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A. J. THURMAN ET AL
MACHINE FOR AGITATING THE FLUENT
CONTENTS OF CONTAINERS

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2 Sheets-Sheet 1

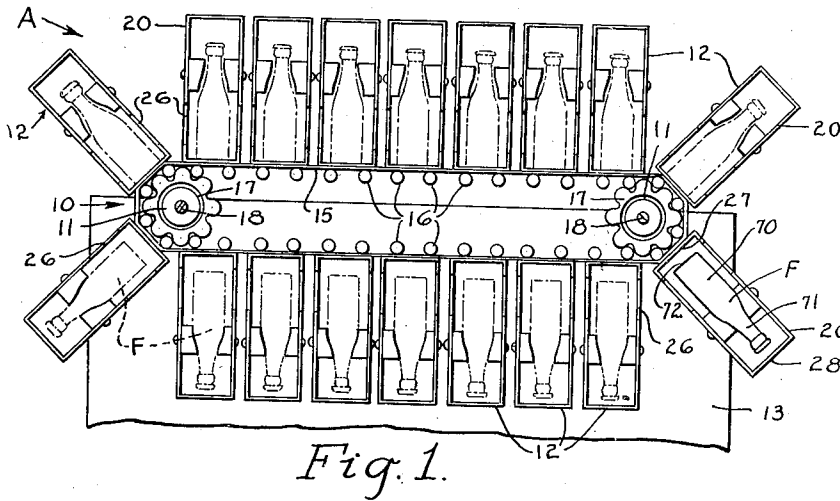
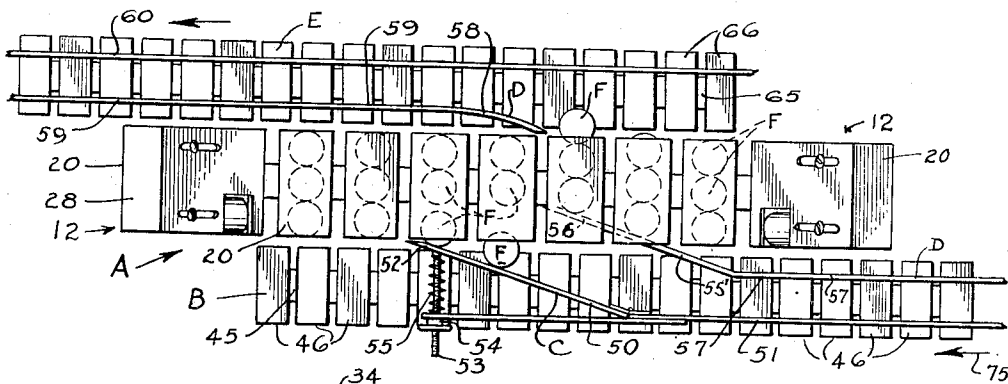
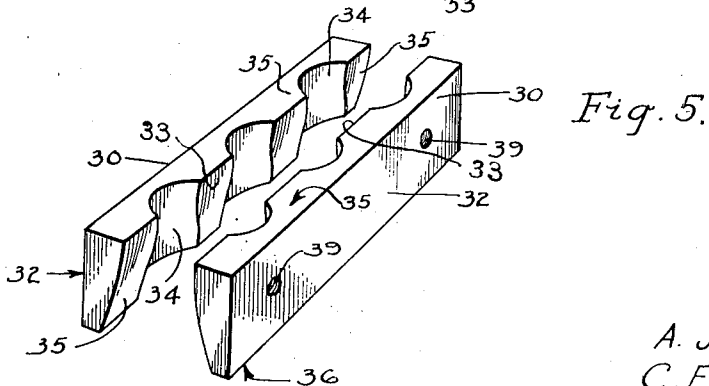


Fig. 2.



