

Rpt. 1.

No. 2662

REPORT ON REFRIGERATING MACHINERY AND APPLIANCES.

(Received at London Office)

JUL 21 1937

Date of writing report 19-7-37 When handed in at Local Office 20-7-37 Port of Barrum
 No. in Reg. Book. Survey held at Barrum Date: First Survey 3-9-36 Last Survey 12-7-1937
 (No. of Visits) 29

on the Refrigerating Machinery and Appliances of the Inde ORCADES Tons {Gross 23456
 Net 14544

Vessel built at Barrum By whom built Vickers Armstrong & Co Yard No. 712 When built 1937
 Owners Orient Steam Navigation Co Port belonging to London Voyage
 Refrigerating Machinery made by J.E. Hall & Co Machine No. 9573 When made 1937
 Insulation fitted by Hammes Insulation Co & Builders When fitted 1937 System of Refrigeration CO₂ + Brine
 Method of cooling Cargo Chambers Brine + Air Insulating Material used Alkali granulated lark
 Number of Cargo Chambers insulated 9 Total refrigerated cargo capacity 193890 cubic feet.

DESCRIPTION OF REFRIGERATING MACHINERY. Where placed

Refrigerating Units, No. of _____ Single, double, or triple _____ Cubic feet of air delivered per hour _____
 Total refrigeration or ice-melting capacity in tons per 24 hours _____ Are all the units connected to all the refrigerated chambers _____
Compressors, driven direct or through ^{single} _{double} reduction gearing. Compressors, single or double acting _____ No. of cylinders _____
 Diameter of cylinders _____ Diameter of piston rod _____ Length of stroke _____ No. of strokes per minute _____
Motive Power supplied from _____
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 _____
 Breadth and thickness of crank webs _____ No. of sections in crank shaft _____ Revolutions of engines per minute _____
Oil Engines, type _____ 2 or 4 stroke cycle _____ Single or double acting _____ B.H.P. _____
 No. of cylinders _____ Diameter _____ Length of stroke _____ Span of bearings as per Rule _____
 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 _____ No. of _____ Rated _____ Kilowatts _____
 Volts at _____ revolutions per minute _____ Diameter of motor shafts at bearings _____
Reduction Gearing, maximum shaft horse power at 1st pinion _____ Revolutions per minute at full power at 1st pinion _____
 2nd pinion _____ 1st reduction wheel _____ main shaft _____ Pitch circle diameter, 1st pinion _____ 2nd pinion _____
 1st reduction wheel _____ Main wheel _____ Width of face, 1st reduction wheel _____ Main wheel _____
 Distance between centres of pinion and wheel faces and the centre of the adjacent bearings, 1st pinion _____ 2nd pinion _____
 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 _____ 2nd _____ Wheel shafts, diameter at bearings, 1st _____
 Main _____ Diameter at wheel shroud, 1st _____ Main _____
Gas Condensers, No. of _____ Cast iron or steel casings _____ Cylindrical or rectangular _____
 No. of coils in each _____ Material of coils _____ Can each coil be readily shut off or disconnected _____
Water Circulating Pumps, No. and size of _____ how worked _____ **Gas Separators**, No. of _____
Gas Evaporators, No. of _____ Cast iron or steel casings _____ Pressure or gravity type _____
 No. of coils in each casing _____ Material of coils _____ Can each coil be readily shut off or disconnected _____
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
 cleared of snow _____ No. of coils in each battery _____ Material of coils _____ Can each coil be readily shut off or
 disconnected _____ 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 _____ how worked _____
Brine Cooling System, closed or open _____ Are the pipes and tanks galvanised on the inside _____
 No. of brine sections in each chamber _____
 Can each section be readily shut off or disconnected _____ Are the control valves situated in an easily accessible position _____

NOTE: THE WORDS WHICH DO NOT APPLY SHOULD BE DELETED.



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Foundation

Are thermometers fitted to the outflow and to each return brine pipe Yes. Where the tanks are closed are they ventilated as per Rule Yes.

Where the tanks are not closed is the compartment in which they are situated efficiently ventilated.

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						
" SEPARATORS						
" CONDENSER COILS						
" EVAPORATOR COILS						
" CONDENSER HEADERS AND CONNECTIONS						
" CONDENSER CASINGS						
" EVAPORATOR CASINGS						
NH ₃ CONDENSER, EVAPORATOR AND AIR COOLER COILS AFTER ERECTION IN PLACE	8.4.37 10.4.37	30 lb.	90 lb.	90 lb.		
BRINE PIPING AFTER ERECTION IN PLACE	8.4.37 10.4.37					

Cooling Test. Has the refrigerating machinery been examined under full working conditions, and found satisfactory Yes.

