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METHOD OF DISPENSING PARTICLES OF MEAT TO CONTAINERS IN A CANNING LINE

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Fig. 1

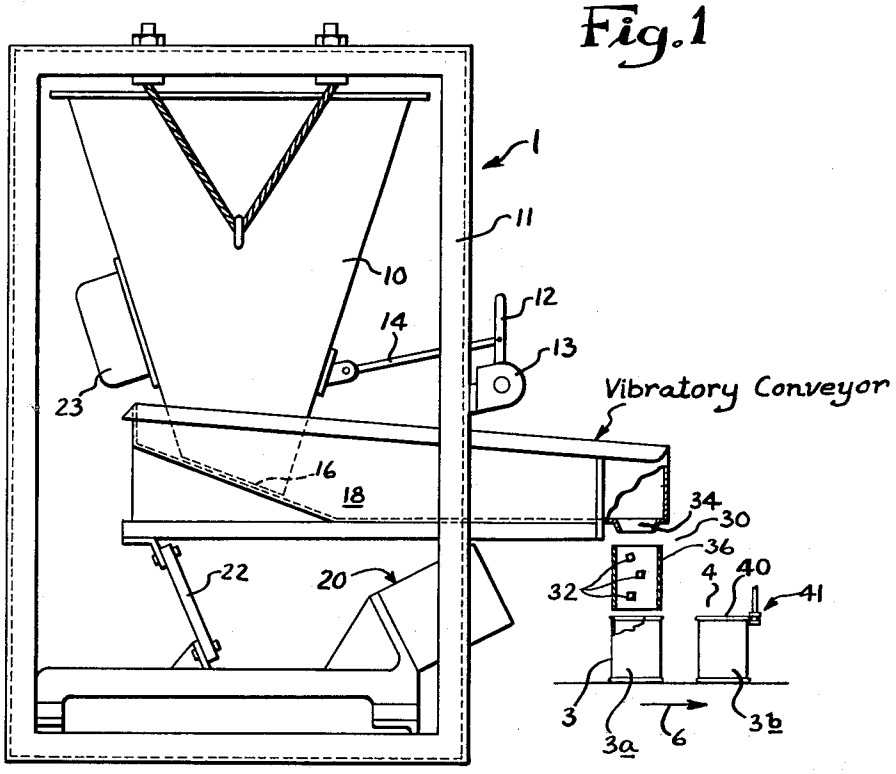
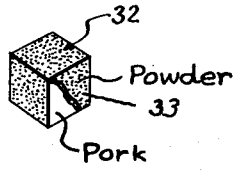


Fig. 2



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METHOD OF DISPENSING PARTICLES OF MEAT TO CONTAINERS IN A CANNING LINE

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This invention relates to the art of canning and is particularly concerned with that branch of the canning art that is concerned with the feeding or supplying of one of the ingredients to be canned in measured quantities to containers in a canning line. In its more specific aspects this invention relates to a method of and means for supplying measured quantities of an item such as for instance, pork, to containers in a line wherein the product being canned is, in this example, pork and beans.

In the canning of pork and beans it is usual practice to cut the pieces of pork to the required size using a combination of mechanical slicing equipment and hand cutting. The size of the pork piece or chunk is dependent upon the container size. It is usually added so that one piece of pork is placed in each container as it passes along continuously on a conveyor. Hand filling is satisfactory where filling lines are operated at less than 200 containers per minute. At speeds in excess of this it has been found difficult to place pork in the cans uniformly unless the line is divided and a number of workers employed. Many attempts have been made to feed the pork mechanically but none of these have been successful.

We have found that if the pork is subdivided into a number of units for addition to the container that mechanical equipment is available, as herein described, which can be arranged for feeding the discrete pieces of pork with relative uniformity into the container. This results in a substantial saving of labor as a line operating at 200 cans per minute usually requires three workers to place the pork in the containers. At higher line speeds a proportionately greater number of workers are necessary.

When it is desired to place one piece of pork in each container it is obvious that this cannot be accomplished by premixing the pork with the beans and then filling into containers. If this were attempted many containers would contain no pork and others would receive two or more pieces. Premixing is not even practical when a small number of pork pieces are required in each container for the same reason.

We have found that if the amount of pork required for each container is cut into small units that these units can then be placed in the container in a separate filling operation with relative uniformity.

