

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

M. W. Marchant

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 *Palmers, 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. *1 3/8"* " " *1 3/8"*
 " " " " Liner *1 3/8"* " " " "
 " " " " 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*
 Diar. " " " *1 3/8"* " *1 3/8"* " " *1 3/8"*
 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 " " *Meay & 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 Checks *103*
 Diar. " " " *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.

SKETCHES

SHAFTING.

Are Crank Shafts Built? *yes* No. of Lengths in each *3* Angle of Cranks *120*

Diar. of Crank Shafts by Rule *12.72* ~~12.78~~ Actual *13 1/2*" Diar. in Way of Webs *13 1/2*"

Makers of " *J. Spencer & Sons* Material *1.5*

Diar. of Crank Pins *13 1/2*" Diar. in Way of Web *13 1/2*"

Makers of " *J. Spencer & Sons* Material *1.5*

Width across Crank Webs at Centre 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*

Diar. 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* Diar. at Mid Length *3 1/4*" Diar. of Pitch Circle *19 3/4*"

Material of Coupling Bolts *Steel*

Crank Shafts Finished by *Palmer's S. & J. Co. Ltd*

Greatest Distance from edge of Main Bearing to Crank Web *2 1/8*"

Description of Thrust Blocks *horse shoe*

Number " " Rings *3*

Diar. of Thrust Shafts by Rule *12.72* ~~12.78~~ Actual (at bot. of Collars) *13 1/2*" Over Collars *23*"

" " " at Forward Coupling *13*" After Coupling *13*"

No. of Thrust Collars *6* Thickness *17/8*" Distance apart *4 7/8*"

Thrust Shafts Forged by *J. Spencer & Sons* Material *1.5*

" Finished by *Palmer's S. & J. Co. Ltd*

Diar. of Intermediate Shafting by Rule *12.08* Actual *12 1/8*"

No. of Lengths, each Engine *3* No. of Tunnel Bearings *3*

Diar. of Bearings *13 1/8*" Length *20*" Distance apart *15 1/4*"

TURBINE ENGINES.

Type

No. of H.P. Turbines

No. of L.P. Turbines

No. of Astern "

How arranged

Revs. per Min.

Horse Power

Diar. 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 " " "

Diar. 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 " " "

Diar. 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 " " "

Diar. of Turbine Spindles

Length of Bearing

No. of Thrust Collars on each Spindle

Thickness

Distance apart

Diar. of Spindles at Bottom of Collars

Diar. over Collars

Spindles Forged by

Material

" Finished by

SKETCHES.



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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^o 777
 Boilers made by Palmers S. & J. C^o. 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 C^o.
 " Stay Bars J. Spencer & Sons
 " Rivets Johnstone, Wallace & C^o. 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 Morrisons 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. & J. C^o. Ltd
 Jarrow
 72
 24-6-07
 Steel
 J. Spencer & Sons Ltd
 Johnstone Wallace & C^o. 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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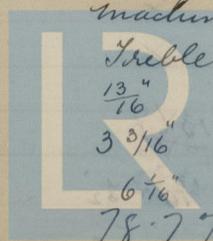
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Main Boilers

No. of Safety Valves, each Boiler 2
 Diar. " " " 3 5/8"
 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 3/16
 7/16"
 Drilled
 Steel
 lap
 ✓
 ✓
 machine
 Treble
 13/16"
 3 3/16"
 6 7/16"
 78-7 % Plate



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Main Boilers

No. of Rows of Rivets in Centre Circumferential Seams ✓
 Are these Seams Hand or Machine Riveted? ✓
 Diar. 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*
 Diar. 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. Diar. " " " by Rule 2.58
 " " " " " Approved 2.787
 " " " " " in Boilers " "
 Material of " " " *Steel*
 How are Stays Secured? *nuts in and out*
 Diar. 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 $\frac{13}{16}" + \frac{1}{32}"$
 " " " " " in Boilers " "