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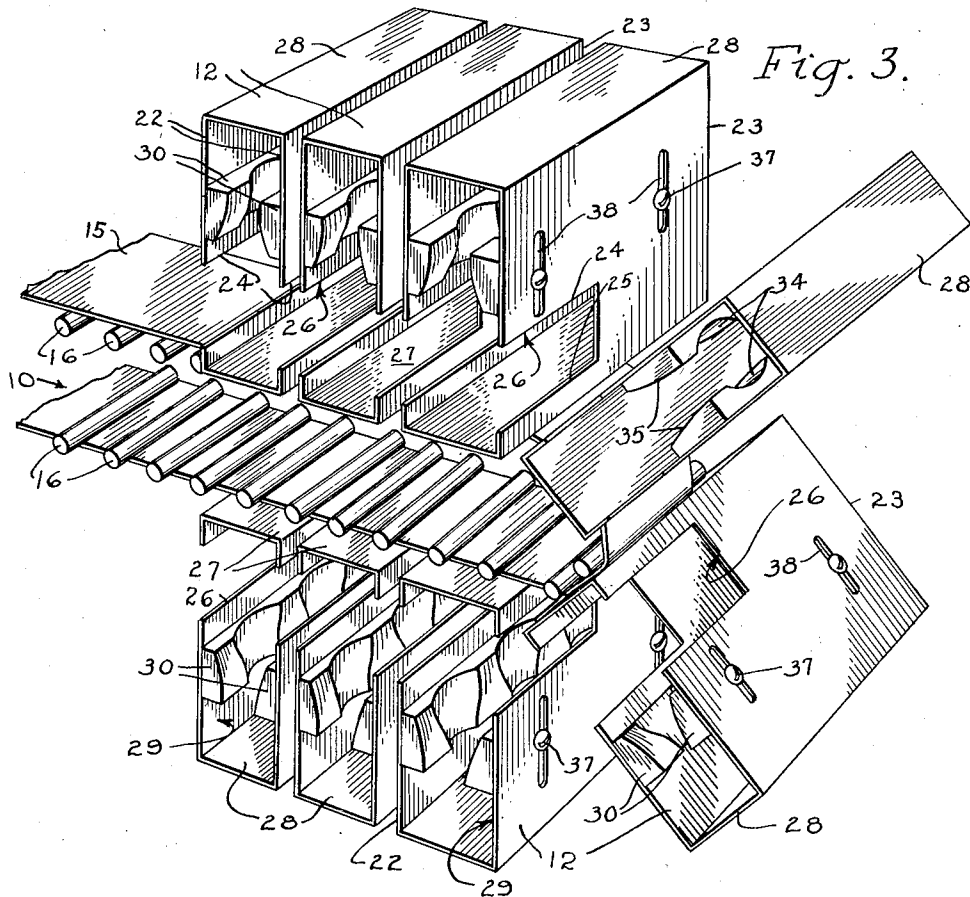
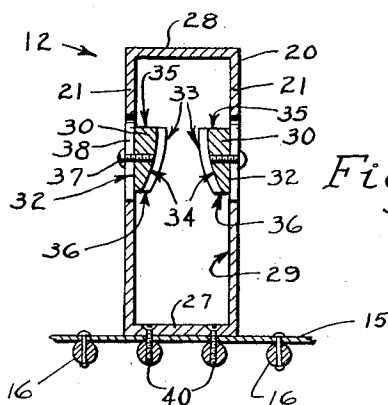
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MACHINE FOR AGITATING THE FLUENT
CONTENTS OF CONTAINERSAvery J. Thurman and Clarence E. Thomas,
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8 Claims. (Cl. 259—54)

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This invention relates to machines for agitating the fluent contents of containers. An example of such a machine is a beverage mixer for mixing liquids of different specific gravities while in a container as, for instance, a closed or capped bottle.

An important object of the invention is to provide a novel agitator which will automatically invert a plurality of containers a plurality of times, also righten them a plurality of times, and finally transfer them to a conveyor for subsequent handling.

Another important object is to provide such an agitator which will not simply invert and immediately righten a container, once or a plurality of times, but will so operate that there will be an interval during which the filled containers are inverted before they are rightened.

