Feb. 6, 1951 E. M. HUNT 2,540,117

HINGE PIN SPINNING MACHINE

Filed Nov. 28, 1945 3 Sheets-Sheet 1

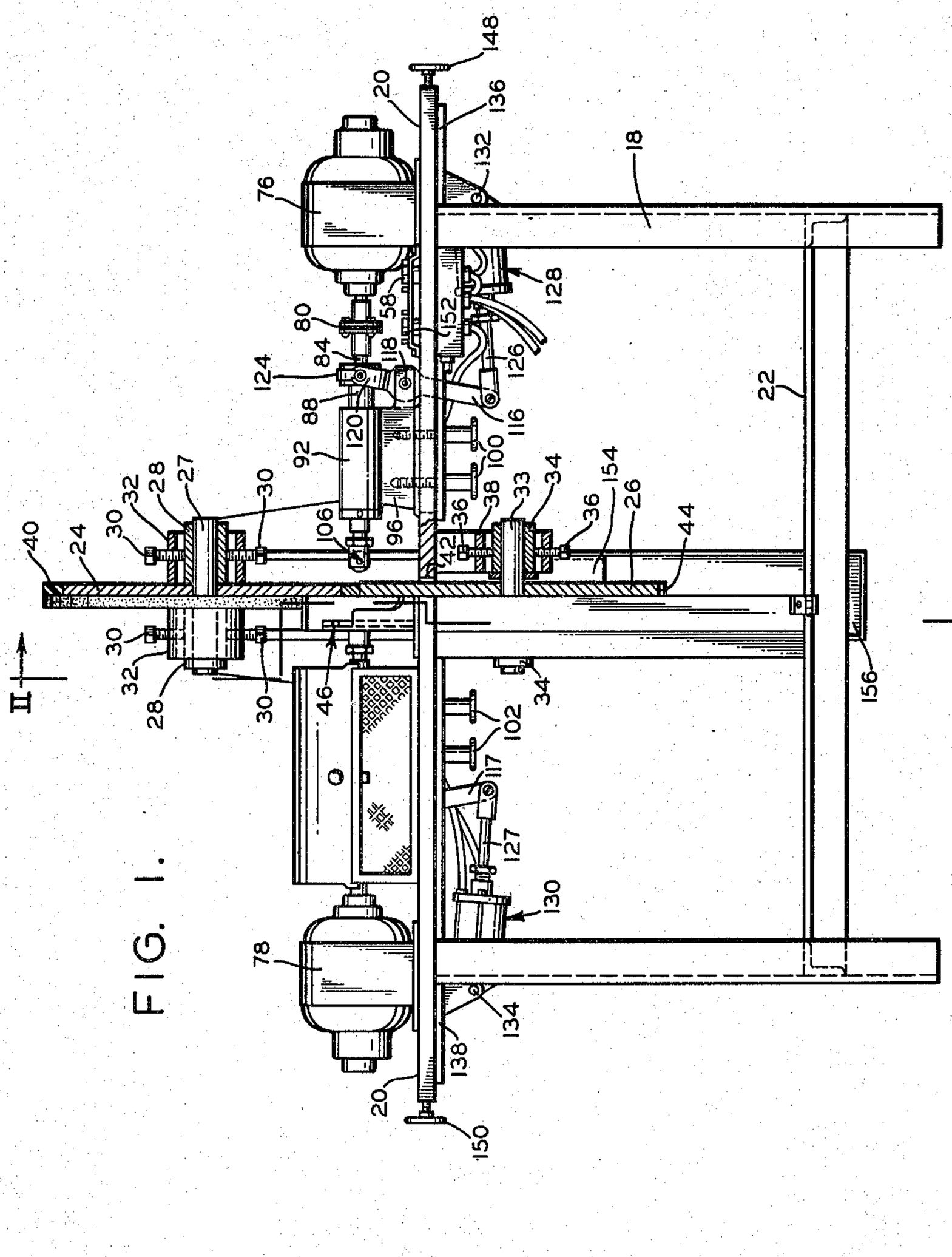

FIG. 1.

