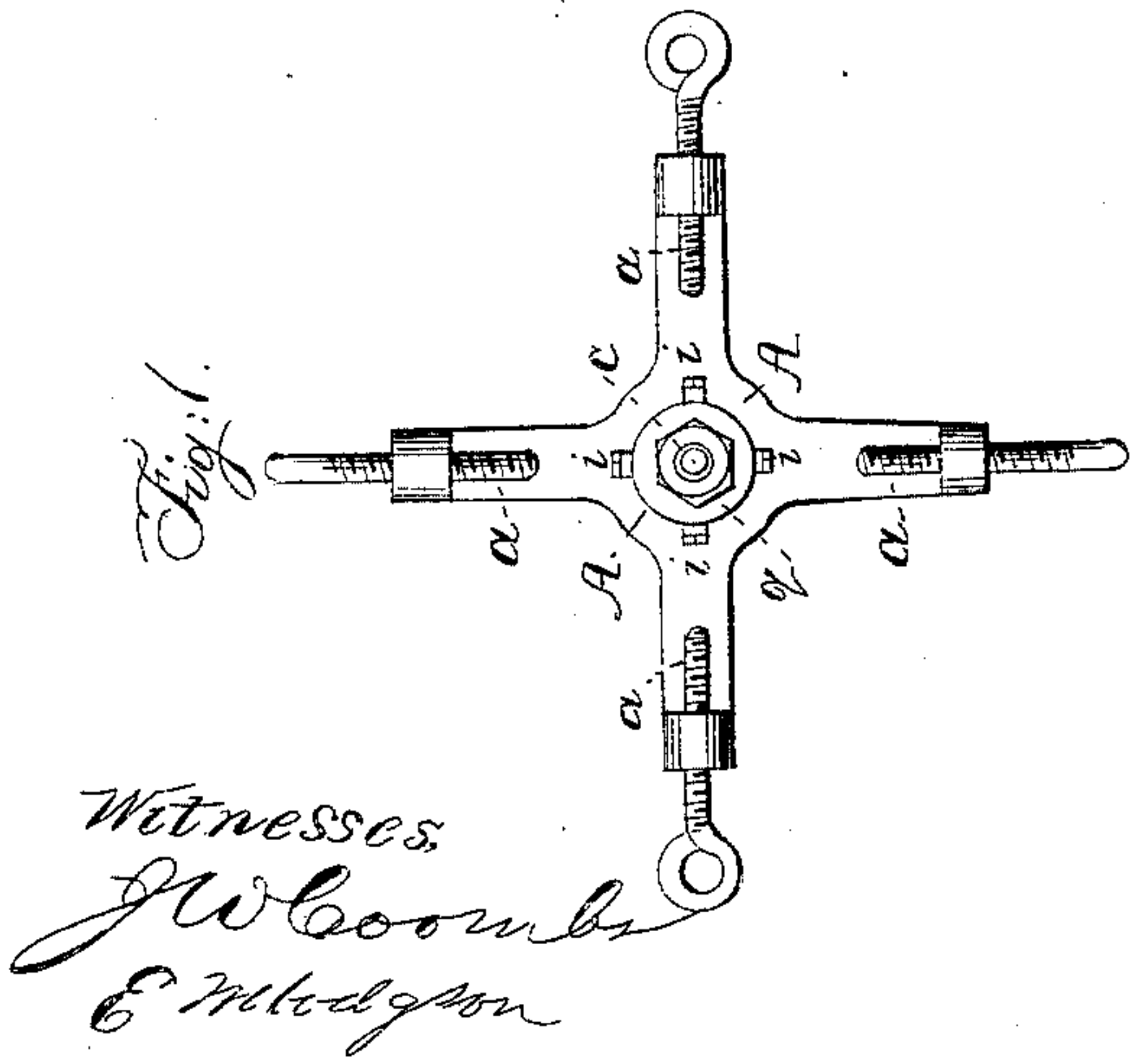
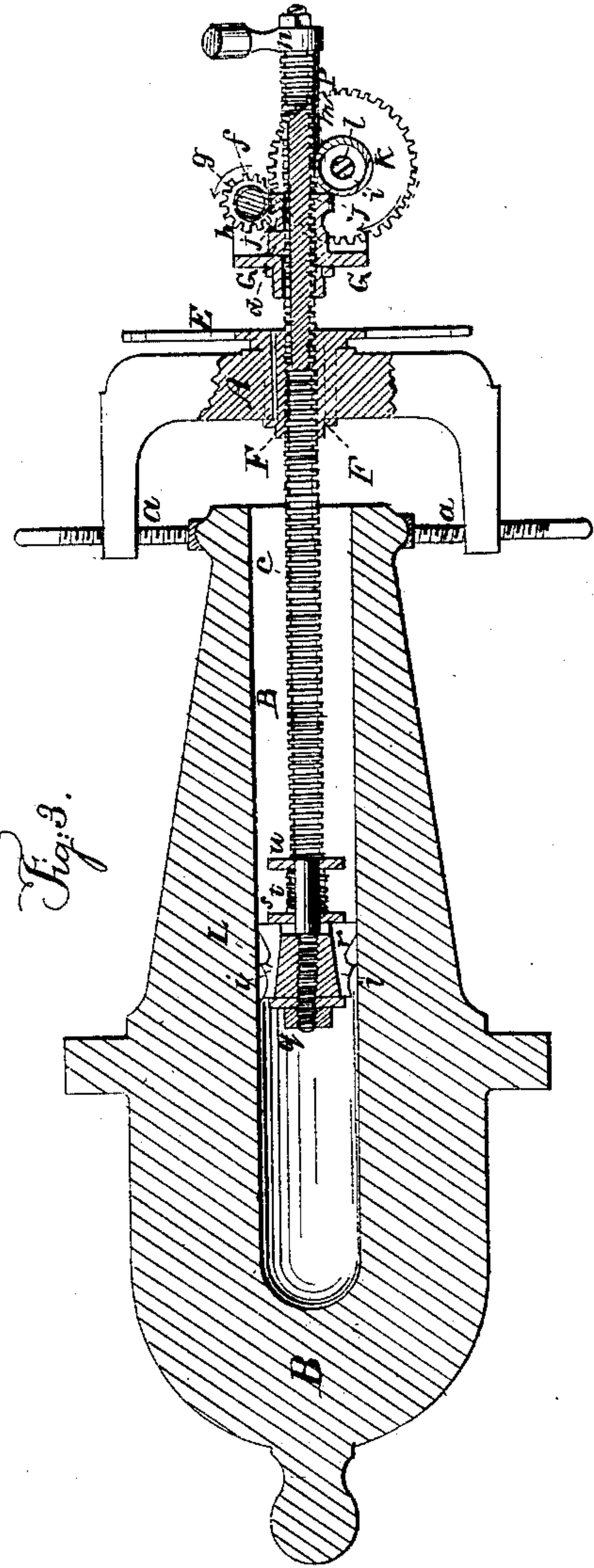
