J. FLEISCHMANN & P. WOLF.

GOVERNOR CONTROLLED IGNITER.

APPLICATION FILED APR. 28, 1911.

1,037,462.

Patented Sept. 3, 1912.

2 SHEETS—SHEET 1.

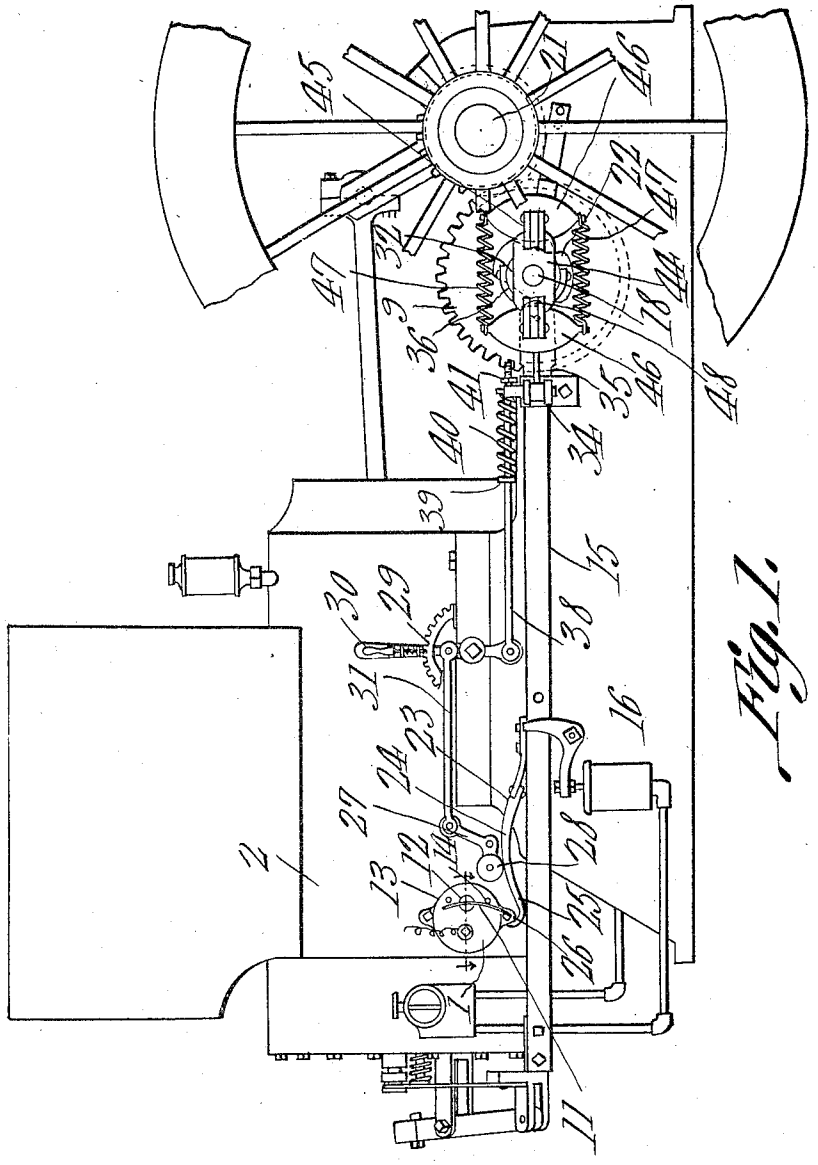

Fig. 1.

Witnesses

J. F. Tomein

L. H. Wilson.

Joseph Fleischmann AND Philip Wolf, Inventors

by C. A. Snow & Co.

Attorneys

J. FLEISCHMANN & P. WOLF.

GOVERNOR CONTROLLED IGNITER.

APPLICATION FILED APR. 28, 1911.

1,037,462.

Patented Sept. 3, 1912.

