

April 7, 1953

J. ALBERTOLI ET AL

2,633,971

UNSCRAMBLER FOR CANS

Filed May 9, 1950

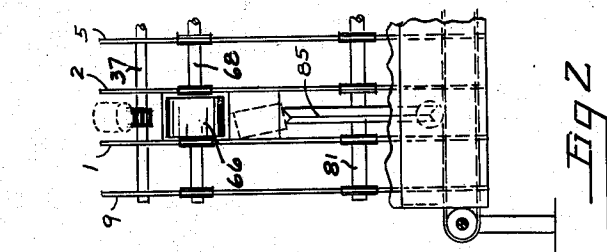


Fig 2

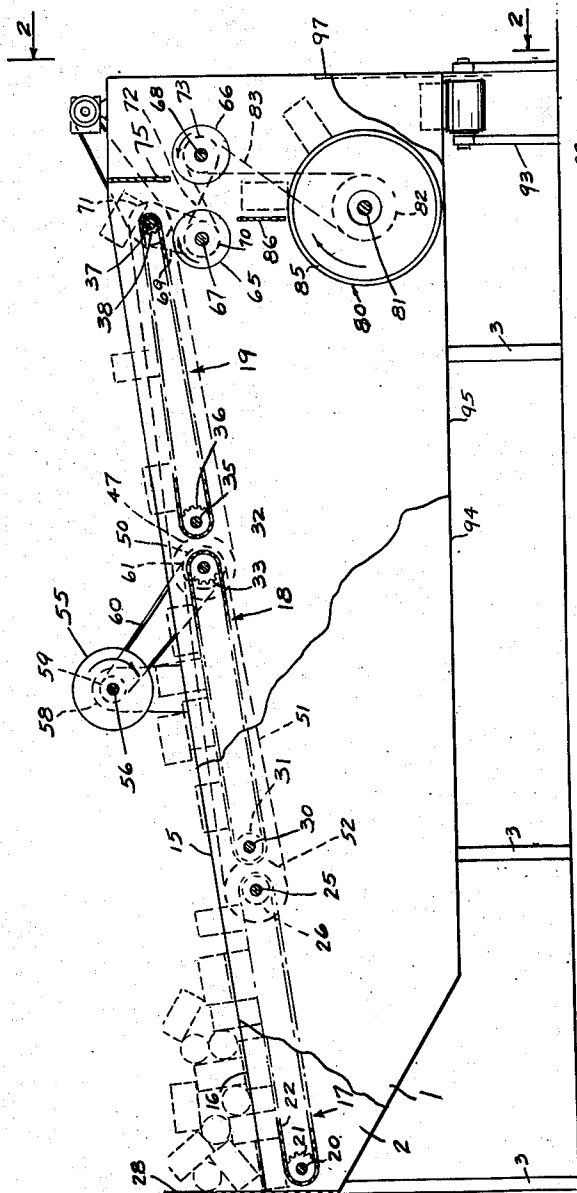
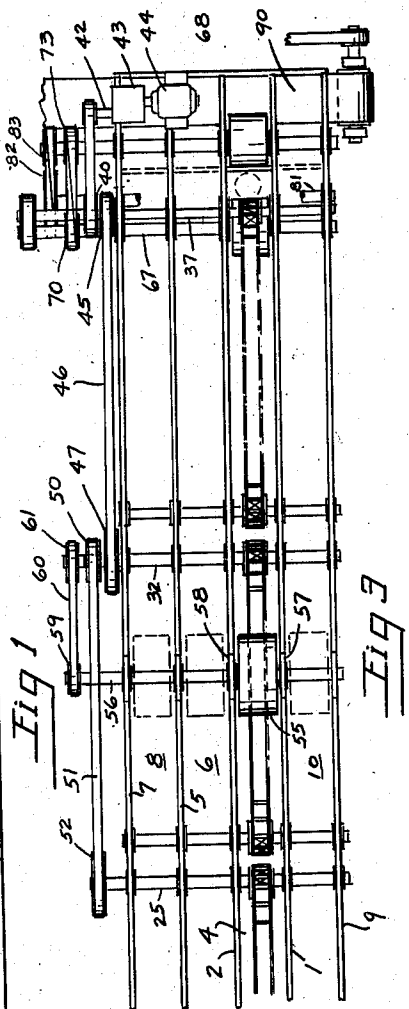


