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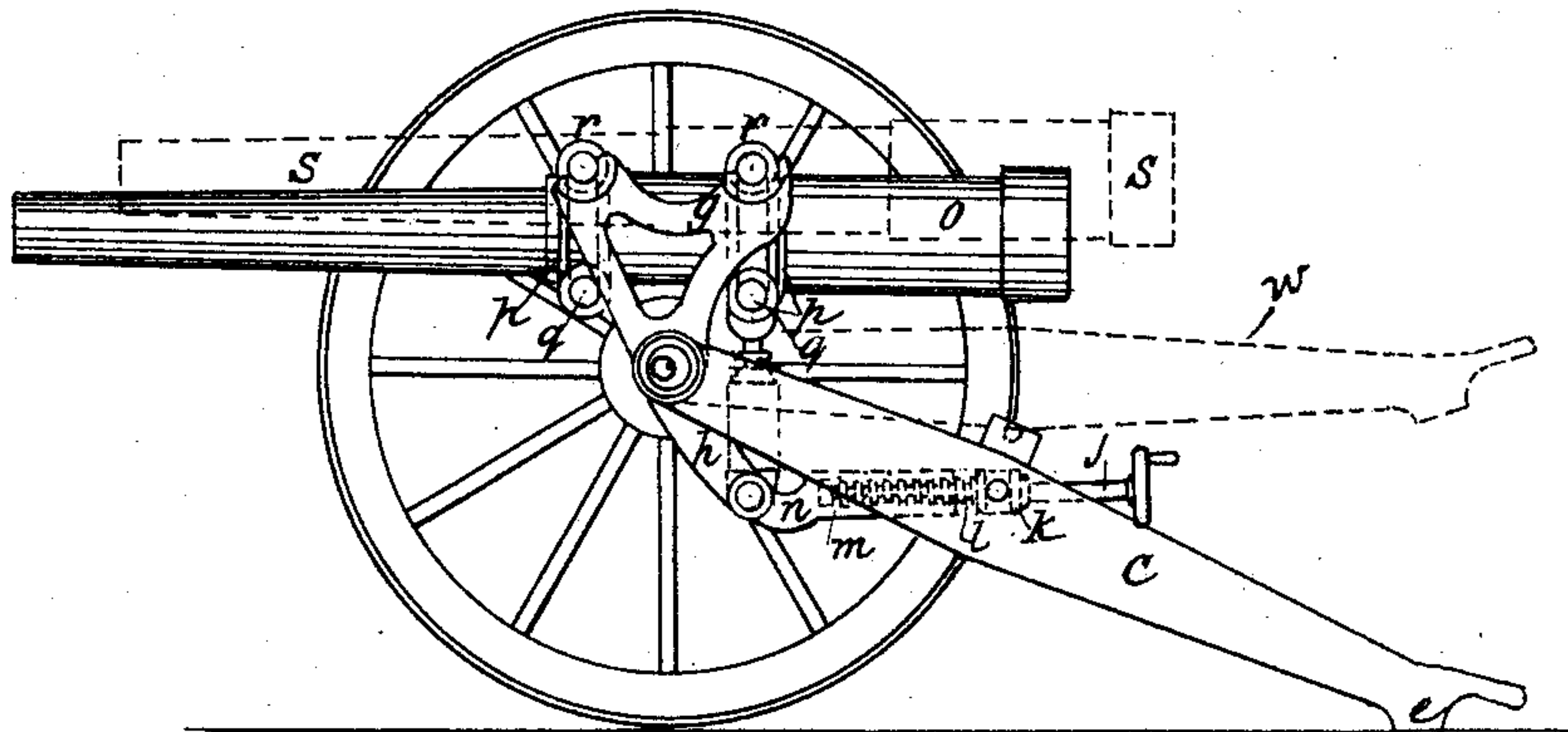
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H. C. E. MALET.  
GUN CARRIAGE AND SHIELD.

