PLASTIC MATERIAL MEASURING AND FILLING MACHINE

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Inventor
William Arthur Coyte

By W. Singer atty
This invention relates to machines or apparatus for dividing off and packing predetermined quantities of ice-cream or similar plastic material, and is concerned particularly with the production of what are known as ice-cream bricks.

The object of the invention is to provide an expeditious and hygienic means whereby portions of ice-cream are divided off and delivered into a lined box or case ready for subsequent freezing into ice-cream bricks.

Therefore in carton and like filling machines in which the carton or containers are moved intermittently into filling position by endless chain or other mechanism, it has been proposed to provide the material feeding devices with stopping mechanism having a releasing member extending into the path of the carton or container so as to be operated only when a carton or container is moved into filling position, and such devices have been arranged to operate on the lever mechanism of pivoted or sliding covers of measuring devices through which the material is fed to the containers. It has also been proposed to use a similar mechanism for stopping the machine when no containers are fed to filling position and also to provide on similar machines a device of the kind having a measuring chamber provided with oppositely sliding shutters at its ends so that when the upper one is open the lower one is closed and vice versa when the material is fed into the container.

The present invention comprises apparatus for dividing off and feeding predetermined quantities of plastic material and having material feeding apparatus held out of operation by controlling mechanism adapted to be operated by the passing of a container into feeding position, characterized by the material being fed by a cylinder of which the reciprocating plunger has continuously operated reciprocating mechanism adapted to be brought into operation by such controlling mechanism.

A machine according to my invention comprises essentially a hopper containing the ice-cream in bulk, an outlet from the hopper controlled by a valve and having means for feeding into delivery position a measured quantity of ice-cream, a travelling belt or chain upon which the boxes or cases adapted to receive the ice-cream are placed and which conveys them to a position beneath the hopper ready to receive the ice-cream, means positively preventing the delivery of the ice-cream unless a box is in position to receive it and ensuring delivery when the box is in position.

In order that the details of construction and action of the invention may be more clearly understood, reference is made to the accompanying drawings in which Figure 1 is a partly sectional side elevation and Figure 2 a partly sectional end elevation of the essential portions of the machine.

In the machine illustrated the mechanism is duplicated on its opposite sides so that the operations may be carried on simultaneously at both sides of the machine.

In these drawings 2 is a hopper containing a plastic substance, in the present example the ice-cream mixture required to be formed into ice-cream bricks or blocks. The hopper 2 is provided with an outlet 3 controlled by a rotary cylindrical valve 4. The ice-cream is during the operation of the machine continually moved across the outlet 3 by a reciprocating paddle 5 hinged to a lever 7 mounted on a rocking shaft 6, the rocking shaft 6 being operated by a lever 8 and rod 9 from any convenient crank eccentric or rocking lever on the machine. The paddle 5 being hinged to the lever 7 in such a manner that it is held vertically and rigidly in the ice-cream mixture during movement towards the outlet 3 and is free to move about its pivot during the reverse movement. The boxes or cases which are indicated by the numeral 10 are moved into and past the feeding position under the valve 4 by an endless chain 11 which passes over a chain pulley 12 at each end of the machine. The chain pulley 12 is given an intermittent feed movement by means of a ratchet wheel 13 keyed to the shaft 14 carrying the chain pulley 12 and operated by a pawl 14* carried by a rocking lever 15 of which the end 16 is connected by a link 17, lever 18 and a rod 19 to an eccentric 20 driven from a power driven shaft.
21, the lever 18 being rockingly mounted on a shaft 73. The shaft 21 is provided with a chain wheel 22 by which it may be driven from any suitable source of power such as an electric motor.

The cylindrical delivery valve 4 is rotatively mounted in a casing 23 fixed under the hopper 2 to a bracket 24 screwed to the standard 26 of the machine. The valve 4 is provided with a spur wheel 25 of which the teeth mesh with those of a quadrant 27 provided with a lever 28 and pivoted on a shaft 29. The end of the lever 28 is connected by a rod 30 and link 31 to a lever 32 mounted at the other end on a rock shaft 33 mounted in a bearing bracket 34 secured to the standard of the machine. The lever 32 is provided with a roller 35 running on a cam 36 secured to the shaft 21, and also with a rod 70 to the end of which is fixed one end of a spring 71 and the other end of the spring being fixed to a bracket 72 on the shaft 73, the spring 71 tending to hold the roller 35 on the cam 36.

