No. 646,061. Patented Mar. 27, 1900.

F. J. WEISS.

SAFETY FEEDING DEVICE FOR BOILERS.

(Application filed Aug. 8, 1899.)

(No Model.)

FIG. 1.

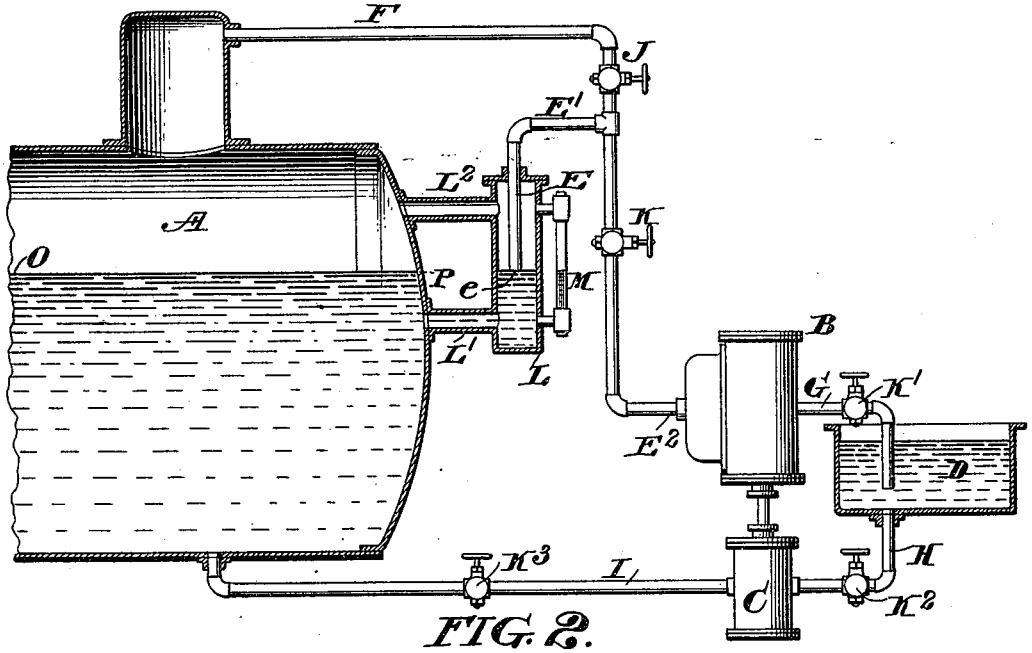
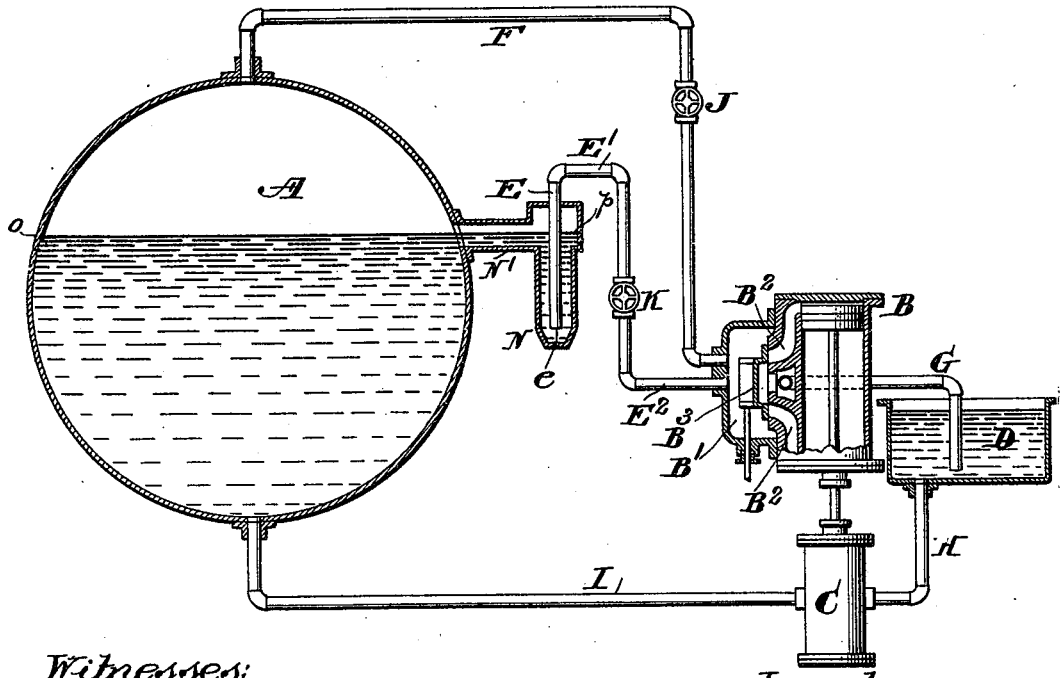


FIG. 2.



