June 20, 1967 M. W. NEWBERRY 3,326,412

VENDING MACHINE WITH ICE BREAKING APPARATUS

Filed Oct. 23, 1965 6 Sheets-Sheet 1

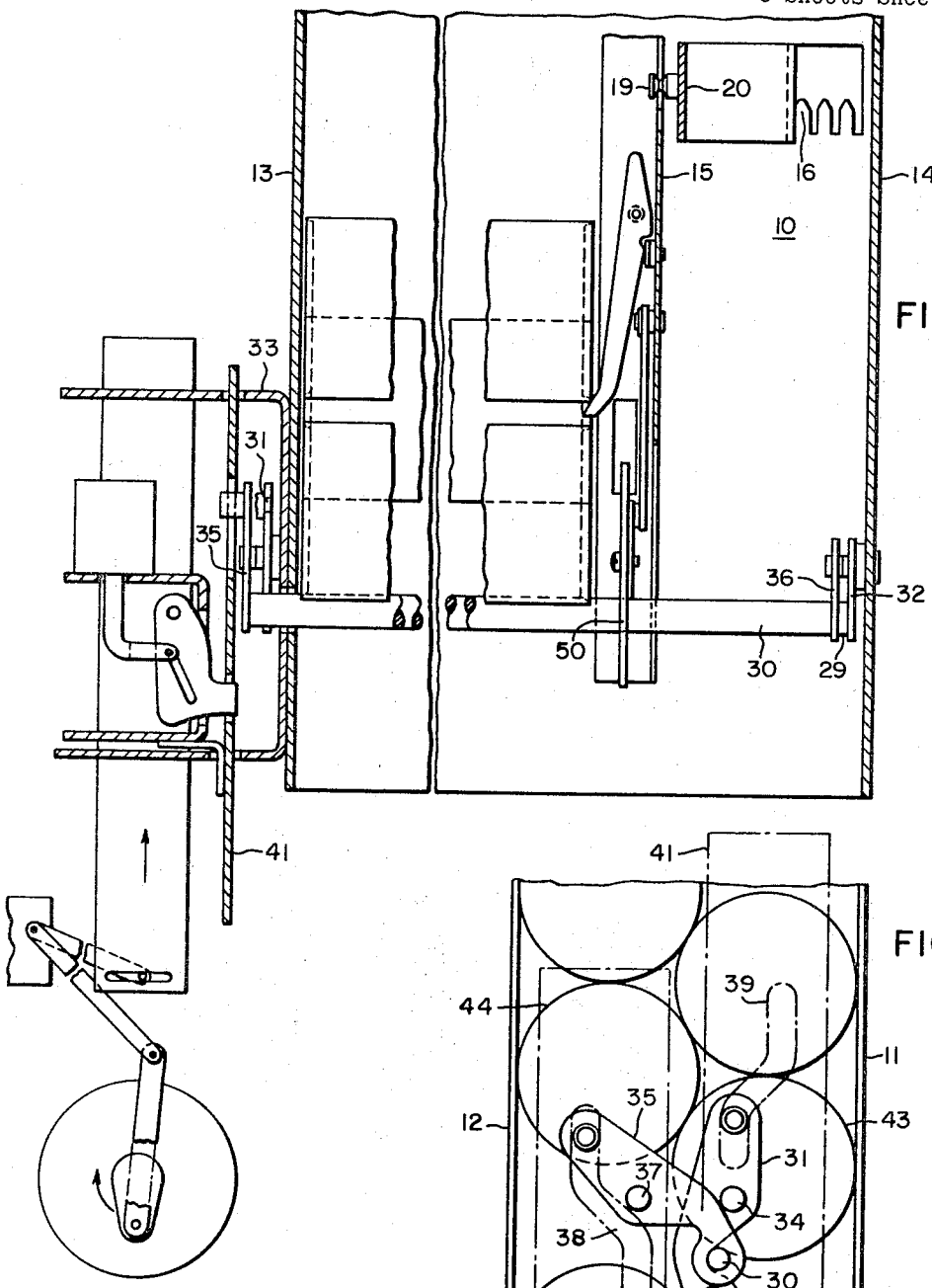


FIG. 1.

FIG. 2.