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3 Sheets-Sheet 2

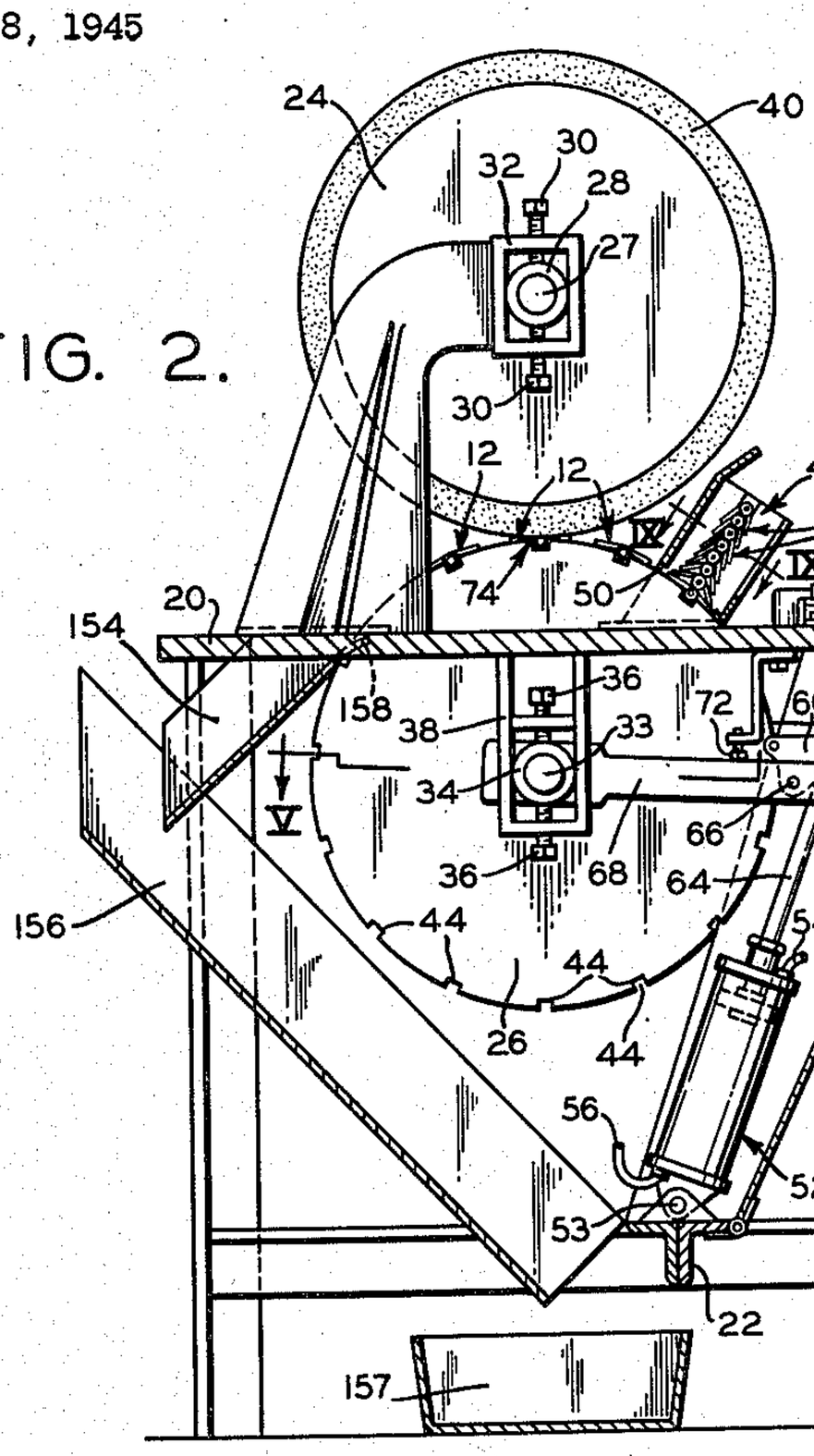

FIG. 2.

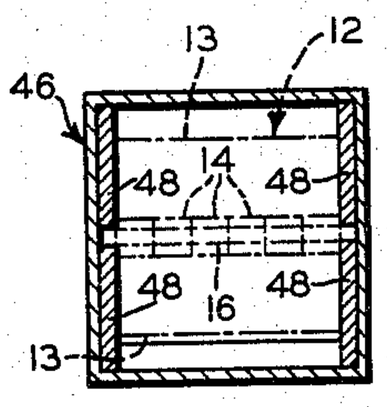

FIG. 9.

