No. 682,728. Patented Sept. 17, 1901.

M. A. LYNCH & H. WILSON.

PERCUSSION FUSE FOR EXPLOSIVE PROJECTILES.

(Application filed Nov. 15, 1900.)

(No Model.)

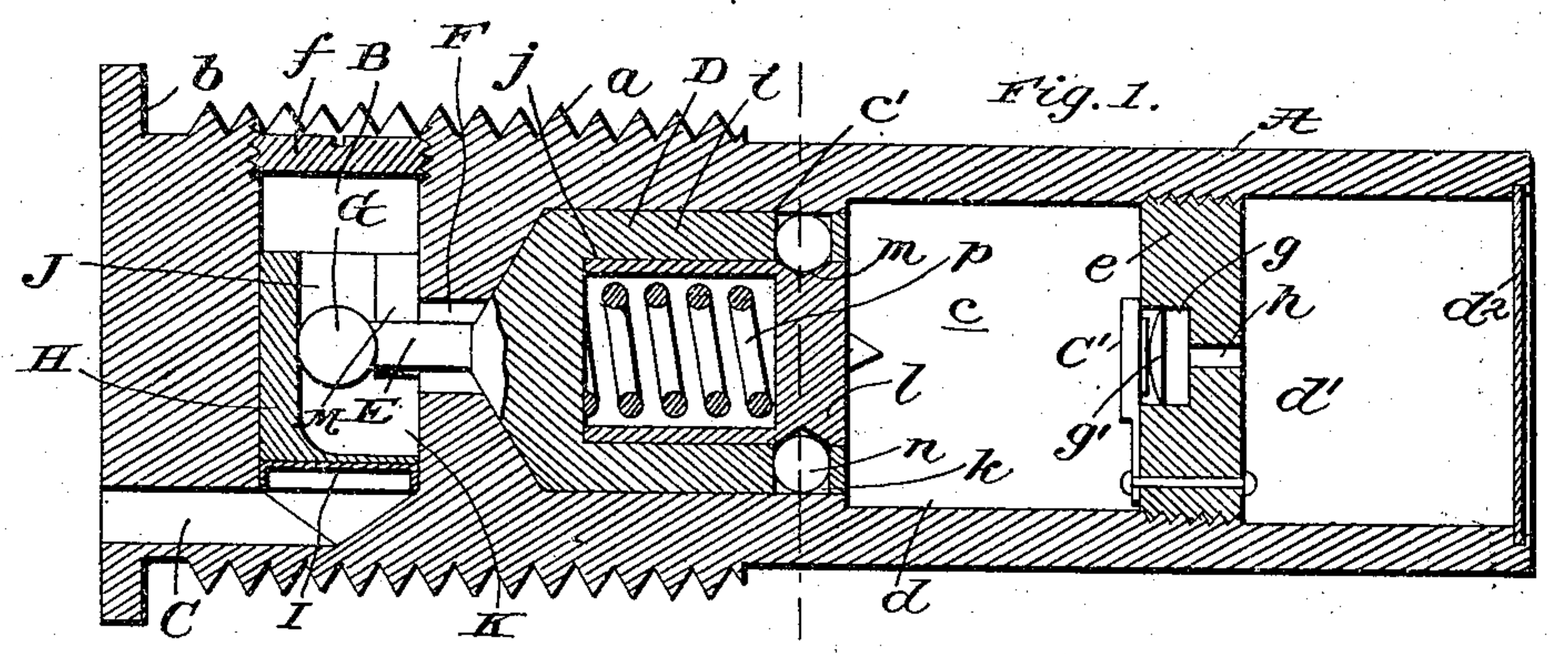

Fig. 1.

