

(No Model.)

P. ARMINGTON.  
STEAM ENGINE GOVERNOR.

No. 327,128.

Patented Sept. 29, 1885.

Fig. 1.

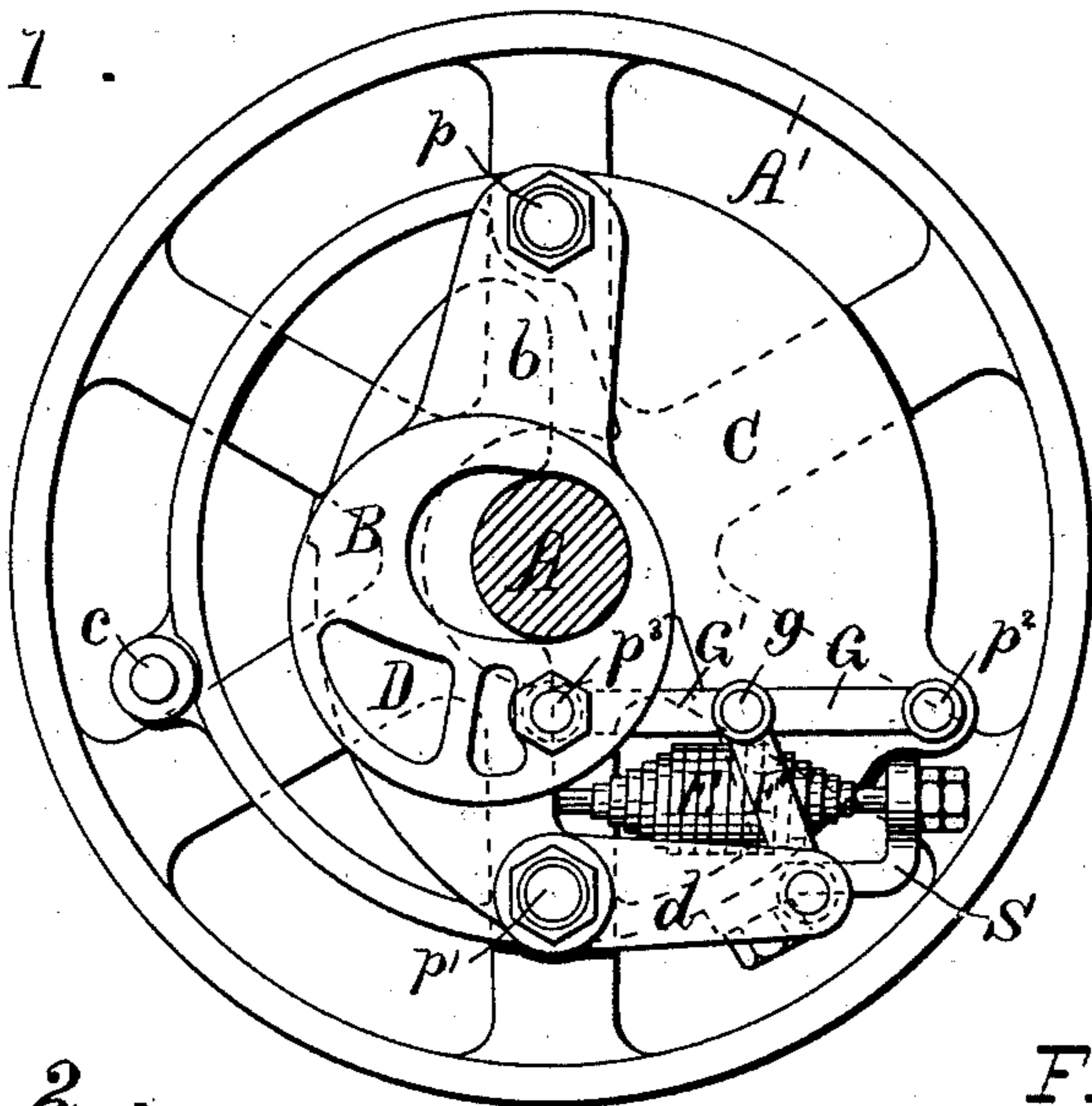


Fig. 2.

