

No. 1094

THE BRITISH CORPORATION FOR THE SURVEY
AND
REGISTRY OF SHIPPING.

Report No. 989 No. in Register Book 1556

" KEYBELL "

Makers of Engines Collingwood & B. Co. Ltd.

Works No. 45

Makers of Main Boilers Collingwood & B. Co. Ltd.

Works No. 124-5

Makers of Donkey Boiler ✓

Works No. ✓

MACHINERY.



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003275-003281-0064

No.

THE BRITISH CORPORATION FOR THE SURVEY
AND
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Report No. 989 No. in Register Book 1556

Received at Head Office

4 November 1912

Surveyor's Report on the New Engines, Boilers, and Auxiliary
Machinery of the S.S. Keybell

Port of Registry

Montreal

Registered Owners

Keystone Transportation Co.
of Canada

Surveyor's District

Toronto Canada

Date of Completion of Engines

" " " " Main Boilers

Oct Aug 30th /12

" " " " Donkey "

Trial Run at

Callowood

Date

Oct 17th /12

First Visit

Last Visit

Total Number of Visits



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ENGINES.

Made by *Collingwood Ship Bldg Co Ltd*

at *Collingwood Canada* Works No. *46*

Description

No. of Cylinders, each Engine *3* Diars. *16" x 26" x 44"* Stroke *36"*

Cub. feet in each L.P. Cylr. *32* Revols. per Min. *80* I.H.P. *800*

Pressure in I.P. Receiver at full Power 2nd I.P. L.P.

Thickness of Metal in H.P. Cylr. *1 3/8" wood* L.P. " "

" " " " Liner " " "

" " " " Valve Chest " " "

Are Spring-loaded Relief Valves fitted to Top and Bottom of each Cylr.?

" " " each Receiver?

Number of Bolts in H.P. Cylr. Cover *16* I.P. *20* 2nd I.P. *24* L.P.

Eff. Diar. " " " *20 7/8* " *1 1/2* " *3/4* " "

Pitch " " " *24 4* " *4 3/4* " *6 1/4* " "

Type of H.P. Valves (Piston or Slide) " " "

" Valve Gear

Diameter of Piston Rods (plain part) *4 1/8*

Makers " " Material

Diameter of Connecting Rods (smallest part)

Makers " " Material

Diar. of Crosshead Gudgeons

Length of Bearing

Material

No. of Top End Bolts (each Rod) *1*

Effective Diar.

Material

" Bot. " "

"

"

" Main Bearings

Lengths

" Bolts in each

Effective Diar.

Material

No. of Holding Down Bolts, each Engine *30*

No. of Metal Checks

Eff. Diar. " " "

1"

Average Pitch

12"

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

Oct. 11th / 12

SKETCHES.



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SKETCHES.

SKETCHES

SHAFTING.

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

Diar. of Crank Shafts by Rule Actual Diar. in Way of Webs

Makers of *"Steel Conf. Canada"* Material *Forged Steel*

Diar. of Crank Pins *9 1/2"* Diar. in Way of Web *9 1/2"*

Makers of *"Canada Steel Co"* Material *Forged Steel*

Width across Crank Webs at Centre of Shaft Thickness

" " " " Crank Pins

" " " " Narrowest part

Makers of Crank Webs *Cwm Kennedy & Son* Material *Cast Steel*

Diar. or Breadth of Keys in Crank Webs Length

" of Dowel Pins in Crank Pins Length Screwed or Plain

No. of Bolts in each Coupling *8* Diar. at Mid Length Diar. of Pitch Circle

Material of Coupling Bolts

Crank Shafts Finished by *Collingwood Shipbldg Co*

Greatest Distance from edge of Main Bearing to Crank Web

Description of Thrust Blocks *Fixed bronzes collar adjustable*

Number " " Rings *Five*

Diar. of Thrust Shafts by Rule Actual (at bot. of Collars) *9"* Over Collars

" " at Forward Coupling *9"* After Coupling *9"*

No. of Thrust Collars Thickness Distance apart

Thrust Shafts Forged by Material

" Finished by

Diar. of Intermediate Shafting by Rule Actual

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

Diar. of Bearings Length Distance apart



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No. of Bolts, each Coupling Diar. at Mid Length Diar. of Pitch Circle

