

J. SHACKLETON.
STEAM-BOILER.

No. 171,436.

Patented Dec. 21, 1875.

Fig. 1.

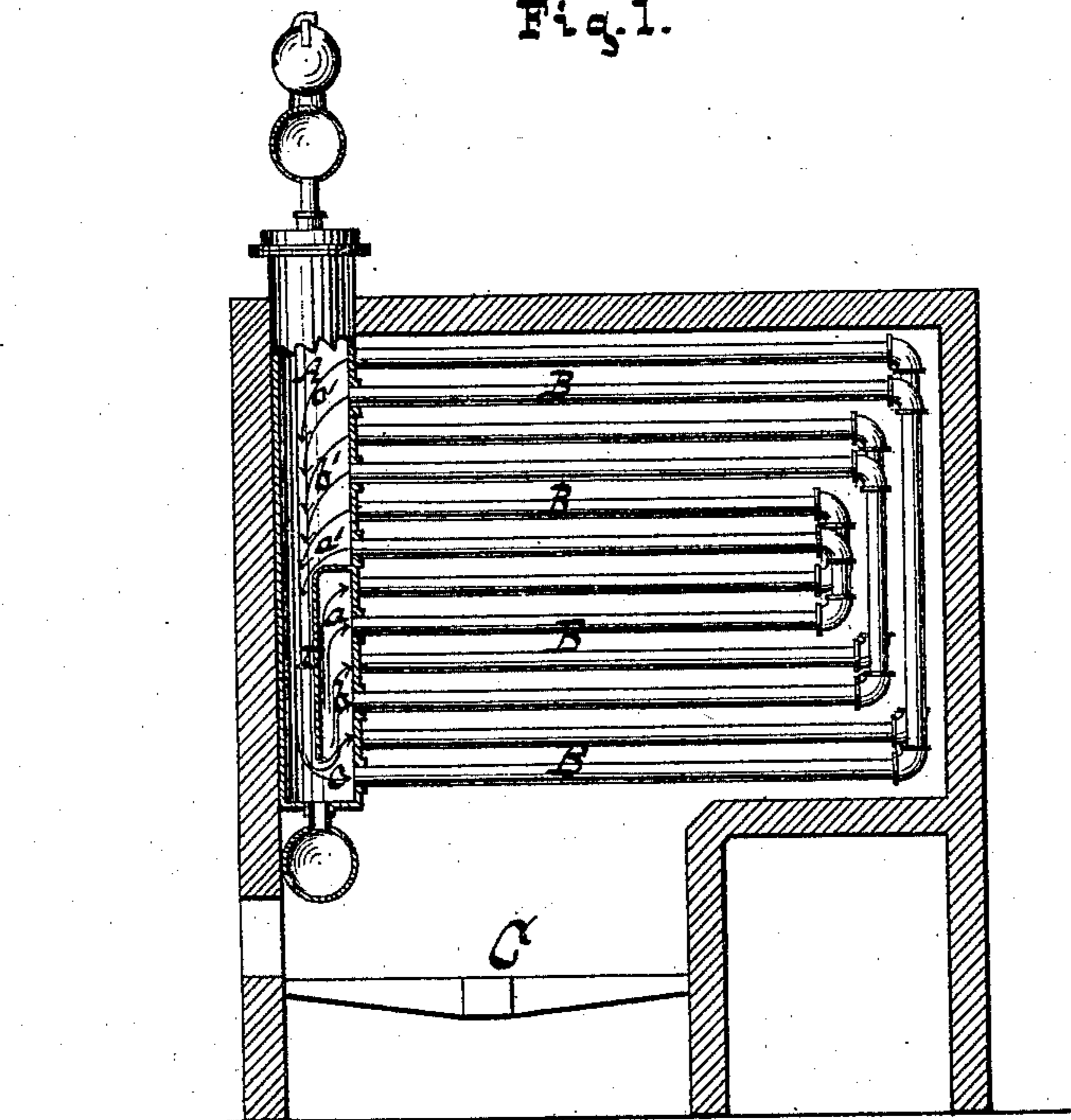
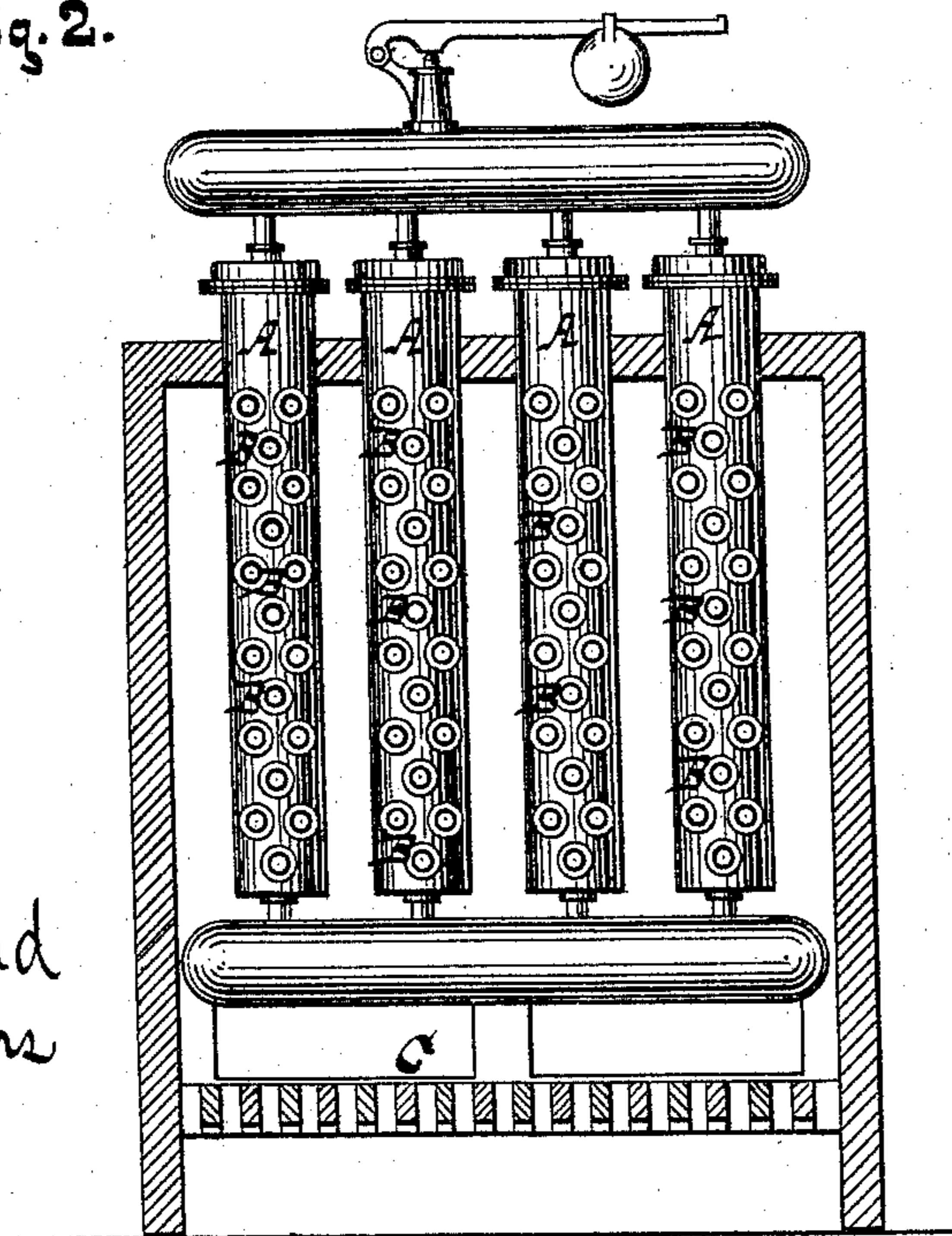


