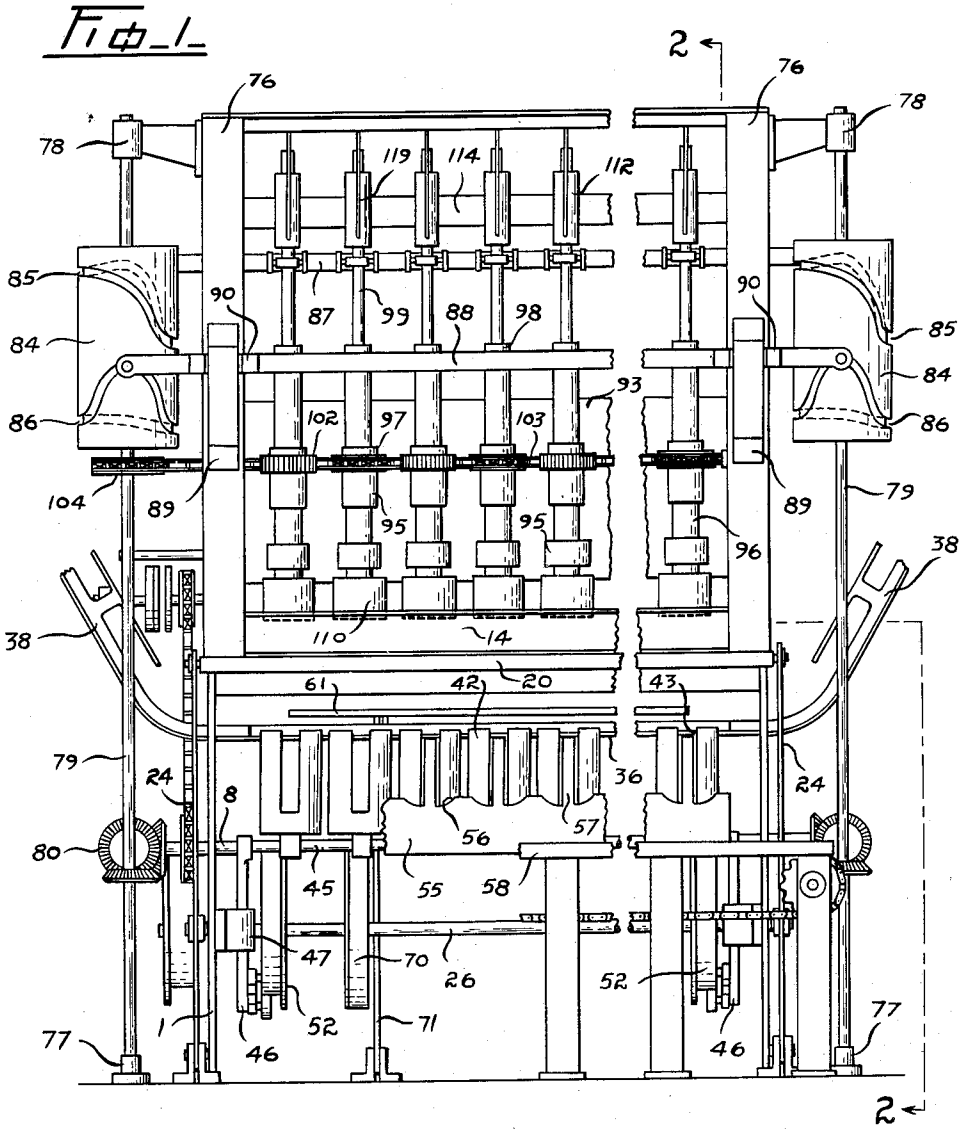
Sept. 27, 1955 H. W. McKINNON 2,718,993

CAN FILLING MACHINES

Filed July 10, 1953 5 Sheets-Sheet 1

Fig. 1



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CAN FILLING MACHINES

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Fig. 8

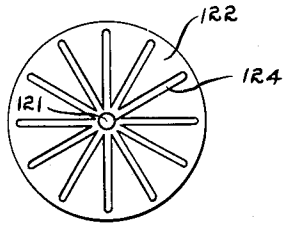


Fig. 7

