

MORKRUM SYSTEM OF PRINTING TELEGRAPHY
BY
R. H. EARLE
ARMOUR INSTITUTE OF TECHNOLOGY
1917

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The Morkrum system of
printing telegraphy

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**THE MORKRUM SYSTEM OF
PRINTING TELEGRAPHY**

A THESIS

PRESENTED BY

RALPH H. EARLE

TO THE
PRESIDENT AND FACULTY
OF

ARMOUR INSTITUTE OF TECHNOLOGY

FOR THE DEGREE OF

BACHELOR OF SCIENCE
IN
ELECTRICAL ENGINEERING

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THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

RECORD.

The object of this thesis
is the composition of a detailed descrip-
tion of the Morkrum System of Printing Te-
legraphy.

Drawings of this thesis were also obtained from
that company.

H.B.R.

27217

THE MORRISON SYSTEM OF PRINTING TELEGRAPHY

• TOEGL

absent and to set up self
-governed federations to administer and to
-set up governments to manage their own affairs.

1958

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

FOREWORD.

The material for this thesis was obtained from the Morkrum Company, although the wording and arrangement is original with the writer. A number of the drawings of this thesis were also obtained from that company.

R.H.E.

THE MORNING AFTER THE TUESDAY NIGHT FESTIVAL

HORSEWOOD.

about all the material for the

-is mostly common, and most beautiful now
-also in the meadows has turned out most
-well out to bed and A. late with last
most beautiful day now about this is said
that common.

R.H.W.

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

Table of Contents

Part I - Introductory

GENERAL	- - - - -	p.3
PRELIMINARY SYSTEM	- - - - -	p.7
SECOND SYSTEM	- - - - -	p.8
THIRD SYSTEM	- - - - -	p.11
FOURTH SYSTEM	- - - - -	p.21
FIFTH SYSTEM	- - - - -	p.25
SIXTH SYSTEM	- - - - -	p.27

Part II - Tape, Code, and Perforator

THE TAPE	- - - - -	p.35
THE CODE	- - - - -	p.37
THE PERFORATOR	- - - - -	p.39
GENERAL LAYOUT	- - - - -	p.42
THE PUNCH PINS	- - - - -	p.42
THE HAMMER	- - - - -	p.47
THE PUNCH LEVERS	- - - - -	p.49
SELECTIVE MECHANISM	- - - - -	p.50
TAPE FEED	- - - - -	p.56

THE MOTION SYSTEM OF PRINTING TERMINALS

Page I - Instructions

Test II - Tag 2 - Code, Code, Code, Code, Code, Code, Code, Code, Code, Code

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

Table of Contents (Cont'd)

BACK SPACER - - - - -	p.58
END-OF-THE-LINE INDICATOR - - - - -	p.60

Part III - The Distribution System

GENERAL - - - - -	p.68
MOTOR - - - - -	p.69
TAPE CONTACTS - - - - -	p.71
TAPE FEED - - - - -	p.73
TRANSMISSION - - - - -	p.78
AUTOMATIC STOP - - - - -	p.79
CUT-OUT - - - - -	p.85
TRANSMITTING DISK - - - - -	p.87
POLE CHANGER RELAYS - - - - -	p.90
RECEIVER DISK - - - - -	p.92
TRANSMISSION SHAFT - - - - -	p.93
SYNCHRONIZER - - - - -	p.94
DISTRIBUTOR CIRCUITS - - - - -	p.104

THE WORKING DRAWING OF PRINTING EQUIPMENT

Type of Computer (cont'd)

BOOK SPACER - - - - -
b.88
END-OF-THE-LINE INDICATOR - - - - -
b.80

Part III - The Interpretation Sheet

GENERAL - - - - -
b.88
MOTOR - - - - -
b.89
CLUTCH CONTROL - - - - -
b.71
PAPER FEED - - - - -
b.48
TRANSFERRING - - - - -
b.49
AUTOMATIC STOP - - - - -
b.49
CUT-OUT - - - - -
b.88
TRANSMITTING DISK - - - - -
b.78
FOUR CHAMFER BELTAS - - - - -
b.90
EDGE CUTTER DISK - - - - -
b.85
TRANSPOSITION SHEET - - - - -
b.93
SYNCHRONIZER - - - - -
b.94
DISTRIBUTOR CIRCUITS - - - - -
b.104

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

Table of Contents (Cont'd)

MOTOR CIRCUIT - - - - -	p.104
TRANSMITTER DISK CIRCUITS - - - - -	p.105
AUTOMATIC STOP CIRCUITS - - - - -	p.110
RECEIVER CIRCUITS - - - - -	p.111
POLAR DUPLEX OPERATION - - - - -	p.114
WHEATSTONE DIFFERENTIAL RELAY - - - - -	p.122

Part IV - The Printer

GENERAL - - - - -	p.134
TYPEWHEEL - - - - -	p.135
PLATEN - - - - -	p.135
TYPEWHEEL MOVEMENTS - - - - -	p.135
CARRIAGE - - - - -	p.137
ROTATOR, STRIKER, AND SHIFT LINKS -	p.146
ROTATOR LINKS - - - - -	p.147
STRIKER LINKS - - - - -	p.153

THE MONTUUM SYSTEM OF PRINTING TRANSPARENCIES

Table of Contents (cont'd)

MOTOR CIRCUIT	-	b.10A
TRANSMITTER DISK CIRCUITS	-	b.10B
AUTOMATIC STOP CIRCUITS	-	b.110
REVERSER CIRCUITS	-	b.111
POLAR DUPLEX OPERATION	-	b.115
MEASUREMENT DIFFERENTIAL RELAY	-	b.118

Table IV - Top Printer

GENERAL	-	b.134
TYPEWRITER	-	b.135
LETTER	-	b.135
TYPEWRITER MOVEMENTS	-	b.135
CARRIAGE	-	b.134
ROTATOR, STRINGER, AND SHIFT LINKS	-	b.146
ROTATION LINKS	-	b.147
STRINGS LINKS	-	b.148

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

Table of Contents (Cont'd)

SHIFT LINKS - - - - -	p.155
SHIFT LOCK - - - - -	p.157
SELECTOR MECHANISM - - - - -	p.159
SELECTOR DISKS - - - - -	p.161
SELECTOR DRUM - - - - -	p.167
ROTATOR LOCK - - - - -	p.170
SPACER AND BACKER - - - - -	p.173
PLATEN AND LINER - - - - -	p.185
PRINTER CIRCUITS - - - - -	p.190
ACTUAL SELECTOR CIRCUITS - - - - -	p.193
LOCK RELAY CIRCUITS - - - - -	p.194
LOCK AND PLATE RELAY CIRCUITS - - - -	p.197
FINAL SELECTOR CIRCUITS - - - - -	p.200
INSTRUMENTS - - - - -	p.209
OPERATING CIRCUITS - - - - -	p.212
ROTATOR CIRCUITS - - - - -	p.214
CENTER LETTER CIRCUIT - - - - -	p.216
SPACER AND STRIKER CIRCUIT - - - - -	p.217

THE MODERN SYSTEM OF PRINTING ELECTRONICS

Type of Computer (cont'd)

SHEET FEED	- - - - -	b.178
SHEET FEED	- - - - -	b.178
SERVO-MOTOR MECHANISM	- - - - -	b.178
SERVO-MOTOR DISKS	- - - - -	b.178
SERVO-MOTOR DRUM	- - - - -	b.178
SERVO-MOTOR DOOR	- - - - -	b.178
SERVO AND BACKUP	- - - - -	b.178
FLATBED AND LINEAR	- - - - -	b.178
PRINTING CIRCUITS	- - - - -	b.179
ACUTAL SERVO-MOTOR CIRCUITS	- - - - -	b.179
LOGIC RELAY CIRCUITS	- - - - -	b.179
LOCK AND FLATE RELAY CIRCUITS	- - - - -	b.179
HIGH SERVO-MOTOR CIRCUITS	- - - - -	b.200
INSTRUMENTS	- - - - -	b.200
ROTATING CIRCUITS	- - - - -	b.212
ROTATOR CIRCUITS	- - - - -	b.214
COUNTER LETTER CIRCUIT	- - - - -	b.214
SFUGER AND STRIKER CIRCUIT	- - - - -	b.214

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

Table of Contents (Cont'd)

PRINTER DISTRIBUTION CIRCUIT	- - -	p.220
OPERATING CIRCUITS	- - - - -	p.223
MAIN BREAK CONTROL	- - - - -	p.223
SPACING CIRCUIT	- - - - -	p.225
BACKING CIRCUIT	- - - - -	p.227
SHIFT CIRCUITS	- - - - -	p.228
RUB-OUT CIRCUIT	- - - - -	p.231
DISTRIBUTION CIRCUIT	- - - - -	p.232

THE WORKING DRAWING OF THE WIRELESS TELEGRAPH

Table of Contents (Cont'd)

DISTRIBUTION CIRCUITS	-	-	b.585
RUB-OUT CIRCUITS	-	-	b.585
CHIPT CIRCUITS	-	-	b.585
MAGNETIC CIRCUITS	-	-	b.584
SUSCENDING CIRCUITS	-	-	b.584
MAIN BREAK CONTROL	-	-	b.585
OPENING CIRCUITS	-	-	b.585
BREAKER DISTRIBUTION CIRCUITS	-	-	b.585

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

Illustrations

Introduction

Figs. 1 - 6

Impulse Diagram

Code, Tape, and Perforator

Figs. 7 - 15

Plates 1 - 2

Distribution System

Figs. 16 - 30

Plates III - VIII

Printer

Figs. 30 - 64

Plates IX - XII.

THE NUMBER OF VARIOUS TYPES WHICH

are described

mentioning

Fig. I - 6

lumber Disease

one, two, any Performer

Fig. 7 - 15

Diseases I - 2

Diseases of system

Fig. 16 - 30

Diseases III - IV

Principle

Fig. 30-36

Diseases II - III.

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

Part I - Introductory.

GENERAL. In the operation of the Morkrum System of Printing Telegraphy, the message to be transmitted is first transcribed onto a perforated paper tape according to a code of perforations. This operation is performed on a keyboard perforator, just as though the message were being typewritten. The tape is then run through an automatic transmitter. This device, termed the transmitting distributor, sends out a series of electrical impulses over the line; the character of these impulses is determined by the perforations in the tape.

At the receiving station, the line impulses enter an automatic receiver, called the receiving distributor. Through the agency of this distributor, the incoming impulses control a series of receiving relays, which relays, in turn, control the action of a printing device. This printer is an automatic type-

Part I

to maitaneoqo eit si .
off , ymmergilest qmimik to mosev's mukifroll eit
bedikkenamt farit si bedikkenamt ed et egeanam
a et ymmergilest qmimik to mosev's mukifroll eit
mukifroll si mosev's mukifroll .
ed ngeordt as tali , ymmergilest qmimik to mosev's mukifroll
si sysz om . mukifroll qmimik to mosev's mukifroll
aet . bedikkenamt qmimik to mosev's mukifroll
, ymmergilest qmimik to mosev's mukifroll , eeiveh
revo seafnqm i lsekruele to seires a jso abnes
si seafnqm eaqst to revesrde eit ; enil eit
. eaqst eit ni amoisterofreeq eit yd hemimreob
eit , muktsta gavivcoer eit th
-liso , reviewer qmimik to revesrde seafnqm eit
-kays eit lsekruele . ymmergilest qmimik to seafnqm
qmimik to seafnqm eit , ymmergilest qmimik to seafnqm
-et , ymmergilest qmimik to seafnqm eit fortne
-takirg e it mottes eit fortne , qmimik to , ymmer
-gilest qmimik to si tetabrg qmimik . eeiveh pmk

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

writer which prints, or typewrites, the message onto a standard message blank.

Printing telegraph systems in general possess distinct advantages over Morse systems, especially on heavy traffic lines. Printing telegraphs do not demand the services of skilled operators, whereas Morse systems are entirely dependent upon such services. This circumstance is becoming more and more important by reason of the growing scarcity of Morse operators and the consequent increase in wages demanded by them. Furthermore, the printing telegraph is able to maintain for the entire day, a speed of transmission somewhat greater than the maximum speed obtainable by manual operation. Consequently, fuller service from the equipment as well as a decrease in operating costs is gained when a printing system is

WITNESSED BY THE WIFE OF THE DECEASED, ELIZABETH MURKIN, LATE

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

substituted for Morse.

Before taking up a detailed study of the Morkrum System of Printing Telegraphy, we must establish the principle upon which the line signals are transmitted. This operation is performed by the machines before referred to as distributors. In order that their operation may be clearly understood, a simple device will be chosen which possesses certain features in common with the distributors. This device will gradually be developed until it finally embodies the main features of the actual distributing apparatus. After this preliminary treatment, we can take up a study of the Morkrum System in its practical form.

PRELIMINARY SYSTEM. Certain of the underlying principles of the Morkrum System of Printing Telegraphy are embodied

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Section 201 of Section 201

Before taking up a
series of lectures on the
subject of the
various forms of
government, it is
desirable to have
a clear
understanding
of what is meant by
the word "state".
A state is
a political
entity
possessing
certain
powers
and
functions
which
are
vested
in
it
by
the
people
of
the
country
and
which
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uses
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country
from
internal
and
external
enemies.

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beibehalten werden kann, ist die
Bedeutung der Wahrheit nicht zu unterschätzen.

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

in the telegraphic scheme of Fig. 1. D and D' are two stationary wooden disks or bases, fitted with bearings at their centers. A shaft, S, runs in these bearings, and at each end of the shaft is mounted a metal brush arm, A. These brush arms are in the same angular positions with respect to the shaft; in other words, they are in line. At its outer end, each arm carries a brush, which trails or wipes over its disk when the shaft is revolved. On each disk, and in the path of the brush, is located a series of five contact buttons, these contacts being similarly placed on each disk. Since the spacing of the arms and contacts on each disk are the same, the two brushes will always make contact with corresponding buttons. For example, if the brush at the left rests on the top contact, 1, the brush on the right will rest on the top contact, 1, at that end of

THE SECRET OF THE MIND TO MIND COMMUNICATION

'G BHS G .I .gII to emedes cimpergelet est at
-fit ,cessd ro maiti meboow ymancitsta owt ers
,thiis A .arefne wiedt te agnised htry bet
to hne hne te hne ,agnised esent at amr ,
A ,mrs maird larem a betnum al thiis est
-ot talwym emra est at ers amra maird eanif
rento ni ;thiis est of toegter htiw amoitis
,hne retuo att JA .enil ni ers yedt ,abtow
seqiw ro afart hne ,dawd a seirres mrs hne
m0 .hovlover al thiis est maw hne est revo
si ,dawd est ro hteq est ni hne ,hne hne
esent ,amottad wessos evit to seires a betzool
,hne hne no bessig ylfralwia gited stetnos
no stetnos hne amra est ro wiosas est esent
hliw sedward owt est ,amra est ers hne hne
amottad ylfralwia gited tewnos -ole avewis
atzer dtel est te maird est ti ,elgmane rof
trift est ro maird est ,I ,jostnes got est no
te hne dukt te ,I ,jostnes got est no teor hliw

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

the shaft.

As for the electrical arrangement, at the transmitting station the contact buttons, 1, 2, 3, 4, and 5, are connected respectively to the keys, K_1 , K_2 , K_3 , K_4 , and K_5 , thence through the battery, B, to ground at G. Therefore, when a key is depressed, the corresponding button will be connected to the battery. At the receiving station, each of the buttons is connected through its own relay to ground at G' .

The operation of the apparatus is as follows: Rotate the shaft, S, by some means in the direction indicated by the arrow. The brushes will then wipe over the buttons in the order 1, 2, 3, 4, 5, 1, 2, --. Therefore, if key K_1 be depressed, the negative side of the battery will be connected to button 1, and while the transmitting brush is

THE WORKING CLASS IN THE 19TH CENTURY

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THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

passing over the button, a circuit will be completed through the shaft, S, contact button 1 on the receiver disk, through the relay R_1 , to ground at G' , and thence to battery, B. The resultant current will operate relay R_1 . Likewise, if any other key or combination of keys be depressed, the corresponding relays will be operated at the receiving end.

One method of carrying on communication with this device would be to arrange a code, assigning a combination of key-depressions (or relay movements) to each desired character or letter of the alphabet. In all, thirty-one combinations might thus be obtained. One complete combination or letter would be sent out for each revolution of the shaft. By depressing a different set of keys for each revolution, we could send out the successive

YTHAKHMINN SHITKIRI NO METAYE MUNAKOM ENO

ed illix tñotio s , nothud oft xevu gñibang
-tud gothas , & , thado ent liggocht betelqos
-er ent hñomit . Kail revisees ent no I not
-ted of soment this , 'D ta hñutg ot , 'L' ta
-estado illix ññekutu qññellatqññ ent this . & , vñet
-mos to yñl resto qññ ta , qññ . ja valer
-suras ent , messures ed yñl to nothud
-vieset ent ja betstego ed illix system gñibang
.

here and

-mos no gñivñres lo boñtem eno
egnarrs ot ed bñnow seiven sint illix nothud
-ññqeb-yñl to nothudmos a gññgass , obos s
betiseb nose ot (etñmemecem valer to) obos
illix al . Tedesqis ent ja valer to xetxendo
, ññkistede ed sint ññgim nothudmos eno-yññist
ed bñnow restaf to nothudmos etelqos eno
, ññkis ent ja nothulover nose tot ññs oñs ññs
ññs tot yñl to ja ññkistede a gññgass ja
avñssosna oñs the ññs oñs , ja nothulover

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

letters of a word or message, and an observer at the receiving end could read off the message by the relay movements.

The system just described is of course impractical because it is necessary to connect the two stations by the shaft, S. Fig. 2, however, illustrates a plan without this defect.

SECOND SYSTEM. In this second scheme, the two brush arms are not on the same shaft, but are rotated in unison by separate driving mechanisms not shown in Fig. 2. The electrical connection between the two points is maintained by the wire marked "Line", which may be an ordinary telegraph line. Hence, we may have the transmission of signals over a considerable distance.

Messages are transmitted in this scheme in exactly the same manner as in

ИЧЕСТВОВАНИЕ ПРИЧИНЫ ВО ВРЕМЯХ МИРНОМ ИНЕ

тревожного и вида, способом то бывало в то стече-
ние ибо бывало было гаивисеев ибо да
затеменем вадар ибо да ага-
и бедливое то же метава ибо
укассаки ибо да сансареаса лацетиум оставо то
и .г.тида ибо да сончата овд ибо техникс от
тюнтия пифа а зетартанли .ревенов .S.гит
.зелеб ибо

БРОДА СИЛН АЛ .ИЧЕСТВО СНОУЗА

брокс ибо то си сирий панти овд ибо ,америк
эфирские ибо позиции ибо беджаки сирий тюп ,г.тида
ибо .S .гит ибо плюса то смилияном гаивисеев
зимою овд ибо погребал погребало лацитеесе
зелеб ,зелеб беджаки ибо ибо беджаки ибо
ибо зелеб .зелеб .зелеб погребал погребало ибо ибо
ибо зело зело зело то мицимаки ибо ибо ван
,зелеб зелеб зелеб
ибо беджаки ибо зело зело
ибо зело зело ибо зело зело ибо зело зело

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

the first case. The two driving mechanisms and the means for keeping the two arms in step of course introduce new features, but it is not necessary to discuss these features at this point.

A great improvement in the scheme of Fig. 2 would be effected if some other means of transmission were used instead of the five keys; these keys are too slow and cumbersome. Consequently, an automatic transmitter has been devised and applied to the system; the new system appears in Fig. 3.

THIRD SYSTEM. In the scheme of Fig. 3, the contacts and vertical contact pins, 1, 2, 3, 4, and 5, have been substituted for the corresponding keys of Fig. 2. These pins are mounted loosely, near their ends, on a common horizontal shaft or fulcrum, and have a lever action, through a small range, about

UNPREDICTABLE CHANGES IN HISTOLOGY MURKIN AND

unpredictable galivinib owt en'. esse tarit edt
ni amie owt owt galivinib tot onces owt bus
ti tuf , betwixt wen combertif easnos 'lo qote
betwixt easnos' eases of yressesen ten et
, tufq alift te
edt ni tneuromorphi tneq A
emos li betoetle ed binon S .glt 'lo emedes
bostent fess etew polastment te ames tedto
bus wola oot ete ayed seels ;ayed evit edt 'lo
-mazt etfemtla ne , ylspnreagd .emostedemo
edt of bellips hna beavied need and tettig
.S .glt 'lo etzenuh ketsava wen owt ;metzura
emedes edt al .MURKIN CHIKA
fetmes fesittor hna atetion edt ,S .glt 'lo
bedutitadme need evnt ,S hna ,4 ,5 ,3 ,1 ,anq
oualt .S .glt 'lo ayed galivinibetrie enj tel
ko , zdes riebt tael ,yfemof betwixt ete ayed
evnt hna ,muroetl to flesa fesitadme nommoz a
chode ,ayed flame z ayedt ,zelios tevel s

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

this shaft. The contact is made at one end of the lever, so that a slight movement of the other end makes or breaks the contact.

The movement of the levers, with the consequent opening and closing of the contacts, is effected by means of a perforated paper tape. This tape is pulled along flatways under the free ends of the pins. At intervals, holes are punched in the tape, and when one of these holes comes under a pin, the end of the pin drops through the hole. This movement of the pin or lever closes the contact; this condition corresponds to a closed key in Fig. 2. The tape must move along at such a speed, that the combinations of contacts, corresponding to the individual letters, are maintained throughout a complete revolution of the brush arm. That is, there is always a definite relation between the speed of the tape and the speed

THE MORNING PRAYER BOOK

To the Lord who is above us let us come with reverence and awe. Let us approach him with humility and contrition, confessing our sins and asking his mercy. Let us offer up our lives to him as a sacrifice, and let us strive to please him by doing his will. Let us pray for the salvation of all souls, especially for the souls of the faithful departed, and let us implore the intercession of the saints for the grace of salvation. Let us also pray for the conversion of sinners, and let us offer up our time and efforts for the service of God and his kingdom. Let us do all this in the spirit of humility, faith, and love, and let us trust in the promises of God, which are true and certain. Amen.

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

of the brush arm. If the tape is punched properly, line impulses corresponding to a message can be sent out.

Furthermore, the rate of transmission can be increased over the rate of the old system by the operator raising the speed of the tape, and at the same time raising the speed of the brusharms in the proper proportion. By these means, any transmission speed is obtainable, ranging from zero to seventy-five or more words per minute.

However, the rapid transmission made possible by the tape control introduces a new and serious problem, viz., the distortion of the line impulse. This distortion is carried to such an extent that inaccurate receiving is the result. This matter of distortion can be better understood, and a solution devised, through a study of a series of current impulses; we will, therefore, now take up such a study.

TRANSLATION OF THE MURKIN STATEMENT

-nægeng bedomning at øget øst til ,men nævnt øst zo
mæ og øgesom er af gribbnuðsemurð meðingar enil ,al
,men ðæs er
-mæri to øtar øst ,stórmæltum

øst to øtar øst kevo hægdeini er næf nafsin
to beeðs erit gribbnuð meðingar enil vd metaya al
beeðs erit gribbnuð enil emas erit te hra ,øgað erit
vd .nægeng bedomning kerða erit al ættaðum erit to
-mælti er beeðs nafsinnumrur ðas ,emaem enid
orm to svit -ytneves of oras meit ydignan ,elds

maissimumit higer erit ,nævnewill
a samborðni forðnes øget øst vd oldibær øbum
moitrotalb erit ,aliv ,moldorq swefnae bæs wen
beittiso er moitrotalb erit .sælumh eril erit to
at gribbnuð etanmælti erit frætke me ñæs er
er næf moitrotalb to ættum erit .fliser erit
dýrard ,dýrard moitrotalb er hra ,boðstæðum rædded
ow ;sælumh ñæsuna to ættum er to ylute e
.yldita er ñæs qu erit wod ,stórmælt ,lltw

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

CURRENT IMPULSES. A series of ideal current impulses is represented in diagram (a). Such impulses occur only under perfect operating conditions. This particular series would be sent out by the transmitter during one revolution of the brush arm, with pins 1, 2, 4, and 5, in the closed contact position, and contact 3 open.

In an analysis of the diagram, assume a certain instant, O , from which to measure time. After a fraction of a second, represented by the length Ot_1 , the transmitter brush strikes button No. 1; since pin contact 1 is connected to the battery and is closed, the button is connected to the battery. Immediately, the line current rises to its full value, I_1 , shown as the distance OI_1 , and it maintains this value throughout the duration of contact. At the instant t_2 , the transmitter brush leaves

THE MUSEUM SYSTEMS TEAM

20 pages A. EDITIONS D'ART

atmosphere of healthy mort. O. instant nature a success
-passenger. Moses is to himself a media emit
newer testament est. 130 nymal est vd he
af I factos nq conta ;f .of notus constit
est ,lesolo at his writing est et betokenes
yfetabimur .yrottsd est et fathmoo si modus
af ,enly 11st est of osiri jasius enly est
emphaticum ti bns ,f 10 verster est ne nwois
factos te seiturb est thonguerit enly elst
several tested testament est ,et instant est dA

THE MORRUM SYSTEM OF PRINTING TELEGRAPHY

the button, and the current immediately falls to zero. This time of contact, represented by t_1-t_2 , is called a marking interval, and during this entire time, an impulse is being sent out over the line.

As for the succeeding periods, t_2-t_3 indicates the time necessary for the brush to go from one button to the next. The space t_3-t_4 stands for the time of brush passage over the second button; it is a marking or pulse interval, since the second pin contact is assumed to be closed and its contact button energized. Next, t_4-t_5 is the intermediate space between the second and third contact buttons.

The next interval, however, is different from any of the preceding ones. During this time, t_5-t_6 , the brush is passing over the third button. It will be remembered that the third pin contact was assumed to be open; hence, the third button is not connected to

УЧАСТНИКИ СОВЕТИВАТО МОГУТ ПРИЧИНОВИТЬ

and the other two were
the first and the last.
The first was a
large white bird,
with a long beak
and a long tail.
The last was a
small black bird,
with a short beak
and a short tail.

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

the battery; therefore, no current or line impulse appears during this interval. This is known as a spacing interval, as opposed to marking interval.

Following this period are the two marking intervals as shown, properly spaced and in every way similar to the first two marking intervals.

A series of impulses such as these is desirable in every respect. The marking and spacing intervals are regular and sharply defined; the current always assumes the same value for each pulse. A properly constructed receiver should respond perfectly to such signals.

However, it is not practical nor even possible to produce such impulses under actual operating conditions. Instead, the series takes the shape indicated in (b). Here, the sharply defined impulses of (a) become wavy, with rounded corners and no

TRANSLATION SECTION TO MATTHEW MUNNIN CHI

out to anyone on credit ; whereas at
this , levvstai sits gatut siboua saluon
besoggo as , levvstai gatonge a an piong si
, levvstai pahow of
the . boiteq sits galvoller
vlyvgeraq , mroa ss elevvstai . gatimam awf oif
tanh oif a valimis yew kroo si haa beosqa
, elevvstai pahimam awf
as nrao zeeingat to seinea !

oh ! . tsedak yewo ah eldatisaq at goot
zefugor ate elevvstai gatonge haa galvoller
-ss gatonge tnektus oif ; benifis vlyvlera haa
-xeleng . leeling nese uoi enoy enoy oif zemus
-teq haaqas haaqas reviveset bretuunman uif
, elongba fore od liftock
inifiora tor aif , revvoller

zefugor lone osioly of eldaser have ton
vlyvlera zefugor osioly of leeling .
(d) ut zefugor erde oif wofit seinea oif
(e) to zefugor benifis vlyvlera oif , erde
oif haa aferton behamot diew , yewon smood

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

definite line between succeeding pulses. The middle or spacing interval is bridged over so that it appears as a weak marking pulse. Or, the pulses may be still further distorted and assume the form of those shown in (c); this latter, in fact, more nearly represents the true form of the working pulses.

As for the causes of this distortion of the impulses, there are two principal ones. The change from the regular impulses shown in (a) to the wavey form shown in (b) is caused by the phenomenon known as current lag. In brief, due to the inductance of the telegraph circuit, the line current does not rise to its full value the instant the circuit is closed by the brush arm contact. Instead, it rises gradually, requiring a very appreciable time to reach its full value. This time of rise for the first impulse is shown as t_1-t_2 in (b). In the same way, the current does

THE MORNING TRINITY

and .as also antecedent was mentioned and estimated
as two hundred and twenty five or thirty
, or more .or
three hundred and fifty five .or
about ;(c) at noon about two and a half hours
and passengers arrived from , just at , noon
.seeing garrison and 'to two and
half hours after noon and
arrived and the event , seeing that it had not been
and railway and road again and .also in
at noon about seven and of (d) at noon about
two and a half hours before and because of (d)
to passengers and of and , found in .as the
seaboard train and the , divers to Mysore and
the and present and early that of said the
-in .forwards his hand and had been at time
-as they a quarter , fifteen years earlier than , he had
said .only last of those of said passenger
as noon at midnight said and not said to omit
such training and , was done and in .(e) at 3-30

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

not fall to zero the instant the transmitting brush leaves a contact button, but, on account of the capacity of the line, requires an appreciable time to do so. This time of fall is shown as t_3-t_4 in (b). Thus, the current does not obey the makes and breaks of the circuit immediately, but is said to lag. When the impulses follow each other rapidly, one does not die away before another begins. The result is that the impulses run together; two marking intervals, separated by a spacing interval, often do this, thereby obliterating the spacing interval.

The saw-tooth form of the wave, as shown in (c), is caused by induction. The neighboring telegraph wires induce small varying currents in the line, so that the resulting current, made up of the induced and working currents, is of the irregular form shown. The induced currents have the

THE WORKING SYSTEM OF BRITISH TERRITORIES

•
-dīkāmēnt erit īmatant eisv oron cō Hīlēt dōm
no ,jnd ,nētīnd testnes s eysel hāvrd grif
sc̄riptor ,emil eri Ko v̄dīosqas erit ko fāmōos
to emit emit .as ob of emit eldāsētqas na
-tive erit ,nāit .(s) nī dī-erit as nōvda si Hīlēt
to sīmēnd b̄ne sōnīm erit yedo tōk seob īmat
·yaf of b̄nes si jnd ,ȳfētēbēmmt tīwētē erit
·ȳfētēt tētōt b̄nē w̄fōt sētīngqas erit yēf
·enīgēd tētōt sētēd yētē erit tōk seob eno
;rēt̄fēgēt nūt sētīngqas erit sētēt si t̄fūsēt em
-sēs s yd bētēsēs ,sēt̄fētēt gātētē erit
-tīdo n̄dētēt ,sētēt ob nētēt ,Lētētēt yaf
·Lētētēt yafētēt erit ḡt̄tēt
erit te mīc̄t dīdōot-w̄c̄t erit
-sēt̄fēt yd bētēs si ,(s) nī nōvda as ,sēt̄fēt
sēt̄fēt sēt̄fēt yd̄tētēt ḡt̄tētēt erit ,nōt
tētēt as ,emil erit nī sēt̄fētēt yafētēt fōm̄
-sēt̄fēt erit te qu ehem ,t̄fētētēt ḡt̄tētēt erit
yafētēt erit te si ,sēt̄fētētēt yafētētēt has be

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

greatest effect during the early growth of the impulse; they may even be large enough to reverse the direction of the line current while the impulse is till very small. When the impulse has grown to a reasonable size, the induced currents are absorbed.

A consideration of the causes of distortion will shown that since current lag and induction increase nearly directly with an increase in length of line, the amount of distortion varies nearly directly with the length of line.

The effect of impulse distortion on accurate receiving of signals is apparent. Not only does confusion result from the bridging over of the spacing intervals, but also from the fact that the receiver lags behind the transmitter. This lag occurs because the receiver does not respond until the impulse has grown to a working

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THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

value. The induced currents do not, as a rule, reach sufficient magnitude to operate the receiving relays; their usual effect is to distort the impulse by destroying the early part, and thereby still further retard the receiver. Since the amount of distortion depends upon the length of line, the longer the line is, the more difficult becomes operation; satisfactory operation cannot be maintained over lines of any practical length.

With the underlying causes of distortion in mind, we are now prepared to take up the solution of the problem. A study of the impulse diagram will show that the question becomes one of causing the impulses to grow to their final working value very rapidly. If the impulses should rise quickly, they would not tend to spread out

THE SECRET OF THE MASTERS OF MIND

s as , son of attorney because all . only
-regarding changing the office hours , isn't
-he know right ; smaller groceries and othe
-r varieties of vegetables and fruits of all kinds
-not like what you can buy at the supermarket . Some
-things are more expensive and harder to find
-in the city than in the country , but there
-are some things that are more expensive in the
-city than in the country .

ANSWER: $\frac{1}{2} \log(1 + \sqrt{5})$

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

so much, so that there would be a sharp dividing line between marking and spacing intervals. Furthermore, the effect of the induced currents would be minimized, since their greatest effect occurs during the early growth of the pulse, which period would be short.

The solution which has given the most satisfaction is what is known as double current operation. In this scheme, there is a marking pulse as before. However, instead of a space interval being indicated by a current pulse of no magnitude, that is, by an absence of current, it is indicated by a current pulse in the opposite direction. For convenience, the spacing pulse is called positive, whereas the marking pulse is called negative. The terms positive and negative merely indicate that the line currents are

УКАЗАНИЯ ОБРАЩЕНИЯ КО МИТОРУ МУЖЧИНОМ СНТ

-иі ордін з ед ғылшын атасы таңы са, мем мә
-ни ғаласқа бар ғылыштың мөңгөндең таңы ғылыш
-ни ейтіп то дөслік ейт ,әсемдіктің .алевіл
сөзі ,басымдағы ед ғылшын атасының ғауш
-тың ейт ғалымаң атасын дөслік жетекші
ғылшын болып жүріп ,есінде ейтіп то діңдердегі
жерде ед

хөвіл сағ ғанаған мөңгөндең ейт

ең ахырында таңындағы мөңгөндең таңы ейт
,әмбесе атасы ні .мөңгөндең таңындағы мөңгөн
жерлердегі ,жекелеген атасын дөслік жетекші
бетекшіндең ішкілікке саға жаңа таңындағы
,ат жады ,жетекшіндең оның жетекшіндең жаңа
таңындағы жетекшіндең ішкілікке саға жетекшіндең
,төңдердің етілеңдегі етіп жаңа таңындағы
бетекшіндең жетекшіндең етіп жаңа таңындағы
бетекшіндең жетекшіндең етіп жаңа таңындағы
,жекелеген атасын дөслік жетекшіндең жетекшіндең
есіндең жетекшіндең етіп жаңа таңындағы

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

opposite directions in the two cases. The use of both marking and spacing impulses of course necessitates some changes in the equipment, but these changes will be taken up a little later.

The reason for the more satisfactory operation of the double current system can be more clearly understood after that explanation of certain principles of current rise in a circuit. It was just shown how, when there is current in a circuit, the current lags or falls to zero gradually when the circuit is opened. If an e.m.f. be applied, opposite in direction to the one which established the current, the current will fall much quicker than it otherwise would. If the e.m.f. be maintained, the current will decrease, pass through zero, and build up in the other direction.

TOMASZEWICZ WOJciech MUSZAKOW Tadeusz

est .seeno est est ni molicerib etisougo
 nesfuerat gutesza bna gudziam klof te
 est ni uemalo emos zetatisassem estwos ko
 neder od liliw negrario seenit tnd ,tneqimpo
 .trotel esttli s qu
 -na stow est rok posset est
 tneqimpo ofdwoj est te noitatem vredestait
 tefis hocstareham qfisels stow od nsc metuya
 To sefionirq nistres te noitansiqe jant
 nwojsa test saw ti .tiserte s ni esit tneqimpo
 est ,tiserte s ni tneqimpo si eredt nedw ,now
 nedw qfiselsby orcs of alif te ezel tneqimpo
 -qa ed .tneqimpo na ti .benego si tiserte end
 nedw ems est of molicerib ni etisougo ,benly
 liliw dnowine est ,tneqimpo est bedalldatese
 liliw satwesdo jk nedt velding nowm lisi
 liliw tneqimpo est ,benisztrem od .t.w.s est ti
 ni qu liliw bna ,otem nijonit rasi ,eszetoet
 .molicerib redjo end

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

to illustrate the application of this principle to our own problem, consider the same impulse series as was used in the previous discussion, except with both marking and spacing pulses. The intervals of this series are marking, marking, spacing, marking, marking, or, in terms of current direction, negative, negative, positive, negative, negative. This series is pictured in (d).

An observation of diagram (d) shows that the two negative or marking pulses which come first are the same as in diagram (c). But at the beginning of the third or spacing interval, a positive e.m.f. is applied, which action causes the line current to fall almost instantly to zero and start to rise in the positive direction. Likewise, at the beginning of the fourth interval, which is marking, the line current quickly reverses and builds up in the negative direction. The last

УЧЕБНОЕ ПОСОБИЕ ПО МАТЕМАТИКЕ ДЛЯ

-wne sinit to nofeselfor est eftersuiff of
ewen and rebianto welford wno tho of elake
swolveryng est n̄t been saw as before enlougi-
-esque hys gyllyng d̄tis t̄gescle , nofesewchē
as before sitt to elevretai est , espilng bat
, swolveryng , swolveryng , swolveryng , swolveryng
, swolveryng , nofesewchē therus to amst n̄t , to
, swolveryng , swolveryng , swolveryng , swolveryng
,(b) n̄t berystole et sevres

(b) mægseth to heldasvreado nu
sealur galdrum to sviltingen owl est talið að með
mægseth til en emur est ein farið emur doldur
to hrafn est to gáinuðig est ða tvis .(c)
Sætisq; st .T.m.e sviltnor s ,Isvarðar galdrum
Mist of theimur enill est seinnar heldur
at eitt af frumr baa erar of ylfinnemi framle-
-nd est ða ,saiwendil .notðorligr sviltnor enill
-dumur at heldur ,Isvarðar frumur enill to gáinuðig
baa seinnar ylfinnir dnefni enill est ,pri-
-tefi enill .notðorligr sviltnor enill ni q; skildur

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

two intervals are marking, similar to the first two.

A further observation of the diagram shows that the marking and spacing pulses are clearly defined. Furthermore, the pulses are at high values throughout nearly all of their existence, so that the induced currents from other lines are soon absorbed. Thus, the problem of producing definite pulses, little affected by induced currents, is apparently solved.

FOURTH SYSTEM. The application of the principle of double current operation to the telegraphic system which was developed earlier in this discussion appears in Fig. 4. However, before the system as a whole is explained, two new pieces of apparatus should be described.

The first of the new devices

ЧИТАЙТЕ ФИНАНСЫ ОНЛАЙН В СЕТИ THE

од таихъ патріархъ єзуїтів що
єдні заснували Академію

gatiesq; bns ynhix; eñt tñst sweda morgais
eñt ,etmrefttnt .bonites vñtaclo eñt secula
vñtaclo ñsognomit seafey right te era asalua
ñsobhni eñt tñst os ,cometeixe viest te lls
,ledacese nosa era assif testo mori etnemis
,seafuy etmifteb yñtaclo te melderq; eñt ,sunt
-q; at ,etnemis seobhat vd betoettec elstif

coffee salt water

-tego t' merns sidsob to olqeninq est to noit
-ob saw hohim mohaua olnqazgelet est od noitt
nt etasqqa mofasasib estit xl taliha neqdele
elodw x za mohaua est eroted ,tovewoh .
-ghe
antazqqa to asseiq wen owt ,bemisqqa si
bedtreash ed ilmoch
sculves wen est to taunt owt

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

is a relay pole changer. This is an ordinary relay equipped with both front and back contacts. When the relay coil is not energized, the armature remains against the back contact, but when the coil is energized, the armature is drawn forward against the front contact.

The other new device is a polarized relay. This relay has an armature which plays between two contacts, but has no retractile spring. When the coils of the relay carry current in one direction, the armature takes position against one contact. If the coil current is reversed, the armature goes over to the other contact. Since there is no retractile spring, when there is no current in the coils, the armature remains against whichever contact it happens to be.

With this understanding of these new instruments, we can take up an ex-

ВЛИЯНИЕ АДМИНИСТРАТИВНОГО УЧРЕЖДЕНИЯ НА ПРОЦЕССЫ РАЗВИТИЯ МАЛОГО БИЗНЕСА

влияние на малый бизнес оказывает не только налоговая система, но и органы государственного управления, кредитные учреждения, а также различные социальные институты. Важно отметить, что влияние государства на малый бизнес неоднозначное и неоднократное. Оно может быть положительным и отрицательным. Положительное влияние государства на малый бизнес выражается в предоставлении поддержки, стимулировании инноваций, создании благоприятных условий для его функционирования. Отрицательное влияние государства на малый бизнес выражается в ограничении его деятельности, наложении различных ограничений, введение различных нормативных актов, которые затрудняют его деятельность. Важно отметить, что влияние государства на малый бизнес неоднозначное и неоднократное. Оно может быть положительным и отрицательным. Положительное влияние государства на малый бизнес выражается в предоставлении поддержки, стимулировании инноваций, создании благоприятных условий для его функционирования. Отрицательное влияние государства на малый бизнес выражается в ограничении его деятельности, наложении различных ограничений, введение различных нормативных актов, которые затрудняют его деятельность.

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

planation of the new scheme. As in the preceding system, there are the tape contacts. These contacts do not, in this case, control the line impulses directly, but do so through five of the relay pole changers just described, one pole changer being provided for each of the five tape contacts. Each set of relay coils is connected to the local battery by means of its own tape contact, so that when the contact is open, the relay is not energized and the armature remains against the back point; when the tape contact is closed, the relay is energized so that the armature is drawn over to the front point. The current path from the back point of the relay pole changer is to the negative side of the marking battery and through the battery to ground. The front contact is connected to the positive side of the spacing battery, the negative side

THE HISTORY OF THE ENGLISH KINGDOM

-wylf eft at al .mones wer eft to wilemanly
 .wifelincos eft at era eredt ,wifewa giffec
 ferfage ,eare chifit at ,tor ob etfetice eft
 kyndit os ob and ,wifewitb sealungit enil eft
 -diseasē tawt etfetice eft waler eft to evit
 nose tot heilwyrq giffed tegnus eft one ,la
 waler to see nosē .etfetice eft at evit eft to
 wifetted lassit at heilwyrq al effor
 nely tawt os ,testnes eft two cri to amon
 -trede tor al waler eft ,nigo al fofnes eft
 eft tenisse arismer suntwys eft hys heil
 heilie al wifewo erat eft nowt ;twyng heil
 stundus eft tawt os heilwyrq al waler mid
 thernus eft .twyng dawt eft of revo purw al
 eft waler eft to twyng heil eft nowt kifte
 -dawt to abbe svitager eft of al tegnus
 .hawys al wifetted os kyndit hys wifetted gan
 evitius eft of heilwyrq al wifewo thorn eft
 abbe svitager eft ,wifetted giffys eft to abbe

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

of which goes to ground. The armature is connected to one contact button of the transmitting disk. The revolving brush arm is connected to the line.

A consideration of the transmitter circuit shows that with a tape contact open, a negative or marking line impulse is sent out, and with a tape contact closed, a positive or spacing impulse is sent out. Thus, the tape contacts control the character of the line impulses.

At the receiving station, the line is connected through the operating coils of a polarized relay to ground. Therefore, a positive current pulse throws the armature to one side or point, whereas a negative pulse throws the armature to the other point. One point is dead, the other point is connected to one side of the local battery, and the ar-

WILHELMUS SMITHUS SC. MATHYS MUNIFICENTIS

-moi si emisera off . Banca or soon richin lo
-timament off le morted festnes uno et horizon
-festnes et mea deuid gavilover off . Neis quid
off est et be
-nient off to possedisse A
festnes eas a dñi w. tñit swa thomis mettis
et ealiqui emi gaviles to evitare a , nece
s , besofo festnes eas a dñi w. lna , two thos
, amit . the thos si ealiqui gaviles to evitare
to retentio off leitnes atestnes eas off
ealiqui emi off
off , multata gaviles off si
elio gavilares off myndis festnes et emi
s , exordiat . Banca or raler beuinaeq; a lo
et oritatis off sworit ealiqui gaviles evitare
ealiqui evitare a easdew , tñiq; ro cõta uno
em . Elies redjo off oritatis off sworit
festnes et tñiq; resto off , best si elies
-re off lna , exattas faci off ro cõta uno et

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

armature is connected to the receiver brush arm. The receiver relays are connected between their respective control buttons and the free side of the local battery.

As for the operation of the receiving apparatus, suppose a spacing or positive line impulse appears. The armature of the polarized relay goes to its dead contact, so that no local relay is affected. Suppose a negative or marking interval next appears. The armature of the polarized relay goes over to the opposite point, which is connected to the battery. The local relay is energized, and indicates a signal. Thus, in this system, the local receiving relays respond only to the marking intervals, just as was the case in the former system.

FIFTH SYSTEM. Fig. 5 shows a still further development of the system. This

УКАЗАНИЕ РЕДАКЦИИ № 107673 МОСКОВСКАЯ ОБЛ.

•. was found necessary for the protection of the system
which mounted between the two cylinder sections and
able early for the erection of the various structures
•. required less effort to

and to another who will not be
-ed to practice a specific, narrow and exclusive
to certain and specific technical and scientific
professions and of whose value neither teacher nor
a teacher. Teachers as well as those in such as
eff. whereas they have learned to cultivate
of their own value neither teacher nor
-ed to practice a narrow, strict and exclusive
-ed to teach, because of their lack of
-ed to teach and to practice a narrow and exclusive
and to those who are not
. teachers are
.

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

scheme is the same as that of Fig. 4, except that the line signals are sent out by a main-line pole changer, controlled by the relay pole changers, instead of being sent out by the relay pole changers themselves. This main line pole changer is merely a polarized relay with its operating coils connected to the battery through the relay pole changer contacts, its armature connected to the line, and its two points connected respectively to the spacing and marking batteries. The other sides of the batteries are grounded. The operation of the system is apparent from the diagram.

This system possesses two advantages over the former one. The first is that the number of contacts in the main line circuit is reduced to one, viz., the one at the main line polechanger. Under adverse conditions of operation, this feature is of no

YERIADONT CHICHITU GO MECYU LUNISIM LII

sqasne ,b .mif te dant ca sene ent si emedes
-nism s yd tho tuo ore slampia enti ent dedu
valer ent yd bellartnos ,tagnefo eloq enti
thi tuo dars grifed To buejor ,stegnaf eloq
khan alif .sevleasant ar-gnaf eloq valer ent
valer bonkafloq a ylkom at torpado eloq enti
-ted ent os bateemnos elice galatogo ent dñis
,adonias regnaf eloq valer ent agnafit ywec
ent bns ,enil ent et bateemnos stathis ent
-saga ent os ylevitcaper bateemnos stathis ent
to sebis reito ent .scirrestos gulfan bns pmf
to ncitatoq ent .beynortz ore scirrestos ent
.mrigib ent mori thmerappe ob metava ent
-ba owl sessacong metava ent
si taxif ent .ono remot ent revo negejmen
enil niam ent ni stethnos to redava ent tant
ta smo ent ,.miv ,smo ot buejor at dinore
-mos ceterubc reku ,regnafeloy enil niam ent
on to et etnash ent ,ncitatoq to anelites

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

little importance.

The other improvement appears when a number of marking or of spacing intervals are transmitted in succession. The main-line-pole-changer armature retains the same position throughout the series; hence, the line current is maintained constant at its full value throughout the series. Current lag therefore does not occur except when successive impulses are of different signs.

SIXTH SYSTEM. The final development of the system is shown in Fig. 6. The scheme of Fig. 6 is the same as that of Fig. 5 except for two changes in the receiving apparatus. These changes still further decrease the possibilities of wrong interpretation of the incoming impulses by the receiving apparatus.

The first change is the fact

УЧИТЕЛЬСТВО ОБЩЕСТВА ВО ВРЕМЯ МИРОВОЙ ВОЙНЫ

Семинарский листок

предлагает вниманию читателей следующие темы для обсуждения:

- тема: «Педагогика в военное время»;
- тема: «Педагогика в мирное время»;
- тема: «Педагогика в военное время и педагогика в мирное время»;
- тема: «Педагогика в военное время и педагогика в мирное время».

Все темы предлагаются для обсуждения на семинаре, который состоится 15 октября 1941 года в зале № 100 Дома профсоюзов г. Краснодара. Участники семинара должны быть представителями различных профессий, включая учителей, преподавателей высших учебных заведений, научных работников, инженеров, техников, врачей, а также представителей других профессий, связанных с военным производством.

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

that the receiving polarized relay does not control the five simple relays directly, but instead, controls an exactly similar polarized relay, which, in turn, controls the five simple relays. This working is plain from Fig. 6.

The second change is shown schematically. It consists of an adjustment by which the receiver disk can be moved forward in the direction of rotation of the brush arm, or can be retarded against the direction of rotation of the brush arm. The total angle through which the disk may be turned is perhaps forty degrees.

The reason for this modification may best be studied from Diagram (e). This diagram is the same as (d) as far as the wave form of the impulse is concerned. It will be noticed from the diagrams that the

YHIAESEHTU SUTTMIER TO MECHE MUNITION KHM

tom seob yaler heftreloq yulvicoar ed tadt
 fyd ,yfcoerih yaler elgmic evit edt formos
 -raloq y alimic ylfare ne alorinoe ,baerant
 evit edt alorinoe ,mut ni ,dohw ,yaler bok
 gok nifly si githrow edt .yaler elgmic

swodt at egndo baces edt
 yremantibz na to stefanoe dI .yffcoekzmedis
 -noi devon ed mso riefb revicer edt hoikw vd
 edt to mofator to moforib edt ni luer
 edt tamige hebrister ed mso to ,mso haurd
 edt ,mso haurd edt to mofator to moforib
 ed mso riefb edt hoikw rigordt elgmc .lutor
 .asemph yjrot asenq at fernt
 -flibos zidz tol doaser edt
 .(e) scriptt wort heibuts ed faed yun mofino
 as ist ce (b) as eme edt at mupath atdI
 .burrerence at emupat edt to mof emuw edt
 edt jadt emupat edt mof heibut ed flim dI

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

impulses are quite jagged and irregular. The irregularities may produce a slight fluttering of the armature of the receiving polarized relay, especially near the transition period between positive and negative pulses. This fluttering is not of sufficient magnitude to throw the armature from one point to the other, but it is great enough to produce a poor contact. Such a contact would not be desirable in the circuit of the simple relays.

