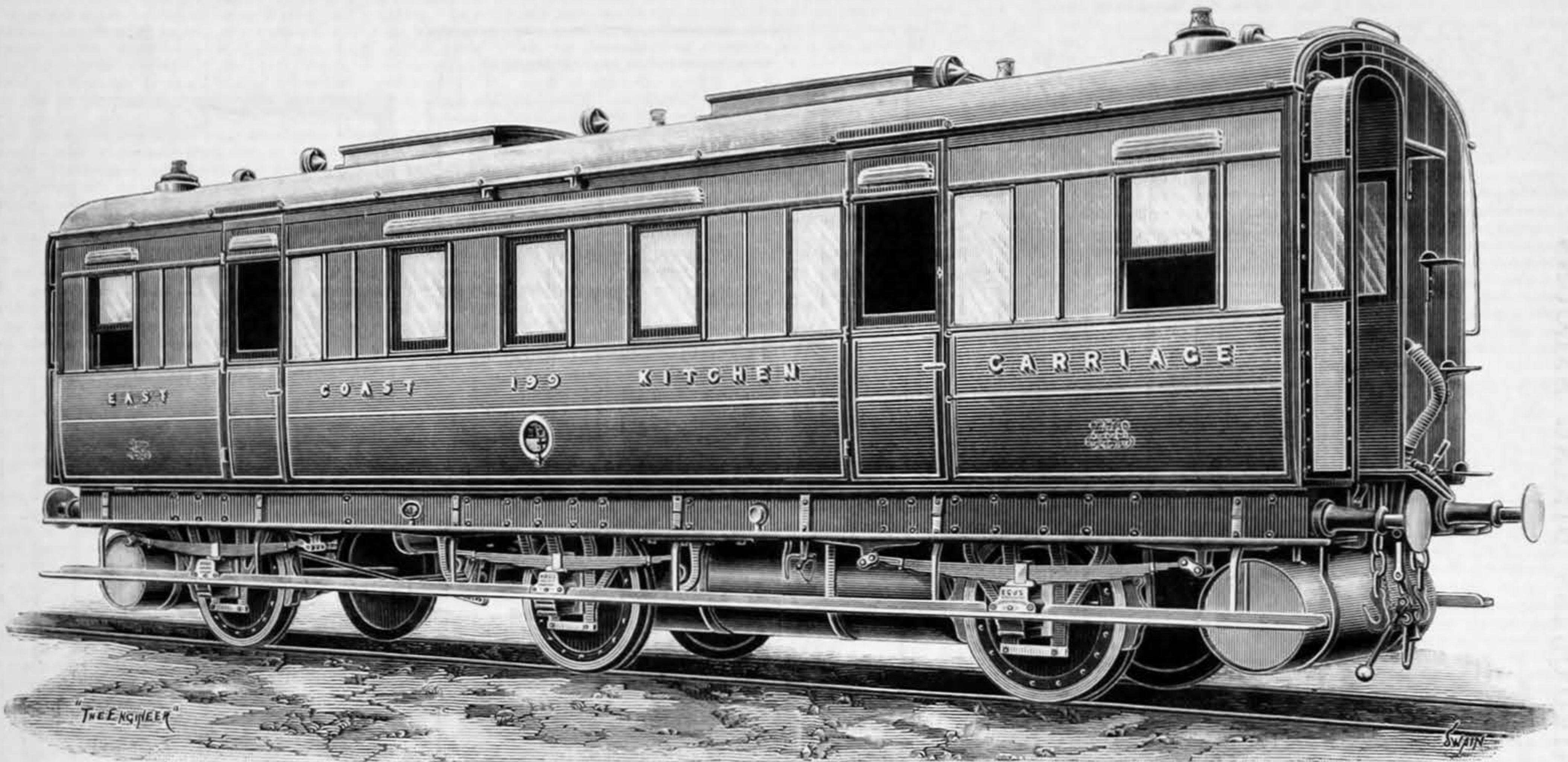


THE EAST COAST DINING AND CORRIDOR TRAINS—THE KITCHEN CARS

THE BIRMINGHAM RAILWAY CARRIAGE AND WAGON COMPANY, CONSTRUCTORS



THE NEW EAST COAST DINING CAR TRAINS.

WITH this impression we publish illustrations of the four new dining car trains just completed for the London and Edinburgh service by the East Coast route. Each train will consist of the following vehicles:—(1) Guard's van, (2) first-class corridor carriage, (3) first-class dining saloon, (4) kitchen carriage, (5) third-class dining saloon, (6) two third-class corridor carriages, and (7) brake van. The whole of the carriages, with the exception of the brake vans, will be connected by covered gangways, so that there will be communication throughout the train, the kitchen car forming the division between the first and third-class passengers.

Two trains will be regularly used for this service, and will run at the times shown in the accompanying table, the other two trains being kept as duplicate or spare stock.

The following is the outside length of bodies of the several vehicles making the train:—

Guards' van	29ft.
First-class corridor carriage	37ft. 6in.
dining saloon	46ft.
Kitchen carriage	34ft.
Third-class dining saloon	46ft.
Two third-class corridor carriages	{ 37ft. 6in.
Brake van	29ft.

Total 296ft. 6in.

as the aggregate length of the carriages, not including the buffers.

The principal dimensions of the third-class dining saloon are:—

Length of body, outside	46ft.
Width	8ft. 6in.
Height inside at middle	7ft. 6in.
Height of doorway in the clear	6ft. 4in.
Width	2ft. 0 1/2 in.
Length of third-class saloons	{ 26ft. 8in.
" vestibules	{ 13ft. 4in.
Centre to centre of bogies	30ft. 6in.
Wheel base of bogies	8ft.
Length of bearing springs	4ft.
Diameter of wheels	3ft. 6in.
Size of journals	5in. x 4in.
Centre to centre of journals	6ft. 5in.

