United States Patent

[11] 3,632,356

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[21] Appl. No. **827,569**
[22] Filed **May 26, 1969**
[45] Patented **Jan. 4, 1972**

[54] **METHOD AND APPARATUS FOR LIQUID CURTAIN COATING OF ONLY PORTIONS OF ADVANCING ARTICLES**
8 Claims, 4 Drawing Figs.

[52] **U.S. Cl.** **99/134,** 118/13, 99/450.7
[51] **Int. Cl.** **A23g 3/20**
[50] **Field of Search** 107/1, 54; 118/13

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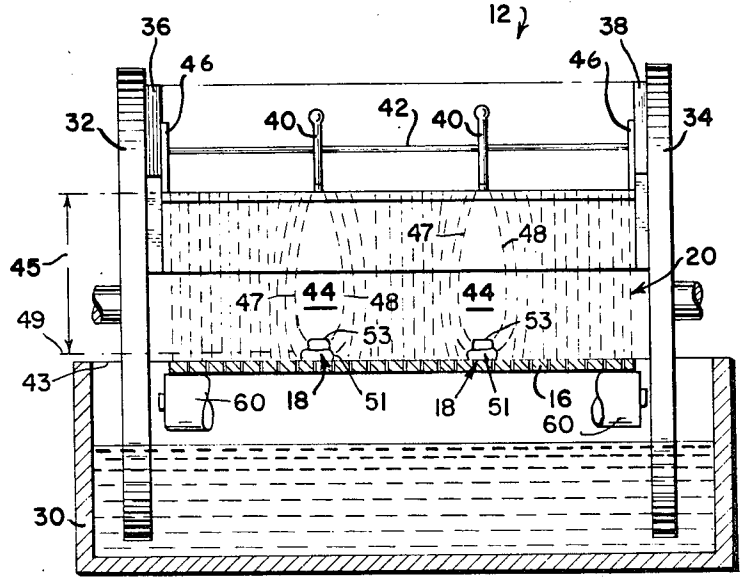
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ABSTRACT: Apparatus for coating articles with a viscous liquid in such a way that the viscous liquid coats the sides and bottoms of said articles but not the tops thereof. Objects are carried on a conveyor through openings in a free-falling curtain of the liquid, which openings are caused by placing flow-interrupting means above the liquid-discharging wall of a dam-type liquid dispenser. The vertical position of these interrupting means is selected to assure the cohesive forces of the viscous liquid will close the openings proximate the surface of the conveyor, i.e., proximate the bottom of said objects to be coated.

Thus the lower portions of the articles are conveyed through the closed bottom of the curtain openings, and receive coating therefrom while the upper portions of the articles ride through the openings uncoated.



