

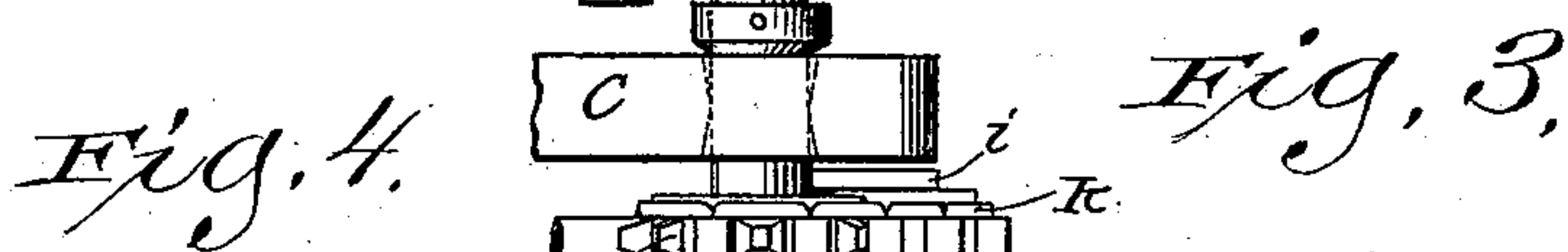
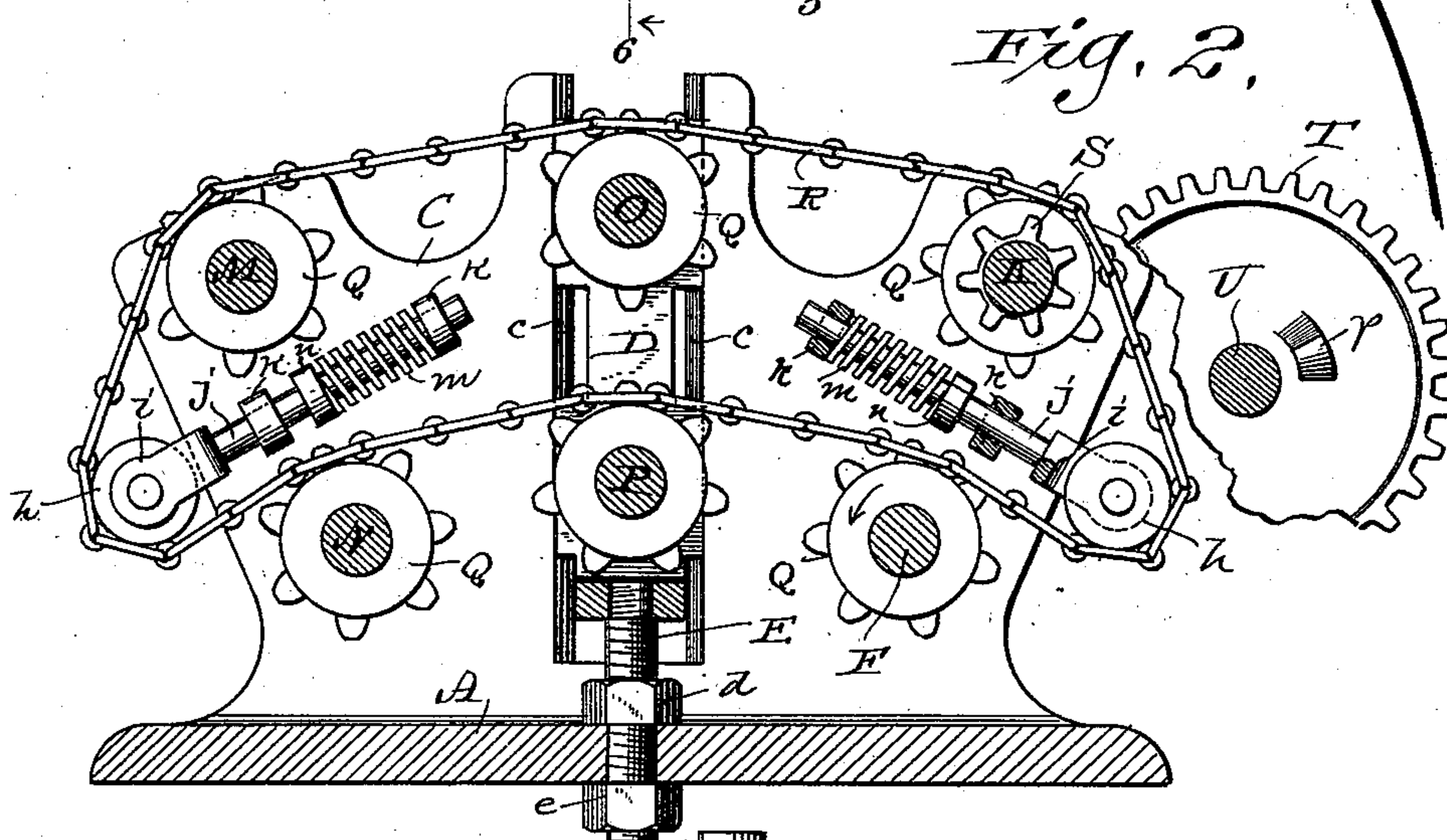
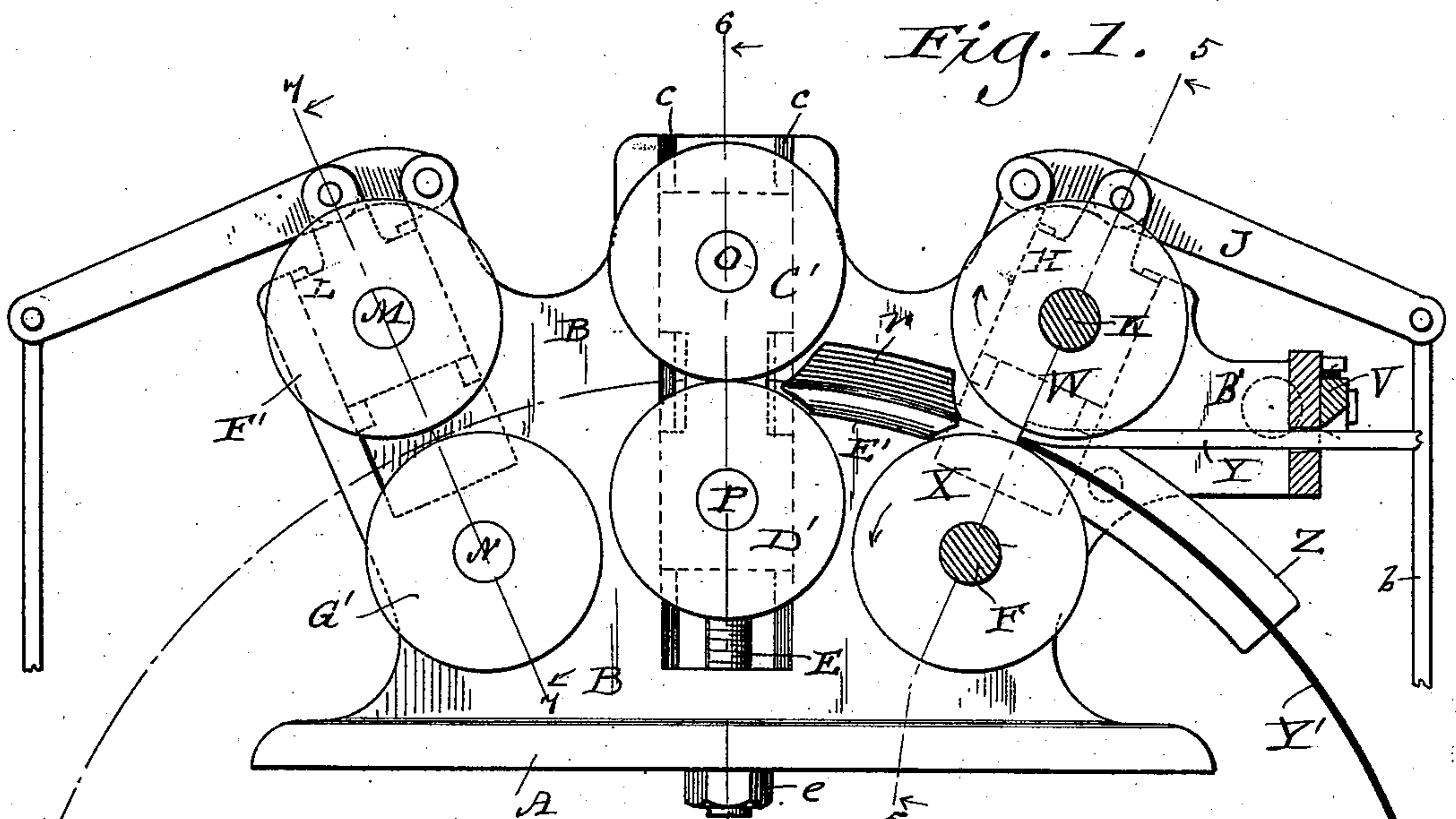
