J. W. SMITH.

GOVERNING MECHANISM FOR EXPLOSIVE ENGINES.

APPLICATION FILED APR. 26, 1906.

906,949.

Patented Dec. 15, 1908

2 SHEETS—SHEET 1.

Fig. 1.

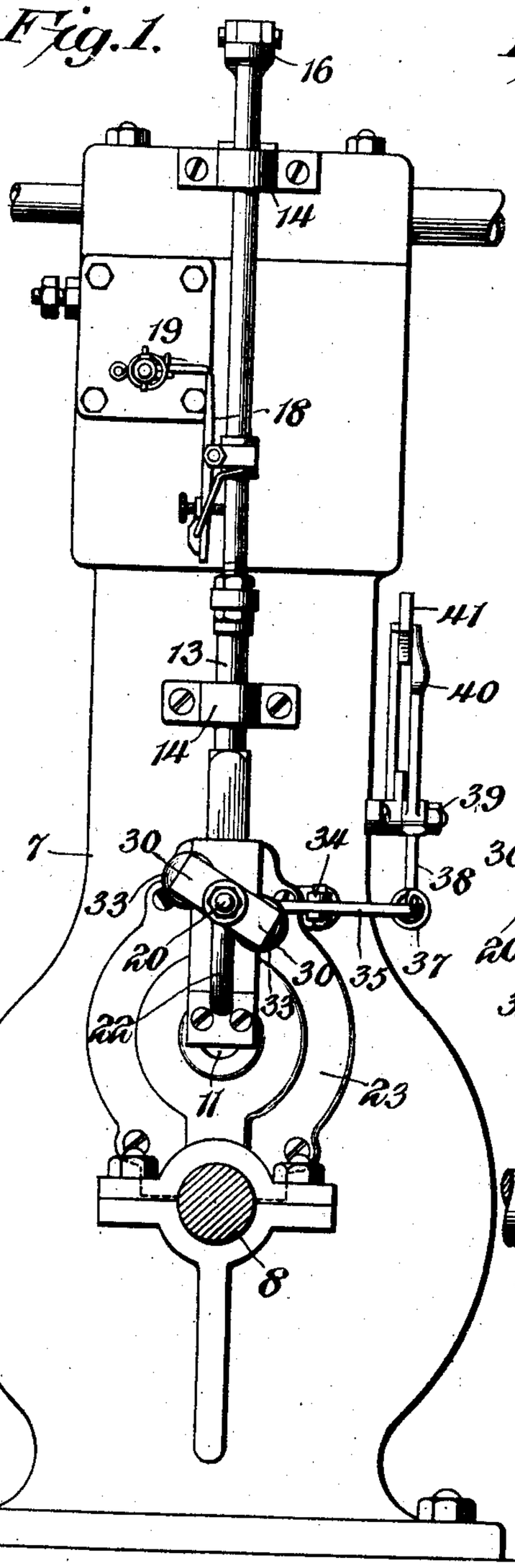
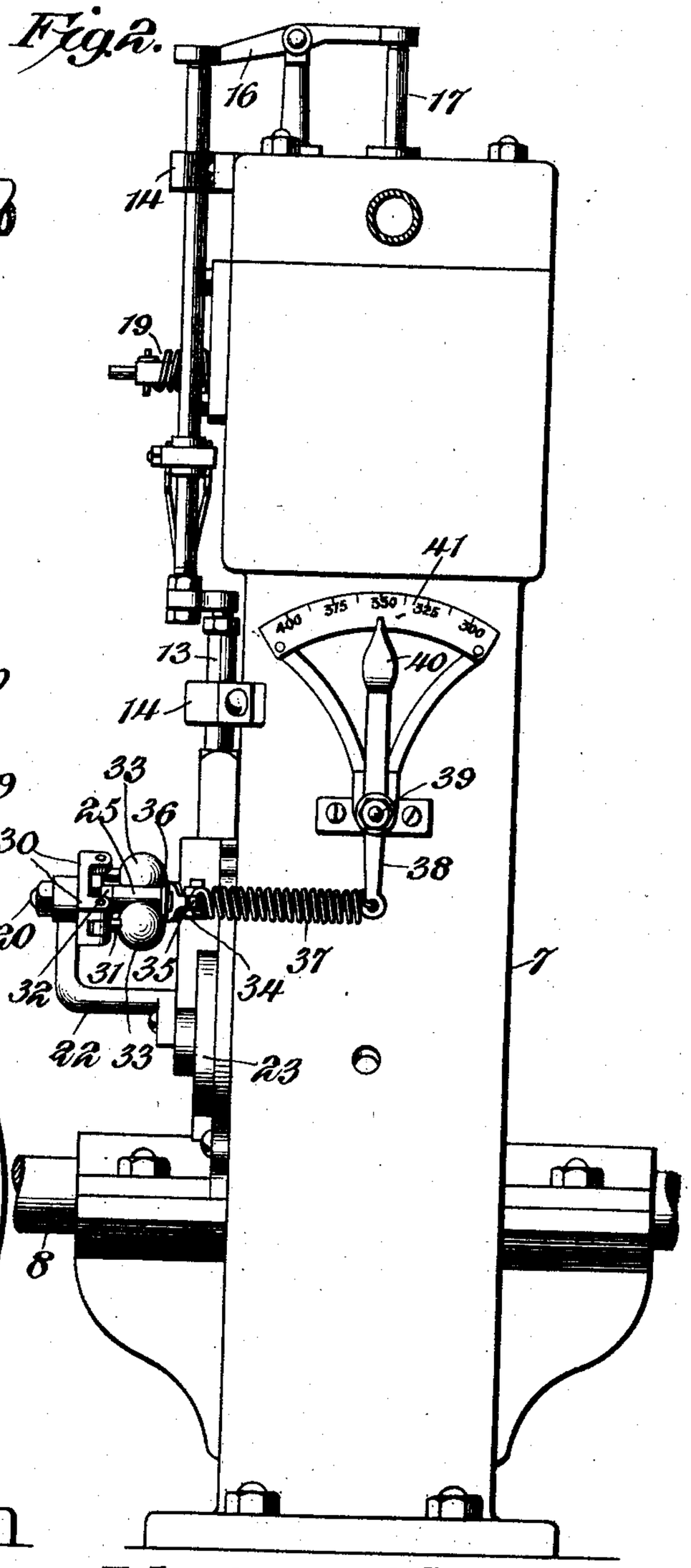


