

Sept. 17, 1957

E. P. TAROT
CAN FEEDING MECHANISM

2,806,580

Filed April 27, 1953

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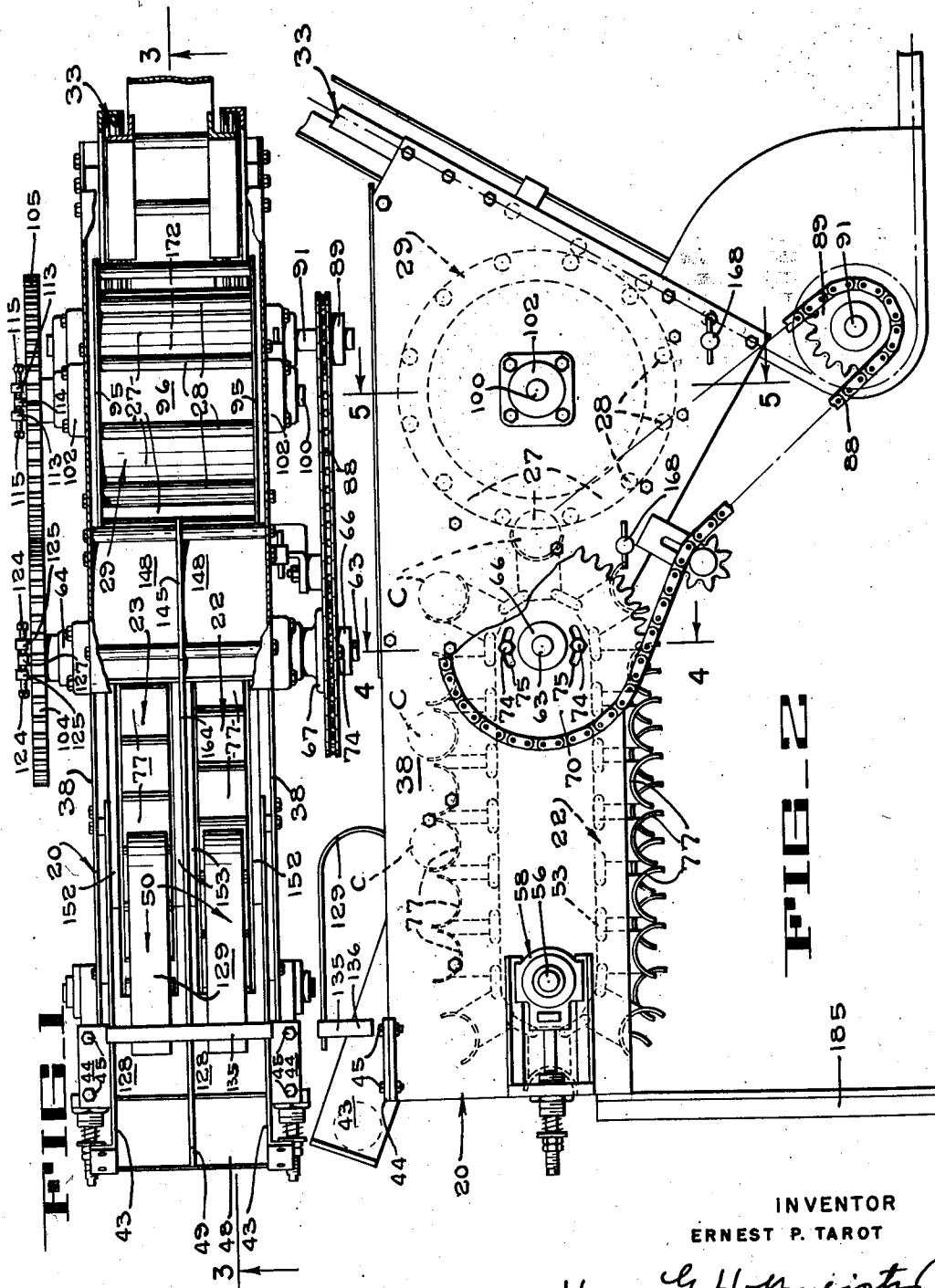