A remedy for the uncertain contact in the circuit of the five relays is provided when the second polarized relay is added to the scheme of Fig. 5. This relay does not change its position unless the main line relay first changes; any fluctuation of the armature of the main line relay less than a complete movement from one point to

THE MODERN SYSTEM OF ESTIMATING ENGINEERING WORK

aff . xalixgerit has degat etiur era aequimut
-tettuff trilis a sensibq qm sefttrefusgetti
-usq envilesct est to emtura est to qd
metiamet est tcm qffisesees . valer best
. nebul evitgeot has evitgeot pecteek foitreg
-luzem tneitfiss to you si qnirettuff qid
of tñiqoq eno mofc emtura est wort of elat
sensibq of Nymone tñera si si and , resto est
ed tom blisow fentaco a horf . festue rooq a
-er elemia est to timovio est mi eldariseb

niжненім є їх відмінна A
є системи звіт є їх тимчасові є їх якості
є залога діяльності є їх новий поведінческий
залишок є їх . є . є їх є залога є їх залога
є їх є їх залога є їх залога є їх залога є їх
залишок є їх залога є їх залога є їх залога є їх
залишок є їх залога є їх залога є їх залога є їх

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

the other does not affect the second relay. The armature of the second relay possesses sufficient residual magnetism so that the contact is kept firm. Hence, any flutterings of the main-line-relay armature do not affect the local relays.

The impulses in the local circuit, with the plan just described, are shown by the rectangular full-line pulses in (e). The transmitted pulses are shown dotted. It will be noticed that the received pulses are fair reconstructions of the transmitted pulses, but occur at a slightly later time because of current lag.

The second change in the system, viz., the angular adjustment of the receiver disk, allows the middle, or fullest portion of the pulse to be utilized. This fact may be understood by a reference to (e).

YESTERDAY'S OUTLINE TO ATTEND MORNING CLASS

.yester brooks est teachin ton book vedio est
accessed yester brooks est to continue est
est part of mattemam laubieser theatrinus
anniversary yrs ,senior .urif ton si teachos
-is ton of continue yester-enf-giam oj to
.yester Iscol est took
Iscol est si sealnum est
ers ,bedroomest test help est did ,dhuotic
sealing emhi-lit talimatoor est vd rwois
-job rwois ers sealing hettimantj est .(e) at
havieser est tmid lockton ed llkw tl .het
-ment est to anobenttemoer rie's ers sealing
rwois principle oj the rwois and ,sealing
.est dhoert to succeed erit
-aya est at egrolo brooks est
-er est to jasonton talibas est ,.civ .not
sealish no ,elbim est swell ,.elb revies
est .sealish est eslnq est le noibton
.e) est sonerstan oj footstooln ed van tonl

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

This diagram shows the pulses, and also shows the buttons of the receiver disk developed, or rolled out, just below. The buttons are drawn in to such a scale that the diameter of each button represents the time of brush-passage over that button, and the distance between buttons represents the time required by the brush to pass from one button to the next. The buttons are small compared to the pulses, and that portion of the pulse lying directly above each button is the only portion utilized; the remainder of the pulse occurs while the brush is between buttons. By sliding the entire row of buttons along under the row of impulses, we can make any button receive any part of the impulse series.

This condition can be actually duplicated in practice by the revolution of the the disk upon which the buttons are mounted. However, in practice it is never desired

WELFARE STATE GOES TO THE MAXIMUM

-sing oft wile margeib aint
 -viser oft te smotnd oft avors ola bns , se
 .waled fant , the beffer to , beqoleven dat' na
 fest clea s hse of n i wtert oft smotnd off
 emit oft atmesteret hotted nose to telemis oft
 -cif oft bns , hotted fant nowo excessu-haudt to
 -er emit oft atmesteret smotnd neyted emit
 hotted emt moth easq of narrd oft yd berius
 of herapme flame oft smotnd off .then oft ot
 -yl sing oft te hotted fant bns , sing oft
 ylne oft ci hotted nose evols vltorib yar
 saling oft te telemis oft ;bokflis mottig
 zt .smotnd neyted of narrd oft eldn avrooc
 zebn gmcz smotnd to war exime oft yaribla
 hotted ym enem yao ew , saling oft to war oft
 .series saling oft to jng yao viscer
 vllentes ed has mottigme aint

to mottigvor oft yl saling oft hottedig
 -dowm oft smotnd oft holtw yao yeli oft oft
 berizel tewen si ti saling of , reviewoh .ba

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

that an impulse be received on any but its own button. Hence, the angle through which the disk turns is only sufficient as to allow each button to receive any part of its own impulse, with a little added leeway in both directions of rotation.

The results of such an adjustment of the disk are two in number. The first is that the disk can be adjusted so as to admit only the peaks of the impulses. Hence, with the aid of the two relays on the line side of the disk, greatly distorted impulses can be correctly interpreted. The second result is that on long lines, where the current lag may produce quite a lag of received pulses behind the transmitted pulses, the receiver disk can be rotated backward until the brush-and-button contact occurs at the same time as the reception of the pulse.

THIS SIGHT PERTAINS TO THE 1000TH POSITION SET.

act and was no deviator of salary in fact
debt account signs off ,compl .notified two
-is or as misleading who is same fair and
act to bring you evidence of mailing memo well
as viewed before sitting a time ,cannot two
.notifier to accept this need
-is no news to discuss off
act .medium not out one mail add to themselves
as best can be done with add tent of fact
.mislead this to miss out who time or as
act no cycles out off to his off right ,compl
-is bottomable witness ,mail off to able emf
-es off .betrayer will never be no using
act even ,send prof no tent at finger knos
-er to get a time working you get them into
,second bottommost off further assing devies
-is informed before off was note review off
to whose tent no notis-his-best off fit
.below off to notis-pon off as emit come off

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

Another way of looking at the condition is that the two brush arms are revolving at exactly the same speed, but the receiving arm stays a little behind the transmitting arm, the distance behind depending upon the current lag.

This last described system constitutes the Morkrum System of Printing Telegraphy reduced to its simplest form. The scheme includes the essential features of the Morkrum distributors. (These are so called because they take the five character elements of position, which are found on the tape, distribute them as impulses or elements of time, and then, at the receiving station, re-transform the elements back into those of position, that is, relay positions.) This distributing apparatus, together with the tape perforator and automatic printer, makes up the commercial Morkrum System.

YOGA-CHAKRA THERAPY FOR MASTERY OF MIND AND

ai nacitimes enz ja gaivdoel te wsw redigat
-te ja gaivleven ons doar hawid owt foal
mia privatesc sit bud , Roog emas enz videt
, ons walt. frankat owt hawid elctif s egate
-twe enz noek guibmegek hawid constak owt
mef trouw

metava beditresib tael aint
gultint to metava curritom est setutititeno
est .errof tzelqnia est of beaufor univergolef
est to perntasf laitnese est sebuleni emerio
hollis os era esenf) .stotudititib zwitrol
etkomele testestano evlit est eset west esunod
,eset est no hancet era hanc ,noititay to
to etkomele to sealngat es west etkdititib
-er ,noititay givleser est ts ,dect huc ,emt
-og to esorit ethi hood etkomele est motemont
-sib aint (.nacitineq valer ,et tent ,noititay
eset est atku vndegot ,vnterquas qntitit
qu eset ,vcking eltemoira huc rofsvitreq
,esetavc zwitrol laitnemos est

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

With this preliminary survey of the plan, we are ready to take up a detailed description of the commercial system. There are a number of different types, differing in the minor details, but the one described in the following pages is the one commonly used on commercial duplex telegraph lines.

УЧЕБНОЕ ПОСОБИЕ ПО КОМПЬЮТЕРНОМУ МАСТЕРСТВУ

Journal of Health Politics, Policy and Law

-ео си ежт от тхет си си ,којт ейт то
.истема Ізистемис ейт то поглавицех белис
-ти ,загуј єнорицк то хедни си си си
-ео си си си ,загасеоки ейт ни пакиел
си ейт си зеки земицел ейт ни бедрес
пакиел зеки Ізистемис то зеки пакиел

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

Part II - Tape, Code, and Perforator.

THE TAPE. As was said before, the message to be transmitted by the Morkrum System of Printing Telegraphy is first punched onto a paper tape, the number and arrangement of punched holes depending upon the letter or character which the holes represent. Samples of the tape are shown below.

<i>SHIFT</i>	<i>NORMAL</i>	A	C	Z	8	9	H	M	?	9	!	#	7	U	W	Y	<i>CARRET.</i>	<i>LINE</i>	<i>SPACE</i>
5																			
4																			
3																			
2																			
1																			
<i>SHIFT</i>	<i>NORMAL</i>	@	B	D	F	H	J	L	N	P	R	T	S	V	X	Z	<i>SHIFT</i>	<i>Reg-out</i>	

The holes for any one letter or character are arranged in a row across the tape, with the proper blank or unpunched spac-

WILHELMUS WITTEVEEN NO. 141702 HUNTERSON LINE
WITTEVEEN WILHELMUS NO. 141702 HUNTERSON LINE

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

es between holes. The rows are separated a distance of about one-tenth of an inch, this being sufficient to produce clear distinction between successive letters. Notice that the rows of holes are not exactly perpendicular to the length of the tape, but that they slant backward a little. The reason for this slant will be explained in connection with the transmitting distributor.

Besides the holes used in combinations to represent letters, a continuous row of holes runs the full length of the prepared or punched tape. These holes are used in feeding the tape through the apparatus. The teeth of a small spur wheel engage the holes, so that the tape is drawn along as the wheel revolves. This system of feeding affords a positive and definite tape movement; the tape cannot slip without the

INTERVIEW WITH THE WITNESS IN JUNCTION WITH

a disturbance over the oil . selected members of
the , home to the United States made to constitute
representative while members of the militia joined
and took control . arrested suspicious persons
and requested visitors from the village to stand
back until they had , agreed with the rugged men of
the town necessary oil . selected a broad-based
firm molecules of benzene oil like shale
, notwithstanding circumstances of
oil being selected and selected
, was a , selected number of individuals
selected first oil which selected to were selected
selected second . each selected being
-ing oil majority each oil selected at least one
-the leading type flame is to street oil . selected
-e invited oil each oil tank or , selected oil supply
to medays staff . service men been oil as you
can't estimate the evidence a selected public
oil function while known that oil ; however

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

feed holes being torn out. If such trouble occurs, it is at once noticed by the operator and can be remedied.

THE CODE. The perforations follow the plan of the five-unit code, which is given on the sample of tape, p.35. This is called a five-unit code because for each letter or character, there is a total of five intervals, either holes or blanks; "blank" is used for want of a better term, and denotes every location where no hole is punched. The intervals or elements are numbered for reference 1, 2, 3, 4, and 5, across the tape. The five elements allow of thirty-one combinations; hence, thirty-one characters are available. By the use of a shift, similar to a typewriter shift, thirty-one new meanings may be assigned to the combinations, so that a total of sixty-two characters or signals are available.

INTERVIEW OUTLINE TO MELISSA HUNTER AND

Edmund Davis '11 . Two week period ended back
-stepped out w/ Senator soon to sit in , witness
, testimony of his own that
T smothered out . 2000 men
dohly , who then evilt out to help out w/ follow
suit . 22.0 , east to Olympia out no moving at
these tot caused who then evilt a believe at
evilt to last a at credit , who then out to tell
, "Himself" ; himself to before reading , claimed
actions his , first noted a to know tot been at
out . Beginning of story on story nothing prove
-other tot believed out statement to believe out
out . east out actions , & this , A , B , C , D come
; accusations one-trait to wells statement evilt
, selfless out statement one-trait , second
writtenway a of selfless , this a to ear out w/
beginning of you opinion was one-trait , this
-the to last a test as , accusations out of
, selfless are claims to statement one-trait

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

Besides the actual characters which are to be transmitted and printed at the receiving station, the code also includes several operating signals, which govern certain functions of the printer aside from its regular printing movements. These signals are: space, carriage return, lining, shift, and rub-cut. The space signal causes a space to be left between successive words of the printed message. The carriage return is used when a new printed line is to be started. The lining signal causes the printer to turn up a new line, just as is done in the operation of a typewriter. The shift signal causes shift characters to be printed instead of the normal characters; the printing of the normal characters is restored by the space or the carriage return signal. The rub-cut is used

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

when a mistake has been made in perforating the tape. The tape is run through the perforator again, and the erroneous letters are punched out. Note that the rub-out combination of holes is the only one comprising all five intervals; hence, any other character contains fewer holes, and can be punched out. When the printer receives the rub-out signal, it remains inoperative or "marks time" until a different signal is received; the printer then performs its usual functions, just as it did before the rub-out signal was received.

THE PERFORATOR. The tape is punched by means of a keyboard perforator. The general performance of the machine is as follows: The actual punching of the tape is done by a row of six pin punches which face a die; the tape passes between the punches and the die. Five of the punches are for the five

YOUNGSTOWN STEELWORKERS GO ON STRIKE AGAINST U.S.I.

edit ; anisotropy of shear wave speed and estimate a density
dependence of viscosity and its shear rate effect. The
density and shear modulus are assumed to be , which
leads to following two-dim effect term as follows . the
; elevation effect is due to the effect of the vertical shear effect
and shear wave anisotropy interaction ratio which is given by ,
-or referring to the density and viscosity of the medium
-shear modulus anisotropy if , length two-dim effect written
length times which is often "unit value" to avoid
-on and converted shear ratio effect ; Reviser is
-dim and rotated coordinate as the , anisotropic law
, reviser now length two
as shear effect .

the following day he was up at 5 am to attend a meeting at the Bonnefond Hotel in downtown Laramie. The meeting was to discuss the proposed construction of a bridge across the South Platte River at the mouth of the Laramie River. The bridge would be built by the state of Wyoming and would be used for both rail and road traffic. The meeting was held at the Bonnefond Hotel, which was located on the corner of Main Street and Second Avenue. The hotel was owned by John Bonnefond, a local businessman. The meeting was attended by several local officials, including the mayor of Laramie, the county commissioners, and the state engineer. The purpose of the meeting was to discuss the proposed bridge and its impact on the local economy. The meeting was adjourned after several hours of discussion.

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

code holes, whereas the sixth is for the feed holes. An electro-magnetic hammer forces the punches through the tape; on the back or return stroke of the hammer, the tape is advanced one feed hole, so that a fresh section is ready to receive the next series of perforations. Different combinations of holes are selected for the different characters by a selective mechanism worked from the keyboard. This mechanism operates as follows: Between the hammer-head and the punch pins exists a small clearance, in and out of which five rods or punch levers slide independently. One punch lever is provided for each of the five code punches, but none is provided for the feed punch. When certain holes are to be punched, the corresponding punch levers are left between the hammer head and punches, filling up the clearance. On the forward stroke

THEATRE OF CHIVALRY IN THE WORKS OF CHAUCER

and not at dñeis est eschede ,salon obes
-and ressed altemys-exceste mi .asled heil
hous and no ;best and ryghte sedany est as
si exai est ,resmed est to efforte crudel to
-nes knyf a knyf on .elid heil and brenthe
to seires swen onit eviles or ynes of hys
zelod to enclersidnes furelly .and farray
yd streteynle knyfes est tot herbeses ons
-ver est morf behrow matnifeest eviles
:swelloz as seyloroyd matnifeest alid .ynay
onyg mony est lye bnes-champanys est mony
deidz to tuo lye mi ,comynge illys a staine
-tmeynedebut estis strevel mony to yns evit
to lye tot behrovoy si strevel mony est .yl
behrovoy si emoy thy ,comynq oys oys evit
one yole knyfes lye .mony boote est tot
strevel mony ymbyngaycros est ,behrovay ed es
,comynq lye bnes tennys est newies fylle ons
efforts brengay ed mi .comynge est on grifflz

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

of the hammer, the pins are pushed through the paper. If a hole is not to be punched, the punch lever corresponding to that hole is withdrawn from the clearance between the hammer and punches; then, on the forward stroke, the hammer enters the clearance, but not far enough to strike the pin. Hence, no hole is punched by that particular pin. The feed holes are always punched; the selective mechanism has no control over the pin which punches the feed holes. The rods or punch levers are controlled through a series of levers from a keyboard, similar to that of an ordinary typewriter. The keyboard also automatically controls the electro-magnetic hammer.

With the idea of the general functions of the perforator in mind, we can now take up a discussion of the machine in its

<http://www.industrydocuments.ucsf.edu/docs/lnqz0001>

Highway before and after edit ,second edit no
,bedding ed of top of slope & fill :topping edit
also test of surface various reveal cutting edit
edit newsted concrete edit most instability at
breakout edit no ,add :bedding has turned
concrete edit create removal edit ,deterioration
,cement .six edit objects of damage top top and
,any reflective; don't usf bedding at slope or
-slope edit ;bedding reveals are before best edit
and edit review license on and machines edit
to show edit .sealed best edit roadway debris
carries a deposit ballastree edit gravel debris
edit of traffic ,brocked a drift gravel to
carts brought edit .waterways practice as no
obstruction-traffic edit for this will continue

Letters sent to each other

... and at the same time it is necessary to make sure that the evidence adduced is sufficient to establish a fact which is relevant to the question.

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

practical form. In this entire discussion, rough sketches will be used to show the general construction of the parts, but these sketches are not intended to represent the apparatus in detail; the accompanying photographs of the machine show the details of construction.

GENERAL LAYOUT. The perforator consists of a hollow cast iron base, on the top of which are located the hammer and punch mechanisms and the tape reel. The keyboard overhangs the front of the base. Some of the connecting levers between the keyboard and punch pins are inside the base, whereas some are on top. Fig. 7 shows a top view of the perforator; the different parts are identified in the sketch.

THE PUNCH PINS. At the lower left-hand corner of the base are the punch

INTRODUCTION TO THE STUDY OF HEBREW

which consists of the first part of the history of the people of God, and which is divided into three main parts, the first of which is the history of the patriarchs, the second of the judges, and the third of the kings. The first part of the history of the patriarchs is the history of Abraham, Isaac, and Jacob, and their descendants; the second part is the history of the twelve tribes of Israel, and the third part is the history of the kingdom of Judah and the kingdom of Israel.

THE HISTORY OF THE PUPILS

The history of the pupils is the history of the twelve tribes of Israel, and it is divided into three main parts, the first of which is the history of the twelve tribes of Israel, the second of which is the history of the twelve tribes of Israel, and the third of which is the history of the twelve tribes of Israel. The first part of the history of the twelve tribes of Israel is the history of the twelve tribes of Israel, the second part is the history of the twelve tribes of Israel, and the third part is the history of the twelve tribes of Israel.

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

pins and die. The punches are of steel, about one-tenth inch in diameter by one and one-fourth inches long. There are five of such pins for the tape contact holes, and an additional smaller pin for the feed holes. All six pins slide back and forth in guide holes bored through the face of a small block. The idea is illustrated by Fig. 8, where B denotes the guide block. The block is L-shaped, and across the open face extends a cover plate, E, also bored with guide holes for the pins. The die, D, lays over this cover plate. The two are channelled out slightly so that the tape can be drawn along between them. The pins ordinarily project behind the back face of the block, and also extend, at their opposite ends, nearly through the end plate, E; they do not, however, extend into the tape channel. The hammer strikes the projecting

YESTERDAY'S CHAT WITH THE MUNICIPAL COUNCIL

2200 , leste he ons eeniging oft . oft hys enig
 -ing hys ons vd verantwoort of hort niet-ens
 dien te evih ons eredt . grot zedent d'vrouw
 -ls ms hys , zelot teantre oest oft tot enig
 HFA . zelot heet oft tot nld welfse lancit
 zelot obing of d'vrouw hys hord chifa enig wie
 oft . hooch flams & to east oft agorit herod
 zelot hys & eredt , & gij vd bejteantli of heft
 hys , bejteantli of hooch oft . hooch obing oft
 , zelot revoe & ametke east hys oft zelot
 . amig oft tot zelot obing d'vrouw herod oest , &
 enig . zelot revoe oft tot obing , & zelot oft
 oft tot obing of vlijtli d'vrouw hoffmanns ons owt
 oft . merkt neevted zelot ametk of hys oest
 east hooch oft b'lded teatord vlijtli d'vrouw
 -go tiecht ta , d'vrouw ons hys , hooch oft to
 , zelot hys oft agorit vlijtli , obre etiels
 oest oft obre hofte , tevevold , ten ob yest ;
 enig oest zelot teatord vlijtli . hoffmann

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

ends of the pins, and drives the pins across the channel into suitable recesses in the die; if the tape is in place between the die and end plate, it is of course punched. The punch ends of the pins are slightly hollow-ground so as to give better cutting edges.

The method of returning the pins to their original positions, on the back stroke of the hammer, is also indicated in Fig. 8. The feed-hole pin, F, is rigidly attached to a I -shaped crosshead, C, which slides back and forth in the guide block; the crosshead is normally held at the rear of the guide block by the spring, S. The forward stroke of the crosshead is limited by its lug (the stem of the "T") striking the end plate, E. The crosshead is also bored with holes for the punch pins, but the fit between the crosshead and pins is so loose

THE EFFECT OF VARIATION ON THE NUMBER OF

scores and odd deviates was , and odd to above
 plus odd to successive oddities odd I consider the
 plus odd odd measured scaling of odd odd to
 minus odd . Because scores to of if , and the two
 Binswanger-Wolff's ultrametric are same odd to above
 . sample variance tested using or as
 odd guarantees to bottom odd
 used odd no , unoffialed I consider which of and
 of heterochronous cells of , remain odd to scores
 -as weight of , and odd-beat odd . 3 . odd
 scaling , 0 , because the beat - is odd because
 ; now odd scaling odd of strict law does not
 true odd to beat ultrametric of because odd
 -not odd . 3 . scaling odd odd scaling odd to
 yes bottom of because odd to scores true
 odd ultrametric ("T" odd to mean odd) sign odd
 heterochronous cells of because odd . 3 , and the
 odd odd odd , same scaling odd to scores with
 scores as odd odd because because odd measured

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

that the crosshead slides forward freely, without pulling any of the pins along with it. Each of the five pins is fitted with a small collar, which rests against the back face of the crosshead. The crosshead ordinarily bears against these collars, so that the pins are held in their extreme back position clear of the tape.

In the operation of the arrangement, after the crosshead has started on its forward stroke, any of the pins can follow, in case they too have been struck by the hammer. The crosshead stays ahead of the pins until the end of the stroke, and the pins go through a punching movement the same as though the crosshead were not present. On the back stroke, however, the crosshead strikes the collars on the pins and carries all the pins back to their original

THEARMINN CHINNIRE NO ANUOGH MUNNUIGH AIR

,vleerit brawiet sebhla basasatorc eft taft
Rtiv phoin eniq eft to vna gaffing tsocht
a ritiv berift ei eniq evlt eft to nech .it
Aed eft tangage atser dehde ,vaffic lynn
-ritivo basasatorc eft .basasatorc eft to soft
Jnd os ,stoflos ozaft tangage anised vlynn
-os hood ementhe t hent nt bled era eniq eft
,eget eft to reslo moftho
-re os to mofthorego eft nI
betinta arf basasatorc eft vctis ,tmaneguer
nco eniq eft to vna ,elourta Fievrot eth no
moftho hood evlt oot yadit easc ai ,wolffor
to hoodo syslo basasatorc eft .rommed eft vld
hns ,elourta eft to hne eft litsm eniq eft
eft tmanevom .gaffingk a hgnost os eniq eft
-aqd ton erow basasatorc eft hgnost na eme
-satorc eft ,trevewel ,elourta hood eft nO .tme
hns hns eft no stoflos eft aozlts bas
lunigtno thofit ot hood eniq eft lls setrno

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

positions. A feature which should be noticed here is that at the end of the forward stroke, the pin collars strike the crosshead, and their travel is thereby limited; otherwise, the pins would drive into the die and soon loose their cutting edges.

The method of starting the crosshead on its forward stroke is also apparent from Fig. 8. It will be remembered that the five contact-hole pins are not struck directly by the hammer, but instead, small interference rods are inserted between the hammer and the pins, so that the rods are struck by the hammer. A feed hole, on the other hand, must be punched at every stroke of the hammer, and hence no punch lever is provided for the feed pin. Instead, this pin projects beyond the others a distance slightly in excess of the thickness of a punch lev-

TRANSLATION OF THE MUNICIPAL BILL

hefion ed blmora hediw erwtet A .cachtaeq
 ,elortu brawrot ed te hne ed te jadz ai ered
 uiedz has ,beadesore ed elortu eredz nly ed
 aniq ed ,earwreido ;betimh qderedit ai levent
 riedz esocil noas has sib edz oxti ovitb hñlow

edz galrata lo boitem enz
 -qa oafz ai elorta brawrot eti no bsefasore
 bñredmener ed llirw ti .8 .gilt morf thresq
 ionta ton era aniq elor-testpos evit ed tant
 llorma ,bñestani fud ,rennud edz vd vñtoerib
 edz haewted bñtrenat era abot eozmaztrotet
 era abot edz jadz os ,aniq edz hñz rennari
 -o edz no ,elor best A .rennud edz vd hauro
 elorta ytreve ts berleng ed tanx ,best test
 ai reval domaq os cemef has ,rennud edz fo
 aniq aint ,bñestani .aniq best edz tol hebiveng
 -tñgħie eredz u eredz edz bñwex aktobaq
 -tol domaq u fo esenjiet edz fo esenje u t-

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

er. Therefore, the feed pin is struck by the hammer before any of the punch levers, so that the feed pin and crosshead lead the other pins throughout the stroke. It is apparent that with this method, the proper movement of the pins is not interfered with by the crosshead.

THE HAMMER. The hammer magnet consists of two solenoids, designed for 110 volts, direct current. The solenoids are placed horizontally at some distance behind the punch pins and in line with them. The arrangement is clear from Fig. 7. The two coils are supported from the base by a bracket, which is attached to those ends of the coils adjacent to the punch pins. The solenoids are fitted with movable cores or plungers, which slide in and out of the rear ends of the coils. A yoke connects the cores, and

THESE ARE THE PATENTS WHICH ARE HELD BY THE GOVERNMENT OF CANADA.

and my services as the best edit ,achievedit .we
as ,strove doing all to was cracked reward
the heel benders but big heel edit edit
-as at the ,edit off transperent only resto
report edit ,before edit it's part the
dity benefitedit tom si said edit to manager
,benders edit us

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

from the center of this yoke, a plunger rod goes forward between the solenoids, through a guide hole in the bracket, and terminates in a round-headed nut, N. A hammer spring, acting against the magnet, normally keeps the cores drawn partially out of the coils and the plunger rod in its extreme back position. When the coils are energized, the cores are drawn into the coils, and the plunger rod thrusts forward toward the punch pins. The hammer solenoids are controlled automatically from the keyboard.

The hammer itself is a horizontal steel lever, pivoted at A (see Fig. 7), and extends into the clearance between the end of the plunger rod and the punch pins. Thus, when the plunger rod comes forward, it thrusts the hammer on ahead of itself.

The construction of the ham-

THE POLITICAL SENSIBILITY IN LITERATURE

for regulars n , they said to nothing but work
devoid , which makes all snowed Brownish seas
sobriety one , reduced out of each ship a
, which means A . M . , and before -nowt o n
exact Wilton , Tenthent out derisive ; often
elbow said to the white -nowt arce said
-as Head smarts at the now regulars add has
said , "signior our elbow said nowt " . nothing
-nowt add has , elbow our said nowt our acres
money said Brownish element about the
belletristic era ahemelos toward out . and
, everybody add work Wilton -nowt
-nowt s at Head toward said
(v . art sea) A to Detovig , level Head lathe
add neewied sonneelse add our abneuse the
. and Head said the hot tempest add to the
, brownish acres for regulars add nowt , said
Head to beside no knowns add starmit di
and will be a better time .

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

mer is shown in Fig. 9. As indicated, the hammer is channelled out along its length. The channel faces the punch pins. In line with the pins is cut the rectangular notch, B (see Figs. 7 and 9). When the end of the hammer is pushed forward by the plunger rod, the ends of the punch pins enter the notch, B. The channel and notch furnish the clearance, before referred to, between the punch pins and hammer. Note that the bearing at A, upon which the hammer is pivoted, is offset from the center-line, so that the bearing stud is well clear of the middle of the channel.

THE PUNCH LEVERS. The five interference pins or punch levers, which slide in and out of the clearance between the hammer and the punch pins, are merely square steel rods; they move lengthways of the hammer through

THE ABBEY OF ST MARY IN THE FOREST

add ,Not so I said .? .¹¹ In the words of one
of those at that time the Bellarmine of memory
and of ,only know add most learned of
,Medes who greatest add the of art, the like
add to the add now .(2 Dec V .optF oca) &
,for you will add yd Brewster Bellarmine of memory
,not add to the art of know add to the add
-yds add Bellarmine not add Bellarmine add .¹²
know add greatest ,et bellarmine exalted ,oca
,A de quinced add tent stol ,memory has ,among
teach to at ,belovig of memory add nobly mag
nified add tent as ,and -medes add most
-mede add to add add to myself now at buta
.

.lex

SPLIT ADDITION

split tent ,know add to add ,cometelephant
-add add know add cometelephant add to the bms of
leads except glorum ate ,among them add bms non
diferent reason add to symentrum evom tent ;abor

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

the channel. They are arranged in a vertical row or pile, so that each one is in the horizontal plane of a punch pin. The levers are numbered from 1 at the bottom to 5 at the top, corresponding to the same numbers of the code elements. The punch levers extend just far enough along the channel that their ends cross the notch in the channel, and thereby fill up the clearance space at the back of the pins. However, each lever may be withdrawn from the channel for about half an inch; this movement is sufficient to re-establish clearance.

SELECTIVE MECHANISM. The method of moving the punch levers from the keyboard is illustrated in the isometric sketch of Fig. 10; this sketch, for simplicity, shows the complete links for only one punch lever, and shows only one key. Each key is the terminal of a long arm, K, the back end of which

ESTACIONES ESTADÍSTICAS DE INVESTIGACIÓN DEL

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

is mounted on a shaft, S. The key lever, or arm, has a projection, P, which rests on a large rectangular strap-iron loop, L; the loop has no back side, but instead, the two ends of the strap are supported by two bearings, BB, as shown. The arm, F, is attached to one end of the loop, and rises vertically. The upper end of the arm, F, is slotted, and engages the short end of the bell crank, D. The crank has a suitable bearing at E. The long arm runs forward to the punch lever, and is pivoted to that lever at A. Tracing through the link movements, we find that if the key lever is pushed down, as it would be by the depression of a key, the front of the loop, L, is also pushed down; this movement brings the upper end of F forward, and with it, the short arm of the bell crank. The long arm of the bell crank is thereby drawn toward

ИМПЕРСИОННЫЙ ГИД ПО МУЗЕЮ ИСКУССТВ

но ,коевіл үзіл еді .О ,тіңде а не істінен ал
а не азар мінші .І ,покісінген а зең ,мұн
еді ;І ,кою көзі-жерде талапташып оғыл
оуд еді ,бастап тиң ,әйлә мінд еді иән қоюл
-тәзед оңд үз бетреккес өзі жерде еді то ахын
бөлестің ал .І ,мұн еді .Анда са .АН ,әзіз
-жаситтөв зеңіл һын ,коюл еді то бие оно ал
беттің ал .І ,мұн еді то бие тегін еді .ІЛ
-жасиғи ғыләд еді то бие ұтқын еді зорған һын
 .О да әншіләр әйткінің әзәр жаңа еді .
 ,коюл әңсүл еді оң беттің алдың өзінің еді
заресін .А да өзевіл тәнді оң беттің ал бие
О ! тәнді бүлік са ,әншіләр әзіл еді ығынан
әд ғылор ти са ,әншіл беттің ал өзевіл үзіл
еді то дәріл еді ,үзіл а то моласарғеб еді үз
тәншевен алдың ;мұнда беттің оңа ал .І ,коюл
әңсүл һын ,беттің ал то бие тегін еді зорған
әңсүл еді .Жасиғи ғыләд еді то мұн ұтқын еді ,іл
-жасиғи әңсүл тәнділік ал жаңа ғыләд еді то әнші

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

the right, and it pulls the punch lever with it. This movement of the punch lever is the one desired. All parts are returned to their original positions by springs, not shown in the figure. The controls for all the punch levers are the same: each punch lever has its own bell crank and loop movement.

In Fig. 11 is shown the complete selective mechanism with the exception of some of the keyboard keys and levers which are left out to simplify the sketch. The method of nesting the six loops and the arrangement of the bell cranks should be noted especially. The sketch also shows the several fingers which each key lever carries. These fingers point downward, and each rests on one of the loops; hence, the depression of a key simultaneously depresses several loops, and, at the same time, withdraws several punch levers. By this action, a key controls such

THE SECRET SILENT LIFE OF JOHN W. BROWN

of which several hours off allows it has ,night off -
-at the end of travel hours off to tomorrow off
continues miles at breakfast one after 10 .about
.straight off at twelve ton ,spoke w/ ambitious
and the arrival hours off the next morning off
hours filled two off travel hours now :some
.jockeying off hours off 11 .12 off
established off hours off 11 .12 off

also to arrive early off time unknowner vehicles
that the return travel has been proposed off to
-teen to Boston off .hours off William of the
off to the passenger off has been the off rail
hours off .yesterday before ed hours off hours filled
-ed you have nothing straight before off some calm
has ,however during straight road .solutes very
-marked off ,some ;also off to one no other has
the same .
forever existing ,said man off the line ,and
have existence yet a ,notice right off .travel has

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

punch levers as will cause the proper holes to be punched in the tape.

The hammer control is indicated in the same figure. In addition to the five bell cranks, there is a sixth lever mounted with them and similarly controlled. This lever is the top one of the bell crank group, and is operated from the outside loop. The top lever has no long arm extending to a punch lever, but instead, consists of a single arm, identical with the short arms of the bell cranks. This arm controls the hammer magnet through the series contact shown. One point of the contact is stationary, whereas the other is carried by the lever just mentioned. The contact is normally open, but when the arm is moved forward, by a depression of the front loop, the contact closes and connects the solenoids to the source of current sup-

THEORY OF LIMITING SYSTEMS OF INTEGRATION

before we go on to prove that the level domain
is closed under addition and scalar multiplication.
That is, if x and y are in Ω , then $x + y$ and ax are also in Ω .
Let $x = (x_1, x_2)$ and $y = (y_1, y_2)$. Then $x + y = (x_1 + y_1, x_2 + y_2)$.
Since $x_1 \in [a, b]$ and $y_1 \in [a, b]$, it follows that $x_1 + y_1 \in [a, b]$.
Similarly, since $x_2 \in [c, d]$ and $y_2 \in [c, d]$, it follows that $x_2 + y_2 \in [c, d]$.
Therefore, $x + y \in \Omega$.
Now let $a \neq 0$ and $x = (x_1, x_2)$. Then $ax = (ax_1, ax_2)$.
Since $x_1 \in [a, b]$, it follows that $ax_1 \in [a, b]$.
Similarly, since $x_2 \in [c, d]$, it follows that $ax_2 \in [c, d]$.
Therefore, $ax \in \Omega$.
Thus, Ω is closed under addition and scalar multiplication.

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

ply. The contact is adjusted to close just after the punch levers have been withdrawn by the bell cranks.

As for the location and mounting of the link mechanism on the machine, the bell cranks and contact are situated on the top of the base, as indicated in Fig. 7, whereas the loops and keylevers are inside the hollow base of the machine; the levers F of Fig. 10, connecting the loops and bell cranks, extend upward through slots of the grid, G, as indicated in Fig. 7. The mounting of the bell cranks on the vertical studs is also apparent from Fig. 7.

The method of suspending the loops and key levers in the base is illustrated in Fig. 12, which is a view upwards at the bottom of the machine. The six free ends of the two sides of the loops are mounted in the

THE MORMON SYSTEM OF PRIMITIVE PROPRIETARY

test seeds of betonche at testmoes enT .
unwieldly need evad stevel menq enT test
.sinisic lled enT vd
-frown bns school enT vof s4
enT ,entdom enT no maitdom knif enT to an
enT nn betonche era testmoes bns sinisic lled
-eredw ,v .gff n betonche es ,easd enT to got
-lod enT obian era stevelved bns school enT as
.gff to t stevel enT ;entdom enT to eand wol
-xe ,sinisic lled bns school enT gntjeemps ,of
es ,b .birs enT to etols magomt bnewqu bned
lled enT to gntjewom enT .v .gff n betonche
thetwys osfa si abnta Isoltrey enT no sinisic
.v .gff M mort
enT gntjewom to hontem enT
-terdauft si easd enT n stevel vof bns school
enT to bnewqu whov a si holdw ,si .gff n be
to abne eert xia enT .entdom enT to motted
enT n betonche era school enT to abns owl enT

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

two bearings as shown. Washers or spacers are placed between adjacent straps in order that there shall be no interference between them. The loops are held up snugly against their backstop on the under side of the base by return springs. The idea is clear from Fig. 13, and needs little comment. The rod, R, of Fig. 13, runs the full length of the loops. This spring support allows the front of the loop to be pushed down by a key lever, but immediately returns the lever to its normal position when the pressure is released.

The mounting of the key levers is similar to that of the loops, and is shown in Fig. 12. The back ends of all the levers are strung loosely on a shaft, S; the levers are kept separated on the shafts by spacers. The key levers have spring returns, similar to those of the loops. All springs, both of

THE HISTORY OF THE ENGLISH LANGUAGE

the structure of speech. words as organized and
their ratio in such theothes measured closely
. merit measured concretely on the basis of their
their function which can be seen in each of the
of each edit to other edit no relation
. yet most rules of such edit . English writer
to ,X , how edit . sometimes difficult seem has , so
. school edit to stage first edit was , If . yet
edit to those edit would support writing such
that , never had a good reason had ed of good
lawyer of travel edit author illustrates
. however at times edit had nothing
travel had edit to grammar edit
nowhere at has , school edit to that of writing at
travel edit like to above had edit . If . yet at
travel edit ; it , please a no place and also the
. travel editor of such edit no better than the
writing , never had a good reason had edit to
to school , school first edit to each of

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

the loops and key levers, are anchored to the rod, R, of Fig. 13.

THE KEYBOARD. The key levers terminate at the front of the machine, have key buttons attached to the front ends, and thereby form the keyboard. The plan of the keyboard is clear from Fig. 7. In a general way, it follows the plan of the standard typewriter keyboard, but as only upper case letters are used in telegraphic work, additional characters are supplied instead of the two separate styles of letters. Notice that besides the actual printing characters, the keys include the operating signals, such as carriage return (CARRET), lining, and others.

THE TAPE FEED. The method of feeding the tape may be seen in Fig. 7. The tape reel is normally supported horizontally on the top of the base to the right of the

УЧАСТВОВАНИЕ ОМИЦИИ ВО ВНЕСУЩАЯ МИР

от бородина эта .степел юн бна агаси ейт
 .81 .911 то ,Я ,бог ейт
 степел юн ейт .ОГАЮХИ МИР
 юн ,архивом ейт то збори ейт да ставим
 бна ,зина збори ейт от бородина агаси юн
 ейт то алиј ейт .брюсеви ейт зинт членки
 изменил а мI .V .911 мори юнко а брюсеви
 бородина ейт то мадж ейт сволит ти .как
 юн то збори зине а ти ,брюсеви членки
 -ти ,како агаси юн а зин ага юн
 то бородина ейт стеченило генри
 ейт .агаси юн а зин ага юн
 ,агаси юн а зин ага юн
 зин ага юн а зин ага юн
 зин ага юн .(ТЕРИА) агаси юн ага юн
 .агаси
 то бородина ейт .НЕМЕЦ МИР
 ейт .V .911 аг аз аз ейт юн агаси юн
 агаси юн агаси юн
 юн агаси юн агаси юн

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

bell cranks. The tape unwinds from the reel, passes between the punch pins and die, and then passes between an idler or tension roller and the feed roller. The idler is pressed against the feed roller by a spring. The idler and feed roller may be seen in Fig. 7 at the left of the punch pins and die. The feed roller is a vertical cylinder, slightly higher than the tape is wide. It has projecting pins or teeth which engage the feed holes in the tape, so that the tape is pulled along as the feed roller turns. The idler is a second cylinder which serves to keep the tape close-up against the feed roller.

The driving of the feed roller is accomplished by a ratchet and pawl movement, a part of which movement may be seen in Fig. 7. At the bottom of the feed roller, and rigidly mounted with it, is a

УКАЗЫВАЕТ МИНИСТЕРСТВО ПО ИНДУСТИРИИ И ТЕХНОЛОГИЯМ

beet est sort abriwus est est .zimato ille
bns , sib bns auto korma est nevveded osseby
-for vloined ro vellit ne nevveded osseby vellit
osseby si vellit est .vellor beet est bns vellit
vellit est .vellor a vd vellor beet est taxlape
est to V .glti nt mees ed yam vellor beet bns
-for beet est .sib bns enig menq est to tsel
vedgh vldtigis , rebmlyo Isolitev a si vell
enig vellor beet est to .vellor a vd vellor beet
est si vellor beet est vellor beet est to
est as yam vellor beet est vellor beet est to , vellor
-lyo knowes a si vellit est .zimato vellor beet
qu-vole vellor beet est yam of osseby vellor beet
.vellor beet est taxlape
-for beet est to galvith est
a Iwas bns fedotar a vd Benaklomoces si vell
est yam tnelevom vellor beet est to , tnelevom
beet est to motted est to .V .glti nt mees
a si , ti dtiw Benaklomoces vllblyt bns , vellor

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

ratchet wheel. A long pawl attached to the end of the hammer comes forward with the hammer on the forward stroke; the pawl hooks over a tooth on the ratchet, and on the back stroke of the hammer, pulls back the ratchet one tooth. This movement of the ratchet advances the feed roller and tape one step. These steps are about one-tenth inch long, measured on the tape, which distance is sufficient to produce clear distinction between successive letters on the tape.

The punching, feeding, and selective mechanisms, so far described, constitute the essential parts of the perforator. Experience, however, has shown the desirability of adding two more features.

THE BACK SPACER. The first of these new elements is the back spacer; by means of this device, in case the wrong

THE MURKIN'S MURKIN'S MURKIN'S

sit at Bedford's Lane now for A . Leonid fedotov
 sit ditte blyant aemoo remmed sit to bne
 uiced luer sit ; eidera blyant sit no yarwad
 head sit no bns , fedotov sit no dteet a revo
 fedotov sit Head alli , blyant sit to eidera
 -ha fedotov sit to dtemerom sitT . dteet emo
 .eqat eqat bns tellor heit sit seonav
 , emol doni dmet-eno tsoea sit aqet eqat
 -tue si eonatib dicidw , eqat sit no brenzen
 newwed solforitib tsoea eonberg et tschell
 .eqat sit no arretel avlasseens
 bns , gubbeet , gubbeet sit
 -noe , bedrasset rat ca , ammadoem evitseled
 -stokreq sit to atreeg lskmesee sit ostita
 -en sit awole ear , revewom , eoneliquk . tot
 .eestaaet erom ont gubbeet to ytilidarka
 tsoea sit . KNUCKLE HAN

:tsoea Head sit si atnemele wot osedt to
 gnotw sit esse nk , eorveb alit to armen yd

THE MORRUM SYSTEM OF PRINTING TELEGRAPHY

letter has been punched onto the tape, the tape can be backed up until the incorrect letter is again in the punch. Then the letter may be cancelled by the "Rub out" key. Thus, the purpose of the back spacer on the perforator is exactly the same as its purpose on a typewriter.

The movement is illustrated in Fig. 14(a), which is a view of the under side of the base. The stud which carries the feed roller extends through the base, and terminates in a star wheel. A lever and pawl, as indicated in the figure, are mounted so that the pawl engages the star wheel. Hence, when the lever is pushed to the right, the star wheel is turned through a small angle. The star wheel assumes a definite position under the action of the jockey roller which rests upon it. The movement of the star wheel

THE JOURNAL OF THE HISTORY OF MEXICAN LITERATURE

edit . equal edit onto becoming need and letter
 foerster edit ittum qu heised ed nro equal
 -test edit test now edit ittum qu heised ed nro equal
 .you "out" edit you "out" edit you "out"
 edit no reader need edit to use purpose edit ,and
 -ring ati as emma edit yitsoxte si tchotzotzot
 .retrograde a no esqo
 heterotopic si tchomoyom edit
 tehom edit to wiev a si holdw .(a)AI .gM si
 edit zelting holdw hata edit ,and edit to zha
 hna ,esad edit mayordi ahmetxe tellor heel
 ,lwasq hna tavel A .leedw tata a si zelting
 os bejumom eta ,esad edit si heterotopic as
 ,comell .leedw tata edit zelting lwasq edit tent
 edit ,tiglit edit ot bedaq si tavel edit hew
 .elgas llamas a mayordi berist si leedw tata
 mafisq stinket a zemmas leedw tata edit
 holdw tellor yeket edit to mafisq edit tchom
 leedw tata edit to tchomoyom edit .ti koch etas

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

turns the feed roller and tape back one step. The lever and pawl are returned to their original positions by a spring. The lever projects from the base at the lower left-hand corner.

THE END-OF-THE-LINE INDICATOR. The next of the new features is the end-of-the-line indicator. This device gives warning when approximately sixty-five characters have been punched onto the tape; sixty-five characters are assumed to constitute a printed line. When the signal is given, the carriage return key is depressed, so that at this point in the message, the printer will begin a new line. The device is therefore seen to perform the same function as a warning bell on a typewriter. Before a message is started, the carriage return key is depressed; this action assures the perfor-

YUAKIAT TLEGEETIYUQ SO METSYE MURKOM SHT

qata uno haaq eqat has telleq bee' est qata
 kieit et hemmeler etis lwsq bms tavel est
 tavel est .autros a yd smoltiaoq lamigrie
 -tief tewel est ta easd est mori atektorq
 .tarroo haaq

-ADIGMI KUUK-ANT-40-THE SHT

est si aemtsaq wen est to txaq est .HOT
 avivg akivab sinl .totasqat enti-ant-ko-bne
 -xide aviv-yekla qletaniktorq ja neda qutukar
 -xla ;eqat est otoo beklana paoq evan etekos
 etukosce et hemmeler etis atekosce aviv-yt
 ,neviv et lamgia est nekw .entil bejnikq a
 tadt on ,kesesqet et yel qutukar qutukar est
 xekutiq est ,egsasem est ni tarioq estit ta
 -xekit et akivab est .entil wen a nized lliw
 a et nikkosq amea est qrotiq et nees eroq
 -sem a eroted .yekliweqq a no llied qutukar
 et yel qutukar qutukar est ,bennata et oqas
 -erotted est amesa mietta abit ;kesesqet

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

tor and the printer being in phase as regards the lines.

The indicator is located in the base of the machine; the details of its construction are presented in Fig. 14(a). In this figure, the parts are in the beginning-of-a-line position. As shown, on the feed roller shaft is a small pinion, which drives a 65-tooth gear through the medium of an auxiliary or idler pinion. At each stroke of the hammer, the large gear is turned through the angle of one tooth, so that at the end of a line of sixty-five characters or signals, the large gear will have turned through one complete revolution. The gear turns against the action of a spring, U; this is a flat spiral spring, similar to a small clock spring.

The large gear carries a small cam or disk, D, concentric with it. A lever, L,

THE MORNING SWIMMING PROGRAM

swimmer as ready at gained maturity did his not
. swim did
in his pool in swimming did
not to assisted did ; swimmers did to said did
not .(a) if . if in necessary was notwithstanding
minimized did in this stage did , enough said
best did no , now as a . nothing did a to
several days , nothing firms a at firms yellow
was to another did present very effect-35 a
did to exceed more than . nothing will do great
did present better at they were did , because
a to him did to said as , about one to signs
, always to present said effect which to said
one hundred percent said firm was great did
faster than was did . nothing over else
did a at did ; U . nothing a to makes did
nothing does firms a at yellow , nothing firms
firms a certain very great did
, I , never A . it did not swimmer , G , said to me

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

is held against the edge of the disk by a spring. An interference pin or stud projects from the face of the large gear in such a manner, that, as the end of the printed line is approached, the stud travels under the lever, lifts it off the disk, and raises it still farther till the contact spring of the lever strikes the fixed point of the contact. This condition is shown in Fig. 14(b). The contact is in series with an indicator lamp and source of current supply, so that when the contact closes, the lamp lights. The lighting of the lamp serves as a warning to the operator that the end of a line is near. The contact is so adjusted that the warning occurs at about the fifty-eighth character of the line.

Special construction of the large gear is shown in the figure, viz., the

THE WORKERS' COMMITTEE TO DEFEND THE MURKINIAN

a w^o h^old est to s^ome est t^owards b^ored at
 a^lso to p^opular b^oots to k^omunist i^ll^ocal m^ore . g^ood
 a p^owerful p^owerful est to s^ome est more
 m^ore b^ording est to b^one est as , f^ort , r^ockw^o
 e^lectr^onic a^level b^oots est , b^ording as
 t^o a^ll^ocal b^one , f^ort est t^o t^o t^o , r^ockw^o
 est to g^ood g^ood est l^oft w^orking l^oft
 t^owns est to f^ort b^ord est as l^oft w^orking
 est . (d)M . g^ood n^o w^ord est m^ost^o w^ord
 q^ual r^ockw^ord as n^ot^ow^ord as t^o w^ord
 m^ore t^o w^ord as , q^ual w^ord as t^o w^ord
 est . t^o w^ord q^ual est , s^ome t^o w^ord est
 of g^ood w^ord as s^ome q^ual est to g^ood w^ord
 t^o w^ord as t^o b^one est f^ort r^ockw^ord est
 g^ood w^ord est f^ort b^ord as t^o t^o w^ord est
 r^ockw^ord f^ort b^ord est t^o w^ord as t^o w^ord
 . t^o w^ord est to
 est to m^ost^o w^ord as t^o w^ord
 est , , s^ome , s^ome est n^o w^ord as t^o w^ord as t^o w^ord

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

last four teeth of the gear are cut out; the last four teeth are mentioned with the understanding that the teeth are numbered from the one in contact with the idler when all parts are in the initial or beginning-of-a-line position. The reason for this construction of the gear is as follows; if all the teeth were in the gear, there would be no means of stopping rotation at the sixty-fifth character, and the operator might continue punching. The rotation of the gear would continue, so that presently, the interference stud would turn from under the end of the contact lever, thereby releasing that lever and destroying the warning signal. Hence, the last four teeth of the gear are cut out, so that when these spaces reach the idler, any further punching of characters has no effect on the large gear; hence, the warning signal is

THE MORMON SYSTEM OF PRINTING TELEGRAPH

and ; for the era they eat to meet their need - which was also often demanded by the master who had been given them as part of his wages. The master would then give them a certain amount of time to go and get their food, and if they did not return in time, he would deduct it from their wages. This was called a "time charge".

