

L. PAGAN.
HIGH SPEED REGULATOR.
APPLICATION FILED SEPT. 22, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.

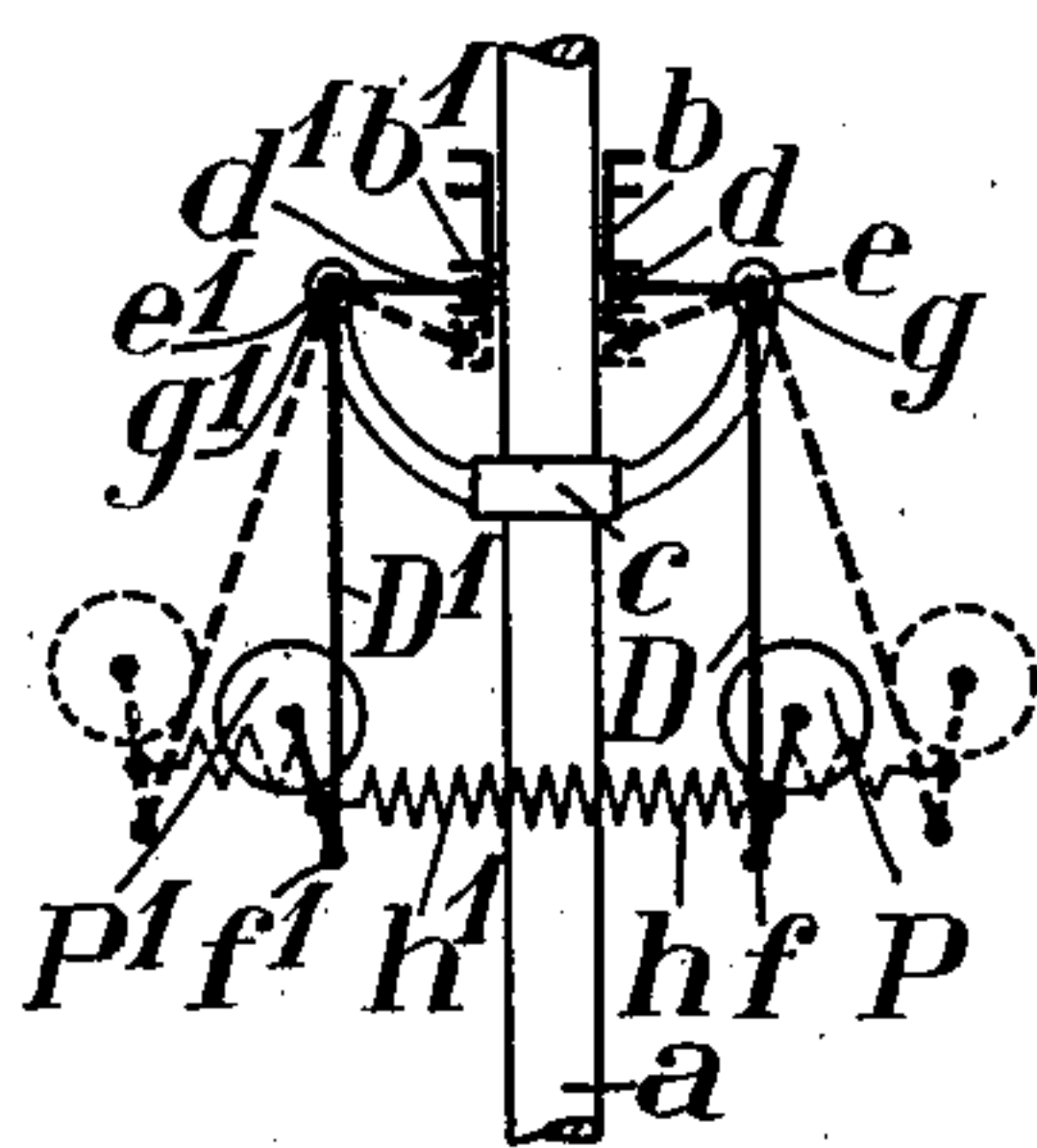


Fig. 2.

