(No Model.)

C. A. SOUTHWICK.

WATER FEEDER.

No. 384,874. Patented June 19, 1888.

Fig. 1.

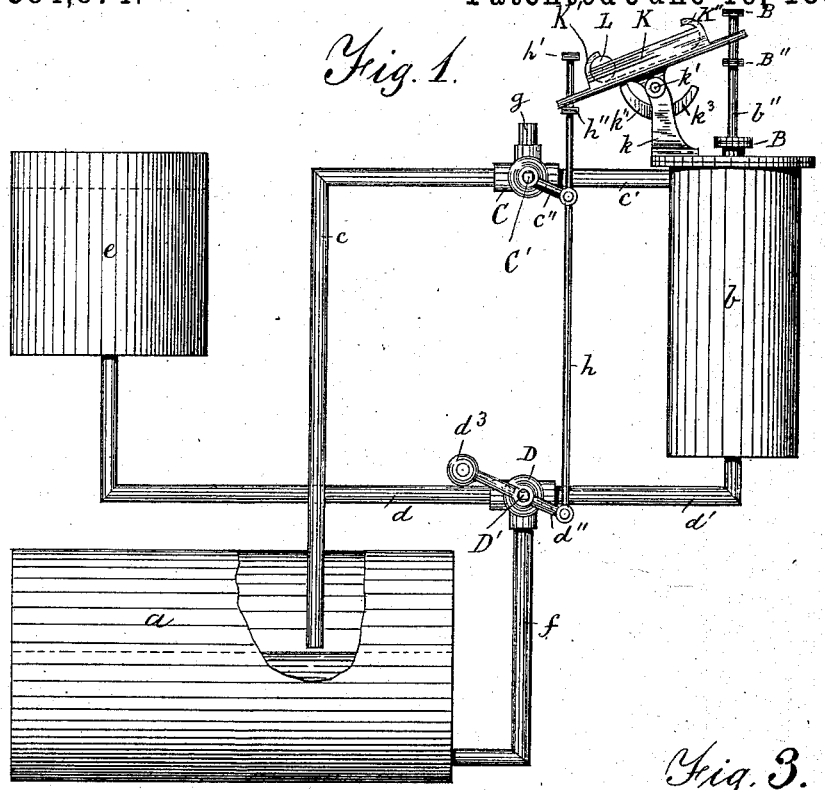


Fig. 3.

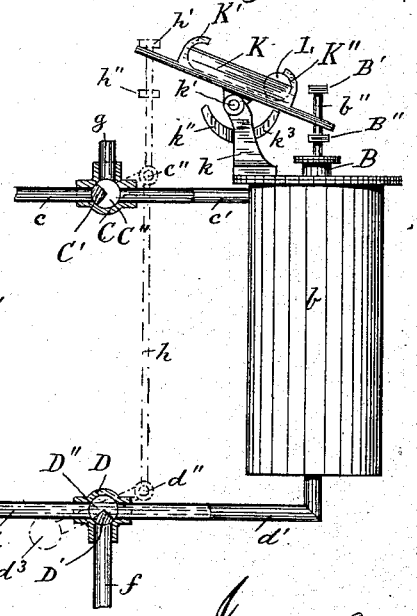
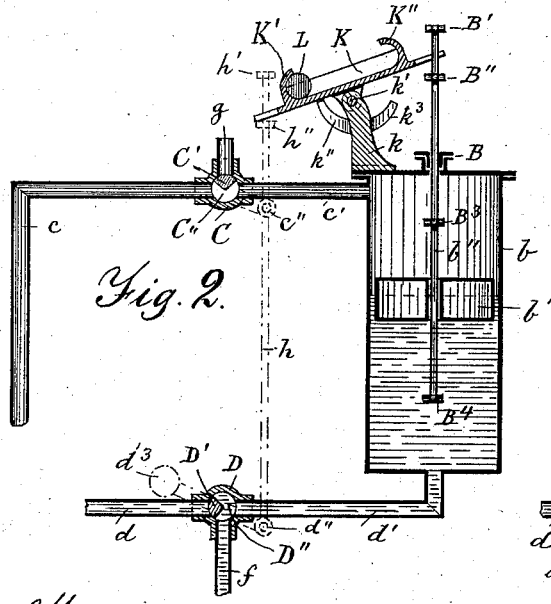


Fig. 2.



