United States Patent

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[33] **Italy**
[31] **19277/67**

[54] **DEVICE FOR IMPARTING A PRE-ARRANGED ARRAY TO AND CARRYING AN ORDERLY-TRAIN OF ELONGATED BODIES, THE BARYCENTRE OF WHICH BEING ADJACENT AND END THEREOF**
6 Claims, 3 Drawing Figs.

[52] **U.S. Cl.** **302/14,** 198/33
[51] **Int. Cl.** **B65g 53/30**
[50] **Field of Search** 302/2, 14; 198/33 (R1); 221/171, 172, 278

[56] **References Cited**
UNITED STATES PATENTS

2,618,373	11/1952	Hathaway	198/33(R1)
2,625,282	1/1953	Nekarda	198/33(R1)

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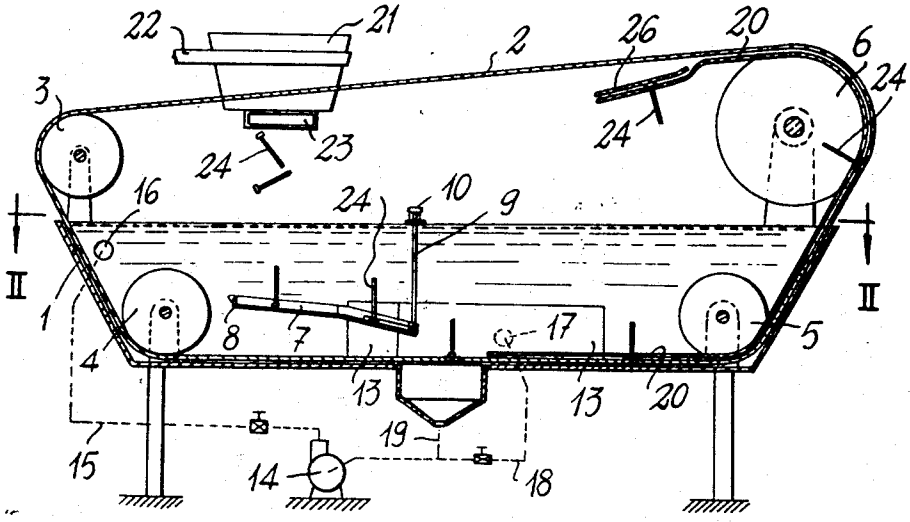
ABSTRACT: Device for imparting a vertical array and conveying along guide means drawing tubes applied on valves to be attached on aerosol containers, the device comprising a container from which the tubes are caused to randomly drop on a moving belt provided with perforated housings or slots. Prior to dropping on the belt, the tubes orientate in a vertical direction due to friction encountered with the fluid in which they move and, once having dropped into the belt housing or slot, they are retained therein due to suction exerted below the belt and then conveyed to collecting guides.



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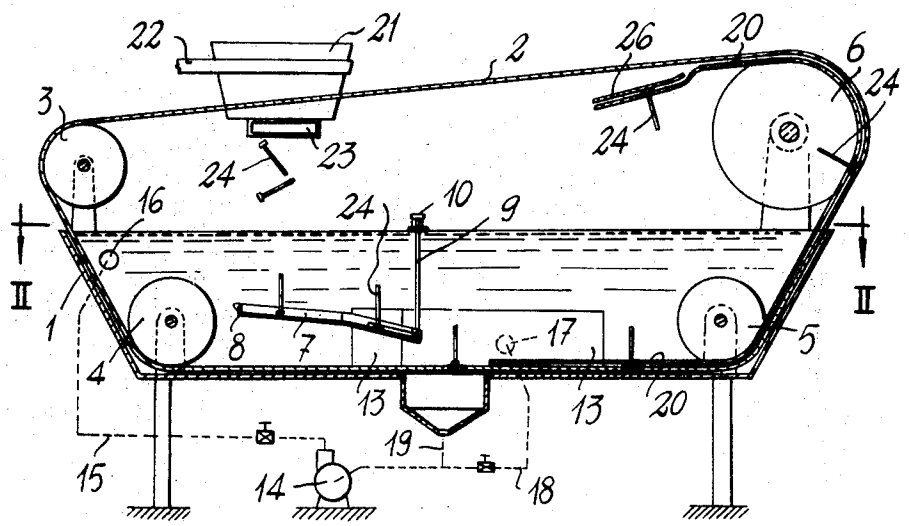

