

Sept. 4, 1928

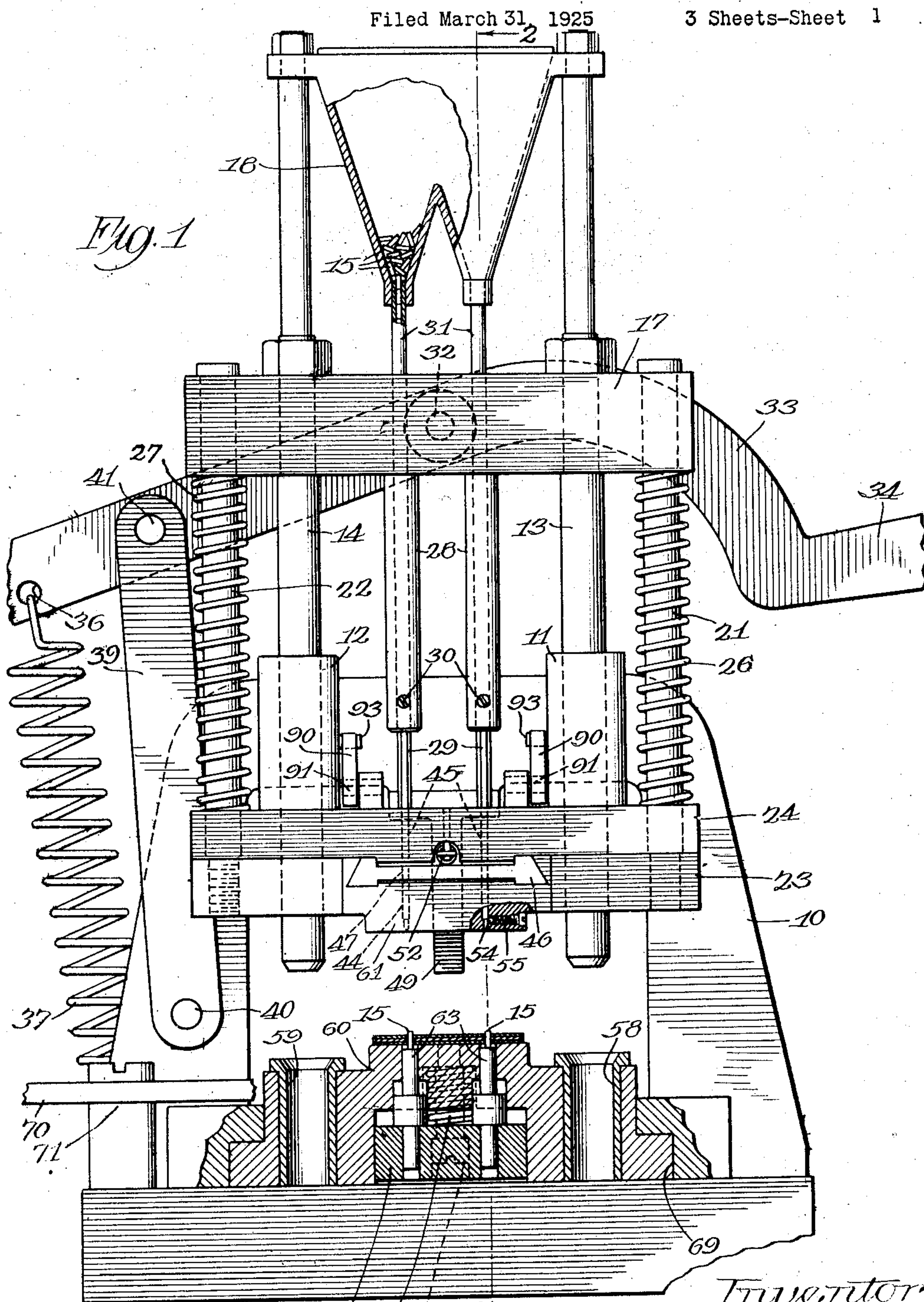
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E. N. JORGENSEN

