C. I. DODSON.

MEANS FOR EXPLODING BLAST CHARGES.

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898,848. Patented Sept. 15, 1908.

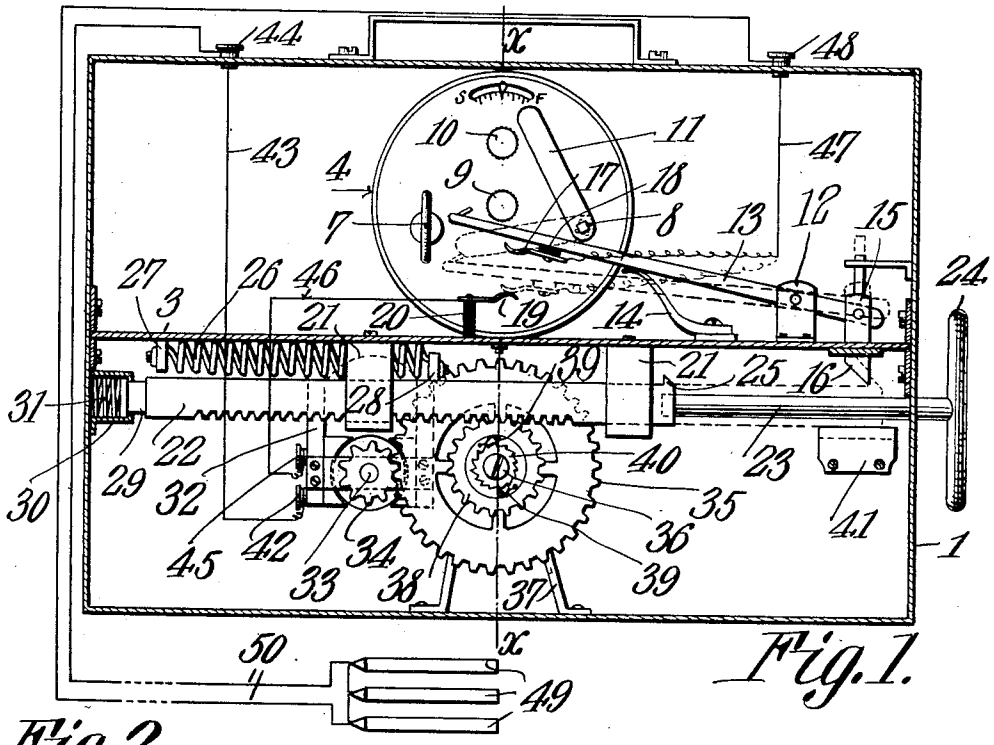


Fig. 1.

Fig. 2.

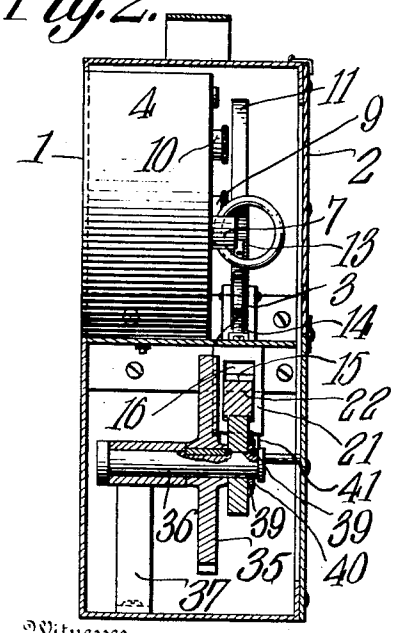
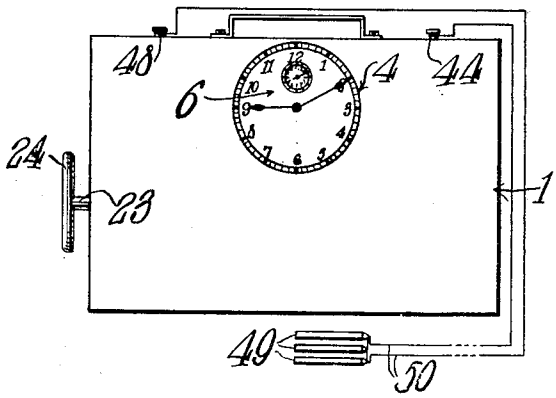


Fig. 3.



Witnesses

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UNITED STATES PATENT OFFICE.

