United States Patent

[11] 3,590,986

[72] Inventors **Ralph L. Andrews;**
William Hollenbeck, both of Hastings, Mich.

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[73] Assignee **Gulf & Western Industrial Products Company**
Grand Rapids, Mich.

[54] **TRANSFER FEED**
2 Claims, 3 Drawing Figs.

[52] **U.S. Cl.** **198/218**
[51] **Int. Cl.** **B65g 25/04**
[50] **Field of Search** 198/19, 218

[56] **References Cited**

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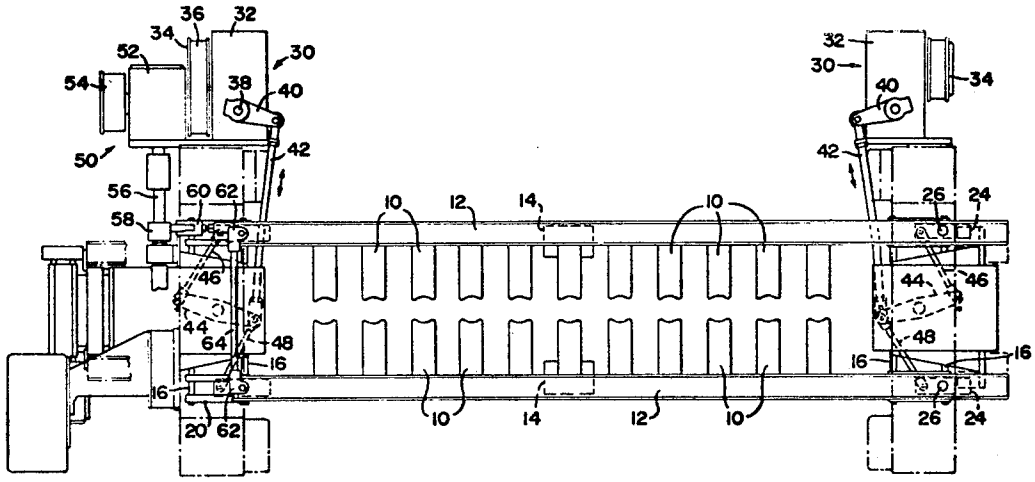
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Primary Examiner—Edward A. Sroka
Attorney—Meyer, Tilberry and Body

ABSTRACT: A transfer feed in which the work gripping fingers are connected to a pair of feed bars. The bars are supported intermediate their ends and at their ends for sliding lateral and longitudinal movement. Cam units are connected to the bars at either end to effect the lateral movement and a third cam unit connected to one end of the bars effects longitudinal movement. No torsional forces are imposed on the bars thus permitting the feeding of heavier parts than has been possible with other types of feeds.