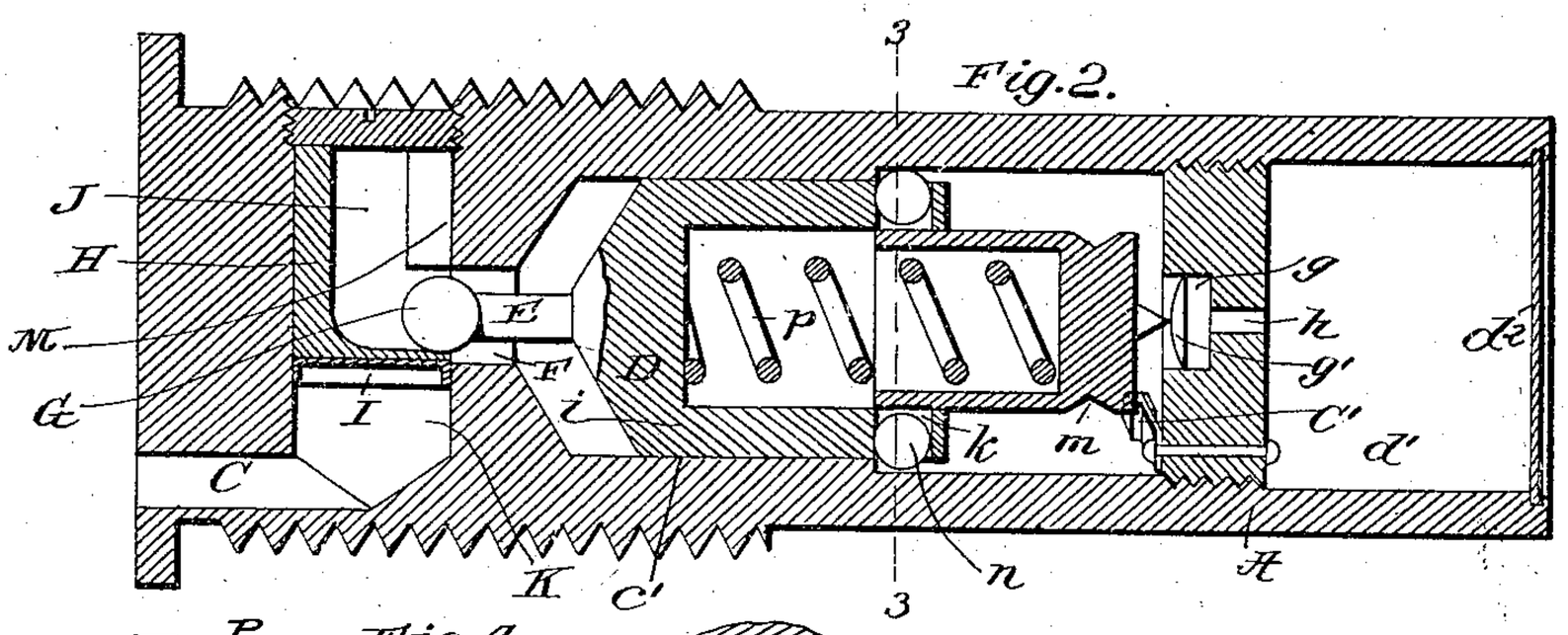

Fig. 2.

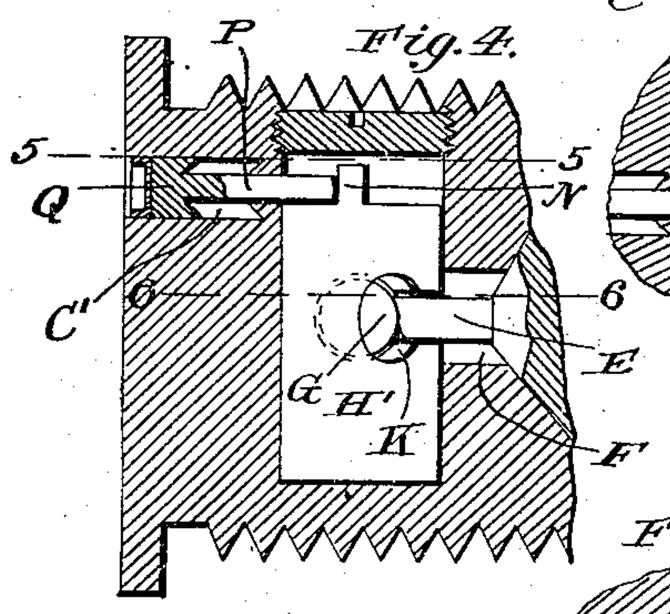

Fig. 4.

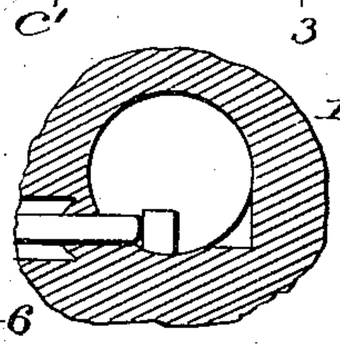

Fig. 5.

