

(No Model.)

J. KELLY.

GOVERNOR FOR STEAM ENGINES.

No. 322,456.

Patented July 21, 1885.

Fig. 1.

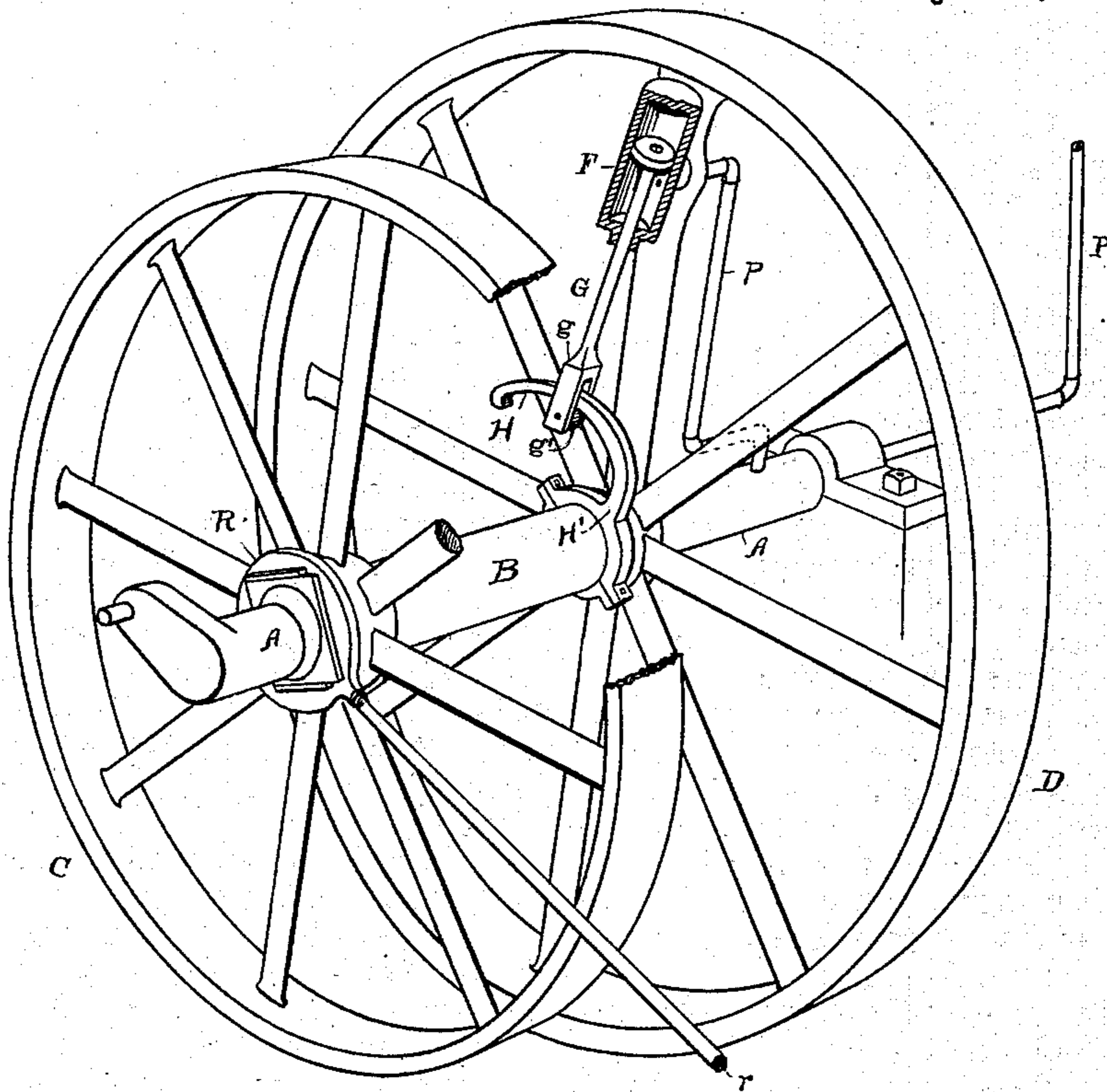


Fig. 2.