FIG. 2

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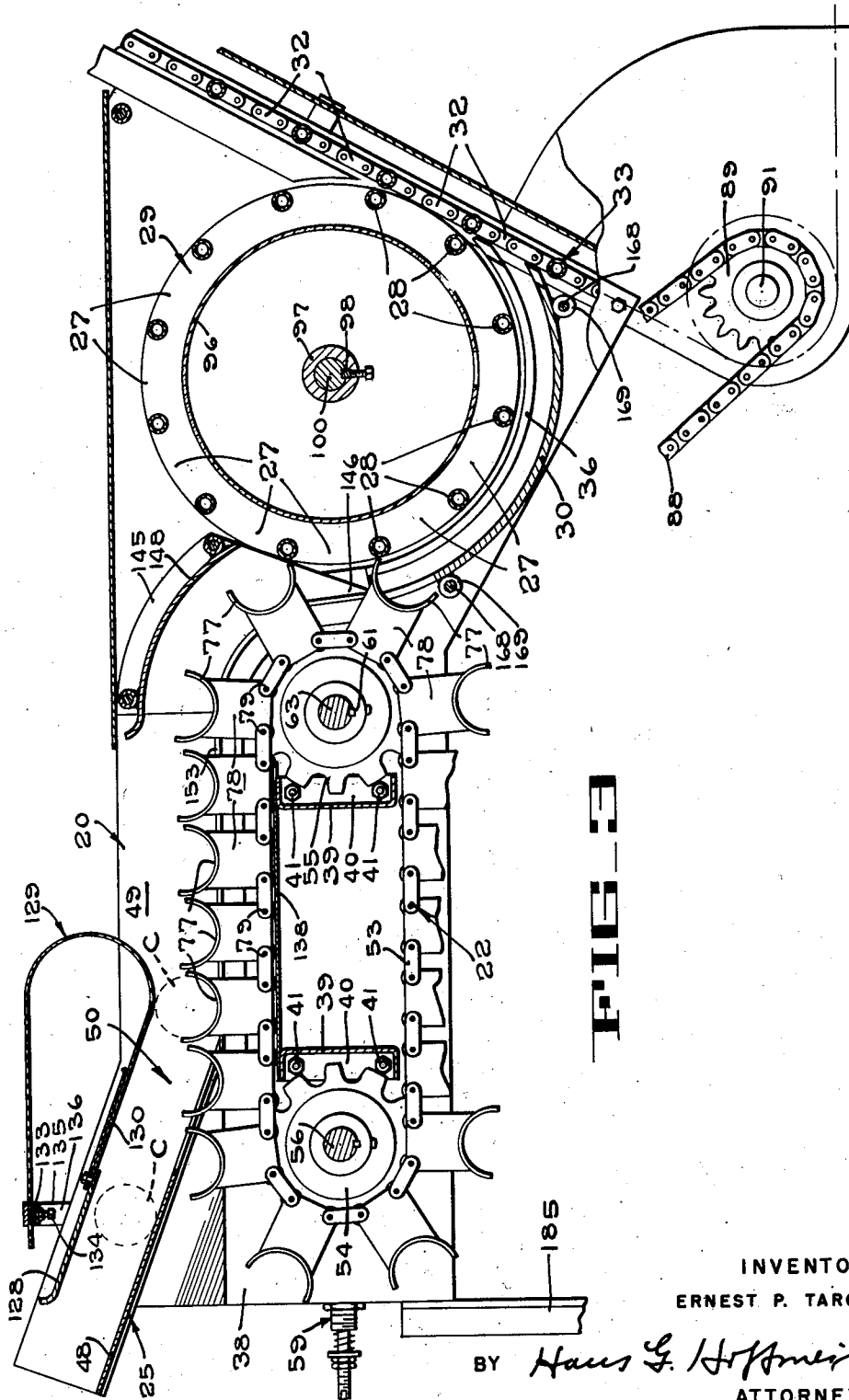
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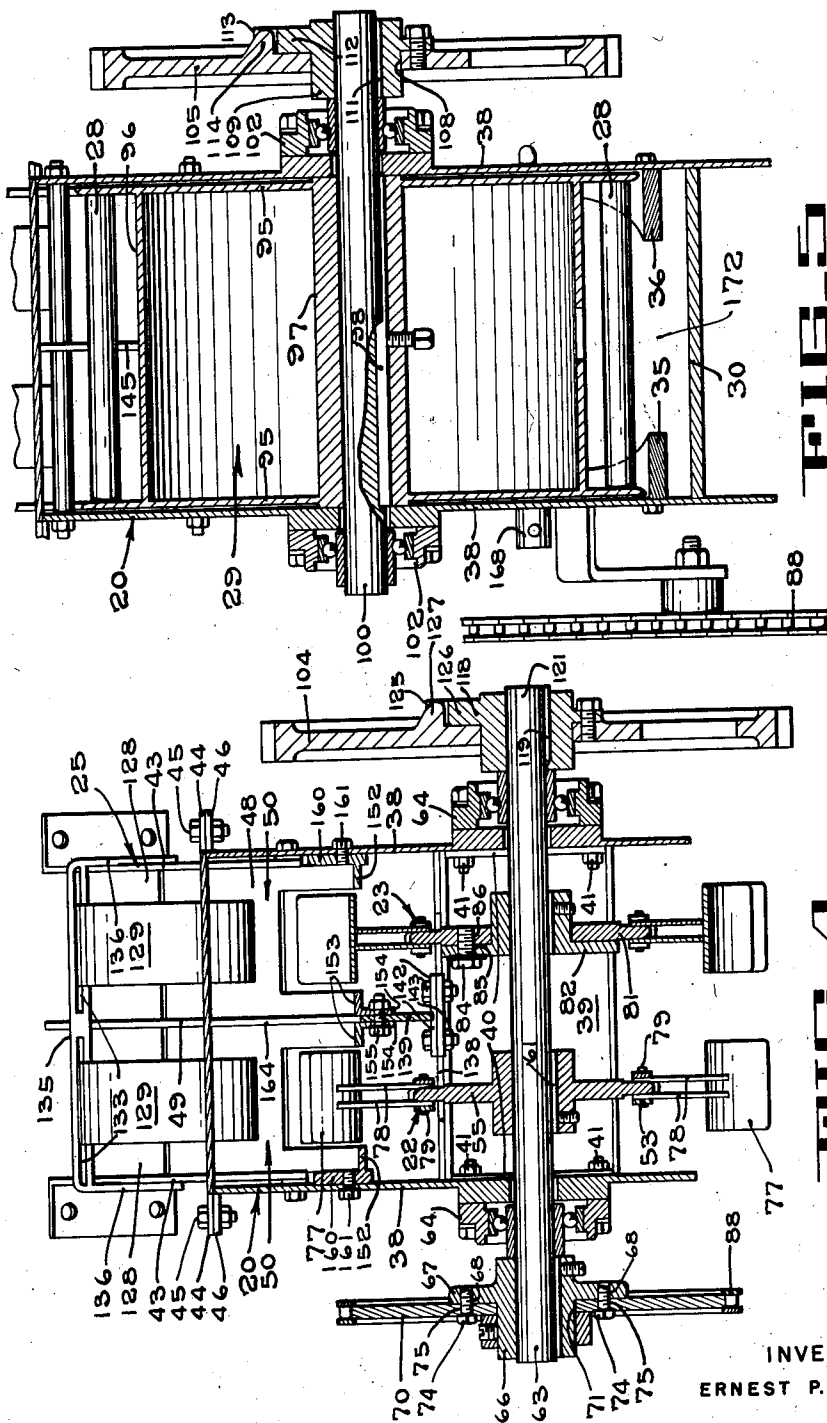
