

No. 658,245.

Patented Sept. 18, 1900.

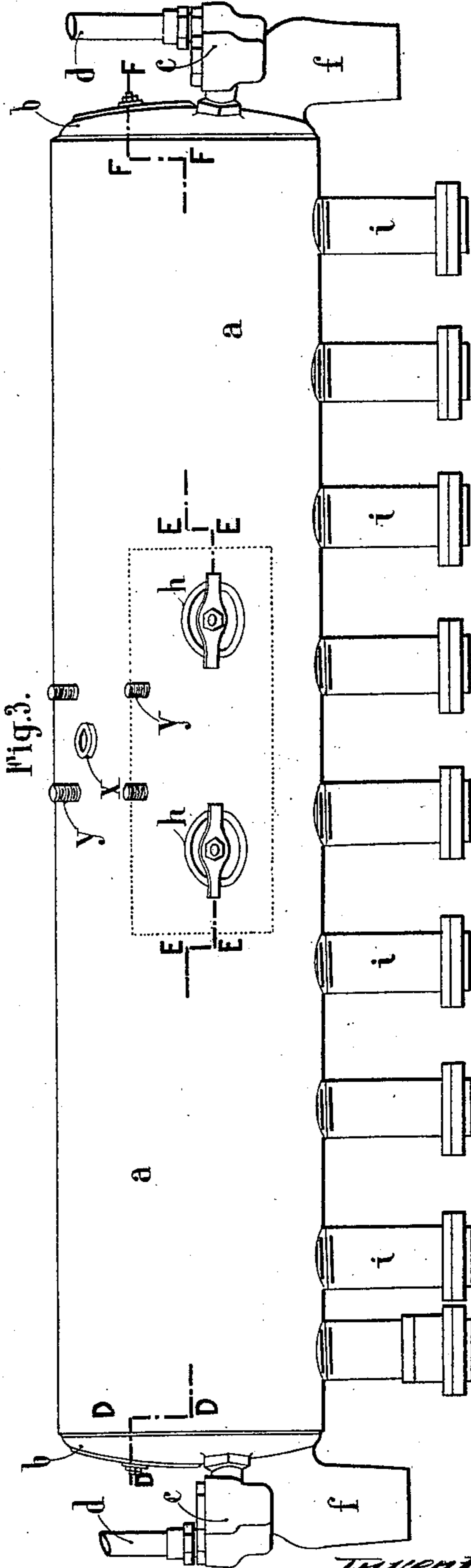
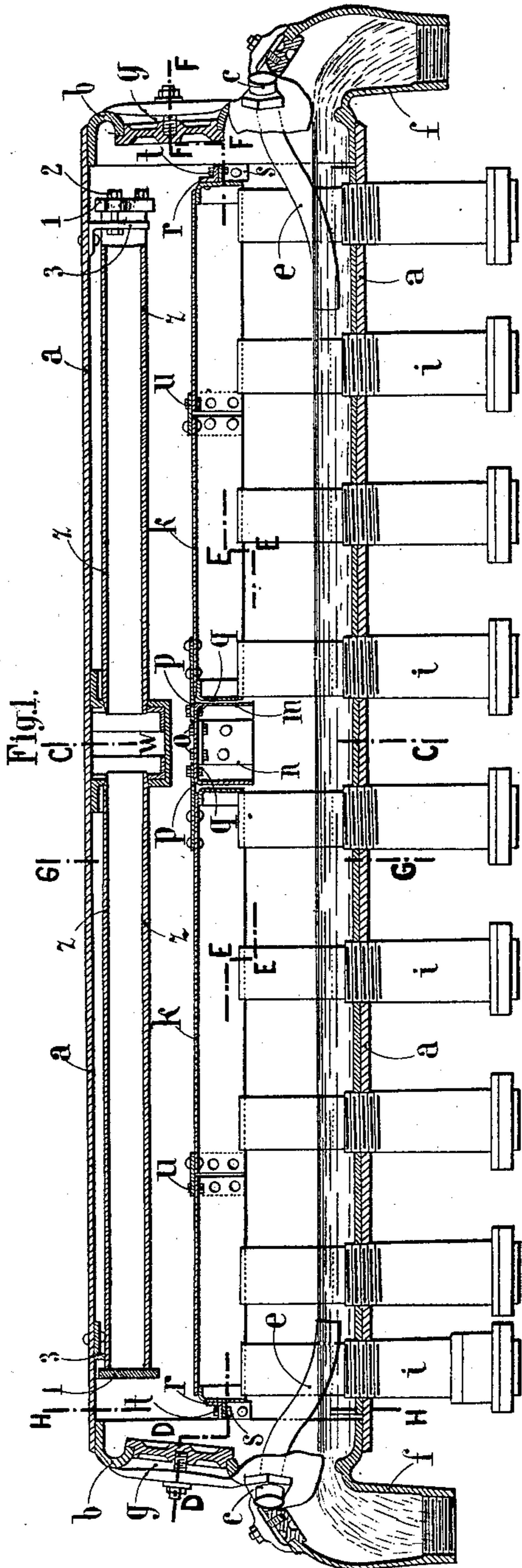
L. M. G. DELAUNAY-BELLEVILLE.

