No. 661,631. Patented Nov. 13, 1900.

R. W. BAYLEY.

MACHINE FOR SEVERING METAL RODS.

(Application filed Sept. 18, 1899.)

(No Model.) 3 Sheets—Sheet 1.

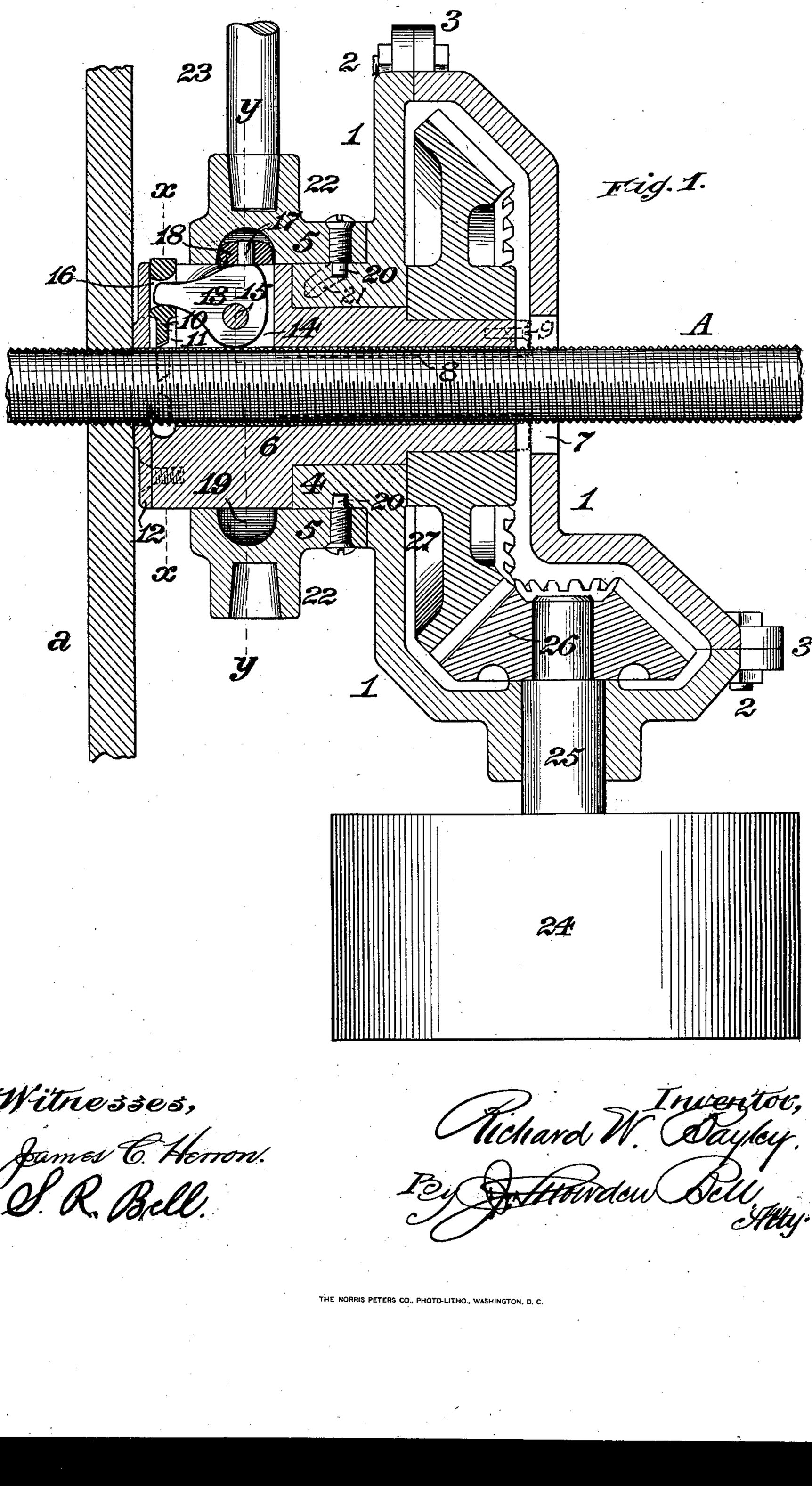

Fig. 1.