Still another important object is to provide an agitator which also embodies means to automatically receive containers and means to automatically discharge containers after agitation of the contents thereof.

Another important object is to provide such an agitator which will handle the containers, as described, without damage, breakage and the like.

A further object is to provide a novel bottle guide and carrier for an agitating machine.

Other objects and advantages of the invention will be apparent during the course of the following detailed description of the invention, taken in connection with the accompanying drawings, forming a part of this disclosure, and in which drawings:

Figure 1 is a side elevation of the agitator.

Figure 2 is a top plan thereof, with conveyor and guide means shown associated therewith.

Figure 3 is a perspective view of one end portion of the agitator.

Figure 4 is a vertical section through a container holder, forming an important part of the new agitator, and an endless belt associated with the holder.

Figure 5 is a perspective view of two complementary sections of a container guide and carrier, associated with the holders of Figure 4.

In the drawings, wherein for the purpose of illustration is shown a preferred embodiment of the invention, similar reference characters designate corresponding parts throughout the several views.

The new agitator A has associated with it a first conveyor means B, a first container moving and guide means C, a second container moving and guide means D and a second conveyor means

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E. Containers, as capped bottles containing fluent material, are designated as F.

Referring mainly to Figures 1 and 3, the agitator A includes an endless belt means 10 trained over suitable rotatable means 11, and supporting a plurality of spaced-apart container holders 12, all of which is carried by a frame or support 13.

The endless belt means 10 may be a flexible strip forming a belt 15 having a plurality of spaced-apart, transversely-extending, cylindrical sprocket wheel-engaging portions 16, secured in any suitable way, as by screws, so that they will be beneath its upper run.

These portions 16 engage a part of the means 11, being the walls of adjacent teeth of a suitable number of spaced-apart sprockets 17, as may be seen in Figure 1. The sprockets are fixedly mounted upon shafts 18 and these may be rotatably carried by the frame 13 and rotated in the same direction by any approved means. The sprockets and shafts constitute the means 11.

As may be seen, particularly in Figure 4, where one is shown, the container holders 12 each comprises a housing 20, having substantially parallel side walls 21, each with opposite edges 22 and 23. The edge 22, which may be termed the forward edge, is irregular in shape, since it substantially parallels the edge 23 for a portion of its length and then extends inwardly toward the edge 23, as at 24, then again substantially parallels the edge 23, whereupon it extends outwardly, as at 25, so that it substantially parallels the edge 24 and, finally, again parallels the edge 23. Thus, there are provided two cut-outs 26 for each holder 12 and they are disposed adjacent the belt 15 when the holders are disposed thereon. There is, too, a belt-engaging wall 27 for each holder, normal to the walls 21, and an upper wall 28 opposite and paralleling the wall 27. Thus, there is provided, by these walls, a compartment 29, open at its ends.

Carried by each side wall 21 is one section 30 of a pair of container guides and carriers, shown particularly in Figure 5. Each section 30 is complementary to the other and may be a block or body of suitable material having some resiliency and provided with a substantially flat, sidewall-engaging face 32 and a front or outer face 33, indented by a plurality of like, arcuate, spaced-apart recesses 34. Each of these preferably has a contour substantially complementary to one-half the peripheral contour of the neck and upper body portion of a conventional bottle, such as one containing soft drinks. It will be noted that the front face 33 slopes from the cap-end sur-

face 35 of the section 30 toward the face 32 and extends to the neck end surface 36. This slope, which is somewhat arcuate (concave) is to permit sliding movement of the containers F (bottles) between adjacent sections 30, which sections face each other, as in Figure 4, and preferably extend the full length of the compartment 29. The resiliency of the material making up the sections 30 and the fact that the container necks and upper body portions have a loose fit in the recesses 34 permits some up-and-down movement of the containers, as will be explained.