FEED WATER HEATER.

(Application filed Sept. 5, 1899.)

(No Model.)

4 Sheets—Sheet 1.



witnesses:
H. C. Meyer
C. D. Parker

Inventor
Louis M. G. Delaunay Belleville
By James L. Norris, Atty

No. 658,245.

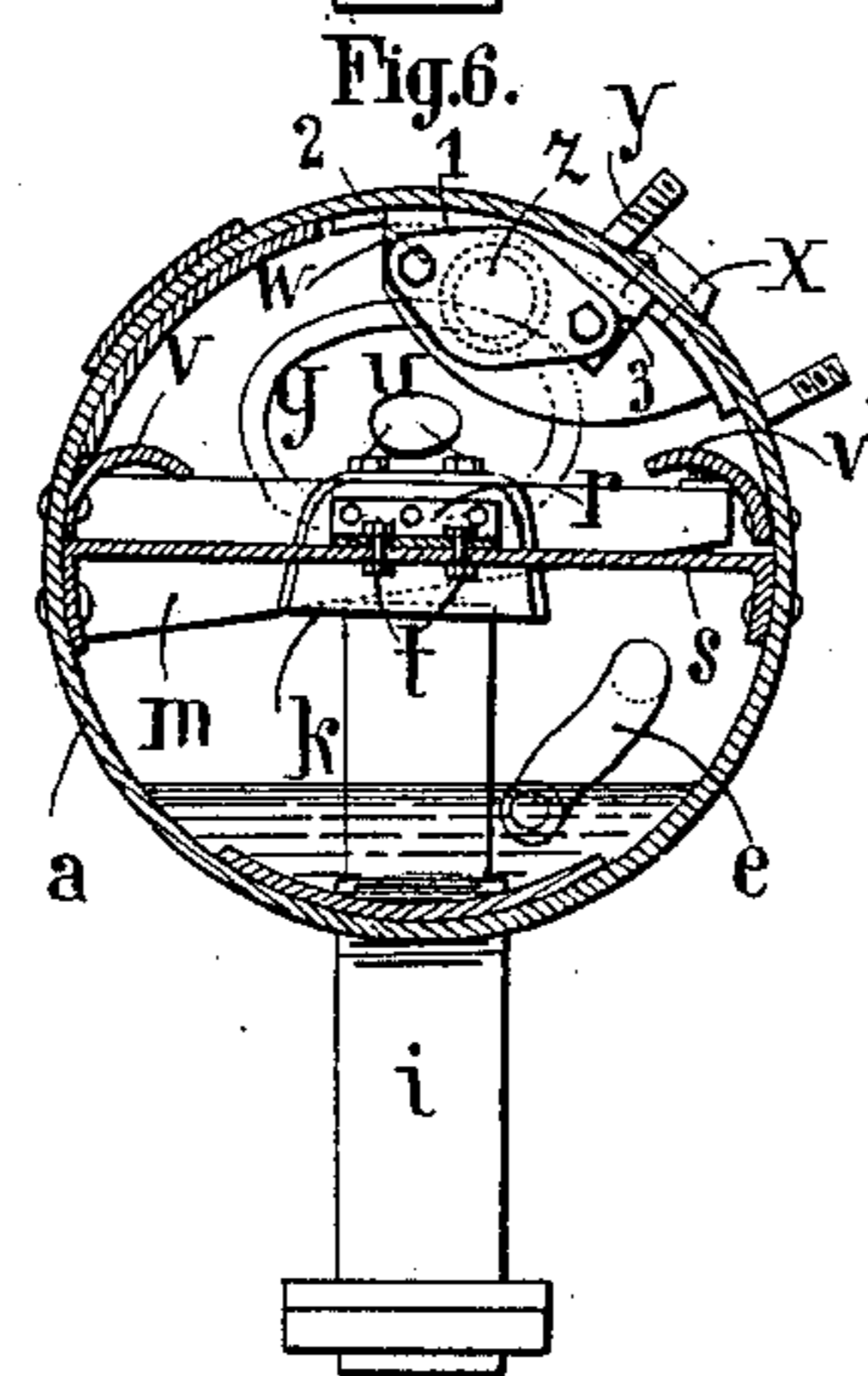
