

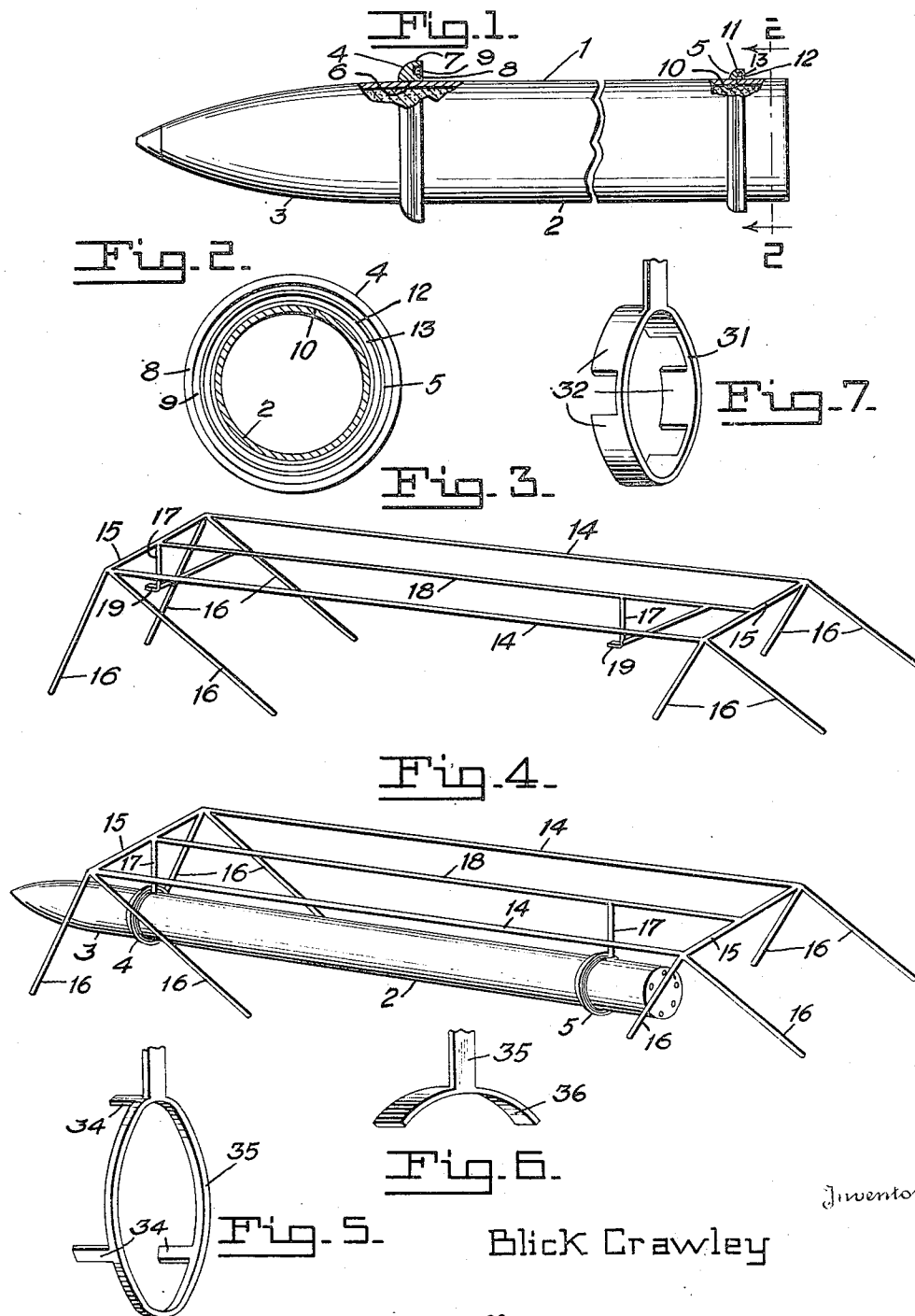
April 24, 1951

B. CRAWLEY
PROJECTILE LAUNCHING

2,549,778

Filed Dec. 14, 1945

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 8.

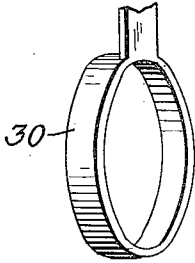


Fig. 9.

