July 5, 1949. E. H. CARRUTHERS 2,475,422

MACHINE FOR PACKING PRODUCTS

Filed April 17, 1944 3 Sheets-Sheet 1

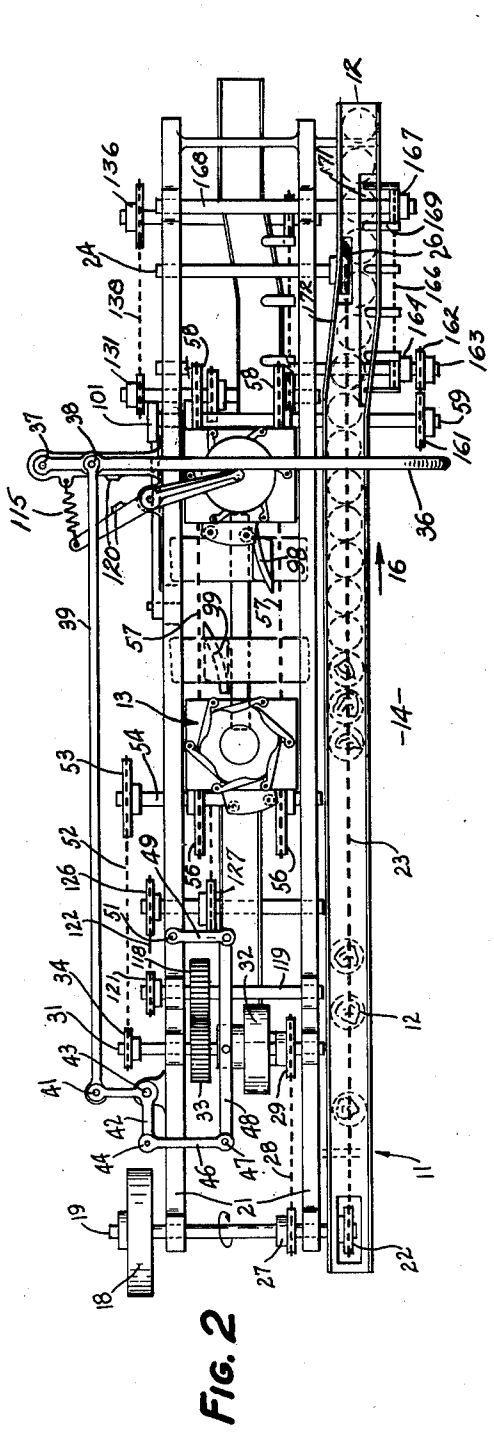


FIG. 2

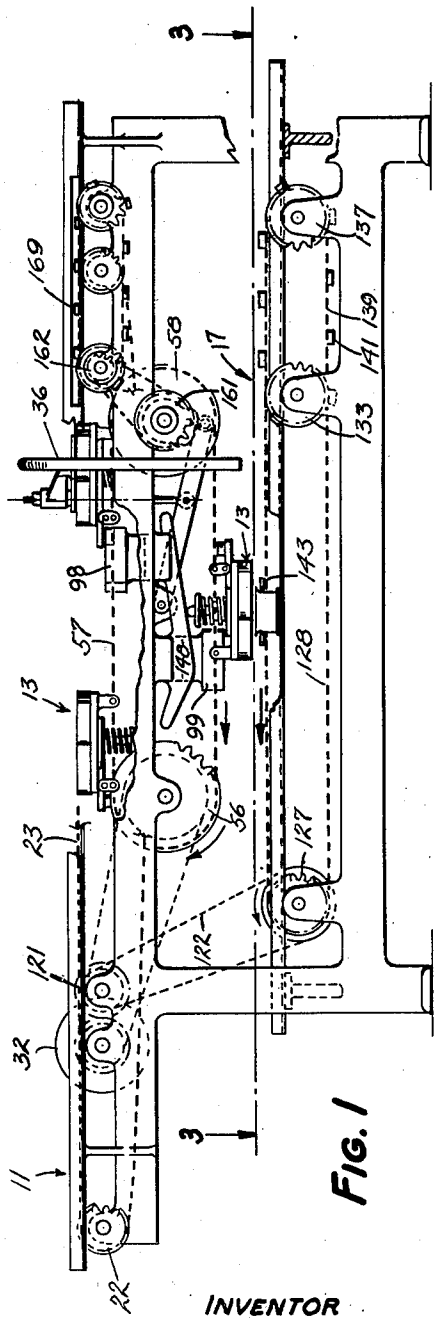


FIG. 1

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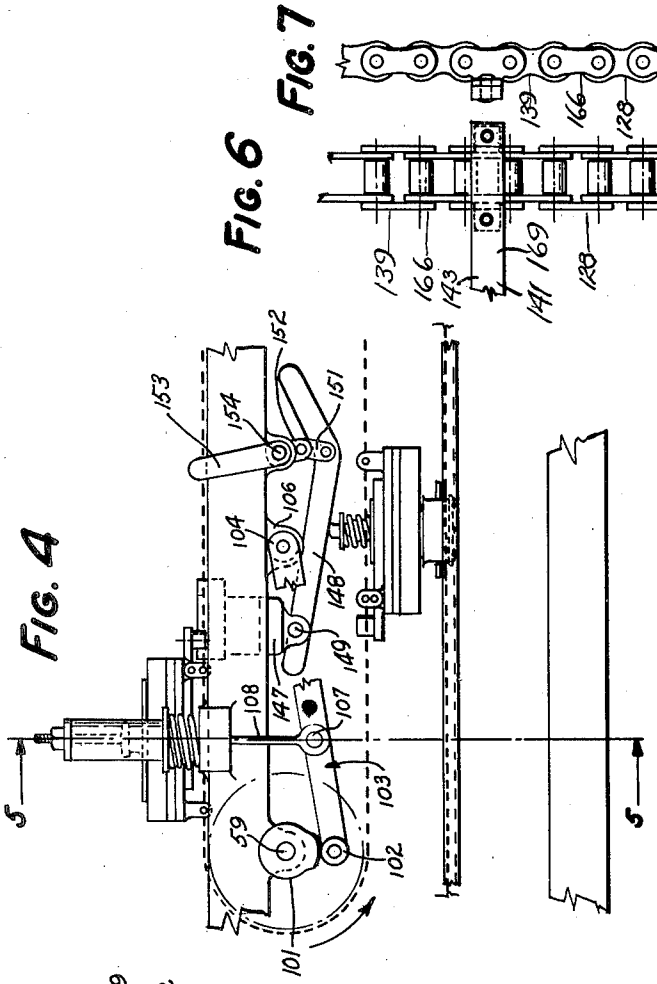


