

No. 789,806.

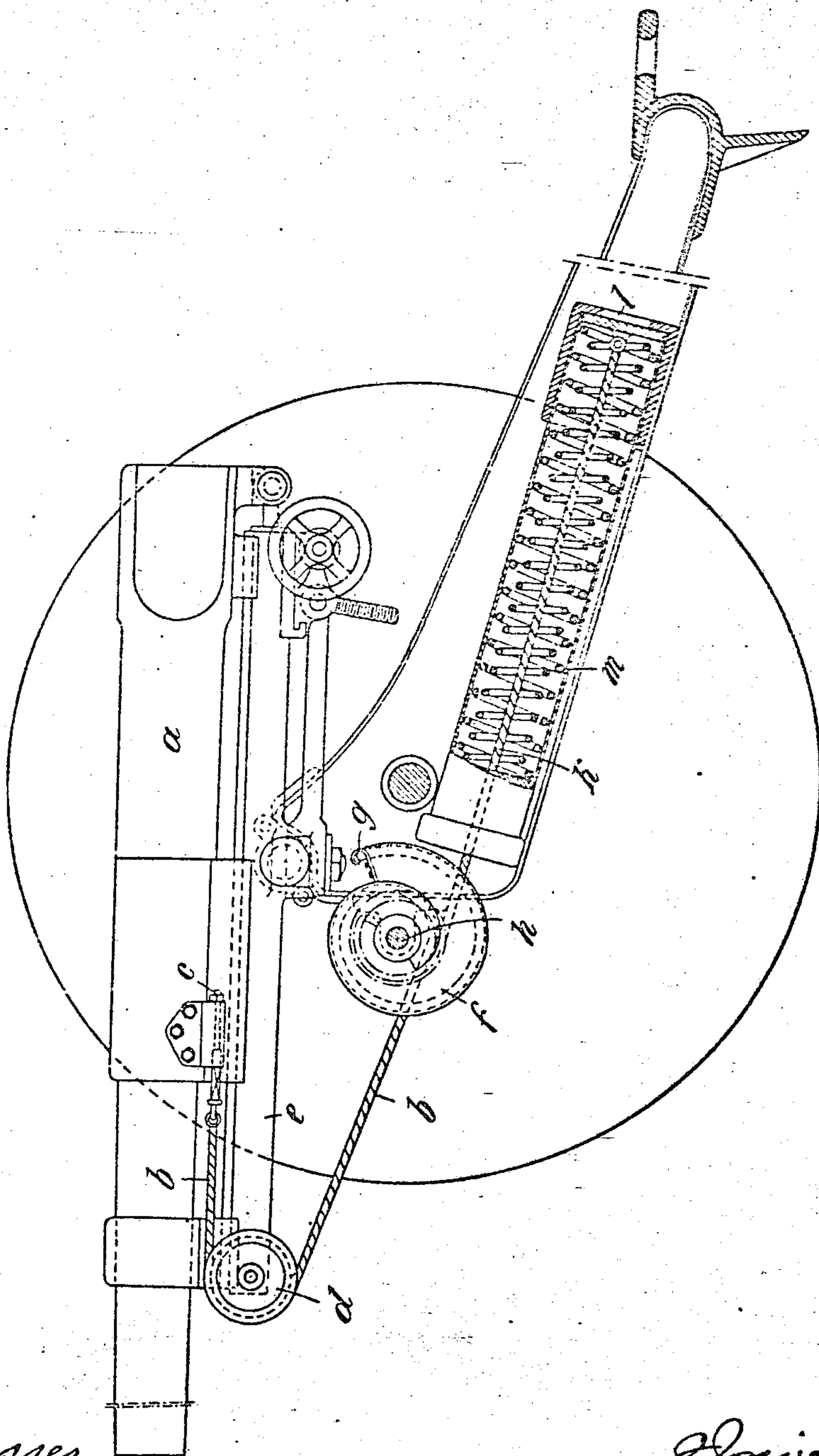
PATENTED MAY 16, 1905.

