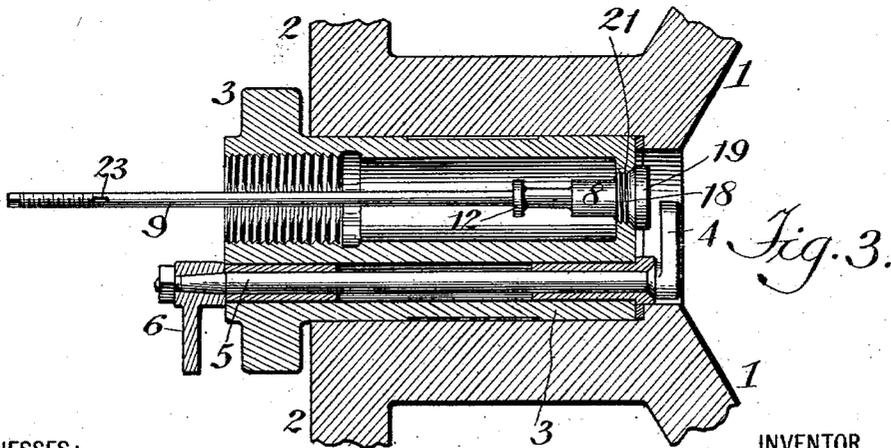
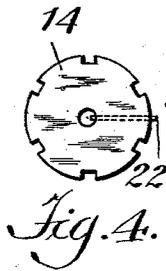
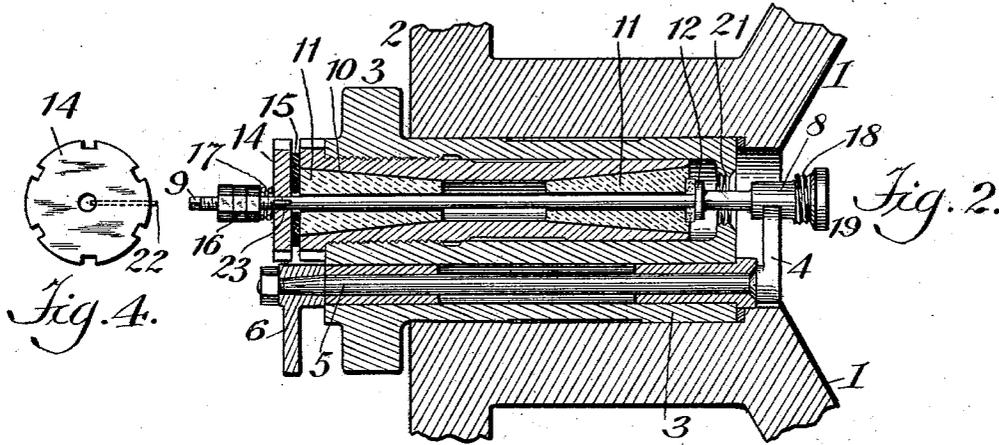
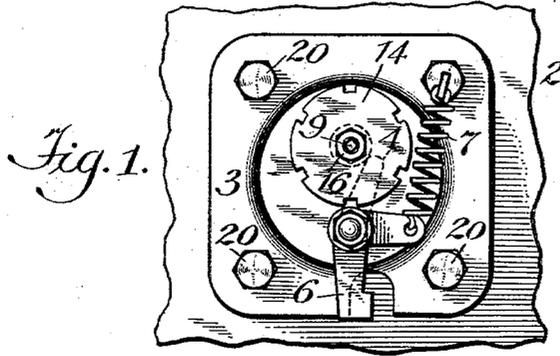


No. 753,226.

PATENTED MAR. 1, 1904.

B. BOTKOWSKI.
IGNITING DEVICE FOR EXPLOSIVE ENGINES.
APPLICATION FILED DEC. 24, 1902. RENEWED AUG. 1, 1903.

NO MODEL.



WITNESSES:

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BORIS BOTKOWSKI, OF NEW YORK, N. Y., ASSIGNOR TO THE DE LA VERGNE REFRIGERATING MACHINE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

IGNITING DEVICE FOR EXPLOSIVE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 753,226, dated March 1, 1904.

