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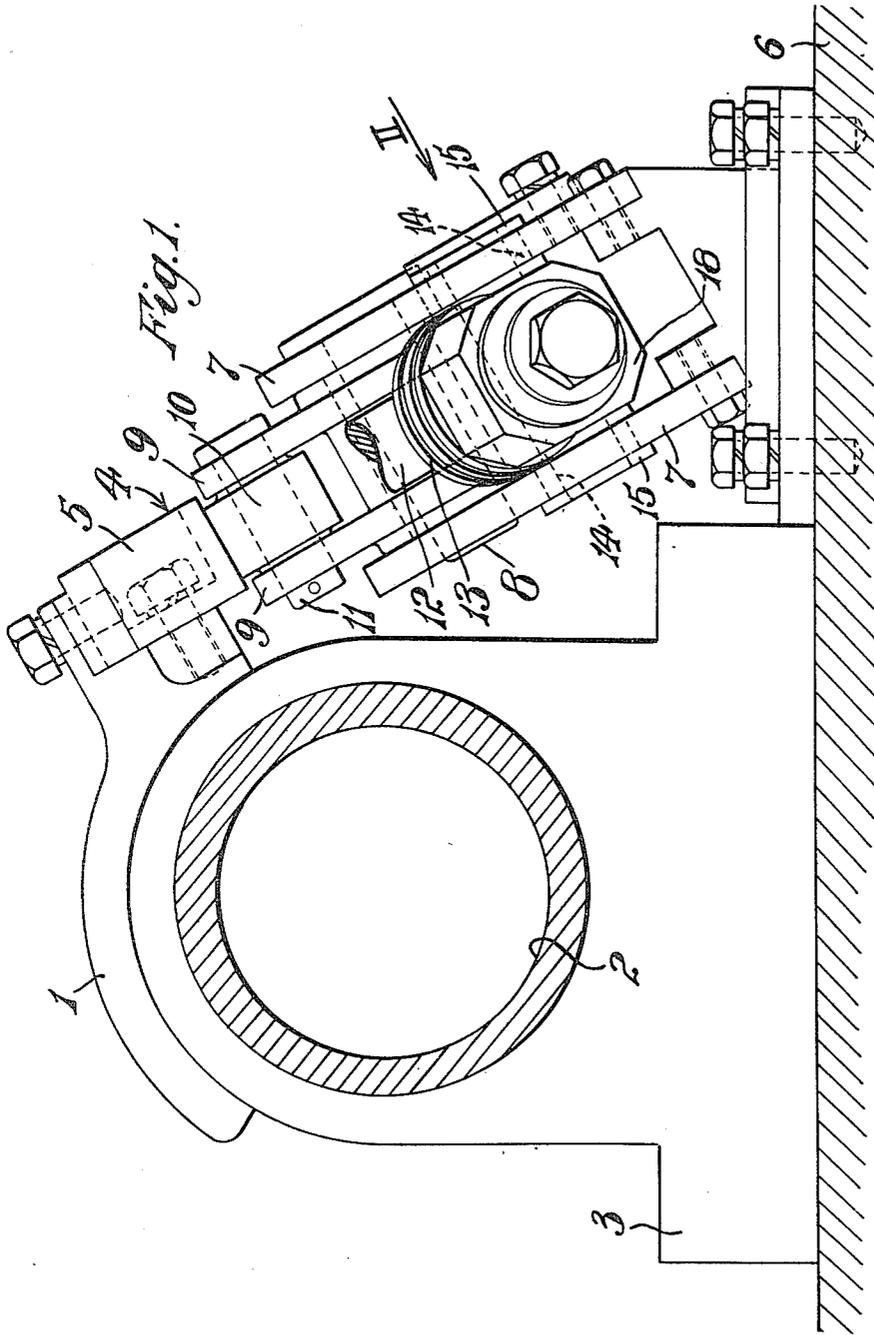
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GUN COUNTER-RECOIL ASSIST MECHANISM

