

TEIKOKU KAIJI KYOKAI

THE IMPERIAL JAPANESE MARINE CORPORATION

TRANSFERRED TO  
L R SYSTEM

Report No. 2694 No. in Register Book NK. 586. 4251

S.S. O. "ARTHASAN MARU"

Makers of Engines Mitsui Bussan Kaisha, Ltd.

Works No. 226.

Makers of Main Boilers /

Works No. /

Makers of Donkey Boiler Mitsui Bussan Kaisha, Ltd.

Works No. 226.

MACHINERY.

TRANSFERRED TO:  
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# TEIKOKU KAIJI KYOKAI

The Imperial Japanese Marine Corporation.

Report No. \_\_\_\_\_ No. in Register Book NK. 586.

Received at Head Office November, 20, 1937.

SURVEYOR'S REPORT ON THE ENGINES, BOILERS AND AUXILIARY MACHINERY OF THE  
SINGLE, ~~TRIPLE~~ TWIN, QUADRUPLE SCREW Oil Motor Ship " ARIMASAN MARU "

Official No. 4 2 9 6 5. Port of Registry Kobe.

Registered Owners Mitsui Bussan Kaishiki Kaisha.

Engines Built by Mitsui Bussan Kaisha, Ltd.  
at Tama. when June 25th, 1937.

Boilers Built by Mitsui Bussan Kaisha, Ltd.  
at Tama. when June 25th, 1937.

Date of Completion July 5th, 1937.

First Visit 29/7/1936. Last Visit 3/7/1937. No. of Visits 1 5 8.

Special Survey due 5/7/1941. Annual Survey due 5/7/1938.



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Turning wheel fitted on the foremost part of crank shafts.  
Fly Wheel Shafts :- Diar. 418 mm. At Coupling / Material Steel.

Fly Wheels :- Diar. 1,975 mm. Weight 2,200 kg.

Ballance Weight :- Total Weight 19,040 kg. Radius of Gyration 897.6 mm.

Thrust Blocks :- Type Burneister & Wain's Enclosed type, designed for forced lubrication.

No. of Rings One pair. No. of Holding Down Bolts / Diar. /

Thrust Shafts :- Diar. at Bottom of Collars 463 mm. At Coupling 463 mm. Material Steel.

No. of Collars 2. Diar 915 mm.

Intermediate Shafts :- No. of Lengths 6. No. of Bearings 12.

Diar. by Rule 15.626" Actual 16 1/2" Material Steel.

Description of Coupling Solid. " "

Diar. of Coupling Flange 770 mm. Thickness 112 mm.

No. of Coupling Bolts 10. Diar. at Mid. Length 84 mm. Diar. of Pitch Circle 630 mm.

Propeller Shafts :- Diar. by Rule 17.105" Actual 18 1/2" At Coupling 18" Material Steel.

Description of Liners Continuous Brass Liner. Diar. over Liners Fore, 20 3/32" Aft, 20 1/2" 9"

Material of After Bearing Lignumvitae. Length 6'-4 1/2".

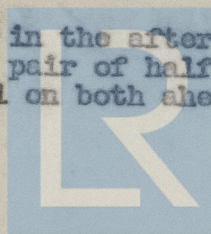
Type of Oil Lubricating System for After Bearing /

Clearance at After Bearing 1.6 mm.

Sketch of Propeller Shaft

Please, see the approved plan.

Note, - The thrust bearing is embodied in the after part of the bedplate of the main engine and provided with one pair of half ring formed thrust shoes of cast iron, lined with whitemetal on both ahead and astern sides, haveing equal surface.



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Connecting Rods forged by Kobe Steel Works, Ltd., Kobe.

Piston Rods       "       Nihon Seikosho, Ltd., Muroran.

Crossheads       "       "       "       "       "

Connecting Rods Finished by Mitsui Bussan Kaisha, Ltd., Tama.

Piston Rods       "       "       "       "       "

Crossheads       "       "       "       "       "

Crank Shafts :- Description Built up type. Material Steel.

No. of Length 2. Angle of Cranks 120°.

Sequence of Firing No.1 Cyl., Nos.6 & 3 Cyls., Nos.4 & 2 Cyls., No.5 Cyl.

No. of Cranks between Adjacent Bearings 1.

Diar. of Shafts by Rule 456.6 mm. Actual 485 mm. In way of Webs 495 mm.

" " Crank Pins 485 mm. Length between Webs 320 mm.

Greatest Width of Crank Webs 960 mm. Thickness 305 mm.

Least " " " " 860 mm. " 305 mm.

Diar. of Keys in Crank Webs 2 of 60 mm. dia. Length 130 mm.

" " Dowels in Crank Pins / Length / Screwed or Plain /

Distance between Inner Edges of Adjacent Bearings 946 mm.

