J. S. THOMPSON.

TYPE CASTING MACHINE.

APPLICATION FILED DEC. 5, 1907.

1,026,185.

Patented May 14, 1912.

5 SHEETS—SHEET 1.

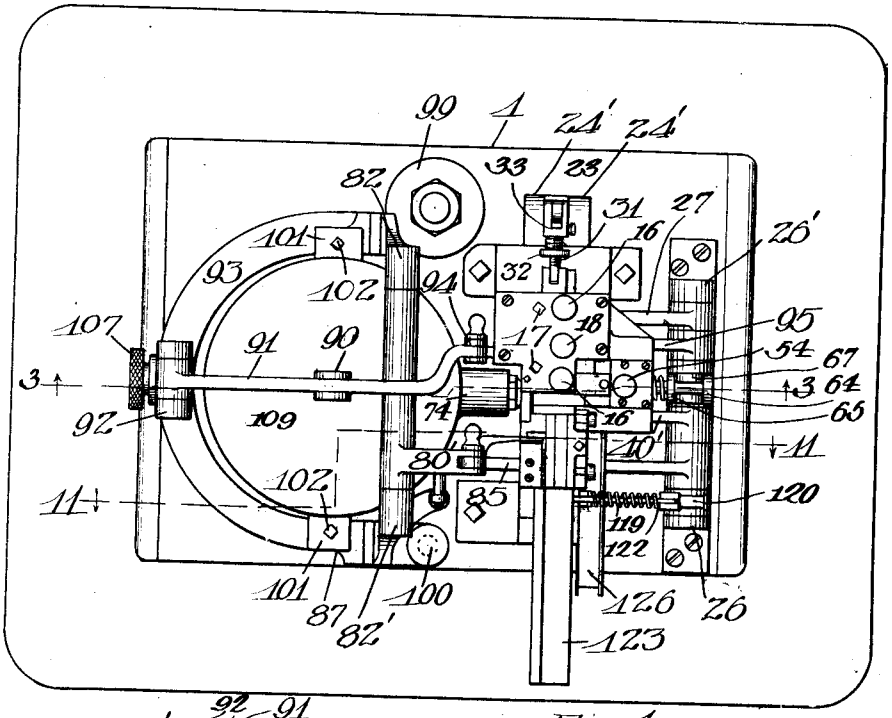
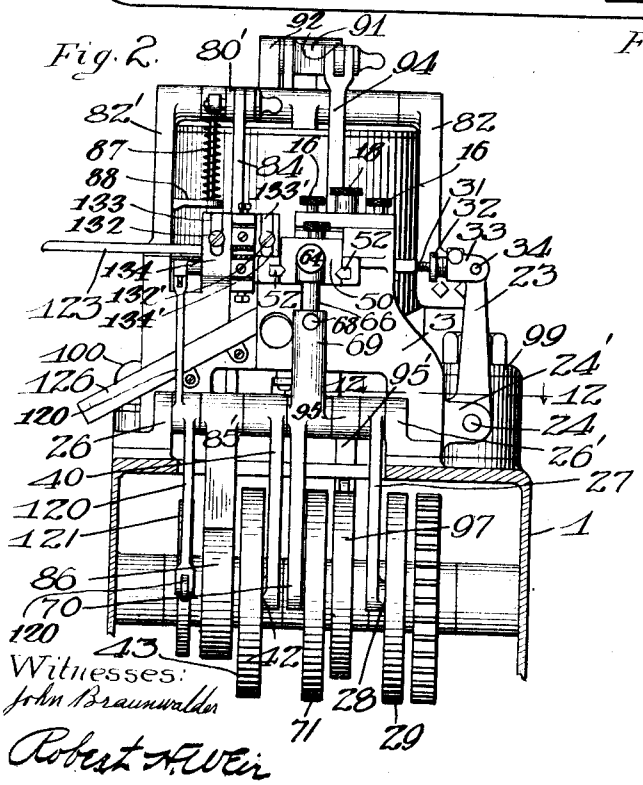


Fig. 1.

Fig. 2.



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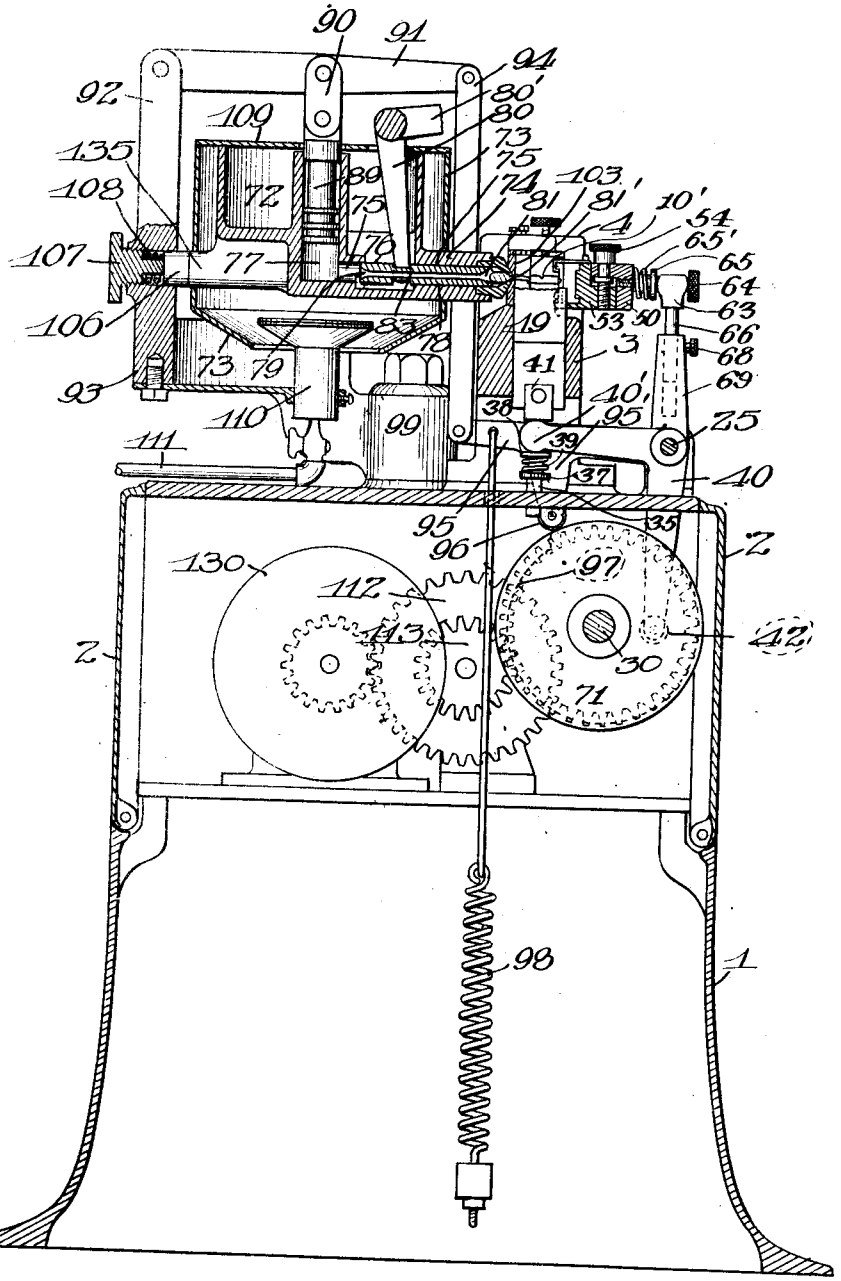

