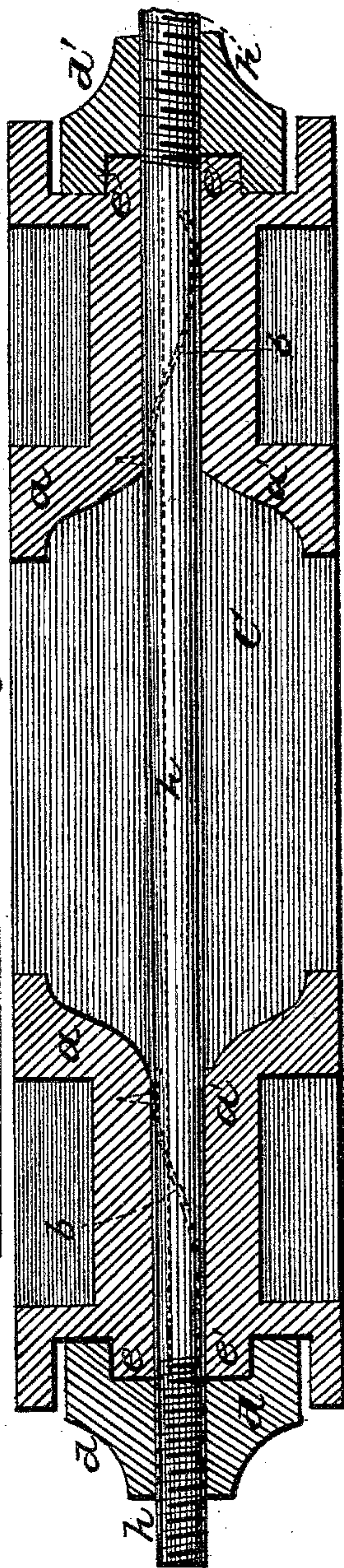
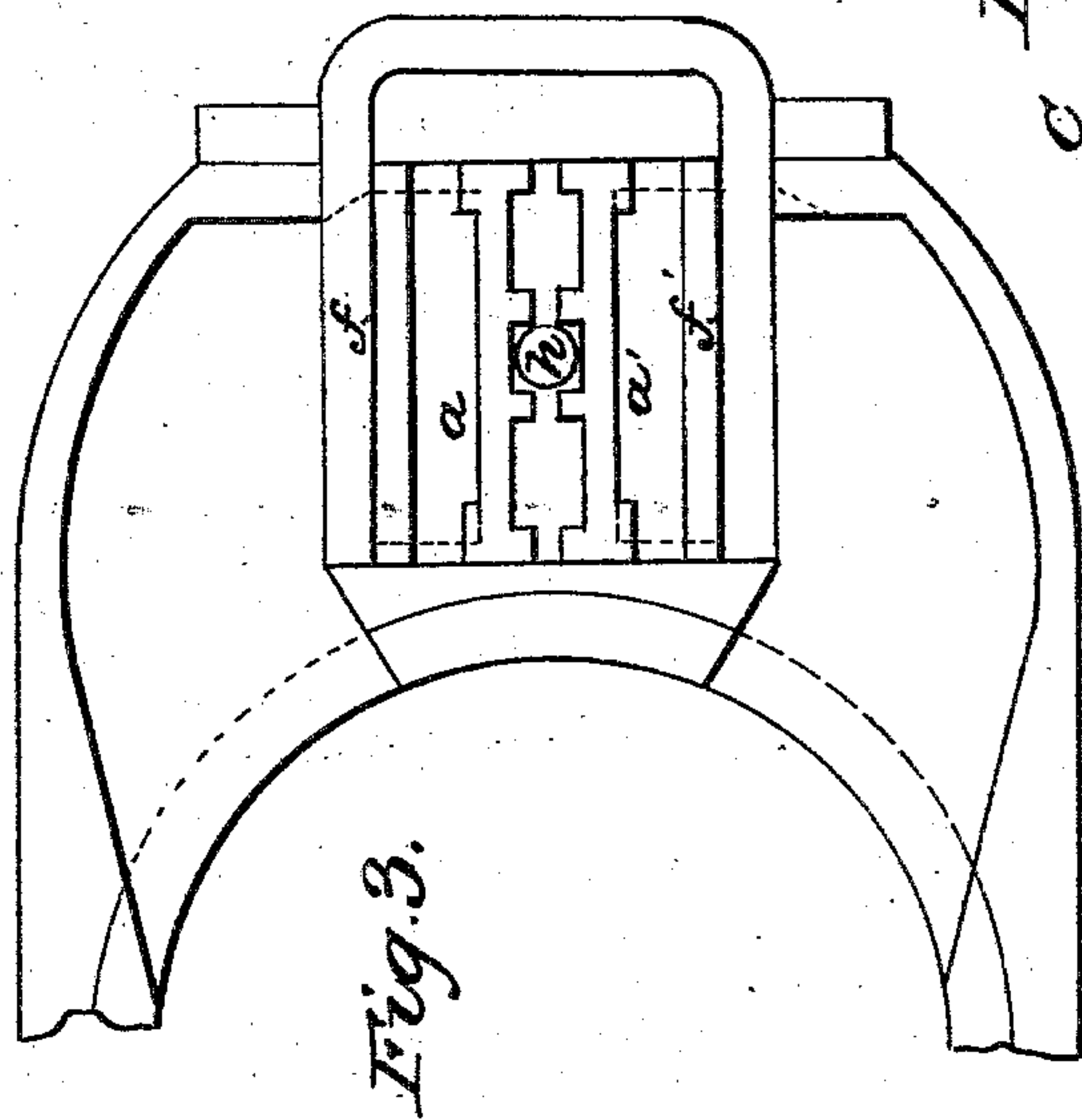
