

C.E. Hutson,

Steam Boiler Heater.

No. 100,631.

Patented Mar. 8, 1870.

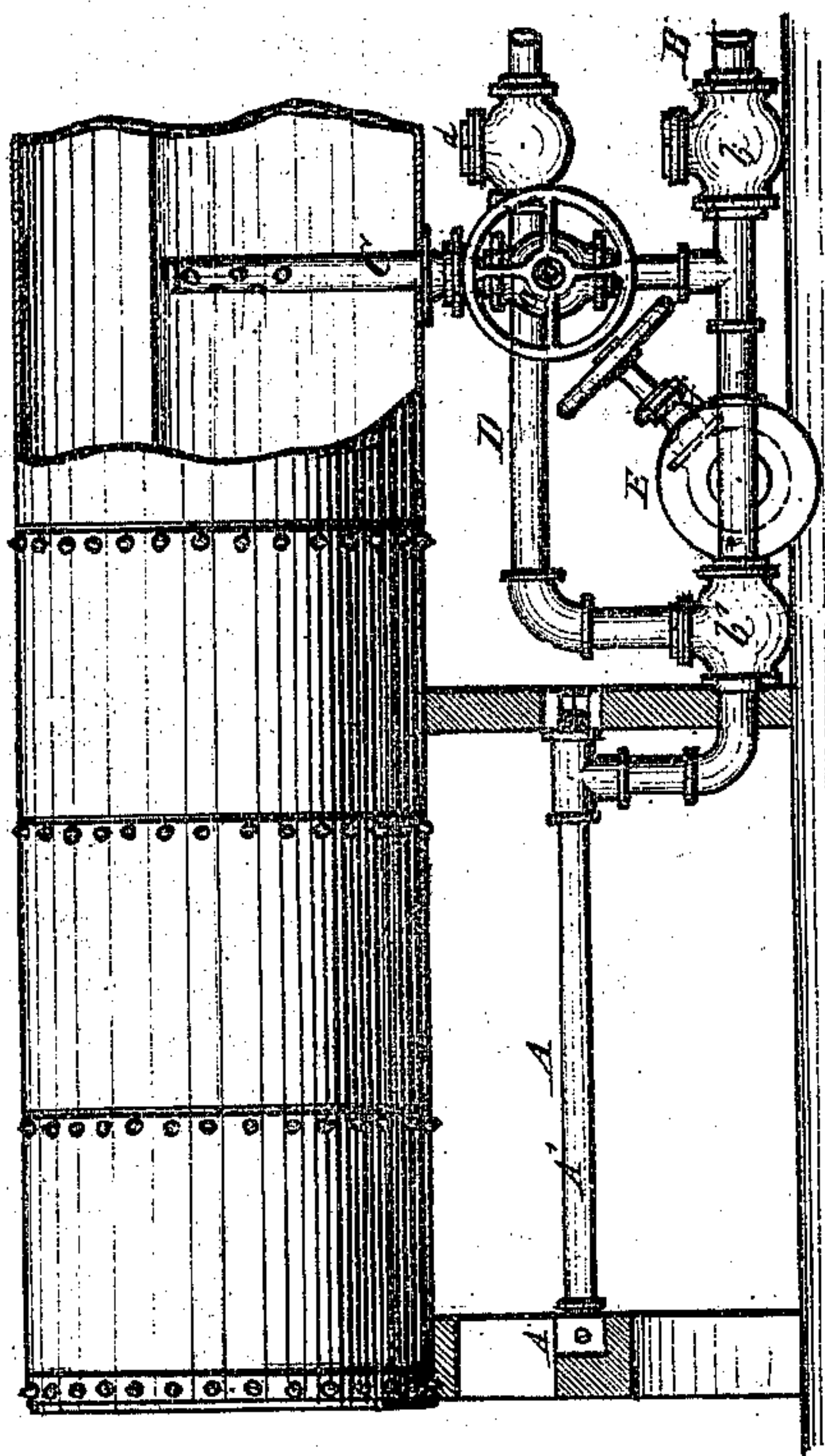


Figure 2.