Thickness of Coupling Flanges 100 mm. and 112.5 mm.

No. of Coupling Bolts 12. Diar. at Mid. Length 84 mm. Diar. of Pitch Circle 650 mm.

Sketch of Crank Shaft

Please, see the approved plan.



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## INTERNAL COMBUSTION ENGINES

Works No 226. No. of Sets 1. Description Mitsui B &amp; W

2 Cycle Double Acting Solid Injection Diesel Engine.

Type D. E. 662 - WF - 140. B. H. P. 7,600

Max. Working Pressure 47.0 kg. Mean Indicated Pressure 6.828 kg. Revs. per min 112.

No. of Cylinders 6. Dia. of Cylinders 620 mm. Stroke 1,400 mm.

Thickness of Cylinder Liners 42 mm.

Are Relief Valves fitted to each Cylinder? Yes.

System of Starting By compressed air.

" " Governing Fuel pumps are regulated by Aspinall governor.

" " Reversing Burmeister &amp; Wain's system.\*

Piston :- Material Chromium steel. No. of Piston Rings 6.  
( Tensile strength, 74 kg. Elongation, 21.0 % )

Piston Rods :- Diar. 182 mm. Material Steel.

Gudgeon or Crosshead Pins :- Diar. 300 mm. Length 188 mm. x 2 Material Steel.

Connecting Rods :- Distance between Centres of Top and Bottom Pins 2,800 mm.

Diar. (Smallest Part) 220 mm. Material Steel.

Crosshead Bolts :- No. 4. Diar. over thrds. 4". No. of thrds. 3/in. Material Steel.

Crank Pin " " 2. " 5". " 2.75/in. " "

Guide Shoes :- Length &amp; Width, Ahead 720 mm. x 330 mm. Astern Do. to Ahead.

Main Bearings :- No. 8. Length 404 mm.

No. of Bearing Bolts 4. Diar. over thrds. 3". No. of thrds. 3.25/in. Material Steel.

Bed Plates :- No. of Holding Down Bolts 124. Diar. 1 1/2". No. of Metal Chocks 124.

Are the Bed Plates bolted to Tank Top or to a Built Seat? To Tank Top.

Are the Bolts tapped through the Tank Top and fitted with Nuts inside? Reamer and Loose bolts.

If not, How are they fitted? 32 reamer bolts at the after parts and 92 loose at the forward as shown in the approved plan, all bolts being fitted with Nuts inside.

Note, - \* Reversal of the main engine is carried out by means of a lever, which brings the cams into the required position for ahead or for astern. The cams for the fuel pump and for the exhaust valves are given a relative rotation automatically, simultaneously with the starting of the engine.

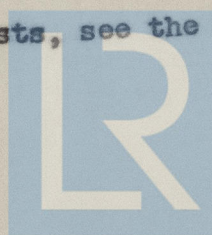
Propellers :- Description Fitted type. No. of Blades 4.  
 Material of Blades Manganese bronze. Boss Cast iron.  
 Diam. 5,400 mm. Pitch 4,990 mm. Developed Area 8.90 sq. m.

Crank Shafts forged by Kobe Steel Works, Ltd., Kobe.  
 " Pins " " " " "  
 " Webs " " " " "  
 Fly Wheel Shafts " " " " "  
 Thrust " " Nihon Seikoshu, Ltd. Muroran.  
 Intermed. " " " " "  
 Propeller " " Kobe Steel Works, Ltd., Kobe.  
 Crank Shafts finished by " " " " "  
 Fly Wheel Shafts finished by " " " " "  
 Thrust " " Nihon Seikoshu, Ltd., Muroran.  
 Intermed. " " " " "  
 Propeller " " Kobe Steel Works, Ltd., Kobe.

# STAMP MARKS ON SHAFTS

Crank Shafts ( 2 lengths, )	NR	S	1525.
Thrust "	NR	S	1016.
Intermediate Shaft.	NR	S	7.
" "	NR	S	9.
" "	NR	S	8.
" "	NR	S	1009.
" "	NR	S	1014.
" "	NR	N	989.
Propeller Shaft.	NR	S	E 8429-B1.

For the results of material tests, see the next sheet.



