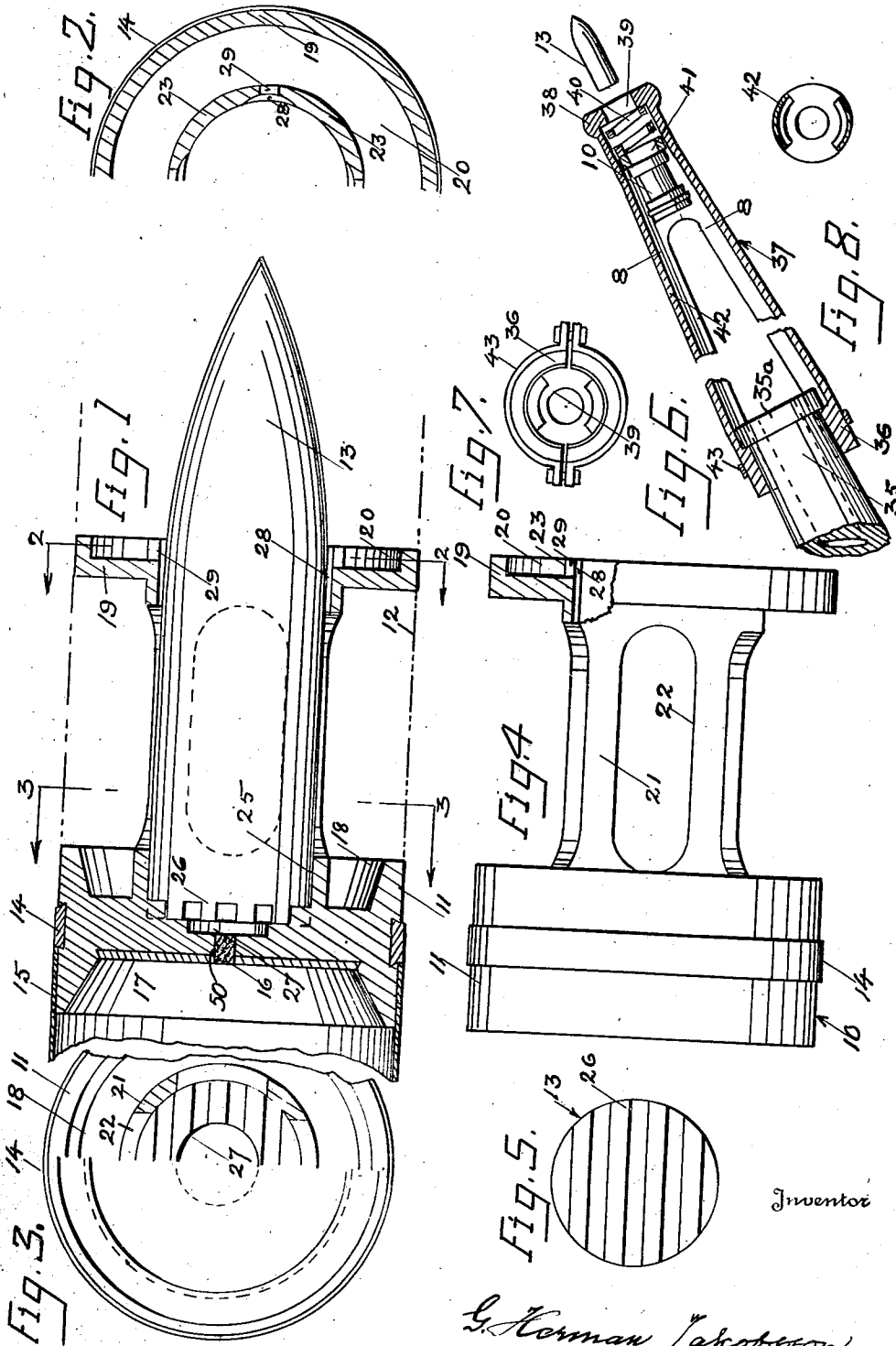


Aug. 14, 1945.

