pt. 4a.

REPORT ON MACHINERY

No. 1957

Received at London Office MON. 19 JUN. 1922

Date of writing Report 10th June 1922. When handed in at Local Office 14th June 1922 Port of Barrow-in-Furness

No. in Reg. Book. 8500 Survey held at Barrow-in-Furness Date, First Survey 26th Aug. 1919 Last Survey 6th June 1922 (Number of Visits 145)

on the T.S.S. "ANTONIA" (Eng. No. 498) Tons Gross 13866·84 Net 8445·40

Master ✓ Built at Barrow-in-Furness By whom built Vickers Ltd When built 1922

Engines made at Barrow-in-Furness By whom made Vickers Ltd when made 1922

Boilers made at Barrow-in-Furness By whom made Vickers Ltd. when made 1922

~~Registered~~ Nom. Horse Power 1640 ✓ Owners Cunard Steamship Co Ltd. Port belonging to Liverpool

Shaft Horse Power at Full Power 8500 ✓ Is Refrigerating Machinery fitted for cargo purposes yes. Is Electric Light fitted yes.

TURBINE ENGINES, &c.—Description of Engines Parsons Impulse-Reaction with Double Reduction Gearing No. of Turbines 2 H.P ahead 2 L.P ahead & astern

Diameter of Rotor Shaft Journals, H.P. 4½" ✓ L.P. 4" ✓ Diameter of Pinion Shaft 8 5/16" H.P. 1st Red^n, 11 5/16" L.P. 1st Red^n, 25" 2nd Red^n.

Diameter of Journals A.P. 5", L.P. 6", 2nd Red^n 15" ✓ Distance between Centres of Bearings 1st Red^n 3'-0¼" ✓ 2nd " 6'-7½" ✓ Diameter of Pitch Circle 8·998" H.P. 1st Red^n, 12·64" L.P. 1st Red^n 26·043" 2nd Red^n ✓

Diameter of Wheel Shaft 19¾" ✓ Distance between Centres of Bearings 7'-5½" ✓ Diameter of Pitch Circle of Wheel 123·999 Main Wheel 64·058 H.P. 1st Red^n 64·058 L.P. " ✓

Width of Face Main Wheel-35" ✓ 2nd Red^n 21" ✓ Diameter of Thrust Shaft under Collars 15¾" ✓ Diameter of Tunnel Shaft as per rule 14·4" as fitted 15" ✓

No. of Screw Shafts 2 ✓ Diameter of same as per rule 15·5" as fitted 16¼" with continuous liner. Diameter of Propeller 18'-0" Pitch of Propeller 18'-9" ✓

No. of Blades 4 State whether Moveable yes. Total Surface 98·8 ft. Diameter of Rotor ~~Drum~~ Discs H.P. 17" Discs L.P. 31,45" astern 36"

Thickness at Bottom of Groove, H.P. Solid L.P. Discs Astern Discs Revs. per Minute at Full Power, Turbine H.P. 3200 L.P. 2170 ✓ Propeller 90. ✓

PARTICULARS OF BLADING.

	H.P. HEIGHT OF BLADES.	H.P. DIAMETER AT TIP.	H.P. NO. OF ROWS.	L.P. HEIGHT OF BLADES.	L.P. DIAMETER AT TIP.	L.P. NO. OF ROWS.	ASTERN. HEIGHT OF BLADES.	ASTERN. DIAMETER AT TIP.	ASTERN. NO. OF ROWS.
1st Expansion	2 Rows Impulse Wheel	2'-9" Mean Dia^r		2½"	36"	4	3 Rows Impulse Wheel	44" Mean Dia^r	
2nd "	1⅛"	19¼"	6	3¼"	37½"	4	1¼"	38½"	2
3rd "	1½"	20"	6	4¼"	39½"	4	2⅛"	40¼"	2
4th "	2"	21"	6	3"	51"	2	3	42	1
5th "	2⅝"	22¼"	6	3⅞"	52¾"	2	3	42	1
6th "	3½"	24"	6	4½"	54"	1	3	42	1
7th "				5-3/8"	55-3/4"	1			
8th "				6⅜"	57¾"	1			
9th "				7½"	60"	1			
10th "				7½"	60"	1			
11th "				7½"	60"	1			

No. and size of Feed pumps 1 Turbo Rotary Pumps, capacity 102 000 lbs water per hr, 2 Vertical Pumps 13½" x 10" x 21" Stroke, capacity 51 000 lbs water per hr each.