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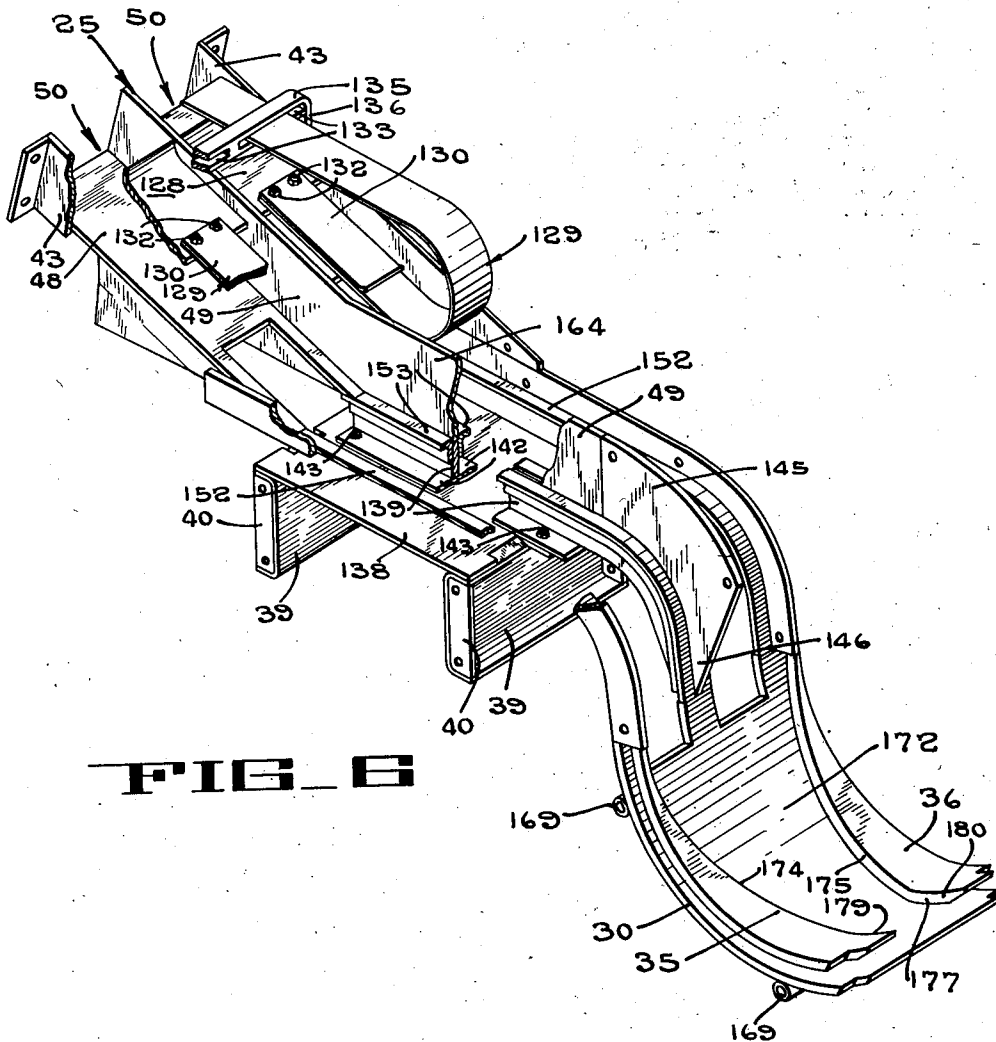
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5 Sheets-Sheet 5

