J. ERICSSON.

Operating Gun Carriage.

No. 40,919.

2 Sheets—Sheet 1.

Patented Dec. 15, 1863.

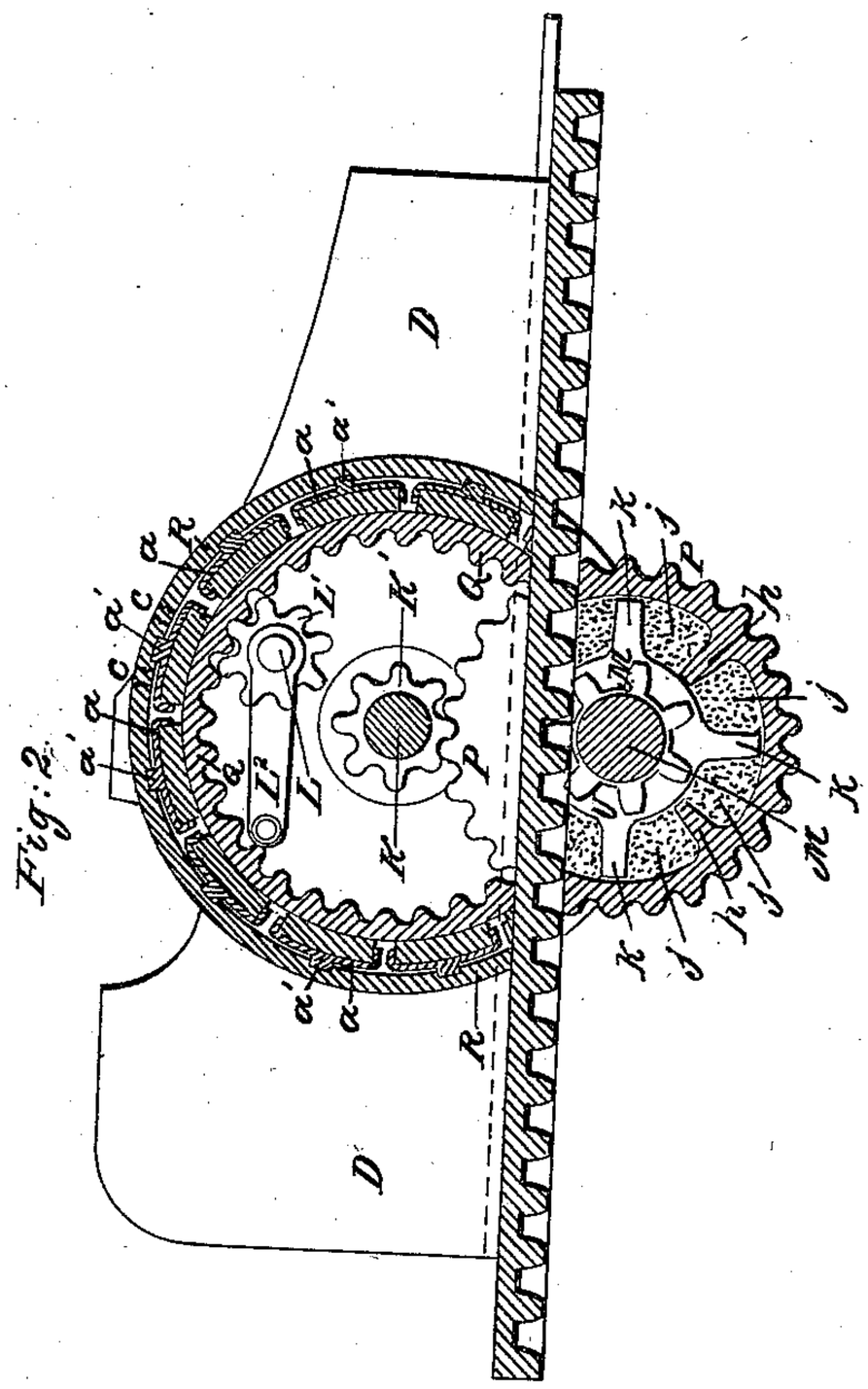

Fig. 2.