The whole of the underframes of the third-class dining saloons are made of teak and of heavy scantlings, the headstocks being 12in. x 4in., the cross-bearers 10in. x 9in. over the bogies, and 10in. x 4in. in the other parts, the sole bars being 9in. x 3 1/2 in., with steel angles 9in. x 4in. x 1/2 in. The body is divided into four compartments, the whole of the framing and outside panels being of teak. The communication between the carriages consists of galvanised sheet iron gangways, panelled and fitted with glass windows, india-rubber bellows, movable fall-plate, arranged as shown, and fixed on the ends of saloon. The doors in the carriage entrance to the gangway are of teak, panelled, and hung with three brass hinges, and fitted with special handles and catches.

Each carriage is fitted with both the Westinghouse and the vacuum brake, and the heating arrangements are similar to those used by the Midland, with fittings obtained from Messrs. Gresham and Craven, and the pipes between the seats are covered with bright-topped perforated brass castings. The carriages will be lighted with oil gas. The wheels are made with teak centres, Kitson's boss, and Mansell's retaining rings, and the steel tires forced on the teak centres with a total pressure of not less than 200 tons, the wheels being forced on the steel axles with a pressure of not less than sixty tons. The whole have been made from the designs and specifications prepared under the supervision of the locomotive superintendent, Mr. Wilson Worsdell. We shall publish further illustration of this train in our next impression.

The third-class dining and corridor carriages have been made by the Oldbury Railway Carriage and Wagon Company, the kitchen carriages by the Birmingham Railway Carriage and Wagon Company, the first-class dining saloon by the Lancaster Carriage and Wagon Company, and the brake vans by Messrs. Craven Brothers.

It is intended to serve dinner in the down train on leaving York, and in the up train on leaving Darlington. The charge for dinner in the first-class dining car will be 8s. 6d. The dinner menu is similar to that provided in the Great Northern dining car now running between London and

Leeds, consisting of soup, fish, entrée, joint and vegetable, sweets, and cheese. In the third-class dining car a half-crown dinner will be served, as well as the full 3s. 6d. dinner. Luncheons will be served between King's Cross and Doncaster in the down train, and between Edinburgh and Newcastle in the up train, at 2s. per passenger, and passengers will be able to obtain at any time a pot of tea or coffee and bread and butter, at a charge of 6d. Each of the dining cars will accommodate twenty-four persons at one time. The existence of the gangway connecting the dining saloon with the other carriages will make it possible for persons who do not desire to have the table d'hôte dinner to be served à la carte, at any time during the journey. The provision of the dinners will be carried out under the superintendence of Mrs. Meyer, the caterer at King's Cross Hotel and refreshment rooms. The following statements show the running speed between the stations at which the train will stop, and the connections in Scotland north of Edinburgh. These connections are made by means of trains put on for the summer service commencing 1st July.

New Dining Trains.—Time Table and Running Speeds.

Place.	P.M.	Running time		Distance.	Speed.
		H.	M.		
Kings' Cross .. dep.	2.30	2	2	105	51.6
Grantham arr.	4.32				
York dep.	4.37	1	35	83	50.8
York arr.	6.15				
Thirsk dep.	6.25	0	28	22	47.1
Thirsk arr.	6.53				
Darlington .. dep.	6.55	0	28	22	47.1
Darlington .. arr.	7.23				
Newcastle .. dep.	7.27	0	45	37	49.3
Newcastle .. arr.	8.12				
Berwick dep.	8.17	1	17	67	52.2
Berwick arr.	9.34				
Edinburgh .. dep.	9.39	1	16	57	45.0
Edinburgh .. arr.	10.55				
	8.25	7	54	393	49.7

Ur.

Place.	P.M.	Running time		Distance.	Speed.
		H.	M.		
Edinburgh .. dep.	2.30	1	15	57	45.6
Berwick arr.	3.45				
Berwick dep.	3.50				
Newcastle .. arr.	5.10	1	20	67	50.2
Newcastle .. dep.	5.15				
Darlington .. arr.	5.59	0	44	37	50.4
Darlington .. dep.	6.1				
Thirsk arr.	6.30	0	29	22	45.5
Thirsk dep.	6.33				
York arr.	7.0	0	27	22	48.8
York dep.	7.10				
Doncaster .. arr.	7.49	0	39	32	49.2
Doncaster .. dep.	7.52	0	43	36	50.2
Newark arr.	8.38	0	20	15	45.0
Newark dep.	9.1				
Peterborough .. arr.	9.33	0	32	29	54.3
Peterborough .. dep.	9.37				
King's Cross .. arr.	11.10	1	33	76	49.0
	8.40	8	2	393	48.9

* Three minutes reckoned for stoppage at Newark and Grantham.

The following shows the Scotch connections arranged for these trains:—

	Up.*	Down.†
Aberdeen .. depart	10.20 a.m.	arrive 3.5 a.m.
Peterhead	7.15
Aberfeldy	9.50
Dunkeld	10.45 ..	arrive 4.17 a.m.
Elgin	6.15 5.50 ..
Inverness	6.0 6.10 ..
Perth	12.30 p.m.	.. 12.7 ..
Callander	11.15 a.m.	..
Oban	8.20

* Connect with 2.30 p.m. up express from Edinburgh.
† 2.30 p.m. down express makes connection at Edinburgh so as to reach towns named at times given.

