

(No Model.)

2 Sheets—Sheet 1.

S. LACAVALERIE & G. N. WHISTLER.
SHELL FUSE.

No. 582,295.

Patented May 11, 1897.

Fig. 1.

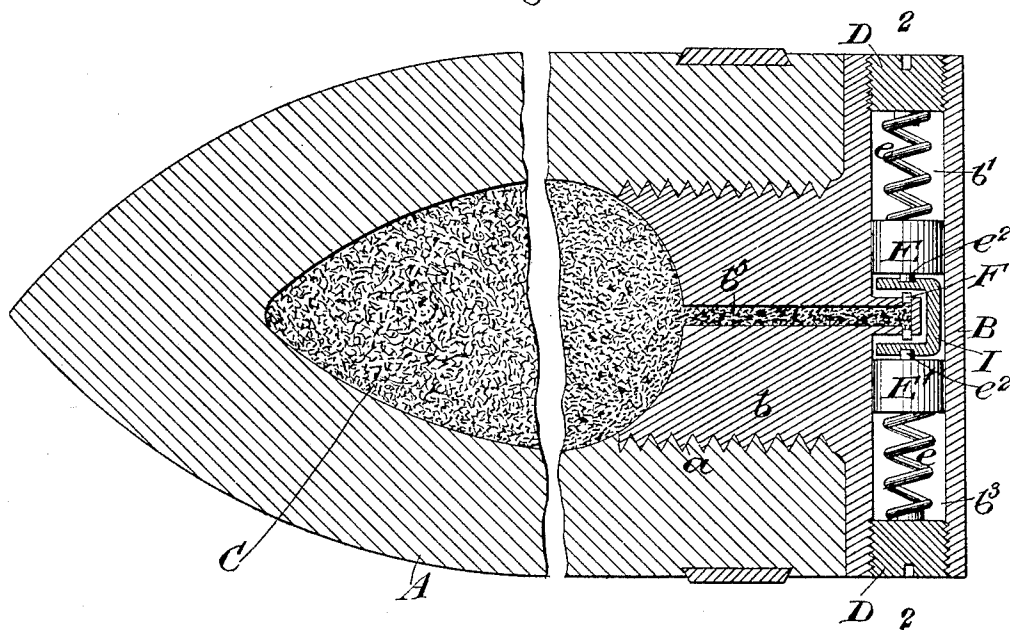


Fig. 2.

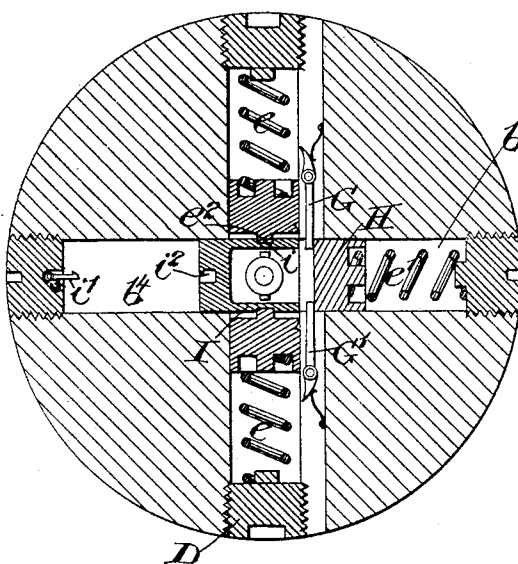
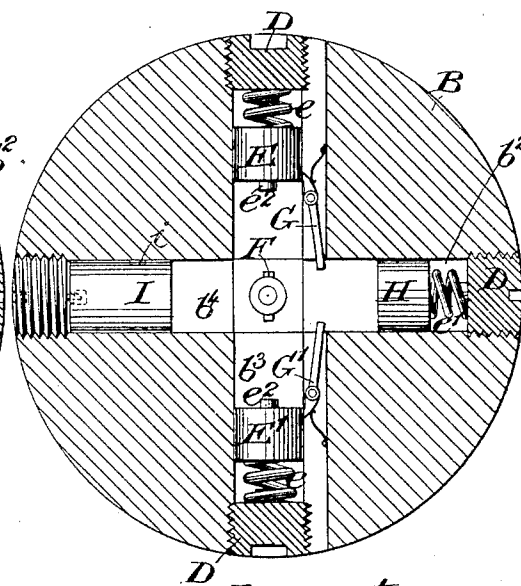


Fig. 3.



Witnesses:
George Barry Jr.
Fred Haynes

Inventors:
Sebastien Lacavalerie
Garland N. Whistler
by attorneys
Brown De Ward

(No Model.)

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Fig. 4.

