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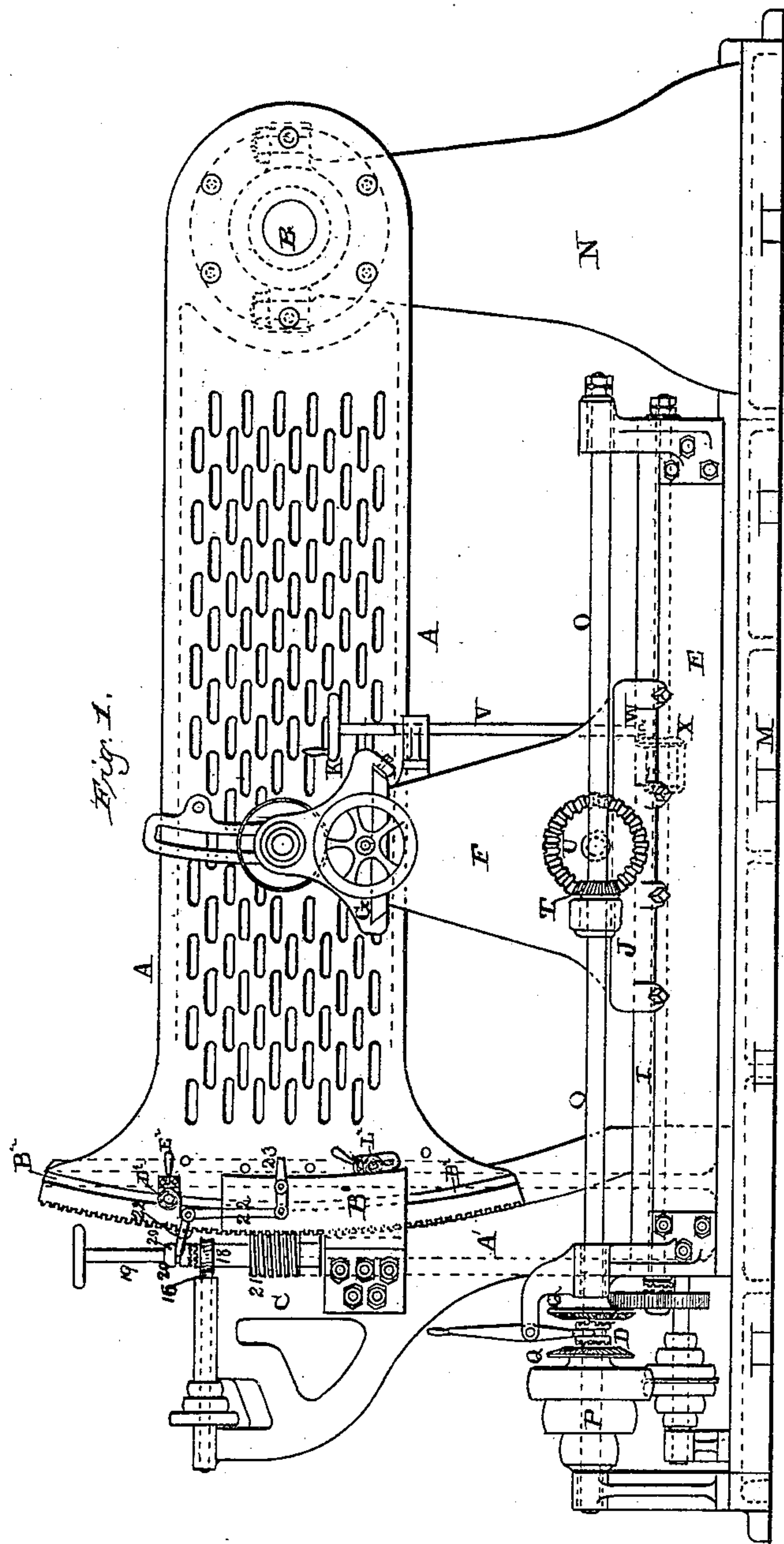
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W. H. DENNEY.

MACHINE FOR MILLING LINKS FOR ENGINES.

No. 271,431.

Patented Jan. 30, 1883.



witnesses:

J. C. Clark

Louis F. Gardner

Inventor;

W. H. Denney

per

F. A. Lehmann

Attorney

(No Model.)