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MEANS FOR EXPLODING BLAST CHARGES.

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Application filed February 14, 1908. Serial No. 415,844.

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 Means for Exploding Blast Charges, of which the following is a specification.

This invention has reference to improvements in means for exploding blast charges, and its object is to provide means whereby the charges may be exploded from a distance and after a time limit enabling the operator of the device to reach a point of safety.

The invention comprises a source or generator of electric current with a time means for rendering such source active to send sufficient current through the fuses of the charges to cause the latter to explode.

The improved device is of such nature as to be readily portable and may be carried from place to place and since the circuit cannot be closed until after a predetermined time the circuit connections may be made in safety and the device be set for operation so as to permit the person using the device to reach a distant point and in the case of a mine to even reach the surface of the ground before the circuit is completed and the charge exploded.

The device is particularly adapted for use quite close to the point where the blasting charges are inserted so as to save cost of the conductors, and since the source of current is in the form of a magnet or dynamo generator there is no danger of the current flowing through the conductors by the accidental completion of the circuit as might be the case were an electric battery used as the source of current.

In the practical embodiment of the invention there is provided a magneto or dynamo generator of sufficient power, inclosed in a suitable carrying case, which case also contains a time piece which may be in the form of an ordinary alarm clock. The dynamo is under the control of a train of gears which may be actuated by a spring put under tension by the operator either before or after the machine has been coupled up to the charges, and included in the circuit there is a circuit-making device normally out of action but under the control of the alarm side of the clock, so that when the alarm mechanism is released in the usual manner this circuit-making device will be actuated to close the circuit and at the same time release the train of gear to the action of the spring so that the magneto or dynamo is set in motion to generate a current, and the latter will flow through the now completed circuit to the charges and cause the latter to be ignited and the explosion to occur. It is possible with such an apparatus to explode many charges over a large area, the magneto or dynamo being designed for such purpose, or because of the small bulk and slight cost of the apparatus each miner, in the case of a mine, may be provided with such an apparatus at his room or working place so that he may explode his charges independently. In this case the miner may take the apparatus quite close to the point where the charges are inserted to save wire and on the setting of the device to become active after a certain predetermined time, the miner may retire to a point of safety and await the explosion.

The invention will be best understood by a consideration of the following detail description taken in connection with the accompanying drawings forming a part of this specification, in which drawings,—

Figure 1 is an elevation of the device with the casing shown in section. Fig. 2 is a section on the line x—x of Fig. 1, with the clock shown in elevation, and Fig. 3 is a face view, on a smaller scale, of the device.

Referring to the drawings, there is shown a casing 1, the back 2 of which may be made removable in whole or in part for access to the interior of the apparatus. The interior of the casing is divided by a middle partition 3 into two parts, if so desired, or this partition may be replaced by a simple strip for the support of parts to be described. In the upper part of the casing there is located a clock 4 which may be of the ordinary alarm type in common use and therefore need not be described in detail. The clock is so arranged that its face 6 is visible through the front of the casing and this clock is provided with a winding stem 7 and alarm stem 8, together with the studs 9 and 10 for setting the time indicating hands and the alarm-indicating dial hand, respectively. Fast upon the alarm stem 8 is an arm 11 which may be used for the purpose of winding the alarm mechanism and for another purpose which will presently appear. Fast on top of the partition 3 near one end thereof is a post 12 carrying a lever 13, which latter has its long arm under the control of a lifting spring 14, and the extreme end of the lever 13 is in

the path of the free end of the arm 11 before referred to, so that when the alarm mechanism of the clock is released to action the arm 11 will engage the free end of the lever 13 and depress the same against the action of the spring 14. The shorter end of the lever 13 carries a latch bolt 15 extending down through a suitable passageway in the partition 3 and below the same is formed with a beveled end 16 for a purpose which will presently appear.

Fast on the long end of the lever 13 is a contact finger 17 insulated from the lever by means of an insulating block 18, and in the path of this finger 17 is another contact finger 19 fast on the end of an insulating post 20 rising from the partition 3. Depending from the partition 3 are two bearing blocks 21, 21, spaced apart and serving to guide and support a rack-bar 22 to one end of which is secured a rod 23 extending through one side of the casing, and exterior thereto this rod is provided with a handle 24. The end of the rack bar where the rod 23 joins it is provided with an upwardly extending tooth 25 having a beveled edge, and this tooth is so located as to engage the latch bolt 15 when the rack-bar is moved toward the corresponding end of the casing. Because of the beveled edges of the tooth and latch bolt the latter is forced upward out of the path of the tooth 25 against the action of the spring 14, and on the continued longitudinal movement of the rack-bar toward the end of the casing the latch bolt 15 will ultimately ride over the tooth 25 and snap down in its path.

