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APPARATUS FOR IGNITING GASEOUS FUEL.

APPLICATION FILED AUG. 30, 1907.

912,066. Patented Feb. 9, 1909.

Fig. 3.

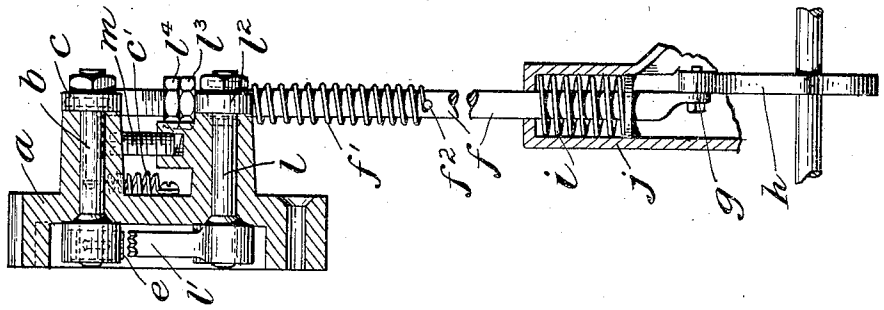


Fig. 2.

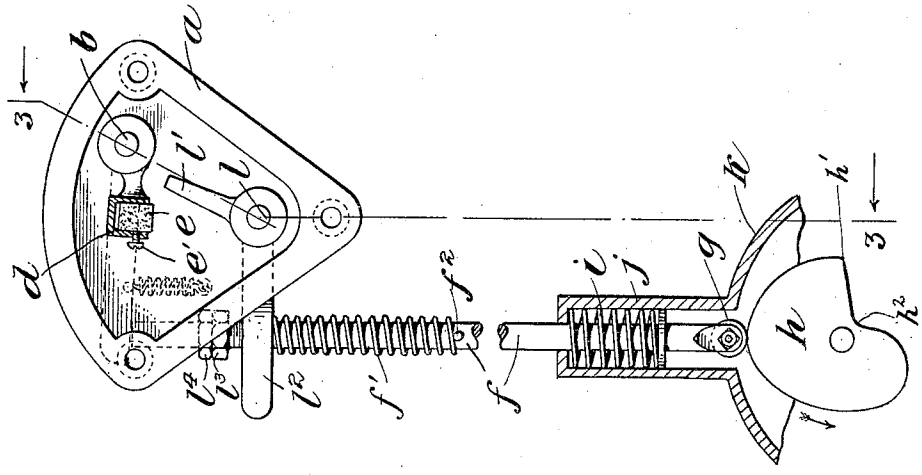
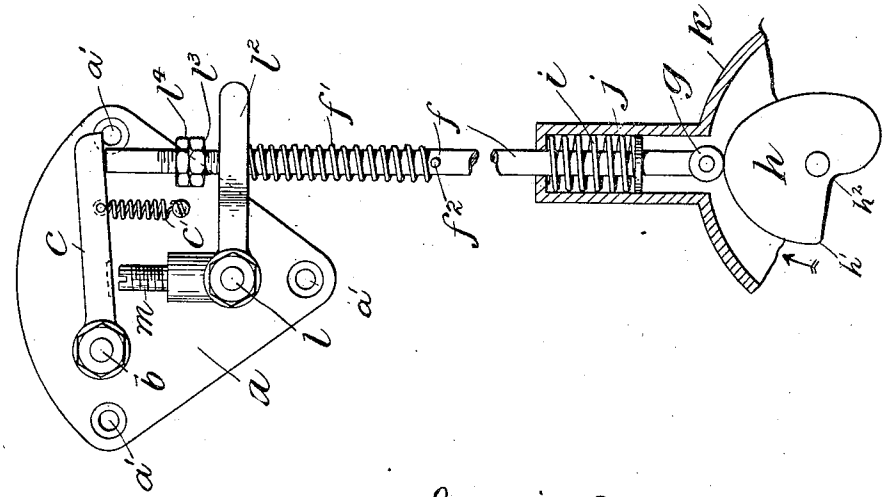


Fig. 1.



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UNITED STATES PATENT OFFICE.

DAVID S. BROWN, JR., AND FRANK C. STINZING, OF NEW YORK, N. Y.