Fig. 2.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 3.

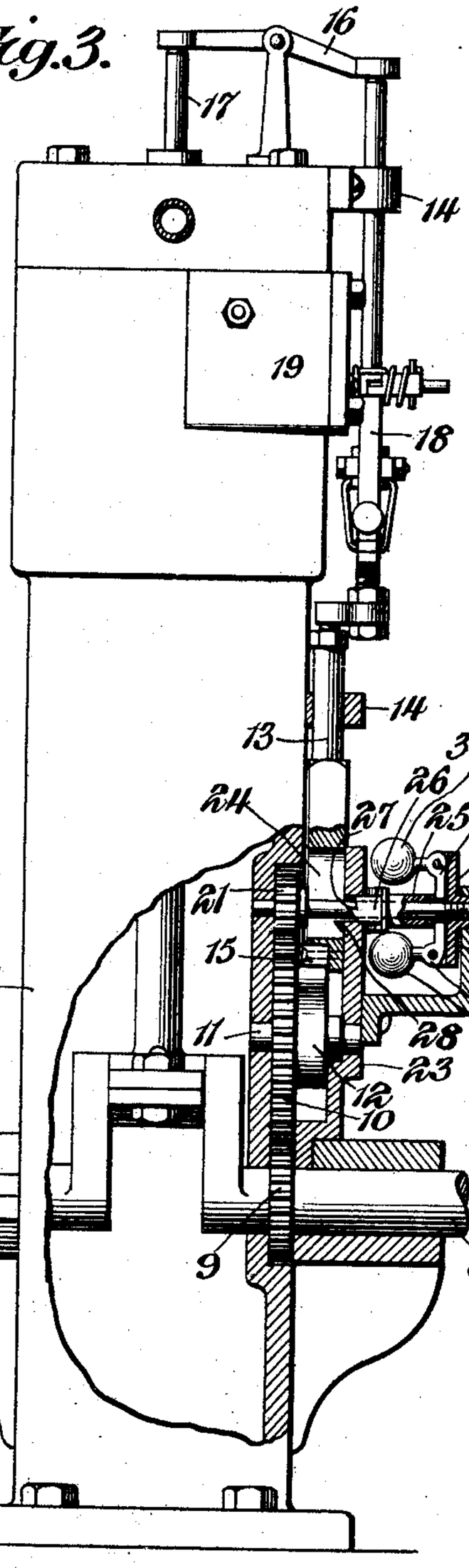


Fig. 5.

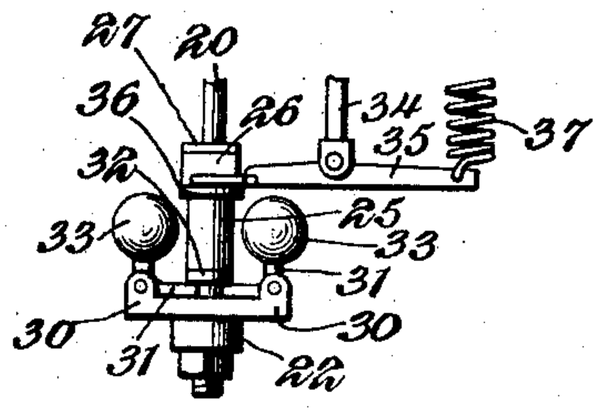


Fig. 6.

