

June 1, 1965

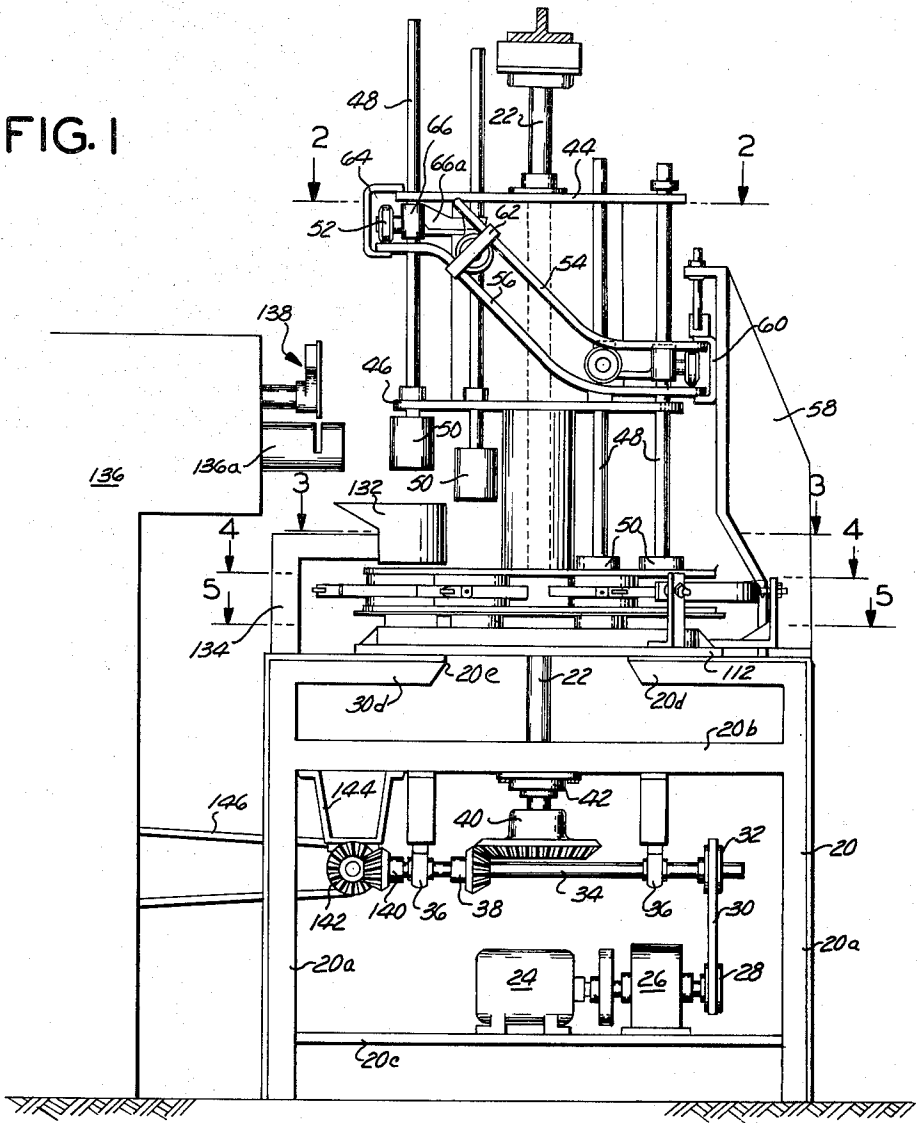
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PACKING MACHINES

3,186,140

Filed Feb. 23, 1962

5 Sheets-Sheet 1

FIG. 1



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FIG. 2

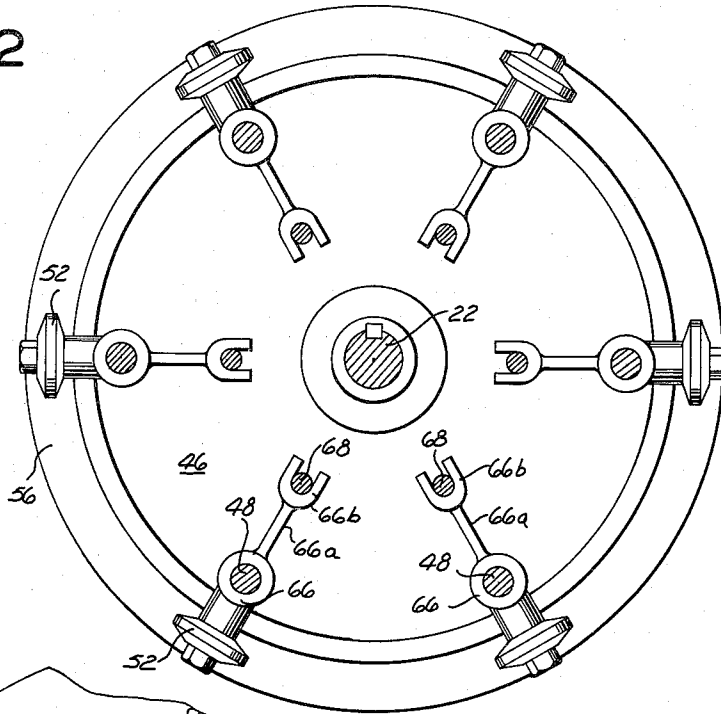
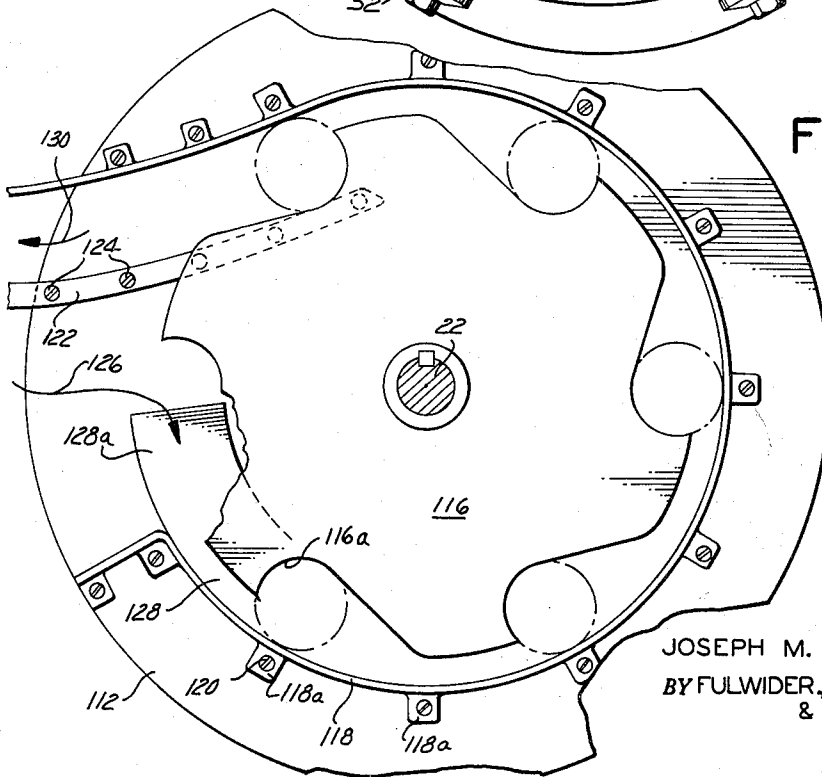