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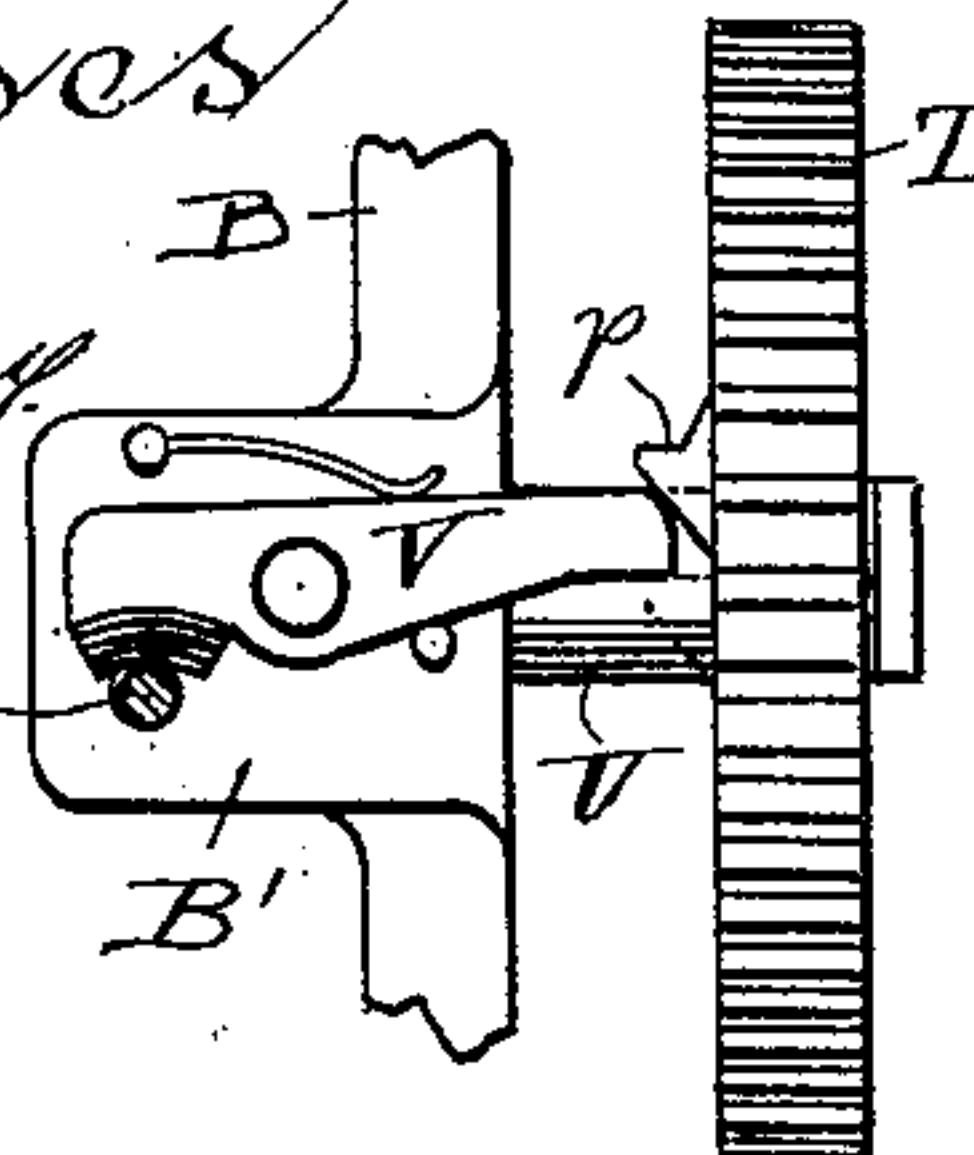
H. L. GATES.  
SHEET METAL WIRING MACHINE.

