(No Model.) 4 Sheets—Sheet 1.

J. GAMGEE.

STEAM BOILER.

No. 466,780. Patented Jan. 12, 1892.

Fig. 2.

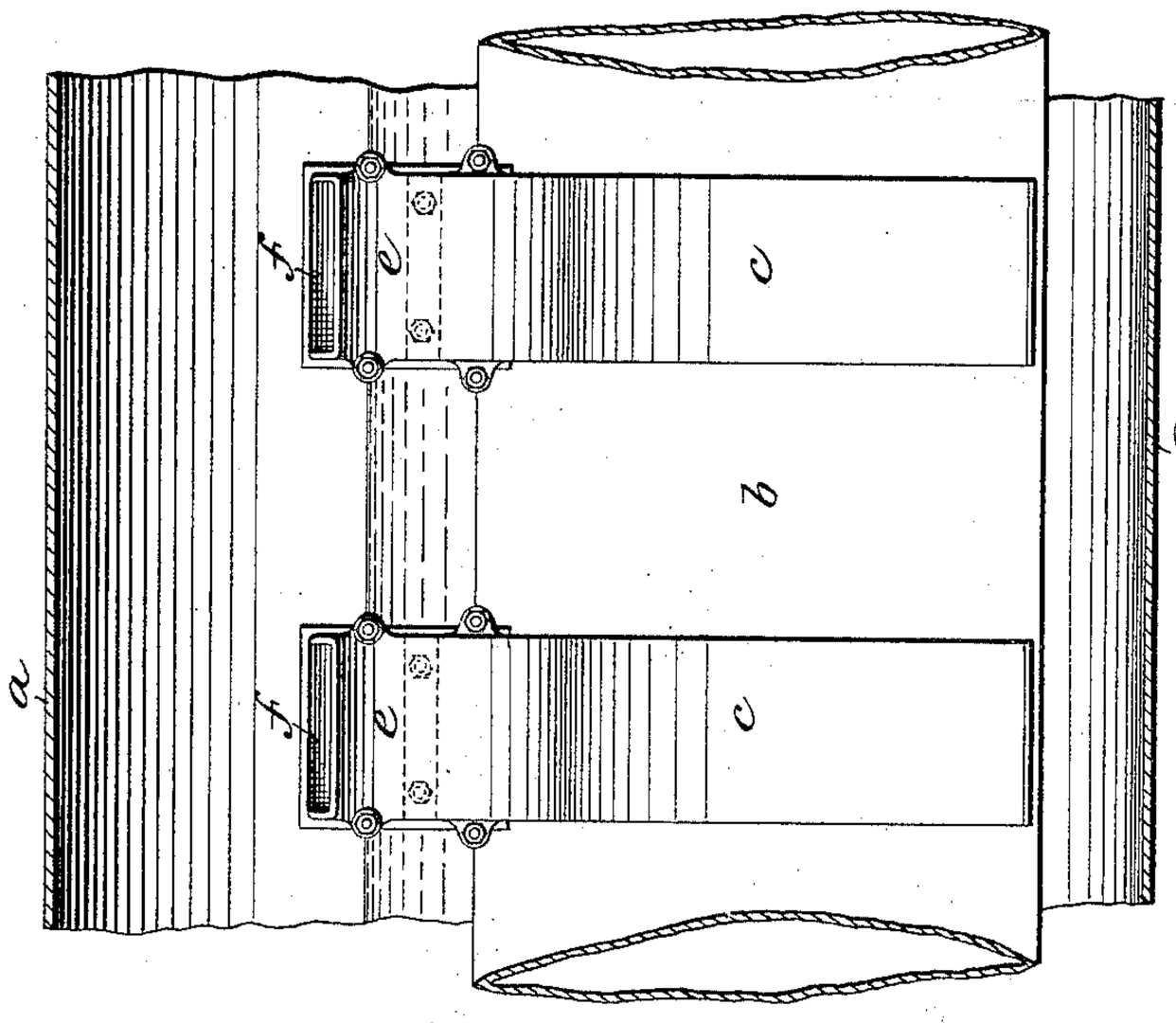
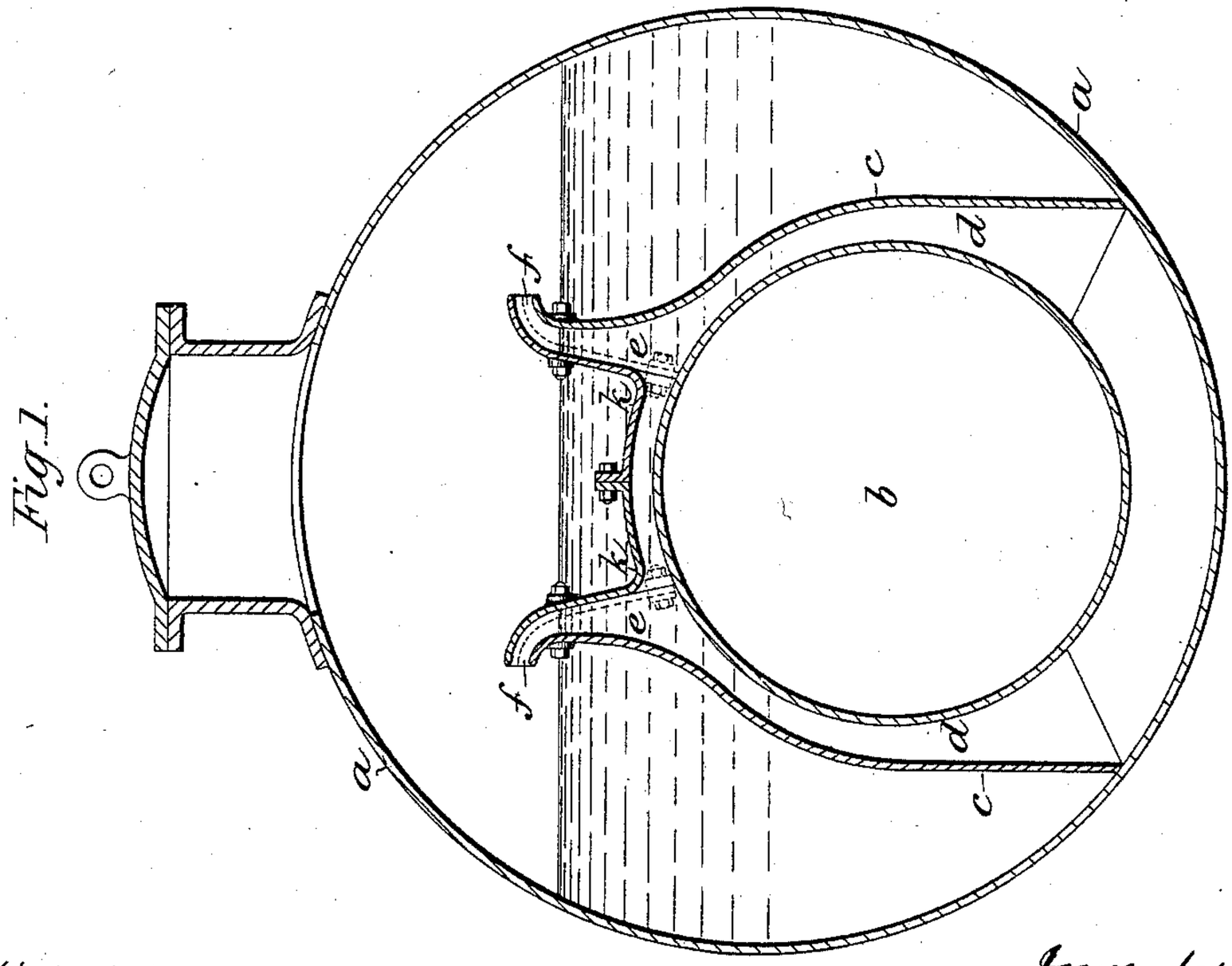