FIG. 5

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FIG. 3

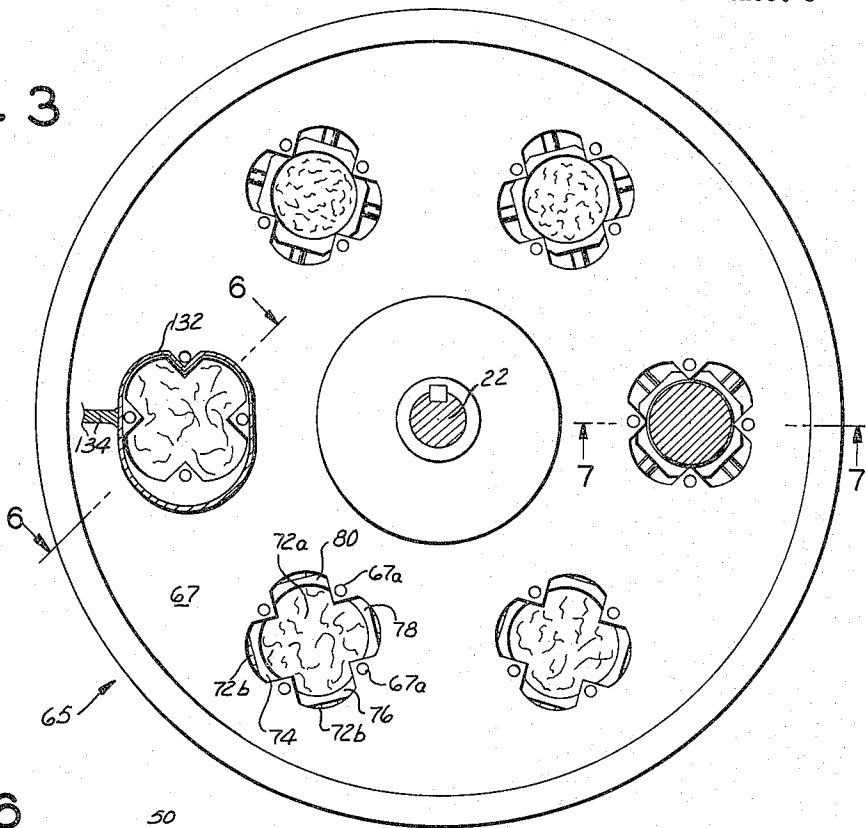


FIG. 6

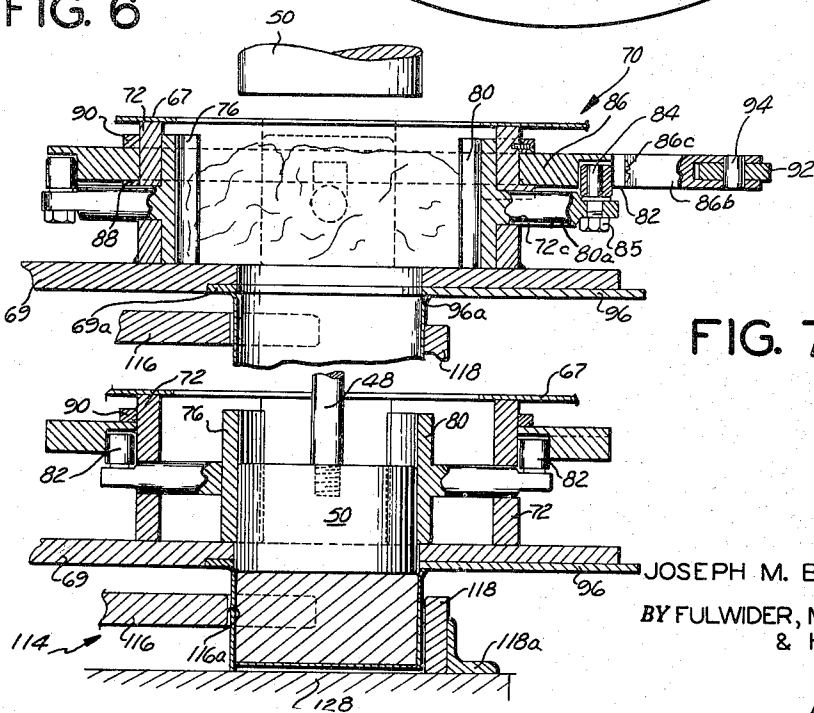


FIG. 7

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FIG. 4

