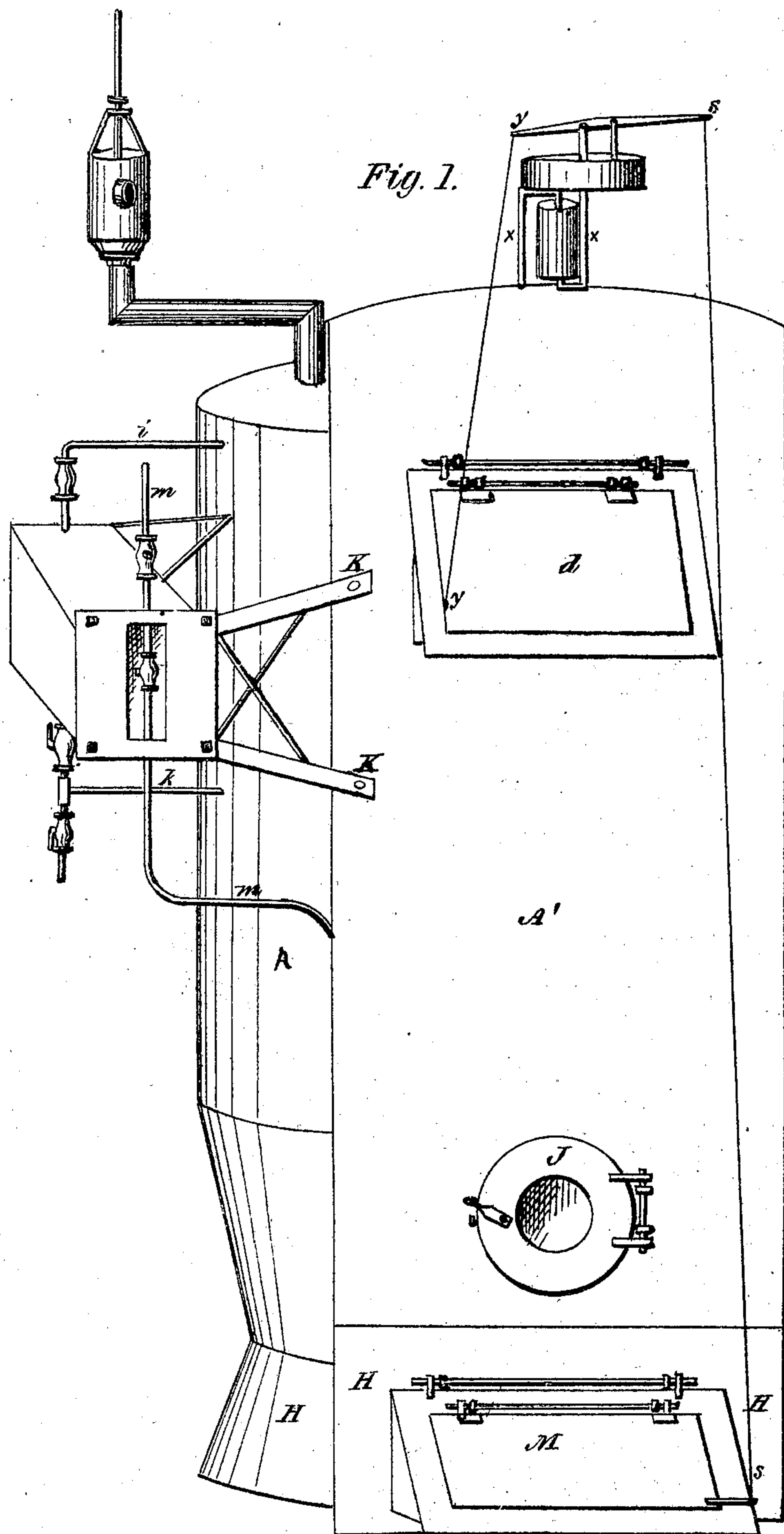


JACOB F. HAYEN.

Improvement in Steam Boilers.

No. 120,516.

Patented Oct. 31, 1871.



Witnesses.

James Winkler
Adolph Meyer

Inventor.