FIG. 4

FIG. 6

FIG. 7

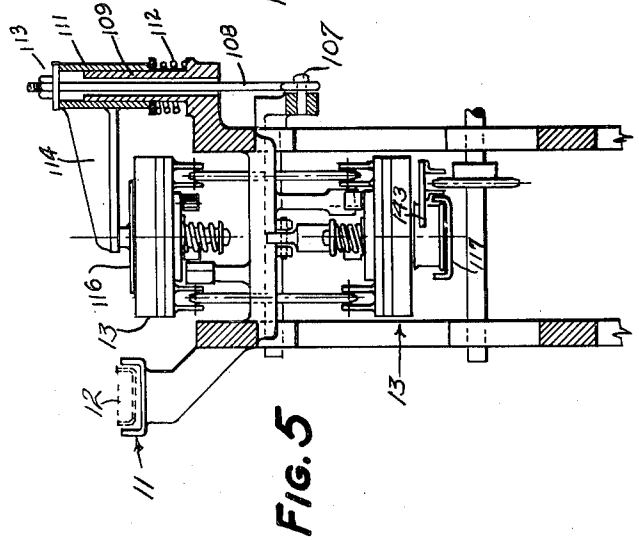


FIG. 5

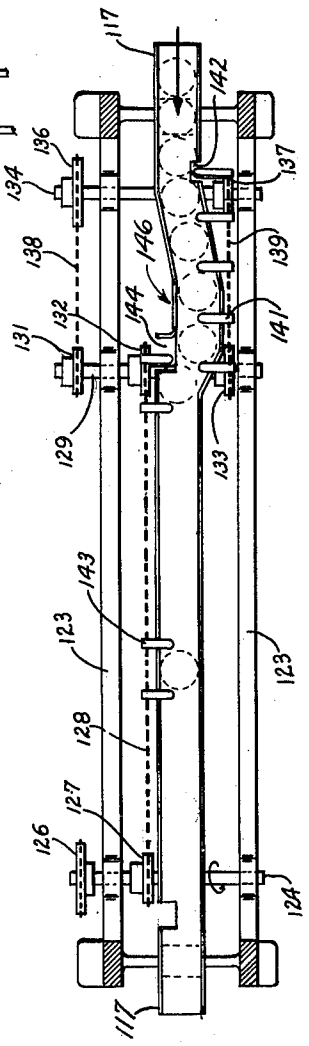


FIG. 3

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MACHINE FOR PACKING PRODUCTS

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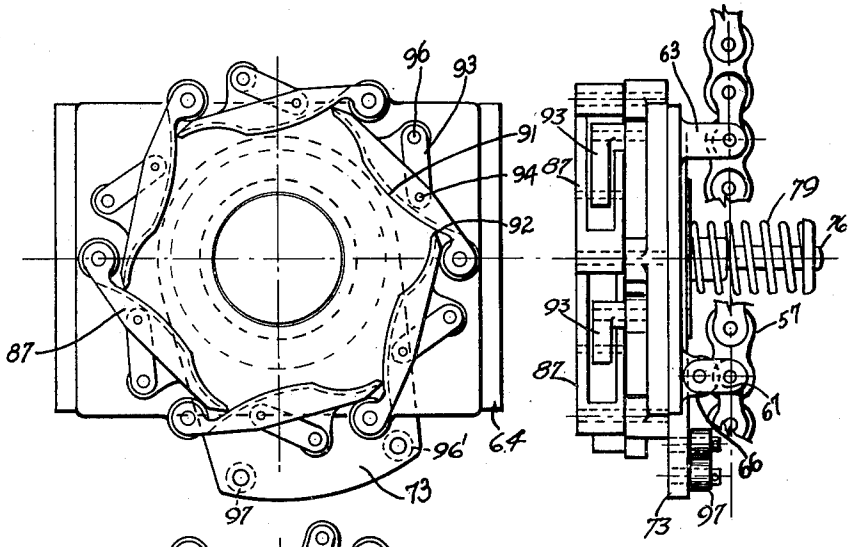


