

J. V. Weitz,

Governor.

N^o 62,457.

Patented Feb. 26, 1867.

Fig: 1.

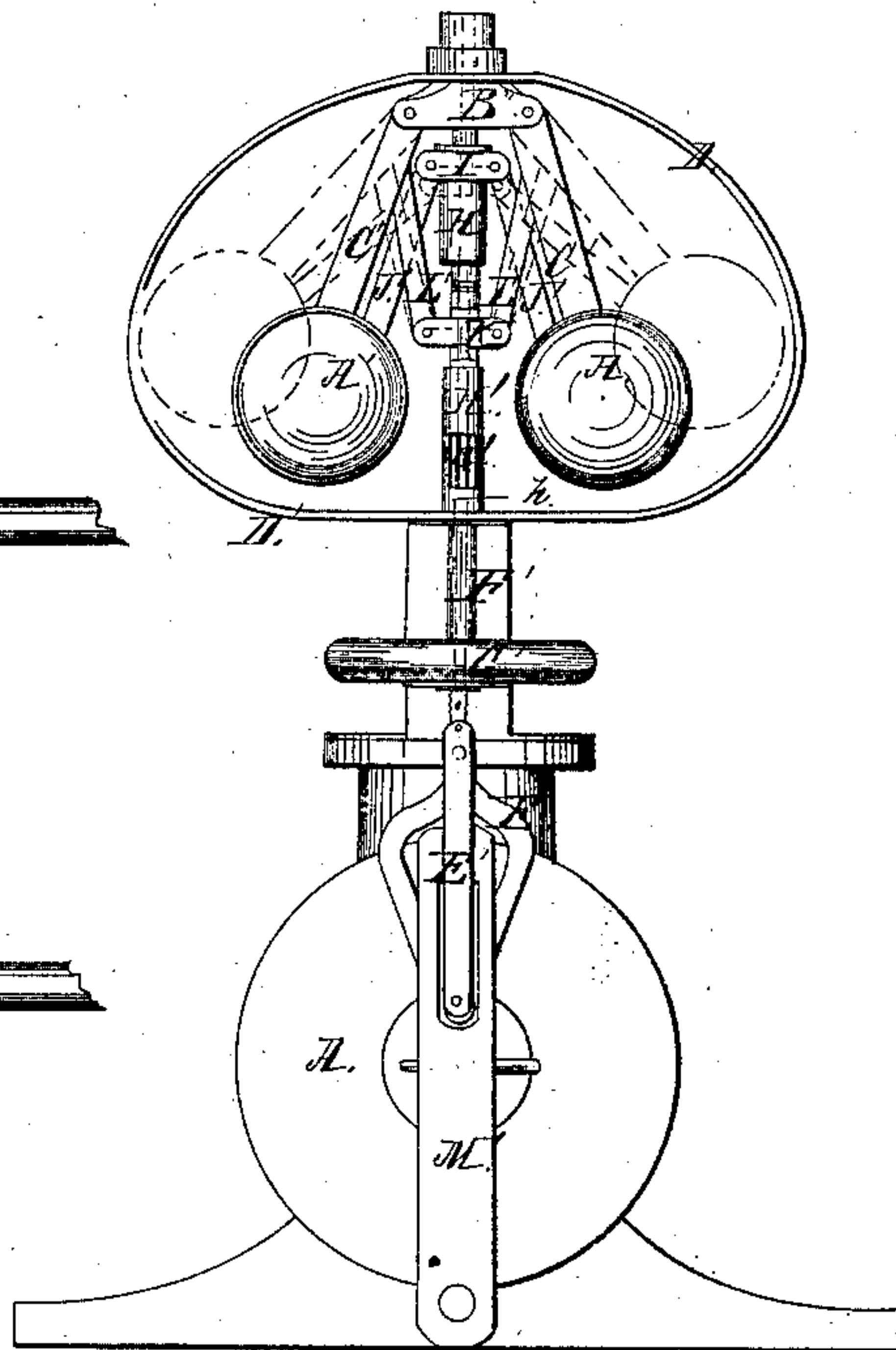


Fig: 2.

