

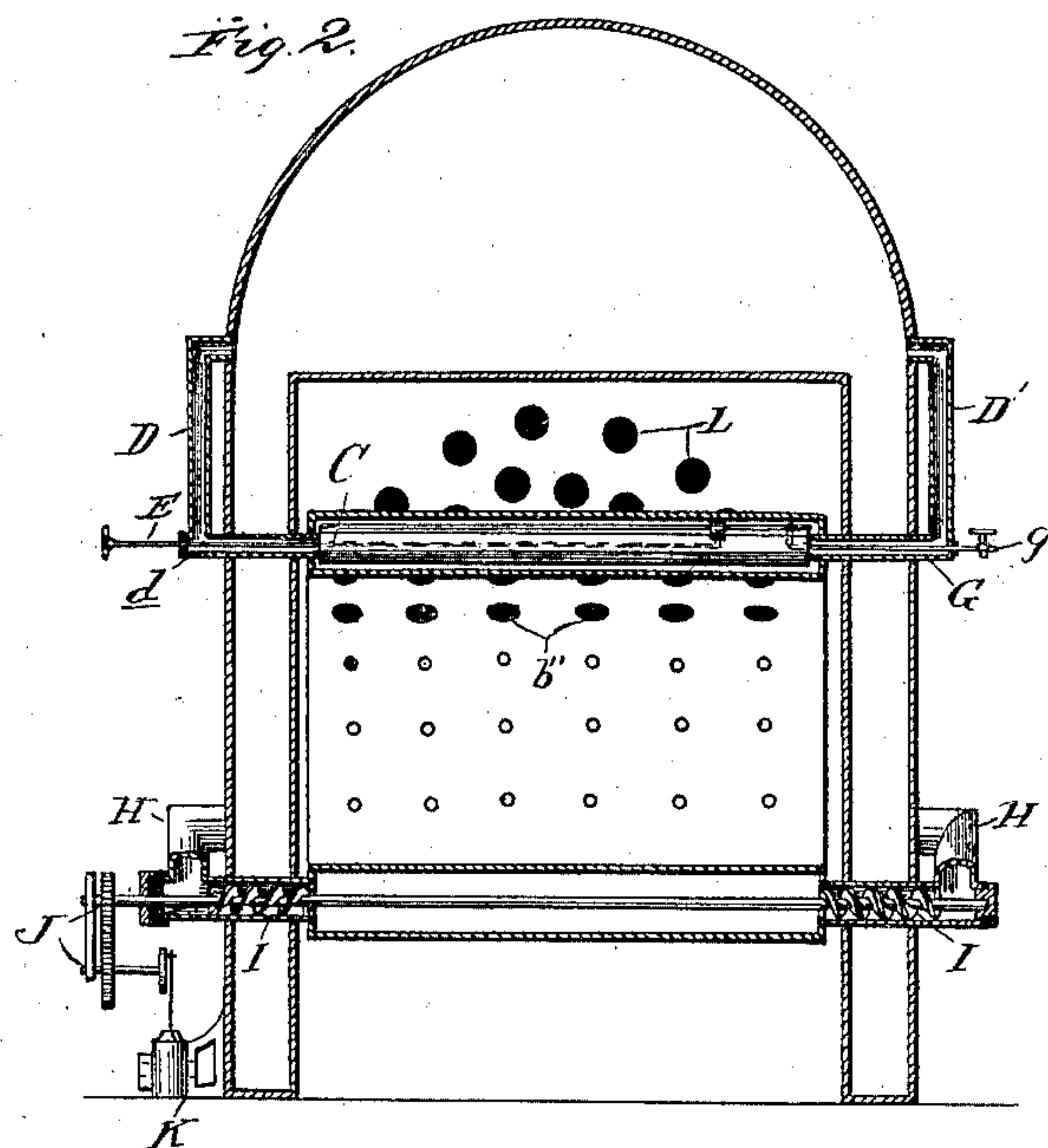
