

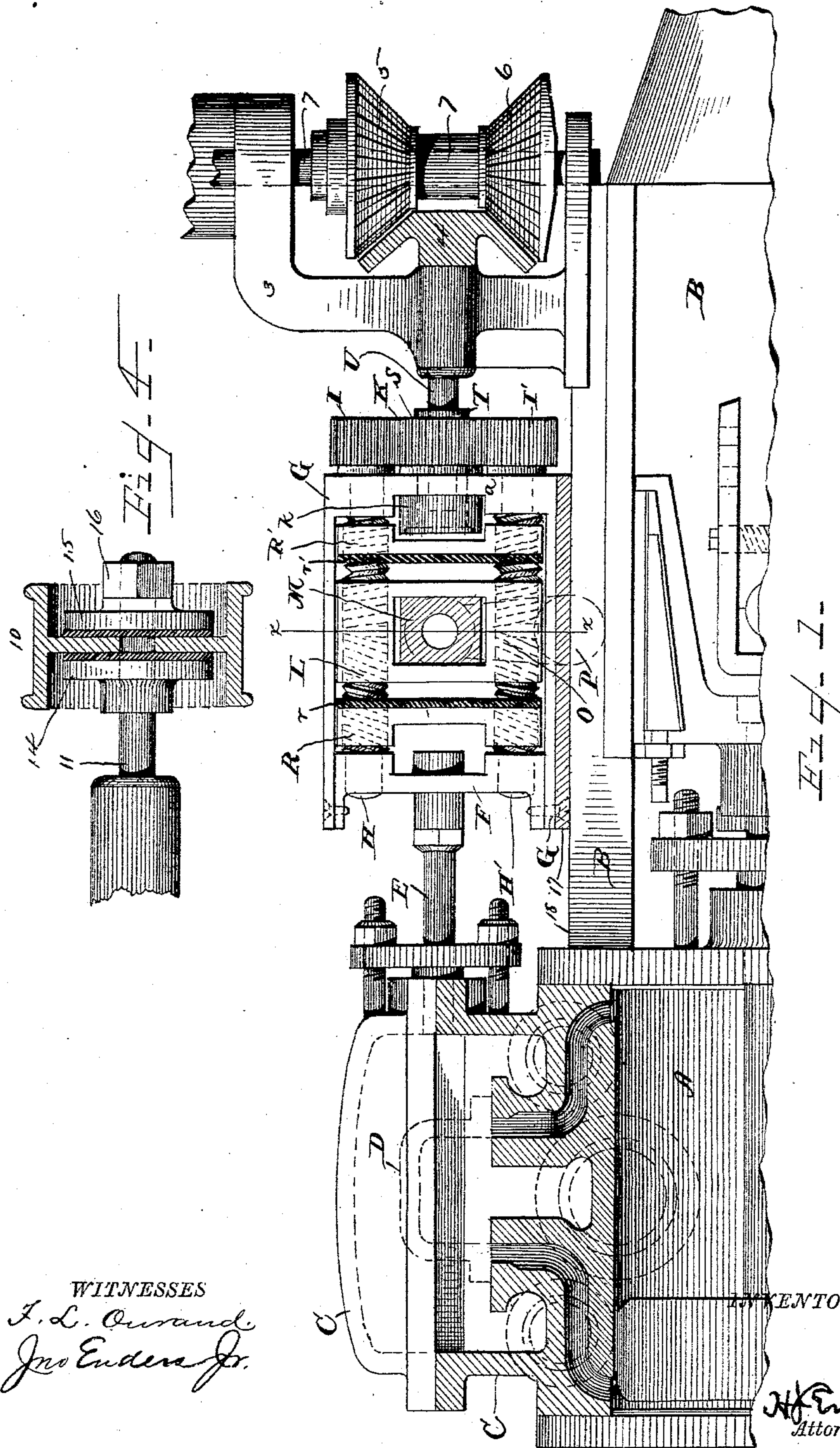
(No Model.)

2 Sheets—Sheet 1.

C. H. ROBERTS.
CUT-OFF VALVE GEAR.

No. 315,664.

Patented Apr. 14, 1885.



WITNESSES
J. L. Owsand
Jno Enders Jr.

