

PASSENGER LOCOMOTIVE (4—6—2 TYPE) FOR THE BELGIAN STATE RAILWAYS.

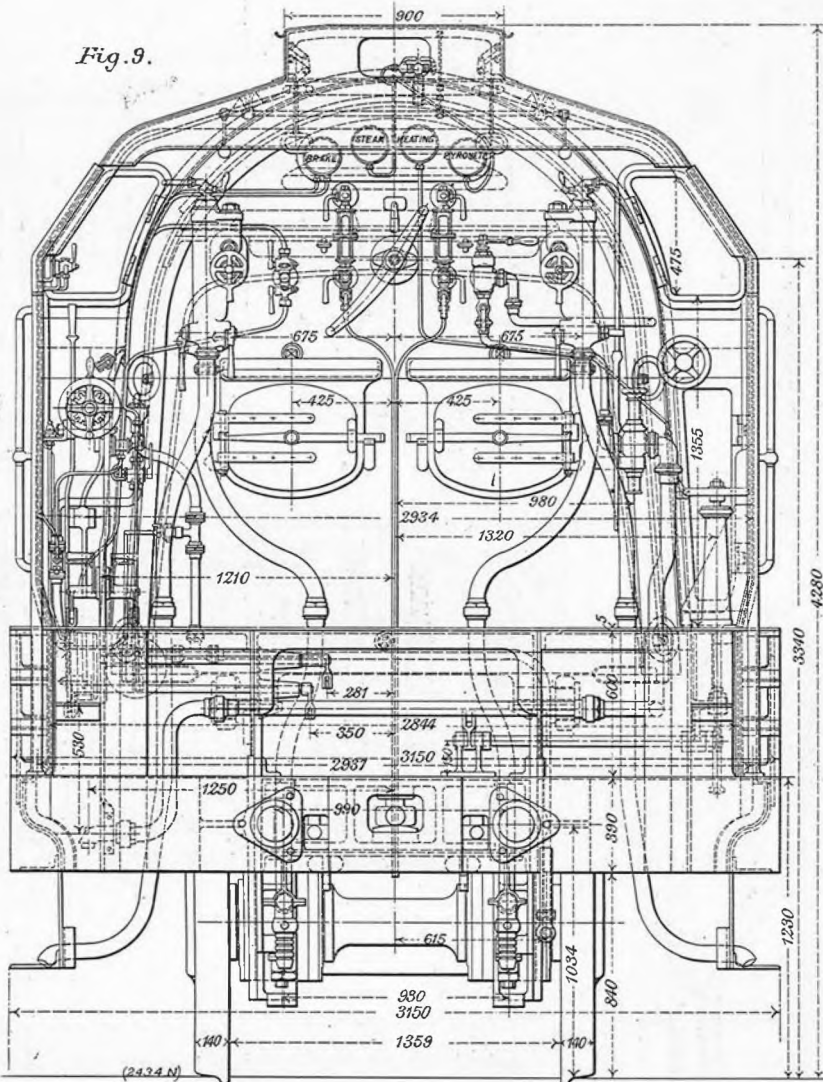
We gave in Figs. 1 and 2, on our two-page plate, No. LII., with our issue of October 20, two general views of a passenger locomotive of the 4-6-2 type, designed by Mr. J. B. Flamme, chief engineer for the Belgian State Railways. As stated in our notice on page 525 *ante*, there are two engines of this type, known as "Type 10," at the Turin Exhibition, one built by the Société Anonyme de St. Léonard, Liège, and the other by the Cockerill Company, Seraing.

The passenger engine, "Type 10," of which we give further engravings in Figs. 3 to 8, on Plate LIV., published with the present issue, and Figs. 9 to 36, on the present page and pages 594, 595, and 598, is an improvement upon the preceding "Type 9." It has four equal cylinders and six coupled wheels, the latter 1.980 m. (6 ft. 6 in.) in diameter. In the locomotive "Type 9," the first axle alone was the driving axle. It was an oblique crank-axle fitted with outside crank-

Total heating surface "S" ..	240 sq. m. (2583.38 sq. ft.)
Superheating surface "S ₁ " ..	62 sq. m. (667.39 sq. ft.)
Ratio: $\frac{S_1}{S}$	0.257
Length of grate	2.5 m. (8 ft. 3 in.)
Width of grate	2 m. (6 ft. 6 1/4 in.)
Grate area	5 sq. m. (53.82 sq. ft.)
Diameter of driving-wheels "D"	1.980 m. (6 ft. 6 in.)
Diameter of trailing-wheels ..	1.262 m. (4 ft. 1 1/2 in.)
Diameter of bogie wheels ..	0.900 m. (2 ft. 11 1/2 in.)
Weight in working order on each bogie axle	14,000 kg. (13 tons 15 cwt. 2 qr.)
Weight in working order on each coupled axle	19,000 kg. (18 tons 14 cwt.)
Weight in working order on trailing axle	17,000 kg. (16 tons 14 cwt. 2 qr.)
Total weight in working order	102,000 kg. (100 tons 7 cwt. 2 qr.)
Weight, empty	92,000 kg. (90 tons 11 cwt. 1 qr.)
Weight available for adherence	57,000 kg. (56 tons 2 cwt.)
Draw-bar pull $\frac{2}{D} \times 0.65 p a^2 l$	15,166 kg. (33,370 lb.)