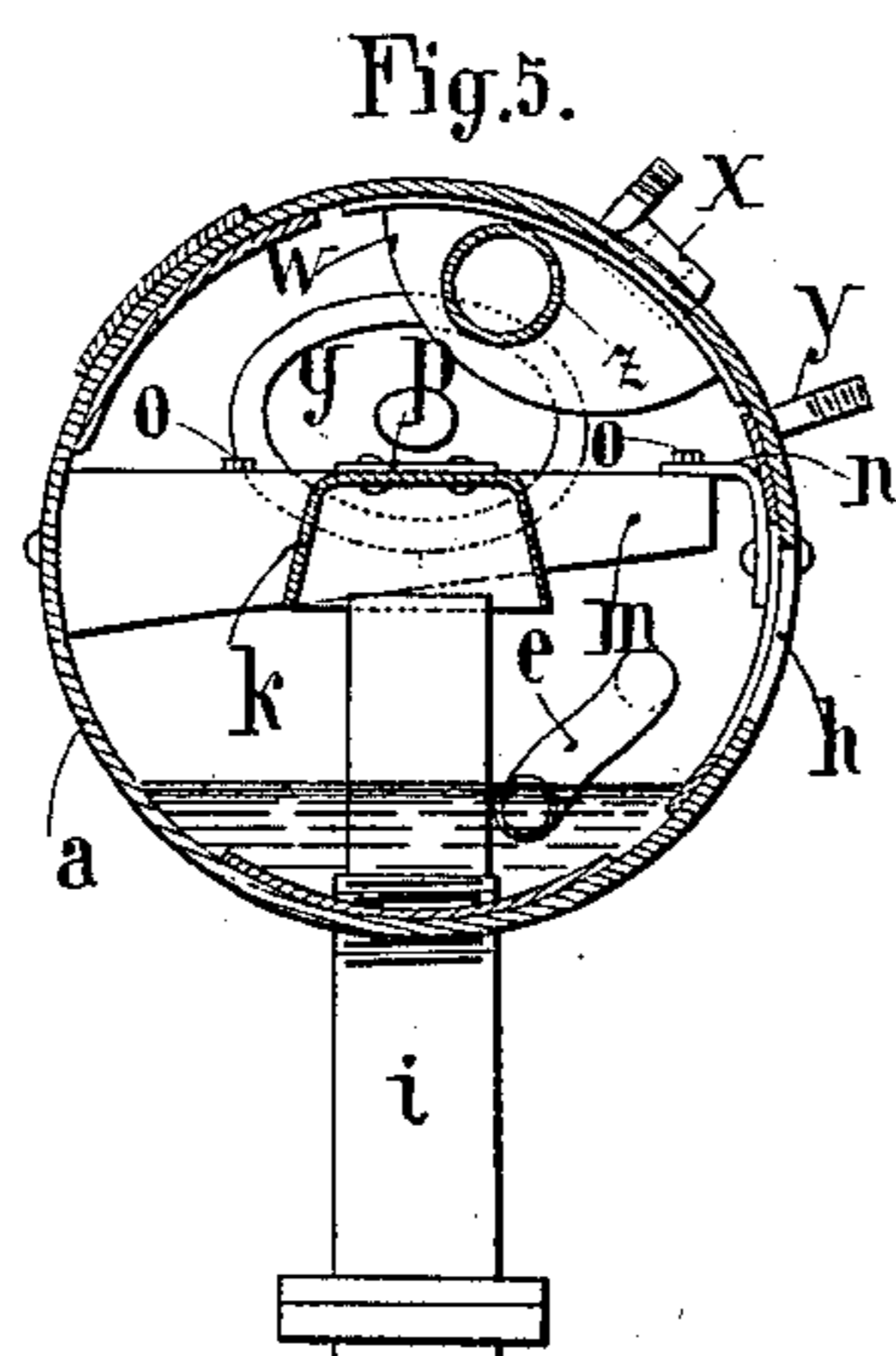
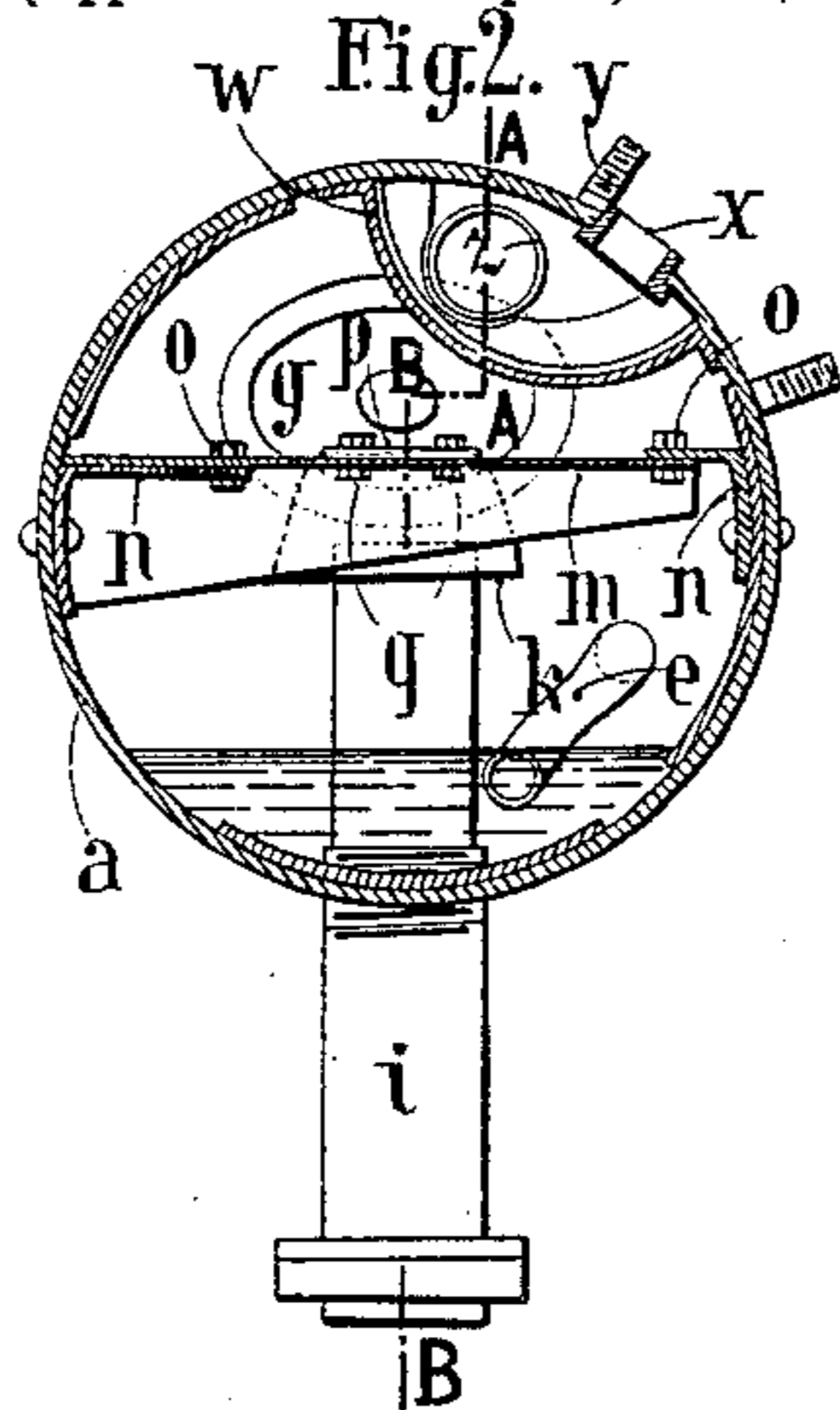
Patented Sept. 18, 1900.

