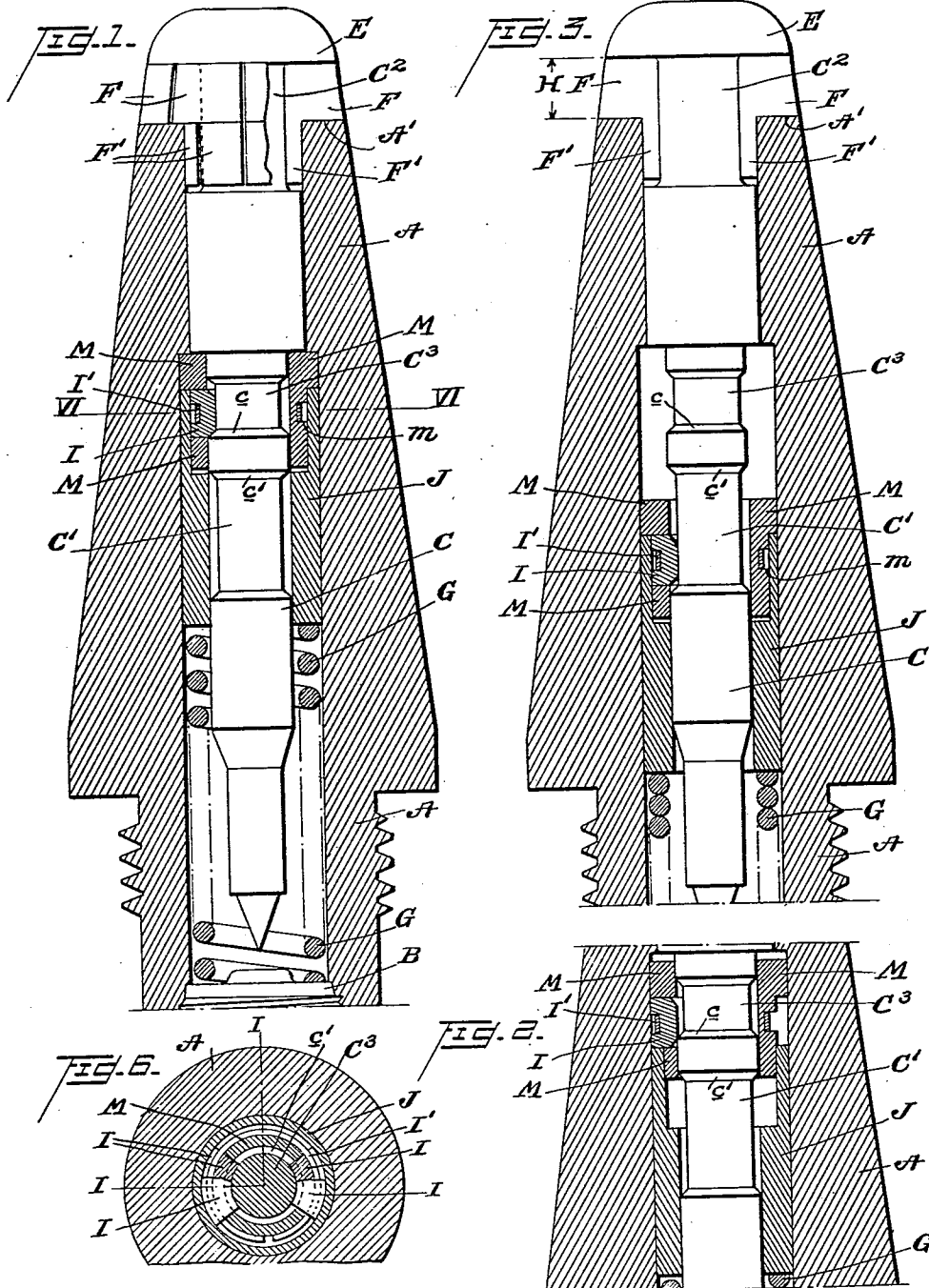


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APPLICATION FILED JULY 21, 1920.

1,352,543.

Patented Sept. 14, 1920.
2 SHEETS—SHEET 1.