Fig. 1.



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By his Attorneys:
Arthur C. Fraser & Co.

(No Model.)

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STEAM BOILER.

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Fig. 4.

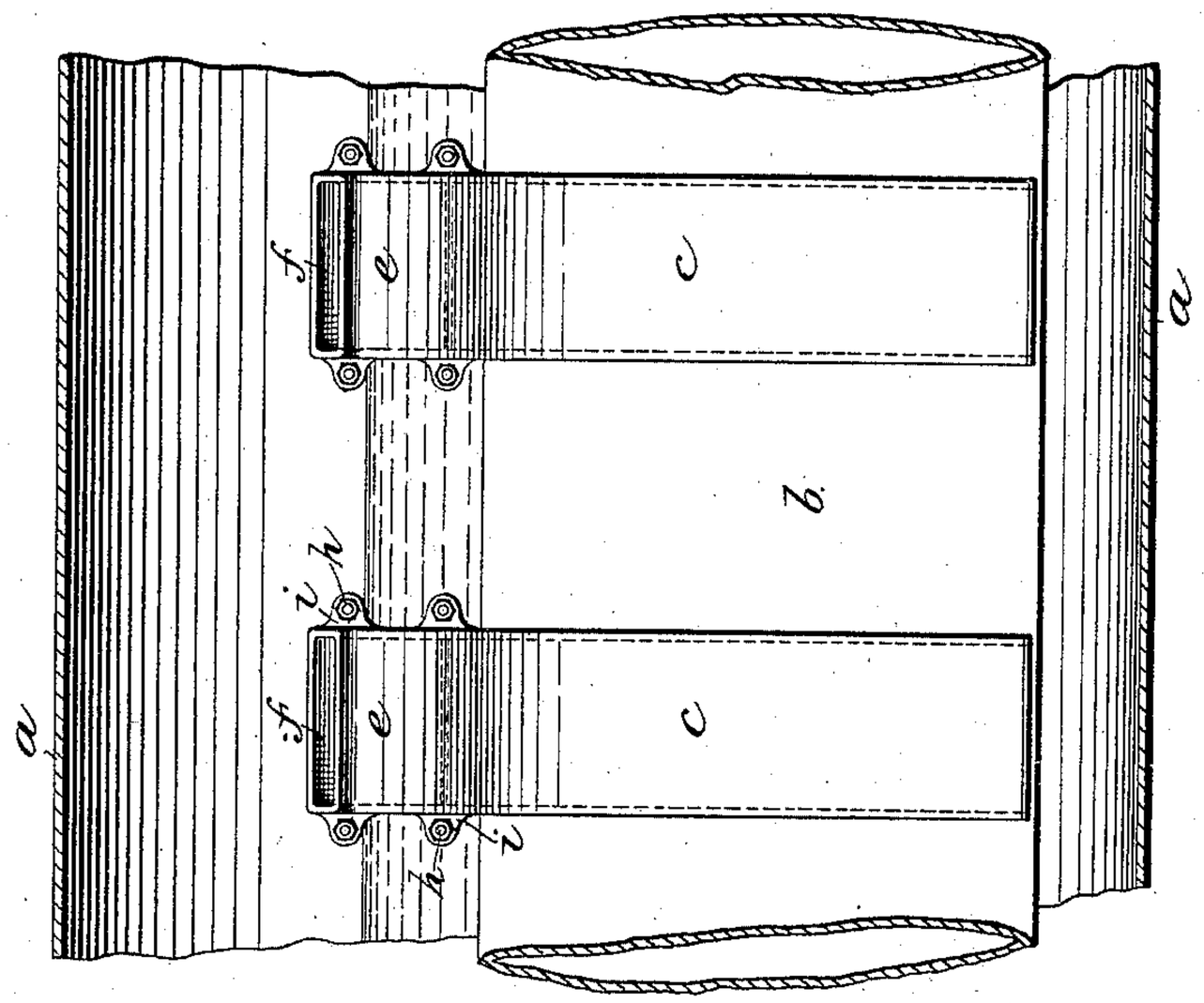
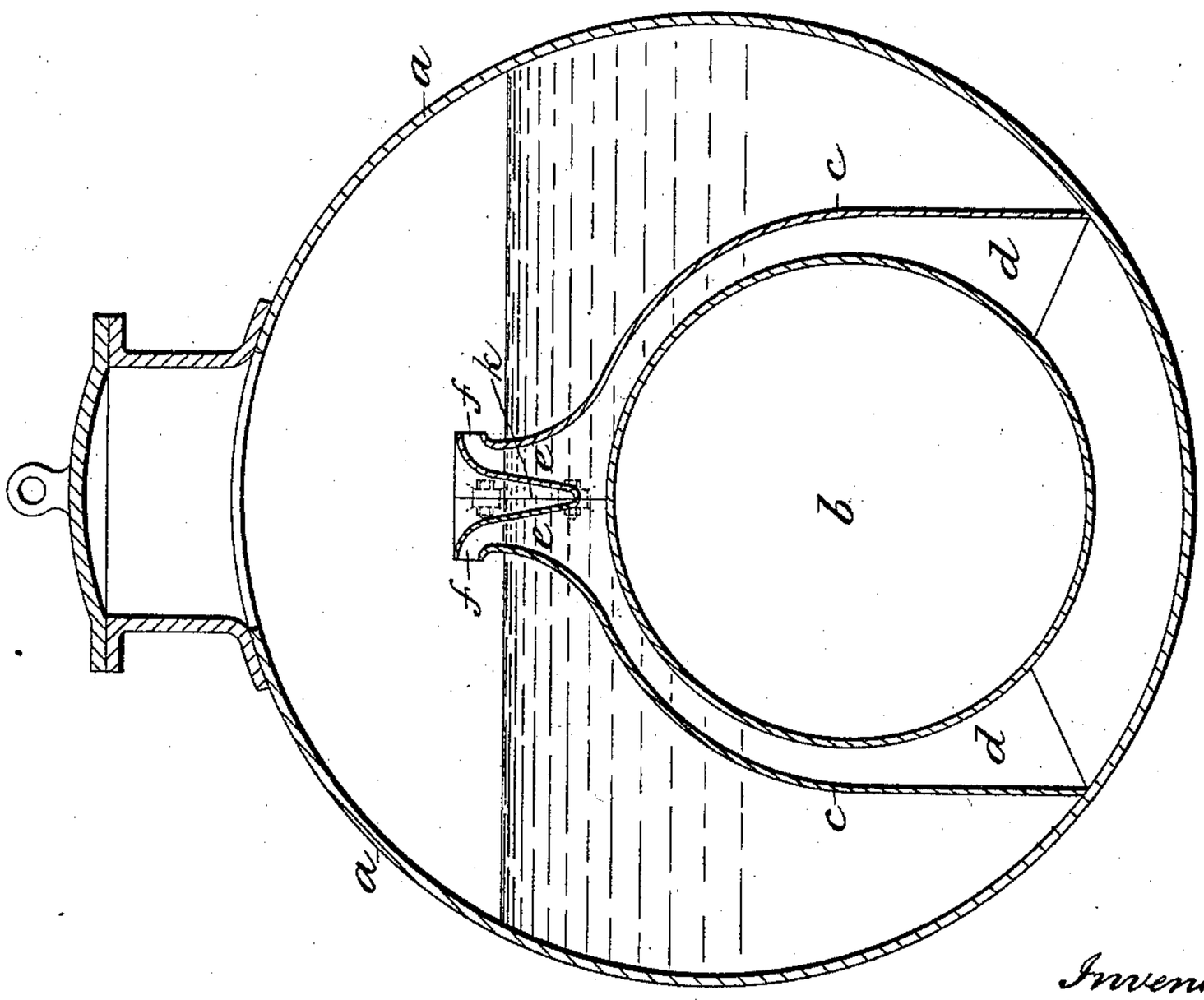