INVENTOR

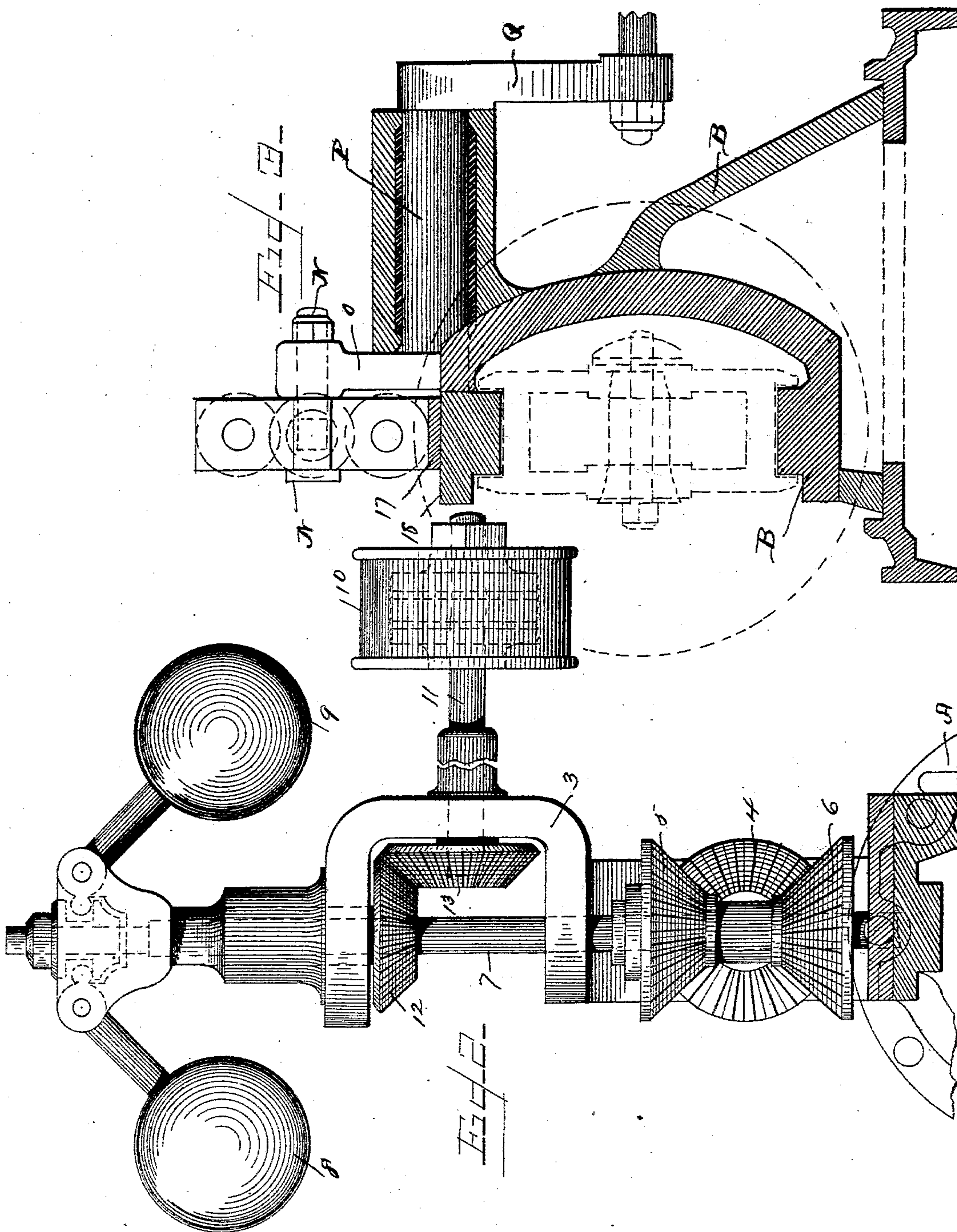
Chas. H. Roberts

H. E. Emme
Attorney

2 Sheets—Sheet 2.

No. 315,664.

Patented Apr. 14, 1885.



J. L. Oursand
Jno. Enders Jr.

INVENTOR
Chas. H. Roberts,

H. Eunis Attorney

UNITED STATES PATENT OFFICE.

CHARLES H. ROBERTS, OF WASHINGTON, INDIANA.

CUT-OFF-VALVE GEAR.

SPECIFICATION forming part of Letters Patent No. 315,664, dated April 14, 1885.

Application filed October 16, 1884. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. ROBERTS, a citizen of the United States, residing at Washington, in the county of Daviess and State of Indiana, have invented certain new and useful Improvements in Automatic Cut-Off-Valve Gears for Steam-Engines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention has relation to combined governors and automatic cut-offs for steam-engines; and its object is to provide a means for regulating the speed of the engine that shall be simple, safe, and automatic in its action; and to these ends the novelty consists in the construction, combination, and arrangement of the same, as will be hereinafter more fully described, and particularly pointed out in the claims.

In the accompanying drawings the same letters of reference indicate the same parts of the invention.

Figure 1 is a side elevation, partly in section, of my improved governor. Fig. 2 is a front elevation of the governor-balls and their connected mechanism. Fig. 3 is a transverse section on the line *x x* of Fig. 1, and Fig. 4 is a cross-section of the band-pulley for driving the governor-balls.

A is the cylinder, and B the frame, of the engine.

C is the steam-chest, and D the ordinary slide-valve, having a valve-stem, E, secured thereto in the usual manner. The outer end of said valve-stem is attached to the end bar, F, of the frame G, and journaled in this frame are two screws, H H', each having "right and left" screw-threads, and I I' are gear-wheels or pinions on the ends of said screws, which mesh with a single gear, K, having its journal *k* mounted in the forward end, *a*, of the frame G.

L is a cross-head mounted upon and sliding freely on the screws H H', and M is a journal-block sliding vertically, but having no horizontal motion, in the cross-head L.

N is the crank-pin of the crank O on the

rock-shaft P, and it is operated by the usual eccentric, (not shown,) having its rod connected to the crank Q on the opposite end of said rock-shaft.

