Aug. 8, 1950 A. L. CHRISTIANSEN 2,518,223

CAN PACKING MACHINE

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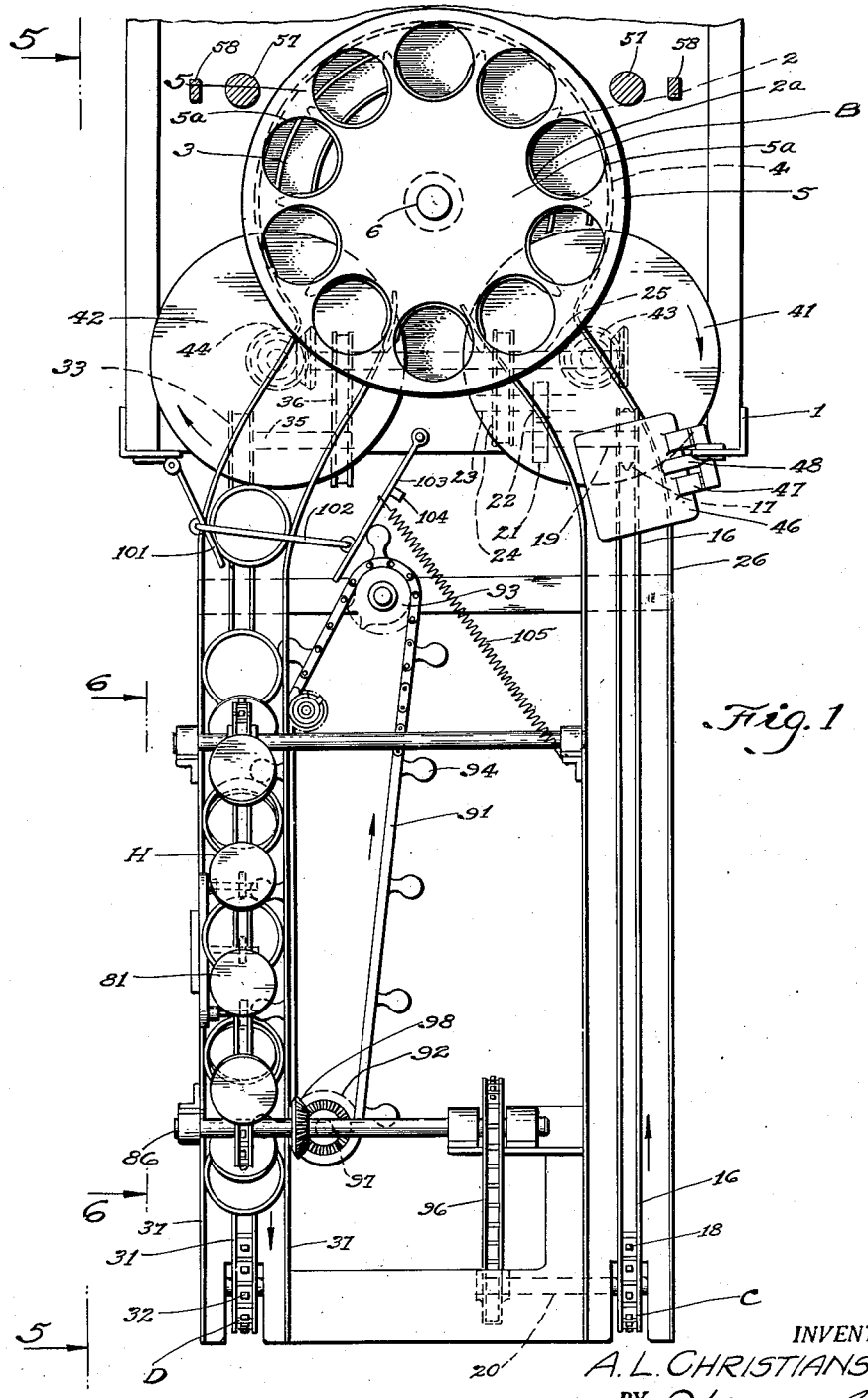


