

Feb. 13, 1968

G. SCHWARTZMAN
APPLICATOR HAVING A POROUS COVERING INTEGRAL
WITH A SLITTED WEB

3,368,232

Filed June 28, 1965

2 Sheets-Sheet 1

FIG. 2

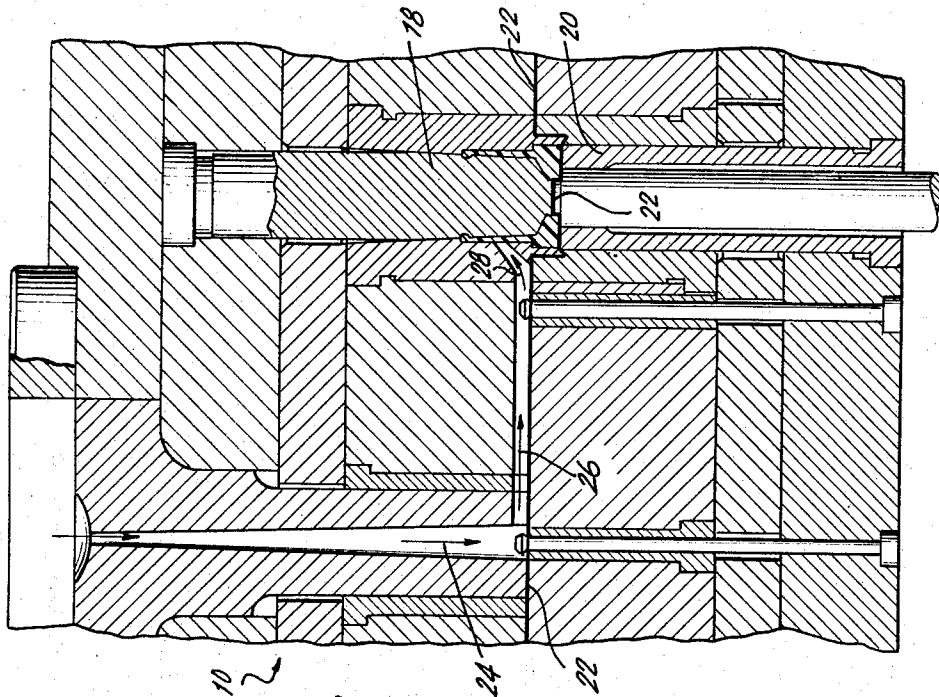
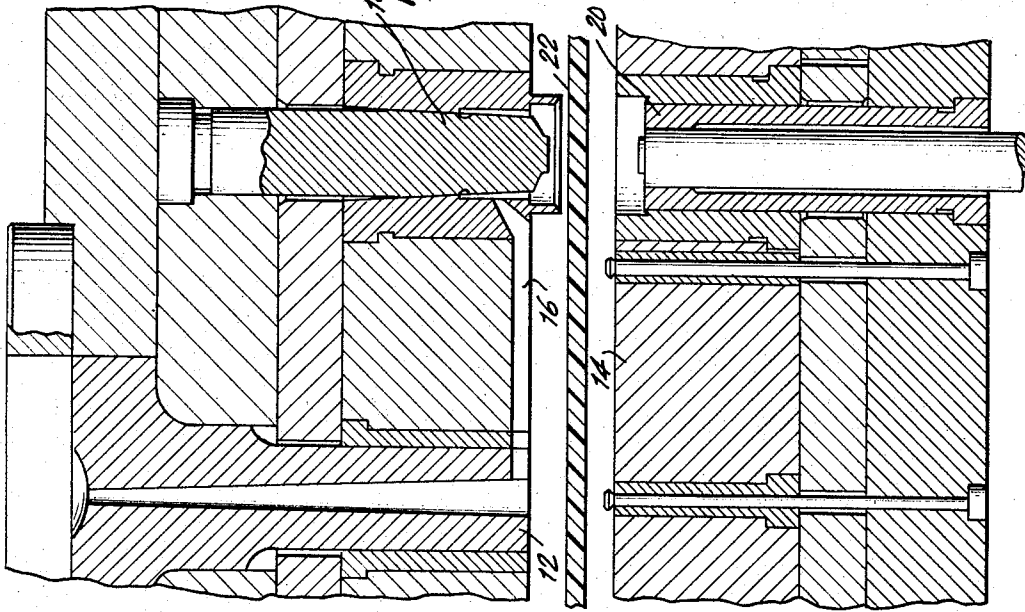


