

(No Model.)

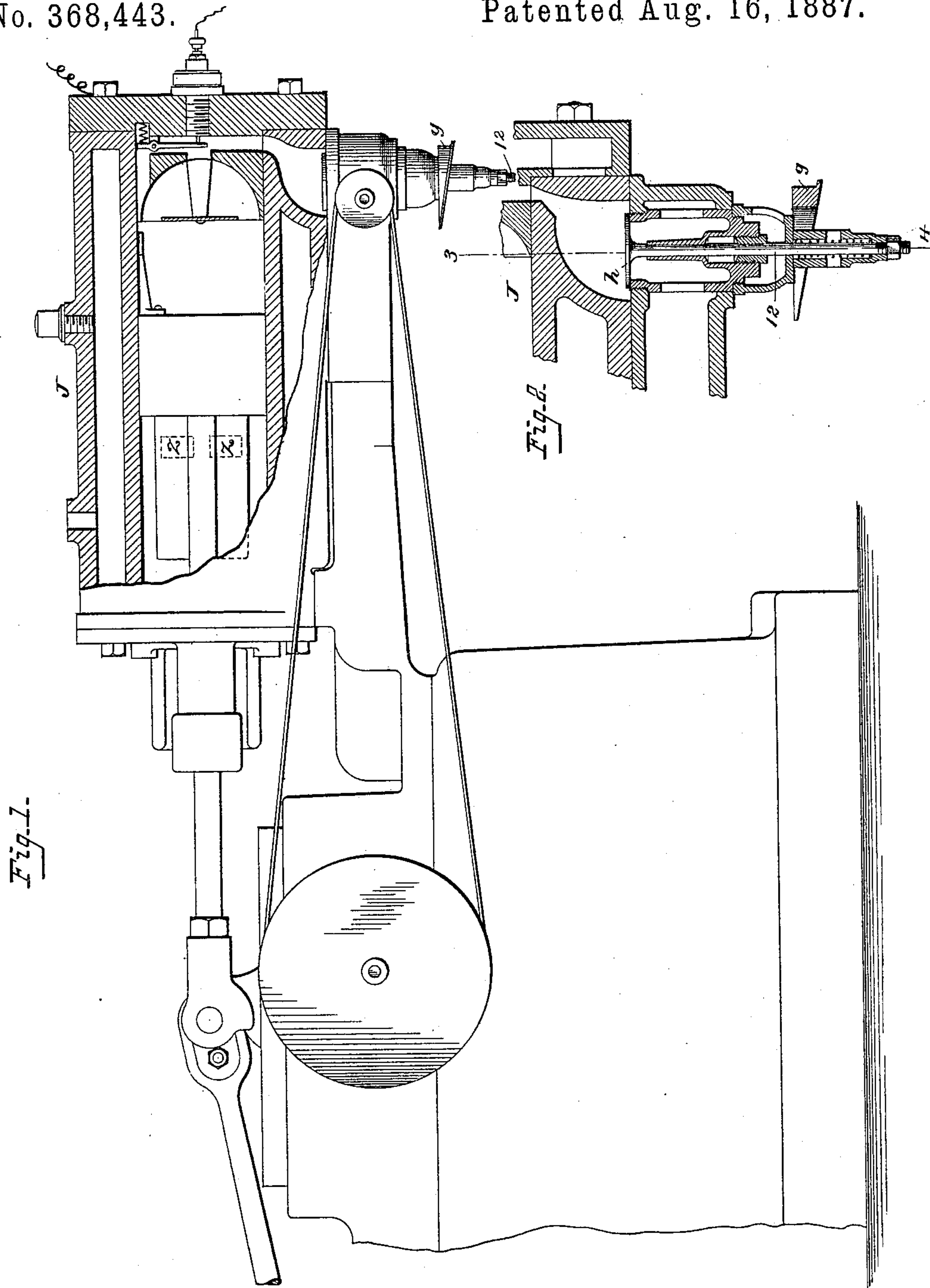
3 Sheets—Sheet 1.

C. W. BALDWIN.

SPEED REGULATING DEVICE FOR ENGINES.

No. 368,443.

Patented Aug. 16, 1887.



Attest:

Court A. Cooper.

A. C. K. Farnham.

Cyrus W. Baldwin,

Inventor:

Wm. Foster Freeman

attys.