SOLDERING ALUMINIUM.

THE essential conditions for the successful soldering of aluminium are gradually becoming better understood, and as a practical result the manufacture of articles of aluminium,

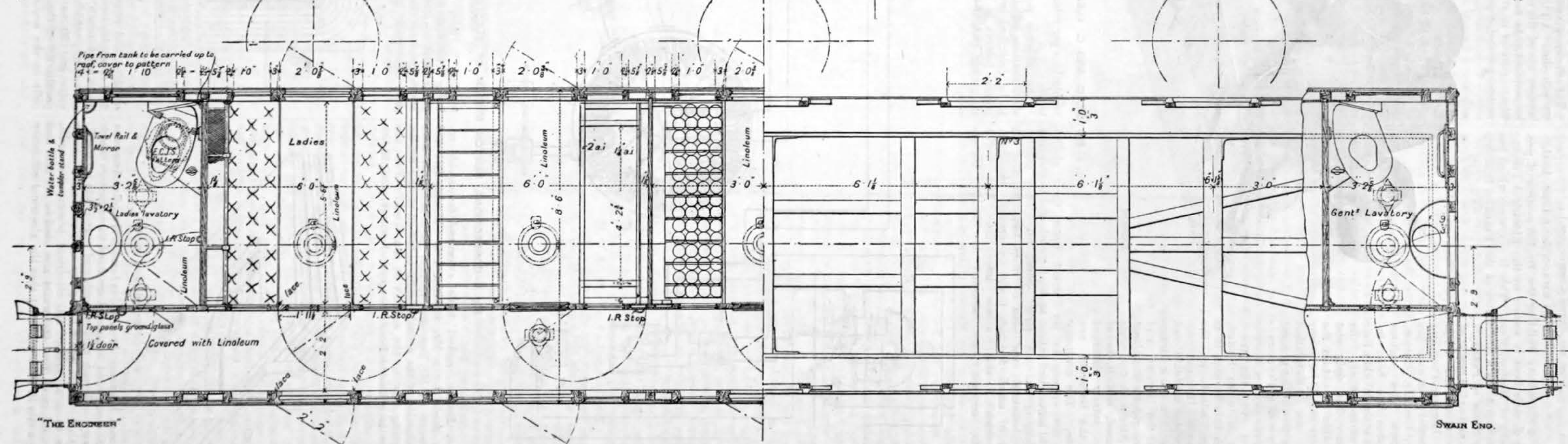
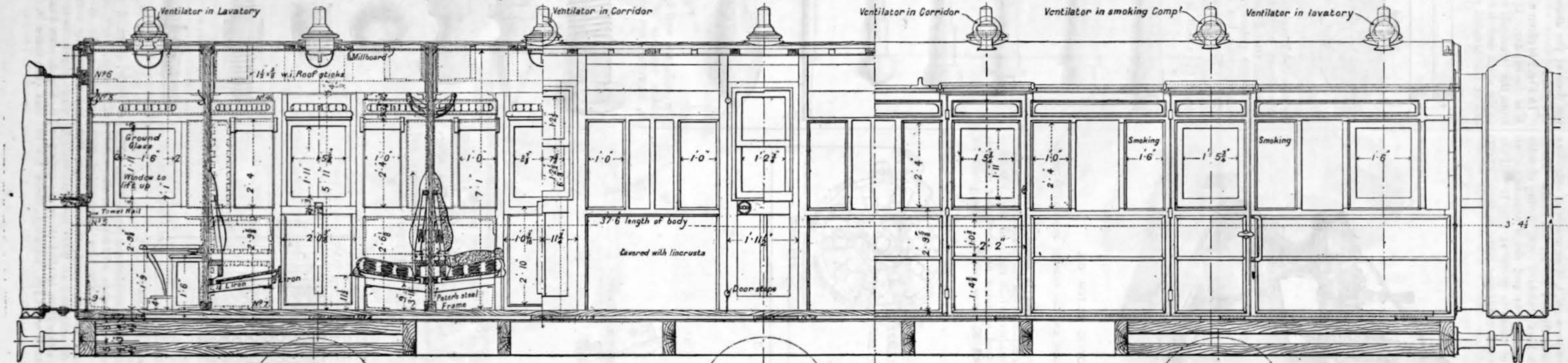
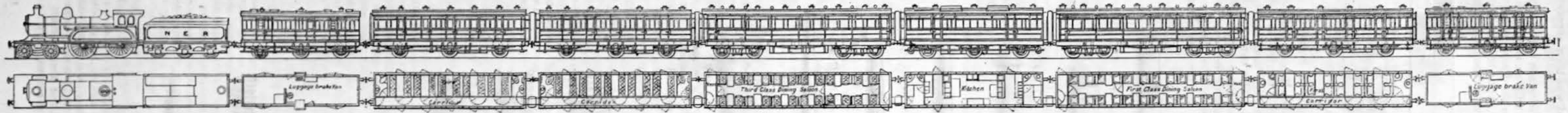
involving the use of soldered joints, is beginning to occupy the position of an ordinary technical process instead of that of a mechanical *tour de force*. It will be remembered that in previously commenting on existing methods, we pointed out that the attempt to discover a special flux for aluminium appeared to be based on an erroneous assumption to the effect that clean aluminium without a flux could not be soldered, and that most recent processes depended on the recognition of the possibility of dispensing with a flux, and had been, in consequence, more nearly successful than their forerunners. Another new method of soldering has lately been made public, in which the use of a flux has been discarded with what appear to be good results. The process has been patented by Mr. Heaton, of Birmingham, and consists in the use of an alloy of tin and aluminium in the proportion of 45 parts by weight of tin to 11 of aluminium. The two metals are melted in separate pots, and are mixed without the use of any flux, and can be cast into ingots and rolled into bars or strips in the ordinary way. The solder is not used with a bit, but with the blow-pipe, the edges of the sheets to be joined being placed nearly horizontal, and heated by a blow-pipe flame, the solder, previously cut into small pieces, being picked up by applying the heated end of a brass wire to the fragments, and then brought in contact with the joint to be made, and there fused by the blow-pipe flame and drawn along the edges of the joint by the brass wire, fresh solder being picked up and applied in successive portions by the aid of the brass wire. We have seen articles soldered by this process, and the joints appear sound and fairly neat. A drinking cup of the ordinary shape—the frustrum of a cone—with a longitudinal seam and with a flat bottom soldered in, served as a fair sample of the work that could be done. That it consisted of aluminium there is little room to doubt, as although plated with silver, its specific gravity, as determined by actual experiment, was 2.76, only slightly in excess of that of pure aluminium. It is scarcely likely that aluminium will ever be as easily soldered as copper or tin-plate, and it is improbable that an ordinary bit can provide enough heat to raise the temperature of the joint sufficiently having regard to the rapidity with which its molecular motion is absorbed and dissipated by the aluminium; but there is no reason why successful soldering should not be accomplished with a source of intense local heat, e.g., a blow-pipe, as in the method quoted above. If the soldered joints are of fair strength, any built-up structure, such as a cycle-frame, could be turned out, and the necessity for ingenious but clumsy systems of bolting and screwing members together done away with.