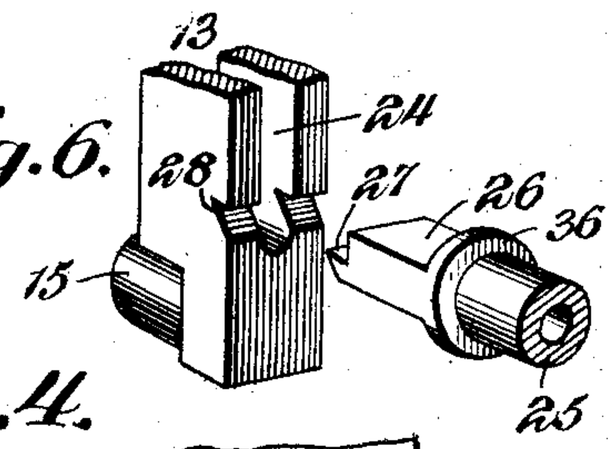
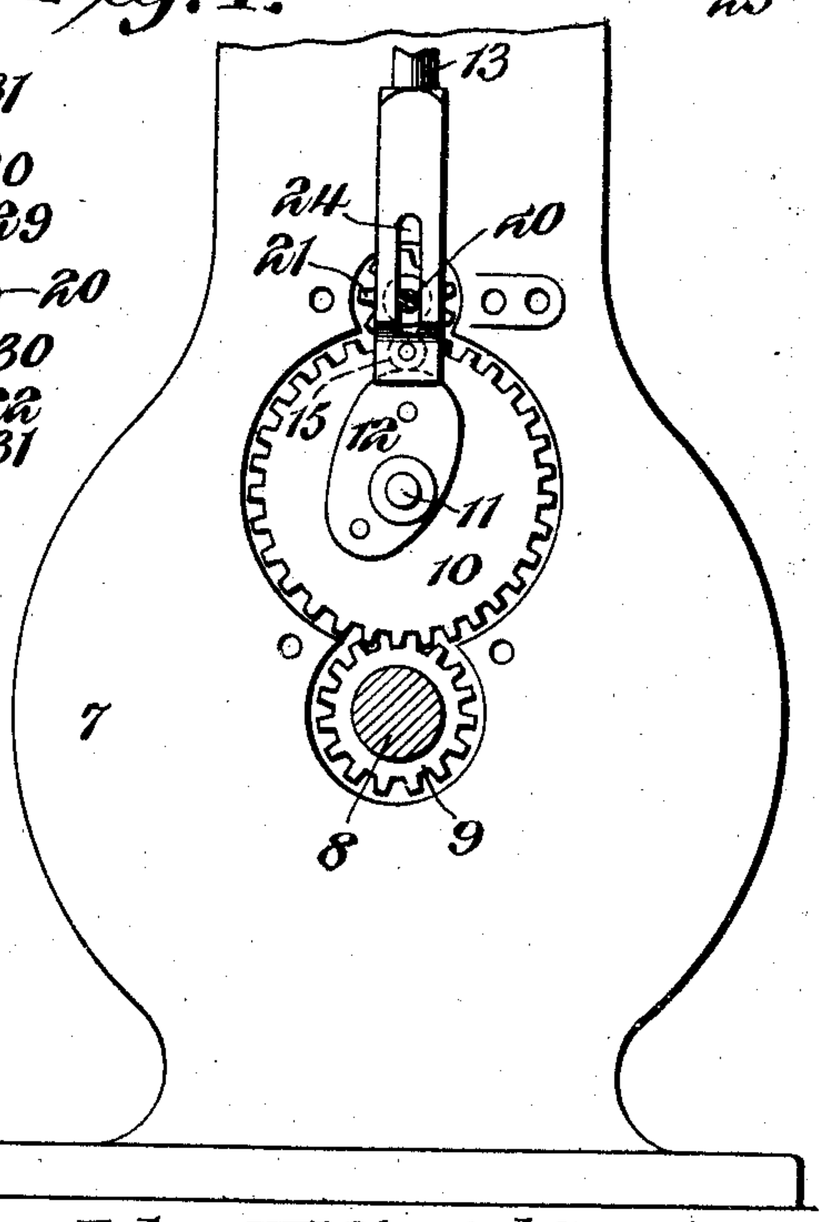


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOHN W. SMITH, OF AURORA, IOWA, ASSIGNOR TO AURORA MANUFACTURING COMPANY, OF AURORA, IOWA, A CORPORATION OF IOWA.

GOVERNING MECHANISM FOR EXPLOSIVE-ENGINES.

No. 906,949. Specification of Letters Patent. Patented Dec. 15, 1908.

Application filed April 26, 1906. Serial No. 313,819.

To all whom it may concern:

Be it known that I, JOHN W. SMITH, a citizen of the United States, residing at Aurora, in the county of Buchanan and State of Iowa, have invented a new and useful Governing Mechanism for Explosive-Engines, of which the following is a specification.

This invention relates more particularly to means for governing the speed of explosive engines by stopping the ignition mechanism and holding the exhaust valve open.

The primary object is to provide novel means of an exceedingly simple and effective nature, whereby the valve or ignition actuating member is locked in an inactive or inoperative position when the speed of the engine reaches a predetermined limit, and another important object is to provide means, whereby this limit of speed may be readily varied without the necessity of stopping the engine or otherwise interfering with its operation.

The preferred embodiment of the invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a side elevation of an engine having the improved mechanism applied thereto. Fig. 2 is a view in elevation at right angles to Fig. 1. Fig. 3 is a vertical sectional view through the mechanism. Fig. 4 is a detail face view of the gearing. Fig. 5 is a top plan view of the governor, the latch, and associated parts. Fig. 6 is a detail perspective view of a portion of the actuating member and the latch.

Similar reference numerals designate corresponding parts in all the figures of the drawings.

