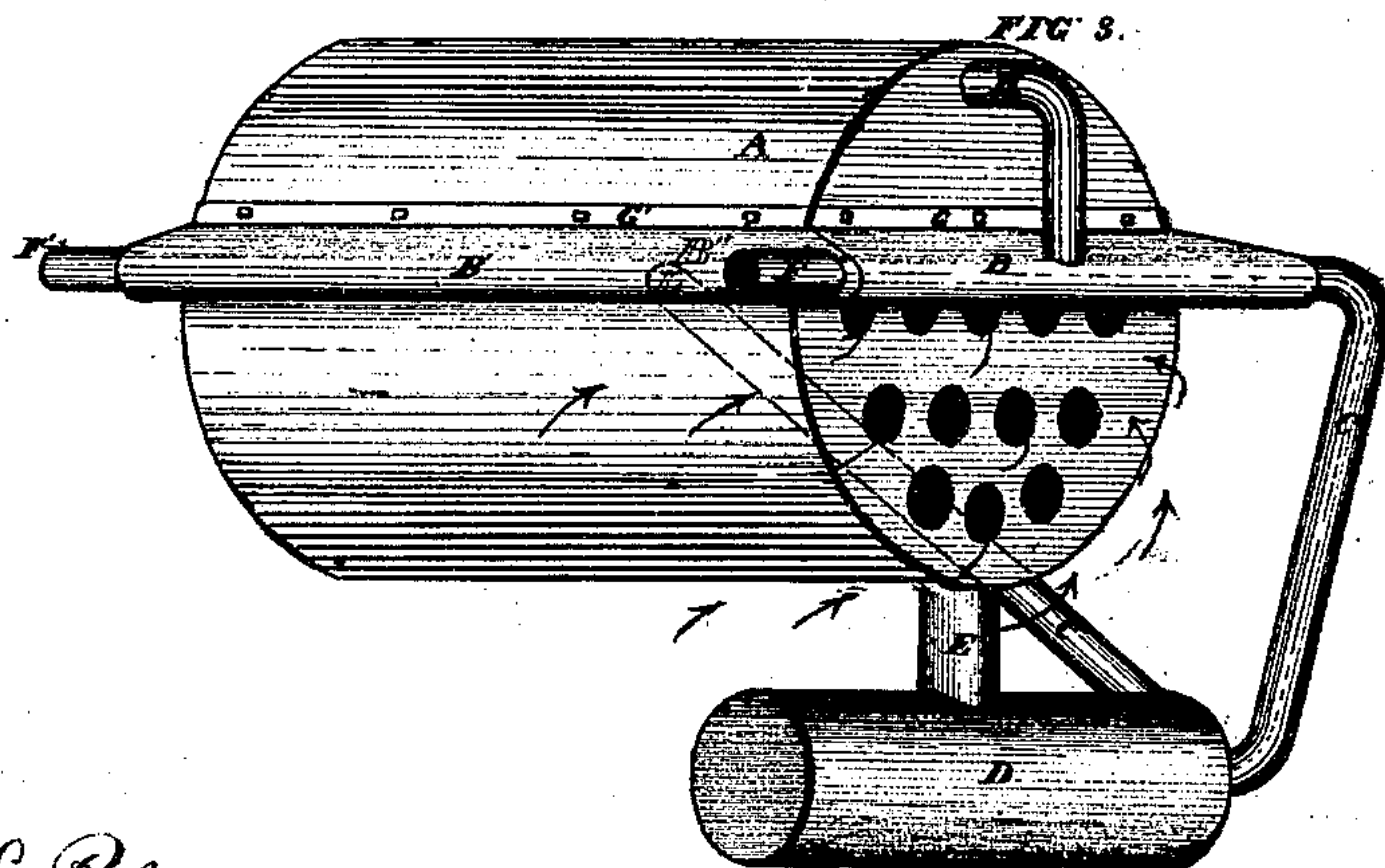
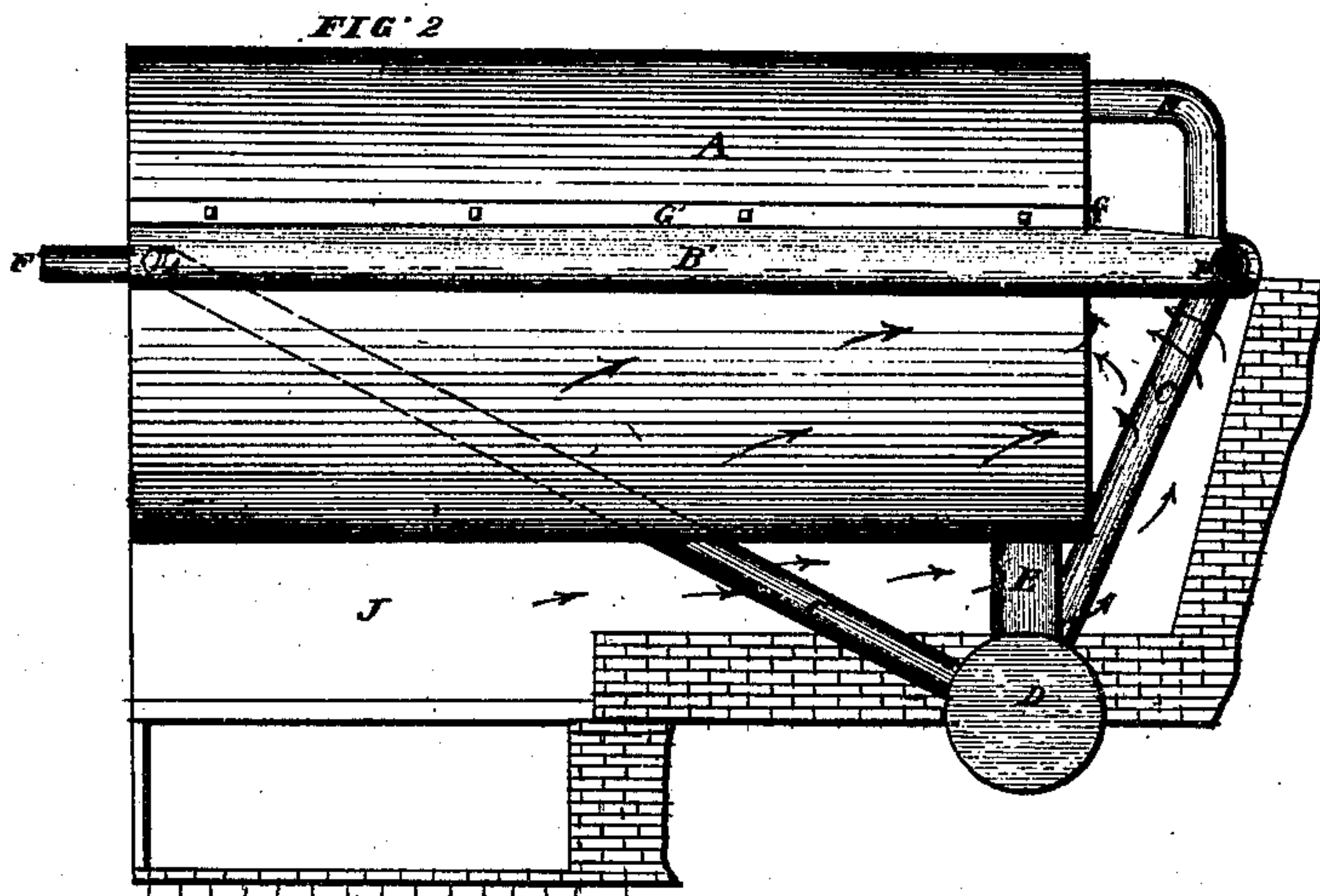
