Rpt. 4.

REPORT ON MACHINERY.

No. 16239

Received at London Office WED. MAY. 22. 1912

Date of writing Report ____ 19 ____ When handed in at Local Office 13/5/1912 Port of Greenock.

No. in Reg. Book. Survey held at Greenock. Date, First Survey 22nd Dec. 1910 Last Survey 9th May 1912 (Number of Visits 8½)

on the TWIN SCREW STEAMER "BELTANA". Tons Gross 11120 Net 7055

Master ____ Built at Greenock By whom built Caird & Co. Limd. When built 1912.

Engines made at Greenock. By whom made Caird & Co. Limd. when made 1912.

Boilers made at Greenock. By whom made Caird & Co. Limd. when made 1912.

Registered Horse Power ____ Owners Peninsular & Oriental Sn. Coy. Port belonging to Greenock.

Nom. Horse Power as per Section 28 1200 Is Refrigerating Machinery fitted for cargo purposes Yes. Is Electric Light fitted Yes.

ENGINES, &c.—Description of Engines Quadruple Expansion (inverted cylinder engines) No. of Cylinders Four No. of Cranks Four

Dia. of Cylinders 23½"-34½"-48½"-70" Length of Stroke 54" Revs. per minute 88 Dia. of Screw shaft as per rule 14.28 (13.44) 14.9" as fitted 15" Material of screw shaft Steel

Is the screw shaft fitted with a continuous liner the whole length of the stern tube Yes. Is the after end of the liner made water tight in the propeller boss Yes. If the liner is in more than one length are the joints burned Turned If the liner does not fit tightly at the part between the bearings in the stern tube, is the space charged with a plastic material insoluble in water and non-corrosive — If two liners are fitted, is the shaft lapped or protected between the liners — Length of stern bush 5 feet

Dia. of Tunnel shaft as per rule 12.9" (13.44) as fitted 13½" Dia. of Crank shaft journals as per rule 13.6" (14.11) as fitted 14½" Dia. of Crank pin 14¼" Size of Crank webs 18"×10½" Dia. of thrust shaft under collars 14¼" Dia. of screw 17'.6" Pitch of Screw 18'.0" No. of Blades 3. State whether moveable Yes. Total surface —

No. of (WEIR'S) Feed pumps 2 Diameter of ditto (Cyl. 15½") 11½" Stroke 24 Can one be overhauled while the other is at work Yes.

No. of Bilge pumps 1 Diameter of ditto (Cyl. 10½") 13" Stroke 24 Can one be overhauled while the other is at work —

No. of Donkey Engines Four Sizes of Pumps 12"×8"×10" (super.) 9½"×7"×18" 2-10½"×13"×24" No. and size of Suctions connected to both Bilge and Donkey pumps

In Engine Room & Stokehold: Six—3½" dia. In Holds, &c. No. 1 HOLD 2-3½" dia. No. 2 HOLD 2-3½" dia. No. 3 HOLD 2-3½". No. 4 HOLD. 2-3½" dia. No. 5 HOLD: 2-3½" dia. TUNNEL WELLS: 1 to each well 3" dia.

No. of Bilge Injections 2 sizes 6". Connected to condenser, or to circulating pump C. P. Is a separate Donkey Suction fitted in Engine room & size Yes: 3½".

Are all the bilge suction pipes fitted with roses Yes. Are the roses in Engine room always accessible Yes. Are the sluices on Engine room bulkheads always accessible none

Are all connections with the sea direct on the skin of the ship Yes. Are they Valves or Cocks Bottle

Are they fixed sufficiently high on the ship's side to be seen without lifting the stokehold plates Yes. Are the Discharge Pipes above or below the deep water line Below

Are they each fitted with a Discharge Valve always accessible on the plating of the vessel Yes. Are the Blow Off Cocks fitted with a spigot and brass covering plate Yes.

What pipes are carried through the bunkers — How are they protected —

Are all Pipes, Cocks, Valves, and Pumps in connection with the machinery and all boiler mountings accessible at all times Yes.

Are the Bilge Suction Pipes, Cocks, and Valves arranged so as to prevent any communication between the sea and the bilges Yes.

Dates of examination of completion of fitting of Sea Connections 12/1/12 of Stern Tube 12/1/12 Screw shaft and Propeller 12/1/12

Is the Screw Shaft Tunnel watertight Yes. Is it fitted with a watertight door Yes. worked from Upper platform

BOILERS, &c.—(Letter for record S.) Manufacturers of Steel D. Colville & Sons

Total Heating Surface of Boilers D.E. 11924 S.E. 6264 18188 ft. Is Forced Draft fitted Yes. No. and Description of Boilers 2 Single & 2 Double Cylindrical Multitubular

Working Pressure 215 lbs. Tested by hydraulic pressure to 430 lbs. Date of test 16/1/12 No. of Certificate 1037.

