Aug. 12, 1947. J. M. J. RIBOUD 2,425,563

MOBILE GUN MOUNT

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Fig. 1.

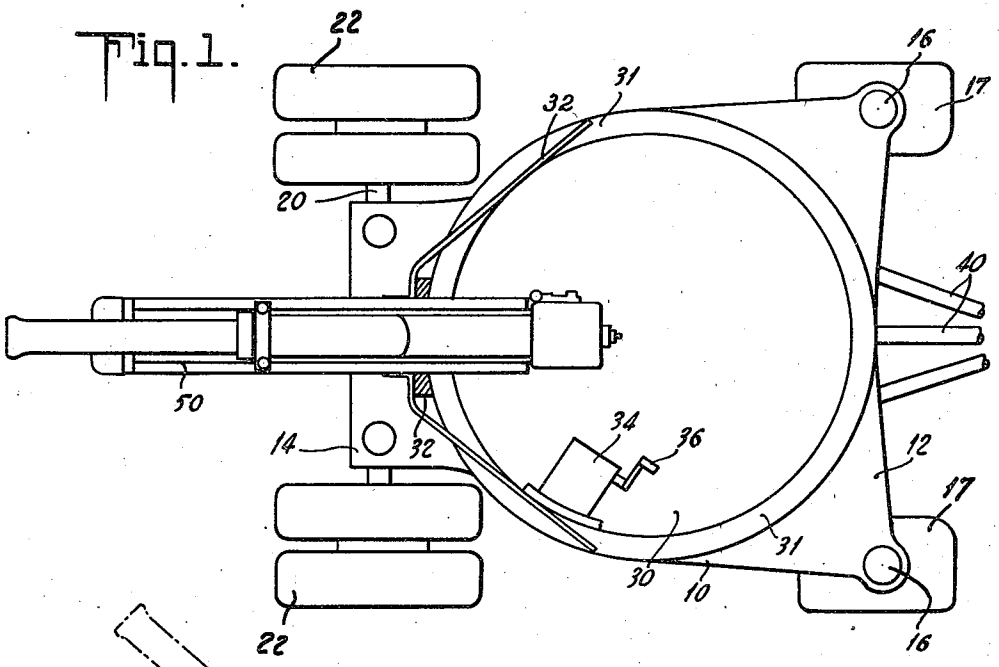

Fig. 2.

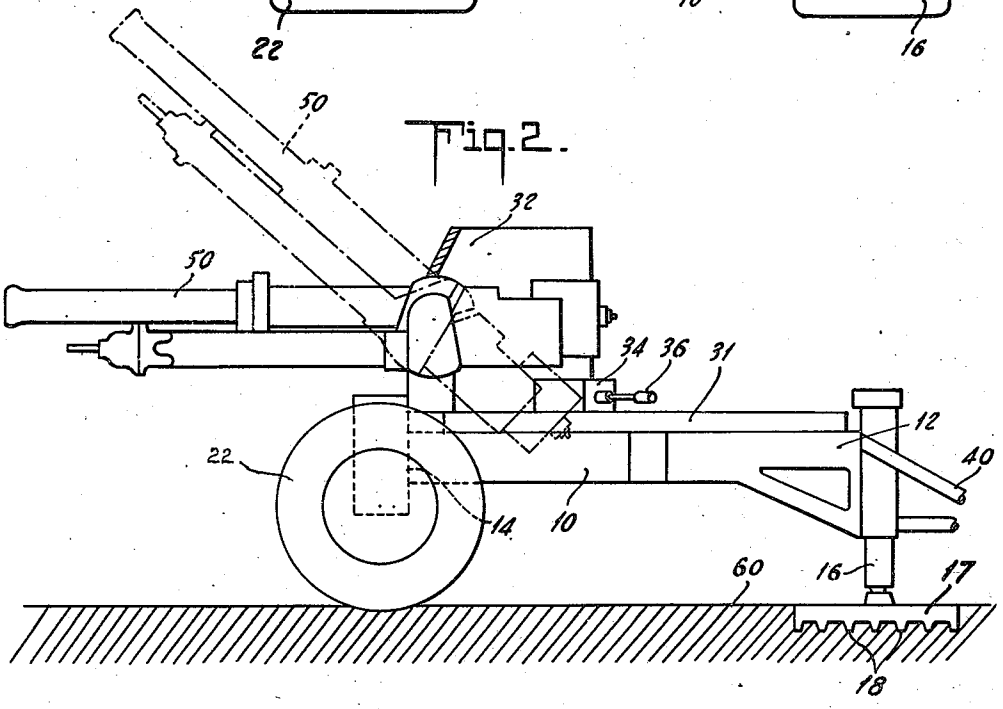

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Fig. 3.

