

(No Model.)

4 Sheets—Sheet 1.

W. E. WARD.

BOLT DRESSING MACHINE.

No. 353,902.

Patented Dec. 7, 1886.

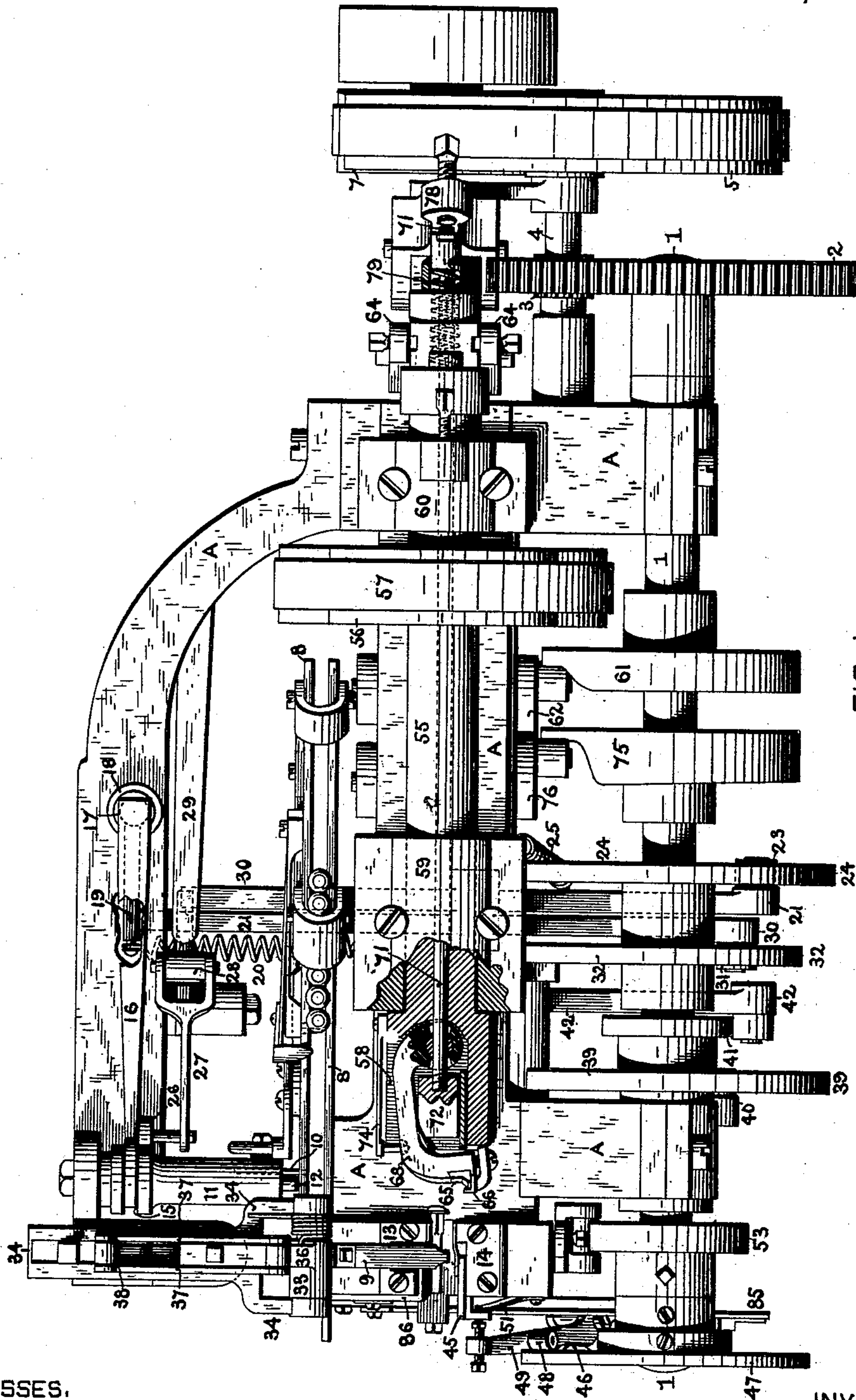


FIG. 1.

WITNESSES.

Joseph H. Marshall
Joseph H. Haight

INVENTOR.

W. E. Ward

(No Model.)

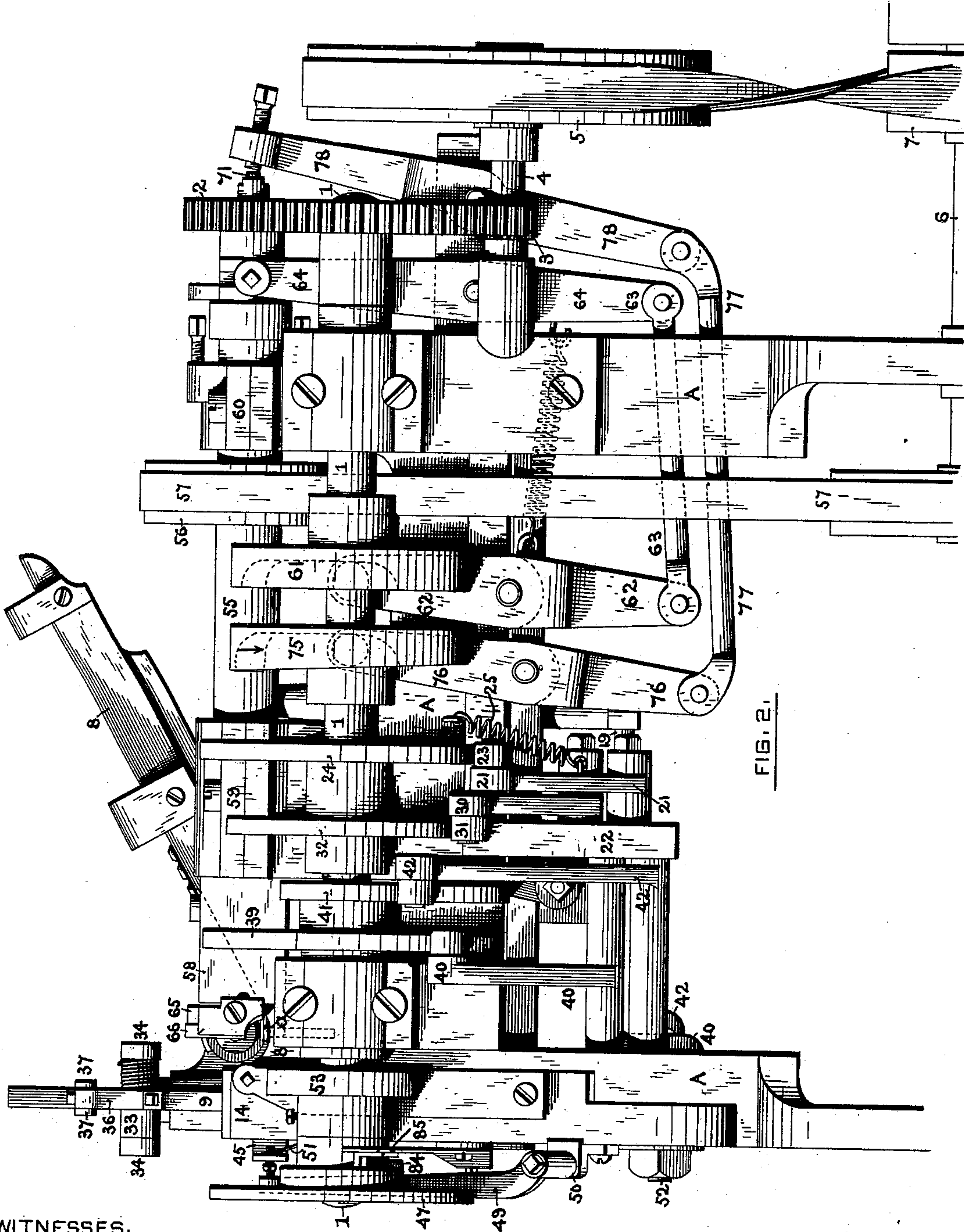
4 Sheets—Sheet 2.

