THE THAMES AND BOULOGNE EXCURSION STEAMER "LA MARGUERITE."

CONSTRUCTED AND ENGINED BY THE FAIRFIELD SHIPBUILDING AND ENGINEERING COMPANY, LIMITED, GOVAN.

(For Description, see opposite Page.)

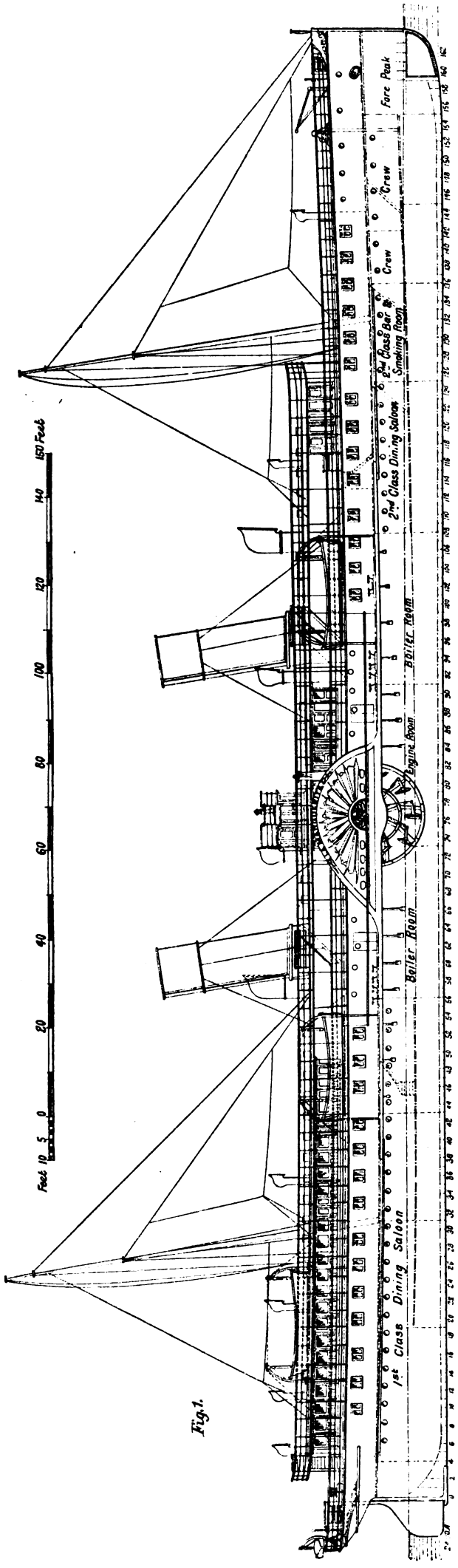

Fig. 1.

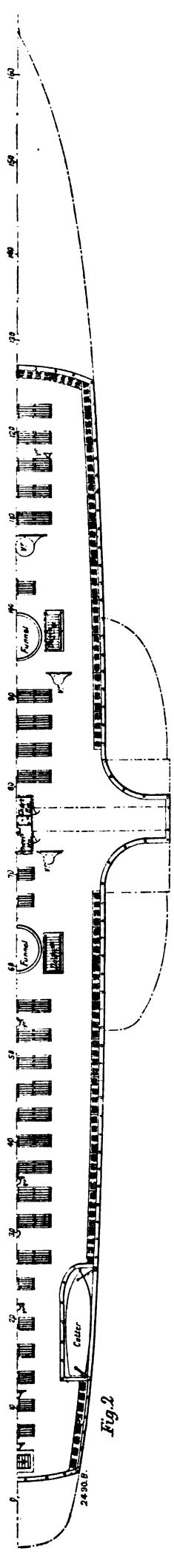

Fig. 2.

