

(No Model.)

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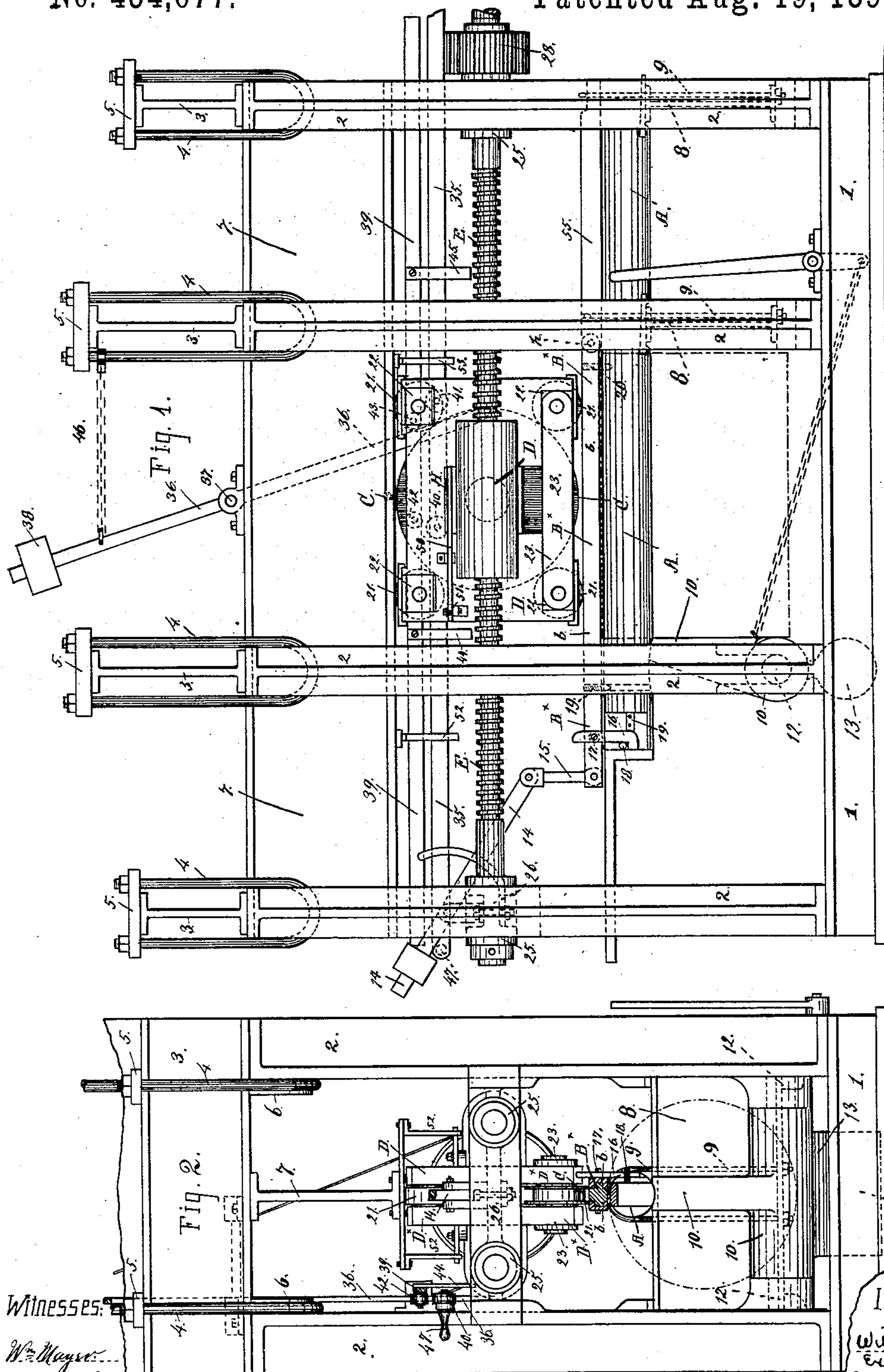
G. PARDY, Dec'd.

W. PARDY, Executor.

RIVETING MACHINE.

No. 434,677.

Patented Aug. 19, 1890.



Witnesses:
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By Smith & Brown Attys. at L.

(No Model.)