Pork and beans were packed in metal containers having a diameter of $4\frac{1}{16}$" and a height of $4\frac{11}{16}$ inches (the standard #2½ can) and approximately ⅓ oz. of pork added. This weight of pork is an average weight that is commercially utilized. A number of trials were made to determine the most advantageous size and number of pieces that could be placed in the individual container. The following table covers the range of the trials for the 401 x 411 can.

Size of Pork Pieces

	¼" Cubes	5/16" Cubes	3/8" Cubes	¼ × ¼ × 3/8"	3/8 × 3/8 × ¼"
Number of pieces of pork per container	21	11	6	14	9

From the standpoint of appearance it was decided that the ¼" cubes were too small. All of the other size cuts

were satisfactory. In canning pork and beans it is highly desirable that each container should contain approximately the same amount of pork. Maximum uniformity in filling is obtained by subdividing the pork into the largest possible number of pieces. When an individual container receives less than its average share of pork this is not as noticeable or objectionable when the number of pork subdivisions is large.

It is one of the objects of the present invention to supply particles or cubes of pork to containers in a pork and bean canning line wherein the cubes are of a comparatively small size so as to require many such cubes per can. As a result there is a very great decrease in the probability that any container will receive no cubes of pork and there is a great probability that each container will receive a number of cubes of pork not objectionably below its required number. There is a minimum size for the cubes or pieces of pork. This is due to the fact that it is desirable that the pieces of pork should be conspicuously visible when the canned product is used, and should not appear too small. It should also be borne in mind the fact that the cubes of pork will tend to shrink in size during the thermal processing of the canned product. We have found that a 5/16" cube or a parallelepiped of approximately the same volume is a desirable size for the particles of pork.

It is another object of the present invention to provide a canning line with feeding mechanism for feeding comparatively small particles of pork to containers in the line and wherein the rate of feed of the pork per container at the receiving station may be adjusted at will, and once adjusted will maintain that rate within close limits and independently of the magnitude of fluctuations in the amount of pork remaining from time to time in the pork supply hopper.

It is a further object of the present invention to provide for the delivery of pieces of pork to containers in a canning line wherein the pieces of pork are substantially cubical or the like in shape, of a small size, say of the order of 5/16 inch cubes, and coated with a material that will inhibit sticking of the pieces to one another or to the mechanical equipment that is used. The coating material is one that is harmless in the end product. A suitable coating material is flour, or corn starch.

While we have herein spoken of the feeding of pieces of pork in a canning line for canning pork and beans, it is within the purview of our present invention to use the principles thereof for feeding pieces of other material in a canning line where it is highly desirable that every container shall receive some of the pieces of material. For instance, the feeding of pieces of chicken meat to containers in a canning line wherein chicken soup is being canned.

The attachment of the above and further objects of the present invention will be apparent from the following specification taken in conjunction with the accompanying drawings forming a part thereof.

In the drawing:

FIG. 1 is a diagrammatic view illustrating a preferred apparatus for carrying out the present invention; and

FIG. 2 is an enlarged perspective view of a piece of pork of the kind that is supplied to the containers.

The apparatus for carrying out the present invention consists essentially of a vibratory hopper and conveyor structure **1** that delivers pieces of pork to containers **3** in a conveying line **4**, the containers of the line moving in the direction indicated by the arrow **6**. The structure **1** is a vibratory dry feeding machine. A preferred construction of a dry feeding machine suitable for the purpose is that which is more fully described in United States Patents 2,187,717 and 2,323,864, all of the disclosures of which patents are by reference herein in-

corporated. Briefly, the structure **1** includes a hopper **10** that is suspended from a frame **11** for pivotal movement, the angular position of which is regulated by a handle **12** of a controller **13** which is connected to the hopper **10** by a connecting rod **14**. The position of the handle **12** determines the location of the hopper outlet **16** with respect to a slightly inclined vibratory conveyor **18** thereby regulating the rate of flow of material from the hopper **10** on to the conveyor.

The conveyor is operated by an electric motor magnet mechanism **20** and is supported at its rear by an elastic support **22** and is operated by a pulsating or alternating current. The material within the hopper flows to the conveyor at a rate determined by the frequency and amplitude of vibration of the conveyor and by the spacing between the outlet **16** of the hopper and the vibrator conveyor, said spacing being varied by tilting the hopper by actuating the handle **12** of the controller **13**. A vibrator **23** is, optionally, provided for vibrating the hopper to prevent jamming of the contents thereof.