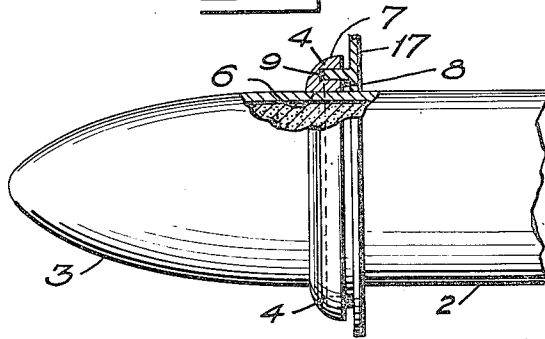


Fig. 10.

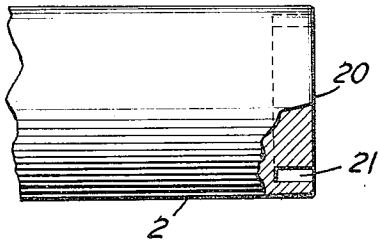


Fig. 11.

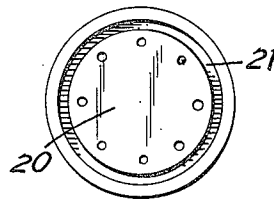


Fig. 12.

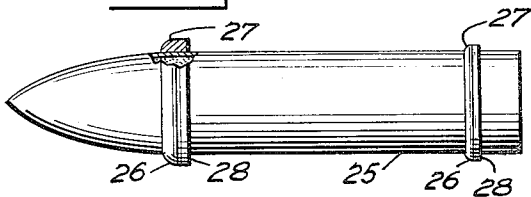


Fig. 13.

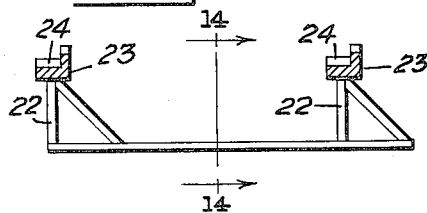


Fig. 15.

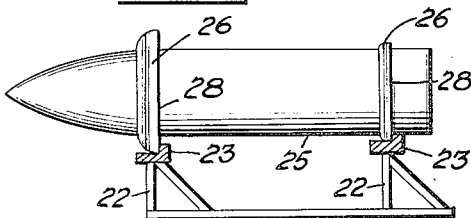


Fig. 16.

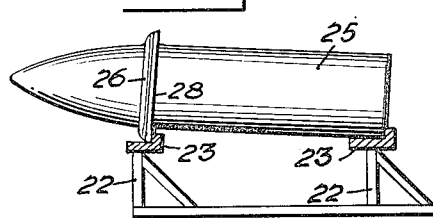


Fig. 14.



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UNITED STATES PATENT OFFICE

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PROJECTILE LAUNCHING

Blick Crawley, Washington, D. C.

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2 Claims. (Cl. 89—1.7)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

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The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

This invention relates to a means for mounting a projectile on a launcher to assure that the projectile is released therefrom instantaneously upon the commencement of its intended flight.

Methods have heretofore been practiced for launching fin-stabilized or non-spinning projectiles with instantaneous release. However, none of these methods are adaptable for launching spin-stabilized or spinning projectiles because the projectile would have an erratic and unpredictable flight due to lack of balance about its longitudinal axis.

The principal object of the present invention is the provision of means on a spin-stabilized type of projectile for mounting the same on a launcher to assure of the projectile being instantaneously and uniformly released therefrom upon starting its intended flight.

Another object of the provision of a novel and relatively simple connecting means on a spin-stabilized type of rocket projectile for readily mounting the same on a launcher so that upon being instantaneously released therefrom a true and accurate flight of the projectile will be assured.