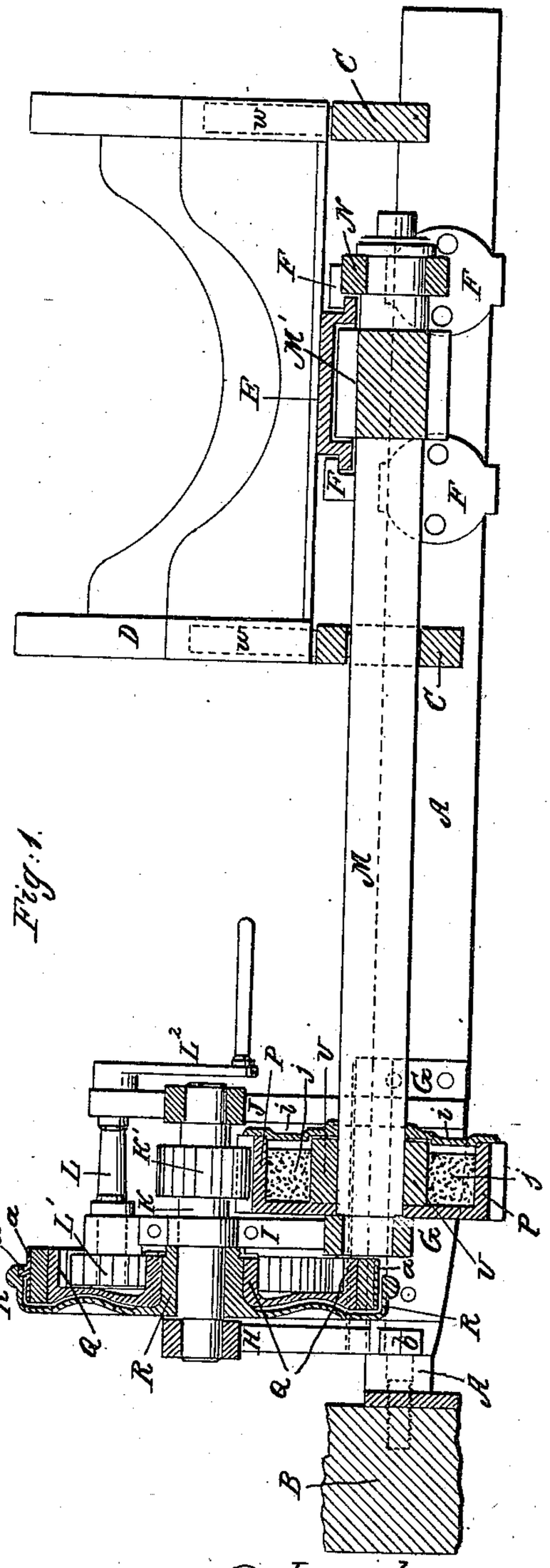

Fig. 1.

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Fig. 3.

