

Nov. 13, 1945.

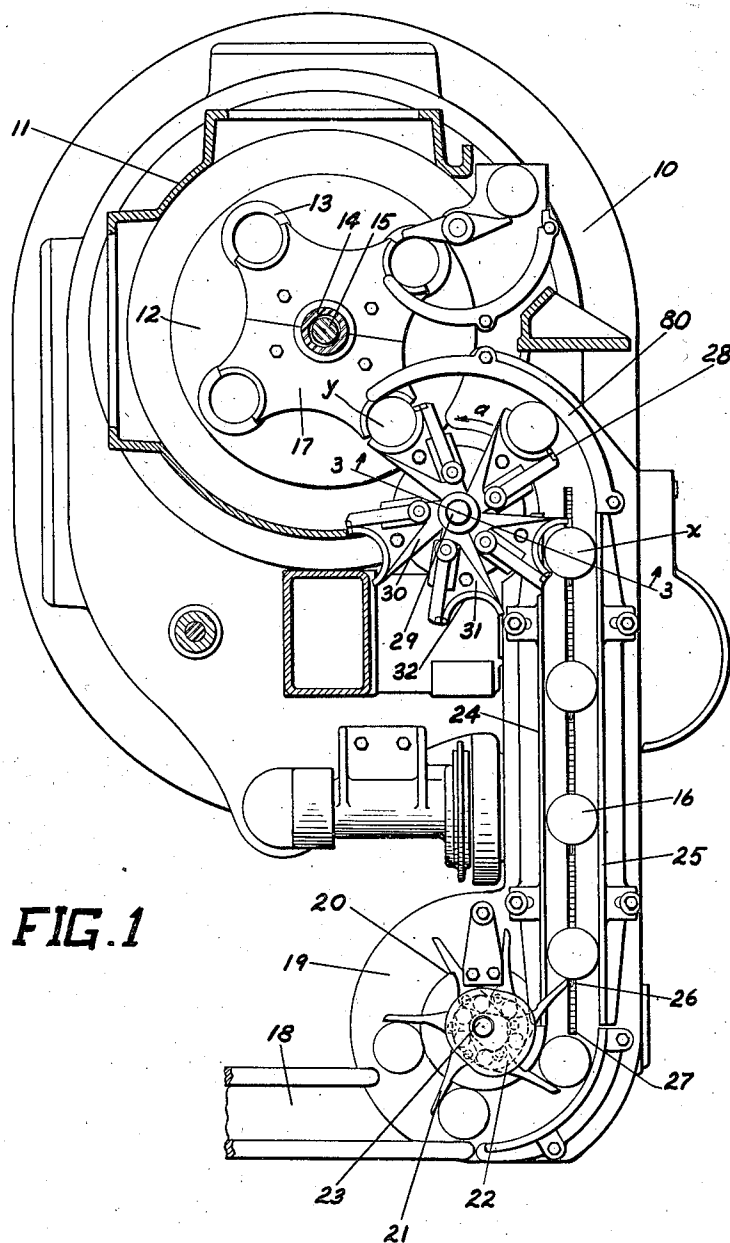
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2,388,804

