

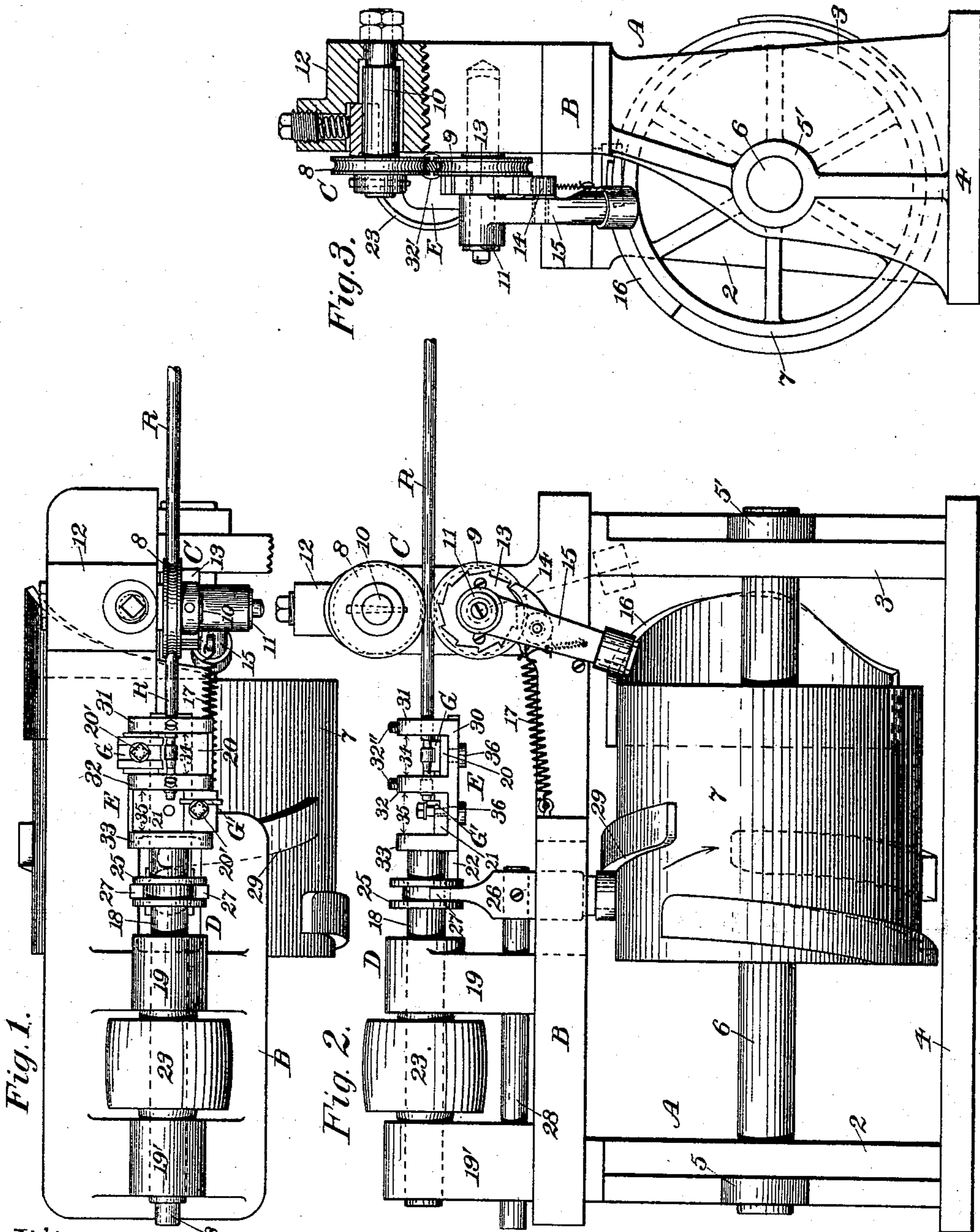
(No Model.)

3 Sheets—Sheet 1.

C. M. SPENCER.
MACHINE FOR MAKING CHAIN PINS.

No. 539,964.

Patented May 28, 1895.



Witnesses:
J. L. Edwards Jr.
Fred. J. Dole.

Inventor:
Christopher M. Spencer.
By his Attorney,
F. H. Richards

(No Model.)