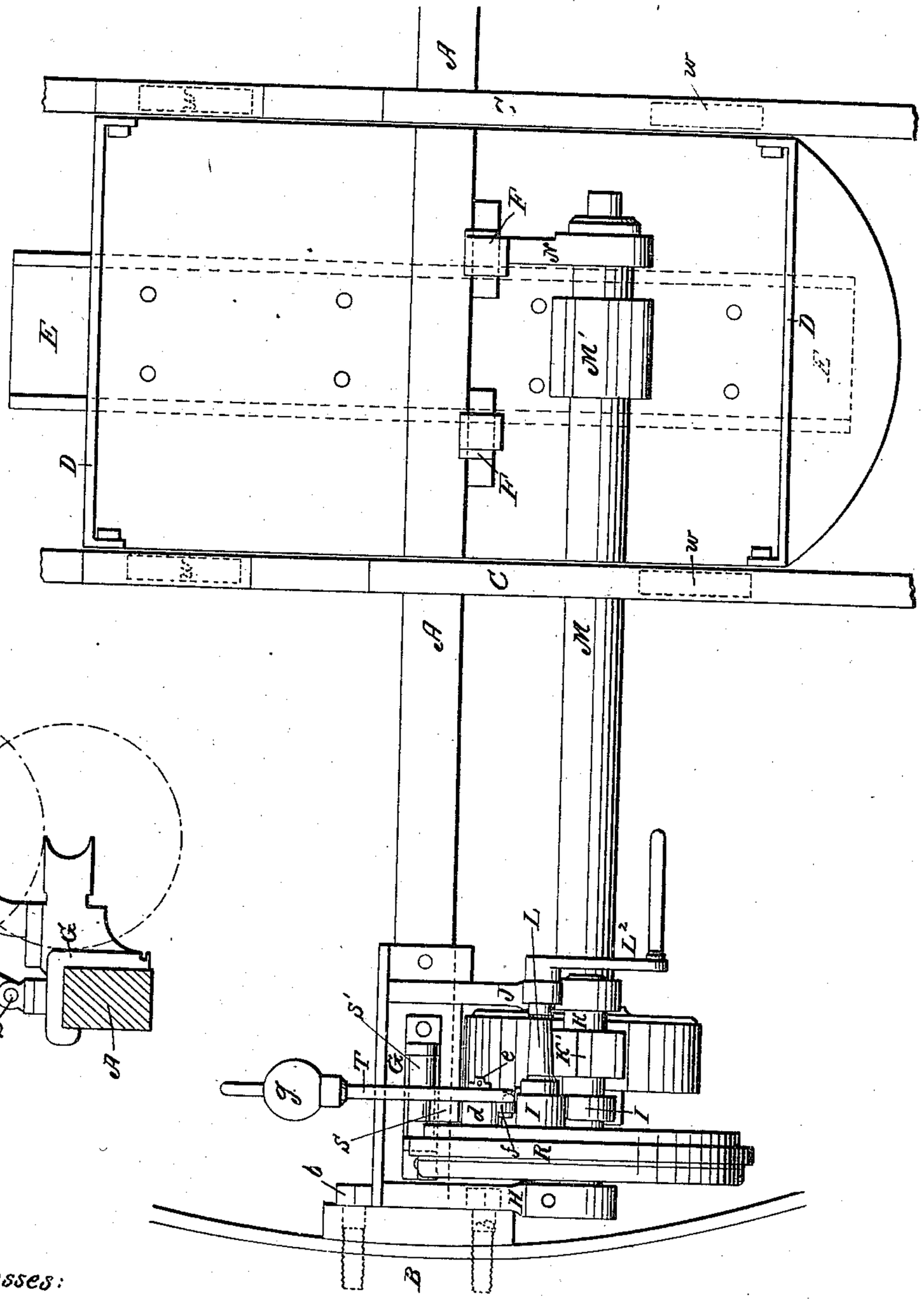
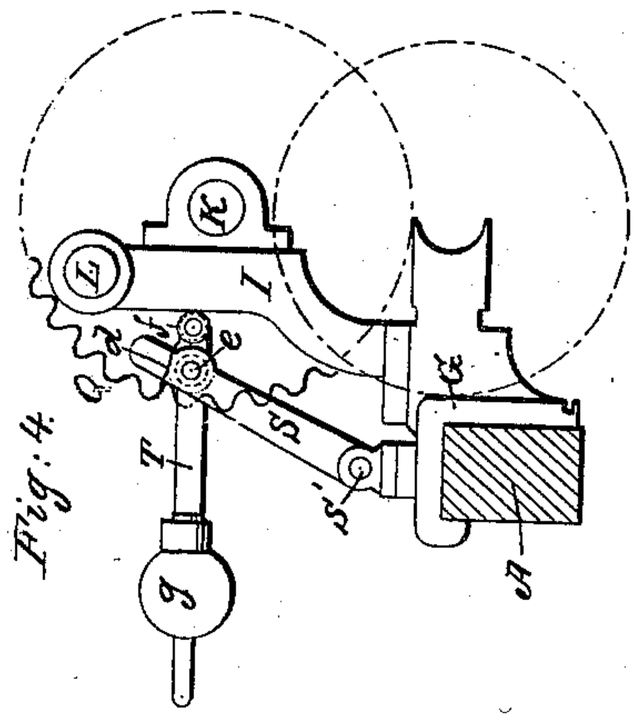


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOHN ERICSSON, OF NEW YORK, N. Y.

IMPROVEMENT IN OPERATING GUN-CARRIAGES.

Specification forming part of Letters Patent No. **40,919**, dated December 15, 1863.

To all whom it may concern:

Be it known that I, JOHN ERICSSON, of the city, county, and State of New York, have invented certain new and Improved Means of Working and Controlling the Recoil of Gun-Carriages; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical section of my invention, showing its application to a gun-carriage, the plane of section being transverse to the carriage. Fig. 2 is a vertical section of the same at right angles to Fig. 1. Fig. 3 is a plan of the same. Fig. 4 is a detail view, which will be hereinafter explained.

Similar letters of reference indicate corresponding parts in the several figures.