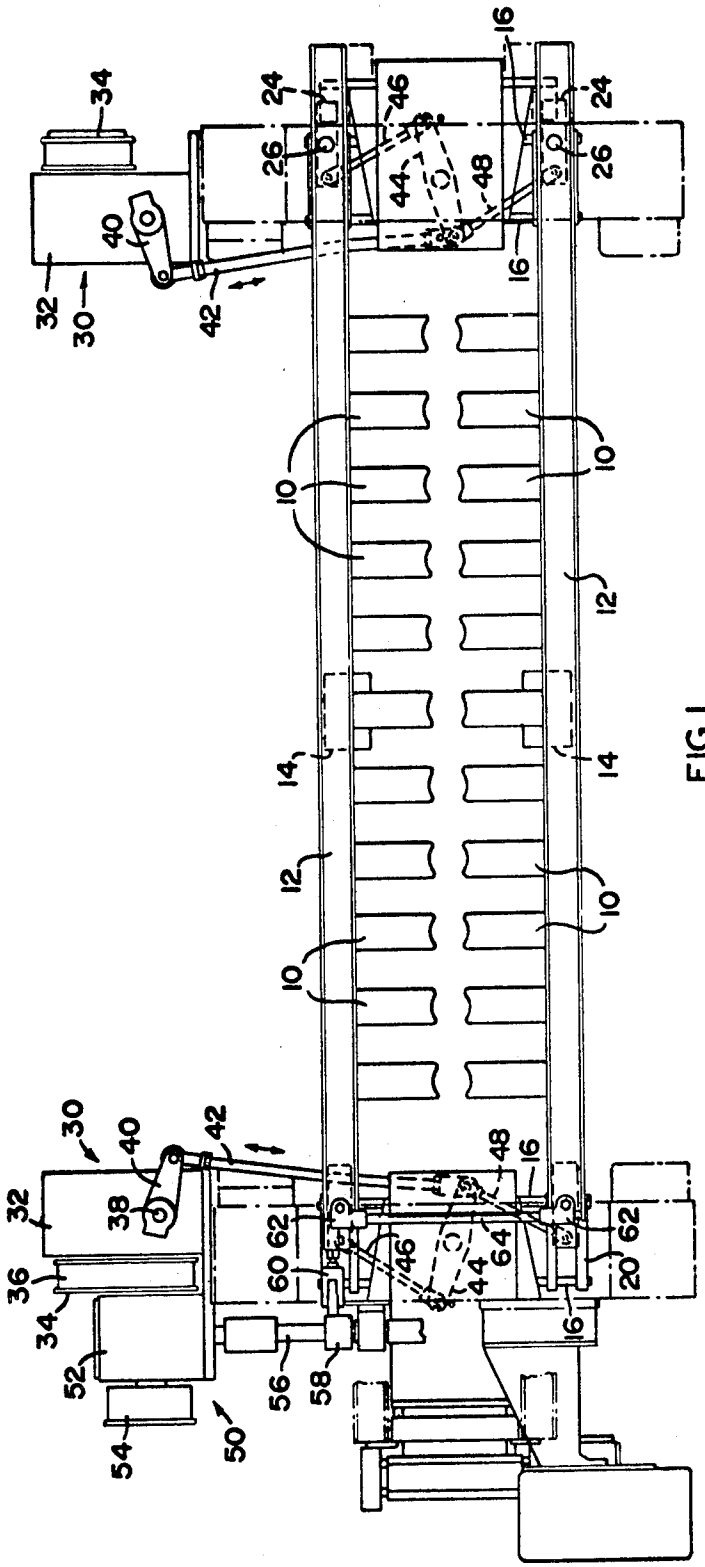


FIG. 1

INVENTORS
RALPH L. ANDREWS
WILLIAM HOLLENBECK
BY
Meyer, Tilberry & Body
ATTORNEYS.

