Sept. 26, 1944. J. H. WILSON 2,358,899

PROJECTILE

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Fig. 1.

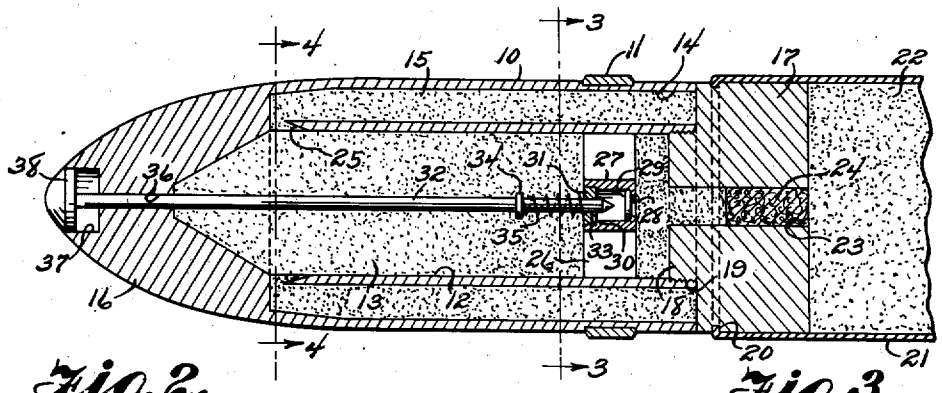


Fig. 2.

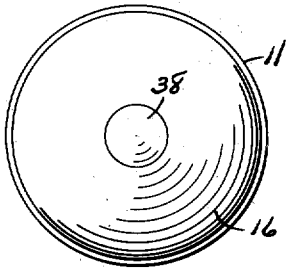


Fig. 3.

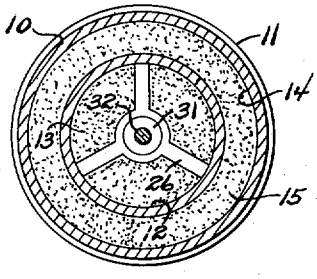


Fig. 4.

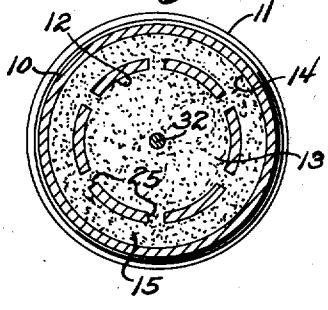


Fig. 5.

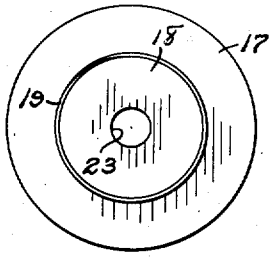
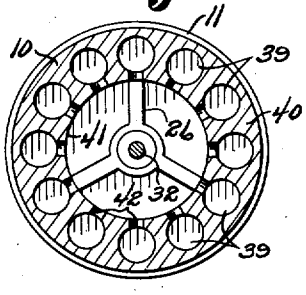


Fig. 6.



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Fig. 7.

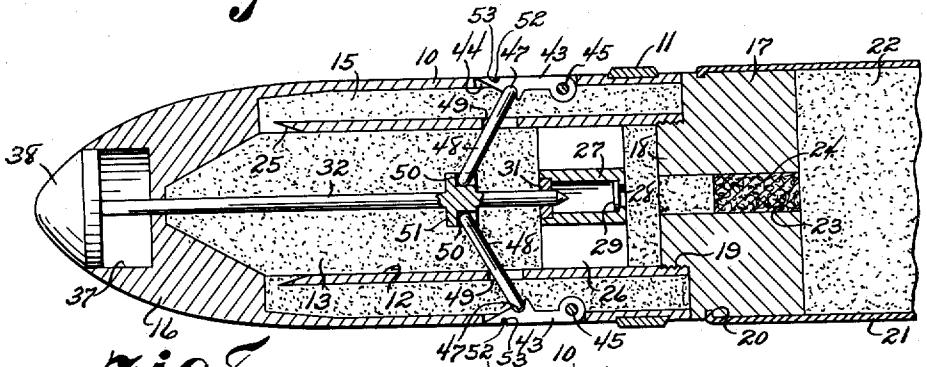


Fig. 8.