Fig. 1

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Fig. 2

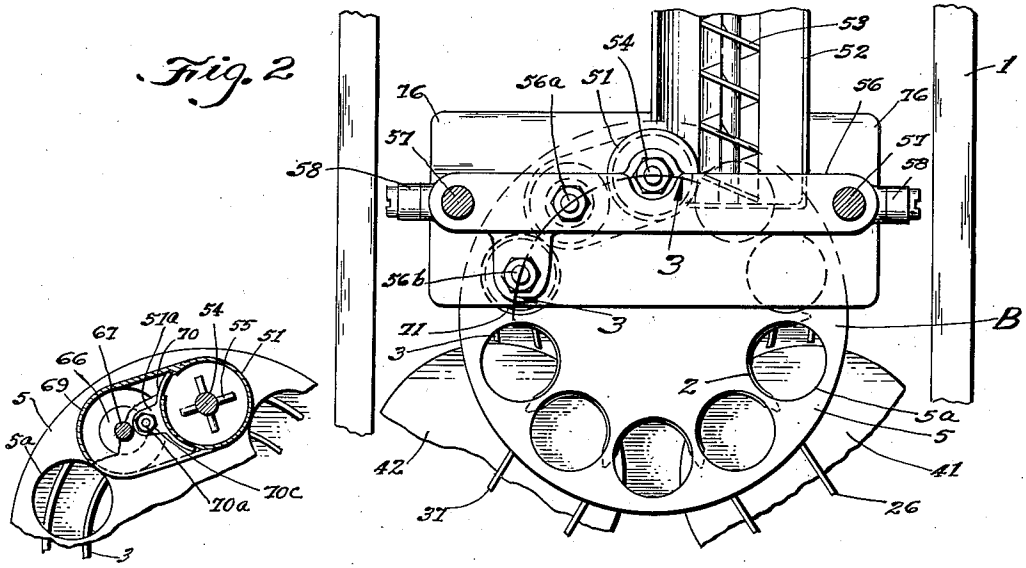


Fig. 4

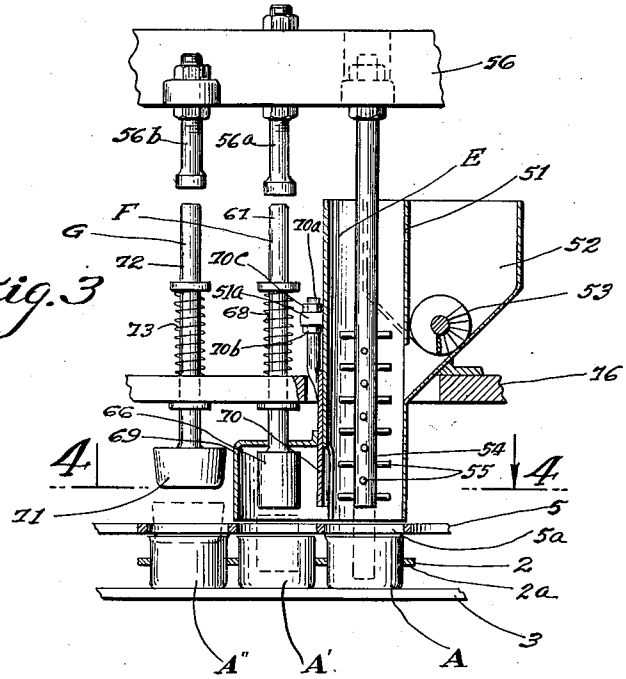


Fig. 3

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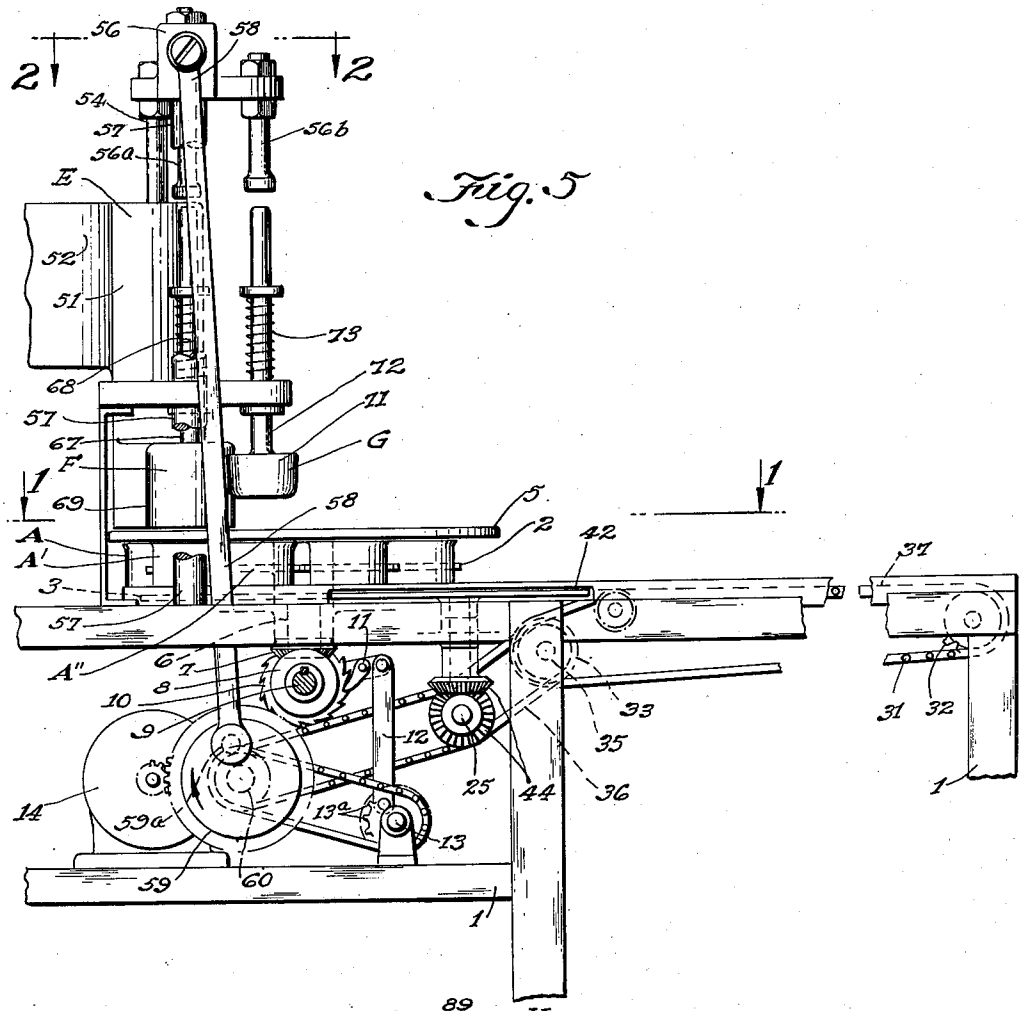


Fig. 5

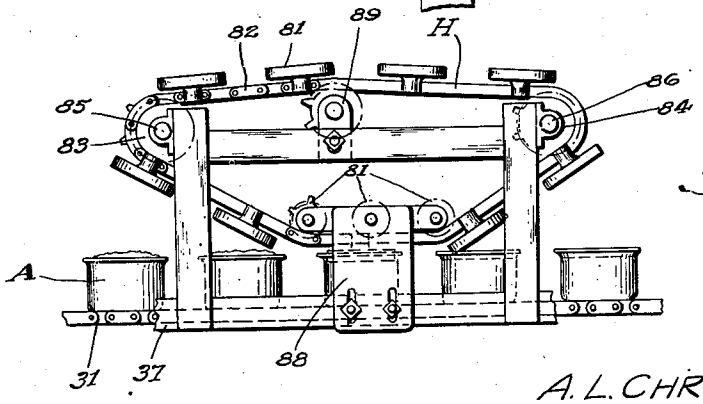


Fig. 6.

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UNITED STATES PATENT OFFICE

2,518,223

CAN PACKING MACHINE

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Application December 4, 1945, Serial No. 632,717

10 Claims. (Cl. 226—71)

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This invention relates to a can packing machine and particularly to improvements over my former U. S. Patent No. 2,274,606, issued February 24, 1942.

One of the principal objects of such improvements is the provision of a machine for packing equal amounts or weights of fish flakes or other products of various consistencies or specific gravity, that is, primarily products containing different amounts of moisture, oil, or other liquid contents.

Another important object of this invention is to provide a packing machine of this class which may be easily adjusted for packing products of such varying moisture, oil, or other liquid content.

An important object also of this invention is to provide a novel and efficient means and method of filling cans and packing the product thereinto.