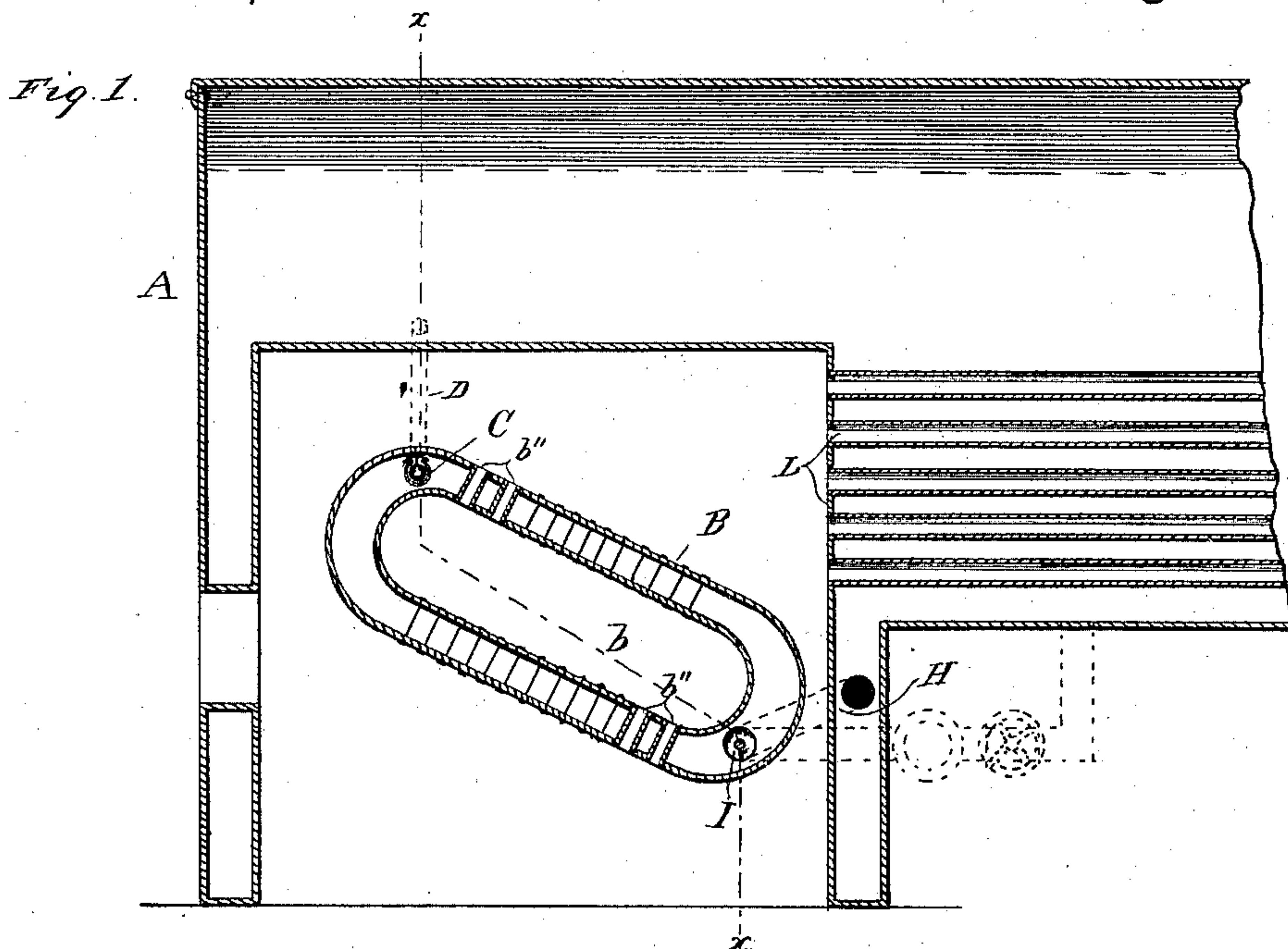
(No Model.)