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WITNESSES.

Joseph W. Marshall
Joseph H. Haight

INVENTOR.

W. E. Ward

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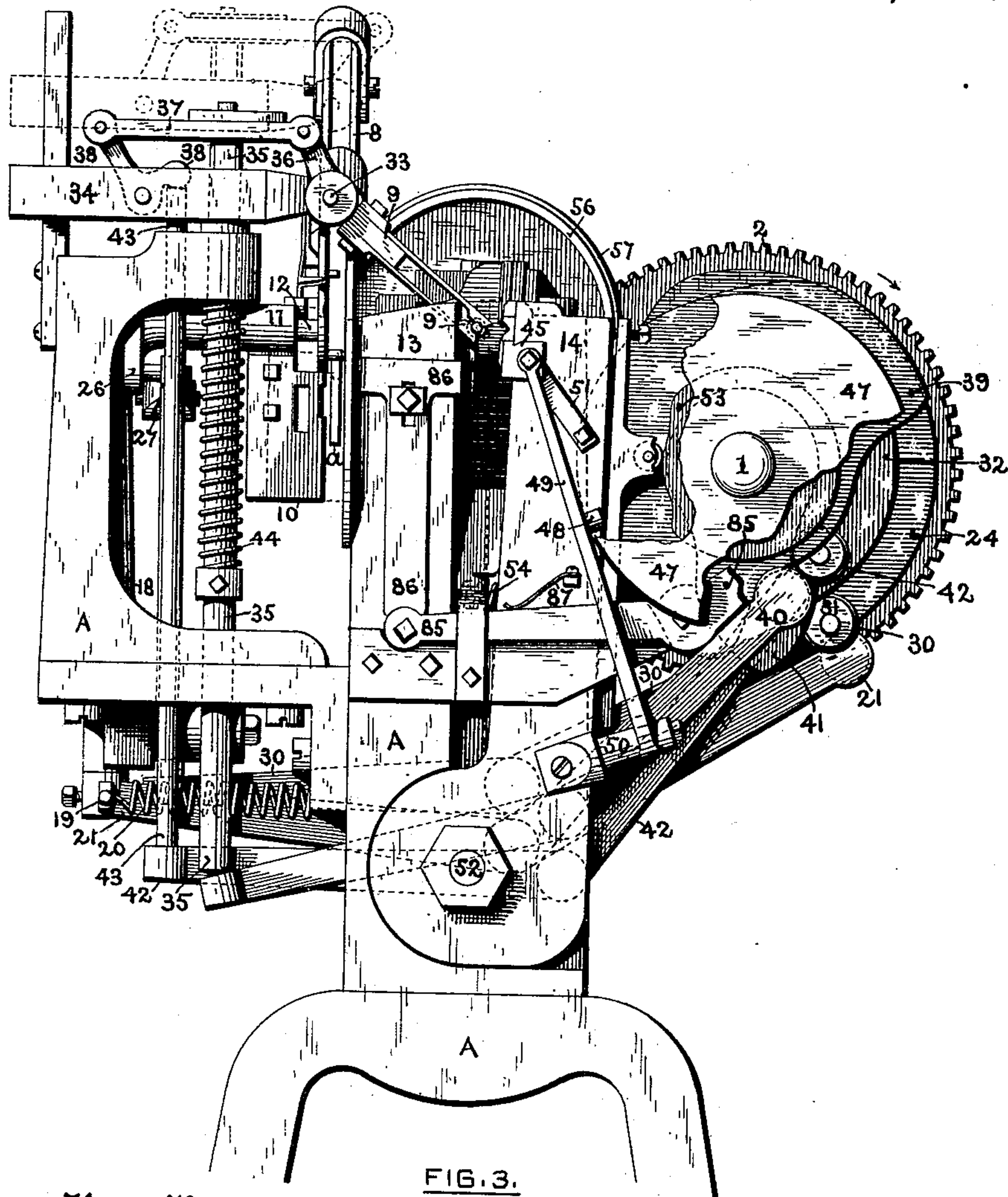


FIG. 3.