2 Sheets—Sheet 2.

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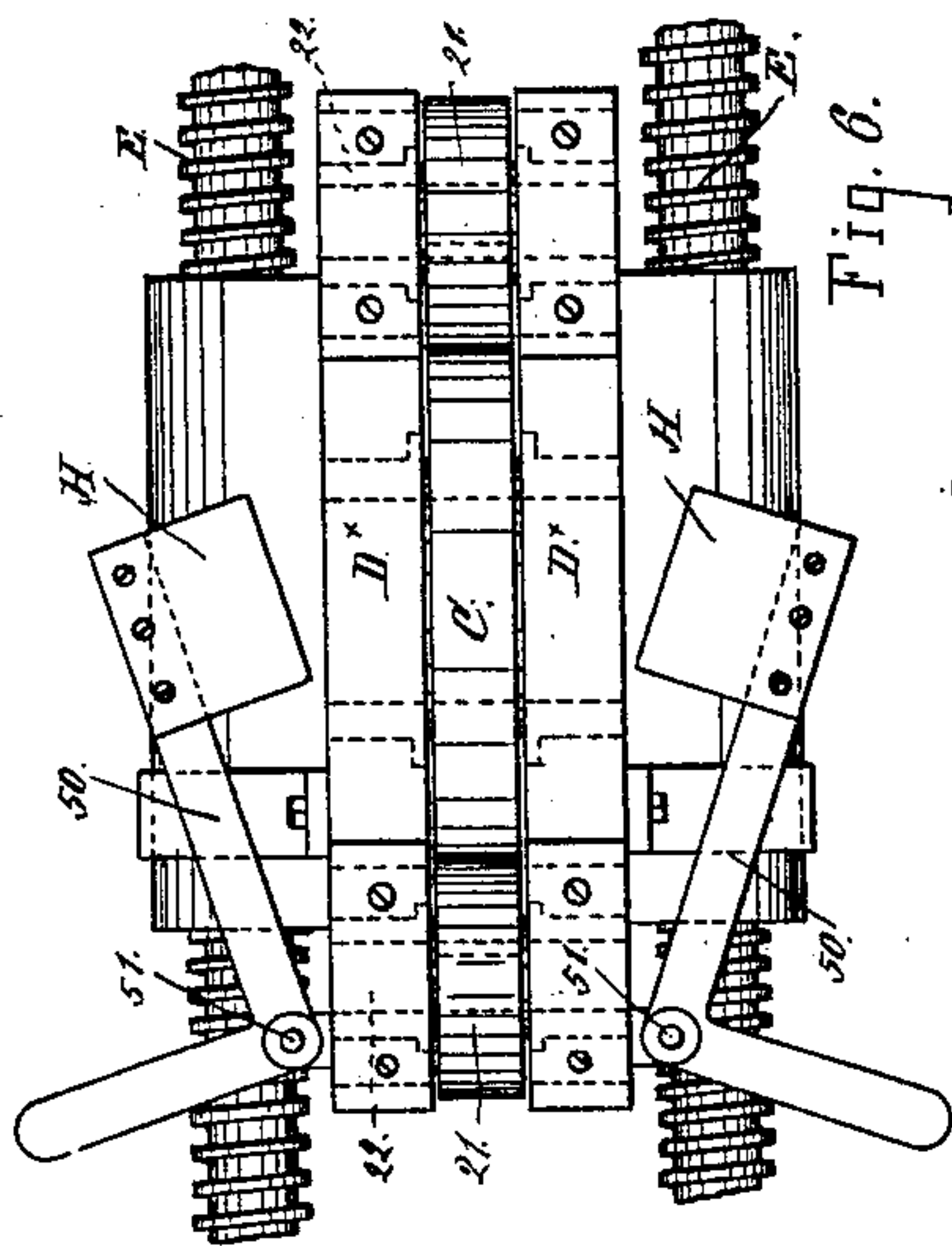


Fig. 6.