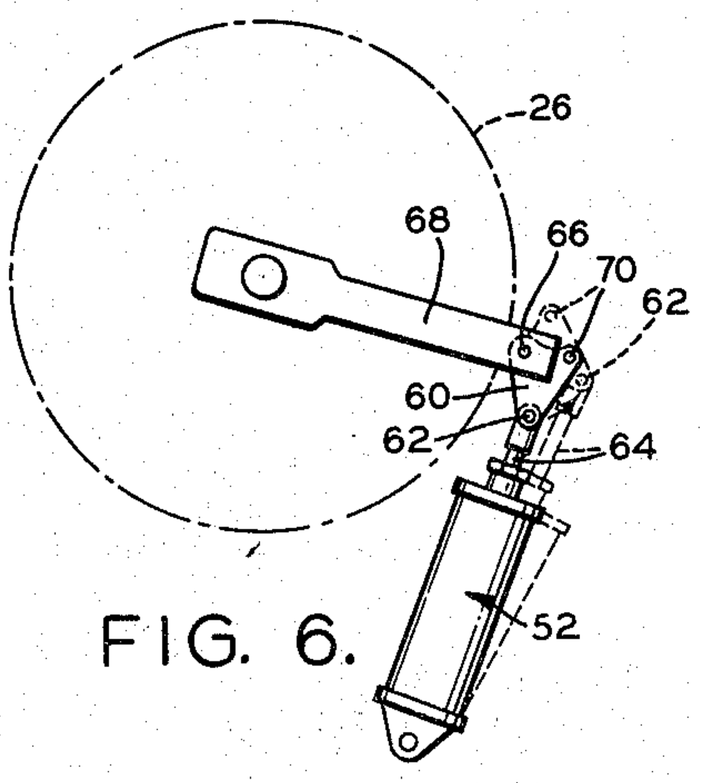

FIG. 6.

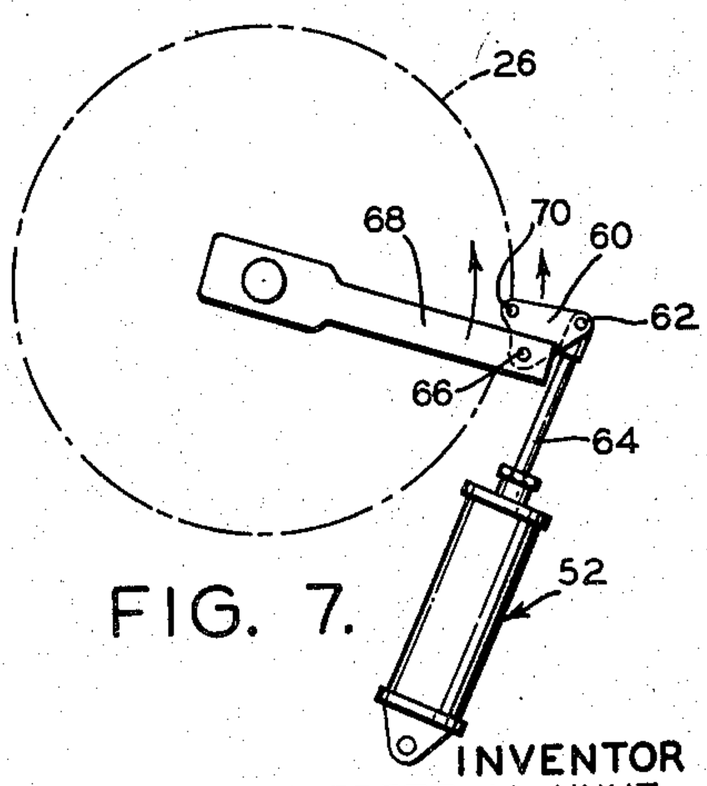

FIG. 7.

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HINGE PIN SPINNING MACHINE

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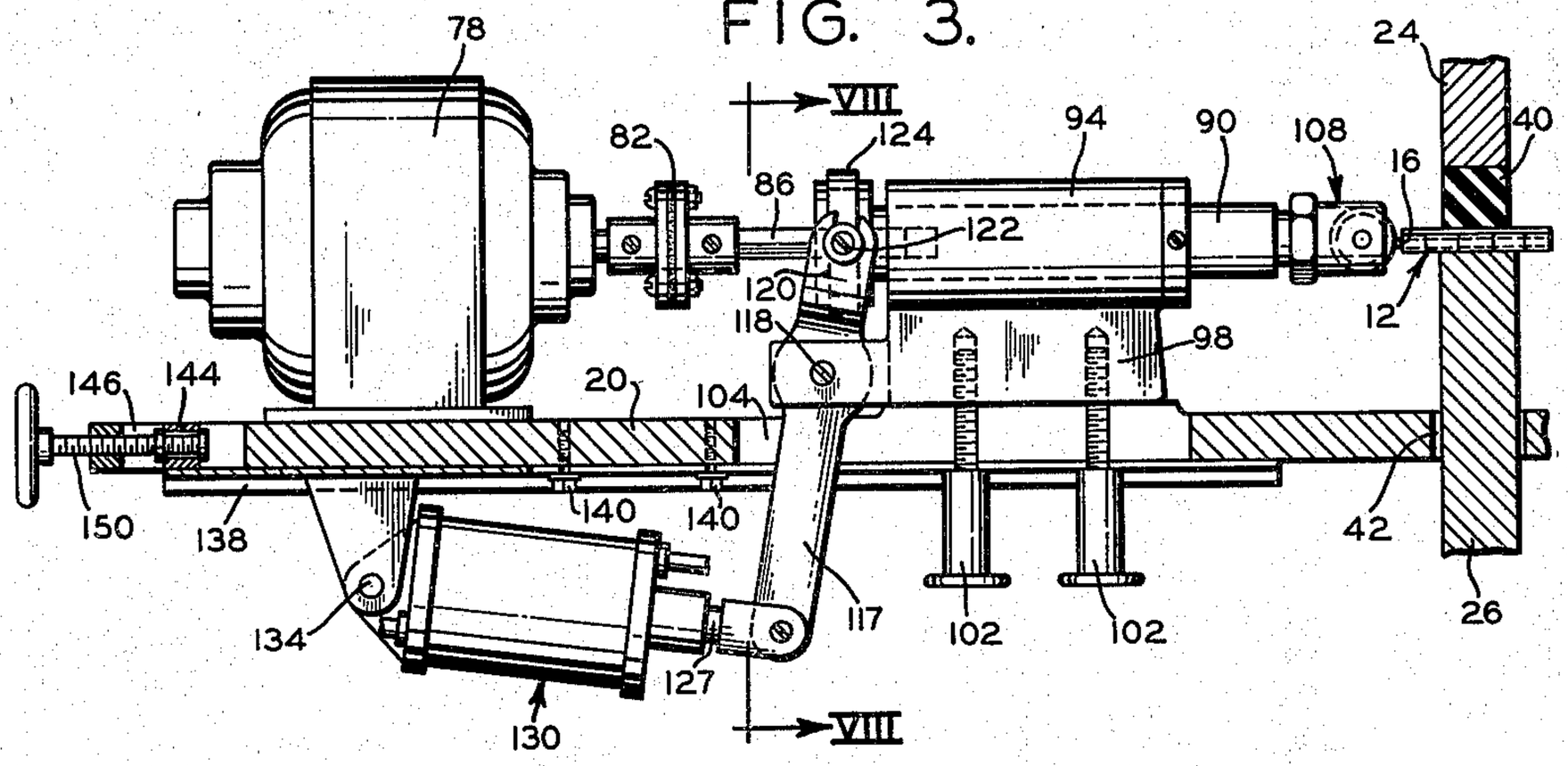
FIG. 3.