RAILWAY COMPANIES AND THE QUESTION OF PRIVATE WAGONS.—For many years past the various railway companies in Great Britain have experienced some considerable difficulty with colliery owners and wagon builders in relation to the disposition of worn-out railway wagons. For the guidance of private wagon owners they have, after several consultations, drawn up a specification which does not apparently meet the wishes of traders. The intervention of the Board of Trade has therefore been solicited, but the decision of the President is in favour of the railway companies. The matter was brought forward by Mr. Powell-Williams, M.P. for South Birmingham, and chairman of the Midland Railway Carriage and Wagon Company, Birmingham, in his place in the House of Commons, who asked the President of the Board of Trade whether he was aware that, whilst railway companies were insisting upon compliance on the part of private owners of railway wagons with certain costly regulations affecting the construction and repair of such wagons, they have themselves large numbers of wagons in regular use which do not conform to those regulations; and whether he would take steps by remonstrance with the railway companies or otherwise to put an end to such treatment of private owners in this respect for the future. Mr. Mundella, in reply, said he was not aware that railway companies were taking the action suggested by the hon. member which would appear to be contrary to the terms of Section 118 of the Railway Clauses Act, 1845. The secretary of the Railway Companies' Association had written that "the companies do not desire to put the private wagon owners to undue or unnecessary expense, but they are satisfied that when old wagons not up to the requirements of the specification are so far worn as to require substantial replacement, they should be abandoned and wagons equal to modern requirements be provided. So far as the companies' own stock is concerned that practice is undoubtedly followed." The House would understand that in the interests of public safety all wagons used on railways should be of proper construction and equipment.

THE NEW EAST COAST DINING AND CORRIDOR TRAINS—COMPLETE TRAIN AND THIRD-CLASS CORRIDOR CARRIAGE

THE OLDBURY CARRIAGE AND WAGON COMPANY, BIRMINGHAM, BUILDERS

(For description see page 43)