Fig. 3.

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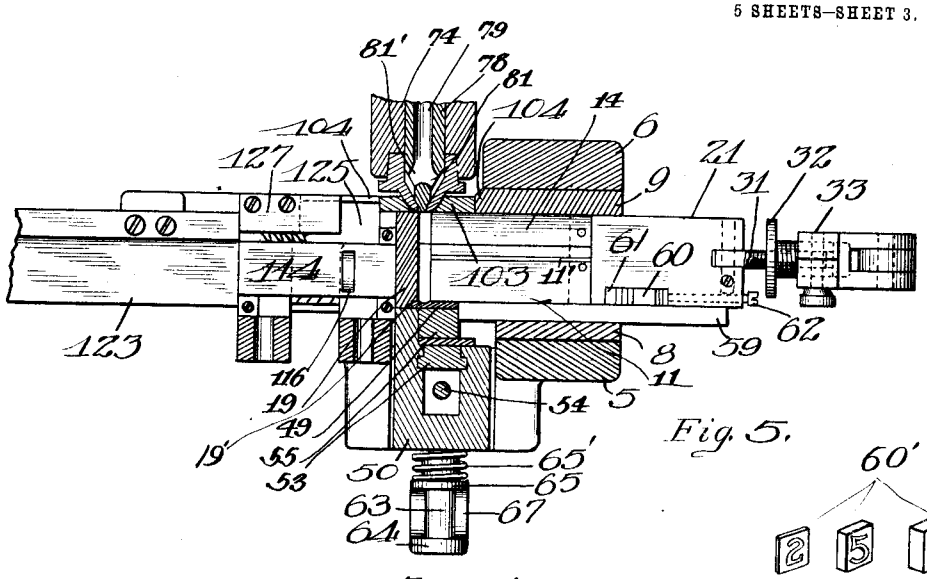

Fig. 5.

Fig. 6.

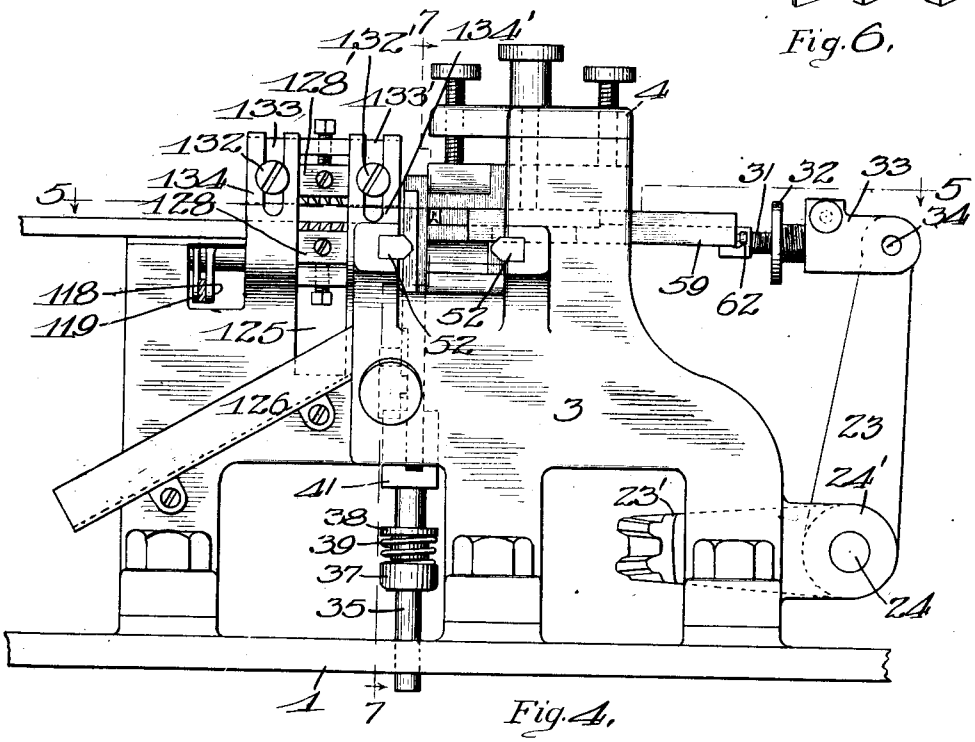

Fig. 4.

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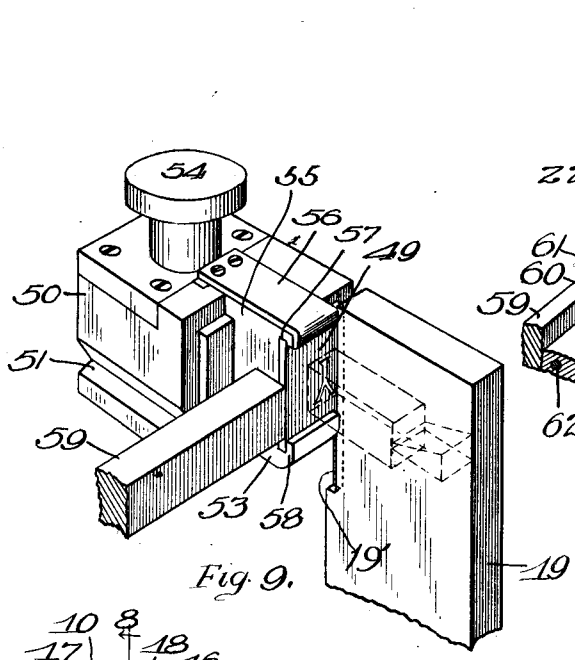

Fig. 9.

