March 3, 1953 E. H. CARRUTHERS 2,630,390

METHOD OF PACKING FISH MATERIALS IN CONTAINERS AND PRODUCTS PRODUCED THEREBY

Filed July 17, 1948 3 Sheets-Sheet 1

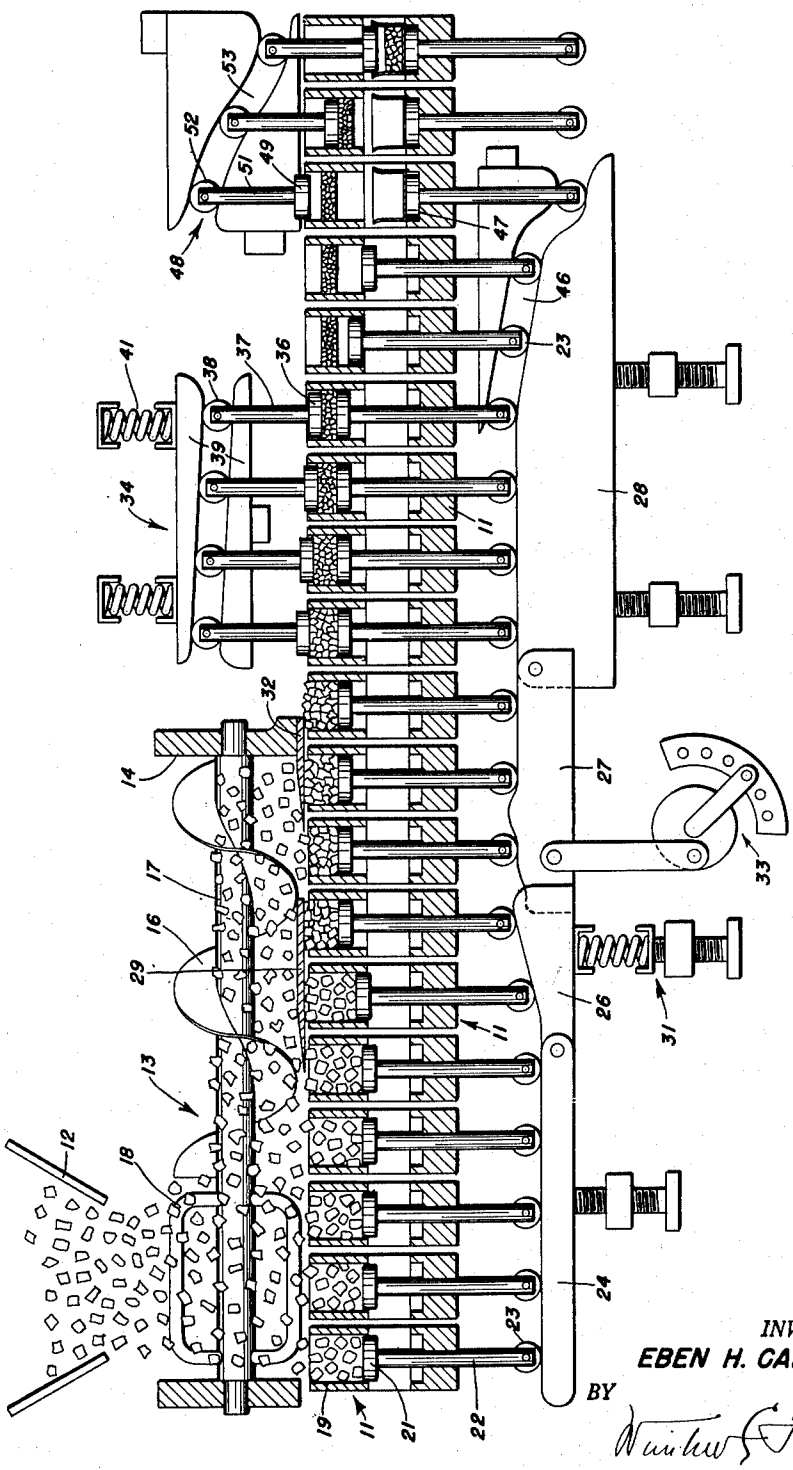


FIG. 1.

