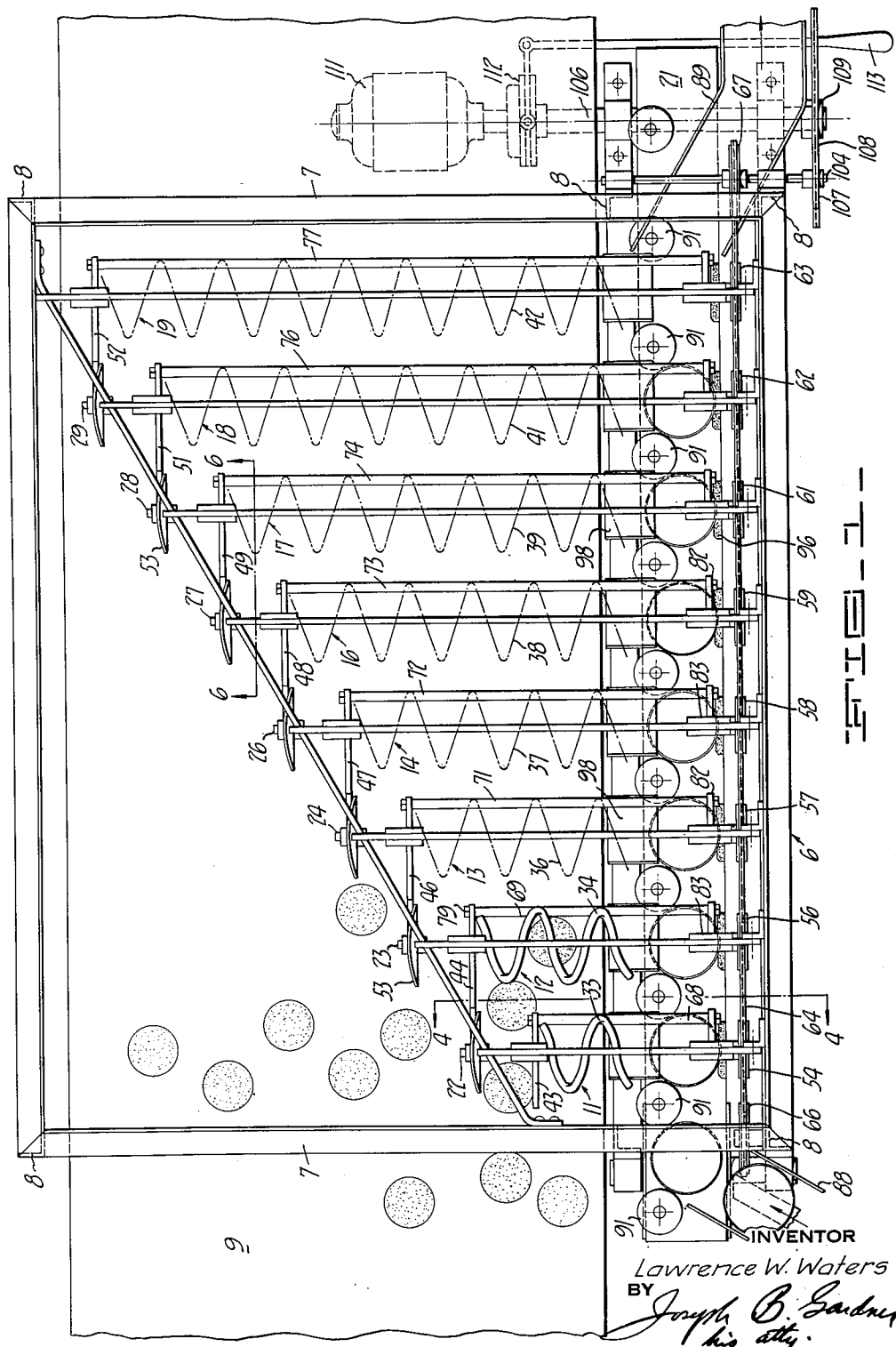


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3 Sheets-Sheet 1



Aug. 3, 1943.