Application filed December 24, 1902. Renewed August 1, 1903. Serial No. 167,946. (No model.)

To all whom it may concern:

Be it known that I, BORIS BOTKOWSKI, a subject of the Czar of Russia, residing in the borough of Manhattan, city of New York, county of New York, and State of New York, have invented certain new and useful Improvements in Igniting Devices for Explosive-Engines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to igniting devices for engines driven by the ignition or explosion of motive mediums; and my invention has for its principal object to provide for the removal and replacement or insertion of the insulator-plugs of such devices without opening or unsealing the explosion-chamber, so that such operation may be performed without stopping the engine. It is well known that in the operation of engines of this character it is necessary to frequently remove carbon deposits from the inner faces of the insulators, and my invention permits this cleaning to be effected as often as desired without stopping the engine.

According to my invention the insulator-plug which electrically separates the electrodes is fitted in an opening in the casing and is removable through such opening, and a stopper for closing the opening is connected with the insulator-plug, so that the removal of the insulator-plug brings the stopper in position to close the opening in the casing. According to my invention one of the electrodes is on a conductive stem, which is embraced by the insulator-plug, and the stopper is also carried by the conductive stem.

According to my invention the insulator-plug engages with the walls of the opening in the casing, and the stopper is also constructed to engage with the walls of the opening, and the engagement of the insulator-plug is of such length that the withdrawing movement will engage the stopper and close the opening before the insulator-plug is disengaged, and means are provided for disconnecting the conductive stem and insulator-plug, so that the disengagement of the insulator-plug may be

continued independently of the conductive stem after the opening has been closed by the stopper on the stem.

My invention includes various features of construction and of the combinations of parts.

I will now describe the construction of igniting device embodying my invention, illustrated in the accompanying drawings, and will thereafter point out my invention in claims.

Figure 1 is an end elevation showing the exterior of the igniting device and the adjacent part of the casing. Fig. 2 is a longitudinal vertical section of the igniting device and the adjacent part of the casing. Fig. 3 is a similar view with the insulator-plug removed. Fig. 4 is a face view of the detachable head of the conductive stem.

The drawings illustrate a lever sparking device and show only the part of the casing of the explosive-engine which is immediately adjacent to the igniting device, 1 designating the wall of the explosion-chamber and 2 the exterior wall.

The igniter-body 3 enters a recess in the casing and is seated against a shoulder near the inner end of the recess and is clamped by bolts 20 passing through its outer flange, as usual in constructions of this character. One of the electrodes is a sparking lever 4, and the other electrode is a sparking anvil 8. The sparking lever 4 is formed or secured upon a shaft 5, and this shaft 5 is fitted to rotate in bearings in the igniter-body and has an actuating-lever 6 clamped upon the outer end of the shaft, a spring 7 engaging one arm of the lever 6 to normally hold the sparking lever in contact with the sparking anvil 8. The lever 6 may be actuated by a hammer or striking means in the usual manner, and the sparking lever may be of the well-known construction shown or of any other suitable construction.

As usual in constructions of this character, the electric current is led to the sparking anvil by a conductive stem which is insulated from the surrounding metallic parts while the sparking lever is in metallic contact with the

metallic framework. The effectiveness of the spark depends, therefore, upon the maintenance of proper insulation between the conductive stem leading to the sparking anvil and the adjacent metallic parts of the engine. The conductive stem 9, having the sparking anvil 8 at the inner end thereof, passes through an insulator-plug comprising a metallic shell 10, which enters a partly-threaded socket in the igniter-body 3 and carries insulators 11, which embrace the conductive stem 9 and perform the insulating function. The insulators 11 are of porcelain or other suitable insulating material and are exteriorly conical and are fitted in corresponding orifices in the insulator-plug, and the conductive stem 9 has a collar 12 between which and the inner end of the inner porcelain insulator is interposed a soft washer of asbestos or other suitable material, and has an outer detachable head 14, between which outer head and the outer face of the outer insulator and of the insulator-plug is interposed a washer 15 of hard rubber or other suitable insulating material, and the outer end of the conductive stem 9 is threaded and provided with clamping-nuts 16, between which and the outer detachable head 14 is interposed a spring, as 17, these devices cooperating to clamp the conductive stem in the insulator-plug with a yielding pressure, as well understood, so as not to break the friable porcelain insulators.