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Filed July 17, 1948 3 Sheets-Sheet 2

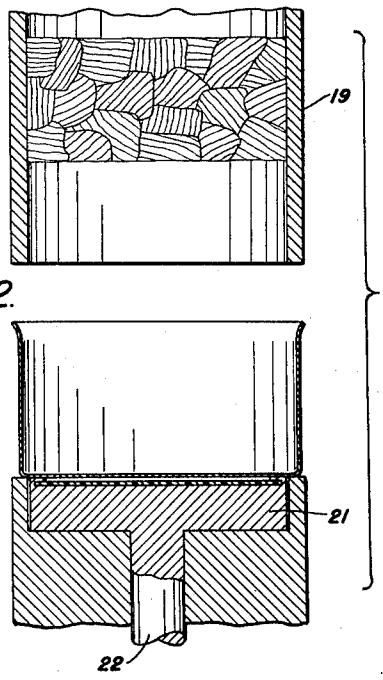


FIG. 2.

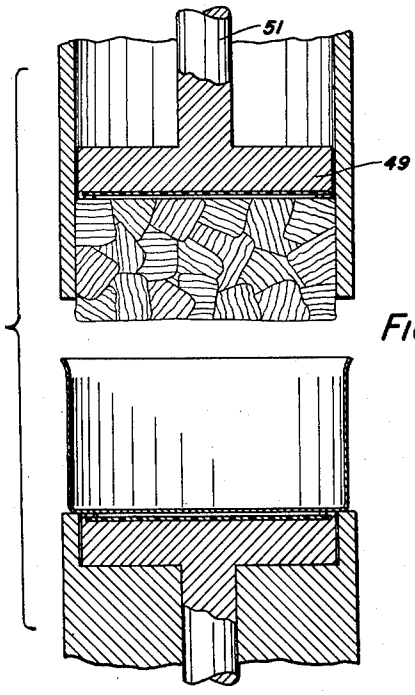


FIG. 3.

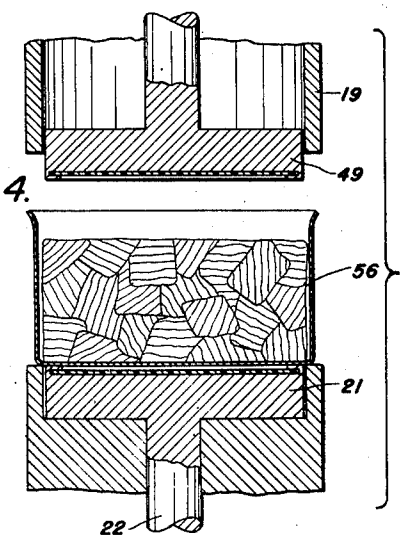


FIG. 4.

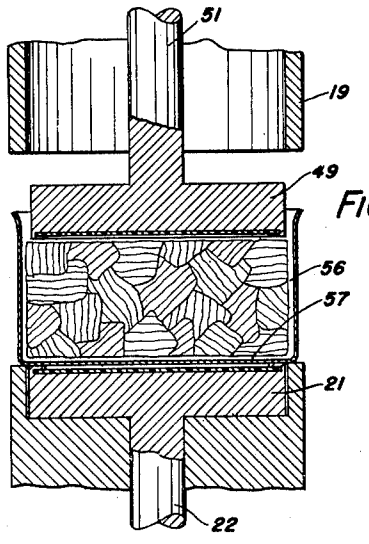


FIG. 5.

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Filed July 17, 1948 3 Sheets-Sheet 3