CAN FEED MECHANISM

Filed Dec. 18, 1942

4 Sheets-Sheet 1



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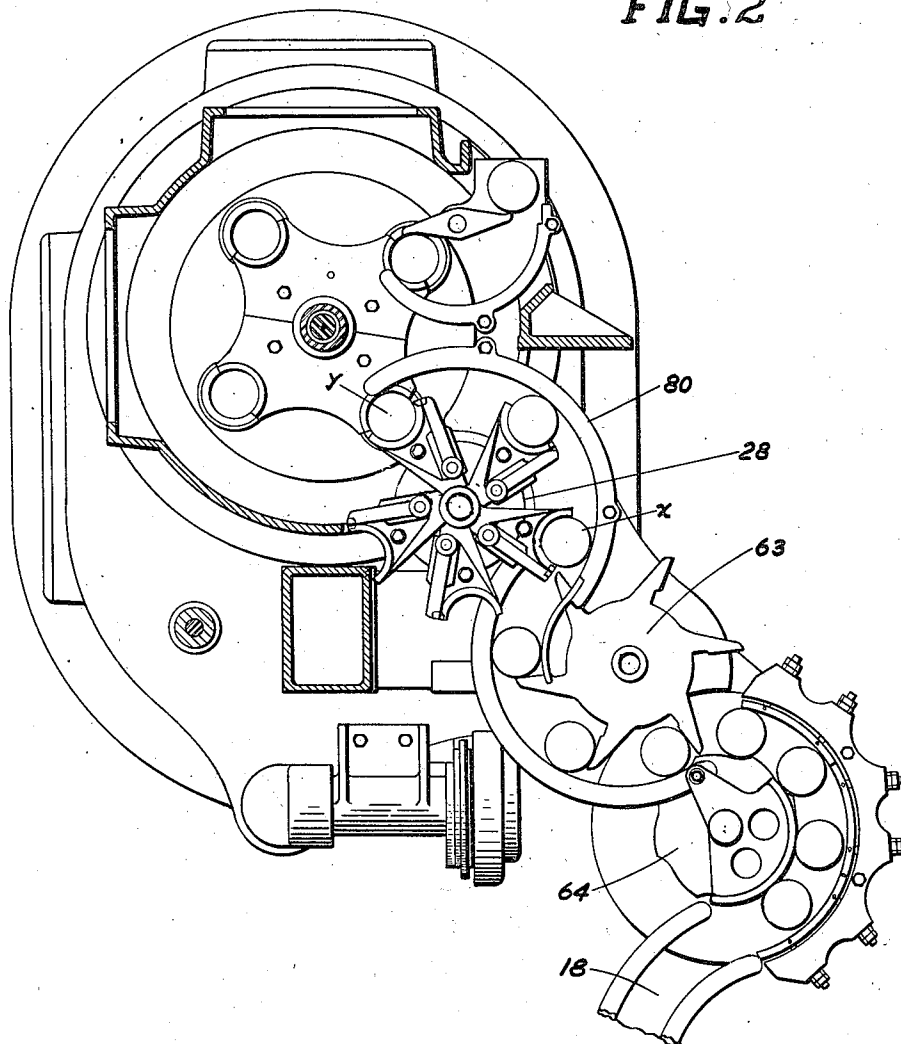
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FIG. 2



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FIG. 3

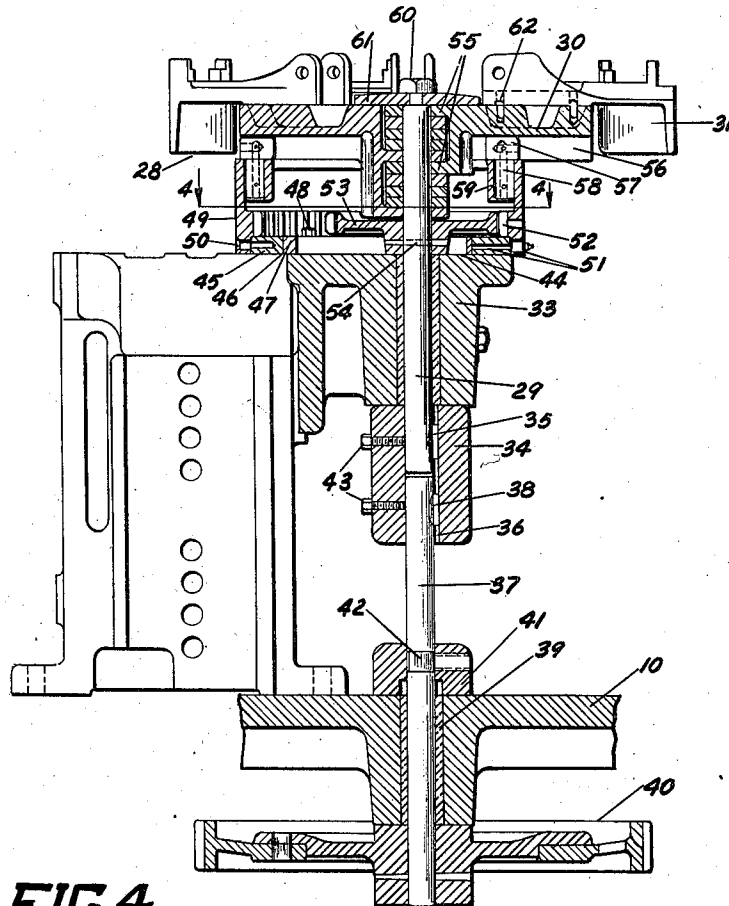
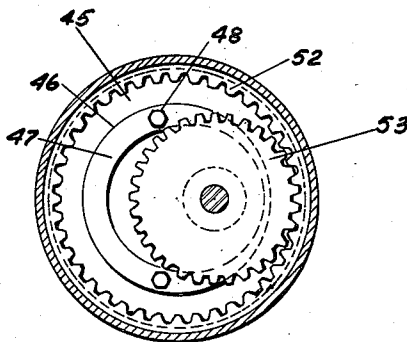


