May 5, 1925. 1,536,420

J. W. CARPENTER

ICE CREAM MOLDING MACHINE

Filed Oct. 10, 1921 4 Sheets-Sheet 1

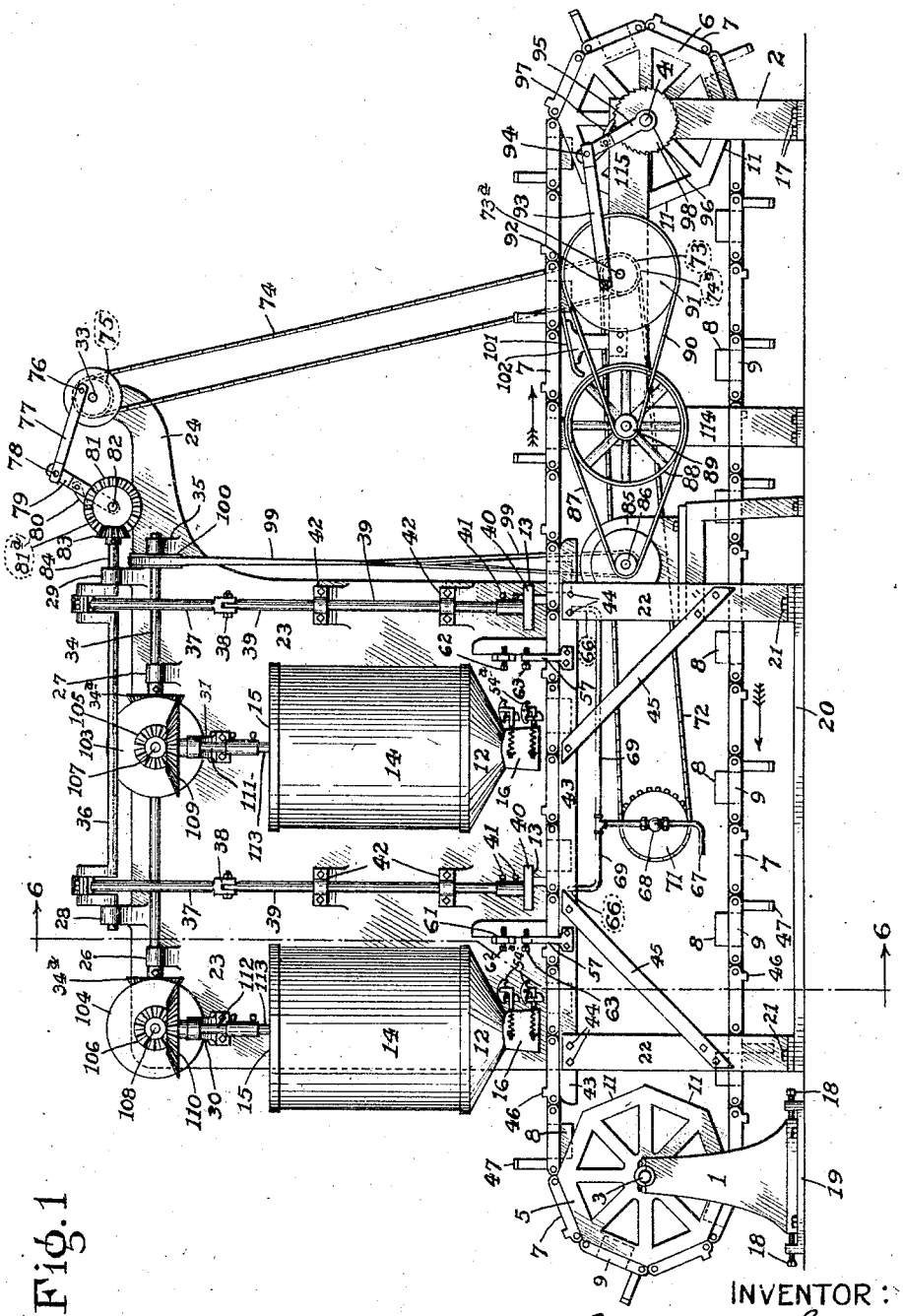

Fig. 1

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ATTORNEY.

