

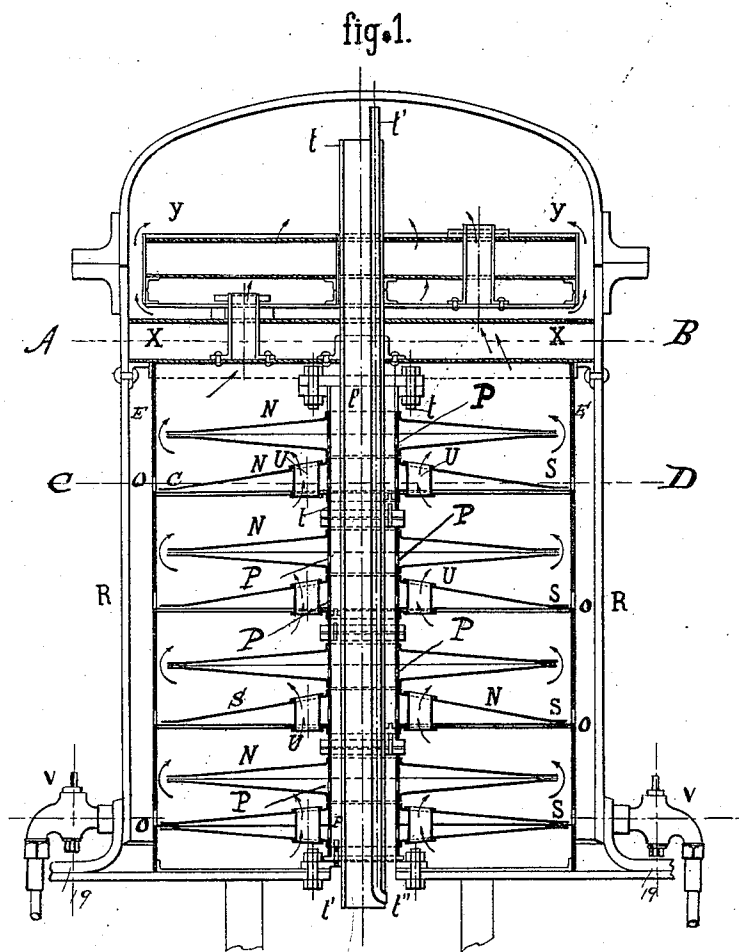
(No Model.)

3 Sheets—Sheet 1.

F. CHAPSAL.
FEED WATER PURIFIER.

No. 461,566.

Patented Oct. 20, 1891.



Witnesses
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Inventor
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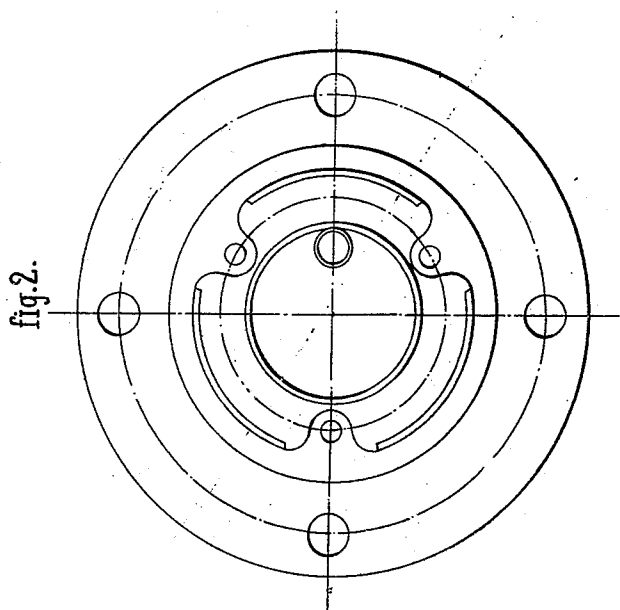
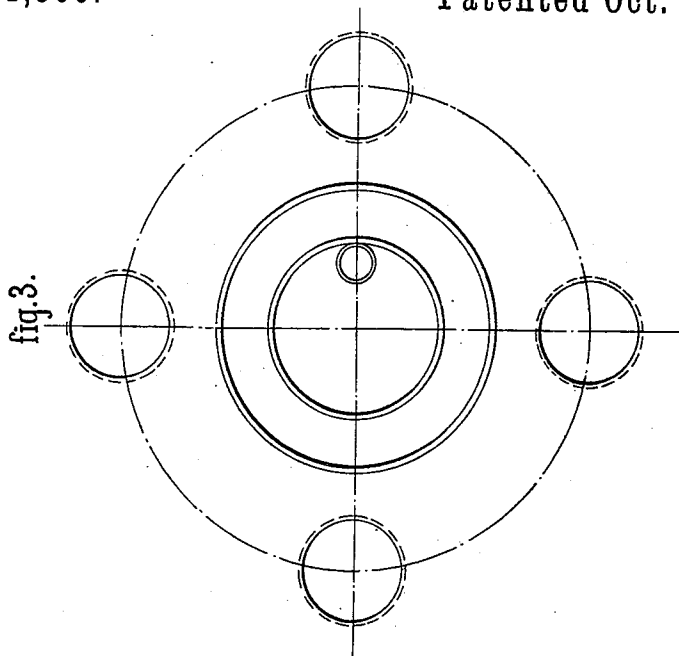
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3 Sheets—Sheet 2.