No. 540,613.

Patented June 4, 1895.



Witnesses  
Geo W. Loring  
H. E. Oliphant



*Inventor*  
Henry L. Gates,  
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Attorney

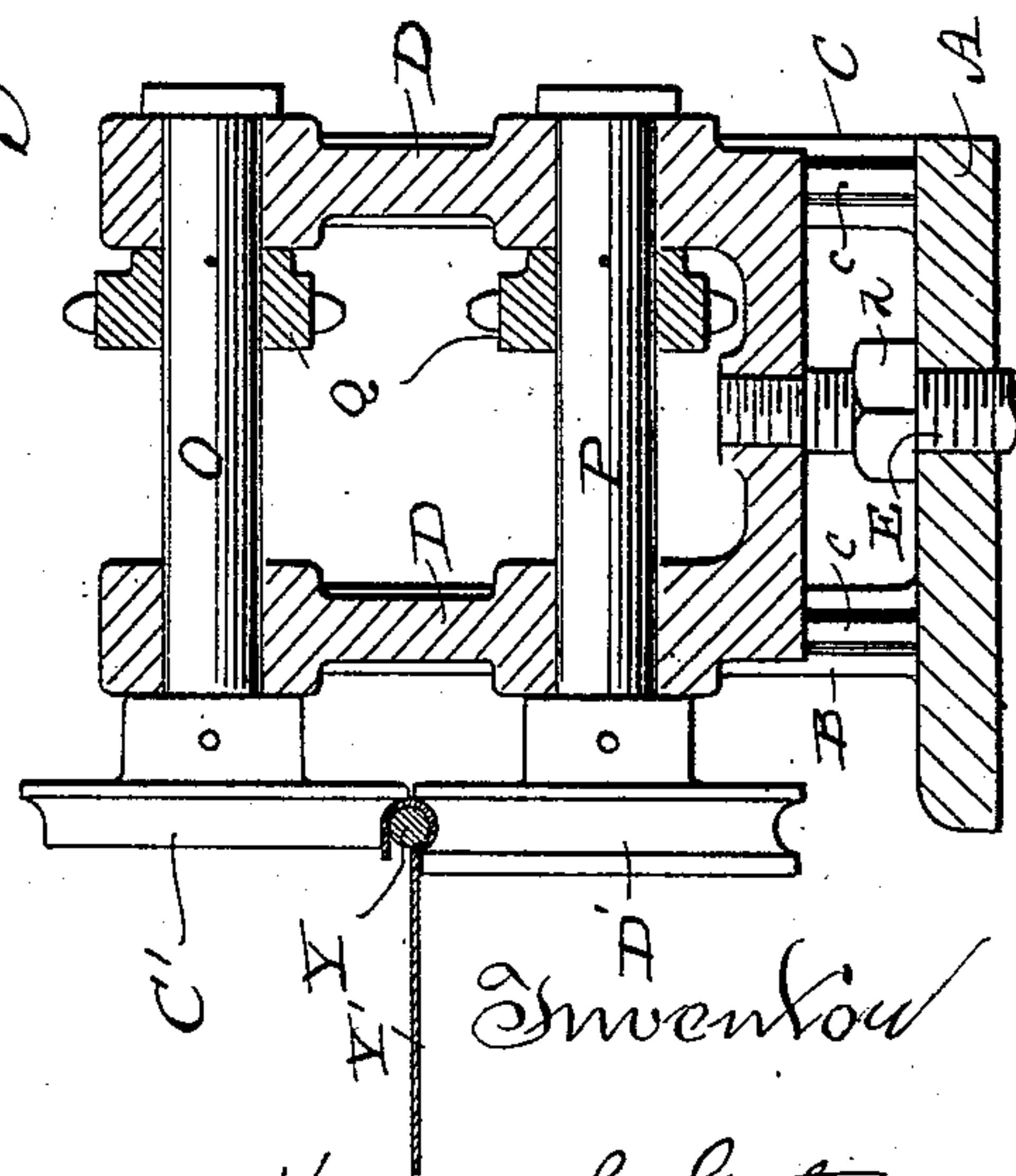