Intermediate Shafts Forged by Material

„ „ Finished by

Diar. of Propeller Shafts by Rule *10⁴* Actual *10¹/₈⁴* At Couplings *10¹/₈⁴*

Are Propeller Shafts fitted with Continuous Brass Liners? *yes*

Diar. over Liners Length of After Bearings *11¹/₂⁴* *3' about*

Of what Material are the After Bearings composed? *Brass Bush lined Syamum*

Distance from After Bearing in Stern Tube to nearest Tunnel Bearing *Vitus*

Are the After Bearings lubricated with Oil or Sea Water? *Water*

What means are adopted to prevent Sea Water entering the Stern Tubes? *Stem tube filled with tallow above gland*

Propeller Shafts Forged by Material

„ „ Finished by *8*

No. of Propellers Diar. *12'* Pitch *13'*

„ Blades, each Propeller *Four* Fitted or Solid *Fitted*

Material of Blades *Cast Iron* Boss *Cast Iron*

Surface, each Propeller *55 Sq ft* Diar. of Propeller *12'*

Rule Diar. of Crank Shaft =

Coefficient of Displacement of Vessel at $\frac{1}{2}$ Moulded Depth

11P
11P
11P

THE SKETCHES.

Table with multiple columns and rows, mostly blank or containing faint text. The table structure is difficult to discern due to the faintness of the original document.



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TURBINE ENGINES.

Type

No. of H.P. Turbines

No. of L.P. Turbines

No. of Astern "

How arranged

Revol. per Min.

Horse Power

10 1/8

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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SKETCHES.

[Faint, mostly illegible handwritten notes and sketches on page 10. Some words like "Sketch" and "No. 1" are visible.]

SKETCHES.

[Handwritten notes and sketches on page 11. Includes phrases like "Sketch", "No. 2", "No. 3", "No. 4", "No. 5", "No. 6", "No. 7", "No. 8", "No. 9", "No. 10", "No. 11", "No. 12", "No. 13", "No. 14", "No. 15", "No. 16", "No. 17", "No. 18", "No. 19", "No. 20", "No. 21", "No. 22", "No. 23", "No. 24", "No. 25", "No. 26", "No. 27", "No. 28", "No. 29", "No. 30", "No. 31", "No. 32", "No. 33", "No. 34", "No. 35", "No. 36", "No. 37", "No. 38", "No. 39", "No. 40", "No. 41", "No. 42", "No. 43", "No. 44", "No. 45", "No. 46", "No. 47", "No. 48", "No. 49", "No. 50".]



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PUMPS, ETC.

No. of Air Pumps *One* Diar. *14"* Stroke *22"*
 Type of " *Edwards vertical*
 Diar. of Air Pump Rod *2 1/4* Material *Tinned Bronze*
 How are Air Pumps Worked? *Direct connected*

No. of Centrifugal Circulating Pumps Maker
 " Reciprocating " " *One* Diar. *2-10"* Stroke *10"*
 Diar. of Circulating Pump Rods Material
 How are Circulating Pumps Worked? *Independent Steam Pump*

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

No. of Feed Pumps on each Engine *2* - Diar. *3"* Stroke *22"*

Where do they pump from? *Hot-Well*
 " " discharge to? *Boilers*

Are Spring-loaded Relief Valves fitted to each Pump? *yes*
 Can one Pump be overhauled while the others are at work? *"*

No. of Bilge Pumps on each Engine *One* Diar. *3"* Stroke *22"*

Where do they pump from? *All Bilges*
 " " discharge to? *Overboard*

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

No. of Bilge Injections connected to Condensers *One* Diar. *8"*

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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No. of Safety Valves, each Boiler

Diar. " " "

Area " " "

Are the Valves fitted with Easing Gear?

No. of Pressure Gauges, each Boiler

" Water " "

" Test Cocks,

" Salfinometer Cocks, "

Are Water Gauge Pillars attached by Pipes to Steam and Water Spaces?

