

P. PAULSON.  
IGNITER FOR EXPLOSIVE ENGINES.  
APPLICATION FILED MAY 10, 1909.

970,545.

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Fig. 2.

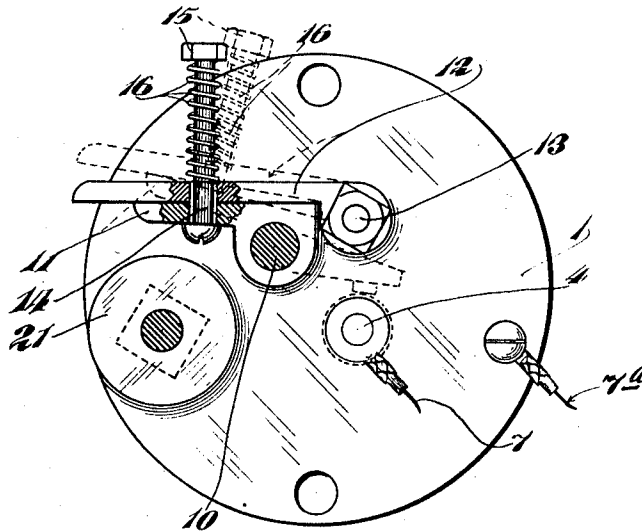


Fig. 4.

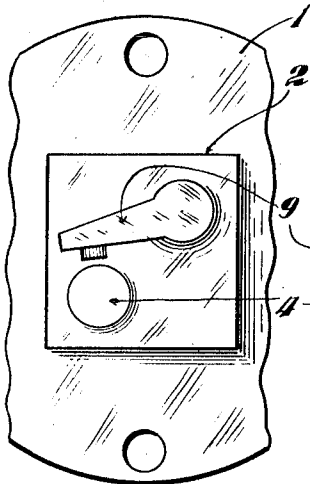


Fig. 3.

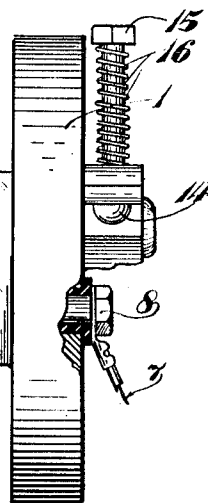
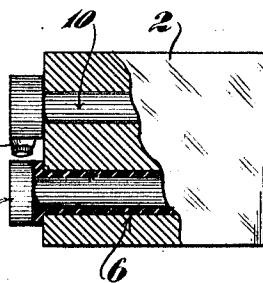
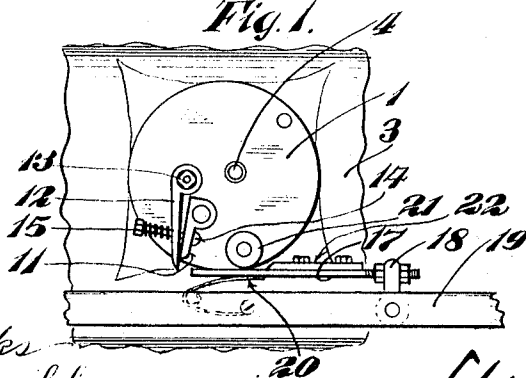


Fig. 1.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

PETER PAULSON, OF MARSHFIELD, WISCONSIN.

IGNITER FOR EXPLOSIVE-ENGINES.

970,545.

Specification of Letters Patent. Patented Sept. 20, 1910.

Application filed May 10, 1909. Serial No. 435,146.

*To all whom it may concern:*

Be it known that I, PETER PAULSON, a citizen of the United States, residing at Marshfield, in the county of Wood and State of Wisconsin, have invented certain new and useful Improvements in Igniters for Explosive-Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to igniters for explosive engines and more particularly to those of the well known make and break type, and has for its especial object to provide improved means for effecting quick separation of the sparking electrodes at the proper time after they have been forced into contact and when they are released to produce the igniting spark.

To the above ends, the invention consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

In the accompanying drawings, which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings, Figure 1 is a view in side elevation, showing the outer mechanism of the so-called igniter head and a cooperating igniter tappet, which is carried by a reciprocating valve rod; Fig. 2 is a side elevation which shows the igniter head on a larger scale than in Fig. 1 and with some parts broken away and some parts removed; Fig. 3 is an edge elevation of the igniter head, some parts being sectioned; and Fig. 4 is an elevation looking at the inner side of the igniter head, some parts being broken away.

The body of the igniter head is, as shown, in the form of a heavy disk-like plate 1 provided with a laterally projecting hub 2, which, as is customary, projects into the cylinder 3, the plate 1 being bolted or otherwise rigidly secured to said cylinder and a gas tight joint being formed between the same and the cylinder.

The fixed sparking electrode 4 has a stem or bolt which extends through the hub 2 and plate 1 and is insulated therefrom by a sleeve 6 of suitable insulating material. One of the wires 7 of the igniting circuit is connected to the outer end of the stem of the electrode 4, as shown, by means of a nut 8.

The other wire 7<sup>a</sup> of the igniting circuit is shown as directly connected to the plate 1.