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J. W. CARPENTER

ICE CREAM MOLDING MACHINE

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Fig. 2

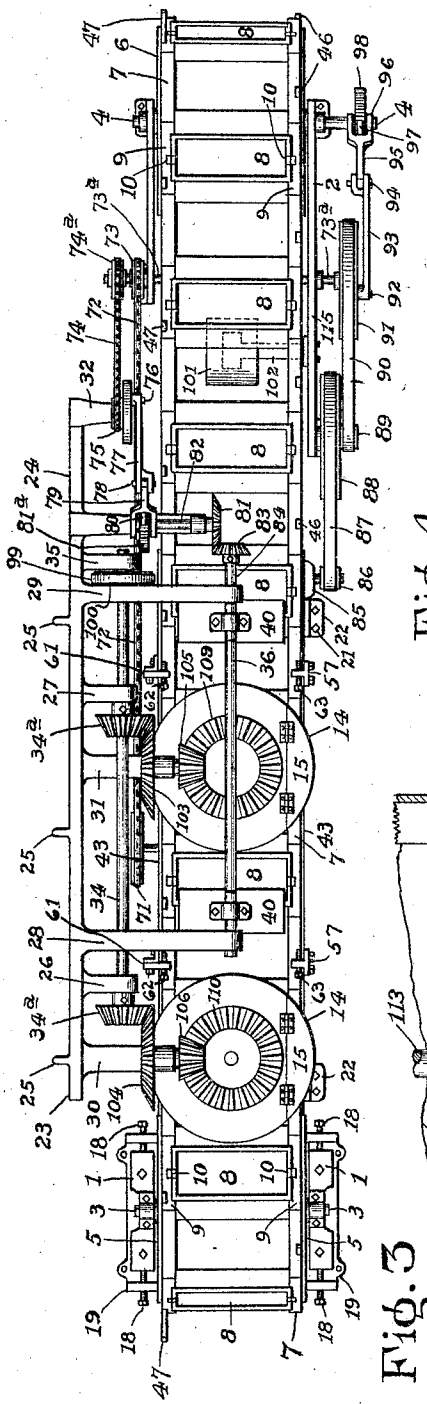


Fig. 4

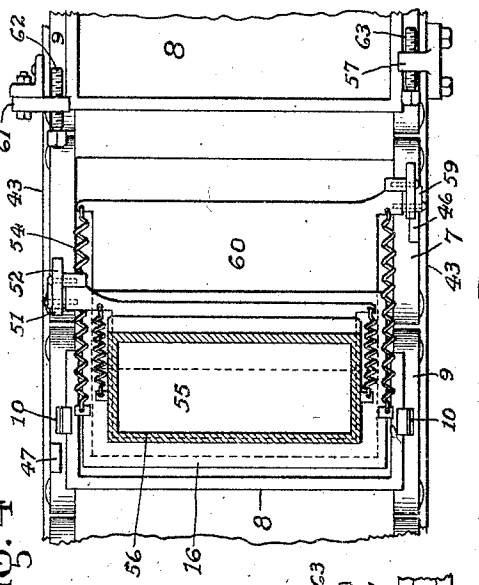
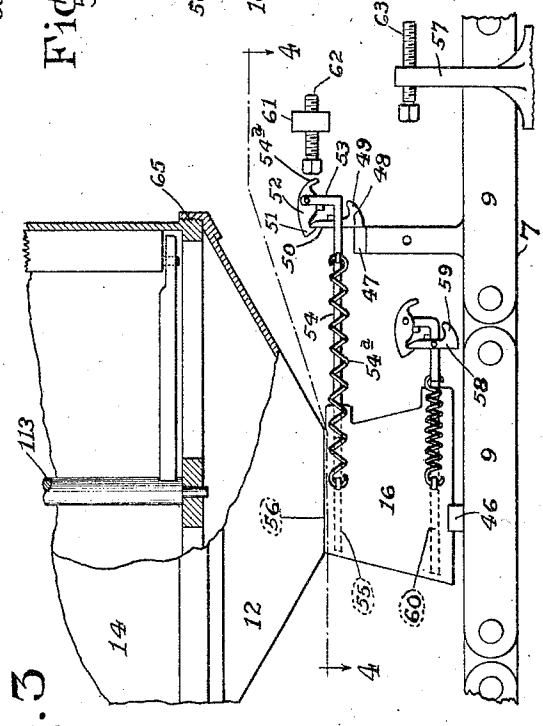


