

No. 616,687.

Patented Dec. 27, 1898.

A. RESOW.
GUN CARRIAGE.

(Application filed Dec. 31, 1897.)

(No Model.)

4 Sheets—Sheet 1.

Fig. 1.

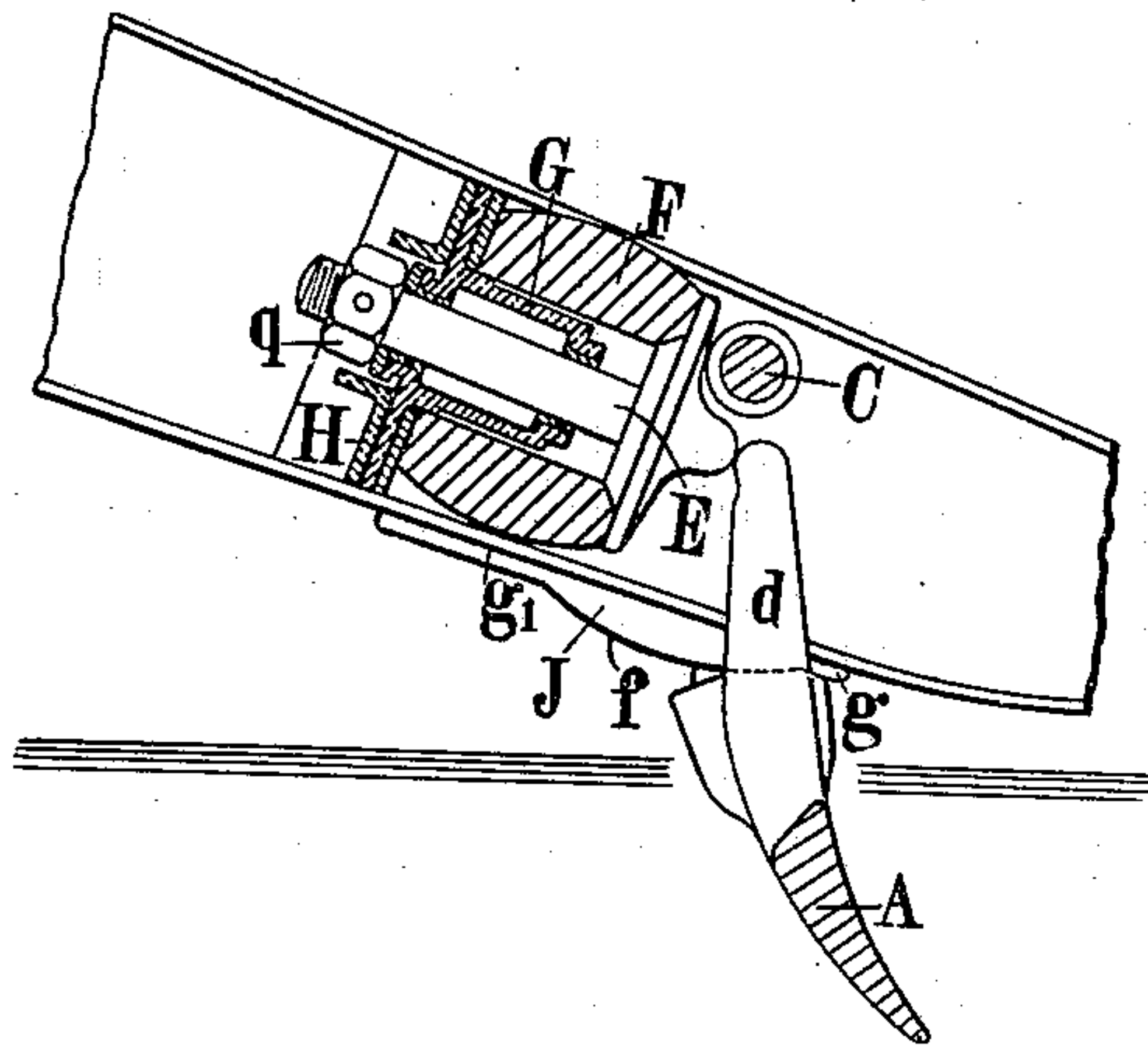


Fig. 3.

