

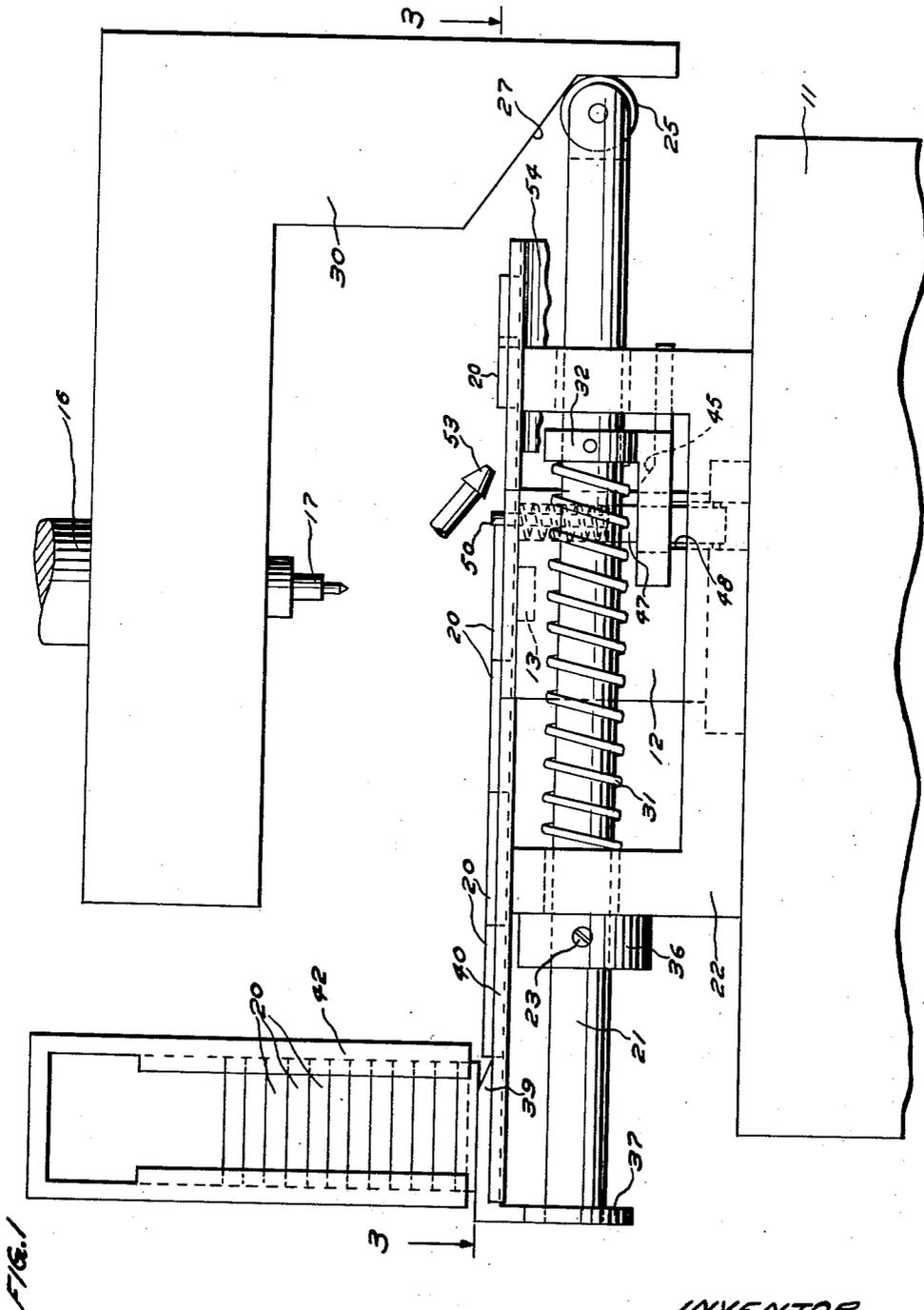
Dec. 13, 1960

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PUNCHING APPARATUS INCLUDING INTERMITTENT
FEED MEANS AND WORK POSITIONING MEANS