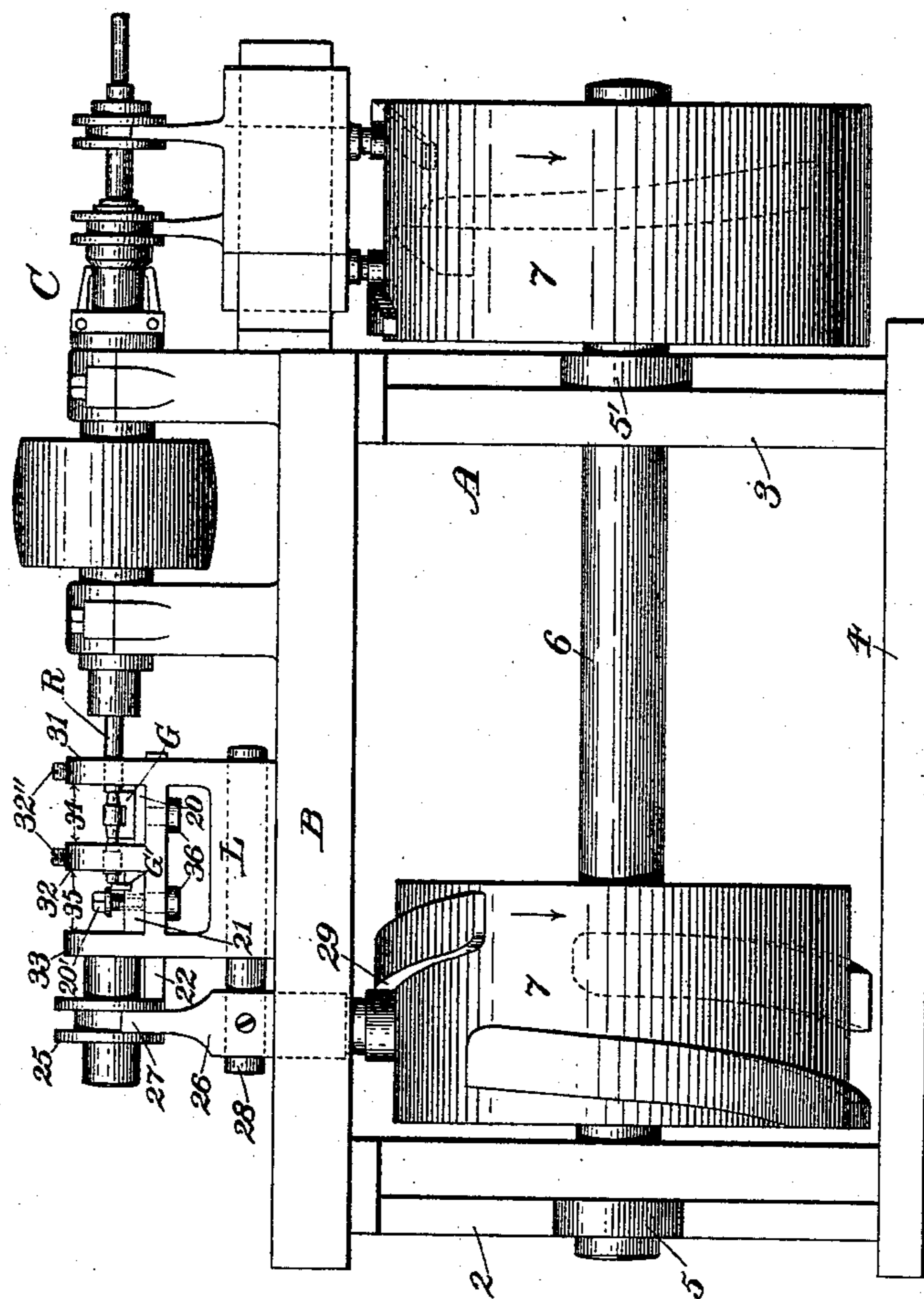
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Fig. 4.



Witnesses:

J. L. Edwards Jr.
Fred. J. Dole.

Inventor:

Christopher M. Spencer.
By his Attorney,

F. A. Richards

(No Model.)

3 Sheets—Sheet 3.

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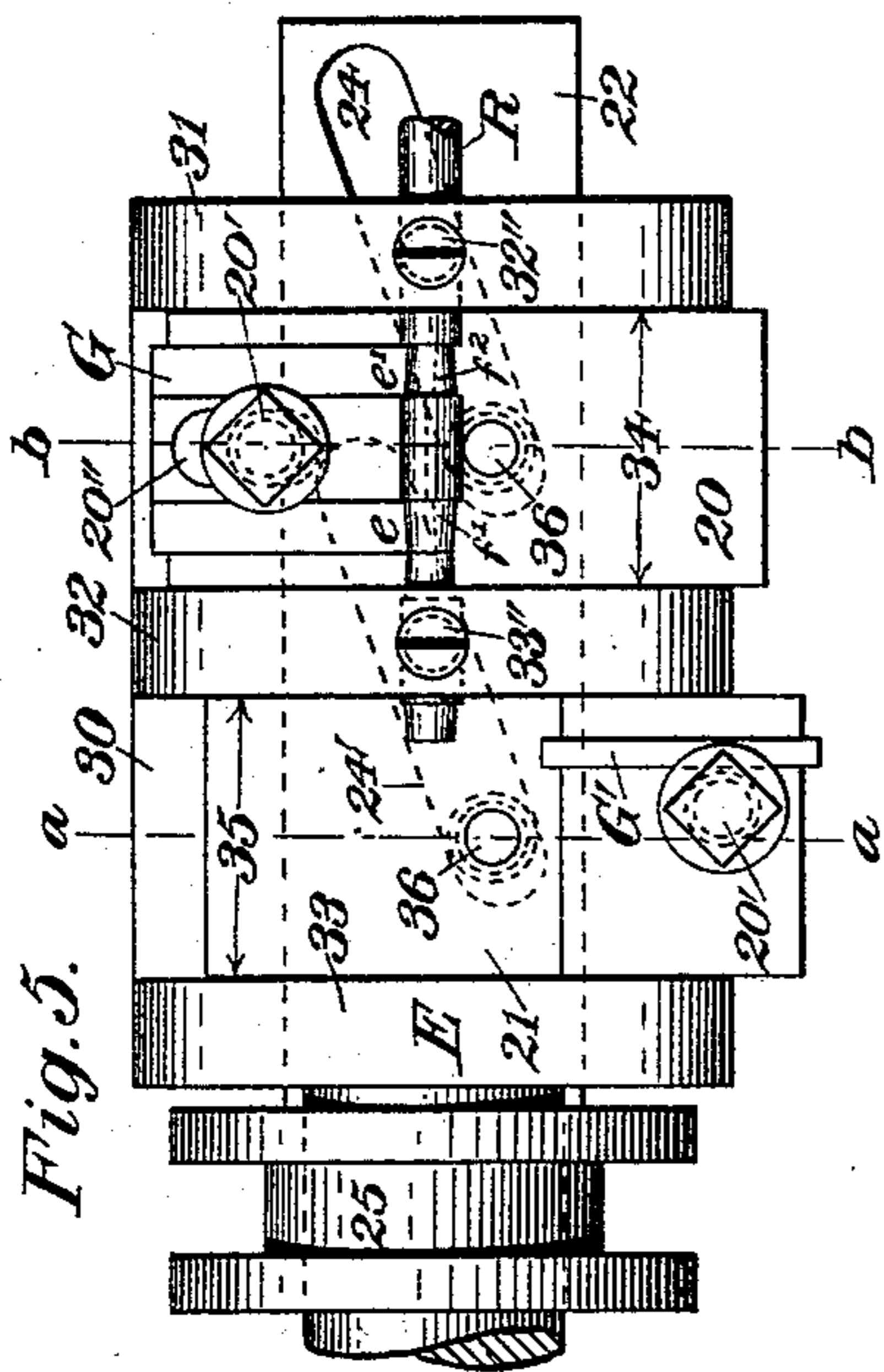


