March 7, 1939. W. J. MUNDY 2,149,461

APPARATUS FOR FILLING CANS

Filed Sept. 5, 1935

FIG. 1.

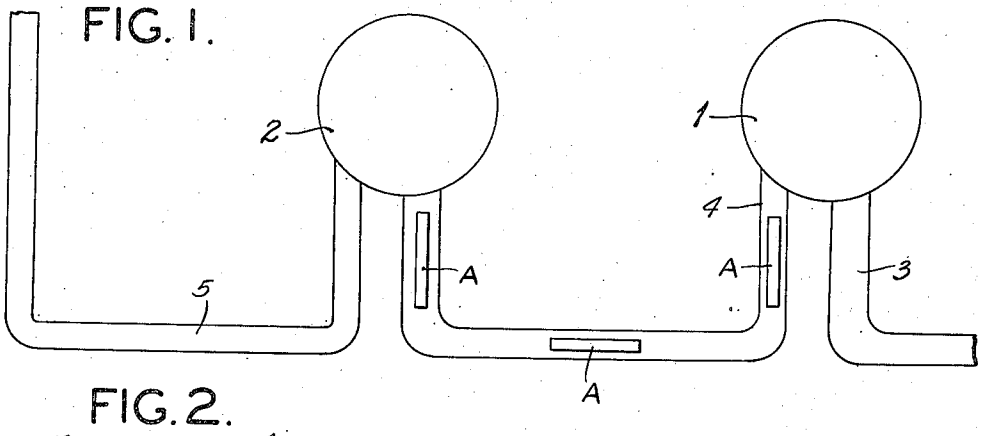


FIG. 2.

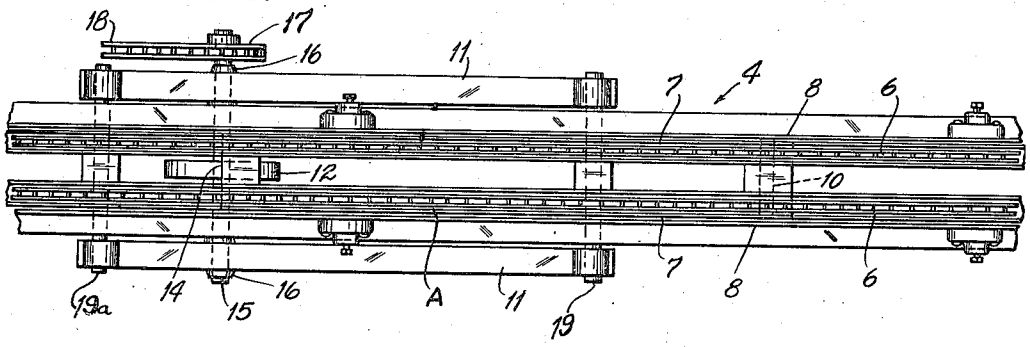


FIG. 3.

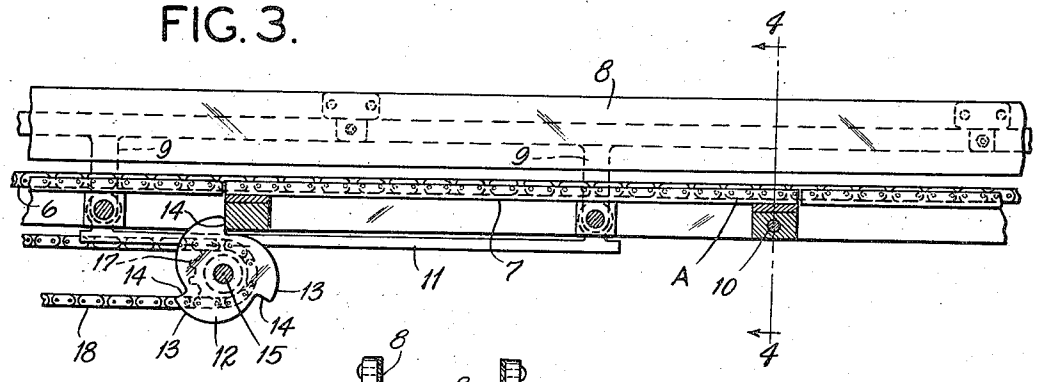
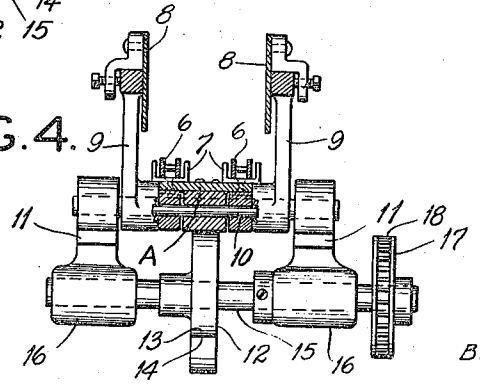


FIG. 4.