2,963,931

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3 Sheets-Sheet 1



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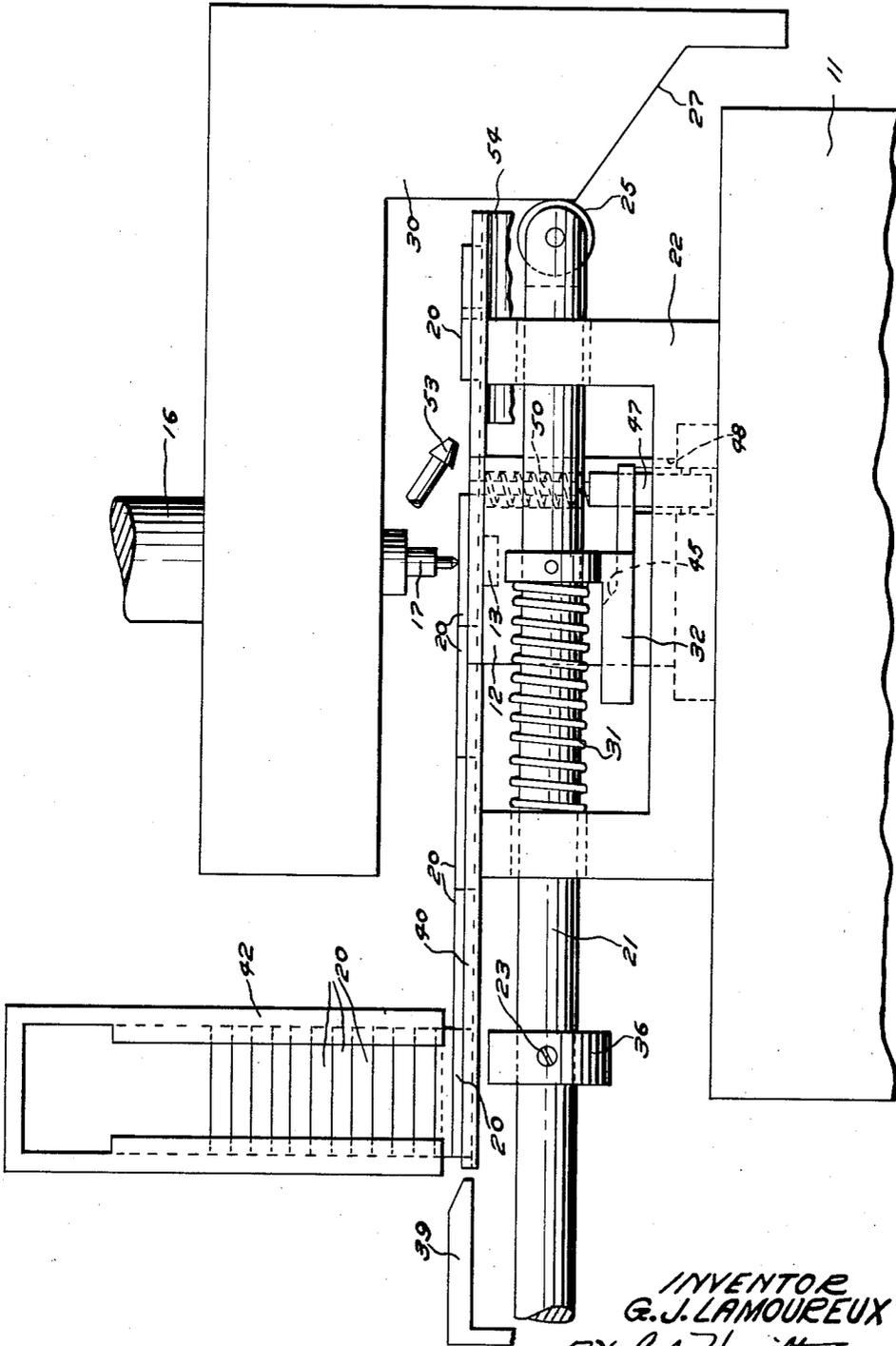