Fig. 5.

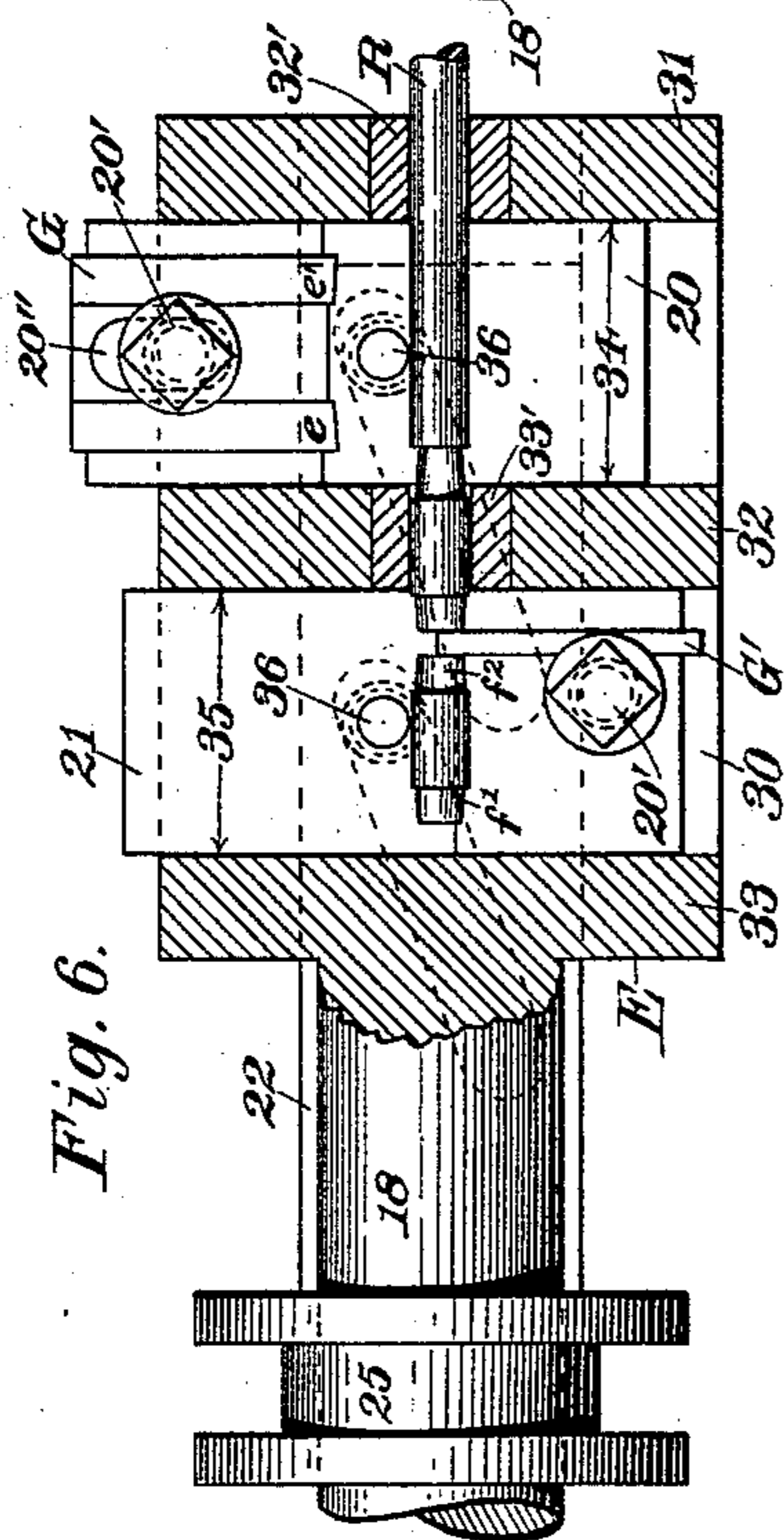


Fig. 6.