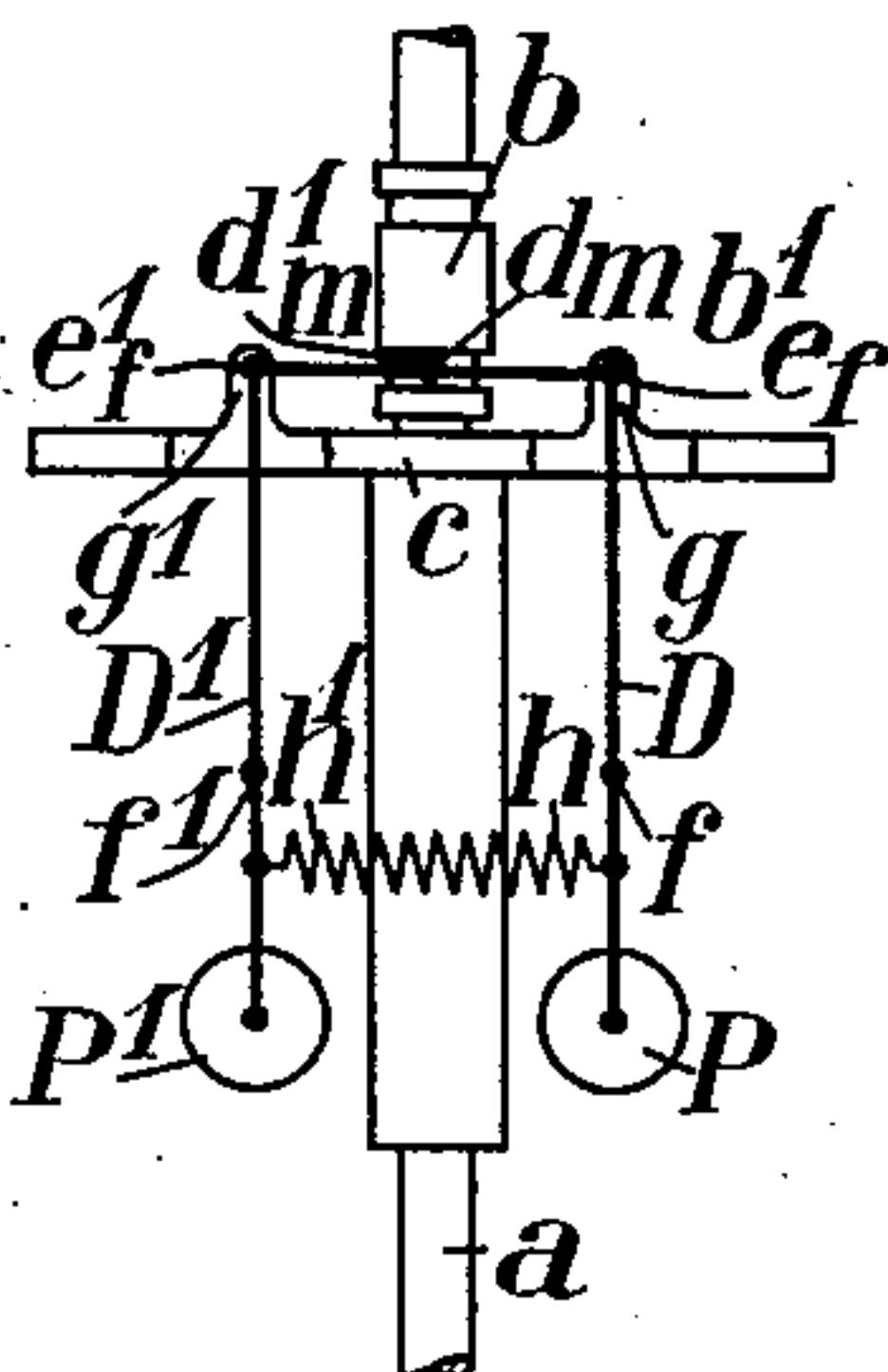


Fig. 3.

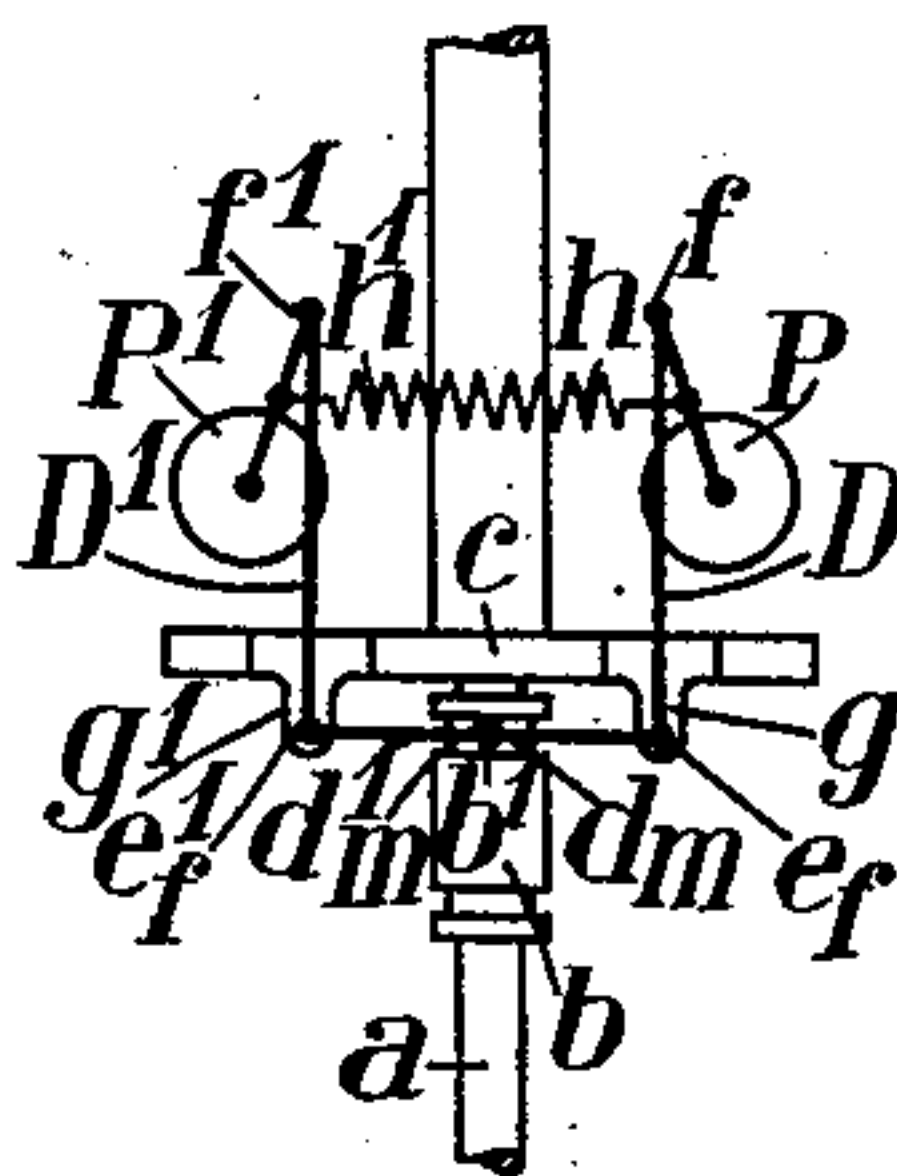


Fig. 4.

