

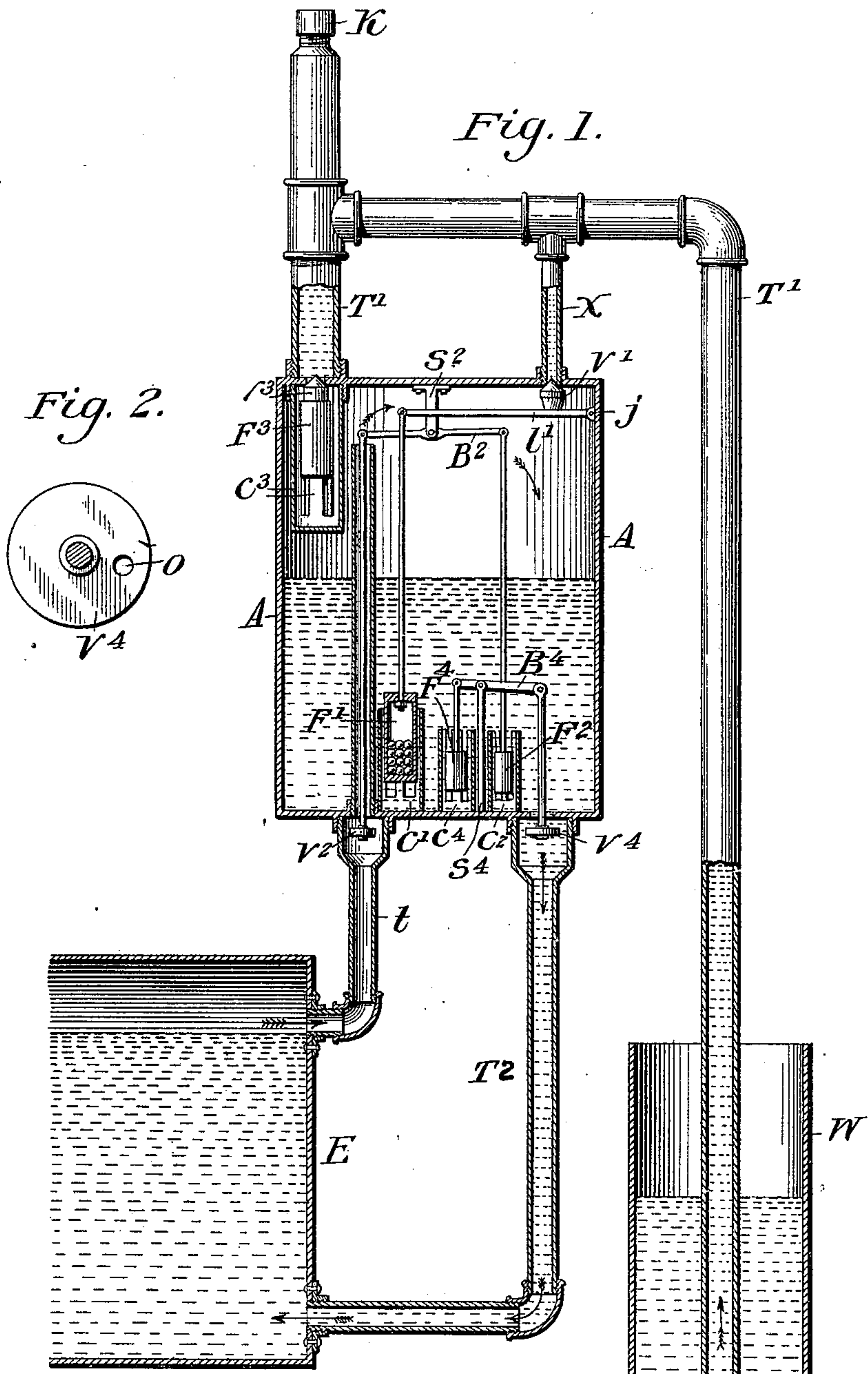
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Patented Mar. 27, 1900.

E. J. STRONG.  
AUTOMATIC FEEDER FOR STEAM BOILERS.

(Application filed Apr. 8, 1899.)

(No Model.)



Witnesses.

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# UNITED STATES PATENT OFFICE.

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## AUTOMATIC FEEDER FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 646,083, dated March 27, 1900.

Application filed April 8, 1899. Serial No. 712,341. (No model.)

*To all whom it may concern:*

Be it known that I, EDWIN J. STRONG, a citizen of the United States, residing at Plover, in the county of Pocahontas and State of Iowa, have invented a new and useful Automatic Feeder for Steam-Boilers, of which the following is a specification.

The object of my invention is to provide an automatic feeder for steam-boilers which will carry water into a steam-boiler when the water in the boiler is under steam-pressure and keep the water near a certain predetermined height in the boiler without the aid or attention of an engineer or attendant.

In the drawings, Figure 1 is a sectional view of the feeder connected with the steam-space of a boiler E by a steam-pipe  $t$  and with the water-space of the boiler E by a water-pipe  $T^2$  and connected with the source of water-supply W by the inlet-pipe  $T'$ , and Fig. 2 a top view of the perforated or leaking valve  $v^4$ .