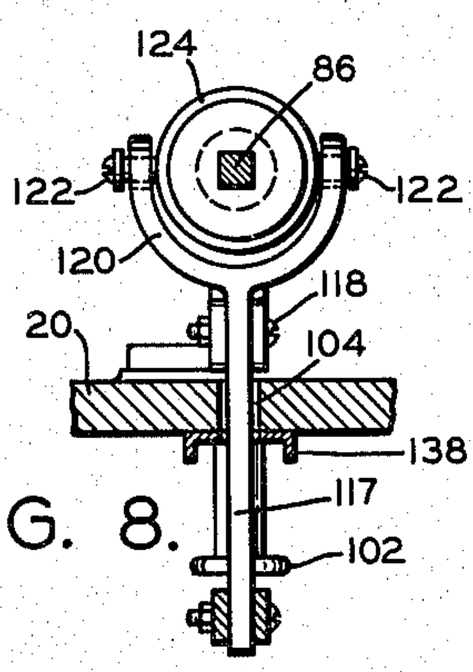


FIG. 8.

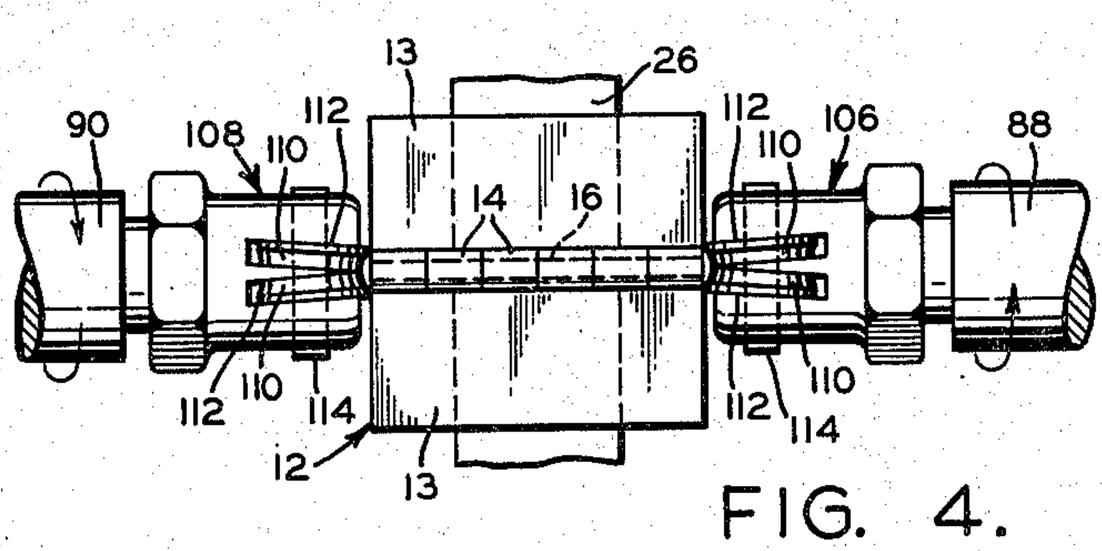


FIG. 4.