FIG. 1



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FIG. 3

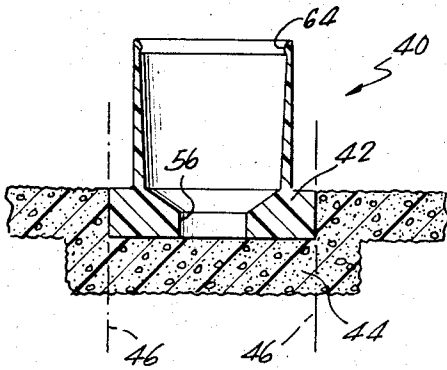


FIG. 6

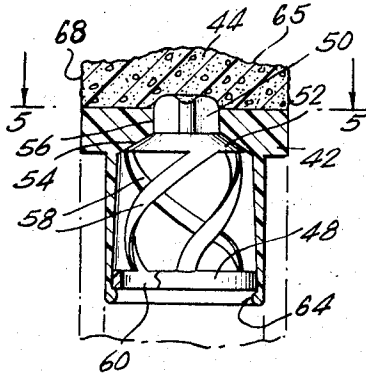
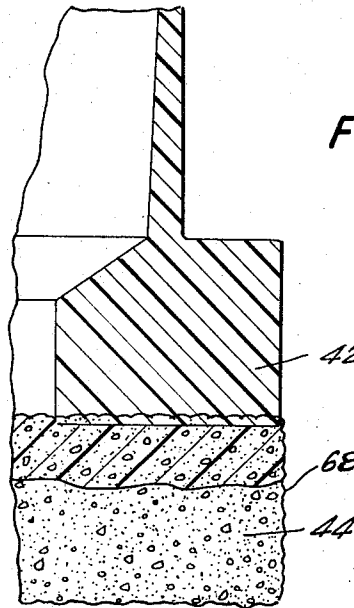


FIG. 4

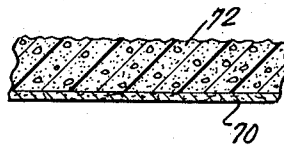


FIG. 7

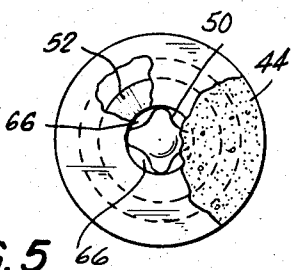


FIG. 5

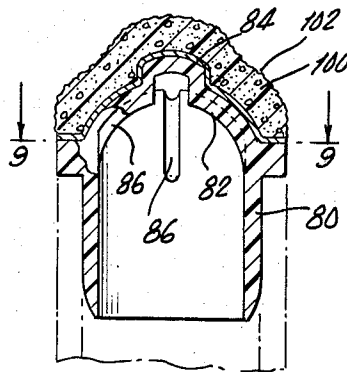


FIG. 8

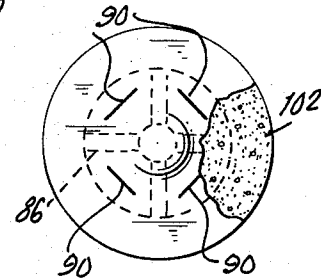


FIG. 9

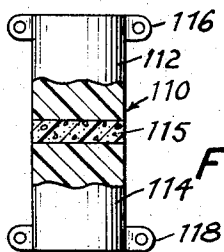


FIG. 10

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3,368,232

**APPLICATOR HAVING A POROUS COVERING
INTEGRAL WITH A SLITTED WEB**

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ABSTRACT OF THE DISCLOSURE

An applicator comprising a retainer ring having a dome-shaped web of circular cross section. A covering of porous material is integral with the web and the ring and extends over the web. The web is resilient and has a plurality of slits therethrough which extend normal to the radii of the web. The slits are annularly spaced from each other.