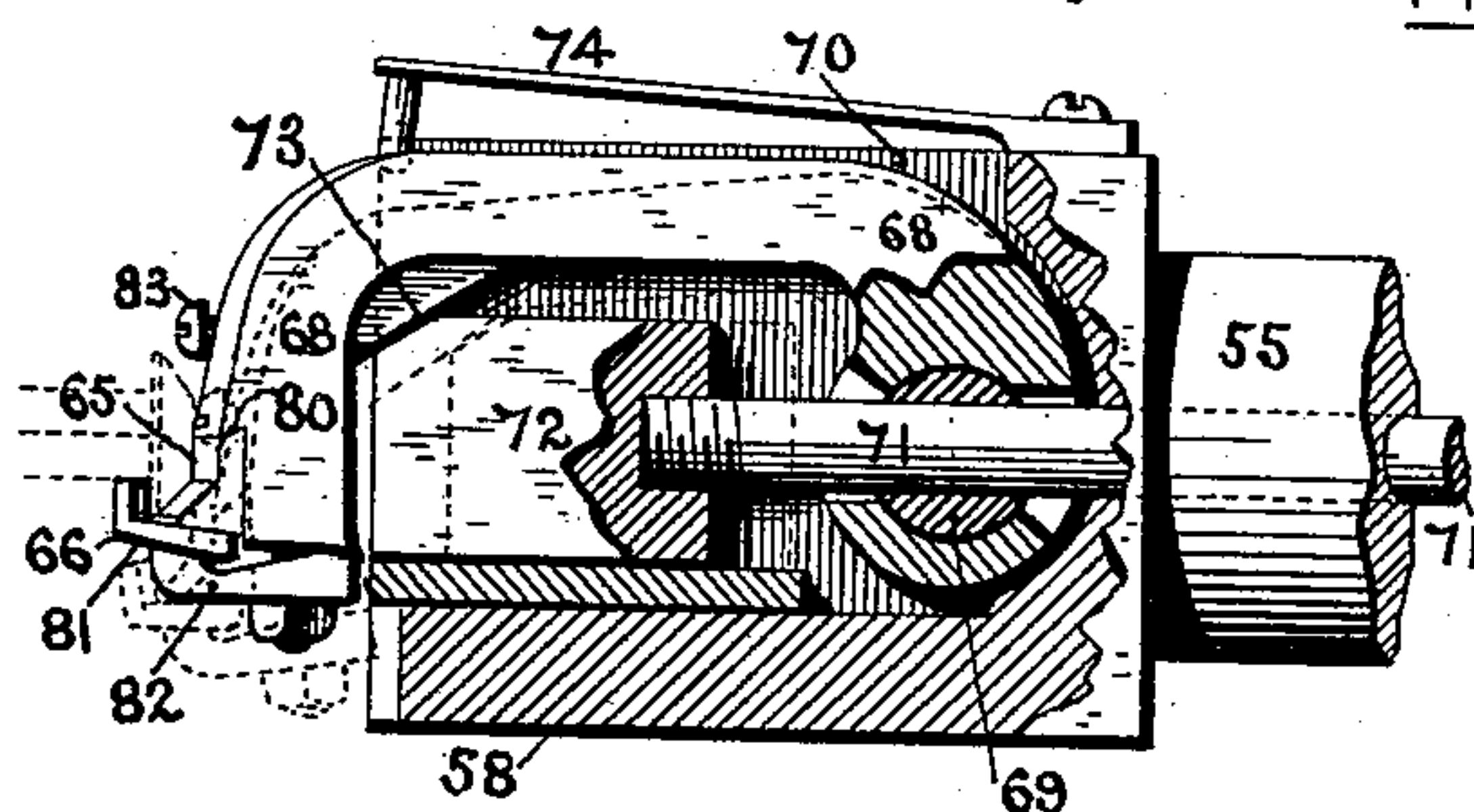


FIG. 4.

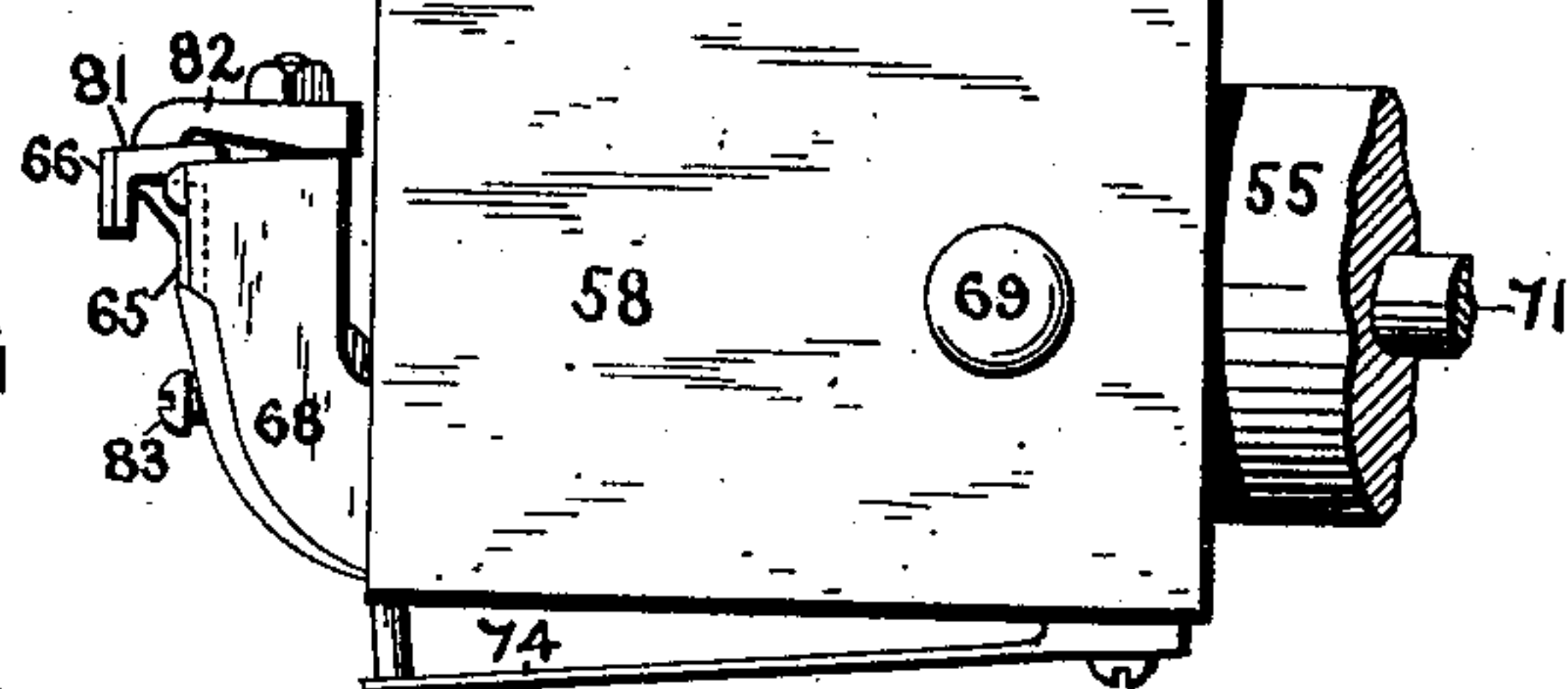


FIG. 5.

WITNESSES.

INVENTOR.