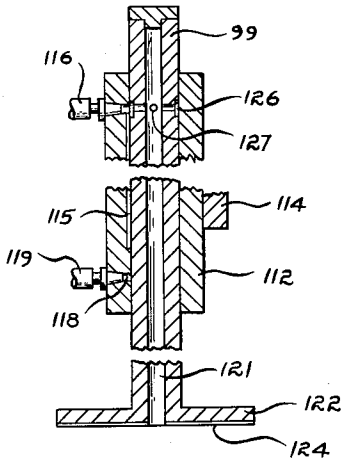


Fig. 2

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CAN FILLING MACHINES

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Fig. 5

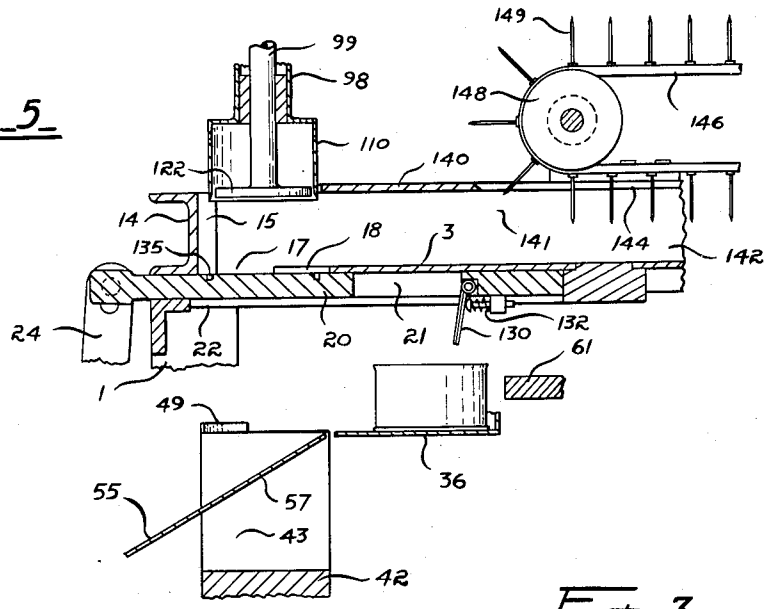
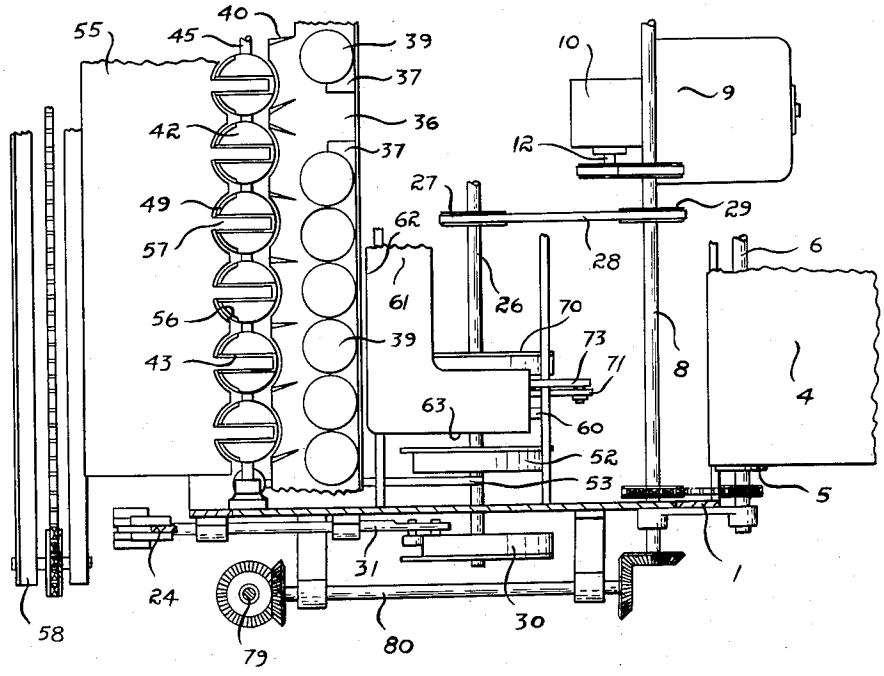


Fig. 3



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Sept. 27, 1955 H. W. McKINNON 2,718,993

