

GILBERT BRADFORD.

Improvement in Steam-Engines.

No. 115,928.

Patented June 13, 1871.

FIG. 1.

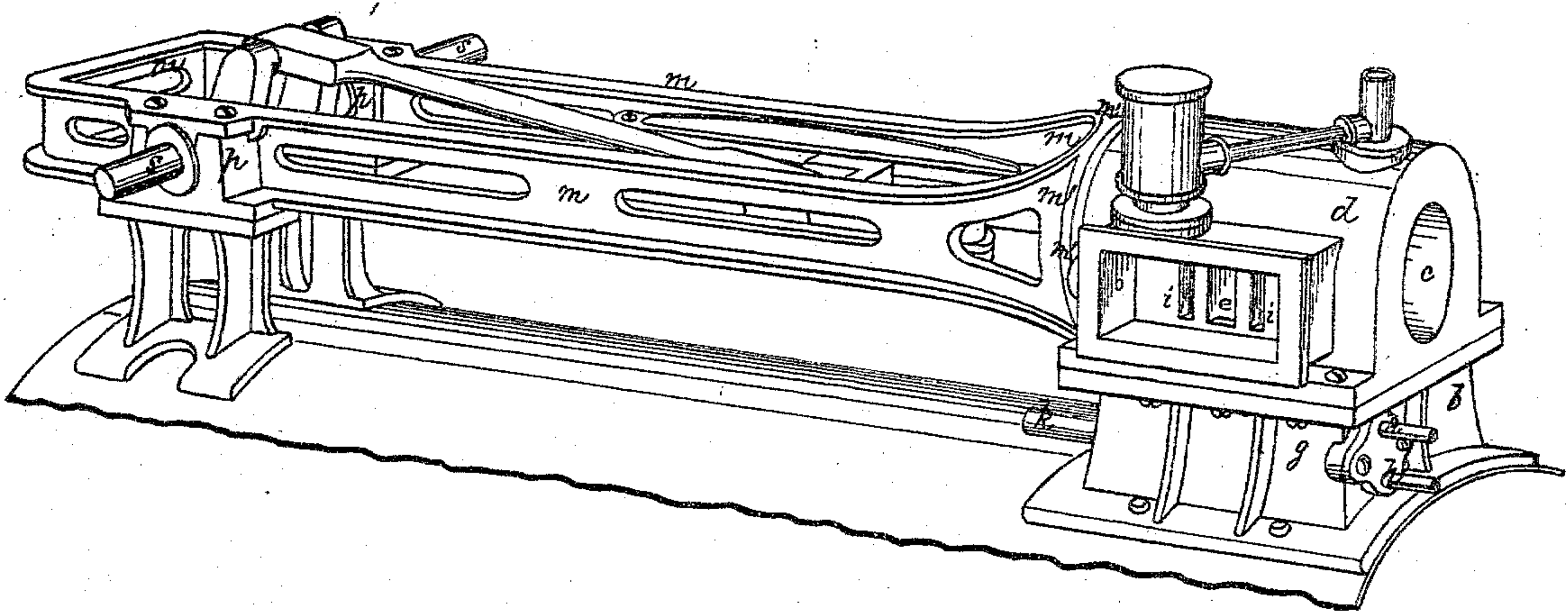
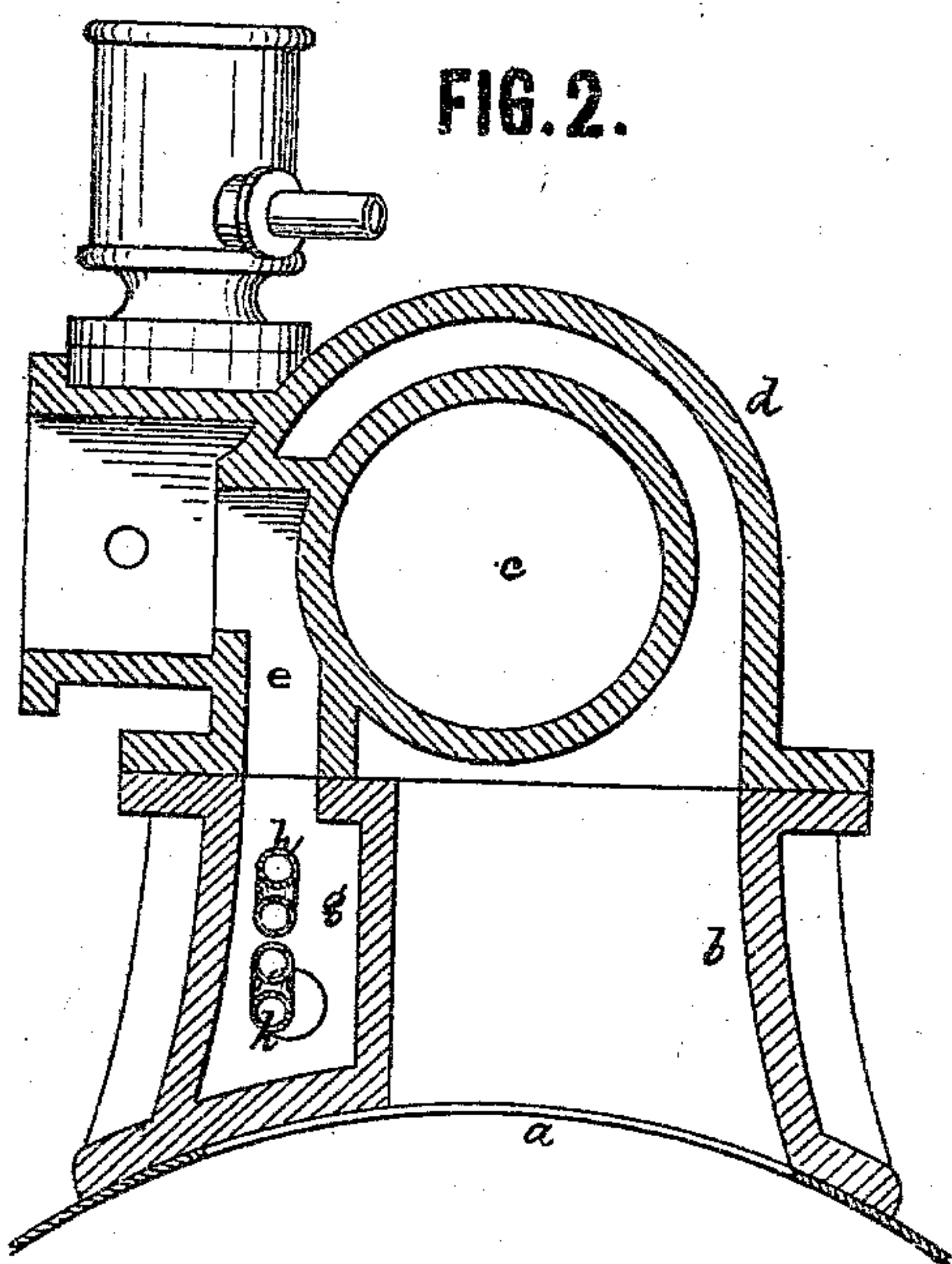


