

No. 867,960.

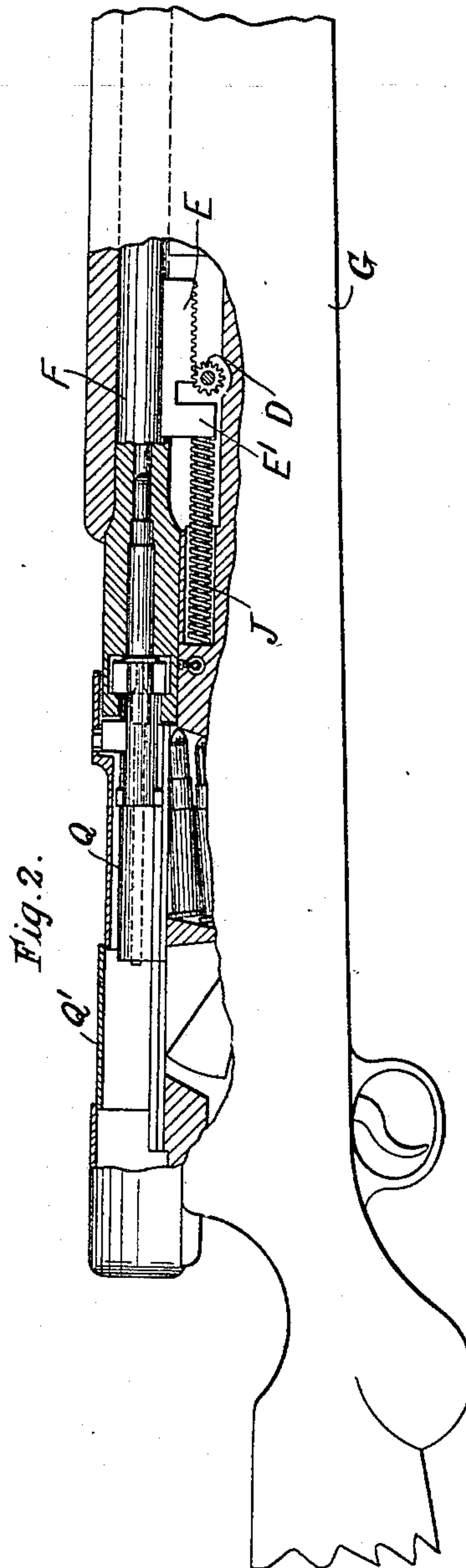
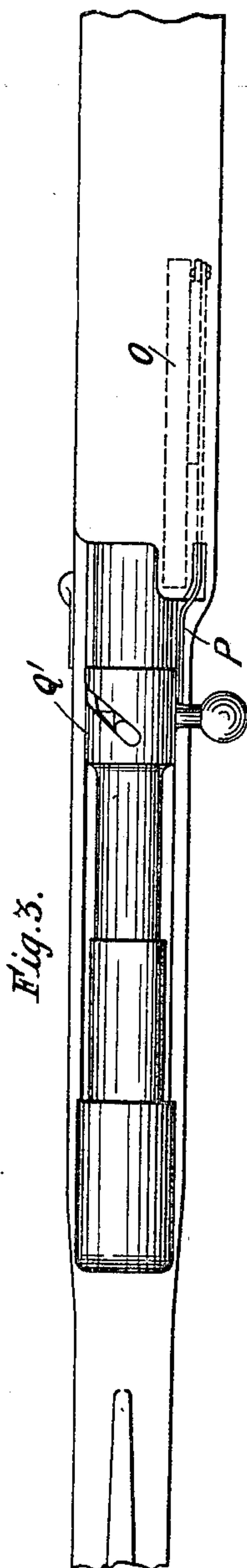
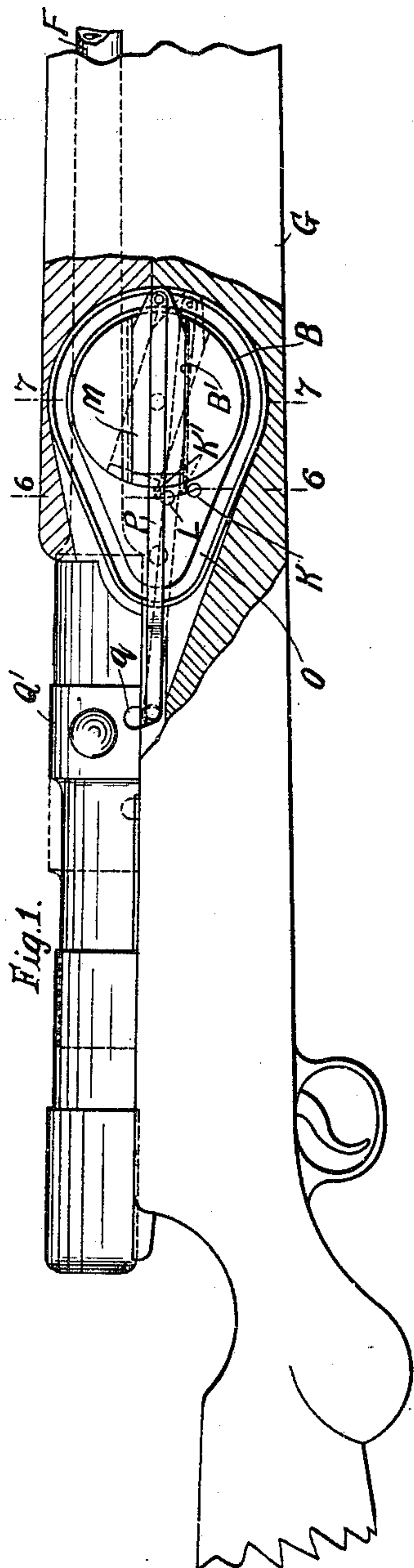
PATENTED OCT. 15, 1907.