Joseph W. Marshall
Joseph Haight

W. E. Ward

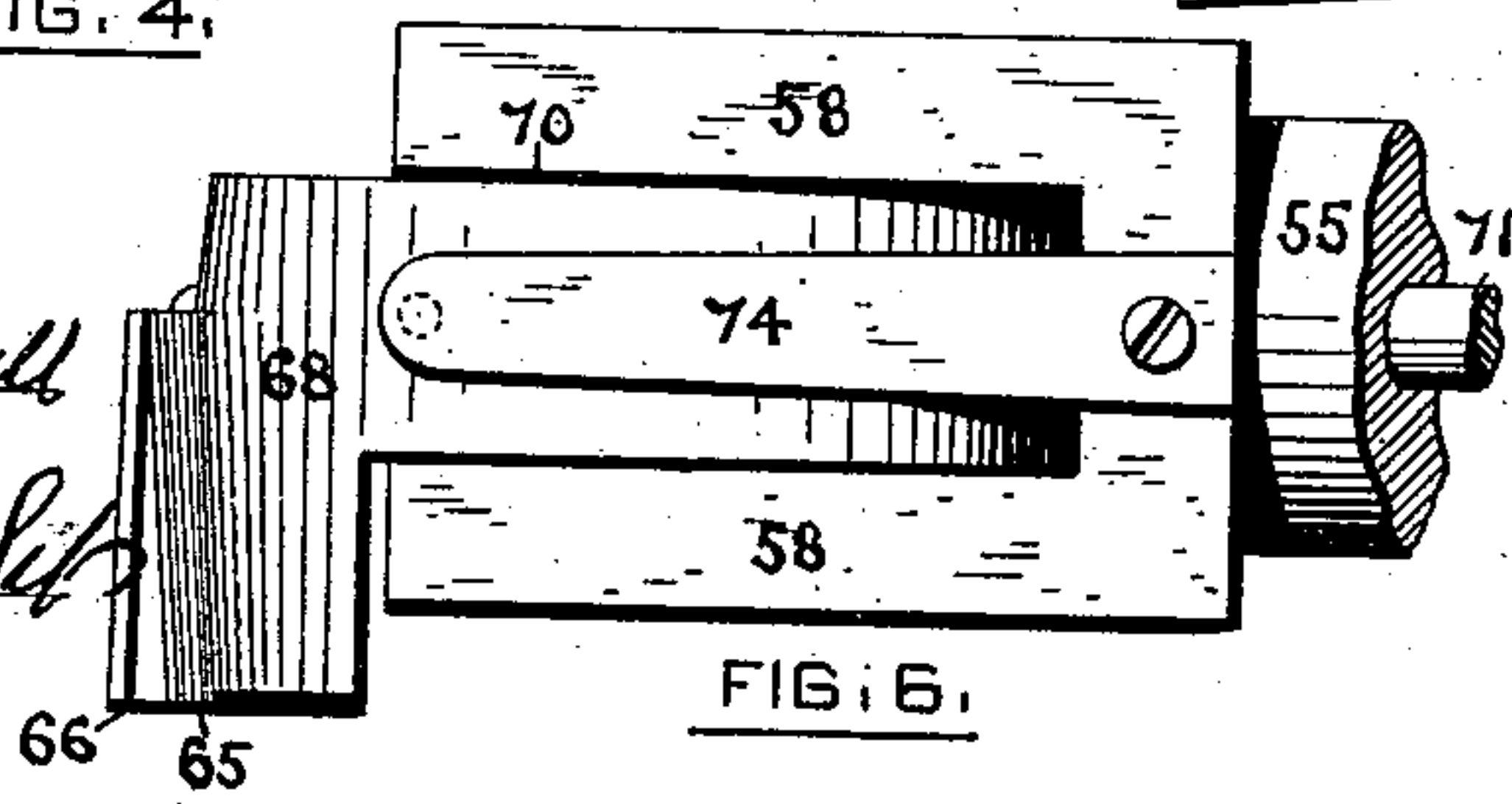


FIG. 6.

(No Model.)

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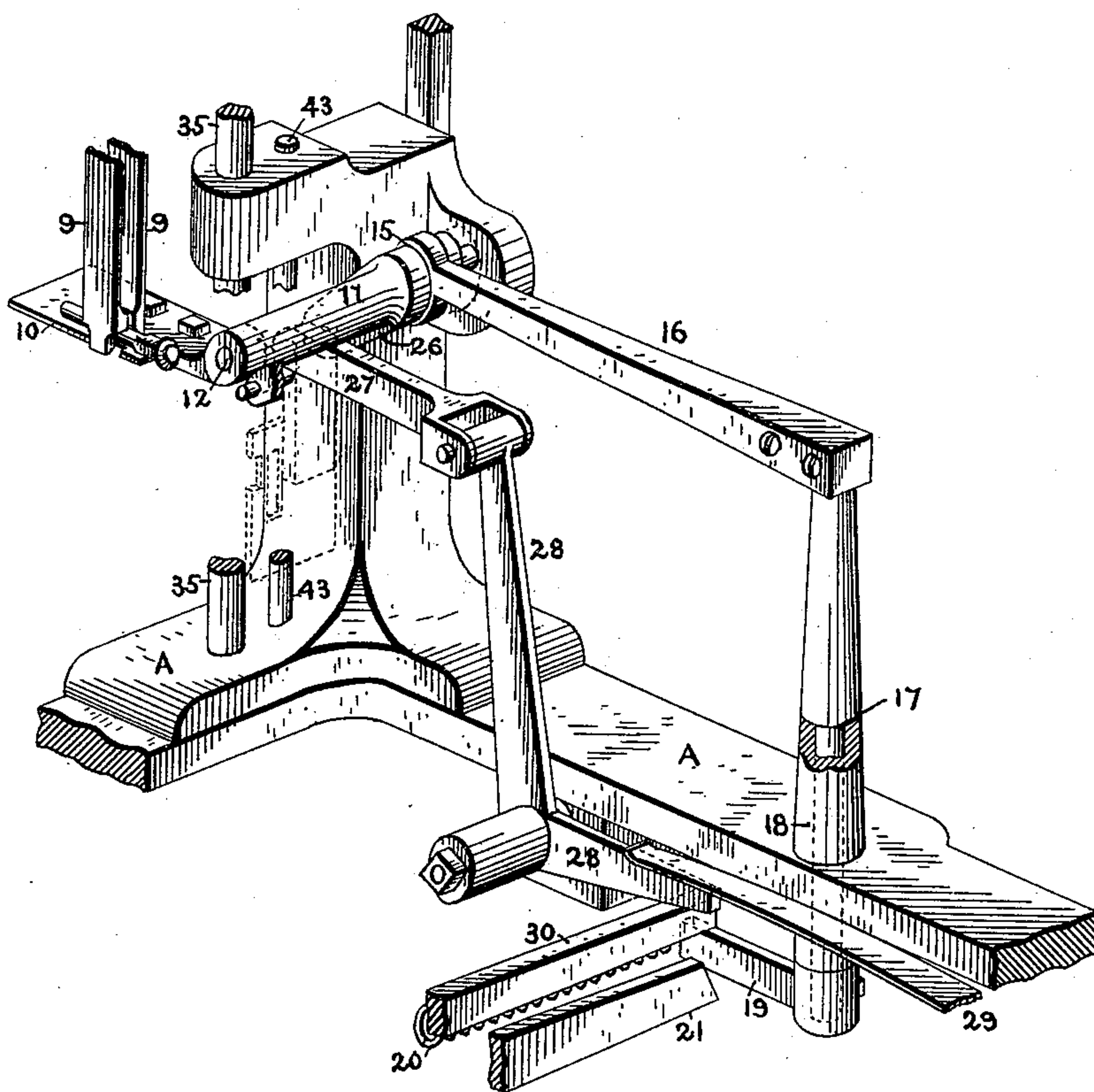


FIG. 7.

