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THE TAUNUS RAILWAY.

A

CONCISE ACCOUNT,

HISTORICAL, STATISTICAL, AND MECHANICAL,

OF THE

RAILWAY FROM FRANKFURT TO WIESBADEN,

WITH TWENTY-FIVE STEEL AND WOOD ENGRAVINGS.

BY

ROBERT THORMAN, ENGINEER.

LONDON:

JOHN WEALE, 59, HIGH HOLBORN.

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THE TAUNUS RAILWAY.

FRANKFURT TO WIESBADEN.



STATION AT HÖCHST, VIEW FROM THE RAILWAY.

NOTE.—Where the letter *m* is placed denotes French metres = 3.280 feet English; *f.* is florins, containing 60 kreuzers, or 1*s.* 8*d.* sterling; *χ* is kreuzers, 3 of which = 1 penny; *ft.* and *inc.* are feet and inches, English measure.

THE Taunus Railway, so named from its running nearly parallel with, and being in the vicinity of, the Taunus Mountains between Frankfurt-on-Maine and Wiesbaden, was constructed by Mr. Paul Denis, and fully opened to the public in the month of April, 1840, some portion of it being opened in September and November the previous year.

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The building of the railway commenced in the summer of 1838. The line runs through three different territories: 1st, commencing in and running through part of the Frankfurt; 2nd, through part of the Duchy of Nassau; and 3rd, through the Grand Duchy of Hessen Darmstadt, for a short distance going through the fortress at Castel, and lastly entering Nassau again.

The Company received their concession from the Senators of the free town of Frankfurt on the 8th of May, 1838; from the government of Hess Darmstadt, 11th May; and from Nassau, 13th June; but not before 19th October the same year from the Military Commission* to go through the fortress at Castel; and in many parts the grounds could not be taken possession of before the summer of 1839, so that the line has been forwarded very expeditiously.

The railway is 41,858^m long = 26 English miles^b, not taking into account the branch line to Biebrich, which is 1,454^m, making together 43,312^m, or 27 English miles. There are six intermediate stations, viz., Höchst, Hattersheim, Flörsheim, Hocheim, Castel, and Biebrich; the first four and last of these being in the Duchy of Nassau, the station Castel in the Grand Duchy of Hessen Darmstadt.

The line runs nearly parallel to the river Maine, which at once almost vouches for the very few engineering difficulties which were met with. Great praise is, therefore, due to the projectors and engineers for their choosing such easy ground to pass over, the benefits of which the shareholders are now reaping. With the exception of parts of the line which run through the celebrated Hock vineyards, the grounds were bought at a moderate rate.

CAPITAL AND COST OF RAILWAY.

The capital of 3,000,000 fl. = £250,000, was raised by 12,000 shares of 250 fl. each = £20 16s. 8d.

The engineer's estimate was 2,300,000 fl. = £191,666 11s. 4d. But the sum of 3,000,000 florins not being sufficient to furnish or stock the railway, a loan of 300,000 fl. = £25,000, was granted, which raised the capital of the Company in 1840 to the sum of 3,300,000 fl. = £275,000.

* Military Commission of the Confederation.

^b This is the length the locomotives run, or length of rails; the total length, including the stations, is about 41,966^m.

The outlay is as follows:—

	fl.	s.	d.
1st. For surveying, measuring, engineering, &c.	175,295	42	= 14,604 19 6
2nd. „ earth-work, &c.	208,865	55	= 17,405 9 10½
3rd. „ bridges and culverts	186,093	=	11,341 1 8
4th. „ walling	21,041	34	= 1,753 9 3½
5th. „ ballasting for sleepers to rest upon	67,075	50	= 5,589 13 0½
6th. „ stone blocks and oak sleepers	203,060	10	= 16,921 13 7½
7th. „ malleable iron rails	592,090	45	= 49,340 17 11
8th. „ cast-iron chairs	140,191	48	= 11,682 13 0
9th. „ iron nails, oak keys, and douls	24,553	44	= 2,046 2 10½
10th. „ felts for underneath chairs	2,661	55	= 221 16 6½
11th. „ laying rails, chairs, &c.	44,371	40	= 3,697 12 9½
12th. „ 25 switches, crossings, and points	13,006	16	= 1,083 17 2½
13th. „ turnpike and cross roads	16,962	41	= 1,413 11 1¾
14th. „ fencing, warning tables and posts, &c.	35,875	7	= 2,989 16 10½
15th. „ 16 large and 13 small turn tables	42,567	19	= 3,547 5 6½
16th. „ building stations and watch-houses	318,162	8	= 26,513 10 2½
17th. „ boundary stones	1,321	55	= 110 3 2½
18th. „ extra excavations, buildings, and foundations, in going through the fortress at Castel	13,225	3	= 1,102 1 9
19th. „ 6 water reservoirs of cast iron, with pumps and water cranes, &c.	7,935	2	= 661 5 0¾
20th. „ work formerly not taken into consideration	6,675	26	= 556 5 8¾
Total outlay for building railway	2,071,000	00	= 172,583 6 8

TO BE DEDUCTED.

1st. For material not used	34,609	19	} 52,909 46 = 4,409 2 11½
2nd. „ ballast waggons and building materials	18,300	27	
Total cost of building	2,018,090	14	= 168,174 3 8¾

	fl.	χ	£	s.	d.
Brought forward	2,018,090	14	=	168,174	3 8 $\frac{3}{4}$
For lands in Frankfort, Hesse, Darmstadt, and Nassau	633,000	0	=	52,750	0 0
„ 6 locomotives, tenders, and duplicates	174,568	27	=	14,547	7 5
„ 87 carriages, 21 goods and cattle trucks	253,777	53	=	21,148	3 1 $\frac{3}{4}$
„ expenses for administration	56,000	0	=	4,666	13 4
„ workshops, tools, &c.	24,001	23	=	2,000	2 3 $\frac{3}{4}$

Fl. 3,159,437 57 = £263,286 9 11

This is the total cost up to the first general meeting of the shareholders, 12th August, 1840.

At the present time the Company have 12 locomotives and tenders, 99 passenger carriages, and 45 trucks and close luggage vans, 12 of the latter coming into this year's account.

	fl.	χ	£	s.	d.
Cost for 4 close luggage vans	7,114	28	=	592	17 5 $\frac{1}{2}$
„ 8 transport waggons for cattle and merchandize	11,750	56	=	979	4 10 $\frac{3}{4}$

At the last general meeting, which took place 17th April, 1845, according to the report given by the Board of Directors, the capital of the Company was 3,571,499 fl. 45 χ = £297,624 19s. 7d., for the year ending 31st December, 1844.

EARTH-WORKS.

There are no heavy cuttings or embankments of any consequence upon the whole line. The only embankments worth noticing are, one between the river Nied and Höchst, which is about 1,500^m long, and at the highest part about 20 feet. The earth to build this embankment was taken out of a piece of ground by the railway side, bought by the Company for that purpose.

The next, after getting through Hattersheim, of about 1,200^m long and 10 feet high. The earth was partly taken from a short cutting between Hattersheim and the embankment, but by far the greatest portion was taken, as before, from a piece of ground by the railway side.

The part running through the vineyards near Hocheim is built upon a sloping ground, supported by a strong stone wall on the under side; the bank sides and

small cuttings were taken to fill the space and level it. There is also, before entering the vineyards, another small embankment of about 1,900^m long, and 6 to 10 feet high; and upon leaving the vineyards, another small cutting which was used for the above.

The next embankment, between Hocheim and Castel, about 2,000^m long, and about 6 to 10 feet high, was taken partly from the cutting of a hill side, and the other part as before from a piece of land bought for the purpose.

Between Castel and Wiesbaden there is one more cutting, and two embankments, the two latter being together about 2,000^m long, and 10 to 12 feet high; the cutting about 500^m long and 8 to 10 feet deep, the proceeds of which were taken for making the above embankments and the Biebrich branch line, of which about two-thirds is also embankment; the wanting material, as before, was taken from ground near the railway. The ballasting of the whole line was taken in a similar manner, from patches of ground found suitable for that purpose, which, on some sections, cost much leadage.

GAUGE, RAILS, ETC.

The gauge is the narrow one, of 4 feet 8½ inches, and the rails of the double T form, weighing 58 lbs. per yard, of Welsh manufacture, contracted for by the Messrs. Goldschmidts, of Frankfurt and Mainz, iron merchants, &c., and delivered at £16 per ton. The joint chairs weigh 22 and the intermediate 19 lbs. each.

Where embankments are raised, the chairs rest upon oak sleepers 8½ feet long, being trees of 12 to 16 inches diameter, cut through the middle; each sleeper cost 2 fl. or 3s. 4d. sterling; and in cuttings, or where no embankments are, they are laid upon stone blocks, 2 feet square and 12 inches thick, felt being laid between the chair and stone; the cost of each stone is 2 fl. 30 x or 4s. 2d.

Since the commencement the permanent way has cost very little repairs, with the exception of one or two places, which were damaged by heavy rains and floods; but between the two systems of wood and stone the latter has cost considerably less than the former.

The earth-works, bridges, and culverts, are finished from Frankfurt to Castel for double way, but as it is not necessary at present to lay down the second line of rails, the grounds are mostly cultivated, and sown with clover, which, as well as the slopings, yield a pretty little capital.

BRIDGES AND CULVERTS.

There are upon the whole line of railway, including the Biebrich branch, 16 bridges and 113 culverts, which, although they cannot boast of any great beauty, make up for it by their strength and durability.

The three largest bridges contain three, four, and six arches respectively; the first over the river Nied, with three of 10^m span each, and 7^m high; the second with four arches, used as a fieldway, underneath the embankment between the Nied and Höchst, 5^m span, and 5½^m high; the third underneath the same embankment, also used as a fieldway, with six arches of 5^m span and 5½^m high. The others are all smaller, containing from one to three arches, and 4^m to 5^m span.

There are also two large wood bridges, one on entering and one on leaving Castel, thrown over the trenches of the fortress; these are supported upon two stone pillars in the middle, or between walls. The length is 70 feet and breadth 24 feet, there being a double row of rails laid upon them. The reason of these being built of wood is, in case of war breaking out they can be easier demolished or removed than when built of stone.

The station house in Castel is also a wood building, for the same reason.

GRADIENTS AND CURVES.

The curves upon the main line are nine in number, but from the great radius of some of them they might almost be counted a straight line. The nine curves are divided into thirteen, having each a different radius.

To take them by rotation, with gradients, from station to station, they stand as follows:—

1st. From Frankfurt to Höchst 8900.75^m, being a straight line, with four descents and one ascent.

The first descent is 4,060^m long, descending $\frac{1}{13\frac{1}{2}}$; second, 2,800^m long, $\frac{1}{31\frac{1}{2}}$; third, 380^m long, $\frac{1}{17\frac{1}{2}}$; and fourth, 300^m long, $\frac{1}{17\frac{1}{2}}$; then ascending 1,540^m long, $\frac{1}{17\frac{1}{2}}$, which is the greatest inclination on the whole line of railway.

2nd. From Höchst to Hattersheim 5927.35^m, having one curve of 2,300^m long, and 2,648^m radius, with four descents, one ascent, and one plane. The first descent 1,140^m long, $\frac{1}{12\frac{1}{2}}$; second, 720^m long, $\frac{1}{12\frac{1}{2}}$; third, 2,400^m long, $\frac{1}{12\frac{1}{2}}$; and fourth, 200^m long, $\frac{1}{12\frac{1}{2}}$; then ascending 1,300^m long, $\frac{1}{12\frac{1}{2}}$, going into the station upon a plane of 200^m long.

3rd. From Hattersheim to Flörsheim, a direct line 6691.79^m, having three descents and six ascents.