These and other objects and advantages will be apparent as the specification is considered with the accompanying drawings wherein:

Figure 1 is a side elevation partly in section of a rocket provided with the grooved rings;

Figure 2 is a sectional view of the same;

Figure 3 is a perspective view of a launching rack to be used in conjunction with the rocket;

Figure 4 is a perspective view of the rocket positioned on the launching rack ready for firing;

Figures 5, 6, 7 and 8 are modified forms of holding brackets for holding the rocket on the launching rack;

Figure 9 is a side view, partly in section, showing a method of supporting a rocket with a modified form of bracket;

Figure 10 is a similar view of the rear portion of a rocket provided with a groove therein;

Figure 11 is a rear view of a rocket shown in Figure 10;

Figure 12 is a side elevation of a rocket having solid bands provided thereon;

Figure 13 is a longitudinal section of a launching rack to be used in launching a rocket as shown in Figure 12;

Figure 14 is a section taken on lines 14—14 of Figure 13;

Figure 15 is a section similar to Figure 13 showing a rocket thereon ready for launching; and

Figure 16 is a similar view of a rocket ready for launching having but one band.

Referring more particularly to the drawings wherein like reference characters refer to like

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parts throughout the several views, numeral 1 designates a conventional rocket projectile consisting of a tubular body 2 and a curved ogive or head 3. The rocket projectile is preferably of the spin-stabilized type which when launched from a launcher will spin or rotate significantly about its longitudinal axis during flight. While the means for effecting such a spinning action does not constitute a part of this invention, it will be understood that this may be accomplished by arranging a series of spaced angularly disposed openings, not shown, in the base plate closing the rear end of the projectile. Thus, when the projectile is fired by any suitable initiating mechanism, not shown, the gases resulting from the burning of the projectile in the body of the projectile will be ejected through the angularly disposed openings and will impart a spinning action to the projectile, in an obvious manner.

In order to enable the rocket projectile to be mounted on a launching mechanism, coupling or connecting means are arranged on the body of the projectile. In the preferred form of my invention, two annular rings 4 and 5 of some suitable material such as metal or plastic are fitted on the projectile in spaced relationship adjacent the ogive 3 and rear end of the tubular body.

The forward ring 4, as best shown in Figure 1, is formed with a relatively flat annular inner face 6 substantially equal in diameter to the diameter of the projectile so that when the ring is positioned thereon the flat face 6 will tightly seat and remain on the projectile during its initial flight. The outer face of the ring is curved upwardly and rearwardly, as at 7, terminating in a relatively flat rear vertical wall 8. Formed in the rear wall 8 is a relatively shallow annular groove 9.

The rearward ring 5 is formed with a relatively narrow flat inner face 10 substantially equal in diameter to the diameter of the projectile to assure of the ring being tightly seated and remaining on the projectile during its initial flight. The ring being formed with an upwardly and rearwardly curved outer face 11 and the rear wall 12 thereof is cut away to form a relatively shallow annular groove 13.

The rocket projectile 1 is preferably mounted for launching on any suitable launching frame having latching clips or release devices thereon for interengaging with the grooves 9 and 13 in the respective projectile rings 4 and 5. While it is to be understood that the launcher may be of any suitable construction and may be of the stationary type for ground firing or may be mounted on aircraft, for the purpose of illustration I have shown a rectangular frame structure in Figures 3 and 4 consisting of side and end wires 14 and 15 and front and rear legs or standards 16. The legs are preferably adjustable by any suitable means not shown, to permit the launcher being elevated or depressed for aiming purposes in an obvious manner.

A pair of spaced downwardly depending latching clips or release hooks 17 are formed on a longitudinally extending centrally disposed wire 13 secured to the end wires 15. The lower ends of the hooks 17 are bent forwardly to provide relatively short extensions 19 which are adapted to fit within the grooves 9 and 13 of the rocket projectile rings 4 and 5 and serve to support the projectile on the launcher. Thus when the projectile is ignited and fired from the launcher, by an initiating mechanism now shown, the projectile will be moved forwardly, relative to the launcher, and the grooves in the rings will be relatively instantaneously removed out of engagement with the extensions 19 on the latching clips 17 and freed from the launcher. To assure of the projectile clearing and being properly released from the launcher, it is essential that the rear ring 5 on the projectile be of smaller outside diameter than the forward ring 4 so that, upon launching, the rear ring 5 will be free to pass beneath the forward latching clip 17 during the forward travel of the projectile. If the inner face of groove 9 on forward ring 4 is thus placed at a greater distance from the center line of the rocket than the outer face 11 of the rearward ring 5, there will be sufficient clearance between the outer face 11 of the rearward ring 5 and the extension 19 of the latching clip 17 normally engaging groove 9 of the forward ring 4 to permit free forward travel of the rocket when it is launched. In other words, the relative diameters of the rings are such that the forward latching clip will not impede the forward progress of the projectile during launching. As the rings are formed with curved symmetrical outer walls and are only of sufficient size to accommodate the latching clip extension receiving grooves, it will be apparent that the rocket projectile will be uniformly balanced and the rings will not interfere with the ballistic efficiency of the projectile.