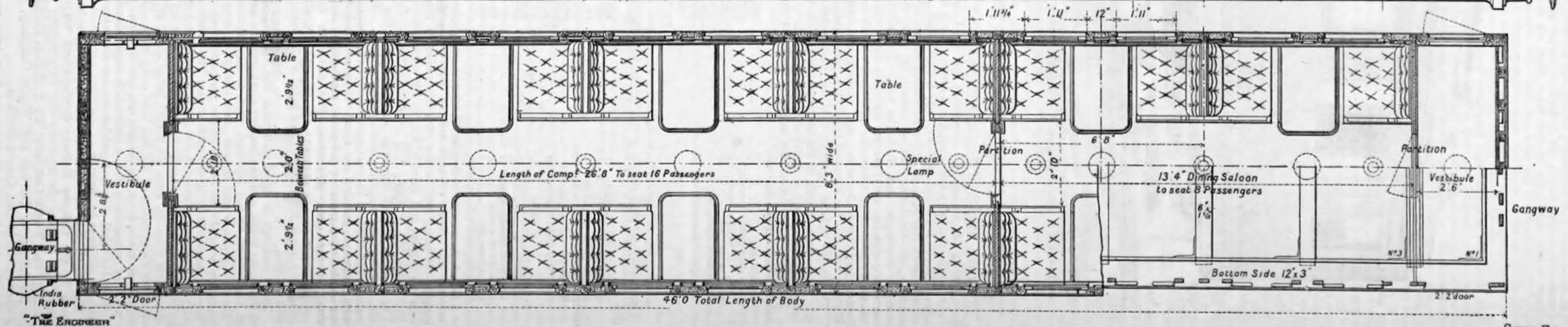
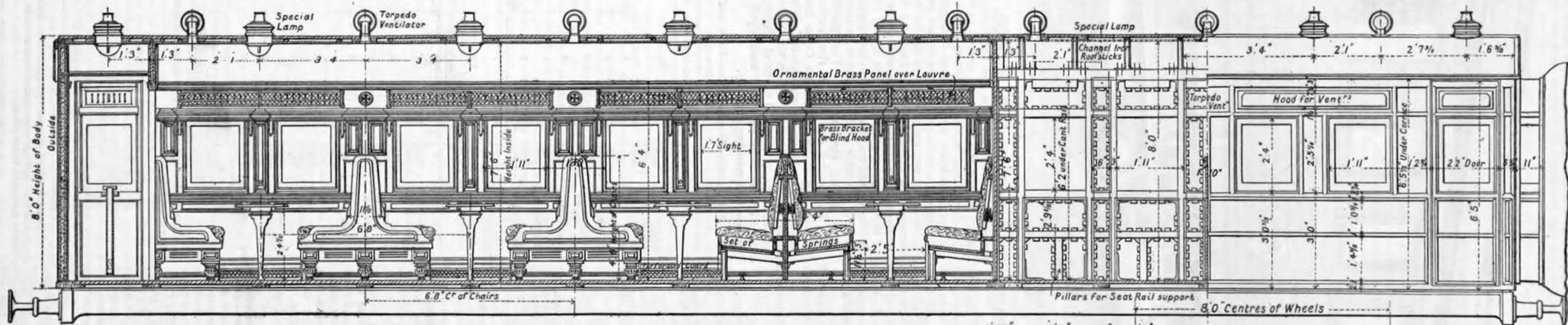
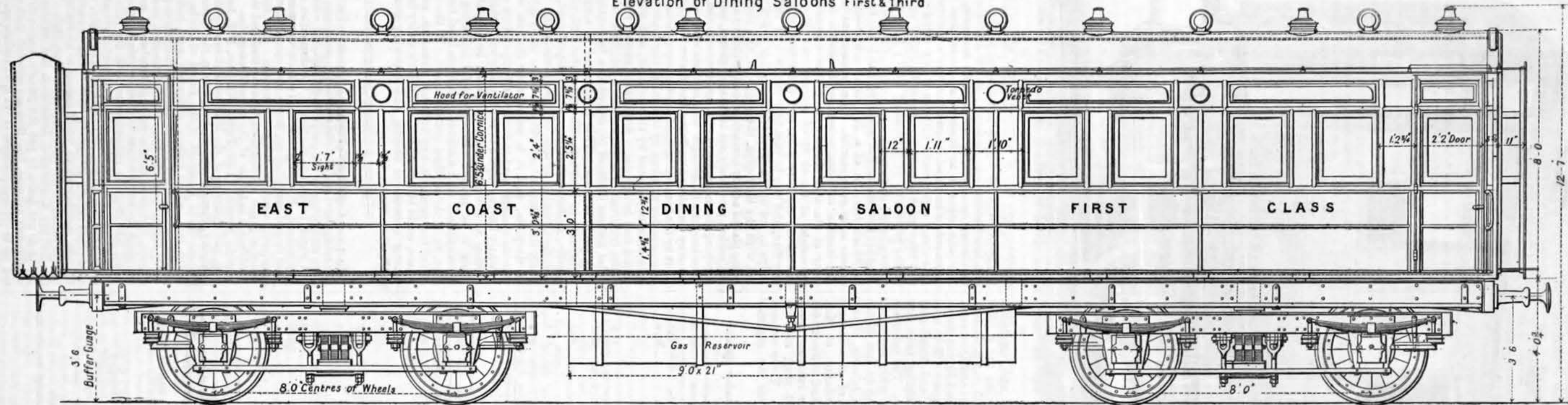


THE EAST COAST DINING AND CORRIDOR TRAINS.—FIRST AND THIRD-CLASS DINING SALOONS

THE LANCASTER AND THE OLDBURY CARRIAGE AND WAGON COMPANIES, BUILDERS

(For description see page 522)

