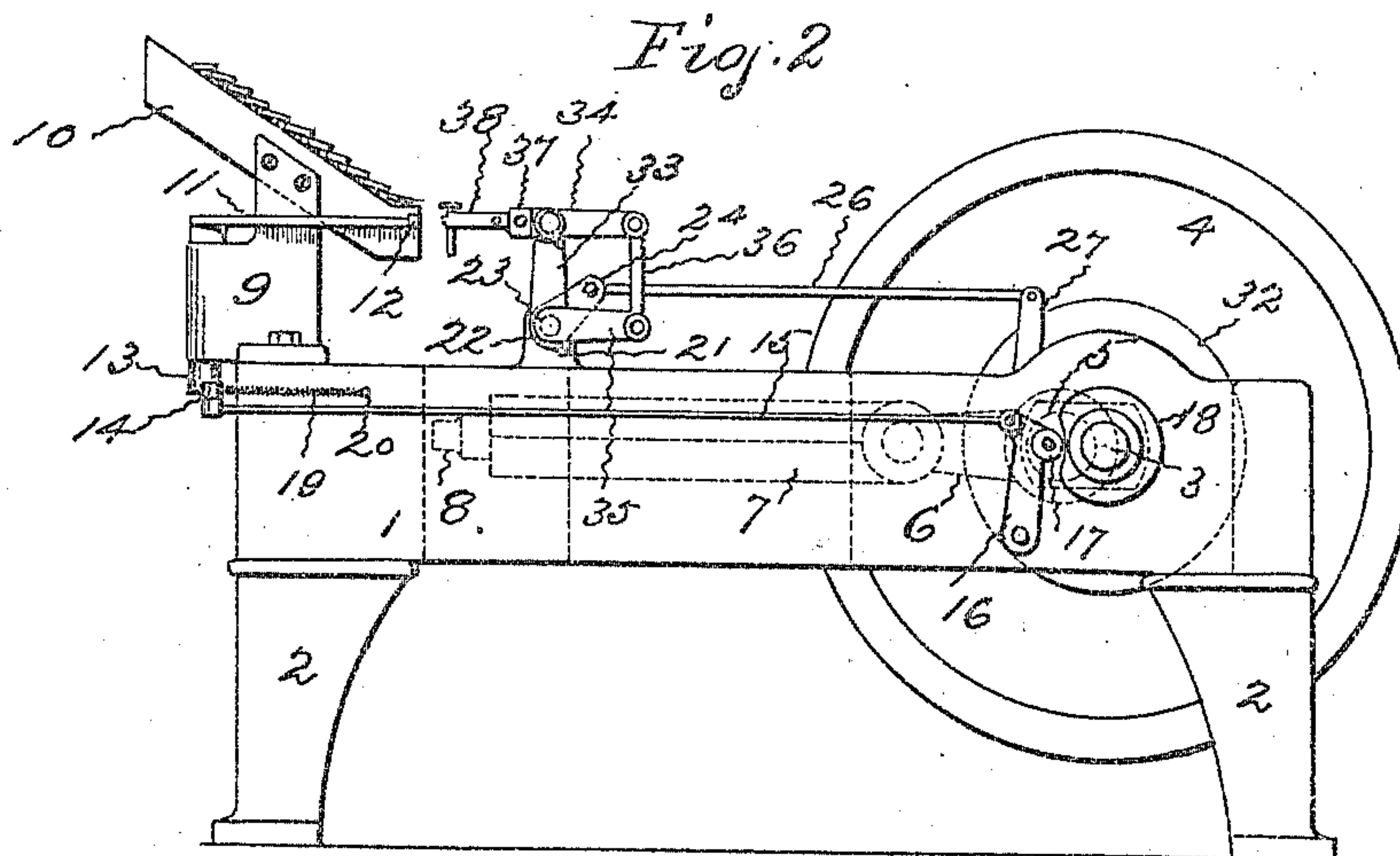
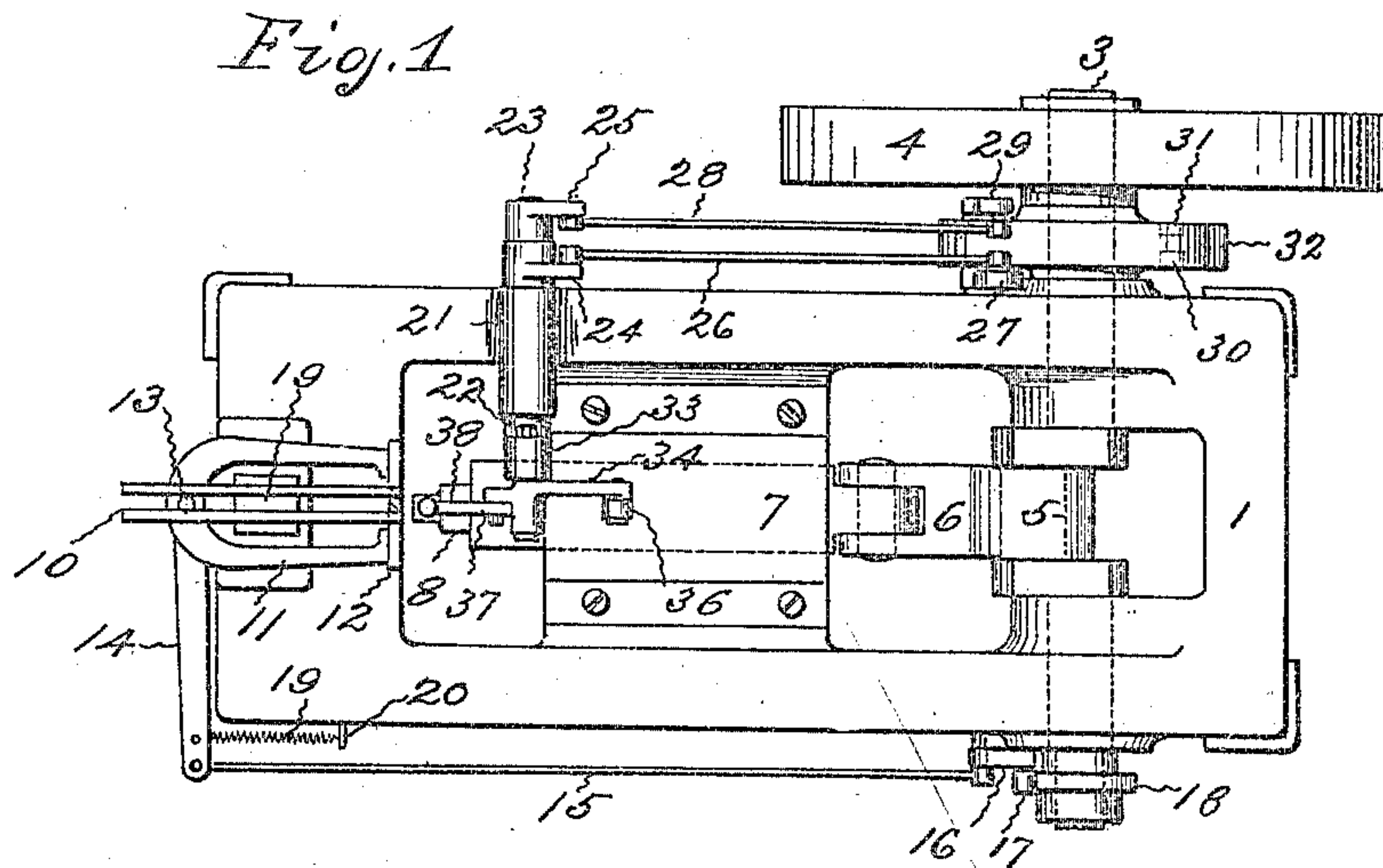