The engine has been designed with a view to hauling the heavy passenger trains which hitherto have required two engines of the ordinary type

Fig. 3.



pins keyed at 180 deg. as regards the cranks on the axle body. In the locomotive "Type 10," which we illustrate, a much more powerful engine than the preceding one, the leading driving axle is a crank-axle, with circular webs, driven by the inside cylinders, the outside cylinders being connected to crank-pins on the second coupled axle.

The piston-rods of the outside cylinders are made to slide in a special guide, owing to their greater length, this arrangement having made it possible to reduce the length of the outside connecting-rods. The steam distribution mechanism of the inside cylinders is driven by a rocking shaft; in this, the newer type of engine, it was not possible, owing to the position of the cylinders, to make use of a horizontal rocking-lever, as was the case in the engine "Type 9."

The principal dimensions are the following:—

Diameter of the four cylinders "d"	500 mm. (19.69 in.)
Stroke "l"	660 mm. (25.98 in.)
Boiler pressure "p" ..	14 kg. per sq. cm. (205 lb. per sq. in.)
Inside diameter of boiler barrel	1.800 m. (5 ft. 11 in.)
Distance between tube-plates	5 m. (16 ft. 5 in.)
Thickness of barrel-plates	20 mm. (0.79 in.)
Height of boiler centre above rail level	2.850 m. (9 ft. 4 in.)
Boiler (Number	230 31
Outside diameter ..	50 mm. (1.97 in.) 127 mm (5 in.)
tubes (Thickness	2.5 mm. (0.098 in.) 4.5 mm. (0.176 in.)
Heating surface of fire-box ..	20 sq. m. (215.28 sq. ft.)
Heating surface of tubes ..	220 sq. m. (2363.10 sq. ft.)

over the heavy gradients. The Belgian lines, as is well known, form a most intricate system, and to the east of Brussels, especially in the vicinity of Liège, the gradients are at places particularly difficult. For example, the line from Liège to Ans has gradients of 31 mm. per metre (1 in 32.3); the lines serving the table-lands of Herve, Pepinster-Gouvy, Verviers-Aachen, Liège-Vivegnis-Liers, have long continuous gradients of 16 mm. to 25 mm. per metre (1 in 62.5 to 1 in 40). These difficulties, combined with the fact that Belgium is on the route taken by a large proportion of the travelling public from this country and from Holland, have compelled the Belgian State Railways gradually to increase the power of their engines so as to enable them to cope with the increasing weight of passenger-trains running at the high speeds which now generally obtain. The latest type of Belgian engine to meet these conditions for passenger traffic is the "Type 10," which we illustrate.

Mr. Flamme states that, for dealing with traffic in Belgium, special types of engines are required, and he gives as an illustration the following instance:—Between Paris and the Belgian frontier, the Paris-Cologne trains, which are hauled as far as Liège by the magnificent du Bousquet engines of the Northern Railway Company of France, run at an average speed of 95 km. (58.5 miles) per hour. On Belgian territory, between Erquelinnes and Liège, their speed is 65 km. (40.5 miles) per hour between Erquelinnes and Char-

leroi, 57 km. (35.5 miles) between Charleroi and Namur, and 63 km. (39.3 miles) between Namur and Liège. It should be noted, however, that the intricacy of the Belgian railway system alluded to above, especially in the industrial districts of Charleroi and the Lower Sambre, where the junctions and branch lines are very numerous, frequently makes it difficult to exceed a speed of 70 km. (43.5 miles) per hour.

The Belgian State Railways used coke on their locomotives until 1853, when firing with coal and briquettes became the practice. In 1856 and 1857 briquettes formed one-third of the fuel used on the Belgian locomotives, a proportion which increased to half in 1858, and to three-quarters in 1859. The change of fuel was accompanied by no change of practice as regards fire-box design, as low-grade slack coal, which was available in abundance, and at a comparatively low cost in the country, was being used in large quantities for raising steam in stationary engines, the possibility of utilising it in locomotives also was then considered. As a result, in 1860, Belpaire, a Belgian engineer, designed his well-known locomotive fire-box for the purpose. On the locomotives gradually increasing in power, the fire-box for burning slack coal exclusively gradually increased in size and ultimately reached large proportions. This led the Belgian State Railways to fit their engines with the Flamme type of boiler, in which slack, nut coal, and briquettes can be burnt separately or together.