First descent, 409^m long, $\frac{1}{11}$; second, 2,400^m long, $\frac{1}{11}$; third, 600^m long, $\frac{1}{15}$; then ascending 653^m long, $\frac{1}{15}$; second, 515^m long, $\frac{1}{15}$; third, 232^m long, $\frac{1}{15}$; fourth, 400^m long, $\frac{1}{15}$; fifth, 880^m long, $\frac{1}{15}$; and sixth, 1,300^m long $\frac{1}{15}$.

4th. From Flörsheim to Hocheim 6483.71^m, having two curves divided with four different radii, three descents, two planes, and one ascent.

1st part of curve	2,341 ^m long, having a radius of 3,680 ^m
2nd "	" " 1,353 ^m " " 2,140 ^m
3rd "	" " 650 ^m " " 2,027 ^m
4th "	" " 624 ^m " " 5,714 ^m

First descent 2,100^m long, $\frac{1}{15}$; next a plane of 214^m long, and ascending 1,400^m $\frac{1}{15}$; another plane of 978^m long, followed by the second descent of 790^m long, $\frac{1}{15}$; and third 602^m long $\frac{1}{15}$, entering Hocheim upon a gentle curve of 624^m long, and 5,714^m radius, as given above.

5th. From Hocheim to Castel 5073.40^m, having two curves, six descents and one ascent. The line has here two descents upon a straight line before entering the first curve. The first descent is 1,153^m long, $\frac{1}{15}$; second 400^m long $\frac{1}{15}$, entering the first curve of 1,276^m long, and 3,300^m radius; an ascent of 1,276^m long, $\frac{1}{15}$; and third descent 324^m long, $\frac{1}{15}$; fourth, 560^m long, $\frac{1}{15}$; fifth, 509^m long, $\frac{1}{15}$; and sixth, 854^m long, $\frac{1}{15}$, entering into Castel with the latter descent upon a curve of 768^m long, having a radius of 747^m.

6th. From Castel to Wiesbaden 8,481^m, with six curves, one plane, and one ascent. This is the worst part of the whole railway, as it ascends the whole way into Wiesbaden, leaving the station Castel with a curve and ascent. The station has a length of 200^m, being horizontal; the first part of ascent 370^m long, $\frac{1}{15}$; the first curve, 370^m long, 700^m radius, a straight line of 507^m ascending $\frac{1}{15}$, then coming into a curve of 930^m long, with a radius of 2,500^m, this curve being quite horizontal; another straight line of 1,440^m, rising $\frac{1}{15}$, joining the third curve, 1,420^m long, and 2,000^m radius, ascending $\frac{1}{15}$; another straight line of 280^m, rising $\frac{1}{15}$, and three curves joining each other; fourth curve, 1,097^m long, 2,000^m radius; fifth, 840^m long, 1,800^m radius; and sixth, 700^m long and 1,604^m radius, entering the station at Wiesbaden with a straight line of 672^m, rising $\frac{1}{15}$, the station being 200^m long, and quite horizontal.

7th. The Biebrieh branch joins the main line half-way between Castel and Wiesbaden, entering it with a curve on the right hand, with a radius of 100^m, and on the left with one of 189^m. It seldom happens that a locomotive must enter these curves,

the first, perhaps, only for a few yards to bring a luggage train, which is brought by horses; and second, through which a locomotive can pass for a similar purpose, or a special train, but which very seldom happens. The other part of the line is straight, with the exception of entering the station, where is a short curve, the station itself being upon a straight line.

CARRIAGES, FARES, AND TRAFFIC.

There are four classes of carriages; the 1st class or Berlins are in three compartments, each holding six persons, similar to those upon the Grand Junction Railway, and other railways in England, fitted out and upholstered with drab-coloured cloth, the seats and backs being stuffed with horse-hair. These carriages are painted a dark green colour intermixed with black, having the arms of Frankfurt, Mainz, and Wiesbaden painted upon their doors. The frame of carriage and wheels are nicely picked out with black and red stripes.

The weight of carriage, with wheels, &c., complete, is 63 cwt., and cost about 3,500 fl., or = £291 13s. 4d. (See Plate IX.)

2nd class, or diligence, in two compartments, similar to the 1st class carriages upon the Belgian railways, holding in each compartment nine persons; these are fitted out similar to 1st class, with the exception of having no arm-leans, having as well as 1st class, glass windows to shut up and down, and are altogether quite as comfortable, but not quite so select. (See Plate X.)

Each carriage weighs 61½ cwt., and cost complete, with wheels, &c., 2,500 fl., or = £208 6s. 8d.

3rd class, or Char-a-banc, holding forty persons, are divided into three compartments, each having two doors, the two end compartments holding each ten, and the middle twenty persons; the seats are stuffed, and covered with horse-hair cloth; the sides are closed by curtains. The partition between each compartment is carried up to the roof of the carriage, so that they are also a very warm carriage, and similar to the 2nd class carriages upon the Belgian railways. (See Plate XIII.)

The weight of one carriage, as before, is 66 cwt. and cost 2,160 fl. = £180.

4th class are similar to the 3rd, with the exception of having no partition between compartments, merely an open frame-work, and the seats not being stuffed; the sides are also furnished with curtains, to shelter the passengers from the weather. These carriages have mostly breaks of the common kind. (See Plate XIV.)

Each carriage weighs 61 cwt. and cost 1,960 fl. = £163 6s. 8d. The 2nd, 3rd,

and 4th class carriages are all painted alike, a green colour, the 2nd having one coat of varnish more, the sloping parts of frame-work being picked out black and red, the wheels plain green; the number and class of carriages being painted in legible figures and letters upon both sides.

There are as well as the above several mixed carriages, two of which have 1st and 2nd classes very comfortable; they are generally used in winter when the trains are short; they are in three compartments, holding in all twenty-eight persons, viz., the two ends, being 2nd class, hold each ten, and the middle, 1st class, eight persons. These carriages are equal in appearance and equally as comfortable as the 1st class carriages. (See Plate XI.)

The others are for 2nd, 3rd, and 4th classes; these carriages are generally used for the Biebrich branch, running from thence to Wiesbaden, and vice versa, and to Castel, and vice versa; they are similar to the 3rd class, having one end closed in with glass windows and doors for 2nd class passengers, the other end for 3rd class, and the middle for 4th class, the two ends holding each ten and the middle twenty passengers. These carriages are drawn by horses from the main line to Biebrich, they being detached while the train is in movement by a simple piece of machinery. The points being changed after the train has passed on, the carriages run in of themselves, and are brought up with a break at the point required, where horses are awaiting to take them to their destination. (See Plate XII.)

The traffic is a mixed one, but consists mostly of passengers, the trains being intermixed with goods, cattle, and gentlemen's travelling carriages, no horses being carried. The traffic may be best judged of by the returns of the last two years, 1844 and 1845. (See Appendix.)

	Fl.	x	x	
The price of 1st class passenger for 26 miles	2	42	or =	6.2 per mile.
2nd " "	1	48	or =	4.15 "
3rd " "	1	15	or =	2.88 "
4th " "	0	51	or =	1.96 "

Thus the 1st Class = 2.06*d.*, the 2nd 1.38*d.*, the 3rd .96*d.*, and the 4th 6.53*d.* per English mile.

Each passenger is allowed 40 lbs. weight of luggage free, but from 1 to 10 lbs. more for the whole distance 15 χ , or .55 χ per mile, or = 18.5*d.*; from 11 to 20 lbs. 25 χ , or .92 χ per mile, or = .306*d.*; from 21 to 30 lbs. 35 χ , or 1.29 χ per mile, or = .43*d.* For greater quantities the price is somewhat reduced.

The price for transporting a gentleman's travelling carriage for the whole distance is

Fl.	χ		χ	
9	12,	or per mile	20.47,	or = 6.8 pence, for a heavy carriage.
7	0,	,,	15.55,	or = 5.18 ,, for a light ditto.

	Fl.	χ	χ	d.
For an ox per whole distance	1	20,	or 3.07 per mile,	or = 1.02
,, 1 pig ,, ,,	0	36,	1.38 ,, ,,	= .44
,, 1 sheep ,, ,,	0	18,	.69 ,, ,,	= .23
,, 1 calf ,, ,,	0	24,	.92 ,, ,,	= .30
,, 1 dog ,, ,,	0	30,	1.153 ,, ,,	= .384

Goods or merchandize are divided into four classes; the 1st is as follows:—grain, fruit, potatoes, meal, fire-wood, coals, pig iron, old metal, and any raw produce, the price of which is for the whole distance 12 χ per cwt., or .46 χ per mile = .153*d.*; a less quantity than 45 cwt. cannot be taken as 1st Class, or must pay 2nd Class tariff.

2nd Class, colonial, drysalts, wine, spirits, beer, oil, cases of mineral water, &c., cotton, wool, hops, leather, silk, cast iron materials, tin, lead, hemp, flax, stone and glass ware, &c., which for the whole distance costs 13 χ, or .5 χ per mile = .166*d.*

3rd Class, is goods, or packages taken as passengers' luggage, and costs for the whole distance 22 χ, or .842 χ per mile = .280*d.*

4th Class, money, or any articles which are by value declared, costs 3 χ, or 1*d.*, per 100 fl. worth, for the whole distance or any distance, no matter how short.

Merchants or expeditors sending per railway in one year

From	12,000 cwt. to	18,000 cwt. receive	5	per cent. return.
,,	18,001	,, 24,000	,, 7½	,,
,,	24,001	,, 50,000	,, 10	,,
,,	50,001	,, 100,001	,, 15	,,
,,	100,001	,, and upwards	,, 20	,,

TABLE, showing number of Passengers travelled on Railway, from the opening to 31st October, 1845.

	1839	1840	1841	1842	1843	1844	1845	REMARKS.
January			16,564	24,292	30,155	28,409	30,835	
February			26,234	29,373	34,675	33,316	28,701	
March			37,476	47,025	36,572	49,052	28,916	In this month, 1845, on account of the railway and station at Castel being overflowed with water, the traffic was stopped for eight days. The damage sustained was covered by 3,000 fl.
April			59,843	57,744	60,637	60,831	39,818	
May			85,401	83,020	60,275	67,076	64,290	
June			82,606	90,837	70,631	92,882	86,995	
July			111,713	120,366	105,978	101,262	110,909	
August			116,884	111,640	108,990	96,351	107,638	not including the loss of income for that time.
September			100,920	105,009	101,234	93,722	95,025	
October			56,625	67,285	50,236	52,074	55,340	
November			42,615	39,010	41,218	39,350		The winter being long the number of passengers much reduced from November, 1844, to
December			32,670	32,811	36,059	29,333		March, 1845.
Total	61,700	658,564	769,551	809,012	744,060	743,667		

Total income, from opening to 31st December, 1845.

1839	1840	1841	1842	1843	1844	1845
fl. x	fl. x	fl. x	fl. x	fl. x	fl. x	fl. x
18,464 25	351,947 47	416,980 6	453,555 23	436,567 22	435,373 0	437,032 8

Total outlay for working, from opening to 31st December, 1844.

1839	1840	1841	1842	1843	1844	REMARKS.
fl. x	fl. x	fl. x	fl. x	fl. x	fl. x	
23,086 57	140,787 29	220,790 50	236,706 25	213,572 40	235,885 35	Not including new locomotives or carriages.

STATIONS AND HOUSES.



STATION AT WIESBADEN, VIEW FROM THE STREET.

The station houses and passenger sheds are very neat buildings, designed by Mr. Oppermann, architect in Mainz, who has shown a great deal of taste in his design, and judgment in the construction. The fault, if any, belongs to the locality, not to the architect. The passengers, in bad weather, have no covering between the waiting rooms and carriages.