Can each boiler be worked separately Yes. Area of fire grate in each boiler 147 sq. ft. No. and Description of Safety Valves to each boiler 2: Direct Spring (Particulars of Double End Boilers) Area of each valve 15.9 □" Pressure to which they are adjusted 220 lbs. Are they fitted with easing gear Yes.

Smallest distance between boilers or uptakes and bunkers or woodwork 14". Mean dia. of boilers 16'.6" Length 20'.0" Material of shell plates Steel

Thickness 1 23/32" Range of tensile strength 30 tons minimum Are the shell plates welded or flanged No. Descrip. of riveting: cir. seams Lap Double & Treble long. seams D.B. Butt Straps Diameter of rivet holes in long. seams 1 23/32" Pitch of rivets 10½" 5¼" (now. 2 rows.) Lap of plates or width of butt straps 24¼"

Per centages of strength of longitudinal joint rivets 95.2 plate 83.6 Working pressure of shell by rules 253 lbs. Size of manhole in shell 16"×12"

Size of compensating ring 8¼"×1 23/32" No. and Description of Furnaces in each boiler 8: Morison's. Material Steel Outside diameter 43¼"

Length of plain part top 8'.2" bottom 8'.2" Thickness of plates crown 5/8" bottom 5/8" Description of longitudinal joint Welded No. of strengthening rings 3-T. Bars

Working pressure of furnace by the rules 233 lbs. Combustion chamber plates: Material Steel Thickness: Sides 5/8" Back — Top 23/32" Bottom 13/16"

Pitch of stays to ditto: Sides 7½"×8¼" Back — Top 9½"×8½" If stays are fitted with nuts or riveted heads Nuts Working pressure by rules 218 lbs.

Material of stays Steel Diameter at smallest part 1 5/8" bare Area supported by each stay 79 □" Working pressure by rules 233 lbs. End plates in steam space:

Material Steel Thickness 1¼" Pitch of stays 18¾"×16½" How are stays secured Double Nuts & Washers Working pressure by rules 237 lbs. Material of stays Steel

Diameter at smallest part 3 7/16" Area supported by each stay 309 □" Working pressure by rules 264 lbs. Material of Front plates at bottom Steel

Thickness 13/16" Material of Lower back plate — Thickness — Greatest pitch of stays — Working pressure of plate by rules —

Diameter of tubes 2½" Pitch of tubes 3¾"×3¾" Material of tube plates Steel Thickness: Front 1 13/16" (with bombing) Back ¾" Mean pitch of stays 8¼" full.

Pitch across wide water spaces 13½" Working pressures by rules 293 lbs. (FRONT) 293 lbs. (BACK) Girders to Chamber tops: Material Steel Depth and thickness of girder at centre 9"×1½" (Suspended at middle from shell crown.) Length as per rule 48" Distance apart 8½" Number and pitch of stays in each 4: 9¼"

Working pressure by rules 223 lbs. Superheater or Steam chest; ~~how connected to boiler~~ None Can the superheater be shut off and the boiler worked separately — Diameter — Length — Thickness of shell plates — Material — Description of longitudinal joint — Diam. of rivet holes — Pitch of rivets — Working pressure of shell by rules — Diameter of flue — Material of flue plates — Thickness —

If stiffened with rings — Distance between rings — Working pressure by rules — End plates: Thickness — How stayed —

Working pressure of end plates — Area of safety valves to superheater — Are they fitted with easing gear —

It is Expected also sent on the Hull of the Ship

Im.1.10.—T.

VERTICAL DONKEY BOILER— *Manufacturers of Steel*

No. ______ *Description* ______

Made at ______ *By whom made* ______ *When made* ______ *Where fixed* ______

Working pressure ______ *tested by hydraulic pressure to* ______ *Date of test* ______ *No. of Certificate* ______ *Fire grate area* ______ *Description of Safety Valves* ______ *No. of Safety Valves* ______ *Area of each* ______ *Pressure to which they are adjusted* ______ *Date of adjustment* ______

If fitted with easing gear ______ *If steam from main boilers can enter the donkey boiler* ______ *Dia. of donkey boiler* ______ *Length* ______

Material of shell plates ______ *Thickness* ______ *Range of tensile strength* ______ *Descrip. of riveting long. seams* ______

Dia. of rivet holes ______ *Whether punched or drilled* ______ *Pitch of rivets* ______ *Lap of plating* ______ *Per centage of strength of joint* *Rivets* ______ *Plates* ______

Working pressure of shell by rules ______ *Thickness of shell crown plates* ______ *Radius of do.* ______ *No. of stays to do.* ______ *Dia. of stays* ______

Diameter of furnace Top ______ *Bottom* ______ *Length of furnace* ______ *Thickness of furnace plates* ______ *Description of joint* ______

Working pressure of furnace by rules ______ *Thickness of furnace crown plates* ______ *Radius of do.* ______ *Stayed by* ______

