Aug. 2, 1966 F. J. TARCZA 3,263,713

HIGH SPEED FILLING MACHINE FOR NON-MAGNETIC RIMLESS CONTAINERS AND INSERT THEREFOR

Filed Dec. 6, 1963 4 Sheets-Sheet 1

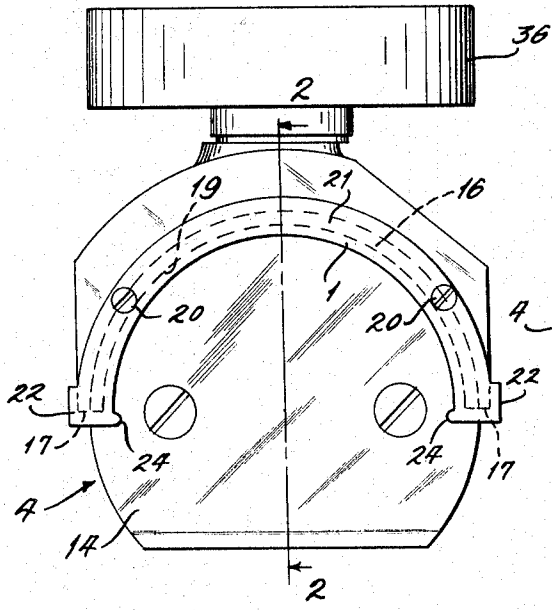


FIG.1

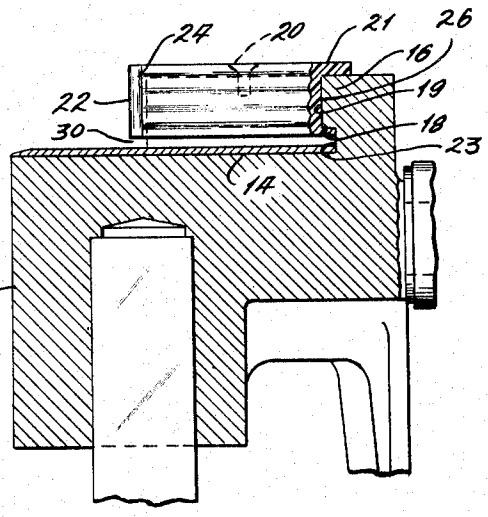


FIG.2

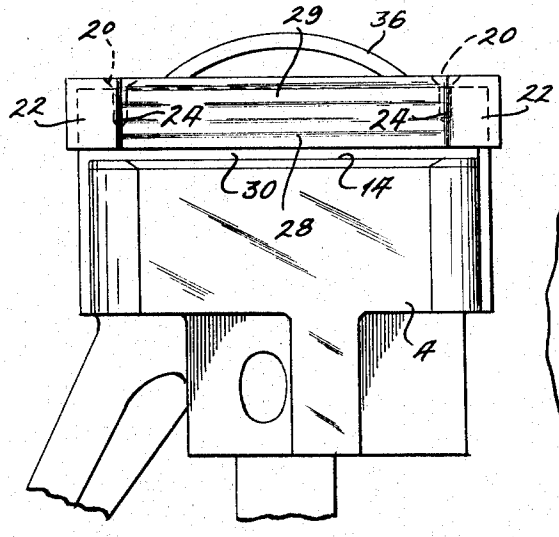


FIG.3

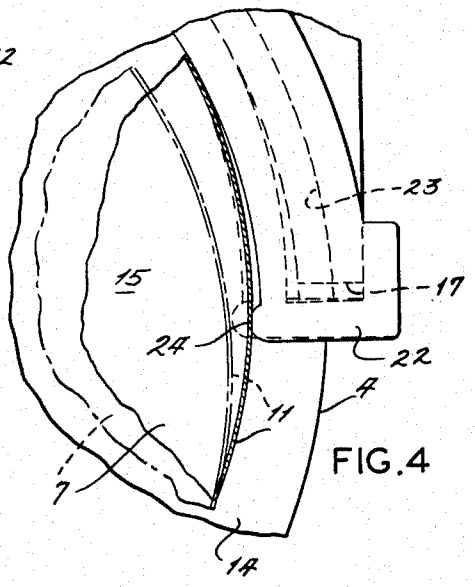


FIG.4

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Filed Dec. 6, 1963 4 Sheets-Sheet 2