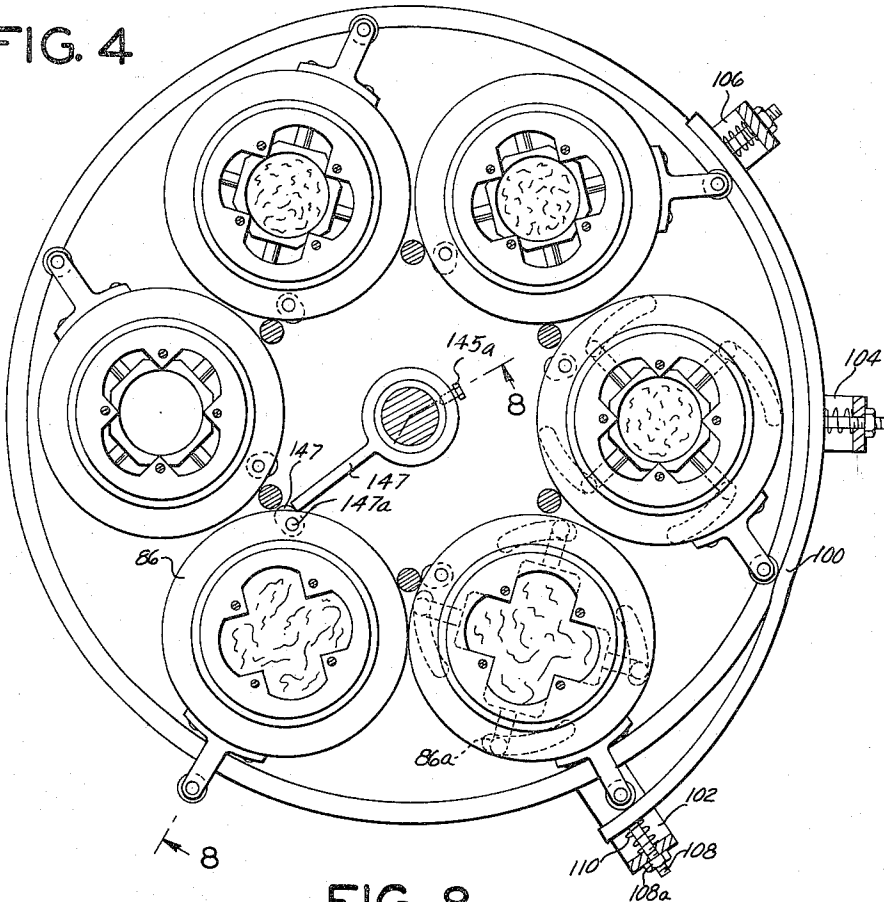
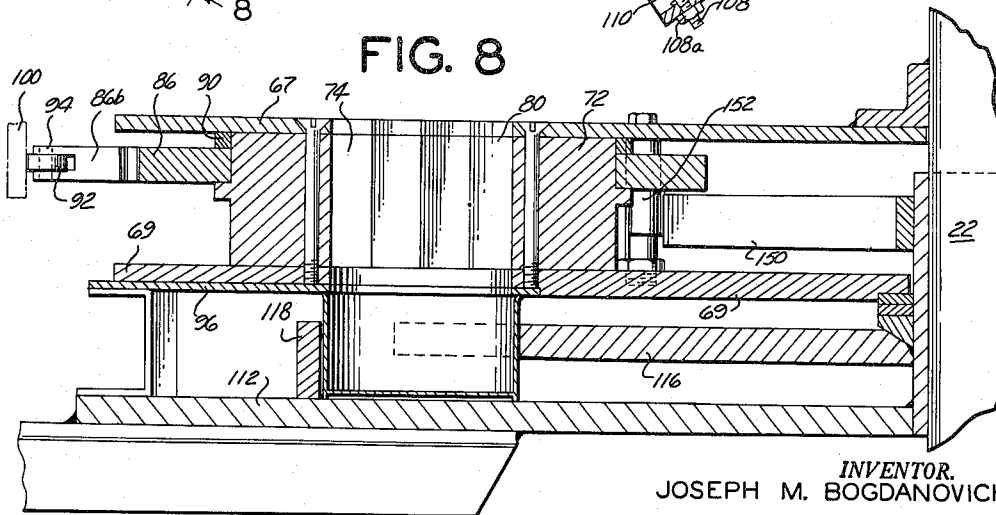


FIG. 8



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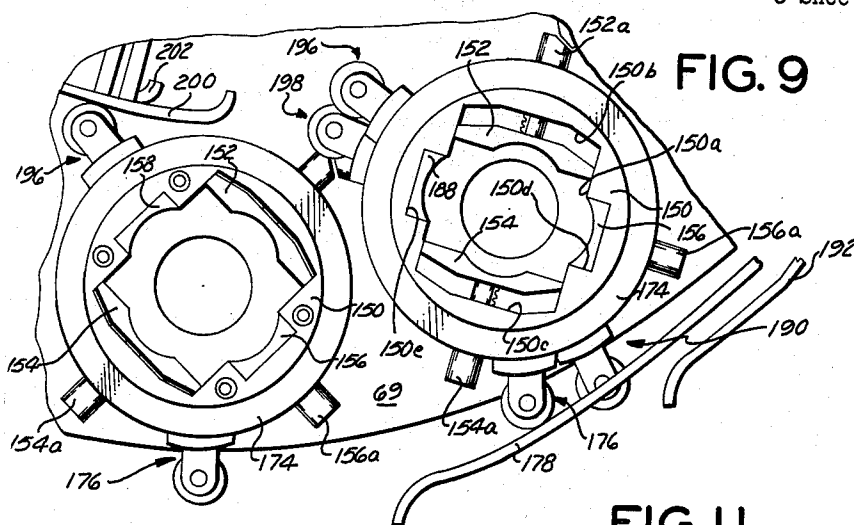


