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WORK TRANSFER MECHANISM FOR PUNCH PRESSES

Filed July 18, 1962 2 Sheets-Sheet 1

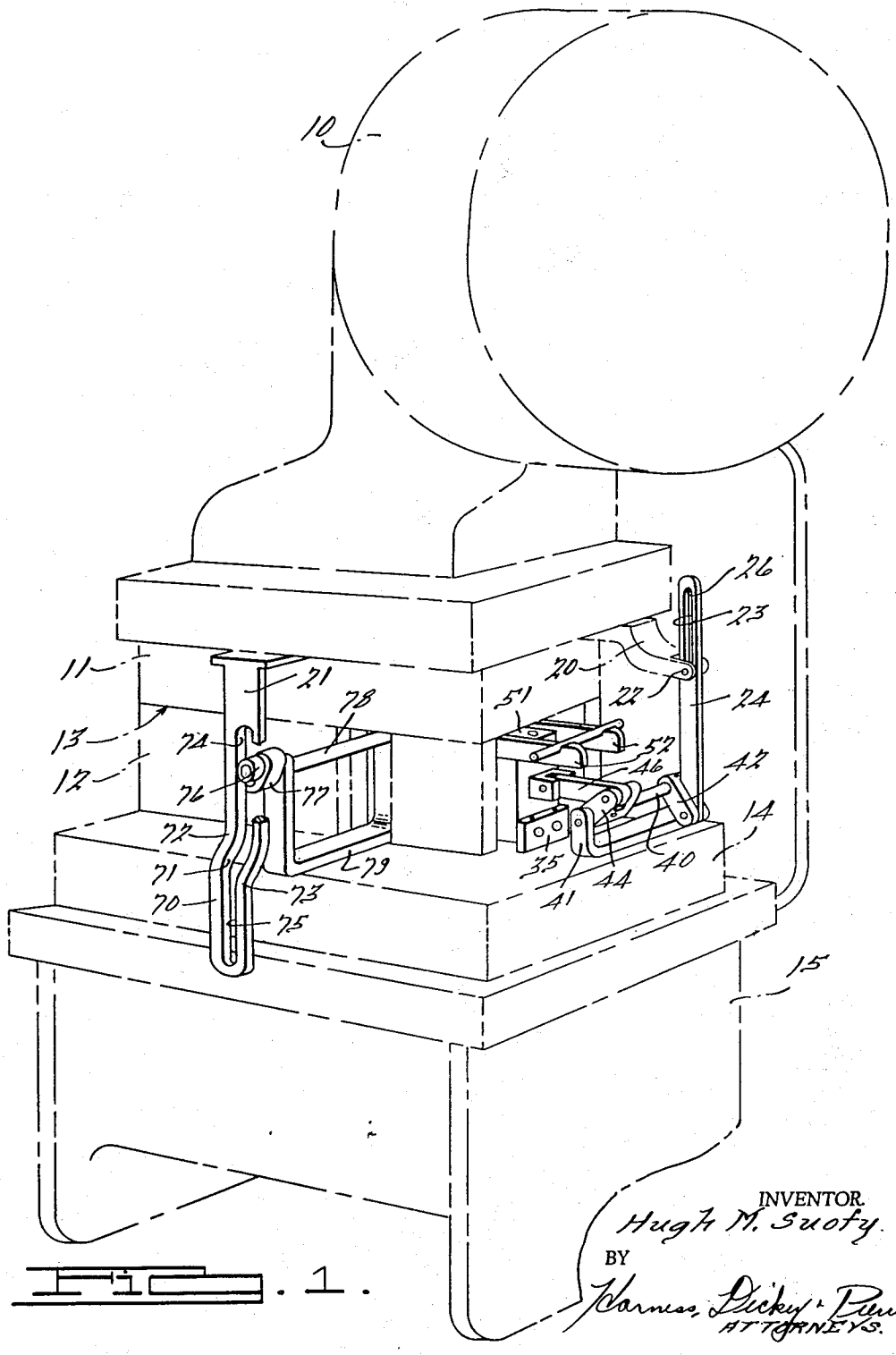


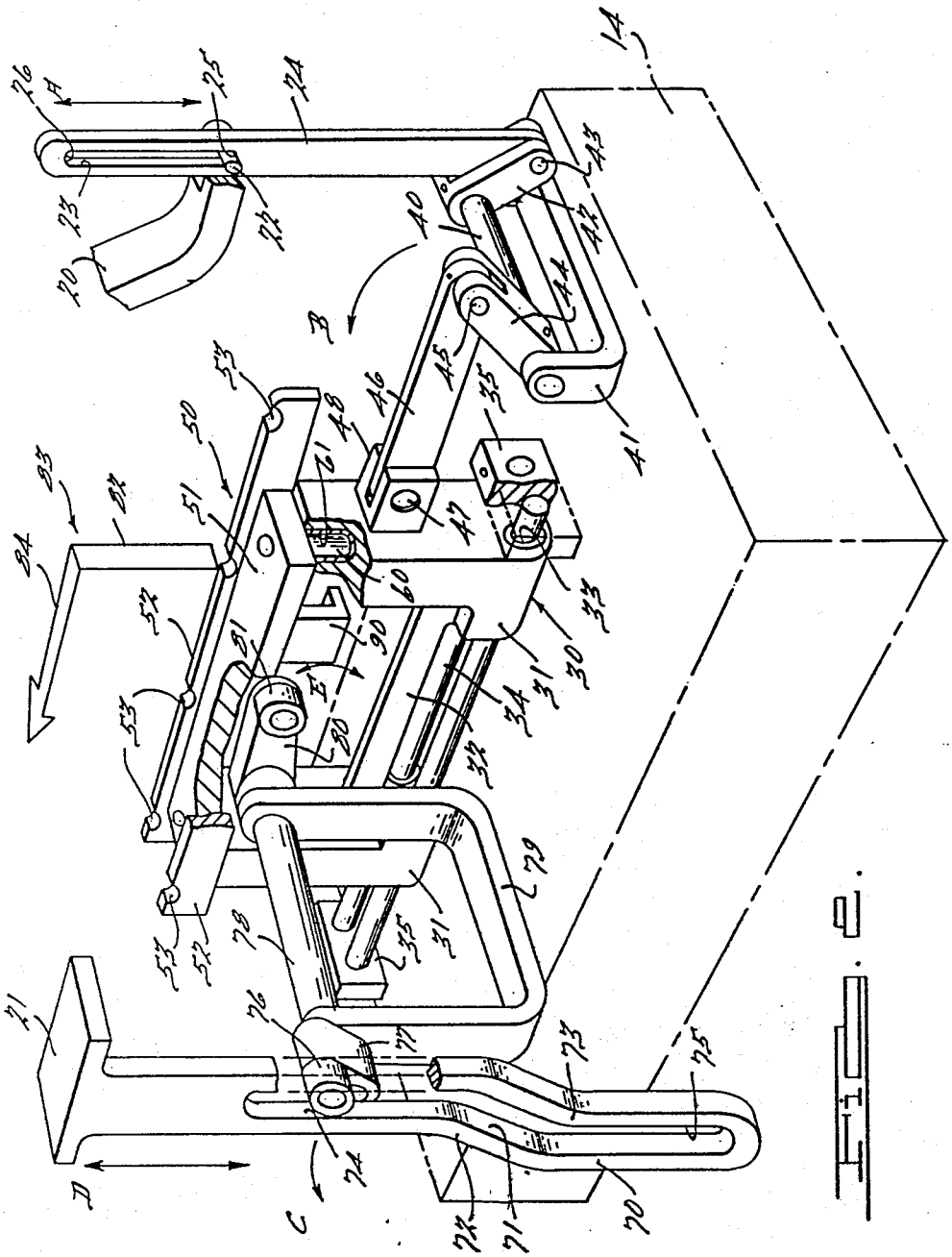
FIG. 1.

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WORK TRANSFER MECHANISM FOR PUNCH PRESSES

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This invention relates to a work transfer mechanism for punch presses and the like and more partticularly to a mechanism of this type actuated by and in timed sequence to the operation of a punch press or other work performing machine.