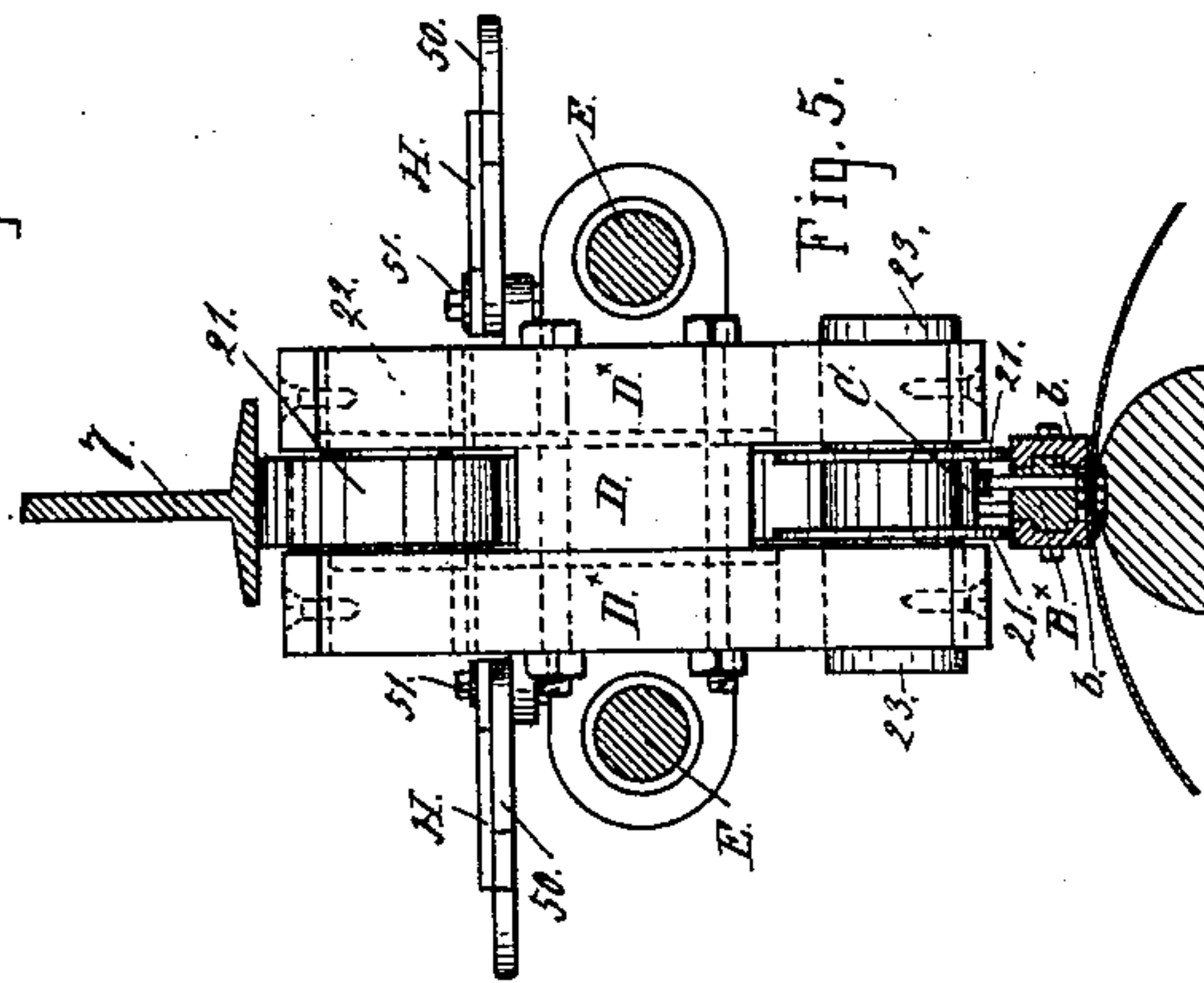


Fig. 5.

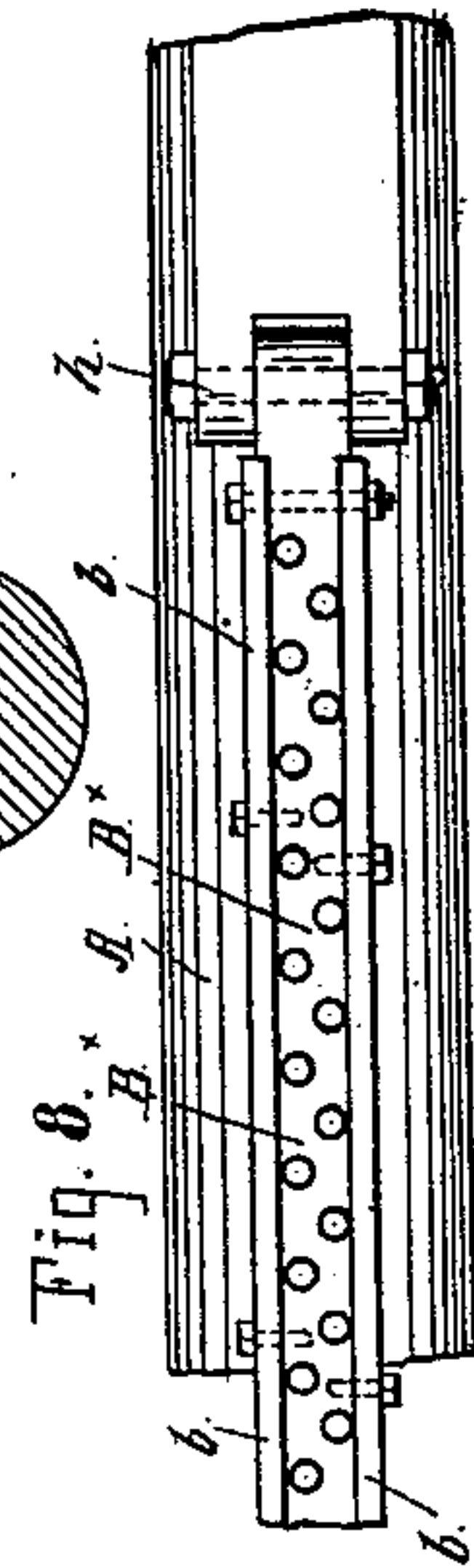


Fig. 8.