No. and size of Bilge pumps 1 Duplex 8" x 9" x 9", 1 Motor driven Emergency dual Pump 8" x 8", 2 Pumps worked from main gear shafts 6¾ bore x 13" stroke

No. and size of Bilge suctions in Engine Room 5-3½", 1-3½" cofferdam, to main line; 1-6" direct to Emergency line; 2-2½" sweall & 1-2½" cofferdam suction to oil transfer pumps. In Holds, &c. 2-3½" in Nos 1, 2, 3, 4 & 5 Holds, 1-3½ in No 6 hold. In Tunnel 5-3½", In Boiler Room 2-3½" to main line, 1-6" direct to Emergency pump, 5-2½" to oil transfer pump.

No. of Bilge Injections 2 sizes 13½" Connected to condenser, or to circulating pump Pump Is a separate Donkey Suction fitted in Engine Room & size yes - 6"

Are all the bilge suction pipes fitted with roses yes. Are the roses in Engine room always accessible yes.

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 None 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.

Is the Screw Shaft Tunnel watertight yes. ✓ Is it fitted with a watertight door yes. ✓ worked from Doors & from Bridge on Stone-Lloyd System

BOILERS, &c.—(Letter for record (Y) ✓ Manufacturers of Steel Beardmore & Co, Spencer & Son, Bessemer & Co. 2 D.E. & 2 S.E.

Total Heating Surface of Boilers 19443 ft. Is Forced Draft fitted yes No. and Description of Boilers 2 Double Ended, 2 Single Ended Multi.

Working Pressure 220 lbs. ✓ Tested by hydraulic pressure to 385 lbs ✓ Date of test 1-10-20, 16-12-20, 24-11-20, 20-1-21 No. of Certificate 311, 312, 315, 317,

Can each boiler be worked separately yes ✓ Area of fire grate in each boiler 165·8 ft. D.E.B, 82·9 ft. S.E.B. No. and Description of Safety Valves to each boiler D.E.B. Quadruple, S.E.B. Double } Spring Loaded

Total Area of each valve 11·04 □" ✓ Pressure to which they are adjusted 224 lbs ✓ Are they fitted with easing gear yes.

Smallest distance between boilers or uptakes and bunkers or woodwork 1'-8" ✓ Mean dia. of boilers 17'-6" ✓ Length D.E.B. 22'-6", S.E.B. 11'-6" Material of shell plates Steel

Thickness 1 21/32" ✓ Range of tensile strength 30/34 tons ✓ Are the shell plates welded or flanged No ✓ Descrip. of riveting: cir. seams D.E.B. – D.R. Lap S.E.B. – D.R. & T.R. Lap.

Long. seams T.R. Double Butt Straps Diameter of rivet holes in long. seams 1 21/32" ✓ Pitch of rivets 10½" ✓ Lap of plates or width of butt straps 23 5/8" ✓

Percentages of strength of longitudinal joint rivets 88·9 % plates 84·2 % Working pressure of shell by rules 223 lbs Size of manhole in shell 21" x 17" ✓

Size of compensating ring 40" x 36½" x 1 21/32" No. and Description of Furnaces in each Boiler D.E.B. 8 - Morison S.E.B. 4 - do. Material Steel Outside diameter 4'-0 7/8" ✓

Length of plain part top ✓ bottom ✓ Thickness of plates crown 11/16" ✓ bottom Description of longitudinal joint Weld No. of strengthening rings ✓

Working pressure of furnace by the rules 221 lbs Combustion chamber plates: Material Steel Thickness: Sides 23/32" Back 23/32" Top 23/32" Bottom 13/16" ✓

Pitch of stays to ditto: Sides 9⅞" x 8" 9 Back 10" x 7⅞" Top 9⅞" x 8" If stays are fitted with nuts or riveted heads Both Working pressure by rules 225 lbs.

Material of stays Iron Diameter at smallest part 1·606" Area supported by each stay 78·75 □" Working pressure by rules 230 lbs. End plates in steam space

Material Steel Thickness 1¼" ✓ Pitch of stays 18" x 17 5/8" How are stays secured Double Nuts Working pressure by rules 220 lbs. Material of stays Steel

Diameter at smallest part 3" ✓ Area supported by each stay 317.25 □" Working pressure by rules 244 lbs Material of Front plates at bottom Steel 3¾ a.w.w. space

Thickness 1" ✓ Material of Lower back plate Steel Thickness 29/32" Greatest pitch of stays 18" x 7" Working pressure of plate by rules 268 lbs.

