No. 620,360. Patented Feb. 28, 1899.

A. RESOW.

GUN CARRIAGE.

(Application filed Dec. 31, 1897.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

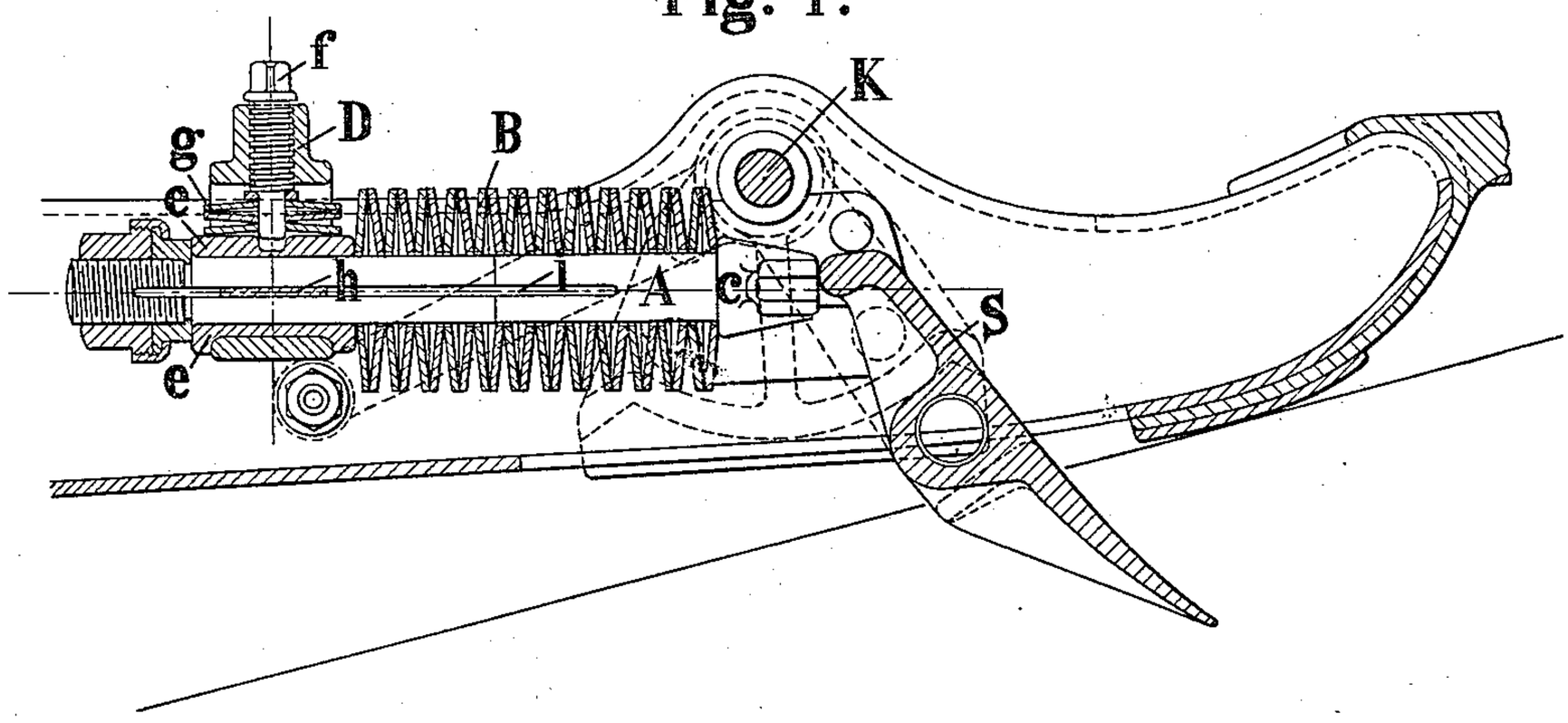
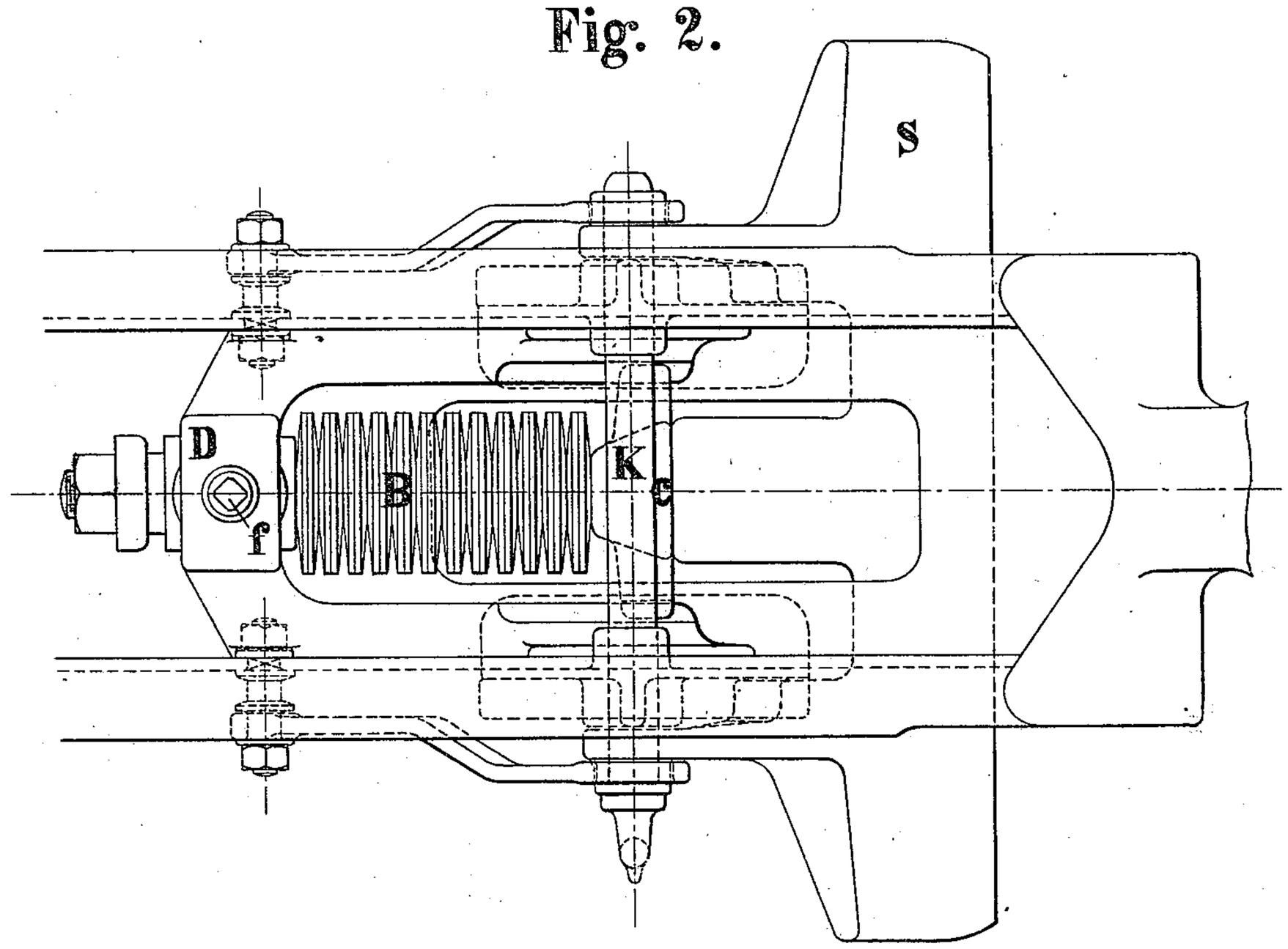