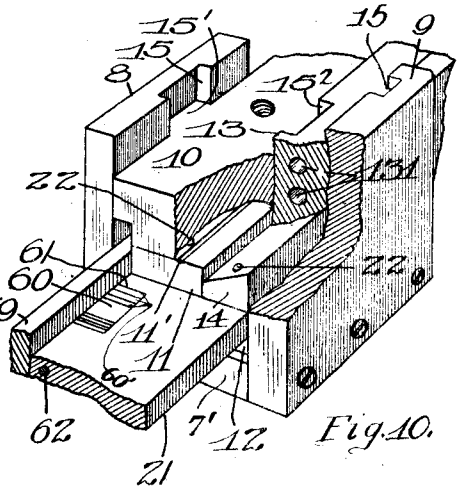

Fig. 10.

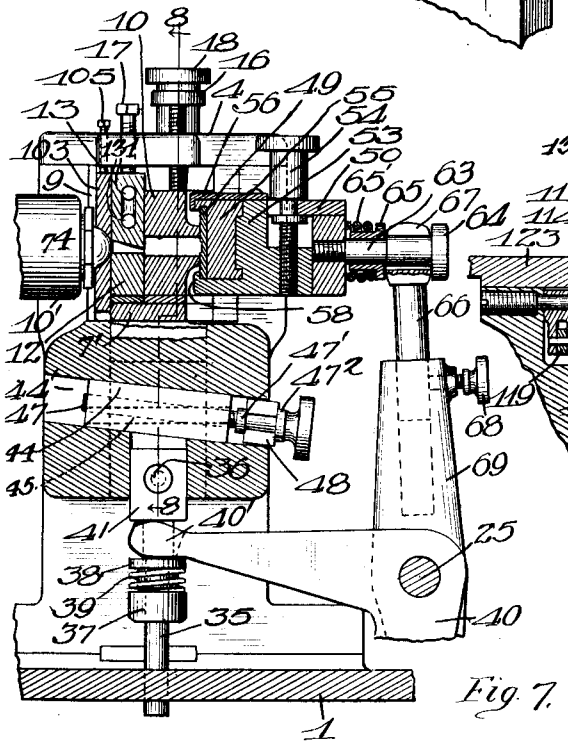

Fig. 7.

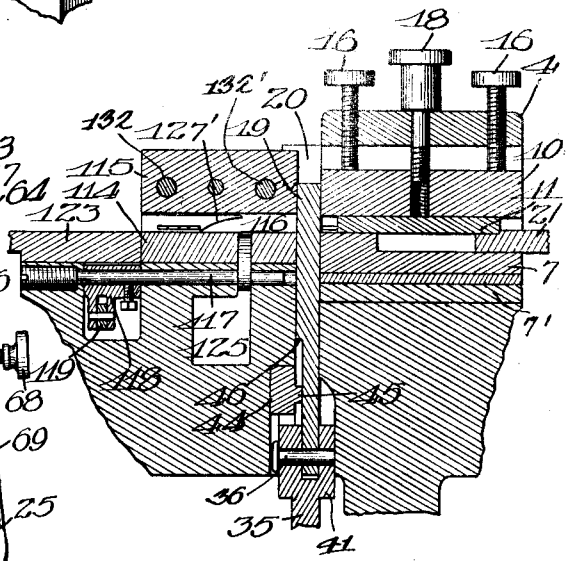

Fig. 8.

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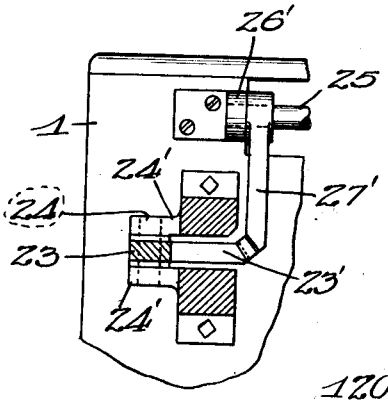

Fig. 12.

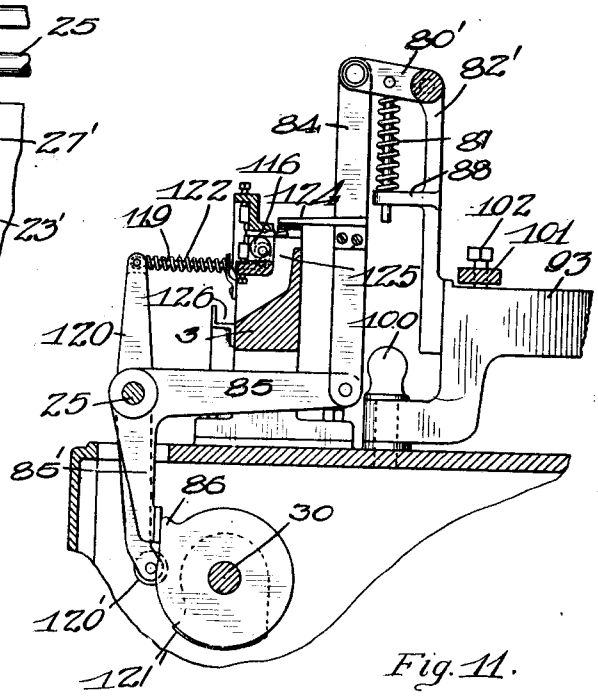

Fig. 11.

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UNITED STATES PATENT OFFICE.

JOHN S. THOMPSON, OF CHICAGO, ILLINOIS.

TYPE-CASTING MACHINE.

1,026,185. Specification of Letters Patent. Patented May 14, 1912.

Application filed December 5, 1907. Serial No. 405,230.

To all whom it may concern:

Be it known that I, JOHN S. THOMPSON, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Type-Casting Machines, of which the following is a description.

