

(No Model.)

J. W. HYATT.

REDUCING VALVE.

No. 371,505.

Patented Oct. 11, 1887.

FIG. 3.

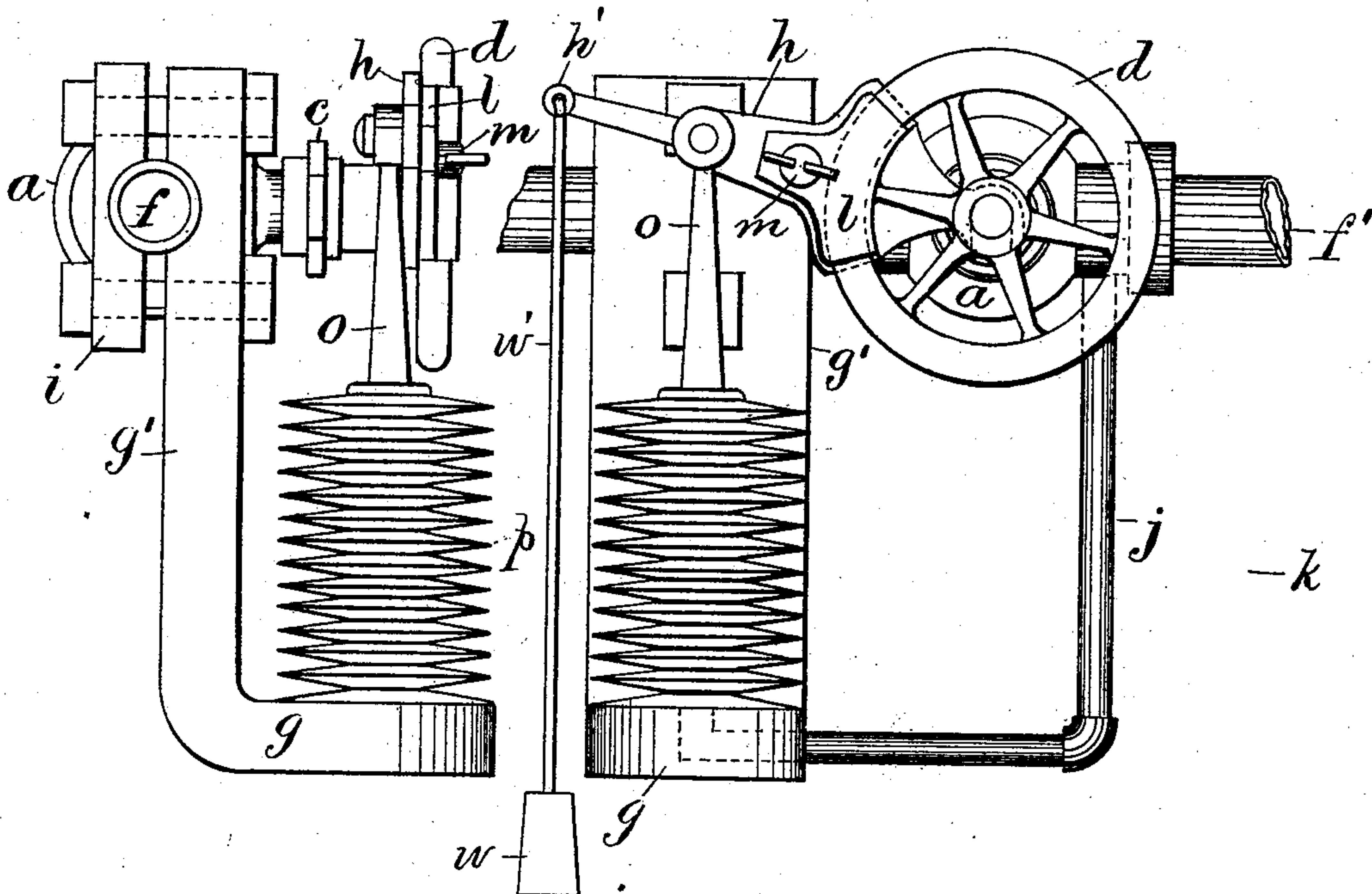


FIG. 1.