K. HAUSSNER.
RECOILING GUN.

APPLICATION FILED MAR. 25, 1902.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

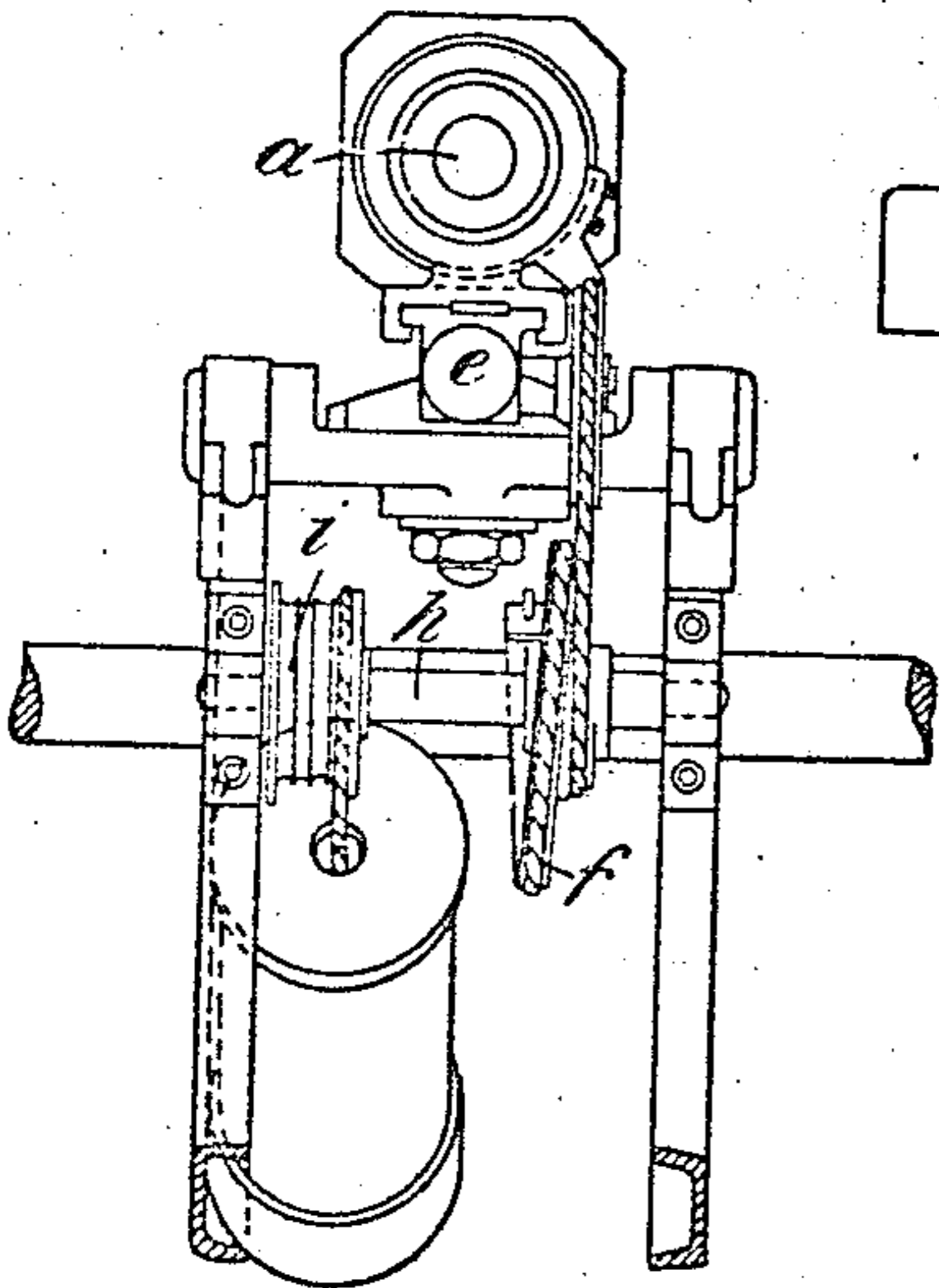


Fig. 3.