A. C. CAMPBELL.  
 BLANK FEED FOR METAL HEADING, PUNCHING, AND TRIMMING MACHINES.  
 APPLICATION FILED APR. 28, 1909.

959,455.

Patented May 31, 1910.

3 SHEETS—SHEET 1.



WITNESSES:

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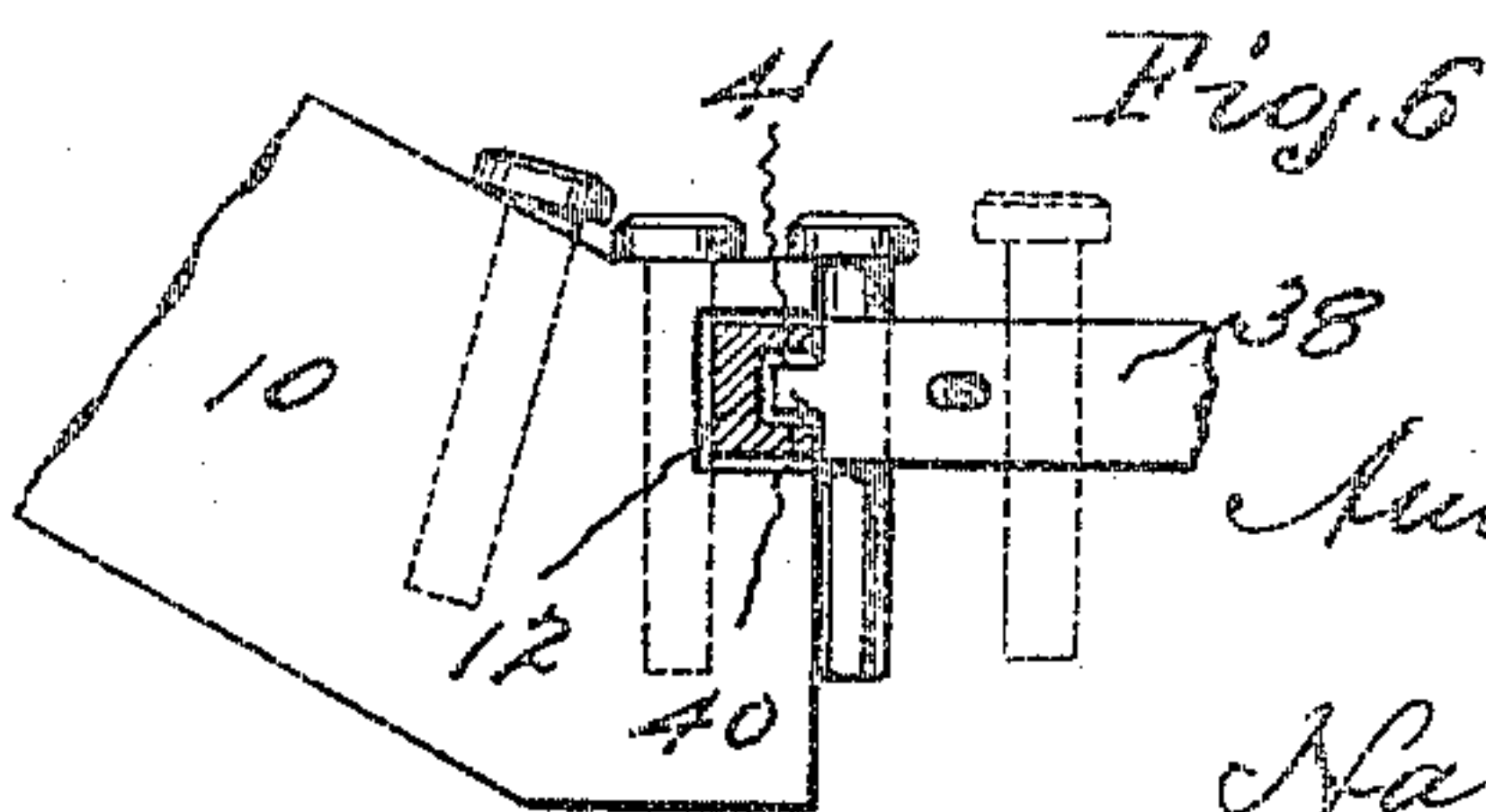
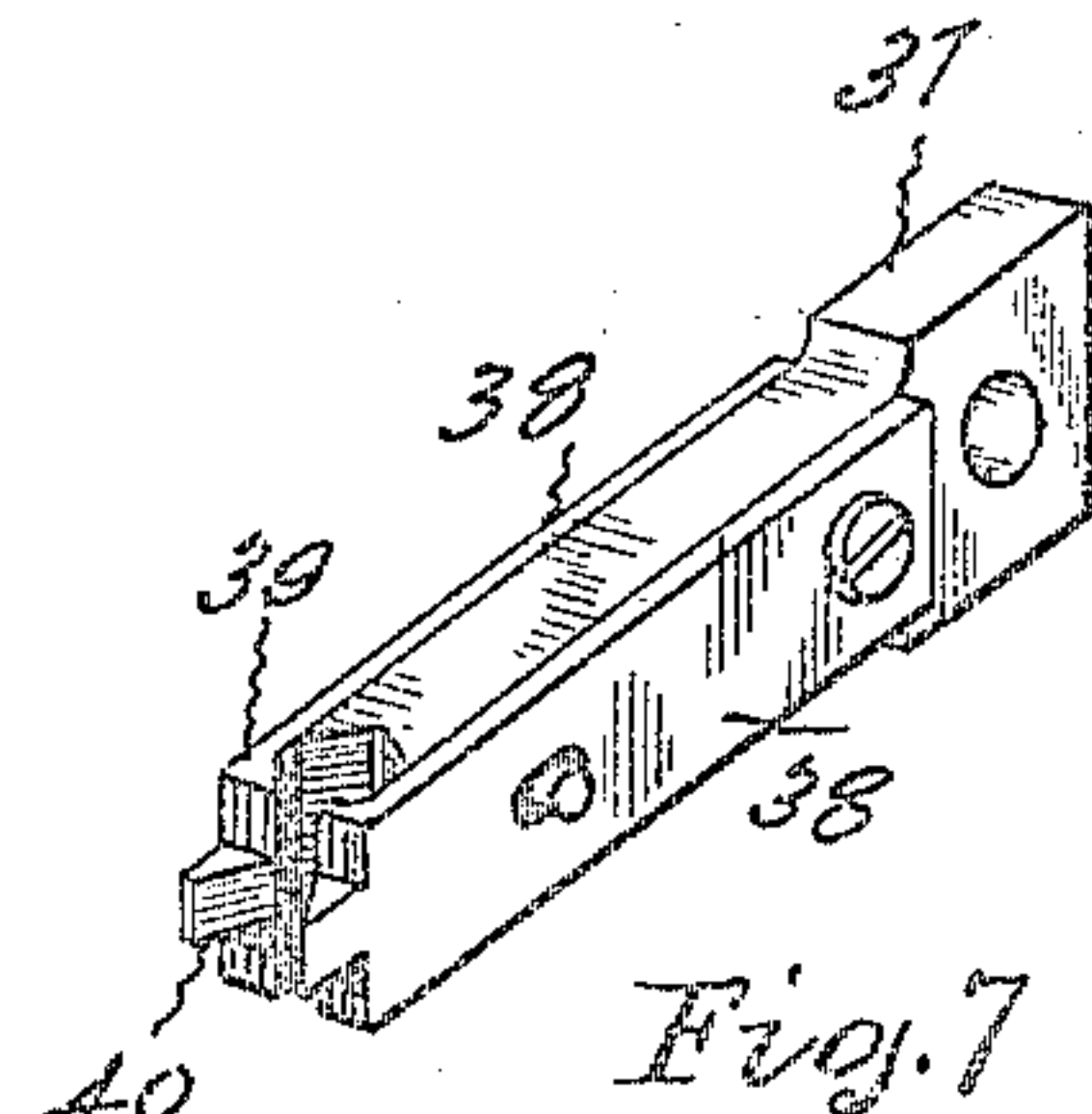
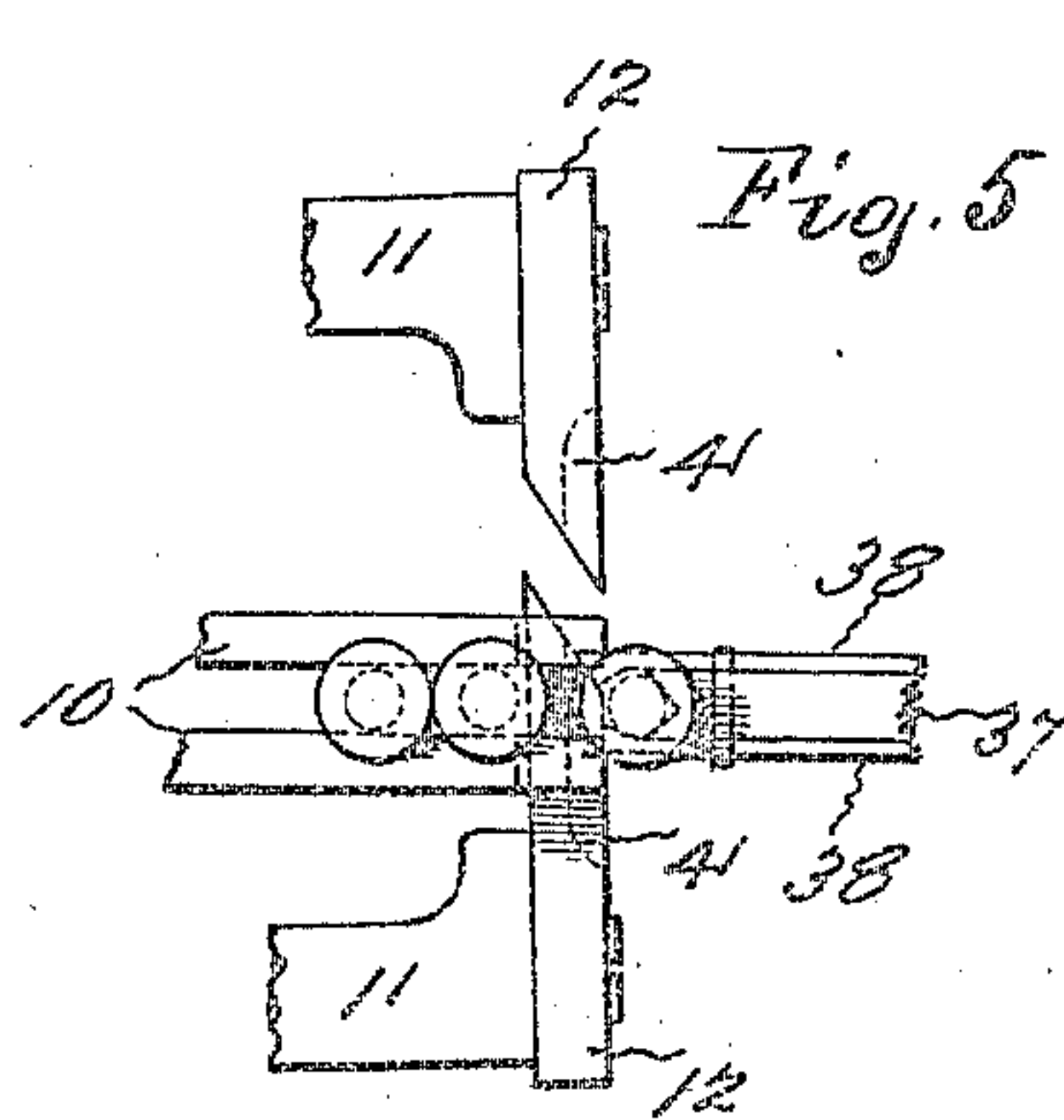