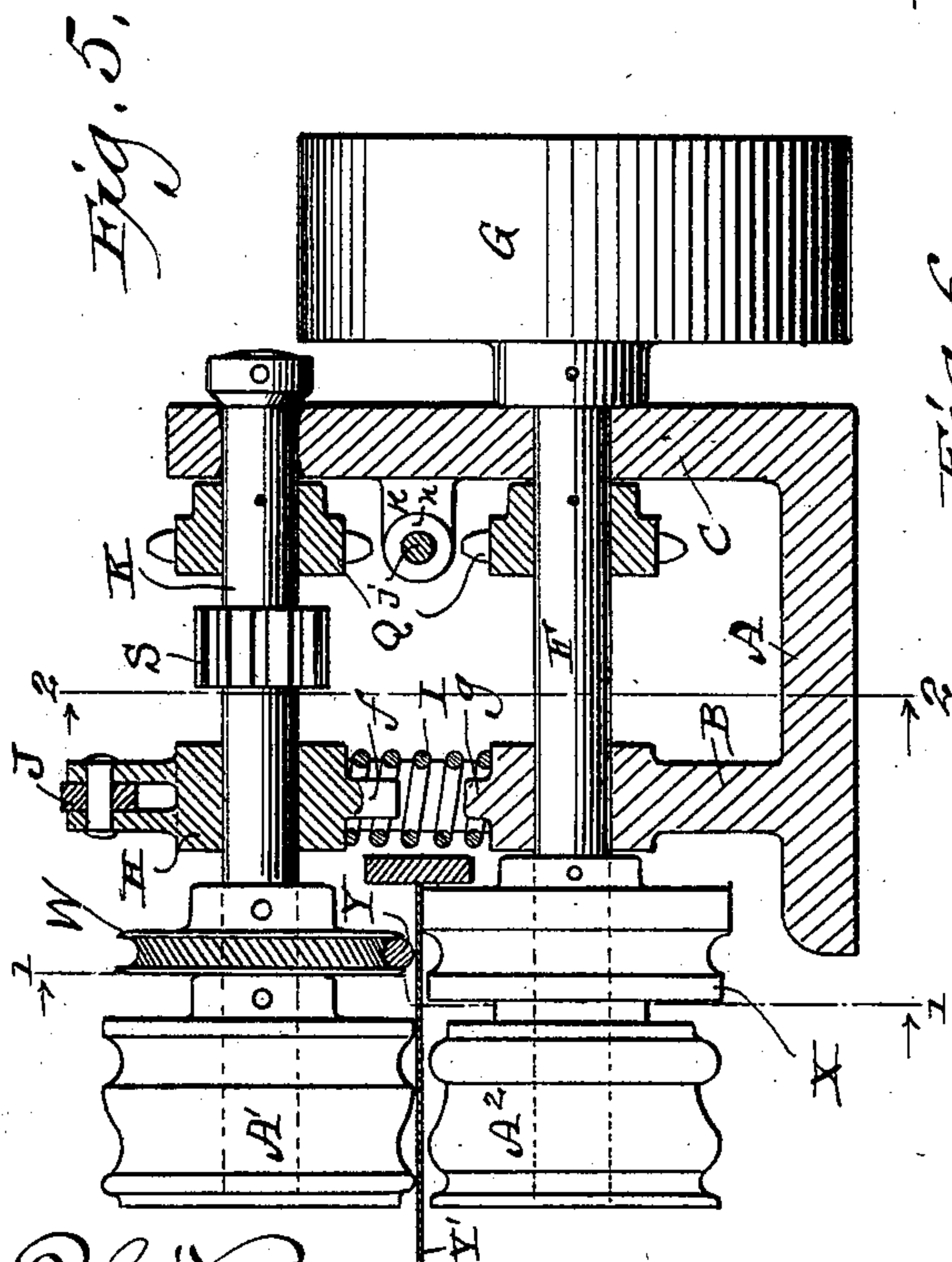
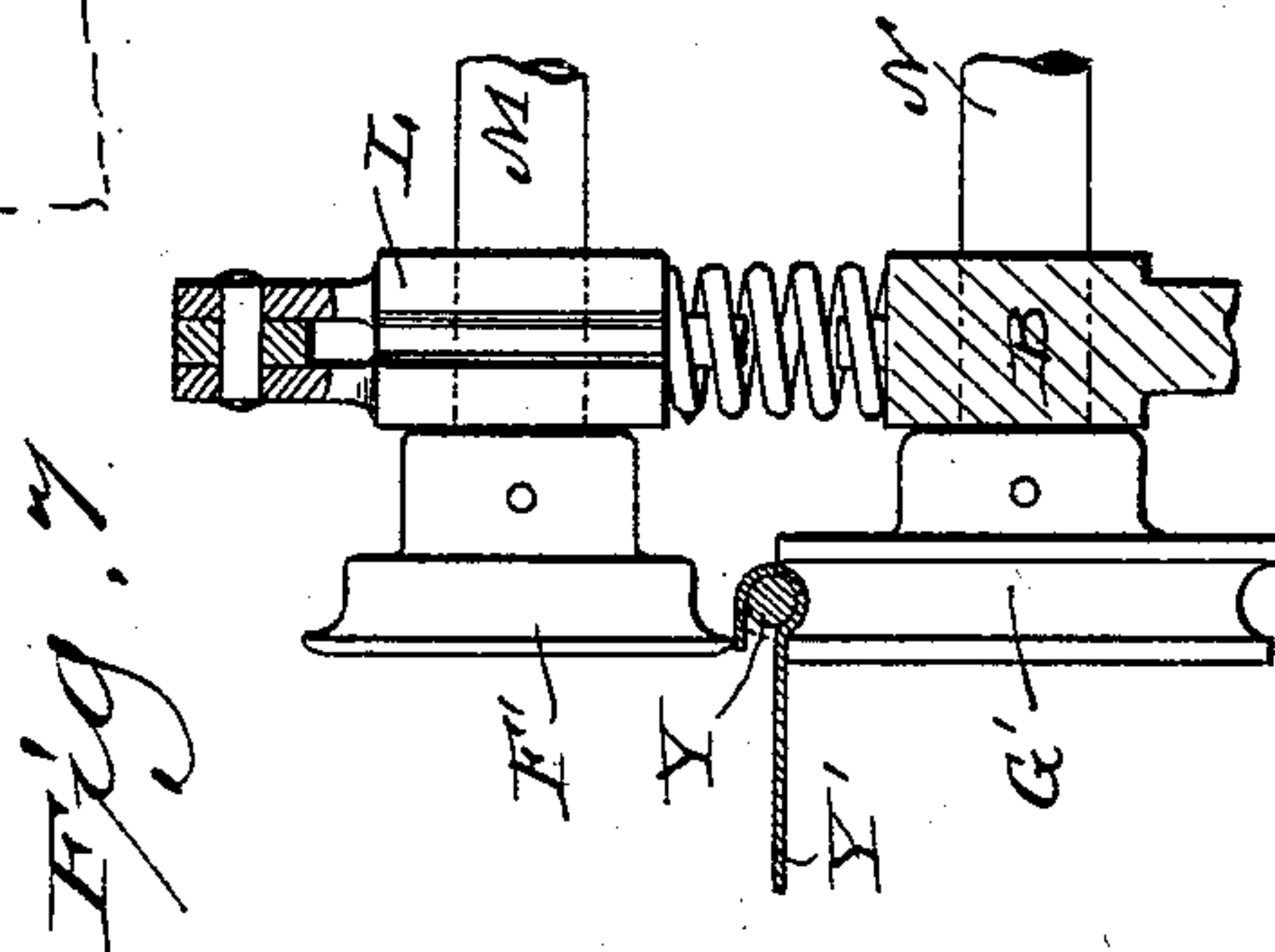
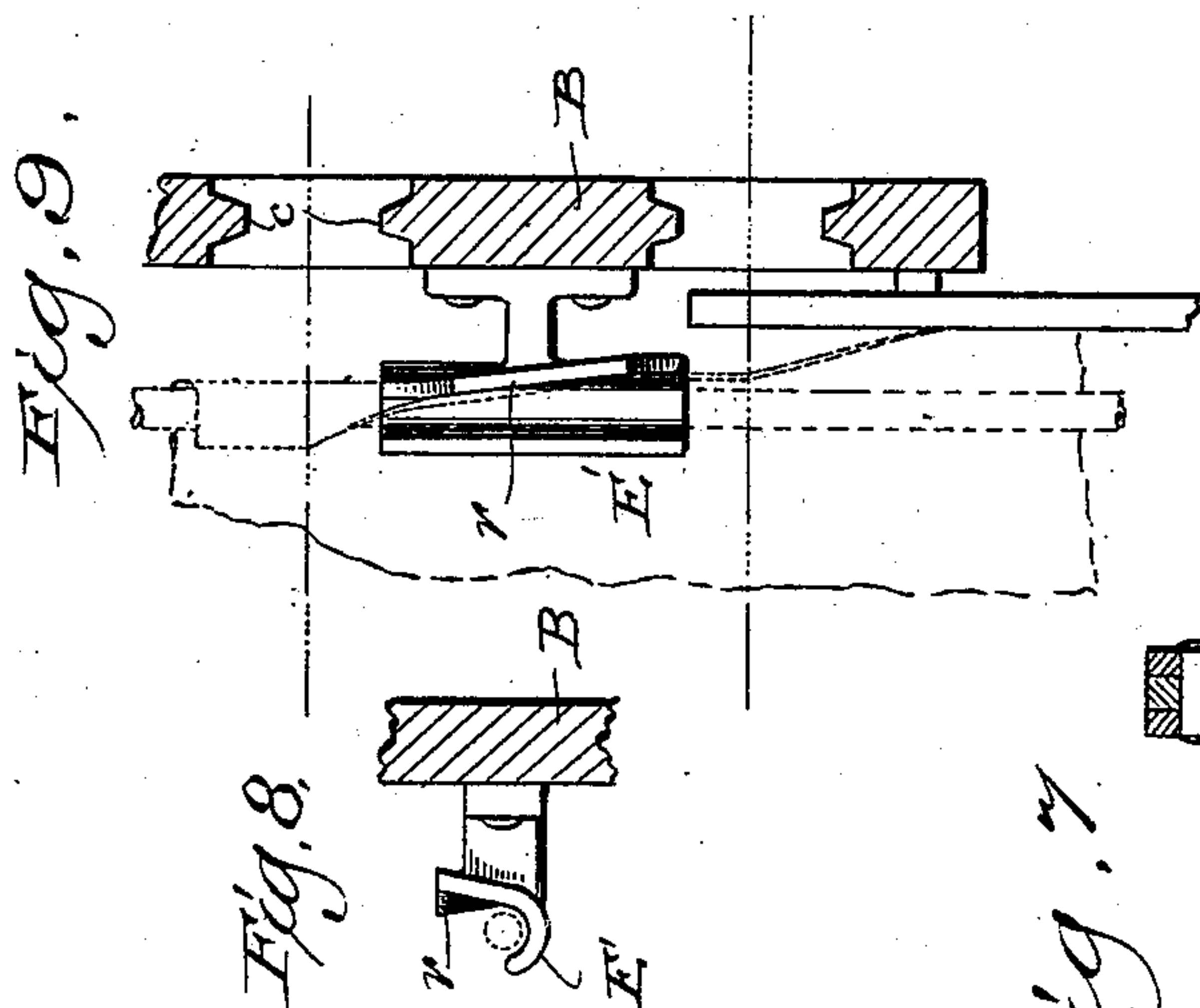
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(No Model.)

