

June 19, 1923.

1,459,600

R. T. NEWTON

PROJECTILE

Filed Oct. 4, 1918

3 Sheets-Sheet 1

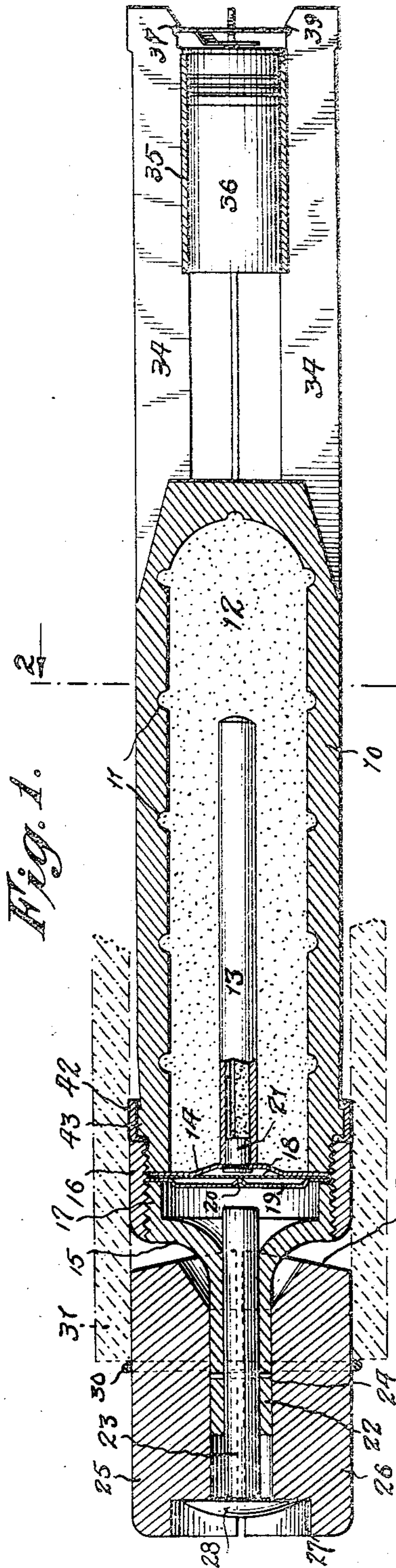


Fig. 4.

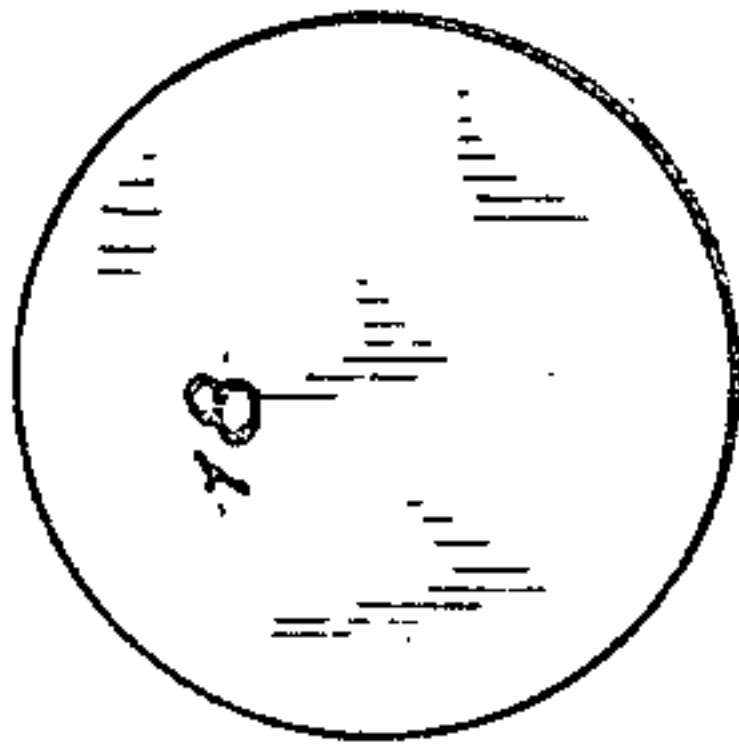


Fig. 3.

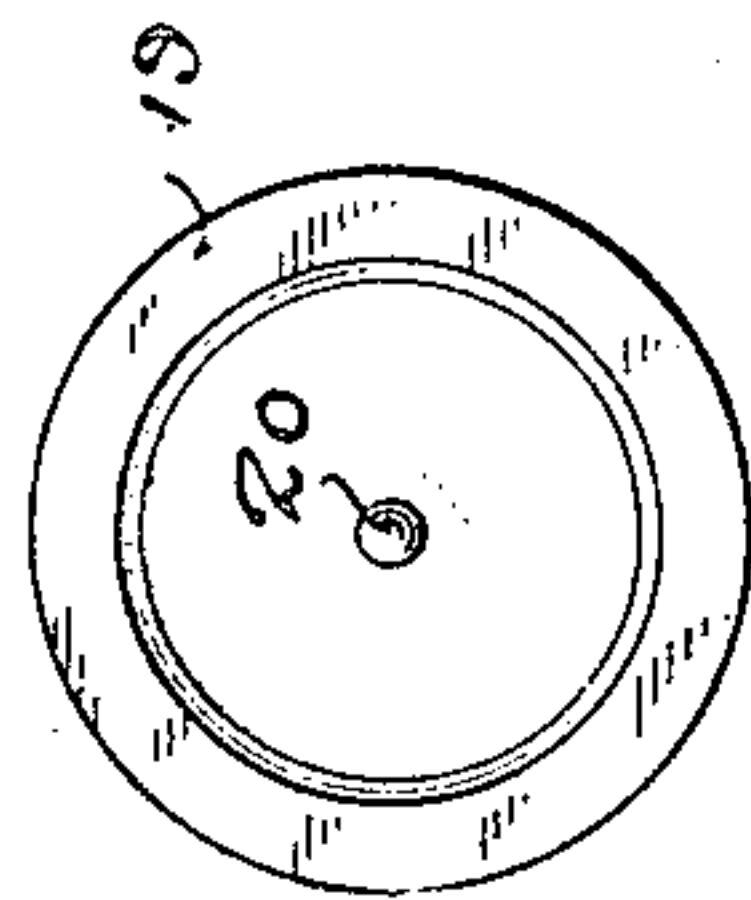


Fig. 2.

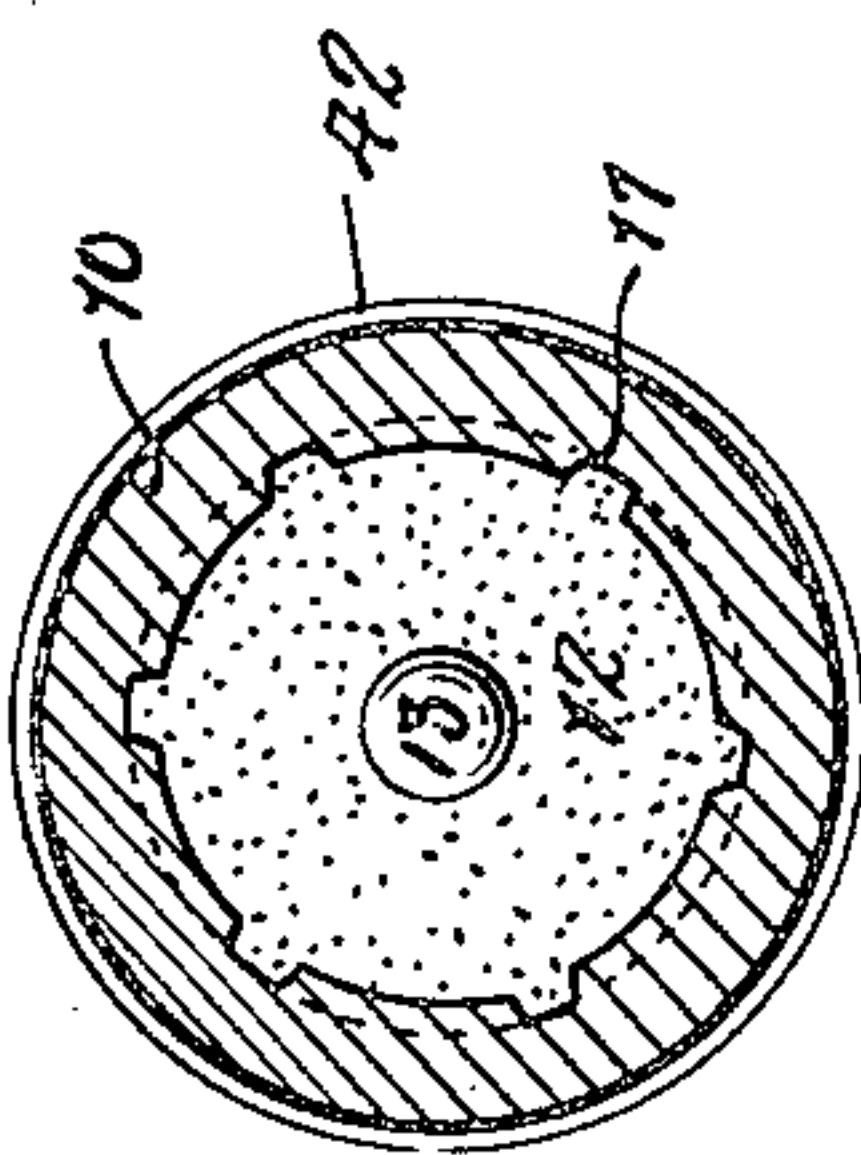


Fig. 7.

