E. EINFELDT.

APPARATUS FOR MACHINING ENDS OF METAL BLANKS.

APPLICATION FILED JUNE 26, 1909.

993,158.

Patented May 23, 1911.

4 SHEETS—SHEET 1.

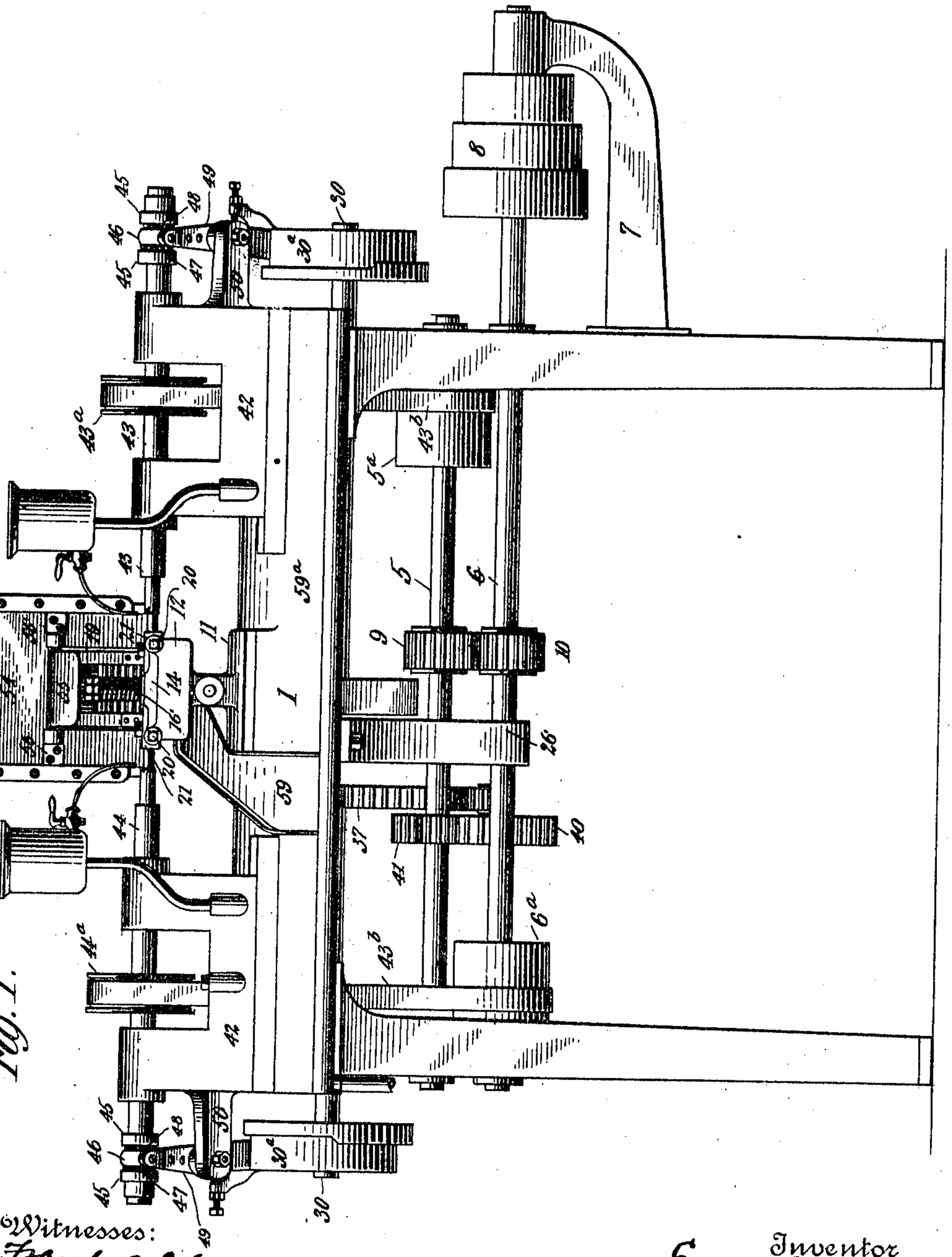

Fig. 1.

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William b. Lacy.