Fig 3

INVENTOR.
JOHN ALBERTOLI
GILBERT P. ALBERTOLI
BY

Boyer, Mohler & Beckley
ATTORNEYS

UNITED STATES PATENT OFFICE

2,633,971

UNSCRAMBLER FOR CANS

John Albertoli and Gilbert P. Albertoli,
San Francisco, Calif.

Application May 9, 1950, Serial No. 160,974

11 Claims. (Cl. 198—30)

1

This invention relates to an unscrambler for rearranging articles from a conglomeration or haphazard pile into orderly rows. More particularly, the invention relates to a device for automatically rearranging filled cans of the conventional type in which food is packed.

In most canning plants, the cans containing food or other material are stored temporarily after sealing and preparatory to labelling. Such cans may be stored in cartons, boxes or similar containers and then removed when it is desired to run them through the labelling machine or other marking device.

Labellers and markers are generally highly automatic and are adapted to receive cans in a row or single file. Thus when it becomes necessary to remove unlabelled sealed cans from their temporary containers they must be placed in an orderly manner with the axis of each can horizontal on the approach belt or conveyor leading to the labeller or marking machine.

When removal of such cans from their containers is done manually, the loss in manpower and time is objectionable since such labelling machines run fast and the manual operation must also be performed rapidly to permit the labelling machine to run at its maximum efficiency.

This loss is particularly high when relatively small cans, such as are used for baby food, are to be run since the handling per unit weight of contents is relatively greater in such a case.

The main object of the present invention is the provision of a full can unscrambler which will automatically rearrange a plurality of cans in an orderly row on the approach belt leading to the labeller or similar device.

Another object of the invention is the provision of a can unscrambler which will handle all cans from a haphazard pile and automatically rearrange such cans into rows or stacks with the axis of each can parallel to the axes of the other cans.

Still another object of the invention is the provision of an unscrambler which will handle relatively small cans with great accuracy. It should be noted in this connection that the automatic handling of small articles is more difficult to achieve than automatic handling of large cans.

Yet another object of the invention is the provision of an unscrambler for cans which will automatically handle such cans gently without marring the same or causing bending or bulging which might impair their saleability.

Another object of the invention is the pro-

2

vision of an unscrambler into which a carton or box of cans may be dumped manually or automatically and which will rearrange such cans in the manner above described with a minimum of manual supervision.

Still another object of the invention is the provision of an unscrambler for cans which is inexpensive to make and maintain and which will obviate many of the expensive time-consuming manual operations which would otherwise be necessary.

Other objects and advantages will be seen from the following specification and drawings wherein:

Fig. 1 is a semi-schematic side elevation of the device partly broken away and in section to show structure.

Fig. 2 is an end elevation of a portion of the device as taken along lines 2—2 of Fig. 1.

Fig. 3 is a top plan view of a portion of the device.

The invention is adapted to receive cans between a pair of spaced opposed parallel guides or side-walls 1, 2 which may be of sheet metal or the like and which may be supported on the floor or ground by means of legs 3.

These side walls 1, 2 form a trough 4 into which the cans are adapted to pass downwardly by gravity from the pile in which they are dumped. It should be noted that the space between the walls 1, 2 is slightly less than the length of a can and greater than the width of a can so that a can entering the trough between the walls 1, 2 will automatically be arranged with its axis in a plane generally parallel to the walls 1, 2 and approximately centrally between said walls. Thus a can lying with its axis perpendicular to the walls 1, 2 cannot enter the trough. However, the trough will receive cans vertically or horizontally disposed.