R R' are two bars mounted upon and screw-threaded to correspond to the right and left threads on the screws H H', and it will readily be seen that if the gear-wheel K be turned one way the bars R R' will be brought closer together until they clamp the cross-head L, so that as the crossed head is given a reciprocating motion by the rock-shaft P the frame G, valve-stem, and valve will have a motion corresponding exactly to the travel of the rock-shaft crank-pin N, which is the exact throw of the eccentric or maximum travel of the valve. If, however, the bars R R' be separated more or less, which will be the case if the gear K be turned the other way from that mentioned above, there will be a certain amount of play or "lost motion" of the cross-head L between said bars, and consequently the frame G will travel less, and a correspondingly-limited motion imparted to the valve. It will thus be seen that while the cross-head L has always and under all circumstances a fixed and positive motion communicated to it from the eccentric through the medium of the rock-shaft above described, the travel of the valve, however, is governed by the position of the cross-bars R R', for if they are separated to their full extent the distance between them corresponds exactly to the full motion of the eccentric. Consequently the valve would have no motion, but would remain stationary over the valve-seat, covering both ports equally; but as the said bars R R' are brought closer together the cross-head L in its motion in one direction will come into contact with the bar R and push it to the end of its stroke, which of course carries the frame G, valve-stem, and valve in that direction, and on its return-stroke it comes in contact with the opposite bar, R', giving a corresponding motion to the valve in that direction. As before stated, these bars are operated by the screws H H', having pinions I I', meshing in the common gear, K. This gear K has a central square hole, S, through which freely slides a square stud, T, which forms the end of the shaft U, mounted in the bracket 3. It will thus be seen that the central opening in the

gear-wheel K slides freely on the stud T as the frame is operated by the eccentric, and while so moving, if the shaft U be turned to the right or left, the gear K will be turned 5 and the screws H H' operated, so as to change the position of the bars R R' and alter the motion of the valve.

4 is a cast-iron bevel or miter wheel secured to the shaft U, and 5 and 6 are similar friction-wheels, of leather or compressed fiber 10 pulp, and they are mounted upon the vertical shaft 7 so that when one is in contact with the wheel 4 the other is clear of it, or vice versa. The top of this shaft 7 is provided 15 with the usual form of governor-balls, 8 9, operated by the pulley 10, mounted on the small counter-shaft 11, through the medium of the bevel-gears 12 13. The pulley 10 is mounted on the shaft 11 between two leather disks or wash- 20 ers clamped between the collars 14 and 15, and the frictional tension of the collars upon the pulley may be increased or diminished by the nut 16.

From the above description it will be seen 25 that when the engine is started, the bars R R' being in close contact with the cross-head L, the valve has its full stroke. As, however, the pressure increases and the engine begins to run faster, the governor-balls rise, which de- 30 presses the shaft 7, so as to bring the friction-wheel 5 in contact with the miter-wheel 4 and revolve it. This in turn rotates the gear K and the pinions I I' and screws H H', so as to separate the bars R R', thereby automatically cut- 35 ting off the steam to correspond to the amount of work being performed by the engine, whereby the steam is most advantageously used expansively, and of course a great saving of steam and fuel effected. On the other 40 hand, should the engine begin to slow down, the governor-balls drop and the miter-wheel 6 comes in contact with the wheel 4, giving it a reverse motion, and closing the bars R R', so as to give the valve its full stroke. The 45 bars R R' have leather or rubber washers r r', which prevent wear and tear and noise be-

tween the bars and the cross-head, and the object of leather disks on the pulley 10 is to prevent bars R R' being "jammed" close or open, as the nut 16 is so adjusted that there will 50 be just sufficient friction to operate the parts without forcing them.

17 is a bearing-brass secured to the under side of the frame G so as to slide freely upon the plane face 18 of the engine-frame, which 55 prevents the frame G from turning, and at the same time forms a bearing for its weight.

Having thus fully described my invention, what I claim as new and useful, and desire to secure by Letters Patent of the United States, 60 is—

1. The combination, with the valve and stem, of the frame G, screws H H', pinions I I', bars R R', cross-head L, operated by the eccentric and rock-shaft, and the gear K, op- 65 erated by the shaft U, as set forth.

2. The combination, in a steam-engine, with the slide-valve having an intermittent motion, of means, substantially as described, whereby the travel of the valve may be regu- 70 lated independently of the positive motion of the eccentric, as and for the purpose set forth.

3. The combination, with the governor and its operating mechanism, and the shaft 7, having friction-wheels 5 and 6, of the shaft U, 75 having wheel 4 and gear K, and the frame G, having screws H H', pinions I I', adjustable bars R R', cross-head L, and the valve and stem, as set forth.

4. The combination, with the valve-gearing, 80 substantially as described, of the governor 8 9, gears 12 and 13, and the shaft 11, having pulley 10 mounted upon said shaft between collars 14 15, the tension of which may be adjusted by the nut 16, as set forth. 85

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES H. ROBERTS.

Witnesses:

FRANK DENVER,
JAMES C. VEALS.