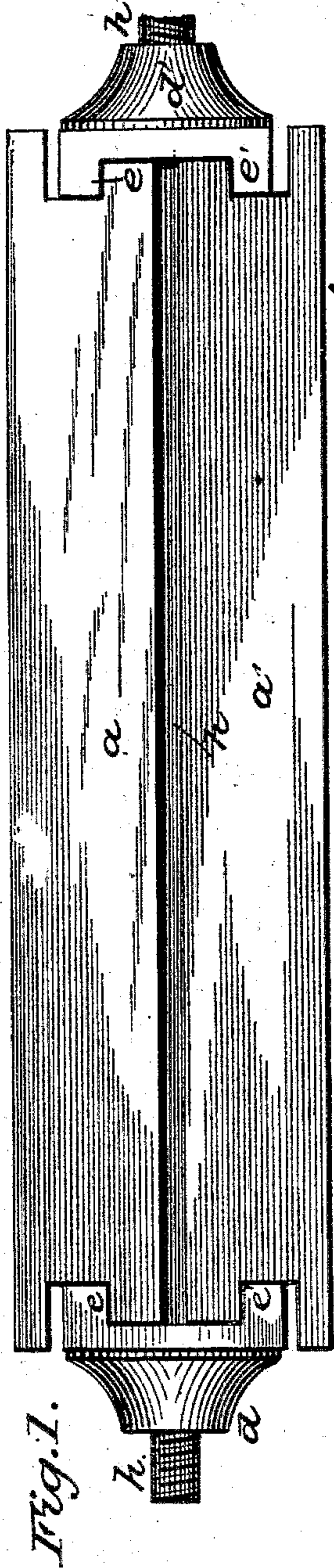