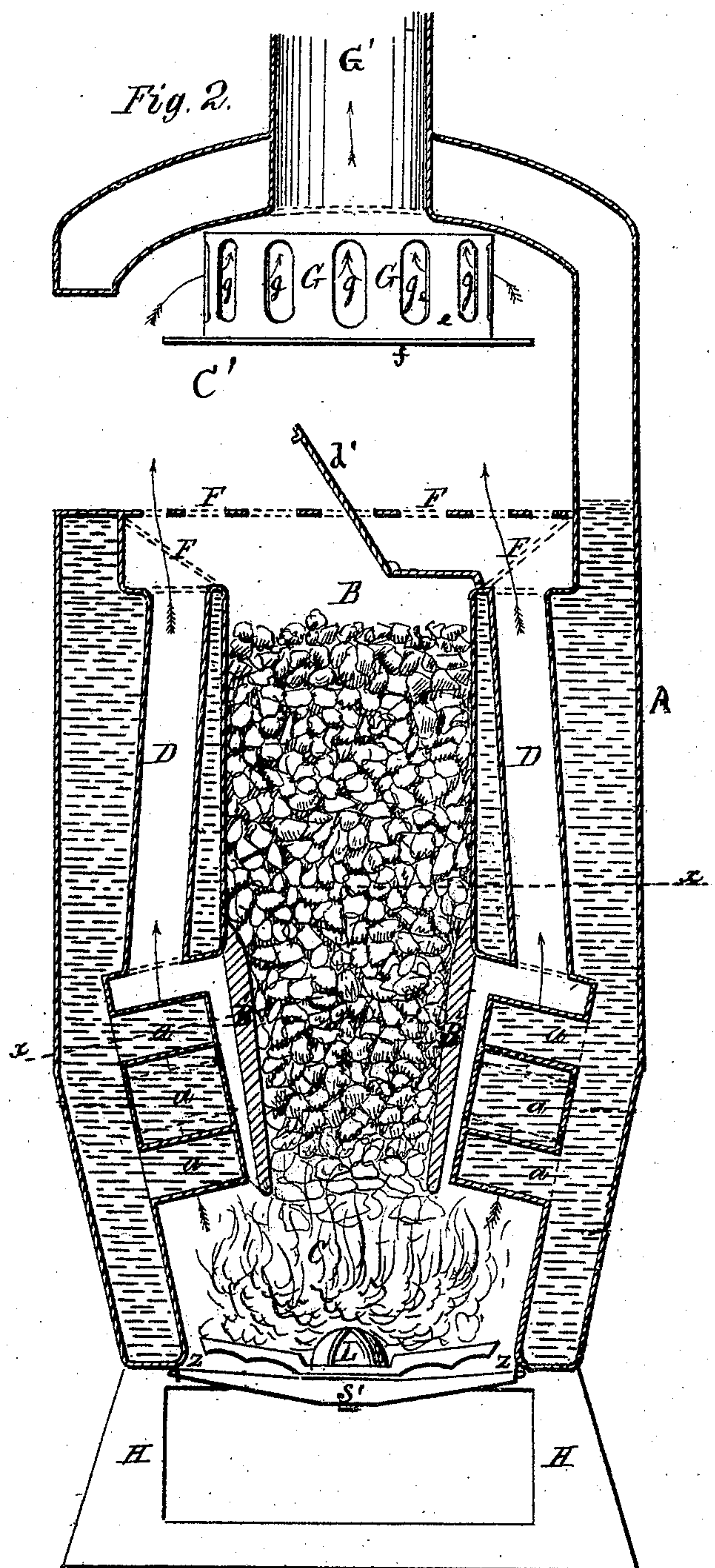
Jacob F. Hayen

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Witnesses.

James W. Ship
Adolph Meyer

Inventor:

Enoch F. Hayn

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Fig. 3.