MATERIAL WORKING MECHANISM

Filed March 31, 1925

3 Sheets-Sheet 1



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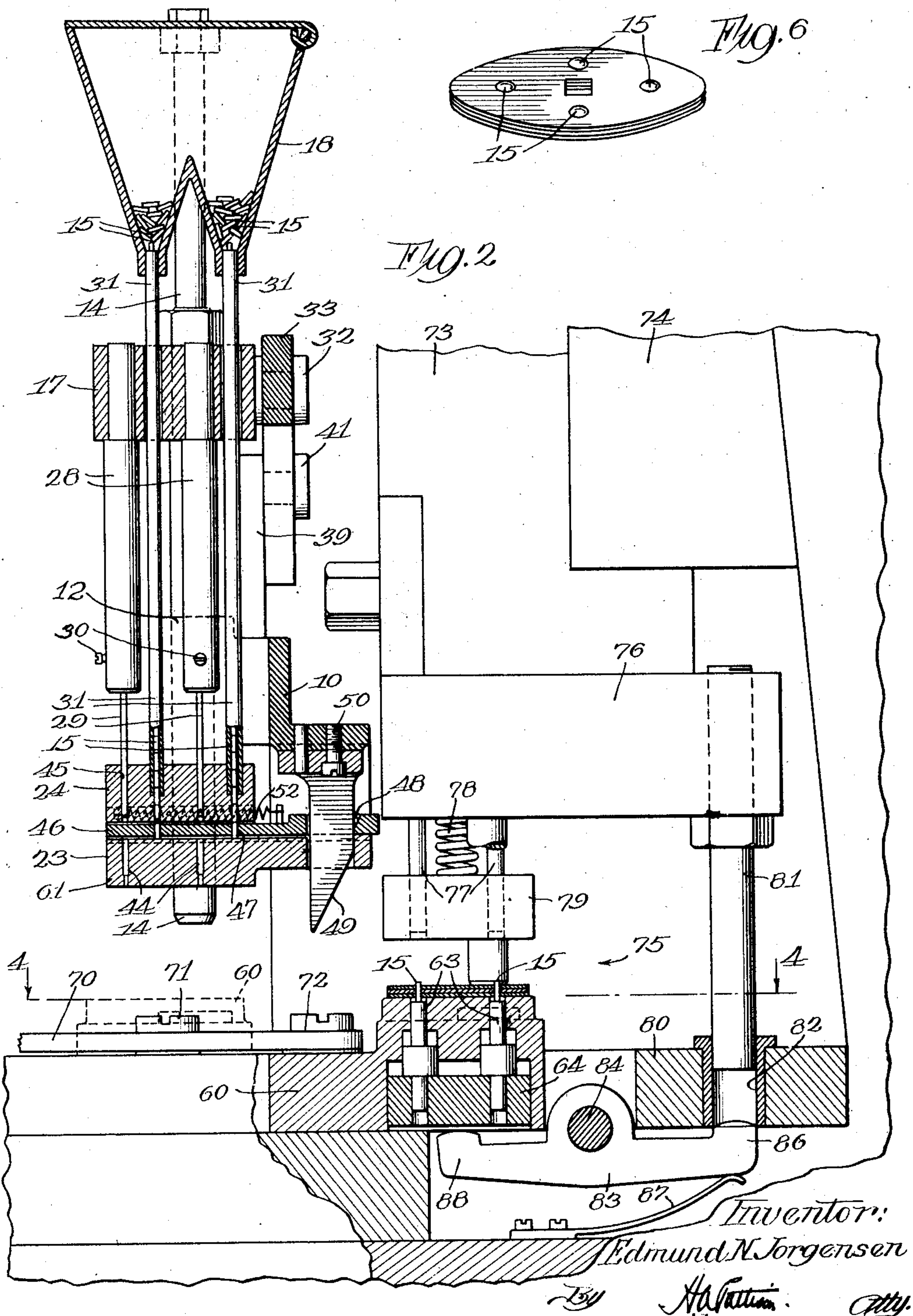
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