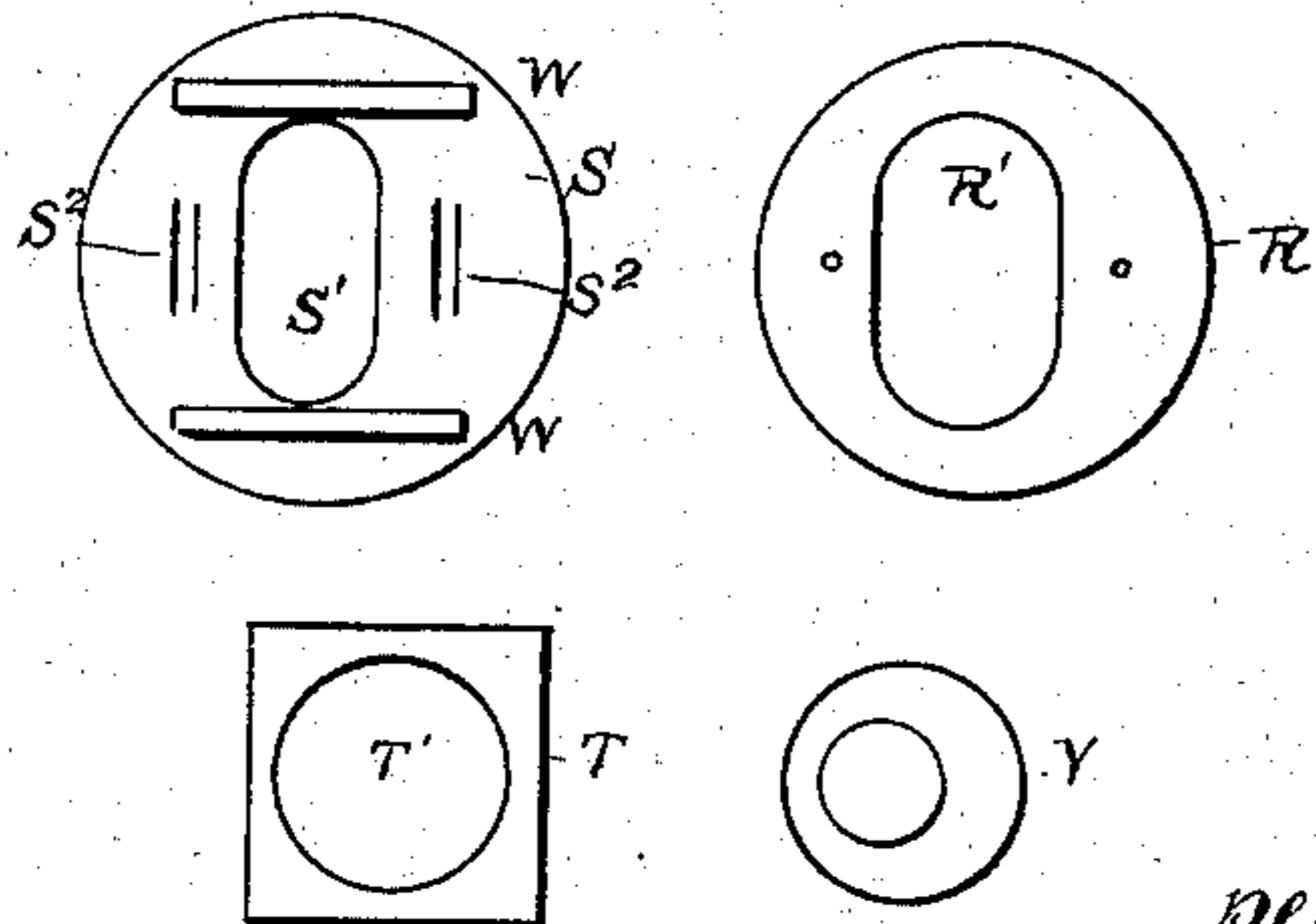
