Lord of the Admiralty announced that the Admiralty intended to base a cruiser squadron at Haulbowline, and probably another at Pembroke Dock. This would appear as if the Admiralty are at last recognising that Milford Haven is a port of importance for the defence of commerce on the West Coast. They have held the opinion in the past, it is evident, from the fact that during manœuvres a defending fleet has been based on Milford Haven on more than one occasion. It is to be hoped that the basing of a squadron here will be an accomplished fact in the near future. The full-power trial of the propelling and other machinery of the destroyer *Wolf* was successfully carried out after her retubing refit and the vessel subsequently proceeded to Devonport. As the result of the completion of the *Wolf* the *Ouse* has been taken in hand.

THE "TITANIC" ENQUIRY.—We have received a reprint, in book form, of the report published by "The Journal of Commerce" relating to the British official enquiry into the circumstances attending the loss of the s.s. *Titanic*, which was held at the Scottish Hall, Westminster, under the presidency of Lord Mersey. In addition to the full report of the evidence and the speeches of Counsel, photographic representations and personal accounts are given of some of the leading individuals in the matter, including Captain Smith and three of the officers who went down with him. The book certainly affords a very concise and compact history of the catastrophe, and should prove most useful to those who wish to go into the details thoroughly.

STEAM TO NEW YORK.—References to the *Comet* and other of the early steamboats reminds us of the first attempt to cross from Britain to America by steam in 1838, when the *Sirius*, about 180 ft. long, steamed under some disability for want of sufficient coal for the run—to New York in about nineteen days. She was closely followed by the *Great Western*, which occupied less time in the crossing by four to five days, both vessels arriving the same day. The *Sirius* was lost in the Irish Channel when nearly ten years old, having been built at Leith in 1837. It may be remembered that the wreck was salved some fourteen years ago and souvenirs made from one of the gun-metal pump rods; on these was inscribed a brief sketch of the vessel's interesting history.

A HOME AND SCHOOLING FOR THE CHILDREN OF MARINE ENGINEERS.—An esteemed correspondent in the Far East has advocated the founding or establishing of a home and arrangements for the education of children of marine engineers whose duties demand their location in lands where children cannot receive that training and education which their parents desire them to have. Many children are sent home to boarding houses or schools, and in some cases the fathers have but little knowledge of those to whom the care of the children is entrusted, dependent as they are upon information from circulars or correspondence. One case is cited where one child was not by any means done justice to in regard to education, in spite of high fees for board and schooling and of reports giving glowing results year by year. The father only discovered when his daughter joined him after some years how he had been deceived. The suggestion has occurred on account of the *Titanic* Engineering Staff Memorial, and the correspondence in connection with it. If a home for orphans of marine engineers could be founded as a memorial, it might be extended to serve as a boarding home with school arrangements for children of marine engineers serving in foreign waters or located in the marine engineering workshops ashore. The boarding home would form a paying part of the establishment, and yearly subscriptions from marine engineers all over the world would cover the payments for the orphans. The contributions to the Memorial are swelling the amount in the hands of the Institute of Marine Engineers, as pointed out by our correspondent, and in his enthusiasm he anticipates a large sum will be gathered, sufficient to form the nucleus of a fund to establish a home which will be looked upon with pride and satisfaction by all marine engineers throughout the world, a home to which they could with confidence send their own children in the consciousness that their education and training would be entrusted to true and faithful hands.

THE SABATHÉ MARINE OIL ENGINE.