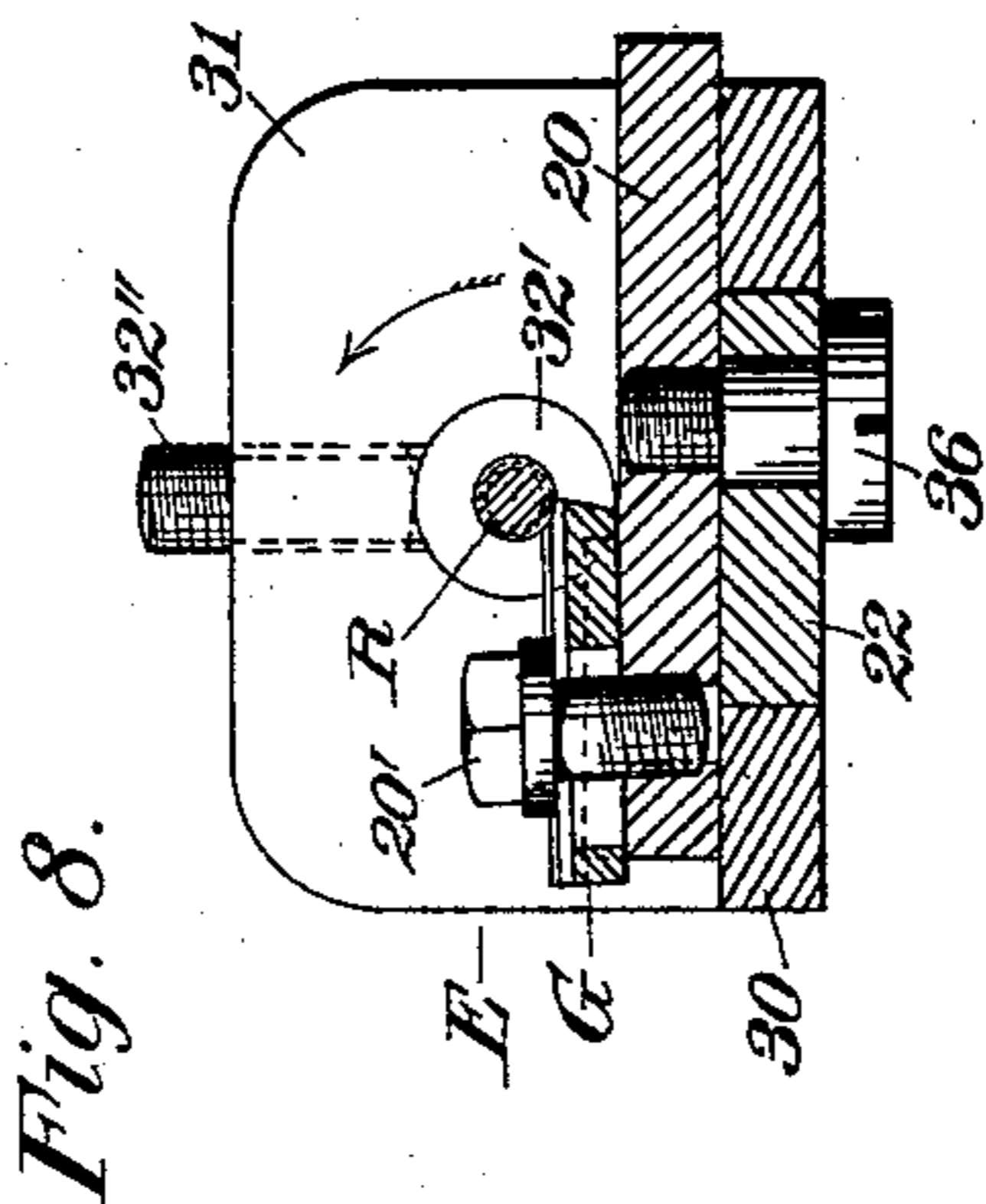


Fig. 8.