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SURVEY REPORT

## Results of Material Tests.

Description.	Test. Marks.	No. of Materials.	Stress kg./sq.mm.	Extension. % in 50 mm.	Bend. Tests.	Drop & Ham- mering tests.
<b>Cast Steel</b>						
Crank Web.	A1431-C	1	47.6	30.0	Good.	Good.
" "	B3328-C	1	47.9	26.0	"	"
" "	B3328-D	1	46.8	24.0	"	"
" "	A1444-E	1	48.4	28.0	"	"
<b>Crank Web with Counter weight.</b>						
" "	A1428-F	1	47.8	29.0	"	"
" "	A1441-C	1	51.3	22.0	"	"
" "	A1477-C	1	49.1	28.0	"	"
" "	A1509-C	1	49.4	28.0	"	"
" "	A1438-E	1	49.1	29.0	"	"
" "	B3402-D	1	46.1	29.0	"	"
" "	A1470-B	1	49.2	28.0	"	"
" "	A1422-C	1	45.5	31.0	"	"
<b>Forged Steel</b>						
Crank Pin.	Y3407-B1, B2 & B3.	3	48.9	32.0	"	-
" "	E8027-A2	1	48.9	32.0	"	-
" "	Y3404-A2	1	48.7	27.0	"	-
" "	E7920-B3	1	51.5	30.0	"	-
<b>Crank Journal.</b>						
" "	E7932-A2	1	49.4	29.0	"	-
" "	E7840-A2	1	47.4	33.0	"	-
" "	E7962-A6, A7 & A8.	3	51.3	34.0	"	-
" "	E7892-A4 & A6.	2	47.2	29.0	"	-
" "	E7852-A5	1	43.2	31.0	"	-
Thrust Shaft.	1016	1	46.1	34.8	"	-
<b>Intermediate Shaft.</b>						
" "	7	1	47.0	39.0	"	-
" "	9	1	47.1	31.7	"	-
" "	8	1	45.7	33.2	"	-
" "	1009	1	48.0	34.5	"	-
" "	1014	1	45.1	36.3	"	-
" "	989	1	43.6	37.8	"	-
Propeller Shaft.	B3429-B1	1	49.4	32.0	"	-



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**Aux.**  
~~Main~~ Air Compressors :- Purpose To charge compressed air in Air reservoirs, and indirectly in Air bottle.

No. 2 sets. Description Vertical single cylinder two stage type.

Kind of Powers, & Capacity Driven by Aux. diesel engines, being coupled to outer end of flywheel shaft by means of electro-magnetic clutch. 240 cub. m./h., each.

1st Stage, Diar. 320 mm. Stroke 170 mm. Pressure 5 kg. per sq. cm.

2nd " " 280 mm. " 170 mm. " 25 kg. per sq. cm.

3rd " " / " / " /

Kind of Cooling Liquid Sea water.

### Emergency

**Aux.** Air Compressors :- Purpose To charge compressed air in Air bottle.

No. 1 set. Description Single cylinder two stage self contained type.

Kind of Power, & Capacity Oil engine of 2.5 B.H.P. 4.6 cub m. per hour.

1st Stage, Diar. 80 mm. Stroke 70 mm. Pressure /

2nd " " 30 mm. " 70 mm. " 25 kg. per sq. cm.

3rd " " / " / " /

Kind of Cooling Liquid Sea water.

Fuel Pumps :- No. 12 sets. Description Plunger type.

How driven? Driven from the cam shafts.

Diar. 35 mm. Stroke Top, 60 mm. Bot. 50 mm. Working Pressure of Fuel Oil 450 kg. / cm.<sup>2</sup>

System of Fuel Injection Solid injection.

Are Fuel Oil Priming Pumps provided? Yes. Duplex plunger type directly driven by the main engine.

Cylinder Cooling Pumps :- No. 2 sets. Description Centrifugal type.

Kind of Power D. C. motor Capacity 50 H.P.

Diar. 300 mm. Stroke / Capacity 300 cub. m. per hour. Kind of Cooling Liquid Sea water.

Working Pressure of Cooling Liquid 11 kg./sq. cm. Intl. Diar. of Delivery Pipe Sea water, 9".

Piston Cooling Pumps :- No. 2 sets. Description Wing type.

Kind of Power D. C. motor. Capacity 60 H.P.

Diar. 233 mm. Stroke / Capacity 250 cub. m. per hour. Intl. Diar. of Delivery Pipe 10".

Kind of Cooling Liquid Heavy lubricating oil. Working Pressure 2.5 kg. per sq. cm.

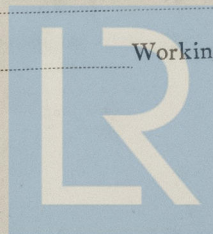
Lubricating Pumps :- No. Description

In Common with above Piston cooling pumps.

Kind of Power Capacity

Diar. Stroke Capacity

Working Pressure of Oil



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System of Lubrication Forced lubrication.