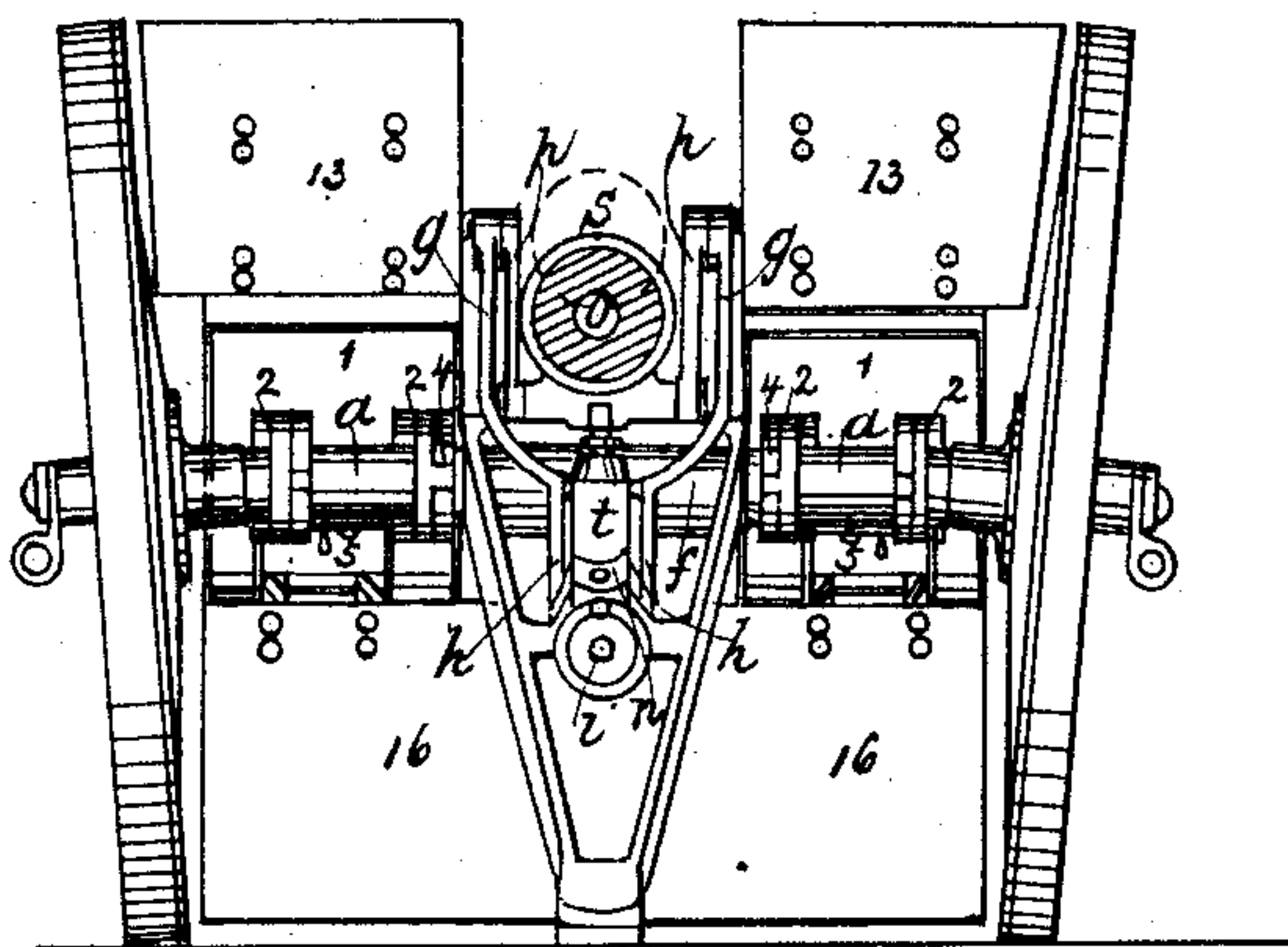
No. 347,002.

Patented Aug. 10, 1886.

*Fig. 1.*



*Fig. 3.*



WITNESSES:

*W. H. K. Kip*  
*D. R. McKee*

INVENTOR

*Henry C. E. Malet*  
BY  
*James H. Lancaster*  
ATTORNEY

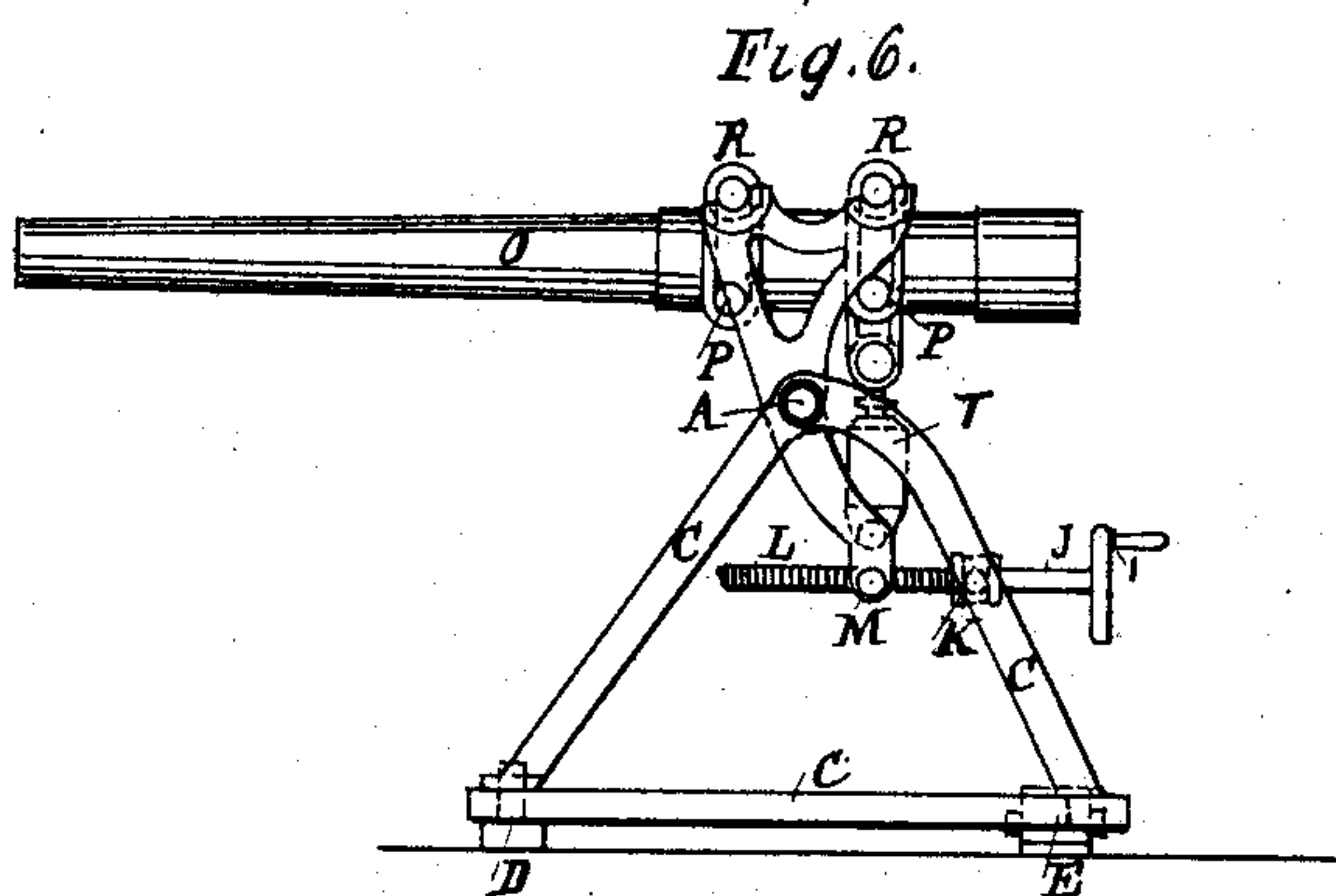
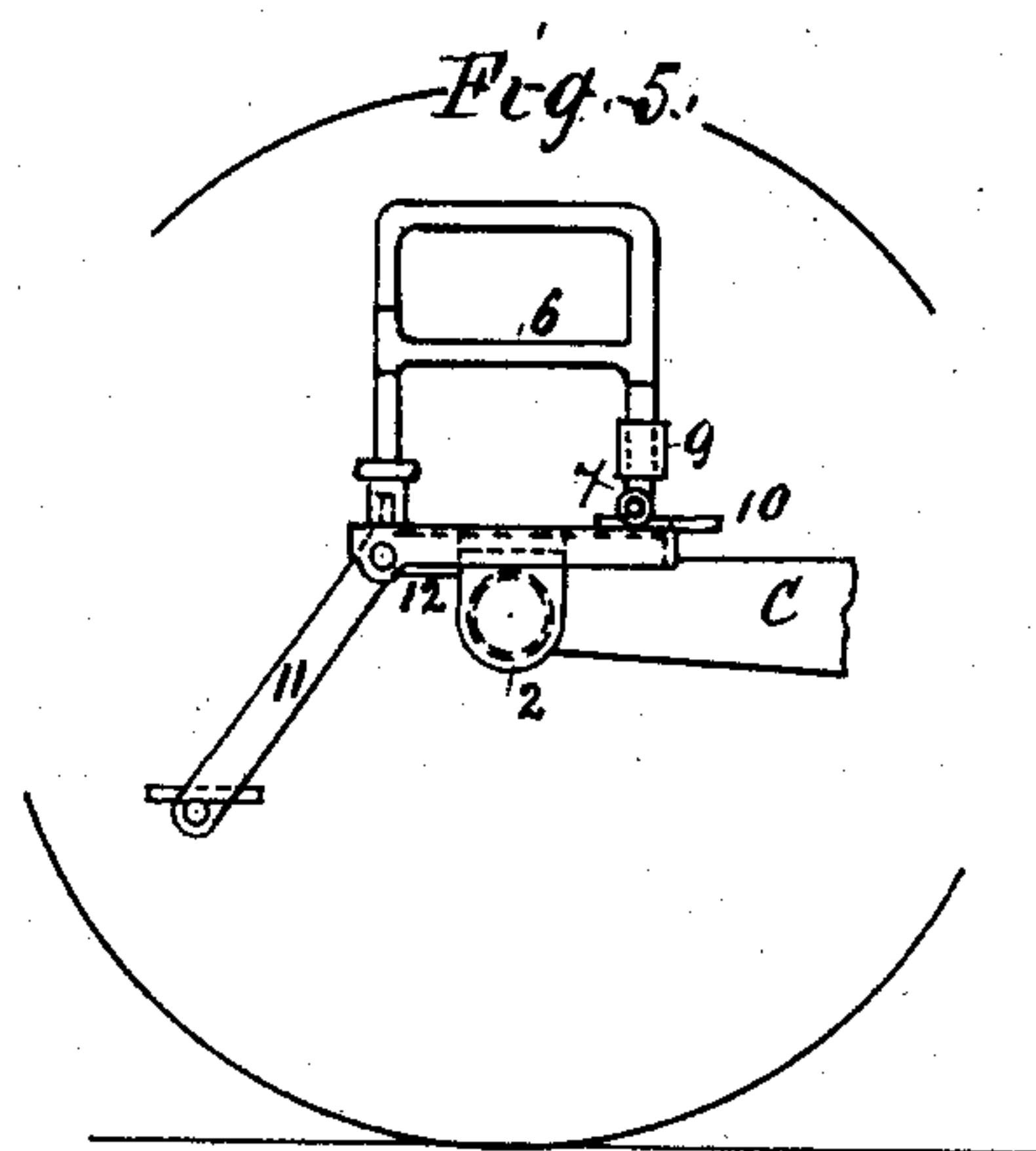
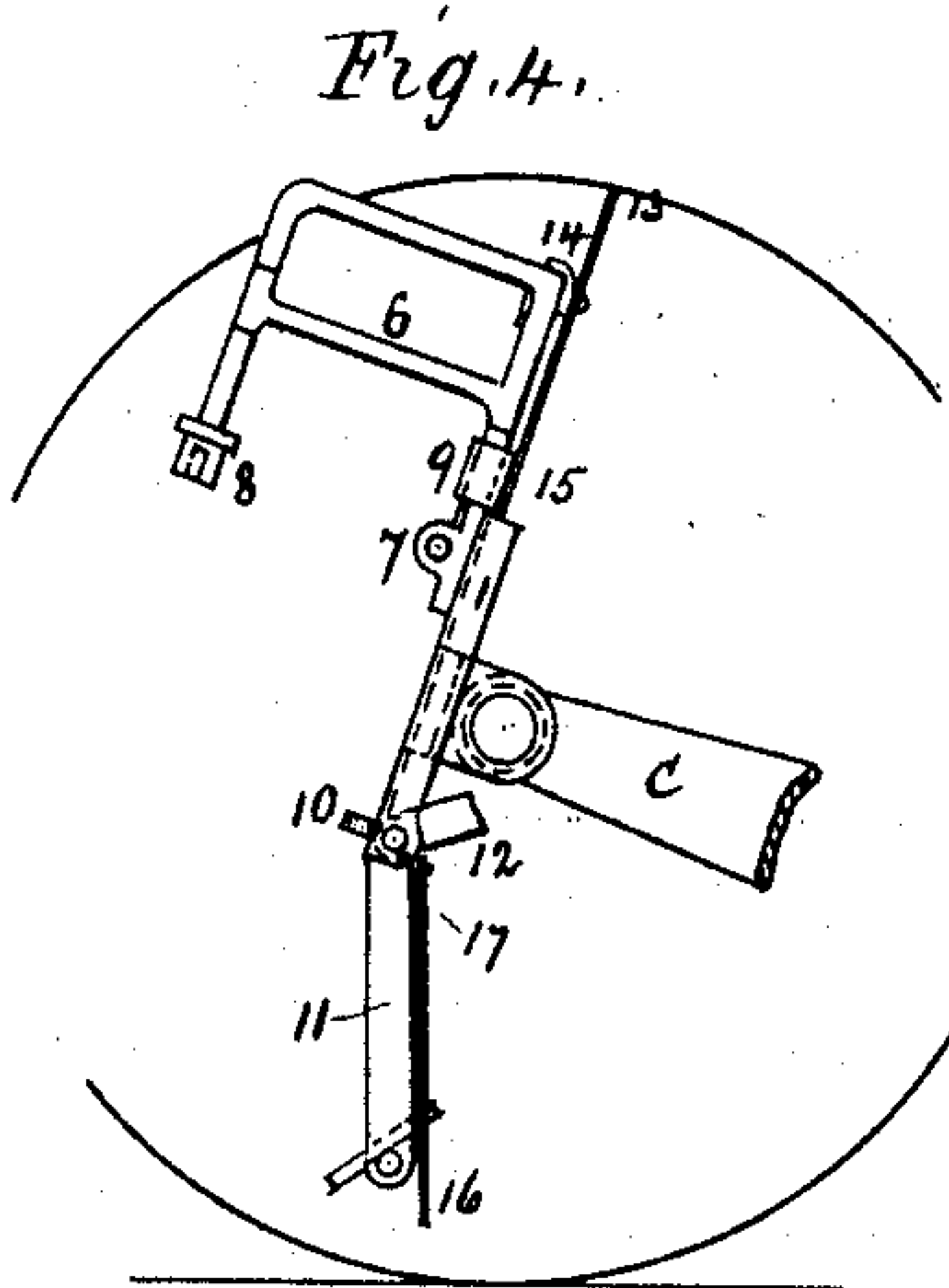