2 Sheets—Sheet 1.

H. STANTON.  
STEAM BOILER.

No. 368,624.

Patented Aug. 23, 1887.



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*W. J. Robertson*

Inventor  
*Henry Stanton*  
By his Attorney  
*T. J. W. Robertson*

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Fig. 3.

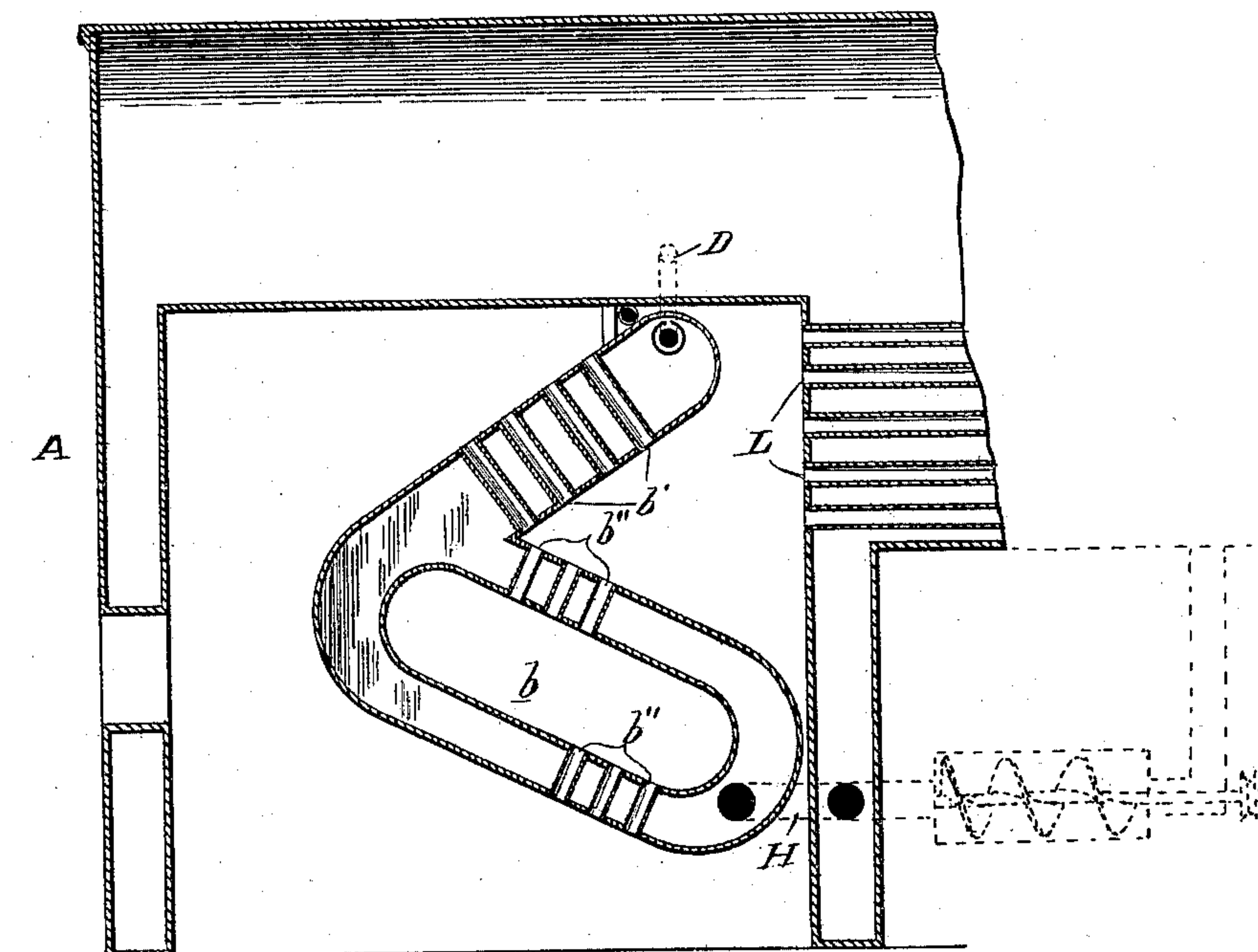


Fig. 4.