Donkey Boilers

Thickness of Doublers in Wide Spaces between Rivets ✓
 Pitch of Stays at " " " ✓
 Eff. Diar. 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 Rivets *in shell* $30 \times 26 \times \frac{7}{16}"$
 Thickness of Doublers in " " " $9.7"$
 " " " " " Approved $\frac{7}{16}"$
 Thickness of Front End Plates at Bottom by Rule $5\frac{7}{8} \times \frac{1}{32}"$
 " " " " " Approved " " "
 " " " " " in Boilers " " "
 No. of Long Stays in Spaces between Turnings $14\frac{1}{2}"$ *single row*
 Eff. Diar. of Stays by Rule 1.66
 " " " " " Approved $1.662"$ *wings* $1.412"$
 " " " " " in Boilers " " "
 Material of " " " *Steel*
 How are Stays Secured? *nuts in front*
 Thickness of Front End Plates by Rule *Centre* $5\frac{7}{8} \times 7\frac{1}{16}"$ *wings* $4\frac{7}{8}" \times 7\frac{1}{16}"$
 " " " " " Approved " " "
 " " " " " in Boilers " " "
 Material of " " " *Steel*
 Thickness of Middle Back End Plate by Rule $\frac{8.1}{16}$
 " " " " " Approved $\frac{8}{16}" + \frac{1}{32}"$
 " " " " " in Boilers " "



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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

4/16

Approved

1 3/16 + 1/32

in Boilers

" "

Pitch of Stay Tubes in Back Tube Plates

7 1/4" x 10 1/4" centres

Plain

3 5/8" x 3 3/4"

Thickness of Stay Tubes

1/2" ; 7/16" ; 5/16"

Plain

8 L.S.W.G

External Diam. of Tubes

2 1/2"

Material

Iron

Thickness of Furnace Plates by Rule

7/16

Approved

1/2"

in Boilers

"

Smallest outside Diam. of Furnaces

37 3/4"

Length between Tube Plates

8'6"

Width of Combustion Chambers (Front to Back)

37"

Thickness of Tops, by Rule

8/16

Approved

5/8" + 1/32"

in Boilers

" "

Pitch of Screwed Stays in C.C. Tops

8 1/2" x 9"

Eff. Diam. by Rule

1.43

Approved

1.608

in Boilers

"

Material

Steel

Thickness of Combustion Chamber Sides by Rule

8.65 / 16

Donkey Boiler

nuts on outer rows

10.3 / 16

11/16 + 1/32

8 1/4" x 8 1/4" centres

4 1/8" x 4 1/8"

3/8"

9 S.W.G.

3"

Iron

7.5 / 16

9/16 + 1/32

35"

5'8 1/2"

21"

2.07 / 16

1/2"

Single row 4" apart

1.0

1.162

Steel

7.95 / 16

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Main Boilers

Thickness of Combustion Chamber Sides Approved $\frac{5}{8} + \frac{1}{32}$

" " " " in Boilers " "

Pitch of Screwed Stays in C.C. Sides $8\frac{1}{2} \times 9$

Eff. Diar. " " by Rule 1.43

" " " Approved 1.608

" " " in Boilers " "

Material " " Steel

Thickness of Combustion Chamber Backs by Rule $\frac{10.3}{16}$

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

" " " " in Boilers " "

Pitch of Screwed Stays in C.C. Backs $8 \times 9\frac{3}{8}$

Eff. Diar. " " by Rule 1.42

" " " Approved Corners 2" outer rows $1\frac{7}{8}$ min $1\frac{3}{4}$ "

" " " in Boilers " " " " " "

Material " " Steel

Are all Screwed Stays fitted with Nuts inside C.C. nuts in & out

Thickness of Combustion Chamber Bottoms $\frac{7}{8}$ "

No. of Girders over each Wing Chamber Four

" " " Centre " Three

Depth and Thickness of Girders 9×1 double

Material of Girders Steel

No. of Stays in each 3

No. of Stay Tubes, each Boiler 136

" " Plain " " " 342

Size of lower Manholes 15×11 "

Donkey Boiler

VERTICAL DONKEY BOILERS $\frac{1}{2}$ "

If the Donkey Boilers are fitted the following particulars should be stated in addition to those on previous pages applicable to them

Type of Boiler

Height of Boiler Crown above Fire grate

Are Boiler Crown Flat or Dishd?

Internal Radius of Dishd Crown

Description of Seams in Boiler Crown

Dist. of Stay Holes

Height of Firebox Crown above Fire grate

Are Firebox Crown Flat or Dishd?

External Radius of Dishd Crown

No. of Crown Seams

Eff. diam Outer rows 1.284, others 1.162"

Material of Water Tubes

No. of screwd stays in firebox sides

Are they fitted with nuts inside?