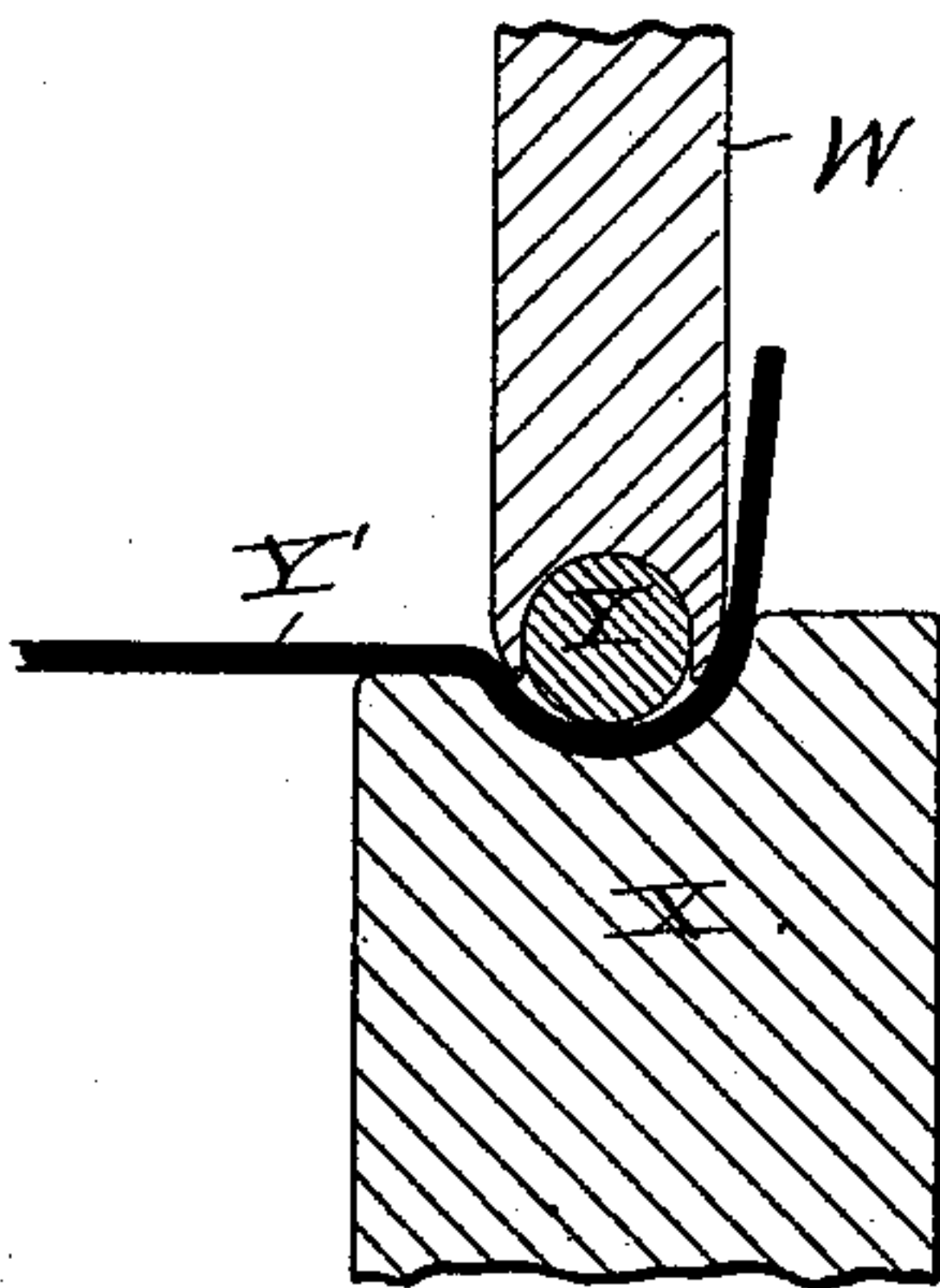
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H. L. GATES.  
SHEET METAL WIRING MACHINE.

