Oct. 7, 1930. E. E. JOHNSON 1,778,005

APPARATUS FOR FEEDING, POSITIONING, AND DISCHARGING METAL BLANKS

Filed April 9, 1924 5 Sheets-Sheet 1

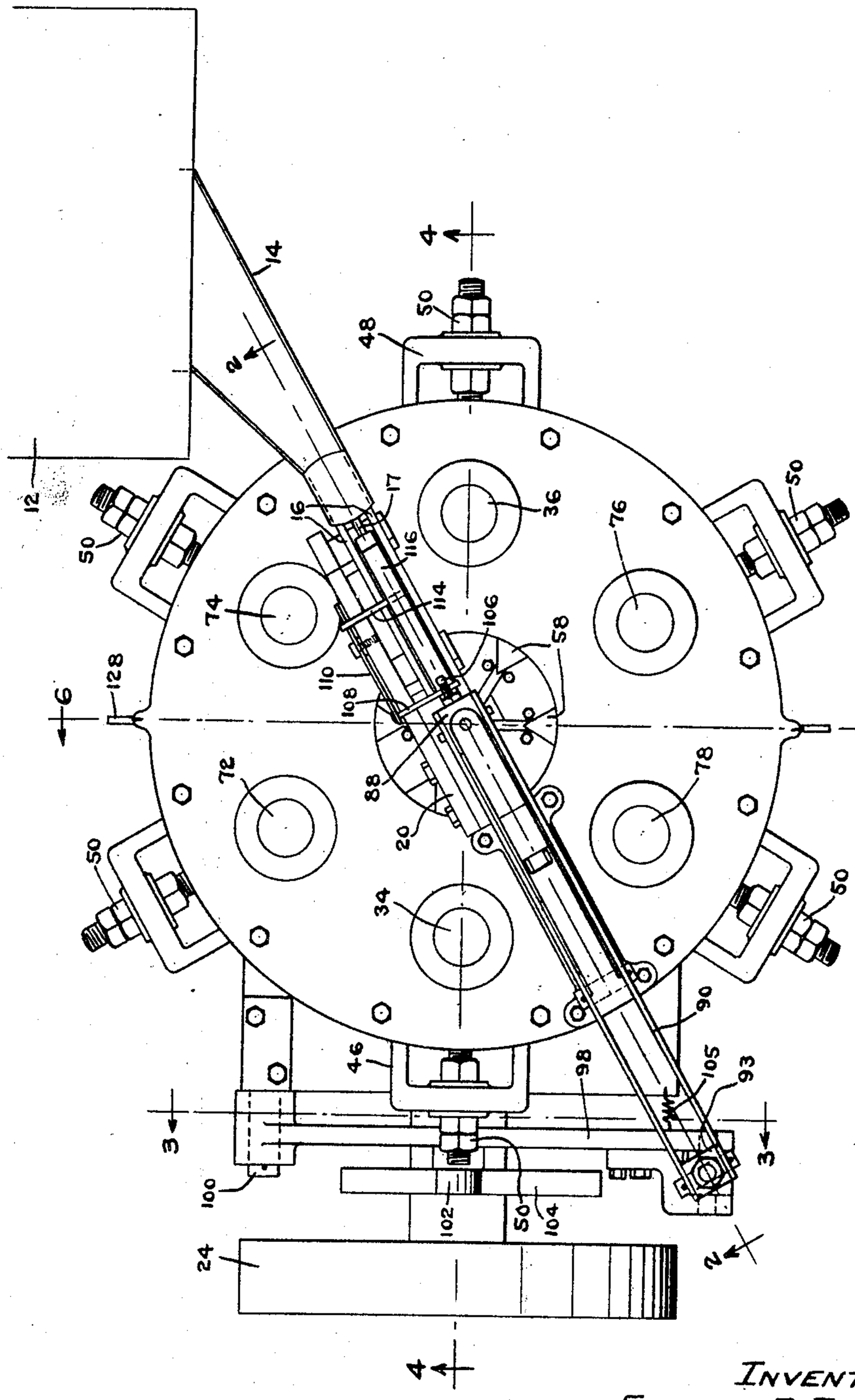

FIG. 1

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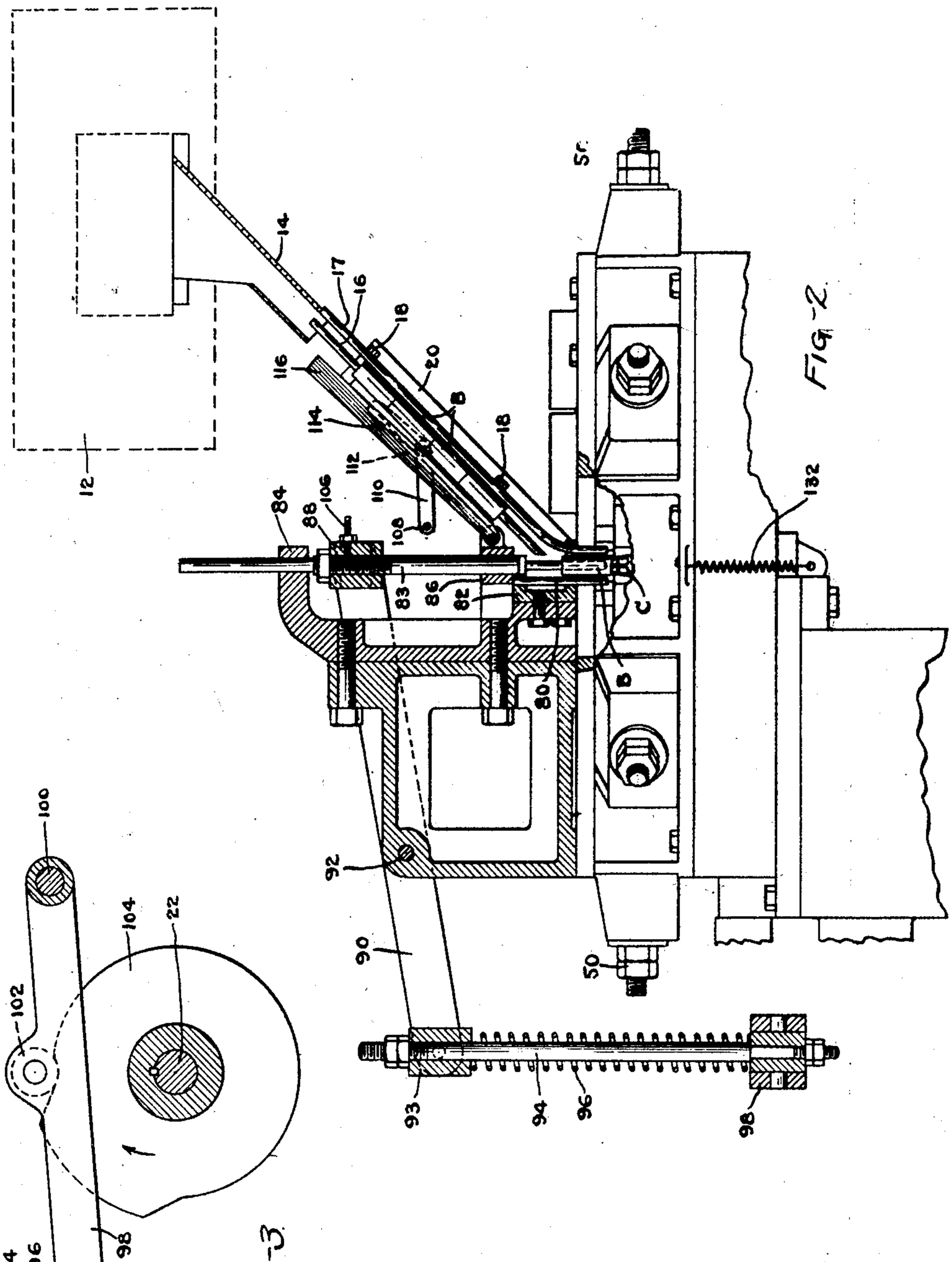

FIG. 2.

FIG. 3.

