(No Model.)

D. CONEKIN.

SHELL FUSE.

No. 523,881. Patented July 31, 1894.

Fig. 1.

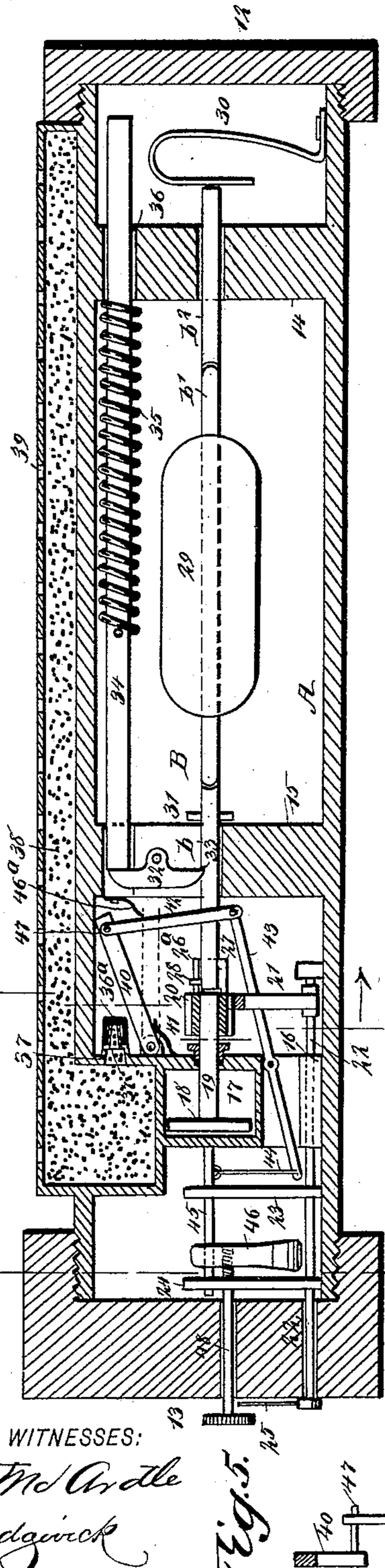


Fig. 3.

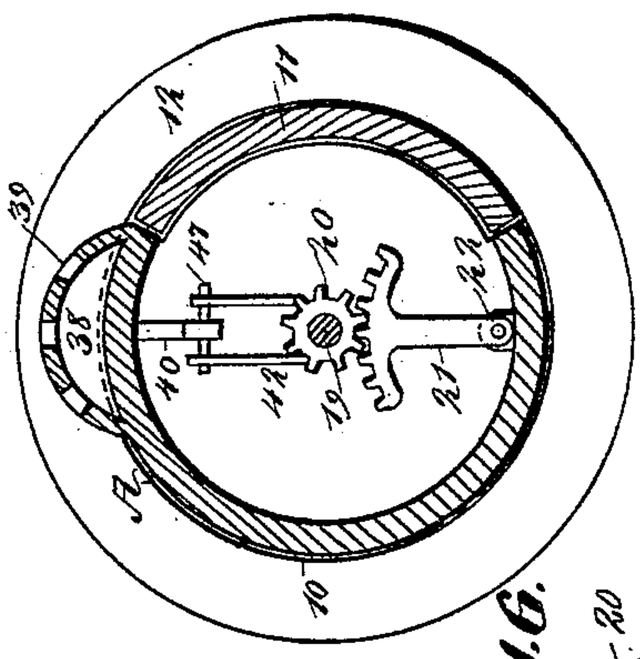


Fig. 6.

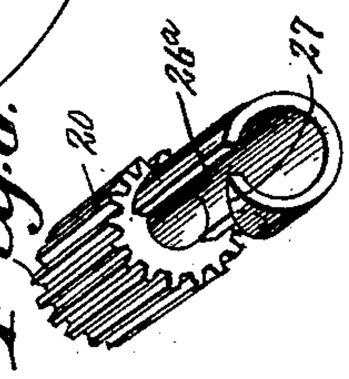


Fig. 2.