M. G. FARQUHAR & A. H. HILL.

AUTOMATIC RIFLE.

APPLICATION FILED MAR. 26, 1907.

2 SHEETS—SHEET 1.



WITNESSES:

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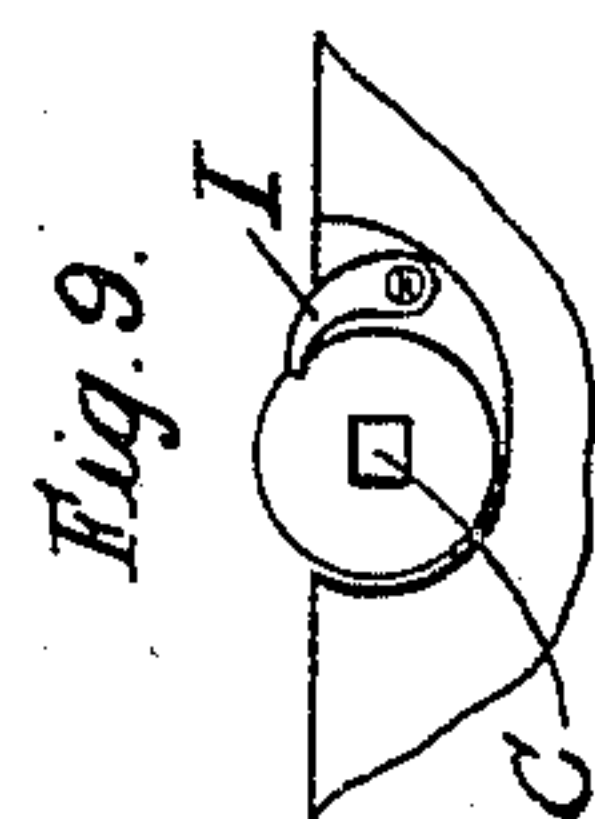