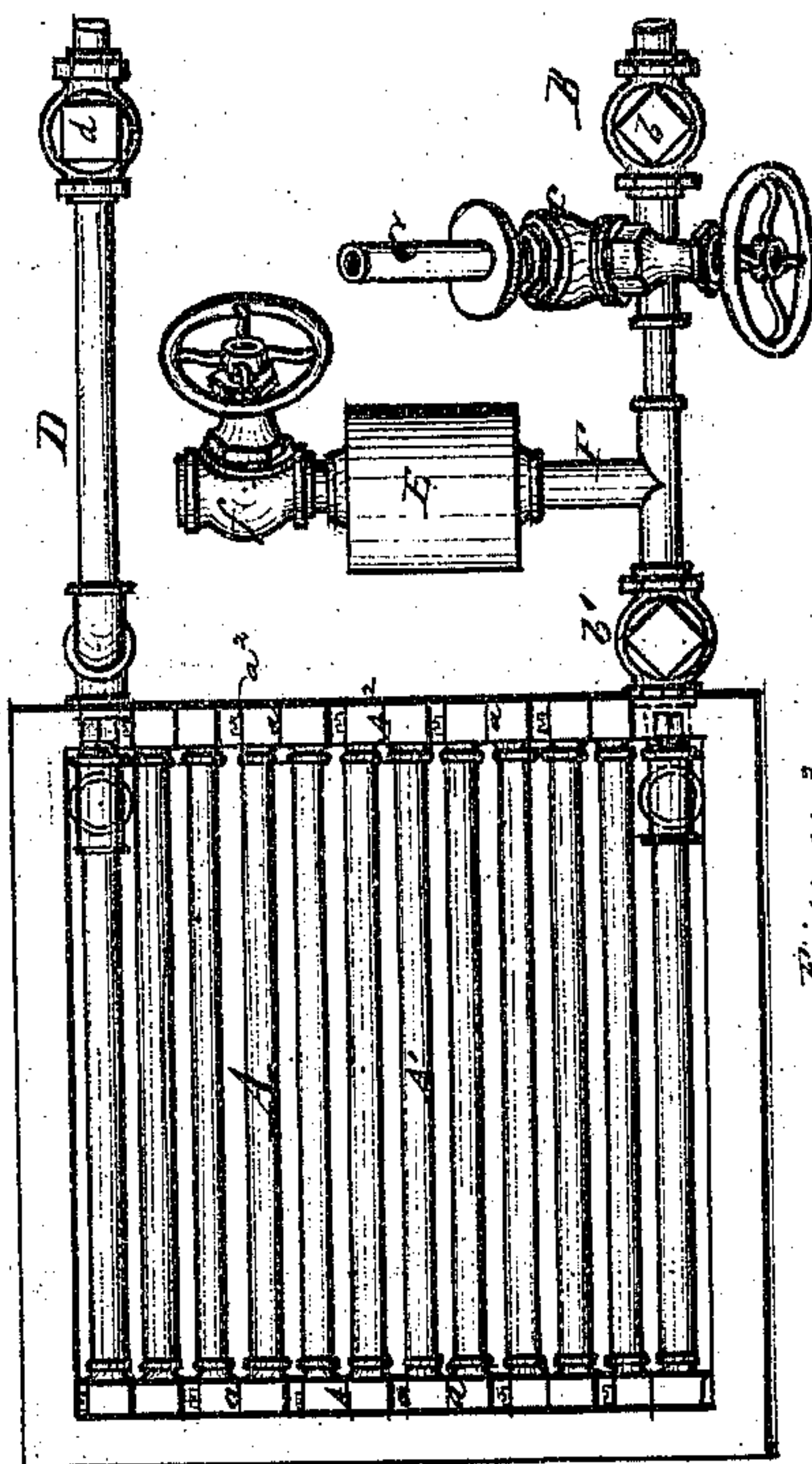


Figure 3.