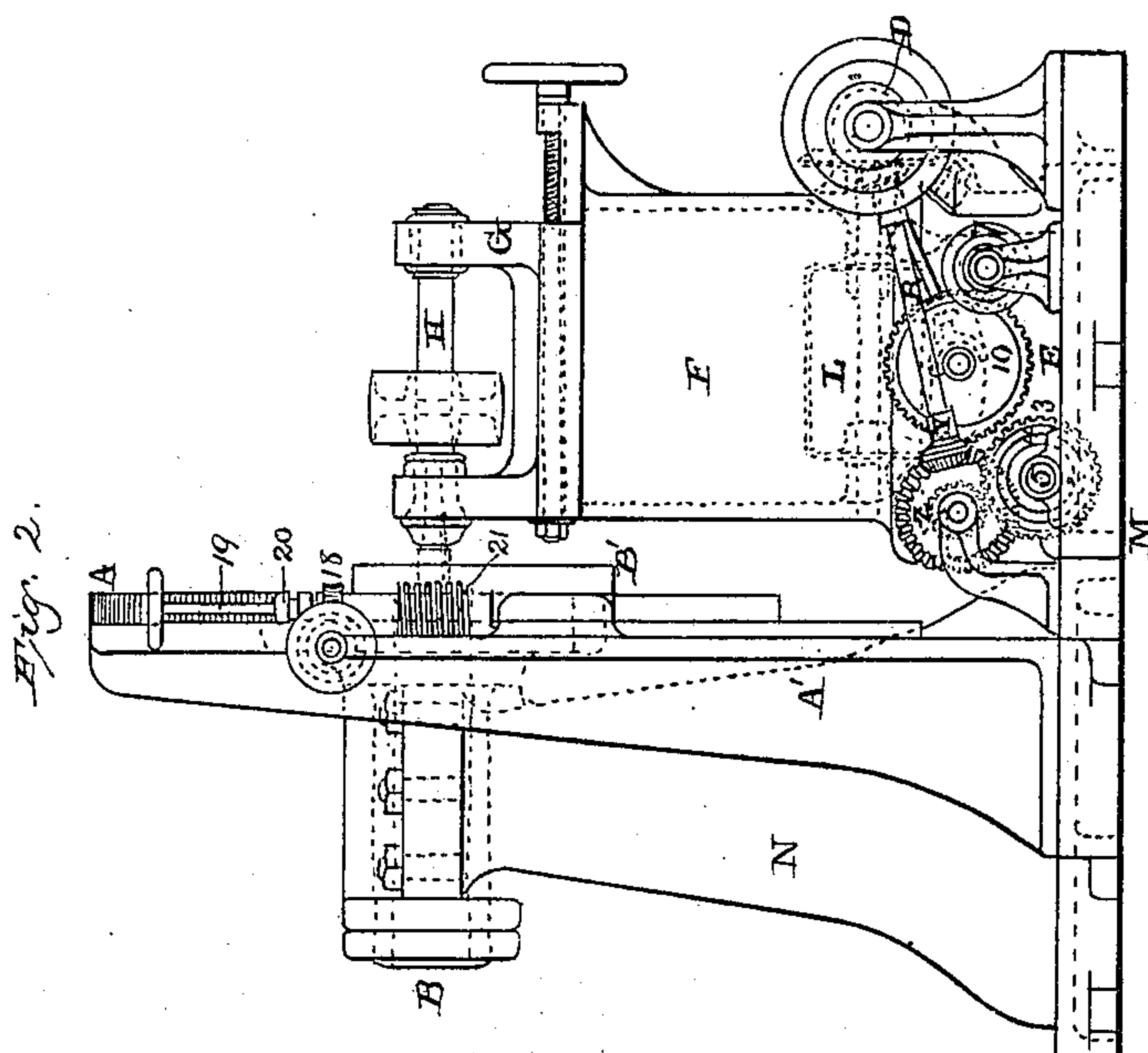
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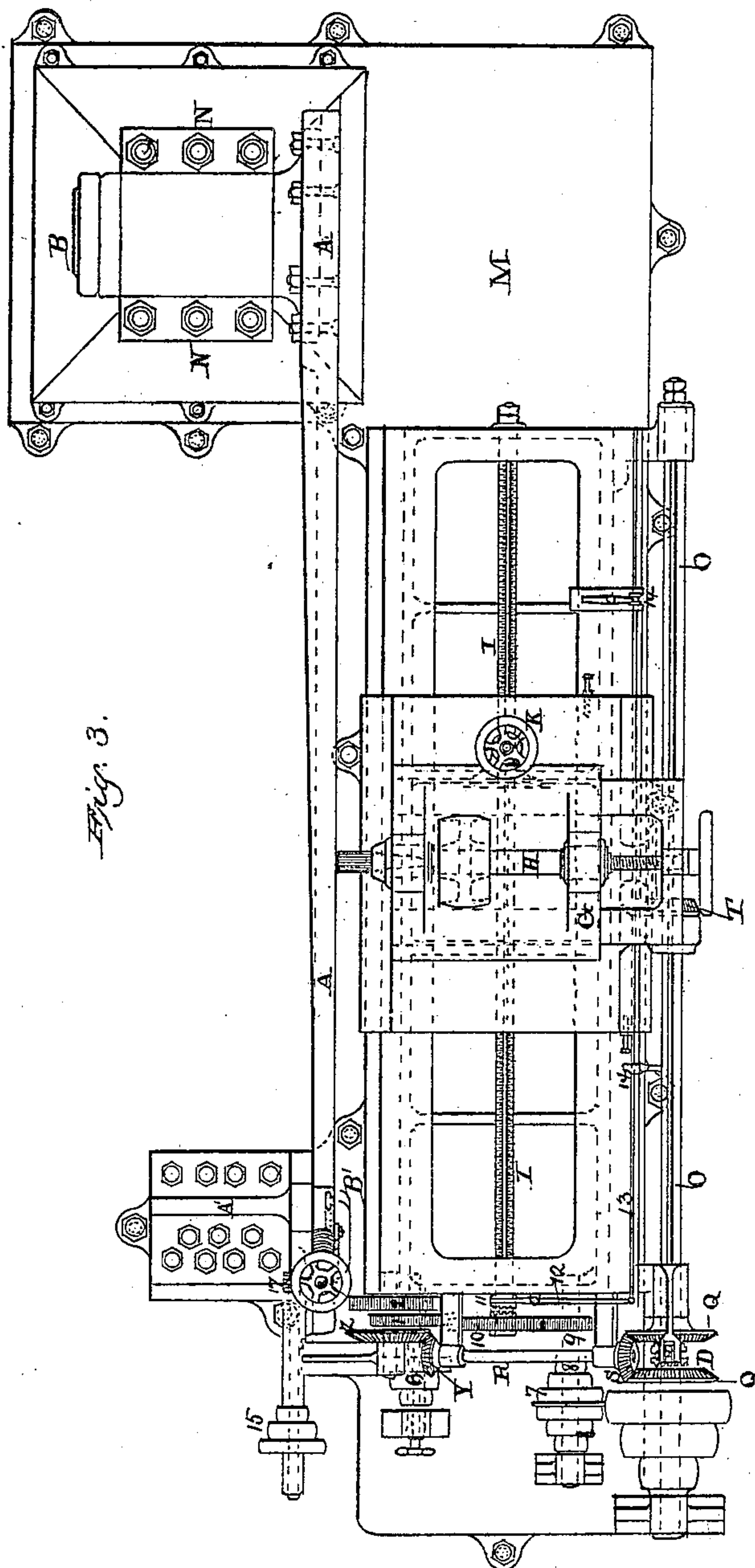
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(No Model.)

