

W. BARAGWANATH.
Feed-Water Heater.

No. 209,105.

Patented Oct. 22, 1878.

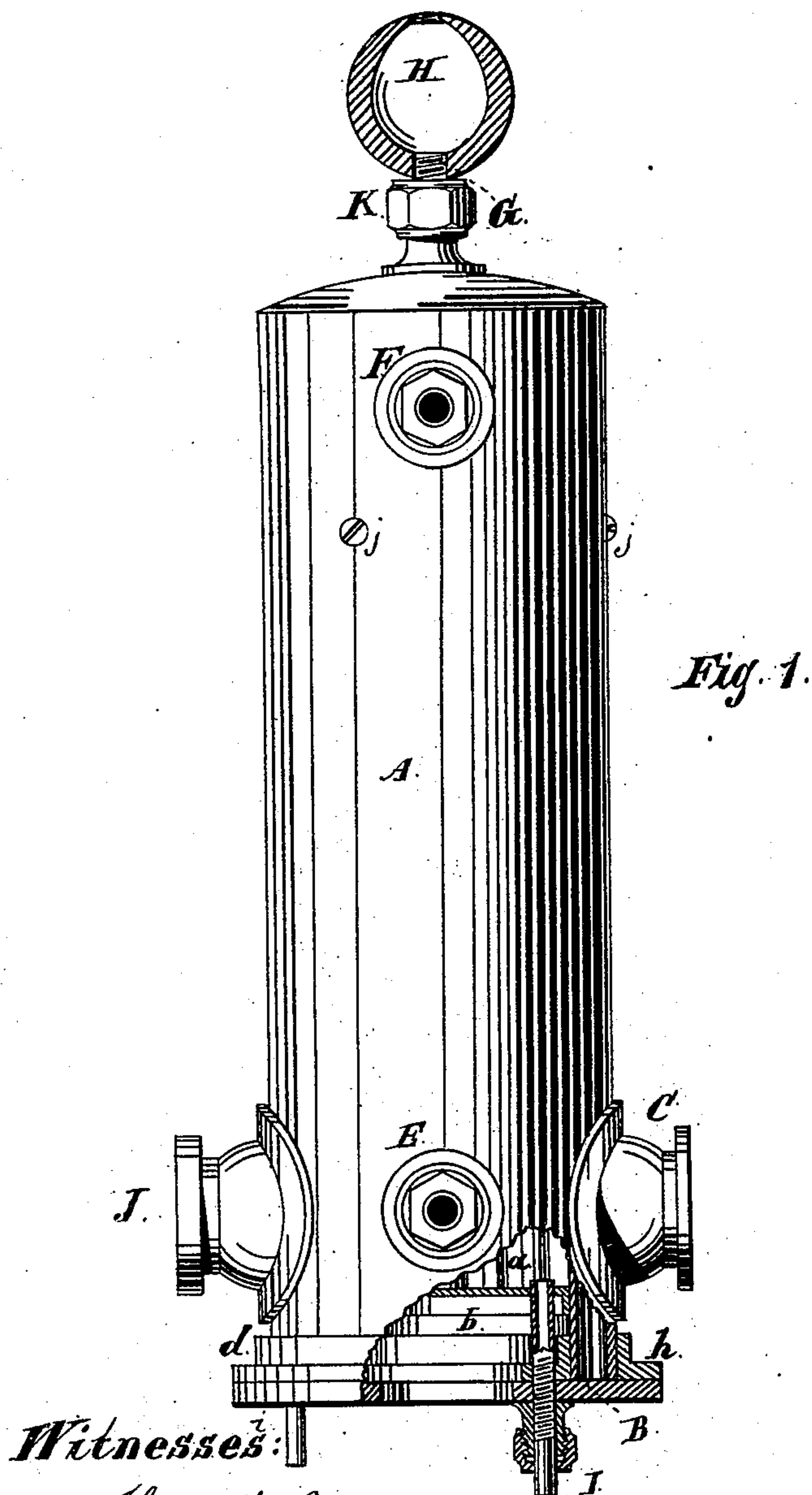


Fig. 1.

