

(No Model.)

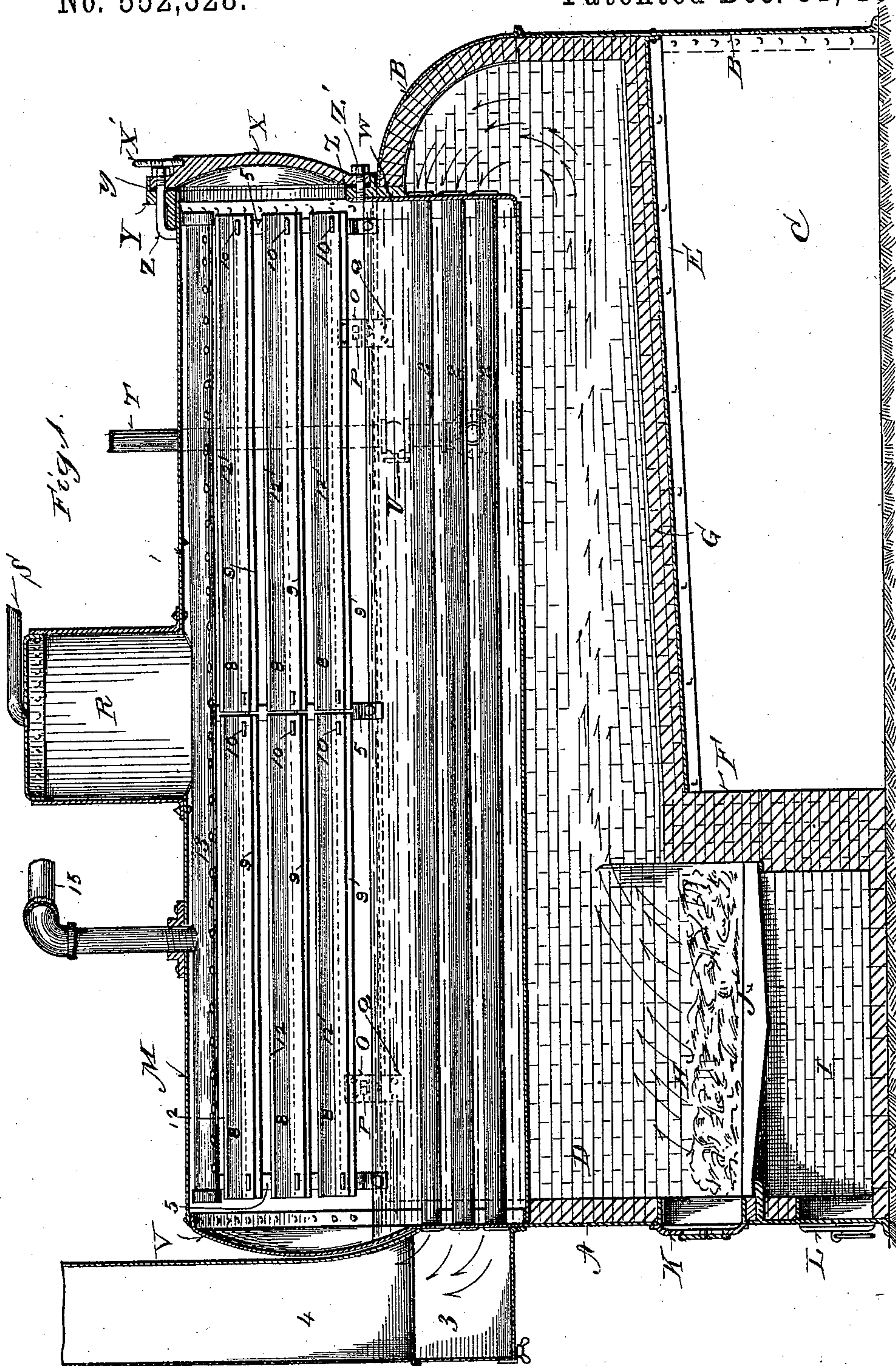
2 Sheets—Sheet 1.

J. S. PHARES.

WATER PURIFIER AND STEAM GENERATOR.

No. 552,328.

Patented Dec. 31, 1895.