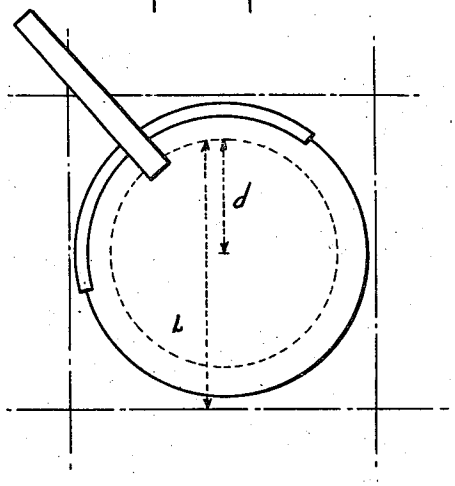
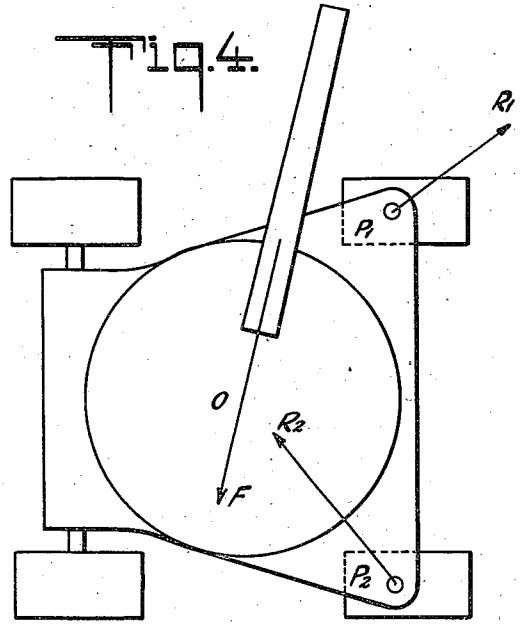


Fig. 4.



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MOBILE GUN MOUNT

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1 Claim. (Cl. 89—40)

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My invention relates to a mobile field gun mount, and in particular relates to a mount for a mobile field gun or the like in which the effects of recoil thrust are minimized. Normally, when a gun is fired, the mount is subjected to a force which, for the sake of convenience, I will refer to as the "recoil thrust." The line of action of this recoil thrust is close to the center line of the gun and is parallel to it. This force has two main effects: (1) it causes the mount to creep or shift laterally of its original position; and (2) it tends to lift the mount. The effects, then, are concentrated along two main lines, the horizontal and vertical. Every gun mount represents, in essence, a compromise between many factors. A fixed mount may be as large and heavy as desired, and the inclusion of means to absorb recoil presents no problem, but in mobile gun mounts, weight reduction is extremely important, and obtaining optimum resistance to recoil thrust consistent with little weight and small size present considerable difficulties. In my invention, also, I am able to provide more protection to the gun operators, and more resistance to recoil per unit of weight than has been heretofore possible.

The main object of my invention is the provision of a mobile field mount for a gun or the like in which the effects of the recoil thrust are effectively absorbed; that is, reduced or minimized.

Another object of my invention is the provision of a mobile mount for a field gun or the like which has a 360-degree traverse, having means to minimize the recoil thrust developed from any part of the traverse from which the gun is fired.

Another object of my invention is the provision of a mobile mount for a field gun or the like, and means to support same in spaced relation to the ground whereby the recoil thrust effects are absorbed from whatever angle of traverse they are developed.

Still another object of my invention is the provision of a mobile box trail mount for a field gun or the like having two wheeled supports, two ground gripping supports, and a gun mounted on the box trail having a full 360-degree traverse.

Still another object of my invention is the provision of a mobile box trail mount for a field gun or the like, having a central opening therewithin, and a gun mounted on the periphery of the opening, the gun being rotatable throughout 360 degrees of horizon, and the center of rotation of the gun being at the symmetrical center of the trail.

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Still another object of my invention is the provision of a mobile box trail mount for a field gun or the like, having a central opening therewithin, and a gun mounted on the trail for rotation throughout 360 degrees of horizon, a pair of wheeled supports for the trail at one end thereof and a pair of ground gripping leg supports for the trail at the opposite end thereof, the center of rotation of the gun being at or about the center of the trail.

Other and further objects of my invention will be pointed out specifically in the following description of an illustrative embodiment of my invention, and still others will be obvious therefrom.

