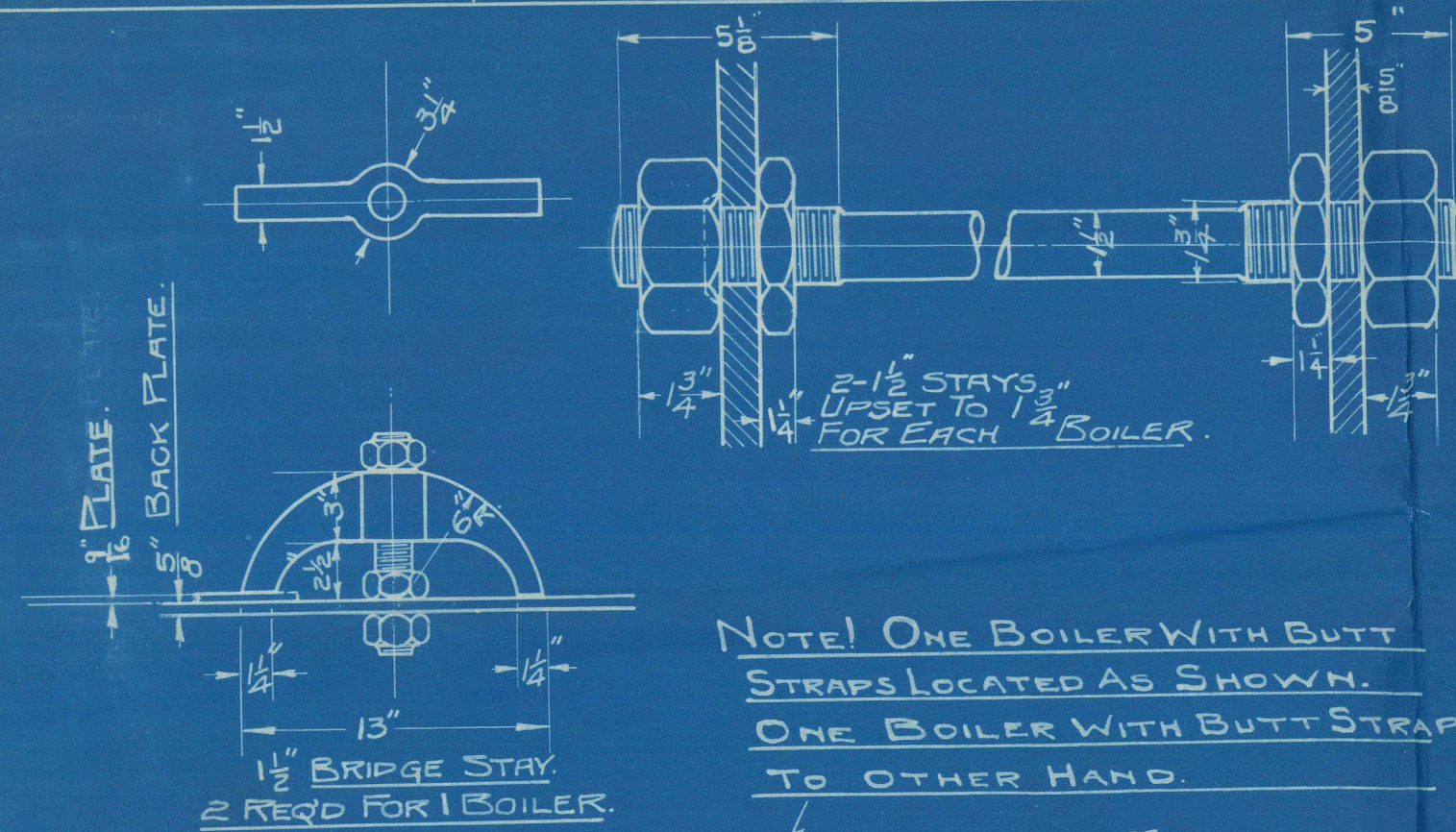


TABLE OF FORMULAE FOR STRENGTHS AT 190 ° WORKING PRESSURE.			
	BRITISH LLOYDS.		U. S. GOV'T.
SHELL PLATES.	$\frac{21.25 A}{140.1} = \frac{17.25 A}{2.865 \sqrt{S}}$	$\frac{6.7120}{2.865 \sqrt{S}}$	$\frac{193.2}{\sqrt{S}}$
INSIDE BUTT STRAP 1 TH.	$\frac{3}{4} \frac{1078 \times (8.11627)}{140 \times 12^2} = 38^{\frac{1}{2}}$		
HEADS-FRONT TUBE PLATE.	$\frac{140 \times 12^2}{52.6} = 38^{\frac{1}{2}}$		
" " IN WATERWAY.	$\frac{140 \times (10 \times 12)^2}{151} = 250^{\frac{1}{2}}$		
" " STEAR IN STEAM SPACE	$\frac{175 \times 17.25^2}{16.25 \sqrt{S}} = 197^{\frac{1}{2}}$		$\frac{175 \times 17.25^2}{16.25 \sqrt{S}} = 197^{\frac{1}{2}}$
" REAR LOWER.	$\frac{100 \times 10^2}{7.25^2} = 190.2^{\frac{1}{2}}$		$\frac{120 \times 10^2}{7.25^2} = 228^{\frac{1}{2}}$
STRESS ON REAR TUBE PLATE	"		
REAR TUBE PLATE PRESS.	$\frac{1750 \times 10 (3.155 \times 1.282)}{212} = 3.26$		$\frac{2 (3.65 \times 2.24) 650}{24 \times 3.65} = 215^{\frac{1}{2}}$
FURNACES.	$\frac{1259 \times (9 \times 2)}{16.125} = 191$		$\frac{15600 \times 56.625}{135 \times 14} = 199^{\frac{1}{2}}$
COMB CHAMBER TOP	$\frac{135 \times 10^2}{71.815} = 237$		$\frac{135 \times 10^2}{8.121^2} = 204^{\frac{1}{2}}$
" " SIDES	$\frac{100 \times 10^2}{7.25^2} = 190.2^{\frac{1}{2}}$		$\frac{120 \times 10^2}{7.25^2} = 228^{\frac{1}{2}}$
