

No. 817,483.

PATENTED APR. 10, 1906.

J. W. HOWARD.
ELECTRIC FUSE IGNITING APPARATUS.

APPLICATION FILED MAY 23, 1905.

2 SHEETS—SHEET 1.

Fig. 1.

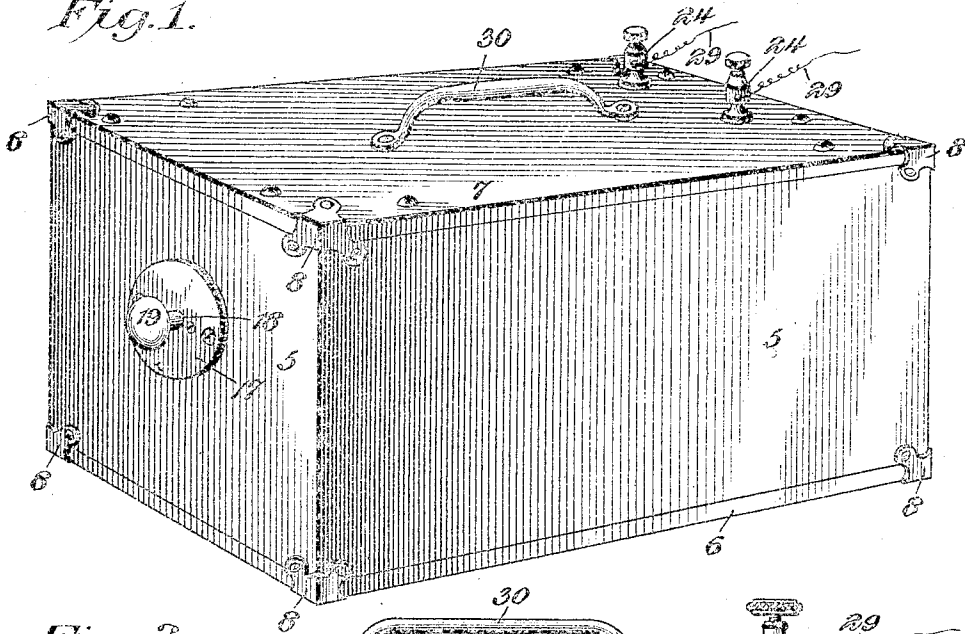
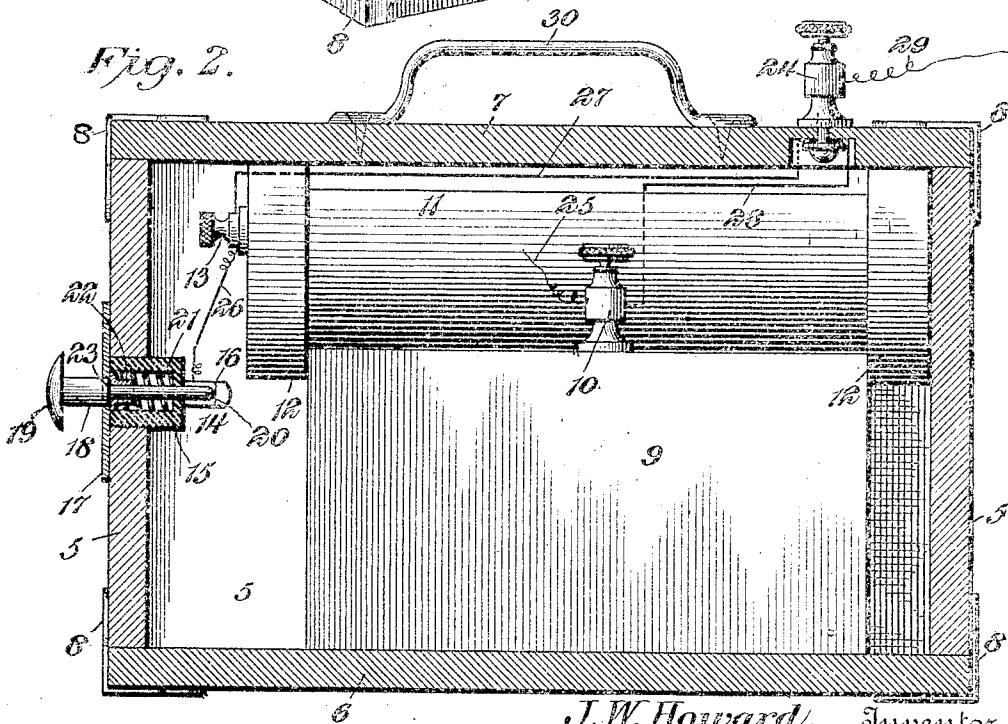


