L. Foote,

Steam Boiler Feeder.

No. 111,116. Patented Jan. 24, 1871.

Fig. 1.

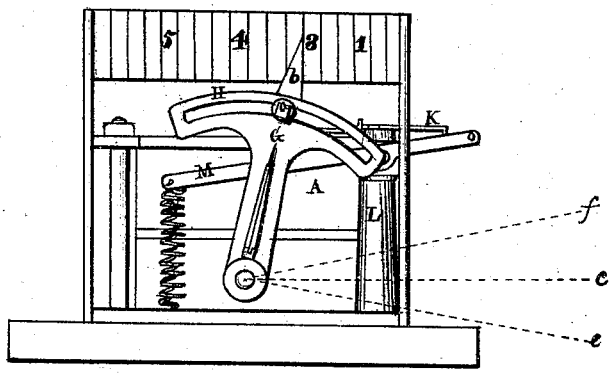


Fig. 2.

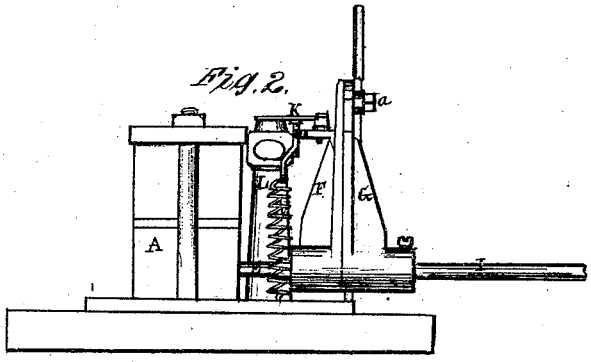
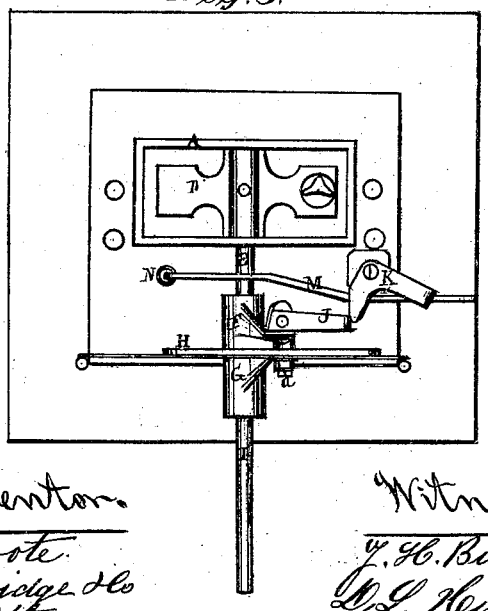


Fig. 3.



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United States Patent Office.

LUCUS FOOTE, OF NORTH FAIRFIELD, OHIO.

Letters Patent No. 111,116, dated January 24, 1871.

IMPROVEMENT IN STEAM-BOILER FEEDERS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, LUCUS FOOTE, of North Fairfield, in the county of Huron and State of Ohio, have invented certain new and useful Improvements in Steam-Boiler Feeder, of which the following is a full and complete description, reference being had to the accompanying drawing making a part of this specification, in which—

Figure 1 is a front view of the feeder.

Figure 2 is a side view.

Figure 3 is a view of the top.

Like letters of reference refer to like parts in the several views.

The nature of this invention relates to a water-feeder for steam-boilers, the object thereof being to indicate when the water in the boiler is at or below the water-line, and, when below said line, to cause a supply of water to the boiler by operating certain valves.

It also relates to the construction of the feeder, which is such that it can be adjusted to any given water-line, high or low, in the same boiler, as hereinafter more fully described, it being an improvement of a former feeder for which United States Letters Patent were granted to me April 19, 1870.

In Figure 1—

A represents a chamber, in which are arranged the valves B C, also indicated by the dotted lines in fig. 1.

Said valves are the same as those in my former machine, and are operated in the same way for the same purpose, by means of a vibratory lever or valve-lifter, D, Figure 3.

Said lever is operated by the shaft E, to the outer end of which is attached an arm, F.

To said arm is attached an arm, G, by means of a set-screw, *a*, passing through a slotted arc, H, of the arm G.

Said arm is secured to a shaft, I, one end of which enters the hub of the arm F, so that the two arms have one common center of vibration, but each one its own respective shaft; hence the two arms can be moved independently of each other by slackening the set-screw *a*, or they can be moved together, by tightening said screws, for a purpose presently shown.

To the arm F is attached a finger, J, fig. 3.

K is a right-angle lever, pivoted to the top of the post L.

M is a lever, pivoted to the side of said post.

One end of said lever M is attached to a spring, N, whereas the opposite end is or may be connected to a steam-whistle, which said lever is intended to operate in the manner as hereinafter shown.