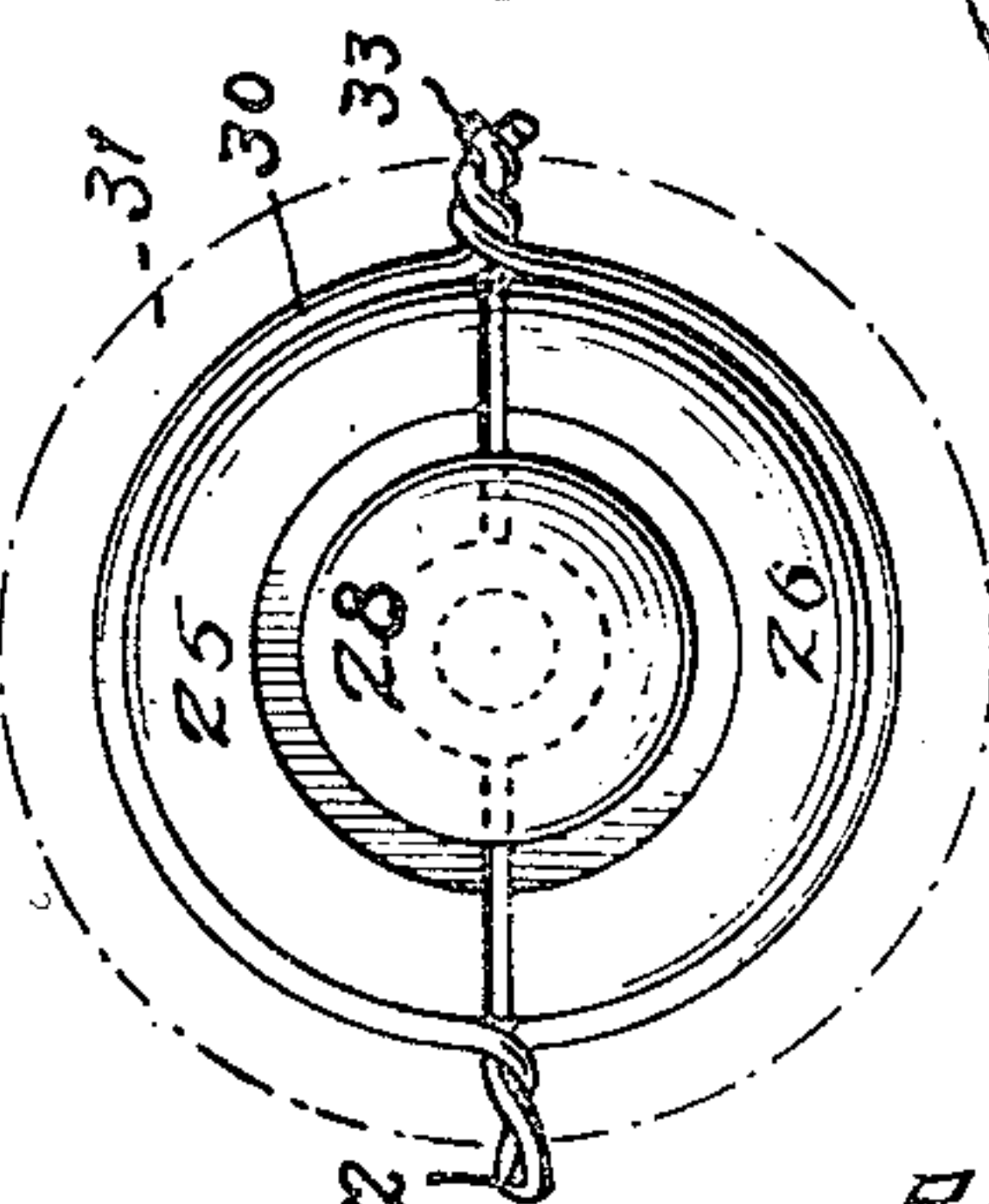


Fig. 5.

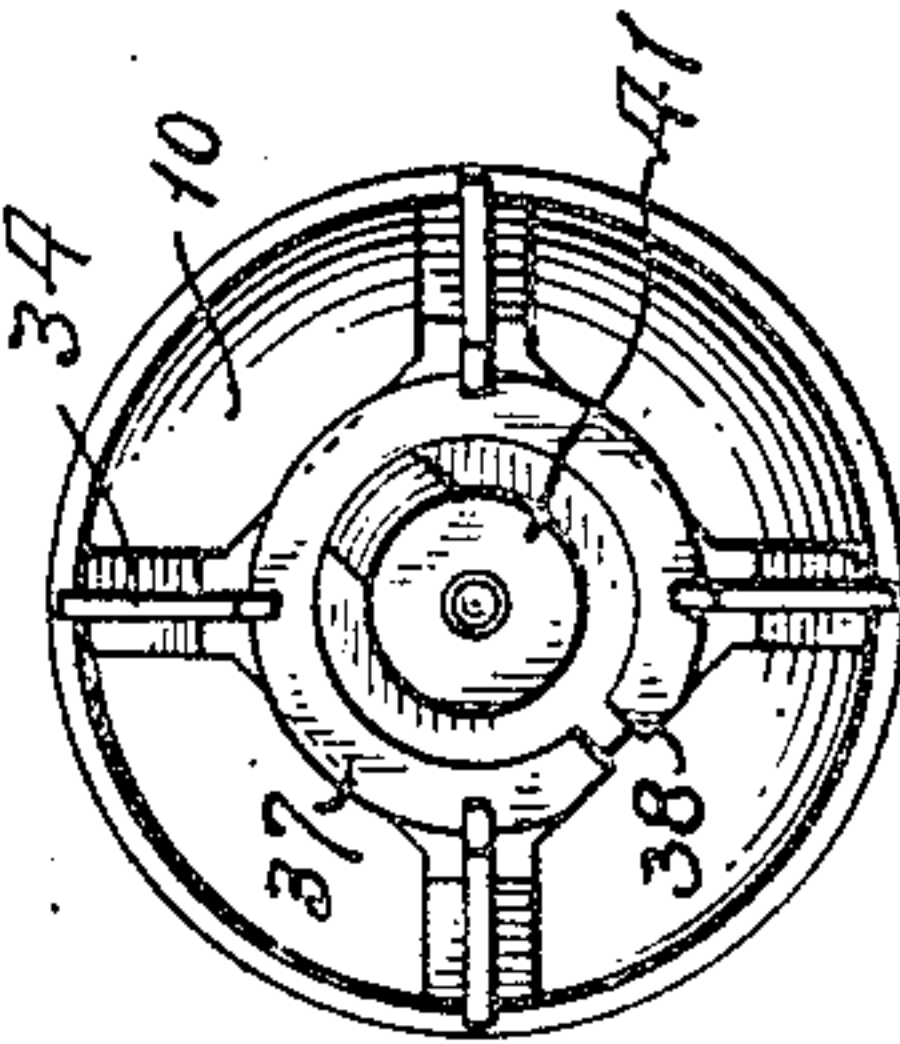


Fig. 8.

