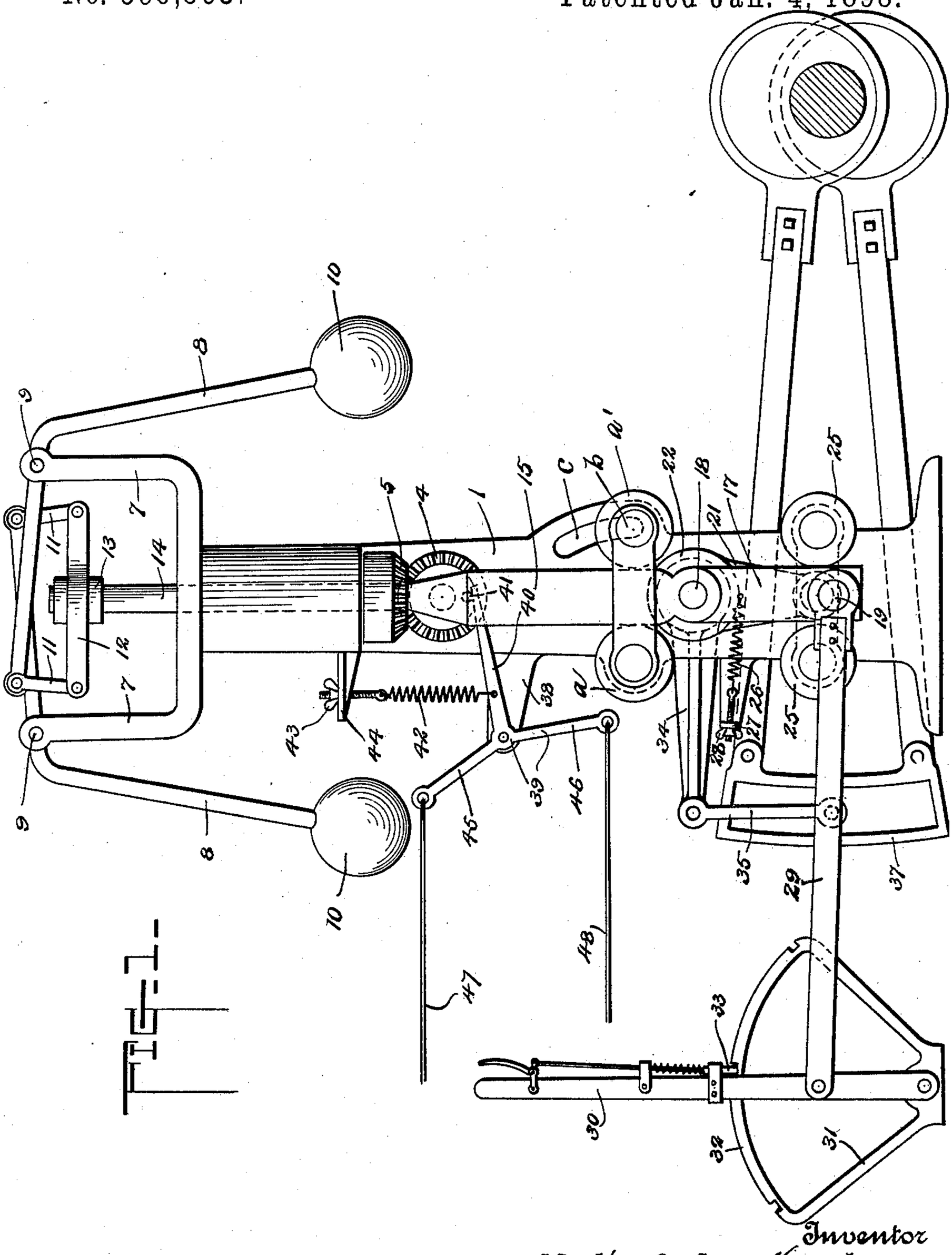
(No Model.) 4 Sheets—Sheet 1.

M. O. ARNEGAARD.

GOVERNOR CUT-OFF FOR STEAM ENGINES.