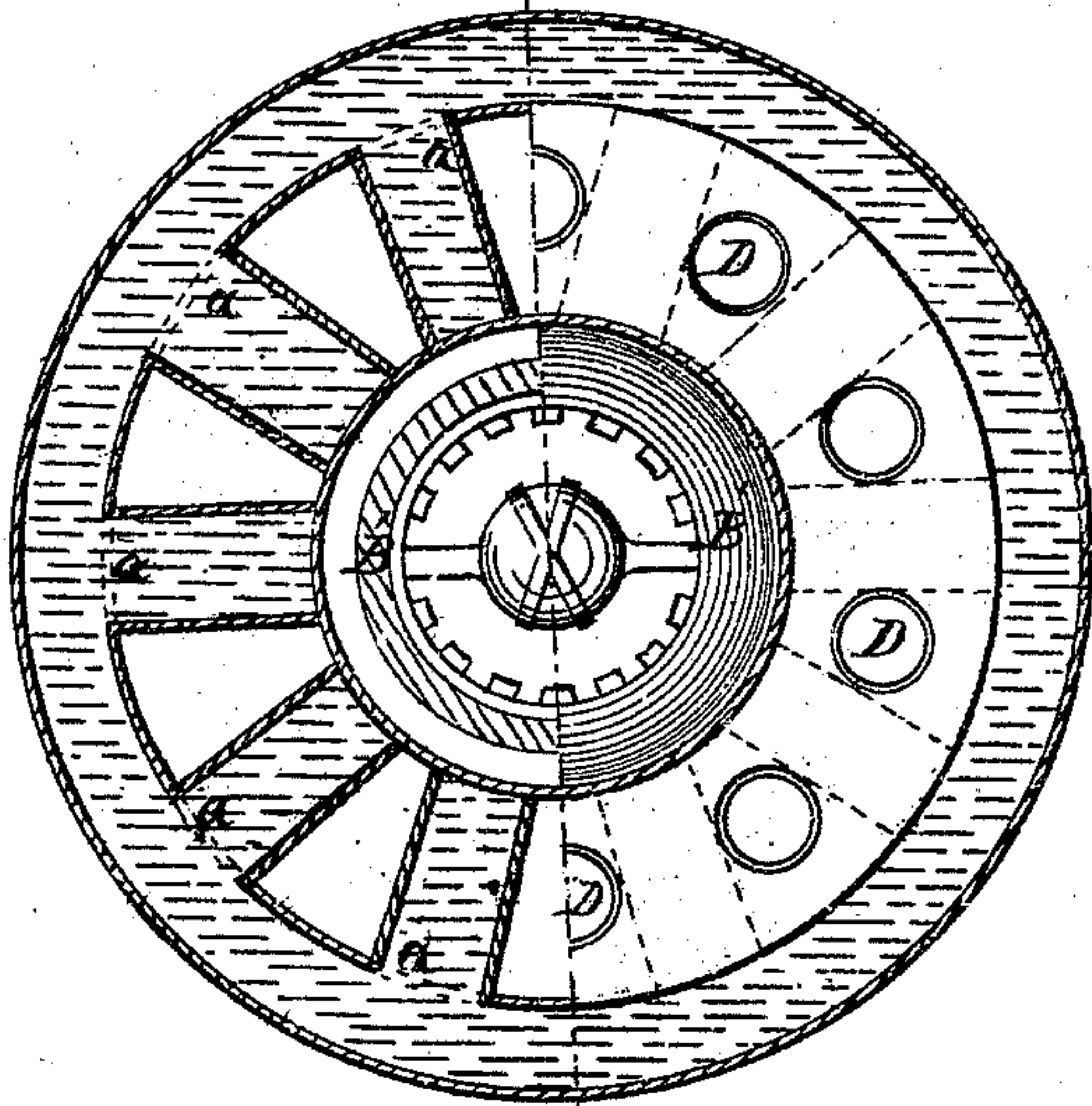


Fig. 4. s'

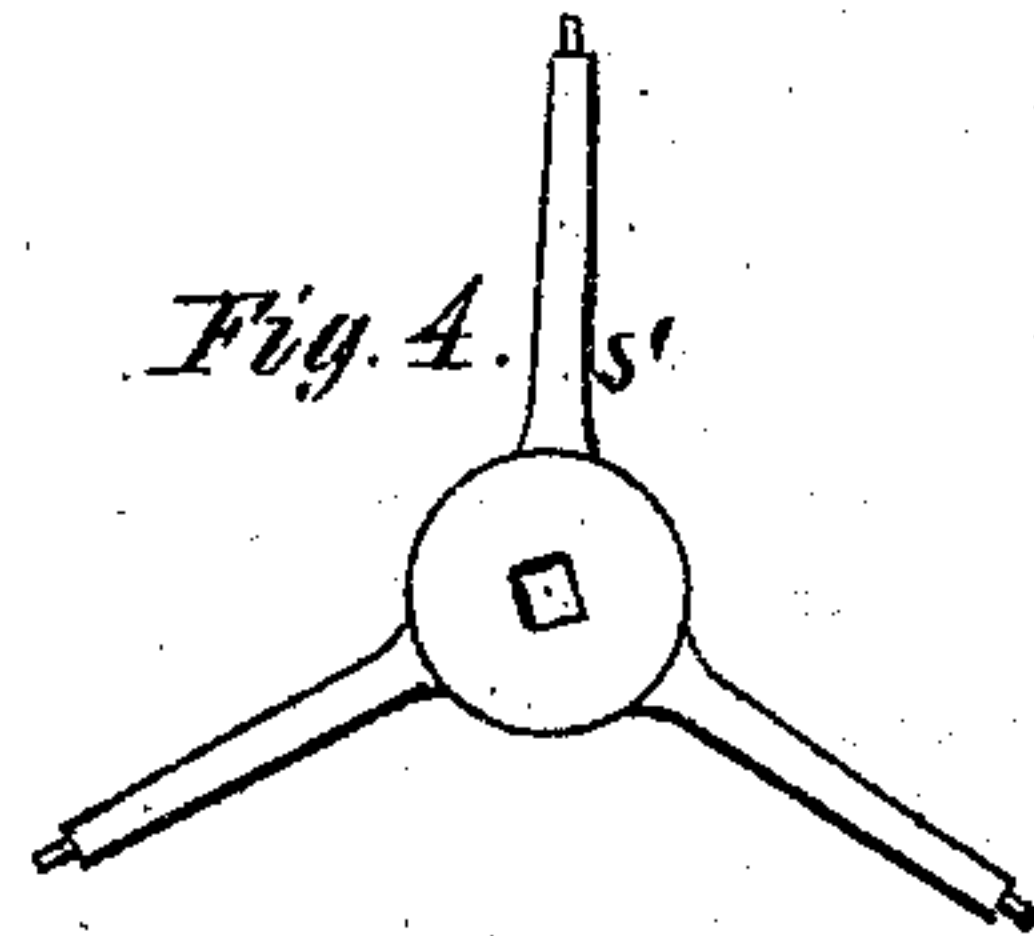


Fig. 5.

