

(No Model.)

J. W. GRAYDON.
CONTACT FUSE FOR PROJECTILES.

No. 382,227.

Patented May 1, 1888.

Fig. 1.

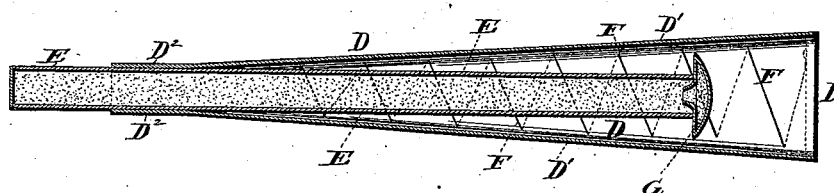
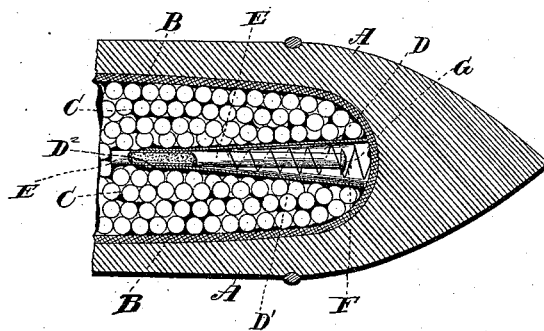


Fig. 2.



Witnesses:
Chas. J. Williamson,
Henry C. Hazard

Inventor,
James W. Graydon,
by Prindle & Russell
his Attorneys.

UNITED STATES PATENT OFFICE.

JAMES W. GRAYDON, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR,
BY MESNE ASSIGNMENTS, TO THE GRAYDON DYNAMITE PROJECTILE
CARTRIDGE AND HIGH EXPLOSIVE COMPANY, OF SAME PLACE.

CONTACT-FUSE FOR PROJECTILES.

SPECIFICATION forming part of Letters Patent No. 382,227, dated May 1, 1888.

Application filed May 7, 1887. Renewed February 15, 1888. Serial No. 261,145. (No model.)

To all whom it may concern:

Be it known that I, JAMES W. GRAYDON, of Washington city, in the District of Columbia, have invented certain new and useful Improvements in Contact-Fuses for Projectiles; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 shows a longitudinal section of my improved contact-fuse; and Fig. 2 shows a longitudinal sectional view of a portion of a shell provided with my fuse.

Letters of like name and kind refer to like parts in each of the figures.

The object of my invention is to provide an improved contact-fuse for use in projectiles, which can be placed wholly within the projectile, and is not exposed to the heat and flame from the explosion of the propelling-charge in the gun; and to this end my invention consists in the fuse and in the construction, arrangement, and combination of the parts thereof, as hereinafter specified.

Where, as has heretofore been done, the percussion or contact firing device of a projectile has been so arranged as to project partly from the projectile, so as to present a portion to be struck, when the projectile strikes an object there is always danger of enough heat being transmitted along the firing-pin or through the wall of the shell to the sensitive percussion-primer to fire the latter. To avoid this danger and the consequent one of premature explosion of the shell, I have invented a contact-fuse which I put entirely within the shell, where it is unexposed to fire or transmitted heat.

In the drawings, A designates the casing of a shell or explosive projectile, such as is fully described in my other pending application, No. 237,448, with its lining B, of material non-conductive of heat, and its explosive charge C, of peculiar nature.

The shell lining and charge are fully set forth and covered in my said other application, and need not be further described in the present specification. So far as the action of my fuse is concerned, other forms of shell and other kinds and varieties of explosive can be used, as desired.

Placed within the front end of the charge-receiving chamber of the shell is the fuse D, which consists, as shown, of the funnel-shaped or rearwardly-tapering tube D', of brass, copper, or some other sheet metal. The large front end of this funnel is in contact with or close to the front end of the chamber. Its rear end is preferably made cylindrical for a short distance at D², to receive the tube E, which is adapted to slide longitudinally within the funnel. At its front end this tube projects forward only to a point at some distance from the front end of the funnel D', and at its rear end it projects, as shown, well beyond the rear end of the cylindrical portion D² on the said funnel. While the tube E is free to slide forward and back within the funnel, it is normally held in the position just described; and shown in the drawings, by a spiral spring, F, within the funnel, attached at its rear end to tube E. The forward end of the spring can either bear against the end of the shell-chamber or be attached to the funnel. On the front end of tube E is the percussion cap or primer G, adapted to be exploded if the tube is driven forward against the front end of the said shell-chamber.

The tube E is, as indicated, filled with powder, to be fired by the explosion of the primer G. The tube can of course be made of any interior capacity, to receive a larger or smaller charge of powder, as desired, for properly and best igniting the exploding-charge of the shell.

With the shell loaded with the explosive such as is described in my said other application more powder is desirable in the tube than is necessary where ordinary powder is used for the shell-bursting charge.

The funnel D' keeps the contents of the shell-chamber away from the spiral spring F and leaves a clear path for forward travel of the tube E.

The operation of my fuse is as follows: With the parts in position as already described, when the shell is fired out of the gun and strikes an object or anything to retard its flight, the tube E travels forward against the front end of the shell-chamber, and, striking the primer G against such end, fires it. The powder in the tube, being set fire to by the

primer, ignites and explodes the charge in the shell-chamber. The time at which the shell will be exploded after striking an object can obviously be regulated by adjusting the distance of the primer-carrying end of tube E from the chamber end—that is by adjusting the distance that the tube will have to travel against the stress of spring F. The time required for the tube E, by reason of its inertia, to compress the spring F and travel through the space intervening between the primer on the tube and the chamber end is of course short; but it is long enough to allow the projectile to enter a steel target two feet through before the shell-exploding charge is fired. The shell and its charge are just then at that position in the target or side of an armored vessel or fort where the greatest amount of work will be done by the explosive. Such a penetration and timing of the explosion is of the very greatest importance where dynamite or other high explosive is used in the shell.

Having thus described my invention, what I claim is—

25 1. A contact firing fuse for projectiles adapted to be put inside of and inclosed by the projectile-casing, and consisting of an outer casing, in combination with a tube slid-

ing within the same, a primer on the tube, and a spring engaging the tube, so as to hold the primer-carrying end of the tube rearward, substantially as and for the purpose shown. 30

2. In a contact-fuse adapted to be placed within the chamber of an explosive projectile, the casing and the powder-containing tube sliding therein, in combination with the percussion-primer on the tube, and the spring engaging the tube and adapted to hold the same rearward in the casing, substantially as and for the purpose shown. 35 40

3. In combination with the funnel-shaped casing, the powder-containing tube, guided and adapted to slide longitudinally within the casing, the cap or percussion primer on the tube, and the spiral spring surrounding and engaging the tube, so as to hold the same rearward in the casing, substantially as and for the purpose set forth. 45

In testimony that I claim the foregoing I have hereunto set my hand this 3d day of May, 1887. 50

JAMES W. GRAYDON.

Witnesses:

GEO. S. PRINDLE,
PHILIP G. RUSSELL.