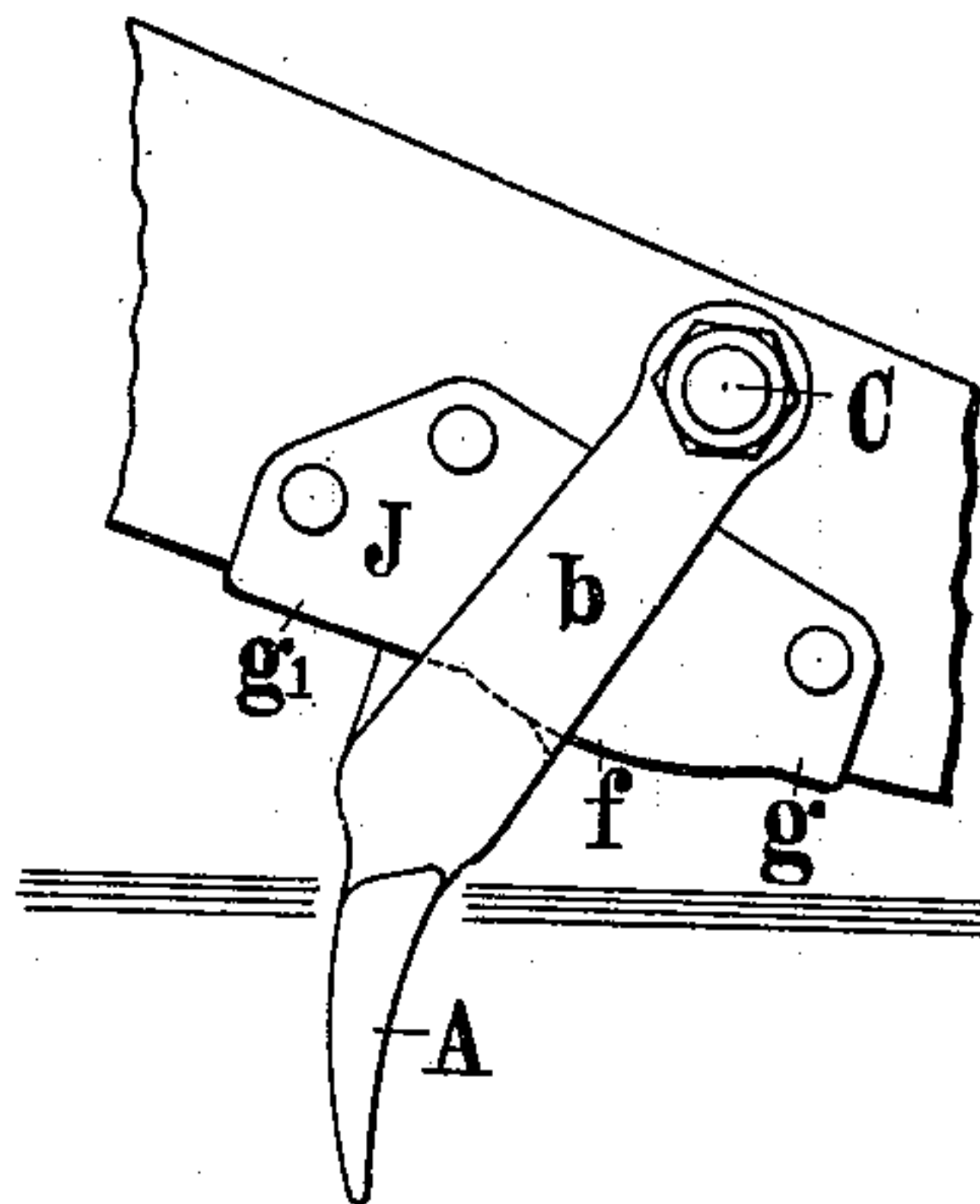
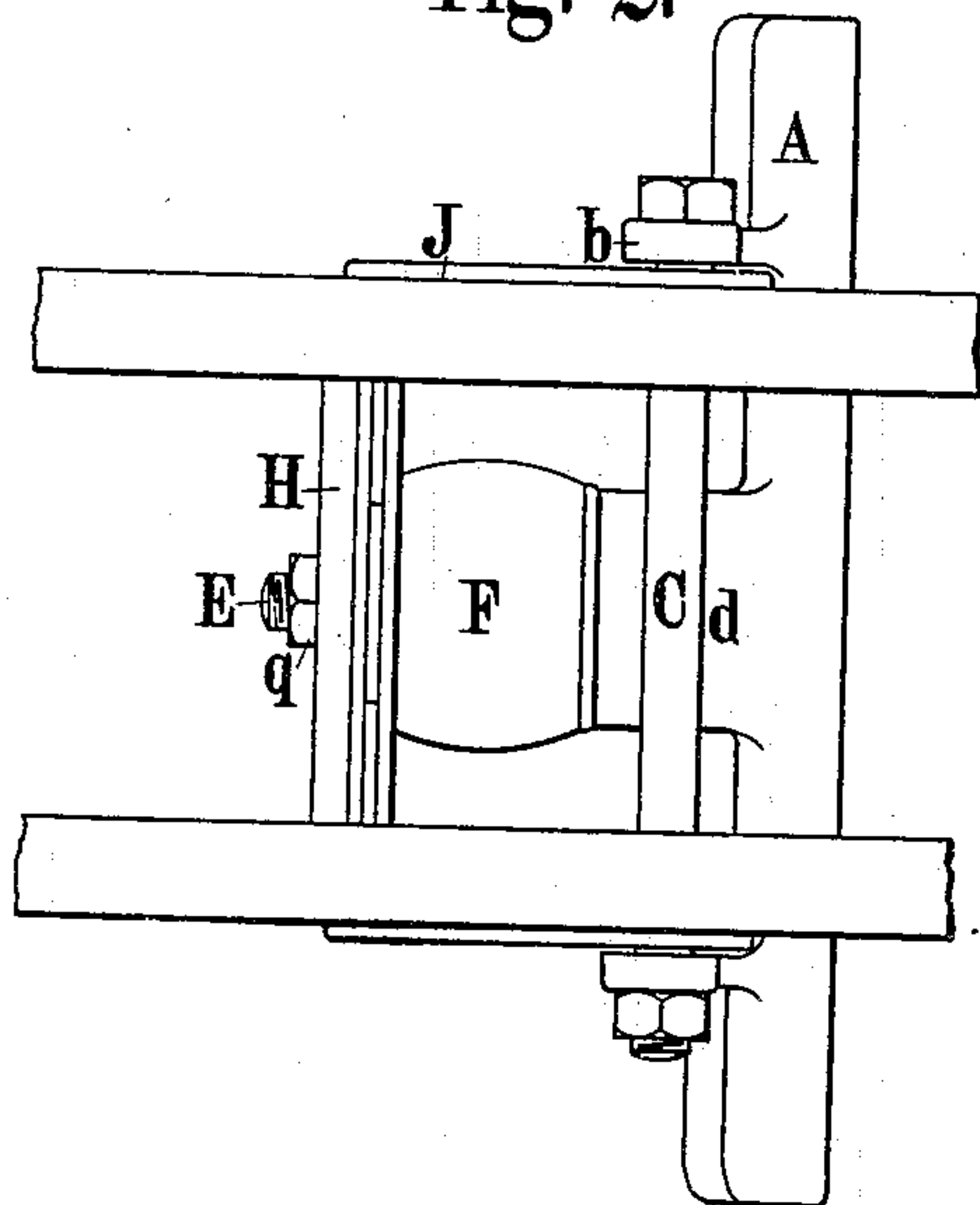


Fig. 2.



Witnesses:
G. W. Gieseler
E. Hendrickson

Inventor:
by Adolf Resow
Att'y. C. Haberdaugh.

No. 616,687.

Patented Dec. 27, 1898.

A. RESOW.
GUN CARRIAGE.

(Application filed Dec. 31, 1897.)

(No Model.)

4 Sheets—Sheet 2.

Fig. 4.

