S. E. McGANN.

ROTARY ENGINE.

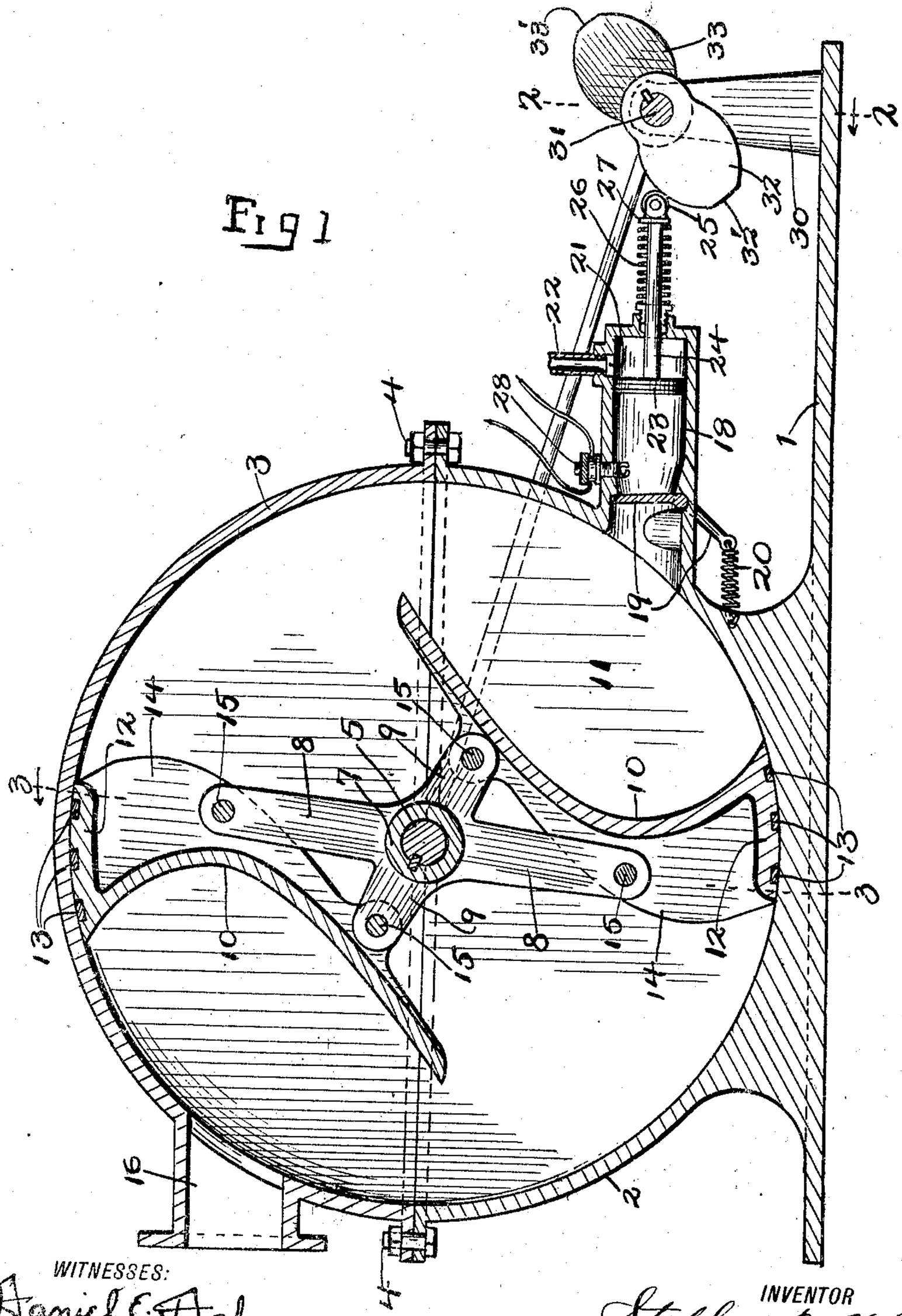
APPLICATION FILED MAY 27, 1907.

985,192.

Patented Feb. 28, 1911.

2 SHEETS—SHEET 1.

Fig 1



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2 SHEETS—SHEET 2.

Fig. 3.