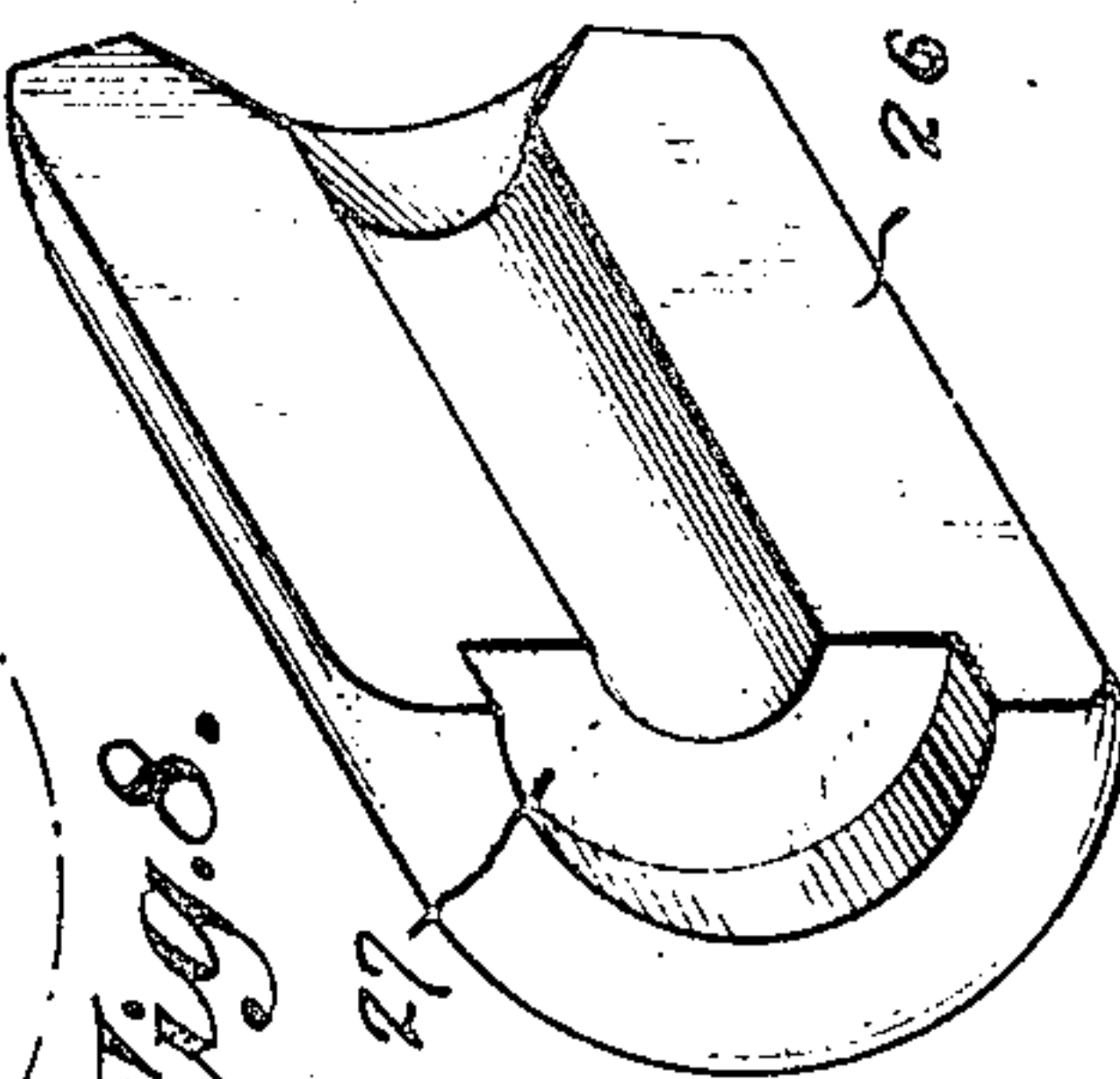


Fig. 6 a.

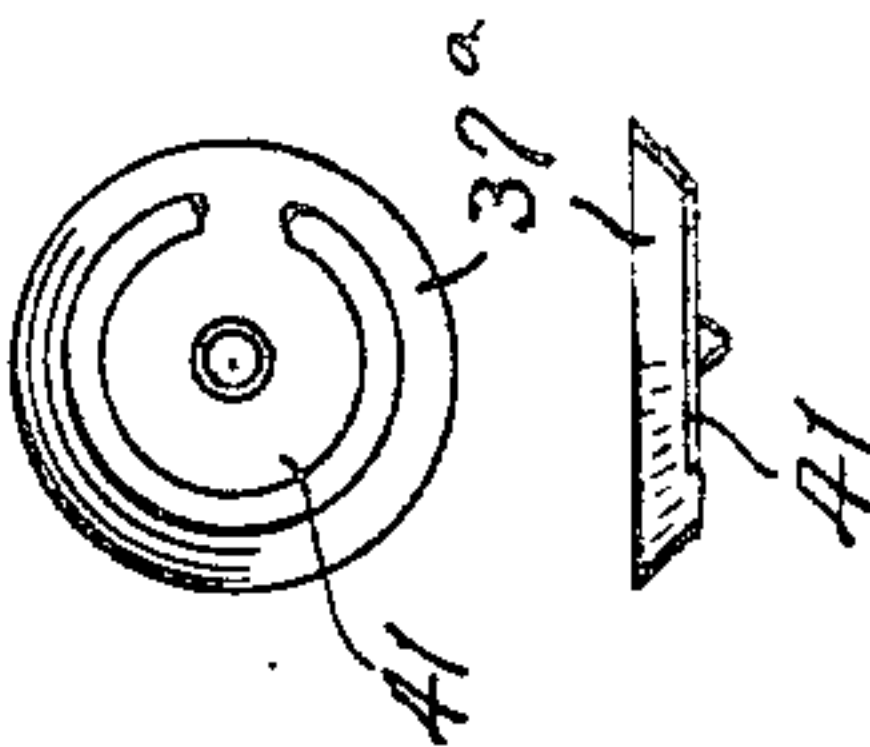
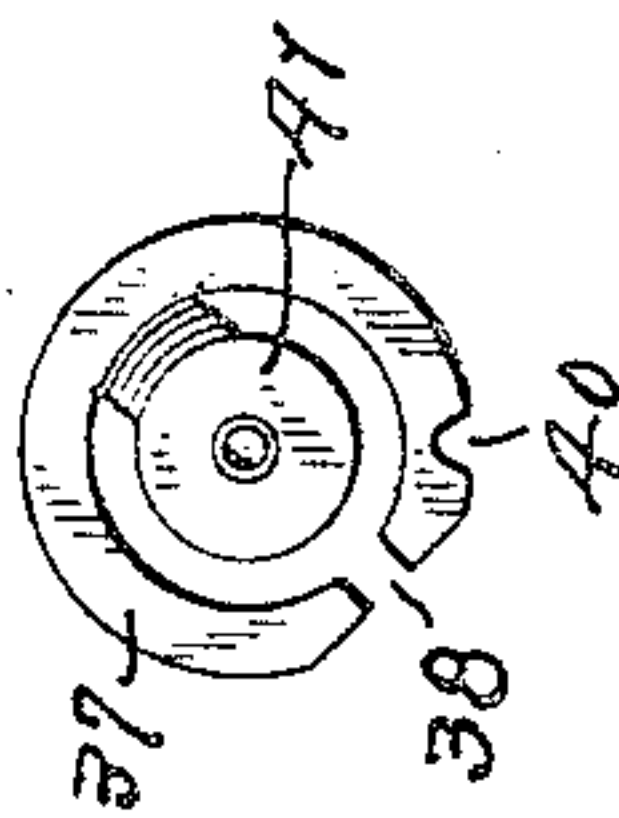


Fig. 6.



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Fig. 9.

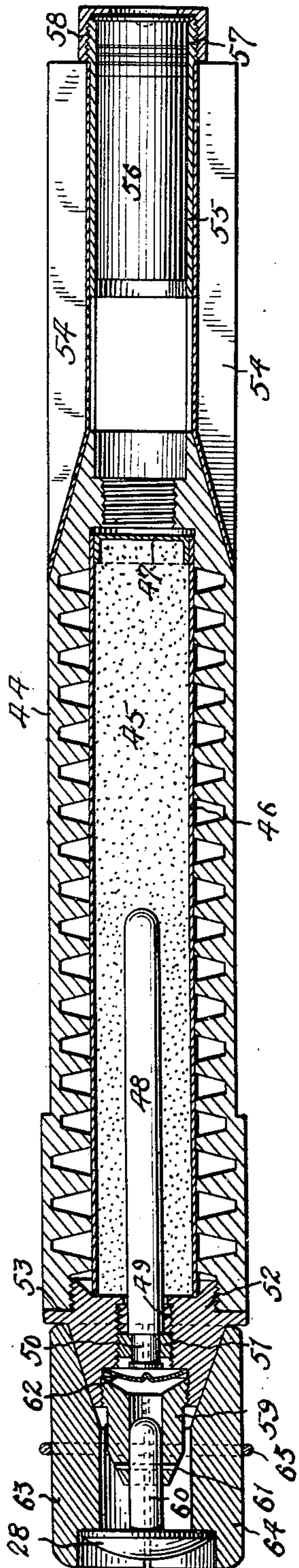


Fig. 11.