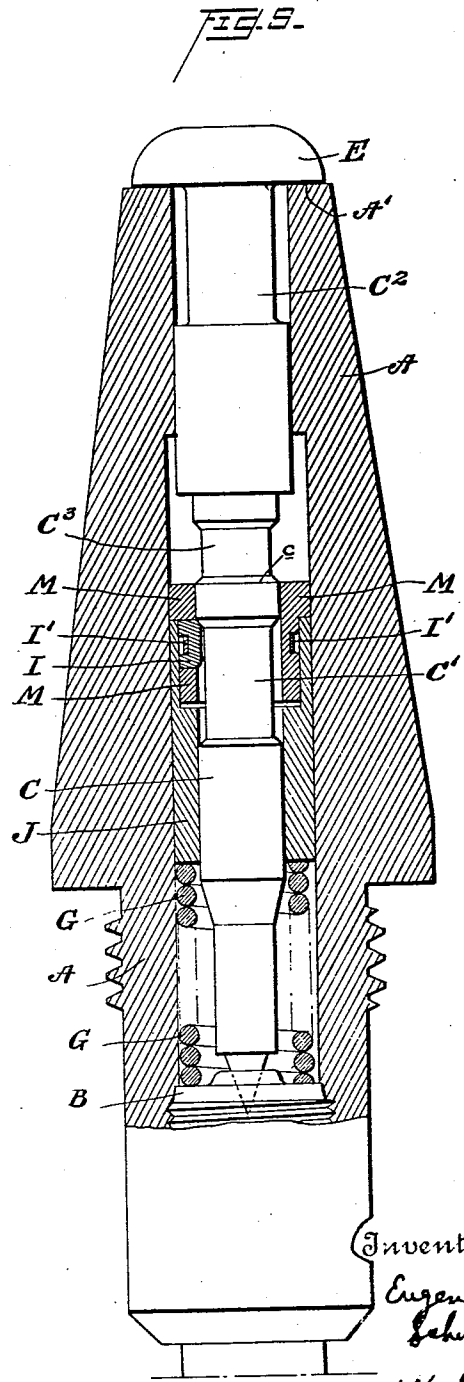
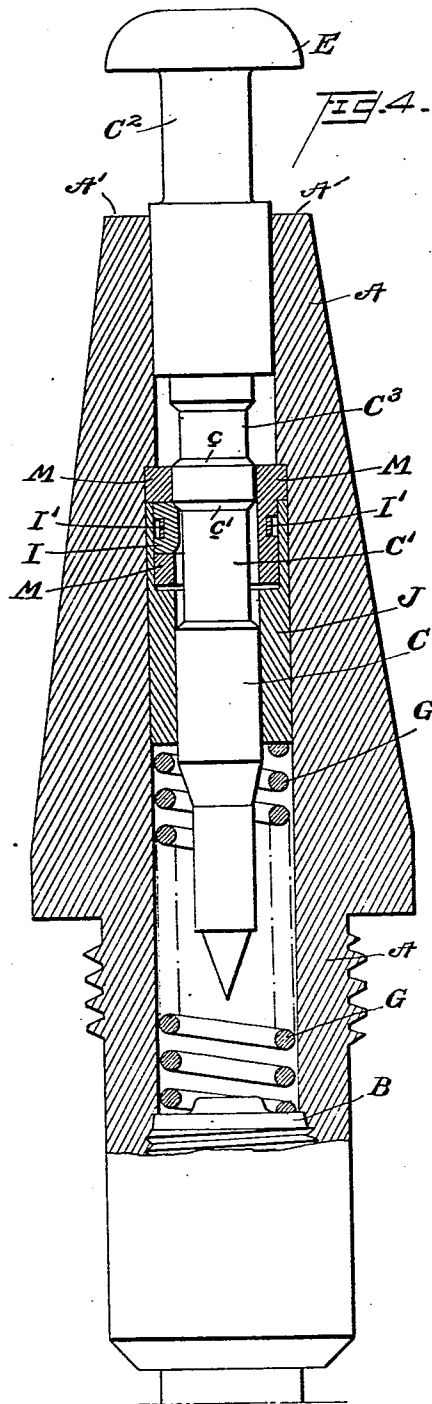


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UNITED STATES PATENT OFFICE.

