Aug. 11, 1953 E. H. CARRUTHERS 2,648,478

APPARATUS FOR PACKING FOOD PRODUCTS

Filed Oct. 4, 1949 4 Sheets-Sheet 1

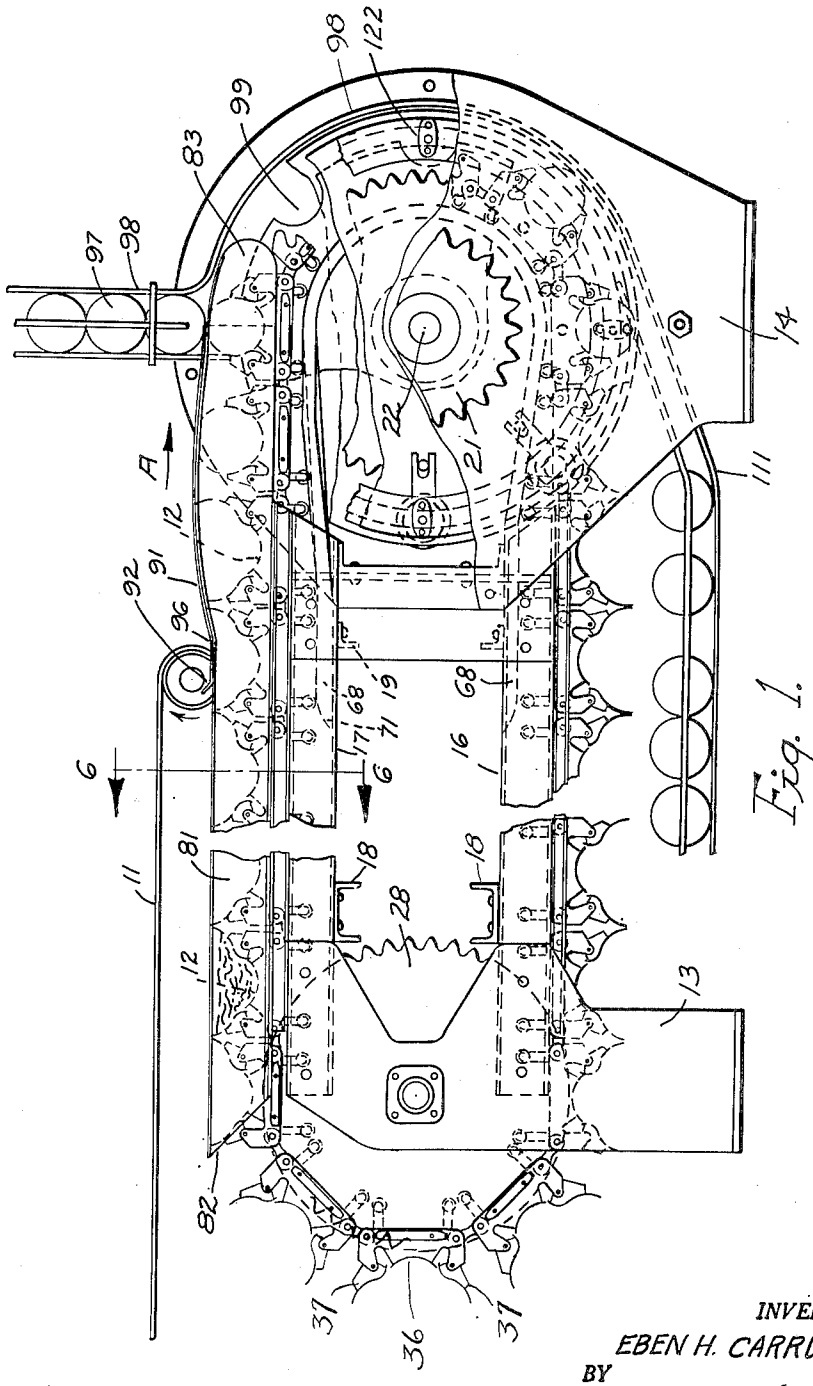

Fig. 1.

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APPARATUS FOR PACKING FOOD PRODUCTS

