No. 808,275. PATENTED DEC. 26, 1905.

C. I. DODSON.

APPARATUS FOR EXPLODING MINE CHARGES.

APPLICATION FILED APR. 29, 1905.

2 SHEETS--SHEET 1.

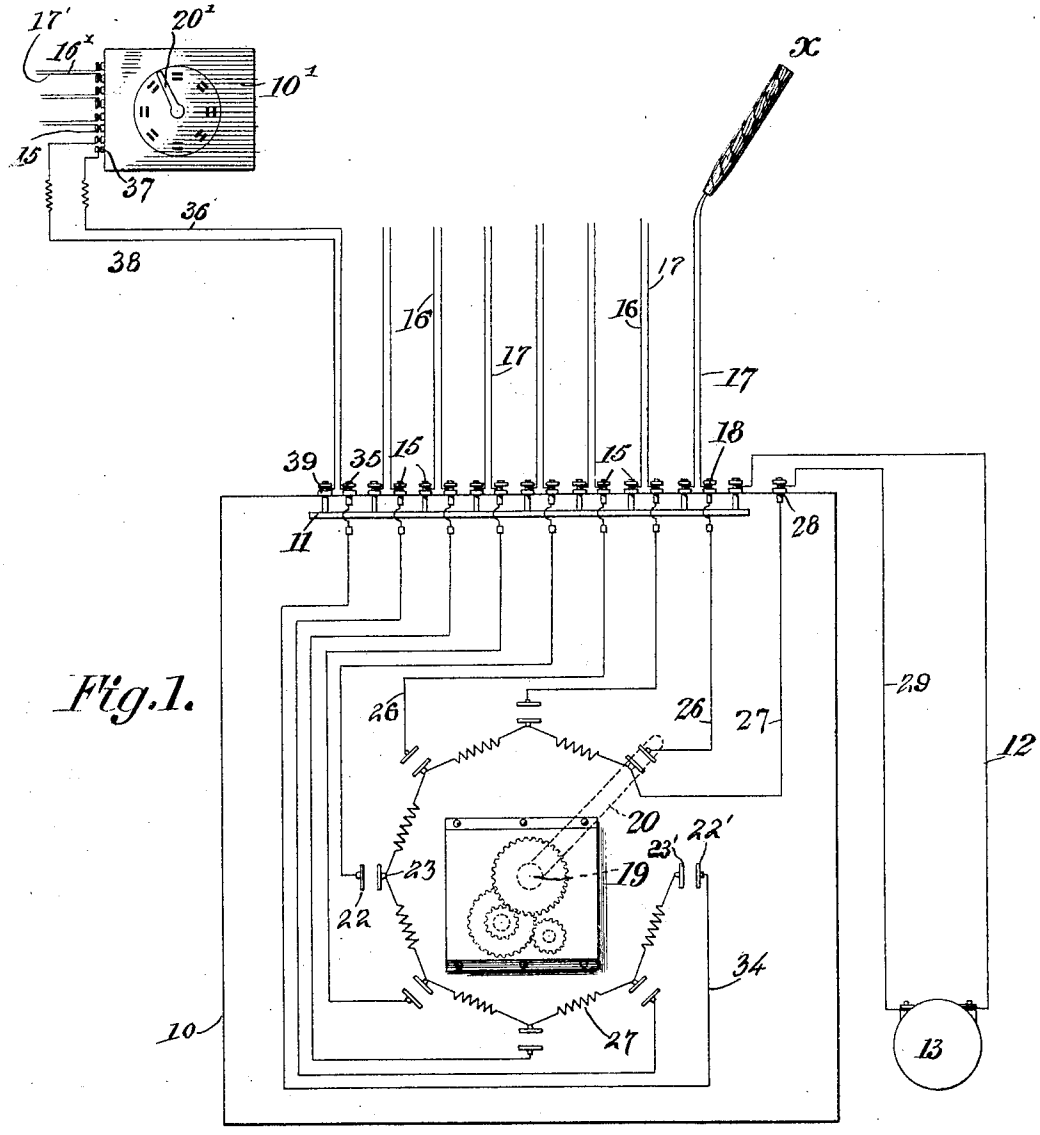


Fig. 1.

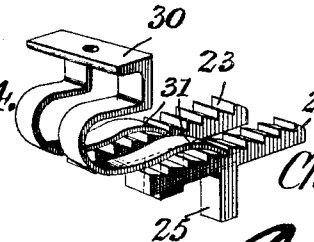


Fig. 4.