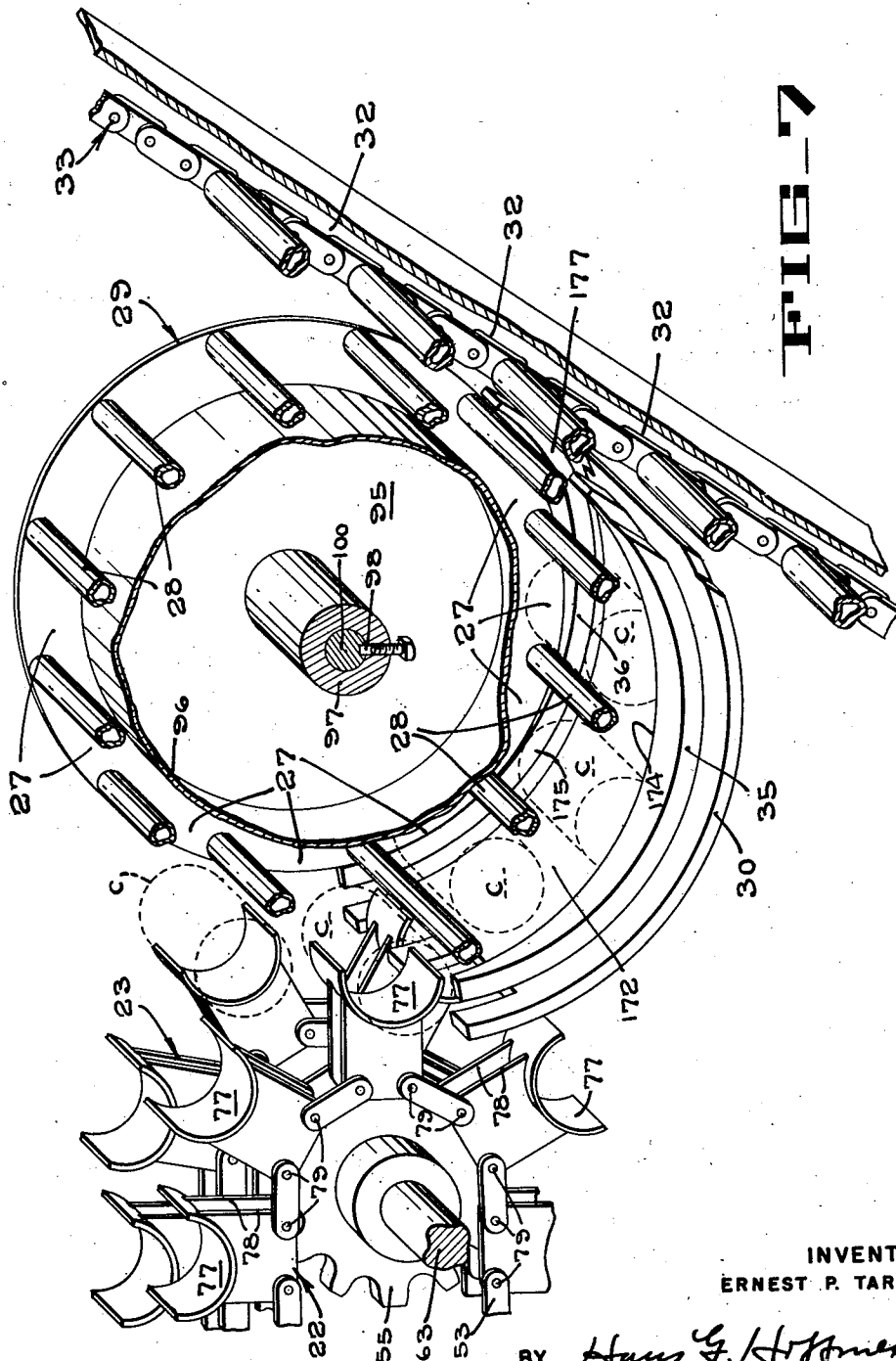


FIG. 7

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CAN FEEDING MECHANISM

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9 Claims. (Cl. 198—32)

This invention relates to can feeding mechanisms and more particularly to an improved mechanism for receiving cans, or similar articles, from a plurality of sources and delivering them to a single processing station such as a continuous cooker.

It is an object of the present invention to provide a novel feed mechanism adapted to receive cans from two separate rows and deliver the cans in timed and spaced relation in a single row to the spaced pockets of an elevator leading to a continuous cooker.

Another object is to provide an improved mechanism for feeding cans to moving receivers so that the cans are accurately and positively delivered to the receivers.

Another object is to provide a can feeding mechanism of simple construction that is efficient in operation and requires no attention during operation.

Fig. 1 is a plan of a preferred embodiment of the can feeding mechanism of the present invention, certain parts being broken away.

Fig. 2 is a side elevation of the mechanism of Fig. 1 with a portion of the drive mechanism broken away and a portion shown diagrammatically.

Fig. 3 is a vertical section taken on line 3—3 of Fig. 1.

Fig. 4 is a vertical section taken on line 4—4 of Fig. 2.

Fig. 5 is a vertical section taken on line 5—5 of Fig. 2.

Fig. 6 is a fragmentary perspective of the internal frame structure of the can feeding mechanism of the present invention.