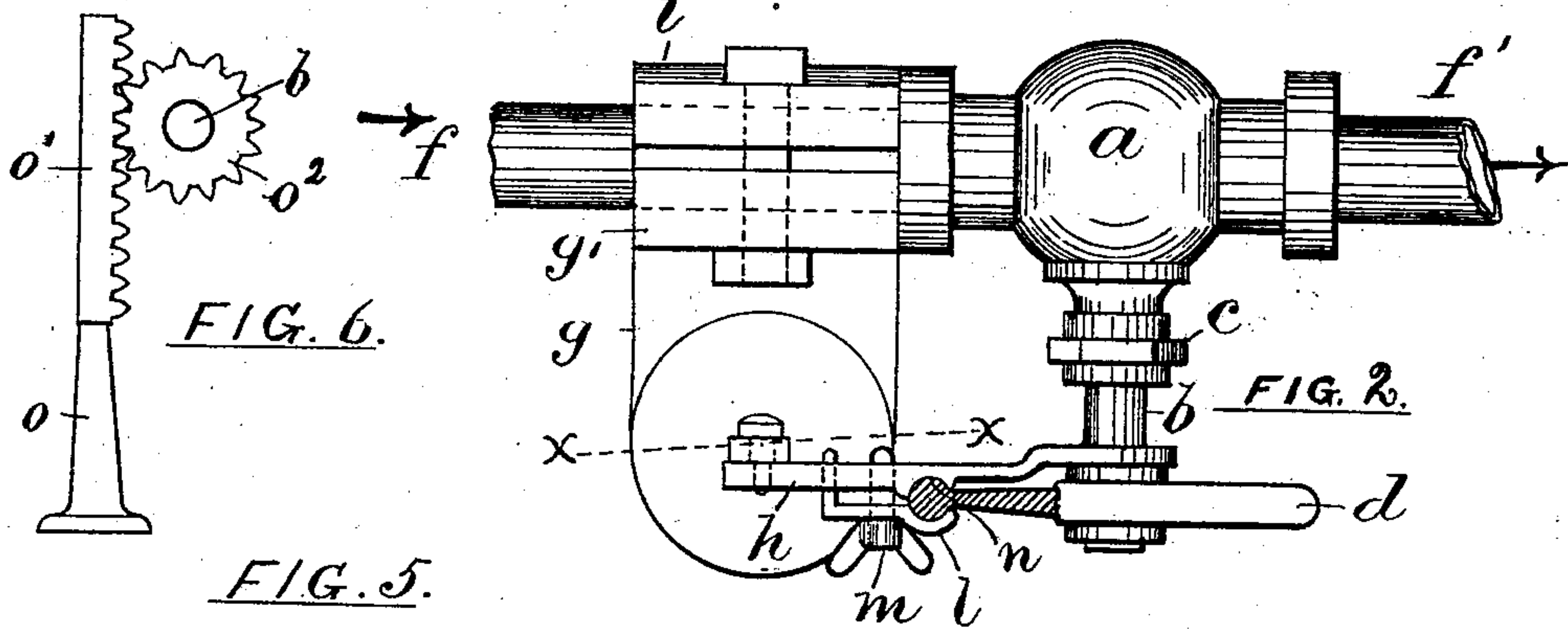


FIG. 6.

FIG. 5.

