

May 16, 1933.

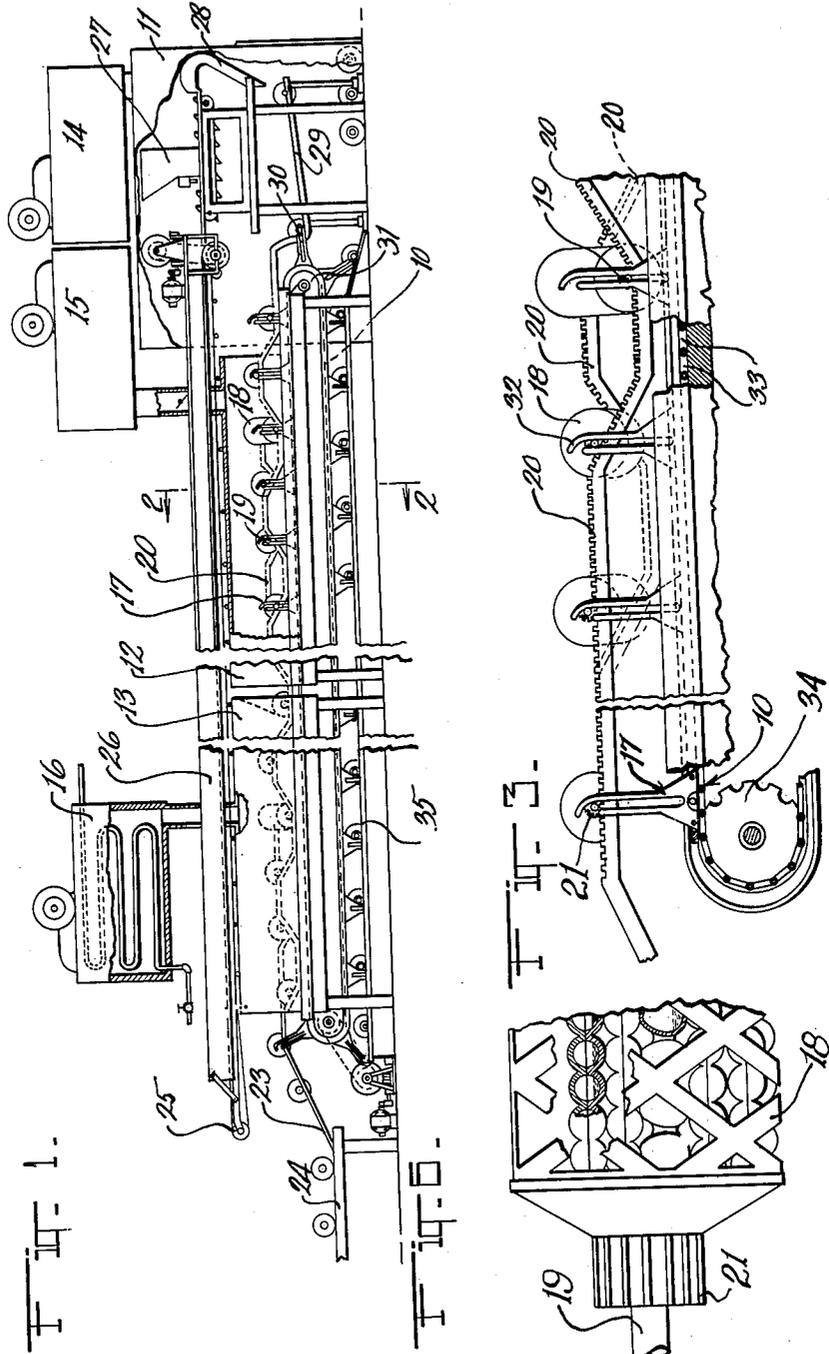
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1,908,769

APPARATUS FOR THE FORMATION OF HOLLOW ARTICLES

Filed Nov. 30, 1931

2 Sheets-Sheet 1



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Fig. 4.

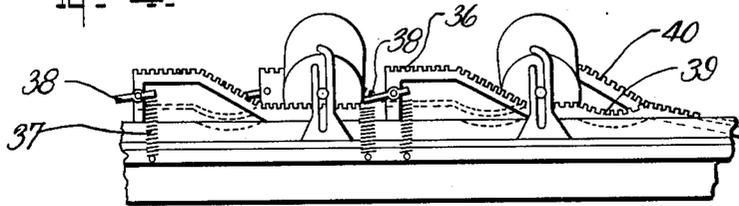


Fig. 5.