In the drawings several troughs are shown in side-by-side relationship. Thus, side walls 5 and 2 form a trough 6 therebetween identical to trough 4 and sides 7 and 5 form trough 8. Side wall 9 on the opposite side of the trough 4 from the above mentioned walls formed a trough 10 with side wall 1. Since all of the troughs shown are identical and have the same operating devices, only trough 4 will be described and illustrated in detail. It will be understood however that any number of such troughs may be made depending on the number of cans to be handled.

The top edges 15, 16 of walls 1, 2 slope upwardly in the direction of travel of the cans or to the right as shown in Fig. 1. These two edges

3

may be made horizontal, but sloping side walls are preferable since the cans are fed downwardly by gravity as will subsequently be described and it is desirable in most cases not to change working levels too much unless absolutely necessary.

Spaced downwardly from the top edges 15, 16 of the side walls 1, 2 are longitudinally aligned generally elongated conveyors 17, 18 and 19. Conveyor 17 is positioned at the rear end of the device, and receives the cans, and conveyor 19 is positioned at the opposite, forward, or discharge end.

Conveyors 17, 18, 19 all travel to the right as shown in Fig. 1 and at different rates of speed with conveyor 17 travelling slowest and conveyor 19 fastest, and conveyor 18 at a rate of speed between that of the others.

Conveyor 17 is supported at its rear end on an idler shaft 20 which carries a sprocket 21 for engaging the chain 22 of the conveyor. A belt conveyor could be employed in lieu of chain 22, but the latter is more positive and presents the desired amount of friction between the conveyor and the cans. Drive shaft 25 supports the forward end of conveyor 17 and is provided with a sprocket 26.

As best seen in Fig. 1, the cans may be dumped on the rear end of the device so that the cans are spread out over the troughs 4, 6, 8 and 10 in a haphazard manner. An end wall 28 is secured to walls 1, 2, 5, 7 and 9 to prevent the cans from falling off the rear end.

Forward motion of the top run of the conveyor will cause those cans which can pass between the top edges 15, 16 to move forwardly to conveyor 18, and from conveyor 18 to conveyor 19.

Conveyor 18 is supported at its rear end on idler shaft 30 and sprocket 31 and at its forward end by drive shaft 32 and sprocket 22. Conveyor 19 is similarly supported by idler shaft 35 and sprocket 36 and drive shaft 37 and sprocket 38.

The drive shafts and idler shafts above described pass through all of the side walls and are rotatable therein and are common to all troughs 4, 6, 8, and 10. On the side of trough 8 outwardly of the side wall 7 is a pulley 40 secured to the end of drive shaft 37 which drives conveyor 19. This pulley 40 is connected by means of a belt 41 with the output shaft 42 of a reducer 43 which in turn may be driven by motor 44 secured to the top of the machine.

Also secured to shaft 37 is another pulley 45 which is connected by means of a belt 46 with drive pulley 47 on drive shaft 32 of conveyor 18. Pulley 47 is preferably somewhat larger than pulley 45 so that conveyor 18 is driven at a slower rate of speed than conveyor 19.

A pulley 50 is also provided on shaft 32 and is connected by means of a belt 51 with pulley 52 on drive shaft 25 of conveyor 17. Pulley 52 is somewhat larger than pulley 50 so that conveyor 17 is driven at a slower rate of speed than conveyor 18.

Thus it is seen that the cans which are received by conveyor 17 will be moved forwardly to conveyors 18 and 19 and at a progressively increasing rate of speed so that the cans on conveyor 19 will be spaced apart longitudinally of the conveyor. To prevent movement of two stacked cans to conveyor 19 a rotating wheel 55 is provided above conveyor 18. This wheel 55 is mounted on a shaft 56 which in turn is rotatably supported in upwardly directed extensions 57, 58 of sidewalls 1 and 2 respectively. Shaft 56 is

4

provided with a pulley 59 which in turn is driven by means of belt 60 from a pulley 61 on shaft 32. This wheel 55 is positioned so that its periphery will engage any cans projecting above the conveyor 18 a distance greater than the height of a can. Thus, both horizontally and vertically disposed cans will be moved to conveyor 19, but the upper can of a pair of stacked cans will be knocked off the lower one.

