

No. 819.994.

PATENTED MAY 8, 1906.

B HEFTYE.
MARINE BOILER.

APPLICATION FILED APR. 7, 1905.

4 SHEETS—SHEET 1.

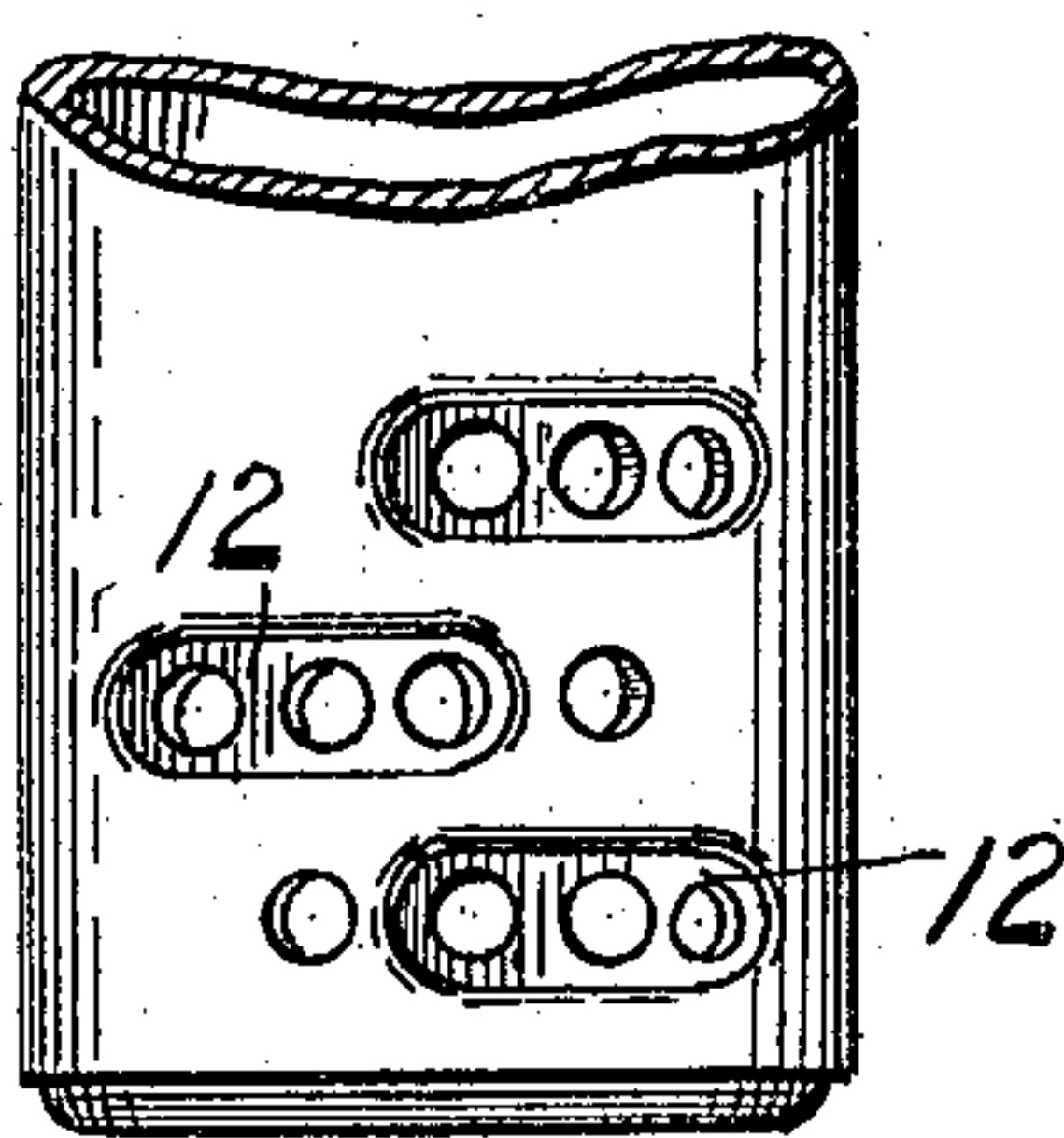
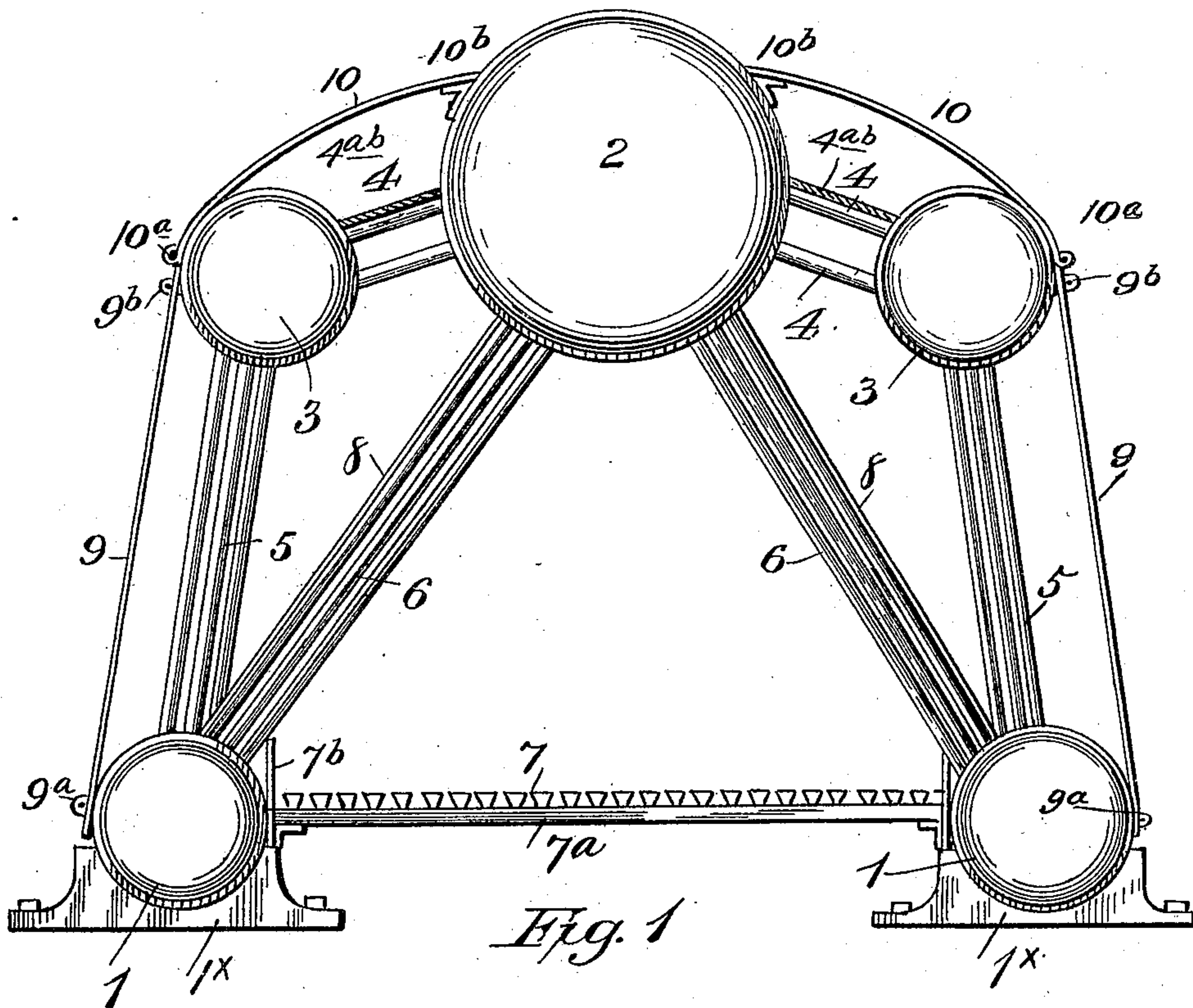


Fig. 6.