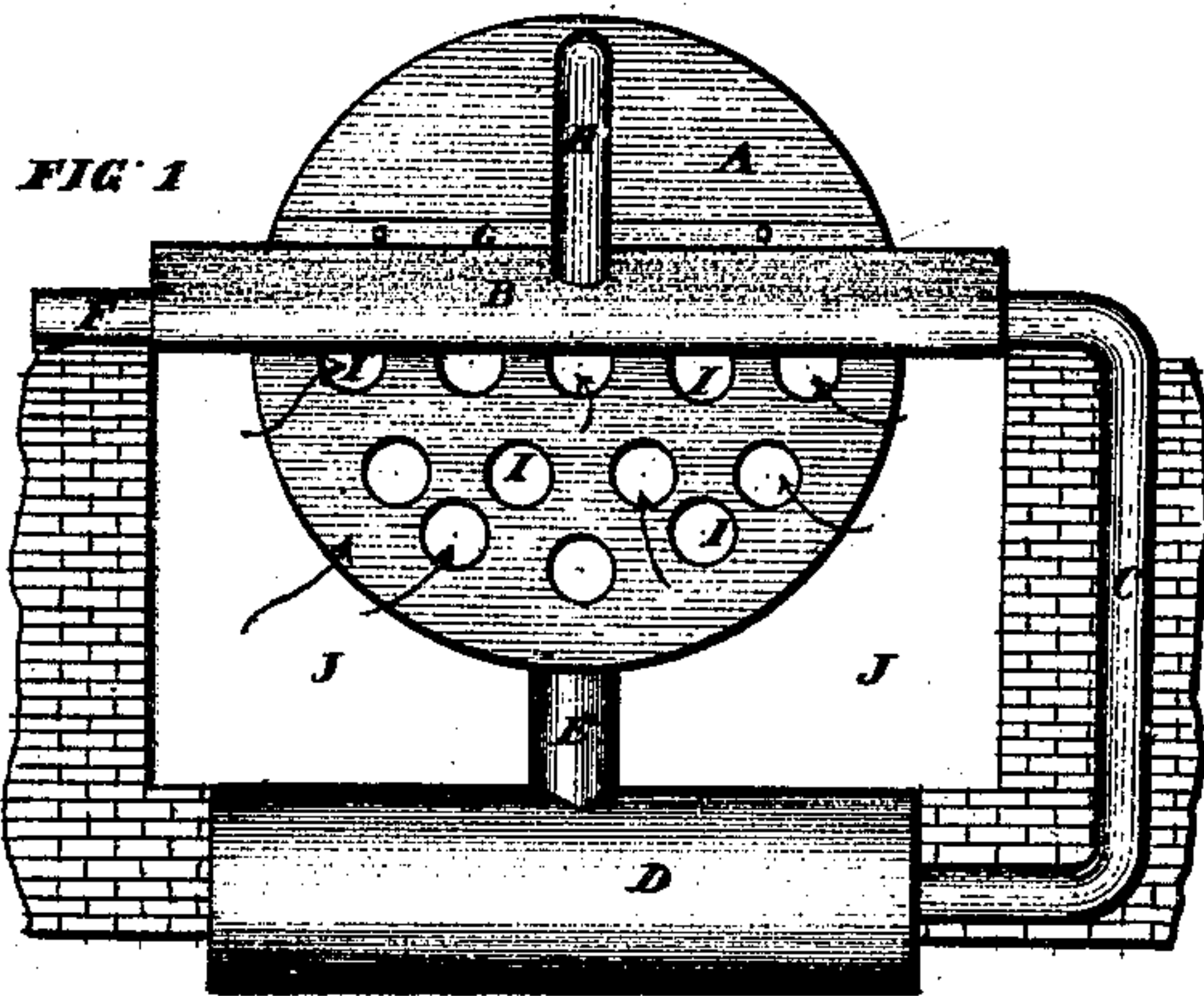