CAN FILLING MACHINES

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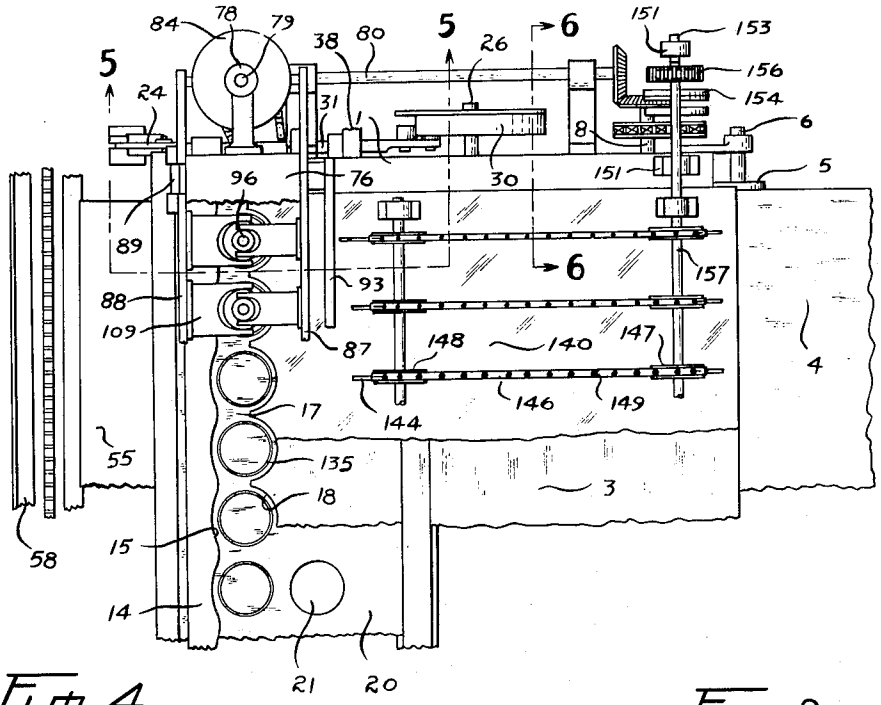


Fig. 4

Fig. 9

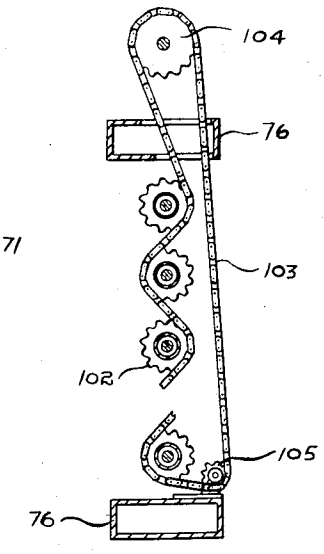


Fig. 10

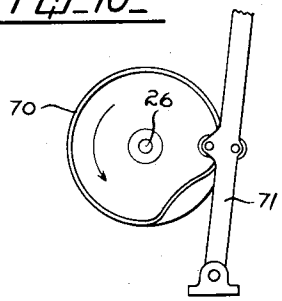
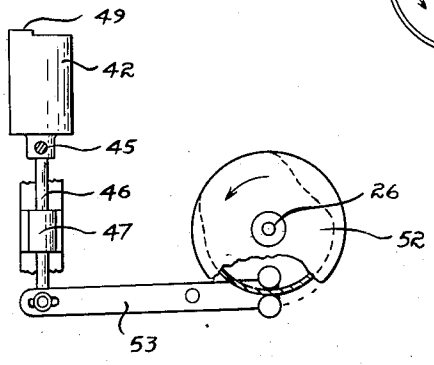


Fig. 11



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Fig. 12.

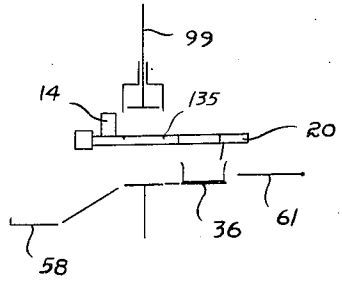


Fig. 13.

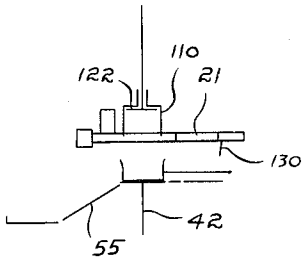


Fig. 14.

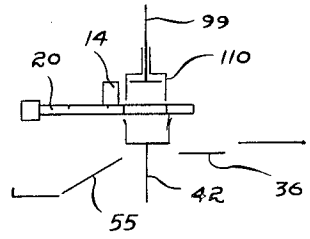


Fig. 15.

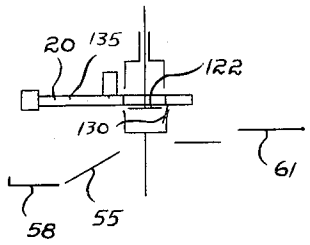


Fig. 16.