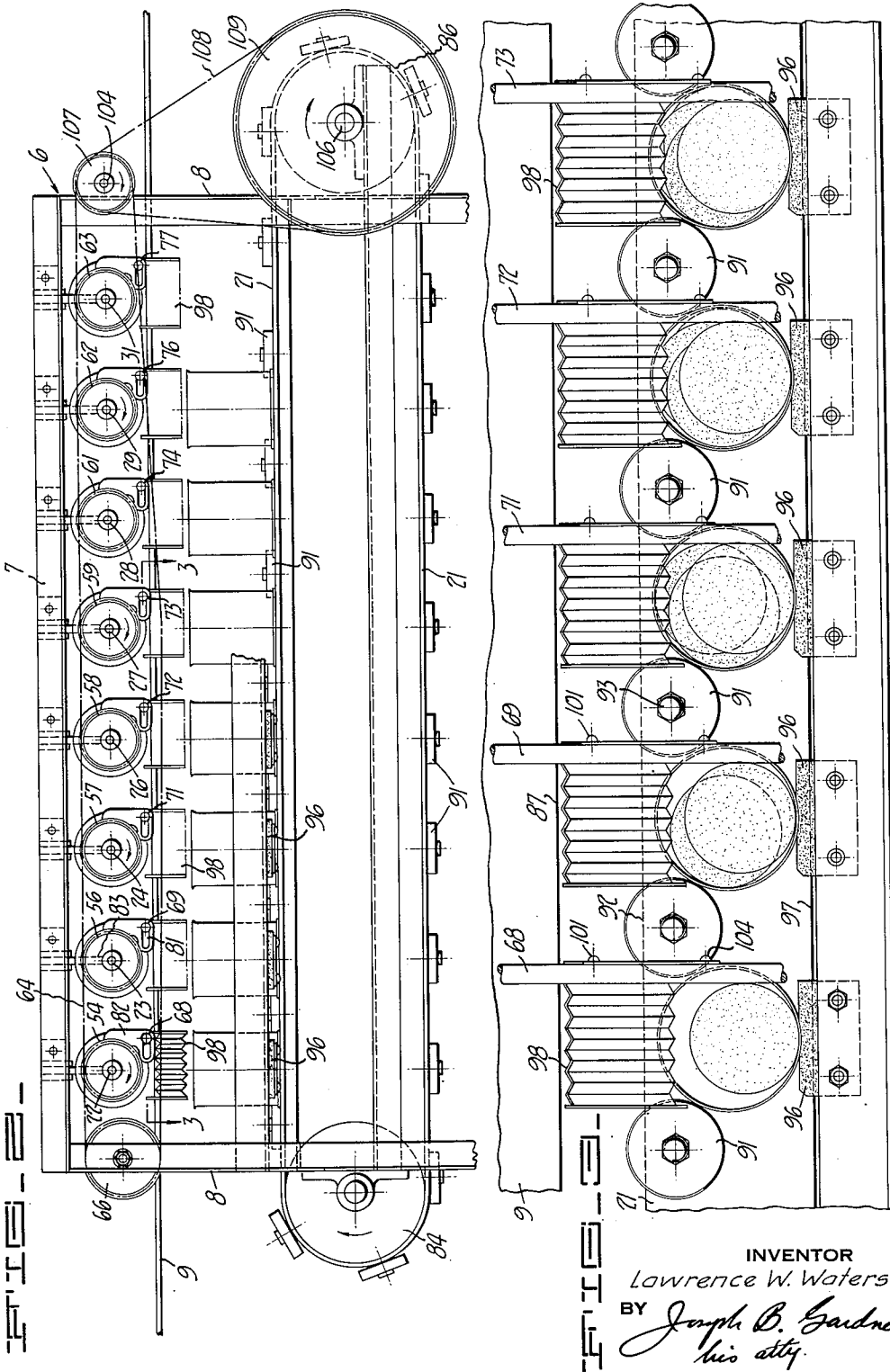
L. W. WATERS

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CONTAINER FILLING MACHINE

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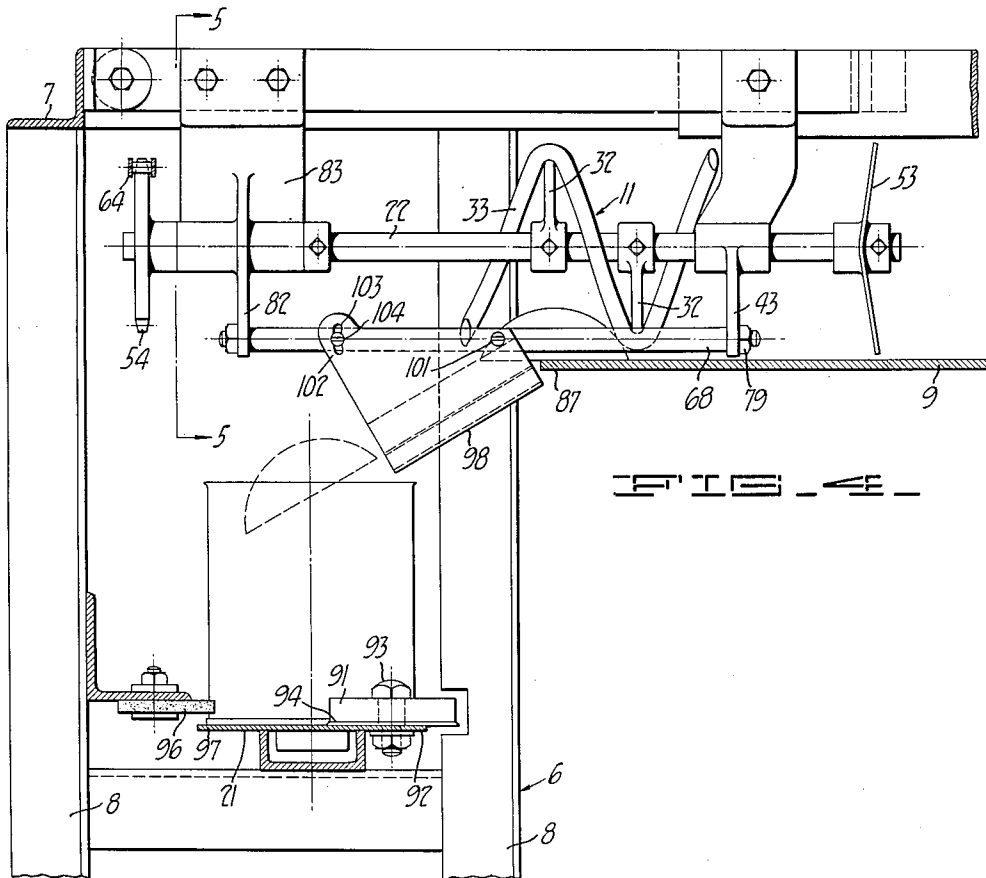


FIG. 4.

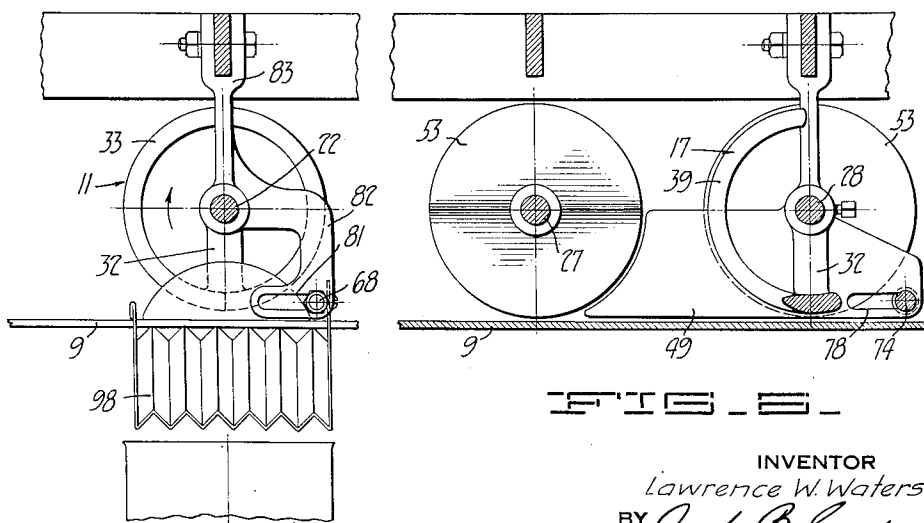


FIG. 5.

FIG. 6.

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CONTAINER FILLING MACHINE

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12 Claims. (CL 226—14)

The invention relates to segregating and filling machinery such as used in packing food stuff and relates more particularly to can filling machines adapted to operate upon fruit to be canned.

An object of the present invention is to provide a filling machine of the character described which will automatically and positively feed a predetermined constant number of pieces of fruit or the like into a can or other receiver and which will properly position the pieces in the container for most efficient packing.

Another object of the invention is to provide a machine of the character above which will be adjustable to accommodate pieces of fruit or the like of different sizes and types and which may be used with either halved or whole fruit.

A further object of the invention is to provide a can filling machine of the character set forth which is sturdy and compact in design and positive and relatively simple in its operation.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the drawings accompanying and forming part of the specification. It is to be understood, however, that variations in the showing may be adopted within the scope of the invention as set forth in the claims.

