Nov. 28, 1944. M. M. JOHNSON, JR 2,363,675

PORTABLE MORTAR

Filed Oct. 20, 1943

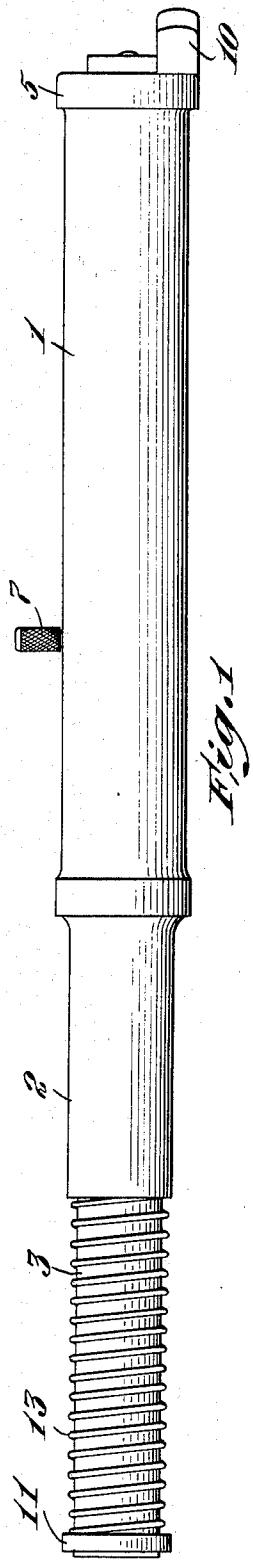


Fig. 1

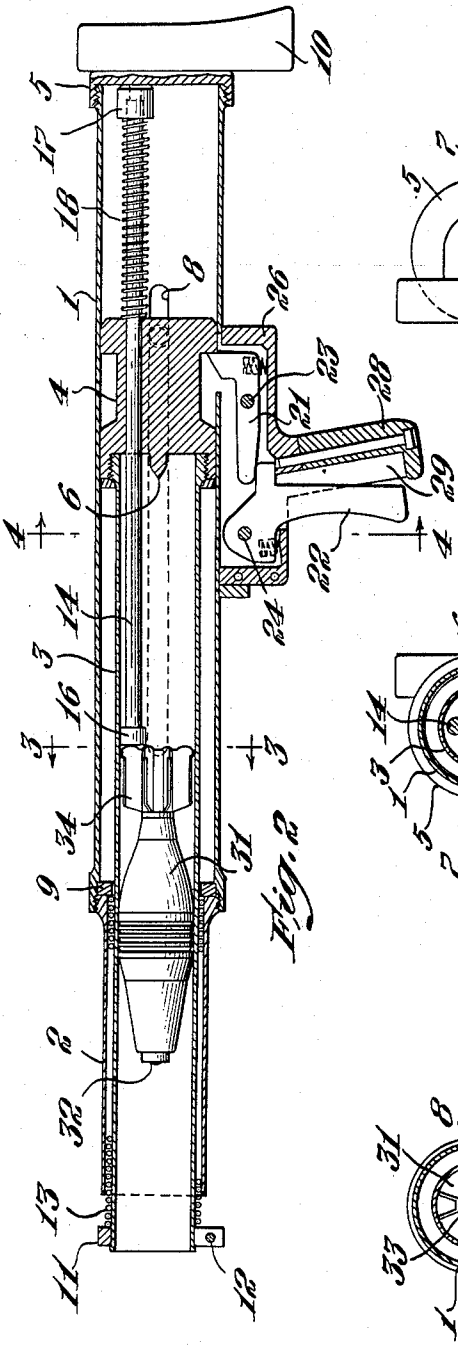


Fig. 2

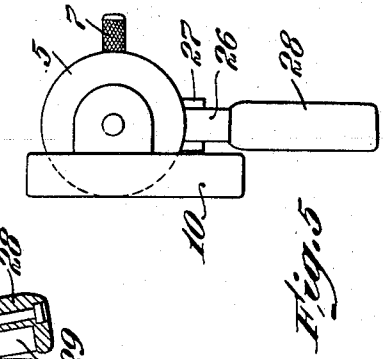


Fig. 5

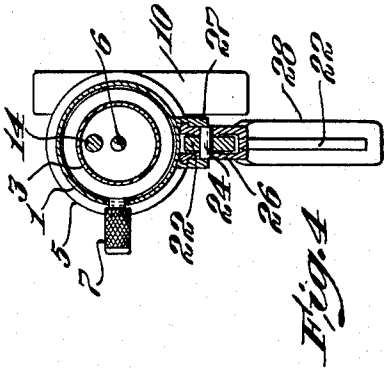


Fig. 4

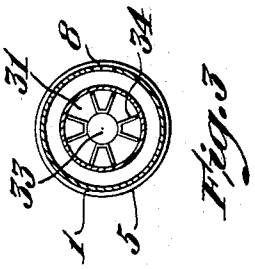


Fig. 3

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PORTABLE MORTAR

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10 Claims. (Cl. 42—1)

