

R. G. MILLER.  
Trap-Valve.

No. 216,801.

Patented June 24, 1879.

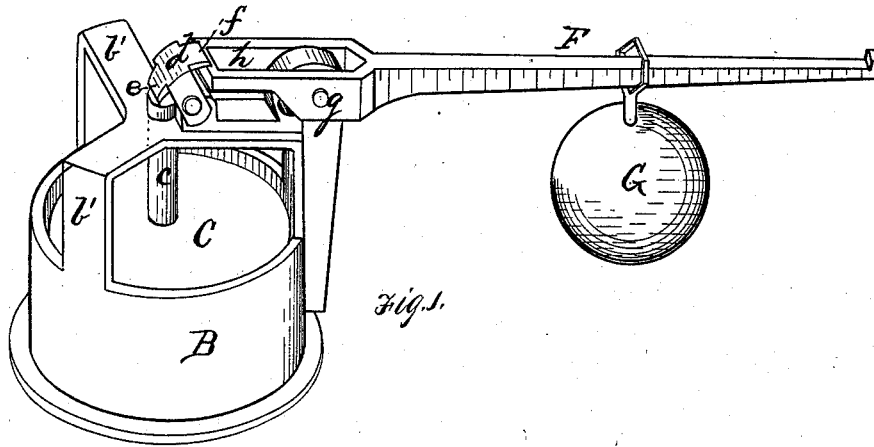


Fig. 1.

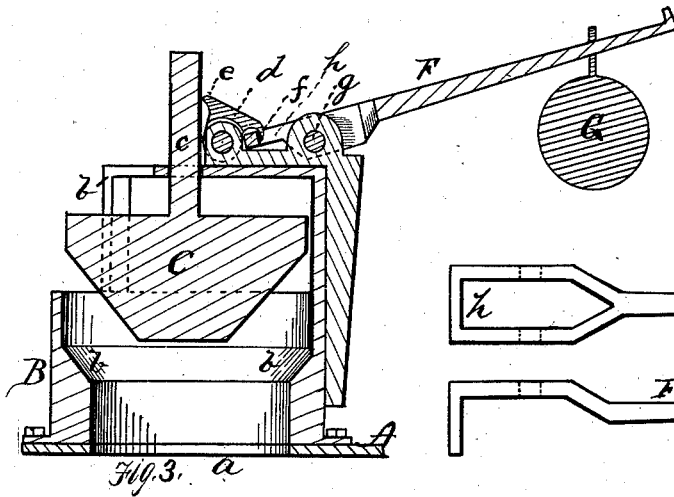


Fig. 3.

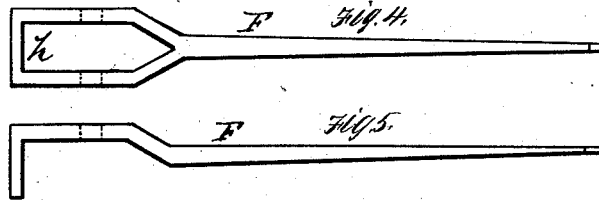


Fig. 4.

Fig. 5.

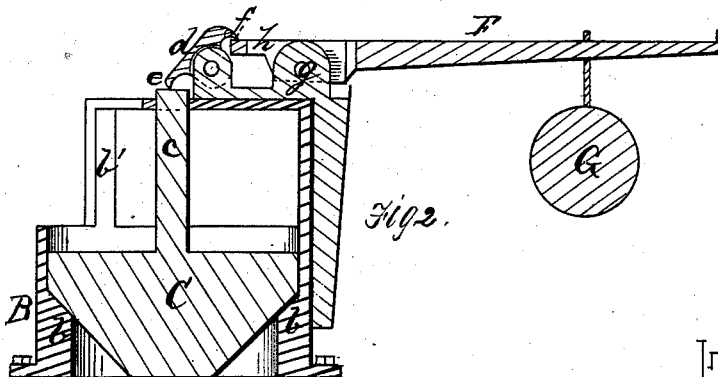


Fig. 2.

Witnesses.

J. H. Smith  
L. C. Fidler.

INVENTOR.

Rasmus G. Miller  
by Bakewell & Kerr  
Attys

# UNITED STATES PATENT OFFICE.

RASMUS G. MILLER, OF GREAT BELT, PENNSYLVANIA.

## IMPROVEMENT IN TRAP-VALVES.

Specification forming part of Letters Patent No. **216,801**, dated June 24, 1879; application filed January 21, 1879.

*To all whom it may concern:*

Be it known that I, RASMUS G. MILLER, of Great Belt, in the county of Butler and State of Pennsylvania, have invented a new and useful Improvement in Trap-Valves for Preventing Explosion in Boilers, Stills, Tanks, &c.; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is an elevation of devices embodying my invention. Fig. 2 is a central vertical section. Fig. 3 is a similar view, showing the operation of the devices. Fig. 4 is a top view of the lever or scale-beam. Fig. 5 is a modification of the scale-beam.

Like letters refer to like parts wherever they occur.

My invention relates to trap-valves for preventing the explosion of boilers—as, for instance, where the usual safety-valve becomes inoperative, and from other causes, said devices being independent of the regular safety-valve—and also for relieving the pressure in stills, the pressure of gas in tanks, &c.; and it consists, mainly, in combining, with a suitable stem-valve, or equivalent, and a scale-beam or weighted pivoted lever, a pivoted arm or cam interposed between the valve and scale-beam, coacting therewith, and adapted, according to its length, either to lock open the valve when the same has been forced open by the pressure, whereby a constant and free escape of steam, gas, &c., is permitted, or to relieve the valve entirely of the weight of the lever, as may be preferred.