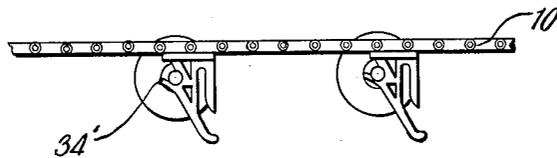
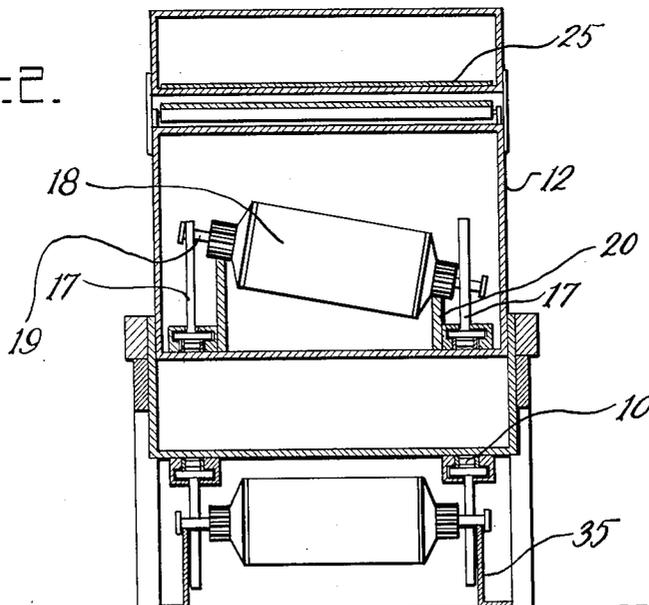


Fig. 2.



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APPARATUS FOR THE FORMATION OF HOLLOW ARTICLES

Application filed November 30, 1931. Serial No. 577,894.

This invention relates to apparatus for the formation of hollow articles, and more particularly to apparatus for solidifying fluid chocolate or other fluid material about the inner surface of a mold.

In general, it is an object of the invention to provide an apparatus of the character described, which will efficiently perform the purpose for which it is intended, which is simple and economical of construction, which can be conveniently operated, and which can be readily manufactured and assembled.

Another object of the invention is to provide apparatus whereby a plurality of mold-containing barrels may be rolled successively along a course while the axes of the barrels is alternately inclined in opposite directions.

A further object is to provide means facilitating the manipulation of such barrels.

Another object is to provide improved means for assuring the formation of a substantially uniform film on the inside of a mold.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the features of construction, combinations of elements and arrangements of parts which will be exemplified in the following detailed disclosure and the scope of the application of which will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings, in which:

Fig. 1 is a side view, partly in section and partly cut away, of one form of machine embodying the invention;

Fig. 2 is a sectional view in elevation of the device shown in Fig. 1 taken along the lines 2—2;

Fig. 3 is a detail view in elevation of a portion of the apparatus;

Fig. 4 is a detail view in elevation of a modification of the track means shown in Fig. 1;

Fig. 5 is a detail view in elevation of a modification of the guide members shown in Fig. 1; and

Fig. 6 is an enlarged detail partly sectional view of a barrel with molds therein.

In the formation of hollow articles of chocolate and other materials in molds, the material is poured into the molds which are thereafter given a heterogeneous motion to spread the material over the inner surface of the molds. While in motion, the material is subjected to a change in temperature to cause it to harden on the inner surface of the molds.

As set forth in the copending application of David Lantinberg and Frank Stefendel, Serial No. 472,330, filed August 1, 1930, the molds may be carried in a barrel, and a rollable unit, which may be such a barrel, is rolled along a course while the axis of the unit is inclined first in one direction and then in the other as it moves along the course. In accordance with the present invention there is provided an endless conveyor means having guide means associated therewith whereby a plurality of barrels may be rolled along the track while the axis thereof is inclined.