" " REAR.	$\frac{100 \times 10^2}{7.25^2} = 190.2^{\frac{1}{2}}$		$\frac{120 \times 10^2}{7.25^2} = 228^{\frac{1}{2}}$
STAY TUBES IN BOUNDARY #6	$\frac{7500 \times 1.4649}{56} = 196^{\frac{1}{2}}$		
" " FIELD #8	$\frac{7800 \times 1.302}{33^2} = 275^{\frac{1}{2}}$		
MAIN STAYS	$\frac{10400 \times 5.94}{264} = 234$		$\frac{9000 \times 5.94}{52.6} = 202^{\frac{1}{2}}$
SCREW " IN FIELD.	$\frac{1259 \times 8000}{23.6} = 191A$		$\frac{1259 \times 9000}{26.6} = 215^{\frac{1}{2}}$
" " WATERWAY.	$\frac{8000 \times 1259}{51} = 197.4$		$\frac{9000 \times 1259}{55} = 222^{\frac{1}{2}}$
GIRDER PLATES.	$\frac{10000 \times 27.115}{(218.7 \times 1) 245 \times 27.5} = 237$		$\frac{825 \times 23.25 \times 15}{(24 \times 71.8125 \times 2.315)} = 191^{\frac{1}{2}}$
" " STAYS.	$\frac{8000 \times 1.474}{7 \times 8^2} = 206.6$		$\frac{9000 \times 1.474}{7 \times 8^2} = 232.7^{\frac{1}{2}}$
T BARS ON COMB. CHAMBER			$\frac{900 \times 10^2}{14 \times 6.6} = 271^{\frac{1}{2}}$

NOTE:- STAYS THREADED THRU PLATES. THREADS TO BE CAULKED AFTER PUTTING IN PLACE. NUTS TO BE CHAMFERED & CUPPED AND SET UP SOLID IRON & IRON

$$\text{RIVETS} \quad \frac{[(1.1075 \times 4 \times 1.75) + 1.1075]}{8 \times 1.0781} \times .85 \times 100 = \underline{87.3\%}$$

CONSTRUCTION LIST.				
NO	NAME	HULL	ENG	ORD
2	CLYDE STMSHP Co	147	473	860
2	" "	148	474	860
2	" "	149	475	860



NOTE! ONE BOILER WITH BUTT
STRAPS LOCATED AS SHOWN.
ONE BOILER WITH BUTT STRAPS
TO OTHER HAND.