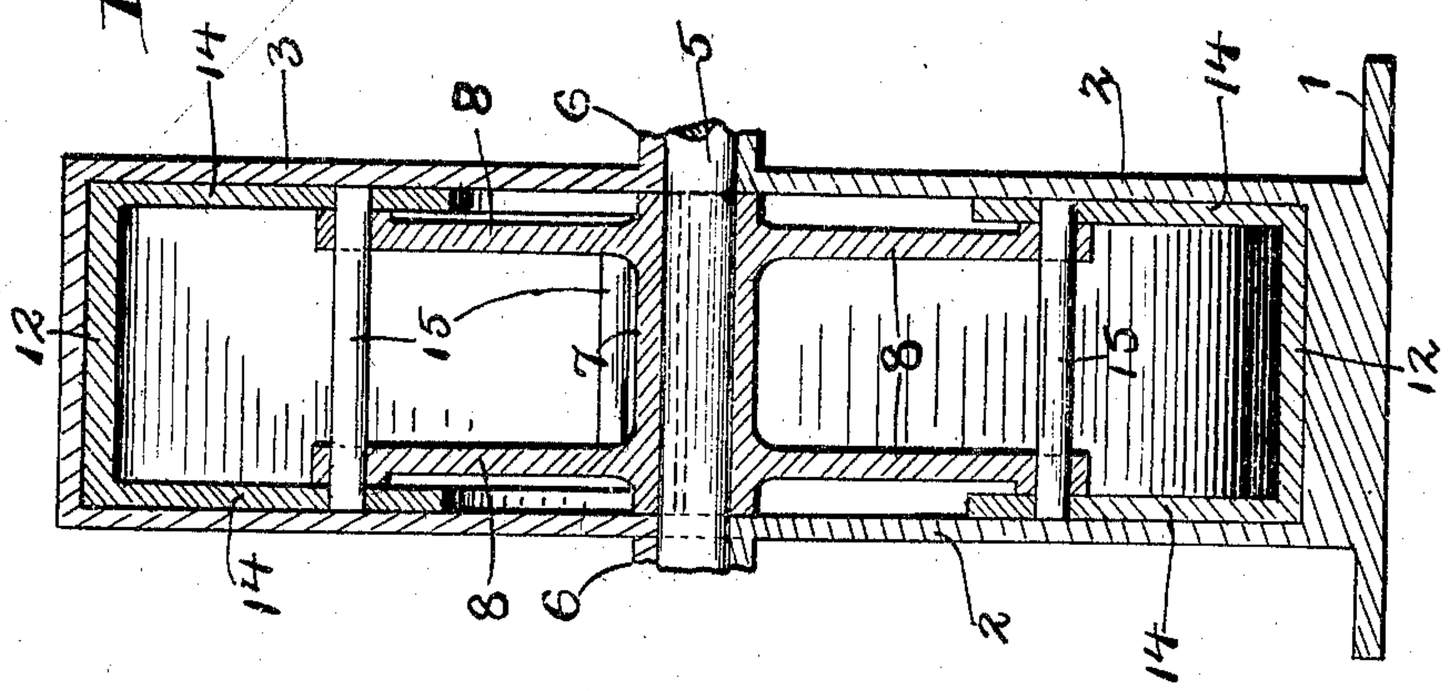