In modern warfare an effective defense against tanks and other armored units is a problem, particularly where portability in difficult terrain is involved. For the infantry an offensive weapon capable of destroying pill-boxes, gun emplacements, and nests is also essential. Objects of the present invention are to provide a gun which has sufficient destructive power for the aforesaid purposes, which is sufficiently light to be carried, which has sufficiently low recoil to be fired from the shoulder, which fires standard ammunition, which is simple and economical in construction, which can be assembled and disassembled with facility, which is reliable and durable in use and which is generally superior to portable guns heretofore produced for similar purposes.

The subject-matter of the present invention is like a mortar in that it uses standard mortar ammunition and is loaded by inserting the ammunition into the barrel through the muzzle. According to the present invention the mortar has a tubular casing and a barrel slidable back and forth in the casing throughout a considerable distance, preferably a distance at least approximately as long as the ammunition used, together with a spring interposed between the casing and the barrel yieldingly to urge the barrel toward its advanced position, a sear to hold the barrel in retracted position against the action of the aforesaid spring, a firing pin carried by the rear end of the barrel, and means movable relatively to the barrel for stopping ammunition slightly in the rear of the aforesaid advanced position as it is loaded through the muzzle so that, when the sear is retracted to release the barrel, the ammunition is not fired until the barrel approaches the aforesaid advanced position with sufficiently high momentum largely to counteract the recoil of the gun, whereby it is possible to fire from the shoulder with ammunition more powerful than it has been possible to use heretofore in shoulder guns. For shoulder operation the gun is preferably provided with a shoulder piece and at least one hand grip under the aforesaid casing, and for operation from prone position it may also be provided with a bipod mount.

In the preferred embodiment the outside diameter of the barrel is less than the inside diameter of the casing, the rear end of the barrel being closed by a head which has a sliding fit in the casing and the casing having at its forward end a bearing in which the barrel has a sliding fit. The aforesaid spring is preferably a coil spring interposed between the casing and barrel around the forward end of the barrel, the forward end of the spring abutting a ring detachably mounted on the forward end of the barrel and the rear end of the spring abutting the aforesaid bearing. The preferred means for stopping the ammunition in forward position as it is loaded in the barrel comprises a rod sliding through the rear end of the barrel with its rear end engaging a stop on the casing and its forward end projecting into the barrel in the path of the ammunition. The rod may have a shoulder on its forward end engageable with the barrel as the barrel approaches its advanced position so that the rod travels with the barrel throughout the forward end of the barrel stroke, in which case a spring is preferably interposed between the rod and the barrel yieldingly to urge the rod rearwardly against the aforesaid stop.

For the purpose of illustration a typical embodiment of the invention is shown in the accompanying drawing in which

Fig. 1 is a top plan view showing the barrel partially extended as at the moment of firing;

Fig. 2 is a vertical longitudinal section showing the barrel latched in retracted position ready to fire;

Fig. 3 is a section on line 3—3 of Fig. 2;

Fig. 4 is a section on line 4—4 of Fig. 2; and

Fig. 5 is a rear elevation.

The particular embodiment of the invention chosen for the purpose of illustration comprises a casing formed in two cylindrical parts, a main rear portion 1 and an extension 2 threaded into the forward end of the body portion. Threaded over the rear end of the casing is a cap 5 and secured to the cap is a shoulder piece 10. The barrel comprises a cylindrical tube 3 having a diameter less than that of the casing and a head 4 threaded over the rear end of the tube, the head having a sliding fit in the casing 1. The head 4 carries an integral firing pin 6 and a detachable actuator 7 which projects outwardly through a slot 8 in the casing. Mounted in the forward end of the casing 1 is a bearing ring 9 in which the barrel 3 has a sliding fit. Detachably mounted on the forward end of the barrel 3 is a split ring 11 which is clamped on the barrel by means of a screw 12. Interposed between this ring and the bearing ring 9 is a coil spring 13 which yieldingly urges the barrel toward its advanced position. The aforesaid stop comprises a rod 14 slidable back and forth in the head 4 and having heads 16 and 17 on its forward and rearward ends, a coil spring 18 surrounding the rod between the heads 4 and 17

yieldingly to urge the rod rearwardly against the rear end of the casing 1.