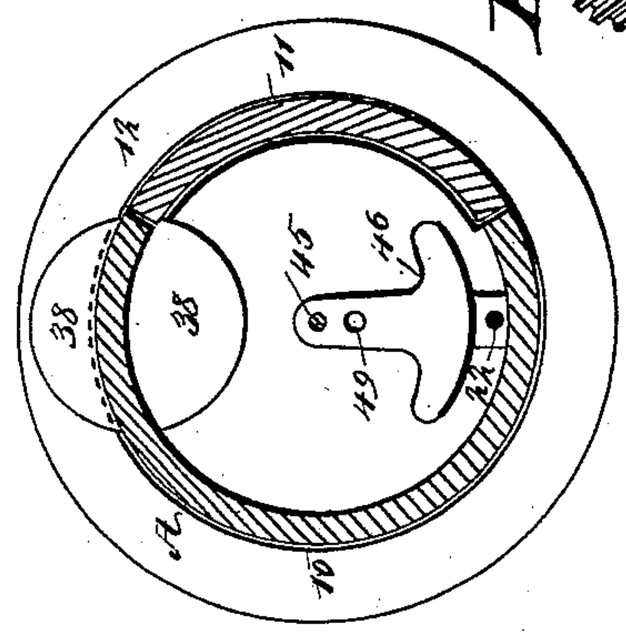


Fig. 4.

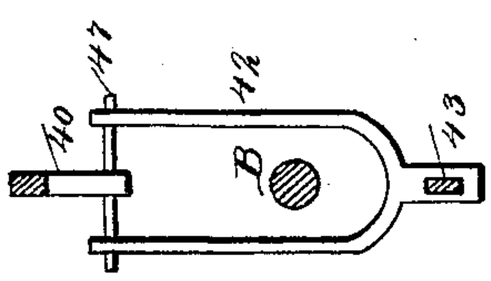
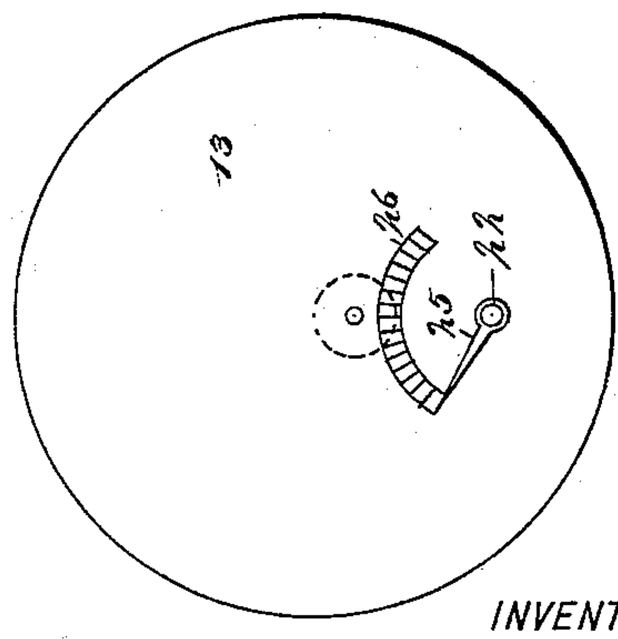


Fig. H.



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DAWSON CONEKIN, OF CHARLESTON, SOUTH CAROLINA, ASSIGNOR OF TWO-THIRDS TO JAMES J. IGOE AND JOHN J. O'CONNOR, OF SAME PLACE.

SHELL-FUSE.

SPECIFICATION forming part of Letters Patent No. 523,881, dated July 31, 1894.

Application filed May 12, 1893. Serial No. 473,927. (No model.)

To all whom it may concern:

Be it known that I, DAWSON CONEKIN, of Charleston, in the county of Charleston and State of South Carolina, have invented a new and useful Improvement in Fuses, of which the following is a full, clear, and exact description.

My invention relates to an improvement in mechanical fuses or detonators, especially adapted for exploding shells used in pneumatic guns, and also for exploding torpedoes. The object of the invention is to provide a fuse which will be of exceedingly simple, durable and economic construction, and which will be fired by impact at its forward end with any object it may strike, whether the object be a solid, or a fluid, as for example water.