IN the Sabathé engine described below we have a type of marine residue oil consuming engine that is distinct from all other oil engines, and although the pure Diesel class can be said to have a remarkably low fuel consumption, the engine in question has been proved to be even more economical, as its consumption of heavy Russian oil has been brought down as low as ·392 lbs. per b.h.p. per hour against ·430 lbs., the lowest yet attained by any ordinary marine Diesel. This has been obtained by the adoption of a system giving combustion at constant volume and at constant pressure, whereas the pure Diesel operates under constant pressure only. So it will be seen that the Sabathé engine is an improved development of the Diesel. Combustion is, of course, by heat developed by compression alone, no hot-pot, tube or electrical ignition gear being required. The designers and builders of this novel engine are the Société des Moteurs Sabathé, of Usines de la Chaléassière, St. Etienne, a firm of repute in France that have already fitted a number of submarines of the French Navy and yachts. The fuel consumptions given were taken during official tests of a large engine built for the French Government. The Sabathé engine is of the reversible four-stroke type, so, of course, the cycle of operation is as follows, First, air suction; second, compression; third, fuel injection and combustion; fourth, scavenging.

We are able to illustrate two marine engines, Figs. 1 and 2, one of 40 h.p. at 600 r.p.m. and one of 500 h.p. at 400 r.p.m., which are two excellent examples of Sabathé design. The sizes constructed range from a two-cylinder 10 h.p. model, to an eight-cylinder engine of 6,000 h.p., although we understand that the largest engine actually constructed and tested has four cylinders and is of 700 b.h.p., or 175 h.p., per cylinder, which is no mean power, when one considers that the engines of the famous 9,800-ton ships *Selandia* and her sister motor ships only develop 156 h.p. per cylinder.

The 500 h.p. engine illustrated has a fuel consumption per brake-horse-power of 178 grams (one gram equalling ·035 ounces avoirdupois) at the normal running speed of 400 revs. per minute, that is to say, a total consumption of 1 cwt. 83 lbs. 9 ozs. per hour. At 350 r.p.m. the engine develops 300 b.h.p. with a fuel consumption of 179 grams per b.h.p. hour, or 1 cwt. 6 lbs. 6 ozs. per hour. On dropping the engine speed to 250 r.p.m. the power given is 110 b.h.p. and the fuel consumption increases per b.h.p. hour to 200 grams, but the total hourly consumption at this speed is only 43 lbs. 2½ ozs., partly due to the great reduction of power. So it will be seen that although the proportionate consumption at low speeds is higher, the engine is remarkably economical when running slowly. Taking residue oil at threepence per gallon the 500 h.p. Sabathé engine costs but 12s. per hour to run at full speed; while at 250 revs. per minute, the cost is only 3s. per hour's running.

In addition to the 500 h.p. Sabathé engine, we are enabled to give illustrations of the 40 b.h.p. model, which being the engine of an auxiliary yacht, will doubtless be also of interest, especially as it is not very well known that high-compression marine oil engines can be obtained in very low powers. Sabathé engines are built down to 10 h.p., and up to 6,000 h.p., as before mentioned. During a four-hour test of this engine 42 b.h.p. was developed at an average speed of 575 r.p.m., the fuel consumption of heavy Russian residue oil being 9,156 grams (about 1¾ gallons), whereas a petrol or paraffin engine of this power would require at least four gallons per hour, so the economy is apparent, especially as the lighter fuels are more expensive. Against this, of course, must be weighed the higher cost of the Diesel type of engine, but it must be remembered that the fuel cost us under 6d. per hour.

Now let us turn to the working and constructional details of the 500 h.p. Sabathé marine engine. It is directly reversible and operates on the four-cycle type, figure 3 showing a section of one of the cylinders, which, it will be noted, are fitted with steel liners. To overcome frictional troubles the pistons have several broad white-metal bands in addition to five cast-iron piston rings. In the head of each cylinder there are four valves, namely, atmospheric air inlet valve, exhaust valve, air starting valve and fuel injection valve, all of which are operated by rockers from a cam-shaft on the