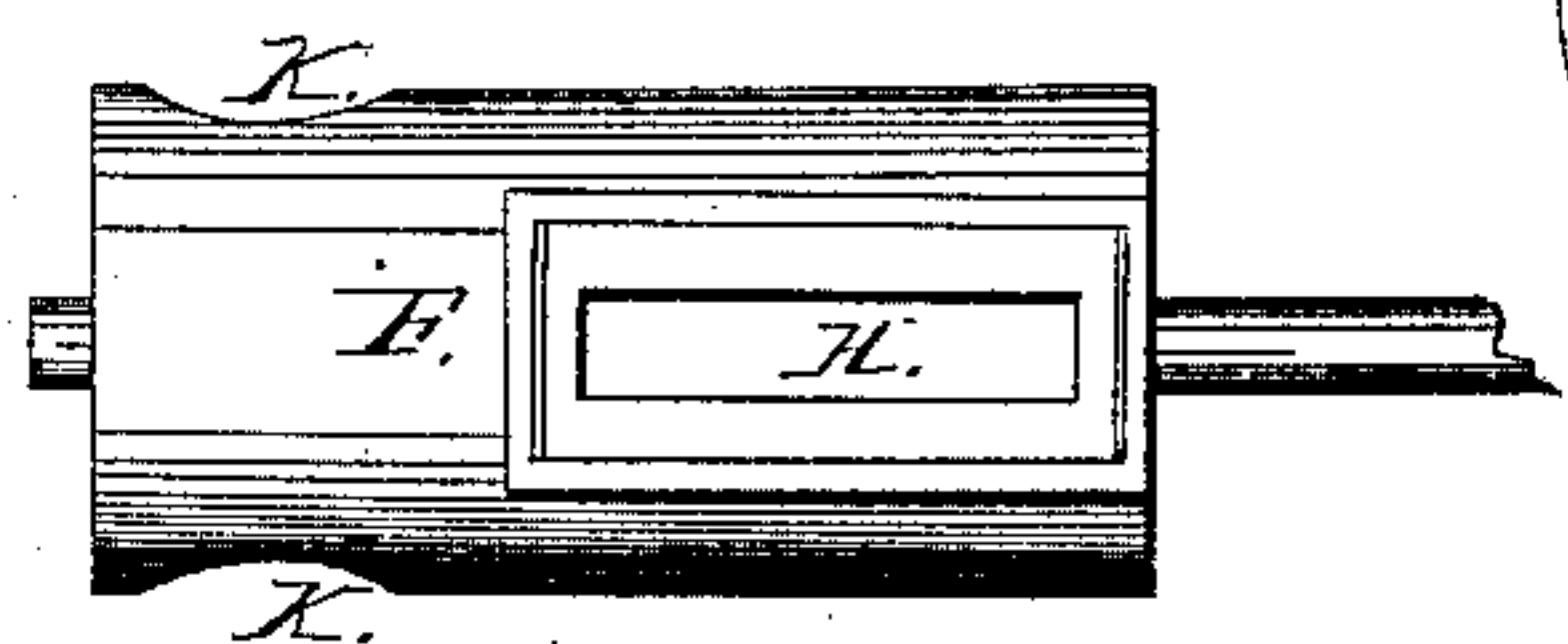


Fig: 3.