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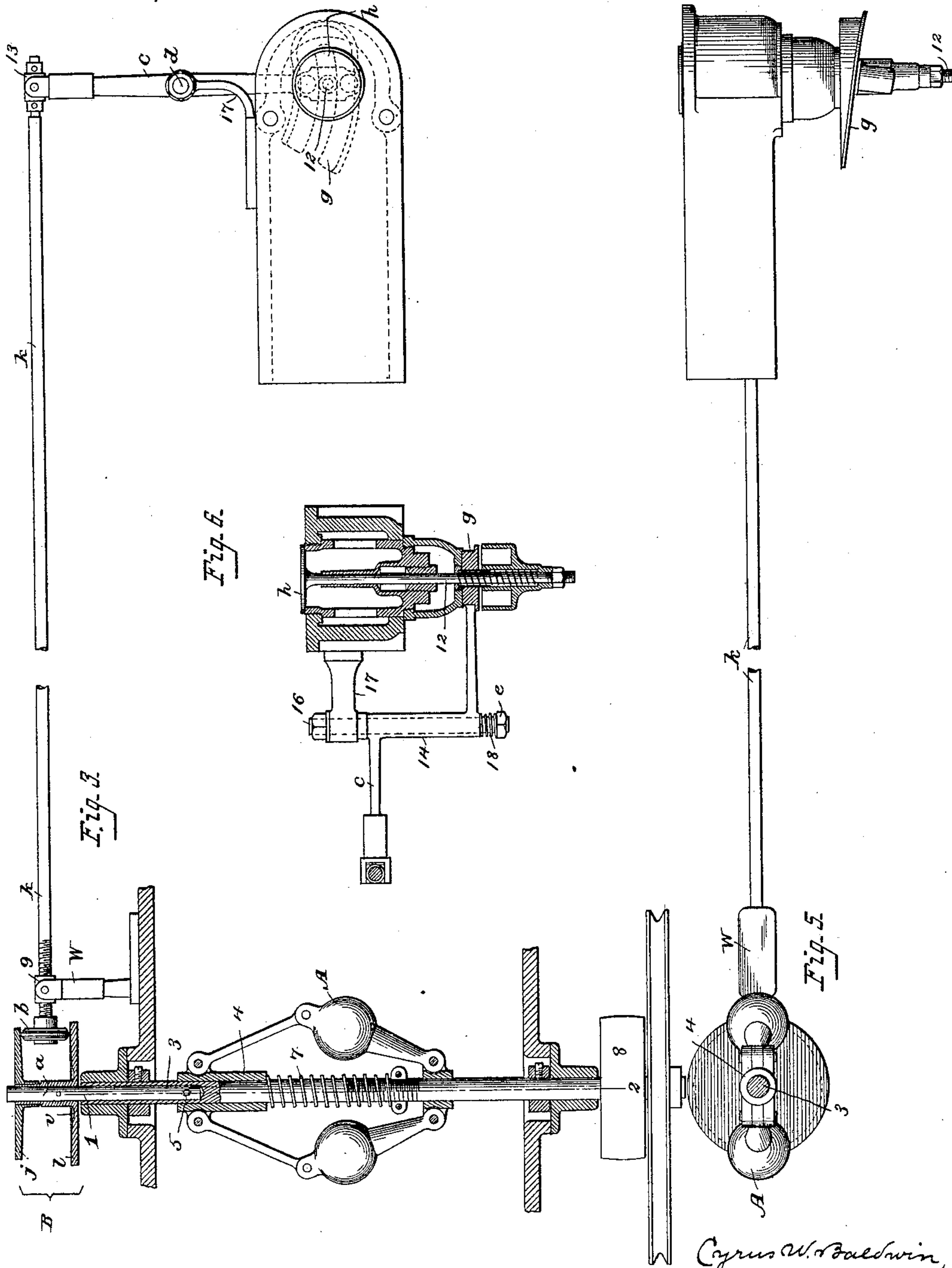
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Attest:

Count. Cooper.

A. C. S. Farnsworth.

Inventor:

Wm. Foster & Freeman  
attys.

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3 Sheets—Sheet 3.

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Fig. 7.