The object of this invention is to enable heavy guns, placed in turrets or otherwise, to be worked with the least possible number of hands, and to reduce the recoil in the greatest possible degree.

The invention consists, first, in the employment, for controlling and checking the recoil of a gun-carriage, and for holding the same stationary while loading and at other times, of a self-acting friction brake or clutch, detached from the carriage, but geared therewith by a suitable system of toothed gearing.

It consists, secondly, in the employment of the same system of gearing by which the gun-carriage is geared with the aforesaid friction brake or clutch, for the purpose of running the carriage out for firing, or of moving it (the carriage) in or out for any other purpose.

It consists, thirdly, in so applying and arranging the two portions Q R of the friction brake or clutch in connection with the gearing by which the gun is worked, and so arranging a movable stop to act on teeth provided on one portion of the brake or clutch, that by the mere shifting of the stop the brake or clutch is brought either to a condition to check the recoil of or secure the carriage, or to a condition to permit the carriage to be run out or in freely.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation with reference to the drawings, which represent the application of the invention within a turret.

A is a wrought-iron beam, extending across the lower part of the turret in a direction transverse to that in which the gun-carriage is intended to run, and bolted securely to the turret B, as shown at *b b*. Only a small portion of the turret is represented.

C C are two parallel beams, upon which the gun-carriage D runs, extending across the turret at right angles to A, and supported partly upon A and partly by being bolted to the turret.

The carriage D is represented in blue outline in Figs. 2 and 3, but in black in Fig. 1. It is of substantially the same form as other navy gun-carriages, and its wheels *w w* run directly upon the track-beams C C.

E is a straight-toothed rack, attached rigidly to the lower part of the carriage, and arranged lengthwise thereof, and with its pitch-line parallel with the straight upper faces of the track-beams C C.

F F are two lipped plates, bolted to the beam A, and entering rabbets formed in the sides of the rack E, for the purpose of holding down the carriage upon its track.

G H I J is a framing bolted upon the beam A near the wall of the turret, and containing or having secured to it the bearings for the short shafts K and L, and one of the bearings of the longer shaft M, the other bearing of which is in a bracket, N, secured to the beam A under the gun-carriage. The shafts above mentioned are parallel with each other and at right angles to the tracks C C. The long shaft M carries a pinion, M′, which gears with the rack E, and a spur-gear, P, which gears with a pinion, K′, on the shaft K. The shaft K also carries the two portions Q R of the friction-clutch, of which the portion Q is constructed with teeth on its interior to constitute an internally-toothed gear, and it gears with a pinion, L′, on the shaft L. The latter shaft is furnished with a hand-crank, L^2, by the turning of which by one man the gun-carriage may be run out or in, as will be presently described. The two portions Q and R of the friction-clutch may both be considered as wheels, as they resemble wheels in construction. The wheel R is keyed or otherwise firmly secured upon the shaft K, and the wheel Q is fitted to turn loosely upon the hub of R. The interior of the rim of R is fitted all around with loose segments *a a*, lined with wood, like ordinary brake-shoes, to

press against the outer periphery of the rim of the wheel Q, which is arranged within the rim of R. The segments *a a* are made with tenons, as shown at *a'* in Figs. 1 and 2, entering mortises in the rim of the wheel R, to compel the said wheel and segments to turn together and prevent either from turning independently of the other or others. Set-screws *c c*, Fig. 2, are also applied in the rim of R, to set the segments to press as tightly as may be desired upon the rim of the wheel Q.