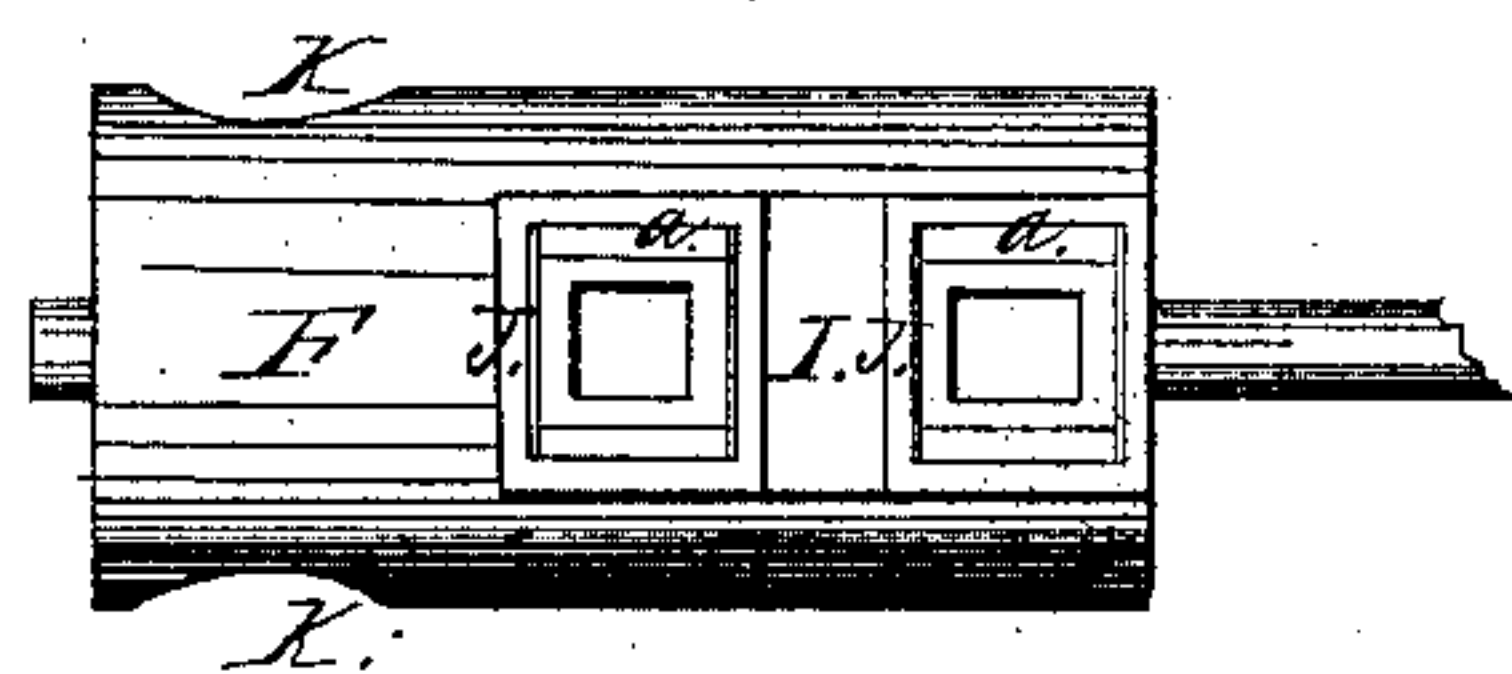


Fig: 4.

