

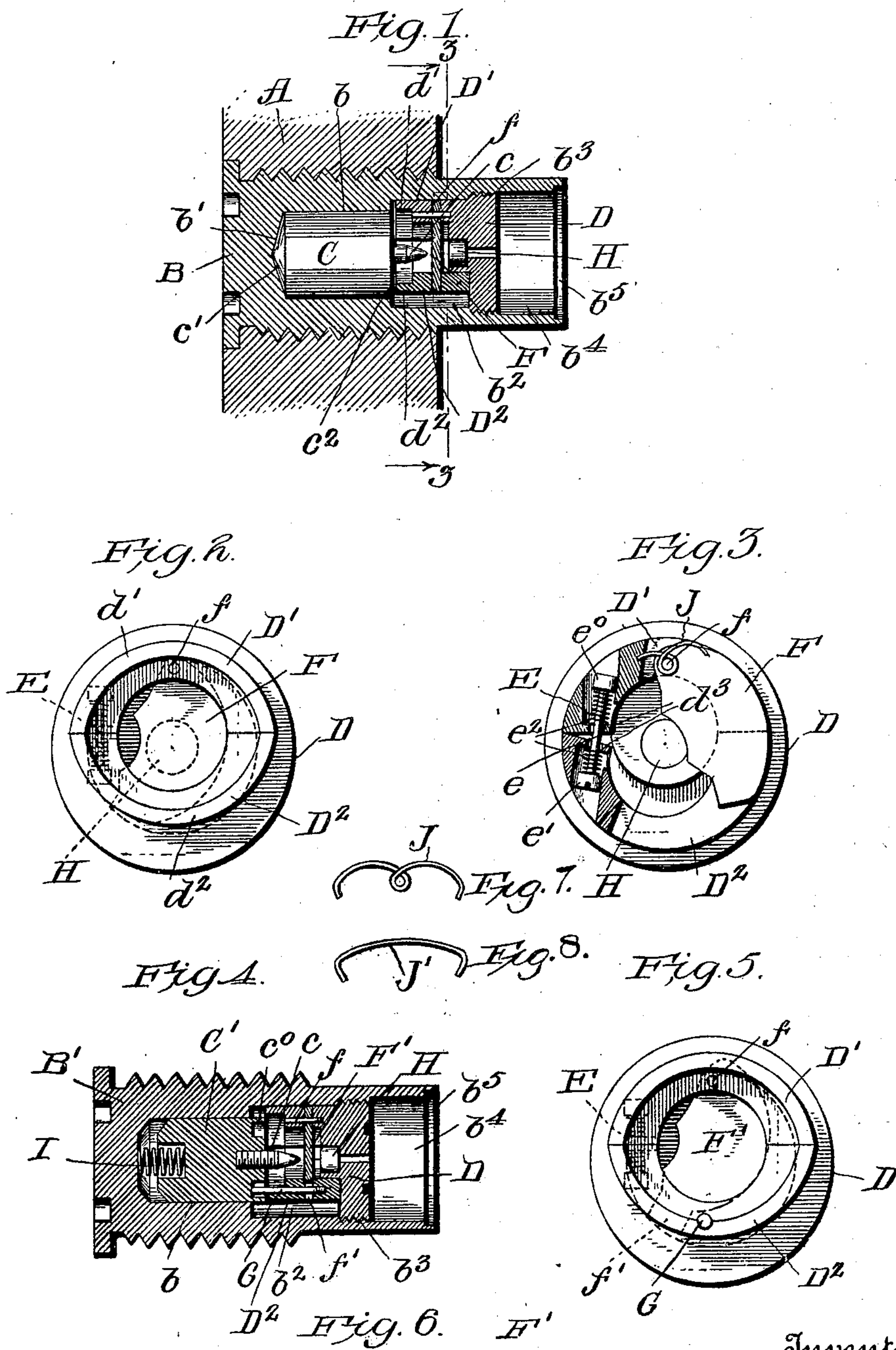
No. 797,468.

PATENTED AUG. 15, 1905.