My invention relates to means for producing the various forms of type used in the art of printing, and may be employed by itself for producing sorts or type, which are suitable to be set by hand in the usual well known manner, or it may be combined with such other mechanism as may be required to automatically assemble or set, justify or otherwise manipulate the same to completely finish the work ready for locking up in the form.

The object of my invention is to provide a simple, accurate and reliable device of the kind described which is substantially automatic in its operation, and which will produce extremely accurate type with great rapidity, without the attendance of skilled labor.

To this end my invention consists in the novel construction, arrangement and combination of parts herein shown and described, and more particularly pointed out in the claims.

In the accompanying drawings wherein like or similar reference characters indicate like or corresponding parts: Figure 1, is a plan view of my device. Fig. 2, is a front elevation of the same, with portions of the base broken away. Fig. 3, is a section taken substantially on line 3—3 of Fig. 1. Fig. 4, is a detail of the mold supporting mechanism, with various operating levers and the matrix carrier removed to disclose the apparatus. Fig. 5, is a section taken substantially on line 5—5 of Fig. 4. Fig. 6, is a perspective detail of several of the setwise adjusting blocks or pieces. Fig. 7, is a section taken substantially on line 7—7 of Fig. 4. Fig. 8, is a section taken substantially on line 8—8 of Fig. 7. Fig. 9, is an enlarged perspective detail of the matrix holder and a portion of the coöperating parts. Fig. 10, is an enlarged perspective detail of parts of the mold. Fig. 11, is a partial section taken substantially on line 11—11 of Fig. 1. Fig. 12, is a section taken substantially on line 12—12 of Fig. 2.

In the form of my device shown in the drawings, a base or pedestal 1 is provided, at the top of which my mechanism is mounted. The pedestal 1 may be of any desired form or construction, preferably comprising a rectangular inclosure provided with a substantially flat top and if desired with any suitable arrangement of doors 2—2 for affording convenient access to its interior.

The mechanism of my device consists of a mold, a matrix holder or carrier, and a metal pot and coöperating mechanism for operating each, all preferably controlled by a common power element, so arranged that the several parts will coöperate to successively cast type in the mold and finish each type before it leaves the machine.

As shown, a stand 3 is mounted upon the top of the base 1 and secured thereto in any desired manner. A longitudinal channel is formed along the top of the stand 3, and a cover plate 4 is provided, rigidly attached to the marginal walls 5 and 6 of the stand in any suitable manner.

The type mold is positioned within the channel and, in the form shown, comprises a bottom plate 7^1 to which the side plates 8—9 are rigidly attached, a bottom part and a top part. Intermediate the top and bottom parts a body piece 11 is positioned corresponding in thickness with the size of type to be cast. A plurality of such body pieces are preferably provided, each corresponding in thickness with a particular size of type, thus accommodating the various sizes of type the machine is adapted to produce.

The top and bottom parts of the mold consist respectively of a bottom mold block, or plate 7, and bottom jet block 12, and an upper mold block or plate 10 and upper jet block 13. A jet piece 14 is provided adapted to coöperate with the body piece 11 and positioned in the cavity formed between the top and bottom jet blocks. The cross section of the jet piece 14 preferably corresponds, and is proportionate, to the size of the body piece 11, or in other words, to the size of type to be cast. The upper mold block and jet block are vertically movable in relation to each other and also vertically movable in relation to the side plates 8 and 9 respectively to conform to the thickness of the body piece and jet piece respectively with which they are temporarily coöperating.

Any suitable means may be provided for maintaining the mold block and jet block in suitable longitudinal relation to each other and also for retaining these parts in their proper position in relation to the side plates 8 and 9. In the form shown, the side pieces 8 and 9 are each provided with a suitable vertical groove or channel 15, upon their inner faces and the mold block and jet block are each provided with a projection 15^1 adapted to coöperate with these grooves respectively to control the longitudinal position of the parts and permit the vertical movement above described. The jet block is also provided with a transverse groove 15^2 and the mold block with a projection adapted to coöperate therewith to lock the same together and yet permit the desired vertical movement between them.

Suitable means are provided to control the vertical position of the mold block 10 and jet block 13. As shown, a pair of set screws 16—16 are provided in the plate 4 positioned to engage the mold block 10 near its extremities to force the same downward, and a cap screw 18 is positioned in a suitable opening near the center of the plate 4 and arranged to engage a suitable threaded opening in the mold block 10 preferably near its center to draw the mold block upward and hold the same firmly in contact with the ends of the set screws 16—16 thus accurately controlling the vertical position of the mold block.

A substantially similar arrangement may be provided for the jet block 13, but in the form shown, only the screws 17—17 are provided to force the jet block downward, as in actual practice it has been demonstrated that the cap screw may be omitted without materially interfering with the operation of the device.

In the form shown, the upper mold block 10 is provided with one or more ribs or equivalent means 10^1 on its lower face arranged to extend across the mold space and adapted to form the characteristic nicks on one side of the type. A recess or groove 11^1 is formed in the upper face of the body piece 11 to receive the rib 10^1 and coöperate therewith.

The parts above described form three walls of the type and jet cavities, the bodywise size of which is determined by the thickness of the members 11 and 14. The remaining side of the mold is formed by a vertically movable member 19 positioned in a slot 20 in the stand 3, and adapted to fit against the ends of the mold and jet blocks to close the open side of the mold. The setwise size of the type is determined by the distance the body piece 11 is positioned from the vertical member 19 during the casting operation.

Any suitable means may be employed for controlling the movements of the body piece and jet piece. In the form shown, the body piece 11 and jet piece 14 are each removably attached to a common pusher plate 21, by means of pins 22 or other suitable means upon the pusher plate extending into suitable openings in the body piece and jet piece. A shaft 24 is mounted in suitable bearings 24^1—24^1 on the stand 3, and a bell crank lever 23—23^1 is rotatably mounted on the shaft 24. A shaft 25 is also mounted in suitable bearings 26—26^1 on the base 1 and a coöperating bell crank lever 27—27^1 is rotatably mounted on the shaft 25. The arm 27^1 of the bell-crank lever 27—27^1 is provided with a bevel segmental gear adapted to coöperate with a similar gear upon the arm 23^1 of the bell-crank lever 23—23^1. The free end of the arm 27 of the bell-crank 27—27^1 is provided with a suitable roller 28 adapted to coöperate with a cam 29 upon a shaft 30 rotatably mounted in suitable bearings upon the base 1.

