

No. 596

THE BRITISH CORPORATION FOR THE SURVEY  
AND  
REGISTRY OF SHIPPING.

Report No. 599 No. in Register Book 1126  
*Lewis Fraser*

*COLISTER*  
S.S. "Richard Welford"

Makers of Engines *Palmers S. & J. Co. Ltd*

Works No. 777

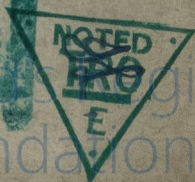
Makers of Main Boilers *Palmers S. & J. Co. Ltd*

Works No. 777

Makers of Donkey Boiler *Palmers S. & J. Co. Ltd*

Works No. 72

MACHINERY.  
**RETRAIN**



003937-003947-0229



No.

THE BRITISH CORPORATION FOR THE SURVEY  
AND  
REGISTRY OF SHIPPING.

Report No. 599 No. in Register Book 1126

Received at Head Office

24<sup>th</sup> March 1908

Surveyor's Report on the New Engines, Boilers, and Auxiliary  
Machinery of the *Steel Screw Steamer*  
*"Richard Welford"*

Port of Registry

Newcastle

Registered Owners

Lyne - Lees Steam  
Shipping Co. Ltd

Surveyor's District

Newcastle

Date of Completion of Engines

2 - 1908

" " "

Main Boilers

2 - 1908

" " "

Donkey "

2 - 1908

Trial Run at

Whitley Bay

Date

25-2-08

First Visit

4-6-07

Last Visit

25-2-08

Total Number of Visits

35

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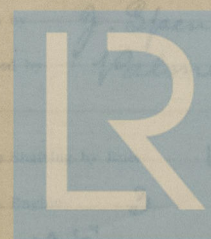


## ENGINES.

Made by *Palmer, S. & J. Co Ltd*  
 " at *Jarrow* Works No. *444*  
 Description *Direct acting triple expansion S.C.*  
 No. of Cylinders, each Engine *3* Diars. *25" - 41" - 66"* Stroke *45"*  
 Cub. feet in each L.P. Cylr. *89* Revols. per Min. *84* I.H.P. *2420*  
 Pressure in I.P. Receiver at full Power *67* 2nd I.P. *✓* L.P. *14*  
 Thickness of Metal in H. P. Cylr. *1 1/2"* I.P. *13/8"* " *✓* " *13/8"*  
 " " " " Liner *13/8"* " *✓* " *✓* " *"*  
 " " " " Valve Chest *1 1/8"* " *1 1/8"* " *✓* " *1 1/8"*  
 Are Spring-loaded Relief Valves fitted to Top and Bottom of each Cylr. *yes*  
 " " " " each Receiver? *I.P. & L.P.*  
 Number of Bolts in H.P. Cylr. Cover *22* I.P. *24* 2nd I.P. *✓* L.P. *28*  
 " " " " " *13/8"* " *13/8"* " *✓* " *13/8"*  
 Pitch " " " *4 3/4"* " *5 7/16"* " *✓* " *7 1/8"*  
 Type of H.P. Valves (Piston or Slide) *Piston* " *Slide* " *✓* " *Slide*  
 " Valve Gear *Ordinary link motion*  
 Diameter of Piston Rods (plain part) *6* At Bottom of Thread *4.68*  
 Makers " *J. Spencer & Sons* Material *1.8*  
 Diameter of Connecting Rods (smallest part) *6"* Material *Iron*  
 Makers " *Keay & Usher*  
 Diar. of Crosshead Gudgeons *6 1/2"* Length of Bearing *7 3/8" x 2* Material *Iron*  
 No. of Top End Bolts (each Rod) *4* Effective Diar. *2 3/4"* Material *Iron*  
 " Bot. " " *2* " *2 1/4"* " *"*  
 " Main Bearings *6* Lengths *13 1/2"*  
 " Bolts in each *2* Effective Diar. *3 1/2"* Material *Iron*

No. of Holding Down Bolts, each Engine *103* No. of Metal Chocks *103*  
 " " " " *1 1/2"* Average Pitch *13 1/2"*  
 Are the Engines bolted directly to the Tank Top? *yes*  
 Are the Bolts tapped through the Tank Top and fitted with Nuts inside? *yes*  
 Date of Test of Tank by Water Pressure with Holding Down Bolts in place *13-2-08*

## SKETCHES.



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SKETCHES.