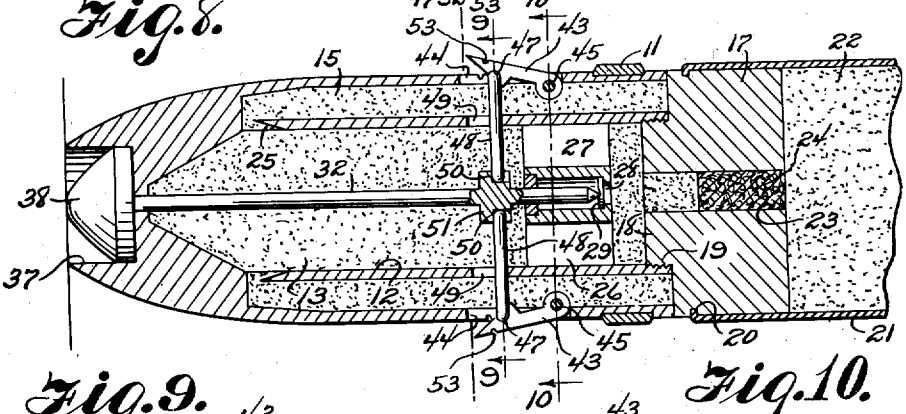


Fig. 9.

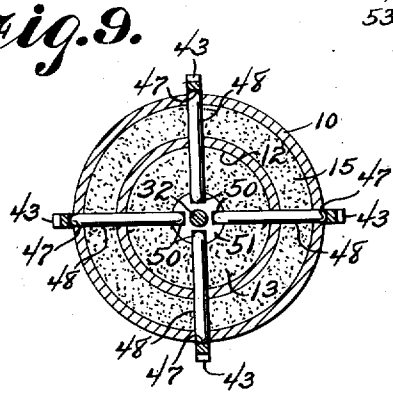
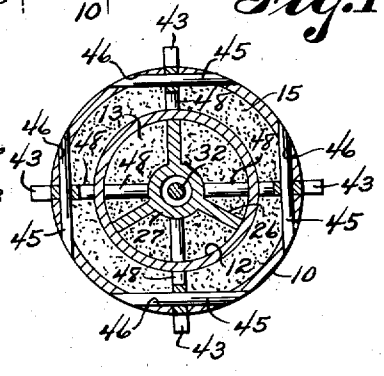


Fig. 10.



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PROJECTILE

John H. Wilson, Bay Shore, N. Y.

Application April 9, 1941, Serial No. 387,740

4 Claims. (Cl. 102—62)

This invention relates to projectiles and has for an object to provide an explosive incendiary projectile which will be more effective against modern insulated and self-sealing air craft fuel tanks than conventional projectiles.

A further object is to provide a projectile having a slow burning powder charge adapted to ignite fuel leaking from the tank because of rupture in the tank walls made by penetration of the projectile, the projectile also having an explosive charge, such as T. N. T., adapted to rupture and destroy material and personnel approximately simultaneous with the ignition of the incendiary powder charge.

A further object is to provide an impact detonating projectile having a firing pin frictionally held tight against the wall of a recess in the nose of the projectile so that the firing pin cannot cause accidents during handling of the projectile, but can only be actuated by the force of impact of the projectile against a target.

A further object is to provide a projectile which will be mechanically destructive to a greater extent than ordinary projectiles by reason of hooks which are released laterally to extend from the projectile upon movement of the firing pin due to impact, which hooks by virtue of axial rotation of the projectile, disrupt, tear and rupture a substantial area of material around the projectile.

A further object is to provide a projectile of this type which may be conveniently handled and used against machines such as tanks, armored cars, mobile artillery, gun implacements and other war material, to produce both destruction and burning of the material at the same impact.

A further object is to provide a device of this character which will be formed of a few strong, simple and durable parts, which will be inexpensive to manufacture, and which will not easily get out of order.

With the above and other objects in view, the invention consists of certain novel details of construction and combinations of parts hereinafter fully described and claimed, it being understood that various modifications may be resorted to within the scope of the appended claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings forming a part of this specification:

Figure 1 is a longitudinal sectional view of a projectile constructed in accordance with the invention.

Figure 2 is a front elevation of the projectile.

Figure 3 is a cross sectional view taken on the line 3—3 of Figure 1.

Figure 4 is a cross sectional view taken on the line 4—4 of Figure 1.

Figure 5 is a front elevation of the base plug of the projectile.