The station house in Frankfurt is a large stone building, being a large pavilion with two wings, and at the end of each wing a small pavilion; the large or middle building contains, 1st, on the ground floor, the booking clerks' offices, where the tickets are given out and money taken; 2nd, in first story, the sitting room for Directors, where their meetings are held, and acting Directors' offices, with office for head cashier and secretary. The attics are used as lumber rooms and store rooms for articles which are left behind. The right wing is used as waiting room for 1st, 2nd and 3rd class passengers, being very tastefully fitted out and decorated, sofas, with horse-hair seatings running round the walls, of mahogany; the windows having beautiful chintz curtains, and the roof or ceiling being tastefully decorated. At the end of this wing is a small pavilion two stories high, the ground story being used as offices and storerooms for luggage and goods transport, the upper story as dwelling for foreman and clerk. The left wing is used as waiting room for 4th class passengers, being as large as the other, but quite plain, the seats being of oak. The pavilion at the end is used for steam-boat offices, &c., on ground floor, and the upper story as a dwelling for the stations overseer. (See Plates III., IV., and V.)

The station houses at Castel and Wiesbaden are very similar to the above, with the exception of the Castel station house being built of wood, and having a covered passage, used only in bad weather, between the waiting rooms and carriages, which was recently erected. Mainz and Castel are joined together by a bridge of boats, as shown in Plates XX. and XXI.

The intermediate station houses, at Höchst, Hattersheim, Flörsheim, and Biebrich, being merely large enough for the clerks to live in the upper stories, the under parts or ground floor being used as waiting room and clerks' office. The station house at Hoheim is considerably smaller, being only a cottage, containing waiting room and office, with a small sleeping room for watchman or police.

The passenger sheds are all splendid buildings, being three in number upon the main line and one at Biebrich, of wood; but from their neat construction and decoration, deceive the eye at once into believing they are made of more solid and substantial materials*. (See Plates VI., VII., and VIII.)

ELECTRIC TELEGRAPH.

The electric telegraph, which is now completed between Castel, Biebrich, and Wiesbaden, is constructed on a very simple and economical plan, the cost being only £11 per mile.

The above-mentioned three stations are included in the line, and each of them is every moment at liberty to forward intelligence to the other two. The despatches are given by a pointer moving on the centre of a dial plate, round which the letters of the alphabet are marked.

Lately a peculiar mechanism has been adopted by the inventor, Mr. William Fardelly, by which the pointers of the several telegraphs are made to move with great speed and ease, so that a small battery of two or three elements is sufficient to move several of these instruments. There is likewise a portable telegraph, to be carried with the trains; this instrument can be applied to any part of the circuit whatever: nevertheless, preparations are being made for this purpose at given distances along the line. The whole is worked by a single conducting wire of copper, $1\frac{1}{2}$ millimetre thick, supported by wooden posts, into the tops of which the wire is fixed by a wooden peg or wedge.

There is also a printing apparatus worked by the same single wire, which may be placed at each station; but as simplicity seems the desirable point for railroads,

* The intermediate stations, Höchst, Hattersheim, and Hoheim, have siding places, Hattersheim being the middle station where the trains meet, they starting at equal times from Castel and Frankfurt.

these apparatuses are better adapted for communication between two end stations alone.

This system, which answers all the purposes of the railway, is in continuation throughout the whole line from Frankfurt to Wiesbaden.

LOCOMOTIVE ENGINES.

Are twelve in number, all six-wheel engines, from the following manufactories:—Nos. 1 to 6, from Messrs. Robert Stephenson and Co.'s, of Newcastle-on-Tyne, having 12 inc. cylinders and 18 inc. stroke, the middle or driving wheels 6 ft. diameter, and bearing wheels 4 ft.; Nos. 7 and 8 from the same establishment, having 13 inc. cylinders and 18 inc. stroke, driving wheels $5\frac{1}{2}$ feet, and bearing ditto 3 ft. 9 inc. diameter; No. 9 from Messrs. Jacobi, Haniel, Hyson, and Co., of the gute Hoffnungs Hütte, near Sterkrath, on the Ruhr; the cylinders are 12 inc. diameter and 18 inc. stroke, driving wheels 6 ft., and bearing ditto 4 feet diameter; Nos. 10 and 11 from Messrs. Sharp, Roberts, and Co., of Manchester, having 14 inc. cylinders and 18 inc. stroke, the driving wheels $5\frac{1}{2}$ ft., and bearing ditto $3\frac{1}{2}$ ft. diameter; No. 12 from the house of Cockerill, in Seraing, with 14 inc. cylinders and 22 inc. stroke, the driving wheels $5\frac{1}{2}$ ft., and bearing ditto 3 ft. 9 inc. diameter. This engine is constructed after Mr. Robert Stephenson's new patent, with long boiler and expansion, giving great satisfaction as regards economy in fuel. The above-mentioned locomotives were furnished between 1839 and 1841. These locomotives were furnished with spark catchers, and extra blast pipes, as the quality of the coke varies so much; the main pipe must be kept small enough to suit the inferior; the diameter of main pipe at its outer end is from $2\frac{3}{8}$ inc. to $2\frac{7}{8}$ inc., the other being 3 inc., most of which are as shown in Plate XVIII.

Accidents upon railways are of very frequent occurrence, arising from various causes, and are attended with various amounts of damage, not unfrequently causing serious losses of life as well as property; it therefore behoves every railway company to offer to the public as much security as possible, which in a great many cases can be done at a very trifling outlay. It very often happens, that could the locomotive and tender be detached from the train when running, very serious accidents would have been avoided.

Upon the Taunus Railway an apparatus is in use, which from its simplicity and efficiency cannot easily be excelled; it is attached to the hinder part of the tender, and is used in case of emergency, as well as being constantly used when at the stations, where it is necessary to uncouple the engine and tender from the train, thereby

saving great trouble, and with less danger to engine-men and firemen, as they can disconnect at any speed or at any time, whether the engine and train is in motion or not.

The apparatus is shown in Figs. 1 and 2, Plate XIX., and consists of a lever, *a*, about 5 to 6 feet long, attached to a weigh-bar, *b*, which rests upon the upper part of tender, and moves in the carriages, *k k*. Upon the end of weigh-bar, *b*, is keyed a short lever, or arm, *c*, which is connected with a double eye and rod to the slightly conical pin, *d*, going through the large double eye, *d*, which is attached to the drag-spring of tender, *r*. The links, *e e*, are to admit of the vibration of drag-spring, which is always more or less stretched when the train is behind the tender; *g* is a guide bolted upon the planking of tender to keep the pin *d* always in a right position; *h* is a standard or catch-plate screwed upon the tank, to hold the lever *a* in its place when the train is coupled to the tender.

When it is found necessary to uncouple, the lever *a* is lifted out of the notch of the plate *h*, and allowed to fall, whereby the pin *d* is raised; the coupling between carriage and tender will immediately fall of itself.

This apparatus is also used upon some carriages which run into a branch line, the carriage being uncoupled at the time the train is running, some time before arriving at the switches or points leading into the branch, whereupon the train passing they are changed, the carriages run in of themselves, and are brought up with a break at the required spot, where horses are awaiting to take them to their destination.

Fig. 3 is a front view of rod and pin, *d*.

Fig. 4 is a front view of catch-plate, *h*.

Fig. 5 is a view of the part of guide, *g*, which is bolted to the planking.

Fig. 6 is a ground plan of ditto.

This system has now stood the test of six years, answering all the purposes for which it was intended, and has very frequently been of the utmost service, more particularly by the bursting of a tube in the boiler, where the flames have been driven from under the fire-bars of fire-box, and through underneath the tender, to such an extent, that had the engine and tender not immediately been detached from train, there was every possibility of setting the first carriage on fire.

The apparatus can be easily adapted to any form of tender or carriage at pleasure, taking care that the links, *e e*, are kept long enough to admit of the vibration of drag-spring.



STATION AT FRANKFURT-ON-MAINE, VIEW FROM THE PROMENADE.

ESTABLISHMENT

Consists of, 1st, a board of Directors, or Verwaltungsrath, chosen by a general meeting of the shareholders, and consists of six members, two being chosen from Frankfurt, two from Mainz, and two from the shareholders of Wiesbaden, their meetings generally being held in Frankfurt. Out of the six members are chosen a chairman and vico-chairman ; a secretary as well always attending to note minutes of meetings.

2nd. Technical administration, consists of a resident Director and Inspector, the Director having full control and management of traffic, &c. ; the Inspector having the inspection of railway, and all buildings, and every thing moveable upon the whole establishment, these two gentlemen always being present at the meeting of the board, every other officer being under their especial order and control.

The establishment in Frankfurt is as follows :—head cashier, or clerk, director's secretary, reviser, stations manager, 1st and 2nd ticket clerks, two merchandize expeditors and two helpers, one stations overseer, with two porters and ten men of different grades.

In Höchst, one ticket clerk, one overseer, and one porter ; in Hattersheim, a stations manager and ticket clerk, one overseer, one porter, two waggon greasers, and four water pumps ; Flörsheim, one ticket clerk, and one porter ; Hoheim, one ticket clerk, and one porter.

In Castel, a stations manager, 1st and 2nd ticket clerk, one merchandize expeditor, one overseer, two porters, and twelve men of different grades.

Biebrich, one stations manager and ticket clerk, one overseer, one porter, and three men of different grades.

Wiesbaden, a stations manager, 1st and 2nd ticket clerks, one merchandize expeditor, one overseer, two porters, and seven men of different grades.

With the trains the following persons are employed:—1st, the Frankfurt train, one commissioner, (Zug commissair,) one head conducteur, and four guards, one packmaster, and two breaksmen; 2nd, Wiesbaden train, one commissioner, one head conducteur, four guards, one packmaster, two breaksmen, and two guards for the Biebrich branch; all the above being under the control of Director.

The way establishment is under the control of inspector, having one head overseer, five under overseers, and seventy-one men, acting as police, switch-changers, and plate-layers.

Locomotive and repairing establishment, also under the control of inspector, consists of locomotive superintendent, one foreman at Frankfurt station, six engine drivers, ten stokers, and five cleaners; and in the workshops one foreman, one clerk, fifty-four workmen, one general storekeeper, and two labourers.

Thus altogether there are 260 persons employed and receiving salaries, besides day labourers for repairing railway, whose wages amounted in 1844 to £820 7s. 8d.

GENERAL OBSERVATIONS.

All reports sent to the board of Directors must go through the hands of the resident* Director or Inspector, and by him laid before the committee when sitting, which takes place twice a month generally. The locomotive superintendent must send in a report once a month, of repairs, accounting for all work done to locomotives, tenders, carriages, &c., as well as all other repairs, accounting for all materials expended. For other departments the month is divided into three periods, when all returns are made, of coles, oil, materials, passengers, goods, and money, &c.

In the summer months there are generally four locomotives in fire every day, there being six through trains from each end, besides extra to Wiesbaden from Castel, two locomotives doing the duty the whole day, the others standing in reserve, and running the extra trips; thus each engine on active duty runs upwards of 156 miles per day, which it does three to four days per week; it is then taken into the

* The resident Director is Mr. A. Beil, of Frankfurt, and the Inspector is Captain Otto Mellar, of the Royal Prussian Engineers, of Mainz.

shed and examined, and remains as many days before again being taken out. In winter there are only four through trains per day, and three locomotives in fire, the one for doing the extra trip and reserve, the others for the regular duty. Each engine driver and fireman have their own engines, and only travel with them, therefore each engine-man rests as many days as his engine, or at least his duty is not so arduous, having only to see that all is in proper order. The general average speed of trains is from 20 to 25 miles per hour; should the engine drivers exceed that, they are liable to be fined by the Company. To this slow speed is to be adduced the very few accidents which have occurred upon this line since the opening.