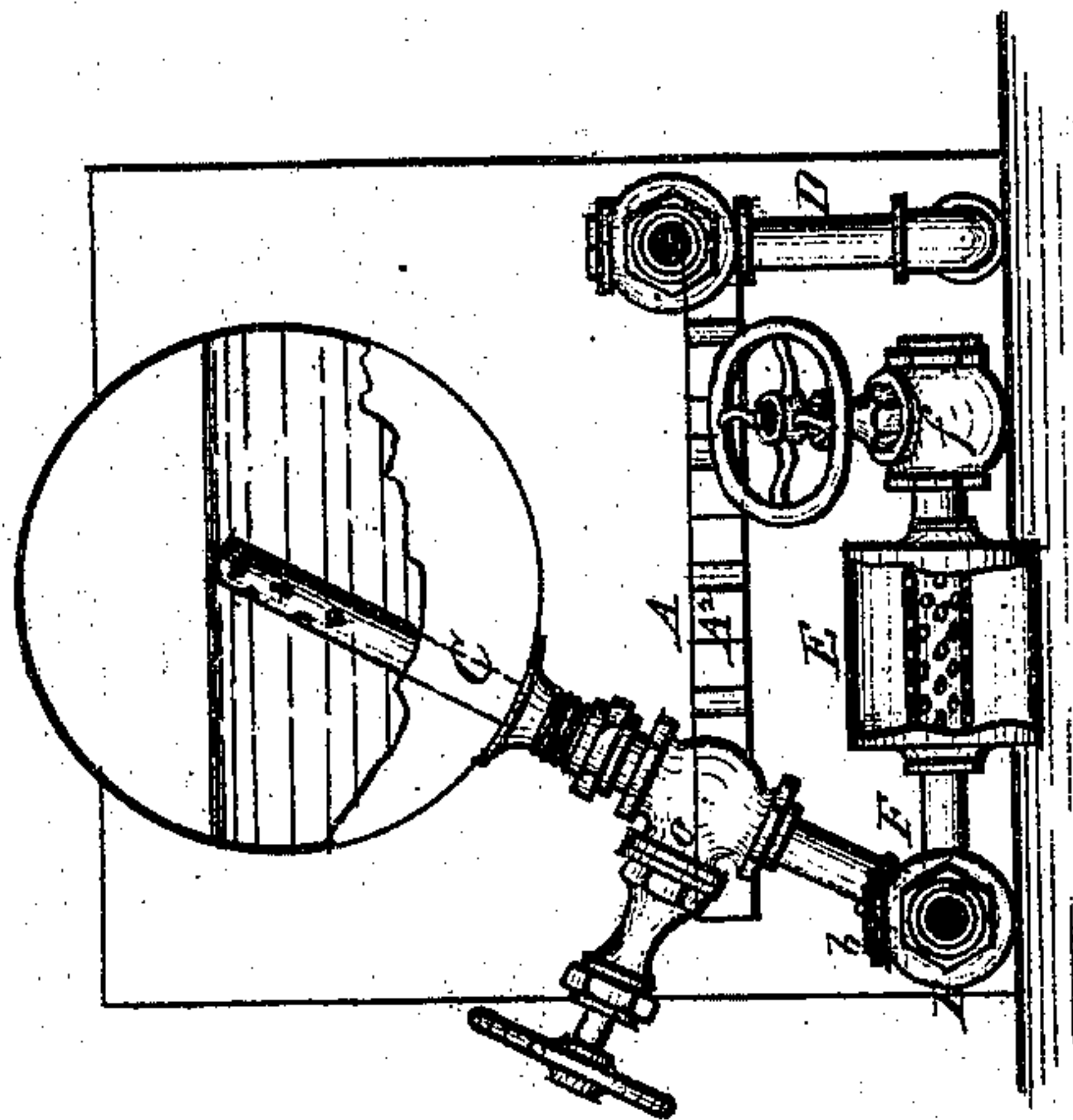


Figure 4.