Fig. 1

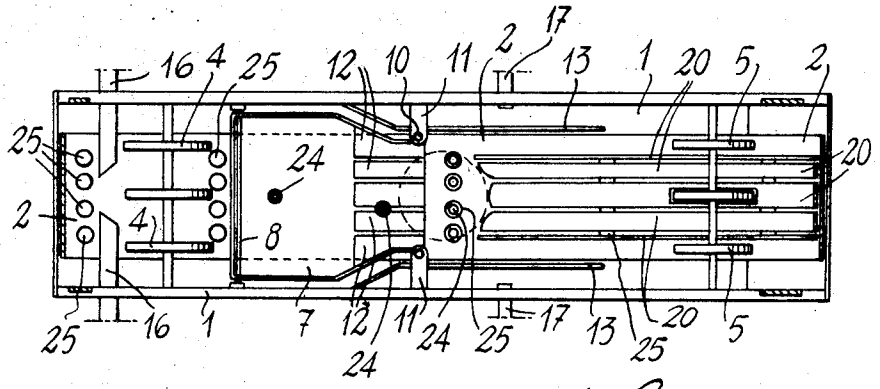

Fig. 2

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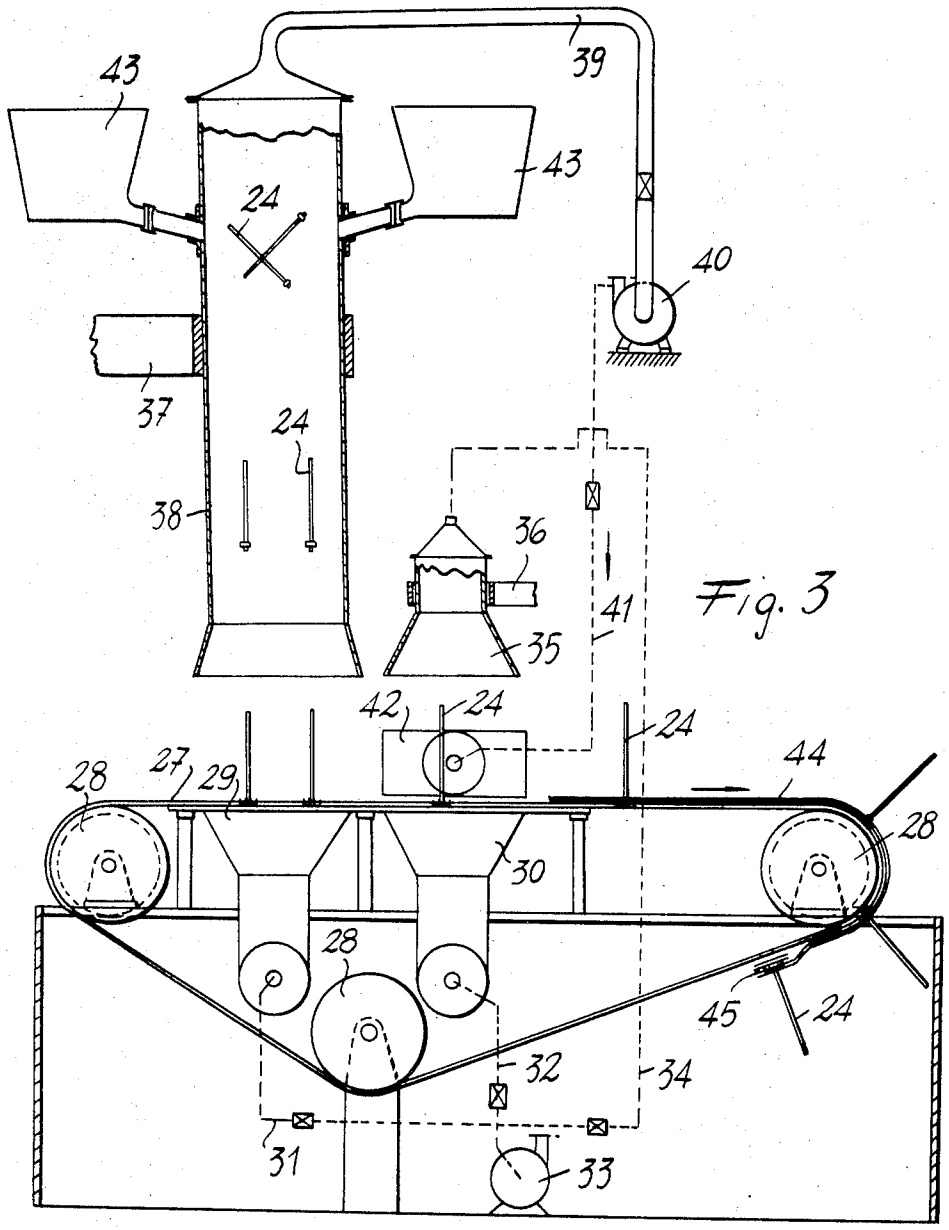