FIG. 8

FIG. 11

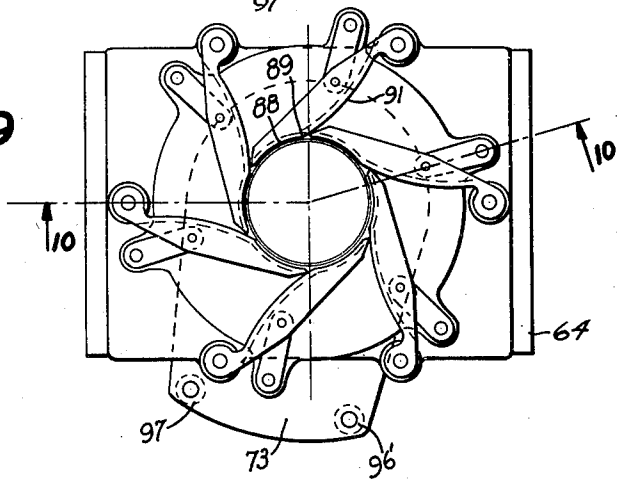


FIG. 9

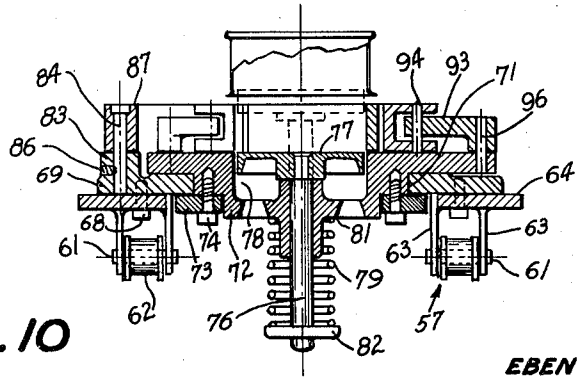


FIG. 10

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Patented July 5, 1949 2,475,422

UNITED STATES PATENT OFFICE

2,475,422

MACHINE FOR PACKING PRODUCTS

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Application April 17, 1944, Serial No. 531,491

16 Claims. (Cl. 226—101)

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My invention relates to a machine for packing articles, particularly articles of variable weight, in a container to the end that the total weight of the articles or material in the container may be substantially predetermined. Reference is made to my copending applications, Serial No. 398,460, filed June 17, 1941, and now abandoned; Serial No. 444,510, filed May 26, 1942, now Patent No. 2,470,916, dated May 24, 1949, and Serial No. 466,697, filed November 23, 1942, now Patent No. 2,434,607, dated Jan. 13, 1948. The apparatus of my invention has other uses but, for purposes of illustration, it will be described and has been originated primarily for use in the tuna packing industry.

The present practices in the tuna industry employed in packing the fish are both time consuming and expensive. The pre-cooked fish are carefully split lengthwise into their natural quarter sections. These sections are then, after being cleaned, sliced perpendicular to their lengths into pieces of a length somewhat less than the height of the can or other container into which they are to be packed. It will be appreciated since the tuna vary in size that the quartered sections vary in size and weight. Moreover, each fish varies in cross section from head to tail. These two factors, after quartering and slicing, result in pieces of tuna which although of uniform length vary greatly in size and weight.

The present hand method of packing tuna is entirely a hand labor operation requiring a large number of reasonably skilled operators. Moreover, the tuna is broken up by reason of excessive handling and fitting of the pieces during packing and these broken pieces must be sold at a substantial discount. In my copending applications, Serial Nos. 398,460 and 444,510, I have shown and described a method and apparatus for selectively packing products, in particular, tuna, wherein the articles are weighed and segregated into separate compartments in accordance with their weight. A plurality of pieces of tuna are then automatically selected from a plurality of the weight groups which will make up the predetermined weight desired to be placed in the container. Following this operation the container is filled with, for example, the three or four pieces selected. The present invention relates to the packing end of the machine of the above mentioned copending applications.

An object of my invention is to provide a machine for packing a plurality of articles in a can or other container.

Another object of my invention is to provide a

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machine for conforming and compacting a plurality of deformable articles into the shape of a can or other container into which they are to be packed and then transferring the shaped and compacted mass to a can or other container.

My invention further contemplates the provision of a machine comprising a compactor adapted to conform and shape a mass of materials so that it may be fitted within a can or other container and the provision of means for automatically transferring the compacted mass to the container while the mass and the cans are maintained in continuous motion.

Other objects and advantages of my invention will be 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 front elevation of the machine of my invention;

Fig. 2 is a top plan view thereof;

Fig. 3 is a plan view showing the mechanism for properly spacing and timing the flow of cans to the filling position;

Fig. 4 is a rear elevation of a portion of the machine showing a compactor head and a can substantially in filling position;

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

Fig. 6 is a view showing the chain or conveyor and the method employed for attaching the spacing elements for the cans and trays;

Fig. 7 is a side elevation of Fig. 6;

Fig. 8 is a top plan view of one of the compactor heads in expanded position;

Fig. 9 is a view of one of the compactor heads in contracted position;

Fig. 10 is a view taken substantially on the line 10—10 of Fig. 9;

Fig. 11 is a side elevation of the compactor head shown in Fig. 8.

