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LLOYD'S REGISTER OF BRITISH AND FOREIGN SHIPPING.

ENGINEER SURVEYOR'S REPORT ON MACHINERY.

ENGINES.

Report (if any) on Hull of Vessel. Port *Glasgow* No. *4569*

Description *Compound Inverted Direct Acting*
 Made by *Muir & Houston*
 When *1877* At *Glasgow*
 Diameter of cylinder *20" x 30"* Length of stroke *24"*
 No. of revolutions per minute *85*
 Point of cut off *9"*
 Diameter of screw shaft *6 3/4"*
 Diameter of crank shaft journals *6 3/4"*
 Diameter of screw, ~~axle~~ *axle* *9 1/2"*
 Pitch of screw *13.6" to 14 1/2"*
 No. of blades *four* Total surface *28 1/2 ft*
 No. of bilge pumps *one* and sizes *2 3/4" dia x 14 1/2" stroke*
 Do they pump from each compartment *yes*

Are all the bilge suction pipes fitted with roses *Yes*
 No. of feed pumps *one* and sizes *2 3/4" dia x 14 1/2" stroke*
 What gauges are there attached to the engines and boilers ... *One Steam and one Vacuum*
 Description and size of Donkey Pumps ... *Double acting 6" dia x 6" pump*
 Where do they pump from ... *From the Sea Bilge & Ballast Tank*
 No. of bilge injections *one* and sizes *2" Cocks*
 Are they connected to air, or circulating pumps *to Air pump*
 Is there a hand pump in the engine room *yes*
 Can it be worked by the main engines *no*
 Is there a deck hose of sufficient length to reach to any part of the vessel *yes*

MAIN BOILERS.

Number *one* Description *Round Horizontal*
 Made by *Muir & Houston*
 When *1877* At *Glasgow*
 Working pressure *65 lbs*
 Tested by hydraulic pressure to *130 lbs*, Date *Nov 23rd 1877*
 Description of super-heating apparatus *None*
 Can each boiler be worked separately *yes*

Can the super-heater be shut off and the boilers worked separately *Yes*
 Description and area of safety valves on each boiler ... *Two Direct Spring each 8.2" area*
 No. of square feet of fire-grate surface in each boiler *34 1/6 ft*
 Are there separate blow off and brine cocks on each boiler, independent of those on the vessel's skin *yes*
 Are all pipes, cocks, roses, and pumps in connection with the machinery accessible at all times. *yes*

DONKEY BOILER.

Description *Round Vertical*
 Where fixed *In Stoketold*
 Working pressure *65 lbs*

Tested by hydraulic pressure to *130 lbs*, Date *Nov 23rd*
 Description and area of safety valves *Two straight 7" area*
 No. of square feet of fire grate *9.6" area*

PIPES, COCKS, AND CONNECTIONS.

Are all connections with the sea direct on the skin of the ship *Main Injection is fitted on seat*
 Are they Kingston valves or common cocks ... *Screw down Valves and Cocks*
 Are they fixed sufficiently high on the ship's side to be seen without lifting the stoke hold plates ... *The Donkey Boiler Sea Cocks are under plates but are fitted as high as possible for bunkers*
 Are the discharge pipes above or below the deep water line *yes*
 Are they each fitted with a discharge valve on the plating of the vessel *yes*

What pipes are carried through the bunkers *None*
 How are they protected *None*
 When were the stern tube, propeller, screw shaft, and all connections examined in dry dock *On Slip previous to being launched*
 Are the pipes, cocks, and valves arranged so as to prevent an unintentional connection between the sea and the bilge *yes*
 Is the screw shaft-tunnel water tight and fitted with a sluice door on bulkhead *yes*

Muir & Houston Manufacturer.

I hereby certify that the whole of the above are correct particulars of the Machinery and Boilers of the Iron ~~or Wood~~ Screw ~~or Paddle~~ Steam Vessel *"Otter"* owned by *London & Edinburgh Shipping Coy* of the Port of *Leith* of *199* Tons Register, and *55* Registered Horse Power, and that they have been carefully inspected and examined by me at *Paisley & Glasgow* and found to be at this date, viz., *Dec 22nd* 18*77* in good order and safe working condition.

Amount of Fee for Survey ... £ *2 : 15 :*
 (Travelling Expenses, if any, £ *12 10 0*)
 (1000/31/7/76.)

James Molloy
 Engineer Surveyor to Lloyd's Register of Shipping.