Witnesses:
Charles H. Fogg.
Henry Chadbourne.

Inventor.
Charles Austin Southwick
by Albert Andrews. his attys

UNITED STATES PATENT OFFICE.

CHARLES AUSTIN SOUTHWICK, OF PEABODY, MASSACHUSETTS.

WATER-FEEDER.

SPECIFICATION forming part of Letters Patent No. 384,874, dated June 19, 1888.

Application filed August 15, 1887. Serial No. 246,955. (No model.)

To all whom it may concern:

Be it known that I, CHARLES AUSTIN SOUTHWICK, a citizen of the United States, and a resident of Peabody, in the county of Essex and State of Massachusetts, have invented new and useful Improvements in Automatic Water-Feeders, of which the following, taken in connection with the accompanying drawings, is a specification.

This invention relates to improvements in automatic water-feeders for the purpose of maintaining a standard level of water or other liquids in steam-boilers, tanks, &c., and it is carried out as follows, reference being had to the accompanying drawings, wherein—

Figure 1 represents a side elevation of the apparatus shown partly in section. Fig. 2 represents a longitudinal section of the automatic feeding mechanism, showing the valves in position for feeding the boiler; and Fig. 3 represents the valves in their reversed positions for conducting the liquid from its source or tank to the feed-reservoir.

Similar letters refer to similar parts wherever they occur on the different parts of the drawings.

a is the boiler, tank, or receiver of any kind, in which a standard level or height of liquid is to be maintained.

b is the feed-reservoir, preferably made cylindrical in form and closed at top and bottom. From the upper end of the reservoir *b* leads a pipe, *c c'*, to the boiler *a*, the lower end of said pipe terminating within the boiler at a place where the level of the liquid is to be maintained, as shown in Fig. 1.

d d' is a pipe leading from the bottom of the feed-reservoir *b* to the tank *e*, or other suitable water-supply—such as the pipe from a water-main, a feed-pump, or other well-known source of supply.

f is a pipe leading from the pipe *d d'* to the bottom of the boiler *a*, as shown in Fig. 1.

On the pipe *c c'* is located a valve-shell, C, having a plug or valve, C', a portion of which is cut away, as shown at C'' in Figs. 2 and 3.

g is an exhaust pipe or opening leading from the valve-shell C to the atmosphere, for such purpose as will hereinafter be described.

D is a valve-shell located at the junction of the pipes *d d' f*, and provided with a plug or valve, D', having a cut-away portion, D'', for the purpose of alternatively establishing a communication between the pipe *d d'* and between the pipes *d' f*.

To the plug or valve C' is attached the lever *c''*, and to the plug or valve D' is likewise attached the lever *d''*, which levers are connected together by means of the vertical rod *h*, the latter having secured to it at its upper end the nuts or collars *h'* and *h''*, which are preferably made adjustable on said rod *h*, either by being screwed thereon or in any other well known manner.

d^3 is a balance-weight on the lever *d''* to counterbalance the rod *h*, its collars *h' h''*, and levers *c'' d''*, as shown in Fig. 1.

Within the feed-reservoir *b* is located the hollow float *b'*, that is free to slide up and down on the rod *b''* as the liquid rises or falls in said reservoir. The rod *b''* in its upper end passes through a suitable stuffing-box, B, in the top of the reservoir *b*, as shown in Fig. 2.

B' and B'' are nuts or collars or projections secured at a proper distance apart on the rod *b''*, on that portion of it that extends above the reservoir *b*, as shown, the purpose of which will hereinafter be described.

Above and below the float *b'* are secured to the rod *b''* the collars, nuts, or projections B^3 B^4, on which the float *b'* acts as the liquid rises or falls within said reservoir *b*.

k is a bracket, preferably secured to the top of the reservoir *b*, or to any other stationary part of the device, such bracket having pivoted to it at *k'* the weighted scale-beam K, the ends of which are long enough to come in contact with the projections B' B'' on the rod *b''*, and projections *h' h''* on the rod *h*, as shown in Fig. 1.

