Sept. 27, 1938. M. D. KEYSER 2,131,048

MUZZLE LOADING MINIATURE MORTAR

Filed April 16, 1937 3 Sheets-Sheet 1

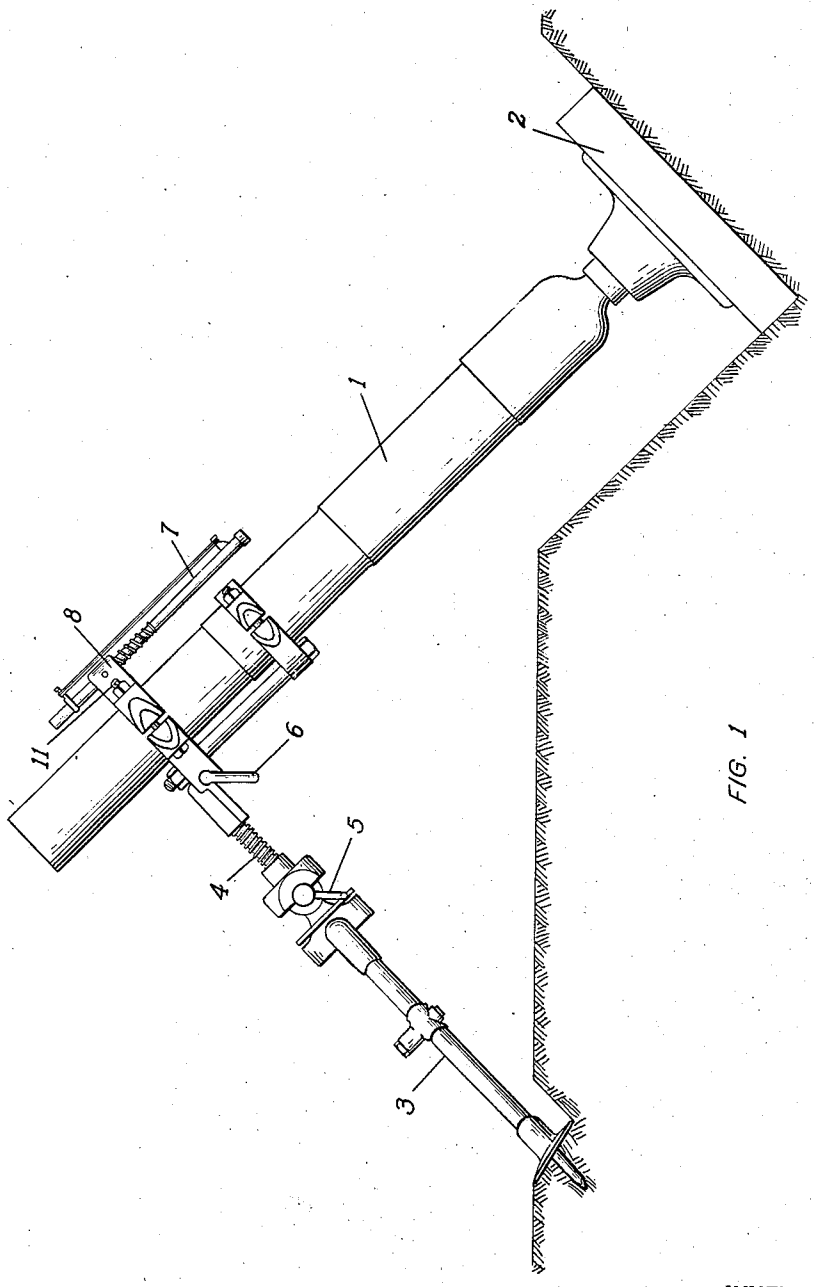


FIG. 1

INVENTOR.
MERRIELL DALE KEYSER
BY Millard F. Peaks, Jr.
ATTORNEY

Sept. 27, 1938. M. D. KEYSER 2,131,048

MUZZLE LOADING MINIATURE MORTAR