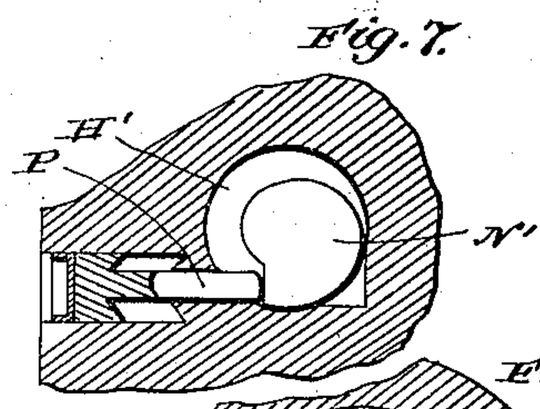

Fig. 7.

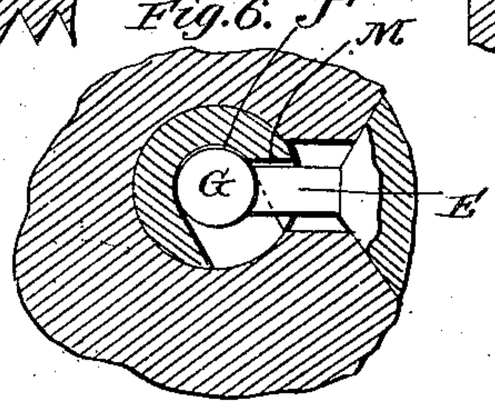

Fig. 6.

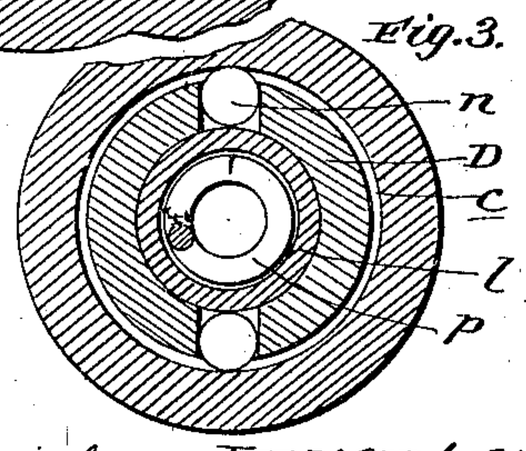

Fig. 3.

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UNITED STATES PATENT OFFICE.

MICHAEL A. LYNCH AND HARRY WILSON, OF WASHINGTON, DISTRICT OF COLUMBIA.

PERCUSSION-FUSE FOR EXPLOSIVE PROJECTILES.

SPECIFICATION forming part of Letters Patent No. 682,728, dated September 17, 1901.

Application filed November 15, 1900. Serial No. 36,642. (No model.)

To all whom it may concern.

Be it known that we, MICHAEL A. LYNCH and HARRY WILSON, citizens of the United States, residing at Washington, in the District of Columbia, have invented new and useful Improvements in Percussion-Fuses for Explosive Projectiles, of which the following is a specification.

Our invention relates to percussion-fuses for explosive projectiles, and more particularly that class of fuses in which the primer-igniting hammer is normally secured against movement in the stock with a view of precluding a casual or premature explosion of the projectile incident to the handling and transportation thereof and is released and rendered free to move in the stock by the pressure of the gases of the propelling charge of a gun at the time of fire. It contemplates the provision in a percussion-fuse of a securing device which in one position is engaged with and calculated to hold the primer-igniting hammer against movement in the stock and in another position leaves the hammer free to move in the stock, so as to strike against the primer and explode the projectile at the time of impact. The stated change of position of the securing device and the consequent release of the primer-igniting hammer is effected at the time of fire and preferably by the pressure of the gases of the propelling charge of the gun.

With the foregoing in mind the invention will be fully understood from the following description and claims when taken with the accompanying drawings, in which—

Figure 1 is a longitudinal diametrical section of a base-fuse embodying our invention, the parts being in the positions they occupy precedent to the firing of the projectile carrying the fuse. Fig. 2 is a similar view illustrative of the positions the movable parts assume when the projectile strikes an object. Fig. 3 is a transverse section taken in the plane indicated by the broken line 3 3 of Fig. 2. Fig. 4 is a detail section illustrating a modification. Figs. 5 and 6 are detail sections taken in the planes indicated by the broken lines 5 5 and 6 6, respectively, of Fig. 4. Fig. 7 is a detail section similar to Fig. 5 and illustrating another modification.