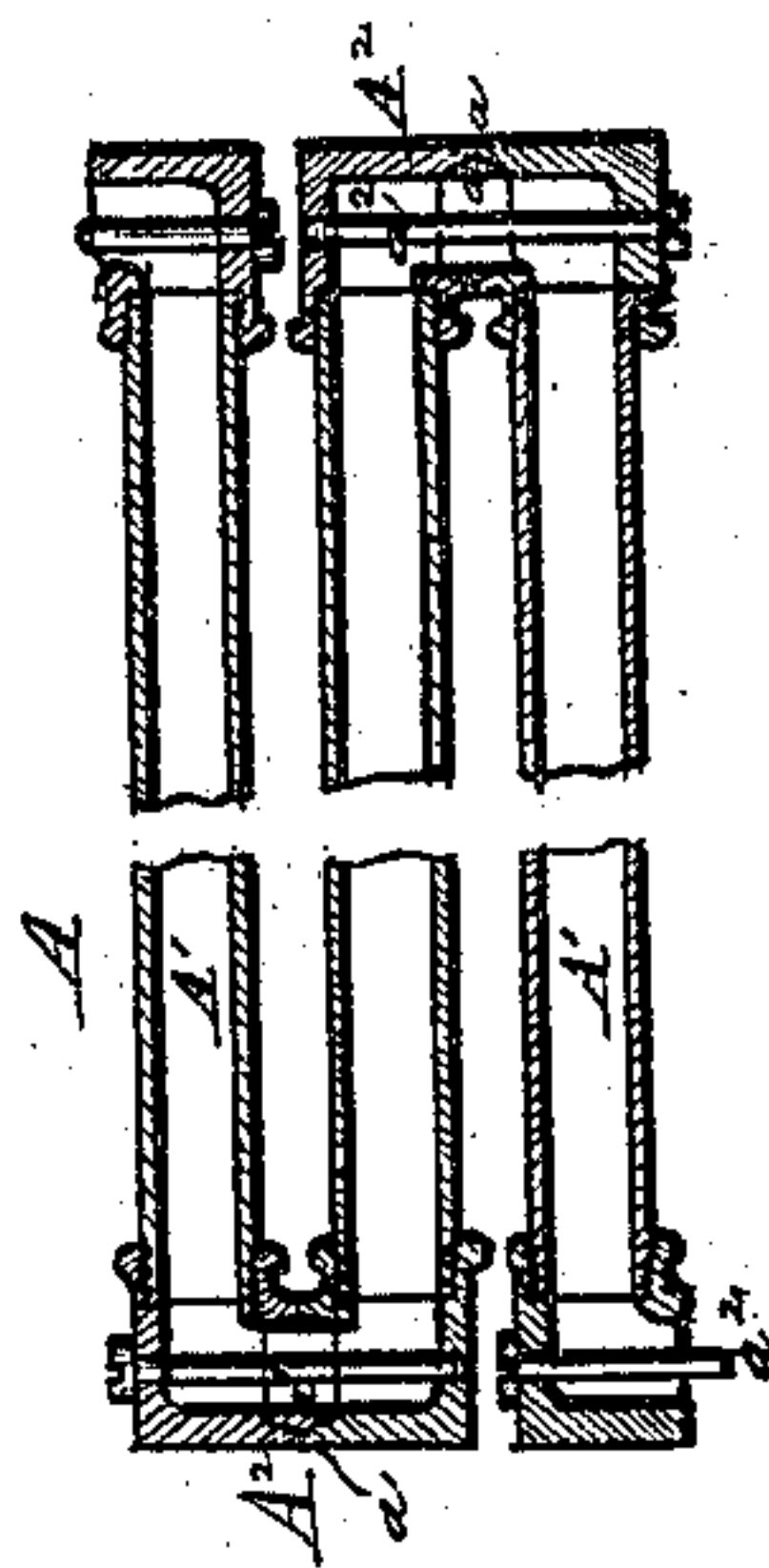


Figure 5.

Witnesses:

William W. Hirthel

Robert Burns.

Inventor:

C.E. Hutson by his Atty

Hirthel & Co



# United States Patent Office.

CHARLES E. HUTSON, OF COMMERCE, MISSOURI.

Letters Patent No. 100,631, dated March 8, 1870.

## HOLLOW GRATE FOR STEAM-BOILERS.

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

### To all whom it may concern :

Be it known that I, CHARLES E. HUTSON, of Commerce, in the county of Scott, and State of Missouri, have made certain new and useful Improvements in Grates for Heating Feed-Water for Boilers, and similar purposes; and I do hereby declare the following to be a full and true description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon.

This invention relates to the manner of passing water through hollow grate-bars, and connecting the water-flow at times with a steam (or steam and hot-water) jet from the boiler, so as to discharge mud, or sediment generally, at a proper mud-drum.

Said invention relates to the detail arrangement and construction of the parts, to enable the same to act more perfectly, to form an improved feed-water heater.

