

[54] **MAGNETIC DISC ORIENTOR FOR AEROSOL VALVES**

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[58] Field of Search.....198/33 AA, 41; 221/171, 212

[56] **References Cited**

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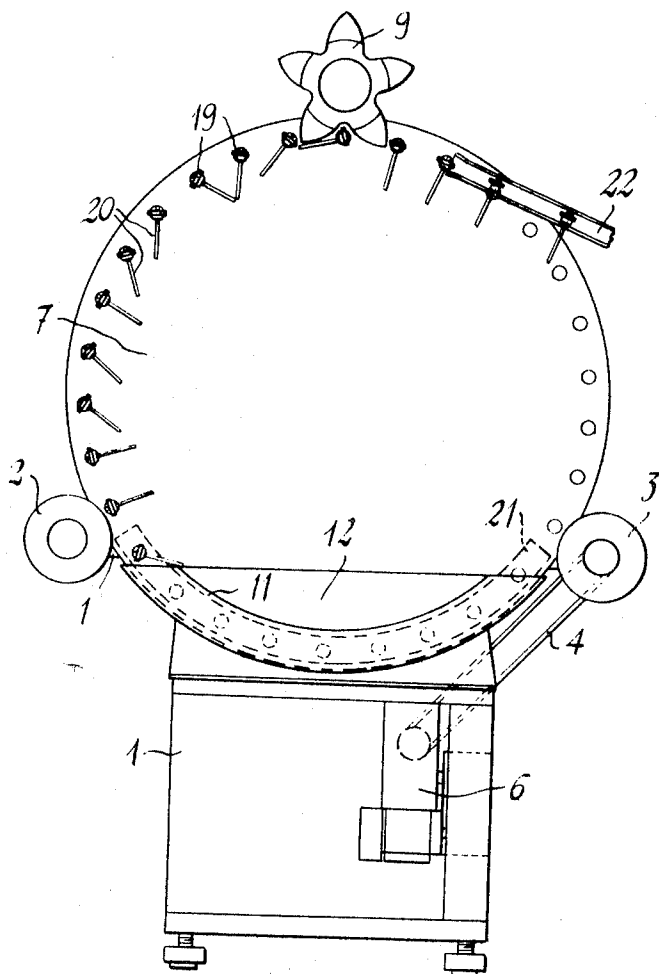
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[57]

ABSTRACT

Device for the withdrawal from a trough of aerosol container valves provided with drawing tube and orderly conveyance thereof to a collecting guide, the device comprising a trough and a rotating disc, the lower portion of which extends within said trough, a plurality of permanent magnets being mounted on the disc periphery. A spider wheel is provided at the top portion of the disc, rotating therewith and having teeth extending on the front disc surface between the magnets on which the teeth never overlie. A fixed guide for valve collection is provided adjacent the spider wheel and has a mouth or inlet opening adjacent the front disc surface and at the circular path along which the permanent magnets move as the disc rotates.