The practical use of this device is for regulating the supply of water to steam-boilers, and for changing the water-line, either above or below a standard line of safety ordinarily used for working the engine, which changing of the line may be required for reasons hereinafter set forth.

The working of this apparatus is as follows:

It is attached to the boiler, at any convenient point, so that the shaft I may penetrate it.

To the end of said shaft is connected a float, which, when the water in the boiler is at the ordinary height, or at the line of safety, the float and arm whereby it is connected to the shaft I, are horizontal, which position of the float and arm opens the valves just enough to allow sufficient water to flow into the boiler to continue it at the line of safety, or the ordinary water-line.

In the event the water falls below said line the float also falls and opens the valves, allowing a larger supply of water to the boiler until it rises again to the water-line; and in the event the water rises above said line the float also rises and closes the valves, thereby shutting off a further supply of water until it descends to or below the standard water-line.

This operation of the float and valves is like that of my former apparatus; but in that apparatus the water-line, when once established, and the float adjusted in accordance with said line, it could not be varied so as to indicate a line above or below it—a temporary line, for some especial purpose—which is often required, as, for instance, should it be necessary to run the water below the standard line, in order to give more steam-space in the event of a foaming of the water, which, if it should be continued at the standard height, the foam would run over with the steam into the cylinder; but by allowing more steam-space, by using less water, this is prevented.

It is often required to clean the boiler, by blowing off the steam and water together. To do this effectually the boiler is allowed to fill nearly up with water. Again, should the boiler be a leaky one it becomes necessary, on stopping for the night, to fill the boiler nearly up, so that in the morning there shall be left in the boiler sufficient water with which to get up steam. This could not be done with my former apparatus, for if more steam-space was needed, and which can only be obtained by lowering of the water in the boiler, such lowering of the water would cause the float to fall and open the valves, thereby allowing more water to flow in, and hence giving no more room or steam-space.

On the other hand, should it be necessary, for the reason aforesaid, to fill the boiler above the water-line, it could not be done, for the float on rising above said line would close the valves, thereby shutting off the water.

To avoid this objection to my first apparatus, and cause it to operate so that the water may fill the boiler above the water-line, or fall below it, as the case may be, I connect the float-shaft I and the valve-shaft E to each other by means of the arms F G and the set-

screw *a;* thus the position of the index *b*, fig. 1, is such as to indicate the standard water-line.

The float during this height of the water will be in a horizontal position, as indicated by the dotted line *c*, which will open the valves just enough to allow a sufficient quantity of water to supply the ordinary waste.

Now, should more steam-space be needed, the water must be lowered to a lower line, or one below the line *c*. This is done by loosening the screw *a*, thereby freeing the arms F G from each other. The arm G may now be moved in direction of the arrow, causing the float to fall to the line *e*, which will now be the water-line, as the index has not been moved. The valves therefore remain open the same distance as when the float was at the line *c*, hence no more water will be admitted to the boiler than was admitted before, and yet the water-line is below the standard line *c*.

It will be obvious that, on the ascent of the float above the line *e*, the valves will be closed the same as when the float was in the position indicated by the line *c*, and that the valves will open more and more as the float falls below the new water-line *e*.

Should it be necessary to fill the boiler for either of the above said reasons, or for others, the float must be carried above the standard line *c*. This is done by reversing the movement of the arm G, causing the float to take a water-line above the standard line *c*, as incated by the dotted line *f*, assuming a new water-line more or less above the line *c*, as may be required.

The index is allowed to remain at the figure 3, which holds the valves open the same distance as before, so that the same amount of water is allowed to flow into the boiler, and no more, as the valves will be closed on raising the float above the new line *f*, but which will be opened more and more as the float descends below said line.

By this device it will be seen that the float and valves can be adjusted to any water-line that may be desired, by simply loosening the screw *a* and moving the arm G in either direction so far as may be required for a new water-line, and then tightening the screw for holding the two arms F and G together.

On changing the water-line, should a larger or lesser quantity of water be required, the arm F, which operates the valves by means of the shaft E, can be moved so as to open the valves more or less, as the case may be, and thus regulate the amount of water supplied to the boiler.

The purpose of the lever M, as aforesaid, is for operating a steam-whistle thus:

The whistle is attached to the end of the lever by any convenient means. When the water falls in the boiler below the water-line the float falls therewith, which will force the finger J against the arm *h* of the right-angle lever K, which will cause the other arm of the angular lever, seen resting upon the lever M, and whereby said lever is depressed, to slip therefrom, which will allow the end of the lever M to spring up, it being actuated by the spring N. This springing up of the lever operates the whistle, thereby giving the alarm or notice that the water is dangerously below the water-line.

Claim.

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

The arms F G, as arranged to operate in relation to each other, and in combination with the shaft E and valves and shaft I and float, in the manner as and for the purpose set forth.

LUCUS FOOTE.

Witnesses:
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