No. 649,057. Patented May 8, 1900.

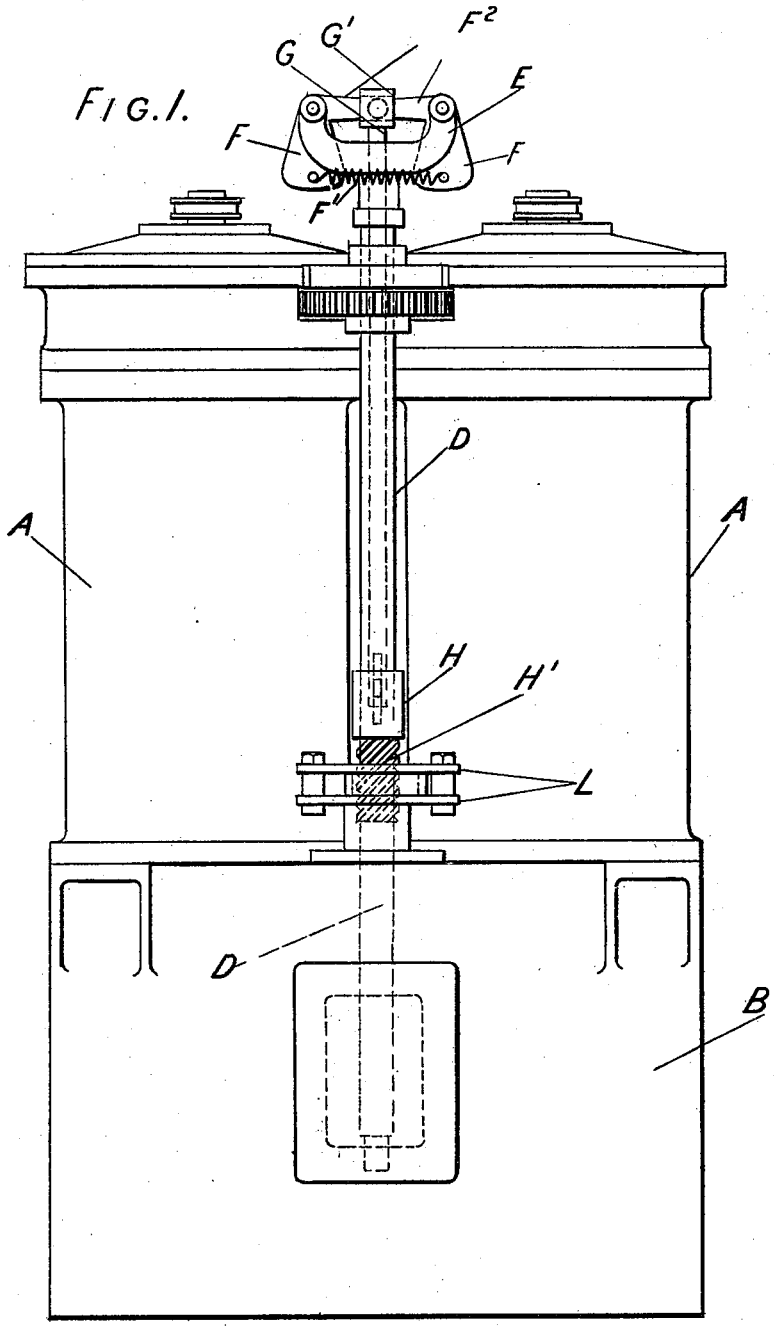
C. M. JOHNSON.

GOVERNOR FOR EXPLOSIVE ENGINES.

(Application filed Sept. 9, 1898.)

(No Model.) 2 Sheets—Sheet 1.

FIG. 1.



Witnesses:
A. L. Wisser
C. A. Stewart

Inventor
Charles M. Johnson
By J. S. Ruggles
Atty.

No. 649,057. Patented May 8, 1900.

C. M. JOHNSON.

GOVERNOR FOR EXPLOSIVE ENGINES.

(No Model.) (Application filed Sept. 9, 1898.) 2 Sheets—Sheet 2.