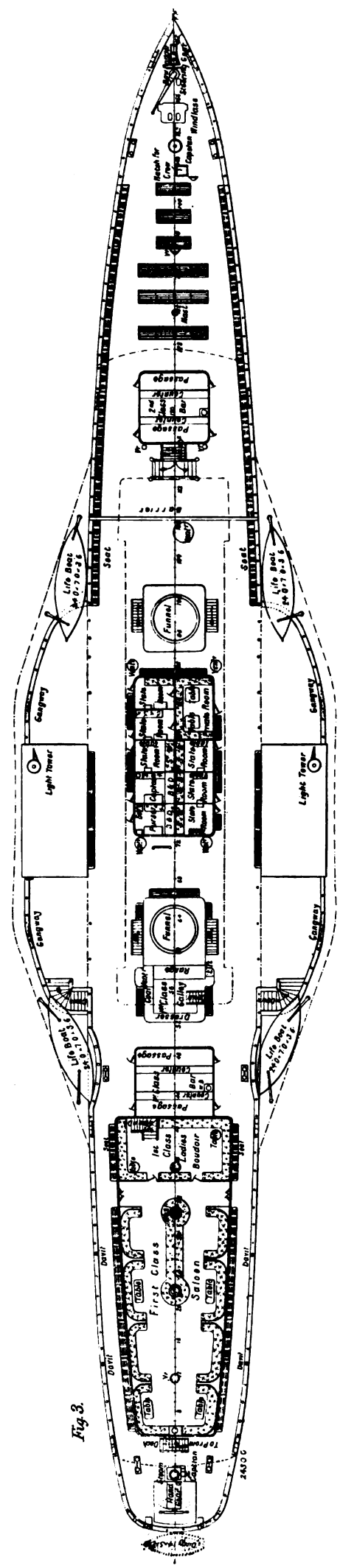

Fig. 3.

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Fig.4.

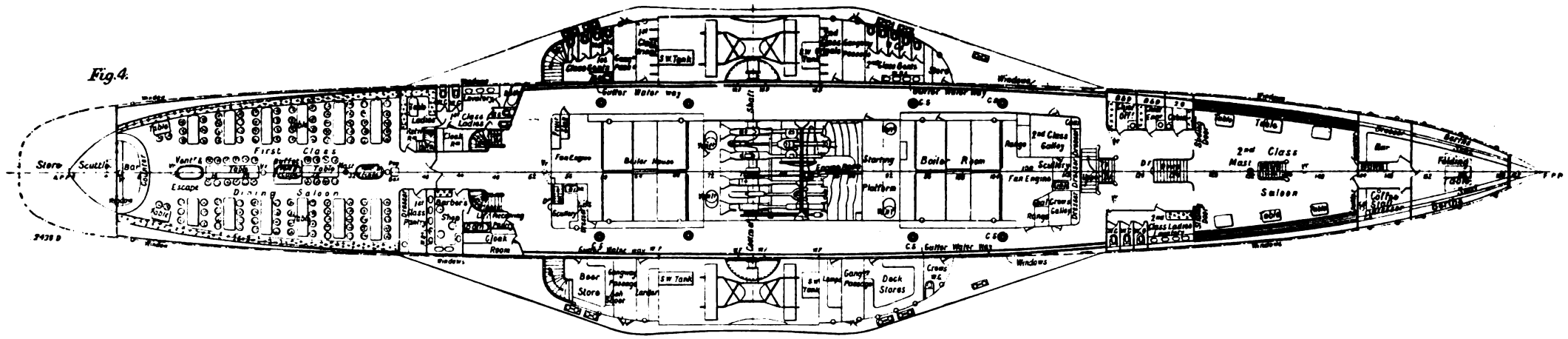
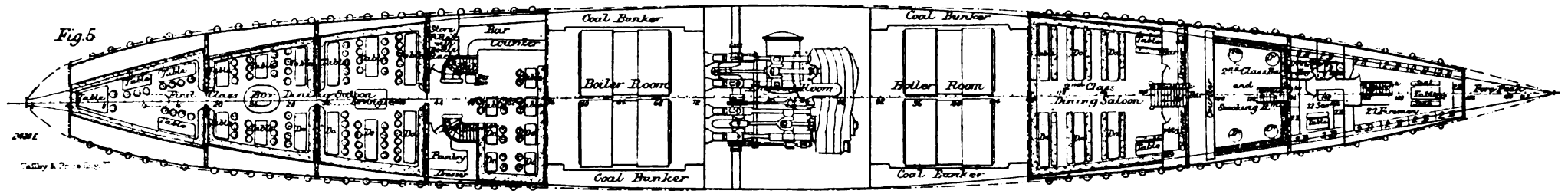