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Fig. 5.

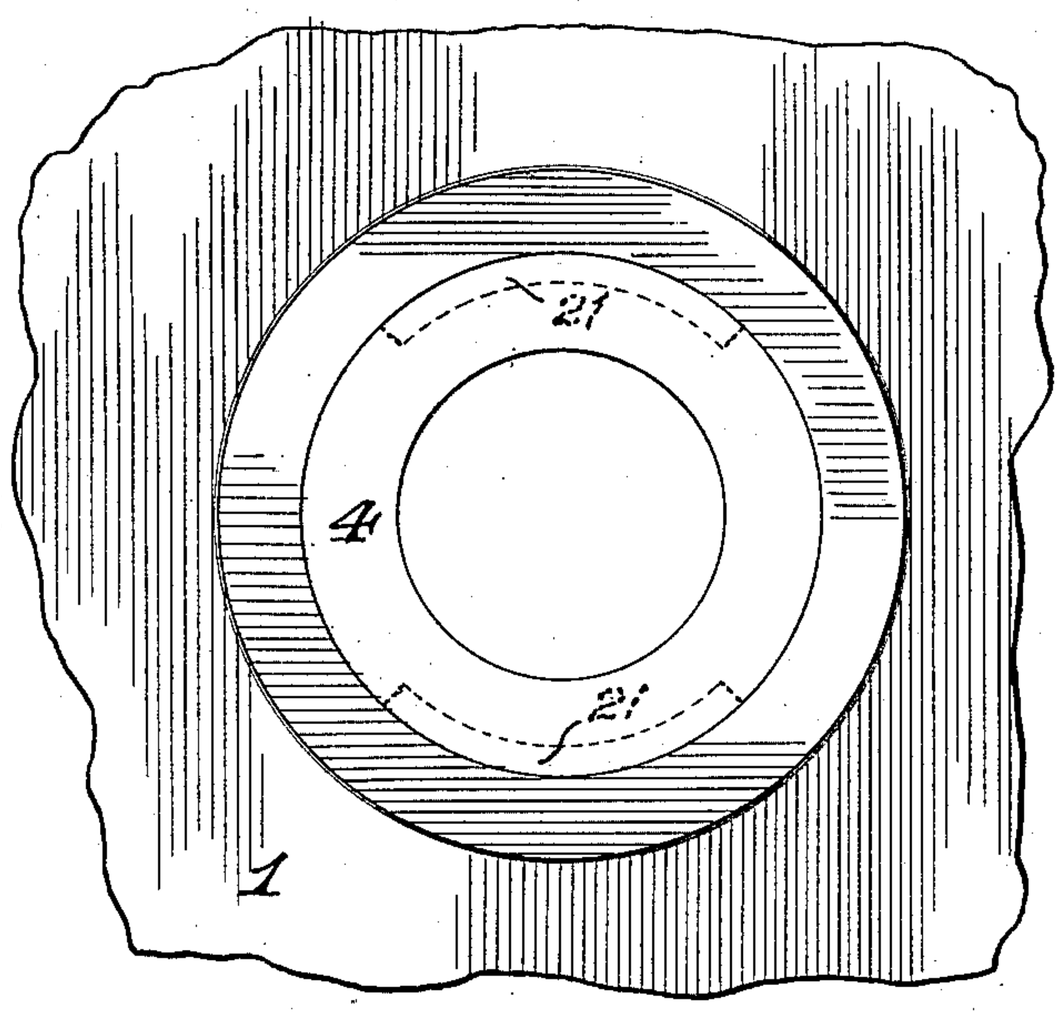


Fig. 4.