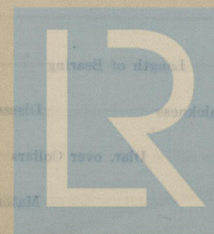
## SHAFTING

Are Crank Shafts Built?	yes No. of Lengths in each		3	Angle of Cranks	120
Di. of Crank Shafts by Rule	<del>12.72</del> 12.72	Actual	13 1/2	Di. in Way of Webs	13 1/2
Makers of	J. Spencer & Sons			Material	1.5
Di. of Crank Pins	13 1/2	Di. in Way of Web		13 1/2	
Makers of	J. Spencer & Sons			Material	1.5
Width across Crank Webs at Cent. of Shaft	25 1/2	Thickness		8 3/4	
" " " " Crank Pins	25 1/2			"	
" " " " Narrowest part	19			"	
Makers of Crank Webs	J. Spencer & Sons			Material	1.5
Di. or Breadth of Keys in Crank Webs	2 1/4	Length		8 1/4	
" of Dowel Pins in Crank Pins	1 1/2	Length		3 1/4	Screwed or Plain plain
No. of Bolts in each Coupling	6	Di. at Mid Length	3 1/4	Di. of Pitch Circle	19 3/4
Material of Coupling Bolts	Steel				
Crank Shafts Finished by	Palmers S. & J. Co. Ltd				
Greatest Distance from edge of Main Bearing to Crank Web	3/8				
Description of Thrust Blocks	horse shoe				
Number " " Rings	Size				
Di. of Thrust Shafts by Rule	<del>12.72</del> 12.72	Actual (at bot. of Collars)	13 1/2	Over Collars	23
" " at Forward Coupling	13	After Coupling		13	
No. of Thrust Collars	6	Thickness	1 7/8	Distance apart	4 7/8
Thrust Shafts Forged by	J. Spencer & Sons			Material	1.5
" Finished by	Palmers S. & J. Co. Ltd				
Di. of Intermediate Shafting by Rule	12.08	Actual	12 1/8		
No. of Lengths, each Engine	3	No. of Tunnel Bearings		3	
Di. of Bearings	13 1/8	Length	20	Distance apart	15 1/4



No. of Bolts, each Coupling 6    Diar. at Mid Length  $3\frac{1}{4}$     Diar. of Pitch Circle  $19\frac{3}{4}$ "  
 Intermediate Shafts Forged by J. Spencer & Sons    Material 1.3.  
 " " Finished by Palmers S. & J. Co. Ltd  
 12.96  
 Diar. of Propeller Shafts by Rule  $13\frac{1}{2}$ "    Actual 14"    At Couplings  $13\frac{1}{2}$ "  
 Are Propeller Shafts fitted with Continuous Brass Liners? yes  
 Diar. over Bihers  $15\frac{1}{2}$ "    Length of After Bearings 4' 8"  
 Of what Material are the After Bearings composed? lignum vitae  
 Distance from After Bearing in Stern Tube to nearest Tunnel Bearing 9' 9"  
 Are the After Bearings lubricated with Oil or Sea Water? Sea water  
 What means are adopted to prevent Sea Water entering the Stern Tubes? none  
 Propeller Shafts Forged by J. Spencer & Sons    Material 1.3.  
 " " Finished by Palmers S. & J. Co. Ltd  
 No. of Propellers One    Diar. 14' 3"    Pitch 19' 4"  
 " Blades, each Propeller 4    Fitted or Solid Solid  
 Material of Blades Cast iron    Boss Cast iron  
 Surface, each Propeller 64 ft<sup>2</sup>    Diar. of Propeller    Rule Diar. of Crank Shaft = 13' 4" 1  
 Coefficient of Displacement of Vessel at  $\frac{1}{2}$  Moulded Depth .62

# SKETCHES.



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## TURBINE ENGINES.

Type

No. of H.P. Turbines

No. of L.P. Turbines

No. of Astern

How arranged

Revs. per Min.

Horse Power

Diam. of H.P. Turbine Drums

MATERIAL

THICKNESS OF METAL

Material of H.P. Turbine Casings

Lengths of Blades in H.P. Turbines

No. of Rows of Blades of each Length

Pitch of

Diam. of L.P. Turbine Drums

MATERIAL

THICKNESS OF METAL

Material of L.P. Turbine Casings

Lengths of Blades in L.P. Turbines

No. of Rows of Blades of each Length

Pitch of

Diam. of Astern Turbine Drums

MATERIAL

THICKNESS OF METAL

Material of Astern Turbine Casings

Lengths of Blades in Astern Turbines

No. of Rows of Blades of each Length

Pitch of

Diam. of Turbine Spindles

Length of Bearing

No. of Thrust Collars on each Spindle

Thickness

Distance apart

Diam. of Spindles at Bottom of Collars

Diam. over Collars

Spindles Forged by

Material

,, Finished by

## SKETCHES.



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## TUB SKETCHES. E8.