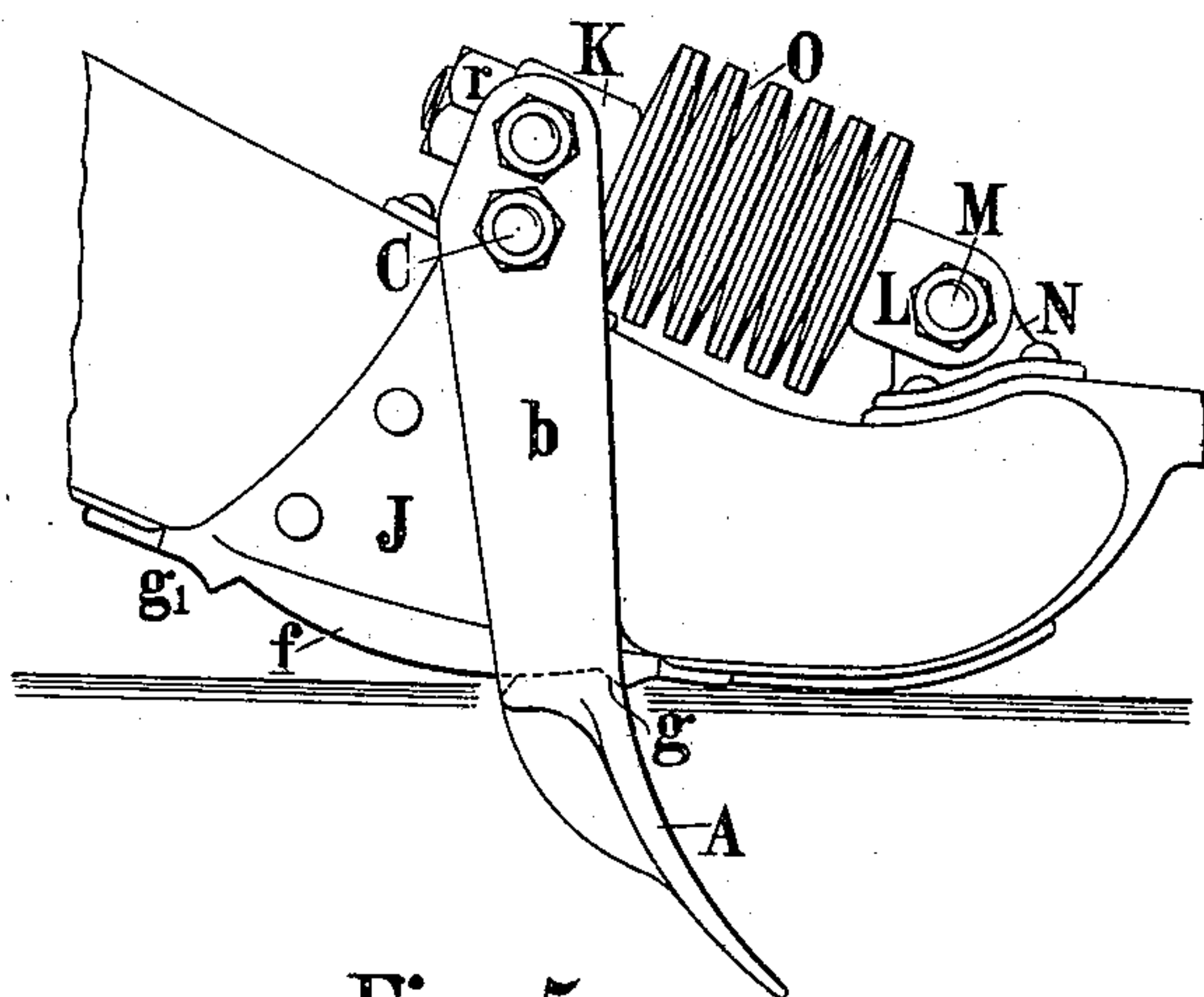
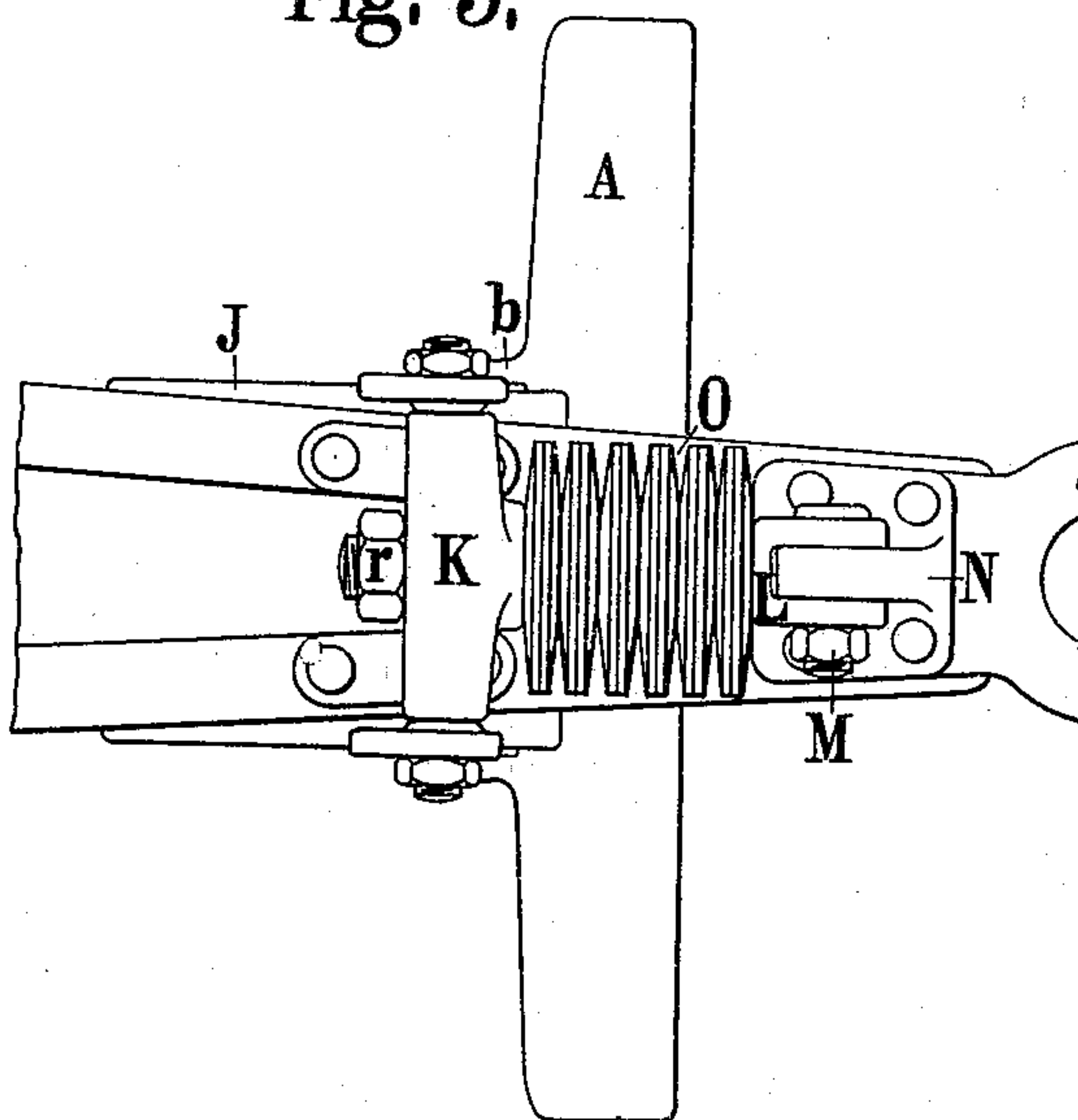