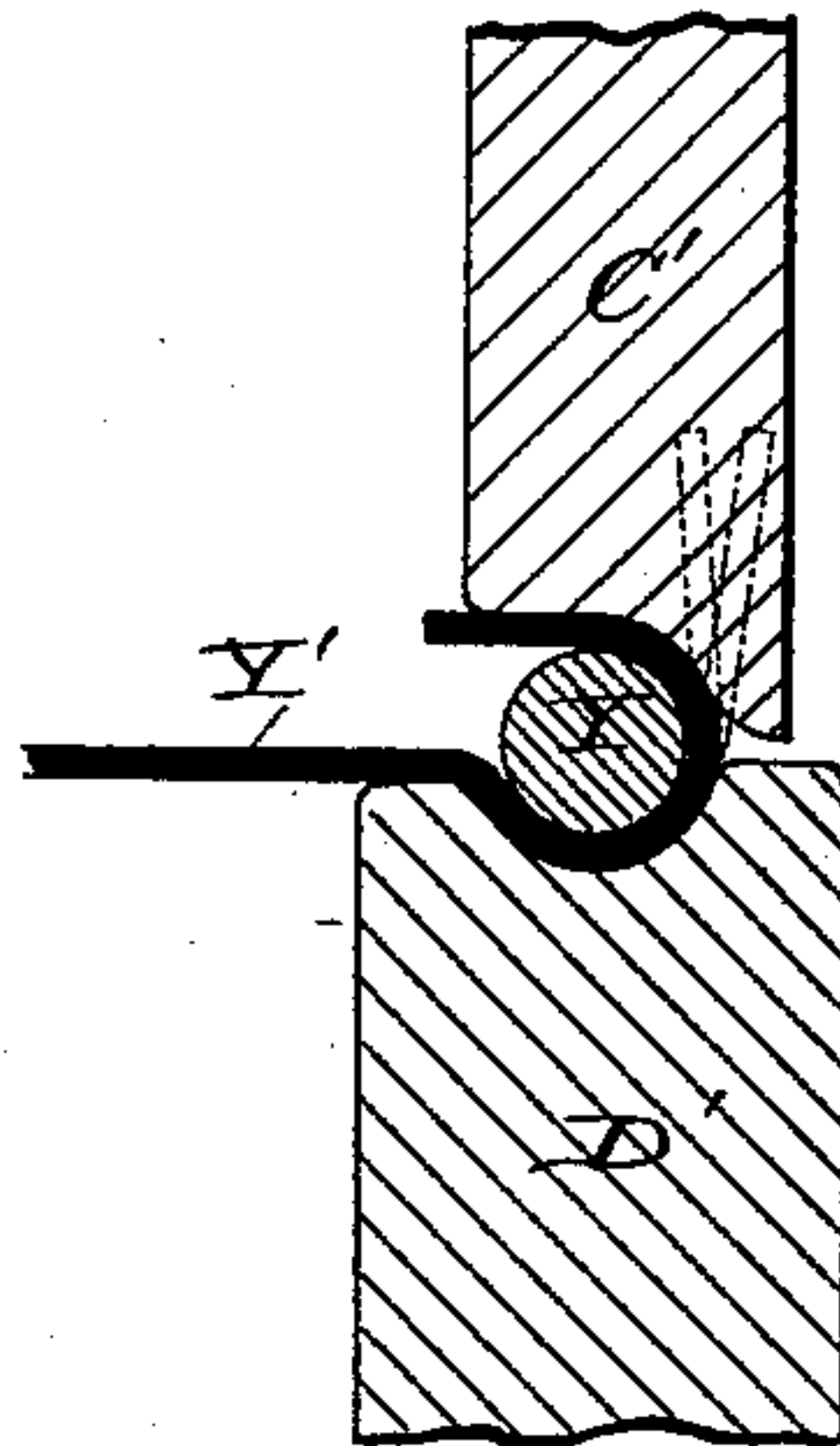
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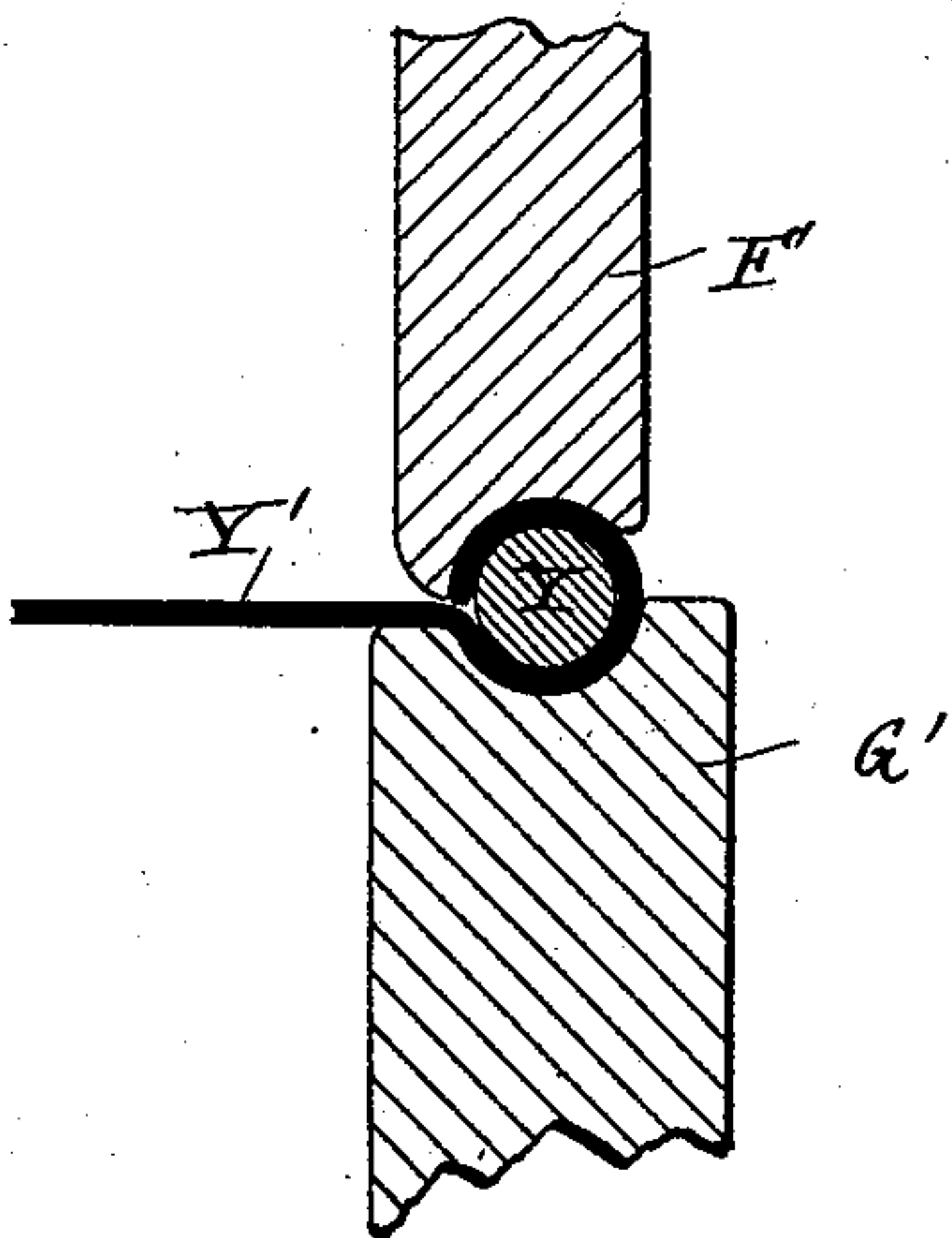
*Fig. 10.*