In the exemplification of the invention shown in the drawings an endless conveyor 10 is provided for moving barrels along a course which extends through chambers respectively formed by casings 11, 12 and 13, and kept at predetermined temperatures by the heat-transfer units 14, 15 and 16. Dampers may control the passage of the conditioned air to and from the chambers. According to the requirements of any particular case one or more of these units may be refrigerating, for example, unit 16, as shown. Guides 17, preferably in pairs, are attached to the conveyor 10 and adapted to move rollable units exemplified by barrels 18 in any suitable fashion, for example, by moving the axles 19 extending from the barrels. A pair of tracks 20 extends along the conveyor within the chambers. This form of track is disclosed and claimed in the copending application of Jesse S. Cohen, Serial No. 608,386, filed April 30, 1932. Certain portions of

these tracks are higher than other portions. Similar portions on one of the tracks are staggered with respect to like portions on the other track. Means are provided on the barrels for contacting with said tracks, whereby the horizontal axes of the barrels may be tipped first in one direction and then in another. These means may comprise wheels 21 at either end of the barrels. The tracks and the wheels may be toothed to assure the rolling motion of the barrels. The guides 17 are adapted to accommodate the rising and falling motion of the barrel ends; for example, they may be U-shaped.

As the barrel reaches the end of the tracks 20, it may be suitably removed by guide members. In the present instance there is exemplified a removal means comprising inclined tracks 23, which retain the barrel while the forked guide members move downwardly and conduct the barrel after it slips out of the forks to a table 24. Here the molds may be removed from the barrels and placed upon a second conveyor 25, which runs through a chamber formed by another casing or as shown, into an extension 26 of the chamber formed by the casing 11. The temperature of this extension being maintained at the temperature of the first chamber, the molds attain a heat proper for receiving fresh liquid material from the filling mechanism shown generally at 27 without causing the material to change its state. Any proper means such as the sloping guides 28 may receive the re-filled molds and conduct them to an empty barrel. This barrel may be supported upon an extension 29 of the tracks 20, which is adapted to permit the barrel to roll to a position shown at 30, where a pair of guides 17, which are being raised around the roller 31, may pick up the barrel and carry it to the toothed portion of the track.

To this end the rear prong of the guide members is formed with a forwardly-extending lug 32.

It will be noted from Fig. 3 that the endless conveyor 10 comprises, in the present instance, a pair of chains each composed of links 33 and that these links are of sufficient length so that a relatively small number thereof will be engaged by the driving sprocket 34 at any given time. By means of this arrangement the movement of the chain is made sufficiently jerky to give a slight additional agitation to the fluid contained in the molds.

There may be an additional, substantially straight, pair of tracks 35 running beneath the return portion of the conveyor 10. The barrels may be suitably positioned on these tracks and pushed along by the returning guides.

In instances wherein it is desired to give a joggling motion to the barrel such as is not imparted thereto by tracks shaped as indi-

cated at 20, the tracks may be formed as indicated at 36 in Fig. 4, so as to permit the abrupt descent of one end of the basket. In this instance there may be provided resilient means such as springs 37 supporting a bar 38 to receive the end of the barrel as it falls. This not only tends to prevent too great a shock but also to provide a succession of joggling motions to the barrel and its contents.

It will be noted also that each of the tracks 36 has depressed portions 39 formed therein opposite the rising portions 40 of the other track whereby the barrel is supported with particular effectiveness.

As shown in Fig. 5, the guides 17 may be formed with projections 34' adapted, when said guides are returning in upside-down position, to receive and carry emptied barrels back to the first chamber.

The operation of the device is as follows: An empty barrel resting on extension 29 of the tracks 20, receives the newly-filled molds and conducts the barrel to position 30, where the rear prongs 22 of a pair of guides 17 picks up the barrel by means of its axis 19 and pushes it along the extension until the toothed portion of the tracks is reached, the axle of the barrel sliding down into the U-shaped portion of the guide. As the guides continue, they push the barrel along the various irregularities of the tracks, the two wheels on the barrel riding on the teeth of the tracks. Within the chamber formed by casing 11, the temperature is maintained at about 85°-90° F., a degree proper for the manipulation of liquid chocolate; it being noted that the barrels remain in this chamber until the rolling and tipping of the barrel is under way. The temperature in the chamber formed by the casing 12 may be maintained at a somewhat lower temperature, for example, from 60° to 70° F., and the temperature in the final chamber may be from 35° to 45° F. or above. When the hollow articles are to be small, the final temperature may be somewhat lower in order to give greater contraction. It will be understood that the temperatures at various stages of the operation may be varied widely and that in formation of hollow articles from heat solidifiable materials a hot hardening unit may be utilized in place of a cold hardening unit. The tracks as they leave the final chamber, rise to lift the barrel out of the U-shaped guide from which it escapes down a decline to the work table 24. There the molds are taken out and emptied. The barrels are placed upon the additional tracks and pushed along by the returning guides. At the receiving end of the main structure as the additional tracks decline, the axle of the barrel slips down away from the guide. In the meantime the emptied molds have been returned upon the conveyor 25 through the extension 26 of the first chamber, have