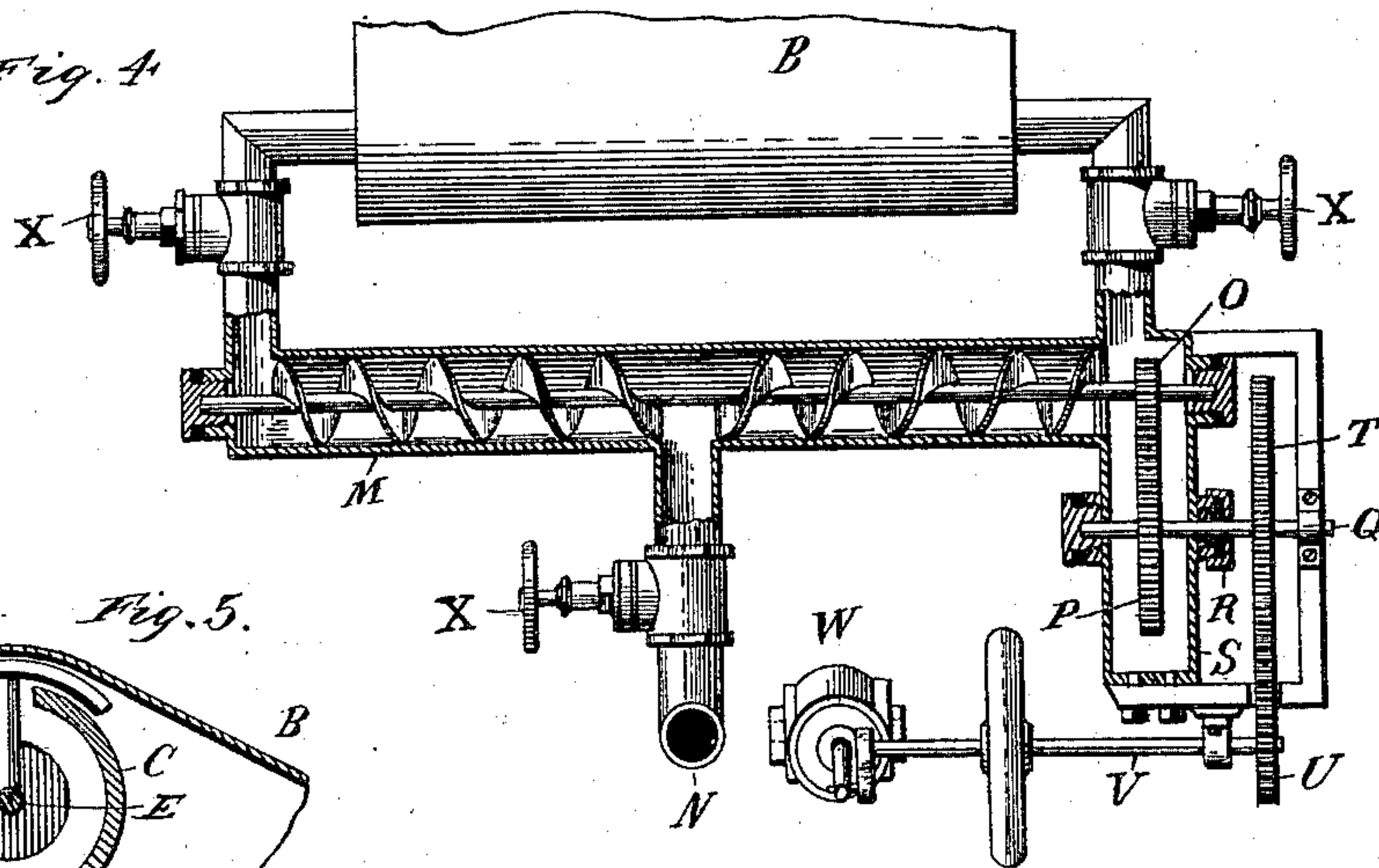


Fig. 5.