WITNESSES:

John L. Chopps

James T. Young

INVENTOR

Meigs W. Newberry

BY

Francis E. Blake

ATTORNEY

VENDING MACHINE WITH ICE BREAKING APPARATUS

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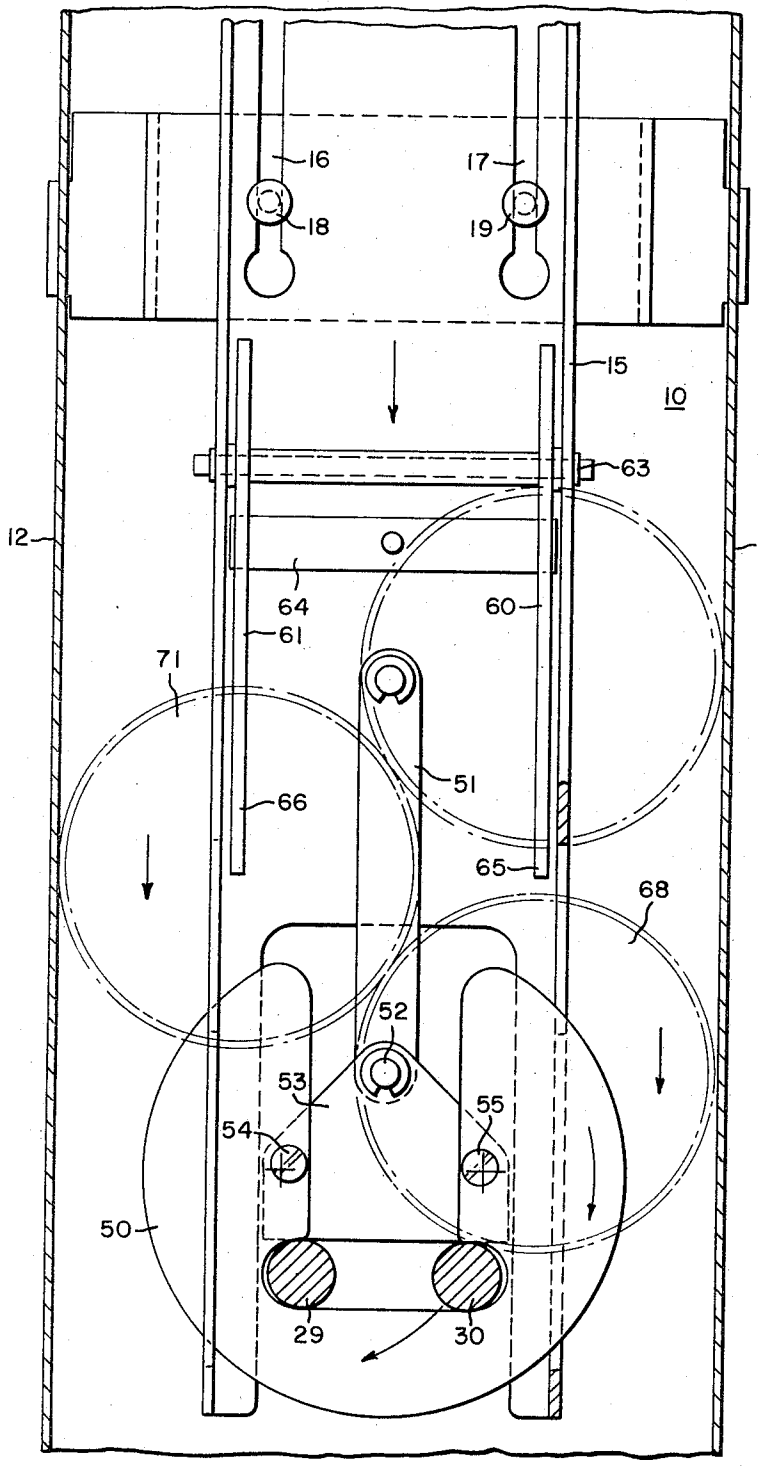


FIG. 3.