Fig. 3



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J. W. CARPENTER

ICE CREAM MOLDING MACHINE

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Fig. 7

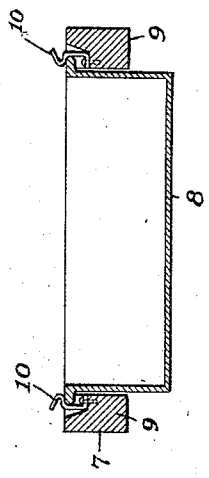


Fig. 9

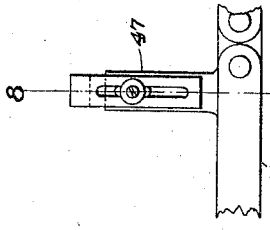


Fig. 8

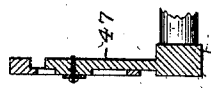


Fig. 6

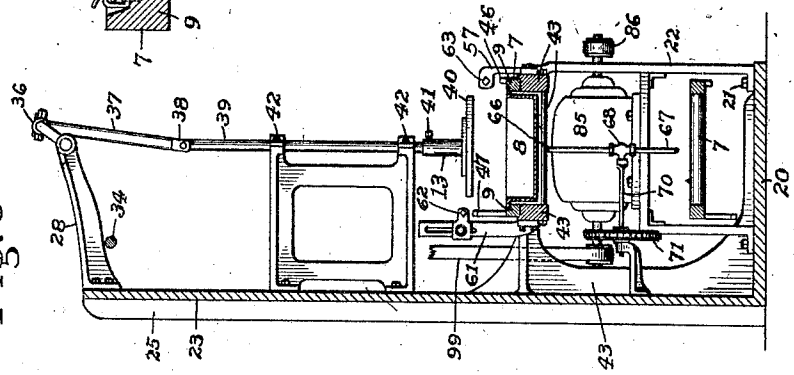
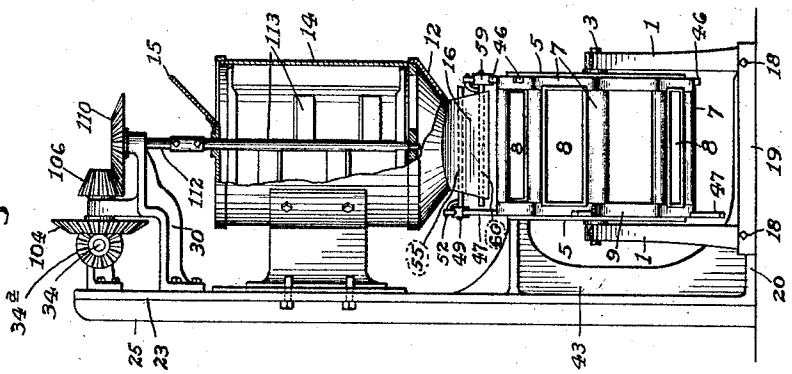