Filed Oct. 10, 1945

2 Sheets-Sheet 1



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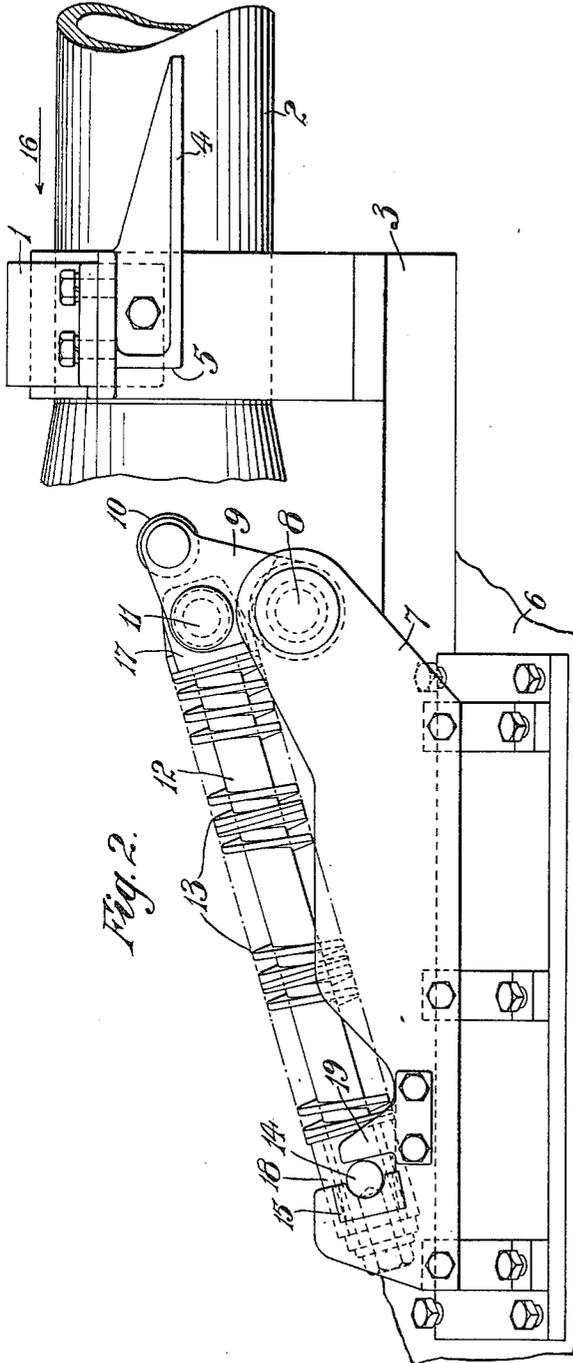


Fig. 2.

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UNITED STATES PATENT OFFICE

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GUN COUNTER-RECOIL ASSIST MECHANISM

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This invention concerns improvements in or relating to ordnance of the recoiling type, the term "ordnance" being hereinafter replaced by the word "guns."

In guns of the recoiling type the barrel and associated parts recoil during firing against the action of a spring or equivalent device and then run out to bring the gun to battery, the force necessary being provided by the compressed spring. When it is desired to increase the rate of firing of the gun and in particular when guns are fitted with automatic loading and firing appliances, it is found that the gun does not run out promptly enough and it is often impossible to increase the speed of runout by strengthening the spring of the recoil devices as there is not room in existing guns for such strengthened springs.

According to the invention there is provided a device for assisting the runout comprising an auxiliary spring adapted to be loaded during the recoil of the gun and a cocking device to retain the spring in the loaded condition during part of the runout (e. g. until the major part of the runout has been completed) and to release the spring at a desired time (e. g. near the end of the runout) to provide an additional force for effecting the runout. The spring may be connected to a pivoted lever adapted to be engaged by an abutment on the recoiling part of the gun and rotated on its pivot to reload the spring, said abutment being so shaped as thereafter to hold the lever in the loaded position, thus constituting a cocking device, the spring being released as the lever moves clear of the abutment near the end of the runout and thereafter operating on the moving parts for the purpose set forth.

One way of carrying the invention into effect will be described with reference to the accompanying drawings, which show a few parts of a six-pounder quick-firing gun of the type provided with a semi-automatic breech.

In the drawings:

Figure 1 is an end elevation showing the device cocked, the view being partly in section and some parts being broken away;

Figure 2 is a side view of Figure 1 in the direction of the arrow 11, the barrel being run out and at rest.

It will be assumed that said gun is provided with automatic loading and firing appliances which necessitate that the gun shall recoil and run out as rapidly as possible.

Referring to the drawings, a bracket 1 is fixed to the recoiling parts of the gun, for example, to

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the barrel 2 or slipper 3 thereof towards the breech end and on this bracket there is fixed an abutment consisting of a flat plate 4 so arranged that its length is parallel to the axis of the gun barrel. The plate may be adjustable lengthwise on the bracket or other means may be provided whereby the position of its rear end face 5 relatively to the breech may be adjusted. On a part of the gun cradle 6 in the vicinity of the said plate, when the gun is at rest, there are fixed plates 7 in which is pivoted, by a pin 8, a lever 9 having a roller 10 or similar device at its free end which is so positioned that the roller can engage the abutment or plate 4 in the manner described hereafter.

About midway of the length of the lever 9 a pivot pin 11 is arranged which passes through a boss 17 of rod 12 which is surrounded by a strong compression spring 13. In the drawing the spring is made up of several separate springs, these being parts of ordnance readily available in war time. The other end of the rod slides in a bush 18 which is supported by cross pins 14 journaled in half-bearings 15 which are supported in the plate 7, and the arrangement is such that when the pivoted lever 9 is rotated in one direction, the spring 13 is compressed and when released the spring will urge the lever in the other direction. Brackets 19 fixed to the plates 7 are provided to house the pins 14 and hold the parts in position when for any reason the pin 11 is removed, e. g. when the auxiliary spring is to be put out of action for any reason.

