

## REPORT ON MACHINERY.

Port of *Glasgow*Received at London Office *10th 23 SE*No. in Survey held at *Covan*  
Reg. Book.Date, first Survey *25 March 1901* Last Survey *12th Sept 1901*(Number of Visits *62*)on the *Twin Screw Steel Steamship Cronos*Gross *9023.4*  
Net *4621.7*Master *J. F. Ruthven* Built at *Covan* By whom built *Fairfield S.B. & Co. Ltd* When built *1902*Engines made at *Covan* By whom made *Fairfield S.B. & Co. Ltd* when made *1902*Boilers made at *Covan* By whom made *do do* when made *1902*Registered Horse Power *1700* Owners *Orient Steam Navigation Co. Ltd* Port belonging to *Glasgow*Nom. Horse Power as per Section 28 *1246.5* Is Refrigerating Machinery fitted *Yes* Is Electric Light fitted *Yes*

ENGINES, &c.—Description of Engines *Twin Screw Triple Expansion* No. of Cylinders *Eight* No. of Cranks *8*  
 Dia. of Cylinders *27 1/4, 39 5/8, 80* Length of Stroke *60* Revs. per minute *80* Dia. of Screw shaft *16 1/2* Lgth. of stern bush *36 3/4*  
 Dia. of Tunnel shaft *16* Dia. of Crank shaft journals *16 3/4* Dia. of Crank pin *17 1/4* Size of Crank webs *32 x 11 1/8* Dia. of thrust shaft under collars *16 3/4* Dia. of screw *17-9* Pitch of screw *24-0* No. of blades *4* State whether moveable *Yes* Total surface *91 ft*  
 No. of Feed pumps *one each engine* Diameter of ditto *7 1/2* Stroke *30* Can one be overhauled while the other is at work *Yes*  
 No. of Bilge pumps *one each engine* Diameter of ditto *7 1/2* Stroke *30* Can one be overhauled while the other is at work *Yes*  
 No. of Donkey Engines *two* Sizes of Pumps *one 10 x 7 x 14 Duplex* No. and size of Suctions connected to both Bilge and Donkey pumps  
 In Engine Room & boiler space *6. 3 1/2" diameter* In Holds, &c. *6 forward and 6 abaft engine & boiler rooms.*  
 No. of bilge injections *2* sizes *16"* Connected to condenser, or to circulating pump *Cir 7* Is a separate donkey suction fitted in Engine room & size *Yes, 2 3/4"*  
 Are all the bilge suction pipes fitted with roses *Yes* Are the roses in Engine room always accessible *Yes* Are the sluices on Engine room bulkheads always accessible *Yes*  
 Are all connections with the sea direct on the skin of the ship *Yes* Are they Valves or Cocks *Both*  
 Are they fixed sufficiently high on the ship's side to be seen without lifting the stokehold plates *Yes* Are the discharge pipes above or below the deep water line *above*  
 Are they each fitted with a discharge valve always accessible on the plating of the vessel *Yes* Are the blow off cocks fitted with a spigot and brass covering plate *Yes*  
 What pipes are carried through the bunkers *Bilge pipes to forward holds* How are they protected *wood boxing.*  
 Are all pipes, cocks, valves, and pumps in connection with the machinery and all boiler mountings accessible at all times *Yes*  
 Are the bilge suction pipes, cocks, and valves arranged so as to prevent any communication between the sea and the bilges *Yes*  
 When were stern tube, propeller, screw shaft, and all connections examined in dry dock *2nd Sept.* Is the screw shaft tunnel watertight *Yes*  
 Is it fitted with a watertight door *Yes* worked from *top platform*

