

Dec. 5, 1961

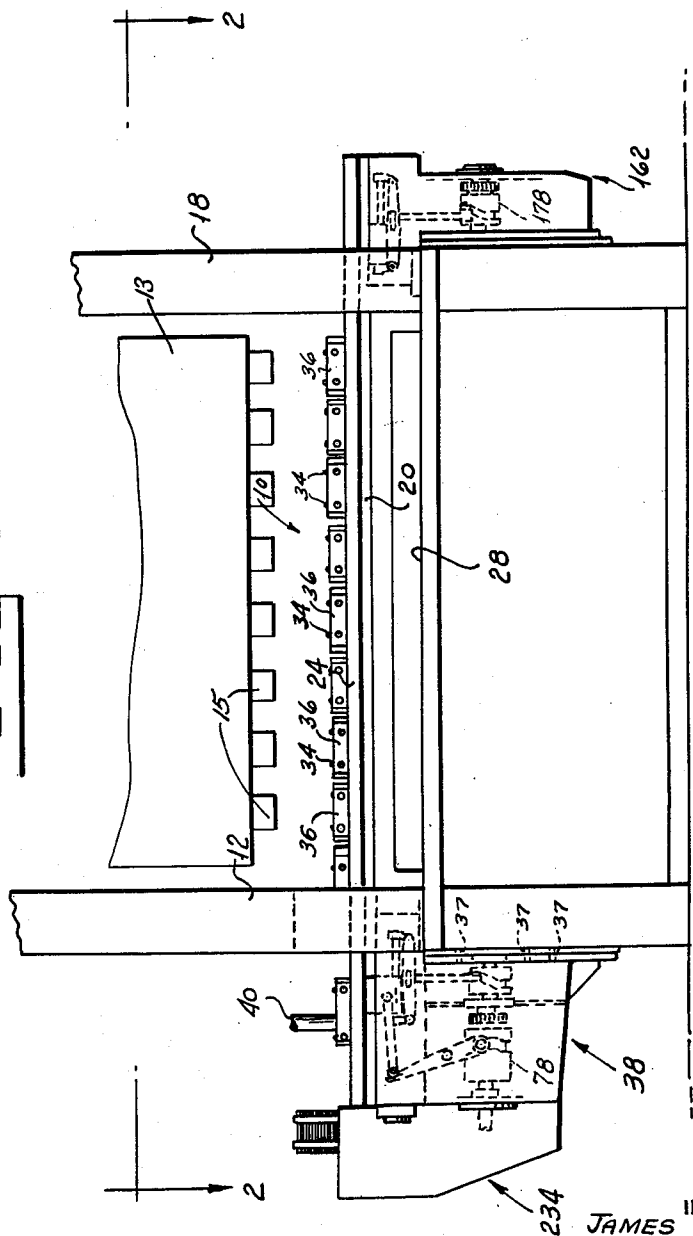
J. C. DANLY ET AL
TRANSFER FEED ASSEMBLY

3,011,464

Filed March 22, 1956

8 Sheets-Sheet 1

Fig 1



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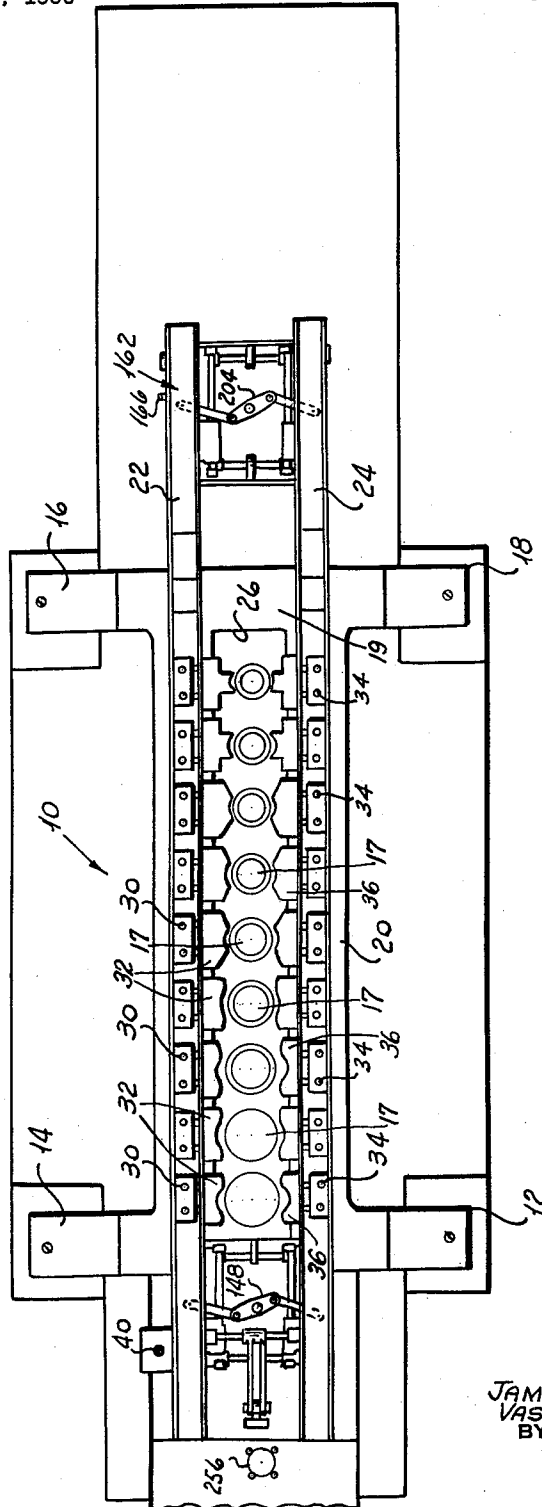