WITNESSES:

J. W. Meister
S. L. Parker

INVENTOR:

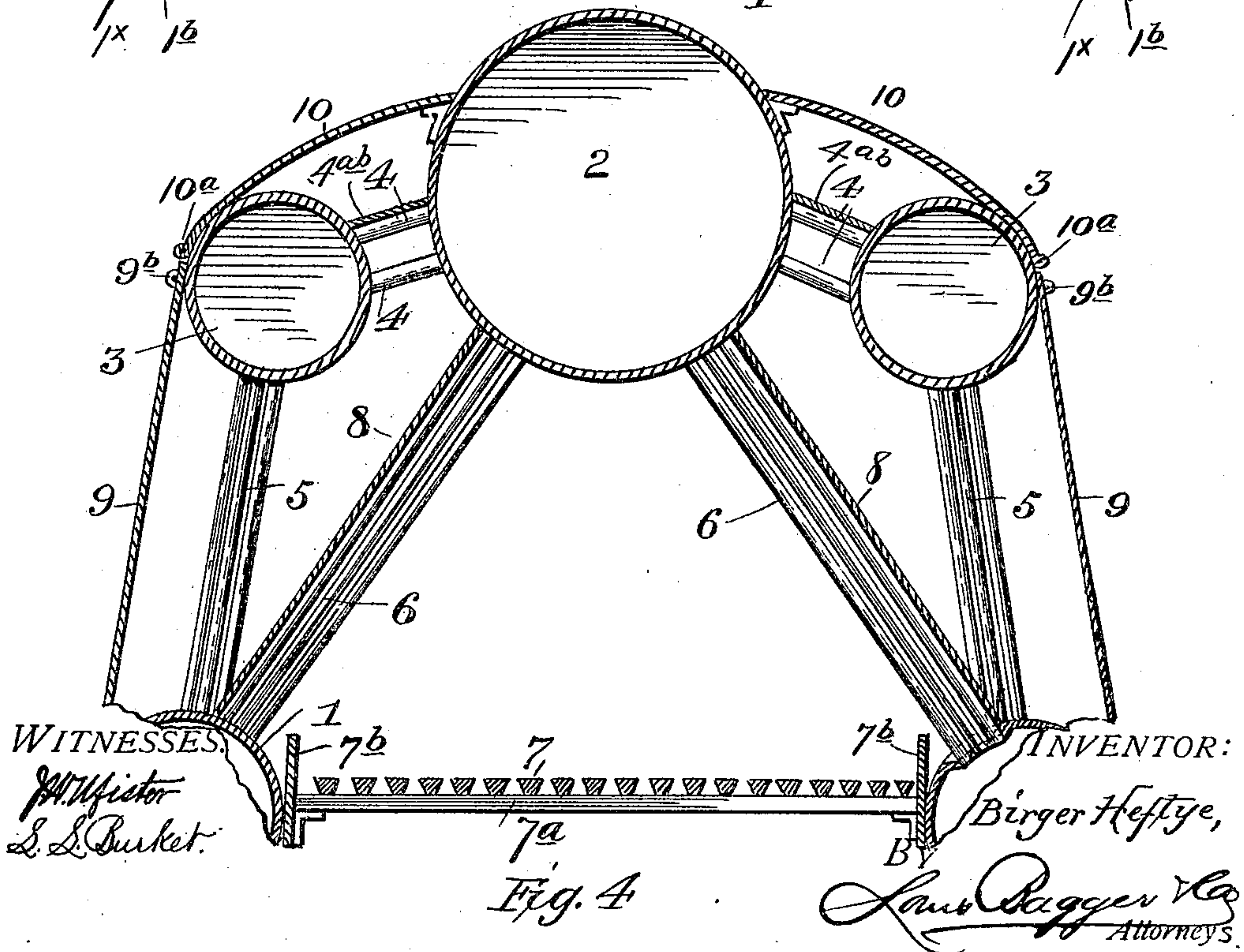