Fig.5



there being 34 rifle grooves 1 millimetre deep and 3.5 millimetres broad. The breech-block is cylindrical in form, and has a screw cut into eight sections, there being two lateral cartridge extractors. The breech-piece has a central drill-hole with electric apparatus* for firing the charge, there being a two-handled bent lever for closing the breech. This gun can fire five shots per minute, and fires shrapnel, ordinary, and segmental shells, weighing, when loaded, 40 kilogrammes, 36 kilogrammes, and 36 kilogrammes respectively. The firing charges for the same are 19.617 kilogrammes of pp_1 powder. The mountings are of metal and centrally pivoted, there being hydraulic brake gear. The hydraulic cylinder is worked by a hand-pump for bringing the gun out of the firing position. The vertical and horizontal training of the gun is effected by mechanical gearing. For the protection of the mountings and the gunners there is a shield of hard steel 30 millimetres thick. The running out of the gun to the firing position is effected automatically by the action of gravity. The recoil slide has an inclination towards the front of 8 deg. On this the carriage fitted with antifriction rollers works. These guns have a vertical range of fire of 25 deg. elevation and 10 deg. depression, and a horizontal range of 120 deg., those in the sponsons having a horizontal range of 170 deg. The maximum recoil is 600 millimetres. The ammunition magazines are on the platform deck, the ammunition being conveyed to the hoists by hand barrows and overhead rails. For serving the guns with ammunition, there are two ammunition hoists forward and two aft, each being capable of raising five cartridges at a lift.

These ammunition hoists are illustrated by Figs. 47 to 55, on pages 5 and 7, and are bolted to the underside of the protective deck; they have two cages each, the hoisting engine being so arranged that as one cage descends the other ascends. Each engine has two 6-in. steam cylinders with 7-in. stroke, the drum shaft being driven by helical gearing in ratio of 5 to 1, the winding barrel on the same shaft being 9½ in. in diameter. The hoists, with projectiles, weigh 16 cwt. They are fitted with automatic controlling gear, and the cages have a safety attachment provided for preventing them dropping with projectiles, and so causing an explosion in the event of the hoisting wire being shot away. Upon trial, the time taken to raise the cartridges from the magazines to the upper deck was 18 seconds with steam pressure at 75 lb., although the machinery is designed to stand the full pressure of 145 lb. These hoists were designed and constructed in the Astilleros.

The forgings for the central tubes for the 28-centimetre and 14-centimetre guns were made by Messrs. Thomas Firth and Sons, of Sheffield, and all the external rings by Messrs. Schneider and Co., of Creusôt, the castings for the mountings of the 14-centimetre guns being also supplied by Messrs. Schneider.

The 7-centimetre guns are made from one piece of cast steel, forged, tempered in oil, and afterwards annealed. They are 1130 millimetres long over all, the length of sight line being 442.65 millimetres, and weigh 100 kilogrammes. There are 18 rifle grooves 1.25 millimetres deep and 3 millimetres wide. The chamber, which is conical, is closed by a cylindrical breech-block, the screw of which is divided into six sections, three being plain. There are three lateral cartridge extractors, and a central touch-hole fitted with percussion rod worked by a spring for firing at will. At the after end there is a side projection for working or closing the breech-block, and in connection with it there is a carrying ring for the block, with a lever and a screw-shaped groove in which the side projection works. This gun can fire five rounds per minute. It fires shrapnel, ordinary shells, and canister shot, which weigh, when charged, 3.3 kilogrammes, 3.6 kilogrammes, and 3 kilogrammes respectively, the firing charge being 650 grammes of disc powder.

There are two kinds of mountings—one for use on board and in the boats, and another for use on shore with landing parties. The boat mounting is of metal, with carriage sliding frame and hydraulic brake, mechanical recuperators being fitted for automatically bringing the gun back to the firing position. There is screw gear for vertical training, with a handwheel for working it. The vertical range of fire is 23 deg. elevation and 3 deg. depression for the boat mounting, and 20.3 deg. elevation and 6 deg. depression for the shore carriage or mounting.