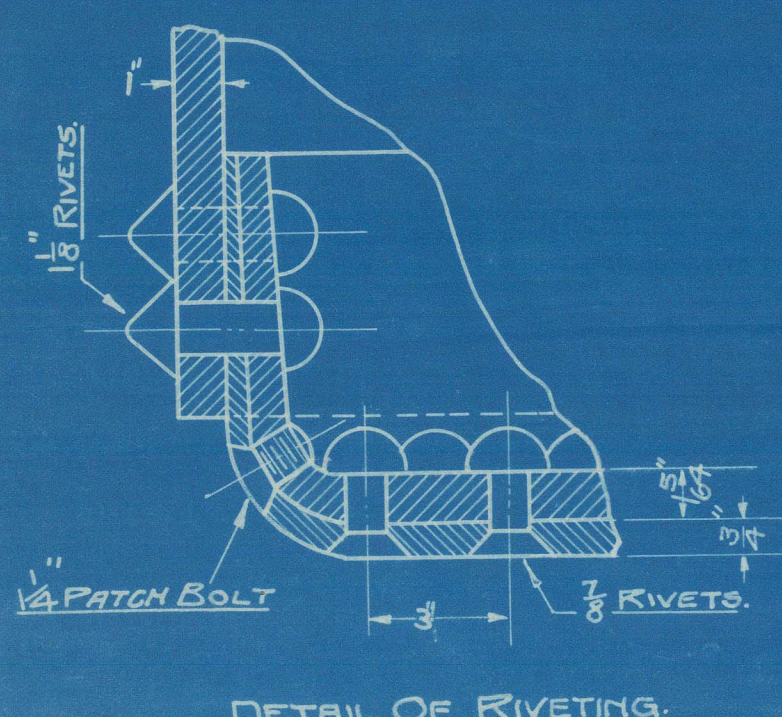
3-2 1/2" STAYS UPSET TO 3"
FOR 1 BOILER

THE FOLLOWING INFORMATION WILL BE REQUIRED WITH THE ORDER
FOR STEEL ON THIS BOILER FOR THE USE OF THE U.S. STEAMBOAT
INSPECTION SERVICE.

YARD NUMBER	BUILDER OF HULL
OWNER	LOCAL INSPECTOR
WATER NAVIGATED	HEADS DISHED BEFORE PLACING IN BOILER
TYPE OF BOILER	TYPE OF VESSEL
TENSILE STRENGTH	SPECIFY FLATES HAVING TENSILE STRAIN.

TO PASS U.S. GOV'T. AND BRITISH LLOYDS REQUIREMENTS FOR A WORKING PRESSURE OF 190[#] PER
TENSILE STRENGTH OF PLATE AT LEAST 62120[#]
ALL STAYS TO BE TESTED STEEL. ALL RIVETS TO BE OF GOOD CHARCOAL STEEL AND TO
MEET WITH REQUIREMENTS OF TESTS FOR U.S. GOV'T. & BRITISH LLOYD.

SPECIFICATIONS FOR RIVETS - U.S. GOV'T.
RIVETS TO BE OF STEEL TENSILE STRENGTH
TO BE BETWEEN 58240* AND 67200*
ELONGATION TO BE 30 PER CENT IN 8 INCHES.
MUST TEST HOT AND COLD BY DRIVING DOWN
ON AN ANVIL WITH THE HEAD IN THE DIE.
MUST TEST BY NICKING AND BENDING BACK
ON THEMSELVES COLD WITHOUT DEVELOPING
CRACKS OR FLAWS.



BOILER
115" INS. DIA. 115" O" OVERALL
190# WORKING PRESSURE
GREAT LAKES ENGINEERING WORKS

DETROIT MICH.

Drawn by: H.M.V. ENGINEERING DEPT. Checked by: *H.M.V.*

Traced by: G.F.M. Scale: 3/4" = 1" Date: 5-28-15

Great Lakes Engineering Works
Detroit

Clyde Line Steamers Nos 147-148-149
Main Boilers

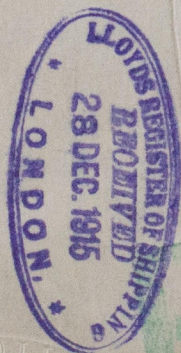
Cleveland (U.S.A.) District

$\frac{5}{8}$ Yague. No. 147.

$\frac{3}{8}$ Yuna. " 148

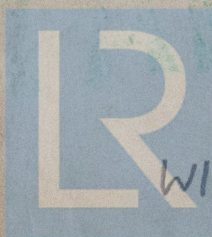
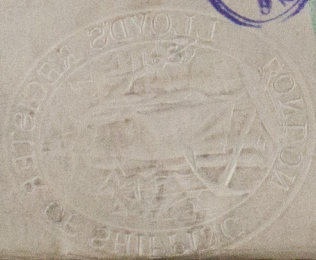
$\frac{3}{8}$ Inca. " 149.

Approved Plan



1 No 147^o Keel 24. 7. 15

2 No 148 Keel 6. 8. 15



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