One of the objects of this invention is to provide a device of this type adapted for use in transferring workpieces progressively from one station to another in a work performing machine such as a conventional press.

Another object of this invention is to provide a transfer device of this type which is so designed and constructed that the major porton thereof may, for convenience,be disposed outside the die area or other work performing area of the machine.

Another object of the invention is to provide a transfer mechanism of this type in which the work supporting means is in the form of work support bars whch extend into the die stations from the outside of the press and are actuated with a walking beam type of motion whereby the workpieces may be received thereby and deposited successively at the die stations.

Further objects of the invention are to provide a device of this type which is efficient, durable, compact, and of simple construction, comprising a minimum number of parts, whereby it may be economically manufactured and assembled with facility.

The various objects and advantages, and the novel details of construction of one commercially practical embodiment of the invention, will become more apparent as this description proceeds, especially when considered in connecton with the accompanying drawings, in which:

FIGURE 1 is a perspective view of portions of a conventional press with the device of this invention associated therewith, and

FIGURE 2 is a fragmentary sectional perspective view of the work transfer mechanism removed from the press.

The work transfer mechanism forming the subject matter of this invention is particularly adapted for use with punch presses or other work performing machines. The device, for instance, might be mounted within the die area of a punch press (if the die area is cut away to accommodate it), or it may be mounted partially or wholly exteriorly of the punch press, in which event the workpiece supporting bars, yet to be referred to, may be extended from the exterior of the press into the die area through suitable slots provided in the press.

One environment in which the work transfer mechanism of this invention may be used to particular advantage is shown in FIGURE 1 of the drawings in which a conventional punch press is illustrated comprising an actuating mechanism contained within the upper housing 10 adapted to reciprocate a punch shoe 11 cooperating with the working part 12 of a die shoe 14, the parting line between these two being indicated by the reference character 13. The reference character 15 indicates what may be termed the bed of the press. In this environment, the work transfer mechanism is located partially interiorly and partially exteriorly of the punch press, although, as previously stated, it may be associated with the press as found to be desirable or expedient.

The transfer mechanism is operated by two acuators 20 and 21 secured to the punch shoe or to some other movable part of the press so as to be moved thereby during the opening and closing of the press. The actuator 20 carries a pin 22 movable in a slot 23 formed in a link 24. when the pin 22 engages the lower end 25 of the slot, it moves the link 24 downwardly, and when it engages the upper end 26 of the slot 23, it moves the link upwardly, as indicated by the arrow A in FIGURE 2.

The reference character 30 indicates a carrier comprising spaced body portions 31 integrally connected by a strut 32. The body portions 31 are provided with bearing apertures 33 adapted to slidably engage a pair of guide rods 34, the ends of which are mounted in blocks 35 secured to the bed 14 of the press. Thus, the carrier 30 is mounted for sliding reciprocable movement relative to the die shoe 14.

The carrier 30 is reciprocated by the link 24 by a mechanism which comprises a rock shaft 40 rotatably mounted in a bracket 41 secured to the die shoe 14. A crank arm 42 secured adjacent one end of the shaft 40 is pivotally connected as at 43 to the lower end of the link 24. Adjacent the other end of the rock shaft 40 is a second crank arm 44 pivotally connected as at 45 to a link 46. The other end of this link 46 is pivotally connected as at 47 to a bracket 48 secured to the carrier 30. Thus, when the pin 22 engages the lower end 25 of the slot 23, the rock shaft 40 will be rotated to move the carrier 30 to the position illustrated in FIGURE 2, which is the position of the parts when the punch shoe and ram are in fully lowered position. When the pin 22 engages the upper end 26 of the slot 23, the link 24 will rotate the rock shaft 40 in the direction of arrow B to move the carrier 30 to the left, as viewed in FIGURE 2.

The workpiece supporting means indicated generally by the reference character 50 comprises a platen 51 to which a pair of work lifting or supporting bars 52 are attached. These work lifting or supporting bars 52 are shown as being provided with a plurality of notches or recesses 53 in which the workpieces are cradled. The bars 52 may be detachably secured to the platen 51 by any suitable means (not shown) so that bars having different types of work receiving recesses may be substituted, or these bars may be replaced by longer or shorter bars, depending upon the type of workpieces and the kind of press with which the transfer mechanism is used.

