

No. 662,572.

Patented Nov. 27, 1900.

T. D. MILLEA.  
CUSHION FOR ENGINE GOVERNORS.

(Application filed Dec. 29, 1897.)

(No Model.)

Fig. 1.

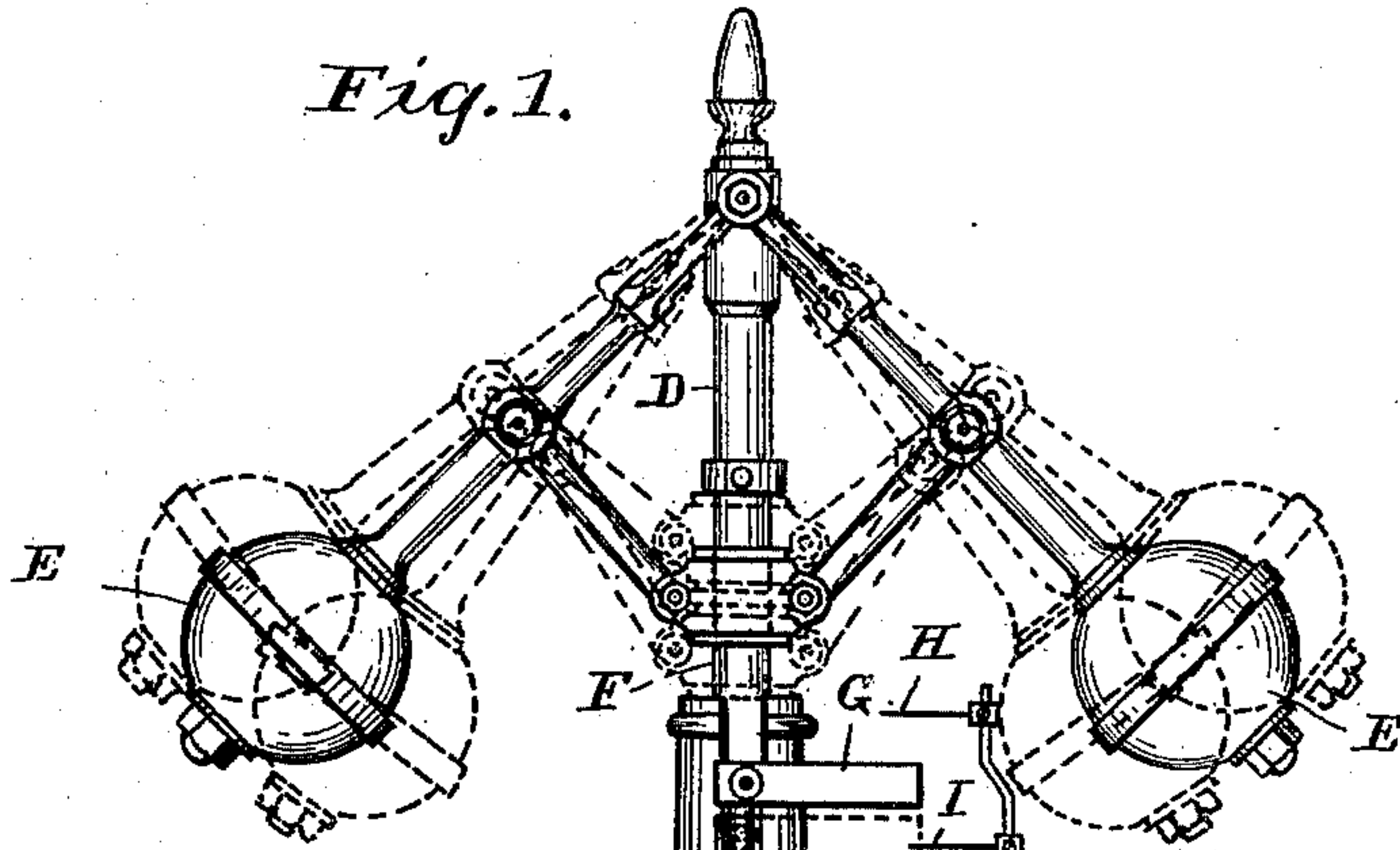


Fig. 2.