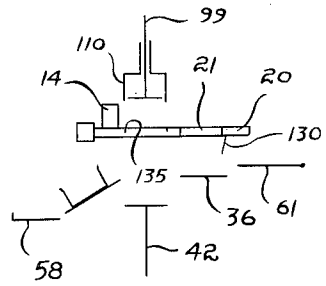
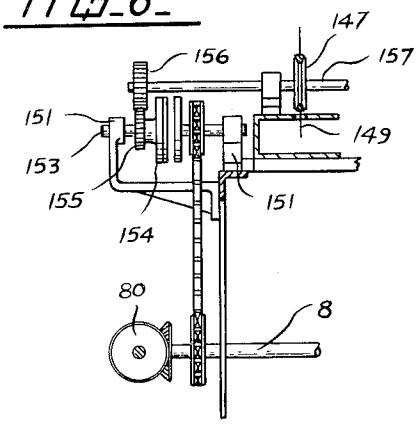


Fig. 6.



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2,718,993

CAN FILLING MACHINES

Horatio Watson McKinnon, New Westminster, British Columbia, Canada

Application July 10, 1953, Serial No. 367,289

18 Claims. (Cl. 226—95)

My invention relates to improvements in can filling machines.

In the canning industry salmon is largely put up in shallow cans known as half pound flats and the fish is cut into lengths by machine to the depth of the cans and in order that it may present a good appearance when the can is open, it is common to fill the cans by hand. This hand filling is somewhat slow and costly. There is a keen demand for smaller quantities of salmon packed in cans, which involves cutting the fish into smaller lengths or slices and requires greater skill in packing so that the slices do not overlap or become twisted before the can tops are put in place. The extra care required in hand filling these very shallow cans increases the cost per pound of fish packed to such an extent that it becomes uneconomical to fill any can less in depth than the so-called "flat."

The object of the present invention is to pack the fish and place it in the can by machine in such a manner that it will be a practical and economic operation and the fish will, on being opened, present the desired good appearance. A further object is to provide a means for assembling the sliced fish on a table where it is compacted prior to being fed into the cans, so that few, if any, cans will be rejected as underweight and very few will be overweight, consequently both time and money will be saved over the conventional filling process.

Referring to the acompanying drawings:

Figure 1 is a rear elevational view of the invention.

Figure 2 is a side elevational view, part in section, taken on the line 2—2 of Figure 1.

Figure 3 is a part sectional plan view taken on the line 3—3 of Figure 2.

Figure 4 is a plan view showing parts broken away.

Figure 5 is an enlarged sectional view taken on the line 5—5 of Figure 4.

Figure 6 is a detail view of the slip clutch drive on the fish feed, taken on the line 6—6 of Figure 5.

Figure 7 is a detail sectional view of the can filling knock-out pad.

Figure 8 is a plan view of same looking up.

Figure 9 is a detail plan view of the knife spindle drive.

Figure 10 is a detail view of the cam for delivering cans to can filling position.

Figure 11 is a detail of the cam for raising the cans to filling position.

Figures 12 to 16 inclusive are diagrammatic views showing the sequence of operations from the commencement of cutting the fish to circular form to delivering said fish to the can and retracting the knife to starting position.

In the drawings like characters of reference indicate corresponding parts in each figure.

The numeral 1 indicates generally a frame supporting a bed 3 upon which the sliced fish steaks are adapted to be delivered from a conveyor belt 4, see Figures 2, 3 and 4. The conveyor belt is trained over a roller 5 fitted upon a transverse shaft 6 and is driven by a sprocket chain from a driven shaft 8, which shaft is in turn driven from

a motor 9 through a suitable reduction gear 10 and its drive shaft 12.

Extending transversely of the rear end of the bed 3 is an end wall 14, see Figures 4 and 5, which is provided on its forward side with a plurality of concave vertical recesses 15, one for each can filled per cycle of operation. The forward edge of the bed 3 facing the end wall 14 is spaced therefrom to define a filling area 17 and is provided with substantially semi-circular recesses 18 which are directly opposite to the recesses 15 of the end wall 14. An apertured plate 20, which is co-extensive with the bed 3, is slidably mounted below the rear end of said bed and in contact therewith. This plate is provided with circular apertures 21, one for each can to be filled. The plate 20 rides upon guide rails 22 at the sides of the frame 1 and is connected at each end to the upper ends of upstanding levers 24.

A cam shaft 26 is mounted transversely of the frame and is fitted with a pulley 27, see Figure 3, which is driven by a belt 28 from a pulley 29 upon the shaft 8. The outer ends of the shaft 26 are fitted with identical cams 30 which are coupled to the levers 24 by horizontal connecting rods 31 to reciprocate the apertured plate 20, which plate is shown in the several figures as being at rest, closing the interspace between the end wall 14 and the inner or recessed end of the bed 3 and with its apertures 21 closed off by the bed.

