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FIRING MECHANISM

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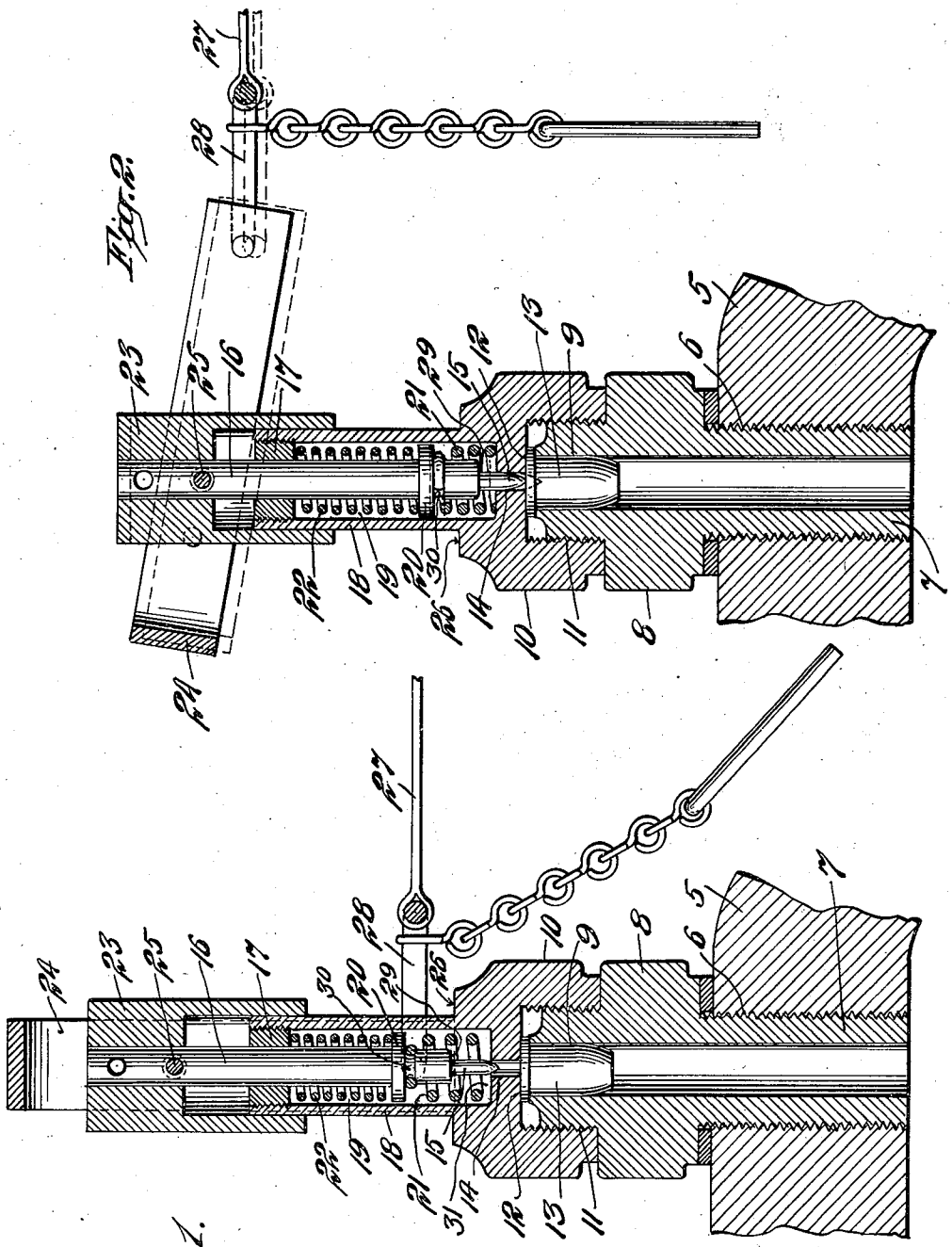


Fig. 2.



Fig. 1.

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## FIRING MECHANISM

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1 Claim. (Cl. 89—27)

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The invention here disclosed relates to firing mechanisms for line throwing guns and the like and is in the nature of an improvement on the invention disclosed in copending patent application Serial No. 538,611, filed June 3, 1944, now Patent No. 2,399,928, which issued May 7, 1946.

In devices of the type disclosed in the copending patent application the firing of signal guns, line throwing guns and the like is accomplished by detonating a blank cartridge into the powder charge of the gun, this cartridge being seated in a chamber which is closed by a screw cap carrying a firing pin.

In previous constructions the arrangement has been such that the spring for impelling the firing pin normally holds the pin in a projecting relation so that when the cap or breech plug member is screwed in place the point of the pin will ride the percussion cap of the cartridge.

Objects of the present invention are to provide a construction in which the firing pin will be held retracted and engage the cap only at the instant of firing.

Related objects are to provide a construction of this character which will not complicate the mechanism to any appreciable extent and which will not interfere in any way with its certainty of operation.