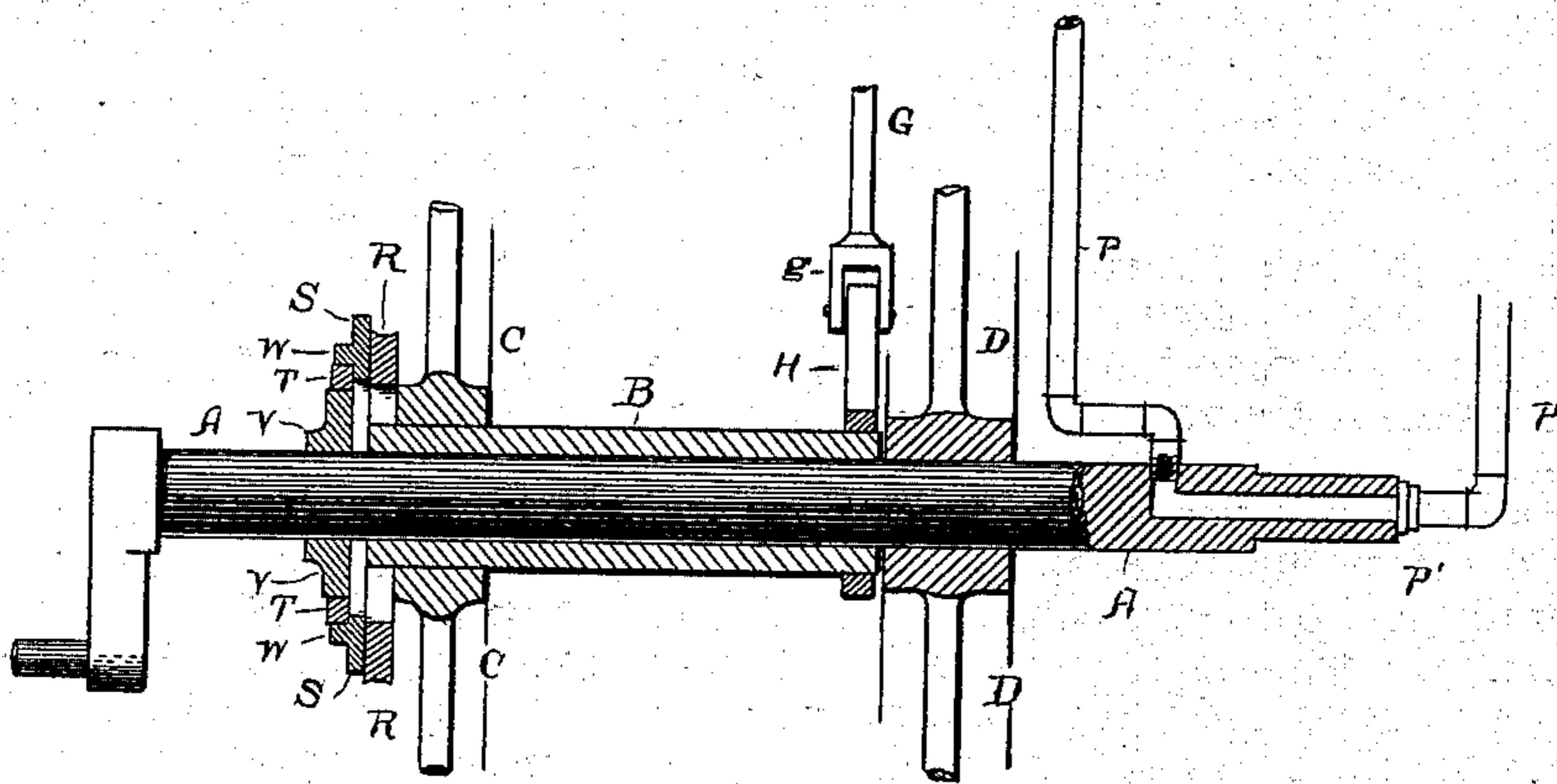