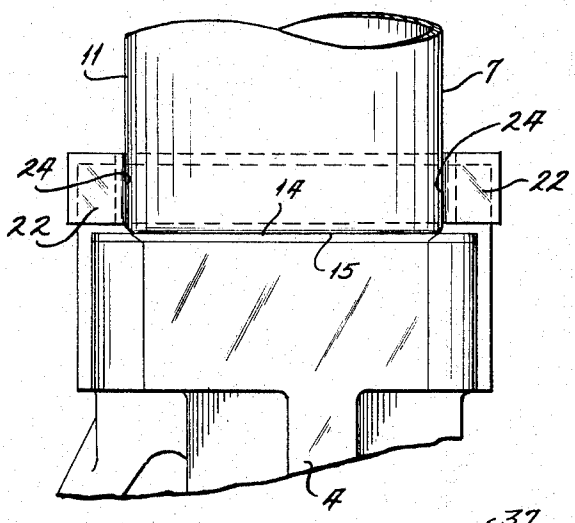


FIG. 6

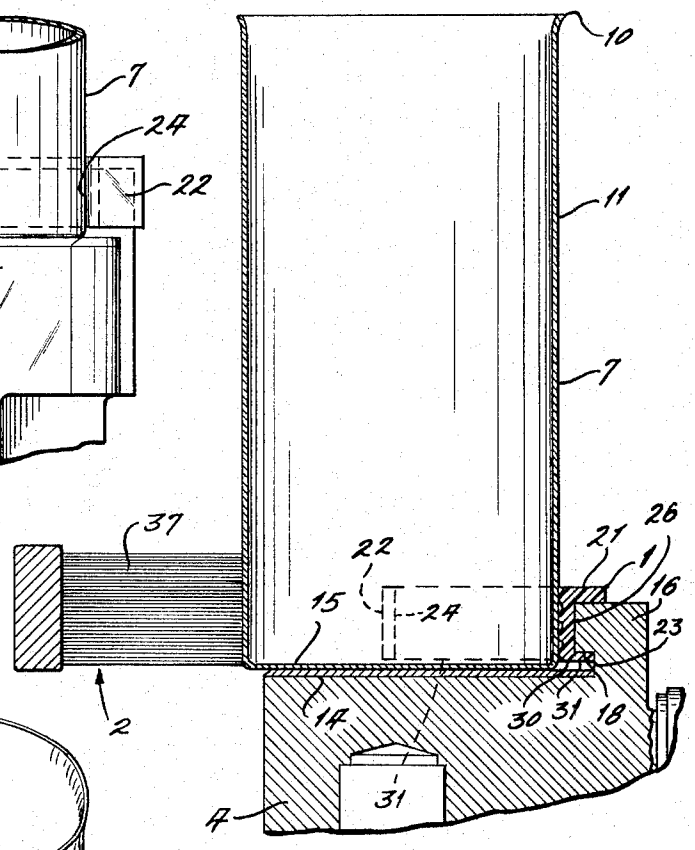


FIG. 7

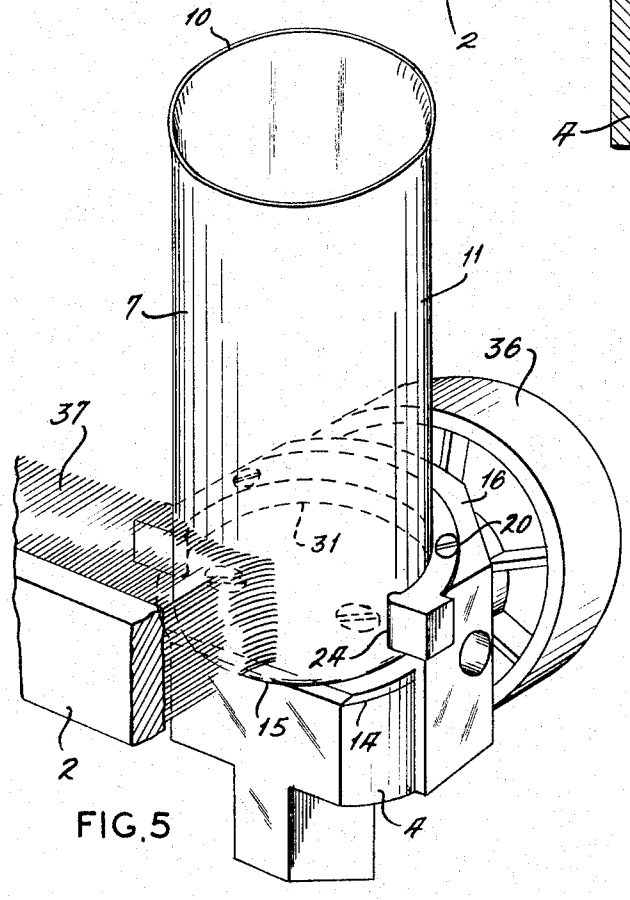


FIG. 5

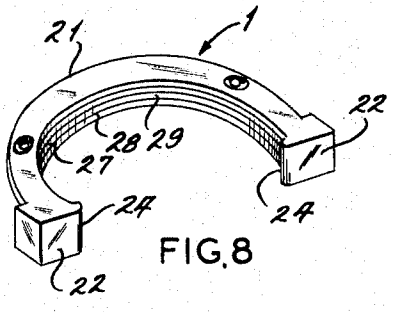