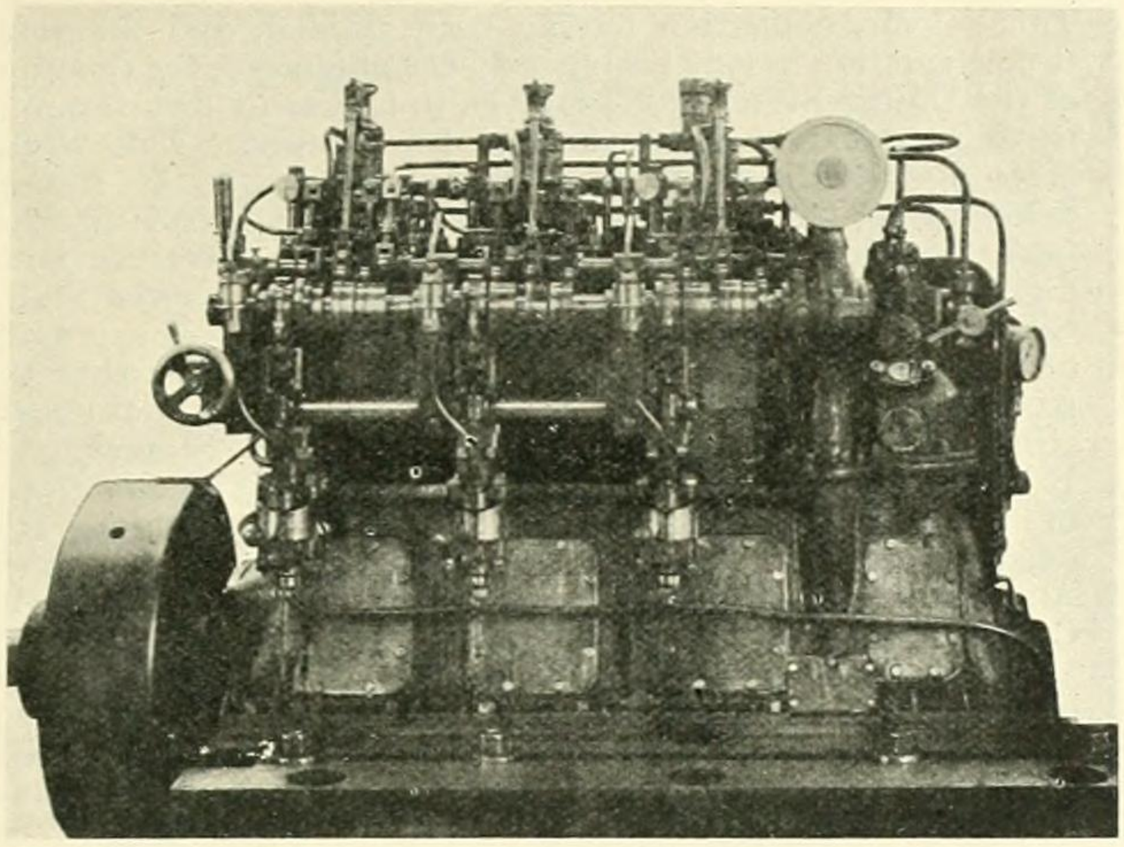

Fig. 1.

40 H.P. Sabathé Engine.

starboard side. There are two sets of cams, one for the ahead motion and the other for the astern movement, and both sets form a sleeve on the cam-shaft, the sleeve being moved lengthwise for reversing by means of a hand wheel; but first the rollers of the valve rockers are lifted from the cams by means of a lay-shaft operated by compressed air. A three-stage compressor, supplies air to storage tanks, for fuel injection, starting and reversing. The pistons can be removed through the doors in the crank case.

Turning to figure 4 the general arrangement of the fuel injection valve is shown. This is of unique and ingenious design and deserves special attention. On the first downstroke of the piston, air is drawn into the cylinder, and on the up-stroke it is compressed to 400 lbs. per square inch, while just as the crank turns over the dead centre *fuel is injected in two stages*, this being done as follows :—Oil is forced from plunger-type fuel pumps, to the two chambers (G) and (E) through the passages (B) and (J). Just as the piston almost reaches the top of the stroke the fuel valve (A) is lifted by means of the cam (P) the motion being affected by the rocker (Q) and the rod (R) and the fuel in the chamber (G) is injected