FIG. 9

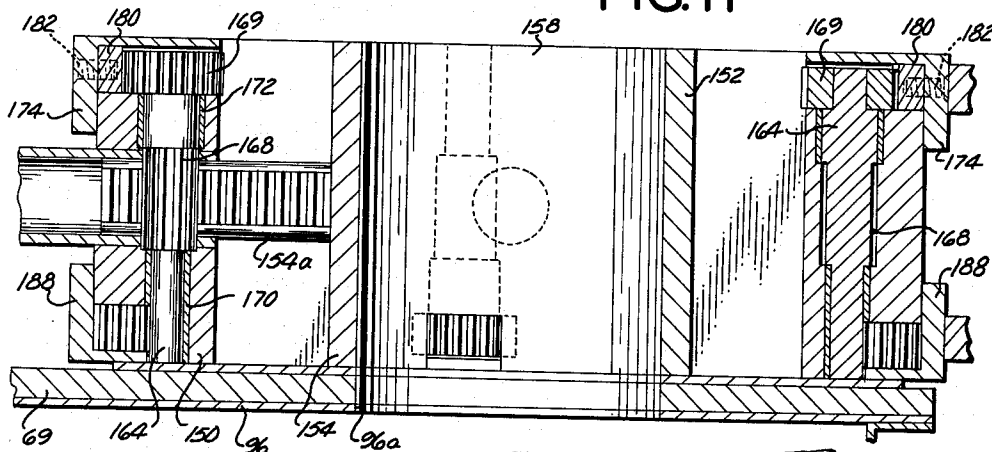
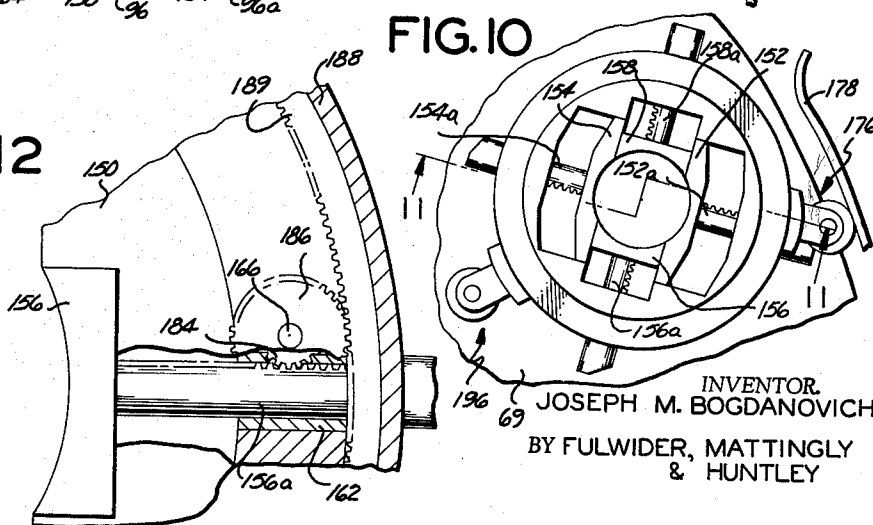


FIG. 10

FIG. 12



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3,186,140

PACKING MACHINES

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Filed Feb. 23, 1962, Ser. No. 175,198
3 Claims. (Cl. 53—124)

The present invention relates generally to packing machines but more particularly to automatic machines for packing a predetermined quantity of bulk product.

In the packaging of bulk products such as foodstuffs it is desirable to employ automatically operable machinery such that the food to be packaged is fed into a machine at one point and packages thereof are received from the machine at a second point. Machines of this general type have heretofore been available and have provided a continuous flow of packaged food.

Prior food packaging machines have, however, exhibited certain shortcomings, particularly those machines which have been used for the packaging of fish products. For instance, machines heretofore used for packaging tuna fish have not been so constructed as to make maximum use of the natural oils of the fish being packaged, the result being that most canned tuna fish has heretofore been somewhat dry and flakey. This result has been particularly noticeable in the packaging of chunk style tuna wherein pieces of tuna fish are compacted so as to provide a substantially solid quantity of fish in cylindrical form. Prior packaging machines for chunk style tuna fish have been so constructed that during the compaction operation much of the natural oils of the fish have been permitted to flow away as waste.

Also, such prior machines have not been constructed so as to receive a predetermined given quantity of fish by weight or volume and to thereafter provide a cylinder of fish of the exact weight called for by the container therefor. Rather, prior machines have required an extra large portion of fish to be placed in each compacting chamber, there being means for removing the excess before the compacted fish is placed in the container, this process being necessary to insure that the proper amount of fish is in each package.

It is an object of the present invention to provide a packing machine which is automatically operable in providing a predetermined quantity of fish for each container.

Another object of the present invention is to provide a machine as characterized above wherein a continuous flow of properly filled containers is maintained from the machine.

Another object of the present invention is to provide a packing machine wherein the bulk product to be packaged is compacted in a plurality of different directions before insertion thereof into the proper container.

Another object of the present invention is to provide a food packing machine having a multiplicity of cups or chambers each of which is formed with relatively movable side wall portions whereby the size of such cups can be reduced from a substantially large size to a size corresponding to the container to be packaged.

Another object of the present invention is to provide a packing machine as characterized above which is constructed to receive a predetermined weight of bulk product in each cup, such weight being maintained throughout the compaction of the product and insertion thereof into the proper container.

Another object of the present invention is to provide a packing machine as characterized above having a plurality of cups or chambers having arcuately formed relatively movable side wall portions which are cam-actuated from open position providing a relatively large cham-

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ber to closed position providing a cylindrical chamber corresponding to the size of the container to be filled.

Another object is to provide a packaging machine as characterized above which further employs a cam-actuated plunger for each cup which cooperates with the movable side wall portions to compact the foodstuffs to the desired size and shape.

Another object of the present invention is to provide a packing machine as characterized above which is simple and inexpensive to manufacture and which is rugged and dependable in operation.

The novel features which I consider characteristic of my invention are set forth with particularity in the appended claims. The device itself, however, both as to its organization and mode of operation, together with additional objects and advantages thereof, will best be understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

FIGURE 1 is a side elevational view of a packing machine according to the present invention;

FIGURE 2 is a sectional view taken substantially along line 2—2 of FIGURE 1;

FIGURE 3 is a sectional view taken substantially along line 3—3 of FIGURE 1;

FIGURE 4 is a sectional view taken substantially along line 4—4 of FIGURE 1;

FIGURE 5 is a sectional view taken substantially along line 5—5 of FIGURE 1;

FIGURE 6 is a fragmentary sectional view taken substantially along line 6—6 of FIGURE 3;

FIGURE 7 is a fragmentary sectional view taken substantially along line 7—7 of FIGURE 3;

FIGURE 8 is a fragmentary sectional view taken substantially along line 8—8 of FIGURE 4;

FIGURE 9 is a fragmentary top plan view of a second embodiment of the present invention;

FIGURE 10 is a fragmentary top plan view of one of the cups of the second embodiment, shown in closed position;

FIGURE 11 is a fragmentary sectional view taken substantially along line 11—11 of FIGURE 10; and

FIGURE 12 is a fragmentary sectional view showing the drive means for one of the cup segments of the second embodiment.