FIG. 2

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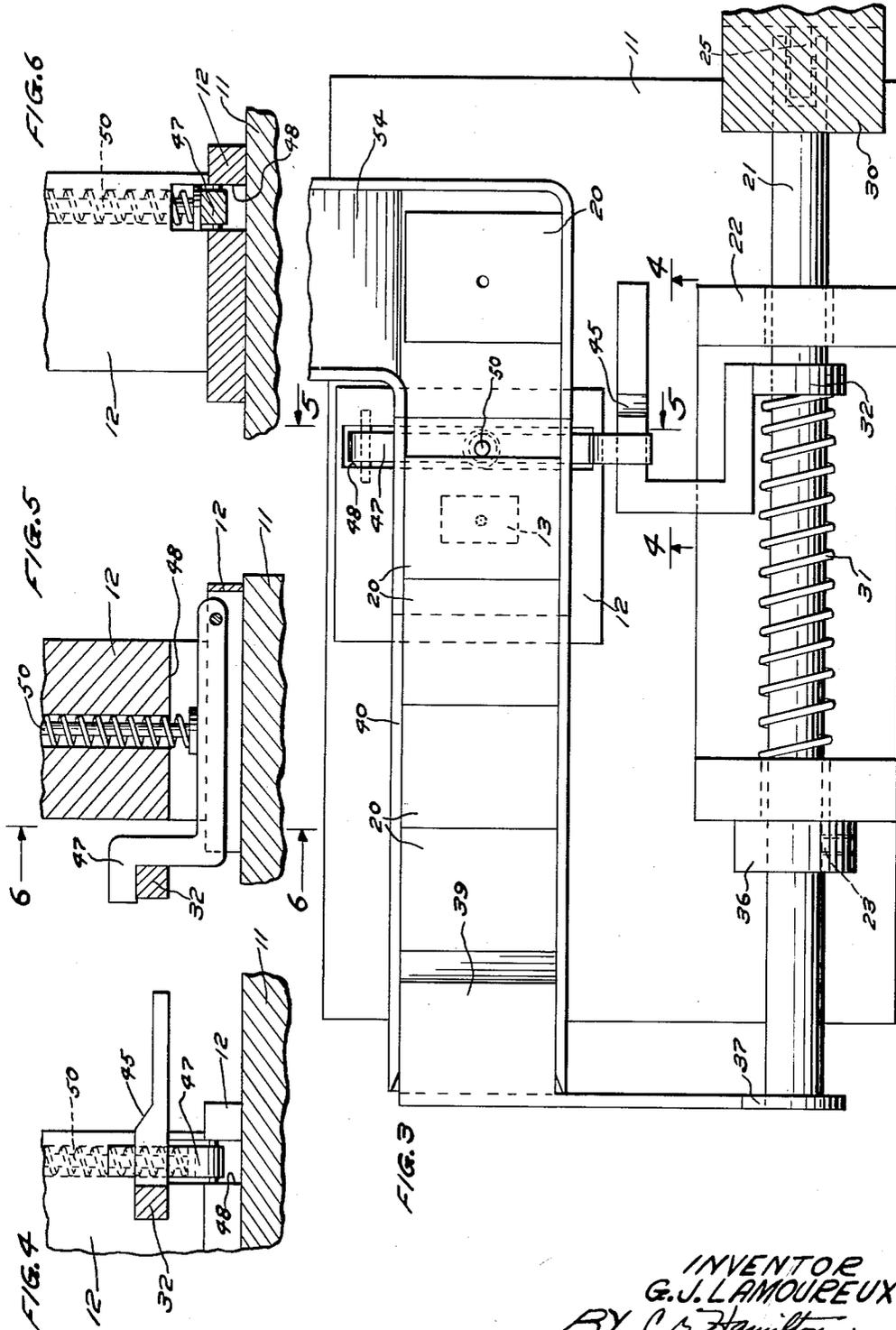
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PUNCHING APPARATUS INCLUDING INTERMITTENT FEED MEANS AND WORK POSITIONING MEANS

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1 Claim. (Cl. 83—223)

This invention relates to work feeding devices and more particularly to devices for feeding work parts into fabricating position between a punch and die.