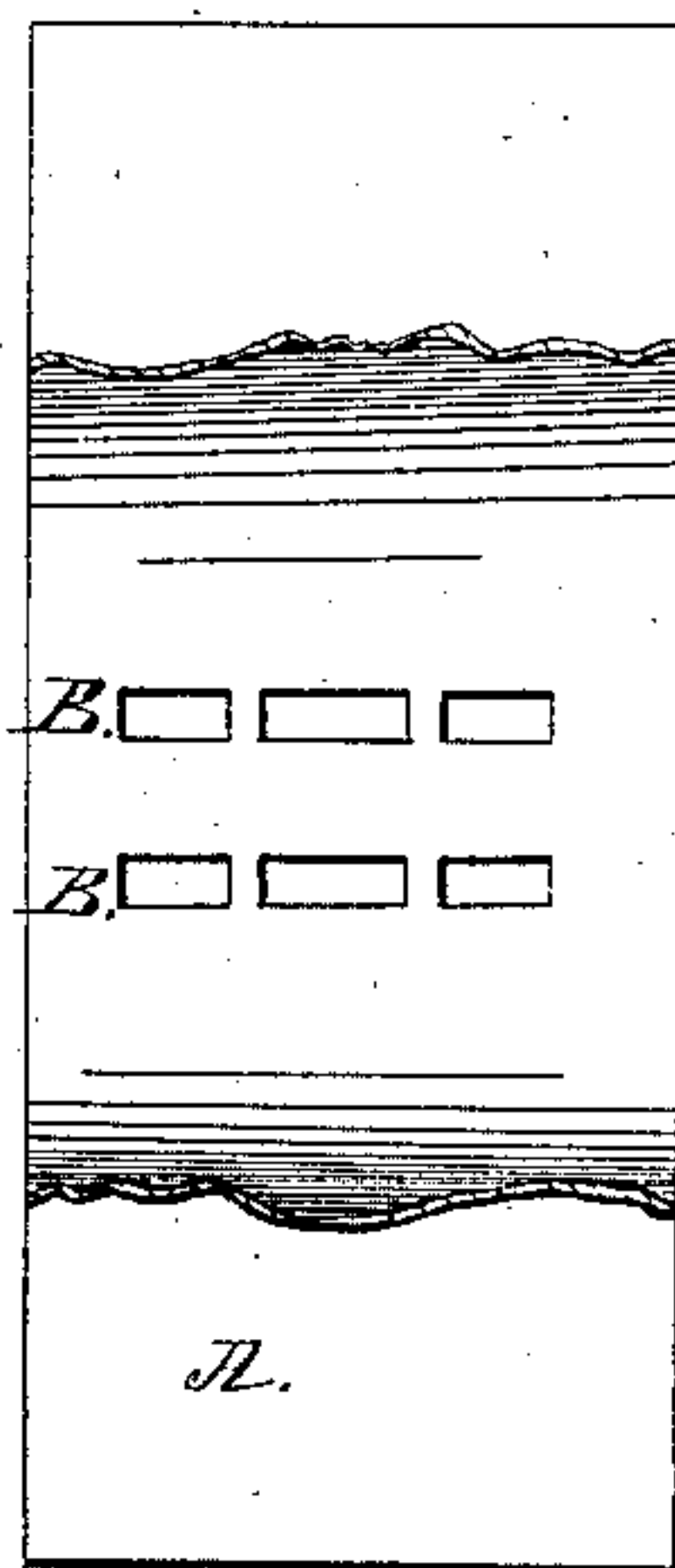


Fig: 7.