Referring to said drawings:

Figure 1 is a plan view of a can filling machine constructed in accordance with the present invention.

Figure 2 is a side elevation of the machine illustrated in Figure 1.

Figure 3 is an enlarged plan sectional view of a part of the machine and taken substantially on the plane of line 3—3 of Figure 2.

Figure 4 is an enlarged vertical sectional view taken substantially on the plane of line 4—4 of Figure 1.

Figure 5 is a cross sectional view of a portion of the machine illustrated in Figure 4 and is taken substantially on the plane of line 5—5 of Figure 4.

Figure 6 is a cross sectional view of a portion of the machine illustrated in Figure 4 and is taken substantially on the plane of line 6—6 of Figure 1.

The filling machine of the present invention consists briefly of the combination of a movable conveyor for supporting a plurality of pieces of fruit or the like in side-by-side relation and a second set of conveyors which intersect the first conveyor and which are adapted to remove the fruit pieces therefrom and to advance such pieces along the second conveyors at a predetermined

rate of speed and a predetermined spacing between the pieces. With this combination a can conveyor may be used which is mounted to support a plurality of open top cans for movement into and out of registration with the discharge ends of the second conveyors for deposit of the pieces therein, and means for driving the second conveyors and the can conveyor at synchronized speeds so as to deposit a predetermined whole number of pieces in the cans upon registration thereof with the discharge ends of the second conveyors.

With more specific reference to the accompanying drawings, the machine herein depicted is assembled on a supporting structure 6, including a top frame 7 and a series of uprights 8 supporting the frame in elevated position. Supported for movement longitudinally across the supporting structure and below the top frame 7 is a conveyor for the pieces of fruit or the like to be packed, and in the present construction the conveyor comprises a relatively broad endless belt 9 which extends from a fruit hopper, not shown but positioned to the left of the can filling machine as viewed in Figures 1 and 2 of the drawings. The present machine has been particularly designed for the packing of halved fruit such as halved peaches, apricots or the like, but as will be understood the machine may be used for handling other forms and types of food stuff or the like. In the present case the halved fruit is fed onto the conveyor 9 with the fruit halves uniformly turned cup down and arranged on the belt in side-by-side relation across and longitudinally of the belt. Intersecting the belt 9 are a plurality of conveyors 11, 12, 13, 14, 16, 17, 18 and 19 which have their receiving ends on the belt 9 at spaced positions across the width of the belt so as to remove longitudinal trains of halved fruit and in the present instance, to convey this fruit at a predetermined rate and spacing of the fruit to a can conveyor 21 associated with the discharge ends of the conveyors 11—19. While various forms of conveyors might be used in the instance of conveyors 11—19, in order to provide a positive predetermined rate of flow and spacing of the fruit pieces, I prefer to use a screw type of conveyor, such as here illustrated. The screw conveyors 11—19 are supported on a plurality of shafts 22, 23, 24, 26, 27, 28, 29 and 31 which are mounted in substantially parallel relation having their axes, in the present instance, extending at substantially right angles to the longitudinal axis of the conveyor 9. Connected to each of the shafts 22—31, as by spoke arms 32, are helical

spiral members 33, 34, 36, 37, 38, 39, 41 and 42 which rotate with the shafts 22—31 and are supported with their under surface adjacent to the top surface of the belt 9, see Figures 4, 5 and 6, so as to engage and displace halved fruit coming in contact therewith. The shafts 22—31 and the helical members 33—42 successively vary in length so that the receiving ends of the conveyors are arranged diagonally across the width of the belt, see Figure 1, while the opposite discharge ends of the conveyors are in substantial alignment parallel to the edge of the belt 9. By reason of the staggered transversely spaced relation of the receiving ends of the conveyors, each of the conveyor ends receives and removes from the conveyor 9 all of the fruit halves lying upon a corresponding element of width of the conveyor 9, and the receiving ends of the conveyors 11—19 thus remove fruit from the conveyor 9 in the form of longitudinal trains of fruit halves. Mounted at the receiving end of each of the conveyors 11—19 are a plurality of vertical end plates 43, 44, 46, 47, 48, 49, 51, and 52 which are fixedly supported relative to the belt and serve as guides for directing the halved fruit into the receiving end portion of the conveyors. As will be clear from Figure 1, a receiving pocket is defined between each adjacent pair of end plates 43—52 and fruit entering these pockets is automatically directed into the receiving ends of the screw conveyors. Preferably means is provided for further assisting the guiding of the fruit halves into the aforementioned pockets by preventing the fruit from gathering at the longitudinal ends of the plates 43—52. As here shown, such means is provided in the form of a plurality of cam-shaped discs 53 which are secured for rotation on the ends of the shafts 22—31 in substantial alignment with the adjacent end plates 43—52, and upon rotation present an oscillating periphery to the oncoming fruit halves so as to direct the same to the opposite sides of the disc, thereby clearing the plates 43—52 and moving directly into the aforementioned pockets.

