

No. 2209

THE BRITISH CORPORATION FOR THE SURVEY
AND
REGISTRY OF SHIPPING.

Report No. 2214 No. in Register Book 3583

S.S. TUG "FLYING EAGLE"

Makers of Engines Bow, McLACHLAN & Co, LTD,

Works No. 3977.

Makers of Main Boilers [SAME]

Works No. 1189.

Makers of Donkey Boiler —

Works No. —

MACHINERY.



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Foundation

009448-002484-0133

RECIPROCATING ENGINES.

Works No. **3977** No. of Sets **One** Description **Compound surface**
Condensing vertical steam

No. of Cylinders each Engine **Two** No. of Cranks **Two**
 Diars of Cylinders **21" and 44"** Stroke **28"**
 Cubic feet in each L.P. Cylinder **24.63**
 Are Spring-loaded Relief Valves fitted to Top and Bottom of each Cylr. **Yes.**
 " " each Receiver? **H.P. only.**
 Type of H.P. Valves, **Piston**
 1st I.P. " **—**
 2nd I.P., **—**
 L.P. " **Andrews & Cameron**
 " Valve Gear **Stevenson Link Motion**
 " Condenser **Riveted steel** Cooling Surface **1244** sq. ft.
 Diameter of Piston Rods (plain part) **4 7/8"** Screwed part (bottom of thread) **3.537"**
 Material " **Steel**
 Diar. of Connecting Rods (smallest part) **4 7/8"** Material **Steel.**
 " Crosshead Gudgeons **5"** Length of Bearing **5"** Material **"**
 No. of Crosshead Bolts (each) **4** Diar. over Thrd. **2"** Thrds. per inch **6** Material **W.I.**
 " Crank Pin " " **2** " **2 1/2"** " **6** " **"**
 " Main Bearings **4** Lengths **10"**
 " Bolts in each **2** Diar. over Thread **2"** Threads per inch **6** Material **Steel**
 " Holding Down Bolts, each Engine **20** Diar. **1 1/4"** No. of Metal Chocks **20**
 Are the Engines bolted to the Tank Top or to a Built Seat? **Built seat.**
 Are the Bolts tapped through the Tank Top and fitted with Nuts Inside? **—**
 If not, how are they fitted?

Connecting Rods, Forged by **Langley Forge Co.**
 Piston " " **Bow, McLachlan & Co. Ltd.** } @
 Crossheads " " " }
 Connecting Rods, Finished by " " "
 Piston " " " "
 Crossheads, " " "
 Date of Harbour Trial **29/10/28**
 " Trial Trip **31/10/28.**
 Trials run at **Skelmorlie and Bareloch miles.**
 Were the Engines tested to full power under Sea-going conditions? **Yes.**
 If so, what was the I.H.P.? **897.75** Revols. per min. **127**
 Pressure in ^{H.P.} Receiver, **108.25** lbs., and I.P., **—** lbs., L.P., **12.25** lbs., Vacuum, **24 1/8** ins.
 Speed on Trial **11.69** knots.
 If the Conditions on Trial were such that full power records were not obtained give the following estimated data:—
 Builders' estimated I.H.P. **950** Revols. per min. **127**
 Estimated Speed **—**



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TURBINE ENGINES.

Works No. *804* Type of Turbines *804*

No. of H.P. Turbines *2* No. of I.P. *2* No. of L.P. *2* No. of Stern *2*

Are the Propeller Shafts driven direct by the Turbines or through Gearing? *None*

Is Single or Double Reduction Gear employed? *None*

Diar. of 1st Reduction Pinion *25 1/10* } Width *10 1/2* Pitch of Teeth *2 1/2*

" 1st " Wheel *31 1/10*

Estimated Pressure per lineal inch *100*

Diar. of 2nd Reduction Pinion *12 1/2* } Width *8 1/2* Pitch of Teeth *2 1/2*

" 2nd " Wheel *15 1/2*

Estimated Pressure per lineal inch *100*

Revol. per min. of H.P. Turbines at Full Power *1244* S.H.P. *1000*

" " I.P. " " *1244*

" " L.P. " " *1244*

" " 1st Reduction Shaft *1244*

" " 2nd " " *1244*

" " Propeller Shaft *1244*

Total Shaft Horse Power *1000*

Date of Harbour Trial *1908*

" Trial Trip *1908*

Trials run at *1908*

Speed on Trial *12* Knots. Propeller Revol. per min. *1244* S.H.P. *1000*

Turbine Spindles forged by *Ball*

" Wheels forged or cast by *Ball*

Reduction Gear Shafts forged by *Ball*

" Wheels forged or cast by *Ball*

None.

