Sept. 23, 1930. G. SCAGLIA 1,776,705

SAFETY DEVICE FOR PROJECTILES, GRENADES, AND THE LIKE

Filed Nov. 10, 1928

Fig. 3

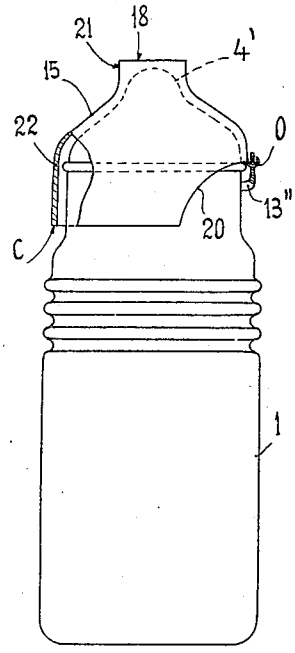


Fig. 1

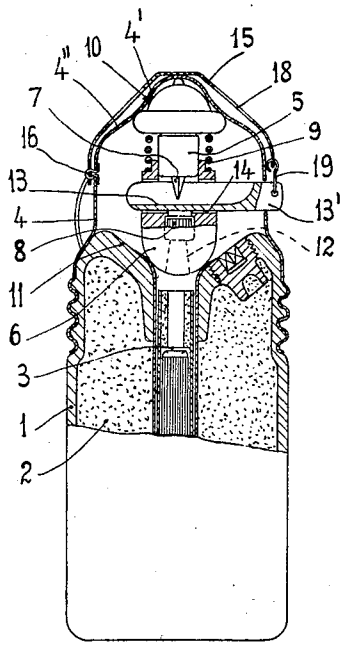
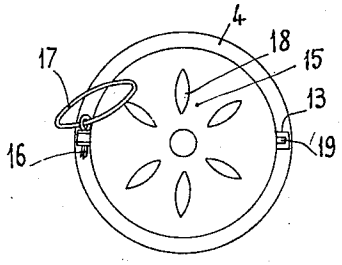


Fig. 2



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UNITED STATES PATENT OFFICE

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SAFETY DEVICE FOR PROJECTILES, GRENADES, AND THE LIKE

Application filed November 10, 1928, Serial No. 318,386, and in Germany October 2, 1928.

This invention relates to safety devices embodied in percussion ignition means used in projectiles, hand grenades, grenades intended to be thrown by grenade throwers, and the like.

It is known that in firing projectiles and grenades by means of throwers having a barrel, it is essential to secure the maximum possible range, the leakage of propelling gases in the thrower barrel having for such a purpose to be reduced to a minimum.

It is therefore necessary that the safety device does not include parts projecting beyond the surface of the projectile or grenade acting to guide said projectile or grenade in its travel along the thrower barrel, while said safety device must prevent absolutely the operation of the ignition means within the thrower barrel; further it is necessary to remove any possible seizure of the safety device in the thrower barrel both at the time of charging and at the time of firing. On the other hand the safety member must drop from the projectile or grenade during its flight to provide for the operation of ignition means at the time of impact, and at the same time said safety member must oppose a minimum resistance against flight through air to prevent any deviation of the projectile or grenade from its required travel.

This invention has for its object a safety device which complies with all the above requirements and may be manufactured and mounted in a quite easy manner.

On the annexed drawing are illustrated by way of example two embodiments of this invention and

Figure 1 is the central section of a grenade having a safety device in accordance with this invention;

Figure 2 is a top view, and

Figure 3 is a side view of a modified construction.

In the construction shown in Figures 1 and 2, the grenade, which may be of any desired construction, comprises a casing 1 (containing an explosive charge 2 and a detonator 3) on which a hollow head 4 having a slightly smaller diameter than casing 1 is secured, said head enclosing the percussion ignition means.

Said ignition means comprise, in the illustrated construction, two telescope sliding parts 5 and 6 adapted to move longitudinally with respect to each other, one of them having a striker 7 while the other one carries a primer 8; in normal conditions parts 5 and 6 are held spaced from each other by an intermediate spring 9 and they bear by rounded heads against the recessed conical surfaces 10 and 11 belonging to head 4 and casing 1, respectively.

At the time of impact on target, after the safety member has been removed, the respective displacement of parts 5 and 6 taking place by effect of inertia, causes in the known manner said striker 7 to act on primer 8 whose flame is transmitted, through port 12, to detonator 3 which ignites the explosive charge 2.

As above described, the front portion 4 of the grenade has a slightly smaller diameter than body 1 of the grenade which provides a cylindrical portion intended to guide it through the thrower barrel and minimize leakage of propelling gases.

According to this invention, the safety member which consists of a transverse member 13 located in a transverse hole 14 of part 6 and engaged between striker 7 and primer 8, is articulated or connected in floating manner with a cap 15 embracing the head 4 of the grenade and having means adapted to assist its removal from said head. The cap 15 is on the other hand engaged on the head 4 by a safety pin 16 intended to be removed by the operator by manipulating ring 17 of said pin immediately before firing.