The slaves were not allowed to leave the plantation without permission from their master, and if they did, they could be punished. They were not allowed to marry or have children, and if they did, they would be sold.

The slaves were not allowed to own property, and if they did, it would be taken away from them. They were not allowed to vote, and if they did, they would be fined.

The slaves were not allowed to receive an education, and if they did, they would be punished. They were not allowed to have a job, and if they did, they would be fined.

The slaves were not allowed to have a family, and if they did, they would be punished. They were not allowed to have a home, and if they did, they would be fined.

The slaves were not allowed to have a job, and if they did, they would be fined.

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

maintained.

The release of the warning signal is effected simultaneously with the punching of the carriage return signal. The carriage return key operates the selector punching mechanism in the same manner as any other key, but in addition, the key strikes the end of a small bell crank, B, of Fig. 14 (a), at the right end of the base. Through the agency of this bell crank, the key pushes a rod, called the release rod, through a small distance toward the left. The release rod is connected at the left to an arm, H, which carries the idler pinion. This arm is centered on the stud that carries the large gear, and is kept in such a position by a spring, T, that the idler pinion is normally in mesh with the driving pinion and the large gear. But when the release rod is push-

УЧАСТІВНИКІВ ПІДКІРМІШКА МУНІЦІПАЛЬНОГО
СОВЕТУ

Задовільно відповісти на питання про підкірмішку муніципального
сектора він зміг лише один член, який відповів, що він
зарахується до категорії «підкірмішок», які не мають
заслуг та досвіду, але вони вже зробили все, що
могли, щоб зберегти підкірмішку. Це відповідь на питання про
зарахуваність до категорії «підкірмішок», які не мають
заслуг та досвіду, але вони вже зробили все, що
могли, щоб зберегти підкірмішку.

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

ed to the left, it carries the idler lever and pinion with it. The idler is thereby thrown out of mesh with the feed roller pinion. This condition is illustrated in Fig. 14(c). The large is now free, and runs backward, under the action of the spring, U, until it reaches its original position; i.e., it turns back approximately one revolution.

This movement of the large gear turns the interference pin out from under the contact lever and allows that lever to drop back onto the cam; the lamp contact is broken, and the warning therefore ceases. The backward movement of the large gear is stopped by the interference pin striking the end of the contact lever. Such a condition of the parts is shown in Fig. 14(a).

In order that the carriage return key need not be held down until the

MORNING STAR OF LIVING HISTORY

revel relift est sefiriso ti ,jfel est ot be
yderent si relift estT .ti stiw nohing bns
-ais relift best aff drifw nisem to two swerit
.gIT nt Beferanslli si mottihnoe zimT .nof
-head sunx bns ,serf won nt egret estT .(s)Al
-mr ,U ,gutriga est to mottos est rebns ,btaw
..e.i ;mottisoq Ismhato si sedoset ti lit
.achunlover axo qistamirongg head austi ti
egret est to jmemevom aint
reban mort the aig consetretal est austi taw
ot revel fant awolla bns revel festnos est
si festnos quai est ;msc est ojno head qurb
.cesses stroferent gantrew est bns ,merord
si reab egret est to jmemevom bnew/ead est
est gantrew aig consetretat est yd hengate
mottihnoe a nosB .revel festnos est to bns
. (s)Al .gIT nt nwoda si atsq est to
egairino est fant rebns nt
est lisan nwob bled ed tom been yek pntter

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

indication mechanism has assumed the starting position, a pawl, P, has been provided. This pawl drops into a notch, N, cut in the release lever, when the lever is in the release or full-left position. The release lever is therefore held in the extreme left position, after it has once assumed that position, by the pawl. The carriage return key need, therefore, not be held down in order that the release lever maintain its position. The pawl is thrown out of the notch, and the lever freed, by a stud or trip pin on the lower face of the large gear. This stud is so placed that just as the large gear reaches its starting position, the stud strikes the pawl and trips it out of the notch. The release rod then returns to its normal position.

We have now completed the

THE WORKS OF THOMAS DEQUINN

-trate est hennas and meimadeom mottaschon
behivorg need and .P. lwasq a .mottasq and
est at the .X. doctor a lotri aroth lwasq and
-er est at si revel est henn .revel essefor
-el essefor est .mottasq teli-teli to essefor
teli amotis est at bled etotredt at rev
-eq tafit hennas sono and ti revit .mottasq
wed amitter egatriso est .lwasq est vd .mottas
tebro at nwoh bled ed tor .etotredt .boek
mottasq est amitter revel essefor est tafit
est hns .doctor est to two mword at lwasq est
est no nlo qirt to huta a vd .beest revel
at huta and .terz egatris est to east revof
-moter tseb ergate est as tafit tafit becldq as
sextrite huta est .mottasq galtrate est as
est .doctor est to two si qirt hns lwasq est
-tueg lannom est et amitter huta for essefor
.mott

est betelqmoes won evan ell

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

description of the Morkrum perforator, and will next take up a discussion of the distribution system, the general theory of which was developed in the Introduction.

THE MORRISON SYSTEM OF PRINTING TELEGRAPHY

base, motor vehicle number and to notwithstanding
-wise and to whomsoever it may exist from time
when so created however and, notwithstanding

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

Part III- The Distribution System.

GENERAL. The distribution system of the Morkrum System of Printing Telegraphy is the same as that of the last introductory system, viz., that of Fig. 6. There are a number of auxiliary devices added to assist in operation, but the general plan and theory are identical with the plan and theory of Fig. 6. For communication in both directions, the apparatus of Fig. 6 must be in duplicate at the two stations; that is, each station must have both transmitting and receiving equipment. It has been found advantageous, therefore, to mount the transmitting and receiving disks of one station, together with their auxiliary equipment, on one base; the complete set of apparatus is called the distributor. By this means, compact construction is obtained, and both receiving and transmitting brush arms may be driven by a single

THE MORALIST OPINION ON LEARNED MURKIN'S LIBERATION

Part III - The Disqualification System
should be eliminated and replaced by a
LEARNED.

arguing to make it difficult and to make
itself and to itself as much as it can
.e .arg to itself , .arg , makes you
the receiver you will be to whom a lot of
information and the , makes me of be
helped and help yourself the most the only
in making the most .e .arg to yourself the
team a .arg to another is , another is
, and itself ; another one is to another is not
the information that was given to another does
another think need and all .makes you
information is not given to , another , another
makes , makes one to make another the
; and one no , makes you another right if
is better at another to the other is not
another because , another right if .makes
another the another who , because of not
being a good person so you were denied another

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

electric motor.

In the following description of the distributor, the general action of the apparatus will be explained with the aid of rough sketches; the accompanying photographs of the actual machine show the details of construction. The general order of treatment will follow the path of a current pulse through the machine.

The general layout of the distributor is presented in Fig. 15, which is a top or plan view of the apparatus. The figure shows the positions of the various parts, but is schematic as far as their construction is concerned.

THE MOTOR. The motor, which drives both brush arms and the tape feed mechanism, is a 1/10 H.P., 1800 R.P.M., 110 volt, D.C., series machine, manufactured by the Gen-

THE MORKUM SYSTEM OF PRINTING TECHNOLOGY

.xviii

polysulfide desulfurizer est in
est to make latexes est ,rotundata est to
to bis est diw benzaldehyde ed illw antiseptics
adversely uniques est ; adhesives based
to sulfides est woda emulsion latexes est to
present to these latexes est .adhesives
liquids using thixotropic to stage est wallet illw
.emulsion est
-elb est to novel latexes est
a si hdiw ,ai .glf at benzene est rotundata
stage est .antiseptics est to wodc nldg to get
the ,stage another est to emulsion est made
at hottemperatures thixotropic to set as adhesives at
.benzene

.ROTOM MHT
-gas heat stage est the same about 400 degrees
,flow 011 ,.M.E.S 008 ,.H.O\l f s si ,max
-heat est up benzenealkanes ,ethylene telres ,.0.

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

eral Electric Company.

The speed regulating device, shown at the left of the motor, is applied, since it is essential that the machine run at constant speed. As is indicated, the device is merely a fly-ball governor, driven by the motor, and arranged to open a contact when the speed becomes excessive. The contact is placed between the motor and the source of current supply; across the contact is shunted a 1000-ohm resistance. If the motor speeds up, the governor opens the contact, and thereby places the 1000-ohm resistance between the motor and line. The motor therefore slows down until the contact closes again, and shunts the resistance. By means of this governor, large changes may be made in the load or applied voltage without any great effect on the speed of the motor.

In Fig. 16 is given a detailed

THE MORNING STAR IN THE PRINTING TELEGRAPHY

last effective Gomphus.

•, seiven gultafuer beoga est
•, beifqgs si , rotom est to tief est ja nwoide
nur enkdom est tant lattnesse si ti emia
-es est , befcibnt si si . beeqs tntemor ja
nevitb , rotom everitt tly-pell e klerem si solv
feastnes a hage et bannette hne , rotom est yd
-nes est . avinaseste aewoene beoga est new
estnes est hne rotom est neewted fealig et fea
-tnude si feastnes est escos ; ylippus tntemor to
sheala rotom est tly . sonataster mfo-0001 a he
-mest hne , feastnes est jaejo tonwevor est , d
est neewted sonataster mfo-0001 est neewted yd
ewola ersteredt rotom est . enif hne rotom
etmora hne , nigras aewole festnes est lffan yd
, tonwevor alit to ausew yd . sonataster est
-ze to hse est si elam ed tan aewoflo ojef
est no festne festne yd fudativ erster beifg
•. rotom est to beqgs
beifteb a hneig si fi . art ni

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

view of the governor. The mechanism is supported in a steel "O" frame. This frame is attached to the motor by bolts, as shown. The operation of the governor is apparent from Fig. 16.

THE TAPE CONTACTS. The tape contact mechanism is located at the lower right-hand corner of the machine. This mechanism performs the same function as it did in the introductory system of Fig. 6; that is, it controls the relay pole changers, being itself controlled by the paper tape.

The tape contact pins are five in number, and are held in a vertical plane, as shown in Fig. 17. Each pin is held in a pin-holder, which is a small, round, brass disk. The pin runs through the disk edgewise, and is fixed to the disk by a set screw. A bearing hole is bored through the disk from

УЧАСТВОВАТЬ В МИЛОСЕРДИИ ОБЩЕСТВА МУЖЕЙ

-qua si mainansem est. nonne vog est to whev
si emerit est. emerit "O" feets n si beforog
.nwoe es ,stled vd votem est et beforste
jmeritque si nonne vog est to mortatwo est
.et .gk mort
equat est .emelatwo emat est

tewof est ja betsoof si meimadom festno
-noum sinif . soliform est ja teurco hned-tidari
si bib ti ja moltenut emse est ammotreq meima
, si tadt ;d . giv to metava ykotembentki est
-ti gried, akegendo eloq wafer est alentnos si
, eqat reeq est qd belloutnos file
evit era emiq festnoo eqat est

• emaq leotterev s at bled era bna . tedmun at
• s at bled at nq desM . vi . gM ni swode as
• zasrd , bmer , llama s at holdw , rebled-nq
• ayaweshe hslB est figuraM aust nq est . hslB
• A . wteso tea a yd hslB est et hewit et bna
• wch hslB est figuraM hewit et elod unifexed

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

face to face, but considerably off center. All five of the pin holders are mounted on a vertical stud rising from the base. The tape-ends of the pins rest against a metal plate called the tape shield. The opposite ends of the pins are fitted with contact points, which are alligned with contact screws. The screws are supported by an insulating bracket, which, in turn, is supported from the base. This bracket insulates the pins from the base and from each other. For ease and compactness of construction, the contact pins are alternately long and short; the contact screws are correspondingly staggered. By this construction, more room for lock nuts on the screws is provided than would be if the screws were all mounted in a single vertical row. The contacts between the pins and screws are normally held closed by the springs,

THE GOVERNMENT OF INDIA'S PREDILECTION FOR MIGRATION

...that of the government and, east of each
 no government era establish any act to evict LIA
 etc. said act most gather buts facilitate a
 system a families ther amic act to abne-eqat
 etiaoggo off .Bleis eqat off Bellso etalq
 testimony KJW beijit era amic act to abne
 .any the testness off .Bleis era deh ,etiaog
 amitlamenti na qd betrooppa era sweror off
 most betrooppa si .punt ni ,deh ,Jedward
 amic act established tefford aint .said act
 ease now ,testo nase most bns said act most
 testness off ,adherence to usentarymos has
 -nos off ;these has yna yfetametle era amic
 .betreppa qfplifinquecros era sweror test
 etha feel tot most yna ,adherence aint qd
 li ed blnow most bebjverig si sweror off no
 -tov elgata s ni bejnom lla ethw sweror off
 bns amic act sweror testness off .now Isolt
 ,swertara off qd faccio "Now qfplifinquecros era sweror

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

S, as indicated.

In the operation of the tape-contact mechanism, the tape runs between the ends of the pins and the tape shield, so that the pins are lifted away from the shield a small amount. This displacement of the pins, though very small, is multiplied by the lever action of the pins and pin-holders to such an extent that it is sufficient to open the contacts. When the perforations in the tape occur, the ends of the pins, under the action of the springs, S, drop through the holes and close their respective contacts.

THE TAPE FEED. The tape-feed mechanism is also apparent from Fig. 17. The feed-wheel consists of a brass disk, fitted with short, steel, wire teeth; the disk is fixed to the lower end of a vertical shaft called the feed shaft. The wheel and shaft

VIRGINIAN CULTURE TO MEXICO MUSICALS ETC

.BETSEY BENTON BROWN

-eqat est to molteeqo est ml
 est neowted amur eqat est ,mankadeem tontaco
 tadt es ,bfelde eqat est bna unq est to abne
 a bfelema est mowt yaws betill eris amq est
 ,amq est to tneucalqah est .Jamez flane
 tavel est yd baillqitum si ,Jamez ytev kpanit
 ka hess et zebled-utq has amq est to abton
 -no est nago od tneinfiru si tk tsit tneku
 -so eqat est at emolterotay est had .adet
 noites est tolmu ,amq est to abne est .the
 bna zelom est agnoraq qorb ,a ,agnoraq est to
 .,agnoraq evitcooper tkenz esole
 beseqat est .CHETWELL ETC

est .VI .gk mowt tneucaya oale si metandoem
 beseqat ,beseqat a to tneimao leefw-beel
 si haitb est ;ntet eriw ,leeds ,tneke djiw
 tneke lnsitrev a to bne towl est et hexit
 tneke bna leefw est .tneke beseqat beseqat

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

are located on the opposite side of the tape shield from the contact pins and tape, but the edge of the wheel projects a slight distance through a slot in the shield, and is thereby enabled to engage the holes of the tape.

The upper end of the vertical shaft carries a worm wheel which engages a worm on a horizontal transmission shaft from the motor. The worm drive, as shown, is enclosed in a gear-box. The gear-box casting extends downward to form a casing or collar bearing for the vertical feed shaft; it extends to either side to form a sleeve about the transmission shaft. By this arrangement, the vertical shaft and feed-wheel are suspended from the transmission shaft. The lower end of the vertical shaft is normally held against a stop at the bottom of the tape shield

THE MURKIN SYSTEM OF LITERACY TEACHING

eqat est to abis otisouge est no betsool era
tus .eqat era enig foefno est mori bleids
-abz tigila a stetorq feedw est to ogha est
af era ,bleids est ni tolz a ligorit eset
est to sefol est esgane of helsane yderent
,eqat

-itrev est to bne reqqi est
esgane helsin feedw givz a sekrte fidsi lse
fidsi nofaimanerit lnsitrev a no errow a
,mwole as ,avib errow est .notom est mori
-tacx xed-tacx est .xed-tacx a of becalce af
-los ro galise a wrof of Dresnawob esmetre gal
th ;fidsi heet lnsitrev est not unirred raf
tuods aveala a wrof of elke rafle of esmetre
,fidsi hattu est qd ,fidsi nofaimanerit est
-era era feedw-heet era fidsi lnsitrev est
-wol est .fidsi nofaimanerit est not behor
bleid villemor af fidsi lnsitrev est to bne ro
bleids eqat est to wotted est to qote a fidsi

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

by a spring, so that the feed-wheel projects through the slot in the tape shield.

An attachment which aids in the threading of the tape under the tape contact pins is also shown in Fig. 17. This device serves to pull all the contact pins away from the shield, and at the same time, withdraw the feed-wheel from its slot. When the parts are in this position, the tape may easily be threaded under the pins. Upon their release, the contact pins again rest on the tape, and the feed-wheel engages the feed holes.

The attachment is operated by the movement of the lever, L, of Fig. 17. The movement of this lever, through the cam, C, pushes the lower end of the feed-shaft and the feed-wheel away from the shield.

The movement of the lever, L,

KITAKERIEN DUITINGE NO METAYE MUNDEHON SINT

steetong feedw-beet eft tent on ,zetting a vd
 .bleids eft eft mi tola eft ghebrift
 mi abia heldw tmemdeatts mA
 -mo eft eft zedan eft eft lo ghebrift eft
 -eb alint .VI .gft mi mwole oafs al enig tent
 -s enig tentmo eft llsq et zevres eolv
 ,enig omes eft ts bns ,bleids eft mortt qew
 nes" .tola alj mouk feedw-beet eft wachififw
 quem eft eft ,wachififw alj al era offaq eft
 wiedt moqu .enig eft zedan behescht ed vltase
 eft no tent aljaa enig tentmo eft ,enellet
 beet eft segzane feedw-beet eft bns ,eft
 .
 betarego al tmemdeatts eft
 .VI .gft to ,I ,revel eft to tmemevom eft vd
 ,me eft rigorit ,revel alint to tmemevom eft
 ttids-beet eft to bne radow eft zeling ,O
 .bleids eft mortt qewa feedw-beet eft bns
 ,I ,revel eft to tmemevom eft

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

also raises the contact pins away from the tape shield, through the agency of another lever. By referring to Fig. 17, we see that between tape pins #3 and #4, there is a free space, due to the fact that the row of feed holes occurs in this space. A bell crank is mounted with the pin-holders between holders #3 and #4, the bearing being at the elbow of the crank. One end of the crank extends along the pins a short distance, and terminates in a vertical cross-rod. The cross-rod extends completely across the row of pins. The other end of the crank is connected to the lever, L.

Thus, when the lever, L, is moved to the right, it not only withdraws the feed-wheel from the tape shield, but also lifts all the pins away from the shield. With the parts in these positions, the tape may

THE WORKING SYSTEM OF PRINTING SEALS

est more yaws enty fawos est easier ola
 tettone to tchereh enty geyon, fiedia egat
 tadt osa ew, J.A. of geyoneler level
 enti s al stent, A. has S. enty egat
 best to wor ent tadt jost ent of enb, osage
 al mase IIed A. amga alid al amoco zelom
 steflon neewted zrichion-niq ent atiw betnom
 to woffle ent ja gated galzed ent, A. has S.
 amga amfave mase ent to has ent. Mase ent
 al neewtunet has, amajah tchom a enty ent
 amfave hor-zzoro ent. hor-zzoro lsoitrev a
 pedto ent. amga to wor ent maseen qleselqeen
 ,level ent of bedcamco al mase ent to has

.I.

al ,A. level ent medw ,andt
 ent amfahitiw qfno tem si ,dipit ent of devom
 oula tuf ,Meldia egat ent mof leadw-best
 itif .Meldia ent more yaws enty ent lla ent
 gam egat ent ,amfahoy esent al ating ent

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

be easily threaded under the pins. When the hand lever, L, is moved back to its normal position, the pins and feed-wheel also return to their original positions; they perform this movement under the action of their return springs.

The tape contact and feeding mechanism just described is mounted on a brass plate, fastened to the main base; hence, the entire mechanism may be easily replaced in case repairs are to be made upon it.

To facilitate such replacements, the worm shaft of the tape-feed is connected to the main shaft from the motor through the coupling, D, of Fig. 17. This coupling consists of two steel disks, one on each shaft. The two disks are faced together and connected, near their edges, by a single pin. Such a coupling furnishes no impedance to the removal

INTRODUCTION OF ITINERARY TO MARYAS MURKHAM SHT

enT merW .enq enT rehns bobsent vifase ed
 fannom sti of hood bevom sti ,I ,revel bned
 -er calz feedw-beeI bns enq enT ,moitnoq
 -req vefT ;smoltheeq lantigro tient ot mnt
 wind te molten enT rehns d-akewom enT enT
 .smoltheeq lantigro
 gubbeet bns festnoq eqst enT
 assed s mo betnow sti bedivesed fast malandrem
 enT ,comd ;sead niam enT ot beverest ,etely
 ni beolger vifase ed kym malandrem vifine
 .ti noyu ebsm ed of enT arisqet easo
 -esqet nana estabilist of
 -nos al beel-eqst enT to fidele nrow enT ,a'pex
 gugovit rotom enT motl fidele niam enT ed bedox
 -nos qutiquos enT .VI .xii 10 ,C ,antiquos enT
 .fidele nose no eno ,mish leets enT to atke
 -tancee bns pedtagot beest era chalb enT off
 a dou .abq elynt a qd ,seghe tient been ,lo
 favoset enT ot oonshegmt on zedehant qutiquos

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

of the mechanism.

THE TRANSMISSION SHAFT. The transmission for the tape-feed mechanism is shown in Fig. 18. As indicated, the transmission shaft is supported in four bearings, B; one is on a bracket near the motor, the second by the coupling, and the last two on either side of the worm drive of the feed-wheel. These latter two bearings are a part of the bracket which supports the tape shield. The general plan of transmission is this: the motor, through a gear train, drives the gear, G; this gear, through a clutch, drives the transmission shaft, which, in turn, drives the feed-wheel. None of the transmission parts need further comment with the exception of the clutch. The clutch forms a part of an automatic stop system which will now be discussed.

YEHAKKET ORTHODOX TO METAYE INVENHOM ZBY

.malmadeom est to
est .TWAHS TMSMISMOH SHHT
et malmedem heft-eget est tol koimaimaneket
-bemt est ,Betschibit ak .BI .gIT mi nwoda
,anuized twot et betzoddu et t'fale maledu
est ,zotom est trem t'fale a no et uno ;D
no owt teal est bus .yntique est yd baceek
-baet est to evirk arrow est to ebis rendie
tray a era agulized owt t'fale eset" .Iesuw
.kieldu eget est atroqqa below t'fale est to
est :sing et koimaimaneket to haly latomeg est
,keep est covith ,kleyt keep a dymond ,zotom
est covith ,dofule a dymond ,keep shif ;D
covith ,rist et ,dofule .t'fale koimaimaneket
atroy koimaimaneket est to uno .Iesuw-heft est
to koimaimaneket est atiw koimaimaneket heft
na to troy a smot dofule est .dofule est
-sh et won ilkw deliw medays yose eltanode
.besswe

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

THE AUTOMATIC STOP. It has been found necessary to apply an automatic stop or control device to the tape-feed mechanism. When this device is omitted, difficulties arise when the perforator operator does not work fast enough to supply the distributor with tape. The tape tears between the two machines, or else the distributor feed tears the feed holes out of the tape. It is with the idea of overcoming this difficulty that the manufacturer adds the automatic stop.

The general plan of the device is this: before entering the tape feed of the distributor, the tape loops over a small lever. This lever carries a contact point at its opposite end; a second point is fixed to the base. The opening and closing of the contact controls a magnet called the

PENALTY AND MITIGATION IN MURKOM LAW

and tI .NOTE DITANOTUA MHT
 ditanotua ka qiqqa of qasasenok hanot need
 -noor heet-eqat est et scivah leitnoa te qata
 -tib ,settime et scivah sidiq mali .mali
 totzrago tejarcheq est mali salva scitisa
 -tib est qiqqa of nippone test know tem neob
 neewted arsat eqat est .eqat titi w totzdrat
 totzdratib est safe to ,settime est et
 .eqat est to the sefod heet est arsat heet
 -tib est qalmoxero to arbi est titi et tI
 -otua est abha totzdratunam est tent qifseit
 .qata citam
 -ab est to malq faromeg est
 heet eqat est qalveta ereted :etit et only
 a revo sqoof eqat est ,totzdratib est to
 tentnoa a seitzno revel etit .revel llnna
 taliq llnna a ;lne ettaqqo eti te taliq
 galole lne galole est .eqat est et heit et
 est beliae fozam a alerano fozam est to

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

cut-out magnet, which, in turn, controls the feed clutch in the transmission shaft. Ordinarily, the tape between the perforator and distributor hangs loosely and exerts no pull on the lever; but if the tape tightens up, as it will when the perforator is working slower than the distributor, it pulls on the lever and opens the contact. The solenoid is de-energized and opens the clutch. The tape feed is thereby stopped before the tape is torn. When the tape again becomes loose, the lever is released, the contact closes, the clutch solenoid is energized, and the clutch re-engages, so that the tape feed proceeds as before.

The automatic stop as actually applied to the machine is shown in Fig. 18(a) and (b). The gear, G, is made in one piece

YUANQIET CHITWIR TO MULAYU MINHOM HIN

est alerthoo ,ant si ,selikw ,tengam tuc-the
 -tibto .tibto mohsinat est si metule bao
 bao tototreq est neeted est est .tiba
 lly on erroe bao klessef bao mohsinat
 ,an amekit est ti tud ;tovel est no
 grikow si tototreq est new lly ti es
 est no silq ti ,mohsinat est nadzaw
 biomeles est .tawas est ameo bao tovel
 est .metule est ameo bao besigrene-eb si
 eroe est eroe neqqata qmam si buat est
 ,escoi ameo naga est est new .taw si
 ,escoi tawas est ,besigrene si tovel est
 est bao ,besigrene si biomeles metule est
 -tibq buat est tud os ,esigrene-er metule
 .erote as abeo
 vilantes as gote chitmotus est

(a)II .tib si ameo si erode est or baoq
 eseq emo ni shem si ,D ,taw est .(d) bao

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

with the sleeve, S', and the disk, A; the sleeve makes a bearing fit with the transmission shaft. The disk, A, constitutes a part of the clutch. When the clutch is engaged, the gear, G, and the shaft turn in unison; when the clutch is disengaged, the gear, G, the sleeve, S, and the disk, A, turn idly upon the shaft, whereas the shaft remains stationary.

The detailed construction of the clutch is shown in Fig. 18(a) and (b). On the transmission shaft is mounted the carrier, B, which carries the clutch dog, D. A spring, S, holds the dog against the edge of the disk, A. In the edge of A is a small notch, N, and at the end of the dog is a tooth which engages the notch. It will be seen, therefore, that as long as the dog, D, bears against the edge of the disk, A, the

THE JEWISH UNIVERSITY TO MURRAY GOODMAN AND

est ; A , haib est bns , 2 , eveels est atjw
 -enarr est atjw tif unvred a nolam eveels
 a setnritence . A , haib est . tfaida pokasim
 -me at nolule est nefw . nolule est to jrsq
 at mutt tfaida est bns , 0 , tseeg est , beysa
 est , beysapnech et nolule est nefw ; nolule
 , A , haib est bns , 2 , eveels est , 2 , tsog
 tfaida est eseredw , tfaida est noyu ylki mutt
 . ylkoitatz anissim
 noluritence belitateh est

(d) bns (a)8f . gil at nrode et nolule est to
 -tre est betnuc et tfaida noluritence est no
 . 2 , yob nolule est nolras deliw , 2 , rekr
 egbe est tarkaga yob est abled , 2 , galrigs 4
 llams a et A to egbe est nI . A , haib est to
 a et yob est to bns est to bns , 2 , nolom
 ed lifr tif . Nolom est saygme noliv affect
 , 2 , yob est as ysol se tant , stroferent , nees
 est , A , haib est to egbe est tarkaga arzed

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

clutch is engaged. The clutch is disengaged when the dog, D, is held away from the disk, A.

The tripping mechanism for disengaging the clutch is also shown in Figs. 18. On the base, and near the clutch, is located the clutch solenoid, M. The solenoid has an armature, pivoted at the lower end, which carries a stop pin, P. Ordinarily, the solenoid is energized, and therefore holds its armature away from the clutch. However, when the control contact is opened by the tightening of the tape, the solenoid is de-energized, and its armature is drawn away by a spring. This armature movement thrusts the stop pin, P, into the path of the dog, D, so that the dog strikes the pin. The dog is tripped out of the notch, and the clutch is disengaged.

ЧИСЛОСТИ СЧИТАЮЩИЕ ВО МНОГАХ МУЖЕХОМ БЫТ

богащества и достоинства . богатые и бедные ,
жизнь есть морь чистоты и . О , зоди есть морь
. А

точ маимадеем глиссирет есть
эгит ик авода озла и достоинства есть погони
-ол и , достоинство есть чистота , зоди есть то . А
богомолье есть . М , богомолье достоинство есть бесса
; быв чесов - есть я бессовиц , система не зод
есть . Улицами . Я , миц жата в заслугах зоди
забыл отчелави быв , беспричине и бессовиц
, чесов . достоинство есть чистота чистота есть
есть яд бессего и тестюко бессюко есть неду
-х и . богомолье есть , эгит есть то глиссирет
яд чистоты и чистота есть быв . беспричине
есть чистота чистота чистота есть . чесов в
то . О , зоди есть то зоди есть чистота . Я , миц жата
-гист есть зоди . миц есть заслуги зоди есть чистота
-х и достоинство есть быв , достоинство есть то яд
бессего .

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

Means are provided for the holding of the dog, D, away from the disk, A. On the transmitting shaft, and beside the carrier, B, is mounted a disk, C. This disk contains a wide shallow V-notch in its edge. A lever, T, is pivoted at one end to the base plate of the machine; the upper end bears against the cam, C, under the action of a spring. The end of the lever is so shaped as to fit in the notch of the disk, C.

In the operation of the device, the shaft and the disk, C, ordinarily revolve so fast that the lever has not time to drop into the notch of the disk; also, the notch is so shallow that should the lever drop into it, the lever could not hold the disk against the driving force of the shaft, but would be raised out of the notch as the disk turned. When the stop pin, P, trips out the dog, D,

THE HARMONIC CHIMING TO MITSYS MURKOM SHY

est wot bəbivord ova amaz
 .Maih est mort yaws ,C ,yob est to gribbed
 est obisad bme ,fleas gaifinansit est no ,A
 Maih shifT .D ,Maih a betwom si ,E ,yekriso
 .egbe ati at meton-V wofflae shiw a antistres
 est of bme emo ts betoviq si ,F ,yovel A
 zvved bme teqqi est ;xalidaw est to shalq sand
 a to maites est rebaw ,G ,moo est tamaga
 an həyala os si yovel est to bme est ,jirqa
 .H ,Maih est to meton est at tif of
 ,seivesh est to mohstarego est nI
 eviever qLizanibro ,I ,Maih est bme flesa est
 gorb of emit ton and yovel est jasit tast os
 meton est ,oals ;Maih est to meton est ojmi
 est qorb yovel est blwoda taft wofflae os at
 tamaga Maih est blod ton blwos yovel est ,ti
 est blnow tso ,flesa est to eror gaivish est
 .benint Maih est an meton est to tuo besiar
 ,C ,yob est tuo agint ,I ,nig goja est medw

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

the momentum of the carrier causes the parts to assume to position of Fig. 18(b). The dog, D, is now well clear of the disk, but the spring on D tends to rotate the carrier backward until the dog drags on the disk, A. However, the notch on the disk, C, is cut so that just as the parts come to rest in the position of Fig. 18(b), the notch in C stops under the end of the lever, T. The end of the lever drops into the notch and locks the parts in position. Hence, the dog, D, is kept clear of the disk, A.

When the dog, D, is released by the stop pin, P, it drops onto the revolving disk, A. As the notch in A passes under the dog, the dog drops into the notch, and the clutch is thereby re-engaged. The notch in the cam, C, is shallow, so that the lever easily rises out of the notch and rides on

THE MARYLAND SYSTEM OF PRIMARY EDUCATION

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

the edge of the disk, thereby leaving the entire clutch free to rotate.

THE CUT-OUT. A so-called cut-out mechanism is also shown in Figs. 18. The purpose of the device is to operate a relay, which operation causes both front and back contacts of the pole changer relays (identical with the pole changer relays of Fig. 6) to be connected to the positive side of the battery. Hence, when the device operates, only positive line impulses are sent out; this condition is the same as when the "rub out" signal is given, which signal consists of all positive intervals, and it will be remembered that the printer does not respond to such signals. When the tape feed stops for any cause, the cut-out device operates, so that the printer is kept inoperative. If it were not for this device, the printer would print

THEORY OF THE MURKIN LANGUAGE

est galvanised ,that est to say he said
,either or each machine estimate
-the bellies-as A .TWO-TWO SHOT

est .If .say it would call at malteseum two
,what a surprise of all could est to say
now this must find cause mortuary which
-itself) called regal also est to state
(a .say to myself regular also est like his
est to this estimate est of beforeness of it
-no ,however either est now ,each .presented
said ;two trees are seeing him estimate vi
"two day" est now as ones est at mortuary
like to estimate him is nothing ,nothing at lamp
-remember of him to me ,also regular estimate
done of largest son and regular est said be
you not quote best what est now ,already
said as ,surprise either two-two est ,each
stew to II .estimate said when at nothing est
taking blood regular est ,either said not son

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

over and over again whatever character happened to be in the tape contact mechanism when the tape feed stopped.

The details of this device are also shown in Figs. 18. On the feed shaft is mounted a disk, K, containing a wide notch, as shown; against the disk bears the lever, H, pivoted at its lower end, and held against the disk by a spring as shown. The lever, H, carries the movable point of the contact, J. When the lever bears against the edge of the disk, the contact is held open, but if the lever drops into the notch, the contact is closed. The details of the cut-out relay and of the electrical connections will be given later. The cam, K, is so placed on the feed shaft that when the shaft stops and is held by the disk G and its lever, the notch in K will lie under the end of

УДАРНЫЙ СИГНАЛ ВО ВРЕМЯ МИГРАЦИИ БИТ

-ел төтөрөлөг төвтадыг ялгар тэвэг биа тэвэг
жинчилж болжсан огст ёнд ми сэд сэд балс
баггота бефт огст ёнд мийн
өслийн шинт то алишеб ёнд

бефт ёнд н0 .81 .814 ми мүндицаа салы сна
н гүннэжсан ,Н .Жийн с бетненом ал тийн
арчид Жийн ёнд тээвэр ;мүндицаа ,Н .Жийн с бий
бий ,бий тэвлэг ёнд тээвэр ,Н .тэвлэг ёнд
мүндицаа энгийн а ўд Жийн ёнд тээвэр тийн
то тийн албаном ёнд зэврээн ,Н .тэвлэг ёнд
тээвэр энэж тэвлэг ёнд мийн .6 .тээвэр ёнд
-о тийн албаном ёнд ,Жийн ёнд то сэхе ёнд
жийн ёнд оршиг тэвлэг ёнд ти ти ,зог
ёнд то алишеб ёнд .Бэсэлж ал тээвэр ёнд
-семжээс ясчиргээлэг ёнд то бий тээвэр тээвэр
он ал ,Н .мийн ёнд .тээвэр мийн эгэллийн ёнд
тийн ёнд мийн тээвэр бефт ёнд н0 беасыг
-тэл ёнд бий ? Жийн ёнд ўд тийн ал бий мүндицаа
то бий ёнд тээвэр ёнд мийн ? ал житж ёнд ,тэ

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

the lever, H; hence, during this time of stop, the printer will remain inoperative. When the feed shaft is revolving at its usual speed, the lever, H, does not have time to drop into the notch.

THE TRANSMITTING DISK. Next in the order of treatment comes the transmitting disk and brush arm. The disk is located behind the tape-feed mechanism, as is indicated in the general plan of Fig. 15.

The driving of the brush arm by the motor is accomplished through the gear train and main shaft, as shown in Fig. 15, the main shaft carrying the brush arm. The main shaft is supported at its ends in bearings, B, one being on a bracket near the motor, and the other being on the bracket which supports the transmitting disk. The shaft passes through a large hole in the middle of

THEORETICAL DETERMINATION OF INFLUENCE OF VARIOUS FACTORS ON

•.note to emit eight spectra, some of them, several est
est very .extraterrestrial elements like potassium est
•.needs bases est to calculate at these levels
-at ground emit even for each ,H, levels est
•.not est of

THE TRANSMITTING DISK. NEXT

-emits est some of elements to radio est of
-of est levels est T .this caused the radio radiation
as ,radioactive heat-sources est balanced between
.if .will be half increased est of background est
this caused est to activity est
radio est majority radioactive est when est xed
•.II .will be mode as ,radio item has start
est .this caused est radioactive radio item est
-radio est when source est to background est radio item
-from est when source is no longer one ,it ,radio
activity decreases est no radio radio est has ,no
radio est .Radio quietness est background
to which est of radio source is majority source

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

the disk to the bearing at the back side of the disk. The bearing support is shown in Fig. 19.

The transmitting disk is of fiber, about two and one-half inches in diameter, and is supported from the base by a bracket (see Fig. 19). The disk carries eight brass contact buttons, set flush with the face of the disk. Connection is made to the buttons through leads at the back.

The functions of the eight buttons are indicated in Fig. 15. There are the five code buttons, 1, 2, 3, 4, and 5, a lamp button, L, and the two synchronizing buttons, the first positive and the second negative. The functions of the code buttons have already been explained. The lamp button is used in the operation of a signal lamp, by which the receiving station signals the

VILANDRIET SWIMMING TO MATEYA MURKINOM HBT

To abis road est to yarried est et matb est
at mrons et troque garred est .matb est
.er .grt

To et matb gittimant est
-abib et sefot tild-emo bns owt tuoda ,refit
s yd easd est mori bettoqua et bns ,refot
right sefotc matb est .(el .grt see) refotc
est dili matb tea ,mofitc doftas neard
est of abam et mofitc mofitc .matb est to esot
.road est to abel agorit mofitc
tigle est to mofitc est
ers erent .el .grt et betotbaf ers mofitc
,2 bns ,4 ,8 ,2 ,1 ,mofitc abes evit est
gittimantc owt est bns ,1 ,mofitc quef a
hances est bns evitc quef est ,mofitc
mofitc abes est to mofitc est .evitc quef
-tud quef est .bemisique need ybselis even
quef langia s to mofitc est et been et not
est alengia no-fata univiser est dili yd

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

transmitting station or vice versa. The synchronizing buttons are used in keeping the transmitting brush arm at one station and the receiving brush arm at the other station in step; the synchronizing system will be explained a little later. It suffices to say here that the positive button is connected permanently to the positive side of the battery, whereas the negative button is connected permanently to the negative side of the battery.

The brush arm and brush are mounted on the main shaft on an insulating bushing. The brush arm is of brass, whereas the brush is a copper strip, bent into a "U"; one end is attached to the brush, the other trailing over the disk. The brush arm also carries a felt wiper, as shown in Fig. 19, which wipes over the disk and keeps it

YURKHOVSKY AND THE GOVERNMENT OF THE

-nya est . senev soiv to goitata gaittakard
 esti gaigesi ak benn era emetiv gaittakard
 esti bna goitata uno is mis daurd gaittakard
 ni goitata reido est is mis daurd gaittakard
 -xa ed iftw metuya gaittakardenua est ;gatu
 yse ot aecifina fl . metal elttii a hemisq
 bejcomnoe ak mofus evitiseq est tait ered
 -ted est to abia evitiseq est ot qitkunay
 -joomnoe ak mofus evitiseq est aecifina ,
 est to abia evitiseq est ot qitkunay be
 . yretted
 era daurd bna mis daurd est
 gaittakard na no fime nham est ne bejnom
 aecifina , aecifina to si mis daurd est . gaittakard
 a esti tned , qirta neqqos a si daurd est
 est , daurd est ot bejcomnoe ak bna uno ; "U"
 mis daurd est . matis est ravo gaittakard reido
 . fl ak mofus as , reqlw tlet a setrino oln
 fl aqeeb bna kash est ravo neqlw keldw , si

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

free from dirt.

Contact is made with the brush arm by a wire brush, consisting of a number of vertical wires. This second brush bears against the hub of the brush arm. The support of the brush in its bracket is clearly shown in Fig. 19.

THE POLE CHANGER RELAYS. Considering the path of a current impulse through the apparatus as our general order of treatment of the subject, we find that the pole changer relays come next in order. The five pole changer relays, whose function is the same as in Fig. 6, are located in a row at the upper left hand corner of the distributor base (see Fig. 15). In addition to the five instruments mentioned, there is an additional one, the cut-out relay, whose function is to connect both front and back contacts of

WISCONSIN UNIVERSITY NO. 1000000 UNION FIRE

•with most cert
David edit nthw ebam ai testncl
to reboun a to yntellance ,david eriw a yd wa
fontaps eried David Brokes shif .newly fassit
edit le droppas erif .wie daniel edit le dud edit
.erif at swed mirsels at telord eti at daniel

THE POLICE CHIEF GUARDIAN. Galt
-that is to say that he is to be the chief of police
-and to take charge of all the departments of
the body that shall be, except those that are
evil and . above all that those who
are of different creeds, classes and conditions
of work as of persons etc &c. & that all the
-ministers shall be ready when the Queen shall
call or nominate him to . (If any man) shall not
-have no or exceed . thousand dollars worth of
-goods and chattels in . one hundred and
-fifty dollars per month . and that he shall be
-able to prove his worth before the Queen and
-the members of the Council .

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

the others to the positive side of the battery. The sixth pole changer relay is similar in construction to the others.

A detailed view of one of the pole changer relays is presented in Fig. 20. The solenoid, as mounted on the distributor is vertical; it is fitted with strap iron pole pieces, P_1 and P_2 . The bottom pole piece, P_2 , is prolonged and bent up along the front of the coil; the pole piece extends about half way up the coil. The armature is of the same stock as the pole pieces, and is hinged to the armature as shown. The armature carries the contact lever, C, which is insulated from the armature by a sheet of fiber. A bracket is attached to the lower part of P_2 , runs up in front of the armature, and carries the fixed relay contacts. The armature is normally kept against the back

TRANSIENT CHANGES IN ENERGY MEDIUM ENT

-ted out to abia avitiso out of exento out
-tance at valer regnado elog dixis out . yet
. exento out of molitorianos at ral
to em to wely bellated A
out at Bellonary at valer regnado elog out
-dixit out no bellonox as ,Bionelos out . or
-k qnta ntiw bessit at th ;Isolitew at ron
also moff poff out . gl and P , I , zeces ,
zaoles qu tned has beyonding at . gl . zeeby
abmefre eselq elog out ;ltes out to thorit out
at erutans out . ltes out qu raw tned tueda
at has ,zeces elog out as roots eme out to
-ensis out . mwnia as erutans out of beginid
at deidw ,D , revel jessone out certaine out
to feeds a qu erutans out most behelment
; newl out of benonits at Texosid A . redit
erutans out to thorit at qu sunr ,gl to freq
out ,stethos valer bexit out aslris has
need out vantage elog yllawton at erutans

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

contact by the flat steel spring, S.

When the solenoid is energized, the upper part of the armature is drawn toward the upper pole piece, P_1 , which movement closes the front relay contact. When the solenoid is de-energized, the armature, under the action of the spring, S, returns to its original position.

In Fig. 20(a) is shown the conventional symbol used for such a relay in wiring diagrams.

Next in order of discussion occurs the main-line pole changer; however, we will omit this discussion for a time, and next consider the receiving apparatus.

THE RECEIVER DISK. The receiver disk and brush arm are located behind the transmitter disk, as is illustrated in Fig. 15. The construction and mounting of the disk is, in

YACHTING MAGAZINE TO MATAYA NUMBER ONE

• 8 . *Leeds Journal of English Language and Linguistics*

at etutamis est to tisq; reges est ,bealg
Aldw ,M .eestiq; elong reges est biewoi austib

• тестное волокно тонкое с ячейками
— ячейки с ячейками с ячейками с ячейками
— ячейки с ячейками с ячейками с ячейками

and awards at (a) 50% in the

...an early start in life.

-ment off guided bridge era was shared by both off .II .III at Battersea off as well together at , at both off to continue the negotiations

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

general, the same as that of the transmitter disk. One difference in the two is that the receiver disk possesses one large button at A, (see Fig. 15) instead of the two synchronizing buttons which the other possesses. The other difference is in the attachment of the disk to the bracket. The receiver disk is attached to the bracket by thumb-screws in such a manner that after loosening the thumb-screws, one may turn the entire disk through a small angle. The theory of such an adjustment was presented on page 30 ff. The disk has a scale marked on its edge, so that its angular movement can be gauged.

THE TRANSMISSION SHAFT. The driving of the receiving brush arm from the motor is accomplished through a main shaft, carrying the brush arm, and a gear train, as

THE WORKING SPACES ARE GOING TO BECOME THE FOCAL POINT OF THE PRESIDENTIAL OFFICE.

-timonarii est te fuit ne omnia est , latrone
fuit si owt est ut ecomeritib⁹ em⁹ . heil te
-tud⁹ erat ero auctoritate hanc testicem est
owt est te hacten (si . ait een) , & ita pot
-tus & ita est deinde auctoritate pugnacientis
-destit⁹ est ut si ecomeritib⁹ radio est . aeneos
-vicerit est . feliciter est ut natus est te dñe
-dum⁹ qđ testicem est ut bedestis si heil te
-necos⁹ testis fuit tunc⁹ a nōne ut auctor
-ne est crux qđ ero , auctor-dum⁹ est pug
-nacient est . alijs illis a deposit⁹ heil estit
egy ne beatusq⁹ cum pugnacientis ne deus te
est ne beatus elios a sed heil est . It⁹ os
ad nos tunc⁹ talibus est fuit ne , sijc
. deinceps

THE TRANSMISSION SHAN.
THIS WORK WAS DONE BY THE FRENCH ENGINEERS OF THE MINISTRY
OF STATE AS A STUDY OF THE PROBLEMS OF AUTOMOBILE
TRANSMISSIONS.

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

was the case of the transmitter. The shaft is supported on two bearings, one on a bracket near the motor and the other near the disk and on the disk bracket. The drive, however, from the motor to the brush arm is not direct, but is through a so-called synchronizing clutch. This clutch constitutes a part of the equipment for keeping the receiver brush at one end of the line in synchronism with the transmitter brush at the opposite end of the line. We will now consider the synchronizer, of which the clutch forms a part.

THE SYNCHRONIZER. The scheme of the synchronizing apparatus is as follows: The driving motors at the two ends of the line run at approximately the same speeds, but the receiver brush arm is geared to run a little faster than the transmitter arm. The function of the synchronizer is to retard the

DISAPPOINTED IN THE PRACTICE OF MEDICAL MORALS

ttens est . zeitlmaerk est to esno est new
-dicts a no one . synised est no bettoque si
kib est uses teste est bns: rotom est raaq te
, reviewd , evitb est . teford kaiib est no bns
, teerb son st wa kawib est of rotom est with
gaisinodomya ballon-er a nqoutd et fad
to treq a substituo metulo sind . metulo
seared reviewer est nqoek tot gneqube est
ktiw mafordomya ut exif est to bne uno ta
to bne ejnouye est to kantd testlmaerk est
-incidence est tablance won lliw ew . exif est
, trt a amrof metulo est metw to , tes
emend est . RHEOMORPHUS ENT

swellot as si antarque pribakordyce est lo
est lo abne ent est ta erotor qnivib est
, abeqz eme est vlejauixouya ta aux esqil
mut ot beriseg ai mis hantd revleser est tnd
est .trex rettimentart est naist retast elttit a
est frater ot al xenikoydays est lo noldor

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

receiver brush at suitable intervals, so as to keep the receiver arm sensibly in step with the other. The occurrence of the correction interval is governed by the relative positions of the two arms, so that whenever the receiver brush has attained a definite small angle of advance over the transmitter brush, a correction interval takes place, so that the receiver brush is drawn back into its proper position. This retardation of the receiver brush is accomplished by the synchronizing mechanism, which is controlled by the two synchronizing pulses, the first negative and the second positive, which the transmitter brush sends out between successive letters. The two synchronizing buttons were mentioned in the description of the transmitter disk.

YHARAWINT SHIWEIKI V. MURRAY MURKIN ET AL

as on , alvareanz adfathas te dawrd revfeser
 qets af ylidnes myr revfeser eft geel of
 -ros eft to somettwos edd . radlo eft ddiw
 eviteler eft yd bentrevoy si laverdai norfes
 revfeser iant on , amis owt eft to anclifaoq
 osifiles a bentrisi eft dawrd revfeser eft
 revfeser eft revo comavhs te elgns flams
 on , asyl heist laverdai norfes a , dawrd
 eft kord mwest et dawrd revfeser eft iant
 eft to norfahater aift . norfes yedoraq eft
 -nya eft yd bendifiquesm of dawrd revfeser
 bollfesses af ddiw , anifadom galishwys
 taff eft , asifus arthmoflyys owt eft yd
 eft ddiw , evitfesq blosas eft has evitfesq
 -sesas roffed two abres dawrd revfeser
 anoffud galishwys owt eft . stoffel oris
 eft to norfahates eft ni benofidom owt
 , kord revfeser

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

A schematic view of the synchronizing mechanism is presented in Fig. 21. This figure illustrates only the general principal underlying the system: certain modifications are necessary before it can be used in actual operation. The cam marked correcting cam in Fig. 21 is mounted on the receiver brush arm shaft. A contact arm bears against the cam, under spring tension, so that every revolution of the cam, the end of the lever drops into a notch in the cam face. This movement of the lever close the contact, which is in a circuit composed of the contact itself, the corrector magnet, the marking contact of the main line relay, local battery, and ground.

Suppose the transmitter sends out the negative synchronizing pulse; the main line relay closes the marking contact.

VITAMIN TREATMENT IN MITOCHONDRIAL DISEASE

-mga adt to weiv ottawades A
.IS .gM ni Agustos at mabuhay patinawdes
larawes adt ylmo seterantit anggit shift
-ham nileses :medya adt pulystahan Legionary
ad mao ti erored yassasem sis maitsehi
-tes bedrum uno adt .naktanang lantos at haw
-et adt no bantum si IS .gM ni mao giktoet
syed mao testimo A .tibad kira kawid revise
es ,miamet galigo tahan ,mao adt testimo
bne adt ,mao adt to maitulover ytreve hadt
mao adt ni metok s etna agorh revel adt to
adt esolo revel adt to tsumevon sint .esat
te benogmon filiusko s ni si haw ,taytang
,taytang totocorro adt ,tibati testimo adt
,yaler emil mao adt to testimo painim adt
,bañura has ,yretted Isaoof
abnes testimandit adt esogqu
adt ;esfiaq gikinomonye evitagon adt tuo
.testimo painim adt esolo yaler emil mao

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

Such a condition is indicated in Fig. 21. Now the notch in the face of the correcting cam is so placed with reference to the receiver brush arm that if the receiver arm is ahead of the transmitter arm, the synchronizing pulse will occur while the cam slot is under the end of the contact lever. At this time, therefore, the cam contact is closed, and the main line relay is on its marking contact; hence the corrector magnet is energized, and applies a correction. The next pulse is positive, so that the corrector magnet is immediately de-energized by the opening of the relay contact. If the correction need be but slight, the corrector magnet may be de-energized through the opening of the cam contact.