Fig. 7 is a fragmentary perspective of the discharge end of the conveyors mounted in the novel can feeding mechanism.

In the preferred embodiment of the can feeder of the present invention illustrated in Figs. 1 and 2, the reference numeral 20 indicates an elongated rigid support frame in which two spaced parallel endless chain conveyors 22 and 23 are mounted. Cans "C" are fed by gravity down a chute unit 25 onto the conveyors 22 and 23 on which the cans are moved longitudinally of the support frame 20 and are discharged alternately from the two conveyors into pockets 27 (Fig. 2) formed between spaced rods 28 in a timing and spacing reel 29. The reel 29 is mounted for rotation on a horizontal axis in a counterclockwise direction (Fig. 3) and is arranged to push the cans along a curved floor plate 30 (Fig. 3) and deliver the cans to pockets 32 of an elevator conveyor 33 which carries the cans to a subsequent processing station, as for example, a continuous cooker. While the cans are being rolled along the floor plate 30 by gravity and by the rods 28 of the reel, cam plates 35 and 36 (Fig. 7) disposed above the floor plate and below the reel, intercept the cans and align them in single file formation, in a manner to be described presently, for delivery to the elevator conveyor. Since the cans are delivered in single file, the elevator conveyor 33 may be relatively narrow, having a width sufficient to accommodate only one can.

The support frame 20 comprises two rigid sheet metal side walls 38 (Fig. 1) held in spaced relation by two generally U-shaped brackets 39 (Fig. 3) which extend

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transversely between the walls. At each side edge the brackets 39 have inturned flanges 40 which are secured to the adjacent side wall 38 by bolts 41. The side walls 38 are also held in spaced relation by the chute unit 25 which is a rigid member having spaced upstanding side walls 43 (Fig. 1) from which horizontal mounting flanges 44 project. Each flange 44 is secured by bolts 45 to a corresponding flange 46 (Fig. 2) extending laterally from each side wall 38 of the support frame 20.

The chute unit 25 comprises a bottom wall 48 extending between the side walls 43 and a central partition 49 which divides the chute into two can guiding channels 50. Cans are delivered to each channel from a separate, preceding can handling machine, such as a can closer, so that the output of different machines can be handled in the can feeder of the present invention.

The endless chain conveyors 22 and 23 into which the cans are directed are substantially identical and therefore a description of conveyor 22 will clearly disclose the structure and operation of conveyor 23 also. Conveyor 22 (Fig. 3) comprises an endless chain 53 trained around an idler sprocket 54 and a drive sprocket 55. The idler sprocket 54 is keyed to an idler shaft 56 that is journaled in chain tighteners 58 and 59 (Figs. 2 and 3) secured to the side walls 38 of the support frame 20. The drive sprocket 55 is keyed at 61 (Fig. 4) to a drive shaft 63 which is journaled in bearing boxes 64 mounted on the side walls of the support frame. The drive shaft 63 extends through the bearing boxes 64 and carries a hub 66 in keyed relation on one end. The hub 66 has a radial flange 67 provided with diametrically opposed tapped holes 68. A sprocket 70 has an axial opening 71 adapted to snugly receive the hub 66. Cap screws 74 extend through curved slots 75 (Fig. 2) in the sprocket and into the tapped holes 68 of the hub to secure the sprocket 70 to the hub 66 in angularly adjustable relation.

When each can is deposited on the conveyor 22 from the chute 25, it is received in one of a plurality of semi-cylindrical cups or pusher-members 77 (Fig. 3). Each cup 77 has a pair of spaced parallel arms 78 (Fig. 4) which straddle the endless chain 53 and are pivotally secured thereto by the usual pins 79 which connect the links of the chain 53 together. The conveyor 23 is identical to the above-described conveyor 22 with the exception that a drive sprocket 81 (Fig. 4) of the conveyor 23 is mounted on a hub 82 that is keyed to the drive shaft 63. A cap screw 84 extends through an elongated curved slot 85 and into threaded engagement with a tapped hole 86 in the sprocket to adjustably mount the sprocket 81 on the hub 82. By means of this adjustment, the cups 77 of the two conveyors can be positioned in a staggered or longitudinally offset relation as seen in Fig. 1.

The sprocket drive shaft 63 is driven by means of a chain 88 (Fig. 2) which is trained around the sprocket 70 and around a sprocket 89 keyed to the power driven shaft 91 of the elevator 33. Therefore, when the elevator shaft 91 is rotated by a power unit (not shown) both the conveyors 22 and 23, as well as the elevator conveyor 33, start to move.

