

(No Model.)

W. WEBSTER.

APPARATUS FOR PURIFYING FEED WATER.

No. 390,927.

Patented Oct. 9, 1888.

Fig. 1.

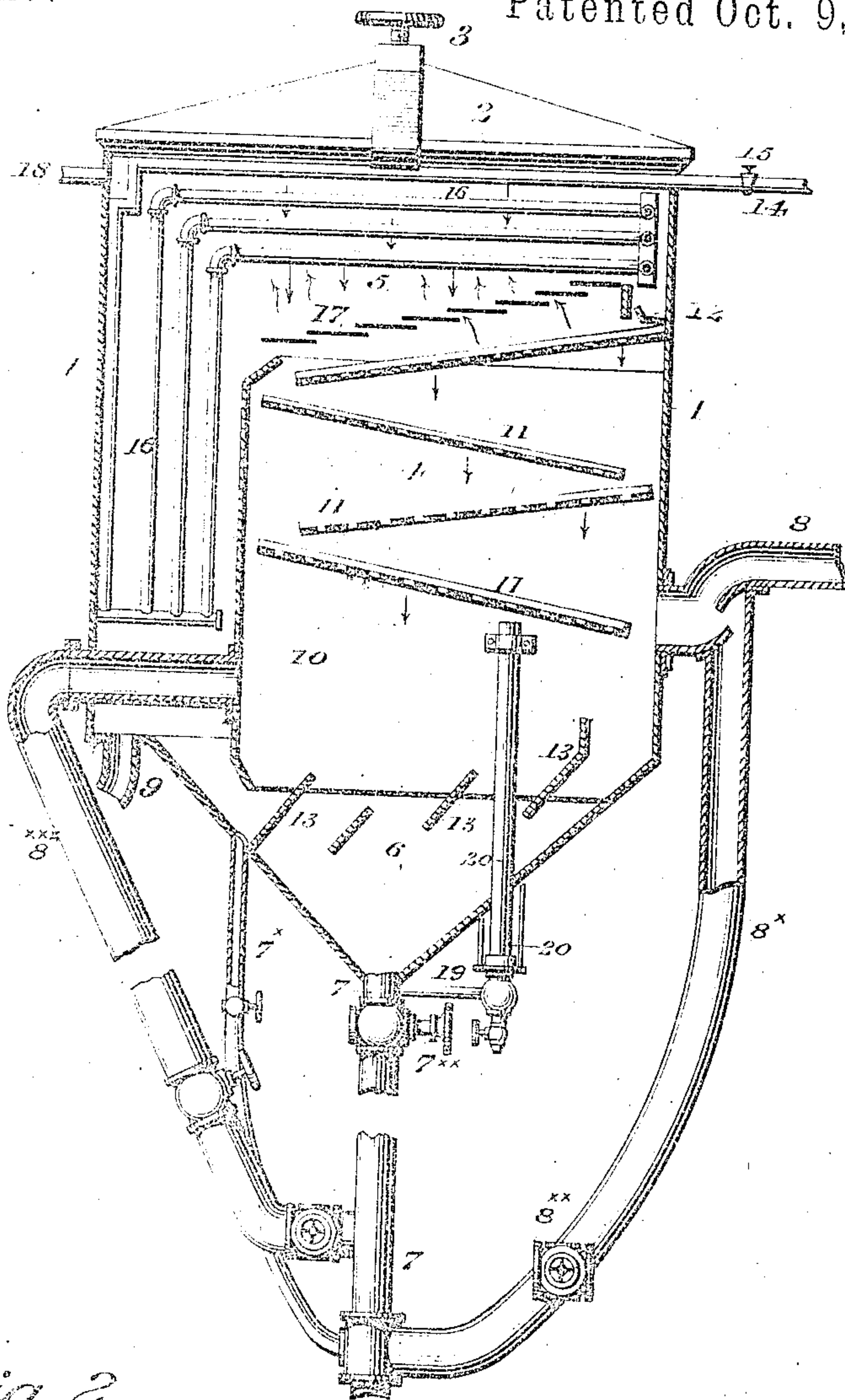
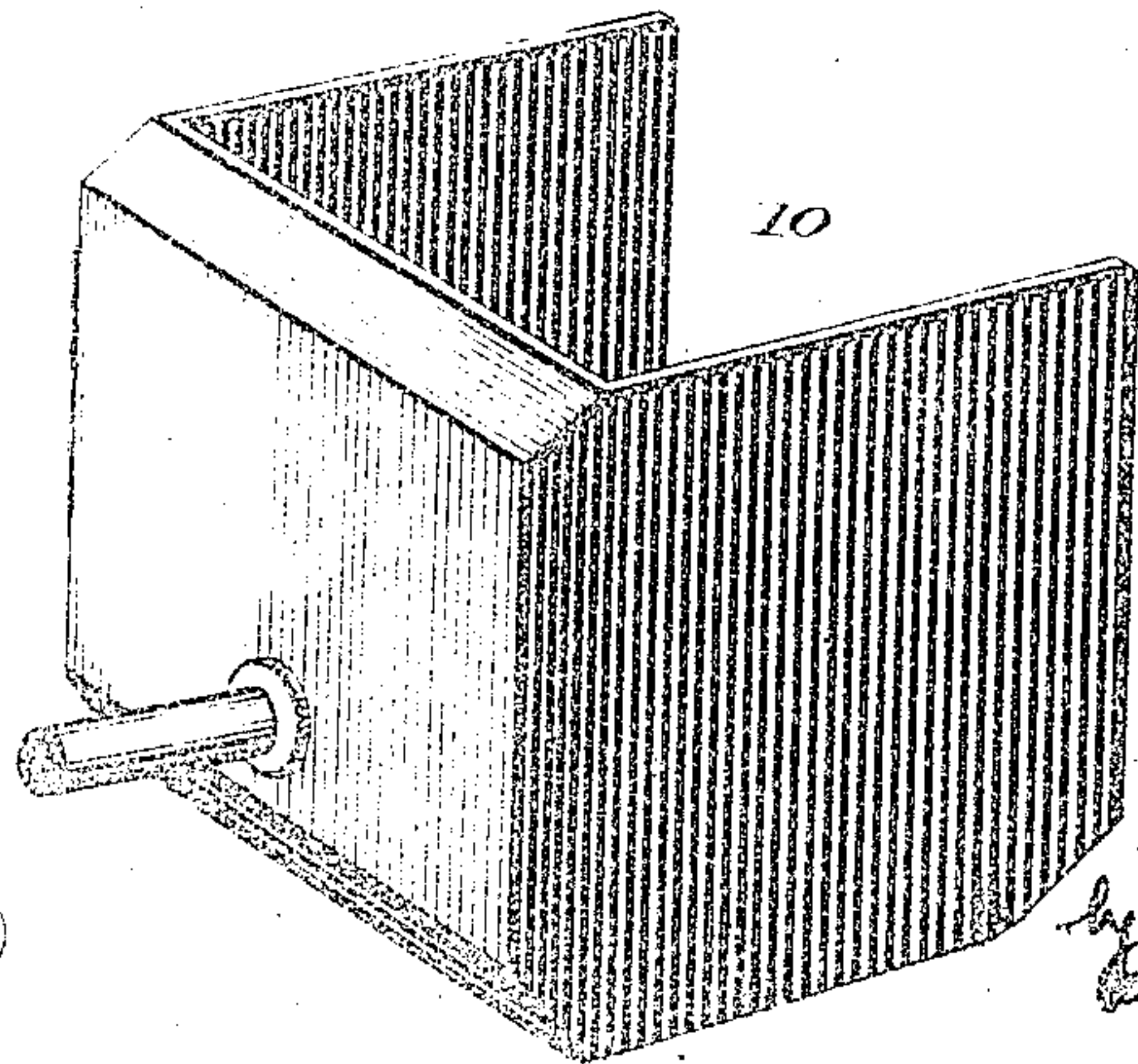


