Feb. 8, 1966 P. M. JESSOP 3,233,769

SCREW-CAPPED CONTAINERS AND SAFETY DEVICES THEREFOR

Filed March 2, 1964 2 Sheets-Sheet 1

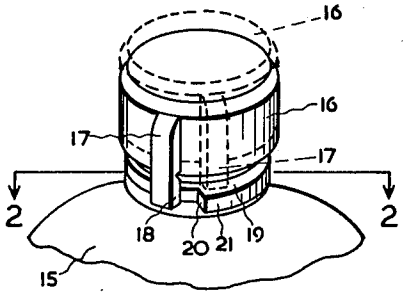

FIG. 1

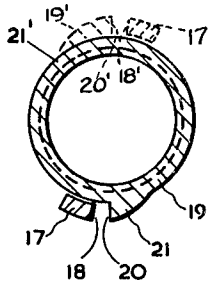

FIG. 2

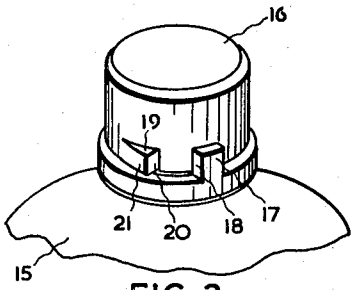

FIG. 3

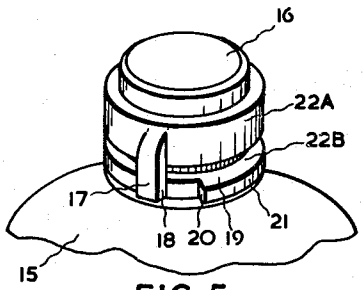

FIG. 5

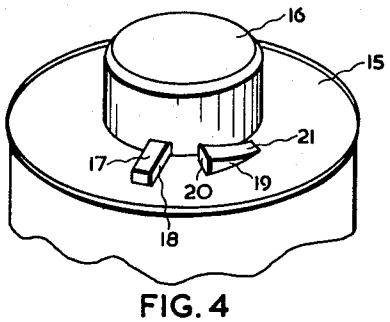

FIG. 4

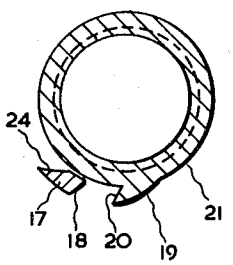

FIG. 6

PETER M. JESSOP
BY: Church & Rogers
PATENT AGENTS

Feb. 8, 1966 P. M. JESSOP 3,233,769

SCREW-CAPPED CONTAINERS AND SAFETY DEVICES THEREFOR

Filed March 2, 1964 2 Sheets-Sheet 2

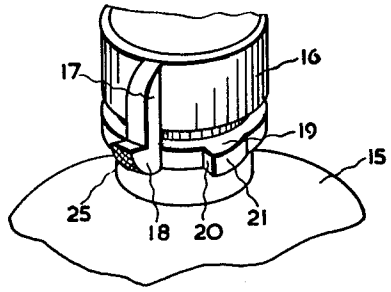

FIG. 7

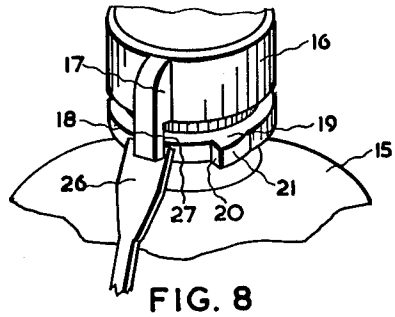

FIG. 8

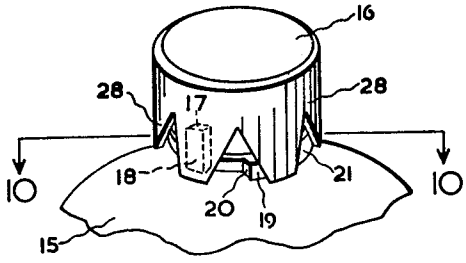

FIG. 9

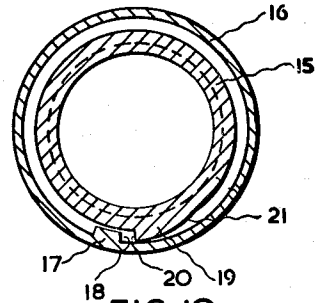

FIG. 10

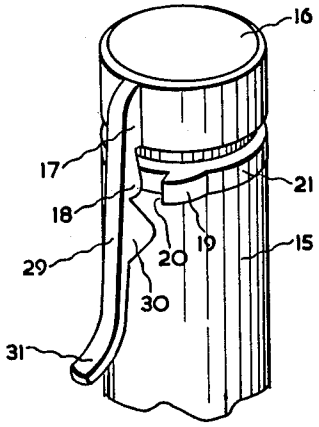

FIG. 12

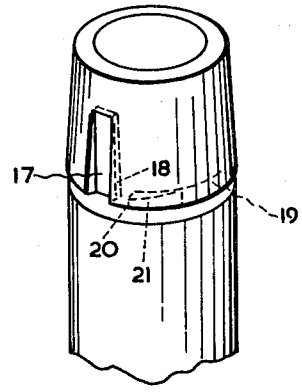

FIG. 11

PETER M. JESSOP
BY: Church & Rogers
PATENT AGENTS

United States Patent Office 3,233,769 Patented Feb. 8, 1966

3,233,769

SCREW-CAPPED CONTAINERS AND SAFETY DEVICES THEREFOR

Peter M. Jessop, 908 Bishop Place, Ancaster, Ontario, Canada

Filed Mar. 2, 1964, Ser. No. 348,654
13 Claims. (Cl. 215—9)

The present invention is concerned with improvements in or relating to screw-capped containers and safety devices therefor.

In recent years there has been an enormous increase in the number of chemicals that are sold for common use in the household, such chemicals varying in toxicity from those that are fatally poisonous in relatively small quantities, as in the case of some insecticides, to those that are only dangerous if ingested in large quantities, such as many toilet preparations. There has been a corresponding increase in the number of pharmaceutical compounds that are commonly used, both with and without a doctor's prescription, and again such compounds vary widely in their toxicity.

The toxicity of an ingested chemical compound is usually directly related to the weight of the person who has taken it, and a quantity of a particular compound that can safely be taken by an adult may be fatally poisonous to a small child. There is also a substantial degree of ignorance on the part of the general public of the toxicity of many chemical and pharmaceutical compounds that are commonly used in the household and, for example, approximately half of the deaths from poisoning among small children are caused by the commonest pain-relieving pharmaceutical substance acetylsalicylic acid. This unhappy situation is compounded by the attitude of indifference of the general public unless they have been directly involved in a case of poisoning, and the tendency in recent years to provide pharmaceutical compounds with pleasant tastes to make them more readily acceptable to the taker.

The rapid increase in the number of cases of accidental poisoning has caused extreme concern to the professional pharmaceutical associations, and many have instituted extensive research programmes on the problem and ways in which such cases can be prevented. A theoretical answer to the problem is to provide for substances of greater than a predetermined toxicity a container which can only be opened by an adult, but such a container already exists in the form of a lockable cupboard or medicine chest, and in practice any container which can meet these requirements will cause such inconvenience to adult users that it will not be accepted by the general public.