FIG. 2

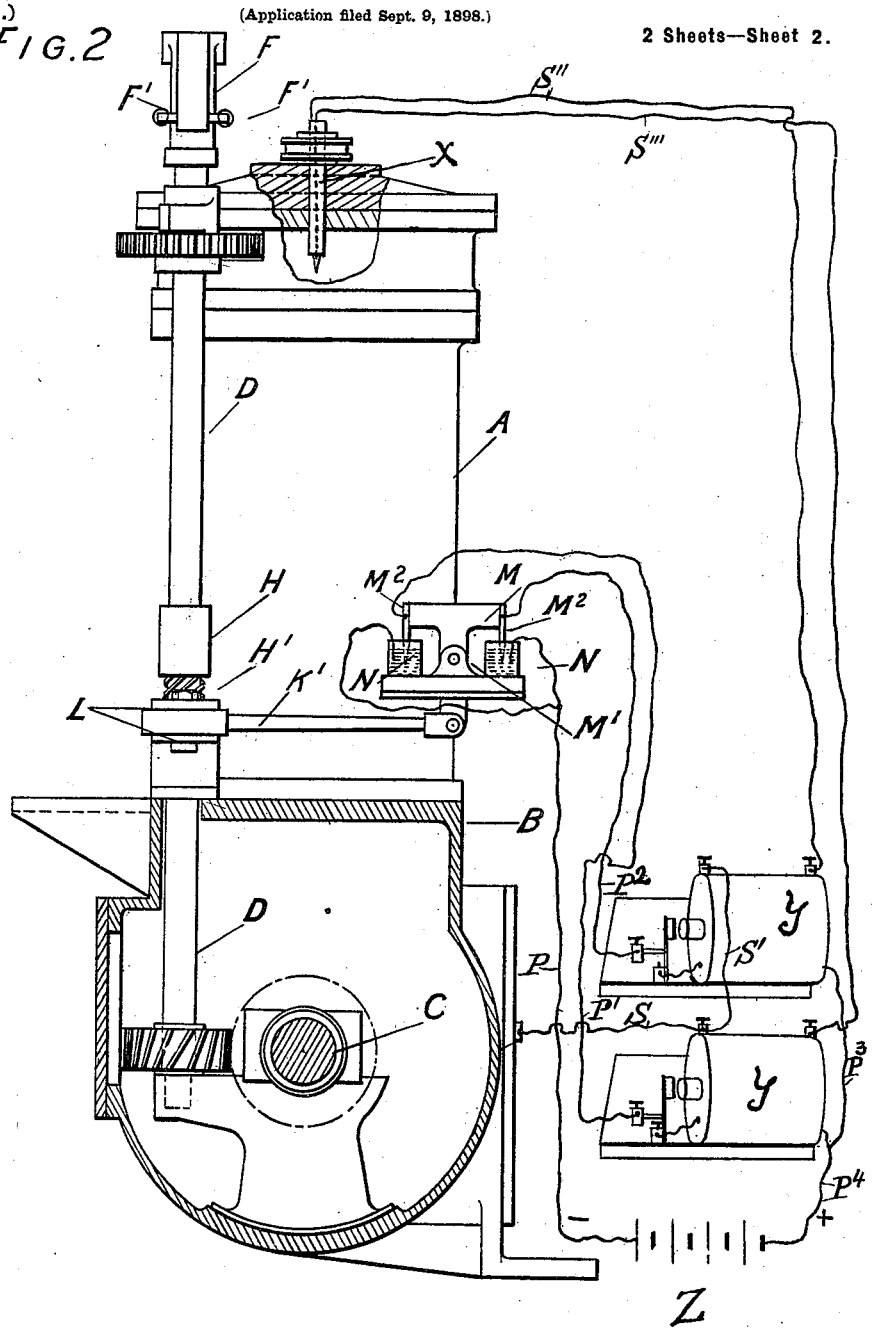
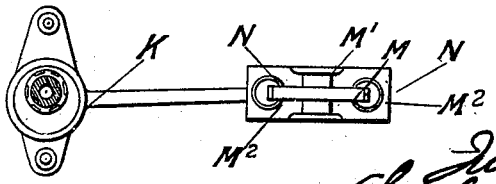


FIG. 3.



Witnesses
E. L. Wisser
C. A. Stewart

Inventor
Charles M. Johnson
By J. B. Rust
Atty

UNITED STATES PATENT OFFICE.