Witnesses

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2 SHEETS—SHEET 2

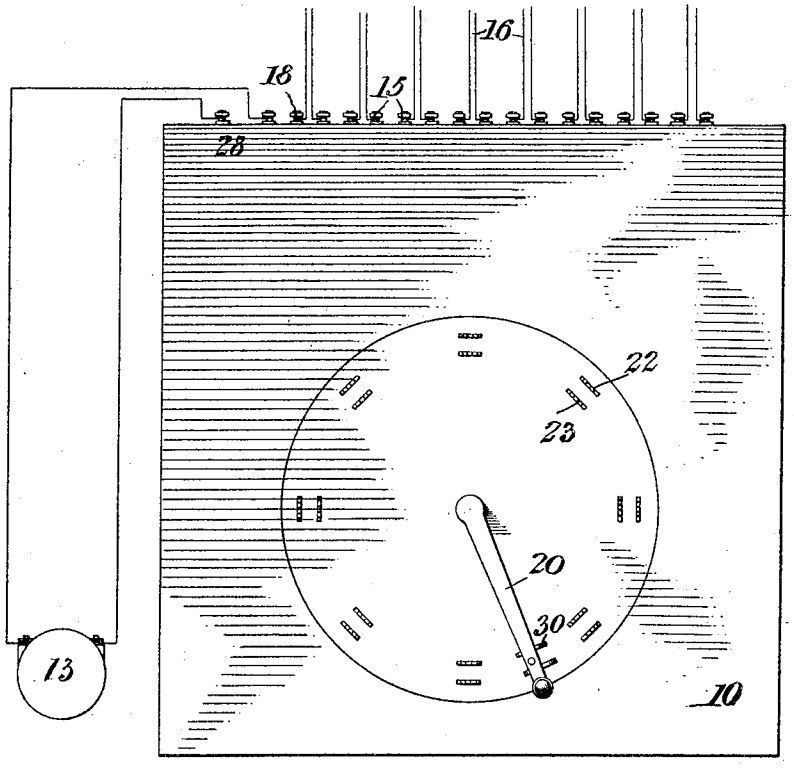
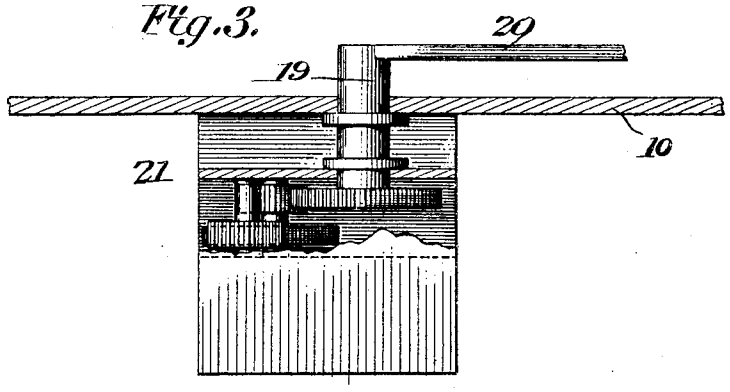


Fig. 2.

Fig. 3.



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APPARATUS FOR EXPLODING MINE CHARGES.

No. 808,275. Specification of Letters Patent. Patented Dec. 26, 1905.

Application filed April 29, 1905. Serial No. 258,060.

To all whom it may concern:

Be it known that I, CHARLES I. DODSON, a citizen of the United States, residing at Pittsburg, in the county of Crawford and State of Kansas, have invented a new and useful Apparatus for Exploding Mine Charges, of which the following is a specification.

This invention relates to apparatus for exploding mine charges.

The principal object of the invention is to provide a means and system whereby blasting charges may be placed in position throughout a mine or other excavation and all connected to a central point, including mechanism for successively closing the circuits through the blasting charges at any desired intervals of time.

A further object of the invention is to provide an apparatus of such nature that the closing of a circuit or the creation of a spark within or adjacent to the explosive charge will be insured, so that all of the charges will be detonated; and a still further object is to so arrange the firing mechanism that a series of circuit-closing devices may be employed where a large number of charges are to be set off, so that it will not be necessary to waste wire by connecting a single circuit-closer to charges at distant points.

With these and other objects in view, as will more fully hereinafter appear, the invention consists in certain novel features of construction and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size, and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings, Figure 1 is a rear elevation of the mechanism for closing the circuits through a series of mine charges embodying the invention, the wiring connections being shown diagrammatically. Fig. 2 is a front elevation of the mechanism. Fig. 3 is a detail sectional view illustrating a portion of the mechanism for transmitting movement to the traveling circuit-closer. Fig. 4 is a detail perspective view of one set of circuit-closing devices.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

In the present methods of hand-firing in coal mines and the like the charges are all placed in position by the miners, and after they leave the mine one or more men detailed for the purpose ignite the fuses of the charges, and it frequently happens that one or more explosions occur before these men reach a position of safety.

In carrying out the present invention the charges are all placed in position by the miners, and each charge is independently connected to a circuit-closing mechanism and a source of electrical energy arranged at any suitable point, the circuit-closer being operated either manually or automatically and serving to ignite the charges in successive order and at any desired intervals.