FIG. 2.



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UNITED STATES PATENT OFFICE.

GILBERT BRADFORD, OF WATERTOWN, NEW YORK, ASSIGNOR TO THE PORTABLE STEAM-ENGINE AND MANUFACTURING COMPANY, OF SAME PLACE.

IMPROVEMENT IN STEAM-ENGINES.

Specification forming part of Letters Patent No. 115,928, dated June 13, 1871.

To whom it may concern:

Be it known that I, GILBERT BRADFORD, of Watertown, in the county of Jefferson and State of New York, have invented certain new and useful Improvements in Steam-Engines, of which the following is a specification:

My invention consists, first, in the arrangement of the steam-cylinder within the steam-dome of the boiler, substantially as hereinafter shown and set forth. Second, in the construction of the steam-dome of the boiler in two parts or sections, the upper section containing and being united with the steam-cylinder. Third, in the combination of the steam-cylinder with the base of the steam-dome and the boiler under the arrangement, substantially as hereinafter shown and set forth, whereby the base of the dome forms at once a part of the man-hole of the boiler and a foundation for one end of the engine, and can be uncovered to open the man-hole into the boiler by removing the cylinder. Fourth, in the arrangement of the steam-dome of the feed-water heater, substantially in the manner hereinafter described. Fifth, in the combination of the steam-cylinder and the pillow-blocks of the crank-shaft with a connecting-frame extending directly between the pillow-blocks and cylinder-head, so that it will receive the strain in a direct line, and will not be deflected by the action of the engine.