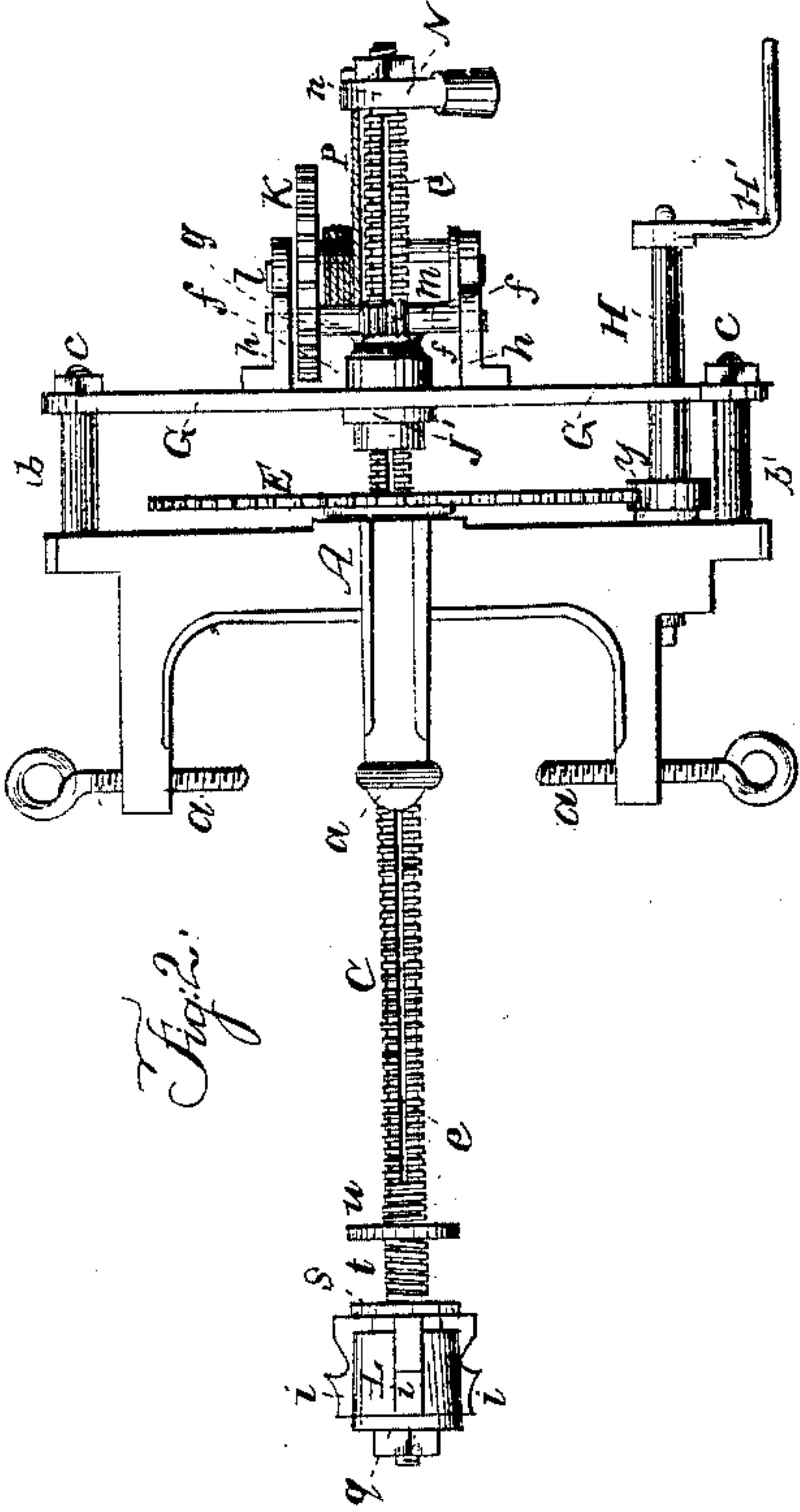


