

(No Model.)

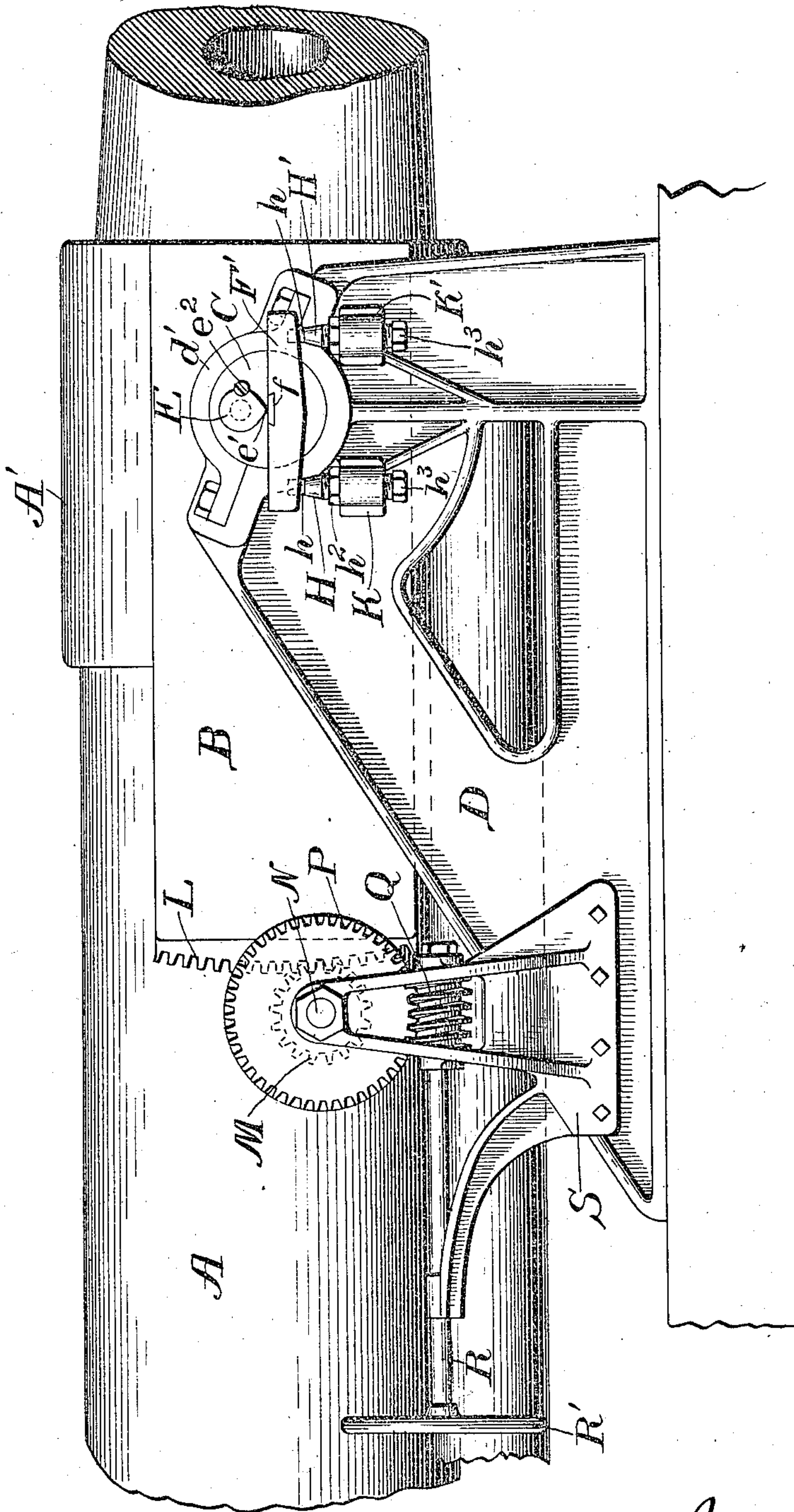
2 Sheets—Sheet 1.