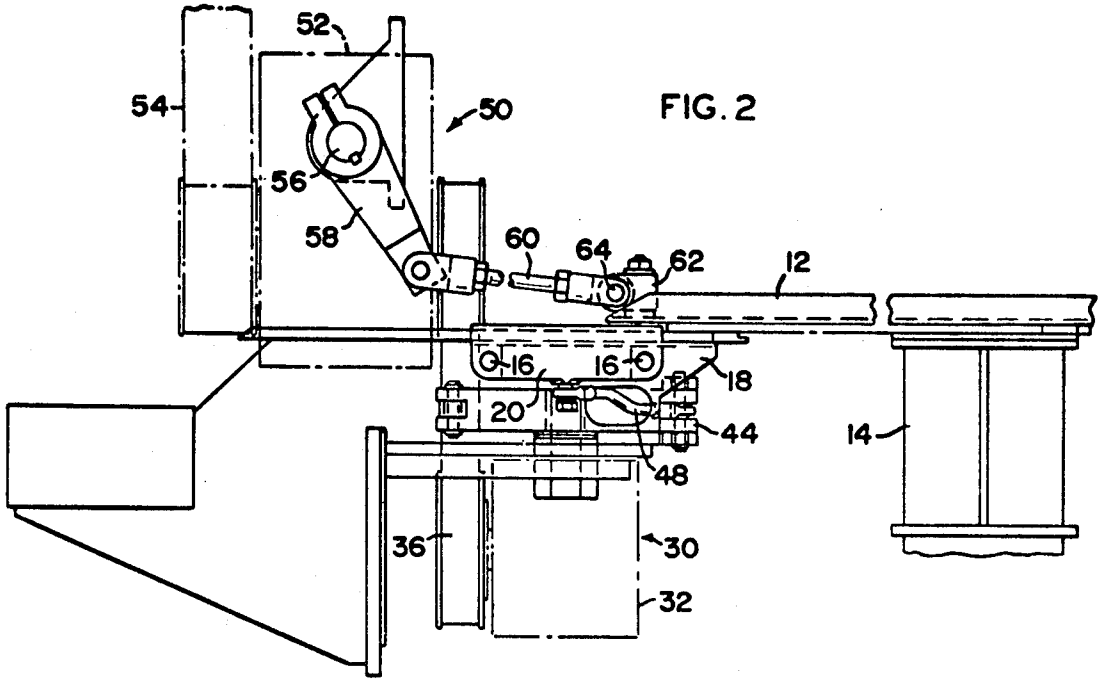


FIG. 2

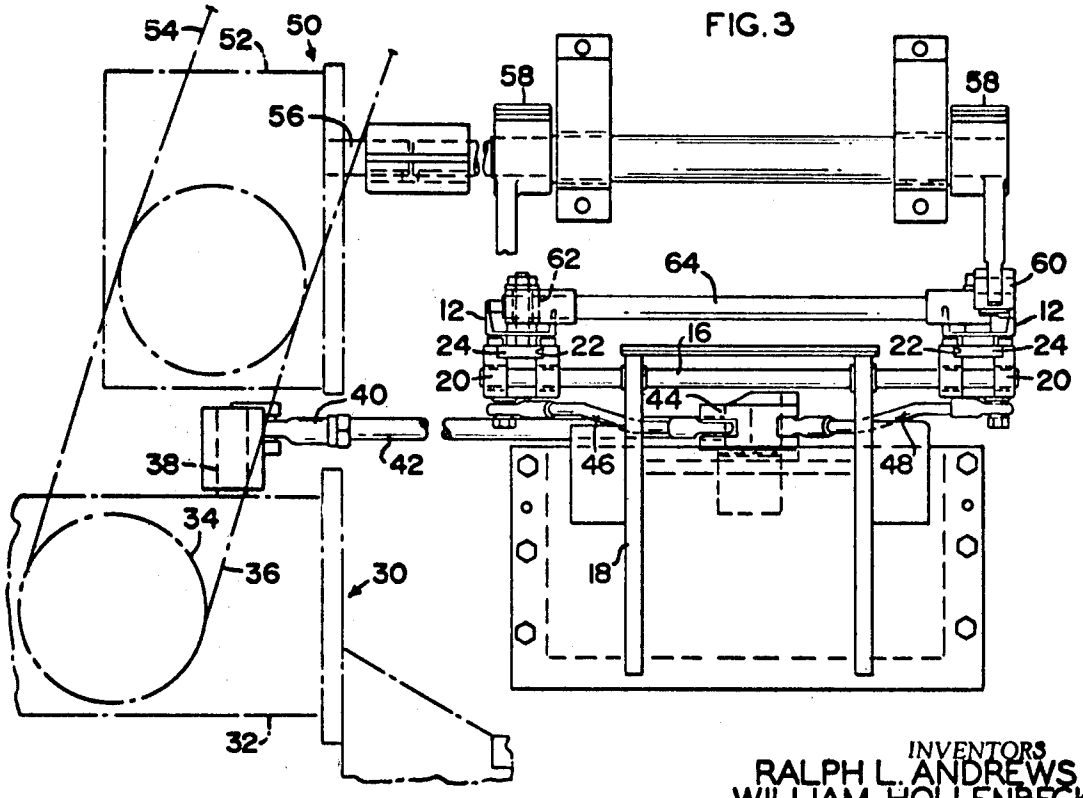


FIG. 3

INVENTORS
RALPH L. ANDREWS
WILLIAM HOLLENBECK
BY
Meyer, Tilberry & Body
ATTORNEYS.

TRANSFER FEED

This invention relates broadly to the art of work handling and, more particularly, to a transfer feed mechanism for use in a transfer feed process.

The invention will be described with particular reference to a transfer feed press having a transfer feed mechanism in which a plurality of pairs of fingers hold a part for the purpose of transferring it successively from 12 receiving station, to a plurality of die stations and then to a discharge station; however, it will be appreciated that the invention may have broader applications other types of work and material handling and transfer devices.

Transfer feed mechanism are known in which pairs of fingers are moved toward and away from each other for intermittent gripping of a part. In addition, the fingers are also given a forward and return motion for longitudinal feeding of the part from station to station. Typically, these motions have been imparted to the fingers by a cam and linkage arrangement, with the drive being transferred from the crankshaft to the cam and linkages. A transfer feed mechanism of this type is generally disclosed in U.S. Pat. No. 1,426,039 issued Aug. 15, 1922.