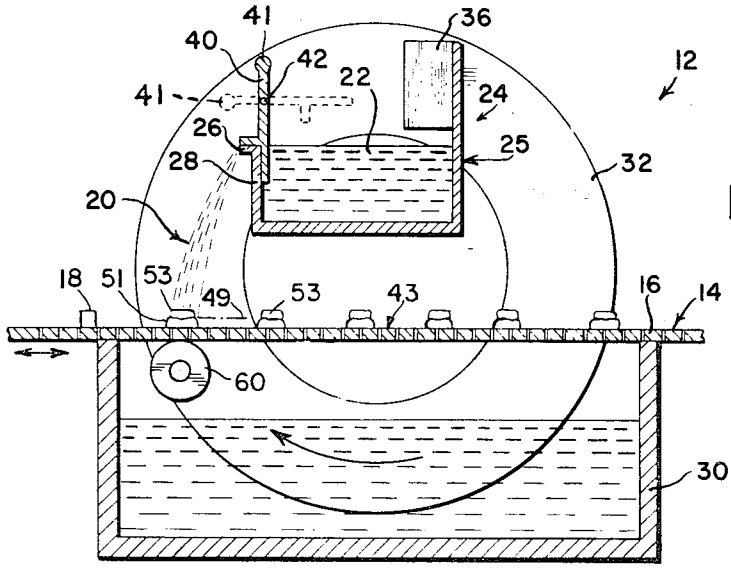


Fig. 1

Fig. 2

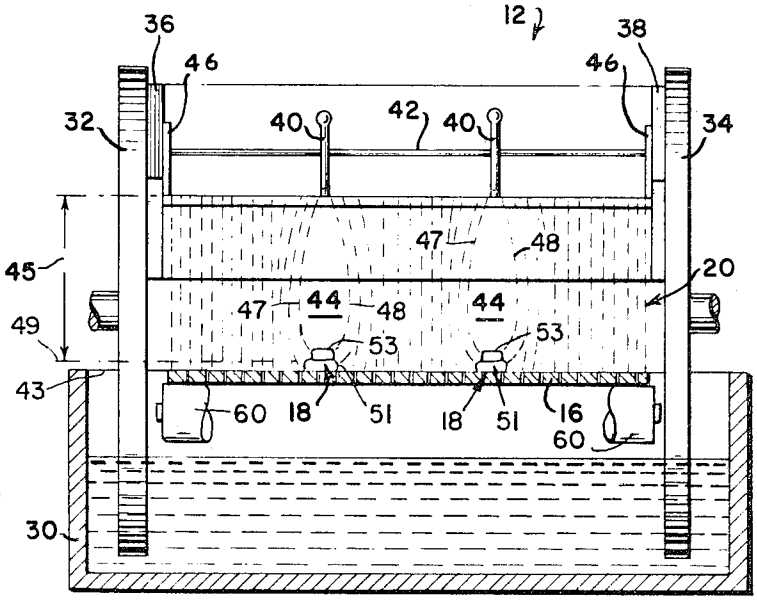
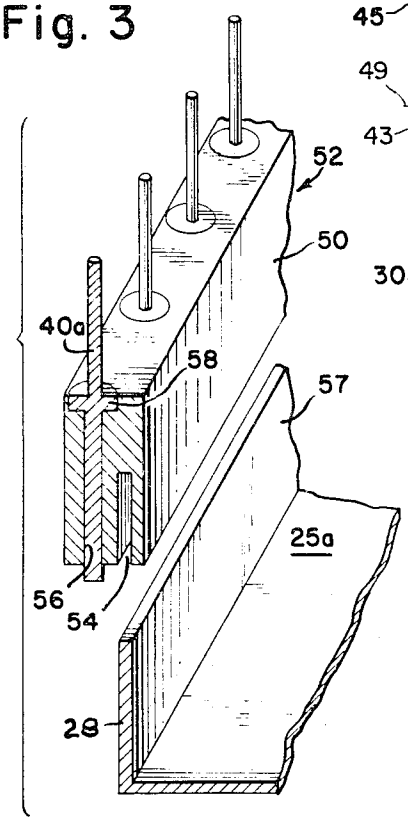


Fig. 3



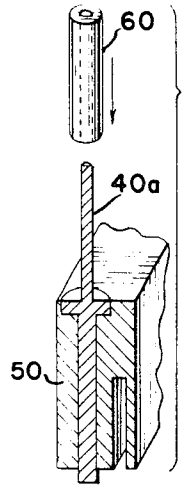


Fig. 4

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METHOD AND APPARATUS FOR LIQUID CURTAIN COATING OF ONLY PORTIONS OF ADVANCING ARTICLES

BACKGROUND OF THE INVENTION

There has been a need for apparatus wherewith articles can be coated on the bottom and on the sides thereof with a viscous liquid without having a portion of the articles coated. In the wax-coating art it has been proposed to pass a liquid curtain over the lip of a trough and down an inclined shelf, there being a barrier near the bottom of the shelf so that the curtain deposited on a strip of paper being processed will have a wax-free strip the approximate width of the barrier. Moreover, partial coatings can be achieved with relative ease if the surface to be protected is relatively uniform in shape. For example, no serious problem would be encountered if the article were a substantially perfect cylinder and it was wished to protect one end thereof from coating. In such a case, the end to be protected could merely be put on the bottom so that the conveyor face will protect it and the liquid could be poured thereover. However, when the top of the article is irregular as is the case with most confections, the problem is a real one and has not been solved by such prior art approaches. Although it may be easy to avoid the liquid coating's hitting the top of the confection, it is very nearly impossible to achieve this result without missing the coating of some of the side surface and even some of the bottom of the confection.

It is, of course, most desirable to solve the problem in such a way that conventional candy-coating machinery, usually representing a sizable investment on the part of the candy manufacturer, may be utilized in making such partially coated confections. This same requirement of versatility applies equally to the coating of objects outside of the food and candy field.

SUMMARY OF THE INVENTION

Therefore, it is a principal object of the invention to provide production line means whereby objects such as confections can be partially coated, with viscous liquids, on the bottom and the sides thereof without coating the tops thereof.

Another object of the invention is to provide apparatus for carrying out such a coating operation, which apparatus is sufficiently versatile to be easily adapted to normal coating operations, e.g., operations including coating the top of the confection.

A further object of the invention is to provide a convenient means for easily converting the apparatus from conventional coating operation to the aforesaid partial coating operation.

Other objects of the invention will be obvious to those skilled in the art on reading the instant specification.