2 SHEETS—SHEET 2.

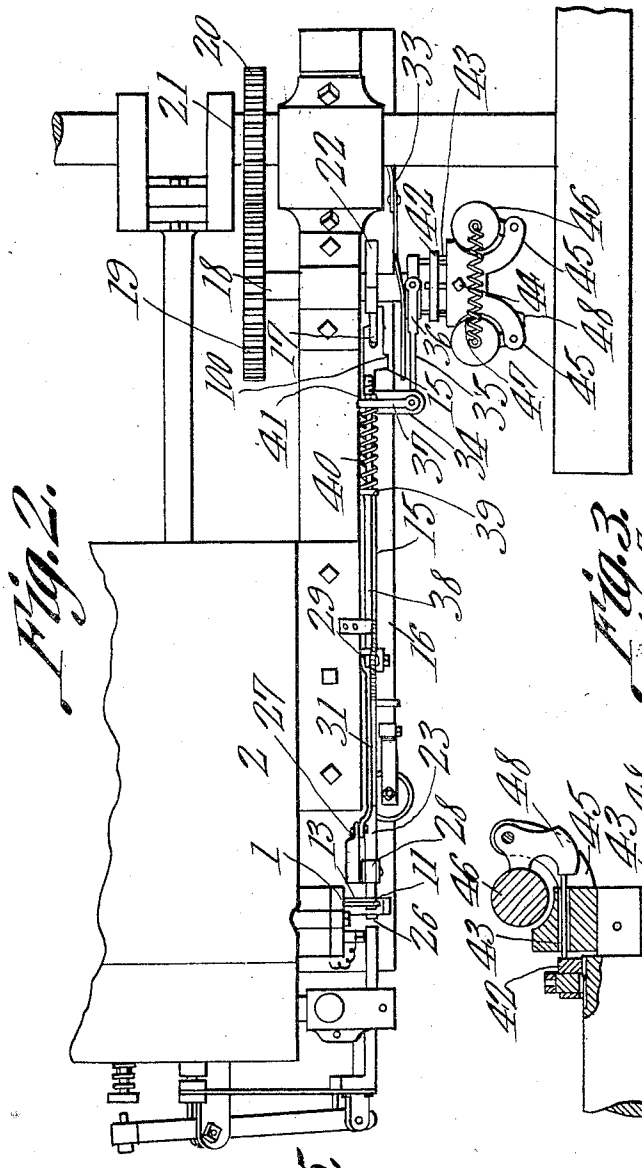

Fig. 2.

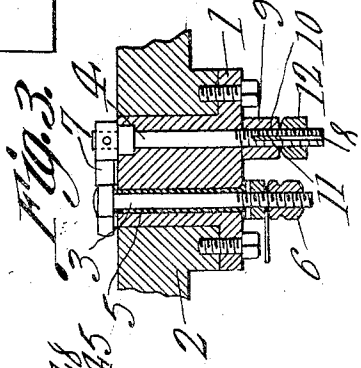

Fig. 3.

Fig. 6.

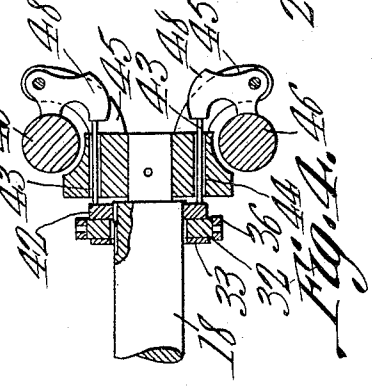

Fig. 4.

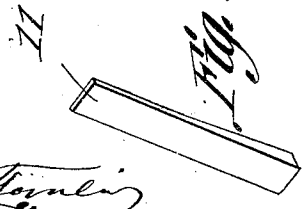

Fig. 5.

Witnesses

J. C. Fennell

L. H. Wilson

Joseph Fleischmann AND Philip Wolf

Inventors

by C. A. Snow & Co.

Attorneys

UNITED STATES PATENT OFFICE.

JOSEPH FLEISCHMANN AND PHILIP WOLF, OF MARSHFIELD, WISCONSIN.

GOVERNOR-CONTROLLED IGNITER.

1,037,462. Specification of Letters Patent. Patented Sept. 3, 1912.

Application filed April 28, 1911. Serial No. 623,818.

To all whom it may concern:

Be it known that we, JOSEPH FLEISCHMANN and PHILIP WOLF, citizens of the United States, residing at Marshfield, in the county of Wood, State of Wisconsin, have invented a new and useful Governor-Controlled Igniter, of which the following is a specification.

This invention has relation to governor controlled igniters for hydro-carbon gas engines and consists in the novel construction and arrangement of its parts as hereinafter described and claimed.

The object of the invention is to provide an igniter of special structure adapted to be operated and controlled by the action of a governor which in turn is operatively connected with the crank shaft of the engine. The means for controlling the operation of the igniter from the governor is of such character that the operation of the igniter is automatically timed with relation to the movement of the piston while the engine is working. Also this means is susceptible of manipulation while the engine is working so that the operation of the igniter may be manually timed.

In the accompanying drawings:—Figure 1 is a fragmental side elevation of an engine equipped with the governor controlled igniter. Fig. 2 is a top plan view of the same. Fig. 3 is a horizontal sectional view of the igniter. Fig. 4 is a horizontal sectional view of the governor mechanism. Fig. 5 is a perspective of the bar whereby the movable electrode is actuated. Fig. 6 is a perspective of one of the electrode nuts.