Fig. 3

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DEVICE FOR IMPARTING A PRE-ARRANGED ARRAY TO AND CARRYING AN ORDERLY TRAIN OF ELONGATED BODIES, THE BARYCENTRE OF WHICH BEING ADJACENT AND END THEREOF

This invention relates to a device for imparting a prearranged array to and for carrying an orderly train of elongated bodies, the barycentre of which being adjacent an end thereof, such as drawing tubes applied on valves for aerosol containers.

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

A substantial problem being encountered in carrying out such an automation is the need of presenting the valves on the machine with their relative drawing tubes being all similarly orientated.

It is the object of the present invention to provide a device for imparting a prearranged array and for carrying an orderly train of valves fast with drawing tubes and designed to be clawed onto aerosol containers.

It is another object of the invention to provide a device of a simple structure, low cost of production and maintenance and requiring a slight servicing for its operation.

These and other objects are attained by a device comprising a belt moving in a closed run, a container having a discharge outlet overlying a portion of said belt, a plurality of shaped housings or slots provided on said belt for accommodating the end adjacent the barycentre of said elongated bodies, at least one fluid between said discharge outlet and the belt portion underlying thereto, at least one suction inlet for said fluid and located below said belt substantially at said limited portion thereof, the belt being crossable by the fluid at least at said shaped housings or slots, at least the guide parallel extending to the belt and suitable for retaining and guiding said elongated bodies on said shaped housings or slots adjacent said limited portion of the belt.

In order that the structure and features of the device be more clearly understood, some embodiments thereof will now be described by mere way of example and not of limitation, reference being made to the accompanying drawings in which:

FIG. **1** is a fragmentary diagrammatic view showing an embodiment of the device as sectioned along a vertical plane;

FIG. **2** is a sectional view taken along line II–II of the device of FIG. **1**; and

FIG. **3** is a diagrammatic elevational and partly sectional view of a different embodiment for the device.

The device, as shown in FIGS. **1** and **2**, comprises a tank **1** filled with water and a belt **2** winding up on pulleys **3**, **4**, **5** and **6**, pulley **6** being driven to rotation by a speed variator (not shown in the FIGS.), so that the belt continuously rotates in a counterclockwise direction as seen in FIG. **1**.

A plate **7** is located within tank **1** inside of belt ring **2**, the plate being freely rotatably supported at an end thereof by a stationary pin **8** and being supported at the other end by two articulated rods **9**, on the upper end of which a bolt **10** is screwed and rests on a stationary arm **11** through a spring shown in FIG. **1**: as seen in FIG. **1**, said plate is inclined and adjacent its end nearest the tank bottom has a plurality of reliefs **12** defining a plurality of grooves which are rectilinear and parallel to one another, and the function which will be described hereinafter.

Two metal partitions **13** project from the tank bottom and extend adjacent to plate **7**.