No. 596,565. Patented Jan. 4, 1898.



Witnesses
A. M. Frontsor
J. A. Wilkinson

Inventor
Martin O. Arnegaard,
by A. Wilkinson
Attorney

(No Model.)

4 Sheets—Sheet 2.

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FIG. 1.

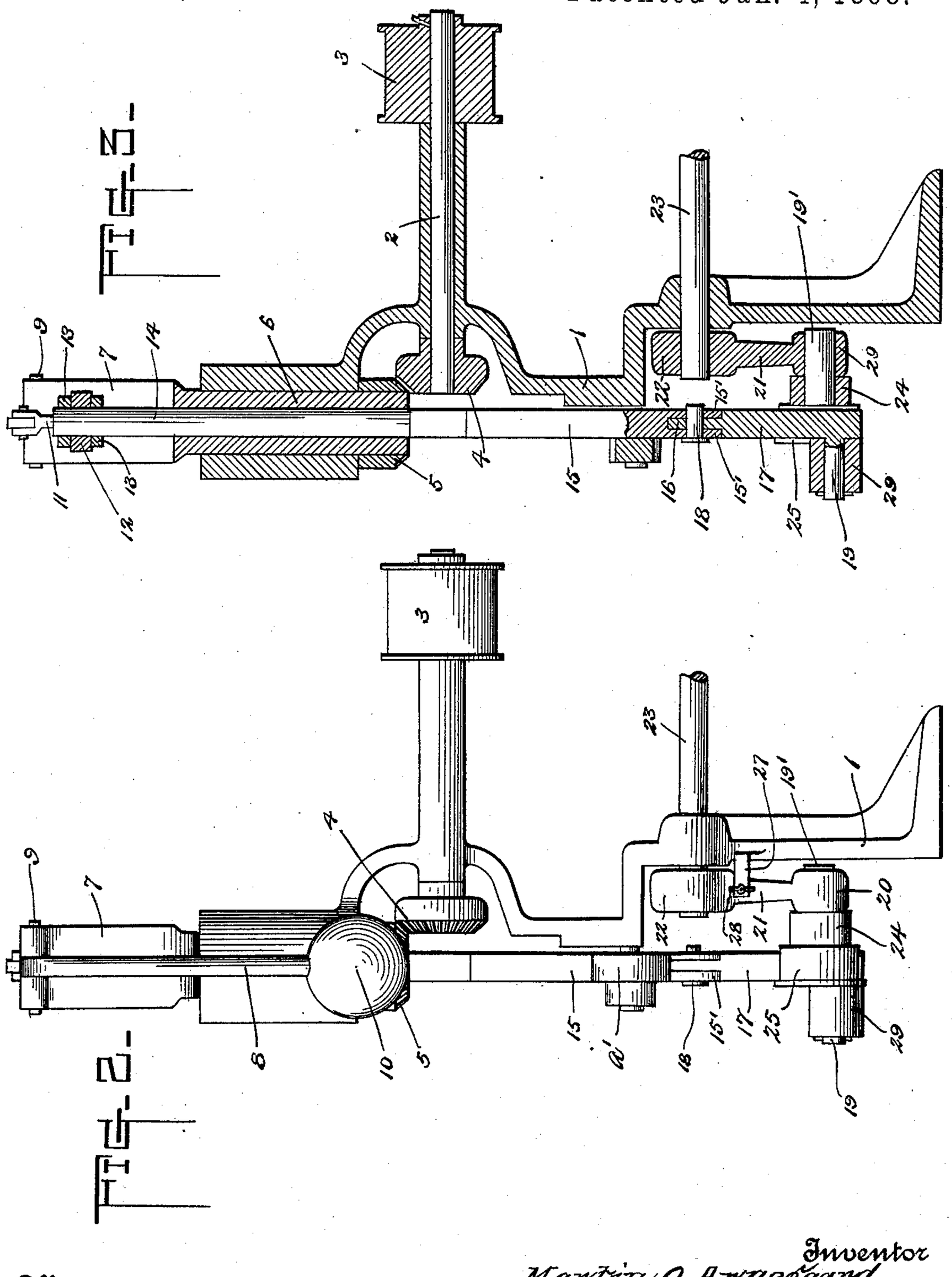

FIG. 2.