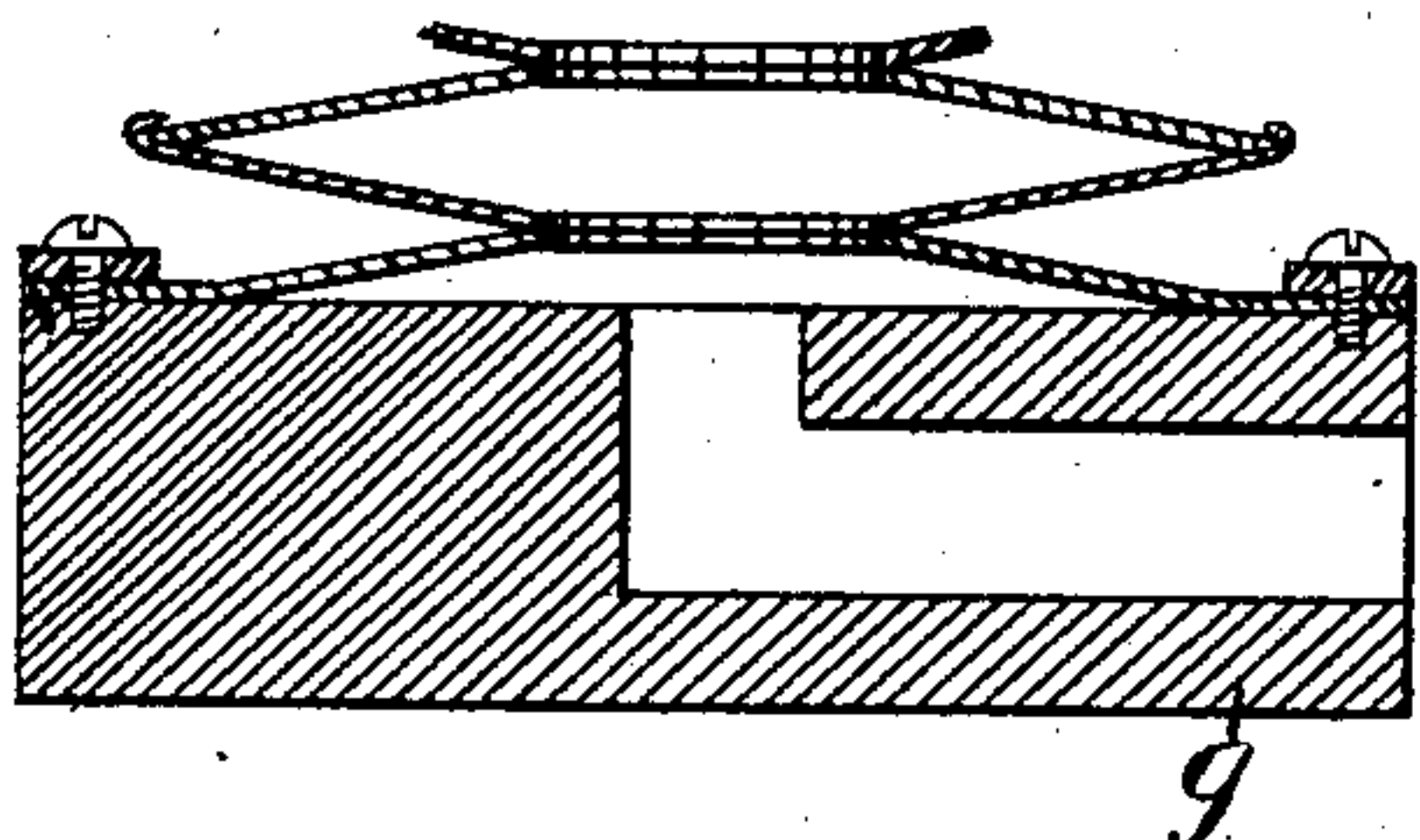
