

(No Model.)

W. B. HOSFORD.
FEED WATER PURIFIER.

No. 488,813.

Patented Dec. 27, 1892.

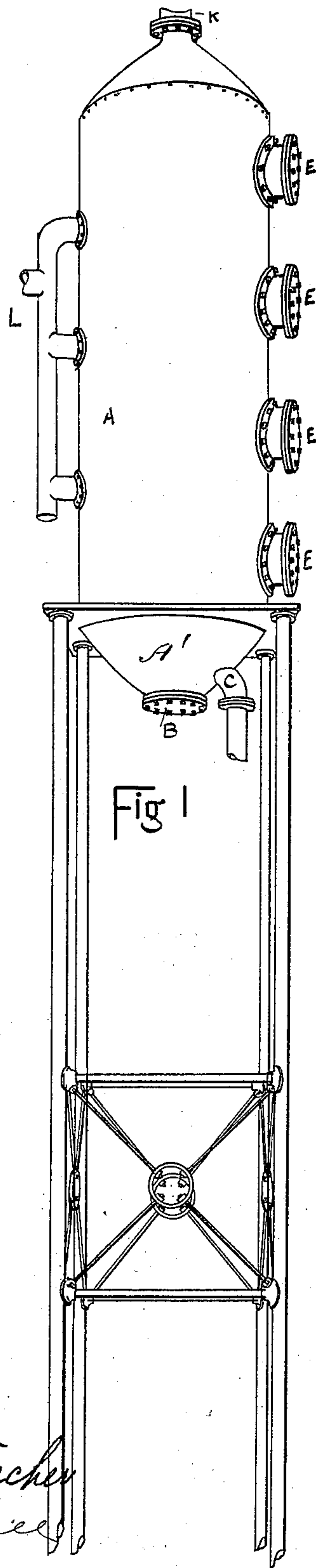
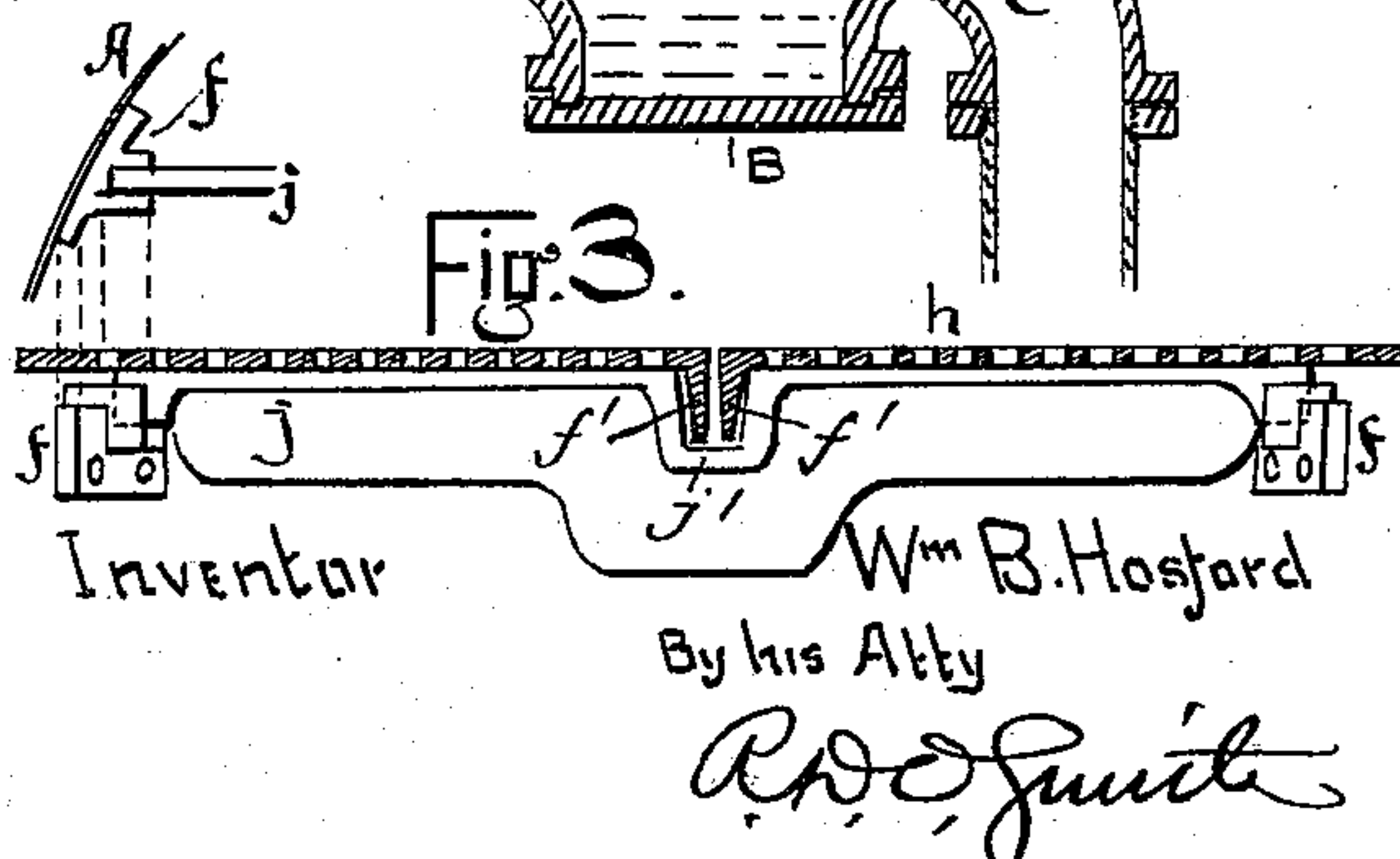
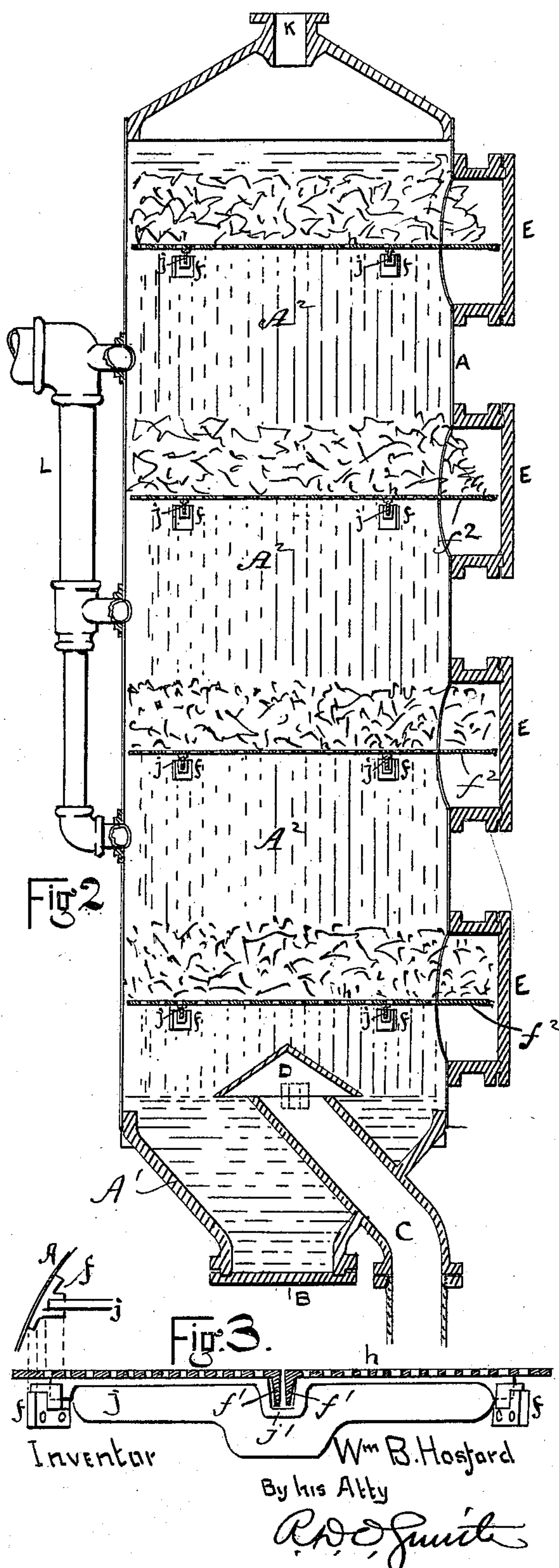