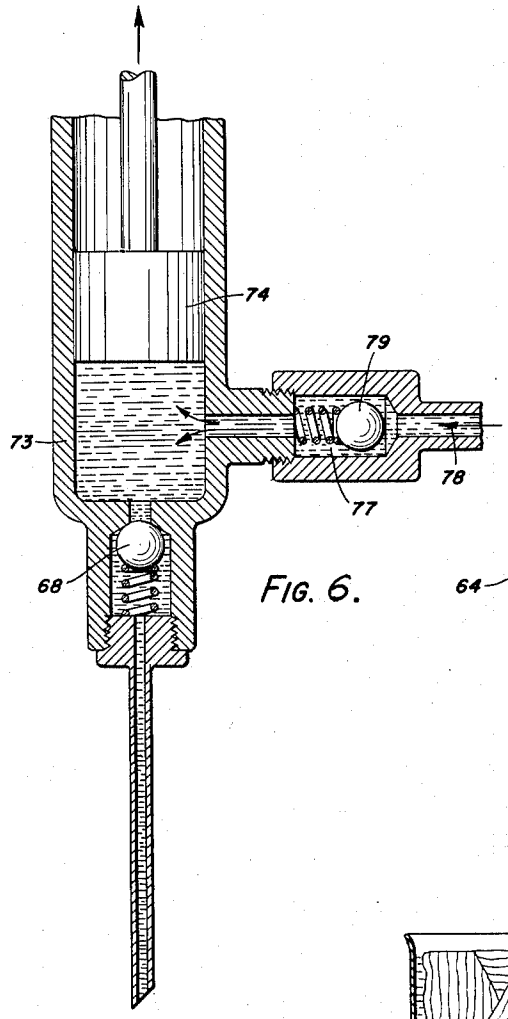


FIG. 6.

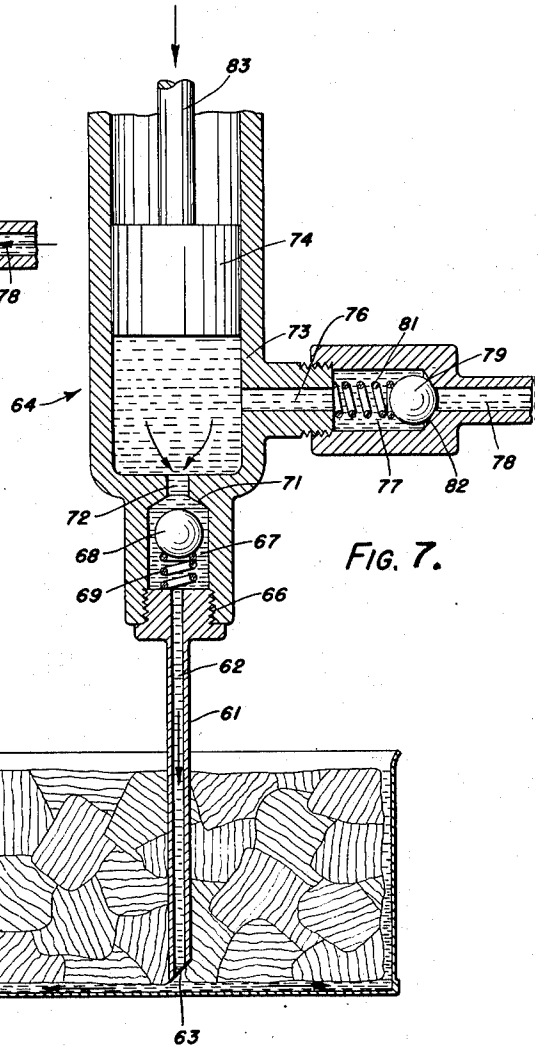


FIG. 7.

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Patented Mar. 3, 1953

2,630,390

UNITED STATES PATENT OFFICE

2,630,390

METHOD OF PACKING FISH MATERIALS IN CONTAINERS AND PRODUCTS PRODUCED THEREBY

Eben H. Carruthers, Warrenton, Oreg.

Application July 17, 1948, Serial No. 39,274

14 Claims. (Cl. 99—188)

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My invention relates to a method of packing materials in containers and the product produced thereby, the invention being particularly adapted to the packing of fish products such as tuna fish.

While the method of my invention has been particularly conceived for the purpose of packing flake tuna fish in cans or other containers, it is also adapted to the packing of other fish products. Moreover, the method of my invention may also be employed in the packing of other food products, particularly products of a moist, oily nature of where materials are added to the product which form with the product a sufficient binder to hold the particles together to enable them to be pressed into a cake of sufficient cohesiveness as at least partly to retain their cake form when placed in cans.

Heretofore, in the packing of flake tuna fish and other fish products, it has been customary practice to fill the can either by hand or by machine and then apply a packing pressure on the contents when in the can either by hand or by a piston. The application of pressure on the tuna serves, among other things, to form a top surface of reasonably smooth and pleasing appearance. The appearance of the can of tuna when opened, is important to the housewife and materially affects the price at which the product may be sold.