The reel 29 comprises a pair of end discs 95 (Fig. 5) secured together in spaced relation by a cylindrical core 96 disposed radially inwardly of the spaced rods 28 (Fig. 7). A continuous hub 97 (Fig. 5) formed between the discs 95 centrally of the reel, is keyed at 98 to a drive shaft 100 which is journaled in bearing boxes 102 secured to the outer surfaces of the side walls 38. The reel 29 is driven by the sprocket drive shaft 63 through a pair of meshing gears 104 and 105 (Fig. 1). The gear 105 (Fig. 5) has a central axial opening 108 through which a hub 109 extends. The hub 109 is keyed, at 111, to the reel drive shaft 100 and has a radial flange 112 with a pair of spaced ears 113 (Fig. 1) projecting outwardly there-

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from. An arm 114 (Fig. 1) projects laterally from the side face of the gear 105 into position between the spaced ears 113. Adjusting cap screws 115 extend through tapped holes (not shown) in the spaced ears and about opposite sides of the arm 114 to establish a drive connection between the hub 109 and the gear 105 and to provide means for angularly adjusting the gear 105 relative to the shaft 100. The other gear 104 (Fig. 4) is disposed on a hub 118 keyed, at 119, to an outer end portion 121 of the conveyor drive shaft 63. Cap screws 124 (Fig. 1) are threaded through tapped openings (not shown) in spaced ears 125 (Fig. 1) that project upwardly from a radial flange 126 (Fig. 4) of the hub 118. At their inner ends the cap screws 124 about opposite side faces of an arm 127 which projects outwardly from the side face of the gear 104 into the space between the ears 125. By means of the cap screws 124, the gear 104 is connected in driving engagement with the hub 118 so that, when the elevator 33 is put into operation, the reel 29 will rotate in timed relation with the conveyors 22 and 23. The gears 104 and 105 are the same size and have the same number of teeth and, therefore, the reel 29 is rotated at the same rotary speed as sprockets 55 and 81 that drive the conveyors 22 and 23.

Fixed within each channel 50 of the chute 25 is an overhead guide plate 128 (Fig. 3) which guides the cans down the chute. The guide plate 128 of each channel is extended by a looped flat spring 129 having its lower end 130 fastened to the guide plate 128 by screws 132 and its upper end inserted in a slot 133 (Fig. 4) in a bridging bracket 135. The bracket 135 straddles the chute 25 and has side legs 136 welded to the side walls of the chute.

The upper flights of the endless chain conveyors 22 and 23 are held in horizontal alignment by a support plate 138 (Fig. 3) which is secured, as by welding, to the top surfaces of the brackets 39. A vertical divider plate 139 (Fig. 6) is mounted on the support plate 138 between the conveyor chains. The divider plate 139 has a rear portion 140 of inverted T-shape cross-section providing laterally extending flanges 142 (Fig. 4) which are secured to the support plate 138 by bolts 143. At its forward end the divider plate 139 has an upwardly extending fan-like section 145 (Fig. 6) and a downwardly projecting section 146. A laterally disposed, curved plate 148 (Fig. 3) is mounted between the fan-like section 145 of the divider plate and each side wall 38 of the support frame to form an overhead guide surface above the cans on each conveyor. These curved plates 148 hold the cans in the cups as the endless chains travel downwardly around the drive sprockets to carry the cans toward the reel 29. The outer surface of the core 96 of the reel 29 prevents the cans from moving too far forwardly as they enter the reel.

As the cans C are moved by the conveyors from the supply chute 25 to the reel 29, the chimbs or beaded end flanges of each can roll along an outer track 152 (Fig. 6) and an inner track 153. The inner tracks 153 are elongated angle bars having down-turned flanges 154 (Fig. 4) secured by bolts 155 to the divider plate 139 near the upper edge thereof. Each inner track extends from the rearward end of the divider plate 139 to the lower edge of the downturned forward end section 146 of the divider plate. The outer tracks 152, which are coextensive with the inner tracks 153, are elongated angle bars having up-turned flanges 160 secured to the side walls by bolts 161. The cans are prevented from sliding laterally out of the cups by the flanges 160 of the outer tracks 152 and by a forwardly extending portion 164 (Fig. 6) of the center partition 49 of the feed chute unit 25. This forward extension 164 rests on the top surface of the divider plate 139 and, at its forward end, abuts the rear edge of the fan-shaped section 145 of the divider plate.

As the cans roll off the forward curved end portions of the tracks, they roll into the floor plate 30 which is

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mounted between the side walls 38 by bars 168 (Fig. 3) which extend through sockets 169 on the floor plate 30 and suitable apertures (not shown) in the walls. The floor plate 30 has a curved configuration corresponding to an arc of a circle that is concentric with the circle defined by the spaced rods 28 of the reel 29. The cam plates 35 and 36 (Figs. 1 and 6) are secured to the inner surfaces of the side walls 38 a short distance above the floor plate 30, and, as seen in Fig. 3, each cam plate has substantially the same curvature as the curvature of the floor plate 30. Thus cans disposed in the pockets 27 of the reel 29 and resting on the floor plate 30 must move into a channel 172 (Fig. 6) defined between the converging side camming edges 174 and 175 of the opposed cam plates. Accordingly, the camming edge 174 contacts the edge of each can discharged from the conveyor 22 and urges the can laterally, as it moves along the channel 172, and directs it into a central straight channel 177 formed between straight side edge portions 179 and 180 of the cam plates 35 and 36, respectively. Similarly, the camming edge 175 urges cans, deposited in the reel 29 by the conveyor 23, inwardly toward the central channel 177. The central channel 177 is wide enough to accommodate one can and, as a result, the cans are fed to the conveyor 33 of the elevator in single file. The sprockets of the reel 29 are so proportioned and positioned, and the reel 29 and the conveyor elevator 32 are driven at such a speed that each pocket in the reel 29 registers with a pocket 32 of the elevator conveyor 33. The conveyor 33 is disposed at such an angle that the cans will fall by gravity into the pockets of the elevator.

