

No. 678,324.

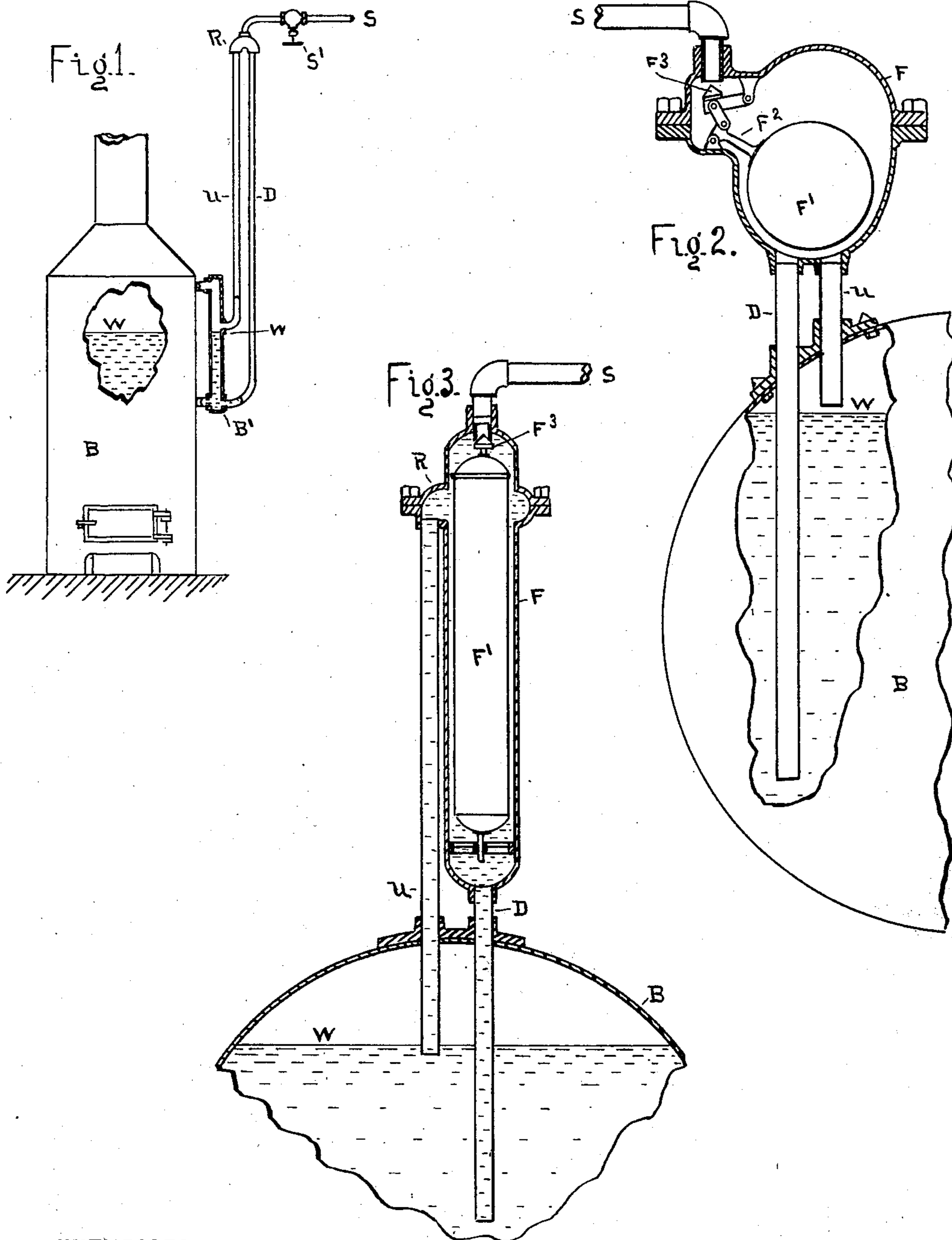
Patented July 9, 1901.

A. G. WATERHOUSE.
FEEDER FOR STEAM BOILERS.

(No Model.)

(Application filed Feb. 26, 1901.)

2 Sheets—Sheet 1.



WITNESSES:

W. S. Watson
Frank W. Harrison

INVENTOR.

Addison G. Waterhouse

No. 678,324.