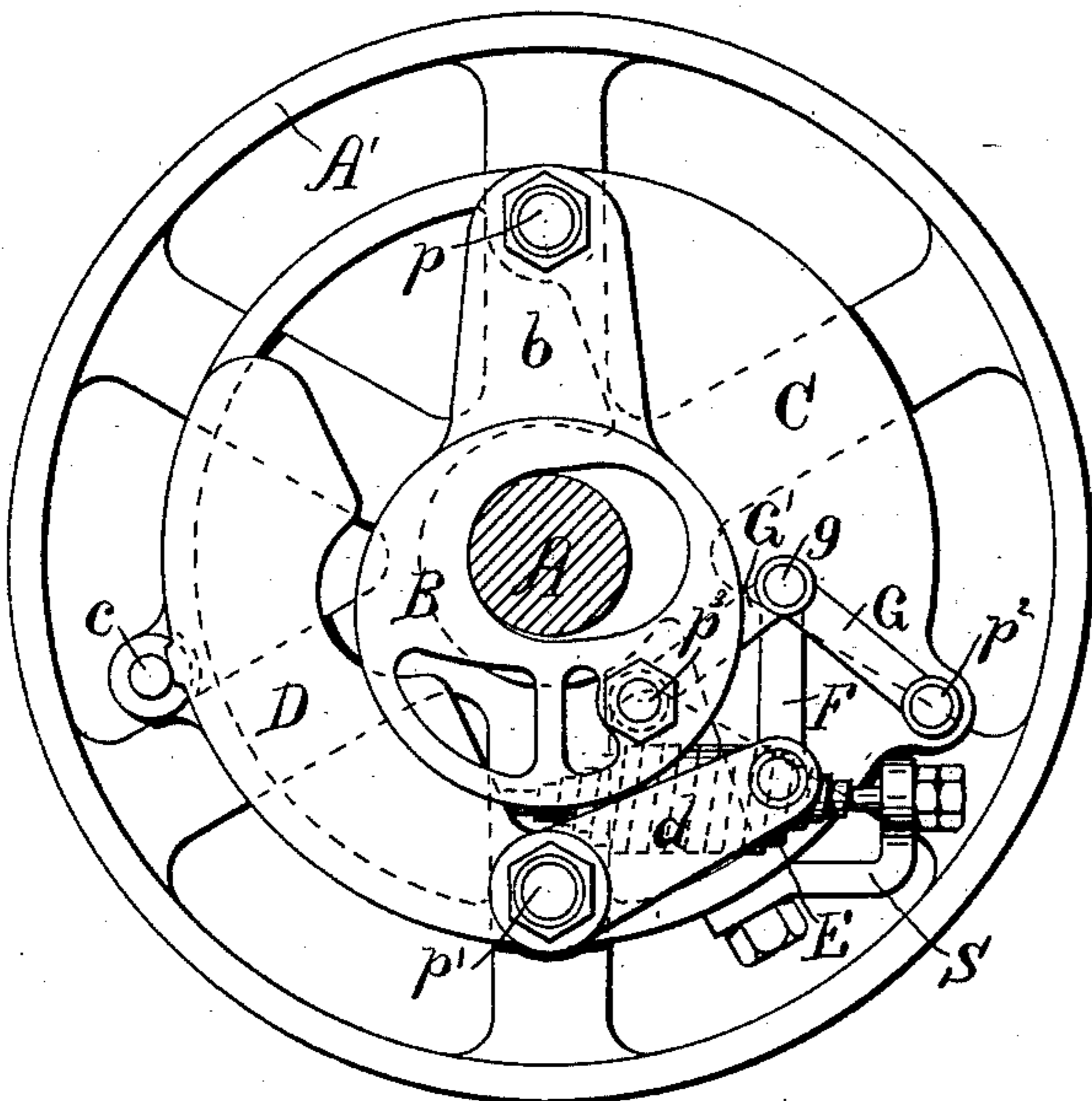
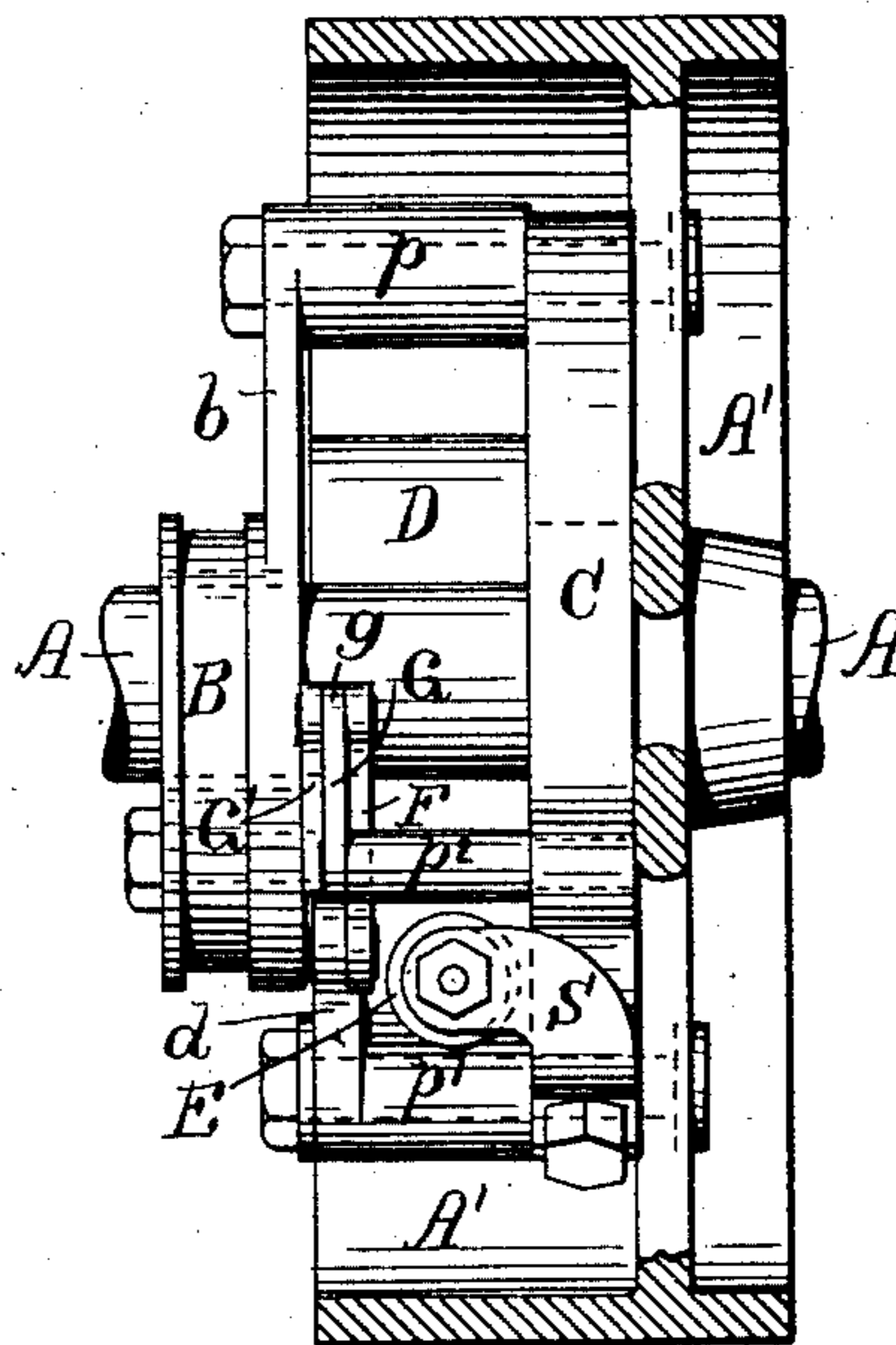