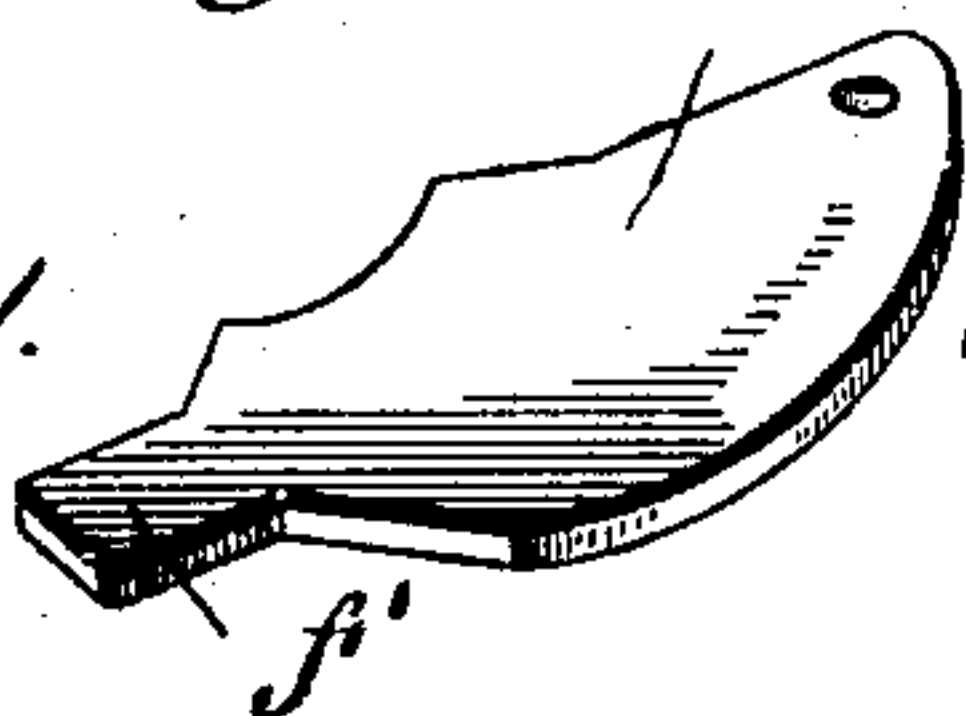
J. L. STICHT.

SHELL FUSE.

APPLICATION FILED JUNE 27, 1904.



Witnesses
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UNITED STATES PATENT OFFICE.

JOHN L. STICHT, OF THE UNITED STATES NAVY.

SHELL-FUSE.

No. 797,468.

Specification of Letters Patent.

Patented Aug. 15, 1905.

Application filed June 27, 1904. Serial No. 214,403.

To all whom it may concern:

Be it known that I, JOHN L. STICHT, a lieutenant in the United States Navy, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Shell-Fuses; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in percussion-fuses, and it is intended to provide a fuse which shall be simple in construction, safe against accidents, and efficient in operation. The fuse as hereinafter described is of that class of fuses in which the firing-plunger is normally separated from the cap by a shield or guard, which shield is swung out of the way of the firing-pin by centrifugal force due to the rotary motion of the shell caused by the rifling in the gun.

My invention will be understood by reference to the accompanying drawings, in which the same parts are indicated by the same letters throughout the several views.

Figure 1 shows a section through the fuse-stock with the plunger in elevation and the shield in the safety position. Fig. 2 is an end view of the plug in which the cap and shield are mounted, the scale being twice as large as that of Figs. 1 and 4 and the shield being in the safety position. Fig. 3 is a section across the plug and swinging guard along the line 3 3 of Fig. 1 looking in the direction of the arrows, but showing the shield thrown out in the firing position, the scale being the same as shown in Fig. 2 and the fuse-stock not being shown. Fig. 4 illustrates a modification of the fuse shown in Fig. 1, showing a central longitudinal section through the fuse. Fig. 5 is a view of the plug of Fig. 4 as seen from the left of said figure and removed from the fuse-stock, the scale being twice as large as that of Fig. 4; and Fig. 6 is a perspective view showing the shield of Figs. 4 and 5. Figs. 7 and 8 show forms of spring suitable for normally holding the shield in the closed position.