On the opposite ends of the shafts 22—31 are sprocket wheels 54, 56, 57, 58, 59, 61, 62 and 63 which are engaged and driven in unison by a roller chain 64 supported on the opposite ends of the frame on sprocket wheels 66 and 67. During operation of the machine, as will be understood, the fruit halves move with the conveyor 9 into the receiving ends of the screw conveyors 11—19 where the same are engaged and disposed laterally across the belt to the discharge ends of the conveyor. Stop members 68, 69, 71, 72, 73, 74, 76 and 77 are mounted transversely across the belt 9 and provide a stop for the movement of the halved fruits longitudinally of the belt while the same are contained within the screw conveyors 11—19. Preferably, in order to accommodate the machine to various sizes of fruit, the members 68—77 are adjustably supported for longitudinal movement to and from the screw whereby large and small fruit halves and other pieces may be confined within the convolutions of the screw. As here shown the stop members 68—77 are supported at their inner ends in elongated slots 78 provided in the end plates 43—52 and are adjustably secured for movement in the slots by means of nuts 79 threaded onto the inner ends of the member 68. The opposite outer ends of the stop members 68—77 are similarly mounted in elongated horizontal slots 81 formed in vertical supports 82 depending from supporting members 83 used for

the journaling of the outer ends of the shafts 22—31. Thus by adjustment of the opposite ends of the stop members 68—77 in the elongated slots provided in the end supports for these members, the stop members may be moved and secured in place in relative longitudinal positions to and from the screw conveyors 11—19.

The foregoing portion of the machine with or without the co-related can or container feeding mechanism forms an important part of the present invention and may be used for a variety of purposes wherever it is desirable to feed the pieces in single file at a predetermined rate and spacing between the pieces. The pieces may be fed from the discharge ends of the conveyors 11—19 to a slicing machine, an inspection table, conveyor or the like. In the present machine the sorting and feeding mechanism described in the foregoing is combined with a can feeding mechanism so that a predetermined number of fruit pieces will be deposited in cans or other containers moved into receiving positions at the discharge ends of the conveyors 11—19. The can conveyor 21 in the present construction is in the form of a horizontal elongated endless belt such as best seen in Figures 2 and 4, and is here supported at the opposite ends of the supporting frame 6 on drums 84 and 86 so that the upper flight of the belt is mounted below the plane of the belt conveyor 9 and somewhat inwardly spaced from the inner edge 87 of the belt 9, see Figure 4. Thus halved fruit displaced transversely across the belt 9 will fall from the inner edge 87 of the belt 9 downwardly and in the direction of the can conveyor 21. Cans are fed onto the conveyor 21 from the left end of the device, as viewed in Figure 1, from an auxiliary can chute 88, and the filled cans are removed from the conveyor 21 adjacent to the right-hand end of the machine, as viewed in Figure 1, by means of a diverting can chute 89. A plurality of rollers or wheels 91 are mounted along one transverse edge 92 of the belt 21 for engaging the periphery of the cans at the base thereof for holding the cans for movement with the belt. The rollers, as will be seen in Figure 4, are mounted on a vertical center bolt 93 so as to support the rollers for rotation in a horizontal plane parallel to the top of the conveyor 21. Preferably, the rollers 91 are formed with an annular base flange or lip 94 which engages under the can and elevates the same slightly from the underlying belt so as to permit rotative displacement of the cans with minimum friction. As an important feature of the present construction such rotation of the can is purposefully effected during movement of the cans between the discharge ends of the screw conveyors so as to present the can in successively rotated positions for receipt of halved fruit from the successive discharge ends of the screw conveyors. This feature is of particular importance in the packing of halved fruit as it insures the complete filling of the can with the fruit and the stacking of the halved fruit in the can in a staggered vertical arrangement, as will be seen in Figure 3, thereby insuring the packing of a maximum amount of fruit in the cans. The turning or rotating of the cans while movement thereof along the can conveyor 21 is here effected by the positioning of a plurality of longitudinally spaced pads 96 along the outer edge 97 of the can conveyor so that the pads 96 will engage the outer periphery of the cans carried on the conveyors and cooperate with the rollers 91 to effect a par-

tial rotation of the cans. Preferably, the pads 96 are formed of a soft compressible material such as live rubber or the like, and as will be clear, the length of the pad, that is parallel to the movement of the can, will determine the amount of rotation given to the can. If desired, the pads 96 may be provided in the form of a continuous strip of material along the edge of the conveyors.