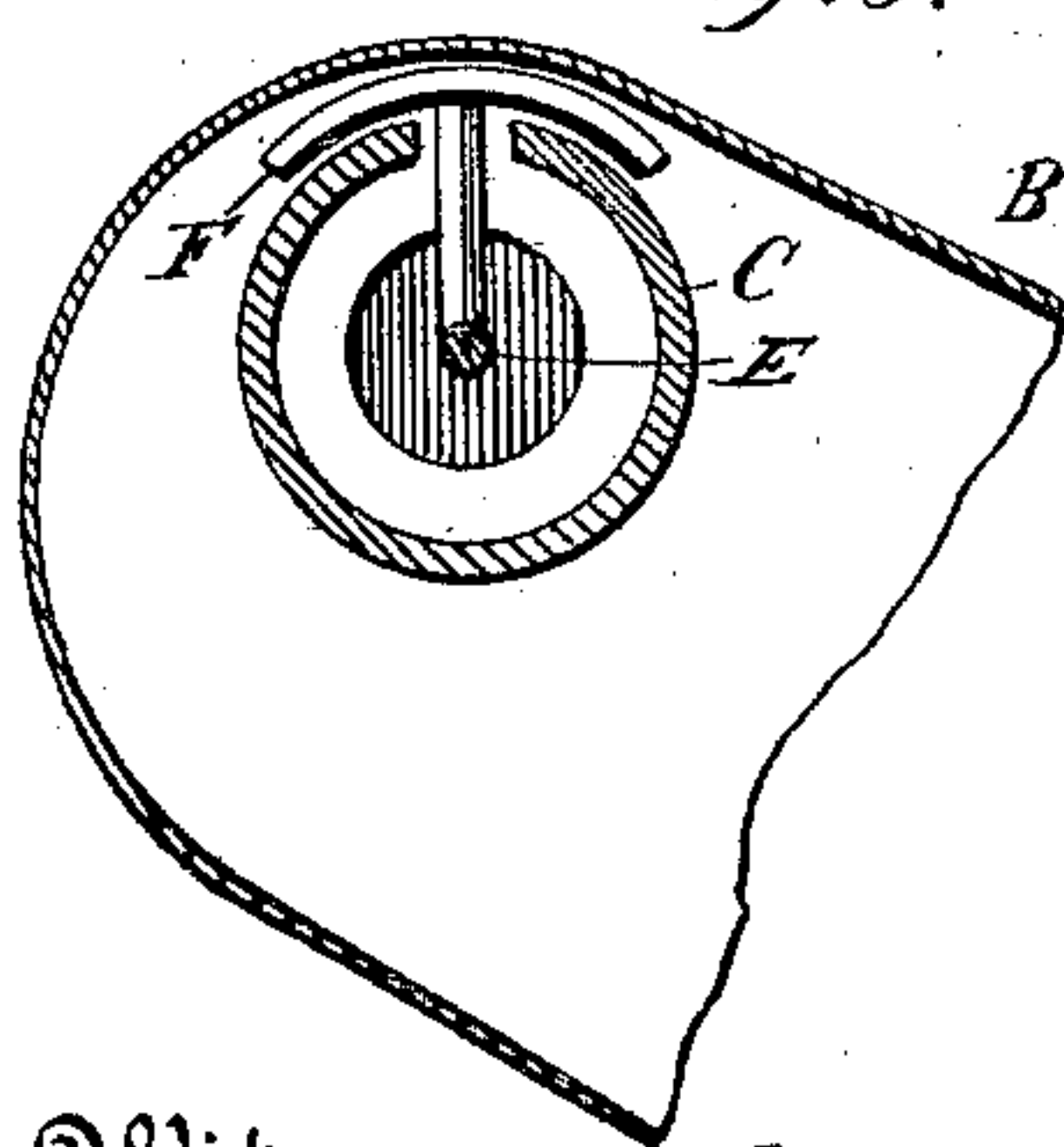
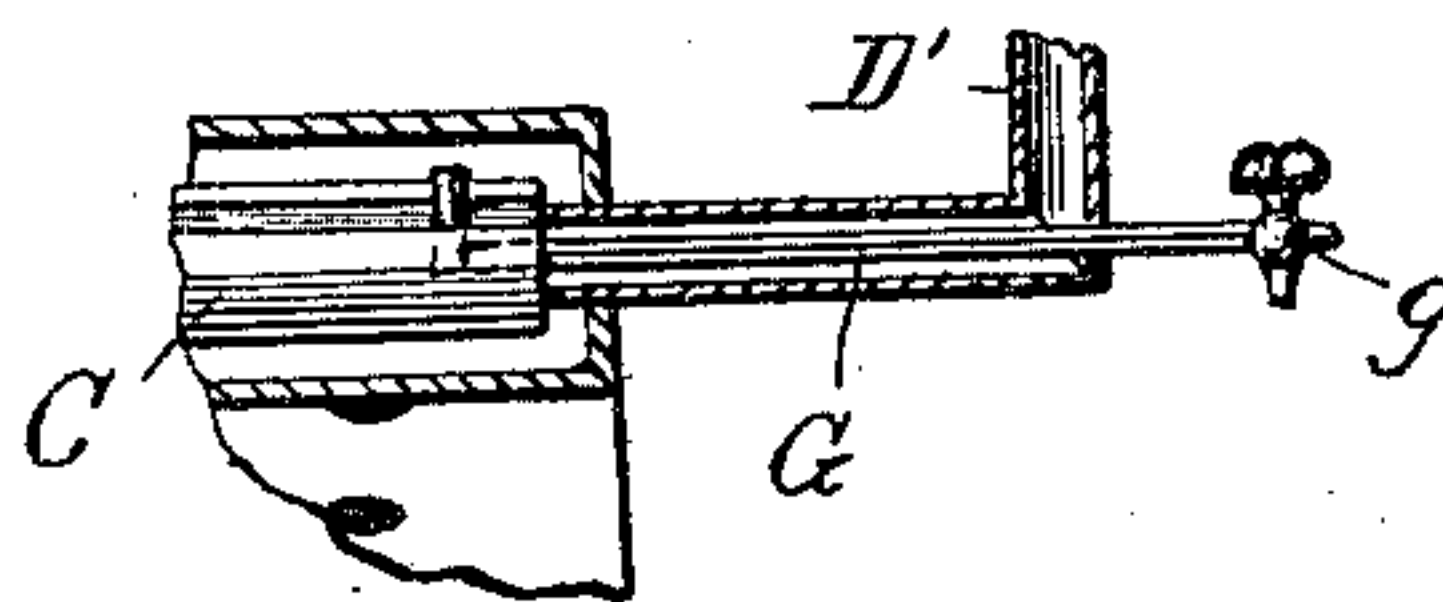