In summary, cans are fed down each channel of the chute 25 into cups 77 on the conveyors 22 and 23. As the cans are moved forwardly they are confined between the extension 164 of the chute partition 49 and the flanges 160 of the outer track 152, and one end flange of the can rolls along an inner track member 153 while the other flange rolls along the outer track 152. At the forward end of the conveyors, the cans are guided downwardly by the forward overhead guide plates 148 and by the cups 77. At a predetermined point each can rolls out of its cup and into a pocket in the rotating reel 29. As the reel rotates in a counterclockwise direction (Fig. 2) each can is rolled along the curved floor plate 30 while it is urged inwardly by one of the camming edges of the cam plates 35 or 36 to the center channel 177 from which the cans are delivered in a single file into the conveyor 33 of the elevator. After the cans are carried through the continuous cooker, they are again divided into the original two row formation by a line divider of any standard type.

It is to be particularly noted in Fig. 7 that the distance a cup in conveyor 22 is offset from adjacent cups in conveyor 23 is greatly increased as the cups move downward around the drive sprockets due to the pivoting action of the arms 78 on which the cups are mounted. This increased offset distance permits each conveyor to deposit cans in the pockets of the reel without interference from the other conveyor. The can feed mechanism of this invention may be mounted in any suitable manner in the line of processing equipment. In Fig. 2, a floor mounted feed mechanism is illustrated in which the lower end of the elevator conveyor rests on the floor and the rear end of the support structure of the can feeder is supported from the floor by support posts 185.

From the foregoing description it will be apparent that the can feeding mechanism of the present invention provides an efficient means of feeding cans from a plurality of sources into a single width standard type elevator conveyor. The novel use of staggered endless chain conveyors permits a maximum number of cans to be carried along in the upper flights of the conveyors while still assuring the one-by-one discharge of the cans into the reel and the novel cam plates which cooperate with the reel provide a

simple, trouble-free means for aligning the cans in a single file formation.

It will be understood that modifications and variations may be made without departing from the scope of the present invention.

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

1. An article feeding mechanism comprising a plurality of separate conveying means each arranged to advance a plurality of articles to a common discharge station, a downwardly sloping article support member disposed below said discharge station and arranged to receive articles discharged one at a time from said conveying means for gravitational descent therealong, means for timing the descent of said articles on said support member, and converging guide means disposed in the path of the articles descending said support member and adapted to channel said articles into single file.

2. An article feed mechanism comprising a pair of endless chain conveyors arranged to move a plurality of rows of articles forwardly and to discharge said articles one by one and in laterally spaced relation by gravity over the forward end of the conveyors, a support plate having a downwardly directed portion adjacent the forward end of the conveyors and arranged to receive articles therefrom and guide them in a downward and forward gravity movement, a reel adjacent said support plate, circumferentially spaced pockets in the peripheral portion of said reel adapted to receive articles discharged alternately from said conveyors one in each pocket to time the descent of said articles on said support, and converging cam means immediately above said support plate adjacent the sides thereof arranged to contact articles moving downwardly along said support plate and guide them into a single row formation.

3. An article feeding mechanism comprising a plurality of conveyors arranged to advance articles along parallel fixed paths, a support plate disposed to receive articles discharged from said conveyors one at a time, a rotary spacing member mounted adjacent the discharge end of said conveyor, a plurality of spacing members carried by said rotary member and arranged to move into position between articles on said support member and advance them individually toward the forward end of said support plate and push them over the edge, converging cam guide means adjacent the side edges of said support plate to cam said articles into single file, a straight line conveyor disposed adjacent the forward end of said support plate, a plurality of spaced article receptacles carried by said straight line conveyor adjacent said support plate forward edge, and means for moving said straight line conveyor in timed relation with the advance of said articles along said support plate to present one of said receptacles adjacent said forward edge as an article is pushed over the edge by one of said spacing members.

4. An article feed mechanism comprising an article receiving and supporting member, a plurality of parallel conveyors each provided with separate moving conveying members each of which is arranged to advance an article toward and deposit it on said article receiving member, the conveying members of the conveyors being in staggered relation with respect to each other and a rotatable timing reel mounted adjacent the point of transfer of articles from said conveying members to said receiving member, said reel including a pair of spaced circular end discs, a plurality of spaced rods disposed in a circular pattern and extending between said discs adjacent the periphery thereof, a cylindrical core secured between said discs radially inwardly of said rods and cooperating with said rods and said discs to define spaced peripheral pockets on said reel movable past said transfer point and adapted to receive articles from said conveying members, and means for timing the rotation of said reel with the

movement of said conveying members to align one of said pockets with each conveying member at said transfer point.