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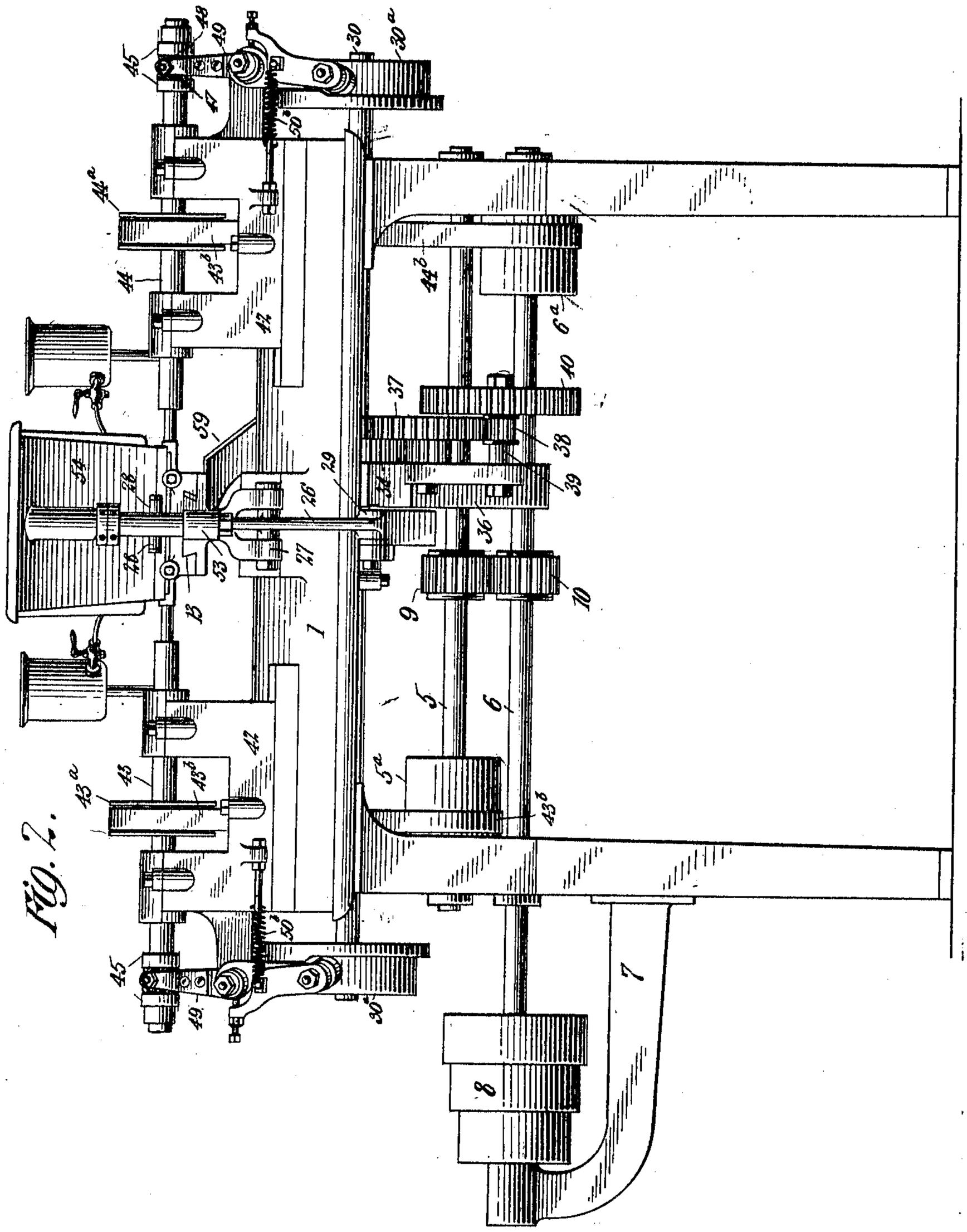

Fig. 2.