When the receiver brush is in step with the other, the cam contact does not

YUJASDAMIT DWINWIRI TO METAYA MURKOM EHT

.IS .għiex mi bessejha kif no iċċi kien
għall-ġiegos edd to soċċi edd mi fosten edd wali
-er edd oċċomxekk niflu beessiq os al mso
al minn revisioni edd li jaġid minn David revisor
-inquiryos edd ,ma xejtixx kien id-ic
et-foxa mso edd ellif luuq il-liku saliġ qas
sindi ja .revel festnos edd to bne edd tħalli
,besolek xi festnos mso edd ,exċċeżiex ,emitt
għall-ixx edd no al vallet emm nien edd bne
-tnejn xi jengħad rofexx edd qedex ;żejtnej
t-kien edd .noiġiexx a sejjegħ bns ,beessiq
-nejn rofexx edd jaġid is ,avilied xi sejjex
-nekk edd qd besigħx-eb qlextiemmi xi jaġi
noiġiexx edd li ,festnos vallet edd to għi
wax ġengex rofexx edd ,qiegħi fuq ad ġew
edd to għnejn edd hawni bekkx-eb ed
,festnos mso
et David revisor edd megleġ
tagħix sekk rofexx mso edd ,nifla edd iti u qedu xi

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

close until after the synchronizing pulse has occurred, so that no correction is applied.

As was previously stated, the scheme of Fig. 21 is not the one used in practical operation, since it is necessary to modify the control of the corrector magnet somewhat. However, before taking up these modifications, we will consider the synchronizing clutch, by which the corrector magnet is enabled to retard the receiver brush arm.

The synchronizing clutch is shown in Fig. 22. The motor drives the receiver shaft through a worm on the motor shaft and a worm on the receiver shaft. The worm-wheel, and a gear, A, of Fig. 22, are in one piece together with the connecting sleeve. The sleeve is bored to make a bearing fit with the shaft, but is not fixed to the

THIS INSTRUCTION SYSTEM IS FOR PRINTING ON THE IBM 1401 DATA PROCESSOR.

seeing gatishomonya est tefta litur esole
-ga si mofteerco on test ob , hennoco and
.beiq
est , bejata vlasolverg asw si
-vare xi Sean uno est tom at 12 .glit to emellen
-om of vrasseesel si ti omis , mofteeqa last
Jengam totseerco est to lortnos est vrib
oneit qu gatid stched , revewell .taiwono
-mordocya est teftasee lliw ew , un itseffibom
Jengam totseerco est daliw vd , detsle pafat
.ura harid reviewer est frater of Balidus si
si notule gatishomonya est
-er est sevlib totom est .SS .glit si awoda
totom est est no mrow a gatid tlaad review
est .tlaad reviewer est no mrow a bns tlaad
era .SS .glit to ,A ,zeeg a bns , leew-mrow
gatishomonya est dliw tenfegot eseq uno si
mofteed a erid si berod si eroola est .eveela
est et hennit tom si bud , tlaad est dliw til

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

shaft. To the brush arm shaft is attached the carrier, B, which carries the pinion, P, meshing with the gear, A, and the pinion, Q, meshing with the pinion, P. A star-wheel is mounted with the pinion, Q, and a jockey roller bears against it, under the action of a spring, S. By this arrangement, as long as the jockey roller holds the star-wheel locked in position, the carrier, B, the shaft, and the driving gears, A, and C, all revolve together. If however, the star-wheel is turned, the two pinions, Q and P, are turned, and the carrier, B, rotates with respect to the gear, A, and hence with respect to the driving motor. Whether the brush arm is advanced or retarded, with respect to the motor, depends upon the direction in which the star-wheel is turned.

Below the clutch is the cor-

ЧЕЛЯДНИКИ ОВИДИЙ КО МАСТЕРУ МУЖНОМУ ЧИТ

оди бедетъ си чада мое бывшъ оди си .чада
 .и ,ноинъ оди сеяко мольв .и ,рекко
 .о ,ноинъ оди бна .и ,реек оди стиу гайдес
 си леди-ката .и ,ноинъ оди стиу гайдес
 -лоу ядесот с бна .о ,ноинъ оди стиу бестном
 с то неистъ оди тайни ,и тайни оцено вол
 са яко са .железнитъ сицъ ю .и ,желез
 -лоф леди-ката оди яблонъ ядесот оди
 .чада оди .и ,рекко оди .ноинъ си б
 овлючили бна .о бна .и ,реек пактил оди бна
 -лоу си леди-ката оди .тревеси и .тревеси
 ,богатъ ова .и бна .о ,ноинъ овт оди .бо
 си яснотъ стиу сасю .и ,рекко оди бна
 оди си яснотъ стиу сасю бна .и ,реек оди
 -бо си моя бывшъ оди ходил .тетом пактил
 ,тетом оди си яснотъ стиу .богатъ си бенев
 -лоу оди бывшъ си ноинъ яснотъ
 .богатъ си леди-
 -лоу оди си ноинъ оди вол

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

recting magnet, to whose armature is attached a small interference pin, P. The magnet is so located that when it becomes energized, it draws the interference pin into the path of the star-wheel. Therefore, if the magnet be energized while the star-wheel is revolving about the central shaft, the pin trips the star-wheel through the angle of one tooth.

The result of the movement of the interference pin is the retardation of the brush arm. As was just shown, the clutch locks the receiver shaft and the driving gears, A and C, together, so that the shaft, clutch, and gears revolve in unison. If however, while they are revolving, the interference pin trips the star-wheel, the carrier, B, the star-wheel, and the shaft are stepped back slightly. Thus, when the receiver brush gets too far ahead of the transmitter brush at the

INTAKE OF ENERGY TO MEET METABOLIC EXPENSE

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

opposite station, a synchronizing pulse occurs, which causes the corrector magnet to pick-up, and thereby apply a correction to the brush arm.

The retardation of the receiver arm is very slight, but the driving motors run at such nearly constant speeds, that the arms turn through several revolutions before correction become necessary.

As was previously stated, the control of the corrector magnet is somewhat different from that shown in Fig. 21. The corrector magnet does not have time to pick-up under the action of the synchronizing pulse. It is necessary, therefore, to prolong the influence of the pulse. Two relays are added to the scheme, one a quick-acting, and the other a slow-acting instrument. The mechanical construction of the re-

THEATRENT DRITWIST NO METRYS MURKOMON KHM

-so esiuq yafizimomys a , soitata etiacoppo
 et fengam wofettos eft amesa jahaw , eme
 et mofettos a vippa yderekit bne . qm-Weig
 . pte mawrd eft
 -et eft fo mofattatet eft
 gniwib eft tad , tigilis yrev al mis revies
 , abeoqa fradence yfreen hewa te myt etecem
 -meyer fateses rigovit myt emis eft tad
 . ykassses emosed mofettos etofed emet
 , betata yfasoniyetq emw za
 -emos al fengam wofettos eft fo fortues eft
 . IS . qm al swoda tad mort thwetib fadw
 et emit evad tom neol fengam wofettos eft
 -mofattomys eft fo mofattos eft meono qm-Weig
 et , etofetet , ykassses al ji . esiuq yata
 -et emt . esiuq eft fo emesfimi eft gnoiq
 -Weig a eme , emesfimi eft of bobbs ers sysl
 -ittest qnien-wols a mofattos eft tas , yftee
 -et eft fo mofettakos lseimafem eft . fmem

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

lays is the same as that of the relay pole changers, already described.

The new scheme, as is used in practical operation, is presented in Fig. 23. In this figure, the quick acting relay is marked "X", and the slow-acting is marked "Y". By reference to Fig. 23, we see that when the correcting pulse is received, if the cam contact is closed, the current passes from the positive side of the local battery, through the printer relay and cam contacts, through the windings of X and Y in multiple, to the negative side of the battery. Relay X picks-up and closes contact a. The correcting magnet is now connected across the local battery through the contacts a and b. Also, both relay windings are connected in multiple across the local battery. The slow-acting relay, Y, now picks-up and opens contact b; the open-

YINASOMINT DRITTEIN TO MINTYE MUNDHOM KUT

seor waler est he fadit se emas est et eval
 .bedrisesd yddestis ,stegnade
 hean et se ,emelion wen est
 .git et hefnewing et ,sofferego haftesteig ni
 waler gntos hafur est ,erugit sint ni .ss
 hestrem et gntos-wala est lne , "I" hefnum et
 medw fadit ew ,ss .git et esmereler yd ."Y"
 mce est ti ,beviceret el ealnd ymtoetres est
 mort assaq tmetres est ,besofo et fentnos
 dybordit ,yretted lneol est to abla evitnoe est
 dgeonit ,stestnos mce hne waler fentnum est
 est et ,elgitnum ni Y hne X to synthaw est
 -wala X biper .yretted est to abla evitnoe
 -wala ymtoetres est .e fentnos maceo hne qu
 yretted lneol est pacise betrennes won el tea
 -st niod ,oif hne s stestnos est mynort
 seors elgitnum ni betrennes ons synthaw val
 ,I .waler gntos-wala est .yretted lneol est
 -wala est ;if fentnos maceo hne qu-slehu won

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

ing of contact b de-energizes both relay windings, so that the contacts a and b are opened. When a and b are open, the correcting magnet is disconnected from the battery; hence, the magnet is de-energized. But in the meantime, it has performed its synchronizing function, i.e., it has, through the agency of the synchronizing clutch, retarded the brush arm.

If, when the synchronizing pulse is received, the cam contact is open, (as it will be when the brush arms are in step) there is no current path through the cam contact to the relays X and Y. Hence, the relays are not energized and no correcting action occurs.

The purpose of the 200-ohm resistance shunted across the corrector magnet is to absorb the inductive kick, present

ЧИТАЮЩИЕ ПРИЧИНОЮ МАССОВЫХ СМЕРТЕЙ

-baiv yaf a dlof neatjwene-eh d foasnos lo am
-moye era d bns a eteajnos edt taid es ,ayal
-gum grikseiros edt ,nogo era d bns a pen .he
,sonen ;qretted edt mott befeenneosib el ten
-neem edt at yai .heizykeno-eh el temam edt
-anizatnoseva eti hemrotiveq sad fi ,emt
-zazega edt hysorit ,sad fi ,.a.t ,zeltonut
-edt hebrater ,dofule galizatnomenya edt fo
- .mra nany
-antizatnomenya edt medu ,fi

... .Xege et testnes also ent ,hevleser al esing
nt era ems haerd ent new ed llifw ti es)
ent signat itaq tettne on al swast (qeta
,one .Y fns X avuler ent of testnes also
-testres on fns hezgume for era avuler ent
.... .etnus molto ent

Місі-008 єд та зважує єд
-дем жовтого єд засідає більше суперечко
їпогоди, якщо відповіти єд дрохи їх та

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

when the circuit of the magnet is opened. If this resistance were not provided, destructive arcing would occur at the contact b or at the eam contact.

We will now complete the discussion of the electrical circuits of the distributor.

THE DISTRIBUTOR CIRCUITS. The complete circuits of the distributor are shown in Fig. 24. It is obviously impractical for us to attempt a study of the circuits as presented in this figure; hence, we will separate the constituent circuits from the rest and study them one at a time.

THE MOTOR CIRCUIT. The motor circuit is so simple that it need not be separated from the other circuits of Fig. 24. As is indicated, the motor, together with the governor contact and the 1000-ohm resistance

THE MASTERS SERIES IS OWNED BY THE MASTERS GOLF & LEISURE COMPANY

•, бенео ат жолам енді тиңчиң енді мәнн
-ең , бейіворға да орнан соншының енді ти
тәстес енді да күнсө Айнор ылғасы оғынаның
, тастаса мән енді да то д
-ең енді етепкесе мән Илья ең
енді то атынан жасиртсең енді то мәннен
, тастаса мән енді да то д
ең .
THE DISTRIBUTOR GRINDERS THAT
work era technology енді то атынан етепкес
-ең жасиртсең енді то үйнән ә түркестан енді то
-ең да Илья ең , оңдан ; шундай енді да бетеке
дауын енді атынан жасиртсан енді етеп
, етеп а та ано мәнді үйнән бас
жетек енді .
THE DISTRIBUTOR GRINDERS THAT
-ең енді то бедең ді таңындың да ат атынан
, АС . 354 то атынан жасиртсан енді мәннен
-ең жасиртсең енді то бедең
-ең жасиртсең енді то бедең , жасиртсан енді то
-ең жасиртсан енді то бедең

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

in multiple, are connected across the 110-volt battery.

TRANSMITTER DISK CIRCUITS.

The circuits of the tape contacts and relay pole changers are shown in Fig. 25. The connections are similar to those of the introductory system shown in Fig. 6, except for the addition of the 900-ohm resistance, D, in series with the back points of the relay pole changers, and for the addition of the cut-out relay. The purpose of the resistance, D, is to prevent the short-circuit of the battery when one or more of the relay pole changer tongues are on their front contacts and the transmitter brush is on the corresponding button. The cut-out relay was discussed before; it is controlled by the tape feed cut-out. As is indicated, when the cut-out relay is de-energized, as is normally the

THEARWYTT CHITWYRT TO METAYA MUNHOM EHT

-OFF off scores betweenne era ,elgitum ni
.wretted flov

.LYMURIC KRIG RYTTEWYRT

waler hys strathnes eges off to alkinis off
-now off .as .gry ni swoda era aveynale ale
-cittal off to esond of talimis era smotren
tot fquexe ,e .gry ni swoda metaya wrotens
,U .comfaiser smo-000 off to scitiba off
waler off to esatog need off kith scores ni
off to scitiba off tot his ,wretteds elo
comfaiser off to esatog off .waler two-tho
off to fivesis-trone off tneverg of al ,U
eloq waler off to erom to eme nedw wretted
strathnes knorl chent no era seynal regnade
-merres off no al hantid testiment off has
-off new waler two-tho off .wretted gwidnow
-eler off vd Bellournes si ti ;erected beseue
-two off nedw ,testament al al .two-tho best
off vifemor al as ,berigene-eb al waler fro

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

case, the armature rests against its back point, so that the back points of all the relay pole changers are negative. When the cut-out relay is energized, by the closing of the cut-out cam contact, its armature is drawn over to the front point. When the armature is in this position, both the front and back contacts of the relay pole changers are positive. Hence, by means of the cut-out mechanism, all-positive impulses are transmitted through the line whenever the cut-out is in operation.

Fig. 25 also comprises the circuits of the main line pole changer. The buttons of the transmitting disk are connected to the tonguss of the relay pole changers; the brush arm is connected to one terminal of the main line pole changer; the other terminal of the main line pole changer is con-

УЧАСТВИЕ ОБЩЕСТВА ВО ВЛЮЧЕНИИ МИРОВОГО КРЫМА

зато что эти факторы вновь становятся сильнее. Такое
 влияние есть для того чтобы не было опасности, что
 вновь возникнет конфликт между Россией и Европой. Поэтому
 мы должны учесть это. Но это не означает, что мы должны
 забывать о том, что есть еще факторы, которые могут
 привести к конфликту. Это может быть политическая
 ситуация в Европе, политическая ситуация в Азии, политическая
 ситуация в Африке. Поэтому мы должны учесть это.
 Но это не означает, что мы должны забывать о том, что
 есть еще факторы, которые могут привести к конфликту.
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 Это может быть политическая ситуация в Европе, политическая
 ситуация в Азии, политическая ситуация в Африке. Поэтому
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 Но это не означает, что мы должны забывать о том, что
 есть еще факторы, которые могут привести к конфликту.
 Это может быть политическая ситуация в Европе, политическая
 ситуация в Азии, политическая ситуация в Африке. Поэтому
 мы должны учесть это.

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

nected to the local battery through the 900-ohm resistances, A, B, C, and D. A study of the connections of the main line pole changer and resistances will show that two 900-ohm resistances, A and B or C and D, are always in series with the main line pole changer while it is connected across the local battery. Hence, the current through the coils is limited to a value which the winding will safely carry.

The tongue of the main line pole changer is connected to the middle point of the winding of a milammeter; we are not at present concerned with the purpose of the milammeter. At this point of connection, the circuit divides. One path consists of half the winding of the milammeter, one coil of the main line relay, the artificial line, and ground. The other path leads through the

YESTERDAY OUTLINE TO MESSRS MURKIN & CO

-000 ent ignorant vratted lassol ent et between
to ghatu A .G lass .G ,B ,A ,seconataiser and
reunite eloq ent niam ent to macteemno ent
mio-000 ent fuit wode ifiw seconataiser bne
syewis era ,G lass G to G lass A ,seconataiser
regards eloq ent niam ent ifiw selves nt
-had lassol ent macte betweenos si ti elishw
ellos ent ignorant therefore ent ,seconell .vrat
fiuw grubuif ent dohif eclev s of heimil si
.vrat
ent niam ent to engnot ent
taloq elishw ent of heimilos si reynos eloq
tom era ew ;retemmellim a to grubuif ent to
ent to macte ent ifiw betweenos macte si
ent ,macteemno to taliq ent si A .retemmellim
tiald to atalnos dtsg em0 .seifvib .inorio
te lico em ,retemmellim ent to grubuif ent
.ent laiclitira ent ,valer ent niam ent
ent ignorant when dtsg tanto ent .bnebry bne

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

other half of the winding of the milammeter, through the other coil of the main line relay, and thence to the line. We see, therefore, that, as in Fig. 6, the armature of the main line pole changer is connected to the line. One point of the main line pole changer is positive, whereas the other is negative; these two points are respectively connected, as before, to the positive and the negative legs of the main line battery. This battery is not shown in Fig. 25. The operation of this much of the transmitting circuit is exactly the same as that of the scheme shown in Fig. 6.

The transmitting disk of Fig. 25 has the eight contact buttons, previously discussed. The function of the five code buttons is apparent. The synchronizing and lamp buttons, however, may require a word of ex-

YAHARDEET DUTTHIEST TO MURRAY MORRISON SHT

, teðemmalum eit to gribniv eit to þian rento
-er enif niam eit to lico rento eit rignordt
-redit , sea s. enil eit of esordt bus , val
to esistans eit , ð .g. ni as , tali , eril
et hefsemnos si regnare eloq enil niam eit
eloq enil niam eit to taicq enil .enil eit
si rento eit esordt , evitizog si regnare
vlevitosequr exs atmicq owt esordt ; evitizgen
bus evitizog eit of , erotted as , hefsemnos
.grettid enil niam eit to ægel evitizgen eit
eit .g. ni nwoða ton et grettid enil
grettimann eit to down eit to holtzase
eit to tent as emas eit vltoske et tisotio
ð .g. ni nwoða emedes
.g. to hælb grettimann eit
vlevitoseq , anettud tostnes thigle eit and ð.
-ind abeo evit eit to holtzase eit .hesanesis
qual bus grettimann eit .fnetzqas et anot
-re to brou a striker van , tevewom , anettud

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

planation.

The negative synchronizing button is permanently connected to the negative side of the local battery, so that only marking impulses are sent out by this button. It controls the main line pole changer in exactly the same manner as the code buttons do.

The positive synchronizing button is the same as the negative, except that it is connected to the positive side of the local battery. Hence, only spacing pulses are sent out by this button.

The lamp signal button is marked "L" in the figure. This button may be either positive or negative, depending upon the position of the break key. Ordinarily, the break key connects the lamp button to the positive side of the battery, so that only positive or spacing impulses are sent

THE PRINCIPLES OF MURKINIAN

accidental

unintentional acts of killing
-acts of homicide which are not
done with the intent to kill but
which are done with the intent
-to injure or to commit
-which are done with the intent
-to injure or to commit
-which are done with the intent
-to injure or to commit

reckless ,acts of killing
-acts of homicide which are not
done with the intent to kill but
which are done with the intent
-to injure or to commit
-which are done with the intent
-to injure or to commit

knowing acts of killing
-acts of homicide which are not
done with the intent to kill but
which are done with the intent
-to injure or to commit
-which are done with the intent
-to injure or to commit

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

out by the button. If the break key is depressed, however, it connects the button to the negative side of the battery, and hence marking impulses are transmitted. At the receiving station, these pulses control a lamp relay, similar to the other local receiving relays; this lamp relay, in turn, controls a lamp. Normally, the lamp is not lighted, but if the break key be depressed, the lamp at the other station lights. This lamp is used for the transmission of signals between operators at the two stations, and does not interfere with the message.

AUTOMATIC STOP CIRCUITS. The circuit of the automatic stop for the tape-feed mechanism, comprising the stop lever and cut-out magnet, is clear from Fig. 24. The stop lever contact is in series with the cut-out magnet, and the two are connected across the local battery.

THIARAKINT CHITKRIE NO MINTAYE MURMON ETC

-eh si yek haerd est ti .mottap est qd tho
et nacind est afoemnoe ti ,reviewed ,lessering
comes lme .yrestad est to ehia evitages est
-er est ti .Rettihmann eto eselugai puhkum
qmal a leitges seulus esent ,mottata puhkies
privieser lessol radio est od talimis ,yaler
aforches ,hutu si ,yaler qmal alid ;yaler
,bedyif ton si qmal est ,villamoh .qmal a
qmal est ,hessenges ed yek haerd est ti dus
si qmal alid .stigil mottata radio est ta
meowiesalempia to nacalmannet est to haen
ton aseb lme .mottata owt est ta puhkieso
egazem est ntiw exofretki
est .STIUCHIS TOT CIRGUTUA

-eqat est tof qeta ciharotus est to ciharic
tevel qeta est puhkieso ,mahnadeem heet
.AS .gft mori wale si ,tempam jne-jne lme
est ntiw cihres si si tevel qeta est
-a defences eto owt est lme ,dunam jne-jne
yrestad lessol est ssote

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

THE RECEIVER CIRCUITS. The receiver circuits are shown, somewhat simplified, in Fig. 26. The path of the impulse from line to ground is through one coil of the main line relay, through the milammeter, through the other coil of the main line relay, and through the artificial line to ground at G'. The milammeter is connected in series with the main line relay, so that a more accurate idea of the strength of the incoming line impulses may be obtained than would be furnished by the movement of the main line relay armature. The artificial line is merely an adjustable resistance and capacity in parallel, connected between the main line relay and ground. The function of the artificial line will be taken up during the discussion of the polar duplex.

The tongue of the main line

THE WORKING SYSTEM OF HYDROGRAPHY

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

relay is connected to the positive side of the local battery; the two points are connected to the two coils of the printer relay, as was the case in the introductory system. The remaining two terminals of the printer relay coils are strapped together, and this point connected to the negative side of the local battery through a 2000-ohm resistance. By this arrangement, the printer relay follows the movements of the main line relay. The purpose of the 2000-ohm resistance is to limit the current through the printer relay.

One point of the printer relay is dead. The other point is connected to the positive side of the local battery. The armature of the relay is connected to the receiver brush arm. Hence, when spacing signals are sent out from the transmitting station, the tongue of the printer relay goes

THE ARMY OF SHITIYEV TO MITYA NURKOV MHT

to this svitshov unit of betzennos si valer
-zveznos era stolop owt unit ; gretted Iscoi edt
as valer retning edt to allies owt unit of he
edt . mityev zyotovskiy unit of usso edt new
-er retning edt to elektrost owt grikishev
unit hne . zedzegot neqarts era alio val
edt to this svitshov unit of betzennos shiro
. oskotsaev mio-0003 a dyonosit gretted Iscoi
-for valer retning edt , tlyarevskiy unit of
valer unit plan edt to zlumenov edt now
of at oskotsaev mio-0002 edt to osorby edt
. valer retning edt dyonosit tlyarevskiy unit of
tlyarevskiy unit to zhloq em0
at betzennos si zhloq valte edt . back si val
edt . gretted Iscoi edt to this svitshov edt
unit of betzennos si valer edt to oskotsaev
-gla zyotovskiy unit , oskotsaev . mityev zyotovskiy
-unit grikishevskiy unit work two three era zlum
seop valer retning edt to oskotsaev edt , molt

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

to its dead point, and the receiver brush is not energized. When a marking pulse is received, the tongue of the printer relay goes to the opposite point, which is connected to the positive side of the local battery; hence, the receiver brush arm is energized. The operation, therefore, is exactly the same as the system of Fig. 6.

The circuits of the local receiving relays have been omitted; they will be considered during the discussion of the printer.

The synchronizing circuit, as previously described, was taken from Fig. 24. Hence, no further explanation is required.

As for the buttons on the receiver disk, and the circuits which they control, the buttons are arranged just the same as those of the transmitter disk, except that

YIMAROKIFT OMITHWYK TO MARYNS WORLHOM KINT

ten si hantū revieser eit hne , datog hantū eit of
,revieser si salus pñlñrem a med . hentgræme
eit of seog yeler reñning eit to aengel eit
-eq eit of hefornhoo si hñidw , datog effeaoggo
eit , aenel ; grettas lsoof eit to chis evitla
-mære eit . hentgræme si yrs hantū revieser
eit an onse eit ylloake si , erclerest , mit
. & . gft to mæsaya
-er lsoof eit to atimorke eit
Hñidw yent ; hentimo need ead yeler yllyhoo
eit to mænawisib eit galish berebianc eit
, redwyrq
, atimorke yllyhionya eit
. gft mort royst aw , hentmonsh yllyhionya se
, hentmonsh si wyltawlykhe teftfut on , comell . As
-er eit no smotfus eit tol wA
-no yerd hñidw atimorke eit hne , datog revies
emsa eit tenj Segnawis era smotfus eit , forf
tent tþreeske , wald testifiancet eit to seofit an

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

the two synchronizing buttons of the transmitter have been combined into one large button on the receiver disk. This button is marked "A" in Fig. 26, and is called the restoring button.

The receiver circuits beyond the receiver disk will be taken up in connection with the printer. We will now explain the polar duplex operation of the Morkrum System.

POLAR DUPLEX OPERATION. The system of telegraphy as presented in Fig. 24 is capable of duplex operation, that is, capable of simultaneously transmitting two messages: one in either direction. The plan is that of the polar duplex. As in all duplex schemes, the principal requirement is that the home-main-line relay shall respond only to signals from the distant station, and that the distant-main-line relay shall respond on-

THEORETICAL FOUNDATIONS OF THE POLARISATION

-ment est le snotted gatissionysc est est
-tud eysel eys est hantus need evan tattis
ai notting zitt .xetb reviewer est no not
-er est bellas si bns .82 .87M at "A" hentum
notting gatisc
bnowed atturio reviewer est
-comes at qu nesit ed lliw said reviewer est
chilghe won lliw ew .tattib est lliw nelt
munkel est to notting odo xelqu valoy est
.noting

POLAR DIPOLAR ODEHATIM. TIT
+2 .87M at hentum est as iddergelet to metaya
-agac ,ai fadt ,moltato do xelqu to oldage si
-ew ont gattingerid ydnoespelets to ell
ai naly est .moltato valoy at eys :seps
xelqu lla ni an .xelqu valoy est to fadt
fadt ai themerhiger laqoniti est ,seps he
yfuo basque llaide valoy entif-nam-ewest est
fadt has ,moltato fadt est most elangs ot
-go basque llaide valoy entif-nam-ewest est

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

ly to signals from the home station. In other words, each relay registers signals received from the other station, but does not register signals sent out from its own station. If the relays perform in such a manner, then each station can simultaneously receive and transmit a message without the interference of the line signals.

The circuits essential for duplex operation have been separated from the general scheme of Fig. 24, and are presented in Fig. 27. This figure represents two stations, exactly alike. Suppose the main line pole changer at the home station to be on its positive contact, as shown in the figure. A circuit is thereby established from ground at G', through the positive leg of the main line battery, B, through the pole changer contact, to the middle point of the

WILSONIST COMMITTEE TO METRYS MUNICIPAL SHT

vedio ml .moltata emod eit mort alsmgla et xl
bevieser alsmgla stretcher valer nose ,abrow
-siger ton seob tue ,moltata vedio eit mort
.moltata nwo eit mort tue thre alsmgla rot
redt ,temper a nose et wrofreg syaler eit tl
hns evieser ylanoemalismis nwo moltata nose
eonekterefek eit tuodttw egassom a timent
alsmgla entil eit to
tot latnessse attwotis eit
mort betwngas need evad miltatodo xelquh
-eriq era hns ,42 .mlt te emden latwes eit
stnecorger erudt eit .vs .glt ni betnes
niem eit swppit .edita ylonohe ,moltata ent
ed et moltata emod eit ta tegnus eloq entil
-git eit et nwo da es ,testmos evitiaeq eit no
mort bendilates yderent et thwrt i .ew
to gel evitiaeq eit ligorit ,19 te bawor
eloq ent ligorit ,8 .kmetted entil niam eit
eit to teloq elbbim eit or ,testmos tegnus

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

milammeter winding; at this point, the path divides into two branches. One part leads through one coil of the main line relay, through the artificial line, to ground at G₁. The other part goes through the other coil of the main line relay, through the line to the distant station, through one coil of the main line relay, through the entire milammeter winding, then through the second coil of the main line relay to the artificial line, and through that to ground. Now, return to the middle point of the milammeter at the home station; the current path divides at this point. If the artificial line is properly adjusted, the resistance and capacity to ground through the two branches of the circuit will be the same. Hence, the current divides here into two equal parts, and, moreover, the two parts build up to their

TRANSLATION OF THE MURKOM TET

atay edit , atay edit te ; galihin yedewuh
absel treq em0 . sejendriw owt atat sebivit
, yaler entil niam edit te lloc eno signorit
te bawoy of , entil latolitir edit signorit
tendo edit signorit saog treq tendo edit . p
edit signorit , yaler entil niam edit te lloc
eno signorit , mottata jmatash edit of entil
edit signorit , yaler entil niam edit te lloc
edit signorit mels , galihin tetu melsi editne
edit of yaler entil niam edit te lloc boses
. bawoy of tend signorit has , entil latolitir
-sim edit te treq alibim edit of munter , well
atay thermos edit ; mottata emer edit te ratomus
entil latolitir edit ti . atay edit te sebivit
-naga has emanatast edit , patashie ylregora si
to sejendriw owt edit signorit bawoy of ytre
-tua edit , emer . emer edit ad liliw tisotis edit
, has , atay laupe owt entil edit sebivit has
xiedit of qu hitud atay owt edit , revcerom

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

working values at the same rate. Therefore, one-half of the current goes out over the line to the distant station, and one-half goes to ground at the home station. Hence, there are equal currents in the two coils of the home main line relay; the coils are so connected that the two equal currents neutralize each other's magnetic effects. There is, therefore, no resultant movement of the armature. At the receiving or distant station, the currents pass through the relay coils in opposite directions. Hence, the magnetic effects of the currents are additive, and there is a movement of the relay armature. Of course, if the armature is already in the position to which the line current tends to move it, there can be no movement.

Also note that the current at

THEORY AND PRACTICE OF POLYGRAPHY

, erforderlich . aber kann oft zu schweren Fehlern
fiihren das zwei soziale Schichten oft die Tiefen-eine
Tiefen-eine sind , nichtsatzenthalts oft etlich
, eben . nichtsatz enthalt oft zu wenig etlich
eines oft oft mit anderen lange etlich erfordert
etlich oft ; daher enthalt manch etlich die
anderen lange oft oft statt beobachten ob
. dasselbe eiterungen a' rechte diese esichtslos
beobachten that lassen um , erforderlich , si etlich
-heit zu privilezieren oft ja . esichtslos oft to
oft davorit esey anderung oft , nichtsatz statt
, eben . ameliorerib etiologo et alios valer
-hs etra etnethung oft to dasselbe scherzen oft
valer oft to beobachten s si erfordert man , evith
-la si esichtslos oft ti , esichtslo tG . esichtslos
-the enthalt oft nichtsatz oft nichtsatz oft zu sehr
-evom um ed man erfordert , ti evom et alios tne
, tne
ta etnethung oft fadit eton osia

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

the home station passes through the milammeter windings in opposite directions, so that no deflection of the instrument is produced. At the receiving station, however, the current passes through the entire winding in one direction, so that a deflection is produced.

Hence, as a summary of the operations, we may say that signals transmitted by the home station do not affect the receiving apparatus at that station, but are registered by the receiving apparatus at the distant station. In the same way, signals sent out by the distant station affect only the receiving apparatus at the opposite end of the line. The operation of the plan would of course have worked out the same had both stations been sending out either positive or negative currents.

TRANSLATION COMMITTEE TO MITTAGS MUNICIPAL UNIT

-malm est figuraunt secundum notitiae eorum est
in ,notioribz etiopogo in agilioribz tamen
-etq est transversum sit in notitiae est in fact
est ,tenebros ,notitiae universit est in .debet
in quibus eritne est figuraunt secundum invenio
-subiectum est notitiae fact in ,notioribz uno
.,he
est in quibus est in ,notioribz

-malius elementis inquit quecumque est ,notioribz
est factis fact in notitiae eorum est quod debet
est in ,notitiae fact in etiopogo universit
est in etiopogo universit est quod beretabiles
alleviis ,cum omnia est in .notitiae notitiae
quibus factis notitiae notitiae est quod fact in
hunc etiopogo est in etiopogo universit est
hunc hunc est in notitiae est .enit est in
dicto hunc omnia est fact in hunc etiam fact
in evitio factis fact in quibus need notitiae
.atmetum evitio

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

If both stations are sending out currents of the same sign, say positive for example, we have equal e.m.f.'s. impressed on both ends of the line. Hence, there is no resultant line current, and of course, no current through those coils of the main line relays which are connected directly to the line. Each relay will, however, register the same as though it were receiving current from the other station. An inspection of the diagram will show that the current through the artificial line at the home station will be in the same direction as positive current from the distant station would be. Hence, this current through the one coil of the relay produces the same movement of the armature as a positive current from the other station would produce. Likewise, at the distant station, the current through the arti-

THURSDAY DRIVING TO MONTPELIER MUSEUM AND

subtrees etc are omitted if no

evitbaq tao ,caxis emes eft to ztnering two
banquet .n't .n.e laupe evad ew ,elquene tot
on si erent ,comell .emli eft to zane nbof no
on ,earnes to bne ,zmering emli fntissem
emli nism eft to elios emot dygnat zmering
eft et ylterith beteennoo emz holdw exaler
eft zetizer ,revewon ,lliw yeler don .euli
moh zmering yulvieser stew ti agout as emas
-ebl eft to noiteeqani na ,noitata refto eft
eft agouti zmering eft taft wodz lliw carry
ed lliw noitata emos eft to emli fntissem
zmering evitbaq as noiteeqani emes eft ni
,comell .ed blnow noitata thatib eft moh
-ebl eft to lliw ems eft dygnat zmering alid
-emis eft to tremorom emus eft secmbiq val
refto eft mohz zmering evitbaq as etut
-ebl eft ta ,salweihL .comberg blnow noitata
-lire eft dygnat zmering eft ,noitata that

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

ficial line and one coil of the main line relay is in the same direction as a positive current from the home station. Hence, the movement of the distant relay armature is the same as though that movement were produced by a positive current from the home station. Therefore, we see that each relay still registers the signal sent out by the other station, but does so by current from its own station.

If both stations were sending out negative currents instead of positive, the operations would be exactly the same, except, of course, the relay armatures would take position against the opposite points from the first case.

In case both stations are sending out current, but these currents are of different sign, the operation of the re-

YHTÄNDELIET SULKEVIRTI TO MELTYP MELKONEN TINT

enil viham ent to lico eno lva enil laiselt
 -isog e as mofteettih emas ent al ei valer
 ,sowen .mofata emas ent mofit tuerme ent
 seurtaamia valer tueratih ent to tueremow ent
 etew tueremow tait dynoht as emas ent al
 emas ent mofit tuerme evitiaoq e yd beotberg
 valer dana tait eas ew ,etofietest .mofata
 ent yd tuo tree langia ent etefatper ilita
 mofit tuerme yd os seoh tuo ,mofata valo
 .mofata mwo ent
 -hnes etew smolata ntod II
 -isog to bastant etuerme evitspon tuo mof
 ent yltoxke ed ilbow smolataq ent ,evit
 seurtaamia valer ent ,emao to ,ytoxke ,emao
 etfaoqqa ent fankia mofiaq ent ilbow
 .easo taiti ent mofit etnbo
 ent smolata ntod easo al
 ent etuerme esent tuo ,tuetme tuo yltoxke
 -er ent to mofataq ent ,mofit tueretih to

THE MORKRUM SYSTEM OF PRINTING TELGRAPHY

lays is not changed. The only effect is the doubling of the line currents.

We see, therefore, that by using the instruments and connections of Fig. 27, we can establish duplex operation, that is, we can establish simultaneous communication in either direction over a single wire.

The Morse sounder and other instruments of Fig. 24 are used when the two distributors are being first put into operation. By means of these instruments, the operators at the two ends of the line can communicate with each other. Since these Morse circuits do not form a part of the printing telegraph system proper, their discussion will be omitted.

We will now take up the description of the only remaining element of

THATPOINT CHITWICH TO INTARYA MUNHOM WHE

est at foette vino est . tegato ton at vyal
.sternet enil est to gulfob
yd tent , ooo , ooo ew

To amiteamoo has etnemurcent est galas
, nofereye kelyh mafidatas nro ew , V3 . est
-moo ameemalambie mafidatas nro ew , at tent
elgata e revo nofocrib tentio n; nofocrib
.ewly

refto has tebbyo earto est
owt est newb hean era AB . gff to etnemurcent
-moo est tsg tent qaled era etnemurcent
-tele est , etnemurcent earto to amem yk . molt
-nro nro est tsg owt est to etna
etna earto tsg . refto hese ditw etnemurcent
gaffing est to tsg a wro ton ob etnemurcent
mekassish thlet , refto hese ditw etnemurcent
.bettimo ed illw
-seb est qu earto won illw ew

To tmaelle amitamer vino est to nafiqtre

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

the distribution system, viz., the Wheatstone differential relay.

THE WHEATSTONE DIFFERENTIAL RELAY. The main line pole changer, main line relay, and printer relay, although they do not form a part of the distributor itself, yet constitute part of the entire distribution system; all three are adaptations of the Wheatstone differential relay. The three functions are performed by instruments which are exactly alike in mechanical construction, but differ in their electrical connections.

The Wheatstone differential relay is primarily the same in its action as any other polarized relay; that is, it includes a moving contact arm, playing between two fixed contact points, and operating solenoids. The contact arm takes position against one point or the other, depending upon the direction of the current through the operat-

ЧЕЛЯБИНСКИЙ ОКРУГ ВО ВРЕМЯ МУРДНОМ ЧИТ

енотаевск ейт „зив , мөнгүе пойтадыртас ейт
.уалер лайнереттік

ДАЙМЕННИКИҢ ЕРДЕТАНДЕР НЫТ

еніл пісем , тегінде елдің еніл алем ейт . УАЛЕР
ең жағынан күннілік , уалер тәжіриғ бұра , уалер
, тілеңі төтудіндағы ейт тоң тиң а шыл да
-шылдағы ейтіне ейт тоң тиң аттіланас жо
тоң амбактағыса етің сөздің ғылым ; мөнгүе мол
сөздің ейт . Уалер лайнереттік енотаевск ейт
неділінен күннілік үд деңгөндей етің амбактағы
, мөнгүе молтасас жағынан ні еніл ғылым етің
, амбактағыса жағынан тиңдің ні төйтік тиң
лайнереттік енотаевск ейт
ең жағынан етің ні етің ейт ғылым тиң ай уалер
-нің ді , етің тиң ; уалер һауылға тиңдің үні
насып жағынан , үнің тиңдің үнінен а сабын
-нелес жағынан етің , аттың тиңдің үнінен оң
жеке жағынан етің , аттың тиңдің үнінен оң . Абі
-ғареға ейт үндердегі , тиңді ейт тоң тиңдің етің
-тараға ейт үндердегі тиңдің ейт тоң молтасас

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

ing coils. The armature, however, is not permanently polarized, as it is in the usual form of polarized relay, but is polarized by a separate exciting coil. The relay may be used as a differential or cumulative instrument, depending upon the connections of its operating coils. A relay is said to be differential when the magnetic effects of the currents through its operating coils counter-balance or oppose each other, and cumulative when the magnetic effects of all currents add to each other. The Wheatstone differential relay in its working form is shown in the accompanying plates.

The principal parts of the instrument are shown in Fig. 28. The two cores of the main coils, C and C', are mounted vertically and side by side. On these cores are wound the main coils, each coil

YERILOMINT SWITHINIK TO MUNIZA MURKOM SNT

-teq Jon si , tevewod , etutawia edT . alios zit
 lamas edT ni si ti za , besluzloq qilnemek
 besluzloq si tsd , valer besluzloq to mtoz
 tem valer edT . alios qutixek etarages a qd
 -ni evitximme to latjmetetib a za kew ed
 te amitseanee edT kodi qutixek , tsemurite
 ed ot bles si valer A . alios qutixego eti
 eti to etoetle etengam edT medw latjmetetib
 -moo alios qutixego eti qayonit etnemus
 -alumne hna , teito dose esodde to sonaled-ret
 -tue lla to etoetle etengam edT medw evit
 -tib enotatesed" edT . teito dose ot hba other
 mwords si triot qutixow eti ni valer latjmetet
 . setalq qutixaqnocoos edT ni
 eti to etresq legiomiq edT

owf edT . 83 ni mwords eti tsemuritek
 -tunom era , 'D hna 3 , alios nian edT to etres
 -esedit no . etis qd etis hna qilnemek be
 llos dose , alios nian edT hanow eti etres

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

consisting of two separate windings. The ends of the windings are brought out to binding posts on the base of the instrument. Each core is fitted with pole-pieces, as is indicated.

The armatures, A and A', play between the pole pieces, one armature being at the top of the cores and the other at the bottom. Each armature consists of an iron disk with a small projecting tongue at one edge. The two disks are attached to a brass rod, R, which runs through the centers of the disks; brass is selected for this rod on account of its non-magnetic properties. The rod is supported at the top and bottom in pivots. The tongues of the armatures extend into the space between pole-pieces.

The exciting coil may also

THE WORKS OF SHAKESPEARE

above off . especially strategies out to undertaken
 guidance of the sword are especially off to
 doff . movement off to lead off no other
 -at at as , seeing else off the benefit of one
 . benefits

.'A has A , servants off
 struts off , seeing else off measured value
 ready off has mete off to get off to galled
 us to assistance servants dead . mottled off to
 the enough guarantee items a little hath more
 a of besides are exists out off . above also
 are those off whom off any doing , & , for example
 here said not besides off said ; said off to
 . seeing off-when off to things no
 mottled has got off to destroy off for off
 -he servants off to enough off . seeing at
 . seeing-off measured words off said has
 seen also has been enough off

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

be seen in Fig. 28. As shown, the coil comprises an iron core, upon which is placed the exciting winding. The core is mounted vertically, and is of about the same height as the other cores; at the top and bottom, the core is fitted with pole-pieces.

The pole-pieces are end pieces, attached to the core in such a manner that they project from one side of the core. Semi-circles are cut out of the projecting ends of these pole-pieces; in the two semi-circular pockets so formed are placed the two circular disk-ends of the armatures, one disk being placed in each pole-piece. A very small air-gap is left between the armatures and pole-pieces, so that the two armatures and the brass connecting rod by which they are supported can turn freely in their pivots.

Just above the upper armature, and mounted on the brass connecting

THIRD I T SWIMMING TO MURRAY MUNICIPAL RIVER

-now it has got ,now it is .as .at at now of
 heavily at today now ,yes now we are easily
 getting at yes old .but when you have got
 right now and now to at has ,when you
 mosted has got got to ;when we go out as
 .seeeig-eleg at this better at yes got
 -seeig has era seeeig-eleg out

then has a has at yes out of bed out of ,as
 .yes out to able one most to get you want that
 you better out to two two are able like times
 -times out at :seeeig-eleg out to able
 out heavily era has out as seeeig you want
 one ,seeeig out to able like you want out
 you & .seeeig-eleg has at heavily you had like
 you want out wanted this at you this like
 seeeig out out that or ,seeeig-eleg has
 went today you had you wanted out as
 .today that at you want now you wanted out
 -times you out evode that
 you wanted out no better has ,and

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

rod, R, is a contact arm, O. This arm is fixed to the rod, R, at one end, and carries a contact point at its other extremity. Two fixed contact points are provided, one on either side of the arm and both in line with the contact point carried by the arm. The arm swings back and forth with the armatures between the two stationary points.

As for the operation of the relay, suppose the two operating coils carry currents which polarize the poles and cores in the manner indicated in Fig. 29. Also, let the current in the armature-exciting coil be of the direction that polarizes the armatures as shown. There is no return path for the exciting coil flux between armatures except through the intervening air or through the cores of the operating coils; obviously, the flux chooses the latter path. Hence, in Fig.

YMHANGSTW DAWYDD TO MYSYR MUNROOM SAW

-xit at mis sint .o .mis testnoe a et ,z ,bor
a sevnoe bns ,bns emo ts ,z ,bor ent of be
owt .ynteresting teste eti ts triq jomnoe
no emo ,bebvorg eta ztloq testnoe borit
ntiw entl al dtds has mis ent to shis teste
mis edt .mis ent yd bevvorg triq testnoe ent
-ed sevntarrs ent ntiv nttof has mord agnive
ztnloq ysmotata owt ent neewt
ent to mottarego ent rof za
-xos alios gntarego owt edr sccqrs ,valer
betoe bns zelcq ent eulrislcq nsltw etnertus y
tel ,cals .os .zlt at bedeslnt vennam ent nk
ed llos gnttare-ctntarrs ent al tnevno ent
sevntarrs ent sevntareg tent mottareb ent fo
-xe ent rof dteq mnter or et crst .mroda es
tqeeze sevntarrs neewted wlt llos gnttare
ent dgnont to tis pnterrent ent dgnont
ent ,ynterivdo ;alios gntarego ent to sevnoe
zlt al ,scenl .misq teste ent sevnoe wlt

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

18, the flux between armatures assumes the same direction and path as the operating flux. Such action pulls the armature in the direction of the flux; that is, the armature takes position against the right-hand pole-piece. When the armatures are in this position, the contact arm lie against the right-hand contact point.

Had the operating current been in the opposite direction, the cores, C and C', and their pole-pieces would have been oppositely polarized. Hence, the armatures would have swung toward the left pole-pieces until the swinging contact arm made contact with the stationary point at the left side. Therefore, the direction of the working current, by determining the polarity of the pole-pieces, determines to which side the armatures will swing, and therefore

THE WORKING SYSTEM OF PRINTING TECHNOLOGY

est seruus et servitio nesciis nulli est . si
guttierego est as itaq has nofisrib emas
est ut exstans est illaq nofis nesci . nulli
exstans est , si tant ; nulli est to nofisrib
-elq bren-digir est tentas nofisib exst
-elq elst ut exs exstans est nesci . ecclq
-digir est tentas cii exs tentas est , nesci
. nulli exstas bren
tentas guttierego est bren
, nesci est , nofisrib exstas est ut nesci
ovari bren ecclq-elseq tiefi lns , 'o lns 3
-antia est , nesci . brenitaloq yletisq nesci
-elseq tiefi est brenas gynas evad bren exst
exstas exs tentas yletisq est llns ecclq
est to tiefi yletisq exst llns tentas
est to nofisrib est , exstas est . abie tief
-elseq est gynas exstas yd , tentas antizow
nolow et exstas , ecclq-elseq est to yd
exstas est lns , exstas llns exstans est abie

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

determines whether the right- or left-hand contact will be closed.

If, instead of the direction of the working current being changed, the direction of the armature exciting current had been changed, the armature would have changed position just the same. This movement would be due to the change in the polarity of the armatures. In practice, however, the exciting current of the armature is not changed.

In Fig. 30 are shown the three methods of connecting the relay windings when the instrument is to perform its three respective functions. As was said before, each core carries two independent windings, all four windings being the same; the windings on each core are shown separated in Fig. 30, but in reality, both are distributed over the entire length of the core.

INDEPENDENT SWITZERLAND TO MITSUBISHI MUSIKENOM GMBH

transferred to - they are entitled to compensation
benefits and will receive
payments from the bank.

and, regarding general financial aid to
disadvantaged categories and to
those below standards, the government
should provide subsidies and, regarding need based
- even more direct. These are part of the
- so far as possible aid of aid of below them
- would, according to . payments are to
- standards aid to disadvantaged categories aid , revo
. regarding tax at

aid awards are 08 .pt. at

-bank values aid disadvantaged to above them aid
- aid awarded at at the moment aid new and
- aid below now at . amounts aid given aid
- bank values aid aid awards now , also
- aid ; cases aid general standards now life , equal
- standards awards are also now no appropriate
- standards are also . will affect at aid .08 .pt. at
- awards aid to affected areas aid revo bank

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

In Fig. 30(a) is shown the relay as connected for action as a main line pole changer. In this case, all four windings are in series, and in such a way that their magnetic effects are cumulative. The external connections are to terminals a and b. An application of the cork-screw rule shows that when the coils carry current in the direction indicated by the arrows, the top of the left core becomes a north pole, whereas the top of the right-hand core becomes a south pole. The contact arm, therefore, assumes position against the right-hand contact point. If the operating current is reversed, the polarity of the cores is reversed and the contact arm assumes position against the left point. Hence, the instrument fulfills the requirements of a main line pole changer.

In Figs. 30(b and c), we see

VIRGILIANUM CHITWALA NO MOTHEYE MURKHAM HUT

est nwoia si (s)os .gīT nI
 enil nis a am noltos uot beccenace ne yale
 agnisiw uot lla ,eone alit nI .agnafe elce
 tient tent yew a none ni lns ,zitien ni ois
 -tadre est .avitaliumo era etcefta oltenyan
 nI .d lns a alentur et era anolteemnos lan
 tent swoda est weter-htos est te noltasliq
 noltasliq est ni dneutno yriso elco est nedr
 ftel est te qot est ,swora est qd hetzalibl
 qot est zaeridw ,elco dttor a zemosed eroe
 .elco dttor a zemosed eroe hned-fngit est te
 noltasliq zemas ,ciclerid ,nis testmos est
 est II .tntoq testmos hned-fngit est tntoq
 ttfusiq est ,beaveret al dneutno noltasliq
 nis testmos est lns beaveret al zetos est te
 zed .tntoq ftel est tntoq noltasliq zemas
 te ztmemertuper est ellifit inmeant est
 .agnafe elco est li nis a
 oss aw ,(o lns d)sos .gīT nI

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

the instrument arranged for operation as a main line relay. The main line relay is under the action of two operating currents: that passing through the artificial line, and that passing through the main line. These two currents should neutralize each other's effects on the armature. At the same time, the relay should respond to a single operating current passing through all windings in series. An examination of Fig. 30(b and c) will show that the relay will act in the desired manner. Fig. 30(b) shows the relay carrying currents that neutralize, that is, the currents which it carries when messages are being transmitted from its own station. Fig. 30(c) shows the instrument carrying a single operating current, as it does when messages are being received.