Any suitable means may be empolyed to adjustably connect the pusher plate 21 and the lever 23. As shown, a link 31 is pivotally attached to the plate with a part threaded to fit the threads upon the interior of a sleeve nut 32, which in turn is threaded externally to fit an opening in a block 33, which is pivotally connected to the extremity of the lever 23 by a pin 34. The threads upon the interior and exterior of the nut 32 are pitched oppositely, that is, one is right hand and the other is left hand, so that a rotation of the nut will change the distance between the block 33 and the pusher plate the combined pitch of the threads upon the nut.

In order to adjust the mold cavity to produce type of varying set widths, the nut 32 is rotated to change the distance between the plate 21 and the block 33.

The vertically movable member 19 is adapted to be depressed after each type has been cast in the mold to permit its ejection therefrom, the top face of the member 19 forming in its depressed position a support for the type as it is transferred across the recess in the stand 3.

Any suitable means may be employed for periodically elevating and depressing the member 19, and controlling the extent of its movement. As shown, a stem 35 is attached to the lower end of the member 19 by a pin 36, a suitable opening in the base 1 being provided to guide the lower end of the stem 35. A collar 37 is attached rigidly to the stem 35 and a bushing 38, and a spring 39, are loosely mounted on the stem above the collar 37.

A bell-crank lever 40—40^1 is pivotally mounted on the shaft 25, one end 40^1 being forked and adapted to be inserted between a shoulder 41 upon the stem 35 and the

bushing 38. The arm 40 is fitted with a roller 42 positioned in operative relation to a cam 43 upon the shaft 30.

Any suitable means may be employed for adjusting the vertical movement of the member 19 and providing a positive stop to bring the top of the member 19 substantially to the level of the bottom of the mold cavity. As shown, a block 44 is positioned in a diagonal groove 44^1 in the stand 3, and provided with a diagonal rib 45 on one of its faces, the rib 45 is adapted to engage a shoulder 46 on the member 19 when the member is depressed and form a limit to its downward movement.

The parts are so proportioned that the lever 40—40^1 is given excessive movement so as to cause a compression of the spring 39 to take up any lost motion in the parts and insure the proper seating of the shoulder 46 upon the rib 45 each time the vertical member is depressed. In the form shown, the adjustment of the stop 44 is accomplished by means of a screw 47 extending into the recess 44^1 and threaded into the block 44. A suitable head or handle is provided upon the screw 47 having two concentric flanges 47—47^1 adapted to engage the opposite sides of a bearing 48 on the stand 3. By rotating the screw 47 a very close and accurate adjustment of the stop block 44 may be made.

Any suitable form of matrix may be employed, and held in position to coöperate with the mold in any desired manner. As shown, the matrix 49 consists of a flat rectangular plate having a character or die on its flat side. The matrix 49 is mounted upon a matrix carrier comprising a carriage 50 provided with a groove or depression 51 upon each side, or other suitable means, adapted to coöperate with guides or ways 52 upon the stand to accurately guide the movement of the carriage 50, preferably in a horizontal direction at substantially right angles to the mold.

The vertical position of the matrix upon the carriage is preferably controlled by an inverted T-shaped block or matrix support 53, one arm of which is adapted to extend beneath and support the matrix. The block 53 is positioned in a suitable chamber or recess in the bottom and front of the carriage and provided with suitable means coöperating with the sides of the carriage to permit the desired vertical adjustment of the block. A screw 54 or other suitable means connects the block and carriage, and controls the vertical adjustment of the block, thus providing convenient means for accurately adjusting the position of the character upon the matrix to the mold.

Any desired means may be employed for clamping the matrix upon the block. As shown, a filling block 55 is mounted in suitable ways upon the block 53 and a bent plate 56, is attached to the top of the block 53, and adapted to hold the block 55 firmly in place. The matrix 49 is inserted in a groove 57 in the block 55, and an upturned lip 58 on the block 53 engages the lower edge of the matrix, providing a suitable seat for the matrix and preventing its vertical or lateral movement on the block 53.

Matrices of the kind shown in the drawings are usually formed of uniform dimensions, irrespective of the size of the character they are intended to produce and the characters are usually located a fixed distance from one edge of the plate and are usually of a certain dimension or number of "points" in width, or "setwise". The parts of my machine are shown arranged for the above described kind of matrix however, merely for the purpose of illustration, as it is evident that my machine may be arranged for employing any kind of matrices whether possessing the characteristics above described or otherwise.

In the form shown, the vertically movable member 19 is provided with a recess or depression 19^1 extending longitudinally of the member along one corner at its front edge as shown in Figs. 5 and 9, the walls of the recess being adapted to engage both the front and one side of each matrix when in casting position, it being understood that this side portion is of uniform width in all matrices of the character described. An auxiliary member 59, is adjustably attached to the pusher plate 21, and operates outside the mold cavity. This member is adapted to engage the opposite side of the matrix at the mold and limit the movement of the pieces 11 and 14 toward the vertical member 19, and thus control the setwise dimensions of the mold cavity.

Any desired means may be employed for adjusting the relation between the auxiliary mold member 59 and the mold piece 11. As shown, a suitably formed recess is provided between the plate 8 and the body piece 11 and the block 59 is fitted in the recess and arranged to move longitudinally therein. A lug 60 is formed upon the block 59 adapted to extend into an opening 61 in the pusher plate 21. The opening 61 is made considerably longer than the dimension of the lug 60 to permit longitudinal adjustment between the block 59 and pusher plate 21. In the form shown, a series of plates 60^1 (see Fig. 6) of various thicknesses, are provided for insertion in the opening 61 between the end of the opening and the lug 60, and a set screw 62 threaded into the end of the pusher plate 21 is provided to clamp the parts tightly together to prevent longitudinal movement therebetween. The plates temporarily out of use may if desired be conveniently placed at the opposite side of the lug in the opening 61 and clamped in place by the set-screw 62, though of course this

is not essential to the operation of the device. These plates are preferably numbered according to their thickness, and as each matrix is stamped upon its face with the width of its particular character in points, it is only necessary for the operator to place the plates corresponding to the number upon the matrix in the opening to produce the proper size of mold cavity for the matrix. This being done, the matrix carrier 50 is advanced against the mold and the cam shaft 30 rotated to bring the mold members into casting position. The sleeve-nut 32 is then rotated to cause the end of the auxiliary mold member 59 to contact with the edge of the matrix, and press its opposite edge firmly against the recessed wall of the vertical member 19. By this arrangement an extremely accurate adjustment of the mold cavity is secured and the type produced are of uniform size and accuracy.

