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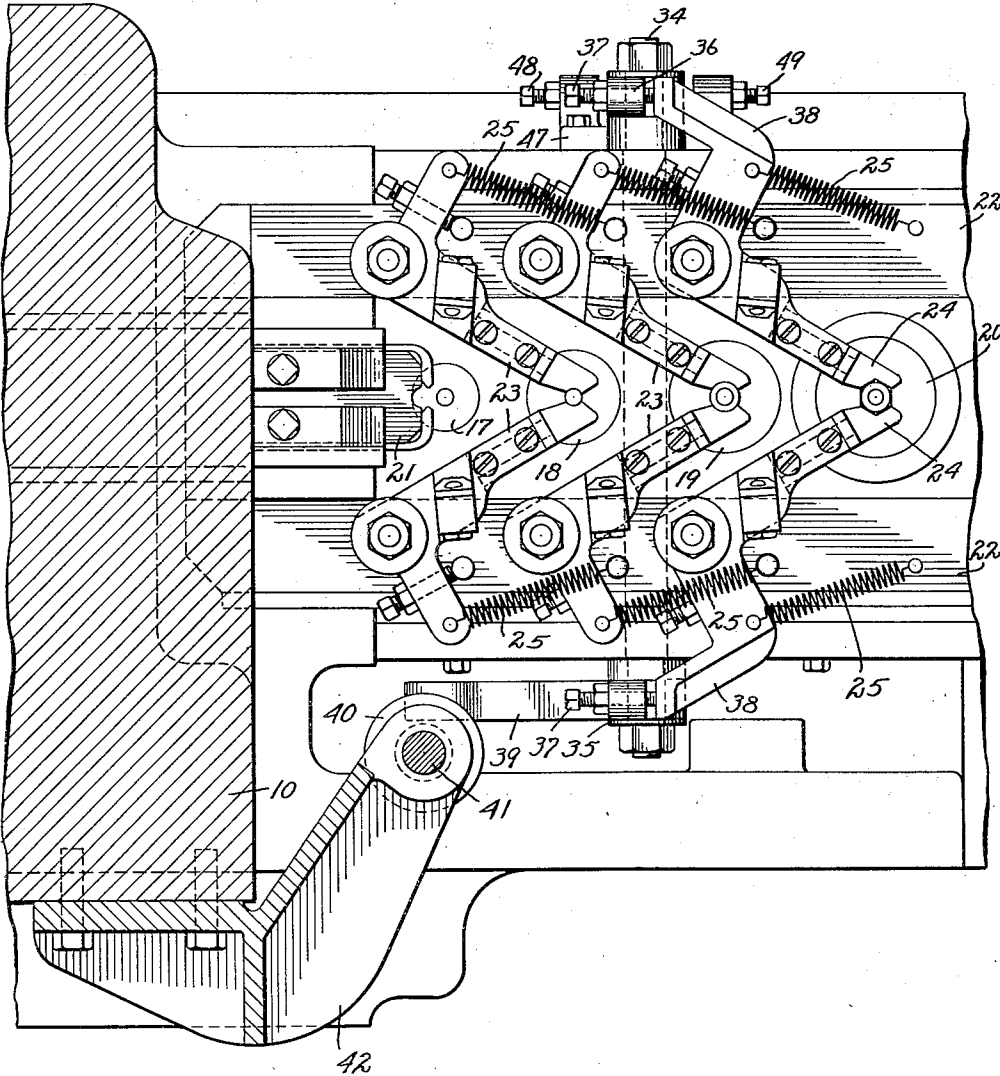
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FINGER GRIP MECHANISM