The Flamme boiler is characterised by a round-topped fire-box casing, strengthened by transversal ties and T-bars riveted to the sides. The fire-box, the width of which, as above stated, is 2 m. (6 ft. 6 1/4 in.), is placed, as shown in Figs. 4 and 6, Plate LIV., above the wheels, and is provided with two doors. The cylindrical ring of the boiler-barrel is followed by a taper course, the object of which is to reduce the height of the boiler in front, so as to bring the steam-dome and the chimney within the limits of the loading gauge. The four safety-valves have been reduced in height, and have been placed in pairs side by side.

The barrel is built up of three steel-plate rings, 20 mm. (0.79 in.) in thickness, lap-riveted together. The top part of the fire-box shell is 30 mm. (1.18 in.) thick, and is directly connected to the crown by vertical stays. The two rows of stays in the vicinity of the tube-plate are arranged to allow for expansion. The connections of the crown to the sides are on a large radius, thus making it possible to decrease the height of the upper row of stays which are specially exposed to fracture. The lower portion of the fire-box tube-plate and of the throat-plate below the arch has been made slanting, as shown in Fig. 4, Plate LIV., and Fig. 1, Plate LII. *ante*, to clear the trailing coupled wheels. The fire-box tube-plate is stiffened by four longitudinal stays connecting it to the smoke-box tube-plate.

The frame-plates are inside the wheels; they are of steel, 30 mm. (1.18 in.) in thickness. Owing to their dimensions, they are made in two parts, lap-jointed together. The boiler is fixed at the smoke-box, and rests on expansion-brackets on the underframe under the barrel and at the fire-box. The Schmidt superheater consists of 124 superheating tubes, which are contained in the thirty-one large smoke-tubes. Each one of the latter contains two loops, the superheating tubes being joined together at the fire-box end by steel bends, in which they are screwed. Each loop thus formed establishes communication between the two compartments of the steam-collector placed in the upper part of the smoke-box. As in the usual practice, the first compartment receives the saturated steam coming from the regulator, and from the other superheated steam is supplied to the steam-pipes leading to the cylinders.

As already pointed out, this locomotive has four cylinders, two outside the frames and two in. They are carried far forward over the bogie. On page 594, in Figs. 10 and 11, are given drawings of the outside cylinders, and in Figs. 12 and 13 drawings of the inside pair, the latter being cast separately. Details of the pistons are given in Figs. 14 to 17. They are steel castings, and are fitted with three packing rings. The latter are grooved in the middle of their outer surface, and are drilled with holes 3 mm. (0.118 in.) in diameter, which run through their whole thickness from the bottom of the groove, to allow the steam to exert a pressure at the back of the rings to cause them to press against the cylinder walls. The rings do not serve to support the pistons; these are carried in the rear by the cross-head, and in front by tail-rods. Each tail-rod runs in a cast-iron liner made with lubricating grooves, enclosed in a cast-iron casing bolted to the front cover of the cylinder. The casing is closed in front; it is provided with a lubricator. In order to prevent compression of the steam which might leak along the tail-rod, a hole 3 mm. (0.118 in.) in diameter establishes a communication between the cylinder and the annular space round the liner and the tail-rod end.

Steam distribution is by piston valves, with inside admission. Drawings of the valve and valve bushings or liners are given in Figs. 18 to 22, page 595. Figs. 19

PASSENGER LOCOMOTIVE (4-6-2 TYPE); BELGIAN STATE RAILWAYS.

CONSTRUCTED TO THE DESIGNS OF MR J. B. FLAMME, ENGINEER-IN-CHIEF, BY THE SOCIÉTÉ JOHN COCKERILL, SERAING.