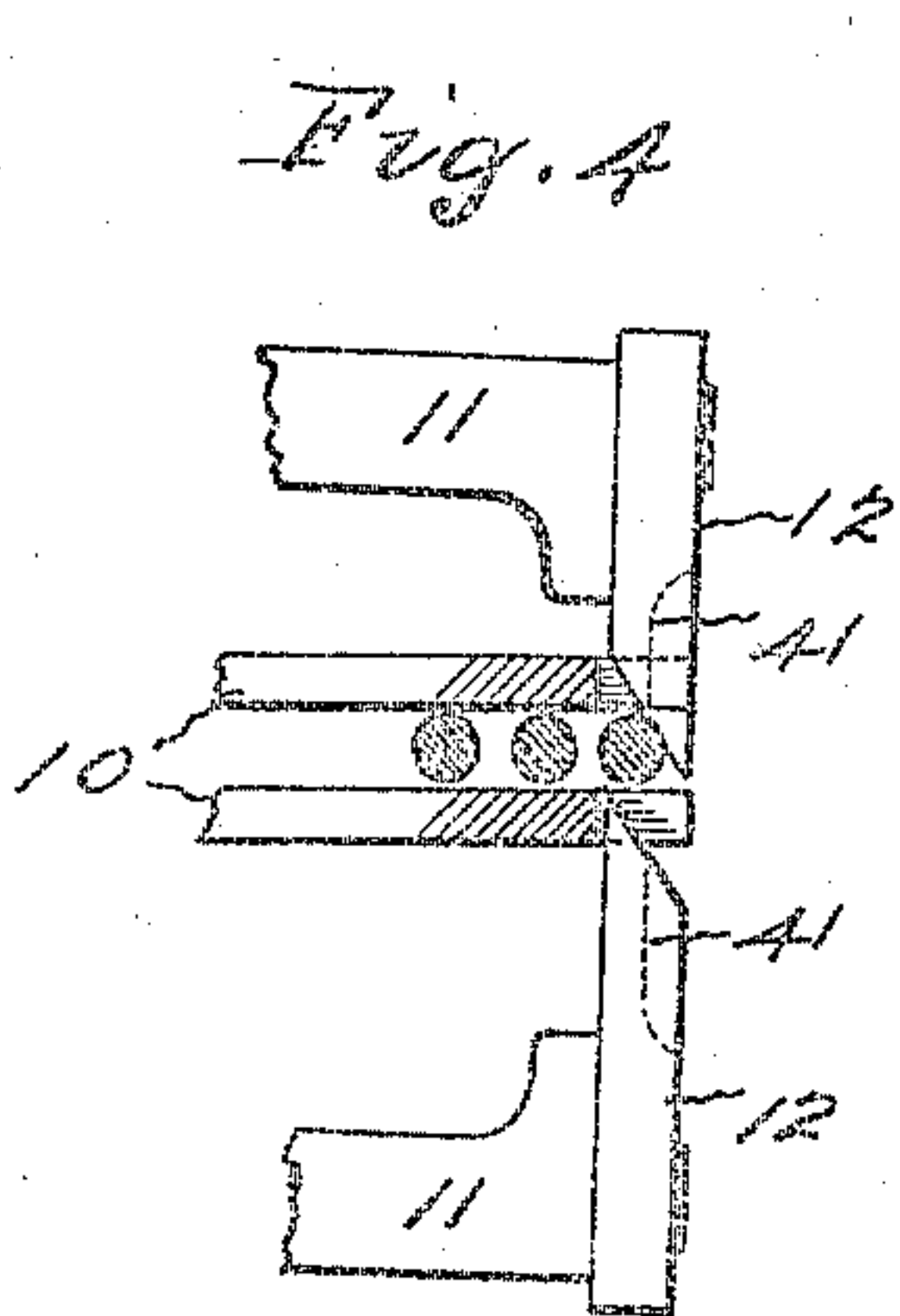
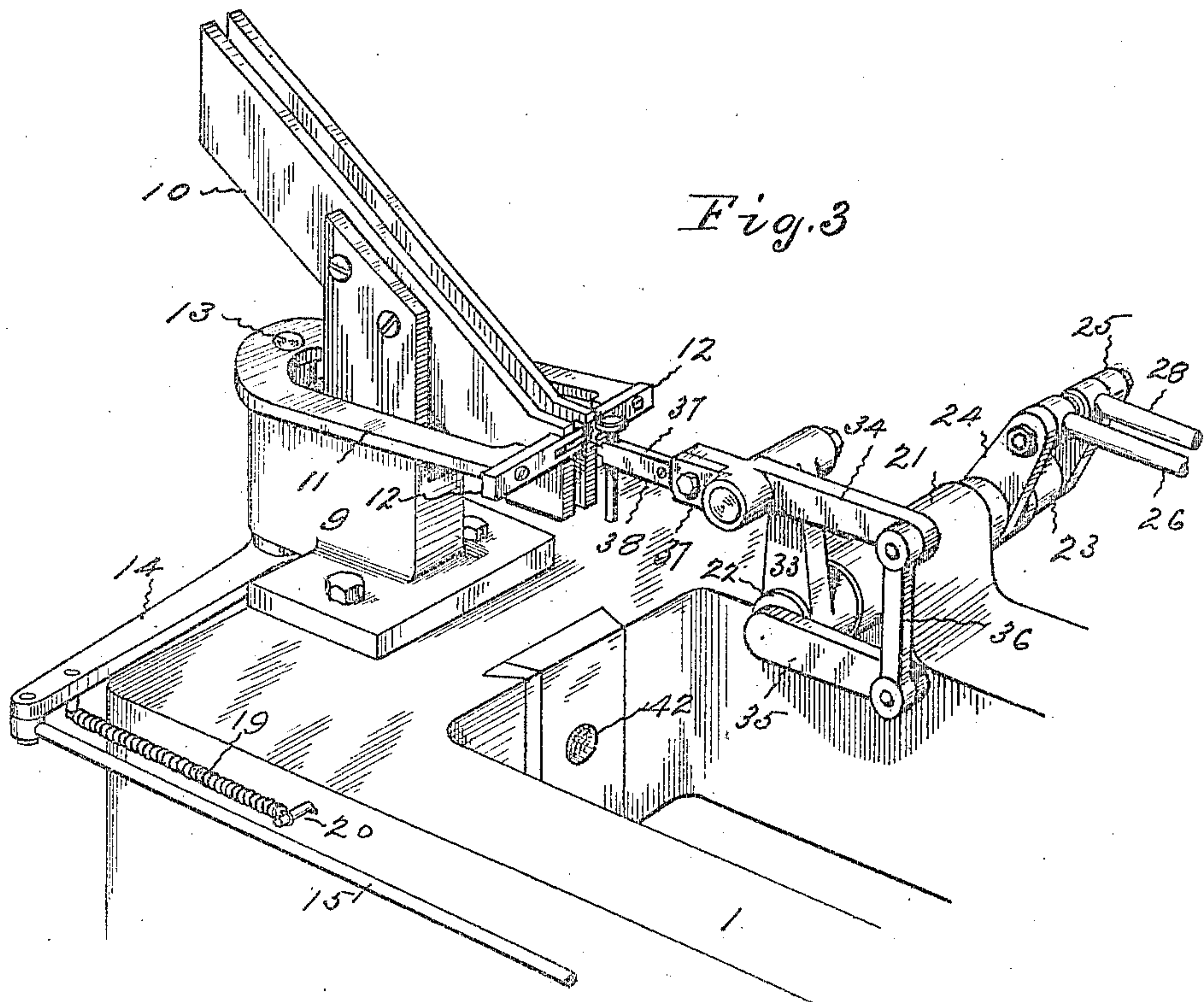
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3 SHEETS—SHEET 2.



