

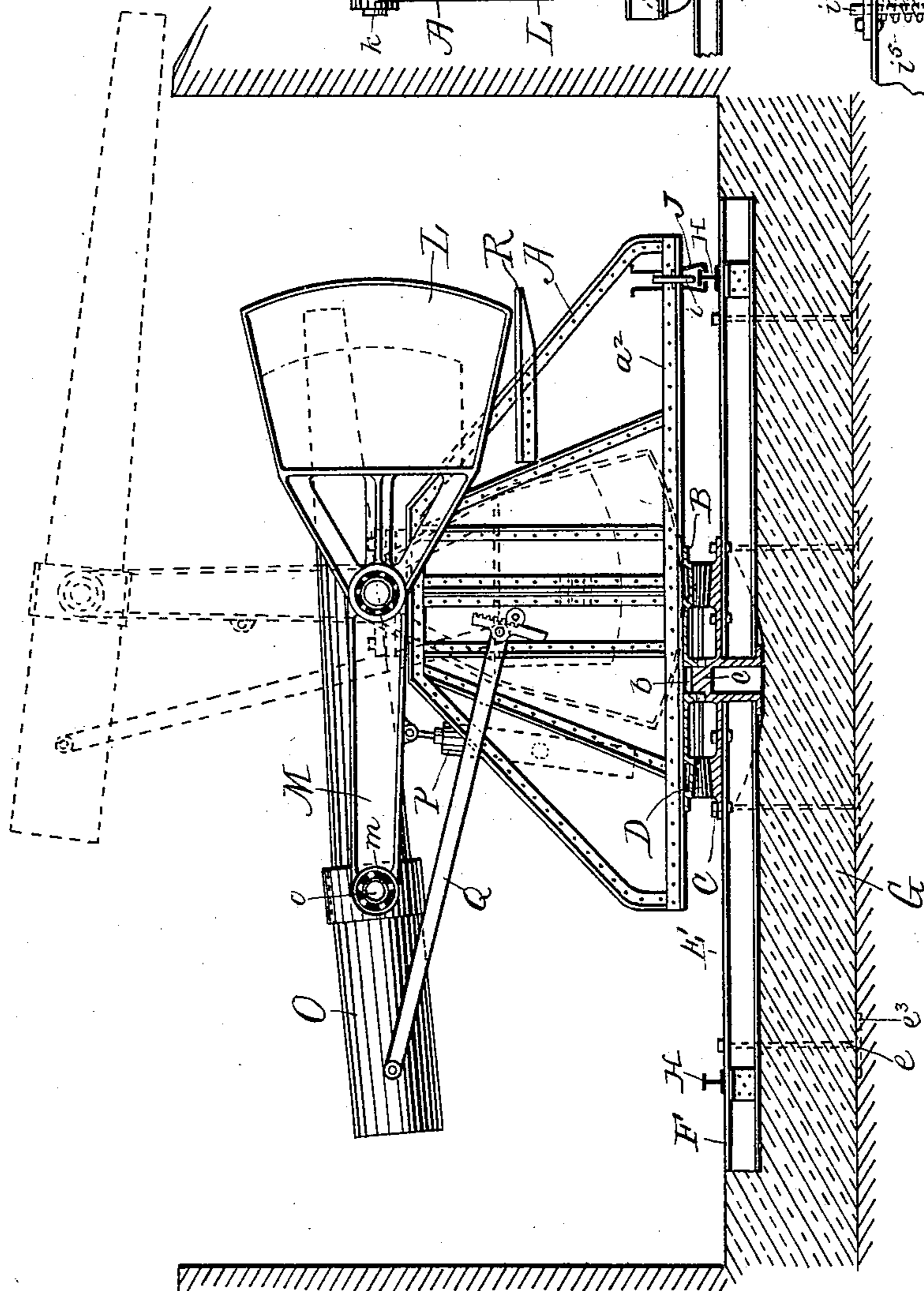