Witnesses:

Heinr. F. Bann.
Q. W. Bond.

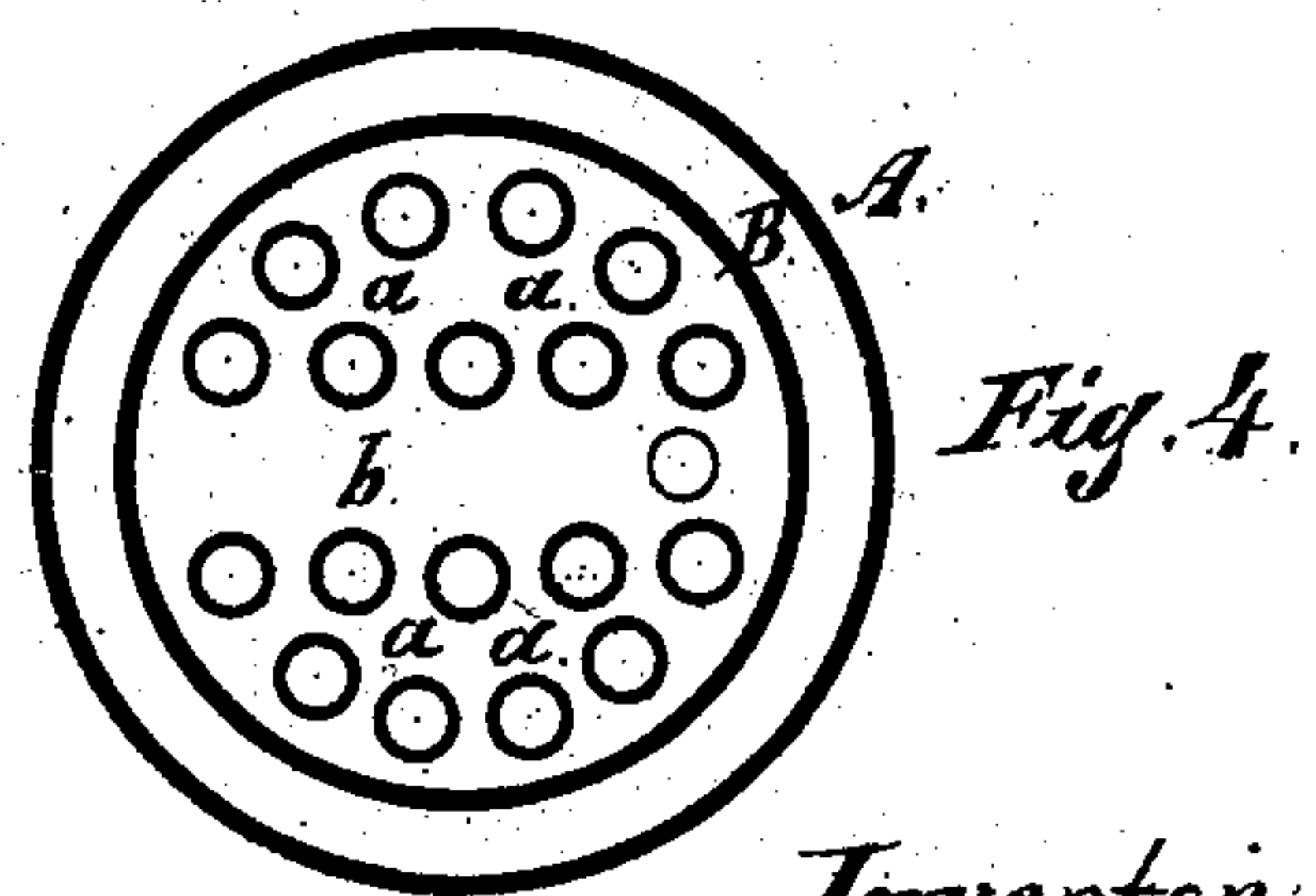
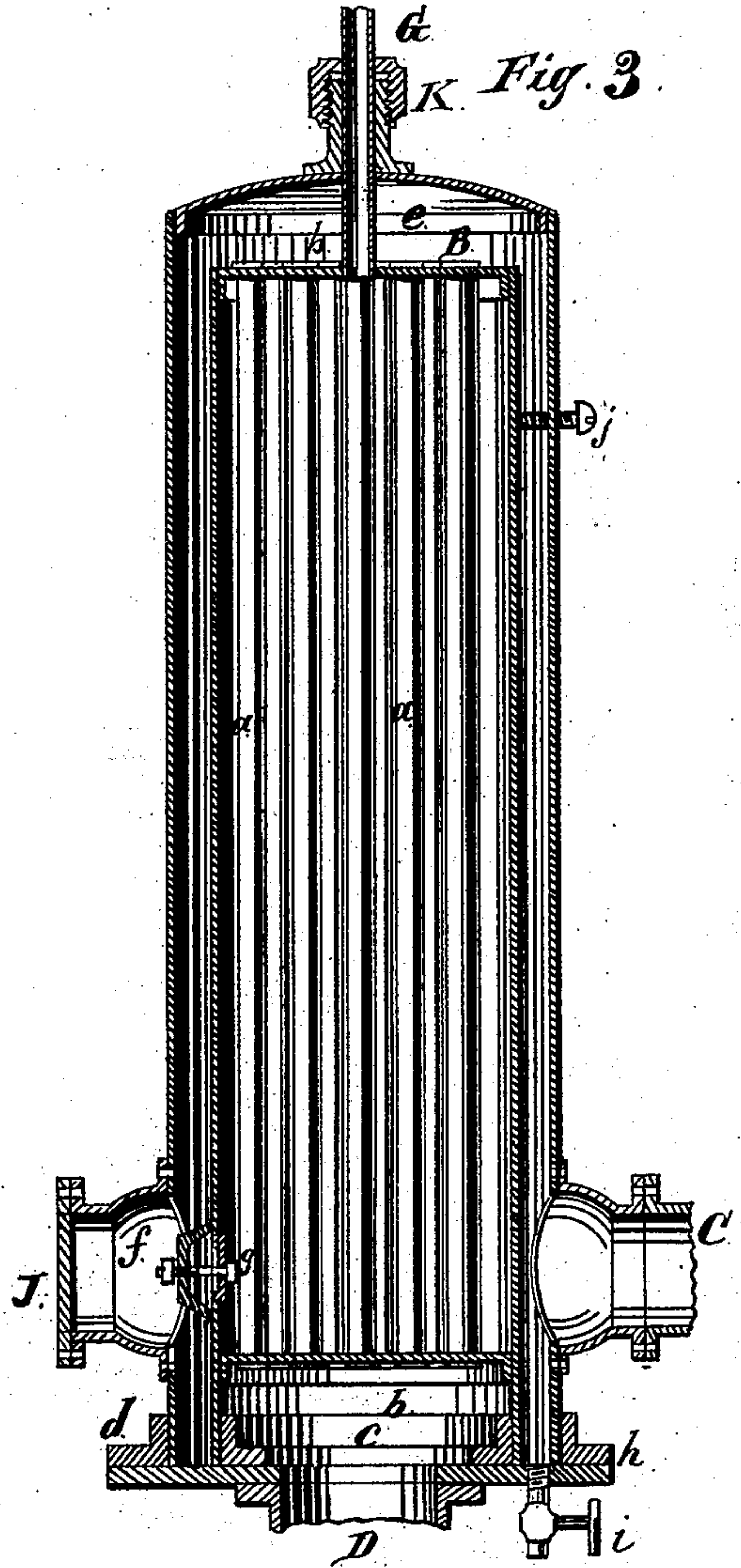