As will be best seen from Figures 2 and 4, the cans are carried on the conveyor 21 in an upright position of the cans, that is with the open top of the can uppermost, and thus the cans are caused to pass under and in registration with the discharge ends of the screw conveyors for receipt of the halved fruit therefrom. Preferably the can is positioned in transversely offset position from the inner edge 87 of the belt conveyor 9, and the halved fruit is supported for movement from the inner edge 87 of the belt into the open top of the can by means of a plurality of chutes 98, mounted in an inclined fashion from the inner edge 87 of the belt 9 to the rim of the can top. As here shown, these chutes 98 are supported on the stop members 68-77, and as an important feature of their support, the chutes are permitted a substantial adjustment of their pitch, that is the inclination of the chute between the top rim of the can and the inner edge of the belt 9. As here best shown in Figures 3 and 4, the inner upper end of the chutes is pivoted to the transverse stop member by a pin or screw 101, while the opposite outer end 102 of the chute is provided with an arcuate slot 103 which receives a fastening pin or screw 104 carried by the transverse stop member. As will be understood, the shifting of the slot 103 relative to the pin 104 produces the desired adjustment of pitch of the chutes. Preferably, the fruit supporting surface of the chutes is corrugated, with the corrugations running lengthwise to the movement of the fruit thereover, so as to reduce the frictional resistance to movement of the fruit thereover.

As an important feature of the present machine, the screw conveyors 11-19 are driven in synchronism with the movement of the can conveyor 21 so that a predetermined whole number of fruit halves will be deposited in the cans during its period of registration with the discharge end of each of the screw conveyors. The relative timing of these conveyors may be set so as to deposit any number of fruit halves or other fruit pieces into the cans. In the arrangement here shown, however, a single fruit piece is discharged from each of the screw conveyors into each of the cans passing by the discharge end of the conveyor. To accomplish this result, the conveyors 11-19 are each rotated one revolution while the can conveyor 21 moves a distance equal to the longitudinal distance between the discharge ends of the screw conveyors. This synchronous drive is here effected by connecting the shaft 104 of sprocket 67 with shaft 106 of drum 86. As will be best seen in Figures 1 and 2, a sprocket wheel 107 is mounted on the forward end of shaft 104 and is connected by means of a chain 108 with a sprocket 109 fixed to the forward end of shaft 106. In the present machine, shaft 106 is used as the main power shaft and is preferably connected to the source of power such as the motor 111. A clutch mechanism 112 is preferably inserted in the drive between the motor 111 and the shaft 106, in order to permit a stopping and starting of the screw conveyors

and the can conveyor at the will of the operator and while the fruit conveyor 9 remains in motion. This is a desirable feature inasmuch as it allows the operator to coordinate the can filling mechanism with varying rates of supply of pieces to be packed. Preferably, a clutch control lever arm 113 is positioned at the side of the mechanism for ready engagement and operation by the operator of the machine. Preferably, the direction of rotation of the screw conveyors 11-19 is contrawise to the movement of the belt 9 so that the bottom portions of the screw conveyor move in a direction opposite to the direction of movement of the belt 9. This relationship is best seen in Figure 6 of the drawings, and provides a desirable lifting action on the halved fruit moving through the conveyor.

It will now be understood that in the operation of the device, the halved fruit, although indiscriminately arranged on the belt conveyor 9, is taken off of the conveyor in an orderly single-file fashion with the fruit halves moving at a predetermined rate and spacing. This positive predetermination of the feeding of the peach halves by the screw conveyor in combination with the positive predetermination of the movement of the cans, insures an automatic and positive filling of the cans with a uniform and unvarying count of halved fruit. It will further be clear that the positioning of the screw conveyors across the entire breadth of the belt 9 insures a complete removal of the halved fruit from the belt. In this connection it will be noted that the number of screw conveyors is optional and will vary with the breadth of the belt. Preferably where halved fruit is to be packed, fruit halves are deposited upon the conveyor 9 with the cup faces of the fruit down on the belt. This positioning of the halved fruit may be obtained by various machines used in the canning art. While in the present construction the screw conveyors are mounted with their receiving ends in a diagonal arrangement across the width of the belt 9 and with their axes at substantially right angles to the length of the belt, it will be understood that the screw conveyors may be otherwise positioned with a different angularity relative to the belt and with their receiving ends spaced differently across the width of the belt.