An object of this invention is to provide a new and novel device for feeding work parts into fabricating position between a punch and die.

Another object of this invention is to provide a new and novel device for automatically feeding work parts sequentially from a magazine into a fabricating position between a reciprocating punch and a die in timed relationship with the punch.

A further object of this invention is to provide a novel device for automatically feeding work parts from a magazine and for stopping them in fabricating position on a die.

One embodiment of the present invention for feeding parts into fabricating position between a reciprocating punch and a die may include a feed element reciprocated along a path by a cam carried by the punch whereby the feed element is retracted to permit a work part to drop from a magazine into the path and is then advanced to move the work part into fabricating position on the die. A camming arm including a stepped surface and carried by the feed element actuates a lever to move a stop into the path of travel of the work part to stop it at the fabricating position.

Other objects and advantages of the invention will become apparent by reference to the following detailed description and the accompanying drawings illustrating a preferred embodiment of the invention, in which

Fig. 1 is a front view of the device showing the punch in a raised position and the feed element in an advanced position to hold a work part against the stop;

Fig. 2 is a front view of the device showing the punch in a lowered position and the feed element in a retracted position;

Fig. 3 is a plan view taken on line 3—3 of Fig. 1 showing the path of travel of the work parts;

Fig. 4 is a fragmentary cross-sectional view taken on line 4—4 of Fig. 3 showing a profile of the stepped surface on the camming member carried by the feed element;

Fig. 5 is a fragmentary cross-sectional view taken on line 5—5 of Fig. 3 showing the lever which lifts the stop to a raised position; and

Fig. 6 is a cross-sectional view taken on line 6—6 of Fig. 5 showing the lever mounted in a slot in the die supporting block.

Referring now in detail to the drawings, a base 11 is shown supporting a die block 12 upon which is mounted a die 13 (Fig. 3). A ram 16, actuated by a hydraulic cylinder (not shown), carries a punch 17 for cooperation with the die 13 to fabricate work parts 20. A rod 21 slidably mounted in a bracket 22 secured to the base 11 is provided with a roller 25 which is engaged and displaced to the left (Figs. 1, 2 and 3) by a cam surface 27 on an actuating member 30 secured to the ram 16. A spring 31 mounted on the rod 21 engages a camming member 32 secured to the rod 21 to urge the

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rod to the right (Figs. 1, 2 and 3) against the action of the actuating member 30. A collar 36 secured to the rod 21 by a set screw 23 engages the bracket 22 to limit the distance that the spring 31 can move the rod 21. The position of the collar 36 on the rod 21 can be adjusted to vary the stroke thereof.

A feed element 37 secured to the rod 21 is provided with a portion 39 which is positioned in a horizontal chute 40 which is provided with upstanding outer edges to guide work parts 20 across the die 13 mounted on the die block 12. A magazine 42 carrying a supply of work parts 20 is positioned above the chute 40 in such a position that when the rod 21 is retracted by the camming member 30, the lowermost work part 20 in the magazine 42 is permitted to drop into the chute 40 in a position forward of the portion 39 of the feed element 37. When the actuating member 30 is raised by the ram 16, the spring 31 moves the rod 21 and the feed element 37 to the right (Figs. 1, 2 and 3) to advance the work parts 20 on the chute toward fabricating position.