FIG 2

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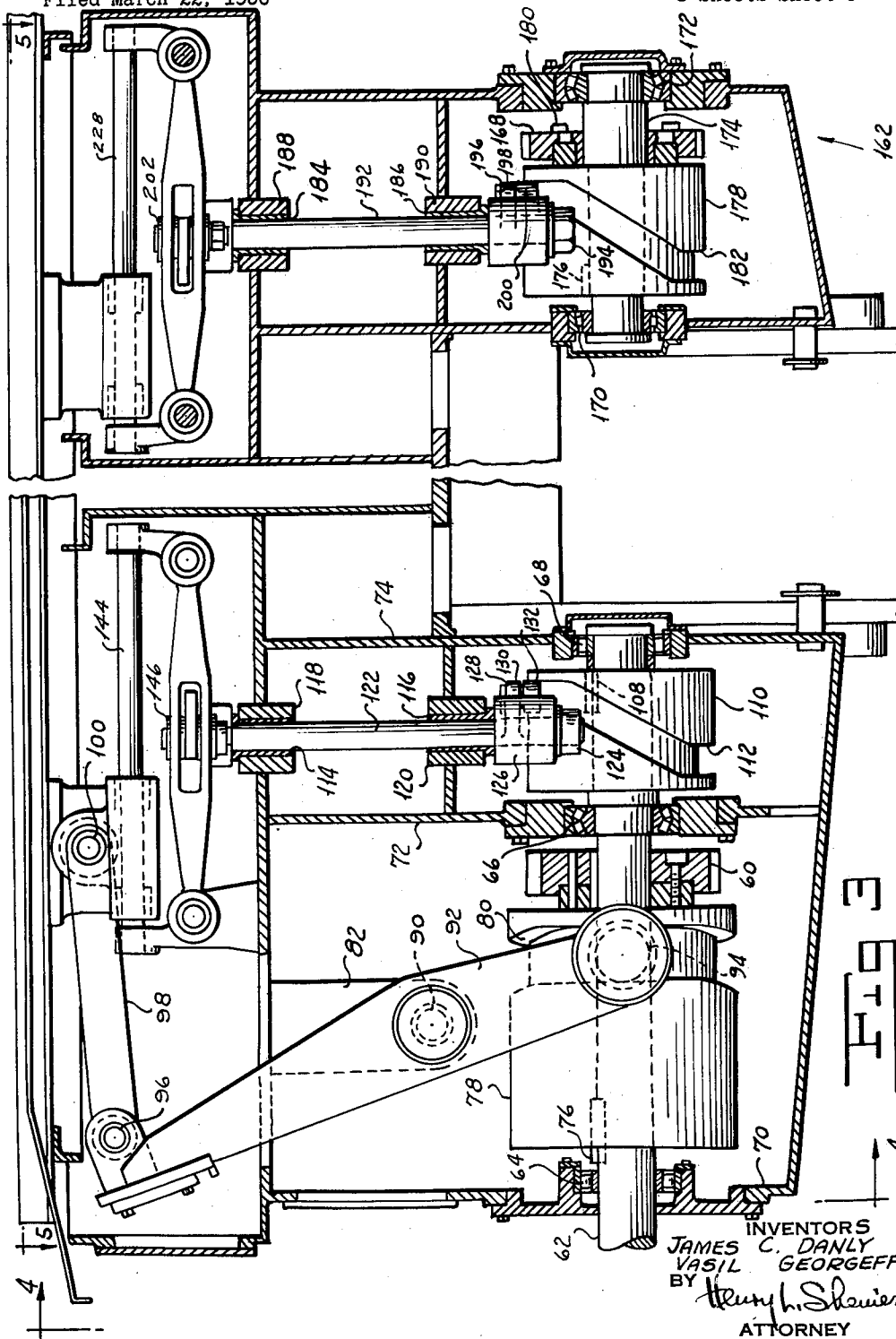
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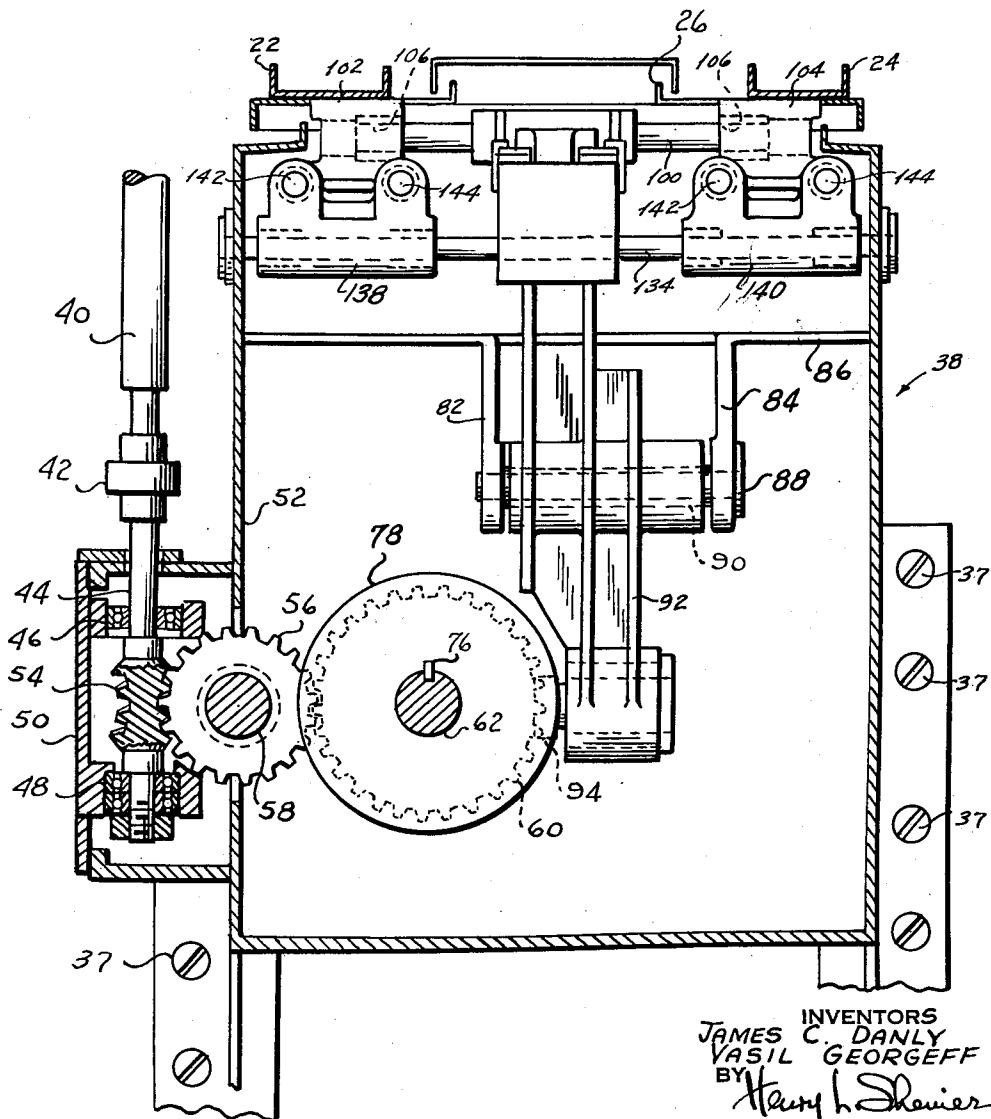
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Fig 4