In my prior application, Serial No. 444,510, I have shown a machine particularly suited to the packing of tuna which weighs the pieces of fish, sorts them into separate compartments in accordance with their weight and then selects a plurality of pieces whose combined weight is substantially equal to the desired weight of fish to be placed in a can or other container. The arrangement shown in that application also shows a conveyor for carrying the selected pieces to a can filling position and shows apparatus suitable for compacting the pieces and transferring them to the can or other container. The present ap-

plication is directed to improvements in the packing end of the machine shown in the above mentioned application.

The pieces of fish from the selecting mechanism are brought to the packing station by means of a conveyor, generally indicated by the numeral 11, on trays indicated at 12. While automatic means might be employed for transferring the contents of the trays to a compacting mechanism or chuck, generally indicated by the numeral 13, preferably for simplification of the machine an operator stands approximately in the position indicated by the numeral 14 and transfers the several pieces of fish from the trays to the compactor chuck 13. The empty trays then continue their travel along the conveyor 11 in the direction indicated by the arrow 16.

The compacting mechanism or chuck 13 is expansible and contractible in a manner presently to be described. In the position shown in Fig. 2, the compactor is in an expanded or open position in which condition the operator may conveniently transfer the pieces to the compactor by hand. The compactor is then contracted so as to conform the plurality of pieces of fish or other material to the shape and size of a can or other container in which the mass is to be packed.

The compactor is preferably continuously driven and during the course of its travel is inverted prior to its approach to the can filling position shown in Fig. 1. The cans are brought to the filling position by a conveyor, generally indicated by the numeral 17, in proper spaced relation with the compactor or chuck and in timed relation with the movements thereof. Suitable mechanism, presently to be described, is provided for transferring the compacted mass from the compactor heads or chucks to the cans.

The machine is driven by a driving element 18 which is driven by a prime mover in any suitable manner. The driving element 18 is mounted on a shaft 19 carried in the side bars of the main frame 21. Mounted on the end of the shaft is a sprocket 22 which drives the chain 23 of the conveyor 11. A shaft 24 is mounted at the other end of the machine and carries on one end thereof a sprocket 26 over which the chain 23 passes. In this manner the trays carrying the pieces of fish or other material are carried to the position for transfer of the pieces to the compactor or chuck.

The shaft 19 has also mounted thereon a sprocket 27 which drives a chain 28 through which a sprocket 29 loosely mounted on a shaft 31 is driven. The shaft 31 is carried by the frame and supports a clutch, generally indicated by the numeral 32, a gear 33 and a sprocket 34.

Means are provided for stopping the operations of the machine should an interruption in the proper flow of trays or cans occur. Such means comprise a stop arm 36 which extends across the machine in a position convenient for the operator to actuate without changing position. The stop arm is pivoted at 37 to the frame of the machine and has pivoted thereto at 38 an elongated rod 39. At the other end of the rod there is pivoted, as at 41, a bell crank 42 which is pivoted at 43 on the frame of the machine. The other arm of the bell crank is pivoted at 44 to a rod 46 which is pivoted at 47 to a clutch lever 48. The clutch lever 48 is pivoted adjacent its center with respect to one element of the clutch 32 and pivoted at its end to a rod 49 pivoted to the frame of the machine at 51.

Should any interruption in the proper flow of trays or cans occur or should the materials not

be properly compacted, the operator may throw the lever 36 to the right, as viewed in Fig. 2, to thereby through the above described mechanism disengage the clutch and stop the operation of the machine. It will, of course, be understood that the sprocket 29 and one element of the clutch 32 operate together and are loose with respect to the shaft 31 while the other element of the clutch 32 is splined and shiftable along the shaft 31 by means of the clutch lever 48.

The sprocket 34 is fixed to the shaft 31 and drives a chain 52 which drives a sprocket 53 fixed to a shaft 54 carried by the frame of the machine. Fixed to the shaft 54 are a pair of sprockets 56 which drive chains 57. The chains 57 drive sprockets 58 fixed to a shaft 59.

Mounted on pins 61 (Fig. 10) which extend through the links 62 of the chain 57 are arms 63 which are preferably rigidly connected to a plate 64. At the forward end of the plate 64 bosses 66 are provided to which are pivotally connected links 67 which are pivoted on the pins 61 of the chain 57. Thus the plate 64 is supported by and carried by both chains 57 through the arms 63 and links 67. The pivotal connection of the plate 64 to the links 67 allows for the shortening of the distance between the forward and rearward chain pins by which the plate is supported, as the chains wrap around the sprocket.

Fixed with respect to the plate 64 by means of screws 68 is a plate or support member 69. The plate 69 has a central opening 71 in which a member or actuating element, generally indicated by the numeral 72, is rotatable. A member 73 is bolted to the member 72, as indicated in the drawings at 74, and constitutes part of the actuating element 72. The member 73 overlaps the inner margin of the opening 71 in the plate 69. Thus the actuating element 72, 73 may be rotated in the opening 71 but is confined against upward or downward movement, as viewed in Fig. 10.