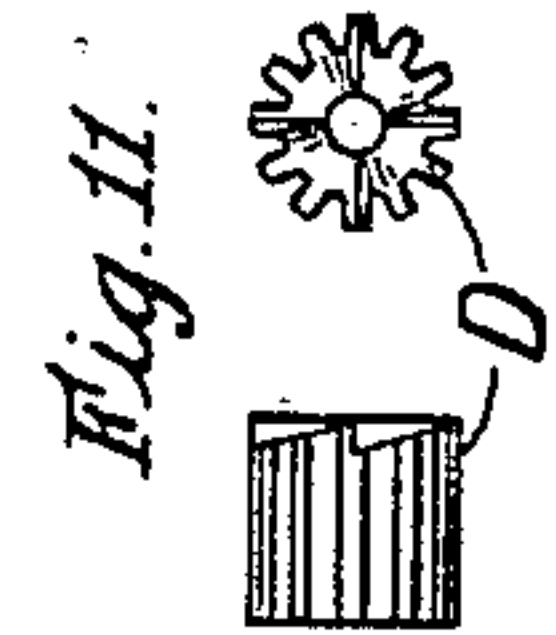
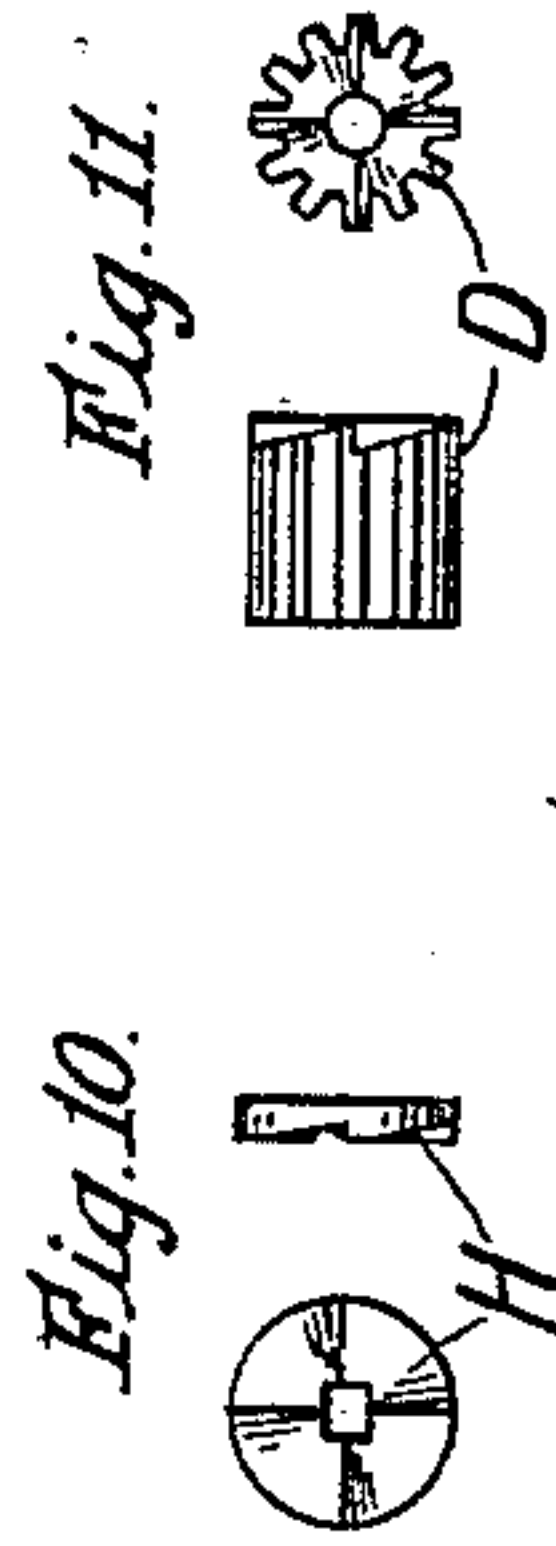
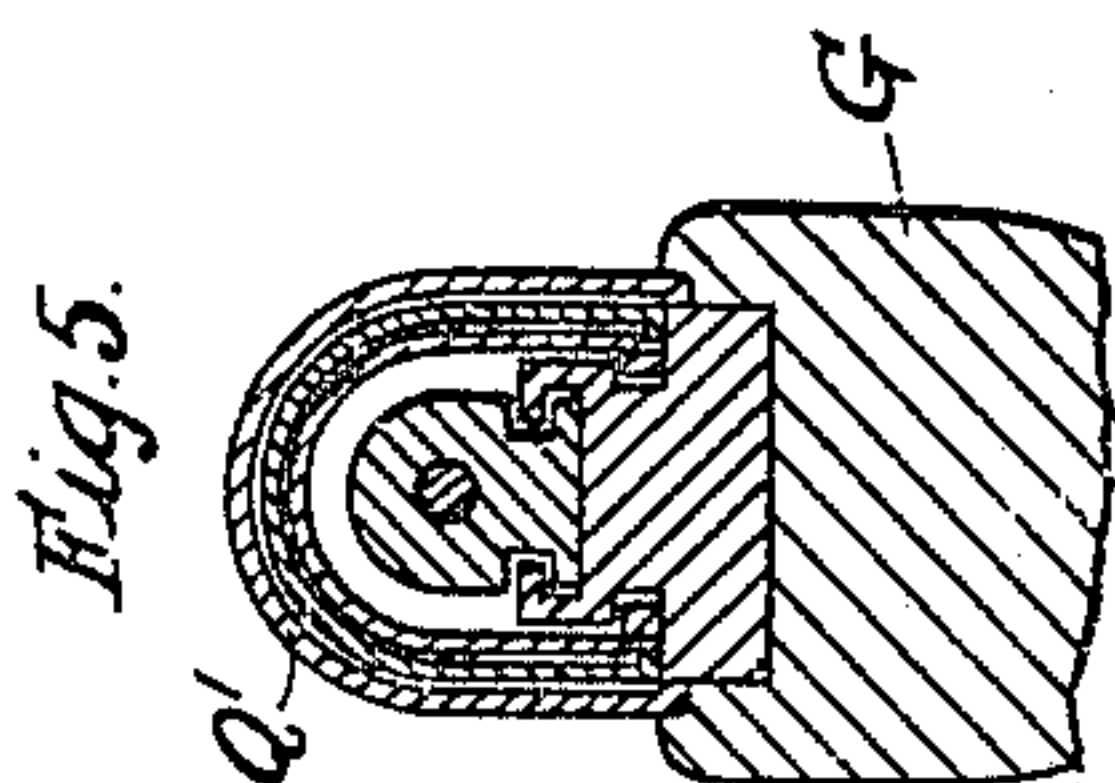