The rack-bar is under the control of a strong helical spring 26 fast at one end to the stud 27 on the under side of the partition 3, and at the other end to a stud 28 on the rack-bar. When the rack-bar is moved toward the right, as viewed in Fig. 1, then this spring is put under tension, and when the latch bolt 15 snaps down in the path of the tooth 25 then this spring is held under strong tension. When the latch bolt 15 is moved out of the path of the tooth 25, then the rack-bar is carried to the left as viewed in Fig. 1 by the action of the spring 26, until ultimately that end of the rack-bar remote from the rod 23 is brought into contact with a block 29 movable in a tube 30 in which there is housed a spring 31. The function of the block 29 and spring 30 is that of an elastic buffer so that when the rack-bar is returned to its initial position by the action of the spring 26 it may be checked without shock or jar. Fast on the under side of the partition 3 is a magneto generator 32 which may be taken as indicative of either a magneto generator or a dynamo generator, and in the following description when reference is made to the generator it will be simply called a magneto with the understanding that a dynamo generator may be substituted, if so desired. Fast on the armature shaft 33 of the magneto is a pinion 34 and this pinion is in mesh with a gear wheel 35 fast on shaft 36 mounted on a suitable post or standard 37 rising from the bottom of the casing. Loose upon the shaft 36 is a small gear wheel 38 in mesh with the teeth on the rack-bar, and this gear wheel 38 carries spring-actuated pawls 39 arranged to engage the teeth of a ratchet pinion 40 fast on the shaft 36.

Opposite the latch bolt 15 there is arranged a bracket 41 to receive the end of the rack-bar 22 when the latter is moved toward the right, as shown in Fig. 1. This bracket 41 serves to support the corresponding end of the rack-bar when it is moved to the set position, and the latch bolt 15 is brought into engagement with the tooth 25.

One terminal 42 of the magneto is connected by a conductor 43 to a binding post 44 on the outside of the casing. The other terminal 45 of the magneto is connected by a conductor 46 to the contact finger 19 and the contact finger 17 is connected by a conductor 47 to a binding post 48 on the outside of the casing. The conductor 47, as will be readily understood, is a flexible conductor to permit the movement of the lever 13 carrying the finger 17. The circuit connections in the drawings are, however, only shown diametrically.

In Figs. 1 and 3, there is shown a set of blast charges 49 which are assumed to be in place at the point to be acted upon by these charges. Suitable conductors 50 lead from the binding posts 44 and 48 to the blast charges 49, and these conductors are assumed to be connected to the binding posts 44 and 48 only after the charges have been inserted and have been suitably connected to the conductors, and the parts are in readiness for the blast. Now, let it be assumed that it is desired to explode one or more blast charges which have been inserted in the pockets prepared for them, and the conductors 50 have been brought from the point where the charges are to be exploded to the point where the apparatus forming the subject-matter of the present invention is located, it being understood that this apparatus is located at a point where the concussion of the charge will not harm it. Harm to this apparatus is not likely to occur even in places where the concussion might be fatal to human life since the casing may be made amply strong to withstand such shocks as it might be subjected to in practice. The clock is wound up if this has not already been done and the arm 11 is moved away from the lever 13 to a sufficient distance to wind up the alarm spring. Under these conditions the lever 13 is in its elevated position under the action of the spring 14 with the contact fingers 17 and 19 separated and the latch-bolt 15 depressed into the path of the tooth