The trains are in summer generally very heavy, averaging from 16 to 18 carriages and trucks, but on Sundays and holidays from 20 to 30. On some days in summer there are from 12,000 to 13,000 passengers travelling in one day; in winter the trains average from 10 to 12 carriages and trucks. The number of passengers travelled upon the railway in 1844, divided by 365, yields an average of 2037.4 persons per day; and in 1845 gives an average of 2020.8 passengers per day.

Labour is rather cheap, but materials are high; a good blacksmith does not receive more than 2s. 2d. per day, a mechanic 1s. 8d. to 2s. per day, joiners the same, day labourers 1s. to 1s. 2d. per day, all working much longer hours than are generally worked in England.

Brass, copper, iron, and metal, are about 20 to 30 per cent. dearer here than in England; coke costs 33s. 4d. per ton, and is about 20 to 30 per cent. inferior to English.

WORKSHOPS, ETC.

The workshops in Castel being the principal one, all the heavy work is done there, and general repairs. The machinery consists of one large lathe for turning driving and other wheels for locomotives; one 14-inch screw-cutting and turning ditto; one 12-inch self-acting ditto, for turning axles, &c.; one 10-inch ditto common, for turning bolts, nuts, &c., and short work; one ditto for turning carriage and tender wheels turning upon their own bearings; one small planing machine; one small drilling ditto; one screwing ditto, and one grindstone, all of which are driven by a steam-engine of eight horses power. One of Shank's punching machines, and cylinder boring machine, for boring in their places, has also of late been added to the list, being two of the most useful machines in existence, more especially the latter.

In Frankfurt there is only one small hand-lathe, there being only five to six workmen employed there on account of the carriage repairs.



STATION AT CASTEL, OPPOSITE MAINZ, FRONT VIEW

DESCRIPTION OF DRAWINGS.

NUMBERED

- I. and II. Sectional double plate, showing length and gradients, the tints determining each State.
- III. Front elevation of the Frankfurt station house.
- IV. Sectional elevation of ditto.
- V. Ground plan of ditto, bottom flat, and upper story. } Engraved on one Plate.
- VI. End view of passenger sheds.
- VII. Side view of ditto, and sectional elevation } Engraved on one Plate.
- VIII. Section of ditto.
- IX. Elevation, end view, cross section, and plan of 1st class carriages.
- X. Ditto ditto ditto ditto of 2nd „ „
- XI. Ditto ditto ditto ditto of mixed 1st and 2nd classes.
- XII. Ditto ditto ditto ditto for the Biebrich branch line,
showing the break and apparatus for uncoupling the carriage when
in motion.

PLATE.

XIII. Elevation and sectional elevation of 3rd class carriages.

XIV. Elevation, end view, cross section, and plan of 4th class carriages.

XV. Details showing different parts of carriages, answering for all classes, with exception of 1st class.

- Fig. 1. Showing the manner the buffer springs are coupled with buffers, with buffer boxes, drag hook, and cast-iron frames, A A.
- „ 2. Elevation, plan, and end view of malleable iron axle horns, for holding grease boxes, drawn 1 inc. per foot.
- „ 3. Iron eye-bolt for receiving the spring carriers, with bolts and nuts for screwing the horns on to cross sheaths of carriages.
- „ 4. Carriers for bearing springs.
- „ 5. Shows section of middle seats of 3rd class carriages.
- „ 6. Showing section of drag hook and spindle for buffer spring.

XVI. Details of different parts, answering for all carriages, with exception of 1st class.

- Fig. 7. Carriage wheels and axles for all carriages and trucks, with exception of 1st class, there being a little difference in their lengths.
- „ 8. Represents the bearing springs, 3 inc. broad, containing 11 plates, being 4 inc. deep for 2nd class and the mixed 1st and 2nd class carriages, and 13 plates 4½ inc. deep for 3rd and 4th classes, scale 1½ inc. per foot.
- „ 9. Is the front view of the two straps, d, which join the bearing springs and grease boxes together.
- „ 10. A thin plate which comes between the bolt-heads and cross sheaths, on being bolted to the axle-horns.
- „ 11. Stretcher which joins the two axle-horns together, helping to stiffen them.
- „ 12. A small rod or carriage of cast iron, which is screwed upon the roof of all carriages for hand-rail.
- „ 13. A cast iron pillar for supporting the seats in the 3rd and 4th class carriages.

PLATE.

XVII. Details of different parts, answering for 2nd, 3rd and 4th, and mixed carriages.

- Fig. 14. Represents a side view and plan of grease boxes.
 „ 15. Represents a section and end view of ditto.
 „ 16. „ an elevational section of grease boxes.
 „ 17. „ ditto ditto and plan of keep for ditto.
 „ 18. Represents the brass bearings for ditto.
 „ 19 and 20 „ the covers to grease boxes, of sheet iron.
 „ 21. Buffer spring frames, of cast iron.
 „ 22. Buffer drawn half size.
 „ 23. The hinder or back seats of 3rd class carriages.

XVIII. Represents in two figures the spark-catching chimney, with double blast-pipe, as now used.

Fig. 1. Is a section; the inner chimney, *A*, is 11 inc. diameter, being bell-mouthed at the top, and going 8 to 10 inc. deep into the smoke-box at bottom; the outer case, *c c*, is surmounted at the top by a brass or copper crown, *D D*, which has at the outlet at the top an iron tube going 3 to 4 inc. into the interior of crown, the same diameter as small chimney.

The outer case or chimney, *c c*, is fastened to the smoke-box by means of the cast iron ring or base, *E E*; on each side is a hand-hole closed by a door, *h h*, for cleaning away the ashes which are deposited. *F F* are the blast-pipes, which are joined together at the bottom by an elbow pipe of cast brass, in the interior of which is a throttle valve, having a spindle attached to it going through one side of smoke-box, a lever and rod being attached; it is carried up to platform of engine, where it is regulated by engine driver at will.

XIX. Uncoupling apparatus. For description see page 15.

XX. Is the ground plan of bridge of boats crossing the Rhein between Mainz and Castel, showing the timbers and method of joining together. The bridge is 1836 feet long, and is built in Yokes (Jochs) of four boats each, which at certain places can be removed at will. At the Mainz end there is one boat built larger than the others, on account of its having

PLATE.

a platform resting entirely on itself. This boat is always dropped down the stream and pulled to one side when any ships or steamers have to pass through. It is brought up to its place again by means of a winch which stands on board, the cable being fastened to its roller or drum; at this place there is never more than one boat removed, but in the middle where the large rafts (flösze) of timber pass, there are from four to eight taken away, as the case may be. Each boat has an anchor, and secured thereto by a chain cable. The ends or platforms at the ends of bridge resting on the shores, are raised or lowered by powerful screws, to suit the rising or falling of river.

XXI. Details of the preceding.

Fig. 1. Shows a cross section of end or outside boats, and longitudinal section of bridge.

.. 2. Is a cross section of bridge, showing part of the longitudinal section of end or outside boats and cross-timbers.

.. 3. Longitudinal section of bridge, and cross section of middle or intervening boats.

.. 4, 5, and 6. Show cross section of bridge and joinings of timbers, where resting on the intervening or middle boats, and other details.

- | | | |
|-------|---|---|
| XXII. | } | Station at Höchst, view from the Railway. |
| to | | Station at Wiesbaden, view from the Street. |
| XXV. | } | Station at Frankfurt-on-Maine, view from the Promenade. |
| | | Station at Castel opposite Mainz, front view. |

Castel, Jan. 1846.

ROBERT THORMAN.

APPENDIX,

SHOWING INCOME AND OUTLAY PRO 1844, AND INCOME PRO 1845.

INCOME FOR THE YEAR ENDING 31ST DECEMBER, 1844.

	fl.	s.	d.
742,331 passengers	381,793	29	or = 31,816 2 5½
11,840½ cwt. passengers' luggage overweight	18,402	53	or = 1,533 11 5½
60,211 ditto of merchandize	17,174	33	or = 1,431 4 3
1,248 gentlemen's travelling carriages	8,955	1	or = 746 5 0½
4,800 head of cattle	3,433	45	or = 286 2 11
32 ditto of venison)			
2539 dogs)	1,130	13	or = 94 3 8½
13,958 marketings)			
1,336 post passengers			
177⅙ cwt. of post passengers' luggage overweight)	2,119	41	or = 176 12 9½
3,042½ ditto ditto goods)			
For extra or special trains	382	45	or = 31 17 11
Passengers paid on the route for higher classes	84	45	or = 7 1 3
Letting grass, clover, &c.	1,555	55	or = 129 13 2½
Letting premises at stations, &c.	340	0	or = 28 6 8
Total	Fl. 435,373	0	or = £36,281 1 8

The above income divides itself into 12 months as follows:—

	fl.	s.	d.
January	14,535	2	or = 1,211 5 0½
February	17,370	9	or = 1,447 10 3
March	26,912	57	or = 2,242 14 11
April	35,978	17	or = 2,998 3 9½
May	36,117	30	or = 3,009 15 10
June	47,871	6	or = 3,989 5 2
Carried forward	Fl. 178,785	1	or = 14,898 5 0½

	Fl.	s.	d.
Brought forward	178,785	1	or = 14,898 15 0½
July	59,412	33	or = 4,951 0 11
August	62,066	20	or = 5,172 3 10½
September	60,038	42	or = 5,003 4 6
October	32,937	40	or = 2,744 16 1½
November	21,053	20	or = 1,754 8 10½
December	16,596	18	or = 1,383 0 6
Extra or special trains	382	45	or = 31 17 11
Passengers paying higher classes	45	48	or = 7 1 3
Post, for passengers, goods, &c.	2,119	41	or = 176 12 9½
Letting premises, grass, clover, &c.	1,895	55	or = 157 19 10½
Total	Fl. 435,373	00	or = £36,281 1 8

EXPENDITURE FOR THE YEAR ENDING DECEMBER 31st, 1844.

	Fl.	s.	d.
Repairs of locomotives and tenders	10,510	52	or = 875 18 1½
Ditto of carriages	4,500	30	or = 375 0 10
Cokes	45,912	22	or = 3,826 0 7½
Oil, tallow, hemp, &c.	3,002	24	or = 250 4 0
Mechanics' wages	24,425	55	or = 2,035 9 10½
Salaries and premiums	86,412	35	or = 7,201 0 11½
Rents and taxes	10,107	17	or = 842 5 5½
Repairs of station houses	5,386	30	or = 448 17 6
Office expenses	3,957	33	or = 329 15 11
Clothing	3,060	36	or = 255 1 0
Repairs of ballast waggons, &c.	815	21	or = 67 18 11
Wages for repairing railway	9,844	36	or = 820 7 8
Materials for ditto ditto	1,696	3	or = 141 6 9
Divers expenses, including decoration of station at Wiesbaden, to welcome the return of the Duke and his bride, printing, and new electric telegraph between Castel, Biebrich, and Wiesbaden, of about 900 fl.	5,042	25	or = 420 4 0½
Heating and lighting stations, &c.	4,561	0	or = 380 1 8
Repairs of moveables, &c.	928	17	or = 77 7 1½
Interest	14,586	18	or = 1,215 10 6
Fire assurance	722	55	or = 60 4 10½
Seeds and cultivation of slopes, embankments, &c.	412	6	or = 34 6 10
Total expenditure	Fl. 235,885	35	or = £19,657 2 7½

• The net income of traffic is Fl. 431,272 39x or = £35,939 7s. 9d.

	FL.	Ƴ	£	s.	d.
Total income	435,373	0	or =	36,281	1 8
Ditto outlay	235,885	35	or =	19,657	2 7½
Nett profit	Fl. 199,487	25	or =	£16,623	19 0½

Nett profits divided into five different heads, as follows:—

	FL.	Ƴ	£	s.	d.
1st. Dividend on 12,000 shares at 15 fl. each	180,000	0	or =	15,000	0 0
2nd. Tantieme for resident Director	1,500	0	or =	125	0 0
3rd. Given to fund for pensions, widows, &c.	1,500	0	or =	125	0 0
4th. To be laid to capital reserve fund	6,000	0	or =	500	0 0
5th. To locomotive and transport ditto	10,487	25	or =	873	19 0½
Total	Fl. 199,487	25	or =	£16,623	19 0½

	FL.	Ƴ	£	s.	d.
The capital reserve fund pro 1844 amounts to	67,000	0	or =	5,583	6 8
Locomotive and transport ditto	24,809	30	or =	2,067	9 2

INCOME FROM TRAFFIC PRO 1845.