The working parts of the apparatus are carried by a suitable frame or casing 10, at one side of which is a bar or rod 11, that is connected by a wire 12 to a source of electrical energy 13, which may be in the form of a small dynamo or batteries. To the bar 11 are connected binding-posts 15, from which lead wires 16 to the several explosive charges x, these being provided with electrically-primed fuses of any ordinary type, generally fuses wherein the terminals are slightly spaced from each other in order that a spark may be created on the passage of a current between them, and from each fuse extends a wire 17, running back to a binding-post 18, also carried by the casing 10. The casing or frame is provided with suitable bearings for a shaft or arbor 19, on which is secured a revoluble arm 20, and said shaft or arbor is driven by suitable gearing connections 21 from a motor of any desired type.

On the front of the casing 10 are arranged a plurality of sets of contacts 22 and 23, these sets of contacts being arranged in an annular series and all within the path of movement of the arm 20. Each contact is in the form of a bar having a serrated upper face of the character more clearly shown in Fig. 4, and from the rear of each contact extends a shank member 25, having a suitable means for connection to a current-conducting wire. The shanks 25 of the contacts 22, which form the outer contacts of each set, are connected, respectively, to wires 26, that lead up to the binding-posts 18, while the shanks of the inner set of contacts 23 are serially connected to a wire 27, that leads to a binding-post 28, and from thence leads a main wire 29 to the source of energy.

To the outer end of the arm 20 is secured a

traveling circuit-closer 30 in the form of a bar, having a pair of spaced integral fingers 31, preferably formed of yieldable material and arranged to engage the serrated faces of the contacts 22 and 23, and as soon as the two fingers engage the two contacts 22 and 23, belonging to one set, a circuit may be traced from the source of energy 13 through wire 12, bar 11, binding-post 15, one of the wires 16, the fuse of the explosive charge x, wire 17, binding-post 18, wire 26, contact 22, the contact members 31, and bar 30, contact 23, wire 27, binding-post 28, and wire 29 back to the source of energy, thus completing a circuit through the fuse of the charge. In order to render the operation more certain and positive, the fingers 31 as they travel over the several contacts 22 and 23 will alternately make and break circuit, the breaking and making being very rapid as the spring-fingers click over the serrations of the contacts, so that if a spark is not created at the first closing of the circuit it may be created on the second or third closing, a sufficient number of teeth being formed on the contact to insure the detonation of each charge. As the fingers 31 make contact with the successive sets of contacts 22 and 23 the explosive charges to which they are connected will be detonated, and as the arm 20 may be made to travel at any speed the intervals between explosions may be timed in accordance with the circumstances, or, if desired, two or more charges may be set off simultaneously by connecting them in multiple or in series to a single set of circuit-closers.

In large mines it frequently happens that the charges are located at great distances from each other, and in order to save wire a series of circuit-closing devices may be employed in connection with a single source of energy. This feature of the invention is illustrated in Fig. 1, wherein 10′ represents a second circuit-closing device provided with a traveling contact-carrier 20′ and with wires 16′ and 17′, leading therefrom to the charges. The circuit-closing fingers 31 are arranged to stop at the completion of each operation in engagement with the final contacts 22′ and 23′ of the sets of contacts carried by the casing 10, and these contacts are connected by the fingers 31, Fig. 4, in such manner that the circuits from the source of energy will be closed through a wire 34 to a binding-post 35, thence by wire 36 to a binding-post 37 on the frame 10′, and as the circuit is successively closed through the several minor circuits leading out to the charges the return is made through a wire 38 to binding-post 39 and the wire or bar 11, so that a single source of energy may be employed in connection with any desired number of circuit-closers.

In a device constructed in accordance with this invention any number of charges may be set off simultaneously or in successive order, and the intervals between explosions may be properly timed by adjusting the positions of the contacts 22 and 23 with respect to the traveling circuit-closer.

The apparatus may be placed in any position, and after the clockwork or other motor mechanism has been wound it may be started and the circuit-closing arm moved over the several contacts.

Having thus described the invention, what is claimed is—

1. In apparatus for exploding mine charges, a casing, a revoluble arm supported thereby, a circuit-closer carried by said arm, a plurality of sets of contacts arranged in an annular series on the casing and adapted to be engaged in successive order by said circuit-closer, a source of energy, one pole of which is connected to one of the contacts of each set, a bar supported by the casing and to which the opposite pole is connected, binding-posts arranged in sets, one set connected to the bar and the other set being carried by the casing, current-conductors extending outward from the binding-posts to the charges to be exploded, and conductors extending between the second contacts of each set and the casing carrying binding-posts.

2. In apparatus of the class described, the combination with a plurality of circuit-closing mechanisms each including a plurality of sets of contacts arranged in an annular series, and a revoluble contact-arm for engaging said contacts, a source of energy connected to the first of said circuit-closing mechanisms, means for connecting the final set of circuit-closers of the first mechanism to the circuit-closers of the second mechanism, and working circuits leading outward from both mechanisms, said working circuits being also connected to the source of energy.

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

CHARLES I. DODSON.

Witnesses:
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C. L. Calhoun