Diameter of uptake ______ *Thickness of uptake plates* ______ *Thickness of water tubes* ______ *Dates of survey* ______

SPARE GEAR. *State the articles supplied :—* 2 main Bearing Bolts, 2 Crosshead Bolts, 2 Crank pin Bolts, 1 Set Coupling Bolts. 1 Set Crosshead Bushes, 1 Set Crank pin Bushes, 1 Piston Rod & Gland, 2 Piston valves & Rings for same, Piston Rings of each size 4 Liners for Piston valve Cylinders, 1 Eccentric strap, 1 set Spare Gear for Centrifugal pump. ½ Crank shaft, 1 Tail shaft and 2 Propeller blades. Air pump Bucket, Rod and Head valves, 50 Condenser tubes, Feed & Bilge pump valves. Bolts, nuts & Iron, 25 Boiler tubes, Thomson's patent Coupling, 4 E.V. Springs. 1 set Check valves, 1 set manhole Doors, 4 Cylinder Escape valve Springs, 4 Slide valve Spindles, 1 Eccentric pulley, 1 set Propeller blade Studs, 1 set Ballast pump valves &c.

The foregoing is a correct description,

FOR CAIRD AND COMPANY, LIMITED.
[signature]
SECRETARY

Manufacturer.

Dates of Survey while building	During progress of work in shops - -	1910 Dec. 22. 26. 1911 Jan 16. 20. Feb 14. Mar 3. 8. 16. 22. 24. 27. Apl. 3. 5. 6. 12. 14. 15. 18. 21. 24. 25. 27. 29. May 2. 5. 9. 17. 20. June 1. 5. 8. 21. 30. July 5. 19. 25. 31. Aug. 7. 16. 23. 29. Sept 1. 5. 13. 15. 19. 29. Oct 2. 11. 13. 17. Nov. 4. 9. 16. 28.
	During erection on board vessel - - -	27. 29. Dec. 4. 6. 8. 19. 27. 28. 1912 Jan 8. 12. 15. 16. 27. 29. Feb 6. 8. 15. 20. 22. 23. Mar 5. 15. 22. Apl. 4. 10. 12. 17. 19. 26. 30. May 1. 9.
	Total No. of visits	87.

Is the approved plan of main boiler forwarded herewith Yes.

" " " donkey " " " ✓

Dates of Examination of principal parts—*Cylinders* 14/11/11 *Slides* 12/4/11 *Covers* 9/5/12 *Pistons* 26/3/11 *Rods* 26/3/11

Connecting rods 14/11/11 *Crank shaft* See Darlington Report *Thrust shaft* 23/11/11 *Tunnel shafts* 12/4/11 *Screw shaft* 1/9/11 *Propeller* 23/11/11

Stern tube 29/11/11 *Steam pipes tested* at Glasgow *Engine and boiler seatings* 12/1/12 *Engines holding down bolts* 20/2/12

Completion of pumping arrangements 20/2/12 *Boilers fixed* 15/2/12 *Engines tried under steam* 9/5/12

Main boiler safety valves adjusted 15/3/12 *Thickness of adjusting washers* Double End Boilers: PF aft 1/4" FV 9/32", SF aft 5/16" FV 23/64"; Single End Boilers: PA aft 13/32" FV 29/64", SA aft 23/64" FV 7/8"

Material of Crank shaft Steel *Identification Mark on Do.* 507 D. *Material of Thrust shaft* Steel *Identification Mark on Do.* 508 D.

Material of Tunnel shafts Steel *Identification Marks on Do.* 508 D *Material of Screw shafts* Steel *Identification Marks on Do.* 508 D.

Material of Steam Pipes Wrot: Iron. *Test pressure* 645 lbs

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

The Engines and Boilers of this vessel were built under Special Survey and the materials and workmanship are good. They were examined on completion while running full power trials and found to work satisfactorily. The Machinery throughout is now in good and Efficient condition and eligible in my opinion to have the record of ✠LMC.5,12. marked in the Society's Register Book.

It is submitted that this vessel is eligible for THE RECORD. +LMC.5.12.
F.D.

[initials] 22.5.12 [initials]

Certificate (if required) to be sent to Greenock

(*The Surveyors are requested not to write on or below the space for Committee's Minute.*)

			When applied for,
The amount of Entry Fee	.. £ 3	: :	14/5/1912
Special	.. .. .. £ 75	: :	
Donkey Boiler Fee	.. .. £	: :	When received,
Travelling Expenses (if any)	£	: :	22.5.1912

Wm. R. Austin.
~~Engineer Surveyor to Lloyd's Register~~ *of British & Foreign Shipping.*

Committee's Minute GLASGOW 21 MAY. 1912

Assigned + LMC 5.12.
F.D.

MACHINERY CERTIFICATE WRITTEN. 22/5/12

LAH 20/5/12