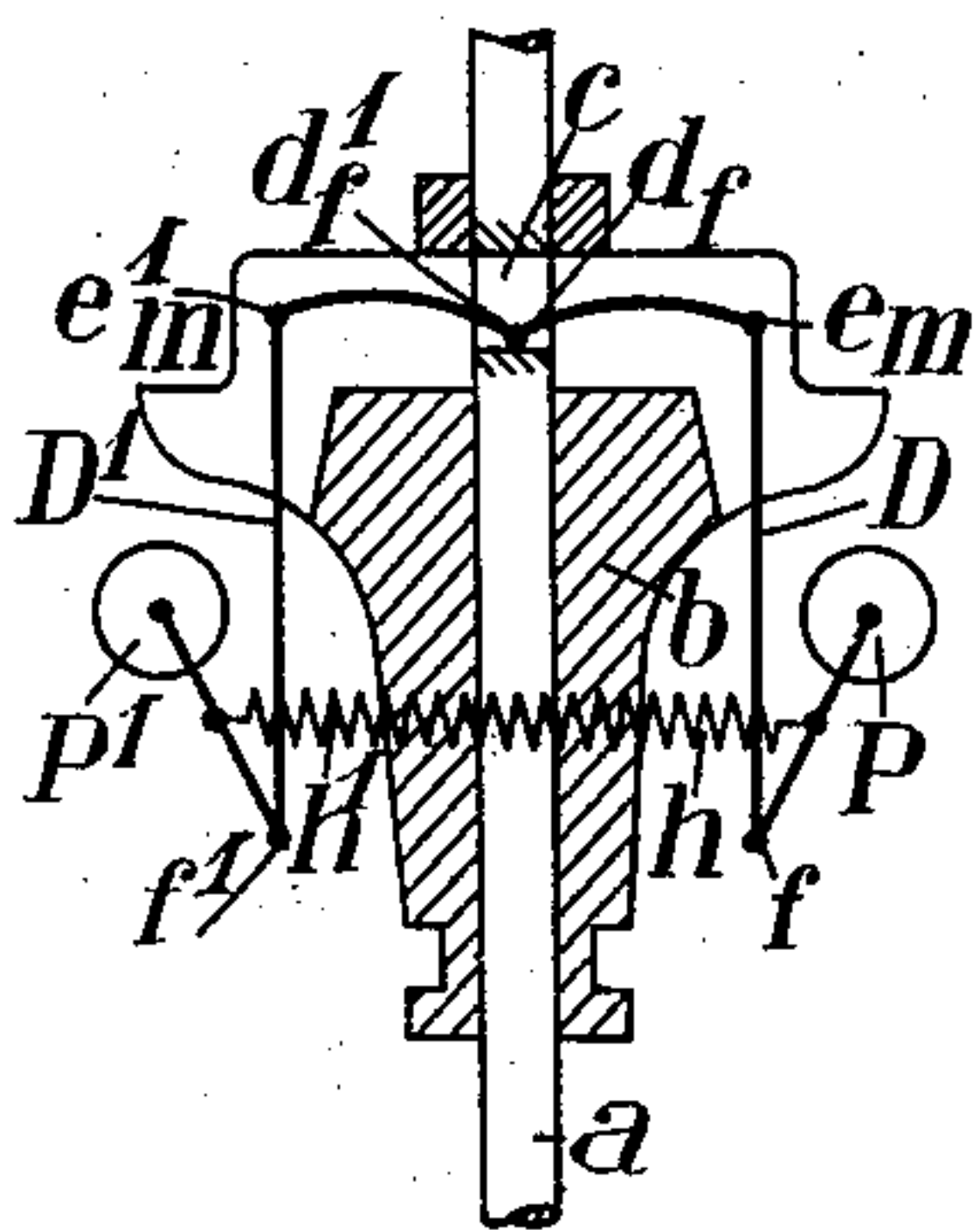


Fig. 5.

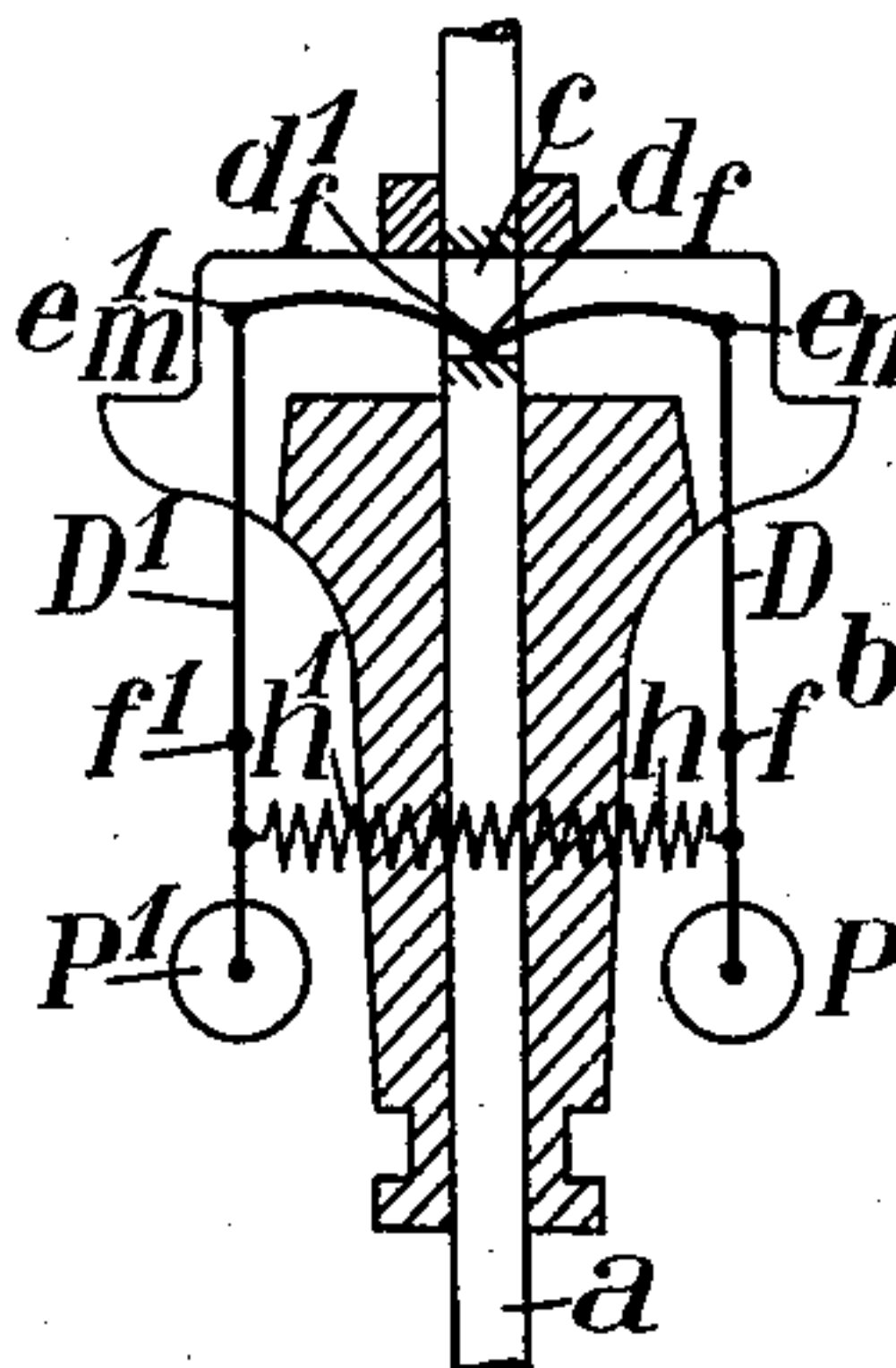


Fig. 6.