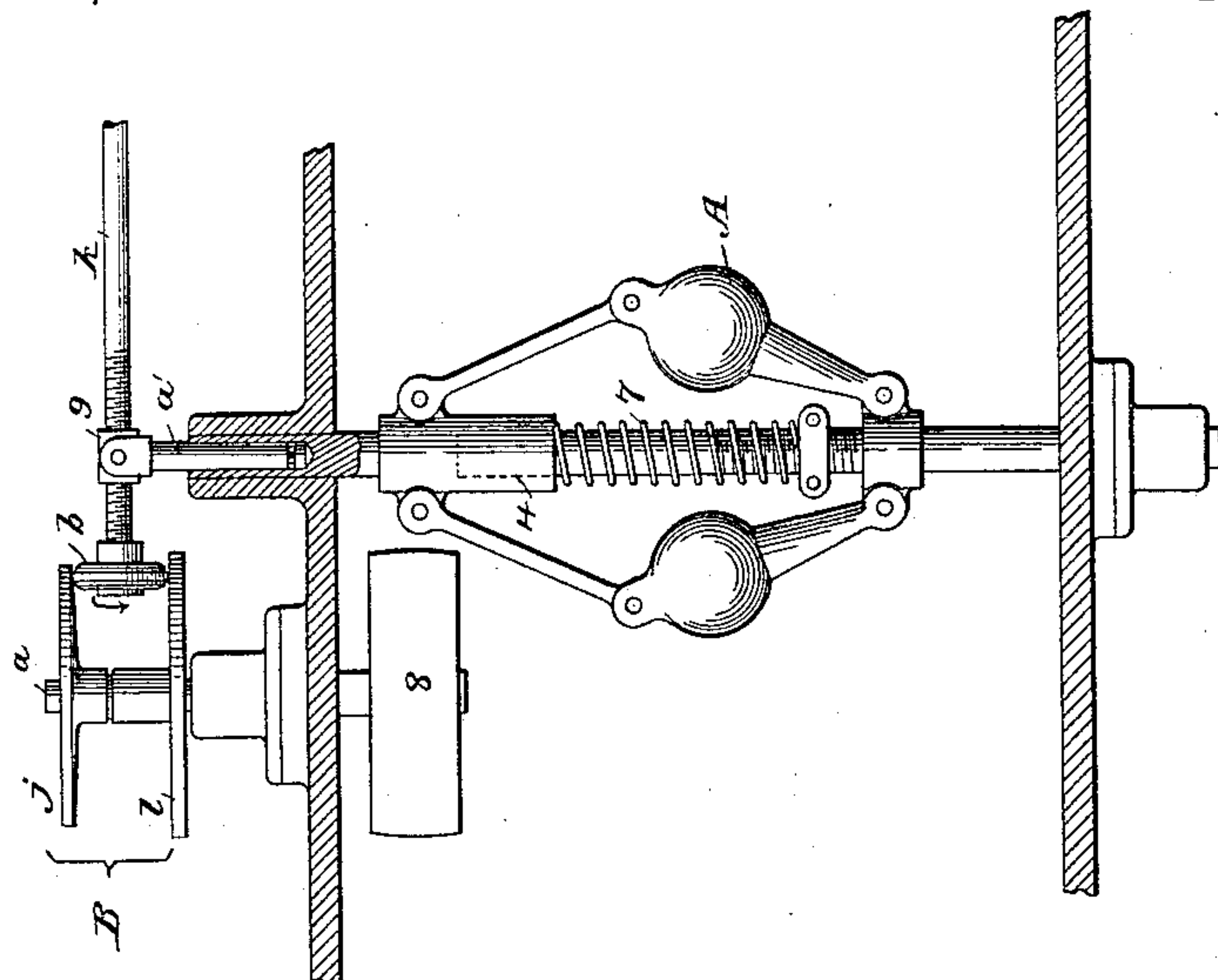