Like reference characters indicate corresponding parts throughout the several views of the drawings.

Referring to FIGURE 1 of the drawings, there is shown therein a first embodiment of the present invention comprising a frame 20 on which is mounted a rotatable central drive shaft 22 for operating the packing machine to be described in detail. Frame 20 is formed of a plurality of vertical members 20a which may be channel members or the like to provide the necessary supporting strength, and horizontal support members shown generally at 20b and 20c. Above support member 20b, frame 20 is formed with support means 20d providing a platform or table having a central opening 20e for receiving shaft 22.

A drive motor 24 is mounted on support member 20c and, as will hereinafter be explained, drives the packing machine through its various operations. Suitable speed reduction means 26 may be connected to the output shaft of motor 24, and may also be mounted on support 20c.

The output shaft of speed reduction means 26 is provided with a pulley 28 which cooperates with a drive belt 30 and a pulley 32, attached to a horizontally disposed shaft 34. Bearing members 36 are fixed to the underside of support 20b for rotatably mounting shaft 34 as shown in FIGURE 1. Shaft 34 carries a bevel gear 38 which cooperates with a bevel gear 40 on the lower end

of drive shaft 22. A bearing member 42 is fixed to the underside of support 20b and in addition to centrally locating shaft 22 within the machine, also acts as a thrust bearing.

Rigidly fixed to the upper portion of shaft 22 is a pair of spaced rotatable plates 44 and 46 having aligned openings for slidably receiving a plurality of plunger shafts 48. Attached to the lower end portion of each shaft 48 is a plunger 50 which moves up and down with shaft 48 relative to rotatable plates 44 and 46. To effect such vertical movement of plunger 50, there is provided on each shaft 48 an adjustable cam-follower roller 52 which is guided by the cam surfaces of stationary spaced cam members 54 and 56. Suitable support means such as frame 58 rigidly attached to the top of frame 20 and bracket member 60 may be employed for maintaining cam members 54 and 56 in the proper stationary position. Other support means such as brackets 62 and 64 may be used for maintaining such cam members in proper relation. Bracket 64 is firmly attached to member 56 and rests on the top of rotatable plate 44.

As will hereinafter become more apparent, the vertical movement of plunger 50 can be altered not only by changing the contour of the cam surfaces afforded by members 54 and 56, but also by changing the position of the respective cam roller 52 on the corresponding shaft 48. That is, each roller 52 is adjustably mounted on its shaft 48 by fitting 66 having a through opening.

As shown most clearly in FIGURES 1 and 2, each fitting 66 is formed with an extended portion 66a having a bifurcated end portion 66b. For each of the cam roller fittings 66, there is provided a post 68 which is rigidly fixed to plate 44 and depends therefrom. The bifurcated end portion 66b of the corresponding fitting 66 is caused to straddle the post 68 so as to be slidable thereon to maintain the respective cam roller 52 properly oriented for engagement with cam members 54 and 56 throughout the rotational operation of plates 44 and 46.

As shown most clearly in FIGURES 3, 4, 6 and 7, immediately beneath each plunger 50 is a rotatable cup or chamber assembly identified generally with the numeral 65. Such assembly comprises an upper plate 67 and a lower plate 69 which are firmly attached to drive shaft 22 for rotation therewith, and are held in spaced relation by the individual cups 70. Each cup comprises a housing member 72 and a plurality of cup segments as shown at 74, 76, 78 and 80. Housing member 72 is rigidly fastened to the lower plate 69 in any desired manner as by welding, soldering, brazing or the like. The upper plate 67 is attached to member 72 by fastening bolts or screws which extend through suitable openings 67a in plate 67 and threadedly engage housing member 72.

Housing 72 is formed with a central chamber 72a having four equi-angularly spaced indentations 72b. As shown most clearly in FIGURES 6 and 7, at each of the indentations 72b, housing member 72 is formed with a through opening 72c for slidably receiving an actuating stem 80a on the corresponding cup segment 80. Such actuating stem may be formed integrally with the segment or may be attached thereto and is provided with a cam roller 82 mounted on a roller pin 84 which is held in place by means including a fastening nut 85. Each cup segment 80 is guided by the side walls of the respective indentation 72b of member 72. It is thus seen that cup assembly 65 comprises a plurality of cups 70 each of which comprises a plurality of cup segments. Each such segment carries an actuating stem which extends through a suitable opening formed in housing member 72 and is positioned for rectilinear sliding movement within a radial indentation formed in housing member 72.

For actuating simultaneously the cup segments from open to closed position, there is provided a cam plate 86 which is rotatably positioned on the cylindrical exterior surface of housing member 72 and is held in proper position thereon by rings 88 and 90. As shown in

dotted lines in FIGURE 4, the underside of cam plate 86 is formed with four cam grooves or cutouts 86a each of which receives a separate one of the cam rollers 82 for actuation of the corresponding cup segment upon rotation of cam plate 86 with respect to housing member 72. Cam plate 86 is further provided with a radially outwardly extending arm 86b which may be formed integrally with plate 86 or may be attached thereto as by bolts 86c. At its outer extremity, arm 86b carries a cam roller 92 which is held in rotatable position within a slot in the end of arm 86b by a pin 94.

Rotatable bottom plate 69 of cup assembly 65 is indented or cut out as at 69a for receiving a stationary plate 96. Plate 96 is attached relative to frame 20 by any appropriate means and forms a support for cup assembly 65 in addition to other very important functions to be hereinafter described.

Referring more particularly to FIGURES 1 and 4, it is seen that a cam surface is provided adjacent the outer periphery of the cup assembly 65 by a stationary cam member 100. Cam member 100 is shock-mounted with respect to frame 20 on L-shaped bracket members 102, 104 and 106. Three studs 108 rigidly fixed to cam member 100 as by welding or the like extend through suitable openings in the upper end portion of the aforementioned bracket members, there being spring means 110 interposed between such brackets and the cam member 100 to provide the necessary shock-resisting mounting. A fastening nut 108a is threadedly mounted on each of the studs 108 to assist in properly positioning cam member 100.