Filed Oct. 4, 1949 4 Sheets-Sheet 2

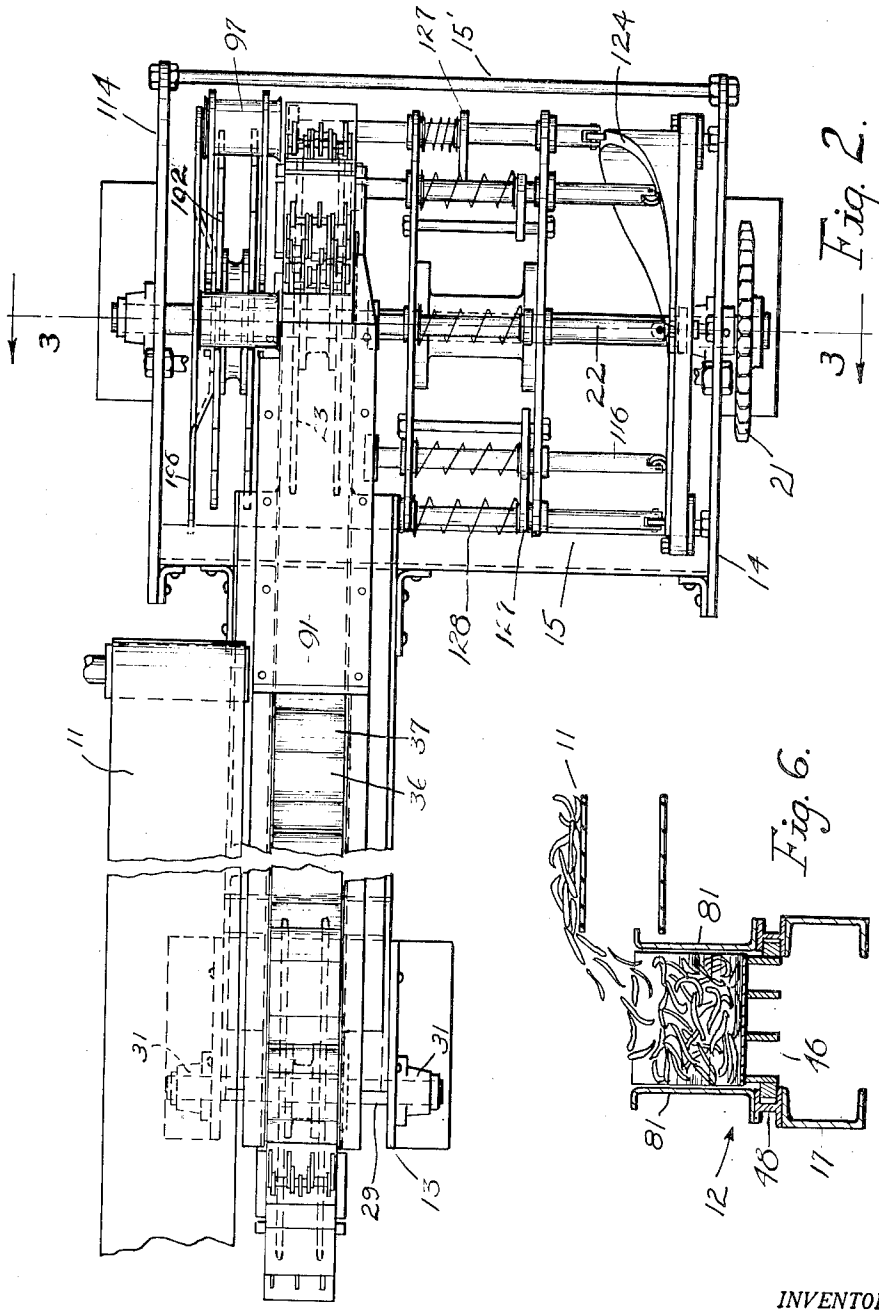

Fig. 2.

Fig. 6.

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Aug. 11, 1953 E. H. CARRUTHERS 2,648,478