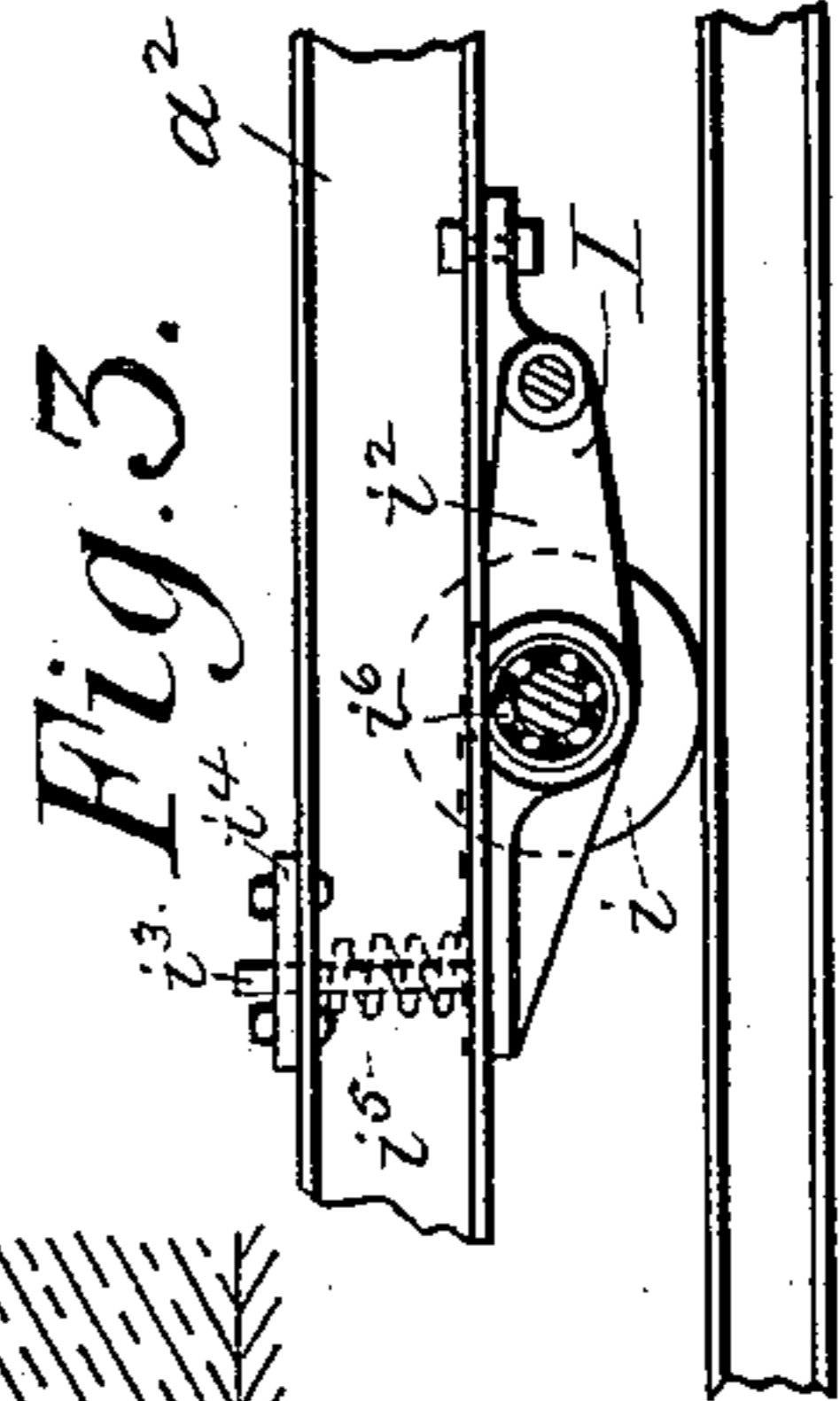