Other desirable objects and the novel features by which the purposes of the invention are attained are set forth or will appear in the course of the following specification.

The drawing accompanying and forming part of the specification illustrates a present practical embodiment of the invention. Structure, however, may be modified and changed as regards such illustration, all within the true intent and broad scope of the invention as hereinafter defined and claimed.

Fig. 1 in the drawing is a broken sectional view of firing mechanism embodying the invention and showing the parts in the cocked relation, ready for firing;

Fig. 2 is a similar view showing in full lines the parts after firing, or what may be considered the uncocked condition and indicating in broken lines the instantaneous firing position of the parts.

In the drawing the breech portion of a line throwing gun is indicated at 5, provided with a screw threaded opening 6 receiving the correspondingly screw threaded shank portion 7 of the tubular plug 8.

This plug or body portion of the device is provided with a cartridge chamber 9 in the outer end of the same.

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The cartridge chamber is closed by a cap or cover 10, screw threaded at 11 over the outer cartridge chamber portion of the plug. This screw cap has a wall 12 engaging over the head of the cartridge 13 and serving to close the cartridge chamber.

The wall 12 has a passage 14 therethrough freely receiving the firing pin 15.

Back of the smaller end portion 15, the firing pin is enlarged into a cylindrical stem or shank 16 slidingly operating through a guide plug 17 screwed in the outer end of the tubular chamber forming extension 18 of the breech cap 10.

Within the cylindrical chamber 19 provided by the extension 18, the stem of the firing pin carries an annular abutment shoulder 20.

Forward of this annular shoulder and confined between said shoulder and the face of the wall 12 closing the inner end of the cylindrical chamber, is a relatively short, stiff and strong coil spring 21.

Back of the annular abutment 20 and confined between that element and the abutment 17 closing the outer end of the cylindrical chamber, is a relatively long, light, flexible coil spring 22.

The shorter spring 21 is heavy and strong enough to hold the firing pin back off the cap and retracted within passage 14, against the forward propelling force of the lighter, longer and more flexible spring 22, substantially as indicated in the full lines in Fig. 2.

The lighter, more flexible spring 22, however, when contracted for firing as in Fig. 1, stores enough energy to overcome the unseating force of the inner, heavier spring, particularly since the latter is expanded at the time and hence is able to overcome the heavier spring and project the firing pin to the firing position indicated in broken lines, Fig. 2.

For so energizing the firing spring and cocking the piece, the firing pin is shown as carrying an external head or hammer portion 23 which can be grasped and pulled out by hand and temporarily secured in such relation by a yoke 24 pivoted thereto at 25 and arranged to engage at its inner ends the annular supporting shoulder 26 at the base of the tubular projection 18.

The mechanism may be fired by tripping the yoke from its supported engagement on shoulder 26, as by means of a lanyard 27 connected with the inner ends of the yoke, as by a pivoted bail 28.

With the proper relation of opposed firing and retracting springs, the firing pin when released will be snapped into engagement with the cap and instantly retracted and held back in the re-

tracted relation. To avoid any possibility of over-throw, the firing pin may be formed with an annular stop shoulder 29 for possible engagement with the breech closing wall 12.

To give the firing spring initial freedom of action and accomplish a quick, immediate rebound of the firing pin, it has been found desirable to construct and arrange the parts as shown in Fig. 1, that is, to contract the upper coil of the rebound spring 21 into a groove 30 in the firing pin so that said spring will be drawn back as the firing pin is retracted, and to make this spring short enough so that it will be lifted clear off its seat, substantially as indicated at 31. The full strength of the firing spring is thus available at the instant of release and the impact of the rebound spring on its seat then has the effect of causing the firing pin to rebound and be held back in the clear, substantially as indicated in Fig. 2.

What is claimed is:

Gun firing mechanism comprising a cartridge holder having a cartridge chamber, a breech piece having a wall closing said cartridge chamber and provided with a firing pin passage, a seat at the outer end of said passage, a firing pin operable in said passage, a relatively long, light, flexible coil spring operable to project said firing pin through said passage, a relatively short, stiff, heavy spring operable when engaged with said seat to hold said firing pin against the opposition of said lighter spring retracted in said passage and releasable means for withdrawing said firing pin and tensioning said lighter spring sufficiently to enable it to overcome the heavier spring and when said means is released project said firing pin from said passage, said heavier spring being attached to the firing pin and withdrawn thereby clear of said seat, said firing pin having an annular groove and said heavier spring having a smaller convolution engaged in said groove and whereby said heavier spring will remain at all times attached to said firing pin and thereby be surely withdrawn from engagement with said seat when said firing pin is withdrawn ready for firing, said means for withdrawing said firing pin and tensioning the lighter spring including a yoke pivoted on the firing pin, the breech piece having a shoulder engageable by one end of the yoke for enabling the yoke to hold the firing pin cocked in firing position with the heavier spring retracted clear of its seat.



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