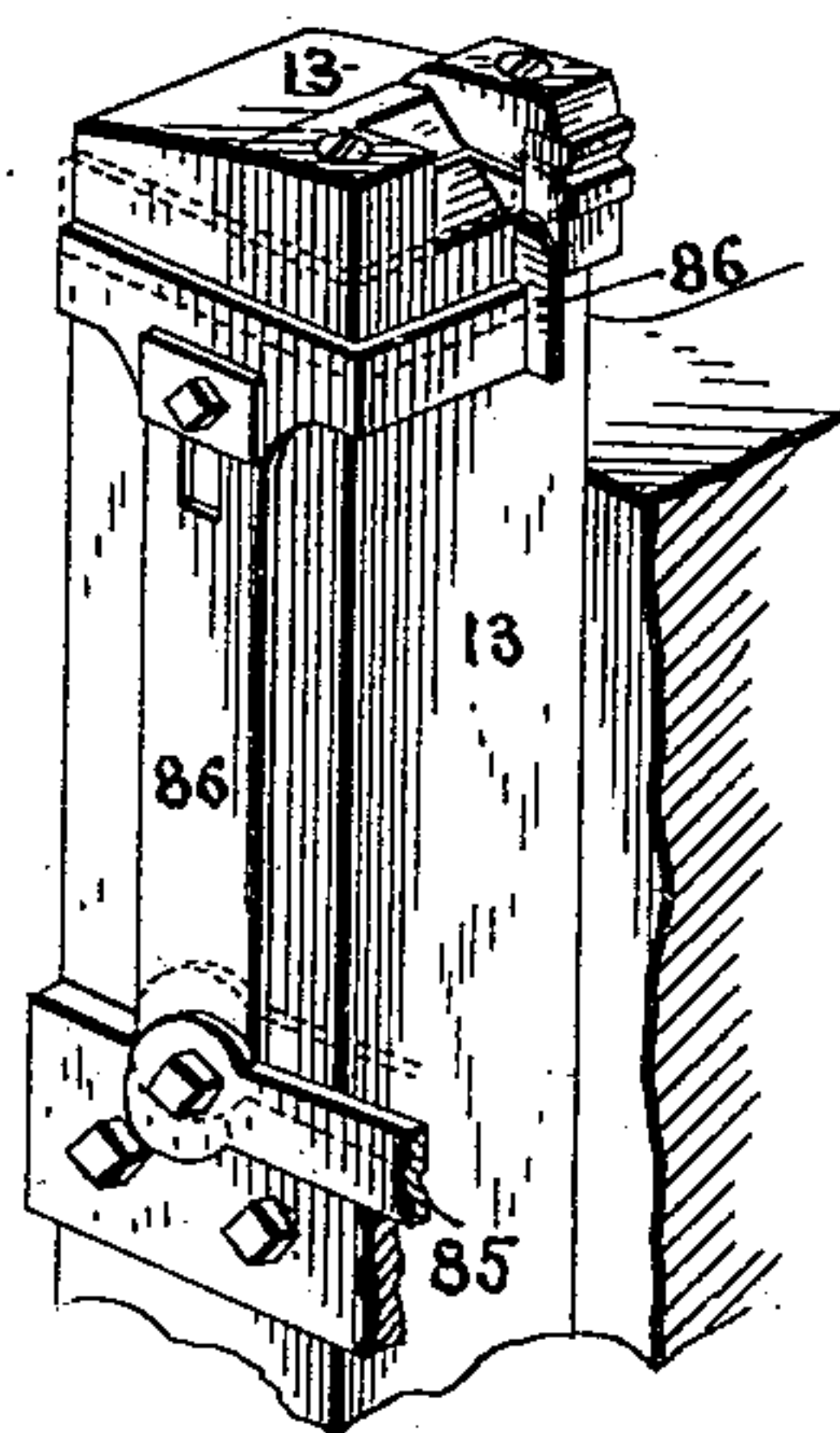


FIG. 8.

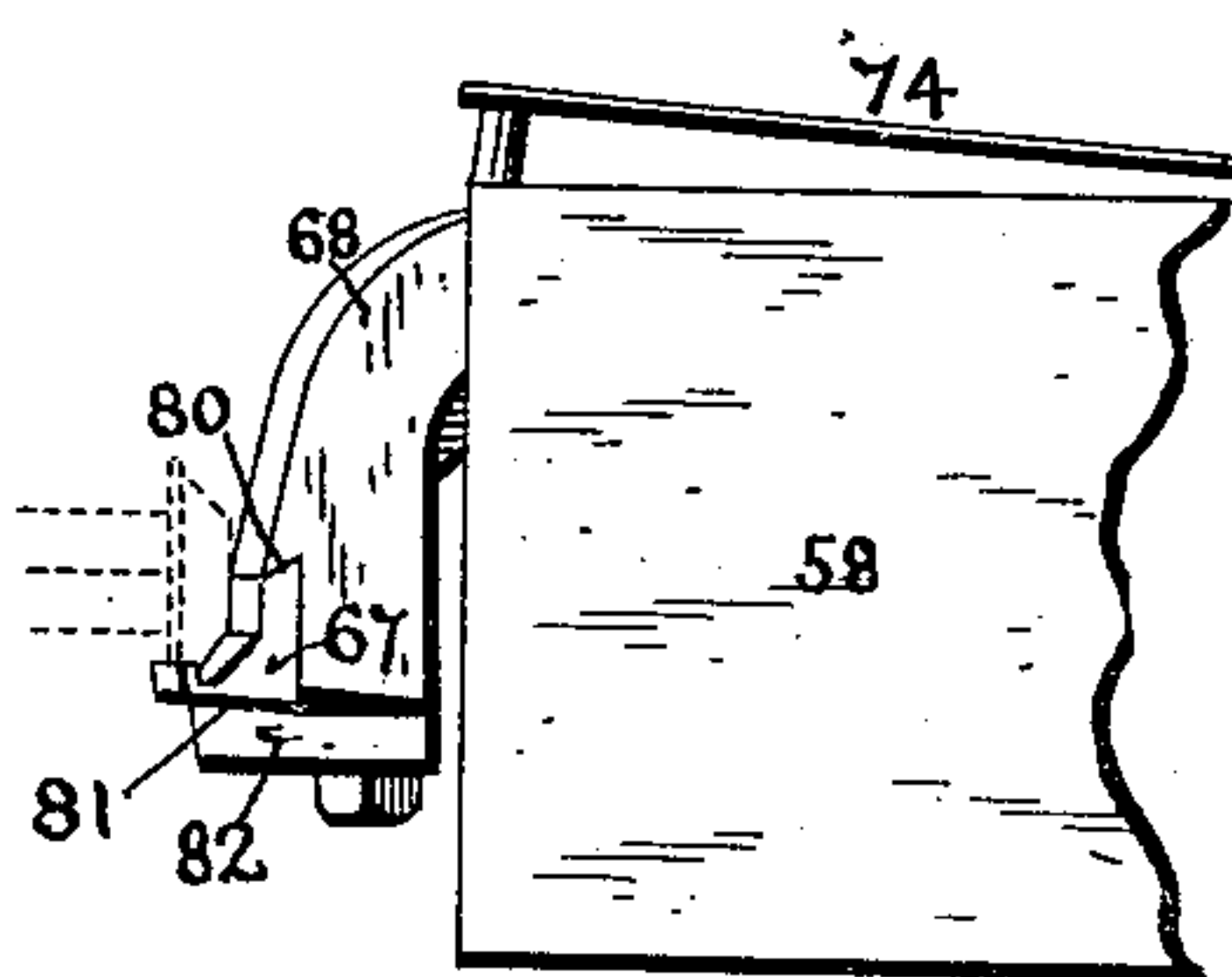


FIG. 10.