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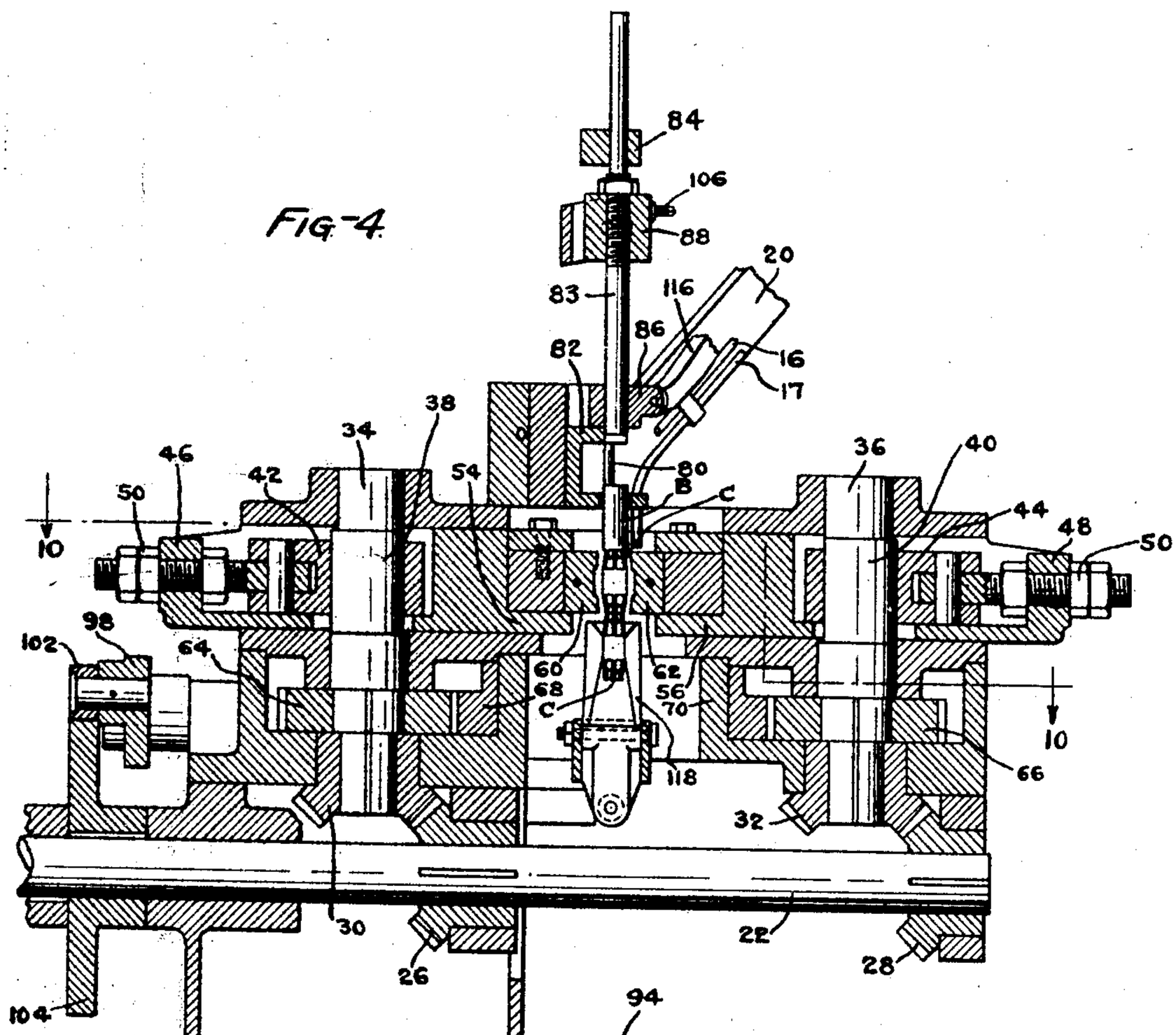
FIG-4.



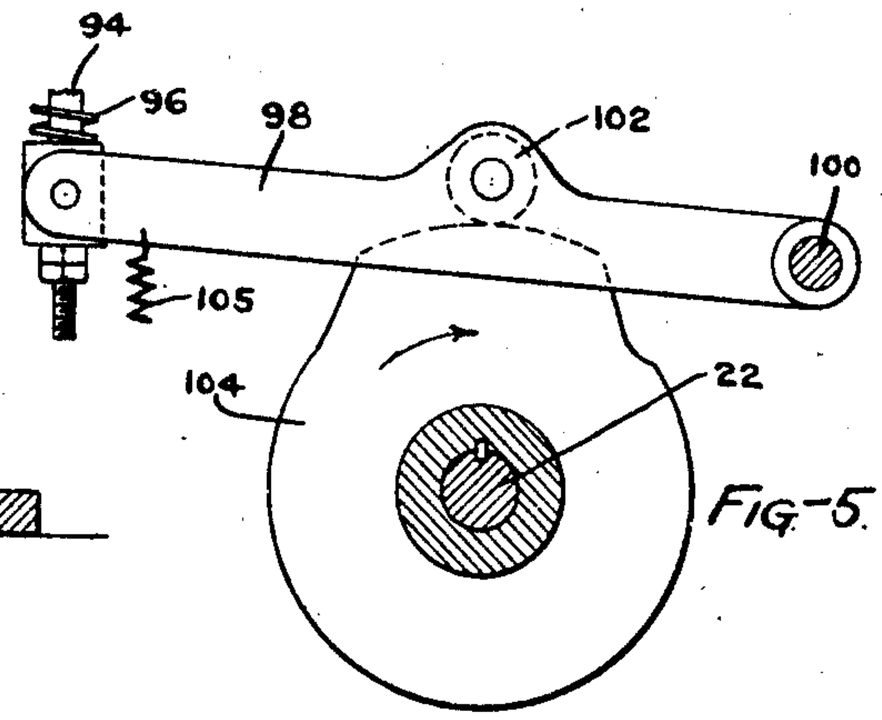


FIG-5.

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FIG-8.