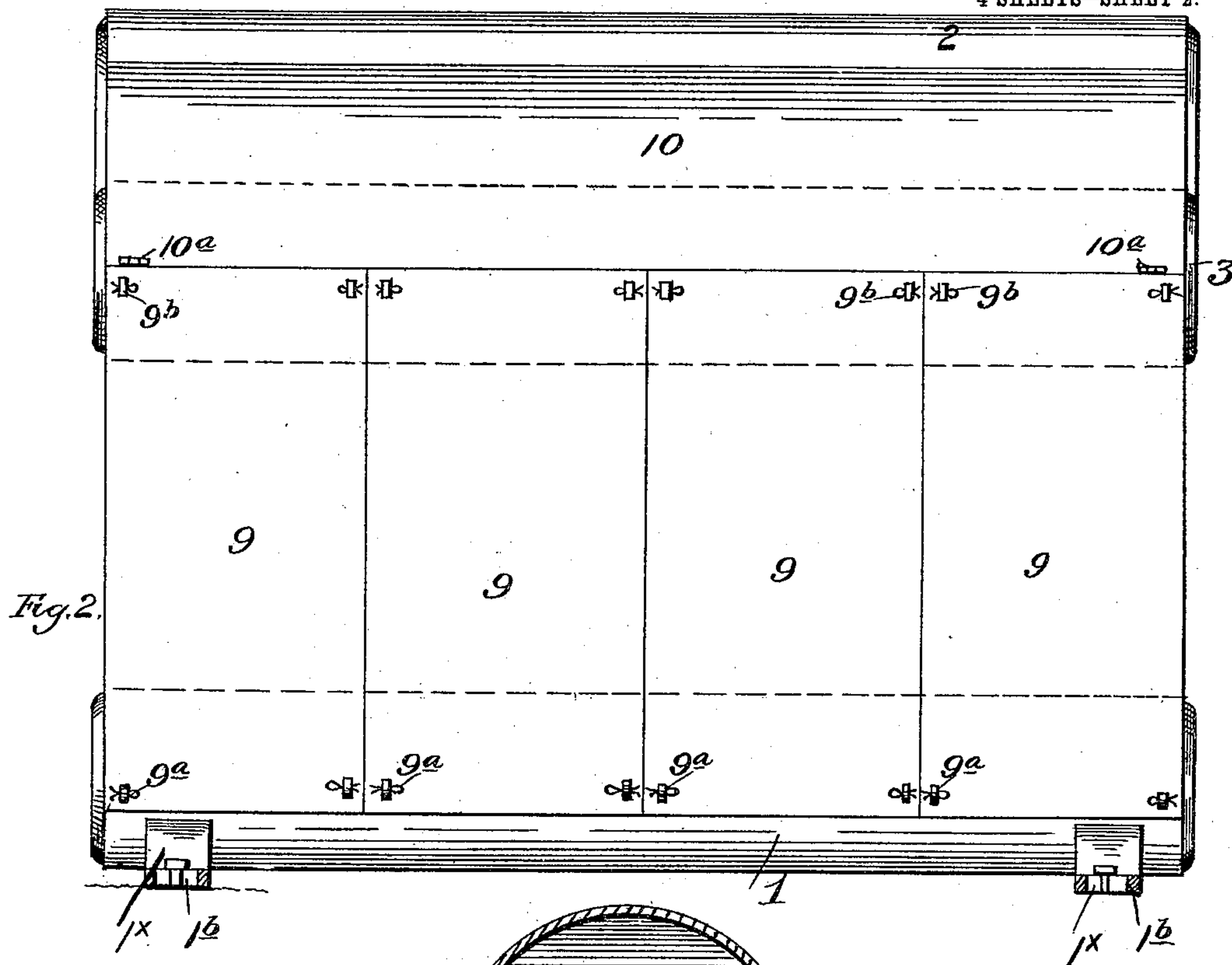
Birger Heftye,
By *Sam. Duggen & Co.*
Attorneys