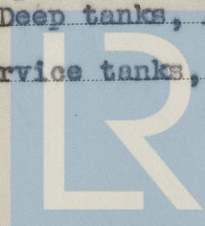
Scavenging Pumps :- No. 1 set. Description Two stage centrifugal.  
 Kind of Power D. C. Motor. Capacity 500 H.P. x 2 ( 1 motor, Spare.)  
of Impeller  
 Diar. 1,360 mm. Stroke / Capacity 750 cub.m. Working Pressure of Air 147 mm. of Hg.  
per min.  
 Intl. Diar. of Delivery Pipe 750 mm.  
 Bilge Pumps :- No. 2. Description Plunger type.  
 Kind of Power By the main engine. Capacity /  
 Diar. 160 mm. Stroke 238 mm. Capacity 25 cub. m. Intl. Diar. of Suction Pipe 3 1/2"  
per h., each.  
 From Where can draw? Each hold, each Deep tank, Engine room, Shaft tunnel  
and each Deep tank coff.-dam.

#### DONKEY PUMPS

Pump :- No. 1 set. Description General service pump: Drysdale type.  
 Kind of Power D. C. Motor. Capacity 22 H.P.  
 Diar. 12 1/2". Stroke / Capacity 70 cub. m. Intl. Diar. of Del. Pipe 3"  
per h.  
 Suctions Sea, Fore & Aft Peak tanks, Fresh water tanks and Bilge main line.  
 Deliveries Peak tanks, Fresh water tank on deck, Wash deck & Sanitary tanks,  
Overboard.

Pump :- No. 1 set. Description Bilge and Sanitary pump: Double acting duplex piston type.  
 Kind of Power D. C. Motor. Capacity 15 H.P.  
 Diar. 165 mm. Stroke 170 mm. Capacity 60 cub. m. Intl. Diar. of Del. Pipe 3"  
per h.  
 Suctions Sea, Common bilge, Independent bilge in engine room.  
 Deliveries Wash deck, & Sanitary tanks, Overboard.

Pump :- No. 1 set. Description Ballast and Cargo oil pump: Double acting duplex piston type.  
 Kind of Power D. C. Motor. Capacity 60 H.P.  
 Diar. 250 mm. Stroke 300 mm. Capacity 170 cub.m. Intl. Diar. of Del. Pipe 8".  
per h.  
 Suctions Fuel oil or Ballast tanks, Sea, Deep tanks, All bilges.  
 Deliveries Fuel oil head tanks, Fuel oil service tanks, Deep tanks, Fuel oil  
or Ballast tanks, Overboard.



## PUMPING ARRANGEMENT

No. of Pumps which can draw Bilge 4. Their Total Capacity 350 cub. m. per h.

Are all Bilge suction fitted with Roses? Yes.

No. of Roses or Mud Boxes fitted on Bilge Suctions Engine room, M.B., 4 R.B., 3. Tunnel, M.B., 2 R.B., 1. Holds, R.B., 8. Deep tanks, R.B., 6. Deep tank coff.-dam, 3.

Are the Valves, etc., so arranged as to prevent Unintentional Connection between Sea and Bilge? Yes.

Are all Sea Connections made with Valves or Cocks on the Ship's Sides? Yes.

Are they placed so as to be easily accessible? Yes.

Are Discharge Valves or Cocks placed above or below the Load Water Line? Above.

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 Flange on the Outside? Yes.

## ELECTRIC INSTALLATION

(See Report Book) Note, - Sign A, for common use.

Dynamo Engines :- No. A, 3 sets. Description A, 2 Cycle Single Acting Solid Injection.  
B, 1 set. B, 4 " " " " "

B. H. P. A, 360. B, 35. Revs. per Min. A, 400. B, 1,200.

Max. Working Pressure A, 47 kg. B, 60 kg. Mean Indicated Pressure A, 6.4 kg. B, 7.03 kg.

No. of Cylinders A, 6 B, 4 Diar. A, 220mm. B, 110mm. Stroke A, 370mm. B, 140mm.

Diar. of Crank Shaft A, 160mm. B, 80mm. ( Pin, 72 mm.)

Distance between Inner Edges of Adjacent Bearings A, 236 mm. B, 101 mm.

## DECK MACHINERIES ETC.

Steering Gears :- Kind of Power D. C. Motor. ( Leonard control system.)

No. and Capacity of Motors Rudder motor, 40 H.P. Leonard Motor, 50 H.P.  
Generator, 33.5 KW.  
Exciter, 0.5 KW.

Windlasses :- Kind of Power D. C. Motor.