It is an object of the present invention to provide, in combination with a screw-capped container, means for preventing accidental removal of the cap from the container.

It is also an object to provide means adapted for application to such a container for preventing such accidental removal of the cap.

According to the present invention there is provided in combination with a screw-capped container wherein the cap and the container are rotatable relative to one another about an axis from a fully-open condition in a closing direction for securing the cap on the container, and from a fully-closed condition in the opposite opening direction for removing the cap therefrom, means for preventing accidental removal of the cap from the container comprising a projection member on one of the cap and the container and a cooperating member on the other thereof, the said projection and cooperating members providing corresponding surfaces that are generally radially-disposed with respect to the said axis and are disposed and adapted to engage one another after rotation of a

predetermined extent from the fully closed condition in the said opening direction and upon such engagement to prevent further rotation in the opening direction, at least one of the said projection and cooperating members having at least a part providing the said radially-disposed surface manually deflectable out of its general plane for disengagement of the said surfaces to permit the said further relative rotation in the opening direction.

Particular preferred embodiments of the invention will now be described, by way of example, with reference to the accompanying drawings, wherein:

FIGURE 1 is a perspective view of a first embodiment,

FIGURE 2 is a section of the embodiment of FIGURE 1, taken on the line 2—2 of that figure,

FIGURES 3 to 5 are perspective views of three further embodiments,

FIGURE 6 is a section similar to that of FIGURE 2, of a further embodiment,

FIGURES 7 to 9 and 12 are perspective views of still further embodiments, and

FIGURE 10 is a section on the line 10—10 of FIGURE 9.

In all of the figures of the drawing similar parts are given the same reference number. Moreover, it will be understood that for clarity of illustration many of the parts are shown with dimensions exaggerated or reduced.

FIGURES 1 and 2 of the drawings are intended to illustrate any type of container 15 which is provided with a cap 16, and wherein the cap and container are connected to one another by a screw thread. It will be understood that the cap and container are rotatable relative to one another about a common axis, from a fully-open condition in a closing direction to secure the cap on the container, and from a fully-closed condition in an opening direction to remove the cap therefrom. In all of the embodiments illustrated, and almost universally in commercial practice, the said closing direction will be a clockwise rotation of the cap and vice versa for the said opening direction.