At the inner end of the sparking anvil 8 a screw-threaded enlargement 18 is formed terminating inwardly in an enlarged head 19 with a conical outer face, this head 19 constituting a stopper to seal the explosion-chamber when the insulating-plug is removed. The inner end of the igniter-body 3 has a threaded orifice 21 to receive the threaded enlargement 18 and a conical seat to receive the outer conical face of the stopper 19. The screw-threads at 18 and 21 are in the same direction as the thread between the insulator-plug 10 and the igniter 3 and preferably of the same pitch, so that when the insulator-plug is screwed out of the igniter-body the stopper 19 will be screwed into the orifice 21 in the igniter-body, and vice versa.

The detachable head 14 of the conductive stem 9 is shown as connected to the conductive stem, so as to rotate therewith, by means of a pin 22, extending radially through the detachable head and entering a groove 23, formed in the conductive stem, and the detachable head 14 is shown as provided with notches to be engaged by a suitable wrench, and the outer flange of the insulator-plug is provided with corresponding notches.

The removal of the insulator-plug is effected by unscrewing it from its threaded engagement with the igniter-body, and primarily the wrench will be engaged with both the head of the insulator-plug and the detachable head 14

of the conductive stem 9, and both the insulator-plug and conductive stem will be moved. The operation of unscrewing both the insulator-plug and the conductive stem will be continued until the threaded part 18 at the inner end of the conductive stem has entered its threaded socket 21 in the igniter-body and has been screwed tightly therein, so as to close the stopper 19 tightly upon its seat in the igniter-body, and thus tightly seal the only opening from the explosion-chamber through the igniter-body. The length of the threaded parts of the insulator-plug 10 and the igniter-body 3 is such that when this has been accomplished there is still a substantial threaded engagement of the insulator-plug and igniter-body. After the stopper 19 has been thus tightly screwed into the orifice 21 the nuts 16 at the outer end of the conductive stem 9 are removed, the pin 22 of the detachable head 14 is pulled out of engagement with the groove 23 in the conductive stem 9, and the detachable head 14 and washer 15 are removed. The unscrewing of the insulator-plug may then be continued until the plug is entirely unscrewed, and the plug may then be slipped freely outward over the conductive stem 9, and the insulator-plug thus entirely removed and its inner face cleaned. The insertion of the insulator-plug will be effected by a reversal of the operations just described, and it will be noted that the insulator-plug is always in threaded engagement with the igniter-body so long as the inner orifice 21 of the igniter-body is not tightly closed, and thus the shocks from explosions in the explosion-chamber and the pressure from compressions therein are always borne by parts in threaded engagement, and there is no possibility of blowing out any part during the operations of removal or insertion of the insulator-plug.

As the removal and insertion of the insulator-plug does not at any time open the explosion-chamber to the outer air, this removal and insertion of the insulator-plug may be accomplished without stopping the engine. The engineer may be provided with duplicate insulator-plugs, so that immediately upon the removal of one plug for cleaning the other plug in cleaned condition may be inserted in the igniter-body. With a sufficiently rapid manipulation of the parts the momentum of the engine may be relied upon to continue the movement of the engine during the interval of change. Should the explosion-chamber be provided with two igniting devices, as in many explosive-engines now in use, the removal of the insulator-plug of one igniting device at a time for the purpose of cleaning it will leave the other igniting device in condition to fully perform its function of exploding the charges in the explosion-chamber.

It is obvious that various modifications may be made in the construction shown and above

particularly described within the spirit and scope of my invention.

What I claim, and desire to secure by Letters Patent, is—

5 1. The combination with a chamber for a medium to be ignited, of an igniting device comprising electrodes, an insulator-plug electrically separating the electrodes and normally closing an opening in the casing of the chamber, and a stopper for closing such opening and normally out of closing position, such stopper being connected with the insulator-plug, whereby the removal of the insulator-plug brings the stopper into closing position.