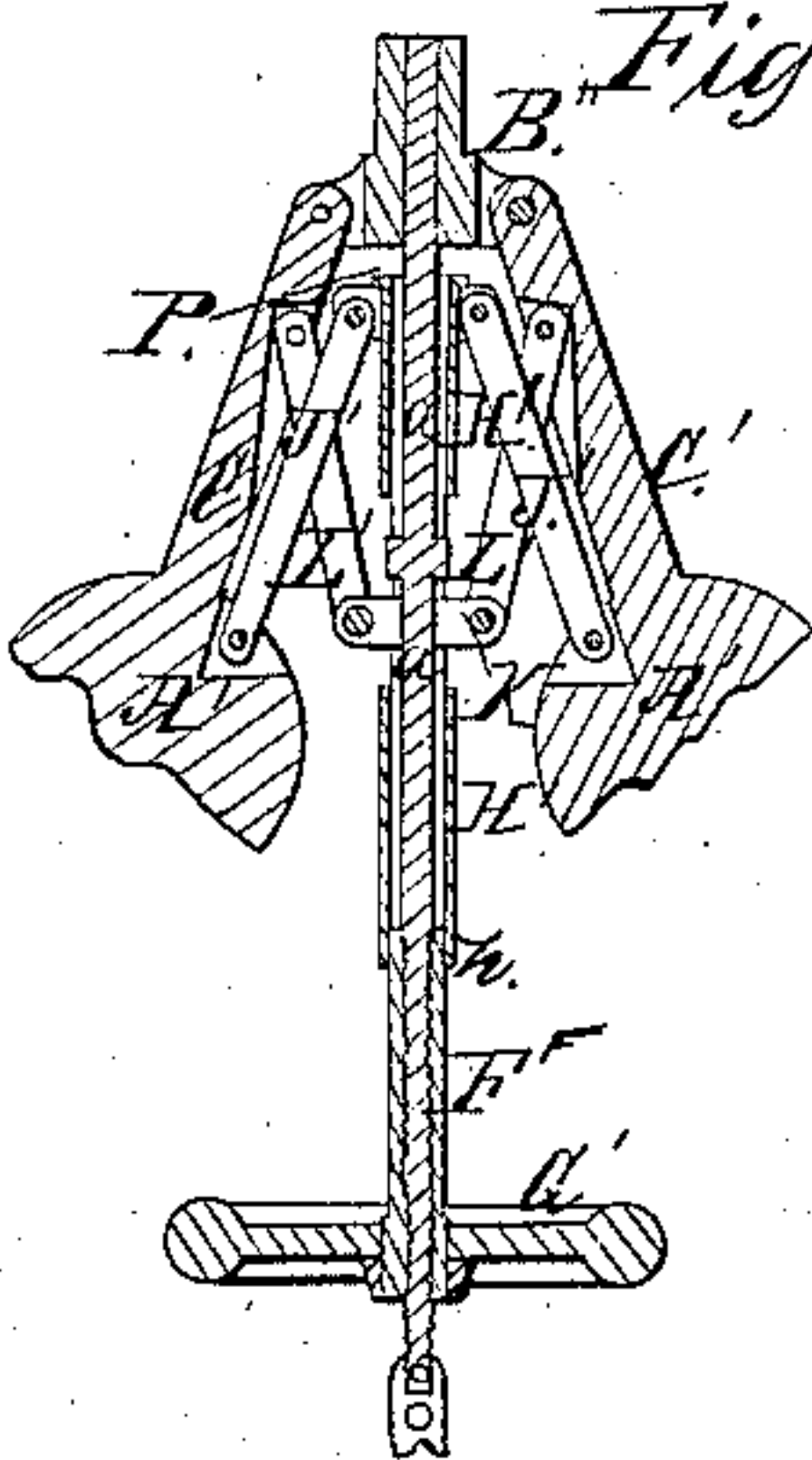


Fig: 5.

