

# REPORT ON MACHINERY.

No. *5004* Port of *Dundee* Received at London Office **MONDAY 3 OCT 1887**  
 No. in Survey held at *Dundee* Date, first Survey *May 12<sup>th</sup>* Last Survey *26<sup>th</sup> Sept. 1887*  
 Reg. Book. *145* on the *Iron S.S. Waverley* (Number of Visits *3096*) Tons *2022*  
 Master *Calvert* Built at *Dundee* By whom built *Gourlay Bros* When built *1881*  
 Engines made at *Dundee* By whom made *Gourlay Bros* *triple* when made *1884*  
 Boilers made at *"* By whom made *"* when made *1887*  
 Registered Horse Power *320* Owners *Williamson Milligan & Co* Port belonging to *Liverpool*

**ENGINES, &c.**—  
 Description of Engines *Triple expansion, Surface Condensing, 4 cylinders*  
 Diameter of Cylinders *19", 19", 41", 68"* Length of Stroke *48"* No. of Rev. per minute *65* Point of Cut off, High Pressure *.5* Low Pressure *.48*  
 Diameter of Screw shaft Diam. of Tunnel shaft Diam. of Crank shaft journals Diam. of Crank pin size of Crank webs  
 Diameter of screw Pitch of screw No. of blades state whether moveable total surface  
 No. of Feed pumps diameter of ditto Stroke Can one be overhauled while the other is at work  
 No. of Bilge pumps diameter of ditto Stroke Can one be overhauled while the other is at work  
 Where do they pump from  
 No. of Donkey Engines Size of Pumps Where do they pump from  
 Are all the bilge suction pipes fitted with roses Are the roses always accessible Are the sluices on Engine room bulkheads always accessible  
 No. of bilge injections and sizes Are they connected to condenser, or to circulating pump  
 How are the pumps worked  
 Are all connections with the sea direct on the skin of the ship Are they Valves or Cocks  
 Are they fixed sufficiently high on the ship's side to be seen without lifting the stokehold plates Are the discharge pipes above or below the deep water line  
 Are they each fitted with a discharge valve always accessible on the plating of the vessel Are the blow off cocks fitted with a spigot and brass covering plate  
 What pipes are carried through the bunkers How are they protected  
 Are all pipes, cocks, valves, and pumps in connection with the machinery accessible at all times  
 Are the pipes, cocks, and valves arranged so as to prevent an unintentional connection between the sea and the bilges  
 When were stern tube, propeller, screw shaft, and all connections examined in dry dock  
 Is the screw shaft tunnel watertight and fitted with a sluice door worked from

**BOILERS, &c.**—  
 Number of Boilers *Two* Description *Circular tubular* Whether Steel or Iron *Steel*  
 Working Pressure *100 lb* Tested by hydraulic pressure to *320 lb* Date of test *10/8/87*  
 Description of ~~superheating apparatus or~~ steam chest *Longitudinal circular*  
 Can each boiler be worked separately *Yes* Can the superheater be shut off and the boiler worked separately   
 No. of square feet of fire grate surface in each boiler *77.5 sq ft* Description of safety valves *Spring* No. to each boiler *Two*  
 Area of each valve *8.29 sq in* Are they fitted with easing gear *Yes* No. of safety valves to superheater  area of each valve   
 Are they fitted with easing gear  Smallest distance between boilers and bunkers or woodwork *10 in* Diameter of boilers *12' 9"*  
 Length of boilers *10' 0"* description of riveting of shell long. seams *Double butt* circum. seams *Lap joint* Thickness of shell plates *1 5/32*  
 Diameter of rivet holes *1 3/16* whether punched or drilled *Drilled* pitch of rivets *8"* Lap of plating *17 7/8" straps*  
 Per centage of strength of longitudinal joint *85%* working pressure of shell by rules *106* size of manholes in shell *17" x 13"*  
 Size of compensating rings *4" x 4" x 3/4"* No. of Furnaces in each boiler *Six*  
 Outside diameter *3' 2 1/2"* length, top *6' 5"* bottom *7' 11 1/2"* thickness of plates *1/2"* description of joint *Jos's Corrugated flue* if rings are fitted *No*  
 Greatest length between rings  working pressure of furnace by the rules *108* combustion chamber plating, thickness, sides *17/32* back *9/16"*  
 Pitch of stays to ditto, sides *7 7/8" x 7 7/8" back*  top *7 7/4" x 7 7/4"* If stays are fitted with nuts or riveted heads *Nuts* working pressure of plating by rules *160* Diameter of stays at smallest part *1 7/32* working pressure of ditto by rules *160* end plates in steam space, thickness *1"*  
 Pitch of stays to ditto *16" x 14 1/2"* how stays are secured *Nuts & riv. washers* working pressure by rules *160* diameter of stays at smallest part *2 3/8* working pressure by rules *160* Front plates at bottom, thickness *3/4* Back plates, thickness   
 Greatest pitch of stays *13/16"* working pressure by rules  Diameter of tubes *3 1/2"* pitch of tubes *5' x 5'* thickness of tube plates, front *13/16"* back *7/8"* how stayed *Stay tabs* pitch of stays *10 x 10"* width of water spaces *5 1/2"*  
 Diameter of ~~superheater~~ Steam chest *2' 6"* length *3' 0"* thickness of plates *7/16* description of longitudinal joint *Double riv. lap* diam. of rivet holes *3/4"*  
 Pitch of rivets *2 1/2"* working pressure of shell by rules *143* diameter of flue  thickness of plates  If stiffened with rings   
 Distance between rings  working pressure by rules  end plates of superheater or steam chest; thickness *1"* how stayed *by angle iron*  
*- stay, 2 1/2" dia* Superheater on steam chest; how connected to boiler *by 12" nuts, 3/4" discs*