No. 819,994.

PATENTED MAY 8, 1906.

B. HEFTYE.
MARINE BOILER.
APPLICATION FILED APR. 7, 1905

4 SHEETS—SHEET 2.



No. 819,994.

PATENTED MAY 8, 1906.

B. HEFTYE.
MARINE BOILER.

APPLICATION FILED APR. 7, 1905.

4 SHEETS—SHEET 3.

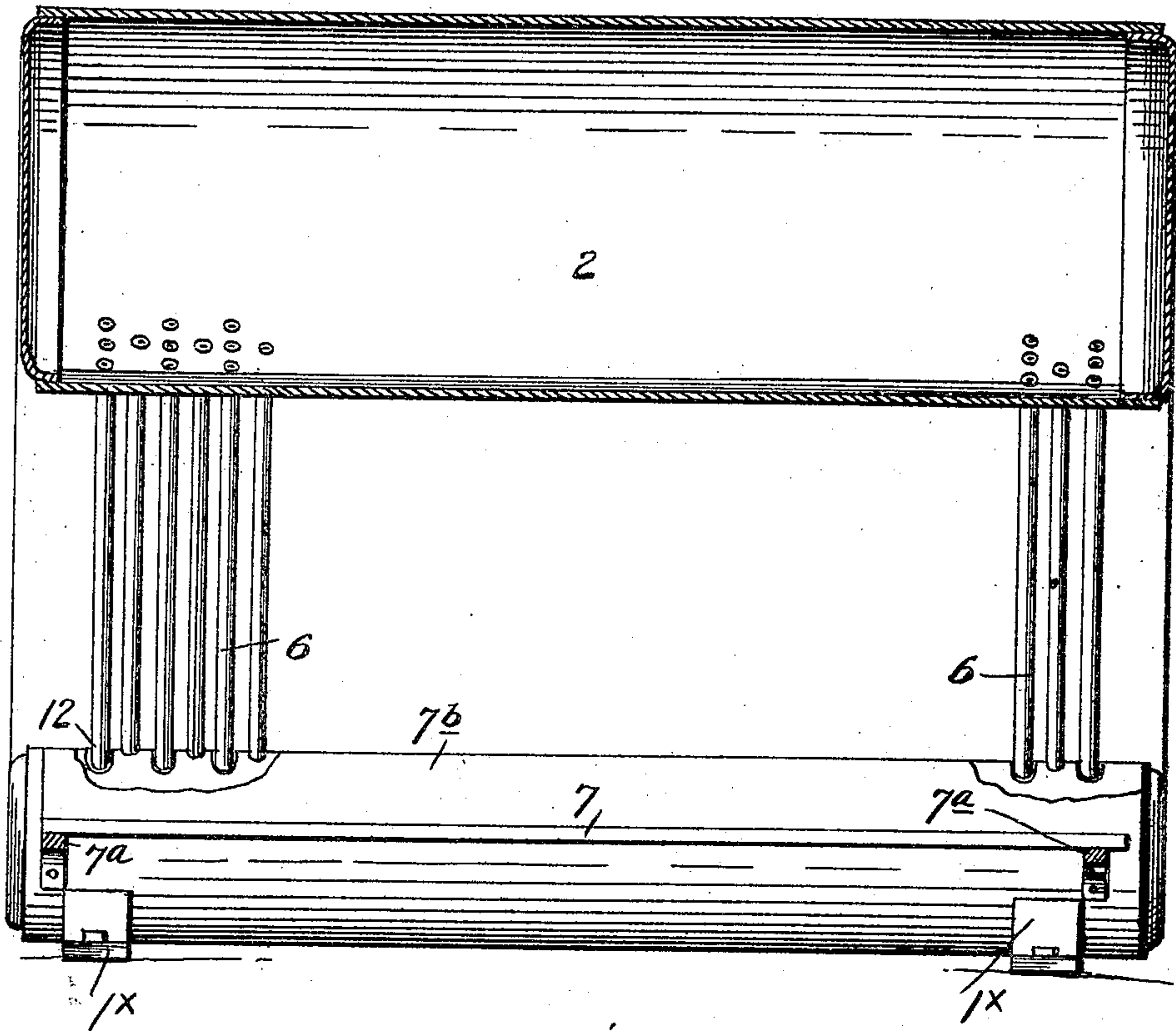


Fig. 3

WITNESSES:

J. W. Foster
E. E. Barker

INVENTOR:

Birger Heftye,

By

Louis Ruggier & Co
Attorneys

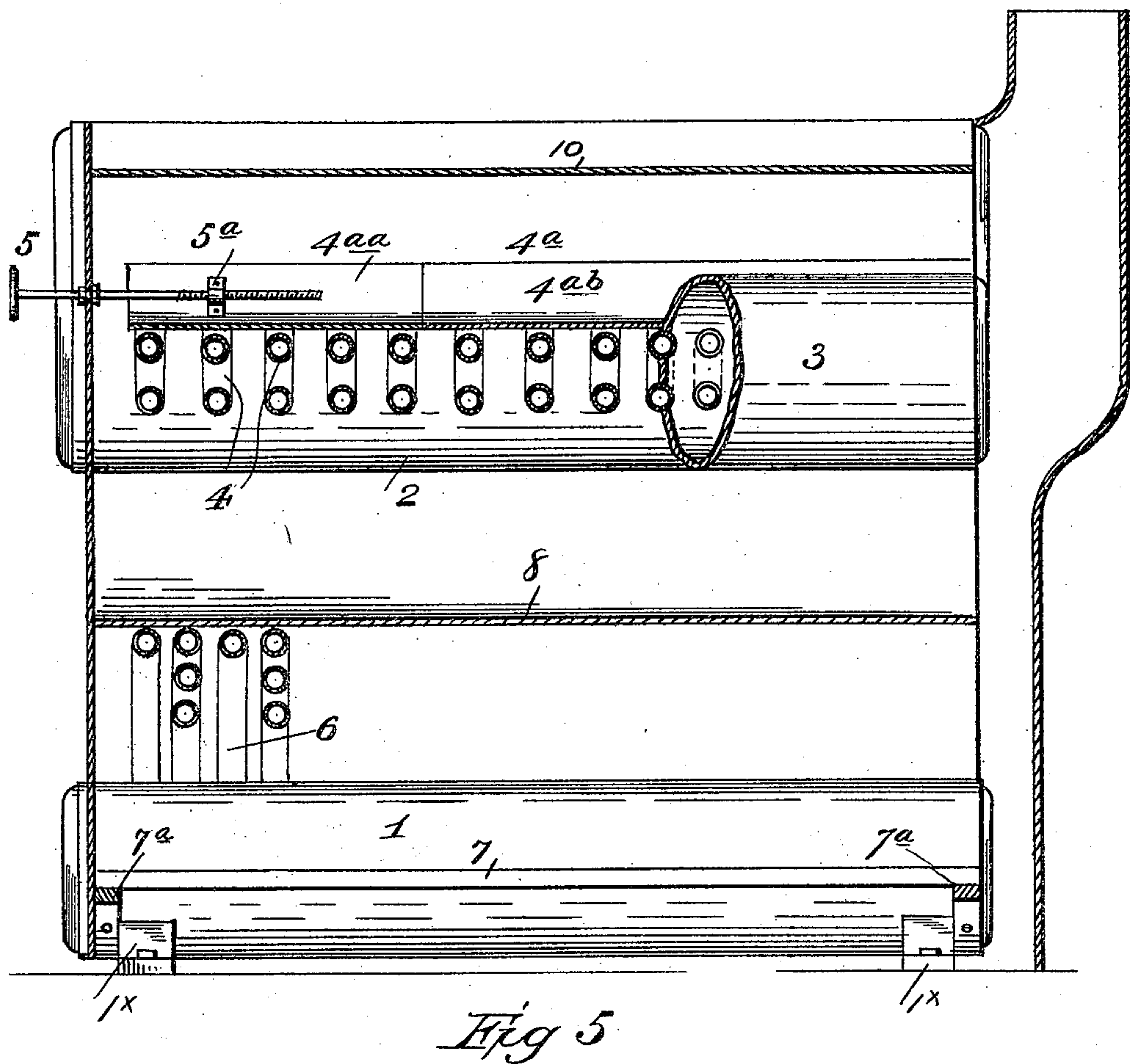
No. 819,994.

