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FLOW CONTROL DEVICE FOR FLEXIBLE TUBES OF LIQUID EMBROIDERY PAINT

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FIG. 1

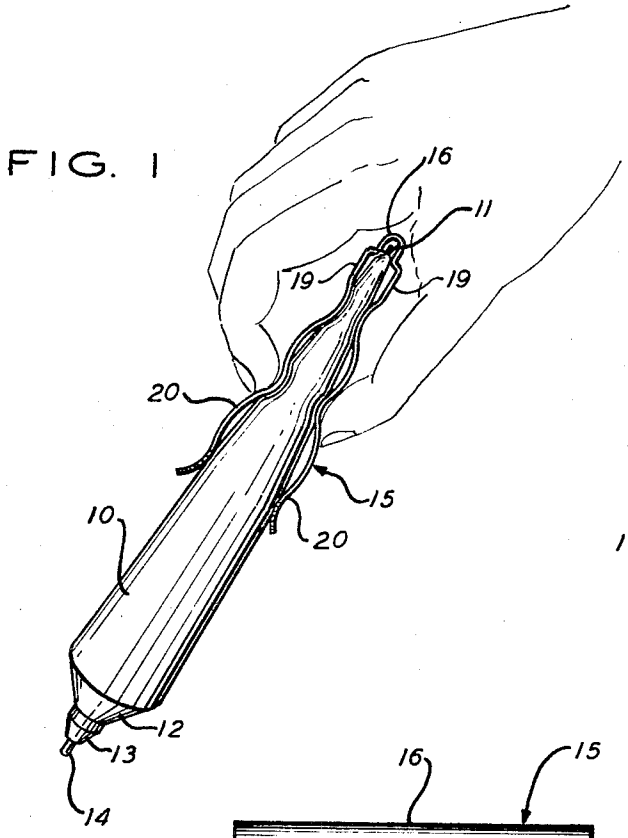
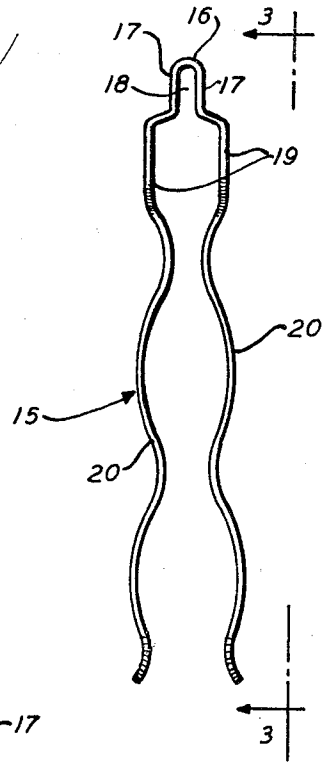


FIG. 2



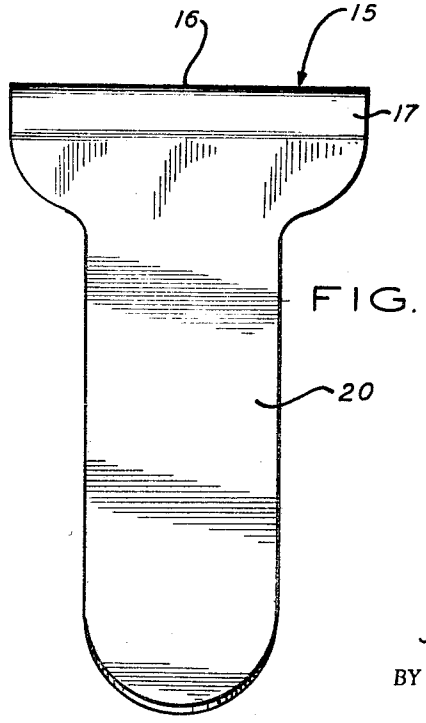


FIG. 3

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FLOW CONTROL DEVICE FOR FLEXIBLE TUBES OF LIQUID EMBROIDERY PAINT

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3 Claims. (Cl. 222—103)

This invention relates to apparatus for dispensing liquid embroidery paint and more particularly to a flow control device for flexible tubes of such paint. The present flow control device is one which can be readily attached to a tube of paint to provide a compressive force on the tube as well as a gripping means by which the tube can be held firmly in the hand to direct the paint accurately along the embroidery lines.