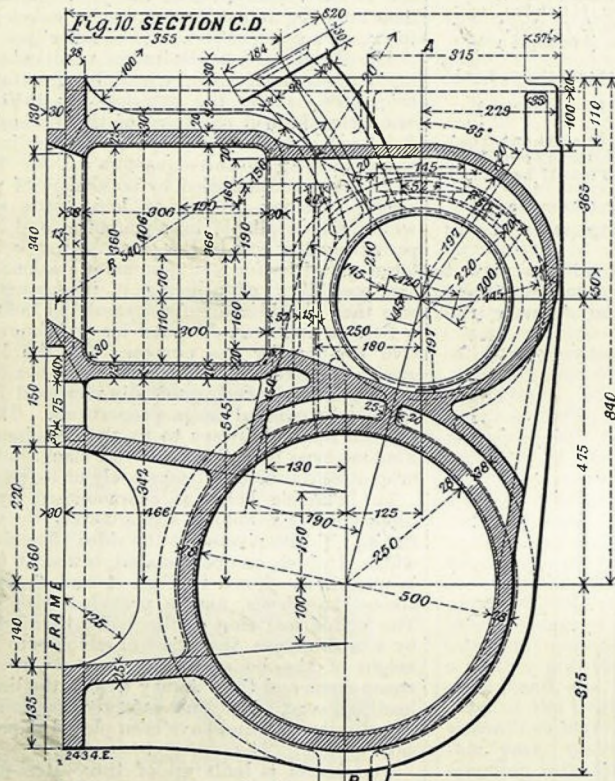
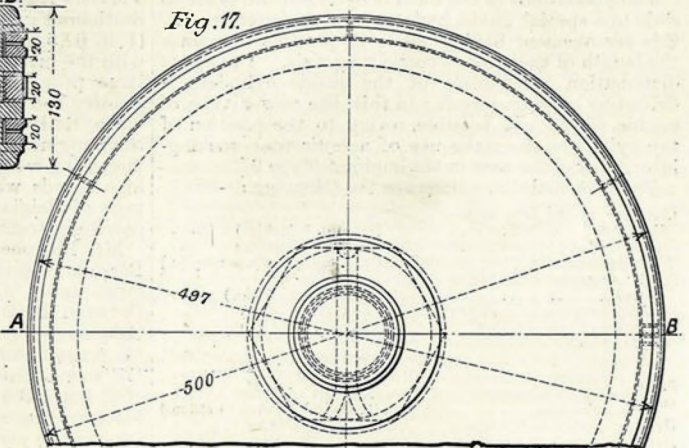
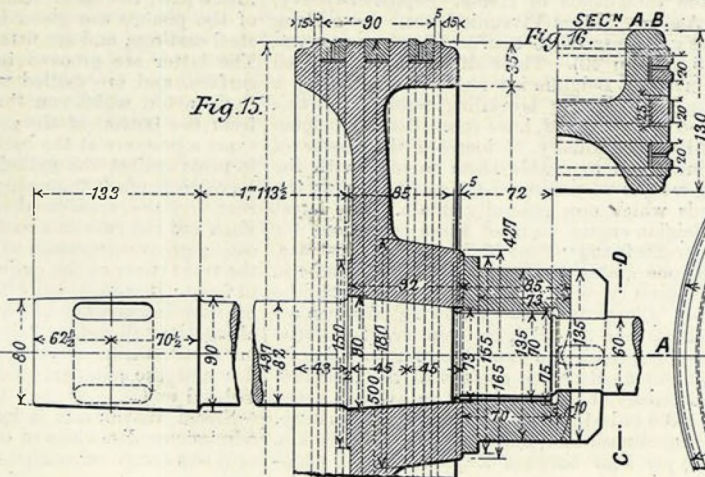