L. M. G. DELAUNAY-BELLEVILLE.
FEED WATER HEATER.

(Application filed Sept. 5, 1899.)

(No Model.)

4 Sheets—Sheet 2.



witnesses:
H. C. Mayne,
C. L. Hester.

Inventor
Louis M. G. Delaunay-Belleville

By James L. Norris,
Atty

No. 658,245.

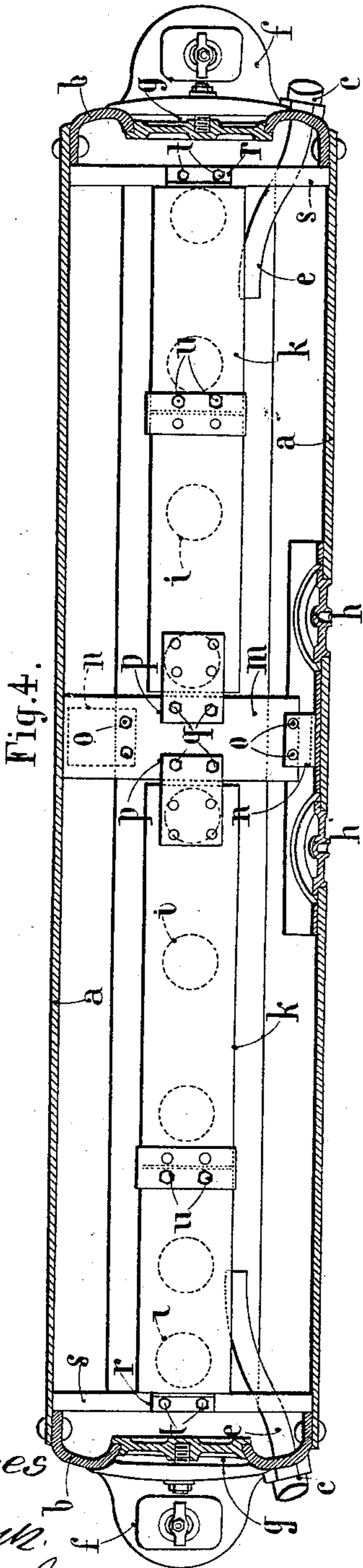
Patented Sept. 18, 1900.

L. M. G. DELAUNAY-BELLEVILLE.
FEED WATER HEATER.

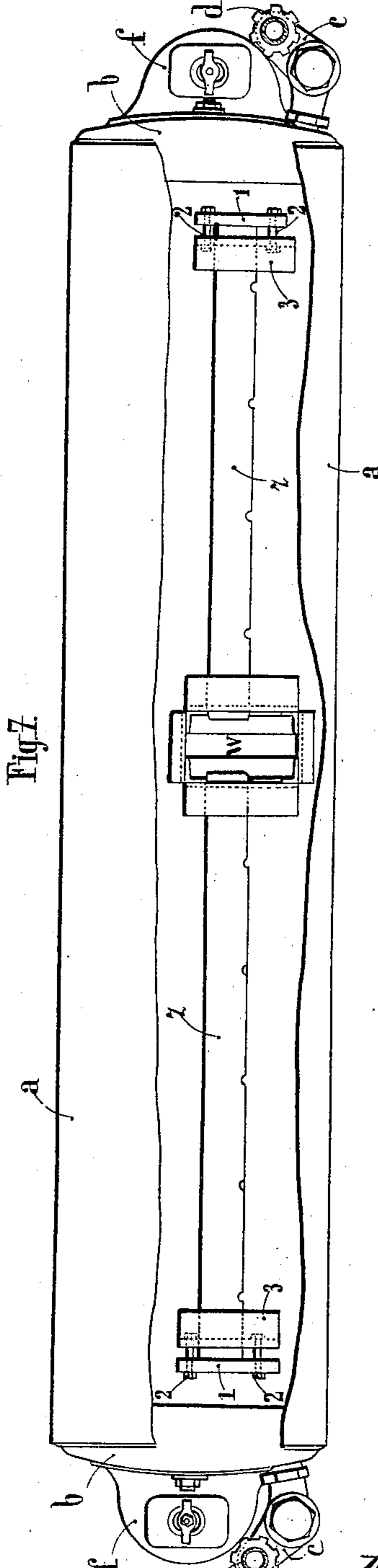
(No Model.)