Extending transversely of the machine is a can receiving table 36 which in the present machine designed to fill a row of tin cans simultaneously is provided with two arcuate stops 37 at its mid-length position and cans are adapted to be fed onto the table from steeply inclined gravity conveyors 38, see Figure 1, feeding downwardly from opposite sides of the machine to deliver two aligned rows 39 of five cans each in contacting relation with each other and with the innermost of each row in contact with a stop 37, as shown in Figure 3. The side of the can receiving table 36 to the left of Figure 3 is provided with upstanding fins 40 which differ in angularity transverse to the table and serve to space the cans apart to their proper position during movement onto the can lifters 42. The can lifters 42 are cylindrical and are each provided with a vertical slot 43 extending therethrough towards the can receiving table, each of said lifters are supported upon a transverse bar 45 supported adjacent opposite ends on vertical rods 46 which are slidably mounted in sleeves 47 carried by the frame 1, see Figure 11. Each can lifter 42 is provided on its upper end with a shallow rim portion 49, see Figures 3 and 11, which serves to stop the can as it is centered onto its respective lifter.

A pair of cams 52 are fitted upon the shaft 26 which impart rocking movement to levers 53, as shown in Figure 11, the free end of each of these levers is connected to the lower end of one of the vertical rods 46 to raise the cans into filling position. To the rear of the can lifters 42 a discharge slide plate having arcuate recesses 56 on its forward edge is provided, the recesses parallel the wall on one side of the can lifters and are each provided with a tongue 57 which extends into a slot 43 of a can lifter, as shown in detail in Figure 5. The slide plate 55 is of such incline and length of incline as to cause cans moving down it to be delivered onto a discharge conveyor 58 which is disposed to the rear of the machine as shown in Figures 2, 3 and 4.

Mounted horizontally on guide rails 60 below the bed 3, see Figures 2 and 3, is a can pusher plate 61 having a front edge 62 which is adapted to simultaneously engage the rows of cans 39 to move them onto the several can lifters 42. The plate 61 also has end edges 63 which, when the pusher plate is advanced to remove the cans from the can receiving table 36, block the path of further cans from the gravity conveyors 38. The

pusher plate **61** is reciprocated by means of cams **70** which are mounted upon the shaft **26**, one only being shown, see Figures 3 and 10, which cams impart swinging movement to a lever **71**. The upper ends of the levers **71** are connected to the free ends of a pair of horizontal rods **73** extending forwardly from the pusher plate. A pair of standards **76** are provided on opposite sides of the bed at the rear of the machine which carry step and head bearings **77** and **78** in which vertical shafts **79** are journalled for unitary rotation. Each of these vertical shafts are driven by mitre gear and countershaft operating trains **80** from the driven shaft **8**. Both shafts **79** are fitted with a drum **84** having upper cam grooves **85** and lower cam grooves **86** which are engaged respectively with vertically reciprocating horizontal bars **87** and **88**, which bars have sliding movement in guides **89** and are provided with stops **90** which engage the sides of the guides **89** to prevent end movement of said bars. A vertical transverse plate member **93** extends forwardly of and from one standard **76** to the other, which plate supports a plurality of pairs of bearing brackets **95** and in these bearing brackets spindles **96** are journalled, one for each can space. Each spindle **96** includes a quill **97** directly journalled in the bearing brackets **95**, a sleeve **98** non rotatable but slidably mounted in the quill, and a vertical shaft **99** vertically slidable in the sleeve **98**. The quills **97** are each fitted with a sprocket **102**, all of which are driven by a chain **103** from a drive sprocket **104** secured upon one of the vertical shafts **79**, the chain following a zigzag course around the sprockets **102** and also around an idler **105**, see Figure **9**, which is adjustably mounted from one of the standards **76** to adjust the tension of the chain **103**. Each sleeve **98** is fitted with a trunnion bearing **108**, and a fork **109** is extended horizontally from the bar **88**, so that the rotation of the cam **86** will impart vertical movement to said sleeve. At the lower end of the sleeve **98** a cylindrical knife **110** is secured, which knife is of the diameter of the disk of fish to be packed in each can. The vertical shaft **99** extends through the sleeve **98** as above stated and is enclosed adjacent its upper end with an air valve cylinder **112**, see detail in Figure 7. The air valve cylinders **112** are supported upon a transverse member **114** which is carried from the standards **76** and each cylinder is provided with a vertical groove or air passage **115** which communicates with a suction pipe **116** leading from a suitable pump or vacuum tank, not shown. At the lower end of the valve cylinder **112** an inlet port **118** is provided which is connected with an air pressure pipe **119**.