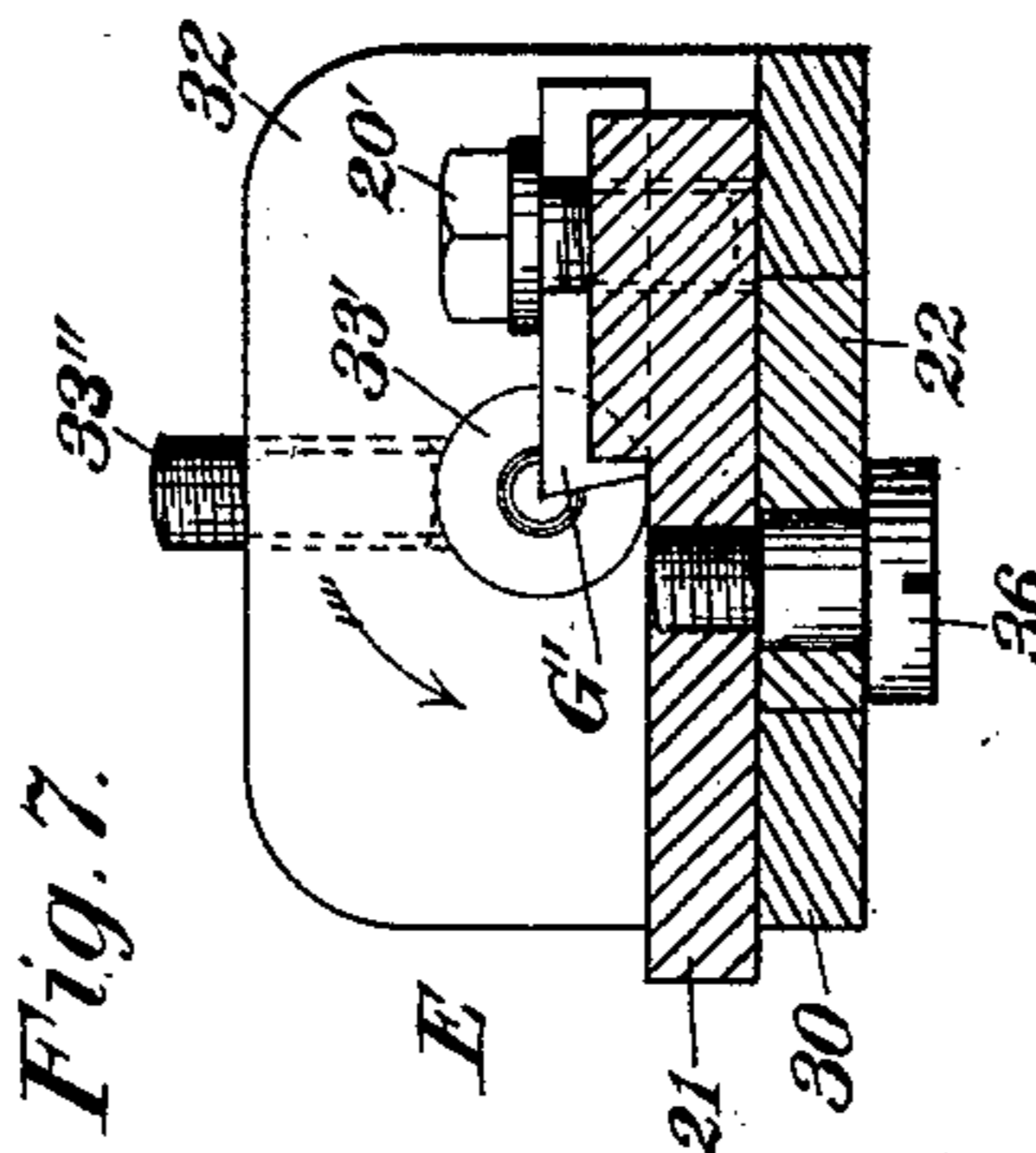


Fig. 7.

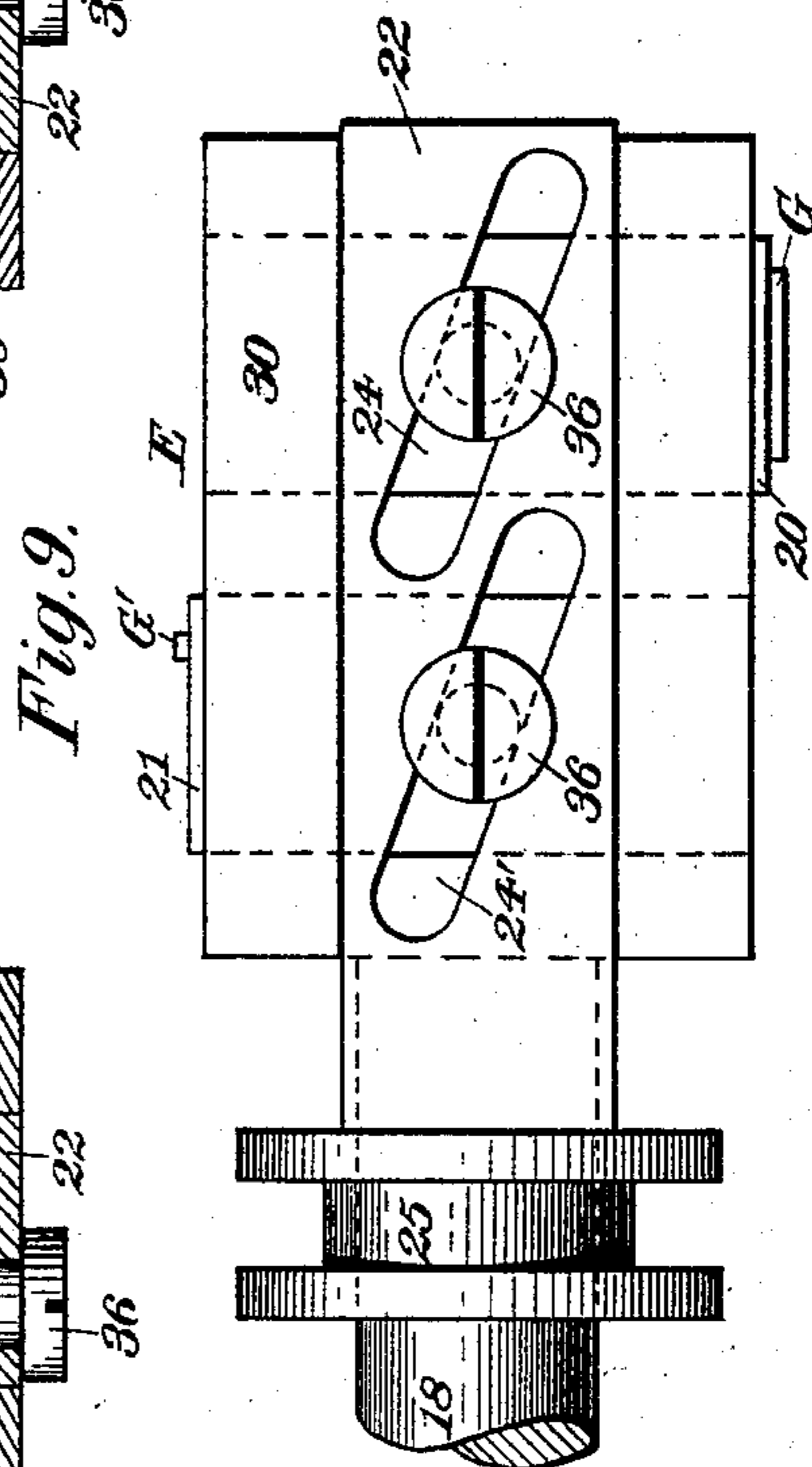


Fig. 9.

Witnesses:
J. L. Edwards Jr.
Fred. J. Dole.

Inventor:
Christopher M. Spencer.
By his Attorney,
F. A. Richard.

UNITED STATES PATENT OFFICE.