S, Figs. 3 and 4, is a lever attached rigidly to a rock-shaft, S', which rocks in suitable bearings supported on the base of the frame G H I J in such a position that the said lever works transversely to the shaft K, very near the inner side of the wheels Q R. This lever has formed upon its head a strong tooth or stop, *d*, of a form to enter and fit one of the spaces between the teeth of the wheel Q, as shown in Fig. 4, which is a side elevation of the parts involved in the action of the stop *d*. The lever S has pivoted to it by a pin, *e*, a second lever, T, which carries a roller, *f*, at the end of its shorter arm, and a weight, *g*, at the end of its longer arm, the roller being so arranged that by bearing against the standard I it may hold the stop-tooth *d* of the lever S in one of the spaces between the teeth of the wheel Q. The weight *g* keeps the roller up to the necessary position to effect this; but the standard I is so formed that by lifting up the end of the lever to which the weight *g* is applied, by hand or by a suitable tackle, the roller, in descending the surface of the said standard, permits the lever S to fall back toward the shaft K, and so allows the tooth or stop *d* to fall out of gear with the wheel Q. This action of the lever S is aided by the weight of the lever T. It is only when the carriage is to be run out or in, and while running it out or in, that the weighted end of the lever T is raised and the stop *d* thrown out of gear from the wheel Q, as above mentioned. At all other times the stop is to be in gear and the said wheel locked. As soon as the gun has been run out for firing, the stop is thrown into gear, and when the recoil takes place the rack E, running back with the carriage, transmits rotary motion through the pinion M' to the shaft M and spur-gear P, and the said gear gives motion through the pinion K' to the shaft L and the wheel R, which is fast upon the said shaft; but the wheel Q, being locked and prevented from rotating, produces by means of its segments *a a* such a degree of friction upon the said wheel R that the recoil is checked from the commencement and stopped before the carriage has run far back. Except in case of the recoil in firing, the friction between the wheels Q R is sufficient, when the wheel Q is locked, to prevent the carriage from moving, so that the gun can never get adrift in bad weather or from any accident. When the wheel Q is unlocked, by raising the weighted end of the lever T and throwing the stop *d* out of gear, the carriage can be run back or forth by turning the crank L^2. This turns the shaft L and pinion L', and the latter gives motion to the wheel Q, which, by means of the friction between it and the wheel R, carries with it the latter wheel, and so turns the shaft K and pinion K'. The latter pinion gives motion through the gear P to the shaft M and pinion M', and so by the action of M' upon the rack E produces the movement of the carriage.

The application of springs to prevent the too sudden checking of the recoil of the carriage by the friction brake or clutch Q R, is illustrated in Figs. 1 and 2. These springs *j j*, made of vulcanized india-rubber, are applied within the wheel P, which is made in the form of a box or hollow drum, as shown in Fig. 1, and with a number of deep radial projections, *h h*, extending all across the interior of its rim. This box or drum like wheel is fitted loosely to the shaft M, and one of its heads, *i*, is movable, to enable it to receive within it a driver, U, and the springs *j j*. The driver U, which is keyed or otherwise made fast upon the shaft M, is composed of a boss or hub having a number of radial arms, *k k*, corresponding in number with the projections *h h* inside of the gear P, the said arms extending all across the box-like interior of the gear. The projections in the gear P reach to or very nearly to the hub of the driver, and the arms *k k* reach very nearly to the rim of the gear, so that a number of nearly close compartments are formed within the gear for the reception of the springs *j j*, which consist of solid blocks of india-rubber, fitted closely between the arms *k k* and projections *h h*, as shown in Fig. 2, but not quite filling up the space between the heads of the box or drum, (see Fig. 1,) in order that when compressed between the said arms and projections they may expand at right angles to the pressure. When the discharge of the gun takes place, the recoil is not instantly checked by the friction of the brake or clutch Q R, but is permitted by the springs *j j* to commence before the wheel R begins to move; and as the springs are compressed by the movement of the driver U with the shaft M on the latter being set in motion by the rack, the force of the recoil gradually overcomes the friction, and the driver then gradually starts the gear P, pinion K', shaft K, and wheel R.

In applying my invention otherwise than in a turret, the framing of the mechanism described may be secured to any suitable base or support. I propose in all cases to make all the parts of wrought-irom and brass or composition metal, generally making the shafts and pinions of wrought-iron, the gearing and wheels of brass or composition, and the framing of either metal.

I do not confine myself to the use of the precise construction and arrangement of parts herein specified; but

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

1. The employment, for controlling and checking the recoil of a gun-carriage, and for

holding the same stationary while loading and at other times, of a self-acting friction brake or clutch detached from the carriage, but geared therewith, substantially as herein described.

2. The employment, for the purpose of running the gun-carriage out or in, of the same system of gearing by which the gun-carriage is geared with the aforesaid friction brake or clutch, substantially as herein specified.

3. So applying and arranging the two portions Q R of the friction brake or clutch in connection with the gearing by which the gun is worked, and so arranging a movable stop to act on teeth provided on one portion of the brake or clutch, that by the mere shifting of the stop the brake or clutch is brought either to a condition to check the recoil or prevent the movement of the carriage, or to a condition to permit it to run freely, substantially as herein specified.

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