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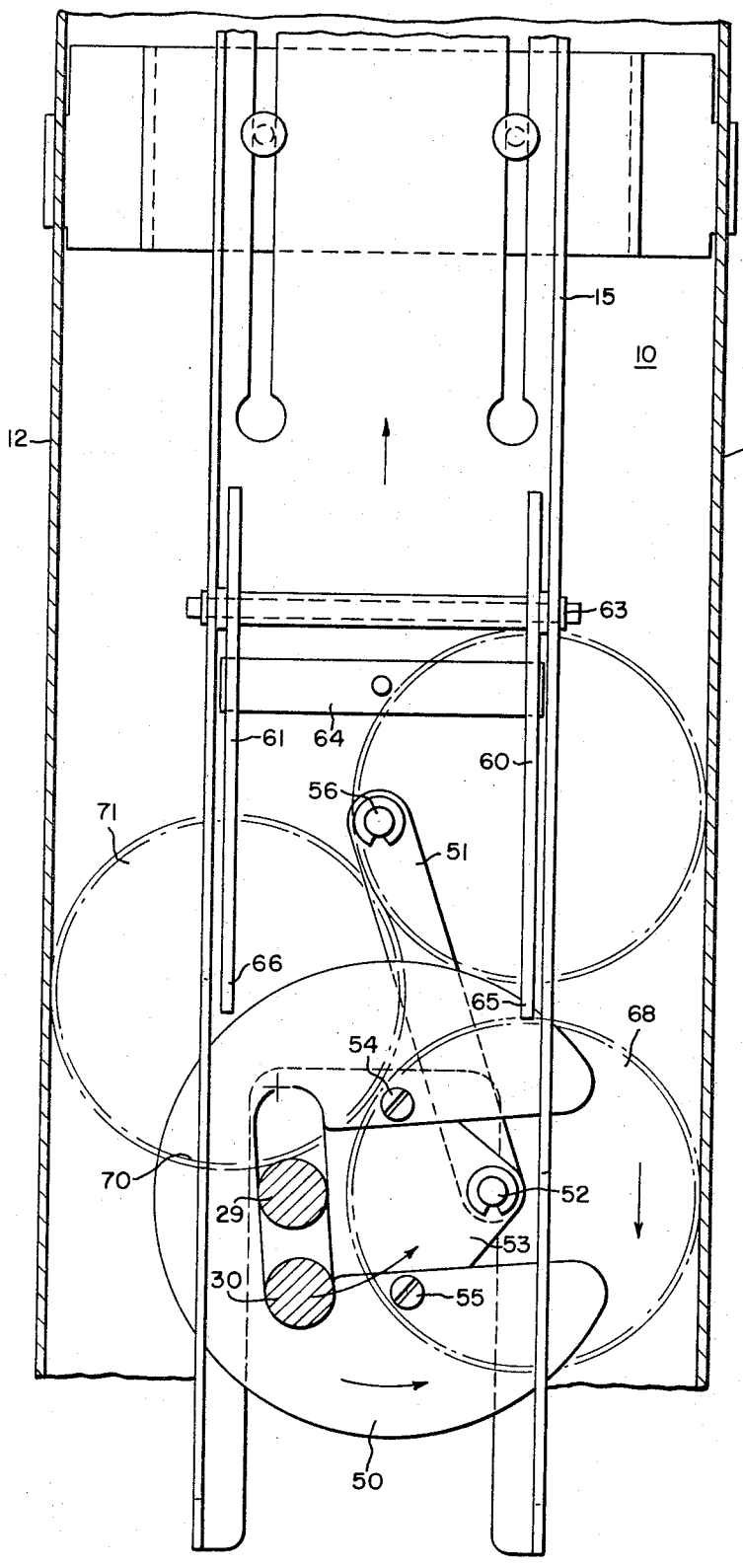


FIG. 4.

VENDING MACHINE WITH ICE BREAKING APPARATUS

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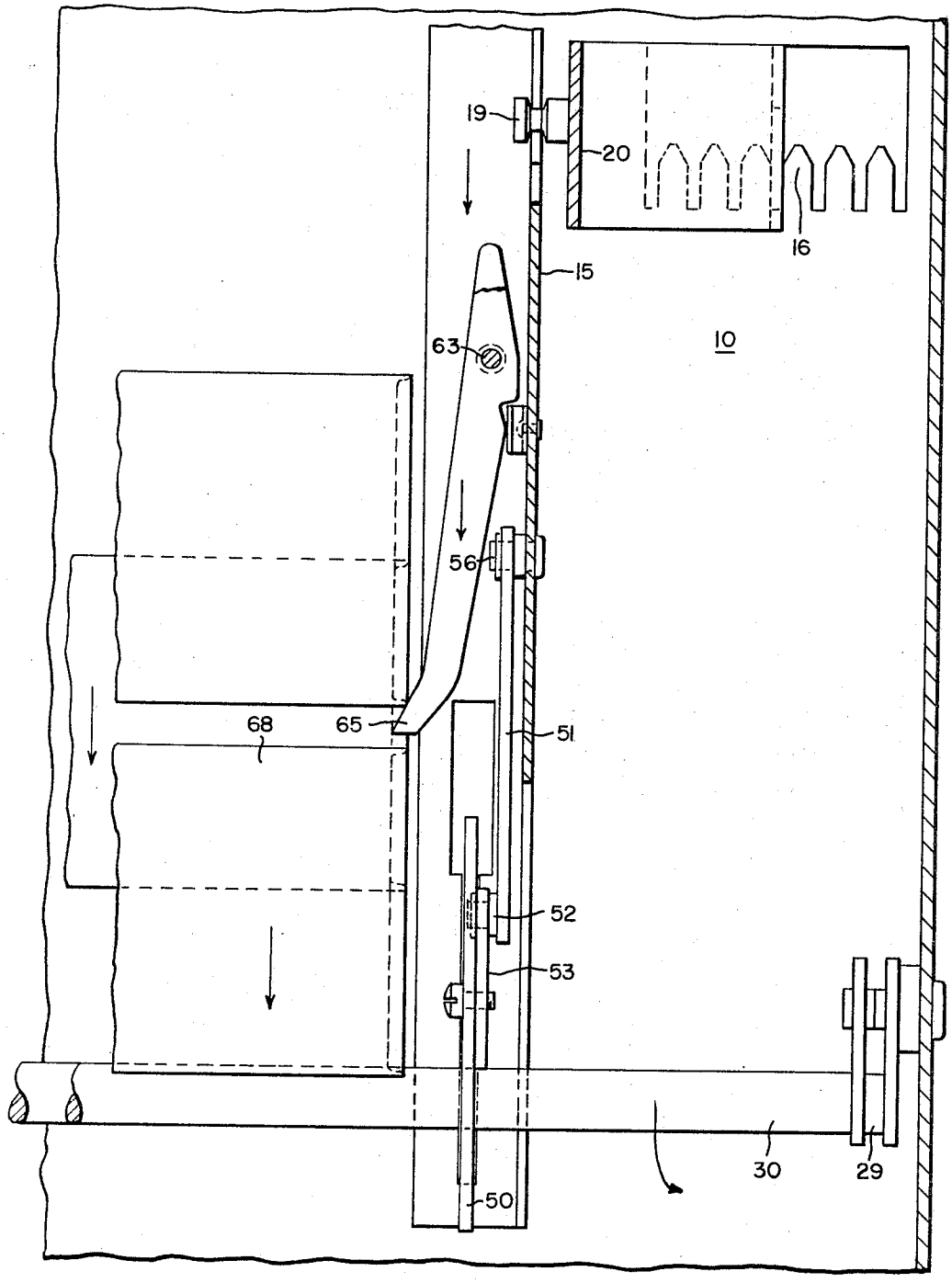