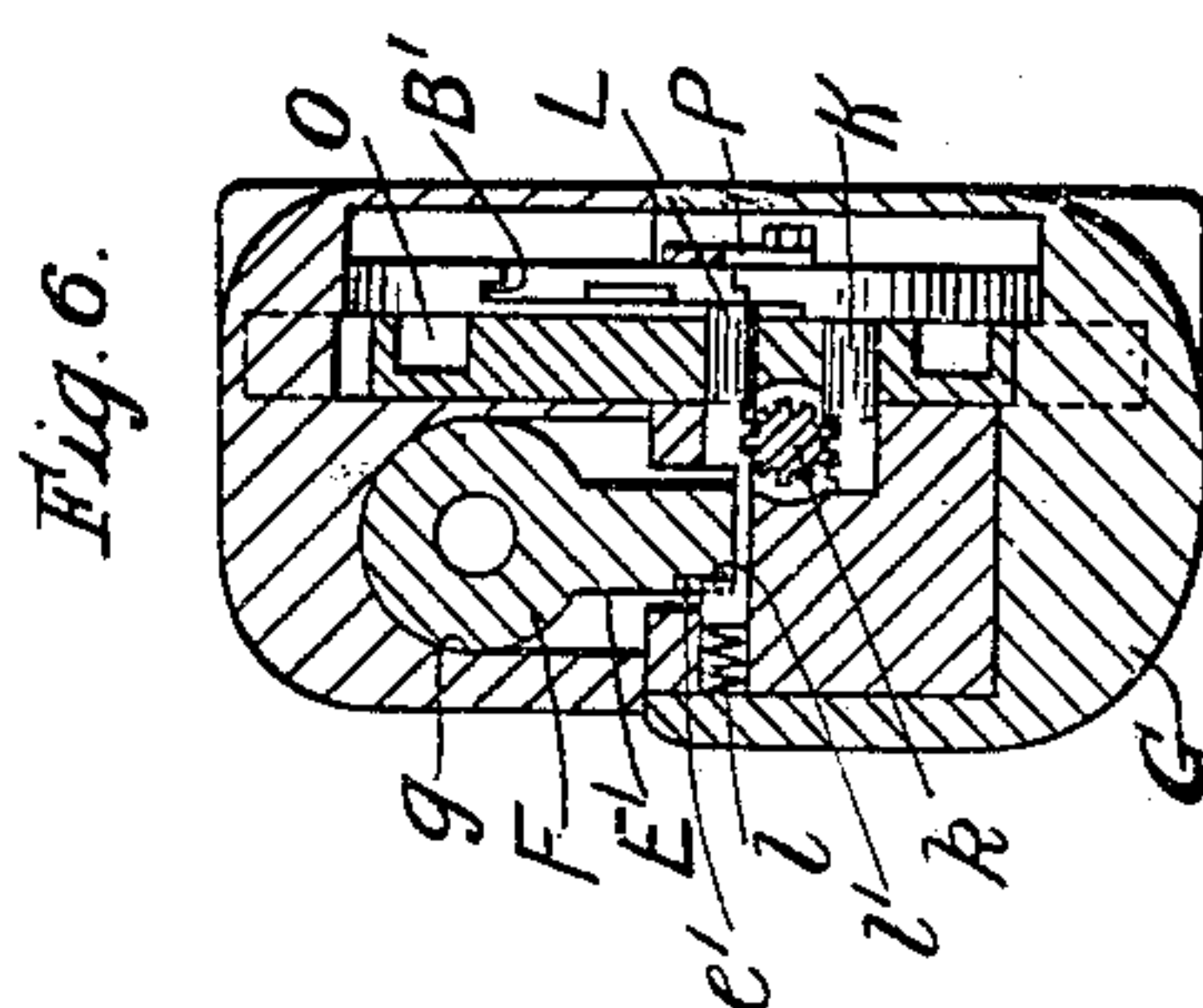
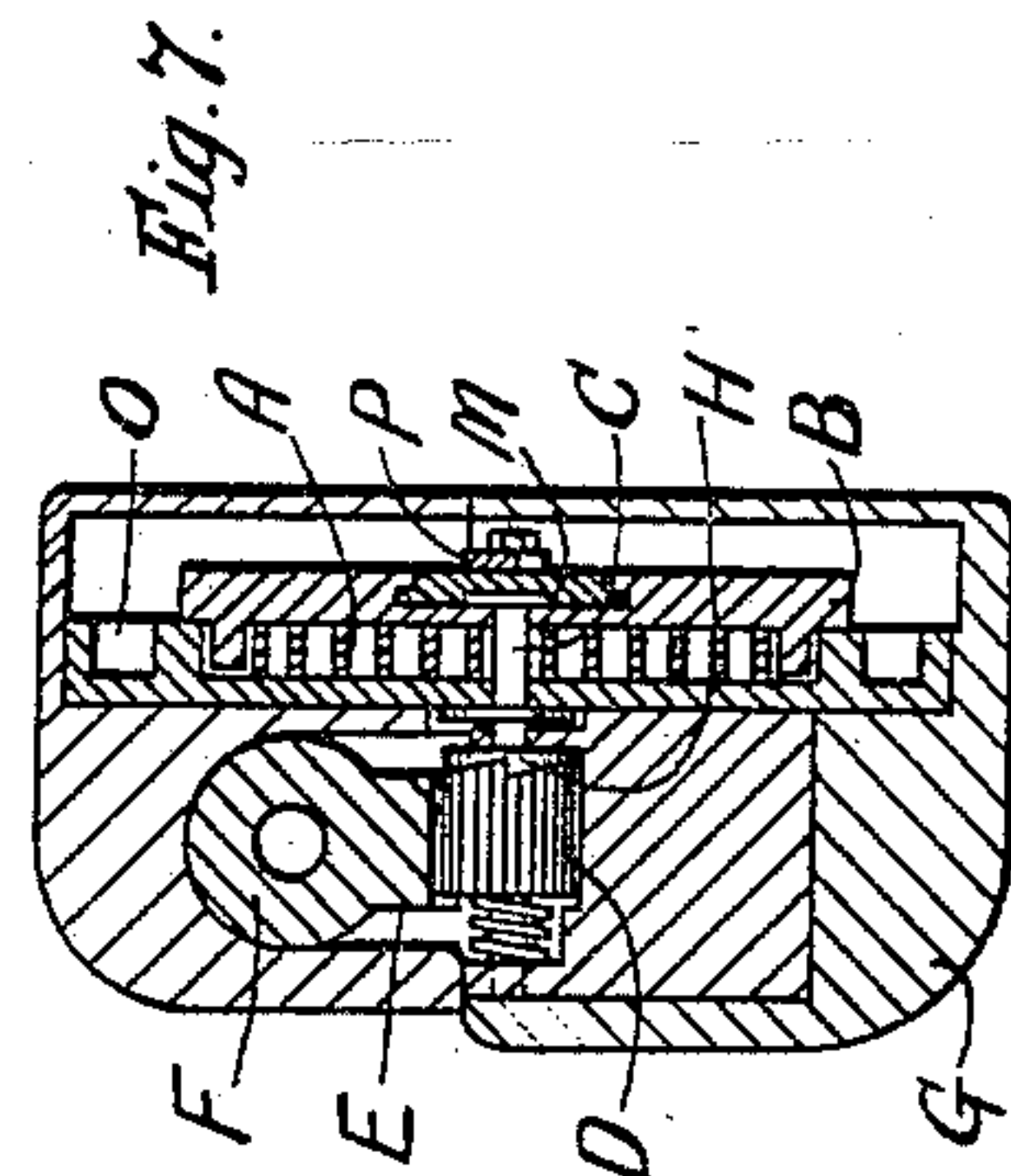
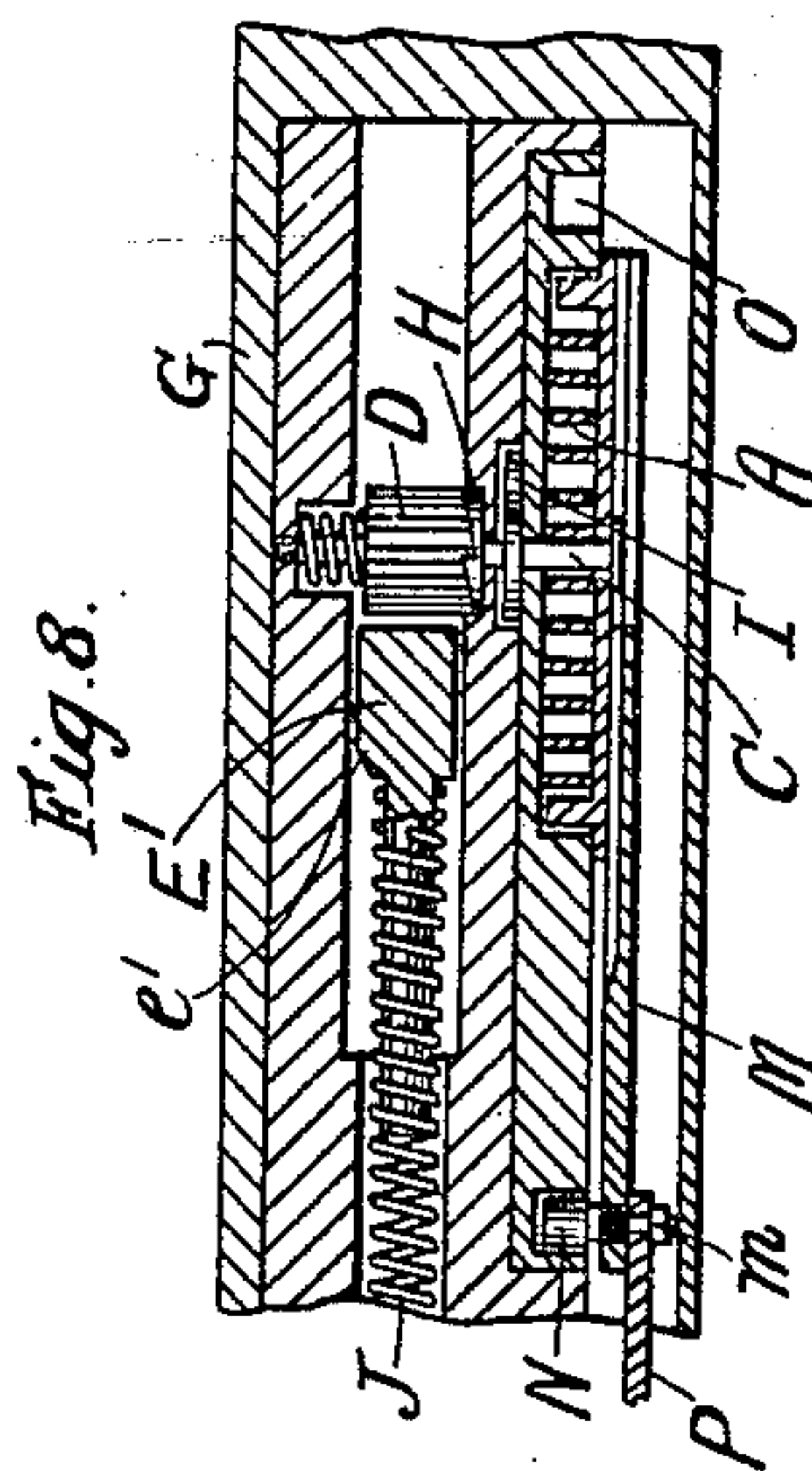