Diameter of tubes 2¾" Pitch of tubes 4" x 4" ✓ Material of tube plates Steel Thickness: Front 1" ✓ Back 15/16" ✓ Mean pitch of stays 10" ✓

Pitch across wide water spaces 17¾" / 13¾ Working pressures by rules 240 lbs Girders to Chamber tops: Material Steel Depth and thickness of girder at centre 9" x 1½" ✓ Length as per rule 30·35" ✓ Distance apart 8" ✓ Number and pitch of stays in each 2 - 9⅞" ✓

Working pressure by rules 290 lbs Steam dome: description of joint to shell None % of strength of joint ✓ Diameter ✓

Thickness of shell plates ✓ Material ✓ Description of longitudinal joint ✓ Diameter of rivet holes ✓ Pitch of rivets ✓

Working pressure of shell by rules ✓ Crown plates: Thickness ✓ How stayed ✓

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THE SURVEYORS ARE REQUESTED NOT TO WRITE ACROSS THE MARGIN.

Header 660 lbs

SUPERHEATER. Type "Robinsons" Date of Approval of Plan 22-3-20. Tested by Hydraulic Pressure to Elements 1200

Date of Test 7-1-21 & Subsequent dates. Is a Safety Valve fitted to each Section of the Superheater which can be shut off from the Boiler Yes.

Diameter of Safety Valve D.E.B. 2½" S.E.B. 2" Pressure to which each is adjusted 225 lbs □" Is Easing Gear fitted Yes.

IS A DONKEY BOILER FITTED? No. If so, is a report now forwarded?

SPARE GEAR. State the articles supplied:— Propeller shaft, 1 set of coupling bolts, 1/20 total bolts in turbi & gear casing joints; 2 studs & nuts for each size of rotor, pinion, & gearing bearing; 1 set of bear bushes for each size of rotor, pinion, & gearing bearing; ½ set of packing rings & springs for each size of rotor shaft glands; 24 thrust pads for turbine adjusting blocks & 16 adjusti liners; 8 main thrust pads & 4 adjusting liners; 5% of total H.P. blading & a quantity of L.P. bladin 1 escape valve spring of each size fitted, 100 main condenser tubes & 50 ferrules; 20 Aux. condenser t & 40 ferrules; 50 oil cooler tubes & ferrules. Turbo feed pumps:- 1 Impeller, 1 set of packing rings, 1 set bearing Direct acting feed Pump:- 1 set each suction & discharge valves with springs, 1 set of piston rings & 3 pump bucket rings. Lub.g Oil Pump:- 2 sets suction & discharge valves, 2 sets of piston rings, several thermom for oil system, & 1 stand by pump complete. Bilge pumps:- 1 set of valves & guards complete. Ballast Pump 1 set of valves complete. Sanitary pumps:- 1 set of valves complete. Oil fuel Installation:- 1 set each of & steam piston rings for one pump; 1 set of suction & delivery valves for one pump, 6 thermometers & burners complete. Oil fuel Transfer Pump:- 1 set each suction & discharge valves with springs, 1 s piston rings. Forced draught fan:- 1 Armature for motor. Boilers:- 50 plain tubes, 6 stay tubes, 3 safety val springs for each size of safety valve, 2 Superheater safety valve & 3 feed check valves.

The foregoing is a correct description,

Manufacturer.

FOR VICKERS LIMITED,

1919 Aug. 26. 30, Sept. 9. 18. 24. Oct. 3. 8. 13. 16. 20. 31. Nov.s 10. 14. 17. 25. 28. Dec.s 1. 4. 11. 15. 16. 22 Jan.y 1920, 6. 7. 23. Feb. 3. 5. 10. 25. 26. Mar. 5. 9. 15. 16. 26. 31. June 7. 28. 6. 14. 27 Aug. 12. 13. 17. 18. 19. 20. 23 Sept. 2. 8. 9. 10 20. 23. 27. 28 Oct. 1. 7. 8. 14. 19. 25 29 Nov. 2. 4. 6. 9. 10. 11. 13. 15. 17 20. 23. 24. 26. 29. Dec. 6. 10. 15. 16. 21. Jan.y 19: 9. 16. 21. Oct. 6. 13. 18. 21. 25. 27 Nov. 2. 7. 15. 18. 23. 24. 29 Dec. 2. 13. 15. 16. 20. 22. Jan.y 1922, 10. 12. 16. 17. 18. 19. 20. 21. 24. 31. Feb. 2. 6. 8. 9. 10. 13. 14. 15. 16. 17. 20. 22. 23. 24. 27. 28 Mar. 1. 2. 10. 21. 22. 24. 28. 29. 30 Apl. 3. 5. 7. 10. 11. 13. 18. 19. 21. 2 May 1. 10. 12. 19. 22. 26. 30. June 1. 2. 3. 4. 5. 6.

Dates of Survey while building — During progress of work in shops: 7. 11. 19. 20. 21. 24. Feb. 3. 4. 7. 14. 16. 18. 23. 24. Mar. 3. 5. 7. 10. 11 (Date of Launch). 16. 18. 23. Apl. 4. 5. 7. 21. May 7. 27. J

During erection on board vessel: 31. Feb. 2. 6. 8. 9. 10. 13. 14. 15. 16. 17. 20. 22. 23. 24. 27. 28. Mar. 1. 2. 10. 21. 22. 24. 28. 29. 30 Apl. 3. 5. 7. 10. 11. 13. 18. 19. 21. 2

Total No. of visits 195.