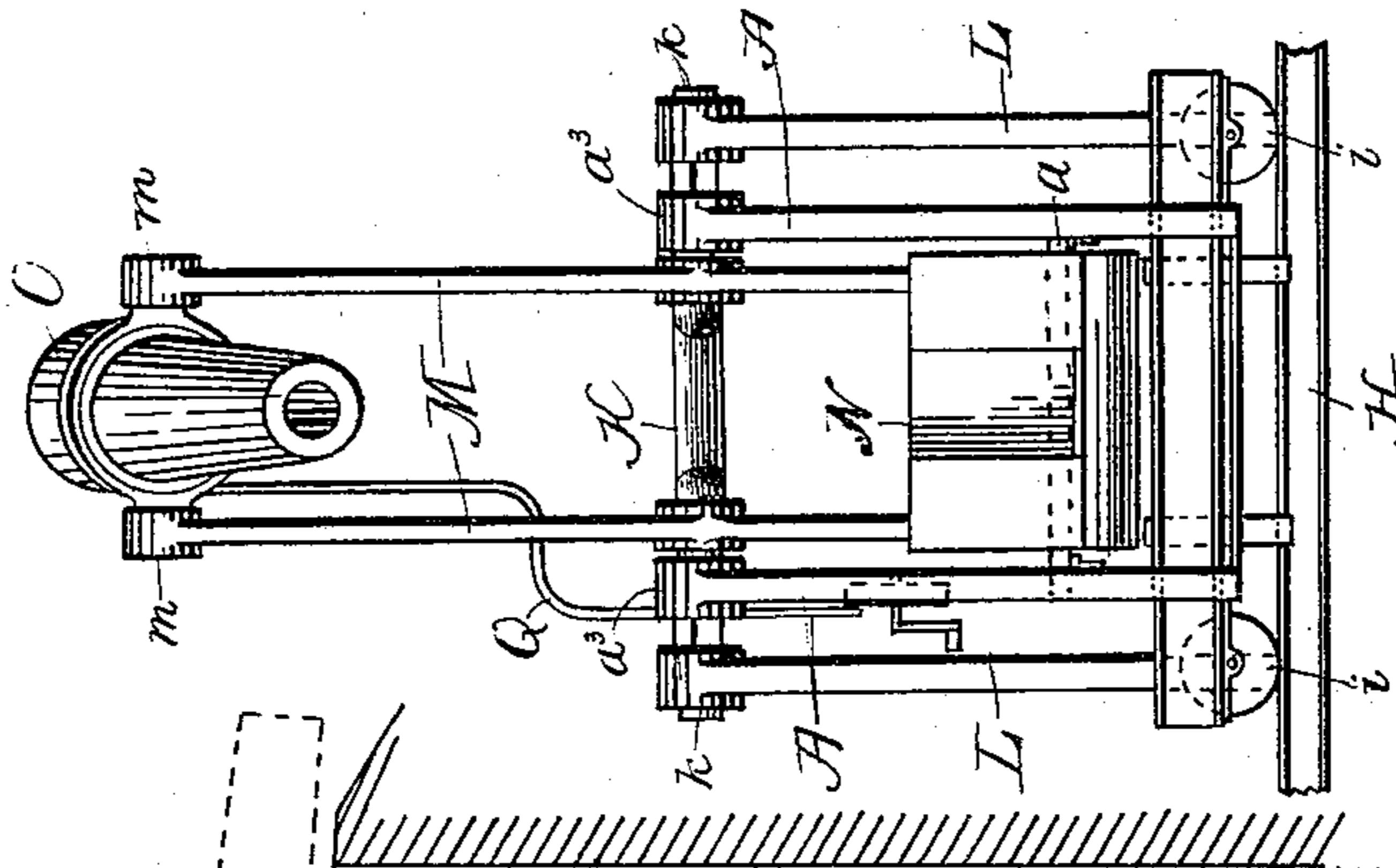
(No Model.)