The invention is intended especially for use with tubes of liquid embroidery paint which are provided with a rolling ball point. In this connection the flow control device is produced of spring steel to exert pressure on the flexible tube until the contents of the portion of the tube embraced by the device are discharged. Features of the device reside in the use of corrugated side members which indent and conform to the flexible sidewalls of the tube to hold the device on the tube and to form a gripping means which enables the device to be easily held in a firm manner in the hand. Preferably, the flow control device is made of sufficient length to extend only along a portion of the tube and is provided with a rounded apex portion to receive the flattened crimped end of the tube as the device is slipped onto the tube. Immediately adjacent the rounded apex end of the flow control device there is an enlarged space to receive the rolled end portion of the tube after the contents of the end portion have been expelled therefrom.

A general object of the invention in addition to the aforestated features and objects is to provide an improved flow control device for collapsible tubes of liquid embroidery paint having a ball dispensing point, which exerts the constant pressure on the tube necessary to maintain a constant even flow of paint from the ball point as the ball is rolled over the surface to be painted, which is easy to adjust into successive positions along the tube as the contents of the tube are expelled and which enables the tube to be held lightly but in a firm manner to control accurately the guiding of the marking point.

These and other objects and features of the invention will be apparent from the following description and the appended claims.

In the description of the invention, reference is had to the accompanying drawings, of which:

FIGURE 1 is a side elevational view of a tube of liquid embroidery paint showing the flow control device of the invention applied thereto;

FIGURE 2 is a side view of the flow control device to an enlarged scale showing the form which the device assumes in a free state before it is slipped onto a tube of paint; and

FIGURE 3 is another side view of the flow control device as seen from the line 3—3 of FIGURE 2.

In FIGURE 1 there is shown a collapsible tube **10** of flexible material having a flattened crimped end **11** forming the sealed end of the tube and having a head **12** of a circular or conical shape provided with a discharge orifice **13** into which is fitted a ball point **14** to enable a liquid embroidery paint in the tube to be expelled along a fine line by rolling the ball point on the surface to be painted in the same manner as a present day ball point pen is used to write on a surface. Heretofore the tubes of paint have been used without any flow control device attached thereto with the result that the user would have to not only hold the tube but also exert sufficient pressure

to maintain a constant flow of paint from the ball point as the point is rolled across the embroidery surface. This entailed not only the difficulty of both holding and pressing onto the tube but also ofttimes resulting in the tube being pressed unevenly and being distorted out of shape causing breakage of the flexible wall of the tube and thereby destroying the tube as for any further use. The present flow control device **15** shown attached to the tube in FIGURE 1 avoids these difficulties by eliminating the need for the user to grip the tube itself and of enabling an even discharge of the contents of the tube embraced by the flow control device.

The present flow control device **15** is made of spring steel which is blanked first into a strip form having a central portion of enlarged width as shown in FIGURE 3. The sheet metal strip is folded on itself on a transverse line at its central portion but the folding is on a discrete radius to form a rounded apex portion **16** with extending parallel walls **17** forming a true U-shaped portion **18** to receive the flattened crimped end portion of the tube **10**. Immediately beyond the U-shaped portion **18** the side members are flared outwardly and then extended in parallel relation to each other to form an enlarged U-shaped portion **19** having a sufficient space therein to receive the rolled end portion of the tube **10** after the contents have been expelled therefrom. Beyond the enlarged U-shaped portion **19** the extending side members **20** are given a corrugated shape so that each side member has a plurality of corrugations along the length of the device as shown in FIGURE 2. Preferably, each side member may have two ridges and three indentations forming pressure points on the collapsible tube **10** as shown. The enlarged width of the apex portions **18** and **19** shown in FIGURE 3 is adapted to give the flow control device greater strength while the reduced width of the corrugated side member portions **20** provide flexibility to enable these portions to be compressed to discharge fully the entire contents of the length of the tube **10** along which extends the side members.