Rifling Cannon.

No. 37,898.

Patented March 17, 1863.



Inventor
A. Bengaw
per Munn & Co
Attorneys

UNITED STATES PATENT OFFICE.

ADOLPHUS BONZANO, OF DETROIT, MICHIGAN.

IMPROVEMENT IN MACHINES FOR RIFLING CANNONS.

Specification forming part of Letters Patent No. 37,898, dated March 17, 1863.

To all whom it may concern:

Be it known that I, ADOLPHUS BONZANO, of Detroit, in the county of Wayne and State of Michigan, have invented a new and Improved Machine for Rifling and Rerifling Cannon and other Ordnance; 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 an end view of the machine. Fig. 2 is a side view of the same. Fig. 3 is a top view of the same, representing it partly in section and in the act of rifling a gun.

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

This invention is more especially applicable to a rifling-machine having its parts constructed, combined, arranged, and operated in such a manner as to make it portable, that it may be attached to and supported by the gun to be rifled and be made to work without any other support, the gun either being upon its carriage or supported in any convenient manner, such machine being conveniently applicable to the rifling of ordnance in forts or on board ships.

It consists in a novel mode of applying the cutters within the cutter-head, whereby they are enabled to pass along the bore of the gun toward the breech without cutting, but caused to cut by the act of their being drawn from the breech toward the muzzle; also, in certain novel means of turning the cutter-bar to produce the twist of the rifle-grooves.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A represents what I call the "center block," which constitutes the principal portion of the framing of the machine, having three or four arms fitted with set-screws, *a a*, for attaching and securing the machine to the gun B near the muzzle thereof. The said set-screws should be fitted with shoes to fit the muzzle of the gun. The center of the block A is bored out for the reception of the hub of a spur-gear, E, in the interior of which is fitted and secured a deep screw-nut, F, through which works the cutter-bar C, the exterior of which has cut upon it a screw-thread to fit the said nut. The said nut is so fitted and secured in the hub of the gear E, and both are so fitted to the cen-

ter block that neither can move in the direction of their axis and that the nut must turn with the gear E.