No. of H. P. Pumps  
No. of L. P. Pumps  
No. of Air Pumps  
How arranged

Material  
Type of Work  
How arranged  
No. of H. P. Pumps  
No. of L. P. Pumps  
No. of Air Pumps  
How arranged

Material  
Type of Work  
How arranged  
No. of H. P. Pumps  
No. of L. P. Pumps  
No. of Air Pumps  
How arranged

Material  
Type of Work  
How arranged  
No. of H. P. Pumps  
No. of L. P. Pumps  
No. of Air Pumps  
How arranged

Material  
Type of Work  
How arranged  
No. of H. P. Pumps  
No. of L. P. Pumps  
No. of Air Pumps  
How arranged

## SKETCHES.

No. of Air Pumps  
Type of  
Diam. of Air Pump Rod  
Material  
Stroke  
Diam.  
How are Air Pumps Worked?  
Type of Work

No. of Centrifugal Circulating Pumps  
" Reciprocating  
Diam. of Circulating Pump Rods  
Material  
Stroke  
Diam.  
How are Circulating Pumps Worked?  
Type of Work

Diam. of Circulating Pump Section from Sea  
How each Circulating Pump a High Section with Non-return Valve?  
Stroke  
Diam.

No. of Feed Pumps on each Engine  
Where do they pump from?  
Discharge to?  
Are Spring-loaded Relief Valves fitted to each Pump?  
Can one Pump be overhauled while the others are at work?

No. of High Pumps on each Engine  
Where do they pump from?  
Discharge to?  
Can one Pump be overhauled while the others are at work?

No. of High Pumps connected to Condensers  
How are they connected?  
Can one Pump be overhauled while the others are at work?  
Discharge to?  
Can one Pump be overhauled while the others are at work?



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## PUMPS. ETC

No. of Air Pumps *One*      Diar. *21"*      Stroke *22½"*  
 Type of " *Single acting*  
 Diar. of Air Pump Rod *3¼"*      Material *Muntz Metal*  
 How are Air Pumps Worked? *Main Engines*

No. of Centrifugal Circulating Pumps ☒      Maker ☒  
 " Reciprocating " " *One*      Diar. *14½"*      Stroke *22½"*  
 Diar. of Circulating Pump Rods *3¼"*      Material *Muntz Metal*  
 How are Circulating Pumps Worked? *by Main Engines*

Diar. of Circulating Pump Suction from Sea *8"*  
 Has each Circulating Pump a Bilge Suction with Non-return Valve? *yes*      Diar. *5½"*

No. of Feed Pumps on each Engine *none*      Diar. ☒      Stroke ☒

Where do they pump from? ☒

" " discharge to? ☒

Are Spring-loaded Relief Valves fitted to each Pump? ☒

Can one Pump be overhauled while the others are at work? ☒

No. of Bilge Pumps on each Engine *2*      Diar. *4½"*      Stroke *22½"*

Where do they pump from? *from all bilges tanks & Sea.*  
 " " discharge to? *deck & overboard.*

Can one Pump be overhauled while the others are at work? *yes*

No. of Bilge Injections connected to Condensers ☒      Diar. ☒

Are all Bilge Suctions fitted with Roses? *yes*

Are the Valves, Cocks, and Pipes so arranged as to prevent unintentional connection between Sea and

Bilges? *yes*

Are all Sea Connections made with Valves or Cocks fitted direct to the Hull Plating? *yes*

Are they placed so as to be easily seen and accessible? *yes*

Are the Discharge Chests placed above the Deep Load Line? *yes*

Are they fitted direct to the Hull Plating and easily accessible? *yes*

Are all Blow-off Cocks or Valves fitted with Spigots through the Hull Plating and Covering Plates or

Flanges on the outside? *yes*



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Main BOILERS. N<sup>o</sup> 777

Boilers made by *Palmers S. & S. Co. Ltd*  
 " at *Jarrow*  
 Works No. *777*  
 Date when Plan approved *12-6-07*  
 Boiler Plates, Iron or Steel *Steel*  
 Makers of Shell Plates *J. Spencer & Sons*  
 " Internal Plates " " *4*  
 " Furnaces *Leeds Forge Co.*  
 " Stay Bars *J. Spencer & Sons*  
 " Rivets *Johnstone, Wallace & Co. Newcastle*  
 Material tested by (B.C., B.T., etc.) *B.C. and B of Trade*  
 No. of Boilers *Two*  
 Single or Double-ended *Single ended*  
 No. of Furnaces, each Boiler *Four*  
 Type of Furnaces *Morrison's Patent Suspension*  
 Approved Working Pressure *180 lbs*  
 Hydraulic Test Pressure *360 lbs*  
 Date of Hydraulic Test *26-11-07*  
 " when Safety Valves set *14-1-08*  
 Pressure on Valves *180 lbs*  
 Date of Steam Accumulation Test *13-2-08*  
 Max. Pressure under Accumulation Test *195 lbs*  
 System of Draught *Howdens C. A.*  
 Can Boilers be worked separately? *yes*  
 Greatest inside Diam. of Boilers *15'9"*  
 " " Length " *12'6"*  
 Square Feet of Heating Surface, each Boiler *3249*  
 " Grate " " *70*