Referring first to Figs. 1 to 3, A represents a portion of the base of the shell, into which the fuse-stock B is secured in the usual way. This fuse-stock may be screwed in a bushing or otherwise secured to the base of the shell, if desired. The fuse-stock B has a chamber

b, which is preferably cylindrical to receive the cylindrical portion of the plunger C, and this chamber b is preferably tapered, as at b', to receive the tapered end c' of the plunger C. The plunger carries on its forward end the firing-pin c, which normally just clears the shield F, which is pivoted, as at f, in the plug D. This plug D carries a percussion-cap H, which ignites the powder charge (not shown) in the magazine b⁴ of the fuse. The magazine is normally closed by a cap (not shown) inserted in the annular recess b⁵. The plug D is screwed into the fuse-stock, as at b³. The plug D has hinged thereto the swinging guard D², which is normally held in the closed position (indicated in Fig. 2) by means of the spring-hinge E; but when the shell is rapidly spun this guard D² flies outward to the position shown in Fig. 3 against the action of this spring, while at the same time the shield F swings outward about its pivot f, allowing the main body of the plunger C to pass between the ribs d' and d² and permitting the firing-pin c to strike the cap H whenever the shell is suddenly arrested in its flight. The rib d' may be omitted, as its only function is to act as a guide, and this is not necessary. When the shell is not spinning, the spring-hinge E will cause the swinging guard D² to pass in front of the flat face c² of the plunger, and the firing-pin cannot strike the cap no matter what may be the position of the shield F. I preferably locate the pivot f of the shield F at an angular distance—say ninety degrees, more or less—from the hinge E, so that should the spring-hinge become weak or otherwise fail to operate to keep the swinging guard D² in the closed position, permitting the guard D² to swing down about its hinge due to the action of gravity, the shield F will also swing downward, thus interposing the shield between the pin and the cap, so that one or the other, or both, will always be in the way of the pin except when under the influence of the centrifugal force due to the spinning of the shell both are thrown to the position shown in Fig. 3.

In order to provide positive means for holding the shield F in its normal position except when the shell is spinning rapidly, I may provide a spring such as J (shown in Figs. 3 and 7) or J', (shown in Fig. 8,) which normally presses the shield to the closed position, and its action is overcome by centrifugal force.

Any suitable form of spring may be adopted. In Fig. 3 the loop of the spring J is shown as slipped over the pivot of the pin f .

The spring-hinge E may be of any suitable construction—such, for instance, as that shown in Fig. 3, in which e represents a bolt having a fixed head e^0 and a nut e' , with two coil-springs e^2 , which bear, respectively, against said head and nut and against the webs d^3 of the plug D and the guard D^2 , respectively.

In the form of device shown in Figs. 4 to 6 the general arrangement of the parts is substantially the same as that shown in Figs. 1 to 3 except that the front end of the plunger is provided with an annular groove c^0 , into which projects the pin G, which is mounted in the swinging guard D^2 of the plug D. This plunger is normally held in engagement with said pin G by means of the spring I. It will be seen that this pin will prevent the swinging guard D^2 from dropping down should the spring-hinge become weak, and thus will take the strain off said hinge. Another function of the pin G will be to keep the swinging member D^2 always in front of the plunger C' except after the gun has been fired, as will be hereinafter described. The swinging shield F' is provided with a catch f' , which passes in front of the pin G, as shown in Fig. 5, and prevents the shield from swinging out of the way of the pin c until the rotary motion of the shell causes the guard D^2 to swing outward far enough to allow the catch f' to swing clear of the pin G. It will be seen that the parts may be so arranged that the pin G may be so located and the shape of the catch f' such that even should the swinging guard D^2 be forced out sufficient to permit the plunger C' to slip between the ribs d' and d^2 the catch f' cannot swing clear of the pin G; but more outward movement of the swinging guard is necessary. This is to insure safety when the shells are dropped and have the base of the fuse indented or telescoped and the plunger is forced or crushes the swinging guard and forces it out. In this case the firing-pin c can only hit the shield F', which is still interposed between the firing-pin and cap. When the gun is fired, the inertia of the plunger C' compresses the spring I and allows the pin G to clear the front face of the plunger, and the rotary motion of the shell will swing the member D^2 outward outside of the path of the plunger, and at the same time the pin G will swing clear of the catch f' of the shield F'. The shield will then also swing outward, allowing the firing-pin c to have a free path forward when the motion of the shell is suddenly arrested. Thus it will be seen that in Figs. 1 to 3 I provide a double system of guards, composed of the guard D^2 and the shield F, by which the firing-pin c is prevented from coming into contact with the cap H except after the shell has been spun.