While the gun preferably has semi-automatic firing mechanism so that it is self-cocking even though the trigger is not released before the barrel recoils, for the purpose of simplifying the illustration Fig. 2 merely shows a sear 21 and a trigger 22 pivotally supported at 23 and 24 in a frame 26 which has a dovetail connection with flanges 27 fast to the bottom of casing 1. Fast to the bottom of the subframe 26 is a hand grip 28 having a recess 29 at its forward side to receive the depending portion of the trigger, the trigger being operable by several fingers instead of a single finger. The rear end of the sear extends into a groove in the head 4 to hold the barrel in the cocked position shown in Fig. 2.

While any suitable mortar ammunition may be employed a typical kind is shown at 31 in Figs. 2 and 3, this kind comprising a detonator 32 at the forward end to explode the shell when it hits the target and at the rearward end a cap 33 engageable by the firing pin 6 when the gun is fired. The rear end of the shell is also provided with fins 34, the head of the rod 16 being larger than the openings between the fins so that in loading the gun through the muzzle the shell is always stopped in the position shown in Fig. 2.

In operation the gun is first cocked by retracting the barrel into engagement with the sear as shown in Fig. 2, the barrel being retracted either by pulling on the actuator 7 or by pushing the forward end of the barrel against an abutment or both. After the gun has been cocked the ammunition is inserted through the muzzle to the position shown in Fig. 2. Upon release of the barrel by pressing the trigger the barrel springs forward in response to the spring 13. When the firing pin engages the ammunition the cartridge is fired from the gun as in an ordinary mortar. Thus at the instant of firing the barrel is moving forwardly so that before recoil the forward momentum must be absorbed. In this way the recoil is greatly reduced, the degree of reduction depending upon the weight of the barrel and the strength of the spring 13. As the barrel springs forward the inertia of the shell holds it substantially in the position shown in Fig. 2 until it is fired. At the moment of firing the barrel has advanced to the position shown in Fig. 1. While the barrel continues forwardly a short distance until its momentum is overcome by the force of the explosion, preferably it does not reach the bearing ring 9. However the ring 9 serves as a stop in case of misfire or in case the gun is not loaded. The rod 14 remains stationary until the barrel reaches firing position, after which it advances with the bolt throughout the short distance required to overcome the momentum of the barrel.

With a gun of this kind a high power shell may be thrown a considerable distance in an approximately straight line. Consequently this gun, unlike the ordinary mortar, may be aimed directly at the target, thereby affording much greater precision. For this purpose suitable sights may be provided on the casing.

It should be understood that the present disclosure is for the purpose of illustration only and that this invention includes all modifications and equivalents which fall within the scope of the appended claims.

I claim:

1. A mortar comprising a tubular casing, a barrel slidable back and forth in the casing, between an advanced position and a retracted position, throughout a distance at least approximately as long as the ammunition used therein, a spring interposed between the casing and barrel yieldingly to urge the barrel toward said advanced position, a sear to hold the barrel in said retracted position against the action of said spring, a firing pin carried by the rear end of the barrel, and means movable relatively to the barrel for stopping ammunition slightly in the rear of said advanced position, whereby when said sear is retracted the ammunition is not fired until the barrel approaches said advanced position with high momentum which largely counteracts the recoil.

2. A mortar comprising a tubular casing, a shoulder piece at the rear end of the casing, a hand grip under the casing, a barrel slidable back and forth in the casing, between an advanced position and a retracted position, throughout a distance at least approximately as long as the ammunition used therein, a spring interposed between the casing and barrel yieldingly to urge the barrel toward said advanced position, a sear to hold the barrel in said retracted position against the action of said spring, a firing pin carried by the rear end of the barrel, and means movable relatively to the barrel for stopping ammunition slightly in the rear of said advanced position, whereby when said sear is retracted the ammunition is not fired until the barrel approaches said advanced position with high momentum which largely counteracts the recoil.

3. A mortar comprising a tubular casing, a barrel slidable back and forth in the casing, between an advanced position and a retracted position, throughout a distance at least approximately as long as the ammunition used therein, the outside diameter of the barrel being less than the inside diameter of the casing, the rear end of the barrel being closed by a head which has a sliding fit in the casing, a bearing on the forward end of the casing in which the barrel has a sliding fit, a spring interposed between the casing and barrel yieldingly to urge the barrel toward said advanced position, a sear to hold the barrel in said retracted position against the action of said spring, a firing pin carried by the rear end of the barrel, and means movable relatively to the barrel for stopping ammunition slightly in the rear of said advanced position, whereby when said sear is retracted the ammunition is not fired until the barrel approaches said advanced position with high momentum which largely counteracts the recoil.