Dates of test 24, 22/6/37. Density of Brine 47° by T. WADDE hydrometer.

Temperatures (when the cargo chambers are cooled down to the required test temperatures) of air at the snow box and of the return air ✓ & ✓.

or, delivery and return air at direct expansion or brine cooled batteries & outflow and return brine -12° & -7°.

atmosphere 65°F cooling water inlet and discharge 58°F & 62°F gas in condensers 77° and evaporators -13°.

the average temperature of the refrigerated chambers 6.3°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 10.5°F Average of holds & Tanks.

SPARE GEAR.

Are the machines in accordance with Section 4, Clause 2 of the Rules

Are the working parts of the machines, pumps and motors respectively, interchangeable.

ARTICLES SUPPLIED AS PER RULE.

ADDITIONAL SPARE GEAR SUPPLIED.

See also Indm Rept No

attached.

ARTICLES REQUIRED BY RULES AND NOT YET SUPPLIED.

The foregoing is a correct description of the Refrigerating Machinery.

Manufacturer.

DESCRIPTION OF INSULATION.

IN LOWER HOLD CHAMBERS.

IN 'TWEEN DECK CHAMBERS.

RULEHEADS.

	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. 118 (Fore Peak)	A	✓ 2 1/2" T+G	Green Cork	1 1/2"	✓	✓	REINFORCED CEMENT	6" GRAN + SLAB	1 1/2" GRAN	✓
FRAME NO. 199	F	- do -	- do -	1 1/2"	✓	✓	- do -	do	1 1/2" GRAN	✓
FRAME NO. 175	A	- do -	- do -	4"	✓	✓	- do -	SLAB	1 1/2" do	✓
FRAME NO. 155	F	- do -	- do -	1 1/2"	✓	✓	- do -	GRAN + SLAB	1 1/2" GRAN	✓
FRAME NO. 155	A	- do -	- do -	1 1/2"	✓	✓	- do -	SLAB	1 1/2" do	✓
FRAME NO. 155	F	- do -	- do -	1 1/2"	✓	✓	- do -	GRAN + SLAB	1 1/2" GRAN	✓
FRAME NO. 155	A	- do -	- do -	1 1/2"	✓	✓	- do -	SLAB	1 1/2" do	✓
FRAME NO. 155	F	- do -	- do -	1 1/2"	✓	✓	- do -	GRAN + SLAB	1 1/2" GRAN	✓
FRAME NO. 155	A	- do -	- do -	1 1/2"	✓	✓	- do -	SLAB	1 1/2" do	✓
FRAME NO. 155	F	- do -	- do -	1 1/2"	✓	✓	- do -	GRAN + SLAB	1 1/2" GRAN	✓
FRAME NO. 155	A	- do -	- do -	1 1/2"	✓	✓	- do -	SLAB	1 1/2" do	✓
FRAME NO. 155	F	- do -	- do -	1 1/2"	✓	✓	- do -	GRAN + SLAB	1 1/2" GRAN	✓
FRAME NO. 155	A	- do -	- do -	1 1/2"	✓	✓	- do -	SLAB	1 1/2" do	✓
FRAME NO. 155	F	- do -	- do -	1 1/2"	✓	✓	- do -	GRAN + SLAB	1 1/2" GRAN	✓
FRAME NO. 155	A	- do -	- do -	1 1/2"	✓	✓	- do -	SLAB	1 1/2" do	✓
FRAME NO. 155	F	- do -	- do -	1 1/2"	✓	✓	- do -	GRAN + SLAB	1 1/2" GRAN	✓
FRAME NO. 155	A	- do -	- do -	1 1/2"	✓	✓	- do -	SLAB	1 1/2" do	✓
FRAME NO. 155	F	- do -	- do -	1 1/2"	✓	✓	- do -	GRAN + SLAB	1 1/2" GRAN	✓
FRAME NO. 155	A	- do -	- do -	1 1/2"	✓	✓	- do -	SLAB	1 1/2" do	✓
FRAME NO. 155	F	- do -	- do -	1 1/2"	✓	✓	- do -	GRAN + SLAB	1 1/2" GRAN	✓
FRAME NO. 155	A	- do -	- do -	1 1/2"	✓	✓	- do -	SLAB	1 1/2" do	✓
FRAME NO. 155	F	- do -	- do -	1 1/2"	✓	✓	- do -	GRAN + SLAB	1 1/2" GRAN	✓
FRAME NO. 155	A	- do -	- do -	1 1/2"	✓	✓	- do -	SLAB	1 1/2" do	✓
FRAME NO. 155	F	- do -	- do -	1 1/2"	✓	✓	- do -	GRAN + SLAB	1 1/2" GRAN	✓
FRAME NO. 155	A	- do -	- do -	1 1/2"	✓	✓	- do -	SLAB	1 1/2" do	✓
FRAME NO. 155	F	- do -	- do -	1 1/2"	✓	✓	- do -	GRAN + SLAB	1 1/2" GRAN	✓
FRAME NO. 155	A	- do -	- do -	1 1/2"	✓	✓	- do -	SLAB	1 1/2" do	✓
FRAME NO. 155	F	- do -	- do -	1 1/2"	✓	✓	- do -	GRAN + SLAB	1 1/2" GRAN	✓
FRAME NO. 155	A	- do -	- do -	1 1/2"	✓	✓	- do -	SLAB	1 1/2" do	✓
FRAME NO. 155	F	- do -	- do -	1 1/2"	✓	✓	- do -	GRAN + SLAB	1 1/2" GRAN	✓
FRAME NO. 155	A	- do -	- do -	1 1/2"	✓	✓	- do -	SLAB	1 1/2" do	✓
FRAME NO. 155	F	- do -	- do -	1 1/2"	✓	✓	- do -	GRAN + SLAB	1 1/2" GRAN	✓
FRAME NO. 155	A	- do -	- do -	1 1/2"	✓	✓	- do -	SLAB	1 1/2" do	✓
FRAME NO. 155	F	- do -	- do -	1 1/2"	✓	✓	- do -	GRAN + SLAB	1 1/2" GRAN	✓
FRAME NO. 155	A	- do -	- do -	1 1/2"	✓	✓	- do -	SLAB	1 1/2" do	✓
FRAME NO. 155	F	- do -	- do -	1 1/2"	✓	✓	- do -	GRAN + SLAB	1 1/2" GRAN	✓
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FRAME NO. 155	F	- do -	- do -	1 1/2"	✓	✓	- do -	GRAN + SLAB	1 1/2" GRAN	✓
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FRAME NO. 155	F	- do -	- do -	1 1/2"	✓	✓	- do -	GRAN + SLAB	1 1/2" GRAN	✓
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FRAME NO. 155	A	- do -	- do -	1 1/2"	✓	✓	- do -	SLAB	1 1/2" do	✓
FRAME NO. 155	F	- do -	- do -	1 1/2"	✓	✓	- do -	GRAN + SLAB	1 1/2" GRAN	✓
FRAME NO. 155	A	- do -	- do -	1 1/2"	✓	✓	- do -	SLAB	1 1/2" do	✓
FRAME NO. 155	F	- do -	- do -	1 1/2"	✓	✓	- do -	GRAN + SLAB	1 1/2" GRAN	✓
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FRAME NO. 155	A	- do -	- do -	1 1/2"	✓	✓	- do -	SLAB	1 1/2" do	✓
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FRAME NO. 155	F	- do -	- do -	1 1/2"	✓	✓	- do -	GRAN + SLAB	1 1/2" GRAN	✓
FRAME NO. 155	A	- do -	- do -	1 1/2"	✓	✓	- do -	SLAB	1 1/2" do	✓
FRAME NO. 155	F	- do -								