At the forward end of conveyor 19 the cans are permitted to drop off and move downwardly by gravity. Positioned under this forward end is a pair of power driven rollers 65, 66 having a resilient outer surface of rubber or the like. Said rollers are driven in the directions of the arrows thereon (Fig. 1). These rollers 65, 66 are supported on shaft 67, 68 respectively. Shaft 67 is driven by shaft 37 by means of belt 69 and pulleys 70, 71 carried by shafts 67 and 37 respectively.

Shaft 67 in turn drives shaft 68 in an opposite direction by means of crossed belt 72 which is supported on pulleys 73 and 74 on shafts 67 and 68 respectively.

Rollers 65, 66 are spaced apart a distance slightly less than the diameter of a can so that a can falling from the forward end of the conveyor 19 will be gripped gently between the yieldable surfaces of the rollers 65, 66 thus retarding the speed of the can's downward movement and then allowing it to fall from between the rollers. To insure each can falling downwardly with its longitudinal axis generally vertical, the sprocket 38 should be as small as possible to give a horizontally disposed can a sharp turn before it is released. To further insure vertical falling of the cans from the conveyor 19 a guide plate 75 of sheet metal or the like is positioned between sidewalls 1 and 2 (Fig. 1). This guide plate 75 is spaced from the outer surface of the conveyor 19 a distance slightly greater than the diameter of a can and somewhat less than the height of a can. The proper distance may be arrived at by experimentation to give best results depending upon the size of cans to be run. In the case of small cans such as are used for baby food, this distance between the conveyor and the guide 75 will be about $1\frac{1}{8}$ to $1\frac{1}{4}$ times the diameter of the can.

After the rollers 65, 66 have released a can, the latter is received on the periphery of a relatively large, vertically disposed wheel 80 which is positioned about centrally between the side walls 1 and 2 and supported on shaft 81 which is in turn rotatably supported in the side walls 1, 2 and the side walls of the other troughs in like manner as the drive shafts hereinbefore described. This shaft 81 is provided at its end outwardly of side wall 7 with a pulley 82 which is driven by a belt 83 from a similar pulley on shaft 68.

The wheel 80 is relatively narrow and is preferably provided with a V-groove 85 around its periphery as best seen in Fig. 2 for tilting the can from the centerline plane between the walls 1, 2 and against one of said walls. The wheel is grooved to tilt the can against wall 1 in Fig. 2. This tilting of the can is accomplished by forming the groove 85 slightly towards the side of the wheel that is nearer to sidewall 1 so that the diameter of the wheel is less at this latter side than at the other.

As the wheel 80 travels clockwise (as seen in Fig. 1), it carries each can slowly along its periphery and then permits it to drop when the axis of the can is substantially horizontal.

5

A baffle or guide 86 is positioned between side walls 1 and 2 to prevent the cans from moving to the left as seen in Fig. 1 after they have landed on wheel 80. It should also be noted that the wheel 80 is offset slightly towards roller 65 so that each can lands on the periphery of the wheel 80 at a point slightly offset from the vertical centerline of the wheel towards the direction in which the periphery is travelling. This also insures the can moving in the same direction that the periphery of the wheel 80 is moving. This distance between the top of wheel 80 and the rollers 65, 66 should be as small as possible and still permit the cans to clear the roller 66 as they are carried past the latter by wheel 80. The smaller this distance, the less is any likelihood of the cans bouncing from the wheel 80 and becoming jammed.

