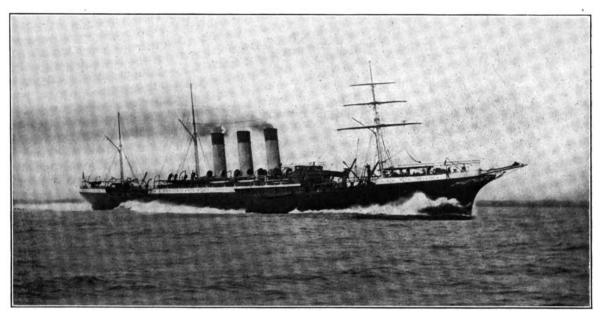
## RUSSIAN VOLUNTEER FLEET STEAMERS.

BY FRANK C. PERKINS.

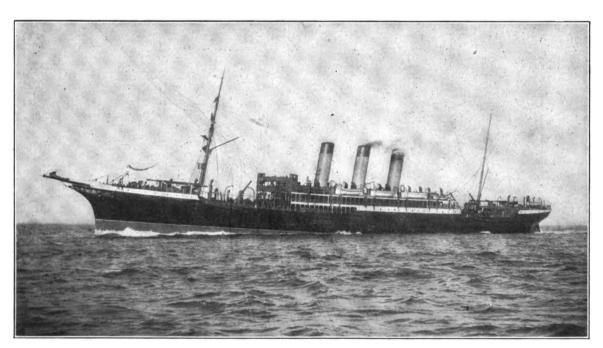
A number of the Russian volunteer fleet steamers have been constructed in English shipyards, and it may be of interest to note some of the details of construction of the two vessels *Kherson* and *Smolensk*, recently completed at the Hebburn shipbuilding yard of R & W. Hawthorn, Leslie & Company, Limited, of Hebburn-on-Tyne.

der measures 36 inches in diameter, the low-pressure cylinder 92 inches, and the intermediate 57 inches. The steam is supplied from 24 Belleville boilers working at a pressure of 250 pounds per square inch. This fleet steamer has attained, on trial, a speed of 19.5 knots.

The twin-screw transport steamer Smolensk was originally designed for trade between Russia and the far east, in time of peace carrying cargo and immigrants, and in time of war being used as a fast cruiser. The total length of the Smolensk is 506 feet over



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The Russian volunteer fleet steamer Kherson is of the twinscrew type, having a length over all of 493 feet. The molded depth of this steamer is 37 feet 3 inches, while the breadth is 54 feet 3 inches. She is fitted with accommodations for 1,480 troops and 72 officers or first-class passengers, and 46 third-class passengers. Provision is made for the mounting of seven 4.7-inch guns. The main engines consist of two sets of the triple-expansion type, having a stroke of 54 inches. The high-pressure cylin-

all, the depth being 37 feet, and the breadth 58 feet. This vessel is fitted up with cabin accommodations for 1,560 troops and 86 officers, and provision is made on her decks for 18 quick-firing guns and for 10 ammunition magazines on the orlop-deck with steel trunkway leading thereto from the upper deck.' She is fitted with electric-fan ventilation throughout; also large steam bread oven, disinfecting plant, and cold-storage rooms, as well as steam laundry, four galleys, and two hospitals. Her water-tight bulk-

heads are so spaced and strengthened that any two compartments may be in open communication with the sea without the vessel's foundering. The steam suction pipes in the holds are also said to be of a most efficient kind, the pumps being capable of delivering over the side 800 tons of water per hour.

The main engines of the Smolensk consist of two sets of the marine triple-expansion type, each having six cylinders, with a stroke 48 inches in length. The two high-pressure cylinders are 26 inches in diameter, the two low-pressure cylinders 75 inches in diameter, and the two intermediate cylinders are 44 inches in diameter. They are so arranged that one high, one intermediate, and one low pressure on each shaft can be thrown out of action when cruising at half power. The engines of this Russian volunteer fleet steamer are supplied with steam from 24 Belleville watertube boilers working at a pressure of 250 pounds per square inch. On trial this vessel has attained a maximum speed of 20.25 knots, and is said to have given excellent service. She escaped into Woosung, the port of Shanghai, after the disastrous naval battle of the Sea of Japan.

## MACHINERY OF THE NEW ANCHOR LINER CALEDONIA.

BY BENJAMIN TAYLOR.

The Caledonia, built by D. & W. Henderson Company, of Glasgow, is 515 feet long, 58 feet broad, and 36 1-2 feet deep, and has accommodation for 300 first-class passengers, 400 second-class, and 800 third-class or steerage. Her draft of 27 feet has been limited to enable her to navigate the river Clyde up to Glasgow. The gross tonnage is 9,400, and load displacement 16,000 tons. She is driven by two sets of triple-expansion engines, each set having three cylinders measuring 31 1-2, 51 1-2, and 85 inches in diameter respectively, with a piston stroke of 54 inches.

The cylinders of each engine are rigidly bolted together and stand on six massive cast-iron columns, the front or inner columns being of rectangular section and divided at the bottom for the double purpose of giving fore-and-aft rigidity to the engines, and also, by permitting the cranks to pass between the columns' feet, of providing ample room on the starting platform between the two engines. The back columns are of cylindrical section, with sufficient taper in their length to provide ample area at their bases to ensure stiffness. The sole-plates, to which the columns are securely bolted, are made in three pieces bolted together. They are of hollow rectangular section, and have strong flanges at the bottom for fixing the engines to the top of the ballast tank. The crank-shaft is in three interchangeable parts and is of the built-up type. Each part is carried on two bearings of extra length, lined with white metal. The bearings throughout the entire engines are made with extra large surfaces, so as to ensure efficient working and minimize the possibility of accident.

The cross-head guide plates on the columns are of hollow section, through which an ample cold-water circulation is provided. The air pumps are on Edward's patent system, and are fixed to the back columns of the intermediate engines, from the cross-heads of which the pumps are driven by means of the usual levers; attached to the air pumps, one on either side, and driven by the same cross-head, are two bilge pumps. The condensers are carried on the lower deck beams close to the side of the ship, and quite separate from the main engine structure; the cold-water circulation through them is supplied by two large centrifugal pumps driven by vertical steam engines, and placed on the level of the starting platform between the low-pressure engines and the ship's side, the diameter of the delivery pipe being 16 inches. There are no feed pumps driven direct by the main engines, the whole of the water necessary for feeding the boilers being supplied by two pairs of Weir's feed pumps of large capacity, each pair being sufficient to provide the entire feed water required. There is to each set of pumps a pipe leading from the hot well to a float tank, with automatic control valve. One pump taking the water from this float tank first passes it through an Alley &