Fig. 5



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May 5, 1925. 1,536,420

J. W. CARPENTER

ICE CREAM MOLDING MACHINE

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Fig. 12

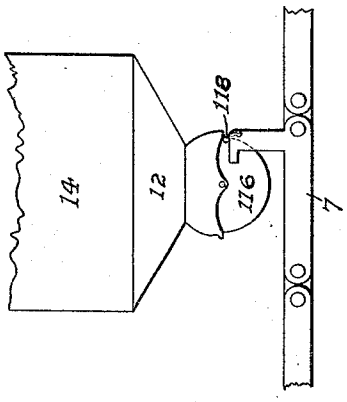


Fig. 11

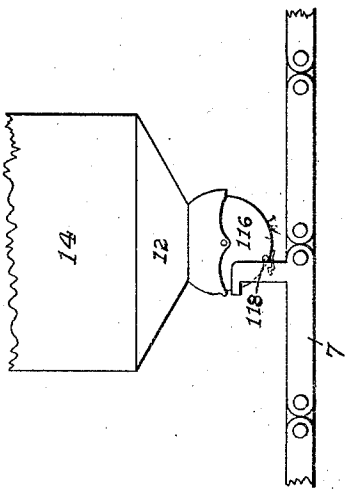


Fig. 10

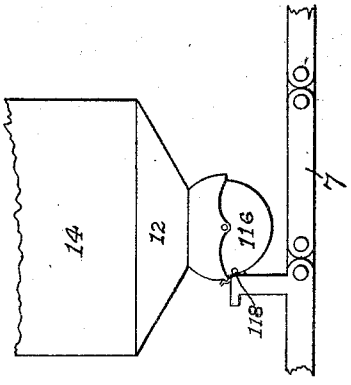


Fig. 15

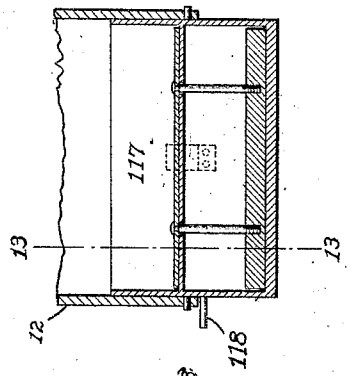


Fig. 14

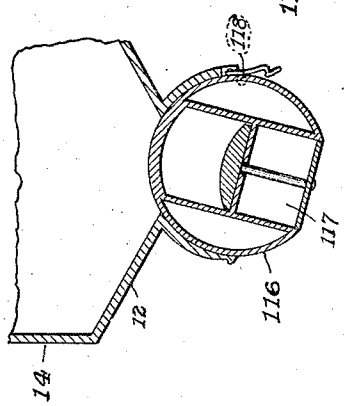
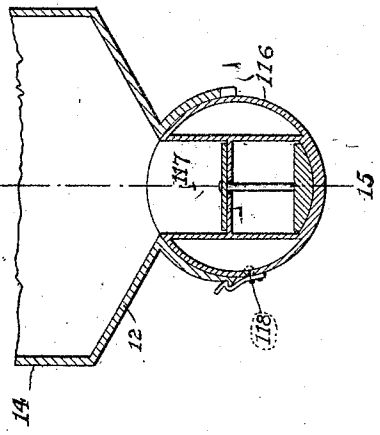


Fig. 13



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Patented May 5, 1925. 1,536,420

UNITED STATES PATENT OFFICE.

J. WILLARD CARPENTER, OF ST. LOUIS, MISSOURI.

ICE-CREAM-MOLDING MACHINE.

Application filed October 10, 1921. Serial No. 506,552.

To all whom it may concern:

Be it known that I, J. WILLARD CARPENTER, a citizen of the United States, residing at the city of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Ice-Cream-Molding Machines, of which the following is a specification.

The object of this invention is to supersede by a new method the hand method of forming ice-cream or the like into what are called bricks, whether composed of one body or of what are known as layers, and the provision of mechanical means for practicing this new method.

The method in practically universal use at the present time for this purpose is for a sweaty workman to dip with a spoon or ladle from a can or other ice-cream container a quantity of first one flavor or kind of ice-cream and then another, each time throwing the same into a box or brick-container; then by hand smoothing off the surplus at the top, thus making waste; and then putting on the lid. The quantities are not thus accurately gaged; the process is not cleanly; unnecessary waste occurs; and severe muscular labor is necessitated. All these are obviated by the present invention.