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No. and Power of Motors **1 set, 70 H.P. Duty of windlass, 19 ton at 25 ft. per min.**  
Winches :- No. **A, 14, B, 4 & C, 1.** Kind of Power & Capacity **D.C. Motors. A, 33 H.P. B, 50 H.P. & C, 50 H.P.**  
Positions placed **No.1 Hatch, A, 2 No.2 Hatch, A, 2 B, 2 No.3 Hatch, A, 2 No.4 " A, 4 No.5 " B, 2 A, 2 No.6 " A, 2 C, 1.**  
Lifting Capacity **A, 3 tons at Rope speed of 41 m./min. B, 5 tons at Rope speed of 37 m./min. C, 8 tons at Rope speed of 23 m./min.**  
Electric Motors (others than those already mentioned) :-

No. **See the next sheet.**

Purpose

Power, each

### AIR RESERVOIRS

No.	2 Reservoirs.	1 Bottle.
Purpose	<b>To be supplied to main &amp; aux. diesel engines for starting and manoeuvring uses, and to whistle, donkey boiler and all cleaning services.</b>	
Working Pressure	<b>25 kg.</b>	<b>25 kg.</b>
Internal Diam. and Length	<b>1,852mm. x 6,400mm.</b>	<b>500mm. x 1,950mm.</b>
Material of Shell Plates & Thickness	<b>Steel, 26 mm.</b>	<b>Steel, 26 mm.</b>
Description of Longitudinal Seams	<b>3 riveted double butt strap joints.</b>	<b>2 riveted double butt strap joints.</b>
Material of Rivets & Diam. of Rivet Holes	<b>Steel, 29.5 mm.</b>	<b>Steel, 20.5 mm.</b>
Thickness & Breadth of Inner Butt Straps	<b>24 mm. x 460 mm.</b>	<b>12 mm. x 212 mm.</b>
" " " Outer "	" " "	" " "
Description of Circumferential Seams	<b>2 riveted lap joints at ends.</b>	<b>2 riveted lap joints at ends.</b>
Material of Rivets & Diam. of Rivet Holes	<b>Steel, 29.5 mm.</b>	<b>Steel, 23.5 mm.</b>
Sketch of Longitudinal & Circumferential Seams	<b>Please, see the approved plans. 3 lengths.</b>	<b>Please, see the approved plans. 1 length.</b>
Form, Thickness & Material of Top End Plate	<b>Partial spherical. (convex outside.) 35mm., steel.</b>	<b>Partial spherical. (convex outside.) 16mm., steel.</b>
Inner Radius of Curvature	<b>1,400 mm.</b>	<b>450 mm.</b>
Form, Thickness & Material of Bottom End Plate	<b>Ditto to top end plate</b>	<b>Partial spherical. (convex inside.) 16mm., steel.</b>
Inner Radius of Curvature	<b>1,400 mm.</b>	<b>450 mm.</b>
Diam. of Safety Valve	<b>31.75 mm.</b>	<b>12 mm.</b>



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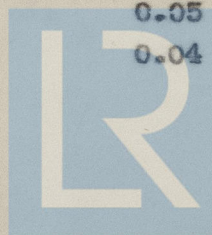
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## SURVEY REPORT

### LIST OF MOTORS.

No.	Purpose.	Each, H.P.	Volts.	Required Amperes, each
2.	For Scavenging blower.	500.0	220.	1880.0
1.	" Lubricating oil pump for do.	2.0	"	9.5
2.	" Lubricating oil pumps.	60.0	"	226.0
2.	" Cooling water pumps.	50.0	"	189.0
1.	" Cargo oil or ballast pump.	60.0	"	226.0
1.	" Bilge & sanitary pump.	15.0	"	60.0
1.	" General service pump.	22.0	"	85.0
1.	" Fuel oil transfer pump.	12.0	"	48.5
2.	" Fuel oil purifiers.	2.5	"	10.9
1.	" Fuel oil shifting pump.	2.0	"	9.0
2.	" Lubricating oil purifiers.	3.0	"	13.0
1.	" Lub. oil shifting pump.	2.0	"	9.0
1.	" Fresh water pump.	3.0	"	13.0
1.	" Engine turning.	12.0	"	51.0
1.	" Forced fan.	2.0	"	8.8
2.	" Engine room ventilating fans.	7.5	"	31.0
4.	" Hold ventilating fans.	15.0	"	60.0
2.	" Compressors for refrigerator.	35.0	"	131.0
2.	" Brine pumps for refrigerator.	3.5	"	14.5
2.	" Cooling water pumps for do.	2.5	"	10.4
2.	" Fans for refrigerator.	3.0	"	12.2
1.	" Generator for auto-frigor.	5.5	"	20.4
1.	" Compressor for auto-frigor. (A.C.)	2.0	"	11.0
1.	" Fan for auto-frigor. (A.C.)	0.125	"	0.53
1.	" Do. (A.C.)	0.0625	"	0.33
1.	" Cooling water pump for do. (A.C.)	0.5	"	2.6
1.	" Gyro compass.	1.0	"	5.0
2.	" Wireless telegraph.	5.0	"	20.0
1.	" Do.	0.45	30.	18.0
2.	" Lifting cranes.	3.0	220.	13.0
1.	" Machine shop.	2.0	"	9.0
2.	" Fire alarm fan.	0.125	"	0.6
5.	" Ceiling fans.	0.05	"	0.24
46.	" Bracket fans.	0.04	"	0.2

Total, 99.