Donkey Boiler No 72  
Palmers S. & S. Co. Ltd

*Jarrow*  
*72*  
*24-6-07*  
*Steel*  
*J. Spencer & Sons Ltd*  
*J. Spencer & Sons Ltd*  
*J. Spencer & Sons Ltd*  
*J. Spencer & Sons Ltd*  
*Johnstone, Wallace & Co. Newcastle*  
*B.C. & B of Trade*  
*One*  
*Single*  
*One*  
*Plain*  
*100 lbs*  
*200 lbs*  
*26-11-07*  
*14-1-08*  
*100 lbs*  
*14-1-08*  
*102 lbs*  
*Natural*  
*yes*  
*7'0"*  
*8'0"*  
*343*  
*12'75"*

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## Main Boilers

No. of Safety Valves, each Boiler 2  
 Diar. " " " 30 7/8"  
 Area " " " 20-6 □  
 Are the Valves fitted with Easing Gear? yes  
 No. of Pressure Gauges, each Boiler one  
 " Water " " one  
 " Test Cocks, " three  
 " Salinometer Cocks, " one  
 Are Water Gauge Pillars attached by Pipes to Steam and Water Spaces? no  
 Are these Pipes connected to Boilers by Cocks or Valves? ✓  
 Are Blow-off Cocks or Valves fitted on Boiler Shells? yes  
 No. of Strakes of Shell Plating in each Boiler one  
 " Plates in each Strake two  
 Thickness of Shell Plates by Rule 20/16  
 " " Approved 1 3/8" & 1/2"  
 " " in Boilers " "  
 Are the Rivet Holes Punched or Drilled? Drilled  
 Are Rivets Iron or Steel? steel  
 Are the Longitudinal Seams Butt or Lap Joints? butts  
 Are the Double Butt Straps of equal width? yes  
 Thickness of outside Butt Straps 1 5/16" & 1/2"  
 " Inside " 1 9/32"  
 Are Longitudinal Seams Hand or Machine Riveted? machine  
 Are they Single, Double, or Treble Riveted? Treble  
 Diar. of Rivet Holes 1 7/16" & 3/4"  
 Pitch " inner row 5" outer rows 10"  
 Width of Overlap 10 7/8" x 2  
 Percentage of Strength in Longitudinal Seams 85-16 % Plate

## Donkey Boiler

2  
 2"  
 6-28  
 yes  
 one  
 one  
 three  
 one  
 no  
 ✓  
 yes  
 one  
 one  
 6 4/16  
 7/16"  
 Drilled  
 Steel  
 lap  
 ✓  
 ✓  
 machine  
 Treble  
 13/16"  
 3 3/16"  
 6 7/16"  
 78-7 % Plate



## Main Boilers

No. of Rows of Rivets in Centre Circumferential Seams ✓

Are these Seams Hand or Machine Riveted? ✓

Diam. of Rivet Holes ✓

Pitch " ✓

Width of Overlap ✓

No. of Rows of Rivets in End Circumferential Seams *Two*

Are these Seams Hand or Machine Riveted? *Back machine front-hand*

Diam. of Rivet Holes  $1\frac{1}{2}"$

Pitch "  $4\frac{7}{8}"$

Width of Overlap  $7\frac{1}{8}"$

Size of Manholes in ~~Shell~~ End  $16" \times 12"$

Dimensions of Compensating Rings *Flanged in*

Thickness of End Plates in Steam Space by Rule  $\frac{17.46}{16}$

" " " " " Approved  $1\frac{1}{16}" \times \frac{1}{32}"$

" " " " " in Boilers " "

Pitch of Steam Space Stays  $15" \times 20"$

Eff. Diam. " " " by Rule  $2.58$

" " " " " Approved  $2.787$

" " " " " in Boilers " "

Material of " " " *Steel*

How are Stays Secured? *nuts in and out*

Diam. and Thickness of Loose Washers on End Plates  $9" \times \frac{3}{4}"$

" " Riveted " " " ✓

Width " " Doubling Strips " " " ✓

Thickness of Middle Back End Plate by Rule  $\frac{13.6}{16}$

" " " " " Approved  $\frac{13}{16}" \times \frac{1}{32}"$

" " " " " in Boilers " "

## Donkey Boilers

Thickness of Doublers in Wide Spaces between Flanges ✓

Pitch of Stays at " " " ✓

Eff. Diam. of Stays by Rule " " " ✓

" " " " " Approved " " " ✓

" " " " " in Boilers " " " ✓

Material *One*

Are Stays Used? *Back machine, front-hand.*

Thickness of Back End Plates at Bottom by Rule  $\frac{13}{16}"$

Thickness of Back End Plates at Bottom by Rule  $1\frac{3}{4}"$

" " " " " Approved  $2\frac{1}{2}"$

" " " " " in Boilers  $16" \times 12"$

Pitch of Stays at Wide Spaces between Flanges  $30" \times 26" \times \frac{1}{16}"$