PATENTED MAY 8, 1906.

B. HEFTYE.
MARINE BOILER.

APPLICATION FILED APR. 7, 1905.

4 SHEETS—SHEET 4.



Birger Hefstye Inventor:

Witnesses;
L. S. Burket.
J. W. Meister

534 Louis Ruggen & Co. Attorneys

UNITED STATES PATENT OFFICE.

BIRGER HEFTYE, OF TULA, MEXICO, ASSIGNOR OF ONE-HALF TO
WILLIAM BRADSHAW, OF VERA CRUZ, MEXICO.

MARINE BOILER.

No. 819,994.

Specification of Letters Patent.

Patented May 8, 1906.

Application filed April 7, 1905. Serial No. 254,381.

To all whom it may concern:

Be it known that I, BIRGER HEFTYE, a citizen of the Republic of Mexico, and a resident of Tula, Vera Cruz, Mexico, have invented
5 new and useful Improvements in Marine Boilers, of which the following is a specification.

My invention relates to improvements in steam-boilers, more especially the marine
10 type.

It has for its object to promote efficiency, water circulation, the cleaning action thereof, and durability, and to effect these in a simple and effective manner; and it therefore
15 consists of certain structural features, substantially as hereinafter fully disclosed, and particularly pointed out by the claims.

In the accompanying drawings, illustrating the preferred embodiment of my invention, Figure 1 is a front end elevation thereof. Fig. 2 is a side elevation. Fig. 3 is a transverse section of the same. Fig. 4 is an enlarged detailed view showing more especially the manner of securing the ends of the
25 water-tube to the drums. Fig. 5 is an axial or longitudinal section produced through a lateral arrangement of baffling-plates. Fig. 6 is a detail plan view showing the seats for the tubes.

In the disclosure of my invention I employ two bottom or base drums 1, forming the mud-drums proper, a relatively central top drum 2, and two intermediate lateral drums 3, all having tubular connection, such
35 connection between the drums 2 and 3 being in the form of short tubes 4, that between drums 1 and 3 as banks of tubes or flues 5 and that between drums 1 and 2 as corresponding banks of flues or tubes 6, the whole being
40 arranged practically in triangular form to produce a mutually-bracing action, as greatly desirable in this type of boilers. Said bottom or mud drums are suitably seated in preferably the concaved or arcuate surfaces
45 of socket members bolted to base-plates 1^x, arranged at the front and back and adapted to be bolted to the floor, the bolt-openings 1^b in said socket members being elongated to provide for longitudinal expansion of the
50 drums or boilers, as will be readily appreciated. Suitably spanning the intermediate space between the bottom or mud drums 1 and supported in position upon cross-bars 7^a, suitably bolted to opposite surfaces of said

drums, are the fire-grate bars 7. Along the lateral edges of the fire-grate are suitably secured upright low guard-plates 7^b, of cast-iron, fire-brick, or other suitable substance, to prevent the shifting of the fire-bed when being trimmed, as would be liable to happen
60 especially at sea in heavy weather.

Baffling-partitions 8, preferably of sheet-iron and having applied thereto or lined with asbestos, are arranged and suitably secured in coincident or parallel lines with and
65 close to the series of water-tubes 6 and extend from the bottom or mud drums 1 to the lower surface of the top central drum 2, thus serving to prevent the lateral escape of the combustion products from the combustion-
70 chamber and to provide for directing said products the whole length of the boiler. Also like provision in the form of door members or sections 9, removably connected together and laterally to the bottom or mud drums 1,
75 as at 9^a 9^b, are employed to form the outer lateral portions or sides of the boiler structure. Also arched or arcuate top plate-sections 10 of like character as the aforesaid parts 8 and 9, are applied to form closures
80 intermediately of the drums 2 and 3, having their lower edges preferably hinged, as at 10^a, to the outer surfaces of the drums 3 and their upper edges suitably held in position, as at 10^b, the entire casing thus formed being
85 readily removable to provide for the cleaning of the rest of the structure. This arrangement also does away with the use of brick-work or masonry for incasing the parts noted, as will be appreciated. It will be noted that
90 the banks of flues or tubes 5 and 6, as also the tubes or flues 4, are relatively staggered to form interspaces and spaces between the baffling-plates 8 and the tube-banks 6, whereby eddies of the combustion products will be
95 formed therearound, having the effect to more fully intermingle the gases, and thus aid combustion, as is apparent.

