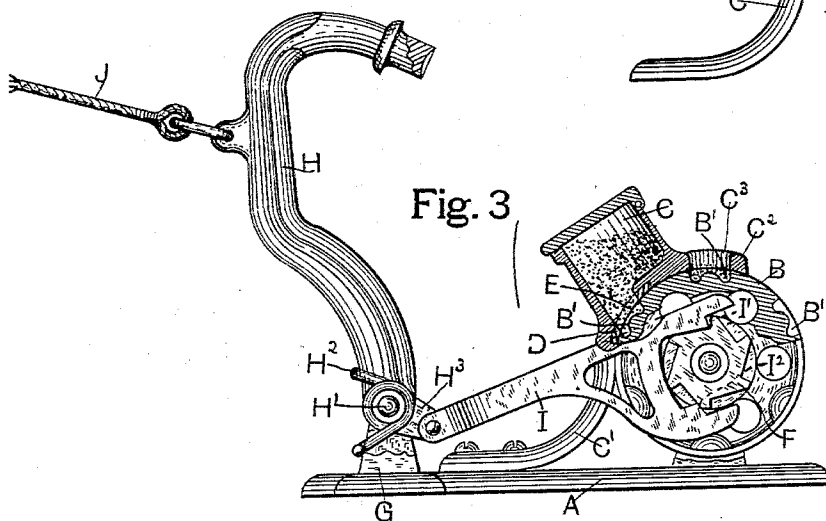
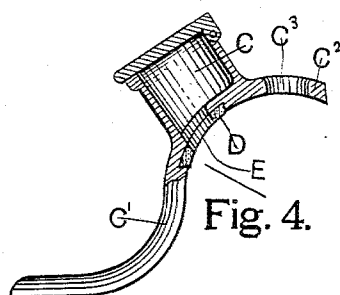
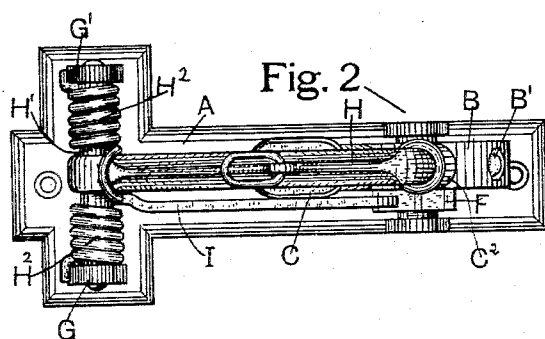
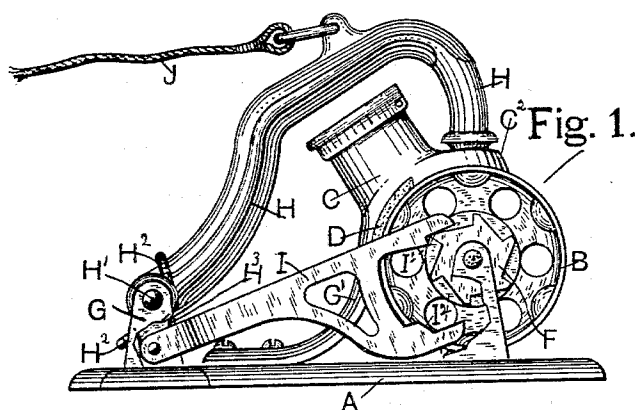


(No Model.)

G. W. DENNIS.
DETONATOR.

No. 583,984.

Patented June 8, 1897.



WITNESSES:

R. H. Hale
R. S. Brown

INVENTOR:

George W. Dennis.
By his atty.
Oscar Snell

UNITED STATES PATENT OFFICE.

GEORGE W. DENNIS, OF CHICAGO, ILLINOIS, ASSIGNOR TO ALBERT E. DENNIS AND AUGUSTINE BARNUM, OF SAME PLACE.

DETONATOR.

SPECIFICATION forming part of Letters Patent No. 583,984, dated June 8, 1897.

Application filed May 7, 1896. Serial No. 590,543. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. DENNIS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Detonator, of which the following is a specification.

My invention relates to means for confining and exploding compounds to produce detonations for signaling and other similar purposes; and my object is to provide a safe, simple, and inexpensive device for this purpose which is furnished with a receptacle or source adapted to receive an explosive in the loose state and means adapted to automatically and successively receive and carry separate charges from the receptacle to a position away from the main bulk of the explosive, where it is fired by the action of a hammer, as is fully described hereinafter, and is illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation showing the parts in the normal position, the standards which support the pivotal centers of the firing-hammer and the rotary chambered anvil being broken away to show the relative position of the ends and the manner of operating the combined pawl and stop which actuates the anvil. Fig. 2 is a plan of the device, which plainly illustrates one method of applying an actuating-spring for the firing-hammer. Fig. 3 is a side elevation with the standards which support the pivotal center of the hammer and the rotary anvil broken away; also, the top side portion of the rotary anvil is broken away to show the form of the firing-chambers, which are disposed in regular order around the periphery thereof. Fig. 3 also shows the chambers for containing the explosive compound and the guard for the top of the firing-chambers broken away to show the relative positions of the orifices for the admission of the explosive compound to the firing-chambers and the orifice in the guard which registers with each firing-chamber as the anvil is intermittently revolved, and which orifice receives the end of the hammer at the moment the charge is exploded. Fig. 4 is a detached side elevation of the chamber for containing the explosive compound and the firing-chamber guard with the side broken away same as in Fig. 3.