My invention is especially applicable to that class of boilers, stills, &c., which are necessarily committed to the charge of inexperienced persons, or where an engineer is not in constant attendance, of which many instances exist, but may be applied to any and all boilers, stills, or tanks as a safety device.

I will now proceed to describe my invention, so that others skilled in the art to which it appertains may apply the same.

In the drawings, A indicates a section of boiler, still, or tank, pierced, as at *a*, to admit the pressure to the valve. Secured to the boiler, still, or tank is the valve-chamber B,

provided with a suitable valve-seat, as at *b*, which may be cast with the chamber B or formed independent thereof, as desired. The valve-chamber B is open above, but terminates in a cage formed by the straps *b'*, said cage serving both to retain and guide the valve.

C represents a valve which may be employed, said valve being preferably (but not necessarily) tapering, as shown, of such size as to present considerable surface upon which the pressure can act, and having a stem, *c*, projecting through the cage *b'*. Pivoted on the cage *b'*, or in equivalent position, is a dog or curved lever, *d*, one end of which, *e*, is adapted to rest on the valve-stem *c* when the valve is in position, its length being such that when tripped the valve will be free, Fig. 2; or it may bear against the stem like a cam and lock the valve open, Fig. 3, when the same has been forced open by the pressure from within, as preferred. The opposite end of lever *d* is likewise curved, as at *f*, and rests upon the extremity of the scale-beam or weighted lever F when the valve is down, Fig. 2, but enters an eye or loop on the lever F when the valve is thrown up, Fig. 3, whereby the weighted scale-beam is made to control the dog or cam *d*, and either force it against the valve and sustain the same, or hold it out of the way of the valve, so that the same can have free play, as preferred.

F indicates the scale-beam or weighted lever, pivoted on the cage *b'*, or its equivalent, as at *g*, and, by preference, terminating in an eye or loop, *h*, for the reception of the curved or hook end *f* of lever *d*, though instead of the eye the beam may be L-shaped, (see Fig. 5,) or an equivalent construction may be adopted—as, for instance, a T head or end to the scale-beam, and a claw end, *f*, to the lever or dog *d*. G indicates the weight employed with the scale-beam.

The devices specified, being applied to a boiler, still, or tank, when in use are set as shown in Fig. 2—that is to say, the valve C is down upon its seat *b*. One end, *e*, of pivoted lever or dog *d* rests on top of the stem *c*, and the other end, *f*, rests on the end of scale-beam F, near the eye or loop *h*, and the weight is arranged to weight the valve a few pounds—say five or ten pounds—more than the safety-valve

proper if on a boiler, or at any desired pressure if on a still or tank. Should the pressure in the boiler, tank, or still exceed the proper limit, and the safety-valve (if on a boiler) not respond properly, the valve C will be forced up, tripping the dog *d*, whose end *f* will slip off the scale-beam F into eye *h*, and the weight of the scale-beam, &c., will either force the end *e* of the dog (which now acts as a cam) against the stem *c*, and lock the valve up or open in the position shown in Fig. 3, giving free escape to the steam, vapors, or gas, as the case may be, thus preventing any explosion, or will hold the dog *d* out of the way if the end *e* of the cam *d* be too short to bind on the valve-stem.

I would state that to obtain good results I would prefer a valve of six or eight inches diameter for a twenty-horse-power boiler, and other sized boilers should have valves of proportionate size; but I do not wish to be limited with regard to size of valve.

I have herein described the dog *d* as adapted by the length of arm *e* to lock open the valve when tripped; but while this is a desirable, it is not an essential, feature, as the arm *e* of dog *d* may be shortened, so as to allow the valve-stem *c* to play freely when the dog is tripped, as in Fig. 3.

The advantages of my invention are simplicity and effectiveness, promptness of action, and the uninterrupted egress afforded the steam, gas, or vapor as soon as the pressure is excessive, and also the safety afforded thereby

when the boiler or still is left unattended, or is necessarily committed to inexperienced persons.

Having thus described the nature and advantages of my invention, what I claim, and desire to secure by Letters Patent, is—

1. In trap-valves for preventing the explosions of boilers and like devices, the combination of a valve provided with a suitable stem, a scale-beam, and an interposed pivoted dog or lever coacting with the valve and scale-beam, all arranged substantially as and for the purpose specified.

2. The combination of the valve with the open cage, the scale-beam or weighted lever, and the interposed pivoted dog or curved lever, all arranged substantially as and for the purpose specified.

3. In trap-valves for relieving boilers, tanks, &c., of excessive pressure, the combination, with the valve and the lever or scale-beam, of an interposed pivoted dog coacting with the lever and valve, and adapted to automatically lock open the valve when the same has been forced open by the pressure, whereby an uninterrupted and free egress of the steam, gas, or vapor is permitted, substantially as and for the purpose specified.

In testimony whereof I, the said RASMUS G. MILLER, have hereunto set my hand.

RASMUS G. MILLER.

Witnesses:

A. C. JOHNSTON,  
F. W. RITTER, Jr.