J. Cochrane,

Steam-Boiler Water-Feeder,

No. 3,660, Patented July 13, 1844.

Fig 3.

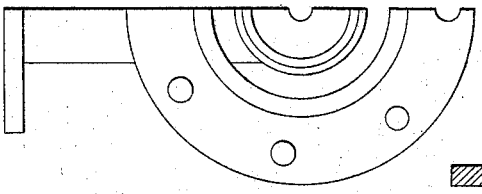


Fig 2.

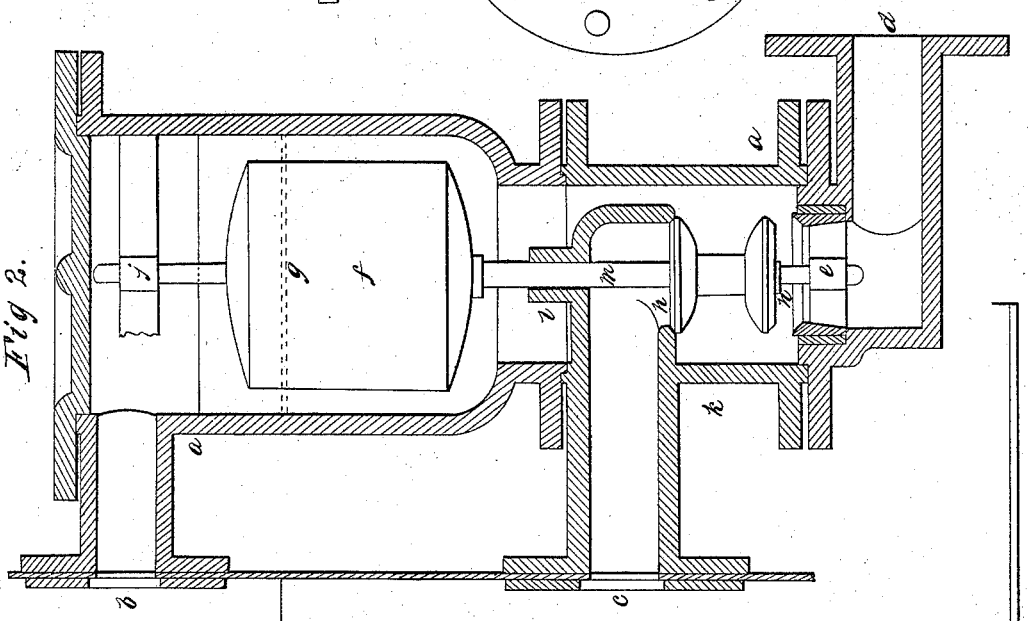
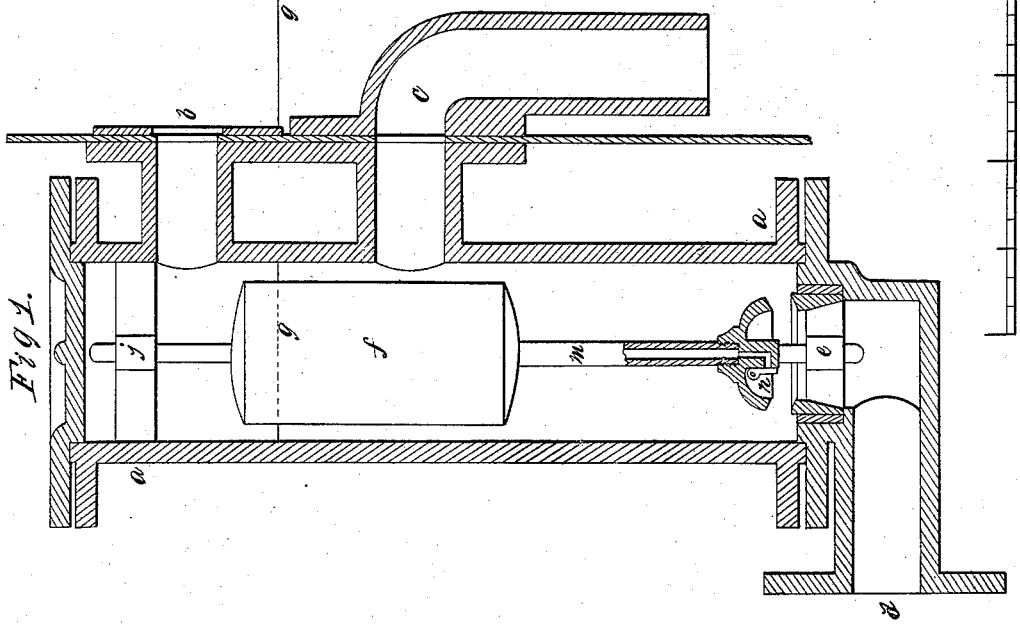


Fig 4.