(Application filed Sept. 5, 1899.)

4 Sheets—Sheet 3.



Witnesses
H. C. Munn
C. D. Keller



Inventor
Louis M. G. Delaunay Belleville
By James L. Norris, Atty

No. 658,245.

Patented Sept. 18, 1900.

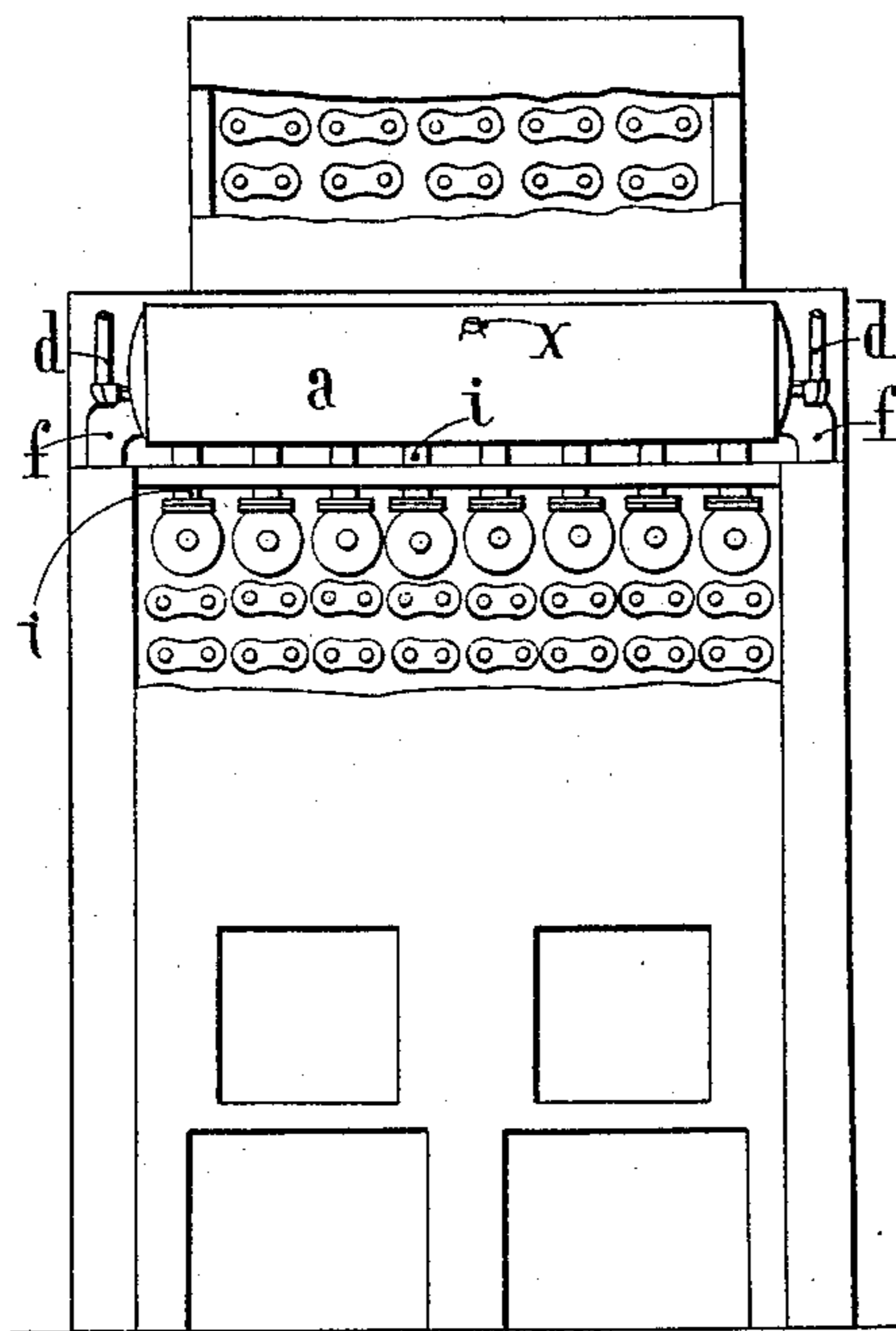
L. M. G. DELAUNAY-BELLEVILLE.
FEED WATER HEATER.