In accordance with this invention the cap 16 is provided with an axially, downwardly extending projection member 17, the part of which that extends below the lower perimeter of the cap provides a surface 18 that is generally radially-disposed with respect to the said axis of rotation. The neck of the container 15 is provided with a cooperating member 19 having a surface 20 that is also generally radially-disposed with respect to the said axis of rotation. As shown in solid lines in FIGURE 1 the cap is in its fully-closed condition, and a limited amount of rotation of a predetermined extent is possible before the surfaces 18 and 20 engage one another, thereby preventing further rotation toward the fully-open condition. In order to continue the rotation the part of the projection member 17 providing the surface 18 must be deflected out of the general plane thereof until the surfaces 18 and 20 no longer engage one another. Such deflection can only be obtained upon performance of a manual operation of the person wishing to open the bottle and accidental opening is not therefore possible.

The surface 21 of the cooperating member 19 has the form of a ramp of progressively increasing radial extent from the axis of rotation, so that upon rotation of the cap in the closing direction the projection member is progressively deflected out of its general plane, without undue effort being required in rotating the cap, and without the need of a separate manual operation by the user.

A principal purpose in the particular mode of operation of a device in accordance with the invention is to prevent, as far as possible, the removal of the cap by young children, so that they are unable to gain access to the contents even if the container has inadvertently been left

in their reach. This purpose is to a large extent achieved since, for the size of container and the age of the child which are of primary concern, the child does not have sufficient manipulative skill to simultaneously hold the container, rotate the cap, and deflect the projection member to the extent necessary for its complete removal from the container. It will be understood that the degree of difficulty in the deflection of the projection member can be controlled by variation of any one or more of a number of factors, such as the radial extent of the surfaces 18 and 20 the radial location of these surfaces relative to one another, the radial thickness of the projection member 18, and the resilience of the material from which the projection member is formed. It will be appreciated that with materials of low toxicity a relatively easily deflectable member may suffice, while for extremely poisonous materials the member may be made so stiff that even adults may have difficulty in deflecting it to the necessary extent.

In practice, there is always the possibility that the cap will be overtightened or otherwise jammed in the fully-closed position. For example, many liquid pharmaceutical preparations will partially evaporate leaving a highly adhesive residue and some will almost inevitably lodge in the screw-thread and prevent rotation of the cap. Therefore, in a practical embodiment, the projection and cooperating members must be so located relative to one another that their cooperating surfaces do not engage until a small amount of relative rotation has taken place, giving an opportunity to release the cap from the said jamming or adhesion with the container. A rotation of about five degrees will usually be sufficient, although a slightly smaller or considerably larger angle can be permitted. Preferably, and as illustrated for this embodiment, the axial extent of the cooperating surfaces 18 and 20 are made such relative to the pitch of the screw-thread between the cap and container that upon a single complete rotation the surfaces can no longer engage, the cap having moved axially to the position illustrated in FIGURE 1 by the broken lines.

Also as illustrated by FIGURE 1, the ease or difficulty of deflection of the projection member may be controlled by the provision of a part 22 of reduced radial thickness between the part of the projection member that provides the surface 18 and the remainder of the member, the part 22 serving as hinge about which the lower end of the member 17 may more readily be bent. The part 22 also enables a user wishing to dispense with the safety device to remove the lower end of the projection member readily by cutting through the said part.

As illustrated by FIGURE 2, two safety devices may be provided that must be manipulated simultaneously for full removal of the cap, the second device being shown in broken lines and the parts thereof being given primed references. The two devices are illustrated as being disposed diametrically opposite to one another, but they can be disposed at any convenient angle.

In the embodiment illustrated by FIGURE 3, the projection member 17 is provided on the container neck and extends radially upward, while the cooperating member 19 is provided on the cap. FIGURE 4 shows an embodiment in which the projection member has its major dimension extending radially outwards from the cap. In other embodiments the projection may have its major dimension extending intermediate between the fully radial and the fully axial directions.

In all of the embodiments so far described the projection and cooperating members preferably are produced integrally with the cap or container as the case may be, e.g. by being moulded from plastic material, but in the embodiment illustrated by FIGURE 5 the projection member 17 is provided on a ring or band 23*a* adapted to embrace the cap 16, while the cooperating member 19 is provided on a similar ring or band 23*b* adapted to embrace the neck of the container 15. With such an arrangement either the cap, or the container, or both, may for example be of metal or glass, the bands being formed from a suitable plastic material and fastened to their respective component by press or force fitting or cementing, etc.