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

Fig. 3.

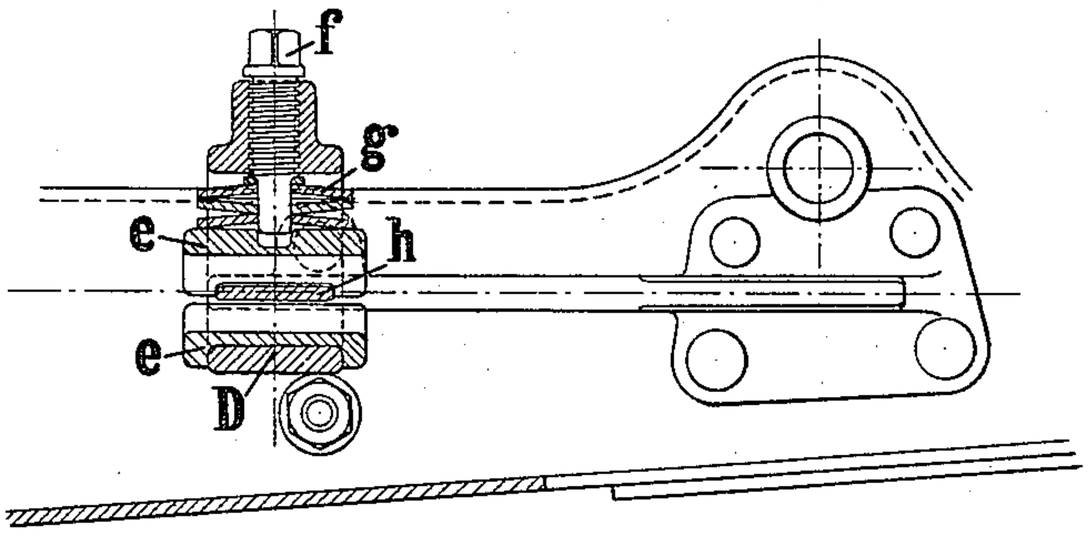


Fig. 4.

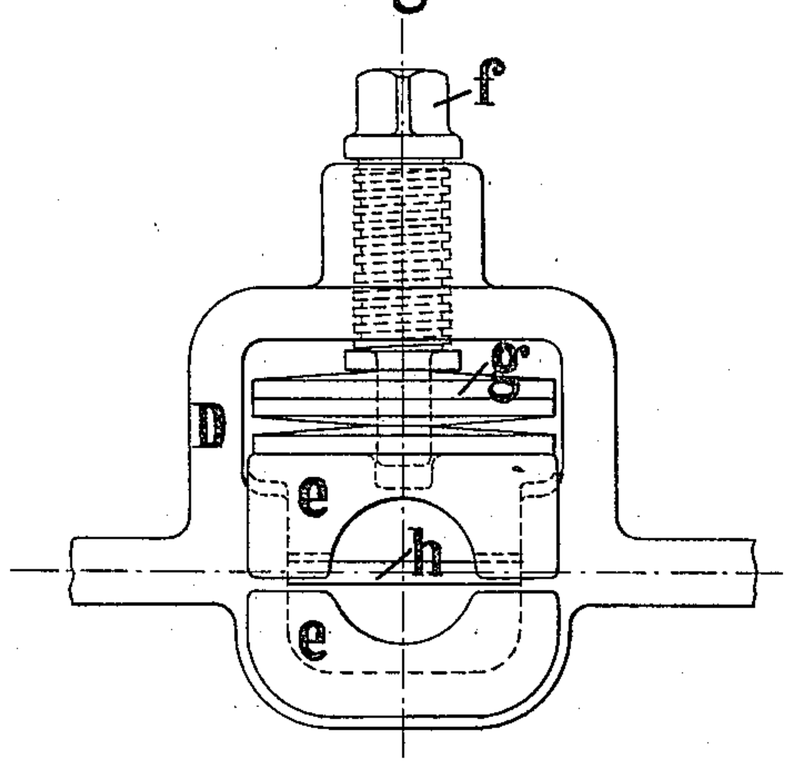


Fig. 5.

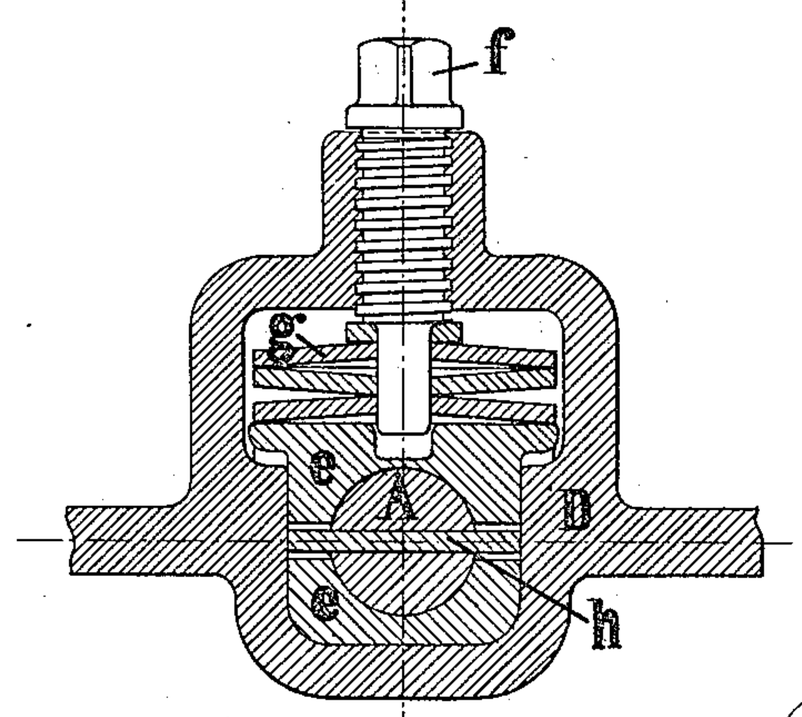
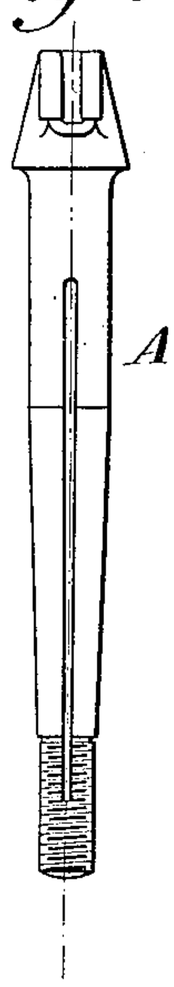