Another object of the invention is to so construct the fuse that no matter to what degree the inner end of the fuse may be struck, or submitted to pressure constant or gradual, the impact or pressure will not act in any manner to explode the fuse, thus rendering it perfectly safe while being handled. As a preventive against premature explosion, the fuse is provided with a safety latch which will prevent the hammer from acting except when it is necessary, or it is desirable to have it act, the safety latch being so constructed that after the shell leaves the mortar or gun in which it is fired, the rotary movement of the shell will cause the safety latch to be automatically carried out of the way of the firing hammer and permit said hammer to act.

Another feature of the invention is to provide a simple means for timing the fuse, and also to provide a means for producing a flame comparatively the entire length of the fuse, thus causing the explosive in the shell to be instantly ignited over a major portion of its surface.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures and letters of reference indicate corresponding parts in all the views.

Figure 1 is a longitudinal section through a fuse. Fig. 2 is a diametrical section taken essentially on the line 2—2 of Fig. 1. Fig. 3 is a similar section, taken practically on the line 3—3 of Fig. 1. Fig. 4 is a view of the rear end of the fuse. Fig. 5 is a detail view of a portion of the mechanism operating the safety latch and Fig. 6 is a detail perspective view of a spiral coupling which is used to time the action of the fuse.

The body of the shell A of the fuse may be cylindrical or circular in cross section, and is hollow; and furthermore the body is ordinarily made in two sections 10 and 11, as shown in Figs. 2 and 3. A thread is produced at each end of the body, and the body sections are united and held connected through the medium of a front cap 12 and a rear cap 13, said caps being preferably secured upon the outer faces of the body, as shown in Fig. 1. Near the forward end of the body a partition 14, is located, and between the center and rear end a second partition 15, is produced, while a third partition 16, is produced between the rear end cap and the inner partition 15. In the rear partition 16, a cylinder 17 is formed, the said cylinder being adapted to contain a fluid, water, for example, and within the cylinder a piston 18, is loosely fitted, which piston is secured to a rod 19, the said rod being passed through a suitable packed opening in the inner face of the cylinder.

A pinion 20, is secured upon the inner end of the piston rod 19, and the said piston meshes with a quadrantal gear 21, the gear being secured to a time shaft 22, journaled in suitable bearings in what may be termed the bottom of the body chamber. The time shaft is likewise journaled in posts 23 and 24, located near the rear cap, and the time shaft passes through a suitable opening made in the said rear cap, and its outer end is provided with a pointer 25, which is adapted to travel over a scale 26 of seconds produced upon the outer face of the rear cap. The pinion 20, which is fast to the piston rod 19, is provided with a coupling 26^a, and the coupling is provided with a spiral groove 27. The coupling is adapted to receive one end of a firing shaft B, which end of the firing shaft has free end movement in an opening pro-

duced in the inner partition 15, and at the rear extremity of the said firing shaft a pin 28, is located, which extends out through the groove in the coupling. Thus when the pinion 20, is turned in one direction the firing shaft will be held in coupling connection with it, and when turned in an opposite direction the rear end of the firing shaft may readily leave the coupling. The firing shaft is made in three sections, a rear section b, an intermediate section b' and a forward section b^2. The forward section has end movement in the forward partition 14, and the central section b', of the firing shaft is provided with a weight 29 secured upon it.

The inner ends of the end sections b and b^2 of the firing shaft are preferably concaved, and the extremities of the central section b', are rounded off or convexed in order that they may fit in the concaved or socketed ends of the outer sections of the shaft. The sections of the shaft are held in engagement, or are held connected, by a spring 30, which spring is secured in any suitable or approved manner in the body of the shell, preferably between the partition 14 and the front cap, the spring having constant bearing against the forward end section of the firing shaft, and it exerts pressure upon said section in an inwardly direction. The rearward movement of the rear section of the firing shaft is limited by a pin 31, passed through it, as shown in Fig. 1.

The opening in the partition 15, through which the rear section of the firing shaft passes, is quite large, and within this opening a trigger 32, is pivoted, preferably at its center; and one end of the trigger when the sections of the firing shaft are coupled, is adapted to enter a recess 33, produced in the rear section of the said firing shaft, as shown in Fig. 1, while at that time the upper portion of the trigger will bear against the rear end of the hammer 34, which hammer is in the shape of a rod or shaft, and is adapted to have end movement in a suitable bearing produced in the upper portion of the opening in the partition 15.