Filed April 16, 1937 3 Sheets-Sheet 2

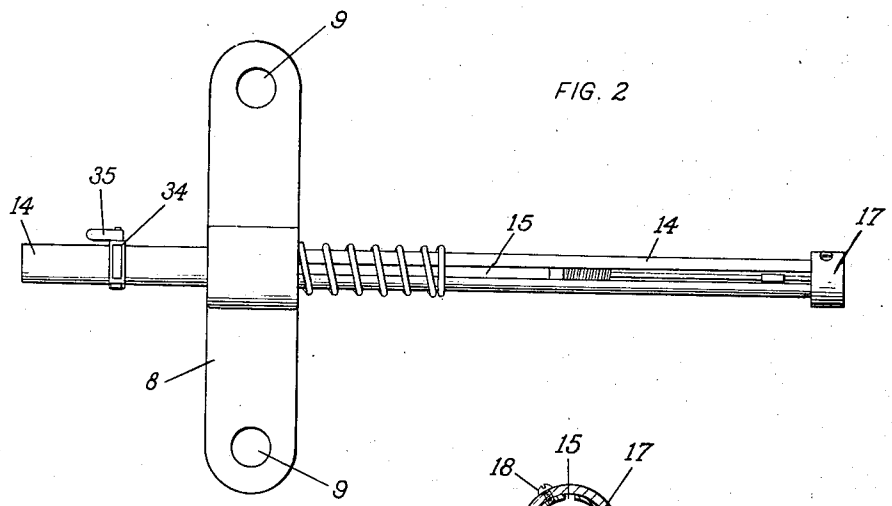


FIG. 2

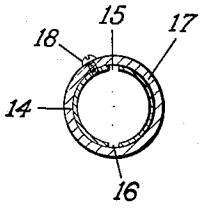


FIG. 4

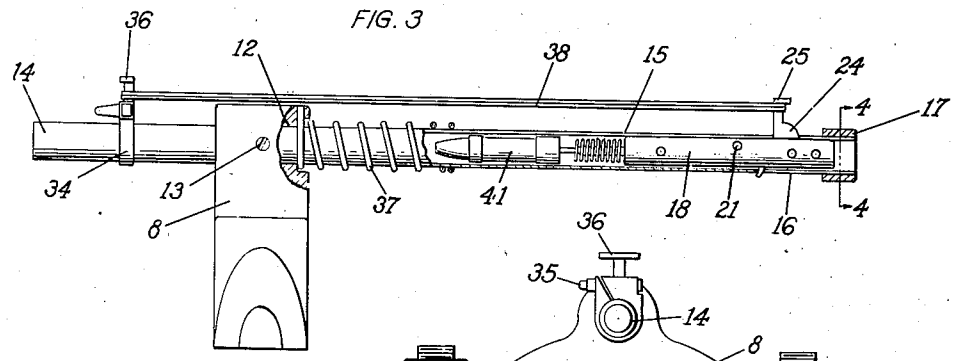


FIG. 3

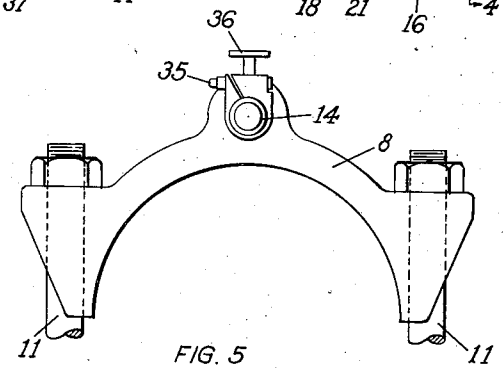


FIG. 5

INVENTOR.
MERRIELL DALE KEYSER

BY Millard F. Peake, Jr.

ATTORNEY.