Fig. 3.



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(No Model.) 4 Sheets—Sheet 3.

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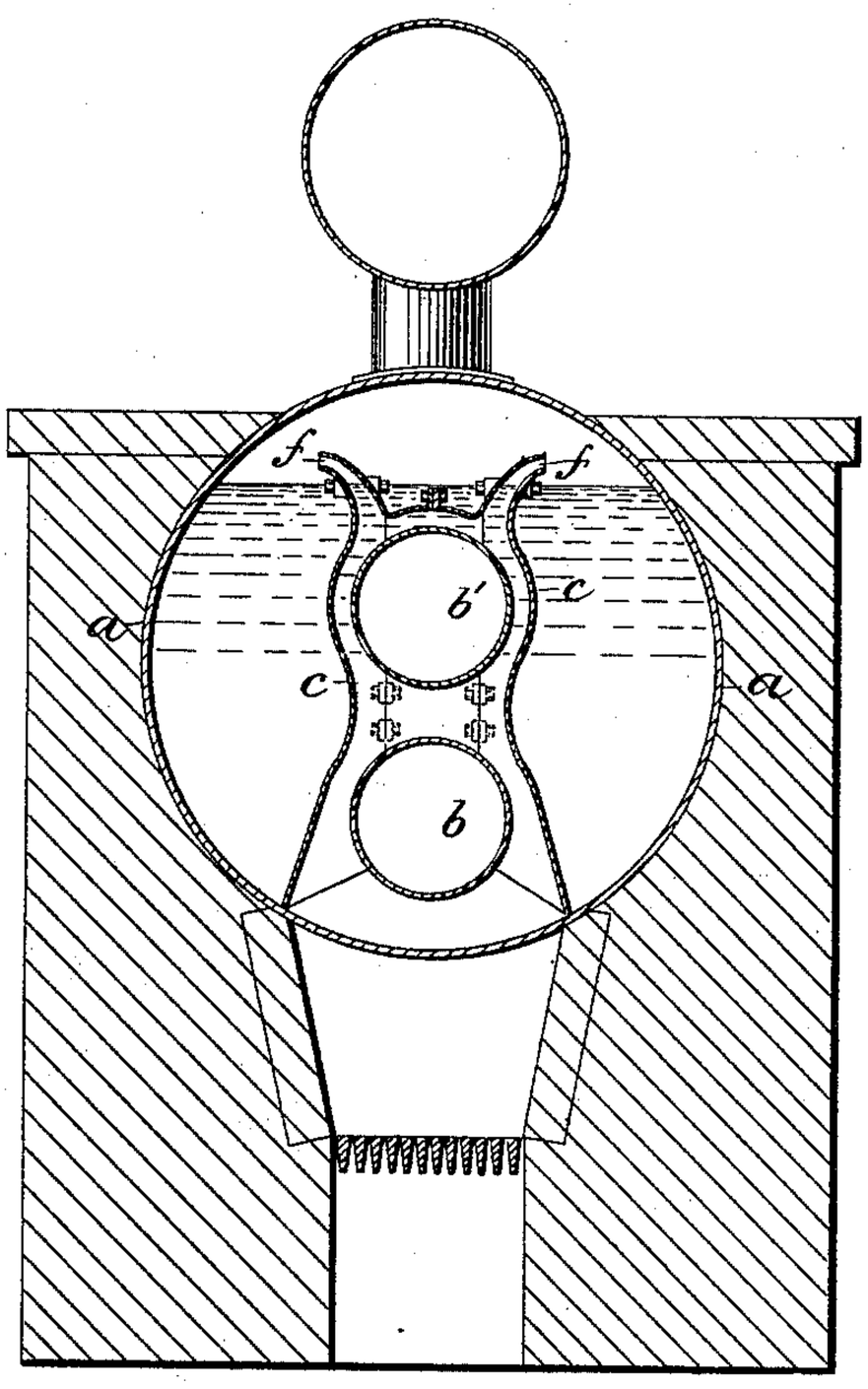
STEAM BOILER.

No. 466,780. Patented Jan. 12, 1892.

Fig. 3.



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4 Sheets—Sheet 4.

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STEAM BOILER.

No. 466,780. Patented Jan. 12, 1892.

