

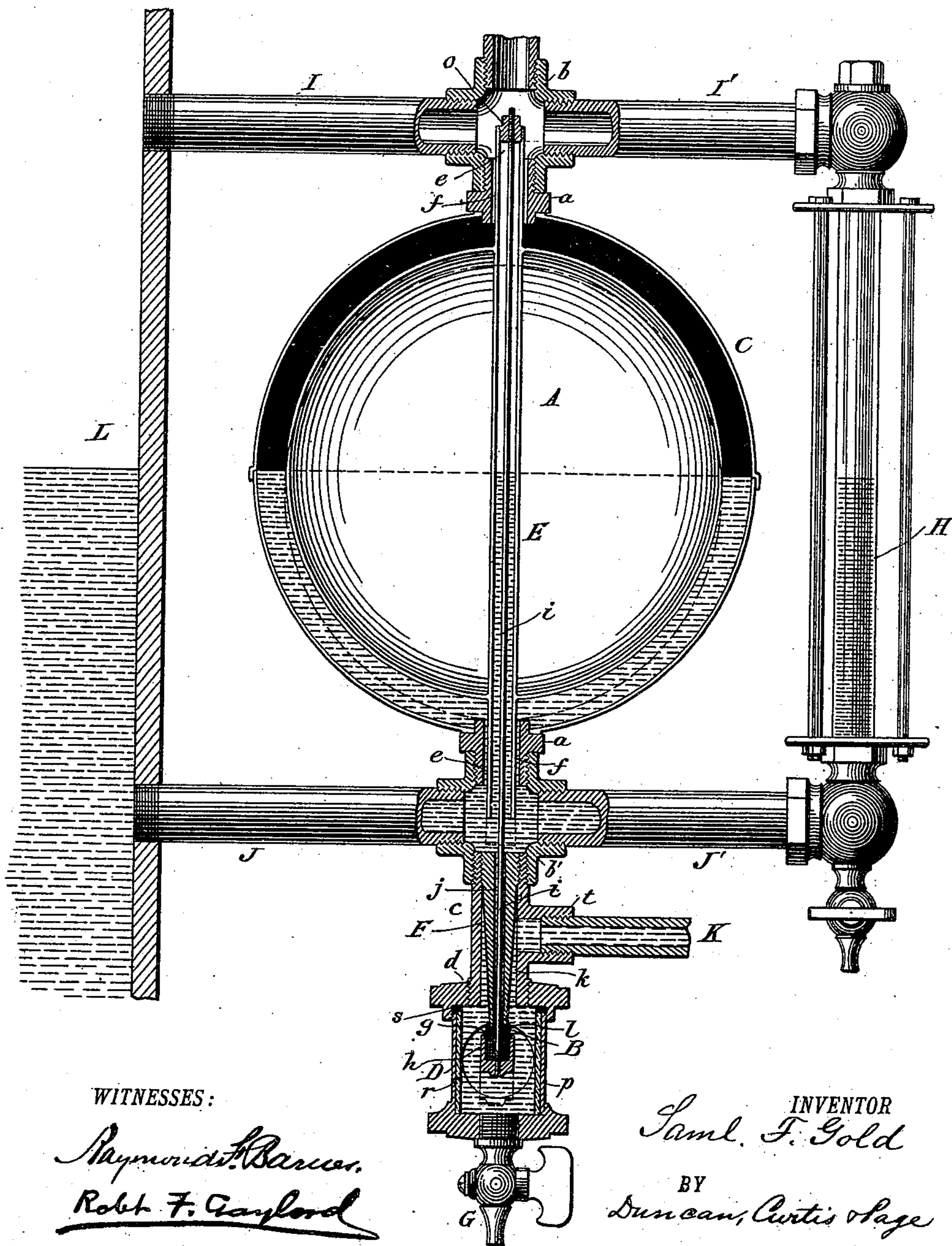
(No Model.)

S. F. GOLD.

AUTOMATIC WATER FEEDER.

No. 354,780.

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UNITED STATES PATENT OFFICE.

SAMUEL F. GOLD, OF ENGLEWOOD, NEW JERSEY.

AUTOMATIC WATER-FEEDER.

SPECIFICATION forming part of Letters Patent No. 354,780, dated December 21, 1886.

Application filed June 5, 1886. Serial No. 204,220. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL F. GOLD, a citizen of the United States, residing in Englewood, in the county of Bergen and State of New Jersey, have invented a new and useful Automatic Water-Feeder; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it ap-
10 pertains to make and use the same.

The present invention relates to automatic water-feeders for controlling the supply of water in boilers or other vessels, and is especially adapted to low-pressure steam-generating apparatus used for heating buildings. For such
15 purposes it is desirable to control the flow of water by means of automatic feeders, which will operate reliably to supply any waste of water and to keep the water in the heating apparatus at substantially the same water-line, and thereby prevent the liability, on the one
20 hand, of reducing the efficiency of the apparatus by flooding, and, on the other hand, of burning and destroying the heating apparatus by too small a supply.

