IMPROVEMENT IN STEAMSHIPS.

That there is ample room for improvements in the construction of steam vessels and in methods of operating them no one will doubt after reading the records of marine disasters for the last few months, and no one who has encountered a rough sea on ordinary vessels would fail to patronize a line of steamers free from pitching and rolling and practicably unsinkable.

Our engraving shows a steamer intended to be of sufficient length to ride several waves at once, and thus avoid pitching, and having breadth of beam sufficient to prevent rolling. The vessel is without masts or rigging, and is to be propelled entirely by steam.

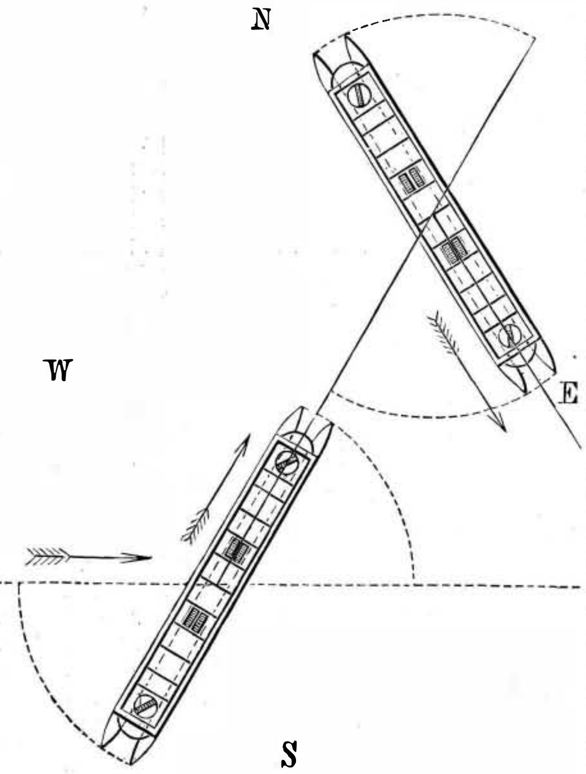
The vessel consists of two longitudinal tubular pontons, sustained parallel to each other at a suitable distance apart by transverse connecting braces, in combination with struts extending vertically from each ponton, longitudinal airtight cylinders connected to the upper ends of the vertical posts or struts immediately above and parallel to the pontons, and transverse braces connecting the two cylinders, the structure so formed being adapted to sustain the deck, cabins, and machinery of a sea-going vessel, and the arrangement being such that if the posts or struts and upper horizontal cylinders, which mainly support the deck and cabins, should accidentally become detached from the pontons by rough usage, the upper cylinders will still subserve the purpose of floating the remaining structure.

The tubes or pontons by which the vessel is supported are pointed at each end, to facilitate the passage of the vessel through the water, and are divided by transverse partitions into a series of water-tight compartments or bulkheads, so that if one of the compartments should be penetrated the remainder of the tube or ponton would be kept free from water. This arrangement of compartments adds greatly to the safety and strength of the vessel and renders it almost impossible to sink her.

The vessel is furnished with four paddle wheels, two of which are fixed at or near the center of the vessel, and are employed in driving the vessel ahead. Two other paddle wheels are arranged one at each end of the vessel. These paddle wheels have horizontal shafts, are supported in turntables which turn on vertical axes, so as to enable the paddle wheels to revolve in a plane parallel with the length of the vessel, or at right angles thereto, as shown in Fig. 2, or, if desirable, at any angle between the two positions. The object of thus swiveling the paddle wheels is to permit the vessel to be propelled in a direction transverse to the run of the waves without turning so as to present the broadside to the action of the waves, and they are also used in steering and maneuvering the vessel. There is at each end of the vessel a rudder of the usual form.

To make the ship lay to, in case of a storm, and to prevent as far as possible the drifting of the vessel in the direction of the run of the waves, the inventor has applied what he calls "water anchors," which consist of heavy iron plates hinged at the under side of the vessel and arranged transversely. When the vessel lays to and it is desired to keep from drifting, the anchor in the end of the vessel heading the run of the waves is let down; but when the vessel is being propelled forward, these anchors are swung up and secured in a horizontal position at the under side of the vessel.