As shown most clearly in FIGURE 1, the bracket members 102, 104, and 106 are mounted on a stationary mounting plate 112 which is secured to the upper surface of frame 20. As also shown in this figure, such bracket members are so constructed and arranged with respect to frame 20 as to position cam member 100 for engagement by the aforementioned cam rollers 92 on the arms 86b of cam plates 86.

Referring now to FIGURES 1, 5, 6 and 7 of the drawings, it will be seen that immediately beneath the stationary plate 96, which assists in supporting the aforementioned cup assembly 65, there is provided a container transport mechanism 114. This consists of a spider gear or plate 116 the outer periphery of which is suitably indented or cut out as shown at 116a for receiving a container or can. Spider plate 116 as shown most clearly in FIGURE 5 is rigidly fixed to drive shaft 22 for rotation therewith in synchronism with the aforescribed cup assembly 65 and plunger assembly. A guide rail 118 is provided in spaced relation to the periphery of plate 116 and is fastened to stationary plate 112 by any appropriate means such as tabs 118a formed in guide rail 118 and mounting screws 120 which extend through suitable openings formed in the tabs 118a and threadedly engage the stationary plate 112. An additional guide or stop member 122 is attached to plate 112 by screws 124 near the outlet of the container transport section.

As will hereinafter be explained in greater detail, the containers or cans are fed into the packing machine in the direction of the arrow identified in FIGURE 5 with the numeral 126. Each can, in its turn, is caused to be engaged by one of the cutout portions 116a of the spider plate 116, the rotational movement of such plate causing such can to be rotated therewith in a counterclockwise direction as shown in FIGURE 5. Throughout the movement of each can with the spider plate 116, the guide rail 118 assists in maintaining the can in the proper path of travel.

As will hereinafter be explained in greater detail, it is desirable to have each can in firm abutting engagement with the under surface of the aforescribed stationary plate 96. To accomplish this, a platform 128 is provided on stationary plate 112 for properly positioning the cans with respect to plate 96. The portion 128a of platform

128 near the inlet for the containers is tapered so as to provide a ramp. As a result, the cans or containers can be loosely inserted between stationary plates 96 and 112 and thereafter are caused by spider plate 116 to be forced up the ramp into abutting engagement with the under surface of stationary plate 96. After the containers complete their intended path of travel, they ultimately individually engage the stop member 122 which causes such cans to follow the outlet arrow 130 in leaving the packing machine.

A stationary funnel member 132 is provided above the cup assembly 65 for directing the bulk product to be packaged into one of the cup members as will hereinafter be described in detail. Funnel member 132 is fixed relative to frame 20 by an L-shaped bracket 134.

The bulk product or food product is fed to funnel member 132 from any appropriate processing machine such as shown generally at 136. Machine 136 is provided with outlet means as at 136a, there being control means as shown at 138 for periodically passing a predetermined amount of the product to funnel member 132. Control means 138 may act as a gate for controlling the periodicity and the quantity of food fed to the packaging machine.

As will be readily apparent to those persons skilled in the art, it is necessary that the operation of control means 138 be synchronized with the operation of the entire packing machine. To accomplish this, it may be desirable to utilize the same power source for driving the packing machine and the food processing machine including control means 138. Such arrangement is shown in FIGURE 1 as comprising a bevel gear 140 mounted on the end of shaft 34 for rotation therewith and a bevel gear 142 which is rotatably mounted with respect to frame 20 by an appropriate mounting bracket 144. A drive belt 146 is shown for transmitting the power from gear 142 to the processing machinery 136. Due to this arrangement, the operation of control means 138 is synchronized with the operation of the packing machine such that a given quantity of food is admitted to the funnel member 132 whenever one of the aforesaid cups 70 is in the proper position therebeneath.

For returning the cup members to open position as will hereinafter be described in detail, there is provided an adjustable stationary arm 145 for engagement with a cam member 147 carried by cam plate 86. An adjustment screw 145a is provided in member 145 for properly positioning the latter as will hereinafter become apparent.

The aforesaid apparatus operates generally as follows.

Proper energization of drive motor 24 causes shaft 34 to rotate so as to properly rotate drive shaft 22 and to operate the processing machine 136 and control means 138. Rotation of shaft 22, of course, causes plates 44 and 46 and associated components to rotate therewith. Also, the entire cup assembly 65 and the spider plate 116 therebeneath also rotate with drive shaft 22, all of such mechanisms being rotated at the same constant speed. The various mechanisms are attached relative to shaft 22 such that for each cup 70 there is a plunger 50 disposed there above or inserted therewithin in accordance with the rotational position of the cup assembly 65. Also, for each such cup there is provided a cutout 116a in the spider plate 116 disposed in such position relative to the cup as to hold a container or can concentrically therebeneath as will hereinafter appear. Thus with the aforesaid relationship provided, containers are admitted to the apparatus along the inlet path represented by arrow 126.

As each cup 70, in its counterclockwise travel with cup assembly 65, reaches a position beneath funnel member 132 it is in its maximum open position as will hereinafter be explained. In accordance with the aforesaid synchronization of the operation of control means 138 and the operation of the packing machine, a given quantity of food or other bulk product is admitted to funnel member 132 while a cup 70 is therebeneath. Such product im-

mediately falls through the funnel member and into the cup 70. As will hereinafter become more apparent, it is a feature of the present invention that the cup 70 being filled be in its maximum open position so as to easily and quickly receive all of the pre-measured bulk product therefor. Such filling operation of a cup is shown most clearly in FIGURE 3, the cup segments thereof being retracted when the cup is beneath the funnel member 132.

As the cup assembly 65 continues to rotate, the cam roller 92 for the cup 70 which has just been filled, eventually engages cam member 100 as shown most clearly in FIGURE 4 of the drawings. Due to the contour of the cam surface of member 100, continued rotation of cup assembly 65 causes arm 86b to rotate the respective cam plate 86 with respect to the corresponding housing member 72. Such relative rotational movement of cam plate 86 on housing 72 causes the cam grooves 86a formed in plate 86 to simultaneously move the cup segments 80 toward the center of the cup chamber 72a. This action, of course, results by virtue of the cam rollers 82 of the cup segments 80 following along the respective cam grooves 86a as the cam plate 86 is rotated with respect to housing 72.

