No. 881,656. PATENTED MAR. 10, 1908.

J. B. BISCHOFF.

DAMPER AND PRESSURE REGULATOR.

APPLICATION FILED APR. 23, 1906.

2 SHEETS—SHEET 1.

Fig. 1.

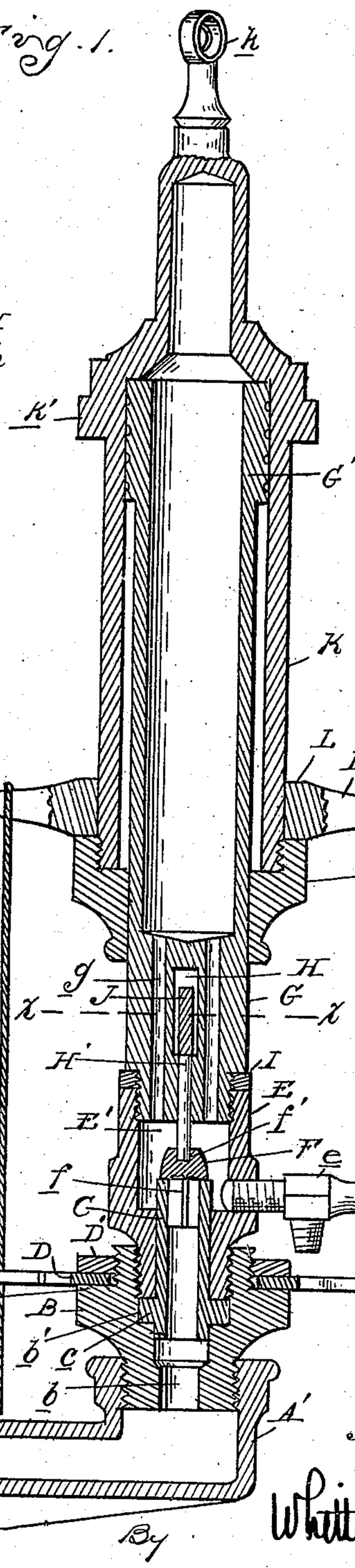

Fig. 2.

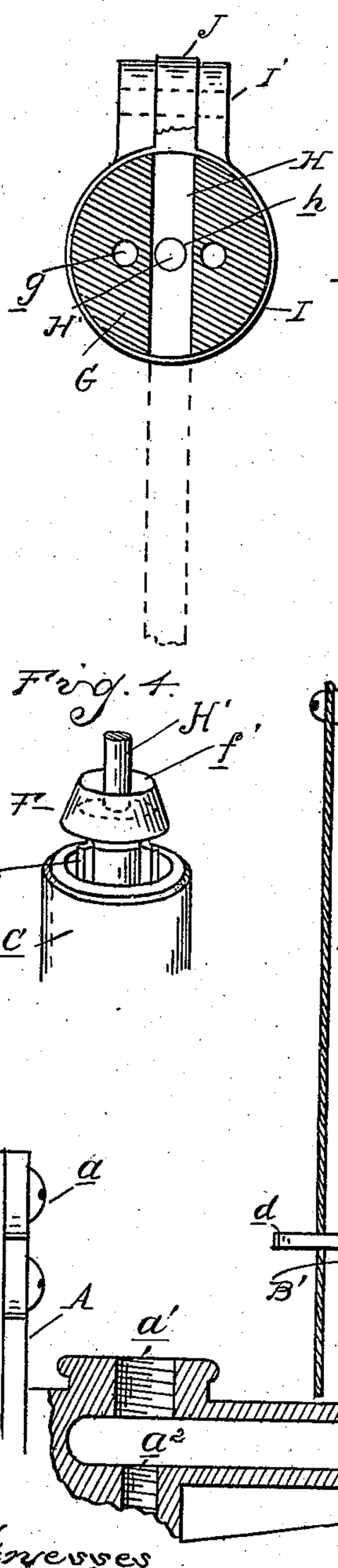

Fig. 3.