Witnesses
A. M. Fosnaton.
J. A. Wilson.

Inventor
Martin O. Arnegaard,
by A. Bowilson
Attorney

(No Model.) 4 Sheets—Sheet 3.

M. O. ARNEGAARD.

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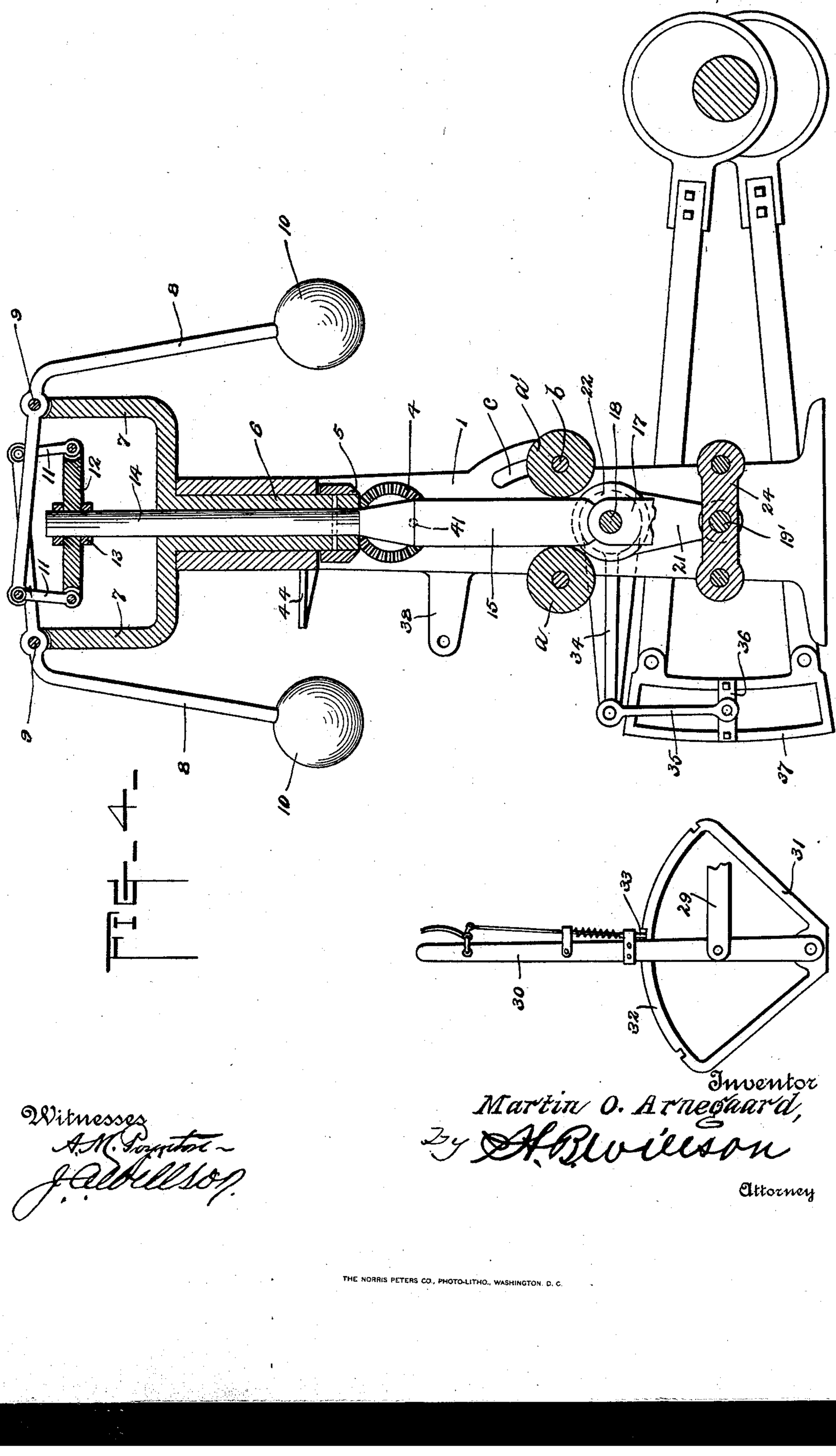