Is the approved plan of main boiler forwarded herewith Yes.

" " " donkey " " "

Dates of Examination of principal parts—Casings 29-11-20, 21-12-20, 5-1-21, 5-3-21. Rotors 7-2-21, 23-2-21, 17-5-21, 9-6-21. Blading 3-3-21, 17-5-21, 9-6-21. Gearing 25-2-20, 16-3, 7-2-21, 5-4

Rotor shaft 16-3-20, 31-3-20 *Thrust shaft* 2-11-21. *Tunnel shafts* 4-4-21, 5-4-21 *Screw shaft* 6-12-20. *Propeller* 24-2-21.

Stern tube 6-12-20 *Steam pipes tested* 2-2-22 to 27-4-22 *Engine and boiler seatings* 24-2-21. *Engines holding down bolts* 15-2-22.

Completion of pumping arrangements 30-5-22 *Boilers fixed* 8-2-22 *Engines tried under steam* 19-5-22, 3rd-4th 5th J

Main boiler safety valves adjusted 12-5-22, 22-5-22, *Thickness of adjusting washers* S.E.B:- Port:- S.F. 7/16" S.A. 23/64" P.F. 25/64" P.A. 3/16" Super.t 13/32" Star.d:- S.F. 11/32" S.A. 23/64" P.F. 3/8" P.A. 3/8" Super.t 13/32" D.E.B. Port:- S.F. 11/32" S.A. 23/64" Super.t 23/64", Aft:- P.V. 15/32" S.V. 3/8" Super.t

Material and tensile strength of Rotor shaft 34/38 ton steel *Identification Mark on Do.* LLOYD'S Nº 151 J.H.

Material and tensile strength of Pinion shaft 40 ton Nickel Steel *Identification Mark on Do.* LLOYD'S Nº 151 J.H.

Material of Wheel shaft 31/35 ton Steel *Identification Mark on Do.* LLOYD'S Nº 151 J.H. *Material of Thrust shaft* 28/32 ton steel *Identification Mark on Do.*

Material of Tunnel shafts 28/32 ton Steel *Identification Marks on Do.* *Material of Screw shafts* 28/32 ton steel *Identification Marks on Do.* LLOYD'S Nº 151 J.H.

Material of Steam Pipes Solid drawn Steel *Test pressure* 660 lbs per □"

Is an installation fitted for burning oil fuel Yes *Is the flash point of the oil to be used over 150°F.* Yes.

Have the requirements of Section 49 of the Rules been complied with Yes.

Is this machinery a duplicate of a previous case No. *If so, state name of vessel*

General Remarks (State quality of workmanship, opinions as to class, &c. The Machinery of this Vessel has bee built under special survey in accordance with the Rules & the approved plan and the materials & workmanship are sound & good. The boilers have been t by hydraulic pressure to 385 lbs per □" & on completion of fitting out all safety v were adjusted under steam to 224 lbs. Accumulation tests were carried out on safety valves with satisfactory results. Steam trials were carried out in dock & at on all machinery, & with the following exceptions everything was found in an efficient working condition. The Emergency Bilge Pump (vertical driving shaf ded not run satisfactorily, & it has been recommended that two additional b & bearings should be fitted to same. Also an air leak was found in the receiver between the H.P. & L.P. turbines of the Port Engine, & on further examination it w discovered that the cast iron bend had been fractured in the tightening up the joint. A new casting was recommended to be supplied & fitted. It i understood that these two items will be attended to at Southampton & t Surveyors there have been advised.

In my opinion the Machinery of this Vessel will be eligible to be classed in t Register Book with the notation + L.M.C. 6-22 "Fitted for oil fuel 6-22, F.P. above 150° when the two outstanding items mentioned have been completed.

John Houston.
Engineer Surveyor to Lloyd's Register of Shipping.

The amount of Entry Fee ...	£ 6 : 0 : 0	When applied for, 14th June 1922.
Special	£ 141 : 0 : 0	
Donkey Boiler Fee ...	£ : :	When received, 19
Travelling Expenses (if any)	£ 4 : 5 : 0	

Committee's Minute FRI. 23 JUN. 1922

FRI. JUL 21 1922

Assigned + L.M.C. 6.22. F.D. C.L.
Fitted for oil fuel. 6.22
F.P. above 150° F.

CERTIFICATE WRITTEN.

Certificate (if required) to be sent to Barrow-in-Furness

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

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