	FL.	Ƴ	£	s.	d.
737,590 passengers	378,675	49	or =	31,556	6 4½
12,187½ cwts. passengers' luggage overweight	19,770	12	or =	1,647	10 4
103,452½ cwts. merchandize	23,371	56	or =	1,947	13 2½
1,339 gentlemen's travelling carriages, &c.	9,808	17	or =	817	7 1½
4,444 head of cattle, &c.	3,277	42	or =	273	2 10
38 ditto venison					
2,314 dogs					
15,589 marketings					
For extra or special trains	770	0	or =	64	3 4
Sundries	134	36	or =	11	4 4
Total income of traffic	Fl. 437,032	8	or =	£36,419	6 10½

The above income divides itself into 12 months, as follows :—

	Fl.	χ	£	s.	d.
January	15,480	45	or =	1,290	1 3
February	15,082	44	or =	1,256	17 10½
March	17,337	55	or =	1,444	16 6½
April	22,856	27	or =	1,904	14 1
May	36,520	8	or =	3,043	6 10½
June	47,756	1	or =	3,979	13 4½
July	67,853	14	or =	5,654	8 8½
August	71,043	41	or =	5,920	6 1½
September	64,017	2	or =	5,334	15 0½
October	34,946	11	or =	2,912	3 7½
November	23,869	32	or =	1,989	2 6½
December	19,363	52	or =	1,613	13 1½
Special trains, &c.	904	36	or =	75	7 8
Total	Fl. 437,032	8	or =	£36,419	6 10½
Total income of traffic pro 1844	431,272	39	or =	35,939	7 9
Increase in traffic in 1845 over 1844	Fl. 5,759	29	or =	£ 479	19 1½

Caste], January, 1846.

ROBERT THORMAN.

TABLE showing the Total Cost of Mileage of Locomotives upon the TAGANUS RAILWAY in 1844, taken from the Superintendent's Books.

No.	Name.	Cost of repairs.				Engines driven, repaired, cleaned, oiled, &c.				Grinding and packing material with fuel.				Total cost.		Distance run in.		Cost per Coal-fired mile.	Remarks.	
		Materials.		Wages.		FL.	X.	FL.	X.	FL.	X.	Kilometres.	English miles.	Kilometres.	English miles.					
		FL.	X.	FL.	X.											Kilometres.	English miles.			
1	Elita	304	82	254	271	350	27	132	17	46	45	1,793	2,982	28	2,593,854	3290.15	32.07	32.57	X	Underwent a thorough repair, receiving new fire and smoke box, &c., and set of new iron tubes, partly accounted for in last year's account.
2	Pfal	1,862	9	1,010	531	694	14	147	24	37	59	2,126	5,868	39	19,364,596	6441.33	33.78	54.06	X	Underwent a thorough repair, receiving a new fire and smoke box, &c., and new brass tubes.
3	Adler	732	85	90	52	1,314	36	359	37	105	58	4,601	7,294	36	19,850,336	12342.66	21.77	35.02	X	Underwent a thorough repair, receiving a new fire-box and brass tubes, part of material used in last year's account.
4	Wienboden	2,149	31	375	47	1,266	7	365	42	85	2	4,724	8,905	41	19,136,948	11856.85	28.12	45.36	X	Underwent a thorough repair, receiving a new fire and smoke box, &c., and new brass tubes.
5	R. Stephenson... ..	2,332	59	1,192	171	429	59	134	20	28	30	1,893	5,492	49	6,493,906	4003.99	51.	81.65	X	Underwent a thorough repair, receiving a new fire and smoke box, &c., and new brass tubes.
6	Gutenberg	348	43	142	211	1,281	27	330	40	113	40	4,453	6,620	51	18,385,584	11531.00	21.37	34.48	X	Underwent a thorough repair, receiving a new fire and smoke box, and set of iron tubes.
7	Frankfurt... ..	3061	...	1,322	401	556	2	123	17	46	28	1,987	7,096	28	8,399,300	5220.24	50.69	81.25	X	Underwent a thorough repair, receiving a new fire and smoke box, and set of iron tubes.
8	Mainz	798	22	354	40	1,037	55	347	10	74	24	4,400	7,012	31	15,641,292	9721.56	26.30	43.28	X	Underwent a thorough repair, receiving a new fire and smoke box, and set of iron tubes.
9	Rhein	154	25	278	45	345	45	150	19	90	37	1,866	3,877	38	5,177,688	3217.83	33.35	53.64	X	Underwent a thorough repair, receiving a new fire and smoke box, and set of iron tubes.
10	Main	354	461	292	1	1,423	17	180	4	117	25	4,549	6,918	33	21,280,076	13281.02	19.28	31.02	X	Underwent a thorough repair, receiving a new fire and smoke box, and set of iron tubes.
11	Tanna	710	411	394	341	1,639	50	296	37	95	10	4,994	6,130	58	24,771,148	15393.37	33.10	32.34	X	Underwent a thorough repair, receiving a new fire and smoke box, and set of iron tubes.
12	Cockertill	175	16	215	47	507	8	133	20	27	55	1,561	2,620	20	7,660,668	4761.26	30.32	33.03	X	This engine was upon trial before being put into service. It was built by the Railway and was a patent invention of and built by Taylor & Co., Warrington.
	Hansa ... ..	...	...	...	...	132	56	...	...	...	...	460	612	56	2,021,256	1256.28	18.19	29.27	X	
	Total	12,984	591	5,925	7	10,917	42	2,690	7	871	38	38,915	72,304	31	164,926,016	102501.54				

NOTE.—The duplicates, which were taken out of store, are accounted for in this Table, the old materials always being deducted, which will account for the difference between this and the Committee's Report. The Coke burnt by the Locomotives when in reserve is not accounted for in this Table.

100

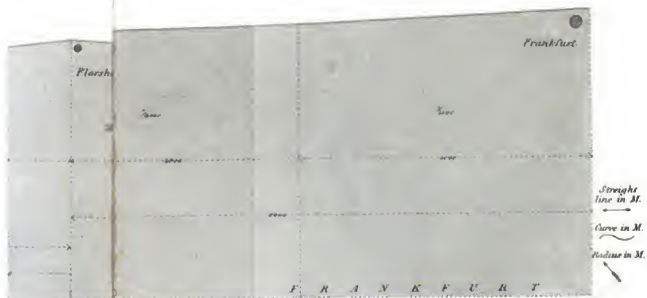
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100

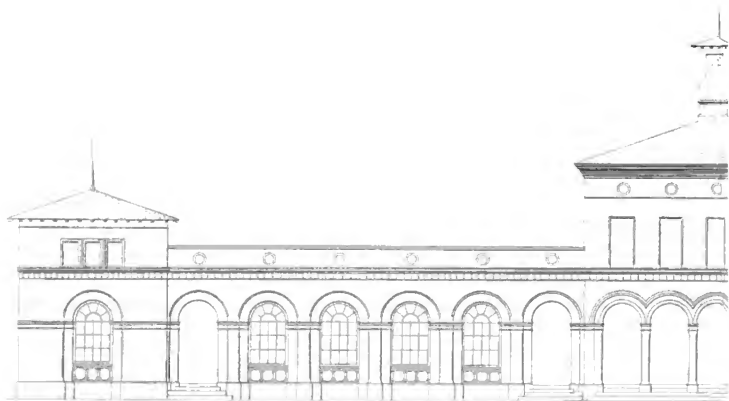
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100

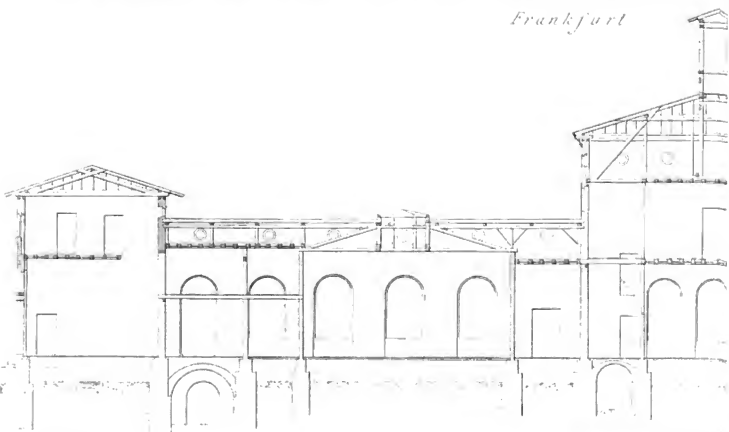
LEVEL

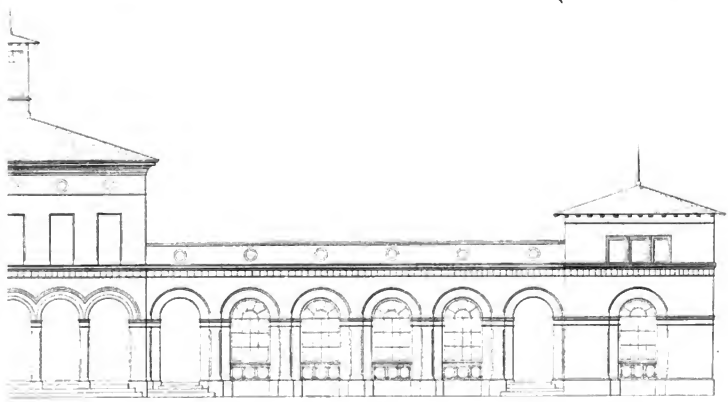


© Water, 2012

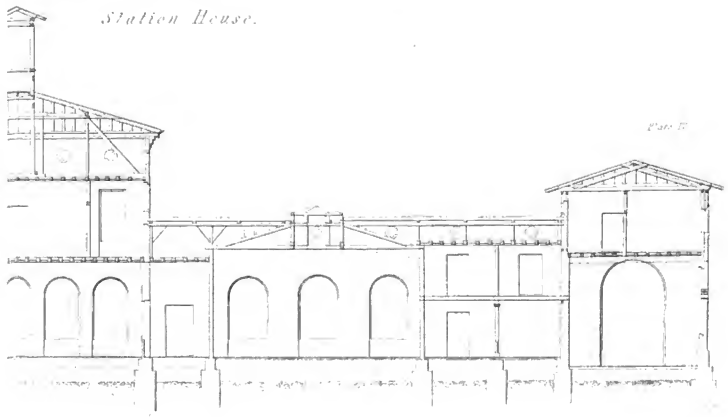


Frankfurt





Station House.



Ground Plan of bottom Flat



Plan of First Story

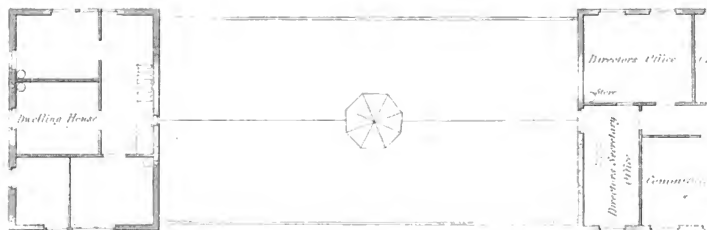


Fig. 1 of Station House in Frankfurt.