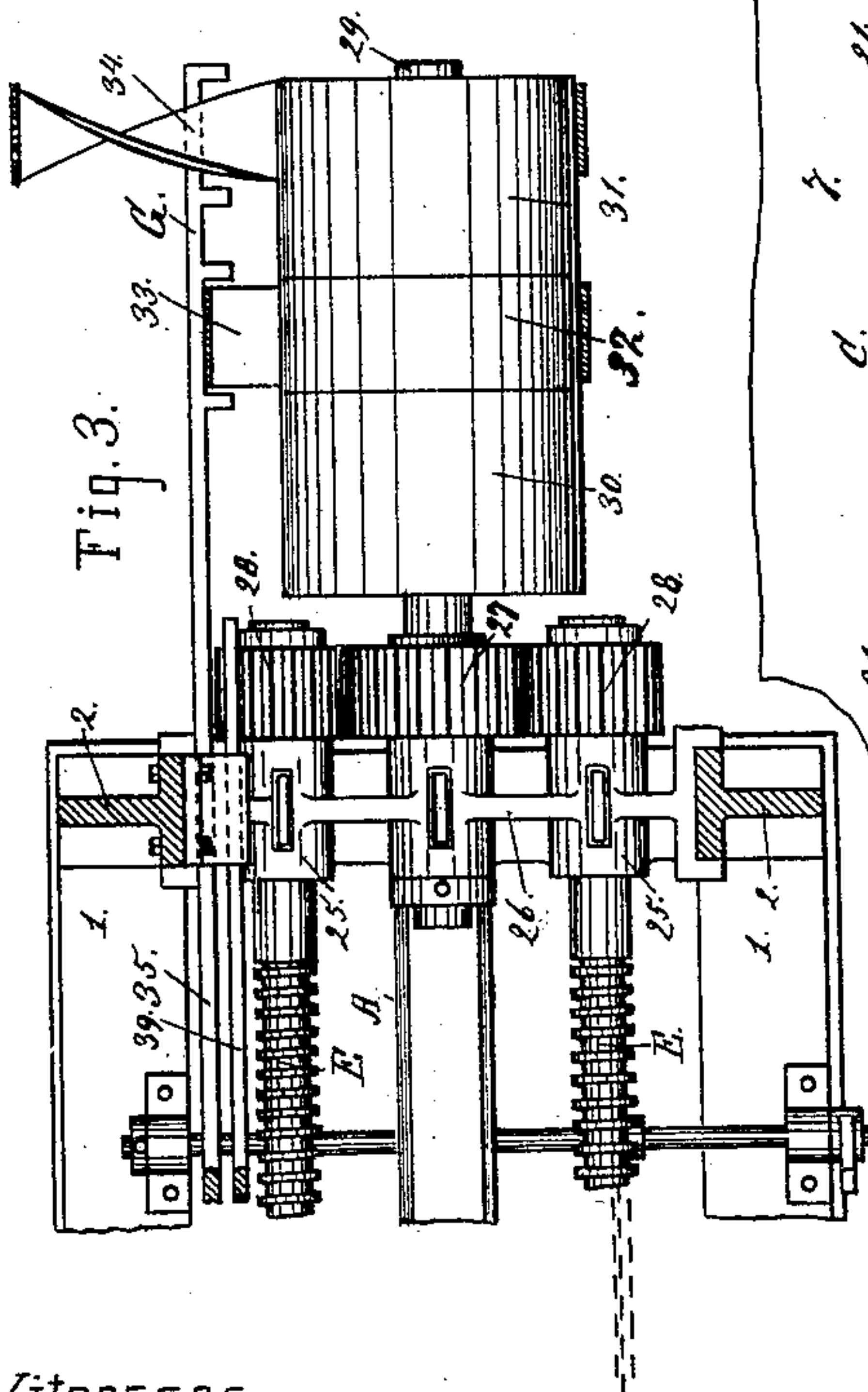


Fig. 3.

