

# REPORT ON REFRIGERATING MACHINERY AND APPLIANCES.

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(No. of Visits 8)

on the Refrigerating Machinery and Appliances of the **SS "CANTON"** Tons { Gross  
Net  
Vessel built at **Linthouse** By whom built **A. Stephen & Sons Ltd** Yard No. **554** When built **1934**  
Owners **Peninsular & Oriental Steam Navigation Co. Ltd** Port belonging to Voyage  
Refrigerating Machinery made by **J. E. Hall Ltd.** Machine Nos. **9811 9812** When made **1934**  
Insulation fitted by When fitted System of Refrigeration **CO<sub>2</sub> + Brine**  
Method of cooling Cargo Chambers **Brine grids + air** Insulating Material used  
Number of Cargo Chambers insulated **5** Total refrigerated cargo capacity **39,000** cubic feet.

## DESCRIPTION OF REFRIGERATING MACHINERY. Where placed **Fore. Ok. midship Port side**

Refrigerating Units, No. of **2** No. of machines **2** Is each machine independent **yes.**  
Total refrigeration or ice-melting capacity in tons per 24 hours **54 tons** Are all the units connected to all the refrigerated chambers **yes.**  
Compressors, driven direct ~~or through~~ **double** reduction gearing. Compressors, single or double acting **Single** If multiple effect compression **no**  
Are relief valves or safety discs fitted **both.** No. of cylinders to each unit **2** Diameter of cylinders **3 1/8"**  
Diameter of piston rod **2"** Length of stroke **7"** No. of revolutions per minute **350**  
Motive Power supplied from **Electric motor direct coupled.**  
(State number of boilers, oil engines or electric generators supplying the motive power.)

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 **CO<sub>2</sub> machine 5" journals, 5 1/2" pins**  
Breadth and thickness of crank webs **4" x 3 1/2"** No. of sections in crank shaft **one** Revolutions of engines per minute  
Oil Engines, type **2 or 4 stroke cycle** Single or double acting **Single** 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

**AIR RECEIVERS:**—Is each receiver, which can be isolated, fitted with a safety valve as per Rule  
Can the internal surfaces of the receivers be examined What means are provided for cleansing their inner surfaces  
Is there a drain arrangement fitted at the lowest part of each receiver If made under survey

No. of Receivers Cubic capacity of each Internal diameter thickness  
Seamless, lap welded or riveted longitudinal joint Material Range of tensile strength Working pressure by Rules

Electric Motors, type **Open - with canopy.** No. of **2** Rated **85 B.H.P.** Kilowatts  
Volts at **220 at 350/240** revolutions per minute. Diameter of motor shafts at bearings

Reduction Gearing Pitch circle diameter, pinion Main wheel Width of face  
Distance between centres of pinion and wheel faces and the centre of the adjacent bearings, pinion Main wheel  
Pinion shafts, diameter at bearings Main wheel shaft, diameter at bearings

Gas Condensers, No. of **2** Cast iron or steel casings **Cast iron** Cylindrical or rectangular **cylindrical** Are safety valves fitted  
to casings **yes.** No. of coils in each **10** Material of coils **SD Copper 3/4" dia.** Can each coil be readily shut off or disconnected **yes.**

Water Circulating Pumps, No. and size of **1- 5" centrifugal** how worked **electrically** Gas Separators, No. of **4**

Gas Evaporators, No. of **2** Cast iron or steel casings **Steel** Pressure or gravity type **pressure** If pressure type, are safety  
valves fitted **air pipe to balance tank** No. of coils in each casing **9** Material of coils **SD Steel 1 1/2" x 1 5/16" o.d.** 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  
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  
**2 - 25" 10000 3000 max.**  
**2 - 15" 1000**  
**1 - 15" 1500** cubic feet capacity, at **2400 max** revolutions per minute

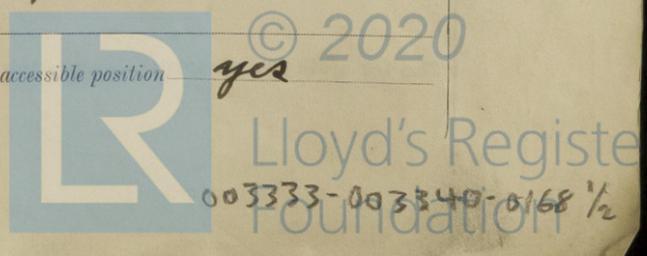
Air Circulating Fans, Total No. of **2 - 15" each of 1000 1500** Steam or electrically driven **electrically** Where spare fans are supplied are these fitted in position ready for coupling up **no**