The shaft **99** has an axial bore **121** and is fitted at its lower end with a circular knock out pad **122**, which pad is preferably provided on its lower face with radial grooves **124** to permit air admitted to the bore **121** of the vertical shaft **99** to break the adhesion of the disk of fish to the knock out pad at the appointed time. The upper end of the shaft **99** is provided, at a point within the valve cylinder **112**, with a peripheral groove **126** and with radial inlet ports **127** extending into the bore of the shaft.

A plurality of vent fingers **130**, one to each can, are provided on the underside of the apertured plate **20**. Each finger is spring tensioned as at **132** to hang with a slight incline to the left as shown in Figure 5, so as to keep it clear of the adjacent can wall when said can is raised into filling position and to allow said finger to lie parallel with the can wall as the fish is forced thereinto. At the rear end of the apertured plate **20** a plurality of circular grooves **135** are provided which are adapted to receive the cutting edges of the cylindrical knives subsequent to cutting through the fish, as will be hereinafter described.

A cover plate **140** having parallel side walls **141** is removably mounted upon the bed, thus forming a tunnel **142** of substantially the depth of the slices of fish to be canned. The upper surface of the cover plate is provided with longitudinal slots **144** and above these slots a plurality of endless belts **146** are provided, which belts are trained over driven and idler pulleys **147** and **148** respectively. The belts are fitted with spikes **149** which extend down through the slots **144** and enter into the fish in the tunnel to urge it towards the end wall **14** of the bed **3**.

A pair of bearings **151** are supported at the front of the machine in which a countershaft **153** is journalled. This shaft is driven by a chain and sprocket train from the driven shaft **8** and is fitted with a slip clutch **154**, one side of which is secured to the shaft and the other side of said clutch is coupled to a pinion **155** which in turn drives a gear wheel **156** and its shaft **157**. The normal speed of the shaft **157** is such that the spikes **149** will traverse the bed at a somewhat higher speed than the conveyor **4** will feed the fish onto it, so as to crowd the fish up against the end wall **14** and the slip clutch **154** is provided to prevent the fish from being compressed unduly when it is abutting the end wall **14** and is below the spindles **96** and their knives **110**.

In operation, fish steaks or slices are placed on the conveyor **4** in relatively close formation from which they are fed onto the bed **3** and into the tunnel **142**. The moving spikes **149** on the belts **146** crowd the fish into a flat sheet confined by the side walls **141** depending from the cover plate **140**. The higher feed speed of the endless belts **146** and their spikes serve to close up any interspaces between the steaks, so that, as it reaches can filling position it is compacted into a substantially solid sheet of fish meat. When the fish at this point is so compacted the knives **110**, rotating, are moved downwardly from the position shown in Figure 12 by the drum cams **84** until their cutting edges are within the circular grooves **135**, as shown in Figure 13 and a disk of fish is cut from the mass. The knock out pads **122** are moved by the cams **85** to follow the knives down without contacting the fish until said knives reach the level of the bed **3**. Immediately following this disk cutting movement the knives are raised by the cams **86** to clear the grooves, as shown in Figure 14. During part of the downward movement of the knives the pusher plate **61** is moved to the left by its operating cam **70** to push a row of cans onto the can lifters **42** and into abutting engagement with the rim portions **49**, so that they will be directly aligned below the several spindles **96**. As soon as the knives are withdrawn from the groove the apertured plate **20** is moved rearwardly by the cams **30** to dispose the apertures **21** directly below the knives and the fish disks carried thereby and immediately following the registration the knock out pads are moved downwardly, pushing the fish out of each knife through the adjacent aperture **21** and into the can therebelow, as shown in Figure 15. During the downward movement of the pad suction is applied to the bore **121** of the vertical shaft **99** to hold the cut fish in contact with the knock out pads **122**. It will be noticed that when each of the cans are in filling position a vent finger **130** will be disposed above it, which will be thrust into parallel position along the can side as the fish enters said can. These fingers will allow air to freely escape from the can as the fish disk enters, thus enabling the fish to enter freely and without causing spillage of fluid carried by the fish meat. When the fish is pressed into the can by a knock out pad, the suction is cut off therefrom and air pressure is supplied through the bore **121** and the radial grooves **124** of the pad to release the said pad from contact with the fish and the pad and the associated knife **110** will be returned to their upper position as shown in Figure 16. Simultaneously with the raising of the knives, the pusher plate **61** will be withdrawn to allow a further row of cans to slide into position on the can receiving table **36** from the conveyors **38** and the can lifters **42** will be lowered, freeing the vent fingers **130** from the cans, so that the apertured plate **20** may

return to the right as in Figure 5. The lowering of the can lifters causes one edge of each can to engage the upper end of a tongue **57** of the slide plate **55**, causing said can to tip to the left and as soon as the rim portion **49** of the can lift recedes below said tongue the can becomes freed therefrom and slides from the slide plate as shown in Figure 16 onto the discharge conveyor **58** for transfer to a capping and sealing machine.