It will be apparent that the wheel 80 might operate satisfactorily without the groove 85. In such a case, however, some cans might become balanced on the wheel without touching the side walls and others might be disposed at various angles of tilt to the plane of the wheel. Under such different conditions, the cans would fall from the wheel 80 at different points and at different angles to the horizontal. Since it is desirable that all cans fall in the same manner and since it is also desirable that the cans should be as nearly as possible in a horizontal position, the structure shown is preferable. The friction between each can and the side wall 1 is sufficient to keep the can on the wheel 80 until it is almost horizontal which is desirable.

The cans falling from the wheel 80 are received by a horizontally disposed belt conveyor 90 or the like which takes the cans to the labelling machine (not shown). The conveyor 90 may be supported at its end remote from the labeller by an idler pulley 90 which in turn is rotatably supported in bearings 92 which in turn are spaced from the floor by means of uprights 93.

The belt conveyor 90 is positioned under the lower edges 94, 95 of side walls 1, 2 and runs transversely of the same to receive the cans from each of the wheels 80. Guide plate 96 may be positioned between side walls 1, 2 adjacent the periphery of the wheel 80 to prevent cans from falling off the conveyor. Another guide 97 may be positioned along the opposite side of the conveyor 90 for the same purpose. These guides 96, 97 may be sufficiently high to permit two or three cans to be stacked on the conveyor 90. It will be understood, of course, that all cans received by conveyor 90 will be disposed with their axes horizontal. Whether or not the cans are allowed to stack on the conveyor 90 will depend on the operation of the labelling machine. The guide 97 should extend upwardly a sufficient distance to prevent the cans from falling out of the forward end of the device. This guide 97 also serves to maintain the cans in a horizontal position and for this reason should be spaced from the wheel 80 a distance slightly greater than the height of a can.

In operation, it is merely necessary to dump a pile of cans onto the rear end of the machine and the machine will deposit all of the cans on belt 90 automatically. The cans falling into the trough 4 will tend to rearrange the other cans above them so that they too will fall in as the lower ones are carried away by the conveyor 17. However, if some cans fall across the top edges 15, 16 of side walls 1, 2 and perpendicular

6

to said side walls the operator who is dumping the cans into the machine may get these cans into the troughs by merely sweeping his hand over the troughs before dumping a new load. However, the constant movement of the cans at the rear end causes almost all of the cans to fall into the troughs and the machine is therefore almost completely automatic.

We claim:

1. In a full can unscrambler for automatically sorting cylindrical cans from a haphazard pile into a row or stack with the longitudinal axes of such cans parallel to each other, a pair of opposed parallel guides adapted to receive cans therebetween, said guides being spaced apart a distance less than the length of a can and greater than the diameter of a can whereby the axes of all cans between said guides will lie in a plane generally parallel to said guides, a conveyor supporting said cans for movement along a path of travel between said guides, said conveyor having a free end from which said cans are adapted to fall downwardly by gravity, retarding means positioned under said end for slowing the downward movement of each of such cans, turning means under said retarding means for receiving said cans and for successively turning each can from a generally vertical position to a generally horizontal position.

2. In a full can unscrambler for automatically sorting cylindrical cans from a haphazard pile into a row or stack with the longitudinal axes of such cans parallel to each other, a pair of opposed parallel guides adapted to receive cans therebetween, said guides being spaced apart a distance less than the length of a can and greater than the diameter of a can whereby the axes of all cans between said guides will lie in a plane generally parallel to said guides, a conveyor supporting said cans for movement along a path of travel between said guides, said conveyor having a free end from which said cans are adapted to fall downwardly by gravity, retarding means positioned under said end for slowing the downward movement of such cans, turning means under said retarding means for receiving said cans and for successively turning each can from a generally vertical position to a generally horizontal position, said retarding means comprising a pair of horizontally spaced rotating rollers for frictionally gripping each can during downward movement of each can therebetween.