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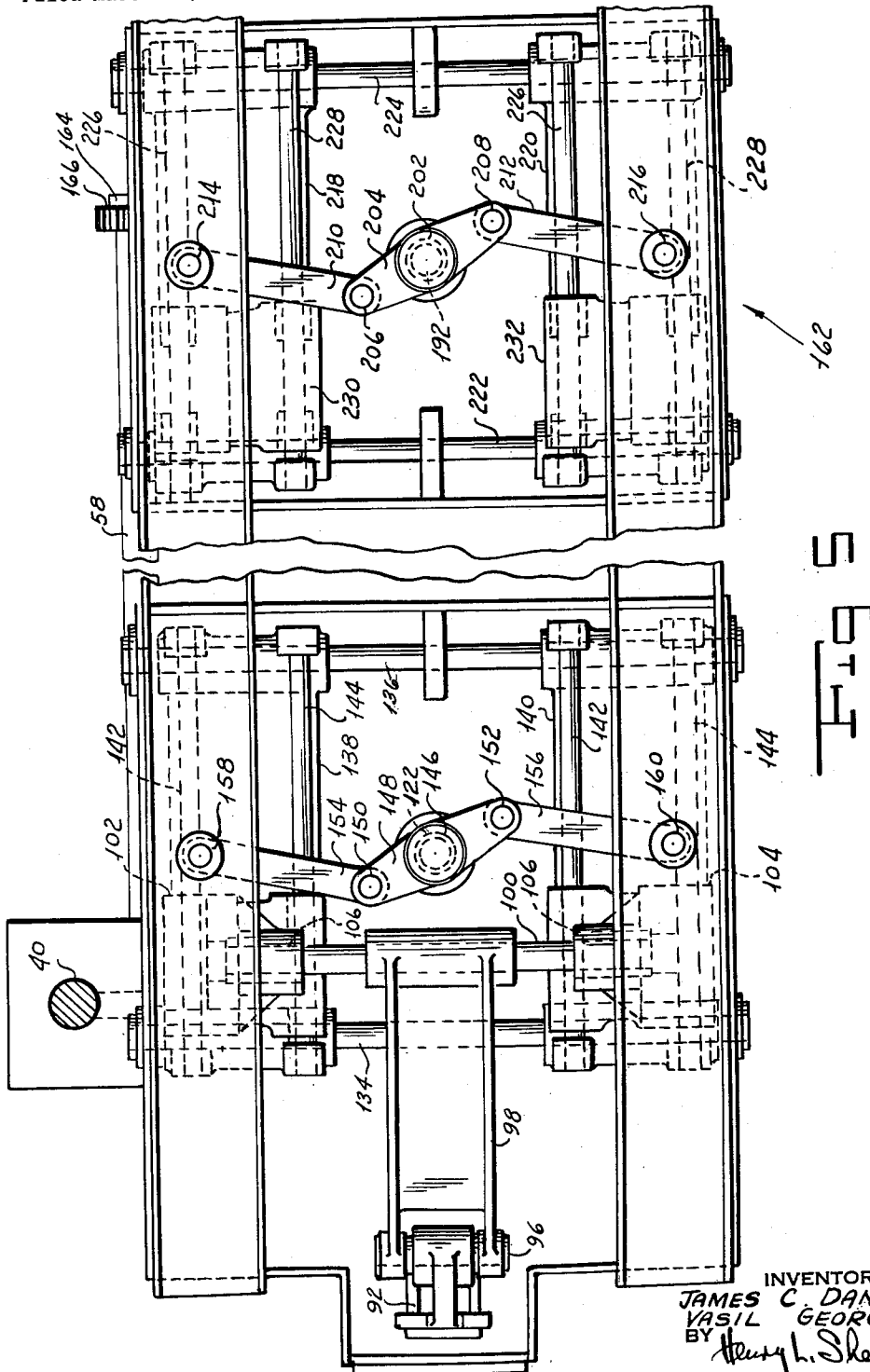
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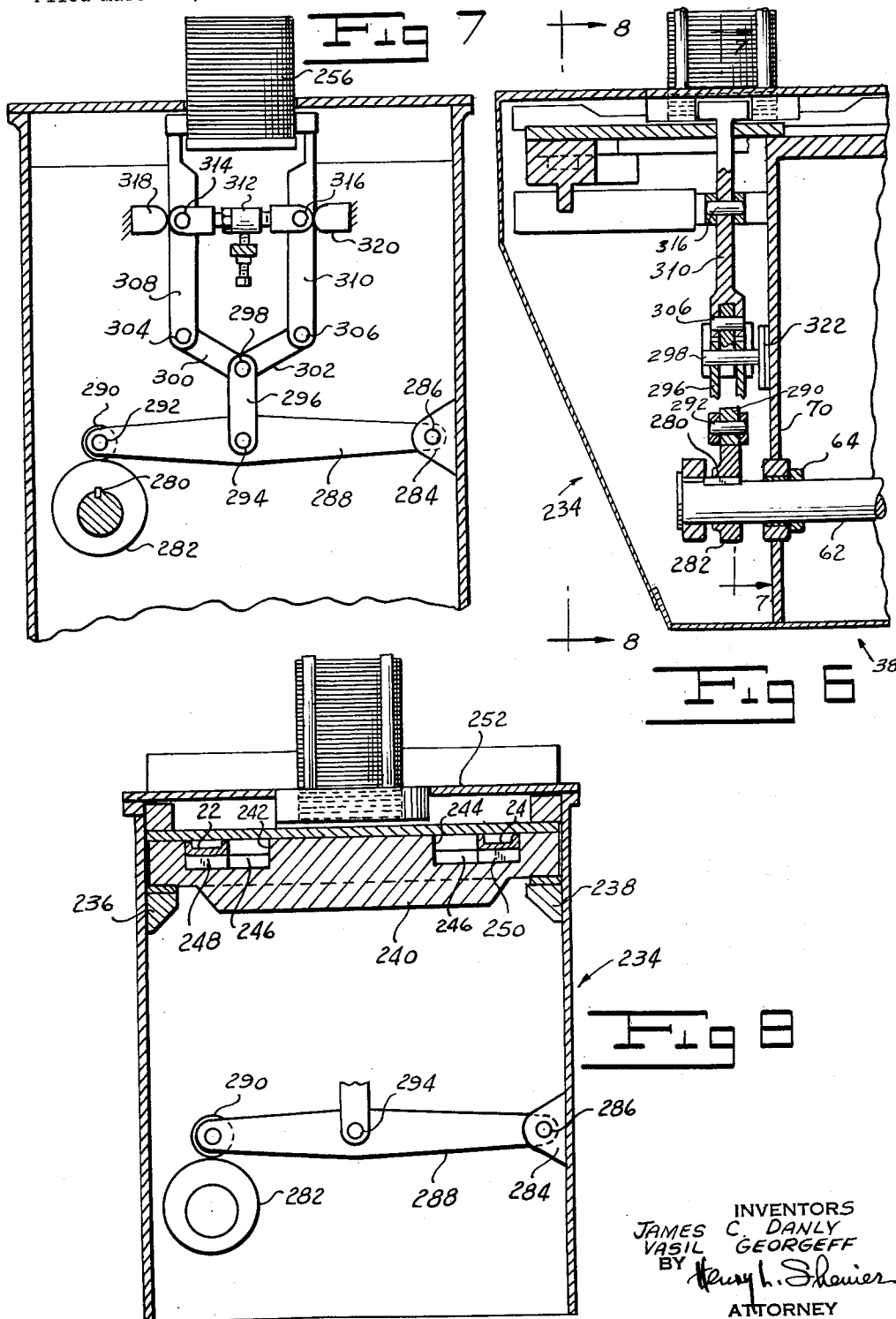
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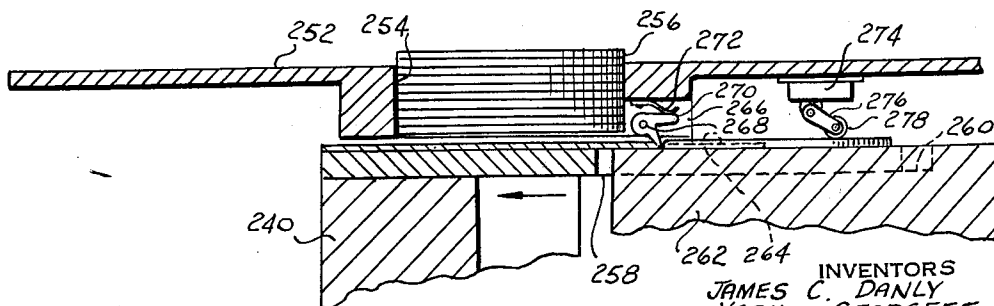
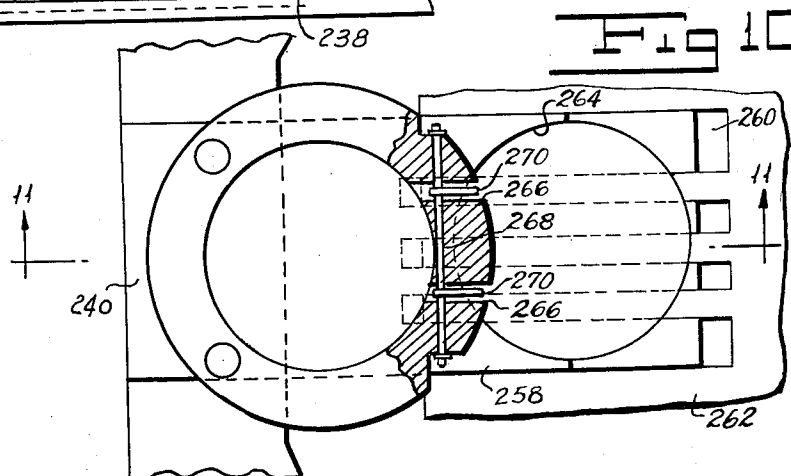
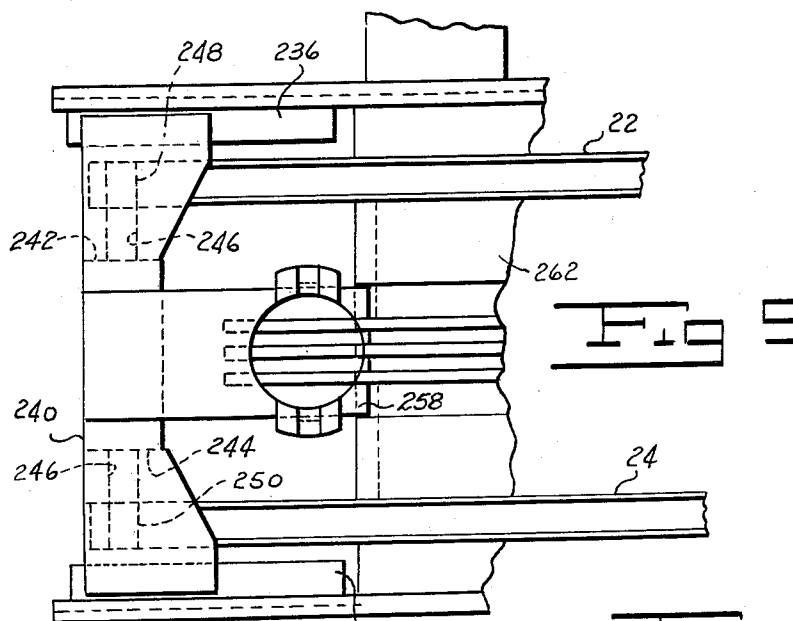
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FIG 13