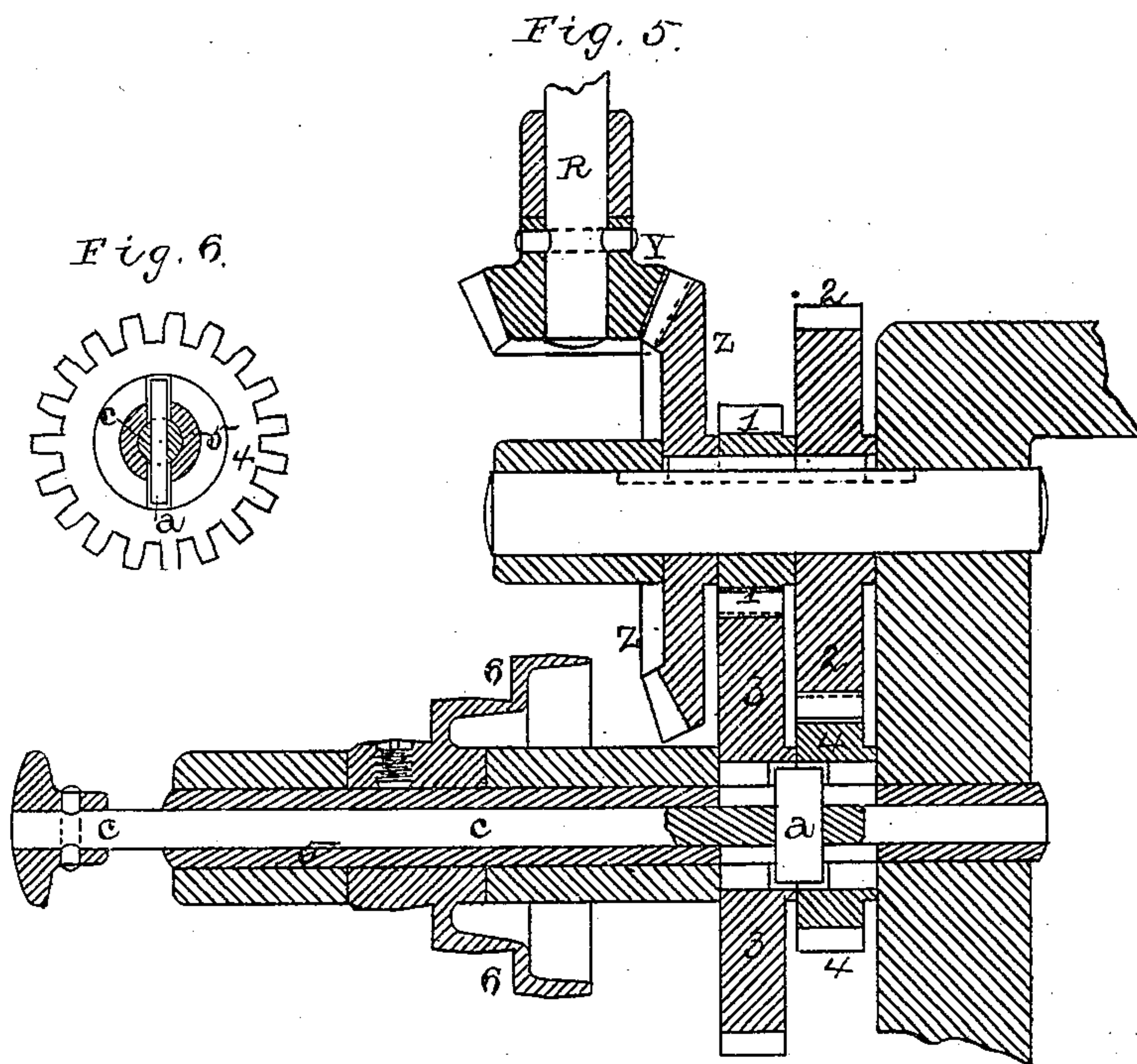
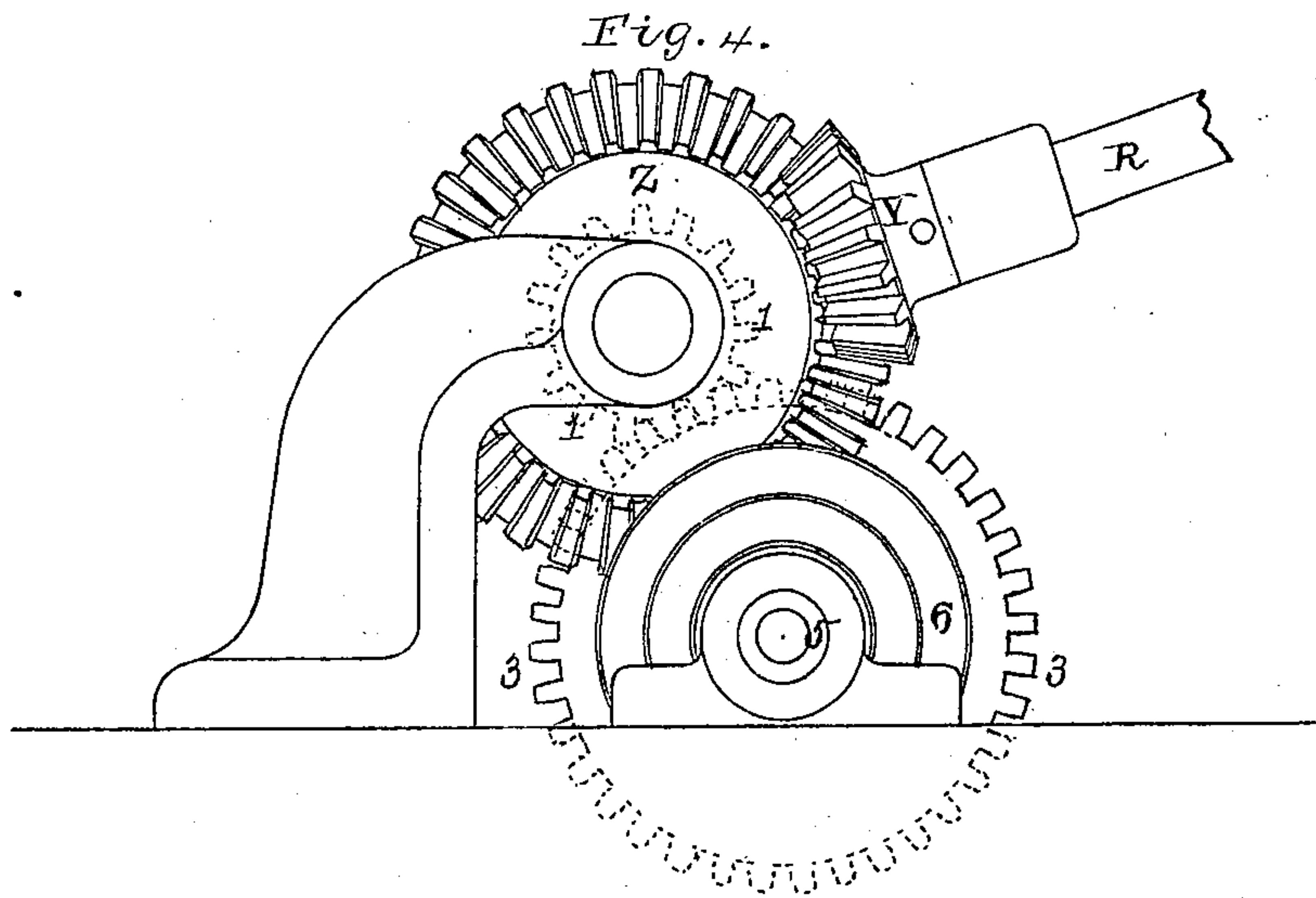
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(No Model.)

