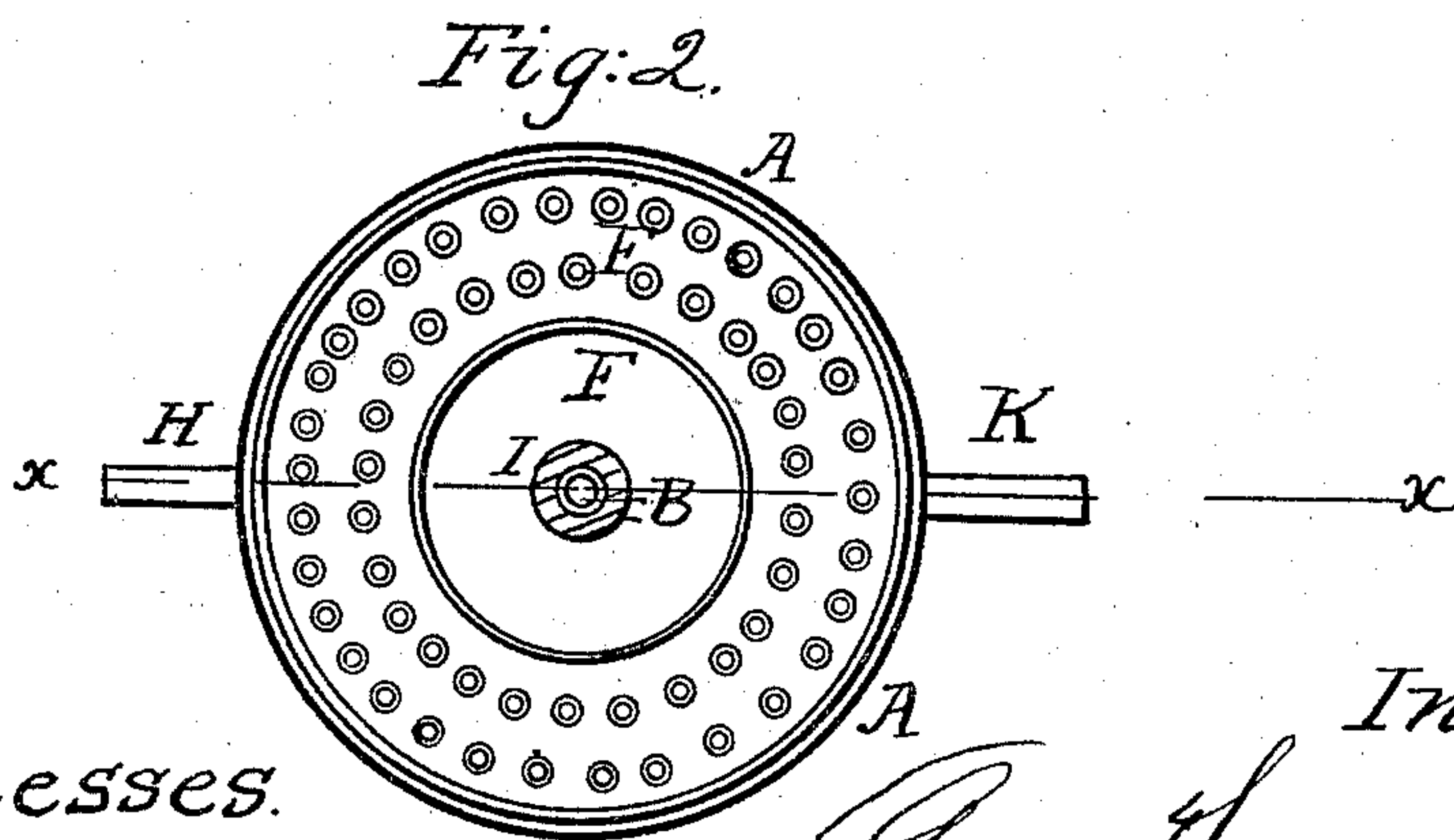