Witnesses:
Henry Drury
H. Stewart

Inventor:
Frany Joseph Weiss
by his atty
Francis J. Chambers

UNITED STATES PATENT OFFICE.

FRANZ JOSEPH WEISS, OF BASLE, SWITZERLAND.

SAFETY FEEDING DEVICE FOR BOILERS.

SPECIFICATION forming part of Letters Patent No. 646,061, dated March 27, 1900.

Application filed August 8, 1899. Serial No. 726,514. (No model.)

To all whom it may concern:

Be it known that I, FRANZ JOSEPH WEISS, a citizen of the Republic of Switzerland, residing in Basle, in the canton of Basle, in the Republic of Switzerland, have invented certain new and useful Improvements in Safety Feeding Devices for Boilers, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

My invention relates to feeding devices for boilers of the general character described in my former patent, No. 623,229, of April 18, 1899, and has for its object to overcome certain practical difficulties met with in the operation of such mechanism. In my said former patent the free opening of the stop-cock in the conduit leading to the motor-pump cylinder from a point in the boiler above the high-water line is apt under some conditions to cause the pump to "run away," as it is called, while on the other hand the partial closing of said stop-cock to throttle the steam-supply and check the unduly-rapid motion of the pump is liable when the normal water-level is reached or exceeded to so unbalance the pressures existing in the boiler and in the main supply-pipe of the pump as to cause a flow of water through the conduit leading from the normal water-level, and thus flood the pump with water and prevent the water-level in the boiler exceeding the determined normal. I have discovered that these defects can be overcome by placing in any of the fluid-conduits leading to or from the pump a throttling device which will when the stop-cock in the steam-pipe is open, but the steam-flow partially throttled by said cock or by other means, insure a resistance or back pressure in the conduit leading from the normal water-level equal to the pressure in the boiler. This is preferably and most conveniently accomplished by connecting the supplemental or steam-supply pipe on the delivery side of its stop-cock with the main or steam and water delivery pipe, as in my former patent, and providing a throttling device in the conduit at a point in the conduits lying beyond this connection, relying upon the throttle to regulate the supply of steam, while insuring that so long as the main stop-cock in the supplemental conduit remains open the pressure in the boiler and in the main pipe which rises above the water-level shall be equal. In order to insure a throttling action of a sufficient degree without unduly contracting the passage through any one of the fluid-conduits, which may be of importance in case of the use of dirty water, I contemplate providing throttles in two or more of the fluid-conduits, by which means the desired degree of throttling can be secured by an aggregate action.

Reference being now had to the drawings in which my invention is illustrated, Figure 1 is an elevation, partly sectional, showing the application of my invention in what I consider to be its best form; and Fig. 2 is a similar elevation showing certain modifications which will help to a correct understanding of the principle of invention.

A indicates the boiler, B the motor-cylinder, and C the water-cylinder, of the feed-water pump.

D is the supply-tank from which the pump draws its water.

E is main supply-pipe for the motor-cylinder of the pump. Its inlet end *e* is arranged, as described in my former patent, to extend into the boiler or a chamber in free communication therewith to a point on or substantially on the normal water-line. Beyond the inlet end a portion E′ of this supply-pipe rises to a greater height, while the other end E^2 of the conduit leads into the steam-chamber of the pump.

F is the supplemental supply-pipe, leading from a point in the boiler above the normal water-line and connecting with the steam-chamber of the pump preferably through the main pipe E, as indicated in Fig. 1, though it may connect directly with the steam-chamber, as indicated in Fig. 2.

G is the exhaust-conduit of the motor-cylinder B, preferably leading, as shown, into the supply-tank D.

H is a conduit leading from the supply-tank to the water-cylinder C, and I a conduit leading from the water-cylinder C to the boiler.

J indicates the stop-cock in the pipe F, and K, K′, K^2, and K^3 indicate throttling devices situated in the various conduits leading to and from the chamber-cylinders, by the ad-

justment of one or more of which any desired resistance or back pressure can be developed in the main supply-pipe E.

In the special construction shown in Fig. 1 L is a chamber connected with the boiler both above and below the water-level by the passages L′ and L², M indicating a gage to show the level of the water in the boiler and the inlet end *e* of the pipe E leading into the chamber L.

In the construction shown in Fig. 2 a chamber N is connected with the boiler through a passage N′, opening into the boiler on its normal water-line, and the pipe E extends down into the chamber N, opening near the bottom thereof for the purposes explained in my former patent.

O P, Fig. 1, indicate the normal water-line in the boiler, and *o p* a water-line somewhat in excess of the normal, to which water is permitted to rise temporarily in the construction shown in Fig. 2.