The foregoing objects have been substantially achieved by modifying a conventional coating apparatus of the type comprising a conveyor means for conducting articles to be coated and a curtain-flow liquid dispensing means (such as a reservoir with an elongated dispensing lip along the front wall thereof over which the viscous liquid is allowed to flow). This modification comprises (1) placing flow-interrupting means mounted along, and extending above, the lip of the dispensing means, and (2) selecting the vertical distance between the lip and the conveying surface, so that openings or interruptions, induced in the free-falling curtain of viscous liquid by the flow-interrupting means, tend to close, advantageously to a width less than that of the width of the objects to be coated, at a point proximate the conveying surface.

This closing of the openings, or apertures, in the free-falling liquid curtain is caused by the rheological properties of viscous liquids and may vary in rate from liquid to liquid. However, those skilled in the art will be able to adapt the teachings of this specification to achieve the advantages of the invention by minor modifications in the width of the flow-interrupting means and the distance between dispensing lip and conveying surface. In general, the flow-interrupting barriers should be wider, and/or the distance between lip and conveying surface should be smaller as more viscous confectionery liquid coatings are used.

In preferred embodiments of the invention, the flow-interrupting means is made readily removable from the lip of the liquid-dispensing means to enable conventional coating to be readily resumed. Pivotally mounting of the flow barriers may be particularly desirable in some situations; but in many manufacturing operations it has been found even more convenient to provide a flow-barrier assembly, or plurality of assemblies, which provides both flow barrier means to interrupt the continuity of the liquid curtain and a carrier or bracket for such barrier means which provides the lip for the reservoir, which lip automatically achieves the desired height for the free-falling liquid curtain.

ILLUSTRATIVE EXAMPLES OF THE INVENTION

FIG. 1 is a partial schematic side elevational view of a candy-coating machine;

FIG. 2, partially in section, is a front elevation of the device shown in FIG. 1;

FIG. 3 is a perspective of a flow-barrier assembly means useful in one embodiment of the invention; and

FIG. 4 is a similar view showing a method of varying the diameter of flow-interrupting barriers.

Referring to FIG. 1, it is seen that coating machine 12 comprises a continuous belt conveying means 14 formed of a foraminous belt 16. Confections 18 which are to be coated are carried along this belt and through a curtain 20 of free-falling confectionery coating 22. The free-falling confectionery coating 22 is held in a liquid-dispensing means 24 comprising an upper liquid reservoir 25, and is discharged therefrom over lip 26 of a front retaining wall 28. The liquid coating is supplied to reservoir 25 from a primary reservoir 30 by a pair of rotating disks 32 and 34, which are mounted on each side of the coating apparatus, the disks dipping into reservoir 30 and being rotated therethrough, thereby becoming coated with the confectionery coating contained therein. When a portion of the disks thus coated rotates to a position adjacent dispensing means 24, scrapers 36 and 38 cause the liquid coating on the disks to be wiped off into upper reservoir 25.

Mounted along, and protruding above, dispensing lip 26 are a flow-interrupting means consisting of a series of vertical cylindrical pins 40. Pins 40 are slidably and pivotally mounted on a rod 42, which is supported at each end on brackets 46. Brackets 46 are each positioned adjacent one side of the upper reservoir 25 and proximate a rotating disk 32 or 34. Because of the pivotal mounting on shaft 42, pins 40 can be readily brought into either (1) an operating position whereby they interrupt the lateral continuity of curtain 20, or (2) a neutral position wherein they have no effect whatsoever on the flow pattern. Pins 40 are counterweighted at 41 as shown and may be slid sidewise to any desired location.

Referring to FIG. 2, it is seen that when pins 40 are in operating position, they cause interruptions, or openings 44, in the free-falling liquid curtain 20. It has been discovered that when the distance 45 between liquid-dispensing lip 26 and confections 18 is properly adjusted, cohesive forces inherent in the liquid flow properties will cause the apertures 44 to narrow, or close, and to form converging streams 47 and 48 which meet at a level 49 proximate, thereof. This effect is noted with confectionery liquids in general and has been found to be particularly effective with conventional chocolate-coating compositions, butterscotch, and the like.