Fig. 2.



WITNESSES:

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APPARATUS FOR PURIFYING FEED-WATER.

SPECIFICATION forming part of Letters Patent No. 390,927, dated October 9, 1888.

Application filed May 31, 1888. Serial No. 273,514. (No model.)

To all whom it may concern:

Be it known that I, WARREN WEBSTER, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Apparatus for Purifying Feed-Water, which improvement is fully set forth in the following specification and accompanying drawings.

My invention relates to improvements in apparatus for purifying water, and is especially designed as an improvement upon similar apparatus for which I have made applications for Letters Patent March 29, 1888, Serial No. 268,859, and May 3, 1888, Serial No. 272,671.

The object of the present invention is to improve the construction of the before-mentioned apparatus, and provide one which shall be simple in construction, thoroughly efficient in operation, and inexpensive of production.

The invention consists of a water-purifier comprising an outer vessel or shell having located therein a vaporizing and purifying chamber, a sediment well or receptacle, and a condensing-chamber; further, in an outer casing or shell containing a vaporizing and purifying chamber, a sediment well or receptacle, a condensing-chamber, a delivery-pipe communicating with the vaporizing or purifying and condensing chamber, water and steam supply pipes, and an overflow pipe, all arranged as shown; and, finally, the invention consists in the details of construction and adaptation of parts for service, as hereinafter described and specifically claimed.

Figure 1 represents a vertical longitudinal sectional view of an apparatus for purifying water embodying my invention. Fig. 2 represents a perspective view of the shell-walled case which provides the purifying and vaporizing chamber.

Similar numerals of reference indicate corresponding parts in the two figures.

Referring to the drawings, the numeral 1 represents the outer casing or shell of my apparatus, provided with the cover or lid 2, which is secured in place by means of the clamping device 3. This shell is divided into three compartments, which are designated the vaporizing or purifying chamber 4, the condensing-chamber 5, and the sediment well or receptacle 6. The sediment-well is provided

with the discharge-pipes 7 and 7', the former being provided with a cock, 7'', the purifying-chamber is provided with the steam-supply pipe 8, having a branch pipe, 8', provided with a safety-valve, 8'', and leading therefrom to the discharge-pipe 7, and said chamber is also provided with an overflow-pipe, 8'', leading also to the discharge-pipe 7.

9 represents the delivery-pipe, which leads from the condensing-chamber to a pump.

The purifying-chamber is formed by means of the three-walled case 10, or the front partition extending entirely across the chamber, the side inner walls could be dispensed with; but the latter are preferred on account of enlarging the condensing-compartment, which extends down into the sediment-well, the purpose of which will presently appear.

In the purifying-chamber are located a series of perforated trays or plates, 11, and the highest plate communicates with a distributing device, 12.

In the sediment-well are arranged a series of inclined plates, 13, which may, if desired, be perforated. These plates are inclined, in order to insure a perfect precipitation of the sediment and also to prevent agitation of the same.

14 represents the pipe for supplying water to the purifier, which is provided with a cock or valve, 15, and this pipe enters the condensing-chamber at the top of the shell and supplies the water through the pipes 16 in the condensing-chamber to the distributing device 12. The supply-pipe is shown as entering the top of the condensing-chamber in this case; but there is no objection to having it enter in any other part of the chamber, and I do not limit myself to the place of entrance.

Above the purifying-chamber and below the pipes 16 in the condensing-chamber is arranged a series of plates or steps, 17, forming an inclined passage to allow vapors to pass freely from the vaporizing-chamber into the condensing-compartment, but to prevent the vapors when in a liquid form from returning again into the vaporizing-chamber.

I do not wish to be limited to this peculiar style of plate, as any arrangement of guttered sheets would answer the purpose as well.

The shell or casing is provided with an air outlet or discharge pipe, 18, by means of

which air is prevented from accumulating in the condensing-chamber, and the air is drawn out by any suitable means. A branch pipe, 19, leads from the discharge-pipe, and a water-gage, 20, communicates with the discharge-pipe, the purpose of said gage being to ascertain the amount of water in the purifying-chamber.

The object of check-valves being placed in the overflow-pipes as far down as possible below the level of the water in the purifier is that a vacuum may be maintained in the purifier, even when the pump which is connected to the delivery is running too slowly to carry all of the water away as quickly as it is purified. The amount of vacuum would be in proportion to the distance the check-valve would be placed in the overflow-pipe below the level of water in the purifier.

The operation is as follows: Water and steam are admitted by means of the water and steam supply pipes. The water passes through the pipes and the distributing device, and from thence to the perforated trays or plates. The steam, passing through said water in its passage over and through the trays, vaporizes the water, removing the impurities therefrom, which impurities fall upon the inclined plates in the sediment-well and are precipitated into said well, being prevented from agitation by said plates. The pure water remains above the impurities and flows out through the delivery-pipe. The grease and light impurities are prevented from passing out with the pure water, on account of the wall being always below the level of the delivery and preventing them from getting past.

The heated vapors from the steam rising above the trays comes in contact with the cold-water-supply pipes, and is thereby condensed and falls in a shower upon the inclined passage or steps 17, and is directed thereby to the delivery-pipe, and the air which rises to the top of the condensing chamber escapes through the air-outlet pipe.

In case too great an amount of water should accumulate in the purifying-chamber it will pass out through the overflow-pipe to the discharge-pipe.