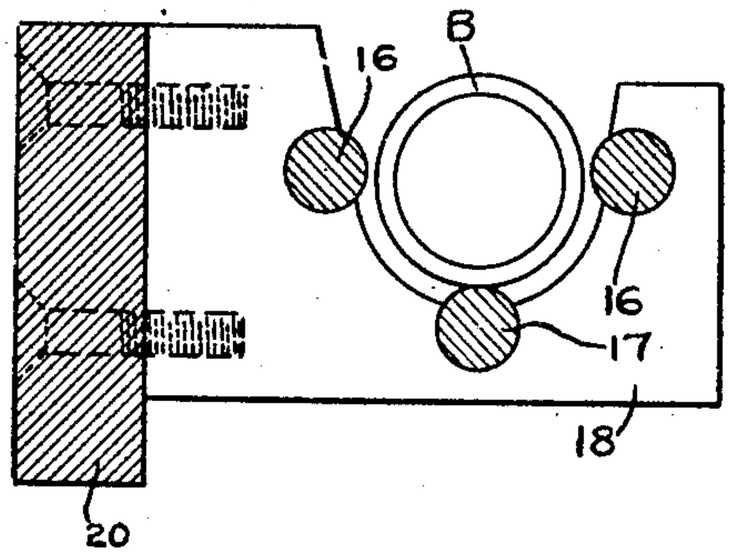

FIG-6.