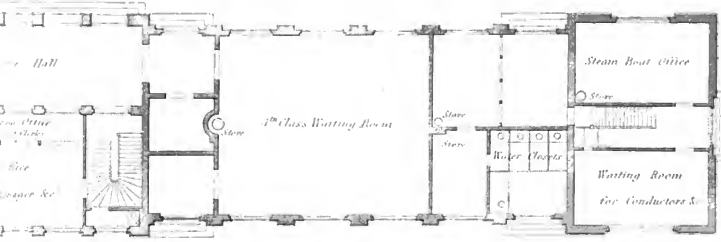
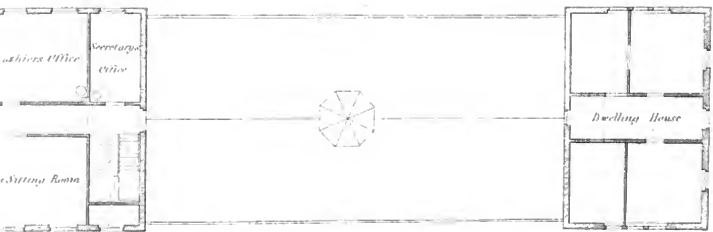
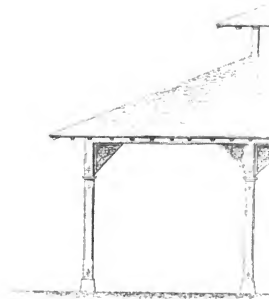
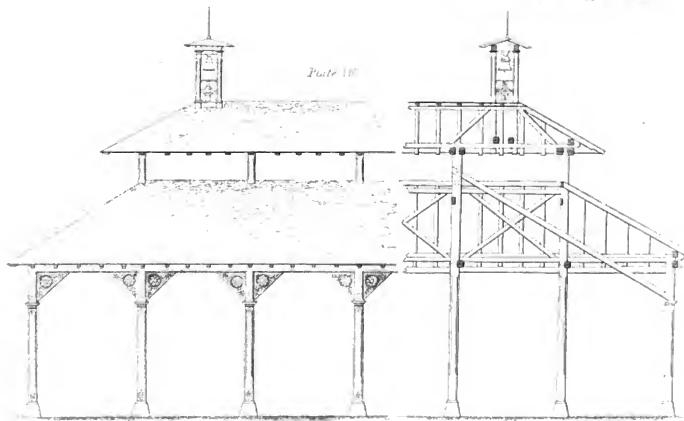


Fig. 2 of Station House

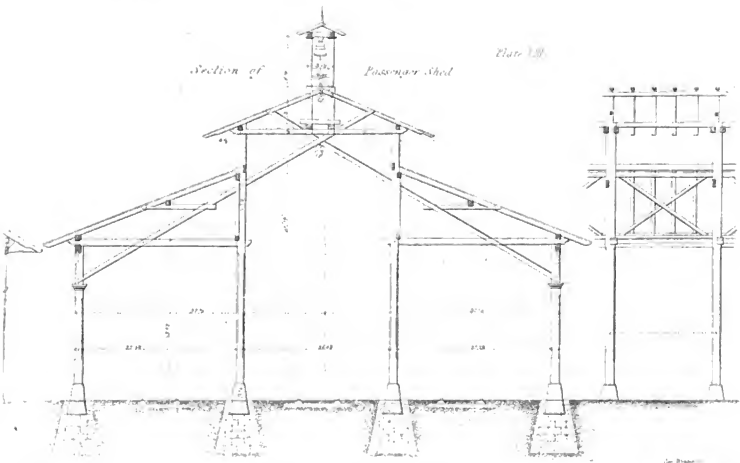
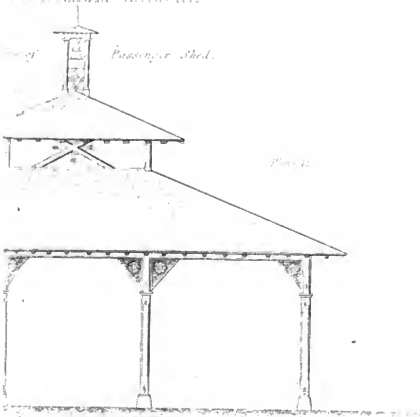


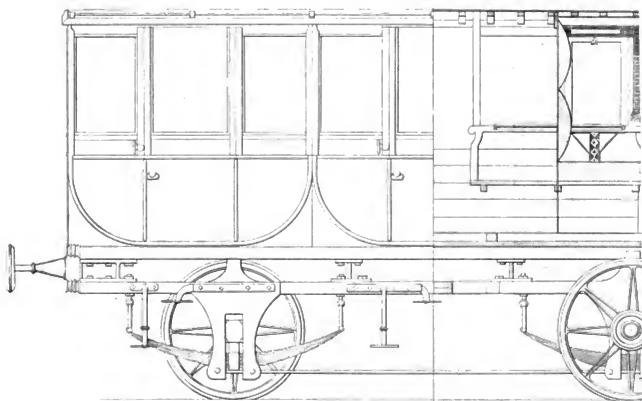


Plan 1/10

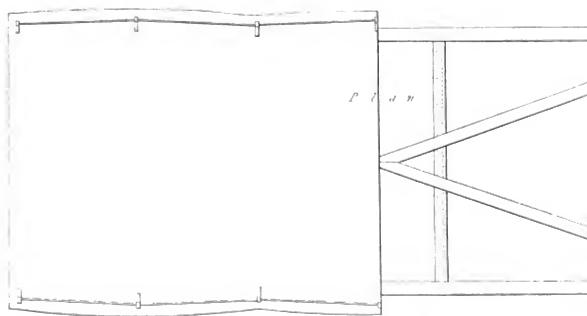


WYCOMBE RAILWAY.

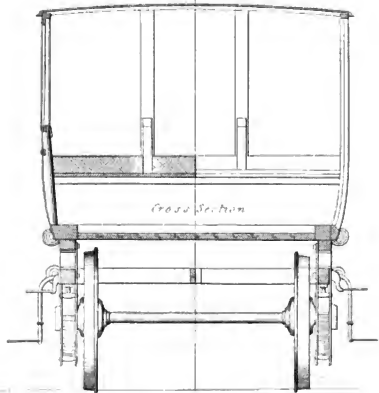
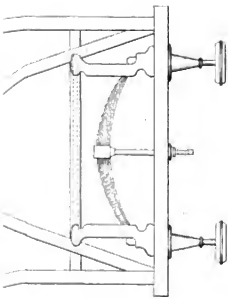
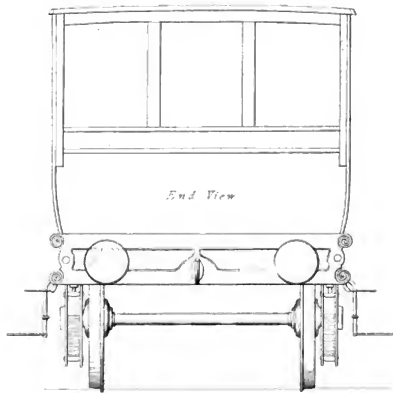
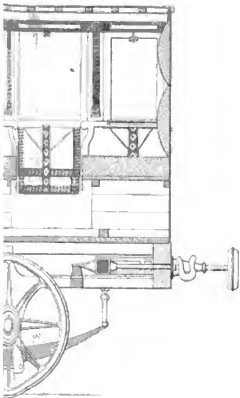




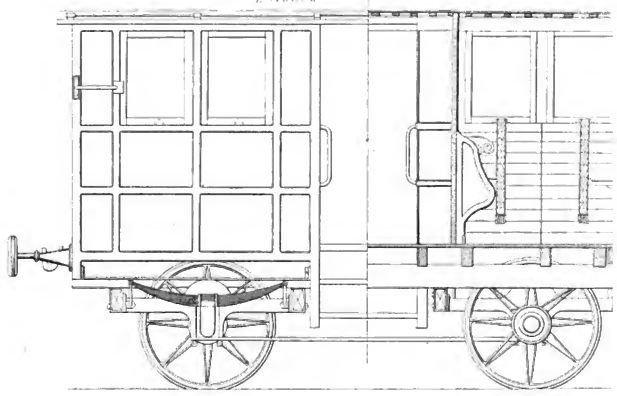
Elevation



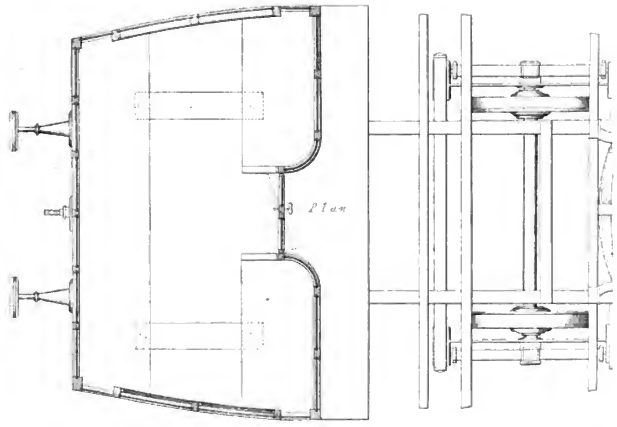
Plan



Elevation



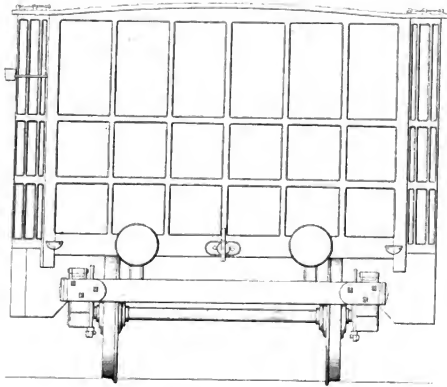
Plan



A. 17, 18, 19, 20, 21

STENBADEN RAILWAY.
is Carriages.

End View



Cross Section

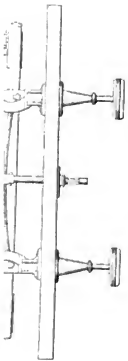
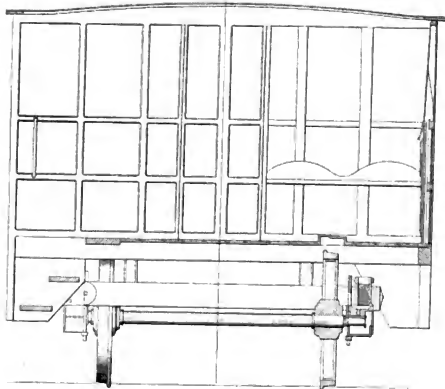