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

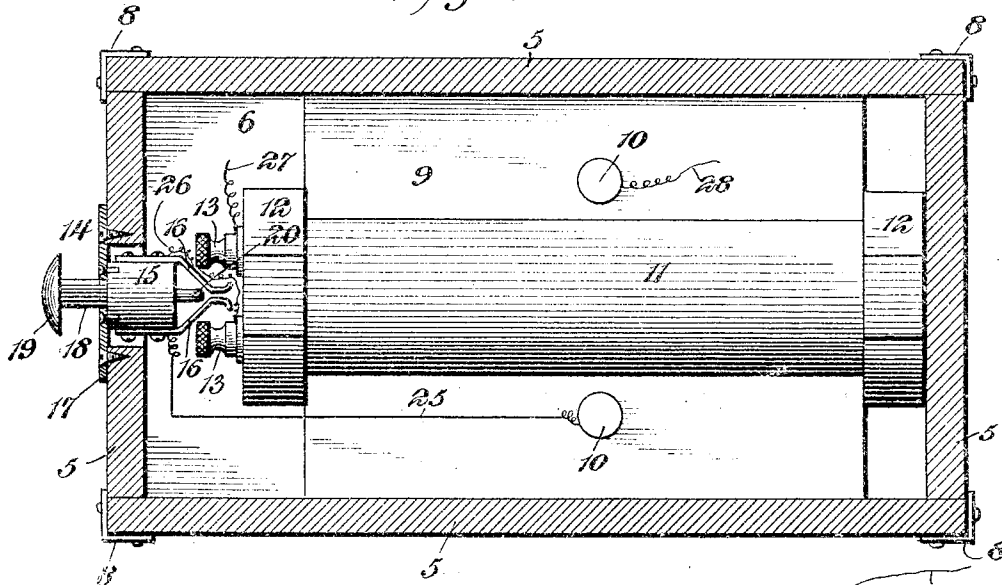
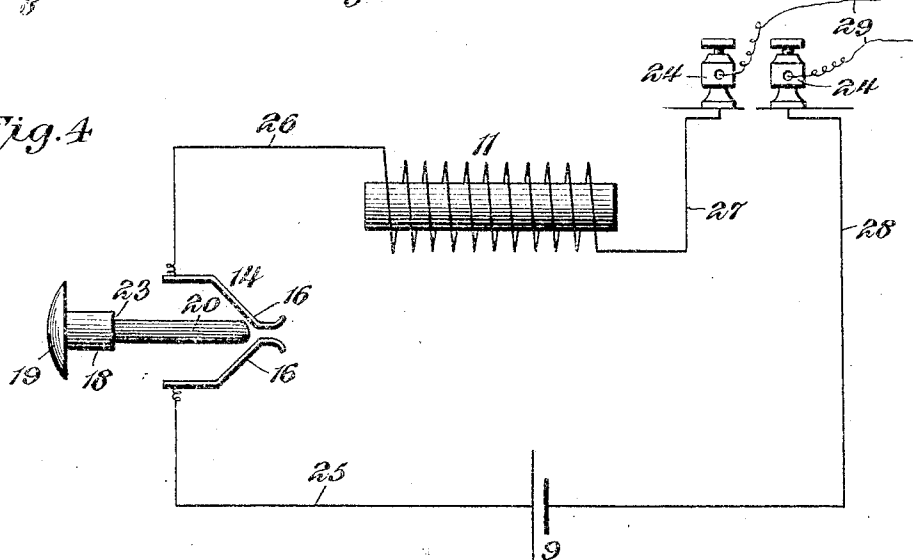


Fig. 4.



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UNITED STATES PATENT OFFICE.

JAMES W. HOWARD, OF CONNELLSVILLE, PENNSYLVANIA, ASSIGNOR TO
HOWARD ELECTRIC BLASTING MACHINE COMPANY, OF CONNELLSVILLE, PENNSYLVANIA, A COPARTNERSHIP.

ELECTRIC-FUSE-IGNITING APPARATUS.

No. 317,492.

Specification of Letters Patent.

Patented April 10, 1906.

Application filed May 23, 1905. Serial No. 261,833.

To all whom it may concern:

Be it known that I, JAMES W. HOWARD, a citizen of the United States, residing at Connellsville, in the county of Fayette and State of Pennsylvania, have invented a new and useful Electric-Fuse-Igniting Apparatus, of which the following is a specification.

This invention relates to improvements in means for igniting the electric fuses of blasting charges and the like; and the principal object is to provide a very simple apparatus of a novel nature wherein a battery is employed for generating electric current, the parts of said apparatus being few in number and compactly arranged; so that the instrument as a whole will occupy but very little space and is convenient to handle and operate.

A further and important object is to provide, in connection with the above apparatus, means whereby the unwarranted actuation of the instrument can be prevented in order to obviate the danger of premature explosion of the charges.

The preferred form of construction is illustrated in the accompanying drawings, wherein—

Figure 1 is a perspective view of the apparatus. Fig. 2 is a vertical longitudinal sectional view therethrough. Fig. 3 is a horizontal sectional view. Fig. 4 is a diagrammatic view showing the arrangement and connection of the various elements.

Similar reference-numerals designate corresponding parts in all the figures of the drawings.

In the embodiment illustrated a casing is employed, comprising side walls 5, a bottom 6, and a top 7, the latter being detachable from the side walls. The corners of the casing are protected by suitable clips 8. Located within the casing is a battery 9 of any suitable type, said battery preferably resting upon the bottom 6 and terminating short of the top 7. Binding-posts 10 are respectively connected to the poles of this battery.