Sept. 27, 1938. M. D. KEYSER 2,131,048

MUZZLE LOADING MINIATURE MORTAR

Filed April 16, 1937 3 Sheets-Sheet 3

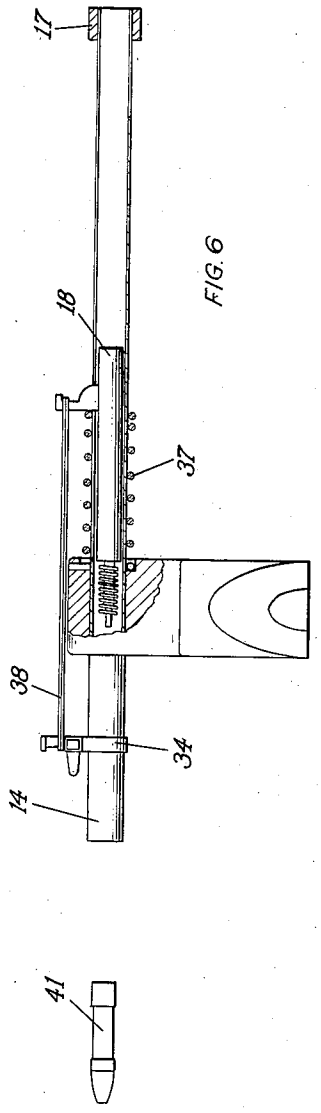


FIG. 6

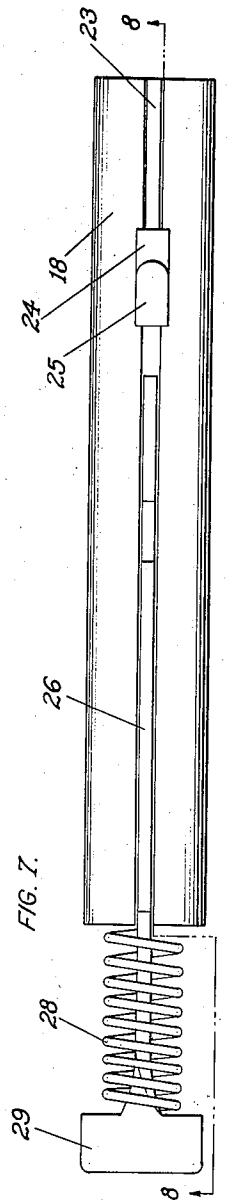


FIG. 7.

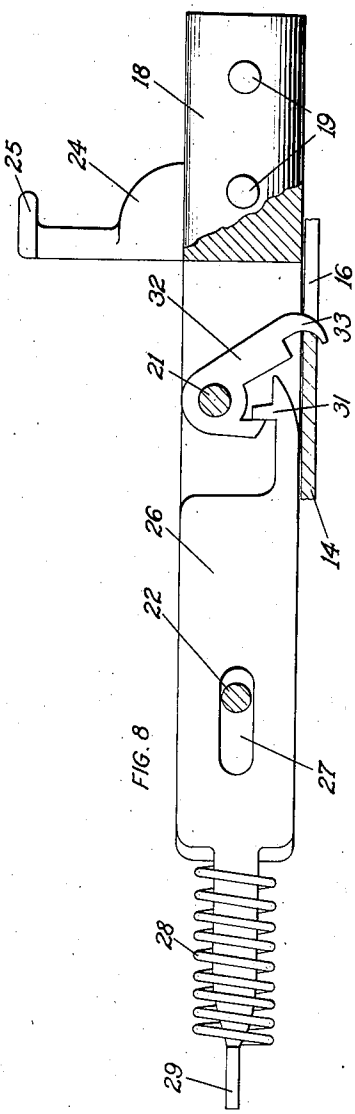


FIG. 8

INVENTOR.
MERRIELL DALE KEYSER

BY Millard J. Peake, Jr

ATTORNEY.

Patented Sept. 27, 1938 2,131,048

UNITED STATES PATENT OFFICE

2,131,048

MUZZLE LOADING MINIATURE MORTAR

Merriel Dale Keyser, Edgewood Arsenal, Md.

Application April 16, 1937, Serial No. 137,277

6 Claims. (Cl. 124—17)

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

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 practice aiming and firing device, and more particularly to such a device adapted to be used with a chemical mortar.

As is well known, the chemical mortar is a relatively light, mobile weapon for firing a chemical shell of 4.2-inch caliber. These mortars may be quickly set up in the field and are fired by dropping the shell into the elevated muzzle of the weapon, the ignition and propellant charge being fired by impact of the shell on a firing pin in the base of the mortar. The support for the mortar includes means for transverse and vertical adjustment for aiming the weapon.

The range of the shell is varied by the variation in the amount of propellant powder used. These propellant charges are made up in units and the number of such units used with each shell determines its range. In the usual mortar, these propellant charges are in the form of rings which are secured to an extension on the bottom of the shell and ranges up to 2,500 yards may be attained.

Practice firing of these mortars is expensive due to the expenditure of powder and shell and the wear on the mortar barrel.

The principal object of this invention is to provide an accessory for a chemical mortar whereby the aiming and firing thereof may be practiced without actually firing the mortar.

Another object of this invention is to provide a miniature weapon provided with propellant mechanism for a small shell and so arranged that the range of the shell may be varied by variations in the number of propellants used.

Another object of this invention is to provide a miniature weapon which may be readily attached to a standard chemical mortar and so arranged that the traversing and elevating mechanisms of the mortar may be used to aim the miniature weapon, and a varying number of propellants may be used therewith to vary the range.

Another object is to provide a miniature weapon having improved trigger catch and release mechanisms, the weapon constituting a novel and simple device which may be used as a toy.

These and other objects of the invention will be apparent from the following description and claims.