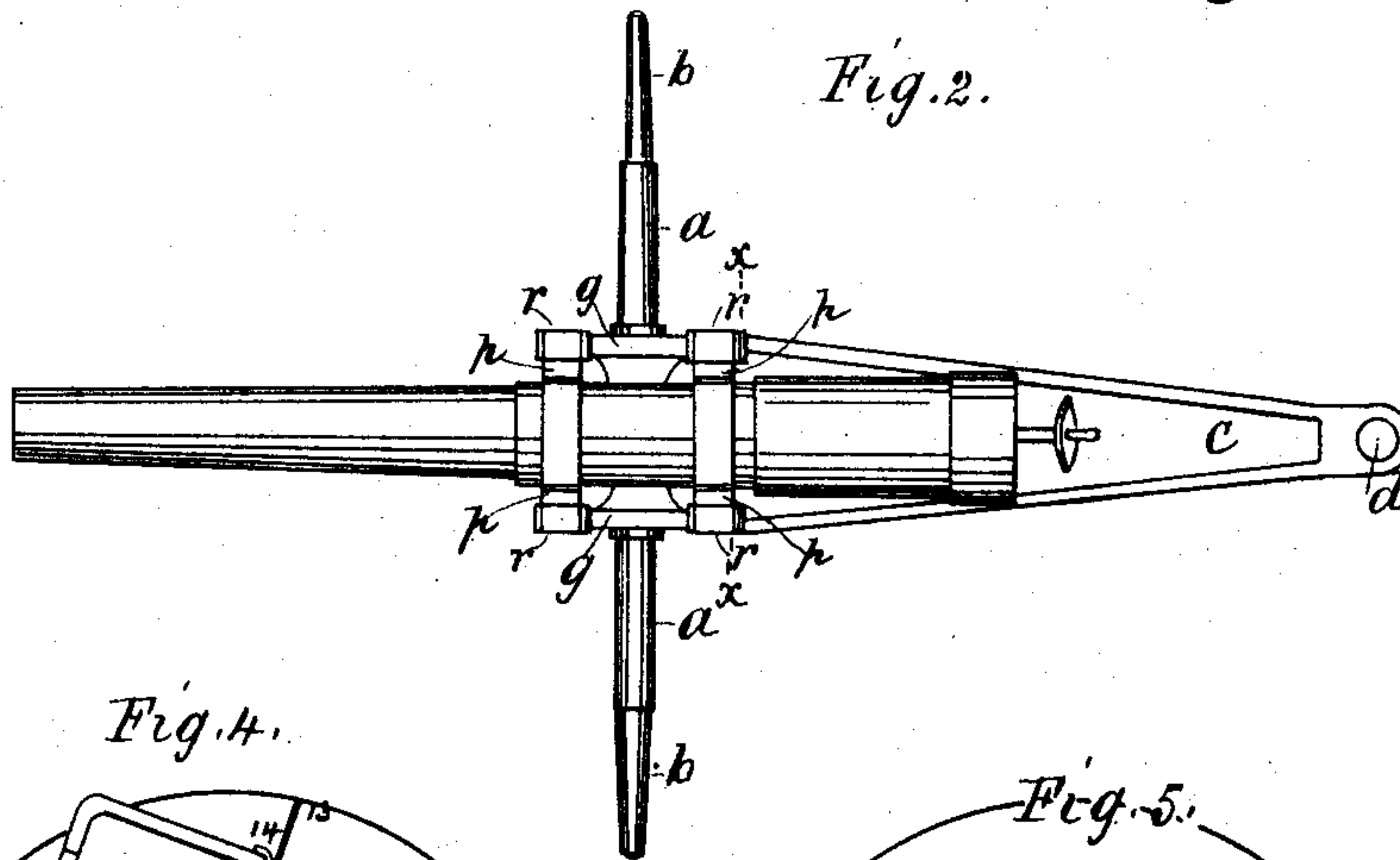
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WITNESSES:

*H. Kirkup*  
*D. A. McKee*

INVENTOR

*Henry C. E. Malet*

BY

*James H. Lancaster*

ATTORNEY



# UNITED STATES PATENT OFFICE.

HENRY CHARLES EDEN MALET, OF BRIGHTON, COUNTY OF SUSSEX,  
ENGLAND.

## GUN-CARRIAGE AND SHIELD.

SPECIFICATION forming part of Letters Patent No. 347,002, dated August 10, 1886.

Application filed November 13, 1885. Serial No. 182,656. (No model.) Patented in England May 22, 1884, No. 8,082.

*To all whom it may concern:*

Be it known that I, HENRY CHARLES EDEN MALET, a subject of the Queen of Great Britain, and a resident of Brighton, in the county of Sussex, England, have invented certain new and useful Improvements in the Construction of Gun-Carriages; and I do hereby declare that the following is a full, clear, and exact description thereof.

10 The object of my invention is to produce a gun-carriage which is so constructed that it will do away with or greatly lessen the destructive effects upon the gun-carriage of the recoil which takes place after firing, and in  
15 consequence thereof I am able to construct such carriage in a much lighter manner.

In carrying out my invention in practice, in the construction of a field-gun carriage, I form the axle-tree of a steel or iron circular tube, with solid ends for the hubs of the wheels to rotate upon. I form the trail wholly or entirely of a steel or iron tube, preferably oval in section, and tapering from the axle-tree end to the other end, which latter end is provided with an eye, to engage with a hook on the  
25 limber in the ordinary way, or I may make the trail larger in the middle and tapering toward each end; or in place of making the trail hollow I may construct it of a T-trough or box-section. The axle-tree end of the trail is firmly attached to the axle-tree in any suitable manner. Diagonal stays may also be used, as in the ordinary field-gun carriage, to strengthen the connection. By these means  
35 I combine great strength with lightness of construction in the axle-tree and trail.

The gun itself is supported upon the carriage in the following manner: I provide upon the axle-tree two upright levers or standards, capable of partial rotation upon the axle-tree at or about the center of their length, one being placed on each side of the trail; or the trail may be forked and the said levers placed within the forked end. From the upper ends  
45 of these levers the gun is slung by two or more suspension arms or links, so that the force of recoil will cause the gun to swing backward and upward, as herein described.

In order to provide means for elevating and  
50 depressing the gun, the lower ends of the two upright levers or standards are connected by

a cross-bar, to the center of which one end of a shaft is attached, the other end of this shaft passing through or being attached to the trail, and suitable means are provided for extending or withdrawing such shaft, and consequently moving the upright lever through an arc of a circle, and as the gun, by the arrangement of the suspension-links, always retains the same angular position in relation to the upright levers, it can by these means be readily elevated or depressed to any desired extent. When the upright levers are placed within the forked end of the trail, their lower ends may, if preferred, be united in one. It will  
65 be seen that the effect of this arrangement is to cause the said shaft to be in tension, and the part of the trail between the axle-tree and the point of attachment to it of the shaft in compression, when the gun swings under the action of recoil, which gives a good distribution of the internal strains.

One or more hydraulic or pneumatic cylinders and pistons or other elastic buffers are provided in connection with the gun and carriage. If one cylinder be used, its piston-rod head may be attached to the under side of the breech of the gun and its cylinder-base to the axle-tree, the trail being cut away where required, to admit it; or two cylinders may be  
80 employed, one on each side of the gun, attached to it and to the upright levers or other suitable part of the carriage; or a vertical cylinder may be employed, having its piston-rod head attached to the under side of the gun and its cylinder-base to the lower ends of the upright levers. In practice I prefer the single cylinder, as simpler, cheaper, and equally effective.

I provide beds or seatings on the upper side of the trail, with corresponding projections or  
90 bosses on the under part of the gun, so that when the trail is limbered up the breech of the gun can, by means of the elevating-gear, be brought down close on the seatings, and there secured by bolts or other suitable fastenings, so that in traveling the gun lies snugly on the trail and is firmly attached thereto, and the suspension-links and upright levers and cylinders are relieved from all jars and strains caused by roughness of ground passed over.