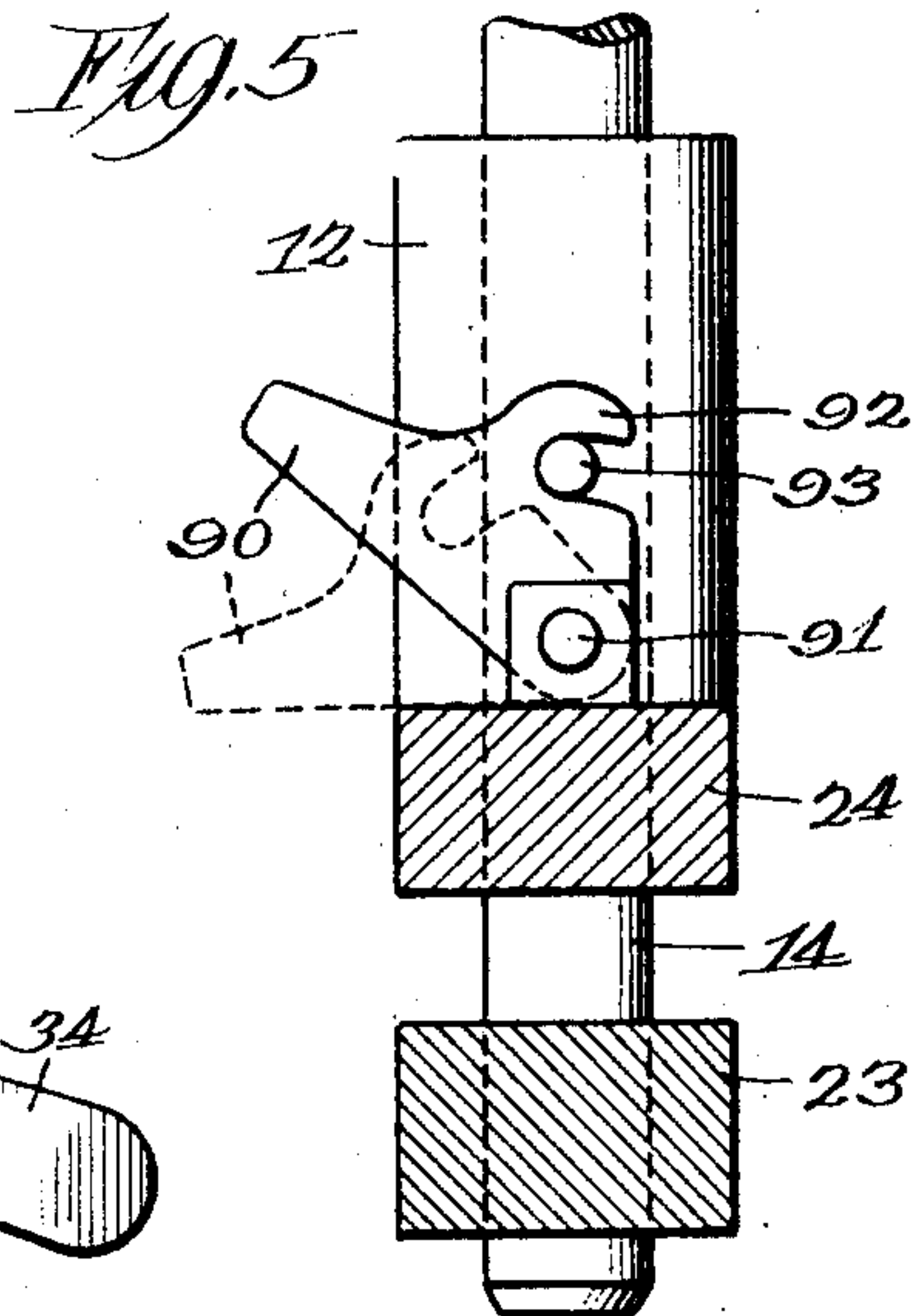
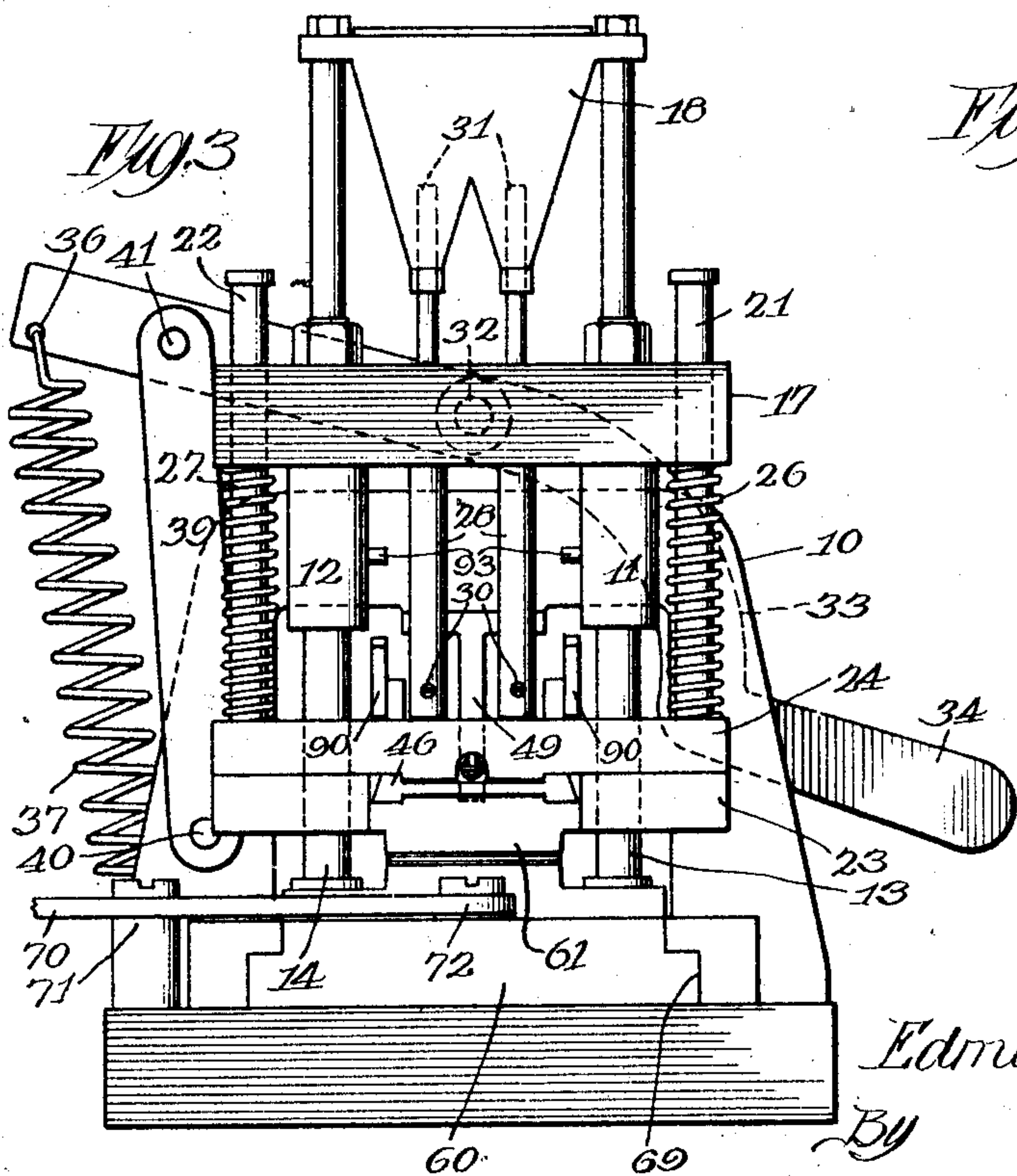