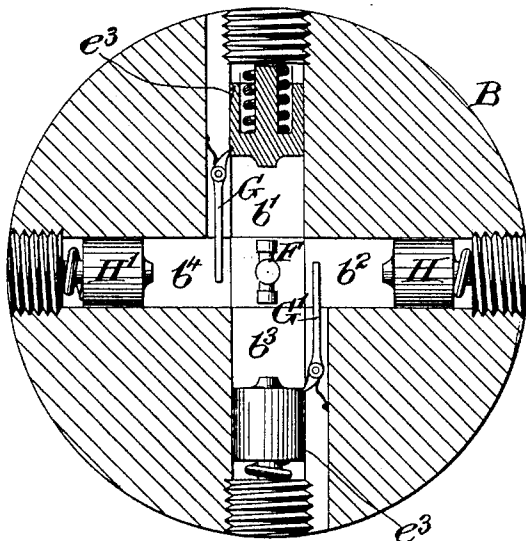
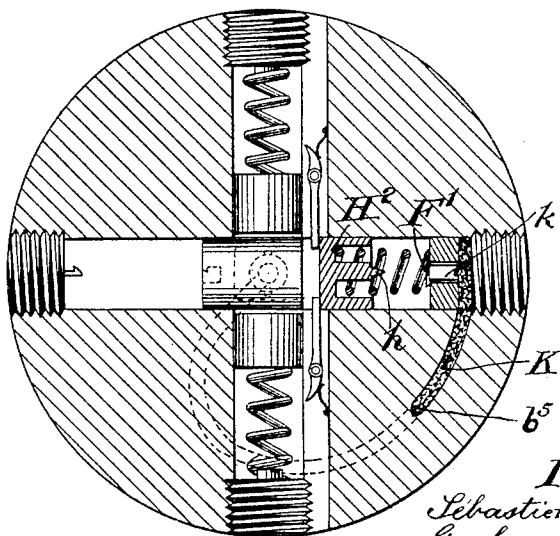


Fig. 5.



Witnesses:-
George Barry Jr.
Frank Hynes

Inventors:
Sebastien Lacavalerie
Garland N. Whistler
by attorneys
Brown & Dowd

UNITED STATES PATENT OFFICE.

SÉBASTIEN LACAVALERIE, OF CARÁCAS, VENEZUELA, AND GARLAND N. WHISTLER, OF POMPTON, NEW JERSEY, ASSIGNORS OF ONE-FIFTH TO JOHN W. MARSHALL AND ANDREA FONTANA, OF NEW YORK, N. Y.

SHELL-FUSE.

SPECIFICATION forming part of Letters Patent No. 582,295, dated May 11, 1897.

Application filed September 2, 1896. Serial No. 604,602. (No model.)

To all whom it may concern:

Be it known that we, SÉBASTIEN LACAVALERIE, of Carácas, Venezuela, and GARLAND N. WHISTLER, of Pompton, in the county of Passaic and State of New Jersey, have invented a new and useful Improvement in Devices for Igniting the Bursting Charge of Shells, of which the following is a specification.

Our invention relates to an improvement in devices for exploding the bursting charge of shells in which provision is made for storing the centrifugal force produced by the rotation of a projectile when fired from a rifle-gun and utilizing said stored force for exploding the bursting charge after the shell has struck and as it comes to rest.

In the accompanying drawings, Figure 1 represents a longitudinal section of a shell provided with the exploding charge in the form in which we at present prefer to employ it. Fig. 2 is a transverse section through line 2 2 of Fig. 1, showing the movable parts in the position which they normally assume before the shell is fired. Fig. 3 is a similar view showing the position which the parts assume after the shell has been fired and before it strikes. Fig. 4 is a transverse section showing a modified form of exploding device, and Fig. 5 is a transverse section showing a time-fuse in connection with the mechanical exploding device.

A represents the body of a shell of ordinary form, such as is in common use. It is one of the advantageous features of our present invention that it may be readily applied to shells which have already been manufactured, its mechanism being limited to the plug which is made to screw into the butt of the shell.

The butt-plug is denoted as a whole by B and is provided with a neck b , which is screw-threaded to register with the screw-threaded socket a in the shell. The butt-plug B is provided with a plurality of radial passages, in the present instance four, (denoted, respectively, by b' , b^2 , b^3 , and b^4), which communicate at their juncture at the axis of the shell with each other and with a tubular passage-way b^5 , leading to the exploding charge C of the shell.

The radial passage-ways b' b^2 , &c., are closed at their outer ends by means of screw-plugs D. The oppositely-extending passage-ways b' b^3 have inserted therein hammers, (denoted, respectively, by E and E',) which are held under tension tending to drive them toward the axis of the shell by coil-springs e , inserted between the inner ends of the plugs D and the outer ends of the hammers. The hammers are each adapted to strike a percussion-cap F on a suitable nipple projecting laterally from the rear end of the wall of the passage-way b^5 for the purpose of igniting the explosive compound in the passage-way b^5 , leading to the explosive charge C.

The hammers E E' are free to move outwardly against the tension of their actuating-springs under the centrifugal force produced by the rotary motion of the shell when fired, and having reached predetermined distances away from the axial line of the shell they are caught by spring-actuated sears G G' and held in their retracted adjustments until such time as the sears G G', one or both of them, shall have been tripped.