A further important object of this invention is to provide efficient means of feeding fish flakes, or other similar products, into cans from a continuous supply of such product.

A still further important object of this invention is to provide efficient means for pressing the product into cans so that the product will remain packed, to provide a space for or to facilitate the addition of oil, liquid seasoning, or the like, a specific feature of the invention being the gradual compressing of the product within the can and holding the product for a predetermined period in such pressed condition.

An object of this invention is the provision of a novel means of carrying out the aforementioned functions.

An important object also is the provision of novel and efficient means of conveying open top cans through a filling and product compressing stage.

With these and other objects in view, as will appear hereinafter, I have devised a can packing machine having certain novel features of construction, combination, and arrangement of parts and portions, as will be hereinafter described in detail and particularly set forth in the appended claims, reference being had to the accompanying drawings, and to the characters of reference thereon, which form a part of this application, in which:

Fig. 1 is a fragmentary sectional view in plan of my can packing machine in a preferred form, with the section taken through 1—1 of Fig. 5;

Fig. 2 is another fragmentary sectional view in plan, taken through 2—2 of Fig. 5, showing the principal can packing portion of my machine;

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Fig. 3 is a fragmentary sectional elevational view thereof, taken through 3—3 of Fig. 2;

Fig. 4 is a fragmentary sectional view thereof, in plan, taken through 4—4 of Fig. 3;

Fig. 5 is a fragmentary elevational view thereof, taken at 5—5 of Fig. 1; and

Fig. 6 is a fragmentary elevational view thereof, taken at 6—6 of Fig. 1.

The machine, shown in the drawings, is particularly designed for packing tuna fish flakes into tin cans. The flakes are packed into the cans, designated A, while being carried on a conveyor means B. Empty cans are fed continuously to the conveyor means B from the conveyor C, and are discharged from the former to a conveyor D. All of the former are carried on a frame 1.

The conveyor means B consists of a rotating star wheel 2 rotatable on a vertical axis, on the frame 1, over a circular track 3 and within a can-retaining and guide rail 4. Above the star wheel and coaxial therewith is a disc 5 which serves as a product cut-off or leveling member, as will be described hereafter. The disc 5 has holes 5a, in line with the peripheral spaced openings 2a in the star wheel.

Both the star wheel 2 and the disc 5 are mounted at the upper end of a vertical shaft 6 which is connected by bevel gears 7 and 8 to a horizontal shaft 9. This shaft 9 has a ratchet 10 which intermittently rotates the shaft 9, and, therefore, the shaft 6 and the conveyor means B. The ratchet is intermittently rotated by a pawl 11 which is oscillated by a link 12 connected to a crank or eccentric disc 13a on a shaft 13 rotated in any suitable manner by a motor 14.

The conveyor C comprises a chain 16 positioned at one side of the frame 1. It extends around sprockets 17 and 18 mounted respectively on shafts 19 and 20 positioned respectively near the middle portion and outer end of the frame 1. The shaft 19 is connected by gears 21 and 22 to a shaft 23 connected by a chain drive 24 to a drive shaft 25, connected in any suitable manner to the motor.

The upper run of the chain 16 rides in a trough of the frame, and has guide rails 26 for guiding the cans thereon toward the conveyor means B.

The discharge conveyor D comprises a chain 31 positioned at the opposite side of the frame 1. This chain extends around sprockets 32 and 33. The latter is mounted on a shaft 35 which is connected, by a chain drive 36, to the drive shaft 25.

The upper run of the chain 31 of the conveyor

D also rides in a trough at the upper portion of the frame, this trough having guide rails 37 at its opposite sides.

The cans are transferred from the feed conveyor C by a turntable 41 to the conveyor means B. The cans on leaving the conveyor means B are transferred by another turntable 42 to the discharge conveyor D. Portions of each of the turntables 41 and 42 are positioned respectively over the chains 16 and 31 of the feed and discharge conveyors, and other portions thereof extend into the conveyor means B, as shown best in Fig. 1. The upper surfaces of both turntables 41 and 42 are located coplanar with the rails of the track 3, the ends of the rails terminating at the edge of the turnables. The outer of the guide rails 26 merges in a gradual curve with the guide rail 4 of the conveyor means B, and likewise the latter guide rail merges with the outer of the guide rails 37 of the discharge conveyor D. The inner member of the rails 26 and 37 extend into the conveyor means B to facilitate the direction of the cans into and from said conveyor means, substantially as shown in Fig. 1.

