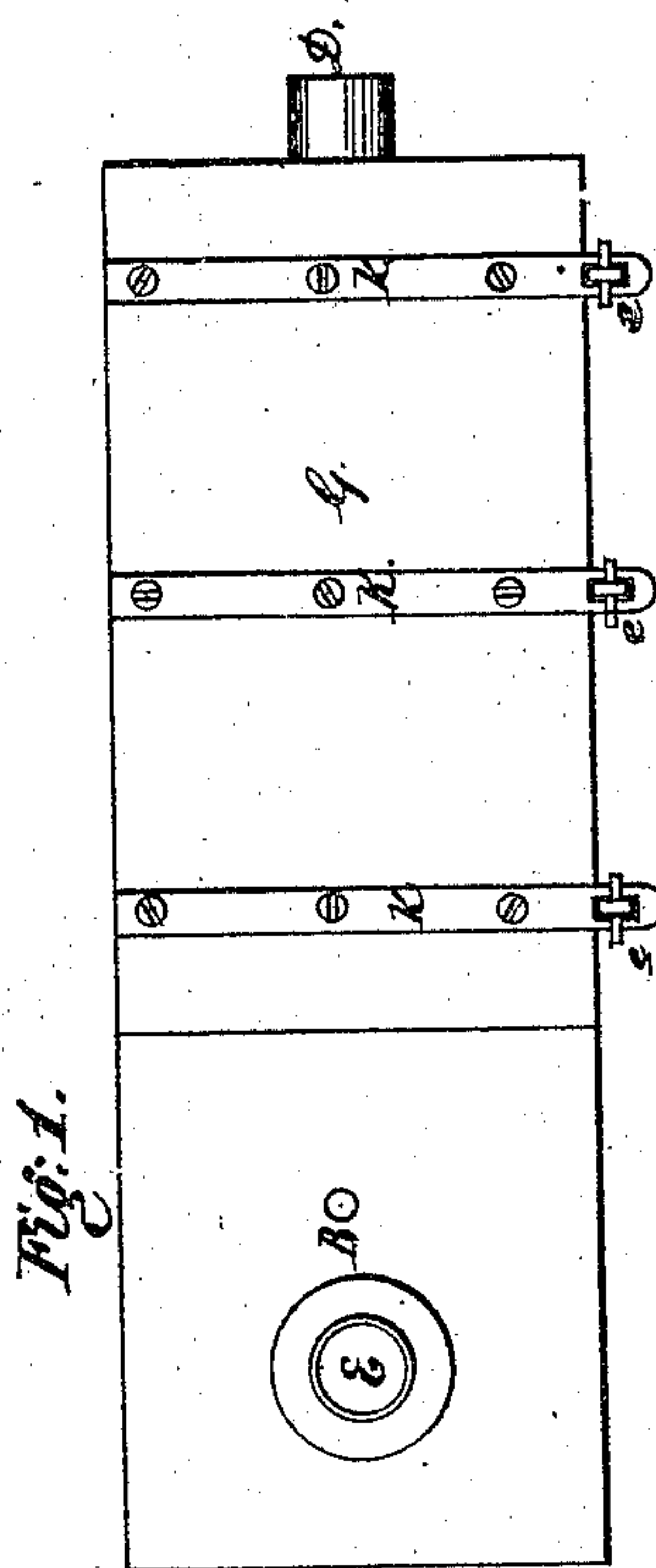
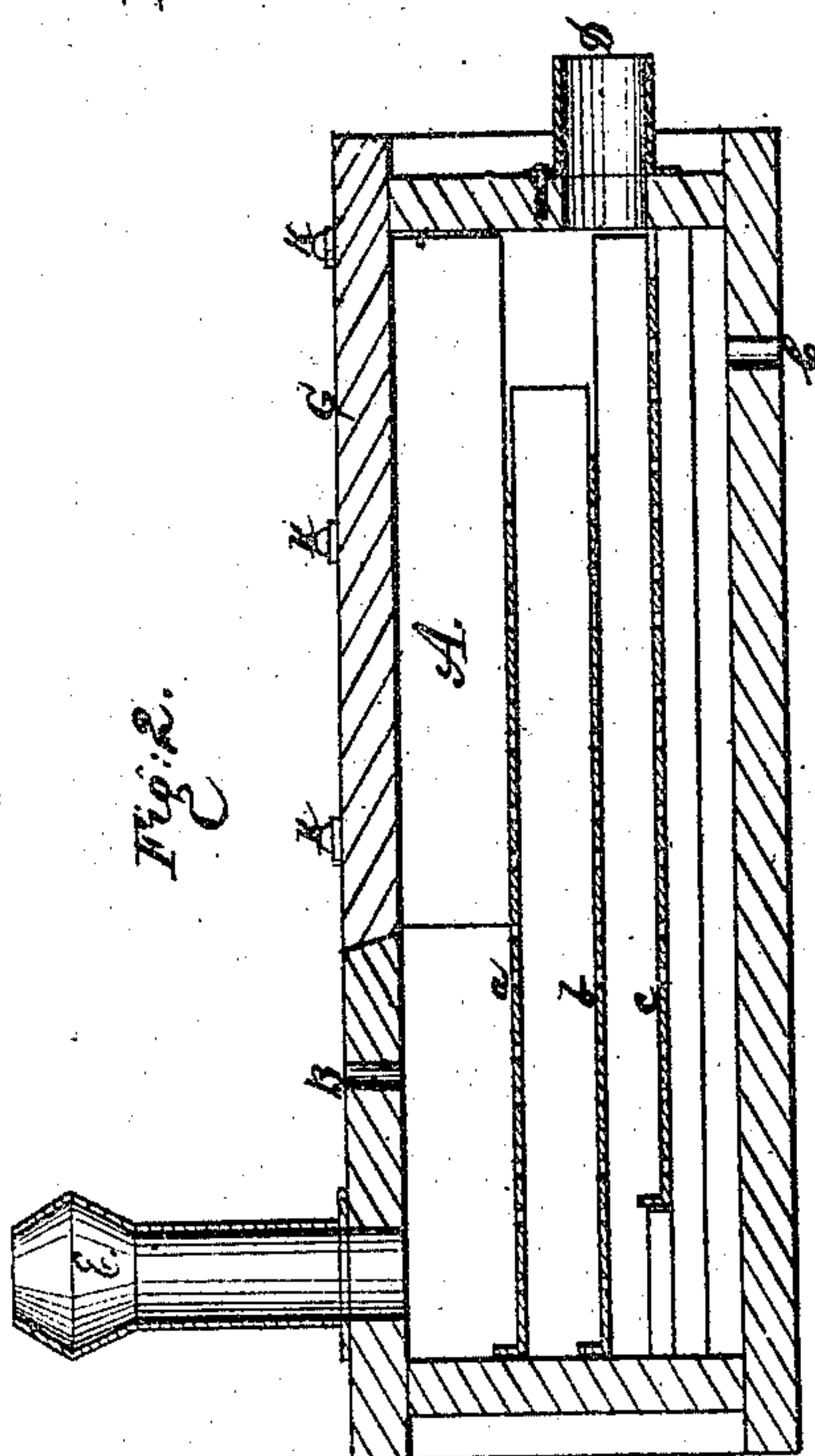