A spring 35, is made to encircle the hammer shaft, which spring has bearing at its rear end against a projection formed on the shaft, and the forward end of the spring rests against the rear face of the front partition 14, while the rear end of the hammer shaft passes through an opening 36 made in the said partition. When the trigger is in engagement with the hammer shaft the spring 35, is compressed, so that the moment the trigger is removed from engagement with the hammer shaft the spring propels it violently forward, and upon the forward movement of the hammer shaft it is adapted to be brought in engagement with a cap 36^a, placed upon a suitable nipple 37, the nipple being in communication with a magazine chamber 38.

The magazine chamber extends longitudinally along the body of the shell between the caps of the body, and may be of any cross sectional shape; in the drawings the major portion of the chamber is shown as semi-circular, but the rear portion, or that portion with which the nipple connects, is of much greater diameter and is shown as circular, as may be seen in Figs. 1 and 2. This magazine chamber is adapted to contain fulminate of mercury, or other explosive, and in the outer wall of the chamber a series of apertures 39, is made, through which the flame may escape the length of the magazine chamber, and ignite the gun cotton or other explosive contained in the shell. Thus it will be observed that whatever explosive may be contained in the shell or torpedo in connection with which the fuse is employed, will be simultaneously ignited throughout a considerable area.

In order to prevent danger when the fuse is handled, a safety latch 40, is located within the shell. Ordinarily this latch consists of a bar pivoted upon the inner face of the partition 16, its pivotal end being pressed in an upwardly direction by a spring 41, which serves to hold the free end of the latch bar in the path of the hammer shaft; and therefore, should the hammer shaft become released accidentally it can not strike the explosive cap 36^a, but must engage with the safety latch 40. The free end of the safety latch is pivotally connected with a yoke 42, which yoke is shown in detail in Fig. 5, and the rear portion of the yoke is pivotally connected with a lever 43, fulcrumed within an opening produced in the lower portion of the partition 16, preferably beneath the cylinder 17, as shown in Fig. 1. The lever extends beyond the rear face of the said partition, and is connected by a cord 44, or the equivalent thereof, with a short shaft 45, journaled in the posts 23 and 24, which shaft is provided with a pendulum weight 46, connected with it, the lower portion of the weight being the heaviest, and said weight is best shown in Fig. 2.

The weight is adapted to revolve the shaft 45, and wind upon it the cord 44 and thereby draw the safety latch 40, out of the path of the firing shaft; and after the latch has been carried out of the path of the firing shaft it is held in that position by means of a spring 46^a, secured preferably to the rear face of the partition 15, which spring will bear against the upper face of the latch and exert downward pressure thereon; but the spring need not necessarily engage with the latch but with the pivot pin 47, by means of which the latch is pivoted to the yoke 42.

In order to prevent the shaft 45 from turning when the fuse is handled to a great extent and turned around, thereby causing the safety latch to be carried out of the path of the hammer shaft, a screw 48, is made to enter an opening 49 in the weight 46 of the shaft, which screw is entered through an opening

made in the rear cap. Thus it will be observed that when this screw is employed the weight 46 can not be moved.

The scale or dial 26, as has heretofore been stated, is preferably made a dial of seconds, and is intended to indicate the number of seconds which will intervene after the fuse engages with an object and the time that it will explode. For example, by placing the indicator or hand 25 to the extreme right the time will be fifteen seconds, which is the extreme limit; by moving the pointer to the left but five seconds may be made to intervene the time of the explosion and the time that the fuse strikes an object; or the dial may be so set as to cause the explosion to take place almost instantly with the impact of the fuse.

When the pointer is set the quadrantal gear rotates the pinion, and therefore engages or disengages the pin 28. The travel of the piston is regulated by the engagement of the pin with the spiral coupling. The quadrantal gear does not move after the pointer is set. The spiral coupling catches the pin at whatever point it may be set, and holds the piston rod together with the shaft, and draws the piston forward until the trigger slips. Thus it will be observed that if the pointer is placed at 15 seconds, the piston will have to draw forward the full distance of the travel of the trigger, and if the pointer is placed at one-half the distance from "15" to zero, the piston will only have to travel one-half of the distance that it would in the instance first named; but when the pointer is placed at zero the pin 28 will not engage the spiral coupling, and consequently there will be no travel whatever to the piston and the action will be instantaneous.