FIG. 4



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FIG. 5

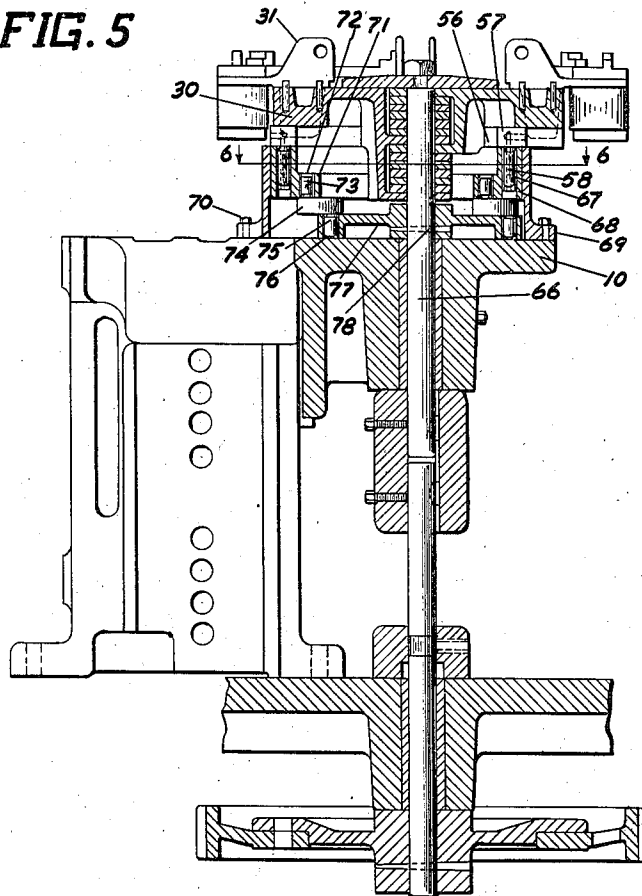
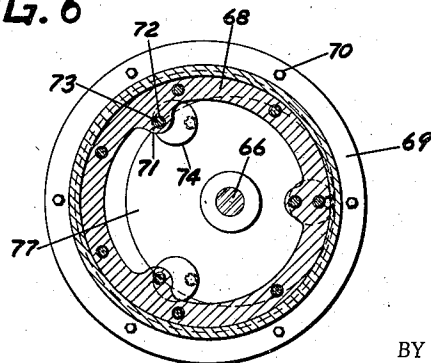


FIG. 6



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CAN FEED MECHANISM

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Application December 18, 1942, Serial No. 469,737

2 Claims. (Cl. 198—22)

This invention relates to can making machinery and particularly pertains to a can feed mechanism.

In connection with can double seaming machines, whether used to seam the bottoms on cans during their manufacture or when sealing a cap on a can after it has been filled, it is desirable to feed the cans into the seaming mechanism and to accelerate the speed of the can from the normal travel of the can as it moves along the can runway to the relatively high speed seaming mechanism. It is obvious that the speed of the can shall be accelerated gradually and without violent movement at any point in its travel, particularly when the can is filled with material. It is also desirable that the can feed accelerating means shall be so designed as to insure that the material with which the can is filled is not violently agitated and will not slop and spill. It is also desirable to insure that in the event there is any spillage of material from the can that it will not be deposited upon or between the parts of the can feed and accelerating means in a manner to cause the parts to become clogged or inoperative. It is the principal object of the present invention, therefore, to provide a can feed mechanism by which cans will be received and engaged while travelling at a predetermined relatively low rate of speed and may be accelerated in speed as they travel to a double seaming mechanism, the accelerating device being so designed as to be shielded from spillage and housed in a manner to operate efficiently under all conditions.

The present invention contemplates the provision of a can feed mechanism operating in synchronism with a double seaming machine and by which cans are delivered from a run of cans into the machine at a gradual progressive speed of travel, said mechanism including a plurality of separate feed arms, the individual speeds of which increase and decrease while in engagement with a cam to gradually accelerate the speed of travel of the can.

The invention is illustrated by way of example in the accompanying drawings, in which:

Figure 1 is a view in plan showing one form of the can feed mechanism.

Fig. 2 is a view in plan showing another form of can feed mechanism.

Fig. 3 is an enlarged view in vertical section through the can accelerating mechanism as seen on the line 3—3 of Fig. 1.