CHRISTOPHER M. SPENCER, OF WINDSOR, CONNECTICUT.

MACHINE FOR MAKING CHAIN-PINS.

SPECIFICATION forming part of Letters Patent No. 539,964, dated May 28, 1895.

Application filed June 13, 1894. Serial No. 514,428. (No model.)

To all whom it may concern:

Be it known that I, CHRISTOPHER M. SPENCER, a citizen of the United States, residing at Windsor, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Machines for Making Chain-Pins, of which the following is a specification.

This invention relates to machines for making pins or rivets of that class used in sprocket and other chains and commonly known as "chain-pins."

The object of my invention is, primarily, to furnish a simple and effective machine for automatically making "two-shoulder" pins, or rivets, from a continuous rod of indefinite length with rapidity and economy, and with a high degree of precision.

In the manufacture of chain-pins as heretofore practiced, it has been customary to turn down or diametrically reduce the opposite ends of the stock or blank from which a pin is to be made to form the shoulders of the pin, and to do this by two successive and separate operations, the stock being first partially cut away or reduced at one end to form one shoulder, and then turned end-for-end and the operation repeated to form the other shoulder. By that method it is extremely difficult to form a chain-pin whose opposite ends are symmetrical and precisely coincide with the other; also it is, by that method, extremely difficult to secure the required accuracy, since the exact distance between the shoulders of each chain-pin is the result of several operations, and not the result of a single operation. In that case the required distance results from the setting and re-setting of the blank in a chuck or holder, as well as from successive cutting operations, all of which will, in practice, vary in some degree thereby rendering it practically impossible to make the pins with a high precision and at the same time rapidly and at low cost. It is therefore the chief object of my present invention to overcome the difficulties in the manufacture of chain-pins inherent to known methods and I do this by providing means whereby both shoulders of the pin may be formed and both ends of the pin may be turned down or diametrically reduced simultaneously and at one cutting operation, there-

by securing precision in the location of the shoulders and coinciding symmetry in the reduced ends of said pin. 55

In the drawings accompanying and forming part of this specification, Figure 1 is a plan view of one form of chain-pin-making machine embodying my invention, said figure showing a pin-forming rod in the position it occupies while being operated upon. Fig. 2 is a side elevation of said machine. Fig. 3 is an end view of the same, looking toward the left hand in Fig. 2, a portion thereof being shown in section. Fig. 4 is a side elevation of a slightly modified form of machine embodying my said invention. Fig. 5 is a plan view of the cutter carrying and traversing mechanism on an enlarged scale, said figure showing the pin-forming rod in position and as being operated upon by a cutter to form a shouldered pin-blank. Fig. 6 is a sectional plan view of said mechanism, showing the severing or cutting-off tool in its advanced operating position and the pin-blank-forming tool in its retracted position. Fig. 7 is a cross-sectional view of the tool carrying and traversing mechanism, taken in line *a a*, Fig. 5, looking toward the right hand in said figure. Fig. 8 is a similar cross-sectional view of said mechanism, taken in line *b b*, Fig. 5, looking toward the right hand in said figure. Fig. 9 is an under side view of said mechanism. 60 65 70 75 80

Similar characters designate like parts in all of the figures. 85

The framework A, which may be of any suitable construction for carrying the several operative details of the machine, is shown consisting of the bed B, supported at its ends by suitable uprights 2 and 3, which may be formed integral therewith or be secured thereto as desired, said uprights being carried upon a base 4. Journaled in bearings 5 and 5', formed in the uprights 2 and 3 is a cam-wheel carrying shaft 6, upon which one or more cam-wheels, as 7 having suitable cam-faces for operating certain elements of the machine, may be mounted, as will be hereinafter described, said cam-shaft, in practice, being driven by usual shaft-driving mechanism (not shown) connected therewith. 90 95 100

Supported at one end of the bed of the machine (shown in the drawings as the right hand end) is the rod-carrying-and-feeding

mechanism, designated in a general way by C, and adjacent thereto and located near the opposite end of the bed B of the machine is the tool-carrying and operating mechanism, designated in a general way by D.

In the drawings I have illustrated two slightly modified forms of pin-forming machines both of which are within the domain of, and embody my invention. In the preferred form thereof shown in Figs. 1, 2 and 3 the rod-carrying-and-feeding mechanism C, is shown consisting of two adjacent peripherally-grooved feed-rollers 8 and 9, revolubly-supported upon studs 10 and 11, secured in an upright 12, upon the bed of the machine, one of said feed-rollers being shown provided with a ratchet-wheel 13, which is operated by a pawl 14, upon a feed-lever 15, pivotally-carried at one end upon the stud 11 and in bearing contact at its opposite end with the cam-face 16, of the cam-wheel 7 secured to the cam-shaft, said lever being retracted by means of a spring 17, as shown most clearly in Fig. 2 of the drawings. In this instance, the pin-forming rod, designated by R, is non-rotatively supported between the feed-rollers in position to be operated upon. In this connection it should be noted that the particular form of rod-supporting-and-feeding mechanism shown in the drawings constitutes no material part of my present invention, as any suitable construction and organization of rod-supporting-and-feeding mechanism may be employed without departure from my invention. In some cases it may be desirable to employ a feeding mechanism embodying a revoluble rod-carrying spindle such as illustrated in Fig. 4 of the drawings, and it is to illustrate the applicability of my improvements to a machine employing either feed-mechanism for rotating the pin-forming rod, or feed-mechanism adapted for holding the rod against rotation, that I have shown the two modifications illustrated, particularly, in Figs. 2 and 4.