A feature of the present flow control device which distinguishes it from other discharging devices of this character is in making the device of a spring steel construction which will exert constant pressure on the collapsible tube enabling an even constant flow of paint from the ball point. This constant pressure causes the side members to indent the collapsible walls of the tube **10** and to interlock therewith in a manner which prevents the flow control device **15** from slipping off of the tube. Still further, this indentation of the corrugated side members with the collapsible tube enables the tube to be held firmly by the flow control device itself without need for the user to exert any direct contact or pressure of the fingers onto the tube itself. The corrugated character of the side members also facilitates the user in firmly holding the flow control device so that he can direct the flow line from the ball point accurately in accordance with the embroidery lines.

When the contents of the outer end portion of the tube **10** have been expelled the flow control device **15** is slipped off from the end, the tube is rolled up from the outer end until the remaining portion assumes a full state, and then the flow control device is slipped onto the tube from the rolled-up end with the rolled portion then filling the space **19**. After several such replacements of the flow control device along the tube, the entire contents thereof can be expelled without danger of disrupting the flexible walls of the tube **10** such as might cause breakage or leakage of the paint contents.

The embodiment of my invention herein particularly shown and described is intended to be illustrative and not necessarily limitative of the invention, since the same is subject to changes and modifications without departure

from the scope of my invention, which I endeavor to express according to the following claims.

I claim:

1. In combination with a collapsible tube of liquid embroidery paint having a flattened crimped form at one end and a circular head at the other end provided with a ball point discharge orifice, a flow control device for said tube comprising a sheet metal strip folded on itself into a substantially U-shape, said device embracing said tube from the flattened end thereof partially along the length of the tube and having a rounded apex end portion for receiving the flattened end of the collapsible tube along the full width thereof, the extending side members of said device being substantially narrower than the corresponding dimensions of said tube, and said side members having transverse corrugations and being of a spring material to exert pressure on the tube and to indent the corrugated side members into the walls of the tube for retaining the flow control device firmly in interlocking engagement with the flexible sidewalls of the tube, said corrugated side members providing a gripping surface for holding the flow control device firmly in the hand to enable the ball point to be directed accurately along an embroidery line.

2. In combination with a collapsible tube of liquid embroidery paint having a flattened crimped form at one end and a head with a discharge orifice and a ball point at the other end, a compression device for said tube comprising a metal strip of spring steel folded on itself on a transverse line intermediate the length thereof, said sheet metal strip being fitted on said tube to embrace the tube partially along the length thereof from the flattened end thereof, said sheet metal strip having a rounded apex portion for receiving the flattened end portion of said tube and having side members of a transversely corrugated form which under compressive force of the side members indent and interlock with the flexible sidewalls of the tube to firmly locate the device on the tube, said sheet metal strip having an intermediate portion between the rounded apex portion and said corrugated side members wherein the side members at the intermediate portion are flat and are spaced substantially farther apart to provide an enlarged space for receiving a rolled end portion of the tube after the liquid contents of the end portion have been discharged therefrom.

3. A compression flow control device for a collapsible tube of liquid embroidery paint formed with a flattened crimped portion at one end and with a discharge orifice having a ball point at the other end, said flow control device comprising a sheet metal strip of spring material folded on itself on a transverse line intermediate the length thereof and to a generally U-shape adapted to be slipped onto said collapsible tube from the flattened end thereof, said device having a circular apex portion and having parallel side members extending from the apex portion to form a U-shaped end portion for receiving the flattened end portion of the tube, said device having its side member portions immediately beyond said U-shaped end portion spaced farther apart and parallel to each other to form an enlarged space for receiving a rolled end portion of said tube after the contents of the end portion of the tube have been discharged therefrom, and said device having further side member portions extending beyond said spaced parallel side member portions which are provided with a plurality of transvese corrugations disposed successively along the length of the side members, said side members being spring biased to indent the opposite walls of the collapsible tube with a compressive force causing the side members to interlock with the tube and enable the tube to be held firmly by a grip of the hand onto the flow control device.

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