FIG-7

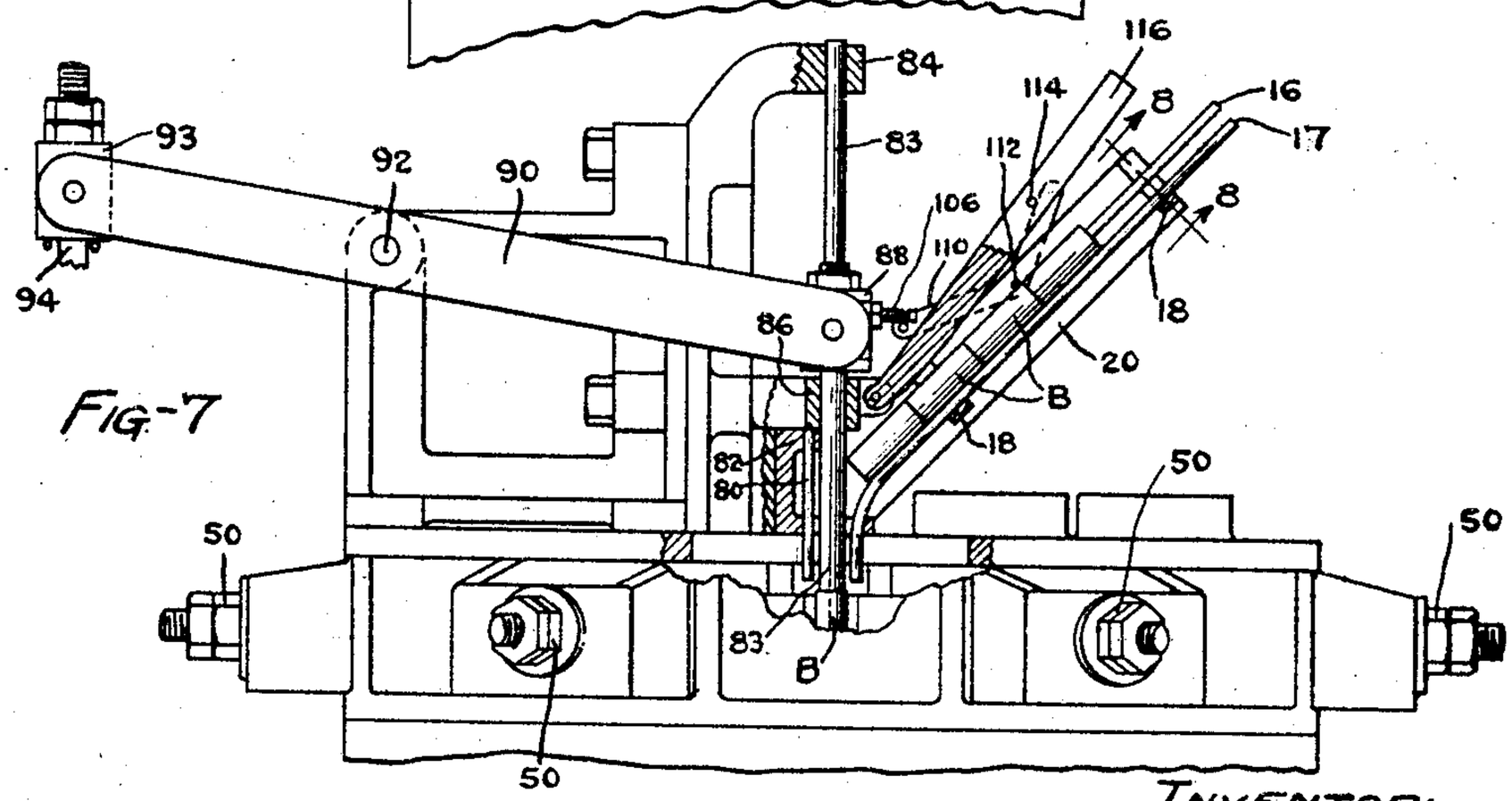

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FIG-9