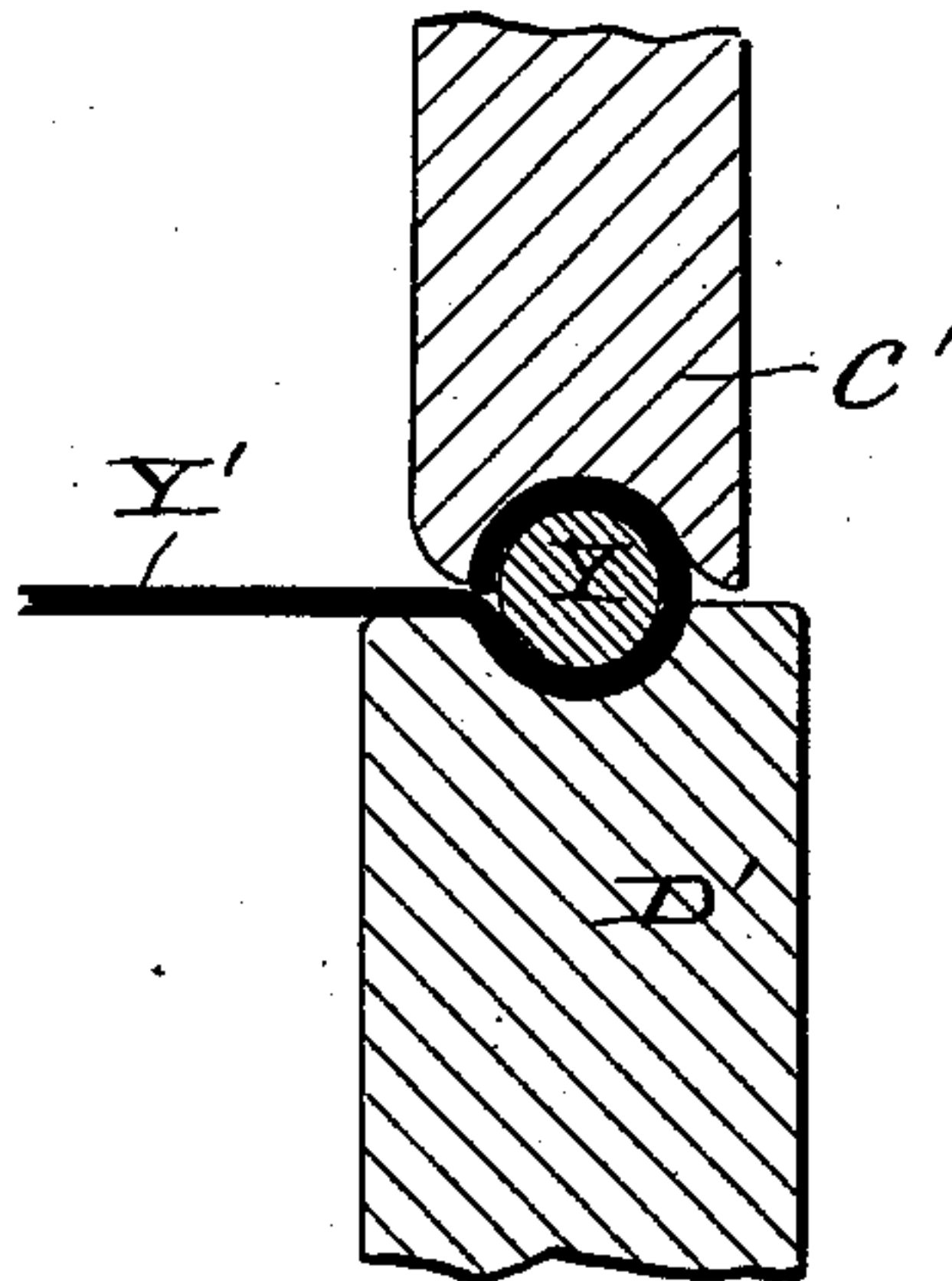
*Fig. 11.*



*Fig. 12.*



*Fig. 13.*



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# UNITED STATES PATENT OFFICE.

HENRY L. GATES, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO THE UTILITY MANUFACTURING COMPANY, OF SAME PLACE.

## SHEET-METAL-WIRING MACHINE.

SPECIFICATION forming part of Letters Patent No. 540,613, dated June 4, 1895.

Application filed December 19, 1892. Renewed April 22, 1895. Serial No. 546,778. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY L. GATES, a citizen of the United States, and a resident of Milwaukee, in the county of Milwaukee, and in the State of Wisconsin, have invented certain new and useful Improvements in Wiring-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention has for its main object to provide a simple means for wiring sheet-metal; and it consists in certain peculiarities of construction and combination of parts to be hereinafter described with reference to the accompanying drawings and subsequently claimed.

In the drawings, Figure 1 represents an elevation of my machine, taken on line 1 1 of Fig. 5, a beading mechanism shown in the latter figure being omitted; Fig. 2, a vertical longitudinal section on line 2 2 of Fig. 5; Fig. 3, a detail plan view illustrating a drive-gear and automatic wire-cutting mechanism; Fig. 4, an elevation of said wire-cutting mechanism; Figs. 5, 6, and 7, transverse sections respectively taken on lines 5 5, 6 6, and 7 7 of Fig. 1; Fig. 8, a detail elevation partly in transverse section, illustrating a guide and metal-turning device that may be employed as part of my machine; and Fig. 9, a detail plan view of the guide and metal-turning device shown in the preceding figure. Figs. 10 to 13, inclusive, are diagrams illustrating various operations of a machine constructed according to my invention.

Referring by letter to the drawings A represents a base provided with front and rear standards B, C, the latter being shown as formed in the center with vertical slots and guides *c* for a frame D, this frame being adjustably connected to the base by means of a depending screw E and held in its adjusted position by means of set-nuts *d*, *e*, arranged on the screw to impinge against opposite sides of said base.

At one end of the machine the standards B, C, are provided with bearings for a shaft F to which a driving pulley G is made fast, and the first of said standards is also provided with a radial groove and guides for a loose block H, the latter being supported on

a spiral-spring I arranged in said groove to engage opposing vertical lugs *f*, *g*, on the block and its relative standard whereby this spring is maintained in its working position. The loose block H is operated against the power of the spring I by means of a lever J pivotally connected to the standard B and likewise preferably joined to said block, and by means of a rod *b* the lever may be connected to a foot-treadle or other actuating device. The block H and the rear standard C are provided with bearings for a shaft K, and the bearing in said standard is of such contour and dimensions as to permit a tilt of the shaft when the lever J is actuated against said block. At the other end of the machine, I prefer to employ another lever-controlled and spring-supported block L loose on guides in a radial groove cut in the front standard B, the latter block and rear standard C being provided with suitable bearings for a shaft M, the details of the latter construction and arrangement of parts being a duplicate of what is hereinbefore set forth in connection with the loose block H at the opposite end of said machine.

Arranged in bearings in both standards B, C, is a shaft N below the one M, and having their bearings in the adjustable frame D are upper and lower shafts O, P, each of the latter and those previously set forth being shown as provided with a sprocket-wheel Q for engagement with a link-belt R, the latter being disposed on said sprocket-wheels in such a manner as to cause the upper shafts to rotate in a direction opposite to the rotation of the lower shafts.