G. H. JAKOBSSON
PROJECTILE ADAPTER

2,382,152

Filed June 3, 1941



Inventor

G. Herman Jakobsson

UNITED STATES PATENT OFFICE

2,382,152

PROJECTILE ADAPTER

Gustav Herman Jakobsson, Takoma Park, Md.,
assignor of one-third to Eugene H. Purdy,
Washington, D. C.

Application June 3, 1941, Serial No. 396,467

4 Claims. (Cl. 102-93)

The present invention relates to a device for making it possible to fire a projectile from a gun of larger caliber in order to considerably increase its range and without any change of the larger gun. In this manner and by giving the same muzzle energy to the small projectile as is ordinarily used for the projectile of the larger gun, the range of the former will be increased several times without any extra cost.

In order to carry out this invention an adapter in the shape of a cradle is used and which has an outside diameter that fits the bore of the larger gun and a recess or pocket suitable to house the small projectile, say a 1.5 pounder or 0.7 kg., 37 mm., in for instance a 75 mm. anti-aircraft gun and by using the regular charge of the latter, the muzzle energy of the 37 mm. shell and adapter, weighing together about 2.5 pounds 1.12 kg., would be increased to about 300 foot tons, which should at least triple its range. Upon firing the gun this small projectile and cradle will leave the gun bore together, but on account of its larger cross-sectional area at the ratio of about 4 to 1, giving a higher air resistance, the adapter will soon be left behind and the shell alone proceed at an increased rate of velocity. If then set to explode at an altitude of say six miles it would illuminate any objects in its neighbourhood, thus disclosing to the gunners on the ground the whereabouts of enemy planes to be fired at. As no searchlight then needs to be used, the position of the anti-aircraft gun would not be disclosed to the enemy, a considerable advantage.

This arrangement would be best suited for guns on board ship, as the adapters when free would fall beyond the railing of the ship and drop into the water. But in order to collect the fired adapters and more particularly to protect the gun crew when firing on land, a barrel extension is attached to the gun muzzle so as to separate the adapter from the projectile and permit it to fall down in a basket or at a predetermined place on the ground, thus to be reloaded and used again. The force of impact of the adapter against the forward end of the extension is preferably eased by supplying a buffer or brake attachment for the barrel extension.

In the accompanying drawing, one embodiment of the invention is illustrated and

Fig. 1 is an axial section of the cradle with the shell in position and a cartridge case attached to the rear end of the cradle ready for loading in a gun of larger caliber than said shell;

Fig. 2 is a half cross section on line 2-2 of Fig. 1;

Fig. 3 is a half rear-end view and half cross section on line 3-3 of Fig. 1;

Fig. 4 a top plan view of the cradle, partly in section;

Fig. 5 a rear end view of the shell;

Fig. 6 an axial section of a muzzle attachment for catching the cradle upon leaving the bore of the gun after firing;

Fig. 7 a rear end view of Fig. 6 and

Fig. 8 is a cross section on line 8-8 of Fig. 6 looking towards the front.

On the drawing the adapter or cradle is denoted in general by numeral 10. It consists of a base or rear disk 11 of a diameter suitable to fit the bore 12 shown in dot and dash lines in Fig. 1 of a gun, for instance a 75 mm. anti-aircraft gun from which a smaller projectile in this example a 37 mm. is intended to be fired. Naturally other sizes of guns and shells may be selected as for example a 150 mm. gun for a 75 mm. shell and so forth.

Around the adapter base 11 is crimped or dovetailed in the usual manner a rifling band 14 similar to that used on 75 mm. ammunition in the example under discussion, for the purpose of engaging the rifling and giving the rotation, first to the adapter and then communicated to the projectile carried therein, and numbered 13 on the drawing. The disk 11 forms a solid base against which the powder charge enclosed in the cartridge case 15 is exploded, the latter gripping the rear end of the base 11 tightly.