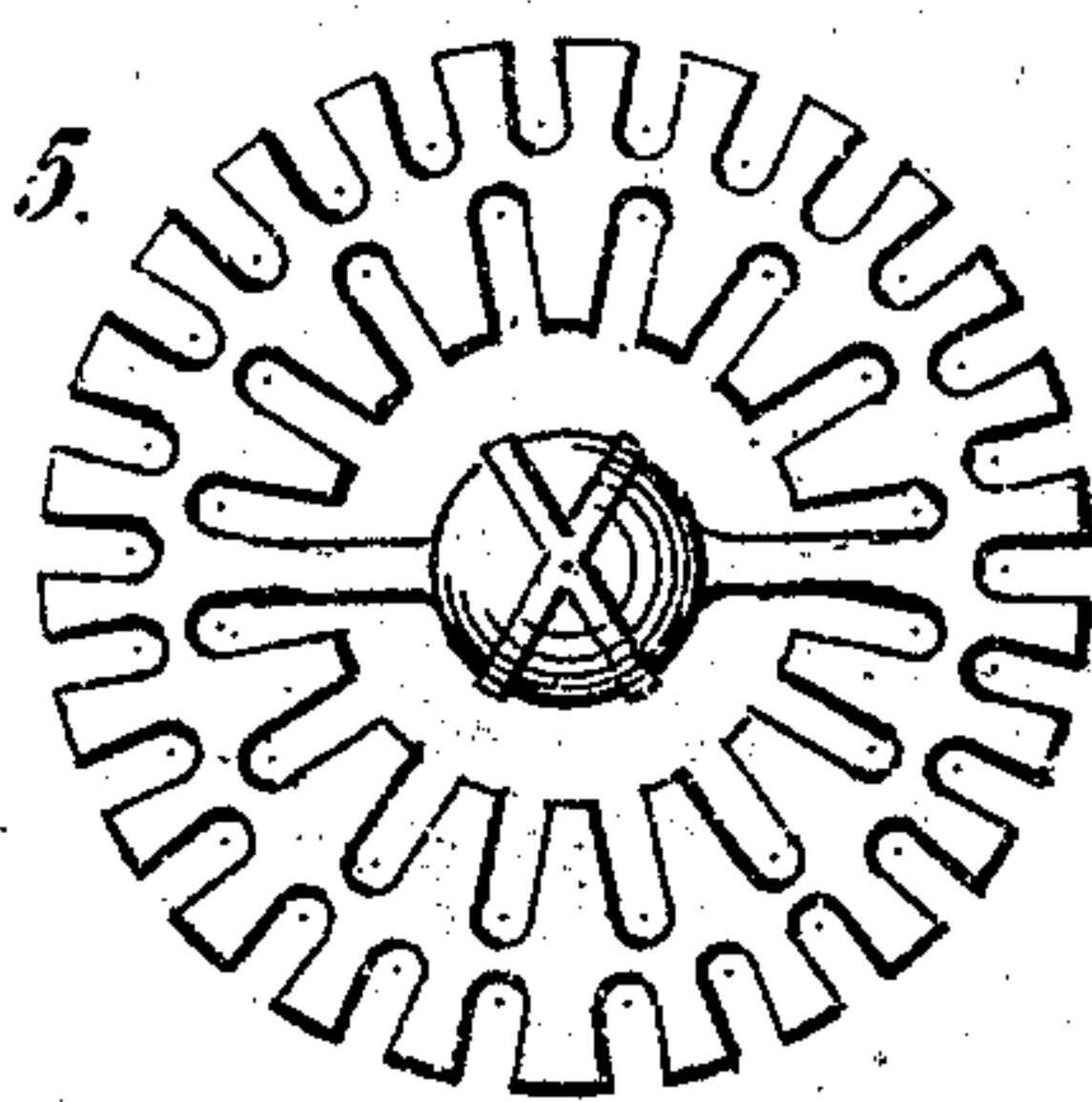


Fig. 6.



Fig. 7.



Fig. 8.