EUGÈNE SCHNEIDER, OF PARIS, FRANCE, ASSIGNOR TO SCHNEIDER & CIE., OF PARIS, FRANCE, A LIMITED JOINT-STOCK COMPANY OF FRANCE.

PERCUSSION-FUSE FOR PROJECTILES.

1,352,543.

Specification of Letters Patent. Patented Sept. 14, 1920.

Original application filed March 31, 1919, Serial No. 286,489. Renewed July 21, 1920, Serial No. 398,031.

Divided and this application filed July 21, 1920. Serial No. 397,945.

To all whom it may concern:

Be it known that I, EUGÈNE SCHNEIDER, a citizen of the Republic of France, and a resident of Paris, France, have invented new and useful Improvements in Percussion-Fuses for Projectiles, which invention is fully set forth in the following specification.

The invention has for its object to provide an improved percussion fuse for projectiles.

The improved fuse is characterized essentially by an apparatus that prevents premature firing, for which purpose the firing mechanism is cocked by the moving apart of the striker and the body-part carrying the percussion-cap. This moving apart is effected under the action of a spring whose tension can be so adjusted that it shall be able to expand, in view of the cocking of the striker, only from the instant when the counteraction of the resistance offered by the air to the progress of the projectile, has become sufficiently reduced, which will take place only at a point of the trajectory at which the cocking can take place without inconvenience.

In other words, according to this invention, a recoil movement of determined extent, has to be performed by the striker before it can make an entering or return movement capable of causing the firing. For the purpose, segments that constitute a shoulder for the striker and prevent the latter from moving toward the percussion-cap, are in their turn prevented from moving out of the way because they are held by being situated between the fuse body and the striker body so long as the striker has not made the desired recoil movement.

This application is a division of my application filed Mar. 31, 1919, Sr. No. 286,489, renewed July 21, 1920, Sr. No. 398,031, directed to the constructional form shown in Figures 9 to 14, inclusive, of said former application.

In the drawings, in which similar reference characters designate corresponding parts,—

Fig. 1 is a partial longitudinal section of the fuse on the line I—I of Fig. 6;

Figs. 2 to 5, inclusive, are sections similar to Fig. 1, showing the parts of the fuse in various positions of operation;

Fig. 6 is a cross-section on the line VI—VI of Fig. 1.

Referring to the drawings, A is the body-part of the fuse having an axial bore in the rear end of which is fixed the carrier B for the percussion-cap of any suitable construction. A striker C is guided in the axial bore of the body-part and has a shouldered impact head projecting beyond the nose A' of the body-part. Means are provided for preventing any movement of the striker toward the cap-carrier previous to a recoil movement of a determined extent by the striker preliminary to cocking.

To such end the striker C bears against the displaceable segments F interposed between the shoulder E of the impact head and the nose A' of the body-part. These segments are seated in the forward reduced part C² of the striker-shank and have rearward projections F', forming auxiliary retaining members, extending into the bore of the body-part to be engaged between the striker-shank and the wall of the bore. The segments so arranged are held against displacement until there is sufficient separation between the shoulder E and the nose A' as to permit the clearance of the bore by the auxiliary retaining extension F'. This separation is caused during the flight of the projectile by the recoil of the striker brought about by mechanism actuated by spring pressure and inertia, the length of the recoil to accomplish the purpose being determined by the distance H (Fig. 3). When this recoil takes place, the segments F are displaced by the centrifugal action imparted by the rotation of the projectile on its longitudinal axis.

While at rest (Fig. 1), all premature movement of the striker C toward the cap-carrier B is prevented by the segments F interposed between the shoulder E of the impact head and the nose A' of the fuse body-part. Premature forward movement of the striker, with the resulting release of the segments, is prevented by the two opposite bolts I movable in the counter-ring M slidable on the striker-shank in the bore of the body-part. These bolts are normally pressed inward to engage the intermediate reduced part C³ of the striker-shank by the spring I' encircling the bolts and the counter-ring,

these members having an annular groove *m* to receive the spring.