Fig. 5.



Witnesses:
G. W. Cusumbrum
E. Hendrickson

Inventor:
Adolf Resow
by *Chas. J. Cusumbrum*
Atty.

NO 616,687.

A. RESOW.
GUN CARRIAGE.

Patented Dec. 27, 1898.

(No Model.)

(Application filed Dec. 31, 1897.)

4 Sheets—Sheet 3.

Fig. 6.

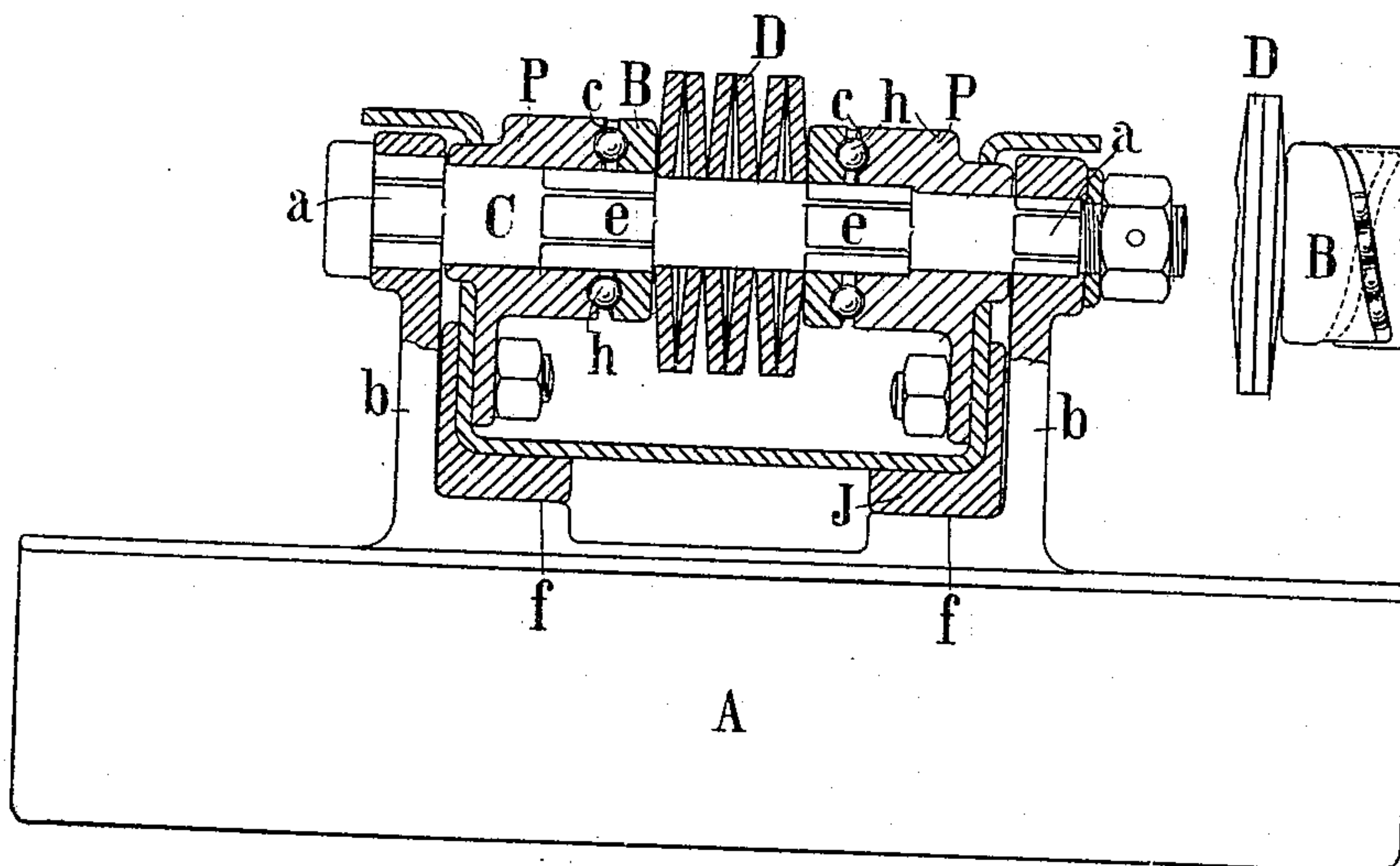


Fig. 10.