BOILERS, &c.—(Letter for record *S*) Total Heating Surface of Boilers *26142 ft* Is forced draft fitted *Yes* How driven *Horizontal*  
 No. and Description of Boilers *2 Double Ended & 4 Single Ended* Working Pressure *215 lb* Tested by hydraulic pressure to *430 lb*  
 Date of test *27/1/02* Can each boiler be worked separately *Yes* Area of fire grate in each boiler *43.5 sq ft* No. and Description of safety valves *4*  
 each boiler *Double direct spring SE* Area of each valve *8.940 sq in* Pressure to which they are adjusted *220 lb* Are they fitted with easing gear *Yes*  
 Smallest distance between boilers or uptakes and bunkers or woodwork *18"* Mean dia. of boilers *16.6"* Length *19.8 ft* Material of shell plates *Steel*  
 Thickness *1 3/32"* Range of tensile strength *31/34* Are they welded or flanged *No* Descrip. of riveting: cir. seams *lap double strap* ing. seams *Double Butt 5 rivets*  
 Diameter of rivet holes in long. seams *1 21/32* Pitch of rivets *10"* Lap of plates or width of butt straps *22"*  
 Per centages of strength of longitudinal joint: rivets *83.4* plate *97.0* Working pressure of shell by rules *253 lb* Size of manhole in shell *16" x 12"*  
 Size of compensating ring *Hanger ring* No. and Description of Furnaces in each boiler *5 Brown DE* Material *Steel* Outside diameter *4 ft*  
 Length of plain part *top 7 1/2* Thickness of plates *bottom 3 5/8* Description of longitudinal joint *Welded* No. of strengthening rings *None on SE*  
 Working pressure of furnace by the rules *228* Combustion chamber plates: Material *Steel* Thickness: Sides *19/32* Back *19/32* Top *19/32* Bottom *7/8*  
 Pitch of stays to ditto: Sides *7 1/4 x 7 1/2* Back *7 1/8 x 7 1/2* Top *7 1/4 x 7 1/4* If stays are fitted with nuts or riveted heads *Nuts* Working pressure by rules *212*  
 Material of stays *Steel* Diameter at smallest part *1 3/8* Area supported by each stay *56 sq in* Working pressure by rules *212* End plates in steam space: *Steel*  
 Material *Steel* Thickness *1 1/4"* Pitch of stays *15 1/4 x 15 1/2* How are stays secured *Double nuts* Working pressure by rules *295* Material of stays *Steel*  
 Diameter at smallest part *2 1/16* Area supported by each stay *238 sq in* Working pressure by rules *246* Material of Front plates at bottom *Steel*  
 Thickness *13/16* Material of Lower back plate *Steel* Thickness *1/2* SE Greatest pitch of stays *12 1/2"* Working pressure of plate by rules *340*  
 Diameter of tubes *2 1/2"* Pitch of tubes *3 3/4"* Material of tube plates *Steel* Thickness: Front *23/32* Back *23/32* Mean pitch of stays *9.6"*  
 Pitch across wide water spaces *13 1/2"* Working pressures by rules *215 lb* Girders to Chamber tops: Material *Iron* Depth and thickness of girder at centre *8 1/2 x 13 1/2 SE* Length as per rule *29 1/2* Distance apart *7 3/4"* Number and pitch of Stays in each *Three, 7 1/4 SE*  
 Working pressure by rules *217 lb* Superheater or Steam chest; how connected to boiler *None* Can the superheater be shut off and the boiler worked separately *Yes*  
 Diameter Length Thickness of shell plates Material Description of longitudinal joint Diam. of rivet holes Pitch of rivets Working pressure of shell by rules Diameter of flue Material of flue plates Thickness If stiffened with rings Distance between rings Working pressure by rules End plates: Thickness How stayed  
 Working pressure of end plates Area of safety valves to superheater Are they fitted with easing gear