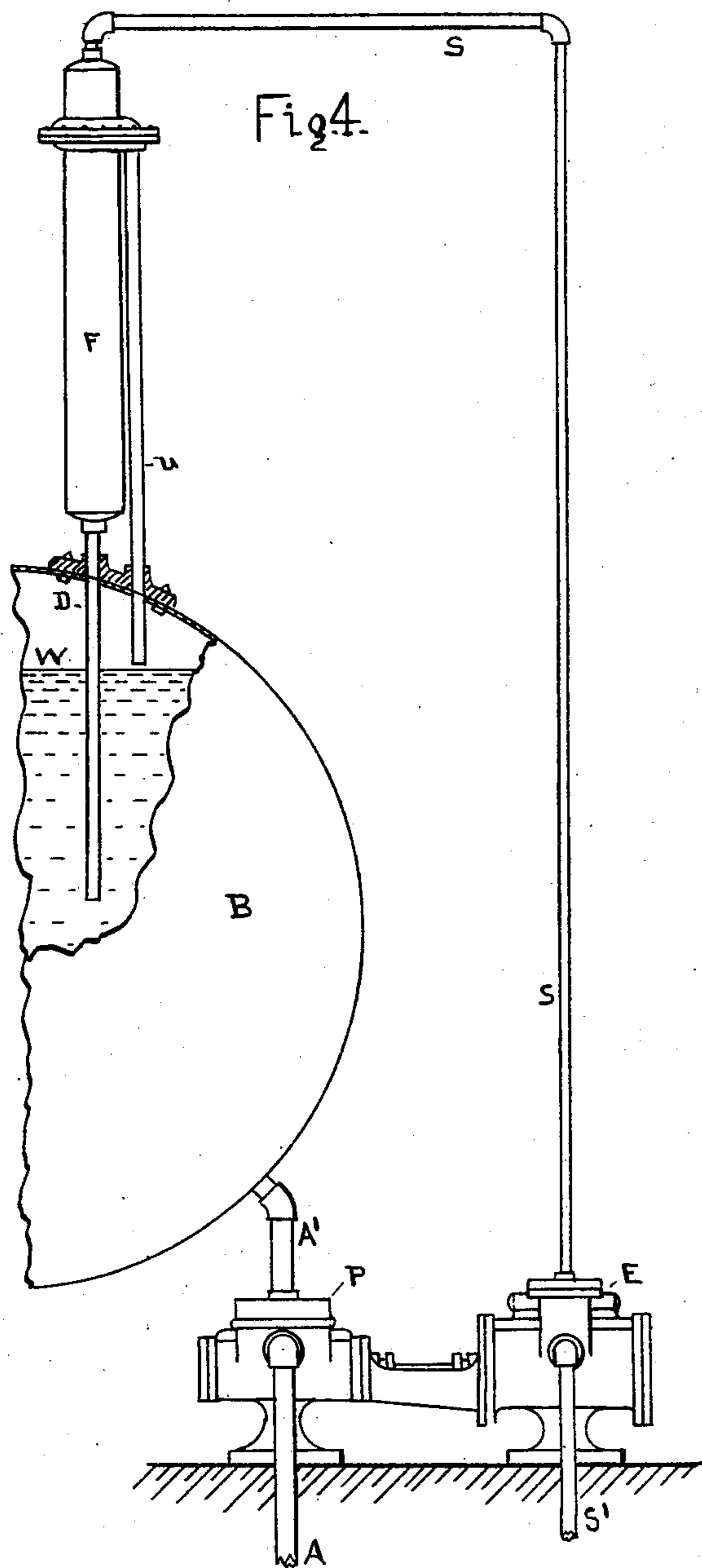
Patented July 9, 1901.

A. G. WATERHOUSE.
FEEDER FOR STEAM BOILERS.

(Application filed Feb. 26, 1901.)

(No Model.)

2 Sheets—Sheet 2.



WITNESSES:

W. S. Watron
Frank H. Harrison

INVENTOR

Addison G. Waterhouse

UNITED STATES PATENT OFFICE.

ADDISON G. WATERHOUSE, OF SPRINGFIELD TOWNSHIP, PENNSYLVANIA.

FEEDER FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 678,324, dated July 9, 1901.

Application filed February 26, 1901. Serial No. 49,019. (No model.)

To all whom it may concern:

Be it known that I, ADDISON G. WATERHOUSE, a citizen of the United States, residing in the township of Springfield, county of Delaware, State of Pennsylvania, have invented new and useful Improvements in Feeders for Steam-Boilers, of which the following is a specification.

My invention relates to automatic steam-boiler feeders; and it consists of improvements on a part of an apparatus shown in my application for Letters Patent filed October 16, 1900, Serial No. 33,217, in which are shown two siphon-passages leading from a steam-boiler, one of which leads from a point below the water-level in a steam-boiler and the other from a point at or near the water-level, the two passages uniting at a point above the water-level and then continuing on through a single passage to a boiler-feeder, by means of which steam passes from the boiler when its water-level is below a fixed point and water passes from the boiler when its level is raised above that point.

My present invention consists of the employment of means for producing the following result: to automatically cause steam to pass from a boiler to a boiler-feeding apparatus only when the water-level in the boiler is below a fixed point and prevent the passage of water from the boiler.

In order to fully set forth my invention, reference will be had to the accompanying drawings, in which—

Figure 1 shows the part of the apparatus referred to in my former application. Fig. 2 shows the two siphon-passages in combination with a water-trap. Fig. 3 is a modified form of Fig. 1. Fig. 4 shows a combination of a steam-boiler, siphon-pipes, water-trap, and steam-pump used as a boiler-feeder.