CHARLES M. JOHNSON, OF NEW YORK, N. Y.

GOVERNOR FOR EXPLOSIVE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 649,057, dated May 8, 1900.

Application filed September 9, 1898. Serial No. 690,578. (No model.)

To all whom it may concern:

Be it known that I, CHARLES M. JOHNSON, a citizen of the United States of America, and a resident of New York, in the State of New York, but temporarily residing at London, England, have invented certain new and useful Improvements in or Relating to Governors for Explosion-Engines, of which the following is a specification.

This invention relates to governors for explosion-engines, its object being to provide an improved form of governor by which the electric ignition of the explosive charge in the cylinder may be caused to occur sooner or later in the cycle of the operations of the engine.

According to this invention the electric circuit through which the charge is ignited is completed by a device operated from an eccentric, the said eccentric being carried upon a sleeve having a screw-threaded exterior, the said sleeve being carried upon and rotating with a spindle driven from the crank-shaft of the engine, the sleeve being also capable of adjustment by motion axially along the spindle.

One construction of governor according to this invention is illustrated in the accompanying drawings as applied to a twin engine.

Figure 1 is a front elevation, and Fig. 2 a side elevation, partly in section, of the engine fitted with the governor; and Fig. 3, a plan view of details of the governor.

With reference to Figs. 1 and 2, A represents the cylinders of the engine, mounted upon a base B.

C is the crank-shaft of the engine, and D the governor-spindle, which also in the example illustrated serves to drive the valve and valve-gearing of the two cylinders.

The spindle D is hollow and carries at its upper extreme a two-arm bracket E, with weights F pivotally attached to each arm of the bracket E. The weights F are connected to one another by a spiral spring F′, and each weight has a crank-like extension F^2, the two extensions being both pivotally attached to a block G′, by means of which they serve to raise and depress a rod G. This rod G extends down the hollow center of the shaft D and is connected at its lower end to a sleeve H upon the shaft D, the latter being slotted to allow for the up-and-down motion of the pin which connects the sleeve H to the rod G. The lower portion of the sleeve H has a screw-threaded extension H′, which passes through the disk K of an eccentric threaded to receive it.

The disk K is prevented from vertical motion by two stop-bars L, attached to the outside of the cylinders, and it is obvious that if the sleeve H H′ be raised or lowered the eccentric-disk K will receive a motion of rotation relatively to the shaft D through a greater or less angle, which angle will be determined by the pitch of the screw-threaded portion H′ and the extent of its vertical motion.

The eccentric K is connected by means of a rod K′ to a lever M, pivotally supported at M′ upon a bracket attached to a fixed portion of a machine. The lever M is T-shaped, its lower extremity being pivoted to the rod K′ and its two lateral extremities carrying electric contact-pieces M^2, which overhang mercury-cups N.

The horizontal to-and-fro motion of the rod K′ received from the eccentric causes the lever M to oscillate about the center M′ and to thus dip the contact-pieces M^2 alternately into their respective cups N. The cups contain mercury in electrical connection with the battery or other device employed to fire the charge within the cylinder, and upon the surface of the mercury a film of oil is placed to prevent oxidation of the mercury and the production of an undesirably-large spark when the contact is broken. One contact-piece M^2 is in circuit when the ignition-wires of one cylinder and the other contact is connected to the other cylinder, and they serve to complete the firing-circuit of the cylinders alternately, owing to the rocking motion received from the eccentric.

In the heads of the cylinders are mounted the firing-pins X, of the usual construction, and they are respectively connected by the wires S″ and S‴ with the secondary coils of the induction-machines Y, and the said secondary coils are connected with the metal of the engine by the wires S and S′. The secondary coils, the wires S, S′, S″, and S‴, the firing-pins X, and the metal of the engines form complete electrical circuits.

The battery Z is connected with the primary

coils of the induction-machines by the wires P, P′, P^2, P^3, and P^4. The wire P leads from the mecury-cups N to one of the poles of the battery, the wires P′ and P^2 lead from the mercury-cups to the primary coils of the induction-machines, and the wires P^3 and P^4 lead from the primary coils of the induction-machines to the other pole of the battery Z.