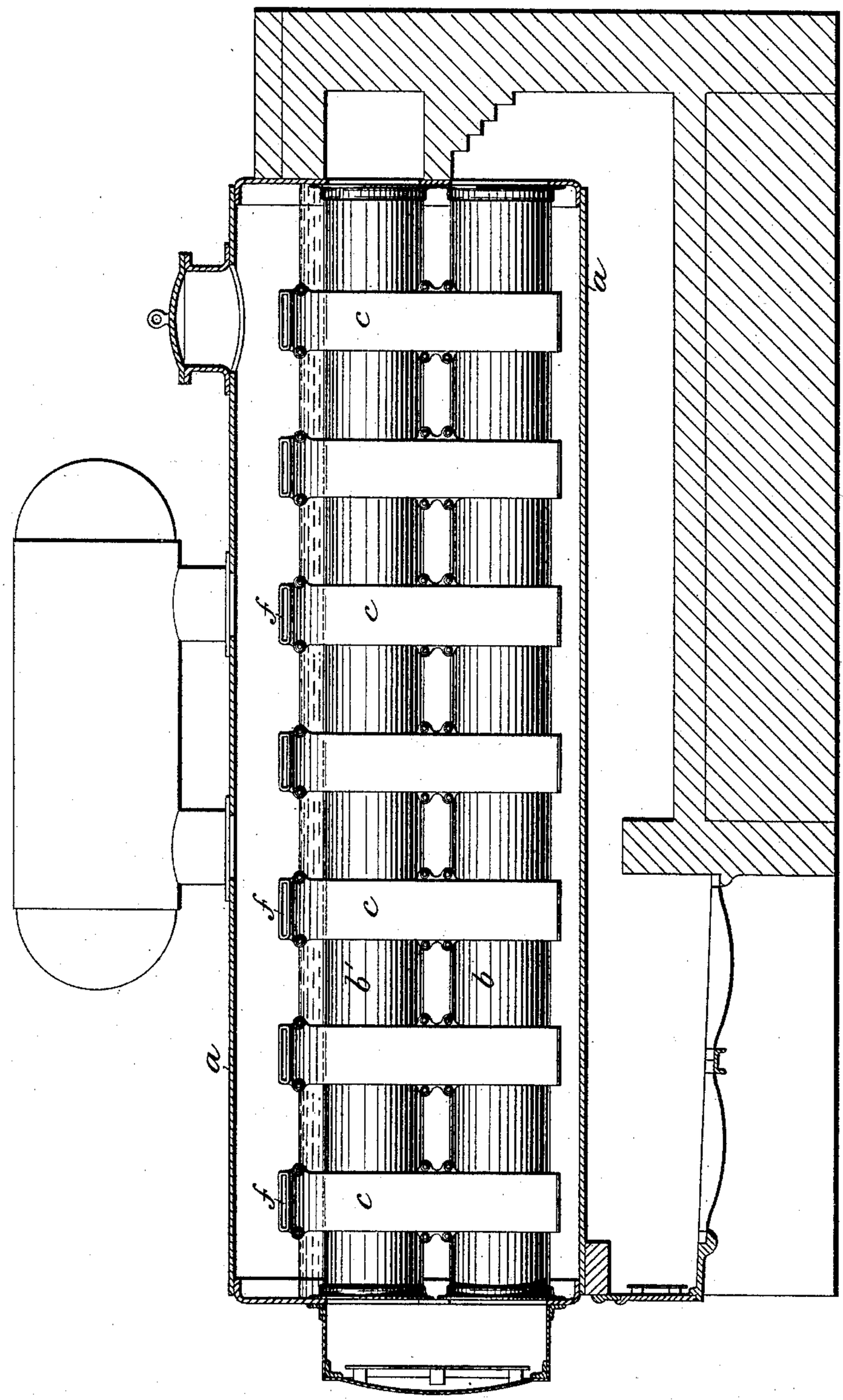

Fig. 6.

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UNITED STATES PATENT OFFICE.

JOHN GAMGEE, OF LONDON, ENGLAND.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 466,780, dated January 12, 1892.

Application filed August 11, 1891. Serial No. 402,338. (No model.)

To all whom it may concern:

Be it known that I, JOHN GAMGEE, of London, England, have invented certain new and useful Improvements in Steam-Boilers, of which the following is a specification.

My invention consists of improvements in steam-boilers, and has special reference to boilers, such as those of the Cornish or Lancashire type, which have one or more internal longitudinal flues, through which the flame and hot gases pass on their way from the furnace to the chimney.

The object of the invention is to cause and maintain a rapid circulation of the water in the boiler in such manner that continuous streams flow from below the flue or flues and are discharged at high velocity through passages of gradually-decreasing sectional area above the level of the main body of water in an approximately horizontal direction.

The invention consists in placing upon the boiler-flue a series of water-circulating saddles, each of which incloses a space between itself and the flue. The saddle is open at bottom to allow water to enter into the said space, and terminates at top in one or more, preferably two, passages of gradually-decreasing sectional area, the two passages (when there are two) by preference pointing in opposite directions. The water from the lower part of the boiler continually rushes up between the saddle and the flue and is discharged in an approximately horizontal direction above the level of the main body of water.