What I claim as my invention is:

1. A can filling machine comprising a bed upon which fish slices are adapted to be placed, a plate coextensive with said bed, said plate having an opening and being slidably mounted with respect to the bed, a rotary cutter arranged transversely above the apertured plate, means for crowding the fish slices into a closely packed sheet of meat, means for supporting a can under the cutter, means for depressing the cutter to cut a disk of fish from the compacted fish, means for disposing the plate opening in registration with the cutter and the can supporting means, and means for forcing the disk of fish into the can.

2. A can filling machine comprising a bed upon which fish slices are adapted to be placed, a plate coextensive with said bed, said plate having a row of openings and being slidably mounted with respect to the bed, a plurality of rotary cutters arranged in a transverse row above the plate, means for depressing the cutters to cut disks from the fish upon the plate, means for moving the plate to dispose its openings in register with the cutters, and means for forcing the fish disks from the cutters downwardly through said openings for filling cans placed therebelow.

3. A can filling machine comprising a bed upon which fish slices are adapted to be placed, a plate coextensive with said bed, said plate having a row of openings and being slidably mounted with respect to the bed, a plurality of rotary cutters arranged in a transverse row above the plate, means for depressing the cutters to cut disks from the fish upon the plate, means for moving the plate to dispose its openings in register with the cutters, means for forcing the fish disks from the cutters downwardly through said openings for filling cans placed therebelow, and means for crowding the fish upon the bed to close up the openings cut in the fish slab by the cutters subsequent to the forcing of one set of fish disks through the openings in the apertured plate.

4. A can filling machine comprising a bed upon which fish slices are adapted to be urged, a plate having a transverse row of openings, said plate being coextensive with said bed and being slidably mounted thereto, an end wall for the bed, said plate being adapted to project below said end wall, a plurality of rotatory cylindrical cutters arranged in a transverse row above the plate, said end wall having a plurality of arcuate recesses coinciding substantially to an adjacent side of the cylindrical cutters, means for reciprocating the cutters to cut disks from fish adjacent the end wall, means for moving the plate to dispose its openings below the cutters, and means for forcing the disks from the cutters through said openings.

5. A can filling machine as claimed in claim 2, said bed having side walls for confining the fish slices laterally of the bed and its plate and an end wall adjacent the cutters, an endless belt mounted longitudinally above the bed, said belt having fish indenting devices adapted to engage the fish upon the bed to urge it under the cutters, and means for driving the endless belt.

6. A can filling machine having a bed upon which fish is moved in sheet form, an apertured plate coextensive with the bed and slidable relative thereto, a table adapted to receive a row of cans, a plurality of can supports each adapted to receive a can from the table, a pusher plate for moving the cans of the row into their respective can supports, means for blanking out disks of fish from the fish upon the apertured plate, means for moving the apertured plate and for discharging the disks downwardly through said apertured plate into the cans upon the can supports, and means for removing the filled cans collectively from said supports to discharge.

7. A can filling machine having a bed upon which fish is moved in sheet form, a table adapted to receive a row of cans, a plurality of can supports each adapted to receive a can from the table, a pusher plate for moving the cans of the row into their respective can supports, means for blanking out disks of fish from the fish upon the plate, means for discharging the disks downwardly below the bed, said can supports each having a slot, an inclined slide plate extending lengthwise of the can supports and having an inclined tongue extending into each slot, means for lowering the can supports to lower each can onto its complementary tongue to cause said can to move to discharge away from its can support.

8. A can filling machine comprising a bed having an apertured plate coextensive therewith and an end wall under which the apertured plate is slidably mounted, a pair of vertical shafts mounted on opposite sides of the bed, a row of spindles extending transversely of the plate, means for rotating the spindles from one of said shafts, each spindle having a sleeve, a cylindrical cutter carried by the sleeve adapted to cut a disk of fish on the plate and a shaft vertically slidable within the sleeve and a knock out pad on the lower end of the shaft and residing within the cylindrical cutter, said spindles being collectively supported for unitary movement, and means for vertically reciprocating the cutters through one sequence of movement, and means for vertically moving the knock out pads through a different sequence of movements.