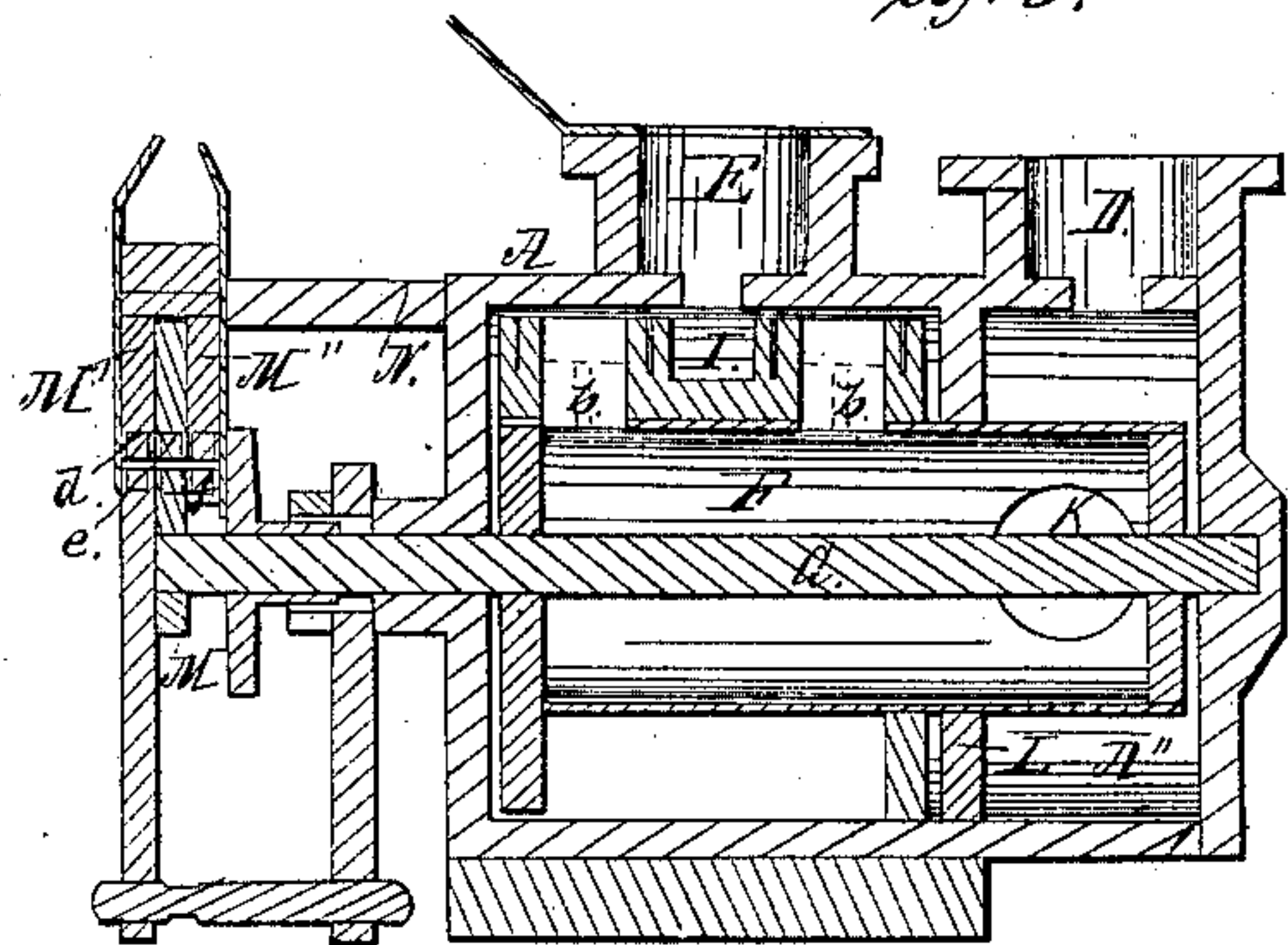
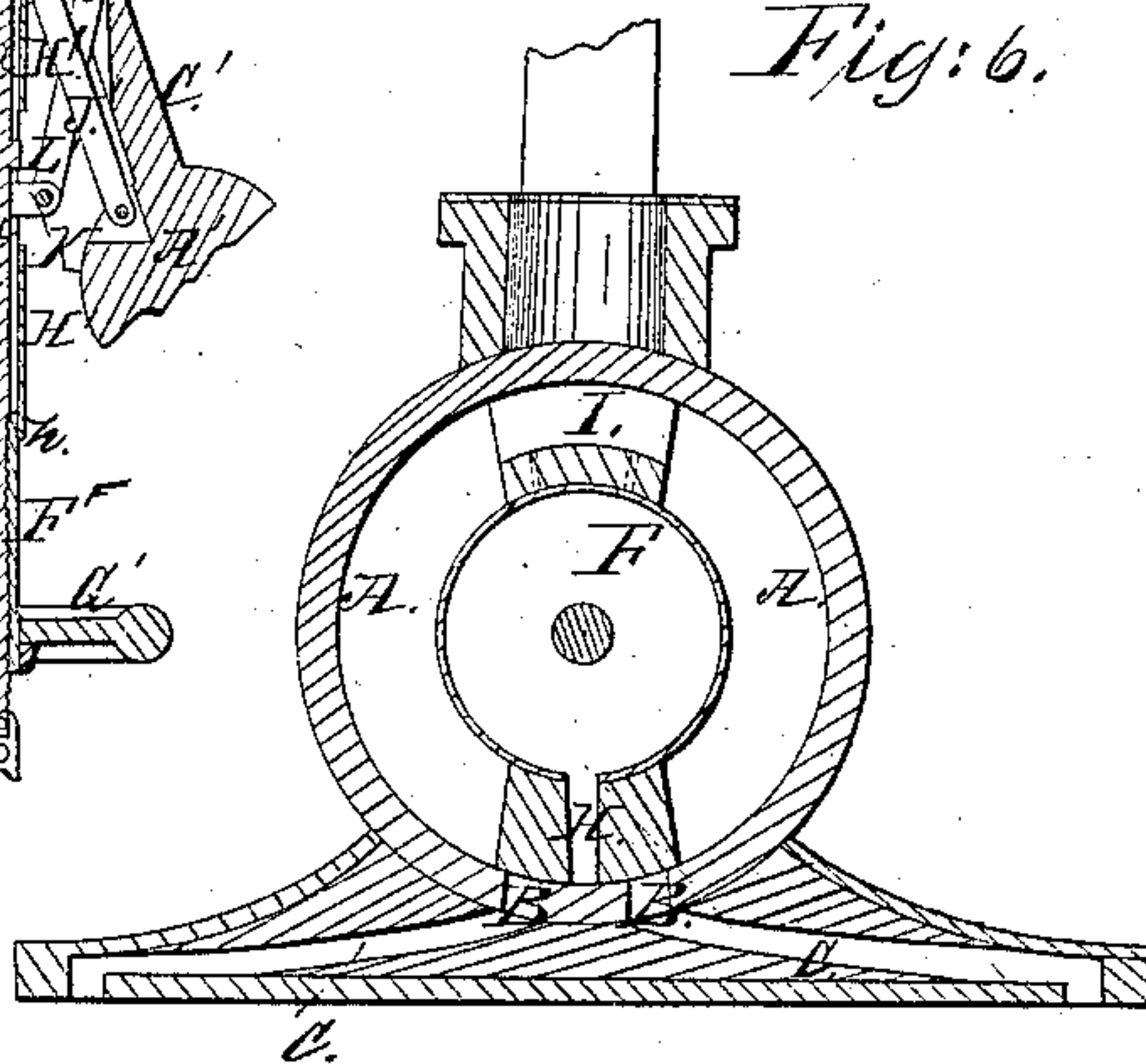


Fig: 6.



Witnesses:

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United States Patent Office.