Again referring to Figs. 1, 2 and 3 of the drawings, the cutter-carrying mechanism is shown comprising a spindle 18, revolubly-supported in bearings formed in brackets 19 and 19', formed upon the bed of the machine at the left hand end thereof, a combined tool-carrier and rod support carried upon the forward end of the spindle 18 and designated in a general way by E, which tool-carrier and rod support will be hereinafter termed the "tool head," one or more transversely-disposed tool-carrying slides, herein shown as two in number, and designated by 20 and 21, respectively, supported for sliding movement in opposite directions in said tool-carrying head, a tool-slide traversing cam, 22, in operative connection with said slides, and tools carried by said slides in position and adapted for operating upon the pin-forming rod, as will be hereinafter more fully described.

As a means for rotating the tool-head E, the spindle 18 thereof will usually be provided

with a pulley 23, which will be driven by a belt (not shown) from any suitable source of power, and as a means for reciprocating the tool-traversing cam 22, this cam, which is in the nature of a plate having obliquely-disposed cam-grooves 24 and 24', formed there-through, is provided at one end with a peripherally-grooved hub or collar 25, which is mounted for sliding movement upon the forward end of the spindle 18, and is operated by a shifting device, which in the form thereof herein shown consists of a shifting arm 26, having a bifurcated upper end 27 in engagement with the collar 25, said shifting-arm 27, being carried midway of its length upon a rod 28, supported for sliding movement in the brackets 19 and 19' the lower end of said shifting-arm being in bearing contact with a cam-face 29, upon the cam-wheel 7, by means of which cam-wheel the shifting device is operated. In this instance the cutter-carrying head is revoluble and the rod R is held against rotation, whereas in Fig. 4 this order of things is reversed, the tool-carrying head being stationary, and the rod being rotatively held.

Referring to the modification shown in Fig. 4, the cutter-carrying head L is shown supported upon the bed of the machine, while the tool-traversing cam-operating mechanism is shown substantially similar to that shown in Fig. 2, with the exception that the guide-rod for the shifter-arm is supported for sliding movement in a bearing formed in the tool-carrying head instead of in a bearing formed in the brackets 19 and 19'. In the preferred form thereof herein shown, the tool-carrying head consists of the bed or main body 30, having a series of remotely-disposed transverse uprights or supports, herein shown as three in number and designated by 31, 32 and 33. The spaces, 34 and 35, between these uprights constitute slideways for tool-slides 20 and 21 carrying tools adapted for successively operating upon the pin-forming rod. As a means for reciprocating the tool-slides, a traversing-cam 22, is provided as before stated, which cam is supported for sliding movement in a groove formed in the under-face of the body-portion 30 of the tool-head E, which cam has parallel obliquely-disposed cam-grooves 24 and 24' formed therethrough, as illustrated most clearly in Fig. 9 of the drawings, and through these grooves are extended studs 36, whose inner screw-threaded ends are screwed into screw-threaded holes formed in the tool-slides, and whose headed ends bear against the under face of the cam 22 as clearly shown in Figs. 7 and 8.

As a means for forming a rigid support for the pin-forming rod, in close proximity to and at both ends of that portion being turned down or diametrically reduced to form the pin shoulders and at each side the cutting path of the turning tool G, the two uprights or supports 31 and 32 are transversely bored to coincide axially with the pin-forming rod when the same is in position to be operated

upon, said bores being usually provided with bushings 32' and 33', the internal diameters of which substantially correspond with the diameter of the rod, which rod will, during the operation have a working fit therein and be held against lateral movement thereby. These bushings will preferably be held in the bores in the supports by screws 32'' extending through said supports and bearing at their lower ends against said bushings as most clearly shown in Figs. 7 and 8. This means of supporting the pin-forming rod, in connection with the particular construction and organization of the turning apparatus, constitute the most important factors in the successful production of chain-pins in accordance with my present invention.

In the method of producing the two-shoulder chain-pin as carried out by the machine herein shown and described, only two successive operations are necessary to complete the pin, that of simultaneously turning down or diametrically reducing remote portions of the pin-forming rod to form the two shoulders of the pin-blank, and that of cutting off the pin-blank so formed from the rod, which last operation completes the pin.

As a means for turning down the pin-forming rod to form a pin-blank at one operation, I have provided a cutter or turning-tool G. This tool is in the nature of a double-tenon, cutter, it having two coinciding, but remotely and preferably obliquely-disposed cutting-edges e and e' , adapted for simultaneously forming two tenons upon the pin-blank forming portion of the rod, the distance between the inner adjacent edges of which exactly coincides with the distance required between the shoulders f' and f'' of the completed pin. In the drawings I have shown the two cutting edges e and e' of the cutter G as obliquely-disposed with relation to the axial line of the rod R which adapts the cutter to form slightly conical ends f' and f'' upon said pin. This cutter, as before stated, is carried by the slide 20 to which it is adjustably-secured by clamp-screws 20' extended through an elongated slot 20'' therein, and is located intermediate to the two rod-supports 31 and 32 with its two side edges slightly remote from the inner faces of said supports, and is adapted to be moved toward and from the rod R by means of the traversing cam 22 in connection with the slide 20, as before described. The cutting-off tool G' is carried, as before stated, by the slide 21 located in the slide-way 35, and will in practice preferably be located at one side of the path of movement of the pin-forming rod opposite to the side upon which the turning-tool G is located. These two tools G and G', as will be understood by reference to Figs. 5 and 6 of the drawings, operate alternately, the one G first operating to form a pin-blank, after which, and during the retraction of the tool G, the one G' operates to cut off the completed pin-blank from said rod. The opera-

tion of feeding the rod forward into position to be operated upon takes place immediately upon the retractive movement of the cutting-off tool G' and before the turning-tool G reaches its cutting position.