The inventor states that, as the displacement of water is much less than that of common vessels, and as the propelling power is much greater, a very high rate of speed can be attained; and, although the vessel is very long, it may be maneuvered as readily as shorter vessels, as the end paddle



OLSEN'S PONTON STEAMER.—MANEUVERING.

wheels may be used in conjunction with the rudders in steering. It is easy, with this arrangement of machinery, to turn her in her own length.

The "Ponton Steamship" is peculiarly adapted for ocean navigation, but it is believed that even on rivers and lakes it will prove superior to other vessels. It can be made long enough to span several waves at once, thereby avoiding all pitching, and by never allowing the side to be presented to the rim of the waves rolling will be avoided.

In regard to her course in relation to the wind: Suppose the ship to be sailing east, then west and east winds are fair. Winds from any point within an eighth of the compass of these winds would not alter the course of the ship, but if heavy northerly or southerly winds prevailed it would be necessary to beat against them by tacking. The annexed diagram shows the maneuvering of the ship when sailing east with a north wind blowing. The arrows show the course of the vessel. It is claimed that the expense of building and running a vessel of this description will be much smaller than that of common ships.

Further information in regard to this invention may be obtained by addressing Mr. A. Olsen, 181 Richard street, Brooklyn, N. Y., until October 1. Permanent address, P. O. box 580, Salt Lake City, Utah.

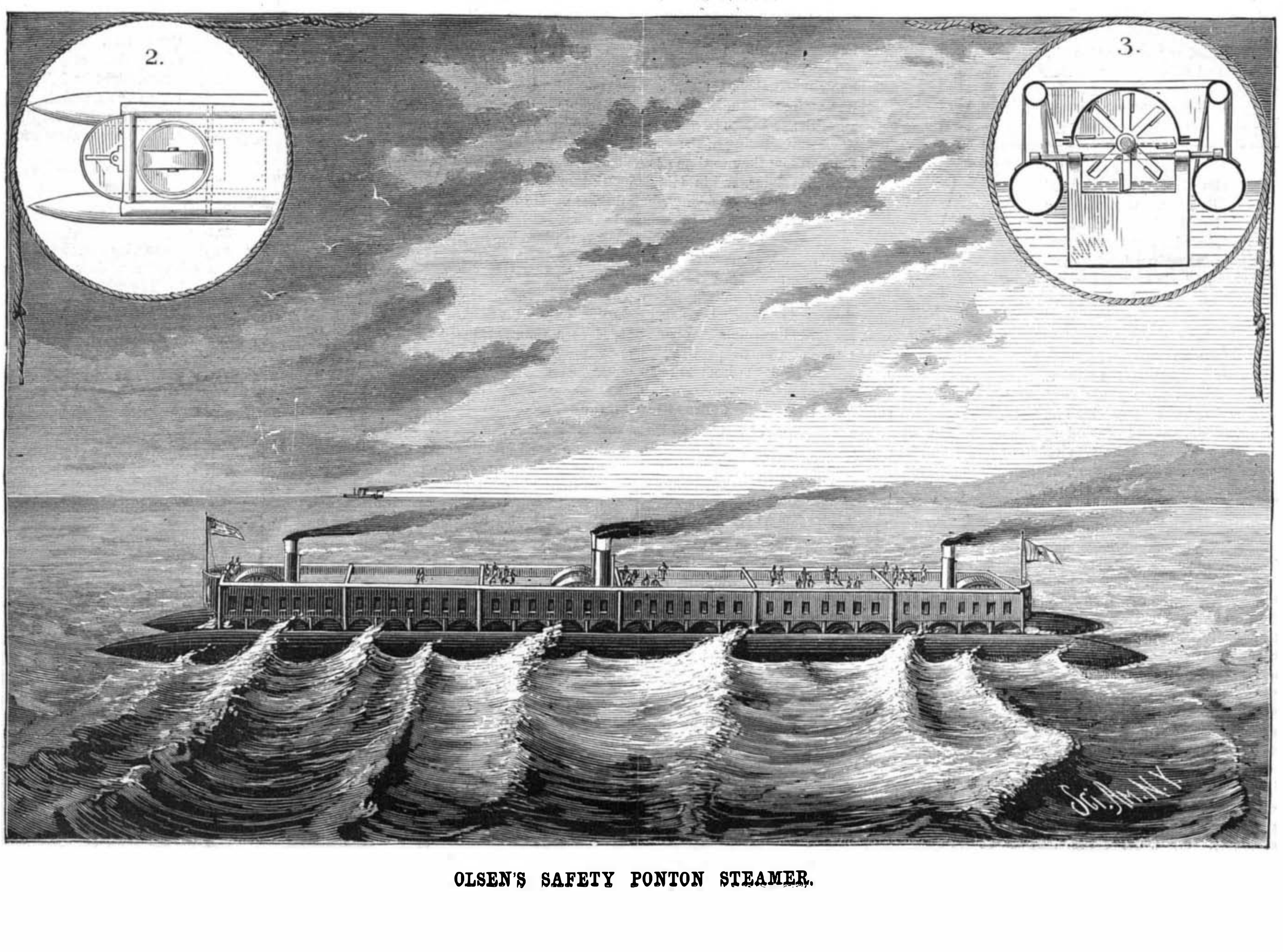
American vs. European Locomotives.

