Feb. 9, 1965 G. SCHWARTZMAN 3,168,776

PROCESS OF FORMING A VALVE MEMBER

Filed May 11, 1960

FIG. 1

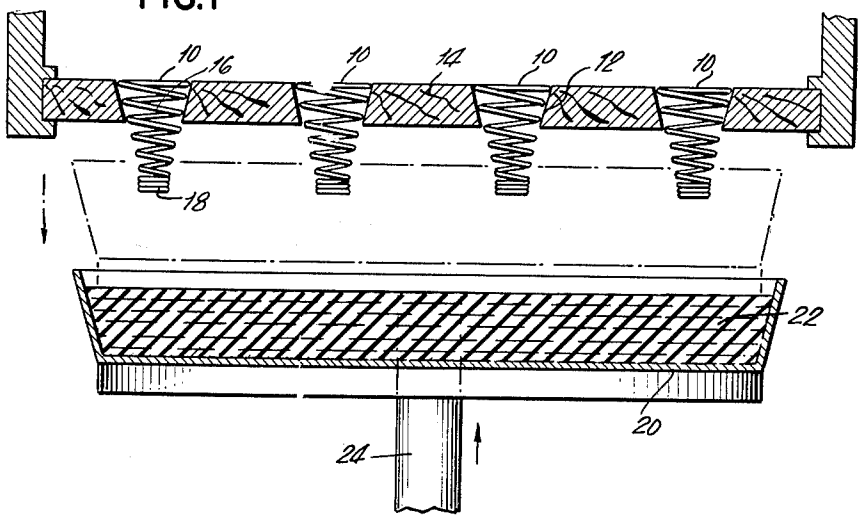


FIG. 2

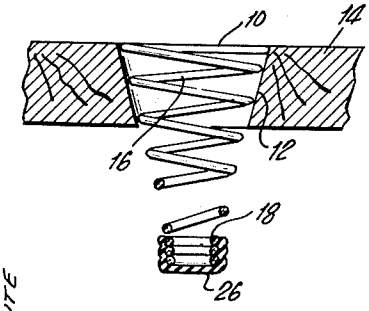
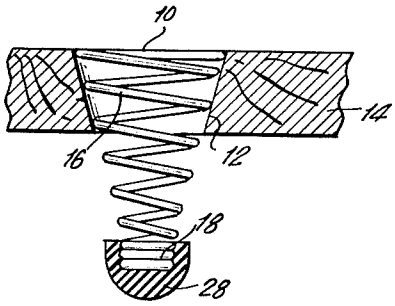


FIG. 3



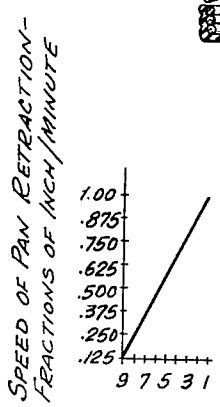


FIG. 5

DEPOSIT OF LATEX IN .001"

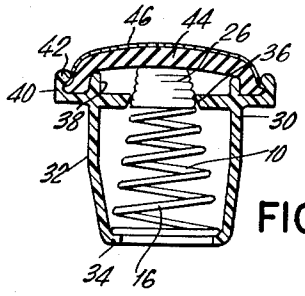


FIG. 4

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PROCESS OF FORMING A VALVE MEMBER

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1 Claim. (Cl. 29—157.1)

This invention relates to a process of forming a valve member for a dauber used in applying cosmetics, medications or the like on the person of the user or for applying oil, lubricants, polishes or the like on any suitable surface.

Further, the invention relates to a closure device for a fluid container used in forming the dauber. In addition, this invention relates to an apparatus for coating helical conical springs, which apparatus is employed in the process for forming the valve member.

This application is a continuation in part of the application of Gilbert Schwartzman, Serial No. 856,424, filed December 1, 1959, for Improved Dauber, now U.S. Patent No. 3,084,375.

An object of the invention resides in the process of forming a valve member which employs the novel concept of dipping a helical coil spring into a solution of latex so as to form an impervious coating on the coil spring, whereby the coil spring may function as a valve member.

Another object of the invention resides in the provision of a closure device having a valve member in the form of a helical coil spring provided with an imperforate coating and adapted to control the flow of fluid from the closure device with the valve member being actuated when the closure device is pressed against the surface being treated.

A further object of the invention resides in the provision of an apparatus for facilitating the carrying out of the process for forming the valve member.

One of the features of the present invention is that the valve member may be formed with a simple flat diaphragm type end closure by means of a single dipping in the latex while on the other hand a hemispherical coating can be formed if the device is dipped in the solution three times.

Still further objects and features of this invention reside in the process of forming a valve member which employs simple steps capable of being carried out by even unskilled labor, which enables a plurality of valve members to be formed simultaneously, and which process is inexpensive to utilize.