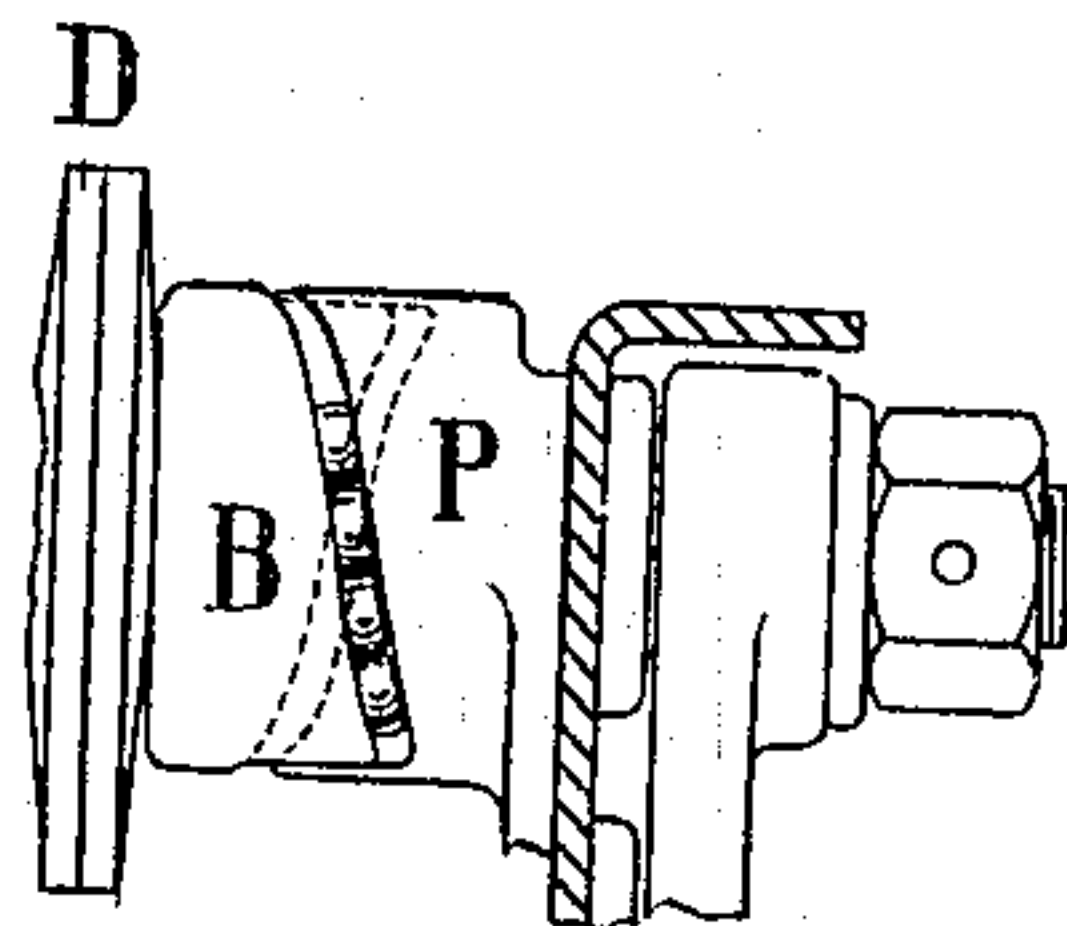
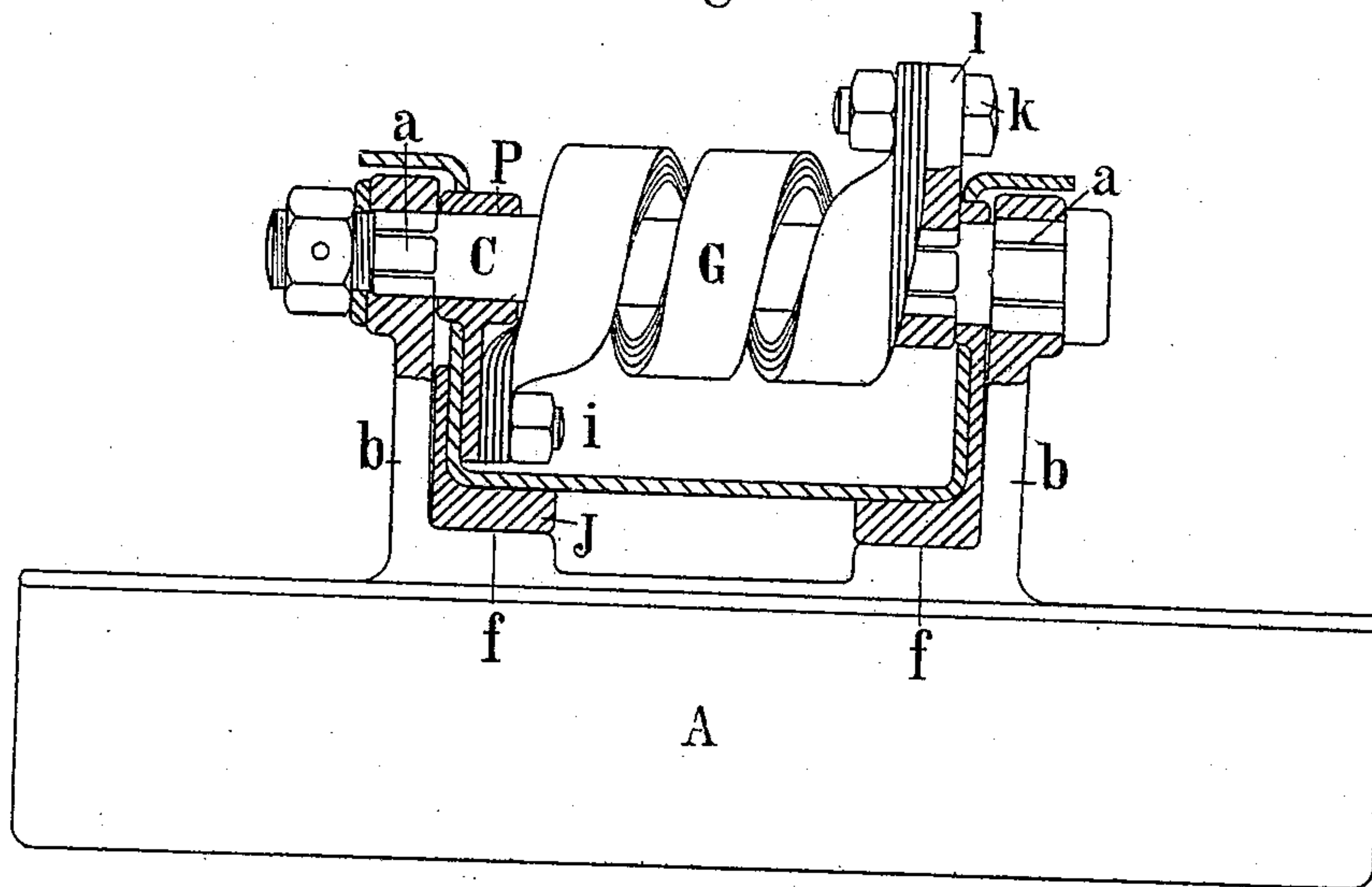


Fig. 8.