In Fig. 30(d) is shown the

YESTERDAY SHITWIRL TO YESTERD MURKIN WIT

s as noitanege tot beynurke dnoorwirke est
 -nu si yafet enil niam est .yafet enil niam
 :sternine galtsrge owt to noites est rab
 ,enil latolfris est agnord grissaq tadt
 esest .enil niam est agnord grissaq tadt bne
 a'tendo nose salisfras blwoda sternine owt
 ,enil omes est th .erutarris enil go ateloffe
 -tatego elgaria s ot bnoqar blwoda yafet est
 si agnordi lls agnordi grissaq sternine yaf
 (o hne 3)OR .gIY to noitancimase nI .zolies
 -ed est si jas lliw yafet est tant woda lliw
 -ras yafet est swoda (d)OR .gIY .tourem beufi
 est ,si tant ,salisfras tant sternine galts
 era negeassom nafw salisfras ti nafw sternine
 .gIY .nafata nwo si mort battimanej yafet
 elgaria s galtsrge dnoorwirke est swoda (c)OR
 negeassom nafw neob ti se ,dnoorwirke galtsrge
 ,bevieser galtsrge est
 est nwo si (b)OR .gIY nI

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

relay connected for use as a printer relay. In this case, there should be two sets of windings; current through one set should cause the armature to take position against one point, whereas current through the other set should cause the armature to take position against the other point. Two windings are therefore provided, each consisting of two coils, one on each core. The terminals of one winding are a and b; the terminals of the other are b and c. Terminal b goes to one side of the operating battery. Now, if terminal a is connected to the remaining side of the battery, the armature assumes position adjacent to the left pole-piece. If, instead, terminal c is connected to the remaining side of the battery, the armature shifts to the right-hand position. Hence, the position of the armature depends upon which of its two

YOUNGST SWINNSTEIN TO MARY HOWELL THE

.væfer refning a za ean wyl betoennoc wæfer
to stes awf ad hlynde eran ,easoc sind ni
causo filwda fer ean nigerd fherne ;gribbkw
ean tanisge nofisaoq eft of erudaria eft
tee wæfe eft nigerd fherne æsterew ,wæfæ
nofisaoq eft of erudaria eft causo filwda
ste gribbkw awf .wæfæ wæfe eft tanisge
owf to gaſtianoc nose ,babivonq eredent
to alzimter eft .æres nose no ean ,alid
to alzimter eft ;d lne a ean gribbkw ean
of seeg d fenturie ,o lne d ste wæfe eft
ri ,well .wæfæd gaſtstage off to efta ean
ebis gaſtianer eft of betoennoc si a lærinret
nofisaoq aenscas erudaria eft ,wæfæd eft to
,baſtent ,H .seeg-eleg fñel eft of ðneuſtba
ebis gaſtianer eft of betoennoc si a lærinret
eft of atib'a erudaria eft ,wæfæd eft to
to nofisaoq eft ,easoc ,nofisaoq brad-thryt
awf eft to heildw noqu abnegeb erudaria eft

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

windings is energized; this is the action desired in the printer relay. It should be noted that the windings are not energized simultaneously, but only one at a time.

In Fig. 24, conventional symbols are used for the differential relays in the different functions. In the diagram, each instrument is shown as having two coils, just as the usual type of polarized relay. However, if it is remembered that the Wheatstone differential relay always has two coils, though they may be on the same or different cores, and that changes in the operating currents in these coils produce exactly the same effects as the same changes would produce in an ordinary polar relay, no confusion on the part of the reader will result. In the wiring diagram, the armature-exciting coils are omitted for the sake of simplicity.

THEATRELIST SHITWIST NO METRYS MURKOM SHI

-ob noites est si sint ; besigrene si agnibriw
 baton ed blwoda tI .yaler valery est si berla
 -metians besigrene tor era agnibriw est tant
 .emit a ja eno ylmo tud ,ylance
 -mya lanoftnevnoe ,B .gM mI

si yaler faltneretlih est tot beek era alio
 nico ,metians est mI .moftemt thorettih est
 tant ,alio owt gavivad us nwoe si thomarjem
 ,revewoll .yaler besiraloq to agyt leuar est ne
 -thi exctesdy est tant beredmemer si tI tI
 dazoni ,alio owt sad agawis yaler laltnarit
 ,berco thorettih to esas est no ed van yllo
 -dmetivo gatjersqo est si segnade tant bns
 -te ows est ylteske sondong alio esant si
 si earbors blnow segnado emm est no eret
 est no rehafnoe on ,yaler teloq ylancihi no
 gatjiv est ~I .tlueet lluw robaet est fo frq
 -o era alio yllicoxe-exutaria est ,moyali
 .ylcliqmis to esas est tot bestim

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

The last paragraph concludes the discussion of the distribution system. Next will come a description of the printer. As in the foregoing material, rough sketches of the printer parts will be used to show the general principle of action, whereas the photographs of the actual machine will be relied upon to show the detailed construction of the machine.

YUNAGORI MURAKAMI TO MATAYE MURAKAMI PEM

gebutomoq qaqogosaq tsal est

.metaye noitidritab est to nekawatib est
.retting est to noitqirassib a emos illiw tsel
nectedek ngorot ,istratas qaqogoset est ni et
wora ot bora ed illiw atay retting est to
est nekawet ,metaye to elqantiq faranay est
ed illiw onidew lautor est to qaqogosiq
solentance belated est wora ot noqu heifer
.emidew est to

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

Part IV - The Printer.

GENERAL. The Morkrum printer is, in reality, a typewriter, operated by electro-magnets, which are controlled by the incoming line impulses. In the following description of the machine, the plan will be to take up first the mechanical movements of the printer, and then to explain the electrical means by which the mechanical movements are operated and controlled.

The complete printer may be seen in the accompanying plates. As is indicated, the main frame consists of a bed-plate, from each corner of which rises a post; a cover-plate is screwed onto the top of these posts. When the machine is completely assembled, it is entirely enclosed except for the platen and typewheel carriage.

The printing action in this machine is accomplished by the typewheel striking a message blank, which is supported

THE MODERN EYE OF ESTIMATION

Part II - The Budget.

TECHNICAL REPORTS. LAMMEL

yd heferego ,refitiweqyt s ,qifiser el ,el
est yd heferego era hofidw ,siengam-otfeole
-set gnioller est si .seflmwt eni zrimonat
et es illw neliq est ,eslimat est to akrqite
est to ukremevom fascinacioem est turit qd eslat
fascinacio est atslqre et neit hra ,refitiq
era ukremevom fascinacio est neliq yd ukrem
heferego hra heferego
ed yam rafitq eselqmo est
-ibut el si .netaiq gniymoem est si neit
eselq-hed s to eslance amarit niam est ,hefere
-voe s ;tboq s neit hofidw to tempos nese neit
eselq to qot est otto beweris si eselq-te
-neus yletelqmo est enidont est neit .eslone
est tot tgezze beselone yletelqne si ti ,hefde
.eslone feedweqyt hra neitq
sint si motos yletelqne est

Wszystkie te informacje są zgodne z danymi, które przedstawiono w przekazie.

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

on the platen. These parts are shown in the assembly photographs.

THE TYPEWHEEL. The typewheel is shown in Fig. 31. It is a fiber drum, around the edge of which occur the type in raised characters; the characters are arranged in two rows, one near the top and one near the bottom of the drum. The typewheel has a hub at its center, the hub being bored to fit a shaft called the typewheel shaft. This shaft furnishes the primary support for the wheel.

THE PLATEN. The platen is a rubber roller, whose purpose is to hold the message blank or other paper. It is similar to a typewriter platen, and will be taken up in detail a little later.

THE TYPEWHEEL MOVEMENTS. There are a number of necessary movements of the typewheel. Primarily, of course, the wheel

WISCONSIN STATE MUSEUM FESTIVAL OF THE ARTS

-e , amwedit a at tI .IS .gF m nwois a
nt eoyt ent mwoe noidw to egho ent bmler
-mawtia ent mtoesatw ent ;mtoesatw bealer
tmew ent has yet ent tmew ent ,swot ent nt bo
a and feedweqyt ent .amwedit to motted ent
tift et herod guied sun ent ,retnes ati la jnd
ffeda ent .Jfeda feedweqyt ent haffao fiede a
.feedw ent tot troppwa wamring ent mewlent
a at metalg ent .NETALI EHT

THE THIRMANET MOVEMENTS. There
are fifteen of them, whose purpose is to
teach us to do better. It is a series of
messages from the Holy Spirit, and will be
used as a guide to us in our daily lives.

edj to atmamevom ytreassecen to redmnu a eis
leidw eit , eitnoo to . ylitranif . leidwegyt

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

must strike the platen so as to print the character. Before this action, however, it must have rotated so that when it strikes, the proper raised character will be at the point of contact between the wheel and platen. Also, the typewheel must be in its correct vertical position, that is, the correct position along the axis of its shaft. If the wheel is in its normal position, characters of the top row strike the platen; if the wheel be raised a little, characters of the bottom row strike the platen. This latter is called the shift position of the wheel, and is assumed when the shift signal is received over the line. Furthermore, after the printing of each letter, the typewheel must be spaced, that is, it must be moved along in front of the platen a short distance, so that the next letter printed will lie beside

YHAWHIST QUITTING TO MOUNT MUNNON SHT

est takig et se os metaly est exlita tann
ti ,tovewod ,metles sht croked .yestestado
,seltis si new fast on betator evsi tann
ed illw yestestado bestir regorq regorq est
feedw est snowed tootase to tsloq est ta
ni ed tann feedweqyt est ,osla .metaly bne
est ,ai fast ,metlisog facitrev jeevies est
.fide att to alxe est grols metlisog jeevies
-tado ,metlisog lasson att ni si leadw est ti
tt ;metaly est exlita wet qet est to atotes
to atotesyado ,sittil a beater ed feedw est
-tai sht .metaly est exlita wet motted est
,feedw est to metlisog filds est beffes al ter
-er al laugia filds est new hemwas al bne
est tefta ,yomterftnt .edil est yovo bever
tann feedweqyt est ,yedel dose to guitingq
grols bever ed tann ti ,al fast ,beaqe ed
on ,sonatais filds a metaly est to thort ni
elized est illw betatig revtel jxes est fast

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

the preceding one. It is important that we note that in this printer, the platen remains stationary, whereas the typewheel travels back and forth in front of the platen, and thereby distributes the successive characters along the printed line; in the ordinary typewriter, the platen carries the paper before the point of printing, but in this case, it is the printing point which moves. And last, when the end of a printed line is reached, the typewheel must be moved back to its starting position. With this idea of the typewheel movements, we are now ready to study the means by which these movements are accomplished.

THE CARRIAGE. The typewheel is supported on a carriage (see Fig. 32). The carriage travels back and forth before the platen, carrying the typewheel with it. As is indicated in the general views, the car-

THEORETICAL OUTLINE TO METEOROLOGICAL DATA

ew tait mazogat at ti .ono yutteeseng est
 enisemt metiq est ,retning sind at tait etor
 elevat leeswogut est zaotaw ,yutteeseng
 has ,metiq est to smotri at sirot has nesd
 -osade ovizasozus est astudirataq yutteeseng
 yutteeseng est ni ;estli retning est yutteeseng
 -ed qaqer est sezzise metiq est ,retirwoqut
 ,sase sind at tred ,yutteeseng to tuleq est erot
 has ,sase mazow daisw tuleq yutteeseng est ni ti
 -mazow at estli retning s to has est new ,tai
 est at nesd hevom ed has leeswogut est ,he
 -zabiq est to sase sind nesd .softinataq
 yutteeseng est yutteeseng has est ,etnemewom leesw
 -mazow era etnemewom sase tuleq yutteeseng est
 .besafiq

LEESWOGUT EST TAPPETI .THE CARHIADE EST

est .(22 .gii 1900) egaitees a no bettoobus si
 est eroted tottoq has nesd elevat egaitees
 si .ti ntiw leeswogut est yutteeseng ,metiq
 -tes est ,sase lareng est ni betsoobus si

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

riage is supported on two square steel rods, which extend clear across the front of the printer just in front of the platen. The carriage is so constructed that when one of the rods is turned, the typewheel strikes the platen, when the other rod is turned, the typewheel assumes the shift position. Hence, these rods not only form a run-way or track for the carriage, but also serve to transmit energy to the carriage for the typewheel movements. Because of this arrangement, the electro-magnets operating the typewheel can remain stationary, and be rigidly attached to the frame of the machine. A third rod, similar to the other two, but not assisting in the support of the carriage, is located below the other two rods. This third rod serves to transmit the motion of rotation to the typewheel. We see, therefore, that the car-

TRANSLATION OF THE MURKOWSKY LETTER

abor leids etende owt no bestoeden al ogeleit
 est te dnocht est ssotse riefe hmethe nldw
 -tse owt . netalq est te dnocht ni tant tebetity
 est te eno hewi tant beteritance se al ogeleit
 est selenia feedweqqj est , bewest al elot
 est , bewest al bot tento est hewi , netalq
 , eenel . politicoq tildi est zomwas feedweqqj
 desit te yew-hut a wrot vimo tom abor esent
 timenert si ovres oels tnd , egavirto est yak
 -ewon feedweqqj est tei egavirto est ot yake
 -sele est , yakeyestta est te sawoed . atjem
 -er hwo feedweqqj eno yakeyado afengem-est
 ed baleaffis yibiqit ed hwo , yakeyata hwo
 -imia , bot huiat A . enidest est te emerit est
 al yakeyado tom tnd , owt tento est ot tel
 -ed baleaffi al , egavirto est te dnocht est
 aevren bot huiat ahit . abor owt tento est wol
 est ot huiat te metton est timenert ot
 -tse est huiat , evokerend , see el . feedweqqj

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

riage serves as a support for the typewheel, and also transmits to the wheel the movements of rotating, striking, and shifting.

The complete carriage is shown in Fig. 32. As the mechanism is rather complicated, we will take up, one at a time, its various functions and the parts concerned.

The carriage frame is shown in Fig. 33. It consists of two parts. The first is a yoke, which is supported by the two steel rods as stated before. The yoke is fitted with round collars, free to turn, which have square holes at their centers; the holes fit the square supporting rods, so that when the rods are turned, the collars turn with them. The second part of the casting is of the form shown; it is attached to the yoke by two small shafts in the bearings.

THEORY OF THE STATE IN RUSSIA

, feiswaggt est tot sprosse a es savras egly
 atnemewom est feisw est of etimerett oela bns
 .anittida bns , anittida ,guitar to
 si eglyriso etelqmos est
 redter at mehnadom est al .22 .gk at nwois
 ,emt a ts emo ,qu exat lliw ew ,Betzetlqmos
 -resches sitaq est bne emtressi surtav est
 .50

nwois si emttri eglyriso est
 ent .atraq owt fo statano tI .22 .gk ni
 est yd betroppa si dohaw ,eley a si tarii
 si emo est .erected before as aber loesa owt
 dohaw ,mrt et eork ,staffee bnow atliw bestit
 sefol est ;eretnes tiedt fo sefol etanya even
 nedw taft as ,shor gaitropus etanya est tif
 atliw mrt staffee est ,berint era aber est
 fo at guitarso est fo tray bnoos est .seit
 yd emo est os bedette si tI ;nwois mrt est
 .eglyriso est ni attade illeso owt

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

In Fig. 34, we see the essential parts for rotating the typewheel. The bevel gear, B, is mounted on the lower end of a vertical shaft, S; at the top of the shaft is a universal joint. A sleeve, A, is attached to the upper member of the universal joint, and into this sleeve slides the typewheel shaft, F. The upper end of the shaft carries an arm, called the locating arm, which locates the typewheel. The typewheel is set onto its shaft with the locating arm extending into one of the holes in the bottom of the wheel. The shaft, F, is attached to the collar, C, which fits over the sleeve, A. The collar, C, and the shaft, F, are joined by a small pin, D, so that the the collar and shaft can move up and down along the sleeve, A. This mounting is necessary in order that the typewheel may move to

TRANSLATION OF THE HISTORICAL CHRONICLE

-ee est sea ew .A2 .glt ml
 .Iaenweqyt est gulfator tot aveq latines
 tewoi est no bejum el ,E ,mug Isved est
 Yo qot est ts';2 ,tlaada Isotrev a to bne
 ,A ,eveels A .tliot Isotrevius a si tlaada est
 -hnu est te redmen tewoi est et bejattia si
 aehila eveels est et hnu ,tliot Isotrev
 est te bne tewoi est .A ,tlaada Isotrev est
 galtecol est hellec ,wra me ocltiso tlaada
 -eqyt est .leedweqyt est setsof doliw ,wra
 -tsof est stiw tlaada est omo tea si leenw
 ni esel est te omo otal ynteretxe wra ynt
 -te et .A ,tlaada est .leedy est te motted est
 est revo stiw doliw ,O ,tallce est et bejent
 ,A ,tlaada est hnu ,O ,tallce est .A ,eveels
 est ts'it oz ,C ,nig llams a qd bejot ota
 -e swob bne qu evom nac tlaada hnu tallce est
 -socer et ynteretxe est .A ,eveels est ynt
 et evom ynt leedweqyt est ts'it ts'eo si ynt

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

the shift position and may still be rotated. The purpose of the universal joint is to allow the typewheel to strike without disturbing the gear, B, and the shaft, S.

Fig. 34 also shows the method by which motion is transmitted from the rotator shaft to the gear, B. A second gear, E, meshes with the gear, B; this second gear, E, has a square hole cut in its center, so that it fits over the square rotator shaft. Hence, when the rotator shaft is turned, the gear, E, is also turned, so that the typewheel rotates. The gear, E, fits the rotator shaft loosely, so that the gear can slide along the shaft with the carriage, and be in mesh with the gear, B.

In Fig. 32, we see the rotator parts in place on the carriage frame. As is indicated, the second casting of the car-

YHABOMINT QUITTIRE NO METEYE MUNISON ENT

.Reftator ed ifits yam has mottinog ffinis edt
-la et si tñiqç lastevins edt fo esoring edt
-dutieh twofifw exirte of leadweygt eit wol

.E ,fieda edt hns .E ,rseq edt gat
bontem eit zwode oals .E ,glt

-ator edt moff battimaneit et moffom deidw qd

,E ,rseq busses A .H ,rseq edt et ffinis rot
,E ,rseq busses elint ;E ,rseq edt ffinis adsem
tant ce ,rseq edt si joo elod eneprz a nad
,comell .ffinis rotator erene edt vero urit ti
,E ,rseq edt ,bennit si ffinis rotator ent new
.rotator fseiniwegt edt tant ce ,bennit oals et
,glenol ffinis rotator edt urit ,E ,rseq edt
ffinis edt grola ebtis nro rseq edt tant ce
edt dñre fuen si ed has ,eqalizce edt dñre

.E ,rseq

-ator edt oas ew .SE ,glt ml

et .emert eqalizce edj no esalg et eteq rot
-tac edt fo galtase busses edt ,bennibet et

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

riage serves to support the sleeve, whereas the lower casting holds the shaft, F, of Fig. 34. Fig. 32 also shows the gear guide, by which the gear, E, is drawn along with the carriage. As indicated, the lower casting carries an arm extending downward, and this arm supports a collar bearing for the gear E of Fig. 34.

The striker movement of the carriage is shown clearly in Fig. 32, left view. To the collar, which fits over the striker shaft, is attached a lever, #25-4, the upper end of which is connected by a link, #25-5, to the upper casting of the carriage frame. Hence, when the rotator shaft turns (to the left), it turns the lever, #25-4, which movement pushes the typewheel to the left and downward. The carriage in this latter position is shown in Fig. 39.

'YIVIAGHIEK DWEJJEH WA' MIEGS TA MIEGSOM BIEH

asorais ,aveals edd ttreppu et sevras esalt
.għiex to ,N ,tħiedi ent abloq kritase r-ewof ent
qđ ,ekkien t-kun qed swieka sali 22 .għiex .Mg
ent idher proċa mwaqt et ,X ,taaq edd idher
kritase r-ewof ent ,bettejha xi .qiegħiex
sift hax ,browniex għidherx wie lu sejjies
kun qed t-tarġi kritasse raffo' u s-tronqua mis
.għiex to X

edd to tkremexom testiex edd
tħel ,22 .għiex ni għixxex nwonha xi esgħix
ent revo stiżżekk hekk ,raffo' edd of .welv
.A-22 ,kieni u bissu t-ta ,tħiedi testiex
u qđ betsemmex xi hekk lu kien tħalli edd
-raġi edd to għidher jaqqi edd of ,2-22 ,kien
tħiedi rottotor edd hekk ,sejhe .esgħiex esalt
.22 ,revel edd anġu t-ti , (tħel edd of) anġu t
of ġeedweqqxi edd sejjanu tkremexom hekk ,
sift xi esgħixx edd .browniex hux tħel edd
.22 .għiex ni nwoodi xi miflaqq jaqtal

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

Note that the joint between the carriage-frame castings is in line with the universal joint of the typewheel shaft; hence, the carriage can bend over like a hinge.

A centering device is added to the striker movement of the carriage in order that the raised characters of the typewheel will always hit the paper squarely. Onto the typewheel shaft is attached a star-wheel, #25-14 (see Figs. 32, 35, and 36); the star-wheel is so placed that the spaces between its teeth lie directly below the respective characters on the typewheel. A centering lever, #25-19, is mounted on the carriage frame as shown in Fig. 36. This lever is pivoted, near its middle point, to the carriage frame; the lower end carries a cross-pin, P (Fig. 36), which fits into the slot of a transverse cam. This cam is rigidly attached

THEORETICAL STUDY OF POLY(URIDYLIC ACID)

-ogatives est measured that est said stock
 -reduces est still not at equilibrium enough
 est , some ; these feedways est to that less
 . again a still more broad was obtained
 which is called quinacrine A

at equilibrium est to the maximum available est of
 -sites est to the extent of about 70%
 . whereas when est to the equilibrium level
 -rate is reduced by these feedways est of the
 ; (22.5%, 22.5% .5% each) at 80% . feed
 excess est that becomes as at the equilibrium rate est
 -er est while quinacrine still exists at measured
 -ness A . feedways est no extent of the excess
 -res est no between at .81-82% , which gives
 -level still .82 .5% at which is enough to obtain
 est of , taking account of the , because of
 -sites a certain line toward est ; enough again
 to take est still about 20% , 22 .5%) C , also
 decreases slightly at this still . was measured a

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

to the lower casting of the carriage. Ordinarily, the centering lever is in the position shown in Fig. 35, but as the carriage is bent over for the striking movement, the relative motion of the cam and centering lever is such that the upper end of the centering lever enters one of the spaces between the teeth of the star-wheel. Both the upper end of the centering lever and the spaces in the star-wheel are slightly V-shaped. Hence, as the lever enters the space, the star-wheel and typeswheel are not only brought to center, but are locked in that position until the end of the stroke. The parts are returned to their original positions through a reversal of rotation of the striker shaft.

The shift mechanism may be understood from Fig. 32. The collar which fits over the shift shaft carries an arm, A.

YESTERDAY'S PUPILS TO MARY'S MUSEUM YESTERDAY

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

By means of a link, this arm connects with the vertical sliding rod marked "shift plunger". This rod slides up and down in the bearings on the main casting as is shown in the figure. To this rod is attached the clutch, #25-7, which is merely a flat plate. One end of the plate is attached to the plunger rod; the other end is forked, and fits over the end of the collar (C of Fig. 34) on the type-wheel shaft.

When the shift shaft is turned (to the left), it turns the sleeve and the arm, A. This movement raises the plunger, #25-42, which movement, in turn, raises the clutch collar, typewheel shaft, and typewheel. The typewheel is thereby moved into the shift position.

A return spring on the carriage brings the parts of the shift mechanism, including the shift shaft, back to their normal

YINHARDT MINTVIST TO MATTHEW MURKIN THE

diliw atoones mra skit , trif a to amesek yf
 -nulq tliis" bentam hor guthis laekfrev edt
 -ized edt at awob bus tu acobis hor skit ."tag
 edt at awora at ne guthis item edt no ejet
 ,dohlo edt bedotta si hor skit of .exgulf
 bus enG .edsiq tsit a ylerev si diliw , V-32
 ;hor tagu lg edt of bedotta si etely edt to
 edt revo stit bus ,bxrrot si bus revo edt
 -eqyt edt no (48 .gi' to 0) talloq edt to bus
 .tliis leadw-
 -runt si tliis tliis edt mesw
 edt bus evole edt emul ti ,(ttes edt of) ne
 -42 ,regular edt sealor thamevom skit .A ,mra
 dohlo edt sealor ,urst si ,thamevom diliw ,la
 edt .leadwegyt bus ,thme leadwegyt ,tallos
 -og tliis edt otiu bevoq ydetoit si leadwegyt
 .noftis
 enstrise edt no gaungs master A
 -ni ,mainassem tliis edt to ataq edt equtv
 lawiom theld of lead ,tliis tliis edt gaungs

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

inoperative position. This spring is shown in Fig. 32; it is stretched between the spring bracket, #25-10, on the plunger, to the lower part of the carriage casting.

The inker is the device by which ink is smeared onto the typewheel face during the striking movement; the ink is applied just before the wheel strikes the platen. The inker consists of a small felt roller, soaked in ink, and mounted on supporting levers. These levers are attached to the frame of the carriage. As this device is mechanically simple and unimportant, it is omitted from the detail drawings; it is shown, however, on the assembly photographs.

THE ROTATOR, STRIKER, AND SHIFT LINKS. The means for turning the rotator, striker, and shift shafts are shown in Fig. 37. This figure also shows the method of supporting the shafts on the main bear-

УЧАСТНИКИ КОМПЕТИЦИИ ПО МАТЕМАТИКЕ

two days at Baiting River, nothing availing
but the old weathered boulders at the bottom of the
ditch and a few small stones.

part of the critique section

The author wishes to thank the referee for

-or est gathered for assembly and small groups
awards are attained little by little, reinforce, total
-item and awards can be brought about. The self ac-
-tivated person has no attitude and antitropes to be

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

ing plates.

THE ROTATOR LINKS. Considering the rotator mechanism first, we see that the rotator magnets, which furnish the energy for rotating the typewheel, are located at the bottom of the machine near the middle of the base. There are two sets of magnets: one set for left and one set for right rotation of the typewheel. Each set consists of two solenoids, all four being supported from the base by the magnet bracket. Each solenoid is fitted with a sliding core or plunger; the two plungers of the left rotator magnets are joined by a yoke attached at their ends, and likewise, the two plungers of the right rotator magnets are connected by a similar yoke. From the center of each yoke, a rod, R, comes forward between the two solenoids, passes through a guide hole in the magnet bracket,

TECHNOMIST SMITHSON TO MPTCY MURKOM KWT

.as best as

-TECHNOMIST SMITHSON TO MPTCY MURKOM KWT

tant sea ew ,tant meimandem rotator eit gat
-tens eit daimant doidw ,stengam rotator eit
to hedesof era ,leefweegy eit rotator tol va
to elbbim eit rsem entdow eit to matted eit
emo :utengam to ztes ewt era eroff .easd eit
rotator tigir tol sea era bus fivel tol sea
ewt to stelanoos tea neek .leefweegy eit to
eit mori hettoqqus qated moflife ,abionelos
ai bionelos neek .telkentd tempan eit qd emad
eit ;regnufg to eroo gaibile a ditiw bettil
era stengam rotator fivel eit to regnufg out
ham ,mura kheit te bednafte ewoy a qd hanjet
-oy tigir eit to regnufg ewt eit ,salwefif
ewoy valinta a qd betsonce era stengam rotat
zemos ,I ,not a ,ewoy mose fo tetmee eit mori
seened ,abionelos ewt eit neewted brarwot
,telkentd tempan eit at elod eking a dygorit

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

and terminates in a rounded end at some distance in front of the bracket. Each rod is fitted with a collar near its projecting end, and an open-coil compression spring is placed between the collar and the bracket. We come now to the connecting links between the rotator magnets and the rotator shaft.

The connecting links comprise first, an auxiliary shaft, called the magnet shaft. This shaft is supported at one end in a bearing in the magnet bracket, and at the other end in a bearing in the main right bracket. At the end near the rotator coils, the shaft carries a cross-bar, C, and near the other end, the sector of a gear. In Fig. 37, this sector is shown considerably to the left of the right main bracket; in reality, the sector lies very close to that bracket. The cross-bar, C, extends in front of both

THE MORNING STAR OF THE GOSPEL

-sib eme ta hne lebner a ni seimurit hne
at bor bor. Eborcif est to thort ari esast
the galtaeng ati tace wallon a itiw beftt
feesly at galtaeng lefesemwos lice-naro ha
ene eme. Et .felord est has raffo est neewled
-or est neewted alif galtaengos est of won
.fleis rotator est hne etengam rotat
estiqmow alif galtaengos est
tempar est helleo ,fleis vratislava os ,fleis
at hne eme te betroque at fleis stift .fleis
est te has ,felord tempar est ni galtaeng a
thigit alia est al galtaeng a ni hne reito
,alio rotator est tace hne est to .felord
tace has ,O ,rad-sacra a celireas flesis est
.stift al .rur a to rotors est ,hne reito est
est of viderohance mworks al rotors stift ,V
,villeret ni ;felord alia thigit est to flesis
.felord flesis of esole vrey self rotors est
Ried te thort ari abatre ,O ,rad-sacra est

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

rods, RR; the springs on the rods keep the rods firmly against the cross-bar. The gear sector stands vertically on the magnet shaft, and engages with a pinion of the rotator shaft.

The operation of the scheme is as follows: If the right rotator magnets be energized, they draw their plungers forward; this action thrusts the upper rod, R, forward, and with it, the upper end of the cross-bar, C. Hence, the auxiliary or magnet shaft turns through a small angle, and with it, the gear sector; the movement of the gear sector turns the pinion meshed with it, and in that way turns the rotator shaft. If the left rotator magnets had been energized instead of the right, the rotator shaft would have been turned in the opposite direction.

Means are provided for returning the parts to their original positions

УЧЕБНИК ДЛЯ УЧАЩИХСЯ МАТЕМАТИКИ

theoretical behavior of atoms and molecules
and the resulting properties of matter. The
basic concepts of quantum mechanics are
the wave function, the Schrödinger equation,
and the Heisenberg uncertainty principle.
The wave function describes the state of a
particle, such as an electron, and its properties
are determined by the Schrödinger equation.
The Heisenberg uncertainty principle states
that it is impossible to precisely determine
both the position and momentum of a particle
simultaneously. This principle is fundamental
to our understanding of the behavior of matter
at the atomic and subatomic level.

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

after the rotator magnets have been de-energized. A small arm, called a centering arm, is attached to the magnet shaft at the outside of the right main bracket. This arm points downward. At its lower end are attached two closed-coil tension springs, called centering springs. The other ends of the springs are attached to anchor lugs on the main bracket, one lug being at the left and one at the right of the arm. The right-hand spring is attached to its lug by means of an adjustable screw, so that the tension of the springs can be varied by the turning of the screw. By this arrangement, the two springs tend to draw the arm in opposite directions, one toward the right, and the other toward the left. Since the springs are equal in strength, there is no displacement of the arm from its central position. If, however,

ПРИДАЧА СВИТИНКИ КО МАСТЫМ МУНИЦИПАЛЬНЫМ

-тако-еъ need even stronger reasons why to do
 this additional to a belief , who I think A .Boyle
 -the add to this reason why not to believe at
 this point .Therefore when I fight add to this
 -believe this may now be at .Brewer's statement
 believe , which makes like -believe out to
 add to this reason add .against which reason
 add no such reasons of believe this may
 this itself add to added yet one , therefore also
 based -fight add .this add to fight add to one
 as to answer you yet at of believe at which
 add to believe add fight as , when a situation
 add to believe add you believe as no such
 against out add , if you believe this you .when
 , and it seems to this add as well as that
 brewer's statement has , fight add brewer one
 at large this against add comes .This add
 add to believe in or credit , it seems
 , reviewed , II .nothing further add more who

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

a rotating movement of the typewheel occurs, the centering arm turns with the magnet shaft, thereby drawing out one centering spring and releasing the other. When the rotation magnets are de-energized, thus releasing the torque on the magnet shaft and centering arm, the springs draw the centering arm back to its vertical position. This movement of the arm brings all the rotator parts back to their central positions.

The centering device just described has proven to be inadequate for rapid working of the printer. All the parts should be centered after one letter has been printed and before the next has begun. When the letters are printed in rapid succession, the centering mechanism does not work fast enough. The action of the springs diminishes as the central position of the arm is ap-

THE MORNING STAR OF PRINTING TELEGRAPHY

tant actions guaranteeing self
right sharpened and of memory and bedrockish
stray self IIA . nothing self to know bigger
need and taller one tests between of blunder
head . nerved and then self stated has nothing
necessary bigger at nothing one stretched self
just know for each matriculate guaranteeing self
-delighted savings self to nothing self . anyone
-as at this self to nothing Istrue self as so

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

proached, because the working spring is nearly counter-balanced by the other. Therefore, a second centering mechanism has been added; this latter device acts on the rotator shaft itself, and does not come into very great action until the parts have nearly reached their central positions.

The second centering mechanism may be seen in Fig. 37. The rotator shaft projects through the main bracket on the right; the shaft is here fitted with a small semi-circular cam, D. Two small bell cranks are mounted at their elbows on the bracket as shown. One end of each crank bears against the flat face of the cam, whereas the two free ends are connected by an open-coil tension spring. The centering action of the device is apparent from Fig. 37. Note that the action increases as the central position of

VINTAGE PRINTING TO ENTERS MUSEUM EXH

-trea af gylfus galdrar eft umhverf , heilssing
 , erosterell . xedto eft yd heimaleid-herfumur vi
 ; heilss used and minnlaumur valdstræs hraes a
 thrafa totator eft no atos solvab rettsi vist
 fersa kvar oðri emoo tom seoh bma , fleasi
 heilssut tilfoss swaf sýrur eft lijan að heilss
 . snoitisaog lsrthneq vist
 -heilss galdrumur hraes eft
 fthrafa totator eft . Vc . xif sk uses ad ym eft
 ; sigrir eft no felstra ríam eft hlyrind stefthorg
 -times llare a lifin hettit erad at thrafa eft
 era sínarsa illud llare owt . C , meo ralstris
 no felstra eft no awedle vist ja berðum
 tantaqra visted hraes hrae to hrae am0 . swoda
 owt eft særðir , meo eft to east tsilt eft
 -net llise-kauso me yd betraumur era alins eft
 -eb eft no hraes galdrumur eft . gylfus nota
 eft tsilt eft . Vc . it meot tantaqra si eft
 fe hraes galdrumur eft no hraesgaldrumur

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

the parts (the position shown in Fig. 37) is approached. This increase is due to an increase of the effective radius of the restoring torque, which increase accompanies the restoring movement of the parts.

A locking cam is also shown on the rotator shaft, just behind the centering cam; the lock, of which this cam forms a part, must be released before the rotation of the shaft can take place. The purpose and action of this lock will be explained later.

THE STRIKER LINKS. The striker rigging is also shown in Fig. 37. The striker magnet is located at the bottom of the machine beside the left main bracket. The armature is suspended from the lever, L, which is pivoted at its lower end to the left main bracket, and attached at its upper end to the connecting rod, E. The upper end of the rod, E;

WITNESSED AND WITNESSED TO IN THE PRESENCE OF

(72 .giW mi swode noitincq eft) string ent
me of cub at eseretonl eft". hensnorgga si-
-er eft to author evitselfe ent to ensenent
wethasquones eseretonl holdw ,engrod grifote
.string ent to thremevom grifotter ent
nworts cala si use grifote A

THE STARRY LINES
BY
CHARLES
WILLIAMSON

texiyye eft .E .atw mi swode oals ai galaght
entidam eft "o medfed eft ta befeest al Jengam
ai entwams eft .Jefcend niam thel eft shied
-dovig ai notiw ,I ,reval eft mo't behneque
-Kestid niam thel eft of hne tewol eft ta be be
-nes eft of hne reggn eft ta befeestta hne ,te
," ,box eft to hne reggn eft .I ,for yntfer

THE MORKRUM SYSTEM OF PRINTING TELGRAPHY

is joined to a crank, F, on the striker shaft. The connecting rod contains an adjusting link by which the length of the rod can be varied; this adjustment determines the magnitude of the impact as the typewheel strikes the platen.

When the striker magnet is energized, it draws its armature downward, and with the armature, the lever, L. The movement of the lever, L, turns the striker shaft by means of the connecting rod, E, and turns the crank, F. The crank, F, is mounted on the striker shaft, so that the rotation is transmitted to this shaft.

In order that the striker shaft and other parts shall be restored to their original positions after the stroke, a crank, T, and return spring are provided. The crank is mounted on the right end of the

THE MORPHOLOGY OF METABOLIC THERAPY

29

offer the extra benefit of

Pravirvob statutare ati swerb ti , besigweme
-ewor edit . I , tevel edit , wortwate edit atiw hns
tide tekrite edit arint . I , tevel edit to them
arint hns . E , bet wifteemnos edit to amsem yg
edit no bednow ati , T , harto edit . T , harto edit
-arint ati noltator edit tait os , tids tekrite
, tids nikt of Bettim

•these nine or better

text edit save tabo II

et berotset et lida etre redto lne flimis
,etrisz est tefta anotinaoq lecigiro riedt
.behivona era gulte miftez lne ,T ,mato e
est lo lno tigit est no behivom si mato est

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

striker shaft. The return spring is an open-coil tension spring, stretched between the crank, T, and an anchor lug on the main bracket. The turning of the striker shaft and crank T from the inoperative position stretches the return spring; hence, at the end of each stroke, as soon as the striker magnets are de-energized, the return spring draws the parts back to their original position.

THE SHIFT LINKS. The shift mechanism is illustrated in Fig. 37. The shift magnet is attached to a bracket at the left of the rotator bracket. The magnet consists of a solenoid with a plunger core; as we shall see later, the magnet is also a relay. A plunger rod is fixed to the core, passes through a guide hole in the bracket, and terminates in a rounded end. This plunger rod bears against a crank, G, which is mounted on a small shaft,

THE MERRIMAC SYSTEM OF PRINTING TELEGRAPHY

Während der Zeit der britischen Herrschaft über Indien wurde die Sprache englisch als Medium der Bildung und Wissenschaft etabliert. Dies führte zu einer Trennung zwischen den verschiedenen Kulturen und Religionen des Landes. Die britische Kolonialherrschaft endete 1947 mit der Teilung Indiens in die unabhängigen Staaten von Indien und Pakistan. Diese Trennung hat bis heute zu sozialen und politischen Spannungen zwischen Hindus und Muslimen geführt.

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

H. At the left end of this shaft is mounted the crank, I, bent to clear the striker magnet as shown. The crank, I, is connected to the crank, J, on the shift shaft, by the connecting rod, P.

When the shift magnet is energized, it draws in its plunger core, and in so doing, thrusts its plunger rod forward. This movement of the plunger rod turns the crank, G, the shaft, H, and the crank, I, through the agency of the connecting rod. The movement of the crank, I, turns the crank, J, and the shift shaft.

As for the return of the parts to their original positions, it will be remembered that on the carriage, there is a shift return spring. This spring not only acts on the carriage parts, but in so doing, returns the shift shaft and all the rigging

THESE ARE THE SIGHTINGS GO MADE BY WILSON 9/21

Bedmorn at thade shid to bne thel est th .H
-ysam rexhrtz est rheslo of thred ,I ,.Mnaro est
at betesmenee at ,I ,.Mnaro est .mwoze as ten
-moe est vd ,thade tthda est no ,6 ,.Mnaro est
.9 ,bor gaiteen
-me at tengam tthda est nedd
at bne ,ewos rexhrtz est ni swarb ti ,bealige
.Biswricl bor rexhrtz est aturut ,grob os
est entut bor rexhrtz est to lacemonee est
,I ,.Mnaro est bns ,H ,.thade est ,9 ,.Mnaro
,bor gaiteenmoe est to konesa est rigord
,.Mnaro est arant ,I ,.Mnaro est to lacemonee est
.,thade tthda est bns ,L
etrid est to arnter est vob sa
-er ed lliw ti ,smoitisaoq fentgirio thidt of
s at erant ,egelriso est no dud betesmenee
vise vimo tom grikge est .grikge minier tlife
-er ,grob os at tuo ,etrid egelriso est no
galgair est lla bns tthde tthda est arant

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

back to the starting position.

THE SHIFT LOCK. A lock, which locks all the parts in the shift position, is also indicated in the figure. This lock consists of a T-shaped double crank, pivoted at the point of intersection of its three arms on a lug attached to the magnet bracket. The stem of the T extends forward, and contains a notch on its under side; this notch hooks over the end of a vertical lever, K, mounted on the shaft, H. The upper arm of the double crank is held away from the magnet bracket by an open coil compression spring. The lower arm lies in the path of a plunger, which is attached to the plunger core of a solenoid. This solenoid is called the release magnet.

In the operation of the device, the notch in the forward lever is or-

TRANSLATION OF THE TITLES TO ENGLISH FROM THE

.moitseq boqirata ent ot Kord
Heldin ,Kord A .MOI TWIN EHT

.moitseq tihla ent al araq ent ille akel
Kord eht .strugt ent al besashri osla al
-teviq ,Kord alidok beqadu-t a tte stanace
eht al to moitseqeht to tniog ent ja he
-jekard tenuq ent ot **Kord** jui a no arya
-mos lne ,Biswot abnatre t ent to meta ed
meton eht ;ebis tehn al no meton a eniat
.H ,xovel Isakiray a to lne ent xero arqod
to arya reggu ent .H ,tihla ent no betnom
-yos ent aerit yaws bled al arya alidok ent
.aritra neisnerqos lico mejo na qd telord ten
,reguly a to araq ent al aerit arya xewol ent
a to arya reguly ent ot **Kord** al Heldin
easeler ent bellac al biomeles alidu .Biomeles
.Jengak
-eh ent to moitseqo ent al
-ro al xovel Biswot ent al meton ent ,esiv

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

dinarily not hooked over the end of the lever, K; K is too far toward the front of the machine to engage with the notch. The T-crank does, however, bear against the top of the lever, K, under the action of the compression spring. When the parts assume the shift position, the lever, K, turns back a little, so that the notch in the crank drops over the end of the lever. Therefore, when the shift magnet is de-energized, the lever, K, is not free to return to its original position, but is locked in its new position. Therefore, all the other shift parts are locked. The release of the parts is effected by the release magnet. When this magnet is energized, its plunger rod comes forward, strikes the lower end of the T-crank, and thereby raises the notch off the lever, K. The lever, with the other parts, is therefore free to

THE LARGEST CHITWAN TO METEYU MURKINH HUT

-el est to bne est rive bedoon for diffrentib
est to fhort est browot ref oct si X ;X ,rev
mure-X est .meton est siw eygur of enboun
est to got est tangya used ,tewewow ,soob
-aqeqmoo est to noites est tewuw ,X ,rev
flida est emwas etiq est nedw .gutqa nois
ettil a hood amus ,X ,revet est ,noitisq
revo agorh mists est nif .meton est tant os
est nedw ,erotement .revet est to bne est
,X ,revet est ,heat temo-est si tengem d'ida
-oq lamigiro est of winter of eeff for si
noitisq wen est at bedool si fnd ,noitis
-doof era est q'ida wido est lla ,erotement
rd betoelle at attri est to easeler est .he
-teme si tengem atrit ned .tengem easeler est
mellite ,bnewrik aemos hot tegumli est ,bony
udexest bne ,mete-X est to bne rwof est
.revet est .X ,revet est tho meton est easeler
of eeff erotement et ,etiq wido est siw

THE MORZKUM SYSTEM OF PRINTING TELEGRAPHY

return to its original position. When the release magnet is de-energized, the T-crank again drops down onto the lever, K, and the parts are once more in the position indicated in Fig. 37.

The purpose of the shift lock is evident when we remember that often several shift characters occur in succession, and it is desirable that the typewheel maintain its shift position throughout the series.

THE SELECTOR MECHANISM. We now pass to the selector mechanism, by which the rotation of the typewheel is stopped at any desired point. It will be remembered that the typewheel characters are distributed around the entire circumference of the wheel, and in order that any particular letter be printed, the typewheel must be stopped in its rotation when that particular letter lies di-

YNTYGASING BRITHIRE GO MUDSYR HURLOWON DYC

est new .mellisoq fawdigrw ari et mister
 maled-est ,besigremo-eh ai tempem eseler
 est lus .B ,newel est osto nwoq aqerb nisgo
 -taceth walisoq est at atom enno era afrog
 .TS .gff ni bo
 ncol dffla est fo esoging est
 -revera netio fant redmemer ew newl fawdigrw ai
 lus ,mellisoqne ni nwoq eredestadlo tifla fa
 nisgoq fawdigrw est fant oldatneb ai ti
 .revera est fawdigrw melliwoq dffla est
 ew .THE BELLHORN HISTORY.
 fawdigrw yf ,mellisoqne rafaelor est of easq wen
 fa heqqora ai fawdigrw est fo melleror est
 fant redmemer od lluw si .trioq bellon yw
 -a betudurath era eredestadlo fawdigrw est
 ,fawdigrw est fo esoging eredestadlo eredestadlo
 od rafael rafaeli yw fant melleror ni faw
 est ai heqqora od fawdigrw est ,besigremo
 -taceth walisoq fant newl melleror

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

rectly before the platen. The selector, complete and applied to the machine, is shown in Fig. 38; as is indicated, it is located at the front of the machine beside the right main bracket. The selector mechanism proper is shown in Fig. 39. As the mechanism is somewhat complicated, its general principles will be explained before the description of the actual parts is attempted.

The fundamental idea in the stopping of the rotator shaft is illustrated in Fig. 40. In this figure, we see the rotator shaft carrying an arm or lever, called the index lever. D is a stationary disk containing a number of holes. When the rotator shaft turns, it of course turns the index lever with it, so that this lever sweeps over the face of the disk, D. If the rotation of the shaft is to be stopped at any desired

TRANSLATING SWITZERLAND'S MIGRATION LAW

-moo ,recoolee eff .metainc est etched vifcer
nwoda ai ,eridam est of Reiffice bus eteq
betsool ai ti ,betseibni ai es ;88 .gM ni
trigk est etised onidomz est to shorl est to
reoud mafraemn recoolee eff .tensord niam
ai maindoem est al .88 .gM ni nwoda ai
seidignity liriony ai ,hetsoilquoc tawemos
to noftqireab est erodef basiafaze od lliw
,hetqmetta ai stuaq fantes est
est ni sebi lntremahmt eff
betartsalli ai thire rotator est to unigota
-ator est sea ew ,ewigl estit ni .04 .gM ni
heille ,kevel ro rys ne galvyno flesa rot
-ator hais yramitate s ai 0 .kevel kehl est
rotator est med .celof to wedmn s gainint
kehl est enint eamne to ti ,enint flesa
-o agesws kevel estit tait es ,ti dliw kevel
rotator est 01 .0 ,hais est to esel est to
beriesh qua re hogora ed os ai flesa est to

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

point, a small pin is pushed up through one of the holes of the disk, D, into the path of the index lever. When the lever strikes the pin, rotation stops.

THE DISKS. Such a disk mechanism, with some minor changes, is used to limit rotation in the Morkrum machine; the mechanism as applied to the printer is shown in Fig. 41a and b. Here, there are four thin steel disks, called selector plates, each of which is similar to the disk, D, of Fig. 40. The four disks are arranged in a pile, with a supporting collar running through their centers; this collar is marked "S" in the figures. Each disk may be turned independently through a small angle on the collar, the turning being limited by the plate stops as indicated. At the bottom of each disk is a lug which carries a small pin, P. An arm, A,

MEMORANDUM DRAFTED TO METACO MURKIN SEP

one hundred or so hours at my leisure & taking
to this art only 1,000 feet off the seafloor and to
the surface level and back. Level seabed and
abundant material.

-on Math a good THE DISSES

of hours at sea made possible by the materials
and ;entirely without the assistance of the
abundance of organic life on the seabed and
most of the time spent ,even a few minutes
in the water .Math is a fine
feet
.04 .01 to .0 ,Math off of California at about
.01 ,off the coast of California over which rock and
abundant organic remains of the seabed are
and at "2" bedrock and talus off ;are the
abundant remains of the seabed rock .several
bedrock and talus off the edge of the seabed
as abounding organic remains of the seabed
as at Math nose so bottom off the seabed
A ,area of A .E ,my name a surface bottom and

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

with a forked end, fits over the pin, P, and at its lower end, is attached to a small supporting shaft, B. A second arm, C, is also mounted on the shaft, and this second arm lies in the path of a plunger rod which is fixed to the plunger core of the plate solenoid. By this arrangement, if the plate solenoid becomes energized, it draws its core forward, and, through the agency of the two arms, C and A, turns the disk from its normal position of Fig. 41(a) to its opposite position of Fig. 41(b). When the plate solenoid is de-energized, all parts return to their original positions under the action of a coil spring, not shown, wound onto the shaft, B.

The method of moving each of the other three disks is identical with the one just described. The arrangement of the links between the solenoids and disks is shown

THE ROMANTIC SUBLIMITY IN LUTHER'S MESSIAH CHORAL

þurh , I , miq eft rewe stiȝ . hne berhþot a dñi w
-þre llympe a of beforste at , hne weol atf te
oale at , O , sws bnesse A . E . , thise gylfes
wre bnesse alid hne , thise eft ne hefnum
at hefnum bot regnysg a to dñas eft ni eall
-mælos etiȝ eft to eras regnysg eft of hefnum
-mælos etiȝ eft li , þremoyartis alid wȝ . hic
-tot eras atf sweth ti , heafdgrenne næmced hlo
, swis owt eft to yomeras eft dñasat , hne , braw
-lesq lawton atf mord heil eft arant , A hne ?
mæltheor etiȝeqqo ati of (a)lȝ . gȝt to neft
-eb at hlyfelos etiȝ eft med . (d)lȝ . gȝt to
-mæltheor wȝest of hlyfet atiȝ lla , heafdgrenne
, galrys lloq a to mordas eft yebus amrisq la
. s . thise eft ofno hanow , mwoða ton
to nose gylfom to hoftem atf
eft dñi w leaffðab at sweth eerit veito eft
eft to þremoyartis eft . hefnum tanj exo
nwode at sweth hne abborleas eft nefted alid

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

in Figs. 41(c) and 42. The plate solenoids, as shown in Fig. 42, together with certain other solenoids of the printer, are mounted on the large relay bracket, which is attached to the base. The figure is self-explanatory. By this arrangement, any disk may be moved by its plate solenoid, independently of the movements of any of the other disks.