2 Sheets—Sheet 1.

J. A. HOWELL.  
COUNTERPOISE GUN CARRIAGE.

No. 556,926.

Patented Mar. 24, 1896.



Witnesses  
J. S. Borren,  
R. H. Bennett,

Inventor:  
John A. Howell,  
by Rey Dyrenforth,  
his Attorney

(No Model.)

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Fig. 4.

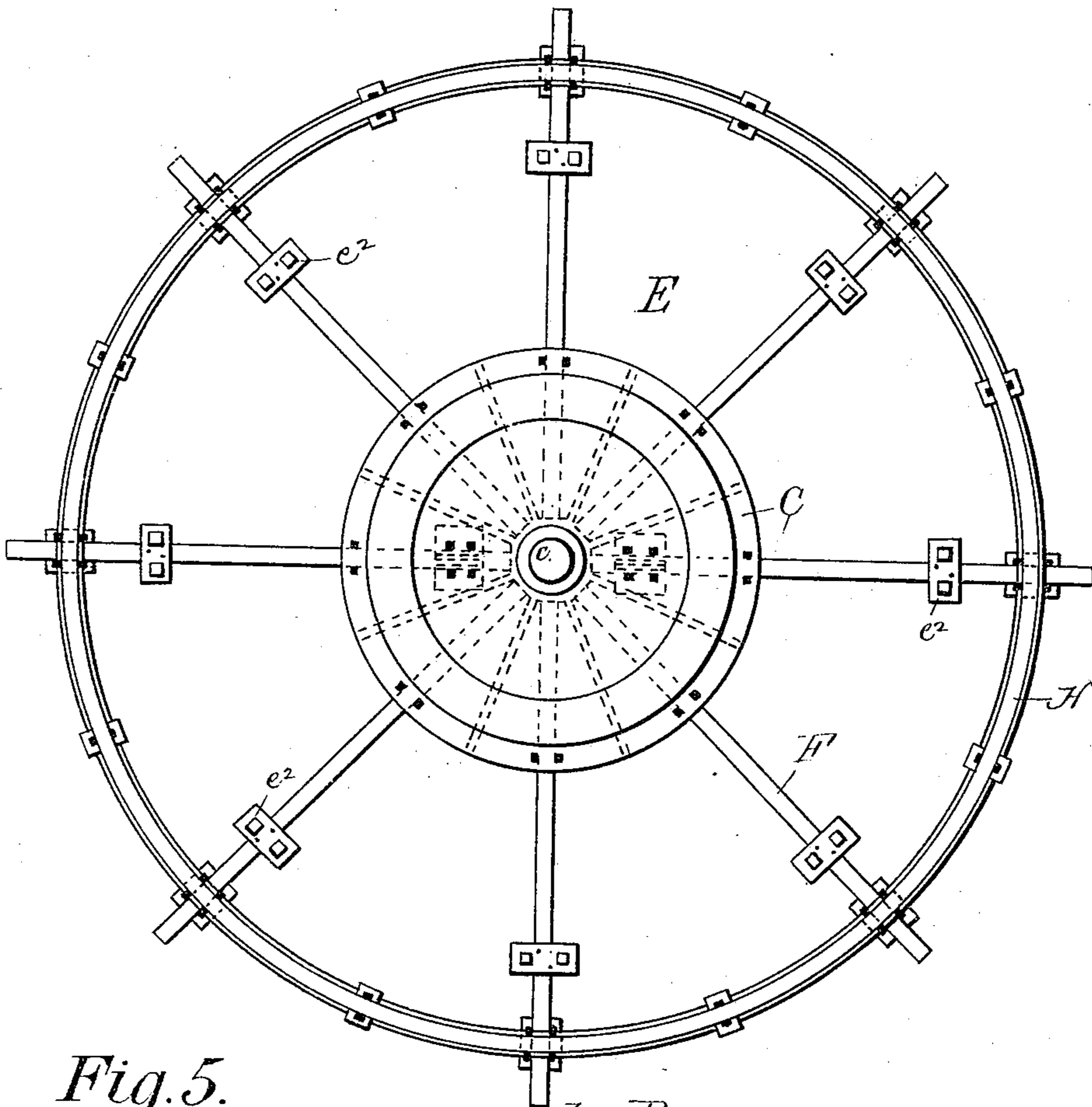


Fig. 5.

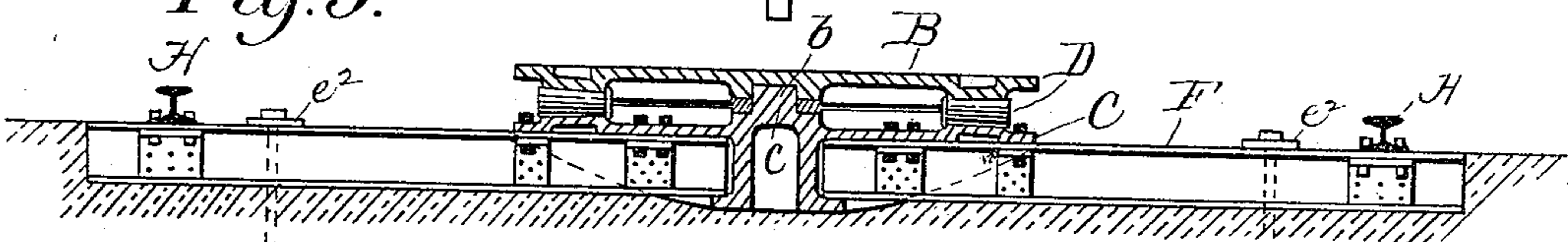


Fig. 6.