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## FUEL OIL TANKS

No. and Capacity	2 x 17.5 m <sup>3</sup> .	1 x 12.2 m <sup>3</sup> .	1 x 2.25 m <sup>3</sup> .
Internal Diar. and Length (or Length, Breadth and Depth)	7'-0" d. x 17'-2½".	6'-0" d. x 17'-2½".	2.0 m. x 1.7 m. x 0.75 m.
Thickness of Each Plate	All, 5/16".	Shell & top, 5/16" Bottom, 7/16".	Shell & top, 6 mm. Bottom, 8 mm.
Descriptions of Seams of Plates	Electrically welded.	Electrically welded.	Electrically welded.

## LUBRICATING OIL TANKS

No. and Capacity	1 x 1.69 m <sup>3</sup> .	1 x 0.3 m <sup>3</sup> .	3 x 1.68 m <sup>3</sup> .
Internal Diar. and Length (or Length, Breadth and Depth)	1.225 m. x 0.76 m. x 1.986 m.	3'-3"x1-9½". x 2'-5½".	3'-8½"x 2'-5½". x 6'-6½".
Thickness of Each Plate	Shell & top, 6mm. Bottom, 8mm.	½".	¼".
Descriptions of Seams of Plates	Electrically welded.	Electrically welded.	Electrically welded.

## FUEL OIL PIPES

	A.	B. (Aux. Eng)	C.	D.	E.	F.
No. of Lengths	36.	18.	8.	3.	4.	12.
Material	Steel.	"	"	"	"	"
Description of Seams	Seamless.	"	"	"	"	"
Internal Diar. and Thickness	7mm. x 4mm.	3.5mm x 3.5mm	5" x 3/16"	2, 9/16" x 1".	2" x 1".	1½" x 1".
Description of Flanges	Conical.	Conical.	El. welded.	El. welded.	"	"

## MAIN STEAM &amp; MAIN FEED PIPES for Donkey Boiler.

No. of Lengths	1. (Steam.)	3 (Feed.)
Material	Copper.	"
Description of Seams	Seamless.	"
Internal Diar. and Thickness	5" x 5/32".	1½" x ½".
Description of Flanges	Brazed.	"

## COMPRESSED AIR PIPES

No. of Lengths	7.	9.	24.	17.	3.	7.
Material	steel.	"	"	"	"	"



Description of Seams	Seamless.	"	"	"	"	"
Internal Diar. and Thickness	4" x 1/4".	3" x 3/16".	2" x 3/16".	1 1/2" x 3/16".	1, 3/16" x 1"	1" x 1/8"
Description of Flanges	El.welded.	"	"	"	"	"

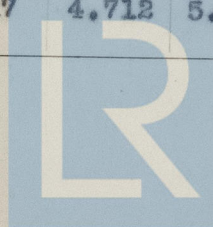
### HYDRAULIC TESTS

Description	Test Pressure	Date of Test
Working Side of Cylinders	Machined internally & externally.	
" " " Cylinder Covers	70.5 kg./sq.cm.	16/2/37 to 2/3/37.
" " " Pistons	" " " "	25/2/37 to 19/3/37.
Cooling Side of Cylinders	3.5 " " "	27/3/37 & 9/4/37.
" " " Cylinder Covers	" " " "	" "
" " " Pistons	4.0 " " "	1/4/37.
Air Reservoirs & Bottle.	41.0 " " "	5/5/37 & 4/6/37.
Oil Tanks	0.72 " " "	18/5/37 & 19/5/37.
Fuel Pipes	A, ----- 1,000 " " "	} 11/5/37 to 24/6/37.
	B, ----- 700 " " "	
	C, D, E & F, --- 7.0 " " "	
Compressed Air Pipes	50.0 " " "	11/3/37 to 15/6/37.