The cylindrical valve 4 is in the form of a hollow sleeve having a port 37 adapted to register with the outlet opening 3 of the hopper 2 when in receiving position and is also provided with a port 38 adapted to register with a valve delivery outlet 39 when rotated by the spur wheel 25 and quadrant 27 to discharging position. Within the cylindrical valve 4 is a plunger 40 of which the rod 41 is adapted to be operated by trip pawls or pushers 43 and 44 pivotally connected to a rocking lever 42 whereby it is reciprocated in such a manner that the charge of ice-cream drawn into the valve 4 when the ports 37 and 38 are in register will on the return stroke of the plunger be forced thereby through the ports 38 and 39 when in register and so be delivered into the box 10 moved into feeding position immediately below the port 39.

The plunger operating lever 42 rocks on a shaft 45 fixed in bosses 46 on the main frame of the machine and the lower end of the lever 42 is connected by a pin 47 to the rod 48 of an eccentric 49 mounted on the shaft 21. By this mechanism the lever 42 is rocked continuously, but the plunger is only operated thereby when the pawls 43 and 44 are in engagement with the abutments 50 and 51 respectively, these abutments being fixed on the rod 41 of the plunger 40.

The pawl 43 is held normally above the abutment 50 by trip mechanism releasable when a box 10 is in position immediately under the feed valve 4 so that should no box be in the feeding position the ice-cream feeding mechanism is inoperative. This mechanism consists of a feeler 51 movable laterally in and out of the path of the boxes 10 by a rod 52 pivoted to a lever 53 rocking on a pivot 54, the feeler 51 being held normally in the path of the receptacles by the weight of the lever 53, the distribution of the material of this lever being slightly unbalanced for this purpose so that when the feeler has moved out of such path and released it will return automatically to its normal position, this movement may be assisted by a spring.

The lower end of the lever 53 is provided with a hook or catch portion 55 adapted to hold up the end 56 of the lever 52 so that the roller 35 can be out of operative engagement with the cam 36 when there is no box in the feeding position, when, however, a box 10 is moved into feeding position its side engages the feeler 51 and pushes the rod 52 outwards sufficiently to tilt the lever 53 about its pivot 54 to such an extent as to draw the hook 55 from under the end 56 of the lever 52 and so release the roller 35 and enable it to be operated by the cam 36. The lever 52 is provided with a portion 57 extending beyond its rock shaft 33 and linked by a rod 58 to one end of a bell-crank lever 59 pivoted at 60 to the rocking lever 42, the bell-crank lever 59 being normally in engagement with a projection 61 under the pawl 43 so as to hold the pawl 43 above the abutment 60 on the plunger rod 41. When the lever 52 is released by the mechanism operated by the engagement of a box with the feeler 51, the end 57 of the lever 52 rises and so tilts the bell-crank lever 59 into a position in which the pawl 43 drops into engagement with the plunger operating abutment 50 and so allows the feeding plunger 40 to be operated by the rocking lever 42.

A lining is preferably placed in the box on its way to the feeding position, and in the operation of the machine an operator places a box between two angle members 62 forming between them a guide way having a central space in which projections fixed at intervals on the chain 11 extend to engage a side of the box and carry it along the guide way. The main flaps forming the cover of the box are bent outwards to the open position and held there while passing under guide rods 64 and 65 which extend a sufficient distance along the guide way to ensure them being held out of the way and keep the box fully open during the feeding operation.

The lined box is held by the intermittent mechanism until it reaches filling position, and while passing into such position engages the feeder 51 to operate the trip mechanism setting into operation the valve rotating and plunger mechanism as described above.

During such operation a charge of ice-cream is drawn from the hopper 2 by the plunger 40 through the ports 3 and 27 into the cylindrical valve 4, the valve is then rotated by the quadrant 27 to shut off the port 3 and open the port 27, whereupon the plunger 40 is moved inwards and forces out the ice-cream composition through the ports 38 and 39 into the box 10.

The box is then conveyed by the chain 11.
to the delivery end of the machine where it is removed and closed by another operator and then conveyed to a freezing room where it is converted into a hard ice-cream brick.

By means of the foregoing, ice-cream bricks of given size can be expeditiously made and packed without the hands of the operator ever coming in contact with them.

