

REPORT ON MACHINERY.

No. **6645**
FRI. 6 AUG 1909

Port of **Belfast**

Received at London Office

No. in Survey held at **Belfast**
Reg. Book. **S.S. "S. Paulo"**
on the

Date, first Survey **23rd Nov 1906** Last Survey **28th July 1909**
(Number of Visits **88**)

Master **Belfast** Built at **Belfast** By whom built **Workman Clark & Bayly** When built **1907**

Engines made at **Belfast** By whom made **"** when made **"**

Boilers made at **"** By whom made **"** when made **"**

Registered Horse Power **"** Owners **Lloyd Brasileiro Coy** Port belonging to **Rio-de-Janeiro**

Nom. Horse Power as per Section 28 **534** Is Refrigerating Machinery fitted for cargo purposes **Yes** Is Electric Light fitted **Yes**

ENGINES, &c.—Description of Engines **Twin Screw Triple Expansion of Cylinders** 6 No. of Cranks **6**

Dia. of Cylinders **18"-30"-49"** Length of Stroke **42"** Revs. per minute **100** Dia. of Screw shaft as per rule **10.13** Material of screw shaft as fitted **11.5** **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 **✓** 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 **Yes** If two liners are fitted, is the shaft lapped or protected between the liners **✓** Length of stern bush **46"**

Dia. of Tunnel shaft as per rule **9.85** Dia. of Crank shaft journals as per rule **10.34** Dia. of Crank pin **11"** Size of Crank webs **19 1/8" x 7 1/2"** Dia. of thrust shaft under collars **11"** Dia. of screw **12"-9"** Pitch of Screw **14"-9"** No. of Blades **3** State whether moveable **Yes** Total surface **46 sq ft.**

No. of Feed pumps **1** Diameter of ditto **4"** Stroke **21"** Can one be overhauled while the other is at work **Yes**

No. of Bilge pumps **1** Diameter of ditto **4"** Stroke **21"** Can one be overhauled while the other is at work **Yes**

No. of Donkey Engines **5** Sizes of Pumps **General 8 x 5 1/2 x 8** No. and size of Suctions connected to both Bilge and Donkey pumps **10 1/2 x 8 x 21**

In Engine Room **4-3 1/2 x 1-3 1/2** **Ballast 9 x 10 x 19** Holds, &c. **6-3 1/2 x 1-3 1/2**
W. 4 1/2 x 3 x 6
Sanit 6 x 6 x 10

No. of Bilge Injections **2** sizes **6"** Connected to condenser, or to circulating pump **Pumps** a separate Donkey Suction fitted in Engine room & size **Yes-3 1/2"**

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 **Both**

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 **Four hold suction** How are they protected **Wood casings**

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 **13/6/07** of Stern Tube **13/6/07** Screw shaft and Propeller **13/6/07**

Is the Screw Shaft Tunnel watertight **Steel plate** is it fitted with a watertight door **Yes** worked from **Upper Deck**

BOILERS, &c.—(Letter for record **9**) Manufacturers of Steel **Sweet's & Kettlewell**

Total Heating Surface of Boilers **8754 sq ft** Forced Draft fitted **Yes** No. and Description of Boilers **3 - Single End Cylindrical**

Working Pressure **180 lbs** Tested by hydraulic pressure to **360 lbs** Date of test **7-5-07** No. of Certificate **398**

Can each boiler be worked separately **Yes** Area of fire grate in each boiler **74 3/4 sq ft.** No. and Description of Safety Valves to each boiler **2 - Sweet Spring** area of each valve **12.56 sq in.** pressure to which they are adjusted **180 lbs.** Are they fitted with easing gear **Yes**

Smallest distance between boilers or uptakes and bunkers or woodwork **about 18"** Mean dia. of boilers **16'-0"** Length **11'-9"** Material of shell plates **Steel**

Thickness **1 1/32"** Range of tensile strength **28-32** Are the shell plates welded or flanged **No** Descrip. of riveting: cir. seams **Lap Wvt.**

long. seams **Butt Lap** Diameter of rivet holes in long. seams **1 1/32"** Pitch of rivets **9 1/4"** Lap of plates or width of butt straps **2 1/4"**

Per centages of strength of longitudinal joint rivets **84.9** plate **94.3** Working pressure of shell by rules **207 lbs** Size of manhole in shell **16" x 12"**

Size of compensating rings **McNeil's** No. and Description of Furnaces in each boiler **4 - Brighton** Material **Steel** Outside diameter **43 1/4"**

Length of plain part top **3"** bottom **10"** Thickness of plates crown **3 3/4"** bottom **3 1/4"** Description of longitudinal joint **Weld** No. of strengthening rings **✓**

Working pressure of furnace by the rules **211 lbs** combustion chamber plates: Material **Steel** Thickness: Sides **3 1/2"** Back **39-41"** Top **3 1/2"** Bottom **3"**