Referring by letter to said drawings, and more particularly to Figs. 1 to 3 thereof, A is a fuse-stock provided with screw-threads *a* and end flange *b* for engagement with the body of a projectile after the usual manner. Said stock is provided interiorly with a hammer-chamber *c*, formed by a bore *c'* and a counterbore *d*, a combustion-chamber *d'*, separated from the hammer-chamber by a partition or primer-holder *e* and having its forward end closed by the usual sealing-plate d^2, a chamber B, located in rear of and communicating with the hammer-chamber *c*, and disposed transverse of the stock, and a gas-passage C, which leads from the rear end of the stock to one end of the transverse chamber B, the opposite end of the said chamber B being preferably closed by a plug *f*, as shown. The partition *e* is recessed at *g* to receive a primer *g'* and has a passage *h* leading from said recess to the forward side of the partition to enable flame to gain access to the combustion-chamber when the primer is ignited.

C' is a guard for protecting the primer against the action of the hammer, presently described. The guard forms part of the subject-matter of our contemporary application, filed August 16, 1900, Serial No. 27,105, and need not be described herein, except to say that it is calculated when the projectile carrying the fuse is fired to be thrown back out of engagement with the partition by its inertia and then moved to one side, as shown in Fig. 2, by the centrifugal action incident to the rotation of the projectile.

The hammer D of our present fuse may in general be of any construction suitable to the purposes of our invention. We prefer, however, to have it comprise a body or casing *i* of a diameter to snugly fit the bore *c'*, said body being provided in its forward end with a recess *j* and adjacent to its forward end with radial apertures *k*, which communicate with said recess, a hollow firing-plunger *l*, which is arranged in the recess *j* and is provided with a circumferential groove *m*, and sear devices *n*, which are preferably in the form of balls, although they might be of any other suitable form, and rest in the apertures *k* of the body and also in the groove

m' of the firing-plunger l. The hammer also comprises, by preference, a coiled spring p, interposed between the firing-plunger and the body. The hammer D thus far described is similar to that disclosed in our aforesaid contemporary application both in construction and mode of operation. When it is released at the time of fire by the improved means hereinafter described, it will be held in the position shown in Fig. 1 and against casual rotary or rectilinear movement or creeping during the flight of the projectile and until the moment of impact. This is due to the fact that the spring p tends to move the firing-plunger l forwardly and through the medium of the same operates to press the sear devices or balls n outward and against the wall of the bore c', with the result that great friction is created between the sear devices and the wall of the said bore, and the hammer is held against creeping in the stock, as stated. When the projectile strikes an object, the arrest of the projectile will cause the hammer to move forward with considerable force, and incident to such forward movement of the hammer and as soon as the sear devices reach the counterbore d, the spring p, through the medium of the firing-plunger, will force said sear devices outwardly, with the result that the firing-plunger will be released from the body i and forcibly impelled by the spring against the primer.

The hammer D is peculiar in that it is provided with a rearwardly-extending stem E, which may be formed integral with or suitably connected to its body i. Said stem E normally rests in a passage F intermediate of the hammer-chamber c and the transverse chamber B and is provided, preferably at its end remote from the hammer, with an enlargement G, which by preference is globular.

H is a device which by coöperating with the stem E of the hammer is calculated in the position shown in Fig. 1 to hold the hammer against movement in the stock and in the position shown in Fig. 2 leaves the hammer free to move in the stock. This securing device is arranged and adapted to be moved in the chamber B and transversely of the stock by the pressure of the gases of the propelling charge of a gun at the time of fire, the gases entering through the passage C and acting against the end of the securing device contiguous to said passage. The securing device is provided at its rear end or end adjacent to the passage C with a soft-metal gasket I, this to prevent the passage of powder-gases past the securing device and into the hammer-chamber. The securing device is also provided with a longitudinal bore J of a size to receive the enlargement G on stem E, an opening K, which communicates with the rear portion of the bore J and is of a size to permit the free passage of the enlargement G, and a notch or slot M, which communicates with the bore J and opening K and extends forwardly from the latter or in the direction in which the securing device is moved to render the hammer D free to move toward the primer. The notch or slot M is of a size to readily receive the stem E, but too small for the passage of the enlargement G on said stem. The passage F in the stock, like the opening K in the securing device H, is of a size to permit of the free passage of the enlargement G.

With the securing device H resting in the position shown in Fig. 1, with the hammer-stem E resting in its notch M and the enlargement G resting in rear of said notch M, it will be seen that the hammer D will be securely held against movement in the stock, and consequently there is absolutely no danger of it casually igniting the primer. At the time of fire of the projectile, however, the pressure of the gases of the propelling charge of the gun operates to move the securing device into the position shown in Fig. 2, and consequently carries the notch M of said securing device out of engagement with the stem E and the opening K into a position coincident or in line with the passage F. This obviously leaves the enlargement G free to pass out of the bore J of the securing device, and consequently permits the hammer to move forward in the stock and effect the ignition of the primer when the projectile strikes an object. In this connection it will be noticed that the release of the hammer is effected by the pressure of the gases changing the position of the securing device with respect to the hammer and does not entail the shearing or breaking of any part. It will also be noticed that while the securing device is not liable to casual movement it is sure to be moved by the gases of the propelling charge at the time of fire, and hence may be relied upon to release the hammer at the proper time. The inertia of the hammer D at the time of fire does not tend to bind and hold the securing device H against movement under the action of the gases for the reason that said hammer bears at its rear end against the stock, as shown in Fig. 1.