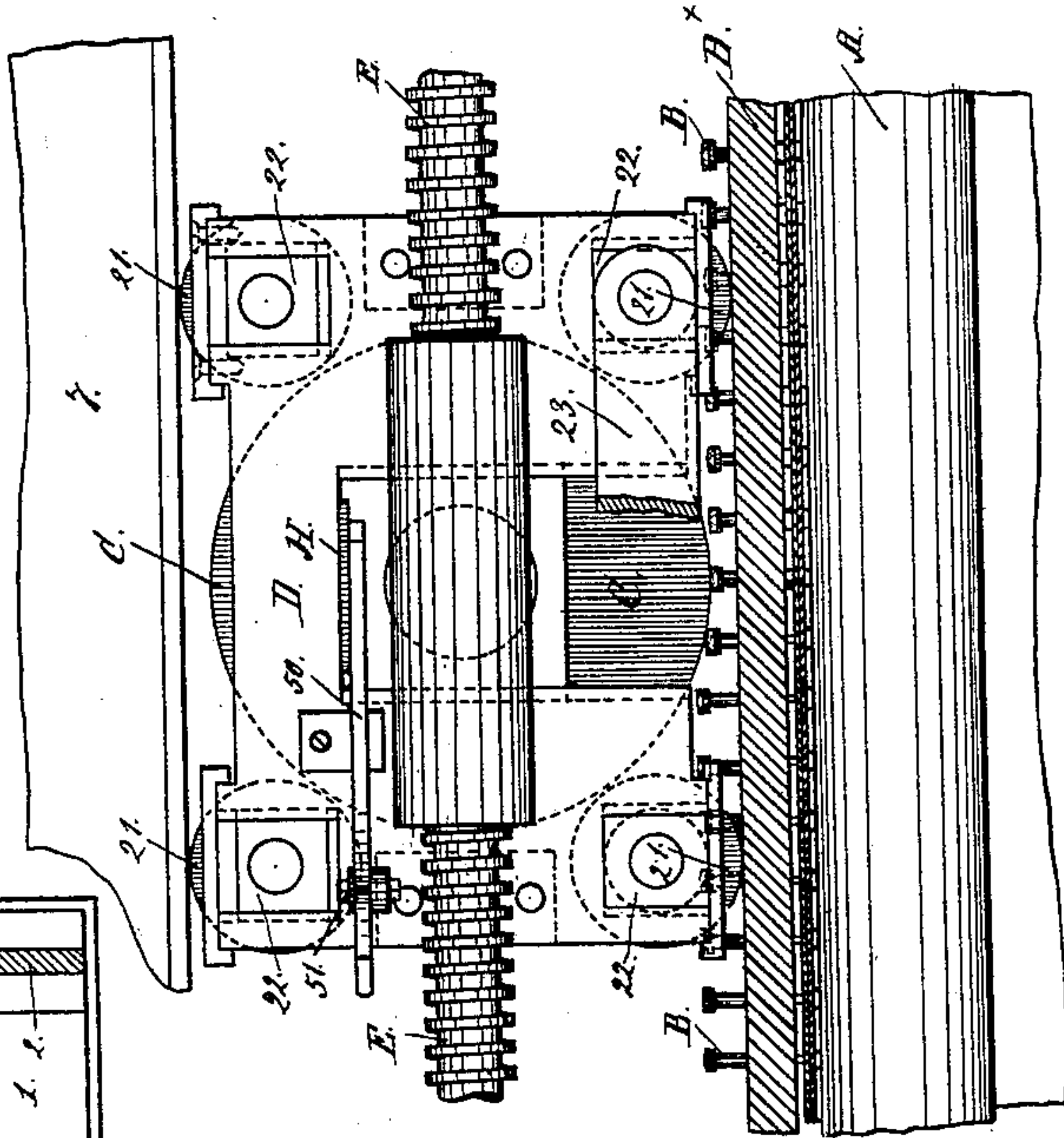


Fig. 4.

