

# REPORT ON REFRIGERATING MACHINERY AND APPLIANCES.

(Received at London Office)

Date of writing Report 5<sup>th</sup> Sept. 1938 When handed in at Local Office 5<sup>th</sup> Sept 38 Port of Glasgow  
No. in Reg. Book. Survey held at Glasgow Date: First Survey 1<sup>st</sup> Dec 1937 Last Survey 7<sup>th</sup> Sept. 1938  
71676 (No. of Visits 9)

on the Refrigerating Machinery and Appliances of the T.W.S.C.T.S. "CANTON". Tons } Gross 15784  
Net 9255

Vessel built at LINTHOUSE, GLASGOW. By whom built ALEX. STEPHEN & SONS LTD. Yard No. 557 When built 1938

Owners PENINSULAR & ORIENTAL STEAM NAV. CO Port belonging to LONDON Voyage -

Refrigerating Machinery made by J. & E. HALL LTD. Machine Nos. 9811 } When made 1937  
9812 }

Insulation fitted by ALEX. STEPHEN & SONS LTD When fitted 1938 System of Refrigeration CO2

Method of cooling Cargo Chambers BRINE GRIDS. & Air. Insulating Material used GRANULATED & SLAB CORK

Number of Cargo Chambers insulated 5 Total refrigerated cargo capacity 33,845 cubic feet.

## DESCRIPTION OF REFRIGERATING MACHINERY. Where placed Tank-top - Ford of E & B. space.

Refrigerating Units, No. of \_\_\_\_\_ No. of machines \_\_\_\_\_ Is each machine independent \_\_\_\_\_

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 <sup>single</sup> } reduction gearing. Compressors, single or double acting \_\_\_\_\_ If multiple effect compression  
<sub>double</sub> }  
are relief valves or safety discs fitted \_\_\_\_\_ No. of cylinders to each unit \_\_\_\_\_ Diameter of cylinders \_\_\_\_\_

Diameter of piston rod \_\_\_\_\_ Length of stroke \_\_\_\_\_ No. of revolutions per minute \_\_\_\_\_

Motive Power supplied from 30 H.P. Diesel (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 \_\_\_\_\_

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 \_\_\_\_\_

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 \_\_\_\_\_ No. of \_\_\_\_\_ Rated \_\_\_\_\_ Kilowatts \_\_\_\_\_

Volts at \_\_\_\_\_ 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 \_\_\_\_\_ Cast iron or steel casings \_\_\_\_\_ Cylindrical or rectangular \_\_\_\_\_ Are safety valves fitted \_\_\_\_\_

to casings \_\_\_\_\_ No. of coils in each \_\_\_\_\_ Material of coils \_\_\_\_\_ Can each coil be readily shut off or disconnected \_\_\_\_\_

Water Circulating Pumps, No. and size of 15' Centrifugal + 4 alternative pumps available for use how worked \_\_\_\_\_ Gas Separators, No. of \_\_\_\_\_

Gas Evaporators, No. of \_\_\_\_\_ Cast iron or steel casings \_\_\_\_\_ Pressure or gravity type \_\_\_\_\_ If pressure type, are safety \_\_\_\_\_

valves fitted \_\_\_\_\_ 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.

*See London Report*



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*RPK  
D.L. 18/7/40*

COMMON

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   
 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 Yes  
 Is the exhaust steam led to the main and auxiliary condensers Electric Drive

**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 ... ..						
„ MULTIPLE EFFECT RECEIVERS... ..						
„ CONDENSER COILS ... ..						
„ EVAPORATOR COILS ... ..						
„ CONDENSER HEADERS AND CONNECTIONS						
„ CONDENSER CASINGS ... ..						
„ EVAPORATOR CASINGS ... ..						
NH <sub>3</sub> 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 Yes  
 Dates of test 1 AND 2 - 9 - 38 Density of Brine 50 by Twaddell hydrometer  
 Temperatures (when the cargo chambers are cooled down to the required test temperatures) - 4° F  
 or, delivery and return air at direct expansion or brine cooled batteries & \_\_\_\_\_, outflow and return brine - 13° F & - 11° F  
 atmosphere 56° F cooling water inlet and discharge 60° F & 65° F gas in condensers 73° F and evaporators - 16° F  
 the average temperature of the refrigerated chambers - 4° F and the rise of temperature in these chambers upon the expiration of twelve hours  
 time after the machinery and cooling appliances have been shut off 10° F

**SPARE GEAR.**

Are the working parts of the machines, pumps and motors respectively, interchangeable   
 Has the spare gear required by the Rules been supplied Yes  
**Additional Spare Gear Supplied:—**  
As per London report dated 3<sup>rd</sup> Dec. 1937

The foregoing is a correct description of the Refrigerating Machinery.