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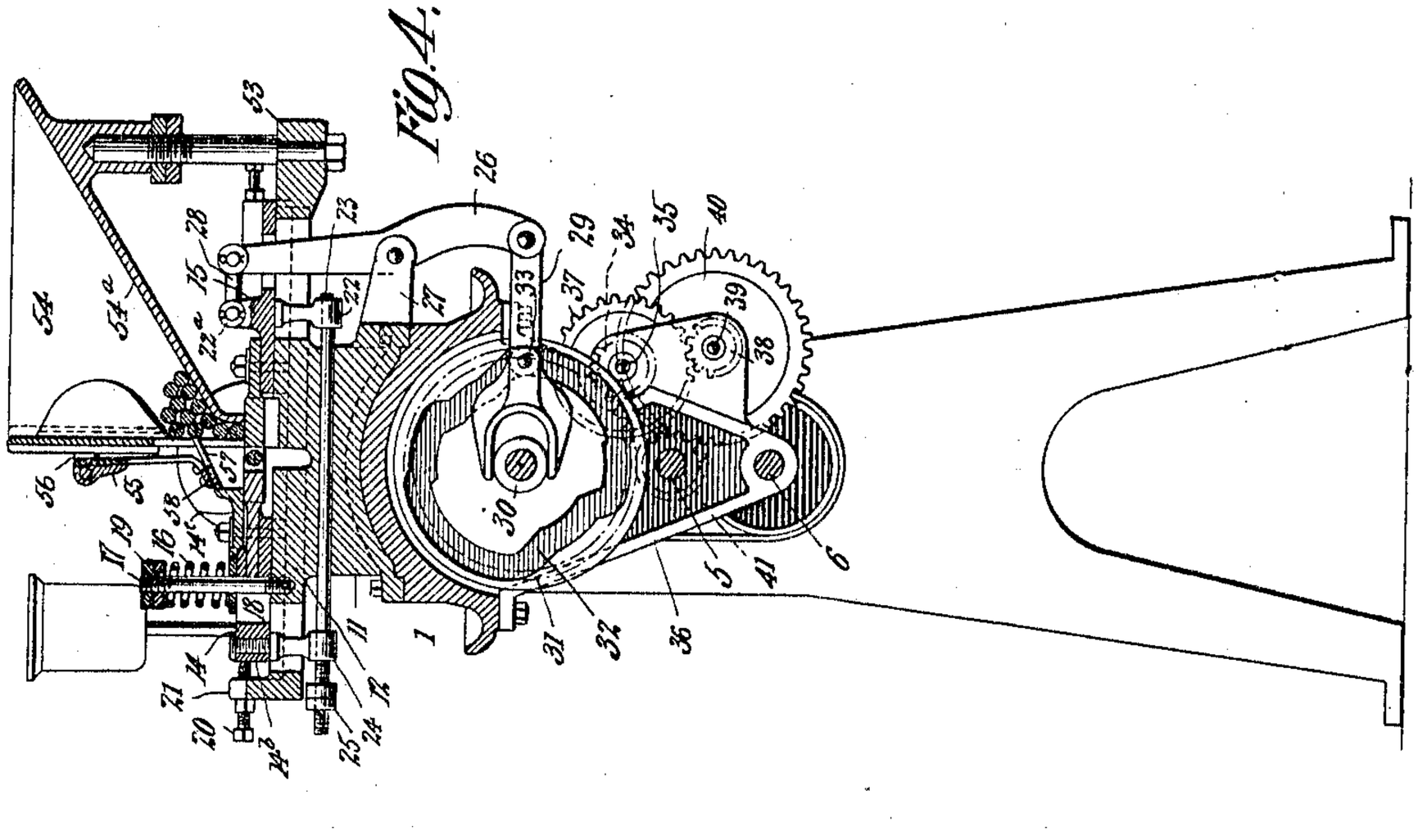

FIG. 4.