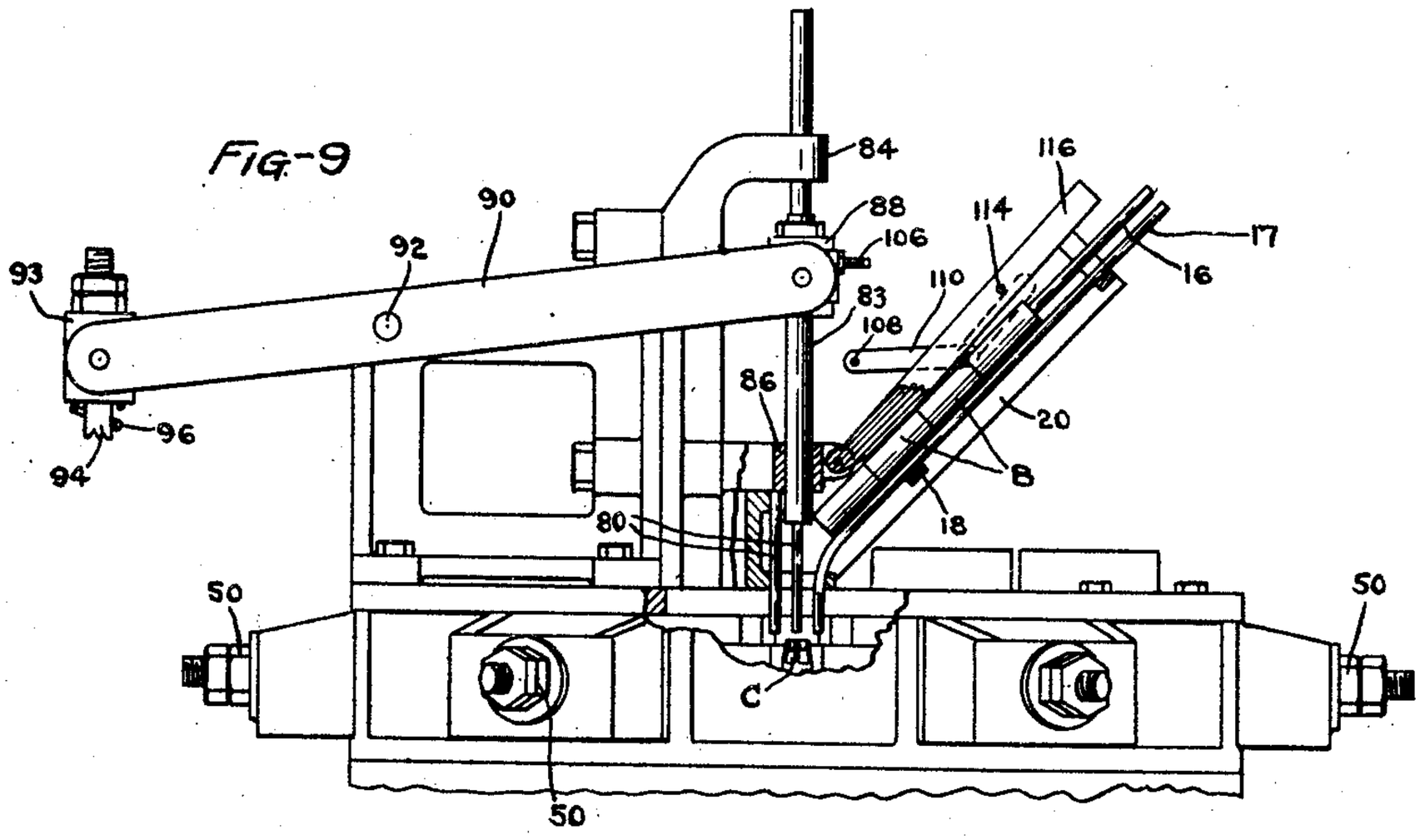
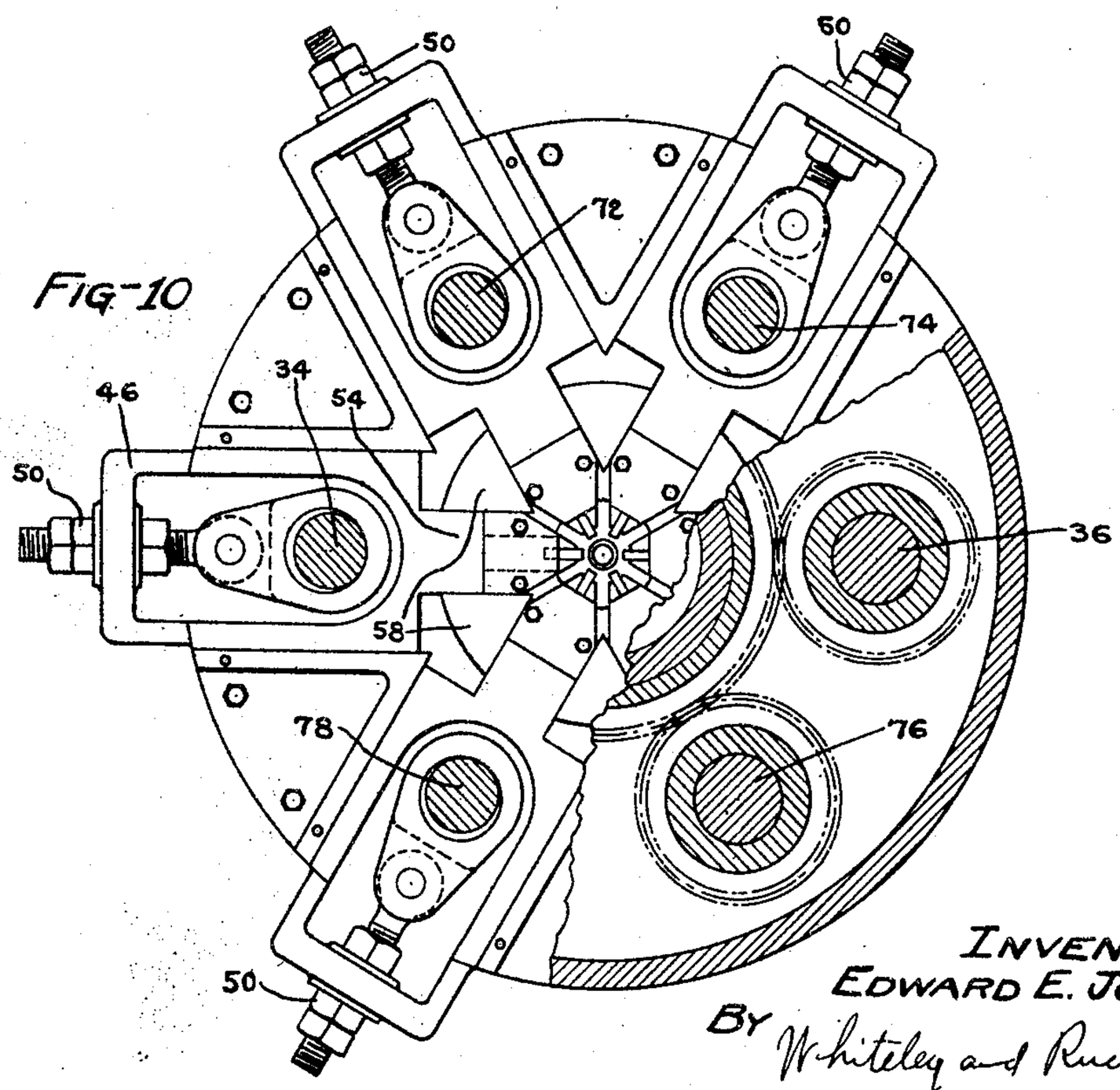