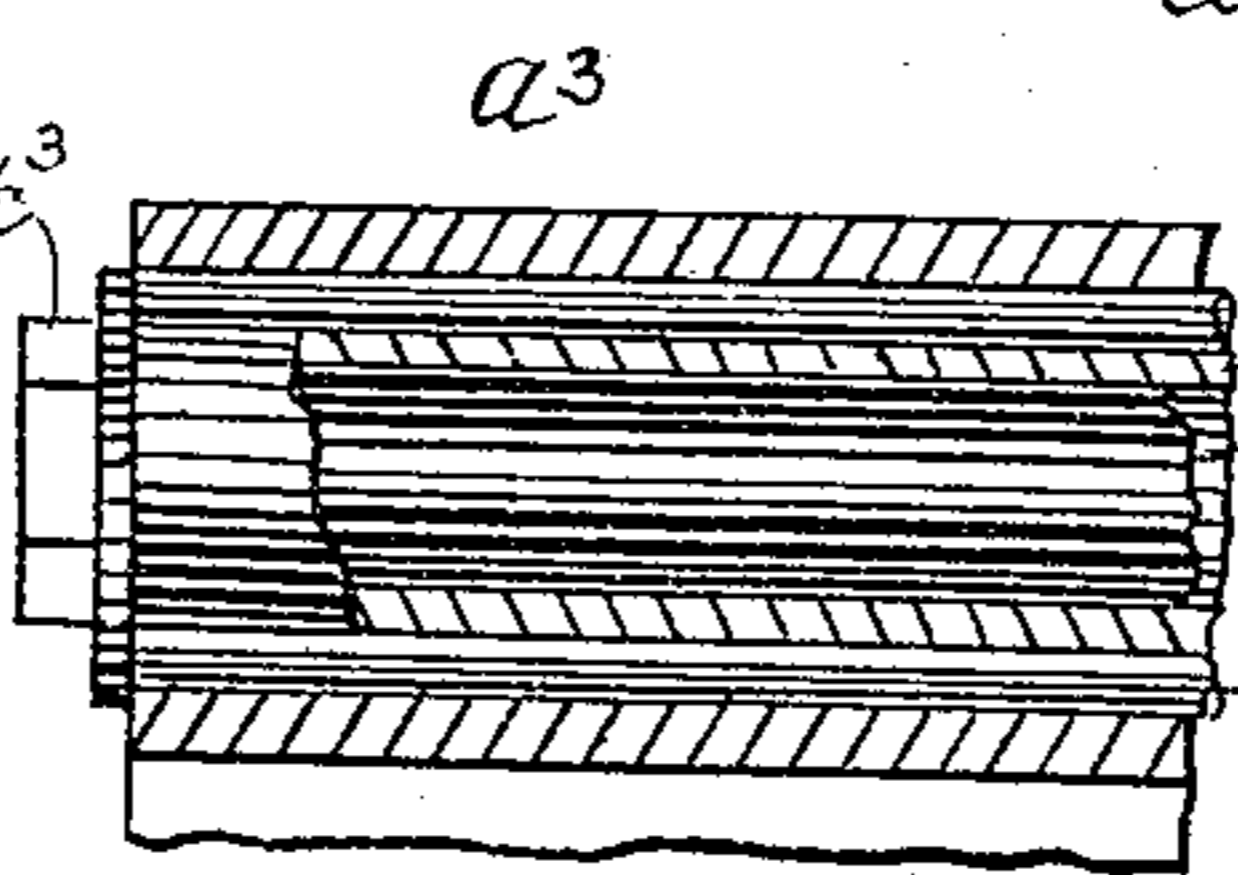
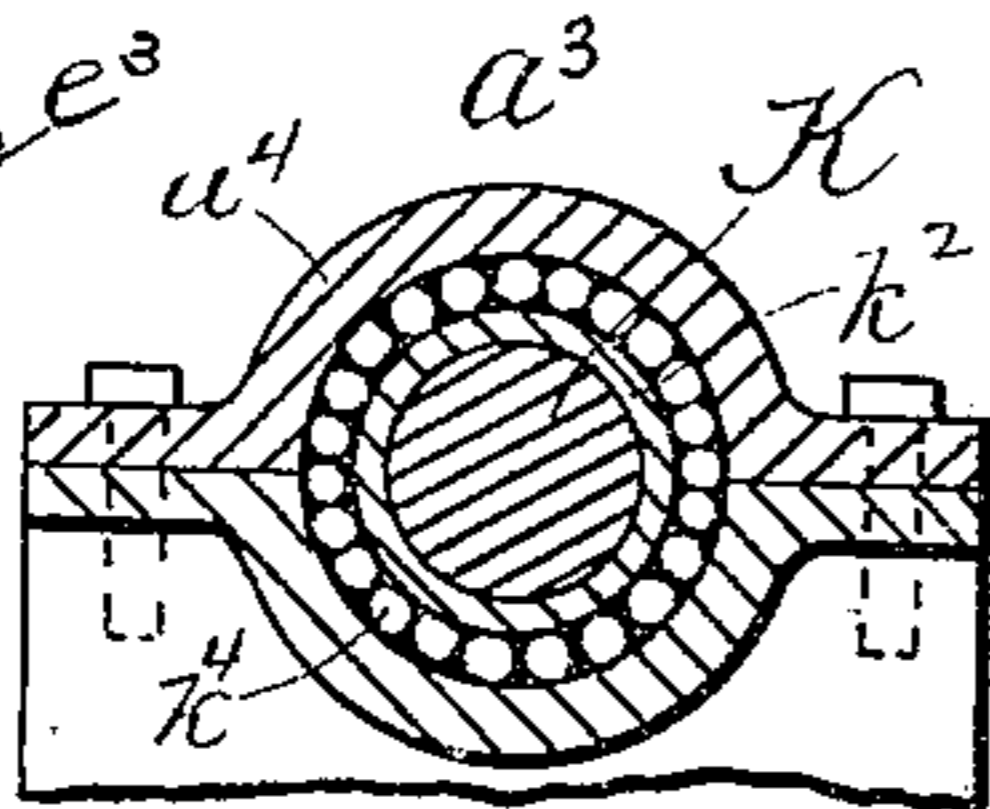