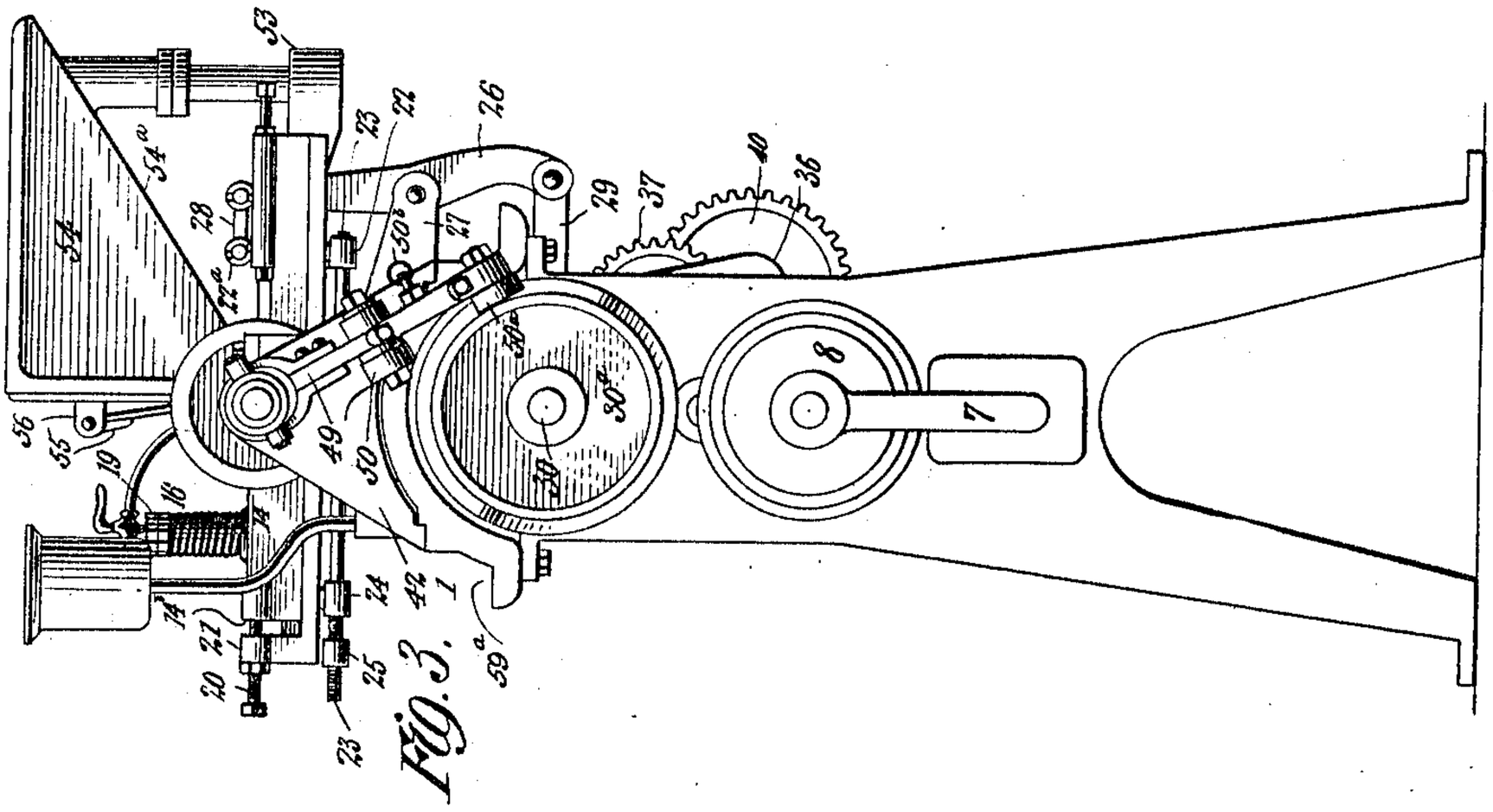

FIG. 3.