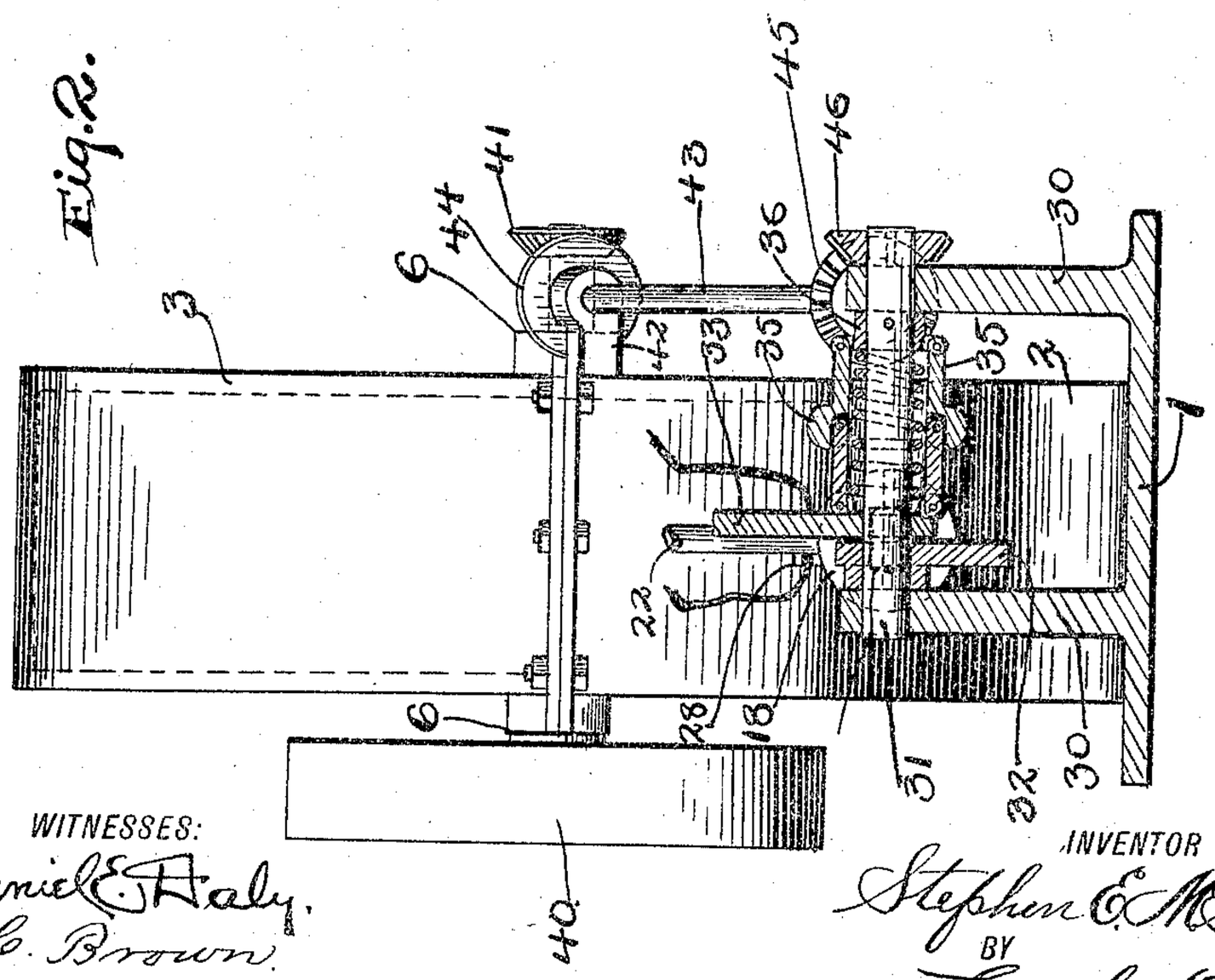