Thickness of Doublers in " " "  $9.7"$

" " " " " Approved  $\frac{1}{16}"$

Thickness of Front End Plates at Bottom by Rule  $5\frac{7}{8} \times \frac{1}{32}"$

" " " " " Approved " "

No. of Long Stays in Spaces between Turnings  $14\frac{1}{2}"$  single row

Eff. Diam. of Stays " " "  $1.662"$  wings  $1'4\frac{1}{2}"$

" " " " " Approved " "

Material of " " " *Steel*

How are Stays Secured? *nuts in & out*

Diam. and Thickness of Loose Washers on End Plates *Centre  $5\frac{7}{8} \times 7\frac{1}{16}"$  wings  $4\frac{7}{8}" \times 7\frac{1}{16}"$*

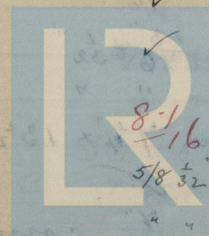
" " Riveted " " " ✓

Width " " Doubling Strips " " " ✓

Thickness of Middle Back End Plate by Rule  $\frac{8.1}{16}"$

" " " " " Approved  $\frac{5}{8} \times \frac{1}{32}"$

" " " " " in Boilers " "



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## Main Boilers

Thickness of Doublings in Wide Spaces between Fireboxes ✓

Pitch of Stays at " " " " ✓

Eff. Diar. of Stays by Rule ✓

" " " Approved ✓

" " " in Boilers ✓

Material " ✓

Are Stays fitted with Nuts outside? ✓

Thickness of Back End Plates at Bottom by Rule

$$\frac{14.3}{16}$$

" " " " Approved

$$\frac{15}{16}$$

" " " " in Boilers

Pitch of Stays at Wide Spaces between Fireboxes

Wing stays  $2\frac{3}{4}$  dia Others  $2\frac{1}{4}$  dia

Thickness of Doublings in " " ✓

Thickness of Front End Plates at Bottom by Rule

$$\frac{12}{16} + \frac{2}{32}$$

" " " " Approved

" " " " in Boilers

No. of Long Stays in Spaces between Furnaces

Twelve

Eff. Diar. of Stays by Rule

$$1.68$$

$$1.69$$

$$1.42$$

" " " Approved

$$2.037,$$

$$2.297,$$

$$2.537.$$

" " " in Boilers

Material of " Steel

Thickness of Front Tube Plates by Rule

$$\frac{12.6}{16}$$

" " " Approved

$$\frac{13}{16} + \frac{1}{32}$$

" " " in Boilers

Pitch of Stay Tubes at Spaces between Stacks of Tubes

$$7\frac{1}{4} \times 13\frac{1}{2} \text{ centres}$$

Thickness of Doublings in " " "

" Stay Tubes at " " "

$$\frac{7}{16}, \text{ corners } \frac{1}{2}$$

## Donkey Boiler

Are Stay Tubes fitted with Nuts at Front End? ✓

Pitch of Stays at " " " " ✓

Eff. Diar. of Stays by Rule ✓

" " " Approved ✓

" " " in Boilers ✓

Material " ✓

Are Stays fitted with Nuts outside? ✓

Thickness of Back End Plates at Bottom by Rule

$$\frac{8.3}{16}$$

$$5/8 + \frac{1}{32}$$

" " " Approved

" " " in Boilers

Pitch of Stays at Wide Spaces between Fireboxes

Thickness of Doublings in " " ✓

Thickness of Front End Plates at Bottom by Rule

$$\frac{9.6}{16}$$

$$5/8 + \frac{1}{32}$$

" " " Approved

" " " in Boilers

No. of Long Stays in Spaces between Furnaces

$$1.31$$

$$1.412$$

Eff. Diar. of Stays by Rule

" " " Approved

" " " in Boilers

Material of " Steel

Are Stays fitted with Nuts outside? ✓

Pitch of Stay Tubes at Spaces between Stacks of Tubes

$$8\frac{1}{4} \times 8\frac{1}{4} \text{ centres}$$

Thickness of Doublings in " " "

" Stay Tubes at " " "

$$3/8$$

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## Main Boilers

Are Stay Tubes fitted with Nuts at Front End? *nuts on top rows and between nests of tubes*

Thickness of Back Tube Plates by Rule

" " " Approved

" " " in Boilers

Pitch of Stay Tubes in Back Tube Plates

" Plain "

Thickness of Stay Tubes

" Plain "

External Diar. of Tubes

Material " "

Thickness of Furnace Plates by Rule

" " " Approved

" " " in Boilers

Smallest outside Diar. of Furnaces

Length between Tube Plates

Width of Combustion Chambers (Front to Back)

Thickness of " " " Tops, by Rule,

" " " " Approved

" " " " in Boilers

Pitch of Screwed Stays in C.C. Tops

Eff. Diar. " " by Rule

" " " Approved

" " " in Boilers

Material " "