5 Claims, 6 Drawing Figures



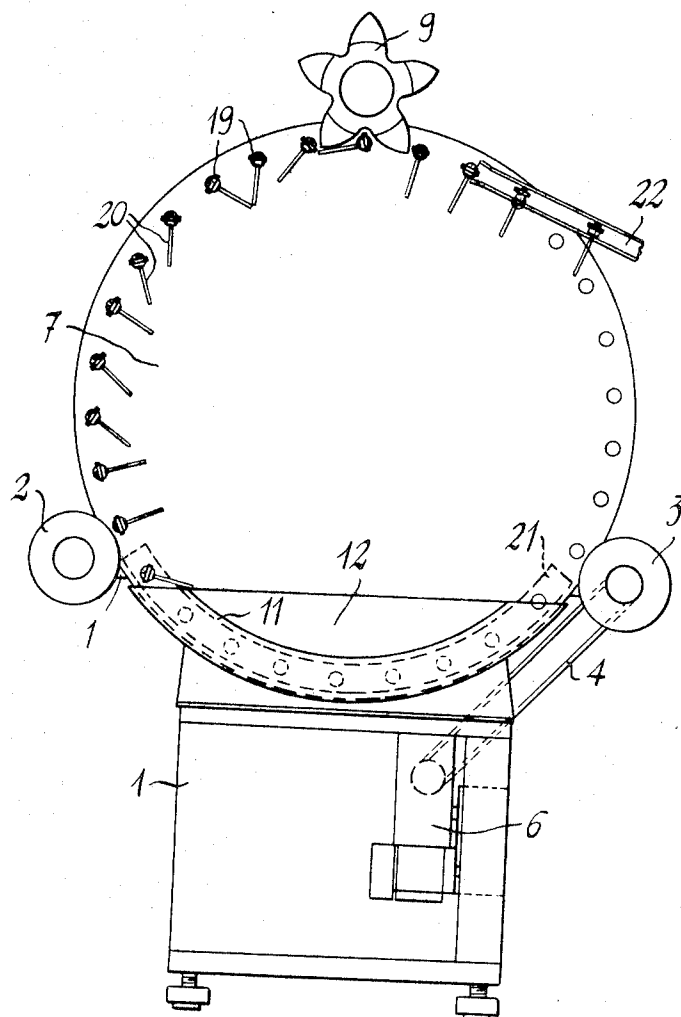


Fig. 1

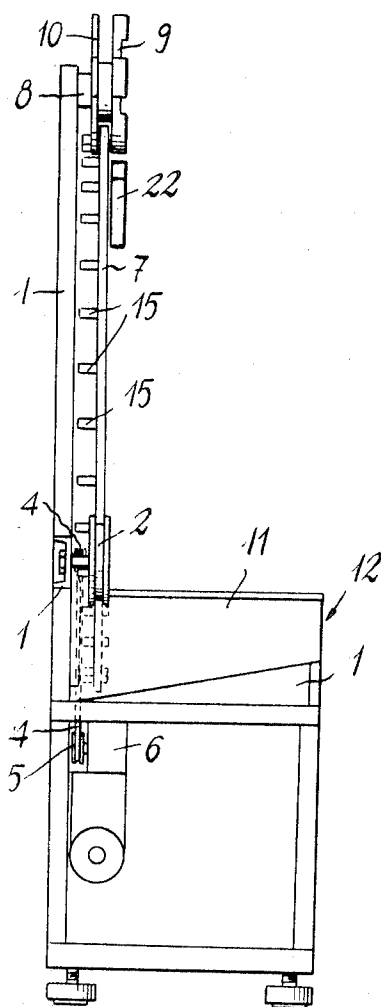
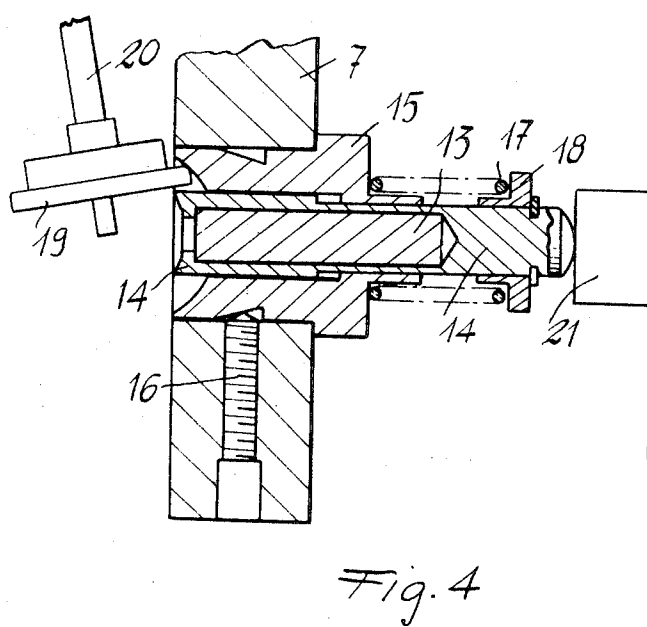
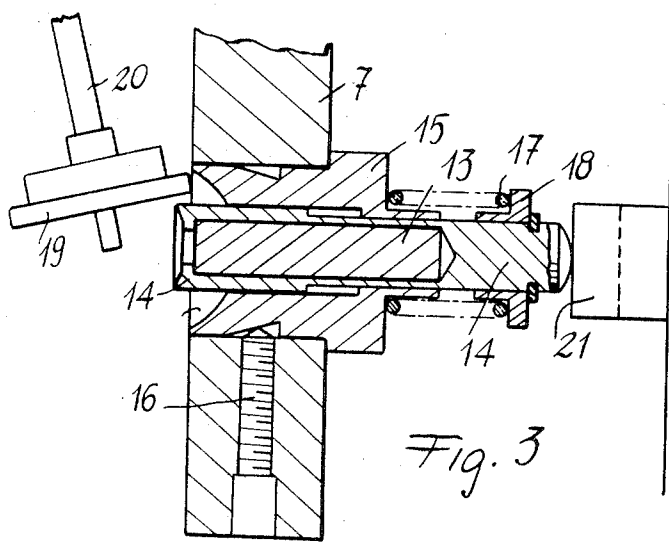
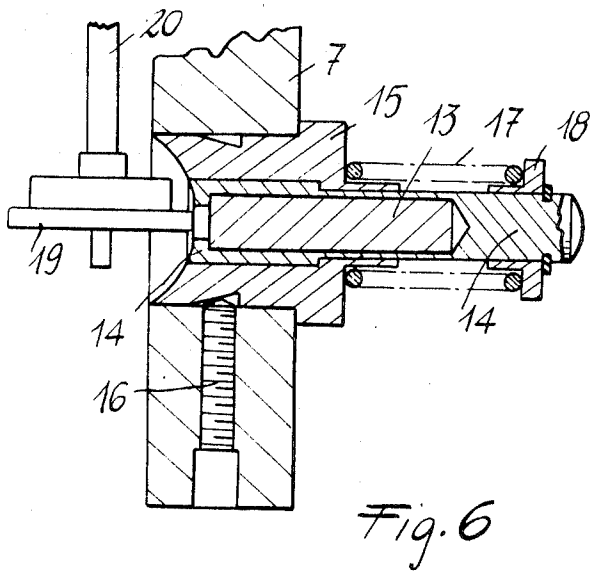
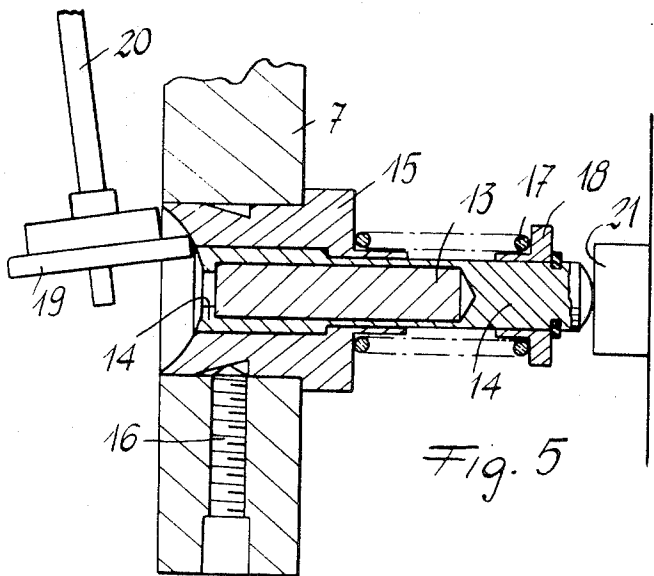


Fig. 2





MAGNETIC DISC ORIENTOR FOR AEROSOL VALVES

This invention relates to a device for the withdrawal from a trough of aerosol container valves provided with drawing tube and orderly conveyance thereof to a collecting guide.

As is well known, aerosol containers comprise a valve with which an elongated tube is fast and extends from said valve to adjacent the container bottom; when preparing such containers, there is a tendency to mechanize and automate any operations relating thereto. For example, there are automatic machines onto each container a valve provided with drawing tube, this valve being then attached to the container.

A substantial problem encountered when carrying out such an automation is the need of presenting the valves on the above-mentioned machine with all of the associated drawing tubes similarly orientated.