The use of a packing pressure on the material when in the can forces the material into intimate contact with the interior bottom and sidewalls of the can. Regardless of whether oil is placed in the can prior to placing the flake tuna in the can or after the packing pressure has been applied, in either case the tuna is in intimate contact with the bottom and side walls of the can when the can is closed. After the can is closed, the cans are placed in a retort and heated to a cooking temperature which may be in the neighborhood of 240° F.

The application of retorting temperatures, due to the intimate contact of the material with the bottom and sidewalls of the can, causes those portions of the tuna in such contact to become scorched. Scorching adversely affects the appearance of the tuna, turning it brown. Moreover, scorching affects the taste of the product causing the scorched portions to taste rancid, perhaps due to the oily nature of the product. The scorched character of the exposed portions of the material when removed from the can is very noticeable in most cases, and adversely affects the desirability of the product insofar as the housewife is concerned.

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An object of my invention is to provide a method of packing flake tuna and other fish products in which a cake of tuna is formed prior to placing the cake in the can, the cake being of a diameter less than the diameter of the can so that when the preformed cake is placed in the can, an annular marginal space extends between the inner sidewalls of the can and the other sidewalls of the cake for the reception of oil.

Another object of my invention is to provide a method of packing such products as flake tuna in which the tuna is protected against scorching during retorting.

A further object of my invention is to provide a method of packing such products as flake tuna whereby a cake of tuna is preformed, then placed in the can without exerting pressure on the cake after it is in the can to the end that the cake rests lightly on the bottom of the can and a marginal space exists between the inner sidewalls of the can and the outer sidewalls of the cake to the end that when oil is placed in the can, a film of oil extends beneath the cake and oil is present in the annular space between the outer sidewalls of the cake and the inner sidewalls of the can to protect the cake during cooking or retorting.

Still another object of my invention is to provide a method of packing tuna whereby a preformed cake of tuna may be placed in the can without exerting pressure on the cake after it is in the can so that it lightly rests on the bottom of the can and an annular space exists between the inner sidewalls of the can and the outer sidewalls of the cake, and in which the oil is placed in the can at a point adjacent the bottom thereof after the cake is in the can so that the oil forms a film on the bottom of the can, rises in the annular space adjacent the sidewalls of the can and flows over the top surface of the cake substantially completely to envelope the cake with oil to protect all surfaces thereof against being scorched during retorting.

My invention further comtemplates the provision of a novel article of manufacture in which the tuna or other product is so packed that upon opening the can and inverting it, the tuna will drop out of the can as a whole cake with the exterior exposed surfaces of the cake being of the same appearance and taste as the remainder of the cake.

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 an unrolled view of a machine suitable

for preforming a cake of flake tuna prior to placing the cake in a can;

Fig. 2 is a sectional view showing one position of travel of the molding units of Fig. 1 and illustrating the cake of tuna after it has been formed in the cylinder by the forming pistons or plungers;

Fig. 3 is a view showing the cake in a partially discharged position;

Fig. 4 is a view showing a cake of tuna after it has been dropped into the can and showing the piston following the cake;

Fig. 5 is a view showing the piston partially moving into the can without exerting a pressure on the cake so as to insure that the cake is properly deposited in the can.

Fig. 6 is a view similar to Fig. 7 showing the oiling mechanism preferably employed in the method of my invention, inserted in the cake of tuna, the piston moving downward in the cylinder and forcing oil into the can; and

Fig. 7 is a sectional view of a suitable mechanism for placing oil in the can, the parts being shown in a position to draw oil into the cylinder.

In my copending application, Serial No. 774,626 filed September 17, 1947, and entitled "A Method and Apparatus for Packing Flake Materials," I have shown and described a machine for preforming such materials into a cake of such consistency and rigidity that the cake may be placed in the can or other container in a preformed whole condition. While the machine of that application, as in the present application, has been primarily designed for packing flake tuna fish, it may be employed for other materials, particularly those materials of a relatively flaky, oily nature.

Reference is made to the above mentioned copending application for a description of the general operation of the machine of that application. The machine of that application will only briefly be described herein, since the machine by which the cake is preformed is not part of my present invention.

In Fig. 1, I have schematically illustrated the operation of the machine of that application in which the somewhat oval path through which the mold units, generally illustrated by the numeral 11, pass. The mold units are carried by chains (not shown) and are moved in an oval path thereby while various actions are performed on the materials deposited in the mold units as the mold units are carried by the chains.