9. A can filling machine as claimed in claim 8, wherein the knock out pads are adapted in their sequence to extend downwardly through the apertures of the apertured plates.

10. A can filling machine as claimed in claim 8, wherein means are provided for applying suction to the underside of the knock out pads when its coacting cutter is cutting fish on the plate and for applying air under pressure to said knock out pad to break the adhesion of the fish to said pad.

11. A can filling machine comprising a bed having an apertured plate coextensive therewith and an end wall under which the apertured plate is slidably mounted, a standard extending above the bed, a row of spindles extending across the bed and mounted for unitary reciprocation from said standard, each of said spindles consisting of a sleeve fitted at its lower end with a cylindrical cutter, and a shaft journalled in each sleeve and fitted at its lower end with a knock out pad, means for rotating the sleeves, means for imparting reciprocatory movement to the sleeves and cutters adapted to cut disks of fish upon the apertured plate, and means for imparting reciprocatory movement to the shafts and pads to thrust said disk through the apertures of the plate.

12. A can filling machine comprising a bed having an apertured plate coextensive therewith, and an end wall under which the apertured plate is slidably mounted, a standard extending above the bed, a row of spindles extending across the bed and mounted for unitary reciprocation from said standard, a driven vertical shaft mounted adjacent the standard, said shaft having a sprocket chain connected to each of the spindles to rotate them, a pair of cams mounted upon said shaft, each of said spindles consisting of a sleeve supporting a cylindrical cutter and a shaft within the sleeve carrying a knock out pad, one of said cams being adapted to reciprocate the sleeve and the other of said cams being adapted to reciprocate the shaft and its knock out pad.

13. A can filling machine comprising a bed having an apertured plate coextensive therewith, and an end wall under which the apertured plate is slidably mounted, a support under the plate upon which a can is adapted to be carried, means for moving the plate relative to the

bed to dispose an aperture of the plate over the can support and the can carried thereon, means vertically disposed above the plate and the can support for thrusting fish from the bed through said aperture into the can, and means extending into the can adjacent its peripheral wall for venting said can as the fish descends thereinto.

14. A can filling machine comprising a bed having an apertured plate coextensive therewith, and an end wall under which the apertured plate is slidably mounted, a can support under the plate upon which a can is adapted to be carried, means for moving the plate relative to the bed to dispose an aperture of the plate over the can support and the can carried thereon, means vertically disposed above the plate and the can support for thrusting fish from the bed through said aperture into the can, and means extending into the can adjacent its peripheral wall for venting said can as the fish descends thereinto, said venting means being carried by the plate and said can support being vertically movable towards the aperture therein when said aperture is in register with the fish thrusting means.

15. A can filling machine comprising a bed having an apertured plate coextensive therewith, and an end wall under which the apertured plate is slidably mounted, a support under the plate upon which a can is adapted to be carried, means for moving the plate relative to the bed to dispose an aperture of the plate over the can support and the can carried thereon, means vertically disposed above the plate and the can support for thrusting fish from the bed through said aperture into the can, and means extending into the can adjacent its peripheral wall for venting said can as the fish descends thereinto, said venting means being a finger hingedly mounted below the plate and said can support being vertically movable towards the aperture therein when the aperture is in register with the fish thrusting means.

16. A can filling machine comprising a bed having an apertured plate coextensive therewith, and an end wall under which the apertured plate is slidably mounted, a cylindrical rotary knife mounted above the plate, means for reciprocating the knife to cut fish upon the plate, said plate having an annular groove to receive the cutting edge of said knife when said knife is at the end of its cutting stroke, means for moving the plate after a fish cutting operation to bring the aperture of the plate into register with the knife, a can support mounted below the rotary knife, and means for forcing the cut fish from within the knife through the aperture and into a can upon the can support.

17. A can filling machine as claimed in claim 16 wherein the means for thrusting the fish from within the knife into the can is a plunger slidably mounted within said knife and is actuated in timed relation thereto.

18. A can filling machine comprising a bed having an apertured plate coextensive therewith, and an end wall under which the apertured plate is slidably mounted, a cylindrical rotary knife mounted above the plate, said plate being adapted to support fish to be cut into circular disks, means for moving the knife in a downward direction to project its cutting edge to a point below the fish supporting surface of the plate, means for returning the knife, means for moving the plate subsequent to the cutting operation to bring the aperture of the plate into register with the knife, and means for forcing the fish cut through said aperture.

References Cited in the file of this patent

UNITED STATES PATENTS

1,152,441	Schlothan	Sept. 7, 1915
2,037,724	Jacobs et al.	Apr. 21, 1936