In the device shown in Figs. 4 and 5 the

same double guards are both employed, but are supplemented by a pin G, which has positive engagement with the plunger C except when the latter is drawn backward and which positively locks the catch f' of the shield F' in the safety position except after the shell has been spun.

I do not intend to confine the invention to any particular form of spring-hinge E or to the exact arrangement or construction of parts herein described, as various modifications might be made which could be used without departing from the spirit of my invention. Thus it will be obvious that the shield F may be pivoted to the swinging guard D^2 , if desired.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a percussion-fuse, the combination with a fuse-stock, of a plunger provided with a firing-pin mounted in said stock, a plug mounted in said stock in front of said firing-pin and provided with a percussion-cap, a swinging guard hinged to said plug, and a swinging shield pivoted to said plug, at an angular distance from said hinge, said shield and guard being interposed between the face of said plunger and said cap, and being both adapted to swing out when the shell is spinning, substantially as described.

2. In a percussion-fuse, the combination with a fuse-stock, of a plunger provided with a firing-pin mounted in said stock, a plug mounted in said stock in front of said firing-pin and provided with a percussion-cap, a swinging guard hinged to said plug, a spring-hinge connecting said guard to said plug and normally holding the guard in the closed position, and a swinging shield pivoted to said plug, at an angular distance from said hinge, said shield and guard being interposed between the face of said plunger and said cap, and being both adapted to swing out when the shell is spinning, substantially as described.

3. In a percussion-fuse, the combination with a fuse-stock, of a plunger provided with a firing-pin mounted in said stock, a plug mounted in said stock in front of said firing-pin and provided with a percussion-cap, a swinging guard hinged to said plug, a spring-hinge consisting of a bolt passing through recesses in said plug and in said guard, and coil-springs mounted on said bolt and normally holding said guard in the closed position, and a swinging shield pivoted to said plug, at an angular distance from said hinge, said shield and guard being interposed between the face of said plunger and said cap and being both adapted to swing out when the shell is spinning, substantially as described.

4. In a percussion-fuse, the combination with a fuse-stock, of a plunger provided with an annular groove mounted in said stock, a firing-pin carried by said plunger, a plug

mounted in said stock in front of said firing-pin and provided with a percussion-cap, a swinging guard mounted on said plug, a pin carried by said guard and projecting into said annular groove, and a swinging shield pivoted to said plug, said shield and guard being interposed between the face of said plunger and said cap, and being both adapted to swing out when the shell is spinning, substantially as described.

5. In a percussion-fuse, the combination with a fuse-stock, of a plunger provided with an annular groove mounted in said stock, a firing-pin carried by said plunger, a plug mounted in said stock in front of said firing-pin and provided with a percussion-cap, a swinging guard mounted on said plug, a pin carried by said guard and projecting into said annular groove, a spring-hinge connecting said guard to said plug and normally holding the guard in the closed position, and a swinging shield pivoted to said plug, said shield and guard being interposed between the face of said plunger and said cap, and being both adapted to swing out when the shell is spinning, substantially as described.

6. In a percussion-fuse, the combination with a fuse-stock, of a plunger provided with an annular groove mounted in said stock, a firing-pin carried by said plunger, a plug mounted in said stock in front of said firing-pin and provided with a percussion-cap, a swinging guard mounted on said plug, a pin carried by said guard and projecting into said annular groove, a spring-hinge consisting of a bolt passing through recesses in said plug and in said guard, and coil-springs mounted on said bolt and normally holding said guard in the closed position, and a swinging shield pivoted to said plug, said shield and guard being interposed between the face of said plunger and said cap and being both adapted to swing out when the shell is spinning, substantially as described.