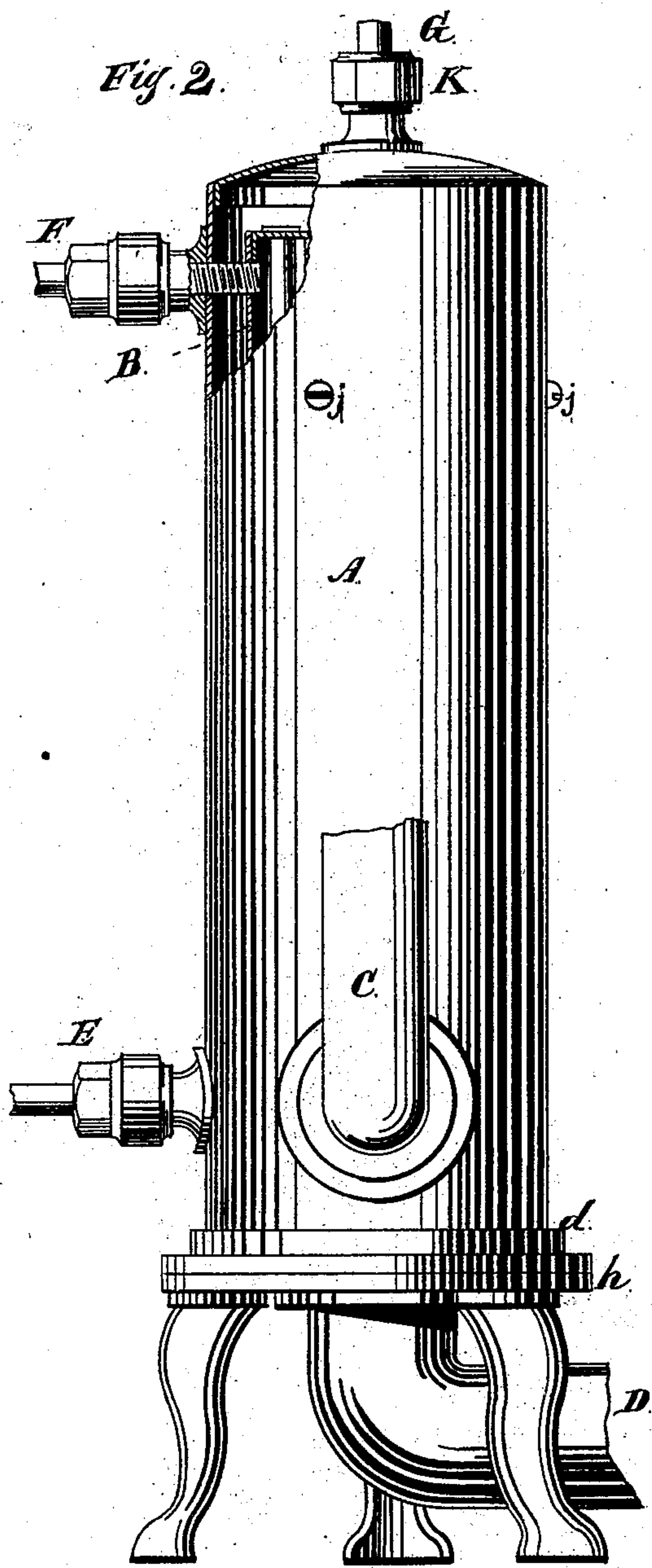
Inventor:

William Baragwanath.

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Witnesses:

Heinr. F. Peters.
C. W. Bond

Inventor:

William Baragwanath

UNITED STATES PATENT OFFICE.

WILLIAM BARAGWANATH, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN FEED-WATER HEATERS.

Specification forming part of Letters Patent No. **209,105**, dated October 22, 1878; application filed January 9, 1878.

To all whom it may concern:

Be it known that I, WILLIAM BARAGWANATH, of Chicago, in Cook county, State of Illinois, have invented certain new and useful Improvements in Feed-Water Heaters, of which the following is a full description, reference being had to the accompanying drawings, in which—

Figure 1 is an elevation with a portion broken away at the bottom. Fig. 2 is an elevation partly broken away at the top, and with the scum-chamber removed; Fig. 3, a central vertical section of the same; Fig. 4, a plan view of an end plate of the interior cylinder.

The object of my invention is to improve the construction and operation of feed-water heaters; and its nature consists in surrounding the water-chamber, through which the steam pipes pass, with a close jacket or case, whereby the body of the heater is enveloped in steam and converted into a heating-surface; in providing the water-pipes with stuffing-boxes; in the arrangement of the devices for cleaning the water-cylinder; in providing a scum-chamber for the removal of the scum; in providing a pipe for the removal of the sediment and dirt from the bottom of the cylinder; and in the combinations of parts hereinafter more fully described.

In the drawings, A represents the outer case or jacket; B, the inner case or water-cylinder; C, the escape-steam pipe or passage; D, the inlet-pipe for exhaust-steam; E F, water-pipes; G, the pipe connecting the water-cylinder with the scum-chamber; H, the scum-chamber; I, the sediment pipe or draw-off; J, a short pipe or nozzle, capped, for access to the hand-plate *g*; K, the stuffing-boxes for the pipes; *a a*, steam-pipes passing through the water-cylinder; *b b*, end plates of water-cylinder; *c*, inner angle-iron; *d*, outer angle-iron; *e*, top plate of outer case; *f*, bridge and bolt for securing the hand-plate; *g*, hand-plate; *h*, base-plate; *i*, valve or cock for discharging the water of condensation; and *j*, set-screws for holding the water-cylinder in position at the upper end.

The heater is constructed in two principal parts, the outer case, A, and the heater proper, B. The heater B, in its best form, is cylindrical, and is provided with heads *b b*, the lower

one being set up, as shown, so as to form a steam chamber or space between it and the base-plate. These heads *b b* are secured to the cylinder by rivets or bolts in the usual manner. Secured to these heads are a number of steam-pipes, *a a*, the number and size depending on the size of the heater, which pipes pass through the entire length of the water-space in the cylinder B, and permit the passage of steam from the lower steam-chamber to the upper steam-chamber, or space formed between the upper head and the head *e* of the outer case.

The inner cylinder, B, is provided with a hand-plate, *g*, located near the lower head, for cleaning the heater, which is held in place by the bridge and bolt *f*; and in order to facilitate such cleaning it will be found advantageous to arrange the pipes or flues *a* with a clear space between them, as shown at Fig. 3, such space being in line with the opening J and the hand-hole covered by the plate *g*.

The inner cylinder, B, is secured to the base-plate *h* by means of the angle-iron *c*, and is held in position at its upper end by means of the set-screws *j*, so that in setting, handling, or rolling the heater the inner cylinder cannot get out of place.

The outer cylinder, A, is secured to the base-plate *h* by means of the angle-iron *d*, or by other suitable means. The outer cylinder or case, A, is made larger and longer than the cylinder B, or the heater proper, so as to leave a sufficient space between them to envelop the heater with steam. This outer case, A, is provided with suitable openings for the attachment of the escape-pipe C and the nozzle or enlargement J, and also for the passage of the water-pipes E F.

The water-pipes E F and the pipe G, leading to the scum-chamber H, are provided with stuffing-boxes, constructed as shown at K, Fig. 2. The other pipes are attached in the usual manner. The scum-chamber H is preferably of a spherical form, as shown, but other forms may be used. This chamber H is attached to the upper end of the pipe G, the lower end of which pipe enters the upper end of the water-chamber B, as shown in Fig. 3, the end of the pipe passing just through the plate *b*.