FIG. 5.

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FIG. 6.

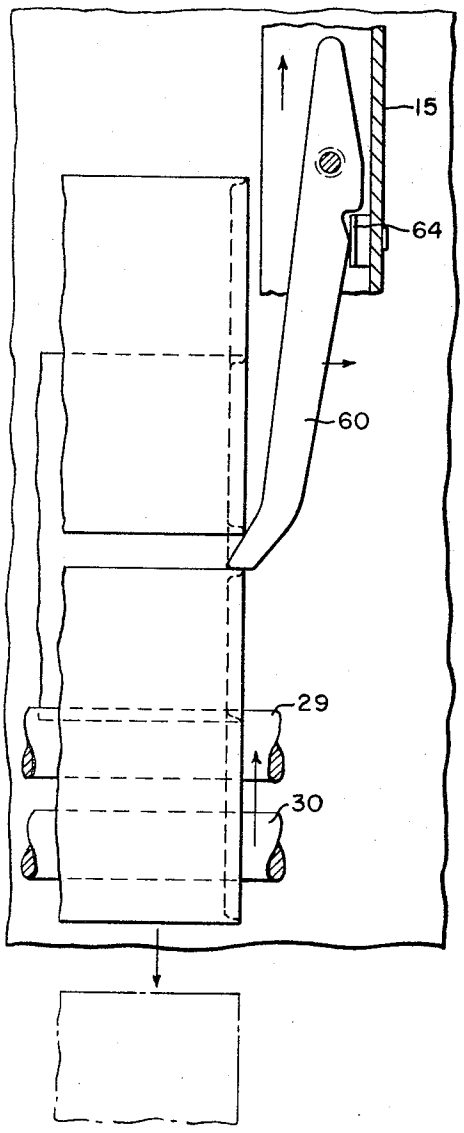
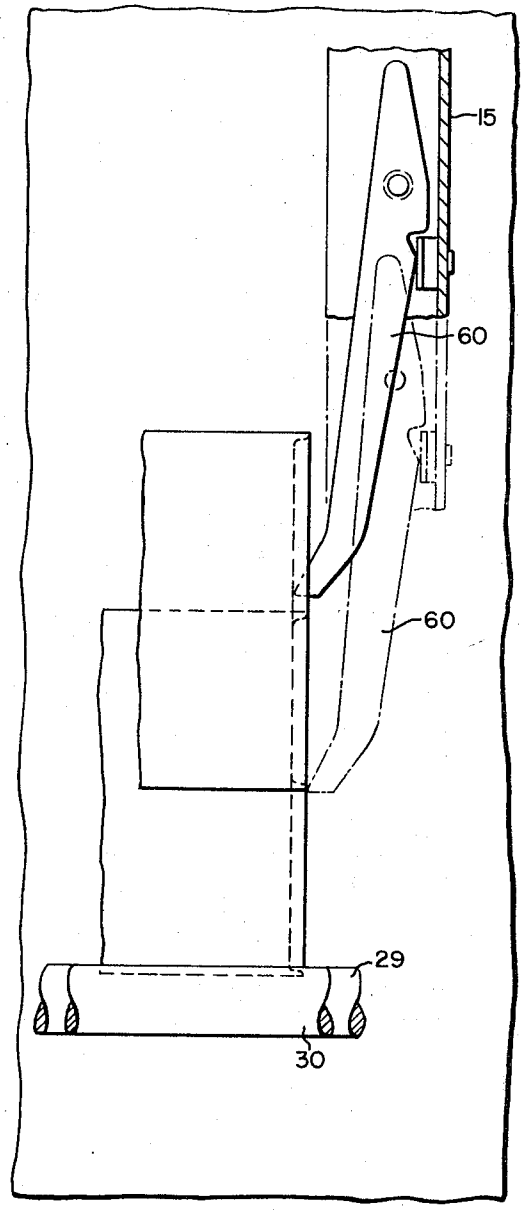