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2 Sheets-Sheet 1

Fig. 1



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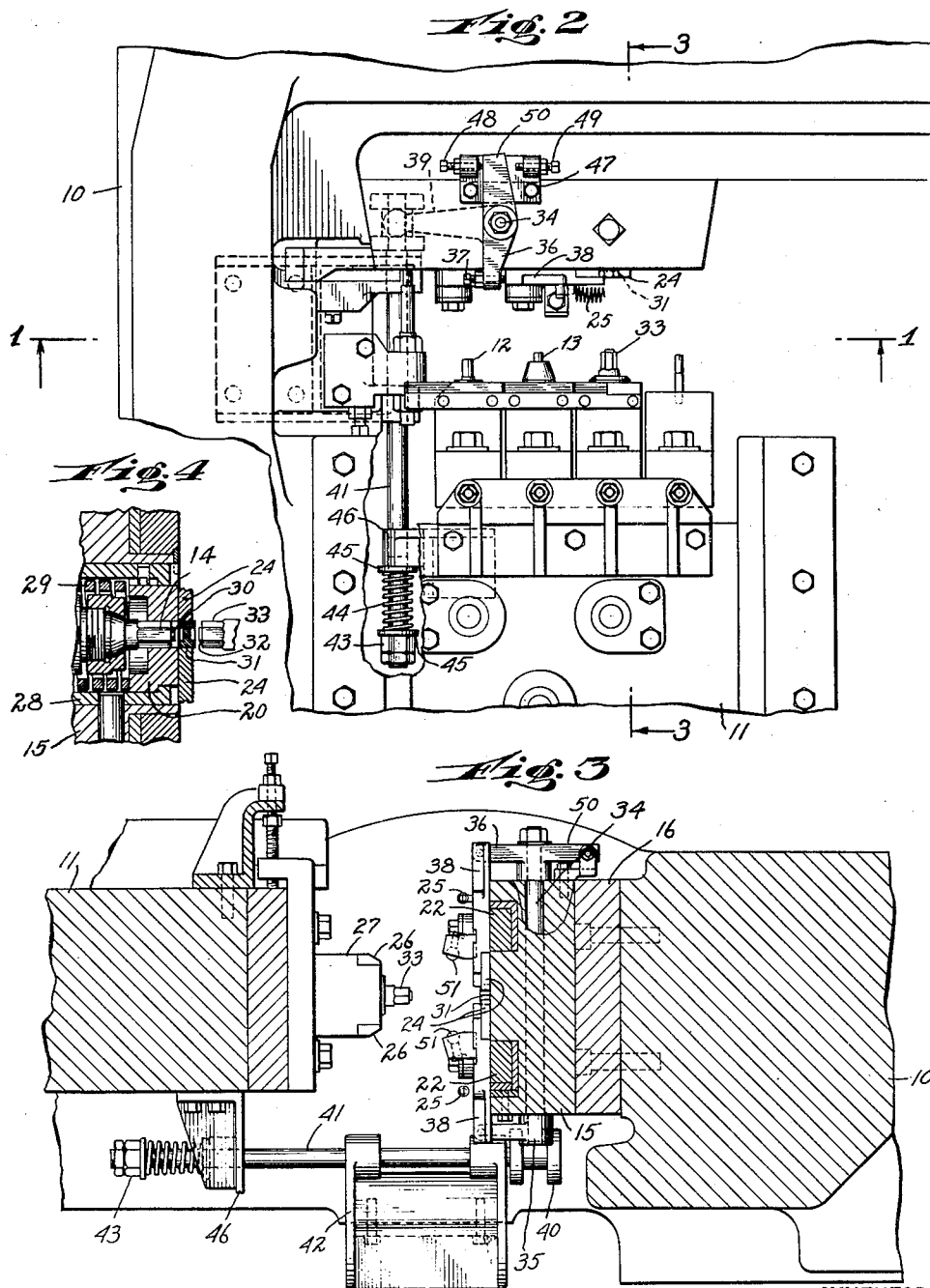
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FINGER GRIP MECHANISM

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This invention relates to a new and improved finger grip mechanism, having means for applying an added grip pressure to an article therein, which in a broad sense will act also as a stripping device.

As shown herein the invention is associated with an upsetting machine or the like that is equipped for the production of articles such as nuts, but its application is very much broader, as it may be used for articles of various shapes other than nuts, such as bolts and screw blanks, and associated with other types of mechanism, and function with equal facility.

It is the object of this invention, among other things, to provide such a device with means whereby an added or supplemental pressure may be applied through the fingers to an article gripped therebetween at a predetermined period of the cycle of operations of the transfer mechanism and accomplish this object with mechanism of few parts that may be readily applied to machines of conventional form without rebuilding the same.

To these, and other ends, the invention consists in the finger grip mechanism, having certain details of construction and combinations of parts, as will be hereinafter described and more particularly pointed out in the claims.

Referring to the drawings, in which like numerals of reference designate like parts in the several figures;

Figure 1 is a front view of the die portion of an upsetting machine and adjacent parts, looking toward the dies and transfer mechanism;

Figure 2 is a plan view;

Figure 3 is a sectional view thereof, the parts in section being taken generally upon line 3—3 of Figure 2; and

Figure 4 is a fragmentary view of the punch and associated die mechanism, with which this improved finger grip mechanism is particularly associated.