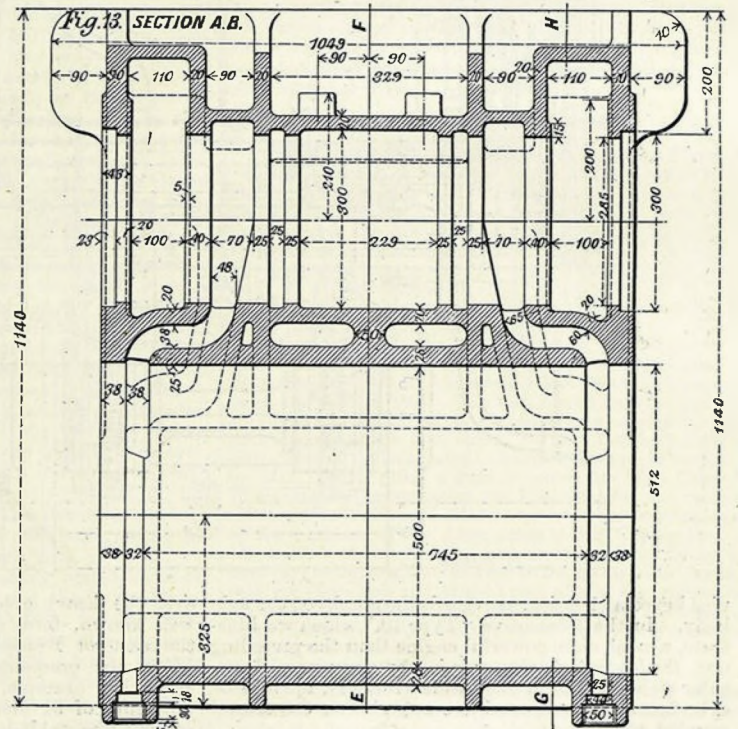
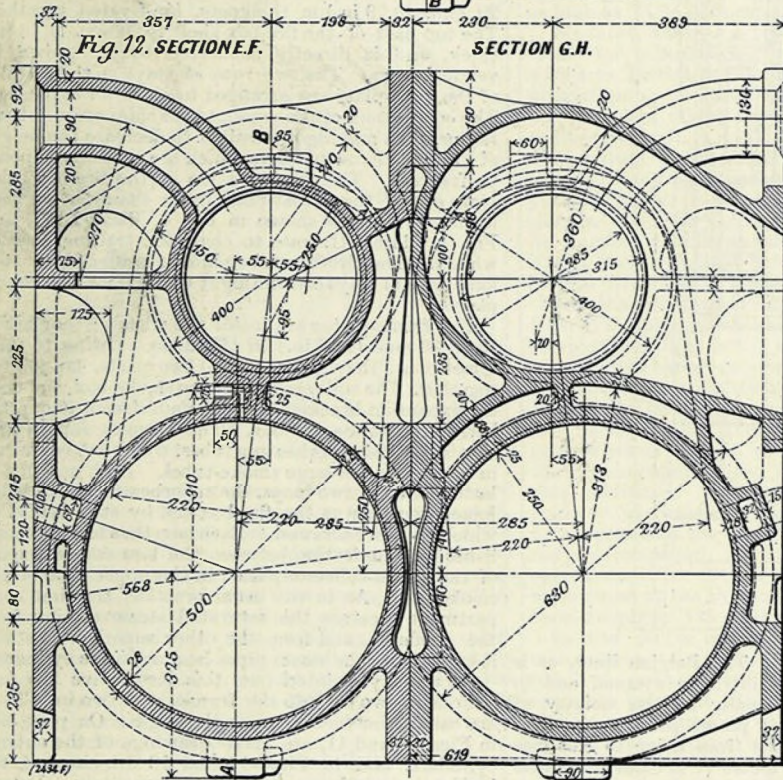
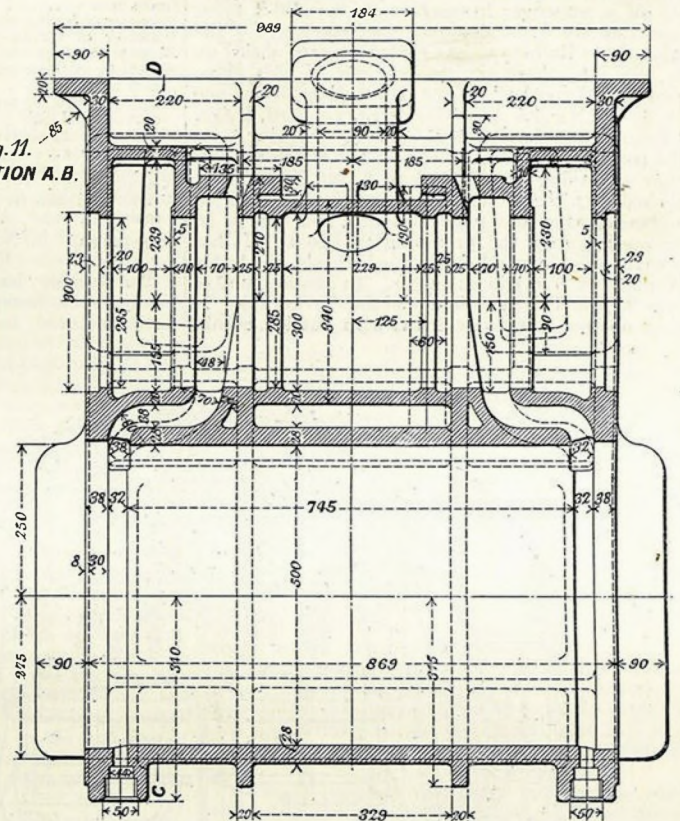