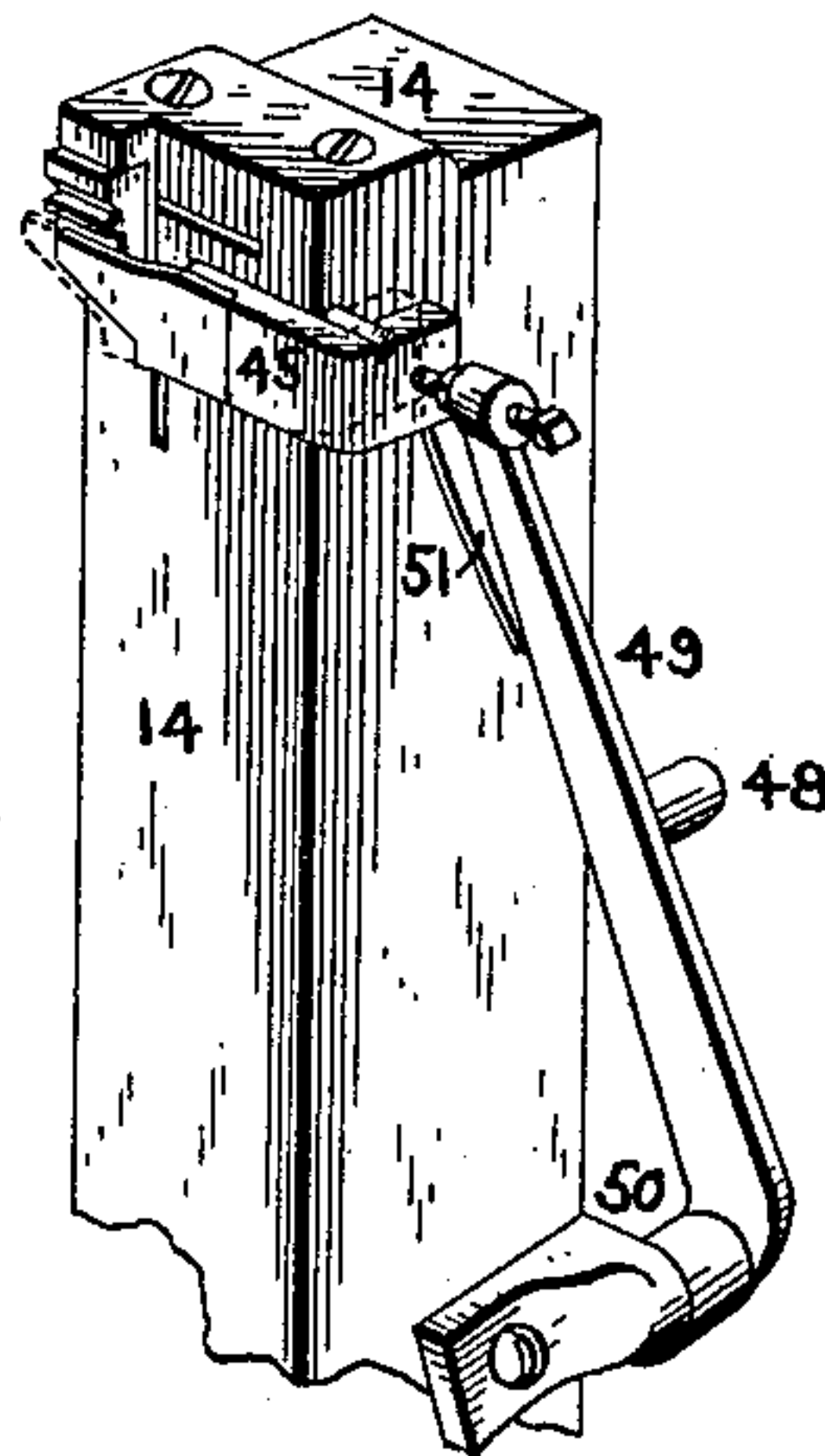


FIG. 9.

WITNESSES,

Joseph W. Marshall
Joseph Haight

INVENTOR

W. E. Ward

UNITED STATES PATENT OFFICE.

WILLIAM E. WARD, OF PORT CHESTER, NEW YORK.

BOLT-DRESSING MACHINE.

SPECIFICATION forming part of Letters Patent No. 353,902, dated December 7, 1886.

Application filed May 29, 1886. Serial No. 203,586. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM E. WARD, a citizen of the United States, residing at Port Chester, county of Westchester, and State of New York, have invented certain new and useful Improvements in Machines for Dressing the Heads of Bolts; and I do hereby declare the following specification, taken in connection with the accompanying drawings, forming a part of the same, to be a full, clear, and exact description thereof.

The improvements in the machine herein-after described consist, first, in a combination of devices whereby a bolt-blank which is formed with the usual squared section under its head can be inserted into a pair of gripping jaws, where it is to be held while its head is being dressed by being presented with certainty in such position that the V-shaped faces of the jaws, as they close, will respectively embrace two adjacent sides of the squared section of the bolt-blank, and thereby avoid that bruising or flattening of the edges of such squared section which would result in case the blank were not presented so that the angle formed by two adjacent faces should correspond with the angles formed by the planes which converge in the jaws to form the V-shaped recesses; second, in means for gaging the position of the blank after it has been inserted into the jaws, but before it has been gripped thereby, so that the head of the blank will project a fixed and certain distance beyond the plane of the front of the jaws when closed, whereby the shaving-tools, after they have performed their work, will leave the heads of the blanks of the same thickness, measuring from the under side thereof; third, in a peculiar arrangement of mounting the tools for shaving or dressing the heads of the blanks in a reciprocating head, and in giving a movement to such tools in the arc of a circle to perform the operation of shaving the exterior of the head and dressing the under side thereof, such tools being all the time, while they perform their work, firmly backed by the block in which they are mounted; fourth, in a means for ejecting or discharging with certainty the blank from the jaws after its head has been dressed.

In the accompanying drawings, Figure 1 represents a top view of a machine embodying

the invention, a portion of the same being shown in section. Fig. 2 represents a side view of the machine. Fig. 3 shows an end view of the same. Fig. 4 shows, in partial section, on an enlarged scale, the holder for the tools for shaving or dressing the heads of the blanks. Figs. 5 and 6 show views of the same at right angles to each other. Figs. 7, 8, and 9 show, in perspective, certain details of construction. Fig. 10 represents a portion of the tool-holder with a single tool therein.

A is the frame of the machine, upon which the various parts are mounted.

1 is a shaft bearing the several cams employed for operating parts of the machine, which shaft has secured to its rear end a gear, 2. This gear meshes with a pinion, 3, upon a shaft, 4, the said shaft having a pulley, 5, which is driven from a shaft, 6, Fig. 2. This latter shaft bears a pulley, 7, belted to the pulley 5.

The machine is provided with a conveyer, 8, for holding a stack of bolt-blanks suspended by their heads, the blanks being fed to the conveyer by hand, or by any preferred mechanism for the purpose. Means well known in the art, and not necessary to be described, are employed for supporting the stack of blanks in the conveyer and for releasing them one by one to be operated upon.

When the lowermost blank, *a*, of the stack is released, it slides down the conveyer by gravity and takes the position shown in Figs. 2 and 3, where it hangs in the hook-shaped lower end of the conveyer, in readiness to be removed to the feeding fingers 9.

The means by which the blank, with a squared section under its head, shall be transferred with certainty, so that the adjacent faces of the squared portion can be readily embraced by the correspondingly - inclined planes which form the V-shaped recesses in the clamping-jaws, hereinafter described, are as follows: The blank *a*, when in the position shown in Figs. 2 and 3, hangs in a vertical plane in front of a plate or platform, 10, which plate normally occupies substantially a vertical plane, as shown by dotted lines in Fig. 7, and laterally outlies the hanging blank, as shown in Fig. 3. This transferring-plate 10 is secured to a sleeve, 11, which is mounted loosely upon a spindle, 12, so that the sleeve