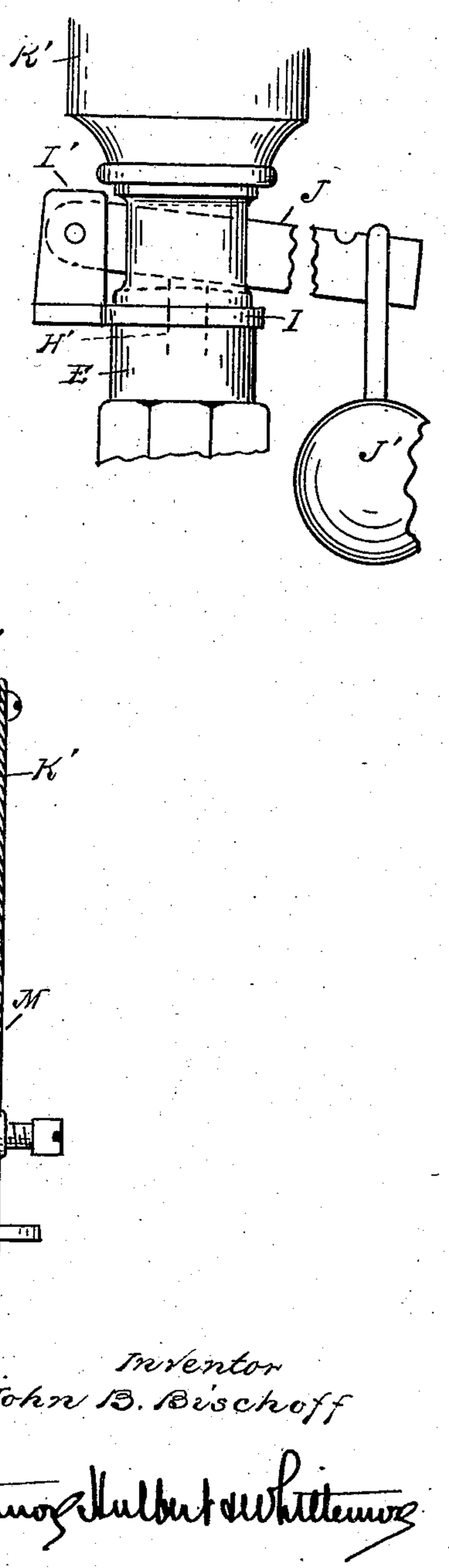

Fig. 4.

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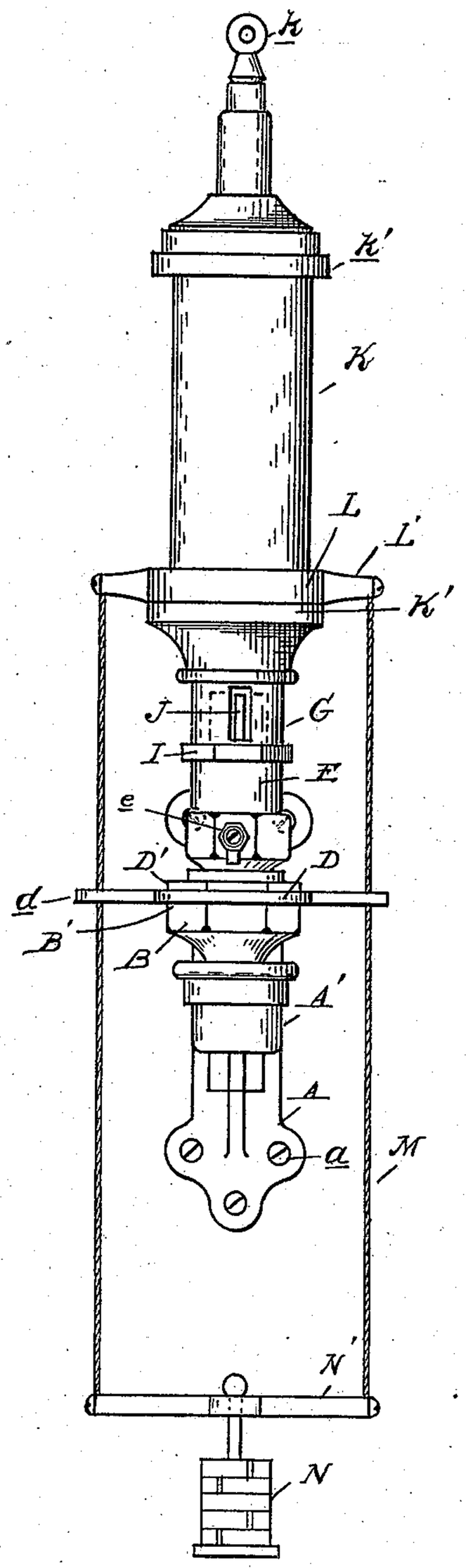
2 SHEETS—SHEET 2.