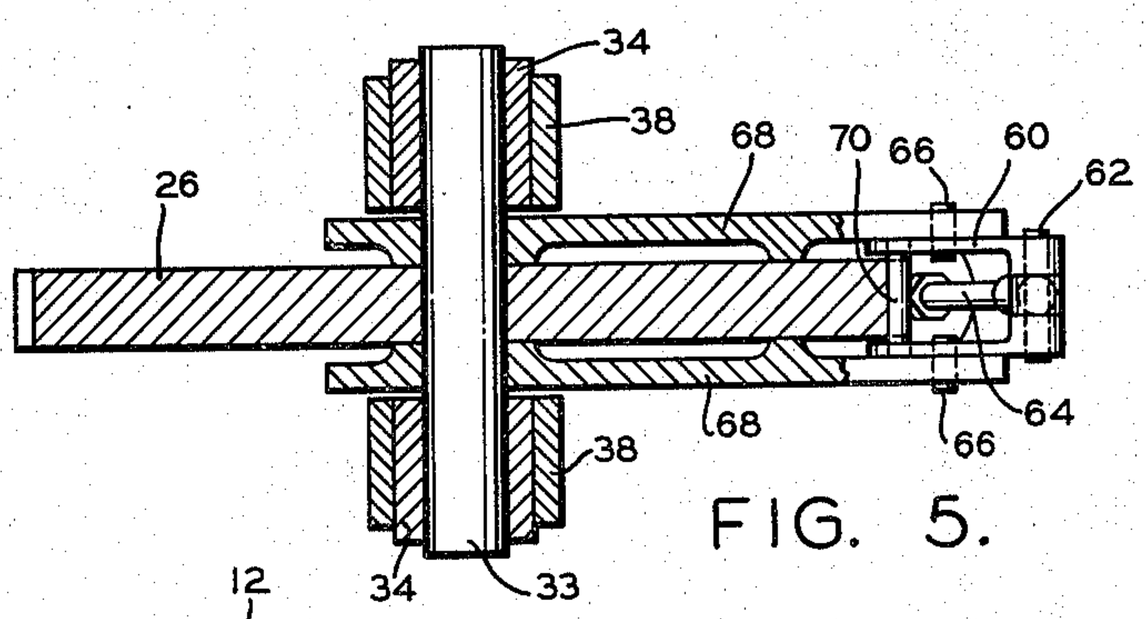


FIG. 5.

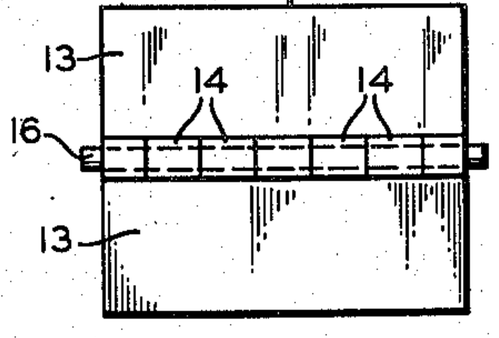


FIG. 10.

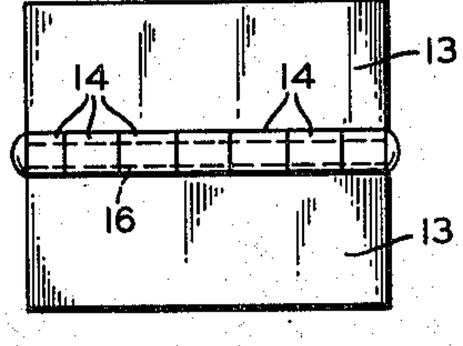


FIG. 11.

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Patented Feb. 6, 1951 2,540,117

UNITED STATES PATENT OFFICE

2,540,117

HINGE PIN SPINNING MACHINE

Everett M. Hunt, Portsmouth, N. H.

Application November 28, 1945, Serial No. 631,461

3 Claims. (Cl. 78—96)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

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This invention relates to a machine for heading pintles and the like and more particularly to a machine for heading hinge pintles.

It is an object of the present invention to provide a machine for feeding hinges one by one, in rapid succession, from a supply hopper to a position where the opposite ends of the hinge pintle are simultaneously headed, and thence to a position where the completed hinge is ejected into a receptacle.

Another object of the invention is to provide, in a machine of this character, a feeding mechanism and a heading mechanism that are jointly effective to positively support the hinge and pintle while the heading mechanism simultaneously engages and spins enlargements on the opposite ends of the pintle in a smooth, quick and efficient manner.

A further object of the invention is to provide a machine of this character which is simple in design and construction, composed of few parts that are readily adjustable to accommodate hinges of varying lengths, and reliably operative to perform pintle heading operations in mass production.

With the above and other objects and features in view, the invention will now be described with reference to the accompanying drawings which illustrate a preferred embodiment of the invention and will be pointed out in the claims.