The action of firing is substantially as follows: The parts having been set as shown in Fig. 1, that is, with the firing shaft in coupling position and the trigger in engagement with the shaft and with the hammer shaft, and the safety latch being within the path of the hammer shaft, the time mechanism is set and the screw 48, is removed from the weight, leaving the pendulum weight 46 on the winding shaft 45 free to act. When the shell leaves the gun in which it is loaded, the shell and consequently the fuse will have more or less of a rotary motion, and therefore the weight 46, will revolve, turning the shaft 45, and the shaft when turning will wind around it the cord 44, carrying the safety latch out of the path of the hammer shaft. The moment that the forward end of the fuse meets with and strikes an object the concussion or impact will cause the forward section of the firing shaft to press forward the spring 30, thereby releasing the central weighted section of the shaft. The rear section *b* of the firing shaft will now be free to move forward and permit the trigger to release the hammer shaft if the said section of the firing shaft were not coupled with the piston rod 19, but the tension of the spring exerted through the medium of the trigger upon the rear section of the firing shaft will cause said section to be carried forward. At the same time, through the action of the spring the piston will be drawn forward and the water which is in front of the piston will slowly escape to the back, the water acting to retard the movement of the piston. A rear section of the firing shaft will also be released at this time, and that section will be carried forward, and the hammer shaft will be freed from the trigger and will move rearward against the firing cap 36ª, exploding that cap and consequently igniting the explosive material contained in the magazine, which will communicate with the charge in the shell. It is therefore evident that the pressure of the water upon the piston 18, together with the position of the quadrantal gear 21, will regulate the time of the explosion.

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

1. In a fuse, a spring-controlled hammer, a sectional firing shaft the sections of which are adapted to be separated by concussion, and a trigger connection between the firing shaft and the hammer, as and for the purpose set forth.

2. In a fuse, a spring-controlled hammer, a sectional firing shaft, one of the sections being weighted, and a trigger connection between the firing shaft and the hammer, as and for the purpose set forth.

3. In a fuse, a spring-controlled hammer, a sectional firing shaft, one of the sections being weighted and the sections of the shaft having a coupling capable of being disjointed by concussion, and a trigger connection between the firing shaft and the hammer, as and for the purpose set forth.

4. In a fuse, a spring-controlled hammer, a sectional firing shaft having a coupling connection capable of being disjointed by concussion, a trigger connection between a section of the firing shaft and the hammer, and a time mechanism connected with the section of the firing shaft operated upon by the trigger, as and for the purpose set forth.

5. A fuse having secured to its exterior wall, a magazine chamber extending along the said wall and communicating with the interior of the fuse by means of an opening adjacent to which a fulminating cap is located, the outer wall of the said magazine chamber being provided with a series of transverse apertures, substantially as described.

6. In a fuse, the combination, with the hammer, of a safety latch located normally within the path of the hammer, means, substantially as described, for removing the latch from the path of the hammer when a rotary movement is imparted to the fuse, and a locking device

projecting to the exterior of the fuse so as to be capable of being set and released by the operator for preventing the said means from being operated when the fuse is being handled, as set forth.

7. In a fuse, the combination, with the hammer, of a safety latch located normally within the path of the hammer, a lever connected with the safety latch, a shaft having rotary movement, a pendulum weight connected with the shaft, and a flexible connection between the lever and the shaft, substantially as and for the purpose specified.

8. In a fuse, the combination, with a hammer, of a safety device consisting of a latch normally located in the path of the hammer, a lever connected with the latch, a shaft mounted to turn within the fuse, a pendulum weight connected with the shaft, a cord connection between the shaft and the lever, and a locking device for removable connection with the pendulum weight, all combined for operation substantially as herein shown and described.

9. In a fuse, the combination, with a spring-controlled firing hammer, a firing shaft constructed in sections, having a coupling connection capable of being disjointed by concussion at the forward end of the shaft, a fluid-containing cylinder, a piston loosely mounted in the cylinder, the piston rod of which is provided with an attached pinion, and a coupling having a spiral opening, the rear section of the shaft being adapted to enter the said coupling, a pin located upon the rear shaft section and entering the spiral channel in the coupling, a time shaft, and a gear connection between the time shaft and the piston rod pinion, as and for the purpose set forth.

DAWSON CONEKIN.

Witnesses:
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