5 Sheets—Sheet 5.

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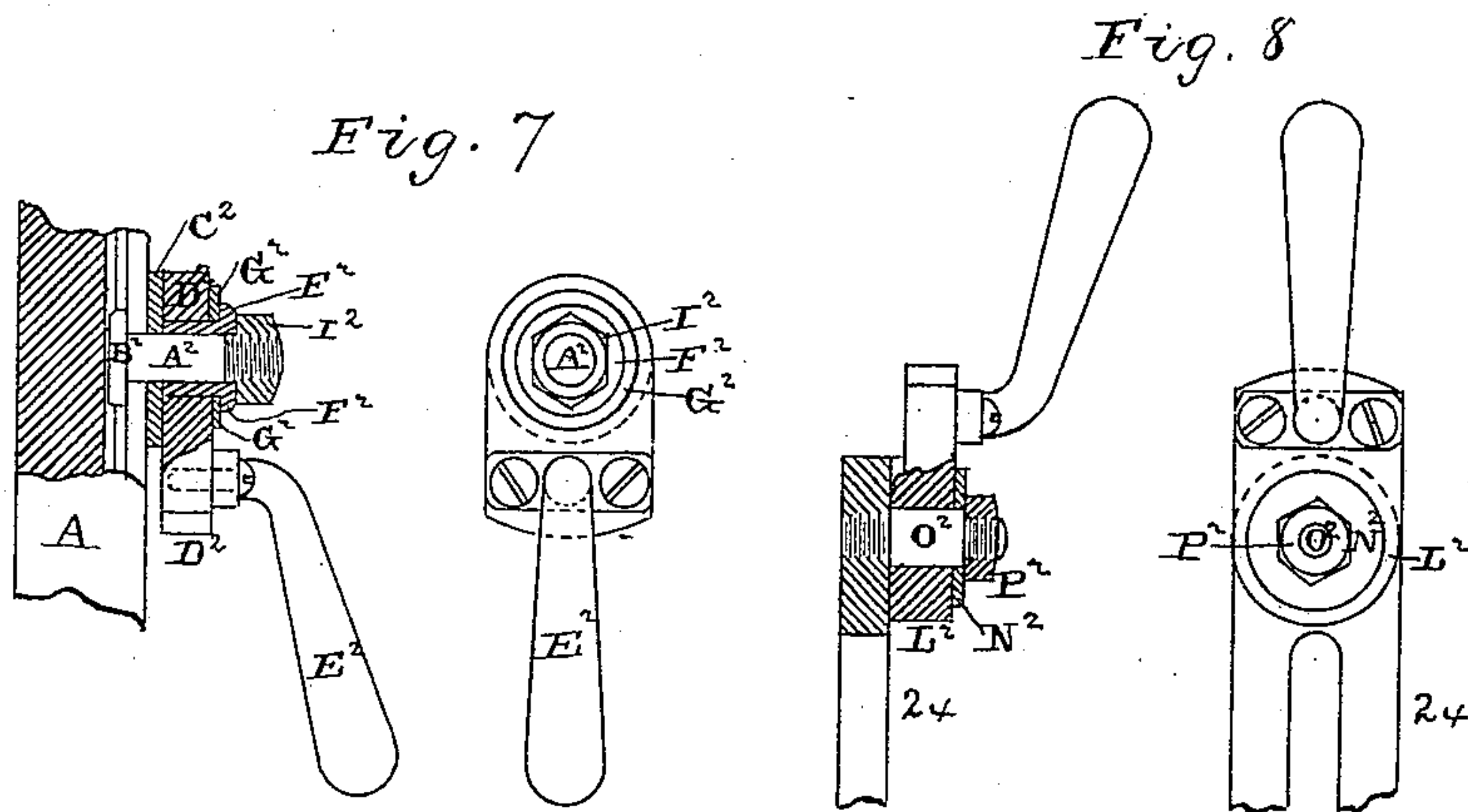


Fig. 10.

