No. 877,024. PATENTED JAN. 21, 1908.

C. H. WAY.

GOVERNOR FOR EXPLOSION ENGINES.

APPLICATION FILED MAY 22, 1905.

Fig. 2.

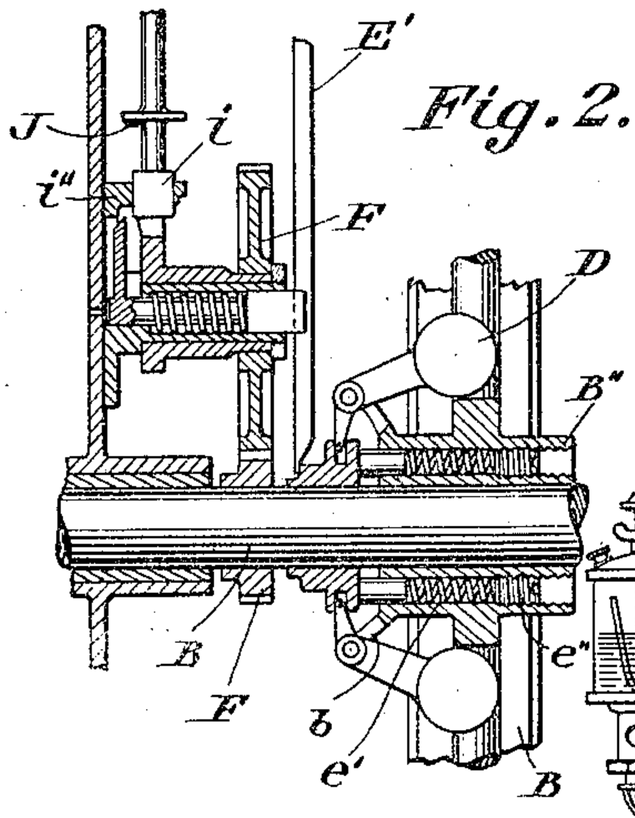
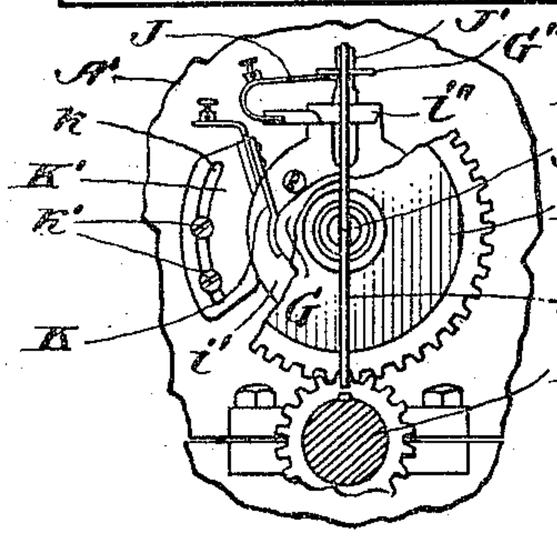


Fig. 1.

Fig. 3.



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GOVERNOR FOR EXPLOSION-ENGINES.

No. 877,024. Specification of Letters Patent. Patented Jan. 21, 1908.

Application filed May 22, 1905. Serial No. 261,570.

To all whom it may concern:

Be it known that I, CHARLES H. WAY, a citizen of the United States, and a resident of the city of Lansing, in the county of Ingham, State of Michigan, have invented certain new and useful Improvements in Governors for Explosion-Engines, of which the following is a specification.

This invention relates to improvements in governors for explosion engines.

The objects of this invention are, first, to provide an improved governor mechanism for explosion engines, by which, when the speed of the engine exceeds the predetermined rate, the charging of the engine is automatically prevented, thereby preventing an explosion and thereby controlling the speed. Second, to provide an improved governor mechanism for an explosion engine, adapted to disconnect the electrical connections for the igniter mechanism when the speed of the engine exceeds a predetermined rate. Third, to provide an improved governor for explosion engines embodying the above advantages, which is very simple in construction and adjustment.

Further objects, and objects relating to structural details, will definitely appear from the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification.