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Witnesses

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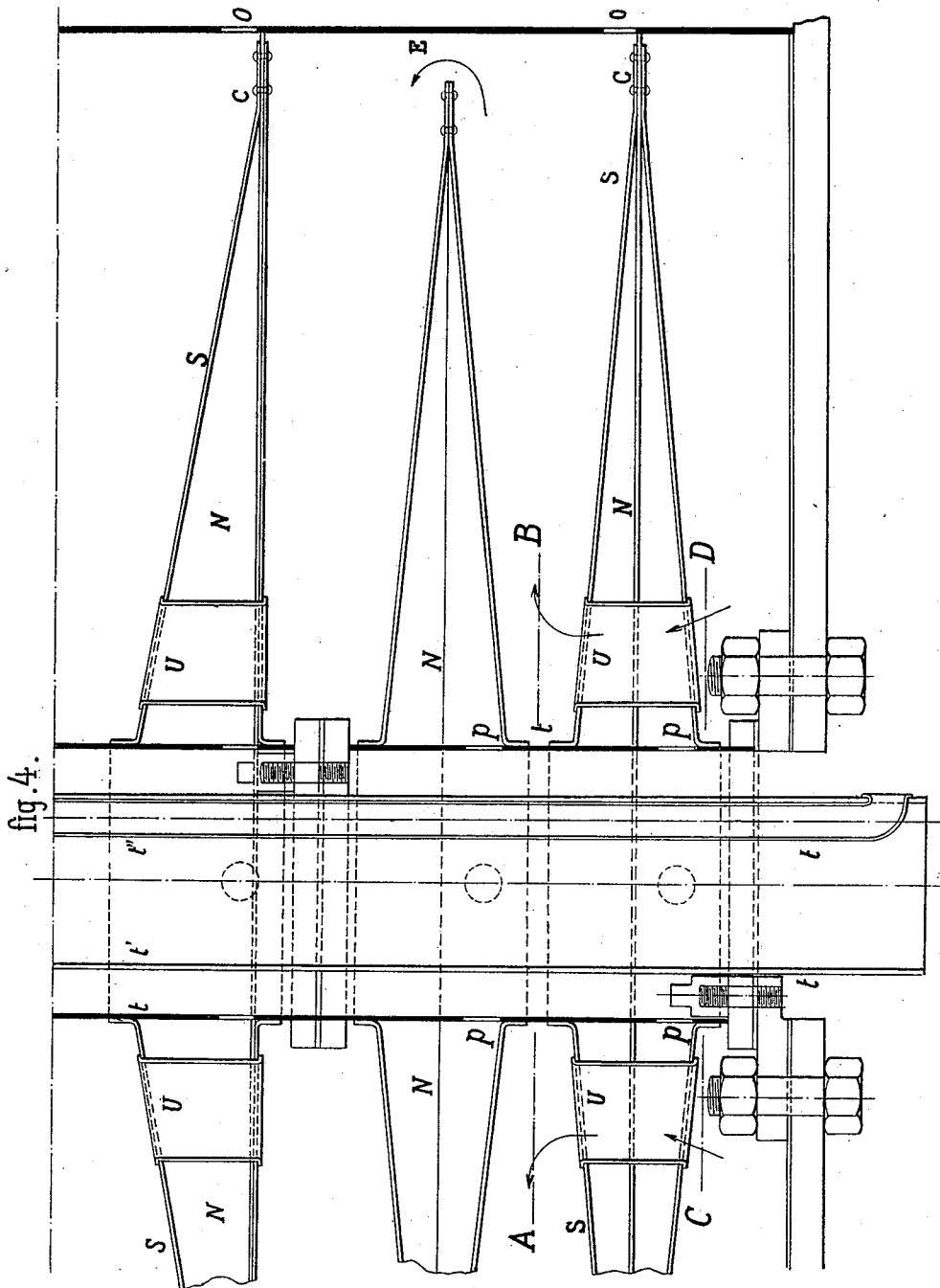
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UNITED STATES PATENT OFFICE.