Description of Superheaters

Where situated

Which Boilers are connected to Superheaters?

Can Superheaters supply all Boilers in work?

No. of Safety Valves on Superheaters

Height of Safety Valve

Date of Hydrographic Test

Date when Boilers were last tested

Single row $8\frac{1}{4}$ " apart

1-0

1.162"

"

Steel

7.95

$\frac{7.95}{16}$

$\frac{1}{2}$ "

"

$9\frac{1}{2} \times 8\frac{1}{4}$ "

1.02

Eff diam Outer rows 1.284, others 1.162"

Steel

nuts in & out

$9\frac{1}{16} + \frac{1}{32}$ "

Four

"

$4 \times 3\frac{1}{4}$ double

Steel

One

16

42

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no 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

Diar. 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 Diar.

Material

External Diar. of Firebox at Top

Bottom

Thickness of Plates

No. of Water Tubes

Int. Diar.

" "

Material of Water Tubes

No. of Screwed Stays in Firebox Sides

Eff. Diar.

Material

Are they fitted with Nuts inside?

Outside?

no 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

Diar.

Area

Are " " fitted with Easing Gear?

Date of Hydraulic Test

Test Pressure

Date when Safety Valves set

Pressure on Valves

MAINTENANCE SKETCHES.

No. of Boilers
Material
Brand, Weight, or Name
Internal Diar.
Thickness
How are Flanges Secured
Date of Hydraulic Test
Test Pressure

2
Steel
Boiler Crown
6"
1/2"
Flanged
19-12-01
540 lbs

REFRIGERATORS

No. of Machines
Description
When any part of the System is to be used for the Carriage of Refrigerated Cargo the following particulars should be stated:—
Total Cubic Capacity of Refrigerated Space
Nature, Construction, Thickness, &c. of Insulation



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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

SUPERHEATERS

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

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

None

No. of Circuits to which Switches are provided on Main Switch Board	Main Switch Board	Position of Dynamos	Current Alternation or Continuity	Capacity	Material of Dynamos	No. and Description of Dynamos	Installation by
1							
2							
3							
4							
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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 Hr _____
 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	<i>One Ballast Pump.</i>	<i>One Auxiliary Feed Pump.</i>
Type	<i>Horizontal</i>	<i>Horizontal</i>
Makers	<i>Hoy. Watson & Sons</i>	<i>Hoy. Watson & Sons</i>
Single or Duplex	<i>Duplex</i>	<i>Duplex</i>
Double-Acting	<i>Double acting</i>	<i>Double acting</i>
Diar. of Steam Cylinders	<i>7 1/2"</i>	<i>7 1/2"</i>
Pumps	<i>9"</i>	<i>4 1/2"</i>
Stroke of "	<i>10"</i>	<i>10"</i>

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.

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

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 _____

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 ✓

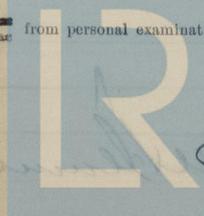
Are the Steam Pumping Arrangements in accordance with the approved Plan? *yes*

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 me from personal examination.



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 Engineer Surveyor to the British Corporation for the
 Survey and Registry of Shipping.

Fees—

GENERAL CONSTRUCTION

MAIN BOILERS.

H.S. 6498 Sq. ft.

G.S. 140 "

Donkey Boilers

H.S. 343 Sq. ft.

G.S. 1275 "

21 0 0

£ : :

ENGINES.

L.P.C. 89 Cub. ft.

20 : 0 : 0

£ : :

Testing, &c. ...

£ : :

Expenses ...

£ : :

Total ... £ 41 : 0 : 0

It is submitted that this Report be approved,

25-3-8 *W. Stebbing*
Chief Surveyor.

Approved by the Committee,

for the Class of *AB5**
on 25th March 1908

Fees applied for 27-2-8

Fees paid 16-3-8

Robert Stebbing
Secretary.

Secretary.



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Main Balance
 6498
 140
 348
 1275
 81 0/0

Balance
 89
 20 0 0

Total 81 0 0

It is requested that this Report be approved.

25-3-08
Robert Henry
 Chief Surveyor

Approved by the Committee for the Colon of M.B.S.
 on 25th March 1908

Fees applied for 27-3-8

Fees paid 16-3-8

Robert Henry
 Secretary



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