The inside of the scum-chamber is formed, preferably, in an egg or acorn shape, the apex being at the upper end of the chamber, as shown in Fig. 1. This construction of the inside of the chamber is the best, as it will insure the forcing of the scum to the apex, so as to facilitate the blowing off thereof. The inside of the chamber may be spherical or in other forms, and perform its work in a successful manner.

The pipe I has its inner end located in the bottom of the chamber B, and passes from such chamber through the base-plate *h*, and is provided at its outer end with a suitable blow-off cock. (Not shown.) A stuffing-box is also provided for this pipe I after it passes through the base-plate *h*.

A suitable valve or cock, *i*, is to be provided, communicating with the space between the inner and outer cylinders, for taking off the water of condensation.

The proportions of the completed heater will be varied according to the size of the boilers with which they are to be used, and according to the location or peculiar surroundings, which will also somewhat vary the location of the pipes, and the whole will be supported on legs or other suitable support.

I have described my heater as cylindrical, but any other suitable form may be used.

In operation, the exhaust-steam passes from the pipes D into the lower chamber, then through the pipes or flues *a* into the upper chamber or space, then down the space between the cylinder A B, and out at the pipe C. The water is forced by the pump through the pipe E into the cylinder or heater B, where it is heated, and passes from the heater to the boiler through the pipe F, both water-pipes E F being furnished with ordinary or suitable valves. The water may be forced through the heater into the boiler by the direct action of the pump, or the heater may be used in connection with an injector.

As the water is heated in the cylinder B the scum and other light particles will rise to the top of the cylinder, from which they will pass into the scum-chamber H through the pipe G, and from the scum-chamber the deposit can be carried off by means of a suitable blow-off or pipe (not shown) attached to the opening in the top of the chamber H, so that the scum will be removed from the upper end of the water-chamber, keeping the water clear and clean.

The heavy particles of dirt and sediment contained in the water will sink to the bottom of

the cylinder B, from whence they can be taken off through the pipe I. By this arrangement of the scum-chamber H and pipe I all the sediment, scum, grit, &c., will be removed from the water before it enters the boiler, thereby preventing to a great extent the incrustation of the boiler.

The complete enveloping of the heater proper by steam enables me to heat the water much quicker, and to maintain a higher degree of temperature in the heater than can be maintained by any other heater known to me.

It is evident that the operation of the steam-pipes can be reversed, and that the steam may enter at C and pass up between the two cylinders A B, thence down through the pipes *a*, and out at D.

This form of water-heater may be used on a boat, in which case the heater is turned on its side, with the pipe E at the bottom. When used for a boat the scum-chamber H is to be omitted, in which event the pipe G may be used for a safety-valve, an ordinary T-head and a valve being added to the pipe G; or the pipe G may be omitted altogether, if desired. When the heater is used on a boat the upper head, *e*, of the cylinder A is to be provided with flanges for securing it to the cylinder, so that the head *e* can be removed for the purpose of cleaning or repairs.

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

1. The hand-plate *g*, in combination with the cupped opening *f* J, pipe-space *b*, and cases or cylinders A B, substantially as described.

2. The combination of the case A, case or cylinder B, having one or more pipes or flues, with the lower steam-chamber and the steam-pipes D C, both located and operating at or near the bottom, substantially as specified.

3. The combination of the heater B and water-pipes E F with the case A, flues *a a*, and pipes C D, arranged to force the steam up through the pipes and around between the cases, substantially as and for the purposes specified.

4. The combination, in a feed-water heater, of the heater B with an outer case or jacket and a scum-chamber, substantially as set forth.

5. In a water-heater, the scum-chamber H, in combination with the water-cylinder B, for removing the scum from the upper part of the of the heater, substantially as specified.

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Witnesses:

O. W. BOND,
H. F. BRUNS.