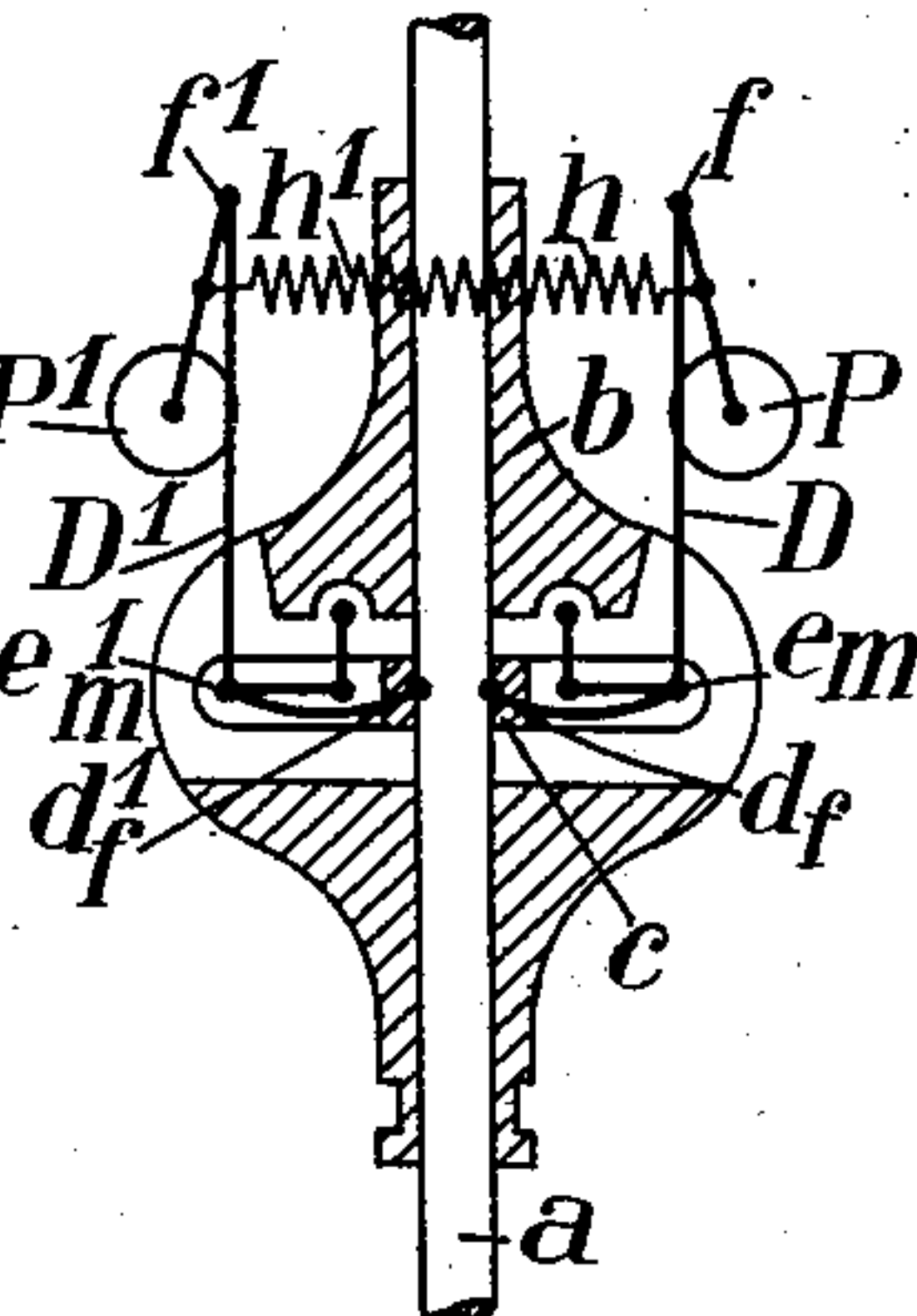


Fig. 7.

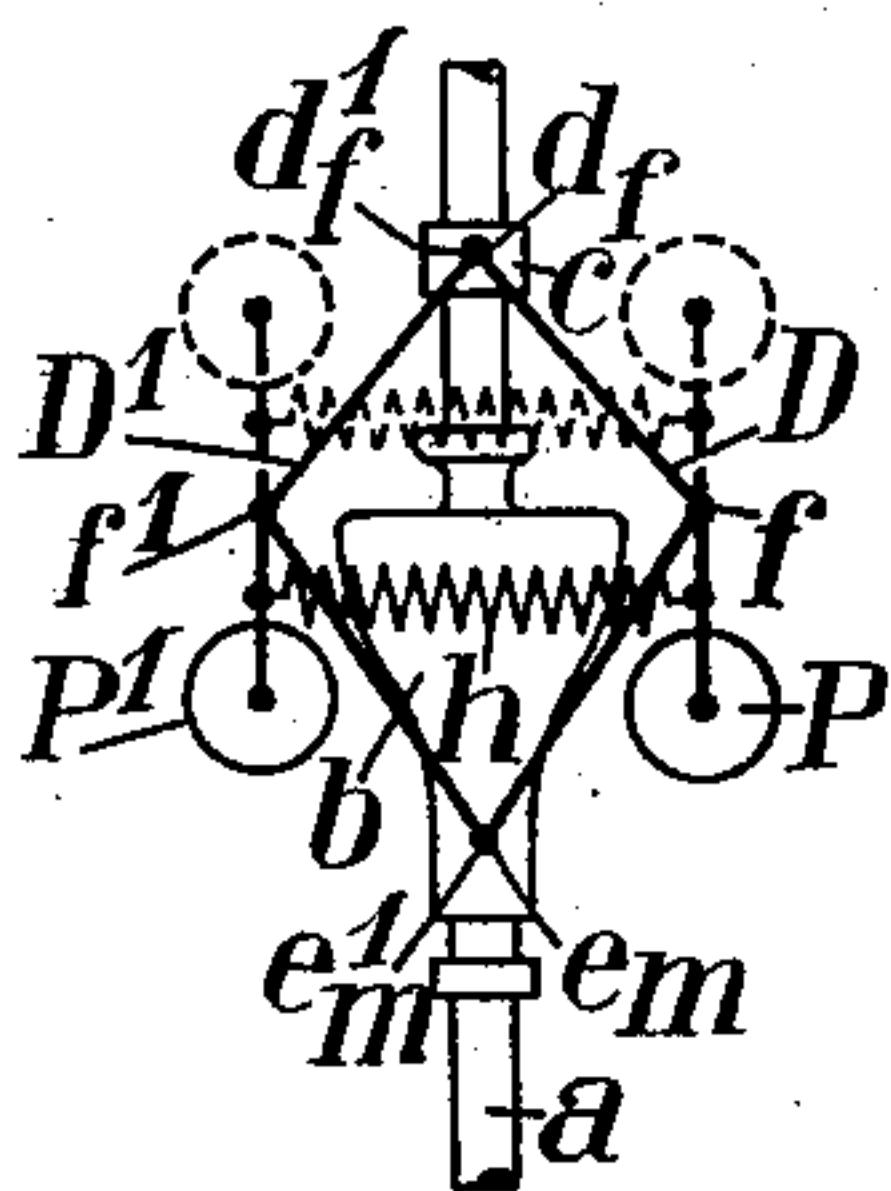


Fig. 8.