In the accompanying drawings forming part of this specification, in which like numbers of reference denote like parts wherever they occur,

Figure 1 is a side elevation;

Figure 2 is top plan view;

Figure 3 is a side elevation on an enlarged scale of one of the hoppers in relation to the endless carrier and the tripping means mounted thereon (the hopper being partly in section);

Figure 4 is a sectional view, taken on the line 4—4 in Figure 3, looking downward;

Figure 5 is an end elevation (parts being broken away);

Figure 6 is a sectional view, taken on the line 6—6 in Figure 1, looking in the direction indicated by the arrows;

Figure 7 is a detail, in section, of one of the molds;

Figures 8 and 9 are details to show how the stops for the triggers on the hoppers are made adjustable, Figure 8 being a sectional view on the line 8—8 in Figure 9; and

Figures 10 to 15 illustrate a modification of the hoppers and unloading device—i. e., unloading the hoppers into molds, and the same in operation.

The standards 1 and 2 support, respectively, shafts 3 and 4 and thereby the polygonal wheels 5 and 6, located at opposite ends of the machine. There is a plurality of standards 1 and, also, of standards 2, located at opposite sides of the apparatus. Wheels 5 and 6 extend approximately the entire distance between their respective standards and approximately across the entire width of the machine.

A caterpillar-like endless carrier 7 extends approximately the full width of the machine and, also, substantially its full length, traveling upon wheels 5 and 6 and around the outer surfaces of both. As these wheels 5 and 6 revolve, their complete circumferences will thus come into contact with carrier 7, but in the way of such things carrier 7 engages at one time only that part of the periphery of wheel 5 that is most remote from wheel 6 and vice versa.

A plurality of molds 8 is borne by carrier 7, the said carrier being a link-belt carrier and each mold 8 being attached to a link 9 by a pair of spring clips 10 that allow easy attachment and detachment. The carrier 7 is driven forward with a step-by-step movement, which is permitted by the plurality of faces 11 on the wheels 5 and 6, preferably octagonal in shape, each face 11 being suitable to allow a link 9 to lie thereon.

The object of the above-mentioned step-by-step movement is to allow each mold 8, with its mouth opening upward, to pause in its forward travel a suitable length of time underneath a hopper 12 (if only one kind of ice-cream is to be molded) or under a plurality of hoppers 12 (if more than one kind of ice-cream is to be molded into brick form) and, also, to pause under a pressure-plunger 13, or a plurality thereof, for the ice-cream to be compacted within the mold 8 and thus, without human touch or proximity, leveled smooth with the top of the mold or box or receptacle 8, ready

for the lid to be put in place, whereupon the package, after being hardened, is ready for the market.

Each hopper 12 is the vent for a container 14, having a lid 15 and a chute-like bottom 16. While the drawings contemplate that a large can of material will be poured into the top of each container 14 (after removal of its lid 15), yet this can be done by mechanical dumping means (not shown in the drawings) or by an endless conveyor or otherwise. If desired, freezers may be substituted for the containers 14. When there is a plurality of containers 14, each will contain a different flavor or kind, and the brick can be formed of several layers or any lesser number of kinds.

The standards 2 are preferably fastened to the floor by bolts 17, and the standards 1 are preferably attached by setscrews 18 to bed-plate 19, which is secured to the floor in any desired manner.

Bed-plate 20 is fastened to the floor by any suitable means. Bolts 21 may be such means, at the same time anchoring standards 22, which support the back-plate or frame 23, having the arm 24 and the reinforcing ribs 25. Arms 26 and 27 and arms 28 and 29 and sleeves 30 and 31 project from member 23. Sleeve 32 extends from arm 24. Shaft 33 is journaled in sleeve 32. Shaft 34 is journaled in arms 26, 27, and 35, the latter arm projecting from back arm 24, and shaft 34 drives gears 34a.

Crankshaft 36 is journaled in arms 28 and 29 and operates connecting rods 37, swiveled at 38 to plungers 39, having the plungerheads 40, which are attached by setscrews 41 to plungers 39, steadied by guides 42. When a mold 8 filled with ice-cream pauses underneath one of the plunger-heads 40, the said pause and the action of the crankshaft 36 are so timed that during such pause the ice-cream within the said stationary mold 8 receives a compressing and smoothing impact from one of the plungerheads 40. There are as many of the said heads 40 as there are containers 14.