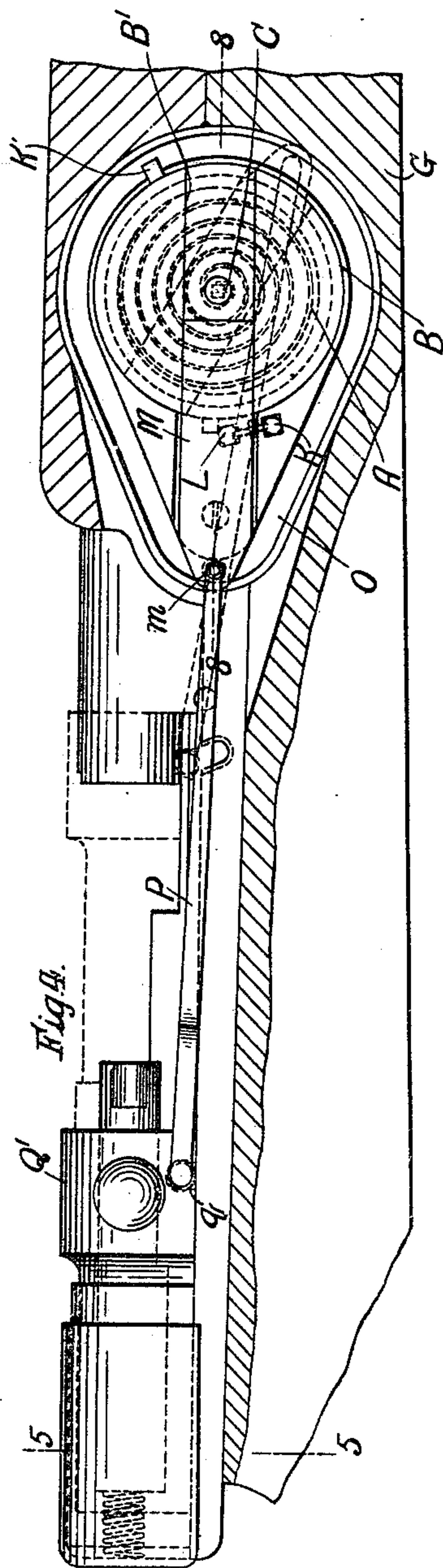
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2 SHEETS—SHEET 2.



