F. M. HALE.

EXPLOSIVE SHELL OR SIMILAR BODY.

APPLICATION FILED DEC. 24, 1918.

1,301,126.

Patented Apr. 22, 1919.

FIG. 1.

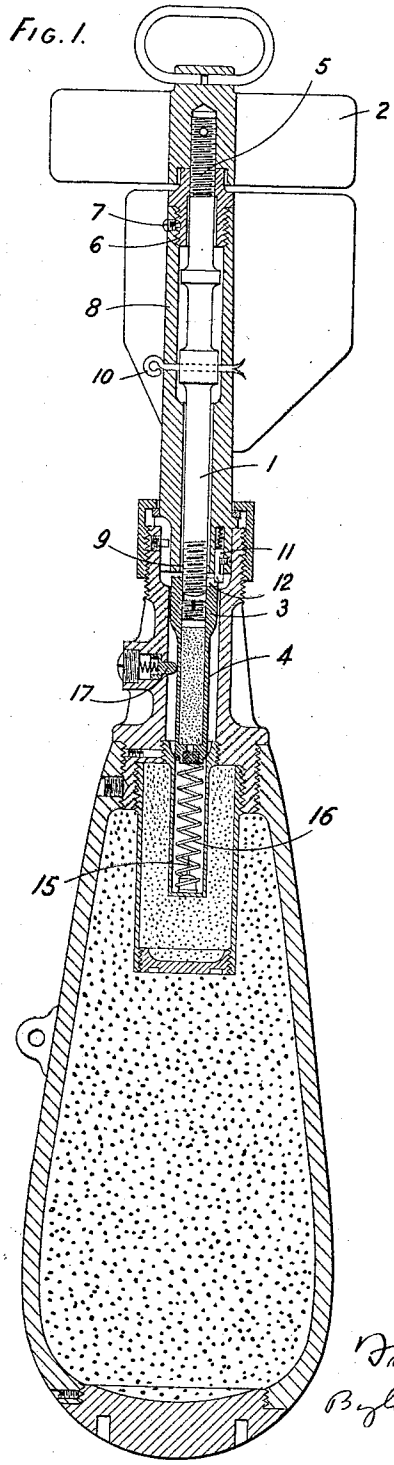


FIG. 3.

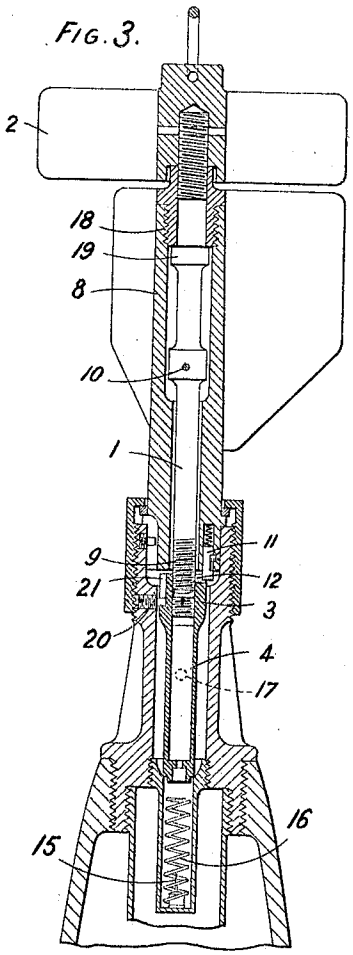
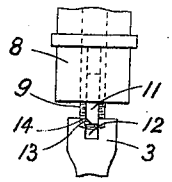


FIG. 2.



Frederick Marten Hale,

By his attorney

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UNITED STATES PATENT OFFICE.

FREDERICK MARTEN HALE, OF BROMLEY, ENGLAND.

EXPLOSIVE SHELL OR SIMILAR BODY.

1,301,126. Specification of Letters Patent. Patented Apr. 22, 1919.

Application filed December 24, 1918. Serial No. 268,156.

To all whom it may concern:

Be it known that I, FREDERICK MARTEN HALE, a subject of the King of Great Britain and Ireland, and a resident of Bromley, in the county of Kent, England, have invented certain new and useful Improvements in or Pertaining to Explosive Shells or Similar Bodies, of which the following is a specification.

This invention relates to explosive shells or similar bodies (hereinafter referred to as shells) intended to be dropped or discharged from aircraft, and of the type in which a detonator is, before the discharge of the shell, arranged in a rear portion of the shell, and is adapted, when the shell has traveled a predetermined distance through the air, to be released so as to be free to move forward in relation to the body of the shell.