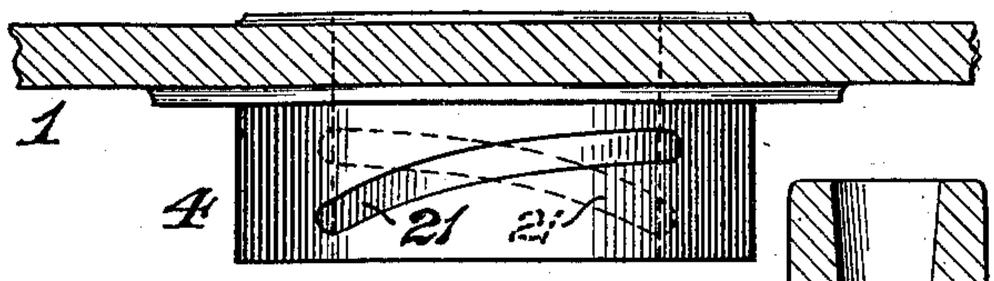


Fig. 2.

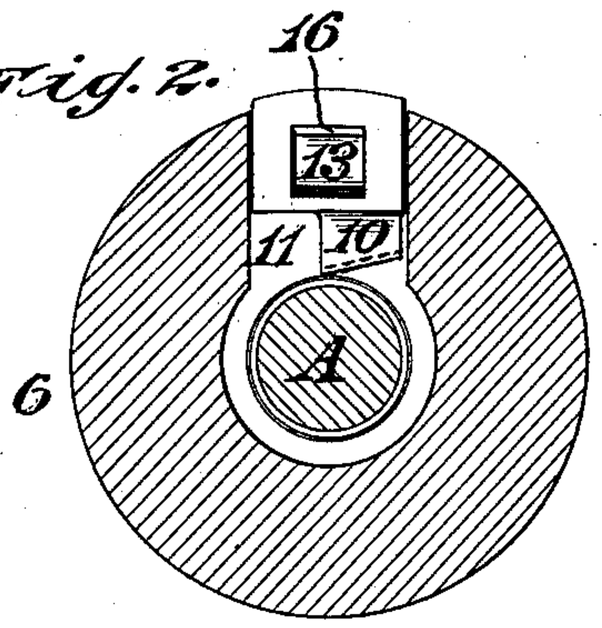
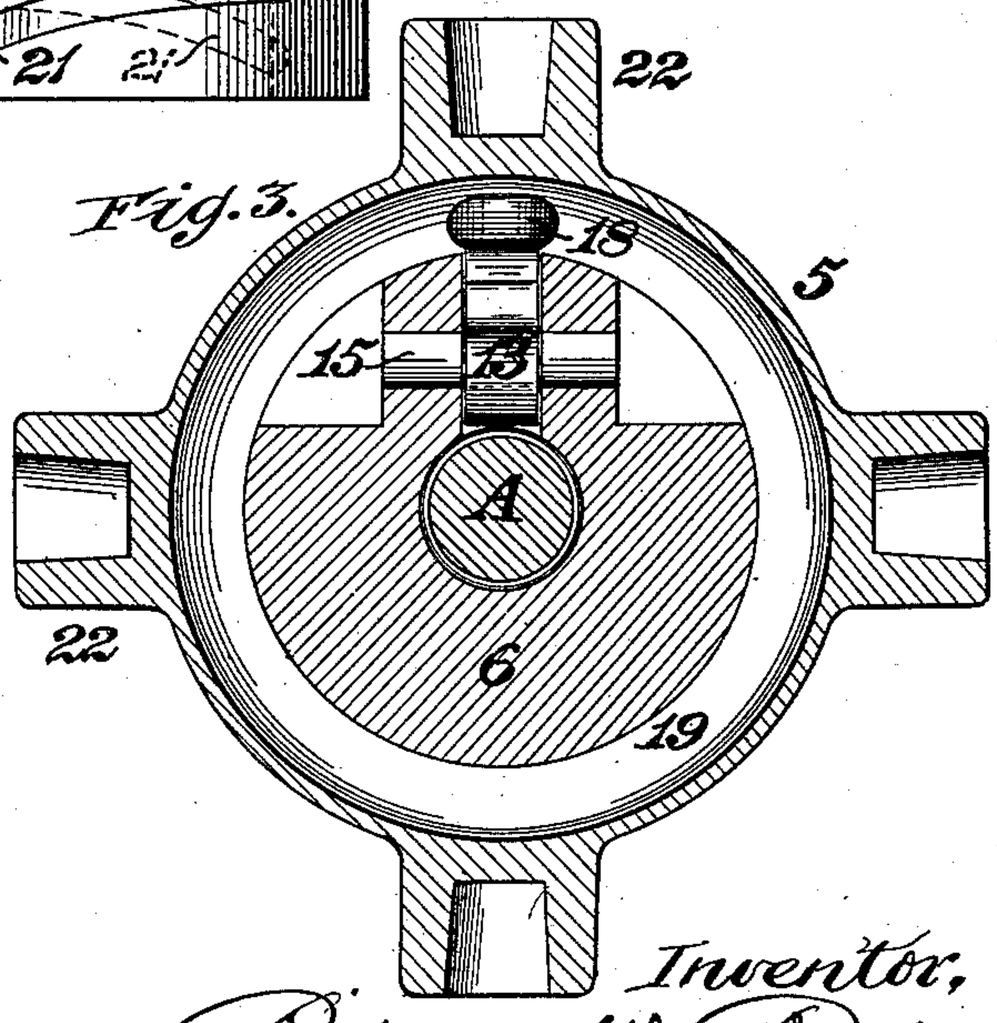