Fig. 7.

Witnesses  
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# UNITED STATES PATENT OFFICE.

JOHN A. HOWELL, OF WASHINGTON, DISTRICT OF COLUMBIA.

## COUNTERPOISE GUN-CARRIAGE.

SPECIFICATION forming part of Letters Patent No. 556,926, dated March 24, 1896.

Application filed February 15, 1895. Serial No. 538,553. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN A. HOWELL, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Gun-Carriages; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an improvement in gun-carriages.

The object of the invention is to produce a gun-carriage, in the nature of a counterpoise disappearing gun-carriage, which shall combine high efficiency in use with great mechanical simplicity and moderate weight and which may readily and easily be operated to bring the gun either to battery or to loading position; furthermore, to produce a gun-carriage having a novel form of roller-bearing for the axles, the arrangement of the bearing being such as to permit of the rollers being taken out and replaced with others without necessitating the lifting of the gun; furthermore, to produce a foundation-frame in which the weight of the gun and the strain incident to firing will be distributed over the whole frame, thereby preventing any centralizing of pressure or strain, which would result in racking and loosening of the parts.

With these objects in view the invention consists in the combination, with a carriage, of a shaft, a lever or bar carrying a gun, and counterpoising-weights disposed at each side of and between the brackets of the carriage, the shaft, lever or bar, and weights forming together a rigid structure; furthermore, in the combination, with a carriage, of a shaft, levers or bars secured thereon and having a gun at one end and a counterpoising-weight at the other, and wing-counterbalances rigid with the shaft; furthermore, in the combination, with a carriage, comprising in part side brackets connected by suitable transoms, of a shaft having levers or bars rigidly secured thereon and carrying a gun at one end and a counterpoise at the other, the counterpoise working between the side brackets; furthermore, in a foundation-frame comprising a series of radially-arranged beams, a bed-plate

bolted to the inner portions thereof and having a base or flange upon which the inner ends of the beams rest, a circular track to which the outer portions of the beams are secured, a base-plate, and live-rollers interposed between the base-plate and the bed-plate; furthermore, in the combination, with a journal and a journal-bearing proper, of a sleeve mounted on the journal and adapted to be moved independently of the journal, and rollers mounted between the sleeve and the journal-bearing, and, finally, in the various novel details of construction, as will be hereinafter fully described and claimed.

In the accompanying drawings, forming a part of this specification, and in which like letters of reference indicate corresponding parts, I have illustrated one form of embodiment of my invention capable of carrying the same into effect, although other forms of embodiments thereof may be employed without departing from the spirit thereof.

In the drawings, Figure 1 is a view in side elevation of a gun equipped with my counterpoising attachment, the elevated position of the gun being shown in dotted lines and its depressed position in full lines, the foundation and the live-roller ring being shown in section for the purpose of illustrating more clearly the connection between the carriage and its support. Fig. 2 is a view in front elevation showing the gun in battery position and displaying also the middle and the wing counterbalances. Fig. 3 is a detached detail view of one of the forward trucks, showing the same provided with a spring adapted to hold the truck-wheel in contact with the track or rail and also to provide a take-up for inequalities in the track and to relieve the roller-bearings of the truck-axles from injurious pressure. Fig. 4 is a view in plan of the iron foundation-frame, showing the manner in which the track and the live-roller ring are connected, so that the strain to the foundation-frame caused by the firing of the gun will be distributed throughout the whole foundation, and thus prevent centering of strain at any one particular point. Fig. 5 is a view in sectional elevation taken on the line  $x x$ , Fig. 4, showing more clearly the arrangement of the foundation and the live-roller ring. Fig. 6 is a view in trans-

verse section of one of the trunnion-axles, showing the journal-box, movable sleeve, and friction-rollers. Fig. 7 is a view in longitudinal section showing more clearly the arrangement of the trunnion journal-box, the collar mounted on the trunnion-axle, and the friction-rollers.