In the specifications of Letters Patent of the United States granted to me June 1st, 1915, and May 1st, 1917, respectively, and numbered 1,141,540 and 1,224,163, the detonator is described as being normally held in position by balls and as being liberated by the freeing of the balls by a screw-spindle moved rearwardly by a wind-vane device, the balls engaging directly with an extension of the detonator in the case of the former patent and engaging indirectly with the detonator by means of a detonator-holder in the case of the latter patent.

Now according to the present invention, the ball connection is dispensed with and a screw-spindle, adapted to be rotated by a wind-vane device and fitting in a screw-socket of the detonator, which is prevented from rotating, is adapted to free the detonator, after a predetermined number of revolutions by being screwed out of the said socket. To enable the screw-spindle to be, by its rotation by the wind-vane device, moved rearwardly in relation to the body of the shell so as not to affect the position of the detonator, it preferably has a corresponding screw-connection with the body of the shell. The screw-spindle is preferably normally held in its forward position by means of a safety pin which at the same time prevents the rotation of the wind-vane device.

In a shell constructed as just described and also so constructed, as described in the specification of the aforesaid Letters Patent numbered 1,224,163, that a tail portion of the shell is adapted to be readily connectible and disconnectible so as to enable a detonator normally carried separately from the shell to be very quickly placed into position immediately before the shell is required for use, it is necessary to prevent the jamming of the screw-spindle by the screwing of the detonator too tightly home against the disconnectible tail portion, and it is also necessary to prevent the rotation of the detonator. These two purposes I achieve by providing in the disconnectible tail portion a spring bolt and forming a corresponding notch in the detonator so that when the detonator is screwed to the desired extent upon the screw-spindle, the spring bolt engages in the notch and so prevents the detonator from being screwed so far upon the screw-spindle as to jam against the detachable tail portion, and also prevents the rotation of the detonator in relation to the detachable tail portion. The notch, or the bolt, or both, is, or are, or may be, so formed that after the bolt has first entered the notch a further revolution or further revolutions of the detonator in the direction for screwing it upon the screw-spindle may be effected so as to enable the bolt to enter still farther into the notch. The bolt is, or may be, adapted, as by projecting radially outward from the detonator, to be forced back by hand to enable the detonator to be easily screwed off the screw-spindle, as may be desirable if, for example, after placing the detonator in the shell, the time be found unsuitable for dropping or discharging the shell.

In some cases, instead of making the screw-spindle movable rearward, as above indicated, I may arrange for the screw-spindle to be stationary longitudinally of the tail portion and for the detonator to be released by being screwed forward off the screw-spindle by the rotation of the latter.

In this case I may, in addition to the spring catch device above described, employ a pin-and-slot device to prevent the rotation of the detonator until it has been screwed completely off the screw-spindle.

It will be obvious that as an alternative the spindle might have an internally threaded socket and the detonator have a correspondingly formed screw-threaded portion to engage therewith, but I prefer to employ the socketed detonator because it

suits the hereinbefore described spring catch device for preventing jamming and rotation of the detonator.

The invention is illustrated by the accompanying drawings, of which Figure 1 represents in longitudinal section an example of a shell constructed in accordance therewith, Fig. 2 is a detail view thereof, and Fig. 3 is a longitudinal sectional view of another example.

In the example shown in Fig. 1, a screw-spindle 1, fixed to a wind-vane device 2 and fitting in a screw-socket 3 of the detonator 4, which is prevented from rotating by the means hereinafter described, is adapted to free the detonator after a predetermined number of revolutions by being screwed out of the socket 3. To enable the screw-spindle to be, by its rotation by the wind-vane device, moved rearwardly in relation to the body of the shell, it has a screw-threaded portion 5 which fits in a nut 6 secured by a screw 7 in the tail portion 8 of the body of the shell, the pitch of the screw-threaded portion 5 being like that of the screw-threaded portion 9 that fits in the socket 3. The screw-spindle 1 is normally held in its forward position by means of a safety pin 10, which also normally prevents the rotation of the wind-vane device 2.