Witnesses;
G. W. Eisenbraun
C. Audrickson

Inventor:
Adolf Resow
By *Alfred A. [unclear]*
Atty.

No. 616,687.

Patented Dec. 27, 1898.

A. RESOW.
GUN CARRIAGE.

(Application filed Dec. 31, 1897.)

(No Model.)

4 Sheets—Sheet 4.

Fig. 7.

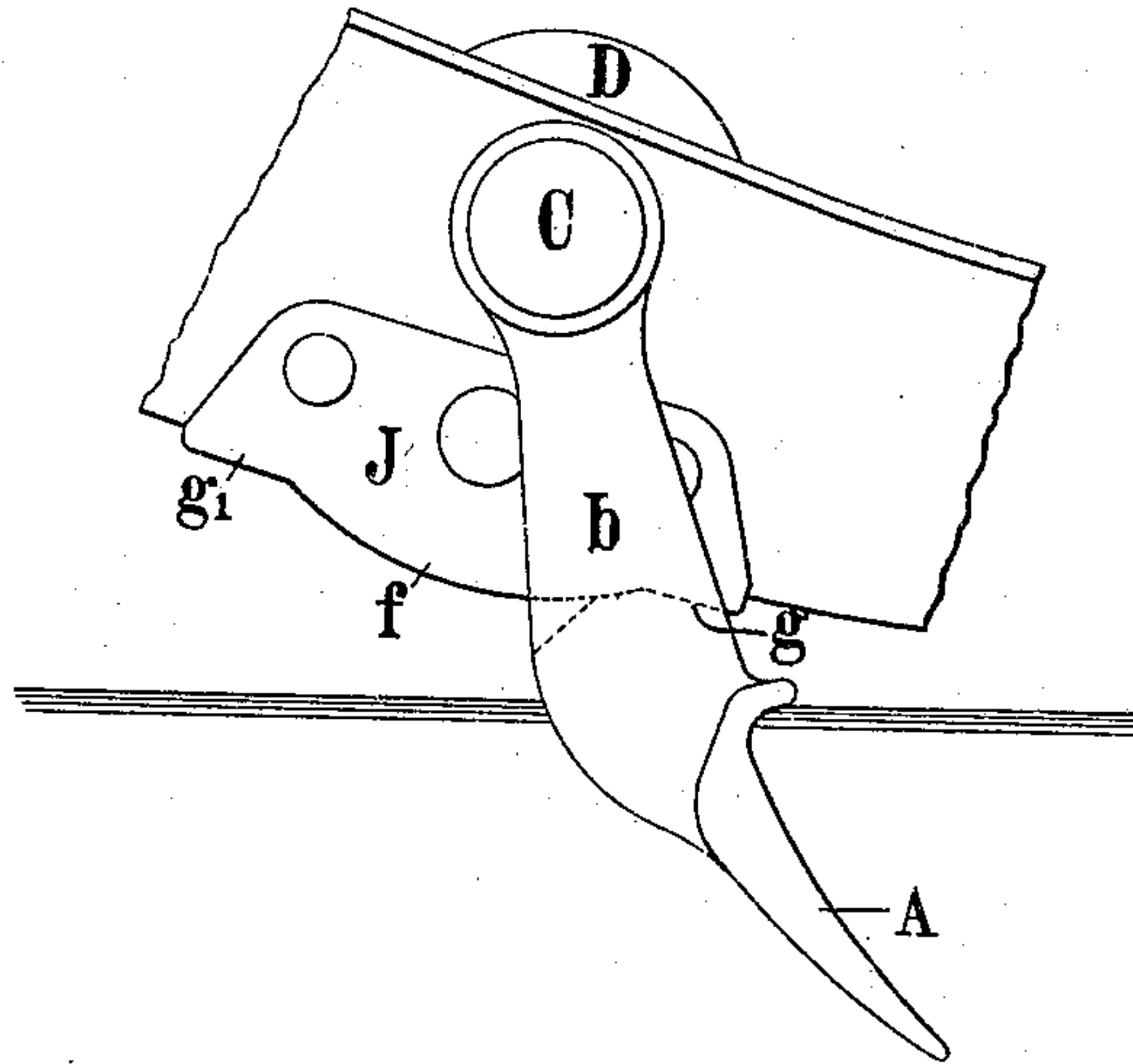
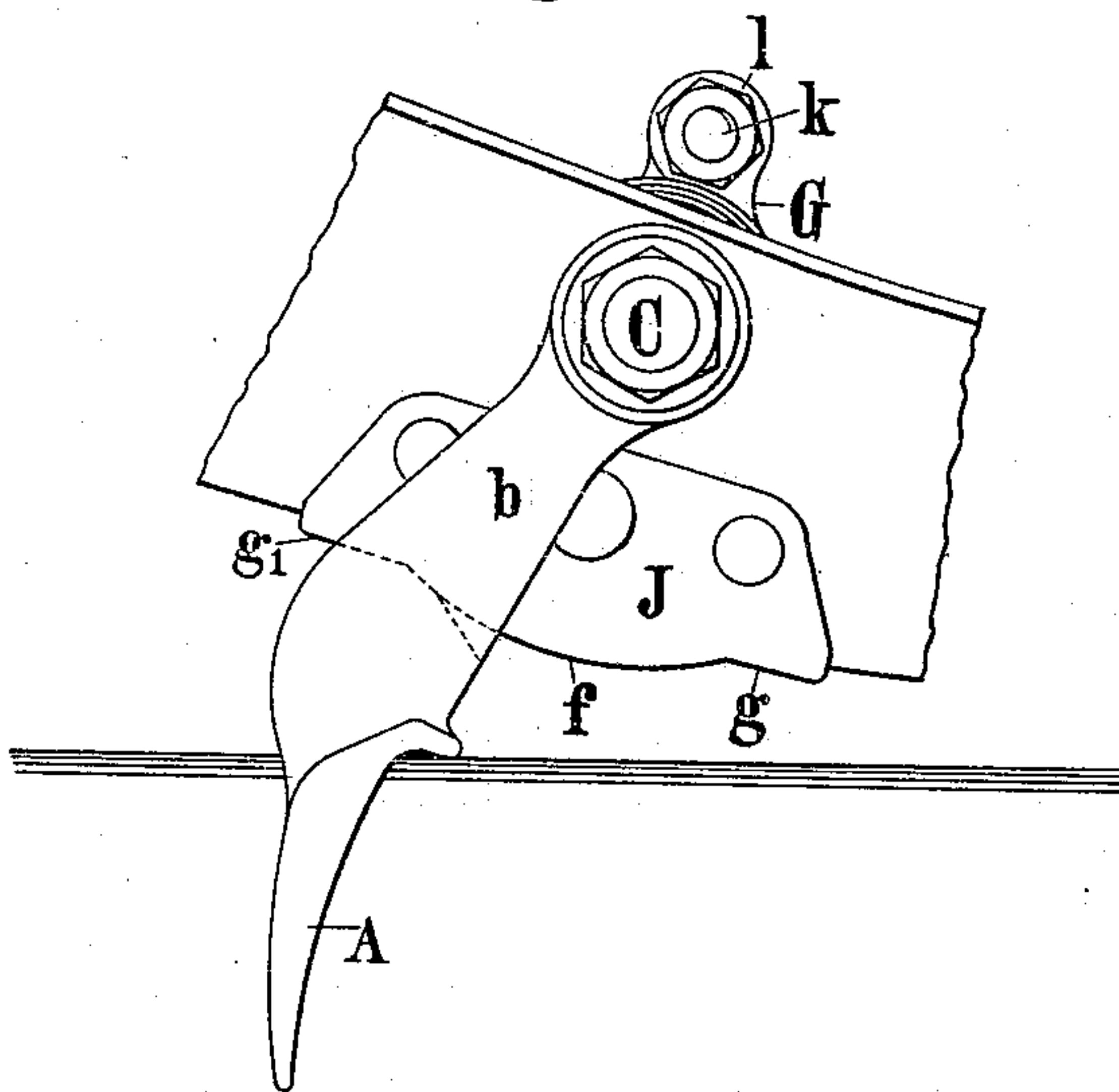