These, together with the various ancillary objects and features of this invention, which will become apparent as the following description proceeds, are attained by this invention, a preferred embodiment of the apparatus employed in the process and of the closure device being shown in the accompanying drawing, by way of example, wherein:

FIG. 1 is a vertical sectional view of the apparatus employed in the process comprising the present invention;

FIG. 2 is an enlarged sectional detail view illustrating one of the valve members after it has been dipped one time in a solution of latex;

FIG. 3 is a sectional view similar to FIG. 2 illustrating the valve member after it has been dipped three times in a solution of latex;

FIG. 4 is a sectional detail view of one of the closure devices constructed in accordance with the concept of the present invention; and

FIG. 5 is a graph illustrating the amount of deposit of latex on the coil spring as compared with the speed of retraction of the coil spring from the solution of latex.

With continuing reference to the accompanying drawing wherein like reference numerals designate similar parts throughout the various views and with particular attention to FIG. 1, it will be noted that herein there is illustrated a plurality of coil springs **10** which are arranged to sit within the tapered holes **12** formed in a tray or board **14**,

preferably formed of wood or any other suitable material. The coil springs **10** are preferably formed of a suitable resilient steel and have wide open coils **16** at one end thereof while the coils **18** at the other end of each spring **10** are closely adjacent or touching each other so as to give a maximum dipping surface. The wide open coil springs allow for proper spring tension and movement as will be henceforth explained.

A pan **20** filled with a solution of latex **22** is provided with a piston rod **24** connected to any suitable means such as a hydraulic cylinder or the like, not shown, for moving the pan upwards so that the closely adjacent coils **18** will be dipped into the latex solution **22** and then for slowly removing the pan **20** downward. The latex solution **22** may be a natural rubber latex or a synthetic latex, but it has been found that a neoprene latex sold under the catalogue number Hi-Build White Coating N–55 sold by Gates Engineering Co., Wilmington, Delaware together with a keytone solvent sold under the catalogue No. N–450–12 Reducer which are mixed to a thick, syrupy consistency in the proportion of 85 percent of the neoprene latex and 15 percent of the solvent gives more uniform and advantageous results than that of any other latex solution.

Further, it has been found that the upstroke or immersion speed is not critical. However, the speed of retraction is very critical. The slower the speed the greater the deposit of latex on the spring as can be seen from the graph of FIG. 5 which illustrates that the thickness of the deposit or coating is directly proportional to the speed of retraction.

To attain the most desirable speed of retraction, a water powered hydraulically operated cylinder is employed for actuating the piston rod **24** and suitable micro-switches may be provided for automatically controlling the device together with a timer if such is desired.

Referring now to FIG. 2, it will be seen that as the helical coil spring is dipped a single time into the solution of latex, a coating is formed with a flat diaphragm-like enclosure being attained as at **26**. The entire coating is imperforate and permits the spring to function as a vlave member.

As can be seen in FIG. 3, an unusual result is achieved if three relatively thin coatings are successively formed on the coil spring. Within the limits of 3 to 10,000 of an inch coating initially provided on the coils **18**, three total dippings will result in a substantially hemispherical coating being formed which is highly desirable for certain types of uses, especially when the valve seat employed in conjunction with the valve member is relatively small or in the cases where the fluid being controlled by the valve member is very free flowing.

Referring now to FIG. 4, it will be seen that herein there is illustrated a closure device employing the coil spring type valve member having the coating **26** on the end thereof. This closure device includes a retainer ring **30** provided with a cylindrical projecting portion **32** which terminates in a rim **34** formed during the molding of the retainer ring or by swaging. The retainer ring is provided with a tapered opening **36** forming a valve seat and an inner cylindrical flange **38** is provided on the retainer ring **30** spaced from an outer retainer flange **40** which has a rim **42** functioning to hold a resilient cover **44** in place.

The cover is preferably formed of foam rubber or the like and has a cloth covering **46** of satin or other suitable cloth or fibrous material. The coil spring extends through the opening **36** with the tapered surface of the coating **26** engaging the valve seat **36** to close the valve and with the end of the valve member engaging the cover **44**.

Because of the flat diapsragm-like shape of the end of the valve member, the valve member cannot be felt through the foam rubber cover. In use, the container provided with the closure device with the projecting portion

32 seating in the neck of the container, not shown, will be overturned and the cover 44 applied against the surface to be treated.

Pressing down on the cover will press the valve member towards the rim 34 and open a passage between the coating 26 and the valve seat 36. Fluid will then flow onto the foam rubber cover 44 and through the porous material forming the cover 46 onto the surface to be treated.

Since from the foregoing the construction, advantages, and method steps of this invention are readily apparent, further description is believed to be unnecessary. However, since numerous modifications will readily occur to those skilled in the art, it is not intended to limit the invention to the precise method steps described or structure defined but all suitable modifications and equivalents may be resorted to which fall within the scope of the appended claim.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

A process of forming a valve member comprising the steps of forming a helical coil spring having a plurality of coils closely adjacent each other at one end thereof, dipping said end of said coil spring in a thick and syrupy latex solution, then slowly removing said end from said solution to form an imperforate coating on said coil spring closing said end thereof, thereafter successively dipping said end of said coil spring into said solution and successively slowly removing said end from said solution to form a solid substantially hemispherical member on said coil spring.

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