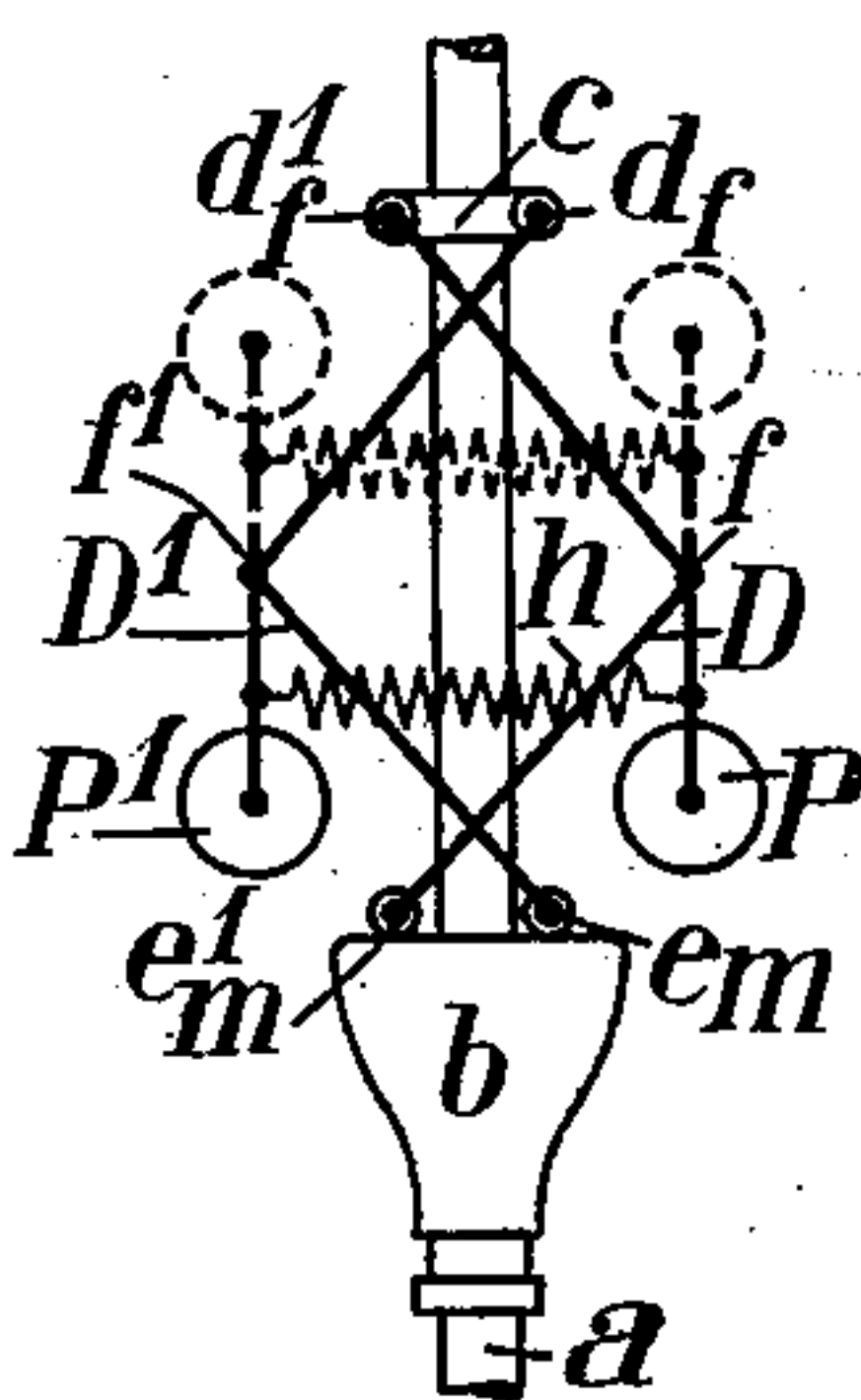
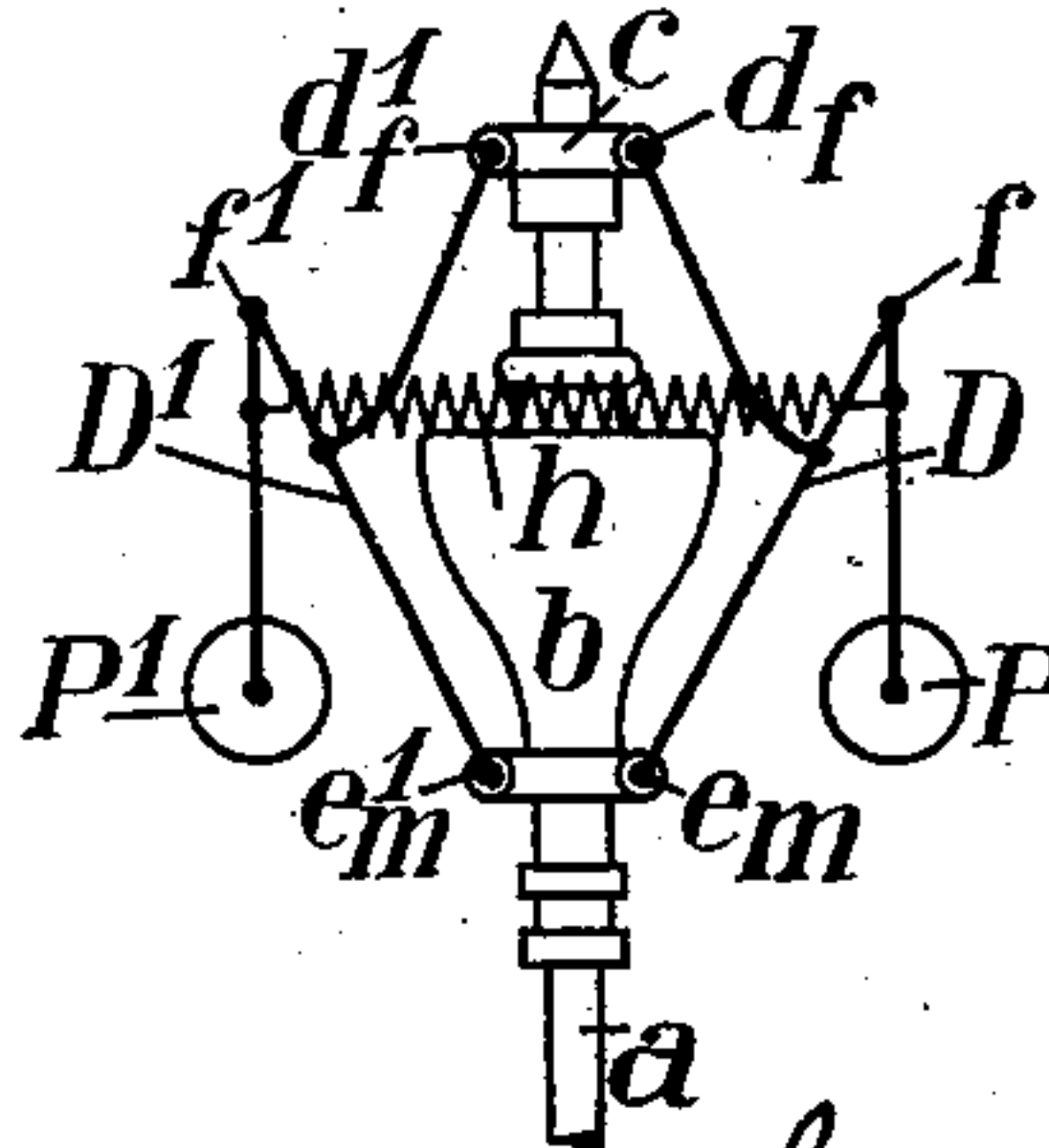


Fig. 9.



