ABSTRACT

A guide for association with a movable chuck in a machine for inserting valved dip tubes in aerosol containers, the guide comprising a plurality of fingers having ends which, in one position, define a restricted opening through which a dip tube can be freely advanced in a desired direction, and which can be moved by the advancing chuck to a second position through which the valve body can be passed for engagement with the open neck of the container.

7 Claims, 4 Drawing Figures
DIP TUBE GUIDE ARRANGEMENT

This application is a continuation-in-part application of my co-pending application, Ser. No. 774,853 filed Nov. 12, 1968.

This invention relates to the guiding of dip tubes attached to aerosol valves and spray pumps, into containers, such as aerosol cans, glass bottles and plastic containers. Dip tubes are made of plastic tubing that is supplied in a roll form. Therefore, when the tubing lengths are unrolled from the supply roll and cut, the tubing is not straight but has a natural arc. Moreover, since the tubing is flexible it is necessary to provide a positive guidance means for gripping the valve and the dip tube and piloting the same through the narrow opening in the container.

An object of this invention is to provide guidance for dip tubes requiring concentric positioning while being placed in containers. This arrangement provides this objective without the use of more complicated motions and intricate mechanical devices.

Another object of this invention is to accommodate various length dip tubes and similar articles without requiring mechanical adjustments.

A further object of the present invention is to provide a rotary machine having a plurality of stations provided with guide arrangements for rapidly inserting valued dip tubes into containers.

The invention will be fully set forth in the following description referring to the accompanying drawings. The features of novelty will be pointed out with particularity in the claims annexed to and forming a part of this specification in which:

FIG. 1 is a view partly in cross-section and partly in elevation showing the dip tube in position to be guided into the container. This view also shows the internal shape and contours of the expanding guide in a closed position. The phantom lines indicate the guide in an expanded position.

FIG. 2 is a bottom plan view of the guide in a closed position.

FIG. 3 is a side elevation view showing the external appearance of the guide assembly in a neutral or closed position.

FIG. 4 is a view of a rotary multiple guide machine.

Referring to FIG. 1; the valve body 6 has previously been picked up mechanically by means of a holding chuck 5 and withdrawn inside the guide 1. The latter is constituted of a plurality of elongated flexible fingers. In this position the dip tube 9 is now in a position to be guided into the opening 7a of the container 7. With a downward movement of chuck 5 the dip tube 9 is piloted through the small opening 1a in the bottom of guide 1. As the travel of chuck 5 continues downward the outer portion 4 of the guide 1 against the internal tapered surface 6 of guide 1 forcing guide 1 to expand from the full line position to the dotted line position thereby allowing chuck 5 and valve body 6 to pass through opening 1a in the lower end of guide 1. The valve 6 is then seated in place in the opening 7a of the container 7. The chuck 5 is of a conventional construction (not illustrated in detail) having an inner collet (not illustrated) mounted on a rod (not illustrated) passing through the spindle 10; when the valve body 6 is seated, the collet hits a stop (not illustrated), the chuck body proceeds slightly further downward whereby the valve body 6 is stripped off the collet. The chuck 5 may now be returned empty to a neutral position.

Expanding ring 2 is fitted about guide 1 as shown in FIG. 1 and 3. This ring 2 is made of yieldable material such as gum rubber or synthetics such as an elastomer which has a quality of high elasticity.

Guide 1, as shown in FIGS. 1, 2, and 3, is provided with a number of fingers which are supported at the upper end by mounting hub 3 and secured loosely by a threaded collar 4. The yieldable ring 2 keeps all finger segments 1 in tight closed position until said finger segments are forced open by chuck body 5.

It should be apparent that the present apparatus is designed to operate with containers that are filled before the valves and dip tubes are placed therein. Thus, the filled containers must be placed in a position for the valve and dip tube guidance system to operate. In this connection, the valve placing or inserting mechanism can be a rotary continuous motion machine or an intermittent motion machine which indexes the containers under the guide mechanism while the valve and associated dip tube is being placed through the narrow neck of the container. In this arrangement, the containers are normally transported by means of a conveyor to the valve and dip tube guiding arrangement.