J. STRAUSS.
APPARATUS FOR MOUNTING GUNS.

No. 547,507.

Patented Oct. 8, 1895.

FIG. 1.



Witnesses
Rory C. Bowen.
J. H. Wilson.

Inventor
Joseph Strauss
By Whitman Milliken
Attorneys

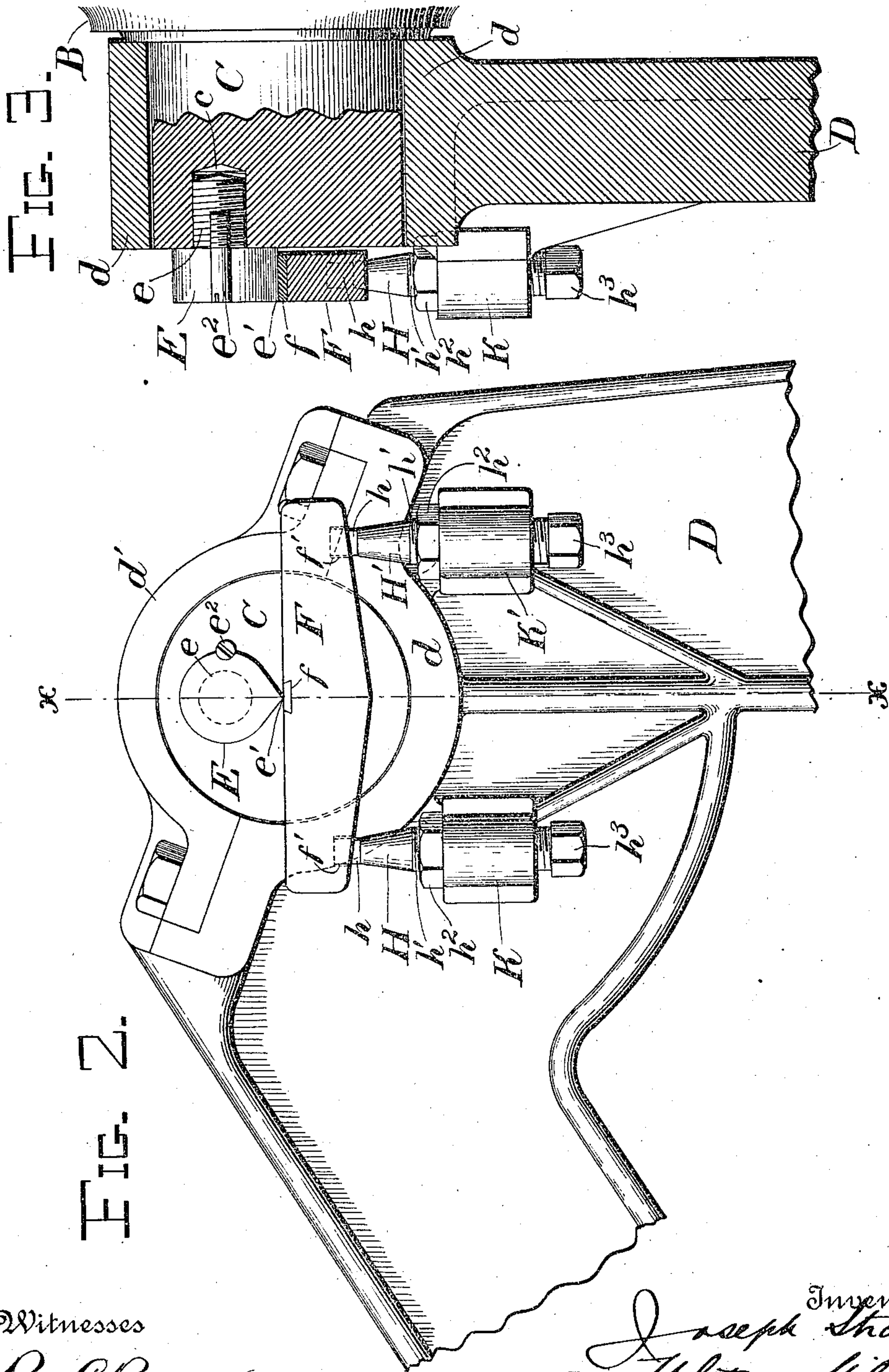
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UNITED STATES PATENT OFFICE.