Any preferred means may be employed to operate the matrix carrier. In the form shown, a stem 63 is rigidly attached to the carriage 50 and provided with a head 64, and a spring actuated collar 65 arranged to move longitudinally of the stem, and resiliently forced toward the head 64. A lever 69 is loosely mounted upon the shaft 25 with its upper end bored longitudinally to receive a cylindrical stem 66 having a forked head 67 adapted to engage the head 64 upon each side of the stem 63. A set screw 68 or other suitable means is provided to retain the stem 66 in its elevated position. The opposite end of the lever 69 is provided with a roller 70 arranged to coöperate with a cam 71, mounted upon the shaft 30, thus providing means for positively withdrawing the matrix carrier from the mold. The collar 65 engages the forked head 67 and resiliently maintains the same in contact with the head 64, the spring 65^1, forming a cushion which, when the machine is in operation, seats the matrix resiliently against the mold, insuring a perfectly tight joint between the mold and matrix, and compensating for wear in the parts. The stem 66 is adapted to be thrust into the opening in the lever 69 or lowered sufficiently to release the matrix carrier and facilitate its removal, to provide convenient means for changing matrices as desired.

The metal pot may be of the usual or any preferred form or construction for storing a suitable quantity of metal and maintaining the same at a proper temperature, and may be arranged in any desired manner for periodically introducing a quantity of the metal contained in the pot into the mold. In the form shown, the metal pot comprises a reservoir or crucible 72 provided with a jacket or housing 73, a nozzle 74 projecting through the lower front side of the jacket, and means for controlling the discharge of metal from said nozzle, the whole being preferably supported so that the nozzle opening will constantly be presented to a port communicating with the jet cavity of the mold. The nozzle 74 is connected to the reservoir 72 by a passage 75, a recess 76 and a well or cylinder 77. A suitable valve or choker 78 is positioned in the passage 75 to control the opening therethrough, and the discharge of metal from the reservoir.

The cylinder 77 is preferably circular, of uniform section, and located vertically near the center of the bottom of the reservoir with its upper end open. The passage 75 extends from the nozzle to the cylinder and is also preferably circular in section. The recess 76 is formed in the bottom of the reservoir 72 near the cylinder 77 and extends downward to a point slightly below the bottom of the passage 75, and communicates freely therewith. The valve or choker 78 is formed to snugly fit the passage 75 and is provided with a tip or point suitably formed to fit within and close the nozzle opening. A duct 79 extends longitudinally of the choker 78 and terminates near the tip or outer end in two openings $81—81^1$. The choker 78 is preferably so formed that when in position closing the nozzle, the tip of the choker will be just flush with the face of the nozzle, and the passage 75 open to the recess 76, so that metal in the reservoir is free to pass into the passage and the lower portion of the cylinder 77. When the choker is retracted to open the nozzle, the body of the choker extends across the lower portion of the recess 76 and completely cuts off communication between the passage 75 and the recess.

The operation of the choker 78 is preferably controlled by a bell-crank lever $80—80^1$ pivotally mounted at the top of the metal pot upon suitable brackets $82—82^1$. The arm 80 extends downward through the reservoir into the recess 76, where it is suitably formed to engage an annular groove 83, or other suitable means, upon the choker for positively controlling its position. The arm 80^1 extends forward, and near its free end is connected by means of a link 48 (see Fig. 11) to the arm 85 of the bell-crank $85—85^1$ pivotally mounted upon the shaft 25, with its arm 85^1 extending downward into the path of a projection or cam 86 upon the shaft 30. A spring 87, or other suitable means, extends from a support upon the arm 80^1 to a bracket 88 rigidly mounted on the support 82^1 and is adapted to normally hold the link 84 in an elevated position and the choker closed.

The cylinder 77 is fitted with a plunger 89 connected, by means of a link 90 passing upward through the reservoir, to a lever 91 pivotally attached to a bracket 92 upon the metal pot supporting arm 93. A link 94

is attached to the free end of the lever 91, with its opposite end attached to the free end of a lever 95, pivotally mounted on the shaft 25. A downwardly extending central member 95^1 is provided upon the lever 95 with a roller 96 at its extremity adapted to coöperate with a cam 97 mounted upon the shaft 30. A spring 98 or other suitable means, is attached to the lever 95 tending to resiliently hold the lever and associated parts at the lower limit of their movement, while the cam 97 is formed to engage the roller 96 and elevate the parts to raise the plunger 89 to the upper limit of its movement and hold it there until the parts are in position to receive a charge of metal from the pot, when a depression in the cam permits the plunger to drop suddenly under the action of the spring 98.

The metal pot supporting arm 93 is preferably pivotally mounted at one end upon the pedestal 1 as at 99 and is formed to curve about the rear of the metal pot, with its free end resting upon the opposite side of the base 1, and secured thereto by a suitable pin 100 or other convenient means, so that when desired the connections between the levers 80^1 and 91 and their respective operating links 84 and 94 may be released, the pin 100 removed, and the entire metal pot swung back from the mold, affording convenient access to the back of the mold and the front of the metal pot.

The metal pot may be mounted upon the arm 93 in any suitable manner. As shown, two lugs or brackets 101—101 are provided upon opposite sides of the pot, projecting through the jacket 73, and suitably formed to rest upon the arm 93 to support the pot. Each lug is preferably provided with an adjusting screw 102 or equivalent means, adapted to engage the arm to adjust the vertical position of the pot. The nozzle 74 is secured in operative relation to the mold by means of a nozzle plate 103 fitted to the back of the mold and having an opening communicating with the jet cavity. The vertical position of the plate 103 is controlled by a set screw 105 extending through the plate 4, and against sidewise movement by its position between the shoulders 104—104 of the adjacent parts. The plate 103 is provided with a conical seat for the nozzle 74 adapted to hold the parts so that the opening in the nozzle will accurately register with the opening in the plate.