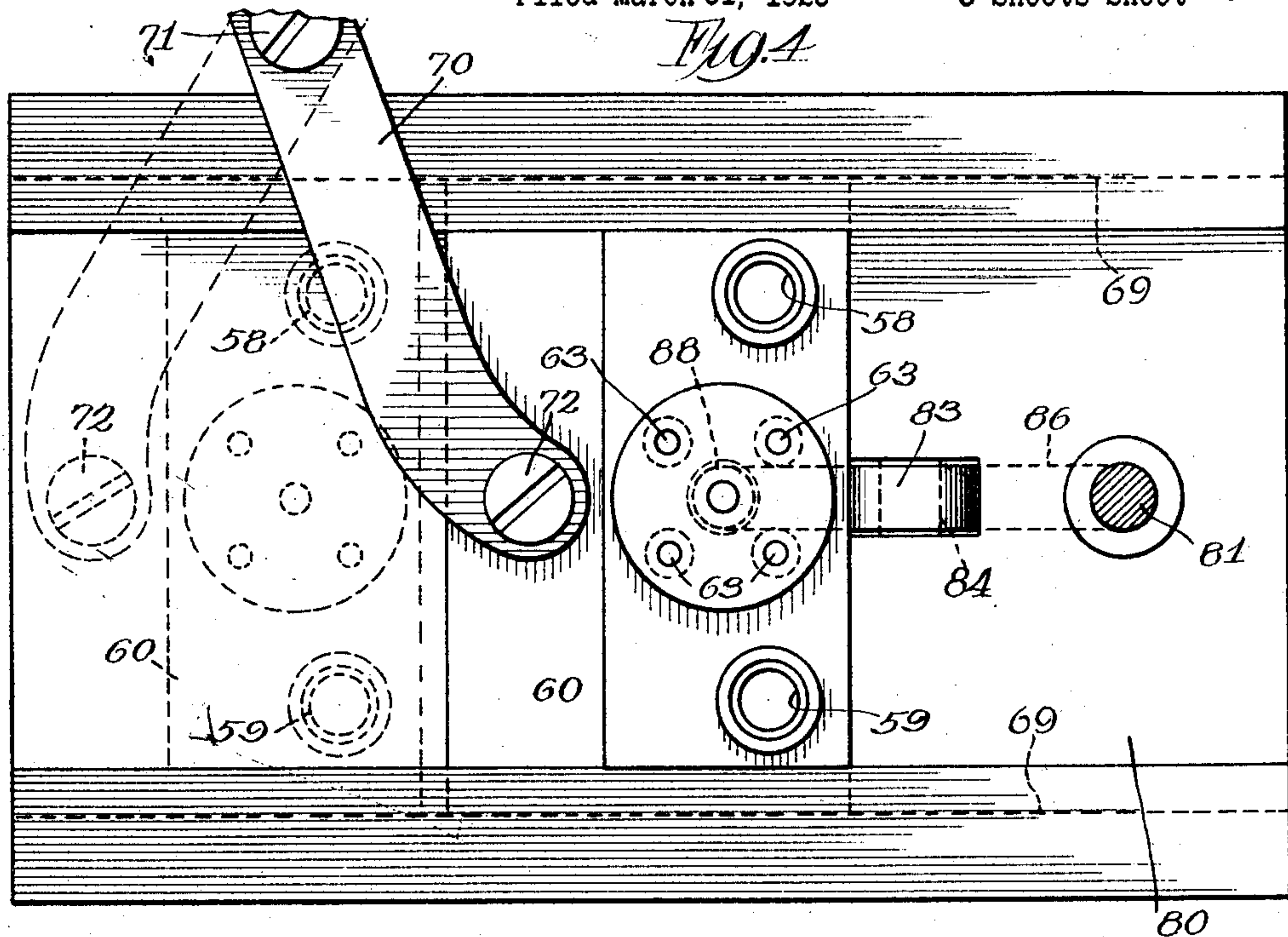
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MATERIAL WORKING MECHANISM