(Application filed Sept. 5, 1899.)

(No Model.)

4 Sheets—Sheet 4.

Fig. 8.



witnesses
H. C. Meyer.
C. L. Hester.

Inventor
Louis M. G. Delaunay Belleville

By James L. Norris.
Atty.

UNITED STATES PATENT OFFICE.

LOUIS MARIE GABRIEL DELAUNAY-BELLEVILLE, OF ST. DENIS, FRANCE.

FEED-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 658,245, dated September 18, 1900.

Application filed September 5, 1899. Serial No. 729,495. (No model.)

To all whom it may concern:

Be it known that I, LOUIS MARIE GABRIEL DELAUNAY-BELLEVILLE, a citizen of the Republic of France, residing at St. Denis, France, have invented certain new and useful Improvements in Feed-Water Heaters and Steam-Purifiers for use in Connection with Steam-Generators, of which the following is a specification.

The object of this invention is to provide a combined steam and feed-water collecting and purifying apparatus for use with steam-boilers, the internal parts of which apparatus can be connected and disconnected with great facility, and it is therefore specially applicable for use with marine boilers.

I will describe the invention with reference to the accompanying drawings, in which—

Figure 1 is a longitudinal vertical section on the line A A B B of Fig. 2. Fig. 2 is a transverse section on the line C C of Fig. 1. Fig. 3 is a front elevation. Fig. 4 is a longitudinal horizontal section on the line D D D E E E E F F F, Figs. 1 and 3. Fig. 5 is a transverse vertical section on the line G G, Fig. 1. Fig. 6 is a transverse section on the line H H of Fig. 1. Fig. 7 is a broken plan showing the steam-inlet. Fig. 8 is a view in front elevation showing the application of the invention to a steam-boiler.

The body *a* of the apparatus is cylindrical and its ends *b* (which should be made of steel) are each provided with a check-valve in the box *b*, which the feed-water enters through a pipe *d*, it passing into the interior of the apparatus through the pipes *e*. Each end *b* has also fitted to it a water-return branch pipe, nozzle, or jet *f*, through which the feed-water flows into the boiler. In each end above the valve-box *c* and the nozzle or jet *f* is provided a hole *g* for inspection, cleaning, and connecting or disconnecting purposes. These holes are closed by means of tight doors or closing devices of any suitable description. Two similarly-closable holes *h* are provided in the side of the body *a*, which body is fitted at its lower part with jets or branch pipes *i*, to the lower ends of which are coupled the steam-producing or vaporizing tubes of the boiler, the upper ends extending into the interior of the apparatus, as shown. Above the upper orifices of the

pipes *i* there is arranged a dome or inverted trough *k*, extending over the whole of the pipes *i*, its object being to deflect downward the mixture of water and steam, which is forced from the boiler into the apparatus through the pipes *i*. This dome or inverted trough *k* is made in parts secured at about the center of the apparatus to a support *m*, common to both and consisting of a bent metal plate attached to the body *a* in any convenient manner. In the drawings, Fig. 2, I have shown the means of attachment as consisting of two angle-pieces *n n*, riveted to the body *a*, the support *m* being preferably in the form of an inverted cup bolted to the angle-pieces *n n* by means of the bolts *o*. Each part of the dome or inverted trough *k* is provided with an extension *p*, which rests upon the support *m* and is secured thereto by bolts *q*. At their opposite ends the said parts of the dome or inverted trough are each provided with an angle-piece *r*, which rests upon a support *s*, riveted to the body-piece *r*, which rests upon a support *s*, riveted to the body part *a*, the bolts *t* serving to retain the dome or inverted trough in position. Each half of the dome or inverted trough *k* consists of two parts connected together by a plate riveted to one and secured to the other by bolts *u*. On either side of the interior of the body part *a* and extending from end to end thereof are two bent metal plates *v*, Fig. 6, riveted to the body *a* and intended to prevent the water deflected down by the dome or inverted trough *k* from rising again along the walls.