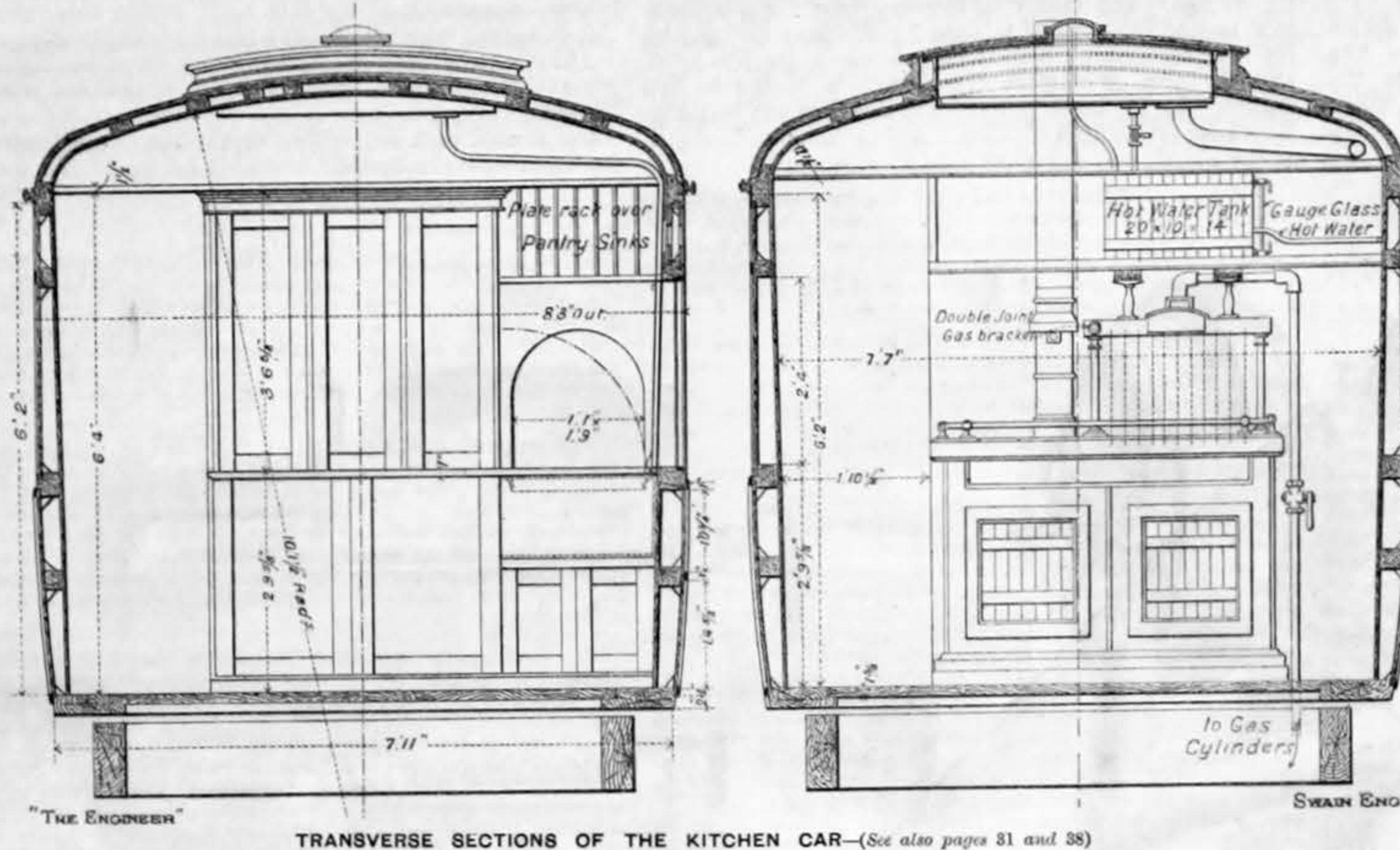
Elevation of Dining Saloons First & Third



PLAN AND SECTIONS OF THIRD-CLASS DINING SALOONS

SWAIN ENG.

THE EAST COAST FIRST AND THIRD-CLASS DINING TRAIN



TRANSVERSE SECTIONS OF THE KITCHEN CAR—(See also pages 31 and 38)

The cost of working is said to be considerably below that of elevators actuated by water-power, but I am unable to obtain any exact data. The rest of the exhibit of the Elekron Company comprises one 15 brake horse-power motor, supplied with current at 500 volts, and belted to a dynamo supplying 160 16-candle power incandescent lamps upon the neighbouring stands. This dynamo gave 110 volts, and was provided with six of the compound brushes already described. Each brush had in this case fifteen carbon pencils in two rows of eight and seven pencils respectively. Another motor was working a pump which filled a tank, and the stopping and starting of the motor was automatically regulated by the height of the level of the water in the tank. Some small motors were also shown in pieces, and these I may be able to illustrate in a future article.

ROYAL OBSERVATORY, EDINBURGH.

We gather from the third annual report of the Astronomer-Royal for Scotland, just published, that this year considerable progress had been made in the erection of the new Royal Observatory in Blackford-hill Park. Work was commenced in May last year, and at present all the buildings, including the observatory itself, the transit house and the dwelling houses, are up to the level of the ground floor. Some parts of the structure have been carried up a good deal higher, the eastern tower in particular having reached the height of 21ft. above the ground. Red sandstone from Doddington Hill, in Northumberland, is used for the face work, and grey freestone from Haile's quarry, near Edinburgh, for the inner walls and less conspicuous portions of the

to cut two grooves in the commutator bars to allow for turning off the tops of the bars, these being arranged as shown in Fig. 13 annexed. This practice is often the cause of the bar being short-circuited through the copper dust which lodges in these grooves, and they are a fruitful source of mischief in street car work. In the Perret motors this is avoided altogether, and no nuts or collars are put on outside of the commutator, the method of connection being shown in Fig. 14, where D is the shaft, A a wrought iron plate, keyed on and held by a set screw inside, and B another plate tightened against the bars C by means of nuts, which are inside between the commutator and armature; the outer end of the commutator is therefore absolutely flat, and can be kept clean with ease. Fig. 15 represents a view of the motor and hoisting crab for the electric elevator I spoke of previously. The motor is supplied with current at 500 volts pressure from the Machinery Hall, and when running at 600 revolutions per minute will give out 10-horse power. The field magnets are shunt wound, and there are only two brushes upon the commutator; the motor itself is thoroughly well insulated from the bed-plate by means of a thick plate of fibre. The armature shaft is connected to the driving shaft by means of a self-adjusting insulating coupling of the form shown in Fig. 16. The shaft c has an enlargement at its end, and is