15 2. The combination with a chamber for a medium to be ignited, of an igniting device comprising a conductive stem and an electrode thereon, another electrode, an insulator-plug embracing the conductive stem and normally closing an opening in the casing of the chamber, and a stopper for closing such opening and normally out of closing position, such stopper being carried by the conductive stem and the conductive stem and insulator-plug being connected, whereby the removal of the insulator-plug brings the stopper into closing position.

30 3. The combination with a chamber for a medium to be ignited, of an igniting device comprising a conductive stem and an electrode thereon, another electrode, an insulator-plug embracing the conductive stem and normally closing an opening in the casing and engaging with the walls of such opening, a stopper for closing such opening and adapted to engage with the walls thereof and normally out of closing position, such stopper being carried by such conductive stem, and detachable means connecting the conductive stem and insulator-plug whereby the removal of the insulator-plug causes the stopper to engage with the walls of the opening and close the opening, the engaging part of the insulator-plug being of such length that the engagement of the stopper and the closing of the opening thereby will precede the disengagement of the insulator-plug.

45 4. An igniting device comprising an igniter-body, a sparking lever and sparking anvil carried thereby, an insulator-plug electrically separating the sparking lever and sparking anvil and normally closing an opening in the igniter-body, and a stopper for closing such opening and normally out of closing position, such stopper being connected with the insulator-plug, whereby the removal of the insulator-plug brings the stopper into closing position.

50 5. An igniting device comprising an igniter-body, a sparking lever carried thereby, a conductive stem and a sparking anvil on the conductive stem, an insulator-plug embracing the conductive stem and normally closing an open-

ing in the igniter-body, a stopper for closing such opening and normally out of closing position, such stopper being carried by the conductive stem, and the conductive stem and insulator-plug being connected, whereby the removal of the insulator-plug brings the stopper into closing position.

6. An igniting device comprising an igniter-body, a sparking lever carried thereby, a conductive stem and a sparking anvil on the conductive stem, an insulator-plug embracing the conductive stem and normally closing an opening in the igniter-body and engaging with the walls of such opening, a stopper for closing such opening and adapted to engage with the walls thereof and normally out of closing position, such stopper being carried by such conductive stem, and detachable means connecting the conductive stem and the insulator-plug, whereby the removal of the insulator-plug causes the stopper to engage with the walls of the opening and close the opening, the engaging part of the insulator-plug being of such length and the engagement of the stopper and closing of the opening thereby will precede the disengagement of the insulator-plug.

7. The combination with a chamber for a medium to be ignited, of an igniting device comprising a conductive stem and an electrode thereon, another electrode, an insulator-plug embracing the conductive stem and normally closing an opening in the casing of the chamber, and engaging with the walls of such opening, a stopper for closing such opening and normally out of closing position, such stopper being carried by the conductive stem and adapted to engage with the walls of such opening, and detachable means for clamping the conductive stem to the insulator-plug.

8. An igniting device comprising an igniter-body, a conductive stem and an electrode thereon, another electrode, an insulator-plug embracing the conductive stem and having a screw-threaded engagement with and normally closing an opening in the igniter-body, a stopper for closing such opening and normally out of closing position, such stopper being carried by the conductive stem and being screw-threaded for engagement with such opening, an exterior removable head for such conductive stem and detachable means for clamping the conductive stem to the insulator-plug, substantially as set forth.

9. An igniting device comprising the igniter-body 3 having an opening therethrough with a screw-threaded portion at the outer end thereof and another screw-threaded portion at the inner end thereof, the conductive stem 9 having the sparking anvil 8 thereon and also having the threaded part 18 and stopper 19, the threaded part 18 being adapted to engage with the threaded portion at the inner end of

the opening in the igniter-body, the insulator-
 plug 10 having a threaded part adapted to en-
 gage with the threaded part at the outer end
 of the igniter-body and having insulators
 5 11, 11, therein embracing the conductive stem
 9, the removable head 14 of the conductive
 stem, detachable means for clamping the con-
 ductive stem to the insulator-plug, and a

sparkling lever carried by the igniter-body,
 substantially as set forth.

10

In testimony whereof I have affixed my sig-
 nature in presence of two witnesses.

BORIS BOTKOWSKI.

Witnesses:

HENRY D. WILLIAMS,
 WALTER L. BUNNELL.