Sept. 15, 1959 A. L. BROWN 2,904,041

PROTECTIVE DEVICE

Filed Jan. 23, 1957

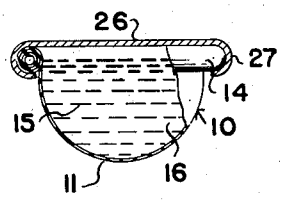

FIG. 6

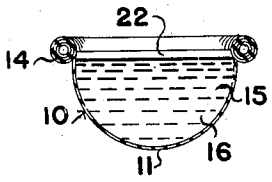

FIG. 4

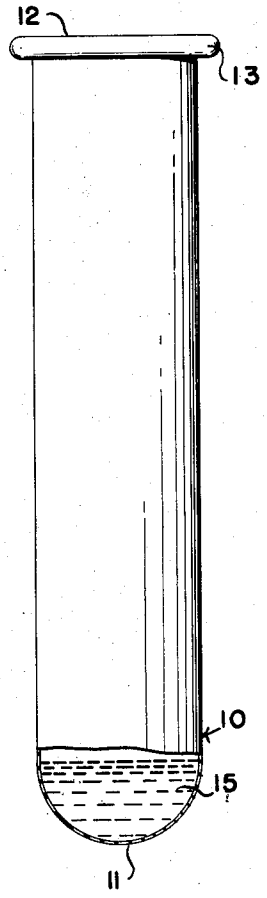

FIG. 2

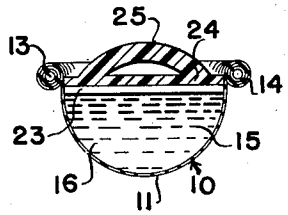

FIG. 5

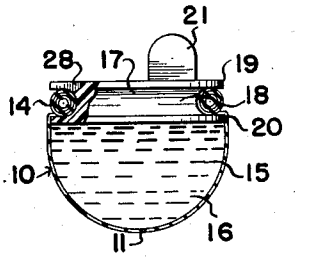

FIG. 1

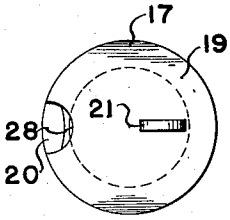

FIG. 7

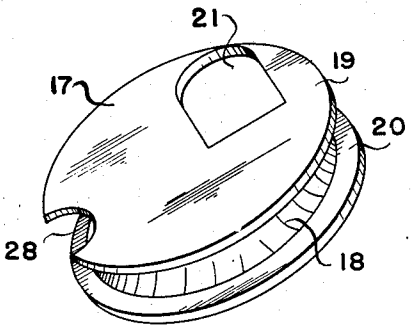

FIG. 3

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PROTECTIVE DEVICE

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Application January 23, 1957, Serial No. 635,766

9 Claims. (Cl. 128—132)

This invention relates to a shield for an external body member and more particularly to a combined mechanical and chemical prophylactic or similar device.

In order to prevent infection, the transmission of certain diseases and for hygienic purposes a shield is often applied to an external body member. Such devices or shields are normally in the form of a tubular member formed of a thin membrane of rubber or rubber-like material wherein one end of the tube is closed. Devices of this character are also used for contraceptive purposes. Shields of this type form mechanical barriers surrounding the external body member and must be manufactured and tested with meticulous care in order to assure against the existence of any holes or perforations therein and to eliminate the possibility of rupturing the membrane during use. Shields of this type also present problems with reference to the possibility of leakage therefrom by reason of the foregoing through the open end thereof. As an alternative, chemicals have been proposed for use for similar purposes and are in use. These chemicals are often prepared in the form of suppositories, jellies or salves which are applied to the body member or cavity. The use of chemical prophylactic and contraceptive substances has been found to be impractical in many applications and have not proved to be entirely effective in others.

It is, therefore, an object of this invention to provide a shield arrangement which combines the features of the mechanical and chemical procedures and thereby assures the complete effectiveness of the arrangement for the purpose for which it is employed.

It is another object of this invention to provide an arrangement of the character indicated which may be readily and economically manufactured and which may be conveniently packaged and stored while being available for immediate use.

It is a further object of this invention to provide an arrangement of the character indicated wherein any imperfection in the mechanical device is compensated for by the presence of the chemical substance and wherein the action of the chemical substance is fortified by the provision of a mechanical barrier which confines it to the region in which it may be most effectively employed.

It is also an object of this invention to provide an arrangement to the character indicated wherein the chemical substance of a germicidal or spermicidal nature is maintained in sealed condition until required for use and the contamination or leakage thereof is effectively prevented.