The turntables 41 and 42 are rotated in the directions of the arrows shown thereon, by means of sets of miter gears 43 and 44 which connect the shafts of such turntables directly to the drive shaft 25.

Further to facilitate the transfer of cans from the chain 16 of the conveyor C to the turntable 41, and to reduce vibration to a minimum, I have provided a plate 46 located to ride on the cans on both of these elements. This plate is hinged at 47 on the frame 1, and is held in a downward position by spring means 48.

On the frame 1 and above the conveyor means B are located a plurality of units E, F, and G, which are arranged axially above three consecutive openings 5a in the cutter or leveling disc 5 when the latter is at rest, for operating simultaneously on three cans carried by the conveyor means B and positioned respectively below the corresponding openings 5a. These units E, F, and G are referred to respectively as feeding, partial compressing, and compressing units.

The feeding unit E has a vertical cylinder 51 which extends upwardly from one of the openings 5a, when the conveyor means B is in one of its intermittent or rest positions. The cylinder 51 is substantially of the diameter of the open end of the cans A to be packed. The lower edge of the cylinder is positioned contiguous to the disc 5 with only such clearance as to allow the disc 5 freely to be rotated. To the upper portion of the cylinder 5 is connected a hopper 52 which is adapted to contain the product to be packed into the cans. In this hopper may be arranged any suitable means, such as a screw 53, for continuously feeding the product into the cylinder. A hopper and feeding means in connection therewith is disclosed in my former patent for Can Packing Machines, No. 2,272,606.

The downward feeding of the product in the cylinder 51 is facilitated by a vertically reciprocating plunger 54 which extends axially through the cylinder and into the upper portion of the can A. The lower portion of the plunger 54 is provided with transverse fingers 55 which agitate the product in the cylinder 51 so that the same may flow freely and readily fill the can.

The plunger 54 is carried by a vertically reciprocating cross-head 56 mounted on vertical guides 57.

As shown in the drawings, the cross-head is

reciprocated by links 58 which are connected at their lower ends to crank portions 59a of eccentric discs 59. These eccentric discs are mounted on a shaft 60 which is also operatably connected to the motor 14.

In the following position of the can, moved by the intermittent conveyor means B, as indicated by A', the product is partially packed into the can by a plunger 66 which is of considerably smaller diameter than that of the can and therefore only partially packs the product thereinto. This plunger is carried at the lower end of a rod 67 which is reciprocally mounted in a vertical direction on a horizontal support 76 carried by the frame 1. This rod 67, and therefore the plunger 66, is normally urged in a raised or receded position by a spring 68. The upper end of the rod 67 is adapted to be engaged by a tappet 56a adjustably carried by the crosshead 56. Thus the plunger 66 is periodically forced downwardly in synchronism with the intermittent movement of the conveyor means B.

The plunger 66 is enclosed by a partially cylindrical enclosure 69 of a diameter substantially smaller than the diameter of the can A. The enclosure 69 is secured at and communicates with one side of the lower portion of the cylinder 51, and the lower edge thereof is coplanar with the lower edge of the cylinder 51 so as to provide only sufficient clearance to permit the disc 5 to rotate. The wall between the lower portion of the cylinder 51 and the enclosure 69 consists of a gate 70 which is vertically adjustable so as to raise the lower edge of the gate above the lower edge of the feed cylinder 51 for allowing varying amount of product to be carried from the cylinder 51 into the enclosure 69 by the rotating disc 5. The vertical adjustment of the gate 70 may be provided by an upwardly extending stem 70a and nuts 70b and 70c which engage the upper and lower sides of a laterally extending lug 51a of the cylinder 51.

The vertical adjustment of the gate is provided to compensate for packing products of varying densities or consistencies by varying the amount of the product which may be packed into each can.