Fig. 1

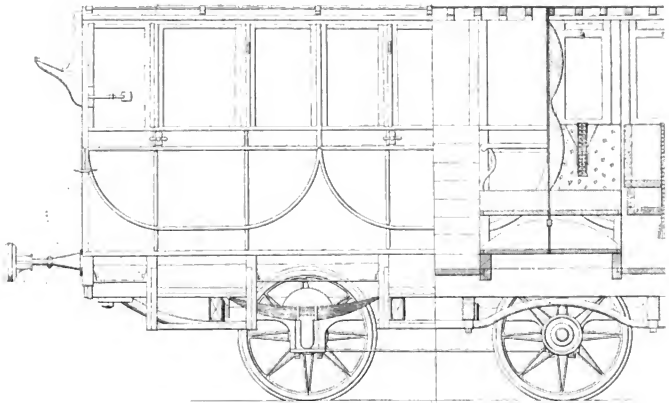
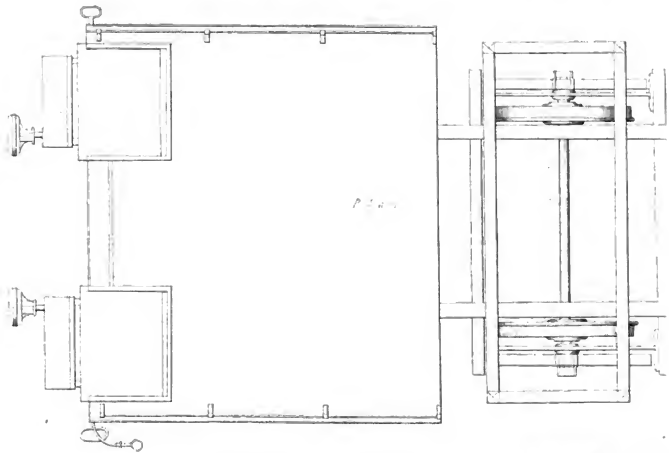
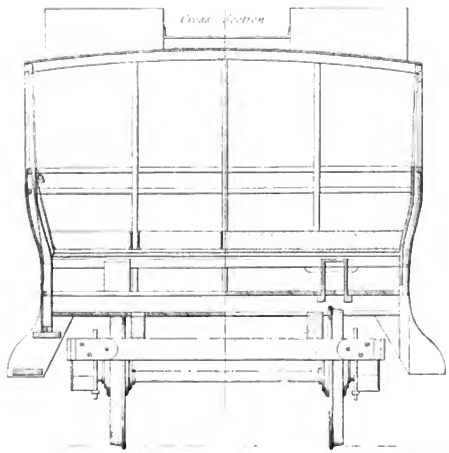
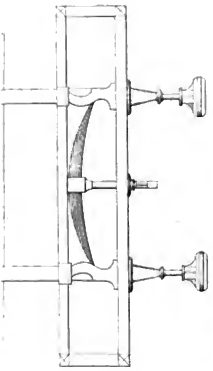
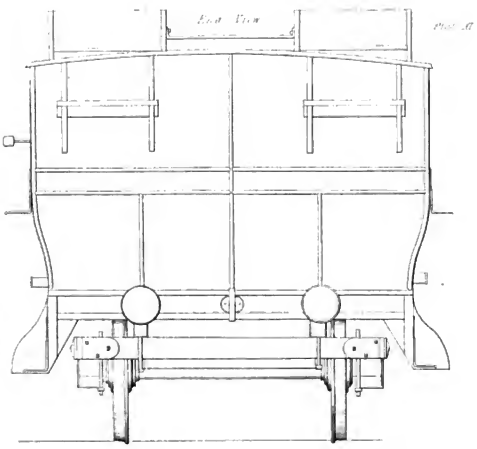
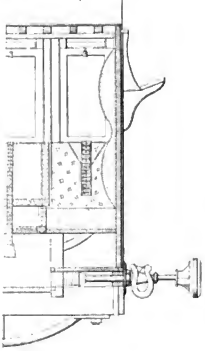
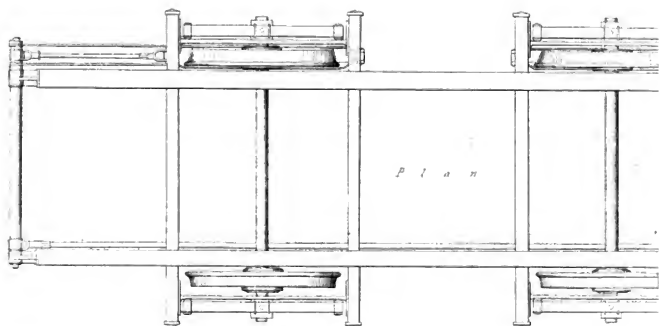
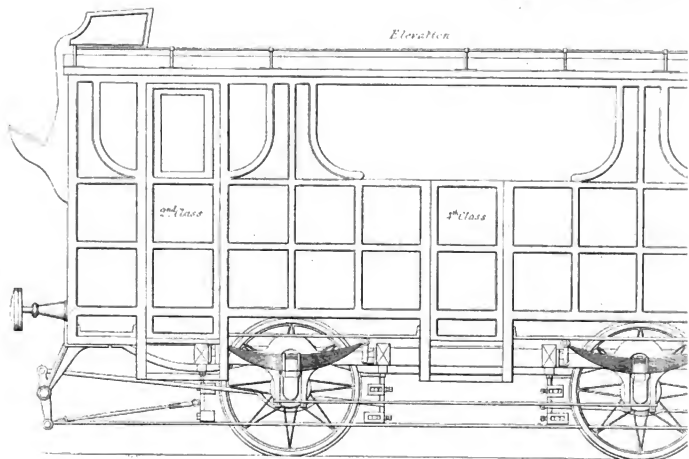


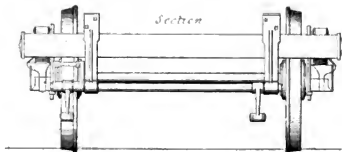
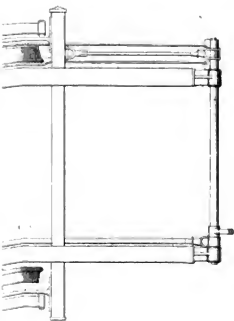
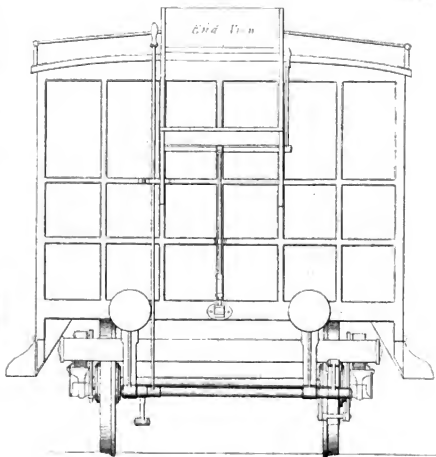
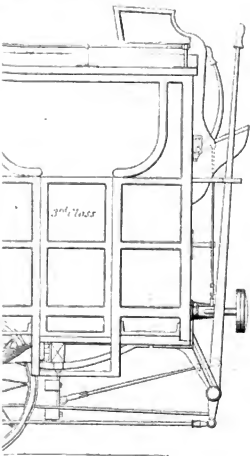
Fig. 2



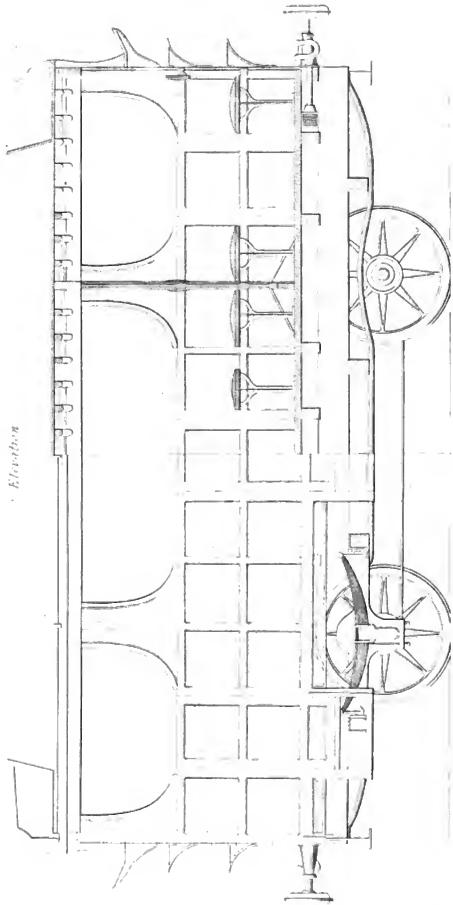
TESBADEN RAILWAY.
Loks Constructie.





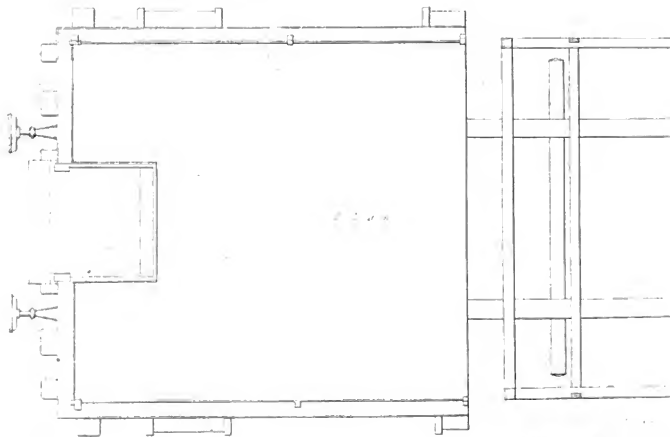
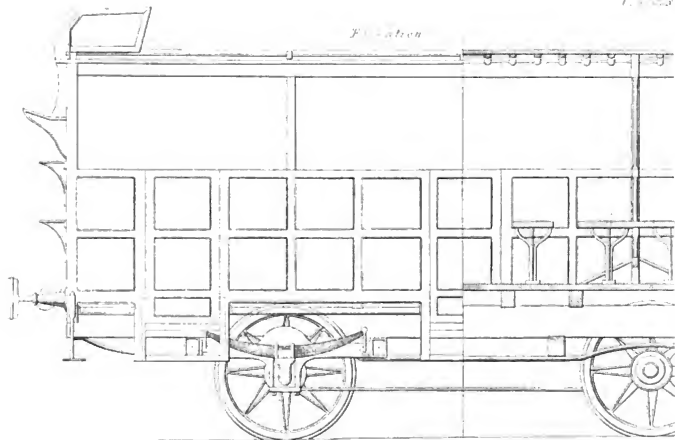


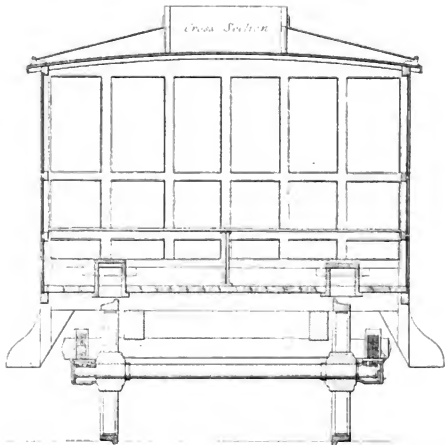
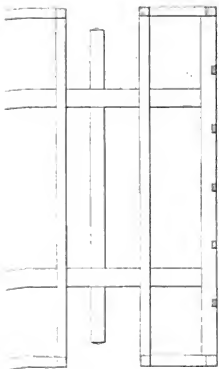
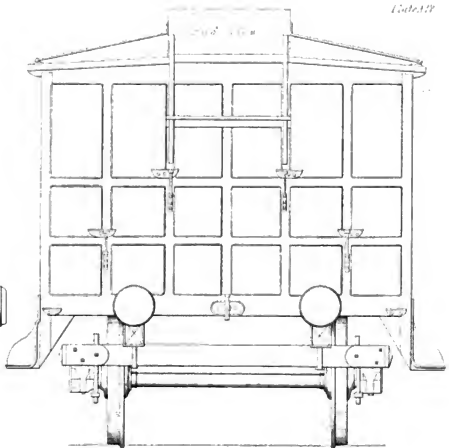
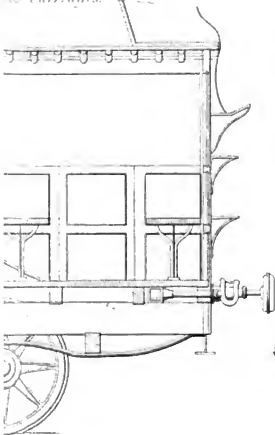
BRADFORD & WESTBURY RAILWAY.
F¹ Class Carriage