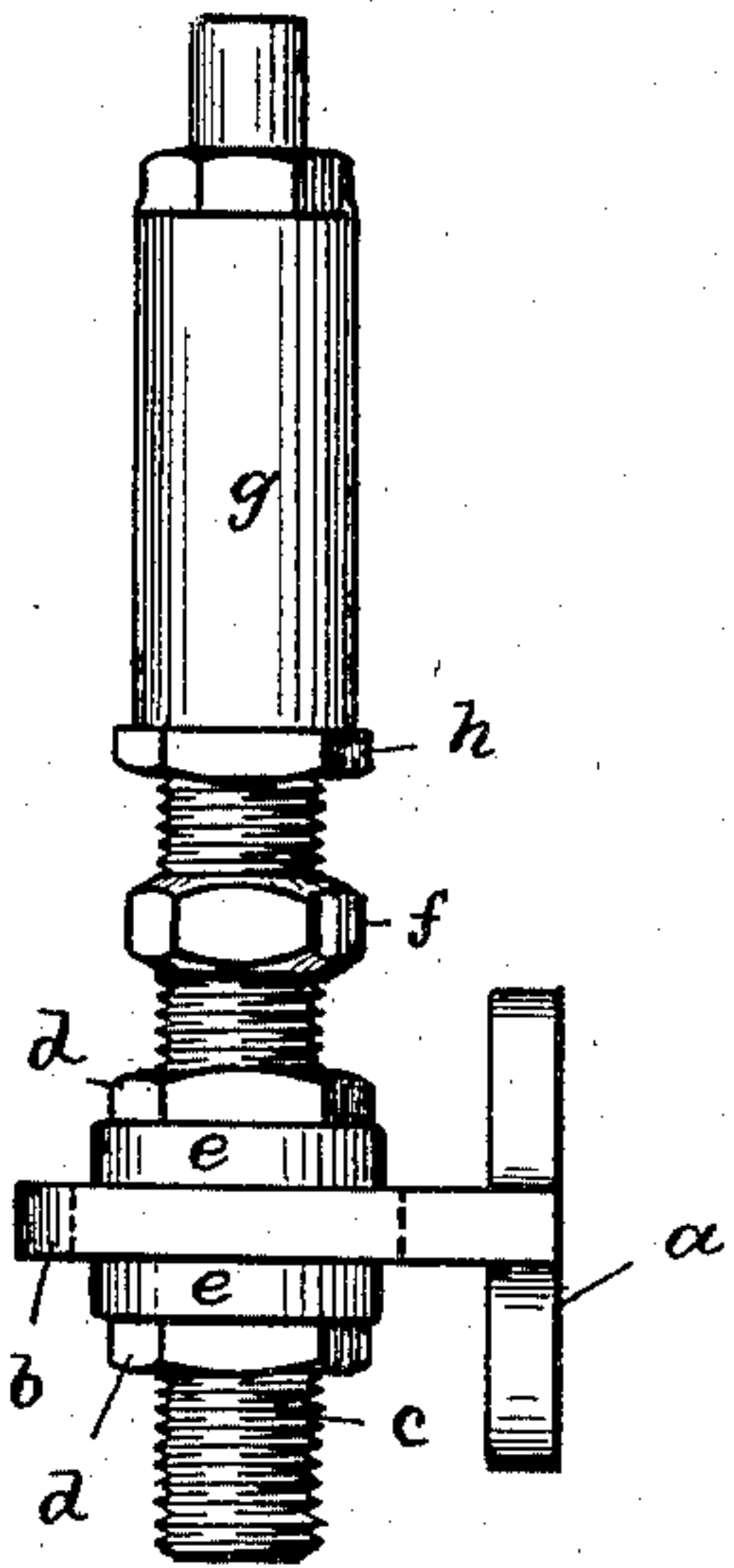
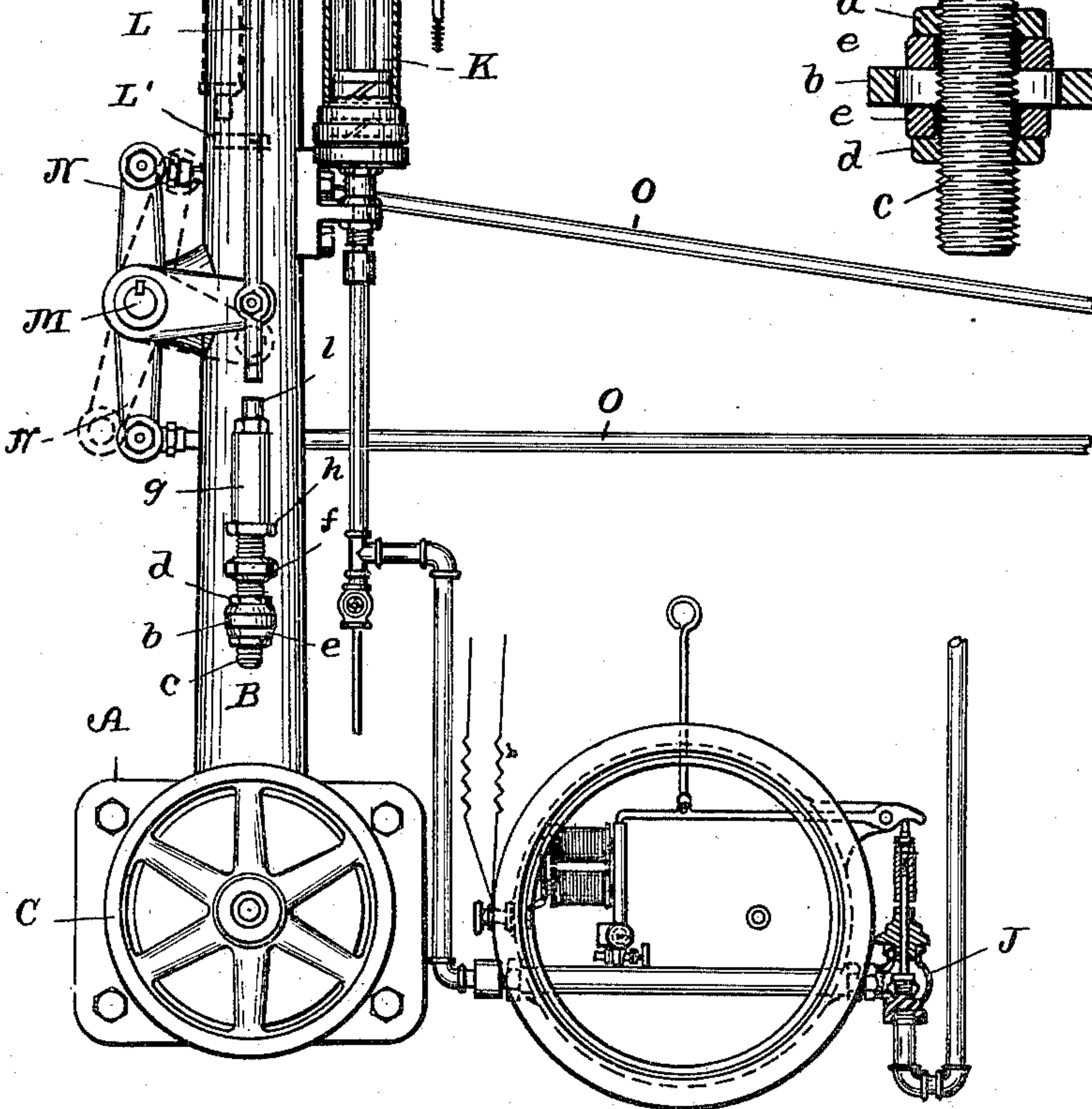