In his annual address as vice-president of the American Society of Civil Engineers, Mr. Octave Chanute compares the working of American and European locomotives, and makes out a strong case in favor of the superior efficiency of the former. Early locomotives were not expected to have a dragging power greater than one-fourteenth of the weight upon their driving wheels. Now, in other countries, one-seventh of the weight is considered a standard and satisfactory performance, while American locomotives regularly work up to one-fifth in winter and do rather better in summer. That is to say, a European locomotive weighing 88,000 pounds might be expected to pull a train equal in resistance to lifting 12,571 pounds, while an American locomotive would pull 19,555 pounds, or 55 per cent more. The average locomotive of Europe travels 15,720 miles per year, while the American performance is 21,900 miles. The reason assigned is simply that the American machines are better ones, and two chief improvements on the European prototype are mentioned: First, the leading wheels of locomotives and all car wheels are not rigidly attached to the frames, but are fixed to trucks pivoted at the center; and, secondly, equalizing levers are used to distribute the weight equally over the driving wheels, thus keeping its apportionment nearly constant, while the wheels are free to adapt themselves to all the irregularities of the track. These and other improvements have reduced the resistance of cars so much that recent experiments have developed a rolling friction of only four or five pounds per ton, or actually only half that given in engineering note books.

MECHANICAL INVENTIONS.

An improved lock, provided with a controlling latch consisting of a flat bar provided with a pin extending into a slot in the tumbler and with a vertical projection at the end, has been patented by Mr. Christian F. Otto, of Zerbst, Germany.

Mr. Duryea S. Van Wyck, of Fishkill Plains, N. Y., has patented a device whereby power can be more conveniently applied to a sewing machine, and whereby the motion of the needle bar may be checked at will without arresting the



OLSEN'S SAFETY PONTON STEAMER.

motion of the treadles or the momentum of the balance wheel. The invention consists of a seat and treadles arranged so that the operator can easily apply the weight of the body upon the latter, of novel attachments for slackening and tightening the driving belt, and for arresting and restoring motion to the needle bar.

Mr. John Connelly, of Hallowell, Me., has patented improvements in sewing-machines, which relate to a permanent attachment for sewing-machines of a certain class, the function of which is to aid in removing the shuttle from the raceway. It consists of a spring-plunger or lifting-rod, attached to the oil pan of a sewing-machine beneath the raceway, so that it is made available in raising the shuttle when it is to be removed.

THE ANTHRACITE.

THE LITTLE STEAMER WHICH IS RUN BY ONE POUND OF COAL PER HORSE POWER PER HOUR.