The operation of the device is as follows: When the gun is at rest, the rear end face 5 of the plate 4 which forms the abutment is in line with the roller 10 on the pivoted lever 9 and when the gun barrel recoils, (moving in the direction of the arrow 16; Figure 2) the end 5 of the plate 4 presses on the roller 10 of the lever 9 and twists the lever around its pivot 8 to such an extent that the roller moves to such a position that it can run on the under surface of the moving plate. During this movement the spring is of course compressed and it is also cocked, as the plate 4 runs along over the roller which prevents the lever from returning. The plate is of sufficient length to ensure that the roller cannot move upwards at any time during the recoil, and runout starts with the roller still held down by the plate so that the spring is still cocked. Towards the end of the runout the plate moves beyond the position occupied by the roller on the pivoted lever and the latter immediately moves up under the pressure of the spring 13, and en-

gages the end face 5 of the plate so that the energy stored in the spring is now available to assist in running out the barrel and other parts.

It will thus be seen that towards the end of the runout when the normal spring of the gun is beginning to lose its energy and the runout speed is approaching its lowest value that a new force is available to assist the runout and increase the speed. It is thus possible by the use of this device to run out the gun at any speed necessary as determined by the rate of firing which in turn depends on the efficiency of the automatic loading and firing appliances.

In the case of the six-pounder gun being described the breech as is usual in such guns is opened towards the end of the runout by the means of a roller on a breech-opening lever which runs up a cam. The resistance offered by the cam is very considerable and slows up run-out a good deal. For automatic working extremely rapid extraction is necessary. The setting of the part 4 relatively to the roller 10 depends on the conditions of any given case. As shown in Figure 2 the auxiliary spring comes into operation some time before the end of the runout so as to overcome said resistance in order that the breech may be opened before the runout is finished and the extraction may take place towards the end of the runout, to enable a new round to be rammed at once. As stated above the part 4 can be adjusted as to its position and to suit any given set of circumstances the length of part 4 can be of any desired dimension. As the speed at which the breech is opened is of paramount importance in automatic working it may be seen that the present invention is of considerable value in this connection as the additional force is available at the moment when the breech is to be opened.

Further, the movement of the pivoted lever may be used wherever desired for doing any other work besides assisting the return to battery.

What I claim as my invention and desire to secure by Letters Patent is:

1. In a gun of the type in which the barrel and associated parts recoil during firing against the action of a resilient device which then causes them to counter-recoil to bring the gun to battery, a device for assisting the counter-recoil comprising an auxiliary spring, means actuated by the recoil of the gun to load said spring during recoil, and a cocking device to retain the spring in the loaded condition during the remainder of the recoil and part of the counter-recoil and to release the spring at a desired time to provide an additional force for effecting the counter-recoil.

2. In a gun of the type in which the barrel and associated parts recoil during firing against the action of a resilient device which then causes them to counter-recoil to bring the gun to battery, a device for assisting the counter-recoil comprising an auxiliary spring, means actuated by the recoil of the gun to load said spring during recoil,

and a locking device to retain the spring in the loaded condition during the remainder of the recoil and until the major part of the counter-recoil has been completed, and to release the spring near the end of the counter-recoil to provide an additional force for effecting the counter-recoil.

3. In a gun of the type in which the barrel and associated parts recoil during firing against the action of a resilient device which then causes them to counter-recoil to bring the gun to battery, a device for assisting the counter-recoil to bring the gun to battery, a device for assisting the counter-recoil comprising an auxiliary spring, a pivoted lever to which said spring is connected, an abutment on the recoiling part of the gun adapted to engage the said lever during recoil to rotate it on its pivot to load the spring, said abutment being so shaped as thereafter to hold the lever in the spring-loading position to retain the spring in the loaded condition during the remainder of the recoil and part of the counter-recoil, the abutment thus constituting a cocking device, the spring being released as the lever moves clear of the abutment during counter-recoil and thereafter operating on the moving parts to provide an additional force for effecting the counter-recoil.

4. In a gun of the type in which the barrel and associated parts recoil during firing against the action of a resilient device which then causes them to counter-recoil to bring the gun to battery, a device for assisting the counter-recoil comprising an auxiliary spring, a pivoted lever to which said spring is connected, an abutment on the recoiling part of the gun adapted to engage the said lever during recoil to rotate it on its pivot to load the spring, said abutment being so shaped as thereafter to hold the lever in the spring-loading position to retain the spring in the loaded condition during the remainder of the recoil and until the major part of the counter-recoil has been completed, the abutment thus constituting a cocking device, the spring being released as the lever moves clear of the abutment near the end of the counter-recoil, and thereafter operating on the moving parts to provide an additional force for effecting the counter-recoil.

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