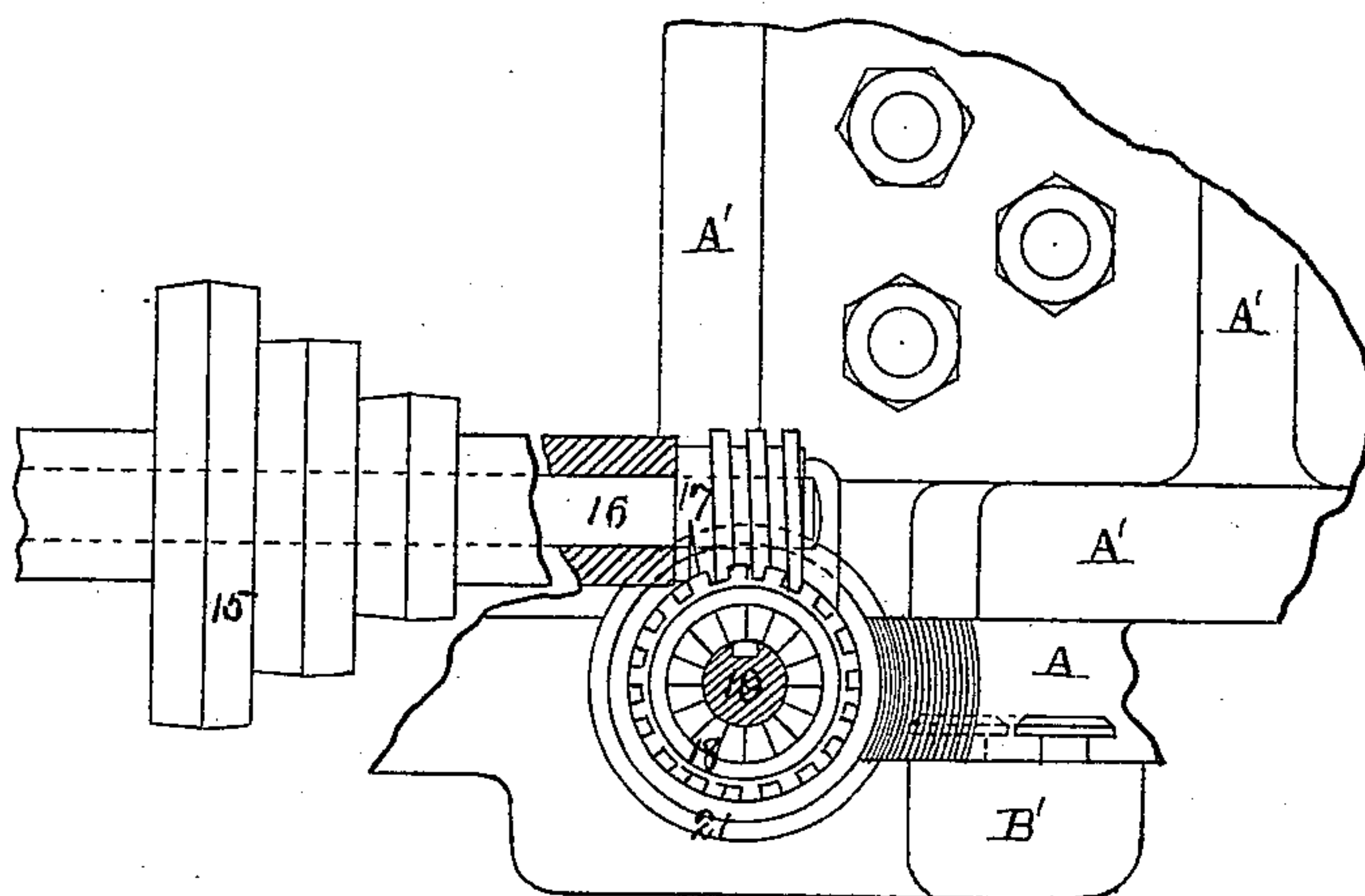
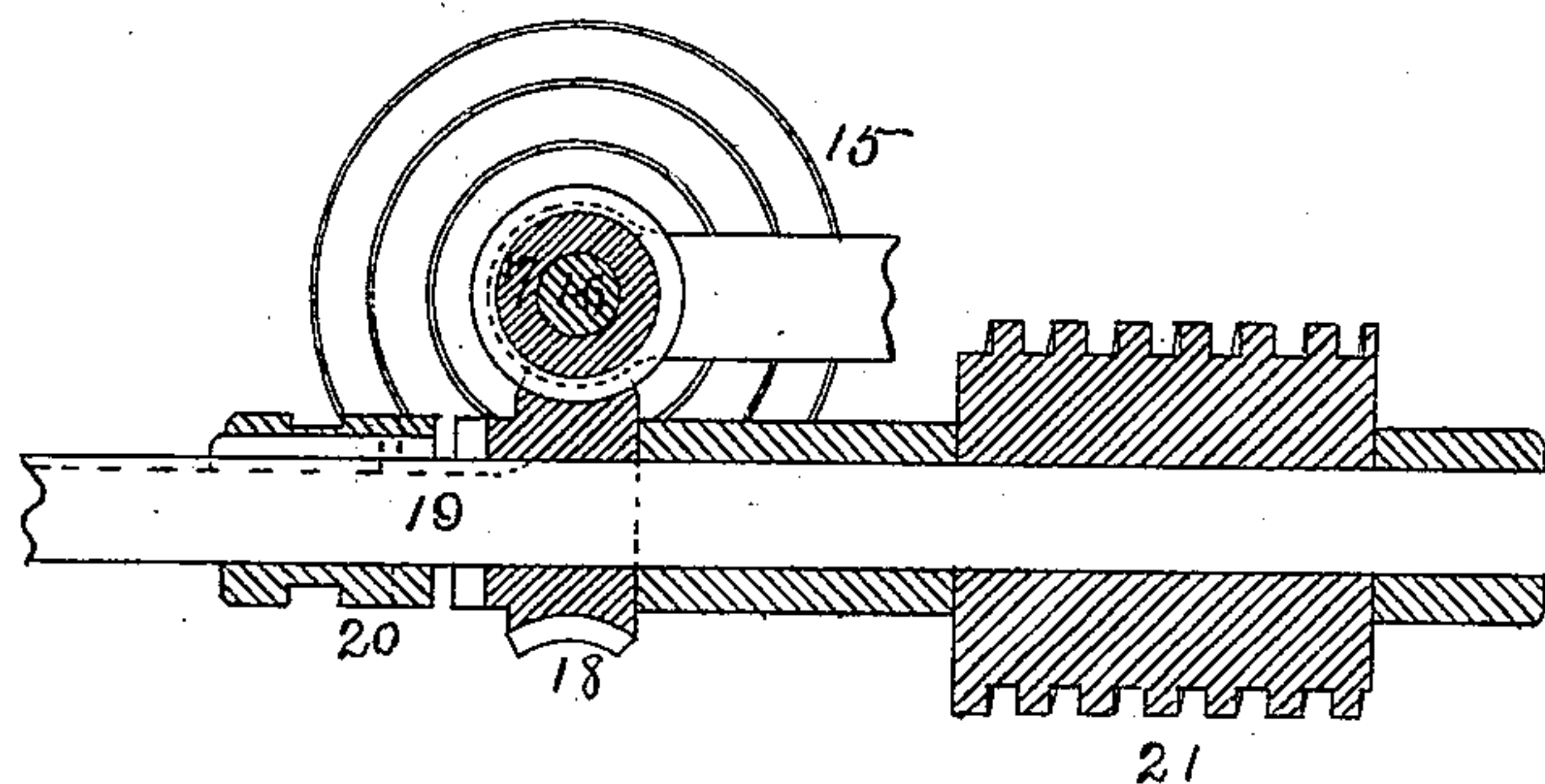


Fig. 9.



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UNITED STATES PATENT OFFICE.

WILLIAM H. DENNEY, OF LANCASTER, PENNSYLVANIA.

MACHINE FOR MILLING LINKS FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 271,431, dated January 30, 1883.

Application filed August 22, 1882. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. DENNEY, of Lancaster, in the county of Lancaster and State of Pennsylvania, have invented certain
5 new and useful Improvements in Machines for Milling Links for Locomotive, Stationary, and Marine Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others
10 skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in
15 machines for milling links for locomotive, stationary, and marine engines; and it consists in the combination of a pivoted arm, provided with suitable means whereby the links may be secured at any desired distance from the center of motion of the arm, whereby the desired
20 radius in the link can be given, with a mechanism for moving the arm, a standard provided with suitable stops, and a carriage carrying a milling-tool.