The apparatus includes a hopper 12 in which the materials are deposited and from which the materials flow by gravity, as indicated in the Fig. 1, to a mold-filling section generally indicated by the numeral 13. The mold filling section 13 includes a filling trough 14 having a helical conveyor 16 mounted therein driven in any suitable manner by means not shown. Mounted on the shaft 17 of the spiral conveyor is a pair of U-shaped agitator bars 18, the purpose of which is to relatively, gently agitate the tuna as it drops into the filling trough so as to distribute it into the cylinders 19 of the mold units 11. The pitch and direction of rotation of the helical conveyor is such as to move the flake tuna or other materials from right to left of the machine as viewed in Fig. 1.

The mold units include pistons 21 which have piston rods 22 to the ends of which are secured rollers 23. The rollers ride over a series of adjustable cams 24, 26, 27 and 28.

After the mold units are loosely filled with the material being packed, the rollers 23 ride on the cam 26, and a knife 29 is provided above the mold units which, as the mold units pass over the edge, scrapes off the loose material. Thereafter, while the rollers are passing over the high point of the cam 26, the pistons in the compression chambers are precompressing the flake material against the extension of the knife 29. This precompression may be made any desired amount by adjusting the spring tensioning means generally indicated by the numeral 31 on the cam 26. This precompression of the material is accomplished at substantially constant pressure, is for the purpose of imparting a substantially uniform density of the mass of material in the compression chamber.

After leaving the cam 26, the rollers ride on the high point of the cam 27 and the pistons are raised slightly so as to raise the partly compressed material in the mold units just slightly to enable a second knife 32 to cut off a thin slice of the partially compressed cake. This trimming operation is for the purpose of securing accurate weight by accurately controlling the volume of the partially compressed flake material in mold units.

To assure accurate control of volume and therefore weight, and also to permit adjustment of the volume and the weight of the final cake to be placed in the can, an accurate and fine adjustment of the cam 27 is provided for adjusting the mechanism generally indicated by the numeral 33.

After leaving the filling section of the machine, the mold units enter a turret section, generally indicated by the numeral 34, where the material is compressed into a cake of considerable rigidity. The compression means include the pistons 21 and pistons 36 carried by the turret 34. The pistons 36 are connected to rods 37 which have rollers 38 mounted thereon. The rollers ride in a cam groove formed by cam elements 39 which are adjustable, as indicated at 41, to vary the degree of compression of the cake. As shown in the drawings, the upper cam element 39 is spring loaded to compress the flake material into a cake of predetermined thickness. The thickness of the cake is dependent upon the weight of the cake desired, the pressure exerted by the upper cam element 39, and the position of adjustment of the cam 28.

After leaving the compression turret, the pistons 36 are of course withdrawn and the rollers 23 enter the cam track 46 of the cam 28 where the lower pistons 21 are withdrawn. It will be appreciated that any desired weight of cake within the limits of the machine may be formed and this cake may be molded at a desired pressure in accordance with the character of the tuna being packed.

At times the tuna is more oily than at other times and the various adjustments of the machine described are necessary to maintain substantially constant weight and in order to secure a cake which will be retained in the compression chambers or mold units without support when the lower compression pistons are removed, upon riding into the cam track 46 of the cam 28. The compression pressure should also be not so great as to cause the material to lose an appreciable amount of oil or moisture.

In my copending application, Serial No. 774,626 filed September 17, 1947, and entitled "A Method and Apparatus for Packing Flake Materials," I have shown a form of piston which may be advantageously employed so as to prevent particles

of flake material from adhering to the pistons when they are withdrawn from the cake as above described.

When the pistons 21 are retracted to the position shown at 47, a can is dropped into the mold units by mechanisms not shown and the mold units enter a cake discharge section, generally indicated by the numeral 48. The cake discharge section 48 includes a turret only diagrammatically illustrated in Fig. 1.

Carried by the turret are pistons 49 having rods 51, at the ends of which are secured rollers 52 which ride in the groove of a cam formed by suitable cam elements 53. At the top position in the rotation of the turret of the cake discharge section 48, a piston or plunger 49 is actuated by the cam 53 and the compressed cake of flake material is pushed into the can. Because the cakes are all molded, it is only necessary for the pistons or plungers to push the cakes free of the compression chambers or mold units and no packing pressure is required on the cake when it is in the can.