A boss 135 is provided upon the back of the reservoir, projecting through a suitable opening in the jacket 73. A spring actuated plunger 106 is fitted in a suitable opening in the arm 93 in position to engage the boss 135 and resiliently force the nozzle 74 against the plate 103. A suitably formed set screw 107 and a spring 108 is provided to adjust the resilient pressure of the plunger 106 against the boss and may also be employed to positively control the horizontal position of the metal pot. In the preferred arrangement, the screw 107 is so adjusted that when the device is first put in operation, the position of the metal pot, which is slightly below its normal temperature, will be controlled by the resilient action of the plunger 106 against the boss 105 but after the metal pot has acquired its normal operating temperature, owing to the resulting expansion of the parts, the tip of the screw 107 will engage the plunger 106 and thus positively control the pressure of the nozzle against the plate 103 and hold the same firmly in its proper position at the back of the mold.

In the form shown, the metal pot is provided with the usual cover plate 109, and a burner 110 for oil, gas or other suitable liquid combustible is provided, and may be attached in any desired manner by means of a hose or pipe 111 to a suitable source of supply (not shown).

Any suitable means may be employed to rotate the shaft 30. As shown, a motor 130 is mounted within the pedestal and connected by a train of gears 112—113 to the shaft 30 so that the same will rotate at a suitable speed to produce the most desirable rate of operation of my device, the several parts of which are preferably so proportioned and timed that a single cast is made at each rotation of the shaft.

In the preferred operation, the vertically movable member 19 is first raised, then the matrix carrier is advanced until the face of the matrix in the carrier is pressed firmly against the faces of the mold members. The body piece 11 and jet piece 14 are then moved toward the member 19 until the auxiliary mold member 59 is pressed against the edge of the matrix. When thus positioned, the metal pump and choker are operated and a charge of metal is forced into the mold. The matrix carrier is next withdrawn and the member 19 depressed. When this is accomplished, the body piece 11 and jet piece 14 are advanced and the type is forced out of the mold over the top of the member 19 and into the space between the plate 114 and shoe 115, where the type is held against longitudinal movement by the engagement of a rib upon the lower face of the shoe 115, with the nick formed in the type.

Any suitable means may be employed to engage the type and prevent its retraction with the parts 11 and 14. As shown (see Fig. 8) a cam or projection 116 is provided upon a shaft 117, adapted to project through the plate 114 and engage a type as it is ejected from the mold and hold the same while the ejector is being retracted. The shaft 117 is mounted in suitable bearings in the stand 3 with an arm 118 attached to the

end thereof. A link 119 connects the free end of the arm 118, to one end of a lever 120 mounted intermediate its ends upon the shaft 25. A roller 120¹ is provided upon the opposite end of the lever 120 adapted to cooperate with a cam 121 upon the shaft 30, and a spring 122 extending from the lever 120 to a suitable portion of the machine is adapted to resiliently force the roller into operative engagement with the cam. The cam 116 is so positioned as to engage the thinnest type the machine is adapted to cast without engaging the body piece 11. The thickest type will therefore only be engaged at their forward edges, as it is obvious that the operation of the mold as above described is such as to always bring the front edge of all type as discharged from the mold into exactly the same position, regardless of their thickness. Immediately after the retraction of the parts 11 and 14 the cam 116 is moved to release the type and the ejection of the succeeding type from the mold advances the type previously cast toward the type receiving stick 123.

Any desired means may be employed to break and remove the jets from the type and thereafter tool or finish the feet. As shown, an arm or breaker 124 is rigidly attached to the link 84 positioned to engage the jet attached to the foot of each type as it comes to rest after being ejected from the mold. A pocket or opening 125 is provided in the stand 3 directly beneath the jet ends of the type when in the above described position. At each operation of the link 84 the breaker 124 engages the jet of the type previously cast and presses it downward, breaking the same from the type and forcing it into the pocket 125, whence it is directed by the chute 126 into any convenient receptacle. As each type is ejected, the type previously cast are pressed forward, and the rough break in the foot of each type is acted upon by the cutting lips of a plow or cutter 127, attached to the stand 3. A projecting lip 127¹ (see Fig. 8) on the plow is adapted to engage the jets if for any reason they are not entirely removed by the breaker 124, and its curved under face forces any remaining portion of the jet downward before it reaches the cutting lips of the plow. The link 84, has a positive downward movement, and ordinarily the breaker 124, will thoroughly remove the jets, so that in practice it has been found that the projecting lip 127¹ may be omitted without interfering with the satisfactory operation of the machine. The plow 127 is preferably so mounted upon the stand 3 that the same may be readily removed and replaced by another plow having cutting lips of suitable dimensions to plow the feet of type whose jets are of larger or smaller cross-section. Suitably formed trimming knives 128—128¹ are also attached to the plate 114 and shoe 115 adapted to operate simultaneously with the plow 127 to trim the front edges of the type and remove any burs or fins of metal adhering to the type. The shoe 115 is vertically adjustable in relation to the plate 114 in order that the space between them may conform to the body-wise size of the mold cavity. For this purpose suitably formed screws 132—132¹ are provided, tapped into the shoe 115 and adapted to pass through the slots 133—133¹ in the vertical supports 134—134¹ to clamp the shoe firmly thereto.

Any desired portion of the mold may be provided with suitable cooling means for reducing the temperature of the parts while in operation, in the usual or any suitable manner. In the preferred construction shown, the jet block 13 is provided with one or more water channels 131 for this purpose, the remainder of the mold parts being wholly unprovided with cooling means. When thus constructed the temperature of the several parts of the mold remain fairly even, that is, the jet blocks which are subject to the greatest heat are prevented from acquiring too high a temperature and the temperature of the body pieces of the mold approach more nearly the temperature of the jet blocks, and the type cast are preferably parallel and the temperature of the parts are more readily controlled and maintained, greatly increasing the rapidity of operation and the life of the parts.

It has been demonstrated in practice that the best results are obtained by changing the size of the jet to conform to changes in the size of the type mold, so that larger type have correspondingly larger jets. The construction shown, permits ready removal of the jet piece and its replacement with another of suitable dimensions whenever desired.

In the foregoing specification I have described my improvement as a type-casting machine, but it is obvious that with various slight modifications, my device may be adapted to cast small objects of various shapes, and wherever in the specification or claims the word type is employed, I desire to be understood as referring to such objects as well as type.

It is also obvious that various immaterial modifications may be made in my device without departing from the spirit of my invention, hence I do not wish to be understood as limiting myself to the exact form and construction shown.