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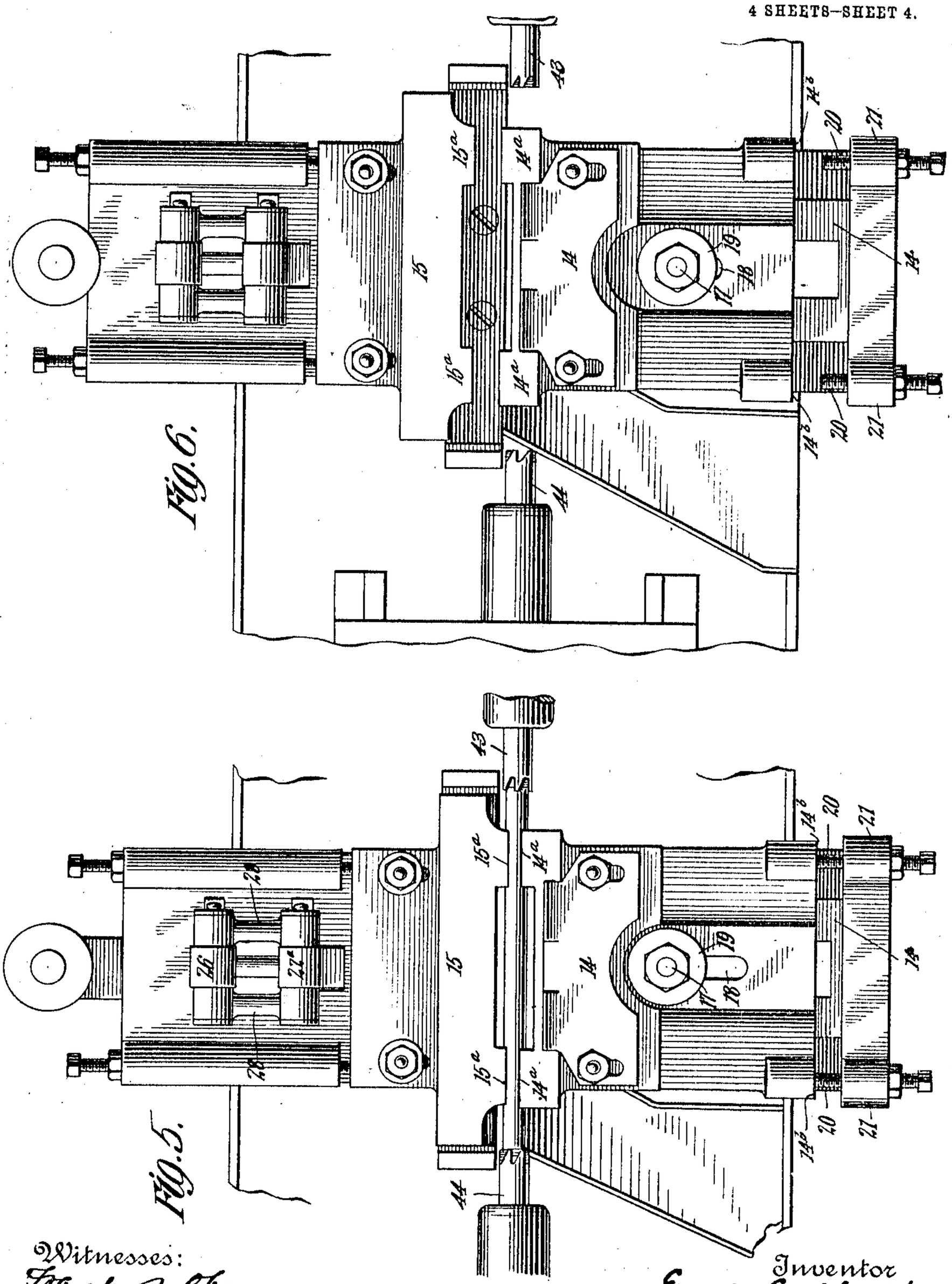

Fig. 6.

Fig. 5.

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UNITED STATES PATENT OFFICE.

EMIL EINFELDT, OF DAVENPORT, IOWA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO G. WATSON FRENCH, NATHANIEL FRENCH, AND JOSEPH L. HECHT, OF DAVENPORT, IOWA, A FIRM.

APPARATUS FOR MACHINING ENDS OF METAL BLANKS.

993,158. Specification of Letters Patent. Patented May 23, 1911.

Application filed June 26, 1909. Serial No. 504,452.

To all whom it may concern:

Be it known that I, EMIL EINFELDT, of Davenport, county of Scott, and State of Iowa, have invented a new and useful Improvement in Apparatus for Machining Ends of Metal Blanks, of which the following is a specification.

This invention relates to grinding or trimming machines, and is designed particularly for shaping the ends of rolls or bars to be used in roller bearings.

The machine embodying the invention is automatic in its action, the metal blanks being fed automatically from a magazine or holder to shaping tools, and after being shaped are delivered therefrom automatically in finished condition.

In its essential features, the machine embodies a magazine or holder in which the blanks to be operated on are stored, clamping jaws by which the blanks are taken one at a time from the magazine, and presented in position to be acted on, and shaping tools adapted to act on the ends of the blanks held between the jaws.

In the accompanying drawings, forming a part of this specification, and in which like reference-characters indicate corresponding parts, and wherein I have illustrated one of many embodiments of my invention: Figure 1 is a view in front elevation of the machine. Fig. 2 is a view in rear elevation of the same. Fig. 3 is a view in end elevation thereof. Fig. 4 is a vertical transverse sectional elevation, taken on a line centrally of Fig. 2. Figs. 5 and 6 are enlarged plan views of the jaw-members, and illustrating, respectively, these members with and without a roller-blank engaged thereby. In these drawings: 1 designates the bed or supporting portion of the machine, sustained by standards or legs, in which bearings are formed for shafts 5, 6, one end of the latter extending beyond the end of the machine and into a bearing carried by a side-bracket 7, contiguous to which the shaft carries pulleys 8 rotated by a belt (not shown) connecting with appropriate driving means. The shafts 5 and 6 carry pinions 9 and 10 meshing with each other, whereby shaft 5 receives motion from shaft 6.