Each successive filling confection 18 advancing through the closed loop opening 44 of chocolate curtain 20, may receive a coating on the bottom also, if desired, by conventional means forming no part of this invention. Thus a conventional roller, indicated diagrammatically at 60 rotatably mounted under the foraminous belt 16 may bar the passage of coating through the belt to build up a layer on the belt which coats the bottom face of the confections. The base, or lower, portion of the leading face, and the corresponding base, or lower, portion of the

trailing face of each filling **18** are coated by the closed, lower deposit **51** of curtain **20** while the sides of the fillings are also coated but the upper face **53** remains free of chocolate coating. The fact that confections **18** are supported at a level **43**, adjacent the level **49** of the closed portion **51** of apertures **44** is most important. Normal variations in flow patterns make use of a substantially vertical coating stream impractical for applying coatings to the sides of the confection. Use of converging streams **47** and **48** allows some practicable adjustment of the apparatus to achieve the proper amount of side-covering that is desired for a particular confection.

Another convenient arrangement for carrying out the invention is illustrated in FIG. **3**. An elongated bar **50** includes an elongate slot **54** and holes **56** for receiving flow-interruption cylindrical pins **40***a*. Pins **40***a* include shoulders **58** for facilitating a snug fit into holes **56**. Bar **50** is detachably mounted on the front wall **28** of upper tray **25***a*, by sliding the slot **54** thereon, and the pins **40***a* project below the bar, as at **57**, so that they may be easily removed. The vertical dimensions of bar **50** can be selected to provide the proper vertical distance between the bar and the confections **18** which are to be coated.

A convenient means for modifying the diameter of the flow-interrupting rods **40** or **40***a* is illustrated in FIG. **4**, whereby a hollow cylindrical sleeve, or tube, **60**, one of a set of such sleeves each having a different outside diameter, is sleeved on a cylindrical pin to provide the desired width of flow interruption.

What is claimed is:

1. In an article-coating apparatus, useful for coating confections with viscous chocolate liquid of the type including a foraminous conveyor means positioned for horizontal movement of confections to be coated along a longitudinal path and a curtain-flow liquid-dispensing means mounted above said conveyor means, for depositing chocolate laterally of said path, the improvement comprising:

flow-interrupting members spaced along a laterally extending, liquid-dispensing lip of said dispensing means, thereby providing spaced laterally extending openings in said curtain-flow, said flow-interrupting members being situated a selected distance above said conveyor means so that said openings narrow to a closure deposit of liquid in the path of said confections at a position proximate said conveyor means;

the lower portions of said confections being coated by passage through said closure deposit while the upper portions thereof remain uncoated in said openings.

2. The article-coating apparatus of claim **1**, wherein said flow-interrupting members are pins upstanding above the level of the lip of said dispenser to split the flow of said liquid over said lip.

3. The article-coating apparatus of claim **2**, wherein said flow-interrupting members are pins, upstanding above the level of said lip, and pivotally carried on a transverse shaft, said pins being selectively pivotable out of the path of said liquid when split-flow is not required.

4. The article-coating apparatus of claim **1**, wherein said flow-interrupting members are cylindrical pins, and said apparatus includes a set of hollow cylindrical sleeves of different diameter, each fitting over a pin to increase the diameter thereof for increasing the split caused thereby.

5. The article-coating apparatus of claim **4**, wherein said flow-interrupting members are upstanding pins removably positioned in a bar and

wherein said bar includes a slot for removably positioning the same on the lip of said dispensing means.

6. The article-coating apparatus of claim **5**, wherein said bar includes a plurality of spaced holes, flow-interrupting pins placed in said plurality of holes, and a slot extending the full length of the bottom of said bar into which said lip of said dispensing means may fit, thereby holding said bar in operating position.

7. A process for coating candy articles with a viscous chocolate liquid whereby the top of said articles remains uncoated, but the lower portion of the sides of the articles become coated, comprising the steps of:

1. conveying said articles on a foraminous belt, along a longitudinal path through laterally extending openings in a free-falling laterally extending curtain of said viscous liquid, while
2. maintaining the distance between the top of said curtain and the bottom of said articles so that the cohesive forces of the liquid form converging streams which close said opening at a point proximate the bottom of said objects and form a coating deposit through which the lower portions of said articles must pass while the top of said articles remains uncoated.

8. In a chocolate-coating machine of the type having an endless foraminous conveyor advancing plural lines of uncoated fillings along a longitudinal path through a laterally extending liquid curtain of viscous coating, the combination of:

a laterally extending dispensing tray of viscous coating mounted above said path with the lip of the front wall thereof normally adapted to create an unbroken liquid curtain of said coating for completely covering the fillings in each line advancing therebelow, and

flow-interrupting means, removably associated with said lip, said means including at least one pin upstanding above the level of said lip, in the path of viscous liquid flowing thereover, and arranged to split said flow to form an opening in said curtain through which the upper portion of a filling may pass without deposit of coating on the top thereof, while forming a closure deposit of said coating at the bottom of said opening, through which the lower portion of said filling passes.

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