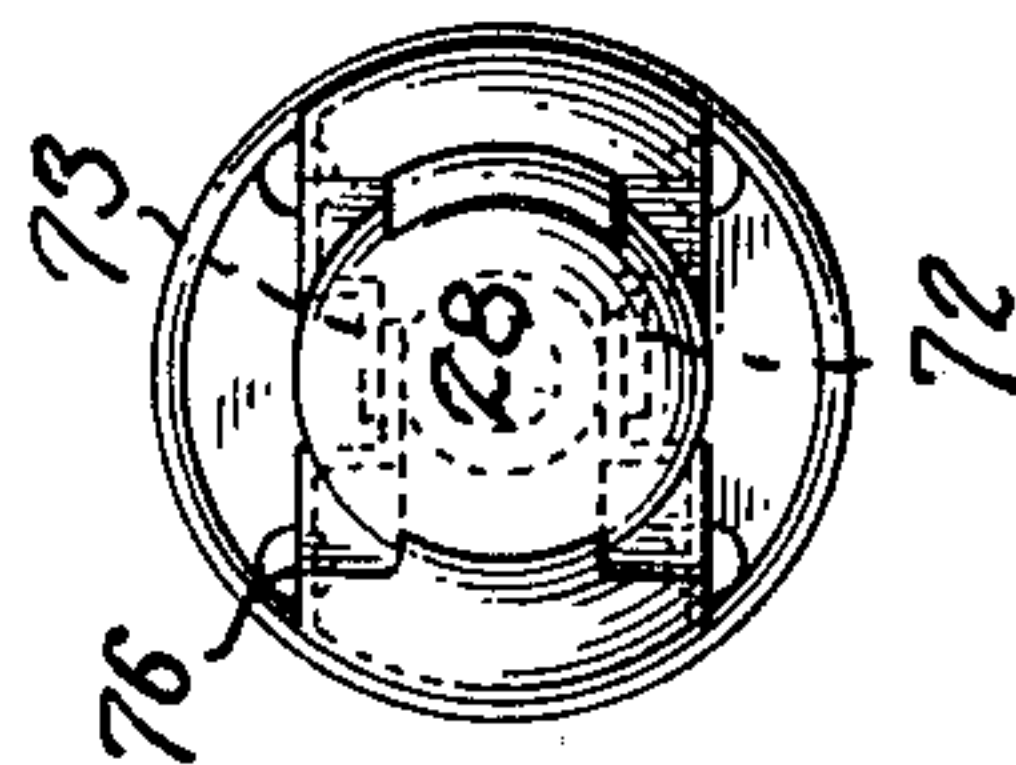


Fig. 10.

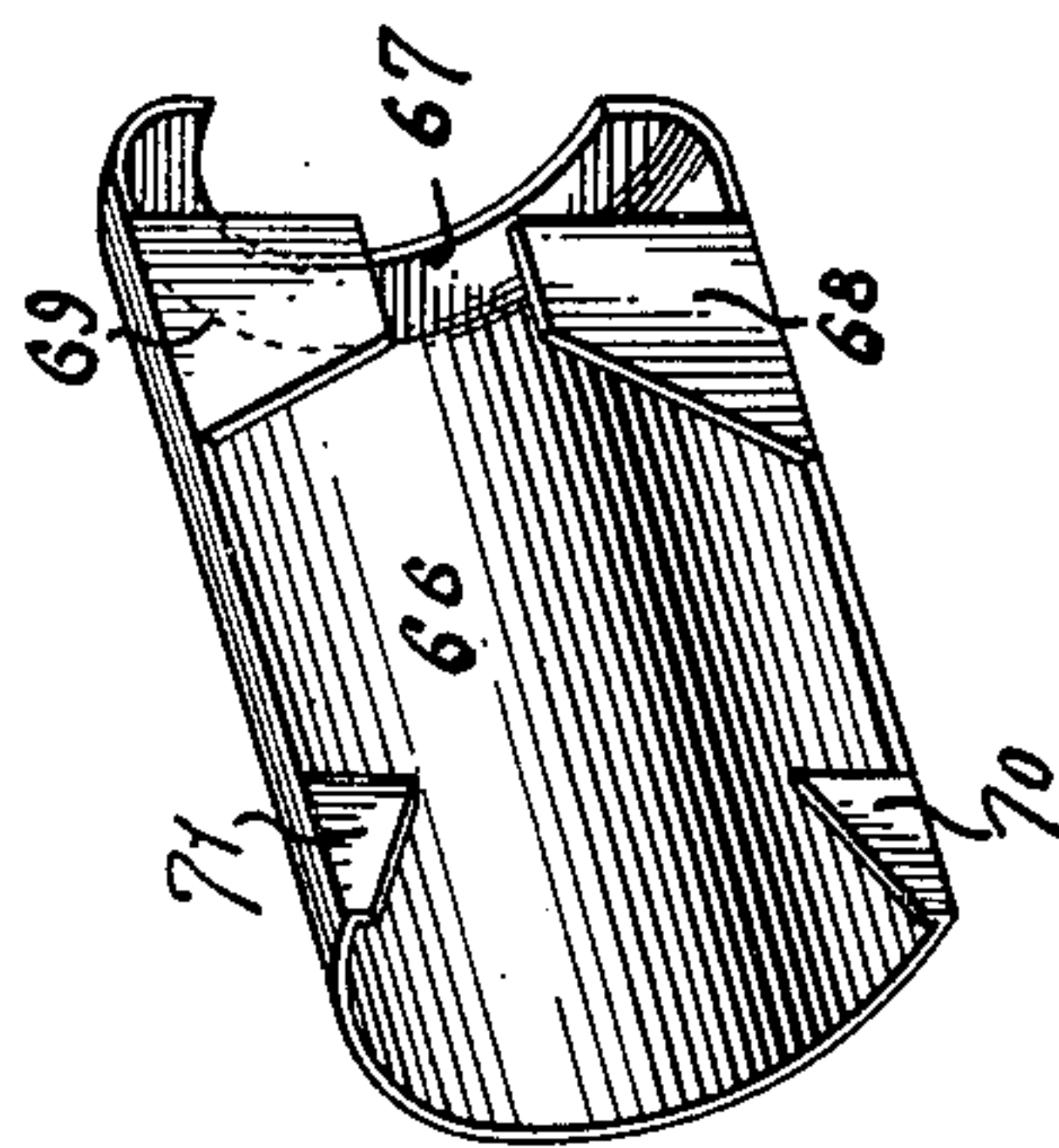
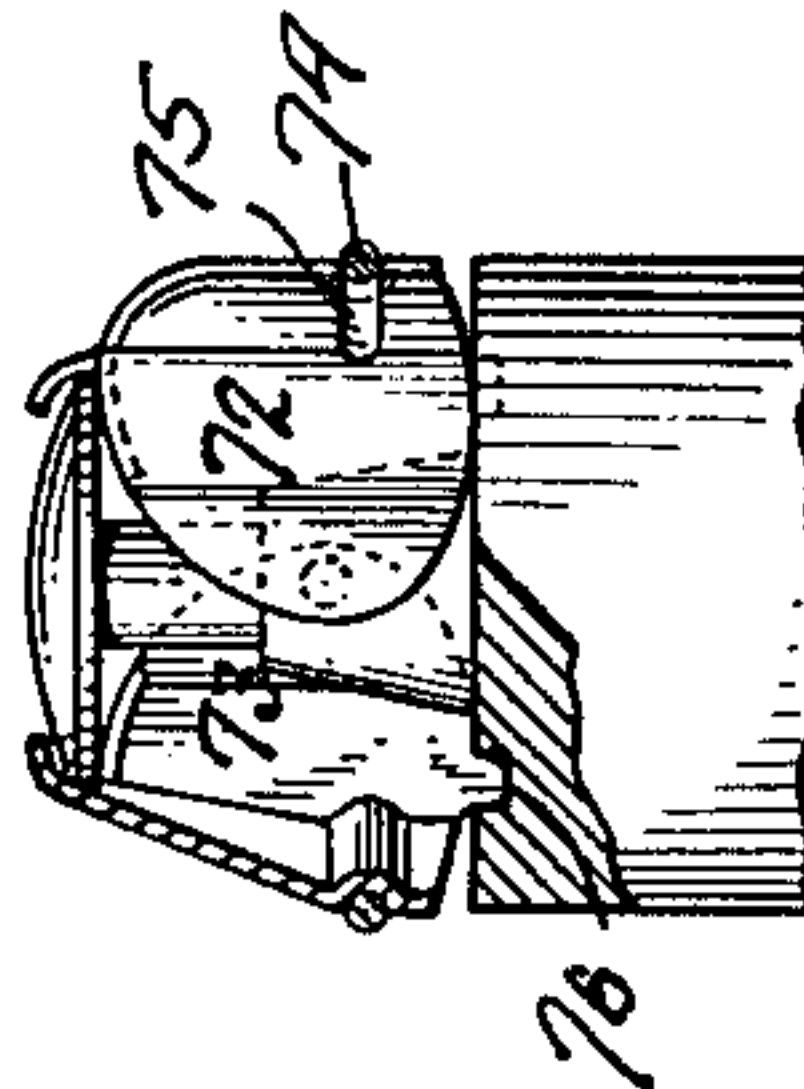


Fig. 12.