This invention relates to an applicator for dispensing liquids of various viscosities.

In the past, various types of applicators and daubers have been devised which employ valve mechanisms for controlling and metering the flow of fluid onto an applicator surface which may employ a foam rubber reservoir for the fluid as well as a cover which in the past has generally been a two-ply fabric. One or more layers of the foam rubber are utilized and are held in place by the cover which is stretched over the foam rubber and then swaged into position by a flange of a retainer ring, which provides an attractive and useful applicator, but the steps of swaging the cover and foam rubber partition is time consuming and costly.

There has been a long and intensive search for suitable materials for new applicator surfaces and for means of attaching these materials to the body of the applicator. Various types of mountings, swaging, riveting, fastening and the like have been attempted, but all have proven insufficient. The concept of this invention features the integral uniting of resilient urethane foam with a polyethylene retainer ring in a unique manner. While urethane foam has been found suitable, ordinary foam rubber or other low melting point foam materials cannot be used in the present invention, and the integral uniting of the housing urethane foam with the applicator only occurs when polyethylene or other similar thermoplastic resins are employed.

It is an object of the present invention to provide an applicator in which a resilient urethane foam or similar high melting point porous sponge-like foam is integrally united with a polyethylene retainer ring so that not only will the top surface of the foam be available for use as an applicator surface, but the entire peripheral sides will likewise be available for use in applying various types of fluid thereby better enabling the fluid to be placed in crevices, cracks and the like, such as when applying shoe polish on shoes or applying medications on the body of a human being.

Another object of the invention resides in the provision of an applicator which employs porous material integrally united with and in combination with a plastic retainer ring so that the peripheral edge of the top surface is free enabling the edge to be used in applying fluid into various tight places.

Another object of the invention resides in the provision of an applicator that is simple in construction, extremely inexpensive to utilize, and which is provided with a novel initial seal, but which after the first use thereof enables the ready application of fluid.

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These, together with the various ancillary objects and features of the invention, which will become apparent as the following description proceeds, are attained by the applicators preferred embodiments of the applicator being shown in the accompanying drawings, by way of example only, wherein:

FIG. 1 is a partial sectional view of pertinent parts of an injection molding apparatus showing the mold open with a sheet of porous material inserted between the halves of the mold;

FIG. 2 is a view similar to FIG. 1, but showing the mold in a closed position prior to injection of liquid polyethylene;

FIG. 3 is a sectional detail view illustrating an applicator manufactured in accordance with the concepts of the present invention shown prior to cutting off of the applicator from the sheet of porous material;

FIG. 4 is a sectional detail view of a completed applicator;

FIG. 5 is a transverse sectional view taken along the plane of line 5-5 in FIG. 4;

FIG. 6 is an enlarged sectional detail view illustrating the manner in which the porous material integrally unites with the polyethylene;

FIG. 7 is an enlarged sectional detail view of another type of material which can be utilized within the concept of the present invention;

FIG. 8 is a longitudinal sectional view of a modified form of applicator;

FIG. 9 is a transverse sectional view taken along the plane of line 9-9 in FIG. 8; and

FIG. 10 is a sectional detail view of a shock absorber device according to the invention.

With continuing reference to the accompanying drawings, wherein like reference numerals designate similar parts throughout the various views, reference numeral 10 is used to generally designate an injection molding apparatus having two main mold parts 12 and 14 which are so arranged as to cooperate to form the mold for the applicator. The mold half 12 includes a channel 16 for forming a sprue for injecting molten polyethylene at a temperature of approximately 400 degrees into the mold. The mold halves 12 and 14 include cooperating core pieces 18 and 20 so designed that the final shape of the portions molded of polyethylene are predetermined by the shape of the core pieces.