In order to force the product wholly within the can which is to be discharged from the conveyor means B without spilling the portion of the product extending above the top of the can, I have provided the compressing means G. This means operates upon a can A'', in the following or next successive position of the can on the conveyor B. The compressing means G also has a plunger 71 mounted at the lower end of a rod 72. This rod is also reciprocally mounted in a vertical direction on the horizontal support 76, and is normally urged in a raised or receded position by a spring 73. The upper end of the rod 72 is adapted to be engaged by another tappet 56b also adjustably carried by the crosshead 56. But in this instance, the plunger 71 is substantially of the diameter of the can opening so that substantially all of the product on the level with the top of the disc 5 is forced downwardly through the corresponding opening 5a into and below the top of the can indicated by A''.

Although the product is forced below the top of the can, certain products, such as fish flakes, and the like, are of such a nature that they do not remain compressed. The compressing means G is provided in this instance only to permit the

cans A on the conveyor means B to be discharged to the next stage.

As shown in the drawings, the movement of the disc 5 relative to the lower edge of the cylinder 51 and the enclosure 69 provides a cutting means for levelling off the product to be packed into the cans even with the top of the disc. The gate 70 allows an additional amount of product to be supplied above the can, and the partial compressing means 66 permits enough product to be packed into the can so that as the can is moved from the position A' to A'', the lower edge of the enclosure 69 cuts or levels off the product so that the desired amount of product is supplied to the can.

As shown in the drawings, the hopper 52 and the cylinder 51 are carried by the support 76 which also supports the rods 67 and 72 and the springs 68 and 73.

As stated above, the compressing unit G merely packs the product into the can so as to permit the can to be discharged from the conveyor means B and fed to the next stage. The next stage is the final product compressing means, which compresses the product below the upper open end of the can so as to permit the addition of substances, such as oily sauce, and the like, to the packed product. This final compressing means, designated H, is arranged in connection with and is located above the chain 31 of the discharge conveyor D.

The unit consists of a plurality of compressing discs 81 which are only slightly smaller than the diameter of the opening of the can, and they are carried by a continuous link belt 82. These compressing discs 81 are synchronized with the cans A carried on the conveyor chain 31. As shown, the link belt 82 extends over sprockets 83 and 84 which are mounted on shafts 85 and 86, respectively. On a plane below these sprockets is a series of smaller sprockets 87 which definitely locate the compressing discs 81, carried by the lower run of link belt 82, so as to compress the product to a predetermined level within the cans A. The chain locating sprockets 87 are carried by a bracket 88 which is adjustably supported at the side of the conveyor D, such as on the outer guide rail 37, as indicated in Figs. 1 and 2 of the drawings. The vertical adjustment of the compressing discs 81 in the lower run of the link belt 82 is compensated for by an idler sprocket 89 over which rides the upper run of the link belt 82.

The cans on the conveyor chain 31 are located in proper spaced relation, or synchronized with the packing discs 81 of the unit H, by another continuous link belt 91. This belt extends around sprockets 92 and 93. It is provided with a plurality of can spacers or lugs 94 which extend considerable distances from the main portion of the belt. These spacers 94 are directed into the path of the cans on the discharge conveyor D in such a manner as to receive only one can between adjacent spacers. The cans are moved in the discharge conveyor D by the spacers themselves. In this manner, the spacers force successive cans, as they are discharged from the turntable 42, in line with the compressing discs 81.

As shown in the drawings, the shaft 86 is connected by a chain drive 96 to the shaft 20 which is operated by the chain 16 of the feed conveyor C. The sprocket 92 for the spacing conveyor 91 is mounted on a shaft 97 which is operatively connected through a set of miter gears 98 to the shaft 86.

In order to regulate the feed of cans from the turntable 42 to the discharge conveyor D I have provided a dog 101 which is pivoted on the frame 1. This dog, which extends with its free end into the path of the cans on the discharge conveyor, is connected by a link 102 to a pivoted arm 103 which is normally held against a stop 104 by a spring 105. In this position, the arm 103 is held in the path of the moving spacers or lugs 94 of the can spacing conveyor 91. This mechanism forces the dog 101 periodically to be withdrawn and permits one can at a time to be fed to conveyor chains 31 of the discharge conveyor D, and as the cans are moved thereby, they are positively engaged by the spacers or lugs 94 and fed thereby into the final compressing stage.

Though I have shown and described a particular construction, combination, and arrangement of parts and portions, I do not wish to be limited to the same, but desire to include in the scope of my invention, the construction, combination, and arrangement, substantially as set forth in the appended claims.