When it is desired to revolvably-support the rod and employ a stationary cutter-head mechanism as illustrated in Fig. 4, any well known form of chuck or rod-carrying spindle, combined with a feeding device such as used in ordinary screw-making machines may be employed, the spindle thereof being provided with the usual driving mechanism, and the feed-mechanism being operated by the usual cam, as shown in said figure.

Having thus described my invention, I claim—

1. In a chain-pin-making machine, the combination with rod-supporting-and-feeding mechanism; of a cutter-head mechanism embodying two transversely-disposed fixed rod-supports carried by the cutter-head and adapted for supporting the rod contiguous to both ends of that portion of the rod which is to be operated upon by the cutter, the transverse slide-way between said rod-supports, and the double-tenon cutter mounted in the slide-way and adapted for simultaneously turning down the rod at two separate points; and means for rotating one of said mechanisms relatively to the other, substantially as described.

2. In a chain-pin-making machine, the combination with rod-supporting-and-feeding mechanism; of a cutter-head mechanism having two transversely-disposed uprights or supports fixed to the cutter-head and forming between them a transverse slide-way, each of said uprights having a transverse rod-receiving bore in alignment one with the other, a cutter-slide supported for reciprocation in said slide-way and guided between said supports, and a cutter-slide-traversing cam in operative connection with said cutter-slide, means for rotating one of said mechanisms relatively to the other, and means for actuating the cutter-slide-traversing cam, substantially as described.

3. In a chain-pin-making machine, the combination with rod-supporting-and-feeding mechanism, of a cutter-head mechanism having two transversely-disposed supports fixed to the cutter-head and supporting the rod at both ends of that portion of the rod which is to be operated upon and said supports also forming between them a transverse slide-way, a cutter-slide supported for reciprocation in said slide-way and guided between said supports and the cutter carried by said slide and having two remotely-disposed cutting-edges one at each side thereof and in position and adapted for operating simultaneously upon opposite ends of that portion of the pin-forming rod which is located between the two supports whereby both ends of a pin are formed simultaneously, means for rotating one of said mechanisms relatively to the other, and

means for reciprocating said cutter-slide, substantially as described.

4. In a chain-pin-making machine, the combination with the bed of the machine, of two adjacent feed-wheels for supporting and feeding forward a pin-forming rod, means for intermittently rotating said feed-wheels, a rotatable cutter-head having a transverse slide-way, uprights or supports located one at each side of the slide-way and in position for receiving and supporting that portion of the pin-forming rod which is to be operated upon, and the cutter supported for reciprocation intermediate of said two supports and guided between the same and serving to simultaneously turn down both ends of that portion of the rod which is located between said supports, and means for operating said cutter, substantially as described.

5. In a chain-pin-making machine, the combination with rod-supporting-and-feeding mechanism, of a cutter-head mechanism having two transversely-disposed rod-supports fixed to the cutter-head and serving to support the rod contiguous to that portion of the rod which is to be operated upon by a turning-down cutter and said supports forming between them a transverse slide-way, a double-tenon cutter supported for reciprocation in said slide-way and guided between said supports and serving to simultaneously turn down the rod at two separate points, transversely-disposed supports fixed to the cutter-head and forming between them a second transverse slide-way, and a cutting-off tool supported for reciprocation in said second slide-way, means for rotating one of said mechanisms relatively to the other, and means for simultaneously reciprocating the double-tenon cutter and the cutting-off tool, substantially as described.

6. In a chain-pin-making machine, a cutter-head mechanism having two remotely and transversely-disposed rod-supports fixed to the cutter-head and supporting a pin-forming rod contiguous to both ends of that portion of said rod which is to be operated upon by a turning-down cutter, and the double-tenon cutter supported for reciprocation intermediate of said supports and guided between the same and adapted for simultaneously turning down the rod at two separate points, rod-sup-

porting-and-feeding mechanism adjacent to said cutter-head mechanism, means for rotating one of said mechanisms relatively to the other, a cam in connection with and serving to actuate the cutter, and a cam in connection with and serving to actuate the rod-supporting-and-feeding mechanism to feed the rod, substantially as described.

7. In a chain-pin-making machine, a cutter-head mechanism having two transverse slide-ways, a turning and a cutting-off tool oppositely-disposed and supported for reciprocation in said slide-ways and guided between the same, said turning tool simultaneously turning the rod at two separate points, and two remotely-disposed rod-supports in position for supporting the rod contiguous to both ends of that portion of the rod which is to be operated upon by the turning-tool, one of said supports being intermediate of the two tools, rod-supporting-and-feeding mechanism, means for rotating one of said mechanisms relatively to the other, cam-mechanism in connection with and serving to reciprocate the two tools of said cutter-head mechanism simultaneously in the same direction and cam-mechanism in connection with and serving to actuate the rod-supporting-and-feeding mechanism to feed said rod, substantially as described.

8. In a chain-pin-making machine, a cutter-head mechanism embodying two transversely-disposed cutter-carrying slides, two rod-supports one of which is located intermediate of the two slides and both of which support a rod contiguous to both ends of that portion of the rod which is to be operated upon, cutters carried by said slides, and a traversing-cam having two parallel cam-faces connected with the two slides, a revoluble cam in operative connection with the cutter-traversing cam, rod-supporting-and-feeding mechanism adjacent to said cutter-head mechanism, means for rotating one of said mechanisms relatively to the other, and a cam for operating said rod-supporting-and-feeding mechanism to feed the rod, substantially as described.

CHRISTOPHER M. SPENCER.

Witnesses:

FRED. J. DOLE,
ROBT. N. RUDELL.