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Fig. 10.

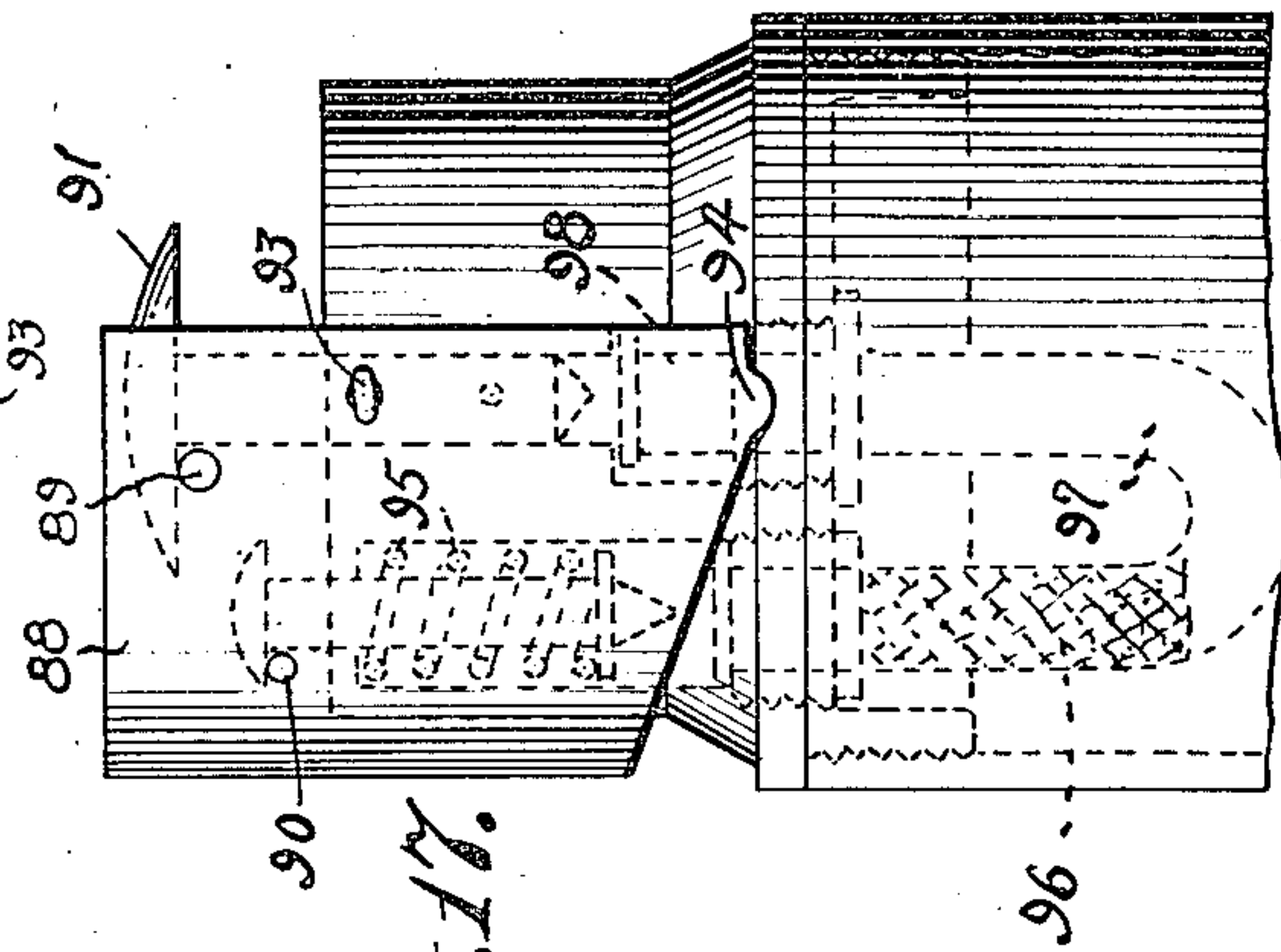
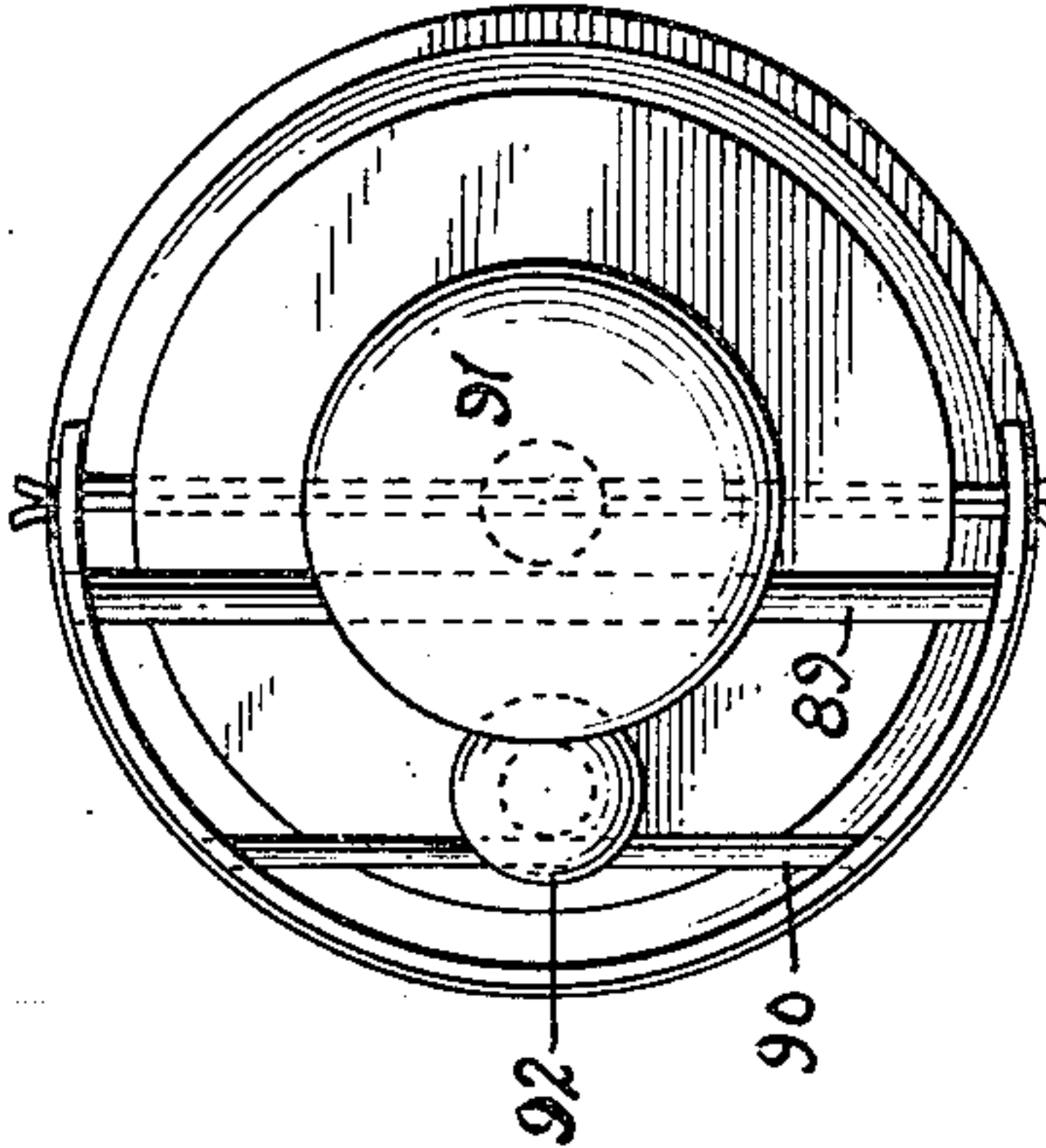


Fig. 17.