In the drawings:

Fig. 1 is a front elevation of the hinge pintle heading machine;

Fig. 2 is a sectional elevation thereof taken along the line II—II of Fig. 1;

Fig. 3 is an enlarged front elevation, partly in section, of one of the pintle heading units shown in Fig. 1;

Fig. 4 is a detailed plan view of the pintle heading tools, the latter being shown in the positions that they occupy when the heads are being spun on the pintle;

Fig. 5 is a detailed sectional view taken along the line V—V of Fig. 2 and showing certain parts of the feed mechanism;

Figs. 6 and 7 are diagrammatic views in side elevation of parts of the feed mechanism, at different stages of their operations;

Fig. 8 is a detailed sectional view taken along the line VIII—VIII of Fig. 3;

Fig. 9 is a detailed sectional plan view taken along the line IX—IX of Fig. 2;

Fig. 10 is a plan view of a hinge before the pintle heading operation has been performed thereon; and

Fig. 11 is a view similar to Fig. 10 but after the pintle heading operation has been performed.

Fig. 10 illustrates a conventional hinge 12 including leaves 13 that have the usual alternate, spaced, oppositely disposed, intermeshing, bearings 14 through which are inserted a conventional hinge pintle 16. It is noted that the opposite ends of the pintle 16 extend a slight distance beyond the ends of the hinge leaves 13, that these ends are flat, and that they are of the same diameter as the body of the pintle. It is in this form that the hinges are placed in the machine. Fig. 11 shows the opposite ends of the pintle 16 with enlarged rounded heads, as formed by the machine, whereby the leaves 13 are held pivoted together in assembled relation.

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The machine comprises a frame 18 having a bed or top 20 and a lengthwise extending cross-strut 22 upon which various units of the machine are mounted. The feed mechanism includes an upper disc 24 and a lower disc 26. The disc 24 is supported on a shaft 27 rotatably journaled at its opposite ends in bearings 28 that are adjustable by screws 30 threaded in upstanding brackets 32 fixed to the top 20. The disc 26 is similarly supported on a shaft 33 rotatably journaled at its opposite ends in bearings such as 34 that are adjustable by screws such as 36 threaded in depending brackets such as 38 secured to the underside of the table top 20. The disc 26 lies in vertical alignment with the disc 24. A rim 40, of rubber or other pliant material, is fixed on the periphery of the disc 24. The screws 30 and 36 are so adjusted with respect to their bearings and discs that the rim 40 bears with frictional contact against the periphery of the disc 26, the upper portion of the latter projecting through a transversely extending slot 42 in the table top 20. Hence, when the disc 26 is driven in rotation, the disc 24 will be driven thereby.

A series of equally spaced notches 44 provided in the periphery of the disc 26 serve the dual purpose of cooperating with the feed drive mechanism and receiving the hinges 12. The width of the slots 44 is just sufficient to receive the bearings 14 of the hinges 12 with slight clearance. The hinges 12 are fed by gravity into the notches 44 from an angularly disposed supply hopper 46 (Fig. 2) secured on the top 20. The hinges are stacked in the hopper 46, one upon another, with their bearings 14 facing downwardly as shown in Fig. 2. The outwardly projecting ends of the pintles 16 are engaged on their opposite sides by vertically spaced guiding members 48 (Fig. 9) secured internally of, and adjacent to, the sides of the hopper. The spacing between the inner ends of the members 48 accommodates the pintles 16 with just sufficient sliding clearance so that the hinges are kept in alignment centrally of the hopper, ready for feeding movement therefrom into the notches 44. The back of the hopper is cut away to provide a throat 50 which permits only one hinge 12 at a time to be removed from beneath the stack as the disc 26 is indexed, step by step, to bring the notches 44, successively one after another, into alignment with the bearings 14 of the hinges.

Any suitable means may be employed for advancing the disc 26. The means herein shown,

comprises a cylinder-piston, fluid operated, power unit 52 pivotally mounted at 53 to the strut 22. The cylinder of this unit has fluid line connections indicated at 54 and 56. These two lines connect to a control valve 58 which is, in turn, suitably connected to a source of fluid under pressure. A yoke 60 (Figs. 5 and 6) is pivoted at 62 to the upper end of the rod 64 of the piston. The yoke 60 is also pivoted at 66 to the forward ends of a pair of arms 68. Arms 68 lie on opposite sides of disc 26, and each arm is mounted for free rotary movement on shaft 33. A pin 70 is connected across the yoke 60.