The alternate dipping of the contact-pieces M^2 into their respective cups sends alternating currents through the primary coils of the induction-machines. These currents in turn induce alternating currents in the secondary coils of the induction-machines. The inducted currents alternately heat the firing-pins to explode the charges in the cylinders.

If the speed of the engine should become undesirably high, the weights F will of course move radially out from their axis of rotation and thus depress the rod G. The result of this will be that the eccentric sheave receives a motion of rotation relatively to the shaft D, and thus causes a later ignition of the charge within the cylinders, thus checking or reducing the speed of the engine. When the speed falls, the rod G is lifted somewhat, as will be readily understood, and the firing-circuit is completed by the contacts M^2 at an earlier point, thus obtaining a greater driving effort of the engine, and consequently greater development of power.

It is obvious that other forms of governor than that shown in the drawings may conveniently be employed to raise or lower the rod G, or some other means may conveniently be adopted for imparting to the eccentric a motion of rotation relatively to the shaft D without departing from the spirit of this invention. Neither is this invention limited to the employment of mercury contacts or to mercury contacts covered with oil, although this latter arrangement is preferred.

I claim—

1. In an explosive-engine, a pivoted lever, an igniting apparatus and a make-and-break device for the electric current connected to said apparatus operated by said lever, an eccentric-rod hinged to and operating said lever, a hollow rotary spindle geared to the engine-shaft, governor mechanism carried by said spindle, a shaft mounted in said spindle and connected with said governor mechanism, a sleeve having a screw-threaded extension movable on said spindle and connected with said shaft, a threaded eccentric carried on said spindle and engaged by said screw-threaded extension of the sleeve, and means for holding said eccentric against movement lengthwise of said spindle.

2. In an explosive-engine, the igniting-electrodes, an electric circuit therefor, a make-and-break device for said circuit, a pivoted lever carrying one of the contacts of said make-and-break device for actuating the same to close and open said circuit, a rod hinged to said lever, a rotatable eccentric connected with said rod, means for holding said eccentric against movement lengthwise of its axis, a screw engaging with said eccentric for moving the same relative to the rod, and governor mechanism for moving said screw.

3. In an explosive-engine, the igniting-electrodes, an electric circuit therefor, a make-and-break device for said circuit, an eccentric connected with one of the contacts of said make-and-break device for actuating the same to close and open said circuit, a screw engaging with said eccentric for adjusting the same, and governor mechanism connected with said screw.

4. In an explosive-engine, two chambers for containing the explosive compound, the igniting-electrodes for each of said chambers, an electric circuit for the igniting-electrodes of each chamber, a make-and-break device for each circuit, an eccentric connected with one of the contacts of each make-and-break device for actuating the same to close and open first one circuit and then the other, means for rotating said eccentric, a screw connected with said eccentric for adjusting the same, and a governor connected with said screw.

5. In an explosive-engine, two chambers for containing the explosive compound, the igniting-electrodes for each of said chambers, an electric circuit for the electrodes of each chamber, a make-and-break device for each circuit, a pivoted lever carrying one of the contacts of each make-and-break device, and means for vibrating said lever for actuating the same to close and open first one of said circuits and then the other consisting of a rotatable eccentric, a rod connecting said lever with said eccentric, means for holding said eccentric against movement lengthwise of its axis, a governor, and mechanism operated by said governor and connected with said eccentric for adjusting the latter.

6. In an explosive-engine, two chambers for containing the explosive compound, the igniting-electrodes for each of said chambers, an electric circuit for the electrodes of each chamber, a make-and-break device for each circuit, a pivoted lever carrying one of the contacts of each make-and-break device, an eccentric-rod hinged to and operating said lever to close and open first one circuit and then the other, a hollow rotary spindle geared to the engine-shaft, governor mechanism carried by said spindle, a shaft mounted in said spindle and connected with said governor mechanism, a sleeve having a screw-threaded extension movable on said spindle and connected with said shaft, a threaded eccentric carried on said spindle and engaged by said screw-threaded extension of the sleeve, and means for holding said eccentric against movement lengthwise of said spindle.

Dated this 19th day of August, 1898.

CHARLES M. JOHNSON.

Witnesses:

F. ALFORD ARMSTRONG,

C. HADINGHAM.