Witnesses
Jas. P. Dawley,
H. M. McNair.

Inventor
James S. Phares,
By his Attorney,
H. A. Toulmin.

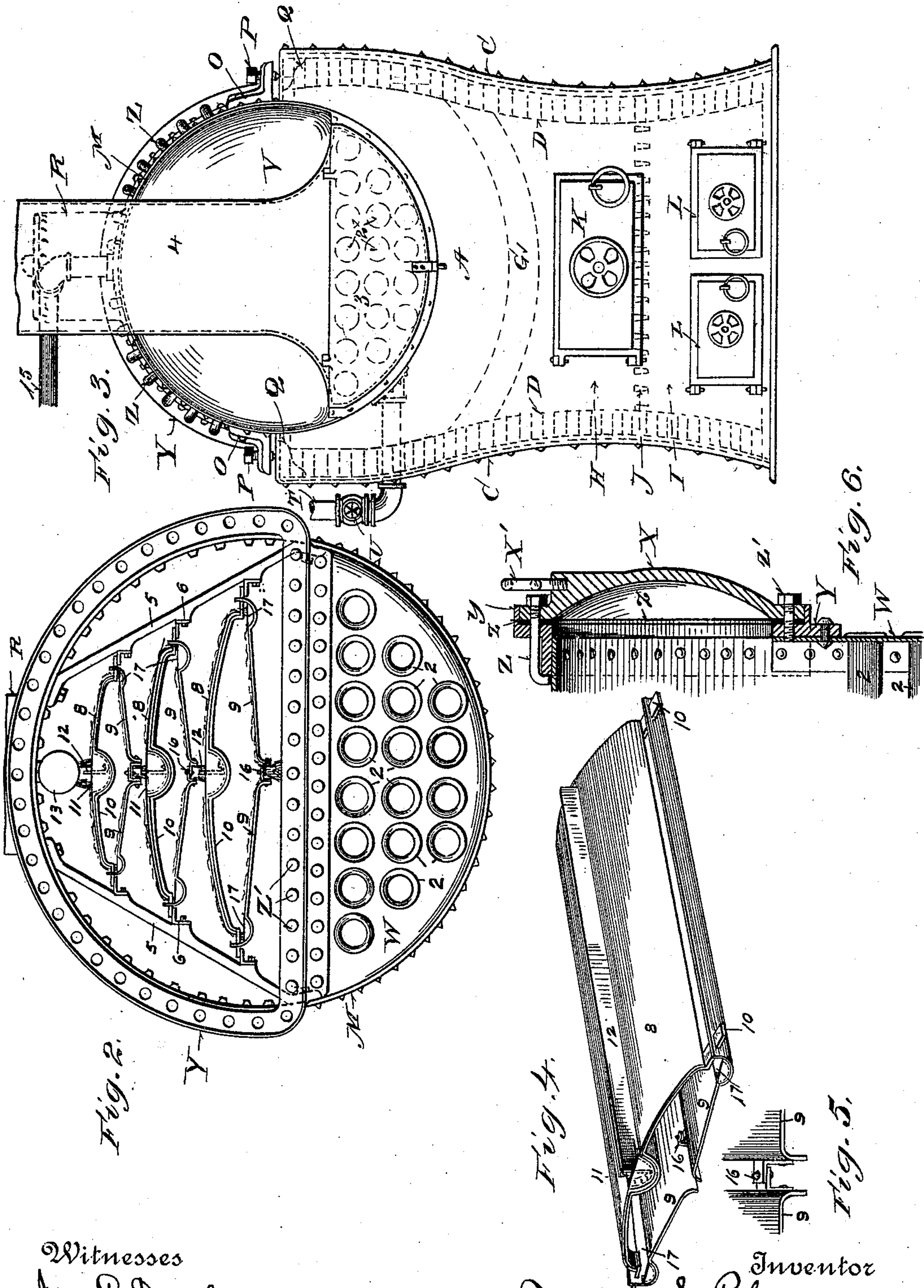
(No Model.)

2 Sheets—Sheet 2.

J. S. PHARES.
WATER PURIFIER AND STEAM GENERATOR.

No. 552,328.

Patented Dec. 31, 1895.