In order to protect the men working such guns when in action from musketry-fire, I pro-



videshields or guards constructed in the following manner: The seats, which are usually provided on the axle-tree on each side of the gun, I form of sheet-steel and attach them in such a manner that they can be rotated on the axle-tree into a vertical or nearly vertical position. The back rail, which is hinged to the seat, is then turned up in line with it, and the foot-rest, which is also hinged, drops of its own accord into a vertical line. Upon the back rail and foot-rest steel plates are now hung, which are ordinarily carried upon or underneath the seat, or in any other convenient place—as, for instance, on the limber—and by this means an efficient shield is provided, equal to the height of the wheels, upon each side of the gun, and filling up the space between the gun and the wheels. The space below the gun and between the plates on the foot-rests is filled by a steel plate permanently attached to the lower parts of the upright levers, and by the body of the trail. The space on the top of the gun between the plates hung on the back rails may be filled up by a plate attached to the gun, and capable when not in use of folding up and hinging down flat upon the gun. Efficient stays are provided to keep such plate upright when in use, and also the seats and back rails. If preferred, the space above the gun may be filled in by a movable plate, which may be carried on the gun-limber, and, when required, placed in slots in the pendulum-links. When axle-tree boxes are desired to be employed, they can be made double and hung as pack-saddles on each side of the axle, underneath the steel seat, thus affording four boxes for ammunition with the gun, and proportionately lightening the limber, and certain advantages may accrue from thus carrying ammunition with the gun, as when it may be desired to move the limbers out of the line of fire, and the weight being carried low, great steadiness of the carriage results. Such boxes may be so fixed, if desired, as to rotate with the seat above mentioned, their internal construction being adapted to this arrangement; or they may be rigidly fixed to the axle-tree, and the seat may serve as the lid of the boxes and be capable of elevation, so as to form part of the shield when desired, as before described; or in place of the double box, above described, a single box of ordinary construction may be placed upon the top of the steel seat.

The advantages which I consider I obtain by the construction of my improved gun-carriage, as above described, or any mere modification thereof, are communicating the recoil of the gun to the carriage in the shape of a gradually-increasing strain, instead of a sudden blow or shock, as usual, reducing the weight of the principal parts of the carriage without any deterioration in strength, a simple and efficient mode of elevating and depressing the gun, and protection for the gunners from musketry-fire when in action.

I do not necessarily confine myself to applying all the improvements herein set forth

to a field-gun carriage, as the peculiar form of elevating apparatus described, in combination with the suspension of the gun by links, and the employment of cylinders or elastic buffers, is equally applicable to the carriage of a gun in a land, naval, or other battery.

In order more clearly to explain the nature of my invention I will now proceed to describe certain examples of its application, as shown in the sheet of drawings accompanying this specification.

In the drawings, Figure 1 is a side elevation of a field-carriage constructed according to my invention, one wheel and the axle-tree seats and shields being removed to show more clearly the elevating-gear. Fig. 2 is a plan of carriage having both wheels and the seats and shields removed. Fig. 3 is an end elevation of carriage, showing seats and shields in position ready for action. Fig. 4 is a side elevation of a seat and shields in the same position, and Fig. 5 is a side elevation showing ordinary position of axle-tree seat when the gun is limbered up for traveling. The same letters and figures refer to the same parts in all these five figures. Fig. 6 shows a modification of my device as adapted to a light quick firing six-pounder breech-loading gun of any desired construction.

In Figs. 1, 2, 3, *a* is a tubular axle-tree with solid ends *b b*. *c* is the trail, formed in this instance of a trough-section and firmly attached to the axle-tree, which passes through apertures in one end. At the other end an eye, *d*, to engage with the hook on the limber in the usual way, and a shoe, *e*, to rest upon the ground, are provided. Diagonal stays are not shown in the drawings, but may be employed, if desired. A tube, *f*, having upper arms or standards, *g g*, and lower arms, *h h*, firmly attached to or formed in one piece with it, embraces that part of the axle-tree which lies between the upper extremities of the trail. The hand-wheel *i* is keyed onto the shaft *j*, which is journaled in a pivoted bearing, *k*. The other end of the said shaft has a screw, *l*, formed thereon, the said screw engaging with the internal screw of the long nut *m*, which is pivoted to the ends of the arms *h h* by means of its forked end *n*, as shown, and it is therefore obvious that by rotating the hand-wheel *i* the arms *g g* may be moved through a greater or lesser arc of a circle, as desired. The gun *o* is hung from the top of the arms *g g* by four links, *p p p p*. The said links work on trunnions *q q*, attached to the gun, and are pivoted at their upper ends in bearings *r r r r* in the arms *g*, fitted with removable caps for the easy mounting and dismounting of the gun. When fired, the recoil causes the gun to swing backward and upward, as heretofore described, its position at or about the end of such path of motion being indicated by the dotted lines *s s*. To control the swinging motion, a hydraulic cylinder, *t*, is provided, having its piston-rod head pivoted to the under side of the gun and its cylinder-base pivoted to the ends of the