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APPARATUS FOR FILLING CANS

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Application September 5, 1935, Serial No. 39,202

2 Claims. (Cl. 226—72)

My invention relates to apparatus and methods for filling cans and more particularly to filling cans with loose material such as cocoa, baking powder, snuff and like products.

The term "loose material" as used herein not only includes material in powder form as stated above, but includes any material which may be settled or otherwise evenly compressed so that a given charge or amount of such material in free or expanded condition may be reduced in volume by any suitable settling operation effected either directly on the material or by operation on the can or other receptacle into which the charge has been introduced.

Heretofore, in machine filling cans with such loose material a charge of the proper size determined either by weight or volumetrically, was introduced into the can which was then capped, labeled and packed, usually together with other cans, in a suitable case. When the charge was flowed or otherwise inserted into the can the material was, of necessity, very loose and unsettled and the particles were separated, so that the volume of the charge was comparatively great for a given weight thereof. When these packed cans were handled in shipping, selling, and delivery to the consumer the shocks and movement to and of the can would have a settling action on the contents thereof so that, although the weight of the charge, of course, would not change, the volume thereof would be decreased substantially. As a result when a can filled in this way was opened by a consumer there would be a substantial space between the opened top of the can and the upper surface of the material therein. Often this would create a dissatisfied consumer of the canned product because such consumers, not appreciating that only the volume and not the weight of the material in the can had been diminished, would think that the can did not contain the full measure or amount paid for and represented as being contained in the can.

Also, the practice as heretofore used was extremely costly to the canner of the product because, although, as required by regulation only the weight of the contents of the can need be given by producers of these kinds of material, of necessity, and for the reasons stated above the canner had to use a can large enough to contain a charge of given weight of material in its expanded or unsettled condition. However, as set forth above, the charge was in such expanded condition for a short period of time only and as a result the cans as heretofore used were unnecessarily large to accommodate a charge of material in expanded condition and such oversize can was expensive to the canner. To obviate these deficiencies attempts have been made to introduce loose material under pressure into the cans. However, such attempts have resulted only in greatly decreasing the speed at which the cans were filled. Some materials cannot be filled under pressure in any event because the pressure changes the color or texture thereof.

The objects of my invention are to provide an apparatus for filling cans wherein the can used may be of a size only large enough to hold a charge of material of given weight in its settled condition; to provide a method and apparatus by which cans of smaller size may be used to contain a charge of given weight; to provide an apparatus and method for filling cans wherein the charge will fill the can at all times after the can is sealed; and to provide a settling device for settling the charge in the can during the filling operation and before it is packed and sealed.

My invention in its broadest aspect contemplates the use of can filling apparatus designed and operated so that a charge of given size is first introduced into the can. Such charge is then settled in the can by any suitable expedient and then a second charge having a volume substantially equal to the reduction in volume of the primary charge during settling is then introduced into the can before the can is capped. By proper designing of the apparatus a complete filling operation may be effected so that a can is filled with an exact weight of material as well as an exact volume thereof.

Apparatus to fill cans and as contemplated by my new invention may be made in various forms. However, in the accompanying drawing I have shown, diagrammatically in part, one filling unit embodying my new and improved apparatus and showing the practice of my new and improved method of filling cans. In the drawing, wherein similar characters are used to designate similar parts, Fig. 1 is a diagrammatic plan view of an assembled unit made according to my invention; Fig. 2 is a plan view showing a detail of a conveying means from a filling machine; Fig. 3 is an elevation of the mechanism shown in Fig. 2; and Fig. 4 is a cross section along the lines 4—4 in Fig. 3.

Referring to the figures and particularly to Fig. 1, a machine for introducing a primary charge of loose material into the can is diagrammatically indicated at 1 and a machine for introducing the secondary charge, all as hereinafter

described, is indicated at 2. These machines may be similar in design and may be of any of the types now in use. Also, they may determine the charge introduced in the can by weight or volumetrically.

The cans as in usual practice may be fed into the first machine by a conveyor assembly 3, the filled cans leave said machine on a conveyor assembly 4, from which conveyor they are introduced into the secondary machine and after the introduction of the secondary charge therein the cans leave this second machine and are carried to a packing table or other suitable place on a conveyor assembly 5. The conveyors used may be of any type, but I prefer that they be adapted to move continuously in a forward direction, that is, from their point of entry into the machine when empty to the place of exit from the machine when filled, and the conveyor 4 particularly should be arranged so that as the cans are on the conveyor the cans can be subjected to an action which will settle the loose material introduced therein in the machine 1.