Fig. 3.

Witnesses:

May C. Upham.

1885.

Inventor

John Kelly;

per A. B. Upham,
His Attorney.

UNITED STATES PATENT OFFICE.

JOHN KELLY, OF PEORIA, ILLINOIS.

GOVERNOR FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 322,456, dated July 21, 1885.

Application filed June 9, 1884. (No model.)

To all whom it may concern:

Be it known that I, JOHN KELLY, of Peoria, in the county of Peoria, in the State of Illinois, have invented an Improved Governor for Steam or other Engines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the annexed drawings, making a part of this specification, in which like letters of reference refer to like parts, and in which—

Figure 1 represents a perspective view thereof; Fig. 2, a central longitudinal section of the same; Fig. 3, detail views of the eccentric and its shifting mechanism.

This invention is in the line of governors which act to increase or diminish the supply of steam or other vapor, gas, or fluid through variations in the resistance to the drive-wheel of the engine. In a former patent of mine in the sameline I show a sleeve mounted upon the main shaft of an engine, a drive-pulley keyed to said sleeve, a variable eccentric mounted upon said shaft, and mechanism whereby the said eccentric shall have its throw shifted by a rotative movement of said sleeve relative to the shaft, and means whereby such rotative movement shall be elastically resisted.

This invention pertains especially to an improved method of resisting said rotative movement of the sleeve to the shaft, and also to an improvement in the variable eccentric's mechanism.

My means for controlling the relative angular position of the shaft and sleeve consists, essentially, of a cylinder mounted upon one of the arms of a fly-wheel keyed to the engine's shaft, of a piston and rod in said cylinder, of a sleeve on said shaft, an arm rigidly projecting from said sleeve, whose outer end is in communication with said piston-rod, and means for supplying steam, gas, or liquid under pressure to said cylinder.

In the drawings, A is the shaft; B, the sleeve mounted thereon; C, the drive-pulley keyed to said sleeve; D, the fly-wheel keyed to the shaft A; E, the cylinder secured to an arm of said fly-wheel; G, the piston-rod of said cylinder, and H the arm projecting from the sleeve B and connected with said piston-rod. R is the eccentric having its throw ad-

justed by the relative rotation of the sleeve B and shaft A. *r* is the connecting-rod joining said eccentric to the slide-valve of the engine. The eccentric R has in it a slot, R', of a width sufficient to receive the suitably-squared end of the sleeve B, and is thereby adapted to slide transversely relatively to said sleeve and to the shaft A within, and also to revolve rigidly therewith. To the face of the eccentric R are secured the parallel bars W, between which is the block T. My new mode of securing these bars to the eccentric R consists of having them formed on a disk, S, and bolting this disk to said eccentric R. The disk S is of course slotted to make way for the shaft A, and the bolt-holes are also slotted, by which the disk and eccentric are bolted together. This slotting of the bolt-holes enables the bars W to be adjusted relatively to the eccentric R. The block T has in it a circular opening within which is the eccentric V. This eccentric V being rigidly fastened to the shaft A, any angular movement of the shaft A relative to the sleeve B causes the eccentric V, through the block T and the bars W, to impress the eccentric R to one side of the shaft more or less, and the throw of said eccentric R is changed accordingly.

To control the relative rotation of the sleeve B with its shaft A the piston-rod G may be pivoted directly to the end of the arm H. The difficulty, however, with this device is that as the resistance to the drive-pulley increases and the sleeve B partially rotates upon its shaft, the arm H approaches an angle of ninety degrees with the piston-rod G, and the cylinder F gains thereby an undue amount of resistance over the relative adjustment of said sleeve and shaft. This does not enable the eccentric to be shifted sufficiently to give a throw capable of admitting sufficient steam to the engine to overcome the resistance aforesaid to the drive-pulley, and the engine consequently slows up.

To have the supply of steam made constantly equal to doing the work of overcoming the resistance of the variable load—that is, to devise a true governor—I have made the following construction:

I should have explained before that the cyl-

inder F is swivelly connected to the arm D' of the fly-wheel D, and is furnished with a pipe, P, passing therefrom to the shaft A and out at an end thereof by a swivel-coupling, P', by which steam, vapor, or water under pressure is admitted to said cylinder F and the sleeve B controlled thereby.