The camming arm 32 carried by the rod 21 is provided with a stepped camming surface 45 which engages a lever 47 which is pivotally mounted in a slot 48 in the die block 12. The lever 47 engages a spring-loaded stop 50 slidably mounted in the die block 12 whereby, when the rod 21 is moved to advance the work parts 20, the cam surface 45 lifts the lever 47 to raise the stop 50 into a position to engage and hold a work part 20 in fabricating position between the punch 17 and the die 13. A nozzle 53 connected to a compressed air source (not shown) directs a stream of air onto the fabricated parts 20 to move them down an inclined portion 54 of the chute 40.

In operation of the device, the ram 16 is reciprocated in a vertical direction whereby the punch 17 cooperates with the die 13 to fabricate the work parts 20 as they are fed in sequence across the die. As the ram 16 is lowered, the actuating member 30 engages the roller 25 and moves the rod 21 to the left (Figs. 1, 2 and 3). As the rod 21 moves to the left, it retracts the feed element 37 to permit one of the work parts 20 to drop out of the magazine 42 onto the chute 40, and it also carries the camming arm 32 to the left (Figs. 1, 2, 3 and 4). When the camming arm 32 moves to the left the lever 47 drops along the surface 45 to a lowered position and the spring-loaded stop 50 is retracted from its exposed position in the chute 40. After the work part 20 positioned on the die 13 is fabricated, the ram 16 is raised to lift the punch 17 and the actuating member 30. As the actuating member 30 is raised, the spring 31 moves the rod 21 to the right (Figs. 1, 2 and 3), carrying the feed element 37 and the camming arm 32 with it. The portion 39 of the feed element 37 engages the work part in the chute 40 and advances it, with others before it, toward fabricating position, the fabricated part 20 being pushed out of fabricating position over the retracted stop 50. After a substantial portion of the fabricated part 20 has passed over the stop 50, the cam surface 45 on the camming arm 32 lifts the lever 47 to raise the stop 50 whereby it will engage the leading edge of the next work part 20 to position it on the die 13. The above-described procedure is then repeated.

It is to be understood that the above-described arrangements are simply illustrative of the application of the principles of this invention. Numerous other arrangements may be readily devised by those skilled in the art which will embody the principles of the invention and fall within the spirit and scope thereof.

What is claimed is:

70 A machine for fabricating work parts comprising, a base, a die block on said base, a die in said die block, a punch, means for reciprocating said punch toward and

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away from said die, a chute mounted on said base and leading to said die, a magazine for holding work parts mounted on said base in position to feed work parts into said chute, a bracket fixedly mounted on said base and having a pair of vertically extending horizontally spaced portions, an elongated rod slidably mounted in said spaced bracket portions and having each end thereof extending beyond a respective one of said portions, said rod being parallel to said chute and reciprocable between a retracted and an advanced position, a work part feeding member secured to said rod adjacent one end thereof and having a portion thereof slidable in said chute between an advanced position blocking the feed of work parts from said magazine and a retracted position permitting the feed of work parts from said magazine, a camming arm secured to said rod between the spaced portions of said bracket, resilient means disposed between said camming arm and one of said bracket portions to resiliently urge said rod toward its advanced position, means on said rod for limiting movement of said rod toward its advanced position, cam engaging means on the other end of said rod, a cam carried by the punch reciprocating means and engageable with said cam engaging means to move said rod to its retracted position against the action of said resilient means upon downward movement of said punch, whereby said work part feeding member moves in said chute to allow a work part to be fed from said magazine to said chute, said cam further allowing movement of said rod to its advanced

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position by said resilient means upon upward movement of said punch, whereby said work part feeding member feeds a work part along said chute into a fabricating position, a stop member disposed in said die block and designed to have one end thereof project into said chute to engage and hold a work part in fabricating position, means for urging said stop member out of a position wherein it projects into said chute, a lever pivotally mounted in said die block and engageable with the other end of said stop member, said camming arm having a stepped surface engaged throughout a feeding cycle with said lever and cooperating therewith to limit by the spacing of the steps the movement of said stop member by said urging means, whereby when said rod is moved to its advanced position the camming arm cams the lever to move said stop member against the action of said urging means into a position wherein said stop member projects into said chute.

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