A further object of this invention is to provide an arrangement which is conveniently hygienic and esthetically unobjectionable when placed into use.

Other and further objects, advantages and benefits of this invention will become apparent from the description thereof contained in the annexed specifications and drawings or will otherwise become obvious. It will be understood that the invention herein disclosed may be employed for other purposes to which the structure and arrangement are adapted.

As shown in the accompanying drawing:

Figure 1 is a cross section of an embodiment of this invention in form for packaging and shipment,

Figure 2 is an elevational view of the device as shown in Figure 1, in unrolled condition as when placed in use, partly broken away to show the contents thereof,

Figure 3 is a perspective view of the diaphragm or cap of the arrangement shown in Figure 1,

Figure 4 is a cross sectional view of a modified embodiment of this invention,

Figures 5 and 6 are cross sectional views of further embodiments of the invention, and

Figure 7 is a top plan view of the cap or diaphragm shown in Figure 3.

As shown in Figures 1, 2 and 3 the present invention comprises a tubular sheath designated generally by the numeral **10**. Tubular member or sheath **10** is fabricated of a relatively thin rubber membrane although rubber containing or rubber-like materials may also be employed as is well known in the mechanical prophylactic art. In employing the term rubber it is intended to include all such suitable materials. The sheath **10** is closed at one end which is shaped into a hemispheric head portion **11** while the other end **12** of the sheath is open. An annular bead **13** is formed at the upper end of the sheath **10** and the device is normally packaged by rolling the beaded end of the sheath downwardly so that the sheath is rolled upon itself as shown at **14**. By rolling the beaded end of sheath upon itself in this manner the head of the external body member may be readily inserted into the interior of the head end of the sheath and the device may be then unrolled to cover the body member. In rolling the sheath upon itself said sheath is rolled to a point spaced from the head end so as to provide a cavity **16** at the head end of the sheath within which a medicament may be deposited. The numeral **15** designates a medicament which may be in the form of a germicide, spermicide or such other substance as may be found to be desirable in the particular application for which the device is employed. It is preferred to fill the cavity **16** head end **11** of the sheath with the chemical substance in viscous form such as a jelly, although the material may be deposited in the cavity **16** of the head end in other forms particularly as will appear hereafter.

In order to enclose the medicament **15** within the cavity and to prevent the escape or contamination of said medicament as well as any contact therewith until the device is actually put into use, a diaphragm or covering cap **17** is positioned directly over said medicament and in spaced relation with the terminal portion of the head end **11** of the sheath. The cap **17** thus cooperates with the head **11** to form a closed chamber corresponding to cavity **16** for the medicament **15**. As may be more particularly seen in Figures 2 and 3, the diaphragm or cap **17** may be formed of any suitable material, it being preferred to form it of a rubber or plastic substance which will not be affected by the chemical action of the medicament nor cause any contamination thereof.

The cap **17** is advantageously fabricated in the form of an annular disc which is provided with a peripheral annular concave groove **18**. Groove **18** is defined by shoulders **19** and **20** and thus forms an annular concave seat for the rolled portion **14** of the sheath so as to capture said rolled portion of the sheath and thereby firmly position said disc transversely across the interior of the sheath and to seal the contents of cavity **16** therein. The cooperative action of cap **17** with cavity **15** at the head end **11** of the sheath thus forms an enclosed and sealed chamber for the medicament. In order to increase the effectiveness of the seal between the sheath and

the cap, the diameter of the cap and the diameter of the peripheral groove may be increased so as to be somewhat larger than the diameter of the interior of the sheath and the rolled portion thereof respectively so that the sheath and rolled portion are stretched somewhat by the insertion of the cap. By dimensioning the cap in this manner a more effective seal is obtained between the sheath and the cap and the cap is more firmly positioned and maintained thereacross. A tab or finger grip **21** is advantageously disposed on the exterior surface of the cap and projects therefrom to facilitate the removal of the cap as the device is placed into use. In order to place the device into use it is merely necessary therefore to pull out the cap and unroll the sheath after the insertion of the external body member into the cavity of the head end. As this is done a layer of medicament is interposed between the body member and the sheath wall and said medicament is applied over the surface of the body member. There is thus afforded the additional protection of a medicament layer between the body member and the sheath or any cavity into which it may be introduced. Furthermore any emission from the body member is immediately subjected to the action of the medicament so that if any leakage should occur between the body member and the sheath such emitted material would have been subjected to the action of the medicament while confined within the sheath. Since the two substances are mixed, the emitted material will continue to be subjected to the action of the medicament even after accidental leakage from the sheath. A modified form of the invention is shown in Figure 4. As shown in said figure the cavity **16** formed at the head end **11** of the sheath has deposited therein a medicament **15** which is similar in nature to the medicament described in connection with the preceding figures. The medicament **15** is sealed into the cavity **16** by means of a transverse wall **22** which is spaced from the head end **11** of the sheath so as to form a similar capped and enclosed chamber therebetween. The transverse wall or diaphragm **22** is disposed adjacent the rolled up portion **14** of the sheath and advantageously is comprised of a thin disc of material which is solid at room temperature but readily melts at normal body temperatures so that contact of the body member with said disc material causes it to be readily melted thereby giving access to the medicament which is then automatically applied to the body member. An example of a suitable material for this purpose is cocoa butter although similar materials such as room temperature solid jells, paraffins or waxes may be employed for this purpose.