TURBO-ELECTRIC INSTALLATION OF ENGINES AND MACHINERY.

No. of Turbo-Generating Sets *None* Capacity of each *None*

Type of Turbines employed *None*

Description of Generators *None*

No. of Motors driving Propeller Shafts *None*

Are the Propeller Shafts driven direct by the Motors or through Gearing? *None*

Is Single or Double Reduction Gear employed? *None*

Description of Motors *None*

Diar. of 1st Reduction Pinion *None* } Width *None* Pitch of Teeth *None*

" 1st " Wheel *None*

Estimated Pressure per lineal inch *None*

Diar. of 2nd Reduction Pinion *None* } Width *None* Pitch of Teeth *None*

" 2nd " Wheel *None*

Estimated Pressure per lineal inch *None*

Revol. per min. of Generators at Full Power *None*

" " Motors " " *None*

" " 1st Reduction Shaft *None*

" " 2nd " " *None*

" " Propellers at Full Power *None*

Total Shaft Horse Power *None*

Date of Harbour Trial *None*

" Trial Trip *None*

Trials run at *None*

Speed on Trial *None* Knots. Propeller Revol. per min. *None* S.H.P. *None*



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SHAFTING.

Are the Crank Shafts Built or Solid?

Built.

No. of Lengths in each

One

Angle of Cranks

120°

Diar. by Rule

8.77"

Actual

9.25"

In Way of Webs

9.25"

" of Crank Pins

9.25"

Length between Webs

10.25"

Greatest Width of Crank Webs

17.5"

Thickness

5.75"

Least

Dowels

(parallel.)

Diar. of Dowels in Crank Webs

1.75"

Length

3"

" Dowels in Crank Pins

1.75" Length 3"

Screwed or Plain

Plain.

No. of Bolts each Coupling

6

Diar. at Mid Length

2.25"

Diar. of Pitch Circle

14"

Greatest Distance from Edge of Main Bearing to Crank Web

Type of Thrust Blocks

Michell.

No. " Rings

One.

Diar. of Thrust Shafts at bottom of Collars

9.25"

No. of Collars

One

" " Forward Coupling

9.25"

At Aft Coupling

9.25"

Diar. of Intermediate Shafting by Rule

8.35" Actual

8.75"

No. of Lengths

One.

No. of Bolts, each Coupling

6

Diar. at Mid Length

2.25"

Diar. of Pitch Circle

1'-2"

Diar. of Propeller Shafts by Rule

9.18" Actual

9.625"

At Couplings

9.6875"

Are Propeller Shafts fitted with Continuous Brass Liners?

Yes.

Diar. over Liners

11.1875"

Length of After Bearing

3'-6"

Of what Material are the After Bearings composed?

Lignum Vitae staves.

Are Means provided for lubricating the After Bearings with Oil?

No.

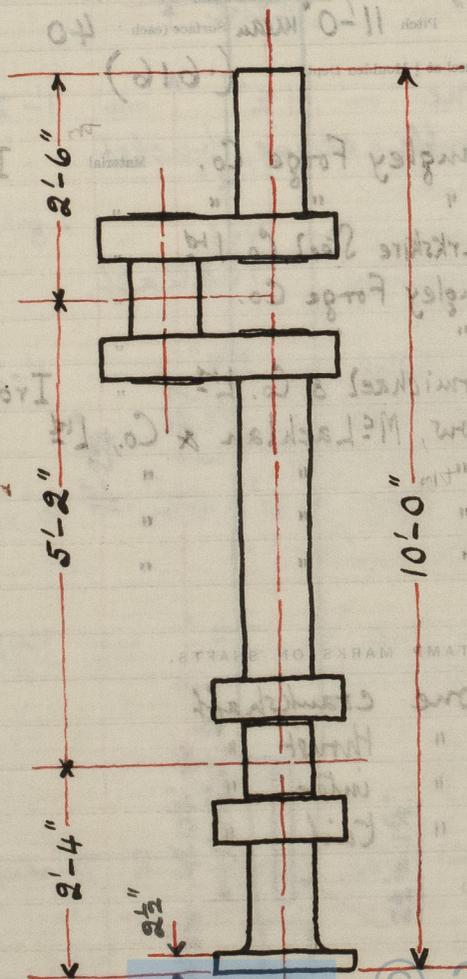
" " to prevent Sea Water entering the Stern Tubes?