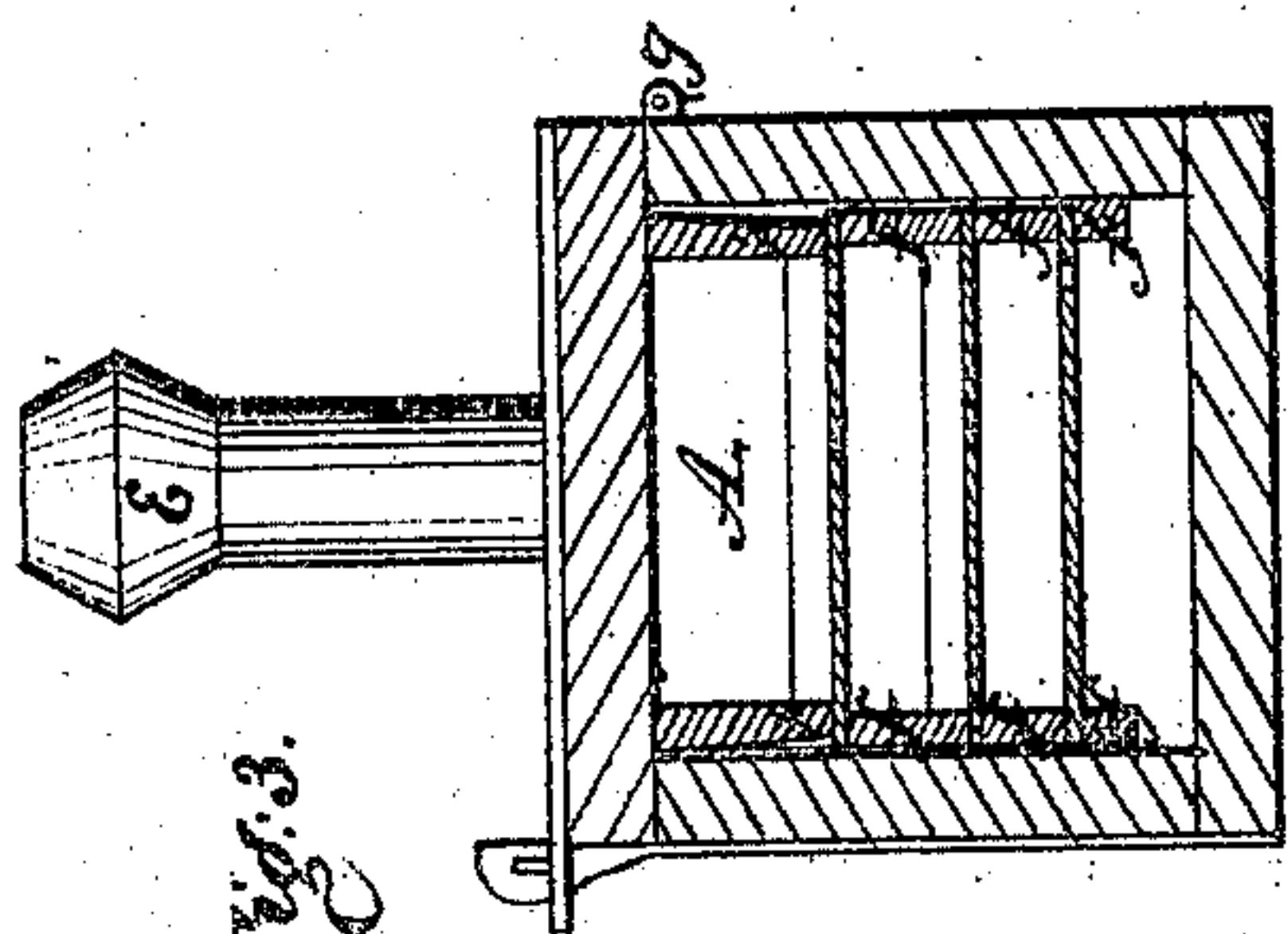


