J. Hughes,

Steam Safety Valve.

No. 33,198. Patented Sep. 3, 1861.

Fig. 2.

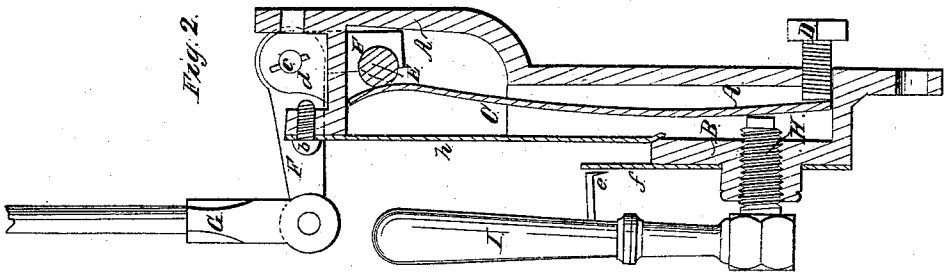
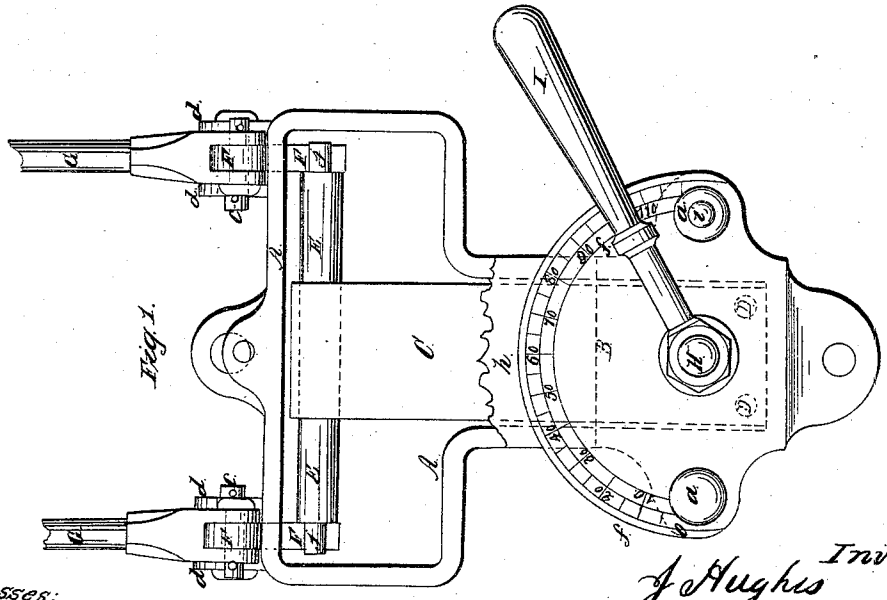


Fig. 1.



Witnesses:
J. W. Coombs
Wm. Tusch

Inventor:
J. Hughes
per Munn & Co
attorneys

UNITED STATES PATENT OFFICE.

JAMES HUGHES, OF SCRANTON, PENNSYLVANIA.

IMPROVED SPRING-BALANCE FOR SAFETY-VALVES OF LOCOMOTIVE AND OTHER ENGINES.

Specification forming part of Letters Patent No. **33,198**, dated September 3, 1861.

To all whom it may concern:

Be it known that I, JAMES HUGHES, of Scranton, in the county of Luzerne and State of Pennsylvania, have invented a new and Improved Spring-Balance for the Safety-Valves of Locomotive and other Steam Boilers; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a front view of my spring-balance with part of the front plate of the box broken away to expose the internal mechanism, and Fig. 2 a vertical section of the same at right angles to Fig. 1.

Similar letters of reference indicate corresponding parts in both figures.

My invention consists in a certain mode of applying a screw and levers in combination with a spring to constitute a spring-balance for safety-valves of such character as to permit the engineer of a locomotive without inconvenience or trouble to reduce the load on the valve instantaneously when the locomotive is compelled to stop at a station or other place or whenever any circumstance occurs which renders it desirable to reduce the load.

It also consists in a certain arrangement, in connection with the aforesaid screw, of an index and graduated scale for indicating the pressure on the valve and of a stop to prevent the valve from being overloaded.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A is an upright box of cast-iron or other metal of the T shape represented in Fig. 1, or of any other suitable form, to contain the principal parts of the balance, made with an open front, the lower part of which is closed by a stout plate B, bolted to it by bolts *a a* and nuts, and the upper part of which is covered by a light movable plate of brass or other sheet metal *h*, that is secured in place by a small screw *b*.

C is the spring, made of a broad or nearly flat piece of steel of a length nearly equal to the height of the box A. The lower part of the back of this spring bears against the points of two screws D D, which screw through the back of the box A, and the upper part of the back of said spring bears against a cross-bar E, which is supported by the lower arms of two elbow-levers F F, which work on fixed fulcrum-pins *c c*, secured in lugs *d d*, provided on the top of the box A. The lower arms of the said levers, which pass through slots provided for them in the top of the box, are nearly upright. The upper arms are nearly horizontal, and are to be connected with the ordinary safety-valve lever or levers by means of rods G G. The cross-bar E may be rigidly attached to the levers; but I prefer to make it in the form of a roller with journals *j j*, fitted to bearings in the lower arms of the levers F F, for the purpose of reducing friction at the bearing of the spring upon it.

H is the screw, whose combination with the spring C and levers F F constitutes the principal feature of my invention, screwing through a tapped hole in the plate B and pressing against the front of the spring C. This screw is furnished with a lever I outside of the box, to enable it to be turned by the engineer for the purpose of putting the load on the valve or taking it off, and the said lever has attached to it a pointer *e*, which serves to indicate upon a properly-graduated plate *f*, secured to the front of the plate B, the load that is produced upon the valve by the pressure of the screw against the spring, such pressure being transmitted through the spring, the bar E, levers F F, and rods G G to the valve-levers. One of the screws *a a* has its head prolonged in a forward direction, as shown at *i* in Fig. 1, such prolongation constituting a stop to arrest the lever I when the screw H has been screwed into the box A far enough to produce a load upon the valve equal to the maximum pressure it is desired to carry in the boiler, thus preventing the engineer from loading the valve beyond that pressure.

The pitch of the screw H and elasticity of the spring C are so proportioned that by a movement of the lever from the stop *i* to the point marked "zero" on graduated plate *f* the pressure of the screw upon the spring is made to cease and the valve thus entirely relieved of its load. The lever I can be instantaneously moved from the position in which the maximum pressure is produced to that in which no pressure is produced without any considerable exertion on the part of the engineer, and can be as easily returned to the first-

named position when the full load is desired to be again applied to the valve. The movement of the said lever I forms a much more handy means of putting on and taking off the load of the valve than the movement of the nut of the ordinary spring-balance.

The screws D D are only used as a means of adjusting the spring C; otherwise a fixed bearing might be substituted for them. The heads of these screws should be covered up or in some way protected from being altered by the engineer.

The balance when constructed for a single valve may have only one lever F.

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

1. The combination of the spring C, screw H, bar E, and lever or levers F F, the whole applied, arranged, and operating substantially as and for the purpose herein specified.

2. The within-described combination of the pressure-regulating screw H, lever I, index *e*, graduated plate *f*, and stop *i*.

JAMES HUGHES.

Witnesses:
WM. R. MYERS,
WILLIAM SIMS.