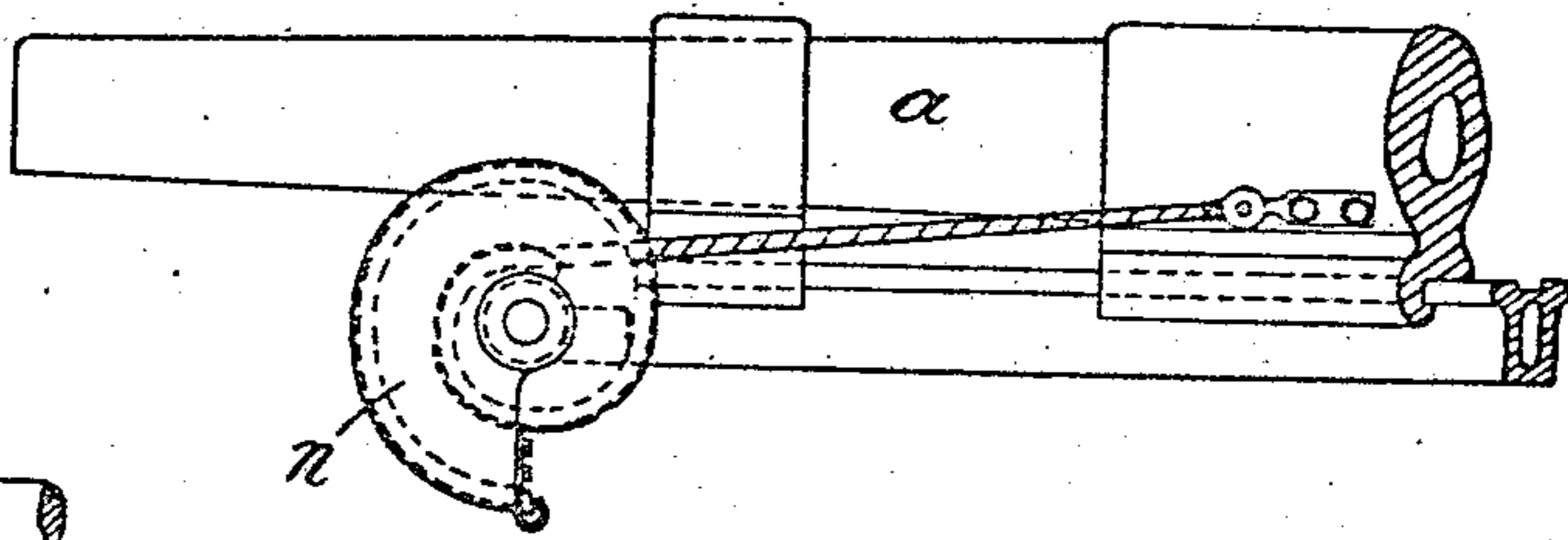


Fig. 4.