I claim:

1. In a machine of the class described, an open-can conveyor, means for feeding a product into the can on the conveyor, means for partially compressing the product into the can, means for cutting the product above the can, and means for compressing the product, after being cut, into and substantially flush with the top of the can, the feeding and both compressing means operating substantially simultaneously in association with different cans on the conveyor.

2. In a machine of the class described, a can conveyor adapted to convey cans in spaced relation, means for causing a stream of a product to be fed toward the path of the cans, means for directing the product from the feeding means into a can when the can is moved by the conveyor into the stream of the product, means for partially compressing the product into the can, other means for compressing the product into, and substantially flush with, the top of the can, the three latter means being synchronized with the conveyor and operable simultaneously with respect to successively arranged cans on the conveyor.

3. In a machine of the class described, a moving open-can conveyor, a chute extending above the conveyor for feeding a product into a can on the conveyor, the chute having a vertically adjustable side wall for leveling off the product in the can at a predetermined height above the can as the can is advanced by the conveyor, and means for compressing the product into the can.

4. In a machine of the class described, a moving open-can conveyor, a chute extending above the conveyor for feeding a product into a can on the conveyor, the chute having a vertically adjustable side wall for leveling off the product in the can at a predetermined height above the can as the can is advanced by the conveyor, means for compressing the product into the can, and an enclosure for the compressing means, the lower end of the enclosure leveling off the product below the first mentioned level by further advance of the can by the conveyor.

5. In a machine of the class described, an open-can conveyor adapted to convey cans with open upper ends, a cutting means positioned above and movable with the conveyor and provided with

spaced openings below which the cans on the conveyor are positioned, a chute extending above the cutting means for feeding a product through an opening of the cutting means into the open can in line therewith and carried by the conveyor, the chute having a vertically adjustable side wall for leveling off the product in the can at a predetermined height above the cutting means as the can is advanced by the conveyor, means for compressing the product into the can, an enclosure for the compressing means, the lower end of the enclosure being positioned contiguous to the top of the cutting means for leveling off the product immediately below the bottom edge of the enclosure by further advance of the can by the conveyor.

6. In a machine of the class described, means for supporting moving cans, and means for compressing and holding a product compressed a short period within and below the top of the cans, the compressing means comprising a plurality of pressing members synchronized with the movement of the cans, each of the compressing members being so constructed and arranged as to enter in sequence the moving cans and movable therewith in such depressed condition and again removing the compressing members from the cans.

7. In a machine of the class described, means for conveying cans, and means for compressing and holding the product compressed a short period within and below the top of the can, said compressing means comprising a conveyor positioned above and synchronized with the moving cans on the conveying means, and compressing devices on the conveyor and movable thereby, each of the compressing devices on the lower run of the conveyor being so arranged as to enter one of the moving cans and movable by the conveyor with such can, said compressing devices being sequentially raised by the conveyor and thereby removed from such cans.

8. In a machine of the class described, a conveyor means for intermittently feeding open end cans successively in a predetermined path to a plurality of stations, means at the first of said stations for introducing an excessive amount of a product into each can so as to over-fill the same, means at the next station for partially compressing the product into each can, means at the next station for removing a portion of the product projecting above each can, and means at the next station movable with each filled can for subsequently compressing the remaining product into and substantially flush with the open top of each can.

9. In a machine of the class described, a conveyor means for intermittently feeding open end cans successively in a predetermined path to a plurality of stations, means at the first of said stations for introducing an excessive amount of a product into each can so as to over-fill the same, means at the next station for partially compressing the product into each can, means at the next station for removing a portion of the product projecting above each can, and means at the next station movable with each filled can for subsequently compressing the remaining product into and substantially flush with the open top of each can and for maintaining the product in its compressed state for a predetermined period of time.

10. In a machine of the class described, a conveyor means for intermittently feeding open end cans successively in a predetermined path to a plurality of stations, means at the first of said stations for introducing an excessive amount of a product into each can so as to over-fill the same, means at the next station for partially compressing the product into each can, means at the next station for removing a portion of the product projecting above each can, and means at the next station movable with each filled can for subsequently compressing the remaining product into and below the open top of each can for a predetermined period of time.

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