An object of the present invention is to provide a device for imparting a predetermined orientation to valves provided with drawing tube and for sequentially conveying such valves to a collecting guide. Machines are known for achieving this object, such as the machines disclosed in British specification No. 1,169,679, but such machines suffer from the disadvantages of low unitary time output, being encumbered and complicated and expensive structure.

Another object of the invention is to provide a device of a simple structure, low cost of production and reliable in operation.

A further object of the invention is to provide a device enabling in time unit to withdraw a large amount of valves provided with drawing tube from a trough wherein such valves are randomly arranged, conveying the valves thus withdrawn to a collecting guide after mechanically imparting a predetermined orientation to the valves.

These and other objects are attained by a device comprising a fixed frame, a disc mounted on said frame and rotatable about a substantially horizontal axis and having a plurality of holes circumferentially arranged and spaced apart from one another, a trough located in front of said disc, at the lower end of said disc forming a sidewall of the trough, the bottom wall of which is slanting to the disc, means for rotatably driving the disc, a plurality of permanent magnets accommodated one in each of said holes wherein said magnets are movable and have a portion thereof projecting from the rear side of the disc, a plurality of springs, each of which having one end thereof abutting on the disc and the other end thereof abutting on one of said magnets urging it to the rear side of said disc, a fixed cam positioned rearwardly of the disc at the holes therein and extending at least at a portion of said trough where the cam surface is moved close to the adjacent disc surface and abuts on the portion projecting rearwardly of the disc for those magnets positioned in this portion of the trough pressing said springs and holding the magnets partially projecting from the front surface of the disc, a rotatable member rotatably driven by the disc adjacent the periphery of which it is mounted on a shaft fast with said frame, this member having at least one elongated arm member forwardly projecting of the disc and extending between and beyond the holes of said disc, only one arm member at a time being positioned between two adjoining holes without overlying thereon, a shaped fixed guide being also provided for holding and allowing the movement thereon for said valves provided with drawing tube, one end of the guide is positioned just in front of the disc and is substantially tangent to the circumference for said holes of the disc.

For a better understanding of the device structure and features, an embodiment of the device according to the invention will now be described, as given by mere way of not limiting example, reference being had to the accompanying drawings, in which:

FIG. 1 is a schematic front view of the device;

FIG. 2 is a side view of the device in FIG. 1; and

FIGS. 3-6 are enlarged detailed views showing one of the permanent magnets mounted on the disc forming part of the device, said magnets being shown at different operative positions.

The device, as shown in the drawings, comprises a fixed frame 1 carrying two horizontal shafts on which two wheels 2 and 3, respectively, are freely rotatably mounted. At the periphery of these wheels a groove is formed, as clearly shown in FIG. 2, a pulley being fast with the wheel 3 and having a belt 4 wound up thereon, which belt 4 also winds up on a pulley 5 fast with the output shaft of a reduction gear 6 mounted on the fixed frame and by which a rotary motion can be given to the wheel 3 about its own axis.

Wheels 2 and 3 carry a disc 7 bearing and held in the grooves of the wheels, this disc being rotated by wheel 3 about its own axis in a clockwise direction, as seen in FIG. 1. A shaft 8 is also fast with frame 1 and freely rotatably carries a member comprising two star-shaped or spider wheels 9 and 10, respectively, these latter wheels being fast with and spaced apart from each other so as to provide a groove or slot in which the disc 7 is inserted. The spider wheels 9 and 10 are of substantially the same shape and have a plurality of shaped teeth, the function of which will be hereinafter explained.

A trough is also fast with frame 1 and is positioned in front of the disc 7, this trough having a bottom wall 11 slanting to the disc 7 and having a sidewall 12, while another sidewall in the trough is formed of the above-mentioned disc.

In the disc 7 there are provided a plurality of holes which are spaced apart from one another and arranged according to a circumference. As clearly shown in FIG. 1, these holes accommodate permanent magnets, the structure of which is shown in detail and on enlarged scale in FIGS. 3-6 to which reference will now be made.