Fig. 9.



Witnesses:
G. W. Eisenbraun
E. Hendrickson

Inventor:
Adolf Resow
by *W. H. H. H. H.*
Att'y.

UNITED STATES PATENT OFFICE.

ADOLF RESOW, OF ESSEN-ON-THE-RUHR, GERMANY, ASSIGNOR TO FRIED.
KRUPP, OF SAME PLACE.

GUN-CARRIAGE.

SPECIFICATION forming part of Letters Patent No. 616,687, dated December 27, 1898.

Application filed December 31, 1897. Serial No. 665,062. (No model.)

To all whom it may concern:

Be it known that I, ADOLF RESOW, a citizen of the German Empire, residing at Essen-on-the-Ruhr, Germany, have invented new and
5 useful Improvements in or Connected with Gun-Carriages, (for which I have obtained patents in Germany, No. 87,996, dated August 28, 1894, and No. 88,540, dated July 23, 1895; in Austria, Vol. 45, page 1236, dated April 7, 1895;
10 in France, No. 245,220, dated February 19, 1895; in Belgium, No. 114,135, dated February 16, 1895; in Italy, Reg. Gen., Vol. XXIX, No. 38,422, Reg. Att., Vol. LXXV, No. 254, dated March 31, 1895; in Spain, No. 17,208,
15 dated June 25, 1895; in Sweden, No. 7,367, dated April 1, 1895; in Denmark, No. 673, dated July 30, 1896, and in England, No. 3,165, dated February 13, 1895,) of which the following is a specification.

20 This invention relates to an improvement in the carriages of traveling guns, such as field-guns and the like, and has for its object to considerably shorten the recoil movement of the latter and to utilize a portion of the
25 force of the recoil for automatically advancing the gun into its original position. This is effected by the use of a sort of spade, pick, or blade, which is pivotally connected with the walls or side frames of the carriage by
30 means of a bolt fixed thereto near the trail or tail end of the gun-carriage and which is held by means of an elastic buffering device inserted between it and the side frames in such a position while it is at rest that it will be
35 driven into the ground by the recoil when the first shot is fired. The ground then offers a certain amount of resistance to the yielding or rearward movement of the pick, spade, or blade when a shot is fired, which even in soft
40 ground is somewhat greater than that of the buffering device. The lowermost edge of the pick, spade, or blade remains, therefore, fixed in the ground after firing, while its upper portion shares the recoil movement of the carriage trail or tail end connected therewith.
45 This recoil movement is, however, very small, because the rotation of the pick (which allows of such recoil) about its bolt is limited. The arrangement is such that after the pick has
50 placed the buffering device to a certain degree under strain the pick bears against the

frames of the carriage, and thus assumes a position approximately perpendicular to the surface of the ground, whereby the resistance of the ground is increased to its maximum. 55
Now since the pick forms a rigid whole with the carriage, the recoil, which is somewhat reduced by the work consumed in placing the buffering device under strain and in turning back the pick, and has thus considerably lost 60
in its injurious influence upon the carriage, is no longer able to produce a further appreciable rearward movement of the gun. When the recoil force has been completely consumed in this manner, that portion of it which 65
has been stored up in the buffer comes into operation and produces a relative rearward rotation of the pick into its original position; but since the pick cannot yield by reason of its lower edge being fixed in the ground this 70
lower edge therefore serves as an abutment or pivot about which the upper part of the pick will rotate in a forward direction. In this manner the pick serves to move the entire gun back into the original position. 75

The accompanying drawings illustrate a number of slightly-different modifications of the above-described invention, which are, however, similar in their mode of operation.

One modification is illustrated in Figures 80 1, 2, and 3. A second modification is shown in Figs. 4 and 5. A third modification is shown in Figs. 6, 7, and 10, and a fourth modification in Figs. 8 and 9.

The device for arresting the recoil consists 85 of the spade, pick, or blade A, hereinafter called "pick," which, together with its two arms b, is pivoted on a bolt C, fixed to the gun-carriage near the trail of the said carriage. In Figs. 1, 4, and 7 the pick A is shown in its 90 initial or rest position and in Figs. 3 and 9 in its recoiled position.

