

REPORT ON REFRIGERATING MACHINERY AND APPLIANCES.

(Received at London Office)

W.F.D. 6 JUN. 1923

Date of writing Report 4.6.1923 When handed in at Local Office 4.6.23 Port of Glasgow
 No. in Reg. Book. Survey held at Clydebank Date: First Survey 14th June 20 Last Survey 25th April 1923
 (No. of Visits 21)

on the Refrigerating Machinery and Appliances of the T.S.S. "FRANCONIA" Tons { Gross 2015 8 Net 1218 5
 Vessel built at Clydebank By whom built J. Brown & Co. Yard No. 492 When built 1923
 Owners Cunard S.S. Co. Port belonging to Liverpool Voyage
 Refrigerating Machinery made by Liverpool Refrigeration Co. Ltd Machine No. 602. When made 1923.
 Insulation fitted by J. Brown & Co. When fitted 1923. System of Refrigeration C.O.²
 Method of cooling Cargo Chambers Air circulation. Insulating Material used Granulated Cork.
 Number of Cargo Chambers insulated 4. (No. 6. Upper & lower P. & S.) Total refrigerated cargo capacity 26,360. cubic feet.

DESCRIPTION OF REFRIGERATING MACHINERY. Where placed on deck top of main funnel.

Refrigerating Units, No. of one Single, ~~double~~ C.O.² Compressor. Cubic feet of air delivered per hour
 Total refrigeration or ice-melting capacity in tons per 24 hours Twelve. Are all the units connected to all the refrigerated chambers. Yes.
 Compressors, driven direct or through ^{single} reduction gearing. Compressors, ^{single} double acting. Drums acting. No. of cylinders one.
 Diameter of cylinders 3 3/4". Diameter of piston rod 1 3/4". Length of stroke 12". No. of strokes per minute 80.512.
 Motive Power supplied from Electric. Ship's power plant.
 Steam Engines, high pressure, compound, or triple expansion, surface condensing. No. of cylinders. Diameter.
 Length of stroke. Working pressure. Diameter of crank shaft journals and pins 4 1/2".
 Breadth and thickness of crank webs 5 1/2" x 3 1/4". No. of sections in crank shaft one. Revolutions of engines per minute.
 Oil Engines, type 2 or 4 stroke cycle. Single or double acting.
 No. of cylinders. Diameter. Length of stroke. Span of bearings as per inch.
 Maximum pressure in cylinders. Diameter of crank shaft journals and pins.
 Breadth and thickness of crank webs. No. of sections in crank shaft. Revolutions of engine per minute.
 Electric Motors, type Enclosed, ventilated. No. of one. Rated 34.76. Kilowatts 220.
 Volts at 700 to 500. revolutions per minute. Diameter of motor shafts at bearings Driven by 3" dia. commutator and 2 1/4" dia.
 Reduction Gearing, maximum shaft horse power at 1st pinion 40. Revolutions per minute at full power at 1st pinion 700 to 600.
 1st reduction wheel. Main shaft. Pitch circle diameter, 1st pinion 9".
 Main wheel 4' 8". Width of face, 1st reduction wheel. Main wheel 6".
 Distance between centres of pinion and wheel faces and the centre of the adjacent bearings, 1st pinion 2' 8 1/2".
 1st reduction wheel. Main wheel. Flexible pinion shafts, diameter 1st 2nd.
 Pinion shafts, diameter at bearings, External, 1st 2nd Internal, 1st 2nd.
 Diameter at bottom of teeth of pinion, 1st 8.75". 2nd. Wheel shafts, diameter at bearings, 1st.
 Main. Diameter at wheel shroud, 1st. Main.
 Gas Condensers, No. of one Cast iron or steel casings Cast iron. Cylindrical or rectangular Rectangular.
 No. of coils in each Four. Material of coils Copper. Can each coil be readily shut off or disconnected Yes.
 Water Circulating Pumps, No. and size of one 1 1/2" Centrifugal. how worked Electric, direct coupled. Gas Separators, No. of one.
 Gas Evaporators, No. of one Cast iron or steel casings Steel. Pressure or gravity type Gravity.
 No. of coils in each casing Six. Material of coils Wrought iron. Can each coil be readily shut off or disconnected Yes.
 Direct Expansion or Brine Cooled Batteries, No. of. Are there two separate systems, so that one may be in use while the other is being
 No. of coils in each battery. Material of coils. Can each coil be readily shut off or
 Total cooling surface of battery coils. Is a watertight tray fitted under each battery.
 Air Circulating Fans, Total No. of. each of. cubic feet capacity, at. revolutions per minute.
 Steam or electrically driven. Where spare fans are supplied are these fitted in position ready for coupling up.
 Brine Circulating Pumps, No. and size of, including the additional pump. Two 1 1/2" Centrifugal. how worked Direct coupled electric.
 Brine Cooling System, closed or open open. Are the pipes and tanks galvanised on the inside no.
 No. of brine sections in each chamber Two. Making 8. in all.
 Cargo plant is cross connected with provision plant, through brine connections. Yes.
 Can each section be readily shut off or disconnected Yes. Are the control valves situated in an easily accessible position Yes.