Figure 5 illustrates a further embodiment of this invention which is in all respects similar to the embodiment illustrated in Figure 4 in that the medicament **15** within cavity **16** is confined to the head end **11** of the rolled sheath by means of a transverse partition or diaphragm **23** formed of cocoa butter or similar suitable material solid at room temperature but which readily melts at body temperatures. The diaphragm **23** is additionally protected by means of a cap **24** which comprises an annular disc which overlies the diaphragm **23** and is provided with a finger grip **25**. The circular disc or cap **23** is maintained in position by adhesive contact with the upper surface at diaphragm **23** and may be readily removed by lifting it away from said diaphragm. The contents of the cavity in the chamber defined by diaphragm **23** and head end **11** of the sheath **10** are thus doubly protected by means of diaphragm **23** and the annular disc **24**. As heretofore indicated, the meltable diaphragm **23** automatically gives access to the medicament as it melts upon being subjected to the body temperature of the external member or a body cavity. The diameter of cap **24** is advantageously somewhat larger than the diameter of the tubular member at this point to additionally secure it in position by means of the resilient grasp of the rubber sheath thereon.

Figure 6 illustrates an additional embodiment of this invention wherein the medicament **15** disposed in the cavity **16** formed at the head end **11** of the sheath **10** is sealed in by means of a transverse diaphragm **26**. Said diaphragm **26** comprises a sheet or membrane of pliable material such as for example aluminum foil. The diaphragm membrane **26** is held in position by being bent over the rolled up portion of the sheath so as to form an inturned depending flange **27** surrounding a substantial portion of the external peripheral surface of rolled up portion **14** of the sheath **10**. The annular concave flange thus formed surrounds and grips the rolled up portion of the sheath and forms an effective seal therewith which firmly maintains the diaphragm in position and effectively seals the contents **15** of the chamber as defined by the transverse diaphragm **26** and head end **11** of the sheath. Diaphragm or membrane **26** may be formed of an aluminum foil which is bent over to surround the bead after the sheath has been rolled. It may, however, also be preformed of somewhat more rigid sheet material and the beaded end of the sheath may then be inserted into the concave annular flanged portion thereof. It will also be understood that the membrane need not be a metallic foil but may be formed from a sheet of suitable plastic or similar material.

Some of the advantages of this invention may also be realized by filling the cavity **16** at the head end of the sheath **10** with a medicament **15** which includes as a carrier cocoa butter or the like to maintain the medicament in solid condition at room temperature but being readily reduced to a liquid or fluent condition upon being subjected to normal body temperatures. In such event the body member contacting the medicament will cause it to melt or be reduced to fluent condition thereby rendering the medicament effective for the desired purpose here and above described. In this connection the melting of the material would be considerably accelerated upon the introduction of the body member into a body cavity. Where such arrangement is employed the medicament containing sheath should be enclosed in a suitable sealed package to prevent contamination.

In connection with cap **17** it is further pointed out that said cap is provided with a notch **28** formed in the shoulder **19**. When the rolled up bead is disposed within groove **18** notch **28** exposes a portion thereof so that the finger of the user may be applied over the exposed portion of the rolled bead **14** and the bead may then be readily rolled over the shoulder **20** to accomplish the removal of the cap **17** from within the sheath.

I have here shown and described a preferred embodiment of my invention. It will be apparent, however, that the invention is not limited to this embodiment and that many changes, additions and modifications can be made in connection therewith without departing from the spirit and scope of the invention as herein disclosed and hereafter claimed.

I claim:

1. A combined mechanical and chemical shield for an external body member comprising an elongated tubular sheath having a closed head end adapted to be applied upon an external body member, the other end being open, said open end being rolled upon itself to form a rolled bead spaced from said head end and defining a cavity therein, a medicament disposed within said cavity and means for confining said medicament within said cavity and for protecting it from contamination, said means comprising a diaphragm disposed transversely across said sheath adjacent said rolled bead whereby an enclosed chamber is provided for said medicament which chamber is defined by said diaphragm and said head end.