Such compacting movement of the various cup segments 80 is accompanied by downward movement of the corresponding plunger 50. That is, it has been found desirable, in order to effect proper compaction of the product within the cup, to simultaneously move the cup segment inwardly and the plunger downwardly into the cup. To accomplish this, the proper shape and position of cam members 54 and 56 for controlling the action of the plungers 50 must be provided with respect to the position and shape of cam member 100 for controlling the action of the cup segments.

Thus as the cup segments of a given cup are caused to move toward the center of the cup chamber, the cam roller 52 of the corresponding plunger 50 must be following the downward sloping portion of the cam members 54 and 56 to cause such plunger to be inserted within the cup chamber. That is, as shown in FIGURE 1, as plates 44 and 46 rotate they carry with them the plunger assemblies as described above. Due to the fact that the cam members 54 and 56 are stationary, as a given cam roller 52 follows the downward sloping portion thereof, the corresponding plunger rod 48 and plunger 50 are moved downwardly. In this manner, the foodstuffs or other bulk product within a given cup is compacted to the proper size and shape corresponding to that of the container to receive it.

The containers or cans, prior to completion of such compaction operation, are fed into the packing machine. Such cans are individually engaged by a separate one of the arcuate cutouts 116a in the spider plate 116 for movement up the ramp portion 128a of platform 128. As above-described, this action causes each can to be forced upwardly into firm abutting engagement with the under surface of stationary plate 96, immediately beneath one of the cups 70.

After the aforesaid compaction operation has been properly performed in a given one of the cups, and a container therefor has been properly positioned therebeneath, the particular cup reaches the opening 96a in stationary plate 96. As will become more apparent, such opening must be so positioned in plate 96 as to insure that the compaction operation is completed before such opening is reached. Thus when a given cup 70 arrives at opening 96a, the compacted food is caused to fall through such opening and into the container therebeneath. It may be found desirable to assist such movement of the compacted food into the container by the use of plunger 50. This, of course, can be accomplished by providing appropriate formations in the cam members 54 and 56 so as to cause each plunger 50 to effect the additional travel after the respective cup has reached the opening 96a.

As will be readily apparent to those persons skilled in the art, opening 96a must be arcuate and elongated to allow sufficient time for the compacted product to be moved into the container. This is necessary, of course, due to the fact that cup assembly 65 rotates with drive shaft 22 at a constant speed.

After the compacted food or other bulk product has been inserted in the container, the latter is transported by spider plate 116 until it engages stop member 122. At this point, the can is pushed out of the packing machine and, by means of appropriate material handling apparatus (not shown), can be transported to the next processing machine.

After a given cup 70 has discharged its compacted product, it continues its rotation with cup assembly 65. During such continued rotation, the plunger 50 and the cup segments 80 are retracted. The retraction of plunger 50 is effected by cam members 54 and 56 while retraction of the cup segments is effected by stationary arm 145. As the cup assembly 65 rotates, arm 145 is caused to engage the cam member 152 on cam plate 86 so as to rotate such plate in a counterclockwise direction as viewed in FIGURE 4. This causes cam grooves 86a of the cam plate to retract the cup segments. As will be readily understood by those persons skilled in the art, this retraction operation must be performed before the cup reaches the filling position beneath the funnel member 132. This is necessary to insure that each cup chamber is of maximum size for quickly receiving the bulk product as above described.

Shown in FIGURES 9-12 inclusive is a second form of construction for the cups which are part of the cup assembly herebefore described. Such second embodiment differs from the first in certain specific particulars, and only these differences will be hereinafter explained, the remaining components of the packing machine shown in FIGURES 1-8 inclusive being identical as used with the second embodiment.

The second cup structure is intended to eliminate the use of cam grooves 86a in plate 86 for actuating the various cup segments. The structure of FIGURES 9-12 inclusive employs rotatable gear members and rectilinearly movable gear racks for effecting positive actuation of the cup segments. Also, as will hereinafter become more apparent, the second embodiment provides a larger cup chamber.

Referring to FIGURES 9 and 10, it is seen that the second embodiment comprises a cup housing 150 having a cup chamber 150a of different size and configuration from the chamber of housing member 72 of the above-explained first embodiment. Housing chamber 150a is formed with a pair of oppositely disposed relatively large indentations or cut outs 150b and 150c and a pair of smaller indentations or cut outs 150d and 150e disposed at right angles to the larger indentations.

In each of the larger indentations 150b and 150c of housing 150 there is provided a large cup segment as shown at 152 and 154 respectively. In like manner, there is provided in each of the smaller indentations 150d and 150e a small cup segment as shown at 156 and 158 respectively. Each of the four cup segments of the second embodiment is formed with an arcuate surface representing one quarter of a cylinder in the same manner as the cup segments of the first embodiment.

The use of both large and small cup segments in the formation of each cup, results in the cup chambers being larger. This, of course, enables such chambers to receive more bulk product or food within a given period of time. The increase in the size of the cup chamber is due to elimination of part of the corners of housing member 72 which extend into the chamber 72a and which separate the indentations 72b as shown in the first embodiment. However, to provide sufficient support for the cup segments, it was found necessary to make one pair of oppositely disposed segments larger than the other.

Thus, without referring to the specific actuating means for the cup segments, it is seen that the larger segments 152 and 154 are to be moved toward the center of the cup chamber 150a prior to the smaller segments 156 and 158 leaving their retracted positions. Then, after the larger segments have reached their closed positions, as shown most clearly in FIGURE 10, they provide means for guiding the smaller segments to their closed positions. In this manner, a portion of the corners of the housing member of the first embodiment are eliminated so that the chamber can receive the bulk product more quickly.

For effecting the above described sequence of operation of the cup segments, the second embodiment employs actuating stems for each segment having gear teeth as shown most clearly in FIGURE 12. Each of cup segments 152, 154, 156 and 158, as shown in FIGURE 10, are provided with actuating stems 152a, 154a, 156a and 158a respectively, each of which extends through a suitable opening in housing 150. If desired, such openings may be provided with a bushing as shown at 162 in FIGURE 12.