To ensure the release of transverse member 13 during the grenade flight, the cap 15 is provided with one or more holes 18 in its front portion, and thus during the grenade flight the air entering through holes 18 in the space intermediate cap 15 and outer surface of the head 4, ensures in any circumstance the separation of cap 15 from head 4 and therefore the removal of transverse bar 13, even in the case the starting speed of the grenade is low. Holes 18 reduce also the

resistance suffered by the cap 15 through air along the portion of the flight in which it is connected with the grenade, the deviation produced by the said cap being thus reduced.

Head 4 provides preferably a central projecting portion 4′ connected with a depressed annular portion 4″ for the purpose of increasing the action of air on the internal face of cap 15.

To assist the removal action produced by cap 15 on the transverse bar 13, their interconnection may be secured with advantage by means of an intermediate part 19 hinged both to transverse bar 13 and to cap 15. Therefore at the time said cap is reversed, said cap takes up a high momentum and part 19 exerts on the transverse bar a pull in the direction of the axis of the said transverse bar, this action assisting the removal of said transverse bar by avoiding any inclined stress which could cause the seizure of said bar in its seat.

Said transverse bar has preferably a U-shaped cross section, as illustrated, to impart a large resistance against bending stresses and to prevent it from being bent under the action produced thereon by parts 5—7 on shot being fired, due to inertia of said parts 5—7; therefore said transverse bar cannot become engaged in the ignition device.

The transverse member 13 comprises a solid portion 13′ adjacent its articulation with cap 15, said solid portion assisting by its weight the removal of the transverse bar.

In the embodiment illustrated in Figure 3, cap 15 has a single opening 18 arranged along the axis of the grenade, the edge of said hole being preferably flaring outwardly to provide a mouth 21 intended to direct air into the space intermediate head 4 and cap 15 for the purpose of assisting the removal of the cap.

The articulation of cap 15 with transverse bar 13 is made in this embodiment by means of an arm 13″ integral with said transverse bar and extending forward parallel with the grenade axis, the cap 15 being thus able to be entirely reversed and to take a position with its centre of gravity on the extension of the axis of the transverse member, this fact further assisting the removal of said transverse bar; for this purpose the edge of the cap is preferably indented or cut-off adjacent its point of articulation with the said transverse bar, as shown by 20 in Fig. 3.

To further assist the reversal of the cap 15, it is also useful to impart a larger weight to the edge of said cap opposite its point of articulation with said transverse bar, either by increasing the thickness of said edge or by affixing a weight thereon; by such a provision the pull produced by the cap on the transverse member is increased due to centrifugal action. A thickened portion 22 provided for this purpose on said cap is shown in Fig. 3.

Finally to prevent the edge —*c*— of the cap from impinging upon the internal surface of the thrower barrel at the time the shot is fired, said cap being free to swing after the usual safety pin (not shown in Fig. 3 but provided on the grenade and similar to pin 16 shown in the embodiment of Figure 1) the said cap is elongated towards the basis of the grenade beyond a plane perpendicular to the grenade axis and passing through the centre —*o*— where said cap is articulated on transverse bar 13; therefore, during the travel of the grenade in the thrower barrel, the possible engagement of edge —*c*— of the cap on the tube surface tends to carry the cap in correct position and to prevent any possible engagement or seizure.

What I claim as my invention and desire to secure by United States Letters Patent is:—

1. A safety device for ignition devices located in the body of grenades, projectiles and the like, comprising a member removably engaging said ignition device and a cap connected with said engaging member and located on the outside of said body, said cap being perforated for admission of air intermediate said cap and body to assist the removal of said cap and engaging member during flight through air.

2. A safety device for ignition devices located in the body of grenades, projectiles and the like, comprising a member removably engaging said ignition device and a cap connected with said engaging member at a point spaced from the axis of said engaging member and located on the outside of said body, said cap being perforated for admission of air intermediate said cap and body to assist the removal of said cap and engaging member during flight through air.

3. A safety device for ignition devices located in the body of grenades, projectiles and the like, comprising a member removably engaging said ignition device, a cap located on the outside of said body, said cap being perforated for admission of air intermediate said cap and body to assist the removal of said cap during flight through air and a part connecting said engaging member and cap and articulated with both.

4. A safety device for ignition devices located in the body of grenades, projectiles and the like, comprising a member removably engaging said ignition device, a cap connected with said engaging member and located on the outside of said body, said cap having a central intake for admission of air intermediate said cap and body to assist the removal of said cap and engaging member during flight through air.

5. A safety device for ignition devices located in the body of grenades, projectiles and

the like, comprising a member removably engaging said ignition device, a cap located on the outside of said body, said cap having a central intake for admission of air intermediate said cap and body to assist the removal of said cap during flight through air and a part connecting said engaging member and cap and articulated with both.

6. A safety device for ignition devices located in the body of grenades, projectiles and the like, comprising a member removably engaging said ignition device and a cap connected with said engaging member and located on the outside of said body, said body comprising a depressed annular portion under said cap and said cap having perforations in register with said depressed portion of said body for admission of air intermediate said cap and body to assist the removal of said cap and engaging member during flight through air.