been automatically filled by the filling mechanism 27, and are ready to slide down the guide 28 into an empty barrel in order that the process may be repeated. The conveyor 5 may have any suitable velocity, for example, three feet per minute, and may have a length from one end to the other, of sixty feet. Sprocket and link connections not shown in detail may be provided for driving the conveyor in such a manner that there is a decided jerk as the various links contact with the various sprocket teeth. When liquid material is used, which solidifies at a higher temperature, the final chamber may be warmer than the first.

It is to be understood that the term "rollable unit" as utilized herein to define the element exemplified by the barrel is intended to include members carrying one or more integral or separable molds as may suit the requirements of a particular case.

Since certain changes may be made in the above construction and different embodiments of the invention could be made without departing from its scope, it is intended that all matter contained in the above description shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Having described our invention, what we claim as new and desire to secure by Letters Patent, is:

1. In apparatus for the formation of hollow articles, the combination of means providing a course for mold-containing barrels, endless conveyor means extending along said course in a portion of its run, guide means disposed at spaced intervals on said conveyor means and arranged to receive barrel portions and to cause barrels to be rolled along said course while permitting the axis of each barrel to be variously inclined during its movement, and means for causing the axis of each barrel to be inclined alternately in opposite directions as it is rolled along said course.

2. In apparatus for the formation of hollow articles, the combination of means providing a course for mold-containing barrels, endless conveyor means extending along said course in a portion of its run, guide means disposed at spaced intervals on said conveyor means and arranged to receive barrel portions and to cause barrels to be rolled along said course while permitting the axis of each barrel to be variously inclined during its movement, and means for causing the axis of each barrel to be inclined alternately in opposite directions as it is rolled along said course, said guide means being arranged to move barrels therewith during a return portion of the course of said conveyor means.

3. In apparatus for the formation of hollow articles, the combination of a plurality of mold-containing barrels, a track for said barrels arranged to incline the axes thereof first in one direction and then in the other as they are rolled thereon, endless conveyor means extending adjacent said track in a portion of the course of said means, guide means disposed at spaced intervals on said conveyor means and each adapted to roll a barrel at a uniform forward speed while permitting the axis of the barrel to be variously inclined with the horizontal.

4. In apparatus for forming hollow articles, the combination of a plurality of mold-containing barrels each formed with axial extensions at the ends thereof, a track for said barrels, means arranged to incline the axes of said barrels first in one direction and then in the other as they are rolled along said track, endless conveyor means extending adjacent said track in a portion of the course of said conveyor means, and a plurality of pairs of forked elements extending substantially perpendicularly of said conveyor means and arranged at spaced intervals thereon and adapted to receive said extensions and to roll said barrels at a uniform forward speed while permitting the axis of the barrel to be variously inclined with the horizontal.

5. In apparatus for the formation of hollow articles, the combination comprising endless conveyor means and a plurality of guide members attached to said means, each of said guide members being adapted to guide a portion of a rollable unit for movement by the conveyor means and to permit the guided portion of the rollable unit to slide therein in variable spaced relation to said means.

6. In apparatus for the formation of hollow articles, the combination of endless conveyor means, means associated with said conveyor means and adapted to move a barrel for containing molds with said conveyor means while permitting the inclination of the axis of such barrel to be varied, and track means adapted for inclining the axis of such barrel first in one direction with the horizontal and then in another.

7. Apparatus for forming hollow articles, the combination of a plurality of mold-containing barrels each formed with axial extensions at the ends thereof, a track for said barrels, means arranged to incline the axes of said barrels first in one direction and then in the other as they are rolled along said track, endless conveyor means extending adjacent said track in a portion of the course of said conveyor means, a plurality of guide means arranged at spaced intervals on said conveyor means for moving barrels along said track, and cooperating toothed portions on said track and said barrels.