*Jackson & Davis,*

*Condenser.*

*No. 88,484.*

*Patented Mar 30. 1869.*



Witnesses  
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# United States Patent Office.

SAMUEL F. JACKSON AND JEFFERSON A. DAVIS, OF EUREKA, ILLINOIS.

*Letters Patent No. 88,484, dated March 30, 1869.*

## IMPROVED APPARATUS FOR HEATING AND SEPARATING LIME FROM WATER.

The Schedule referred to in these Letters Patent and making part of the same.

*To all whom it may concern :*

Be it known that we, SAMUEL F. JACKSON and JEFFERSON A. DAVIS, of Eureka, in the county of Woodford, and State of Illinois, have invented a new and valuable Improvement in a Spray-Heater and Lime-Extractor Combined; and do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a perspective view of the spray-heater and lime-extractor combined.

Figure 2 is a longitudinal section of the same.

Figure 3 is a transverse section of the same.

Our invention relates to spray-heaters and lime-extractors; and

It consists in providing more efficient means than have been heretofore devised for separating lime and other salts from water.

Letter A of drawings represents the body of the spray-heater and lime-extractor.

Letter B, an aperture in the top of the heater, near the escape-pipe.

Letter C, an aperture in the bottom, near the front end of the heater.

Letters *a b c* are perforated sheet-iron shelves, of unequal lengths, arranged, one above another, and supported by wooden slats, *f f f f f f*, as represented in fig. 3 of drawings.

Letter D represents a pipe, inserted in the front end of the heater, for carrying steam into the heater.

E, an escape-pipe for the steam.

Letters *e e e* (see fig. 2) are wedges, for fastening the lid, or door of the heater.

Letters F F are slats, fastened to the under side of the door, for the purpose of pressing down on the shelves, and securing them in their places.

Letter G (see fig. 1) represents the door of the heater, secured, on the back side, by strong hinges, *g*, (see fig. 3,) and, in the front, by wedges, *e e e*, in manner as set forth in fig. 1 of drawings.

Our device is operated as follows:

The impure water enters the heater by means of a suitable pipe inserted in aperture B, (see figs. 1 and 2,) when it falls upon perforated shelf *a*; from thence to shelf *b*; thence to shelf *c*; and thence to the bottom of the heater. Then, by means of a pipe inserted in aperture H, the purified water is conveyed away from the heater.

The heater can either be set on trestles, or hung on a frame-work, and the end from which the water leaves the heater is lowered, so that the water will all run out.

The steam enters the heater at the pipe in the front end of the heater, and the shelves in the heater are so arranged as to throw the steam equally under each shelf.

The steam passes through under the shelves, and goes out through the escape-pipe on top.

The water, falling through the small perforations in the shelves, becomes misty, and is rapidly heated by the steam, as it passes through the heater.

The lime, or other salt, is deposited on these perforated shelves, and on the bottom of the heater.

The shelves do not extend to the front, but a short opening is left, so that, if the perforations in the shelves should become closed by the formation of lime-sediment, the water can run over the ends; and they do not extend quite to the back end, so as to enable the steam to pass up to and through the escape-pipe.

These shelves are made of sheet-iron, and are cleaned from the lime-sediment by removing them from the heater, and rolling them up, when the sediment breaks into small pieces, and falls off.

The heater-box is made of two-inch lumber.

The lid, or door, on top, is secured to the back side of the heater-box by three hinges.

Three iron bars, or straps, *k k k*, are screwed on to the top of the door, extending from the back to the front side, and secured, by slots and wedges, to corresponding bars secured to the front side, perpendicularly, extending from the bottom to the top of the front side, as in manner set forth in figs. 1 and 2 of accompanying drawings.

What we claim as our invention, and desire to secure by Letters Patent, is—

A spray-heater and lime-extractor, having perforated shelves *a b c*, apertures B and C, lid, or door G, slats F F, and hinges and wedges, as described, constructed, arranged, and operating substantially as specified.

In testimony that we claim the above, we have hereunto subscribed our names, in the presence of two witnesses.

SAMUEL F. JACKSON.  
JEFFERSON A. DAVIS.

Witnesses:

JOHN S. WOOD,  
C. W. REYNOLDS.