FIG. 8

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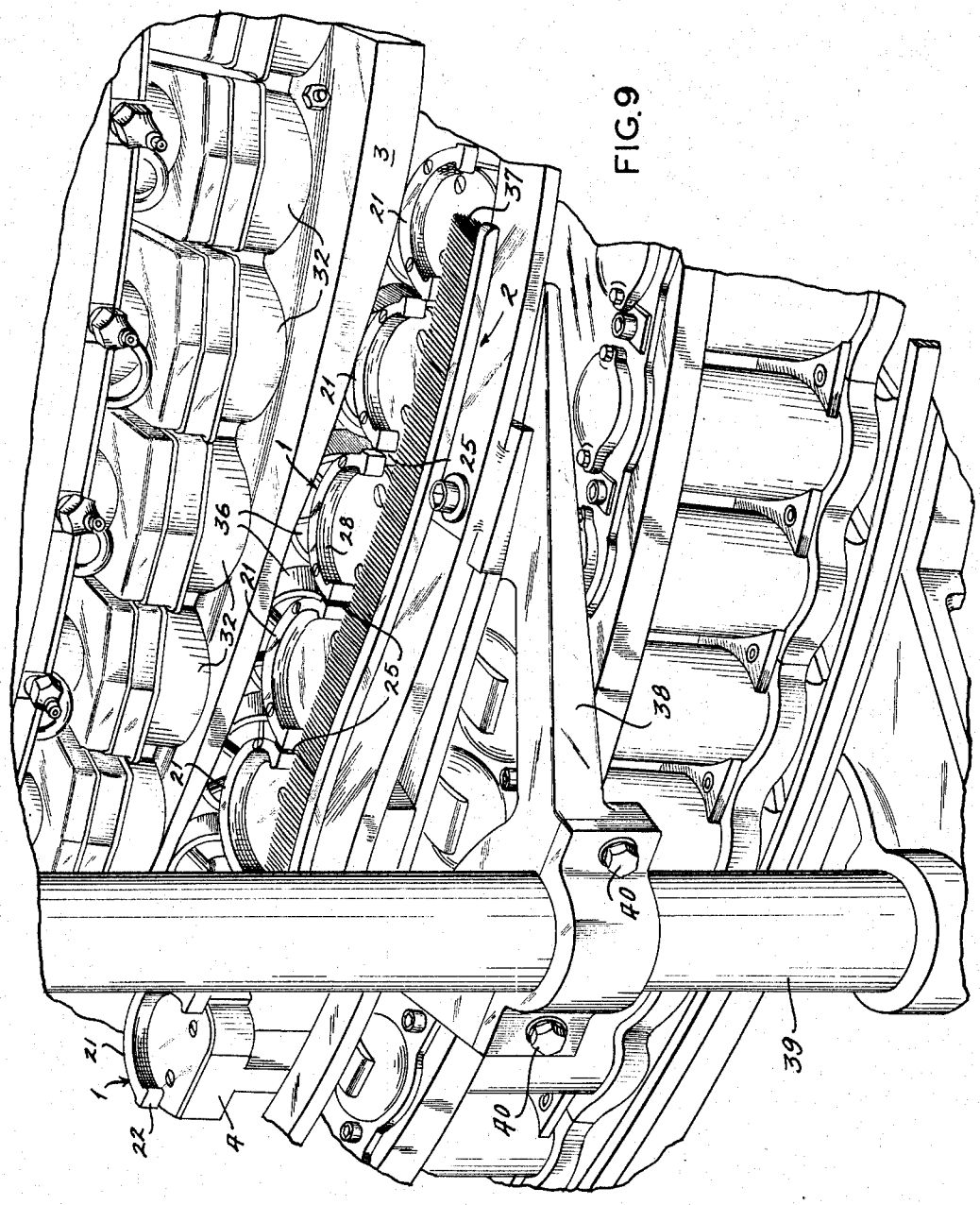
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FIG. 9