Fig. 11. SECTION A.B.



and 20 show the valve piston. Fig. 21 shows the steamport openings developed, and Fig. 22 sections through the steam and exhaust ports. Figs. 23 to 25 show the piston-valve rings in three stages of finish, Fig. 25 representing their final form. With inside admission it has been found possible to dispense with metallic packing for the valve spindles, which are simply provided with oil grooves. The valve spindles are shown in Figs. 26 and 27, Fig. 26 showing the spindle for the outside cylinders, and Fig. 27 the spindle for the inside cylinders, operated by rockers at the front. The valve gear is of the Walschaert type. The cylinders are fitted with relief valves, 100 mm. (3.94 in.) in diameter, and a by-pass valve operated from the footplate by compressed air. Figs. 28 to 32 show the piston-rod packing of metallic rings, fitted with spring neck-rings carried in a box. Figs. 31 and 32 show the gland, and Figs. 29 and 30 the oiler fixed to the gland studs, and shown in section in Fig. 28.

The reversing-gear consists of a small steam cylinder, the piston of which is connected on one side to the weigh-bar, and on the other to the reversing lever. Lubrication of the valve casings, cylinders, and piston counter-rods is ensured by two eight-way distributing boxes, operated by the link-motion gear. The flow of each of the eight pipes is made adjustable.

The engine is coupled to a six-wheel tender which has a capacity for 24,000 litres (5280 gallons) of water and 7 tons of coal.

The bogie is of the Flamme type with lateral play. It is illustrated in Figs. 33 to 36 on page 598. It has a spherical centre bearing which rests in a centre casting suspended by four inclined swing-links. The bogie centre is a steel casting made with stiffening ribs. The bogie frame-plates, 26 mm. (1 in.) in thickness, are inside the wheels, and are further connected together by two headstocks of plates and angles. The load is transmitted by four independent supporting springs. The spherical centre pivot is fixed to a horizontal plate fitted to the locomotive underframe, and which bears against the inside cylinders. A horizontal bar fixed to two lugs, cast in one piece with the bogie centre, holds the bogie to the engine. Check-clamps prevent the side play exceeding 65 mm. (2.56 in.) towards either side. The bogie is fitted with the Westinghouse brake, since it carries a high proportion (28 tons) of the total weight of the engine. The Belgian railways were the first to extend the continuous brake to the bogie. In the case of the engine "Type 10," the bogie is provided with a separate brake mechanism and cylinders connected to a separate triple valve and receiver. The bogie, therefore, in regard to braking, forms, as it were, a distinct vehicle.

The running on curves is also facilitated by a 50-mm. (1.97-in.) play, provided between the guides and the axle-boxes of the trailing axle, controlled by wedge blocks above the axle-boxes.

The engine is provided with the Westinghouse brake, which acts on all the wheels, the bogie-wheels being also braked as above stated.

THE LATE MR. WILLIAM C. MARTIN.—We regret to have to record the death, at an early age, of Mr. William C. Martin, of the firm of Messrs. W. C. Martin and Co., of Glasgow. Mr. Martin, who was born in 1862, was well-known in electrical and shipbuilding circles, his firm having made a speciality of electrical ship work for many years. They were responsible for the electrical installation on the Cunard liner *Mauretania*. Mr. Martin, who, in earlier years, was connected with the Telephone Company, of London, and the British Electric Light and Power Company, of Scotland, was a member of the Institution of Engineers and Shipbuilders of Scotland, of the Institution of Electrical Engineers, and of the Incorporation of Hammermen, of Glasgow. He had been a member of the Glasgow Town Council since 1908.

PERSONAL.—The office of the Patents Secretary (Mr. H. G. Graves) under the Inventions and Designs Act, which is now a branch of the Department of Commerce and Industry, Government of India, has been removed from 2, Bankshall-street, Calcutta, to 1, Council House-street, Calcutta.—Messrs. Cutbill, King, and Co., of 26, Nicholas-lane, Lombard-street, E.C., have been appointed sole agents in Great Britain for the De Laval Steam-Turbine Company, Limited, of Stockholm.—Mr. Rowland C. Feilding has ceased to be a member of Messrs. Hooper, Speak, and Feilding, mining engineers and managers, of 3, London Wall Buildings, E.C., and his business address now is 18, St. Swithin's-lane, London, E.C. Mr. Edward Hooper and Mr. S. J. Speak will remain in partnership, and will continue to carry on their business under the style of Hooper, Speak, and Co.—Mr. J. R. Garner, for eight years works manager of the Electric and Ordnance Accessories Company, Limited, Aston, Birmingham, has resigned in order to take up a similar position with the Lancashire Dynamo and Motor Company, Limited, Manchester.—Mr. William C. Mountain, M.I. Mech. E., M.I. Min. E., M.I.E.E., is retiring from the firm of Messrs. Ernest Scott and Mountain, Limited, and proposes to devote his whole time and attention to consulting work, and has taken offices in Sun-buildings, Newcastle-on-Tyne. He has been appointed arbitrator by the coal trade to represent a number of the principal counties of England in connection with the use of electricity in mines.

"JET PROPULSION."

TO THE EDITOR OF ENGINEERING.
SIR,—With reference to the interesting article on "Jet Propulsion," which appeared in last week's *ENGINEERING*, we are in entire agreement with the opening paragraph, in which the efficiency of jet propulsion is insisted upon. Our experience, moreover, goes to show that whatever may be the obstacles to the adoption of jet propulsion on an extensive scale, it is undoubtedly extremely useful in many special cases. One of these special cases is in relation to fire-floats stationed in canals, harbours, or other situations where the frontage to be protected is small, and where, consequently, any desired position can be reached in a sufficiently short time at a moderate speed.