In the herein shown embodiment of the invention, which is only one of its many forms; 10 indicates the body or frame of a header, upsetting machine or the like, within which is mounted a reciprocating gate 11, having associated therewith a plurality of punch holders 27, within which are secured the punches 12, 13 and 33.

Secured to the frame 10 in front of the backing block 16, and opposite the gate 11, is a die block 15, in which are a plurality of dies 17, 18, 19 and 20, shaped to produce the desired article by successive operations.

Mounted within the frame, and operating in a well known manner, is a cutter 21. Secured thereto and movable therewith are the transfer bars 22, upon each of which are the transfer fingers 23 and 24, the engaging ends of which are moved toward each other by suitable springs 25 and separated by cams 26 on the punch holders 27, which engage poppets 51 on the fingers.

The mechanism, other than the fingers 24, above described is now known in the art and constitutes no part of this present invention.

In operation a length of wire is fed through the die 17, the projecting end thereof is cut off by the cutter, and carried thereby to the die 18. At this station the blank is projected into the die 18 by the punch 12 and an upsetting or other operation performed thereon.

The cutter 21 is withdrawn to the position substantially shown in Figure 1, ready for another cut-off operation. By a suitable and well known knockout mechanism the blank is then ejected from the die while the gate 11 recedes therefrom. The blank is then grasped between the first set of fingers 23 and at the next cut-off operation is carried over and into line with the die 19. The punch 13 projects the blank into the die 19 and a required operation performed thereon, during which time the cutter and first set of fingers move to their former position, as shown in the drawings. After the blank is ejected from the die 19 by suitable knockout mechanism it is grasped by the next set of fingers 23 and transferred into register with the die 20 for required operations thereon. The cutter and fingers are again withdrawn ready for another cut-off and transfer operation. At each cycle of operations there is a partially completed blank in each of the dies 18, 19 and 20, so that at each stroke of the gate 11 an operation is performed on each blank at each station, substantially as outlined.

This invention relates particularly to the transfer fingers 24 and the operation thereof.

The die 20 is mounted in a sleeve 28 in the die block 15 and moved relatively therein in one direction by a spring 29. The outer end of the knockout rod 14 is provided with a projection 30 to form a depression in the blank 31 at this station, a projection 32 being similarly formed on the outer end of the co-operating punch 33. Heretofore the knockout rod 14 had an opening within which a pin, of substantially the same cross sectional area as the projection 30, was movably mounted, which when drawn into the knockout rod, stripped the blank 31 therefrom. In some cases a hole in the knockout rod weak-

ened it materially and thereby increased the possibility of its fracture. As considerable pressure is required to form the depression in the blank, the latter had a tendency to stick to the depression forming pin and thus require considerable pull to dislodge it. In this invention the projection 30 is an integral part of the knockout rod 14, as is also the projection 32 on the punch 33 and the transfer fingers are utilized as a stripping device. This is accomplished by applying sufficient pressure upon the blank by the fingers 24 to hold the same rigid and permit the withdrawal of the projections 30 and 32 therefrom by mechanism hereinafter described.

Journalled in the die block 15 is a rock shaft 34, having an arm 35 thereon under the die block and an arm 36 thereon above the die block. Threaded in each arm is a set screw 37, the inner end of which engages the tail 38 on the finger 24. Rotary motion is imparted to the rock shaft 34 through a rock arm 39, preferably integral with the arm 35, the outer end of which projects into a groove in the spool 40 on a reciprocating shaft 41 journalled in a bracket 42 fixed to the frame 10. This shaft 41 projects through an opening in a pressure plate 46 fixed on the gate 11, and near its outer end carries suitable lock and jamb nuts 43, between which and the pressure plate 46 is a coil spring 44 which abuts at its ends against collars 45. As the gate 11 moves away from the die block 15 the shaft 41 is moved lengthwise against the tension of the spring 44. This rocks the rock arm 39 and with it the shaft 34. The timing of these parts is such that the gate recedes and allows the knockout mechanism to eject the blanks from the several dies and cut off a new blank from the rod length; and this, as well as the incomplete predecessor blanks advanced by the transfer mechanism to the successive dies in the series before the punches are advanced by the gate in its next forward movement.