may slide and turn. At the proper time a sidewise movement is given to the plate to carry it behind the hanging blank, and then an upward swinging movement is imparted to the plate to remove the blank from the conveyer and deliver it to the feeding-fingers, which are to transfer the blank to clamping-jaws 13 and 14, in which the blank is to be held while its head is being dressed. These sidewise and swinging movements of the plate are produced as follows: The sleeve 11 is provided with a groove, 15, which is forked by the outer end of an arm, 16. The inner end of this arm is secured to a vertical shaft, 17, Fig. 7, which is mounted in a standard, 18. To the lower end of the shaft 17 an arm, 19, is secured, and to this arm one end of a spring, 20, Figs. 1, 3, and 7, is attached, the other end being secured to the frame of the machine. The arm 19 is engaged by the inclined end of a bell-crank lever, 21, which is pivoted to a standard, 22, Fig. 2, upon the frame of the machine, and the opposite end of said lever bears a roller, 23, Figs. 1 and 2, which is held in contact with a cam, 24, by a spring, 25. The sleeve 11 is also provided with an arm, 26, Figs. 1, 3, and 7, which is connected by means of a link, 27, to one end of a bell-crank lever, 28, pivoted upon the frame of the machine. The opposite end of this bell-crank lever is held by a spring, 29, in contact with a lever, 30, which is pivoted to the standard 22. The upper end of the lever 30 bears a roller, 31, Fig. 2, which, through the influence of the spring 29, is held in engagement with a cam, 32. When a blank is to be removed from the conveyer, the spring 25, by an upward pull upon that arm of the lever 21 to which it is attached, depresses the inclined end of said lever, (the contour of the cam 24 allowing,) and the spring 20 swings the arms 19 and 16 laterally, and thereby slides the sleeve 11 toward the conveyer and carries the plate 10 behind the bolt. The cam 32 now acts upon the lever 30 and causes it to tilt the bell-crank lever 28, which motion, through the link 27 and arm 26, partially rotates the sleeve 11 and swings the plate 10 upwardly into the position shown by full lines in Fig. 7, thereby delivering the blank to the feeding-fingers 9, which have been brought into position to receive it. While the said blank is resting upon the plate 10 it will necessarily turn itself axially, so that it will lie upon one of the flat sides of its square, unless it shall happen that it does not need to turn to assume that position. Consequently, when the plate 10 has reached a horizontal position, the blank will lie thereon with two opposite sides of its squared portion in horizontal planes. The feeding-fingers 9, which now stand vertically over the blank, as shown in Fig. 7, are permitted to seize the blank, which is done in this instance by the plate 10 forcing the blank, by a continuance of the upward movement of the plate, into said fingers, as will be readily seen; or, if preferred, the fingers may be made to descend

vertically to pick up the blank from the plate. The fingers 9, which now hold the blank with two opposite faces of its squared portion standing in vertical planes, are next given a movement which brings them into a position substantially directly in a vertical plane passing midway between the faces of the clamping-jaws 13 and 14 when closed, which jaws are finally to receive the said blank. The feeding-fingers now stand at an angle with the plane of the horizon of about forty-five degrees, and consequently a vertical plane about midway between the faces of the clamping-jaws will pass through the squared portion under the head of the blank, bisecting the same through two opposite angles of the square. The feeding-fingers now bodily move downward to a position between the clamping-jaws, which are standing wide open, and so that a horizontal plane will bisect the two opposite angles of the squared portion of the blank, and also the angles formed by the converging faces of the V-shaped depressions in the faces of the clamping-jaws, respectively. The clamping-jaws now close upon the squared portion of the blank and grip the same. It is obvious that by thus presenting the blank to the clamping-jaws the V-shaped depressions in the jaws will act in combination with the converging faces of the squared portion under the head of the blank, forming opposite angles of such squared portion as inclined planes to easily embrace that part of the blank, and, if necessary, slightly rotate it on its axis, so as to insure its proper entrance between the jaws.

The several movements which perform the operations above described, for thus fixing the position of the squared portion of the blank for right presentation to the V-shaped depressions in the clamping-jaws, are as follows: The spring-fingers 9 are secured to a tang projecting from a rock-shaft, 33, Figs. 1, 2, and 3, which shaft is pivoted in a frame, 34, secured to a rod, 35, Fig. 3, mounted to slide vertically in the frame of the machine. The shaft 33 is furnished with an arm, 36, which is connected by links 37 to a bell-crank lever, 38, pivoted in the frame 34. It is clear that the fingers 9 will be moved in the arc of a circle around the axis of the rock-shaft 33 whenever the bell-crank lever 38 is caused to be rocked, and therefore will be swung from the vertical position shown in Fig. 7 to the inclined position shown in Fig. 3. It is also apparent that, because the frame 34 with all its attachments is mounted upon the vertically-sliding rod 35, whenever such rod is raised or lowered such frame with its attachments will partake of the same movement. Now, after the fingers have received a blank, as hereinbefore explained, the rod 35 first receives a slight upward movement, which correspondingly elevates the fingers 9 with the blank therein. This movement is effected by means of the cam 39 operating upon one end of the lever 40, the other end of such lever working against the foot of the vertically-sliding rod 35. The fingers in this position

are clear of all portions of the machine with which they would come into collision when rocked in the arc of a circle for the purpose of assuming the position shown in Fig. 3. The rocking movement of the fingers is now induced by the cam 41, which operates upon one end of the lever 42, the other end of said lever working against the foot of a vertically-sliding rod, 43, Fig. 3. This rod, when elevated, strikes against the horizontal arm of the bell-crank lever 38, and consequently imparts a rocking movement in the arc of a circle to the fingers. The result is, that the fingers are brought into a position which is at an inclination of about forty-five degrees to a horizontal plane, and the bolt-blank held by such fingers will stand substantially in a vertical plane midway between the clamping-jaws when the same are closed. To lower the fingers, with the blank, to a position where the latter will be taken by the clamping-jaws, the rods 35 and 43 both descend, and this descent is permitted by the contour of the cams 39 and 41. It will be well, also, to aid the descent of the frame 34 and its attachments, mounted on the rod 35, by means of a spring, 44, applied to said rod, as shown in Fig. 3. By these connections and movements the fingers are brought into the position shown in Fig. 3.

The second feature of the invention relates to the means for gaging the position of the blank after it has been inserted into the clamping-jaws, but before it has been gripped thereby. In combination with the movable member 14 of the clamping-jaws there is a sliding plate, 45, which works in a dovetail groove in said jaw, as shown in Fig. 9. While the blank is still in the possession of the feeding-fingers 9, but when in proper relation to the clamping-jaws to be taken by them when closed, the said sliding plate 45 is made to move forward for a definite distance, the extent of which by adjustable devices can be regulated at pleasure. The front end of the sliding plate will strike against the under surface of the flanged head of the bolt-blank, the diameter of such head, of course, being considerably greater than the diameter of the shank of the blank. The sliding plate is actuated by a projection or cam-face, 46, located upon the disk 47, Fig. 1. This cam face at the required time comes into contact with an arm or pin, 48, upon the lever 49, Figs. 1, 3, and 9, one end of which is pivoted to the jaw 14 at 50, and the opposite end bears against the rear end of the sliding plate. A spring, 51, tends always to retract the sliding plate and keep the rear end of such plate in contact with the end of the lever 49. It is obvious that the plate will be projected forward when the cam-face gives movement to the lever 49, and that the effect will be to push forward the bolt-blank, so that it will project for a definite distance beyond the plane of the front of the clamping-jaws. It is also evident that so soon as the cam-face 46 permits the same to be done the spring 51 will cause the sliding plate to be retracted.

By this means the heads of the bolt-blanks will always, when dressed, be of the same thickness, and as the gage-plate acts against the under side of the head of the blank the largest diameter of the head will be preserved when the same is operated upon by the head shaving and dressing tools. The clamping-jaws are now ready to close upon the blank. One of the jaws, 13, is stationary, and really forms a part of the frame of the machine. The other jaw, 14, is movable in the arc of a circle on a pivotal pin or stud, 52, Fig. 3. This latter member is moved to bring about the closing of the jaws by means of the cam 53, Figs. 1, 2, and 3, in a well-understood way, and when the contour of such cam permits it to be done the jaws will open through the influence of a spring, 54, Fig. 3, placed between the two jaws.

The third feature of the invention relates to the peculiar means for mounting the tool or tools for shaving or dressing the heads of the blanks.