The igniter consists of a plate 1 which is applied to an engine cylinder 2 in the usual manner and which is provided with bores which receive electrodes 3 and 4. The electrode 3 is held in position in the plate 1 and is surrounded by a sleeve of insulation 5. A nut 6 is screwthreaded upon the outer end portion of the electrode 3 and to the said nut one of the terminals of a source of electric current may be connected while the other terminal of the said source may be connected with the frame of the engine in the usual manner. The electrode 4 is journaled in its receiving bore provided in the plate 1 and upon its inner end is provided with an arm 7 in the path of movement of which is located the projecting inner end of the electrode 3. The outer end portion of the electrode 4 is longitudinally slitted as at 8 and a binding nut 9 is screwthreaded upon the outer portion of the said electrode 4 and is also slitted as at 10 the slit in the said nut being adapted to register with the slit 8 in the said electrode. A spring bar 11 is inserted at its intermediate portion in the slits 8 and 10 when the same are in register. A clamping nut 12 is screwthreaded upon the outer end portion of the electrode 4 and is adapted to bear against the opposite side portions of the outer end of the said electrode 4 together and pinch the spring bar 11 between them. The said spring bar 11 gradually increases in thickness from its upper toward its lower end and pins 13 and 14 are mounted upon the outer face of plate 1 and the thinner or upper portion of the bar 11 normally rests against the pin 13 while the thicker or lower portion of the said bar 11 normally rests against the pin 14. The pins 13 and 14 therefore are located at approximately diametrically opposite sides of the electrode 4.

A valve operating rod 15 is slidably mounted upon the engine frame 16 in a usual manner and a wheel 17 is journaled in one end of the said rod 15. A stub shaft 18 is journaled upon the engine frame 16 and is provided with a gear wheel 19 which meshes with a gear wheel 20 mounted upon the engine crank shaft 21. A cam 22 is fixed to the shaft 18 and the wheel 19 is adapted to travel along the periphery of the said cam. The cam 22 is so shaped that the valve rod 15 is caused to reciprocate in a predetermined relation with respect to the frame of the engine and the crank shaft. A spring supported arm 23 is mounted upon the valve rod 15 and the said arm at an intermediate portion is provided with an upwardly disposed hump 24 which is continued into a downwardly disposed bend 25 which in turn merges into an upwardly disposed extremity 26. Normally the lower end of the spring bar 11 lies in the path of movement of the upwardly disposed extremity 26 of the said arm 23. A rocker arm 27 is pivoted to the side of the engine and is provided with a roller 28 which lies above and upon the front portion 24 of the arm 23. A lever 29 is fulcrumed at the side of the engine and is provided with an upper handle portion 30. A rod 31 is pivotally connected at one end with the lever 29 and is pivotally connected at its other end with the upper end portion of the rocker 27.

A ring 32 is slidably mounted upon the outer end portion of the stub shaft 18 and a spring supported arm 33 is mounted upon the side of the engine and bears against the inner face of the said ring 33 and tends to hold the same away from the frame of the engine. There is a shoulder 100 upon one side of the rod 15 adapted under circumstances to be described hereinafter, to be engaged by the free end of the arm 33.

A bracket 34 is mounted beside the engine frame 16 and the shaft of an arm 35 is journaled in the said bracket. The outer end of the arm 35 is forked as at 36 and the branches of the said fork are pivotally connected to the opposite sides of the ring 32. An arm 37 is fixed to the end portion of the shaft of the arm 35 and the said arms 35 and 37 are approximately at right angles to each other.

A rod 38 is pivotally connected with the lever 29 at the opposite side of the fulcrum point of the said lever from the point of connection of the rod 31 therewith and an abutment 39 is mounted upon the said rod 38. The outer portion of the rod 38 passes through an opening provided in the arm 37 and a coil spring 40 surrounds the rod 38 and is interposed between the arm 35 and the abutment 39. A nut 41 is screw-threaded upon that end portion of the rod 38 which projects beyond the arm 37 and by adjusting the said nut 41 the tension of the spring 40 may be increased or diminished and at the same time the rod 38 is moved longitudinally so that the distance between the arm 37 and the lower end of the lever 29 may be increased or diminished.

A collar 42 is splined upon the outer portion of the stub shaft 18 and is provided upon its outer face with parallel pins 43 which are slidably received in apertures provided in the governor head 44. The said governor head is fixed to the outer end of the stub shaft 18 and is provided with usual arms 45 to which are attached the shanks of weights 46. Coil springs 47 connect the weights 46 at the opposite sides of the shaft 18 together and the angularly disposed extremities 48 of the shanks of the said weights bear against the outer ends of the pins 43 carried by the collar 42.