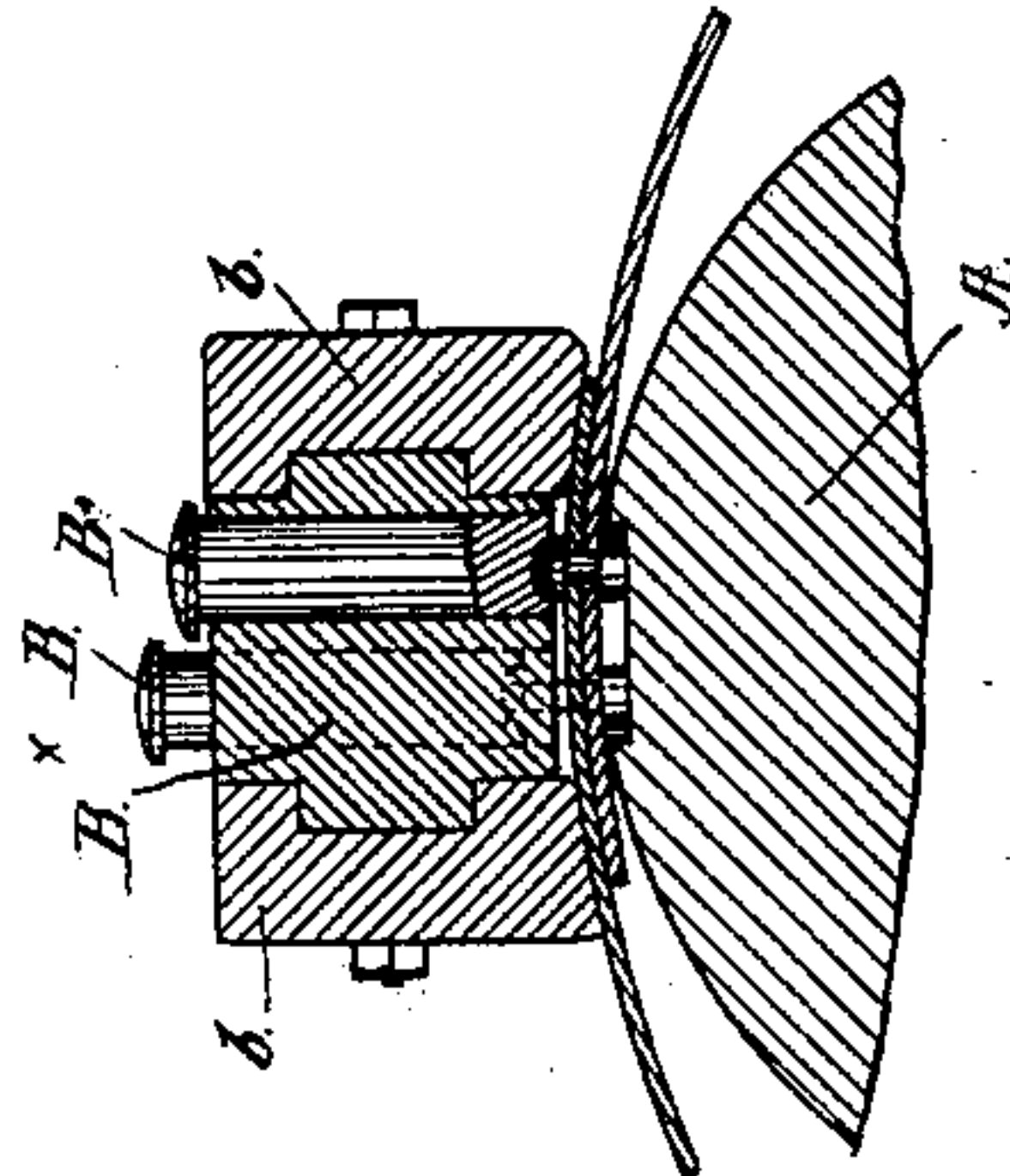


Fig. 7.

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UNITED STATES PATENT OFFICE.

WILLIAM PARDY, OF SAN FRANCISCO, CALIFORNIA, EXECUTOR OF GEORGE PARDY, DECEASED.

RIVETING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 434,677, dated August 19, 1890.

Application filed December 16, 1889. Serial No. 334,008. (No model.)

To all whom it may concern:

Be it known that GEORGE PARDY, late a citizen of the United States, residing in the city and county of San Francisco, State of California, did invent certain new and useful Improvements in Riveting-Machines, of which the following is a specification.

This invention relates to riveting-machines for all kinds of tubular work, such as sheet-metal cylinders, small boilers, and tanks, metal tubes, and piping; and it consists in certain construction and combination of stationary mandrel or support for the work, a gang of rivet-sets, and a traveling riveting-tool operating to crush and head the rivets by pressure, as hereinafter fully described, producing a machine for setting and fixing a line or lines of rivets along a seam or joint of considerable length at one operation.

The accompanying drawings, forming a part of this specification, represent an improved riveting-machine constructed according to the present invention for the special work of fixing two rows of rivets along the seams of sheet-metal piping.

Figure 1 is a side elevation, and Fig. 2 is an end view, of the machine, looking toward the left-hand side of Fig. 1. Figs. 3 to 8, inclusive, represent the principal parts and mechanisms in detail on a larger scale. Fig. 3 is a top view of the reversing-gear that operates the traveling riveting-tool. Figs. 4, 5, and 6 show the riveting-tool in side view, end view, and top view. Fig. 7 is a vertical cross-section through the stationary mandrel or work-support and the rivet-sets and holding-bar, and Fig. 8 shows the same parts in top view.

The principal parts of this machine consist of the stationary mandrel A, on which the piece of work is supported, a gang of rivet-sets B, Fig. 4, corresponding in number and arrangement to the rivets along the seam or joint of the work, and a pressure wheel or roller C, mounted in a traveling carrier D, having movement between guide-rails over the line of work and pressing upon the heads of the rivet-sets with sufficient force to crush down and head the rivets upon which the

rivet-sets act. The riveting-roller at each complete operation is moved twice over the gang of the rivet-sets, first in one direction to crush down the rivets and then back over the line again to head up and finish the end, and in connection with the roller or its carrier there is provided means to maintain suitable pressure of the roller upon the rivet-sets during such return movement. Automatic reversing-gear controls the movement of the carriage D and changes the direction of travel at the end.

The parts of the machine-frame consist of the bed 1, Fig. 1, the posts or uprights 2 2, and the cross-beams 3 3. The posts are bolted down to the bed in two rows, leaving suitable space between the rows to take in the work to be riveted, and the overhead beams joining the tops of each opposite post are fastened by stirrup-bolts 4 4 and strap-washers 5 5. Each bolt takes a half-round lug 6, cast on the inner side of the post, and the washers straddle the beam. A deep center beam 7, Fig. 2, with the top and bottom flanges, is fixed against and supported by these cross-beams longitudinally through the center space in the frame. Two other cross-beams 8 8, below the deep center beam, are fixed between the two pairs of posts at the rear end of the frame. All beams are what are called "deck-beams." The mandrel or work-support A rests at one end on the cross-beams 8 8, and is secured to them by stirrup-bolts 9 9; but the front or opposite end is supported by a swinging prop-bar 10, that is arranged to be swung back out of the way when introducing and removing the piece of work. This prop is hinged at 12, and the face of the mandrel where the prop bears against such cut-away part is cut away on a curve corresponding to the curve described by the end of the prop. The counter-balance 13 below the center of movement brings the prop into upright position when released after being turned down.