It will be understood that the latching clips may be provided with any suitable retaining or locking means, not shown, for retaining the projectile in position and preventing the latter from slipping or otherwise being dislodged from the launcher.

An embodiment of the preferred form of projectile coupling or connecting means is illustrated in Figure 10 wherein an annular groove 21 is formed in the end wall 20 of the projectile 1. The groove 21 is of sufficient depth and size to accommodate the extension 19 of the rearward latching clip 17 of the launcher. In this embodiment, it will be understood that the groove 21 is substituted for the rearward annular projectile ring 5 and that the annular grooved ring 4 will still be mounted on the projectile. The rearward clip 17 is somewhat greater in length than the forward clip so that when the forward clip 17 fits within the groove 9 in the ring 4, the groove 21 will receive the extension on the rearward clip so that the projectile will be supported in an obvious manner on the launcher.

While I have illustrated and described a launcher frame having downwardly depending latching clips, it should be understood that the rocket projectile may be supported on a launcher, such as that illustrated in Figures 13 and 14, having two spaced upstanding brackets 22. Suitably mounted on the upper ends of the brackets are substantially L-shaped latching clips 23 having arcuately-shaped forwardly extending lips 24 formed thereon as best shown in Figure 14. The lips 24 are of sufficient length to accommodate

the lower portions of a pair of spaced annular rings 26 mounted on a rocket projectile 25, which rings 26 are formed with curved symmetrical outer walls 27 and flat rear walls 28. Thus, the rocket projectile is supported on the launcher in an obvious manner. In this embodiment, it may also be desirable to omit the rearward ring 26 from the projectile and so arrange the rear launcher bracket 22 that the latching clip 24 thereon will engage with and support the rear end of the projectile, as illustrated in Figure 16.

It is to be understood that while I have shown a preferred form and two modifications of my connecting means on a spin-stabilized type of rocket projectile and launching apparatus for supporting the same to assure of the projectile being instantaneously released from the launcher, various other changes and modifications may be made without departing from the scope and spirit of the appended claims. Thus, for example, the latching clips may constitute a continuous metal ring 30, as shown in Figure 8, which will interfit with the grooves 9 and 13 in the front and rear rings 4 and 5, or in lieu of this structure, a latching ring 31 illustrated in Figure 7 may be formed with a series of three spaced annular lips or segments 32 adapted to fit with the grooves of the projectile rings. If desired, the structure of Figure 7 may be further modified to the form shown in Figure 5, wherein a latching ring 35 is provided with a series of three uniformly spaced clips 34 which engage with the grooves of the rings. A still further modification is illustrated in Figure 6 wherein the latching member 35 comprises a convex tongue or lip 36 adaptable for fitting within the respective projectile ring grooves.

What I claim is:

1. In combination with a rocket launching apparatus including a frame, a cylindrical pointed rocket projectile, an annular ring encircling said projectile, a rearwardly directed recess in said ring, and a forwardly directed latching clip formed on said frame, said clip having an extension thereon for interengaging with the recess in said ring for supporting the projectile on said launching apparatus without hindrance to forward motion of said projectile upon firing of said rocket.

2. In combination with a rocket launching apparatus including a frame, a cylindrical pointed projectile, spaced rings encircling said projectile rearwardly directed, annular grooves formed in said rings, and spaced latching clips formed on said frame, said clips having bent extensions thereon interfitting with the annular grooves in said rings for supporting the projectile on said launching apparatus without hindrance to forward movement of said projectile on firing of said rocket.

BLICK CRAWLEY.

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