APPARATUS FOR PACKING FOOD PRODUCTS

Filed Oct. 4, 1949 4 Sheets-Sheet 3

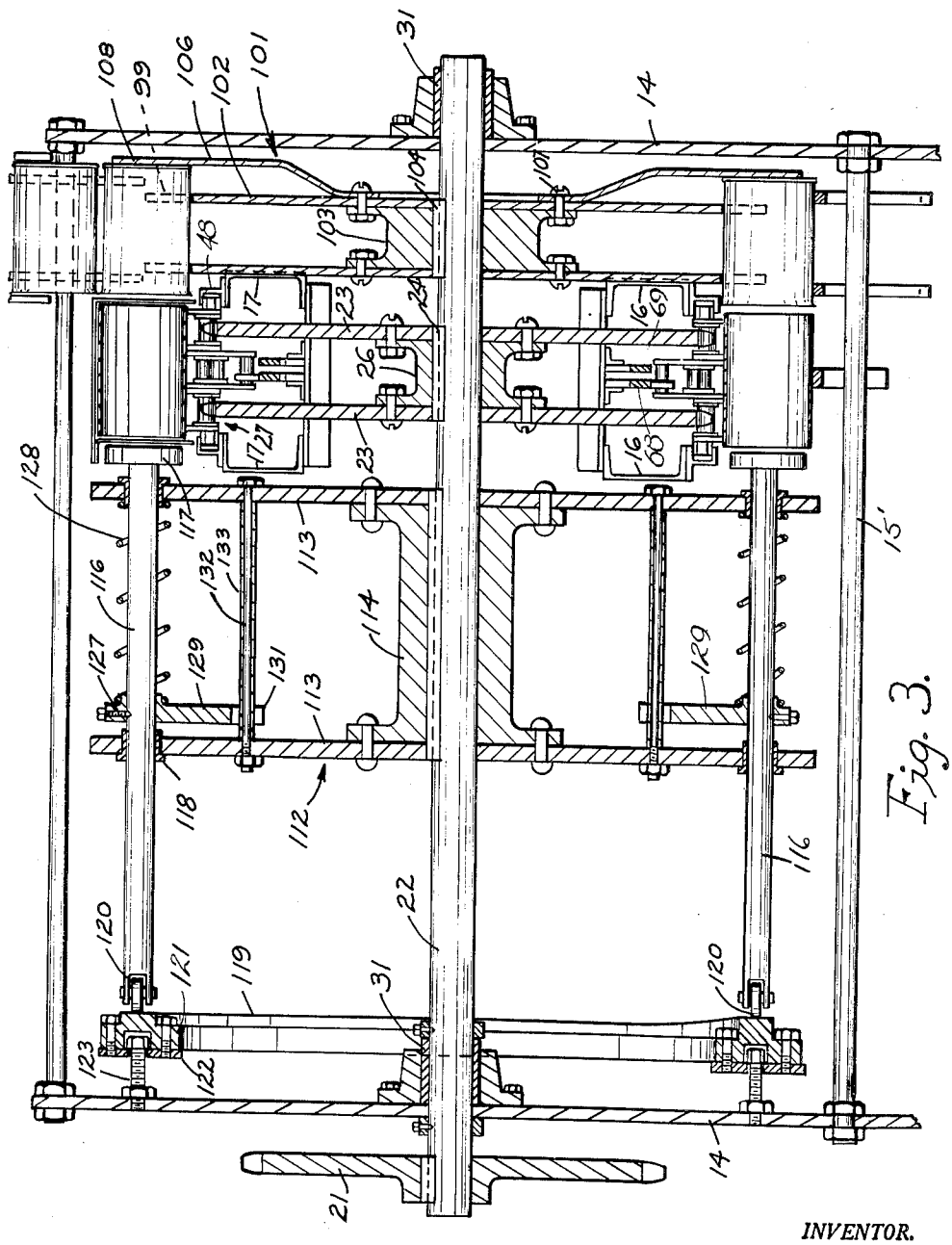

Fig. 3.

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APPARATUS FOR PACKING FOOD PRODUCTS

Filed Oct. 4, 1949 4 Sheets-Sheet 4

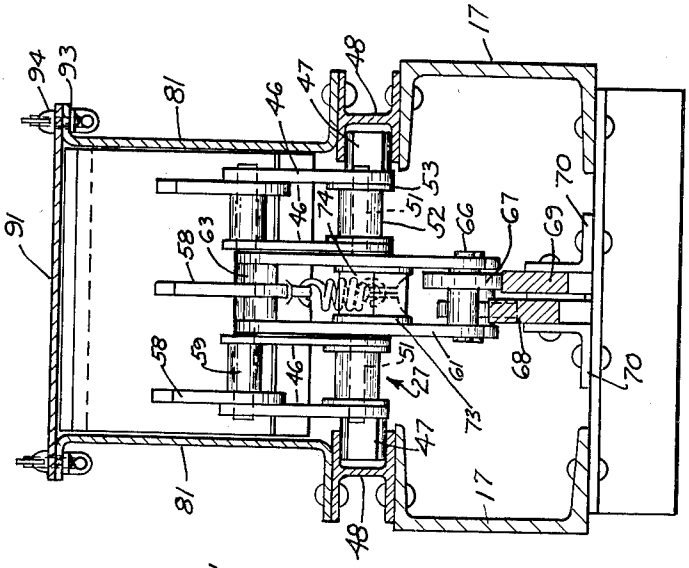

Fig. 5.

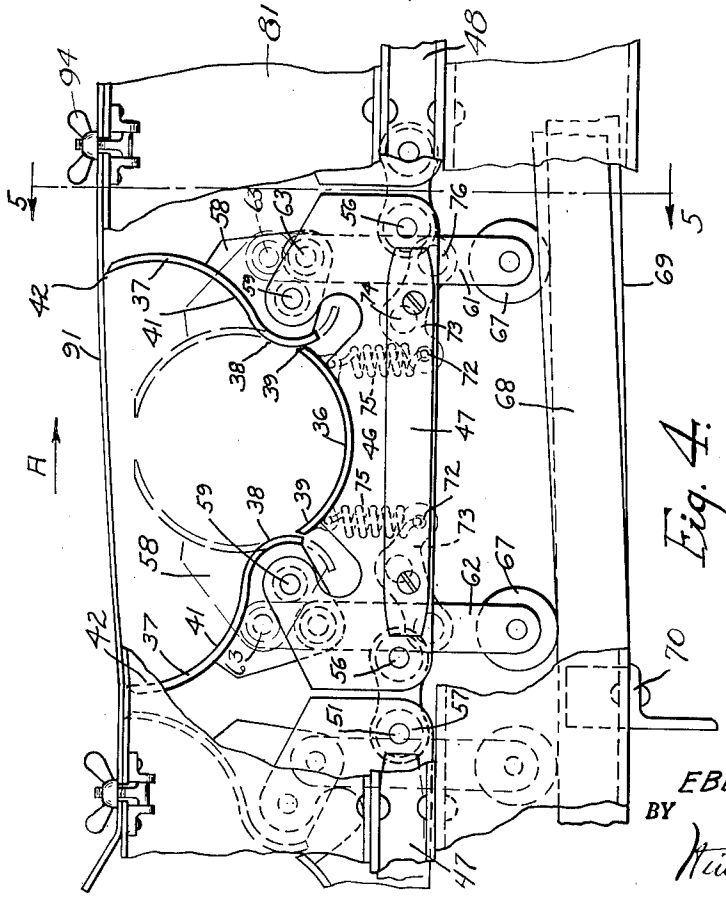

Fig. 4.

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Patented Aug. 11, 1953

2,648,478

UNITED STATES PATENT OFFICE

2,648,478

APPARATUS FOR PACKING FOOD PRODUCTS

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Application October 4, 1949, Serial No. 119,467

14 Claims. (Cl. 226—101)

1

My invention relates to apparatus for packing food products and more particularly to apparatus for molding and packing elongated vegetables such as string beans, carrots, asparagus, etc. in cans in what is sometimes called in the art an "asparagus" type of pack.

