F. LUNKENHEIMER.

Safety-Valve.

No. 206,589. Patented July 30, 1878.

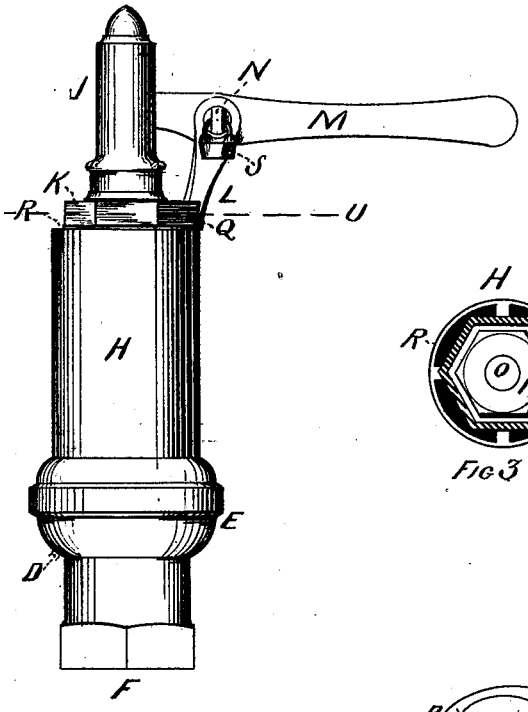

Fig 1

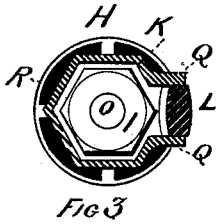

Fig 3

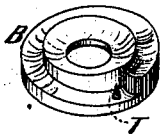

Fig 4

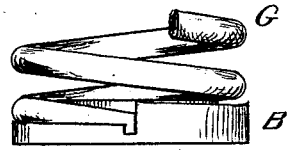

Fig 5

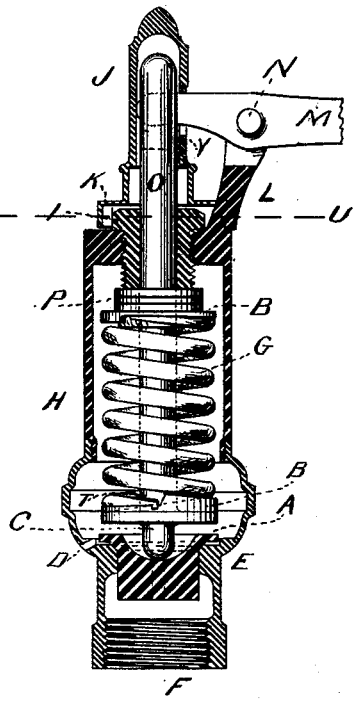

Fig 2

Witnesses

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UNITED STATES PATENT OFFICE.

FREDERICK LUNKENHEIMER, OF CINCINNATI, OHIO.

IMPROVEMENT IN SAFETY-VALVES.

Specification forming part of Letters Patent No. **206,589**, dated July 30, 1878; application filed May 14, 1878.

To all whom it may concern:

Be it known that I, F. LUNKENHEIMER, of Cincinnati, county of Hamilton, and State of Ohio, have invented certain new and useful Improvements in Lock-Up or Sealed Safety-Valves, of which the following is a specification:

The invention relates to what are known as "spring-loaded safety-valves;" and consists in providing a simple and effective locking device, whereby no alteration can be made of the pressure at which the valve is set to blow off without destroying the lock or attached seal.

The invention further consists in providing a simple and positive means of adjusting the valve to "blow" at different pressures.

In the ordinary lock-up or sealed safety-valve security against tampering with the adjustment of load is obtained by enveloping the entire valve in a shell or case of metal, which, when in position, is locked or sealed. This construction not only impairs the general appearance of the valve, but materially enhances the cost, and to a large extent prevents the general use of this form of valve. In this valve perfect security against tampering with the adjustment of load is obtained by an inexpensive and thoroughly reliable device.