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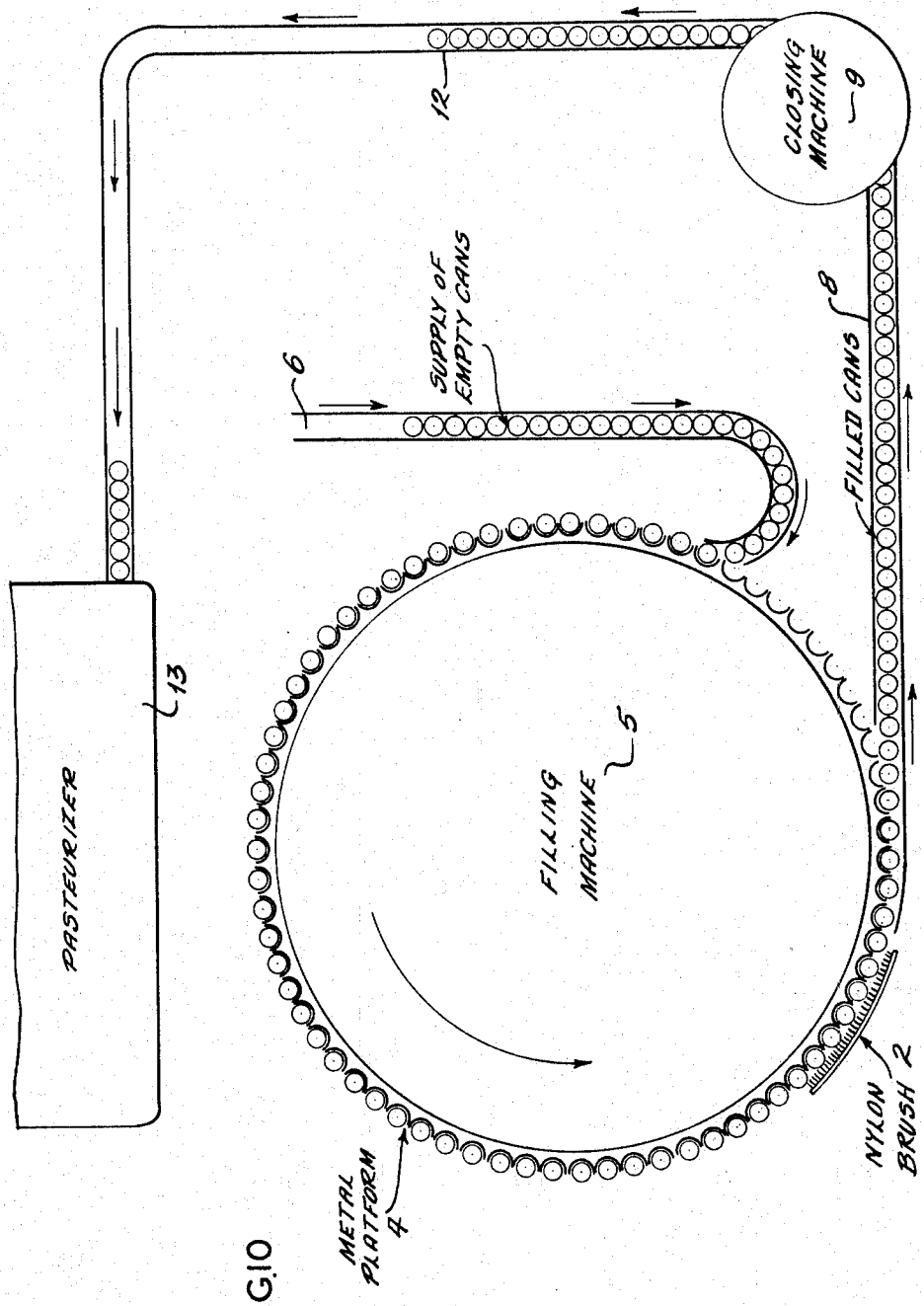