"

If so, what Type is adopted?

—

SKETCH OF CRANK SHAFT.



B. C.
11051
H.W.V.
11/158



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BOILERS.

Works No. 1189

No. of Boilers One Type Cylindrical Multitubular.

Single or Double-ended Single.

No. of Furnaces in each 3

Type of Furnaces Deighton

Date when Plan approved 12/5/28

Approved Working Pressure 130 lb/□"

Hydraulic Test Pressure 245 "

Date of Hydraulic Test 28/9/28

" when Safety Valves set 29/10/28

Pressure at which Valves were set 134 lb/□"

Date of Accumulation Test 29/10/28

Maximum Pressure under Accumulation Test 138 lb/□"

System of Draught Natural

Can Boilers be worked separately? -

Makers of Plates (Shell) Colville, Dalzell. (flange & wrapper) Jas. Dunlop & Co. L^{td}, Calderbank.

" Stay Bars (steel) Scottish Iron & Steel Co. L^{td} (iron)

" Rivets Rivet, Bolt & Nut Co. L^{td}, Coatbridge.

" Furnaces Thos. Piggott & Co, L^{td}.

Greatest Internal Diar. of Boilers 16'-6"

" " Length " 12'-0"

Square Feet of Heating Surface each Boiler 2946

" " Grate " " 72

No. of Safety Valves each Boiler One pair Rule Diar. 27³/₈" H.L., Actual 3" high lift.

Are the Safety Valves fitted with Easing Gear? Yes.

No. of Pressure Gauges, each Boiler One No. of Water Gauges 2

" Test Cocks " - " Salinometer Cocks One

B.C. TEST.

5124

245 lb.

W.P. 130 "

J.W.H.

28/9/28

Rob^t Heath

$$2946 \times \frac{1.25}{145} = 25.6 \square$$

÷ 4 for each high lift valve = 6.4 □

equivalent to 27³/₈" bare diam. per valve.

Are the Water Gauges fitted direct to the Boiler Shells or mounted on Pillars?

Are the Water Gauge Pillars fitted direct to the Boiler Shells or connected by Pipes?

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 Approved

in Boilers

Are the Rivets Iron or Steel?

Are the Longitudinal Seams Butt or Lap Joints?

Are the Butt Straps Single or Double?

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?

No. of Rivets in a Pitch

Diar. of Rivet Holes

Pitch

No. of Rows of Rivets in Centre Circumferential Seams

Are these Seams Hand or Machine Riveted?

Diar. of Rivet Holes

Pitch

No. of Rows of Rivets in Front End Circumferential Seams

Are these Seams Hand or Machine riveted?

Diar. of Rivet Holes

Pitch

No. of Rows of Rivets in Back End Circumferential Seams

Are these Seams Hand or Machine Riveted?

Diar. of Rivet Holes

Pitch

Size of Manholes in Shell

Dimensions of Compensating Rings

Pillars.
Direct, with

End plate

Cocks on end plates.

One.

2

1"

1"

Steel.

Butt.

Double.

Yes.

$\frac{3}{4}$ "

$\frac{7}{8}$ "

Machine.

Treble.

5

1"

7"

—

—

—

—

2

Machine.

$1\frac{1}{4}$ "

3.27"

2

Machine.

$1\frac{1}{4}$ "

3.27"

16" x 12"

2'-10" x 2'-6"

$2\frac{1}{2}$ " G.M. cocks.

(see sketch)

Steel

Not inside & outside

$\frac{1}{4}$ "

$\frac{1}{4}$ "

121

P

P

$\frac{1}{4}$ "

$\frac{1}{4}$ "

W. H. H. W.



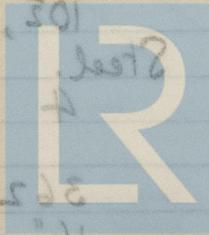
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(Oval Octagon)