Figure 6 is a rear elevation of a modified form of projectile showing a plurality of longitudinal chambers in the shell wall for high explosives rather than a single chamber as shown in Figure 4.

Figure 7 is a longitudinal sectional view of a modified form of projectile showing pivoted hooks and means for operating the hooks by movement of the firing pin.

Figure 8 is a view similar to Figure 7 but showing the hooks extending laterally from the projectile in operative position.

Figure 9 is a cross sectional view taken on the line 9—9 of Figure 8.

Figure 10 is a cross sectional view taken on the line 10—10 of Figure 8.

Referring now to the drawings in which like characters of reference designate similar parts in the various views, 10 designates the cylindrical steel body of the projectile, the same being provided externally near the rear end with a rotating band 11, as is customary. The projectile body is provided with an axial longitudinal powder chamber 12 adapted to contain a slow burning incendiary powder charge 13. The projectile body is also provided with an annular chamber 14 concentric with and outside of the axial chamber 12 adapted to contain a high explosive charge 15, such as T. N. T. The nose 16 of the projectile is integral with the body and the body of the projectile is closed at the rear end by a base plug 17, having a reduced extension 18, which is threaded into the rear end of the powder chamber, as shown at 19. The plug is provided with a circumferential groove 20 in which the end of the shell case 21, containing the propelling charge 22, is crimped as is customary in fixed ammunition. The plug is also provided with an axial bore 23 closed by wadding 24 at the rear end and containing some of the slow burning powder charge 13 at the front end. The wadding is blown out by the ignited powder charge to open the bore 23 for escape of the flames and sparks from the ignited powder charge.

A plurality of openings 25 are formed in the wall of the powder chamber adjacent to the nose of the projectile establishing communication between the high explosive chamber 14 and pow-

der chamber 12 so that when the incendiary powder charge 13 is ignited at the rear end of the charge as will presently appear, there will be an almost inappreciable lag before the explosive charge 15 of T. N. T. or the like is exploded by the burning powder charge in the openings 25.

The rear end of the wall of the powder chamber 12 is reinforced by a spider 26 having an axial tubular hub 27 provided with a shoulder 28 at the rear end to support a cap 29 for detonating the powder charge 13. The front end of the hub is provided with a shoulder 30 against which a guide disk 31 is lodged to support a firing pin 32.

The rear end of the pin is slidably fitted in an axial opening 33 formed in the disk. A collar 34 is formed on the firing pin, and a helical spring 35 is sleeved on the firing pin between the collar and the disk to hold the pointed rear end of the firing pin spaced from the cap 29. The firing pin extends through the slow burning powder charge 13 and through an axial opening 36 formed in the nose 16 of the projectile. A recess 37 is formed in the nose of the projectile to receive a disk head 38 formed on the firing pin at the front end thereof. The disk head frictionally engages the wall of the recess 37 and prevents movement of the firing pin except under force of impact of the projectile against a target so that safe handling of the projectile is assured.

In operation, when the projectile impinges against a target of any character whatsoever, the force of the impact will drive the firing pin 32 rearwardly to explode the cap 29 and ignite the incendiary slow burning powder charge 13.

The ignited powder charge blows out the wadding 24 so that the sparks and flames escape through the bore 23 of the base plug 17 and set fire to the target, as for example, escaping motor fuel from the ruptured wall of an insulated self-sealing fuel tank penetrated by the projectile. The ignited powder charge 13 in the openings 25 detonates the high explosive charge 15 to break the shell into fragments with consequent damage to the target and material and personnel adjacent to the target of whatever character the target may be, whether an airplane or mechanized troops and material.

In Figure 6 is shown a modified form of projectile body, the body being identical in all respects with the body 10 above described, with the exception that an annular series of cylindrical chambers 39 are formed in the wall 40 of the body to accommodate the high explosive charge, instead of a single chamber as shown in Figure 4. The chambers 39 communicate with the axial slow burning powder charge chamber 41 through the medium of radially disposed passages 42, preferably arranged adjacent the nose of the projectile, as previously described.

A modified form of the invention is shown in Figures 7 to 10 inclusive. In this form of the invention the only differences over the form just described are in the addition of hooks and means for operating the hooks from the firing pin, and for the sake of brevity, these parts will be referred to by additional respective reference characters, while the parts of the projectile which are identical with the form shown in Figures 1 to 5, inclusive, will be designated by identical reference characters.