The bolts are held in locked engagement with the striker-shank by the safety sleeve J movable on the striker-shank within the bore of the fuse body-part. This sleeve is normally pressed forward by the spring G compressed between the rear end of the sleeve and the cap-carrier B. With the sleeve pressed forward, its front end extends over the rear end of the counter-ring M, the contacting faces of the sleeve and counter-ring being cut away to permit such engagement of the two members. In extending over the counter-ring, the sleeve also extends over the bolts I and the latter are held against outward movement. So arranged, the forward end of the sleeve engages a shoulder on the forward end of the counter-ring and the forward end of the counter-ring engages a shoulder on the wall of the bore in the fuse body-part. These several engagements limit the forward movement of the sleeve and counter-ring against the thrust of the spring G.

With the segments F interposed between the shoulder E of the impact head and with the bolts I in engagement with the reduced part C' of the striker-shank and locked in such engagement by the overlapping sleeve J, there can be no premature rearward movement of the striker to explode the cap on the carrier B, and there can be no premature forward movement of the striker to free the displaceable segments F to permit subsequent premature firing.

When the projectile is fired from the gun, the sleeve J, having a suitably determined mass for such purpose, by its inertia lags behind in the bore of the fuse body-part to the position shown in Fig. 2 and compresses the spring G. In this relatively rearward movement of the sleeve it slides off the counter-ring M and travels to the rear of the bore. As the sleeve moves rearward, the counter-ring, also by its inertia, tends to follow the sleeve, but is held back by the bolts I engaging the striker-shank. The counter-ring is held until the sleeve clears the bolts and, when this happens, the counter-ring also moves to the rear and forces the bolts I over the chamfer *c* (Fig. 2) on the striker-shank. The camming action between the chamfer and the beveled edges of the bolts forces the latter outward against the action of the spring I' and thereby releases the counter-ring from the striker-shank to follow the sleeve J. As the counter-ring moves rearward the bolts register with the reduced part C' of the striker-shank and are forced into engagement with the same by the spring I'. The length of the reduced part C' is such as to provide sufficient travel for the bolts therein and to permit the counter-ring to move into engagement with the sleeve J at

the rear of the bore, as shown in Fig. 3. So engaged, the sleeve holds the bolts in locked engagement with the reduced part C' of the striker-shank.

The position of the sleeve and counter-ring in the rear end of the bore of the fuse body-part compressing the spring G, as shown in Fig. 3, will be maintained until the diminishing acceleration of the discharged projectile is predominated by the force of the spring to overcome the inertia or lagging effect of the sleeve and counter-ring. When this occurs the spring forces forward the sleeve and engaged counter-ring until the bolts I bear against the shoulder *c'* (Fig. 4) on the striker. The bolts cannot ride over this shoulder as they are held against outward movement by the overlapping sleeve J. By this engagement of the bolts with the shoulder, any further outward movement of the sleeve and counter-ring, through the action of the spring, will be imparted to the striker. As the predominance of the spring increases, the inertia of the striker will also be overcome and the engaged parts will be forced forward in the bore of the fuse body-part until the front end of the counter-ring engages the shoulder on the wall of the bore as shown in Fig. 4. This forward or recoil movement of the striker, which is slightly in excess of the distance H (Fig. 3), carries the retaining extension F' of the segments F clear of the bore of the fuse body-part and the separation of the shoulder E and the nose A' is such as to permit the escape of the segments through the centrifugal action imparted by the rotation of the projectile. With the segments displaced, the striker is cocked, ready for impact with the target, as shown in Fig. 4. When the projectile strikes the target, the impact on the head of the striker drives the latter into the bore of the fuse body-part to detonate the percussion cap on the carrier B, the several parts assuming the position shown in Fig. 5.