4. A mortar comprising a tubular casing, a barrel slidable back and forth in the casing, between an advanced position and a retracted position, throughout a distance at least approximately as long as the ammunition used therein, a coil spring interposed between the casing and barrel around the forward end of the barrel yieldingly to urge the barrel toward said advanced position, a sear to hold the barrel in said retracted position against the action of said spring, a firing pin carried by the rear end of the barrel, and means movable relatively to the barrel for stopping ammunition slightly in the rear of said advanced position, whereby when

said sear is retracted the ammunition is not fired until the barrel approaches said advanced position with high momentum which largely counteracts the recoil.

5. A mortar comprising a tubular casing, a barrel slidable back and forth in the casing, between an advanced position and a retracted position, throughout a distance at least approximately as long as the ammunition used therein, a coil spring interposed between the casing and barrel around the forward end of the barrel yieldingly to urge the barrel toward said advanced position, a ring detachably mounted on the forward end of the barrel to abut the forward end of the spring, a sear to hold the barrel in said retracted position against the action of said spring, a firing pin carried by the rear end of the barrel, and means movable relatively to the barrel for stopping ammunition slightly in the rear of said advanced position, whereby when said sear is retracted the ammunition is not fired until the barrel approaches said advanced position with high momentum which largely counteracts the recoil.

6. A mortar comprising a tubular casing, a barrel slidable back and forth in the casing, between an advanced position and a retracted position, throughout a distance at least approximately as long as the ammunition used therein, the outside diameter of the barrel being less than the inside diameter of the casing, the rear end of the barrel being closed by a head which has a sliding fit in the casing, a bearing on the forward end of the casing in which the barrel has a sliding fit, a ring detachably mounted on the forward end of the barrel, a coil spring interposed between said bearing and ring yieldingly to urge the barrel toward said advanced position, a sear to hold the barrel in said retracted position against the action of said spring, a firing pin carried by the rear end of the barrel, and means movable relatively to the barrel for stopping ammunition slightly in the rear of said advanced position, whereby when said sear is retracted the ammunition is not fired until the barrel approaches said advanced position with high momentum which largely counteracts the recoil.

7. A mortar comprising a tubular casing, a barrel slidable back and forth in the casing, between an advanced position and a retracted position, throughout a distance at least approximately as long as the ammunition used therein, a coil spring interposed between the casing and barrel in an annular space between the casing and barrel yieldingly to urge the barrel toward said advanced position, a sear to hold the barrel in said retracted position against the action of said spring, a firing pin carried by the rear end of the barrel, and means movable relatively to the barrel for stopping ammunition slightly in the rear of said advanced position, whereby when said sear is retracted the ammunition is not fired until the barrel approaches said advanced position with high momentum which largely counteracts the recoil.

8. A mortar comprising a tubular casing, a barrel slidable back and forth in the casing, between an advanced position and a retracted position, throughout a distance at least approximately as long as the ammunition used therein, a coil spring interposed between the casing and barrel in an annular space between the casing and barrel yieldingly to urge the barrel toward said advanced position, the forward portion of the casing surrounding said spring being detachably mounted on the rear portion of the casing, a sear to hold the barrel in said retracted position against the action of said spring, a firing pin carried by the rear end of the barrel, and means movable relatively to the barrel for stopping ammunition slightly in the rear of said advanced position, whereby when said sear is retracted the ammunition is not fired until the barrel approaches said advanced position with high momentum which largely counteracts the recoil.

9. A mortar comprising a tubular casing, a barrel slidable back and forth in the casing, between an advanced position and a retracted position, throughout a distance at least approximately as long as the ammunition used therein, a spring interposed between the casing and barrel yieldingly to urge the barrel toward said advanced position, a sear to hold the barrel in said retracted position against the action of said spring, a firing pin carried by the rear end of the barrel and a rod sliding through the rear end of the barrel with its rear end engaging a stop on said casing and its forward end projecting into the barrel to stop ammunition slightly in the rear of the closed end of the barrel when in said advanced position, whereby when said sear is retracted the ammunition is not fired until the barrel approaches said advanced position with high momentum which largely counteracts the recoil.

10. A mortar comprising a tubular casing, a barrel slidable back and forth in the casing, between an advanced position and a retracted position, throughout a distance at least approximately as long as the ammunition used therein, a spring interposed between the casing and barrel yieldingly to urge the barrel toward said advanced position, a sear to hold the barrel in said retracted position against the action of said spring, a firing pin carried by the rear end of the barrel, a rod sliding through the rear end of the barrel with its rear end engaging a stop on said casing and its forward end projecting into the barrel to stop ammunition slightly in the rear of the closed end of the barrel when in said advanced position, a shoulder on the forward end of the rod engageable with the barrel as the barrel approaches said advanced position so that the rod travels with the barrel throughout the forward end of the barrel stroke, and a spring interposed between the rod and barrel yieldingly to urge the rod rearwardly against said stop.

MELVIN M. JOHNSON, JR.