A sheet of porous material 22 is inserted between the mold halves. This porous material is urethane foam. It has been found that ordinary foam rubber and various other materials are definitely unsuitable for this process, the material especially adapted being porous urethane foam with or without a backing of nylon tricort material.

The core pieces may include knife edges 21 for the purpose of cutting the sheet of porous material.

After the porous material 22 has been inserted between the mold halves 12 and 14 the mold halves are closed severely compressing the porous material 22 into substantially a thin line except at the location of the core pieces 18 and 20 where it is very much compressed but not quite completely compressed as elsewhere in the mold. The reduced amount of compression at the location of the core pieces 18 and 20 gives rise to the unusual and unexpected result that there is with the integral uniting of the cellulose foam or urethane foam with molten polyethylene which is injected at approximately 400 degrees in the direction of arrows 24, 26, 28, into the space defined by the core pieces 18 and 20 respectively.

Then, the injection molding machine is opened and the partially completed applicator, which is generally indi-

cated by reference numeral 40 is withdrawn. This partially completed applicator includes the molded polyethylene retainer ring integrally united with a web or covering 44 of the porous material. Then, the excess porous material is die cut from the retainer ring 42 along the line 46. Thereafter, a one-piece valve assembly 48 molded out of a suitable plastic material, such as polyethylene or polyurethane, is inserted into the retainer ring 42. The valve assembly 48 includes a valve head 50 having a tapered portion 52 corresponding with the tapered valve seat 54 formed by the tapered opening 56 in the retaining ring 42. Further, a plurality of resilient spring members 58 are integrally formed with the valve head and an enlarged ring 60 which is swaged in position as at 64. The valve head presses up into the web or covering 44 and the web 44 when depressed upon use of the applicator, depresses the valve head to allow fluid flow through the plurality of channels 64 formed in the valve head 50, so as to permit the entire web or covering 44 to become saturated with the fluid to be applied. It is particularly to be noted that the sides of the web 68 as well as the top 65 may be utilized for applying fluid. In cases where it is desired to apply shoe polish on shoes, the edge and side portions are very desirable for enabling application of fluid into crevices and the like. This is also true when applying fluid onto portions of the human body. The spring members 58 are of such characteristics as to normally hold the valve head 52 in a closed position against the valve seat 54.

In the case where knife edges 21 are provided, the foam material is cut to shape during the molding step.

As can be seen in FIG. 6, the web 44 is integrally united to the polyethylene ring 42 with the polyethylene extending downwardly deep into the foam material and through the loops thereof. This uniting is more than a mechanical bonding, but includes an actual integration of the materials.

The polyethylene utilized is a specially cone-pointed rubber polyethylene, US 1634 Ultrathene.

It is possible to use a combination of foam material and fabric. The urethane foam cellulose may be bonded to brushed nylon tricot or other pile-type fabric and the brushed nylon tricot fabric 70, see FIG. 6, may be mechanically bonded to the polyethylene during molding operation.

An alternate form of the invention is shown in FIGS. 8 and 9. In lieu of core pieces as at 18 and 20, other core pieces are provided so as to mold a retaining ring 80. This retaining ring has a dome-shaped web 82 provided with an upwardly extending projection 84 and a plurality of annularly spaced reinforcing ribs 86 extending downwardly from the upper surface thereof. These ribs reinforce the dome structure so that after the retaining ring 80 has been molded with the porous material, knives may be used to cut a plurality of slits 90 in the dome. The knives do not fully penetrate the covering. These slits are cut with hot knives so that upon withdrawal of the knives the slits will close, but will be very frangible, whereupon initial pressure on the projection 84 will cause the slits to open. Thus, there has been achieved a device provided with an initial seal until the first use thereof. The contents of a container employing the device as shown in FIGS. 8 and 9 can have a substantially indefinite shelf life.