APPARATUS FOR IGNITING GASEOUS FUEL.

No. 912,066. Specification of Letters Patent. Patented Feb. 9, 1909.

Application filed August 30, 1907. Serial No. 390,790.

To all whom it may concern:

Be it known that we, DAVID S. BROWN, JR., and FRANK C. STINZING, citizens of the United States, and residents, respectively, of the borough of Manhattan and borough of Bronx, in the city, county, and State of New York, have invented certain new and useful Improvements in Apparatus for Igniting Gaseous Fuel, of which the following is a specification.

This invention relates to means intended and designed to cause the ignition of gaseous fuel, more particularly of the gaseous explosive charges of internal combustion motors, as carbureted air, through the medium of sparks, or sprays of fire, produced by percussion, as through the sudden striking of certain hard substances.

The object of our invention is to provide a simple, reliable and effective igniter for combustion apparatus, of whatever description, in which the "flint and steel" method of producing fire may be advantageously utilized.

As is well known, certain varieties of silica, as agate, bloodstone, chalcedony, carnelian, jade, carborundum, flint and others, all of which belong to the quartz family, and which will be generally referred to hereinafter as "flint", when thoroughly dry and hard, will produce fire in the form of sparks, on being struck by a piece of steel. Sparks so produced have great penetrating and heating power, and are, therefore, well adapted for use in gas and oil engines, in which rapidity and intensity of ignition are considerations of prime importance. A hot spark that penetrates or projects into the explosive or combustible charge in the cylinder of a gas engine with rapidity, is capable of increasing the power of explosion, quite materially due, no doubt, to an increased speed of flame propagation. Furthermore, flint and steel igniters are not only capable of furnishing a succession of sparks, practically unlimited as to extent, but a plurality of sparks simultaneously, producing thereby a spray of fire of great intensity and avidity, through which a greater degree of certainty of ignition is obtained.

In the accompanying drawings, in which like characters of reference indicate like parts in all the views and figures, we have shown one way in which the flint and steel method of producing fire may be carried into effect to ignite the gaseous charges of internal combustion apparatus.

Figure 1 is a front elevation of the igniter. Fig. 2 is a rear view. Fig. 3 is a cross section on the line 3—3 of Fig. 2.

In said figures the letter a indicates a pocket or housing which can be secured to the wall of the combustion chamber of a gas engine, being provided with bolt holes, as a', for that purpose. A pivot, as b, is mounted in said pocket, and carries, exteriorly of the pocket, a horizontal arm c; and, within the pocket, a flint holder d. The flint holder comprises a socket adapted to receive a piece of flint, as e, which projects slightly outside the pocket and is held in position as by a set screw e; and a spring, as c; connects the arm c with pocket e at a lower point on the latter, exerting tension to draw said arm, and the flint holder d, downward. A vertical rod f, which is adapted to be actuated by a cam, bears at its upper end against the lower surface of the arm c, to move the latter upward. Said rod f, carries a roller g at its lower end, in position to be actuated by a cam h. A coiled spring i, about the lower part of rod f, and contained in a sheath j, which extends from cam-case k, serves to hold the roller compressively against the cam. Also mounted in the pocket a is a pivot l, which carries a bell-crank lever, one arm of which, as l', is intended to serve as a striker, while the other arm, as l^2, is bifurcated, and straddles the rod f. A light coiled spring, as f', is held at its lower end by a pin f^2, and at its upper end is adapted to engage the arm l^2 of the bell-crank lever, thus constituting a yielding stop for engagement with the lower side of said arm; while an adjustable stop, as a set-nut l^3 and a lock-nut l^4, is provided for engagement with the upper side of the arm.