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

1. Apparatus for dividing off and feeding measured quantities of plastic material into receptacles, comprising means for feeding the receptacles into filling position intermittently and delivering them therefrom after filling, a measuring cylinder having a reciprocating feeding plunger, a continuously oscillating member, means for placing the oscillating member into the path of the feeding plunger to drive the same and means for holding the latter means out of operation until a receptacle has been fed into filling position.

2. Apparatus for dividing off and feeding measured quantities of plastic material into receptacles, comprising means for feeding the receptacles into filling position intermittently and delivering them therefrom after filling, a measuring cylinder having a reciprocating feeding plunger, a continuously oscillating member, a pivoted pawl lever mechanism for moving the pawl into the path of the feeding plunger to drive the same, means for returning the feeding plunger, mechanism for transmitting movement from a receptacle to the pawl, the pawl being pivoted on the oscillating member and the pawl moving lever mechanism operated by a receptacle when moved into filling position, and the means for returning the feeding plunger being operated by the continuously oscillating member.

3. Apparatus for dividing off and feeding measured quantities of plastic material into receptacles, comprising a guide-way and intermittently operated mechanism for feeding the receptacles into filling position and delivering them therefrom after filling, a measuring cylinder having a reciprocating feeding plunger, a continuously oscillating lever mechanism for moving the feeding plunger when the cam operated lever is held by the catch lever and allow the pawl to engage the feeding plunger when the catch lever is released by the feeler being pushed out of the path of the receptacles by one of them being moved into filling position, and the means for returning the feeding plunger being operated by the continuously oscillating lever.

4. Apparatus for dividing off and feeding measured quantities of plastic material into receptacles, comprising a guide-way and intermittently operated mechanism for feeding the receptacles into filling position and delivering them therefrom after filling, a measuring cylinder having a reciprocating feeding plunger, a continuously oscillating member, a reciprocating feeler normally extending transversely into the guide-way at filling position, a cam, a lever operated thereby, a catch lever linked at one end to the reciprocating feeler and provided at its other end with a catch normally holding the said cam operated lever away from the cam but removable therefrom by the feeler when engaged by a receptacle, and means actuated by the said cam operated lever to place the oscillating member in the path of the feeding plunger to drive the same.

5. Apparatus for dividing off and feeding measured quantities of plastic material into receptacles, comprising a guide-way and means for feeding the receptacles into filling position and delivering them therefrom after filling, a measuring cylinder having a reciprocating feeding plunger, a continuously oscillating lever carrying a bell-crank lever and a pawl movable thereby into the path of the feeding plunger to drive the same, means for returning the feeding plunger, a cam, an oscillating lever actuated thereby, a catch lever and a feeler held thereby normally out of contact with the cam, and connected by link mechanism to the bell crank lever on the continuously oscillating lever so as to hold the pawl out of engagement with the feeding plunger when the cam operated lever is held by the catch lever and allow the pawl to engage the feeding plunger when the catch lever is released by the feeler being pushed out of the path of the receptacles by one of them being moved into filling position, and the means for returning the feeding plunger being operated by the continuously oscillating lever.

6. Apparatus for dividing off and feeding measured quantities of plastic material into receptacles, comprising means for feeding the receptacles into filling position intermittently and delivering them therefrom after filling, a measuring cylinder having a reciprocating feeding plunger, a continuously oscillating lever, two oppositely disposed pivoted paws carried by the continuously oscillating lever one for effecting the feed and the other the return movement of the plunger, and lever and link mechanism for moving the feeding pawl into feeding position, the lever and link mechanism for moving the
feeding pawl into feeding position being operated by a receptacle moving into filling position.

7. Apparatus for dividing off and feeding measured quantities of plastic material into receptacles, comprising a guide-way and intermittently operated mechanism for feeding the receptacles into filling position and delivering them therefrom after filling, a measuring cylinder having a reciprocating plunger, a continuously oscillating lever, two oppositely disposed pivoted pawls carried by the continuously oscillating lever one for effecting the feed and the other the return movement of the plunger, a reciprocating feeler normally extending transversely into the guide-way at filling position, a cam, a lever operated thereby, a catch lever, the catch lever being linked at one end to the reciprocating feeler and provided at its other end with a catch normally holding the cam operated lever away from the cam but removable therefrom by the feeler when engaged by a receptacle, and means actuated by the cam operated lever for causing the oscillating lever to engage the pawls with the feeding plunger.

In witness whereof I affix my signature.

WILLIAM ARTHUR COYTE.