Witnesses
A. M. Gillman, Jr.
J. J. McCarthy.

Inventor
Louis Pagan
by Foster & Hummer
Attorneys

L. PAGAN.
HIGH SPEED REGULATOR.
APPLICATION FILED SEPT. 22, 1902.

NO MODEL.

2 SHEETS—SHEET 2.

Fig. 10.

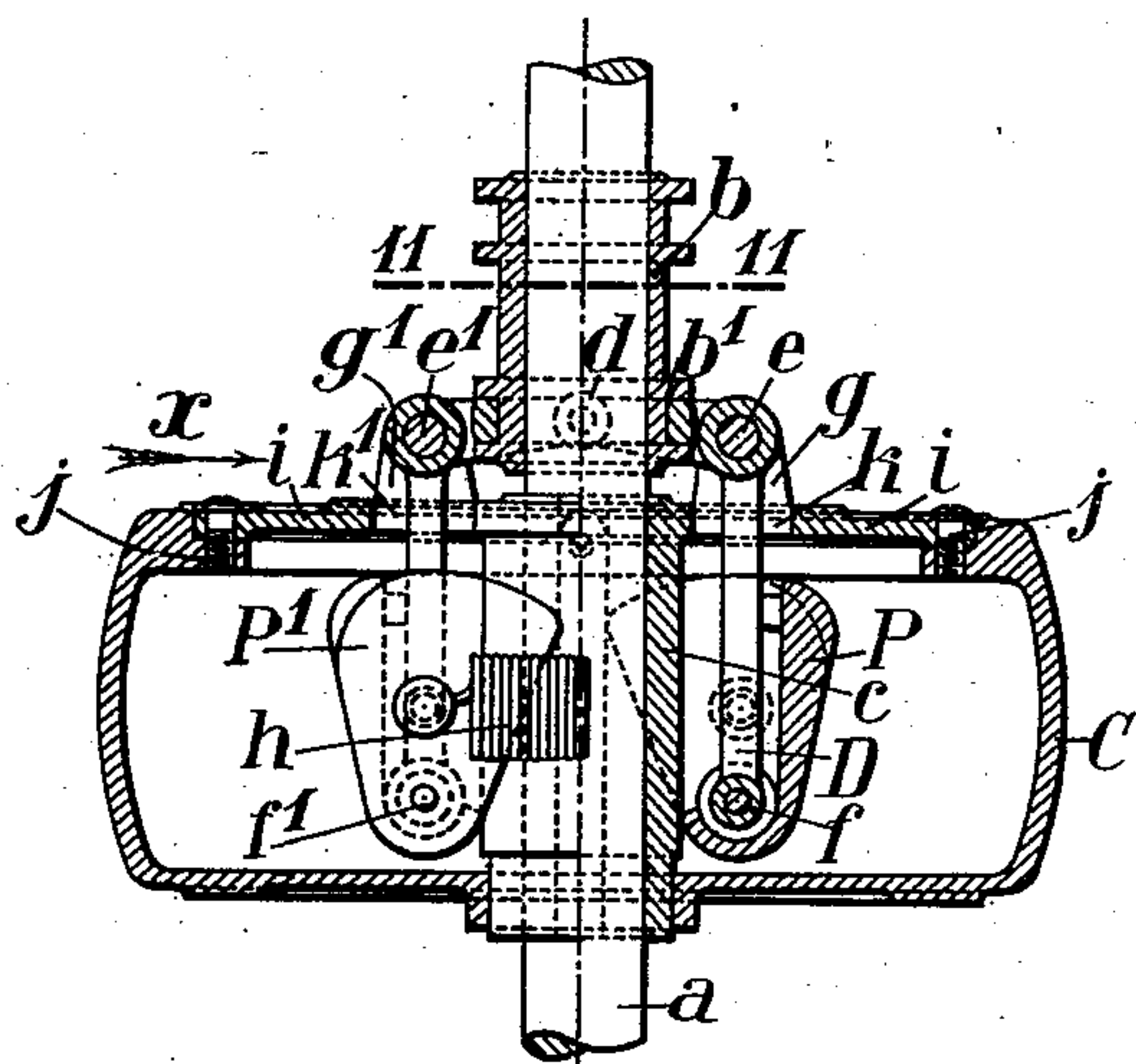


Fig. 11.