Fig. 2.



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ROTARY ENGINE.

985,192. Specification of Letters Patent. Patented Feb. 28, 1911.

Application filed May 27, 1907. Serial No. 375,908.

To all whom it may concern:

Be it known that I, STEPHEN E. McGANN, a citizen of the United States of America, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Rotary Engines; and I hereby 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 pertains to make and use the same.

This invention relates to improvements in rotary engines, and particularly to the type known as hydrocarbon explosive engines.

The object of my invention is to provide an engine of this character which will be extremely simple in construction, durable and practical in operation and capable of automatically regulating the number of explosions according to the speed at which the engine is being driven.

With these objects in view, my invention consists in providing a new and improved form of piston and new and improved means for regulating the admission of the gas to the explosion chamber.

My invention also consists in the features of construction and combinations of parts as described in the specification, pointed out in the claims and illustrated in the accompanying drawings.

In the accompanying drawings, Figure 1 is a central section of a rotary engine embodying my invention. Fig. 2 is a section on line 2—2, Fig. 1, looking in the direction of the arrow. Fig. 3 is a section on line 3—3, Fig. 1.

Again referring to the drawings 1 represents a suitable base plate on which is arranged the cylinder of the engine. The cylinder as shown is formed in two parts, the lower part 2 being preferably integral with the base and the upper part 3 being fastened to the upper part by means of bolts 4. A shaft 5 extends through the center of the casing and is suitably mounted in bearings 6. On the shaft 5 within the casing is keyed a hub 7 and on said hub are arranged two pairs of long arms 8 and two pairs of short arms 9. The long arms are arranged diametrically opposite each other and the short arms are arranged diametrically opposite each other.

The pistons 10 which are preferably two in number are scoop shaped in form and each piston is so arranged that one end thereof comes in contact with the curved wall of the cylinder, and the other end is arranged a short distance therefrom so that the scoop and the adjacent wall of the cylinder form a pocket 11 which is at all times open at one end. Where the pistons come in contact with the wall of the casing they are provided with broad bearing surfaces 12 and in the faces thereof are secured packing strips 13. The pistons are preferably provided with reinforcing side flanges 14 which lie close against the sides of the casing. One piston is secured to each pair of long arms and to the adjacent pair of short arms by means of pins 15 so that the pistons are supported at opposite sides of the hub.

Near the top of the engine cylinder is formed an exhaust opening 16. Near the bottom of the engine cylinder and in open communication therewith is arranged a cylinder 18 which constitutes the combustion and compression chamber. At the mouth of the chamber is arranged a valve 19 which is held in its closed position by means of a spring 20. The spring 20 is made sufficiently strong to withstand the pressure in the cylinder 18 while the gas is being compressed but so that it will yield to the explosive force of the charge and permit it to act upon the pistons without appreciably diminishing the force thereof. At the opposite end of the compression chamber is formed an intake opening 21 which is connected by means of a pipe 22 with a gas reservoir not shown. Within the compression chamber is arranged a piston 23 which is provided with a piston rod 24, and on the end of the piston rod is mounted a roller 25. A coiled spring 26 is arranged on the piston rod 24 and one end thereof abuts against the end of the compression cylinder 18, and the other end abuts against a collar 27 arranged near the end of the piston rod. The object of this spring is to hold the piston rod normally in its outer position and consequently to hold the piston in the rear end of the compression cylinder 18. In the compression cylinder 18 is arranged a sparking plug 28 of the usual description. Standards or supports 30 are mounted on the base 1 in proximity to the end of the compression cylinder 18 and therein is journaled a shaft 31. On the shaft 31 are mounted two cam-disks 32 and 33. The cam-disk 32 is rigidly secured on the shaft and the cam-disk 33 is secured on the shaft by means of a feather so as to

turn with the shaft while being free to slide longitudinally thereon. The cams 32 and 33 are so mounted on the shafts that their points of greatest eccentricity are on diametrically opposite sides of the shaft. The cams 32 and 33 are similar in form and at their points of greatest eccentricity are slightly flattened as indicated at 32′ and 33′. On the shaft 31 is mounted a spring governor 35 of the usual construction which is secured to the slidable cam 33 and to a collar 36 which is secured on the shaft 31 so as to turn therewith.

On the outer end of the shaft 5 at one side of the casing is secured a fly-wheel 40, and on the other end of said shaft is secured a beveled gear 41. In suitable bearings 42 is journaled a shaft 43 which is provided at one end with a beveled gear 44 arranged to mesh with the beveled gear 41, and at its other end with a beveled gear 45 which is arranged to mesh with a beveled gear 46 secured on the shaft 31.

The operation of my engine is as follows:—When the engine is to be started it is cranked as is customary so as to permit a charge to enter the compression chamber and in order to do this the shaft carrying the cams must be rotated so as to bring the parts of the cam having the least eccentricity opposite the end of the piston rod and therefore the piston rod would be in its outer position and the piston will be in the rear end of the compression chamber. The gas is therefore able to flow into the cylinder and as the shaft continues to rotate the cam in contact with the roller on the end of the piston rod will shove in the piston rod and thereby compress the charge in the compression chamber. When the flat spot on this cam is in contact with the roller on the piston rod the charge will be exploded and the force thereof will open the valve 19 and be expended against one of the engine pistons which at that moment will be in proximity to the mouth of the compression chamber. As the shaft 31 continues to rotate the other cam will come in contact with the roller on the end of the piston rod and the operation thereof will be the same as already described. There will therefore be two explosions for each rotation of the shaft 31 as long as the engine runs below the predetermined velocity, but if the engine exceeds the predetermined velocity the arms of the governor will swing apart thereby drawing the slidable cam out of contact with the roller on the end of the piston rod, and thereafter only the fixed cam will come in contact with said roller and there will only be one explosion for each revolution of the shaft 31.