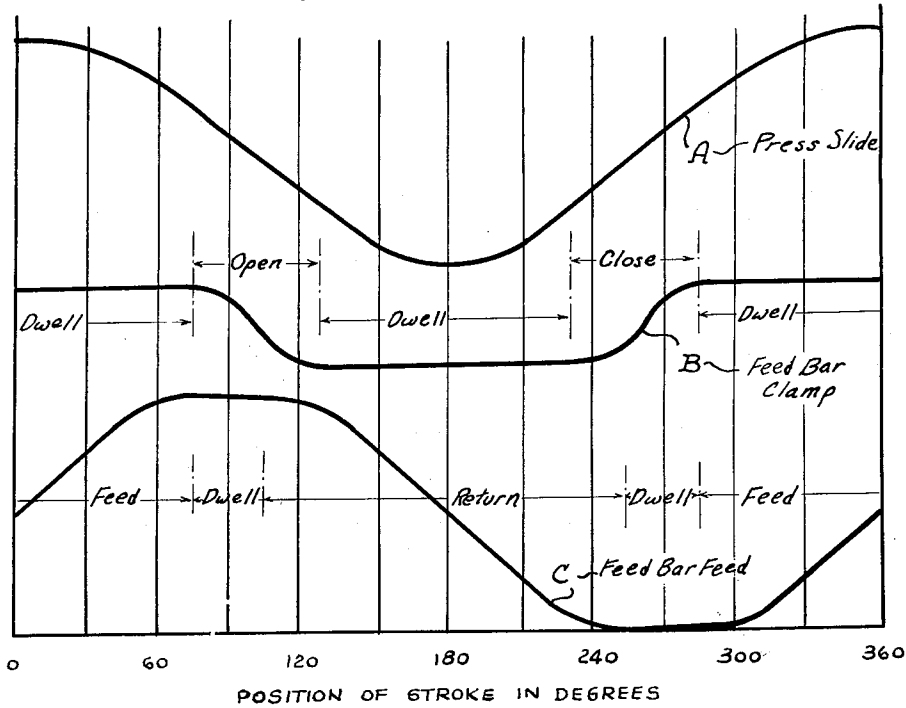
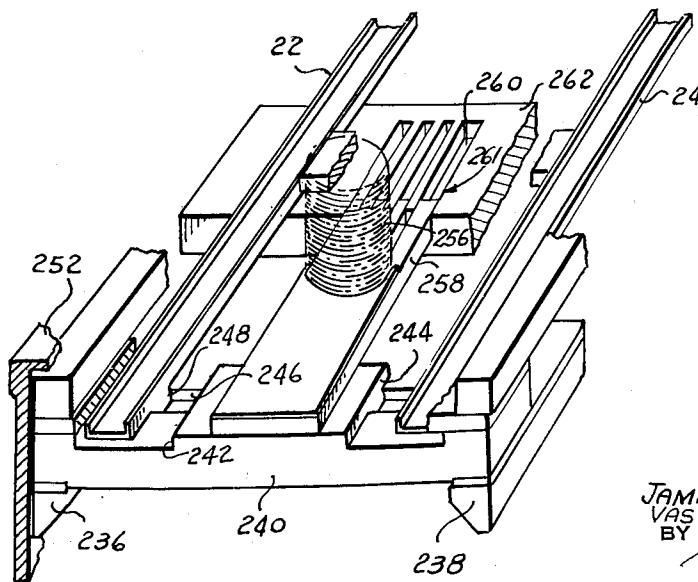