In the drawings,

Fig. 1 is an elevation of a standard chemical mortar with my miniature weapon mounted thereon.

Fig. 2 is a top plan of the weapon detached from the mortar.

Fig. 3 is a side elevation thereof with parts broken away.

Fig. 4 is a section on line 4—4 of Fig. 3.

Fig. 5 is an end elevation.

Fig. 6 is a side elevation with parts broken away showing the weapon just after firing.

Fig. 7 is a top plan of the plunger.

Fig. 8 is a section on line 8—8 of Fig. 7, with a portion of the gun barrel shown.

Referring to Fig. 1, the usual chemical mortar comprises a barrel 1 supported at its lower end in a baseplate 2 which may in some cases rest horizontally on the ground or may be partly embedded as shown. The forward end of the barrel is supported in inclined position by bipod 3 which is clamped to the barrel. Bipod 3 includes an elevating screw 4 operated by handle 5 whereby the elevation of the barrel 1 may be adjusted and also includes a traversing screw (not shown) operated by a handle 6, this screw serving to move the mortar barrel transversely within a fork on the upper end of the bipod.

The miniature weapon 7 is mounted on the mortar barrel parallel thereto. It is conveniently mounted in the upper half of 8 of the two-part clamp which connects the barrel 1 to the bipod. As seen in Figs. 2, 3, and 5, clamp 8 has openings 9 through which bolts 11 pass. The upper portion of clamp 8 has an opening 12 through which the miniature gun projects, being secured in position by set screw 13, Fig. 3.

The miniature gun comprises a barrel 14 formed of thin metal tubing and having an elongated slot 15 in its upper portion which extends from the rear end of the gun to the clamp 8, as seen in Fig. 2. Barrel 14 also has a shorter slot 16 in its bottom, see Figs. 3 and 8. The rear end of barrel 14 is reinforced by a band 17 held on the barrel by a set screw.

Within barrel 14 is a plunger device for propelling a bullet out of the upper end of the barrel. The plunger device comprises a main cylindrical plunger 18 formed of two semi-cylindrical parts secured together by pins 19, 21 and 22. At the rear end (right hand end of Figs. 7 and 8) a spacer 23 is placed between these parts to thus space the two members of the plunger at its forward portion. Spacer 23 has an upwardly extending portion 24 with a rearwardly extending head 25.

Slidably positioned in the forward portion of

plunger 18 is a sear 26 having a slot 27 through which pin 22 passes. The forward end of sear 26 projects beyond plunger 18 and has a coiled spring 28 which bears against plunger 18 and elongated head 29 on the sear, thus holding the sear in advanced position. The inner end of sear 26 has an upstanding lug 31 which interlocks with trigger 32.

Trigger 32 is pivoted on pin 24 and has a slot to receive lug 31 and a downwardly extending curved latch 33. Latch 33 normally projects through slot 16 of barrel 14 to thereby hold the plunger and sear in cocked position.

The forward portion of barrel 14 supports a split collar 34 adjustable lengthwise of the barrel and secured in place by thumb nut 35 of a set screw. Collar 34 has an upstanding lug 36, which together with lug 24 constitutes the means upon which the propellants for the bullet are mounted.

A coil spring 37 surrounds barrel 14 and is secured to clamp bracket 8 as seen in Fig. 3. This spring functions as a shock absorber to prevent lug 24 from hitting the bracket 8.

It has been found that ordinary rubber bands may be used as propellants. These propellant bands 38 are slipped over lugs 25 and 36 as seen in Fig. 3. As previously pointed out, it is desirable to simulate as closely as possible the actual firing of a chemical mortar, and one operation of such firing is placing the required number of rings of propellant powder on the mortar shell. This operation is simulated in this invention by the placing of a variable number of propellant rubber bands in accordance with the range required.

Practice firing with this invention is usually done so that the miniature shells fall into a miniature field placed about 25 feet from the weapon. Such a field should preferably include a miniature terrain such as is usually encountered; for example, roads, bridges, houses, trenches, and so forth. To obtain maximum range of the chemical mortar as now used, eight rings of propellant powder are used. The maximum range of the miniature gun of this invention is obtained by using eight propellant bands, and a less number of bands corresponds proportionately in range to a less number of powder rings. Thus the range of the practice gun varies just as does the range of the mortar.

By trial it is found that with the forward lug 36 spaced a definite distance from the rear lug 25, eight rubber bands of a definite size will give maximum range. It is a simple matter to run a quick test on the rubber bands to be used for stretch, such as suspension of a known weight, thus securing a number of bands of equal and known force.