Fig. 13.

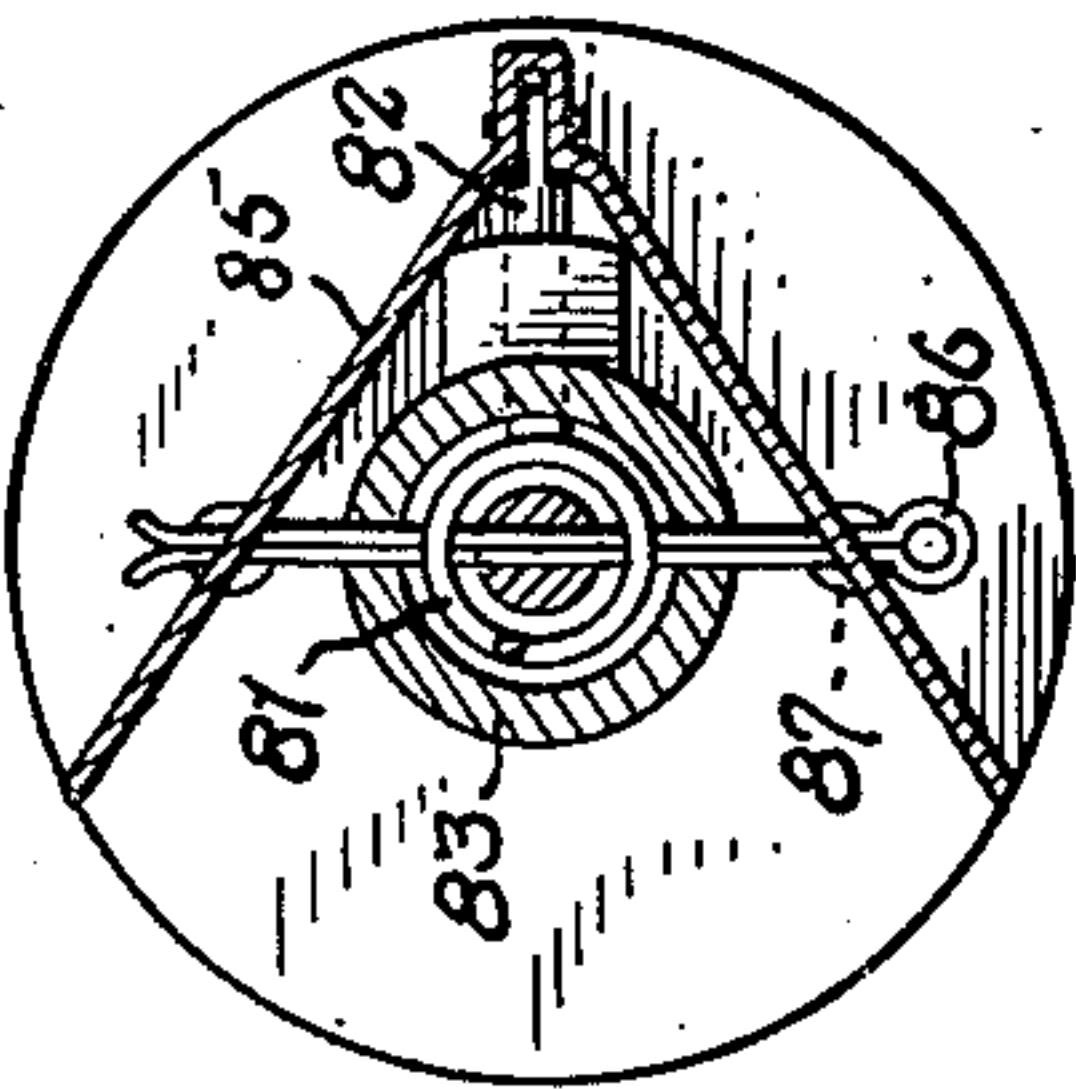


Fig. 14.

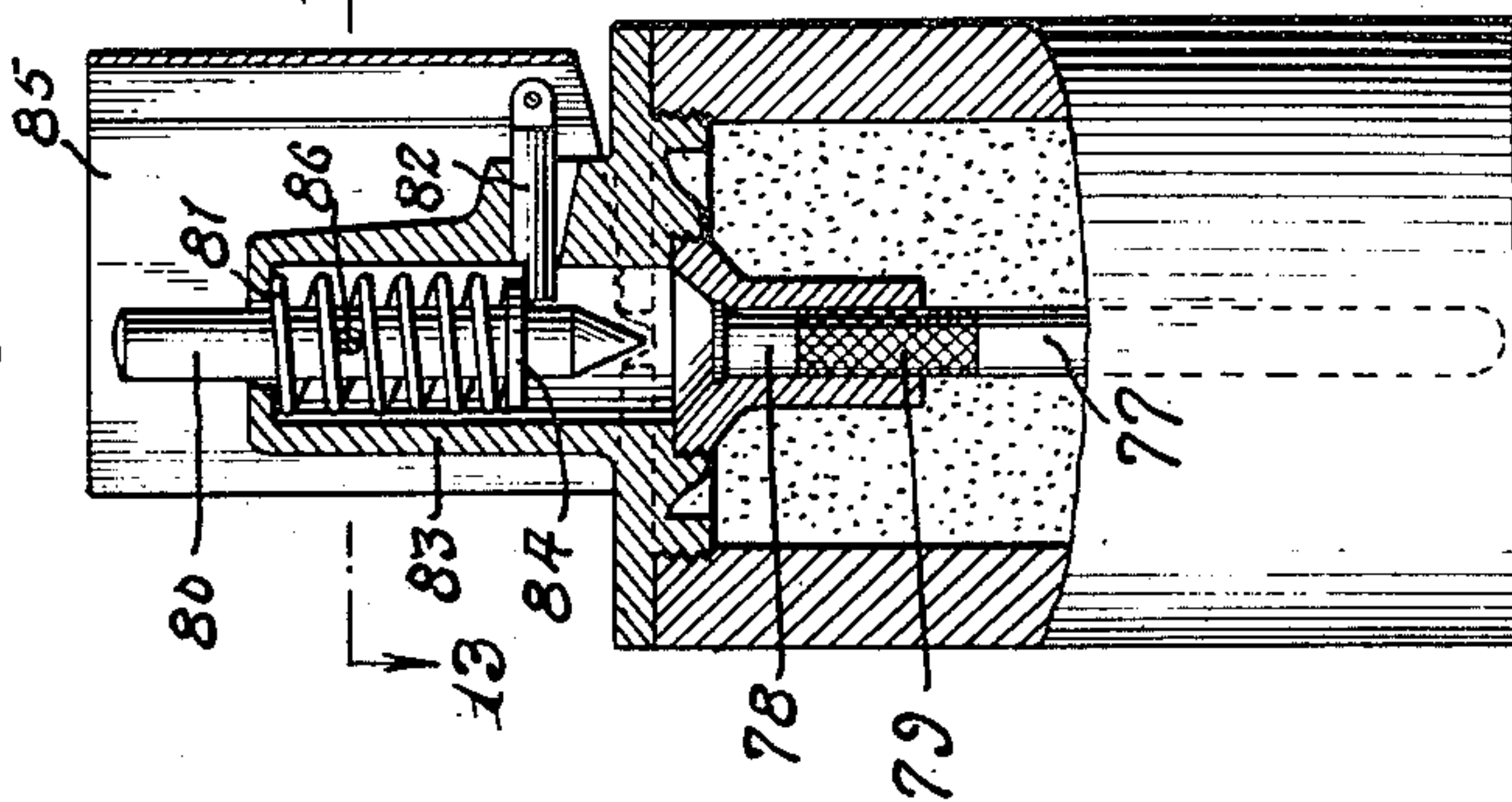
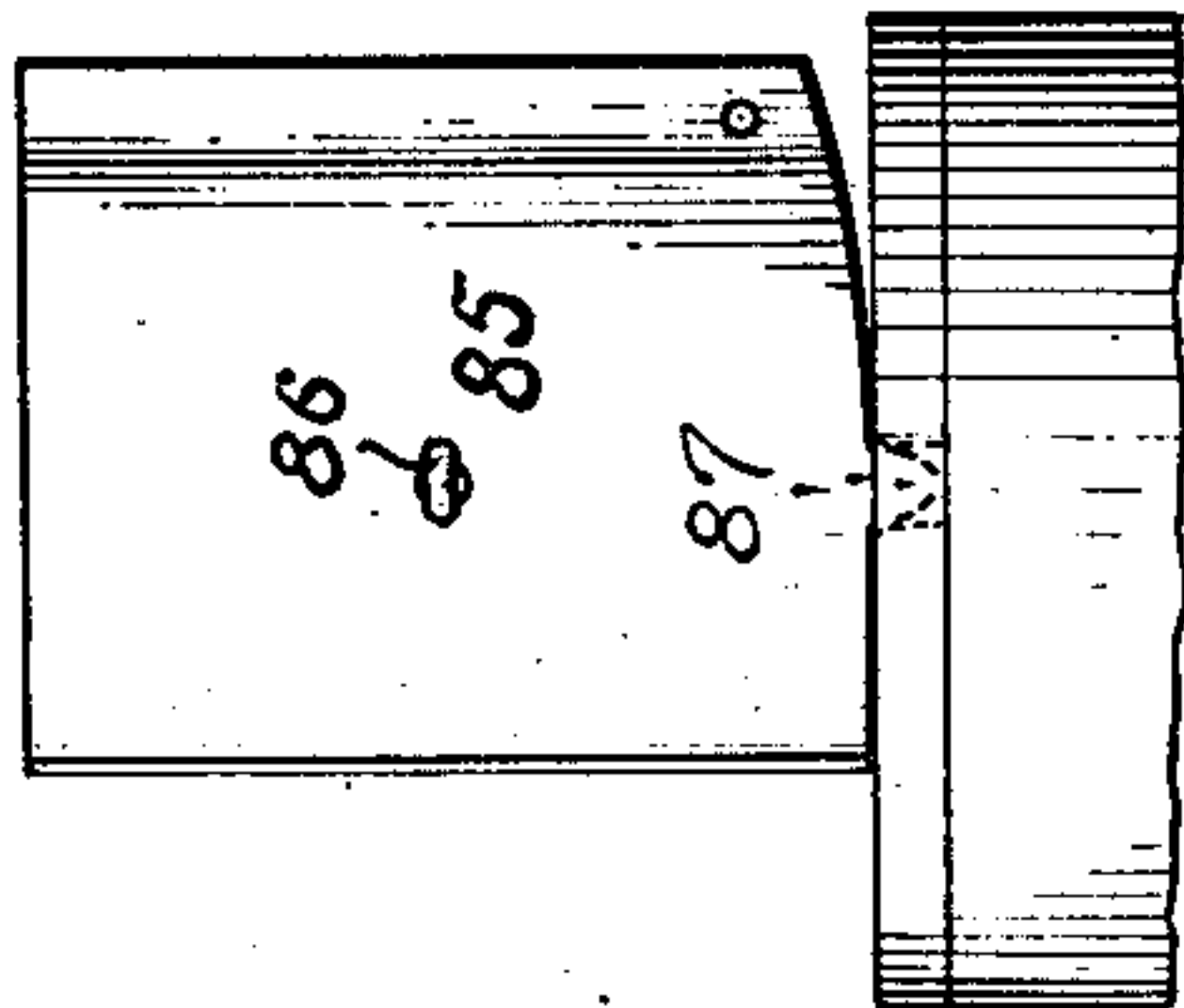