It will be understood that while I have explained my invention in connection with an apparatus for filling cans, it will be obvious that the invention is applicable for use with other forms of containers, and the word "can" as used herein is intended to embrace all types of receivers with which the present invention may be used.

I claim:

1. A can filling machine for packing a predetermined number of pieces of fruit or the like into a can comprising, a relatively broad movable conveyor for supporting a plurality of said pieces in side-by-side relation across and longitudinally of said conveyor, a plurality of conveyors connecting with said first conveyor and having their receiving ends spaced transversely across said first conveyor to remove longitudinal trains of said pieces on said first conveyor, said second named conveyors being arranged and driven to advance said pieces along said second conveyors at a predetermined rate and spacing, a can conveyor mounted to support a plurality of open top cans for movement into and out of registration with the discharge ends of said second conveyors, and means for driving said second conveyors and said can conveyor at synchronized speeds to de-

posit a predetermined whole number of said pieces into said cans during period of registration of the cans with each discharge end of said second conveyors.

2. A can filling machine for packing a predetermined number of pieces of fruit or the like into a can comprising, a relatively broad movable conveyor for supporting a plurality of said pieces in side-by-side relation across and longitudinally of said conveyor, a plurality of conveyors connecting with said first conveyor and having their receiving ends spaced transversely across said first conveyor to remove longitudinal trains of said pieces on said first conveyor, said second named conveyors being arranged and driven to advance said pieces along said second conveyors at a predetermined rate and spacing, a can conveyor mounted to support a plurality of open top cans for movement into and out of registration with the discharge ends of said second conveyors, means for driving said second conveyors and said can conveyor at synchronized speeds to deposit a predetermined whole number of said pieces into said cans during period of registration of the cans with each discharge end of said second conveyors, and means for rotating said cans during movement thereof between the discharge ends of said second conveyors.

3. A can filling machine for packing a predetermined number of pieces of fruit or the like in a can comprising, a movable conveyor for supporting a plurality of said pieces in side-by-side relation, a screw conveyor intersecting said first conveyor and adapted to remove pieces therefrom and to advance said pieces along said screw conveyor at a predetermined rate and spacing, a can conveyor mounted to support a plurality of open top cans for movement into registration with and pass the discharge end of said screw conveyor for deposit of said pieces from said screw conveyor into said cans, and means for rotating said screw conveyor at a synchronized speed relative to the movement of said can conveyor to deposit a whole number of said pieces into said cans during period of registration thereof with the discharge end of said screw conveyor.

4. A machine for packing a predetermined number of pieces of fruit or the like into a can comprising, a movable belt conveyor for supporting a plurality of said pieces, a screw conveyor having a receiving end overlying said belt conveyor and adapted to remove said pieces therefrom and to advance said pieces at a predetermined rate and spacing along said screw conveyor, a can conveyor mounted to support a plurality of open top cans for movement past the discharge end of said screw conveyor for deposit of said pieces into said cans, means for rotating said screw conveyor at a synchronized speed relative to the movement of said can conveyor, said last named means rotating said screw conveyor to move the adjacent faces of said screw conveyor and belt conveyor in opposite directions.

5. A machine for packing a predetermined number of pieces of fruit or the like into a can comprising, a movable belt conveyor for supporting a plurality of said pieces, a plurality of screw conveyors having receiving ends overlying said belt conveyor at positions spaced transversely across said belt conveyor for receipt of longitudinal trains of said pieces, a can conveyor mounted to support a plurality of open top cans for movement into and out of registration with

the discharge ends of said screw conveyors, and means for rotating said screw conveyors at a synchronized speed relative to the movement of said can conveyor to deposit a whole number of said pieces into said cans during period of registration thereof with said screw conveyors.

6. A can filling machine for packing a predetermined number of pieces of fruit or the like into a can comprising, a relatively broad movable conveyor for supporting a plurality of said pieces in side-by-side relation across and longitudinally of said conveyor, a plurality of second conveyors mounted in substantially parallel relation at substantially right angles to the longitudinal movement of said first conveyor and having their receiving ends overlying said first conveyor in spaced positions transversely and diagonally across said first conveyor so as to receive and remove from said first conveyor longitudinal trains of said pieces, said last named conveyors being arranged and driven to advance said pieces therealong at predetermined rate and spacing and a can conveyor mounted to support a plurality of open top cans and movable past the discharge ends of said second conveyors, and means for moving said second conveyors and can conveyor in synchronism to deposit a whole number of said pieces from said second conveyors into said cans.