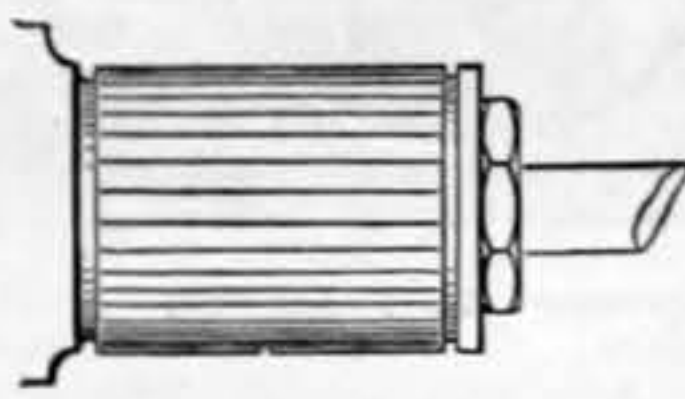


Fig. 13

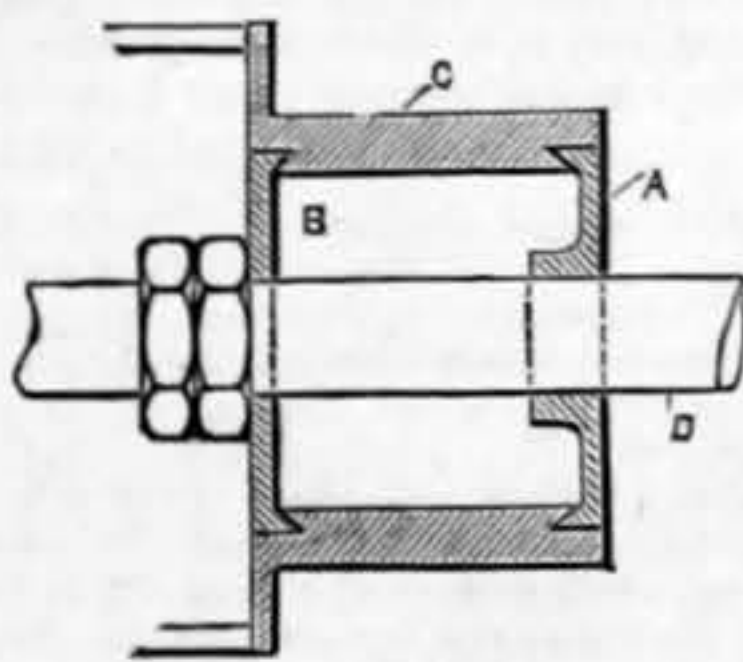


Fig. 14

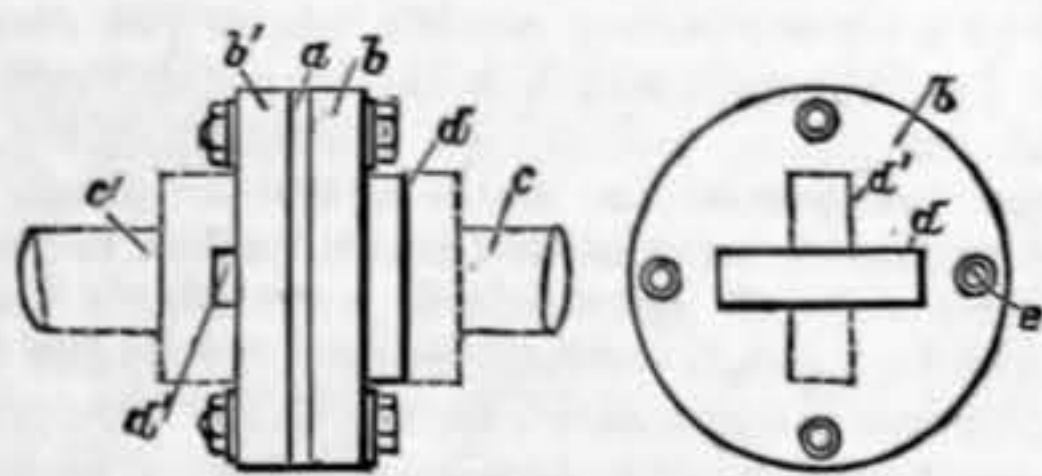


Fig. 16

provided with a key-way across the end, and the shaft c', is formed in a similar manner. The coupling consists of two discs of wrought iron, b and b', provided with keys d and d' at right angles to one another. A plate a of insulating material is placed between the two flanges, and they are held together by bolts passing through tubes e of insulating material, and having insulating washers under the nuts and bolt heads.

The portion of the shaft which is insulated from the motor carries a steel worm forged solid on, and afterwards cut by machinery; this worm gears with a phosphor-bronze wheel, and both are enclosed in a cast iron case—easily seen in Fig. 15—which is filled with oil, so that the lubrication of the gearing is as perfect as possible. Upon the same shaft that bears the worm wheel is keyed the cast iron winding drum, which carries the steel wire rope used for lifting the elevator car. In case of actual breakage of the rope itself, the car is prevented from falling by means of cam-shaped pawls, which grip the sideways upon which the car works. If the drum should for any reason begin to travel too fast, this motion is checked by the action of a centrifugal governor, controlled by powerful springs and placed inside the drum.

As soon as the speed rises above the calculated maximum, the strap brake is put upon the edge of the drum.

A special apparatus is also designed to avoid slack in the wire rope, which might entail serious consequences. This apparatus consists of a pair of arms pivoted on the drum shaft, and carrying a cross bar and jockey pulley—seen in Fig. 15—resting upon the surface of the winding drum. This jockey pulley rides against the hauling part of the rope, and if this should become too slack the pulley will fall towards the floor; in doing so it actuates a clutch mechanism provided with engaging claws, and by its means causes a second powerful strap brake to grip an enlargement of the driving shaft, close to the insulated coupling we have already described. The action of the apparatus is thus fully safeguarded.