7. In a percussion-fuse, the combination with a fuse-stock, of a plunger provided with an annular groove mounted in said stock, a firing-pin carried by said plunger, a plug mounted in said stock in front of said firing-pin and provided with a percussion-cap, a swinging guard mounted on said plug, a pin carried by said guard and projecting into said annular groove, and a swinging shield pivoted to said plug, the axes about which said shield and guard swing being located at a distance from each other on said plug, and said shield and guard being interposed between the face of said plunger and said cap, and being both adapted to swing out when the shell is spinning, substantially as described.

8. In a percussion-fuse, the combination with a fuse-stock, of a plunger provided with an annular groove mounted in said stock, a firing-pin carried by said plunger, a plug mounted in said stock in front of said firing-

pin and provided with a percussion-cap, a swinging guard mounted on said plug, a pin carried by said guard and projecting into said annular groove, a spring-hinge connecting said guard to said plug and normally holding the guard in the closed position, and a swinging shield pivoted to said plug, the axes about which said shield and guard swing being located at a distance from each other on said plug, and said shield and guard being interposed between the face of said plunger and said cap, and being both adapted to swing out when the shell is spinning, substantially as described.

9. In a percussion-fuse, the combination with a fuse-stock, of a plunger provided with an annular groove mounted in said stock, a firing-pin carried by said plunger, a plug mounted in said stock in front of said firing-pin and provided with a percussion-cap, a swinging guard mounted on said plug, a pin carried by said guard and projecting into said annular groove, a spring-hinge consisting of a bolt passing through recesses in said plug and in said guard, and coil-springs mounted on said bolt and normally holding said guard in the closed position, and a swinging shield pivoted to said plug, the axes about which said shield and guard swing being located at a distance from each other on said plug, and said shield and guard being interposed between the face of said plunger and said cap and being both adapted to swing out when the shell is spinning, substantially as described.

10. In a percussion-fuse, the combination with a fuse-stock, of a plunger provided with an annular groove mounted in said stock, a firing-pin carried by said plunger, a plug mounted in said stock in front of said firing-pin and provided with a percussion-cap, a swinging guard mounted on said plug, a pin carried by said guard and projecting into said annular groove, and a swinging shield pivoted to said plug, and provided with a catch normally engaging said pin, but clearing same when said guard swings outward, said shield and guard being interposed between the face of said plunger and said cap, and being both adapted to swing out when the shell is spinning, substantially as described.

11. In a percussion-fuse, the combination with a fuse-stock, of a plunger provided with an annular groove mounted in said stock, a firing-pin carried by said plunger, a plug mounted in said stock in front of said firing-pin and provided with a percussion-cap, a swinging guard mounted on said plug, a pin carried by said guard and projecting into said annular groove, a spring-hinge connecting said guard to said plug and normally holding the guard in the closed position, and a swinging shield pivoted to said plug, and provided with a catch normally engaging said pin, but clearing same when said guard swings outward, said shield and guard being interposed

between the face of said plunger and said cap, and being both adapted to swing out when the shell is spinning, substantially as described.

12. In a percussion-fuse, the combination with a fuse-stock, of a plunger provided with an annular groove mounted in said stock, a firing-pin carried by said plunger, a plug mounted in said stock in front of said firing-pin and provided with a percussion-cap, a swinging guard mounted on said plug, a pin carried by said guard and projecting into said annular groove, a spring-hinge consisting of a bolt passing through recesses in said plug and in said guard, and coil-springs mounted on said bolt and normally holding said guard in the closed position, and a swinging shield pivoted to said plug, and provided with a catch normally engaging said pin, but clearing same when said guard swings outward, said shield and guard being interposed between the face of said plunger and said cap and being both adapted to swing out when the shell is spinning, substantially as described.

13. In a percussion-fuse, the combination with a fuse-stock, of a plunger provided with an annular groove mounted in said stock, a firing-pin carried by said plunger, a plug mounted in said stock in front of said firing-pin and provided with a percussion-cap, a swinging guard mounted on said plug, a pin carried by said guard and projecting into said annular groove, a spring normally pressing said plunger toward said pin, and a swinging shield pivoted to said plug, said shield and guard being interposed between the face of said plunger and said cap, and being both adapted to swing out when the shell is spinning, substantially as described.