7. A safety device for ignition devices located in the body of grenades, projectiles and the like, comprising a member removably engaging said ignition device, a cap located on the outside of said body, and a connecting part articulated with both said engaging member and cap, said body comprising a depressed annular portion under said cap and said cap having perforations in register with said depressed portion of said body for admission of air intermediate said cap and body to assist the removal of said cap and engaging member during flight through air.

8. A safety device for ignition devices located in the body of grenades, projectiles and the like, comprising a member removably engaging said ignition device, a cap floatingly connected with said engaging member and located on the outside of said body, said cap being perforated for admission of air intermediate said cap and body to assist the removal of said cap and engaging member during flight through air and comprising a portion extending beyond the plane passing through the point of interconnection of said cap and engaging member and transverse to the axis of said body.

9. A safety device for ignition devices located in the body of grenades, projectiles and the like, comprising a member removably engaging said ignition device, a cap floatingly connected with said engaging member and located on the outside of said body, said cap being perforated for admission of air intermediate said cap and body to assist the removal of said cap and engaging member during flight through air and comprising a portion extending beyond the plane passing through the point of interconnection of said cap and engaging member and transverse to the axis of said body, said cap having further a cut-off portion adjacent said point of interconnection.

10. A safety device for ignition devices located in the body of grenades, projectiles and the like, comprising a U-cross section member removably engaging said ignition device, a cap floatingly connected with said engaging member and located on the outside of said body, said cap being perforated for admission of air intermediate said cap and body to assist the removal of said cap and engaging member during flight through air.

11. A safety device for ignition devices located in the body of grenades, projectiles and the like, comprising a U-cross section member removably engaging said ignition device, a cap located on the outside of said body, a part connecting said engaging member and said cap and articulated with both of them, said cap being perforated for admission of air intermediate said cap and body to assist the removal of said cap and engaging member during flight through air.

12. A safety device for ignition devices located in the body of grenades, projectiles and the like, comprising a member removably engaging said ignition device, a cap floatingly connected with said engaging member and located on the outside of said body, said cap being perforated for admission of air intermediate said cap and body to assist the removal of said cap and engaging member during flight through air, and a weighted portion on said engaging member adjacent its interconnection with said outer member.

13. A safety device for ignition devices located in the body of grenades, projectiles and the like, comprising a member removably engaging said ignition device, a cap floatingly connected with said engaging member and located on the outside of said body, said cap being perforated for admission of air intermediate said cap and body to assist the removal of said cap and engaging member during flight through air and a weighted portion on said cap at a point opposite its point of floating connection with said engaging member.

14. A safety device for ignition devices located in the body of grenades, projectiles and the like, comprising a member removably engaging said ignition device, a cap floatingly connected with said engaging member and located on the outside of said body, said cap being perforated for admission of air intermediate said cap and body to assist the removal of said cap and engaging member during flight through air, said cap having a portion extending beyond the plane transverse to axis of said body and passing through the point of floating connection of said cap with said engaging member, and a weight on said extending portion of said cap opposite said point of floating connection.

15. A safety device for ignition devices located in the body of grenades, projectiles and the like, comprising a member removably engaging said ignition device and a cap located

on the outside of said body for its removal from said body during flight through air, said cap being articulated with said engaging member at a point spaced from the axis of said engaging member and located on the outside of said body.

16. A safety device for ignition devices located in the body of grenades, projectiles and the like, comprising a member removably engaging said ignition device, a member embracing said body and located on the outside of said body for its removal from said body during flight through air, and a part connecting said engaging member and said outer member and articulated with both.

17. A safety device for ignition devices located in the body of grenades, projectiles and the like, comprising a member removably engaging said ignition device, a cap located on the outside of said body, and a part connecting said engaging member and cap and articulated with both.

18. A safety device for ignition devices located in the body of grenades, projectiles and the like, comprising a U-cross section member removably engaging said ignition device, a cap floatingly connected with said engaging member at a point spaced from the axis of said engaging member, said cap being located on the outside of and embracing said body.

19. A safety device for ignition devices located in the body of grenades, projectiles and the like, comprising a U-cross section member removably engaging said ignition device, a cap located on the outside of said body, and a part connecting said engaging member and said cap and articulated with both of them.

20. A safety device for ignition devices located in the body of grenades, projectiles and the like, comprising a member removably engaging said ignition device, a cap floatingly connected with said engaging member and located on the outside of said body, and a weighted portion on said cap at a point opposite its point of floating connection with said engaging member.

21. A safety device for ignition devices located in the body of grenades, projectiles and the like, comprising a member removably engaging said ignition device, a cap floatingly connected with said engaging member and located on the outside of said body, said cap having a portion extending beyond the plane transverse to axis of said body and passing through the point of floating connection of said cap with said engaging member, and a weight on said extending portion of said cap opposite said point of floating connection.

In testimony whereof I have signed my name to this specification.

GREGORIO SCAGLIA.