The weapons which constitute the remainder of the armament of these cruisers are too well known to necessitate description, further than to state that the 11-millimetre "ametralladoras" are provided with two mountings, one for the military tops and one for the launches or boats. The 57-millimetre guns have hydraulic recoil brake mountings, and command a vertical range of fire of 18 deg. elevation and 20 deg. depression, and a horizontal range of 130 deg. in case of those fore and aft, and 120 deg. in case of those amidships. The 37-millimetre revolver guns are mounted on interchangeable pedestals, and have the same range of fire as the 57-millimetre guns, which are mounted beside them on the main deck.

* Experiments are at present being carried out for effecting the ignition of the charge either by electricity or by percussion, as may be desired, without, at the same time, interfering with the rapidity of fire.

THE THAMES AND BOULOGNE EXCURSION STEAMER "LA MARGUERITE."

WE reproduce on this and the opposite pages profile and deck plans of the new Thames and Boulogne excursion steamer La Marguerite, which a fortnight ago inaugurated a new Channel service under the direction of Mr. Arnold E. Williams, to whose energy is due in large measure the greatly improved steamer service in the estuary of the Thames. Like her predecessors, the Koh-i-Noor and the Royal Sovereign, the new vessel has been constructed by the Fairfield Shipbuilding and Engineering Company, Limited, Govan. She is, however, considerably larger than these vessels, as the following Table of dimensions indicates :

	"Koh-i-Noor."	"Royal Sovereign."	"La Marguerite."
Length between perpendiculars	310	310	330 ft.
Length on water line ...	310	310	330 ft.
Beam	32	33	40 ft.
Breadth over paddles ...	58	61	73 ft.
Depth moulded (to upper deck)	19	19	21 ft. 6 in.
Gross tonnage	880	890.72	2204.99
Draught in service ...	5.9	6	8.9 ft.
Displacement	951.5	1063	1868 tons.

The hull is of steel, with reverse angle frames, and at intervals strong web brackets are introduced at the height of each deck for strengthening the structure. Ten water-tight bulkheads further bind the ship, so that at no speed is there any vibration, even at the extreme ends. The sponsons have a strong box girder

covering in a timber beam, while the sponson brackets are of steel, firmly secured through the shell plating to heavy frames. To facilitate the manœuvring in port a bow rudder has been fitted, as shown on the profile, Fig. 1, and this takes the form of the run of the boat. It is operated by screw steering gear fitted on the upper deck (Fig. 3), and worked with the usual wheel. A simple locking arrangement is fitted for keeping the rudder in normal position when the vessel is driving ahead. The after rudder is of large area, and is fitted with Caldwell's well-known steering-gear, placed in the engine-room under the charge of the engineer, and operating the tiller-head by chain gear. Steam capstan forward and aft and windlass forward enable the ship to be easily warped up against the piers, and the telegraph arrangements from the captain's bridge are very complete, so that all the navigating appliances are of the modern type.

The vessel has four decks, illustrated by Figs. 2 to 5, showing respectively the promenade, upper, main, and lower decks, and one feature which may be here mentioned is that the lighting and ventilation are admirable. The rooms on the lower deck occupy the full width of the ship, and large square windows pierce the shell plating. To conserve the strength, these square spaces are divided into four windows, as shown on the profile. In the case of each alternate window the lower sashes open inwards on vertical axes, and in the centre frame is fitted a lock, so arranged that the turning of the handle locks both windows. The two upper sashes fold downwards, and are guided on racks. These windows are considerably above the water line, and can, therefore, be opened even in the Channel. The lower deck is lighted by large circular port-holes, also fitted above the water line, so that no artificial light need be resorted to. There are many ventilating shafts from the deck above. The electric lighting installation has been fitted by Mr. W. Mackie, 77, Turnmill-street, London, E.C. A vertical high-speed Robey engine with a 9½ in. cylinder and 9 in. stroke, having ordinary slide valve and a Pickering governor, is coupled direct to the armature of an ordinary inverted U-type dynamo, capable of running 360 lights at 250 revolutions, the electromotive force being 100 volts. The number of lights in the ship is 300. A special feature of the installation is the arrangement whereby any defect can be localised and joints repaired without inconvenience or damaging the woodwork of saloons, &c. The dynamo is in the engine-room, and from it the electric current is led to a switchboard on the engineer's platform, whence the current is distributed to omnibus bars in various parts of the ship—on the lower deck aft, lower deck forward, main deck aft, main deck forward, upper saloon aft, and the machinery compartments and amidships. There is a fuse, and a switch on a slate base, and two wires led from the omnibus bar to each lamp, so that the only joints are at the lamp and at the distributing centres. The navigating lights are electric, and on the bridge are two incandescent light projectors, with Edison-Swan double filament lamps for lighting the passenger gangways.