Fig. 3.



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(No Model.) 3 Sheets—Sheet 3.

Fig. 6.

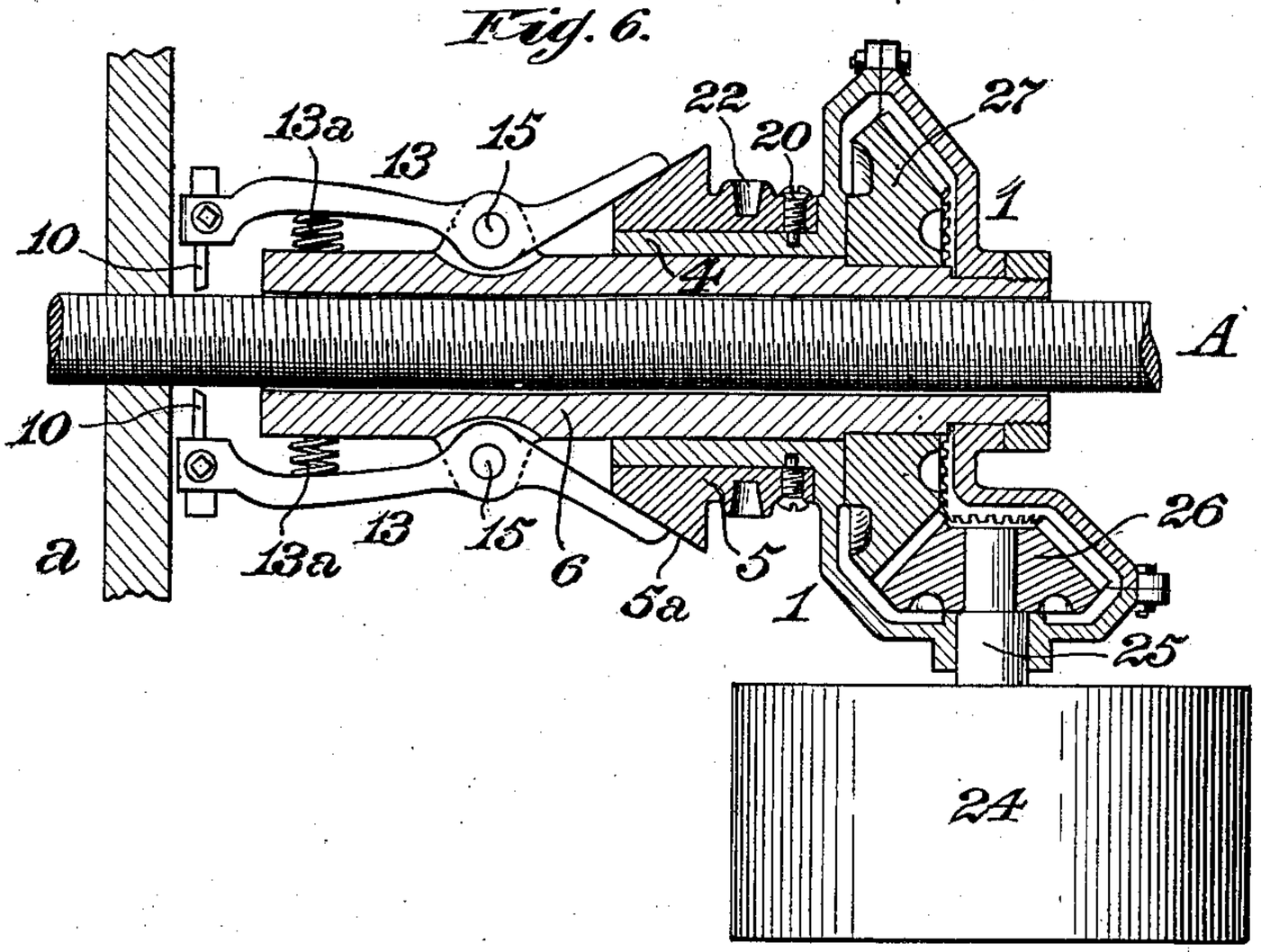
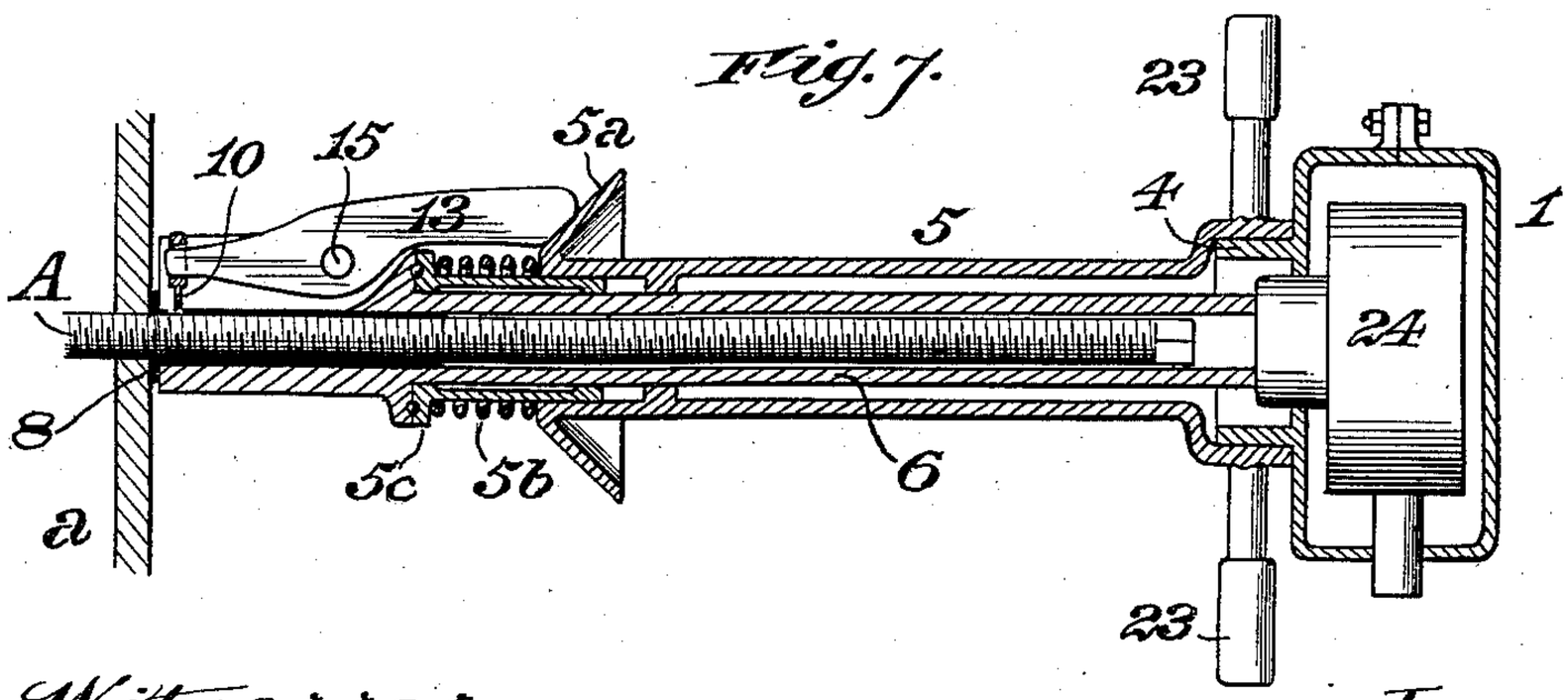