In the embodiment shown in the drawing the conveyor used is of the chain type and is constructed as described in Patent No. 1,476,112 issued December 4, 1923, and now owned by the assignee of this application. A portion of this conveyor is shown in Figs. 2, 3 and 4. The conveyor chains 6, driven by any suitable expedient, are arranged to move in channel members 7, and, preferably, are positioned so that the upper surface thereof is slightly above the upper edges of the channels. Guide rails 8 carried by any expedient such as posts 9 are arranged to guide the cans as they are moved by the chains.

In this embodiment of my invention the settling action on the cans is effected in the following manner: A section, indicated at A in the figures, of the channel members 7 is pivotally mounted on the pin 10 suitably carried by the conveyor structure and is freely supported at its other end by an eccentric cam 12 positioned so that as the cam is rotated the free end of the section A will be raised gradually for a slight distance together with the portions of the chains 6 and the carried cans passing thereover at that time and then will be allowed to drop sharply onto the bars 11 to impart a settling action to the cans. In the figures, the cam 12 comprises three cam shoulders 13 and a similar number of notches 14. However, the exact form of cam used is immaterial. The unity of the conveyor is maintained by the bars 11 extending between the rods 19 and 19a carried by fixed portions of the conveyor.

The cam 12 is fixed to the shaft 15 rotatably mounted in bosses 16. On the outer end of the shaft 13 is a sprocket 17 which engages a drive chain 18 moved by a drive sprocket, not shown, but preferably driven by the same source of power as used for driving the conveyor chain 6.

The method of filling cans by means of the apparatus described above of similar machines should be understood readily. Cans are placed on the conveyor assembly 3 and are moved along said conveyor into the machine 1. In this machine a primary charge of loose material, determined either by weight or volumetrically, is introduced into the cans. Preferably, this charge is sufficient to fill the can. From the machine 1 the cans each containing a primary charge are discharged onto the conveyor assembly 4 and are carried thereby over to the machine 2. As the cans move along the conveyor assembly 4 settling mechanism, such as the movable sections A, is operated to settle the loose material in the cans and thereby effect a reduction of the volume of the charge in each can. The cans then enter the machine 2 and a secondary charge is introduced into the can. Preferably, this secondary charge is of a size equal to the reduction of volume of the primary charge as a result of the settling action. The filled cans are then carried from the machine 2 by the conveyor assembly 5. The cans move continuously in a forward direction during their progress through the apparatus during the filling operation.

It will be understood that the secondary charge will be comparatively small and that any settling thereof will be slight. Therefore, the filled cans will maintain approximately the same volume of material therein throughout the handling, shipping and delivery to the consumer and when the can is opened it will be full. Furthermore, obviously, a given weight of material by the use of my method and apparatus may be included in a smaller can than heretofore was possible because the comparatively large primary charge is settled and then the reduction of volume of such charge is made up by the secondary charge before the can is sealed. This will result in a great saving of can cost.

Furthermore, with the use of a unit as described above, cans may be filled at high speed. If the weight of the loose material in various conditions is known the final charge in the can may be definitely regulated and determined even though the can is filled by the introduction of charges measured volumetrically.

Apparatus embodying my invention and the practice of my new method may be changed within wide limits when such apparatus and method are adapted to filling cans with different materials. In some instances, a single filling machine may be used to introduce both the primary and secondary charge, but I do not believe that such use would result in operation as effective as when two filling machines are used as described above. However, this and other changes may be made without deviating from the spirit of my invention as included in the appended claims.

What I claim as new and desire to secure by Letters Patent, is:

1. An apparatus for filling cans with loose material, and comprising a machine for filling said can with a primary charge of said loose material, a second machine to introduce a secondary charge of said material into said can, and a conveyor assembly adapted and arranged to carry cans from said first machine to said second machine, said conveyor assembly having a section thereof hingedly mounted at one end and having the other end free to move relative to the other parts of said conveyor, and means for intermittently moving the free end of said section to cause a settling action on cans passing thereover.

2. The combination in an apparatus for filling cans, of a conveyor assembly including a channel member, a movable chain adapted to move along said channel member, a section of said channel member being hingedly mounted at one end thereof and having its other end free to move relative to the rest of said channel member, and means for causing said movable free end of said section to move up and down to effect a settling action on cans passing thereover.

WILLIAM J. MUNDY.