The promenade deck extends three-fourths of the ship's length, and is without obstruction, if we except the wheel-house and chart-room, which forms a centre support for the captain's bridge. On this bridge are telegraphs, gongs, and speaking tubes, enabling the captain to communicate orders to the engineer, and forward and aft, so that he has absolute control of the ship, and this, with the fore and aft rudder, makes it easy to steer the vessel stern first out of Boulogne between the long wooden jetties which protect the inner harbour. As is usual in paddle steamers the engine-room divides the classes, the first-class passengers having all the promenade deck and the after part of the vessel to themselves. Here the dining saloons are fitted on the main and lower decks, as shown on Figs. 4 and 5, and in order to distinguish these apartments they are called respectively the Palace and Marguerite saloons, the distinction being rendered desirable on account of the intention to have a graded tariff to meet the ideas of the passengers. They accommodate about 320 persons. Forward of the main deck saloon on the port side is a retiring room for ladies (Fig. 4), while on the starboard side are cloak-room and a barber's shop. On the upper deck aft (Fig. 3) is the social hall, with ladies' boudoir adjoining, communicating with the ladies' room on the main deck by a separate staircase. This private ladies' saloon is fitted with berths to accommodate any passengers who may be affected by the voyage. Here also are the lavatories, cloak-room, and bath-room (Fig. 4). In a large midship deck-house (Fig. 3) are the captain's and purser's rooms, and six private sleeping cabins or state-rooms. The framing in the first-class accommodation is of dark mahogany, having panels of plane-tree handsomely decorated by paintings of flowers, fruit, &c., in the lower, and of satinwood in the upper, dining saloon, with large mirrors introduced at the ends. The sofas and chairs in these apartments are upholstered in red morocco leather, while in the ladies' boudoir, social hall, and private cabins, they are covered with old gold Utrecht velvet. The windows are all draped with silk curtains, and all fittings are electro silver-plated. At the fore end of the upper, saloon (Fig. 3) is the first-class bar, and forward is the second-class bar. The second-class dining saloon is on the lower deck (Fig. 5), and the accommodation also includes a deck saloon, with ladies' cabin (Fig. 4) and a smoking and refreshment room (Fig. 5). The passenger arrangements are certainly most complete and convenient, and reflect the experience of Fairfield and the shipyard manager, Mr. Shearer.

The engines, designed by Mr. Andrew Laing, are generally similar in arrangement to those of the Koh-i-Noor and Royal Sovereign, and as we illustrated the machinery of the first-named vessel, it is not necessary again to make engravings.* As in the case of the dimensions, &c., of the vessel, we give the details of the three engines for comparison :

—	"Koh-i-Noor."	"Royal Sovereign."	"La Marguerite."
Diameter of cylinders	50 in. and 80 in.	45 in. and 83 in.	56 in. and 110 in.
Stroke of piston ...	5 ft. 6 in.	5 ft. 6 in.	6 ft.
Steam pressure ...	120 lb.	120 lb.	140 lb.
Number of boilers	4	4	4
Type ,, ...	Low Navy	Ordinary double-ended	Ordinary double-ended
Diameter ,, ...	10 ft.	10 ft. 6 in.	14 ft. 6 in.
Length ,, ...	18 ft. 3 in.	16 ,, 9 ,,	18 ,, 9 ,,
Number of furnaces	12	16	24
Diameter of furnaces	3 ft. 4½ in.	3 ft.	3 ft. 8 in.
Indicated horse-power	3300	3500	7500
Revolutions ...	50 knots	52 knots	52 knots
Speed on trial ...	19.499	19.6	22.3