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE.

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MATERIAL-WORKING MECHANISM.

Application filed March 31, 1925. Serial No. 19,672.

This invention relates to material working mechanisms; and more particularly to a mechanism for feeding rivet blanks to and positioning them in material at a riveting position.

The object of the invention is to provide an improved mechanism for rapidly and accurately feeding blanks to and positioning them at a working position.

In accordance with the main features of the invention a plurality of open end tubes, positioned vertically within a vertically reciprocating hopper containing promiscuously arranged headless rivet blanks, serve to collect therein columns of uniformly arranged blanks and position them in predetermined numbers in a plate which transfers them to a working position. The blanks are then removed from the plate and inserted in the positioned work by a plurality of reciprocating plungers after which simultaneously operating punches form uniform heads on the ends of the blanks. Access to the feed tubes, should they become clogged by misshapen rivets, is afforded by latchable separating means.

Other advantages and features will become apparent in the following detailed description taken in connection with the accompanying drawings, in which

Fig. 1 is a front view, partially in section, of the mechanism embodying the invention;

Fig. 2 is a section taken on the line 2—2 of Fig. 1 looking in the direction indicated by the arrows;

Fig. 3 is a reduced front view of the mechanism embodying the invention shown at the completion of an operation;

Fig. 4 is a section taken on the line 4—4 of Fig. 2 looking in the direction indicated by the arrows;

Fig. 5 is an enlarged detail section taken on the line 5—5 of Fig. 1 showing the latchable separating means; and

Fig. 6 is a perspective view of the riveted article.

In the drawings in which like reference numerals designate like parts throughout the several views, 10 denotes a frame on which are formed bearings 11 and 12 in which liner pins 13 and 14 are slidably mounted. A crosshead 17 is mounted on shouldered portions of the liner pins 13 and 14 and on the top of the pins a hopper 18 is

mounted. Loosely mounted on opposite ends of the crosshead 17 and parallel to the liner pins 13 and 14 are two rods 21 and 22, and their lower ends are threaded to support a lower cross member 23. Resting on the cross member 23 and mounted on the rods 21 and 22 is an upper cross member 24 which is held in close relation with the lower cross member 23 by springs 26 and 27. Mounted in the crosshead 17 are four members 28 which hold insertion plungers 29 fastened in the members 28 by set screws 30.

Feed tubes 31, four in number, have their lower ends fastened in the cross member 24 and the upper ends are slidably mounted in the bottoms of funnel shaped compartments of the hopper 18. Pivotaly secured at 32 to the crosshead 17 is a hand lever 33 at one end of which is shaped a handle 34 and near the opposite end is a hole 36 in which is fastened one end of a tension spring 37 which is fastened to the frame 10. A link 39 is pivotaly fastened to the frame 10 at 40 and also to the hand lever 33 at 41. The tension spring 37 serves to hold the handle 34 of the lever 33 in a raised position and thereby support the crosshead 17 which in turn supports the hopper 18 and other attached mechanism. It is obvious that when the handle 34 is pulled downwardly the entire apparatus, with the exception of the frame 10, descends with it. A feed plate 46 is slidably mounted in the lower cross member 23, and holes 47 therein admit rivet blanks 15 from the feed tubes 31. Holes 44 and 45 located in the lower and upper cross members 23 and 24, respectively, and in alignment with insertion plungers 29 serve to guide the plungers. One end of the feed plate 46 is provided with a slot 48 one end of which engages a cam 49 secured to the frame 10 by screws 50 (Fig. 2). The blanks 15 rest in the holes 47 of the feed plate 46 and when the handle 34 of the lever 33 is pulled downwardly a tension spring 52 causes one end of the slot 48 of the feed plate to follow the surface of the cam 49 thereby sliding the feed plate 46 outwardly until the holes 47 are in alignment with the holes 44 and 45 permitting the blanks 15 to drop through to the lower part of the guide holes 44 where steel balls 54 backed by springs 55 (Fig. 1) hold the blanks until the plungers 29 insert them in the material to be riveted. The