WITNESSES:

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UNITED STATES PATENT OFFICE.

MOUBRAY GORE FARQUHAR, OF ABOYNE, SCOTLAND, AND ARTHUR HENRY HILL, OF BIRMINGHAM, ENGLAND.

AUTOMATIC RIFLE.

No. 867,960.

Specification of Letters Patent.

Patented Oct. 15, 1907.

Application filed March 26, 1907. Serial No. 364,709.

To all whom it may concern:

Be it known that we, MOUBRAY GORE FARQUHAR and ARTHUR HENRY HILL, subjects of the King of the United Kingdom of Great Britain and Ireland, and residing at Aboyne, Aberdeenshire, Scotland, and Birmingham, Warwickshire, England, respectively, have invented certain new and useful Improvements in Automatic Rifles, of which the following is a specification.

This invention relates to automatic rifles operated by a sliding barrel which conserves the energy obtained by the recoil following on the explosion of the charge in the cartridge, and the improvement consists in the means now provided whereby this energy is employed to open and close the breech, eject the empty cartridge case and reload a cartridge from the magazine into the chamber when the barrel has returned to the firing position after its recoil, a special feature being that the energy obtained from the recoil is conserved until all pressure on the barrel has been relieved and the breech may be safely unlocked.

The invention is illustrated in the accompanying drawings in which

Figures 1 and 2 are part sectional elevations and Fig. 3 a plan showing part of the improved rifle. Fig. 4 is a part sectional elevation to a larger scale corresponding to Fig. 1 but showing the parts in a different position. Fig. 5 is a cross section taken at the line 5—5, Fig. 4. Figs. 6 and 7 are cross sections taken at the lines 6—6 and 7—7 respectively of Fig. 1. Fig. 8 is a horizontal section taken at the line 8—8, Fig. 4, and Figs. 9, 10, 11 and 12 show details hereinafter referred to.

For the purpose of conserving the energy obtained from the recoil of the barrel we employ a ribbon spring A working in a drum B and secured to a central axle C passing through said drum, outside which drum is a toothed wheel D attached to the axle C and meshing with a rack E secured to the barrel F. The axle of the drum B is held by and works in a forward extension of the rifle body G while the barrel F on its recoil slides in the body. Thus when the barrel recoils in grooves g while the body G and drum B do not recoil, the toothed rack E engaging the toothed wheel D revolves the axle C of the drum and winds up the ribbon spring A. Said toothed wheel D is connected with the drum by pawls or bevel faces on a disk H Fig. 10 so that it holds the axle C only during the backward travel of the barrel while another pawl I Fig. 9 connected to the body prevents the axle from turning back as the barrel returns to the forward or firing position under the action of a coil spring J fitted in the body and which coil spring J is compressed by the barrel on its recoil and returns the barrel to firing position immediately after the bullet has left the muzzle. The barrel on returning to its normal or firing position releases the drum B containing the ribbon spring A so that the drum is enabled