In the embodiment illustrated, the engine may be of any well known type, including a casing 7, and an engine or driving shaft 8. The driving shaft has secured thereto a gear wheel 9, which is in mesh with another gear wheel 10, carried by a stub shaft 11, mounted on the exterior of the casing. A cam 12 is connected to the gear wheel 10, and constitutes the means for operating the actuating member. In the present embodiment, this actuating member comprises a sectional, reciprocatory rod 13, slidably mounted in bearings 14, secured to the engine, and having at its lower end a roller 15, which rides upon the cam 12. The upper end of the actuating member operates against a lever 16, which actuates the exhaust valve in a manner well understood, the stem of said valve being shown at 17. The actuating member 13 in the present embodiment also constitutes operating means for an igniter, and for this purpose, a trip 18, adjustably secured to the member, coacts with the igniter, shown at 19. While it will be evident that any suitable form of ignition mechanism may be employed, in the present embodiment, an igniter is shown, which is fully disclosed in a copending application, Serial No. 313,818. It will be apparent that when the engine is in operation, the engine shaft 8 will be revolved, thereby rotating the cam 12, and causing the reciprocation of the actuating member 13. This reciprocation will, in turn, effect the operation of the ignition mechanism and the exhaust valve.

In order to maintain the ignition mechanism inoperative, and to hold the exhaust valve in open condition, the following simple means is preferably employed. A governor shaft 20 has a pinion 21 meshing with the gear wheel 10. Said shaft is journaled at its inner end in the engine casing, and its outer end is rotatable in a bracket 22, secured to a casing plate 23, the shaft 20 passing through said plate and through a longitudinal slot 24 in the actuating member 13. A latch is slidably mounted on the governor shaft 20, and comprises a sleeve 25, disposed between the bracket and casing plate and having an angular portion 26 slidable through the latter, said sleeve being thereby held against rotation. A tooth 27, carried by the inner end of the sleeve is movable into and out of a notch 28, formed in the outer side of the actuating member 13, said notch being in line with the tooth 27 when the actuating member is elevated. A collar 29 is secured to the outer end of the governor shaft 20, preferably by being threaded thereon, and is journaled in the bracket 22. This collar has outstanding ears 30, to which are pivoted arms in the form of bell cranks 31. The inner terminals of the bell cranks bear against the outer end of the latch or against a washer 32, interposed between said end and the arms. The other end of said arms are provided with weights 33.

Fulcrumed upon a supporting pin 34 that is carried by the engine casing is a forked lever 35, the fork of said lever bearing against a flange 36 on the latch, the opposite terminal of said lever having secured thereto one end of a spring 37. The other end of the

spring is fastened to a tensioning lever 38, having a friction fulcrum 39 on the engine casing, the opposite arm of the lever being preferably formed in the shape of a pointer 40 that coacts with a plate 41 having a scale thereon, the designations of said scale indicating different numbers of revolutions per minute. It will be evident that the spring 37 resists the centrifugal movement of the weights 33, and that the amount of resistance is varied by swinging the tensioning lever 38.

The operation of the mechanism may be briefly described as follows. As already described, the operation of the engine effects the reciprocation of the actuating member13, and thereby the ignition means and the exhaust valve. At the same time, it will be apparent that the governor shaft 20 will be revolved at a comparatively high speed. If this speed becomes excessive, the weights 38 will move outwardly under the action of centrifugal force, and the inner ends of the arms 31, bearing against the latch, will force said latch inwardly against the tension of the spring 37. Therefore when the actuating element 13 is elevated by the cam 12, and the notch 28 is brought into alinement with the tooth 27, said tooth will enter the notch, and prevent the downward movement of the actuating element. As a result, it will be evident that the exhaust valve will be held open, and the ignition mechanism will not be operated. As soon, however, as the speed of the engine falls within the desired rate, the spring 37 will react to force the latch outwardly, thereby disengaging the actuating element, and permitting it to again follow the cam. By turning the lever 40, to the different designations of the scale, the speed of the engine may be altered without the necessity of stopping or otherwise changing the mechanism.