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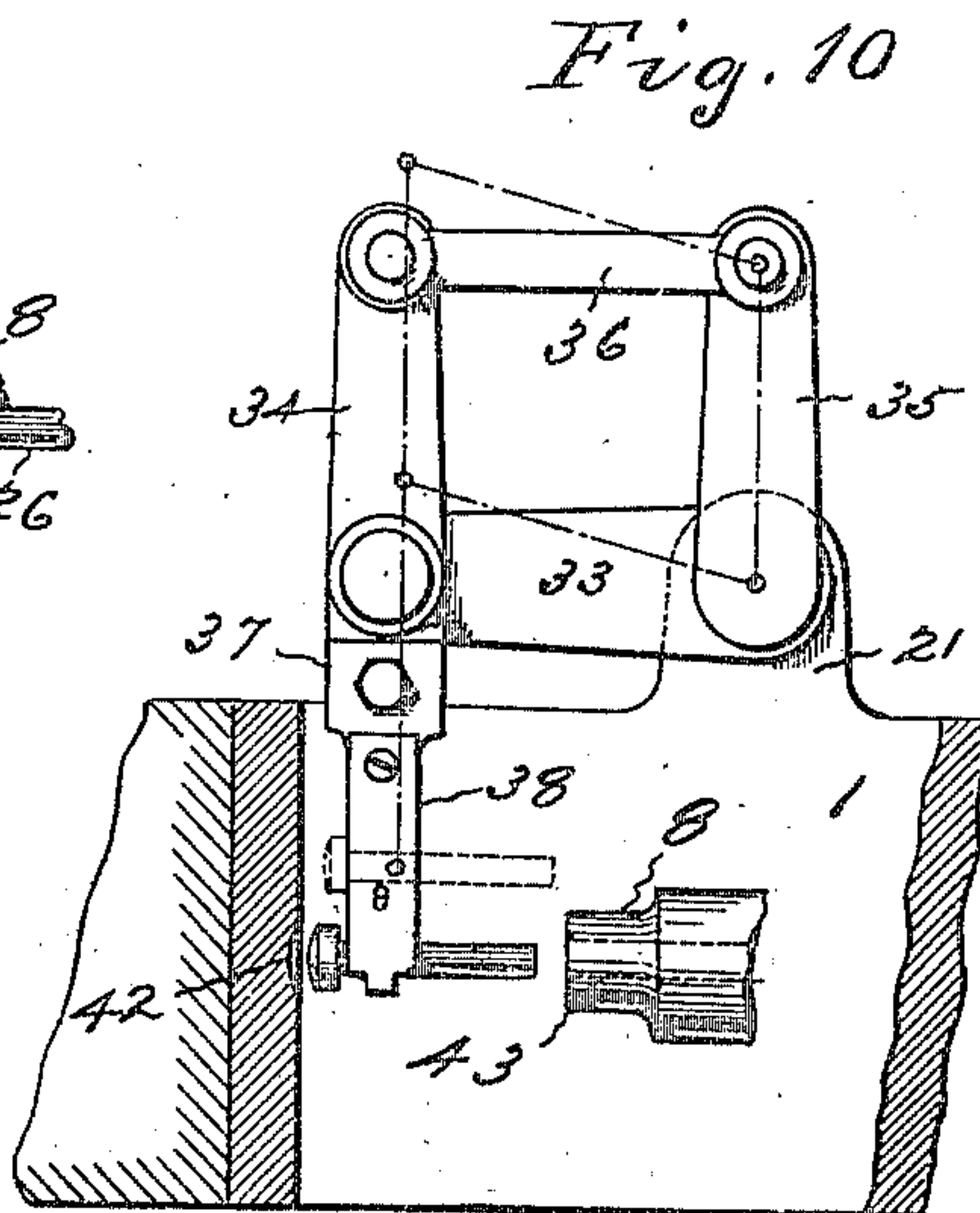
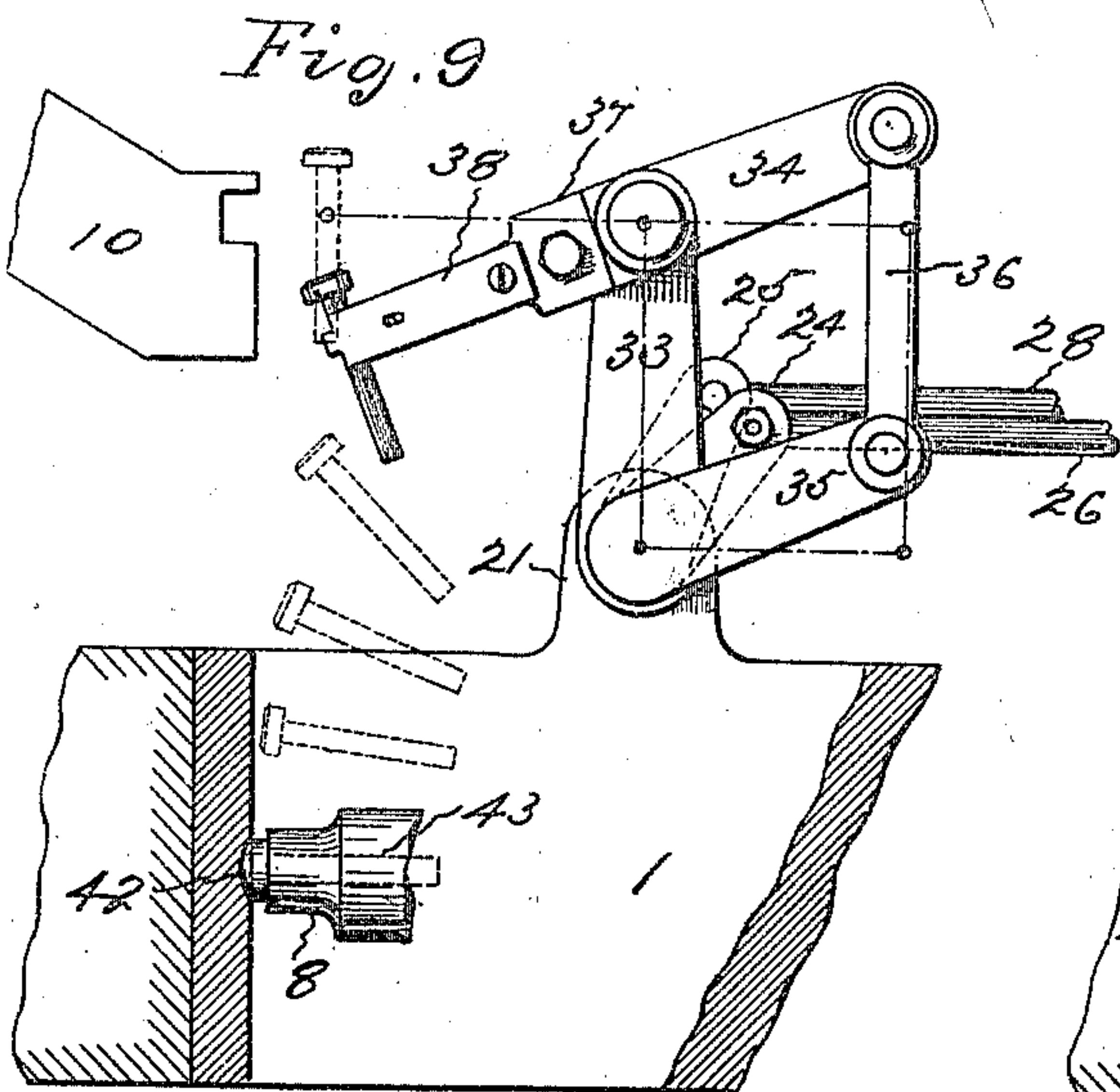
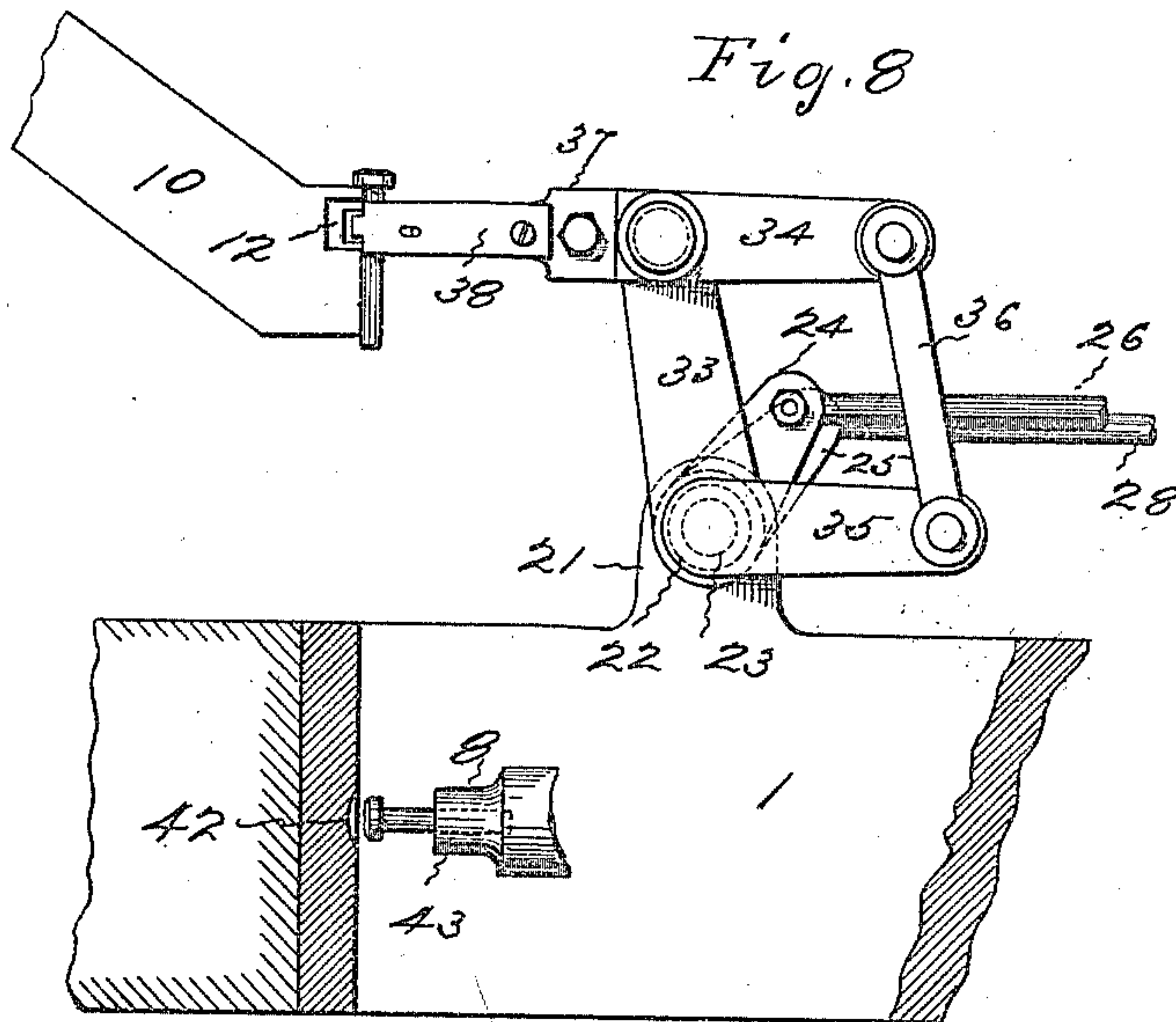