We have frequently utilised the pumping plant of such a fire-float to effect its propulsion with very gratifying results. In one recent case a boat 50 ft. long, with a relatively small pumping outfit—1000 gallons per minute only—was fitted with two 1½ in. nozzles fore and aft, and attained a speed in still water of 5 miles per hour, with the jets discharging into the atmosphere just above water-level. This, of course, is only a sharp walking pace, but serves its special purpose admirably, with a minimum of initial outlay and expenses of upkeep. This method of propulsion is also extremely handy for manoeuvring purposes, as the vessel can be readily steered or reversed by the simple operation of two valves.

With regard to the type of pump proposed in the article referred to above, though no doubt a centrifugal pump would be necessary to deliver the enormous volume of water required for jet propulsion on a large scale, for the small quantities which we have employed for this purpose we have invariably used reciprocating pumps. Our experience shows that with the relatively small quantity and high pressure necessary for this class of work a considerable improvement in efficiency is obtained with reciprocating pumps as compared with pumps of the centrifugal type.

In conclusion, we would say that, though water-jet propulsion may never reach an efficiency high enough to warrant its general adoption, it still possesses features which, perhaps, merit more consideration than they commonly receive.

We are, Sir, yours faithfully,
MERRYWEATHER AND SONS, LIMITED.
Greenwich-road, London, S.E. November 1, 1911.

JET PROPULSION: ERRATUM.—By a slip of the pen, in our article on page 569 of our last issue, the efficiency of a jet propelling a tank which moves at half the speed of the jet was said to be unity. It should, of course, have been 75 per cent.

CITY OF BRADFORD TECHNICAL COLLEGE.—We have received from the City of Bradford Education Committee a copy of the Calendar for the thirtieth session, 1911-1912, of the City of Bradford Technical College, which gives complete information in all the various courses. These cover the textile industries, chemistry and dyeing, and engineering.

THE LONDON CHAMBER OF COMMERCE (INCORPORATED).—Members desirous of being included in the engineering and allied trades sub-section are requested to forward, for registration, the name of the person whom they may wish to depute to represent them at meetings. The engineering section is divided into (a) consulting engineers, or those who have more or less the same interests as professional engineers; and (b) manufacturing companies, firms, and individuals interested in or concerned with engineering.

LLOYD'S RECORD OF SHIPWRECKS.—A gratifying condition is reflected in the quarterly report of shipwrecks just issued by Lloyd's, which indicates continuous improvement in ship construction, because it establishes a decreasing rate of loss, the total number of vessels removed from the Register from all causes during the quarter being 112, and the tonnage 129,211. This, as will be seen, is equal to only about half a million tons per year. Of the total, 52, of 97,645 tons, were steamships, and 60 vessels, of 31,566 tons, sailing ships. In view of the enormous preponderance of steamships in Lloyd's Register the number of sailing vessels seems great, but against this it has to be noted that the average age is considerably higher. Wrecks, as usual, account for the greater number of losses—practically two-thirds—namely, 55 vessels, of 79,085 tons, of which 20,716 tons were of sailing ships. Collisions account for the second largest number, 28 vessels, of 28,858 tons; and here naturally steamers preponderate, sixteen steamships owing their loss to this cause, the tonnage in this case being 25,770 tons. The number of ships reported missing is four, of 7441 tons, including a sailing ship of 146 tons. The other causes of loss are—ships foundered, eight, of 4480 tons; ships abandoned at sea, four, of 3094 tons; ships destroyed by fire, four, of 2412 tons; and ships lost from other causes, five, of 2204 tons. In the case of four vessels, of 1637 tons, the explanation is that they were broken up or abandoned. The British ships again establish a satisfactorily low rate of loss per 100 tons owned, the percentage being only 0.29; but for no country is the rate more than 0.66 per cent., the ratio applicable to Italy; next comes Spain, with 0.51 per cent.; Norway, 0.45 per cent.; the United States of America, 0.41 per cent.; the British Colonies, 0.40 per cent.; France, 0.30 per cent.; Germany, 0.21 per cent.; Denmark, 0.19 per cent.; Russia, 0.17 per cent.; Sweden, 0.14 per cent.; and Austria-Hungary, 0.02 per cent. All of these rates, it must be admitted, are most satisfactory.

NOTES FROM THE NORTH.