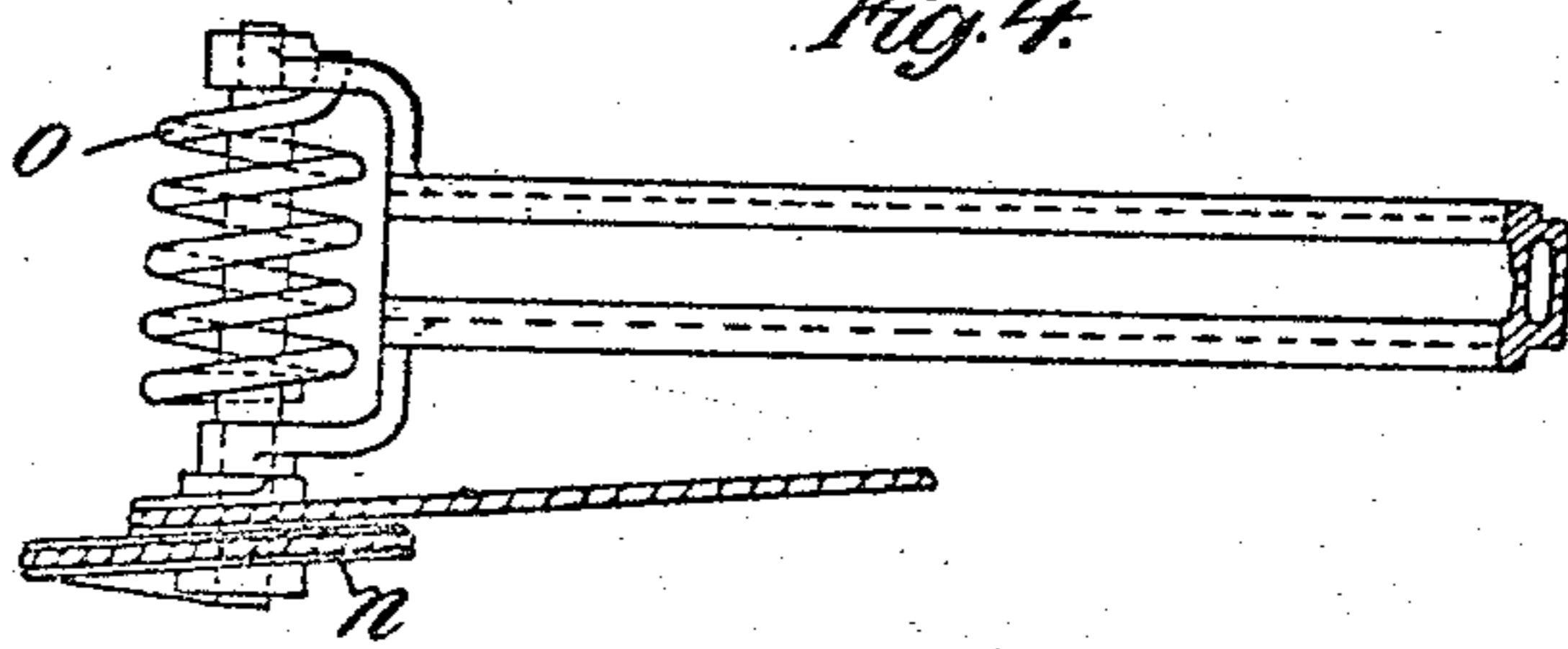


Fig. 5.

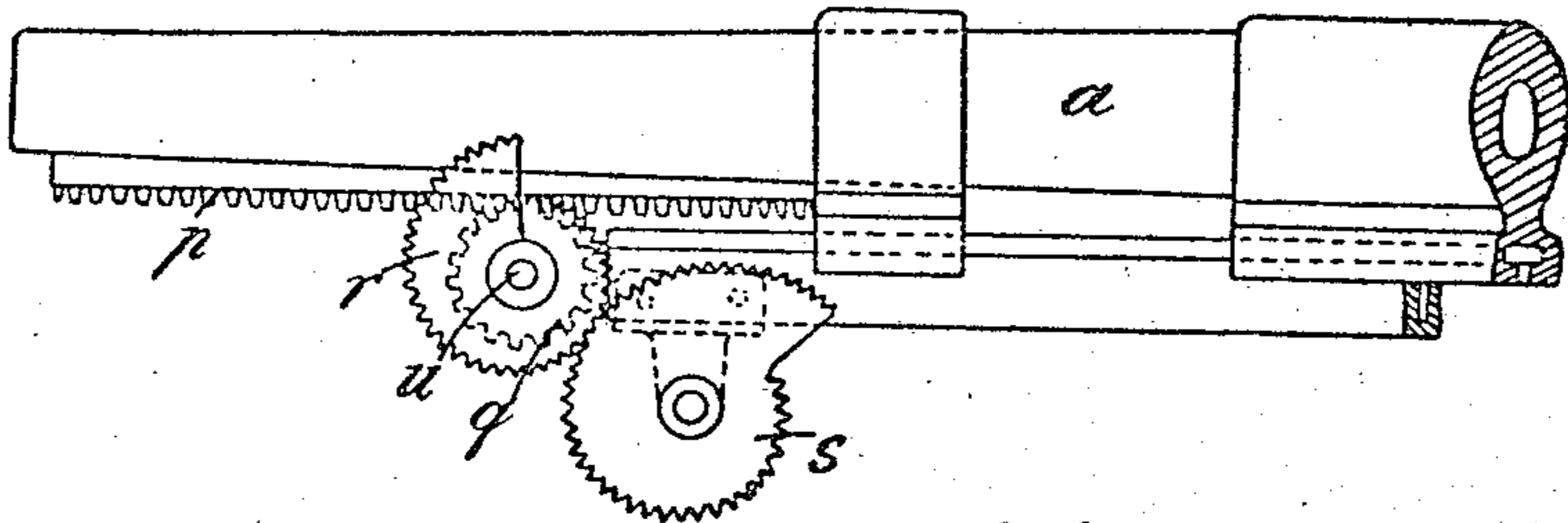
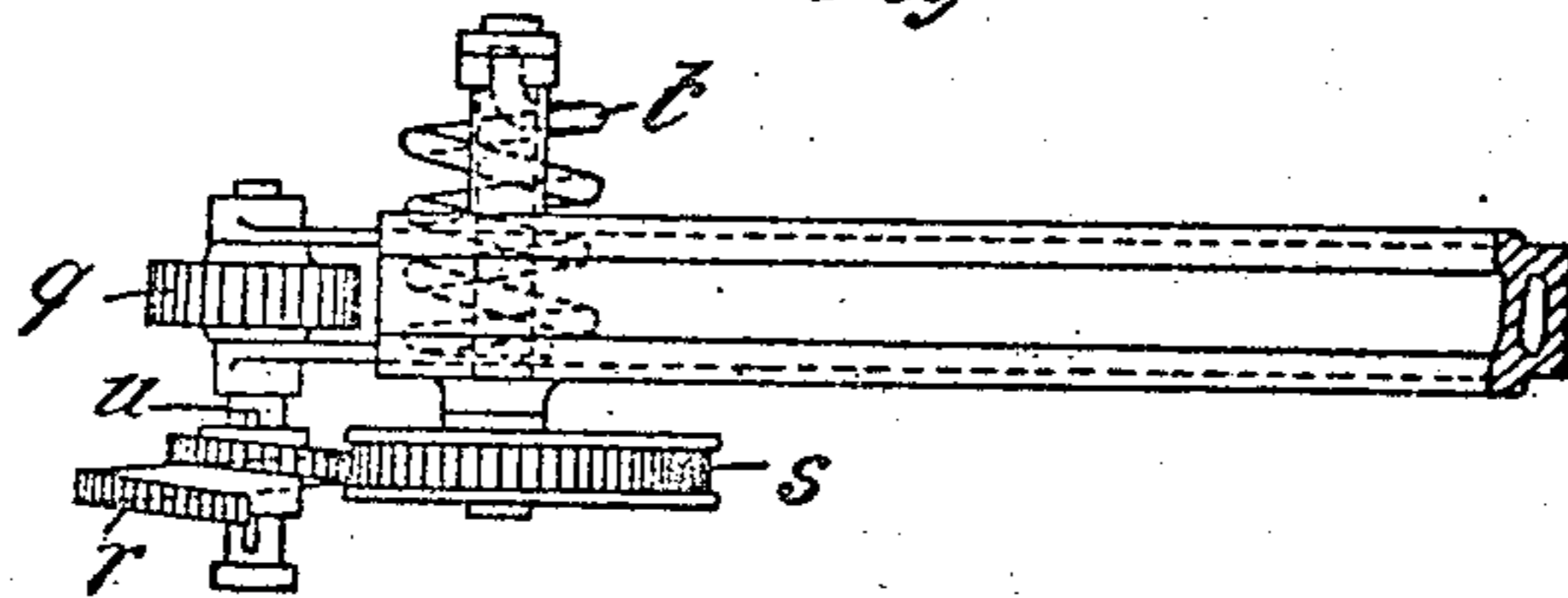