The tripping of the sears or detents G G' is effected by a plunger H, which is in effect a trigger and which, like the hammers E E', is actuated by a spring e' , inserted between its outer end and the inner end of the plug D, which closes the passage-way b^5 .

The plunger or trigger H will be held away from the sears G G' so long as the shell continues its rotary movement, but when it strikes and its rotary movement is arrested to an extent sufficient to permit the tension of the spring e' to overcome the centrifugal force tending to throw the plunger H outwardly it will seek the axial line of the shell and come in contact with the tails of the sears G G', releasing them from the hammers E E' and permitting the latter, under the tension of their actuating-springs e , to strike the percussion-caps F and fire the explosive material C within the shell.

In order to prevent the unintentional explosion of the shell by accidentally dropping it in handling, we provide for guarding the percussion-caps F until such time as the shell shall have been fired. This, as represented

in Figs. 1, 2, 3, and 5, is accomplished by a shield I, which is arranged to work radially within the passage-way b^4 . When in its normal position, (represented in Figs. 1 and 2,) it is held in position between the hammers and the percussion-caps by means of noses e^2 , which project from the faces of the hammers and enter shallow sockets i in the exterior walls of the shield I. As soon as the hammers have started on their outward movement under the centrifugal force of the revolving shell the shield I becomes released and under the said centrifugal force is slid outwardly toward the inner end of the plug D, which closes the passage-way b^4 , in which the shield I slides, and upon reaching the inner end of the plug it is retained by means of a catch i' , adapted to hook over a shoulder in the side of a socket i^2 in the outer end of the shield. This serves to fully protect the percussion-caps against unintentional engagement with the hammers and at the same time leaves them fully exposed after the shell has been fired and when it strikes and comes to rest. In the form shown in Fig. 4 we have omitted the shield I and have located the sears G G' upon opposite sides of their respective hammers E E', providing at the same time two triggers H H', the one for tripping the sear upon only one of the hammers and the other for tripping the sear upon the other hammer. In this form we have guarded the percussion-caps F against accidental engagement with the hammers by providing an undercut notch e^3 in each of the hammers adapted to receive the holding end of the sear to such a depth that the sear cannot be released from the hammer by its ordinary rocking movement, but when once released by the outward movement of the hammers under the centrifugal motion of the shell the sears will be held out of engagement with the hammers by the inward pressure of the plungers or triggers H H' when the shell has come to rest, so as to leave the hammers free to strike the percussion-caps as soon as they have been released.

In the form shown in Fig. 5 we have provided, in addition to the mechanical means for igniting the shell after it has struck or come to rest, a time-fuse to be fired at the moment the shell is shot from the gun, in order to effect the explosion of the shell when it shall have reached a predetermined point in its flight and before it has struck. This is to supply a demand which is sometimes of great importance in warfare, and by using it in connection with the mechanical means for exploding the shell when it strikes we are enabled to give the shell the additional advantage of final execution when it strikes, even if the explosion from the time-fuse should fail. To accomplish this, we lead a time-fuse K from its connection with the ex-

plosive material in the passage-way b^5 to the base of a nipple k at the inner end of the plug D, which closes the passage-way in which the trigger H² is located, and provide the trigger (denoted by H²) with a head h for striking a percussion-cap F' on the nipple k when it reaches the limit of its outward throw under the centrifugal force due to the rotary movement of the shell.

In the several forms which we have presented we have shown a plurality of hammers. This is for the purpose of lessening the possible failure to explode, as a single hammer would be sufficient if it never failed.

It is obvious that changes might be resorted to in the form and arrangement of the several parts without departing from the spirit and scope of our invention. Hence we do not wish to limit ourselves strictly to the construction herein set forth, but we disclaim the combination, with a shell; of a device for firing the bursting charge of the shell at the moment the shell strikes or comes to rest, said firing device comprising means for storing the centrifugal force produced by the rotation of the shell and means for expending said stored-up force, substantially as set forth.

What we claim is—

1. The combination with a shell, of a device for firing the bursting charge of the shell, said firing device comprising a hammer arranged to move toward and away from the axis of the shell, a spring for forcing the hammer toward the axis of the shell, a detent for holding the hammer temporarily away from the axis of the shell against the tension of said spring and a spring-actuated plunger or trigger for automatically tripping the detent, substantially as set forth.

2. The combination with a shell and percussion material for igniting the bursting charge of the shell, of a firing device comprising a spring-actuated hammer arranged to move away from and toward the said percussion material as the shell rotates and ceases to rotate and means for holding the said hammer normally out of contact with the percussion material, substantially as set forth.

3. The combination with a shell and percussion material for igniting the bursting charge of the shell, of a spring-actuated hammer arranged to move toward and away from the percussion material, a shield held normally between the hammer and the percussion material and means for automatically locking the shield in position to uncover the percussion material when the shell is rotated, substantially as set forth.

SÉBASTIEN LACAVALERIE.
GARLAND N. WHISTLER.

Witnesses:

FREDK. HAYNES,
GEORGE BARRY, Jr.