The acting part of this apparatus is shown by Fig. 1, in which B represents a steam-boiler with part cut away, showing the proper water-level W. Outside of B is a vertical tube B', communicating with the boiler at its extreme ends, so that the water-level W will be the same in B' as in B. The siphon-pipes U and D are joined together at their upper end at R. The lower end of D enters B' below the water-level W, and the lower end of

U enters at or near the level W. If the water-level W is up to or above the lower end or aperture of pipe U, then water will pass up through it and fill the pipes U and D, and if the valve S' is opened water will pass through the pipe S; but if the water-level W in B is below the lower end of pipe U then steam will pass up into it and all the water in both pipes U and D, owing to its weight being greater than steam, will be siphoned out of both pipes by flowing down through pipe D and drawing the remaining water up and out from pipe U. Then if the valve S' is opened steam will pass out through pipe S, so that either steam or water will fill the pipes U and D and pass out at S at times which will accord with the rise and fall of the water-level W above or below the lower aperture of pipe U.

Fig. 2 shows the siphon-pipes U and D extending directly into the steam-boiler B to points at and below the water-line W. These pipes U and D unite at their upper end in a water-trap F, having a float F', which acts through a pivoted lever F² and opens or closes the valve F³, so that the passage leading to the steam-pipe S is opened or closed, according to the position of the float F'. If at first the pipes U and D and trap F are filled with water, the float F' will be raised with a force equal to its total buoyancy and the valve F³ will be closed, so that no water can pass through pipe S. If under this condition the water-line W in B should fall below the lower end of pipe U, then steam would pass up U and all the water in F would flow down pipe D and be replaced by steam, so that the float F' would drop and open the valve F³, which would allow the steam to pass up through pipe U, through the trap F, and out at S until the water-level W in B rose to the end of pipe U, when water would flow up and fill F, which would raise the float F' and close the valve, so that no water could pass out at S, thereby allowing steam only to pass out at S whenever the water-level W in the boiler B fell below the lower end of pipe U.

Fig. 3 shows a different form of water-trap F, which consists of an elongated tank, which forms an upper extension to pipe D. This tank F has a float F', with a valve F³, that

opens and closes the passage leading from the steam-pipe S as the float F' is raised by the buoyancy of surrounding water or caused to fall as the water recedes from the trap F.

5 The other pipe U of the siphon extends from the boiler B at or near the level W, as before described, so that as the level W rises above the lower end of pipe U water flows up and enters the trap F' at R, so that F' becomes
10 filled with water, whereby the valve F³ is closed by the buoyancy of the float F' when the water-line W falls below the end of pipe U. Then steam passes up and the water in F flows down pipe D into the boiler, which
15 causes the float F' to drop and the valve F³ to open, so that steam can pass out through pipe S as long as the water-line W remains below the lower end of pipe U. It is obvious that as the water-trap F is either completely
20 filled or emptied of water a very powerful or positive action can be imparted to a float within the trap F and that this extreme action will result from a very slight change in the level of the water-line W of the boiler B.

25 I do not confine myself to any particular form of water-trap or float, for in place of a float, which depends upon the buoyancy of the water, a bucket-float may be used or one open at the top, which is worked by being
30 filled with or emptied of water.

Fig. 4 shows a practical application of my invention to the work of feeding water into a steam-boiler by means of the siphon-pipes U and D, with the water-trap F arranged as
35 described, so that only steam will be allowed to pass through the steam-pipe S, and that will be limited to the time during which the water-level W in the boiler B is below the end of the pipe U. The steam passing through
40 pipe S is employed to work a steam-pump for feeding water in the boiler by means of the steam entering through pipe S into the engine E, which steam is exhausted at S'. This engine E works the pump P and draws
45 water from a source of supply A and forces it through pipe A' into the boiler B, so that the pump will start and stop its work when the water-level W rises and falls in the boiler B, as described, it being evident that in place
50 of a steam-pump an injector may be used or

any kind of a boiler-feeding apparatus which can be actuated by steam from a boiler.

Any form of float may be used, such as a bucket or open-top float, or in place of a float a tank connected to the boiler by flexible
55 pipes may be used, so that the difference between the weight of water and steam in the tank (represented by F) will cause it to move up and down, by means of which motion valves can be worked the same as described in rela-
60 tion to the float.

In place of making the pipes U and D of different lengths they both may be made the same length, or nearly so. In such a case the steam would rise in either one, causing the
65 other one to siphon the water down out of the water-trap. In such a case one would be practically longer than the other, and I wish it understood that in describing the two pipes as extending down to different levels it in-
70 cludes two pipes or passages leading to any level or levels that will enable one to siphon the water down as steam passes up into the other.

What I claim as my invention is—

75 The combination of a steam-boiler and a steam feed-water pump, or injector, adapted for being worked by steam from the boiler, with a steam-pipe leading from the boiler, at the level at which the water is to be main-
80 tained in the boiler, up to a float-box, located above the level of the water in the boiler; the float-box being provided with a second or siphon pipe, extending into the boiler to a level below its water-surface; the steam-pipe being
85 continued or extended from the float-box to the steam-pump or injector; the float-box being provided with a valve actuated by a float, adapted for closing the steam pipe or passage leading from the float-box; when the float is
90 raised by the buoyancy of water in the box; and opening the valve to admit the free passage of steam, when the water is siphoned from the box, substantially as, and for the purposes set forth.

ADDISON G. WATERHOUSE.

Witnesses:

W. S. WATSON,
FRANK W. HARRISON.