Referring to the drawings, A designates the side brackets, which may be of any well-known or preferred construction, the same being connected and rendered rigid by suitable transoms, of which one,  $a$ , is shown in dotted lines in Fig. 2.

The brackets are mounted upon a circular base-plate B, secured at a point near the rear portion of the brackets, the base-plate being in turn supported on a circular bed-plate C, which latter is provided with a pivot  $c$  engaging an orifice  $b$  in the base-plate, and between the two plates B and C are interposed a series of live-rollers D, which operate in a manner that will be perfectly obvious. The bed-plate is provided with a pillar or support  $c^2$ , which is located centrally of the plate, and is provided with or terminates at its lower end in a flange or tread  $c^3$ , that bears upon the foundation on which the frame rests and supports the bed-plate independently of any other supporting means.

The bed-plate C is bolted to an iron foundation-frame E, comprising a series of radially-arranged I-beams F securely anchored in place in a bed of concrete G or the like by means of tie-rods  $e$ , the upper ends of which are secured to plates  $e^2$  bearing upon the upper surface of the I-beams and the lower ends to anchor-plates  $e^3$  sunk in the concrete. The inner ends of the beams rest upon the flange  $c^3$  of the bed-plate and are thereby rigidly held against any sagging from the weight of the gun and its appurtenances.

At a point near the outer ends of the beams F is secured a circular track or rail H, on which travels the wheels  $i$  of the trucks I, of which there are by preference but two, located at the front of the carriage. The trucks comprise each a pair of brackets  $i^2$  connected at one end to the base-flange  $a^2$  of the carriage, and carrying at their other ends bolts  $i^3$ , which project at their upper ends through a guide-plate  $i^4$ , as shown in Fig. 3. Between the plate  $i^4$  and the bracket is interposed a coiled spring  $i^5$ , which exerts pressure downward and serves the double function of causing the truck-wheel automatically to accommodate itself to inequalities in the track, and also of relieving the pressure on the friction-rollers  $i^6$  of the truck-wheel bearing. In order to prevent any jump of the carriage when the gun is fired, clamps J are employed, which embrace the track, as shown in Fig. 1.

As before stated, the bed-plate C and track H are secured to the foundation-frame and the latter by suitable means, already described, to the concrete bed, and by this arrangement the whole foundation-frame and

its attached parts form a firmly-connected whole, which will successfully withstand shocks and strains without spreading or yielding in any direction.

The upper portion of the side brackets are provided with journal-bearings  $a^3$ , in which are journaled the axles  $k$  of the journal or shaft K. Upon each of the said axles is placed a loose collar  $k^2$ , which is adapted to be turned independently of the axle by means of a suitable wrench, the end of the collar being squared, as at  $k^3$ , for this purpose, and interposed between the collar and the journal-bearing proper and the cap-square  $a^4$  are a series of roller-bearings  $k^4$ , as clearly shown in Fig. 6. Should it be desired at any time to examine the under roller-bearings or to replace injured rollers with new ones, it will only be necessary to remove the cap-square and turn the collar, in the manner already indicated, to bring all of the rollers successively to view.

The axles  $k$  project beyond the side brackets A and have rigidly attached near their outer ends wing-counterbalances L, which may be of any desired contour to meet the requirements of the case, the form shown being merely illustrative of one style that may be employed.

Upon the journal or shaft on the inside of the side brackets are rigidly secured two bars or levers M, to the lower ends of which is secured the middle counterbalance N.

By providing two sets of counterpoises, and arranging them between and on the outside of the side brackets of the carriage undue strain on the axles  $k$  will be prevented. This distribution of the weight will also operate to overcome any yielding on the part of the shaft K intermediate of its ends from the combined weight of the gun and the middle counterpoise, as the wing counterbalances will, with the journal-boxes  $a^3$  as fulcrums, tend to exert an upward-lifting pressure on the shaft and thereby equalize the strain thereon.