The engines are compound, with the cylinders placed diagonally and working on a two-throw crankshaft, as shown on Figs. 4 and 5. With the exception of the cylinders, which are of cast iron, the engines are entirely of forged and cast steel. The pistons have phosphor bronze packing with coach springs, while the pisten valve to the high-pressure cylinder has Buckley's packing. The high-pressure cylinder piston valve is placed on the outside of the cylinder, and the slide valve of the low-pressure cylinder between the two cylinders (Fig. 5), and these are operated by the usual double eccentric and link motion. The piston and connecting rods have a diameter of 10 in. The crankshaft was forged by Messrs. Beardmore, Glasgow, and is in two pieces, which are interchangeable. The diameter is 20½ in., as is also that of the paddle-wheel shafts, the connection being by flanged couplings. The paddle-wheels have an over-all diameter of 22 ft. 6½ in., and the floats, which are curved, and on the feathering principle, are 13 ft. long. They are constructed entirely of steel. The starting and reversing is accomplished by steam and hydraulic engine. The condenser is made of galvanised steel, and is cylindrical. It is placed athwartship under the engines (Fig. 5), and between the cylinders and the cast-steel brackets for the shafting. The water is supplied to the condenser by Messrs. W. H. Allen and Co.'s centrifugal pump, driven by two engines, each of which is capable of doing the maximum work. This pump is arranged to withdraw from the bilge in the event of a serious leak. The air pumps are driven by a lever connected by links to the low-pressure crosshead. There are two air pumps, as well as two bilge pumps and two sanitary pumps. To the crankpins, crossheads, ahead guides, and main bearings the "Axiom" lubricator is fitted, grease being used, not oil, while the astern guides are fitted with stationary tubes, also on the system of Messrs. Thompson Brothers.

Two boilers are fitted forward and two abaft the engine compartment, so that the machinery is spread over three compartments, and occupies nearly one-third of the length of the vessel. The boilers are of the ordinary double-ended return-tube type, and, as we have stated, are 14 ft. 6 in. in diameter by 18 ft. 9 in. long, each with six furnaces about 3 ft. 8 in. in diameter. There is a common combustion chamber to each pair of furnaces. The boilers are worked under a system of assisted draught, the stokeholds being open, with large ventilating shafts. There are also on board four double inlet fans 6 ft. in diameter, driven by triple-expansion engines on the single-acting system patented by the makers, Messrs. W. H. Allen and Co. The boilers are fed by two of Weir's special engines. Fitted on the main and auxiliary pipes is a feed filter and a feed heater. There are two separate smoke-stacks, the diameter of the funnels being 10 ft., and the height from furnace bars 60 ft. The boilers work under a pressure of 140 lb. to the square inch, and in this, as in most other respects, are in advance as regards power of the two preceding vessels, the Koh-i-Noor and the Royal Sovereign, and, as shown in our Table above, the result is a distinct advance in speed. The new vessel is, therefore, destined to share in the popularity of these two vessels.

* See ENGINEERING, vol. liii., page 656.

CAPITAL AND LABOUR.

TO THE EDITOR OF ENGINEERING.

SIR,—"J. M." seems to be a rather curious admixture of cynicism and abnormal self-complacency. He writes: "You have had lately as correspondents an anti-capital faddist" ("F. G. W."), "an anti-ground-rent faddist" (Mr. Hanssen), "and now you have an anti-betterment faddist; I have replied to the first two, and would like a word with the last." Now cynicism and abnormal self-complacency naturally result from the insufficient exercise of the observing and reflective faculties; and, of course, the retentive faculties, not being brought into play (comparatively speaking), deteriorate through lack of use. It is then that we have the dissatisfaction of seeing a man endeavouring to depend more on his imagination than on his memory. "J. M." must have lapsed into such a condition; for his anti-capital faddist ("F. G. W.") writes: "Capital makes the *best* of servants," &c.; and his anti-ground-rent faddist (Mr. Hanssen) writes: "I for one should be very sorry to see all rents confiscated. . . . what is wanted is some effective way of *regulating* the rent question." And as for his anti-betterment faddist (my own sweet self), I propose to "regulate" him a little there too.