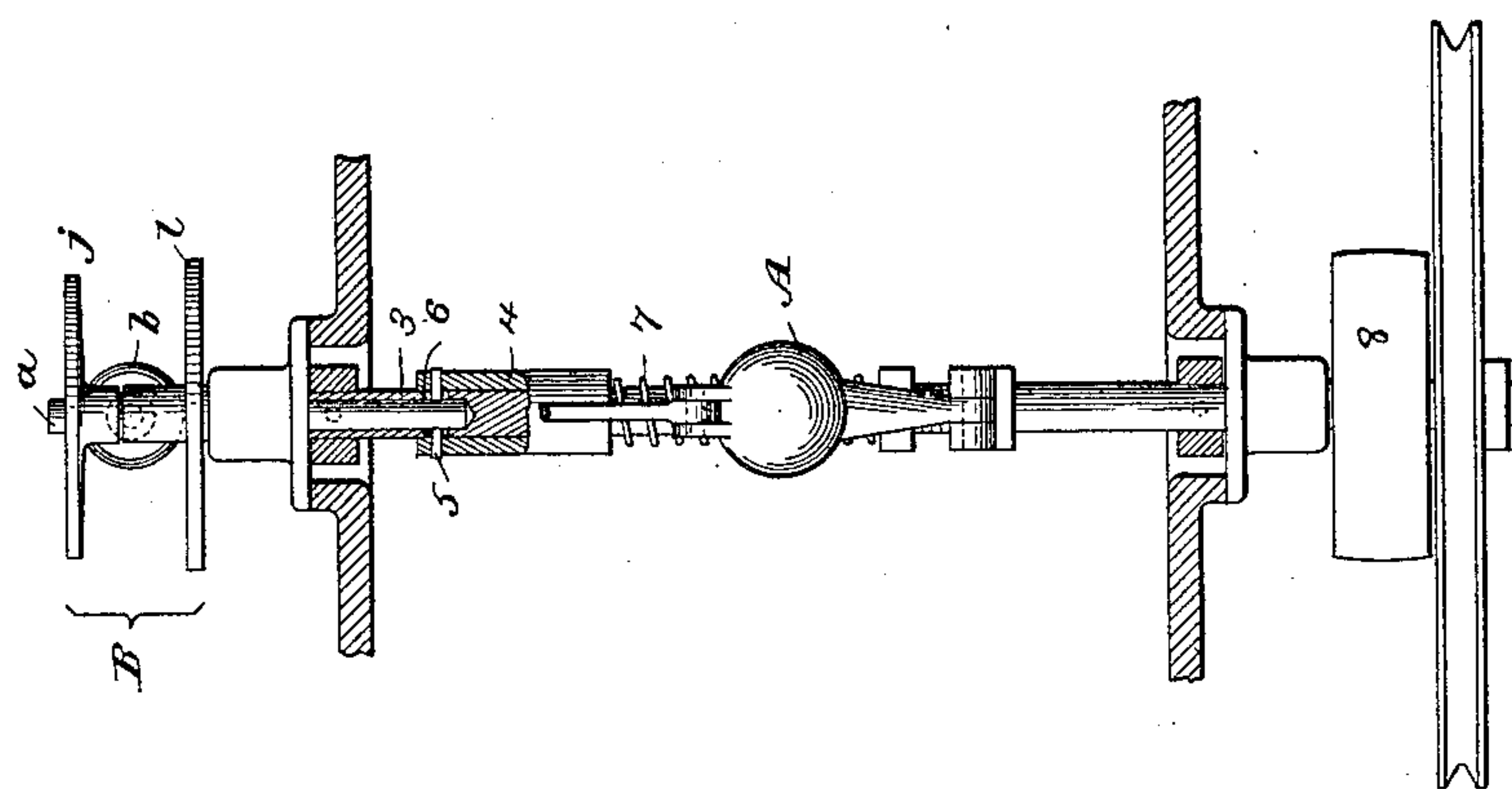