KEY BOILER— No. 1 Description *Open Ended Multitubular*

*Cowan*

By whom made

*Fairfield S. B. & Co. Ltd*

When made *1902* Where fixed *upper deck*

Working pressure *120* tested by hydraulic pressure to *240 lb*

No. of Certificate *1148* Fire grate area *357 sq ft*

Description of safety valves *Direct spring*

of safety valves *2* Area of each *490*

Pressure to which they are adjusted *125 lb*

If fitted with easing gear *yes*

enter the donkey boiler *no*

Dia. of donkey boiler *11-0"*

Length *9-0"*

Material of shell plates *Steel*

Thickness *1/16"*

Range of tensile

strength *28/32* Descrip. of riveting long seams *Double Butt Straps*

Dia. of rivet holes *3/16"*

Whether punched or drilled *Drilled*

Pitch of rivets *5 1/2"*

Lap of plating *✓*

Per centage of strength of joint *97.5*

Rivets *97.5*

Thickness of shell plates *1"*

Radius of do. *5/16"*

Stays to do. *16 1/2"*

Dia. of stays *2 1/2"*

Diameter of furnace *10 1/2"*

Length of furnace *6-6"*

Thickness of furnace plates *13/32"*

Description of

joint *Welded*

Thickness of furnace crown plates *9/16"*

Working pressure of furnace by rules *125 lb*

Diameter of uptake *3 1/4"*

Thickness of uptake plates *1/16"*

Thickness of uptake tubes *5/16"*

Working pressure of shell by rules *123 lb*

Stays *16 1/2"*

### SPARE GEAR.

State the articles supplied:— *As required by the rules also valve spindles, feed and bilge pump plungers, air pump buckets & rods, eccentric rods, sheaves & straps guide ches, top & bottom end brasses, propeller shaft & blades. Thrust shoes circulating pump vanes & shafts &c. &c.*

The foregoing is a correct description, THE FAIRFIELD SHIPBUILDING

Manufacturer.

AND ENGINEERING CO. LIMITED.

*Alfred Grace*

Dates of Survey while building  
During progress of work in shops— *1901: Mar. 25. Apr. 12. 17. 30. May 9. 14. 17. 22. 23. 31. Jun. 4. 11. 17. 26. 1702: Apr. 30. Aug. 7. 20. Sep. 6.*  
During erection on board vessel— *12. 13. 19. 27. 30. Oct. 4. 11. 21. Nov. 6. 11. 21. 29. Dec. 2. 6. 21. 27. 30. 1902: Jan. 10. 11. 13. 27. Feb. 3. 4. 6. 19. Mar. 12.*  
Total No. of visits *62.* *Apr. 9. 21. May. 20. 30. Jun. 10. 30. Jul. 17. Aug. 5. 14. 27. Sep. 2. 3. 4. 5. 8. 9. 10*  
Is the approved plan of main boiler forwarded herewith *yes*  
" " " donkey " " " *yes*

### General Remarks (State quality of workmanship, opinions as to class, &c.)

Material of screw shaft *Simon Martin* Is the screw shaft fitted with a continuous liner the whole length of the stern tube *yes*.  
Is the after end of the liner made water tight in the propeller boss *yes* If the liner is in more than one length are the joints burned *yes*.  
If the liner does not fit tightly at the part between the bearings in the stern tube, is the space charged with a plastic material insoluble in water and non-corrosive *yes*. If two liners are fitted, is the shaft lapped or protected between the liners *✓*

*The machinery of this vessel has been built under special survey. The materials and workmanship are of good quality, it has been securely fitted on board and a full speed satisfactory trial run.*

*In our opinion the machinery of this vessel is now eligible for record of L.M.C. 9.02 (in red) in register book.*

*The speed on trial was slightly over 18 knots.*

- Plans forwarded
- 4* Forging reports
  - 2* plans main boilers
  - 1* plan donkey boiler
  - 4* plans main & auxiliary stop valves
  - 1* plan of main steam pipes

It is submitted that this vessel is eligible for L.M.C. 9.02  
FD; Elec light; ref: machy.

The amount of Entry Fee. £ *3* : :  
Special .. .. £ *93* : *5* :  
Donkey Boiler Fee .. .. £ *11* : *15* :  
Travelling Expenses (if any) £ : :  
When applied for, *17/9/02*  
When received, *23/9/02*

*George Murdoch & James Morrison*  
Engineer Surveyor to Lloyd's Register of British & Foreign Shipping.

Committee's Minute *Glasgow.* *22 SEP. 1902*

Assigned *L.M.C. 9.02.*  
*Martha Fair*

MACHINERY CERTIFICATE  
WRITTEN 23/9/02