The apparatus of my invention will be particularly described in connection with the packing of string beans in a so-called jumbled type of pack, one of the purposes for which it has been primarily designed. However, it may be employed for packing products other than those specifically mentioned, such as beets, sausages and perhaps other products of similar character.

While most vegetables have been with reasonable success packed by machine, insofar as I am aware, no one prior to the invention of this application has developed a machine for successfully packing a so-called jumbled pack of string beans. In making a jumbled pack of string beans, the beans are usually picked when quite young and tender. At this stage in their development, the beans are very pliable and there is a lack of uniformity in their size and shape. They tend to tangle themselves in a mass particularly because the long axis thereof is usually sharply curved and it is therefore impossible to arrange them in the can in any uniform manner. The tangling of the beans in a mass makes it substantially impossible to pack them by conventional food packing machinery and, while the machine of the present invention has other uses, it has been particularly developed to overcome the problems encountered in packing a jumbled pack of young string beans.

An object of my invention is to provide an extremely simple machine adapted to pack a jumbled pack of a substantially uniform weight of string beans at a high rate of speed.

A further object of my invention is to provide an endless chain of mold units so constructed and arranged that when they are open the adjacent mold units form substantially edge to edge contact with each other so that no or very little space exists between adjacent molds in which the beans may lodge to interfere with closing of the mold units or result in the damage to the beans.

Another object of my invention is to provide a machine particularly designed for packing a jumbled pack of string beans in which during the filling operation the mold units or molding pockets are open in substantially edge to edge contact and the ends of the mold units are closed so that the operators may place the beans in the mold units from the top while all sides of the mold units

2

are closed, the open top presenting a large area opening and the molding unit presenting a large capacity trough in which the operator may deposit the beans without the operator being required to exercise undue care in the filling of the mold units with a substantially uniform quantity of beans.

Still another object of my invention is to provide a mold unit which when open presents a large pocket or trough for the reception of the beans, the capacity being very much greater than the mold unit when it is closed so that the beans when deposited in the pocket with a proper charge for filling the can, are for the most part well below the top edges of the mold unit.

Another object of my invention is to provide a series of continuously moving mold units in which after the charge is placed in the troughs of the mold units, the mold units are closed at the top whereby any openings in the mold units in which beans may jam are of insignificant size and the movable mold elements during the closing thereof sweep the top closure so as to sweep any stray beans not in the troughs of the mold units into the troughs.

My invention further contemplates the provision of a mold unit which, when open, presents a large capacity pocket or trough which may be properly filled to the desired capacity solely by the judgment of the operator and which during the closing of the mold is completely protected on all sides against jamming of the beans in between adjacent parts of the mold unit and the stationary members which form with the mold elements a complete enclosure for the product, the mold unit when closed molding the material to the shape of the can and the mold units being successively moved to a can filling station where the charge of beans is automatically placed in the cans in substantially the proper amount for the filled weight desired.

Other objects and advantages of my invention will be particularly pointed out in the claims and will be apparent from the following description, when taken in connection with the accompanying drawings, in which:

Fig. 1 is a side elevation of the machine of my invention with parts broken away and other parts illustrated in dotted lines better to illustrate the machine of my invention;

Fig. 2 is a top plan view of the machine showing a part of the belt for feeding the beans to the operators prior to placing them in the mold units with portions of the machine being shown in dotted lines;

Fig. 3 is a vertical sectional view taken substantially on the line 3—3 of Fig. 2 in the direction indicated by the arrows;

Fig. 4 is an enlarged view of a portion of Fig. 1 showing the action during the closing of the mold units with part of the side wall enclosing the mold units broken away and part of the mold closing elements shown in dotted lines better to illustrate the invention;

Fig. 5 is a sectional view taken substantially on the line 5—5 of Fig. 4 in the direction indicated by the arrows; and

Fig. 6 is a sectional view taken substantially on the line 6—6 of Fig. 1 in the direction indicated by the arrows.

In the drawings, I have shown a feed belt 11 for conveying the beans to the operators who stand adjacent the end of the feed belt and transfer the beans to the mold units, generally indicated by the numeral 12. If desired apparatus (not shown) may be employed in connection with the feed belt 11 to feed the beans at a more or less uniform rate to the operators at the filling station. Moreover, if desired, several feed belts may be employed to feed the materials to the operators. Thus, for example in the packing of fruit cocktail it would be possible to provide separate feed belts for each ingredient to be packed in the cans. These and other arrangements are no part of my present invention.

Referring to Fig. 1, the machine includes a frame comprising a pair of supporting members 13 and a pair of supporting members 14 located on opposite sides of the machine. The supporting members 14 are spaced further apart than the supporting members 13 and are connected together by a channel 15 and tie rods 15'. The supporting members 13 and 14 are connected together through the channel 15 by pairs of channel shaped runner members 16 and 17 located at opposite sides of the machine which may be welded or otherwise secured to the channel 15. Extending across the machine are pairs of channels 18 and 19 which are welded or otherwise secured to the runner members 16 and 17, the assembly providing a rigid frame structure for the reception of the operating parts of the machine.

A driving sprocket 21 (Fig. 2) is fixed to a drive shaft 22 by means of a key and may be driven by a chain and motor (not shown).

As shown in Fig. 3, a pair of driving sprockets 23 are keyed to the shaft, as indicated at 24, so as to rotate with the shaft. A spider 26 extends between the driving sprockets and is bolted or otherwise secured thereto so that the driving sprockets are rigidly held together. The drive sprockets are each adapted to receive the drive pins of a chain, generally indicated by the numeral 27. As shown in Fig. 1, the chains pass over idler sprockets 28 mounted on an idler shaft 29 carried by the supporting frame members 13. The driving shaft 22 and the idler shaft 29 are of course suitably journaled in the frame, as indicated at 31 (Figs. 2 and 3).