Fig. 4.



Attest:

Count. A. Cooper.

A. C. Farnham.

Cyrus W. Baldwin.

Inventor:

Wm. Foster Freeman  
attys.



# UNITED STATES PATENT OFFICE.

CYRUS W. BALDWIN, OF YONKERS, NEW YORK, ASSIGNOR TO WILLIAM E. HALE, OF CHICAGO, ILLINOIS.

## SPEED-REGULATING DEVICE FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 368,443, dated August 16, 1887.

Application filed August 19, 1886. Serial No. 211,299. (No model.)

*To all whom it may concern:*

Be it known that I, CYRUS W. BALDWIN, a citizen of the United States, residing at Yonkers, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Speed-Regulating Devices for Engines, of which the following is a specification.

My invention relates to devices for regulating the speed of engines; and it consists of two heads revolved by the engine and a disk connected to move the engine-valve or other regulating device, and a governor whereby the contact of the disk with one or other of the heads is determined by the governor, and the regulation of the engine thus effected.

In the drawings, Figure 1 is a side elevation, in part section, of sufficient of a gas-engine to illustrate the use of my speed-regulator in connection therewith. Fig. 2 is a longitudinal section of a portion of the rear end of the working-cylinder and adjacent valve-chamber. Fig. 3 is an enlarged sectional plan of the speed-regulating devices. Fig. 4 is a longitudinal section on the line 1 2, Fig. 3. Fig. 5 is a side view of the speed-regulating devices. Fig. 6 is a section on the line 3 4, Fig. 1. Fig. 7 is a view illustrating a modification.

A represents a governor, which may be a ball-governor, as shown, or of any other suitable construction. B is what I term a "spool," consisting of a sleeve provided with two parallel circular heads or flanges, *j l*, or of such flanges mounted upon a spindle, *a*, and preferably adjustable thereon.

In the construction shown the spindle *a* slides in a hollow portion of the governor-shaft 3, to which are hung the arms carrying the usual balls, connecting-rods being jointed to the balls and to the governor-sleeve 4. A transverse pin, 5, carried by the sleeve 4, passes through a longitudinal slot, 6, in the governor-shaft and through the spindle *a*, which is thus connected to move longitudinally with the sleeve.

The usual spring, 7, serves to force the sleeve outward until it is drawn in by the movement of the balls. Between the heads *j l* is arranged, upon a shaft, *k*, at right angles to the spindle, a disk, *b*, which, as shown, consists of two flat

plates, between which is clamped a disk, of rubber, leather, or other frictional material, which projects very slightly beyond the edges of the plates, so as to make a frictional rim for contact with the inner faces of the heads, and the latter are arranged at such a distance apart—slightly greater than the diameter of the disk *b*—that the disk may occupy a central position out of contact with either head; but a very slight longitudinal movement of the spindle *a* will suffice to bring one head or the other into contact with the disk.

The governor-spindle is provided with a belt-pulley, 8, receiving a belt, or is otherwise geared to be revolved by the action of the engine to be governed, and the parts are so adjusted that when the engine is operating at its proper speed the heads *j l* will both be out of contact with the disk *b*. When thus arranged, an extremely slight increase of speed, causing the balls to fly out, will move inward the sleeve 4 and at once bring the head *j* into contact with the disk *b*, and will cause the latter to be at once revolved in the direction of its arrow; and any reduction from the normal speed will carry the head *l* into contact with the disk *b* and revolve the latter in an opposite direction. These movements of the disk *b* are made the medium of altering the position of the governing-valve, shifting-bar, electrical switch, or other engine-regulator, according to the character of the engine, and the intermediate devices for communicating motion from the disk to such regulator may be varied to a great extent.

The construction shown in the drawings is adapted for use with a gas-engine, and in this case the shaft *k* is threaded at one point and there passes through a nut, 9, pivotally supported by a bracket, W, so that a longitudinal movement will be imparted to the shaft in one direction or the other, according to the direction in which it is turned, this longitudinal adjustment of the shaft altering the position of the regulator.

To prevent the disk from continuously revolving after either head has been brought into contact therewith, and until the position of the head is changed, I make the inner face of one head, *j*, convex or conical and the in-



ner face of the head *l* parallel therewith, or concave, as shown in Fig. 3. If the head *j* is brought against the edge of the disk *b*, it will be revolved until the shaft *k*, turning in its nut 9 in the direction of its arrow, moves outward sufficiently to carry the edge of the disk *b* from contact with the conical face of the head, a slight movement of the shaft effecting this result, so that the disk *b* is turned only a few revolutions sufficient to effect a slight adjustment of the regulator before it ceases its motion—the regulator therefore being altered in position only just enough to compensate for the slight increase of speed. A like result ensues when the concave head *l* is brought against the disk; but if in either case the engine continues to accelerate or decrease its motion one head or the other is continuously moved toward the disk to maintain contact therewith until the regulator is moved to the desired extent.