Fig. 4 is a view in transverse horizontal section through the main feed mechanism as seen on the line 4—4 of Fig. 3.

Fig. 5 is a view in plan showing another form of can feed and accelerating device.

Fig. 6 is a view in vertical section through the structure as seen on the line 6—6 of Fig. 5.

Referring more particularly to the drawings, 10 indicates the base structure of a can double seaming machine. Mounted upon the base 10 is a housing 11 within which a double seaming turret 12 is mounted. This turret includes chucks 13 mounted upon a sleeve 14 and shaft 15 and receiving cans 16 preparatory to a double seaming operation. The chucks 13 and the frame 17 which carries them rotate at a relatively high speed of travel as compared to the speed of travel of the cans fed to the machine along a runway 18. The can runway 18, as shown in Fig. 1 of the drawings, delivers cans onto a table 19 over which a variable speed can feed structure 20 moves. This structure includes radial feed arms 21 actuated by a suitable cam mechanism 22 by which the arms 21 are caused to move at variable speeds with relation to the constant rotating speed of a drive shaft 23. The cans are fed by the arms 21 into a position between track rails 24 and 25, where they are engaged by feed lugs 26 carried upon a feed chain 27. This chain moves the cans along a lineal path of travel to the can accelerating means 28 with which the present invention is particularly concerned. This accelerating means is mounted upon a shaft 29 and includes a plurality of arms 30. The arms 30 are pivoted upon the shaft 29 for free rotation and carry castings 31 at the outer ends of which can pockets 32 are formed. Referring particularly to Fig. 3 of the drawings, it will be seen that the shaft 29 extends downwardly through a bearing 33 and into a coupling sleeve 34. The shaft is provided with a key 35 extending into a keyway 36 of the sleeve and is thus splined to the sleeve. A lower shaft 37 is provided with a key 38 likewise splined into the sleeve 34 so that the shaft 29 and the associated mechanism of the can feed structure 28 may be separated easily from the shaft 37. The shaft 37 extends downwardly through a bearing 39 in the base 10 of the structure and receives a gear 40 by which the shaft is driven through suitable driving gears not shown in the drawings. A collar 41 is mounted upon the shaft 37 and engages a shoulder 42 formed on the shaft to prevent downward movement of the shaft. Suitable set screws 43 hold the sleeve 34 with relation to the shafts 29 and 37 when the structure is assembled.

The bearing 33 is formed with an upper flat

face 44 upon which the variable speed structure is mounted. Resting directly upon the face 44 is a feed guide ring 45 formed with a central circular bore 46. Mounted within the circular bore is an eccentric cam ring 47, the outer circumference of which fits the bore 46. The ring 47 is held in position by screws 48. Providing a housing for the ring 45 is a cylindrical shell 49 which extends upwardly for a predetermined height. Screws 50 hold the housing and ring 45 together. Grease ducts 51 lead through the housing and the ring 45 to the ring 47.

Disposed within the cylindrical housing 49 and here shown as being formed integral with the wall thereof is an internal spur gear 52. In mesh with and circumscribed by the spur gear 52 is a gear 53. This gear is materially smaller in diameter than the gear 52 and is therefore disposed eccentrically to the gear 52. The gear 53 is mounted upon the shaft 29 and is secured by a pin 54. Pivotaly mounted upon the shaft 29 above the housing member 49 are the arms 30 which carry the pocket castings 31. The arms 30 are each formed with a pair of bearing yokes 55 which are spaced from each other to give stability to the arms and to hold them rigidly in planes at right angles to their rotating axes. The yokes are staggered in pairs along the shaft 29 while the arms themselves are maintained in a common plane. Formed upon the under face of each arm is a longitudinally extending slot 56 which is disposed radially and into each of which a slide block 57 extends. The slide blocks are carried on the upper ends of stub shafts 58 which fit into bearing seats 59 formed around the housing 49. It will be evident that as the housing 49 rotates around the relatively fixed ring 47 upon an axis eccentric to that of the shaft 29 the blocks 57 will slide along the slots 56 and will drive the arms 30 at different rates of speed along their orbit of travel around the axis of shaft 29.

The arms 30 are all held in position upon the shaft 29 by a cap screw 60 and a washer 61. The outer ends of the arms are provided with pins 62 which extend into sockets of the feed pocket castings 31 and by which they are held in position.