To prevent the jamming of the screw-spindle 1 by the screwing of the detonator 4 too tightly home against the disconnectible tail portion 8 of the body of the shell, and also to prevent the rotation of the detonator 4, there is provided in the disconnectible tail portion 8 a spring bolt 11 and a corresponding notch 12 is formed in the detonator 4 so that when the detonator is screwed to the desired extent upon the screw-spindle 1, the spring bolt 11 engages in the notch 12 and so prevents the detonator from being screwed so far upon the screw-spindle 1 as to jam against the detachable tail portion 8, and also prevents the rotation of the detonator in relation to the detachable tail portion. The notch 12, or the bolt 11, or both, is, or are, or may be, so formed, as by beveling on one side, that after the bolt has first entered the notch a further revolution or further revolutions of the detonator 4 in the direction for screwing it upon the screw-spindle 1 may be effected so as to enable the bolt 11 to enter still farther into the notch 12. Fig. 2 shows the catch 11 and the notch 12 both beveled at one side, the catch projecting into the notch 12 but not far enough to prevent further rotation of the detonator on the spindle; it will be seen that on further rotation of the detonator the bevels 13 of the catch and 14 of the notch will move the catch backward out of the notch 12 so that the detonator can be still farther screwed upon the spindle 1 until the bevels 13 and 14 have passed each other, when the detonator will be prevented from further rotation in the same direction and will be secured against being screwed off the spindle by rotation in relation to the tail portion 8. The bolt 11 is shown to be adapted, by projecting radially outward from the detonator, to be forced back by hand to enable the detonator 4 to be easily screwed off the screw-spindle 1, as may be desirable if, for example, after placing the detonator in the shell, the time be found unsuitable for dropping or discharging the shell. 15 is the fixed firing pin, 16 a spring for preventing the detonator from creeping forward during the descent of the shell into too near proximity to the pin 15, and 17 a spring catch adapted to engage with the rear end of the detonator and so prevent it from rebounding when it strikes the firing pin 15.

In the example shown in Fig. 3, the screw-spindle 1 is stationary longitudinally of the tail portion 8 and the detonator 4 is thus adapted to be released by being moved forward off the screw-spindle 1 by the rotation of the latter: in this case there is no screw connection between the spindle 1 and the tail portion 8, a cylindrical portion of the spindle fitting in a bearing 18 which is secured therein and which, to prevent longitudinal movement of the spindle 1, bears at one end against the wind-vane device 2 fixed to the spindle 1 and at the other end against a boss 19 on the spindle 1. In this example, in addition to the spring catch device 11, 12 above described, there is employed a device comprising a pin 20 fixed to the main portion of the shell and projecting into a longitudinal slot 21 in the detonator to prevent the rotation of the detonator until it has been moved completely off the screw-spindle by the rotation of the latter. This modification presents the advantage that the detonator 4 is brought closer to the firing pin 15 during the descent of the shell and consequently explosion is caused sooner after impact; in this case the spring 16 may advantageously be, as shown, made so short as to be reached by the detonator only at the end of its movement produced by the rotation of the spindle 1.

The spring catch 17 is in this example arranged at right angles to the pin 20 so as not to engage in the groove 21.

What I claim is:—

1. A shell adapted to be dischared from aircraft and comprising a wind-vane device rotatable in relation to the body of said shell, a spindle fixed to said device, a detonator having a screw-connection with said spindle and adapted to be disengaged from said spindle by rotation of said spindle in relation to said detonator, and means for preventing the rotation of sail detonator in relation to the body of said shell.

2. A shell adapted to be discharged from aircraft and comprising a wind-vane device rotatable in relation to the body of said shell, a spindle fixed to said device and projecting forward into the body of said shell, a detonator having a screw-connection with the forward end of said spindle and adapted to be disengaged from said spindle by rotation of said spindle in relation to said detonator, and means for preventing the rotation of said detonator in relation to the body of said shell.

3. A shell adapted to be discharged from aircraft and comprising a wind-vane device rotatable in relation to the body of said shell, a detonator located within said body and having an internally screw-threaded rear end portion, a spindle fixed to said device and having an externally screw-threaded forward end portion fitting said internally screw-threaded portion of said detonator and adapted to be disengaged therefrom by the rotation of said spindle in relation to the body of said shell by said wind-vane device during the descent of said shell, and means for preventing the rotation of said detonator in relation to the body of said shell.

4. A shell adapted to be discharged from aircraft and comprising a wind-vane device rotatable in relation to the body of said shell, a spindle fixed to said device, a detonator having a screw-connection with said spindle and adapted to be disengaged from said spindle by rotation of said spindle in relation to said detonator, and means for preventing the rotation of said detonator in relation to the body of said shell, said spindle having with the body of said shell a screw-connection adapted on rotation of said spindle to cause said spindle to move in relation to said body in the same direction as that in which the aforesaid screw-connection is on the same rotation of said spindle adapted to move said spindle in relation to said detonator.

5. A shell adapted to be discharged from aircraft and comprising a body including a main portion and a tail portion adapted to be readily disconnected from and connected to said main portion, a detonator, a wind-vane device rotatable in relation to said body portion, a spindle fixed to said device and mounted in said tail portion, a detonator having a screw-connection with said spindle and adapted to be disengaged from said spindle by rotation of said spindle in relation to said detonator, and a spring catch mounted in said tail portion and engaging in a notch in said detonator.

Signed at 75/77 Cornhill, London, Eng., this 27th day of November 1918.

FREDERICK MARTEN HALE.

Witnesses:

WM. A. BROWN,

J. M. BERTHCLOT.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."