FRAMES OR REVERSE FRAMES, FACE 2" SLAB CORK + 1/2" CEMENT REINFORCED.

BULKHEAD STIFFENERS, TOP 1 1/2" SLAB + 2 1/2" T+G BOTTOM - do - 1 1/2" CORK + 2 1/2" T+G Slabs. AND FACE 3 1/2" SLAB + 1/2" REINFORCED CEMENT. T. 1/2"

RIBBAND ON TOP OF DECKS 5'-0" x 2 1/2" LARD WOOD DECK AT SIDES NO. 1 TOP ONLY.

SIDE STRINGERS, TOP BOTTOM AND FACE IN INSULATION (1 1/2" + 2 1/2" T+G)

WEB FRAMES, SIDES AND FACE

BRACKETS, TOP 2" SLAB (ALL ROUND) + 1" T+G BOTTOM 2" SLAB CORK + 2 1/2" T+G AND FACE 2" SLAB + 2 1/2" T+G

INSULATED HATCHES, MAIN 6" GRAN CORK 12 1/2" T+G TOP + BILGE 5 1/2" SLAB 12 1/2" T+G TOP + BILGE. MANHOLE 1 1/2" GRAN CORK 12 1/2" T+G TOP + BILGE.

HATCHWAY COAMINGS, MAIN PITCH-PINE + 3/16" GAL. PLATE BILGE TEAK.