Fig. 2.



Witnesses.

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JOSEPH SHACKLETON, OF BUFFALO, NEW YORK.

IMPROVEMENT IN STEAM-BOILERS.

Specification forming part of Letters Patent No. **171,436**, dated December 21, 1875; application filed October 29, 1875.

To all whom it may concern:

Be it known that I, JOSEPH SHACKLETON, of Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Steam-Boilers, which improvement is fully set forth in the following specification, reference being had to the accompanying drawing, in which—

Figure 1 represents a longitudinal vertical section. Fig. 2 is a transverse section.

Similar letters indicate corresponding parts.

This invention relates to an improvement in that class of steam-boilers in which a series of U-shaped pipes are secured with their open ends in a common uptake, said pipes extending in a horizontal direction over a fire-grate, so that when they are filled with water and exposed to the action of the fire, a rapid and abundant generation of steam is effected.

My present improvement consists in combining an F-shaped partition or screen with the uptake, and with the U-shaped water-pipes extending from the same, in such a manner that a complete circulation of water through the U-shaped pipes is effected, and the escape of solid water with the steam is prevented.

In the drawing, the letter A designates the uptake of my steam-boiler, from which extend a series of U-shaped pipes, B, which are of gradually-increasing length, so that each succeeding one will entirely embrace those preceding. Each of these U-shaped pipes is secured in the uptake with its open ends, and all said pipes extend over the fire-grate C, which is situated in the lower part of the furnace-wall which surrounds my boiler. In the interior of the uptake is secured an F-shaped partition or screen, D, which separates the lower apertures *a b c* of the U-shaped pipes from their upper apertures *a' b' c'*.

If the boiler is filled with water, and a fire is raised on the grate C, the water contained in the lower branches of the U-shaped pipes is driven out above, and the water thus displaced is immediately replaced by water from the uptake, and by these means a complete

circulation of the water through the boiler is effected, and at the same time the water which issues from the upper apertures *a' b' c'* of the U-shaped pipes is immediately drawn down to supply the water displaced from the lower branches of said pipes, and the steam which disengages from the water, and which accumulates in the upper portion of the uptake, is free from solid particles of water.

It is obvious that the number of U-shaped pipes emanating from the uptake A can be increased to any desired extent.

In the example represented by the drawing I have shown four uptakes, A, which are connected at the bottom to a common horizontal drum, D, and at the top to a common steam-dome, E.

In each of the uptakes are secured three sets of U-shaped pipes, B, which may be staggered, as indicated in Fig. 2. By this arrangement a boiler of any desired capacity can be constructed, and steam can be generated with rapidity, safety, and economy.

The U-shaped pipes B are secured in the uptake, each with its open ends at different levels, one of the said ends of each U-shaped pipe being situated above the other end, so that by the difference of the temperature in the two horizontal branches of each pipe combined with the action of the diaphragm, a constant circulation of the water through said U-shaped pipes is insured.

What I claim as new, and desire to secure by Letters Patent, is—

The combination of a series of return-tubes, having ascending branches, with an uptake and a deflector, D, the upper ends of all the said return-tubes being situated above, and their lower ends below, the deflector, as and for the object specified.

In testimony that I claim the foregoing I have hereunto set my hand and seal this 18th day of September, 1875.

JOSEPH SHACKLETON. [L. S.]

Witnesses:

EDWD. C. HAWKS,
T. H. HUBBELL.