For high speed feeding of relatively light parts, there has been developed a transfer feed mechanism which employs a pair of oscillatory shafts which impart the in and out motion to the gripping fingers. A pair of cam units located at opposite ends of the shafts are used to drive the oscillatory shafts with the two cam units being synchronized in their movements. A third cam unit is used to impart the longitudinal feed movement to the fingers independent of the oscillatory shafts.

Although the latter type of feed mechanism has proven entirely satisfactory for the high speed feeding of relatively light parts, it has not been entirely satisfactory for feeding heavier parts because of the torsional deflection encountered by the oscillatory shafts.

This limitation on the prior art transfer feed mechanisms is overcome by the present invention in which the oscillatory shafts are replaced by reciprocating channels which are supported in the center and driven in and out and right to left by three separate cam units. This arrangement eliminates the torsional deflection heretofore experienced and provides for greater displacement of the transfer fingers thus permitting the feeding of heavier parts through the transfer feed press.

In accordance with the principal aspects of this invention, there is provided a transfer feed and drive comprising a plurality of pairs of transfer feed fingers adapted to grip and hold a part for transfer from one station to the next. The fingers are supported by a pair of parallel, spaced-apart feed bars in the form of channels. A pair of cam units are located adjacent opposite ends of the channels and are synchronized to actuate the two channels for lateral movement toward and away from each other through a predetermined sequence of operation. In addition, a third cam unit is located adjacent one end of the two channels and is operative to reciprocate the channels longitudinally. The two channels are supported at their center and by sliding housings at either end.

Referring now to the drawings wherein like reference numerals indicate like parts in the various views:

FIG. 1 is a partial top view of the transfer feed mechanism.

FIG. 2 is a partial side elevation view of the mechanism of FIG. 1.

FIG. 3 is a partial end elevation view of the feed mechanism of FIGS. 1 and 2.

Referring now to the drawings wherein the showings are for the purpose of illustrating a preferred embodiment of the invention only and not for the purpose of limiting same, FIG. 1 illustrates a transfer feed mechanism for use with a transfer feed press in which a part is to pass through successive work stages. As is conventional, the part is transferred through these work stages by a plurality of transfer fingers. These transfer feed fingers are indicated by the reference numeral z0 in FIG. 1. Each of the fingers is carried by one of a pair of parallel feed bars in the form of channels 12. The channels 12, and thus the fingers 10, are adapted to be moved laterally toward and away from each other, thereby permitting the fingers 10 to close on and separate from the part which is to be transferred by the mechanism. In addition, the channels 12 are also adapted to receive reciprocatory longitudinal movement for transferring the parts from one station to the next.

Referring now more in detail to the support for the channels 12, each channel is slidably supported on a center support pedestal 14. Appropriate wear plates or other bearing means are employed between the channels and the pedestals thus enabling the channels to move both laterally and longitudinally along the upper surface of the pedestals. In addition, a separate support mechanism is provided at the ends of each of the channels, which support mechanism also enables the channel to move both longitudinally and laterally. This support mechanism comprises a pair of support rods 16 located at each end of the channels 12. These rods 16 are supported in brackets 18 carried by and fastened to the bed of the press. Slidably supported on each of the pairs of rods 16 are pairs of support brackets or housings 20 with each bracket being associated with one of the channels 12. These support brackets 20 are adapted to slide longitudinally of the rods 16. Machined in the upper surface of each of the support brackets 20 is a groove 22 in which there is slidably received blocks 24. These sliding blocks are secured by appropriate fasteners 26 to the underside of the channels 12.

It is to be understood that the described interconnection between the channels 12, the blocks 22, the sliding housing 20 and the rods 16 is the same for each end of both of the channels 12, thus enabling each channel to slide longitudinally along the grooves 22 and move toward and away from each other along the rods 16.

To cause the channels or feed bars 12 to move laterally toward and away from each other, there is provided at each end of the channels a drive unit indicated generally by the reference numeral 30. Each of these drive units is identical so that only one of the units will be described in detail although it is to be understood that the description applies equally to the other as well.