Are these Pipes connected to Boilers by Cocks or Valves?

Are Blow-off Cocks or Valves fitted on Boiler Shells?

No. of Strakes of Shell Plating in each Boiler

" Plates in each Strake

Thickness of Shell Plates by Rule

" " Approved

" " in Boilers

Are the Rivet Holes Punched or Drilled?

Are Rivets Iron or Steel?

Are the Longitudinal Seams Butt or Lap Joints?

Are the Double Butt Straps of equal width?

Thickness of outside Butt Straps

" inside "

Are Longitudinal Seams Hand or Machine Riveted?

Are they Single, Double, or Treble Riveted?

Diar. of Rivet Holes

Pitch "

Width of Overlap

Percentage of Strength in Longitudinal Seams

One Turn Type on Each Boiler
2 1/2" Escape Pipe 3 1/2"
Turn Type

No

Two

One

Three

yes

yes

yes

Two One

Two

1.26

Drilled

Steel

Butt J.

yes

1 1/8" inside - 7/8" outside

Machine Riveted

Triple

1 3/16"

8"

Handwritten notes and diagrams on page 17, including dimensions like 15" x 12" and 3 1/2" x 2 1/2" x 1 1/2" x 1 1/2".



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No. of Rows of Rivets in Centre Circumferential Seams

None

Are these Seams Hand or Machine Riveted?

Machine

Diam. of Rivet Holes

Pitch

Width of Overlap

No. of Rows of Rivets in End Circumferential Seams

One

Are these Seams Hand or Machine Riveted?

Machine

Diam. of Rivet Holes

1 1/4"

Pitch

3"

Width of Overlap

1 7/8"

Size of Manholes in Shell

12" X 16" thru

Dimensions of Compensating Rings

31 1/2" X 34 1/2" X 1.125"

Thickness of End Plates in Steam Space by Rule

.7

Approved

in Boilers

Pitch of Steam Space Stays

14" X 14 1/2"

Eff. Diam. by Rule

Approved

in Boilers

Material of

Steel

How are Stays Secured?

Screwed into both plates & nutted

Diam. and Thickness of Loose Washers on End Plates

Riveted

No rivets

Width Doubling Strips

Thickness of Middle Back End Plate by Rule

Approved

in Boilers

Faint handwritten notes and bleed-through from the reverse side of the page, including numbers like '18 1/2' and '11 1/2'.



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Thickness of Doublings in Wide Spaces between Fireboxes

$\frac{11}{16}$ "

Pitch of Stays at " " " "

$13\frac{1}{2}$ " x $5\frac{1}{2}$ "

Eff. Diar. of Stays by Rule

" " " Approved

" " " in Boilers

Material "

Are Stays fitted with Nuts outside?

yes

Thickness of Back End Plates at Bottom by Rule

$\frac{17}{32}$

" " " " Approved

" " " " in Boilers

Pitch of Stays at Wide Spaces between Fireboxes

$13\frac{1}{2}$ "

Thickness of Doublings in " "

$\frac{11}{16}$ "

Thickness of Front End Plates at Bottom by Rule

" " " " Approved

" " " " in Boilers

No. of Long Stays in Spaces between Furnaces

Eff. Diar. of Stays by Rule

" " " " Approved

" " " " in Boilers

Material of "

Thickness of Front Tube Plates by Rule

" " " " Approved

" " " " in Boilers

Pitch of Stay Tubes at Spaces between Stacks of Tubes

8 " x $7\frac{5}{8}$ "

Thickness of Doublings in " " "

" Stay Tubes at " " "

Handwritten notes at the top of page 21, including "No. of stays" and "Pitch of stays".

Large handwritten notes in the middle of page 21, including "D.W. P.H." and "Pitch of stays".



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Are Stay Tubes fitted with Nuts at Front End?

No - Screwed

Thickness of Back Tube Plates by Rule

5/8"

" " " Approved

" " " in Boilers

Pitch of Stay Tubes in Back Tube Plates

8" X 7 5/8"

" Plain "

4" X 3 13/16"

Thickness of Stay Tubes

" Plain "

1/4" # 9 B.W.G.