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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.
BULKHEADS.	FRAME No. (Fore Peak) A									
	FRAME No. 126	F				-	1/4" W.P.	GR. CORK	9"	-
		A								
	FRAME No. 145	F				-	1/4" W.P.	GR. CORK	9"	-
		A								
	FRAME No.	F								
		A								
	FRAME No. (Boiler Room)	F								
		A								
	FRAME No. (Engine Room)	F								
		A								
	FRAME No.	F								
A										
FRAME No.	F									
	A									
FRAME No. (After Peak)	F									
	A									
SIDES ...						-	1/4" W.P.	GR. CORK	11"	
OVERHEADING ...						-	1/4" W.P.	GR. CORK	10"	
FLOORS OF CHAMBERS ...						-	1/4" SURFASTAL	SLAB CORK	8"	
TRUNK HATCHWAYS ...						-	1/4" W.P.	GR. CORK	9"	
THRUST RECESS, SIDES AND TOP ...										
TUNNEL SIDES AND TOP ...										
TUNNEL RECESS, FRONT AND TOP ...										

FRAMES OR REVERSE FRAMES, FACE *2" inside frames.*

BULKHEAD STIFFENERS, TOP *2" to 4 1/2"* BOTTOM *Do* AND FACE *Do.*

RIBBAND ON TOP OF DECKS *2 1/2" white pine ribband on G. BK only.*

SIDE STRINGERS, TOP - BOTTOM - AND FACE -

WEB FRAMES, SIDES - AND FACE -

BRACKETS, TOP - BOTTOM - AND FACE -

INSULATED HATCHES, MAIN - BILGE *5 1/2" Cork 1" 3/4" P.P. T & B.* MANHOLE -

HATCHWAY COAMINGS, MAIN - BILGE *9" P.P.*

HOLD PILLARS *1" felt and 2 1/2" P.P. protection also metal protection for 4'-0" above deck.*

MASTS - VENTILATORS -

Are insulated plugs fitted to provide easy access to bilge suction roses *Yes* tank, air, and sounding pipes *Yes* heels of pillars *Yes*  
 and manhole doors of tanks *Nil* Are insulated plugs fitted to ventilators *Yes* cargo ports *Nil* and side lights *Nil*

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 *3" x 2" P.P. about 18" apart* floors *NIL* tunnel top -  
 fixed or portable *fixed to screws* Are screens fitted over the brine grids at chamber sides *Yes* hinged or permanently fixed *portable panels*

Thermometer Tubes, No. and position in each chamber *2 to large spaces 1. to small spaces.*  
 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. What provision is made for draining the inside of the chambers *Trapped scuppers led to drain tank from P. Side led to bilge S. side.*  
 Where sluices, scupper pipes, and drain pipes are fitted are means provided for blanking them off *Screws down caps.*

What provision is made for draining the refrigerating machinery room *Drain into cofferdam lat basin (I.P.S.)*  
 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 *NIL.*

**Sounding Pipes**, No. and position in each chamber situated below the load water line *1 P. 2 1.5 into "H" deck compartment.*

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 *No*

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 *Yes*

Are they permanently fixed or collapsible, or portable *portable panels at ship's sides & bulks. main supply on roof fixed*

Where air trunkways pass through watertight bulkheads, are they fitted with watertight doors *NIL* 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" bore* Minimum thickness *1/4"* Are they galvanised externally *Yes*

How are they arranged in the chambers *overhead and side walls.*

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

The foregoing is a correct description of the Insulation and Appliances. **Alexander Stephen & Sons, Limited,** *Am Quarrie* Builders.

**Plans.** Are approved Plans or Specifications forwarded herewith for the Refrigerating Machinery and Insulation *Yes*

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 and appliances have been built under special survey and in accordance with the Rules. The materials & workmanship are good. They have been efficiently fitted in position on board and afterwards tested under full working conditions and found in order. The refrigerating machinery & appliances of this vessel are eligible in my opinion, to be classed in the Register Books with notation of + Lloyd's R. 9.38.*

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

REFRIGERATING MACHINES.					System of (1) Refrigerating (2) Insulating the Chambers.	Ice melting capacity per 24 hours. Tons.	Is Refrigerating Machinery Electrically Driven?	INSULATED CARGO CHAMBERS.	
No. of Units.	No. of Compressors.	System.	Makers.	Date of Construction.				No.	Capacity. Cubic ft.
2	4	Carl Anby	J. & E. Hall Ltd	1937	(1) Brine - Air (2) Gpm - Slab Cool	54	Yes	5	33845

Land 96 £2.0.0  
 Fees 96 £4.0.0  
 Travelling Expenses £ 1 : 1 : -  
 Fee applied for, 8/9/1938  
 Received by me, 19/11/1938

*J. Thomson & T. O. Morris*  
 Surveyors to Lloyd's Register.

Committee's Minute *13/9/38*  
 Assigned *+ Lloyd's Rmc 9.38*  
*Route Gls.*

CERTIFICATE WRITTEN