As the knockout mechanism is actuated, additional pressure is applied to the fingers 24 through the means above described, that is, the rock shaft 34, arms 35 and 36, and set screws 37. The extent of the pressure and the timing of the application thereof are determined in part by adjustment of the screws 37.

In a fixed bracket 47 are the screws 48 and 49 that are on opposite sides of the tail 50 of the arm 36. The screw 48 is set so as to just clear the tail 50 to allow the full pressure of the grip by the fingers 24, or to engage the same to partially limit such pressure. The screw 49 forms a stop to limit the extent of rotation of the rock shaft 34 in one direction, as does also the screw 48 in the opposite direction. After the transfer fingers 24 begin their transfer movement, the tails 38 thereon move away from the screws 37 and thereafter such pressure as is applied to the fingers is by the springs 25.

Obviously there may be variations and modifications in the details of the invention as disclosed in the particular embodiment herein, and therefore desire it to be understood that the invention is not limited to the herein disclosure but all that falls fairly within the spirit and scope of the appended claims.

What I claim as new is:—

1. In mechanism of the character described; a plurality of sets of co-operating tools, one tool in each set being movable toward and away from another tool in the same set; a movable member; a plurality of fingers on the movable mem-

ber and arranged to grasp an article while associated with said tools, said member and fingers being adapted to transfer an article from one of said sets of tools to another set of tools; means, the action of which is initiated through the parts associated with a moving tool while in motion, for applying sufficient pressure to the article through the fingers to hold the article and strip it from the tools.

2. In mechanism of the character described; a plurality of stationary tools; a reciprocating gate; a plurality of co-operating tools on the gate; means for successively transferring an article from a position in line with one of the stationary tools to a position in line with another stationary tool, comprising a movable member and a plurality of fingers associated therewith; and means actuated by said gate for applying pressure to some of said fingers and holding an article therebetween with sufficient force to strip the article from the tools.

3. In mechanism of the character described; a plurality of stationary tools; a reciprocating gate; a plurality of co-operating tools on the gate; means for successively transferring an article from a position in line with one of the stationary tools to a position in line with another stationary tool, comprising a movable member, and a plurality of fingers associated therewith; means actuated by said gate for applying pressure to some of said fingers and holding an article therebetween with sufficient force to strip the article from the tools; and means connected with the movable member for holding the fingers under pressure during the transfer movement thereof.

4. In mechanism of the character described; a plurality of stationary tools; a reciprocating gate; a plurality of co-operating tools on the gate; means for successively transferring an article from a position in line with one of the stationary tools to a position in line with another stationary tool, comprising a movable member, and a plurality of fingers associated therewith; and means actuated by said gate for applying pressure to some of said fingers and holding an article therebetween with sufficient force to strip the article from the tools, said means comprising in part a rock shaft, elements associated with the rock shaft and engaged by the last mentioned fingers during the movement thereof, and a reciprocating member in the path of movement of the gate for actuating the rock shaft.

5. In mechanism of the character described; a plurality of stationary tools; a reciprocating gate; a plurality of co-operating tools on the gate; means for successively transferring an article from a position in line with one of the stationary tools to a position in line with another stationary tool, comprising a movable member, and a plurality of fingers associated therewith; and means actuated by said gate for applying pressure to some of said fingers and holding an article therebetween with sufficient force to strip the article from the tools, said means comprising in part a rock shaft, elements associated with the rock shaft in line with and for the last mentioned fingers during the movement thereof, a reciprocating member in the path of movement of the gate for actuating the rock shaft, and a resilient element associated with the reciprocating member, through which the latter is actuated in one direction.

6. In mechanism of the character described; a plurality of stationary tools; a reciprocating

gate; a plurality of co-operating tools on the gate; means for successively transferring an article from a position in line with one of the stationary tools to a position in line with another stationary tool, comprising a movable member, and a plurality of fingers associated therewith; and means actuated by said gate for applying pressure to some of said fingers and holding an article therebetween with sufficient force to strip the article from the tools, said means comprising in part a rock shaft, elements associated with the rock shaft and engaged by the last mentioned fingers during the movement thereof, a reciprocating member in the path of movement of the gate for actuating the rock shaft, and an adjustable member connected with each of said elements to vary the relative position of the application of pressure to the said last mentioned fingers.

