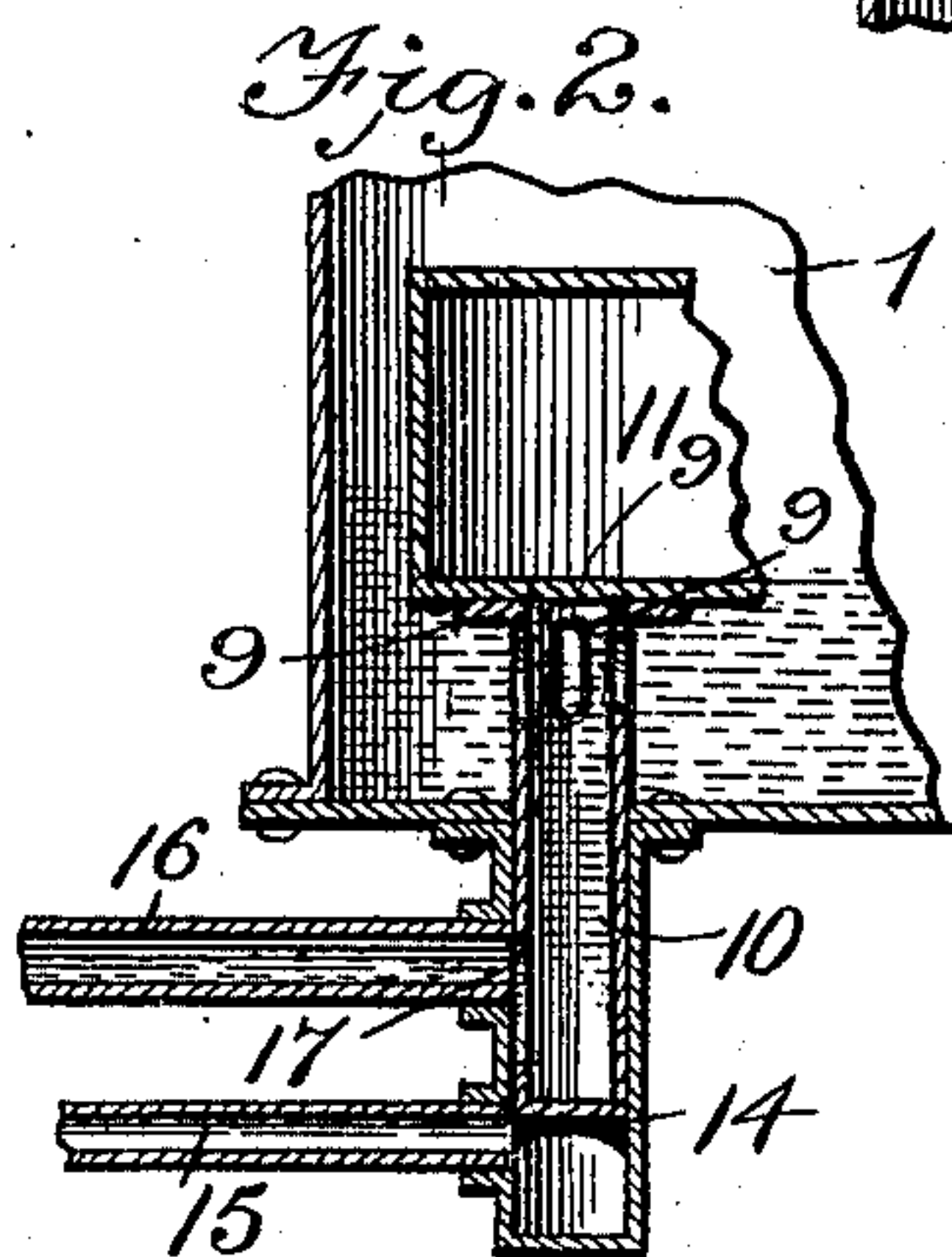
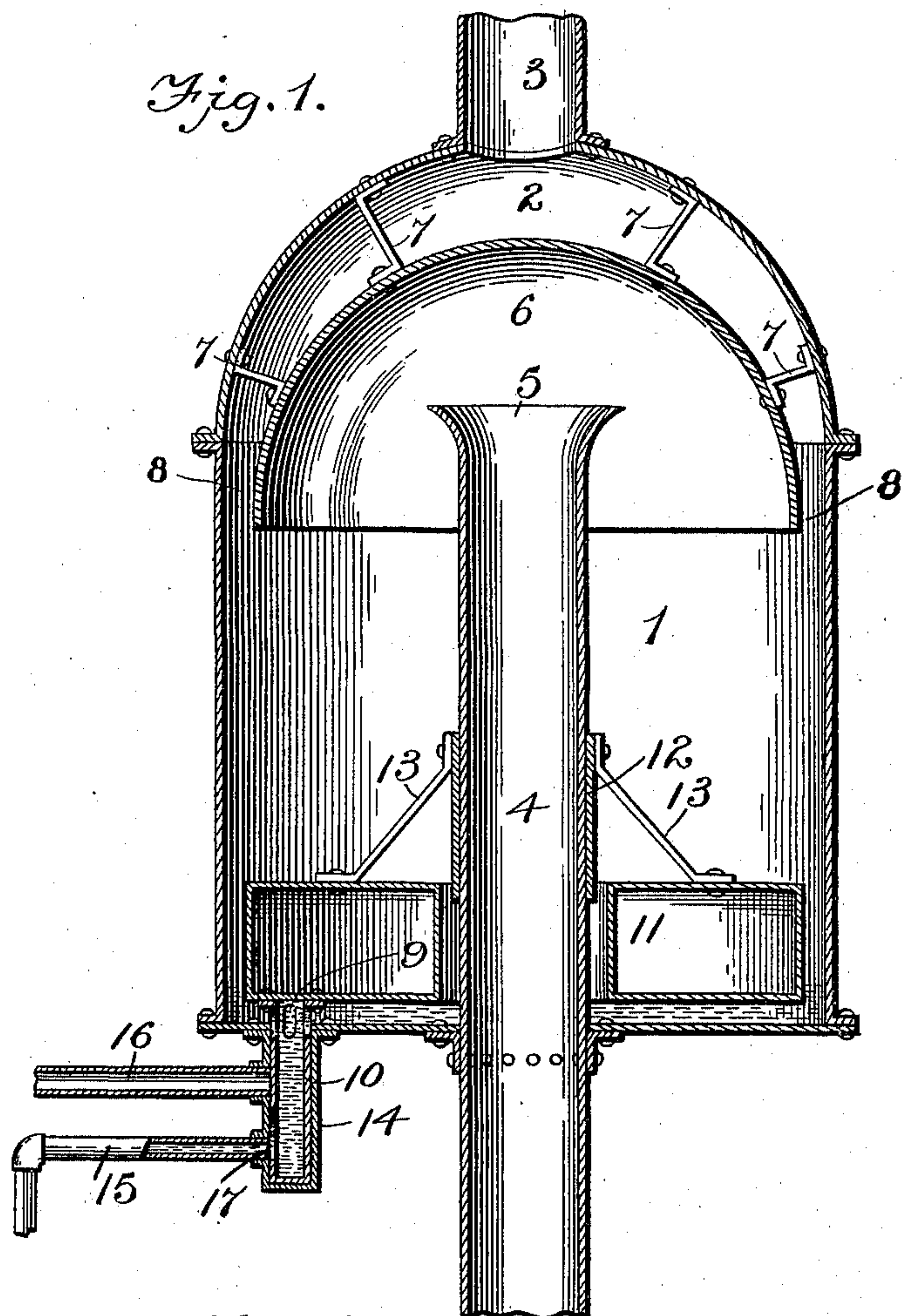