Fig. 6.



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UNITED STATES PATENT OFFICE.

KONRAD HAUSSNER, OF EISENACH, GERMANY.

RECOILING GUN.

SPECIFICATION forming part of Letters Patent No. 789,806, dated May 16, 1905.

Application filed March 25, 1902. Serial No. 99,958.

To all whom it may concern:

Be it known that I, KONRAD HAUSSNER, a subject of the King of Prussia, German Emperor, residing at Eisenach, Germany, have
5 invented certain new and useful Improvements in or Relating to Recoiling Guns, of which the following is a specification.

In order to bring a gun or gun-support after the recoil forward into firing position in
10 many cases, air or spring accumulators are used. The springs are compressed during the recoil of the gun, and the power stored in the springs is used for moving the gun forward into firing position. The apparatus used for
15 carrying out this idea is as a rule of such a construction that the springs are inserted into the gun-support under a certain compression which keeps the barrel in firing position even at its greatest elevation, thereby preventing
20 it from slipping back. On firing a still stronger compression of the spring is effected, so that at the end of the recoil a total compression is obtained which far exceeds the power necessary to bring the gun back into firing position.
25 Consequently the gun or gun-support upon advancing tends to do so too violently and has to be checked by the so-called "fore-brake." However, these apparatuses have the disadvantage that it is necessary to store
30 up extra power in the spring, which spring causes a considerable and unnecessary increase of weight. To overcome these drawbacks, and particularly to reduce the weight of the spring to a minimum, which is especially desirable in some forms of guns, the device forming the subject of the present invention is used
35 in order to attain upon the advance of the gun a constant or almost constant exertion of power by the spring or air accumulator. The invention is characterized by the recoiling gun or gun-support being connected with the spring-accumulator through a transmitting mechanism in such a manner that the transmitting power between the gun and the spring-power
40 is gradually changed in the same proportion as the spring compression increases, so as to cause an almost uniform energy to act upon the gun-carrier throughout the time of its recoil. On advance of the gun the transmission

again effects in the opposite way a uniform
50 or almost uniform exertion or application of power. To carry out the invention, various forms of construction are possible. For instance, helicoidal pulleys are used for rope or belt transmission, while worm or spiral gear-
55 ing is used in connection with ordinary tooth-wheeled gear transmission.