The platen 51 and the bars 52 are mounted on the carrier 30 for vertical movement relative thereto by means of pins 60 depending from the platen 51 and engaging corresponding shaped recesses 61 formed in the body portions 31 of the carrier 30. In substituting new work carrying bars 52, the entire platen 51 and the bars 52 might be removed and replaced with a new assembly, if this is found to be desirable.

The workpiece supporting bars 52 are adapted to have imparted thereto a walking beam type of motion. This is provided in the following manner: The actuating member 21 which moves with the movable part of the press, in the directions of the arrow D, comprises an arm 70 having an elongated slot therein. This slot has a cam portion 71 extending from approximately the point 72 to the point 73. The slot is provided with an upper dwell portion 74 and a lower dwell portion 75. The

cam portion 71 of the slot is adapted to be engaged by a cam follower or roller 76 mounted on the end of a crank arm 77 on the end of a second rock shaft 78 rotatably mounted in a bracket 79 secured to the die shoe 14. When the cam follower 76 engages the cam portion 71 of the slot, the cam follower 76 is oscillated in the direction of the arrow C. This rotates the rock shaft 78, which, on its other end, carries a crank arm 80 provided with a roller 81 which engages the underside of the platen 51. The roller 81 moves in the directions of the arrow E. Thus, when the cam portion 71 of the slot rocks the rock shaft 78 in the direction of arrow C, the platen 51 and the work supporting bars 52 are raised. This will lift the workpieces out of their die stations in which they are then located, as indicated by the portion 82 of the arrow 83.

After the workpieces have been lifted out of their die stations, the actuator 20 is moved to engage the end 26 of the slot 23 to move the link 24 upwardly and through the mechanism previously described to shift the carrier 30 to the left, as viewed in FIGURE 2. This advances or indexes the workpieces one station in the press, as indicated by the portion 84 of the arrow 83. During this final upstroke of the punch shoe, the cam follower 76 simply moves in the dwell portion 75 of the cam slot without having any effect upon the platen 51 and the work carrying bars 52.

When the carrier 30 and the platen 51 are shifted to the left, as viewed in FIGURE 2, an L-shaped bracket 90 on the bottom of the platen 51 is moved under the roller 81 so as to be engaged thereby, for a purpose yet to be referred to.

On the downstroke of the punch shoe 11, tht cam follower 76 first moves in the dwell portion 75 of the cam slot from the lower end of the slot to the point 73, and the pin 22 moves part way down in the slot 23 without effect. The first thing that happens then is that the cam follower traverses the cam portion of the slot from the point 73 to the point 72 which rocks the shaft 78 through the crank arm 77 and through the crank arm 80, and the roller 81 lowers the platen 51. At this point, it should be observed that the roller 81 engages the bracket 90 to pull down on the platen 51 and lower it against any resistance in the bearings 61 which guides the platen.

By the time the cam follower 76 has traversed the cam portion 71 of the slot, it has lowered the work supporting bars 52 below the work supports at the die portions, so that the work is deposited in the die and released by the bars 52. By the time the work supporting bars 52 have deposited the workpieces, the pin 22 is moved downwardly in the slot 23 sufficiently to engage the lower end portion 25 thereof to push the link 24 downwardly, and the latter, through the rock shaft 40, crank arms 42 and 44, and link 46, again moves the carrier 30 to the right, as shown in FIGURE 2. During this latter motion, the cam follower 76 merely traverses the dwell portion 74 of the cam slot without effect.

From the foregoing, it will be apparent that the platen 51 and work supporting bars 52 partake of a walking beam motion whereby to lift and advance or index the workpieces from one station of the press to the next station and then deposit the workpieces at the new station. In the environment illustrated in FIGURE 1, the new workpieces may be deposited manually or automatically (by means not shown) on the extending portions of the work supporting bars 52. Moreover, with the arrangement illustrated, the raising and lowering of the workpiece supporting means occurs in timed relation with the reciprocation of the carrier, so that the resulting motion is the walking beam type of action previously referred to.