8. In apparatus for the formation of hollow articles, a plurality of rollable units adapted for containing molds partially filled with liquid material, a hardening unit adapted to exchange heat with said material for hardening said material, endless conveyor means adapted to move said rollable units through said hardening unit, said conveyor means including guide members arranged to permit the end portions of said rollable units to slide therein whereby the axes of the rollable units may be successively and variously inclined with the horizontal, means to rotate said rollable units during such movement, and means to incline the axes of said rollable units successively and variously with the horizontal.
9. In apparatus for the formation of hollow articles, the combination comprising endless conveyor means and a plurality of pairs of guide members attached to said means, each of said members being adapted to move a portion of a barrel for containing molds in variable spaced relation to said means, and each of said pairs being adapted when in a substantially horizontal position to pick up said barrel, when in upright position perpendicular to the principal travel of said means to retain said barrel, and as said pair leaves the upright position to release said barrel.
10. In apparatus for the formation of hollow articles, the combination comprising endless conveyor means and a plurality of pairs of guide members attached to said means, each of said guide members being adapted to move a portion of an object in variable spaced relation to said means, each of said members being U-shaped and having two prongs and one of said prongs being bent toward and somewhat beyond the other.
11. In apparatus for the formation of hollow articles, the combination comprising endless conveyor means, a plurality of guide members attached to said means, each of said members being adapted to move a portion of a barrel for containing molds in variable spaced relation to said means, and a pair of tracks over which said barrel is rolled during a portion of its travel and adapted to incline the axis of said barrel first in one direction with the horizontal and then in another, each of said tracks having in succession raised and depressed portions, the raised portion of one track being in registry with the depressed portion of the other track.
12. In apparatus for the formation of hollow articles, the combination comprising endless conveyor means, a plurality of guide members attached to said means, each of said members being adapted to move a portion of a rollable unit and to permit the guided portion to slide therein in variable spaced relation to said means, and a pair of tracks over which said rollable units are rolled during a portion of their travel, and adapted independently to vary said relation, the region around one portion of said means and said tracks being at a predetermined temperature, the region around another portion of said means being at a temperature higher than said predetermined temperature, and the region around another portion of said means being at a temperature less than said predetermined temperature.
13. In apparatus for the formation of hollow articles, the combination comprising endless conveyor means, a plurality of guide members attached to said means, each of said members being adapted to move a portion of a barrel for containing molds in variable spaced relation to said means, and each of said pairs being adapted, when in a substantially horizontal position, to pick up a barrel for containing molds, to retain said barrel while in upright position, and to release said barrel as it leaves the upright position, and a pair of tracks over which said barrel is rolled during a portion of its travel and adapted independently to vary said relation, said tracks extending beyond said means at one end and adapted to guide barrels moving under gravity and to hold them in a position such that a pair of said members may pick up said barrels.
14. In apparatus for the formation of hollow articles, the combination comprising endless conveyor means, a plurality of guide members attached to said means, each of said members being adapted to move a portion of a barrel for containing molds in variable spaced relation to said means, and each of said pairs being adapted when in a substantially horizontal position to pick up said barrel, while in upright position perpendicular to the principal travel of said means to retain said barrel, as it leaves the upright position to release said barrel, and a pair of tracks over which said barrel is rolled during a portion of its travel and adapted independently to vary said relation, said tracks extending beyond said means at one end and adapted to guide barrels under gravity away from said means as said barrels are released by said members.
15. In apparatus for the formation of hollow articles, the combination comprising endless conveyor means, a plurality of barrels for containing molds and provided with doors, one or more molds in each of said barrels, a plurality of guide members attached to said conveying means, each of said members being adapted for moving an end of one of said barrels, means for releasing said barrels from said guides, and a second conveyor means adapted for returning said molds to a second point adjacent and earlier in the cycle of said first conveyor means.
16. In apparatus for the formation of hollow articles, the combination comprising endless conveyor means, a plurality of bar-

rels for containing molds and provided with doors, one or more molds in each of said barrels, a plurality of guide members attached to said conveying means, each of said members being adapted for moving an end of one of said barrels, means for releasing said barrels from said guides, a second conveyor means adapted for returning said molds to a second point adjacent and earlier in the cycle of said first conveyor means, means at said second point for putting said molds into unfilled barrels, and means for returning said refilled barrels to said members.

17. In apparatus for the formation of hollow articles, the combination comprising endless conveyor means, a plurality of barrels adapted for containing molds and provided with doors, one or more molds in each of said barrels, a plurality of guide members attached to said conveyor means, each of said members being adapted for moving an end of one of said barrels in a given direction, means for varying the inclination of the axis of each barrel during such movement, means adapted for releasing said barrels from said guide members, a second conveyor means adapted for moving said emptied molds in an opposite direction, means for refilling said molds, means for putting said molds into unfilled barrels, means for returning said refilled barrels to said members, and a casing surrounding said first conveyor means.