On the scale-beam or lever K the weight L is free to roll or slide as the said lever is tipped, said lever having end projections, K' and K'', that serve as stops for the movable weight L to limit its motion in either direction on the lever K. I prefer to have the weight L movable on the lever K, as shown; but this is not essential, as, if so desired, it may be secured to said lever above its fulcrum, similar to the manner in which railway-switch-lever weights are arranged to hold the switch in position.

k'' and k^3 are stop projections on the bracket

k to limit the rocking motion of the lever K as it is being tipped by the projections B′ and B″ during the downward and upward motion of the rod *b*″, caused by fall and rise of the float *b*′. It is not essential that such stop projections should be located on the bracket *k*, as they may be arranged on the lever K, or any of the movable parts of the device, the object being to limit the motion of the valves or plugs C′ D′ during the operation of the device.

The operation is as follows: We will suppose that the liquid in the boiler *a* has fallen a little below the lower end of the pipe *c*, (which is the normal level,) and that the various parts are in their respective positions, as shown in Figs. 1 and 2, the plugs or valves C′ and D′ being held as shown in said figures, so that the steam from the boiler *a* will pass through pipe *c*, valve C′, and pipe *c*′ to the upper end of feed-reservoir *b*, above its float *b*′, causing the latter to move downward and the liquid in said reservoir to be forced out through pipe *d*′, valve D′, and pipe *f*, and thus to flow into the bottom of the boiler *a*, the communication to the pipe *d* and its tank *e* being closed, as shown in Fig. 2, the exhaust-pipe *g* at the valve shell C being also closed, as shown in Fig 2. As the float *b*′ continues to sink it comes in contact with the lower projection, B⁴, on the rod *b*″, and thus causes the latter to move downward with it, and during such downward motion of the said rod *b*″ its upper projection, B′, depresses the right-hand end of the scale-beam K until the latter is rocked below a horizontal line, when the weight L rolls on the lever K against the stop K″, causing the lever K to be instantly tripped on its fulcrum to the position shown in Fig. 3, and by so doing the left end of said lever actuates the projection *h*′ on the rod *h* and raises the latter instantly to the position shown in Fig. 3, by which the positions of the valves or plugs C′ D′ are reversed, the former closing the pipe *c* and establishing an open communication from the upper end of the reservoir *b* and its pipe *c*′ to the exhaust-pipe *g*, the latter closing the pipe *f* and establishing an open communication from the tank *e* to the lower end of the reservoir *b* by means of the pipes *d* and *d*′, as shown in Fig. 3, causing the liquid from the tank *e* or water-source to enter the bottom of the reservoir *b* and to force the float *b*′ upward, and during such upward motion of the float *b*′ the air or steam above it is allowed to pass freely out through pipes *c*′ *g* and the valve C′. As the float *b*′ continues to rise it comes in contact with the projection B³ on the rod *b*″ and moves the latter upward, causing its projection B″ to trip the lever K sufficiently to cause its weight L to roll to the position shown in Figs. 1 and 2, by which the rod *h* is instantly depressed by the medium of the projection *h*″ on it and the various parts returned to their original positions, as shown in Figs. 1 and 2, and if the liquid in the boiler *a* has fallen below the end of the pipe *c* the water from the reservoir *b* will be caused to flow into the boiler through the pipes *d*′ *f*. Should, however, the lower end of the pipe *c* be sealed in the liquid in the boiler *a*, no feed will take place until the level of the liquid in the boiler falls below the open lower end of the steam-pipe *c*.

Having thus fully described the nature, construction, and operation of my invention, I wish to secure by Letters Patent, and claim—

The water-feeder, as described, consisting of the water-supply *e* and reservoir *b*, the pipe *d d*′, connecting the same, the valve D′, arranged on said pipe and having pipe *f* entering the water-space of the boiler *a*, the pipe *c*′ *c*, leading from the upper portion of the reservoir *b* to the boiler *a*, and terminating within the latter at the normal level of the water in said boiler, and having the valve C′ arranged upon said pipe, as described, the said valves C′ D′ being connected by means of the weighted levers *c*″ *d*″ and rod *h*, combined with the float *b*′, arranged within the reservoir *b*, the float-rod *b*″, having collars B′ B″ B³ B⁴, and the weighted rocking lever K L, substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 9th day of August, A. D. 1887.

CHARLES AUSTIN SOUTHWICK.

Witnesses:

ALBAN ANDRÉN,

HELEN S. ANDRÉN.