From the foregoing, it is thought that the construction, operation, and many advantages of the herein described invention will be apparent to those skilled in the art, without further description, and it will be understood that various changes in the size, shape, proportion, and minor details of construction, may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

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

1. In governing mechanism of the class described, the combination with a reciprocatory actuating member having a slot, of a supporting element disposed transversely of the actuating member and passing through the slot, a reciprocatory latch slidably mounted on the supporting member and movable into and out of coaction with the actuating member, and a centrifugal member for sliding the latch upon the support.

2. In governing mechanism of the class described, the combination with a movable actuating member, of means for operating the same, a governor shaft, a governor driven thereby, and a non-rotatable latch mounted on the shaft and slidable thereon into and out of coaction with the actuating member, said latch being moved by the governor.

3. In governing mechanism of the class described, the combination with a movable actuating member, of means for operating the same, a governor shaft, a governor mounted thereon, and a reciprocatory latch separate from said operating means, slidably mounted on the shaft and movable into and out of coaction with the actuating member to hold the same in inoperative position with respect to the operating means, said latch being operated by the governor.

4. In governing mechanism of the class described, the combination with a movable actuating member, of means for operating the same, a shaft, centrifugal arms pivotally connected to and rotating with the shaft, and a latch comprising a sleeve slidably mounted on the shaft and operated by the arms, said sleeve having a tooth that is movable into coaction with the actuating member to hold the same inactive.

5. In governing mechanism of the class described, the combination with a reciprocatory actuating member having a slot and a notch, of a shaft extending through the slot, an outer bearing for the shaft, a collar secured to the shaft and journaled in the bearing, weighted arms pivoted to the collar, a sleeve slidably mounted on the shaft, said sleeve being actuated by the arms and having a tooth movable into and out of the notch of the actuating member, and means for resisting the swinging movements of the arms.

6. In governing mechanism of the class described, the combination with a support including a casing plate, of a bracket secured to the casing plate, a reciprocatory actuating member disposed in rear of the casing plate, said member having a slot therethrough, and a notch in its outer side, a shaft extending through the slot and through the casing plate, a sleeve slidable on the shaft and having a tooth on its inner end that is movable into and out of the notch of the actuating member, said sleeve slidably engaging the casing plate and being held thereby against rotation, a collar fixed to the shaft and journaled in the bracket, and centrifugal arms pivoted to the collar and having portions that engage the sleeve to effect its sliding movement on the shaft.

7. In governing mechanism of the class described, the combination with an engine shaft, of a wheel geared thereto and having a cam, a reciprocatory actuating member engaged and operated by the cam, a governor shaft geared to the wheel, a centrifugal gov-

ernor mounted on the shaft, and a latch also mounted on the shaft and operated by the governor, said latch being movable into coaction with the actuating member to maintain the same inactive.

8. In governing mechanism of the character described, the combination with an actuating member, of a reciprocatory latch movable into and out of engagement with the actuating member for holding it against operative movement, a centrifugal governor engaging the latch for moving it in one direction, a lever fulcrumed between its ends and having one end engaged with the latch, and a spring for placing variable tension on the lever, said spring being secured to the other end of said lever and through the lever operating against the centrifugal governor.

9. In governing mechanism of the class described, the combination with an engine shaft, of a wheel geared thereto and having a cam, a reciprocatory actuating member operated by the cam, a shaft geared to the wheel, a latch slidable on the shaft into coaction with the actuating member to maintain the same in inoperative condition, a centrifugal governor operated by the governor shaft and operating on the latch to move the same into coaction with the member, a lever having an engagement with the latch to move it out of coaction with the member, a spring connected to the lever, a tensioning lever connected to the spring, and a gage plate coacting with the tensioning lever and having a scale thereon.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

JOHN W. SMITH.

Witnesses:

WILBUR J. BERRYMAN,

FRANK RICHE.