FIG.10

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United States Patent Office 3,263,713 Patented August 2, 1966

3,263,713

HIGH SPEED FILLING MACHINE FOR NON-MAGNETIC RIMLESS CONTAINERS AND INSERT THEREFOR

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Filed Dec. 6, 1963, Ser. No. 328,602
8 Claims. (Cl. 141—165)

The present invention relates to an improved high speed filling machine for containers including non-magnetic rimless containers, and in particular, to a high speed filling machine for extruded aluminum beer cans which have no lower chime or bead, and to an insert for said machine.

High speed filling machines, such as to fill over a thousand beer cans per minute, are used in the brewing industry at the present time. One typical such machine is cylindrical, being slightly over six feet in diameter, and having 72 stations or platforms around its outer margin. Each platform is adapted to hold a beer can, said beer can having its lower portion abutting a flange over about 180° with the lower bead extending into a recess beneath said flange and retained in said position by magnetic means which are effective with steel beer cans. The magnet and groove retain the beer can against the platform during the filling operation and during the rapid downward movement of the platform to move the top of the filled can away from the upper filling head and the sealing gasket therein. The cans normally tend to stick to the upper sealing gasket and would tend to hang up or move downwardly at a slower rate than said platform due to the forces involved, except for the positive action of the bead being positioned within the groove with magnetic means therein. Such machines may also be provided with a solid steel bar opposite to the cam which insures keeping the can head in the recess beneath the flange and gives positive downward movement after filling.

Of course, the acceleration forces created by the rapid downward movement of the platform would be much less in filling machines operating at a slow rate, such as 300 cans per minute. However, at higher rates of speed positive means must be provided to keep the bottom of the can in contacting relation with the platform to prevent the can from wobbling or spilling some of its content, thereby having a low filled can which must be rejected, or preventing the can from moving such a great distance as to become crushed and jammed in the mechanism, thereby causing the machine to stop until the jammed cans are removed.

The principal object of the present invention is to provide a high speed filling machine for containers including non-magnetic containers having no bottom rim or bead or chime. Another object is to provide a high speed filling machine for extruded aluminum containers having a thickness of about 0.007 inch and having no lower bead or chime. Another object is to provide an improved high speed filling machine having novel container retension means thereon in combination with opposing means which tend to force said container into contact with said retension means. Another object is to provide a platform having resilient means thereon for holding containers which may or may not have a bottom bead and which may or may not be made from magnetic material. Another object is to provide a simple modification for the expensive high speed filling machines which are in existence, said modification comprising a plastic insert having retension means at the outer edges thereof and brush means opposite to the cam means on the machine for holding the cans in place. Another object is to apply a force by means of resilient means, such as a brush with proper characteristics, to hold the cans against the inserts and downwardly on the platform.

These and other objects and advantages will become apparent hereinafter.

The present invention is embodied in a high speed filling machine for containers including non-magnetic rimless cans having a plurality of fast moving platforms, each of said platforms having an upstanding flange with resilient means secured thereto with inwardly extending means at the ends thereof, and stationary resilient holding means positioned opposite to the cam on the machine which causes each platform to move from its upper filling position to a lower position for leaving the filling machine.