In the form of the feed structure shown in Fig. 2 of the drawings the variable speed structure 28 is utilized and is of the construction previously disclosed. Associated with this feed structure is a star wheel 63 having fixed feed arms and a timing star wheel 64. By this means the cans are led along a circuitous path of travel from the can runway 18 to the accelerating can feed structure 28.

Referring particularly to Figs. 5 and 6, a different form of can accelerating structure is shown, which, however, embodies the same general principle of operation as the structure shown in Figs. 1 to 4, inclusive. In the device shown in Figs. 5 and 6 the arms 30 carry the pocket elements 31, as previously described. These arms are mounted upon a drive shaft 66 in a manner to dispose all of the arms in the same horizontal plane. Each of the arms is formed on its under side with the slot 56 to receive a feed block 57. The stub shaft 58 of each feed block is mounted in complementary vertical bores 67 which are equally spaced around and formed through an operating ring 68. The operating ring is rotatably supported within a cylindrical bearing 69 which rests upon the upper face of the base 10 and is secured by cap screws 70. The operating ring 68 is formed with an inwardly extending flange 71 through which bearing openings 72 are formed.

These openings are aligned radially with corresponding openings 67 in the operating ring so that the openings 67 and 72 will be arranged in pairs. The bearing openings 72 receive upwardly projecting stub shafts 73. Each of these stub shafts is carried by a crank arm 74, all of which arms lie in a common horizontal plane beneath the operating ring 68. Upon the opposite side of each of the crank arms 74 from the stub shafts 73 are stub shafts 75. The axes of the shafts 73 and 75 on each of the cranks 74 are parallel and are off-set from each other to provide a crank throw of a desired length. The shafts 75 extend downwardly and into bearing openings 76 of an eccentric throw plate 77. The plate 77 is fixed rigidly upon the shaft 66 and is here shown as secured by a pin 78. The outside diameter of the plate 77 is concentric with the axis of the shaft 66 and the stub shafts 75 are spaced equidistant from each other along a circle, which is likewise concentric with the shaft 66. It will thus be seen that the plate 77 is driven by the shaft 66 and that the stub shafts 75 move along a circular path concentric with the shaft 66 but eccentric to the circular path of the stub shafts 73. The cranks shown in Fig. 6 of the drawings are disposed at opposite sides of the axis of shaft 66, with the cranks arranged at their extreme position of eccentricity.

In operation of the form of the invention shown in Figs. 1 to 4 of the drawings, the arms 30 are mounted to swing freely around the shaft 29 and to swing in the direction of the arrow *a*, as indicated in Fig. 1 of the drawings. The housing 49 together with the ring gear 52 and the pinion 53 are so disposed with relation to the axis of shaft 29 and the path of travel of the cans advancing to the can accelerating feed mechanism 28 and conducting the cans to the turret 12, that the feed pockets 32 will coincide with the individual cans 16 as they are advanced by the chain 27 or the star wheel 63. It is also to be understood that the parts have been so designed as to insure that at the point of coincidence of the can advancing to the accelerating feed means and at which point the can registers with a pocket 32, the peripheral speed of travel of the can pocket around the shaft 29 will be the same as the speed of travel of the can which registers therewith. This insures that the travelling can will be placed in a feed pocket and will be advanced along its arcuate path of travel in this pocket without any violent acceleration of speed of the can. The possibility of spillage of the contents of the can will thus be minimized. After the can has properly registered with a pocket 32 it will advance along the arcuate path of travel as defined by the guide rail 80 which leads from the can runway to a position along the path of travel of the chucks 13 of the can turret 12. As the shaft 29 drives the gear 53 the entire housing 49 will be rotated around its individual axis by driving engagement between the gear 53 and the ring gear 52, and since the radial axis of the arms 30 is eccentric to the axis of the ring gear 52 and the housing 49, the feed blocks will move along an eccentric path of travel with relation to the shaft 29. This will cause the feed blocks 57 to slide back and forth in the guide slots 56, and will thus change the radial length from the center of shaft 29 to the feed block, so that the individual arms 30 will swing separately and at progressively varying speeds. The result will be that from the time a can 16 comes to register with a feed pocket 32, as indicated at *x* in Figs. 1 and 2 of the drawings,

until the same can comes to register with a chuck 13, as indicated at *y* in Figs. 1 and 2 of the drawings, the speed of travel of the can will be accelerated gradually from the speed of the initial feed and timing mechanism to the speed of travel of the chucks carried by the turret. Thus, the cans will move into position upon the chucks 13 of the turret while travelling at the speed of the turret and there will not be any violent agitation of the contents of the open can, as it is then engaged by the double seaming mechanism.