External Diam. of Tubes

2 3/4" Outside

Material " "

Steel.

Thickness of Furnace Plates by Rule

9/16"

" " " Approved

" " " in Boilers

Smallest outside Diam. of Furnaces

40 1/8"

Length between Tube Plates

7' 3"

Width of Combustion Chambers (Front to Back)

29"

Thickness of " " Tops, by Rule

17/32"

" " " Approved

" " " in Boilers

Pitch of Screwed Stays in C.C. Tops

5 7/8" X 7"

Eff. Diam. " " by Rule

1 3/8"

" " " Approved

" " " in Boilers

Material " "

Thickness of Combustion Chamber Sides by Rule

17/32"

Thickness of Combustion Chamber Sides Approved

" " " in Boilers

Pitch of screw stays in C.C. tops

Eff. diam. " " by Rule

" " " Approved

" " " in Boilers

Material

Thickness of Combustion Chamber Sides by Rule

" " " Approved

" " " in Boilers

Pitch of screw stays in C.C. tops

Eff. diam. " " by Rule

" " " Approved

" " " in Boilers

Material

Are all screw stays fitted with nuts at front end?

Thickness of Combustion Chamber Bottoms

Are all stays over and 1/2" diameter

Centre

Depth and Thickness of Grates

Material of

No. of stays in each



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Thickness of Combustion Chamber Sides Approved

" " " " in Boilers

Pitch of Screwed Stays in C.C. Sides

Eff. Diar. " " by Rule

" " " Approved

" " " in Boilers

Material " "

Thickness of Combustion Chamber Backs by Rule

" " " " Approved

" " " " in Boilers

Pitch of Screwed Stays in C.C. Backs

Eff. Diar. " " by Rule

" " " Approved

" " " in Boilers

Material " "

Are all Screwed Stays fitted with Nuts inside C.C.?

Thickness of Combustion Chamber Bottoms

No. of Girders over each Wing Chamber

" " " Centre "

Depth and Thickness of Girders

Material of Girders

No. of Stays in each

No. of Stay Tubes, each Boiler

" " Plain " " "

Size of Lower Manholes

 $\frac{17}{32}$ $6\frac{1}{4}" \times 6"$
 $1\frac{1}{2}"$ Screw Stay

Steel,

 $\frac{1}{2}"$ $5\frac{1}{2}" \times 5\frac{3}{4}"$

Steel,

B.C. Crown and
bounding row,

six

 $9" \times 9\frac{1}{16}"$ Steel
Three

68

136

 $11" \times 15"$ ○

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 boiler

Height of Boiler Crown above the Grate

Are Boiler Crowns Flat or Dished?

Internal Radius of Dished Boilers

Description of means in Boiler Crown

Diam. of Rivet Holes

Height of Rivet Crown above the Grate

Are Rivets Crown Flat or Dished?

External Radius of Dished Crowns

No. of Crown Stays

External Diam. of Rivets at Top

No. of Rivet Holes

Material of Water Tubes

No. of riveted stays in Water Tubes

Are stays fitted with Nut inside?

SUPERHEATERS

Description of superheater

Where situated

If the boiler is horizontal, the position of the superheater should be stated in addition to those on

No. of tubes & tubes in superheater



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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		
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?	

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	

SKETCHES.

250#
 1/2" x 1/2" x 1/2"
 3/4" x 3/4" x 3/4"
 1" x 1" x 1"
 1 1/2" x 1 1/2" x 1 1/2"
 2" x 2" x 2"
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MAIN STEAM PIPES.

No. of Lengths	Three
Material	Wrought Iron
Brazed, Welded, or Seamless	Lap welded
Internal Diam.	7" at engine 5" each Boiler
Thickness	Extra Heavy Wt Iron Pipe
How are Flanges Secured?	Riveted
Date of Hydraulic Test	Oct-7th/12
Test Pressure	270 lb

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.