To the center block, A, on the front side thereof, there is secured to it by screw-posts *b b* and nuts *c c* a plate, G, which contains one of the bearings for a shaft, H, the other bearing for the said shaft being in the center block. This shaft H has fast upon it a pinion, I, gearing with the spur-gear E, and is furnished at its front end with a crank, H', or other means of turning it, for the purpose of making the said pinion give rotary motion to the gear E and nut F, and thereby, through the action of the nut on the screw-thread of the cutter-bar, produce the longitudinal movement of the said bar and its attached cutters *i i*, by which the cutting of the grooves on the bore of the gun is performed. The cutters, which are attached to the bar near its rear end, are constructed and applied to cut in moving outward from the breech toward the muzzle, and in order to relieve the screws *a a* of the strain of the cutting operation, screws may be screwed through the center block parallel with the cutter-bar and operate like jack-screws directly against the muzzle of the gun. The plate G has provided in it, opposite the center of the center block, a hole for the reception of the hub J' of a worm-gear, J, which is bored out large enough for the cutter-bar to work back and forth freely through it, and is furnished with a feather, *d*, which enters and fits easily into a straight groove, *e*, provided in the cutter-bar, said groove extending nearly the whole length of the bar, and the said pin causing the bar to turn with the said worm-gear, but leaving the said bar to move freely lengthwise within the said gear, which is so fitted to the plate G as to be capable of turning freely therein, but so secured therein as not to be capable of moving in the direction of the length of the cutter-bar. The said gear gears with an endless screw, *f*, cut on a shaft, *g*, which is arranged transversely to the cutter-bar in bearings in two brackets, *h h*, secured to the plate G, and on this shaft there is secured a small spur-gear, *j*, which gears with a spur-gear, *k*, on a shaft, *l*, which works in bearings in the brackets *h h*, and on this shaft there is secured a barrel, *m*, on which is wound a cord or chain, *p*, which is attached to the outer or front end of the cutter-bar by a weighted

swivel, *n*, which is free to turn on the bar the said swivel preventing the cord or chain from winding around the cutter-bar as the latter is turned, to produce the twist of the grooves.

The turning of the cutter-bar is effected by the following means: As the said bar is drawn outward from the breech toward the muzzle of the gun to produce the cutting operation the cord or chain *p* attached to it is caused to be unwound from the barrel *m* and to turn the said barrel on its axis, and as the shaft *l* and gear *k* turn with the barrel the gear *k* gives motion to the gear *j*, shaft *g*, and endless screw *f*, causing the latter to turn the worm-gear *J* and the cutter-bar. If the barrel *m* is of cylindrical form, the rotary motion of the bar bears a constant relation to its longitudinal motion and a regular twist is produced, but by making the said barrel of conical form a progressive or gain twist is obtained.

The cutters *i i* are represented in the drawings as fitted to grooves in a cutter-head, *L*, that is firmly secured to the inner end of the cutter-bar, and these grooves have their bottoms inclined in a forward direction toward the center of the bar, as shown at *r r* in Fig. 3. The cutters are free to slide in the grooves of the head, and they are arranged between two collars, *q* and *s*, of which *q* is fast at the back of the head, and *s* is free to move back and forth under the control of a spring, *t*, coiled round the bar between it and a third collar, *u*, the front of which bears against a shoulder on the bar. The spring *t* tends to press the cutters back along the grooves *r r*, and so keep them pressed outward from the center of the bar. In inserting the cutter bar and cutter-head into the bore of the gun from the muzzle, the friction of the cutters in the bore overcomes the pressure of the spring and allows the cutters to slide forward in the grooves and so approach the center of the bar near enough to allow them to pass back through

the bore, but in drawing out the bar, the hold taken by the cutters in the metal causes their forward movement with the bar and head to be retarded until the collar *q* has come in contact with their rear ends and the inclined bottoms of the grooves have, by a wedge-like action, forced them out as far as permitted by the said collar *q*, which is far enough to produce the depth of cut desired. As the grooves are cut by a single passage of the cutters along the bore, it will be desirable where they are to be of considerable depth to make each cutter with two or more points or cutting-edges, one behind another, the back ones increasing in prominence so that the front will take a cut but a slight depth, the next one deeper, and so on. I propose generally to fit the grooves *r r* with stocks for the reception of the cutters, and to connect the said stocks firmly with the sliding collar *s*, so that by applying chains to draw forward the said collar all the cutter-stocks and cutters may be drawn forward in the cutter-head and so held as to prevent the edges of the cutters from rubbing on the surface of the bore while the cutter-head is being inserted therein.

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

1. The cutter-head having its cutters *i i*, or stocks to which the said cutters are attached, fitted to grooves *r r*, with inclined bottoms, and having applied in connection with them a spring, *t*, and collars *q s*, substantially as herein specified.

2. The employment for producing a regular or progressive twist of the rifle-grooves of a barrel, *m*, connected by a cord or chain with the cutter-bar and geared with the said bar, substantially as herein specified.

ADOLPHUS BONZANO.

Witnesses:

C. E. EDDIE,
JOHN HILESENDEGER.