The slits 90 extend at substantially a 45 degree angle relative to the ribs, because it has been determined that this arrangement of the slits 90 serves to provide the best metering of fluid as well as the easiest and most frangible arrangement for the slits upon first use. The covering 100 is urethane foam or may be formed of a urethane cellulose foam with a laminated brushed nylon tricot fabric 102 similar to the material shown in FIG. 7. The molten polyethylene extends into the weave of the laminated

fabric used as a base for the foam. This mechanical anchoring, while different from the integral uniting of the polyethylene with the urethane foam is nevertheless quite strong and desirable.

In the case where the applicator is to be used for application of shoe polish, the foam method may be provided with flocking over the top thereof as well in other similar applications where foaming and bubbling of product is detrimental.

Referring now to FIG. 10, there will be seen a shock absorbing device 110 constructed in accordance with the concepts of the invention. The device 110 includes a pair of shafts or bodies 112 and 114 of polyethylene having a layer 115 of urethane foam integrally united thereto during molding operations similar to those heretofore described. Fastening gears or other means 116 and 118 integrally molded with the bodies 112 and 114 are used for anchoring purposes of this device.

A latitude of modification, substitution and change is intended in the foregoing disclosure, and in some instances, some features of the invention will be employed without a corresponding use of other features. Accordingly, it is appropriate that the appended claims be construed broadly and in a manner consistent with the spirit and scope of the invention herein.

I claim:

1. An applicator comprising a retainer ring having a dome-shaped web of circular cross section, a covering of porous material integral with said web and said ring and extending over said web, said web being resilient, said web having a plurality of slits therethrough, said slits extending normal to radii of said web and being annularly spaced from each other.

2. An applicator comprising a retainer ring having a dome-shaped web, a covering of porous material integral with said web and said ring and extending over said web, said web being resilient, said web having a plurality of slits therethrough, said web having a plurality of radially and downwardly extending reinforcing ribs.

3. An applicator comprising a retainer ring having a dome-shaped web, a covering of porous material integral with said web and said ring and extending over said web, said web being resilient, said web having a plurality of slits therethrough, said web having a plurality of radially and downwardly extending reinforcing ribs, said ribs dividing said web into a plurality of sectors, there being one of said slits in each of said sectors.

4. An applicator comprising a retainer ring having a dome-shaped web, a covering of porous material integral with said web and said ring and extending over said web, said web being resilient, said web having a plurality of slits therethrough, said web having a plurality of radially and downwardly extending reinforcing ribs, said ribs dividing said web into a plurality of sectors, there being one of said slits in each of said sectors, said slits extending at a substantially 45 degree angle to said ribs.

5. An applicator comprising a retainer ring having a dome-shaped web of circular cross section, a relatively thick covering of porous material integral with said web and said ring and extending over said web, said covering having a top applicator surface, said web being resilient, said web having a plurality of slits therethrough, said slits extending normal to the radii of said web and being annularly spaced from each other, said ring and said covering having side walls lying flush with each other so that said covering forms a dauber head for applying fluid passing through said opening out of the side walls of said covering as well as out of said top applicator surface.

6. An applicator comprising a retainer ring having a dome-shaped web, a relatively thick covering of porous material integral with said web and said ring and extending over said web, said covering having a top applicator surface, said web being resilient, said web having a plurality of slits therethrough, said ring and said covering

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having side walls lying flush with each other so that said covering forms a dauber head for applying fluid passing through said opening out of the side walls of said covering as well as out of said top applicator surface, said web having a plurality of radially and downwardly extending reinforcing ribs dividing said web into a plurality of sectors, there being one of said slits in each of said sectors.

7. An applicator according to claim 6, wherein said slits extend substantially at an angle of 45 degrees to said ribs.

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