The arm H, rigidly connected with the sleeve B, is not straight, but is formed as a portion of a spiral, as shown in Fig. 1. At the end of the piston-rod G is a stirrup, *g*, adapted to receive said curved arm H, and in said stirrup is a friction-wheel, *g'*, touching said arm H at its concave side. By means of this construction the pressure of the steam in the cylinder F tends to turn the sleeve B about upon the shaft A until the friction-wheel *g'* is reached by the hooked end of the arm H. This is evident when it is remembered that said end is farther from the center of the shaft A than any other portion of the arm, and that the piston-rod G is by the pressure of the steam in the cylinder F drawn from the said shaft A. As the resistance to the drive-pulley C tends to turn the sleeve B, and therefore the curved arm H, in the contrary direction to what the piston-rod G is impressing the same, a light load permits the sleeve B to be turned upon the shaft A until the end of the arm H is at the stirrup *g*, while an increased load carries the arm H backward till said stirrup is nearer its base H'.

By making the arm H of the correct curve, which only experiment can determine, the sleeve B is so controlled that the eccentric R has its throw exactly changed to admit the correct amount of steam to the engine's cylinder that shall keep the engine at a uniform velocity whatever the changes in the resistance overcome thereby.

In improving my eccentric-shifting mechanism I have constructed the same as follows: R, the eccentric, has a slot, R', which is entered by the end, suitably squared, of the sleeve B and abuts against the hub of the drive-pulley C. Against the other side of said eccentric I place a slotted disk, S, secured thereto by bolts passing through slots S² in said disk. On the outer face of this disk are secured or formed two parallel bars, W W, between which is a block, T, this block having a circular hole therein, in which fits an eccentric, V, keyed to the shaft A. Any relative rotation of the shaft A and sleeve B varies the throw of the eccentric R. By thus having the bars W on the adjustable disk S the amount of variation which the eccentric V can give to the eccentric R may be changed as found neces-

sary for the work which the engine is expected to do.

What I claim as my invention, and for which I desire Letters Patent, is as follows, to wit:

1. In a variable eccentric, the slotted eccentric R and slotted disk S, having parallel bars W, and means for adjustably securing together said disk and eccentric, in combination with the box T and eccentric V, as set forth.

2. In a governing device for engines, the shaft A, sleeve B, and curved arm H, in combination with the cylinder F, piston-rod G, having stirrup *g* and friction-wheel *g'*, fly-wheel D, keyed to said shaft and having bearings in an arm thereof for said cylinder F, and the pipe P, substantially as and for the purpose specified.

3. In a governing device for engines, the combination, with the shaft of an engine, a sleeve thereon, a cylinder having rigid connection between its bearings and said shaft, and a piston-rod in said cylinder, of means whereby said cylinder and piston-rod can control in any necessary proportion the relative angular movement of said shaft and sleeve, for the purpose set forth.

4. In a governing device for engines, a sleeve mounted upon the main shaft of the engine, in combination with a cylinder, a piston-rod therein, an arm or other means for rigidly joining the bearings of said cylinder to said shaft, means for supplying said cylinder with a motive fluid, and a connection between said piston-rod and sleeve adapted to resist the backward turning of said sleeve relative to the shaft, for the purpose specified.

5. In a governing device for engines, a sleeve mounted upon the main shaft of the engine, a drive-pulley fast on said sleeve, and a variable eccentric governing the engine's supply of motive force and adapted to have its throw changed by the relative angular displacement of said shaft and sleeve, in combination with an arm projecting rigidly from said sleeve, a cylinder whose piston is connected with said arm, means for rigidly connecting said cylinder with said shaft, and means whereby to supply said cylinder with a motive fluid, substantially as set forth.

In testimony that I claim the foregoing invention I have hereunto set my hand this 5th day of June, 1884.

JOHN KELLY.

Witnesses:

A. B. UPHAM,
H. W. WELLS.