55, Figs. 1, 2, and 4, is a horizontal shaft, upon which is mounted the driving-pulley 56, which receives its motion from the belt 57. Upon the front end of the shaft 55 is the block 58, in which latter the cutting-tools for dressing the head of the blank, presently to be described, are attached. The said shaft 55 is set in bearings 59 and 60, as shown in the drawings, and is capable of sliding longitudinally in said bearings for a limited distance. Until the bolt-blank has been seized by the clamping-jaws 13 and 14 the shaft 55 and its block 58 are at their rearmost positions, so as not to interfere with the introduction of a blank into the jaws by the feeding-fingers. After said blank has been inserted into said jaws, the cam 61, Figs. 1 and 2, comes into action, and through the system of lever-and-link connections 62, 63, and 64, as particularly shown in Fig. 2, causes the shaft 55 to be moved forward, so as to bring the tools which are to dress the head of the blank into proper vertical alignment with the head.

In the head-block 58 the dressing-tools 65 and 66 are mounted. These tools are shown at Fig. 1, and on an enlarged scale at Figs. 4, 5, and 6. If a single tool be employed, it may be of such form as to operate at the same time upon the flat surface on the under side of the head, as well as upon the top surface of the head. It is much better, however, in practice to have the tools which are to operate, respectively, upon these portions of the head separate devices, but arranged and held relatively to each other, so that the under side as well as the top surface of the head can be dressed at the same time. When only the top surface of the head and its periphery are to be dressed, a single tool, 67, may be used without inconvenience, as illustrated at Fig. 10. The head-dressing tool or tools are set in an arm, 68, which is pivoted to the head-block 58 by a pin, 69, and is capable of moving in the arc of a circle within a slot, 70, in said block. A rod,

71, occupies the central axis of the shaft 55, and is capable of sliding longitudinally therein. The forward end of this rod is attached to a wedge-block, 72, (shown plainly at Figs. 1 and 4,) the upper forward corner of which is preferably beveled to form an inclined plane, so as to work in conjunction with an inclined plane or cam surface, 73, on the under side of the arm 68. Obviously, when the block 72 is made to slide forward, the resulting effect will be to progressively raise the free end of the arm 68 in the arc of a circle. A counter-acting spring, 74, causes the said arm to be moved in the opposite direction whenever the rod 71, with its attached operating-block 72, is slid rearwardly. It is also clear that by this employment of a pivoted tool-holder in combination with a sliding wedge-block, (for which a revolving wedge-block may be substituted,) the said tool-holder, although pivoted to the revolving head-block so as to move in the arc of a circle, will be firmly backed by the wedge-block during the whole period that the tools which it carries are operating to dress the head of the bolt-blank.

The necessary movements of the rod 71 and its block 72 to give motion at the required times to the arm 68 are effected by the cam 75 operating the lever-and-link connections 76, 77, and 78. (Particularly shown at Fig. 2.) The return movement of the rod 71 is effected by means of a spring, 79, Fig. 1.

The head-dressing tool or tools are set in the arm 68 in the following manner: The upper edge of the tool 65 is beveled, corresponding with the wall of a beveled recess, 80, in the end of the arm. The lower surface, 81, of the tool 66 is beveled in the opposite direction, so that the surfaces produced by these two bevels would meet at a common point. It is apparent from this statement that whether the head-dressing tool be made as an integrity or in two members the application of a clamping-plate, 82, so as to press against the surface 81, will serve to force the combined tools or the single tool 67 (shown in Fig. 10) as a wedge into the dovetail recess 80, and firmly hold the same therein. After the horizontal shaft 55 has been moved forward into proper position, the arm 68, carrying the head-dressing tool or tools, commences to move in the arc of a circle, and the head of the bolt-blank is dressed upon its outside, its periphery, and its surface under the head, if desired.

An adjustable stop, 83, may be placed upon the arm 68, as shown in Figs. 4 and 5, for the purpose of gaging the position of the bolt-blank in the clamping-jaws, in co-operation with the devices hereinbefore particularly explained for that purpose.

In case the bolt-blank should stick fast in the clamping-jaw 13 or 14 after it is ready to be discharged, so as to obstruct the introduction of a succeeding blank, the following means for clearing the blank from the jaw are employed: A pin or cam-face, 84, Fig. 2, projects radially

from the revolving cam-shaft, and at the proper time comes into contact with the short arm of a bell-crank lever, 85, Figs. 2, 3, and 8, and causes the long arm of the same to rise. To the end of the long arm of this lever is pivoted a vertically-sliding clearer, 86, which is moved vertically past the V-shaped depression in the jaw 13, and starts the blank from the jaws should it stick. This movement is timed to take place just as the jaws are opening. The clearer 86 may be moved downwardly by gravity or by a spring, 87, Fig. 3.

The general operation of the machine as a whole may be briefly stated as follows: The blanks are introduced by any suitable means, from a hopper or otherwise, into the inclined conveyer 8, from which they are taken one by one and brought to a position where each in succession can be seized by a pair of feeding-fingers. Each blank in succession is presented to the clamping-jaws, and before it is finally gripped by them its position in the jaws is determined by gaging devices. The blank is then clamped in the jaws. At this time the head-dressing tools are out of the way of the blank-head. The tools are now moved to position, and are caused to dress the head of the blank. The tools then retire, the clamping-jaws commence to open, and the clearing device insures the discharge of the finished blank. The several operations above mentioned are then repeated.

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

1. The combination, substantially as hereinbefore set forth, of a conveyer for a series of headed blanks, a transferring plate or platform for removing the blanks from the conveyer, substantially as described, feeding-fingers adapted to take a blank from said plate, clamping-jaws for holding the blank, and mechanism, substantially as described, for moving said fingers from a position to receive a blank from the transferring plate to the position described for presenting the blank to said jaws, whereby the blank can be introduced with certainty and accuracy into the jaws.

2. The combination, substantially as hereinbefore set forth, of feeding-fingers, clamping-jaws, and an adjusting-gage, said gage being arranged to operate against the under side of the head of the blank to project the blank a definite distance beyond the faces of the clamping-jaws, to insure the preservation of the greatest diameter of the head when acted upon by the head-dressing tools.

3. In combination with feeding-fingers and clamping-jaws, substantially as described, a head-dressing tool or tools mounted in an arm pivoted to a longitudinally-sliding and revolving shaft, and operated by mechanism, substantially as described, for first advancing said tool or tools in a direction parallel with the axis of the bolt-blank, and, secondly, in a direction transversely of the axis of the blank,

for dressing the head of the blank, substantially as set forth.

4. The combination, substantially as hereinbefore set forth, of a tool-holder constructed with a dovetailed recess, as described, and pivoted to a revolving shaft, a cutting-tool the upper edge of which is inclined in the same direction as the wall of said recess, and the lower surface of which has an inclination in the opposite direction, and a clamping device for wedging the cutter to the tool-holder.

5. The combination of the tool-holder pivoted to the head-block of a revolving shaft, a wedge-block for moving said holder on its

pivot, and mechanism, substantially as described, for actuating the wedge-block, whereby the tool-holder is firmly backed during its entire path of movement, substantially as set forth.

6. The combination, substantially as hereinbefore set forth, of the clamping-jaws, the clearer 86, and mechanism, substantially as described, for operating the clearer.

W. E. WARD.

Witnesses:

JOSEPH H. MARSHALL,
JOSEPH HAIGHT.