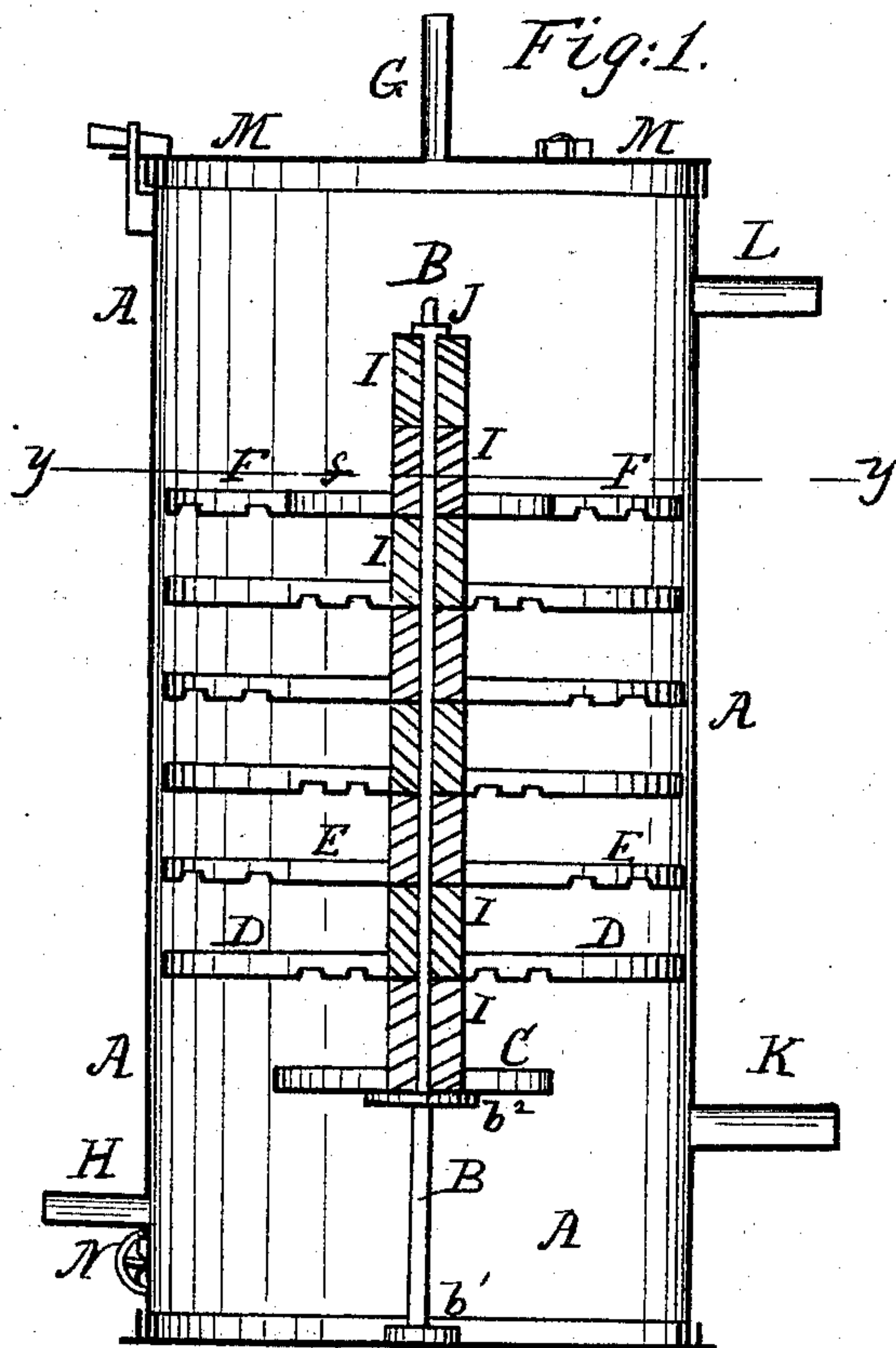