As will be understood by those persons skilled in the art, there is provided for each large cup segment, such as segments 152 and 154 shown in FIGURES 9 and 10, a pin 164 carrying gear members 168 and 169 as shown in FIGURE 11. For cooperation with the gear members 169 and corresponding actuation of the large cup segments, there is provided on housing 150 a cam-operated gear plate 174. Plate 174 is rotatably mounted on the upper end of the housing 150 and is operated by a cam follower mechanism 176 which engages a cam member 178 as above-explained with respect to the operation of cam plate 86 of the first embodiment. Gear plate 174 may be formed with internal gear teeth or may be provided with a gear member 180 having gear teeth. Member 180 is fastened to plate 174 by means such as screws 182.

Due to the above arrangement, as gear plate 174 is rotated on housing 150 as a result of engagement of cam mechanism 176 with cam member 178, the several pins 164 are simultaneously rotated due to engagement of gear member 180 and the several gear members 169. This causes the cup segments 152 and 154 to be moved toward the center of the cup chamber due to the cooperation of the gear members 168 with their respective actuating stems 152a and 154a.

Similar components are provided for driving cup segments 156 and 158 toward the center of the cup chamber. As above-explained, adjacent the actuating stems 156a and 158a is a pin 166 as shown in FIGURE 12. Each such pin carries a gear member 184 approximately midway of its entire length, and a gear member 186 near the lower or bottom end portion of the cup housing 150. Suitable bushings may be employed on pin 166 as above-explained with reference to the pins 164 which drive the larger cup segments.

At the bottom of housing 150 is a gear plate 188 which is similar to gear plate 174 on the upper portion of the housing and which cooperates with gear members 186 as plate 174 cooperates with gear members 169. Gear plate 188 carries a cam mechanism 190 which cooperates with a cam member 192 fastened relative to the frame of the packing machine. As will be readily understood by those persons skilled in the art, gear plate 188 may be formed with internal gear teeth for cooperation with the several gear members 186, or may be provided with a gear member 189 having the necessary gear teeth, on the order of gear member 180 for gear plate 174 as above-explained.

With this arrangement, it is seen that any desired sequence of operation of the segments can be provided merely by properly relating the cam members 178 and 192 on the frame of the machine. By having the lower gear plate 188 operate a predetermined time following operation of upper plate 174, as by proper relation of cam members 178 and 192 as shown in FIGURE 9, the larger segments 152 and 154 are caused to close before the small-

er segments leave their retracted positions. Thus after the larger segments are moved to their closed positions they afford guide means for the smaller segments as shown most clearly in FIGURE 10. As above-explained, such construction results in the cup chamber being larger than in the first embodiment.

To open the cup following compaction of the product and transfer thereof to the proper container therebeneath as above-explained with reference to the first embodiment, there is provided a cam mechanism on each of the gear plates 174 and 188 as shown at 196 and 198. Mechanism 196 is attached to gear plate 174 and cooperates with a cam member 200 fixed relative to the machine frame. Cam mechanism 198, on the other hand, is formed integrally with or is attached to the lower gear plate 188 and cooperates with stationary gear member 202. Thus after the cylinder of food has been transferred to the proper container, the cup is moved with the cup assembly so that the cam mechanism 198 first engages cam member 202 to retract the smaller cup segments 156 and 158. Thereafter, when the larger segments are no longer needed as guide means for the smaller segments, the cam mechanism 196 engages cam member 200 to return the larger segments 152 and 154 to their retracted positions. Thus there is provided firm positive actuation of the cup segments between their open and closed positions.

It is thus seen that the present invention provides a packing machine for bulk product or foodstuffs which is operable to quickly package a desired quantity of such product within a given container therefor. Such a machine has been found particularly desirable in the packing of chunk style tuna fish. However, it is readily apparent that this invention can be used in providing machines of various types for packing substantially any kind of bulk product.

Although I have shown and described certain specific embodiments of my invention I am fully aware that many modifications thereof are possible. My invention, therefore, is not to be restricted except insofar as is necessitated by the prior art and by the spirit of the appended claims.

I claim:

1. In a machine for packing cans with a predetermined quantity of food material, the combination of:

a frame;

a bottom plate mounted for horizontal rotation on said frame and having a plurality of openings there-through;

a plurality of cup assemblies on said bottom plate, each cup assembly defining a peripherally continuous chamber in communication with the openings of said bottom plate and each cup assembly including two pairs of cup segments having opposed arcuate faces;

support means on said bottom plate supporting said cup segments for concurrent horizontal movement between an open position wherein food material is dropped into said chambers and a compacting position wherein the opposing arcuate faces of said cup segments define a cylinder corresponding to

the size and shape of the interior of said cans, each pair of cup segments moving toward one another in a straight line normal to the direction of movement of the other pair of cup segments;

a stationary plate on said frame below said bottom plate for closing the lower ends of all but one of said chambers, and having a discharge opening there-through for said one of said chambers;

means for successively positioning cans below said discharge opening;

a plurality of plungers each movable in a downward direction into one of said chambers to compact food material against said faces and said stationary plate to reduce the height of the food material in said chambers;

drive means on said frame for effecting common rotation of said bottom plate and said plungers;

actuating means operatively connected to said plungers and said support means that upon rotation of said bottom plate simultaneously effect downward movement of said plungers and closing movement of said cup segments from their open position to their compacting position to compact food material in said chambers into the shape of the interior of said cans as said chambers approach said discharge opening for discharge therethrough of the food material in that one of said chambers which is aligned with said discharge opening into a can positioned below said discharge opening, said actuating means effecting further downward movement of that one of said plungers aligned with said discharge opening to eject the compacted food material in that one of said chambers into one of said cans positioned below said discharge opening;

and means for dropping a predetermined quantity of food material into said chambers prior to the time said actuating means effects said compacting movement of said plungers and said closing movement of said cup segments.

2. In a machine according to claim 1, the combination wherein said actuating means includes cam means interposed between said bottom plate and said cup segments.

3. In a machine according to claim 1, the combination wherein said actuating means includes gear means interposed between said bottom plate and said cup segments.

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