Are thermometers fitted to the outflow and to each return brine pipe *Yes*. Where the tanks are closed are they ventilated as per Rule *✓*
Where the tanks are not closed is the compartment in which they are situated efficiently ventilated *No*.
Steam Condensing Plant. State what provision is made for condensing steam, in terms of Section 4, Clauses 13 and 14. *✓*

HYDRAULIC AND OTHER TESTS.

DESCRIPTION.	Date of Test.	Working Pressure.	Hydraulic Test Pressure.	Air Test Pressure.	Stamped.	REMARKS.
ENGINE CYLINDERS (IF TESTED)						
GAS COMPRESSORS		1200. <i>14.0"</i>	3000. <i>14.0"</i>	1500. <i>14.0"</i>		<i>These parts have</i>
" SEPARATORS		<i>20</i>	3000. <i>14.0"</i>	1500. <i>14.0"</i>		<i>all been tested</i>
" CONDENSER COILS		<i>20</i>	3000. <i>14.0"</i>	1500. <i>14.0"</i>		<i>(by makers)</i>
" EVAPORATOR COILS		<i>20</i>	3000. <i>14.0"</i>	1500. <i>14.0"</i>		<i>but no record</i>
" CONDENSER HEADERS AND CONNECTIONS		<i>20</i>	3000. <i>14.0"</i>	1500. <i>14.0"</i>		<i>of date have been</i>
" CONDENSER CASINGS		<i>15 1/2. 0"</i>	30. <i>14.0"</i>			<i>Rept.</i>
" EVAPORATOR CASINGS		<i>Open top</i>				
NH ₃ CONDENSER, EVAPORATOR AND AIR COOLER COILS AFTER ERECTION IN PLACE						
BRINE PIPING AFTER ERECTION IN PLACE	<i>22/3/23</i>			<i>90. 14.0"</i>		

Cooling Test. Has the refrigerating machinery been examined under full working conditions, and found satisfactory. *11 hours trial*
Dates of test *April 24th 1923.* Density of Brine by *hydrometer*
Temperatures (when the cargo chambers are cooled down to the required test temperatures) of air at the entrance and of the return air
on delivery and return air at direct expansion or brine-cooled batteries *5.0° F. & 30.0° F.*
atmosphere *48° F.* cooling water inlet and discharge *40° F. & 48° F.* gas in condensers *48° F.* and evaporators *17° F.*
the average temperature of the refrigerated chambers *10° F.* and the rise of temperature in these chambers upon the expiration of *12* hours
time after the machinery and cooling appliances have been shut off *13° F.*

SPARE GEAR.

ARTICLES SUPPLIED AS PER RULE.

ADDITIONAL SPARE GEAR SUPPLIED.