Pitch of stays to ditto: Sides **9 1/8 x 9 x 7 1/2** back **9 1/8 x 8** Top **9 x 8 1/2** If stays are fitted with nuts or riveted heads **Nuts inside** Working pressure by rules **198 lbs**

Material of stay **Steel** Diameter at smallest part **1 1/2"** Area supported by each stay **76 1/2 sq in.** Working pressure by rules **203 lbs** End plates in steam space: Material **Steel** Thickness **1 1/32"** Pitch of stays **19 x 16** How are stays secured **Nuts inside** Working pressure by rules **204 lbs** Material of stays **Steel**

Diameter at smallest part **2 1/16"** Area supported by each stay **304 sq in.** Working pressure by rules **219 lbs** Material of Front plates at bottom **Steel**

Thickness **1"** Material of Lower back plate **Steel** Thickness **5 1/8"** Greatest pitch of stays **13 1/2"** Working pressure of plate by rules **86 lbs**

Diameter of tubes **2 1/2"** Pitch of tubes **3 1/4 x 3 5/8** Material of tube plates **Steel** Thickness: Front **1 5/16"** Back **1 3/16"** Mean pitch of stays **9 1/8 x 7 1/4"**

Pitch across wide water spaces **13 1/2"** Working pressures by rules **185 lbs** Girders to Chamber tops: Material **Steel** Depth and thickness of girder at centre **9 x (3/4 x 2)** Length as per rule **32 3/4"** Distance apart **8 1/2"** Number and pitch of stays in each **2-9"**

Working pressure by rules **183 lbs** Superheater or Steam chest; how connected to boiler **"** 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

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 _____ Stayed by _____

Diameter of uptake _____ Thickness of uptake plates _____ Thickness of water tubes _____ Dates of survey _____

SPARE GEAR. State the articles supplied:— *Propeller shaft: 2 propeller blades; pair crank pin bushes; pair cross head bushes; air pump work. bucket. head. valve seat; Centrif. pump fan spindle; sets 14. P. & 1. P. piston rings; sanitary pump work & plunger; Condenser tubes ferrules set; 2 side valve spindles & all parts to Lloyd's Rules Extra*

The foregoing is a correct description,
FOR WORKMAN, CLARK & CO., LIMITED.
M. W. Bell Manufacturer.

Dates of Survey while building	During progress of work in shops - - -	1906: - - -	1905-23-26-29	1906: 6. 13. 18. 30.	1907: - Jan 3. 10. 14. 16. 21. 29.	Feb. 6-8
	During erection on board vessel - - -	1909: - - -	1909: 1. 13. up to 10 th	1907: - - -	1908: - Feb. 5. 20. June 2 up to 21 st	1908: - - -
	Total No. of visits		88			

Is the approved plan of main boiler forwarded herewith *Yes*

Is the approved plan of donkey boiler forwarded herewith *Yes*

Dates of Examination of principal parts—	Cylinders	Slides	Covers	Pistons	Rods
Connecting rods	14 -	Crank shaft	6	Thrust shaft	1
Stern tube	14-5-04	Steam pipes tested	11-3-04	Engines and boiler seatings	25-6-07
Completion of pumping arrangements	6-12-07	Boilers fixed	7-8-07	Engines tried under steam	20-6-04
Main boiler safety valves adjusted	10-12-04	Thickness of adjusting washers	10-14		28-7-09
Material of Crank shaft	<i>W. Steel</i>	Identification Mark on Do.	<i>LLOYDS 7.5.0</i>	Material of Thrust shaft	<i>W. Steel</i>
Material of Tunnel shafts	<i>W. Steel</i>	Identification Marks on Do.	<i>W. Steel</i>	Material of Screw shafts	<i>W. Steel</i>
Material of Steam Pipes	<i>W. Iron</i>	Test pressure	<i>540 lbs</i>		<i>26-4-07</i>

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

The machinery of this vessel has been constructed under Special Survey, and, in accordance with the Rules, the workmanship and the materials used are of good description, and an trial under steam in Belfast Lough. The machinery worked satisfactorily.

The progress of work on this vessel has been delayed from time to time, for various reasons, not of a technical nature.

In my opinion, it is eligible for record + L.M.C. 7-09 with notation "Forced draft & Electric Light"

It is submitted that this vessel is eligible for THE REGD. + L.M.C. 7.09
Ref. mech. F.D. ARR

The amount of Entry Fee..	£ 3 : 0 :	When applied for,	29-7-09
Special	£ 46. 14 :		
Donkey Boiler Fee	£ : :	When received,	31-9-09
Travelling Expenses (if any) £	: :		

R. J. Pennington
Engineer Surveyor to Lloyd's Register of British & Foreign Shipping.

Committee's Minute TUES. 10 AUG 1909

Assigned + L.M.C. 7.09
Ref. mech. F.D.

Certificate (if returned) to be sent to the office of the Registrar of Shipping (The Surveyors are requested not to write on or below the space for Committee's Minute.)