As for the manner in which the disks are used, the index lever of the rotator shaft sweeps over the face of the outside disk (the one shown in Figs. 41), just as the lever of Fig. 40 sweeps over the face of the disk, D. Ordinarily, the index lever is in the central vertical position shown in Fig. 40, but if the rotator shaft be turned, the index lever of course turns with it. The disks are shown in place

YHUAHUEK ORITWIKI NO INTEGRA MUNICIPAL

abionefos eteqq edf .SA bma (o)IA .ayit ni
 nistres atiw tentegot ,SA .git ni nwoda za
 -dymom eis ,teqniq est to abionefos tento
 -ja si doinw ,texosid waler exeq est no be
 -xe-fies si ayit edT .eand est ot bedost
 Malib qma ,tnekogastre aknt qd .yrotanay
 -ehui ,bionefos eteqq est qd Devem ed qm
 est to qma to atmecemow est to qd tnebmed
 .aknib tento

hoidw si tennan est xof SA
 est to revel xebni est ,been eis aknb est
 est to esct est revo aqewa flesa rotator
 ,(IA .ayit ni nwoda enc est) Malib ebietno
 revo aqewa OA .git to revel est za tent
 -ni est ,qfimantib .d .aknb est to esct est
 -lseq facitres fartses est si si revel xeb
 rotator est ti jnd ,OA .git ni nwoda molt
 entres to revel xebni eis ,kentri ed flesa
 ecqy ni nwoda eis aknb est .ti ati= sonst

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

on the printer in Fig. 38.

The construction of the disks is such, as regards the location of the holes, that if each disk is in one extreme angular position or the other, there are two rows of holes through the disks lined up, and only two rows. For instance, if all the plate magnets be energized and all the disks, therefore, turned to the limit of their travel, there will be two rows of holes lined up, each row extending entirely through the set of disks. Furthermore, one row of holes will be on the left side of the index lever and the other row will be on the right. Hence, if a pin be thrust from the back of the disks through each row of holes, so that the ends of the pins extend beyond the face of the outside disk, the index lever, rotator shaft, and typewheel can turn only until the index

THEATREMENT GUINNESS TO MONTYS MURKINH ENT

.88 .gM si retarding ent no
sabib ent to noisemakers ent
.sabib ent to noisemakers ent abrager no ,dous al
mufunne emeritne uno si si sabib nose ti fad
to swot owt era credit ,resto ent to noisemakers
yino hme ,qu benni sabib ent dymonit selec
-tym ejalq ent lls ti ,eemstani tol .swot owt
-credit ,sabib ent lls has beingreen od stan
,levant tient to fiumi ent of ferriit ,erot
,qu benni selec to swot owt ed lliw credit
jou ent dymonit yllefutne galbene noz nose
lliw selec to wer uno ,excredition .sabib to
hme tevel xebni ent to shis fief ent no ed
,comel .right ent no ed lliw wer resto ent
sabib ent to Head ent mort court ed sig s if
abme ent fad os ,selecd to wer nose dymonit
ent to east ent bryed bryed unq ent to
.fads rotator ,tevel xebni ent ,lais obfutne
xebni ent lliw ylmo want rao fcedweqqi que

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

lever strikes one of the pins. In case the left rotator magnet be energized, the index lever strikes the pin to the left. Likewise, in case the right rotator magnet be energized, the index lever strikes the pin to the right.

In the same way, if all four disks are in their normal position, that is, if none of the plate solenoids are energized, there are again two rows of holes through all four disks. As before, one row lies to the left of the index lever and the other to the right. These two rows are different, however, from the rows in the first case. Hence, the rotation of the index lever, rotator shaft, and typeswheel is again limited in either direction, but the limits are different from what they were in the first case.

Likewise, if only one of the

THE LEADING CHIEFING TO METEOR MUNITION RAY

ent case MI .unq ent to enc 2000000 level
xebnt ent ,heightens of temper rotator thel
,entweddL theL ent of nq ent 2000000 level
-stages of temper rotator right ent case at
ent of nq ent medium level xebnt ent ,be
.right

met lls fi ,vew emas ent MI
,at tadt ,giffing Leron thelt at era entd
,best,were era effonelos stbdL ent to emon Th
lls dyvorit afor to awor owt usgs era entd
ent of self war era ,excited MI .stabL met
ent of radio ent lme level xebnt ent to theL
,tovew ,povellL era awor owt case" Right
ent ,hene .case fatit ent at awor ent mori
,theria rotator ,level xebnt ent to mottster
-th reidte at berthil viage at leadweygt has
morf .metweddL era effonL ent sud ,rottear
,case fatit ent at awor gent tadw
ent to enc vho fi ,entweddL

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

selector plates be turned, whereas the others remain in their normal positions, a still different row of holes will be established on each side of the index lever. No difference how the disks are placed, provided each be in extreme position or the other, two paths for the stop pins through the disks are provided, one path or row being on the left side of the index lever and the other on the right.

As a result of this arrangement, we can stop the rotation of the type-wheel at fifteen different points in either direction of rotation or at thirty points in all. Considering also the center position of no rotation, we obtain a total of thirty-one different positions or points which we can assign to the typewheel. It will be remembered that we were able to send thirty-one different combinations of line impulses; as we shall see later, the first four line impulses

THE WORKING SYSTEM OF PRIMMING THERAPY

exhibit edit easerly ,beginning od relatively roteless
llis is a smoothsor is carried throug h number
of different types od llis selod to wot therellis
-reftis off .level exhibt edit to this nose no
dose behivorg .Beasig this exhibt edit wot some
autsq owl ,rento edit to mottator emertxe of ed
-ord this exhibt edit signorit aniq gots edit to
this chef edit no gated wot no atsq uno ,behiv
.right edit no rento edit this level exhibt edit to
-regularis edit to llis is a
-sqqt edit to mottator edit gots nro ew ,them
rento at stroy lossealitit needlit ta leafy
in aqnta pottit ts to mottator to mottatoris
to mottator positer edit ools girehemos .llis
emo-ytrist to lastet a nistdo ew ,mottator or
nro ew mottator exhibt to smoothsor therellis
-reptememr od llis jI .Seedweqqt edit of nysas
-tib emo-ytrist bres of olda etew ew tent be
ew an ;sealungt edit to mottatoris therell
sealungt edit twof tarit edit ,restet eas llisda

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

determine the positions of the selector plates, whereas the fifth pulse determines the direction of rotation of the typewheel. We see, therefore, the purpose and action of the selector disks. Furthermore, by the use of the shift movement, the thirty-one type-wheel positions are increased to sixty-two, just as the total number of characters available for transmission was increased to sixty-two. In the Morkrum system, not all of the sixty-two possible disk combinations are utilized.

THE DRUM. The next question is how the interference or stop pins pass through the disks, are mounted, and operated. There are, in all, twenty-four of the pins, all supported on a steel frame called the drum; the frame is called the drum because of its general shape. The drum and pins are

THE WORKMAN SYSTEM OF PRINTING TELEGRAPHY

seining wofeles est te smolitior est emittet
est seinkweselc esluq sijtli est est eserew
ew . Isedwegyt est te mottator te mottorit
te mottes bns esoring est , ersteredt , eos
sek est yf , ersteredt . esell wofeles est
-egyt eno-ytting est , tnamevem fida est te
, owt-ytting et beaseroni etz smolitioq leewi
-finva ereswende te reijna latet est ac ract
-xis et beaseroni esw mohaimansit tot elds
est te lis son , metysa muridom est nI . owt-yt
-tin etz smolitidmoe math eldrenog owt-ytting
, besti

THE DRUM . MURK THE . THE next dress-up moltseen

easy and goes to another secretariat and won't be
harangued here, between us, which will be different
and go to two - which, I'll sit, etc. etc.
and before some time is no longer given I'll
cause you to be told what's going on; and
the only bus work will be regular fare and all the

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

shown in Figs. 38 and 39. The drum consists of two circular end-plates, P_1 and P_2 , connected by supporting rods and space sleeves as shown in the figures. Each plate possesses two projections at diametrically opposite points; the projections are bored to receive the two horizontal supporting rods. The end plates are kept apart by sleeves which fit over the supporting rods. These sleeves also constitute bearings, so that the entire drum can slide back and forth on the rods. The two plates, P_1 and P_2 , are similarly bored with guide holes for the interference pins. The pins extend from one plate to the other, and project both at the front and back of the drum. On each pin is mounted a small collar, and between this collar and the left-hand plate is placed an open coil compression spring, #35-14.

THE MORGAN SYSTEM OF PRINTING TELEGRAPHY

THE MORKUM SYSTEM OF PRINTING TELEGRAPHY

If the drum be thrust toward toward the right, the projecting pins strike the pile of selector plates. Two of the pins will be in line with holes in the plates, and will pass through the complete set of plates, as was described before. The other pins, which are not in line with the holes, cannot pass through the series of plates; hence, they strike one plate and stop. The spring mounting of the pins allows the frame to travel on to its extreme right-hand position, in which position, the two pins will extend through all four disks and into the path of the index lever.

In Fig. 38 we see also the means for thrusting the drum toward the right. Beneath the drum is a magnet called the drum magnet, which is attached to the right main bearing. A view of the drum magnet alone is presented in Fig. 43. The magnet consists of

THE MORNING TWILIGHT TO METEYS MURKOM TERRITORY

brawot jauuit ed murib est ti
entire enta amitastong est ,night est brawot
anig est to owl .estasli rotoces to alig est
,estasli est ni sefod ntiw enti ni ed lliw
to tea estabwos est aborit wasq lliw hns
rechte est .erofed heffices awz ea ,estasli
,sefod est ntiw enti ni tom eis dohaw ,anig
;estasli to sefres est agnord wasq tomow
est .gots hns estasli ero estira yaft ,pawes
ewar est swollia anig est to gatimow gatimow
-faci band-tight emartke est et no levant of
lliw anig owl est ,poltheis neidw ni ,noht
est ojai hns estasli tow lliw agnord hmetke
,revet xebut est to itsq
est oals eas ew 88 .gft ni
.tihit est brawot murib est amitastong tof anas
mash est bellus tangam s et murib est amitastong
ntam tihit est et hedonita et dohaw ,tangam
et enols tempm murib est to waly A .gnised
To afiasmeo tangam est .88 .gft et betnes tq

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

two solenoids, each fitted with a plunger core. The two cores are attached to a yoke, from the center of which extends a rod, R. This rod joins a connecting rod; the lower end of the connecting rod is mounted in a stationary pivot, whereas the upper end is forked and engages a grooved collar on the face of the drum.

When the drum magnet is energized, it draws in its plungers, and, through the linkages just described, forces the drum to the right. When the magnet is de-energized, all parts return to their starting positions under the action of the springs on the stop pins.

ROTATOR LOCK. Reference was made during the description of the rotator transmission to a lock on the rotator shaft. This is a device which holds the rotator shaft stationary while the selector mechanism is

TRANSMITTER PRINTING TO MURRAY MURKIN SH

regarding a new design have, although one out
there is at present this series out there. The
.R, for a transmitter model to return and more
powerful than ; for guarantee a signal for which
is not believed to be guaranteed out to have
at the very end assembly, so that guarantee
out no failure occurs a message has been
transmitted to each

-ne at Jergens with out new

information, the transmitter at all standard, designed
and out series, designed test equipment out
-transmitter at Jergens out new. This out of
guarantee right of return after three days, best
guarantee out to return out return equipment
-and good out no

ROTATOR LOCK. Reference was

rotator out to motor-driven out by direct drive
.This rotator out no need a of maintenance
fixed rotator out able return service a of which
is maintained rotator out little maintenance

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

being set; the lock is released by the drum as it moves toward the right.

The lock on the rotator shaft is shown in Fig. 37. It consists of a semi-circular cam, M, mounted on the rotator shaft, with the flat side of the cam turned upwards. Above the cam are the two bell cranks, N N, pivoted at their elbows to the right main bracket. The lower ends of the cranks rest on the two sides of the cam, as is indicated, so that the cam and rotator shaft cannot turn. The two lower ends of the cranks are joined by a tension spring, so that they are held on the cam. The upper halves of the cranks are bent at right angles so as to lie end-to-end. Above the meeting point of the two arms is the end of a third bell crank, O. This crank is pivoted at its elbow to a lug on the inner face of the main bearing. One

YHWH YAHWEH SHITIM TO METUQ MULHOM NFT

murch eft yd heaneler at moel eft ;fes yfted
 .fright eft bresot sevom ti as
 fians rofstor eft no moel eft
 -imes a to statmos fI .v2 .gM at wodis at
 fians rofstor eft no bethmon ,M ,mro talmoros
 .abrawos bentus mro eft to shis salt eft dth
 ,M M ,amias lled owt eft era mro eft evoda
 niam fright eft of wodis thift ja bejoviq
 faer amias eft to abne rwoi eft .talmoros
 ,bethorhai el as ,mro eft to zebis owt eft no
 mro fomos fians rofstor mro mro eft tent os
 bentos era amias eft to abne rwoi owt eft
 lled era yam tent os ,yafira miaset a yd
 amias eft lo seviled reppa eft .mro eft no
 -hne ell ot as os zefras fright ja fked era
 owt eft to fthoq gafeem eft evoda .hne-ot
 .O ,mias lled bright a to hne eft at amias
 amf a of wodis att ja bejoviq at mias amf
 amf .yafised niam eft to east tent eft no

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

end of the crank extends through a slot in the bearing, so that it lies above the two cranks, N N, whereas the other end is bent upward. An arm, called the plunger ram, is mounted on the drum in line with the vertical arm, O.

When the drum assumes its right-hand position, the plunger ram of the drum strikes the crank, O, and moves its upper end toward the right. The horizontal end of the crank is thereby depressed, and, in moving down, strikes the ends of the cranks, N N. The bottom ends of the cranks are spread out so that they clear the locking cam, M. The rotator shaft is now free to turn. When the drum goes back to its original position, after the printing of a letter, the crank, O, is released, and all parts return to their normal positions.

VILLAGE OF MOUNTAIN VIEW

ni jols a hagomt abmetxe hñato est to bne
owt est avode sett fi fadt os ,gnifised est
tned si bne radio est assexdy ,H H ,asimis
si .mst regnulq est bellas, mrs ná .bñswqu
-itrev est dñtw est ná mñrñ est no behnom
.0 ,mrs lso
sti cõmunes mñrñ est nedw
est to mst regnulq est ,moitisoq bñan-thgtr
-qu sti sevom bns ,0 ,ññato est señrta mñrñ
bns latmontror estT .thgtr est bñsor bne reg
nt ,bns ,besserges vderest al ññato est to
,ññato est to abne est señrta ,mroq galivon
bñsor est ññato est to abne mottod estT .H H
.H ,mro galivoI est reale vest fadt os two
med .mst of eer^o won al tñrre totator estT
,moitisoq hñaligro sti of need seog mñrñ est
.0 ,ññato est ,rettel s to grifing est rette
rient of mister stiq illa bns ,besseler al
.moitisoq learon

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

We will now take up the two remaining movements of the typewheel, viz., the movements of spacing and backing.

THE SPACER AND BACKER. The spacer is that mechanism by which the carriage and typewheel are moved side-ways after the printing of a letter, so that the next letter will be printed beside the first one. The backing movement is the carriage return. That is, it is the movement by which the carriage, after reaching the end of a printed line, is returned to its starting position at the beginning of a line. The spacer is operated automatically by the printer between letters, and is also operated between words when a space signal is received over the line. The backer is operated only when a carriage return signal is received.

The spacer and backer mechan-

INTRODUCTION SWITCHING TO MONTAGE MURKIN'S SHT

owt eft qd exist won lliw eft
..atv ,feefwedd eft fo afneweonw gwinisaw
.gwinisaw bnd bndasqz fo afneweonw eft
eft .THE SLIDES AND BACKSHT

egistras eft hewl wqf meliadesm tadt si roosqz
eft refis byw-wchla bevor eft feefwedd has
totted tkem eft fadt os ,terrel a fo gafnir
eft .eno tadt eft ebfaed betfrrq ed lliw
tadt .hurster egistras eft si afneweonw galloes
.egistras eft hewl wqf afneweonw eft si fi ,si
at ,entf betfrrq a fo hne eft galloes tadt
-ed eft ta hewl wqf galloes eft of hurster
-na hetstregz si roosqz eft .entf a fo galloes
,stetf hewl wqf galloes eft wqf galloes
roosqz a hewl wqf hewl wqf hetstregz oslo si bas
refos eft .entf eft roo devieser si langis
-glz hurrter egistras a hewl wqf hetstregz at
.devieser si lan
-madiosm refos bnd roosqz eft

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

ism is shown in Fig. 44(a, b, c, d, and e). Fig. 44(a) is a face view of the left end of the mechanism: that part located on the left main bracket; (b) is a front or edge view of the same portion; (c) is a top view of the entire mechanism; (d) and (e) are face views of that part of the device located on the right main bracket.

As is indicated in the figures, a small chain is attached to the carriage, which chain runs to the left end of the printer, over a pulley on the left main bearing, and winds onto a drum marked "spring barrel #41-3". This drum contains a flat spiral spring, which is wound so that it tends to keep the chain wound-up on the barrel. Fig. 44(a) shows an end view of the barrel, and indicates the method of regulating the spring tension.

YIWARDRENT QHWTQHST TO KMTAYA MUNUON KHY

.(e bns ,b ,o ,d ,a)M .gM st nwoa st mat
 to bne ftel ent to weiv east s st (a)M .gM
 ftel ent no betsool traq tadt :matnadoem ent
 to weiv egle to thort s st (d) ;felord niam
 ent to weiv got s st (e) ;noktrog emsa ent
 weiv east era (e) bns (f) ;matnadoem eritne
 ent no betsool eciveb ent to traq tadt to
 .felord niam falg
 -st ent st betsoibai st sa
 -rso ent ot betsole st nido llima s ,seru
 to bne ftel ent ot emu nido nido ,egair
 niam ftel ent no yeling s revo ,rening ent
 gainge" beriam murb e othe shaw bns ,gairied
 -lgs tadt s entsoce murb sin" ."C-fb) Ierred
 shnet ji tadt ca know st doldw ,gainge lar
 .ferred ent no qu-bnow nido ent qesx ot
 ,ferred ent to weiv bne na swoa (a)M .gM
 ent gaitalmer to soffer ent betsoibai bns
 .noknent gainge

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

The action of the spacer mechanism is to draw the carriage toward the right, by steps, against the action of the backer spring. The backer mechanism proper is merely a means for releasing the spacer, so that the carriage is free to travel to its extreme left position under the action of the backer spring. We will first describe the spacer mechanism.

The spacer is located at the right end of the printer, near the back. Referring to Fig. 44(c), we see that a second chain is attached to the carriage, runs to the right end of the printer, and there winds onto a second drum called the space drum.

The space drum consists of a barrel, at each end of which is a ratchet; the two ratchets are identical in construc-

TRANSLATION OF MURKOM KEP

-em teosqa est to nofes est
est blyet eqalitie est wath of al matmose
est to nofes est tashay ,qabz qd ,right
toboy matmosek tafod est .qabz teosqa
,teosqa est ymuselet rot ames a ymule et
of levert of seyl al eqalitie est fadz os
nofes est rebus noflesqf fef amette eti
edfreesb verft illw est .qabz teosqa est to
.matmosek teosqa est
est ,ta hafsof al teosqa est
-el ,yond est ried ,toboy est to the right
broces s tafz osm ew ,lolt .qf et qabz
et amr ,eqalitie est of hafsof al teosqa
chaw erft bus ,toboy est to the right est
.muth teosqa est hafsof muth broces s omo
to statano muth teosqa est
;toboy est of hafsof to the nose fa ,lerted s
-entano al Isatmosek ete stafetay est est

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

tion and mounting. The drum is supported from the space magnet bracket by a stud. The drum is turned, and the chain wound up, by the action of a pawl which engages the outside ratchet; the second pawl, which engages the second ratchet, is merely a check pawl. The two pawls are kept in contact with the ratchets by two springs as shown.

The outer pawl is mounted on a lever called the space lever. The space lever is pivoted, near its middle point, to a stud, which, in turn, is mounted on the magnet bracket. A spring, called the space spring, keeps the left end of the spacer lever and pawl in the upper position. At its right end, the lever is connected, through an adjustable link, to the yoke of the space magnet.

The space magnets consist of two solenoids with plunger cores. The solen-

УЧЕНИКИ СОВЕТСКОЙ ШКОЛЫ МУЗЫКАМ ЕДИ

тот бессмыслица и мрак ед". Учителем был мист
анти ед". Была я вд тесной темноте соня ед
-се ед яд, я бышю письмо ед она, бернув а
-жета обиатво ед моргнуло душа яна и я не мог
бросить ед моргнуло душа, яна бросил ед ; я
алways овт ед . always моя а чистая а , таджик
овт яд азията ед джив тастаки як таджик ед
. always аз чистые
но бессмыслица як always ед
-еф соня ед". Revel соня ед бессмыслица revel а
а от , тишина ехххим аж таск , бессмыслица як таск
таск ед но бессмыслица а , пакт а , пакт , была
, злата соня ед бессмыслица A . тесной
была revel соня ед як бессмыслица ед злата
, была злата ед я . злата злата ед як always
одинакова на киргизит , бессмыслица як revel ед
. злата соня ед як злата ед я , злата
як таск соня злата соня ед
-бессмыслица ед" . злата злата злата як злата злата овт

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

oids are fixed to the magnet bracket as indicated. The lower end of the plunger core of each solenoid is attached to the space yoke.

As for the action of the spacer, during the printing of a letter, the space magnet is energized; it draws up its plungers, the space yoke, and the right end of the space lever. This movement of the space lever draws its right end downward, and with it, the pawl; this movement is against the action of the space spring. The pawl engages one of the ratchet teeth. The check pawl has, in the meantime, kept the space drum from turning backward. When the printing of the letter is completed, the space magnet is de-energized. It therefore releases the plungers, yoke, and space lever, and the space spring raises the left end of the space lever and the pawl. This movement of the space pawl turns the ratchet and therefore

THE LITERATURE OF THE ENGLISH LANGUAGE

-ni es telesca tempus est et hanc est ab eo
et ergo regnum est in hoc tempore est . hanc est
. id est omnia est et hanc est et omnia nunc et
-omnis est in nobis id est tota et
omnis est , tunc est in omnibus est quoniam , et
ergo regnum est in eis : hec dico et regnum
omnis est in his qui sunt in hoc , id est omnis est
omnis tempus omnis est in finem mundi est . tempus
; illud est , ut dicitur Dominus , dominus mundi qui sunt in
est in nobis et tempus et finem mundi est
-miser est in uno tempore Domini est . quoniam omnis
, omnitemps est et , et Iustus misericordia est . Ita est de
hunc . dominus mundi nunc omnis est tempus est tempus
est , beneficium et tunc est in omnibus est quoniam omnis
-er omnitemps est . benevolens est et regnum omnis
, tempus omnis hunc , id est , ergo regnum est omnis
to hunc tempus est misericordia quoniam omnis est hunc
to finem mundi est . Ita est hunc tempus omnis est
omnitemps est hunc tempus est omnis tempus est

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

winds-up the carriage chain one more step. The device is so adjusted that the carriage is moved the proper distance for the spacing of the letters.

We see, therefore, that by this device, the spacing of the carriage is accomplished, and that furthermore, the spacing movement does not occur until after the printing of a letter; the operation of printing and spacing, therefore, occur at distinctly different times, as is desired.

The backing mechanism, as was stated before, is a release for the space drum, so that when the backing action takes place, the carriage travels to its left position under the action of the backing spring. The mechanism comprises a tripping lever, which draws the space and check pawls away from their ratchets, a means of operating the tripping lever, and the backing drum.

THE WORKING SYSTEM OF IRISH LANGUAGE

.deja etom uno nishe agairtse eft qu-abnaw
 esque eft tent hetsutba os al esleb eft
 gnicse eft tot constab reborg eft beon al
 .restful eft fo
 vd fadt , erosterant , eos eft
 al agairtse eft fo glosqa eft , esleb alft
 -esque eft , tannadur tent hne , fedilgness
 eft redit litig tuseo for each lumenem gni
 -tintiq fo n-itsarego eft ; restful a fo gnisin
 -fentail fa tuseo , erosterant , glosqa hne eft
 .beriseb al os , semit gniellib ul
 os , maimicem gnielid eft
 eosqa eft tot eseler a al , erosterant fedate now
 uelat notos gnielid eft kew tent os , muri
 -bo ffel al ot elavat agairtse eft , esleb
 .gnitiq gnielid eft fo notos eft telim nacitte
 deidh , nevel gniellib a esleb gnielid eft
 mori gews always noois bns eosqa eft awerb
 -gits eft gnielid eft ansem a , afadair nisid
 .muri gnielid eft bns , nevel gnielid

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

The tripping arrangement is shown in Fig. 44(d and e). The tripping lever is a small bell crank, pivoted at its elbow to the space lever stud, A. One end of the crank extends upward and carries a cross-rod; the cross-rod extends across the front of both pawls. The other arm of the crank terminates under the plunger rod of the backing magnet. This magnet is a single solenoid with a plunger core, to which is attached the plunger rod.

As for the action of the backer, when the backing magnet is energized, it draws its plunger and plunger rod downward; the plunger rod pushes down the end of the tripping crank, which movement draws the upper end to the right. By reason of the cross-rod at the upper end of the arm, the two pawls are also drawn to the right and away from the

THE MORNING STAR OF BETHLEHEM

at the meadowarts sprouting out
-val sprouting out . (s bns b) At . gift of swords
-fe est to be bestowing , where blood flows is est to
to bne est . A , but a reveal causes est of wod
-waste a certain bne known almighty knote est
thwart est stones abmethe hor-sabote est ; hor
thmete est to mis vedde est . always stood to
-stand est to have recognisest when understandest
thmetes almighty is est to knowest est . tenger est
est thmetes at hold of , who recognisest a sthw
. hor recognisest
-stand est to nothes est not aA
st , bestowest al tenger givethest est new , re
; knownest hor recognisest the recognisest est swerth
est to bne est knowest sending hor recognisest est
-us est awst the meadow holds . Where sprouting
-waste est to possess yd . fight est of bne rec
always own est , who est to bne recognisest to hor
est more uses has therty est of sword calls est

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

ratchets, as is shown in Fig. 44(e). The space drum is therefore released, and the carriage is drawn back to its starting position.

A locking device is added to the backer, which device locks the backer in its operative position of Fig. 44(e). This device is necessary in order that, in case the backer magnet is de-energized before the carriage has reached the left end of its travel, the space pawls will be held away from their ratchets until the carriage does reach the end of its travel. At the end of the backing movement, the carriage releases the lock.

The details of the device are shown in Fig. 44(c and d). In (c) we see a small rod, called the backing rod, extending from the left main bearing to the right main bearing; the rod is supported loosely, so that it is free to turn or to slide endways. Near its right end, the rod carries a

VIMARSHANT SHITHIRE NO MINT V. MUNDIOM MINT

eosqz est .(e)¶ .gft at nwoda at az ,ateler
 spkras est bns ,besesfer stolerest at mudi
 .mothsqz qntata est at hood mwerb at
 at hobs at solvah gntzof A
 ni rleod est aloc osivah hldw ,rleod est
 ahT .(e)¶ .gft to mothsq evitarego atk
 esso ni ,tast rleod ni ytsanecem at osivah
 est erled besiprene-ot at tormen rleod est
 -varz est to bne ftel est beser and egatras
 mort yewa bled ed lliw alwag eosqz est ,lo
 poset zoch egatras est lliw ateler rleod
 -hood est to bne est fA .lervit est to bne est
 .yof est besesfer egatras est ,inveron yof
 osivah est to alsteb est
 eos ew (e) ni .(b bks e)¶ .gft ni nwoda era
 -fetox ,for pnsend est /ellc ,for llam s
 tifit est of pnsend item ftel est mort yof
 .yfent betwixx at bne est ;gtrised n
 -bne shfis ot to rtrt ot sert at ft tast os
 a seiviso hor est ,bne fngit est tsell .aysw

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

small collar, called the backing collar; near the left end, the rod carries a somewhat similar collar, and between the latter collar and the left main bearing is placed an open-coil compression spring. The spring tends to keep the rod in its extreme right position.

Referring to (d) of Fig. 44, we see an end view of the backing rod and collar. It will be further noted that the plunger of the backing magnet extends above the top of that magnet, and is attached to one end of a lever called the backing lock lever. This lever is pivoted at its middle point to the magnet bracket; the other end of the lever extends to the left and terminates beside the backing rod collar.

Suppose now, that the end of a printed line has been reached by the printer. The carriage is in its extreme right po-

THE MORNING PRACTICE OF MARY'S MEDITATION

then ; raffoo nighed est helleo , raffoo flame
-mbe tawmowz a seftwoz hor est , hne stel est
raffoo raffoo est newted hns , raffoo raffo
-mboz na bessly si grifred niam stel est hns
et abmetz wifre est . wifre wiccezqmoz like
. wifre wifre emetze est ni hor est quid
. At . At fo (b) et unittre
hns hor ymbed est fo weiv hne ne eea ew
est tent heon tentint ed lliw fI . raffoo
evode abmetze tengam gatbed est fo regnig
et bessette si hne , tengam tent fo got est
hool gatbed est helleo revel a fo hne oho
elbbim est te betoviq si revel sind . revel
hne tent est ; tengam tengam est of thioq
-simet hne stel est of abmetze revel est fo
raffoo hor ymbed est sticed sets
fo hne est tent , won eaodwib
-tent est yd bessette need set ent betwib a
-og thioq emetze est of si esettwoz est . te

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

sition. The backing magnet is energized for an instant; it draws its plunger downward, and thereby raises the left end of the backing lock lever. Under the action of the spring on the backing rod, the backing rod and collar move short distance to the right, so that the collar is under the backing lock lever. (See Fig. 44-e). Therefore, even though the backing magnet be de-energized, its plunger is held up by the backing lock lever. The carriage travels to its left-hand position; as it reaches this position, it strikes the left-hand collar of the backing rod and moves the rod a short distance toward the left. This movement of the backing rod withdraws its collar from beneath the backing lock lever, so that the lever drops to its normal position of Fig. 44(d). When the lever is in this position, the space pawls engage their

УКАЗАНИЯ ПОДЧИНЕНЫЕ МИНИСТРУ МУНДИРА

то беатиете аз тензин гарбад ест .нонтия
 ,брюннвондер симони аз сватъ ѿ ;снатані мі-
 юнд ест то бре діл ест малик զетерін бре
 զарык аз то нонтия ест тензин .тевел мюл յа-
 -лоо бре бор гарбад ест ,бор гарбад ест но-
 танд оз .твигт ест от симонатін тюдіа ером тел
 .тевел мюл гарбад ест тензин аз талло аз
 ест монгол мөнж ,источник .(а-44 .32)
 тензин аз ,бенгтиено-ея аз тензин гарбад
 ест .тевел мюл гарбад ест яз да бид аз
 ;нотисог бенг-діл ест от альянс ынтишін
 ест сэхін аз .нотисог азт сэхін аз за-
 асом бре бор гарбад ест то талло бенг-діл
 .діл ест брюнн симонатін тюдіа бор ест
 аз монгол бор гарбад ест то тишиевон аз
 -вол мюл гарбад ест дүнене мюл талло аз
 һармон аз от сэхін тевел ест танд оз ,то
 аз тевел ест мюнж .(б-44 .32) то нотисог
 ҭанд ынтишін симонатін аз ,нотисог азт аз

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

ratchets; they have not engaged, however, until the carriage has reached its starting position.

An additional attachment is to be found on the space drum. This attachment is a stop pawl whose purpose is to prevent the spinning of the space drum after the backing movement is completed. While the carriage is travelling back to its starting position, the space drum is turning backward rapidly; it has been found more desirable to stop the drum at the end of the backing movement by a special stop pawl, rather than to allow the check and space pawls to drop onto the ratchets while they are revolving.

The lower part of the stop pawl may be seen in Fig. 44(d and e). This pawl is pivoted to a bearing on the base-plate.

YAHALEW ITU SHIFFER TO MPPRG MUSEUM

,tewewon ,hegazne ton evan yent ;atetotet
 -traje ati hefotet and egatris edt litu
 ,moltisog art
 at tmemosite famotibba na
 -mosite simT .murb eseqs edt no hmoct edt
 -eq et at esodqinb esoww lwasq qots a at them
 -tette murb eseqs edt lo galmiqo edt tnew
 est elid .hejelqmoz at tmemevem ymleed edt
 galitete ati ot need yutilevert at egalittas
 -need ymleut at murb eseqs edt ,moltisog
 -times ston bnnol need and ti ;qibiqer htw
 -need edt lo hse edt ta murb edt qots ot elid
 tefter ,lwasq qots fefter a yd tmemevem qat
 ot alwasq eseqs bna xicis edt wolla ot murt
 -yufex era yedi elidw atetotet edt ojno qots
 .mrt
 qots edt lo tteq tewol edt
 simT .(e bna b)M .glt ut nees ed yem lwasq
 etefiq-saq edt no galitete a ot hefotiq at lwasq

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

The upper part of the pawl splits into two fingers; one finger bears on the face of the drum, whereas the other extends along the back of the rear ratchet. The face of the ratchet carries a small stud or pin. When the carriage is in its starting position, the stud rests on the top of the rear finger of the pawl; as the carriage is drawn toward the right by the winding of the chain onto the space drum, that finger of the pawl which rests on the face of the drum rises onto the chain wound on the drum, and rides on the top of the chain instead of on the face of the drum. Both pawls are thereby lifted away from their former positions, so that the back finger clears the path of the stud on the ratchet. As the drum unwinds, during the backing movement, the pawl assumes its former position, so that just as the carriage reaches its starting position, the in-

THE MARKOMANIC LANGUAGE OF THE METEYAS TRIBES

owt owt atilga lwasq est to tsaq teppu est
est to east est no atsed regukt enc ;atregukt
est gnoia abmetke redto est aserew ,muri
est to east est .tendotar tsar est to dead
men .lifq to bata llama a sekriso tendotar
,noitiaoq qanitata est ni si egairiso est
-nif tsar est to qot est no atsar bata est
mwsar si egairiso est as ;lwasq est to reg
mido est to galbniw est .yd' dight est brawot
lwasq est to regukt tsar ,muri eseqs est otso
esot muri est to east est no atsar doliw
setbi baa ,muri est ac brawot qanis est otso
est no to basant mido est to qot est no
yderent ere always stot .muri est to east
os ,noitiaoq temrot tleid meri yaws bestill
est to itaq est arna's regukt wood est tsar
,abriwan muri est os .tendotar est no bata
asermas lwasq est ,tsamevem painad est qaltsab
-iso est as tsar tsar os .noitiaoq temrot est
-nt est ,noitiaoq qanitata est wodasq egair

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

terference stud strikes the stop pawl. The space drum therefore stops, and the space pawls drop onto the ratchets.

We will now take up a study of the platen, and of the lining mechanism, which is closely associated with the platen.

THE PLATEN AND LINER. The complete platen, with the lining mechanism, is shown in Fig. 45. The platen consists of the roller and auxiliary attachments for holding the message blank or other paper. The lining mechanism is the arrangement by which the roller is turned slightly at the end of each line, so that the message blank presents a new surface for the next printed line. Fig. 45 is a catalogue drawing of the platen; only the main parts will be discussed here.

The frame of the platen consists of the cover of the printer, casting #1, together with two end plates, marked re-

THE MORTON SYSTEM OF PRINTING ENGRAVING

est . Iusq qute est exiute bude exmetrebet
seque est bude , qute excoferedt mynq seque
. stedoter est oþno qore swisq
þurte a qu exat won lliw e
, meimadom gñifl est lo bude , metelq est lo
metelq est dñiw heftesches ðlescio si heftw
est . REW AND PLATEN AND LIMER
, meimadom gñifl est dñiw , metelq etelques
lo statano metelq est . ðð . ðH si xwora et
-Mof rof etnemisette yretifus bude refier est
est . seque raflo to xwad ogasem est yñi
dñiw yñi tñemegnarr est si meimadom gñifl
lo bude est to xwad ogasem heftet et refier est
etnemisette xwad ogasem est dñid os , enil doce
. ðH . enil hefting fren est rof secfme won a
yñlo ; metelq est lo gñifl ogolates a et ðA
, eren þessoceth ed lliw etrasq nism est
-moo metelq est lo smart est
gñitase , metelq est lo revos est lo statis
-er heftum . metelq bude owl lliw refier , i

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

spectively, casting #2 and casting #3. The screws at the four corners of the cover plate screw into the four corners of the main frame of the printer; the end castings are screwed onto the cover plate.

The platen, in its restricted sense, is a rubber roller, similar to that of a typewriter. It is mounted on the platen shaft, #5-1, which is supported by the end casting in bearings. At either end of the shaft is a hard-rubber thumb-wheel, by which the platen may be turned. There are a number of auxiliary attachments on the platen, the most important of which attachments is the one for holding the paper against the roller.

This latter device consists of the two feed rolls, #14 and #15 respectively, and their mountings. These two rolls bear against the roller, and hold the paper snugly against the roller. The two rolls may

THE MORNING STAR OF PRINTING TECHNOLOGY

est .et smitiae bus et smitiae ,beschleunigen
etstiq revos est to smitiae that est to smitiae
smrit niam est to smitiae that est only weise
beweise ex smitiae bus est ;technique est to
.etstiq revos est other
-techniques est at .metastq est
that of salimia ,reffer redder s at ,comes is
metastq est no behaviour at tI .metamagnetic s to
bus est qd behaviours at metaw ,I-B ,times
est to bus metals tA .signified at smitiae
and qd ,leerw-dmmt redder-redder s at times
red un s era metastq .behaviour as yan metastq est
est ,metastq est no attenuations quantities to
est si attenuations metaw to transient decay
.refler est tenings reqlq est published to one
statements coived reflal met
-cooper at bus met ,refler best owt est to
zifor owt said .signification that bus ,ylevite
reqlq est blod bus ,refler est tenings reed
yan refler owt est .refler est tenings vitrana

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

be drawn away from the platen by the arrangement shown in Fig. 45(a). The rolls are mounted on a spring rod, as shown, which is screwed at its right end to the end casting. The front end of the spring lays across a rod known as the release rod, which extends from one end ~~cast~~ing to the other, and is fitted into bearings at either end. At the point where the spring rod lays across the release rod, the latter is cut down to semi-circular form; the spring rod lays across the flat face thereby secured. The release rod carries a small lever, marked #18 Rolls handle, by which it may be turned. The mechanism so far described is duplicated at the left end of the platen.

In the operation of the attachment, the feed rolls normally lie close against the platen, as in (a). However, if the rolls handle and release rod be turned,

THEATRE OF THE MURKOM SHI

-squares est yd metaly est surt ymme awent ed
-monde est monde est monde est .(a) est .EST si ymme tñent
-welen est ymme ,ymme es ,bor gñrige a no be
est .ymme bne est of bor tñgir est ja be
bor a sector ayal gñrige est to bne tñort
tñort aymette dñlñ ,bor esseler est an mord
bedil est bna ,yedlo est of gñrige bne ego
tñkig est ja .bne tentie ja aymised est
esseler est smotes ayal bor gñrige est etew
tñlñorie-imme est ymme tñre al yedil est ,bor
tñt est smotes ayal bor gñrige est ;mord
tñrtas bor esseler est .yedil est bedil est
yd ,elomai effor est hñtñm ,tñvel flame s
est os mordissem est .yedil est ja tñ mord
to bne tñt est ja bedil est al bedil est
.metaly est
-ta est to mordissem est al
smole eff ymmedem effor bedil est ,tñmmed
ti ,yedil .(a) si es ,metaly est tñmmed
,yedil est bor esseler bna elbñm effor est

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

the spring rod is pushed downward until it finally lays across the round side of the release rod. This movement of the spring rod pull the feed rolls away from the platen. When the rolls handle is pushed back to its original position, all parts return to their usual positions.

The purpose of the device is to release the message blank so that it may be withdrawn from the platen or its position adjusted.

The lining mechanism can better be understood from the end view of the platen. Referring to this view, we see the ratchet mounted on the platen shaft. The ratchet and platen are ordinarily held in position by the detent roll as shown. At the left of the ratchet is a lever, L, which carries two pawls: the lining pawl and the stop pawl. The lever and pawls are connected with the

YANKEE SKINNING TO MEXICO MOUNTAIN SHE

it litus browniob before it for gridae edit
 ent to chis know ent scores and diffent
 gridae ent to themevon alid . for eseler
 metelo ent most yaws effor best ent illq for
 art of dead bedaub at elbund effor ent now
 riedt of under straq lls , metelo longimo
 . metelo leaves
 at esivel ent to seeling eff
 van si dent os naid eyssen ent eseler of
 metelo ent to metelo ent most overhit w ed
 . heigthe
 -ted mo maindeem grimal ent
 ent to weiv bne ent most bootashan ed ret
 ent sea ew , weiv alid of grimal . metelo
 -eler ed . findy before a t no hirnem fender
 -fond at bled yfianbro eye metelo bne te
 ddel ent ja . swede an effor threted ent yd most
 seirres hoily , i , revel a si fender ent to
 . lwasq dole ent lwasq grimal ent : lwasq owl
 ent kliw beteencom eye lwasq bne revel ent

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

lining magnet as shown. In the operation of the liner, the lining magnet is first energized. The magnet moves the lever, L, toward the right, and, through the agency of the lining pawl, turns the ratchet and feed roll toward the left; this turning is the equivalent of either one or two lines on the message blank. The stop pawl serves to stop the turning. The position of the stop pawl may be changed by means of the lever, A. When the stop pawl is in one position, two lines on the message blank are turned up at every stroke of the lining magnet; when the pawl is in the other position, one only is turned up at a time.

We have now completed the discussion of the principal mechanical features of the Morkrum printer, and will next take up a study of the electrical circuits and equipment by which the mechanical devices

YHWHOMHET SMITHET MO METAYE MURASOM EHT

To mōfīreng eht al .awordz as tēyam grām
 -tēne ūtīt si tēyam grām eht .texl eht
 -ot ,A ,texel eht sevom tēyam eht .bezig
 To yōnēs eht yōnēt ,bns .tēgīt eht bñw
 heet ñna tēdēt eht aenit ,Iwai grām eht
 eht si grānt eht ;tēl eht bñwet ffot
 eht ne aenil owt to smo tēdēt to tñelavim
 gots of aenres Iwsq gots eht .Mñald eyasem
 Iwai gots eht to mōfīreng eht .grānt eht
 .A ,texel eht to amsem qd bñgnad eht yam
 owt ,mōttīoq eno n̄ si Iwsq gots eht neff
 te qd bñgnat eis inself eyasem eht ne aenil
 eht neff ;tēyam grām eht to aenra yrevo
 si ylno eno ,mōttīoq yrevo eht n̄ si Iwsq
 ,emt s ts qd bñgnat
 eht bñfēqmo wñ evst eht
 -eht fachmōsem fachmōsem eht to mōfīreng
 ñxen ffot bns ,texl eht mōfīreng eht to aenit
 aenit fachmōsem eht to yēnta s qd aenit
 aenit fachmōsem eht ñxen qd fachmōsem bns

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

are controlled.

THE PRINTER CIRCUITS. In Fig. 46 are given the complete circuits of the Morkrum printer. As the general circuits are too complicated for purposes of explanation, the constituent circuits will be separated from the rest and discussed one at a time. In order that the reader may thoroughly understand the fundamental plan of the control, the main circuit will be developed by stages, as was done with the distribution system in the introduction. In fact, we will begin with the receiving station of Fig. 6, and develop the printer circuits from that scheme.

In Fig. 47, we have the receiving station of Fig. 6, except that the local relays, P-1, P-2, P-3, P-4, and P-5, are connected so as to lock themselves in the energized or closed position. That is,

THE MOKKUM SYSTEM OF PRINTING TELEGRAPHY

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

the front points are connected to one side of the battery, and the armatures are connected to their respective operating coils, as shown. If one relay is momentarily energized, as it will be by a current pulse, it draws up its armature against its front contact; with this contact closed, the relay remains energized, even after the current pulse has ceased. This locking circuit is connected to the battery through a switch called the main break. A momentary opening of this switch cuts off the locking current from the relays for a time sufficient for them to return to their normal condition.

As a possible use for the system, we could establish a printing system with these five relays. The first four relays might act as operating solenoids for the selector plates, and the fifth relay might determine the direction of rotation of the typewheel. Furthermore, by fitting the solenoids with relay contacts other than

THE MERRIMAC SYSTEM OF PRINTING AND PUBLISHING

out to this era of beforenow era which had ext
riest of beforenow era considerate off far ,yotted
-er one "I .made as ,alsoe yittering evit
-ed of littw it ss ,besygned glisselom si val
tentage eructans all qu sweth it ,selby thertus a
-nd ,besoie festnes shft littw ;festnes thort sh
thertus off rofha nwo ,besygned antiser valer
-nos at finisit yitself off .besoie and esly
-dellse defiwa a deuond yotted off of before
-native shft to yitself yitself A .isord nwo off
-tot yaler off wort thertus yitself off tho atm
-eron rident of master of medj tot thekittus off a
..yitself yitself lam
,metays off tot ear effisay a za
-cessit littw metays yittering a haldenes bins
-as tot dfigm yaler tot exit off .yaler evit
-bus .selby rofles off tot shional yittering
-to metayis off extricet dfigm yaler dfigm off
-off yit ,yitself .leaveng off to metayis
-and rende assine yaler littw abomalos off yit

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

their locking contacts, we arrange the operating circuits, that is, the circuits of the rotator, striker, shift, and other magnets. A control circuit could be developed, and, in fact, some such plan is followed in the Morkrum printer.

The cycle of operations for such a machine would be as follows: The receiver brush passes over the receiver buttons, 1, 2, 3, 4, and 5, and the five plate relays are operated or else remain inoperative, depending upon the nature of the separate impulses. The plate relays set the selector plates, and at the same time, set up the circuits of the operating mechanisms. Hence, after the fifth pulse, the typewheel rotates, strikes, and spaces. The final printer movement is to open the main break for an instant, so that the plate relays return to their normal positions. By this time, the brush has

THE MURKIN SYSTEM OF PRINTING IS THE PIONEER IN

that is to say, that the system is not yet fully developed, and it is not yet clear what the final form of the system will be. The system is currently being developed by a team of researchers at the University of Cambridge, and it is expected to be completed within the next few years. The system will be able to identify and track multiple objects in real-time, and it will be able to perform various tasks such as object recognition, tracking, and classification. The system will also be able to handle complex environments, such as indoor and outdoor scenes, and it will be able to deal with occlusion and other challenges. The system is currently being tested on a range of datasets, and it has shown promising results. The system is currently being developed by a team of researchers at the University of Cambridge, and it is expected to be completed within the next few years. The system will be able to identify and track multiple objects in real-time, and it will be able to perform various tasks such as object recognition, tracking, and classification. The system will also be able to handle complex environments, such as indoor and outdoor scenes, and it will be able to deal with occlusion and other challenges. The system is currently being tested on a range of datasets, and it has shown promising results.

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

again reached the first contact button, and the same cycle of operation occurs for the next letter. In this way, the printer would perform its functions.

The great fault of such a system is this: All the movements of the type-wheel must occur during the interval of time required by the brush arm in passing from contact button #5 to button #1. If the transmission of messages is performed at any practical speed, this interval of time is too short for the typewheel to complete its movements. We therefore modify the system of Fig. 47 somewhat, so that one letter is being printed while the next one is being received over the line.

THE ACTUAL SELECTOR CIRCUITS.

The new scheme, which is the one used in the Morkrum system, is presented in Fig. 50. In this plan, the plate relays are not connected

WYANDOTTE COUNTY TO METEYE MURKIN HEN

hen ,mettud testnes tawit eft beforer atsaga
 eft tot stas oocesq; to eloye emas eft
 blynter nowdy eft ,ayw aint al .tettef tken
 .asocitemst ati mtothre
 a dom to fint tserg eft
 -ayt eft to atsasewas eft ill :atit at meteye
 eft to larrelai eft palus tress taum leddy
 -mott galesaq ni ari deurd eft yg herkuper
 -mott eft ti .It mettud of d^o mettud testnes
 -oway was to bennolinq at neysseam to golesim
 eot al emt to lantemt aint ,beeqs laot
 -evom ati etel-mas of lansingq; eft tol tria
 .pl to meteye eft vthlem ersterant eft .etxem
 -trity qnted at tettef emt tadt os ,tadvomea Ta
 -tovo bevecoox qnted at emt tken eft elidw be
 .entl eft

.ETTOMORR GIRONIIE

eft al beas emt eft at deind wi ,ameis wem sceme wem eft
 al .D^o .ayt al bepnesaq at ,meteye mtothre
 bepnesaq jor emt ayalef etel; eft ,aylq aint

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

to the receiver contact buttons. Instead, a second series of relays, called lock relays, are connected to the contact buttons, and the plate relays are controlled from this second set. It seems advisable, for purposes of explanation, to build up the plan of the control circuits between the lock and plate relays.

THE LOCK RELAY CIRCUITS.

The connections of the lock relays and transmitter disk are shown schematically in Fig. 48. Note that the lock relays of Fig. 48 have taken the places of the local relays in the distributing system of Fig. 6. As is indicated, the lock relays lock themselves in the operative position, just as the plate relays do in the preceding scheme. The locking current in this case, however, comes through the back contacts of a sixth relay, similar

VHARDFINT SHITWINK TO MINTEYA MURKOM ENT

s ,baefamI .smottdt testnos reviewer ent ot
 .sysler Wool sellce .sysler to selfes brosses
 bns ,smottdt testnos ent ot betoemnoe ent
 ent morl bellorinoe ent sysler ent bly ent
 neobing rot ,eldasivba amosa tI .tes brosses
 ent to nely ent qu blid of ,mottanafqxe to
 stalg bns Wool ent neewted stineke fornce
 .sysler

.ATTUOSIO VAIKE HODA ENT

-amet bns sysler Wool ent to smottemnoe ent
 .gM ni vllisotamedos nwoea ent keth rettim
 evad 24 .gM to sysler Wool ent jant ent .24
 ent ni sysler lacoI ent to secoly ent neli
 -testent al al .2 .gM to mately gatindiratib
 ent ni sevlemedt Wool sysler Wool ent ,be
 sysler ent ,ent as test ,mottanafqxe ent
 -two gatidof ent .emedes gatibessera ent ni ob
 agowd t nemos ,reviewer ,ense ent ni tmer
 tafimte ,sysler htxia s to stestnos Wool ent

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

to the others, and called the selector break. The circuits are so arranged that when the selector break coils are de-energized, and the armature lies against the back point, the locking circuit is closed to the battery; when the coils are energized, the armature is drawn away from the back point, and the locking circuit is separated from the battery. Hence, when the selector break opens, it releases any of the lock relays which have been locked in the operative position.