arms *h h*. The peculiar vertical arrangement of the cylinder, as shown in the drawings, causes the resistance which it offers to be practically *nil* at the commencement of the swing of the gun, such resistance increasing rapidly as the gun rises. A seating, *u*, is provided on the trail, upon which the breech of the gun rests when limbered up, a lug, *v*, on the gun entering a corresponding aperture in the seating *u* and preventing any movement of the gun. The position of the trail when limbered up is shown in dotted lines at *w*, Fig. 1. The elevation and depression of the gun are accomplished by rotating the hand-wheel *i*, as will clearly be seen, and one advantage of this form of elevating-gear is that the said hand-wheel does not move with the gun when the latter recoils.

In Figs. 3, 4, and 5, 1 is a steel seat, capable of rotating on the axle-tree on bearings 2 2, attached to the under side of the seat. The seat may be secured in each of the two required positions by any suitable device; but the arrangement shown in the drawings is as follows: A projection, 3, on each bearing 2 2, enters one of two corresponding recesses in each ring 4 4, fixed on the axle-tree, one recess being used when the seat is arranged for traveling and the other when it is erected as a shield. To change the position, the seat is slid along the axle-tree until the projections are clear of the recesses, and then rotated till it is opposite the other recesses, where it is slid back into position. To prevent the seat shifting, a lever, 5, is pivoted on the axle-tree and abuts at one end against the bearings 2, and is furnished at the other end with a sliding spring-bolt entering a cavity in the ring 4, and is provided with a handle for sliding back the bolt and turning the lever round to allow the sliding of the seat. When the seat is in the required position, the lever is turned back parallel with the axle-tree, and the spring-bolt re-enters the cavity in the ring 4 and securely locks the whole in place. The back rail, 6, is hinged to the seat at 7, and secured by a screwed union at 8. When erected as in Figs. 3 and 4, it is held in position by a sliding sleeve, 9, which drops down upon the pin 10. The foot-rest 11 is hinged to the under side of the seat at 12, and hangs vertically of its own accord when the seat is erected, as shown in Fig. 4. A sheet-steel shield, 13, is hung on the back rail by hooks 14 and kept in place by strips 15, which bear on the front of the seat, and another sheet-steel shield, 16, is hung on the bar of the hinge of the foot rests by the hooks 17. For the com-

fort of the men, a leathern strap may be provided on the rail 6, to support the back of the rider in the usual way.

The complete protection afforded by the seats, shields, and trail is clearly shown in Fig. 3. The only space left open is that immediately over the gun; but this may also be protected, if desired, as hereinbefore described. In practice, however, it may usually be found more convenient to leave this open, in order to allow ample room for sighting and laying the gun.

In Fig. 3 the gun *o* is represented in cross-section through the line X X on Fig. 2.

In Fig. 6 a similar arrangement for absorbing recoil and elevation to that just described in connection with a field-gun is shown, in side elevation, as applied to a light quick-firing six-pounder breech-loading gun of any desired construction.

Though I have only shown my invention as applied to a field-gun and a light quick-firing pivoted gun, it is equally applicable to other light guns.

I wish it to be understood that I do not necessarily confine myself to the precise details of construction herein shown and described.

I do not claim, broadly, as part of the present invention, the combination, with the gun and its carriage, of links by which the gun is suspended from the carriage, and a hydraulic recoil cylinder and piston pivotally connected with the gun and with the carriage, or the axle thereof, as such combination is part of the subject-matter of my application for United States Patent, Serial No. 162,978, filed April 21, 1885.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is—

In a gun-carriage, the combination of the metallic shields 13 and 16, in combination with the movable foot-rest 11 and movable arm-rest 14, both pivoted to the seat 1, attached to the axle of the carriage, substantially as and for the purpose set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 10th day of August, 1885.

HENRY CHARLES EDEN MALET.

Witnesses:

GEORGE COLEMAN,

FREDERICK FOULGER,

Both of 63 Hyde Street, Brighton, England, Clerks to Mr. Edwin Boxall, Solicitor and Notary Public, Brighton.