In Figs. 2, 3, 4 and 5, I have illustrated the successive operations of the piston 49 in discharging the cake of material into the can. It will be appreciated from an examination of Fig. 4 that the cylinders 19 of the mold units are of a lesser diameter than the diameter of the can. The purpose of this is not only to facilitate entry of the cake into the can but also to leave a marginal space 56 extending annularly around the outer wall of the cake for a purpose which will later appear. That is, the preformed cake is of a lesser diameter than the diameter of the cake so that when the cake is placed in the can, an annular space exists between the outer sidewalls of the cake and the inner sidewalls of the can. It will further be appreciated from an examination of Figs. 4 and 5 that the cake is of less height than the height of the can.

In Fig. 2, I have illustrated the position of the mold units prior to entering the cake discharge turret, and when the cake is supported in the cylinders 19 free of the pistons. In this position, the can is deposited in the mold unit as shown in Fig. 2 so as to lie beneath the cake. In Fig. 3 the piston 49 has been moved downward by the cam 53 so as to push the cake out of the cylinder 19. As shown in Fig. 4, as soon as the cake is free of the cylinder, it drops by gravity into the can free of the piston 49. In Fig. 5, I have illustrated the position of the piston after it has continued its downward movement from the position shown in Fig. 4. The position of the piston shown in Fig. 5 is intended to not exert a pressure on the cake after it is in the can but instead, merely to insure that the cake will be deposited in the can as occasionally a cake may strike the lip of the can. Thus the cake lightly rests on the bottom of the can since no compression pressure is exerted on the cake after it is in the can. This light contact of the cake with the bottom of the can I have exaggerated by illustrating a space 57 between the bottom of the cake and the bottom of the can.

In the packing of tuna, oil is placed in the can which may be any suitable vegetable oil. The oil may be placed in the can prior to depositing the cake therein, but is preferably, due to a saving in oil, placed in the can after the cake is in position. Regardless of whether the oil is placed in the can prior to or subsequent to the cake, a film of oil extends between the bottom of the cake and the bottom of the can, due to the light contact of the cake to the bottom of the can. Moreover, the oil fills the annular space 56 so as to apply a protective outer covering for the cylindrical side walls of the cake. In addition, the top of the can above the cake has a layer of oil which protects the top surface of the cake. Thus the cake on all sides is enveloped by a protective layer or film of oil from intimate contact with the metal of the can.

After the can has been closed by the usual can-closing machinery, the cans are placed in a retort and cooked at a temperature which may approximate 240° F. The film or layer of oil extending around the cake is extremely important in protecting the outer surfaces of the cake from being scorched during the retorting or cooking operation. Scorching of the tuna not only changes its appearance and makes a less desirable pack, but also the scorched portions of the tuna are rancid and the taste of the tuna is materially affected by scorching.

For the purpose of insuring that a film of oil will exist between the bottom of the cake and the bottom of the can, I have shown in Figs. 6 and 7 a means of bottom oiling the can. This mechanism comprises a tubular element 61 having a passage 62, the lower edge of which has been cut off at an angle indicated at 63. The angular cutoff 63 is to insure that the oil will have free passage to the bottom of the can without interference from the bottom of the can.

In Figs. 6 and 7, I have somewhat exaggerated the desirable diameter of the tubular member 61, better to illustrate the invention, but it will be appreciated that preferably the tubular member is of the form and size of substantially a needle so that it may be readily inserted in the cake of tuna and pushed therethrough to a position adjacent to but slightly spaced from the bottom of the can.

The oiling mechanism includes an oil pump, generally indicated by the numeral 64, to the lower end of which, as illustrated at 66, the tubular member 61 is threaded. The oil pump includes a valve chamber 67 having a ball 68 mounted therein which is pressed by a spring 69 toward engagement with a valve seat 71 normally to close an oil passage 72.

The oil pump includes a cylinder 73 having a reciprocable piston 74 mounted therein. At the side of the cylinder an oil passage 76 is provided which communicates with the valve chamber 77 which in turn communicates with the passage 78 connected to a source of oil supply. The oil supply may be placed above the pump mechanism and flow to the pump by gravity if desired. The valve chamber includes a ball check valve 79 pressed by a spring 81 into engagement with a seat normally to close the passage 78.