Diar. of Stays Approved 2" Threads per Inch 6"
 " " in Boilers 2"
 Material Steel.
 Thickness of Front Tube Plates Approved 15/16"
 " " " " in Boilers 15/16"
 Pitch of Stay Tubes at Spaces between Stacks of Tubes 15 1/2" x 9" (vert.)
 Thickness of Doublings in " " " —
 " Stay Tubes at " " " 3/8"
 Are Stay Tubes fitted with Nuts at Front End? No.
 Thickness of Back Tube Plates Approved 3/4"
 " " " in Boilers 3/4"
 Pitch of Stay Tubes in Back Tube Plates 13 1/2" x 9" (vert.)
 " Plain " 4 1/2" x 4 1/2"
 Thickness of Stay Tubes 3/8"
 " Plain " 8 I.W.G.
 External Diar. of Tubes 3 1/2"
 Material Lap welded Wrot Iron.
 Thickness of Furnace Plates Approved 9/16"
 " " " in Boilers 9/16"
 Smallest outside Diar. of Furnaces 4'-1 1/8"
 Length between Tube Plates 7'-2"
 Width of Combustion Chambers (Front to Back) 3'-10 7/32"
 Thickness of " " Tops Approved 9/16"
 " " " " in Boilers 9/16"
 Pitch of Screwed Stays in C.C. Tops 9" x 9"

Diar. of Screwed Stays Approved 2" Threads per Inch 6"
 " " in Boilers 2"
 Material Steel.
 Thickness of Front Tube Plates Approved 15/16"
 " " " " in Boilers 15/16"
 Pitch of Stay Tubes at Spaces between Stacks of Tubes 15 1/2" x 9" (vert.)
 Thickness of Doublings in " " " —
 " Stay Tubes at " " " 3/8"
 Are Stay Tubes fitted with Nuts at Front End? No.
 Thickness of Back Tube Plates Approved 3/4"
 " " " in Boilers 3/4"
 Pitch of Stay Tubes in Back Tube Plates 13 1/2" x 9" (vert.)
 " Plain " 4 1/2" x 4 1/2"
 Thickness of Stay Tubes 3/8"
 " Plain " 8 I.W.G.
 External Diar. of Tubes 3 1/2"
 Material Lap welded Wrot Iron.
 Thickness of Furnace Plates Approved 9/16"
 " " " in Boilers 9/16"
 Smallest outside Diar. of Furnaces 4'-1 1/8"
 Length between Tube Plates 7'-2"
 Width of Combustion Chambers (Front to Back) 3'-10 7/32"
 Thickness of " " Tops Approved 9/16"
 " " " " in Boilers 9/16"
 Pitch of Screwed Stays in C.C. Tops 9" x 9"



Diar. of Screwed Stays Approved $1\frac{1}{2}$ " Threads per Inch 9
 " " " in Boilers $1\frac{1}{2}$ "
 Material " " Lowmoor Iron.

Thickness of Combustion Chamber Sides Approved $\frac{9}{16}$ "
 " " " " in Boilers $\frac{9}{16}$ "
 Pitch of Screwed Stays in C.O. Sides 9" x 9"

Diar. " " Approved $1\frac{1}{2}$ " Threads per Inch 9
 " " " in Boilers $1\frac{1}{2}$ "
 Material " " Lowmoor Iron.

Thickness of Combustion Chamber Backs Approved $\frac{17}{32}$ "
 " " " " in Boilers $\frac{17}{32}$ "
 Pitch of Screwed Stays in C.O. Backs $7\frac{7}{8}$ " x 9"

Diar. " " Approved $1\frac{3}{8}$ " Threads per Inch 9
 " " " in Boilers $1\frac{3}{8}$ "
 Material " " Lowmoor Iron.

Are all Screwed Stays fitted with Nuts inside C.O.? Yes.
 Thickness of Combustion Chamber Bottoms $2\frac{1}{32}$ "

No. of Girders over each Wing Chamber 5
 " " " Centre " 4
 Depth and Thickness of Girders $10\frac{1}{2}$ ", two $\frac{13}{16}$ " plates.
 Material of Girders Steel.

No. of Stays in each 4
 No. of Tubes, each Boiler 362
 Size of Lower Manholes 16" x 12"

VERTICAL DONKEY BOILERS.

None.

No. of Boilers	Type
Greatest Int. Diam.	Height
Height of Boiler Crown above Fire Grate	Are Boiler Crowns Flat or Dished?
Internal Radius of Dished Boilers	Description of seams in Boiler Crowns
Width of Overlap	Dist. of Rivet Holes
Height of Firebox Crown above Fire Grate	Are Firebox Crowns Flat or Dished?
External Radius of Dished Crowns	Thickness of Plates
No. of Crown stays	Diam.
External Diam. of Firebox at Top	Bottom
Thickness	Ext. Diam.
No. of Water Tubes	Material of Water Tubes
Size of Manhole in Shell	Dimensions of Connecting Pipe
Heating Surface, each Boiler	Grate Surface

SUPERHEATERS.