JOSEPH STRAUSS, OF THE UNITED STATES NAVY.

APPARATUS FOR MOUNTING GUNS.

SPECIFICATION forming part of Letters Patent No. 547,507, dated October 8, 1895.

Application filed January 4, 1895. Serial No. 533,830. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH STRAUSS, an ensign in the United States Navy, and attached to the Bureau of Ordnance, at Washington, in the District of Columbia, have invented certain new and useful Improvements in Methods of and Apparatus for Mounting Guns; 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.

My invention relates to improvements in methods of and apparatus for mounting guns on their carriages or other supports, so that with a small expenditure of energy they may be readily elevated or depressed. In the mountings now generally in use the gun is suspended on trunnions, which may be either on the gun itself or on the oscillating slide in which the gun recoils, and the weight of the gun is generally supported by the circular bearing-plate or trunnion-seat placed beneath the trunnion and forming part of the gun-carriage. The pressure on this bearing is ordinarily exerted by the lower element of the cylindrical trunnion upon which the weight of the gun is supported, and since the supporting element of the trunnion is not usually in the line of recoil there is a tendency of the trunnion to roll backward when the gun is fired, causing the muzzle of the gun to tilt upward, and thus causing a heavy strain on the elevating-gear. Moreover, since the weight of the gun supported by the trunnions is supported on a line of bearings eccentric to the center of gravity of the gun and below the same it will be seen that the larger the trunnions the lower will be the points of support of the gun, and hence the greater energy will be required under existing conditions to elevate and depress the gun. Moreover, since in order to secure the necessary strength large guns require large trunnions this difficulty becomes greater in operating large guns than in operating small ones. If the trunnions of the gun could be made very small, the moment-arm of the friction caused by elevating and depressing would be much reduced. In this method the arm at which the friction acts is practically reduced to zero, thereby reducing the work of elevating and depressing to

merely that of overcoming the inertia of the mass.

Reference is had to the accompanying drawings, in which the same parts are indicated by the same letters throughout the several views.

Figure 1 represents a side elevation of a gun fitted with my improved device. Fig. 2 represents a side elevation, on an enlarged scale, of the trunnion and the means for supporting the same; and Fig. 3 represents a section along the line xx of Fig. 2 and looking to the left.

A represents the central portion of a gun, which is provided with a band A' , adapted to slide in the oscillating slide B, which slide is provided with the trunnions C, which are journaled between the circular plates or trunnion-seats d and the cap-squares d' of the carriage D.

The particular character of the carriage is immaterial, as the hereinafter-described invention may be readily applied to any of the mounts for heavy guns.

The trunnions C are tapped with screw-threads c to receive the screw e , rigidly attached to or integral with the plate E, which plate is provided with a knife-edge e' , so adjusted as to be at approximately the exact center of the face of the trunnion. The said plate E is held against turning by the set-screw e^2 , screwed into the face of the trunnion. The knife-edge e' rests upon the hardened plate f , let into the block F, which block is recessed on its bottom and near its ends, as at f' , to receive the heads h of the lifting-screws H and H'. These screws are provided with screw-threads h' , which engage in the screw-threaded sleeves or nuts K and K', fast to the gun-carriage. The said screws H and H' are provided with angular heads h^2 to be turned by a wrench; but capstan-bars or other equivalent devices may be provided, if desired, and are also provided with lock-nuts h^2 to lock the said screws at the desired position. In practice these two screws are so adjusted that a thin sheet of paper or other gage can be passed between the base of the trunnion and the base-ring d , when the weight of the gun will be supported by means of the knife-edge e' on the hardened plate f . It will readily be seen that when so lifted clear of the trunnion-