2. A shield for an external body member comprising an elongated tubular sheath of rubber or the like having a closed head end adapted to be applied upon an external body member, the other end of said sheath being open and rolled upon itself to form a rolled bead spaced from

said head end, a medicament disposed within said head end, a diaphragm removably disposed across the interior of said sheath for confining said medicament within said head end and for protecting it from contamination, said diaphragm comprising a circular disc, said disc being provided with a peripheral groove within which said rolled bead is removeably received in order to maintain said diaphragm in position across said sheath and to define an enclosed chamber for said medicament between said head end and said disc and to permit contact between said member and said medicament upon the removal of said disc.

3. A shield for an external body member comprising an elongated tubular sheath of rubber or the like having a closed head end adapted to be applied upon an external body member, the other end of said sheath being open and rolled upon itself to form a rolled bead spaced from said head end, a medicament disposed within said head end, a diaphragm removeably disposed across the interior of said sheath for confining said medicament within said head end and for protecting it from contamination, said diaphragm comprising a circular disc, said disc being provided with a peripheral groove within which said rolled bead is removeably received in order to maintain said diaphragm in position across said sheath and to define an enclosed chamber for said medicament between said head end and said disc and to permit contact between said member and the medicament upon the removal of said disc, said disc being provided with a projecting tab whereby said disc may be readily grasped to facilitate the removal thereof upon said sheath.

4. A shield for an external body member comprising an elongated tubular sheath of rubber or the like having a closed head end adapted to be applied upon an external body member, the other end of said sheath being open and rolled upon itself to form a rolled bead spaced from said head end, a medicament disposed within said head end, a diaphragm removeably disposed across the interior of said sheath for confining said medicament within said head end and for protecting it from contamination, said diaphragm comprising a circular disc, said disc being provided with a peripheral groove within which said rolled bead is removeably received in order to maintain said diaphragm in position across said sheath and to define an enclosed member for said medicament between said head end and said disc and to permit access of said body member to said medicament upon the removal of said disc, the peripheral groove of said disc being defined by spaced shoulders, a notch formed in one of said shoulders whereby a portion of said rolled bead is exposed thereby permitting the application of finger pressure to said exposed bead portion to facilitate the removal of said disc from said sheath.

5. A combined mechanical and chemical shield for an external body member comprising an elongated tubular sheath having a closed head end adapted to be applied upon an external body member, the other end being open, said open end being rolled upon itself to form a rolled bead spaced from said head end and defining a cavity therein, a medicament disposed within said cavity and means for confining said medicament within said cavity and for protecting it from contamination, said means comprising a transverse diaphragm disposed transversely across said sheath adjacent said rolled bead whereby an enclosed chamber is provided for said medicament defined by said diaphragm and said head end, said diaphragm being in the form of an annular disc, the diameter of which is larger than the interior diameter of said sheath whereby said disc causes said sheath to be stretched when it is disposed therein and is thereby retained more securely in position.

6. A combined mechanical and chemical shield for an external body member comprising an elongated tubular sheath having a closed head end adapted to be applied upon an external body member, the other end being open, said open end being rolled upon itself to form a rolled bead spaced from said head end and defining a cavity therein, a medicament disposed within said cavity and means for confining said medicament within said cavity and for protecting it from contamination, said means comprising a diaphragm disposed transversely across said sheath adjacent said rolled bead whereby an enclosed chamber is provided for said medicament which chamber is defined by said diaphragm and said head end, said diaphragm is comprised of a material which is relatively rigid at ambient temperature and which melts readily at normal body temperature.

7. The device according to claim 6 wherein a disc is provided overlying said diaphragm.

8. The device according to claim 6 wherein said diaphragm is comprised of a thin layer of cocoa butter.

9. A combined mechanical and chemical shield for an external body member comprising an elongated tubular sheath having a closed head end adapted to be applied upon an external body member, the other end being open, said open end being rolled upon itself to form a rolled bead spaced from said head end and defining a cavity therein, a medicament disposed within said cavity and means for confining said medicament within said cavity and for protecting it from contamination, said means comprising a diaphragm disposed transversely across said sheath adjacent said rolled bead whereby an enclosed chamber is provided for said medicament which chamber is defined by said diaphragm and said head end, said diaphragm comprising a membrane extending across said open end and overlying said rolled bead and having an annular depending inturned flange surrounding a portion of said rolled bead.

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