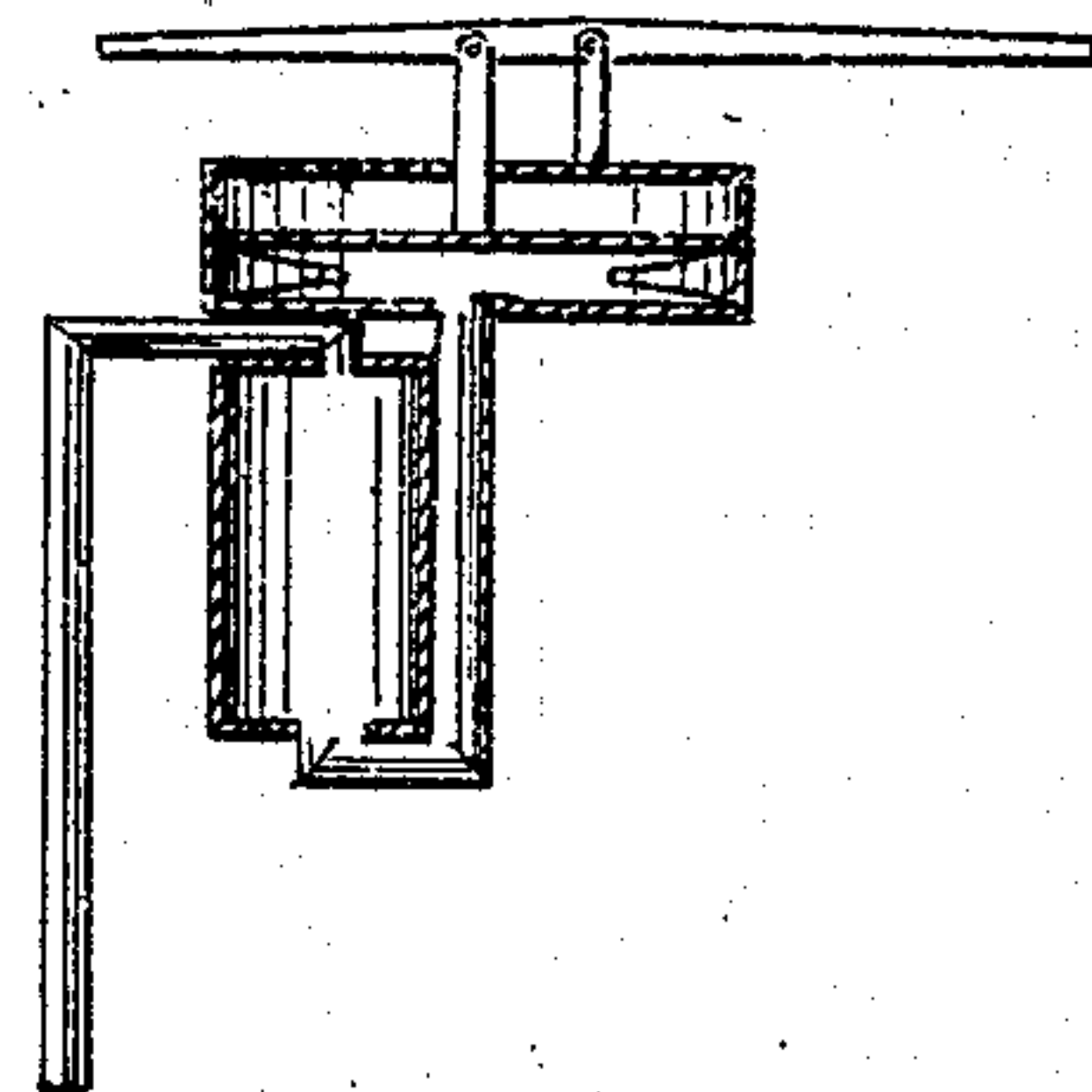


Fig. 10.