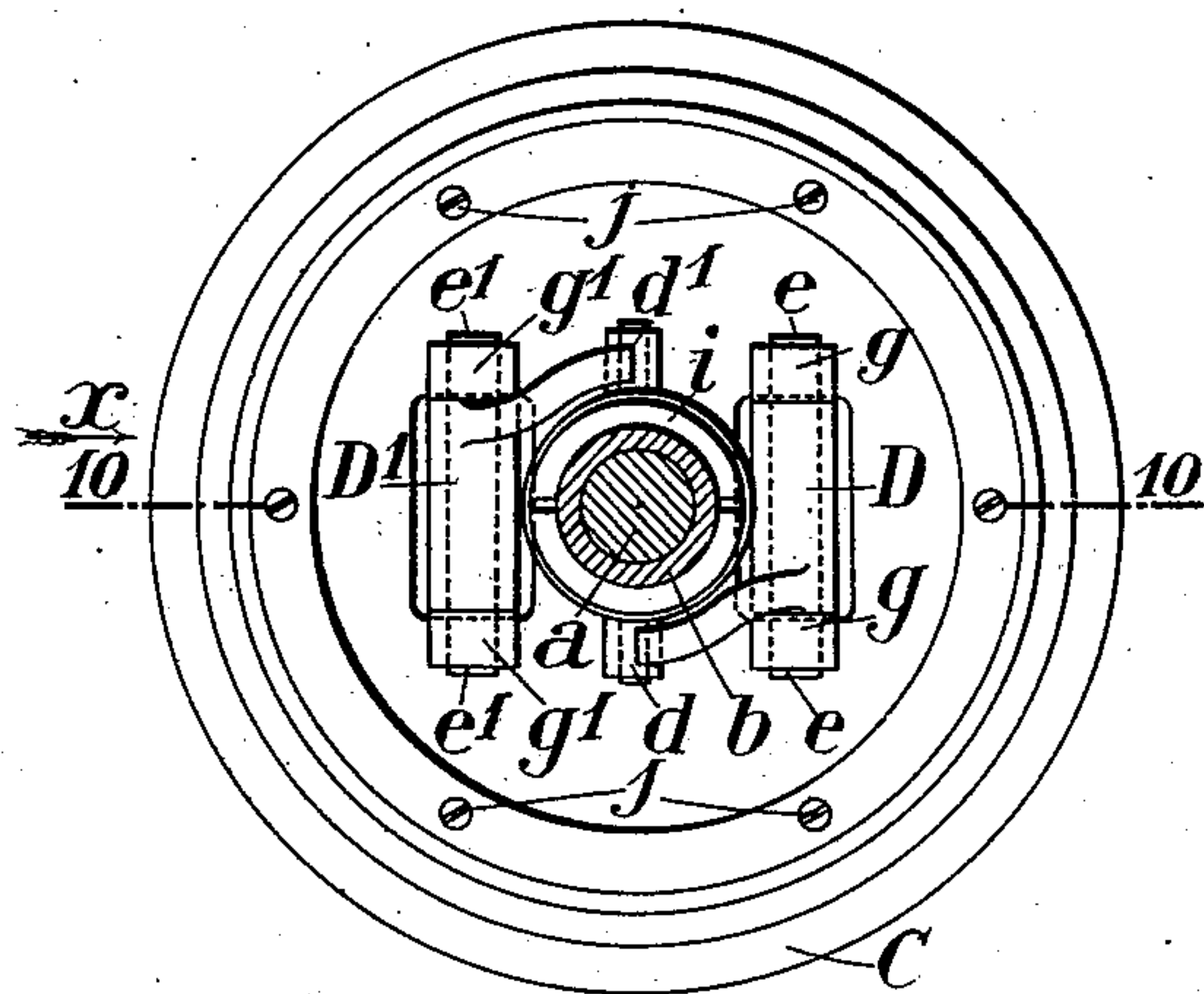
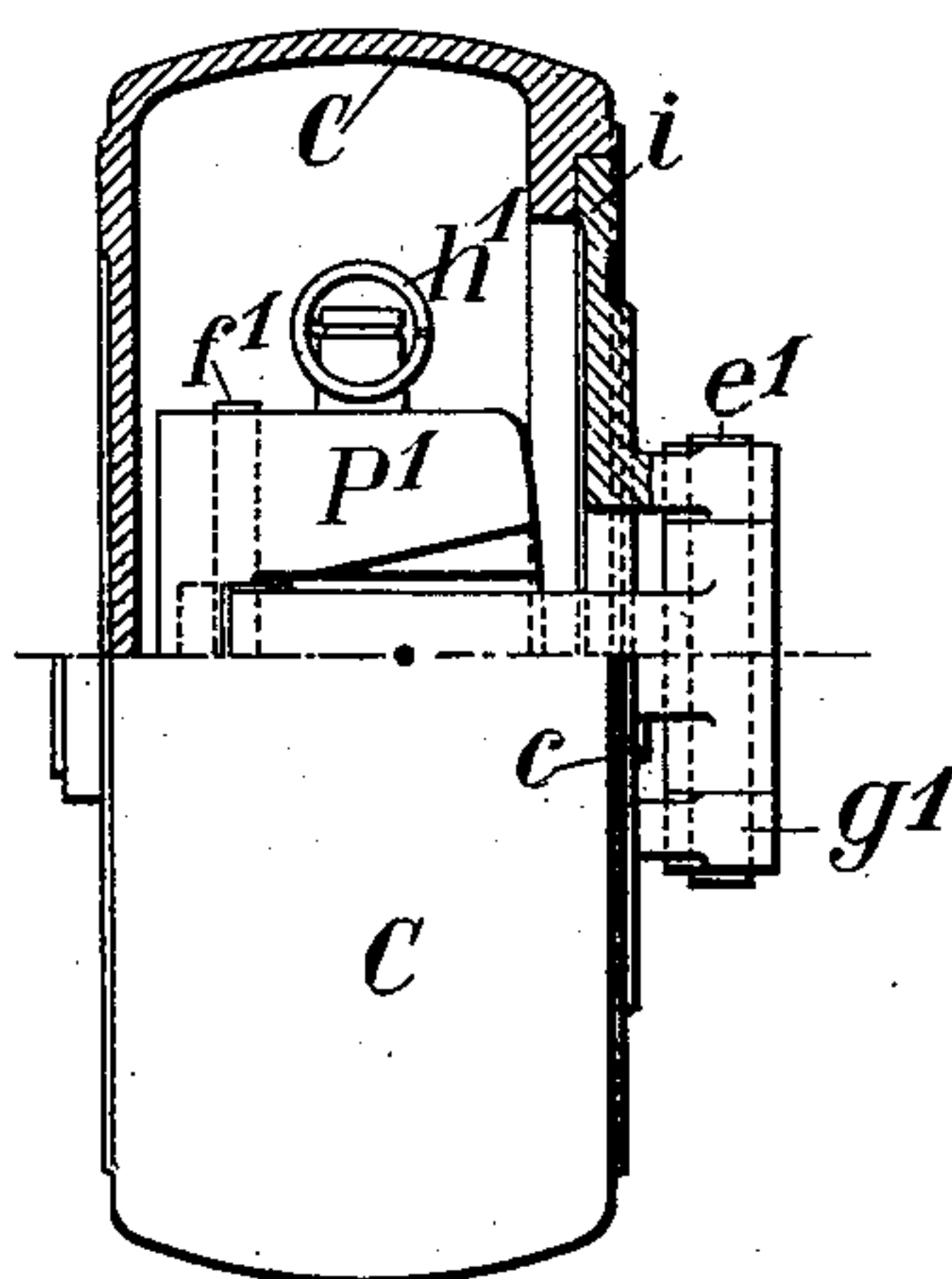


Fig. 12.



Witnesses
Wm. Gillman, Jr.
J. J. McCarthy

Inventor
Louis Pagan
by Wm. Gillman
Attorneys.

UNITED STATES PATENT OFFICE.

LOUIS PAGAN, OF MAUBEUGE, FRANCE, ASSIGNOR TO COMPAGNIE
DUPLEX, OF PARIS, FRANCE.

HIGH-SPEED REGULATOR.

SPECIFICATION forming part of Letters Patent No. 749,217, dated January 12, 1904.

Application filed September 22, 1902. Serial No. 124,467. (No model.)

To all whom it may concern:

Be it known that I, LOUIS PAGAN, a citizen of the French Republic, residing at Route de Ferrière, Maubeuge, Nord, France, have invented certain new and useful Improvements in High-Speed Regulators, of which the following is a specification.