7. In mechanism of the character described; a plurality of stationary tools; a reciprocating gate; a plurality of co-operating tools on the gate; means for successively transferring an article from a position in line with one of the stationary tools to a position in line with another stationary tool, comprising a movable member, and a plurality of fingers associated therewith; and means actuated by said gate for applying pressure to some of said fingers and holding an article therebetween with sufficient force to strip the article from the tools, said means comprising in part a rock shaft, elements associated with the rock shaft and engaged by the last mentioned fingers during the movement thereof, a reciprocating member in the path of movement of the gate for actuating the rock shaft, and means for limiting the extent of movement of the rock shaft.

8. In mechanism of the character described; a plurality of sets of co-operating tools; a reciprocating gate; means for successively transferring an article from one set of said tools to another set of said tools comprising a movable member and a plurality of fingers arranged to grasp the article therebetween; means, in part connected with and movable with the fingers and in part independent thereof, for applying pressures to said fingers whereby the article is held between the fingers under a pressure different at one portion of the cycle of operations than at other portions thereof.

9. In mechanism of the character described; a plurality of sets of co-operating tools; a reciprocating gate; means for successively transferring an article from one set of said tools to another set of said tools, comprising a movable member and a plurality of fingers arranged to grasp the article therebetween; means, in part connected with and movable with the fingers and in part independent thereof, for applying pressures to said fingers whereby the article is held between the fingers under a pressure different at one portion of the cycle of operations than at other portions thereof, the timing of the application of said pressures being variable.

10. In mechanism of the character described; a plurality of sets of co-operating tools; a reciprocating gate; means for successively transferring an article from one set of said tools to another set of said tools, comprising a movable member and a plurality of fingers arranged to grasp the article therebetween; means, in part connected with and movable with the fingers and in part independent thereof, for applying pressures to said fingers whereby the article is held

between the fingers under a pressure different at one portion of the cycle of operations than at other portions thereof, said movable member being in a rest position during a portion of the cycle of operations thereof, and one of said pressures being applied to the fingers while the movable member is in such rest position.

11. In mechanism of the character described; a plurality of sets of co-operating tools; a reciprocating gate; means for successively transferring an article from one set of said tools to another set of said tools, comprising a movable member and a plurality of fingers arranged to grasp the article therebetween; means, in part connected with and movable with the fingers and in part independent thereof, for applying pressures to said fingers whereby the article is held between the fingers under a pressure different at one portion of the cycle of operations than at other portions thereof, said movable member being in a rest position during a portion of the cycle of operations thereof, one of said pressures being applied while the movable member is in such rest position and another of said pressures during the transfer movement of said movable member.

12. In mechanism of the character described, wherein an article is subjected to plural tool operations and transferred to and from the tools; a movable member; a plurality of fingers on the movable member that grasp the article while associated with said tools, and thereafter carry it away therefrom during the transfer movement of the movable member; means for applying pressure to the article through said fingers with sufficient force to hold the article and strip the same from said tools; and other means for applying pressure to said article through said fingers with sufficient force to hold the article between the fingers while moving away from said tools.

13. In mechanism of the character described, wherein an article is subjected to plural tool operations and transferred to and from the tools; a movable member; a plurality of fingers on the movable member that grasp the article while associated with said tools, and thereafter carry it away therefrom during the transfer movement of the movable member; means for applying pressure to the article through said fingers with sufficient force to hold the article and strip the same from said tools; and means for applying pressure to said article through said fingers with sufficient force to hold the article between the fingers while moving away from said tools, the last mentioned pressure being less than the first mentioned pressure.

14. In mechanism of the character described; a plurality of sets of co-operating tools; a reciprocating gate; means for successively transferring an article from one set of said tools to another set of said tools, comprising a movable member and a plurality of fingers arranged to grasp the article therebetween; means associated with the movable member for imparting movement to the fingers thereon; and other means independent of the movable member for imparting movement to the fingers.

15. In mechanism of the character described; a plurality of sets of co-operating tools; a reciprocating gate; means for successively transferring an article from one set of said tools to another set of said tools, comprising a movable member and a plurality of fingers arranged to grasp the article therebetween; means associated with the movable member for imparting movement to the fingers thereon; and other means

independent of the movable member for imparting movement to the fingers, the timing of this latter movement being variable.