The drive unit 30 includes a cam unit 32 which may comprise the commercially available Ferguson cam box. The cam unit 32 is actuated by a timing pulley 34 driven by a timing belt 36. Extending from the cam box 32 is a shaft 38 to which there is connected a lever 40. This lever 40 is in turn connected to one end of a link 42. The other end of the link 42 is connected to a crank 44 which is pivotally mounted at its center on the frame of the press. One arm of the crank 44 is connected to a connecting rod 46 while the other arm of the crank 44 is connected to a second connecting rod 48. The first connecting rod 46 extends toward one of the channels 12 and is pivotally connected to the sliding bracket 20 associated with that channel. The other connecting rod 48 extends toward the other of the channels and is connected to the sliding bracket 20 associated with that channel. It will be appreciated from this description that as the shaft 38 is rocked by the cam box 32, the lever 40 will be oscillated causing the link 42 to transmit a pivoting motion to the crank 44. Depending on the direction of the pivoting motion of the crank 44 about its axis, the two channels 12, will be caused either to move toward or away from each other. Thus, assuming the crank 44 pivots in a counterclockwise direction as viewed in FIG. 1, the two connecting rods 46, 48 will cause the channels 12 to be drawn toward each other along the rods 16, thereby causing the pairs of fingers 10 to move toward each other and grip the workpiece.

As stated previously, the same construction is provided at the other end of the two channels 12, and it will be appreciated that the two drive units 30 will be synchronized to impart a properly timed lateral motion to both ends of the channels.

To impart a longitudinally reciprocating movement to the channels 12, there is provided a third drive unit indicated generally by the reference numeral 50. This drive unit com-

prises a third cam box 52 driven by a timing belt 54. An oscillatory shaft 56 extends from the cam box 52 and has secured thereto a pair of rocker arms 58. Each of these rocker arms is connected to one end of a link 60. The other end of each link is connected to a bracket 62 which is secured to the end of the associated channel 12. It will be appreciated that as the arms 58 are rocked, the connecting rods 60 will alternately push and pull on the channels 12 to impart the desired reciprocatory motion. A rod 64 extends laterally between the two brackets 62 and is slidably received therethrough. This rod assists in the proper synchronizing of the reciprocating longitudinal movement of the two channels 12.

In operation, a press having the described transfer feed mechanism will be operated in the following manner. The workpieces will be positioned between the fingers 10 and a forming operation will be performed. When it is desired to transfer the workpieces to the next station, the cam boxes 32 are actuated in the proper sequence to pivot the cranks 44 and cause the fingers 10 to come together to grip the workpiece. Thereafter, in proper sequence, the cam box 52 rocks the rocker arms 58 thereby causing the channels 12 to shift longitudinally a predetermined amount. Thereafter the cam boxes 32 pivot the cranks 44 in the opposite direction thereby retracting the fingers 10 away from each other to release the workpieces and the cam box 52 then actuates the rocker arms 58 to shift the channels 12 back to their original position.

It is apparent from the foregoing description that the channels 12 are not subjected to any undesirable torsional forces as they are actuated to perform the feeding of the parts. Moreover, simply by adjusting the cam boxes, the motion imparted to the channels can be varied over a wide range thereby enabling the mechanism to be used both with relatively large and relatively small parts.

Modifications and alterations in the described embodiment of this invention will occur to those having ordinary skill in the part and it is intended that such modifications and alterations are to be included within the scope of the invention as defined by the appended claims.

Having thus described my invention, I claim:

1. A transfer feed mechanism comprising;

a. a pair of feed bars positioned in parallel spaced-apart relationship,

b. support means movably supporting said feed bars for lateral reciprocating movement toward and away from one another and for longitudinal reciprocating movement,

c. first drive means for driving said feed bars in lateral reciprocating movement toward and away from one another,

d. said first drive means including first crank means mounted for rotation of a pivot axis located intermediate said pair of feed bars, said first crank means having first and second end portions disposed on opposite sides of said pivot axis,

e. first connecting rod means pivotally connected with said first end portion of said first crank means and with one of said feed bars,

f. second connecting rod means pivotally connected with said second end portion of said first crank means and with the other of said feed bars,

g. power means for rotatably driving said first crank means about said pivot axis to reciprocate said feed bars toward and away from one another by alternate pulling and pushing force applied through said first and second connecting rod means by rotational movement of said first crank means,

h. second drive means for driving said feed bars in longitudinal reciprocating movement,

i. said second drive means including second crank means mounted for rotation about a pivot axis,

j. longitudinal connecting rod means pivotally connected with said second crank means and with said feed bars, and

k. power means for rotatably driving said second crank means to longitudinally reciprocate said feed bars by alternate pulling and pushing force applied through said longitudinal connecting rod means by rotational movement of said second crank means.

2. The device of claim 1 wherein said feed bars have end portions and undersurfaces and said support means includes pedestal means engaging said undersurfaces intermediate said end portions.