Fig. 6.



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# UNITED STATES PATENT OFFICE.

HENRY STANTON, OF FLUSHING, OHIO.

## STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 368,624, dated August 23, 1887.

Application filed January 3, 1887. Serial No. 223,257. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY STANTON, a citizen of the United States, residing at Flushing, in the county of Belmont and State of Ohio, have invented certain new and useful Improvements in Steam-Boilers, of which the following is a specification, reference being had therein to the accompanying drawings, in which—

Figure 1 represents a central vertical longitudinal section of a steam-boiler; Fig. 2, a transverse section through the line *xx* of Fig. 1. Fig. 3 is a similar section to that shown in Fig. 1 of a modification. Fig. 4 is a plan of a modification of the connections between the boiler and water-bridge. Fig. 5 is a sectional detail of a clearing device, and Fig. 6 is a detail of an air-tube and its connections.

This improvement relates more particularly to that class of boilers which are provided with water-bridges in their fire-boxes; and the invention consists in the peculiar combinations and construction and arrangement of parts, as hereinafter more particularly described, and then definitely pointed out in the claims.

Referring now to the details of the drawings, A represents a boiler of the ordinary locomotive type, having a water-bridge, B, preferably provided with a heating-space, *b*; but this heating-space may be dispensed with, as shown in the detail, Fig. 5. I have found that there is a great tendency in these water-bridges as heretofore constructed to burn out at the extreme upper part, owing to the steam which rises there expelling the water therefrom, and to remedy this is the main object of my invention, which I accomplish by means of the devices now to be described. In the extreme upper end of the bridge I arrange a pipe, C, having its upper side slotted for its whole length, and connect it to the boiler at its opposite ends by the pipes D D'. Through the pipe D and a stuffing-box, *d*, at one of the elbows runs a rod, E, supplied with a scraper, F, (see Figs. 2 and 5,) which, if moved backward and forward occasionally, will keep the slot in the pipe clear. Through the other connecting-pipe, D', runs a small pipe, G, (see Fig. 6,) closed by a petcock, *g*, which allows the air confined in the highest point of the water-bridge to escape when the boiler is being filled with water.