B^x, the set bar or part that holds and places the rivet-sets B B B, is a bar or plate having a number of holes for the rivet-sets and finished flat on the top, but concave on the bot-

tom. The sets B are made of hardened steel with a slight increase in diameter at the top, giving sufficient taper to prevent them from dropping through the holder when that part is raised, and each set has a concave point corresponding to the shape of the rivet-head it is intended to form. The set-bar is pivoted at *h*, Figs. 1 and 8, and is raised and lowered on this point of attachment in setting and removing the piece of work, and the bottom face of the bar is curved in cross-section to agree with the average curvature of the cylinder or piece to be riveted.

In a machine constructed for work of comparatively small diameters—say piping or tubing from six to twenty-four inches in diameter—the curvature for a fifteen-inch pipe could be taken, while for large work the bottom of the bar could be practically flat.

Steel side strips *b b*, bolted or welded on the bar *B*^x, stand above the face of the bar to take the pressure of the carriage wheels or rollers. The front end of the set-bar is suspended from the end of the weighted lever 14 by link 15, Fig. 1, the weight being adjustable on the lever to slightly overbalance and tend to raise the bar. Against the action of this weight the latch 16 holds down the end of the bar. This latch is a hook pivoted at 17 to the set-bar and projecting a short distance above the bar at the upper end, while the hook takes under a pin 18 on the side of the mandrel. A friction-plate 19, between the hook and the flattened side of the mandrel, holds the hook at any point when thrown back clear of the pin. The function of this latch is to prevent the front end of the set-bar from tipping up when the riveting-tool is pressing down on the opposite end beyond the point where the set-bar rests on the piece of work before the roller has come fairly over the seam at that end of the pipe. A tapering pin 19, projecting from the bottom of the set-bar, takes in a hole in the mandrel beneath and accurately centers the rivet-sets over the rivets in the work. In setting the piece of work it is fixed and held by a tapering pin 20 on the bottom of the set-bar, so placed that it shall take into the last hole in the line of rivet-holes from which the last rivet is omitted until the next joint of pipe is joined to it and the round seam is riveted up. At such time of operation, also, the opposite end of the joint is held in place with proper lap by slipping a ferrule or short sleeve over the shank of the last rivet in the line at that end, and this sleeve standing above the rivet enters the hole in line with it in the set-bar, and by pushing out that rivet-set draws the overlapping ends of the pipe into line. This ferrule is picked out of the hole in the set-bar before the riveting-tool reaches that point in the line of seam, and the displaced rivet-set is returned to place. The ferrule has a slight taper, in order to enter the hole easily.

The carriage of the riveting-wheel is formed of the two slabs *D*^x *D*^x, fixed at suitable distance apart to give room in the center for the small carrying-wheels 21 21 and the riveting-wheel C, or the frame of the carriage may be cast in one piece. Openings at the top and bottom are provided for axle-boxes 22 of the top and bottom carrying-wheels, and also an opening in the center of each side for the boxes of the wheel C. As these center openings tend to weaken the carriage, the strengthening-bars 23 23 are fixed across the carriage over the axle-boxes, as seen in Figs. 1 and 2. On the sides of this carriage are brass screw-nuts or boxes for the screw-shafts *E E*, that move the carriage. In this movement the upper set of wheels travel against the bottom flange of the deep center beam, and the lower wheels run on the raised side strips *b* on the rivet-set bar, which forms a track or rail for that purpose.

Journal-boxes 25 25 on the cross-bars 26 26 at each end of the machine support the screw-shafts, and motion is given to both shafts by the spur-gears 27 28 28, Fig. 3.

The driver 27 is fast on the counter-shaft 29, on which are two loose pulleys 30 31, separated by a third pulley 32, fast on the shaft. One of these loose pulleys carries a straight belt 33 and the other a cross-belt 34 from a main-line shaft, and from either one of these belts the shaft 29 is driven by shifting the belt from its carrying-pulley to the driving-pulley 32.

In connection with the belt-shifter *G* an automatic shifting mechanism is arranged to change the direction of motion by or from the movements of the carriage. This mechanism consists of the long slide-bar 35, connecting at the outer end with the belt-shifter and extending along at one side of the frame, the lever 36, pivoted at 37 on the top of the center beam, the lower end of which lever sets against the side of the bar 35, while the end above the pivot is overweighted by the weight 38. A second slide-bar 39, above and parallel with the bar 35, is moved by the carriage and acts upon the lever 36 to throw it over the center, by means of which the principal slide-bar is moved and the belt-shifter worked. The lever 36 plays between the two sets of rollers 40 41 42 43 on the slide-bars 35 39. (Seen in Fig. 1 in dotted lines, because they are behind the carriage, and in end view, Fig. 2.) Two stops 44 45, depending from the upper bar in the path of the carriage—one in front and the other behind it—move a bar 39 when struck by the carriage, and as the roller of the bar which is behind the lever moves the lever over beyond the center the weighted upper end at such time acts to throw out the lower end with force against that roller on the lower slide-bar which is in front of the lever. Thus the upper slide-bar moves the weighted lever, and that part in turn operates

to throw the shifting-lever through the medium of the lower slide-bar. The stops are so adjusted that the motion of the screw-shaft is arrested and the carriage stopped, or it is reversed and the carriage moved back to the starting-point at the end of the travel. The chain 46 holds the lever from throwing over too far. A handle 47 is provided on the front end of the slide-bar 35 for working the belt-shifter by hand.