*Hosecoster & Stephens,*  
*Steam-Boiler Condenser.*  
*No 58,099. Patented Sep. 18, 1866.*



*Witnesses.*

*Jas. A. Service  
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 Isaac Stephens  
 Per Messrs C  
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# UNITED STATES PATENT OFFICE.

GEORGE HASECOSTER AND I. STEPHENS, OF RICHMOND, INDIANA.

## IMPROVEMENT IN FEED-WATER HEATERS.

Specification forming part of Letters Patent No. 58,099, dated September 18, 1866.

*To all whom it may concern:*

Be it known that we, GEORGE HASECOSTER and ISAAC STEPHENS, of Richmond, Wayne county, State of Indiana, have invented a new and useful Improvement in Feed-Water Heaters; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical longitudinal section of our improved feed-water heater, taken through the line *x x*, Fig. 2. Fig. 2 is a horizontal cross-section of the same, taken through the line *y y*, Fig. 1.

Similar letters of reference indicate like parts.

Our invention has for its object to furnish an improved feed-water heater for steam-boilers, by means of which the water to feed the boiler may be heated, and the lime which may be in it be deposited before it is introduced into the boiler; and it consists of a series of removable perforated shelves constructed, arranged, and combined with each other, with the connecting-rod and washers, and with the cylinder, as hereinafter more fully described.

A is the cylinder, the capacity of which will vary with the capacity of the boiler for feeding which the apparatus is to be used. The cylinder may be made of heavy sheet-iron, with cast-iron heads keyed or bolted fast. B is the connecting-rod, the lower end of which terminates in a button or plate, *b'*, which rests upon the bottom or lower end of the cylinder, as shown in Fig. 1. A short distance above the button *b'* there is securely attached to the rod B another button or plate, *b''*, upon which the series of perforated shelves or plates rest. Immediately upon the plate *b''* rests the lowest plate or shelf, C, of the series. This shelf C is not perforated, is much smaller than the others, and has around its edge an upwardly-projecting flange about an inch in height, as shown in Fig. 1. The next shelf, D, is of a diameter about equal to the interior diameter of the cylinder A, and has an upwardly-projecting flange around its edge about an inch in height.

The bottom of the plate D is perforated from the under side with numerous holes, so that

the edges of the holes may project upward about a quarter of an inch above the upper surface of the plate D. These holes must all be around the central part of the plate, so that the water that flows through them may all fall upon the plate C.

The plate or shelf E is exactly similar to the plate D, except that the perforations are arranged around the outer edge of the shelf, so that the water that falls through them may all fall upon the plain part of the shelf D outside of the perforations through said shelf. The other shelves of the series are all arranged in the same manner—that is, the perforations are alternately around the center and around the outer edge.

Around the central part of the upper shelf, F, is formed a cup, *f*, or upwardly-projecting flange, as shown.

The water is introduced into the heater through the pipe G, and first falls within the cup formed upon the upper surface of the shelf F, and flows over the edges of the said cup and through the holes formed through the said shelf.

It will be observed that as the water flows from one shelf to another it always falls upon the plain part of the shelf, and has to flow a short distance along the surface of such shelf before it can find its way through to the next lower one.

When the water reaches the shelf C it falls thence directly to the bottom of the cylinder, and passes thence through the pipe H to the boiler.

The shelves C D E, &c., are separated from each other by washers I, of a height equal to the desired distance between the plates.

The washers and shelves are all removable, and are secured in place upon the rod B by the nut J, as seen in Fig. 1.

Steam is introduced into the heater from the exhaust-pipe of the engine through the pipe K, and any uncondensed steam may escape through the pipe L at the upper end of the cylinder. The water, as it makes its way through the cylinder from one shelf to another, comes in contact with the steam and becomes heated, depositing any lime that may be in it upon the shelves during its passage, and escapes through the pipe H heated almost to the boiling-point.

If desired the lime may be still further fil-

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tered from the water by passing the said water through a filter of hay, straw, or shavings. To clean the heater the pipe G is uncoupled and the head M removed. The rod B and the shelves attached to it are then lifted from the cylinder, and cleaned either by taking the shelves and washers from the rod for that purpose, or in any other convenient manner.

For convenience in cleaning the cylinder, a hand-hole, N, may be made through its lower part, if desired.

We do not claim the parts the subject-matter of the patents of Richard Bristol, of February 24, 1863, or of E. R. Stilwell, of October 4, 1864; but

What we do claim, and desire to secure by Letters Patent, is—

The combination of the rod B, flanged shelf C, flanged perforated plates D E F, constructed and arranged as described, the receiving-cup f, and washers I with the cylinder A, substantially in the manner, and for the purpose herein specified.

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Witnesses:

LEWIS D. STUBBS,  
ISAAC H. DIX.

*Stile*