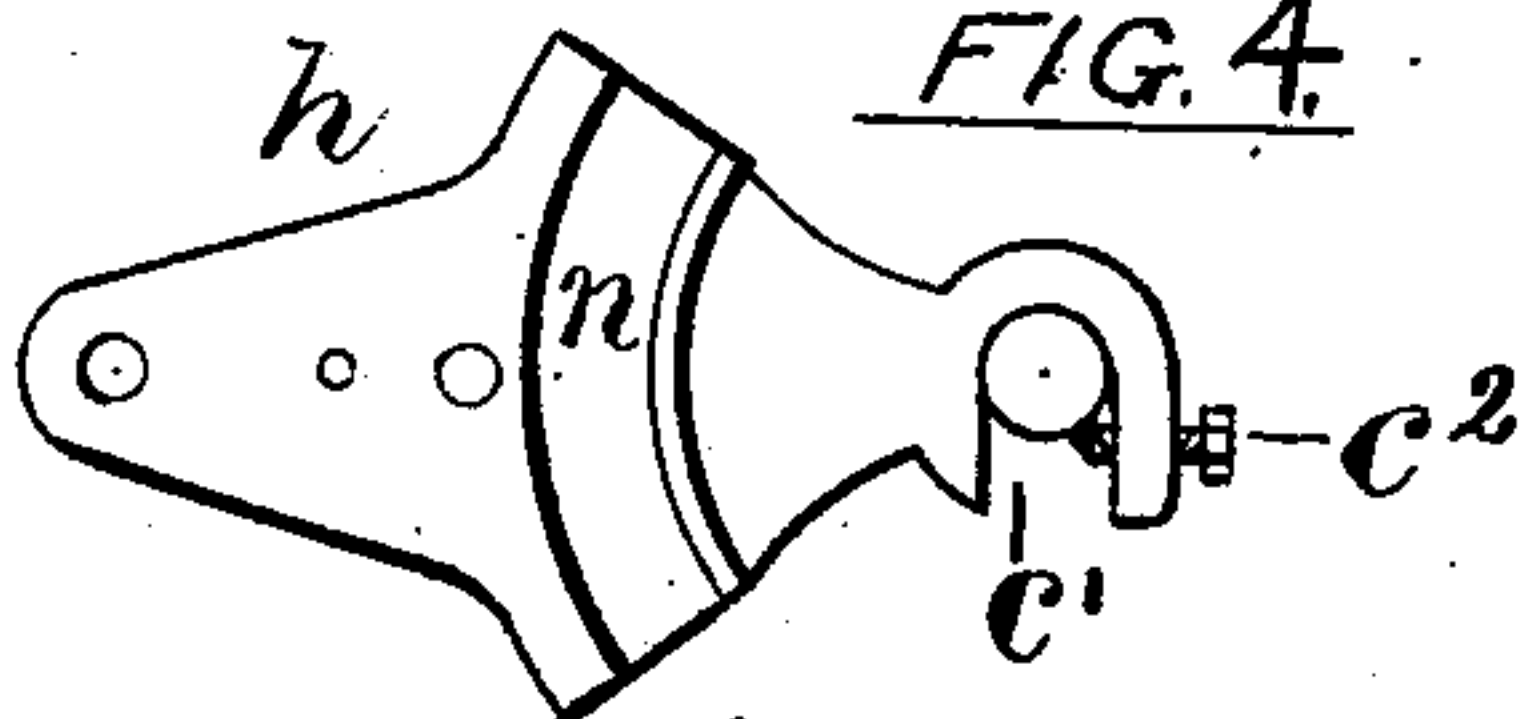