Fig. 3.



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# UNITED STATES PATENT OFFICE.

PARDON ARMINGTON, OF PROVIDENCE, RHODE ISLAND.

## STEAM-ENGINE GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 327,128, dated September 29, 1885.

Application filed January 30, 1885. (No model.)

*To all whom it may concern:*

Be it known that I, PARDON ARMINGTON, of the city and county of Providence and State of Rhode Island, have invented a new and useful Improvement in Steam-Engine Governors, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to that class of governors which are mounted upon the crank-shaft so as to revolve therewith, and which operate, under centrifugal force, to shift a movable eccentric which is connected with the slide-valve, and thereby vary the throw of the slide-valve in accordance with variations in steam-pressure and load. It is the purpose of this class of governors to maintain a uniform speed in the running of the engine; but as heretofore constructed such governors have failed to perfectly accomplish this object because the changes of the position of the eccentric to or from the center of revolution so change the center of gravity that centrifugal force forced the eccentric out of its true position, and thereby produced sudden variations in speed, which made such engines unfit for driving dynamos used in electric lighting.

The object of my invention is to produce a governor which shall be simple and durable in construction, and which shall preserve the equilibrium of the mass, in whatever position the eccentric may be, and also be locked in the position of the largest throw of the eccentric when the engine is taking the most steam and doing its full work, so as to prevent the sudden changes in the speed of the engine, to which engines provided with governors of this class were liable.