Located upon the battery 9 and between the binding-posts 10 is a spark-coil 11, that is thus disposed between the battery and the cover or top 7, said spark-coil being provided with end disks 12, that embrace the upper portion of the battery and are borne upon by

the top 7. Thus said spark-coil is held securely in place. The terminals of the coil are in the form of binding-posts 13, located at one end of said coil and in one end of the casing. A key-switch, designated as a whole by the reference-numeral 14, is located in the end of the casing having the binding-posts 13 and in the present form consists of an insulator-supporting plug 15, on which are mounted a pair of spring-arms 16. The plug 15 is tubular in form and is carried by a face-plate 17, secured to one of the side walls 5, said plug passing through the side wall and the spring-arms 16 being located within the casing. A detachable actuating plunger-key 18 slidably passes through the tubular support 15, being provided at its outer end with a head 19 and at its inner end with a stem 20, adapted to engage between the inner terminals of the arms 16, and thus electrically connect the same. The key is, however, normally held in projected relation and disconnected from the arms 16 by a coiled spring 21, arranged within the tubular support 15 and bearing against a sleeve 22, also located within the tubular support, which sleeve bears against a shoulder 23 on the key. Connections for the line fuse-wires are in the form of binding-posts 24, and said binding-posts are carried by the top 7.

The above-described elements are included in an electric circuit, and in the present form one of the poles of the battery is connected by a wire 25 with one of the spring-arms 16 of the switch, the other spring-arm being connected by a wire 26 with one of the terminals of the spark-coil. The other terminal of this spark-coil is connected by a wire 27 with one of the binding-posts 24, and the coacting binding-post is in turn connected by a wire 28 with the other pole of the battery. The fuse line-wires are shown at 29.

In using the apparatus the same is carried to any convenient spot, a handle 30 being mounted on the top for this purpose. The fuses are connected to the line-wires 29 in the ordinary manner, and said line-wires are attached to the binding-posts 24. When, therefore, the key 18 is pressed inwardly, the electric circuit will be closed through the fuses, as will be apparent by reference to Fig. 4, and the charges consequently exploded. In pre-

paring the fuses the operator can detach the key 18 from the switch, and thus the apparatus becomes inoperative. Moreover, by having the switch at the side there is no danger of dirt entering the same.

It will be seen that the apparatus is made up of a few simple elements that are compactly arranged, so that it is readily portable and convenient to handle and operate. Furthermore, as the authorized operator may withdraw the key from the instrument when the fuses are being prepared and connected the danger of an unwarranted actuation of the device, with consequent premature explosions, will be obviated.

From the foregoing it is thought that the construction, operation, and many advantages of the herein-described invention will be apparent to those skilled in the art without further description, and it will be understood that various changes in the size, shape, proportion, and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

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

1. In apparatus of the class described, the combination with a casing, of a battery located therein, a key-switch carried by the casing, connections for the line fuse-wires also carried by the casing, and an electric circuit including the battery, the connections and the switch.

2. In apparatus of the class described, the combination with a casing, of a battery located therein, a key-switch carried by the casing and having an actuating-key projecting from said casing, a spark-coil also located in the casing, connections for the line fuse-wires located on the casing, and an electric circuit including the battery, the connections, the spark-coil, and the switch.

3. In apparatus of the class described, the combination with a casing, of a battery arranged within the casing, a key-switch located in the casing, an actuating-key for the switch projecting from the casing and also detachable therefrom, binding-posts mounted on the casing and adapted to have the line fuse-wires connected thereto, and an electric circuit

including the battery, the binding-posts and the switch.

4. In apparatus of the class described, the combination with a casing having side walls, of a battery located within the casing, a spark-coil also located within the casing, binding-posts located upon the casing, a key-switch carried by one of the side walls and located within the casing, said wall having a key-receiving opening alined with the switch, a detachable key passing through the opening and cooperating with the switch, and an electric circuit including the battery, the switch, and the binding-posts.

5. In apparatus of the class described, the combination with a casing having side walls, a top, and a bottom, of a handle secured to the top, binding-posts mounted on said top, a battery located within the casing and terminating short of the top, a spark-coil arranged between the battery and the top of the casing, a key-switch mounted on one of the side walls of the casing and arranged within said casing, a detachable key arranged to be passed through said side walls and cooperating with the switch, and an electric circuit including the battery, the switch, the spark-coil, and the binding-posts.

6. In apparatus of the class described, the combination with a casing, of a battery located therein, a spark-coil also arranged within the casing, a key-switch mounted on the casing, and including a removable key, connections for the line fuse-wires carried by the casing, and an electric circuit including the battery, the switch, the spark-coil, and said connections.

7. In apparatus of the class described, the combination with a casing, of a battery located therein, connections for the line fuse-wires mounted on the casing, a key-switch carried by the casing and including a detachable key which when removed makes said switch inoperative, and an electric circuit including the battery, the switch, and the connections.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JAMES W. HOWARD.

Witnesses:

JOHN H. RISBECK,
B. MOORE.