Thickness of Combustion Chamber Sides by Rule

## Donkey Boiler

*nuts on outer rows*

$$\frac{10.3}{16}$$

$$\frac{11}{16} \times \frac{1}{32}$$

$$8\frac{1}{4} \times 8\frac{1}{4} \text{ centres}$$

$$4\frac{1}{8} \times 4\frac{1}{8}$$

$$\frac{3}{8}$$

$$9 \text{ S.W.G.}$$

$$3"$$

$$\text{Iron}$$

$$\frac{7.5}{16}$$

$$\frac{9}{16} \times \frac{1}{32}$$

$$35"$$

$$5'8\frac{1}{2}"$$

$$21"$$

$$\frac{2.07}{16}$$

$$\frac{2}{8} \times \frac{1}{32}$$

*Single row 4" apart*

$$1.0$$

$$1.162"$$

$$"$$

$$\text{Steel}$$

$$\frac{7.95}{16}$$

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# VERTICAL DONKEY BOILERS.

If the Donkey Boilers are Vertical the following particulars should be stated in addition to those on previous Pages applicable to such Boilers:—

Type of Boilers

Height of Boiler Crown above Fire Grate

Are Boiler Crowns Flat or Dished?

Internal Radius of Dished Ends

Thickness of Plates

Description of Seams in Boiler Crowns

Diam. of Rivet Holes

Pitch

Width of Overlap

Height of Firebox Crowns above Fire Grate

Are Firebox Crowns Flat or Dished?

External Radius of Dished Crowns

Thickness of Plates

No. of Crown Stays

Effective Diam.

Material

External Diam. of Firebox at Top

Bottom

Thickness of Plates

No. of Water Tubes

Int. Diam.

"

"

Material of Water Tubes

No. of Screwed Stays in Firebox Sides

Eff. Diam.

Material

Are they fitted with Nuts inside?

Outside?

## SUPERHEATERS.

Description of Superheaters

Where situated

Which Boilers are connected to Superheaters?

Can Superheaters be shut off while Boilers are working?

No. of Safety Valves on Superheaters

Diam.

Area

Are " " fitted with Easing Gear?

Date of Hydraulic Test

Test Pressure

Date when Safety Valves set

Pressure on Valves

## SKETCHES.

No. of Boilers  
Material  
Dished, Welded, or Seamed  
Internal Diam.  
Thickness  
How are Flanges Secured  
Date of Hydraulic Test  
Test Pressure

## REFRIGERATORS.

No. of Machines  
Description  
When any part of the Year is to be used for the Carriage of Refrigerated Cargo the following particulars should be stated:—  
Total Cubic Capacity of Refrigerated Spaces  
Nature, Construction, Thickness, &c. of Insulation  
Means for securing the insulation from moisture  
Means for securing the insulation from fire  
Are all Pipes Air Tights &c., well secured and protected from risk of damage?  
Are all pipes electrically sound, and Air Pipes in Insulated Spaces properly fastened?  
Are Thermometer Tubes so arranged that Water cannot enter and freeze in the Tubes?  
Are Drain Valves fitted on any of the Boilers in Insulated Spaces?  
Are these fitted with Non-return Valves?  
Are the Boilers and Pipes properly secured?  
Are the Boilers and Pipes fitted with Non-return Valves?



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## MAIN STEAM PIPES.

No. of Lengths	2		
Material	Steel		
Brazed, Welded, or Seamless	Solid drawn		
Internal Diam.	6½"		
Thickness	¼"		
How are Flanges Secured?	Riveted		
Date of Hydraulic Test	19-12-07		
Test Pressure	540 lbs		

no REFRIGERATORS.

No. of Machines      Makers

Description

When any part of the Vessel is to be used for the Carriage of Refrigerated Cargo the following particulars should be stated:—

Total Cubic Capacity of Refrigerated Spaces

Nature, Construction, Thickness, &c., of Insulation

Are all Pipes, Air Trunks, &c., well secured and protected from risk of damage?

Are all Bilge Suction, Sounding, and Air Pipes in Insulated Spaces properly insulated?

Are Thermometer Tubes so arranged that Water cannot enter and freeze in the Tubes?

Are Sluice Valves fitted on any of the Bulkheads of Insulated Spaces?

Are these fitted with Brass Non-return Valves?

Are they always accessible?

Are the Bilges and Bilge Rose Boxes always accessible?

Are the Steam Suctions to Bilges fitted with Non-return Valves?

Is the Machine Room effectively separated from Insulated Spaces?

properly Ventilated and Drained?

No. of Steam Cylinders, each Machine      Diars.

" Compressors,      "

Diam. of Crank Shafts      No. of Cranks

Give particulars of Pumps in connection with Refrigerating Plant, and state whether worked by

Refrigerating Machines or independently

Are Brine and other Regulating Valves placed so as to be accessible without entering the Insulated Spaces?