Witnesses
A. M. Poppitor
J. A. Bellson

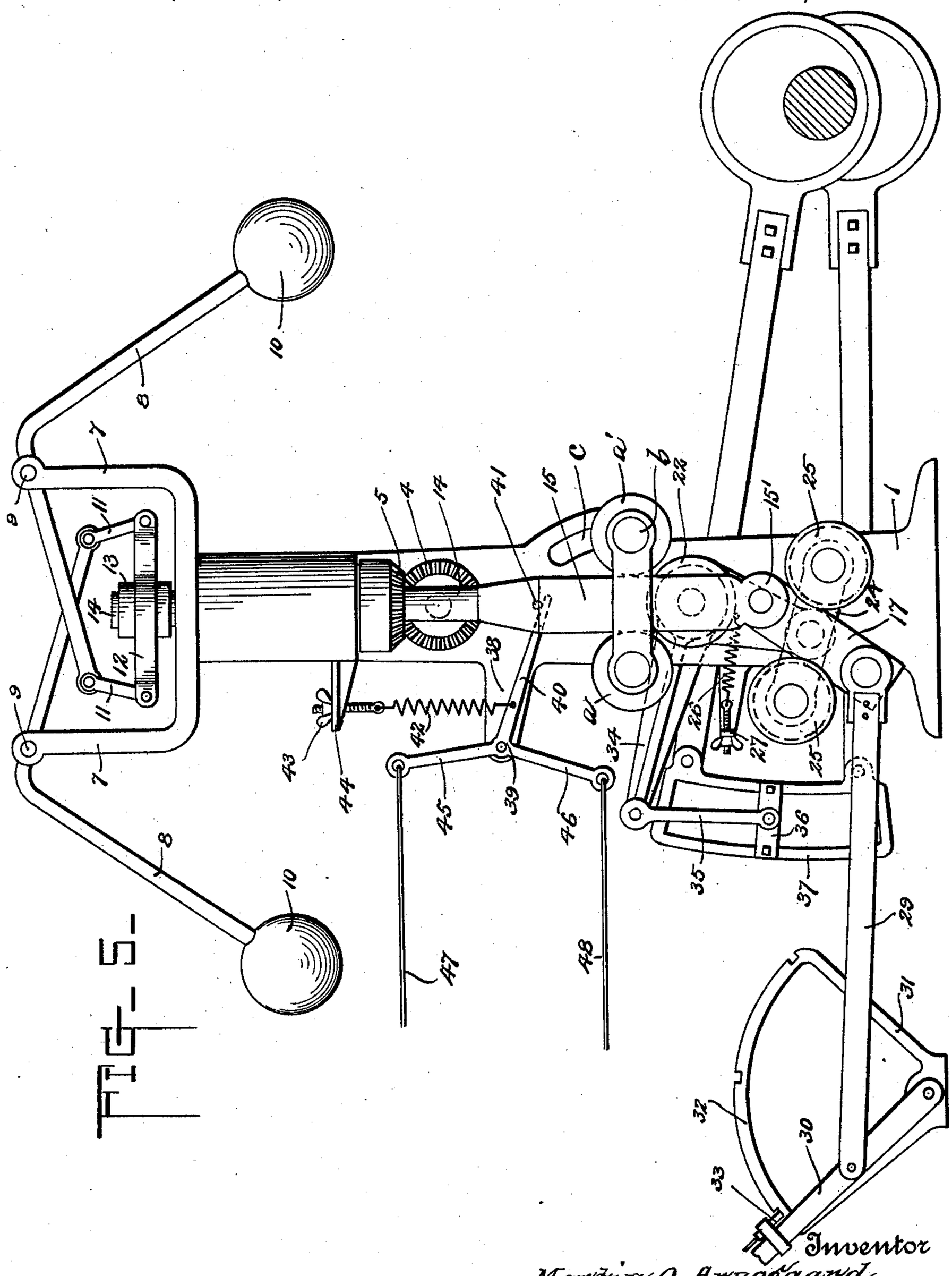
Inventor
Martin O. Arnegaard,
By A. R. Wilson
Attorney

(No Model.) 4 Sheets—Sheet 4.