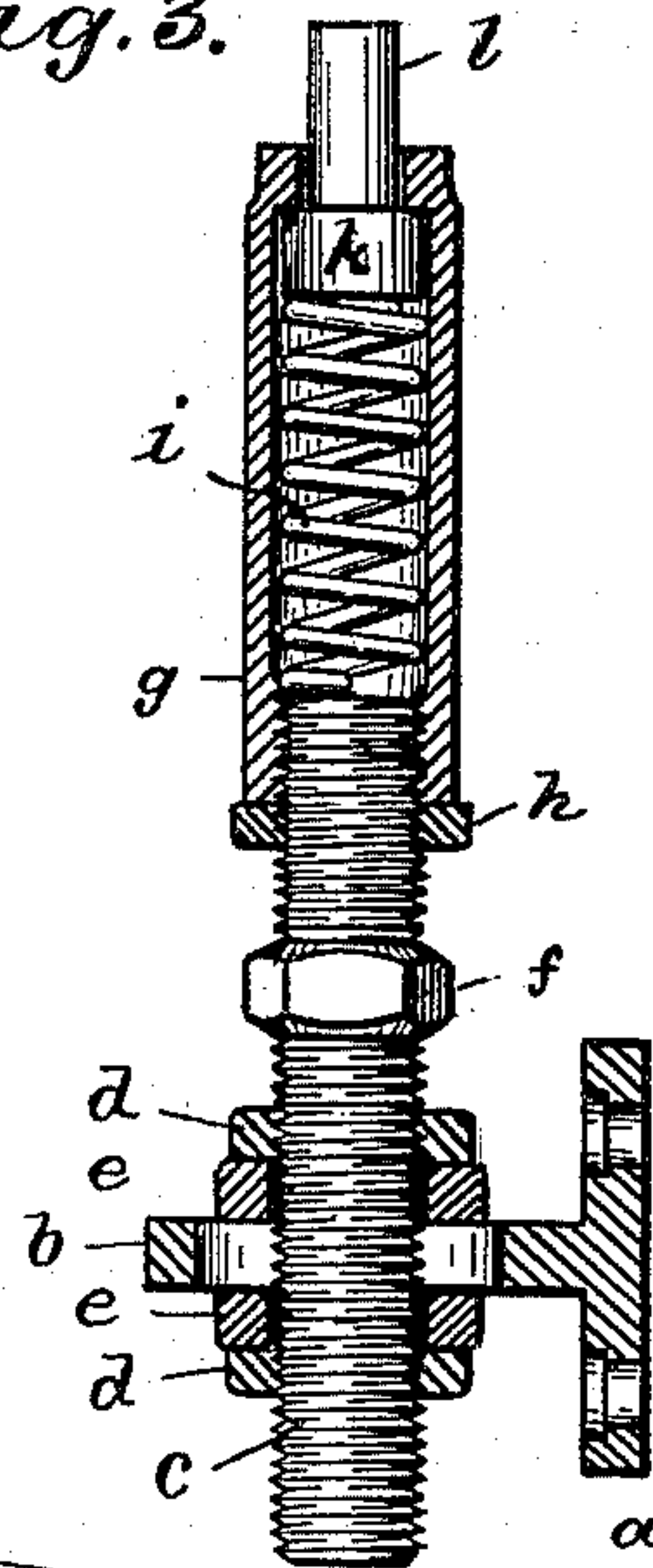