UNITED STATES PATENT OFFICE.

JOHN COCHRANE, OF NEWARK, NEW JERSEY.

MODE OF REGULATING THE SUPPLY OF WATER TO STEAM-BOILERS.

Specification of Letters Patent No. 3,660, dated July 13, 1844.

To all whom it may concern:

Be it known that I, JOHN COCHRANE, of Newark, county of Essex, and State of New Jersey, have invented a new and useful machine to Regulate the Supply of Water from Forcing-Pumps to the Boilers of Steam-Engines; and I do hereby declare that the following is a full and exact description thereof.

The nature of my invention is such, that it is necessary for the pump attached to the engine to be of sufficient size to meet the expenditure of water in the boiler from evaporation and other causes; and that it be allowed to work its full capacity; the apparatus being capable, without manual assistance, of applying so much of this water as may be required to the replenishment of the boiler, and of returning the remainder back again to the pump, without loss of power or heat.

This apparatus is shown in vertical section at Figure 1 and consists of a tall vessel *a a* made of cast iron or other suitable material sufficiently strong to stand the pressure of the steam, and communicating freely with the boiler by two branches or springs, one above and the other below the water line as *b* and *c*. The branch *d* connects with the force pump of the engine; and *e* is the check valve between it and the boiler. To this check valve is attached the float *f* sufficiently buoyant to raise it off its seat when the water is above the proper line *g*. The water forced from the pump to the boiler must pass the valve *e*, which acts as a common check valve while the water is at or below the proper surface line *g*, but when it rises above this line it will carry with it the float *f* and keep the valve *e* open, allowing the excess of water to repass back to the pump on its return stroke, when the valve will again close. Thus the boiler is first replenished and then the overflow water returned to the pump. This valve and float could be placed within the boiler, and the excess of water allowed to escape without being returned to the pump; but the plan here given is the most preferable, because 1st, the water in the chamber *a a* is not affected by the foaming of the boiler. 2nd, warm water being specifically lighter than cold, it will occupy the upper part of the water space in *a a* and also fill the pipe *c* which opens into this region, while the cold water will remain at the bottom or be returned to the pump or elsewhere as before provided. 3d, in working the full capacity of the pump, using part and returning the remainder back again to the pump, the power consumed and the quantity of water injected and returned in the boiler will be equal; for whatever excess the pump will give beyond this is again returned to it under pressure, when it exerts the extent of its quantity a moving force on the engine.

Fig. 2, is the same apparatus with the addition of the valve *h* placed in the pipe *c* (the same letters are used to represent the same parts) and operated by the same float *f*, so that when the water is to its proper height in the boiler the float *f* will close the valve *h*, preventing further admission to the boiler, at the same time keeping the valve *e* open. In this case the excess of water is confined to the chamber *a a* till it escapes through *e* as before provided for. The valve *h* might be operated by a separate float, or be placed within the boiler and attached to a float there, but a complication of parts without increased advantage would be the result.

In Figs. 1 and 2, *j* is a brace with a bearing in the center to steady the rod of the float *f*. Fig. 3 is the plan of the part *k* in Fig. 2. In reference to this part it may be observed that no great accuracy is required in fitting the valve *h;* and no packing is required where the stem comes through the boss *l*, if they are made to fit snug.

The float *f* should be made of sheet copper and to have the joinings perfectly closed; but as it is rare to get one that will remain tight for any length of time, so as to answer the purpose, I obviate the difficulty by using, instead of a solid rod, a small tube *m* opening from within *f* down to *n* beneath the valve *e*, where it is guarded by a little valve opening outward, shown in section at Fig. 1. By this arrangement *f* is regularly exhausted every stroke of the pump; and it would require a considerable leak to incapacitate it from its duty.

This specification and the drawings herewith deposited are considered sufficient to enable any competent mechanic to construct and use this apparatus. The proportions will be regulated by the size of the engine to which it is to be attached.

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

1. The manner in which I have connected and combined the float and the check valve with the force pump, and with the boiler, as herein described, so as to allow any excess of water from the pump to return back thereto by the opening of the check valve under the action of the float.

2. The connecting of the second valve, placed in the pipe, or opening, through which the water passes from the chamber to the boiler, with the check valve and float, so that both may be operated on by the float, for the purpose, and in the manner described.

3. The connecting the float internally with the pump that supplies the boiler by means of a hollow stem and valve, in combination with the check valve, so that the float may be exhausted at each stroke of the pump, and thereby be made to discharge any water that may have backed into it.

JOHN COCHRANE.

Witnesses:
WM. L. MEEKERS,
CYRUS CARRIER.