### RECORD OF SHOP TRIAL

Date of Trial 7/5/1937.  
Where carried out? Tama works of Mitsui Bussan Kaisha, Ltd.  
Kind of Fuel Oil with Specific Gravity California A, 0.912

Conditions of Load		1/4	1/2	3/4	4/4	11/10
Durations of Trial ( Hours. )		1	2	2	8	1
Revolutions per Min.		72.0	89.0	100.8	112.7	115.0
Max. Working Pressure in Cylinders	Mean of Top Cyls.	43.6	46.9	47.5	47.6	47.9
	Mean of Bot. Cyls.	36.9	42.5	43.7	43.9	44.2
	Mean.	40.2	44.7	45.6	45.8	46.0
Mean Indicated Pressure in Cylinders	Mean of Top Cyls.	3.772	5.227	6.281	7.237	7.854
	Mean of Bot. Cyls.	2.662	4.198	5.408	6.265	6.456
	Mean.	3.217	4.712	5.844	6.751	7.155



I. H. P.	Each Cylinder	No.1 T.	245.3	451.4	631.0	824.0	920.3
		B.	199.0	359.8	489.8	621.8	655.3
		No.2 T.	238.0	455.8	631.0	820.8	904.3
		B.	194.7	328.8	483.2	606.8	631.0
		No.3 T.	305.3	494.0	659.8	849.2	908.3
		B.	156.0	312.6	461.4	609.4	636.7
		No.4 T.	309.0	504.0	656.6	847.8	929.0
		B.	194.3	338.2	471.6	626.0	660.7
B. H. P.		No.5 T.	272.3	488.8	658.6	831.8	931.7
Mechanical Efficiency		B.	161.7	326.2	476.4	614.4	654.3
Fuel Consumption (Gr./B.H.P.)		No.6 T.	293.3	454.4	640.4	820.8	937.0
		B.	96.3	289.2	469.8	615.4	647.7
		Total.	2665.3	4803.2	6729.6	8688.2	9416.3
Pressure (kg./cm <sup>2</sup> )	Blast Air						
	Fuel Oil Injection.						
	Scavenge Air						
	Exhaust Gas						
	Cylinder Cooling Water						
	Piston Cooling Water or Oil						
	Lub. Oil, at Main Bearings						
	" " Crossheads						
Temperature (Cent.)	Exhaust Gas	Top Cyls.	113.0	159.4	210.7	261.6	297.0
		Bot Cyls.	95.6	142.2	192.6	252.8	278.0
	Cyl. Cooling Water, Inlet		19.0	19.8	20.0	20.4	22.7
	" " " Outlet		27.3	30.7	34.3	38.7	43.8
	Piston Cooling Water or Oil, Inlet		32.3	32.4	33.0	36.4	38.0
	" " " Outlet		37.7	38.1	39.4	44.2	45.9
	Lubricating Oil, Inlet						
	" " Outlet						



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I. H. P.	Each Cylinder	No. 1 T.	245.3	451.4	631.0	824.0	920.3
		B.	199.0	359.8	489.8	621.8	655.3
	Total						
B. H. P.			1965.7	3884.2	5683.4	7654.6	8360.7
Mechanical Efficiency			73.37	80.86	84.46	88.12	88.80
Fuel Consumption (Gr./B.H.P.)			183.	162.	160.	159.	163.
Pressure (kg./cm <sup>2</sup> )	Blast Air	--	--	--	--	--	--
	Fuel Oil Injection.		381.9	402.6	416.7	478.2	486.4
	Scavenge Air	M. of H <sub>2</sub> O.	1.6	1.6	1.7	1.9	2.1
	Exhaust Gas	--	--	--	--	--	--
	Cylinder Cooling Water		1.0	1.0	1.0	1.0	1.0
	Piston Cooling <del>Water</del> or Oil		1.1	1.2	1.2	1.2	1.2
	Lub. Oil, at Main Bearings		1.1	1.1	1.1	1.1	1.1
	" " Crossheads		"	"	"	"	"
Temperature (Cent.)	Exhaust Gas	Top Cyls.	113.0	159.4	210.7	261.6	297.0
		Bot Cyls.	95.6	142.2	192.6	252.8	278.0
	Cyl. Cooling Water, Inlet		19.0	19.8	20.0	20.4	22.7
	" " " Outlet		27.3	30.7	34.3	38.7	43.8
	Piston Cooling <del>Water</del> Oil, Inlet		32.3	32.4	33.0	36.4	38.0
	" " " Outlet		37.7	38.1	39.4	44.2	45.9
	Lubricating Oil, Inlet		--	--	--	--	--
	" " Outlet		--	--	--	--	--



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## TEIKOKU KAIJI KYOKAI

P. 13.

No. ....

## SURVEY REPORT

Trial Trip.