The invention also consists in the parts and in the arrangements and combinations of parts hereinafter described and claimed. In the accompanying drawings which form part of this specification and wherein like numerals refer to like parts wherever they occur:

FIG. 1 is a top plan view of a filling machine platform out of the machine with the insert thereon,

FIG. 2 is a vertical cross-sectional view taken along the line 2—2 of FIG. 1,

FIG. 3 is a front view of the platform and insert shown in FIG. 1,

FIG. 4 is an enlarged top plan view of an end of an insert showing its normal position in dotted lines and its can holding position in solid lines,

FIG. 5 is a fragmentary perspective view of a platform with a can thereon and showing the resilient means or brush,

FIG. 6 is a fragmentary front view of a platform showing a rimless can thereon,

FIG. 7 is a vertical cross-sectional view of a platform showing a can and the brush in contact with said can,

FIG. 8 is a perspective view of the insert member itself,

FIG. 9 is a fragmentary view showing the brush, the platforms, and the cam on the machine, and

FIG. 10 is a diagrammatic view of filling machine, closing machine and connecting conveyors.

Referring now to the drawings in detail, it will be seen that the embodiment of the invention which has been illustrated comprises an insert **1**, preferably made from a plastic material such as "Zytafin" made by the Dow Chemical Company, and resilient holding means **2**, such as a nylon brush, said holding means **2** being positioned opposite to a cam **3** which causes the individual platforms **4** on a high speed filling machine **5** to move downwardly.

The filling machine **5** is cylindrical and rotates at about fourteen revolutions per minute in order to fill over 1,000 cans per minute. Such a machine is presently referred to as a high speed filling machine. A conveyor **6** brings empty cans **7** without lids to the machine, which cans **7** are directed onto the individual platforms **4** along the periphery of said machine **5**. The machine **5** fills the cans **7** with beer and directs them onto a conveyor **8** to a closing machine **9** which applies a lid to the top edge **10** of the can and seals the same to the can body **11**. The filled and closed cans **7** then pass on a conveyor **12** to a pasteurizer **13**.

One typical filling machine **5** in use today has 72 stations or platforms **4**. Each platform **4** has a base **14** for receiving the circular bottom of a can **15**. A rear flange **16** with ends **17** is provided on the base **14** with an undercut or groove **18** therein. The rear flange **16** is adjacent to the machine **5** itself and is curved in semi-circular fashion to extend around about or slightly less than 180° of the can. The resilient member or insert **1** is secured to the concave inner surface **19** of said rear flange **16** by suitable means, such as the screws **20**, which extend through a rearwardly extending portion **21** on the insert **1** inwardly of the ends **22** of said insert **1**.

The insert 1 is of such a length that it extends slightly beyond 180 degrees. The concave inner surface 19 of the metal flange 16 is undercut or reduced, as at 23, near the ends 17 so that the end portions 22 of the inserts 1 are not backed up and are capable of springing outwardly for receiving a container 7. Each vertical inner free end 22 of the insert 1 is provided with an enlargement or nub 24 which is positioned slightly beyond 180 degrees and which extends inwardly about 1/32 of an inch. A slight space 25 is provided between the rear surface 26 of adjacent inserts 1. The inner surface 27 of the insert 1 is provided with a slip resisting means comprising a plurality of horizontal ribs 28 and concave grooves 29 which tend to expel any liquid or moisture from the outer surface of the can to insure a better and direct seal between the insert 1 and the container 7 without anything therebetween. Without these grooves 29, moisture tends to remain between the insert 1 and the container 7, which moisture acts as a lubricant and might allow the can to slip vertically within the insert 1. The inner surface 27 of the insert 1 is undercut as at 30, at the bottom 31 in order to adapt the filling machine 5 to either rimless aluminum cans or rimmed steel cans.

As a can enters the filling machine 5, the platform 4 moves upwardly under a filling head 32 having multiple nozzles therein which direct beer under pressure downwardly into the can 7 along the inner wall, the upper edge 10 of the can 7 being forced into sealed relation with an upper sealing gasket within the filling head 32. The base 14 of the platform 4 is forced upwardly by means of a piston in a cylinder positioned below the base 14. The inserts 1 tend to stabilize the containers 7 as they enter the machine, thereby insuring a more positive feeding into the filling head.