J. F. Morse,
Feed Water Heater.
No. 104,187. Patented June 14, 1870.



WITNESS

C. Palmer
John H. Hanson

J. F. Morse INVENTOR

UNITED STATES PATENT OFFICE.

JOHN F. MORSE, OF OSHKOSH, WISCONSIN.

FEED-WATER-HEATING APPARATUS.

Specification forming part of Letters Patent No. **104,187**, dated June 14, 1870.

To all whom it may concern:

Be it known that I, JOHN F. MORSE, of the city of Oshkosh, in the county of Winnebago and State of Wisconsin, have invented certain new and useful Improvements in Steam-Generators; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing, and to the letters of reference marked thereon.

To enable others skilled in the art to construct and use the invention, I will proceed to describe it.

My invention consists in replacing the cast-iron covering in common use over the fire-box, immediately in rear of and adjoining the boiler, with a water conductor or heater, flattened so as to cover the entire space occupied by the cast-iron covering aforesaid; and, also, in a similar heater placed along the sides of the boiler, which, in connection with the heater in rear aforesaid, furnish a continuous conductor from the front end of the boiler on one side, around the rear, and to the front end on the opposite side of the boiler.

Where the heat returns through the flues, at the rear end of the boiler, is the very hottest place about the boiler, insomuch that the cast-iron coverings soon burn out and need frequent renewing. By replacing this covering with a conductor, bringing the water in at one end of it, and discharging it at the other end into the feed-pipe, this now-wasted heat is utilized, saving largely in fuel, and introducing the water into the boiler boiling hot, instead of cold, as is now the custom.

I have also invented the pipe leading from the heater into the upper part of the boiler to equalize the pressure.

Figure 1 is a rear view of a boiler with my improvements attached. Fig. 2 is a side view. Fig. 3 is a perspective view.

B is the heater; G, the flange by which it is screwed or bolted to the boiler; F, the tube through which the water enters, passing through B, and out of it, through the feed-pipe C, into the mud-receiver D, from which it rises, through the pipe E, into the boiler A. H is an equalizing-pipe for the passage of steam generated in the heater into the boiler A. J is the fire-box, and I the flues.

Thus far reference is had only to the rear heater. When the side heaters are used in connection with the rear heater, the tube F, through which the water enters, is placed on the front end of the side heater. (Represented by F' in Figs. 2 and 3.) The water then, entering through F', passes through B', across the rear, through B, and returns to the front on the opposite side of the boiler, through B'', Fig. 3, out at L, into the feed-pipe C', and into the mud-receiver D, as before, H serving to equalize the pressure.

G and G, the flanges by which the heater is fastened to the boiler, as before.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The water conductors or heaters B and B', substantially as specified.
2. The equalizing-pipe H, substantially as specified.

J. F. MORSE.

Witnesses:

C. PALMER,
JEARUM ATKINS.