In the accompanying drawings, Figures 1, 2, 3, and 4 show a practical means for carrying out the invention in connection with rope-
60 pulleys of various constructions.

A rope *b*, Figs. 1 and 2, is fixed at *c* to the gun *a* or gun-support. This rope passes over a pulley *d*, arranged upon the forward end of the brake-cylinder *e*, which on firing remains
65 stationary. From the pulley *d* the rope *b* passes round a helicoidal pulley *f*, to the outer circumference or spiral of which it is fastened at *g*, the pulley *f* being keyed or otherwise suitably fixed on a shaft *h*. On the shaft *h*
70 is rigidly fixed another rope-pulley, *i*, Fig. 2, with screw-form grooves for the rope. To this pulley is attached one end of a rope *k*, while its other end is connected with a spring-plunger *l*, against which press the preliminary
75 compressed springs *m*.

The operation of the apparatus is as follows: Upon the recoil of the gun the barrel or carrier *a* draws the rope *b*, and consequently
80 operates the helicoidal pulley by drawing the rope off the latter. Thus as the spires increase in diameter the leverage is correspondingly and continually increased until the drawing off of the rope *b* from the pulley is finished at
85 the end of the recoil. Meantime the rope *k* is wound onto the pulley *i*, thereby gradually compressing the springs *m*. The pitch of the coils of the pulley *f* is so calculated that the radius of each winding or spire is in
90 proportion to the corresponding compression of the spring. When after the recoil of the gun the spring expands, the contrary action takes place, and the radius of each successive spire of the pulley *f* decreasing in the same
95 proportion as the compression action of the spring decreases the gun will be moved forward throughout the whole length of its return motion with an almost constant power.

In Figs. 3 and 4 a modified helicoidal-pulley device is shown connected with a spiral spring *o*.

Another modification is shown in Figs. 5 and 6, which is adapted for toothed wheel-gear. Upon the barrel *u* is arranged a rack *p*, which on the recoil of the gun engages with and rotates the spur-wheel *q*. On the shaft *v*, which carries the spur-wheel *q*, is mounted a worm-gear *r*, which in its function is equal to a conical helicoidal spur-wheel and which can move longitudinally on its shaft, but rotates therewith, and therefore is rotated at the same speed as the spur-wheel *q*. The helicoidal gear *r* engages with a spiral or cam gear *s*, the spiral of which is formed in one plane and which is connected with a spiral spring *t*. The operation and effect are the same as in the form described above.

Instead of creating a uniform drawing action for the return of the gun the constantly-altering speed-gear can also be so arranged that upon the beginning of the return motion of the gun a slightly greater power is used than at the end of that motion, and vice versa. It is obvious that without in any way affecting the principal idea of the invention the same method can easily be used in connection with air-power accumulators, which replace the spring-power accumulators.

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

1. Means for attaining a constant or almost constant exertion of power for the return of a gun-barrel or its support after recoil in con-

nection with the use of spring or air accumulators consisting of independently-variable transmitting mechanism connecting the gun-barrel or its support and the power-accumulator in such a manner that the power transmitted to effect the return of the gun varies in proportion with the compression of the spring or air.

2. Apparatus of the kind described characterized by the transmitting means between the barrel or gun support and the accumulator being in the form of a helicoidal rotary member coöperating with the gun-barrel for the purpose of obtaining a constant or almost constant exertion of power upon the return of the barrel or its support by gradually altering the amount of power transmitted to the barrel from the accumulator in proportion to the gradually-diminishing power of the compressor.

3. Means for attaining a constant or substantially constant exertion of power for the return of the gun-barrel or its support after recoil comprising power-transmitting mechanism connecting the gun-barrel with the power-accumulator, said transmitting mechanism embodying a helicoidal or spiral-shape toothed gearing.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

KONRAD HAUSSNER.

Witnesses:

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NIKOLAS KOCH.