Referring particularly to FIG. 4, a rotary machine 14 supported on a rotor column 15 is shown having a plurality of guides at different stations A, B and C. Thus, the containers 7 are transported by means of a conveyor (not shown) to one of the various stations set forth above whereby the guides for the valued dip tubes are made operative in the manner illustrated in FIG. 1. It should be noted that the chuck 5 is carried by a spindle 10 which moves vertically by means of a barrel cam 12 having a cam follower 16 operatively connected thereto, the cam follower 16 being guided by a camming groove 19 in the internal face of the cylindrical wall of the barrel cam 12. A compression spring 18 is held between the top of the spindle 10 and a part of the spindle carriage 20 riding on carriage post 22. In this manner, the chuck 5 which grasps the valve body 6 together with the dip tube 9 moves vertically within the segmented legs of guide 1. As soon as the chuck 5 contacts the conical portions of the legs of the guide 1 in its downward travel the legs are caused to move laterally outwardly. As seen in FIG. 1, the chuck 5 is shown in dotted lines in its lower position and the corresponding legs of the guide 1 in dashed lines in dotted lines moved outwardly from their full line position. It should also be apparent that the collar 4 holds the flexible legs of the guide 1 loosely so that these legs can be moved and flexed in an outwardly direction.

The guiding of dip tubes associated with closing valves for aerosol or other pressure containers is necessary since these dip tubes are made of plastic tubing which comes in a roll form and therefore the tubing when cut is set to a natural arc. It is therefore necessary to straighten the tube and to confine the same closely until it is piloted into the narrow neck opening 7a of the receptacle 7.

Ring 2 is preferably constituted of an elastomeric material and surrounds the segmented legs of guides 1 and is inserted in a groove 23 which is cut in the adjacent legs thereby forming an annular continuous groove. Thus, the yieldable ring 2 continually biases the legs of the guide 1 together so that a restricted passage 1a is normal in the arrangement in the present construction.

The narrow passage 1a provides the necessary guidance for the dip tube 9 as it enters the narrow neck 7a of the container 7 in an aligned manner, and thereafter the valve body is inserted in the narrow neck 7a and securely held therein.

1. A guide arrangement for inserting a valued dip tube through the small mouth opening of a container comprising a base member, a plurality of yieldable guide fingers spaced from each other and forming together in a retracted position a relatively narrow passage at the free ends thereof, means mounted on said base member for holding the other end of each of said fingers, a chuck for holding said valued dip tube and inserting the same through said small mouth opening, means for moving said chuck from a neutral position in a reciprocating manner within the area between said fingers with said dip tube passing through said narrow passage and said small mouth opening, said chuck as it moves in said area in one direction engaging said fingers and moving the same laterally outwardly over said container to an expanded position until said dip tube is in said container and the associated valve is properly seated in said small mouth opening of said container, said chuck releasing said valued dip tube and thereafter being moved in the opposite direction to the neutral position whereby said fingers move back to said retracted position.

2. A guide arrangement as claimed in claim 1 further comprising a yieldable ring, said guide fingers being provided with
aligned grooves whereby said yieldable ring fits in said grooves and normally biases said fingers to said retracted position.

3. A guide arrangement as claimed in claim 1 wherein said flexible guide fingers are provided with internal surfaces angled toward the longitudinal axis of said chuck to form a taper whereby certain surfaces of said chuck engages said tapered internal surfaces of said guide fingers during the reciprocating movement of said chuck in one direction to force said fingers out to said expanded position.

4. A guide arrangement as claimed in claim 2 wherein said fingers are constituted of flexible nylon.

5. A guide arrangement as claimed in claim 2 wherein said yieldable ring is an elastomer.

6. A guide arrangement as claimed in claim 1 wherein said means for moving said chuck is a spindle and a cam operatively connected to said spindle for moving the latter vertically.

7. A guide arrangement as claimed in claim 1 wherein said means mounting the other ends of said fingers on said base member are a hub and a collar, the latter loosely holding the other ends of said fingers.