Witnesses
Jas. P. Dawley,
H. M. McMain.

Inventor
James S. Phares,
By his Attorney,
H. A. Tourlure

UNITED STATES PATENT OFFICE.

JAMES S. PHARES, OF SPRINGFIELD, OHIO.

WATER-PURIFIER AND STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 552,328, dated December 31, 1895.

Application filed July 22, 1895. Serial No. 556,686. (No model.)

To all whom it may concern:

Be it known that I, JAMES S. PHARES, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in a Combined Water-Purifier and Steam-Generator, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to certain new and useful improvements in feed-water heaters and purifiers.

Among the objects of my invention are (a) that of improving the construction of a combined feed-water heater and purifier and a steam-generator, (b) that of providing the removable part of the head of the casing with a peculiar packing and fastening means, and (c) that of providing the purifier with collecting-pans with channels or chambers.

In the accompanying drawings, on which like reference letters and numerals indicate corresponding parts, Figure 1 is a longitudinal vertical section of my improved apparatus entire; Fig. 2, a rear elevation of the purifier with the removable head detached; Fig. 3, a front elevation of the apparatus entire; Fig. 4, a detail perspective view of one of the pans; Fig. 5, a detail view thereof, showing the means of connecting the bottom plates of the pans; and Fig. 6, an enlarged vertical sectional view of a portion of the apparatus, casing, removable head and its connections.

The letter A designates the front plate, the letter B the rear plate and the letter C the side plates, which are riveted together, as indicated in the drawings, to constitute a metallic housing. Within this housing I build up in the form of a lining a structure D of brick or other refractory material. I also secure to the rear plate numerous angle or channel bars E, and embed the same in the wall F to support them, and on these bars I lay a lining G, also of brick or other refractory material. The usual fire-box H and ash-pit I, with grate-bars J, are thus constituted and respectively have the feed-door K and the ash-door L. Upon this setting I place the casing M of my apparatus, and by means of brackets O secured thereto, with set-screws P, resting upon plates Q let into the setting, I effect any adjustment necessary to set the

entire devices in a true or horizontal position. This casing has a steam-dome R of the usual type, with a pipe S leading off to an engine or pump in those cases when the apparatus is to be used as a steam-boiler for running such machinery. The casing also has a water-discharge pipe T controlled by a cock U and entering slightly above the lowest part when designed to convey purified water to tanks or other receptacles from which it may be taken up and fed into ordinary steam-boilers, or in the case of my apparatus being located near a steam-railroad the water gravitates into the supply-tanks to be fed into locomotive-tenders to be used by locomotives. In this way my apparatus will find a large field of usefulness in supplying such boilers, and particularly locomotive-boilers with purified water. In some cases a pump may need to be connected to the pipe T to conduct the water to the place desired. Also in cases where this apparatus will be used to supply railroad-tanks the steam it generates may be used to operate a pump for pumping water from a creek, river, or well, &c., into this apparatus itself for purification.

The casing is further provided with a fixed head V, the lower part of which constitutes a flue-sheet, while at the other end it has a head composed of a fixed sheet W constituting a flue-sheet, and a removable head X opposite the purifying-pans. A heavy cast-iron frame Y is riveted to the casing and extends over the upper portion and across the casing. This form has a flange y, within which is fitted a packing z of asbestos or other suitable material, while the head X is placed against this packing and within the flange y and held by hook-bolts Z whose inner ends engage with the edge of the frame Y. Thus the strain of the bolts is brought against the strong solid part of the frame. Along the straight portion of the frame I use bolts Z' to secure the corresponding straight side of the head X. The flange y forms a wall which prevents the steam and pressure from blocking the packing out. A handle X' facilitates handling the removable head. This removable head forms that portion of the casing opposite the ends of the pans, and the fixed head forms the flue-sheet for that portion of the casing wherein the flues 2 are

located. I lay special claim to such construction of head, a portion being fixed and a portion being removable, enabling me to combine within one casing the tubes and the purifying-pans, while admitting of the removability of the latter for the purpose of cleansing them of incrustation from time to time and for giving access to the interior of the casing to cleanse it also.

The arrangement of the fire-box, the flues, the smoke-box 3, and the smoke-stack 4 constitutes a boiler of the return-flue type.