Handwritten notes:
 74 at engine
 Extra Heavy
 270 #

REFRIGERATORS

ELECTRIC LIGHTING.

Installation Fitted by *Collingwood Shipbldg Co -*
 No. and Description of Dynamoes *One - # 12974 100 hp Engine*
 Makers of Dynamoes *J.H. Holmes & Co Newcastle on Tyne # 12974*
 Capacity " " Amperes, at *56* Volts. *110* Revols. per Min. *375*
 Current Alternating or Continuous *- Continuous -*
 Position of Dynamoes *On Half Deck in Main Engine Room*
 " " Main Switch Board *Do -*

No. of Circuits to which Switches are provided on Main Switch Board

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.

Total No. of Lights

No. of Motors driving Fans, &c.

No. of Heaters

Current required for Motors and Heaters



EVAPORATORS.

No. Type Tons per Day or at
 Makers
 Working Pressure Test Pressure Date of Test
 Date of Test of Safety Valves under Steam

FEED WATER HEATERS.

No. Type
 Makers
 Working Pressure Test Pressure Date of Test

DONKEY

No. of Donkeys

Type "

Makers "

Single or Duplex

" Double-Acting

Diar. of Steam Cylinders

" Pumps

Stroke of "

Where do they pump from?

Where do they discharge to?

Capacity, Tons per Hour of Ballast Donkey

Diar. of Pipe required by Rule for

FEED WATER FILTERS.

No. Type Size
 Makers
 Working Pressure Test Pressure Date of Test

FORCED DRAUGHT FANS.

No. of Fans. *One* Diar. *60"* Revols. per min. *about 400*
 How are Fans driven? *By Direct Connected Engine*

PUMPS.



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largest Ballast Tank

Velocity of Water in Pipe

SPARE GEAR.

No. of Top End Bolts	No. of Bot. End Bolts
" Main Bearing Bolts	" Coupling Bolts
" Cylr. Cover Bolts Studs	" Valve Chest Cover Bolts Studs
" Feed Pump Valves	" Bilge Pump Valves
" Safety Valve Springs	" Fire Bars
" Piston Rings	" Junk Ring Bolts Studs
" Piston Rods	" Connecting Rods
" Valve Spindles	" Air Pump "
" Air Pump Valves	" " " Buckets
" Crank Pin Bushes	" Crosshead Bushes
" Crank Shafts	" Propeller Shafts
" Propellers	" " Blades
" Boiler Tubes	" Condenser Tubes

OTHER ARTICLES OF SPARE GEAR:—

GENERAL CONSTRUCTION.

Have all the Requirements under Sections 31 and 32 of the Rules been complied with?

If not, give details of the points of difference, and state when these were sanctioned by the Chief

Surveyor.

Engine & Boilers and
other machinery spec all arranged
aft.

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

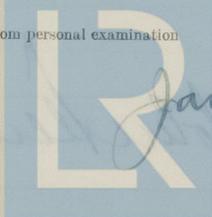
Surveyor

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

Is the Workmanship throughout thoroughly satisfactory?

The above correctly describes the Machinery of the S.S.

as ascertained by me from personal examination



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

Fees—

GENERAL CONSTRUCTION

MAIN BOILERS, ...

H.S. ... Sq. ft. ...

G.S. ...

DONKEY BOILERS, ...

H.S. ... Sq. ft. ...

G.S. ...

£ : :

ENGINES.

L.P.C. ... Cub. ft. ...

Testing, &c. ...

£ : :

Expenses ...

Total ... £ : :

It is submitted that this Report be approved,

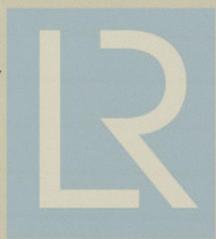
Green King
Chief Surveyor.

Approved by the Committee, for the Class of M.B.S.*
on the 13th Novr., 1912.

Fees applied for

Fees paid

Robert Fleming
Secretary.



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[Faint, mostly illegible handwritten text, possibly a list or account entries.]

Robert King
1840

[Faint handwritten text, possibly a date or reference.]

Robert King



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