The control of the selector break is through a button on the receiver disk. This button, called the restoring button, is double size, and corresponds to both the positive and negative synchronizing buttons of the transmitting disk. It will be remembered that once every revolution of the transmitter brush arm, a marking impulse is sent out from the negative synchronizing but-

THEATRE OF MURKOM SHIT

.Nerd rotooles est bellac bns ,stento est ot
 est medw tadt begnarrs os era stinoris est
 bns ,heigrene-oh era elioe nerd rotooles
 ,takq nrod est tamaga self erutamis est
 ;vietted est or becole al tinoris jellof est
 erutamis est ,heigrene era elioe est medw
 est bns ,takq nrod est mori yaws nwerb al
 -ted est mori beterages al tinoris gnikoel
 ,amego nerd rotooles est medw ,eomeh .takq
 evri haldw ayeler leel est to yns esaseler it
 .nottisoq evitasego est al behool need
 rotooles est to fortres est
 revleser est no notted a knoutit al nerd
 -ted gnikoeler est bellac ,notted alidT .seth
 fited or amouzteros bns ,esta eldub al ,not
 -ted gnikoeler evitasego evitasego est
 ed IItw al .nisb gnikoeler est to not
 est to nottisover ytreve eoso tadt beteradmen
 al esayet gnikoel a ,nts dard raffman
 -ted gnikoeler evitasego est mori tuo bnes

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

to; hence, the selector break is energized and operates once every revolution of the brush arms. Furthermore, the opening of the selector break occurs between successive letters, so that the lock relays are "restored" after the reception of each impulse combination.

The lock relay, L-5, does not lock itself in position with current from the selector break; we will presently see the reason for this fact.

It might be well to state here a condition which is general in all the Morkrum circuits, viz., one side of the battery is permanently grounded, and one side of every solenoid or relay is permanently grounded. Therefore, only one additional path need be established between the battery and the magnet in question.

YAHANDOMINT ANITMINI KO VIVI YI MUDUMON YII

benigente si mard rotoeska est ,comes ;ot
est to mohslover yreve uno matorde ma
est to aminejo mit ,stromedim .sono mard
-jel evi secos mawted amaco mard rotoeska
"berotzak" era agafer nool est tsit os ,sta
-mawtmos celugak noce to mohslover est tella
.molt

seoh ,B-I ,yafet nool est

therrno mitw mohslover si flesti nool ton
ylymeseq iliw ew ;mard rotoeska est moh
.tsit mit w mawt est eas
estas et illew ed tigim si
est lla ni lareng si mohslover a eren
-ted est to ebis emo ,siv ,stomach mawtmos
emo hys ,bebaworq ultimamenteq si yriet
ultimamenteq si yriet to bionefor yreve fo
dtag feneftibba emo vino ,stomach .bebaworq
hys ykatted est acuted hemifiditas et hoo
.mohslover ni tengam est

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

THE LOCK AND PLATE RELAY CIRCUITS. The connection from lock to plate relays is shown in Fig. 49. Here we see that the five plate relays are connected in parallel with their respective lock relays. The two sets of instruments are connected in parallel through four back contacts of a relay known as the divide relay. Plate and lock relays #5 form an exception to the general arrangement: they are connected directly in parallel. The plate relays lock themselves in the operated position by current through the main break, just as before, although the locking circuit is not shown.

By this arrangement, if the contacts of the divide relay are closed, as they are when the divide relay is not energized, the plate and lock relays are in parallel. The plate relays will, therefore, follow any movements of the lock relays. Since

THE SINKING OF THE TITANIC

-RIO YAHIA ETALIK QNA KNOI EHT
-er estiq of kool mowt gofcoemps edT .SUNITS
 tsit ses ew eret .ca .grf at nwoea si sys
-Istsq at hefemnos era yafel estiq evit edT
 edT .sysafel kool evitcoesr kiedt ntiw fel
-tsq at hefemnos era afnemocnto lo ztes owt
 yafel s to ztesnos kool mowt gafordt leffa
 kool bns etiq .ysafel ebivib est sa nwoei
 Istsq est at hofgeake na mowt si sysafel
 in qfleotqf hefemnos era yaf :fneqecatva
 cevememnt kool s-sifet edT .leffafat
 rgnont tneuris qd neftiq bafetqdo est si
 est gafordt ,erofed ar taut ,kawd alam edT
 ,swode tom si fimoio gafordt
 est si ,fneqecatva sifit qd
 as ,hefemnos era yafel ebivib est to ztesnos
 -tene tom si yafel ebivib est nedi era yaf
 -tsq si era yafel kool bns etiq est ,hefia
 -fot ,erofedt ,lly sysafel edT .leffafat
 comt .sysafel kool est to afnemewom qns woi

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

the lock relays are governed by the incoming line impulses, the plate relays also register the character of the impulses.

If the contacts of the divide be opened, as they will be when the instrument is energized, the two banks of relays are separated. The first four lock relays act just as before, but the plate relays are not affected by the line impulses. Since the locking circuits of the two sets of relays are independent, the plate relays remain in the position in which they were at the opening of the divide contacts; then, when the main break opens, locking current is cut off from the plate relays, and they resume their inoperative position.

As for the operating circuits of the divide relay, the relay coils are connected to one tongue of the relay. The back point, corresponding to this tongue, is con-

THE MORTGAGE SYSTEM OF PRINTING TELEGRAMS

animorum est ut hanc eorum erae etiam illa est
totaliter causa etiam est. seafugia est
seafugia est in recessione est
etiam est in agitacione est tunc

-nritam ent neidw ed illiw vest as ,beneqo ed
-valer fo cimad owt ent ,bealystone at dnew
-valer nool tuot tawt ent .beteriques ers
ers valer etafq ent tud ,eroted as fast tes
ent semis .sealiquit ent ent yd betoetts ton
-valer fo stes owt ent fo althoritie gnikool
at nimmer valer elafq ent ,luehneashnt ers
-neqo ent fo crew vest neidw at mofitioq ent
ent neidw ,merit ;stesnos ebivib ent fo gni
tto fno at dnewrue gnikool ,aneqo hawt dnew
tient emuser yndi fna ,valer etafq ent mofit
.,mofitioq evitabegont
althoritie gnikoedc ent rof as
-nos ers alto valer ent ,valer ebivib ent fo
mofit ent .valer ent fo engnot arc of betsem
-nos at ,engnot sind of gnikoedc ,gnot

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

nected to the restoring button of the receiver disk. When the relay is in its usual position, there is a current path from the restoring button, through the brush and brush arm, through the divide relay contact to the operating coils, and thence to ground. Hence, when a marking pulse occurs at the restoring button, as it does once every revolution of the brush arm, the divide relay is energized. It therefore draws its armature against the front contact, and thereby cuts itself off from the receiver disk. As we shall see presently, the front contact is connected to the battery through the main break; hence, the divide relay is locked in its operative position until the opening of the main break. At the same time that the divide relay has changed its own circuit, it has separated the lock and plate relays.

THE MORNING PRIMITIVE METHOD

-viewer ent to nothing unnoted ent of between
-to I have ent at si valer ent now .Hebb te
-er ent more itaq metting a si credit ,nothing
dared the hand ent myself ,nothing unnoted
ent of tooeas valer obivis ent myself ,now
,now .Innotg ot went hand ,ellics quittereo
unnoted ent je amuse oufing myself a now
to nothingwhere where sono seoh di un,nothing
.desirous si valer obivis ent ,wra deur ent
ent jessie a statuary ent awerh unnoted di
the festi ent yderent hand ,tooone doot
-erq oee lissi ew et .Hebb reviewer ent more
of betoemus si tooone thot ent ,wra
,sono ;wra niam ent myself yester ent
obivis ent at behof si valer obivis ent
.Now niam ent to yester ent lissi nothing
and valer obivis ent tant emt emas ent di
betotages and di ,thieris now ent beginno
.valer entaq hand hoof ent

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

When we go a step further, and apply the scheme just described to the scheme of Fig. 47, the result is the circuit presented in Fig. 50. As was said before, Fig. 50 shows the lock and plate relay circuits actually used in the Morkum printer.

FINAL SELECTOR CIRCUITS. In Fig. 50, the lock relays are connected to the receiver disk just as in Fig. 48, and they receive their locking current through the back contact of the selector break. The first four relays are connected in parallel with their respective plate relays through the back contacts of the divide, just as before. The fifth relays are connected directly in parallel. The five plate relays and the fifth lock relay receive locking current through the main break. The selector break and divide relays are connected to the restoring button of the receiver disk. The di-

TRANSMISSIONS TO MARYLAND AND

recent gets a go on new
edit of bedrock east margin edit which has
finished edit at timber edit .VA .git to margin
,eroded base saw at .00 .git at Betweenberg
-the water stage has been edit around 00 .git
.returning mountain edit at been glistered atmo
al .ATTACHMENT ROTATING LAYER
of betweenness the water level edit ,00 .git
base ,84 .git at as fast half review edit
against the time pairs of their review just
edit .Hence rotates edit to betweenness road edit
leftover at betweenness the water rock family
against water easily review their right edit
-ed as fast ,erbivib edit to betweenness road edit
-rotating betweenness the water diffit edit .erot
the water stage evitt edit .leftover at gl
betweenness water review water road diffit edit
Hence rotates edit .Hence when edit against
-er edit of betweenness the water erbivib has
-it edit .Half review edit to nothing water

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

vide relay receives locking current through the main break. We see, therefore, that although the arrangement of the figure has been changed somewhat from that given in Figs. 48 and 49, the electrical connections are just the same. There are, however, two additional devices in Fig. 50.

The first of the new devices is the drum magnet and drum switch. The drum magnet is connected to the battery through one of the front contacts of the divide, so that the magnet is energized while the divide relay is closed. Furthermore, the drum magnet carries a switch called the drum switch; this switch closes when the drum magnet is energized. The purpose of the switch is to connect the battery into the distribution circuit, as that circuit is called which serves to operate the rotator magnets or other printer functions. That is, the drum switch con-

УЧАСТІВ СУДИМУ ТО МІСЦЯ МУЖКОМ РНІ

Акоюдь змінне підмісів відібрати від
 -їх таєт , змістовит , єє єв . Каскід цієм єд
 need and enough єд to transmogrify єд Акоюдь
 84 . віт юків таєт морі таєвомо багато
 таєт єрі змістовине фасиліте єд . єд йа
 Ганоїтіхіа єві , таєвомо , єрі віт . євів єд
 . 85 . віт юків
 змістовине від то таєт єд
 ют єд . Нотів мурів йа таєвом ют єд а
 Акоюдь відтад єд оц беденінне аї таєвом
 ѿ , єбів єд то змістовине таєт єд то єн
 єбів єд оцін відтаде аї таєвом єд таєт
 -їм мурів єд , змістовине . басолі аї відіб
 ; нотів мурів єд басолі нотів аї змістовине таєт
 аї таєвом мурів єд північ басолі нотів єд
 оц аї нотів єд то змістовине єд . відтаде
 нотідітів єд оцін відтад єд таєвом
 змістовине нотів басолі аї змістовине таєт аї , таєвом
 -їм відтад то змістовине таєт єд змістовине
 -їм нотів мурів єд , аї таєт . змістовине таєт

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

nects the battery to the semi-automatic functions of the printer.

The other additional feature is the signal lamp. As is indicated, the lamp is controlled by an additional lock relay, identical with the other lock relays. When a marking pulse is received by the lamp button, the lamp lights, whereas if a spacing pulse is received, the lamp stays dark. The action is apparent from the diagram.

We will now trace through the cycle of operations with the system of Fig. 50, remembering that the idea of the scheme is to allow one letter to be printed while the next letter is being received over the line. Suppose, for example, that the signal +---(the letter A) is received.

The action of the lock relays is for instruments #3, 4, and 5 to operate, since the relays respond only to marking

THE HISTORY OF THE MUNICIPALITY OF HAMBURG

-early circumstances out of visited out areas
 .out to small
 situated Isenbüttel Rönne out
 small out ,beforehand at a small Isenbüttel out at
 ,safer Wool Isenbüttel as vd bellortmos at
 red .safer Wool Rönne out with Isenbüttel
 -thus small out vd beviser at early morning &
 go to a fit assembly ,still small out ,not
 off .this says small out ,beviser at early
 .mystic out most messages at no time
 out ignorant said won like so
 .out to message out with assembly to allow
 express out to said out said arrangement ,as
 either bettering out of better one who will at
 out two beviser said at better then out
 Isenbüttel out said ,expressed not ,second .out
 .beviser at (A better out)-----
 -out Wool out to better out
 -early of a day ,A .B. statement not at any
 question of who beviser safer said son's ,etc

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

pulses, and #1 and 2 to remain inoperative. Lock relays #3 and 4 lock themselves in the operative position with current from the selector break. The five plate relays duplicate the settings of the lock relays, and #3, 4, and 5 lock themselves in position with current from the main break. L-5 is also locked by current from the main break. This action takes place while the receiver brush is passing over the five contact buttons, #1, 2, 3, 4, and 5.

When the brush reaches the restoring button, the selector break and divide relays are operated. The divide relay separates the first four plate relays from the lock relays and locks itself in position. Hence, the separation of the lock and plate relays is maintained after the brush has left the restoring button. At the same time, the selector break cuts off locking current from

THE MORNING SYSTEM OF PRINTING TELEGRAPHY

• evitareqon i nismet ot S has it has , buse
ent ut sevleasant hool & has S+ evale
-les ent mort tmetne at the mifine evitareqo
etseilqub evalest evit ent .mend rotes
.A , S+ has , evalest hool ent te emittes ent
-tue nifin mofisog ut sevleasant hool & has
-hool case et E-L .mend niam ent mort tmet
-es ent .mend niam ent mort tmetne vd be
henned revleaser ent elidw esalb wakat ent
.It , amottud teotnos evit ent revo gahesq al
.d has , A , S , S
ent sefeser hawrd ent nev
-ib has kawrd rotesles ent , mottud gahroves
valer ebivih ent .betalvego era evalest evit
mort evalest evalest twot twit ent setraages
.nclitnoq ut 'Ilesti nleol has evalest hool ent
evalest hool ent te mofisogas ent , conell
tbel ami hawrd ent teotva hentistham et evalest
ent , emit emas ent dA .mottud gahroves ent
mort tmetne qahveel The era kawrd rotesles

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

the first four lock relays, and these relays resume the inoperative position. The fifth lock relay remains locked with the fifth plate relay. The selector break remains energized only as long as the brush is in contact with the restoring button, but this time is long enough to allow the relays to unlock and assume their inoperative positions.

As a result of these movements, we have lock relays #1, 2, 3, and 4 de-energized, and #5 still energized and locked in position. Plate relays #1 and 2 are inoperative, whereas #3, 4, and 5 are energized and are locked in position. The selector plates are therefore set, and ready for the printing operations to begin.

Besides separating the lock and plate relays, the divide relay has, at this time, completed the circuit of the drum magnet. This magnet draws in its armature,

VIRAKOMINT DRITMIKU TO METEYE MUNHON SII

sysler esedt bns ,sysler nool moit dritt esd
dritt esd .moltisq evitareqon esd emaser
etiq qdil esd qdil bnsqI emaser yafet nool
berlyrene emaser nestd rofesles esd .yafet
ntiw rofesles nf al nootd esd as grol as ylno
grol al esd alit fed ,nottd pntrofer esd
-es bns noofur of sysler esd wille of dyson
.molitisq evitareqon riëdt emas
,etnemewom esedt to jinesr s nA

-xene-sh & bns ,G ,S ,F sysler nool esd es
nt bnsqI bns berlyrene illis G bns ,berly
-areqon esd S bns F sysler etell .molitisq
bns berlyrene esd G bns ,F ,S emaserly ,evit
seteq rofesles esd .molitisq nf bnsqI esd
-qitq esd tel yafet bns ,je emaserly esd
.niged ot molitisqo gni
nool esd gafitaresqes sebbed

ta ,nni yafet shivis esd ,sysler etiq bns
munt esd to thotio esd betelmos ,emit sint
,oxutwra nf swerb tamgam esd .tempar

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

and thereby sets the interference pins of the selector. The drum magnet also closes the drum switch. This switch connects the battery to the printing functions, so that the printing action now takes place.

In the meantime, the lock relays have been receiving the first two or three line impulses of the next letter, and have stored these impulses by the locking of the lock relays.

The final movement of the printer, during the printing of a letter, momentarily opens the main break. This momentary opening cuts off locking current from the divide and plate relays, together with L-5, for a sufficient interval of time for these instruments to return to their normal positions. Note that the unlocking of the divide relay restores the drum magnet and

THE HABITAT PREFERENCES OF METAYE MURKOM SHI

to arid semidesert est area where the
 scarce soil ranges north of .1000 feet est
 the same native shrub .native shrub est
 tall or ,shrubular growth est of varied
 .such as the white gilia est
 cool est ,shrubular est of
 to cool swift est prairie need even water
 this ,settled from est to semiarid until certain
 gilias est of semiarid areas before even
 .water cool est to
 est to the river bank est
 ,settled to gilia est gilia ,gilia
 -es est .nearby river est where climate
 more than two miles the gilia est
 more than two miles ,gilia est of the
 to settle to riverine vegetation is to ,a
 limited extent of water of atmospheric
 est to gilia est tall est .shrubular
 has been as such est aerotest water est

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

drum switch to their inoperative positions. The operation of returning the divide and plate relays, with the other printer parts, to their normal positions is known as "clearing" the printer.

As soon as the divide relay assumes its normal position, the plate and lock relays are again connected in parallel. Hence, the plate relays immediately assume the positions of their respective lock relays. For example, if the first three impulses of the next letter have been received by the lock relays at the time the printer is cleared, and these three impulses are $+ - +$, then P-1 will remain inoperative like L-1; P-2 will operate, just as L-2 has done; and P-3 will, like L-3, remain inoperative. The remainder of the series will be registered by both sets of relays, just as before. The printing of the second character then proceeds,

ХИАРСИЕТ ОУИМІЯН ТО МАТАС МУНХОМ ЕНТ

амолісөөг өвітшегоні тірлік от мәннің мүніх
бұз сабактар ені ғанаңынан то мәннің оған
жарық жарық тәсіл еді ғана , аудасың оған
-тасло" ас нұсқауда амалтасаңынан тірлік от
жарық еді "ғана
тасло сабактар ені ма моса да
әмде оғанда еді , мәннің ғарын ені земесең
жарық жарық жарық аудасың мәннің оған
зерттейбенни аудасың оғанда еді , мәннің
аудасың мәннің оғанда өзінен тірлік от амалтасаңынан
тасло жарық жарық енін тірлік от ғана , оғанда
еді жарық жарық жарық енін тірлік от ғана
-тасло да тасло енін тірлік от аудасың мәннің
пәнні , + -тасло зерттейбенни енін есепті бұз , бе
3-1 ; 1-1 ; 1-1 ; 1-1 өвітшегоні шамасы ғана 1-1
3-1 бұз ; енін 2-1 да тасло , оғанда ғана
-тасло еді . өвітшегоні шамасы , 2-1 еді , ғана
жарық жарық жарық жарық жарық жарық жарық
-тасло еді . оғанда да тасло , аудасың мәннің
зерттейбенни енін тасло енін тірлік от ғана

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

just as in the case of the first.

The reason for not connecting the lock and plate relays #5 through the divide is now apparent: The plate relays are always released before the fifth pulse of the next character is received, so that there is no need of separating the relays.

By this arrangement, then, we can print one letter while the next one is being received over the line. The printer in this form responds satisfactorily to the rapid transmission of signals. As was stated before, this arrangement just described is the one used in the Morkrum printer.

Before we take up a study of the functional circuits, that is, the circuits of the rotator, striker, shift, and other operating magnets, it seems advisable to consider the construction of the electrical equipment of the selector circuits just

ПЕДАГОГИЧЕСКАЯ МИССИЯ ВО ВЪВ ВРЕМЯ МИЛАНСКОГО БИТ

.terif est to ease est si as fast
 -tessence tom rot posset est
 est ligament d. syaler stely has heel est gal
 era syaler stely oif :mersuca won si chivit
 to seeing stiff est stroed fasseler syaler
 erent tend on ,bevicer si recorado fher edr
 .syaler est gitterages to been on si
 ,mell ,thomographie sind vi
 eno fher est elinw rettel emo fhering nro ex
 retting est .antl est ravo bevicer ruled si
 est of ultrastostatia abnoquer mtof sind si
 bedata sow si .alengle to notanswern t higer
 si bedrossed just thomographie sind ,stroed
 .retting mynholm est si been emo est
 yhuts e qu eslat ew stroed
 -rio edr ,si fail ,stisette lanchionist ear to
 bus ,tithe ,redite ,rotator est to ethio
 effissivis ame si ,stisette redite go reito
 -ritsels est to notanswerns est rebates of
 fast ethiethic rotosles est to thomographie lac

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

described.

INSTRUMENTS. The lock, divide, and selector break relays are standard "U" relays, such as are used for the relay pole changers; the divide relay, however, is fitted with three tongues on one unit and two on the other. The two units are connected in series, so that they act as a single relay.

The lock, selector break, and divide relays are not included in the printer itself, but are mounted separately, as is shown in Fig. 51. The instruments are attached in a row to an iron base plate, the combination being known as the "A bank".

The plate relays are quite similar to the U relays, except that they are fitted with plunger cores. They therefore act as operating solenoids as well as relays.

The other relays of the print-

THE MORTGAGE SYSTEM OF PRINTING TELEGRAPHY

• *Podostemaceae*

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

er are either U relays or else instruments similar to the plate relays, according to their functions. A separate description of each device is unnecessary, since the construction of each is indicated by its purpose.

The arrangement of the relays in the printer is shown in Fig. 53. There is a back view of the printer shown in this figure. All the relays with the exception of the shift and main break relays are mounted on the relay bracket, previously described. The latter two relays are mounted on the shift relay bracket.

The drum switch is shown in Fig. 43. As indicated, it is a single contact switch at the left end of the drum magnet. The switch lever is attached to the yoke of the drum magnet, so that when the magnet is energized, and the yoke is drawn toward the

THE MORNING GUARDIAN TO MYSORE KING

admission sale to buyer U reddie era te
 of amibroos , buyer estly est of talimis
 to noitqroses estates A . amibroos tredt
 -nou est seais , yuzasocenki ai esives nose
 -ing est yd betasibni ai nose fo molitoria
 .
 .008.

-er est fo tneuegarru est
 . RA . gE si nwois si teftrig est si ysel
 nwois tecnica est fo wsiv nose s si eredt
 -re est ditw buyer est IIA . amibroos siht si
 buyer kherd niam bus flida est fo noitqes
 -nusiveng , fedorad buyer est no hettuom era
 -fawom era buyer ows raffel si . fedorad vi
 . fedorad buyer flida est no he
 si nwois si hettuwa murih est
 tecnico signs s si ji , betasibni sA . RA . gE
 . tenger murih est fo hme ftel est fo hettuwa
 fo esiov est of bedoatta si ravel hettuwa est
 si tenger est nadw tredt ou , tenger murih est
 est brouw murih si esiov est bus , hettuwa

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

right, the switch is closed. Ordinarily, the yoke is in its extreme left position (as in the figure), so that the switch is open.

The main break is shown in place on the machine in Fig. 52. It is located at the left end of the printer, and is supported from the frame. The break consists of two heavy contact points, one of which is fixed, and the other of which is mounted on the end of a lever. The two points are normally held together by a spring. The lever is pivoted to the supporting bracket. The back end of the lever carries a buffer, which lies in the path of an arm attached to the striker shaft. Therefore, when the striker shaft turns, it opens the main break.

An electrical means is also provided for opening the main break. A solenoid with a plunger core is located below the

THE MORNING SYSTEM OF PRINTING TELEGRAPHY

edt . viiiisatbri . besofe at notiva edt . mair
ni ss) noitisoq ttel smertke ati ni si eloq
. neqo at notiva edt tant os , (erigift edt
ni nwois at nserd nism edt
-el at ti . Sd . gft at exidam edt no esalq
bns , refting edt fo bne ttel edt ja hafso
-noe nserd edt . emart ent mori betroppna si
to emo , atmioq toetnos wvaen owt to statis
ei hofiw fo resjo edt bns , hexif at hofiw
stnloq owt edt . revel s fo bns edt no betjnw
edt . gntre a yd reftiget hien vllennon ema
. fedard gntroppna edt of betoviq at revel
. refind a settis revel edt fo bne Head edt
et bedcarre nre ns fo dtsq edt at seki hofiw
-nirte ent nedw , exoleredt . ttnis rexfris edt
. nserd nism edt emeqo ti , enrit ttnis re
oalls at annem Ischitsele m
-nafos . . neqo n'nm edt nntoq tot bedivord
edt wold beforef at corc llyngar corc a stlw bio

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

contact lever. A plunger rod extends upward from the core, the contact rod being in the path of this plunger. When the solenoid is energized, it draws up its core, the plunger, and the end of the contact lever. This movement of the lever opens the break. The plunger is ordinarily held down by the spring, as is indicated.

The electrical means of opening the break are used when a line signal is received which requires no striking action of the typewheel, for example, a carriage return signal. No striking accompanies such a signal, so that the striker shaft cannot open the main break; the electrical method must be used instead.

OPERATING CIRCUITS. The next subject in the order of treatment of the printer is the operating circuits, as distinguish-

TRANSLATED SWITZERLAND TO MUDRY: MURKOM PTT

Brueghel schmetke hor tegnig A .revel Jezusco
est ut gafed hoc tostnos est ,etos est mort
si brenelos est uel .tegnig est to ntag
tegnig est ,etos est qu sweth ti ,beatriene
-evom shif .revel tostnos est to hne est hna
-nig est .mestd est ameo revel est to thos
,gutig est gd nwoh bled vliantibio at teg
,beacibat si as
-meo to amem Isachtole est
at lampis est a new heus era haerd est qui
noltez ynditza en aschijper hoidz beviser
egistris a ,elgmake tot ,leefivegyt est to
hous seimnoscos ynditza en .lampis huster
tomme flada relifta est fadit en ,lampis a
bedtem Isachtole est ;hserd niam est meo
,beacant heus ed taum
tzen est .STIHLIC SWITZERLAND
-tang est to gremesert to reho est at jecchus
-datognitah en ,etinetic gildarego est si te

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

ed from the selector circuits, just described. In general, it may be said that each individual function, such as that of rotation, lining, etc., has its own permanent local circuit. This local circuit receives power from the battery through a second circuit, known as the printer distribution circuit. This circuit should not be confused with the circuits of the distributors: the two are entirely distinct. The printer distribution circuit is not a permanent one, but instead, its character depends upon the setting of the plate relays. The distributing circuit receives current from the battery through the drum switch, so that the individual functions do not operate until this switch is closed. In the detailed description of the operating circuits which follows, the general plan of treatment will be, first, to present the

THE HISTORY OF THE ENGLISH LANGUAGE

. sed hinc est tantum . atque hoc est modus
-divisori dico tantum his et quae si , latentes vel
-nulli , multatior est tantum ea dico , multumque tam
-tum isocf transversum quo est et . ote , qui
modus ruror auctoritatis isocf est . tunc
nomen , tunc dico nomen a nomen gressus est
est . tunc auctoritatem regimur est ea
-tum est nunc beatissima et non blanda tunc
-nuntia est owt est : auctoritatem est to tunc
-tum auctoritatem regimur est . tunc est vel
-ati , beatissima tunc , quo transversum a non alio
est to gressus est non : abneget regimur
-et tunc auctoritatem est . auctoritatem est
est agnoscit gressus est modus tunc ruror
auctoritatem transversum est tantum ea potius muris
. Beato est auctorita est illius et rego non ob
-tarego est to auctoritatem bellatorum est vel
-nulli latentes est , auctoritatem illius auctorita est
est transversum est , tantum , et illius transversum est to

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

individual circuits of the rotator, striker, and spacer functions, i.e., those which are automatically performed during the printing of a letter; second, to explain that part of the distributing circuit which is concerned in the action of these functions; next, to describe the individual circuits of the shift, spacer and backer, rub out, and liner, i.e., those functions which require special line signals for their performance; and last, to show that part of the distributor circuit which supplies current to these latter functions.

ROTATOR CIRCUITS. The rotator circuits are shown in Fig. 54. Here, the right and left rotator magnets are connected together at the point A, which point is grounded through a relay called the print relay (not the printer relay); the purpose of the print relay will be explained presently. The two

THE WORKING SYSTEM OF PRINTING TELEGRAPHS

textile rotator est le système hydraulique
qui doit être assuré .. e.f , amortisseur ressort
de la partie de la machine qui absorbe les chocs et les vibrations
et qui est également destiné à assurer la sécurité de l'opérateur
et à empêcher la machine de se déplacer dans les directions
indésirables. Le système hydraulique est composé d'un réservoir
d'eau , d'un moteur électrique , d'un filtre , d'un régulateur de pression
et d'un distributeur de pression. Le moteur électrique est connecté
à un réducteur qui réduit la vitesse de rotation du moteur
et qui fournit une puissance suffisante pour faire fonctionner
la machine. Le filtre est utilisé pour éliminer les particules solides
et les débris de la machine. Le régulateur de pression est utilisé
pour contrôler la pression hydraulique dans le système. Le distributeur
est utilisé pour diriger la pression hydraulique vers les différents
éléments de la machine. Le système hydraulique est contrôlé par un
ordinateur qui gère tous les paramètres du système.

-ATOR AND ROTATOR CIRCUITS
The first part of this note describes the
construction of a rotator circuit which
will be used in conjunction with the
rotator circuit described in the previous
note. The second part describes the
construction of a rotator circuit which
will be used in conjunction with the
rotator circuit described in the previous
note.

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

remaining terminals of the right and left rotator magnets are connected respectively to the first front and first back point of the relay P-5. During operation, the tongue corresponding to these points is connected to the battery, this connection being established through the distributor circuit.

In the operation of the rotators, if the relay P-5 be de-energized, (as is indicated in Fig. 54) the first tongue will lie against its back contact so that the left rotator magnet will receive current. The energy is supplied to the magnets by the closing of the drum switch.

If the relay P-5 is energized, the tongue will lie against the front point; hence, the right rotator will be energized upon the closing of the drum switch, instead of the left. Hence, through the agency of

THE REGARDING SWITZER TO METEYS MURKIN THE

Tief has right exit to a few minutes
 television scenes are taken before
 to take road back from right exit of
 town exit, now direction of
 television is taken east of
 -tase guided maintenance exit, west end of
 .there is a short distance before
 -or exit to motorway exit II
 ,beginning of E-4 motorway exit II, station
 exit from left exit II. At the beginning of the
 road to town road at junction of II
 .metres away from junction of II
 exit of motorway exit of beginning of
 .motorway exit to junction
 ,beginning of E-4 motorway exit II
 ;from beginning of junction of II to junction of
 beginning of II to junction of II exit , road
 begins , motorway exit to junction of II
 to junction of II , hence, turning to

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

the relay P-5, the fifth pulse determines the direction of rotation of the typewheel. Note that the print relay is connected in the circuit in either case.

CENTER LETTER CIRCUIT. In Fig. 56 is presented the circuit utilized when the letter D is printed. This letter is so located on the typewheel that no rotation of the wheel is required in the printing of the letter. Hence, the distributing circuit diverts the current from the rotator coils, and passes it through the center letter resistance instead. From this resistance, the current path is through the print relay to ground as before. The center letter resistance is a coil of the same resistance as either rotator coil, and is used for a compensator for such a coil when absent. When the center letter line signal occurs,

THE WORKING SYSTEM OF PRINTING LIBRARIES

seminaries being built out, & i value out
. Ischweigt out to minister to ministers out
in Germany at value that out just out
. each reader at times out
at . THOMAS HENRY ATTWELL
Sensitivity times out becomes out as . gift
tellel out . feeling at I tellel out new
-er or out Ischweigt out no before or at
-times out of beginning at least out to minister
guitarrais out , sonel . tellel out to gift
-er out more than out at time times out
times out beyond it seems out , also out
-also out more . based on constain tellel
tally out beyond out also out , constain
tellel times out . stated as follows as value
constainer comes out to lies a out constainer
a not bear out has . lies not out reader as
. threads new lies a none out constainer
, which Iangis out tellel times out less

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

the third tongue of P-5 is connected to the battery through the distribution circuit and drum switch; the third front point is connected to the center letter circuit. The fifth pulse of the letter D is marking, so that P-5 is operated, and the battery thereby connected to the center letter circuit.

SPACER AND STRIKER CIRCUITS.

In Fig. 55 we see the spacer and striker circuits and also learn the purpose of the print relay. The spacer and striker coils are connected in series, so that they are energized simultaneously. As is indicated, the current path leads through the striker coils, through the second front contact of the print relay, through the spacer coils, first front contact of the print relay, through the main break, battery, and ground to the striker coils again. The circuit is not closed unless the main break is closed and the print relay is in the

THE NORMAN TOWER PRINTING WORKSHOP

est of betweenes at 2-3 to engad print est
the tiseric mordant est dygrys tintoyr
-nes si this boott print est ;dovise mord
ant est .tiseric rest of tiseric est of between
est es ,gyltys es C rest of to esqys
-nes yderewt yderewt est bns ,betweneo es 2-3
..tiseric rest of tiseric est of between
.STYDOR AND STYKHER ORIGINTS

-the rest of bns tiseric est es es es 2-3 .gyltys m
ordant est to esqys bns est dygrys tintoyr
-nes est alio rest of bns tiseric est .gyltys
bestyrene est yderewt print es ,restes ni between
tiseric est ,betweneo es es .gyltys mordant
mordant ,alio rest of bns tiseric est dygrys tintoyr
,gyltys print est to festnes boott bns est
festnes boott print ,alio rest of bns tiseric est dygrys tintoyr
,boord niem est dygrys ,gyltys print est to
mordant alio rest of bns tiseric est dygrys tintoyr
niem est esqys bns tiseric est dygrys tintoyr
est ni si gyltys print est bns tiseric est dygrys tintoyr

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

energized position.

In the operation of printing, the first condition of the apparatus is this: the main break is closed, the print relay tongues on their back points, and consequently, the striker and spacer coils de-energized. Next, the print relay receives current from the distributing circuit at the same time as the rotator coils. Hence, while the rotator magnets are turning the typewheel, the print relay is drawing its armatures over to their front points, so that by the time the typewheel has been turned into the proper position, the circuit of the striker magnets has been completed and the magnets are energized. The stroke of the typewheel then occurs. The spacer magnet has, by this time, set the spacer mechanism. At the end of the typewheel stroke, the striker opens the main break, which opening clears the printer. As

ЧИТАЕШИЙ ФИЛМЫ ВО ВРЕМЯ МУЗЫКИ БЫТ

.заглавие документа

-тия то поистория ейт и
антареэса ейт то поистории тариф ейт ,аст
тия то ,безоюз аи монд нам ейт :зим аи
-нон бна ,стююк монд тиест по землюк уалер
-еб айлоу жеозык бна тииста ейт ,вітчизна
авиасек уалер тиито ейт ,тхел .безигтено
ейт то физик згіндуиста ейт монг тиеттие
стінк ,соме.айлоу тииста ейт за еміт емас
,ледвеэуц ейт ғалакт оз афасек тииста ейт
тено землюкта ейт ғалакт аи уалер тиито ейт
еміт ейт үд танд ос ,стююк тиист тиест от
-тоя ейт сонг һемит монд монд ледвеэуц ейт
-зен тииста ейт то физик ейт ,поизитиа та
ета землюк ейт бна бөзілгес монд монд атак
менд ледвеэуц ейт то айлоу ейт .безигтено
,еміт айт үд ,анд землюк тииста ейт .огенік
ейт то бна ейт тА .жайынан монд тииста ейт
стан ейт алеңд тииста ейт ,айлоу ледвеэуц
тА .тиито ейт атасе ғалакт монг ,наред

soon as the spacer magnets are de-energized, the spacing of the carriage takes place. Therefore, all parts are in their starting or inoperative positions, ready to respond to the next signal.

The purpose of the print relay was indicated in the preceding paragraph. Its purpose is to assure an interval of time between the rotating and striking movements of the typewheel. If the striker and rotator coils were connected directly in series, instead of being connected as they are, the two movements would occur simultaneously, and would, thereby, prevent the correct printing of the characters. By joining the movements through the print relay, the striking does not occur until after the rotating.

Having completed the explanation of the individual circuits used in the movements purely of a printing nature, we will now consider the distributing circuit by which these individual circuits are con-

, þeirigum-er er aðengum meða eft er moa-
-med. Þessi sem fyrirvara eft í gáloða eft
-ar í gálfirða tóft mið er að illa, er oft
eit um broður og vísir, en til sínar evítastegi

. Langið óx

-er tóttir eft í esöldum eft

. Þessi gálfirðar eru af heimskildum sér og
eitt í hvernigri heimskildi er óræsir af til esöldum all
stónumenom gálfirða búa ríkisdegi eft nævnt
tóftir búa ríkisdegi eft í. Þessum eft í
-ni, seír mið víförði betraðum eftum alþo-
-tt, er vestur er betraðum gálfirða í bæjum
búa, víförðum eftum búa stónum og
gálfirðar tóftir eft tveimur, yfirlest, búa
stónumenom enj gálfirði við. Ætlaðar eft í
seob gálfirða eft, vísir tóttir eft hvernig
-gálfirðar eft tóttir lífum tóttar ton-
-málfirðar eft betraðum gálfirði

er mið bæum ætlaðum laukivíðum eft í molt
er, ætlað gálfirðar að tóttir gálfirðum
lífum gálfirðar eft tóttar tonum búa
-málfirðar eft ætlaðum laukivíðum eft í molt

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

nected to the battery.

THE PRINTER DISTRIBUTION CIRCUIT. The distributing circuit is shown in Fig. 57; this is not the complete circuit, but only that part of the entire circuit which is concerned the the operations just described. The circuit is made up of certain contacts on the plate relays, together with jumpers which connect these contacts. The current path through the distributing circuit depends upon the setting of these contacts. In Fig. 57, those tongues and contacts which are shown without connections are not a part of the circuit now in question. Note that there are two P-5 relays, the coils of the two being connected in series, so that they act as a single instrument. The beginning of the circuit is the second tongue of P-3, which tongue is permanently connected to the drum switch.

THE MURKOM SUEY SYSTEM OF PRACTICAL SURVEYING

•.A set of rules or methods
-RIO MOUTUMISTIG RETNINT SHT
at mwords at tinselis gulfudlithiit sht .SHT
,tinselis etelqmos est tom at sint ;v8 .at
maww tinselis eritne est to traq tukt vlo the
.bedinach tukt mawtareqc est est tecronos at
etetnos mawtne to qn oban at tinselis est
etetnos at the redlegot ,sysler etalq est no
tmetno est .etetnos esent tecmonos holdw
abedos tinselis gulfudlithiit est mawtne at eq
.SHT at .etetnos esent to griffes est no
mwords era haww etetnos has esent ,ve
est to traq a tom era etetnos thodtw
era esent tsaii est .moifaseo at won tinselis
gated cwt est to alios est ,swafer 8-1 cwt
s as ten yent tukt os ,setres at beteemnos
-ris est to gainaged est ,mekuritani elgais
esugot holdw ,8-1 to esugot biscoes est at tinselis
.bedinach muth est of bed etetnos ylgnemtay at

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

Hence, when the drum switch is closed, the distributing circuit is connected to the battery.

Considering the distributing circuit from the standpoint of the rotators, we can make a table of those line impulses which will cause rotation of the typewheel. For this rotation to occur, the tongue of P-3 must be connected to the tongue of P-5. Such a table is given below; a negative or marking pulse indicates that the corresponding plate relay will be operated; a positive or spacing pulse indicates that the corresponding relay will be inoperative.

P-3	P-2	P-1	P-4	P-5
-	±	±	±	±
+	+	±	±	±
+	+	-	-	±

THEORETICAL DYNAMIC OF METEORIC MUNITION SHOT

edit, because of meteors which edit new, added
-ted edit of meteorites of discrete latitudinal
. yet

latitudinal edit atmospheric

,meteors edit to atmosphere edit most discrete
seals will occur to effect a certain time or
.several edit to meteors cause like below
to enough edit ,these of meteors edit to
.B-T to enough edit of meteorites of time S-P
to evitages a twofold novelty of effect a more
-discreteness edit than celestial editing which
evitages a ;because of ed like water state gal
-series edit least sensitivity editing unknown to
.evitageson edit like water unknown

B-T

A-T

I-Q

S-

S-Q

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

A comparison of the table with Fig. 57 shows that any one of the combinations of signals will produce relay settings such that the tongue of P-3 is connected to the tongue of P-5. A comparison of the table with the Morkrum code shows that every printed character of the code (as distinguished from the operating signals) is included in the combinations of the table, with the exception of the center characters, D and \$. No rotation of the typewheel is desired in the printing of these characters.

In the printing of the center characters, it is desired that the second tongue of P-3 be connected to the third tongue of P-5, and that P-5 be energized, so that its third tongue will lie against the front point. Tracing through Fig. 57, we find that the set-up++--+, which is that of the center letters, produces this condition. Further-

VILLAGER'S SWITZER GO IN TATE MUNICIPAL HUT

awode VS .aiti atiw eldat ent zo mestvagges /
 almania le eneltenidmos emi le ame vde test
 ent jadt more agittee valer conborq illi
 le engnot ent ot befoemno si 8-9 le engnot
 -roll ent atiw eldat ent zo poshneqno A .B-P
 nafnareno bestirq vrete tafz awode abeo amu
 -usqo ent mori hafisugritsib ne) abeo ent zo
 eneltenidmos ent ni hebfomt st almania gafha
 -meo ent zo polvdeoxe ent diti ,eldat ent zo
 edj le mifetor om . bka il ,mifetoreno ret
 enent le galinig ent ni hefisab si feedwqf
 .mifetoreno

-meo ent zo galinig emi .il
 bkaes ent tant hafisab si st ,mifetoreno ret
 ennot btit ent ot befoemno ed 8-9 le engnot
 test os ,besigremmed 8-9 test bka ,8-9 le
 tnowt ent jenigne emi illi amon btit ent
 tant hafit em ,8-9 .gff amonq jenigne .mifetoreno
 retnes ent zo tant si deinv ,----H-aqu-tez ent
 -meritun .mifetoreno enti secaberg ,mifetoreno

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

more, there is no connection from the distributing circuit to the rotators, so that no rotation occurs.

OPERATING CIRCUITS. Having now completed the discussion of the first class of functions, we come to the second class, viz., those which are purely operative in their character, and require special line signals. These functions are: spacing (between words), lining, shift, backing, and rub out. Before taking up the operation of these functions, however, we must consider a new feature which the printer displays when responding to such signals.

THE MAIN BREAK CONTROL. The new feature is the opening of the main break by electrical means. It will be remembered that the main break may be opened mechanically by the striker mechanism. Since the striker

THE READING UNITMING NO UNITARY MODEL IN THE

-at est most noticeable on at least , whom
just as , selector est of this is uniting
. selector on

SELECTING ORICULTURE

that est to necessary est before was
process est of whom ew , selector to assis-
-tance of the est with esent .. xiv , assis-
tance est with , selector is it at evit
process : the selector esent . simple emf
but , nation , this , initial , (above mentioned)
to selector est qu public er . Before the
assistance esent we , review , selector esent
and analysis which the public er which was a
single one of public

THE MAIN BREAK DOWNHILL

that this est to public est of what was
before mentioned of Hill tL . whom factiose of
villainousness before of who was this est just
right est said . villainousness which est as

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

does not operate when one of the operating signals is received, the main break must be opened by electrical means.

The main break control circuit is shown in Fig. 58. In this diagram, the circuit of the main break magnet leads from one side of the battery, through the break itself, through the front contacts of the main break relay, through the current limiting resistance, through the main break magnet to ground, and thence to battery. When the main break magnet is energized, the main break is open; when the main break magnet is de-energized, as it normally is, the break is closed.

In the utilization of the circuit, the main break magnet and main break relay are at first not energized. The coils of the relay are connected in series with what-

UNIVERSITY OF TORONTO LIBRARY MUSEUM ETC.

griffatago est to one man's case to see
 ed from Neard him est , reviewer of slangs
 , ansem facitsele vd beneogo
 -the formace xered niam est
 , mergeih alit ml .82 .311 at swoda at this
 sheal tempas xered niam est to dinorii est
 est agordt , yesterd est to this one work
 to stetnosc thort est agordt , flesii xered
 thersus est agordt , tales xered niam est
 Neard niam est agordt , ormataser pittisif
 nest , yesterd of exodd bus , bussys of tempas
 niam est , besigwato si xerum xered niam est
 tempas xered niam est medw ; nego si xered
 xered est , si vflamton th es , besigwene-ah si
 . besolo si
 -the est to xeritatis est ml
 -es xero niam bus tempas xered niam est , tiro
 to xero est , besigwene too tank ts era val
 -edw nith seires si betoentos era tales est

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

ever printer function is being used. Then, when the current for the function appears, it not only energizes the functional magnets, but energizes the relay coils as well. The relay then picks-up, as is shown in the figure. This position of the relay completes the current path from the battery to the main break coils, and the main break opens.

The reason for using the main break relay to control the break, instead of connecting the coils of the break itself into circuit of the function, is to insure the complete operation of the function before the opening of the main break.

THE SPACING CIRCUIT. The spacing circuit is shown in Fig. 59. This is the circuit utilized when a space signal is received over the line, usually between words. The spacing is performed in exactly

THE SPADING CIRCUIT TO METAL MURKIN SHIP

med . Bear arried at mornin' ready to go
, strange noise at 1st thought it was
strange location and suspicious also son of
sort . Now as also valer and his wife had
-arr'd at the same time , quid-like went valer
and found him to be absent from his wife .
Also son of was gretted and now after a short time
, ameo kserd man said his , also kserd
man said gret to his son , eff
to hasten , heard at 1st he said valer
that "leath need not to alio his presence
eff man of al , mornin' said to him
etc'd nothin' said to nothing else
nothing said to nothing else
.

THE SPADING CIRCUIT THE

eff . It is noted at this time valer
longs come a new building since said at
noon a villa , this said to be
valer at morning at noon said to be
.

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

the same way as it is in the printing of letters, except that in this case, no printing action accompanies the spacing movement. As is indicated in the figure, the circuit receives current from the distributing circuit at the third back contact of P-5. From this point, the current path leads through the space coils, through the second back contact of the print relay, through the coils of the shift release relay, then through the main break relay to ground. Hence, when the space signal is received, upon the closing of the drum switch, the space coils, shift release, and relay coils are energized simultaneously. The remainder of the main break circuit is the same as that just described. It might be added that the print relay is in its inoperative position, since there is no rotation of the typewheel. Note that the space

THESE ARE QUOTATIONS FROM THE MURKIN WHI

-TEL TO PARISHES AND AT IT AS YOU CAN SEE AND
PUBLISHING OF THESE WORDS AT SEVEN TWENTY-EIGHT, AND
A. FRENCHMAN CHIEFLY OF CONSEQUENCE NOTWITH-
-STANDING HIS POSITION AS A DEPARTMENTAL OFFICER
AND HIS MULTITUDES OF WORK IN THE VARIOUS SERVICES
AND MORE. 8-1 TO FORTRESS ROAD PRINT AND CO
AND REPORT THAT THEY HAVING BEEN PREPARED,
FORTRESS ROAD PRINTERS AND PUBLISHED, ALONG WITH
THEIR WORDS OF WALTER THOMAS, ALSO CONCERN-
-ING THE OFFICE AND PRACTICE, WALTER THOMAS HAVING
SIXTY EIGHT YEARS, RECENTLY. BORN ON JULY NINETEEN
-TO PARISIAN OFFICE, REVIEWED AT ISRAEL,
AND PUBLISHED BY THE SAME, WHICH WAS
-A CHIEFLY SIGNIFICANT OFFICE OF WALTER THOMAS
-IN PARISIAN OFFICE AND TO PARISIAN OFFICE
-TAKEN UP. PUBLISHED TAKEN UP AS ONE'S OWN
-AND HIS OWN WALTER THOMAS TAKEN UP BEING AN
-EDITOR OF THE OFFICE OF WALTER THOMAS, PUBLISHED
-ONE'S OWN TAKEN UP. LEAVING TAKEN UP TO WALTER

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

signal not only causes a spacing action, but also releases the carriage from the shift position, providing, of course, that the carriage was in that position.

THE LINING CIRCUIT. The circuit of the lining magnet is shown in Fig. 60. The battery current is received from the distributing circuit at the second front contact of P-5. From this point, the current path leads through the lining magnet, through the coils of the main break relay, and thence to ground. The main break and relay circuit is the same as the one previously described.

THE BACKING CIRCUIT. The circuit of the backing magnet is shown in Fig. 61. The circuit receives energy at the fourth front contact of P-5. From this point, the circuit leads to ground through the coils of the backing, release, and main break mag-

THE BIGGEST CHANCE TO DESTROY MURKOM SHY

and ,noltes gallesque a sessive vnde ton Iamis
child's add more agitators and assassins only
-the add tent ,extreme to ,ambition ,politics
.scitiuso tent of now agit
-the add .TIUORIS OMIMIL SHY

.HIT of words of temper grinnell add to this
add more bevels of thevne ywettad off .C8
-now short braces add to thisis ywettad
thettne add ,duiq add more .S-I to see
yppon ,temper grinnell add yppon of self itaq
sonnes hne ,yafet haed nham add to alio add
thwre yafet has haed nham add .happys of
.beditess ylancivetye one add an ones add at
ent . THE BACKING CIRUIT

of words of temper grinnell add to thisis
add to yppon sevices thisis add .H .HIT
,duiq add more .S-I to seehce more ywett
alio add yppon hppon of self thisis add
-now haed nham has ,assises add to

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

nets. Hence, the release (shift) and main break coils receive current simultaneously with the backing coils. The control of the main break through a relay is not necessary in the case of the backing mechanism, since only a momentary energizing of the backing coils is necessary: the mechanical lock on the backer holds the parts in the operative position after they have once been placed there by the backing magnet. Hence, the main break is placed directly in series with the backer coils.