The starting and stopping of the machine is effected by means of a wire rope which is passed round the large grooved pulley in the fore-ground, and a second grooved pulley is keyed upon the same shaft as the former, and this second pulley is connected to a grooved pulley seen at the base of the machine in the front. The last pulley actuates, through a small cross shaft and gearing, a system of levers partially visible in the background, and these control the switches. One switch gives the proper direction to the current for either raising or lowering the elevator car, and this switch is closed first. The other switch puts the current into the armature, and is in series with an automatic resistance frame. This starting switch is of very ingenious construction, and has both quick make and quick break, so as to avoid the serious arcing which would occur with currents at a pressure of 500 volts. The automatic resistance is a very neat arrangement, which was shown and explained to me, but as the design is not yet patented in Great Britain I am unable to illustrate it in detail. Suffice it to say that it consists of a solenoid, which draws down a core connected with a lever, and controlled by an air dashpot. The end of the lever is fitted with a contact piece, and describes an arc over a series of separate contacts which are connected with German silver resistance coils. At starting, the whole of the resistance is automatically inserted in series with the motor, and is gradually switched out as speed is got up. I am informed that the current used at starting was from two to two and a-half times the ordinary full load working current of the machine. The makers told me of a case where a series-wound motor by a very well-known firm was used for an electric elevator in Boston, and it took a current of 160 ampères to start it. The current was obtained from an electric street car line at a pressure of 500 volts, but this large starting current so seriously affected the generators at the power station that the manager there objected to its use, and the motor was removed and replaced by one of the Perret type, which, I am informed, does the same work with a starting current of 50 ampères. I may observe that with the Perret motor shown in the Electricity Building no resistance is used in the field magnet circuit.

The present drum is 36in. diameter, and the speed of lift is 140ft. per minute, and the maximum load is 2000 lb. If a larger drum were used a load of 1200 lb. could be lifted at a speed of 225ft. per minute, and with a 15-horse power motor 2000 lb. could be raised at this speed. One noticeable feature of the plant is that in case of a serious overload the machine will not start at all, as the whole of the resistance is kept in series with the armature coils by the automatic regulator. This appears to me a very desirable feature, as I know of a certain other type of American electric elevator, where the mere pull upon the controlling cord first puts the resistance in for an instant, and then cuts it out. If, therefore, the car has not started owing to overloading, the current through the armature of the motor may be enormous, and quite sufficient to destroy it altogether. I was particularly struck with the easy starting and stopping of this elevator, and I am told that it is particularly suitable for a current supply at 220 volts, such as is common in the metropolis on the three-wire system.

building. The transit circle stands on hewn granite pillars, the foundations of which are finished and capped by a large granite slab, weighing nearly four tons. When the piers are completed, they and the bearings of the transit circle will be approximately adjusted by means of an ordinary telescope, with pivots of the same size as those of the actual instrument. This arrangement having been completed, the piers will then be boxed in, until the building is so far finished as to admit of the erection of the transit circle. It will be necessary to leave the final adjustment until the piers have become thoroughly and permanently settled, as the bearings have no screw adjustments, either in altitude or azimuth.

It is expected that the domes will be ready to fix as soon as the masonry is fit to receive them. Owing to the exposed nature of the site, the domes have, says the author of the report, been specially designed to resist the most violent gales, while they can be partially opened to permit of the safe and efficient use of the instruments in the windy or showery weather so often associated with a partially clear sky in Scotland. Through the pierced tube of the transit circle the collimators will be mutually visible, and the slope of the ground to the south will admit of the use of a meridian mark visible through holes in the supports of the southern collimator. As the distance of this mark is something less than 300ft., a lens of long focus properly mounted will be used for observing it. The stones forming the granite piers for the transit circle already mentioned were brought from the old piers at Dunecht, and the task of separating them required extraordinary care and patience. The Astronomer-Royal observes:—"They had been bedded in cement in the most solid manner, and this hard cement had to be solely removed from the joints by means of iron blades fed with emery and water." Success, however, attended the operation, and our author mentions that the successful accomplishment of this task was mainly due to the aid of Mr. John Smith, the experienced and skilful mason who had erected the piers at Dunecht more than twenty years ago, and it is gratifying to state that the same skilful hands are rebuilding the piers in their present position.

In connection with the observatory there is a time gun at Edinburgh, a time ball on Nelson's monument, and several sympathetic clocks in the city and at Dundee. On several occasions the outside communication has been interrupted owing to the multitude of wires in the neighbourhood, but in no case has a failure occurred through causes under the control of the observatory.

THE EAST COAST DINING AND CORRIDOR TRAINS.

ABOVE and on pages 31 and 38 we publish further engravings illustrating these trains. One part of the engraving illustrates one whole train on a small scale, the other shows one of the third-class corridor carriages. These carriages were described in our last impression, and to this we need not at present make any addition. In our impression of the 30th ult., page 580, we illustrated and described the kitchen and other carriages. The trains are now running the usual preliminary journeys to see that everything is quite satisfactory, and it is intended to commence regular service on Monday next.

A TERRIBLE fire broke out in a cold storage warehouse in the World's Fair grounds at 2 o'clock on Monday afternoon. The cupola of the warehouse where the outbreak was first noticed was 200ft. in height, was built of wood, and elaborately ornamented, near the top being a landing. The flames were first observed 30ft. above this landing, and when the firemen arrived thirty-five or forty of them climbed up to it. They were preparing to bring their hose into play when the flames, which had made their way downwards inside the tower, suddenly broke out on all sides beneath the landing. Five firemen saved themselves by sliding down the ropes, but before their companions could follow the ropes were burnt through. The remainder were then left huddled together on the north side of the cupola, quite beyond the reach of ladders or any other means of rescue. The crowd of spectators, which now numbered 20,000, being unable to render any help stood horror-stricken, watching the flames mount higher and higher until the firemen were almost concealed from view. One of the men sprang from a landing far out into the air, but was dashed to pieces on the roof of the building 80ft. below. Four others followed his example and met with a similar fate. The upper portion of the cupola was then seen to give way, and the remaining firemen were swallowed up in the burning mass of timbers.