In the arrangement shown in Figs. 1 to 3 the pick or blade is formed as a one-armed lever which bears against the head of the 95 buffer-bolt E, with its tongue d situated between the two arms b. This bolt E serves to guide the elastic buffer F (shown in the drawings as being a rubber buffer) and is itself guided by means of a sleeve G, fixed to 100 the transverse stay H of the side frames. A screw-nut g on the buffer-bolt E allows of

adjusting the initial strain of the elastic buffer F, according to requirements. To the side frames there are fixed guide-pieces J, which have a twofold purpose. First, they serve to relieve the bolt C of the vertical pressure of the weight of the gun and of the recoil, and for this purpose their lower surfaces are cylindrical and concentric with the bolt C, and they constitute the slideway for the corresponding hollow surfaces of the pick A, while the bolt C may have a slight amount of play in the eyes of the arms *b* of the pick. The plane surfaces *g g'*, which form the terminations of the cylindrical surfaces *f* and upon which the pick bears with similar plane surfaces in its end positions, also serve to limit the rotary movement of the pick. By this means it is possible not only to keep the strain to which the buffer is exposed within determined limits independently of the nature and resistance of the ground, but also to determine the end position of the pick shown in Figs. 3 and 9 independently of the nature of the ground in such a manner as is necessary for most effectively preventing the recoil. The initial and end strain of the buffer is made such that it will be borne or resisted even by very soft ground, but will be quite adequate to produce the certain advance of the gun.

In the arrangement shown in Figs. 4 and 5 the arms *b* of the pick are prolonged beyond the pivot C and are connected at their ends to the pins or journals of the cross-head K. In the center of the latter there is fixed, by means of the screw-nut *r*, the buffer-bolt L, the other end of which is formed with an eye or ring. This eye embraces the bolt M, which is fixed in bearings N on the trail of the carriage and by means of which the buffer-bolt L is movably jointed to the side frames. An elastic body—such, for example, as the pile or series of springs O, (shown in Figs. 4 and 5,) mounted on the buffer-bolt—bears at one end against the cross-head K and at the other end against the eye of the buffer-bolt. The strain thereon may be regulated according to requirements by means of the nut *r*. The guide-pieces J have the same shape and serve the same purpose as those in Figs. 1 and 3.

In the arrangement shown in Figs. 6 and 7 the bolt C is capable of rotation in the suitably-bored bearings P, fixed to the side frames, while the arms *b* of the pick A are slipped with their prismatic cavities or polygonal apertures over similarly-formed places *a* on the bolt, so that when they (the arms *b*) rotate the latter (the bolt) is also rotated. The inner end surfaces *c* of the two bearings P have the shape of a single or multiple screw-surface, the generating-line of which intersects the axis of the bolt C at right angles. Against these end surfaces are pressed the similarly-formed outer end surfaces of the two annular pieces B by the series of springs D, which are mounted upon the mid-

dle of the bolt C. The annular pieces B are also mounted upon prismatic or polygonal parts *e* of the bolt C in such a manner as to be obliged to rotate therewith, but so as to be capable of moving laterally thereon in the direction of the length of the bolt. Now when the pick A is caused by the recoil to turn about the axis of the bolt C the arms *b* of the pick compel the bolt C, and consequently also the annular pieces B, to rotate therewith, the result being to compress the springs D, because the inner surfaces of the annular pieces are brought nearer together by reason of the helical form of their outer end surfaces and of the inner surfaces of the bearings P. When the force of the recoil has been consumed, the strained springs D come into operation and force the annular pieces B apart. These are caused by the sliding motion of their outer helical surfaces on the inner surfaces *c* of the bearings P to rotate backward. They also compel the bolt C to share this motion. The bolt C turns the pick back again into its original position with reference to the gun-carriage, which is thereby moved forward again into position ready for firing. For the purpose of reducing the friction between the helical surfaces of the bearings and of the annular pieces balls *h*, running in turned grooves, may be inserted into part of the space between the said screw-surfaces, as indicated in Fig. 10.

In the arrangement shown in Figs. 8 and 9 the pick A is also fixed to the bolt C by means of the cavities of the arms *b*, which are suitably formed to receive the prismatic or polygonal parts *a*, so that when the pick rotates about its axis the bolt C will also rotate therewith. It will be noticed that on the bolt C, Fig. 6, each hexagon is followed to the right by a cylindrical part of smaller diameter than the inscribed circle of the hexagon, so that the bolt C can be inserted into the parts P, B, and D, previously assembled in their relative positions, for which purpose they may be first arranged on a short bolt, which is pushed out by inserting the bolt C. In its position of rest the pick is held by means of a spring G, which is composed of plates coiled in helical manner and inclosing the bolt C. One end of this spring is fixed by means of a screw-bolt *i* to the bearing P of the bolt connected to the side frame, and its other end is fixed by means of a screw-bolt *k* to an arm which rotates with the bolt. The mode of operation is exactly the same as in the preceding arrangement.

I claim—

1. In recoil-brakes for field-gun carriages, the combination of a pick extending transversely beneath the trail and provided with two upwardly-extending arms *b* pivoted to the trail; two guide-pieces J with stops *g g'*, for guiding the pick, taking up the vertical pressure and for limiting the throw of the pick in both directions; and an elastic body interposed between the frame of the gun and the

pick, adapted to be placed under tension by the recoil and to run the gun back into battery, substantially as described.

2. In recoil-brakes for field-gun carriages, the combination of a pick extending transversely beneath the trail and provided with two upwardly-extending arms *b* pivoted to the trail; two guide-pieces *J* with stops *g g'*, for guiding the pick, taking up the vertical pressure and for limiting the throw of the pick in both directions; a shaft transversely mounted on the frame of the carriage, the arms *b* secured on the outer ends of said shaft, so as to form a pivotal connection between the arms *b* and the frame, and a spring between the bearings of said shaft, adapted to be placed under tension by the recoil, and to run the gun back into battery, substantially as described.

3. In recoil-brakes for field-gun carriages, the combination of a pick extending trans-

versely beneath the trail and provided with two upwardly-extending arms *b* pivoted to the trail; two guide-pieces *J* with stops *g g'*, for guiding the pick, taking up the vertical pressure and for limiting the throw of the pick in both directions; the shaft *C* transversely mounted on the frame of the carriage; the arms *b* secured to the outer ends of said shaft, so as to form a pivotal connection between the arms *b* and the frame; and a spiral torsional spring having one end fixed to the frame and the other end to an arm projecting from the shaft *C*, substantially as and for the purpose specified.

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

ADOLF RESOW.

Witnesses:

WILLIAM ESSENWEIN,
CARL POHLIT.