Supported from the bed 1 of the machine, intermediate of its ends, is a bracket 11 upon which is formed a fixed horizontal guide 12, provided with a central dove-tailed portion 13. Slidably supported on and engaging said dove-tailed portion are two horizontally movable jaw-members 14 and 15, which I shall hereinafter refer to as the front jaw-member 14 and the rear jaw-member 15, the former being movable relatively to the other horizontally, and, also, in unison, for purposes presently to be explained. These jaws are each in the form of a flat plate, the abutting edges 14^a and 15^a of which are preferably concaved in order to engage the roller-blanks A.

The front jaw-member is held frictionally on its guide by means of a vertical spiral spring 16 encircling a bolt 17 fixed to the guide and extending upwardly through a fore-and-aft slot 18 in the jaw-plate, the upper end of said spring bearing against a head 19 on the bolt, and the lower end bearing against the upper face of the jaw-plate. The forward motion of the plate 14 on its guide is limited by two longitudinally-extending set-screws 20, 20, passing through vertical shoulders 21, 21, at the sides of the guide 12 at its front, and in position to be encountered by the front edge 14^b of the front jaw-plate when the latter arrives at the limit of its forward motion, as presently to be described. The rear jaw-plate is also horizontally movable on the guide 12, and has a depending arm 22 extending through a slot in said guide and connected with a rod 23 extending forward and loosely through an arm 24 depending from the front jaw-member 14. On the end of the rod 23, beyond the arm 24, is a head 25, which is adapted to engage the lower end of the depending arm 24 when the rod slides rearwardly through the same and which will thereby act to retract the front jaw-member 14. From this construction it will be seen that when the rear jaw is moved forward, it will, through the medium of the roller-blank between it and the front jaw-member, push the latter forward and position the roller-blank for shaping as will presently be fully explained. During this forward movement of the jaws, the blank is merely held between them, but, when edge 14^b of the front jaw-member is arrested by the set screws 20, the rear jaw-member will continue its forward movement and will act

to clamp the blank firmly. It will be understood that the operations just described are for the purpose, first, of positioning the jaws (separated from each other) to receive the roller-blank; secondly, of clamping the same between these two members, and, finally, of positioning the clamped blank for the machining or shaping operation.

After the shaping operation is completed, the jaws are shifted rearward, and, during the first part of the retractive movement of the rear jaw 15, it moves away from the front jaw-member and separates from engagement with the finished blank thereby releasing the same, this separating operation taking place before the head 25 on the rod 23 again engages the depending arm 24, so that, by the time the head contacts with the said arm, the roller-blank has been released and delivered. The continuation of the rearward movement of the rear jaw-member for the next machining operation brings the head 25 into engagement with said arm 24 and thereby shifts the front jaw-member rearward with the rear jaw-member until the jaws are again positioned to receive the second roller-blank.

The mechanism for effecting the positioning-movement of the jaw-members comprises a vertical lever 26 pivoted between its ends, between the forks of a bifurcated bracket 27 (Fig. 5) extending rearwardly from the machine-frame. Said lever has jointed at each side of its upper end, two horizontal links 28 which are also pivoted at each side of the upper end 22^a of the arm 22 carried by the rear jaw-member 15. The lower end of the lever 26 is jointed to the rear end of a horizontal arm 29, the forward end of which is forked to embrace a shaft 30, by which the arm 29 is guided in its movements back and forth. which movements are effected by means of a cam-wheel 31 keyed on the shaft 30, and formed with a cam-groove 32 in which engages a roller 33 carried by the arm 29 at its side. The shaft 30 is mounted in bearings in the frame of the machine and receives its rotary movement by gear teeth on the cam-wheel 31 meshing with a pinion 34 carried by a stub-shaft 35 supported in a bracket 36 depending from the machine-bed, which stub-shaft carries a gear 37 meshing with a pinion 38 carried by a stub-shaft 39. On the outer end of the stub-shaft 39 is mounted a gear 40 which, in turn, meshes with a pinion 41 carried by the shaft 5, before referred to, and a pinion 9 meshing with a pinion 10 on the shaft 6, the latter being driven by the pulley 8.