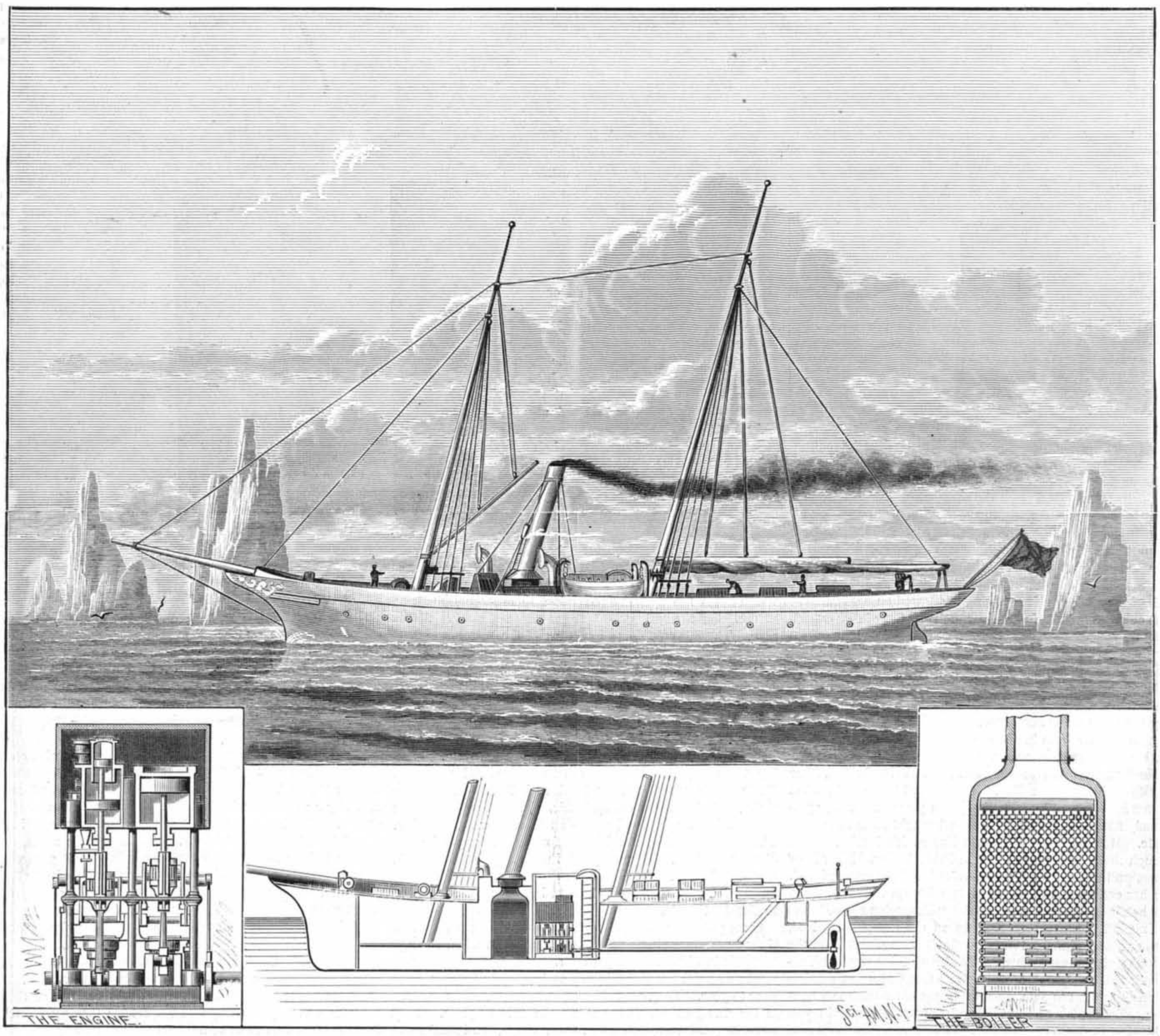
The recent arrival of this little vessel in New York Harbor has excited an unusual degree of interest among engineers. Those interested in running marine boilers and engines are curious to know all the particulars regarding the machinery of the craft, which gives a practical illustration of the attainment of the greatest economy in fuel ever yet reached. We therefore present the accompanying engraving illustrating the general appearance of the steamer, and give outlines of her machinery, showing the proportionate space it takes up in the vessel. In former numbers of the SCIENTIFIC AMERICAN, as well as of the SUPPLEMENT, we have given some of the leading particulars regarding her construction, and have illustrated and described the Perkins system of utilizing steam at high pressures, and we now present some details not before given.