Fig. 3.



Witnesses.

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# UNITED STATES PATENT OFFICE.

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## CUSHION FOR ENGINE-GOVERNORS.

SPECIFICATION forming part of Letters Patent No. 662,572, dated November 27, 1900.

Application filed December 29, 1897. Serial No. 664,160. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS D. MILLEA, a citizen of the United States of America, residing in Springfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Cushions for Engine-Governors of the Gravity-Ball Type, of which the following is a specification, reference being had to the accompanying drawings and the letters of reference marked thereon.

This invention relates to new and useful improvements in cushions for engine-governors of the gravity-ball type, and is adapted to permit of a larger but safe variation of speed.

It is the object of my invention to provide a yieldable cushion in line of movement of the governor-stem or other operative part and to be acted on thereby in such a manner as to compensate for sudden and ineffective changes in the speed of governors which may or may not be provided with safety devices. My invention is, however, particularly applicable to governors provided with automatic safety-stops, such as is shown in a former patent to me, No. 578,650, of March 7, 1897. As before stated, this improvement increases the range of speed which governors may assume and at the same time in no way interferes with the desirable working of the automatic stop device above referred to and which is designed to be brought into play only in case of accident, such as a runaway or the like.

With the above object in view my invention resides and consists in the novel construction and combination of parts shown in the accompanying drawings, forming a part of this specification, upon which similar letters of reference denote like or corresponding parts throughout the several figures, and of which—

Figure 1 shows a side view of a governor fitted with an automatic stop mechanism and provided with my improved cushion. Fig. 2 shows a detached side elevation of my yieldable cushion, and Fig. 3 is a central vertical sectional view of the construction shown in Fig. 2.

In order to render a more intelligible under-

standing of the application of my improvement, I will give a brief description of the construction of the governor shown and its attachments for automatically stopping the same.

A indicates a base bearing the vertical tube B.

C represents a belt-wheel upon a shaft, which latter is connected by bevel-gears to a vertical shaft D, journaled within the tube. To the upper end of this shaft is pivoted arms bearing the governor-balls E E, which are connected by links with a collar of a sleeve F, adapted to slide upon the shaft in accordance with the position of the ball. This sleeve carries a small arm G, which serves to make and break electrical connections with contact-fingers H and I, attached to the electrically-controlled valve J, governing a steam-supply for pressure-cylinder K, the latter bearing a piston and rod which act upon the arm G aforesaid in a manner to force the governor to its highest position and operate the main valves of the engine. The connection with the above arm for the cylinder-valve consists in a rod L, with an arm upon a rock-shaft M, which shaft bears similar arms N N at a right angle to the rod-arm and to which the reach-rods O O are connected. These rods are provided with suitable connections with the main valve and by their various positions regulate the amount of steam admitted to the engine-cylinder.