It still further consists in a carriage provided with the milling-tool upon its top and a mechanism for moving the carriage back and forth, and a mechanism for varying the speed at which the arm shall be moved while the
30 milling-tool is at work, all of which will be more fully described hereinafter.

The object of my invention is to produce a machine by which links used upon engines of different kinds can be entirely machine-made, and thus dispense with all hand-labor upon
35 them, whereby a better link can be produced at a much smaller cost than can be done by either a planer or a slotter.

Figure 1 is a side elevation of a machine embodying my invention. Fig. 2 is an end view, and Fig. 3 is a plan view, of the same. Figs.
40 4, 5, 6, 7, 8, 9, 10 are detail views.

M represents a suitable bed-plate, which may be either of the shape here shown or any other that may be preferred, and upon which
45 the whole of the machine is placed. Upon one corner of this bed-plate rises the standard N, in the top of which is journaled the mandrel B, having the slotted arm A secured to
50 one of its ends. This arm will be made of any desired length, so as to make links from the

largest to the smallest size that is used, and the arm is provided with a series of slots or fastening devices of any kind from one end to the other, so that the link that is being
55 made can be fastened to the arm at any point desired. The mandrel B at its outer end is provided with a screw-thread, and upon this screw-threaded end are placed two nuts, so that the arm can be drawn against the face of
60 the column or standard N with sufficient force to prevent the slightest vibration or lateral movement.

Journaled at any suitable point in bearings which rise upward from the shears E is the
65 main driving-shaft O, which receives its motion through the pulleys P from any suitable source. This shaft has a spline running from end to end, as shown in Fig. 3, and upon the outer end of the shaft are secured the two
70 beveled gears Q, between which the clutch D is placed, so that by shifting the clutch from one wheel to the other the shaft having the pinion S upon its end can be made to revolve in either direction desired. Sliding back
75 and forth upon this shaft O is the pinion T, which is provided with a feather to catch in the spline, so as to cause it to revolve with the shaft, and which pinion meshes with the beveled gear U, secured to the end of the shaft
80 which passes through the bottom of the column F. This shaft has secured to it a driving drum or pulley, L, from which the belt passes up over the pulley which is secured to the shaft H, and which shaft H has the
85 milling-tool secured to its inner end for finishing the slot which is to be made in the link. This shaft or spindle H is journaled in the head G, which is dovetailed upon the top of the column F, and which can be moved back
90 and forth over the top of the column, so as to move the milling-tool into and withdraw it from the slot in the link. Either the screw here shown for moving this head back and forth may be used or any other means which
95 may be preferred. The link having been secured to the arm A at a suitable distance from the center of motion, the column F is adjusted into position so that the cutter will come just opposite to the slot in the link, and
100 then the milling-tool is moved endwise across the top of the column, so that it will catch in-

side of the slot in the link. Should the column require but a very slight adjustment, it may be moved by means of the hand-wheel K, which is secured to the upper end of the shaft V, which has the pinion W secured to its lower end. This pinion meshes with the beveled gear X, which is placed upon the screw I, which passes through the center of the shears E, and by means of which the column F can be adjusted either forward or back. This column F is dovetailed upon the top of the shears, and is then secured in place by means of suitable set-screws.

The shaft R has secured to one end the pinion S and to the other end the pinion Y, which meshes with the beveled gear Z, which is secured to a short shaft which is journaled in one end of the shears E, and a suitable bracket which supports its outer end. Upon this shaft are secured the two wheels 1 2, of different sizes, one of which gears with a large wheel, 3, and the other with a smaller wheel, 4, on a hollow counter-shaft, 5, which is provided with driving-pulleys 6. The two wheels 3 and 4 can be locked to or disconnected from the counter-shaft 5 by means of the clutch a, which is connected to the inner end of the slide-rod c, which extends outward through the shaft. By shifting this clutch a either wheel 3 or 4 can be made to drive the shaft, according as a faster or slower motion is desired. From these pulleys 6 passes the belt over around the double-ended pulleys 7, which are placed upon a short shaft which is journaled in one end of the shears and a suitable standard made to support its outer end. Upon the inner end of this shaft 8 is secured the pinion 9, which meshes with the wheel 10 upon the outer end of the screw 1. This screw is provided with a suitable clutch, 11, by means of which the wheel 10 can be thrown in and out of gear with the screw, and thus enable the screw to be stopped at any time. This clutch 11 is connected to the lever 12, which has its longer end pivoted to the endwise-moving rod 13, which extends along upon the side of the shears E. Secured to this endwise-moving rod 13 are the two dogs 14. When the column F reaches the desired point it strikes against one of the dogs 14 and moves the rod 13 so as to shift the clutch 11, and thus throw the screw 1 out of gear with the wheel 10, and thus stop all movement of the screw. When it is desired to move the column again the clutch 11 must be moved in gear with the wheel 10 by moving the rod 13 endwise by hand. For this purpose either one of the dogs 14 may be provided with a small handle.