Of the 84 feet length of the Anthracite, her engines, furnaces, and boilers take up a space of 22 feet 6 inches, leaving a hatchway, kitchen, and forecastle cabin in the forepart of the boat, besides a water-tight bulkhead, which takes up 5 or 6 feet; abaft the engines are three cabins, with extra sleeping bunks beside the hatchway, and a water-tight bulkhead in the stern. The screw is of the ordinary fish tail pattern, with two blades. Her gross tonnage is 70·26 tons, and her registered tonnage 27·91 tons. Her average consumption of coal since she left England, on the voyage thence to Newfoundland, and from there here, has been one ton of coal a day, Welsh bituminous coal having been burned on the voyage. The weather was very rough coming out, consequently the sails could be used but little, and she is not remarkably well fitted for sailing, but her lines are such that she is well adapted to outride the roughest sea. The counter which registers the revolutions of her screw was set at 0 before she left England, and now marks 3,980,000. She has hitherto burned only bituminous coal, but it is intended to test the economy of using anthracite. In the voyage over the furnace was operated without any artificial blast, the natural draught only being used, but there is a fan blower connected with it which can be brought into use if increased consumption of fuel and a proportionately higher pressure of steam are desired.

The peculiarity of the machinery which effects the great economy of fuel lies solely in the means employed for using steam at very high pressures safely, and without undue wear or strain. The average boiler pressure on the voyage over was from 350 to 400 pounds to the square inch, but the boilers had previously been tested up to 2,500 pounds per square inch by hydraulic pressure, this pressure having been maintained for some time without showing any defects whatever. The body of the boiler consists of a series of horizontal tubes, welded up at each end, and connected together by a vertical tube, and the several sections are connected by a vertical tube to the top ring of the fire box, and by another to the steam collecting tube. The fire box is formed of tubes bent into a rectangular shape. The boiler is surrounded by a double casing of thin sheet iron, filled up with non-conducting material to prevent loss of heat. The cylinders and valve boxes are steam jacketed, and further protected by jackets of non-conducting material; so that, although all the parts are kept at a high temperature, the heat given out in the engine and fire room is much less than is usual with ordinary marine engines. The sections of tubes of the boiler are connected so that any one of the sections may be taken out and replaced without interfering with the others, and in case of any accident causing a rupture of one of the tubes, the comparatively small amount of steam liberated would escape up the smoke stack, while the remaining sections of tubes could be used with increased pressue to make good the loss. Very little water is lost in operating these boilers and engines. All the joints and valves are practically very nearly perfect. The steam generated is constantly and completely condensed in a surface condenser, and the water is reused; the loss of water is extremely small, and the additions required are easily provided for. Under these circumstances there is no deposit or scale inside the boiler, and the wear of the boiler is very slow. One built and operated on this principle, which was taken to pieces after twelve years' use, showed no appreciable effects of use. The steam required for the whistle, and also that for cooking, is generated in a small supplementary boiler heated by a coil from the main boiler, the coil being placed inside the boiler and in contact with the sea water, from which the steam is made. The steam coming from the main boiler is returned to the condenser to be reused in the boiler.

The difficulty arising from friction and imperfect joints in practically working machinery at high pressures was one of the most serious obstacles encountered in developing this system. The inventor, after a long series of experiments, adopted an anti-friction alloy, of which the packing rings and internal rubbing surfaces are made. No lubrication is required beyond that furnished by the steam. The inventor states that cylinders fitted with piston rings made of this metal have been several years at work, the cylinders showing no signs of wear, the only wear occurring on the rings, which may be easily and cheaply replaced. Not only is the cost of oil and grease thus saved, but the destructive action on the machinery and boiler of the acids generated from lubricants is avoided.

For the use of steam at these high pressures three differ-



THE ANTHRACITE THE SMALLEST STEAMER THAT EVER CROSSED THE OCEAN.