There are two standards 22, one at about one end of the machine and the other about its middle.

From the back 23 extends a member 43, which is fastened by bolts 44 to standards 22 and braced therefrom by braces 45. Member 43 serves as a supporting guide for the carrier 7 during that part of the travel where the molds 8 are receiving their loads from containers 14 and the impacts of plungerheads 40. Member 43 is made up of several parts.

Stops 57 are mounted on the front edge of member 43. They are stationary stops, as distinguished from the traveling stops 46 and 47, the said traveling stops being fixed to carrier 7. The traveling stops mentioned are at both sides of carrier 7, that is one at the front and the other at the rear.

When in the course of travel of carrier 7 a stop 47 comes into contact with the foot 48 of trigger 49, tongue 50 remains in holding engagement with lip 51 of member 52, pivoted to arm 53 on rod 54 or extension of plate 55, until the tail 52a of member 52 strikes the head of setscrew 62, which tilts member 52 on its pivot and releases tongue 50 from lip 51. Thereupon spring 54a which is fastened to plate 55, causes plate 55 to return to closed position. Prior to tail 52a striking setscrew 62, the plate 55 has been forced forward in such manner that ice-cream falls through the opening 56 into chute 16. Similar operations occur when stop 46 in the course of travel of carrier 7 impinges upon foot 58 of trigger 59, thereby causing plate 60 so to move as to open chute 16 at the bottom and to allow its contents to fall into the mold 8 pausing thereunder. The stops 61 and 57 are so arranged that when plate 55 is open plate 60 is closed and vice versa.

The screws 62 and 63 make stops 61 and 57 adjustable. Setscrews 41 have a similar effect with respect to plungerheads 40. This is true in regard to setscrews 18 and standards 1, for the purpose of taking up slack in carrier 7.

In Figures 8 and 9, means is illustrated for adjustably regulating the height of stop 47, corresponding to changes in the size or shape of the chute-like bottom 16 of hopper 12, which hopper 12 is attached by screwthreads 65 to container 14, which arrangement facilitates cleaning, also.

There is a natural tendency for ice-cream to cling to the plungerheads 40. To reduce possibility of the ice-cream adhering to the plunger to a minimum a spray or nozzle 66 is located near each head 40, through which nozzle 66 a jet of steam or water squirts after each downward movement of head 40 and contact with ice-cream in mold 8. The steam or water that is ejected through nozzle 66 comes from the supply pipe 67, past the valve 68, and through the branch pipe 69.

Valve 68 is controlled and opened or closed by shaft 70, rotated by gear or sprocket-wheel 71, actuated by sprocket-chain 72, driven from sprocket 73, which is driven continuously by shaft 73a, driven by pulley 91.

Crankshaft 36 is driven intermittently forward from chain 74, driven by sprocket 74a, which drives sprocket 75, to which is attached by pin 76 arm 77, pivoted at 78 to arm 79, intermittently driving pawl 80, fixed thereto, said pawl 80 being in engagement with toothed wheel 81a rigidly mounted with bevel gear 81 on shaft 82. Gear 81

is in mesh with and drives pinion 83, mounted on an extension 84 of crankshaft 36.

The opening of the valve 68 can be and is timed to occur immediately after the plungerhead 40 has pressed the ice-cream in a mold 8 and that particular mold 8 has moved on out of the way. When the valve is opened and the mold is out of the way, steam is directed against the bottom surface of the plunger head and heats the same, a portion of the steam condensing and adhering to the surface until the next compacting operation takes place. The heat and water are utilized in the next subsequent compacting operation to heat and otherwise treat the surface of the ice cream in the mold and thereby prevent the plunger head sticking to the ice cream and further forming a smooth surface. The intermittency of the said action is caused by the rotation of shaft 70. The timing of the plungers 40 is caused by the alternation of the bite of pawl 80 and its riding loose on the teeth of gear 81a.