Date of Test under Working Conditions

Fall of Temperature in Insulated Spaces

Time required to obtain this Result

Articles of Spare Gear for Refrigerating Plant carried on board



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## SKETCHES.

is the Machine Room electrically separated from the other spaces

properly ventilated and drained

No. of Steam Cylinders and Machine

Compressor

No. of Crank Shafts

Give particulars of Pumps in connection with Refrigerating Plant and state whether worked by

Refrigerating Machines or Independently

19-12-07

570 lbs

## REFRIGERATORS.

## ELECTRIC LIGHTING.

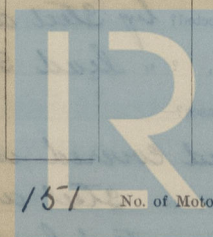
Installation Fitted by *W.C. Martin & Co., Glasgow*  
 No. and Description of Dynamos *One compound wound*  
 Makers of Dynamos *Clarke, Chapman & Co., Gateshead*  
 Capacity „ *120* Amperes, at *100* Volts, *300* Revols. per Min.  
 Current Alternating or Continuous *continuous*  
 Position of Dynamos *Lower engine room platform, Starboard side*  
 „ Main Switch Board *near dynamo*  
 No. of Circuits to which Switches are provided on Main Switch Board *4*

Particulars of these Circuits:—

No. of Circuit.	Name of Circuit.	Number of Lights.	Candle Power.	Current Required. Amps.	Size of Conductor.	Current Density.	Conductivity of Conductor.	Insulation Resistance per Mile.
1	Ship forward	41	$\left. \begin{matrix} 16 \\ 32 \\ 500 \end{matrix} \right\}$	35	19/18	1000	98%	2000 meg
2	Ship aft	33	$\left. \begin{matrix} 16 \\ 32 \\ 500 \end{matrix} \right\}$	28	19/18	900	"	"
3	Passenger Circuit	53	16	29	19/18	900	"	"
4	Engine Room	24	16	13.2	19/20	800	"	"
2 500 c/s Dunkam lamps for discharging purposes								

Total No. of Lights *151* No. of Motors driving Fans, &c. ☒ No. of Heaters ☒

Current required for Motors and Heaters ☒



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Positions of Auxiliary Switch Boards, with No. of Switches on each

*None*

Are Cut-outs fitted as follows?—

On Main Switch Board, to Cables of Main Circuits

*yes*

On Aux. " " each Auxiliary Circuit

*yes*

Wherever a Cable is reduced in size

*yes*

To each Lamp Circuit

*yes*

To both Flow and Return Wires of all Circuits when the Double-Wire System is adopted

*yes*

Are the Fuses of Standard Sizes?

*yes*

Are all Switches and Cut-outs constructed of Non-inflammable Material?

*yes*

Are they placed so as to be always and easily accessible?

*yes*

Smallest Single Wire used, No.

*18*

S.W.G., Largest, No.

*16*

S.W.G.

How are Conductors in Engine and Boiler Spaces protected?

*by Steel armour*

" " Saloons, State Rooms, &c., " ?

*Lead Sheathing*

What special protection is provided in the following cases?—

(1) Conductors exposed to Heat or Damp

*Lead covered in tubes*

(2) " " passing through Bunkers or Cargo Spaces

*Steel armour*

(3) " " Deck Beams or Bulkheads

*teak bushes & W.T. glands*

Are all Joints in Cables properly soldered and thoroughly Insulated so that the efficiency of the Cables

is unimpaired?

*no joints*

Are all Joints in accessible positions, none being made in Bunkers or Cargo Spaces?

*no joints*

Are all Hull Connections for Single-Wire Systems made with Screws of large Surface?

*double wire system*

Are the Dynamos, Motors, Main and Branch Cables, so placed that the Compasses are not injuriously

affected by them?

*yes*

Have Tests been made to prove that this condition has been satisfactorily fulfilled?

*yes*

Has the Insulation Resistance over the whole system been tested?

*yes*

What does the Resistance amount to?

*750,000*

Ohms.

Is the Installation supplied with a Voltmeter?

*yes*

" " " an Ampere Meter?

*yes*

Date of Trial of complete Installation

*25-2-08*

Duration of Trial

*8 hours*

DONKEY



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# no EVAPORATORS.

No. Type Tons per Da  
 Makers  
 Working Pressure Test Pressure Date of Test  
 Date of Test of Safety Valves under Steam

## FEED WATER HEATERS.

No. one Type Compactum  
 Makers J. Kirkaldy Ltd London  
 Working Pressure 180 lbs Test Pressure 432 lbs Date of Test 28/10/04

## DONKEY

No. of Donkeys	One Ballast Pump.	One Auxiliary Feed Pump.
Type	Horizontal	Horizontal
Makers	Hoy. Watson & Sons	Hoy Watson & Sons
Single or Duplex	Duplex	Duplex
" Double-Acting	Double acting	Double acting
Diar. of Steam Cylinders	7 1/2"	7 1/2"
" Pumps	9"	4 1/2"
Stroke of "	10"	10"

Where do they pump from? Sea, tanks and bilges. Hotwell, sea, tanks bilges and boilers.