14. In a percussion-fuse, the combination with a fuse-stock, of a plunger provided with an annular groove mounted in said stock, a firing-pin carried by said plunger, a plug mounted in said stock in front of said firing-pin and provided with a percussion-cap, a swinging guard mounted on said plug, a pin carried by said guard and projecting into said annular groove, a spring normally pressing said plunger toward said pin, a spring-hinge connecting said guard to said plug and normally holding the guard in the closed position, and a swinging shield pivoted to said plug, said shield and guard being interposed between the face of said plunger and said cap, and being both adapted to swing out when the shell is spinning, substantially as described.

15. In a percussion-fuse, the combination with a fuse-stock, of a plunger provided with an annular groove mounted in said stock, a firing-pin carried by said plunger, a plug mounted in said stock in front of said firing-pin and provided with a percussion-cap, a swinging guard mounted on said plug, a pin carried by

said guard and projecting into said annular groove, a spring normally pressing said plunger toward said pin, a spring-hinge consisting of a bolt passing through recesses in said plug and in said guard, and coil-springs mounted on said bolt and normally holding said guard in the closed position, and a swinging shield pivoted to said plug, said shield and guard being interposed between the face of said plunger and said cap and being both adapted to swing out when the shell is spinning, substantially as described.

16. In a percussion-fuse, the combination with a fuse-stock, of a plunger provided with an annular groove mounted in said stock, a firing-pin carried by said plunger, a plug mounted in said stock in front of said firing-pin and provided with a percussion-cap, a swinging guard mounted on said plug, a pin carried by said guard and projecting into said annular groove, and a spring normally pressing said plunger toward said pin, said guard being interposed between the face of said plunger and said cap, and being adapted to swing out when the shell is spinning, substantially as described.

17. In a percussion-fuse, the combination with a fuse-stock, of a plunger provided with an annular groove mounted in said stock, a firing-pin carried by said plunger, a plug mounted in said stock in front of said firing-pin and provided with a percussion-cap, a swinging guard mounted on said plug, a pin carried by said guard and projecting into said annular groove, a spring-hinge connecting said guard to said plug and normally holding the guard in the closed position, and a spring normally pressing said plunger toward said pin, said guard being interposed between the face of said plunger and said cap, and being adapted to swing out when the shell is spinning, substantially as described.

18. In a percussion-fuse, the combination with a fuse-stock, of a plunger provided with an annular groove mounted in said stock, a firing-pin carried by said plunger, a plug mounted in said stock in front of said firing-pin and provided with a percussion-cap, a swinging guard mounted on said plug, a pin carried by said guard and projecting into said annular groove, a spring-hinge consisting of a bolt passing through recesses in said plug and in said guard, and coil-springs mounted on said bolt and normally holding said guard in the closed position, and a spring normally pressing said plunger toward said pin, said guard being interposed between the face of said plunger and said cap and being adapted to swing out when the shell is spinning, substantially as described.

19. In a percussion-fuse, the combination with a fuse-stock, of a plunger provided with a firing-pin mounted in said stock, a plug mounted in said stock in front of said firing-pin and provided with a percussion-cap, a swinging guard hinged to said plug, a swing-

ing shield pivoted at an angular distance from said hinge, said shield and guard being interposed between the face of said plunger and said cap, and both being adapted to swing out when the shell is spinning, substantially as described.

20. In a percussion-fuse, the combination with a fuse-stock, of a plunger provided with a firing-pin mounted in said stock, a plug mounted in said stock in front of said firing-pin and provided with a percussion-cap, a swinging guard hinged to said plug, a spring-hinge connecting said guard to said plug and normally holding the guard in the closed position, and a swinging shield pivoted at an angular distance from said hinge, said shield and guard being interposed between the face of said plunger and said cap, and being both adapted to swing out when the shell is spinning, substantially as described.