None.

Description of Superheater	Where situated?
Which Boilers are connected to Superheaters?	Can Superheaters be shut off while Boilers are working?
No. of Safety Valves on each Superheater	Date of their installation
Date when safety Valves set	Pressure on Valves



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MAIN STEAM PIPES.

No. of Lengths	2
Material	Copper. Seamless.
Brazed, Welded or Seamless	
Internal Diar.	6½"
Thickness	6 W.G. = .192"
How are Flanges secured?	Brazed.
Date of Hydraulic Test	26/10/28
Test Pressure	260 lb/□"

MAIN FEED DO.

No. of Lengths	2
Material	Copper. Seamless.
Brazed, Welded or Seamless	
Internal Diar.	3"
Thickness	10 W.G. = .128"
How are Flanges secured?	Brazed.
Date of Hydraulic Test	25/10/28
Test Pressure	325 lb/□"

AUX. FEED DO.

No. of Lengths	One.
Material	Copper. Seamless.
Brazed, Welded or Seamless	
Internal Diar.	2½"
Thickness	12 W.G. = .104"
How are Flanges secured?	Brazed.
Date of Hydraulic Test	25/10/28
Test Pressure	325 lb/□"

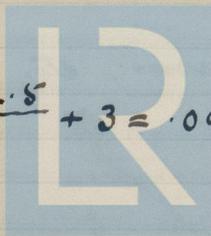
John Morrison & Sons, Coppermiths, Paisley.

Rule Thickness; -

$$t = \frac{130 \times 6.5}{60} + 3 = .171", \text{ made } .192"$$

$$t = \frac{130 \times 3}{48} + 3 = .11", \text{ made } .128"$$

$$t = \frac{130 \times 2.5}{48} + 3 = .097", \text{ made } .128"$$



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EVAPORATORS.

No.	Type	Tons per Day

Working Pressure Test Pressure Date of Test
 Date of Test of Safety Valves under Steam
 None.

FEED WATER HEATERS.

No.	Type	Tons per Day

Working Pressure Test Pressure Date of Test
 None.

FEED WATER FILTERS.

No.	Type	Size

Working Pressure Test Pressure Date of Test
 None.

STEERING GEAR.

2 cyl. horizontal worm & wheel type with chain barrel below; No: 2431; by Caldwell & Co. Ltd.

LIST OF DONKEY PUMPS.

Ballast by Dawson & Downie Ltd. No. 8429.

General Service by Dawson & Downie Ltd. No. 8438.
 6" and 4 1/2" diameters; 6" stroke.



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GENERAL CONSTRUCTION.

Have the Machinery and Boilers been constructed in accordance with the requirements of the Rules and the

Approved Plans? *Yes.*

If not, give details of the points of difference, and state when these 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. tug "Flying Eagle" as ascertained by *me* from personal examination

J. Wood Harrington.

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

Fees—

MAIN BOILERS.		£	s.	d.
H.S.	Sq. ft.	:	:	
G.S.	"	:	:	
DONKEY BOILERS.				
H.S.	Sq. ft.	:	:	
G.S.	"	:	:	
		£	:	:
ENGINES.				
L.P.O.	Cub. ft.	:	:	
		£	:	:
Testing, &c. ...		:	:	
		£	:	:
Expenses ...		:	:	
Total ...	£	:	:	

It is submitted that this Report be approved,

W. Ste King
Chief Surveyor.

Approved by the Committee for the Class of M.B.S.* on the 28th November 1928

Fees advised

Fees paid



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Secretary.

GENERAL CONSTRUCTION

Fees

and the amount of the same as shown in the following statement and certified by the Engineer in Charge

MAIN BOILERS

H.S.	1	1	1
G.S.	1	1	1

DOMESTIC BOILERS

H.S.	1	1	1
G.S.	1	1	1

ENGINEER

L.E.O.	1	1	1
Expenses	1	1	1

Total	1	1	1
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It is submitted that this Report be approved.

[Handwritten signature]
Chief Engineer

Approved by the Committee for the Class of M.E.S. on the 28th January 1932

[Handwritten signature]

Witnessed

Free paid

[Large handwritten signature]
Harrington



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