The device comprises a pump **14**, the delivery side of which is connected through a pipe **15**, diagrammatically shown in FIG. **1**, to two tubes **16** for water admission into tank **1**. The suction side of pump **14** is connected to two suction pipes **17** through a pipe **18** diagrammatically shown in FIG. **1** and is also connected through a pipe **19** to a large sized hole in the tank bottom, which can be seen in FIG. **1** and is shown in FIG. **2** by a dashed circle, such a hole being located just below belt **2**.

Through arms not shown in the drawings for sake of simplicity, elongated metal elements **20** are secured to the tank, such elements **20** being parallel to belt **2** and defining guide grooves, the function of which is to be later described.

At the top of the device there is provided a container **21** as supported by an arm **22** forming part of a stationary frame, not shown in the FIGS. for sake of simplicity; container **21** is located sidewise to the belt and from the bottom thereof a discharge outlet **23** projects and extends inside the ring as defined by belt **2** to over plate **7**. Container **21** is filled with a plurality of drawing tubes mounted on valves designed to be secured on aerosol containers, the tubes being randomly placed within the container.

In the drawings, the valved tubes have been designated by reference numeral **24**, the widest portion of each tube as shown in the drawings comprising the valve, while the actual tube is the elongated portion. The tube is much lighter than the valve, so that the unit barycentre is adjacent that end of the tube where the valve is mounted.

During operation of the device, a vibrator would shake container **21**, from the outlet **23** of which said tubes drop in a number depending on the rate of vibrations being imparted to container **21**. The tubes exiting from outlet **23** drop into the water in the tank and due to gravity force, the resultant of which passes through the barycentre of the valved tube, and due to frictional forces as well as buoyancy acting with increasing intensity (in accordance with its larger volume) on the tube than on the valve, the tubes will arrange at a vertical position and contact plate **7** by that end thereof on which the valve is attached.

Due to the movement imparted by pump **14** to the water in the tank, the tubes move on plate **7** vibrating about pin **8** and insert into and move within the grooves defined by reliefs **12**.

In belt **2** there are formed a plurality of housings or slots **25**, distributed on parallel rows (FIG. **2**) and suitable for accommodating the valve fast with the tubes dropping into the container; through housings or slots **25** the water can be passed from one to the other surface of the belt.

Tubes **24** falling from plate **7** on leaving the grooves between reliefs **12**, in part drop on the belt and in part into the housings or slots **25** of the belt. The tubes not dropping into said housings or slots **25** will move on the belt following the water stream sucked by pipes **17** and collect within the chamber defined by partitions **13**, bottom wall and sidewalls of tank **1** and now and then are withdrawn therefrom and returned to container **21**.

On the contrary, the tubes dropping into housings or slots **25** are firmly retained therein by water suction through the enlarged hole in the tank bottom below the belt through pipe **19**.

The movement of the water in the tank aids in causing the tubes as dropped into the housings or slots to assume a correct vertical array, said tubes, on moving away from plate **7** as carried by the belt, inserting into the grooves defined by metal elements **20**; thus, the valves fast with the tubes are between the belt and metal elements **20** and the tubes are carried by the belt on parallel rows to arrive at a collecting guide **26**, from which they are orderly fed to a utilizing machine which applies them onto the containers.

The amount of tubes to be delivered to the collecting guides can be varied by varying the vibration conditions in container **21** and plate **7** and speed of rotation of the belt as well as rate of water exchange in the tank.

A different embodiment of the device, in which the fluid being used for imparting a vertical array to the tubes is air, is shown in a diagrammatic and partly sectional view in FIG. **3**, wherein a belt **27** provided with housings or slots similar to those in belt **2** is shown moving clockwise on pulleys **28**, one of which is driven to rotation by a speed variator.

The upper portion of the belt is horizontally rectilinear and below it there are provided two large suction inlets **29** and **30** which are connected through pipes **31** and **32**, respectively, to

the suction side of a fan **33**, the suction side of fan **33** being also connected by a pipe **34** to a suction inlet **35** carried by an arm **36** on a rigid support (not shown in the FIG. for sake of simplicity), inlet **35** overlying inlet **30**.