21. In a percussion-fuse, the combination with a fuse-stock, of a plunger provided with an annular groove mounted in said stock, a firing-pin carried by said plunger, a plug mounted in said stock in front of said firing-pin and provided with a percussion-cap, a swinging guard mounted on said plug, a pin carried by said guard and projecting into said annular groove, and a swinging shield normally held in front of said firing-pin, said shield and guard being interposed between the face of said plunger and said cap, and being both adapted to swing out when the shell is spinning, substantially as described.

22. In a percussion-fuse, the combination with a fuse-stock, of a plunger provided with an annular groove mounted in said stock, a firing-pin carried by said plunger, a plug mounted in said stock in front of said firing-pin and provided with a percussion-cap, a swinging guard mounted on said plug, a pin carried by said guard and projecting into said annular groove, a spring-hinge connecting said guard to said plug and normally holding the guard in the closed position, and a swinging shield normally held in front of said firing-pin, said shield and guard being interposed between the face of said plunger and said cap, and being both adapted to swing out when the shell is spinning, substantially as described.

23. In a percussion-fuse, the combination with a fuse-stock, of a plunger provided with an annular groove mounted in said stock, a firing-pin carried by said plunger, a plug mounted in said stock in front of said firing-pin and provided with a percussion-cap, a swinging guard mounted on said plug, a pin carried by said guard and projecting into said annular groove, a spring-hinge consisting of a bolt passing through recesses in said plug and in said guard, and coil-springs mounted on said bolt and normally holding said guard in the closed position, and a swinging shield normally held in front of said firing-pin, said

shield and guard being interposed between the face of said plunger and said cap and being both adapted to swing out when the shell is spinning, substantially as described.

24. In a percussion-fuse, the combination with a fuse-stock, of a plunger provided with an annular groove mounted in said stock, a firing-pin carried by said plunger, a plug mounted in said stock in front of said firing-pin and provided with a percussion-cap, a swinging guard mounted on said plug, a pin carried by said guard and projecting into said annular groove, and a swinging shield normally held in front of said firing-pin, the axes about which said shield and guard swing being located at an angular distance from each other relative to said plug, and said shield and guard being interposed between the face of said plunger and said cap, and being both adapted to swing out when the shell is spinning, substantially as described.

25. In a percussion-fuse, the combination with a fuse-stock, of a plunger provided with an annular groove mounted in said stock, a firing-pin carried by said plunger, a plug mounted in said stock in front of said firing-pin and provided with a percussion-cap, a swinging guard mounted on said plug, a pin carried by said guard and projecting into said annular groove, a spring-hinge connecting said guard to said plug and normally holding the guard in the closed position, and a swinging shield normally held in front of said firing-pin, the axes about which said shield and guard swing being located at a distance from each other on said plug, and said shield and guard being interposed between the face of said plunger and said cap, and being both adapted to swing out when the shell is spinning, substantially as described.

26. In a percussion-fuse, the combination with a fuse-stock, of a plunger provided with an annular groove mounted in said stock, a firing-pin carried by said plunger, a plug mounted in said stock in front of said plunger and provided with a percussion-cap, a swinging guard mounted on said plug, a pin carried by said guard and projecting into said annular groove, and a swinging shield normally held in front of said firing-pin, and provided with a catch normally engaging said pin, but clearing same when said guard swings outward sufficiently far, said shield and guard being interposed between the face of said plunger and said cap, and both being adapted to swing out when the shell is spinning, substantially as described.

27. In a percussion-fuse, the combination with a fuse-stock, of a plunger provided with an annular groove mounted in said stock, a firing-pin carried by said plunger, a plug mounted in said stock in front of said plunger and provided with a percussion-cap, a swinging guard mounted on said plug, a pin carried by said guard and projecting into said annu-

lar groove, a spring-hinge connecting said guard to said plug and normally holding the guard in the closed position, and a swinging shield provided with a catch normally engaging said pin, but clearing same when said guard swings outward, said shield and guard being interposed between the face of said plunger and said cap, and being both adapt-

ed to swing out when the shell is spinning, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN L. STICHT.

Witnesses:

A. L. ULRICH,

K. A. WUNDER.