Jan. 15, 1935. J. RADY ET AL 1,987,912

ELECTROMAGNETIC GUN

Filed Feb. 27, 1933

Fig 1

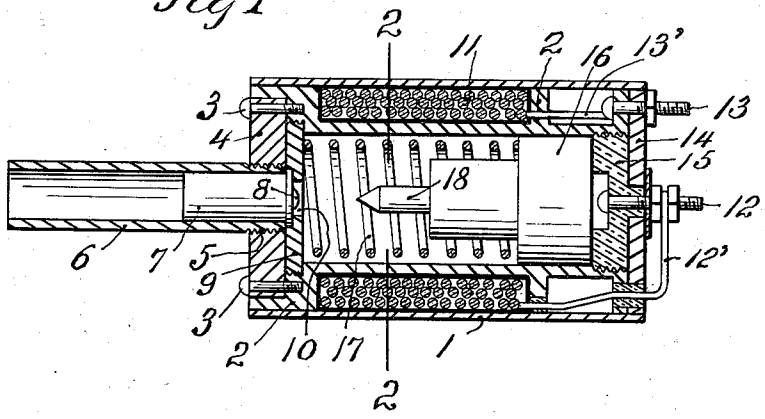


Fig 2

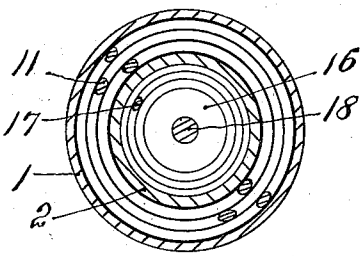


Fig 3

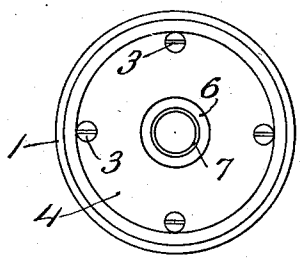
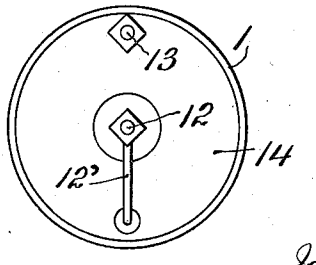


Fig 4



INVENTORS.
Joseph Rady
John M. Rady
Charles R. Winn
BY Warren D. House
Their ATTORNEY

Witness
H. Vernon Olson

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ELECTROMAGNETIC GUN

Joseph Rady, John M. Rady, and Charles R. Winn,
Kansas City, Kans.

Application February 27, 1933, Serial No. 658,770

1 Claim. (Cl. 42—84)

Our invention relates to improvements in electromagnetic guns.

It is particularly well adapted for use in connection with tear gas cartridges.

One of the objects of our invention is the provision of a novel gun of the kind described, which is simple, cheap, strong, durable, not likely to get out of order, which can be quickly fired, and which is efficient in its operation.

Another object of our invention is the provision of novel means by which the cartridge to be fired can be easily and quickly inserted and firmly held, and which after firing can be as readily removed.

The novel features of our invention are hereinafter fully described and claimed.

In the accompanying drawing, which illustrates our invention in the preferred embodiment thereof,

Fig. 1 is a longitudinal central sectional view of our improved gun, showing a cartridge mounted therein, and the core with its firing pin retracted.

Fig. 2 is a section on the line 2—2 of Fig. 1.

Fig. 3 is a front end of our improved gun.

Fig. 4 is a rear end view of the same.

Similar characters of reference designate similar parts in the different views.

Our improved gun is provided with a support comprising a cylindrical shell 1 in which is fitted a spool 2 to the front end of which is fastened by screws 3, or other suitable means, a circular plate 4 having therethrough a central threaded hole 5 in which is removably fitted the rear externally threaded end of a forwardly extending barrel 6, adapted to have releasably inserted in its rear end, when the barrel is removed, a cartridge 7 having detonating means, such as a cap 8, at its rear end.

Fitted across the front end of the spool 2, and having at its periphery threaded removable engagement with the spool, is a breech block 9, disposed at the rear of the plate 4 and having a central hole 10 therethrough adapted to receive the cap 8.

The barrel 6 at its rear end engages the forward side of the rim 11 of the cartridge and holds the rear end of the cartridge against the breech block 9.