From the foregoing construction it will be seen that the rod L assumes a position in accordance with the position of the sleeve operated by the balls and that by providing yieldable stops for the same the movement of the balls and the arm G can be prolonged and governed as desired. My invention therefore resides in the construction of a novel yieldable cushion-stop for the above purpose which will now be described. In practice I preferably employ two of these stops, one to govern the upward movement and one to govern the lower. They, however, are of similar construction, and a detailed description of one will answer for both. To the tube B or any other suitable part of the device I attach an adjustable bracket a, which bears a right-angular slotted projection b, through



which a threaded stem *c* passes, said stem being made adjustable therein by means of nuts *d d* engaging the lower threaded end thereof, as shown. Washers are also provided, which better permit the lateral adjustment of the stem within the projection of the bracket. A head *f* is fixed to the stem and made a part thereof, which serves to afford means for engagement of a wrench, whereby said stem is retained against movement when the nuts are tightened. To the upper threaded nut of the stem is attached a barrel *g*, which is also adjustable upon said stem and is retained in position by means of a lock-nut *h*, as shown. Within the barrel is placed a spring *i*, one end of which rests against the top of the stem and the other against the head *k* of a plunger *l*. It will thus be seen that the tension of the spring can be governed by the adjustment of the barrel upon the stem and that the stem can likewise be adjusted both vertically and laterally by the mechanism before described. In practice the plunger *l* is designed to register with the free end of the before-mentioned rod *L* or a bracket *L'*, secured thereon, the latter being adapted to engage the top stop, as will be obvious.

From the foregoing construction it will be apparent that with the application of my improvement to an automatic stop device, as illustrated, the action and result would be substantially as follows: With uniform speed applied to the governor it would operate and assume a position substantially as shown in full lines in Fig. 1. By an increased speed it would be raised somewhat above said position and to a point where my yieldable stop (shown in dotted lines) would be engaged, which latter serves to afford a resistance and is designed to check its movement except in case of extreme emergency, such as a runaway, when the resistance of the stop is overcome and the arm *G* rises to make the electrical connection, which applies the steam-pressure in a manner to raise the balls and operate the main valves. The action upon the lower is similar to that of the upper one and affords a means of supporting the governor when a sudden load is applied to the engine and prevents the governor settling to such a position as would prevent the main valves from opening, as shown in dotted lines, which might be brought about by the breaking of the governor-belt or similar accident, in which instance it is desirable that the governor should prevent the main valves from opening. It will be observed that by this construction the cushion is not put in operation and does not act to affect the operation of the governor within a certain predetermined limit, so that while the governor is operating at its normal speed or at a speed varying slightly from its normal desired speed the cushion will not in any way affect the operation, but that after the speed has passed or varied from a certain predetermined limit then the cushion is called

into operation and tends to relieve the strain on the governor mechanism.

It will be obvious that my improved cushion can be connected to any convenient part of the frame and may likewise be operated from any preferred part of the mechanism and need not be operatively connected as shown in the drawings. It will further be apparent that the use of my cushion need not be confined to automatic engine-stops, as shown, but can be used on ordinary governors direct.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination of a ball-governor, a part operatively connected and movable as the balls are elevated or lowered, and a cushion device arranged to receive the thrust of such part, the cushioning device being mounted on a stationary and non-moving support, and being inoperative while the governor is moving at its normal speed, and also inoperative while varying from such normal speed inside of the desired predetermined limit of speed.

2. The combination of an engine-governor, a part moved by the governor, and a stationary cushion mounted on a stationary non-moving support arranged in the path of said part and disconnected therewith and in position to take the thrust when the governor exceeds its limit of normal motion.

3. In a cushion device for governors, the combination with a ball-governor of a lug attached to the stem, a suitable contact-piece, a barrel forming a way in which the same is mounted, means for adjusting the barrel and means for connecting the same to a governor-frame.

4. In a cushioning device for automatic engine-stops the combination with the governor of a cushion comprising a yieldable contact, a barrel forming a way in which the same is mounted, an adjustable stem supporting said barrel, a bracket in which the stem is mounted, and means for adjustably securing the same to the governor-frame.

5. The combination with a governor of a cushioning device comprising a part attached to a moving part of the governor, but not attached to the barrel or contact part *l*, a contact-piece *l*, a way in which the same is mounted, a spring to normally extend said contact, means for adjusting said spring, a bracket adjustably supporting said way and by means of which the same is attached to the governor.

6. The combination with the governor of a cushioning device, comprising a yieldable contact-plunger, a barrel in which the same is guided, a spring within the barrel, means for adjusting said spring, a stem supporting said barrel, a bracket in which the stem is mounted, means for adjusting the stem upon the bracket, means for connecting the same to a suitable part of the governor-frame.

7. The combination with the governor of a



cushioning device comprising a threaded stem, a barrel engaging the upper threaded end thereof, a contact-plunger protruding from said barrel and yieldably retained therein, a bracket in which the lower end of the stem is mounted, means for affording lateral adjustment of said stem within the bracket, and means for providing vertical adjustment to said stem, substantially as shown and described.

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