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3 SHEETS—SHEET 3.



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# UNITED STATES PATENT OFFICE.

ANDREW C. CAMPBELL, OF WATERBURY, CONNECTICUT, ASSIGNOR TO THE E. J. MANVILLE MACHINE COMPANY, OF WATERBURY, CONNECTICUT, A CORPORATION OF CONNECTICUT.

BLANK-FEED FOR METAL HEADING, PUNCHING, AND TRIMMING MACHINES.

959,455.

Specification of Letters Patent.

Patented May 31, 1910.

Application filed April 28, 1909. Serial No. 492,696.

*To all whom it may concern:*

Be it known that I, ANDREW C. CAMPBELL, a citizen of the United States, residing at Waterbury, in the county of New Haven and State of Connecticut, have invented a new and useful Improvement in Blank-Feeds for Metal Heading, Punching, and Trimming Machines, of which the following is a specification.

This invention relates to means for feeding blanks, such blanks for instance as are intended to be formed into bolts, headed studs, rivets, hinge pins, lag, coach and other screws, and similar metallic articles, which have heads or enlarged sections that may be round, square, hexagonal or other shape. These blanks are usually placed, so as to hang by their heads vertically in succession, in a track, race-way or other device designed to receive them, by the hand of the operator, or by automatically acting mechanism which gathers them from a promiscuous mass in a hopper, or other receptacle. The feed mechanism carries the blanks one at a time from the vertical position at the end of the track to a horizontal position in line with the opening in the forming die and punch, which receive and act upon the blanks for the purpose of further enlarging, or reshaping, or trimming, the heads, or enlarged portions, as the case may be.