In order to permit up and down adjustment of the sections 30, there is provided adjusting means which may be a pair of set screws 37 for each section 30, with their heads bearing against the outer faces of the adjacent walls 22, and their shanks extending through parallel slots 38 in the walls 22 extending toward the planes of the walls 27 and 28. These shanks also extend into suitable screw-threaded sockets 39 in the sections 30. It is now seen that the sections 30 may be adjusted so as to provide for the accommodation of containers having various heights and various neck lengths.

The container holders 12 are spaced apart slightly, as is clear from Figures 1 and 3 and so spaced that they will not contact each other, even when the belt 15 carries them around the sprockets 17. The holders 12 may be secured to the belt 15 as shown in Figure 4, where screws 40 extend through the wall 27, the belt 15 and the two adjacent portions 16 and the securing means just described is spaced well inwardly of the walls 24, thus permitting the belt 15 to move over the sprockets without binding.

The first conveyor means B, shown in Figure 2, may be an endless conveyor belt 45, carrying a plurality of spaced-apart container supports 46 with their upper surfaces disposed so that the horizontal supports 46 of the upper run will be in substantially the same planes as the upper surfaces of the walls 27 of the upper run of container holders 12. These supports 46 and walls 27 are disposed closely adjacent each other, whereby the containers F may be slid over the supports 41 and onto the walls 27.

The first container moving and guide means C accomplishes this sliding of the container F and may comprise a resilient guide arm 50 carried by a support portion 51 extending longitudinally of the conveyor 45 with the guide arm 50 projecting over the upper run of the conveyor 45, as in Figure 2, and with its free end 52 adapted to be positioned close to a passing container holder 12. It will be noted that this end 52 is to one side of the transverse central axis of the agitator A. That is, it is closer to the descending portion of the belt 15, thus giving containers sufficient time to move diagonally across the belt and onto the adjacent wall 27. In order to afford adjustment of the arm 50, so that its free end 52 will be disposed a desired distance from an adjacent wall 27, there may be provided a screw-threaded shank 53 secured to the arm 50 adjacent the end 52, extending through an opening in the support 51 and carrying an adjusting nut 54 bearing against the outer face of the support 46. An expansion coil spring 55 encircles the shank 53 and bears against the arm 50 and arm of the support 51.

By drawing the shank 53 outwardly (by rotation of the nut 54) the diameters of larger containers will be accommodated and there will also

be a more positive cooperation of guide means C, conveyor B, and agitator A.

The container moving and guide means D includes a guide arm 55', positioned so that its free end portion 56 extends into the cut-outs 26 of the passing container holders 12, as is indicated in Figure 2. The guide arm 55' is carried by a support portion 57 substantially parallelly the support portion 51. Of course, the support portions 51 and 57 have the additional function of preventing the containers F upon the first conveyor means B from moving transversely off the conveyor belt 45 before they contact the guide arm 50, since they are spaced apart a distance somewhat more than the diameter of the body portion of a container but less than the lengths of the support 46 and are spaced above the supports 46 so that they may contact the body portions of the containers intermediate the heights of these body portions. The guide arm 55' is adapted to guide containers from the holders 12, as will be subsequently explained.

The means D also includes a second guide arm 58 and support 59, disposed above the conveyor means E which is disposed on the side of the agitator A opposite that occupied by the conveyor means B. The free end of the guide arm 58 just clears the passing holders 12, and the arm 58 guides the container F, which are urged from the holders 12 by the guide arm 55, onto the conveyor means E. There is also a guide rail 60 which parallels the support 59 and, with this support 59, functions like the support portions 51 and 57, to prevent containers upon the second conveyor means E from moving transversely off this means E.

It is preferred that the conveyor means E be substantially like the conveyor means B but disposed as stated and conveys the containers F, discharged thereon, in the same direction of travel as that of the containers F on the conveyor means B. The means E comprises a conveyor belt 65 carrying a plurality of spaced-apart horizontal supports 66 with their upper surfaces disposed as are those of the supports 46.