The vessel run on trial trip on June 25th, 1937, off Tsuda, Kagawaken, and the engines tested to 10 % over load under sea-going condition and the machinery found to be working in a satisfactory manner, the results of trial being as follows:-

Draug ht: Fore, 3.43 m. Aft, 5.87 m. Mean, 4.65 m.				
Fuel Brand: " California A " S.G. 0.912				
Item.		1st Run.	2nd Run.	Mean.
Speed in knots.		19.088	19.434	19.261
Revolution per minutes.		120.5	121.0	120.75
Max. Pressure, in kg./sq.cm. (Mean in 6 Cyls.)	Top Cylinders.	46.58	46.33	46.455
	Bottom Cylinders.	46.42	46.08	46.250
Mean Eff. Pressure, in kg./sq. cm. (Mean in 6 Cyls.)	Top Cylinders.	7.552	7.595	7.5735
	Bottom Cylinders.	7.558	7.488	7.5230
I.H.P. in 6 Cyls.	Top Cylinders.	5571.	5626.	5598.5
	Bottom Cylinders.	4764.	4740.	4752.0
Total I.H.P. ( Top & Bottom ),		10335.	10366.	10350.5
Total B.H.P.		9033.	9060.	9046.5
Pressure in kg./cm. <sup>2</sup>	Fuel Oil, (Inj. P.)	3.1	3.1	3.1
	Do. (do. deliv. Top.)	523.3	533.3	528.30
	Do. (do. deliv. Bott.)	470.0	462.0	466.00
	Cooling Water.	1.0	1.0	1.0
	Lubricating Oil.	1.1	1.1	1.1
	Cooling oil.	1.1	1.1	1.1
	Scavenging Air.	0.17	0.17	0.17
Temperature in C°.	Engine Room.	27.	26.	26.5
	Sea Water.	20.	20.	20.0
	Cool. Water, Inlet.	28.0	28.	28.0
	Do. Outlet.	44.3	39.8	42.05
	Cool. Oil, Inlet.	33.	34.	33.5
	Do., Main Pist. Out.	47.7	48.8	48.25
	Do., Exh. Pist. Out.	43.2	44.2	43.70
	Exhaust Gas, Top.	295.5	312.5	304.00
	Do. Bottom.	277.2	304.2	290.70
	Blower, Inlet.	27.	27.	27.0
	Do. Outlet.	52.	53.	52.5
Slip, in %.		2.05	0.65	1.35

# TEIKOKU KAIJI KYOKAI

No. ....

## SPARE GEARS

Description	Required Number	Actual Number	Description	Required Number	Actual Number
Cylinder Cover, complete with Valves, etc.	1 set.	2 sets. (T.&B.)	Ignition Plugs	/	/
Piston, complete	1 set.	"	Connecting Rod Top and Bottom-end Brasses	1 set of each.	"
Piston Rings	2 sets.	6 sets.	Connecting Rod Top and Bottom-end Bolts and Nuts	1 set of each.	"
Fuel Valves, complete with Seat, Box, Spring, etc.	3 sets.	24 sets.	Coupling Bolts and Nuts	1 set of each size.	"
Suction Valves, complete with Seat, Box, Spring, etc.	/	/	Piston Rings for <del>Main and Aux.</del> Air Compressors	1 set of each size.	"
Exhaust <del>Valves, complete with Seat, Box, Spring, etc.</del> <b>Pistons with piston Rings,</b>	/	2 sets. (T.&B.)	Bellows	1.	2.
Fuel Pipes and Fittings	1 complete set.	"	Tap and Dies, with Tap-handle and Die-stock	1 set.	2 sets.
Telescopic or Flexible Piston Cooling Pipes	1 set.	2 sets.	Ratchet Braces	1 set.	2 sets.
Cylinder Cover Bolts and Nuts	/	1 set of each size.	Anvils	1.	"
Main Peering Bolts and Nuts	1 set.	"	Fixed Vices	1.	3.
Suction and Delivery Valves, with Springs, for Main and Aux. Air Compressors	1 set of each size.	1 set of each size.	Electric Battery	/	/
Scavenging <del>Pump Valves and Springs</del> <b>Blower Impeller and Shaft.</b>	/	1 set.	Electric Cords	Assorted.	"
Working Parts for Fuel Pump	4 sets.	12 sets.	Blow Lamps	/	/
Impeller Shafts for Cylinder Jacket and Piston Cooling Pumps	1 of each.	"	Tackle and Falls	2 sets.	T. 4 sets C. 10 "
Valves and Springs for Cylinder Jacket and Piston Cooling Pumps	/	/	Steel Plates (various size)	Assorted.	"
Lubricating Pump <del>Valves and Springs</del> <b>are in common with piston C. pumps.</b>	/	/	Steel Bars (various size)	Assorted.	"
Oil Transfer Pump Valves and Springs	/	/	Bolts and Nuts, Assorted (various size)	Assorted.	"
Bilge Pump Valves	1 set.	"	Engineer's Tools	1 complete set.	"
" " " (Indep. Bil.P.)	/	2 sets.	Thermometers	2.	4.

### CONSUMPTIONS PER DAY UNDER ORDINARY WORKING CONDITION

(Average number of days under service during one year.....days)

Mean draught

Mean speed

Fuel oil

Internal oil

Fresh water

External oil



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