"J. M.," while frantically trying to demolish "F. G. W.," wrote: "A fool can ask as many questions in five minutes as it would take a philosopher five days to answer;" yet he does not hesitate in endeavouring to swamp myself (who am only a *budding* philosopher as yet) with a whole half-column of illustrated questions. His half-column of "illustrated questions," however, were virtually answered by my own immediately preceding whole column of replies; but as a recapitulation of the economic principles which determine the properties of animate and inanimate matter and energy may not be out of place, I will take the liberty, with your permission, of adding a few more observations to those already submitted to your readers. Let us consider "J. M.'s" illustrated questions in their order. "Some years ago a portion of land was sold by the then Town Council of Glasgow for 1500*l.*"—it was 1200*l.*—"to the ancestors of the present owners. The ground has now become valuable. Mr. Macdonald says it is worth 50,000*l.* per annum, and he wishes to take the extra valuo, or what he terms betterment, from the present owner, and give it to some one else, say to the State. I should like to know on what honest principle he could do this." Well, Sir, I do *not* propose to give betterment to the State; nor do I wish to take the above "produot" of betterment (mistakenly called "extra value" of town land) from those who have hitherto succeeded in wheedling it out of the hands of the producers of it; but what I do wish to do is to prevent them from continuing this wheedling process in the future. Moreover, I do not, and did not, affirm that the above-mentioned city land is now more valuable that it formerly was, that is, when it was used for agricultural purposes. I wrote: "The present successor to this 'example' to Glasgow actually draws, and that, too, without the expenditure of any form of energy in the *production* of it, a nice little annual income (an increasing one) of some 50,000*l.*" But although, by reason of his unjust monopoly, he manages to annually ease the producers (*bonâ-fide* capitalists and their employés) of this 50,000*l.*, it does not necessarily follow that the ground in question has become more valuable; for, as a matter of fact, it is now, literally speaking, less valuable. This last statement calls for a further, and, in this case, a more particular, definition of what constitutes betterment.

An all-wise Providence has determined that betterment shall be the product of human enterprise, and that it be divided into two classes, namely: (1) the betterment of agricultural land *only*, and (2) betterment in the implements (capital) which, from time to time, we construct for the purpose of assisting us to tap agricultural and other land, and to help us in the manipulation of the various articles which the tapping process (the "contact force" referred to in page 812) has enabled us to secure possession of. For an example of class 1, which is the betterment of agricultural land only, the following will suffice: Here in this field, let us imagine, is a particular part of the soil, of an area of 1 square foot, and on which at present there grow, let us say, 100 blades of grass, Any method of treatment on the part of humanity which induces this particular square foot of soil to yield a crop of, say, 200 blades of grass, produces betterment. The method of treatment causes the increased growth, and it is the "increased growth,'' let it be noted, not the "treatment," that constitutes betterment. The proceeds of this class of betterment (class 1) should naturally go into the stomachs, on to the backs, and into the pockets of agriculturists only. Let us now examine class 2, which comes under the head of "betterment in the implements" used in the production of wealth, and here I may add that the land itself is not an "implement" (instrument) of production; for an instrument is always a tool, and every engineer knows that it is the province of tools to assist us in operating on raw material—pig iron, for instance, *as* pig iron, is never anything but raw material to the ironfounder, although it may be the finished article in the hands of those who extract it from the ore—and is not land, similarly considered, raw material? Any method of treatment, then, on the part of humanity, which enables us to further control matter and energy—matter in its various forms of solids, liquids, vapours, and gases, and in its combinations of two or more of these forms, and also in its many forms among the lower animals; and energy in *its* various forms, includ-