At the lower end of the water-bridge are two pipes, H H', which connect the lower parts of the boiler and the water-bridge. In these pipes work right and left hand screws I I, which, as they are revolved by the gearing J, worked by a small engine, K, create a strong current of water from the boiler through the water-bridge and into the top of the pipe C, from whence it passes through the pipes D D' into the upper part of the boiler.

Instead of making the water-bridge in the form shown in Figs. 1 or 5, I may sometimes make it with an extension, B', as shown in Fig. 3, with tubes *b'*, through which the products of combustion may pass on their way to the main tubes L.

To enable the products of combustion to obtain access into and pass out of the heating-space *b*, and to provide additional heating-surface, I provide the water-bridge with tubes *b'' b''*, so arranged that the products of combustion must take a circuitous course in its passage through the heater, as shown by the arrows.

Instead of making the screws or circulating apparatus force the water directly into the water-bridge, the screws may be worked in a separate tube, M, which is connected with the lower end of the water-bridge and passes around and behind the furnace, as shown in dotted lines in Fig. 1, from whence it is connected with the boiler by a pipe, N. The screws in this case are preferably operated by the arrangement of gearing shown in Fig. 4, in which O is a pinion on the shaft of the screw, which meshes in a spur-gear, P, mounted on a shaft, Q, which works through a stuffing-box, R, in the side of the casing S. This shaft Q carries another and larger wheel, T, which meshes with a pinion, U, on a shaft, V, to which motion is given by a small independent engine, W, by which arrangement the speed of the shaft that runs through the stuffing-box R is greatly reduced, notwithstanding that the screw is given a tolerably rapid motion. It will be seen that by this construction a continual forced circulation of the water in the bridge is caused by the screws forcing the water from the boiler through the water-bridge and out at the slotted pipe C, whereby the top of the bridge is not only prevented from burning, but there



is induced a better circulation through the boiler, whereby its steaming capacity is very largely increased.

For convenience in repacking the stuffing-box R, and for other purposes, I provide the pipes with gate-valves X X X, as shown in Fig. 4; but they are not absolutely necessary to the operation.

It is evident that any convenient means for turning the screws may be employed, and I do not limit myself to the plans shown. It is also evident that should the screws be stopped for any purpose there will be a circulation through the water-bridge, as the screws, when at rest, will not stop the circulation.

I do not intend to limit myself to screws for driving the water into the water-bridges, as it is evident that other water-impelling devices may be employed, if preferred; nor do I intend to limit myself to screws of opposite twist, as a single screw may be employed, if desired, in which case I should prefer to arrange it as shown in dotted lines in Fig. 3.

Having thus described what I now consider the preferable plans of carrying out my invention, but without thereby limiting myself to the construction shown, what I claim as new is—

1. In combination with the water-bridge of a steam-boiler, a water-impelling device, as I, to create a forced circulation through said bridge, substantially as described.

2. In combination with the water-bridge of a boiler, one or more screws working in the path of the water in its passage from the boiler to the water-bridge, substantially as described.

3. In combination with the water-bridge of a boiler, multiple screws of opposite twist working in the path of the water and an independent engine for operating the same, substantially as described.

4. In combination with the water-bridge of a boiler, the slotted pipe C and a rod, E, having a handle at one end and a scraper at the other, working through the slot in the pipe C and over the top thereof, substantially as described.

5. In combination with a water-bridge, B, having a pipe extending to the outside of the boiler, said pipe provided with an internal pipe having one end terminating in the highest part of said bridge and its outer end provided with a petcock, substantially as and for the purpose specified.

In testimony whereof I affix my signature, in presence of two witnesses, this 1st day of January, 1887.

HENRY STANTON.

Witnesses:

WILLIAM WILSON,  
J. W. HOLLINGSWORTH.