In Figs. 4, 5, and 6 we have illustrated a modification which comprises a rotary movable hammer-securing device H′ as distinguishable from the rectilinearly-movable device H of Figs. 1 and 2. The device H′ is provided with a chamber J′, which, like the chamber J of the device H, is of a size to loosely receive the enlargement G on the hammer-stem, an opening K of a size to permit the free passage of the enlargement G and which communicates with the chamber J′, and a notch M, which extends forwardly from the opening K or in the direction in which the device is rolled to release the hammer and is of a size to freely receive the hammer-stem E, but too small for the passage of the enlargement G. The axially-movable device H′ is also provided at one end with a projection N, which is arranged in the path of a rod P on a piston Q, arranged in a passage C′

of the stock. From this it follows that when the projectile is fired the gases of the propelling charge force the piston Q forwardly, and said piston acting against the projection N of the device H′ rolls said device H′ so as to carry the notch M out of engagement with the hammer-stem E and the opening K into a position coincident with the passage F to permit of the forward movement of the hammer in the manner before described.

The modification shown in Fig. 7 is similar to that shown in Figs. 4, 5, and 6, except that the projection N′ on the axially-movable securing device differs in form from the projection shown in Figs. 4 and 5.

Having described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a fuse for explosive projectiles, the combination of a stock, a hammer adapted to move therein and having a projection provided with an enlargement, a securing device for the hammer, movable in the stock, and having a chamber of a size to receive the enlargement of the hammer projection, an opening, of a size to permit the passage of the enlargement of said projection communicating with the chamber, and a comparatively reduced opening communicating with the first-named opening and the chamber and extending forwardly from said first-named opening or in the direction in which the device is moved to release the hammer and means whereby the securing device is moved to effect the release of the hammer when the projectile is fired from a gun.

2. In a fuse for explosive projectiles, the combination of a stock, a hammer adapted to move therein and having a projection provided with an enlargement, a securing device for the hammer, movable in the stock and having a chamber of a size to receive the enlargement of the hammer projection, an opening, of a size to permit the passage of the enlargement of said projection, communicating with the chamber, and a comparatively reduced opening communicating with the first-named opening and the chamber and extending forwardly from the former or in the direction in which the device is moved to release the hammer, and means whereby the gases of the propelling charge of a gun are enabled to move the securing device and thereby effect the release of the hammer.

3. In a fuse for explosive projectiles, the combination of a stock having a hammer-chamber and a transverse chamber connected with the hammer-chamber by a passage intermediate of the two, a hammer adapted to move in the chamber therefor, and having a stem or projection provided with an enlargement of a size to pass through said intermediate passage, a securing device for the hammer, movable in the transverse chamber of the stock, and having a chamber of a size to receive the enlargement of the hammer stem or projection, an opening, of a size to permit the passage of the enlargement of said stem or projection, communicating with the chamber, and a comparatively reduced opening communicating with the first-named opening and the chamber and extending forwardly from the former or in the direction in which the device is moved to release the hammer, and means whereby the gases of the propelling charge of a gun are enabled to move the securing device and thereby effect the release of the hammer.

4. In a fuse for explosive projectiles, the combination of a stock having a hammer-chamber, a transverse chamber arranged in rear of the hammer-chamber, a passage intermediate of the two chambers, and a passage for gases leading to the transverse chamber, a hammer arranged and adapted to move in the hammer-chamber, and having a rearwardly-extending stem terminating in an enlargement of a size to pass through the said intermediate passage, and a rectilinearly-movable securing device for the hammer, arranged in the transverse chamber of the stock, and having a chamber of a size to receive the enlargement of the hammer-stem, an opening, of a size to permit the passage of said enlargement, communicating with the chamber, and a comparatively reduced opening communicating with the chamber and the first-named opening, and extending forwardly from the latter or in the direction in which the device is moved to release the hammer.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

MICHAEL A. LYNCH.
HARRY WILSON.

Witnesses:
JOHN H. O'DONNELL,
JOS. C. MCMENAMIN.