Any suitable means may be provided to actuate the piston rods 83 of the pistons 74. For example, a series of oil pumps 64 may be provided in a movable turret and the cans may be moved in synchronism with the oil pumps so that the parts are in the position of Fig. 6 for a sufficient length of time to secure adequate oiling. The oil pumps are raised from the position shown in Fig. 6 at the end of the oiling operation and the piston rods 83 may be actuated by a stationary cam on which rollers at the end of piston rods 83 rise. The mechanism for raising and lowering the pump units as a whole and for actuating the pistons 74 is no part of my present invention. This subject matter is reserved for an application to be later filed.

On Fig. 7 I have shown the operation of the pump when the piston 74 is retracted to open the check valve 79 and draw oil through the passage 78 into the valve chamber 77 and the cylinder 73. In this operation the check valve 68 is closed. On completion of the upward movement of the piston 74, the check valve 79 closes and the check valve 68 remains closed.

The pump unit 64 then as a whole is lowered so that the tubular member 61 enters the cake of tuna and the end thereof moves to a position adjacent to but slightly spaced from the bottom of the can. It will be appreciated that when the valve 79 closes, the tubular member 61 is filled with oil which is retained therein, due to the fact that any tendency of the oil to run out of the tubular member 61 creates a vacuum in the valve chamber 67 which prevents such action. Thus the oil in the tubular member 61 prevents entry of tuna into the tubular member as it is inserted in the cake of tuna, thereby preventing clogging the tubular member.

Upon the downward movement of the piston 74, the check valve 79 is held tightly on its seat and valve 68 opens to discharge oil to a point adjacent of the can. The oil flows in a film along the bottom of the can and tends to buoy up the cake of tuna so as to free it from the bottom of the can and provide a layer of oil between the bottom of the cake and the bottom of the can for further protecting the bottom of the cake from scorching during retorting, as mentioned above. The oil flows along the bottom of the can and rises in the annular space between the outer side walls of the cake and the inner side walls of the can. Oil also flows over the top of the cake to provide a protective covering at the top of the cake of tuna.

It will now be appreciated that I have provided a method of packing materials of an oily nature which may be compressed into a cake, such as flake tuna, in which the cake may be preformed prior to insertion in the can so that no pressure is applied on the cake when in the can and have provided a method wherein the cake is completely enveloped by the oil in the can so as fully to protect the cake against scorching during retorting.

While I have shown the method of oiling the can by placing the oil at the bottom of the can in connection with a cake of flake tuna, it will of course be appreciated that bottom oiling may be advantageously employed with solid packs of tuna and with flake tuna which is either loosely placed in the can or pressure applied after the tuna is in the can.

While I have shown the preferred method of my invention, it will be appreciated that various changes may be employed therein, particularly in the form of the apparatus by which my method is carried out, without departing from the spirit of my invention as set forth in the appended claims.

I claim:

1. A method of packing fish in a container which comprises compressing the fish materials into a cake of cylindrical shape of a diameter less than the diameter of the container which the cake is to occupy, inserting the cake in its formed condition in the container so as to leave an annular space between the inner side walls of the container and the outer side walls of the cake, and then putting oil in the container to fill said annular space.

2. A method of packing fish in a container which comprises compressing the fish materials into a cake by pressures applied on the top and bottom of the cake, said cake being of cylindrical shape of a diameter less than the diameter of the container which the cake is ot occupy, thereafter inserting the cake in its formed condition in the container so as to leave an annular space between the inner side walls of the container and the outer side walls of the cake, then putting oil in the container to fill said annular space, and then closing the container and retorting the contents of the container at a cooking temperature.

3. A method of packing fish in a container which comprises compressing the fish materials into a cake of cylindrical shape of a diameter less than that of the diameter of the container which the cake is to occupy, the height of the cake being less than the height of the container and thereafter inserting the cake in its formed condition in the container and without exerting pressure on the cake when in the container so that the cake rests lightly on the bottom of the container and an annular space exists between the inner side walls of the container and the outer side walls of the cake so that when oil is put in the container it tends to fill said annular space and flow in a film across the bottom of the container.

4. A method of packing tuna fish which comprises flaking the tuna, compressing the flaked materials into a cake by pressures applied on the top and bottom of the cake, said cake being of cylindrical shape of a diameter less than the diameter of the container which the cake is to occupy, the height of the cake being less than the height of the container, and thereafter dropping the cake in its formed condition into the container without exerting any packing pressure on the cake when in the container so that the cake rests lightly on the bottom of the container and an annular space exists between the inner side walls of the container and the outer side walls of the cake to the end that when oil is put into the container it tends to fill said annular space and flow in a film across the bottom of the container.