From the double-ended pulley 7 extends a belt, which passes over the pulley 15 on a shaft, 16, which has a worm, 17, secured to its inner end. This worm 17 gears with a worm-wheel, 18, which revolves loosely upon the vertical shaft 19, when the worm-wheel is not connected to the shaft by means of the clutch 20. When the clutch 20 is thrown out of gear with the worm-wheel 18 the shaft 16 will cause

the worm-wheel 18 to freely revolve without affecting the shaft 19; but when the shaft 19 is made to revolve by the worm-wheel 18 the worm-wheel 21, which meshes with the teeth formed on the outer end of the arm A, will cause the arm A to rise and fall, so that the milling-tool will traverse from one end of the slot in the link to the other. The clutch 20 has connected to it the lever 22 and a connecting-rod, which has pivoted to its lower end the lever 23, which, when struck by the lever that is secured to the cam L², which is secured to the lower end of the arm A, throws the clutch 20 out of gear and stops the movement of the arm A. Through the arm A are made a series of holes, so that this cam can be adjusted from one point to the other, and as the cam-frame 24 is slotted a very fine adjustment can be given to it, so as to regulate the length of the stroke of the arm. The upper cam, D², is fastened in a groove, B², which is made in the side of the arm A, and which is made adjustable, so that it will throw the clutch 20 out of gear whenever the arm A is moved upward far enough to bring the milling-tool against the end of the slot in the link.

Rising upward from the bed M is a suitable column, A', against the side of which the arm A bears at its outer end, for the purpose of steadying the arm in its movement and preventing vibration of any kind. Upon the front side of this column is built a suitable plate, B', which bears against the front side of the arm, and thus the end of the arm is held between the two parts, so that any but a vertical movement is impossible.

In order to enable the movement of the arm or lever A to be reversed when it reaches the end of its vertical play in either direction, two cams are used. The one which is attached near the upper end of the arm or lever consists of a bolt, A², which has its headed end held in the slot B² in the arm A. Over this bolt A² is passed the washer C², which bears against the side of the arm A, and against this washer bears the cam D², provided with the handle E² and the inner end of the sleeve F². Between the outer end of the sleeve F² and the cam D² is placed a spring-washer, G², which serves to hold the cam in any position into which it is turned by means of frictional contact. Upon the outer end of the bolt A² is placed a nut, I², by means of which the parts can be clamped rigidly together. While the link is being milled the cam is set so that its thickest part will strike the lever E² and disengage the clutch. After the clutch is disengaged and the movement of the arm A is stopped, and it is desired to throw the clutch in gear again, the cam D² is turned around by means of its lever E² until the shorter side of the cam stands where the long side was. The lever E² can then be moved to allow the clutch to engage again. The lower clutch consists of a cam, L², which is placed upon the bolt O², which has the clamping-nut P² screwed upon its outer end. Between the nut and the cam

is a spring-washer, N², which serves to hold the cam in position by frictional contact. This cam is designed to be turned upon its bolt, as above described, so that its handle will be struck by the arm or lever, and moved so as to loosen the cam and stop the movement.

The link is first forged, cast, or otherwise formed, its sides planed, and then it is rigidly secured to the arm A at any suitable point. The column F is then adjusted into position so that the milling-tool will cut away either the outside edges of the link or cut away the edges of the slot, as may be desired. The milling-tool is designed to finish the edges and ends of the link complete, so that when the link is removed from the arm it will be a finished link, ready to be case-hardened. By means of a machine constructed as above described it will be seen that all hand-labor in finishing the link is entirely dispensed with, and that a perfect link is made entirely by machinery. After the link has been finished the blocks, which are to move in the slots in the links, can be secured to the arm and milled off in the same manner.

I do not limit myself to the precise devices here shown for giving the arm a vertical movement, for this may be accomplished by a different arrangement of the parts without in any wise affecting the operation of the machine.

Having thus described my invention, I claim—

1. In a milling-machine, the combination of the pivoted arm, a mechanism for moving the free end of the arm through a portion of a circle, and a standard at the free end of the arm, provided with suitable stops to limit the movement of the arm, with a carriage that is movable back and forth in a line with the arm, and having a milling-tool mounted thereon, substantially as shown.

2. In a milling-machine, the combination of

a pivoted arm that is adapted to sweep through a portion of a circle at its free end, and having a series of slots through it, so that the link can be secured to it at any point, with a carriage that is moved back and forth in a line with the arm, and a milling-tool that is adjustable back and forth on the carriage, substantially as described.

3. The combination of the arm A, pivoted upon the mandrel B, and provided with means for the attachment to its side of the links, shaft 16, worm-gear 18, shaft 19, clutch 20, worm 21, dogs secured to the arm, and a suitable mechanism for throwing the clutch 20 in and out of gear, substantially as specified.

4. The combination of the arm A, which is made to sweep through a portion of a circle, and which is adapted to have the link or other device secured to its side, and a mechanism for moving the arm with the column F, carrying the milling-tool upon its top, and which is made to move back and forth along the side of the arm.

5. The combination of the column F, carrying the milling-tool upon its top and adapted to be moved back and forth upon the shears E, with the screw 1, wheel 10, clutch 11, lever 12, and endwise-moving rod 13, substantially as described.

6. The combination of the endwise-moving rod 13, provided with suitable dogs, 14, lever 12, clutch 11, wheel 10, screw 1, and column F, having a milling-tool upon its top, said tool being adjustable endwise across the top of the column, substantially as set forth.

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

WILLIAM H. DENNEY.

Witnesses:

F. A. LEHMANN,
W. H. KERN.