Fig. 5.



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UNITED STATES PATENT OFFICE.

JOHN B. BISCHOFF, OF MOUNT CLEMENS, MICHIGAN.

DAMPER AND PRESSURE REGULATOR.

No. 881,656. Specification of Letters Patent. Patented March 10, 1908.

Application filed April 23, 1906. Serial No. 313,242.

To all whom it may concern:

Be it known that I, JOHN B. BISCHOFF, a citizen of the United States of America, residing at Mount Clemens, (R. F. D. 4,) in the county of Macomb and State of Michigan, have invented certain new and useful Improvements in Damper and Pressure Regulators, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to damper regulators of the type shown in Patent No. 668,156 granted to me February 19, 1901, and consists in new and useful improvements in the construction and arrangement of parts as will be more fully hereinafter described and set forth in the claims.

In the drawings Figure 1 is a vertical central section through the regulator and supporting bracket; Fig. 2 is a horizontal section on lines *x*—*x* of Fig. 1; Fig. 3 is an elevation showing the pivot; Fig. 4 is a perspective view of the valve and the stem, and Fig. 5 is a front elevation of the regulator and bracket.

A is a bracket of any desired form suitably mounted as by screws *a* and terminating in screw threaded nipple A′. A portion of the bracket is hollow and provided with a nipple *a*′ for connection with the steam space of the boiler and in the lower side is tapped or provided with a nipple at a^2 for the application of a suitable pet cock to carry off the water of condensation.

The hollow portion of the bracket opens through the nipple A′ in which is screwed the coupling member B, having a central aperture *b* enlarged at *b*′ to receive the enlarged portion *c* of the tubular member C. The outside of the upper end of the coupling B is reduced in diameter to form a shoulder B′ to support the ring D having oppositely projecting chain guides *d* and above the shoulder B′ the coupling is threaded for engagement with the nut D′ which holds the ring D in place.

The interior of the upper end of the coupling B is threaded to engage a second coupling E the upper end of which is threaded to engage the lower end of the tubular piston G. The coupling E is centrally bored to fit the body portion of the removable tubular member C and its upper end is chambered at E′. The member C projects above the lower side of this chamber and at one side the coupling is tapped to receive a pet cock *e* which is left slightly open to permit the escape of water condensed and to permit a gradual escape of steam as will be more fully hereinafter described.

The tubular member C forms a guide and a seat for the valve F, having a winged guide bar *f* and the head of the valve is recessed at *f*′. This valve is substantially the same as the valve shown and described in the above-mentioned Letters Patent and therefore I shall not further describe it.

The piston G is preferably hollow for most of its length, and open at the upper end, which is provided with a suitable head G′, while its lower end is longitudinally bored at suitable points as *g* for communication between its hollow portion and the chamber E′. The lower end of the piston is also transversely slotted at H, and from this slot to the chamber E′, is a longitudinal bore *h* alined with the valve head recess *f*′. A pin or stem H′ passes through this bore with sliding engagement and rests in the recess *f*′. Between the coupling E and the piston G is held a collar I having upwardly and outwardly projecting lugs I′ at one side and alined with the slot H.