Where do they discharge to? To condenser and overboard. To boilers, deck, sea, ash ejector and overboard.

Capacity, Tons per Hour of Ballast Donkey 135 tons

Diar. of Pipe required by Rule for

## FEED WATER FILTERS.

No. One Type Compactum Size  
 Makers J. Kirkaldy Ltd London  
 Working Pressure 180 lbs Test Pressure 432 lbs Date of Test 28/10/04

## FORCED DRAUGHT FANS.

No. of Fans One Diar. 84" Revols. per min.  
 How are Fans driven? by Single Cylinder Vertical Engine 7x5  
 made by J. Howden & Co.

## PUMPS.

One Donkey Boiler Feed pump.	One Main Feed Pump.
Horizontal	Woodesons Patent
Hoy. Watson & Sons, Newcastle	Clarke, Chapman & Co.
Duplex	Single
Double acting	Double acting
4 1/2"	9 1/2"
2 3/4"	4"
4"	24"

Sea, aux'y condenser, drain tank and Ballast tanks. Hotwell, Sea and Tanks.  
 To donkey boiler. To main boilers.

Largest Ballast Tank

Velocity of Water in Pipe

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## SPARE GEAR.

No. of Top End Bolts	2	No. of Bot. End Bolts	2
" Main Bearing Bolts	2	" Coupling Bolts	One set
" Cylr. Cover Bolts Studs	6 for each	" Valve Chest Cover Bolts Studs	6 each
" Feed Pump Valves	1	" Bilge Pump Valves	1
" Safety Valve Springs	2	" Fire Bars	50
" Piston Rings	✓	" Junk Ring Bolts Studs	24
" Piston Rods	✓	" Connecting Rods	✓
" Valve Spindles	✓	" Air Pump "	one
" Air Pump Valves	one set	" " Buckets	one
" Crank Pin Bushes	one pair	" Crosshead Bushes	✓
" Crank Shafts	✓	" Propeller Shafts	One
" Propellers	✓	" " Blades	✓
" Boiler Tubes	12	" Condenser Tubes	12

OTHER ARTICLES OF SPARE GEAR:— Two Donkey Boiler Safety valve Springs,  
One circulating pump bucket, valve and rod complete,  
One eccentric strap complete. A quantity of plate  
& bar iron, bolts nuts studs and washers,  
2 dozen gauge glasses & washers.

## GENERAL CONSTRUCTION.

Have all the Requirements under Sections 31 and 32 of the Rules been complied with? *yes*  
If not, give details of the points of difference, and state when these were sanctioned by the Chief

Surveyor ✓


Are the Steam Pumping Arrangements in accordance with the approved Plan? *yes*

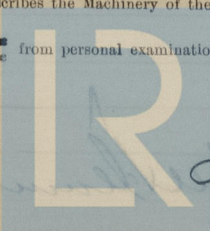
If not, state in what respects they differ and when such differences were sanctioned by the Chief

Surveyor ✓

Are the Materials used in the Construction of Engines and Boilers, so far as could be seen, sound and trustworthy? *yes*

Is the Workmanship throughout thoroughly satisfactory? *yes*

The above correctly describes the Machinery of the S.S. "Richard Welford"  
as ascertained by  from personal examination.

 Lloyd's Register  
Engineer Surveyor to the British Corporation for the  
Survey and Registry of Shipping.



Fees—

## MAIN BOILERS.

H.S. 6498 Sq. ft.

G.S. 140 "

## DONKEY BOILER.

H.S. 343 Sq. ft.

G.S. 12.75 "

21 0 0

£ : :

## ENGINES.

L.P.C. 89 Cub. ft.

20 : 0 : 0

£ : :

Testing, &amp;c. ...

£ : :

Expenses ...

£ : :

Total ... £ 41 : 0 : 0

It is submitted that this Report be approved,

25-3-8 *W. S. King*  
Chief Surveyor.

Approved by the Committee,

for the Class of *AB5\**  
on 25<sup>th</sup> March 1908

Fees applied for 27-2-8

Fees paid 16-3-8

*Robert Fleming*  
Secretary.

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Fees:

Main Entry

No. 6498

C.A. 140

Main Entry

No. 343

C.A. 1275

21 0/0

Fees:

No. 89

C.A. 20

0 0

Fees:

Fees:

Total

21 0/0

It is submitted that this Report be approved.

25-3-8 *Robert Henry*  
Chief Secretary

Approved by the Committee

on 25<sup>th</sup> March 1908

Fees applied for 27-3-8

Fees paid 16-3-8

*Robert Henry*  
Secretary

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