While a commercially practical embodiment of the invention has been described and illustrated herein somewhat in detail, it will be understood that various changes may be made as may come within the purview of the accompanying claims.

What is claimed is:

1. A work transfer mechanism for use with a press having a movable part, said work transfer mechanism comprising, a reciprocably mounted carrier, workpiece supporting means mounted on said carrier for vertical movement thereon to raise and lower the workpieces, a link having a slot engaged by a pin on the movable part of the press, said pin being adapted to actuate said link upon engagement with each end of said slot, a first rock shaft, crank arms on said first rock shaft pivotally connected to said link and to said carrier to reciprocate the carrier upon movement of said first rock shaft, a member having a cam slot therein connected to the movable part of the press for movement therewith, a second rock shaft, a crank arm on said second rock shaft having a cam follower engaging said cam slot to rotate said rock shaft, a second crank arm on said second rock shaft operatively engaging said workpiece supporting means to raise and lower the same, said cam slot having dwell portions engageable by the cam follower at each end of its movement, whereby the raising and lowering of the workpiece supporting means occurs in timed relation to the reciprocation of the carrier.

2. A work transfer mechanism for use with a press having a movable part, said work transfer mechanism comprising a reciprocably mounted carrier; workpiece supporting means mounted on said carrier for vertical movement thereon to raise and lower the workpieces; means actuated by said movable part of the press for reciprocating said carrier; and means actuated by said movable part of the press and moving said workpiece supporting means in timed relation to the reciprocation of said carrier, said carrier reciprocating means comprising a link having a slot engaged by a pin on the movable part of the press, a rock shaft, a crank arm fixed to said rock shaft and pivotally connected to said link, a second crank arm fixed to said rock shaft, and a second link pivotally connecting said second crank arm to said carrier.

3. A work transfer mechanism for use with a press having a movable part, said work transfer mechanism comprising a reciprocably mounted carrier; workpiece supporting means mounted on said carrier for vertical movement thereon to raise and lower the workpieces; means actuated by said movable part of the press for reciprocating said carrier; and means actuated by said movable part of the press for moving said workpiece supporting means in timed relation to the reciprocation of said carrier, the means for actuating said workpiece supporting means comprising a member having a cam slot therein connected to the movable part of the press, a rock shaft adapted to be actuated by a cam follower engaging said cam slot, and means connecting said rock shaft to said workpiece supporting means.

4. A work transfer mechanism for use with a press having a movable part, said work transfer mechanism comprising a reciprocably mounted carrier; workpiece supporting means mounted on said carrier for vertical movement thereon to raise and lower the workpieces; means actuated by said movable part of the press for reciprocating said carrier; and means actuated by said movable part of the press for moving said workpiece supporting means in timed relation to the reciprocation of said carrier, the means for raising and lowering the workpiece supporting means comprising a member having a cam slot therein connected to the movable part of the press for movement therewith, a rock shaft, a crank arm on said rock shaft having a cam follower engaging said cam slot to rotate said rock shaft, and a second crank arm on said rock shaft operatively engaging said workpiece supporting means to raise and lower the same.

5. A work transfer mechanism for use with a press having a movable part, said work transfer mechanism comprising a reciprocably mounted carrier; workpiece supporting means mounted on said carrier for vertical

movement thereon to raise and lower the workpieces; means actuated by said movable part of the press for reciprocating said carrier; and means actuated by said movable part of the press for moving said workpiece supporting means in timed relation to the reciprocation of said carrier, the means for raising and lowering the workpiece supporting means comprising a member having a cam slot therein connected to the movable part of the press for movement therewith, a rock shaft, a crank arm on said rock shaft having a cam follower engaging said cam slot to rotate said rock shaft a second crank arm on said rock shaft engaging said workpiece supporting means to raise the same, and a bracket member on said workpiece supporting means engageable by said second crank arm in one position of said carrier to provide a positive connection with said second crank arm to lower said workpiece supporting means upon rotation of said second crank shaft.

References Cited in the file of this patent

UNITED STATES PATENTS

2,321,788	Anderson	June 15, 1943
3,091,347	Sehn et al.	May 28, 1963