The motor 85 furnishes power for all the operations of the machine, first by means of pulley 86 driving belt 87 and thereby idler pulley 88, thence by means of pulley 89 the belt 90 and pulley 91. Pivoted at 92 to pulley 91 is an arm 93, which is pivoted at 94 to arm 95, having an eye 96, encircling shaft 4. A pawl 97 is mounted in the usual way on arm 95 and engages ratchet 98, fixed to shaft 4. When pulley 91 revolves so that by reason of the pivotal attachment thereto of arm 93 the latter is forced forward the arm 95 is forced forward, which results in driving the pawl against the teeth of ratchet 98, thereby rotating shaft 4 and with it wheel 6 and carrier 7 and wheel 5. When this thrust is ended, pawl 97 rides back idly on ratchet 98, during which time the carrier 7 is at rest, allowing certain molds 8 to receive a load from the hoppers 12 and the plungerheads 40 to compact the contents of other molds 8 loaded at the last preceding pause or stoppage of carrier 7.

A belt 99, twisted to change direction, runs from the shaft of motor 85 to a pulley 100, which it drives, and therewith shaft 34, mounted on back 23, in brackets 26 and 27 and 35. Pinions 34a fixed to shaft 34, drive gears 103 and 104, and therewith pinions 105 and 106, mounted on the same shafts 107 and 108, respectively, as gears 103 and 104. Pinions 105 and 106 drive gears 109 and 110, respectively and therewith shafts 111 and 112, to each of which is attached a beater or dolly or stirrer 113, the paddles of which continuously agitate the contents of containers 14 and keep the same from packing, but in a condition readily to fall through opening 56, being further assisted thereto by the fact that the said paddles are inclined slightly downward, whereby the same as rotated by shafts 111 and 112 act as an endless screw or screw-conveyor.

An inclined tripper 101 is supported by bracket 102 attached to cross-piece 115 that runs from standard 2 to standard 114. The said tripper 101 is arranged at such a height and at a suitable angle that each mold 8 will thereby be caused to rise out of engagement with springs 10 and be thus detached from the carrier 7 at the point where tripper 101 is located. The cover (not shown in the drawings) for the box or mold 8 is thereupon applied, either by hand or by suitable mechanical means (not shown in the drawings), and the said box removed, while a clean and empty box or mold 8 in its stead is attached to carrier 7 by being forced into engagement with springs 10. The said empty box may be supplied and attached by mechanical means (not shown in the drawings) just as the full one can be similarly removed.

In Figures 10 to 15 is illustrated a rotary hopper 116, having therein a chamber 117, adapted to receive and contain an exact and predetermined quantity of ice-cream deposited therein (in the manner hereinbefore described) from the container 14. When carrier 7 brings a mold 8 adjacent to hopper 116, pin 118 comes into contact therewith and hopper 116, the chamber 117 of which has previously been filled from container 12 in the manner hereinabove set forth, tilts and finally rotates half way around to the dumping position shown in Figure 14, from which the ice-cream is deposited in the mold 8. The other figures illustrating this modification depict other steps or details.

The herein-described method of molding ice-cream is intended to obviate the human body or any part or product of it coming into contact with or near the ice-cream, which is accomplished by providing molds and an endless carrier and means for easily attaching the said molds to the said carrier and a container or containers for the ice-cream located in proximity to the said carrier and having appliances automatically operatable adapted to effect the loading of the said molds from the said containers without human intervention and, further, by providing automatic mechanical means for compacting the contents of the molds and smoothing the top thereof and, finally, delivering the filled molds, having their contents arranged in layers if desired, to the end of the operation, ready for the application of lids by hand or by machine.

The arrangement of the containers 14 over the path of travel of the molds enables gravity to play an important part in this process of non-human intervention in the handling of the material to be fed into the molds 8, but, to assist in maintaining a non-solid condition of the ice-cream, so that gravity may act, the action of the stirrers 113 is, also,

important, as the same produce constant agitation of the contents of the containers 14, besides, as above stated, acting as a force-feed or endless screw-feed toward the openings from the containers 14.

The mechanism operating the plungers 13 can be re-arranged so as to be located, if desired, at a less height than shown in the drawings and from underneath the belt or carrier 7.