FIG. 7.



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FIG. 8.

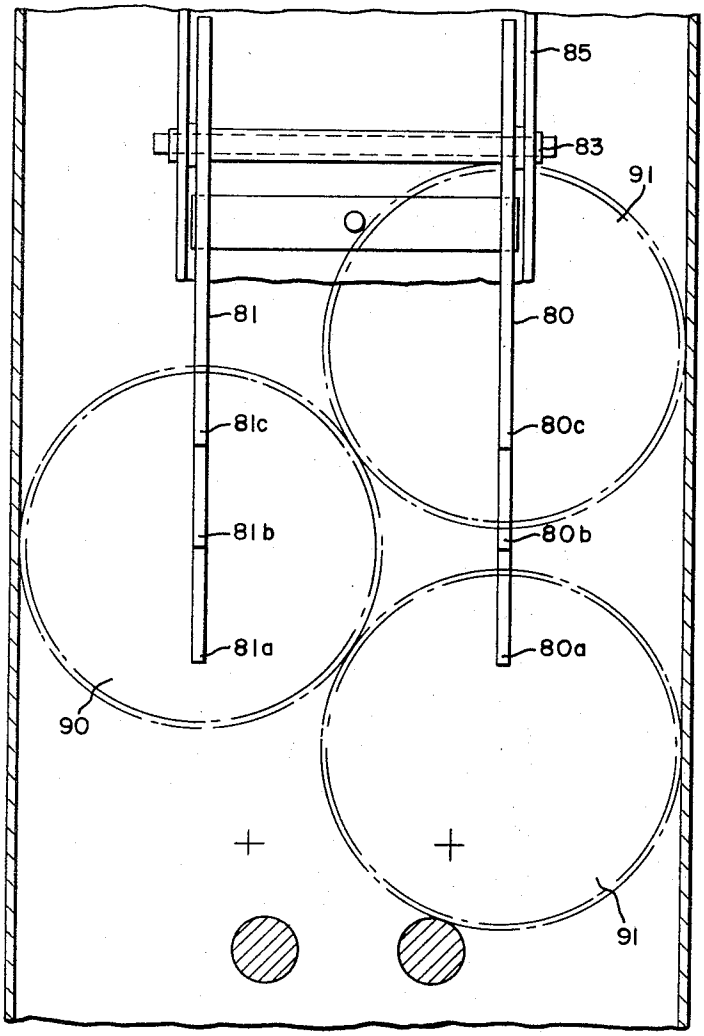
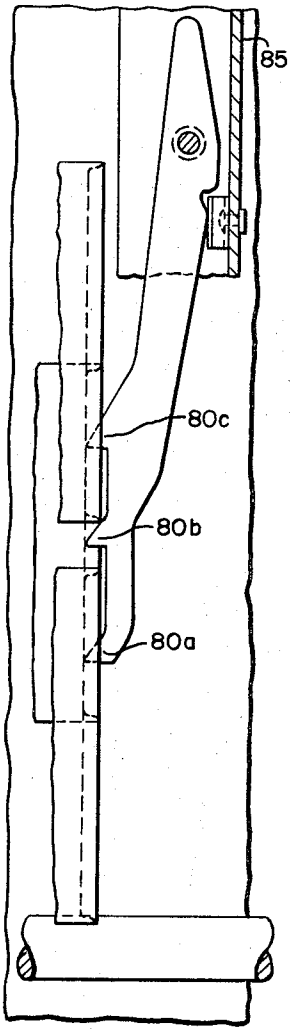


FIG. 9.



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VENDING MACHINE WITH ICE BREAKING APPARATUS

Meigs W. Newberry, East Longmeadow, Springfield, Mass., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa., a corporation of Pennsylvania

Filed Oct. 23, 1965, Ser. No. 503,971
6 Claims. (Cl. 221—67)

The present invention relates to vending machines of the refrigerated type adapted to dispense articles from at least a pair of side-by-side vertical columns of articles to be vended.