The invention is clearly defined and pointed out in the claims.

A structure embodying the features of my invention is clearly illustrated in the accompanying drawing forming a part of this specification, in which—

Figure 1 is a detail vertical sectional view of a structure embodying the features of my invention, certain parts, such as shafts, valves, and the like, being shown in full lines. Fig. 2 is a detail sectional view showing the position of the parts when the governor is in a position of rest. Fig. 3 is a detail view showing the arrangement of the electrical connections.

In the drawing similar letters of reference refer to similar parts throughout the several views.

Referring to the drawing, the base A is of any suitable construction, and is preferably adapted to serve as a storage for the liquid hydrocarbon. A crankshaft casing A′ is supported on the base A and is preferably made integral therewith. The crankshaft casing is provided with suitable bearings, as A″, for the crankshaft B′. A pair of fly wheels B are provided. The cylinder C is mounted upon the upper end of the crankshaft casing, and its inner end opens therein. These parts are preferably constructed as I have illustrated and described in my application for Letters Patent filed March 30, 1905, Serial No. 252,926, although they may be of any style preferred.

A pair of governor weights D are pivoted on the arms *b* which project from the hub B″ of one of the fly wheels. The inner ends of the governor weight arms engage the grooved collar E which is slidably mounted on the crankshaft B′. The governor weights are held normally inward by the coiled springs *e′* which are arranged in suitable chambers *b′* formed in the hub B″. The inner ends of these springs bear against the blocks *e* which press against the collar E, thus forcing the collar normally inward. The springs *e′* are adjustably retained in the chambers *b′* by means of the screws *e″*, as clearly appears from the drawing. Thus arranged, the centrifugal force in the governor weights throws the collar E outwardly against the tension of the springs.

An actuating cam G for the exhaust valve I is mounted upon the hollow spindle *g* secured upon the side of the crank shaft casing. The cam G is driven by the gear F F′, the gear F being secured to the crankshaft B, and the gear F′ being secured to the hub G′ of the cam G.

When the engine is running at its normal rate, or at any rate below that predetermined as the maximum speed, the stem I′ of the exhaust valve I engages the actuating cam G therefor. When the speed of the engine exceeds the predetermined or maximum rate at which the engine is set to run, the exhaust valve I is locked in its open position by means of the finger *g″* carried by the slide or plunger *g′*. The slide or plunger *g′* is arranged in the hollow spindle *g* of the actuating cam. A spring *g‴*, which is arranged within the hollow spindle to engage this slide, holds the same normally outward. This slide is connected to the collar E on the crankshaft by means of the rod E′ which engages the outer end thereof. The rod E′ is pivoted at *e‴*, its lower end engaging the collar. When the collar is in its inner or nor-

mal position, the plunger, through the connection described, is forced inwardly, throwing the finger g'' out of engagement with the head i of the exhaust valve stem, thereby allowing the same to engage the actuating cam G. A coiled spring I'' on the valve stem holds the same normally in engagement. When the speed of the engine exceeds the maximum rate at which it is set, the collar E is thrown outwardly by the governor weights, thereby releasing the slide g' and allowing the finger g'' thereof to engage the exhaust valve stem, locking it out of its engaging position with the cam and thus holding the valve open, so that no charge is taken into the engine until the speed again falls below the predetermined rate. Then the governor balls drop back, disengaging the finger and allowing the cam and valve stem to engage as before. By thus holding the exhaust valve open, cold air is drawn into and forced out of the cylinder during the time that the engine is running above its normal predetermined rate, thereby cooling the valves and the engine cylinder, and wiping the same free of exhausted gases.

The inlet valve H is a suction valve and is operated by suction against the tension of the spring H'' arranged on the stem H'. These parts are of the usual or any desired construction. The igniter is of the well-known jump spark variety, the details of which are not here illustrated.