Having thus described this invention, I hereby reserve the benefit of all changes in form, arrangement, order, or use of parts, as it is evident that many minor changes may be made therein without departing from the spirit of this invention or the scope of the following claims.

I claim:

1. A machine of the character described, comprising a pair of wheels having a plurality of flat surfaces, a link-belt carrier adapted to travel on the said wheels, a plurality of molds mounted on the said carrier, means for imparting intermittent movement thereto, a plurality of containers, a plurality of compacters, means for opening the containers, means for actuating the compacters, the said means for intermittent driving being so timed as to allow each of the said molds to pause adjacent to each of the said containers when the same is open and adjacent to each of the said compacters at the time when the same is operating.

2. A machine of the character described, comprising a plurality of containers, means for opening the same, a plurality of compacters, means for operating the same, a pair of wheels having flat surfaces, a caterpillar conveyor adapted to travel on the said wheels and adapted to pause repeatedly coincidently with part thereof lying on one of the said flat surfaces, a plurality of molds borne by the said carrier and so arranged as to stop near the said containers and, also, near the said compacters, means for imparting a step-by-step movement to the said carrier, and an initial source of power for all operations, the said operations being so timed that a mold is presented empty to a container at the time when the same opens and to a compacter at the time when the same operates and moves out of the way to the next place leaving room for its successor.

3. A machine of the character described, comprising a caterpillar carrier, a pair of polygonal wheels with which the same is adapted to travel and one of which drives the same, means for imparting an intermittent movement to the said driving wheel, a plurality of molds mounted on the said carrier, a container and a plunger located in juxtaposition to the said carrier, a stirrer within the said container, means for actuating the same, and means for automatically opening the said container.

4. A machine of the character described, comprising a caterpillar carrier, a pair of polygonal wheels with which the same is adapted to travel and one of which drives the same, means for imparting an intermittent movement to the said driving wheel, a plurality of molds mounted on the said carrier, a container and a plunger located in juxtaposition to the said carrier, a stirrer within the said container, means for actuating the same, and means for automatically opening the said container, the opening of the container and the action of the plunger being so timed as to synchronize with the pause adjacent to the same of one of the molds in its step-by-step movement.

5. A machine of the character described, comprising a container, a carrier adapted to travel in proximity thereto, a plunger so located relative to the said container as to be in the path of travel beyond the plane of the said carrier, a pipe leading to a point adjacent to the said plunger and having a mouth, a valve controlling emission from the said mouth, and means adapted to control the opening of the said valve so that the same will open at a time immediately following the compacting operation of the said plunger and the latter is elevated.

6. A machine of the character described, comprising a container having an opening, a member adapted to close the said opening and to be withdrawn so as to open the same, a carrier adapted to travel in proximity to the said container, engaging means mounted on the said carrier, engaging means mounted on the said closing and opening member and adapted to be actuated by the said engaging means upon the said carrier so as to open the said opening, and means mounted on the frame of the machine adapted to cause the release of said opening and closing member from said engaging means.

7. A machine of the character described, comprising a container having an opening, a member adapted to close the said opening and to be withdrawn so as to open the same, a carrier adapted to travel in proximity to the said container, engaging means mounted on the said carrier, engaging means mounted on the said closing and opening member and adapted to be actuated by the said engaging means upon the said carrier so as to open the said opening, means mounted on the frame of the machine adapted to cause the said member to return to closed position, and a compacting plunger located adjacent to the said container and in the further path of travel of the said carrier.

8. A machine of the character described, comprising a container having an opening, a member adapted to close the said opening and to be withdrawn so as to open the same, a carrier adapted to travel in proximity to the said container, engaging means mounted

on the said carrier, engaging means mounted on the said closing and opening member and adapted to be actuated by the said engaging means upon the said carrier so as to open the said opening, means mounted on the frame of the machine adapted to cause the release of said opening and closing member from said engaging means, a compacting plunger located adjacent to the said container and in the further path of travel of the said carrier, and a plurality of molds borne by the said carrier and adapted to pass in proximity to the said container and later in proximity to the said plunger.

In testimony whereof I hereunto affix my signature.

J. WILLARD CARPENTER.