liner pins 13 and 14 engage holes 58 and 59 in a die block 60, thereby assuring perfect alignment of the insertion plungers with holes in the parts to be riveted which are positioned upon the die block.

When the handle 34 of the lever 33 is pulled (Fig. 3) downwardly a pad 61 formed on the under side of the cross member 23 engages the top surface of the material or parts to be riveted and a continued pressure exerted on the hand lever will cause the cross head 17, which carries the members 23, to slide on the rods 21 and 22 compressing the springs 26 and 27, clamping the material firmly while the insertion plungers 29 continue to travel downwardly and drive the rivets 15 from their positions in the guide holes 44 into the holes in the material. It will be noted that when the crosshead 17 descends it carries the hopper 18 downwardly over the upper ends of the feed tubes 31, thus aiding in guiding and positioning the rivets 15 in the feed tubes.

The die block 60 on which the work is located includes hammers 63 which are fastened in a cylindrical block 64 which is capable of a slight vertical movement. The block 64 is actuated downwardly (Fig. 1) by a compression spring 65 and this motion is limited by a headed stop screw 66.

The die block 60 is slidably mounted in a groove 69 in the frame 10 (Fig. 4). A hand lever 70 is pivotally mounted on the frame 10 at 71 and secured to the die block at 72 so that a movement of this hand lever will slide the die block 60 in the groove 69.

Located directly behind the feeding mechanism, just described, is a riveting mechanism indicated in general by the numeral 75. A ram 73 slidable in guides 74 supports a head 76 which carries hammers 77 and a spring 78 that supports a pad 79. The ram 73 may be driven in any suitable manner (not shown) such as that followed in the usual punch presses. A downward stroke of the head 76 brings the pad 79 in contact with the top of the work compressing the spring 78 and causing the hammers 77 to strike the upper ends of the blanks. Since the blanks used are headless, a blow must be struck at each end at the same time to produce a uniform head on each end of the rivet. The head 76 carries a ram 81 which enters a hole 82 in a frame 80. A member 83 is pivotally mounted intermediate its ends on the shaft 84 mounted in the frame 80. One end 86 of the member 83 is in alignment with the end of the ram 81 and is supported by a leaf spring 87 while another portion 88 of the member 83 is adapted to engage the underside of the cylindrical block 64 when the die block 60 is in position under the riveting hammers 77.

At the same time that the head 76 descends and the hammers 77 strike the upper

ends of the blanks 15 the ram 81 strikes the end 86 of the member 83 forcing it downwardly and the end 88 upwardly, thereby moving the cylindrical block 64 upwardly and causing the hammers 63 to strike the lower ends of the blanks with blows similar to and simultaneously with the blows given to the upper ends of the blanks by the hammers 77.

A pair of latching means 90 are pivotally mounted at 91 to the upper cross members 24 (Fig. 5). Hooked portions 92 are adapted to engage pins 93 which are mounted in the bearings 11 and 12 of the frame 10. Should the feed mechanism become clogged at any time the latches 90 and pins 93 are engaged and the handle 34 of the hand lever 33 drawn downwardly, thereby compressing the springs 26 and 27 and causing the two members 23 and 24 to separate thus rendering the lower ends of the tubes as well as the transfer plate accessible for the removal of the clogging cause.