By shifting the valve 58 to one of two positions, fluid passes through the line 56 and drives the piston of the unit 52 upwardly. By shifting the valve 58 to its other position, fluid passes through the line 54 and drives the piston downwardly. During the first increment of movement of the rod 64 upwardly, corresponding pivotal movement of the yoke 60 from the position shown in Fig. 6, moves the pin 70 into engagement with one of the notches 44. As the rod 64 continues its upward movement, to the position shown in Fig. 2, the disc 26 is rotated an amount corresponding to the distance between the notches 44. A stop 72 depending from the underside of the top 20 is adjusted to engage one of the arms 63 and thereby limit the upward stroke of the rod 64 and the pin 70 to insure proper, central registration of a notch 44 beneath the supply hopper 46.

When the valve 58 is operated to move the piston rod 64 downwardly, from the position shown in Fig. 2, back to the normal position shown in Fig. 6, the pin 70 simply rocks out of engagement with the notch 44 with which it was last engaged, there being sufficient friction between the discs 24 and 26 to hold them stationary during the disengaging movement.

As the disc 26 rotates step by step in feeding direction, the hinges 12 are fed, one by one, from the supply hopper 46 to a pintle heading station indicated at 74 in Fig. 2. A hinge 12 that has been advanced to the pintle heading station is engaged by the rim 40. The rim yieldingly admits the hinge but securely presses against its upper surface so that the hinge is secured in its corresponding notch 44 ready for the pintle heading operation to be performed by the heading mechanism now to be described.

The heading mechanism comprises two oppositely disposed motors 76 and 78 mounted adjacent to the right and left ends of the table top 20. The drive end of each motor shaft is connected, through conventional mechanical filters 80 and 82, to horizontally disposed square shafts 84 and 86, respectively. The free ends of the shafts 84 and 86 slidingly engage within square openings provided in sleeves 88 and 90. The sleeves are mounted for sliding and rotary movement in horizontally disposed bearings 92 and 94. The bearings 92 and 94 are formed on upstanding brackets 96 and 98 adjustably mounted on the top 20 by headed screws 100 and 102 passing upwardly through slots, such as 104, in the table top 20.

The inner ends of sleeves 88 and 90 have secured thereon, pintle heading tools 106 and 108. The tools are identical in construction and each comprises a pair of discs 110 disposed in angular relation with respect to each other in inclined slots 112, the discs being mounted for rotation in the slots on a pin 114 fixed in the tool and passing through the slots. The peripheries of the discs are curved so that at their

contiguous forward ends they form a concave surface which serves to spin a rounded end on the pintle 16 when rotatively brought into engagement therewith. The tools 106 and 108 are moved into and out of engagement with the opposite ends of the pintle 16 by arms 116 and 117 pivoted as at 118 to the brackets 96 and 98. The upper end of each arm has a yoke 120 (Fig. 8) pivoted at 122 to a ring 124 rotatably mounted on the outer end of each sleeve 88 and 90. By this construction, the sleeves may be slid toward or away from the ends of the hinge pintle 16 while, at the same time, the sleeves are rotated in opposite directions by the motors 76 and 78, respectively. The lower ends of the arms 117 and 118 extend downwardly through the openings 104 in the table top.

The outer ends of piston rods 126 and 127 of cylinder-piston, power units 128 and 130, similar to the unit 52, are pivotally connected to the lower ends of the arms 116 and 117. The outer ends of the units 128 and 130 are pivoted at 132 and 134, respectively, to projections depending from adjustable channel strips 136 and 138. The strips 136 and 138 are secured to the underside of the table top 20 by screws such as 140, passing through elongated slots provided centrally of the strips, the screws being threaded into the top 20. The outer ends of the strips 136 and 138 have lugs 144 extending upwardly into slots such as 146 provided in the top 20. Adjusting screws 148 and 150 threaded in the top 20 and rotatably journaled in the lugs 144 provide a means for adjusting the strips 136 and 138 and their units 128 and 130 longitudinally of the top 20. Following such adjustment the units are held in their adjusted position by taking up upon the screws 140. By means of the adjustment just described and, the adjustment afforded by brackets 92 and 94, the length of stroke of the heading tools 106 and 108, from their normal position shown in Fig. 1 to their pintle end-engaging positions (Figs. 3 and 4) may be readily adjusted to accommodate hinge pintles 16 of different lengths.

The units 128 and 130 each have suitable dual, fluid line connections to a control valve 152, similar to the control valve 58, which is, in turn, connected with a source of fluid under pressure. By shifting the valve 152 to one of two positions the piston rods 126 and 127 are thrust outwardly and, through the connections above described, the head-spinning tools 106 and 108 are withdrawn away from the opposite ends of the pintle 16. By shifting the valve 152 to its other position, the rods 126 and 127 are retracted within the cylinders and the arms 116 and 117 are rocked on their pivots to thrust simultaneously, the tools 106 and 108 into spinning contact with the opposite ends of the hinge pintle 16.