In operation, rotary movement is transmitted from the crank shaft 21, through the intermeshing pinions 20 and 19 to the shaft 18. When the shaft 18 is thus rotated, the cam 22 upon the shaft 18, engaging the wheel 19, will impart reciprocating movement to the valve operating rod 15. As the rod 15 thus reciprocates, the extremity 26 of the arm 23 will engage with the lower end of the spring bar 11, tilting the movable electrode 4, and causing the member 7 to make and break with the inner end of the electrode 3. Should the engine begin to race, the weights 46 will separate, forcing the pins 43 inwardly, the pins 43 sliding the intermediate ring 42, and consequently the ring 32, and tilting the spring arm 33, until its free end engages the shoulder 100 of the valve-operating rod 15. Under such circumstances, the valve-operating rod 15 will be held beyond the control of the cam 22, the valve-operating rod 15 being thus held in such a position that it will maintain the exhaust valve open, and close the inlet valve, until the speed of the engine decreases, whereupon, the free end of the arm 33 will let go of the shoulder 100 upon the valve rod 15, and the valve rod will then move forward, under the actuation of the valve springs, and close the exhaust valve and open the inlet valve, so that the engine can take in a charge for another explosion.

When the engine is running, the lever 30 remains stationary, owing to the presence of the spring 40. The lever 30 constitutes a means whereby the speed of the engine may be changed manually. When the free end of the lever 30 is moved toward the igniter, the rod 38 will increase the tension of the spring 40, and an increased strain will thus be thrown upon the weights 46, and the engine, under such circumstances, will run faster, in order to make the weights operate the pins 43, and effect a throttling of the engine, in the manner hereinbefore described, in connection with the coöperation of the parts 33 and 100. If the free end of the lever 30, is swung in the manner hereinbefore described, not only will an increased tension, due to the spring 40, be put upon the weights 46, but at the same time, the member 31 will be operated, causing a tilting of the crank arm 27, and depressing the roller 28 against the arched portion of the spring supported element 23, thus advancing the spark, so as to get the full power of the engine.

The foregoing arrangement is of great importance to a person who is not entirely conversant with gas engine practice, since it enables him to advance the spark according to the speed at which the engine is running, so as to obtain the full power of the engine. This operation is obtained automatically, by simply shifting the position of the lever 30, in the manner hereinbefore described. If the upper end of the lever 30 be swung toward the shaft 21, the rod 38, through the instrumentality of the arm 37 and the rod 35, will effect a sliding movement of the ring 32, advancing the free end of the spring arm 34, into engagement with the shoulder 100 of the valve-operating rod 15. The exhaust valve will thus be held open, so that there will be no compression in the cylinder, whereupon the fly wheel may be thrown over easily.

Having thus described the invention, what is claimed is:—

1. In combination with an internal combustion engine, an igniter; a reciprocating, valve-operating member; means for operating said member from the engine shaft; a yieldably supported arm upon said member and adapted to operate the igniter; a pair of engine-supported levers, one of which is adapted to bear upon the arm, the other of which is manually operable; a connection between the levers; an element slidable upon the engine shaft; means operable by said element to engage the valve-operating member and to hold the same out of operative relation with respect to the igniter; a governor adapted to operate said element to cause the same to actuate said means; and a spring structure connecting said element with the manually operable lever.

2. In combination with an internal combustion engine, an igniter; a reciprocating, valve-operating member; means for operating said member from the engine shaft; a yieldably supported arm upon said member and adapted to operate the igniter; a pair of engine-supported levers, one of which is adapted to bear upon the arm, the other of which levers is manually operable; a rod connected with the manually operable lever; a tiltable, engine-supported structure comprising angularly disposed arms, in one of which arms the rod is slidable; spring means for connecting the rod with said arm; a ring carried by the other arm and slidable upon the engine shaft; governor mechanism adapted to engage the ring; and means engageable by the ring to hold the valve-operating member out of operative relation with respect to the igniter.

3. In an internal combustion engine, a slidably mounted valve-operating member; an igniter; an arched spring secured adjacent one end to the valve-operating member, and at the other end slidable upon the valve-operating member, the last named end of the spring being provided with an element adapted to operate the igniter; and movable means engaging the spring to flatten the same, and to cause the last named end of the spring to move upon the valve-operating member, thereby to change the position of the said element with respect to the igniter.

In testimony that we claim the foregoing as our own, we have hereto affixed our signatures in the presence of two witnesses.

JOSEPH FLEISCHMANN.
PHILIP WOLF.

Witnesses:
WESLEY ARMSTRONG,
JACOB WOLF.