The spring contact member J is mounted upon the outwardly projecting lug i'' to which the head i of the valve stem reciprocates. In operation this spring is adapted to be engaged by the projection G'' on the valve stem as it reciprocates, thereby making and breaking the circuit through the metal parts of the machine. When the valve stem is locked out of operation, as described, it is evident that the circuit remains broken. A second contact member K is carried by an adjustable plate K', which is secured to the crank shaft casing by means of set screws k' arranged through a suitable slot k in the plate. As the cam G revolves it engages the contact member K, thereby causing and timing the sparking, the timing being regulated by the adjustment of the plate, thereby adjusting the position of the contact member K, and, as is evident, causing the cam to engage it earlier or later in the stroke. It is apparent that no spark takes place except when the circuit is made through the contact member J, as described.

When the valve stem I' is locked out of operation by means of its connection to the governor, the electrical connection is broken, thereby preventing the sparking during such period. This is of great advantage, in that the electrical current is not needlessly exhausted. To vary the speed of the engine the springs e' of the flywheel are stiffened or relaxed. By stiffening the spring it is necessary that the engine run faster in order to throw the governor balls out the required distance to allow the finger g'' to engage the exhaust valve stem. By relaxing the springs the engine is caused to run slower, as it requires less speed to accomplish this result.

By my improved governor mechanism I am enabled to run an engine with a minimum waste of fuel, and at the same time a minimum amount of electricity is used. I am enabled to control the engine so that its speed is comparatively even. The structure is very simple and economical, and is very easy to adjust to change the speed of the engine. I have illustrated and described the same in detail in the form preferred by me on account of its structural simplicity and the convenience with which it may be adjusted. I am, however, aware that it is capable of considerable structural variation without departing from my invention.

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

1. In an explosion engine, the combination of a governor; an exhaust valve; a stem therefor; an actuating cam for the said exhaust valve; a hollow spindle for said cam; a plunger arranged in said hollow spindle; a finger on said plunger adapted to engage said exhaust valve stem when said plunger is in its outer position, to hold the same open; connections for said governor and plunger; an electrical contact member; and a projection on said exhaust valve stem adapted to engage said contact member as said exhaust valve is operated, for the purpose specified.

2. In an explosion engine, the combination of a governor; an exhaust valve; a stem therefor; an actuating cam for said exhaust valve; a hollow spindle for said cam; a plunger arranged in said hollow spindle; a finger on said plunger adapted to engage said exhaust valve stem when said plunger is in its outer position, to hold the same open; and connections for said governor and plunger, for the purpose specified.

3. In an explosion engine, the combination of a crank shaft; a flywheel, the hub of said flywheel having chambers formed therein; governor weights pivotally mounted on said flywheel; a collar slidingly mounted on said shaft connected to said governor weights; blocks arranged in the said chambers in said flywheel hub to engage said collar; coiled springs arranged in said chambers to engage said blocks; screws for adjustably retaining said springs in said chambers; an exhaust valve; an actuating cam for said exhaust valve; means for holding said exhaust valve in its open position; and a connection from said collar thereto, whereby said means are controlled, for the purpose specified.

4. In an explosion engine, the combination

of a crank shaft; a flywheel, the hub of said flywheel having chambers formed therein; governor weights pivotally mounted on said flywheel; a collar slidingly mounted on said shaft connected to said governor weights; blocks arranged in the said chambers in said flywheel hub to engage said collar; coiled springs arranged in said chambers to engage said blocks; an exhaust valve; an actuating cam for said exhaust valve; means for holding said exhaust valve in its open position; and a connection from said collar thereto, whereby said means are controlled, for the purpose specified.

5. In an explosion engine, the combination of a crank shaft; a flywheel, the hub of said flywheel having chambers formed therein; governor weights pivotally mounted on said flywheel; a collar slidingly mounted on said shaft connected to said governor weights; blocks arranged in the said chambers in said flywheel hub to engage said collar; coiled springs arranged in said chambers to engage said blocks; an exhaust valve; and means controlled by the said collar for holding said exhaust valve in its open position when the speed of the engine exceeds a predetermined rate.

In witness whereof I have hereunto set my hand and seal in presence of two witnesses.

CHARLES H. WAY. [L. S.]

Witnesses:
E. W. GOODNOW,
L. A. RUGGLES.