A problem often encountered in vending chilled articles from a gravity dependent refrigerated vending machine is that the articles become coated with frost to such an extent that they freeze to each other or the guide walls of the machine and do not drop by gravity to the vending chute when the article release member is moved to the release or vend position. So-called ice-breaker mechanisms for disturbing or nudging an article toward the vending chute as the article release member is moved to the vend position have been devised and an example of such a mechanism as specifically intended for bottle vending machines is disclosed in the co-pending patent application Ser. No. 420,899, by Meigs W. Newberry, filed on Dec. 24, 1964, and assigned to the same assignee as the subject invention. The mechanism of the above-mentioned application is not suitable for use in vending machines that vend the more bulky articles such as cans or the like that do not have the necked body portions with which most bottles are provided.

It is a principal object of the present invention to provide a refrigerated vending machine with a simple mechanism for moving a bulky article such as a can or the like towards a dispensing outlet in a manner to break any ice bond whenever the vending mechanism is operated to release and vend the article.

Another object of the present invention is to provide a refrigerated can vending machine of the gravity storage and delivery type with a novel form of ice breaking apparatus that will move or disturb a plurality of the lowermost cans in the vertically stored row of cans each time the vending mechanism is actuated.

The mechanism of the invention is particularly adapted to refrigerated vending machines of the gravity storage and delivery type in which two vertical side-by-side rows of cans are maintained in the so-called corded stack relation and a support or release rod is provided beneath each row to be alternately moved and reciprocated through an arcuate path from the article support to article release positions whereby the lowermost can from each row is alternately vended when the vending mechanism is operated. An example of this form of vending machine and release mechanism of the corded stack type is shown and described in the patent application Ser. No. 173,222, now Patent No. 3,209,942, filed Feb. 14, 1962, by Francis A. Gasparini and James E. Howard and assigned to the same assignee as the subject invention. In accordance with a preferred form of the present invention, a floating plate is pivotally supported on both of the article support and release rods to be rotatably reciprocal from a normal position in one first direction about a pivot point on one of said rods when the other of said rods is reciprocally moved through an arcuate path for vending and to be reciprocably rotated from the normal position in the other first direction about a pivot point on the other of such rods when said one rod is reciprocably moved through an arcuate path for vending. Resilient pawl means for engaging and moving downwardly at least the lowermost article or can to be vended is connected by a link member to the floating plate such that as the floating plate is reciprocably rotated during vending, the link and pawl means are reciprocated vertically for disturbing and moving at least the lowermost article in the row of articles to be vended.

In a modified form of the invention, the pawl member is provided with a plurality of article engaging projections spaced from each other by a distance that is related to the spacing between vertically stored cans such that a single reciprocation of the pawl member will engage and simultaneously disturb a plurality of cans during each vending operation.

Further objects, features and the attendant advantages of the invention will be apparent with reference to the following specification and drawings in which:

FIGURE 1 is a longitudinal fragmentary section of the lower portion of a gravity dependent vertical storage can vending mechanism with the ice-breaker mechanism shown in the position assumed after a can has been vended and before the next vending operation;

FIG. 2 is a fragmentary elevational view of the article storage and release rods and their operating mechanism;

FIG. 3 is an enlarged fragmentary elevational view of the ice-breaker mechanism showing the floating operating plate in the normal position;

FIG. 4 is a view similar to FIG. 3, but showing the floating plate in one operated position as it is about to be rotatably reciprocated back to the normal position;

FIG. 5 is a side elevational view similar to FIG. 3;

FIG. 6 is a side elevational view similar to FIG. 4;

FIG. 7 is a detailed side elevational view similar to FIGS. 5 and 6 but showing the resilient pawl as it moves over the rear end of the lowermost can remaining in storage in the vertical row of cans when returning to the normal position;

FIG. 8 is a view similar to FIG. 3, but showing the modified form of pawl for simultaneously disturbing cans in both rows of cans during a vending operation; and

FIG. 9 is a side elevational view of the pawl as used with the mechanism of FIG. 8.

Referring first to the embodiment shown in FIGS. 1–7 of the drawings, it includes a compartment **10** formed by side walls **11** and **12**, a front wall **13** and a rear wall **14**. The walls **11** and **12** are spaced to accommodate two columns of cans in corded stacked relation, that is, with the cans of one column in vertically staggered and horizontally overlapping relation to the cans of the other column. Each of the side walls may be a partition between two adjacent compartments of which there may be any desired number in the dispensing or vending machine.