Containers F, which are shown as capped bottles having body portions 70, neck portions 71 and bottoms 72, after filling and capping, are disposed upon the conveyor belt 45, right-side up, and move in the direction of the arrow 75 until they abut, one after another, the guide arm 50 whereupon they are guided by this arm into the most adjacent or first recess 34 of the passing container holder 12, which is moving in the same direction as that of the conveyor belt 45. While in these most adjacent or first recesses 34, the containers F will receive one inversion when they reach the left-hand limit of the agitator A, as shown in Figure 1 and will be carried, head downwardly until they are again rightened, as is apparent from Figure 1 at the right-hand end thereof.

When the containers F in these said most adjacent or first recesses 34 reach the free end portions 56 of the guide arm 55', that arm will guide them into the second recesses 34 where they will remain during another inversion and rightening but it is apparent that each container F will be joined by another container F in the first recess 34 so that, when the containers in the second recesses 34 again approach the free end portion 56 the containers in the first recesses will be guided into the second recesses and force the containers, which they contact, into the third recesses, whereupon the containers in the third

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recesses receive other inversions and rightenings, as is apparent.

This repeated inversion (instead of a quick inversion and rightening) and rightening, shakes up the contents thoroughly.

As each container F in the third recesses 34 come opposite the free end portion 56 of the guide arm 55', this portion and the two other containers within each housing 20, moving transversely through the housing, will force the containers from the third recesses 34 onto the conveyor belt supports 62 for conveyance to a discharge point for crating or the like.

The two sections 30 of each container guide and carrier retain the containers against striking each other during inversion and rightening, since each container body will force the container ahead of it, in any one housing, past the yielding cap end surface 35 and cause it to slip into the next adjacent recess 34.

By comparing the positions of the container F shown in dotted lines upon the upper run of the belt 15 in Figure 1, with the container F shown in full lines in that figure, it will be seen that the containers move toward the wall 28 of the housing 20 when following the arcuate paths—that is, the containers respond to centrifugal force and, thus, the contents receive an added impetus so that it is better shaken for mixing.

During agitation, the containers F are protected by the walls 21 and 28 of the housings 20, and it is shown that centrifugal force cannot cause the containers to fly away from the agitator as they round the ends of the latter, because they are resiliently held in place and because of the upper wall 28.

The machine herein disclosed differs from a machine which simply whirls bottles, the contents of which contain liquids of different specific gravities, since such a machine simply carries the bottles in a circular path and causes the liquid of greater specific gravity to move toward one end of the bottle and remain there.

What is claimed is:

1. In an agitator for the contents of closed containers of fluent material, an open-ended housing having a container-receiving passageway from one open end to the other open end; means to feed containers into one open end; conveyor means to move said housing into horizontal and arcuate paths to cause said containers to be inverted and rightened; means cooperating with said containers and said conveyor means to cause said containers to move along said passageway, while traveling along one of said paths; and means cooperating with said containers and said conveyor means to cause said containers to move farther along said passageways and outwardly of the other end of said housing.

2. In an agitator for the contents of closed containers of fluent material, an open-ended housing having a container-receiving passageway from one open end to the other open end; means to feed containers into one open end; conveyor means to move said housing into substantially straight and arcuate paths to cause said containers to be inverted and rightened; means cooperating with said containers and said conveyor means to cause said containers to move along said passageway, while traveling along one of said paths; and means cooperating with said containers and said conveyor means to cause said containers to move further along said passageways and outwardly of the other end of said housing.

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3. In an agitator for the repeated agitation of the contents of bottles, a housing having side walls, open ends, a bottle passageway from one end to the other end, and a pair of spaced-apart, complementary, bottle neck-receiving sections carried by said side walls and provided with a plurality of spaced-apart, bottle neck-receiving recesses; means to move said housing into paths to alternately invert and righten bottles within said housing; means, including a movable bottle support, to feed bottles, one at a time and right-side up, into the recess nearest said support, said recess being the first recess; and means to move said bottles, after inversion and rightening, into the next recess adjacent said first recess, said next recess being the second recess, and to move said bottles, after another inversion and rightening, from said second recess into the next adjacent recess, and to move said bottles, from the recess farthest from said bottle support, out of said last-named recess, said last-named means being assisted by said bottles contacting each other as they move from recesses beyond the first recess.