FIG-10



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UNITED STATES PATENT OFFICE

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APPARATUS FOR FEEDING, POSITIONING, AND DISCHARGING METAL BLANKS

Application filed April 9, 1924. Serial No. 705,246.

My invention relates to apparatus for feeding, positioning, and discharging metal blanks, and an object is to provide an apparatus by means of which metal blanks may be delivered with speed and certainty and positioned accurately to be operated upon one at a time as they come from the source of supply such as a furnace in which they are heated. Another object is to provide means whereby the finished articles may be discharged from the machine without jamming. An object in particular is to provide an apparatus of this character which will feed the heated metal blanks to a die forging machine for producing couplings of the character described in my prior Patent No. 1,478,124 dated December 18, 1923.

The full objects and advantages of my invention will appear in connection with the detailed description, and the novel features of my inventive idea will be particularly pointed out in the claims.

In the accompanying drawings which illustrate one form in which my invention may be embodied, Fig. 1 is a top plan view of the apparatus. Fig. 2 is an elevational sectional view, the portion in section being on the line 2—2 of Fig. 1. Fig. 3 is a view in section on the line 3—3 of Fig. 1. Fig. 4 is a view in section on the line 4—4 of Fig. 1. Fig 5 is a view similar to Fig. 3 but showing the parts in a different position. Fig. 6 is a view in section on the line 6—6 of Fig. 1. Fig. 7 is a view showing a portion of the apparatus in side elevation and a portion on the same section line as Fig. 2 but with the movable parts operated into different position. Fig. 8 is a view in section on the line 8—8 of Fig. 7. Fig. 9 is a view similar to Fig. 7 but showing some of the parts in a still different position. Fig. 10 is a view in horizontal section on the line 10—10 of Fig. 4.