1. Crankshaft. 1. Pair main bearings. 2. Main bearing slide rails. 1. Pair of crank pin bearings & liners. 1. Pair of connecting rod bearings. 1. Pair of crosshead pin bearings. 1. Compressor piston and complete. 2. Compressor delivery valves & seats. 2. Compressor suction valves & seats. 1. 1/4 in. C.O. valve complete. 1. Complete set of metallic packing for compressor piston rod. 1. Spare piston. 1. Regulating valve spindle & head. 1. 1/2 in. stop valve spindle & head. 6. Compressor valve springs. 2. C.O. gauges. 1. Water hydrometer. One complete set of joints & packing. (C.O.). 2. Brass coated brass thermometers. 3. Lengths each of 1/2" & 1/4" reg. brine pipe with fittings. Spares for pumps & pump motors. (Motor interchanging). One armature. One set of bearings. One set of brush holders. One set of carbon brushes. One short field coil. One set of static spools. One fan roller impeller & bronze spindle for water pump. One C.O. impeller & stainless steel spindle for brine pumps. One set of bearing bushes (either pump). Spares for Comp. motor. One armature, one field coil, one interpoles coil. 4. bearing bushes. One set of brushes. One set of brush springs. One set of static spools.

ARTICLES REQUIRED BY RULES AND NOT YET SUPPLIED

The foregoing is a correct description of the Refrigerating Machinery.

For THE LIVERPOOL *A. J. Adamson* Manufacturer.

DESCRIPTION OF INSULATION.

**G. TWEEN DECKS
IN LOWER HOLD CHAMBERS.**

**TUNNEL FLAT
IN TWEEN DECK CHAMBERS.**

BULKHEADS.

		Air Space.	Outer Lining.	Non-conducting Material.	Thickness of ditto.	Inner Lining.	Air Space.	Outer Lining.	Non-conducting Material.	Thickness of ditto.	Inner Lining.
FRAME No. (Fore Peak)	A										
FRAME No. 24	F	NONE	2 1/8 W.P.	GRANITE CORK	11	✓	NONE	2 1/8 W.P.	GRANITE CORK	11	✓
	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FRAME No. 51	F	NONE	1 1/2 W.P.	GRANITE CORK	4	✓	✓	✓	✓	✓	✓
	A	"	1 5/8 W.D.	CORK SLAB	7	✓	NONE	2 1/8 W.P.	GRANITE CORK	11	✓
FRAME No.	F										
	A										
FRAME No. (Boiler Room)	F										
	A										
FRAME No. (Engine Room)	A										
FRAME No.	F										
	A										
FRAME No.	F										
	A										
FRAME No.	F										
	A										
FRAME No. (After Peak)	F										
SIDES		NONE	2 1/8 W.P.	GRANITE CORK	13	✓	NONE	2 1/8 W.P.	GRANITE CORK	13	✓
OVERHEADING		"	2 1/8 W.P.	2. 20"		✓	"	"	"	9 1/2"	✓
FLOORS OF CHAMBERS		"	2 1/2 COMPOSITION				1 1/2 W.P.	GRANITE CORK	"	11"	✓
TRUNK HATCHWAYS		5/8 in. Cork 2 thicknesses of W.P. 1/4 each side =					1 1/4 W.P.	GRANITE CORK		9	
THRUST RECESS, SIDES AND TOP	✓	...	...	...	...	...	✓
TUNNEL SIDES AND TOP	✓	...	...	...	...	...	✓
TUNNEL RECESS, FRONT AND TOP	✓	...	...	...	...	...	✓	1 1/2 W.P.	GRANITE CORK	11	

FRAMES OR REVERSE FRAMES, FACE

BULKHEAD STIFFENERS, TOP *✓* BOTTOM *✓* AND FACE
RIBBAND ON TOP OF DECKS *✓*
SIDE STRINGERS, TOP *✓* BOTTOM *✓* AND FACE
WEB FRAMES, SIDES *✓* AND FACE
BRACKETS, TOP *✓* BOTTOM *✓* AND FACE
INSULATED HATCHES, MAIN *5/8 in. Cork 2 thick. W.P. 1/4* BILGE *✓* MANHOLE *✓*
HATCHWAY COAMINGS, MAIN *5/8 in. Cork 2 thick. W.P. 1/4* BILGE *✓*
HOLD PILLARS *✓*
MASTS *✓* VENTILATORS *Insulated with 13 in. cork of fitted with plugs -*
Are insulated plugs fitted to provide easy access to bilge suction roses *✓* tank, air, and sounding pipes *✓*
and manhole doors of tanks *✓* Are insulated plugs fitted to ventilators *yes* cargo ports *✓* and side lights *✓*
Is the insulation of the lower hold floor and tunnel top in way of the hatchways protected *yes* if so, how *3/8 wood -*
Oil Storage Tanks, where adjacent to the insulated chambers, state what provision has been made for ventilating the air space between the insulation and the bulkhead plating *none*