There is provided at the rear of the compartment a can guide **15** which may be adjustably positioned as determined by the adjusting rack **16** in accordance with the length of can to be stored and vended. It should be noted that the rear can guide member **15** is provided with a pair of slots **16, 17** in which are received the studs **18, 19** respectively of the guide support bracket **20**. Thus, the rear can guide member **15** may be vertically reciprocable in the directions of the arrows in a manner to be later described in more detail.

The can supporting and releasing mechanism is provided adjacent the bottom of the compartment and, for example, the illustrated embodiment may include the mechanism shown and described in the previously mentioned application Ser. No. 173,222 filed Feb. 14, 1962 by Francis A. Gasparini and James E. Howard, Jr. This mechanism comprises two can supporting and releasing rod members **29** and **30** extending lengthwise of the compartment and the cans therein and under the two columns respectively. The rod **29** is mounted on levers **31** and **32**, which are pivoted respectively to a stationary channel

33 adjacent the front wall 13 and to the rear wall 14 on a common pivot axis 34, and the rod 30 is mounted on levers 35 and 36 which are pivotally mounted on the stationary channel 33 adjacent the front wall 13 and to the rear wall 14 respectively on a common pivot axis 37. As shown in FIG. 2, the front levers 31 and 35 have upwardly extending arms carrying cam follower rollers that extend through cam slots 38 and 39 in vertically slidable plates 40, 41. The cam slots 38, 39 are in the form shown by FIG. 2 of the drawings to affect the movement which will now be described.

To dispense the lowermost can when in the left-hand column as shown in FIG. 2, the cam plate 40 is moved upwardly causing the lever 31 to move in counterclockwise direction and to move the rod 29 downwardly and to the right to a position under the rod 30. Normally, the lowermost can 42 follows the rod 29 by gravity, and the higher cans follow the can 42 until the second lowermost can 43 in the right-hand column engages the rod 30, after which the lowermost can 42 continues its downward movement freed of the weight of the higher cans. Upon sufficient movement of the rod 29, the lowermost can 42 is released between the side wall 12 and the rod 29, whereupon the latter is returned to its normal rest position by downward movement of the cam plate 41.

To dispense the can 43, which is now the lowermost and rests on the rod 30, the latter is swung about the pivot axis 37 downwardly and under the rod 29, this being effected by upward movement of the cam plate 40 which causes the lever 35 to move clockwise. The lowermost can 43 normally follows the rod 30, and the higher cans follow the lowermost can until the lowermost can 44 in the left-hand column engages the rod 29, after which the lowermost can 43 continues its movement until it passes between the rod 30 and the side wall 11. The rod 30 is then returned to its normal or rest position by downward movement of the cam plate 40.

While normally the lowermost can follows by gravity the downward releasing movement of the releasing rod, it has been found that occasionally it would fail to do so. As previously mentioned, a common cause of such failure is the formation of ice, whereby the can is frozen either to an adjacent can or a part of the can retaining structure. In order to assure movement of the can upon releasing movement of the releasing rod, should it fail for any reason to follow the rod, there is provided the ice-breaker mechanism of the invention which will now be described in more detail.

Referring now more particularly to FIGS. 3–5 of the drawings, a floating plate 50 is pivotally supported on the support rods 29 and 30 as shown in a manner to be reciprocably rotated for example about one of the support rods 29 when the other of the support rods 30 is moved through its arcuate path. Similarly the floating plate 50 will be rotatably reciprocated in the opposite directions about the support rod 30 when the support rod 29 is reciprocably moved through its arcuate path for vending. The normal position for the floating plate member 50 is shown by FIG. 3 of the drawings and the rotated position of the floating plate 50 about the pivot point of the support rod 29 when the support rod 30 is arcuately moved as shown by FIG. 4 of the drawings. A link member 51 is pivotally connected to the floating plate 50 at 52 through the bridging plate 53 which is fastened by the screws 54 and 55 to the floating plate 50. Thus, whenever the vending mechanism is operated to move either one of the support rods 29, 30, the floating plate 50 is rotatably reciprocated to reciprocate the link member 51.

The link member 51 is pivotally connected at its upper end 56 to the rear can guide 15 which has been previously described. Thus as the link member 51 is reciprocated downwardly and upwardly the rear can guide member 15 is also reciprocated downwardly and upwardly on the studs 18 and 19 of the support bracket 20. Spring pressed

pawl means which in the preferred embodiment of the invention includes the two pawl members 60 and 61, are pivotally mounted at 63 on the rear can guide member 15 with a leaf spring 64 provided as shown to normally urge the pawl assembly towards the front of the machine. As shown by FIGS. 4 and 5 of the drawings, the lower projecting ends 65 and 66 of the respective pawls 60, 61 will normally engage the upper end surface of the lowermost can to be vended such as the can shown at 68. Thus, when the support rod 30 is moved from the position shown by FIG. 3 of the drawing to the position shown by FIG. 4 of the drawing, the can guide 15 carrying the spring pressed pawls 60 and 61 will move downwardly with the projecting end 65 of the pawl 60 engagaing the upper end surface of the can 68 to positively move it toward the dispensing outlet. Also at the same time it will be noted that the projecting end 66 of the pawl 61 will engage the inner lower rim surface 70 of the next lowermost can 71 thus, simultaneously moving or nudging and freezing the can 71 as the can 68 is vended.