It will now be understood that the lever 26 receives an oscillatory motion by reason of the travel of the roller 33 on the arm 29 in the cam-groove 32 during the rotation of the cam-wheel 31; that this oscillatory motion of said lever effects a retraction or projection (as the case may be) of the rear jaw-member 15 by reason of its connection with said lever through the link 28 and the arm 22; and that the front jaw-member 14 has imparted to it (in the manner already described) a relative horizontal movement.

Mounted in bearings in vertical standards 42, 42, rising from the machine-bed, are two alined horizontal spindles or shafts 43, 44, provided at their inner ends with shaping or cutting tools and at their outer ends carrying driving pulleys 43^a and 44^a, splined to the shafts, and driven by bands 43^b and 44^b, passing over pulleys 5^a and 6^a mounted on the shafts 5 and 6, respectively, by which means the spindles receive rotary motion respectively in opposite directions.

At its outer end, each spindle is encircled by two collars 45, 45, each containing a ball-race, and, between said collars the shaft is loosely encircled by a central sleeve or disk 46 with straight plane side-faces,—two series of balls 47, 48, being interposed between the opposite sides of the sleeve and the raceways. The sleeve 46 is jointed to the upper end of a forked lever 49 pivoted between its ends to a bracket 50 projecting from the side of the standard 42, and which lever carries on its lower end a roller 50^a engaged by a cam-wheel 30^a on the outer end of the cam-wheel shaft 30 before referred to, by which means the two spindles are moved to and from each other to cause the shaping tools to operate on the ends of the blanks and release the same respectively. The lever 49 is, as shown, formed in two parts jointed together, the upper part or member being pivoted on the bracket 50, and the lower part being jointed to the upper member below its fulcrum on the bracket, adjusting screws being provided for changing its operating position with relation to the upper member. The form of the cam 30^a and its relation to the jaw-operating cam 31 (carried by the shaft 30) is such that the forked levers 49 will be operated to move the spindles inward toward and against the roller-blank after the latter have been moved by the jaw-members to the position to be operated upon. The roller 50 is maintained in positive engagement with its cam by the spring 50^b connected with the lever 49 and the machine-frame.

As the upper end of the fork-lever 49 moves transversely back and forth on its pivot, the sleeve 46 carried thereby will move slightly between the two series of balls and transversely of the spindles, which movement is provided for by forming the bore of said sleeve of a diameter considerably greater than that of the spindles.

Supported above the machine-bed, and, at its rear, on the bracket 53 carried by the rear end of the guide 12, is a holder or

magazine 54 preferably formed with an inclined bottom 54ª (Fig. 4), the forward end of which is bent downward to present a channel between it and the front wall of the magazine for delivering a single blank at a time to the jaw-members. In order that the blanks in the magazine may be prevented from becoming wedged or clogged therein and, thus prevented from readily entering between the jaw-members, I provide the magazine with a swinging frame or agitating member 55 pivoted at its upper end between lugs 56 projecting from the front of the magazine, and having at its lower end an inwardly extending lip 57 projecting into the magazine, as shown in Fig. 4. This swinging member carries a forwardly extending projection 58 adapted to be engaged by an upstanding lug 14ᶜ on the rear end of the front jaw-member, with the result that when the jaw-member moves backward to receive a roller-blank, the lug will engage the projection 58 and force the lip 57 inwardly against the pile of blanks in the box and agitate them.

From the foregoing, the complete operation of the machine will be clear: The motion imparted to the drive-shaft 6 will, through the gearing already described, rotate the shaft 5 and operate the pulleys 5ª and 6ª to rotate the spindles and the cam-wheel 31 to effect a positioning of the jaw-members—first, to receive the blank from the overlying magazine, then to close them upon the blank, and finally to carry them and said blank into a position where the latter will be in alinement with the shaping tools. Thereupon, the cams 30ª on the ends of the cam-shaft 30, operate the levers 49 and move the spindles longitudinally in their bearings and, thus, position the respective shaping tools in operative relation to the ends of the blank. The spindles also having a rotative movement, the tools perform their functions, after which the tools are withdrawn from cutting relation with the blank-ends by means of the cams 30ª, the jaw members with the finished roller then moving forward and separating to drop the same into an inclined chute 59, leading to a trough 59ª at the front of the machine-bed.