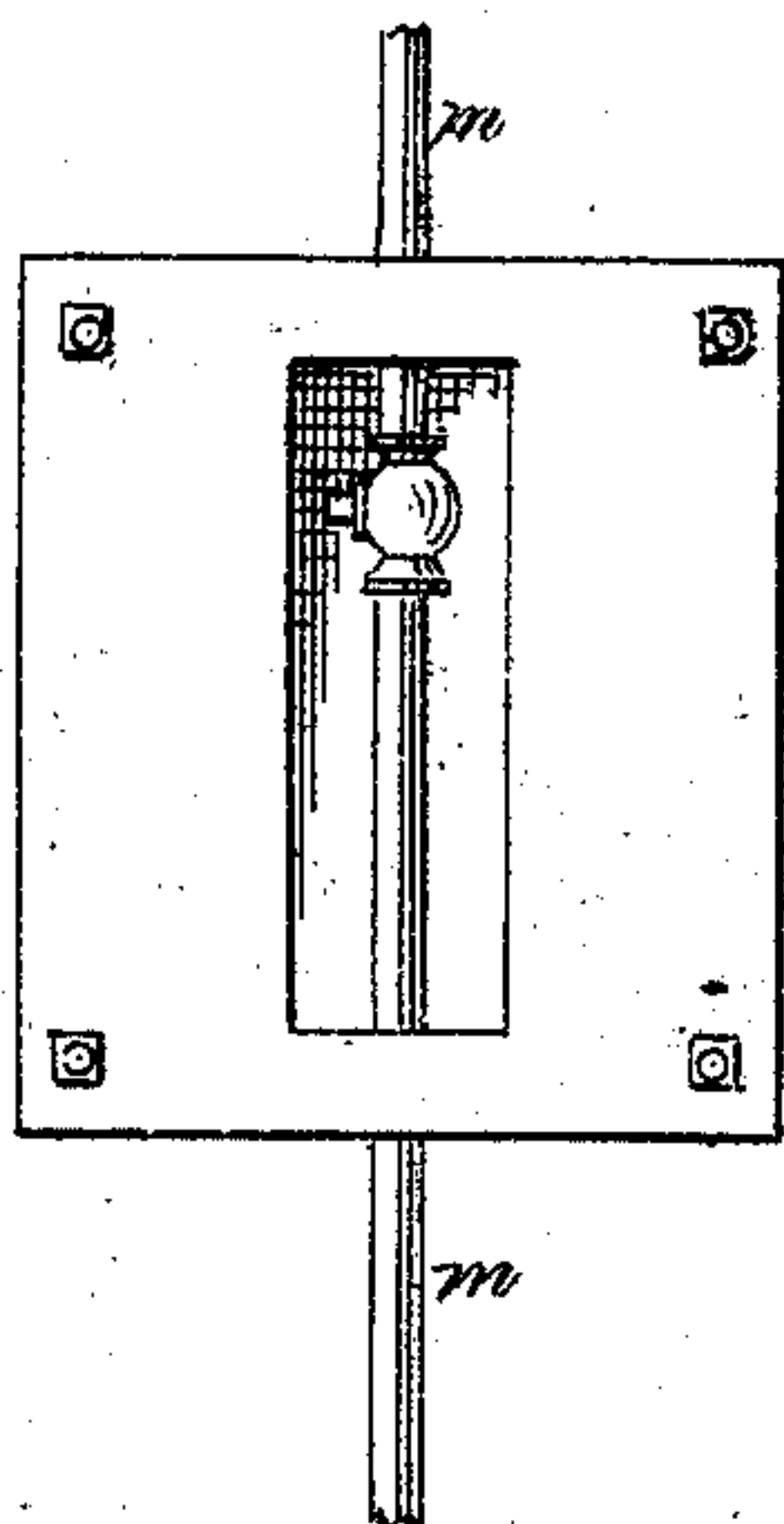


Fig. 9.