In the modified form of the invention, a plurality of hooks 43 are mounted in respective longitudinal recesses 44 formed in the body 10 of the projectile so as to normally lie flush with the wall of the body and not project therebeyond. There are preferably four hooks pivoted at the rear ends on pivot pins 45 which are mounted in openings 46 in the wall of the body.

The hooks are provided with notches 47 in which the outer ends of operating arms 48 are engaged through recesses 49 formed in the wall of the axial powder chamber 12 and the inner ends of the arms are lodged in sockets 50 formed in a collar 51 which is integral with the firing pin 32.

Frangible wire bands 52 are shrunk into grooves 53 formed on the outer faces of the hooks. The bands hold the hooks against being thrown outwardly by centrifugal force when the projectile is in flight.

As best shown in Figure 7, the arms normally are inclined forwardly from the hooks. When the head 38 of the firing pin is dislodged rearwardly due to impact to explode the powder charge and detonate the high explosive charge, the collar 51 will be carried rearwardly with resultant spreading of the arms 48 to burst the hook retaining bands 52 and swing the hooks 43 outwardly to project from the body of the projectile. In this position, due to axial rotation of the projectile, the hooks will cut and tear an annular path in the vicinity of and exteriorly of the body of the projectile to increase the damage to the target, as for example, to more completely rupture and rip open the insulated self-sealing wall of an air craft fuel tank.

Since the operation of the projectile has been described as the description of the parts progressed, it is thought that the invention will be fully understood without further explanation.

What is claimed is:

1. A projectile comprising a cylindrical body, a cylindrical chamber in said body filled with a high explosive charge, a percussion cap arranged in the rear end of the cylindrical body for exploding a charge, a rod movable through the charge and extending beyond the nose of the projectile and adapted to explode the cap upon the inward movement thereof, a plurality of hooked members pivoted in the wall of the cylindrical body and normally held inwardly beyond the periphery thereof, and links pivotally connected to said hooks at their outer ends and their inner ends pivotally connected to the said rod, whereby the inward movement of the rod to explode the cap forces the hooks out beyond the periphery of the cylindrical body.

2. A projectile comprising a cylindrical body, a cylindrical chamber in said body filled with a high explosive charge, a percussion cap arranged in the rear end of the cylindrical body for exploding the charge, a rod movable through the charge and extending beyond the nose of the projectile and normally held spaced from the cap and adapted to explode the same upon the inward movement thereof, a plurality of hooked members pivoted at their rear end in the wall of the cylindrical body and normally held inwardly beyond the periphery thereof by the outward position of the rod, links pivotally connected to said hooks at their outer ends and their inner ends pivotally connected to the rod, and a fragile ring arranged in beyond the periphery of the cylindrical body and holding the hooked members in their inward position, whereby the inward movement of the rod to explode the cap forces the

hooks out beyond the periphery of the cylindrical body.

3. A projectile comprising a cylindrical body, an axial powder chamber in the body, an annular powder chamber in the body exteriorly of the axial chamber, there being an opening affording communication between said chambers at the forward end of the projectile, a plug connected with the body and closing the rear ends of said chambers, said plug having a bore forming a continuation of the axial chamber, a spider having a tubular hub disposed in the rear end of the axial chamber, a cap in said hub, a guide disk mounted in the hub, a firing pin engaged through the guide disk, a spring connected to the firing pin to yieldingly hold the same spaced from the cap, there being a recess in the nose of the projectile and a head on the firing pin frictionally engaging the wall of said recess adapted upon impact to move the firing pin rearwardly endwise to explode the cap.

4. A projectile comprising a cylindrical body, an axial powder chamber in the body, an annular powder chamber in the body exteriorly of the axial chamber, there being an opening affording communication between said chambers at the forward end of the projectile, a plug connected with the body and closing the rear ends of said chambers, said plug having a bore forming a continuation of the axial chamber, means at the rear end of the axial chamber operated by impact of the projectile to detonate the powder charge therein, a firing pin, a plurality of arms carried by the firing pin, a plurality of hooks pivoted on the body of the projectile and normally lying flush with the exterior thereof, said arms engaging the hooks and moving the latter outwardly when the firing pin is moved rearwardly endwise upon impact of the projectile and frangible means for holding the hooks against outward movement by centrifugal force when the projection is in flight.

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