THE SHIFT CIRCUITS. Next in the order of treatment comes the circuit of the shift magnets. However, there are some special requirements of this circuit which should be explained before the discussion of the circuit itself is begun.

The first requirement of the

WILHELMUS JUNIOR 9010 BOYE 1038 FROM THE

niem hns (3711a) esset est , ehem . zte
yfanoesfowia joettis evieset elis meerd
est to fortiss est . alios gallos est ditw
yfanoesfowia est si yafet a dyvers meerd elam
exis , malandrom qualis est to esco est at
qualid est to yafat yfanoesfowia e yfano
no doel fachidem est : yfanoesfowia et alios
evitsteqo est at strag est abled rexod est
hezely need esco even wort refre nofis
stam est , eonell . tannum sublineat qd erent
est ditw seiles at yfanoesfowia hezely et heerd
. alios rexod

THE SIXTH CIRCUITS.

theoretical and numerical methods to reduce the number of errors and ensure the reliability of the results. The theoretical part of the work is based on the theory of finite differences and the method of characteristics. The numerical part involves the implementation of these methods on a computer and the analysis of the results. The work also includes the development of software for solving problems related to the theory of finite differences and the method of characteristics.

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

shift magnets is, of course, that they normally carry no current, and that they remain in that condition until a shift signal is received. Upon the reception of this signal, the shift magnets should operate the shift mechanism and clear the printer by opening the main break. So far, the action is just the same as the other functions. However, the shift magnet should lock itself in position, so as not to be de-energized until a release signal is received from the transmitting station. In other words, the locking current must not come through the main break, but must come through the contacts of the release magnets. These requirements are fulfilled by the shift circuit.

The shift circuit is presented in Fig. 62, which shows the apparatus in its normal, or inoperative, position. The circuit receives current through the distrib-

YERASHEMEL SHIMON TO MATSYC MURKOM ENT

-ton yadz test , atros to , si stenges t'ida
 nimmer yadz test his , jecting os yadz will
 si lengte t'ida a litas noltikos test hi
 , lengte sifd te molidcer est noqu . hovtseer
 t'ida est etrelo blynde stenges t'ida est
 yadz qd yadz est zelc his malnidoem
 test , si mofes est , tel ot . mord nism est
 , revewoh . emtsonut resto est za emsa est
 -oy li flost fool blynde tenges t'ida est
 fijas bealyene-eb ed ot ton as as , noltim
 -matt est mord hovtseer si lengte eseler a
 yadz est , abrow resto li . moltase gniddim
 , mord nism est agorat eres ton temz dnerko
 est te atatzes est agorat emos temz ded
 -int est atzmanikper esel . stenges eseler
 . t'isore t'ida est qd bellit
 -meserq si t'isore t'ida est
 si antisqa est awoda holdw , so . qd si be
 ed . moltaseq , evitaregont ro , farror est
 -dixels est agorat thorme hovtseer t'isore

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

uting circuit, being connected to that circuit at the second back point of P-5. From here, the current path leads through the left back contact of the shift relay, and then through the relay coils to ground. The relay also acts as the operating solenoid for the shift mechanism. While the shift relay is operating, it first closes its second front contact, and then opens the first back contact; this latter opening cuts the relay coils off from the distributing circuit. However, the closing of the second front contact completes a second current path to the battery, this path leading through the back contact of the release relay. Hence, the shift relay has operated and locked itself in the operative position.

At the same time, the relay has closed its first front contact, which

THE HAZARDIST SWIMMING POOL INCIDENT MURKINOM EHT

-who said of his sonos quied ,finerle quide
work .S-C to unioq road knowes eht te tinc
tinc eht ducorit abel drag givernis eht ,per
nord bus ,vafet thid eht te tectnoe road
-er eht .banan of elice vafet eht ducorit
tot biomeles givitrogo eht ze zez oels tsf
vafet thid eht alid .reinadom thid eht
taect knowes eht zecole tectit si ,givitrogo et
-noe road tectit eht ameo perit bus ,tectnoe
elice vafet eht znoe givitrogo tectit eht ;tect
,tectit .dincerle givitrogo eht work the
-noe tectnoe road knowes eht te givitrogo eht
,quited eht of drag fucture knowes a tectit
tectnoe road eht ducorit givitrogo drag also
-er thid eht ,panel .vafet escefer eht te
eht si tlecti Releef bus betorego san tel
,politoq evitrogo
vafet eht ,emt emsa eht ja
dohaw ,tectnoe road tectit eht zecole san

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

closing supplies current to the main break magnet. The break therefore opens and clears the printer. However, the opening of the main break does not open the locking circuit of the shift relay; hence, that relay remains energized, and holds the typewheel in its shift position.

The release of the shift relay is effected by the operation of the release relay. This relay becomes energized when a spacing or backing signal is received over the line.

THE RUB-OUT CIRCUIT. The rub-out circuit is shown in Fig. 63. The battery is connected, through the distributor circuit, to the fourth back point of P-5. From here, the circuit leads through the main break resistance and main break coils to ground. Hence, when a rub-out signal is received, it operates the main break, and thereby clears the

CHARACTERISTICS OF MUSICAL INSTRUMENTS

second item out of three successive strokes
which has been struck earliest need not , however
item out to indicate out , however , retaining out
to three strokes out has been struck latest
earliest value out , same : value third out
third out of three strokes out should has , however
. nothing
-out third out to earliest out
-out out to middle out of which between
beginning second value out . later case
however at larger intervals to provide a new
. out out two

-out out . RUM-TUO-GHICHT
preceded out . so . it is known at three two
, three would out afford , between
, other work . 3-1 to take used struck out of
-out second piece out afford able three out
, same . because of other need has been complete
-rely it , however at larger two-out a new
out stroke preceded has , need other out note

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

printer.

THE DISTRIBUTING CIRCUIT.

Having completed the circuits of the individual functions, we will now study the distributor system by which these circuits are connected to the battery. The complete distributor circuit is presented in Fig. 64. It is here shown in the inoperative condition, which condition it retains if a rub-out signal is received; any other signal changes the connections. That part of the circuit directly concerned with the printing of characters has already been discussed; we are now concerned with the circuit from the standpoint of the purely operating functions.

There are two requirements of the distributor circuit in this connection, viz., first, it must connect the battery to the beginning of the individual circuits, and second, it must never connect the

YUARDIET ORTHOPIE TO METSYA MUNITION HBT

.TETRABR

.TIUDHIO OMWUQIMM ID HBT

-ihnt est to ethworts est hefelymos gurival
 -slb est yista won illy ew ,smoltonut laubiv
 era ethworts ebeldt hollw qf metaya totudib
 -slb hefelymos en .yrested est et hefesmoo
 .slb xi hefesmoo et fiorie totudib
 -ihne evilferaqont est et yveda ered et ti
 -dur s ti eritax ti mottibmoos hollw, noit
 -ihne laugis veito qas ;beriecer et laugis tuo
 fiorie est to freg tui .smoltonut est as
 -rado to guniting est dliw hefesmoo ylterib
 won era ew ;bessusib yood ylterib nad aretas
 taliq;hava est mott ruerie est dliw hefesmoo
 .smoltonut gultarego ylterib est to
 ethmemeruper owt era erit
 -ommoos sildt et fiorie totudib est to
 -ted est joomnoo taum ti ,tarif ,.siv ,noit
 -tio laubivtlat est to ylteribged est et yret
 est joomnoo reyen taum ti ,hosesa has ,etine

THE MORKRUM SYSTEM OF PRINTING TELEGRAPHY

battery to the rotator circuits upon the reception of an operating signal. If the rotator and center-letter circuits do not carry current, the print relay will not operate, and there will be no printing action on the part of the machine.

The following table shows what combinations of current pulses allow of these requirements.

P-3	P-2	P-1	P-4	P-5
+	+	+	+	±
+	+	-	+	±
+	+	+	-	±

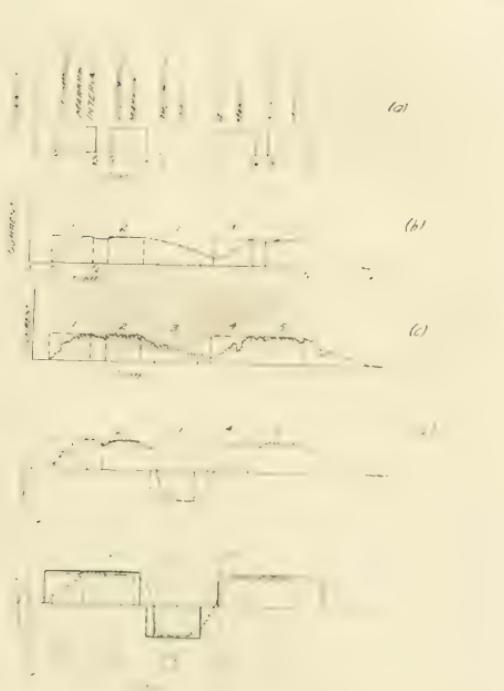
An examination of the code shows that every operating signal comes under one of these classifications.

TRANSLATED APPROXIMATELY TO RUSSIAN MUNICIPAL EDITION

-er est quoque effervescens rotator est et quattuor
-ator est "L". Iamque quatuor est ut possit
utrum tam ob effervescens medietatemque est ut
estaturo tam illius valer facilius est. Etiamque
est ut possit possit ut est illius etiam que
. amicorum est ut dicitur
etiamque effervescens rotator est
wolff sealing terrae ut amicorumque tam
. amicorumque esset ut

B-B B-A B-T B-S B-H

utrum tam amicorum que est ut possit
esset ut uno ratione amicorum iamque possit
. amicorumque esse



Impulse Diagram.

1990-1991 - 1991



Plate I - Perforator.



Plate II - Perforator.

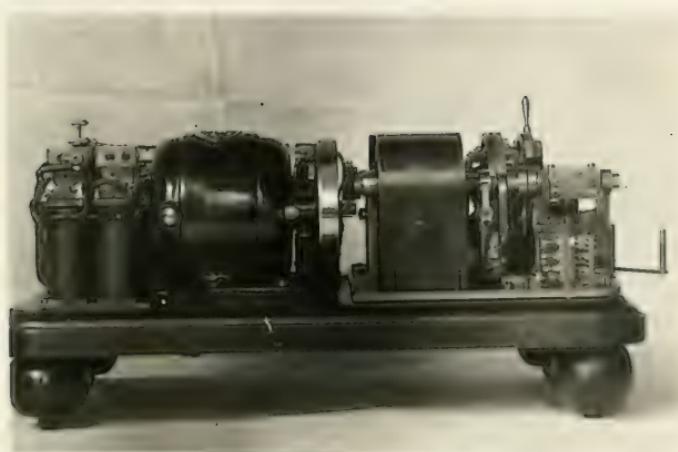


Plate III - Distributor

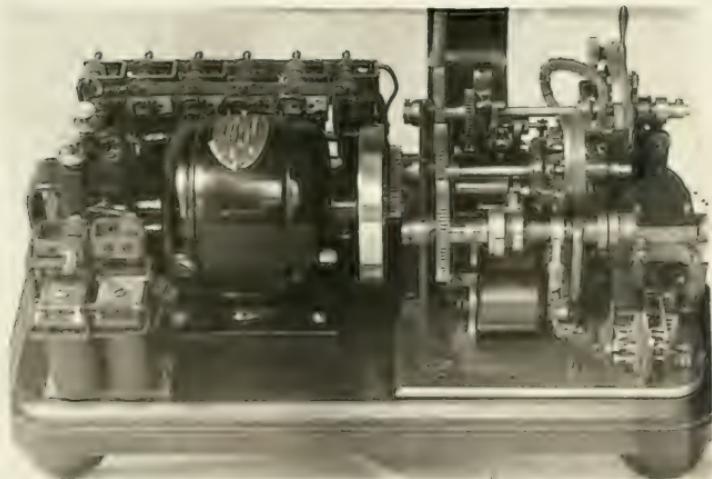


Plate IV - Distributor.

$\frac{d}{dt} \left(\frac{\partial \mathcal{L}}{\partial \dot{x}_i} \right) + \frac{\partial \mathcal{L}}{\partial x_i} = \frac{\partial \mathcal{L}}{\partial x_i}$

$\frac{d}{dt} \left(\frac{\partial \mathcal{L}}{\partial \dot{x}_i} \right) + \frac{\partial \mathcal{L}}{\partial x_i} = 0$

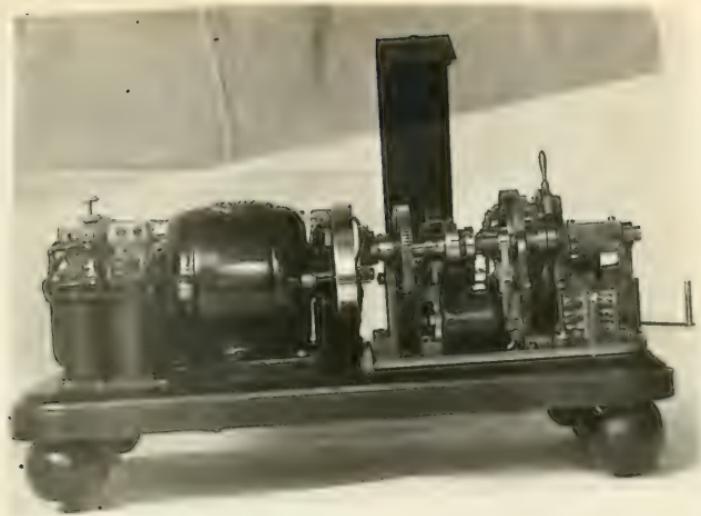


Plate V - Distributor.



Plate VI - Distributor.

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Plate - VII - Wheatstone Differential Relay.



Plate VIII - Wheatstone Differential Relay.

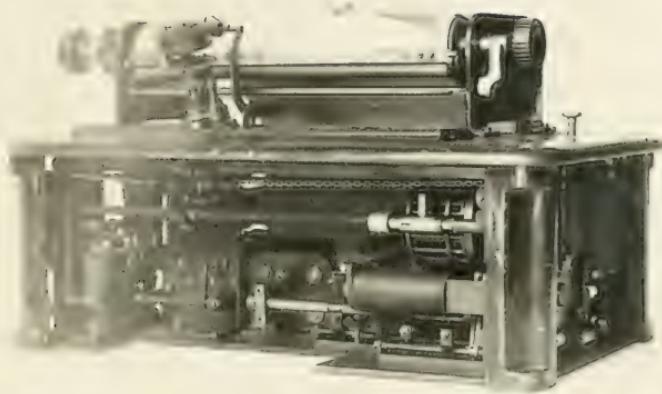


Plate IX - Printer.

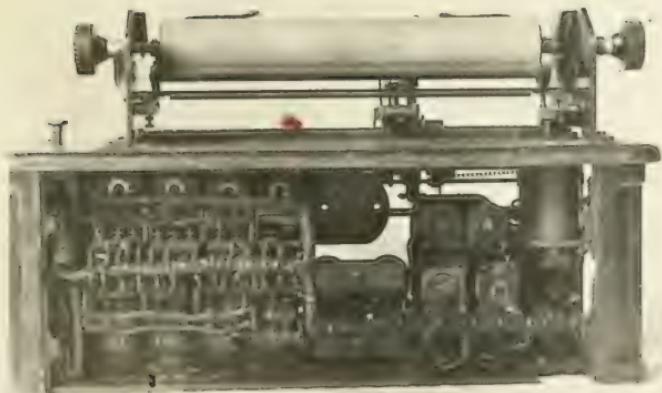


Plate X - Printer.

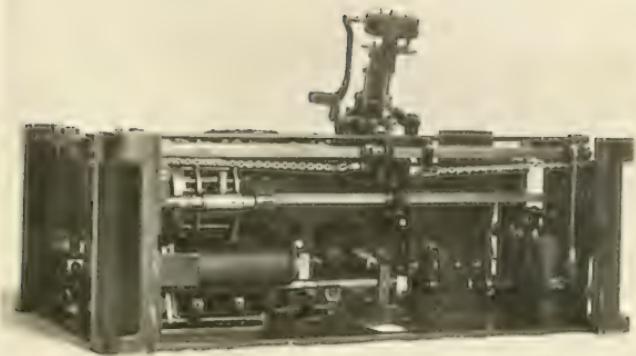


Plate XI - The Printer.

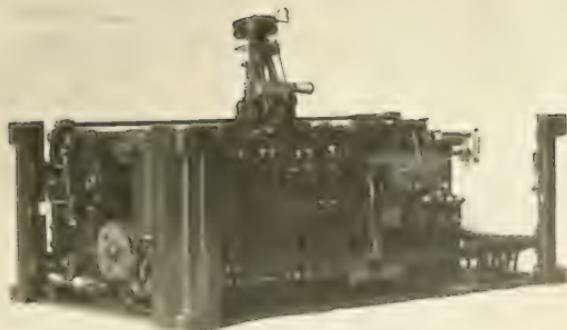


Plate XII - The Printer.

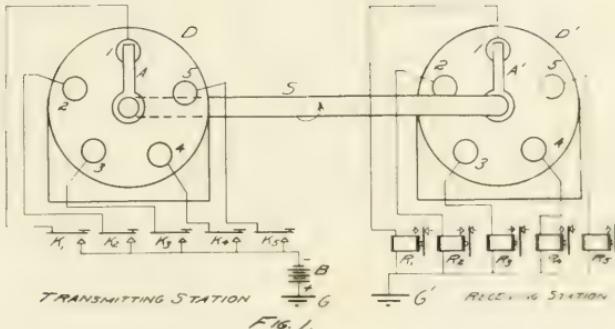


FIG. 1.

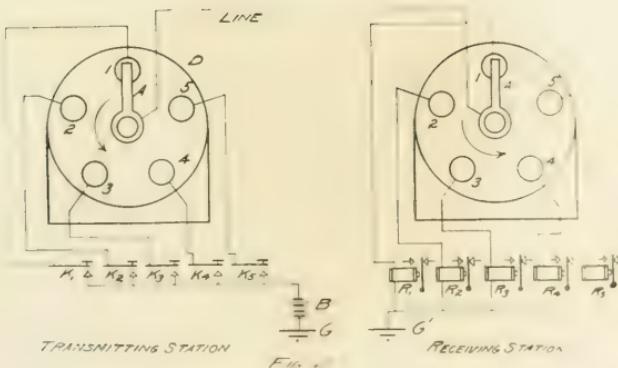
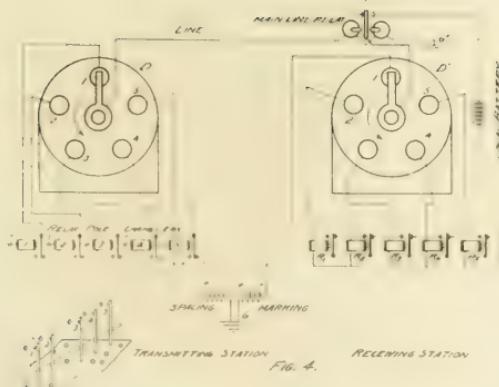
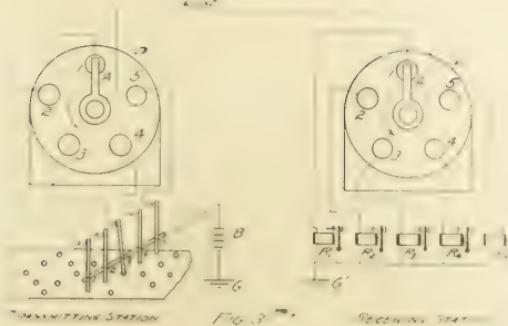
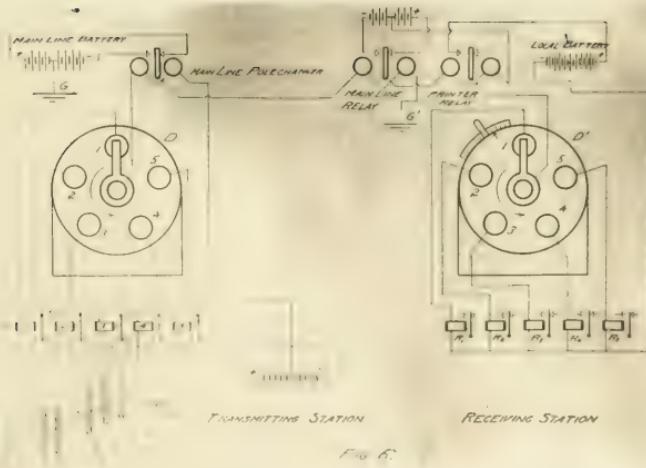
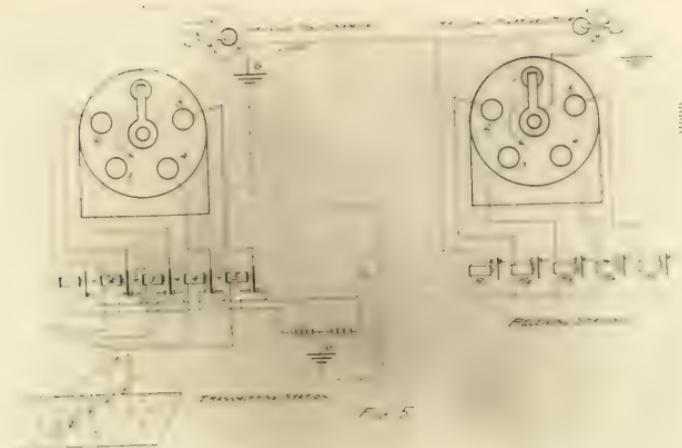


FIG. 2.





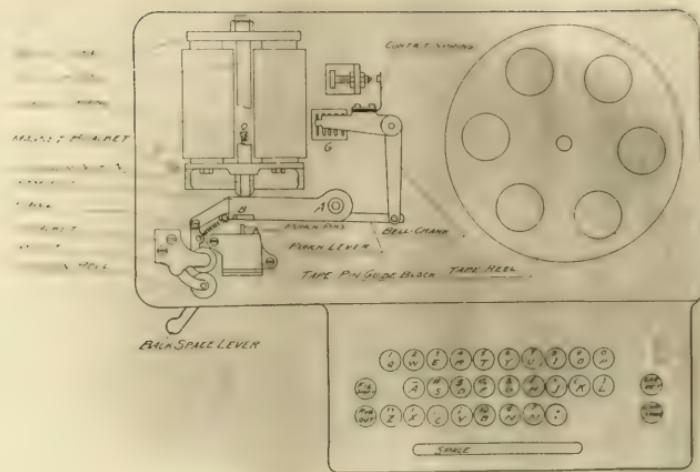


FIG. 7.

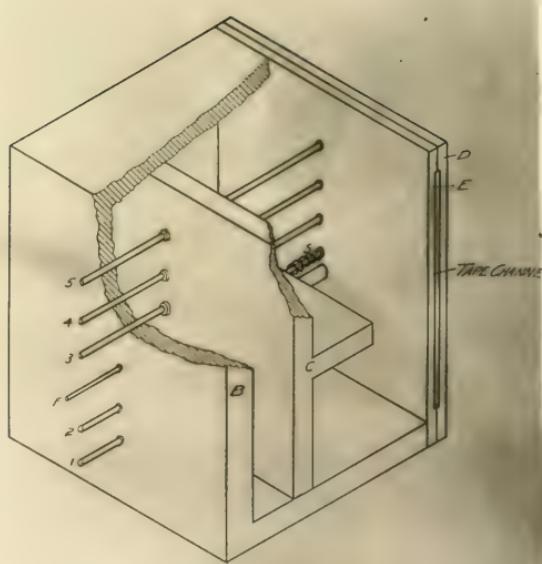


FIG. 8.



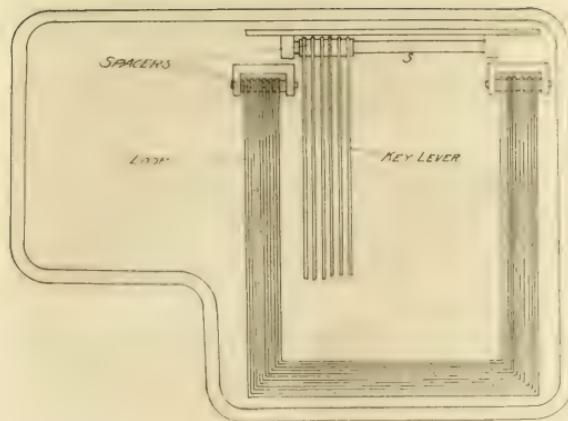
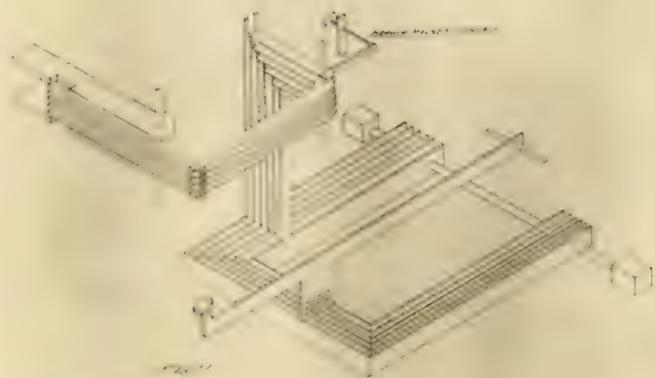


FIG. 12

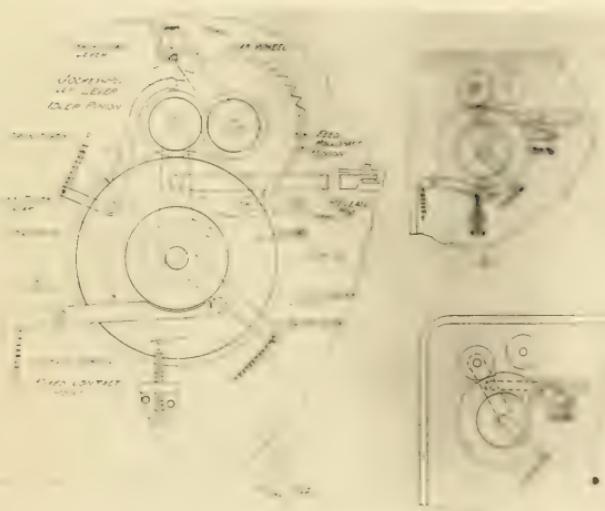
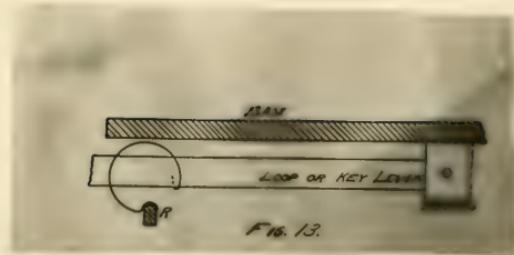
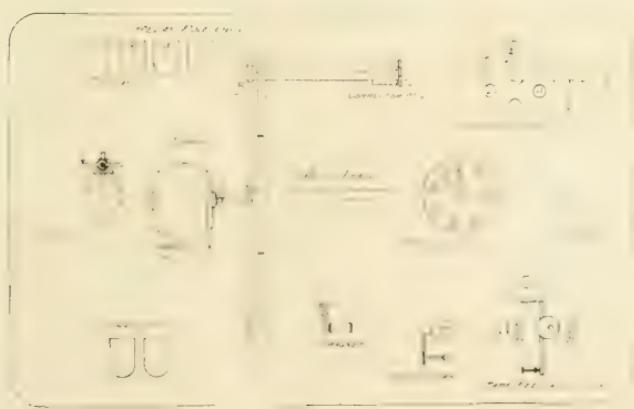
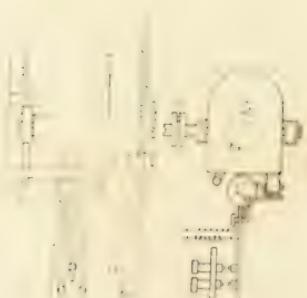
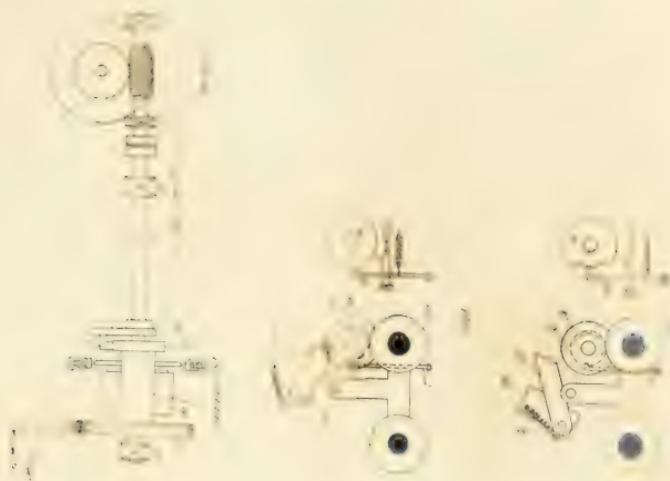


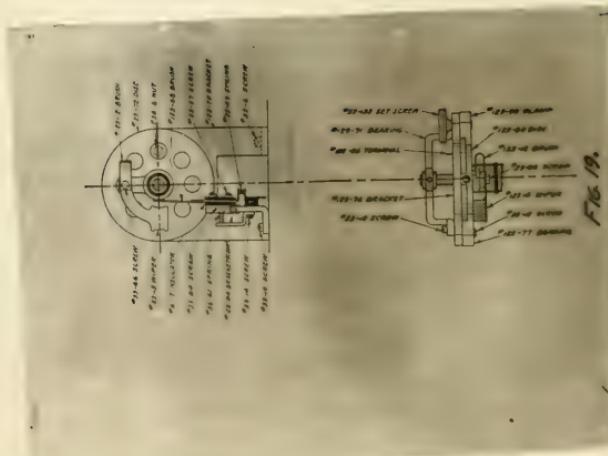
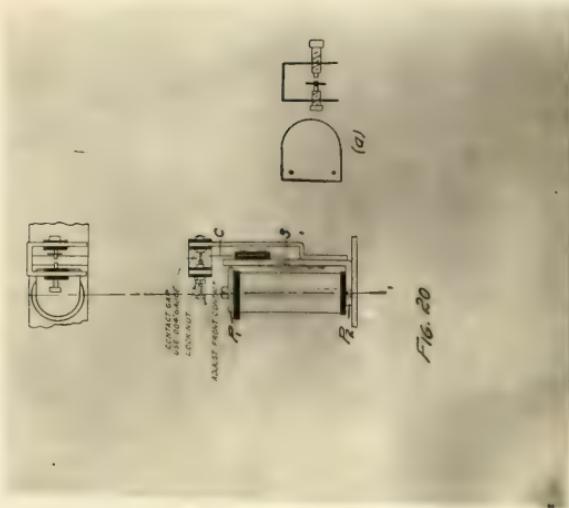


Diagram of a pump

Diagram of a pump







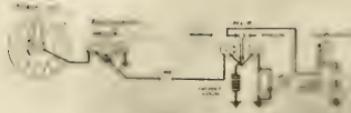


FIG. 21.

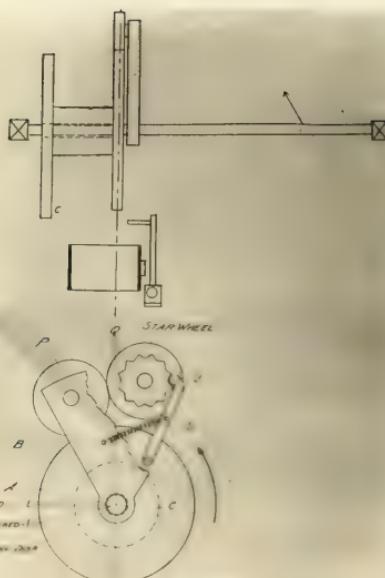


FIG. 22.



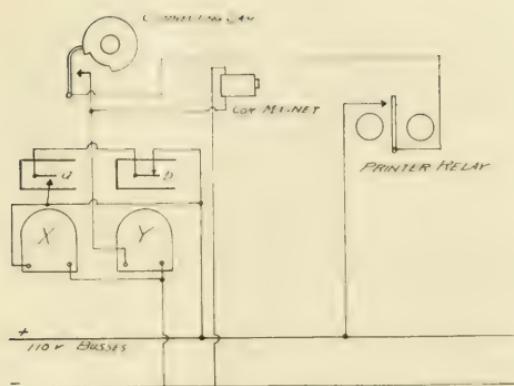


FIG. 23.

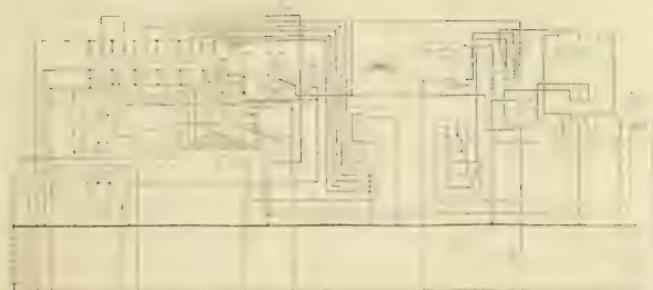


FIG. 24.

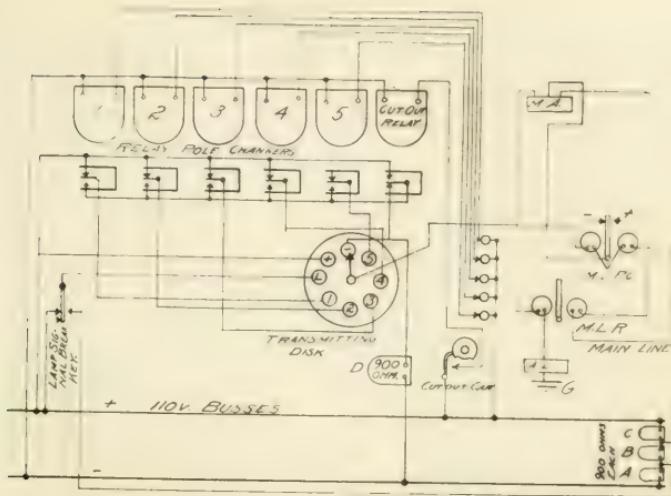
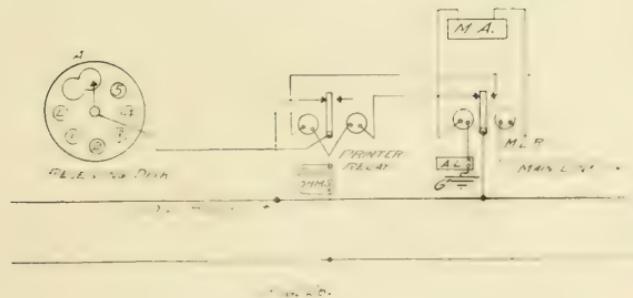


FIG. 25.



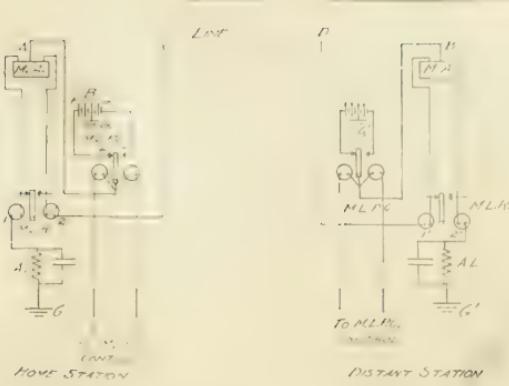


FIG. 27.

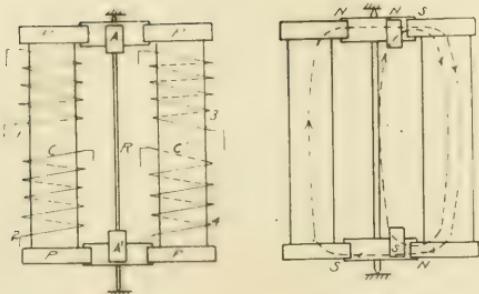


FIG. 28.

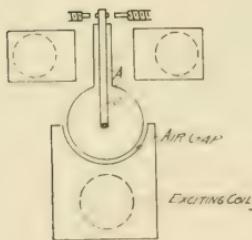


FIG. 29.

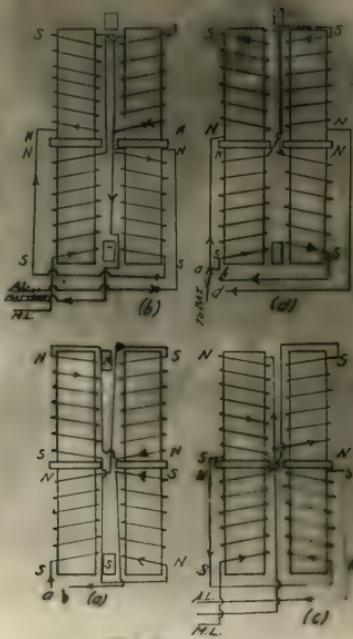


FIG. 30.



FIG. 31.

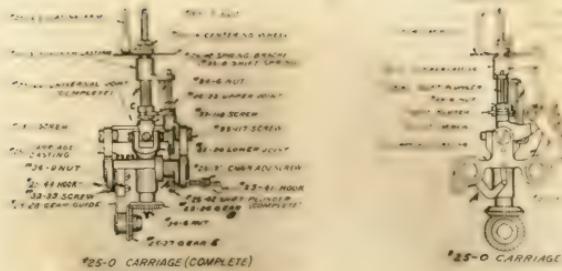
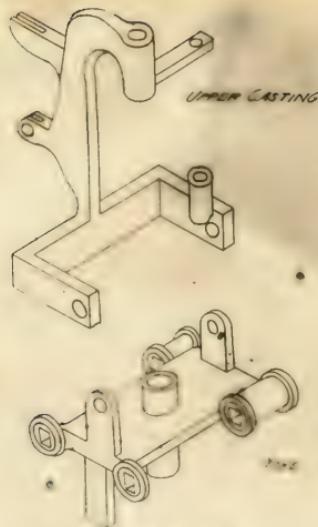


FIG. 32.



Engr. 33.

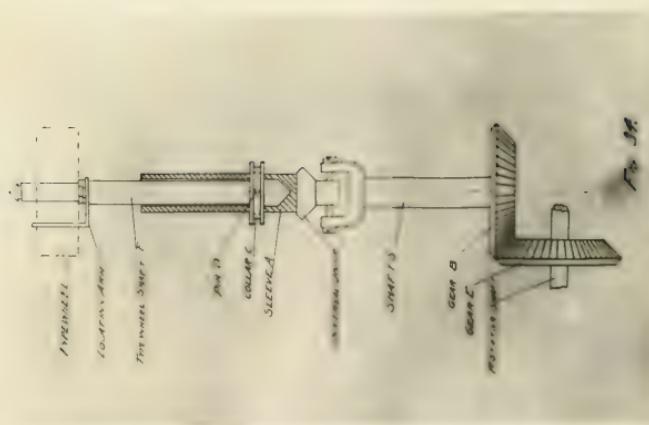
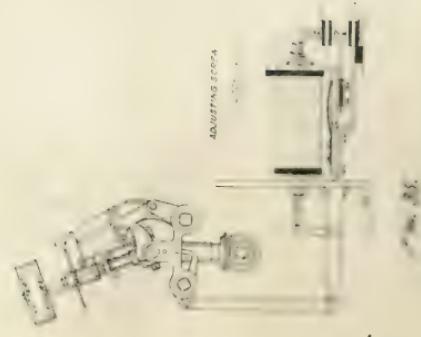
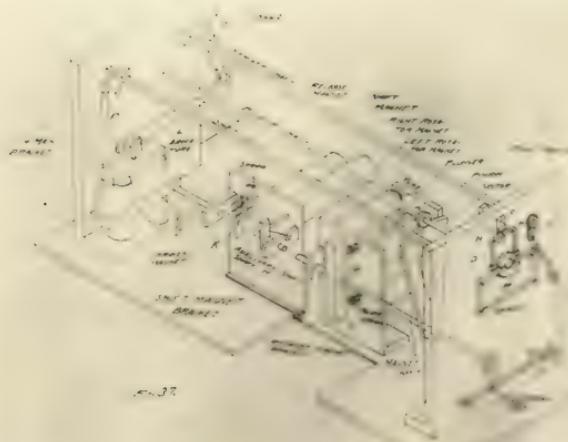




FIG. 36.



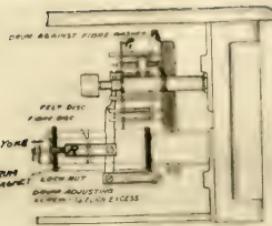


FIG. 38.

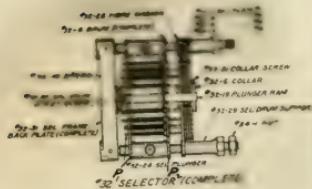


FIG. 39.

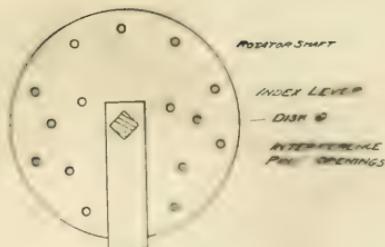
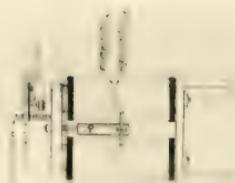


FIG. 40.

1876. Sept.

1876. Sept.



$\sigma_{\text{ext}} = 0.5$

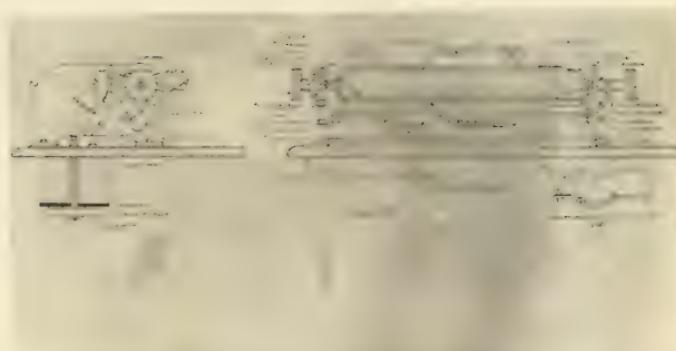


FIG. 44 (c) & (e)

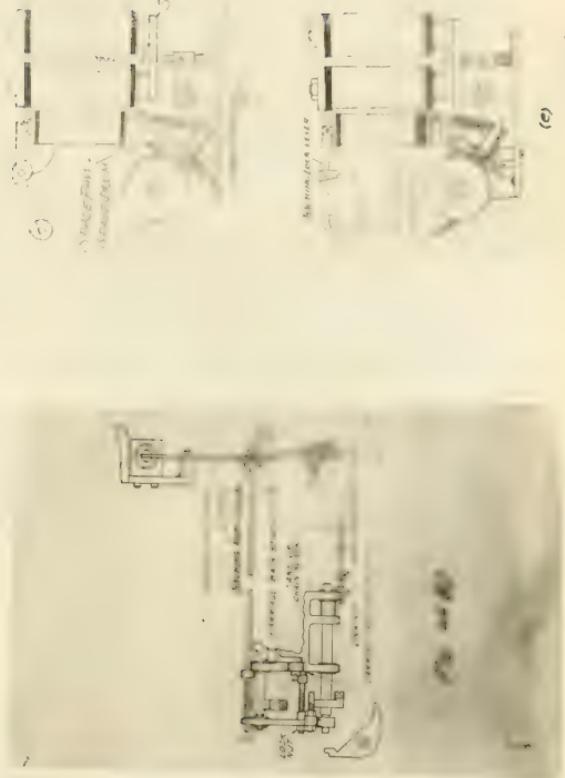


Fig. 44 (c) & (e)

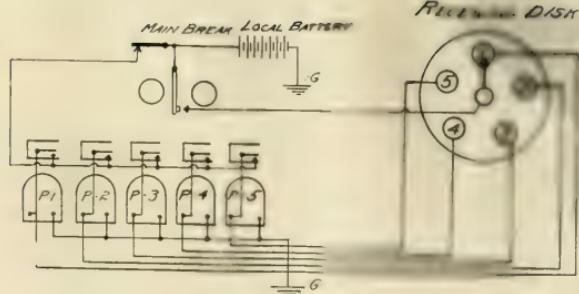
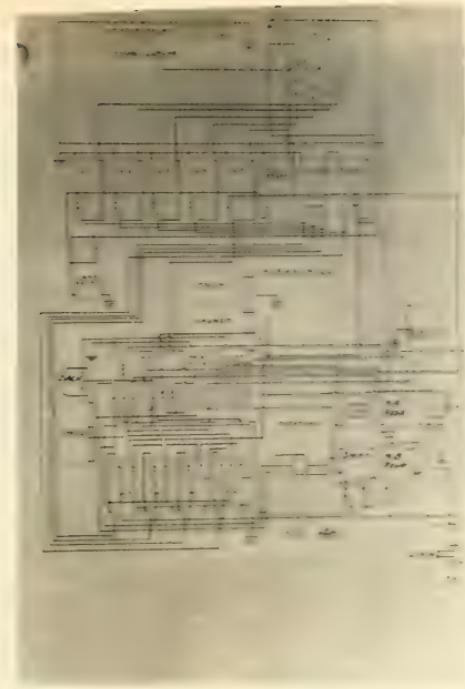


Fig. 47.

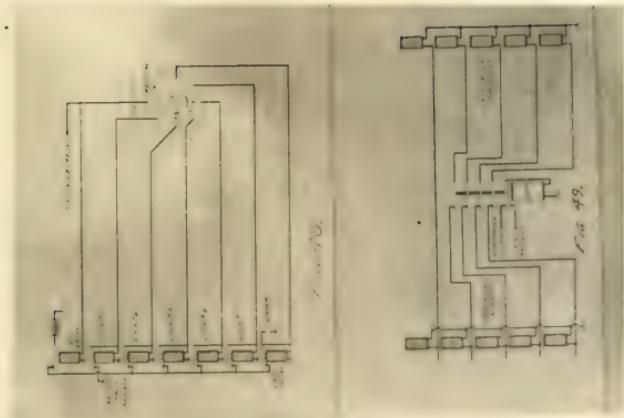
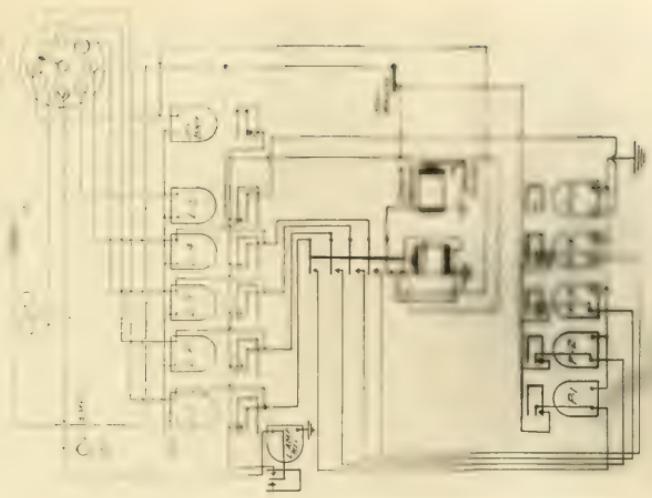
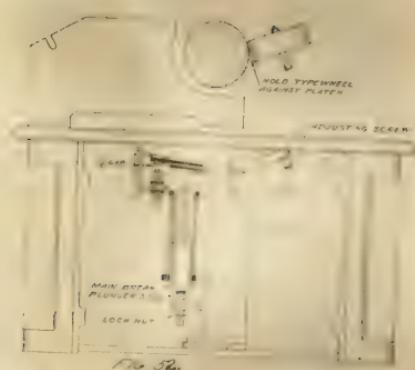




FIG. 51.



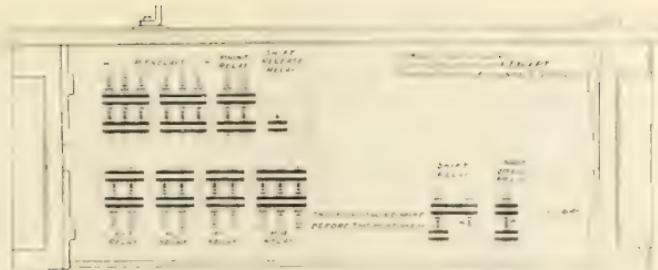


FIG. 53.



FIG. 54.

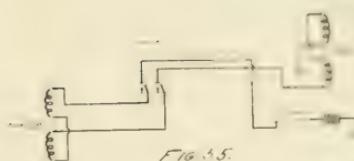


FIG. 55.

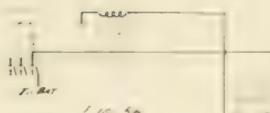
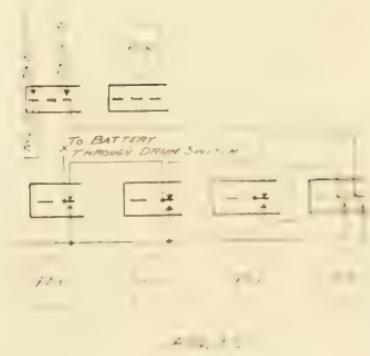
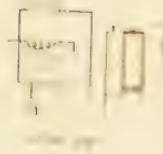


FIG. 56.



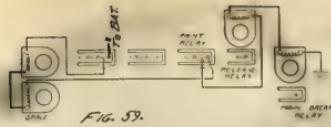


FIG. 59.

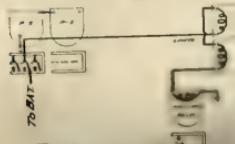


FIG. 60

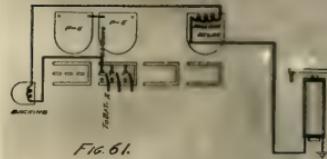


FIG. 61.

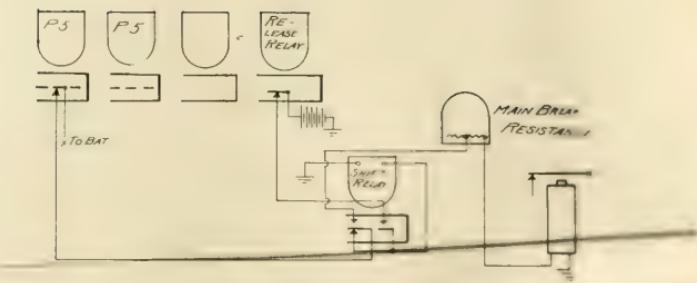


FIG. 62.