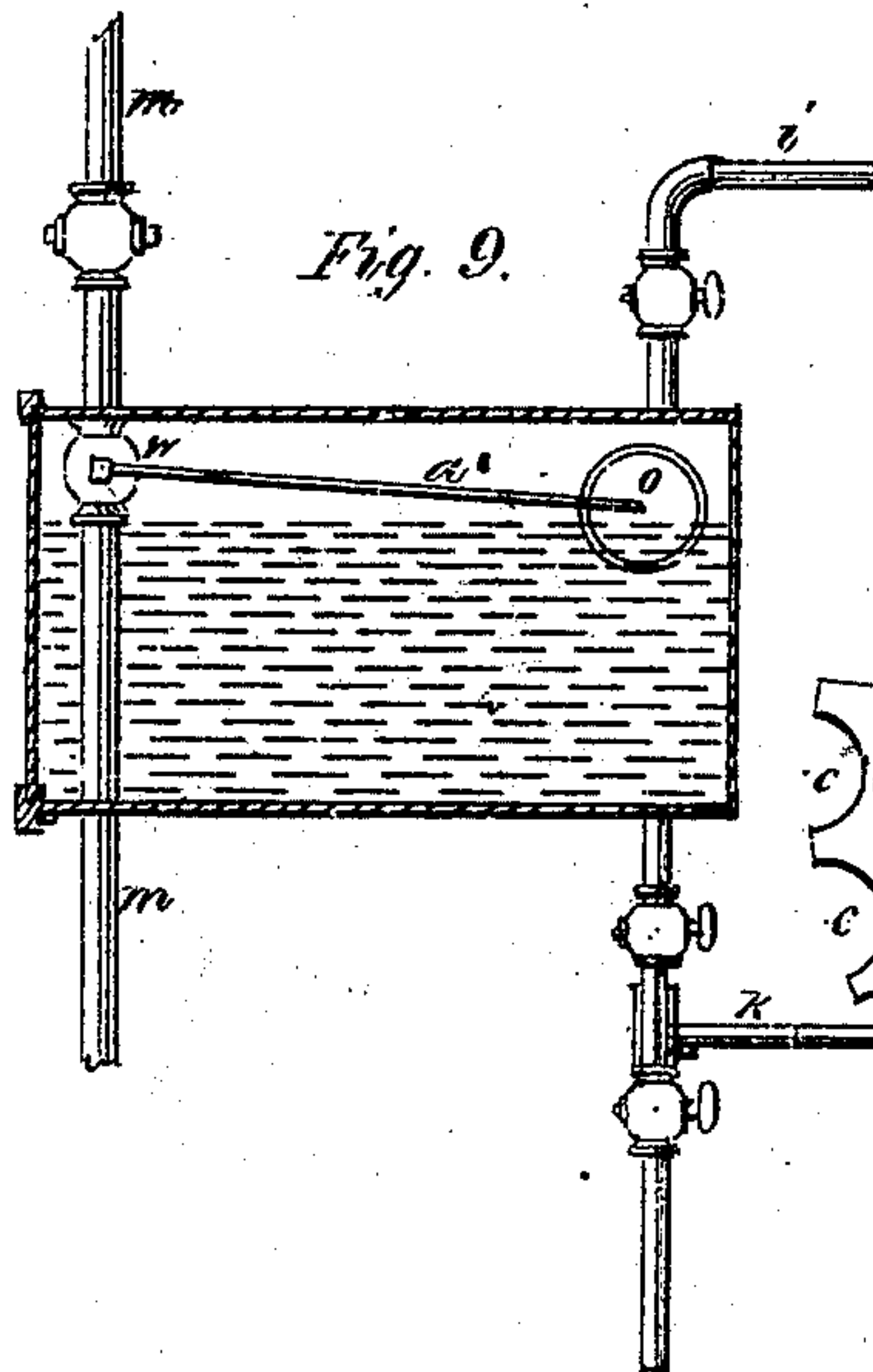
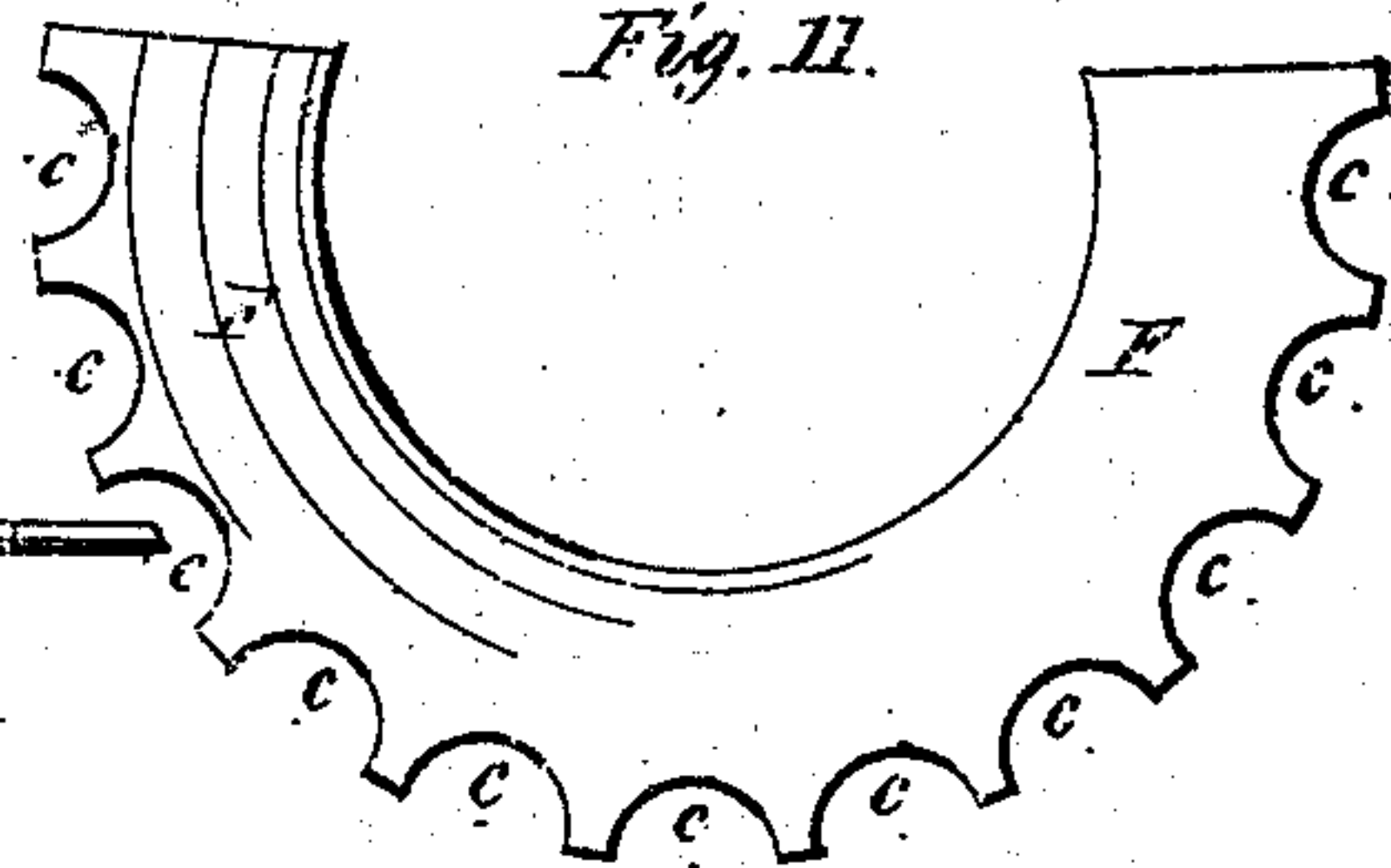


Fig. 11.



Witnesses.

James H. Kinslip
Adolph Meyer

Inventor.

Jacob F. Hayen

UNITED STATES PATENT OFFICE.

JACOB F. HAYEN, OF BUFFALO, NEW YORK.

IMPROVEMENT IN STEAM-BOILERS.

Specification forming part of Letters Patent No. 120,516, dated October 31, 1871.

To all whom it may concern:

Be it known that I, JACOB F. HAYEN, of the city of Buffalo, county of Erie and State of New York, have invented a new and Improved Upright Base-Burning Steam-Boiler; and I do hereby declare that the following is an exact and full description thereof, reference being had to the accompanying drawing and the letters of reference marked thereon making a part of this specification.