Centrally located with respect to the actuating element 72 is a bore for the reception of a plunger rod 76. Mounted on the plunger rod 76 is a plunger 77 which normally lies in a recess 78 formed in the actuating element 72. A spring 79 is confined between an enlargement 81 formed on the actuating element and a backing plate 82 fixed on the plunger rod. Upon actuation of the plunger rod the plunger is moved from the solid line position, shown in Fig. 10, to the dotted line position shown therein and is returned to normal position by the action of the spring 79.

The plate or support member 69 is provided with a plurality of bosses 83 which are provided with bores for the reception of pins 84 which are fixed in the bosses by means of set screws 86. Pivotally carried by each of the pins 84 is an arm or chuck finger 87. Any desired number of fingers may be provided. In the drawings I have shown six fingers, the pivot points of which are equidistant from a central axis.

Each of the fingers has an end portion 88 formed on the arc of a circle or rather cylinder. The arc of the cylinder upon which the end portions 88 are formed is such that when the fingers are shifted to their contracted position, as shown in Fig. 9, they form a circle or cylinder which is slightly smaller in diameter than the diameter of the can which the compacted mass of tuna is to occupy, as shown in Fig. 10. The arcs 88 terminate at 89 and from these points the fingers are preferably curved on arcs 91 each of which is, in the preferred form, the arc of a circle or cylinder, the radius of which is preferably equal to the dis-

tance between adjacent centers about which the fingers swing.

With the fingers curved, as above described, the point 92 of one finger maintains contact with the arc 91 of the adjacent finger throughout the movement of the fingers from the position shown in Fig. 8 to that shown in Fig. 9. This arrangement is extremely important particularly after compression of the material starts to take place. The tuna is readily deformable and when placed in the chuck or compacting element with the parts in the position shown in Fig. 8, an uninterrupted wall is maintained about the pieces. There are no openings in this wall in which the tuna may lodge. This continuous wall is maintained while the chuck is being contracted and preferably throughout the movement of the fingers from the position shown in Fig. 8 to that shown in Fig. 9. Moreover, the pieces of tuna are gradually compacted by pressure exerted on all sides so that the mass is uniformly compacted.

The fingers are actuated by means of links 93 which are pivoted to the fingers at 94 and pivoted at their opposite ends by means of pins 96 to the actuating element 72, 73. Thus a shifting of the actuating element 72, 73 from the position shown in Fig. 8 to that shown in Fig. 9 shifts the pivot points 96 in a clockwise direction as viewed in Fig. 8. This action exerts pressure on the fingers to pivot them against the resistance of the pieces of fish in the chuck.

Of particular importance is the fact that the links in moving from the position shown in Fig. 8 to that shown in Fig. 9 are shifted slightly past a dead center position. That is, the pivot point 96 moves around the pivot point 94 to a position slightly beyond a line drawn from the axial center of the chuck through the center of the pivot 94. Thus, when the fingers are in the position shown in Fig. 9, the mass is compacted and the fingers are locked in the position of the parts shown so that the pressure of the mass can not open it. This is a distinct advantage since during the course of travel of the chuck or compactor no means need be provided for holding the actuating element 72, 73 in the position shown in Fig. 9, since the links 93 serve to lock the chuck.

The projecting end of the actuating element 72, 73 is provided with a pair of rollers 96' and 97. These rollers are engaged by cams 98 and 99 which lie in the path of movement of the chuck or compactor (Fig. 2). As the chuck moves to the right, as shown in Fig. 2, the roller 96' engages the cam 98 and shifts the actuating element 72, 73 from the position shown in Fig. 8 to that shown in Fig. 9. With the mass compacted and the fingers locked in contracted position the chuck continues its movement and is inverted to the position shown in Fig. 1. After transfer of the material from the chuck to the can, the roller 97 engages the cam 99 so as to shift the actuating element 72, 73 from the position shown in Fig. 9 to the position shown in Fig. 8 and thereby open the chuck.

It will be noted when the chuck or compactor is open, the open area as shown in Fig. 2 is relatively large so that the operator has no difficulty in loading the chuck with loose pieces of fish. This is one of the major advantages of the chuck shown in the present application over that shown in my Patent No. 2,434,607. If the top of the chuck were open, as the chuck closed to compact the mass, there would be a tendency for the mass to bulge upward. To prevent this I have provided novel means for applying a cover to the

chuck which is adapted to travel with the chuck during the contraction thereof. This arrangement also maintains the top of the mass smooth and level so that the mass may be fitted into the can and the top surface of the mass make uniform contact with the bottom of the can.

For the purpose of accomplishing this I have provided on the end of the shaft 59, a cam 101 shown more clearly in Fig. 4. A roller 102 is mounted on the end of an arm 103 and is adapted to ride on the cam. The other end of the arm 103 is pivoted, as shown at 104, to a boss 106 provided on the frame. Pivoted between the ends of the arm 103, as shown at 107, is a rod 108.

The rod 108 (Fig. 5) extends upward through a bore formed in a cylindrical element 109 carried by the frame. A cylindrical element 111 is concentric with and rotatably supported on the cylindrical element 109. A spring 112 is interposed between the bottom of the cylindrical element 111 and a fixed part of the frame so as to normally urge the cylindrical element 111 in an upward direction. This upward force is transmitted to the rod 108 by means of a nut and washer assembly 113 which maintains the roller 102 in engagement with the cam 101. Rigid with the cylindrical element 111 is an arm 114 which carries at its outer end a disk or plate 116. The disk has a planular under surface and is of a diameter such as to cover the top of the chuck when the chuck is in the open position shown in Fig. 8.