Fig. 7.



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UNITED STATES PATENT OFFICE.

RICHARD W. BAYLEY, OF CHICAGO, ILLINOIS.

MACHINE FOR SEVERING METAL RODS.

SPECIFICATION forming part of Letters Patent No. 661,631, dated November 13, 1900.

Application filed September 18, 1899. Serial No. 730,796. (No model.)

To all whom it may concern:

Be it known that I, RICHARD W. BAYLEY, of Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Machines for Severing Metal Rods, of which improvement the following is a specification.

The object of my invention is primarily and specially to provide a simple, compact, and effective mechanism by which threaded rods manufactured for use as stay-bolts in boilers, tanks, &c., may be cut apart into sections, each of proper length to engage the sheets of the structure in which it is to be employed and to provide sufficient stock for turning or riveting over at its ends, the severance of the stay-bolt rods being effected without waste other than a short remnant of the rod over and above the plurality of stay-bolts into which it is divided by the apparatus.

My invention is also designed for and adaptable for operation in severing rods of other descriptions, either threaded or plain, or for cutting tubes and pipes.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a vertical central section through a machine for severing stay-bolts, illustrating an embodiment of my invention; Figs. 2 and 3, transverse sections through the same at the lines $x\,x$ and $y\,y$, respectively, of Fig. 1; Fig. 4, a side view in elevation of the casing-bearing of the feed-sleeve; Fig. 5, an end view of the same; and Figs. 6 and 7, vertical central sections through machines, illustrating modification in structural detail of my invention.

Referring first to Figs. 1 to 5, inclusive, my invention is illustrated as applied in a mechanism for cutting off a long threaded rod A at a proper distance from the outer sheet a of a boiler or tank in which it is screwed to admit of the riveting over of the portion of the stay-bolt section left in the boiler which projects beyond the outer sheet. The rod A is formed of sufficient length to be divided into a plurality of stay-bolts, and after being cut apart the longer portion is secured in another position in the boiler to form another stay-bolt, from which the main portion of the rod A is similarly severed, and these operations are repeated until the entire length of the rod, except the short remainder, which may not be long enough to serve as a stay-bolt, is utilized.