SEE SUPERVISORS ARE REQUESTED NOT TO WRITE ACROSS THIS MARGIN, NOR ON THE UPPER PART OF THIS SIDE OF THE FORM.

Lloyd's Register  
 Foundation  
 DUNN-0240

**DONKEY BOILER**— Description *Vertical, two in number.*  
 Made at *Dundee* by whom made *Gourlay Bro' & Co* when made *1887* where fixed *On deck*  
 Working pressure *70k* tested by hydraulic pressure to *140* No. of Certificate *505* fire grate area *17'4"* description of safety valves *Spring*  
 No. of safety valves *One* area of each *7'05"* if fitted with easing gear *Yes* if steam from main boilers can enter the donkey boiler  
 Thickness of shell plates *3/8"* diameter of rivet holes *1/16"* whether punched or drilled *Drilled* pitch of rivets *2 3/8"* lap of plating *3 3/8"*  
 per centage of strength of joint *70* thickness of crown plates *9/16"* stayed by *seven solid stays, 2 ins. dia.*  
 Diameter of furnace, top *4'* bottom *4'8 1/2"* length of furnace *5'11"* thickness of plates *1/2"* description of joint *Single riv. lay.*  
 Thickness of furnace crown plates *1/2"* stayed by *seven solid stays, 2 ins. dia.* working pressure of shell by rules *79k*  
 Working pressure of furnace by rules *70k* diameter of uptake *15'-16"* thickness of plates *3/8"* thickness of water tubes *3/8"*

**SPARE GEAR.** State the articles supplied:—

The foregoing is a correct description,  
*Gourlay Brothers* Manufacturer.

**General Remarks** (State quality of workmanship, opinions as to class, &c.)

The Machinery of this vessel has been built under special survey. Two new high pressure cylinders each 19 ins dia one placed over the old cylinders and the diameter of one of the old cylinders by the inversion of a taper is reduced to 18 ins. by these means the old compound engines of 44" and 78" dia are formed into triple expansion engines with two high pressure cylinders each 19" dia the intermediate cylinder 41 ins dia and the low pressure cylinder of 68 ins dia.

The steel plates used in the construction of the boiler have been tested at the steelworks by one of the Society's surveyors and the certificates of tests are appended. The workmanship is good.

The safety valves have been tested under steam with satisfactory result. Those of the main boiler blowing off at 100 k and those of the donkey boiler at 70 k.

The engines are tried under steam and are working well.

This vessel is in my opinion eligible to remain as belated and to have the Modifications + L.M.C. q. 87 and N.B. q. 87 recorded in the Registerbook.

Submitted that this vessel is eligible to have the modification + L.M.C. q. 87 and + N.B. 87

The amount of Entry Fee .. £ : : received by me,  
 Special .. £ 18 : 0 :  
 Donkey Boiler Fee .. £ : :  
 Certificate (if required) .. £ : : Sept. 30 18 87  
 To be sent as per margin.

*W. H. D. S. 2019*  
 Engineer Surveyor to Lloyd's Register of British & Foreign Shipping.  
 3.10.87

Committee's Minute TUESDAY 4 OCT 1887