Where, as in Fig. 1, the supplemental steam-supply pipe F connects with the pipe E² and with the motor-cylinder of the pump by said pipe and where a throttling-valve K is placed in the pipe E² beyond its connection with the supplemental steam-pipe, it is very evident that the desired throttling to prevent the run away of the pump being effected by the device K and the stop-cock J being left open the pressure in the elevated part E′ of the main supply-pipe E will always be equal to the boiler-pressure, and therefore there will be no tendency for the water to rise into and through the elevated portion E′ until the water-level in the boiler is as high as said portion. Obviously, therefore, the water-level may be raised to any desired degree, while at the same time the desired throttling of the steam is effected. While this is my preferred and, I believe, best construction, it will also be evident that where the pipes F and E are not connected at all except through the steam-chamber of the pump (indicated at B′ in Fig. 2) a throttling-valve K, placed in the pipe E, as shown in said figure, can be made to afford any desired resistance to the passage of fluid through the pipe and that such resistance can easily be adjusted so as to be equal to that incident to using the stop-cock J as a throttling device to prevent the run away of the pump. This also is the case if the throttling devices are placed in the pipes G, H, or I, as indicated at K′, K², and K³, and I may state that a material advantage is incident to using two or more such throttling devices because such use enables the desired resistance or back pressure to be attained without contracting the passage for the steam or water at any one place so much as would be necessary where a single throttle is relied upon.

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

1. In combination with a boiler, a feed-water pump adapted to work with either steam or water as a motive fluid, a main supply-pipe connected at one end to the motor-cylinder of the pump and at the other end connected with the boiler, as described, and so as to have its inlet end flooded when the water in the boiler reaches a determined level, a portion of said supply-pipe being arranged to extend above its inlet end, a supplemental steam-supply pipe leading from a point above high-water level in the boiler and connecting with the motor-cylinder, a stop-cock in the supplemental supply-pipe and means for throttling the flow of fluid through the other fluid-conduits leading to or from the pump whereby the running away of the pump when the stop-cock in the supplemental supply-pipe is opened can be prevented without stopping its operation or flooding the motor-cylinder with water.

2. In combination with a boiler, a feed-water pump adapted to work with either steam or water as a motive fluid, a main supply-pipe connected at one end to the motor-cylinder of the pump and at the other end connected with the boiler as described and so as to have its inlet end flooded when the water in the boiler reaches a determined level, a portion of said supply-pipe being arranged to extend above its inlet end, a supplemental steam-supply pipe leading from a point above high-water level in the boiler and connecting with the motor-cylinder said supplemental feed-pipe connecting also with the main supply-pipe, a stop-cock in the supplemental supply-pipe and means for throttling the flow of fluid through the other fluid-conduits leading to or from the pump whereby the running away of the pump when the stop-cock in the supplemental supply-pipe is opened can be prevented without stopping its operation or flooding the motor-cylinder with water.

3. In combination with a boiler, a feed-water pump adapted to work with either steam or water as a motive fluid, a main supply-pipe connected at one end to the motor-cylinder of the pump and at the other end connected with the boiler as described and so as to have its inlet end flooded when the water in the boiler reaches a determined level, a portion of said supply-pipe being arranged to extend above its inlet end, a supplemental steam-supply pipe leading from a point above high-water level in the boiler to the main supply-pipe, a stop-cock in the supplemental supply-pipe and means for throttling the flow of fluid through the other fluid-conduits leading to or from the pump whereby the running away of the pump when the stop-cock in the supplemental supply-pipe is opened can be prevented without stopping its operation or flooding the motor-cylinder with water.

4. In combination with a boiler, a feed-water pump adapted to work with either steam or water as a motive fluid, a main supply-pipe connected at one end to the motor-cylinder of the pump and at the other end connected with the boiler as described and so as to have its

inlet end flooded when the water reaches a determined level, a portion of said supply-pipe being arranged to extend above its inlet end, a supplemental steam-supply pipe leading from a point above high-water level in the boiler to the main supply-pipe, a stop-cock in the supplemental supply-pipe and a throttling device in the main supply-pipe in the rear of its connection with the supplemental pipe whereby the running away of the pump when the stop-cock in the supplemental supply-pipe is opened can be prevented without stopping its operation or flooding the motor-cylinder with water.

5. In combination with a boiler, a feed-water pump adapted to work with either steam or water as a motive fluid, a main supply-pipe connected at one end to the motor-cylinder of the pump and at the other end connected with the boiler as described and so as to leave its inlet end flooded when the water in the boiler reaches a determined level, a portion of said supply-pipe being arranged to extend above its inlet end, a supplemental steam-supply pipe leading from a point above high-water level in the boiler to the main supply-pipe, a stop-cock in the supplemental supply-pipe and a throttling device in the main supply-pipe in the rear of its connection with the supplemental pipe and means for throttling the flow of fluid also in the other fluid-conduits leading to or from the pump whereby the running away of the pump when the stop-cock in the supplemental supply-pipe is opened can be prevented without stopping its operation or flooding the motor-cylinder with water and without unduly contracting the conduits leading to and from the pump at any one point.

FRANZ JOSEPH WEISS.

Witnesses:
GEORGE GIFFORD,
ALBERT GRAETER.