FIG. 2.

FIG. 4.



ATTEST:

L. Lee.

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JOHN W. HYATT, OF NEWARK, NEW JERSEY.

REDUCING-VALVE.

SPECIFICATION forming part of Letters Patent No. 371,505, dated October 11, 1887.

Application filed February 5, 1887. Serial No. 226,641. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. HYATT, a citizen of the United States, residing at Newark, Essex county, New Jersey, have invented certain new and useful Improvements in Reducing-Valves, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

The object of this invention is to furnish a more efficient and economical construction for a pressure-reducing valve; and it consists partly in the combination, with a valve-stem and a lever affixed thereto, of an expanding pressure-cylinder formed of a series of elastic disks exposed to the fluid delivered by the reducing-valve, partly in a means for combining a pressure-cylinder with the hand-wheel of an ordinary wheel-valve, and partly in the means for conducting pressure from the body of an ordinary wheel-valve to the pressure-cylinder.

My invention will be understood by reference to the annexed drawings, in which Figure 1 is a front elevation of the entire apparatus. Fig. 2 is a plan of the same. Fig. 3 is an end view of the same. Fig. 4 is a detached view of the lever, and Fig. 5 a section of the cylinder-seat on line *xx* in Fig 2. Fig. 6 is a modification.

a represents the body of an ordinary wheel-cock in which the valve is moved to and from its seat by a threaded screw-stem, the stem *b* projecting from a stuffing-box, *c*, and being provided at its outer end with a hand-wheel, *d*, by which the valve may be opened, closed, or adjusted, as usual.

f is the inlet-pipe to the body *a*. *f'* is the outlet-pipe from the same.

p is the pressure-cylinder, and *h* is the lever by which the motion of the pressure-cylinder is transmitted to the stem *b*. The cylinder is sustained upon a seat, *g*, carried by a foot, *g'*, which is sustained upon the pipe *f* by a clamp, *i*.

The term "cylinder" is used for convenience, although not literally descriptive of the construction I employ, as the agent which I expose to the variable pressure is a series of elastic disks or metal plates connected together by a steam-tight joint alternately at their centers and circumferences, forming a receptacle of cylindrical form externally, but capable by the yielding of the elastic plates under the pressure admitted of expansion in

a longitudinal direction. The elasticity of the plates tends to collapse the cylinder by pressing the plates normally together, while the variations in the pressure admitted serve to extend the length of the cylinder more or less, according to the pressure applied. A connection, *o*, affixed to the uppermost disk of the series (which is closed at the center to retain the pressure) is pivoted to the lever *h*, and the variations in the pressure thus effect the actuation of the valve in the required manner.

It is understood that a reducing-valve is intended to supply fluid of a uniform pressure, whatever variations of pressure may occur in the source of the fluid, and the pressure-cylinder would therefore be connected with the body *a* or pipe *f'* upon the outlet side of the valve-seat to experience any variations that might arise in the pressure of the fluid delivered from the valve. Such variations would immediately affect the length of the cylinder *p*, and thus actuate the lever *h* to open or close the valve, as might be required.

The means for conducting the fluid to the pressure-cylinder are shown herein as a pipe, *j*, inserted in the outlet side of the valve-body *a* by tapping a small hole therein and conducting the pipe therefrom to the seat *g*, through which it is conducted by a suitable passage to the interior of the cylinder. If preferred, the pipe may be inserted in the outlet-pipe *f'*.

The lever *h* is connected with the rim of the hand-wheel by a detachable clamp consisting in a gib, *l*, pinched upon the rim of the wheel by a thumb-screw, *m*, the lever *h* being formed with a segmental groove, *n*, to fit the rim of the wheel similarly to the gib, and the turning of the screw *m* sufficing to hold the lever rigidly upon the wheel wherever desired. As shown in Fig. 4, the lever is entirely detachable from the hand-wheel, and, although it requires no connection with the stem *b*, it is shown fitted thereto by an open notch, *c'*, to facilitate its movements around the stem.

As the object of the lever-clamp is merely to apply the same conveniently to an ordinary wheel-valve stem, it is obvious that the clamp might be applied directly to such stem, as by the set-screw *c'*, (shown at the inner end of the lever in Fig. 4,) and the gib *l* and screw *m* be entirely dispensed with.

It is obvious that the loosening of the screw

m permits the free turning of the hand-wheel and the adjustment of the valve to supply any volume of fluid desired, the clamping of the lever to the wheel then serving to place the valve under the control of the pressure-cylinder and rendering its movements automatic under the succeeding variations of the pressure delivered.

By the use of my construction any hand-wheel valve may be converted into a pressure-reducing valve by applying the expanding cylinder in the manner described and clamping a lever upon the rim of the wheel, or upon the stem of the valve, in any convenient manner. The adaptation of the cylinder to such a valve is obviously facilitated by sustaining the cylinder upon a seat and foot clamped to the adjacent pipe, as shown in Fig. 2, while the fluid-connection to the expanding cylinder may be made in any convenient manner and to any point where the variable pressure is operative, so as to actuate the reducing-valve in the desired manner.