Coal Bunker Bulkheads, and Brine Outflow and Return Pipes passing through coal bunkers. Is the insulation, so far as practicable, fireproof *✓*
Where Cooling Pipes pass through watertight bulkheads or deck plating, are the fittings and packing of the stuffing boxes both watertight and fireproof *yes*
Cargo Battens, Dimensions and spacing, sides *none* floors *Seating battens* tunnel top *✓*
fixed or portable *✓* Are screens fitted over the brine grids at chamber sides *yes* hinged or permanently fixed *✓*
Thermometer Tubes, No. and position in each chamber *2 each side in each compartment -*
diameter *2 1/2* are they fitted in accordance with Section 3, Clause 8 *yes -*
Protection of Pipes. Are all pipes, including air and sounding pipes, which pass through or into insulated chambers, well insulated *yes*
Draining Arrangements. Where the chambers are situated below the load water line, what provision is made for draining the inside of the chambers *Steel scuppers to bilge* Where sluices, scupper pipes, and drain pipes are fitted are means provided for blanking them off *yes*
What provision is made for draining the refrigerating machinery room *drain bilge*
brine return room *to bilge* fan room *✓* water circulating pump room *bilge*
Are all air spaces behind insulation arranged to drain to the bilges, bilge wells, or gutterways of the respective chambers *no air spaces -*

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Sounding Pipes, No. and position in each chamber situated below the load water line

Drummed by steel supports to ledge

Diameter

Are all sounding pipes in way of insulated chambers fitted in accordance with Section 3, Clause 11

Are all wood linings tongued and grooved

Are cement facings reinforced with expanded steel lattice

How is the expanded metal secured in place

How are the cork slabs secured to the steel structure of the vessel

Air Trunkways in Chambers, inside dimensions, main

and branch

Are they permanently fixed or collapsible, or portable

State position in chambers

Where air trunkways pass through watertight bulkheads, are they fitted with watertight doors

Are the door frames efficiently insulated

Are insulated plugs supplied for the doorways

Where are the doors worked from

Cooling Pipes in Chambers, diameter

Are they galvanised externally

How are they arranged in the chambers

Thawing Off, what provision is made for removing the snow from the cooling pipes in the chambers

The foregoing is a correct description of the Insulation and Appliances.

John Brown & Company, Limited.

Builders.
Glasgow Secretary.

Plans. Are approved Plans or Specifications forwarded herewith for the Refrigerating Machinery

and Insulation

Is the Refrigerating Machinery and Appliances duplicate of a previous case

Is so, state name of vessel

If the survey is not complete, state what arrangements have been made for its completion and what remains to be done

The insulation has been fitted according to the approved plan & the workmanship is of a high standard - In my opinion the insulation merits the class contemplated -

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

This installation has been well fitted on board and the spare gear checked, the machine was started on the four cargo chambers and particulars taken; during the trial the installation worked satisfactorily and is eligible in our opinion to be classed in the Register Book with the notation of LLOYDS R.M.C. 5-23.

It is submitted that
this vessel is eligible for
THE RECORD. Lloyd's RMC 5.23.

J.W.D. 6/6/23

PARTICULARS TO BE ENTERED IN REGISTER BOOK.

REFRIGERATING MACHINES.					System of (1) Refrigerating (2) Insulating the Chambers.	POWER.		INSULATED CARGO CHAMBERS.	
No. and whether Single or Duplex.	Makers.	Date of Construction.	System.	Type.		Cubic feet of air delivered per hour.	Ice melting capacity per 24 hours. Tons.	No.	Capacity.
Single	Hislop & Co	1923	Brine	C.C.	(1) Brine				
			Carb. Anhyd		(2) Granulated		12	4	26360

Fee £ 6 : 0 : 0

Fee applied for, 30/5/1923

Travelling Expenses £ :

Received by me, 11.6.23

Committee's Minute

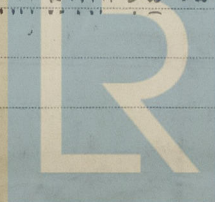
GLASGOW 5-JUN 1923

Assigned

Lloyd's RMC 5.23

FRI JUN 29 1923

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