(No Model.)

A. ILER.
STEAM SEPARATOR.

No. 598,630.

Patented Feb. 8, 1898.



Witnesses

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UNITED STATES PATENT OFFICE.

ALONZO ILER, OF GREER DEPOT, SOUTH CAROLINA.

STEAM-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 598,630, dated February 8, 1898.

Application filed May 29, 1897. Serial No. 638,790. (No model.)

To all whom it may concern:

Be it known that I, ALONZO ILER, a citizen of the United States, residing at Greer Depot, in the county of Greenville and State of South Carolina, have invented a new and useful Steam-Separator, of which the following is a specification.

This invention relates to steam-separators; and it has for its object to provide a simple and efficient device of this character especially intended for use in a line of pipe leading from a steam-boiler or a battery of boilers to provide means for thoroughly separating the water from the steam and returning such water to the boiler or to a point exterior to the boiler automatically, according to the quantity of water that is delivered with the steam into the separator.

To this end the main and primary object of the present invention is the construction of a steam-separator providing for the thorough separation of water from the steam, so that the latter will pass to the engine perfectly dry, thereby relieving the engine from the bad effects of having water carried to the working parts thereof and also rendering it possible to run the engine with much less lubrication thereof. In connection with the delivery of perfectly dry steam to the engine the invention also contemplates an improved automatically-controlled drain for the water separated from the steam, whereby such water will be drained back to the boiler or to a point exterior thereto, according to how greatly the steam is impregnated with water as it is delivered from the boiler.

With these and other objects in view, which will readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts hereinafter more fully described, illustrated, and claimed.

In the drawings, Figure 1 is a vertical longitudinal sectional view of a steam-separator constructed in accordance with this invention. Fig. 2 is an enlarged detail sectional view of the drain-valve, showing a different position of the valve from that illustrated in Fig. 1.