Brine Circulating Pumps, No. and size of, including the additional pump **3 - 4" centrifugal** how worked **electrically**  
Brine Cooling System, closed or open **closed** Are the pipes and tanks galvanised on the inside **no.**

No. of brine sections in each chamber **3 T.D. port for 1 = 2, 3 T.D. port aft = 2, 3 T.D. for 1 star = 2**  
**3 T.D. aft = 5, 3 LID = 8 circuits**

Can each section be readily shut off or disconnected **yes** Are the control valves situated in an easily accessible position **yes**

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



Common  
 Are thermometers fitted to the purlin 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  
 Are the number and capacity of the machines and the number of pumps and sea connections in accordance with Section 2, Clause 1 of the Rules  
 Is the exhaust steam led to the main and auxiliary condensers

HYDRAULIC AND OTHER TESTS.

DESCRIPTION.	Date of Test.	Working Pressure.	Hydraulic Test Pressure.	Air Test Pressure.	Stamped.	REMARKS.
ENGINE CYLINDERS (IF TESTED)						
GAS COMPRESSORS	5-10-37	1000 lb sq in	3000 lb sq in	1500 lb sq in	St.	
" SEPARATORS	16-11-34	do.	do.	do.	St.	
" MULTIPLE EFFECT RECEIVERS	none					
" CONDENSER COILS	25-5-37	do.	do.	do.	St.	
" EVAPORATOR COILS	28-4-37	do.	do.	do.	St.	
" CONDENSER HEADERS AND CONNECTIONS	14-8-34	do.	do.	do.	St.	
" CONDENSER CASINGS	28-9-34	10 to 15 lb sq in	30 lb sq in		St.	
" EVAPORATOR CASINGS	24-8-34	20 to 25 lb sq in	50 lb sq in		St.	
NH, CONDENSER, EVAPORATOR AND AIR COOLER COILS AFTER ERECTION IN PLACE						
BRINE PIPING AFTER ERECTION IN PLACE						

Have important steel castings and forgings been tested in accordance with the Rules

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

Dates of test \_\_\_\_\_ Density of Brine \_\_\_\_\_ by \_\_\_\_\_ hydrometer

Temperatures (when the cargo chambers are cooled down to the required test temperatures)

or, delivery and return air at direct expansion or brine cooled batteries & \_\_\_\_\_ outflow and return brine & \_\_\_\_\_ atmosphere cooling water inlet and discharge & \_\_\_\_\_ gas in condensers and evaporators the average temperature of the refrigerated chambers \_\_\_\_\_ and the rise of temperature in these chambers upon the expiration of \_\_\_\_\_ hours time after the machinery and cooling appliances have been shut off

SPARE GEAR.

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

Has the spare gear required by the Rules been supplied

Additional Spare Gear Supplied:-

2 pistons & rods for comp. with rings  
 1 impeller & spindle for brine pump  
 1 do do for Circ. pump  
 1 set of 2 leather moullets  
 12 lubricator piston leathers  
 2 do do gland do  
 2 bolts & nuts for conn. big end  
 2 do do. x head do  
 2 do do. main bearings  
 1 regulator valve spindle  
 2 brass CO<sub>2</sub> pipe flanges  
 2 laundry brush corks  
 Assorted bolts & nuts  
 3 lengths each size brine lead fitted  
 3 N. I. bends do do  
 3 N. I. sockets & backnuts  
 1 set screwing dies  
 4 sets copper joint rings for comp. other points  
 1 set do do  
 2 sets special metal rings for each compressor  
 4 sets each of 2 valves seats & springs  
 24 addl. valve springs  
 2 springs for CO<sub>2</sub> safety valve  
 2 do. water relief valve  
 1-1/8" CO<sub>2</sub> valve with 3 spare pipe  
 1 hand pump for press. lubricator  
 1 CO<sub>2</sub> gauge  
 1 hydrometer  
 2 brass cased thermometers  
 12 safety discs  
 1 set coupling bolts for 1 machine  
 2 sets leather coupling washers for 1 machine  
 1 fitted box for comp. parts.

ELECTRICAL SPARES.

one Armature  
 one line of brush holders  
 one complete interior of controller  
 Sets of Brushes  
 Machine motors ----- 2  
 Water pump motor ----- 1  
 Brine pump motor ----- 3  
 Fan motors each size ----- 1 set to each motor

The foregoing is a correct description of the Refrigerating Machinery.