HOLD PILLARS 2 1/2" SLAB + 1" T+G WITH GAL. STEEL PROTECTION PLATES AT CORNERS.

MASTS VENTILATORS 2" SLAB CORK + 2 1/2" T+G

Are insulated plugs fitted to provide easy access to bilge suction roses Yes. tank, air, and sounding pipes in insulation heels of pillars 2" SLAB + 1" T+G with GAL. PLATE AT CORNERS.

and manhole doors of tanks Yes. Are insulated plugs fitted to ventilators ✓ cargo ports ✓ and side lights ✓

Is the insulation of the lower hold floor and tunnel top in way of the hatchways protected ✓ if so, how ✓

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 ✓

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 2" x 2" floors 2 3/4" x 1 3/4" tunnel top ✓

fixed or portable PORTABLE. Are screens fitted over the brine grids at chamber sides NO STD ONLY hinged or permanently fixed PORTABLE

Thermometer Tubes, No. and position in each chamber - 1 TOK 4 (F. Amos. A) NO. 2 HOLD 4 (2P. 25) NO. 3 HOLD 2P. 20 NO. 3 STOK/1A diameter 2 1/2" BORE 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

SCUPPER PIPES U TYPE Where sluices, scupper pipes, and drain pipes are fitted are means provided for blanking them off PORTABLE

What provision is made for draining the refrigerating machinery room MOTOR PUMP & MAIN SUCTION

brine return room do fan room ✓ water circulating pump room ✓

Are all air spaces behind insulation arranged to drain to the bilges, bilge wells, or gutterways of the respective chambers ✓

Sounding Pipes, No. and position in each chamber situated below the load water line *Nº1 222 1/2 Nº2 42 1/2 Nº3 52 1/2* *ALL AT ENDS, FELT COVERED + IN INSULATION*

Diameter *2 1/2"* Are all sounding pipes in way of insulated chambers fitted in accordance with Section 3, Clause 11 *YES*

Are all wood linings tongued and grooved *YES* Are cement facings reinforced with expanded steel lattice *YES*

How is the expanded metal secured in place *STAPLES*

How are the cork slabs secured to the steel structure of the vessel *ADHERE TO BITUMASTIC*

Air Trunkways in Chambers, inside dimensions, main *4'-6" x 1'-6"* and branch *12' x 4" 18' x 4" 10' x 4"*

Are they permanently fixed or collapsible, or portable *PERMANENT* State position in chambers *SIDES + ROOF*

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 *1 1/2" + 1 1/4"* Are they galvanised externally *YES*

How are they arranged in the chambers *Nº1 Hold - SIDES + ROOF Nº2 Hold ROOF ONLY Nº3 Hold ROOF ONLY Nº1 TONK - SIDES + ROOF Nº2 TONK - ROOF Nº3 - ROOF*

Thawing Off, what provision is made for removing the snow from the cooling pipes in the chambers *NOT BRINE (STEAM HEATED)*

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

J. M. Drimton
SHIPBUILDING MANAGER,
BARROW WORKS,
Builders.

Plans. Are approved Plans or Specifications forwarded herewith for the Refrigerating Machinery *YES* and Insulation *YES*
(If not, state date of approval)

Is the Refrigerating Machinery and Appliances duplicate of a previous case *✓* If 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 *Complete*

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

This refrigerating machinery has been efficiently installed on board + the insulation fitted in accordance with Rule requirements. It has been tested under working conditions, found satisfactory, and in my opinion is eligible for the notation + Lloyds Rule 7.37.

PARTICULARS TO BE ENTERED IN REGISTER BOOK.

REFRIGERATING MACHINES.					System of (1) Refrigerating (2) Insulating the Chambers.	POWER.		INSULATED CARGO CHAMBERS.	
No. of Units.	No. of Compressors.	System.	Makers.	Date of Construction.		Cubic feet of air delivered per hour.	Ice melting capacity per 24 hours. Tons.	No.	Capacity. Cubic ft.
<i>3</i>	<i>6</i>	<i>CARR AM44.</i>	<i>JRE HALL L.</i>	<i>1937.</i>	<i>BRINE + AIR</i>		<i>154</i>	<i>9.</i>	<i>193,890.</i>

See also Insulin
Fee *Sept attached* £ *24 0 0* { Fee applied for, *20 7 1937.*
Travelling Expenses £ *16 0 0* { Received by me, *27.8 1937*
Insulin 15 0 0
Committee's Minute *TUE. 27 JUL 1937*

McCumlan
Surveyor to Lloyd's Register.

Assigned

+ Lloyd's Rule 7.37



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Foundation