J is a lever pivoted in the lugs I′ and passing through the slot H and J′ is a weight adjustable on said lever. The stem H′ projects into the slot H and the lever J rests on the head of said stem, so that the weight on the lever tends to hold down the stem and thus hold the valve F to its seat, the adjustment of the weight on the lever determining the amount of pressure required to lift the valve. As the valve or its seat becomes worn by use, they may be reground to a true surface and by also grinding off the upper surface of the enlarged part or washer *c* of the member C, the proper proportion of the parts may be retained. Otherwise the pin or stem H′ would be too short after the valve and its seat had been reground.

K is a cylinder having a closed top preferably integral and a ring *k* or other suitable means for connection with the damper (not shown) of the furnace. The cylinder engages the piston head G′, and at its lower end is provided with a nipple K′, which extends inwardly into engagement with the body of the piston G and forms a shoulder to engage the lower end of the head G′ to limit the upward movement of the cylinder. Near the upper end of the cylinder is a flange *k*′ and between this flange and the shoulder

formed by the upper edge of the nipple K′ is a collar L sleeved on the cylinder body and having oppositely projecting arms L′.

A weight N is hung on the cylinder to counter balance the weight of the damper and to draw the cylinder down to its lowest position when the steam valve F is closed. This weight is preferably supported by a cross bar N′ suspended on chains or cords M from the projections L′, and these chains or cords preferably pass through the hook shaped chain guides *d* on the ring D.

In the operation of the device when the desired pressure of the steam in the connections, predetermined by the position of the weight J′ on the lever J, is reached, the valve F will be raised and the steam will pass into the piston to raise the cylinder and operate the damper (not shown) to check the fire. This may be done by causing the raising of the cylinder to open a damper in the stack, or to close a damper under the fire, or both, if desired.

If the connections between the weight N and the collar L were rigid, and the valve F opened, the cylinder, in raising quickly, would be stopped suddenly when it reached its upper position and the impetus of the weight would raise the collar L a considerable distance from its seat on the nipple K′. It is obvious that, when its impetus has been overcome by the force of gravity, the weight N would drop and a strain would be imposed upon the upper portion of the cylinder when in its upper position and only held at the lower end. This strain would be liable to throw the cylinder out of line and cause it to jam on the piston head. By constructing the collar L as light as possible and providing flexible connections M, I obviate this danger for the reason that the impetus of the collar L is overcome by friction with the cylinder and the impetus of the weight N simply causes a slack in the connections M. When the jar of the drop comes the connections will be held substantially in line by the chain guides *d* and there will be a straight downward strain upon the collar L in its lowest position on the cylinder, which position will always be below the top of the piston head.

The member C may be removed for grinding the valve seat and may be replaced cheaply. This removable member is of great importance as there is great wear on the parts and in the regulator heretofore used the up-keep was very expensive due to replacement of worn parts, the parts in that case being large and expensive.

What I claim as my invention is:

1. In a damper regulator, the combination with a stationary tubular piston, of a cylinder therefor, a weight, flexible connections between said weight and the lower end of the cylinder, steam connections leading into the lower end of said piston, a valve in said connections, and means permitting the opening of said valve by a predetermined pressure for permitting said pressure to raise said cylinder and weight, for the purpose described.

2. In a damper regulator, the combination with a stationary tubular piston, of a cylinder therefor, supporting means for said piston, steam connections leading into said piston, a valve in said connections, means for permitting the opening of said valve by a predetermined steam pressure to raise said cylinder, a flange on the lower end of said cylinder, and a weighted collar supported on said flange and slidable on said cylinder, for the purpose described.

3. In a damper regulator, the combination with a stationary tubular piston, having in its lower end a transverse slot and a communicating longitudinal aperture, of a movable cylinder therefor, having a flange on its lower end, a collar sleeved on said cylinder and normally resting on said flange, a weight, flexible connections between said weight and collar, supporting means for said piston, steam connections leading into said piston and cylinder, a valve in said steam connections, a stem resting on said valve and passing through said longitudinal aperture, a pivoted lever passing through said transverse slot and resting on said stem, and a weight on said lever to hold said valve on its seat, for the purpose described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN B. BISCHOFF.

Witnesses:
JAMES P. BARRY,
EDWARDS DUELS.