What I claim is:—

1. A percussion-fuse comprising a body-part having an axial bore with a cap-carrier at the rear end of said bore, a striker having a shank movable in said axial bore and provided with a shouldered impact head, displaceable segments interposed between the impact head and the nose of the fuse body-part to prevent premature rearward movement of the striker onto the cap-carrier, and means operated during the flight of the discharged projectile for moving forward the striker to cock the same preliminary to impact on the target, the forward movement of the striker relative to the fuse body-part releasing the segments to be detached by the centrifugal action imparted by the rotation of the projectile to permit the subsequent rearward movement of the

striker onto the cap-carrier resulting from the impact of the head on the target.

2. A percussion-fuse comprising a body-part having an axial bore with a cap-carrier at the rear end of said bore, a striker having a shouldered impact head and a shank movable in said axial bore, said shank having a reduced part adjacent to said head, displaceable segments interposed between the impact head and the nose of the fuse body-part and seated in the reduced part of the striker-shank and having retaining projections extending into the mouth of the axial bore, said segments operating to prevent premature rearward movement of the striker onto the cap-carrier, and means operated during the flight of the discharged projectile for moving forward the striker to cock the same preliminary to impact on the target, the forward movement of the striker relative to the fuse body-part releasing the segments to be detached by the centrifugal action imparted by the rotation of the projectile to permit the subsequent rearward movement of the striker onto the cap-carrier resulting from the impact of the head on the target.

3. A percussion-fuse comprising a body-part having an axial bore with a cap-carrier at the rear end of said bore, a striker having an impact head and a shank movable in said axial bore, displaceable segments interposed between the fuse body-part and the striker to prevent premature rearward movement of the striker onto the cap-carrier, a counter-ring slidable on the striker-shank and having a limited forward movement in the axial bore, spring-pressed bolts carried by the counter-ring to engage a reduced part of the striker-shank with the counter-ring at the forward limit of its movement in the axial bore and the striker-shank at the rearward limit of its movement as determined by the interposed segments to prevent premature forward movement of the striker, said counter-ring by its inertia during the flight of the discharged projectile moving rearward in the axial bore to release the bolts from the striker-shank, and means operating during the flight of the projectile for moving the striker forward to release the segments to be detached by the centrifugal action imparted by the rotation of the projectile to permit subsequent rearward movement of the striker onto the cap-carrier resulting from impact of the head on the target.

4. A percussion-fuse comprising a body-part having an axial bore with a cap-carrier at the rear end of said bore, a striker having an impact head and a shank movable in said axial bore, displaceable segments interposed between the fuse body-part and the striker to prevent premature rearward movement of the striker onto the cap-carrier, a counter-ring slidable on the

striker-shank and having a limited forward movement in the axial bore, spring-pressed bolts carried by the counter-ring to engage a reduced part of the striker-shank with the counter-ring at the forward limit of its movement in the axial bore and the striker-shank at the rearward limit of its movement as determined by the interposed segments to prevent premature forward movement of the striker, a sleeve slidable on the striker-shank within the axial bore and at the rear of the counter-ring, and a cocking spring normally pressing the sleeve and counter-ring forward, said sleeve and counter-ring at the discharge of the projectile by their inertia moving rearward against the action of the cocking spring, the counter-ring in its rearward movement disengaging the spring-pressed bolts from the forward reduced part of the striker-shank and moving them into engagement with a rear reduced part of said striker-shank, said spring during the flight of the projectile and at the lessening acceleration thereof predominating the inertia of the sleeve and counter-ring to force the same forward together with the striker-shank engaged by the bolts carried by the counter-ring, said forward movement of the striker-shank operating to cock the striker and to free the segments to permit the displacement of the same through the centrifugal action imparted by the rotation of the projectile, the displacement of the segments permitting subsequent rearward movement of the striker onto the cap-carrier resulting from the impact of the head on the target.