The object of this invention is to provide for machines designed to operate upon the above mentioned articles, a very simple and cheap, accurate and durable means, which will advance horizontally in substantially a right line and take the first blank that is hanging vertically by its head at the end of the track or outlet from the hopper, then after receding horizontally in substantially a right line, so far that the blank will clear the end of the track or other holder, will swing in a curve until the blank is in a horizontal position, and then move vertically in substantially a right line, with the blank held horizontally, and carry the blank into absolute alinement with the center of the opening in the die and punch, or other tools, which are provided for acting upon it.

This invention is adapted for feeding blanks to headers, trimmers, riveters and similar metal forming machines, of the classes known as single, double, or multiple stroke machines, which are provided with

either solid or open dies of any conformation, which machines may have any ordinary types of hoppers or receptacles for holding the blanks, but for the sake of simplicity and clearness, the invention is illustrated in the accompanying drawings, and described in this specification, only in connection with a single stroke, solid die heading machine, without any hopper, and only so much of the actuating mechanism of such a machine is illustrated and specified as is necessary to impart a clear and concise comprehension of the nature and use of the invention.

The feed mechanism embodying the invention in the simple form shown and described, has two rocker shafts with coincident axes, each being turned through an arc of about 90 degrees by two cams on the crank shaft of the machine. Carried on the inner ends of each rocker shaft is an arm, to one of which is pivoted a lever that carries the spring fingers which take the blank from the end of the track and deliver it to the die and punch. A link joins the opposite end of the finger lever to the arm on the other rocker shaft, thus forming a parallelogram link system, by which it is possible, with properly shaped cams, to grasp a blank that is hanging by its head in a vertical position, and without interfering with any part or mechanism, carry it directly to an exact horizontal position. The fingers while lying horizontally are moved forward to receive the blank, which a cut-off passes from the end of the track into the fingers. The fingers with the blank move back horizontally in a right line away from the track for a short distance, after which the link arm is caused to rise a little, thereby depressing the fingers with the blank, then both arms are oscillated. This motion of the two arms is continued until the blank is carried to a horizontal position, and then the link arm is held for a time while the movement of the finger carrying arm is continued. This latter action causes the fingers carrying the blank to move downwardly in a right line until the blank is in exact alinement with the center of the die and punch. After the punch has advanced a sufficient distance onto the end of the blank, to hold it, the fingers move upwardly in a right line until they clear the punch, and then are oscil-



lated into horizontal position, in order to be again moved forward for the purpose of receiving the next blank.

Figure 1 of the accompanying drawings shows a plan of a single stroke solid die heading machine provided with a feed mechanism which embodies this invention. Fig. 2 shows a side elevation of the same. Fig. 3 shows on larger scale, a perspective view of a cut-off and feed mechanism containing this invention. Fig. 4 shows a view of the lower end of the track, and the cut-off bars in the position they occupy when obstructing the outlet from the track and holding back the row of blanks, which hang by their heads. Fig. 5 is a similar view with the cut-off bars moved to the position occupied after they have separated the lowest blank from the others, and forced it from the outlet at the end of the track into the fingers of the feed mechanism. Fig. 6 is a side view of the mechanism shown in Fig. 5. Fig. 7 shows a perspective view of the finger bar and the spring fingers mounted thereon. Fig. 8 shows a side elevation of the feed mechanism in the position occupied when the fingers are taking a blank from the lower end of the track. Fig. 9 shows a view of the feed mechanism in the position occupied after the fingers have moved back from the track and have commenced to oscillate downwardly, so as to carry the blank from the vertical to the horizontal position. Fig. 10 shows the feed mechanism in the position occupied when the fingers have carried the blank to the lowest position, and in line with the die opening and punch.

The horizontal type of machine chosen to illustrate the application of the invention, has an oblong frame 1 mounted on legs 2. The crank shaft 3, which is supported in suitable bearings near one end of the frame, has the customary fly wheel 4, and crank 5, which, by means of the pitman 6, reciprocates the gate 7 that slides horizontally in the frame and carries the punch 8. The many details of a machine of this character are not illustrated and described in full, for as stated, the present invention is applicable not only to the simple machine shown, but also to the more complicated multiple stroke machines, and these details form no part of the present invention.

Mounted on a bracket 9, fastened to the top, at one end of the frame of the machine shown, is a track 10. This track is shown as formed of two plates fastened edgewise to the top of the bracket, the space between the plates being wider than the diameter of the shanks of the blanks, but narrower than the diameter of the heads of the blanks. The blanks may be placed in this race-way by hand, or automatically by mechanism, such as is commonly used in this class of machines.

Pivoted on the bracket so as to move horizontally is a yoke 11, which at its front ends carries the cut-off bars 12 which have wedge-shaped ends. These cut-off bars are arranged to move horizontally through mortises in the ends of the track plates, and their points are opposed so that when one is in front of the end of the track, it will hold all of the blanks from coming down, as shown in Fig. 4, but when the other is moved in front of the track, it will push out the lowest blank and hold back the remainder.

The cut-off yoke shown, is fastened to a shaft 13 which is supported vertically by the bracket. This shaft, on its lower end, has a rocker arm 14 that is connected by a rod 15 with the lever 16 which has a roll 17 that is held against the surface of the cam 18 on the crank shaft, by means of the spring 19 which is extended between the rocker arm and a pin 20 projecting from the side of the frame.

Pivotally supported in a bearing 21 on the top of one side of the frame, is a tubular rocker shaft 22. Extending through this tubular shaft is a rocker shaft 23. On the outer end of the tubular shaft is a rocker arm 24, and on the outer end of the solid shaft is a rocker arm 25. The first of these rocker arms is connected by a rod 26 with a lever 27, and the second of these rocker arms is connected by a rod 28 with a lever 29. These levers are adapted to be oscillated at the desired time by properly cut cam grooves 30 and 31 in opposite sides of the cam disk 32 which is mounted on the crank shaft by the side of the fly wheel. (Fig. 1.)

Projecting upwardly from the inner end of the tubular shaft 22 is a rocker arm 33, and pivoted to the upper end of this rocker arm is a lever 34. Projecting rearwardly from the solid shaft 23 is a rocker arm 35. A link 36 connects the rear end of the lever 34 and the rear end of the rocker arm 35. Attached to the forward end of the lever 34 is the finger carrying bar 37, mounted upon the sides of which are the spring fingers 38. These fingers have grasping jaws 39 and separating points 40. (Fig. 7). The cut-off bars have mortises 41 into which the points 40 extend when the fingers are forward for the purpose of receiving a blank, as shown in Figs. 5 and 6.