Fig 12



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3,011,464

TRANSFER FEED ASSEMBLY

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Filed Mar. 22, 1956, Ser. No. 573,201
3 Claims. (Cl. 113—38)

Our invention relates to a transfer feed assembly for simultaneously advancing a plurality of work pieces from station to station on a multistation press and more particularly to a transfer feed assembly which has a low moving mass and which is simple in operation.

The nature of many piece parts which are formed on a power press is such that they cannot be made in a single stamping operation but must be fabricated in a number of progressive punching or stamping operations. In order to form such parts, multistation presses carrying a plurality of dies located at spaced stations simultaneously perform successive operations on a number of piece parts, each of which is in a respective progressive stage of its formation from a work blank to a finished part. For efficient operation of a multistation press, automatic means must be provided for stepping the parts from station to station between successive punching or drawing strokes of the press.

Transfer feed assemblies are known in the prior art for stepping work from station to station on a multistation press. Each of these transfer feed assemblies has a large moving mass, with the result that the assembly drive consumes a large amount of power. These assemblies of the prior art employ complicated drives to provide the necessary transverse and longitudinal motions of the feed. Owing to their complicated construction, these assemblies are expensive to construct. Since the assembly drives consume large amounts of power, they are expensive to operate. The assemblies employ intermittent drives to feed the work pieces in synchronization with press operation. Because of the high inertia of the large moving mass of the prior art assemblies, they "hammer" as they intermittently feed. The intermittent stopping and starting of the drive to overcome the high inertia of the moving mass add to the high power consumption.

We have invented a transfer feed assembly for simultaneously advancing a plurality of work pieces from station to station on a multistation press. Our feed assembly has a low moving mass. Consequently, its drive consumes appreciably less power than transfer feed assembly drives of the prior art. Our assembly is simpler in construction than those of the prior art and is, therefore, less expensive. We have arranged our assembly so that all work carriers are actuated from one continuously rotating shaft to provide the required transverse and longitudinal motions. Since the drive for our transfer feed assembly is continuous, an excessive amount of power is not consumed in stopping and starting electrical equipment.

One object of our invention is to provide an improved transfer feed assembly which has a low moving mass.

Another object of our invention is to provide an improved transfer feed assembly which is simple in construction and in operation.

A further object of our invention is to provide an improved transfer feed assembly in which all parts are driven from one continuously rotating shaft.

Other and further objects of our invention will appear from the following description.

In general our invention contemplates the provision of a transfer feed assembly including a pair of feed bars mounted for transverse and longitudinal sliding move-

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ment on the assembly frame. At spaced locations along the length of the feed bars, we mount pairs of opposed work grippers or carriers, one of each pair of which is carried by a respective feed bar. The space between adjacent pairs of work carriers along the length of the bars is equal to the distance separating the centers of adjacent work stations on the multistation press with which our assembly is used. We provide a transverse drive mechanism for reciprocating the feed bars toward each other alternately to grip work pieces between the pairs of carriers and to release the work pieces from the carriers. We provide another drive means for reciprocating the feed bars longitudinally through the distance separating adjacent pairs of carriers. Both the transverse and longitudinal drives are operated from a single continuously rotating shaft. The composite motion of the feed bars is synchronized with the press operation.

In the accompanying drawings which form part of the instant specification and which are to be read in conjunction therewith and in which like reference numerals are used to indicate like parts in the various views:

FIGURE 1 is a side elevation of our transfer feed assembly.

FIGURE 2 is a top plan view of our transfer feed assembly with some parts removed and other parts broken away, taken along the line 2—2 of FIGURE 1.

FIGURE 3 is a sectional view of the transverse and longitudinal drive mechanisms of our transfer feed assembly drawn on an enlarged scale.

FIGURE 4 is a sectional view of the transverse and longitudinal drive mechanisms of our transfer feed assembly taken along the line 4—4 of FIGURE 3.

FIGURE 5 is a plan view of the transverse and longitudinal drive mechanisms of our transfer feed assembly taken along the line 5—5 of FIGURE 3.

FIGURE 6 is a sectional view of one form of the blank feeding mechanisms, drawn on an enlarged scale, which may be employed with our transfer feed assembly.

FIGURE 7 is a sectional view of the blank feeding mechanism of our transfer feed assembly taken along the line 7—7 of FIGURE 6.

FIGURE 8 is a sectional view of the blank feeding mechanism of our transfer feed assembly taken along the line 8—8 of FIGURE 6.

FIGURE 9 is a top plan view of the blank feeding mechanism of our transfer feed assembly, with parts removed.

FIGURE 10 is a fragmentary plan view of the shuttle of our blank feeding mechanism, drawn on an enlarged scale, with a part in section.

FIGURE 11 is a fragmentary sectional view of the shuttle of our blank feeding mechanism taken along the line 11—11 of FIGURE 10.

FIGURE 12 is a fragmentary view, with parts in section, of the shuttle blank feeding mechanism of our grip feed.

FIGURE 13 is a diagrammatic view showing the relationship of the transverse and longitudinal motions of our grip feed to the operating stroke of the press.

More particularly referring now to FIGURES 1 and 2 of the drawings, our transfer feed assembly, indicated generally by the reference character 10, includes four upright supports 12, 14, 16, and 18 carrying a table 20. We mount a pair of spaced feed bars 22 and 24 on table 20 for transverse and longitudinal sliding movements. We provide table 20 with an opening 26 for permitting the drawing slide dies (not shown) carried by the die holders 15 of the upper slide 13 of the press with which our assembly is used to move into cooperative relationship with dies 17 carried by the bed 28 of the press. It will readily be appreciated that each of the

die holders 15 and the cooperating lower die 17 in the press bed 19 is located at a work station along the length of our transfer feed assembly.