FIGS. 6 and 7 of the drawings show how the spring pressed pivoted pawls such as the pawl member 60 are pivoted away to override the ends of the remaining cans stored in the vertical column when the rear can guide 15 is again reciprocated upwardly in the direction of the arrow shown by FIG. 6 toward the normal position when either of the can support rods 29 and 30 are moving towards the position shown by FIG. 3 of the drawings.

Referring now to FIGS. 8 and 9 of the drawings, a slightly modified form of the invention is shown in which the spring pressed pawls 80 and 81 which are pivoted at 83 on the vertically movable rear can guide member 85 are provided with a plurality of suitably spaced projections 80A, 80B, 80C and 81A, 81B and 81C. As shown, the projections 80A–80C and 81A–81C are suitably spaced from each other by a dimension that is related to the diameter of the can being vended or in other words to the spacing of the cans are supported in the vertical rows of cans to be vended. As can be clearly seen by FIGS. 8 and 9 of the drawings the vertical reciprocation of the rear can guide 85 downwardly will cause the projection 81A to engage the inside lower rim at the back end of the can 90 while at the same time the projection 80B will engage the upper edge of the back end of the can 91 and the projection 80C will engage the inner lower rim at the end of the can 92. Thus, during each vending operation and the consequent reciprocation of the rear can guide 85 with pawl members 80 and 81, all three of the cans 90–92 will be disturbed or moved towards the vending outlet in a manner to break any ice formation tending to lock the cans in position.

Although the invention has been described in connection with a can vending machine it should be understood that other cylindrical bulky objects which may be stored in two vertical rows of side-by-side corded stack arrangement may be similarly vended. This invention is not to be limited to the type of mechanism as specifically shown for moving the article support rods 29 and 30 in the required alternate sequence since many different arrangements are known for actuating such article support and release rods. Various modifications will occur to those skilled in the art.

I claim as my invention:

1. In a vending machine of the type adapted to contain under refrigeration two side-by-side vertical columns of articles to be vended with a pair of article support rods each movably positioned to be reciprocably moved through an arcuate path from and to article supporting relation beneath respective columns for vending an article, the article moving ice breaking apparatus comprising, a floating plate pivotally supported on both of said rods to be rotatably reciprocable from a normal position in one first direction about a pivot point on one of said rods when the other of said rods is reciprocably moved for vending and to be reciprocably rotated from the nor-

mal position in the other first direction about a pivot point on the other of said rods when said one rod is reciprocably moved for vending, pivotal pawl means movably mounted for vertical reciprocating movement, resilient means to move said pawl means into engagement with an article to be vended as said pawl means is moved vertically downward and to allow said pawl means to pivot out of engagement with an article as said pawl means is moved vertically upward, and link means interconnecting said floating plate and said pawl means whereby said pawl means is reciprocably moved downwardly and then upwardly to move the article to be vended as said plate is reciprocably rotated from the normal position during vending.

2. The vending machine of claim 1 in which a vertically movable rear guide member is provided for the two side-by-side columns of articles to be vended, said pivotal pawl means being mounted on said guide member, and said link means is interconnected between said floating plate and said guide member for vertically moving the guide member and associated pivotal pawl means during vending.

3. The vending machine of claim 2 in which the pivotal pawl means is provided with a plurality of article engaging projections spaced from each other by a distance proportionate to a dimension of the article to be vended whereby more than one article in the vertical column of articles is moved during the reciprocating movement of the pawl means.

4. The vending machine of claim 1 in which the pivotal pawl means is comprised of a pair of pivotal pawl members with a respective pawl member positioned to engage articles in a respective one of the side-by-side columns of articles.

5. The vending machine of claim 4 in which a vertically movable rear guide member is provided for the two side-by-side columns of articles to be vended, said pair of pivotal pawl members being mounted on said guide member, and said link means is interconnected between said floating plate and said guide member for vertically moving the guide member and associated pivotal pawl members during vending.

6. The vending machine of claim 5 in which each pivotal pawl member is provided with a plurality of article engaging projections spaced from each other by a distance proportionate to a dimension of the articles to be vended whereby more than one article in each vertical column of articles is moved during the reciprocating movement of the pivotal pawl members.

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ROBERT B. REEVES, *Primary Examiner.*

K. N. LEIMER, *Assistant Examiner.*