When the machine is in operation, the rocker arm 33 is oscillated forwardly by its cam. During this first movement of the arm 33, the rocker arm 35 is held stationary by its cam. By reason of the parallel link motion, this action causes the spring fingers to move forward to the end of the track, as shown in Fig. 8. The cut-off mechanism is then moved to one side and separates the lowest blank, which is hanging by its head in the track, from the others and forces that blank into the grasp of the fingers carried by



the lever 34, as shown in Figs. 5, 6 and 8. When the lowest blank is thus forced into the fingers, the cut-off bar that accomplishes this separation, prevents the remaining blanks from dropping from the track. The cam then oscillates the rocker arm 33 backwardly, and as before, the rocker arm 35 being held stationary, the link motion causes the fingers to recede and hold the blank approximately vertical. When the blank has been carried back a sufficient distance for it to clear the track and cut-off, that is, when the rocker arm 33 is again vertical, the cam causes the rocker arm 35 to lift and oscillate the lever 34 on its pivotal center. The rocker arm 33 at this time being held stationary, the fingers are tipped so that the blank occupies the position shown in full lines in Fig. 9. Then the cams oscillate both rocker arms together. This carries the blank downwardly through the various positions illustrated by dotted lines in Fig. 9 until it arrives in the horizontal position shown by the dotted lines in Fig. 10. The cams now act to hold the rocker arm 35 in a vertical position and to continue the movement of the rocker arm 33, which action, due to the parallel link motion, carries the blank downward from the horizontal position, shown by the dotted lines in Fig. 10 to the horizontal position shown by the full lines in that figure, where it is in line with the die opening 42 and punch opening 43. After the punch has been advanced so that it will hold the blank, the fingers are by the cams and parallel link motion lifted until they are clear of the blank, and then oscillated to a horizontal position and again moved forward to obtain another blank. While this is taking place, the cut-off has been oscillated back to the position shown in Fig. 4, ready to separate another blank and pass it to the spring fingers when they are again moved up.

As previously stated, the shape of the die and of the punch are immaterial to the invention. The spring fingers are readily removed at any time to permit the application of fingers of a different size for carrying a blank of another length and diameter. With this feeding mechanism, which is very simple to construct, and is accurate and positive in operation, the blanks are quickly taken from the end of a track in which they hang naturally with their heads uppermost, and transferred from a vertical to a horizontal position, without interfering with any of the other mechanisms of the machine. This invention dispenses with complicated guides, curves and other obstructions, which are expensive to build, limit the speed of operation, and are a source of annoyance, at the end of the track and in proximity to the tools.

The pantograph or link motion of the mechanism carrying the fingers, is always

the same in the form shown, since both controlling cams are cut on one disk. Of course these cams can be so cut, and the length of the rocker arms and the lever and link, so proportioned as to produce variations in the travel of the blank, such as might be necessary for blanks of varying lengths. In all cases, however, the fingers move forwardly, and after grasping a blank, carry it from one position to a position at right angles thereto, without interfering with any of the tools or tool actuating mechanism.

The invention claimed is:

1. A feed mechanism having fingers, mechanism for advancing the fingers in substantially a right line toward a blank, for withdrawing the fingers in substantially a right line with a blank, for oscillating the fingers so as to turn the blank substantially 90 degrees, and for carrying the fingers with the blank in substantially a right line after having been turned 90 degrees.

2. A feed mechanism having fingers, mechanism for advancing the fingers in substantially a right line toward a blank, for withdrawing the fingers in substantially a right line with a blank, for oscillating the fingers so as to turn the blank substantially 90 degrees, for carrying the fingers with the blank in substantially a right line after having been turned 90 degrees, a track for holding the blanks and a cut-off for forcing the blanks from the track into the fingers.

3. A feed mechanism having fingers, mechanism for advancing the fingers in substantially a right line toward a blank, for withdrawing the fingers in substantially a right line with a blank, for oscillating the fingers so as to turn the blank substantially 90 degrees, for carrying the fingers with the blank in substantially a right line after it has been turned 90 degrees, an inclined track, and a cut-off movable at the end of the track for forcing the blanks into the fingers.

4. A feed mechanism having fingers, mechanism for advancing the fingers in substantially a right line toward a blank, for withdrawing the fingers in substantially a right line with a blank, for oscillating the fingers so as to carry the blank from a vertical to a horizontal position, for carrying the fingers with the blank in substantially a right line after it has been swung 90 degrees, a track for holding the blanks, and a wedge-shaped cut-off for controlling the blanks in and forcing the blanks from the track to the fingers.

5. A feed mechanism having a finger-lever, spring fingers extending longitudinally of said lever, means for moving the lever forwardly and backwardly in substantially a right line, means for oscillating the lever, and means for raising and lowering the lever in substantially a right line.



6. A feed mechanism having spring fingers, a parallel link mechanism carrying the fingers, and mechanism for moving the link mechanism so the fingers travel first in substantially a right line and then on a curve, and then in substantially a right line.

7. A heading or trimming machine having a straight inclined track for holding blanks, spring fingers adapted to receive the blanks, a cut-off mechanism at the end of the track for separating the lowest blank from those above and forcing it into the spring fingers, and mechanism for moving the spring fingers with the blank substantially horizontally, then on a curve to carry the blank from a vertical to a horizontal position, and then substantially vertically.

8. A feed mechanism for a swaging machine having a track for supporting blanks, means for holding the blanks in the track and at the proper time cutting off and forcing forward the first blank, mechanism for actuating the cutting off means at the proper time, fingers adapted to be moved forwardly to the end of the track and to receive the blank cut-off and forced outwardly by the separating means, and mechanism for reciprocating and oscillating the fingers so as to carry the blank from a vertical to a horizontal position.

9. A feed mechanism having a rocker arm, a lever pivotally mounted on the

rocker arm, grasping fingers carried by the lever, a rocker arm having its axis coincident with the first mentioned rocker arm, a link connecting the second mentioned rocker arm and the lever, and means for oscillating the rocker arms.

10. A feed mechanism having a tubular shaft, a rocker arm projecting therefrom, a shaft extending through the tubular shaft, a rocker arm projecting from the inner shaft, a lever carried by the rocker arm projecting from the tubular shaft, fingers carried by the lever, a link connecting the lever and the rocker arm projecting from the inner shaft, and means for oscillating the rocker shafts.

11. A feed mechanism having a tubular shaft, a shaft extending through the tubular shaft, rocker arms projecting from the outer end of the tubular shaft and the outer end of the inner shaft, cams, levers oscillated by the cams, rods connecting the levers with the said rocker arms, rocker arms projecting from the other ends of the tubular and inner shafts, a lever carried by one of the latter rocker arms, spring fingers carried by the lever, and a link connecting the lever with the other of the latter rocker arms.

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Witnesses:

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