Referring to Figs. 4 and 5, each mold unit comprises a fixed but bodily movable base member 36 and a pair of movable jaw elements 37 which are pivoted with respect to the base 36 on opposite sides thereof. The base 36 is a partial cylinder and extends transversely of the machine for a length somewhat in excess of the height of the can in which the beans or other products are to be packed. The movable jaws are somewhat S shaped so that when moved from the open position shown in solid lines in Fig. 4 to the substantially closed position, shown in dotted lines, the portions 38 of the movable jaws follow the contour of the transverse edges 39 of the base member. By this arrangement close clearances result and crevices are avoided in which the beans may lodge. The portions 41 of the movable jaws are formed on the arc of a circle and extend transversely of the machine to form partial cylinders which, when closed, completely envelope all sides of the product except for the fact that the molds have open ends.

In Fig. 4 I have shown the right mold unit as partly closed for purposes which will later appear. However, when the mold units are fully open, as illustrated in dotted lines in Fig. 1, they present a trough of considerably greater capacity than the mold units when they are closed so that the operators will have no trouble in placing the beans in the bottom of the mold units. The mold units are of sufficient capacity when open to receive a full charge of beans with the beans, except for stray beans, being located well below the top transverse edges 42 of the movable jaws 37.

One of the distinct advantages of the mold units thus far described lies in their large capacity when open. However, further advantage resides in the fact that the movable jaws extend along opposite sides of the base member 36 so as to provide a rectangular opening or trough between the edges 42 of the movable jaws which presents an extremely wide mouth or trough to the operators for the reception of the beans. The beans may thus be placed in the mold units without the operators being required to exercise undue care.

As shown most clearly in Fig. 1 and as also shown in Fig. 4, the movable jaws when open are in contiguous relation with the movable jaws of adjacent mold units to avoid spaces between the mold units during the filling operation in which beans may lodge. By "contiguous" I mean a relationship between the movable jaws of adjacent mold units such that they are either touching when open or are in such close proximity to each other that no substantial space exists between the adjacent movable jaws.

Secured to the under side of each base member 36 as by welding or brazing are four plates or frame members 46 (Fig. 5). These plates not only serve to support the base member but also serve as the fixed elements about which the various movable parts, as presently described, shift. Fastened to the outer frame members 46 are runners 47 which slide in channels 48 carried by the frame channels 17 as shown in Fig. 5. The channels 48 extend across the top of the machine to a point just beyond where the cans enter the machine (Fig. 1) and the leading ends of the runners are beveled to facilitate their entry into the channels. The base members 36 thus move along a fixed path as they travel through the mold filling and mold closing stations.

The chain pins 51 (Fig. 5) extend through the rollers 52 of the chain and through the chain links 53 and the plates or frames 46. In this manner the mold units are secured to the chain but the links may shift their relative position with respect to the mold units when the chains pass around the sprockets.

The four links 53 of the two chains are pivotally connected, as shown at 56 (Fig. 4), to the plates or frame members 46 of one base member and the other ends of the links 53 are pivotally secured, as shown at 57, to the corresponding plates or frame members 46 of the adjacent

molding unit. The arrangement of the complete set of molding units and showing how they are connected together is illustrated in Fig. 1.

Each of the movable arms or mold members 37 has on the rearward side thereof, a plurality of ears 58 which are by means of pivot pins 59 (Fig. 5) pivotally connected (see also Fig. 4) to the plates or frame members 46 of the base member 36. Thus, when actuated by suitable mechanism, the movable arms 37 may swing about the pivots 59 from the solid line position shown in Fig. 4 to the dotted line position shown in the same figure.

The means for actuating the movable arms or mold elements 37 comprises a pair of depending connecting members 61 and 62, one pair being pivotally attached to each of the movable arms 37. The connecting members are pivoted to the center of the three ears 58 on the rearward side of the movable arms 37 by means of pivot pins 63 whereby the connecting members 61 and 62 are free to swing with respect to the ears 58. A shaft 66 extends between each pair of depending connecting members 61 and 62 and each shaft carries a roller 67. As will be clear upon reference to Fig. 5, the rollers are adapted to ride upon cams 68 and 69. The cams are suitably supported on angle irons 70.

As shown in dotted lines in Fig. 1, the cams 68 and 69 have an entrance end 71 which is inclined upwardly so as to receive the rollers 67. The movable arms gradually begin to close somewhat beyond the entrance end, the direction of travel of the mold units being indicated by the arrows A in Figs. 1 and 4. It will be apparent from the foregoing that each movable mold element 37 has its own actuating means.

As will be clear from Fig. 4, the cams 68 and 69 are out of phase. By the expression "out of phase" is meant the fact that cam 68 for the roller 67 for the leading arm or mold element 37 rises sooner than the corresponding cam for the roller 67 of the following arm 37. That is, as shown in Fig. 4, the roller 67 at the right is higher than the roller 67 at the left by reason of the out of phase relationship of the cams. This causes the leading arm or mold element 37 to move toward a closed position prior to the following arm 37 for a purpose which will later appear.