In the practice of my invention I provide a casing or frame 1, which serves to support the working parts and inclose the gearing when gearing is employed, as is frequently desirable and as is herein exemplified. The casing 1 is parted or divided into separate sections on lines proper to admit of the insertion and removal of the supported and inclosed members, the casing-sections being connected by bolts 2, passing through lugs or flanges 3 on the sections. The casing 1 is made as light as is compatible with proper strength and is provided at one end with a tubular bearing 4, the periphery of which forms a bearing for a feed-sleeve 5 and in the bore of which a tool-carrier 6 is fitted to rotate freely. The tool-carrier 6 is tubular in form, its central bore being of such diameter as to fit neatly on the periphery of the thread of a stay-bolt rod A of the greatest diameter within the capacity of the machine, the rod A projecting through an opening 7 in one of the casing-sections. When operating on rods of less than maximum diameter, a sleeve or bushing 8, of proper thickness, which is indicated in dotted lines in Fig. 1, is interposed between the stay-bolt rod and the bore of the tool-carrier, the bushing being fixed to the latter, so as to rotate with it upon the rod A by one or more bolts 9 passing through an end flange on the bushing and screwed into the end of the tool-carrier. A cutting-tool 10 is fitted to traverse at right angles to the axial line of the tool-carrier in a recess 11, formed in the end thereof adjacent to the outer sheet a, in which the rod A which is to be severed is secured. The tool 10 is held as against longitudinal displacement and its ready removal for grinding or renewal provided for by a removable plate 12, which is secured to the end of the tool-carrier by two or more bolts. The tool 10 is connected to and moved toward and from the axial line of the tool-carrier by one of the arms of a feed-lever 13, which fits in a radial recess 14 in the tool-carrier adjacent to the tool-recess 11 and is pivotally connected to the tool-carrier by a pin 15. The feed-lever is in this instance of the form known as an "elbow-lever" or "bell-crank," one of its

arms, which projects into the recess 11, which receives the cutting-tool 10, being jointed to the latter, preferably as shown, by fitting in an opening 16 formed therein. The other arm of the lever 13 carries a pin 17, which projects into an annular groove 19 in the feed-sleeve 5, the bearing of the sides of said groove upon said pin rocking the feed-lever about the axis of its pivot 15 when longitudinal movement in either direction is imparted to the feed-sleeve. In order to reduce friction between the pin 17 and the surfaces of the groove 19, a roller 18 is preferably mounted upon the pin, the diameter of said roller being slightly less than the width of the groove. Longitudinal movement is imparted to the feed-sleeve 5 upon its bearing 4 to effect the inward traverse or feed of the cutting-tool 10 and to move the same outwardly after a cut has been made of sufficient depth to admit of the larger portion of the rod A being broken off from the shorter portion through the engagement of pins 20, fixed radially in the feed-sleeve, with cam-grooves 21 formed on the periphery of the feed-sleeve bearing 4. Peripheral sockets 22 are formed upon the feed-sleeve for the reception of a handle 23, by which the feed-sleeve may be turned on its bearing 4. It will be seen that the action of the cam-grooves 21 upon the pins 20 will move the feed-sleeve longitudinally upon its bearing toward or from the cutting-tool in accordance with the direction of rotary movement imparted to the feed-sleeve by the handle 23. Movement toward the cutting-tool rocks the feed-lever 13 in the same direction and effects the inward feed of the tool to its work, while movement in the opposite direction moves the tool toward the initial position shown in Fig. 1.

The cam-grooves 21 are preferably, as shown, made of gradually-increasing pitch, in order that the rapidity of feed may be increased proportionately as the tool advances into the work and makes its cuts on surfaces of progressively-decreasing diameters.

Rotation is imparted to the tool-carrier 6 from any suitable prime mover, preferably an independent motor 24, which may be either fluid-pressure or electric and of any suitable and preferred construction. The driving power is in this instance shown as applied through the intermediation of gearing, the motor-shaft 25 carrying a bevel-pinion 26, which engages a corresponding gear 27, fixed upon the tool-carrier. The tool-carrier may, however, be rotated directly by the motor, if preferred, a machine of such type being shown in Fig. 7, or may be driven by a belt from an appropriately-located driving or counter shaft.