My invention also comprises a special construction or arrangement of the parts of which the said water-circulating saddles are composed, so that they can be readily introduced into the boiler in pieces through a man-hole, and the pieces be then fitted together in place by means of bolts and nuts.

In the annexed drawings, Figure 1 is a transverse section of a boiler constructed in accordance with my invention in its preferred form. Fig. 2 is a longitudinal elevation of a portion of the same, the outer shell of the boiler being in section. Figs. 3 and 4 are views corresponding, respectively, with Figs. 1 and 2, illustrating a modified construction, in which the discharge-passages *e e* are closer together. Figs. 5 and 6 are views corresponding, respectively, with Figs. 1 and 2, illustrating the application of my invention to a boiler having two flues, one above the other.

Referring first to Figs. 1 and 2, *a* is the outer shell, and *b* the internal flue. *c c* are the saddles, each of which incloses a space *d* between itself and the flue. Each saddle terminates at top in two passages *e e* of gradually-decreasing sectional area and having outlets or mouths *f f*, which discharge the water in an approximately horizontal direction above the level of the main body of water in the boiler. The two passages *e e* are placed at some distance apart, being separated by the part *k*, so that the respective deliveries therefrom take place at a considerable distance from each other. The saddle is made up of four main pieces, which are adapted to be readily fixed together by bolts and nuts, after having been introduced separately into the boiler through a man-hole. It will be seen that these four pieces are: two pieces each of which forms one side of the saddle *c* and the outer half of the corresponding discharge-passage *e*, and two pieces each of which forms one-half of the separating-piece *k* and the inner half of the corresponding discharge-passage *e*. They are secured together by bolts and nuts *h h*, the bolts passing through lugs *i i* on the said pieces.

The modified construction shown in Figs. 3 and 4 differs from that shown in Figs. 1 and 2, in that the discharge-passages *e e* are closer together, being separated by the V-shaped piece *k*. The saddles are constructed in halves secured together by the bolts and nuts *h h*.

In Figs. 5 and 6, *b* is the lower flue, and *b'* the upper or return flue, for the flame and gases. The saddles are the same as those shown in Figs. 1 and 2, merely modified in form to enable them to be suitably fitted to the sides of the two flues. The arrangement will be clearly understood from the figures, without further explanation.

When the saddles are constructed with only one discharge-passage *e*, it will be situated at the center of the top of the saddle, and, as in the case when there are two passages, will be of gradually-decreasing sectional area, and discharge the water in an

approximately horizontal direction above the level of the main body of water in the boiler.

What I claim, and desire to secure by Letters Patent, is—

1. In a steam-boiler having one or more internal flues, a series of water-circulating saddles, each of which incloses a space between itself and the flue, each of said saddles being open at bottom and having at top an outlet-passage of gradually-decreasing sectional area, and adapted to discharge the water in an approximately horizontal direction above the level of the main body of water in the boiler, substantially as set forth.

2. In a steam-boiler having one or more internal flues, a water-circulating saddle, which incloses a space between itself and the flue, said saddle having at bottom a large open end and having at top an outlet-passage of less sectional area than said open end at bottom, and said saddle constructed of gradually-decreasing sectional area between said bottom opening and said outlet, substantially as set forth.

3. In a steam-boiler having one or more internal flues, a water-circulating saddle, which incloses a space between itself and the flue, said saddle being open at bottom and having at top two oppositely-directed passages, each directed outwardly from the side of the flue over which it stands, arranged in the same plane and adapted to discharge the water approximately horizontally in opposite directions above the level of the main body of water in the boiler, substantially as and for the purpose set forth.

4. A water-circulating saddle for the flue of an internal-flued boiler, said saddle having two passages of gradually-decreasing sectional area, adapted to discharge the water approximately horizontally in opposite directions above the level of the main body of the water in the boiler, constructed of two pieces, each of which constitutes one side of the saddle and the outer half of the corresponding discharge-passage, and two pieces bolted thereto and to each other, each of which constitutes one-half of a separating-piece between the two passages, and the inner half of the corresponding discharge-passage, substantially as and for the purpose set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JOHN GAMGEE.

Witnesses:

JOHN C. NEWBURN,

GEORGE C. BACON.