In the operation of the mechanism the materials or parts to be riveted are placed on the die block 60, the hopper 18 having been filled with rivet blanks 15 which are guided into the feed tubes 31 by the funnel shaped compartments formed in the hopper 18. The blanks slide down the feed tubes 31 until the bottom blanks in each column rest in the holes 47 in the feed plate 46. To operate the mechanism the handle 34 of the lever 33 is drawn downwardly, resisted by the tension spring 37, the entire apparatus moves downwardly with the exception of the frame 10 and the bearings 11 and 12 in which the liner pins 13 and 14 are slidably mounted. The liner pins enter holes 58 and 59 and when the pad 61 has engaged the top surface of the work a continued movement of the handle 34 compresses the springs 26 and 27 tightly clamping the work and forcing the punches 29 through the holes 45 in the upper cross member 24. The tension spring 52 and the cam 49 cause the feed plate 46 to slide outwardly and bring the holes 44, 45 and 47 in direct alignment so that the punch 29 can go through and drive the blanks 15 out of the lower half cross member 23, in which they are held by the balls 54 and springs 55, and insert them in holes in the material or parts to be riveted. The hand lever 70 is then used to slide the die block 60 under the riveting mechanism by way of the groove 69 (Fig. 4). The riveting machine 75 then actuates and the hammers 77 and 63 therein form heads upon the ends of the blanks to rivet the materials or parts as hereinbefore described.

Although the mechanism is particularly adapted for riveting the laminations of composite disk or plate members as shown in Fig. 6 which may be used as electrical contact members in telephone exchange equip-

ment it is to be understood that the mechanism may be used for other operations than riveting and for producing a variety of articles. Therefore the invention is limited only by the scope of the appended claims.

What is claimed is:

1. In a material working mechanism, a tube for delivering blanks to be worked, a blank positioning member carrying said tube, means for transferring one blank at a time from the tube to an opening in the blank positioning member, means for moving the blank positioning member to its operative position, means for causing the transferring means to operate when the blank positioning member is moved to its operative position, thereby transferring a blank to the positioning member, and means for moving the blank from the opening in the blank positioning member to the work.

2. In a material working mechanism, a tube for delivering blanks to be worked, a blank positioning member carrying said tube, means for transferring one blank at a time from the tube to an opening in the positioning member, means for moving the positioning member to its operative position, a cam for controlling the operation of the transferring means when the positioning member is moved to its operative position for transferring a blank to the positioning member, means to force the blank from the positioning member into position, and means to retain the blank in the positioning member until said last mentioned means becomes effective.

3. In a material working mechanism, a container for blanks, a feed tube for guiding blanks therefrom, means for supporting one end of the tube and having an opening therein to receive blanks discharged from the tube, means for limiting the movement of the discharged blanks, and latchable means for separating and maintaining separated the supporting and limiting means to provide

access to the opening in the supporting means.

4. In a material working mechanism, a container for blanks, a feed tube for guiding blanks therefrom, means for supporting one end of the tube and having an opening therein for receiving blanks discharged from the tube, transfer means having an opening therein adapted to register with the opening in the supporting means to receive a discharged blank, means for limiting the movement of the discharged blanks through the supporting and transferring means, and means for separating the supporting and limiting means to provide access to the openings in the transfer and supporting means.

5. In a material working mechanism, a container for blanks, a feed tube for guiding blanks therefrom, means for supporting one end of the tube and having an opening therein for receiving blanks discharged from the tube, transfer means having an opening therein adapted to register with the opening in the supporting means, means for limiting the movement of the discharged blanks through the supporting and transferring means, and latchable means for separating and maintaining separated the supporting and limiting means to provide access to the openings in the transfer and supporting means.

6. In a material working mechanism, a work support, vertically reciprocating means for positioning blanks in work carried by the work support, including a tube for supplying blanks and a horizontally reciprocating member for removing one blank at a time from the tube to an opening in the positioning member, and means for expelling the blanks from the positioning means and placing them in the work.

In witness whereof, I hereunto subscribe my name this 18th day of March A. D., 1925.

EDMUND NIELS JORGENSEN.