J. V. WEITZ, OF CLEVELAND, OHIO.

Letters Patent No. 62,457, dated February 26, 1867.

IMPROVEMENT IN STEAM-ENGINE GOVERNOR.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, J. V. WEITZ, of Cleveland, in the county of Cuyahoga, and State of Ohio, have invented certain new and useful improvements in Steam-Engine Regulators; and I do hereby declare that the following is a full and complete description of the construction and operation of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a front view of the regulator as attached to the steam valve.

Figure 2 is a view of the steam valve, showing the induction port of the valve.

Figure 3 is a view of the same, showing the exhaust ports of the valve.

Figure 4 is a section of the steam chamber, showing the induction ports of the chamber.

Figure 5 is a longitudinal sectional view of the valve and chamber.

Figure 6, a transverse view of the same.

Figure 7, a vertical section of the regulator.

Like letters of reference refer to like parts in the several views.

A, fig. 1, is the steam chamber. B B are the steam ports. C C the steam throats, leading from the chamber to the cylinder, and upon which the valve and regulator stand. D is the induction steam pipe. E the exhaust steam pipe. F is the steam valve, and consists of a hollow cylinder, through the centre of which passes the rock-shaft G, fig. 5. At the lower side of this valve is the steam port H, figs. 2 and 6. On the upper side is the exhaust port I, figs. 3 and 5. J J is a counterbalance to the weight of the steam port H. *a a* is a packing which is let in to the face of the counterbalance, and is forced outward against the inner surface of the cylinder by the pressure of the steam which is admitted to the under side of the packing through holes provided for that purpose, and which are indicated by the dotted lines *b b*, fig. 5; these ports and packing may be in a circular form if thought desirable. The face of the port H is also provided with a packing, arranged and operated in the same manner; by this means the valve is at all times kept steam-tight within the chamber, and equally balanced. K K are also steam ports. The section of the chamber occupied by these ports is divided off from the rest of the chamber by a diaphragm, L, fig. 5. This diaphragm fits closely around the valve, thereby making a separate chamber, A'', around the ports K and the end of the valve, in which the ports are. The rock-shaft G projects through the front end of the chamber, as shown in fig. 5, to the extreme end of which is connected the lever M. M' M'' are two independent levers, their upper ends being connected together and placed upon the end of the projecting arm N, and from which they swing or vibrate. The lever M passes up between the levers M' M'', and is connected to them by the shaft *c*, upon which are the friction-rollers, *d, e, f*, which work respectively in the slots of the levers M' M'', and by means of which the friction of working the lever is reduced and operates more easily and independently in working the steam valve for the purpose of receiving and exhausting steam into and from the cylinder, which is effected in the following manner: The position of the valve, as shown in fig. 6, shuts off the steam from the cylinder. On moving the valve, by means of the eccentric to which the valve is attached by means of the lever M', to the right, steam is admitted to the cylinder through the port H, first taking steam from the steam pipe D into the valve ports K, thence through the port H into the cylinder through the steam throat C; then by the reaction of the valve the steam freely exhausts, through the throat C, the port B, into the chamber, thence through the port I into the exhaust E, and so on alternately, as the eccentric continues to oscillate the valve from right to left and from left to right. In order to give the engine a regular and uniform volume of steam, a governing apparatus is attached to the valve, and operated conjointly with it. This apparatus consists of a pair of balls, A' A', fig. 1, connected to a cross-head, B'', by the arms C' C', and is suspended in a frame D' and placed immediately over the levers on the rock-shaft, and to which it is connected by the stem or rod *a'*, figs. 1 and 7. This rod connects with the levers by the intervention of the stirrup E', the lower end of the stirrup being secured to the shaft *c*, upon which are the friction-rollers *d, e, f*, while the upper end is pivoted to the lower end of the rod; the lower end of this rod or stem is provided with a thread which screws into a sleeve, F'. On the lower end of the sleeve is a hand-wheel, G', for the purpose of screwing the rod upward and downward in the sleeve for a purpose hereafter shown. This sleeve and rod are fitted to another sleeve H', in which it freely plays upward and downward, as the case may be. To the upper end of the sleeve H' is secured the cross-head I', to which the