The operation of the device is as follows. With the miniature weapon mounted on the usual chemical mortar as in Fig. 1, the mortar is set up as usual. The officer in charge then sights on the target and instructs the gun crew to operate the traversing screw and the elevating screw in accordance with his measurements. These variations will be the same as if the mortar itself was to be fired, since the traversing and elevation of the miniature weapon is directly proportional to that of the mortar. Instructions are then given to use a certain number of propellants (in this case rubber bands) and such number is the same as if the mortar was to be fired with propellant powder rings.

The gun crew aim the mortar as instructed, place the correct number of rubber bands on the lugs 25 and 36, and then pull lug 25 to the rear until the trigger 32 catches on the end of slot 16 in the barrel, see Fig. 8. In this position, spring 28 on the sear pulls the trigger forward and the curvature of latch 33 is such that the gun remains cocked. A miniature shell 41 is then dropped into the end of barrel 14, which hits the head 29 of the sear, moving the sear rearward to release trigger 32. The bands 38 snap the plunger forward to propel the shell, the spring 37 cushioning the forward movement of the plunger.

The entire miniature weapon is cheap to manufacture and is readily assembled on a standard mortar. Accuracy of fire comparable to that of the mortar may be obtained. Thus the gun crew and the officer may practice firing, either indoors or out, without using the expensive ammunition.

The split collar 34 is adjustable lengthwise of the barrel in order to easily calibrate the range in accordance with the rubber bands used. For example, it is desirable to have the maximum range of the miniature weapon some definite fraction of the maximum range of the mortar; one convenient range is 25 feet which is approximately one-three hundredth of the maximum range of the chemical mortar. Therefore, the collar 34 is adjusted so that with eight rubber bands of the type to be used, the maximum range will be 25 feet.

It will be understood that other propellants may be used; for example, coil springs may be substituted for rubber bands. However, the rubber bands are preferred since they are cheap, readily obtained, and easily used.

The miniature weapon herein disclosed may be used alone as a toy, since it is simple and relatively harmless. The shells for such a toy may be made of wood or soft rubber so that no injury would result if they hit a child.

The miniature mortar as described may be readily associated with a standard chemical mortar as now used by the U. S. Army, since the clamp 8 is readily substituted for a similar clamp on the standard mortar.

While I have shown and described the preferred embodiment of my invention, I wish it to be understood that I do not confine myself to the precise details of construction herein set forth by way of illustration, as it is apparent that many changes and variations may be made by those skilled in the art without departing from the spirit of the invention or exceeding the scope of the appended claims.

I claim:

1. A miniature weapon comprising a barrel, a plunger therein, a sear on said plunger normally held projected forward of the plunger, a latch on said plunger adapted to engage the barrel and hold the plunger retracted, and resilient means for driving the plunger forward, said sear being movable by impact of a projectile dropped into the barrel to thereby release said latch.

2. A miniature weapon adapted to be fired by dropping a projectile therein, comprising a barrel, a plunger therein, a latch on said plunger adapted to engage the barrel and hold the plunger retracted, means for connecting a number of resilient driving elements with said plunger to propel the same, and means to release said latch by impact of a projectile dropped into the end of the barrel.

3. The invention as defined in claim 2 wherein said resilient driving elements comprise rubber bands.

4. A miniature weapon adapted to be fired by

dropping a projectile therein, comprising a slotted barrel, a plunger therein, a latch on said plunger for holding the same retracted, a member on said plunger projecting through the slot in said barrel, a stationary member, resilient means connectible to said members to propel said plunger, and means to release said latch by impact of a projectile dropped into the barrel.

5. A practice firing weapon for use with a chemical mortar of the type including a barrel supported in inclined position and fired by dropping a mortar shell into the upper end of the barrel and the range of which is varied by associating a varying number of propellant charges with the shell, comprising a miniature barrel, a plunger in said barrel, means for associating a varying number of resilient driving elements with said plunger for driving said plunger forward, each of said resilient elements proportionally varying the range of the practice firing weapon as a propellant charge varies the range of the chemical mortar, latch mechanism for retaining said plunger retracted and released by a miniature projectile dropped into said barrel, and means for mounting said weapon on a chemical mortar barrel.

6. The invention as defined in claim 5, wherein said resilient elements are rubber bands, and said latch mechanism includes a sear mounted on and movable with respect to said plunger.

MERRIEL DALE KEYSER.