To the above purpose my invention consists in the provision of a governor in which the shiftable eccentric is balanced by a centrifugally-acting weight connected with the eccentric by a toggle-jointed link-connection, the movement of which is counteracted by a spiral spring, as hereinafter more fully described.

In order that my invention may be more fully understood, I will proceed to describe it with reference to the accompanying drawings, in which—

Figure 1 is a side elevation of my improved governor, showing the relative position of

parts under a maximum condition of load. Fig. 2 is a similar view of the same showing the relative position of parts under a reversed condition of load. Fig. 3 is a sectional view of Fig. 2.

In the said drawings, A designates the crank-shaft of an engine, and B the shiftable eccentric for the same. This eccentric is to be connected by connecting rod or rods with the stem of a slide-valve, so as to throw the valve, and thus control the admission and exhaust of steam into and out of the cylinder or cylinders.

A' designates the fly or balance wheel, and C designates a disk which is arranged to revolve with the shaft A. The eccentric B is pivoted upon one side of the disk C at the outer end of the arm *b* of said pitman, as is shown at *p*.

D designates a weight which is approximately L-shaped, and which is pivoted at *p'* to the same side of the disk C, at a point opposite to the pivot *p* of the pitman.

E designates a coiled spring which is connected at one end to the outer end of a standard or bracket, S, which is mounted on the periphery of the disk C. The opposite end of the spring is secured to the weight D at a point above its pivot, and said spring acts contractively to draw the weight toward the shaft A. The arm *d* of weight D is connected at its outer extremity by a link, F, to the joint *g* of a toggle-link, G G'. The outer end of the member G is pivoted at *p<sup>2</sup>* to the side of disk C, while the corresponding end of the member G' is pivoted at *p<sup>3</sup>* to the eccentric B.

*c* designates a stop which may be formed or secured upon the disk C, so as to limit the outward movement of the weight D.

Now, supposing the parts to be in the position illustrated in Fig. 1, as the engine increases in speed the weight D will be thrown by centrifugal action outward toward the stud *e*, and will thus act against the spring E. At the same time the arm *d* of the weight will break the joint of the double link G G', and thus draw the eccentric toward the position illustrated in Fig. 2, and away from that illustrated in Fig. 1. This movement of the eccentric is made by the action of the weight in preponderance over the weight of the

eccentric and over the power of the spring. When the weight of the weight D and eccentric B are properly proportioned to each other and to the power of spring E, there will be a perfect condition of equilibrium between these parts, which can only be overcome by the centrifugal action of the weight. Thus the governor, as a whole, will possess exactly the proper amount of sensitiveness, neither more nor less; and the perfect condition of equilibrium existing between the parts will prevent any irregular action of the eccentric under the effect of gravity, and the conditions of steam admission and exhaust will be so quickly and perfectly varied in accordance with variations in load and steam-pressure, that the engine will run perfectly smooth and with uniform speed. Moreover, as the changes in the relative positions of parts will occur steadily, and, comparatively, gradually, the governor will possess great stability and little wear will result in its use.

It will be observed that when the engine is doing the maximum amount of work and the parts of the governor occupy the position shown in Fig. 1, the toggle-link G G' will be in a locked position, and that the weight D will be nearest to the shaft while the center of the eccentric will be farthest from the shaft. Now, their relative weight is so proportioned that the center of gravity of the mass will, in all positions, be in the center of the crank-shaft.

It will also be seen that by the peculiar man-

ner of connecting the eccentric with the disk by the toggle-link, the eccentric cannot change its position until, by an increase of speed of the engine, the weight B moves outward and breaks the joint of the toggle-link.

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

1. In a centrifugal governor, the combination of the pivoted eccentric B, the pivoted weight D, having the arm *d*, the arm F, the toggle-link G G', connected at one end to the eccentric, and united at its joint to arm F, and the spring E, connected at one end to the weight D, substantially as described.

2. The combination, with the shaft A, carrying the disk C, of the eccentric B, pivoted to said disk by its arm *b*, the weight D, having the arm *d*, and pivoted to said disk, the spring E, secured to the weight and to the standard S, and the links F G G', as specified.

3. The combination, with the shaft A, the disk C, having the stop *c*, the eccentric B, having arm *b*, and pivoted at *p* to the disk, of the weight D, having the arm *d*, and pivoted at *p'* to said disk, the spring E, connected to the weight and to the standard S, the links G G', pivoted at *p*<sup>2</sup> *p*<sup>3</sup>, and the link F, pivoted to the arm *d* and to the joint *g*, as shown and described.

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Witnesses:

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