The adapter is made of light material in order to keep the combined weight of projectile and adapter as low as possible, in this instance 2.5 pounds for a 1.5 pound, 37 mm. shell with a one pound adapter. Duralumin or any similar alloy would be suitable, but fireproof or non-fireproof plastic material may also be used. In the latter case a metal plate 16 may be provided in the bottom of the recess or annular space 17 formed in the end of the disk 11. This space as well as the space 18 on the forward side of the disk 11 is provided for the sake of lightness. The front portion of the adapter consists of a similar disk 19 which is saucer shaped having an annular depression 20 on its forward side partly for lightness and also in order to collect the meeting air in flight. A tubular middle portion 21 connects the front disk 19 with the rear disk 11 to form a unitary construction of the adapter. The tubular portion 21 may be perforated as at 22 to make it lighter. It continues to the forward side of

the disk 19 to form a rim 23 around the shell. The inside diameter of this tubular portion and rim is slightly more than that of the shell so as to permit the shell to slip out easily from the cradle after firing. A seat or recess 25 for the shell is provided in the disk 11 having the same diameter as that of the tubular portion 21.

Suitable means for keying the shell 13 to the adapter 10 is provided and may consist of inter-engaging lands and grooves at the end of the shell and in the bottom of the seat 25 as shown at 26, or along the side face near the edge of the shell. In the bottom of the seat 25 is shown a depression forming a chamber 27 intended to hold a small powder charge which is timed to explode when the adapter leaves the bore of the gun in order to assure the separation of the adapter from the shell, so as to send the latter forward alone, which dropping the adapter behind more quickly than by the air pressure alone. This may be accomplished in any suitable manner, as for instance by a slow burning pellet in the passage 50, which connects the disk recess 17 and the chamber 27 containing said small powder charge, see Fig. 1. Upon firing the gun, the regular powder charge, contained in the cartridge case 15, will thus ignite the pellet in the passage 50.

The forward rim 23 is provided with a number of longitudinal passages or slots 28 with radial vents 29 for permitting compressed air, collecting in the saucer shaped depression 20 in the front disk 19, to flow in a stream against the side of the shell and thus further aid the shell to slip easily out of the adapter.

In Figs. 6, 7 and 8 is shown a device for positively arresting the flight of the adapters directly after leaving the muzzle of the gun, so that they may be collected for use again. This would make a further saving in the use of this invention.

In Fig. 6, the muzzle end of the gun is denoted by numeral 35 and shown at an elevation of 30°, but generally a much higher elevation would be used. Back of the bourrelet 35a of the muzzle is secured the rear end of the barrel extension 37, which extension has the general shape of a hollow, truncated cone, terminating in front with a head 38 which is reinforced to be able to withstand the impacts of the adapters 10 during firing. The head 38 has a central aperture 39, of slightly larger diameter than the shell 13 which has to pass thru unobstructed. Within the hollow portion of the head 38 is lodged a resilient member 40, consisting for instance of a coiled spring with a washer 41 behind it for contacting with the advancing adapter 10 to stop it in its course and throw it out thru the opening formed between the arms 42, two or more in number and which constitute the middle portion of the barrel extension 37. The rear end thereof is made in as many ring-sections as there are arms 42 and form the ends of the latter. This permits of their spreading to pass over the bourrelet of the gun muzzle in order to be secured on the gun by means of a clamping band 43 or by any other suitable means.

Instead of making the barrel extension in one piece it may be made telescopic and to draw the head back towards the gun muzzle by means of a spring or the like. The head would then yield upon impact of the adapter against it to lessen the blow.

Upon firing the adapter carrying the shell, the latter will be given a rotation, corresponding to the twist of the rifling as communicated from the rifling band 14 by the adapter 10 thru the

keying device at 26 to the shell 13, which latter will be sent forward spinning and with considerably increased velocity and passing thru the aperture 39, while the adapter will, on the other hand be stopped in its flight and thrown to the ground or collected in a receptacle for further use.