seat *d* and supported about the axis of the trunnions the gun may be readily elevated or depressed with a very small expenditure of energy. Now when the gun is fired the trunnion will jump directly backward in the line of fire until it strikes the trunnion-seat; but since the lost motion of the trunnion in its bearing is very small the resiliency of the knife-edge *e'* will readily yield to the said pressure and thus prevent any permanent disarrangement of or any injury to the said knife-edge or to the plate *f*. After the counter-recoil the gun will once more be supported upon the knife-edge and may be elevated or depressed as before. The herein-described trunnion attachment renders it possible to work the elevating-gear of very heavy guns by hand with sufficient rapidity, which is a great desideratum. While any form of elevating-gear may be used, I prefer that shown in Fig. 1, in which *L* is a segmental rack struck with the same center as the trunnion *C*. *M* represents a pinion gearing in the said rack and mounted on the shaft *N*, which is journaled in the bracket *S* at the side of the gun-carriage. The worm-wheel *P* is fast on the said shaft *M* and is turned by the worm *Q*, fast on the shaft *R*, which is also journaled in the said bracket *S* and is revolved by the hand-wheel *R'*. While the elevating-gear need only be made light for purposes of operation by hand-power, it must be made strong enough to stand the shifting of the weight of the gun on recoil and also the shock of recoil. It will be seen that by thus suspending the gun on the approximate mathematical axis of the trunnions the gun may be elevated or depressed with great facility, and that the error known as "jump," allowed for in most range-tables, is largely obviated. It will be seen that I practically provide two sets of trunnions, the smaller trunnions projecting from the larger and supporting the weight of the gun when the gun is "run out" or in the initial position, and the larger trunnions taking up the shock of recoil.

In order to make the bearing-surface of the smaller trunnions as small as possible and at the same time have the requisite strength, I prefer instead of making the smaller trunnions concentric with the larger to make only the point of support of the smaller trunnions concentric with the larger and to place the mass of metal necessary to give the req-

uisite strength above this point of support. The effect of this is to practically have the gun pivoted for elevating or depressing upon a trunnion of inappreciable diameter, while for resisting the shock of discharge the ordinary trunnions are provided. It will be obvious that the herein-described auxiliary trunnions may be applied either to guns having trunnions or to the trunnions of oscillating slides, and that they may be readily applied to any such guns now in use without necessitating expensive changes in their mounts.

These and the other advantages of the herein-described apparatus will readily suggest themselves to any one skilled in the art.

It will be obvious that various modifications of the herein-described apparatus might be made which could be used without departing from the spirit of my invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a gun mounting, the combination with a gun, and trunnions to stand the shock of recoil, of knife edges secured to said trunnions to sustain the weight of the gun, and supports for said knife edges, substantially as described.

2. In a gun mounting, the combination with a gun, and trunnions adapted to stand the shock or recoil, or knife edges secured to said trunnions, to sustain the weight of the gun, and vertically adjustable supports for said knife edges, substantially as described.

3. In a gun mounting, the combination with a gun, and trunnions to stand the shock of recoil, of knife edges secured to said trunnions, blocks supporting said knife edges, and screws connected to the gun carriage and adjustably supporting said block, substantially as described.

4. In a gun mounting, the combination with a gun, of knife edges which support the same at approximately the point about which the gun is turned for elevating and depressing, and means which limit the longitudinal movement of said knife edges relative to their bearings on the recoil of the gun.

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

JOSEPH STRAUSS.

Witnesses:

B. A. FISKE,

CHAS. L. HUGHES.