Each of the permanent magnets 13 are accommodated within an elongated cylindrical body 14 which is slidably mounted on a sleeve 15 inserted in one of the holes in disc 7 and secured therein by a screw 16. A spring 17 is effective between said sleeve 15 and cylindrical body 14 and has one end abutting on the sleeve, while the other end abuts on the flange 18 of a washer mounted on the body 14, as shown in FIGS. 3-6. Spring 17 is under compression and thus operates on said body 14 and permanent magnet 13 to urge the latter to the rear side of disc 7, that is rightward of the disc as seen in FIGS. 3-6. The front end of the sleeve 15 and cylindrical body 14 is shaped, particularly in the form of a spherical cap or bowl having substantially the same radius as that of the bottom 19 fast with an aerosol container valve, with which a known type of drawing tube 20 is also fast.

Rearwardly of the disc 7, at the above-mentioned trough a cam 21 extends and is fast with the fixed frame of the device and positioned just behind the disc holes adjacent thereto. At the trough, the surface of cam 21 is close to the adjacent surface of disc 7 and abuts on that end of the cylindrical bodies 14 projecting rearwardly of the disc, compressing the springs 17 and holding the magnets 13 partially projecting from the front disc surface, as particularly shown in FIG. 3.

A fixed guide 22 is provided adjacent the spider wheel 9 and shaped so as to restrain and allow the movement thereon for the valves provided with drawing tube, one end of this guide 22 having a free mouth or inlet, in proximity of which said guide is positioned just in front of the disc and substantially tangent to the disc holes, as seen in FIG. 1.

Still as seen in FIG. 1, the spider wheel 9 has shaped teeth projecting forwardly of disc 7 and extending between and beyond the disc holes: it is important to note that only one tooth at a time of said spider wheel 9 will be positioned between two adjoining holes of disc 7, the profile for the spider wheel teeth being such that they never overlie the disc holes, while always being adjacent thereto during the device operation. The spider wheels 9 and 10 can be directly rotated by disc 7 through friction, or by a gear coupling, but in the case as shown in the drawing the rotation and correct positioning for spider wheel 9 relative to the holes of disc 7 is provided in that the shaped teeth of spider wheel 10 abut on the portion of sleeve 15 projecting rearwardly of the disc, so that it is just the movement of sleeves 15 travelling along a circular path that provides for the rotation of the spider wheels.

Assume now the trough forming part of the device is filled with valves provided with drawing tube, valves which by sliding along the slanting bottom wall 11 of the trough will contact the front surface of disc 7. Also assume that disc 7 and spider wheels 9 and 10 therewith are rotated by wheel 3 via the reduction gear 6. Consider a permanent magnet accommodated in a disc hole and assume it is initially positioned between the wheel 3 and the portion of fixed guide 22 shown in FIG. 1. During the rotation of disc 7, as soon as the permanent magnet comes close to the trough, the cylindrical body 14 will contact the surface of cam 21 which causes the permanent magnet to move relative to said disc, as shown in FIG. 3. Under these conditions, the portion of body 14 projecting from the front side of the device operates on the valves as collected within the trough by mixing them up and magnetically attracting one or more bottoms forming part of the valves in the trough.

When the permanent magnet being involved is about to exit from the zone as defined by the trough, it will start to move to the rear side of disc 7 (FIG. 4), because of the free surface of cam 21 moving away from the adjacent surface of the disc, this movement continuing until the permanent magnet has completely reentered (FIGS. 5 and 6) the sleeve 15; during this movement, only one of the bottoms for the valves which could have been initially attracted by the magnet will move to the magnet axis. This is due to the spherical cap configuration for the front surface of sleeve 15 and cylindrical body 14 not allowing, or better very hardly allowing more than one bottom to be retained by the permanent magnet.

On exiting from the trough, almost all of the permanent magnets carried by disc 7 will hold a valve and associated drawing tube, as shown in FIG. 1 (the valves have not been shown in FIG. 2 in order not to complicate the drawing and because not essential for understanding the operation of the device).