Bolts, or the like, 30 secure work carriers 32 to feed bar 22. Bolts 34 secure carriers 36 to feed bar 24. It is to be noted that we form bars 22 and 24 as channel bars from lightweight material such as magnesium or the like. Owing to this construction our assembly has a very low moving mass. Carriers 32 and 36 may also be formed of a lightweight material. We arrange the carriers 32 and 36 in spaced pairs along the length of feed bars 22 and 24. The space between adjacent pairs of carriers is equal to the distance separating the centers of a pair of adjacent dies. It is to be noted that the shape of respective pairs of carriers 32 and 36 changes along the length of the feed bars. This is to accommodate the changing shape of the work piece as operations are progressively performed on it during the press operations.

Referring now to FIGURES 1 to 4, a plurality of bolts 37 secure a housing indicated generally by the reference character 38 to the supports 12 and 14. A shaft 40, driven by any convenient means (not shown) from the main drive shaft of the press with which our assembly is used, is connected by a flexible coupling 42 to a shaft 44. A pair of bearings 46 and 48 carried by an auxiliary housing 50 on a side 52 of housing 38 rotatably support shaft 44. A worm 54 carried by shaft 44 for rotation with it drives a pinion 56 carried by a shaft 58 for rotation with it. Pinion 56 meshes with and drives a gear 60 carried by a shaft 62 for rotation with it. A number of bearings 64, 66, and 68, carried respectively by the back 70 of housing 38, a support plate 72 within housing 38 and the front 74 of housing 38, rotatably support shaft 62 within the housing. Any convenient means such as a key 76 or the like secures a barrel cam 78 on shaft 62 for rotation therewith. We form barrel cam 78 with a cam track 80. A pair of depending supports 82 and 84 formed in the top 86 of housing 38 carry a fixed shaft 88. A bushing or the like 90 on shaft 88 pivotally supports a lever 92, one end of which carries a cam follower 94 disposed in the track 80 of barrel cam 78. A pin 96 pivotally connects the end of lever 92 remote from follower 94 to a drive link 98. We dispose a drive bar 100 in the end of link 98 remote from pin 96. We secure a pair of drive members 102 and 104 to the respective feed bars 22 and 24 by any convenient means such as welding. Each of the members 102 and 104 is formed with a cylindrical recess or bore 106 adapted to receive one of the respective ends of the drive bar 100.

It is to be noted that in the open position of feed bars 22 and 24 as shown in FIGURE 4 the drive bar 100 extends only a short distance into bores 106. When the feed bars are moved toward each other to clamp work pieces between the pairs of carriers 32 and 36, bores 106 cover a greater portion of the drive bar 100.

From the structure thus far described, it will be seen that as shaft 40 rotates, it drives worm 54 to drive pinion 56 which drives gear 60 to rotate shaft 62. As shaft 62 rotates, barrel cam 78 oscillates arm 92 to reciprocate link 98. The reciprocating motion of link 98 drives bar 100 to reciprocate members 102 and 104 and feed bars 22 and 24 by reason of the driving engagement between the ends of rod 100 and the members 102 and 104. It is to be noted that the driving connection between bar 100 and the feed bars 22 and 24 permits transverse reciprocation of the bars while the feed bars 22 and 24 reciprocate longitudinally.

Referring to FIGURES 3, 4, and 5, any convenient means such as a key or the like 108 fixes a second barrel cam 110 on shaft 62 for rotation with it. We form cam 110 with a track 112. A pair of bushings 114 and 116 disposed in respective supports 118 and 120 carried by housing 38 pivotally mount a vertical shaft 122. Any suitable means such as a nut 124 threaded on an end of

shaft 122 secures the hub 126 of a crank arm 128 on shaft 122 for rotation with it. A pin 130 pivotally mounts a cam follower roller 132 on the end of crank arm 128 remote from hub 126. Follower 132 is disposed in track 112 so that as barrel cam 110 rotates, arm 128 oscillates to oscillate shaft 122. A pair of slide rods 134 and 136, supported by any convenient means in the sides of housing 38, slidably support a pair of slides 138 and 140 for sliding movement transversely of the assembly. Each of the slides 138 and 140 carries a pair of feed bar rods 142 and 144. Each pair of rods 142 and 144 passes through a pair of bores in one of the respective members 102 and 104 slidably to support the member for longitudinal movement. Any convenient means such as a nut or the like 146 threaded on the end of shaft 122 remote from nut 124 secures a crank 148 on shaft 122 for rotation with it. Respective pins 150 and 152 connect the arms of crank 148 to links 154 and 156. Respective pins 158 and 160 pivotally connect links 154 and 156 to slides 138 and 140.

It will be seen that as barrel cam 110 rotates, cam track 112 actuates follower 132 to oscillate the crank 128 and shaft 122. As the shaft 122 oscillates, links 154 and 156 reciprocate slides 138 and 140 transversely of the assembly. Owing to the engagement between slides 138 and 140, and the respective members 102 and 104 provided between pairs of rods 142 and 144, members 102 and 104 and the feed bars 22 and 24 carried thereby reciprocate with slides 138 and 140. The driving connection between slides 138 and 140 permits the feed bars to be reciprocated longitudinally of the assembly while being driven transversely of the assembly.

As can be seen in FIGURE 5, shaft 58 extends from housing 38 to a second housing, indicated generally by the reference character 162, fixed on supports 16 and 18 at the end of the assembly remote from housing 38. The shaft 58 may be rotatably supported by any convenient means such as bearings, one bearing 164 of which is shown in FIGURE 5, carried by the respective housings 38 and 162. We fix a second pinion 166 on shaft 58 for rotation with it. This pinion 166 drives a gear 168 disposed in housing 162. Respective bearings 170 and 172 carried by housing 162 rotatably support a shaft 174. Any convenient means such as a key or the like 176 fixes a barrel cam 178, shown in FIGURE 3, on shaft 174 for rotation with it. Means such as screws 180 secure gear 168 to the hub of cam 178. As shaft 58 rotates, pinion 166 drives gear 168 to rotate shaft 174 and the barrel cam 178. We provide cam 178 with a cam track 182 identical with the track 112 in cam 110. A pair of bushings 184 and 186 carried by respective supports 188 and 190 in housing 162 rotatably support a vertical shaft 192. A nut or the like 194 threaded on an end of shaft 192 secures a crank arm 196 on shaft 192 for rotation with it. A pin 198 carried by arm 196 pivotally supports a cam follower roller 200 disposed in track 182. A nut or the like 202 threaded on the end of shaft 192 remote from nut 194 secures a crank 204 on shaft 192 for rotation with it. As shaft 58 rotates, pinion 166 drives gear 168 to rotate shaft 174 and barrel cam 178. As cam 178 rotates, it oscillates crank arm 196 to oscillate shaft 192 and the crank 204 carried by the shaft. Respective pins 206 and 208 connect the arms of crank 204 to respective slide drive links 210 and 212. Respective pins 214 and 216 connect the ends of links 210 and 212 remote from pins 206 and 208 to slides 218 and 220 mounted for transverse sliding movement on rods 222 and 224 supported by housing 162. Each of the slides 218 and 220 carries a pair of rods 226 and 228. Each pair of rods 226 and 228 passes through bores in a respective one of a pair of feed bar drive members 230 and 232 fixed to the underside of respective feed bars 22 and 24 by any convenient means such as welding or the like. It will be seen that the mechanism housed by housing 162 forms a slide transverse drive identical with the slide transverse drive

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disposed in housing 38. Thus we provide two transverse drive means adjacent the respective ends of our assembly for reciprocating feed bars 22 and 24 transversely of the assembly. The construction of these drives is such that they reciprocate the feed bars transversely while permitting longitudinal reciprocation of the bars.