To enable those herein skilled to make and use my said invention, I will now more fully describe the same, referring to the accompanying—

Figure 1 as a rear-end view, showing certain parts in section, as hereafter explained.

Figures 2 and 3, respectively, are side elevation and plan.

Figure 4 is a detail sectional elevation of a series of grate-bars.

The grate-bars A will be supported in the usual manner upon proper foundations, so that fuel may be placed thereon, and be consumed in a combustion-chamber or furnace of the usual form.

Connecting with the end grate-bar is the cold-water feed-pipe B, coming from an ordinary cold-water pump, or from a heater or other feed-water supplying-vessel.

In said feed-pipe is a check-valve, *b*, preventing a return flow of the water.

In connection with said feed-pipe B, I arrange a steam or hot-water jet-pipe, C, the upper end whereof is suitably perforated, and which passes into the boiler or other vessel which is to be supplied with water.

At the joint of the pipe C with the skin of the boiler, a suitable cap will be placed, firmly securing the pipe C to the boiler, and making a steam-tight joint, in the usual manner.

Said pipe C has a valve, *c*, operated by hand-wheel, or in any other manner, by the operator, so as to cut off the steam or water in its passage from the boiler, and prevent the entrance of feed-water from the pipe B.

A second check-valve, *b'*, is placed in the feed-pipe B, beyond the joint with said pipe of the pipe C. This check-valve again is arranged to prevent a re-

turn flow of the feed-water immediately from the grate-bars.

The feed-water passes from the pipe B into the grate-bars A, and through the same to the influent pipe D, and from this into the boiler as a feed-water supply.

The connection of the pipe D with the boiler is in the ordinary manner, and said pipe has a check-valve, *d*, of proper form to prevent the return flow of the water.

As the feed-water passes from the pipe B through the grate-bars, it becomes heated, and, at the same time, acts to reduce the heat of the grate-bars, to prevent them from being consumed by the fuel and by oxidation.

In order to retain the sediment out of the feed-water, so as to prevent the same from depositing in the grate-bars, or from accumulating in the boiler, I arrange in connection with the feed-pipe B a mud-drum, E, about the side pipe F, which connects directly with said pipe B, and passes steam-tightly through the drum E, and is perforated for that part of its length which is within said drum. This is more clearly indicated in fig. 1, where the mud-drum E is shown in sectional elevation, to reveal the perforated pipe F.

The pipe F has a suitable blow-off valve, *f*.

It is plain that the feed-water, as it rises from the pipe B to the heating-chamber formed by the grate-bars, will deposit a great deal of its lime, sand, and other sedimentary matter, and this will pass to the side pipe F and the drum E. In order to wash out said drum, the operator opens the jet-pipe valve *c*, and the inflowing jet of steam, or steam and hot water, from the boiler, striking against the feed-pipe flow in B, will cause the sediment in E and F to pass out at the opened blow-off valve *f*. At the same time, a reflow of the water out from the grate-bars and influent pipe D cannot take place, because of the check-valve *b'*, while the necessary feed-water flows through the grate-bar still occur, owing to the pressure of steam from pipe C, which operates more or less powerfully through the pipe B, as well as the pipe F.

In order to form the grate-bars removably, so as to cause as little damage as may be in case one bar is disabled, the said bars consist principally of the usual wrought-iron-pipe part A<sup>1</sup>, joined, by a screw or flange-joint, with the head castings A<sup>2</sup>.

The head castings of two adjoining bars abut at the edge *a*, and, to make a packed joint, a double-cone packing-ring, *a'*, is inserted. The through-bolt, *a''*, then, in drawing up, makes the joint perfect, as more clearly appears in fig. 4.

The construction of all of said parts is simple, insuring great durability, and the arrangement of the whole device, with the check-valves, insures great safety, while the operation of the whole is such that a loss of heat is avoided to great degree.

Having thus fully described my invention,

What I claim is—

The combination of the feed-pipe B, jet-pipe C, side pipe F and drum E, grate A, and influent D,

and arranged with valves and stop-cocks, substantially as set forth.

In testimony of said invention, I have hereunto set my hand, this 23d day of September, A. D. 1869, in the presence of—

C. E. HUTSON.

Witnesses:

GEORGE P. HERTHEL, Jr.,  
WILLIAM W. HERTHEL.