5. A method of packing tuna fish which comprises flaking the tuna, compressing the flaked materials into a cake of cylindrical shape of a diameter less than the diameter of the container which the cake is to occupy, the height of the cake being less than the height of the container, thereafter inserting the cake in its formed condition in the container without exerting pressure on the cake when in the container so that the cake rests lightly on the bottom of the container, then closing the container, and then retorting the contents of the container at a cooking temperature.

6. A method of packing fish in a container which comprises placing the fish materials in the container, inserting a tubular member in the mass of fish material, and forcing an oil through said tubular member into the container.

7. A method of packing fish in a container which comprises placing the fish materials in the container, inserting a tubular member in the mass of fish material to a point adjacent the bottom of the container, and forcing an oil through said tubular member and allowing it to spread over the bottom of the container.

8. A method of packing fish in a container which comprises compressing the fish materials into a cake of cylindrical shape of a diameter less than that of the diameter of the container which the cake is to occupy, then inserting the cake in its formed condition in the container so as to

leave an annular space between the inner side walls of the container and the outer side walls of the cake, inserting a tubular member in the mass of fish material to a point adjacent the bottom of the container, and forcing an oil through said tubular member and allowing it to spread over the bottom of the container and rise in said annular space.

9. A method of packing a fish product which is to be retorted after container sealing in a container which comprises compressing the fish materials into a cake of cylindrical shape of a diameter less than that of the diameter of the container which the cake is to occupy, the height of the cake being less than the height of the container, thereafter inserting the cake in its formed condition in the container and without exerting substantial pressure on the cake when in the container so that the cake rests lightly on the bottom of the container and an annular space exists between the inner side walls of the container and the outer side walls of the cake, then inserting a tubular member in the mass of fish material to a point adjacent the bottom of the container, and forcing an oil through said tubular member and allowing it to spread over the bottom of the container and rise in said anular space.

10. A method of packing a fish product which is to be retorted after sealing the container in which the fish product is packed which comprises forming the fish product wholly outside the container into a cylinder of lesser diameter than the diameter of the container, thereafter inserting the cylinder in its formed condition into the container without exerting a forming pressure on the cylinder when in the container thereby to leave a marginal space between the outer side walls of the cylinder and the inner side walls of the container, then putting oil in the container to fill said marginal space.

11. A method of packing a fish product which is to be retorted after sealing the container in which the fish product is packed which comprises forming the fish product wholly outside the container into a cylinder of lesser diameter than the diameter of the container, thereafter inserting the cylinder in its formed condition into the container without exerting a forming pressure on the cylinder when in the container thereby to leave a marginal space between the outer side walls of the cylinder and the inner side walls of the container, inserting a tubular member in the cylinder of fish product, and forcing

an oil through said tubular member into the container.

12. A method of packing a fish product which is to be retorted after sealing the container in which the fish product is packed which comprises forming the fish product wholly outside the container into a cylinder of lesser diameter than the diameter of the container, thereafter inserting the cylinder in its formed condition into the container without exerting a forming pressure on the cylinder when in the container thereby to leave a marginal space between the outer side walls of the cylinder and the inner side walls of the container, then inserting a tubular member in the mass of fish material to a point adjacent the bottom of the container, and forcing an oil through said tubular member and allowing it to spread over the bottom of the container and rise in said marginal space.

13. An article of manufacture comprising a cage of flaked tuna in a container, said cake of tuna being smaller in diameter than the diameter of the container so that an annular space filled with oil extends between the side walls of the cake and the side walls of the container, said cake being of sufficient rigidity and cohesiveness that when the container is opened and inverted the cake drops from the container in a substantially whole cake condition.

14. An article of manufacture comprising a cake of flaked tuna in a container, said cake of tuna being smaller in diameter than the diameter of the container so that an annular space filled with oil extends between the side walls of the cake and the side walls of the container and a film of oil exists between the bottom of the cake and the bottom of the container, said cake being of sufficient rigidity and cohesiveness that when the container is opened and inverted, the cake drops from the container in substantially whole cake form.

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