The feed bar motions provided by the respective longitudinal and transverse drives can best be seen by reference to FIGURE 13. In the figure the curve A represents the motion of the drawing slide of the press with which our assembly is used in performing a punching operation. The transverse motion of the feed bars 22 and 24 is indicated by the curve B, while the longitudinal motion of the feed bars is indicated by curve C. The curves indicate the respective positions of drawing slide and feed bars in the course of one revolution of the main drive shaft of the press with which our assembly is used. During the portion of the press drawing slide stroke of from approximately 285° to about 75°, the feed bars are in clamping position. During this period the longitudinal feed bar drive advances the work blanks from left to right through a distance equal to the distance between centers of successive stations on the press. During the period of from about 75° to 125° the feed bars are operated to release the work pieces. The longitudinal drive dwells from about 75° to 105° to permit the work to be unclamped. From 125° to 235° the transverse drive dwells to permit the press drawing slide to perform its drawing operation. When the drawing operation is complete, the feed bars are again moved to clamping position. During the time when the feed bars are out of clamping position and when the drawing operation is being performed, the longitudinal drive returns the feed bars to the initial position on the assembly. It is to be understood that the transverse and longitudinal motions of the feed bars may readily be varied as required merely by replacing cams 78, 110, and 178 with cams having appropriately shaped tracks.

We provide automatic means for feeding work blanks to the first pair of carriers 32 and 36 on feed bars 22 and 24. Referring now to FIGURES 1 and 7 to 12, housing 38 supports by any convenient means such as bolts or the like a blank feeding mechanism housing, indicated generally by the reference character 234. A pair of guides 236 and 238 fixed to the sides of housing 234 slidably support a blank feeding shuttle 240. We form shuttle 240 with a pair of openings 242 and 244 into which the feed bars 22 and 24 extend. We form the base of each of the openings 242 and 244 with a slot 246. Respective bosses 248 and 250 formed on the underside of the respective feed bars 22 and 24 lie in slots 246. From the foregoing it will be seen that as the bars 22 and 24 reciprocate longitudinally of the assembly, they reciprocate shuttle 240 by reason of the engagement of bosses 248 and 250 in slots 246. This driving connection between the shuttle 240 and the feed bars 22 and 24 permits the bars to be reciprocated transversely while being driven longitudinally. We form the top 252 of housing 234 with an opening 254 through which a plurality of work blanks 256 pass to the shuttle 240. We form shuttle 240 with a forwardly extending portion 258 which extends into a slot 260 formed in a blank transfer table 262 carried by any convenient means in housing 234. To avoid confusion, the details of the portion 258 of shuttle 240 and the slot 260 have not been shown in detail in FIGURES 1 and 2. Slot 260 serves as a guide for the shuttle 240. As can be seen by reference to FIGURES 9 to 12, shuttle 240 and the transfer table 262 intermesh as indicated generally at 261 so that the table supports a blank removed from the stack of blanks 256 to permit it to be gripped by the first pair of grippers.

Referring now to FIGURE 10, shuttle 240 is formed with a semicircular blank engaging raised portion 264. When the shuttle is in its extreme left-hand position as viewed in FIGURES 6 and 9, the lowest blank in the

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stack of blanks 256 is engaged by portion 264. When the shuttle travels from this position in the direction of feed of our transfer feed assembly, it carries the lowest blank in the stack out to a position on transfer table 262 where it may be gripped by the first pair of grippers 32 and 36.

Top 252 is formed with a pair of recesses 266 through which a pin 268 passes. Pin 268 pivotally carries a pair of blank retaining pawls 270. Leaf springs 272 normally urge pawls 270 in a direction toward table 262. These pawls 270 engage a blank fed from stack 256 to prevent the blank from being drawn back into the stack when the shuttle returns. Top 252 also carries a limit switch 274 having thickness measuring arm 276 carrying a blank engaging roller 278. When more than a single blank is accidentally fed from the stack of blanks 256 by shuttle 240, the arm 276 of switch 274 moves to a position where the switch is actuated. Switch 274 may be connected into the press drive circuit to interrupt the circuit when two blanks are accidentally fed. We provide means for lifting all but the lowest of the blanks 256 in the stack when shuttle 240 is to feed the lowest blank.

Referring now to FIGURES 6, 7, and 9, it will be seen that shaft 62 extends from housing 38 into housing 234. Any convenient means such as a key or the like 280 fixes a cam 282 on shaft 62 for rotation with it. One side of housing 234 is formed with a lug 284 carrying a pin 286 which pivotally mounts a lever 288. The end of lever 288 remote from pin 286 pivotally mounts a cam follower roller 290 by means of a pin 292. As cam 282 rotates, it oscillates lever 288 about pivot pin 286. A pin or the like 294 carried by lever 288 pivotally connects the lever to a link 296. A pin 298 pivotally connects link 296 with a pair of links 300 and 302 pivotally connected by respective pins 304 and 306 to stack gripping fingers 308 and 310. An adjusting turnbuckle 312 pivotally connected by respective pins 314 and 316 to fingers 308 and 310 governs the distance between the pivot points of fingers 308 and 310. The back 70 of housing 38 carries a pair of guides 318 and 320.

When cam 282 drives lever 288 in a clockwise direction about pivot 286, it drives pivot 298 upwardly. Housing back 70 carries a guide 322 which constrains pin 298 to move in a vertical direction. As pin 298 moves upwardly, fingers 308 and 310 tend to rotate about their respective pivots 314 and 316 in a direction to move the upper ends of fingers toward each other. This movement is prevented by the stack of blanks 256, with the result that the stack is gripped by the fingers. The arrangement of the fingers is such that the stack is gripped at a point just above the lowest blank in the stack on shuttle 240. Thus, this blank may be drawn out from under the stack by the shuttle to a position to be gripped by the first pair of work carriers 32 and 36 when the feed bars move toward each other.