Referring particularly to Figs. 5 and 6 of the drawings, a structure is shown which differs in detail from that previously explained but which operates in the same manner. This structure has the advantage of being cheaper to manufacture due to the fact that it is not necessary to cut the expensive internal gear 52. The device of Figs. 5 and 6 is used in the same setting as that disclosed in Figs. 1 and 2 of the drawings, and is driven in the same manner by power applied to shaft 66. In this case, however, the throw plate 77 is rotated with the shaft 66 to which it is pinned and will carry the stub shafts 75 with it. The crank arm 74 will tend to follow the stub shafts and if unconfined the stub shafts 73 upon the opposite sides of the cranks would assume a position approximately along the circular path of travel of the stub shafts 75 as the cranks followed the shafts 75. Since the stub shafts 73 are disposed in bearing openings 72 of the operating ring 68, rotation of the plate 77 will tend to draw the operating ring 68 with the plate, and since the ring 68 is confined within the fixed housing 69 the ring 68 will rotate within the housing on an axis which is eccentric to the shaft 66. Due to the change in eccentric positions of the stub shafts 73 and 75 of the crank 74 as brought about by this eccentricity of movement, the crank 74 will assume various angular positions to accommodate this shift of the plate 77 and the ring 68 in their parallel moving planes. Thus, there will not be any binding action between the plate 77 and the ring 68 and the two members will be connected with a full floating drive. In view of the fact that the axis of shaft 66 around which the arms 30 swing radially is eccentric to the fixed axis of the housing 69 and the operating ring 68 which rotates therein, it will be seen that the feed blocks 57 will have the same feed action as described with relation to Figs. 1 to 4, and that these blocks will slide back and forth in the longitudinal slots 56 to impart a variable swinging motion to the arms 30 as all of the arms progressively move around the axis of the shaft 66.

By reference to Figs. 3 and 5 of the drawings it will be seen that the shafts 29 and 37 may be easily disconnected by coupling sleeve 34, so that either the upper or lower structures could be removed independently.

It will thus be seen that the invention here disclosed provides a variable speed can feed, which is compact in design and construction and which houses all of the operating mechanism in a manner to protect it from the accumulation of extraneous material and the possibility of

breakage of parts, and which structure operates directly and positively to engage a can travelling at a relatively slow rate of speed and to deliver it to a can double seaming machine travelling at a relatively high rate of speed by a progressive accelerating movement.

While I have shown the preferred form of my invention as now known to me, it will be understood that various changes may be made in combination, construction and arrangement of parts by those skilled in the art, without departing from the spirit of my invention as claimed.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A can accelerating feed mechanism, comprising a fixed bearing structure, a vertically disposed shaft rotatably supported therein, a plurality of separate radially extending arms mounted upon said shaft and capable of free independent swinging movement around the axis thereof, each of said arms carrying a can pocket, the can pockets all being disposed in a common horizontal plane, longitudinally extending slots, one formed in the bottom face of each of said arms, blocks, one slidably mounted in each of said slots, a fixed circular housing carried by the bearing support and disposed eccentrically of the shaft axis, an operating ring encircled by said housing and adapted to rotate therein, pivotal connections between the operating ring and the sliding blocks, a throw plate fixed to the shaft and disposed beneath said operating ring, and means articulately connecting the operating ring with the throw plate whereby a uniform speed of rotation of the throw plate will produce a variable speed of rotation of the operating ring and will impart driving movement to the arms, causing said arms to be progressively accelerated and retarded in speed of travel at periods in their cycle of movement around the axis of the shaft.

2. A can accelerating feed mechanism, comprising a fixed bearing structure, a vertically disposed shaft rotatably supported therein, a plurality of separate radially extending arms mounted upon said shaft and capable of free independent swinging movement around the axis thereof, each of said arms carrying a can pocket, the can pockets all being disposed in a common horizontal plane, longitudinally extending slots, one formed in the bottom face of each of said arms, blocks, one slidably mounted in each of said slots, a fixed circular housing carried by the bearing support and disposed eccentrically of the shaft axis, an operating ring encircled by said housing and adapted to rotate therein, pivotal connections between the operating ring and the sliding blocks, a throw plate fixed to the shaft and disposed beneath said operating ring, and cranks, each formed with oppositely extending pins at their opposite ends, one pin being pivotally mounted in the throw plate and the other pin being pivotally mounted in the operating ring, whereby a rotary driving action will be imparted from the concentrically mounted throw plate to the eccentrically mounted operating ring.

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