What I claim as new and desire to secure by Letters Patent is:

1. A type mold comprising a cap and a base, an intermediate body piece controlling the body-wise and set-wise dimensions of the

mold, two jet blocks associated with said cap and base for forming a jet on said type, a jet piece working between said jet blocks, a vertically movable plate forming one side of the mold and jet cavities, and a pusher plate and associated parts to which said body piece and jet piece are attached, and means for independently altering the cross sectional area of said mold and jet cavities.

2. In a casting machine, an adjustable mold, and means for presenting a matrix to said mold, in combination with an adjustable stop rigidly attached to one of said mold members adapted to coöperate with said matrix for limiting the set-wise dimension of the mold.

3. A type mold comprising a stationary base, an adjustable cap, a variable intermediate body-piece, a stationary jet forming block, and an adjustable jet forming block associated therewith, a variable intermediate jet piece, a pusher plate to which said body piece and said jet piece are removably attached, a vertically movable plate forming a fixed wall for the mold cavity, means for advancing said body-piece and jet-piece variably toward said vertical plate for varying the size of the mold cavity.

4. A type mold comprising top and bottom members, an intermediate body member, a vertical member forming one side of the mold and provided with an abutting surface for a matrix and an auxiliary member coöperating with said member and said matrix to control the set-wise adjustment of the body member, means for adjusting the parts to form type of varying widths.

5. A type mold comprising top and bottom members, a movable intermediate body member, and an auxiliary member, coöperating therewith, a vertically movable member adapted to form a fixed side of the mold and coöperate with a matrix and said auxiliary member to gage the distance between the members, means for adjusting the body member to and from said vertically movable member to control the width of the mold opening.

6. A type mold adapted to cast type of varying sizes, said mold comprising a plurality of interchangeable body pieces, and a plurality of interchangeable jet pieces, a pusher plate common to said jet pieces and body pieces, and means for adjusting the relative positions of said body pieces and said jet pieces to locate the jet at any desired point on the type.

7. A type mold comprising the vertical side walls 8—9, the bottom part to which the side walls are attached, the lower mold block 7 and lower jet block 12, and the relatively adjustable upper mold block 10, and relatively adjustable upper jet block 13, and a plurality of interchangeable body pieces 11, and jet pieces 14 of varying cross-section, the various parts coöperating with each other to form a complete type mold.

8. A type mold comprising top and bottom members, and an intermediate body part adapted to jointly form a mold cavity, an auxiliary member associated with said body member and operating outside the mold cavity, and means for adjusting the relative positions of said body member and auxiliary member, whereby the mold cavity may be adjusted to produce various set widths of type.

9. A type mold comprising top and bottom members, and an intermediate body part adapted to jointly form a mold cavity, an auxiliary member coöperating with said body member and operating outside the mold cavity, a pusher plate provided with means for engaging both the body and the auxiliary members, and means for adjusting said auxiliary member longitudinally of said body member.

10. A type mold comprising top and bottom members, an intermediate body member adapted to jointly form a mold cavity, an auxiliary member coöperating with said body member and operating outside the mold cavity, an abutment on said auxiliary member and a plurality of distance pieces adapted to be inserted on either side of said abutment to control the relative positions of said body and auxiliary members, and means for clamping said parts together.

11. A mold for casting type of various sizes provided with a jet orifice, the cross section of which is adapted to be altered to conform to the changes in the size of the mold cavity, a plurality of interchangeable mold body-pieces and a plurality of interchangeable jet ejectors.

12. In a type casting machine, a mold for casting type of various sizes provided with a jet orifice, the cross-section of which is adapted to be altered to conform to changes in the size of the mold cavity, a nozzle plate coöperating with said mold and adjustable in relation thereto, whereby the nozzle is presented at the proper level to deliver molten metal to the mold.

13. In a machine for casting type, a mold provided with an adjustable cavity for casting the body of the type, an adjustable cavity for casting the jet, a type body piece and a jet piece, a pusher plate common to both pieces and means for varying the vertical cross-section of either the mold or the jet cavity independently of the other.

14. A type mold comprising top and bottom members, and an intermediate body member adapted to jointly form a mold cavity, an auxiliary member coöperating with said body member and positioned outside the mold cavity, a vertically movable

mold member projecting beyond the face of the mold, and adapted to coöperate with said auxiliary member to engage a matrix between them and gage and control the width of the mold cavity.

15. A type mold comprising top and bottom members, and an intermediate member adapted to form one side of the mold cavity and eject the type therefrom, a vertically movable member adapted to form another side of the mold cavity and be retraced while the type is being ejected, mechanism to impart motion to said vertical member and said intermediate member, and resilient means interposed between the vertical member and its operating mechanism to form a yielding connection therebetween.

16. A mold including a movable member forming one wall of the mold cavity, an auxiliary member co-acting therewith, a member movable at right angles therewith and forming another wall of said mold cavity, and coöperating with said auxiliary member to engage a matrix between them, means for advancing the matrix to coöperate with the mold, means for advancing the movable parts to coöperate with the matrix.

17. A type mold comprising top and bottom members and an intermediate body piece adapted to jointly form a mold cavity, a part upon said body piece projecting beyond the face of said top and bottom members, a vertically movable member also projecting beyond the face of said top and bottom members, the projecting portions of said body piece and vertically movable member being adapted to engage the opposite edges of a matrix between them, and means for advancing said body member to engage said matrix and to control the width of the mold cavity.

18. In a casting machine, a mold comprising top and bottom members and a movable body member, an auxiliary member adjustably connected to said body member and adapted to coöperate with a matrix to gage the set-wise dimension of the mold.

19. In a casting machine, an adjustable mold having an open end, in combination with a matrix adapted to coöperate with opposing mold parts to close the open end of the mold and to gage the width of the mold opening.

20. In a casting machine, a matrix adapted to form one side of a mold and to engage opposing mold members to form a mold of a predetermined size corresponding to the size of the character upon the matrix.

21. In a casting machine, an adjustable mold comprising a plurality of movable members each of which are provided with parts adapted to engage a matrix to determine the width of the mold.

22. In a casting machine, a mold having a plurality of movable members and means upon each movable member adapted to coöperate with a matrix to gage the distance between the mold members to correspond with the size of the character upon the matrix.

In testimony whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

JOHN S. THOMPSON.

Witnesses:
BURTON U. HILLS.
CHARLES I. COBB.