In operation of our transfer feed assembly, a stack of work blanks 256 is placed over the opening 254 in the top 252 of housing 234. From an initial position of the elements, the press drawing slide begins to move from its bottom dead center position toward its top dead center position. During this motion of the drawing slide, feed bars 22 and 24 are open and are returned to their extreme left-hand position as viewed in FIGURES 1 and 2. When the feed bars arrive at their left-hand position, or position from which a feed is to begin, shuttle 240 has moved to a position where its raised portion 264 may engage the lowest blank 256 in the stack. At this time the cam 282 actuates lever 288 to lift the stack of blanks by means of fingers 308 and 310. When the stack is lifted and the feed bars move from left to right as viewed in FIGURES 1 and 2, shuttle 240 carries the lowest blank out of the stack to a position to be gripped by the first pair of carriers 32 and 36. Pawls 270 retain the advanced blank in this position. As a result of this opera-

tion, a fresh blank is always in position to be gripped by the first pair of carriers at the beginning of a feeding operation.

When the bars 22 and 24 arrive at the position from which a feed is to begin, they move toward each other to grip the work pieces at each station of the press between carriers 32 and 36. During this period of movement of the bars toward each other, the longitudinal bar drive dwells to permit the clamping action to take place. Once the bars move to clamping position, their longitudinal feed moves the bars from left to right. During this longitudinal movement of the bars, the transverse drive dwells until the work pieces have been moved through a distance equal to the distance between the centers of a pair of successive stations. These motions can best be seen by reference to FIGURE 13. After the movement of the bars from left to right as viewed in FIGURES 1 and 2, the longitudinal drive dwells and the transverse drive moves the bars 22 and 24 away from each other to unclamp the work pieces. It is to be understood that during this feeding movement of the bars, the press drawing slide moves up through its top dead center position and begins its downward or drawing stroke. After the work pieces have been unclamped, the transverse bar drive dwells and the longitudinal drive returns the bars for the next feeding operation while the press drawing slide performs its drawing stroke. The shuttle 240 and the stack lifting mechanism release the stack during this return movement.

It is to be understood that as many press stations may be provided as are required. While we have shown and described a particular mechanism for feeding work blanks to the first pair of work carriers, it is to be understood that other means may be employed to accomplish this feed. It is to be noted further that there may be a number of idle stations in the feeding assembly to permit oiling and other similar operations. The finished work pieces may be carried away from the assembly by any convenient means such as a delivery chute.

It will be seen that we have accomplished the objects of our invention. We employ a simple barrel cam drive which avoids the complicated gearings used in assemblies of the prior art. Since our assembly is simpler than those of the prior art, it is less expensive. Our assembly has a small moving mass having a low inertia. It is less expensive to operate than assemblies of the prior art. Since the moving mass has a low inertia, our assembly does not have the tendency to "hammer," which is present in assemblies of the prior art. Our assembly is driven from a single continuously rotating shaft. It does not require the power consuming intermittent drives of the prior art.

It will be understood that certain features and sub-combinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of our claims. It is further obvious that various changes may be made in details within the scope of our claims without departing from the spirit of our invention. It is therefore to be understood that our invention is not to be limited to the specific details shown and described.

Having thus described our invention, what we claim is:

1. A transfer feed assembly for a power press having a pair of spaced stations at which respective drawing operations are to be performed on a workpiece including in combination a frame, a pair of feed bars having axes extending in the direction of feeding, a pair of slide rods, means mounting said slide rods on said frame with their axes extending at right angles to the direction of feeding, a pair of guide rods, means slideably mounting said guide rods on said slide rods with their axes extending in the direction of feeding for movement along said slide rods, means mounting said feed bars on said guide rods for movement along said rods, a drive bar extending transversely of said feed bars, means mounting said drive bar

on said feed bars for movement of said feed bars along said drive bar, a pair of fingers, means mounting a finger of said pair on each feed bar to engage stampings formed from said workpieces, a shaft driven by the press, means mounting said shaft for rotary movement on the press, a cam carried by said shaft for rotation with the shaft, a lever pivoted on said frame intermediate its ends, a cam follower carried by one end of said lever and adapted to coact with said cam, a drive link connecting the other end of said lever to said drive bar, said cam being formed to actuate said follower to oscillate said lever to cause said link to reciprocate said bars longitudinally to move said fingers from one of said stations to the other of said stations and from said other station to said one station and drive means including said shaft for moving said guide rods toward and away from each other to impart transverse reciprocating motion to said bars to cause said fingers to engage a stamping at said first station and to release said stamping at the other station.

2. A transfer feed assembly for a power press having a pair of spaced stations at which respective drawing operations are to be performed on a workpiece formed from a blank including in combination a frame, a pair of feed bars having axes extending in the direction of feeding, means mounting said feed bars on said frame for movement in the direction of feeding and for movement transversely of the direction of feeding, a drive bar extending transversely of said feed bars, means mounting said drive bar on said feed bars for movement of said feed bars along the length of said drive bar, a pair of fingers, means mounting a finger of said pair on each feed bar to engage stampings formed from said workpieces, a shaft driven by the press, means mounting said shaft for rotary movement on the press, a cam carried by said shaft for rotation with the shaft, a lever pivoted on said frame intermediate its ends, a cam follower carried by one end of said lever and adapted to coact with said cam, a drive link connecting the other end of said lever to said drive bar, said cam being formed to actuate said follower to oscillate said lever to cause said link to reciprocate said feed bars longitudinally to move said fingers from one of said stations to the other of said stations and from said other station to said one station, drive means including said shaft for imparting transverse reciprocating motion to said feed bars to cause said fingers to engage a stamping at said first station and to release said stamping at the other station, means for supporting a stack of blanks to be fed to said fingers, a shuttle adapted to be driven to feed the lowermost blank in said stack to said pair of fingers and means responsive to the operation of said lever for reciprocating said shuttle.

3. A transfer feed assembly for a power press having a pair of spaced stations at which respective drawing operations are to be performed on a workpiece formed from a blank including in combination a frame, a pair of feed bars having axes extending in the direction of feeding, means mounting said feed bars on said frame for movement in the direction of feeding and for movement transversely of the direction of feeding, a drive bar extending transversely of said feed bars, means mounting said drive bar on said feed bars for movement of said feed bars along the length of said drive bar, a pair of fingers, means mounting a finger of said pair on each feed bar to engage stampings formed from said workpieces, a shaft driven by the press, means mounting said shaft for rotary movement on the press, a cam carried by said shaft for rotation with the shaft, a lever pivoted on said frame intermediate its ends, a cam follower carried by one end of said lever and adapted to coact with said cam, a drive link connecting the other end of said lever to said drive bar, said cam being formed to actuate said follower to oscillate said lever to cause said link to reciprocate said feed bars longitudinally to move said fingers from one of said stations to the other of said stations

and from said other station to said one station, drive means including said shaft for imparting transverse reciprocating motion to said feed bars to cause said fingers to engage a stamping at said first station and to release said stamping at the other station, means for supporting a stack of blanks to be fed to said fingers, a shuttle adapted to be driven to feed the lowermost blank in said stack to said pair of fingers, means responsive to the operation of said lever for reciprocating said shuttle to feed the lowermost blank from said stack to said pair of fingers and means responsive to the operation of the press for lifting the blanks above said lowermost blank in the course of a blank feeding operation.

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