Fig. 15.



Inventor

RICHARD T. NEWTON

By his Attys *Harmon and Harmon*

UNITED STATES PATENT OFFICE.

RICHARD T. NEWTON, OF NEW YORK, N. Y., ASSIGNOR TO ARMS PRODUCTS COMPANY, INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

PROJECTILE.

Application filed October 4, 1918. Serial No. 256,802.

To all whom it may concern:

Be it known that I, RICHARD T. NEWTON, a citizen of the United States of America, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Projectiles, of which the following is a specification.

My invention relates to projectiles and particularly to explosive projectiles, the object of my invention being to improve the latter in certain features of construction and to provide a novel guard by which accidental operation of the firing mechanism during handling is prevented.

In the accompanying drawings,

Fig. 1 is a longitudinal section through a shrapnel shell in which my invention is embodied in one form;

Fig. 2 is a transverse section on the line 2—2 Fig. 1;

Figs. 3 and 4 are plan views of the striker diaphragm and seal disc respectively;

Fig. 5 is an elevation of the rear end of the projectile;

Fig. 6 is a plan of the cartridge striker;

Fig. 6^a shows in plan and section a modification thereof;

Fig. 7 is an end elevation of the head of the shell;

Fig. 8 is a perspective of one of the guard struts;

Fig. 9 is a longitudinal section through a shell of modified construction;

Fig. 10 is a perspective view of a modified guard strut;

Figs. 11 and 12 are end and broken side elevations respectively of a further modified form of guard;

Figs. 13, 14 and 15 are, respectively, section on line 13—13, of Fig. 14, broken longitudinal section and side elevation of a further modified form of guard;

Figs. 16 and 17 are respectively end and side elevations of a further modified guard construction.

Referring first to the construction shown in Figs. 1 to 8 inclusive, my invention as here shown, is embodied in a projectile of the shrapnel type comprising a shell 10 internally serrated at 11 to form shrapnel segments. The explosive charge 12 is contained within the shell and the detonator tube 13 mounted on its carrier 14 is embedded in the charge. The carrier 14 is here shown as a disc resting against the open

end of the shell and clamped in position by the nose 15 of the shell and its holding ring 16. Between the flange 17 of the nose piece and the detonator carrier 14 I interpose a sealing disc 18 of any suitable perforable material, such as paper, and a striker diaphragm 19, from which is depressed the striker point 20 in line with the primer 21 of the detonator. The nose piece 16 has a tubular extension 22 in which is guided the firing pin 23 normally held in stationary position by the shear pin 24.

In order to prevent premature displacement of the firing pin 23 I provide a guard therefor in the form of a pair of wing struts 25 and 26 shouldered at 27 to accommodate the mushroom head flange 28 of the firing pin and against which it rests. The inner ends of the struts are bevelled at 29 to afford pivot points of support at the inner margins thereof, on which the guard wings rock off during the flight of the projectile. A wire retaining ring 30 surrounds the guard wings 25 26 and holds them in engagement with the firing pin until the shell is pressed into the muzzle of the gun 31 from which it is to be fired. Projecting twists 32 and 33 at opposite sides of the ring engage the gun muzzle and the ring is forced off as the projectile is pressed into the gun bore. When the projectile starts its flight the wind pressure on the head of the projectile forces the now unrestrained guard wings outward and they drop off, leaving the firing pin 23 free to be driven in against the striker diaphragm 19 when the projectile hits its target.

At the rear end of the projectile are secured guide vanes 34 of any suitable number and extent, preferably four cast with the shell or arranged in the mold when the shell is cast. A cylindrical cartridge holder 35 is secured to the vanes adjacent their rear ends and receives the propelling cartridge 36. In order to secure the inserted cartridge in holder 35 I provide a retaining ring 37 which is split at 38 to accommodate one of the guide vanes 34. After the ring has been adjusted in its notch seat 39 in the vanes it is rotated and the notch 40 in the outer periphery of the ring 37 engages one of the guide vanes 34 and holds the ring against escape. A striker diaphragm 41 integral with the ring 37 projects into alignment with the cap of the cartridge 36 and forms

the striker against which impinges the firing pin (not shown) of the gun 31. In modification 6^a, retaining ring 37^a is beveled and merely sprung into position.

5 I have found it advantageous to provide a gas packing ring 42 adjacent to the head of the projectile to prevent leakage of the propulsive gases on the discharge of the cartridge 36. This ring is here shown clamped
10 between the nose ring 15 and the flange 43 formed on the projectile adjacent its head.

In the modified construction shown in Fig. 9 the shell body 44 is of the same general type as that first shown, although serrated somewhat more deeply to form the shrapnel segments. The explosive charge 45 is contained in a powder tube 46 fitting within the shell and closed at its lower end by a cap 47, but open at its opposite end to receive the detonator tube 48 carried by ferrule 49. The primer 50 is supported by another ferrule 51 both 49 and 51 screwing into a tapped well in the nose piece 52 of the shell. This nose piece with its associated
25 parts is in turn screwed into the open end of the shell and seated against the latter at the flange bearing 53.