The present invention has for its object to provide a very sensitive governor for motors of any kind, such as steam and gas engines, turbines, &c.

Centrifugal-force governors as generally constructed are all more or less sluggish—that is to say, a relatively long time elapses before the action of the governor makes itself felt starting from the moment in which is produced a variation of speed. These governors are therefore not very sensitive, since relatively great changes of speed may take place before the checking influence of the governor begins to act. This is occasioned from the fact that the weights of these governors are rigidly connected with the arms of the levers which carry them and oscillate with them. Yet during an increase of speed the intensity of the action on the driven members decreases on account of the shortening of the lever-arm at the extremity of which the centrifugal force acts. These objections are overcome by the present invention, according to which instead of making the weight rigidly integral with its lever it is connected to the lever by a suitable joint, so that the said weight may swing round its point of attachment. This results in varying the effective length of the lever or the distance from the pivot to the center of gravity, increasing and decreasing the same as the speed of rotation increases and decreases, respectively.

The power of action of an ordinary governor undergoes a diminution, because the effective centrifugal lever-arm varies inversely as the speed, while in a governor made according to this invention the effect of the governor increases with the speed, because the variations of the three factors all operate in the same direction.

In the annexed drawings, Figures 1 to 9 represent in diagram some modifications of

the new governor, and Figs. 10, 11, and 12 represent a practical form of governor of the type of Fig. 1. Fig. 10 is an elevation in section on the line 10 10 of Fig. 11, except the internal members of the left half of the figure, which are in face view. Fig. 11 is a plan, the sleeve of the governor being in section on the line 11 11 of Fig. 10; and Fig. 12 is a view of the apparatus in the direction of the arrow x of Figs. 10 and 11, part of the casing being broken away to show the interior.

According to Fig. 1 a designates the governor-shaft, on which slides the movable sleeve b , the ascending and descending movements of which control the motor. A support c , fixed on the shaft a , carries levers $D D'$ of the governor in such a way that these levers may oscillate round their axes e or e' , mounted in the bearings $g g'$ of the support c . The extremity d or d' of the lever D or D' engages the neck b' of the sleeve b . The extremity f or f' of the lever D or D' carries a weight P or P' , mounted in such a way as to be able to oscillate round its point of attachment or pivotal connection f or f' , and this is the only positive connection of the weight. The weights P and P' are connected at points removed from their pivotal connections by two springs $h h'$, tending to bring the weights toward the axis, while the centrifugal force tends to push them apart. Other suitable retracting means than springs $h h'$ may be provided.

The operation of this arrangement is as follows: Let us suppose the governor is going at such a speed that the sleeve b , the levers $D D'$, and the weights $P P'$ occupy the positions indicated by the full lines. When the speed increases, the weights $P P'$ under the action of centrifugal force oscillate round their points of attachment $f f'$, pushing away from the axis and stretching the springs $h h'$, and at the same time the levers $D D'$ oscillate round the points $e e'$, and the weights, the springs, the levers, and the sleeve b will take, for example, the positions indicated by the dotted lines. When the speed diminishes, the system will tend to return to its original position and will even pass that position if the diminution of speed is great enough.

It will be noticed in Fig. 1 that the weight P is in a position of unstable equilibrium on its fulcrum. It will also be noticed that the position of the spring h varies with relation to the point of suspension f of the weight and that in such a way as to increase the sensitiveness of the apparatus, for the farther the weight goes from the axis the more sensitive the relation between the centrifugal force and the tension of the spring becomes, because the equilibrium of the weight becomes more and more unstable with relation to the spring. If the arm of the lever with which the weight acts to overcome the spring diminishes, the lever-arm with which the spring resists diminishes also, but the resistance of the spring increases faster than the centrifugal force of the weight. In explosion-motors, as in steam-engines, this property of my governor is important, for it becomes sensitive even to the variations of speed during a single revolution of the engine. According as the motor has a tendency to exceed or fall short of its normal speed the influence of the spring or that of the centrifugal force will be seen to predominate.

The position of the weight P with relation to the fulcrum e may be varied. The weight P may be above or below the point e . The mode of attaching the sleeve b may be varied also, for the point d may be fixed and the point e movable parallel to the axis, or, inversely, e may be fixed and d movable.

The construction of Figs. 1 to 9 show different arrangements capable of being employed most generally. These constructions show the different positions which can be given to the weights. When the point e is fixed, it is marked by the letter f . When it is movable, it is marked by the letter m . The notation is the same for the point d . We can in this way dispense with describing these modifications in detail. It will thus be seen from these figures that any existing governor can be provided with oscillating weights and springs according to my invention which will give a greater sensitiveness to such governors.

Referring to Figs. 10, 11, 12, the shaft a is provided with the sleeve b , capable of sliding longitudinally under the action of the governor. On this shaft is fastened by a pin or otherwise the support c , which is a sleeve provided in the upper part with a shoulder or disk i . Cast in one piece with or fixed to the disk i are two bearings $g g'$, diametrically opposed, in which are mounted the axes of oscillation $e e'$ of the levers D D', which pass through apertures $h h'$ in the disk. The disk i serves as a cover to a casing C, inclosing the regulating mechanism, which casing is fixed

to the cover by means of screws j or in any other suitable way. The extremities $d d'$ of the bent levers D D' engage the groove b' of the sleeve b at points diametrically opposite and are preferably provided with rollers to reduce friction. The other extremity f or F of each lever carries an oscillating weight P or P', placed in unstable equilibrium. The weights P and P' are connected by coiled springs $h h'$ on both sides of the axle.

Naturally the construction of the governor may vary in its details of execution without limiting the scope of the invention.

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

1. In a centrifugal governor, the combination with a lever of a weight having a single positive connection, pivotally connected to said lever and retracting means acting upon said weight at a point removed from its pivotal connection.

2. In a centrifugal governor the combination with the levers, of weights pivotally connected to said levers, each weight having a single positive connection, and retracting means acting on said weights at points removed from their pivotal connections.

3. In a centrifugal governor the combination with the levers, of weights pivotally connected to said levers, each weight having a single positive connection and springs connecting said weights.

4. In a centrifugal governor the combination with the levers, of weights pivotally connected to said levers and arranged in an unstable equilibrium, each weight having a single positive connection, and retracting means acting on said weights at points removed from their pivotal connections.

5. In a centrifugal governor the combination with the levers, of weights pivotally connected to the levers and arranged in unstable equilibrium, each weight having a single positive connection and a spring connecting said weights.

6. In a centrifugal governor the combination with a governor-shaft, of a casing mounted on the shaft, a pair of levers pivotally connected to the casing, weights pivotally connected to said levers, each weight having a single positive connection and a spring connecting the weights.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LOUIS PAGAN.

Witnesses:

T. E. SARASIN,
M. LANDRICUS.