16. In mechanism of the character described;
 5 a pair of operating tools; a reciprocating gate, one of said pairs of operating tools being movable with the gate; means for stripping an article from said tools after it has been operated on thereby and moving it away therefrom, comprising
 10 in part a movable member, a plurality of fingers associated with the movable member, and plural means for imparting independent movements to said fingers on said movable member, one of said plural means being derived from the
 15 movement of the gate and transmitted through a connection to a rock shaft, having members thereon corresponding in number with the number of said fingers, and projecting into the path of movement of said fingers.

17. In mechanism of the character described;
 20 a pair of operating tools that move toward and away from each other; a reciprocating gate; means for holding an article after it has been operated on by said tools and while the latter are
 25 moving away therefrom and thereafter moving the article away from said tools, said means comprising in part a movable member, a plurality of fingers associated with the movable member,
 30 means for imparting independent movement to the fingers whereby said article will be grasped with sufficient force to hold the same rigid while the tools are being moved away therefrom, said
 35 means being in part actuated by the reciprocating gate and comprising in part a rock shaft, members thereon corresponding in number with the number of said fingers and projecting into the path of movement of said fingers, and a connection between the gate and rock shaft that permits overmovement of the gate.

18. In mechanism of the character described;
 40 a pair of operating tools; a reciprocating gate, one of said pairs of operating tools being movable with the gate; means for stripping an article from said tools after it has been operated on
 45 thereby and moving it away therefrom, comprising in part a movable member, a plurality of fingers associated with the movable member, and means for imparting independent movement to the fingers on the movable member, comprising
 50 in part a rock shaft, members on the rock shaft that project into the path of movement of the fingers, a reciprocating shaft, having an operable connection with said rock shaft, and a connection between the reciprocating shaft and the
 55 gate, whereby the rock shaft may be actuated by the movement of the gate.

19. In mechanism of the character described;
 60 a pair of operating tools; a reciprocating gate, one of said pairs of operating tools being movable with the gate; means for stripping an article from said tools after it has been operated on thereby and moving it away therefrom, comprising in part a movable member, a plurality of fingers associated with the movable member, and
 65 means for imparting independent movement to the fingers on the movable member, comprising

in part a rock shaft, members on the rock shaft that project into the path of movement of the fingers, a reciprocating shaft, having an operable connection with said rock shaft, a connection between the reciprocating shaft and the gate, whereby the rock shaft may be actuated by the movement of the gate, and adjustable stop means for limiting the movement of the rock shaft. 80

20. In mechanism of the character described;
 85 a pair of operating tools; a reciprocating gate, one of said pairs of operating tools being movable with the gate; means for stripping an article from said tools after it has been operated on thereby and moving it away therefrom, comprising in part a movable member, a plurality of
 90 fingers associated with the movable member, and means for imparting independent movement to the fingers on the movable member, comprising in part a rock shaft, members on the rock shaft that project onto the path of movement of the
 95 fingers, adjustable parts on said members whereby to vary the timing of the movement of the fingers, a reciprocating shaft, having an operable connection with said rock shaft, a connection between the reciprocating shaft and the
 100 gate, whereby the rock shaft may be actuated by the movement of the gate.

21. In mechanism of the character described;
 105 a pair of operating tools; a reciprocating gate, one of said pairs of operating tools being movable with the gate; means for stripping an article from said tools after it has been operated on thereby and moving it away therefrom, comprising in part a movable member, a plurality of
 110 fingers associated with the movable member, and means for imparting independent movement to the fingers on the movable member, comprising in part a rock shaft, members on the rock shaft that project into the path of movement of the fingers, a reciprocating shaft, having an operable
 115 connection with said rock shaft, a connection between the reciprocating shaft and the gate, whereby the rock shaft may be actuated by the movement of the gate, and a spring between the reciprocating shaft and the gate which will
 120 permit overmovement of the gate without actuating the rock shaft.

22. In mechanism of the character described;
 125 a pair of operating tools; a reciprocating gate, one of said pairs of operating tools being movable with the gate; means for stripping an article from said tools after it has been operated on thereby and moving it away therefrom, comprising in part a movable member, a plurality of
 130 fingers associated with the movable member, and means for imparting independent movement to the fingers on the movable member, comprising in part a rock shaft upon that side of the fingers opposite to that of the gate, members on the
 135 rock shaft that project into the path of movement of the fingers, a reciprocating shaft, having an operable connection with said rock shaft, and a connection between the reciprocating shaft and the gate, whereby the rock shaft may be
 140 actuated by the movement of the gate.

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