Fig. 6.



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UNITED STATES PATENT OFFICE.

ADOLF RESOW, OF ESSEN, GERMANY, ASSIGNOR TO FRIED. KRUPP, OF SAME PLACE.

GUN-CARRIAGE.

SPECIFICATION forming part of Letters Patent No. 620,360, dated February 28, 1899.

Application filed December 31, 1897. Serial No. 665,063. (No model.)

To all whom it may concern:

Be it known that I, ADOLF RESOW, a citizen of the German Empire, residing at Essen, Germany, have invented new and useful Improvements in or Connected with Gun-Carriages, (for which I have obtained Letters Patent in Germany, No. 98,219, dated April 13, 1897; in Austria, Vol. 47, page 4805, dated November 16, 1897; in France, No. 271,187, dated October 11, 1897; in Belgium, No. 131,187, dated October 11, 1897; in Italy, Reg. Gen., Vol. XXXIII, No. 46,194, Reg. Att., Vol. XC, No. 169, dated December 31, 1897; in Spain, No. 21,657, dated December 10, 1897; in Sweden, No. 9,122, dated September 27, 1897; in Norway, No. 6,350, dated October 7, 1897; in Denmark, No. 1,777, dated August 25, 1898; in England, No. 23,445, dated October 12, 1897, and in Switzerland, No. 15,354, dated September 24, 1897,) of which the following is a specification.

In guns which are required to fire quickly it is necessary not only to reduce the recoil as much as possible, but also to allow the gun to have automatically such an amount of running-out movement as will cause it to return wholly or nearly into its original position. The checking of the recoil may be effected by means of friction, hydraulic brake, spring-brake, &c. The automatic running out of the gun may be effected by means of gravity or even by means of springs.

In the case of a variable nature of the running-surface of the gun the recoil and also the running out become irregular or non-uniform if the recoil-brake and the running-out apparatus cannot be adjusted to suit the nature of the said running-surface.

The want of uniformity of the running-surface is especially great in the case of guns which are fired while situated on ordinary soil or ground, because the said ground is generally of very variable nature and may also be inclined in different directions. If, for example, a recoil-brake and a running-out apparatus be so arranged that the recoil and the running out of the gun will be approximately equal upon medium horizontal ground, then the said gun will have considerably too much recoil and too little running-out movement in the case of soft ground having an inclination to the rear, whereas the same gun will have too little recoil and too much forward movement in the case of hard ground having a forward inclination. It is therefore important to be able to regulate the force of the recoil-check and of the running-out movement to suit the nature of the running-surface in order to keep variations from the normal movement within allowable limits. The apparatus hereinafter described is now designed to solve this problem.

The drawings illustrate the apparatus in its application to a spur for wheeled gun-carriages of German Patent No. 88,540 of 1895. It can, however, be applied to any other recoil-checking device having a running-out movement.

In the drawings, Figure 1 is a longitudinal section of the apparatus. Fig. 2 is a plan view of Fig. 1. Fig. 3 is a longitudinal sectional view of the friction-bearing and of part of the trail. Fig. 4 is an end view of the friction-bearing. Fig. 5 is a cross-section of the friction-bearing. Fig. 6 is a detail view of thrust-rod A, Figs. 1 and 5, with its conical feature a little exaggerated.