Laterally of the central drum or boiler 2 and above the pipes 4 are suitably secured in
100 position additional arrangements of baffling-partitions 4^a, practically subdividing the upper portion of the boiler structure or casing into two compartments or subchambers, one upon each side of said boiler or drum 2, effective,
105 as presently seen, for the circuitous or tortuous passage of the combustion products. Each arrangement of baffling-partitions com-

prises a fixed or stationary plate 4^{ab}, extending from a point suitably removed from the forward end of the boiler structure or casing clear back to the rear or smoke-exit end of the latter, and a movable plate-section or slide 4^{aa}, effective as a damper and to fill the unoccupied space between the forward end of the aforesaid plate 4^{ab} and the opposite end of said casing or boiler structure. Said slide or damper is controlled by a hand-wheel-equipped screw or shaft 5, bearing in and suitably extending through an opening in the front end of the boiler structure or casing and working in a nut 5^a, fixed to said slide or damper, whereby by actuating said screw or shaft said damper may be requisitely moved according to the course or direction it may be required to impart to the combustion products. Also the banks of flues or tubes 5, as well as the tubes or flues 4, have their ends suitably secured in countersunk or inward-extending surfaces or portions, as 12, of the respective drums 1, 2, and 3. These countersunk surfaces remove or isolate the tube or flue ends where connection is effected between the boiler or drum and the latter from the direct action of the fire or flame, therefore preventing the premature destruction thereof from the fire. Also said inward-extending or countersunk surfaces are produced in right lines without appreciably affecting the general boiler or drum outline, each of sufficient area to provide for the securing of a plurality of tubes or flues thereto at one end and which is believed to afford a more effective and stronger means of connection between the boilers and flues than in forcing outward or offsetting the boiler or drum surface in effecting a like purpose. Also it is noted that by the aforesaid arrangement or assembling of the drums and banks of flues the water circulation is greatly aided, as well as the water-holding capacity thereof increased, since any mud, scale, or incrustation or other sediment will by the thus effective circulation set up be held in suspension and caused to pass with the water from the main boiler member or drum downward through the connecting banks of flues or tubes and finally be delivered into the mud-drums below,

from which the same may be blown by opening the usual blow-off cocks provided for that purpose, as well understood. All heat from the fire or combustion chamber, it is further observed, is utilized for water-heating and steam-generating purposes, since no brickwork or masonry is present to absorb or intercept the action of the heat-currents, as has been made apparent from the foregoing.

It will be seen that, the ebullition action taking place in the main or larger drum or boiler proper, 2, where of course the steam is generated thereby, the circulation thus produced will be in two directions via the tubes or flues 4, lateral drums 3, banks of flues 5, mud-drums 1, and up through the banks of flues 6, back into the boiler 2.

Latitude is allowed as to details herein, since they may be changed as circumstances suggest without departing from the spirit of my invention.

I claim—

1. A marine boiler comprising drums and banks of communicating tubes therebetween, the drums having sunken or depressed surfaces for the attachment thereto of said banks of tubes, with the lateral walls of the depressions extending continuously therearound and a uniform depth below the general external boiler-surface.

2. A marine or other boiler, employing a series of drums arranged in the bottom, the lateral portions and upper part of the casing, baffle-plates laterally subdividing the chamber or casing, and horizontal baffling arrangement of partitions, one of the plates of each contacting with the rear end of said casing and stopping a short distance from the front end of the latter, and a second plate serving as a damper effective to close the vacancy between the aforesaid plate and the opposite or front end of said casing and means for actuating said damper.

In testimony whereof I affix my signature in presence of two subscribing witnesses.

BIRGER HEFTYE.

Witnesses:

D. H. DASHIELL,
J. M. SUSUNAGA.