In the drawings, the roller g is shown at the highest point of the cam, and the latter turning in the direction of the arrow. The height of the cam decreases to the point indicated at h', at which point there is a sharp descent, to the lowest point h^2 of the

cam; so that the roller, on passing point h' drops quickly to said lowest point, carrying, of course, the rod f with it. In this action, the bell-crank lever has been swung about its pivot, so that the striker l', which in the ascending movement of rod f had passed rearward, without contact, across the face of the flint, with the drop of rod f, springs forward across the face thereof, producing a spark or a shower of sparks. To explain this operation particularly, we will say that, as the cam turns to cause the roller to travel from its lowest to its highest point, the initial upward movement of the rod f effects no movement of the arm c and little or no movement of the arm l^2 of the bell-crank lever. The arm c is stationary, because the rod f had dropped considerably below it, leaving the arm resting against the adjustable support m. The bell-crank lever remains stationary, because the spring f' is a light one, whereby the initial upward movement of the rod f results mainly in a slight compression of the spring, so that the bell-crank lever may be substantially unaffected. The compression of the spring f' is but slight; and, as the rod continues to move upward, the arm l^2 is elevated, thereby causing the striker l' to commence to travel from a position well in advance of the flint toward the latter. Before the roller g arrives at the highest point of the cam, and while the striker l' is still in advance of the flint, the top of the rod f engages with the under side of the arm c, raising the latter, together with the flint, slightly. This permits the striker l', in its uninterrupted movement, to pass across and beneath the face of the flint, without contacting therewith. The parts are now in the position shown most clearly in Fig. 2. Now, as the surface of the cam descends beneath the roller, the lowering of the rod f permits the spring c' to draw the arm c and the flint downward. The initial downward movement of the rod causes little or no movement of the arm l^2 connected with the striker, the spring f' at this time expanding slightly to correspond with its former compression. The result is that the flint descends to its lowest position, in the path of the striker, while the latter is still in rear of the flint. Thus, when the roller g is at the point h' of the cam, the flint is in position to be struck, and the striker is immediately behind the flint. The nut l^3 is now about to engage, or has already engaged, the upper side of the arm l^2. Consequently, as the roller g makes its sharp descent from the point h' to the point h^2, the jump of the rod f causes the striker to traverse quickly the lower face of the flint, producing the shower of sparks already alluded to.

However, we do not limit ourselves to the particular features of construction and operation herein shown and described, as we are aware that these may be modified very considerably without departing from the spirit of the invention. The flint may be of any suitable shape and character, and conveniently carried in a holder of the kind shown or of any other suitable character, whereby it may be conveniently adjusted in position and removed for removal. The striker may also be of any practical character. It is important that either the flint or the striker, or both, be yieldingly supported, so that, when striking contact is made between these members, there shall be a cushioned effect, to avoid the danger of breaking. The springs c' and f' both contribute to this cushioning effect.

What we claim as new and desire to secure by Letters Patent in the United States is:—

1. A flint and steel igniter, for gas engines, comprising a flint holder and a flint therein, a steel, and actuating means so associated with said members that they pass each other with a clearance in one direction and contact to produce a spark in the other direction.

2. A flint and steel igniter for gas engines, comprising a movable flint holder and a flint therein, a movable striker, and actuating mechanism associated with said flint and striker in such fashion that the flint is moved out of the path of the striker with reference to the travel of the latter in one direction, but moved into the path thereof with reference to its travel in the reverse direction.

3. A flint and steel igniter for gas engines, comprising a movable flint holder and a flint therein, a movable striker, and reciprocable actuating mechanism which has positive engagement with the flint holder and yielding engagement with the striker during movement in one direction, whereby the flint is lifted out of the path of the striker, and positive engagement with the striker on the return movement, whereby the striker is brought into violent contact with the flint.

4. A flint and steel igniter for gas engines, comprising a pivoted flint holder and a flint therein, a pivoted striker, a spring tending to draw the flint holder to position the flint in the path of the striker, and a cam actuated operating rod adapted during its movement in one direction to engage positively with said flint holder to move the same against the tension of its spring to carry the flint out of the path of the striker, together with a spring encircling said rod and adapted to yieldingly engage and move the striker during the same operation, said rod in its reverse travel being adapted to engage the striker positively to cause the latter to contact forcibly with the flint which has been permitted by this movement of the rod to occupy a position in the path of said striker.

5. A flint and steel igniter for gas engines comprising an ignition pocket, a flint holder

pivoted therein, a flint carried by said holder, and a pivotal striker, one of said members being cushioned; together with means adapted to be mechanically operated whereby a clearance is provided between the flint and striker at one period of their movement, and whereby said clearance is eliminated at another period of their movement to permit said members to co-act.

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In the presence of—
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