The cylindrical element 111, arm 114 and plate 116 are free to rotate on the cylindrical element 109 and also to move upward and downward with respect thereto. In its normal position the plate 116 lies above the cam 98. The cam 101, since it is driven by the shaft 59, is rotated in timed relation with the movement of the chucks to the right, as viewed in Fig. 2.

When the chuck starts to close by reason of engagement of the roller 96' with the cam 98, the roller 102 rides up on the high point or lobe of the cam 101, thus bringing the plate 116 into engagement with the chuck and the top surface of the contents thereof against the action of the spring 112. The continued movement of the chuck by reason of the pressure engagement of the plate with the chuck, carries with it the plate which, as previously mentioned, is free to swing about the cylindrical element 109. Thus the pieces of fish or other contents of the chuck are confined at the bottom and top and pressure is applied from all sides to compress the materials into a compact mass.

When the parts are in approximately the position shown in Fig. 2 the chuck is fully closed and locked in the manner previously described. The roller 102 rides off the lobe of the cam 101 and the spring 112 lifts the plate off the chuck. The plate then swings clockwise, as viewed in Fig. 2, in position to receive the next chuck. The plate is swung for the reception of the next chuck by means of a spring 115 one end of which is attached to an arm secured to the arm 114 and the other end of which is attached to a fixed part of the frame (Fig. 2). A pair of stops 120 properly position the plate over the chuck.

The chucks mounted on the chain 57 are maintained in continuous motion as long as the clutch 32 is engaged. The chucks are spaced on the chain with equal spacing between them so that the chucks and the cans may be moved in timed relation with each other and the mass of material in the chuck transferred to the cans while motion is maintained. In Fig. 3 I have shown the mech-

anism for timing the movement of and spacing the cans so that a can and a chuck may move along, as viewed in Fig. 4, with their open ends facing and in alinement with each other.

The cans are brought to the machine by means of a chute or any suitable type of conveyor and enter a can track 117 in which they are spaced and timed. Referring to Fig. 2, the gear 33 drives a gear 118. The gear 118 is fixed to a shaft 119 which has rigidly secured thereto a sprocket 121 which drives a chain 122.

A frame 123 which carries the can track 117 also carries a shaft 124 having rigidly secured thereto sprockets 126 and 127 (Fig. 3). The chain 122 drives the sprocket 126 to thereby rotate the sprocket 127 which carries with it in a direction to the left, as viewed in Fig. 3, a chain 128. Carried by the frame 123 is a shaft 129 which has fixed thereto sprockets 131 and 132 and, loose with respect thereto, sprocket 133. The chain 128 drives the sprocket 132, shaft 129 and sprocket 131.

A third shaft 134 carried by the frame 123 has sprockets 136 and 137 fixed with respect thereto. A chain 138 drives the sprocket 136, shaft 134 and sprocket 137. A chain 139 is driven by sprocket 137 and drives the sprocket 133 loose on the shaft 129. The sprockets 131, 136 and 137 are of such size as to cause a speed reduction and thereby drive the chain 139 at a much slower speed although in timed relation to the speed of the chain 128.

Mounted on the chain 139 are a plurality of spaced pins or fingers 141 which serve to drive and space the cans as they are moved to the left. The can track is provided with a cut-out 142 to accommodate the fingers and permit them to raise and engage the sides of the can, as viewed in Fig. 3, and urge them along the can track. The chain 128 has a plurality of pins or fingers mounted thereon which are mounted in pairs. The fingers in the same pair are spaced apart approximately by amounts substantially that of the diameter of the can so that the cans are confined between the fingers and held in position. The can track has a cut-out 144 to accommodate the fingers and is provided with an offset, generally indicated at 146, to enable transfer of the cans from control by the fingers 141 to control by the fingers 143. It will, of course, be appreciated that the timed relation of the chains 139 and 128 is such that each can in turn is pushed by the fingers 141 into a space between a pair of fingers 143.

Each pair of fingers is spaced along the chain 128 in accordance with the spacing of the chucks. Since the chains 128 and 57 are driven at the same speed the cans and chucks move along as shown in Fig. 1 with their open ends facing each other in superimposed relation. Carried by a boss 147 mounted on the main frame of the machine is an arm 148 which constitutes a cam element. The cam element 148 is pivoted to the boss at 149 and has adjacent its opposite end a pivoted link 151. The link 151 is pivoted to an arm 152 and is connected to a hand lever 153 pivoted on the frame at 154.

Upon actuating the hand lever 153 the arm or cam element 148 may be raised so as not to be in a position to actuate the plunger in the manner shown in Fig. 4. This permits the operator to stop the transfer of the material from the chuck to the can in case a can should jam under the plunger. The arrangement shown also permits an adjustment of the cam with respect to the plunger so as to adjust the amount of depression of the plunger.