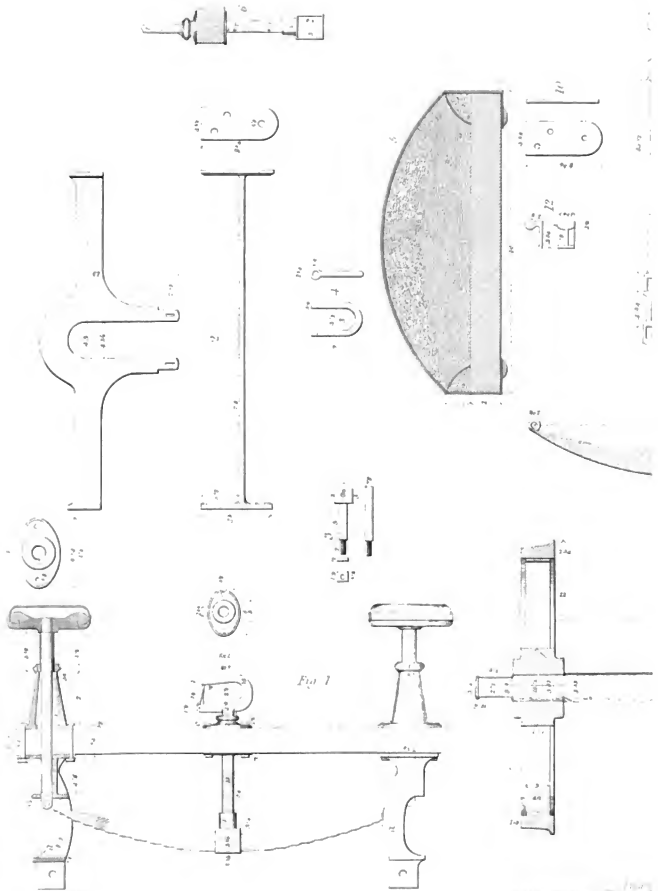


· Elevation

F. 1/2







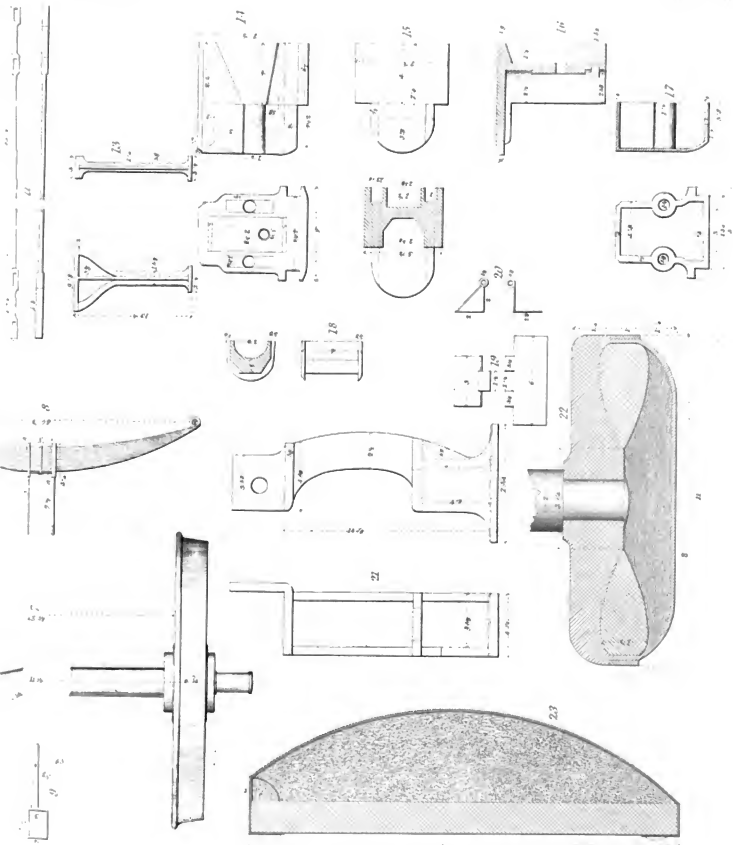


Fig. 1



Fig. 2.



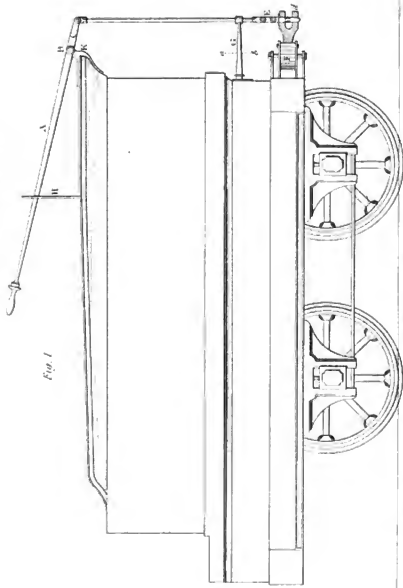


Fig. 1



Fig. 3



Fig. 4



Fig. 5



Fig. 6

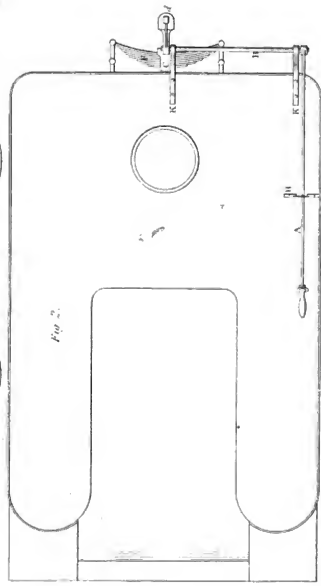
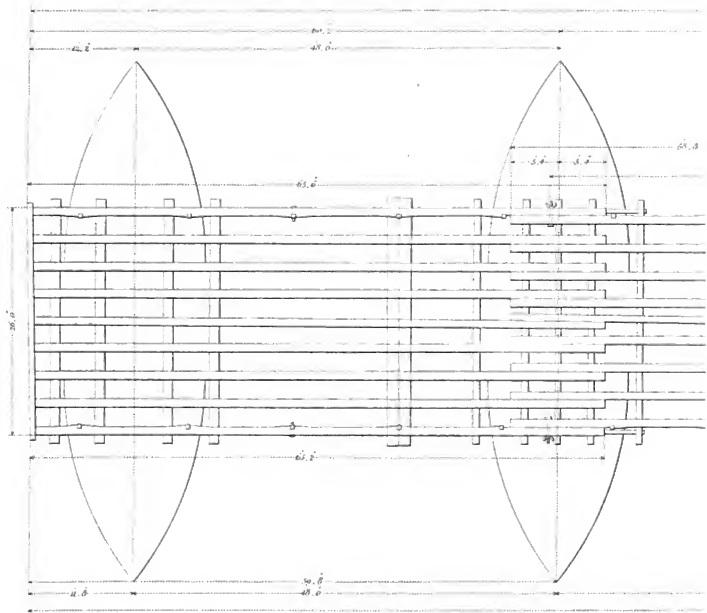


Fig. 2

Detaching Apparatus,
 TILLY'S PATENT,
 by Bob. Thomson
 ENGINEER

Scale is 1/4 in. to 1 Foot

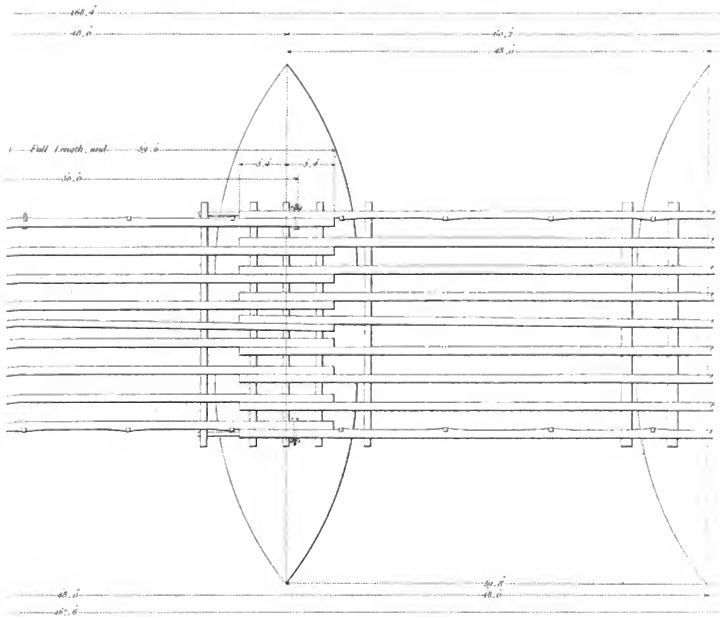
BRIEF
ACROSS THE RHINE
The Frankfurt Sta



OF ROADS.

AT MAYENCE AND CASTEL.

ways terminate adjacently



Take Notice, that this Bridge is built with a sweep across the River, which accounts for the two dimensions

BRIDGE
ACROSS THE RHINE
The Franklin

D 1

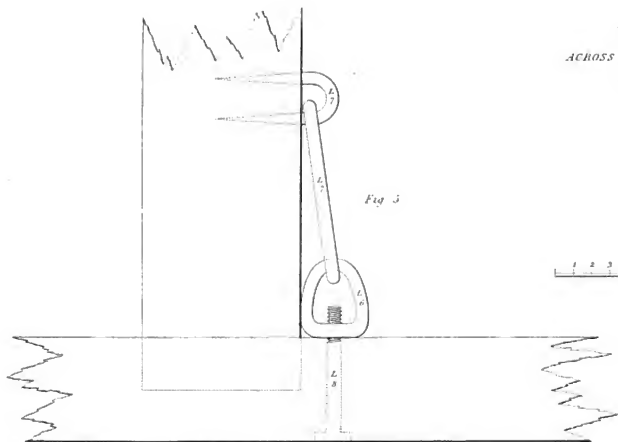
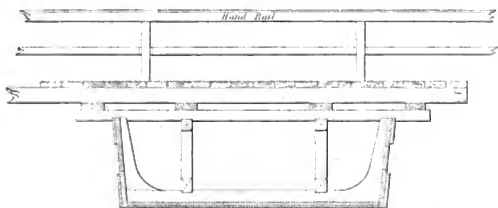


Fig. 3

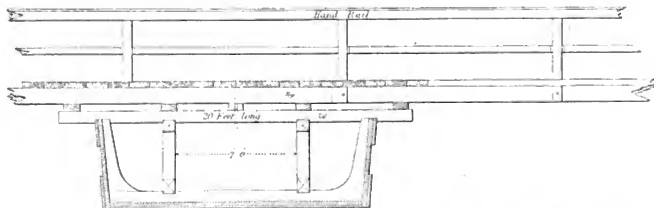


Fig. 1



Section

Fig. 3



OF BOATS.

AT MAYENCE AND CASTEL.

the Railway termini adjacently,

DETAILS



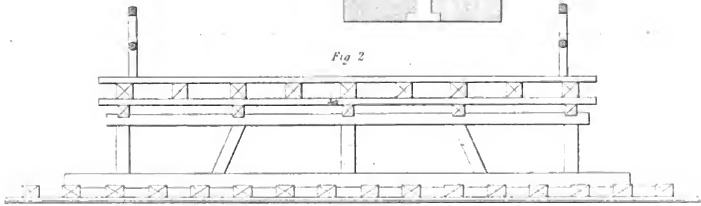
Fig 7



Fig 6



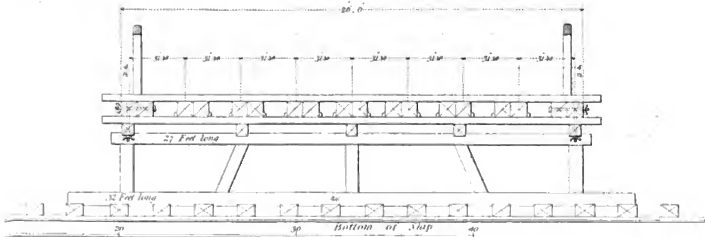
Fig 2



Bottom of Ship or Boat

of the Middle or Inside Ships

Fig 4



Bottom of Ship

London 5th High Holborn 1846

BOUND

NOV 12 1954

UNIV. OF MICH.
LIBRARY