In order to keep the link-belt sufficiently taut at all times, I may employ suitable tighteners, those shown being automatic and comprising rollers *h* supported in yokes *i* that have shanks *j* loosely arranged in eyes *k* on the rear standard C and engaged by spiral-springs *m* under compression intermediate of the innermost eyes and collars *n* on said shanks.

The shaft K is shown as having a pinion S fast thereon and in mesh with a spur-wheel T that has its bearing on a stud U upon the inner side of a right-angle extension B' of the front standard B, said spur-wheel being pro-



vided with a cam-lug *p* arranged to actuate a spring-controlled blade *V* that is pivoted to said standard extension parallel to said stud.

Fast on the shaft *K* is a grooved roller *W* in opposition to a similar roller *X* on the shaft *F*, and as shown in Fig. 5, the former roller may have the groove therein serrated or otherwise roughened crosswise in order to prevent slipping on a strand *Y* of wire against which it operates.

In rear of the grooved rollers *W*, *X*, I arrange a gage *Z* and when desirable I may arrange beading rollers *A'* *A''* on the shafts for said grooved rollers as shown in Fig. 5, these beading rollers being of any suitable contour.

Fast on the shaft *O* is a turning down roller *C'* of suitable contour, and the shaft *P* is provided with a grooved roller *D'* in line with said turning down roller. Intermediate of the rollers *W*, *X*, and the rollers *C'* *D'*, I show a guide *E'* in the form of a trough-like device having a beveled flange *r* for the purpose hereinafter described.

When the machine is organized as herein shown and thus far described, the shaft *M* is provided with a finishing roller *F'* and opposed to this finishing roller is another grooved roller *G'*, on the shaft *N*, but it is possible to omit these shafts and rollers, and have the roller *C'* of such contour as to turn down and finish the sheet-metal *Y'* on the strand *Y* of wire. It is also possible to impart a simultaneous rotary motion to the several shafts by means other than those above described without departure from the spirit of my invention.

As shown, the machine is organized to wire sheet-metal bodies of circular contour, and the frame *D* is made vertically adjustable to raise or lower the rollers *C'* *D'* in proportion as such bodies vary in their radii, the rollers *X'*, *G'*, being on a circle of certain radius and the opposing rollers *W*, *F'*, concentric thereto. It may be found desirable to have a positive radial adjustment of the rollers *F'*, *G'*, this being a matter of mechanical expediency that may be accomplished by various means, none of which I have deemed necessary to illustrate, and in case provision is made for such adjustment, the guide *E'* will also be made adjustable.

In the operation of my machine, the sheet metal *Y* is placed between the rollers *W*, *X*, against the gage *Z* and the strand *Y* of wire positioned over this metal and the groove in the latter roller. The lever *J* is now actuated to depress the roller *W* and thereby set the wire and metal into the grooved roller *X*, as shown in Fig. 10, the same operation causing that portion of the metal intermediate of said rollers and the gage to rise from a horizontal to an approximately vertical position, as is also shown in the same figure. The roller *W* being held down in the position shown in Fig. 10, there is a continuous feed of the wire and metal. If the guide *E* be employed, that portion of the metal turned up incidental to the action of the first pair of rollers *W*, *X*, is partly

bent over the wire by frictional contact along the beveled flange *r* of said guide, this bending of said metal being shown by dotted lines in Fig. 11. The wire and metal being fed to the rollers *C'* *D'* the first of these rollers, being of suitable contour, will lay the upturned portion of the metal over the wire in a horizontal position, as shown in Fig. 11, and the upper roller in the next pair *F'*, *G'*, being of suitable contour, will complete the bending of said metal around the wire as shown in Fig. 12, although it is possible, as shown in Fig. 13, to have the roller *C'* of such contour as to perform both of the latter operations, but in any event it is to be understood that the entire wiring is automatically performed by successive operations on one machine. The spur-wheel *T* is of suitable diameter proportionate to the length of wire to be utilized, and at each revolution of said spur-wheel the lug *p* thereon operates against the knife *V* to tilt the latter on its pivot and thereby cut off the desired length of said wire.

It will be observed from the foregoing, that the formation of the seat for the wire is simultaneous with the feed of the latter, inasmuch as this wire is practically the face of the roller *W* at the point of contact with the metal, and the depth of the groove in the roller *X* is proportionate to the diameter of said wire.

While the machine herein described is especially designed for the purpose set forth, it is observed that the same machine may be utilized for the operation known as blank-writing, that consists in turning over an edge of a sheet metal blank without inclosure of a wire, or said machine may be employed to simply shape a wire independent of the sheet-metal.

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

1. A sheet-metal wiring-machine comprising a suitable frame provided with a pair of feeding and turning rollers and a succeeding pair of adjustable wiring rollers, substantially as set forth.

2. A sheet-metal wiring-machine comprising a suitable frame provided with a pair of feeding and turning rollers, a succeeding pair of adjustable wiring rollers, and a guide arranged intermediate of the two pair of rollers, substantially as set forth.

3. A sheet-metal wiring-machine comprising a suitable frame provided with a pair of feeding and turning rollers, a succeeding pair of adjustable wiring rollers, and another pair of wiring rollers succeeding those aforesaid, substantially as set forth.

4. A sheet-metal wiring-machine comprising a suitable frame provided with a pair of feeding and turning rollers, the upper one of the pair being serrated or otherwise roughened crosswise of its face, and a succeeding pair of wiring rollers, substantially as set forth.



5. A sheet-metal wiring-machine comprising a suitable frame provided with a pair of feeding and turning rollers beading rollers mounted on the shafts that carry the former rollers, and a pair of wiring rollers succeeding said feeding and turning rollers, substantially as set forth.

6. A sheet-metal wiring-machine comprising a suitable frame provided with a pair of feeding and turning rollers, a succeeding pair of wiring rollers, a wire cutter, and a timed mechanism for actuating the cutter, substantially as set forth.

7. A sheet-metal wiring-machine comprising a suitable frame provided with a pair of feeding and turning rollers, a succeeding pair of wiring rollers, a guide arranged intermediate of the two pair of rollers, another pair of wiring rollers succeeding those aforesaid, a wire cutter, and a timed mechanism for actuating the cutter, substantially as set forth.

8. A sheet-metal wiring-machine comprising a suitable frame, a pair of feeding and

bending rollers, the upper one of which has its face of a contour conforming to the shape of the wire fed by both, whereby this wire is virtually a portion of said upper roller at the point of contact with the adjacent metal, and succeeding wiring rollers for the completion of the desired operation coincident with the travel of said material, substantially as set forth.

9. A machine comprising a suitable frame, a pair of shaping and feeding rollers, a pair of adjustable rollers succeeding those aforesaid, and a wire-cutter preceding the first pair of rollers, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand, at Milwaukee, in the county of Milwaukee and State of Wisconsin, in the presence of two witnesses.

HENRY L. GATES.

Witnesses:

N. E. OLIPHANT,  
GEO. W. YOUNG. -