3. In a full can unscrambler for automatically sorting cylindrical cans from a haphazard pile into a row or stack with the longitudinal axes of such cans parallel to each other, a pair of opposed parallel guides adapted to receive cans therebetween, said guides being spaced apart a distance less than the length of a can and greater than the diameter of a can whereby the axes of all cans between said guides will lie in a plane generally parallel to said guides, a conveyor supporting said cans for movement along a path of travel between said guides, said conveyor having a free end from which said cans are adapted to fall downwardly by gravity, retarding means positioned under said end for slowing the downward movement of such cans, turning means under said retarding means for receiving said cans and for successively turning each can from a generally vertical position to a generally horizontal position, said retarding means comprising a pair of horizontally spaced rotating rollers for frictionally gripping each can during downward movement of each can therebetween, guide

means adjacent said end for guiding said cans downwardly with their axes generally vertical whereby said cans will be received by said rollers in a substantially vertical position.

4. In a full can unscrambler for automatically sorting cylindrical cans from a haphazard pile into a row or stack with the longitudinal axes of such cans parallel to each other, a pair of opposed parallel guides adapted to receive cans therebetween, said guides being spaced apart a distance less than the length of a can and greater than the diameter of a can whereby the axes of all cans between said guides will lie in a plane generally parallel to said guides, a conveyor supporting said cans for movement along a path of travel between said guides, said conveyor having a free end from which said cans are adapted to fall downwardly by gravity, retarding means positioned under said end for slowing the downward movement of such cans, turning means under said retarding means for receiving said cans and for successively turning each can from a generally vertical position to a generally horizontal position, said turning means comprising a vertically disposed rotating wheel adapted to receive said cans on its periphery with the longitudinal axis of each can disposed radially of said wheel, said wheel being adapted to rotate with a can on said periphery for turning said can from a vertical to a generally horizontal position.

5. In a device for rearranging cans from a haphazard pile into a row or stack with the axes of each can horizontal, a plurality of troughs in side by side relationship adapted to receive a pile of cans thereon, conveyor means in each of said troughs for supporting cans for movement along a path of travel in a direction away from said pile, said conveyor having a free end remote from said pile from which said cans are adapted to fall downwardly by gravity, retarding means adjacent said free end for slowing the downward movement of each of such cans, turning means under said retarding means adapted to receive cans from the latter for turning said cans from a generally vertical position with their longitudinal axes vertical to a generally horizontal position with their axes horizontal.

6. In a can unscrambler for automatically orienting indiscriminately arranged cylindrical cans, a generally vertically extending passageway, two opposed sides of which are partially defined by a pair of horizontally spaced rollers supported for rotation about parallel horizontal axes and having relatively soft peripheral surfaces for yieldably gripping the opposed cylindrical sides of such cans, means for simultaneously rotating said rollers in opposite directions in which their adjacent sides move downwardly whereby cans fed to the space between said rollers from above will be drawn downwardly between said rollers, a feed device above said space for feeding said cans thereto with their axes generally vertical, and a can tipping support below said space having a generally downwardly and laterally extending supporting surface with its upper end positioned for supporting the bottom ends of cans discharged from said space whereby cans so discharged onto said surface from between said rollers will be tipped to one side for positioning on their sides.

7. In a can unscrambler for automatically orienting indiscriminately arranged cylindrical cans, a generally vertically extending passageway, two opposed sides of which are partially

defined by a pair of horizontally spaced rollers supported for rotation about parallel horizontal axes and having relatively soft peripheral surfaces for yieldably gripping the opposed cylindrical sides of such cans, means for simultaneously rotating said rollers in opposite directions in which their adjacent sides move downwardly whereby cans fed to the space between said rollers from above will be drawn downwardly between said rollers, a feed device above said space for feeding said cans thereto with their axes generally vertical, and a can tipping support below said space having a generally downwardly and laterally extending supporting surface with its upper end positioned for supporting the bottom ends of cans discharged from said space whereby cans so discharged onto said surface from between said rollers will be tipped to one side for positioning on their sides, a horizontally extending conveyor positioned adjacent said can tipping device for receiving the cans so positioned on their sides.