By having the three-walled partition forming the purifying-chamber extending downward into the sediment-well below the level of the water the vapors cannot pass out of the delivery-pipe before first passing through the vaporizing-chamber, and then coming in contact with the condensing-surface, consequently becoming liquefied before entering the delivery-pipe.

The peculiar arrangement of the inclined plates in the sediment-well causes the sediment to be more rapidly precipitated, and also prevents agitation of said impurities.

The discharge-pipe 7* preferably leads from the bottom of the inclined plate nearest the delivery-pipe, and is especially adapted for removing grease or oil which accumulates.

In case water should back and enter the

steam pipe it will be directed into the branch pipe which leads therefrom to the discharge-pipe, and this branch pipe has a valve which is opened by the pressure, weight, or gravity of the water, but which is retained normally in a closed position. The branch pipe thus serves to prevent water which may enter the steam-supply pipe from reaching the engine.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A water purifying and vaporizing apparatus consisting of a purifying-chamber with a steam-inlet pipe and a water outlet-pipe, a condensing chamber, an inlet water-pipe passing through said condensing-chamber into said purifying-chamber, and a sediment-chamber with a discharge-pipe, said parts being combined substantially as described.

2. A water purifying and vaporizing apparatus consisting of a purifying-chamber with a steam-inlet pipe and a water-outlet pipe, a condensing chamber communicating with said purifying-chamber and having an air-outlet, and an inlet-pipe leading into said purifying-chamber, said parts being combined substantially as and for the purpose set forth.

3. A water purifying and vaporizing apparatus consisting of a condensing-chamber having a supply-pipe, a purifying-chamber having inclined perforated trays to receive the supply, a sediment-well having a discharge-pipe, and a pipe for supplying steam to the purifying-chamber, having a branch pipe leading to the discharge-pipe, and an overflow-pipe communicating with the purifying-chamber and leading to the discharge-pipe, all combined, arranged, and adapted to serve substantially as and for the purpose described.

4. In a water purifying and vaporizing apparatus, the combination of a purifying-chamber having a steam-supply pipe and overflow-pipe, a condensing-chamber having the water-supply pipes arranged therein for supplying water to the purifying-chamber, and a sediment-well communicating with the purifying-chamber, substantially as described.

5. In a water purifying and vaporizing apparatus, the combination, with a condensing-chamber having the supply-pipes, of a purifying-chamber provided with a series of perforated trays arranged in a zigzag manner and adapted to receive the water from the supply-pipes, and a pipe for supplying steam to the purifying-chamber, substantially as and for the purpose described.

6. In a water purifying and vaporizing apparatus, the combination, with the condensing-chamber having the water-supply pipes, of the purifying chamber provided with a series of inclined perforated trays to receive the water, a pipe for supplying steam to the purifying-chamber, and the plates arranged above said chamber in the form of steps, substantially as and for the purpose described.

7. In a water purifying and vaporizing apparatus, the combination of a condensing-

chamber having an air-outlet pipe, a delivery-pipe, supply-pipe, and series of plates forming steps arranged below said supply-pipes, a purifying-chamber having a steam-supply pipe
5 and overflow-pipe, a sediment-well provided with discharge-pipes and inclined plates, and branch pipes leading from the steam-supply pipe and overflow-pipe of the purifying-chamber, arranged and operating substantially as
10 and for the purpose described.

8. In a water purifying and vaporizing apparatus, the combination, with the condensing and purifying chamber, of the sediment-well provided with the inclined plates, substan-
15 tially as and for the purpose described.

9. In a water purifying and vaporizing apparatus, the condensing-chamber having an air outlet and delivery pipe, a purifying-chamber having a steam-supply pipe and overflow-
20 pipe, and a sediment-chamber provided with a discharge-pipe in communication with the said steam supply and discharge pipes, substantially as and for the purpose described.

10. In a liquid-purifying apparatus, the

combination, with the purifying chamber, of 25 the overflow-pipes leading therefrom and provided with check valves below the level of the water in said purifying chamber, substantially as described.

11. In a liquid-purifying apparatus, the 30 combination, with the purifying-chamber, of the steam-supply pipe communicating therewith, and the overflow branch pipe communicating with said pipe and chamber, substantially as described.

12. In a liquid-purifying apparatus, a puri- 35 fying-chamber with steam-inlet pipe, a sediment chamber with discharge-pipe, and a branch pipe leading from the steam-inlet pipe to the sediment-discharge pipe, said branch 40 pipe being adapted to receive the overflow of the purifying-chamber without the same entering the steam supply pipe, substantially as described.

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Witnesses:

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