5. A percussion-fuse comprising a body-part having an axial bore with a cap-carrier at the rear end of said bore, a striker having an impact head and a shank movable in said axial bore, displaceable segments interposed between the fuse body-part and the striker to prevent premature rearward movement of the striker onto the cap-carrier, a counter-ring slidable on the striker-shank and having a limited forward movement in the axial bore, spring-pressed bolts carried by the counter-ring to engage a reduced part of the striker-shank with the counter-ring at the forward limit of its movement in the axial bore and the striker-shank at the rearward limit of its movement as determined by the interposed segments to prevent premature forward movement of the striker, a sleeve slidable on the striker-shank within the axial bore of the fuse body-part and adapted to move into engagement with the counter-ring and to overlap the spring-pressed bolts to lock the latter in engagement with the striker-shank, and a cocking spring normally pressing the sleeve forward into overlapping engagement with the counter-ring to lock the bolts and to press the counter-ring to the limit of its forward

movement, said sleeve at the discharge of the projectile moving rearward by its inertia against the action of the cocking spring to free the counter-ring and to release the bolts, the disengaging counter-ring by its inertia also moving rearward to engage again the sleeve held by the compressed cocking spring, the counter-ring in its rearward movement disengaging the spring-pressed bolts from the reduced part of the striker-shank and positioning said bolts to engage a rear reduction of the counter-shank, said cocking spring during the flight of the projectile and the lessening acceleration thereof predominating the inertia of the engaged sleeve and counter-ring to move forward said engaged members with the sleeve overlapping the bolts to hold the latter in locked engagement with the rear reduction of the striker-shank so that the continued predominance of the cocking spring through said intervening mechanism will also move forward the striker to cocked position, the forward movement of the striker operating to release the displaceable segments to respond to the centrifugal action imparted by the rotation of the projectile, the displacement of the segments permitting the striker on impact with the target to be driven into the fuse body-part onto the cap-carrier.

6. A percussion-fuse comprising a body-part having an axial bore with a cap-carrier at the rear end of said bore, a striker having a shank movable in the axial bore and a shouldered impact head projecting beyond the nose of the body-part, said striker-shank having forward, intermediate and rear reductions with the intermediate reduction of restricted length and the rear reduction elongated as compared with the intermediate reduction, displaceable segments interposed between the nose of the body-part and the shoulder of the impact head and seated in the forward reduction of the striker-shank to prevent premature rearward movement of the striker in the body-part, said segments having auxiliary retaining projections extending into the bore of the body-part, a counter-ring movable on the striker-shank within said axial bore, the forward movement of the counter-ring being limited by a shoulder on the wall of the axial bore, bolts movable in the counter-ring to engage the intermediate and rear reductions in the shank of the striker, a spring normally pressing the bolts toward the shank of the

striker, said bolts engaging the intermediate reduction with the counter-ring at the forward limit of its movement and with the striker at the rearward limit of its movement as restricted by said interposed segments to prevent premature forward movement of the striker, a sleeve slidable on the shank of the striker within the axial bore of the body-part, and a cocking spring normally pressing said sleeve forward to engage the counter-ring to press the latter to the limit of its forward movement, said sleeve in its engaged position with the counter-ring overlapping the bolts to hold the latter in locked engagement with the intermediate reduction of the striker-shank to hold the striker against forward movement, said sleeve at the discharge of the projectile moving rearward by its inertia against the action of the cocking spring to free the counter-ring and to release the bolts, the disengaged counter-ring by its inertia also moving rearward to engage again the sleeve held by the compressed cocking spring, the counter-ring in its rearward movement disengaging the spring-pressed bolts from the intermediate reduction of the striker-shank and positioning said bolts to engage the rear reduction of the striker-shank, said cocking spring during the flight of the projectile and the lessening acceleration thereof predominating the inertia of the engaged sleeve and counter-ring to move forward said engaged members with the sleeve overlapping the bolts to hold the latter in locked engagement with the rear reduction of the striker-shank so that the continued predominance of the cocking spring through said intervening mechanism will also move forward the striker to cocked position, the forward movement of the striker separating the shouldered impact head from the nose of the fuse body-part to free the displaceable segments to permit their escape through the centrifugal action imparted by the rotation of the projectile, the displacement of the segments permitting the striker on impact with the target to be driven into the fuse body-part onto the cap-carrier.

In testimony whereof I have signed this specification.

EUGÈNE SCHNEIDER.

Witnesses:

ANDRÉ MOSTICKER,
CLEMENT EDWARDS.