Similar letters indicate like parts throughout the several views.

A is the base-plate, from which projects two standards, in and between which the anvil-wheel B is mounted to revolve, and this wheel is provided in this instance with six shallow cavities B', which have the bottom part raised in the center, as shown in section in Fig. 3.

At C is a chamber, covered by a removable cap, for receiving an explosive compound in a powdered or loose state, and this chamber is usually made integral with a rearward projection C', whose lower end is attached to base-plate A, and with a forward projection C², which is provided with a perforation C³, which successively registers with the several cavities B' in the periphery of wheel B, against which the bottom portion of chamber C and the forward projection C² closely contacts.

At D is inserted, in a dovetail groove, a piece of packing, such as leather, to form a slightly elastic bottom for the chamber C around the perforation E at the bottom of the chamber, through which the explosive compound falls by gravity into the cavities B' as they are made to successively register with the perforation, this packing serving to make a tight though easy sliding joint between the bottom of the chamber C and the anvil-wheel.

A ratchet-wheel F is attached to or is integral with one side of wheel B, there being one tooth in the ratchet-wheel for each cavity B' in the periphery of wheel B.

At G and G', Fig. 2, are standards which arise from the base A and which support the pivotal center of hammer H, whose pivotal shaft H' has wound thereon a helical spring H², whose ends engage with the standards G and G' and whose middle portion engages with the hammer handle or arm near the shaft H'. Projecting downwardly from the boss of hammer H is a short arm H³, which has pivoted to its lower end the rear end of the combined pawl and stop I, which latter is bifurcated at the end which engages the ratchet-wheel, the shoulder I' near the end of the upper or long arm of the bifurcation being adapted to engage the ratchet-teeth as an actuating-pawl to revolve the wheel in one

direction, while the other or short arm has a shoulder I^2 , adapted to engage the backs of the teeth of the ratchet-wheel on the opposite side thereof from shoulder I^1 and serve as a stop after the ratchet-wheel has been moved equal to the pitch of one tooth thereof.

In operation, after chamber C has been filled with an explosive compound which may be fired by percussion, the hammer H is pulled back, by power applied through string J, to the position shown in Fig. 3, which causes shoulder I^1 to engage a ratchet-tooth and turn wheel B the amount equal to the pitch thereof, which causes a cavity B^1 , filled with explosive material, to move out from under chamber C and stop in register with the orifice C^3 in guard C^2 , when if string J is suddenly released the helical spring H^2 forces hammer H to descend with sufficient percussive effect into the cavity below orifice C^3 to explode the compound contained therein. By successively pulling and suddenly releasing the string J there will be a succession of explosions until the chamber C is exhausted.

It is obvious that a much larger chamber C may be employed than the one shown in the drawings, and that the apparatus may be made of various sizes to suit any duty it may be adapted to.

For ordinary signaling a very safe explosive compound may be made by a mixture of chlorate of potash, niter, and sulfur, to which is added a portion of fine sand, which materials may be easily procured and used without the great danger incident to the use of ordinary high-grade fulminates.

I claim as my invention—

1. The combination in a detonator of an anvil-wheel revoluble in a vertical plane, and having a series of cavities in the peripheral face thereof, upon which face is mounted, in

sliding contact, and in communication with the said cavities, a chamber for containing a fulminating compound, a spring-actuated hammer pivotally mounted and adapted to strike into the cavities of the anvil-wheel, a pawl connected with and moved by the hammer, a ratchet-wheel connected with the anvil-wheel and having the same number of teeth as there are cavities in the peripheral surface thereof, the ratchet-wheel engaged by the said pawl and actuated the pitch of one tooth by the cocking of the hammer whereby the successive cocking of the hammer serves to successively move the several cavities in the anvil-wheel out of communication with the fulminate-chamber and into register with the place of impact of the hammer in the anvil, for the purpose stated.

2. In a detonator, a revoluble anvil-wheel and a hammer adapted to successively strike the anvil-wheel at several different portions of the periphery thereof, a ratchet-wheel connected with the anvil-wheel and a combined pawl and stop connected at one end with and actuated by the movement of the hammer, the opposite end from such connection being bifurcated and one arm of the bifurcation adapted to engage the ratchet-teeth as a pawl, and the other arm of the bifurcation adapted to contact the backs of the said ratchet-teeth, at the opposite side of the ratchet-wheel from the pawl, and serve as a stop, to limit the motion of the ratchet-wheel, in the manner and for the purpose described.

In testimony that I claim the foregoing I have hereunto set my hand, this 21st day of April, 1896, in the presence of witnesses.

GEORGE W. DENNIS.

Witnesses:

F. B. WILLIAMS,
OSCAR SNELL.