In the operation of riveting the crushing and heading is partly done in the forward travel of the carriage and is afterward finished by the return movement, and consequently the riveting-roller requires to be set more closely down to the work in the backward travel. This is accomplished by the use of shims or plates H H, inserted between the tops of the journal-boxes of the riveting-roller and the frame of the carriage at the proper time. These prevent the riveting-wheel from rising as high as before and set it down closely against the partly-pressed-down rivet-sets.

The shims are set in and drawn out mechanically by the following-described means: The horizontally-swinging levers 50 50, pivoted at 51 51, Fig. 6, to lugs on the outer side of the carriage, have the shims H fixed on the end nearest the frame in position to enter the side openings over the journal-boxes, and their other ends are bent outward from the pivots to set in the path of depending stops 52 53, Fig. 1, that are fixed to the under side of the center beam, one in front of and the other behind the carriage. The stops are properly set to throw in the shims when the riveting-wheel drops down after passing over the last of the rivet-sets in front, previous to the return movement of the carriage, and they are drawn out immediately after the wheel returns over the first set in the rear. The bar 55 on the top of the mandrel, in line with the rivet-set bar, forms a track for the carriage after it leaves the end of the set-bar. This bar has about the same height and width as the set-bar.

In the operation of this machine the cylindrical work is tacked together by a rivet at each end to hold the piece in shape and the rivets are stuck in all along the seam, filling every hole but one at the end. The piece is then placed on the mandrel with seams and rivets properly centered, and the rivet-set bar is lowered and fastened down at the front end by the latch. The carriage is started forward by throwing the proper belt upon the driving-pulley, and by traveling over the gang of rivet-sets first forward and then back again to the starting-point the whole number of rivets along the seam are crushed down and headed.

Having thus fully described his invention, what he claims, and desires to secure by Letters Patent, is—

1. The combination of a stationary mandrel

or work-support, a gang of rivet-sets mounted in a holding-bar, which is laid over the line of rivets with a rivet-set directly upon each rivet, and a traveling pressure wheel or roller having movement along the rivet-set bar and adapted to act upon the heads of the rivet-sets with suitable pressure, as hereinbefore described.

2. In a riveting-machine, a stationary mandrel or work-support, a rivet-set bar having a gang of rivet-sets loosely mounted therein and adapted to be raised from the mandrel for inserting the piece of work and to be brought down and secured in place over the seam or joint to hold a rivet-set directly upon each rivet of the work, a traveling pressure-roller mounted in a carriage to travel along the set-bar over the heads of the rivet-sets, an overhead rail arranged above said set-bar and adapted to hold the carriage down to its work with suitable pressure, and mechanism for moving said carriage over the work between the set-bar and the overhead rail.

3. In a riveting-machine, the combination, with the stationary mandrel, of the gang of rivet-sets, the traveling carriage, pressure wheel or roller, overhead rail, screw-shafts, driving-gear, reversely-driven pulleys, driving-pulley, and belt-shifting mechanism adapted to be operated on by the carriage to control and reverse the movements thereof, as described.

4. In a riveting-machine, the stationary mandrel supported permanently at one end and at the opposite end by a swinging support arranged to be thrown clear of the mandrel to insert and remove tubular work, in combination with the removable rivet-sets mounted therein and the centering-pins in the set-bar adapted to take through the work and into the mandrel beneath.

5. The combination of the stationary mandrel or work-support, rivet-set bar, loosely-mounted rivet-sets, traveling carriage, one head-rail, pressure wheel or roller having axle-boxes movable in recesses in said carriage, and the shims or plates adapted to take in said recesses over the axle-boxes, substantially as and for the purpose described.

6. In a riveting-machine, a traveling carriage having a pressure wheel or roller mounted therein, a gang of rivet-sets mounted in a holding-bar, a stationary mandrel adapted to support the work under the rivet-sets, mechanism for moving said pressure-roller carriage back and forth along over the rivet-set bar, and means for setting down the pressure-roller against the heads of the rivet-sets in the return or backward movement of the carriage.

7. In combination with the stationary mandrel or work-support, the rivet-set bar hinged at one end, the supporting-lever to which the opposite end is attached, and the latch ar-

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ranged to hold down that end, substantially as described.

5 8. In a riveting-machine, a gang of rivet-sets mounted in a holding-bar by which they are placed and held in position on a line or lines of rivets to be crushed down and headed, in combination with a stationary work-support and a traveling riveting-tool adapted to move over said holding-bar with suitable

pressure against the heads of the rivet-sets, so substantially as described.

WILLIAM PARDY,

Executor of the estate of George Pardy, deceased.

Witnesses:

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A. M. CHARLOT.