Still as seen in FIG. 1, the stems 20 of the valves as held by the permanent magnets are differently orientated. When the permanent magnets come close to the spider wheel 9 anticlockwise rotating about its own axis, the teeth of this wheel contact the valve stems and operate thereon substantially radially orientating them, as shown in FIG. 1, the valves involved being those positioned between the spider wheel 9 and guide 22. The valve stems are not exactly radially orientated by the teeth of spider wheel 9 but, however, the stems may assume a direction within a small angle (generally 30°) with its apex on the axis of each permanent magnet. As the disc continues to rotate, the valves thus orientated come at the mouth or inlet of guide 22, threading thereon and being detached off therefrom by the permanent magnets to be orderly supplied to a known type of utilizing machine for application thereof to aerosol containers.

It will be appreciated that where the permanent magnet retains more than one valve, or a plurality of valves remain mechanically bound to one another at a permanent magnet, the spider wheel 9 will cause the surplus valves to fall down in the trough, or will cause only one valve to be retained by a permanent magnet.

Instead of being carried by the wheels 2 and 3, the disc 7 could also be carried by a shaft fast with its center, or the disc could be mounted on a stationary shaft located at its axis.

As above mentioned, the spider wheel 9 might not be coupled to the spider wheel 10, but could be rotatably bound to disc 7 by gears, or a chain or other mechanical means inhibiting a phase-difference between the spider wheel and disc. In addition, the spider wheel 9 could also have only one tooth, the profile of which could in case not be shaped, that is said tooth could be in the form of a rod.

In the embodiment, as shown in FIGS. 1 and 2, the cam 21

has been indicated as positioned only at the trough, but it is apparent that the cam could be of an annular shape and extend all about the disc: in this case, the cam surface would be close to the adjacent disc surface only at the trough and moved away therefrom at the other portions of the cam; in this case, the rear portion of the permanent magnet would still abut on the cam having also the function of preventing the permanent magnet from unthreading from the associated supporting sleeve which, of course, should be no more provided with stops to limit the permanent magnet sliding to the rear side of the disc under the action of the spring operating thereon.

The device as described has already been carried into effect and it was found that by such a device a large amount of valves could be withdrawn, orientated and dispensed in time unit to the collecting guide 22, notwithstanding the device is of comparatively reduced and compact dimensions.

What I claim is:

1. A device for the withdrawal from a trough of aerosol container valves provided with drawing tube and orderly conveyance thereof to a collecting guide, comprising a fixed frame, a disc mounted on said frame and rotatable about a substantially horizontal axis and having a plurality of holes circumferentially arranged and spaced apart from one another, a trough located in front of said disc, at the lower end of said disc forming a sidewall of the trough, the bottom wall of which is slanting to the disc, means for rotatably driving the disc, a plurality of permanent magnets accommodated one in each of said holes wherein said magnets are movable and have a portion thereof projecting from the rear side of a disc, a plurality of springs, each of which having one end thereof abutting on the disc and the other end thereof abutting on one of said magnets urging it to the rear side of said disc, a fixed cam positioned rearwardly of the disc at the holes therein and extending at least at a portion of said trough where the cam surface is moved close to the adjacent disc surface and abuts on the portion projecting rearwardly of the disc for those magnets positioned in this portion of the trough pressing said springs and holding the magnets partially projecting from the front surface of the disc, a rotatable member rotatably driven by the disc adjacent the periphery of which it is mounted on a shaft fast with said frame, this member having at least one elongated arm member forwardly projecting of the disc and extending between and beyond the holes of said disc, only one arm member at a time being positioned between two adjoining holes without overlying thereon, a shaped fixed guide being also provided for holding and allowing the movement thereon for said valves provided with drawing tube, one end of said guide having a free mouth or inlet in proximity of which said guide is positioned just in front of the disc and is substantially tangent to the circumference for said holes of the disc.

2. A device according to claim 1, wherein at each of said holes the front surface of the disc is of a spherical cap or bowl shape, the curvature radius of which is substantially the same as that for the bottom with which are fast said valves provided with drawing tube.

3. A device according to claim 2, wherein said rotatable member has a plurality of arms in the form of shaped teeth.

4. A device according to claim 3, wherein said fixed cam is annularly shaped and extends behind the disc at the circumference according to which said holes in the disc are arranged, said cam being close to the adjacent surface of the disc only at said trough.

5. A device according to claim 3, wherein said fixed cam extends only at said trough and stops are provided, said permanent magnets as urged by said springs abutting thereagainst.

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