In the drawings annexed hereto and forming a part hereof,

Figure 1 is a top plan view of one form of field gun mount constructed according to and embodying my invention;

Fig. 2 is a side elevational view thereof; and

Figs. 3 and 4 are schematic views of the box trail gun mount of the present invention.

In the drawings, reference numeral 10 indicates the chassis of my mount comprising a four-sided platform, or box trail, slightly wider at the rear 12 than at the front 14 thereof. A pair of flat-bottomed, ground gripping jack-legs 16, 16 are secured to the rear of the platform, at opposite sides thereof. As seen in Fig. 2, plates 17 are pivotally secured to the bottoms of the legs, and have a plurality of elongated spikes 18, 18 on the underside thereof adapted to enter into and grip the ground. The jack legs 16, 16 may be individually actuated, if desired, so that they can be raised or lowered as desired.

The front 14 of my chassis is disposed atop a shaft or axle 20, at the opposite ends of which shaft or axle 20 are mounted wheels 22, 22. Thus, as seen in Fig. 1, my platform or box trail at the front 14 thereof is mounted between a pair of widely spaced wheels, and a four-point ground support for my chassis 10 is provided, the four points being the two jack legs at the rear 12 and two wheels at the front 14 thereof.

The term box trail is used herein to denote the artillery mount of my invention which comprises a body portion one end of which has axle means and ground-engaging wheels thereon, and the other end of the body is provided with jack legs, the body having a circular well for occupancy by the gun operators to facilitate moving the gun about the total periphery of the well.

My box trail chassis 10 has an opening 30 in the center thereof, the opening being as large as pos-

sible consistent with retaining the necessary rigidity of the chassis, the opening defining a space within the margins of the chassis in which the gunners may function to operate the gun mounted thereon. A bearing ring 31 is fixedly secured atop chassis 10 about the margin of the central opening, and a shield portion 32 is mounted on ring 31, in such manner that it may be shifted among and entirely around the ring the full 360-degree traverse. Any conventional means may be provided, such as gear box 34, operating through a crank handle 36, all secured in proximity to shield 32, whereby the shield through which field gun 50 is mounted and on which it is secured, may be swung around on bearing ring 31, to bear as desired since the specific means used are no part of the particular invention here involved. Other means may be employed for rotating shield 32 and gun 50 about the box trail, the desiderata being the rotation of the gun about the box trail.

A bracket assembly 40 is provided, extending out from the rear of the chassis whereby the rear end of the platform may be lifted from the ground and rested on the rear wheels alone when it is desired to move the gun from one site to another.

In Fig. 2, my box trial is shown on ground 60 ready for firing, the gun 50 being readily swung around to any desired position. Means may be provided, of course, whereby the gun may be elevated or depressed to any desired degree.

The advantages of my box trail gun mount over conventional mounts are numerous. In conventional field guns having a single trail extending rearwardly of the mount, the trail has a spade at the end thereof to be embedded into the ground. With this type of mount, the recoil thrust usually tends to lift and shift the carriage about the spade as the pivot. It is plain that in order to reduce the lifting effect, the resisting moment must be greater than the driving moment, or recoil thrust (or the tendency-to-lift component thereof). If we assume P to be the weight of the mount, L the horizontal distance from the spade to the center of gravity of the gun and mount, H the distance from the spade to the center line of the gun, and F the recoil thrust, PL must be greater than HF in order to keep the gun from lifting. When any three of these factors are known, or determinable, the minimum value of the fourth to prevent lifting is readily ascertainable. Another conventional gun has a single trail mounted on a firing platform in order to achieve a 360° traverse of the horizon. Still another conventional gun has four branches or trails radiating from a central pivot about which the field piece has a 360° traverse. In Figure 3, I have shown a schematic view of the box trail gun mount of my invention.

If we consider the recoil thrust (F), the weight of the mount (P), the height (H), and the horizontal distance from the space to the center of gravity of the gun (L) to be equal in the device of my invention, as in Fig. 3, to the same factors in the three conventional guns above referred to, it will be plain that my device requires much smaller space for one thing. If it is desired to sweep the full 360 degrees of horizon with the single trail field piece, the minimum area required would be a circle of area πL^2, as would be true if this same type of field piece were mounted on a pivot. Also, in the four branch or four trail field piece wherein the gun is centered, the pivot must be at a distance at least equal to L from the axis about which it tends to lift. The length of each one of the branches or trails must be of length $L\sqrt{2}$, and the minimum area is $4L^2$.