J. & E. HALL, LTD  
 J. Wells  
 DIRECTOR  
 Manufacturer.

DESCRIPTION OF INSULATION.

	IN LOWER HOLD CHAMBERS.					IN 'TWEEN DECK CHAMBERS.				
	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. F										
FRAME No. A										
FRAME No. F										
FRAME No. A										
FRAME No. F										
FRAME No. (Boiler Room) A										
FRAME No. (Engine Room) A										
FRAME No. F										
FRAME No. A										
FRAME No. F										
FRAME No. A										
FRAME No. F										
FRAME No. A										
FRAME No. F										
FRAME No. (After Peak) F										
SIDES										
OVERHEADING										
FLOORS OF CHAMBERS										
TRUNK HATCHWAYS										
THRUST RECESS, SIDES AND TOP										
TUNNEL SIDES AND TOP										
TUNNEL RECESS, FRONT AND TOP										

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	BILGE	MANHOLE
HATCHWAY COAMINGS, MAIN	BILGE	
HOLD PILLARS		
MASTS	VENTILATORS	

Are insulated plugs fitted to provide easy access to bilge suction roses \_\_\_\_\_ tank, air, and sounding pipes \_\_\_\_\_ heels of pillars  
 and manhole doors of tanks \_\_\_\_\_ 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 \_\_\_\_\_  
 and for draining the tank top \_\_\_\_\_

Fireproof Insulation. Is the insulation and woodwork fireproof in way of bunkers or any surfaces exposed to excessive heat \_\_\_\_\_  
 Where Cooling Pipes pass through watertight bulkheads or deck plating, are the fittings and packing of the stuffing boxes both watertight and fireproof \_\_\_\_\_  
 Cargo Battens, Dimensions and spacing, sides \_\_\_\_\_ floors \_\_\_\_\_ tunnel top \_\_\_\_\_  
 fixed or portable \_\_\_\_\_ Are screens fitted over the brine grids at chamber sides \_\_\_\_\_ hinged or permanently fixed \_\_\_\_\_

Thermometer Tubes, No. and position in each chamber \_\_\_\_\_  
 diameter \_\_\_\_\_ are they fitted in accordance with Section 3, Clause 8 \_\_\_\_\_

Protection of Pipes. Are all pipes, including air and sounding pipes, which pass through or into insulated chambers, well insulated \_\_\_\_\_  
 Draining Arrangements. What provision is made for draining the inside of the chambers \_\_\_\_\_  
 Where sluices, scupper pipes, and drain pipes are fitted are means provided for blanking them off \_\_\_\_\_  
 What provision is made for draining the refrigerating machinery room \_\_\_\_\_  
 brine return room \_\_\_\_\_ 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**

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.** Are the arrangements satisfactory and in accordance with the approved plans

Are they permanently fixed or collapsible, or portable \_\_\_\_\_

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** \_\_\_\_\_ **Minimum thickness** \_\_\_\_\_ **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.**

Builders. \_\_\_\_\_

**Plans.** Are approved Plans or Specifications forwarded herewith for the Refrigerating Machinery \_\_\_\_\_ and Insulation \_\_\_\_\_  
(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 \_\_\_\_\_

*General Remarks (State quality of workmanship, opinions as to class, &c.)* The refrigerating machinery has been constructed under special survey and the materials and workmanship are good and it will be eligible for the notation + Kloyds R.M.C. (with date) when the installation and testing have been satisfactorily completed.

**PARTICULARS TO BE ENTERED IN REGISTER BOOK.**

REFRIGERATING MACHINES.					System of (1) Refrigerating (2) Insulating the Chambers.	Ice melting capacity per 24 hours.	Is refrigerating mechanically Driven?	INSULATED CARGO CHAMBERS.	
No. of Units.	No. of Compressors.	System.	Makers.	Date of Construction.				No.	Capacity. Cubic ft.
2	4	Carl. Ruby	J. E. Hall & Co.	1934	Prime Air	Tons. 54		5	39,000

Fee London..... £ 2: - : - } Fee applied for, 19  
GLS 1/2  
Travelling Expenses £ 4: 0 : 0 } Received by me, 19

*D. Gemmell*  
Surveyor to Lloyd's Register.

Committee's Minute \_\_\_\_\_

Assigned \_\_\_\_\_

*See minute on  
GLS 60177*



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