18. In apparatus for the formation of hollow articles, the combination comprising endless conveyor means and a plurality of pairs of guide members attached to said means, each of said members being adapted to move a portion of a barrel for containing molds in variable spaced relation to said means, mold-returning means, means to heat said molds during their movement of said means, means to fill said molds, means to maintain a basket beneath said filling means, a chute to guide said molds to said baskets, and means to conduct a filled barrel to a position for reception by a pair of said guide members.

19. In apparatus for the formation of hollow articles, the combination comprising a pair of tracks, the height of each of said tracks being abruptly changed at one or more points independently of each of the others, one or more barrels adapted to be rolled along said tracks, and resilient means adapted to break the fall of each barrel as it passes said points.

20. In apparatus for the formation of hollow articles, the combination comprising endless conveyor means, a plurality of guide members attached to said means, each of said members being adapted to move a portion of a barrel for containing molds in variable spaced relation to said means, a pair of tracks adapted to incline the axis of said barrel first in one direction with the horizontal and then

in another, the height of each of said tracks being abruptly changed at one or more points independently of each other, and resilient means adapted to break the fall of said barrel and to agitate the contents of the molds as it passes said points.

21. In apparatus for the formation of hollow articles, the combination comprising endless conveyor means, a plurality of guide members attached to said means, each of said members being adapted to move a portion of a barrel for containing molds in variable spaced relation to said means, and a pair of tracks over which said barrel is rolled during a portion of its travel and adapted independently to vary said relation, each of said tracks having arcuately-depressed, inclined, level and abruptly-changing sections, inclined sections on each track being in registry with arcuately-depressed sections on the other track.

22. In apparatus for the formation of hollow articles, the combination of endless conveyor means, guide members associated with said conveyor means and adapted to move a barrel for containing molds with said conveyor means while permitting the inclination of the axis of said barrel to be varied, track means adapted to incline the axis of said barrel first in one direction with the horizontal and then in another during a portion of the travel of said conveyor means, and means on said guide members for supporting said barrel during another portion of the travel of said conveyor means.

23. In apparatus for the formation of hollow articles, the combination of means providing a course for mold-containing barrels, endless conveyor means extending along said course in a portion of its run, guide means disposed at spaced intervals on said conveyor means and arranged to receive barrel portions and to cause barrels to be rolled along said course while permitting the axis of each barrel to be variously inclined during its movement, means for causing the axis of each barrel to be inclined alternately in opposite directions as it is rolled along said course, said conveyor means comprising a chain and sprocket means for driving said chain, the size of said links with respect to the arc of said sprocket being sufficiently great so that uneven motion will be imparted to said chain by said sprocket.

24. In apparatus for the formation of hollow articles, the combination of a plurality of rollable units, a track for said rollable units arranged to incline the axes thereof first in one direction and then in the other as they are rolled thereon, endless conveyor means extending adjacent said track in a portion of the course of said means, guide means disposed at spaced intervals on said conveyor means and each adapted to roll a unit at a uniform forward speed while per-

mitting the axis of the unit to be variously inclined with the horizontal.

25. In apparatus for forming hollow articles, the combination of a plurality of rollable units each formed with axial extensions at the ends thereof, a track for said rollable units, means arranged to incline the axes of said units first in one direction and then in the other as they are rolled along said track, endless conveyor means extending adjacent said track in a portion of the course of said conveyor means, a plurality of pairs of forked elements extending substantially perpendicularly of said conveyor means and arranged at spaced intervals thereon and adapted to receive said extensions and to roll said units at a uniform forward speed while permitting the axis of the unit to be variously inclined with the horizontal, and cooperating toothed portions on said track and said rollable units.

26. In apparatus for the formation of hollow articles in molds, the combination with a rollable unit formed with wheel portions adjacent its ends and means to roll said rollable unit along a course, of track means arranged to cooperate with said wheel portions to incline the axis of said unit in one direction at a plurality of periods during its movement and to incline the axis of the unit in another direction at a plurality of intermediate periods and to maintain the unit in each inclined position for a period after it reaches the same.

In testimony whereof we affix our signatures.

DAVID LANTINBERG.
GLENN M. JONES.

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