Figure 1 is a perspective view of my improved boiler. Fig. 2 is a central vertical section of the same. Fig. 3 is a transverse section taken in the plane of the line *x x*, Fig. 2. Figs. 4, 5, 6, and 7 are detached views of the furnace-grate. Figs. 8, 9, and 10 are detached views of a steam-gauge and its attachments; and Fig. 11 is a sectional view of the deflecting-plate, detached from the boiler-furnace.

Similar letters of reference in the accompanying drawing denote the same parts.

My invention has for its object to improve that class of upright steam-boilers which is provided with a base-burning furnace, whereby the same is simplified in construction and rendered more efficient in operation. To this end the invention consists in the combination and construction of various parts, as I will now proceed to describe.

In the accompanying drawing, A is the upright cylindrical shell of the boiler, composed of the proper materials, and mounted upon a suitable base, H. A' is a plate, affixed to the front of the shell and extending the whole length of the same and the base H, for the purpose of affording the necessary support for the doors *d* J M, and also to impart the proper finish to the boiler. C is the combustion or fire-chamber, arranged concentrically within the base of the boiler above the support H, the latter serving as an ash-pit, to which access is had, through the door M, from the outside of the plate A'. B is the fuel-reservoir, placed concentrically within the boiler, and connecting, at its lower end, with the combustion-chamber C. Its upper end terminates at a point some distance above the center of the boiler and opens into the upper combustion-chamber C'. Fuel is supplied to the reservoir through the door *d* in the side of the boiler and the door *d'* upon the upper end of the reservoir. B' is the cast-iron fire-pot, connecting the fuel-reservoir with the combustion-chamber. It

is made in the form of an upright cylinder, slightly tapering, and composed of sections, so that it can be removed when the furnace or flues are to be cleaned. The inner shell of the boiler, immediately above the combustion-chamber C, is constructed with a series of water-legs or pipes, *a*, of circular form, which projects over the sides of said chamber and terminates a short distance from the fire-pot B'. The combustion-chamber C communicates with the upper chamber C' through a series of flues, D, which passes upward between the water-legs *a*, as shown in Fig. 3, so that the products of combustion pass freely around said legs as they leave the combustion-chamber. F is an annular deflecting-plate, fitting with close contact about the upper end of the fuel-reservoir, and from thence inclining upward and outward to the shell A, passing over the ends of the flues D. Its outer edge is formed with a series of notches, *c*, from which the products of combustion from the flues D escape into the upper chamber C'. This plate, by its construction and arrangement, deflects the currents of hot air and products of combustion, as they escape from the flues D, directly against the inner shell of the boiler, thereby heating the water therein as well at the top as at the bottom around the furnace. G' is the smoke-stack or flue, extending through the top of the boiler into the chamber C', where it terminates in a damper, G, as shown in Fig. 2. The damper G is composed of two concentric rings, *e e*, fitting closely, one within the other, upon a closed bottom, *f*. Each ring is provided with openings *g*, and, by moving the outer ring in either direction, the openings will be opened or closed, as desired. By this arrangement of a damper the draught through the furnace is regulated within the boiler itself—that is to say, within the chamber C'. L is the grate, composed of cast-iron and pivoted centrally to the stand S', so as to revolve freely thereon, said stand in its turn being secured to the furnace, as shown at *z*, Fig. 2. J is an opening, extending through the side of the boiler into the furnace, to permit the inspection of the latter from time to time and to admit of the fire being stirred, when necessary. Fig. 9 exhibits a hermetically-sealed reservoir, composed of any suitable material, and attached to the boiler at any desired point on the water-line. It is connected to the boiler by two pipes, *i k*, the former

entering above, and the latter below, the water-line. By this means the same water-level is preserved in both boiler and reservoir. *m* is the water-supply pipe, passing through the reservoir into the boiler. The supply of water is regulated by means of the valve *w* and float *O*, which are connected by the rod *a*¹ so as to form a float-valve, by which a uniform level of the water in the boiler is maintained. In Fig. 8 is shown a steam-gauge, to be attached to the side of the boiler. The lever *a*² of the gauge is adapted to work up or down, according to the pressure of steam in the boiler. One end is connected, by a chain, *y*, to the upper door of the latter, and its opposite end is connected to the lower door of the ash-pit. By this arrangement the draught of the furnace is regulated in accordance with the pressure of steam in the boiler.

Having thus described my invention, what I claim as new, is—

1. The boiler herein described, consisting of the shell *A*, reservoir *B*, cast-iron fire-pot *B'*, vertical flues *D*, deflecting-plate *F*, radial water-legs *a a*, and furnace *C*, all substantially as shown and described, for the purposes specified.

2. The inclined annular deflecting-plate *F*, in combination with the fuel-reservoir *B*, upper chamber *C'*, flues *D*, and the inner shell of the boiler, substantially as described, for the purpose specified.

3. The damper *G*, arranged within the upper chamber *C'* above the deflecting-plate *F*, and fuel-reservoir *B*, substantially as described, for the purposes specified.

JACOB F. HAYEN.

Witnesses:

JAMES WINSHIP,
ADOLPH MEYER.

(149)