GLASGOW, Wednesday.
Glasgow Pig-Iron Market.—Last Thursday morning there was little doing in the pig-iron market, and the dealing consisted of only one lot of Cleveland warrants at 46s. 5d. cash, with sellers over at that figure and at 46s. 9d. one month, and 47s. 4d. three months. Cash buyers of hematite offered 60s. 9d., but sellers wanted 61s. 3d. In the afternoon Cleveland warrants were the turn firmer, but business was confined to 3000 tons at from 46s. 5d. to 46s. 5½d. cash, and at 47s. 4½d. three months. Closing sellers quoted 46s. 6d. cash, 46s. 9½d. one month, and 47s. 5d. three months. Hematite was unchanged at 60s. 9d. cash buyers. On Friday morning quietness again prevailed, and only one lot of Cleveland warrants was done at 46s. 4½d. cash. The closing quotations were called at 46s. 5d. cash, 46s. 9d. one month, and 47s. 4d. three months sellers. The afternoon session was a complete blank as regards business, and sellers of Cleveland warrants quoted easier at 46s. 4½d. cash, 46s. 8d. one month, and 47s. 3½d. three months. On Monday morning Cleveland warrants were again in small demand, and prices were weak. The turnover consisted of 1500 tons at 46s. 3d. cash, 46s. 6½d. one month, and 47s. 1½d. three months, with sellers over at these quotations. One lot of hematite changed hands at 62s. 1½d. three months, with sellers over. In the afternoon the market was the turn firmer, and 1500 tons of Cleveland warrants were dealt in at 46s. 4d. cash, and 47s. 1½d. and 47s. 2d. three months. Closing sellers quoted 46s. 4d. cash, 46s. 7½d. one month, and 47s. 2½d. three months. Hematite was quoted at 61s. cash sellers, with buyers at 3d. less. On Tuesday morning the tone was steady, but business was limited to one Cleveland warrant at 46s. 3½d. cash, and there were sellers at the close at 46s. 4d. cash, 46s. 7½d. one month, and 47s. 2½d. three months. The afternoon session was a repetition of its predecessor, and only one Cleveland warrant changed hands at 47s. 1½d. three months. Closing quotations were easier, with sellers at 46s. 3½d. cash, 46s. 7d. one month, and 47s. 1½d. three months. When the market opened to-day (Wednesday) business was quiet, and only two lots of Cleveland warrants were done at 47s. 1½d. three months. At the close prices were the turn firmer at 46s. 4d. cash, 46s. 7½d. one month, and 47s. 2d. three months sellers. Buyers of hematite offered 60s. 6½d. cash, but there were no sellers. The afternoon session was also quiet, and dealings were limited to 1500 tons of Cleveland warrants at 46s. 7d. one month, and 47s. 1½d. three months. Closing quotations were unchanged at 46s. 4d. cash, 46s. 7½d. one month, and 47s. 2d. three months sellers. The following are the market quotations for makers' (No. 1) iron:—Clyde, 61s. 6d.; Calder, 61s. 6d.; Gartsherrie, 62s.; Summerlee, 63s.; Langloan, 63s. 6d.; and Coltness, 82s. 6d. (all shipped at Glasgow); Glengarnock (at Ardrossan), 63s. 6d.; Shotts (at Leith), 62s. 6d.; and Carron (at Grangemouth), 63s. 6d.

Sulphate of Ammonia.—A good demand for sulphate of ammonia is general, and the forward inquiry is also of a satisfactory nature. The current price is firm at 14l. 5s. per ton for prompt lots, Glasgow or Leith. The amount shipped from Leith Harbour last week was 1555 tons.

Scotch Steel Trade.—Scotch steel-makers report no scarcity in specifications for ship-plates and heavy material generally, with the result that the various works are all very well employed. Old contracts are, of course, responsible for the present activity, but new home business is still exceedingly quiet. For the latter, producers must now quote the official selling prices, although export orders do not come under the category of the new rebate scheme, particulars of which are given on page 597. A fair amount of business has lately been put through on shipping account, India, Australia, and Japan all having fixed lots of ship-plates and angles for early dispatch. The demand for angles and boiler-plates is rather better, but there is not quite so much doing in structural sections generally. No falling-off is reported by makers in the demand for black sheets, and consumers at home and abroad are pressing for delivery.

Malleable-Iron Trade.—Producers of malleable iron in the West of Scotland are much better off for work at present, and most of the plant is fully employed. Inquiries for lots for home consumption have improved, but the prices on offer are still very low.

Shipbuilding.—The shipbuilding industry in Scotland is at present in a very healthy condition, and the majority of the yards are well off for work. New orders have been fixed up with some regularity during recent months, and a number of important contracts were also booked during October. With regard to output, the past month stands out well, and the Clyde total alone creates a record for the month of October. The district figures are:—

	Vessels.	Tons.
The Clyde	24	58,185
The Forth	1	60
The Tay	1	1,250
The Dee	2	790
Total	28	60,285

As is only to be expected, the output from the yards on the Clyde is a long way ahead and is the third highest month's total for the year, and it also makes the year's total to date the third highest on record. The figures for the past ten months now amount to 219 vessels, of 491,404 tons, as against 500,823 tons for 1907, and 509,862 tons for 1906, so that there is quite a possibility of the year 1911 creating a new record in output.

(For Notice, see Page 525.)