In the embodiment of the invention shown in the drawings, I provide a furnace 12 in which metal blanks or sections of tubing are heated. Connected with the furnace at a discharge opening is an apron 14 of sheet metal which delivers the heated blanks to a downwardly extending slideway, so set that the blanks feed down the same by gravity. The slideway consists of three longitudinally extending rods, there being two rods 16 constituting the sides of the slideway and a rod 17 constituting the bottom thereof and these rods being supported by setting them into cross members 18 which are attached to a support 20. The cross members 18 are concaved on their upper side and the rods are arranged around the concaved recess so that the rod 17 is at the bottom and there is a rod 16 at each side. In the embodiment shown, blanks are fed to, positioned in, and discharged from a die forging machine having a shaft 22 to which is secured a driving pulley 24. Secured to the shaft 22 are two bevel gears 26 and 28 which mesh respectively with bevel gears 30 and 32 secured to vertical shafts 34 and 36 mounted in bearings on the frame and located on diametrically opposite sides of its center as shown in Fig. 4. The shafts 34 and 36 are provided with eccentrics 38 and 40 adapted to rotate in openings in connecting rods 42 and 44 adjustably secured to open center slides 46 and 48 by bolts having lock nuts 50. The open center slides 46 and 48 have reduced or plunger portions 54 and 56 which reciprocate between fixed guides 58 carried by the frame. Secured to the inner ends of the plunger portions are shaping dies 60 and 62 which reciprocate radially. Secured to the shafts 34 and 36 are spur gears 64 and 66 which mesh with a ring gear 68 rotatably mounted around a cylindrical member 70 carried by the frame. Mounted in bearings on the frame are four vertical shafts 72, 74, 76 and 78 which are like the two shafts 34 and 36 except that they do not carry bevel gears on their lower ends and which are operatively connected to shaping dies in the same manner that the shaping dies 60 and 62 are connected. The six vertical shafts and the dies operated thereby are equally spaced around the center of the die forging machine and the central space between the dies when retracted constitutes a chamber of sufficient size to receive and guide the blank to be operated on. The lower end of the lower rod 17 is curved downwardly to form a vertical guide finger which cooperates with vertical guide fingers 80 car-

ried by a support 82 to form a vertical guide chamber underneath a plunger 83 and concentric with and leading into the chamber between the retracted dies already referred to. The downward curve of the rod 17 provides the necessary means of guiding a blank from its sloping position in the slideway as shown in Fig. 9 to vertical position in the guide chamber, as shown in Fig. 2, when released for movement by the upward travel of the plunger 83, as will be described later. A succession of heated blanks B coming from the furnace 12 pass down the slideway by gravity and are let off one at a time into the chamber between the vertical guide fingers by the mechanism now to be described. The plunger 83 reciprocates vertically in guides 84 and 86 carried by the frame and has three purposes: to push into position with exactness the top of a blank beneath it as B in Fig. 7; to act as a valve to check the movement of the string of blanks B in the slideway as shown in Fig. 7; and at the proper time to release the lower blank from the slideway into the vertical guide chamber. The plunger 83 has a block 88 threaded thereon for adjustment and to which the inner end of a lever 90 is attached by a Scotch yoke having sliding blocks 91 as shown in Fig. 6 to provide for the swinging movement of the lever which is intermediately pivoted at 92. The lever 90 is pivotally attached at its outer end to a collar 93 slidable on the upper end of a vertical rod 94 and engaged by a spring 96 which surrounds this rod. The rod 94 is pivotally attached at its lower end to one of a lever 98 whose other end is pivotally attached to the frame at the point indicated 100. An intermediate portion of the lever 98 carries a cam roller 102 which rests upon the periphery of a profile cam 104 which is secured to the shaft 22 as shown in Fig. 4. When the cam 104 moves from the position shown in Fig. 3 to that shown in Fig. 5, the plunger 83 is moved from the position shown in Fig. 2 to that shown in Fig. 7. Since the upper end of the spring 96 engages the collar 93, it will be understood that in case the plunger 83 encounters an obstruction, the spring will be compressed and there will be no liability of breaking any of the parts. The roller 102 is maintained in contact with the cam 104 by a spring 105 attached to the lever 98 and a convenient part of the frame. Attached to the block 88 is a projection 106 which when the plunger 83 is moved from the position shown in Fig. 2 to that shown in Fig. 7 engages a projection 108 on the inner end of a bent arm 110 pivoted at 112 to the support 20. The outer end of the arm 110 engages the underside of a projection 114 carried by the outer end of a gravity bar 116 whose inner end is pivoted to the guide 86. As will be apparent from Fig. 2, the bar 116 near its pivoted end normally rests upon the lowermost blank, thus restraining the series of blanks from further movement downwardly. When the plunger descends as shown in Fig. 7, the gravity bar 116 is lifted and the string of blanks is permitted to have a sliding movement downwardly and is arrested by the lowermost blank striking against the side of the valve or plunger 83 in which position the lowermost blank is beyond the reach of the gravity bar 116 as shown in Fig. 9, and is ready to be released into the vertical guide chamber and underneath the plunger 83 by the further upward movement of said plunger to the position shown in Fig. 2. When the plunger 83 rises, the bar 116 engages the next blank as shown in Fig. 9 before the plunger 83 is lifted completely above the lowermost blank. As soon as the plunger 83 has completed its upward movement and is in the position shown in Figs. 2 and 4, the lowermost blank which has been previously released from the bar 116 drops into vertical position under the plunger 83 upon the top of the coupling C which has just been pressed into shape by the dies. This coupling when the dies are retracted, continues to rest upon the top of a previously formed coupling which is held between a pair of cooperating jaws 118 and 120 comprising the discharge passageway and pivoted to frame members at 122 and 124 to the lower ends of which are secured outwardly extending rods 126 and 128 held upwardly by springs 130 an 132 so that the coupling last referred to is held frictionally between the jaws. When the plunger 83 descends the last mentioned coupling is pushed out of the jaws, the coupling last formed between the dies is pushed between the jaws, and the blank superposed on the last formed coupling moved into position between the dies as will be apparent from Fig. 4. Exact positioning of the blank to be operated on is of prime importance and this is secured by the plunger 83 pushing the top of the blank down to a fixed position while the frictional hold of the discharge jaws provides the adjustment necessary to accommodate blanks of varying lengths. The rods 126 and 128 of discharge jaws 118 and 120 beside providing means of attaching the springs 130 and 132 serve as handles so that when depressed manually against the action of said springs the discharge jaws open and release freely the blank between them and those superimposed thereon, as may from time to time be necessary to remove defective or cold blanks. As shown in Fig. 6, the throat 134 of the discharge jaws 118 and 120 is made conical so that the jaws are forced open without jamming when empty by the first blank to descend between them. It will be understood that the cam 104 and the eccentrics 38, 40, etc. are so timed relatively to each other that the dies are in retracted position when the plunger 83 is lowered and the