What I claim is:—

1. In an engine of the character indicated, the combination of a cylinder, a shaft mounted in said cylinder, a scoop-shaped piston supported on said shaft intermediate the ends of said piston, one end of said piston being arranged to contact with the wall of the cylinder and the other end being in proximity to but spaced a short distance away from the wall of said cylinder so as to leave an exit for the gases between said end and the wall of the cylinder, a combustion chamber communicating with said cylinder, means for supplying a charge to said chamber and means for exploding said charge when the concave face of said piston is in position to bridge the mouth of said combustion chamber.

2. In an engine of the character indicated the combination of a cylinder, a shaft mounted in said cylinder, a plurality of scoop-shaped pistons supported on said shaft intermediate the ends of said pistons, each piston being arranged so that one end thereof is in contact with the wall of said cylinder and the other end is in proximity to the wall of the cylinder but spaced a short distance therefrom, a combustion chamber communicating with said cylinder, means for supplying explosive gas to said chamber and means for exploding said charge when the concave faces of said pistons are in position to bridge the mouth of said combustion chamber.

3. In an engine of the character indicated, the combination of a cylinder, a shaft rotatably mounted in said cylinder, a scoop shaped piston secured on said shaft, said piston being provided with flanges on both its side edges and on one end arranged to contact with the wall of the said cylinder and having the other end spaced a distance away from the wall of said cylinder, a compression chamber communicating with said cylinder, a spring controlled valve arranged in the compression chamber, a piston provided with a piston rod arranged to extend through the rear end of said compression chamber, means for resiliently holding the piston in the rear end of said chamber, a shaft arranged in proximity to the end of the piston rod, a cam arranged on said shaft so as to come in contact with the end of the piston rod when the shaft is rotated and force the piston rod into the compression chamber, and means for actuating said shaft.

4. In an engine of the character indicated, the combination of a cylinder, a shaft rotatably mounted in said cylinder, a scoop shaped piston secured on said shaft and arranged to contact at both side edges and one end with the walls of said cylinder and having its other end spaced a distance away from the wall thereof, a compression chamber communicating with said cylinder, a spring controlled valve arranged to intercept communication between the compression chamber

and the said cylinder, a piston arranged in the compression chamber and provided with a piston rod arranged to extend through the rear end of said compression chamber, means for resiliently holding the piston in the rear end of said chamber, a shaft arranged in proximity to the end of the piston rod, two cams mounted on said shaft at diametrically opposite sides of said shaft and arranged to turn therewith, one of said cams being free to slide longitudinally on said shaft, means for driving said shaft, and a governor secured to said shaft and to the slidable cam.

5. In an engine of the character indicated, the combination of a cylinder, a shaft rotatably mounted in said cylinder, two scoop shaped pistons secured on said shaft at diametrically opposite sides thereof, each of said pistons being arranged to contact at both side edges and at one end with the walls of said cylinder, and having its other end spaced a distance away from the wall thereof, a compression chamber communicating with said cylinder, a spring controlled valve arranged to intercept communication between the compression chamber and said cylinder, a piston arranged in the compression chamber and provided with a piston rod arranged to extend through the rear end of said compression chamber, means for resiliently holding the piston in the rear end of said chamber, a shaft arranged in proximity to the end of the piston rod, two cams mounted on said shaft at diametrically opposite sides of said shaft and arranged to turn therewith and come in contact with the end of the piston rod, one of said cams being free to slide longitudinally on said shaft, means for driving said shaft, and a governor secured to said shaft and to the slidable cam.

In testimony whereof, I sign the foregoing specification, in the presence of two witnesses.

STEPHEN E. McGANN.

Witnesses:
VICTOR C. LYNCH,
B. C. BROWN.