It will be evident that the invention is not limited to the details of construction here shown and described, but that these may be varied widely without departing from the spirit of the invention as defined by the claims.

Another and equally important advantage of this invention resides in the use of the adapter for firing ammunition of odd calibers from larger guns in which it does not fit. When for instance an army succeeds in driving enemy troops from a fortification or other position on land or if warship captures an enemy vessel with stored ammunition the projectiles from the latter can be immediately fired against the enemy from guns of larger caliber on hand, simply by inserting the shells in adapters already prepared. All that is needed is to key the shell in the adapter to obtain the same rotation as given the adapter by the rifling. No relining or other costly change whatsoever is necessary in the gun to be used, which affords an enormous saving in time and cost. This invention may therefore at times be the cause of winning a battle, if shortage of ammunition were experienced, when now enemy shells can be immediately used.

I claim:

1. In an adapter for firing a projectile from a gun of larger caliber and with a correspondingly increased charge, comprising a cradle having a diameter fitting the bore of said gun and an axial seat adapted to house said projectile, a rifling band around the cradle suitable for said gun bore and means for positively keying the projectile in the cradle circumferentially while permitting easy axial separation, whereby the twist of the rifling will be communicated to said projectile to produce the desired rotation during flight, a front disk and a rear disk at a suitable distance apart and a tubular connecting portion between said disks, each of the disks having an annular, forward facing depression forming an air pocket with vents from said depression towards the face of the projectile for the purpose of facilitating the separation of cradle and projectile.

2. In an adapter for firing a projectile from a gun of larger caliber and with a correspondingly increased charge, comprising a cradle having a diameter fitting the bore of said gun and an axial seat adapted to house said projectile, a rifling band around the cradle suitable for said gun bore and means for positively keying the projectile in the cradle circumferentially while permitting easy axial separation, whereby the twist of the rifling will be communicated to said projectile to produce the desired rotation during flight, a front disk and a rear disk at a suitable distance apart and a tubular connecting portion between said disks, each of the disks having an annular, forward facing depression forming an air pocket with vents from the depression towards the face of the projectile, a central chamber formed in the seat of the rear disk adapted to carry a powder charge for the purpose of facilitating the separation of cradle and projectile.

3. In an adapter for firing a projectile from a gun of larger caliber and with a correspondingly increased charge, comprising a cradle having a diameter fitting the bore of said gun and an axial seat adapted to house said projectile, a rifling band

around the cradle suitable for said gun bore and means for positively keying the projectile in the cradle circumferentially while permitting easy axial separation, whereby the twist of the rifling will be communicated to said projectile to produce the desired rotation during flight, in which said cradle comprises a front disk and a rear disk at a suitable distance apart and a tubular connecting portion between them, said keying means being axially slidable and comprises ribs in the cradle-seat adapted for engaging corresponding groove formed in the projectile; said disks having a greater transverse area than that of the inserted projectile providing a considerably greater air resistance during flight, thus aiding in separating said projectile from the cradle.

4. In an adapter for firing a projectile from a gun of larger caliber and with a correspondingly increased charge, comprising a cradle having a

diameter fitting the bore of said gun and an axial seat adapted to house said projectile, a rifling band around the cradle suitable for said gun bore and means for positively keying the projectile in the cradle circumferentially while permitting easy axial separation, whereby the twist of the rifling will be communicated to said projectile to produce the desired rotation during flight, in which said cradle comprises a front disk and a rear disk at a suitable distance apart and a tubular connecting portion between said disks, said keying being adapted for circumferential locking but permitting axial sliding between the projectile and the cradle, said disks having a greater transverse area than that of the inserted projectile whereby the inequality against air resistance will aid in separating the adapter from the projectile during flight.

GUSTAV HERMAN JAKOBSSON.