(No Model.)

J. B. ALLFREE.  
BALANCED SLIDE VALVE.

No. 280,993.

Patented July 10, 1883.



WITNESSES:  
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# UNITED STATES PATENT OFFICE.

JAMES B. ALLFREE, OF CUMBERLAND, MARYLAND.

## BALANCED SLIDE-VALVE.

SPECIFICATION forming part of Letters Patent No. 280,993, dated July 10, 1883.

Application filed April 27, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES B. ALLFREE, a citizen of the United States, residing at Cumberland, in the county of Alleghany and State of Maryland, have invented a new and useful Improvement in Balanced Slide-Valves, of which the following is a specification.

My invention relates to that class of slide-valves which operate in the chests of engines to admit and emit steam to and from the cylinders, and are called "balanced" valves. It is a well-known fact in engine-running that when the steam is suddenly shut off the reaction on the valves is severe, causing them to thump.

The same result is also sometimes produced when the steam condenses into water by being let into a cold engine. To guard against injury to the valves and steam-chests from such shocks, it is common to provide balanced valves with springs, which allow the valves to yield.

The object of my invention is to provide means whereby valves having such springs may yet be restrained from pressing unduly against the valve-seats or the walls of the steam-chest. To this end my invention consists in the construction and combination of parts forming a double slide-valve, hereinafter described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of my valve. Fig. 2 is a longitudinal vertical section of the same; and Fig. 3 is an end view of the valve on a reduced scale, showing also a portion of a cylinder.

A represents the valve, which consists of two parts, *a a'*, which are duplicates of each other, and are, in fact, two valves turned back to back, each one seated, as usual, over the parts of the steam-chest. The two faces *f f'* of said chest forming said seats are perfectly parallel with each other. The two parts *a a'* of the valve are pressed upon their seats by springs *b*, which act between said parts to separate them.

C represents one or more openings through both parts *a a'*, from face to back, to allow steam to circulate behind the valves. This would naturally press each valve upon its seat with the whole force of steam on every inch of the valve-back, and cause great friction and wear;

but in my invention I balance this action by opposing one part, *a*, to its mate *a'*, and I restrain said action within a given limit by means of a pair of clamps, *d d'*, which engage the ends of the parts *a a'* by means of ledges *e e'* thereon. These ledges and the corresponding ledges on the clamps are nicely fitted to each other, so that they limit the spread of the two parts *a a'* to the exact space between the two valve-seats *f* and *f'*. These parts are nicely adjusted when the engine is being finished, and the relative proportion of the ledges to the faces of the valves is intended to be such that the slight reciprocating motion of said ledges on each other will wear them away at the same rate that the valve-faces will be worn in the same time, thus keeping the valves well seated, and all the time preventing their bearing unduly on their seats. Whenever the faces of the valves become enough worn to require facing off, the said ledges on the valves and on the clamps will also be readjusted, so that they require no attention on the part of the engineer.

*h* is the valve-stem, serving also as a screw-bolt by having a right-hand thread at one end, engaging a similar internal thread or nut in one of the clamps, *d*, and a left-hand thread at or near the other end of the valve, similarly engaging the other clamp, *d'*. By rotating this valve-stem the clamps may be drawn with any desired degree of tightness on the ends of the valve. This may be done by applying a wrench to a squared portion of the valve-stem outside of the chest without opening the chest for such adjustment, and the rod may be fixed; as usual, to screw-bolts by means of check-nuts. By any extreme shock upon their faces, these valves will be pressed upon their springs, and they will be restored to place by the normal action of the steam.

What I claim as my invention is—

1. The combination, with two valve-seats placed face to face parallel with each other, and two valves adapted to reciprocate thereon, and having ledges upon their ends, of two clamps having corresponding ledges adapted to hold said valves to a fixed limit of separation, and springs adapted to separate them, as specified, whereby said valves are allowed



to approach each other when unduly pressed, and are rigidly restrained from pressing upon their seats, as described.

2. The combination, with two parallel valve-  
5 seats, *f* and *f'*, and two valves, *a* and *a'*, adapted to slide thereon, and provided with ledges *e* and *e'*, of two clamps, *d* and *d'*, adapted to engage said ledges, and having, respectively,

right and left screw-threads or nuts in them, and the valve-stem *h*, provided with right and 10 left screw-threads, and the springs *b*, between the valves, as and for the purpose specified.

JAMES B. ALLFREE.

Witnesses:

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