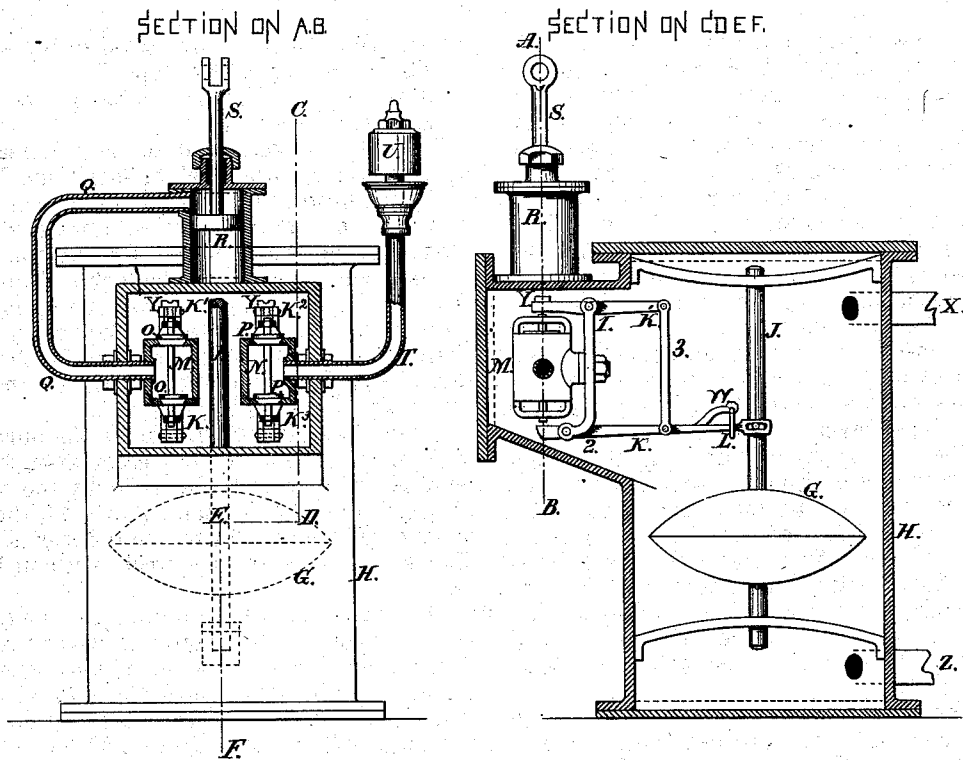


H. S. COLE.

Steam-Boiler Indicators.

No. 155,828.

Patented Oct. 13, 1874.



WITNESSES:

DeForest. Grandall
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INVENTOR:

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UNITED STATES PATENT OFFICE.

HENRY S. COLE, OF MILWAUKEE, WISCONSIN.

IMPROVEMENT IN STEAM-BOILER INDICATORS.

Specification forming part of Letters Patent No. **155,828**, dated October 13, 1874; application filed June 26, 1874.

To all whom it may concern:

Be it known that I, HENRY S. COLE, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Steam-Boiler Indicators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

The object of my invention is to automatically control the amount of water forced into a steam-boiler, so as to always keep the same at the proper level.

In the accompanying drawing, H is a hollow vessel, of cast-iron or other suitable material, connected with the boiler by the tubes X and Z, which lead into the boiler—one above and the other below the water-level. G is a float, resting upon the water and rising and falling it. K and K' are levers, pivoted at 1 and 2, and connected by the bar 3. The end of lever K is fastened to the float-stem S at L.

As represented in the drawing, the lever K has a much greater purchase than the lever K'. M is a small chamber, fastened to the inside of the vessel H, and contains the balanced puppet-valve O O, which opens upward. This valve is opened and closed by the horizontal motion of levers K and K'. A set-screw in the end of lever K' adjusts them to the valve-spindle. Q Q is a pipe connecting the valve-chamber M to the cylinder R near the top of the latter.

In cylinder R works piston S. The end of the piston-rod S is connected by means of a rod, chain, or other device with the pumping machinery, and operates by stopping and starting the pump, opening and closing the water or steam pipe, or in any other way desired.

I have contemplated attaching it to a lever, which should throw a band onto a fast or loose pulley, and thus stop or start the pump.

N is a valve-chamber, precisely similar to M in construction, and containing the balanced puppet-valves P P, which are similar to O O in their construction and action, and

which, when open, admit steam to the alarm-whistle U through steam-pipe T.

Levers K'' and K''' are similar in operation to the levers K and K'.

Lever K''' is connected to lever K near the float-stem S by means of the loose link W.

My invention operates as follows: As the water in the boiler lowers, it lowers also in vessel H, and the float G falls. The float G, by its weight, depresses the levers K and K'. The lever K rising at its other end opens the puppet-valve O O. Steam then rushes from chamber H into valve-chamber M through pipe Q Q and into cylinder R above the piston S, and forces it down.

It may be observed that since the purchase or leverage of lever K is greater than that of lever K', whenever the lever K, by the action of the float G, raises the valve O O, the end of lever K' moves faster than lever K, and allows the valve to rise freely without binding.

The pump is set in motion by this downward motion of the piston by means of the connections before spoken of, and water is forced into the boiler until the float G rises, and, by means of lever K', closes valve O O and shuts off all steam from cylinder R. As the steam in cylinder R condenses a counterpoise (not shown) draws it back to its first position, when the water ceases to flow into the boiler. The water again running low, the same result is repeated, and it is thus kept at a uniform level.

The link W connecting K and K''' allows the lever K to move freely without moving lever K'', except when the water runs dangerously low. It then is forced down sufficiently to draw down K''' also, which opens valve P P and allows steam to rush out of whistle U through pipe T and sound an alarm.

It is obvious that the float, levers, valves, and all their connections may be placed within the boiler instead.

It is obvious, also, that instead of by the link W, the levers K and K'' may be connected by a chain or other suitable means, or that the lever K'' might be directly attached to the float G.

What I claim as my invention is—

1. The combination of the float G, lever K,

link W, levers K'' and K''', balanced puppet-valve P P, and whistle U, substantially as and for the purposes described.

2. The combination of the float G, connected levers K and K', link W, connected levers K'' and K''', puppet-valves O O and P P, cylinder R, and whistle U, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand this 19th day of June, 1874.

HENRY S. COLE.

Witnesses:

SAMUEL MARTIN,

DE FOREST CRANDALL.