Referring to the drawings, the numeral 1 designates the casing of the separator, which may be cylindrical, square, or other shape in cross-section and is provided with a rounded

upper end 2, in which is centrally fitted one end of the dry-steam pipe 3, which leads to the engine or other point where it is desired to deliver steam in a perfectly dry condition, entirely free from water or spray. The lower end of the casing, or opposite the end having the dry-steam-pipe connection therewith, has centrally fitted therein the steam-inlet pipe 4, which leads from the steam-boiler or from the main steam-drum of a battery of boilers, as the case may be, to provide for delivering the steam as it is generated from the boiler or boilers directly into the casing of the separator. The steam-inlet pipe 4 extends upwardly within the casing to a point near the upper end thereof and is provided with a flared mouth or delivery end 5, which is disposed directly within the hemispherical inverted separating-cup 6, arranged in a fixed position within one end of the casing. The inverted hemispherical separating-cup 6 is rigidly supported in position, preferably by means of a plurality of fastening-braces 7, securely bolted to the convexed side of the cup and the adjacent sides and end of the separator-casing, as clearly illustrated in Fig. 1 of the drawings.

The hemispherical separating-cup 6 is somewhat narrower in width than the casing 1, so as to leave a dry-steam passage 8 between the peripheral edge of the cup and the inner sides of the casing, while the pendent peripheral edge of the cup serves to deflect the water downwardly into the lower closed end of the casing, from which it finds escape through the perforate upper end 9 of the vertically-movable valve-tube 10, secured fast to the under side of a float 11, working over the inwardly-extending portion of the pipe 4 within the casing 1 and carrying a guide-sleeve 12. The guide-sleeve 12 is securely connected with the upper side of the float 11 by means of the brace-feet 13, secured at their upper ends to the sleeve and at their lower ends to the float, said guide-sleeve serving to steady or guide the float in its up-and-down movement as it floats on the water, so as not to disturb the proper positioning of the valve-tube 10 within the valve-casing 14, in which it works.

The valve-casing 14 is fitted at its upper end to the lower end of the casing 1 and is pro-

vided with a closed lower end, and said valve-casing 14 has fitted to the side thereof at different horizontal planes the separate drain-pipes 15 and 16, respectively, the drain-pipe 15 being the lowermost pipe and adapted to drain the water back to the boiler, while the uppermost pipe 16 is intended to drain the water, when there is an excess thereof, to a point exterior to the boiler. The valve-tube 10 snugly registers within the casing 14 and is provided in one side, at the lower end thereof, with an elongated drain-port 17, adapted to register with the openings in the valve-casing for either of the pipe connections 15 and 16, the normal position of the float and the valve-tube 10 providing for disposing the elongated drain-port 17 in communication with the pipe connection 15, leading to the boiler.

When the water in the boiler is in a normal condition, the water that is separated from the steam by the cup 6 will readily find escape through the valve-tube 10 and into the pipe connection 15, which conducts the same back to the boiler; but when the boiler or boilers are priming and a larger amount of water collects in the separator-casing than can be carried off through the pipe 15 the float 11 rises until the drain-port 17 of the valve-tube communicates with the pipe connection 16, thereby cutting off communication with the pipe 15 and permitting the excess of water to discharge or drain through the pipe 16 to a point exterior to the boiler.

While the separator has been described as especially adapted for use in connection with a line of piping running to a steam-engine, it will be understood that the same may be used to equal advantage with a line of piping used in drying apparatus and the like; and it will be understood that various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed, and desired to be secured by Letters Patent, is—

1. In a steam-separator, the casing having a pair of drain-pipe connections therewith, and a single float-operated valve arranged to alternately cover and uncover said drain-pipe

connections, the movement of said valve in one direction providing for automatically directing the drain of water through one of said drain-pipe connections and at the same time cutting off the flow through the other connection, substantially as set forth.

2. In a steam-separator, a casing, an inverted hemispherical separating-cup fixedly supported within the upper end of the casing and having its pendent peripheral edge out of contact with the inner sides of the casing, a steam-inlet pipe extended inwardly within the casing to a point within the concaved side of the cup, a dry-steam-pipe connection with the upper end of the cup, a pair of drain-pipe connections with the casing, and means for automatically directing the drain of water through either of said drain-pipe connections, substantially as set forth.

3. In a steam-separator, the casing having a fixed separating-surface therein for separating the steam and water and deflecting the latter into the lower part of the casing, a pair of drain-pipe connections with the casing, and means for automatically directing the drain of water through either of said drain-pipe connections, substantially as set forth.

4. In a steam-separator, the casing having an inwardly-extending steam-inlet pipe and a fixed separating-surface arranged in line with the inner end of said pipe, a valve-casing fitted to the lower end of the separator-casing, a pair of drain-pipes fitted to said valve-casing respectively in different horizontal planes, a float arranged within the separator-casing and having a sliding connection with said steam-inlet pipe, and a vertically-movable valve-tube working in said valve-casing and secured to the under side of the float, said valve-tube being provided with a perforate upper end, and in one side at its lower end with a drain-port adapted to communicate with either of the drain-pipe connections with the valve-casing, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

ALONZO ILER.

Witnesses:

J. S. BURNETT,
I. A. MAYFIELD.