In Fig. 1 the cylindrical receptacle or steam-chamber A is connected with the steam-space of a boiler E by a steam-pipe  $t$ , which extends upward into the cylinder A and is provided with a valve  $v^2$ , pivotally attached to a lever  $B^2$ , suspended by its fulcrum  $s^2$ , and to the opposite end of said lever  $B^2$  is pivotally attached a float  $F^2$  in a cage  $c^2$ . The water-space of the boiler E is connected with the cylinder A by the water-pipe  $T^2$ , having a perforated or leaking valve  $v^4$ , (top view shown in detail, Fig. 2,) which allows water to flow from cylinder A into the boiler E through the pipe  $T^2$ , but prevents it from flowing in the opposite direction except in a small stream. Said valve  $v^4$ , having a leak-hole  $o$ , is pivotally attached to a lever  $B^4$ , which is supported upon its fulcrum  $s^4$ , and to the opposite end of the lever  $B^4$  is pivotally attached a float  $F^4$  in a cage  $c^4$ .

The source of water-supply or tank W is connected with the cylinder A by a water-inlet pipe  $T'$ , provided with a valve  $v^3$  upon a float  $F^3$  in a cage  $c^3$ . The interior of cylinder A and water-inlet pipe  $T'$  are also connected by a steam-pipe  $x$ , which is provided with a valve  $v'$  upon a lever  $l'$ , which is pivotally attached to cylinder A at  $j$ , and to its opposite end is pivotally attached a weighted float  $F'$  in a cage  $c'$ .

K is a cap-screw on top of inlet-pipe  $T'$ .

The operation consists in having the boiler E filled with water to above the open end of the steam-pipe  $t$  in the boiler E and the entire feeder filled from the boiler E to the source of water-supply W. Then as the water boils down below the open end of steam-pipe  $t$  in the boiler E steam is free to pass upward through pipe  $t$  into cylinder A, and the water in cylinder A is free to flow downward by gravity and seek its level in the boiler E. When nearly all the water in cylinder A is exchanged for steam, the weighted float  $F'$  pulls down on the long end of lever  $l'$ , and thereby opens steam-pipe  $x$ , which gives vent to the steam in cylinder A, which causes a sudden draft of steam and water up through steam-pipe  $t$  and water-pipe  $T^2$ , which instantly shuts their valves  $v^2$  and  $v^4$ , and as steam continues to pass through steam-pipe  $x$  the steam-pressure upward is relieved from valve  $v^3$ , which drops open, and the water in the inlet-pipe  $T'$ , between valve  $v^3$  and steam-pipe  $x$ , flows down through cage  $c^3$  and commingles with steam in cylinder A, which suddenly condenses, forming a vacuum in cylinder A and in the inlet-pipe  $T'$ , which soon entirely fills with water from the source of water-supply W. When cylinder A fills with water, the float  $F'$  brings valve  $v'$  up and closes steam-pipe  $x$ , and float  $F^3$  brings valve  $v^3$  up and closes the inlet-pipe  $T'$ . Then as water gradually leaks up through the perforated valve  $v^4$  the boiler-pressure upward against valve  $v^4$  and valve  $v^2$  is permitted to pass up through into cylinder A, and thereby relieve valve  $v^4$  and valve  $v^2$  from steam-pressure upward, and consequently open steam-pipe  $t$  and water-pipe  $T^2$ . Now cylinder A is again filled with water, and its pipes which communicate with the interior of the boiler E are open, and cylinder A is again ready to give the boiler E water in exchange for steam until the open end of steam-pipe  $t$  in the boiler E is flooded with water, which stops its operation until the water again boils down.

What I claim as new, and desire to secure by Letters Patent, is—

1. In an automatic feeder for steam-boilers, the combination with the chamber A, the boiler E and a source of water-supply W of



the steam-pipe  $t$  connecting the steam-space in said boiler E with said chamber A and extending vertically to near the upper end of said chamber A; the water-pipe  $T^2$  connecting the lower end of said chamber A with the lower portion of said boiler E; the fulcrum  $s^2$  depending from the lower face of the upper head of said chamber A; the lever  $B^2$  pivoted in said fulcrum  $s^2$  and provided with a rod having a valve  $v^2$  adapted to work in the enlarged upper end of said steam-pipe  $t$ ; the lever  $l'$  provided with a valve  $v'$  for opening and closing the steam-pipe  $x$  communicating with the inlet-pipe  $T'$ ; the cage  $c'$  rising from the bottom of said chamber A; the weighted float  $F'$  connected with said lever  $l'$  and adapted to work in said cage  $c'$ ; the lever  $B^4$  supported on the fulcrum  $s^4$ ; the perforated valve  $v^4$  located in the upper end of the water-pipe  $T^2$  and pivotally connected by a valve-rod with said lever  $B^4$ ; the cage  $c^3$  connected with the head of said chamber A directly below the inlet-pipe  $T'$ , and the float  $F^3$  provided with valve  $v^3$  located in said cage  $c^3$ ; substantially as specified.

2. In an automatic feeder for steam-boilers, a water-chamber A, a water-inlet pipe with a

valve therefor, pipes  $t$ ,  $T^2$ , connecting said chamber with the steam and water spaces of the boiler, a valve for each of said pipes, the valve in the water-pipe  $T^2$  being provided with a leak-opening whereby the gradual leakage of water from the boiler into the chamber A will raise the pressure therein to the boiler-pressure, substantially as described.

3. In an automatic boiler-feeder for steam-boilers, the combination with the boiler of a chamber A having a water-inlet pipe  $T'$ , water-pipe  $T^2$  leading from the chamber to the boiler, steam-pipe  $t$  leading from the steam-space of the boiler to the chamber A and the steam-pipe  $x$  connecting the upper part of the chamber with the water-inlet pipe, a valve for each of these pipes the valve  $v^4$  in pipe  $T^2$  having a leak-opening  $o$  whereby the water is permitted to leak backward from the boiler into chamber A for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

EDWIN J. STRONG.

Witnesses:

S. S. APPLEBY,  
W. J. HOGAN.