Having thus described my invention, its construction and mode of operation, what I claim and desire to secure by Letters Patent of the United States is as follows:

1. In a machine of the type described, the combination of two jaws movable relatively and in unison and adapted to grasp the article to be acted on between them, means for moving one of the jaws toward the other jaw, whereby said jaws and the article between them will be moved in unison to present the article to the action of the shaping devices, and means for arresting the movement of the said other jaw, whereby the continued movement of the first jaw relative to the other jaw will bind the article fixedly between them.

2. In a machine of the type described, the combination of a front jaw and a rear jaw movable relatively to each other and in unison, and adapted to grasp the article to be acted on between them, means for moving the rear jaw toward the front jaw, whereby said jaws and the article between them will be moved in unison to present the article to the action of the shaping devices, and means for arresting the motion of the front jaw, whereby the continued movement of the rear jaw will bind the article fixedly between them.

3. In a machine of the type described, the combination of two sliding jaws movable relatively and in unison and adapted to grasp the article to be acted on between them, means for advancing the jaws in unison from the receiving position to present the article to the action of shaping devices and for retracting one of the jaws relatively to the other to release the clamped article, and connections between said jaws adapted on the continued retraction of said jaw to move the other jaw back with it to a receiving position.

4. In a machine of the type described, the combination of a front jaw and a rear jaw movable relatively to each other and adapted to grasp the article to be acted on between them, said jaws being adapted to be advanced in unison to present the article to the action of shaping devices, means for retracting the rear jaw relatively to the front jaw to release the article, and a connection between said jaws adapted on the continued retraction of the rear jaw to draw the front jaw back with it.

5. In a machine of the type described, the combination of a front jaw and a rear jaw movable relatively and in unison and adapted to grasp the article to be acted on between them, means for moving the rear jaw toward the front jaw to cause the jaws and the grasped article to be advanced from the receiving position to present the grasped article to the action of the shaping devices, means for arresting the motion of the front jaw, whereby the continued movement of the rear jaw will bind the article fixedly between them, means for retracting the rear jaw relatively to the front jaw to release the article, and a connection between said jaws adapted, as the retraction of the rear jaw continues, to move the front jaw back with it.

6. In a machine of the type described, the combination of a front jaw and a rear jaw movable relatively and in unison and adapted to grasp the article to be acted on between them, means for advancing and retracting the rear jaw, a rod connected with

the rear jaw and extending to the front jaw, and a stop on said rod adapted to encounter the front jaw as the rear jaw is retracted and carry the front jaw rearwardly.

7. In a machine of the type described, the combination of a magazine to hold the articles to be acted on, an agitator device movable in said magazine, two jaws movable back and forth relatively to the magazine and adapted to grasp the articles between them, one of said jaws being adapted to engage and operate the agitator device.

8. In a machine of the type described, the combination of a magazine, an agitator device operating therein, a front jaw, a rear jaw, a connection between the two jaws, means for operating the jaws relatively to the magazine, and means carried by one of the jaws for operating the agitator device.

9. In a machine of the type described, the combination of a magazine adapted to hold the articles to be acted on, said magazine being provided in its bottom with an opening for the discharge of the articles and being provided in its front with a second opening, an agitator frame mounted on the magazine and operating through the front opening in the magazine, coöperating front and rear jaws movable forwardly and backwardly with reference to the magazine and acting to grasp the articles to be acted on and advance the same, and a lip on the front jaw in position to encounter the agitator frame when the said front jaw is retracted.

10. In a machine of the class specified, a support, a guide thereon, a magazine sustained by said support, an agitator-device working in said magazine, a front jaw member slidable on said guide, a rear jaw member also slidable upon said guide, a connection between the two jaw-members, means for operating said jaw-members relative to said magazine, cutting tools shiftable with relation to said jaw-members, and means for operating said cutting tools, and means carried by one of said jaw-members for operating said magazine agitating-device.

In testimony whereof I hereunto set my hand this 10th day of June, 1909, in the presence of two attesting witnesses.

EMIL EINFELDT.

Witnesses:

ANDREW NEILSON,

LEON ZOECKLER.