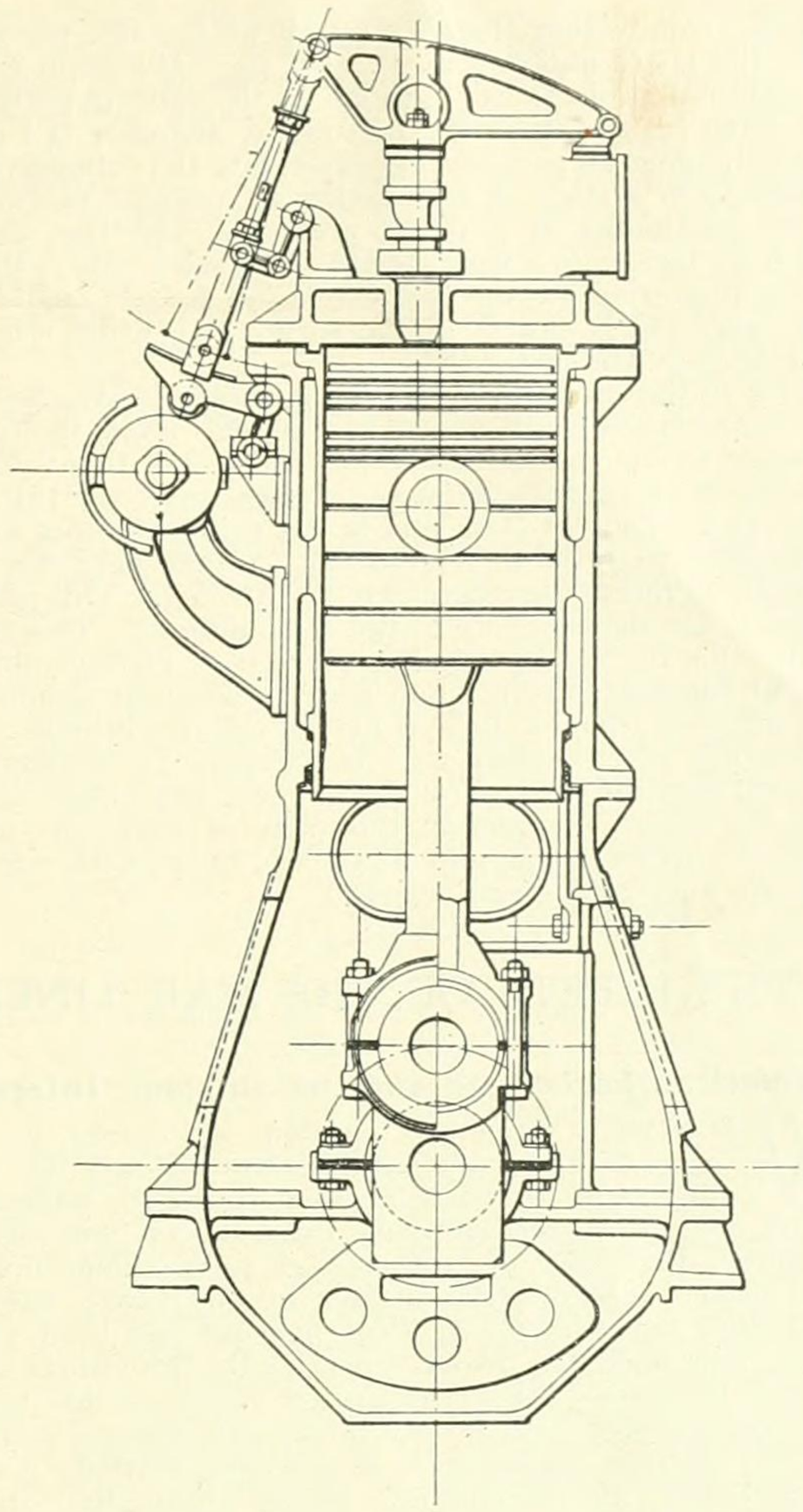

Fig. 3.