to make one complete rotation. For this purpose we arrange two studs or plungers K, L, one above the other situated in the body, geared together by a toothed wheel k, so that when the barrel is in the firing position one stud L projects under the action of a coil spring l and when the barrel recoils said stud (which is formed with a gap and beveled at l', Figs. 6 and 12) is withdrawn and the other stud K forced outwards by the projection on the barrel or projecting piece E¹ (Figs. 2, 6 and 8), only one stud projecting at a time. The projection E¹ withdraws the stud L by means of its beveled face e¹ engaging with the correspondingly beveled face l' on said stud L, whereby the toothed wheel k is caused to revolve and so project the stud K. When the first stud L projects a corresponding stop K¹ on the drum abuts against it, and when the barrel recoils and the first stud L is withdrawn the drum is enabled to move slightly until the stop K¹ engages the second stud K. When the barrel returns after recoil the second stud K is withdrawn and the first stud L projected but the stop K¹ on the drum having passed the first stud the drum is able to make a complete rotation under the action of the ribbon spring until its stop again comes in contact with the first stud L.

In the outside of the drum B and crossing its diameter is a dove-tail recess B¹ in which works a slide M equal in length to the diameter of the drum. This slide has a pin or projection m at one end carrying a roller or wheel N which works in a guide way O. The slide M is also fastened to one end of a connecting rod P which has a self-detachable engagement at its other end with the bolt cover by which the bolt Q is operated. The guide-way O passes completely round the drum B and is contiguous to the drum for half of the perimeter of the latter but thereafter leaves the drum until at its furthest point it is at a distance of about half the diameter of the drum away from it. When the drum is at rest the slide M is exactly at the middle of that portion of the guide-way which is contiguous to the drum. When the drum revolves the slide does not move in the recess B¹ until the point is reached when the guide-way leaves the drum. From this point the slide protrudes gradually so that the roller or wheel N can follow the guide-way and after passing the furthest point it gradually closes until it reaches the point at which the guide-way again becomes contiguous to the drum. Thus all the work of locking and unlocking the bolt and effecting primary extraction of the cartridge case is performed while the slide M is nearest to the center of the drum and the spring has its greatest leverage. By means of this drum slide M and guide-way O a travel of the connecting rod P, and therefore of the breech bolt Q in which the connecting rod P engages, is obtained, equal to the greatest diameter of the guide-way O. The connecting rod P is disen-

gaged from its bolt cover until the drum commences to revolve when the end of the connecting rod rises up and engages in a slot q in the bolt cover q^1 and remains engaged until the drum has completely revolved.

- 5 The hammer or striker is placed in full cock when the barrel and breech bolt recoil together and the ribbon spring is wound up. The barrel F and bolt Q still locked return together to the firing position and immediately the drum is released by said system of studs
- 10 K, L . The ribbon spring A causes the drum B to revolve actuating the connecting rod P which unlocks the bolt, carries it back, brings it forward again with a fresh cartridge and again locks it. This is done by one turn of the drum releasing one turn of the spring which
- 15 is again brought to full tension by being wound up one complete turn by the action of the barrel after the next explosion.

The barrel and body can be locked together by a key bolt attached to a lever so that the barrel cannot

20 slide back and actuate the drum and spring and the rifle can then be operated by hand.

Having now described our invention what we claim and desire to secure by Letters Patent of the United States is:—

- 25 1. In an automatic rifle, in combination with the rifle body the sliding barrel and the bolt, a spring for returning the barrel to firing position after recoil, a drum carried by

the rifle body, a ribbon spring within said drum, means for winding said spring during the recoil of the barrel, means for locking the drum from rotation during the sliding 30 movement of the barrel, means for disengaging said locking means and so permitting the drum to rotate under the action of the ribbon spring when the barrel has returned to firing position, and connections between said drum and the bolt for opening and closing the breech during the rota- 35 tion of the drum.

2. In an automatic rifle in combination with the rifle body, the sliding barrel and the bolt, a spring for returning the barrel to firing position after recoil, a spindle carried on the rifle body, a drum loosely mounted on the spindle, a 40 toothed wheel mounted on said spindle, a rack on the barrel engaging said toothed wheel, a ribbon spring within the drum having one end connected to the spindle and the other end connected to the drum, a stop for locking the drum from rotation during the movement of the barrel, 45 means for disengaging said stop when the barrel returns to firing position and so permitting the drum to rotate under the action of the ribbon spring, a guide way formed in the rifle body around the drum, a slide moving in the drum, a connecting rod attached to said slide and having a roller en- 50 tering said guideway, said connecting rod adapted to be secured at its other end to said bolt.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

MOUBRAY GORE FARQUHAR.
ARTHUR HENRY HILL.

Witnesses:

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JNO. ARMSTRONG, Junr.