Similar letters refer to corresponding parts throughout the several views.

In Figs. 1 to 5 of the drawings, A is the thrust-bolt, carrying the dish-springs B, which are compressed during recoil by the spur S by means of the head *c* of the thrust-bolt A, whereby the recoil is checked and the necessary work is stored for running out the gun. The thrust-bolt A does not bear with its front end in a fixed bearing or support, as is the case with the ordinary spring-spur, but it bears in a thrust-bearing. This thrust-bearing consists of the fixed journal-box D, the adjustable brasses *e*, and of the thrust-plate *h*, which latter is situated in a slot *i* of the pressure-bolt A. The brasses *e* and also the halves (separated by the slot *i*) of the thrust-bolt may be pressed against each other and against the thrust-plate *h* by means of a thrust-screw *f* through the medium of an elastic intermediate layer shown in the drawings as consisting of the compression-springs *g*. In the present arrangement the shank of the thrust-bolt A is conical, and its end nearest the head *c* is thicker than the other end.

This has for result that according as the shank of the thrust-bolt enters the thrust-bearing during the compression of the springs B the brasses *e* are forced by the conical shank A apart, and consequently the compression-springs *g* are compressed, thereby increasing their tension, and consequently also the pressure between the bearing-steps and the thrust-bolt or thrust-plate. In case this effect is not desired the shank of the bolt A may be cylindrical.

The brake operates in the following manner: By the pressure of the thrust-screw *f* upon the springs *g*, and consequently upon the brasses, friction is produced between the brasses, the thrust-plate, and the thrust-bolt, which friction has a tendency to resist the motion of the thrust-bolt. If during the recoil of the gun the thrust-bolt is forced forward by the spur, the work of recoil is diminished by the sum of the work of the spring-tension and the work of the bolt-friction, whereas after the termination of the recoil only the difference between the work of the spring and the work of friction is available for the purpose of running out the gun. Therefore the stronger the thrust-screw is tightened up the more energetically will the recoil be braked, and also at the same time the running-out movement be decreased in force.

The conical form of the shank of the thrust-bolt, and the thereby resulting variability of the friction, enables the difference between the tension of the dish-springs B and the friction—that is to say, the force for running out the gun—to be kept within determined limits in all positions of the spur—that is, at all stages of the recoil. By tightening the thrust-screw *f* with more or less power the said force can be varied very abundantly or within very wide limits, and consequently can be adjusted to the nature of the surface on which the gun is supported—*i. e.*, of the running-surface of the gun—so that in this manner the recoil and the running-out movement can be regulated accordingly.

The action of the above-described apparatus is not altered if instead of dish-springs for checking the recoil there be employed another checking force—such, for example, as a hydraulic brake—and if instead of a spring-spur for producing the running-out movement there be employed another force—such, for example, as that of gravity, compressed air, &c. In such cases only the connection of the regulating apparatus with the brake is modified.

I claim—

1. In a recoil apparatus for field-gun carriages, the combination of the brake-spur; the thrust-bolt A having a head *c* engaging the spur and a slotted shank journaled at the forward end in a fixed box D; an adjustable friction-bearing; a thrust-plate *h* traversing the slot of the shank of the bolt A and means substantially as described for exerting an adjustable yielding pressure on the bolt; thereby creating an adjustable degree of friction on the bolt and between the surfaces of the slot in the bolt and the plate *h*, substantially as and for the purpose specified.

2. In a recoil apparatus for field-gun carriages, the combination of the brake-spur; the thrust-bolt A having a head *c* engaging the spur and a slotted shank journaled at the forward end in a fixed box D with adjustable brasses *e;* a thrust-plate *h* traversing the slot of the shank of the bolt A and means substantially as described for exerting an adjustable yielding pressure on the brasses; thereby creating an adjustable degree of friction between the brasses and the shank, and also between the surfaces of the slot and the plate *h*, substantially as and for the purpose specified.

3. In a recoil apparatus for field-gun carriages, the combination of the brake-spur S; the thrust-bolt A having a head *c* engaging the spur, and a conical slotted shank supported at its forward end in conical brasses *e* adjustably secured within a brake-box D with adjusting-spring *g*, adjusting-bolt *f;* and thrust-plate *h* traversing the slot of the thrust-bolt, whereby the friction between the brasses *e* and the bolt, as well as between the thrust-plate *h* and the surfaces, is regulated, and the friction in running into battery is decreased, 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.