Cross Section of 500 H.P. Sabathé Engine.

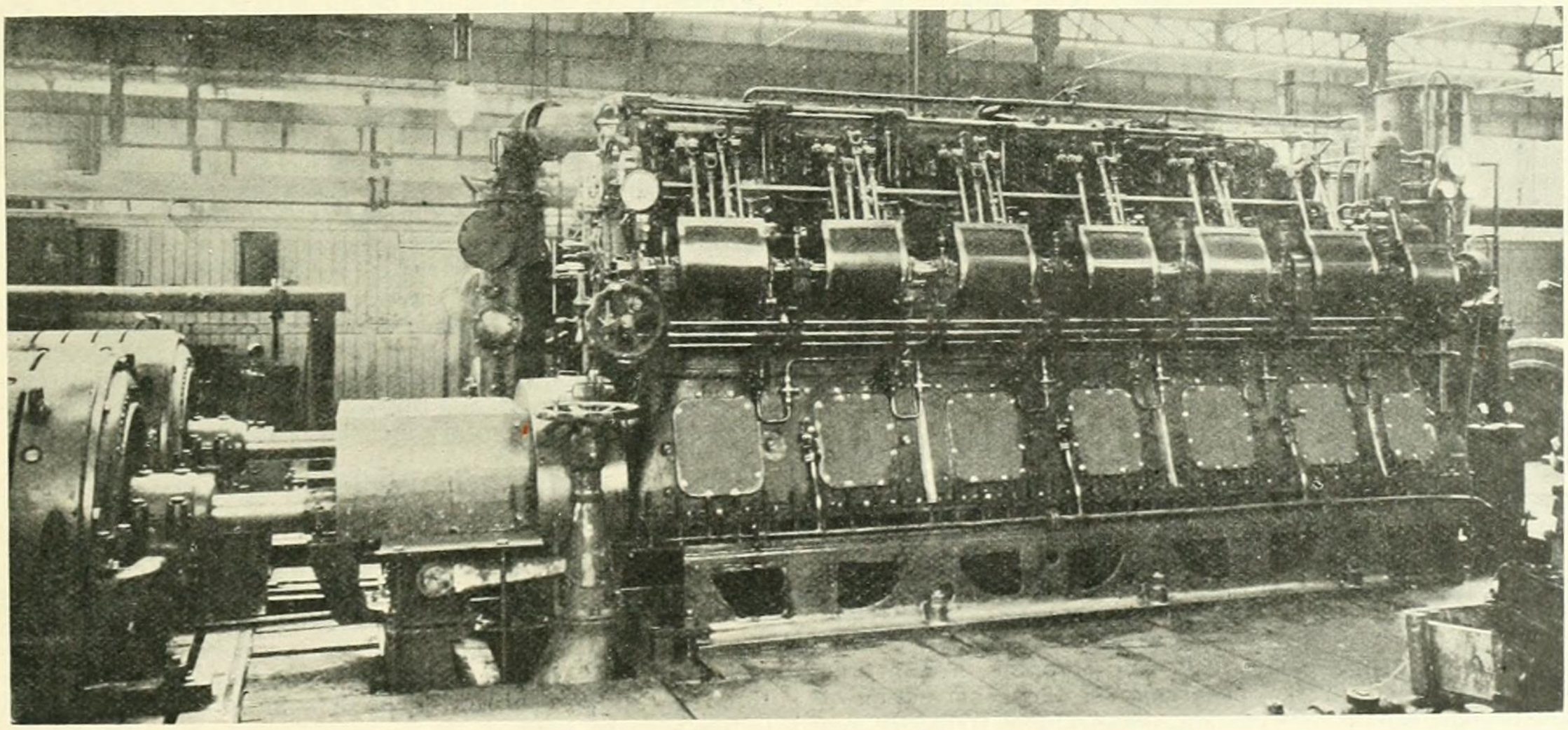

Fig. 2.

500 H.P. Sabathé Engine.