For the purpose of normally retaining the molding arms 37 in an open position a pair of springs 75 are provided. One end of each of the springs is connected to ears carried by the stationary base 36. The other ends of the springs are connected, as shown at 72, to bell cranks 73. The bell cranks are pivoted. as shown at 74, to the center frame members 46 of the fixed base member 36 and the other ends of the bell cranks are secured, as shown at 76, to the depending connecting members 61. The action of the spring 75 and the bell crank is normally to rotate the bell crank at the right (Fig. 4) clockwise around its pivot point 74. The other bell crank is normally urged in a counterclockwise direction. The movable molding arms 37 are thus normally retained in the open position. The springs further retain the connecting members 61 and 62 substantially vertical and urge the depending connecting members downward into engagement with the cams 68 and 69.

As shown most clearly in Fig. 5, carried by the members 68 and preferably riveted thereto are a pair of side walls 81. These side walls 81 extend from the forward end of the upper run

of the chains, as shown at 82, to the rearward end of the upper run of chains, as shown at 83. As will be apparent from Fig. 6, the mold units are open at their transverse ends. The purpose of the side walls 81 is to close effectively the open ends of the molds during the filling operation and during the closing of the molds. The side walls 81, as indicated in Fig. 5, are sufficiently close to the open ends of the mold units as to prevent beans from lodging or being caught in the slight space which does exist between the ends of the movable mold units and the stationary side walls 81.

It will now be apparent that during the filling of the molds, the molds are open at the top. However, on all other sides the mold units are closed. Moreover, since the two movable arms or mold elements spread upward and outward from a central base member which also serves to form a part of the cylinder, the distance between the free ends of the movable molding arms is quite large so that a full charge of the beans occupies only a small portion of the mold units. Moreover, the movable free ends of adjacent mold units are contiguous to avoid any substantial space between the free edges in which beans may lodge and, as previously mentioned and as shown in Fig. 6, the side walls 81 close the ends of the molds without any substantial space existing between the ends of the molds and the side walls 81.

Clearly shown in Fig. 1, at the end of the filling station, a cover plate 91 is provided which extends from the end of the filling station to substantially the point where the cans to be filled are admitted to the machine. The forward end of the cover plate has a transversely extending upturned lip 92 for the purpose of brushing into the mold units any stray beans which may have lodged on the top edges of the free ends of the mold units.

As shown most clearly in Fig. 5, the cover plate rests on flanges 93 formed along the top edges of the side plates or walls 81. The cover plate 91 may be held in position in any suitable manner as by wing nuts 94 suitably spaced along the cover plate. Adjacent the point 96 (Fig. 1) where the molds start to close, the cover plate and of ocurse the top flanges 93 of the side walls upon which the cover plate rests, is shaped so as to conform to the arc about which the molding arms 37 swing. This arc of movement of the molding arms is controlled by shaping the cams 68 and 69 to produce the desired path of movement of the free ends of the arms. Thus, as viewed in Fig. 4 in which view the right molding arm is shown partly moved toward closed position, the extremity of the free end of the arm moves in close proximity during the closing movement thereof or contiguous to the under side of the cover plate 91. The effect of this arrangement is to cause the molding arm to sweep closely beneath or contiguous to the cover plate 91 as it moves toward closed position and push the beans ahead of it without allowing them to escape from the mold units. Similarly the rearward molding arm sweeps forwardly in close proximity to the under side of the cover plate and pushes the beans ahead of it. The mold units are thus completely closed on all sides while the movable molding arms are moving toward closed position. Stray beans are thus constrained to move into one or the other of the mold units and the beans are gathered and compressed into a compact cylindrical form. As previously mentioned, the cams 68 and 69 are out

of phase so that the molding arm 37 at the right of Fig. 4 preferably starts to close first.

The cans 97 enter the machine through a can track 98 and drop into semi-circular openings 99 (Fig. 1) formed in a can turret, generally indicated by the numeral 101. The can turret comprises a pair of plates 102 which are connected together as shown in the drawings by a spider 103. The plates 102 and the spider are keyed to the shaft 22 as indicated at 103 so that they will rotate in unison with the sprockets 23. Thereby, as each mold unit is closed and moved into the can filling station, it comes into registry with a can dropped down from the can shoot or track into a pocket 99. A backing plate 106 secured to the can turret, as shown at 107, engages the bottom of the can as shown at 108 and forms a stop for the can when the beans are pushed into the can. After the cans have been filled, as will be presently described, the cans rotate through approximately 180 degrees and drop (Fig. 1) into a can discharge chute or track 111.

Rigidly secured to the shaft 22 so as to rotate therewith is a plunger carrying unit, generally indicated by the numeral 112. The plunger carrying unit comprises a pair of plates 113 which are connected together as shown in the drawings by a spider 114. The plunger carrying unit 112 since it is keyed to and rotates with the shaft 22, can be and is arranged so that the plungers 116 aline with the mold units which, as previously mentioned, aline with the open ends of the can. The plungers 116 have a plunger face 117 slightly smaller than the diameter of the mold units when closed. The plungers 116 pass through bushings 118 mounted in the plates 113 and the actuation of the plungers is controlled by a cam 119. Rollers 120 mounted on the ends of the plunger rods 116 ride on the cam 119.