In the center of the top part of the apparatus and above the support *m* is tightly riveted the steam-supply chamber *w*, constructed, preferably, of stout steel. *x* is the steam-outlet, to which is secured, by nuts on the screw-bolts *y*, the end of the steam-supply pipe. The steam enters the chamber *w* through two steam-inlet tubes *z*, provided with perforations, as shown in Fig. 7. These tubes *z* are open at one end—viz., the end at which they communicate with the chamber *w*—and they are provided with conical end pieces or couplings, whereby they are tightly secured in the walls of the chamber *w*. The opposite ends of these tubes *z* are closed, they being each provided with a flange, such as 1, which are secured by bolts 2 to angle-pieces

3, riveted to the body part *a*. The joint between the open end of each of the tubes *z* and the walls of the chamber *w* is kept tight by screwing home the bolts 2.

5 The mixture of water and steam which the boiler discharges into the apparatus through the pipes or jets *i* meets the dome or inverted trough *k*, which deflects it downward. The water collects in the lower part of the apparatus
10 while the steam rises to the upper part and enters the steam-supply chamber *w* through the perforations in the tubes *z*, whence it is supplied to the engine. The feed-water may come direct from a tank or any other suitable
15 source of water-supply. The pipes *e*, which are bent to a point in a direction parallel with the axis of the apparatus, are both arranged on the same side of the pipes or jets *i* and divide the feed-water into two currents flow-
20 ing in opposite directions to each other and which at their meeting point are so deflected as to pass over to the other side of the said jets *i* and return toward the ends *b*, mixing, as they do so, with the water forced down by the
25 dome or inverted trough *k* and then passing through the jets *f* into the vaporizing-tubes.

In apparatus constructed or arranged according to my invention the internal parts can be disconnected and removed and re-
30 placed and connected with great facility and without disconnecting or shifting the apparatus itself, because they are retained in place by a small number of bolts or fastenings, which are situated in the vicinity of the inspec-
35 tion-holes.

If either half of the dome or inverted trough *k* when detached cannot be sufficiently inclined to admit of its removal through the corresponding inspection-hole, the fastenings
40 *u* can be removed and the half be again divided.

The principal object of constructing the support *m* in the shape of an inverted cup is to enable it to intercept the current of feed-
45 water if there should be only one inlet for feed-water; but I prefer to use two such inlets, as at *d c e* in the drawings, so that the feed-water can pass unimpeded into the apparatus, even should the temperature of this
50 water happen to be at the time higher than that of the steam.

All accessory parts and details may be varied according to requirements without departing from the nature of my invention.

Having now particularly described and as- 55
certained the nature of my invention and in what manner the same is to be performed, I declare that what I claim is—

1. Apparatus of the character described, comprising a chamber, adapted to conduct 60
the feed-water to the boiler and having steam-pipe connection with the boiler, a water and steam deflector arranged in said chamber, above the feed-water line and contiguously to the upper delivery ends of the pipes of said 65
steam-pipe connection, said pipes also extending above the feed-water line, whereby the water and steam entering through said pipes are deflected or diverted, the water being di- 70
rected into the feed-water chamber, and the steam passing off to the steam-supply, substantially as set forth.

2. Apparatus of the character described, comprising a chamber adapted to conduct the 75
feed-water to the boiler and having steam-pipe connection with the boiler, a water and steam deflector arranged in said chamber, above the feed-water line and contiguously to the upper delivery ends of the pipes of said 80
steam-pipe connection, said pipes also extending above the feed-water line, the steam-supply chamber arranged in the upper part of said first referred-to chamber, above said de- 85
flector, and perforated pipes connected to said steam-supply chamber, substantially as set forth.

3. Apparatus of the character described comprising a cylinder or chamber, having 90
feed-water-pipe connection and steam-pipe connection with the boiler, the feed-water pipes extending into the lower part of said cylinder or chamber, in opposite directions, the deflector, inverted-trough shape and ar- 95
ranged above the feed-water line, the steam-supply chamber arranged in the upper part of said cylinder, and the perforated pipes connected to said steam-supply chamber, the pipes of said steam-pipe connection also ex- 100
tending above said feed-water line, with their upper or delivery ends arranged contiguously to said deflectors, substantially as set forth.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

LOUIS MARIE GABRIEL DELAUNAY-BELLEVILLE.
Witnesses:

EDWARD P. MACLEAN,
NEPPOLYTE JOSSE.