Wound on the spool 2 is a solenoid winding 11, within the shell 1 and having its terminals 12' and 13' fastened to the binding posts 12 and 13 mounted on the rear end of the spool and extending through a plate 14 secured to said rear end by the binding post 13.

In the spool 2 at the inner side of the plate 14 is fastened by means of the binding post 12 a resilient pad, preferably soft rubber 15 against which is adapted to bear the rear end of a magnetizable core 16, which is reciprocative, and has a rear portion of enlarged diameter slidably fitted in the spool 2, and which core is normally held against and retracted to said pad 15 by a coil spring 17 in the spool 2, the rear end of which spring bears against said enlarged rear portion of the core 16, and the front end of which spring bears against the rear side of the breech block 9. The core 16 has its front portion of reduced diameter encircled by the spring 17.

The core 16 carries at its front end a firing pin 18, preferably integral with or rigidly fastened to the core in any suitable manner, and which is adapted when the core is forced forwardly from its retracted position, shown in Fig. 1, to strike the cap 8 and fire the cartridge 7.

In its retracted position, the core 16 protrudes rearwardly from the winding 11. When the latter is energized by a suitable current passed through it from any suitable source connected in the usual manner to the binding posts 12 and 13, the winding 11 will be energized and will force the core forwardly to its firing position. When the current ceases to flow through the winding 11, the spring 17 will force the core 16 to its retracted position.

The cartridge 7 when discharged, is removed by unscrewing the barrel 6 from the plate 4, and the discharged cartridge is replaced by a new cartridge, after which the barrel 6 is again screwed into the plate 4 so as to hold the new cartridge in its operative position.

By removing the screws 3 and the plate 4, the breech block 9 can be unscrewed from the spool 2 for access to the interior thereof, if desired. The disposition of the coil spring 17 within the spool 2, forward of the core 16 and bearing against the inner side of the breech block 9; and the core 16, abutment 15, breech block 9 and plate 4 being located all within the spool 2, provide a self contained unitary structure from which there are no projecting movable parts. This construction also provides a compact mechanism having a minimum of length.

By having the protecting shell 1 fitted over the spool 2 and the rear end plate 14, and the terminals 12' and 13' of the winding extended through the rear end of the spool 2 and the plate 14, the protecting shell may be readily

slipped into or out of its operative position without disturbing the terminal connections of the winding 11, thereby affording a construction which can be easily and quickly assembled, or as easily and quickly disassembled for repair purposes.

By having the spring 17 encircling a front portion of the core 16 of reduced diameter, a maximum length of stroke for a given length of core and firing pin is afforded, and a relatively long spring can be employed without its superposed coils impeding the stroke.

By having the shell 1 removably slidably fitted on the spool 2, and the latter fastened to the front plate 4 only by the screws 3, a burned out winding 11 may be rewound on the spool 2 without the removal or disassemblage of any parts excepting the shell 1.

The binding posts 12 and 13, in addition to their usual functions, serve the double function of fastening the pad 15 to the abutment plate 14, and holding the latter to the spool 2.

The location of the binding posts 12 and 13 within the shell 1, permits the removal of the latter and replacing a burned out winding 11, without releasing or disassemblage of other parts.

We do not limit our invention to the structure shown and described, as many modifications, within the scope of the appended claims, may be made without departing from the spirit of our invention.

What we claim is:—

In an electromagnetic gun, a tubular spool, a solenoid winding thereon, a magnetizable core having a rear portion slidably fitted in said spool and having a front portion of less diameter than said rear portion and having fastened rigidly to its front end a firing pin, a front plate having a threaded central barrel receiving opening, means extending through said front plate into the front end of said spool for fastening the latter to said front plate, a breech block against the rear side of said front plate and having a central hole for receiving therethrough said firing pin and in register with said opening, an abutment plate fastened to the rear end of said spool, a resilient pad in said spool bearing against the front side of said abutment plate, two binding posts respectively fastening said abutment plate to said spool and said pad to said abutment plate, and respectively connected with the terminals of said winding, and a coil spring in said spool encircling said front portion of said core and bearing at one end against the front of said rear portion thereof and bearing at its front end against said breech block, and the tension of which spring normally forces said core rearwardly, said winding when energized forcing said core forwardly to the firing position.

JOSEPH RADY.
JOHN M. RADY.
CHARLES R. WINN.