After the container 7 is filled, it must move downwardly from in under the filling head 32. This is accomplished by means of a wheel or follower 36 secured to the platform 4 which engages the sloping cam 3 which moves the platform 4 about 1.5 inches downwardly. This downward movement occurs over a distance of about 5 stations or 25 degrees. Because of the great speed at which the containers 7 are moving, which are blurred to a viewer, the centrifugal force of the machine and the acceleration forces due to the sudden downward movement tend to cause the container 7 to separate from the base 14 of the platform 4 momentarily. With machines running at a very low rate, such as 300 cans per minute or less, these forces are usually not too great. When running steel cans at high rates of speed, such as 1,000 cans per minute, the recess 18 in the flange 16 of the platform 4 together with the magnet at the rear center of said recess 18 hold the bottom of the can 7 in tight contact with the base 14 of the platform 4.

With non-magnetic rimless containers 7 such as the thin extruded aluminum cans 7 which are being used to a greater degree in the brewing and other industries, high speed filling has become a problem because the material is nonmagnetic, is much lighter in weight, and there is no rim or bead at the bottom of the container. This prevents the aluminum can from having a portion within a bottom recess or being held therein by magnets. Present platforms 4 for holding rimmed steel cans can be modified by slightly cutting away the inner surface of the rear flange 16 and the outer ends 17 thereof, if necessary, and applying an insert 1, preferably made from plastic such as "Zytafin" made by Dow Chemical Company. The insert 1 may extend down to the base 14 of the platform 4 if only rimless aluminum cans are to be filled, but to allow for the filling of either rimmed steel cans or rimless aluminum cans, the insert 1 is provided with a recess 30 adjacent to the base 4 for receiving the rims of steel cans.

The nylon brush 2 is about 17 inches long, about 0.75 inch high, and slopes downwardly opposite to and parallel to and generally follows the contour of the cam 3

so that the bristles of the brush 2 contact the can 7 over about the lower 0.75 inch of the can 7. The nylon bristles 37 are about one inch long and there are about 560 bristles per square inch of brush 2. It has been found that this exerts the proper force against the bottom of the can to aid in keeping it in contacting relation with the insert 1, and at the same time, not so much force as to scar the painted label on the can. The bristles 37 are resilient and compensate for the tolerances within the machine and other factors which tend to cause the outer margins of the cans to be at a slight variance, or variance in distance, from the center of the machine. The brush 2 is mounted so that it can be adjusted in any direction and moved toward or away from the center of the filling machine. The brush 2 is adjustably mounted on a bracket 38 opposite to the cam 3. The bracket 38 is mounted on a post 39 and is adjustable thereon by means of the bolts 40. A plain bar substituted for the nylon brush will not operate satisfactorily, since such a bar will damage some cans by pushing them inwardly too far against the insert 1, and conversely, there might be a space between the can and the bar thereby allowing the can to wobble or to spill its contents or tip over thereby jamming the machine.

Thus, it is important to have resilient means opposite to the space where the cans are in their downward movement being moved downwardly away from the upper sealing gasket in the filling head 32. This forces the can 7 with the proper force against the insert 1 so that each insert with its nubs 24 and ribs 28 and/or grooves 29 can exert sufficient force to pull the can away from the upper sealing gasket within the filling head 32, to which it sometimes tends to stick. Thus, the contour of the nylon brush 2 follows the contour of the cam 3 to insure that a force is directed against the can 7 to force said can 7 against the insert 1 at all times.

This invention is intended to cover all changes and modifications of the example of the invention herein chosen for purposes of the disclosure, which do not constitute departures from the spirit and scope of the invention.

What is claimed is:

1. A high speed filling machine for cans having a plurality of fast moving platforms and a cam for causing said platforms to be lowered after said cans have been filled, each of said platforms having an upstanding flange with resilient means secured thereto, said resilient means extending circumferentially more than 180° around said platform and being adapted to receive the lower portion of a can, and stationary holding means positioned opposite to said cam for applying sufficient force to retain said cans in said resilient means, said stationary holding means having a resilient face thereon for contacting said cans at their lower portion.