On the box trail mount of my invention, however, the center of gravity need not be at the center of rotation of the gun 50 and its shield mount 32, but off center at or about bearing ring 31. The gun 50 and the shield 32 on which it is supported are the heaviest moving parts of my mount as a whole, and the center of gravity is off center of rotation for every direction of fire; close to gun 50 proper and at a maximum distance from the axis about which the mount would normally tend to pivot. Thus, if the center of gravity of gun and mount and chassis is at a point which is a distance D from the center of rotation and on the center line of the barrel, the chassis or mount will occupy substantially the area of $4(L-D)^2$. If, for example, L is 7 feet and D is 3 feet, the area taken up by my mount is 64 square feet, and taking the same value of L for the field gun with a single trail mounted on a pivot, and for the four branch or four trail field piece, the area in each will be approximately 154 square feet and 196 square feet, respectively. My mount, therefore, occupies less than half the area of the gun on a firing platform and about a third of the area of the pivotal gun, both of which are comparable in the sense that the same gun has the same 360-degree traverse.

My mount does not require outriggers or lengthy trails; it is smaller and lighter than other supports; it can be emplaced more quickly since a much smaller pit need be dug; and its small dimensions permit easier camouflaging.

It is plain, therefore, that my new and improved mobile gun mount has numerous advantages over the mounts now known, at least so far as the tendency to lift as a result of recoil thrust is concerned. I will now demonstrate that my gun mount also overcomes the tendency to creep in a much more efficient manner than do presently-known mounts.

The wheels on which guns are mounted, unless secured in some manner or other, develop relatively little ground friction, and do not prevent the mount from creeping. That is why, of course, gun mounts are provided with spades secured at the ends of the balancing trails, or with a spiked platform disposed underneath the wheels. On the pivotal gun, having four branches or trails, the recoil thrust, for any direction of fire, falls either wholly on one or between two branches or trails, transmitting the horizontal force to the ground to overcome the tendency to creep. On the gun mounted on a firing platform, the recoil thrust acts on the center of the platform directly beneath the gun and at the center of rotation.

With my mount, the horizontal component of the recoil thrust is transmitted to the ground by the spiked plates 17 hinged to the bottom of the jack legs. These are spaced away from the center of rotation of the gun, and for certain directions of fire, the recoil thrust will pass between the two plates. However, despite the positioning of the ground gripping plates 17 away from the center of rotation, they do transmit to the ground a horizontal force of variable direction, the magnitude of which is less than the thrust of the recoil, and we find that the reactions (as R_1 and R_2, see Fig. 4) developed at the bottom of the jack legs are smaller than the recoil thrust force to prevent creeping no matter from what angle the gun is fired. The ground plates, posi-

tioned as shown hereinabove, function in the same way as a central firing platform, and even more efficiently for certain directions of fire, as in Figs. 1 and 2.

My mount is infinitely less cumbersome than the plurality of trails of the conventional pivotally mounted gun; it is more easily positioned for firing than either the pivotal gun or the gun disposed atop a firing platform; the ground gripping jack legs are in better position to transmit the horizontal force to the ground than is the firing platform. Indeed, when the single trail field piece is fired, the tendency to lift, so to speak, "unloads" the firing platform, the load being carried to the trail. But the trail is not ground dug-in in order to permit traversing of the gun, and this mount, therefore, has a definite tendency to creep. My ground gripping plates, or at least one of them, for almost every direction of firing of the gun, are pushed deeper into the ground by the vertical force developed by the firing.

With my particular four-point support, therefore, it is possible to obtain in an easily mobile mount a full 360-degree traverse of the horizon, consistent with resistance to both the vertical and horizontal components of the recoil thrust; maximum protection for the gunners per unit of weight, all within a much smaller compass than conventional mounts.

With the gun mount of my invention, the gunners placed within the well of the central opening are better protected against enemy fire. The gun may be traversed easily and quickly to be brought to bear against a moving target. The gun may be mounted relatively low, since there is no part of the chassis, for any direction or angle of elevation of fire, in the path of the recoil, features not found in any other conventional fully pivotal gun. When the gun is traversed, the center of gravity is always carried at the maximum distance from the axis about which the carriage tends to lift. The shield supports the gun and also serves to protect the gunner. No other field piece presents, per unit of weight, the same advantages, due in my device, to the above-described construction thereof.

Having now described my invention, what I claim and desire to secure by Letters Patent is:

A mobile artillery mount, a gun thereon, the mount having a body portion one end of which has axle means and ground-engaging wheels thereon for mobile support, the other end of which body has a pair of individually adjustable ground-engaging jack legs, said body portion having a circular well for occupancy in operating the gun, the gun being mounted on the periphery of said well for movement about the total periphery of the well in azimuth.

JACQUES M. J. RIBOUD.

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