I have already claimed in my Patent No. 219,914, dated March 5, 1878, and in an application co-pending herewith, special means for constructing an expanding cylinder such as I require for the present purpose, and I do not therefore claim the construction of such cylinder herein; but having shown the operation of my present invention, it will be seen that the use of the expanding cylinder entirely obviates the use of a movable piston or rod with any kind of stuffing-box or packing.

I am aware that combinations of yielding disks have already been used in various constructions, and have patented one such combination myself on March 5, 1878, in United States Patent No. 200,914. I am also aware that steam-pressure regulators have been actuated by pressure upon one or more elastic disks, and I do not therefore claim as my invention either an elastic diaphragm or a mere series of elastic diaphragms for actuating a fluid-valve, nor the use of a fluid-tight packing at the junction of such elastic disks. My invention is limited to the particular constructions which I have claimed herein. In my present construction the elastic disks are rendered so firm and rigid by their connection with one another (which is effected in the manner shown in my aforesaid Patent No. 200,914, dated March 5, 1878, or in my later patent application, No. 226,596, filed February 4, 1887) that no external cylinder or casing is required to maintain them in an operative position. As the elasticity of the plates in my expanding cylinder may be made sufficient to counterbalance the fluid-pressure applied, I am able in most cases to dispense with a weight or spring to oppose such pressure, but may use such a weight or spring in connection with my cylinder, if required. I do not therefore claim herein an elastic diaphragm for actuating a fluid-valve.

In Fig. 1 a weight, *w*, is shown suspended

by a rod, *w'*, from an eye, *h'*, at the extreme end of the arm *h*, to compress the cylinder *p* when the pressure diminishes; but a spring might be similarly applied to reverse the movement of the valve or to control or regulate the effect of the pressure upon the elastic disks of the cylinder.

It is immaterial how the rod *o* be connected with the valve, and I have shown in Fig. 6 a rack, *o'*, formed upon the rod and fitted to a pinion, *o''*, which may readily be secured to the valve-spindle by suitable means. By the use of a rack and pinion the angular movement transmitted to the spindle is much increased.

Having set forth the nature and advantages of my construction, what I claim is—

1. The combination, with a fluid-valve, of a cylinder-support, an expanding cylinder formed of a series of elastic metal plates connected alternately at their centers and circumferences and exposed to the variable pressure, and a connection between said cylinder and valve, the whole arranged and operating substantially as herein set forth.

2. The combination, with a fluid-valve having a rotary stem, of a lever attached thereto, a cylinder-support, an expanding cylinder formed of a series of elastic metal plates connected alternately at their centers and circumferences, and a connection from the cylinder to the said lever to oscillate the valve-stem, as and for the purpose set forth.

3. The combination, with a fluid-valve having a rotary stem and a hand-wheel attached thereto, of a lever clamped upon the rim of said hand-wheel, a cylinder-support, an expanding cylinder formed of a series of elastic metal plates connected alternately at their centers and circumferences and exposed to the variable pressure, and a connection between said cylinder and lever, as and for the purpose set forth.

4. The combination, with a fluid-valve having a rotary stem and a hand-wheel attached thereto, of a lever clamped adjustably upon the rim of said hand-wheel, a pressure-cylinder support clamped upon a pipe inserted in the said valve, and a cylinder fixed upon said support and operated to actuate the said lever, as and for the purpose set forth.

5. The combination, with a wheel-valve, of a lever clamped upon the rim of the wheel, a cylinder-support clamped upon the outlet-pipe of such valve, a cylinder on the said support actuated to move the lever as desired, and a fluid-connection from the outlet side of the valve to the said cylinder, as and for the purpose set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOHN W. HYATT.

Witnesses:

THOS. S. CRANE,
W. R. SANDS.