Means are provided for adjusting the cam 119 which is provided with integral flanges, indicated at 121 through which bolts pass and secure a plate 122. The cam 119 has an annular cavity for the reception of the heads of bolts 123 which are threaded into the side stands or frame members 14. By adjusting the position of nuts 123, the cam may be adjusted to cause the plunger faces to be inserted into the mold units at the proper time and to the proper extent to secure a desired degree of compression of the beans in the can. Preferably the lobe or high point 124 of the cam is arranged so that the face 117 of the plunger enters the can to an extent sufficient to compress the beans so that their natural resiliency will not cause them to spring outwardly over the edges of the can. Each of the plunger rods 116 is provided with a collar 127 fixed to the plunger rod as shown in the drawings. The collar serves as a backing for a spring 128, the other end of which bears against the plate 113. The spring serves to press the collar and plunger in a direction to the left, as viewed in Fig. 3, so that the roller rides on the cam 119. The collar 127 has an extended arm 129 which has a forked end 131. Rods 132 extend between and are secured to the plates 113 and are adapted to receive sleeves 133 which the forked ends of the arms straddle. By this arrangement the rods are maintained in position such that the rollers 126 will always maintain contact with and rotate parallel to the cam 119.

It is believed from the above that the operation of the machine of my invention will be clear. It is sufficient to state that during the initial part of the upper run of the chains the mold units are spread wide open so as to readily receive the beans placed therein by the operator. After being filled with a proper charge of the material, the proper level of charge being capable of being readily estimated by an experienced operator, the mold units pass through, in effect, a tunnel during which interval the mold units are closed on all sides so as to avoid jamming of the beans and the movable mold elements move to a closed position. After the molds have been closed and the beans have been compressed thereby, the mold units are brought into alinement with the open ends of the cans fed from the can shoot 98. The plungers 116 are then actuated in proper timed relation by the cam 119 to force the compressed beans into the can. As previously mentioned the plunger to some extent extends into the can so that the beans are compressed in the cans. The filled cans continue their rotation with the can turret and are discharged into the discharge shoot 111. At the bottom of the turret the cams 68 and 69 are sloped so that the molds are free to open under the action of the springs 75. They remain in this open condition throughout most of their movement until they again reach the tunnel formed by the cover plate.

While I have described the preferred form of my invention, it will be apparent that various modifications and changes may be made particularly in the form and relation of parts without departing from the spirit of my invention as set forth in the appended claims.

I claim:

1. In a machine of the character described, in combination, a plurality of molding units, each of said molding units including a base portion of partial cylindrical form and a pair of arms pivoted with respect to said base portion on each side thereof, each of said arms having at least a portion of its surface forming a partial cylinder, and means for moving said arms to a closed position with respect to said base portion to form a cylinder, one of said arms being movable toward the closed position before the other.

2. In a machine of the character described, in combination, a plurality of molding units, means for pivotally linking adjacent molding units together, means for moving said molding units through a path of travel, each of said molding units including a pair of arms of partial cylindrical form pivoted with respect to each other and having free edges, said arms when swung apart forming a trough for the reception of the product, means for swinging said arms toward each other to form substantially a cylinder for confining the product, a covering element beneath which the molding units pass during their travel after they have been filled, said covering element being shaped so that the path of movement of said arms being such that during closing of the molding units the free edges of the arms move in contiguous relation to the covering element.

3. In a machine of the character described, in combination, a plurality of molding units, means for pivotally linking adjacent molding units together, means for moving said molding units through a path of travel, each of said molding units including a base portion of partial cylindrical form and a pair of arms of partial cylindrical form pivoted with respect to each other and with respect to said base portion and having free edges, said arms when swung apart forming with the base portion a trough for the reception of the product, means for swinging said arms

toward each other to form with the base portion substantially a cylinder for confining the product, a cover element beneath which the molding units pass during their travel after they have been filled, said cover element being shaped so that and the path of movement of said arms being such that during closing of the molding units the free edges of the arms move in contiguous relation to the cover element.

4. In a machine of the character described, in combination, a plurality of molding units, means for pivotally linking adjacent molding units together, means for moving said molding units through a path of travel, each of said molding units including a pair of arms of partial cylindrical form pivoted with respect to each other and having free edges, said arms when swung apart forming a trough for the reception of the product, means for swinging said arms toward each other to form substantially a cylinder for confining the product, stationary means for closing the ends of said molding units while they are being filled and during their closing movement, a covering element beneath which the molding units pass during their travel after they have been filled, said covering element being shaped so that and the path of movement of said arms being such that during closing of the molding units the free edges of the arms move in contiguous relation to the covering element.

5. In a machine of the character described, in combination, a plurality of molding units, means for pivotally linking adjacent molding units together, means for moving said molding units through a path of travel, each of said molding units including a base portion of partial cylindrical form and a pair of arms of partial cylindrical form pivoted with respect to each other and with respect to said base portion and having free edges, said arms when swung apart forming with the base portion a trough for the reception of the product, means for swinging said arms toward each other to form with the base portion substantially a cylinder for confining the product, stationary means for closing the ends of said molding units while they are being filled and during their closing movement, a covering element beneath which the molding units pass during their travel after they have been filled, said covering element being shaped so that and the path of movement of said arms being such that during closing of the molding units the free edges of the arms move in contiguous relation to the covering element.

6. In a machine of the character described, in combination, a plurality of molding units, means for pivotally linking adjacent molding units together, means for moving said molding units through a path of travel, each of said molding units including a pair of arms of partial cylindrical form pivoted with respect to each other and having free edges, said arms when swung apart forming a trough for the reception of the product and with the free edges of adjacent molding units being contiguous, means for swinging said arms toward each other to form substantially a cylinder for confining the product, a covering element beneath which the molding units pass during their travel after they have been filled, said covering element being shaped so that and the path of movement of said arms being such that during closing of the molding units the free edges of the arms move in contiguous relation to the covering element.