7. A can filling machine for packing a predetermined number of pieces of fruit or the like into a can comprising, a relatively broad movable conveyor for supporting a plurality of said pieces in side-by-side relation across and longitudinally of said conveyor, a plurality of elongated screw members mounted in substantially parallel relation overlying said first conveyor with the longitudinal axes of said members at substantially right angles to said first conveyor and with the receiving ends of said members spaced uniformly across the transverse dimension of said first conveyor in a diagonal fashion whereby said receiving ends will remove from said first conveyor parallel longitudinal trains of said pieces, the opposite discharge ends of said members terminating in substantial alignment, a can conveyor for supporting a plurality of open top cans mounted under and aligned with the discharge ends of said members for moving a plurality of cans into vertical alignment with said discharge ends for receipt of said pieces therefrom, and means for rotating said screw members at a synchronized speed relative to the movement of said can conveyor.

8. A can filling machine for packing a predetermined number of pieces of fruit or the like into cans comprising, a belt conveyor for supporting and moving a plurality of said pieces, a second conveyor overlying said belt conveyor for receiving said pieces and displacing said pieces transversely across said belt, stop means mounted adjacent said second conveyor to hold said pieces in said second conveyor, and a can conveyor for supporting a plurality of open top cans and moving said cans into registration with the discharge end of said second conveyor, means for driving said second conveyor and said can conveyor at synchronized speeds, and means to interrupt the movement of said second and can conveyors relative to said first conveyor.

9. A can filling machine of the character set forth in claim 8 wherein the said stop means is adjustably supported for movement longitudinally of said belt to and from said second conveyor to accommodate pieces of different sizes.

10. A machine for packing a predetermined number of pieces of fruit or the like into a can comprising, a movable belt conveyor for supporting a plurality of said pieces, a plurality of screw conveyors having receiving ends overlying said belt conveyor at positions spaced transversely across said belt conveyor for receipt of longitudinal trains of said pieces, means carried by and rotatable with the receiving ends of said screw conveyors positioned upon said belt conveyor for supporting the pieces on said conveyor into longitudinal trains for movement into said receiving ends, a can conveyor mounted to support a plurality of open top cans for movement into and out of registration with the discharge ends of said screw conveyors, and means for rotating said screw conveyors at a synchronized speed relative to the movement of said can conveyor to deposit a whole number of said pieces into said cans during period of registration thereof with said screw conveyors.

11. A can filling machine of the character described comprising, a relatively broad belt conveyor adapted for the support and movement of a plurality of pieces of fruit or the like arranged in side-by-side relation across and longitudinally on said belt conveyor, a plurality of second conveyors intersecting said belt conveyor and adapted to remove said pieces therefrom and to advance said pieces along said second conveyors at a predetermined rate and spacing, a can conveyor comprising an endless belt member mounted below the discharge ends of said second conveyors and arranged to support a plurality of open top cans for movement across said discharge ends, means for driving said second conveyors in

synchronism with said can conveyor a plurality of rollers carried by said can conveyor belt for spacing of cans therebetween and holding said cans for movement on said belt, and stationary means mounted alongside of said belt and engaging a portion of said cans to cause rotation thereof during movement between the discharge ends of said second conveyors.

12. A can filling machine of the character described comprising, a relatively broad belt conveyor adapted for the support and movement of a plurality of pieces of fruit or the like arranged in side-by-side relation across and longitudinally on said belt conveyor, a plurality of second conveyors intersecting said belt conveyor and adapted to remove said pieces therefrom and to advance said pieces along said second conveyors at a predetermined rate and spacing, a can conveyor comprising an endless belt member mounted below the discharge ends of said second conveyors and arranged to support a plurality of open top cans for movement across said discharge ends, means for driving said second conveyor in synchronism with said can conveyor a plurality of rollers carried by said can conveyor belt for spacing of cans therebetween and holding said cans for movement on said belt, and a plurality of members formed of a soft compressible material mounted adjacent to and along said belt and positioned to engage a peripheral part of said cans upon movement of the latter on said belt to produce rotative displacement of said cans during movement of the latter between the discharge ends of said second conveyors.

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