The object of the present invention is to produce a strong, compact, economical, and reliably-operating automatic water-feeder for the uses above specified, in which the valve
30 which controls the flow of the water to the boiler is located in a chamber below the boiler-connection and below the supply or inlet pipe, for the reasons hereinafter fully set forth.

My water-feeder may be constructed substantially as hereinafter described, and as shown in the accompanying drawing, in which the operative parts of the feeder are shown in central section, and are designated by letters, and described as follows:

40 A represents a float carrying a valve, B, the float being inclosed in or surrounded by a case or shell, C. The float is preferably made of sheet-copper or other non-corrosive metal, and is preferably spherical-shaped, and is hollow
45 to render it light and buoyant. The inclosing-case C is also preferably, for the purposes of economy of construction, strength, compactness, and appearance, spherical in shape, and sufficiently larger than the float to permit the
50 latter to move up and down in it to close and open its valve B, as hereinafter explained. The case may be properly made of sheet-cop-

per in two parts, which are soldered or brazed together after the float has been inserted. The case C inclosing the float is provided at its upper and lower surface with tubular fittings *a a*, secured to the wall of the case by soldering or brazing, and forming openings into the case from opposite points. To these fittings are secured in the usual way cross-fittings *b b'*, and to the lower cross-fitting, *b'*, is attached a T-coupling, *c*, to which is secured, by a screw-threaded joint, *d*, a detachable valve-chamber, D.

E is a pipe or small tube passing through the center of the float A, and secured to its wall and projecting therefrom both above and below, the projecting parts *e e* forming guides to direct the upward and downward movement of the float. These projections enter the bores
70 *f f* of the fittings *a a* and form guide-ways.

The valve B and its seat *l* are located at a distance below the float and its case, as well as below the lower or water connection with the boiler, and below the supply or inlet pipe K, in order that the valve may be free from or escape the injurious and often destructive effect of the hot water, which in most constructions of this class has had direct access to the valve, and also to enable the valve to be inclosed in
80 a chamber removed from and substantially independent of the water-receiving casing which contains the float which operates the valve, and below the inlet or supply pipe, so that such chamber can be detached and the advantages of its detachment be availed of. In the
85 drawing the valve B is shown as consisting of a cylinder, *g*, of india-rubber or other suitable material, seated in a cup, *h*, these parts being secured together by a wire or rod stem, *i*, passing through the rubber and screwed into the
90 bottom of the cup. The stem *i* passes up through a channel, *j*, in the coupling *c*, connecting the valve and the lower boiler-connections, the channel being preferably but little larger than the stem *i*. This channel is conveniently formed by boring a hole longitudinally through a plug, F, fitted into the bore of the coupling *c* at its upper end, and preferably made tapering or cut away below, so as to form
100 a water-space, *k*, between the plug and the inner wall of the tube. The lower end, *l*, of the plug forms the seat for the valve B. The stem *i* of the valve B is secured to the float A in any de-

sirable way, the preferable attachment being to run the stem within the tube E and attach it to a plug, *o*, in its upper end, where it can be easily reached, if desired.

5 The detachable valve-chamber D consists of a cylindrical or other shaped vessel, secured to and removable from the coupling *c* at the screw-threaded joint *d*. This chamber is provided with transparent windows *w*, located opposite
10 the valve B, and conveniently formed by cutting out portions of the outer metal case or wall, *p*, and introducing a glass or other transparent thimble, *r*, within the same, the thimble and case being tightly secured by a suitable
15 packing, *s*, between their ends and the screw-top of the chamber. G is a petcock located in the bottom of the chamber D.

The above-described parts, combined substantially as described, and shown in the drawing, form a complete water-feeder for the
20 purposes named, capable of easy attachment to almost any boiler, and constituting a separate article of manufacture and sale.

The drawing shows the feeder properly connected with a boiler and supply or inlet
25 pipe, and ready for operation, the simple and convenient connections being described as follows: The upper and lower boiler-connections, I and J, are screwed into the cross-couplings *b* and *b'*, corresponding connections, I' and J', being made with a gage-glass, H. These
30 connections place the interior of the case C and the exterior of the float A in direct communication with the steam and water portions of the boiler L, the steam and water being free to
35 pass to and from the case C and boiler L through the channels *f f* and connections I and J. The supply or inlet pipe K is attached to the coupling *c* by a screw-threaded joint, *t*, this pipe
40 being connected with the street-main, or with some supply upon a higher level than the water-line of the boiler. The dotted lines in the valve-chamber D and in the case C show the position of the valve B and float A before
45 the float has been raised by the admission of sufficient water into the case C.