7. In a machine of the character described, in combination, a plurality of molding units, means

for pivotally linking adjacent molding units together, means for moving said molding units through a path of travel, each of said molding units including a base portion of partial cylindrical form and a pair of arms of partial cylindrical form pivoted with respect to each other and with respect to said base portion and having free edges, said arms when swung apart forming with the base portion a trough for the reception of the product and with the free edges of adjacent molding units being contiguous, means for swinging said arms toward each other to form with the base portion substantially a cylinder for confining the product, stationary means for closing the ends of said molding units while they are being filled and during their closing movement, a covering element beneath which the molding units pass during their travel after they have been filled and forming with the stationary means a tunnel, said covering element being shaped so that and the path of movement of said arms being such that during closing of the molding units the free edges of the arms move in contiguous relation to the covering element.

8. In a machine of the character described, in combination, a plurality of molding units, means for pivotally linking adjacent molding units together, means for moving said molding units through a path of travel, each of said molding units including a pair of arms of partial cylindrical form pivoted with respect to each other and having free edges, said arms when swung apart forming a trough for the reception of the product, means for swinging said arms toward each other to form substantially a cylinder for confining the product, a covering element beneath which the molding units pass during their travel after they have been filled, said covering element being shaped so that and the path of movement of said arms being such that during closing of the molding units the free edges of the arms move in contiguous relation to the covering element, said path of travel including a can filling station, and means at the can filling station for ejecting the contents of said molding units successively into cans.

9. In a machine of the character described, in combination, a plurality of molding units, means for pivotally linking adjacent molding units together, means for moving said molding units through a path of travel, each of said molding units including a pair of arms of partial cylindrical form pivoted with respect to each other and having free edges, said arms when swung apart forming a trough for the reception of the product, means for swinging said arms toward each other to form substantially a cylinder for confining the product, stationary means for closing the ends of said molding units while they are being filled and during their closing movement, a covering element beneath which the molding units pass during their travel after they have been filled, said covering element being shaped so that and the path of movement of said arms being such that during closing of the molding units the free edges of the arms move in contiguous relation to the covering element, said path of travel including a can filling station, and means at the can filling station for ejecting the contents of said molding units successively into cans.

10. In a machine of the character described, in combination, a plurality of molding units, each of said molding units including a pair of arms of partial cylindrical form pivoted with respect to each other, said molding unit forming a trough for the reception of the product when open, said

molding units being spaced so that the arms of adjacent molding units when open are contiguous, means for moving said arms to a closed position with respect to each other to form a cylinder, said molding units having open ends, means for moving said molding units continuously through a path of travel, and stationary means for closing said open ends while the molding units are being filled with product and while the arms are moving to a closed position.

11. In a machine of the character described, in combination, a plurality of molding units, each of said molding units including a base portion of partial cylindrical form and a pair of movable arms of partial cylindrical form pivoted with respect to said base portion on each side thereof, said base and arms forming a trough for the reception of the product when open, said molding units being spaced so that the arms of adjacent molding units when open for the reception of the product are contiguous, means for moving said arms to a closed position with respect to said base portion to form a cylinder embracing the product and molding the same, with the axes of adjacent cylinders being parallel to but out of alignment with each other, and means for moving said molding units continuously through a path of travel with the axes of the cylinders always parallel to each other.

12. In a machine of the character described, in combination, a plurality of molding units, each of said molding units including a base portion of partial cylindrical form and a pair of movable arms of partial cylindrical form pivoted with respect to said base portion on each side thereof, said base and arms forming a trough for the reception of the product when open, said molding units being spaced so that the arms of adjacent molding units are contiguous, means for moving said arms to a closed position with respect to said base portion to form a cylinder having an axis, said molding units having open ends, stationary means for closing said open ends while the molding units are being filled with product, and means for moving said molding units continuously through a path of travel with the axes of the cylinders always parallel to each other.

13. In a machine of the character described, in combination, a plurality of molding units, each of said molding units including a base portion

of partial cylindrical form and a pair of arms of partial cylindrical form pivoted with respect to said base portion on each side thereof, said base and arms forming a trough for the reception of the product when opened, said molding units being spaced so that the arms of adjacent molding units are contiguous, means for moving said arms to a closed position with respect to said base portion to form a cylinder having an axis, said molding units having open ends, means for moving said molding units continuously through a path of travel with the axes of the cylinders always parallel to each other, and means for closing said open ends while the molding units are being filled with product and while they are moving to a closed position.

14. In a machine of the character described, in combination, a molding unit including a base portion having transverse edges and a pair of arms having free transverse edges and being hinged with respect to said base portion on opposite sides of and adjacent the transverse side edges of the base, said base and arms each being partially cylindrical and forming when in closed relation a cylinder for embracing the product with the cylinder having open ends, means for opening and closing said molding unit, said molding unit when open forming a trough which is relatively long in its longitudinal direction to facilitate placing a full charge of the product in the trough with the bulk of the product well below the free edges of said arms, stationary means for closing the open ends of the cylinder while it is being filled with product, and means for moving said molding unit continuously in a direction such that when the molding unit is closed to form a cylinder the axis of the cylinder is normal to the direction of movement, said axis remaining in said normal position throughout its movement.

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