Near each end and at one or more intermediate points within the casing I secure at each side supporting-bars 5, and to each of these supports I attach slides 6 in the form of angle-iron. On these slides I mount the purifying-pans in series one above the other, and which may or may not grow smaller from the lower to the upper one according to the shape of the casing in cross-section and the position of the supporting-bars 5. Each of these pans consists of a top 8 and a bottom 9, the former inclining from near the center downward to the edges, and the latter inclining from near the outer edges downward to near the inner edges, to form the proper water-shed to cause the water to flow from near the center outward on the top 8 and from near the outer edges to near the inner edges of the bottom 9. Each pan has a cross-bar 10 whose projecting ends rest upon the slides 6 to support the pans and at the same time allow them to be slid in and out of the casing.

I depress the central portion of each top 8 to form a sediment or collecting chamber 11, and within the chamber secure a partition 12 extending slightly above the top and dividing the chamber into two portions. The water is fed into both parts of the chamber, and this partition prevents the water from flowing in one direction only should one side of the pan be slightly lower than the other, for in that case each part will fill and ultimately overflow independently from the chamber 11. The water is introduced into the upper of these chambers through a distributing-pipe 13 having a line of perforations or other form of opening adapted to direct water into either part of the chamber 11. A supply-pipe 15 connects with the pipe 13.

Each bottom 9 is turned down at its extreme inner edge to properly discharge the water and the two parts of the bottom are connected by the brackets 16. I also provide each bottom with two sediment-chambers 17, formed by shaping the material as shown. By thus shaping the tops and bottoms of the pans to form these chambers the pans are incidentally stiffened, so that I can use thinner material than ordinarily.

Thus it will be seen that in one concrete apparatus I combine both a water-purifier and a steam-generator with all the advantages of compactness, economy of construction, and adaptability of uses above referred to, and that

instead of having a boiler with all that that implies and a separate purifying apparatus to be heated by the live or exhaust steam from the boiler with the loss of heat effects inherent in the transmission of that fluid from one to the other, I bring into one casing the purifying mechanism and agents, and subject the one to the immediate action of the other and eliminate distance between them. Thus my purifying device and my heating medium are brought in that relation which produces the maximum result and the highest efficiency. I therefore wish to be understood as laying a broad claim to this organization. The heat from the generated steam acting on the pans and the water passing over them in thin sheets precipitates the solids which are in suspension and causes them to collect in the chambers and to adhere to the surfaces, and this water being thus purified passes into that part of the apparatus nearest the fire and in turn becomes evaporated into steam. Thus also there is one continuous operation of purification and generation.

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

1. In a combined purifier and generator the following instrumentalities; the casing, heating flues located in one portion, and water discharge pans in another portion thereof and consisting each of a top with a central channel and a bottom with outer channels and inner discharge edges.

2. In a combined purifier and generator, the following instrumentalities; the casing having heads, one of which heads is divided into a fixed flue sheet and a removable part, heating tubes connected with the fixed flue sheet, and water distributing pans consisting each of a top with a central channel and a bottom with outer channels and inner discharge edges, said pans being removably mounted and located opposite to the removable part of said divided head.

3. In a combined purifier and generator, the combination with the casing, of the heating tubes in one part supporting bars in another part, slides secured to the bar, pans resting on slides and consisting each of a top with a central channel and partition and a bottom with outer channels and inner discharge edges, the pans being in series one above the other, and a removable portion of the head opposite said pans.

4. In a purifier, the combination with the casing and a frame Y, secured thereto and extending across the casing and partially around the same and having a flange *y* running around the circular and cross portions thereof, a removable head X, fitted inside of the flange, a packing *z*, inside of the flange and between the frame and head, and hook-bolts Z, whose hook-ends engage the edge of the circular part of the frame and whose shanks pass through the frame and removable head, and

nuts on said hook-bolts, the strain of the bolts being exerted only on the removable head and body of the frame and not on the flange of the frame.

- 5 5. A purifier pan having its top depressed near the center, and a partition in the channel so formed.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES S. PHARES.

Witnesses:

JAS. C. DAWLEY,
W. M. MCNAIR.