The operation of the water-feeder is as follows: The water from the inlet-pipe K flows
50 downwardly into the chamber D, and if the valve B is open, or not closed tightly upon its seat, the water flows through the channel or way *j* through the connection J into the boiler L, and as the boiler fills the water flows through the lower channel, *f*, and rises in the
55 case C and around the float A to the same level as in the boiler. When sufficient water has entered the case C to begin to raise the float A, the valve B begins to rise toward its seat *l*, and the water continues to flow in until the valve is closely drawn and held water-tight against its seat. This closing and holding the valve against its seat after the boiler
60 has been filled to a certain height establishes the water-line in the boiler, and the case, with its float, may be so positioned relatively to the wall of the boiler as to establish this water-line at any desired height. As the water in

the boiler is gradually diminished and the water-line falls, the float will fall with the water and the valve B be slightly depressed
70 or loosened on its seat, and a sufficient quantity of water be admitted to the boiler to restore its normal water-line. In practice so delicate is the apparatus that any waste of water is almost instantly replaced by a new
75 supply, keeping the water constantly up to substantially the same level and giving to the valve an almost constant but slight movement. The location and vertical play of the stem *i* within the narrow water-channel *j* operates to keep
80 the channel open for the free passage of the water.

The union of the valve-chamber D with the coupling *c* by the screw-threaded joint *d*, and the location of this joint below the supply-
85 pipe K, provide means for readily detaching the chamber for the purpose of thoroughly cleaning it, or for the purpose of repairing the valve, without the employment of skilled labor. The location of the valve-chamber at
90 the lowest part of the structure enables a simple screw-cap to be almost instantly substituted for the removed chamber, and the feed of the water and the working of the valve can be continued during the temporary absence of
95 the chamber proper; also, as the valve-chamber is located below the supply or inlet pipe and is provided with a cock, G, at its bottom, any sediment which may collect in the chamber may be carried out through the cockway,
100 and by permitting the flow of the water under the full force of the main or tank, the interior surface of the windows of the chamber may be washed and kept reasonably clean, so that the
105 detaching of the chamber for the purpose of cleaning the windows will be rendered less frequent. This is practicable, since the narrow channel between the chamber and the boiler will not permit of any rapid flow of water from the boiler when the cock G is
110 opened.

One of the great advantages of this feeder is that the valve B is so located as to be free from the deleterious effects of the hot water, and in this respect it is distinguished from
115 most constructions of the kind. The valve is placed at a considerable distance below the lower boiler-connection, and the hot water, in order to reach it, must penetrate downward through a column of cold water. To give ad-
120 ditional protection to the valve it may be provided that the only communication between it and the hot water may be through the narrow stem-channel *j*, and also that the walls of this channel may be surrounded with cold water
125 in direct connection with the inlet-pipe and the valve-chamber. The valve is also located outside of the case C and is only connected with it through a narrow water-channel when the valve is open. This enables the valve to
130 be inclosed in a separate chamber, which can be easily detached without recourse to skilled labor, as described, for the purpose of removing any foreign substance which might inter-

fere with its action; so, also, as the valve-chamber is located below the supply or inlet pipe and is provided with a cock, G, at its bottom, any collected sediment may be expelled from the chamber by opening the cock and permitting the supply-water, under full pressure of the main or tank, to flow through it, and at the same time the interior surface of the windows with which the chamber may be provided will be washed by the flow and pressure of the water.

It is not intended that this invention shall be limited to the exact construction, location, or arrangement of the several parts shown in the drawing, since it is evident that there can be a wide departure from the details there shown, and yet employ substantially the same principle of construction and operation—as, for instance, I do not limit the invention to the use of a spherical-shaped float or case, as other forms may be employed and will operate in substantially the same way. Neither do I limit myself to the special guides *ee*, or guide-ways, or either of them, or to the tube passing through the float, or to the attachment of the valve-stem to the upper part of the float, it being obvious that the float, if properly guided in any manner, will operate the valve attached thereto in substantially the same manner as shown and described. Neither do I limit myself to any special form of valve, or seat, or valve-chamber, it being, however, true that the special arrangement and construction of the various parts as shown in the drawing are well adapted to the successful working of the device.

What I claim as new in an automatic water-feeder is—

1. A float constructed to rise and fall in an

inclosing-case with the rise and fall of water therein, in combination with a valve located below the lower boiler-connection and below the supply or inlet pipe, whereby the valve is protected from contact with the hot water of the boiler, substantially as set forth.

2. A valve-chamber provided with transparent windows, and a cock located below such windows, in combination with a supply or inlet pipe located above such valve-chamber, substantially as and for the purpose set forth.

3. A tube attached to and projecting downward from a float, in combination with a valve whose stem is received within such tube, substantially as and for the purpose described.

4. A tube passing through a float and projecting beyond the upper and lower surface thereof to form guides, in combination with a valve whose stem is attached at or near the upper end of such tube, substantially as and for the purpose set forth.

5. A water-way or channel connecting the valve-chamber and the water-connection of a boiler, in combination with a cold-water space surrounding or partially surrounding the walls of said channel, substantially as and for the purpose described.

6. A plug provided with a channel or water-way, and located between the water-connection of a boiler and a valve-chamber, in combination with a valve whose seat is the lower end of such plug, and whose stem rises and falls in such channel by the rise and fall of a float located above said plug, substantially as and for the purpose described.

SAMUEL F. GOLD.

Witnesses:

ROBT. H. DUNCAN,
ROBT. F. GAYLORD.