M. O. ARNEGAARD.

GOVERNOR CUT-OFF FOR STEAM ENGINES.

No. 596,565. Patented Jan. 4, 1898.



Witnesses
A. M. Pointon —
J. A. Wilkinson.

Inventor
Martin O. Arnegaard,
By A. B. Wilkinson
Attorney

UNITED STATES PATENT OFFICE.

MARTIN O. ARNEGAARD, OF MAYVILLE, NORTH DAKOTA.

GOVERNOR CUT-OFF FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 596,565, dated January 4, 1898.

Application filed May 20, 1897. Serial No. 637,407. (No model.)

To all whom it may concern:

Be it known that I, MARTIN O. ARNEGAARD, a citizen of the United States, residing at Mayville, in the county of Traill and State of North Dakota, have invented certain new and useful Improvements in Automatic Variable Governor Cut-Offs 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.

My invention has relation to automatic governor cut-offs for steam-engines; and the object is to provide a simple, effective, and reliable cut-off for steam-engines generally; and to this end 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 reference-characters indicate the same parts of the invention.

Figure 1 is a side elevation of my improved automatic cut-off governor. Fig. 2 is an end view of the same. Fig. 3 is a vertical section. Fig. 4 is a similar view taken at a right angle to that shown in Fig. 3. Fig. 5 is a side elevation showing the governor in operative position.

1 represents the standard in which is journaled the horizontal shaft 2, provided at its outer end with a pulley 3 and at its inner end with a bevel gear-wheel 4, which meshes with a similar bevel gear-wheel 5, fixed on the lower end of a vertical sleeve 6, journaled in the standard and terminating in vertical parallel arms 7 7.

8 8 represent approximately right-angular levers fulcrumed on the bolts 9 9 in the upper ends of the arms 7 7, and their outer depending ends are provided with the usual governor-balls 10 10. The inner ends of the levers 8 8 are pivoted to the upper ends of the connecting-rods 11 11, the lower ends of which are pivoted to the horizontal cross-head 12, which is loosely journaled between the collars 13 13 on the upper end of the vertical cylindrical shaft 14, journaled in the sleeve 6.

The lower portion 15 of the shaft 14 is flat or rectangular in cross-section, and it terminates in the parallel ears 15′ 15′, between which is pivoted the tongue 16 of the connecting-rod 17 by the bolt 18.

a represents a guide-roller fixed on the standard 1, and *a′* represents a similar guide-roller mounted on a stud *b*, adjustably secured in a slot *c* in the standard, and these rollers engage the opposite edges of the rectangular portion 15 of the vertical shaft to insure an easy vertical movement of the same.

A bolt 19′ extends through the contiguous end 20 of a crank 22, fixed on the rock-shaft 23, journaled in the lower end of the standard 1.

24 represents a lateral arm on the bolt 19′, which carries the flanged guide-rollers 25 25.

26 represents a spiral spring fixed at one end to the crank 22 and at its other end to a threaded rod extending through a guide-bracket 27 and having a thumb-screw 28 encompassing its outer end to counterbalance the link and its operating mechanism.

29 represents a rod pivoted at one end to the bolt 19 and at its other end to a hand-lever 30, fulcrumed in a frame 31, provided with a notched semicircular rack 32, which engages the pawl 33 on said hand-lever and secures it in the position to which it may be adjusted.