upper ends of the links J' are attached, the lower end being-connected to the balls A' . The cross-head K' passes transversely through the sleeve H' , slots in the sides of the sleeve being provided for that purpose. A hole in the centre of the head permits of the rod or stem a' to pass up through it. To this cross-head is pivoted the lower end of the links L' , and the upper end to the arms C' . The action of the regulator upon the valve is as follows: When the balls are down, as shown in fig. 1, the greatest degree of oscillation is given to the valve for the reason that the friction-rollers are now at the lower end of the slot in the lever M' . The vibration of the lever being greater as the distance increases from the centre of motion of the lever M' , it follows that a greater vibratory action is thereby given to the lever M , which, as a consequence, gives the greatest degree of oscillation to the valve, as above stated; hence the engine at this time is taking the largest or a full head of steam. The accelerated speed of the engine causes the balls to expand, which lifts the rod a' , to which the stirrup and rollers are attached, by means of the cross-head K' , through which, as above stated, the rod passes. A collar on the rod, which rests upon the upper side of the head, allows the lifting of the rod by the cross-head, at the same time permits it to slide freely through it. It is obvious that this lifting of the rod brings the rollers nearer the centre of the vibration of the lever M' , hence the oscillation of the steam valve is checked and the steam proportionately shut off, and so on alternately as the balls may rise or fall, opening or closing the valve more or less. In case any accident should occur to the regulator, as the slipping or breaking of the belt, so that the balls would in consequence fall and thereby open the steam valve, causing the engine to take on an undue head of steam, the governing apparatus is so arranged as to shut off the steam, and in such an event cause the engine to stop. This is accomplished as follows: The sleeve H' , as above stated, being connected to the cross-head I' , is raised up on the falling of the balls; the sleeve F' , being within the sleeve H' , is raised up with it at the same time, by means of the collar h on the end of the sleeve F' , and a shoulder on the inside of the sleeve H' , upon which the collar rests when being lifted. It will be observed that on screwing the sleeve F' down by means of the hand-wheel; G' , so that the collar will be close to the shoulder within the sleeve H' , the sleeve, and so also the stem, will be raised up the distance the cross-head I' slides upward on the rod, which will be sufficient to entirely shut off the steam, and thereby stop the engine. On screwing the sleeve up, making a distance, more or less, between the collar and shoulder, the distance that the sleeve will thus be raised will be less than the space between the shoulder and collar, for the shoulder will have to pass over the space thus made to react the collar in order to lift it; therefore the valve will not be entirely closed, as in the former case. It will be seen that the sleeve may be screwed up so far as to be out of the reach of the sleeve H' , which may be done in the ordinary working of the engine, but in this way it does not act as a guard against casualties above named. For the security of the engine, in the event of accident to the regulating apparatus, the sleeve F' must be screwed down to or near the shoulder, so that the collar above described may be reached by it, and thereby raised up so as to shut off the steam. These two actions of the regulator are entirely independent of each other; that is, the balls and cross-head, K' , in connection with the rod a' , for the purpose of gauging the amount of steam into the cylinder, are not in any way affected by the operation of the sleeve and screw for the purpose above explained, notwithstanding they act conjointly and within each other.

By this arrangement of the governing apparatus I dispense with the use of the throated valve in the following way: When it is required to stop the engine, the sleeve F' is screwed down by the hand-wheel G' ; this, as above stated, raises the rollers, and thereby shuts off the steam by the lifting of the rod a' by the screw-sleeve F' and sleeve H' , in the manner as above described; and so, in order to start the engine, the sleeve is screwed up, thereby opening the valve or allowing it to be opened by removing the collar up away from the shoulder, for when the wheel is screwed down the rod and rollers are lifted by the descent of the balls and the steam in consequence shut off.

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

1. The tubular shaft H'' , stem or rod a' , in combination with the screw-sleeve F' , links J' , cross-head I' , arranged in the manner and for the purpose as described.
2. The steam-balance valve F' , ports J , H , and K , as arranged in combination with the chamber A , and auxiliary chamber A'' , for the purpose and in the manner set forth.
3. The levers M M' , rollers d , e , f , and stirrup E , as arranged, in combination with the shaft G , and valve F , for the purpose and in the manner as herein described.
4. The shaft H' , screw-sleeve F' , levers M and M' , and rollers d , e , f , as arranged for the purpose and in the manner specified.
5. The screw-sleeve F' , wheel G' , and rod a' , as arranged in combination with the stirrup E , levers M M' , for the purpose and in the manner as set forth.

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Witnesses:

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