A tube **38** is provided above suction inlet **29**, supported by an arm **37** fast with a rigid frame and connected by a pipe **39** to the suction side of a fan **40**, the delivery side of which is connected by a pipe **41** to two blowing outlets **42**, one of which being provided on one side of the belt and the other on the other opposite side.

Two containers **43** are fast with said tube **38** and filled with drawing tubes **24** mounted valves, identical to those above described, containers **43** being subjected to vibrations by known apparatus, not shown in the drawing for sake of simplicity.

During device operation, tubes **24** confusedly drop from containers **43** into tube **38**, moving downwards along it by gravity and encountering an intense ascending draught causing them to be vertically orientated with the valve disposed downward of the tubes. Tubes drop onto belt **27** and those dropping into said belt housings or slots are firmly retained therein by the air being sucked by inlet **29** and next, moving along with the belt, by the air being sucked by inlet **30**. Air being sucked by outlets **42** aids in shaking and causing those tubes **24** having assumed an inclined array on dropping into the housings of the belt to assume a vertical array. Those tubes **24** which did not drop into the housings of the belt drop from said belt onto an inclined plane provided sidewise and below the belt, and not shown in the FIG. for sake of simplicity, and are collected and then returned into the containers **43**.

On continuing to move along with the belt, the tubes will insert into grooves defined by guides **44** similar to those as described in connection with FIGS. **1** and **2**, and move along said guides to arrive at a collecting guide **45**, from which they are withdrawn and sent back to the utilizing machine.

I claim:

1. A device for imparting a prearranged array to and for carrying an orderly train of elongated bodies, the barycentre of which being adjacent an end thereof, such as drawing tubes applied on valves for aerosol containers, comprising a belt moving in a closed run, a container having a discharge outlet overlying a portion of said belt, a plurality of shaped housings or slots provided on said belt for accommodating the end adjacent the barycentre of said elongated bodies, at least one fluid between said discharge outlet and the belt portion underlying thereto, means for imparting a movement to said fluid, at least one suction inlet for said fluid located below said belt substantially at said limited portion thereof, the belt being crossable by the fluid at least at shaped housings or slots, at least one guide extending parallel to the belt and suitable for retaining and guiding said elongated bodies on said shaped housings or slots adjacent said limited portion of the belt.

2. A device according to claim **1**, wherein said belt is carried on pulleys rotating on shafts supported by a tank filled with a liquid, said belt portion being immersed in the liquid to which a pump imparts a feeding movement to said guide in the movement direction of the belt portion immersed therein, the bottom wall of the tank below said belt portion having at least one hole in connection with the suction inlet of a pump, there being provided in the tank as immersed in the liquid an inclined plate having at least one guide groove aligned with said guide parallel to the belt, the plate being interposed between said belt portion and the discharge outlet of said container, admission inlets being provided for the liquid into the tank at the opposite side of said hole in the bottom wall of the tank to said plate.

3. A device according to claim **2**, wherein said container is subjected to vibrations by a vibrator and sidewise of said belt, at the hole in the bottom wall of the tank, partitions are provided which define with the adjacent walls of the tank chambers which are connected to the suction inlet of said pump by suction pipes for the liquid.

4. A device according to claim **3**, wherein an end of said guide parallel to the belt is adjacent the hole in the bottom wall of the tank, the other end of said guide being outside the tank adjacent an end of a collecting guide for the elongated bodies.

5. A device according to claim **1**, wherein said fluid is air, said discharge outlet opens inwardly of a vertical tube in which an ascending draught is generated by a fan, the lower end of said tube overlying said belt portion below which there is provided at least a first air suction inlet.

6. A device according to claim **5**, wherein below the belt, adjacent said first inlet and located behind it in belt movement direction, there is provided a second suction inlet, above which and above the belt there are provided a further suction inlet and two side blowing outlets, an end of said guide parallel to the belt being adjacent said blowing outlets, the other end of the guide being adjacent an end of a collecting guide for the elongated bodies.