34 represents a horizontal arm fixed on the outer end of the rock-shaft 23, and its outer end is provided with a connecting-rod 35, pivoted to a yoke 36, fixed about midway on the link 37, so that the centrifugal action of the governor-balls will be communicated, through the medium of the vertical shaft 14, to the link 17, and by this link and the bolt 19′ to the cranks 21 22 and rock-shaft 23 and to the link 37, and as the link controls the ordinary slide-valve (not shown) through the medium of the valve-stem, the motion being imparted to said link by the usual eccentrics and their rods, as shown, it follows that a perfect variable cut-off is produced by the action of the governor on the valve through the link.

38 represents an integral horizontal arm on the standard 1, in the outer end of which is fulcrumed a lever 39, the horizontal arm 40 of which projects under a lateral pin 41, fixed in the shaft 14. The lower end of a spiral spring 42 is connected to said arm 40, and its upper end to an adjusting-screw 43, mounted in a bracket 44, and which acts as a partial counterbalance for the shaft 14. 45 46 repre-

sent the oppositely-disposed arms of said lever 39, and 47 48 represent hand rods or cords connected to the outer ends of said arms, and by means of which the governor may be manipulated to increase or diminish the speed of the engine, as occasion requires.

When the lever 30 has been shifted to the position shown in Fig. 5, the link 37 is raised by the rod 35, connected to arm 34, fast on the rock-shaft 23, carrying the crank 21, connected through bolt 19′ to the link 17, which is pivoted to the end 29. In this condition the governor-shaft may be raised or lowered by the action of the governor-balls sufficiently to change the position of the link 37 and then control the action of the slide-valve. The link 17 being connected to the governor-shaft at one end and to the lever-rod 29 at the other end its inclination may be set by the lever and thereafter varied by the action of the governor, the construction being as described above.

Although I have specifically described the construction and relative arrangement of the several elements of the invention, I do not desire to be confined to the same, as such changes or modifications may be made as clearly fall within the scope of my invention without departing from the spirit thereof.

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

1. An automatic variable governor cut-off for steam-engines, comprising the standard 1, the sleeve 6, vertically journaled therein, the governor-levers 8 8, fulcrumed in the upper end thereof, the vertical shaft 14, journaled in said sleeve and in operative connection with said levers, the connecting-rod 17 pivoted to the lower end of said shaft 14 in combination with the lateral arm 24, the flanged guide-rollers 25 25 journaled on said arm, and the rock-shaft 23, the crank 22, fixed thereon and carrying said arm, and means substantially as described for imparting a governing motion from said shaft to the link 37, as and for the purpose set forth.

2. An automatic variable governor cut-off for steam-engines, comprising the standard 1, the sleeve 6, journaled therein and means substantially as described for imparting motion to said sleeve, the governor-levers 8 8, carried by said sleeve, the shaft 14 journaled in said sleeve, and in operative connection with said levers, in combination with the shaft 23, its crank 22, the arm 24, fixed thereon, the rollers 25 25 mounted thereon, the connecting-rod 17, pivoted to the lower end of the shaft 14, the arm 34 fixed on said shaft, and in operative connection with the valve-gear, substantially as and for the purpose set forth.

3. An automatic variable cut-off governor for steam-engines, comprising the standard 1, the vertical sleeve 6 journaled therein and terminating at its upper end in the vertical parallel arms 7 7, the governor-levers 8 8, fulcrumed in the upper ends of said arms, the vertical cylindrical shaft 14 journaled in said sleeve 6, the horizontal cross-head 12, pivoted on the upper end of said shaft, and the rods 11 11, connecting the outer ends of said cross-head to the inner ends of the levers 8 8, in combination with the rod 17 pivoted at its upper end to the lower end of the shaft 14, the rock-shaft 23 provided with the crank 22, the bolt 19′ connecting said rod 17 and rod 29, and the horizontal arm 34 fixed on said rock-shaft and in operative connection with the link 37, and means substantially as described for imparting motion to said link independently of the movement communicated to it by the governor-levers 8 8, as and for the purpose set forth.

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

MARTIN O. ARNEGAARD.

Witnesses:

H. BENDEKE,

O. K. WAXVIK.