8. In a can unscrambler for automatically orienting indiscriminately arranged cylindrical cans, a generally vertically extending passageway, two opposed sides of which are partially defined by a pair of horizontally spaced rollers supported for rotation about parallel horizontal axes and having relatively soft peripheral surfaces for yieldably gripping the opposed cylindrical sides of such cans, means for simultaneously rotating said rollers in opposite directions in which their adjacent sides move downwardly whereby cans fed to the space between said rollers from above will be drawn downwardly between said rollers, a feed device above said space for feeding said cans thereto with their axes generally vertical, and a can tipping support below said space having a generally downwardly and laterally extending supporting surface with its upper end positioned for supporting the bottom ends of cans discharged from said space whereby cans so discharged into said surface from between said rollers will be tipped to one side for positioning on their sides, a horizontally extending conveyor positioned adjacent said can tipping device for receiving the cans so positioned on their sides, said can tipping device comprising a wheel supported for rotation about a horizontal axis and the said horizontal axis of said wheel being laterally offset relative to the central part of the downwardly projected area of said space.

9. In a can unscrambler for automatically orienting indiscriminately arranged cylindrical cans, a generally vertically extending passageway, two opposed sides of which are partially defined by a pair of horizontally spaced rollers supported for rotation about parallel horizontal axes and having relatively soft peripheral surfaces for yieldably gripping the opposed cylindrical sides of such cans, means for simultaneously rotating said rollers in opposite directions in which their adjacent sides move downwardly whereby cans fed to the space between said rollers from above will be drawn downwardly between said rollers, a feed device above said space for feeding said cans thereto with their axes generally vertical, and a can tipping support below said space having a generally downwardly and laterally extending supporting surface with its upper end positioned for supporting the bottom ends of cans discharged from said space whereby cans so discharged onto said surface from between said rollers will be tipped to one side for positioning

on their sides, a horizontally extending conveyor positioned adjacent said can tipping device for receiving the cans so positioned on their sides, said can tipping device comprising a wheel supported for rotation about a horizontal axis and the said horizontal axis of said wheel being laterally offset relative to the central part of the downwardly projected area of said space, the outside diameter of said wheel being greater along one edge thereof than along the other whereby a can supported thereon will be inclined to one side, and a side support relatively close to said one side for holding a can on said wheel from falling over in the direction of said one side.

10. In a can unscrambler for automatically orienting indiscriminately arranged cylindrical cans and including a generally vertically extending passageway adapted to receive downwardly falling cans in a generally upright position, a can tipping device at the lower end of said passageway for turning said cans from a position with their axes vertical to a position with their axes horizontal comprising: a wheel supported for rotation about a horizontal axis and adapted to successively receive said falling cans on its periphery, stationary means alongside said wheel adapted to frictionally engage said cans during rotation of said wheel whereby said cans will remain on said periphery for substantially a quarter of a revolution of said wheel before fall-

ing therefrom in a position with their axes generally horizontal.

11. In a can unscrambler for automatically orienting indiscriminately arranged cylindrical cans and including a generally vertically extending passageway adapted to receive downwardly falling cans in a generally upright position, a retarding device for slowing the downward speed of said cans comprising: a pair of horizontally spaced rollers, means for rotating said rollers in opposite directions with their adjacent sides moving generally downwardly for carrying said cans downwardly at a rate of speed proportional to the speed of said rollers, tipping means under said rollers for receiving cans therefrom and for tilting said cans from a vertical to a horizontal position.

JOHN ALBERTOLI.
GILBERT P. ALBERTOLI.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
876,291	Blakeslee	Jan. 7, 1908
1,495,610	Paridon	May 27, 1924
1,696,715	Huddleston	Dec. 25, 1928
1,972,489	Rideont	Sept. 4, 1934
2,169,833	Conley	Aug. 15, 1939