4. In an agitator for the repeated agitation of the contents of bottles, a housing having side walls, open ends, a bottle passageway from one end to the other end, and a pair of spaced-apart, complementary, bottle neck-receiving sections carried by said side walls and provided with a plurality of spaced-apart, bottle neck-receiving recesses; means to move said housing into paths to alternately invert and righten bottles within said housing; means, including a movable bottle support, movable in a path normal to the longitudinal axis of said housing, and a guide member extending across said last-named path and with its free end closely adjacent one of said paths of travel of said housing, to feed bottles, one at a time and right-side up, into the recess nearest said support, said recess being the first recess; and means to move said bottles, after inversion and rightening, into the next recess adjacent said first recess, said next recess being the second recess, and to move said bottles, after another inversion and rightening, from said second recess into the next adjacent recess, and to move said bottles, from the recess farthest from said bottle support, out of said last-named recess, said last-named means being assisted by said bottles contacting each other as they move from recesses beyond the first recess.

5. In an agitator for the repeated agitation of the contents of bottles, a housing having side walls, open ends, a bottle passageway from one end to the other end, and a pair of spaced-apart, complementary, bottle neck-receiving sections carried by said side walls and provided with a plurality of spaced-apart, bottle neck-receiving recesses; means to move said housing into paths to alternately invert and righten bottles within said housing; means, including a movable bottle support, to feed bottles, one at a time and right-side up, into the recess nearest said support, said recess being the first recess; and means to move said bottles, after inversion and rightening, into the next recess adjacent said first recess, said next recess being the second recess, and to move said bottles, after another inversion and rightening, from said second recess into the next adjacent recess, and to move said bottles, from the recess farthest from said bottle support, out of said last-named recess, said last-named means being assisted by said bottles contacting each other as they move from recesses beyond the first recess, and said last-named means including an

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elongated guide member having a free end extending into said housing.

6. In an agitator for the repeated agitation of the contents of bottles, a housing having side walls, open ends, a cut-out extending into each of said side walls at one like end of each side wall, a bottle passageway from one end to the other end, and a pair of spaced-apart, complementary, bottle neck-receiving sections carried by said side walls and provided with a plurality of spaced-apart, bottle neck-receiving recesses; means to move said housing into paths to alternately invert and righten bottles within said housing; means, including a movable bottle support, to feed bottles, one at a time and right-side up, into the recess nearest said support, said recess being the first recess; and means to move said bottles, after inversion and rightening, into the next recess adjacent said first recess, said next recess being the second recess, and to move said bottles, after another inversion and rightening, from said second recess into the next adjacent recess, and to move said bottles, from the recess farthest from said bottle support, out of said last-named recess, said last-named means being assisted by said bottles contacting each other as they move from recesses beyond the first recess, and said last-named means including an elongated guide member having a free end extending into said housing at said cut-outs.

7. In an agitator for repeated agitation of the contents of closed bottles; an open-ended housing having side walls; a bottle-receiving passageway from one open end to the other open end,

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and a pair of spaced-apart complementary sections carried by said walls and facing one another, each section being of resilient material and having a plurality of spaced-apart recesses, each recess constructed and arranged to accommodate a portion of the neck and upper part of the body of a bottle, the contents of which is to be agitated; means to move bottles, one at a time into one end recess; means to alternately invert and righten the bottles within said housing a plurality of times; and means operable, after each alternate inversion and rightening, to move the bottles into the next adjacent recess and finally out of the other end recess.

8. As an article of manufacture, a bottle guide and carrier section for a bottle contents agitating machine, said carrier section comprising a body containing resilient material and having a side face provided with a plurality of spaced-apart bottle neck and upper body portion receiving recesses.

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