In operating the machine, with the motors 76 and 78 running, the valve 58 is shifted to advance a hinge from hopper 46 to the heading station 74. The valve 58 is then shifted to restore the pin 70 to normal position ready for the next operation. Next, the valve 152 is shifted to cause the tools to engage the opposite ends of the pintle and perform the spinning operation and, following this, the valve is shifted to retract the heading tools from the ends of the hinge pintle. The valve 58 is again operated to advance the next succeeding hinge 12 into the heading position 74 where the heading operation is performed as described, and so on.

Referring now to Fig. 2, an angularly disposed, depending chute 154 is secured to the underside of the table top 20 and has its lower end entering into another angularly disposed chute 156 mounted on the machine frame and having its lower end located above a receptacle 157. The bottom of the chute 154 has a slightly inturned lip 158 at its upper end. The lip 158 is slotted centrally to embrace the opposite sides of the disc 26 adjacent to its periphery. As the disc advances, step by step, the completed hinges are engaged by the lip 158 one after another, and thus removed from the notches 44 whereupon, they descend from the chute 154 into the chute 156 and thence into the receptacle 157.

The invention described herein may be manufactured and used by or for the Government of the United States of America for government purposes without the payment of any royalty thereon or therefor.

Having described the invention what is claimed as novel and desired to be protected by Letters Patent of the United States is:

1. A feeding mechanism for successively positioning a series of assembled hinges in work engaging relation with means for spinning heads on the ends of pintles extending therefrom, said feeding mechanism comprising, a disc rotatable about a horizontal axis having substantially rectangular work receiving notches equally spaced about the periphery thereof, power driven means cooperating with said work receiving notches for advancing said disc in steps equal to the spacing between successive notches, said driving means including a ratchet adapted to engage said notches and driven by a rod having a stroke of a length sufficient to advance said disc one of the aforesaid steps and on the return stroke falling back to engage the next successive notch in said disc, said disc being of such thickness that the hinges carried within said notches extend beyond the opposite faces of said disc, the central portion of the hinge containing the pintle being received in said notches and the leaves thereof lying along the periphery of the disc, the aforesaid spacing of the notches being sufficient to provide a space between successive hinges along the periphery of said disc, a resilient disc engaging said driven disc at the uppermost portion of said driven disc thereby to rigidly maintain said hinge in position in said notch and to maintain said driven disc in a condition of rest, said hinge while engaged by said resilient disc being positioned in the aforementioned work engaging relation with respect to said spinning means, the hinges falling from said disc feeding mechanism upon further rotation of said hinge beyond said position of engagement with said resilient disc.

2. A feeding mechanism for successively positioning a series of assembled hinges in work engaging relation with means for spinning heads on the ends of pintles extending therefrom, said feeding mechanism comprising, a disc rotatable about a horizontal axis having substantially rectangular notches equally spaced about the periphery thereof, power driven means cooperating with said work receiving notches for advancing said disc in steps equal to the spacing between successive notches, said driving means including a ratchet adapted to engage said notches and driven by a rod having a stroke of a length sufficient to advance said disc one of the aforesaid steps and on the return stroke falling back to engage the next successive notch in said disc, a supply hopper positioned in juxtaposition with said disc adapted to drop single assembled hinges centrally in successive work receiving notches, said disc being of such thickness that the hinges extend beyond the opposite faces of said disc, the central portion of the hinge containing the pintle being received in said notches and the leaves thereof lying along the periphery of the disc, the aforesaid spacing of the notches being sufficient to provide a space between successive hinges along the periphery of said disc, a resilient disc engaging said driven disc at the uppermost portion of said driven disc thereby to rigidly maintain said hinge in position in said notch and to maintain said driven disc in a condition of rest, said hinge while engaged by said resilient disc being positioned in the aforementioned work engaging relation with respect to said spinning means, the hinges falling from said disc feeding mechanism upon further rotation of said hinge beyond said position of engagement with said resilient disc.

3. A mechanism for successively positioning and intermittently holding hinges in a predetermined work engaging position, said mechanism comprising a first disc rotatable about a first horizontal axis having substantially rectangular work receiving notches equally spaced about the periphery thereof, a second disc having a resilient rim thereon rotatable about a second horizontal axis parallel to said first axis and contacting said first disc at its uppermost portion, the point of contact of said first and second discs defining said work engaging position, and power driven means cooperating with said work receiving notches for advancing said first disc in steps equal to the spacing between successive notches, said driving means including a ratchet adapted to engage said notches and driven by a rod having a stroke of a length sufficient to advance said first disc one of the aforesaid steps and on the return stroke falling back to engage the next successive notch in said first disc, said disc being of such thickness that the hinges carried within said notches extend beyond the opposite faces of said first disc, the central portion of the hinge containing the pintle being received in said notches and the leaves of said hinge lying along the periphery of said first disc. said second disc rigidly maintaining said hinge in position within said notch and periodically maintaining said first disc in a condition of rest at the above-defined work engaging position, the hinges falling from said mechanism upon further rotation of said hinge beyond said work engaging position.

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