To enable those skilled in the art to understand and use my invention, I will proceed to describe the manner in which the same is or may be carried into effect by reference to the accompanying drawing, in which—

Figure 1 is a perspective view of the steam-dome, cylinder, pillow-blocks, and connecting-frame, together with a part of the horizontal boiler upon which said parts rest. Fig. 2 is a transverse vertical section of the steam-dome and cylinder through the central or exhaust-port of the cylinder.

My invention has special reference to portable steam-engines and other engines in which the parts are required to be arranged as compactly as possible, and I prefer that arrangement of the engine by which it is placed upon the top of a horizontal boiler, as indicated in the drawing.

A suitable opening, *a*, is formed in the top

of the boiler over the fire-box, and over this opening is placed the base *b* of the steam-dome, through which free access can be had to the water-surface of the "crown-sheet," tubes, and fire-box of the boiler. Over the base *b* is placed the steam-cylinder *c* of the engine, which may be provided with flanges or other suitable appliances to fit the flange on the top of the base *b*, the contiguous faces being ground in order to make a tight joint when bolted together. The steam-cylinder can thus be made to close the dome, while the latter not only serves as part of the man-hole of the boiler, but also as a foundation to support one end of the engine. The man-hole is readily opened by separating the ground-joint above referred to and removing the cylinder. I prefer, however, to arrange the steam-cylinder within the dome, or to incase it in a jacket or covering which forms the upper part of the dome, the cylinder being thus surrounded by steam. I am in this way enabled to avoid condensation in the cylinder and steam-pipes, preventing in great measure the pounding, strain, and breakage occasioned by water in the cylinder, which is so injurious to the engine and does so much toward destroying it. The cylinder-case, which may be termed the upper part of the dome, is represented at *d* united with the lower section or base *b* by a ground-joint, and allowing steam to circulate around the cylinder. On one side of the upper section is the valve-chest *f*, provided with the usual cylinder and exhaust-ports *i i* and *e*. Within the space inclosed by the base of the dome I place the feed-water heater *h*, which is arranged in a chamber, *g*, shut off from the steam-space of the dome, but communicating with the exhaust-port *e*, as indicated clearly in Fig. 2, so that the exhaust steam shall be brought in contact with and impart heat to the coil or other suitable heating apparatus *h* before passing out through the exhaust-pipe *k*. Thus the heater-pipes, incased within the dome, are entirely secure from frost, while they are still acted on as hitherto by the exhaust steam. The pillow-blocks *p* of the crank-shaft *s* are connected with the cylinder by a metallic frame, *m*, which is connected centrally with said cylinder and blocks—that is to say, extends directly between the pillow-blocks and cylinder-head,

which it connects, as shown in Fig. 1, the frame at one end being bolted to the cylinder-head and at the other end secured to the pillow-blocks. The frame, which may be called a skeleton frame, consists of the side pieces *m*, which connect at one end with the pillow-blocks, and at the other end are cast in one piece, or otherwise united with a ring or annular frame-piece, *m'*, which has the same diameter or nearly the same as the cylinder-head, and is bolted thereto. The side pieces are diametrically opposite each other, and the whole frame thus constructed combines lightness with solidity, besides possessing the advantage of receiving in a direct line the strain from the working of the piston and crank, so that it will not be liable to deflection from the action of the engine.

I have described only so much of the engine and boiler as needed in order to fully explain my invention, and it will be understood that the other parts of the engine or boiler may be constructed in any ordinary or suitable manner.

Having now described my invention and the manner in which the same is or may be carried into effect, what I claim, and desire to secure by Letters Patent, is—

1. The arrangement of the engine-cylinder within a sectional steam-dome forming part of

the man-hole of the boiler, substantially as shown and set forth.

2. The steam-dome, constructed in two sections, the upper of which contains the steam or engine-cylinder, substantially as herein shown and set forth.

3. The combination of the steam-cylinder with the base of the steam-dome and the boiler, substantially in the manner herein shown and described, whereby the base of the dome forms at once a part of the man-hole and a foundation for one end of the engine, and can be uncovered to open the man-hole into the boiler by removing the cylinder or the dome portion inclosing it.

4. The feed-water heater, arranged within a chamber in the steam-dome, substantially as shown and described.

5. The combination of the heater with an inclosing-chamber formed in the base of the dome, and communicating with the steam-cylinder exhaust under the arrangement shown and described.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

GILBERT BRADFORD.

Witnesses:

EDM. F. BROWN,
WM. H. MCCABE.