Fig 1



Attest
J. F. Fischer
C. W. Green

Inventor

Wm B. Hosford
By his Atty

R. D. Smith

UNITED STATES PATENT OFFICE.

WILLIAM B. HOSFORD, OF MISHAWAKA, INDIANA.

FEED-WATER PURIFIER.

SPECIFICATION forming part of Letters Patent No. 488,813, dated December 27, 1892.

Application filed April 15, 1892. Serial No. 429,326. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM B. HOSFORD, of Mishawaka, in the county of St. Joseph and the State of Indiana, have invented new and useful Improvements in Feed-Water Purifiers; and I do hereby declare that the following is a full and accurate description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of one of my purifiers mounted for use. Fig. 2 is a longitudinal section of the same. Fig. 3 is an elevation of one of the shelf supporting bars.

It is known that at and above a temperature of 266° Fahrenheit, water parts with and precipitates its mineral matter held in solution, and for that reason hard feed waters cause boilers to scale when steam is carried at any of the pressures now common in engine practice. To avoid this scaling, various chemical precipitants have been employed and also feed water has been heated to the temperature required to cause complete precipitation before entering the boiler.

My invention relates to this last named mode and it consists in a vessel adapted to be readily inspected, loaded and unloaded and parts kept at the required temperature.

I am aware that I was not the first to admit steam from the boiler to the purifier, and do not claim broadly the maintenance of the required temperature by the admission of steam from the boiler.

My purifier is conveniently a cylindrical shell A of boiler iron and is supported on end at an elevation high enough for the purified feed water to descend from it by gravity into the boiler. A purifier so placed is shown in Fig. 1 which represents the way in which I have used it in connection with steam boilers. It will be understood that if the water is to be purified for any use other than boiler feeding, there will be no necessity for the high elevation of the purifier. The shell A is provided at its upper end with an inlet K for the feed water, and its lower end with a conical head A' having its apex a removable plate B or other means for the ready removal of the solid matters which may settle in the lower end of the purifier. There is also at the lower end an escape pipe C for the feed

water which pipe enters through the side of said conical head in a direction inward and upward and the inner end of said pipe is provided with a hood D so that solid particles descending with the water shall not enter said pipe and be carried into the boiler. Along the side, I provide a series of hand holes E about on the horizontal plane of the center of said holes L rivet to the shell at proper intervals, bracket lugs *f* to receive and support bars *j* upon which I place the perforated shelves *h*, said shelves being made in two or more parts for easy entrance or exit through the hand holes E. These shelves when in place divide the vessel into separate heating and deposit chambers A². To prevent the half-shelves from slipping inward toward each other, and overlapping and permitting the coke to drop from one apartment to the next, they are provided on their meeting edges with flanges *f'*. These flanges also stiffen the shelves and enable them to sustain the weight of the superimposed material. The bars *j* are provided at their middles with downward bends *j'* which receive and hold the flanges *f'*. Opposite the hand holes the shelves have forward extensions *f*² which occlude what would otherwise be an open space and furnish supports for the coke out as far as the hand-hole cover. Steam is admitted from the boiler by pipes L below the several shelves *h* which are respectively covered by thin layers (say sixteen or eighteen inches in thickness) of some solid insoluble substances which will present solid nuclei for the deposit of lime held in solution by the water. A separate inlet pipe is provided for each chamber A² so that the maximum temperature may be maintained in each chamber and the necessary precipitation caused independently in all parts of the purifiers. This material may be anything convenient such as broken stone &c. but coke is preferable to all others because of the great area of exposed surface presented by its cellular structure, and because after its use in the purifier it presents a material of some combustible value.

The shelves *h* are arranged opposite the middle of the hand holes so that access may be had readily to the interior both above and below each shelf, and the admission of steam be-

low each shelf keeps the temperature approximately uniform throughout the system, so that the deposition of the calcareous matter may be continuous throughout the passage of the water through the purifier, a result which is not feasible when the filtering material is presented in thick masses through which the water slowly percolates. By this arrangement the feed water may be completely and rapidly purified of its calcareous and other suspended matters, and the rapidity of the process forms an important element of value in my apparatus, because the size of the same must necessarily be increased as the flow through is retarded, and also in proportion to the retardation of the flow the expenditure of steam to maintain the temperature is increased. These are both considerations of high importance. Another point of practical importance is in the fact that the purifier does not retain a large amount of stored water, but that the water passes away as rapidly as it descends to the lower compartments.

Having described my invention I claim—

25 1. In a feed water purifier, the vessel or shell provided with hand holes, combined with divided shelves situated in proximity to

said hand holes and having along their meeting edges vertical flanges, and supports for the shelves, substantially as set forth. 30

2. In a feed water purifier the vessel or shell provided with hand-holes E, extending out laterally from said vessel, divided shelves *h* supported within said vessel and having extensions *f*² projecting outward into said hand-holes, and dividing said vessel into separate compartments, and live steam pipes L communicating independently of each other with said vessel between the shelves, substantially as set forth. 35 40

3. In a feed water purifier, the combination with the vessel A having lugs *f*, of the divided shelves *h* having along their meeting edges flanges *f'*, and supporting bars J mounted within the vessel and having depressions or downward bends *j'* to receive the said flanges of the shelves, the vessel being provided with hand holes E opposite the shelves, substantially as set forth. 45

W. B. HOSFORD.

Witnesses:

C. W. GILL,
D. O. FONDA.