dies are advanced slightly before the upward movement of the plunger begins.

The operation and advantages of my invention have been quite fully stated in connection with the foregoing description. The blanks may be fed into the slideway in any convenient manner. One method is for a workman to move them by a hooked rod from the furnace on to the metal apron from which they slide into the upper end of the slideway.

I claim:

1. In apparatus for feeding and discharging metal blanks, the combination of a guide chamber for receiving blanks, a die chamber and a discharge passageway successively in alinement with each other, a slideway for blanks leading into said guide chamber, and a plunger working in said guide chamber to push a finished article from said die chamber into said passageway and thereby eject a previously finished article from said passageway.

2. In apparatus for feeding and discharging metal blanks, the combination of a guide chamber for receiving blanks, a die chamber and a discharge passageway successively in alinement with each other, a slideway for blanks leading into said guide chamber, means for releasing blanks one at a time from said slideway into said guide chamber, and a plunger working in said guide chamber to push a finished article from said die chamber into said passageway and thereby eject a previously finished article from said passageway.

3. In apparatus for feeding and discharging metal blanks, the combination of a die chamber and a discharge passageway in alinement with each other and a plunger which is reciprocated to push a finished article from said die chamber into said passageway and thereby eject a previously finished article from said passageway.

4. In apparatus for feeding and discharging metal blanks, the combination of means for operating on the blanks to finish the same, a discharge passageway adjacent thereto, and a plunger which is reciprocated to push a finished article from said finishing means into said passageway and thereby eject a previously finished article from said passageway.

5. In apparatus for feeding and discharging metal blanks, the combination of means for operating on the blanks to finish the same, a discharge passageway adjacent thereto, and a plunger which is reciprocated to position one end of the blanks with relation to said finishing means and to push a finished article from said finishing means into said passageway whereby said finished article constitutes a movable abutment for the other end of the blanks.

7. In apparatus for feeding and discharging metal blanks, the combination of a guide chamber, a die chamber and a discharge passageway successively in alinement with each other, means for supplying blanks one at a time to said guide chamber, and a plunger working in said guide chamber to push a blank therefrom into said die chamber and to push a finished article from said die chamber into said passageway and thereby eject the previously finished article from said passageway.

8. In apparatus for feeding metal blanks, the combination of a guide chamber for receiving blanks, a die chamber, a frictional holding device for articles finished in said die chamber, said guide chamber, die chamber and holding device being successively in alinement, and a plunger working in said guide chamber and cooperating with the blank which is being fed thereby and with a finished article in said die chamber to eject a previously finished article from said holding device.

In testimony whereof I hereunto affix my signature.

EDWARD E. JOHNSON.