5. An article feed mechanism comprising a plurality of sprockets mounted for rotation about parallel axes, a plurality of endless chains trained around said sprockets, open top spaced carrier members mounted on each of said chains, each carrier member being proportioned to longitudinally confine articles carried thereon and arranged to discharge an article carried thereon as the carrier member moves downwardly over one of said sprockets, the carrier members on the chains being in staggered relation with respect to each other, a timing reel mounted adjacent said one sprocket for rotation about an axis parallel to the axis of rotation of said one sprocket, means defining spaced article receiving pockets at the periphery of said reel, each pocket being movable past the point at which articles are discharged from said carrier members and being proportioned to receive an article as it is discharged from said member, and means for continuously rotating said reel at the same rotary speed as said sprockets, the carrier members and the sprockets being so proportioned relative to the diameter of the reel and the size of the pockets thereon that rotation of said reel at the same speed as said sprocket will align a pocket on said reel successively with each carrier member on said chains.

6. An article feed mechanism comprising two spaced, elongated upright side walls, longitudinally spaced transversely extending brackets rigidly secured between said walls, a longitudinal partition secured in upright position on said brackets midway between said side walls, a set of support tracks extending longitudinally of said side walls between said partition and each side wall, an endless chain conveyor mounted on said structure for longitudinal movement between the tracks of each set, a reel rotatably mounted in said side walls and extending transversely therebetween adjacent the discharge end of said conveyors, a plurality of rods carried by said reel in spaced relation near the periphery of the reel to define pockets movable past the discharge end of said conveyors and arranged to receive articles therefrom, a curved support plate mounted between said side walls immediately below said reel and arranged to support articles disposed in the pockets of said reel, and a pair of spaced guide members secured adjacent the upper surface of said support plate having opposed walls defining a passage having a converging inlet portion and a straight article aligning portion of a width sufficient to permit passage of said articles in a single file.

7. An article feed mechanism comprising an elongated support structure, a reel rotatably mounted in said support structure and including spaced circular end disks, a plurality of rods disposed in a circular pattern in spaced relation between the peripheral portions of said disks to define therebetween a plurality of peripheral article-receiving pockets, means for rotating said reel, a support plate mounted immediately below said reel and having an arced configuration concentric with the circle defined by said rods, said support plate being arranged to support articles disposed in the pockets of said reel as said reel rotates, means for delivering articles from a plurality of sources one by one into the pockets of said reel, and guide means disposed in the path of movement of said articles moving along said support plate and adapted to channel said articles into single file relation.

8. An article feed mechanism comprising an elongated support structure, an article receiving and supporting member mounted on said structure, two sets of aligned sprockets rotatably mounted on said support structure, one sprocket of each set being disposed adjacent said article receiving member, an endless chain trained around each set of sprockets, a plurality of equi-spaced arms pivotally mounted on each chain and projecting out-

wardly therefrom, the arms on one chain being spaced apart a distance equal to the spacing between adjacent arms on the other chain, means for driving both of said chains at the same linear speed, and an article carrier secured to the outer free end of each arm and arranged to receive an article thereon and advance it toward and deposit it on said article receiving member, the carriers of one chain being disposed in a position offset longitudinally relative to the carriers of the other chain a distance less than the longitudinal dimension of the article being conveyed when said carriers are in the upper reach of the chains and being disposed in a position offset a distance greater than the longitudinal dimension of the article as the chains pass around the sprockets adjacent said article receiving member.

9. An article feed mechanism comprising a pair of upright elongated sidewalls mounted in spaced parallel relation, an elongated partition mounted in upright position midway between said sidewalls and dividing the space between said sidewalls into two longitudinal passages, an article support member mounted between said sidewalls adjacent the forward end of said partition, a set of longitudinally aligned sprockets rotatably mounted in each longitudinal passage, the forward sprocket of each set being disposed adjacent said support member, an endless conveyor chain trained around each set of sprockets, spaced carrier members on said conveyor chain arranged to discharge articles onto said support member as the chain passes around said forward sprocket, a chute mounted on said side walls and having a discharge end

portion adjacent each conveyor chain and arranged to deliver articles to the carrier members thereon, a resilient guide member disposed above each discharge portion and arranged to press each article resiliently into the carrier members of the associated conveyor, a downwardly curved overhead guide member mounted directly above the forward sprocket of each conveyor chain and arranged to urge each article in a downwardly direction as the portion of the carrier on which the article is disposed passes around the forward sprocket, means for coordinating the discharge of articles from said conveyors to effect one by one discharge of the articles to the support member, and means adjacent said support member arranged to align all articles delivered thereto into single file formation.

References Cited in the file of this patent

UNITED STATES PATENTS

20	683,039	Hagen	Sept. 24, 1901
	738,937	Prince	Sept. 15, 1903
	1,185,329	Janisch	May 30, 1916
	1,527,337	Wilcox	Feb. 24, 1925
	1,548,600	Hansen	Aug. 4, 1925
25	1,662,803	Frelinghuysen	Mar. 13, 1928
	1,870,375	Mott	Aug. 9, 1932
	2,321,387	Jackson	June 8, 1943
	2,535,859	McPherson	Dec. 26, 1950
	2,540,181	Zimpel	Feb. 6, 1951
30	2,619,216	Kinnicutt	Nov. 25, 1952