25. The operator now draws out the rod 23 by means of the handle 24, thus causing the rack-bar 22 to move longitudinally until the tooth 25 passes under and is locked by the latch bolt 15, thus putting the spring 26 under tension and rotating the gear wheel 38. But under these conditions the pawls 39 move idly over the ratchet wheel 40. Let it further be supposed that the alarm mechanism is set to be released at a certain predetermined time which may be as long as the the operator desires after the apparatus has been coupled up for operation. The conductors 50 have in the meantime been connected to the binding posts 44 and 48 and under these conditions even though the contact fingers 17 and 19 complete the circuit through the magneto still there being no current generated none can flow through the blast charges 49. The operator now leaves the apparatus and seeks a point of safety, which in the case of a mine may be at a sufficiently remote point from the point of the blast or the time interval before the blast will explode may be such that the operator may even leave the mine. In the case of surface blasting the operator is given ample time to reach a point of safety. When the time has elapsed the clock will cause the alarm mechanism to be freed and this will allow the arm 11 to travel in a direction to ultimately engage the free end of the lever 13 and depress the same against the action of the spring 14. The parts are so timed that the latch bolt 15 is moved out of the path of the tooth 25 at the time the two contact fingers 17 and 19 are brought together. There is now a complete circuit from the magneto to the blasting charges 49 and the rack-bar is at this time being impelled toward its initial position by the spring 26, thus causing the gear wheel 38 to rotate counter clock wise. Under these conditions the pawls 39 engage the teeth of the ratchet disk 40 and thus cause the shaft 36 to rotate, and since the gear wheel 35 is fast on this shaft rotation is imparted to the armature of the magneto. Current is now generated and the fuse of the charges 49 are set off by the effect of the electric current and the charges are exploded in the usual manner.

It will be seen that the apparatus is compact and easily portable and may be set to be automatically actuated at any predetermined time thereafter, so that the apparatus may be placed comparatively close to the location where the blast is to take place, thereby saving in the conductors leading from the apparatus to the blast charges.

It is to be understood that the invention is not limited to the exact proportions or sizes of the parts or to the minor details of construction but that in the practical embodiment of the invention various changes may be made so long as the characteristics of the invention are retained and the advantages of the invention are present.

What is claimed is:—

1. A means for exploding blast charges comprising a suitable casing, a mechanical generator of electricity therein, means for actuating said generator, a latch for holding the actuating means in the inactive position, a circuit closer in the circuit of the generator, and time controlled means for closing the circuit and releasing the generator actuating means.

2. In a means for exploding blast charges, a mechanical generator of electricity, means for actuating the same, a latch for holding said actuating means in inactive position, a circuit closer in circuit with the generator, a time piece, and means under control of the time piece for simultaneously actuating the circuit-closing means and unlatching the generator actuating means.

3. In a means for exploding blast charges, a mechanical generator of electricity, means for actuating the same, a time piece, a latch carried by the lever for engaging and locking the actuating means for the generator, circuit terminals carried by the lever, and means on the time piece for engaging the lever to move the same to close the circuit at the circuit terminals and to release the generator actuating means.

4. In a device of the character described, a mechanical generator of electricity, a train of gear for actuating the same, a longitudinally-movable rack-bar engaging said train of gear and active to the same in one direction, a spring for impelling the rack-bar on its active movement, a latch for holding the rack-bar in its inactive position and against the action of its spring, a lever carrying the latch, a contact finger carried by the lever, another contact finger in the path of the lever-carried finger, and both contacts included in the generator circuit, and means under the control of the time piece for moving the lever to close the circuit and release the rack-bar.

5. In a device of the character described, a time piece of the alarm clock type, a mechanical generator of electricity, spring-actuated means for actuating the generator, a latch for holding the generator impelling means against action when its spring is under tension, circuit terminals in the circuit of the generator, an arm carried by the alarm side of the time piece, and means under the control of said arm for causing the closure of the generator circuit and the release of the generator-actuating means.

6. In a device of the character described, a suitable receptacle or casing, a mechanical generator of electricity contained therein, a spring-actuated means for propelling the electrical generator, a time piece of the alarm clock type, an arm fast on the alarm side of the clock and movable thereby, a lever in the

path of the arm, a latch member carried by the lever in the path of the actuating means for the generator, and circuit terminals in the circuit of the generator with one of said terminals carried by the lever.

7. A device of the character described comprising a suitable casing, a mechanical generator of electricity, a train of gear connected to the same, a longitudinally-movable rack-bar engaging said gear and active thereto in one direction, a spring for causing the active movement of the rack-bar, a spring-actuated lever, a latch carried by said lever in the path of the rack-bar, circuit terminals, one carried by the lever and both included in the generator circuit, a time piece, and means under the control of said time piece for actuating the lever against its spring to release the rack-bar and to close the circuit at the circuit terminals.

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:
G. C. MOORE,
D. W. JONES.