

UNITED STATES PATENT OFFICE.

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GAS-ENGINE ATTACHMENT.

SPECIFICATION forming part of Letters Patent No. 510,879, dated December 19, 1893.

Application filed December 22, 1892. Serial No. 456,015. (No model.)

To all whom it may concern:

Be it known that we, MORA M. BARRETT and JOHN F. DALY, citizens of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Gas-Engine Attachments; and we do hereby declare the following to be a full, clear, and exact description of said invention, such as will enable others skilled in the art to which it most nearly appertains to make, use, and practice the same.

Our invention relates to a certain new and useful improvement in gas engine attachments, which consists in the arrangement of parts and details of construction as will be hereinafter more fully set forth in the drawings, described and pointed out in the specification.

The object of the present invention is to provide an automatic locking device, which, when the engine is running with undue speed, will cause the exhaust operating mechanism to be held in such a position as to maintain the engine exhaust valve open until the speed of the engine is decreased, when the locking device will automatically be thrown from engagement with the exhaust operating mechanism.

Referring to the drawings forming a part of this application, wherein similar letters of reference are used to denote corresponding parts throughout the entire specification and several views—Figure 1, is a side view of a horizontal gas engine, showing improved attachments connected thereto; Fig. 2, an enlarged detail view of supplemental chamber with firing electrode secured therein, showing adjustability of fixed electrode; Fig. 3, a top plan view of Fig. 2, with cover of chamber removed; Fig. 4, an enlarged side elevation of the locking device for exhaust operating mechanism; and Fig. 5, a top plan view of Fig. 4.

The letter A is used to represent the engine frame, and B, the engine cylinder, while A', and B', indicate the fly-wheel and engine piston respectively, all of which parts, together with supplemental chamber C, being of usual construction in this class of machinery, have call for no specific description herein.

Within supplemental chamber C, is located electrode *a*, preferably formed of elastic

spring metal, which is held in place by means of insulated plug *b*, into which it is secured as shown. This plug is externally screw-threaded, as shown at *a'*, and screws into internally screw-threaded collar *b'*, which is in turn screwed into open end *c*, of supplemental chamber, as shown. The firing spark is created by means of the spur or pin *C'*, located on shaft *c'*, contacting with the flexible electrode, as reciprocated by the oscillating shaft *c'*. This spur or pin constitutes the other or non-elastic electrode.

It is obvious that inasmuch as the firing spark is created by the wiping of one electrode against the other, a "quick" or "slow" firing may be created by moving the fixed electrode in or out, owing to the fact that if the fixed electrode is adjusted so that the end of each electrode just makes contact a "quick" firing will result, while when moved inward so as to allow of each overtopping for a given length, a "slow" firing will result, for the reason that a longer period of time will be consumed before the two electrodes separate, the separation of which creates the spark for ignition of the inflowing gas. This manner of creating a spark, that is by reciprocating one electrode and cause same to wipe against the other, first on its up movement and then on the downward one, is fully set forth in Letters Patent No. 430,505, granted to Barrett and Daly June 17, 1890, for an improved gas engine, but in said patent no arrangement is made for providing a "quick" or "slow" firing.

The supplemental chamber is connected with the engine cylinder or combustion chamber in the ordinary manner, and the inflow of gas through inlet pipe D, and exhaust pipe D', is controlled by valves D², D³, the valve stems *d*, *d'*, being surrounded by springs *d*², *d*³, in order to make the valves spring actuated.

To the outer end of shaft *c'*, is secured wheel E, to which is pivoted inner end of operating rod E', the opposite end of which is pivoted or loosely connected to upper arm of crank lever E², which lever is fulcrumed to the engine frame by means of pin *e*, and said crank lever is made to reciprocate by means of cam E³, which is secured to shaft *c'*, back of plate or wheel E⁴, contacting during rotation with

roller or small wheel e'' , pivoted to outer end of lower arm of crank lever, as shown. This cam or segment E^3 , is connected to wheel E^4 , by means of pin e^2 , which passes through slot e^1 . As the cam E^3 during its rotation rides upon roller e'' , lower arm of crank lever is thrown inward, which throws upper arm outward, consequently drawing rod E' , likewise, which causes shaft c' , to reciprocate, and when cam E^3 , has passed beyond roller e'' , the tension of spring F , serves to impart an opposite throw to crank lever, thus reversing reciprocation of shaft c' .

Upon the inner end of shaft e' , inside the frame, see Fig. 5, is located large gear wheel F' , which meshes with smaller gear F^2 . This shaft has fly-wheel A' , fastened to one end and governor-wheel f' , to the other. To the face of this wheel is pivoted, by means of pin f^2 , cam governor f^3 , the free end of which is connected to governor wheel by means of spring f^4 .

Lower end of exhaust valve stem d' , rests upon outer end of arm g , of crank lever G , when lifted, which lever is connected to machine frame by means of pin g' ; and to arm g^2 , of crank lever G , is pivoted inner end of exhaust operating rod G' , the outer end of which is connected to upper end of rocker arm G^2 . To the inner face of this rocker arm is fastened a shoe g^3 , which shoe projects beyond face of wheel E^4 ; consequently as said wheel rotates the rollers or projections h , contact with shoe g^3 , and forces rocker arm G^2 , to swing outward, carrying therewith operating rod G' , which throws lever arm of crank-lever G , upward and opens exhaust valve. When roller h , has passed beyond shoe g^3 , the resiliency of spring surrounding exhaust valve stem, forces crank lever G , back into position, shown in Fig. 1, and closes the exhaust. By making the shoe g^3 , adjustable, by means of thumb-screw h' , the lift of exhaust valve may be increased or decreased at will.

To the machine is pivoted catch rod H , which is located between governor wheel f' , and top of pivoted upright G^2 . See Figs. 1 and

4. This catch bar is held in a raised position by means of spring H' , one end of which is secured to said rod, while the other is fastened to the engine frame. To the top of said bar is fastened a spring h^2 , which prevents the catch bar contacting with periphery of governor wheel. If the engine speed increases beyond a certain rate, the velocity of governor wheel causes spring-actuated cam governor to be thrown outward by centrifugal force, which, governor during rotation of governor wheel, bears downward upon catch bar or rod H , and causes hooked end i , thereof to engage upper end of pivoted standard G^2 , when the latter is thrown outward in order to open exhaust valve, as before described, and maintain same in this position and exhaust open, until engine decreases its speed, when tension of spring f^4 overcomes centrifugal force of governor wheel and lifts cam governor from contact with catch bar or rod, when power of spring H' , serves to raise the catch bar from engagement with pivoted standard, which when released, allows of exhaust valve closing.

Having thus described our invention, what is claimed as new and Letters Patent requested upon is—

The combination with the exhaust valve and the rocker arm connected therewith, of a governor wheel, arranged above the rocker arm, a catch bar arranged above the rocker arm and adapted to engage and hold the upper end of the same when acted upon by the governor wheel, a spring holding said catch bar normally raised, and a spring arranged between said bar and the governor wheel to prevent the bar being unduly acted upon by said wheel.

In testimony whereof we affix our signatures in presence of two witnesses.

MORA M. BARRETT.
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Witnesses:

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