FRANÇOIS CHAPSAL, OF PARIS, FRANCE.

FEED-WATER PURIFIER.

SPECIFICATION forming part of Letters Patent No. 461,566, dated October 20, 1891.

Application filed October 23, 1890. Serial No. 369,096. (No model.) Patented in France December 7, 1889, No. 202,446.

To all whom it may concern:

Be it known that I, FRANÇOIS CHAPSAL, a citizen of the Republic of France, residing at the city of Paris, France, have invented certain new and useful Improvements in Feed-Water Purifiers, (patented in France December 7, 1889, No. 202,446;) and I do hereby declare the following to be a full, clear, and exact description of the same.

10 The apparatus forming the subject of my invention is composed of an auxiliary reservoir fixed on or connected with the generators of steam and is especially adapted to locomotive-boilers. The feed-water is heated in passing through the reservoir or decanter having a circulation of steam, where it deposits the salts or other impurities precipitated by the heat. The purification of the feed-water is completed by its passage through a filter. 15 The feed-water forced by the pump or by the injector is fed either directly to the decanter by one or more tubes connected between themselves in the interior or on the exterior to the generator, or by any heating apparatus placed in or outside of the boiler.

25 In the accompanying drawings, forming a part of this specification, Figure 1 is a vertical section through my improved feed-water purifier. Figs. 2 and 3 are horizontal sections through the purifier. Fig. 2 is a section through A B, and Fig. 3 a section through C D. Fig. 4 is an enlarged section of a part of the purifier, showing details of construction.

30 The decantation apparatus consists of a series of cones N, within which there is a steam-circulation, mounted on a tube *t*, which forms the center and which is in communication with the steam-space of the boiler. The water resulting from the condensation of the steam in these cones drops into tube *t* through the openings P and returns to the boiler. The feed-water comes by a tube placed in the interior of the boiler. The water thus introduced mounts in the apparatus while circulating, as indicated by the arrows in Fig. 1, 35 around the cones N, in which steam circulates. It is seen by these arrows that the water is forced to be in prolonged contact with the heating-cones N. Above these cones are diaphragms S, on which is collected the sediment which the water leaves while heating.

These diaphragms are inclined in such a manner that the deposits gravitate toward their outer edges C, which are in contact with the interior casing E of the purifying apparatus. 55 The sediment as it accumulates passes through openings O into the annular space between the interior casing E and the exterior casing R, forming a collector of the sediment. The sediment thus isolated between the casings E 60 and R, Fig. 1, can be drawn off by a cock and drain-pipe V, for the upper part of the annular space being closed no circulation of water can establish itself in the collector of sediments and these impurities will fall to the bottom. The water as it passes upward through the purifier is heated more and more by its continued contact with the cones in which the steam circulates, and its purification becomes in consequence more and more perfect. When 70 it has arrived at X X, Fig. 1, it must traverse a filter X X Y Y, formed of two diaphragms, between which are fragments of coke, sand, and any other filtering matter. Water then passes to the upper part of the reservoir, and it flows 75 through a special tube *t'*, mounted in the interior of the first tube. A small tube *t''*, destined to assure the communication of the steam with the upper part of the dome, is fixed in the tube *t'*. This tube *t''* maintains 80 the equilibrium of pressure in the whole purifying apparatus. The water traverses the exterior of these diaphragm-cones, passing through sleeves U, and is forced to circulate around the cones. In this manner the joining of the groups of the cones can be made 85 in the interior of each piece of pipe by means of bolts fixed on the inner lugs of the flange and by nuts tightened on the bolts by means of a wrench. The central tube, by which the purified water flows into the boiler, is put in its place the last and is joined by means of bolts and nuts on the outer flange of the last group of cones. It has the object of allowing the heating-cones to be put in place and dismounted without entering the boiler. This 95 mounting is not claimed and may be varied at will.

What I claim is—

1. In a feed-water purifier, the combination, 100 with the tube *t*, communicating with the steam-space of the boiler, and the series of

cones mounted thereon, of diaphragms S for collecting the sediment from the heated water, substantially as set forth.

2. In a feed-water purifier, the combination,
5 substantially as described, of the outer shell having a closed top provided at its lower end with a discharge-opening, the inner shell provided at bottom with an inlet and at intervals of its length with openings, a filter (one
10 or more) arranged at the top of the inner shell and closing the top of the annular space between the shells, a pipe extending from above the filter through the inner shell, hollow steam-

circulating cones extending from the pipe outward to near the inner shell, and diaphragms or cones abutting against the inner shell just below the openings and provided with openings near the pipe to admit of the passage of feed-water.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

FRANÇOIS CHAPSAL.

Witnesses:

R. J. PRESTON,
W. LONG.