It will now be clear that as the chuck or compactor moves to the right as viewed in Fig. 4, a can is carried along by the fingers 143 in phase and in synchronism therewith. The open end of the chuck is in superimposed facing relation with the open end of the can. As the chuck travels to the right the plunger rod 76 engages the cam 148 and the plunger 77 forces the mass while in a compacted and conformed condition out of the chuck and into the can as illustrated in dotted lines in Fig. 10. After the chuck is emptied it is opened by engagement with the cam 99 ready to receive another charge of pieces of tuna. The filled cans continue their travel along the can track to other stations, which form no part of my present invention, where, for example, oil may be added to the can.

Referring now to Fig. 2 after the contents of the trays have been transferred to the chuck or compactor 13 they are urged to the right by the chain 23. Novel mechanism is provided for discharging the trays from the conveyor 11 in timed relation with the movements of the chuck. For this purpose the shaft 59 is provided with a sprocket 161 which drives a sprocket 162 fixed to a shaft 163. The shaft 163 is carried by the frame and has rigidly secured thereto a sprocket 164 which drives a chain 166. The chain 166 passes over a sprocket 167 mounted on a shaft 168 carried by the main frame. Pins or fingers 169 are carried by the chain and as the chain is rotated they are adapted to engage the trays as illustrated in Fig. 2, a cut-out 171 being provided in the conveyor to accommodate the fingers. The conveyor is offset as shown at 172 to facilitate the transfer of movement of the trays from the chain 23 to the fingers 169.

The fingers 169 by proper selection of the sprockets which drive the chain 166 are synchronized in speed with the movements of the chucks so that assuming the machine is set up for the selection of three pieces to make up the desired weight three trays are discharged from the conveyor 11 as each chuck passes the chuck filling station 14.

In starting the machine the operator fills up part of the conveyor 11 with empty trays to establish a stop of empty trays approximately in the position shown in Fig. 2. This position is the most convenient position for the operator to empty the contents of the filled trays into the chuck. The chain 23 runs at a higher speed than the discharge speed of the trays from the conveyor 11 and for this reason is constantly bunching the trays toward the right hand end of the conveyor. At times the conveyor may be filled with full trays from the station 14 to the left, as viewed in Fig. 2, but the three trays the operator is emptying will remain in substantially fixed relation with the chuck the operator is filling. As each chuck passes the operator, the tray discharge timing fingers allows three trays to pass (assuming that the selecting mechanism described in the above mentioned application is set for the selection of three pieces of tuna to make up the desired weight).

The fingers 141 and 169 are attached to the chains in the manner illustrated in Figs. 6 and 7. The fingers are riveted, as illustrated, to special side plates which are part of the chain and well known in the chain art.

It is believed that the operation of the machine is clear from the foregoing so that no further

explanation thereof is necessary. It will, of course, be appreciated that the machine shown herein is timed with relation to the speed of selection of the pieces as illustrated in the above mentioned applications.

While I have shown and described the preferred form of my invention, it will be appreciated that various changes and modifications may be made therein; that, in particular, changes may be required, for example, if the material to be packed is different; or if the number of pieces selected to make up the predetermined weight is varied. The invention is, therefore, not limited to the apparatus shown but includes apparatus falling within the scope of the appended claims.

I claim:

1. A machine for packing materials in a series of container elements comprising, in combination, a series of holding elements each having a flat bottom wall and an open end which is uppermost when the materials are placed in the holding elements, means for moving the holding elements, means for moving the container elements with their open ends uppermost, means for turning one of said series of elements upside-down so that the open ends of the two series of elements face each other, the means for moving the holding elements and the means for moving the container elements being coordinated so that the holding elements and the container elements are opposite each other and move in synchronism, and means for transferring the material from the holding elements through the open ends thereof into the container elements.

2. A machine for packing materials in containers comprising, in combination, holding elements, each having a flat bottom wall and an open end which is uppermost when the materials are placed in the holding elements, means for moving the holding elements, means for moving the containers with their open ends uppermost, means for turning the holding elements upside-down after the material has been placed therein, the means for moving the holding elements and the means for moving the containers being coordinated so that the holding elements and the containers are opposite each other and move in synchronism, and means for transferring the material from the holding elements through the open ends thereof into the containers.

3. A machine for packing materials in containers comprising, in combination, holding elements, each having a flat bottom wall and an open end which is uppermost when the materials are placed in the holding elements, means for contracting the holding elements, means for covering the holding elements during their contraction, means for moving the holding elements, means for moving the containers with their open ends uppermost, means for turning the holding elements upsidedown after the material has been placed therein, the means for moving the holding elements and the means for moving the containers being coordinated so that the holding elements and the containers are opposite each other and move in synchronism, and means for transferring the material from the holding elements through the open ends thereof into the containers.

4. A machine for packing materials in a container comprising, in combination, expansible and contractible holding means for containing the materials to be packed, means for expanding and contracting the holding means while the entire holding means is maintained in motion, means movable with the holding means for locking the holding means in contracted position, means for moving a container in synchronism and in alignment with the holding means, and means for transferring the materials from the holding means into the container while both are maintained in motion.

5. A machine for packing materials in a container comprising, in combination, expansible and contractible holding means, said holding means having an open end extending upward for the reception of the materials to be packed, means for locking the holding means in contracted position, means for moving the entire holding means and reversing its position so that the open end extends downward, means for moving a container in synchronism and alignment with the holding means with the open end thereof facing the open end of the holding means, and means for transferring the materials from the holding means to the container while both are maintained in motion.