2. A high speed filling machine for cans as set forth in claim 1 wherein said resilient means comprises a resilient plastic member extending slightly more than 180° circumferentially around the platform, said member having an inwardly extending nub thereon at each end thereof and a rear portion therebetween, said ends being sufficiently resilient to allow a can to slide on to said platform between said nubs into contacting relation with the rear portion of said plastic member and then spring back to their normal position to hold said can.

3. A high speed filling machine for cans as set forth in claim 1 wherein said resilient means comprises a resilient plastic member extending slightly more than 180° around the platform, said member having an inwardly extending nub thereon at each end thereof and a rear portion therebetween, said ends being sufficiently resilient to allow a can to be positioned on said platform in continuous contacting relation with said plastic member and then spring back to their normal position to hold said can after said can contacts the rear portion of said member.

4. A high speed filling machine for cans as set forth in claim 1 wherein said resilient means comprises a resilient plastic member made from "Zytafin" plastic, said member extending slightly more than 180° circumferentially around said platform, the bottom of said member being raised from said platform slightly higher than the normal vertical height of a chime on a conventional can, said member having slip resisting means on the inner face thereof, said member having an inwardly extending nub at each end thereof, said ends being sufficiently resilient to allow a can to slide onto said platform to move said nubs outwardly, said ends springing inwardly when said can has contacted the rear portion of said member thereby holding said can on said platform.

5. A high speed filling machine for cans as set forth in claim 1 wherein said resilient means comprises a one-piece resilient plastic member made from "Zytafin" plastic, said member being substantially semi-circular and extending slightly more than 180° circumferentially around the rear of said platform, the bottom of said member being raised from said platform slightly higher than the normal vertical height of a chime on a conventional can, said member having horizontal ribs and grooves thereon for wiping moisture from said can, said member having an inwardly extending rounded nub at each end thereof, said ends being sufficiently resilient to allow a can to slide onto said platform to move said nubs outwardly, said ends spring inwardly when said can has contacted the rear portion of said member thereby holding said can on said platform, the chime of cans with chimes extending under the bottom of said member.

6. A high speed filling machine for cans having a plurality of fast moving platforms and a cam for causing said platforms to be lowered after said cans have been filled, each of said platforms having an upstanding flange with resilient means secured thereto, said resilient means extending circumferentially more than 180° around said platform and being adapted to receive the lower portion of a can, and stationary holding means positioned opposite to said cam for applying sufficient force to retain said cans in said resilient means, said stationary holding means having a resilient face thereon for contacting said cans at their lower portion, said face comprising a plurality of bristles which contact said cans over the entire horizontal distance during the lowering thereof in said machine after filling.

7. A high speed filling machine for cans having a plurality of fast moving substantially circular receiving platforms and a cam for causing said platforms to be lowered after said cans have been filled, said machine having elongated brush means positioned opposite to said cam substantially throughout its length for contacting said cans along their lower portion and tending to force said cans in the direction of said platform, each of said platforms having upstanding means thereon with resilient means connected thereto, said resilient means being substantially semicircular and extending circumferentially around said paltform more than 180° and being adapted to receive a can at its lower portion, said resilient means having a nub at the inner portion of each end thereof, said ends being sufficiently resilient to allow a can to slide onto said platform between said nubs thereby spreading said nubs apart until the diameter of the can has been passed at which time the nubs tend to spring back to their normal position.

8. A high speed filling machine for cans having a plurality of fast moving substantially circular receiving platforms and a cam for causing said platforms to be lowered after said cans have been filled, said machine having elongated brush means positioned opposite and parallel to said cam throughout its length for contacting said cans along their lower portion and tending to force said cans onto said platform, each of said platforms having upstanding means at the rear thereof with resilient means connected thereto, said resilient means being substantially semicircular and extending circumferentially around said platform more than 180° and being adapted to receive the can at its lower portion, said resilient means having a plurality of horizontal ribs and grooves therein, said resilient means having a nub at the inner portion of each end thereof, said ends being sufficiently resilient to allow a can to slide onto said platform between said nubs thereby spreading said nubs apart until the diameter of the can has been passed and the can contacts the ribs on said member at which time the nubs tend to spring back to their normal position to hold the can in position on its platform.

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