The means of adjustment of the ordinary spring-loaded safety-valve is objectionable from the fact that in loading the valve to blow no index exists to determine the proper compression of spring for different pressures, and it is only by varying the resistance of the spring with steam-pressure on, and by elevating the pressure to the desired blowing-off point, that a satisfactory adjustment can be made. This is not only an inconvenient and dangerous method, but assumes the accuracy of the steam-gage by which the valve is set to blow.

In this valve any number of positive adjustments of load can be made without the aid of steam-pressure or steam-gage by varying the number of washers between the spring and the abutment, each washer being turned to such a thickness as to represent an addition or subtraction of a certain load to or from the valve.

In the accompanying drawing, Figure 1 is an elevation of valve complete. Fig. 2 is a sectional elevation; Fig. 3, a plan of valve-case and section, taken on the line U U, Fig. 1 and Fig. 2.

Similar letters of reference indicate corresponding parts.

E is the body of the valve, united by a screw-joint to the cylinder or case H. A is the valve proper, resting on a ground seat. G is the spring. O is the valve-spindle, having a collar near the lower end, upon which the lower equalizing-plate rests, and against which the force of the spring is exerted. The lower end of the spindle rests on the valve, and, by means of the spring, holds it to the seat against any pressure less than that at which the valve is set to blow.

Through the top of the case or shell H the six-headed screw I passes, forming a guide to the spindle and an abutment against which the upward thrust of the spring is exerted. Between the top equalizing-plate and the lower end of the abutment a series of washers, P, are introduced to vary the compression of the spring. These washers are graduated in thickness, so that the addition of one washer increases the blowing-pressure a certain convenient number of pounds pressure per square inch of valve-area. Thus, if one washer represents a variation in load of twenty pounds per square inch, two washers would represent a variation of forty pounds, and three washers a variation of sixty pounds. Any convenient number of washers may be used.

The hollow bonnet J rests upon and embraces the head of the screw-abutment, and is further provided with jaws Q Q, which straddle the fulcrum L. The lever M (for easing the valve) is pivoted in the slotted fulcrum at N, and passes through the slot V in the side of the cylindrical portion of the bonnet, and engages with the valve-spindle near the upper end.

The pivot N may be a screw or pin, with a head or shoulder at one end and a flattened projection at the other, with an eye for the insertion of the wire of a seal or the shackle of a small padlock, S. Thus the seal or lock prevents the removal of the pivot, the pivot retains the lever in the fulcrum, and the lever retains the bonnet in position and prevents tampering with the abutment to increase the blowing-pressure.

The slot in the side of the bonnet allows the valve to be lifted from its seat to blow by hand, but effectually prevents increasing the load or blowing-pressure by providing a stop to the downward motion of the lever at the bottom of the slot.

The equalizing-plate B has a helical surface upon one side, to conform to, and form a seat for, the first coil of the spring, and a plane surface upon the reverse side, to bear against the collar on the spindle and series of washers under the abutment.

The valve attaches to the boiler or steam-pipe at F, and is provided with a small hole at D, to drain the body of the valve of condensation.

It is obvious that the improvements described are not limited to the precise form of safety-valve shown in the drawing, but can be applied with equal facility to any of the ordinary forms of spring-loaded safety-valves.

The locking mechanism, as arranged in this valve, besides preventing improper manipulation of the adjustment of load, also prevents any variation in the position of the abutment by reason of the vibration due to the blow of the valve.

What I claim is—

1. In a spring-loaded safety-valve, the bonnet J, in combination with the abutment or screw I, lever M, pivot N, and fulcrum L, so arranged as to form a locked or sealed safety-valve, substantially as shown and described.

2. In a spring-loaded safety-valve, the series of washers P, for the purpose of adjusting the compression of the spring, in combination with said spring, substantially as shown and described.

FREDERICK LUNKENHEIMER.

Witnesses:

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