6. A machine for packing materials in a container comprising, in combination, expansible and contractible holding means, said holding means having an open end for the reception of the materials to be packed when the holding means is expanded, means for closing said open end during the contraction of said holding means, and means for maintaining the entire holding means and the closing means in motion while the holding means is being contracted.

7. A machine for packing materials in a container comprising, in combination, expansible and contractible holding means, said holding means having an open end for the reception of the materials to be packed when the holding means is expanded, means for moving the holding means, means for contracting the holding means movable with the holding means while the entire holding means is maintained in motion, means for locking the holding means in contracted position, means for transferring the material to a container while motion of the holding means is maintained, and means for expanding the holding means after transfer has taken place and while motion of the holding means is maintained.

8. An expansible and contractible device comprising, in combination, a plurality of elements having fixed pivots, a member upon which said elements are mounted, actuating means for swinging said elements about said pivots, means comprising a cam for shifting said actuating means to one position, means for locking said actuating means in said position, and means comprising a second cam for unlocking said actuating means and shifting said actuating means to another position.

9. An expansible and contractible device for compacting materials comprising, in combination, a support, a plurality of fingers pivoted on said support, each of said fingers having a free end a portion of which is curved on the arc of a circle and a second curved portion adjacent said pivot, means for moving said fingers to and from a contracted position with the free end of one finger substantially contacting the second curved portion of the adjacent finger comprising an arm pivoted on each of said fingers, and an actuating element to which said arms are pivotally connected, the curved ends of said fingers when contracted forming a circle encompassing the materials to be compacted.

10. A machine for packing materials in a container comprising, in combination, an expansible

and contractible device having an open end for containing the materials to be packed, means for moving said device, means for closing said open end during the contraction of said device comprising a plate, means for moving said plate upward and downward into and out of contact with said device, and means for moving said plate with said device during a portion of the travel of said device so that the plate is maintained in covering relation with said device during the contraction thereof.

11. An expansible and contractible device for compacting materials comprising, in combination, a support, a plurality of fingers having fixed pivots on said support, each of said fingers having a free end, a portion of which is curved on the arc of a circle and a second configurated portion adjacent said pivot, and means for moving said fingers to and from a contracted position with the free end of one finger at all times being in substantially contiguous but moving relation to the configurated portion of the adjacent finger.

12. An expansible and contractible device for compacting materials comprising, in combination, a support, a plurality of fingers having fixed pivots on said support, said fingers being arranged about a central axis to form a complete enclosure about said axis, each of said fingers having a free end, a portion of which is curved on the arc of a circle and a second configurated portion adjacent said pivot, and means for moving said fingers to and from a contracted position with the free end of one finger at all times in substantially contiguous but moving relation to the configurated portion of the adjacent finger so that during the entire movement of said fingers to and from a contracted position said axis is enclosed.

13. An expansible and contractible device for compacting materials comprising, in combination, a support, a plurality of fingers having fixed pivots on said support, said fingers being arranged about a central axis to form a complete enclosure about said axis, each of said fingers having a free end, a portion of which is curved on the arc of a circle and a second configurated portion adjacent said pivot, and means for moving said fingers to and from a contracted position with the free end of one finger at all times in substantially contiguous but moving relation to the configurated portion of the adjacent finger so that during the entire movement of said fingers to and from a contracted position said axis is enclosed, said means including a link pivotly connected to each of said fingers and an actuating member to which each of said links is pivoted.

14. An expansible and contractible device comprising, in combination, a plurality of elements having fixed pivots, a member having an opening upon which said elements are mounted, a cylindrical plunger closing said opening, actuating means for swinging said elements about said pivots, said elements being shaped and arranged so that when swung inward they form a cylinder in alignment with said plunger, means comprising, a cam for shifting said actuating means to one position, means for locking said actuating means in said position, and means comprising a second cam for unlocking said actuating means and shifting said actuating means to another position.

15. An expansible and contractible device for compacting materials comprising, in combination, a support, a plurality of fingers having fixed pivots on said support, said pivots being equally spaced about a central axis and the fingers forming a complete enclosure about said axis, each of said fingers having a free end, a portion of which is curved on the arc of a circle and a second portion toward said pivot which is curved on the arc of a circle the radius of which is substantially equal to the distance between two adjacent pivot points, and means for moving said fingers to and from a contracted position with the free end of one finger at all times being in substantially contiguous but moving relation to the second curved portion of the adjacent finger so that during the entire movement of said fingers to and from a contracted position said axis is enclosed, said means including a link pivotly connected to each of said fingers and an actuating member to which each of said links is pivoted.

16. An expansible and contractible device for compacting materials comprising, in combination, a support, a plurality of fingers having fixed pivots on said support, said pivots being equally spaced about a central axis and the fingers forming a complete enclosure about said axis, each of said fingers having a free end, a portion of which is curved on the arc of a circle and a second portion toward said pivot which is curved on the arc of a circle the radius of which is substantially equal to the distance between two adjacent pivot points, and means for moving said fingers to and from a contracted position with the free end of one finger at all times being in substantially contiguous but moving relation to the second curved portion of the adjacent finger so that during the entire movement of said fingers to and from a contracted position said axis is enclosed.

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