The movable sparking electrode, which co-operates with the fixed electrode 4, is in the form of an arm 9 secured to the inner end of a rock shaft 10 that is journaled in and extends through a plate 1 and hub 2. The hub of a short so-called secondary arm 11 is rigidly secured to the outer end of the rock shaft 10 and the flat side thereof normally engages the flat face of a cooperating so-called primary arm 12, the hub of which is positioned close to the hub of the secondary arm 11 and is pivotally connected to the plate 1, as shown, by a nut-equipped stud 13. The two arms 11 and 12 are provided with co-incident perforations through which a bolt 14 is loosely passed. On the projecting end of the bolt 14 is a nut 15 and between this nut and the primary lever 12 a coiled spring 16, which surrounds the said bolt, is compressed. The tension of this spring 16 normally holds the two arms 11 and 12 engaged flatwise, as shown by full lines in Fig. 2, and in this position of the said levers, the movable electrode 9 is separated from the fixed electrode 4, as shown in Fig. 4. It may be here noted that the movable electrode 9 is electrically connected to the wire 7<sup>a</sup> through the plate 1 and rock shaft 10.

The tappet for striking the end of the primary arm 12 to produce the spark between the electrodes 4 and 9 may, so far as the present invention is concerned, be operated in any suitable way. As shown, however, the igniter tappet is in the form of a blade 17 adjustably secured to a short arm 18 that is pivotally connected to a reciprocating valve rod 19. This valve rod 19 must, of course, be operated with a properly timed action and, in practice, would preferably be arranged to operate the exhaust valve not shown. A light spring 20, applied to the rod 19, yieldingly presses the igniter tappet 17 upward against a roller 21 journaled on the outer surface of the plate 1. Also, the said igniter tappet 17 is provided with an adjustable cam plate 22 which engages with the roller 21 at the proper time in the movement of the valve rod 19 from the right toward the left in respect to Fig. 1, to permit the engagement of said igniter tappet with the arm 12 and to cause the disengagement of said tappet of said arm at proper times in respect to the piston and crank shaft move-

ment. When the tappet 17 engages the free end of the arm 12 under movement from the right toward the left, in respect to Fig. 1, it rocks the two levers 11 and 12 on their independent pivots and forces the said levers into positions, indicated by dotted lines in Fig. 2, by reference to which it will be noted that the electrode 9 is moved into engagement with the electrode 4 and that the two levers are separated throughout their main body portions, the point of the secondary lever 11 only being engaged with the primary lever 12. Furthermore, when the two electrodes 9 and 4 are engaged, the secondary arm 11 can move no farther, but the igniter tappet may force the primary lever 12 beyond the position indicated by dotted lines in Fig. 2, so as to thereby completely separate the two levers and, when the said tappet is properly adjusted, this complete separation of the two levers will take place each time immediately before the tappet is forced out of engagement with and releases the said primary lever 12. When the said primary lever is released by disengagement of the tappet 17 from the arm 12, the latter, by the spring 16, will be forced against the secondary lever 11, striking the same a sharp blow which serves to instantaneously separate the electrode 9 from the electrode 4, thereby insuring a good spark.

The efficiency of the igniting device above described has been thoroughly demonstrated in practice. It is of comparatively small cost, has no parts that are likely to get out of order, is extremely reliable in its actions and insures the production of large sparks such as desired in all explosive engines and absolutely required in high speed explosive engines.

What I claim is:

1. An igniting mechanism for explosive engines, comprising a pair of sparking electrodes, one of which is movable in respect to the other, a pair of pivoted arms, one of which is connected to the movable electrode and the other of which has its pivot eccentric to that of said electrode connected lever, a common spring device reacting against said two pivoted arms and yieldingly holding the same pressed together flatwise, and a tappet operative on one of the said arms, substantially as described.

2. In an igniting mechanism for explosive engines, the combination with a fixed and a

movable electrode, of a secondary arm secured to said movable electrode, a primary arm having an independent pivot eccentric to the pivot of said movable electrode, a bolt passed through said two arms, a spring on said bolt normally holding said two arms engaged flatwise and said electrodes separated, and a tappet operative on the free end of said primary arm to effect the engagement of said movable electrode with the cooperating electrode, the said spring when released serving to force the two levers together and to effect a quick separation of the electrodes, substantially as described.

3. In an igniting mechanism for explosive engines, the combination with a head detachably secured to an engine cylinder, of a fixed electrode and a movable electrode, the former having a stem extended through and insulated from said head and the latter having a rock shaft extended through and journaled in said head, a secondary arm secured to the outer end of said electrode rock shaft, a primary lever pivoted to said head adjacent but eccentric to the hub of said secondary arm, a bolt passed through co-incident passages in said two arms, a spring on said bolt normally holding said two arms engaged flatwise and said electrodes separated, and a tappet operative on the free end of said primary arm to separate said arms and move said electrodes into engagement, said spring, when said primary arm is released from said tappet, serving to throw said primary arm against said secondary arm and effect a quick separation of said electrodes, substantially as described.

4. An igniting mechanism for explosive engines, comprising a pair of sparking electrodes, one of which is movable in respect to the other, a pair of pivoted arms, one of which has its pivot eccentric to that of said electrode connected lever, a common adjustable spring device reacting against said two pivoted arms and yieldingly holding the same pressed together flatwise, and a tappet operative on one of the said arms, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

PETER PAULSON.

Witnesses:

P. N. CHRISTENSEN,  
JACOB CHRISTENSEN.