The upper ends of the levers are each provided with a journal-box  $m$ , in which is journaled the trunnion  $o$  of the gun O. The journal-boxes  $m$  are constructed like those in the journal-bearings  $a^3$ , and therefore need no further description.

In constructing a gun-carriage in accordance with my invention the counterbalances L and N are to be of a weight equal to the weight of the gun, so that to bring the gun to battery or to rest it will be necessary, practically, to overcome only the inertia and the friction of the parts. When the gun is fired the recoil is taken up by a recoil-check P, which may be of any preferred form. In the event of the check stopping the gun before being brought to loading position the distance remaining for the gun to be moved may readily be accomplished by hand. To sight the gun, range-bars Q may be employed.

For convenience in mounting and dis-

mounting, a shelf R may be bolted to the side bracket, so that the gun and counterbalancing system can be conveniently supported independently of the trunnions.

5 Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

10 1. The combination with a carriage, of a shaft, a lever or bar carrying a gun, and counterpoising-weights disposed at each side of and between the brackets of the carriage, the shaft, lever or bar, and weights forming, together, a rigid structure, substantially as described.

15 2. The combination with a carriage, of a shaft, levers or bars rigidly secured thereon and having a gun at one end and a counterpoising-weight at the other, and wing-counterbalances rigid with the shaft, substantially as described.

20 3. The combination with a carriage, of a shaft having its ends projecting beyond the sides of the carriage, levers or bars rigidly secured on the shaft and having a gun at one end and a counterpoising-weight at the other, and wing-counterbalances rigid with the ends of the shaft, substantially as described.

25 4. The combination with a carriage, of a shaft having its ends projecting beyond the sides of the carriage, levers or bars rigidly secured on the shaft and having a gun at one end and a counterpoising-weight at the other, wing-counterbalances rigid with the projecting ends of the shaft, and a recoil-check substantially as described.

30 5. The combination with a carriage, of a shaft having its ends projecting beyond the sides of the carriage, levers or bars rigidly secured to the shaft and having a gun at one end and a counterpoising-weight at the other, wing-counterbalances rigid with the projecting ends of the shaft, and a recoil-check operatively connected with one of the levers, substantially as described.

35 6. The combination with a carriage comprising in part side brackets connected by suitable transoms, of a shaft having levers or bars rigidly secured thereon and carrying a gun at one end and a counterpoise at the other, the counterpoise working between the side brackets, substantially as described.

40 7. The combination with a carriage comprising in part side brackets connected by suitable transoms, of a shaft, levers rigidly secured thereon and having a gun at one end, and a counterpoising-weight at the other working between the side brackets, and wing-

counterbalances rigid with the shaft and working outside of the brackets, substantially as described. 60

8. A counterpoise gun-support, comprising a shaft, a lever or bar, and counterpoising-weights substantially as described, the parts being rigidly connected together, substantially as specified. 65

9. A foundation-frame comprising a series of radially-arranged beams, a bed-plate bolted to the inner portions thereof and having a base or flange upon which the inner ends of the beams rest, and a circular track to which the outer portions of the beams are secured, substantially as described. 70

10. A foundation-frame comprising a series of radially-arranged beams, a bed-plate bolted to the inner portions thereof and having a base or flange upon which the inner ends of the beams rest, a circular track to which the outer portions of the beams are secured, and tie-rods secured to the said frame and held in place by anchor-plates sunk in a bed of concrete or the like, substantially as described. 75

11. A foundation-frame comprising a series of radially-arranged beams, a bed-plate bolted to the inner portions thereof and having a base or flange upon which the inner ends of the beams rest, a circular track to which the outer portions of the beams are secured, a base-plate, and live-rollers interposed between the base-plate and the bed-plate, substantially as described. 80

12. A foundation-frame comprising a series of radially-arranged beams, a bed-plate bolted to the inner portions thereof and provided with a pivot and with a base or flange upon which the inner ends of the beams rest, a circular track to which the outer portions of the beams are secured, a base-plate having an orifice or seat engaging the pivot of the bed-plate, and live-rollers interposed between the base-plate and the bed-plate, substantially as described. 85

13. The combination with a journal and a journal-bearing proper, of a sleeve mounted on the journal and adapted to be moved independently of the journal, and rollers mounted between the sleeve and the journal-bearing, substantially as described. 90

In testimony whereof I affix my signature in presence of two witnesses.

JOHN A. HOWELL.

Witnesses:

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R. M. ELLIOTT.