At the rear end of the shell are secured the guide vanes 54 and holder 55 for cartridges 56. In this modified form the holder projects at 57 beyond the ends of the vanes and is threaded to receive the ring cap 58, the flange of which engages and holds the cartridge in the carrier.

35 At the head of the shell a plug 59 projects from the nose piece 52 and carries the firing pin 60 and its shear pin 61, while it also confines the striker diaphragm 62 with its point in alignment with cap 50 of the detonator. The guard wings or struts 63 and 64 are of the same type as that first described with the distinction that the inner ends are slightly modified to conform to the different shape of the nose piece 52. The
45 struts are held in position during the handling of the projectile in the same manner by the retaining ring 65 which is forced off automatically when the projectile is pressed into the muzzle of the gun.

50 In both of the constructions thus far described the guard wings 63 are shown solid, but the material of which they are made is light, for example, wood, compressed paper, or the like, so that when they fall
55 off the projectile during flight there will be no danger of injury to those nearby.

In the remaining figures however I have shown various modified constructions in which the guards are formed from sheet metal. Thus Fig. 10 illustrates one 66 of a pair, each semi-cylindrical and having at one end an internal wind flange 67. Adjacent this end of the guard are marginal supporting flanges 68 and 69 which project to-
65 ward each other and underlie the mushroom

head of the firing pin. At its opposite end are flanges 70 and 71 which bear against the inclined face of the nose piece and serve to steady the guards in position. They may be held in engaging position by the wire retaining ring 65 in precisely the same manner as the wooden guards above described. 70

In Figs. 11 and 12 I have shown another modified form of sheet metal strut in which the wings 72, 73, are extended beneath the head of the firing pin a sufficient distance to overlap on opposite sides of the nose piece of the projectile. The retaining ring 74 lies in annular groove 75 pressed into the outer face of the guards. 75

Pivot lugs 76 formed at the lower edges of the flanges 72, 73, rest in recesses in the head of the projectile and the guards rock outward on these points under air pressure during the flight of the missile. 80

In Figs. 13 to 15 I have shown a further modification in which the drop-off guard of the present type is adapted to a fused projectile. In this case the detonator 77 is spaced from the primer 78 by a fuse 79. 85 The firing pin 80 on its release is driven inward against the cap 78 by the spring 81, thus igniting fuse 79. The pin is temporarily held in an inoperative position by a trigger 82 which projects into the nose 83 of the shell and engages beneath the flange 84 on the firing pin. At its outer end the trigger 82 is pivoted to the guard 85 which is here shown in the form of a pair of wings lying in angular relation to each other and embracing between them the nose of the projectile. A cotter pin 86 pierces the guard wings and also the firing pin 80 thus holding the parts in safety position. The cotter pin 86 is withdrawn at the moment the projectile is inserted in the gun and the guard is then maintained in safety position by its engagement with the wall of the gun barrel. After the projectile has left the gun and started its flight however, the wind pressure rocks off the guard 85 on its pivots 87 thus withdrawing the trigger 82 from beneath the flange 84 of the firing pin and releasing the latter. 90 95 100 105 110

The same thought is embodied in Figs. 11 16 and 17 which differs from that just described in that the projectile is of the combined fuse and percussion type. As here shown the arcuate guard 88 is provided with two supporting cross pins 89 and 90, the former engaging beneath the head of the percussion pin 91 and the other beneath the head of the fuse pin 92. The guard is held in position as before by a cotter pin 93 which pierces the opposite margins of the guard wing and also the stem of firing pin 91. When the cotter pin has been withdrawn and the projectile fired, the guard swings off on its pivot 94, thus releasing both percussion and fuse pins 91 and 92. 11 12 13 14 15

The fuse pin 92 is at once actuated by its spring 95 and ignites the fuse 96 leading to the detonator 97. If the projectile should strike its target however, before the fuse is consumed the projectile is exploded by the impact of the firing pin 91 against the primer 98.

Various other modifications will readily suggest themselves to those dealing with the problem and I do not limit what I claim as my invention to the details shown and described.

The underlying thought of my invention is the provision of a guard device which releases the firing mechanism and falls from the projectile during its flight. This thought is embodied in my corresponding application filed February 18, 1918, Ser. No. 216689 and the present application is a continuation and extension of the conception therein disclosed.

I claim as my invention:

1. An explosive projectile having a firing mechanism displaceable to explode the charge, in combination with guard means freely mounted on the nose of the projectile and engaging the firing mechanism with freedom to rock outward and away from the axis of the projectile, and to fall off under the influence of inertia and wind pressure during the flight of the projectile, regardless of rotation of the latter together with means normally surrounding said guard means to maintain the same in position on the projectile, but adapted to be automatically removed by the insertion of the latter into the bore of the gun from which it is fired.

2. An explosive projectile having a firing mechanism displaceable to explode the charge, in combination with guard means freely mounted on the nose of the projectile and engaging the firing mechanism with freedom to rock outward and away from the axis of the projectile, and to fall off under the influence of inertia and wind pressure during the flight of the projectile, regardless of rotation of the latter, said guard means being outwardly overweighted with respect to its point of support and the axis of the projectile to increase the inertia effort together with means normally surrounding said guard means to maintain the same in position on the projectile, but adapted to be automatically removed by the insertion of the latter into the bore of the gun from which it is fired.

3. An explosive projectile having a firing mechanism displaceable to explode the charge, in combination with guard means lying within the diameter of the projectile and freely mounted on the nose of the projectile end and engaging the firing mechanism with freedom to rock off during the flight of the projectile, together with guard-holding means extending beyond the pro-

jectile diameter and frictionally gripping the guard to permit said holding means to be automatically removed by its engagement with the end of the gun barrel on the insertion of the projectile into the latter.

4. An explosive projectile having a firing mechanism at its head end, and guard means normally engaging said mechanism to prevent its premature operation, said guard means comprising an engaging member mounted on the head of the projectile and rocking off under wind pressure during the flight of the projectile together with means normally surrounding said guard means to maintain the same in position on the projectile, but adapted to be automatically removed by the insertion of the latter into the bore of the gun from which it is fired.

5. An explosive projectile having a firing mechanism at its head end, guard means normally engaging said mechanism to prevent its premature operation, said guard means comprising a pair of struts arranged on opposite sides of the axis of the firing mechanism, and supported at points spaced radially inward from their centers of gravity to facilitate their rocking off under the influence of wind pressure and inertia during the flight of the projectile, together with means normally surrounding said guard means to maintain the same in position on the projectile, but adapted to be automatically removed by the insertion of the latter into the bore of the gun from which it is fired.

6. An explosive projectile having a firing mechanism at its head end, and guard means normally engaging said mechanism to prevent its premature operation, said guard means comprising a pair of wooden struts bevelled at their inner edges to afford a pivotal support on which the struts rock off the head of the projectile and free the firing pin under the pressure of the wind during the flight of the projectile.

7. An explosive projectile having a firing mechanism, fall-off guard means normally engaging said firing mechanism to prevent its premature operation, said guard means being arranged within the diameter of the projectile and adapted for initial flight therewith, in combination with guard-holding means comprising a slip-off ring frictionally engaging said guard but projecting beyond the diameter of the projectile into position to be engaged and automatically removed by the end of the gun barrel on the insertion of the projectile to firing position in the gun.

8. An explosive projectile having a firing mechanism, fall-off guard means normally engaging said firing mechanism to prevent its premature operation, said guard means being arranged within the diameter of the projectile and adapted for initial flight therewith, in combination with guard-holding

means comprising a slip-off wire ring frictionally engaging said guard and having outwardly extending twists which project beyond the diameter of the projectile into position to be engaged and automatically removed by the end of the gun barrel on the insertion of the projectile to firing position in the gun.

9. In an explosive projectile, a tubular casing open at one end to receive the explosive charge, a detonator carrier supported at the open end of the casing, a perforable seal overlying the detonator, and a head piece secured to the casing and serving to hold said carrier and seal in position, in combination with a firing pin carried by the head piece and a striker interposed between the firing pin and the detonator and overlying the sealing disk.

10. In a construction such as specified in

claim 9, a striker comprising a plate overlying the sealing disk and having formed therein a striker point in alignment with the firing pin and detonator.

11. An explosive projectile having at its nose a firing mechanism, fall-off guard means normally engaging said firing mechanism to prevent its premature operation, means carried by said guard means for normally maintaining the latter in guard position, but adapted for automatic removal upon the insertion of the projectile into the bore of the gun from which it is fired, vanes projecting from the opposite end of the projectile, and a propelling charge adapted to be arranged within the vane area.

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

RICHARD T. NEWTON.