The construction shown in Fig. 6 embodies the same essential features and operative principle as that above described and differs structurally therefrom merely in the employment of two cutting-tools and in the specific form of the feed-levers and contact-surfaces of the feed-sleeve. The feed-levers 13 are in this instance double-armed levers pivoted by pins 15 to the tool-carrier 6 on opposite sides of its axial line. The cutting-tools 10 are secured to the feed-levers in the ordinary manner near one of their ends, and the feed-levers bear at and near their opposite ends on a conical face 5^a, formed on the adjacent end of the feed-sleeve 5, which is fitted on a bearing 4 and moved longitudinally thereon through the engagement of pins 20 with cam-grooves on the bearing, as in the instance first described. Springs 13^a are interposed between the feed-levers and the tool-carrier to retract the cutting-tools from the work as the feed-sleeve is moved toward its initial position shown in the drawings for that purpose. The rotation of the feed-sleeve in one direction by a handle inserted in one of the sockets 22 will through the engagement of the pins 20 with cam-grooves in the bearing 4, as in the instance first described, move the feed-sleeve 5 longitudinally toward the cutting-tools, and the conical face 5^a will force the adjacent ends of the feed-levers outwardly and their opposite ends, which carry the tools, inwardly, thereby effecting the desired feed. Movement of the feed-sleeve in the opposite direction releases the bearing of the conical face 5^a upon the feed-levers, and the springs 13^a force the opposite ends of the levers outwardly, thereby retracting the tools from the work.

Fig. 7 illustrates a construction in which the tool-carrier 6 is rotated directly by the motor and the inward traverse or feed of the cutting-tool is effected through the bearing of a conical face 5^a on the feed-sleeve 5 against the adjacent end portion of a double-armed feed-lever, as in the instance last described. The pins 20 and the cam-grooves with which they engage are, however, in this instance dispensed with, and the longitudinal movement of the feed-sleeve on its bearing 4 in direction to feed the tool is effected by the application of the pressure of the hand in that direction to handles 23 on the feed-sleeve. Upon the release of pressure on the handles the feed-sleeve is returned to initial position by the spring 5^b, which is shown as interposed between the end of the feed-sleeve on which the conical face is formed and a flange 5^c on a sleeve surrounding the tool-carrier and abutting against a shoulder thereon. It will be obvious that, if desired, a retracting spring or springs could be applied at the opposite end of the feed-sleeve, so as to act between the frame or casing 1 and points of attachment on the handles 23 or on the body of the feed-sleeve. The tool-carrier and feed-sleeve are made of sufficient length to accommodate the entire length of the rod A which is to be severed in order to enable the motor to be located in line axially therewith.

My invention provides a machine-tool which is of simple and inexpensive construction and is of such form and compass as to be

conveniently and advantageously applicable in locations where work of the character for which it is suited is required to be done. It will be obvious from the exemplifications of its embodiment which are herein set forth that the structural details of my invention may be materially varied in the discretion of the constructor without departure from its governing principle and leading and essential features, and I do not therefore limit myself to the specific form in which said principle and features are herein shown and described.

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

1. In a machine-tool for severing metal, the combination of a casing or frame, a tool-carrier rotatable thereon, a cutting-tool pivotally connected to the tool-carrier, a feed-sleeve fitting and movable longitudinally and peripherally on the casing, and having a surface bearing against a member of the connections of the cutting-tool and adapted to impart movement thereto toward the axial line of the tool-carrier, helical grooves on the casing, and pins fixed to the feed-sleeve and engaging said helical grooves.

2. In a machine-tool for severing metal, the combination of a casing or frame, a tool-carrier rotatable thereon, a cutting-tool pivotally connected to the tool-carrier, a feed-sleeve fitting and movable longitudinally and peripherally on the casing, and having a surface bearing against a member of the connections of the cutting-tool and adapted to impart movement thereto toward the axial line of the tool-carrier, helical grooves, of progressively-increasing pitch, on the casing, and pins fixed to the feed-sleeve and engaging said helical grooves.

3. In a machine for severing metal, the combination of a casing or frame, a tubular bearing projecting therefrom, a tool-carrier rotatable in said bearing and having a central bore for the admission of the metal to be severed, a cutting-tool fitted to traverse in an end recess of the tool-carrier toward and from the axial line thereof, a feed-lever of bell-crank form, pivoted in a recess of the tool-carrier and having one of its arms connected with the cutting-tool, and a feed-sleeve fitting and movable longitudinally on the tubular bearing of the casing, and having an annular groove within which the other arm of the feed-lever is free to rotate and which provides a bearing-surface whereby the feed-lever may be moved about its pivotal axis by longitudinal movement of the feed-sleeve to effect the inward traverse or feed of the cutting-tool.

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