The head *l* is slightly larger in diameter than the head *j*, and is also provided with a recess, *v*, near its center or hub, so that if the head *l* continues in contact with the disk *b* the latter will only turn until the regulator is at the limit of its position, when the disk will pass opposite the recess *v* and will then stop. In like manner, when the disk continues in contact with the head *j*, the disk will be turned until the regulator reaches the limit of its movement in the opposite direction, when the motion of the disk will be arrested by its passing from contact with the head. By these means an extremely slight variation in the speed of the engine will at once turn the disk *b* in one direction or the other and change the position of the regulator-valve or other regulating appliance; but no further movement of the latter will ensue unless the engine continues to increase or decrease its speed.

Instead of altering the position of the spool in respect to the disk, the spool may have no longitudinal movement, and the disk *b* may swing between the heads. One means of effecting this is shown in Fig. 7, and consists in connecting the sleeve 4 to a sliding rod or spindle, *a'*, carrying the nut 9.

The regulator in the construction shown is a wedge, *g*, slotted for the passage of the spindle 12 of the lift-valve *h*, which controls the flow of the gaseous charge into the cylinder *J* of the engine, as set forth in the Letters Patent No. 325,378, issued to me September 1, 1885.

In the construction shown the wedge is carried at one end of a pivoted lever, *c*, carrying at the other end a pivoted bearing, 13, in which the end of the shaft *k* turns without sliding. The wedge is curved to correspond to the arc of a circle having the pivot *d* of the lever *c* for its center.

The lever *c* consists of a sleeve or hub, 14, from which the two arms project in opposite directions, the said sleeve turning on a pendent pintle, 16, supported by a bracket, 17, and

the lower end of the sleeve rests on a spiral spring, 18, supported by a nut, *e*, on the pintle, whereby the wedge is kept up to its upper seat to prevent noise.

It will be obvious that the revolving heads and intermediate disk may be used with many different devices for relatively adjusting them under varying speeds, as described, and that they may be employed in many different connections.

The charge is admitted to the rear end of the cylinder and is compressed on the return movement of the piston, and when exploded acts against and propels the piston. When the piston passes and uncovers the outlet-port *z*, the spent charge passes out of the exhaust. The ignition of the charge results from separating the terminal electrodes within the cylinder in a manner not necessary to be here described, as this and other features constitute the subject-matter of another application for Letters Patent, Serial No. 194,353.

I do not here claim the combination of the parts described with a gas-engine, as this will constitute the subject of a separate application for Letters Patent.

Without limiting myself to the precise construction and arrangement of parts shown, I claim—

1. A speed-regulating device consisting of two parallel revolving disks or heads driven by the engine, one larger than the other, a disk occupying a position between said heads and connected to operate the engine-valve or other regulator, and a governor whereby one or other of the heads is brought into frictional contact with said disk, according as the speed increases or decreases, substantially as set forth.

2. The combination, with the disk connected to operate the regulator, of two revolving heads on opposite sides of the disk, one greater in diameter than the other, and the latter recessed near the center, and a governor for bringing the disk and entire head into contact, according as the speed of the engine must be increased or diminished, substantially as set forth.

3. The combination of the parallel revolving heads, one with a central recess, a disk arranged between the heads, and a governor for shifting the parts according to the speed of the engine, substantially as described.

4. The combination of a threaded shaft turning in a nut and carrying a disk, heads of different diameters carried by a revolving shaft driven by the engine, and a governor whereby the contact of the disk with one or other of the heads is insured upon a change of speed, substantially as described.

5. The combination of the sliding and revolving shaft connected to the regulating device of an engine and carrying a disk, revolving heads upon opposite sides of the shaft, one convex and the other concave, and a governor and connections whereby the contact of the



disk with one or other of the heads results upon a change of speed of the engine, substantially as described.

5 6. The combination of the heads revolved by the engine, one convex and the other concave, a disk arranged between the heads, a threaded shaft carrying the disk and passing through a nut, and connections between the shaft and the engine-regulating device, substantially as described.

10 7. The combination of a shaft driven by an engine and carrying two heads with concave and curved faces, a governor for shifting the heads, a shaft carrying a disk arranged between the heads, and a nut supporting the shaft

and pivoted to its support, substantially as described.

8. The combination of the revolving heads of different diameters and disk connected to operate the engine-regulator, and provided with a frictional rim, and a governor for altering the relative positions of the disk and heads, substantially as described. 20

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses. 25

CYRUS W. BALDWIN.

Witnesses:

JOHN C. HARRIGAN,  
WILLIAM RILEY.