When a pulsating current is passed through the operating coil of the electromagnet of the mechanism **20**, the conveyor **18** is set into a vibratory motion, and material placed thereon, such as pieces of pork, will be conveyed in one direction. The natural periodicity of the conveyor mounting is preferably sub-synchronous to the periodicity of the electrical impulses applied to the motor mechanism **20** so that the conveyor at all times responds to the electro-magnetic impulses. The rate of feed of the conveyor therefore can be quickly changed by adjusting the current supplied to the solenoid of the magnet of the motor mechanism **20**, thus governing the amplitude of vibration of the conveyor. The material to be fed having been introduced into the hopper through the top thereof, is discharged from the hopper through the space between the outlet **16** at the bottom thereof and the vibratory conveyor. The conveyor acts as a vibratory gate to control the discharge from the hopper, and the reciprocations of the conveyor carry the material along and discharge it from the open end of the hopper in a moving stream. By adjusting the feed opening between the hopper and the conveyor, a different number of particles of pork may be delivered to the conveyor per vibration thereof. For a more complete description of this mode of action, reference is had to Patent 2,323,864, and the references therein referred to.

In the embodiment herein shown a container **3** on the conveying line is moved in a step by step manner to a position *3a* which is at the delivery station **30** where particles of pork **32** drop from an outlet opening **34** in the conveyor **18**, through a container filler pocket **36** into the container at *3a* which is open at its top and to which the proper amount of beans have been or will subsequently be added. This is followed by the addition of the sauce. The container moves to an ultimate position *3b* where the container is sealed by a lid **40** which in the instance of a conventional so called "tin" can is seamed on to the can by a conventional seaming apparatus **41**.

The particles of pork **32**, illustrated to an enlarged scale in FIG. 2 are of a generally cubical shape. It has been found that a desirable size for the cubes of pork is a cube $\frac{5}{16}$ of an inch long on each side or parallelepipeds of ¼" x ¼" x ⅜" or ⅜" x ⅜" x ¼" per side. These pieces of pork are of sufficient size so that even if there is shrinkage of the size of the pieces of pork in the container, as for instance due to thermal processing after sealing of the container, each remaining piece of pork within the container will still be large enough to be clearly and distinctly visible. The pieces are sufficiently small so that in the small containers there is delivered an average of approximately a dozen pieces of pork.

Before the pieces of pork are put into the hopper **10** they are coated with a film **33** of powdered food material that will inhibit sticking of the pieces together. This material may consist of ordinary wheat flour or corn starch or the like.

In the accompanying drawing the sizes of the container **3** are, for the sake of illustration, disproportionately large in proportion to the size of the structure **1**. For instance, the structure **1** may be of a height of the order of four feet, and the cans may be of a height of the order of four inches.

The pieces of pork **32** in the hopper **10** are preferably, although not necessarily, chilled, but it is not necessary that they be frozen.

While I have herein shown and described a process for delivering pieces of pork to containers of beans on a pork and bean canning line, it is of course understood that the invention is of broader application. For instance, instead of pieces of pork there may be pieces of chicken or beef delivered by the conveyor to containers of soup on a canning line.

In compliance with the requirements of the patent statutes, we have herein shown and described a preferred embodiment of the present invention.

What is considered new and sought to be secured by Letters Patent is:

1. In the art of canning, the method of delivering edible ingredient material to containers in a canning line wherein the containers are displaced successively and at a controlled frequency to and past an ingredient receiving station in the canning line, which comprises providing the desired ingredient material as discrete particles of predetermined substantially uniform volume, localizing a supply of such discrete particles, and continuously removing particles from the localized supply by vibrational displacement of the particles at a rate preselected relative to the frequency of container displacement to and past the station, and conveying the removed particles to said station and into successive containers.

2. The method of delivering meat to containers in a canning line wherein the quantity of meat delivered to each container is a minor fractional part of the contents of each container, which comprises dividing the meat into substantially uniform pieces, localizing a supply of such pieces, and conveying the pieces from the localized supply to the containers successively by vibrational displacement of the pieces, the vibrational displacement of the pieces being at a rate such that each container receives at least one piece of meat.

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