FIGURE 6 is intended to illustrate that the surfaces 18 and 20 need not in some embodiments be truly radially disposed with respect to the axis of rotation. These surfaces may also be inclined in the opposite direction, but the extent of such opposite inclination is limited in that beyond a certain inclination they will cooperate as ramp surfaces and no longer act as stop surfaces in accordance with the invention. The figure also illustrates that the surface 24 of the projection member may be formed as a ramp surface which may cooperate with or replace the ramp surface 21 of the cooperating member 19.

In the embodiment of FIGURE 7, the projection member 17 is provided with a part 25 which can readily be engaged by a finger or thumb of the user to assist in the manual deflection of the lower end of the member 17.

The embodiment of FIGURE 8 is intended principally for use with highly toxic materials and the projection member 17 is made so stiff that it cannot be deflected out of its general plane by hand alone, but must be levered out by means of a levering tool such as 26, which may for example be a pharmacists spatula. Accordingly, the part of the member 17 providing the surface 18 is so shaped and disposed relative to the neck of the container that a space 27 is provided for insertion of said tool 26.

The embodiments of FIGURES 9 to 12 show ways in which the safety device may be incorporated in a screw-topped container which is required to have a decorative appearance. In the embodiment of FIGURES 9 and 10 the projection member 17 is hidden behind one of a series of decorative scallops 28 surrounding the cap, while in that of FIGURE 11 the member 17 is struck out of the material of the cap. The container of FIGURE 12 is intended for liquids of relatively low toxicity, such as toilet preparations, with which it is desired that the safety device be manipulated relatively easily. To this end the projection member is provided with an extension 29, having a part 30 thereof engaging the outside of the container to form a pivot, and an end part 31 for engagement by the user's fingers. As the end part 31 is moved radially inwards towards the container 15 the surface 18 is moved radially outward until the cap can be removed without engagement between the surfaces 18 and 20.

Although in all the embodiments described herein the projection member 17 is illustrated as being integral with its associated cap, container or collar 22, and is movable to disengage the surfaces 18 and 20 against the resilience of the material of the member, it is contemplated that in other embodiments not illustrated herein this may not be the case. For example, it is also contemplated that the part of the projection member providing the surface 18 is pivoted to the remainder of the member and must be moved against the biasing force provided by a separate spring to disengage the surfaces and continue the opening rotation.

Other embodiments within the scope of the appended claims, comprising different combinations of the individual features herein disclosed, will be apparent to those skilled in the art.

What I claim is:

1. Means for preventing accidental removal of the cap from a screw-capped container wherein the cap and container are rotatable relative to one another about an axis from a fully-opened condition to a fully-closed condition, comprising a collar adapted for embracement of the cap and providing an axially and downwardly extending projection member having at least a part thereof providing a generally radially-extending surface, and a collar adapted for embracement of the container and pro-

viding a cooperating ramp member having a generally radially-extending surface engageable with the radially-extending projection surface after rotation of a predetermined extent from the fully-closed condition toward the fully-opened condition, such engagement preventing further rotation toward the fully-open condition, the said projection member being capable of and requiring manual deflection of the said part providing the radially-extending surface out of its general plane against the resilience of the material thereof for disengagement of the said surfaces to permit further relative rotation toward the fully-open condition, the said cooperating member providing a ramp surface adapted to engage the said part of the other member providing the radially-disposed surface upon rotation toward the fully-closed condition and to deflect the said projection part out of its general plane to permit rotation to the fully-closed condition.

2. A combination as claimed in claim 1, wherein said projection member has a first part thereof providing the said radially-extending engaging surface and another part thereof connecting the member to the cap, the said other part having at least a portion thereof of reduced dimensions to constitute a hinge portion between the said first part and the remainder of the other part, about which hinge portion the said deflection out of the general plane can take place.

3. In combination with a screw-capped container of the kind wherein the cap and the container are rotatable relative to one another about an axis from a fully-open condition to a fully-closed condition, means for preventing accidental removal of the cap comprising an axially and downwardly extending projection member on the cap and having at least a part thereof providing a generally radially-extending surface, and a cooperating member on the container having a generally radially-extending surface engageable with the radially-extending projection surface after rotation of a predetermined extent from the fully-closed condition toward the fully-open condition, such engagement preventing further rotation toward the fully-open condition, the said projection member being capable of and requiring manual deflection of the said part providing the radially-extending surface out of its general plane against the resilience of the material thereof for disengagement of the said surfaces to permit further relative rotation toward the fully-open condition, an extension of the said projection member constituting a lever arm adapted upon manual displacement thereof toward the container to cause the said deflection of the said part in the direction required to effect displacement of the radially-disposed surfaces.

4. In combination with a screw-capped container wherein the cap and the container are rotatable relative to one another about an axis from a fully-open condition in a closing direction for securing the cap on the container, and from a fully-closed condition in the opposite opening direction for removing the cap therefrom, means for preventing accidental removal of the cap from the container comprising a projection member on one of the cap and the container and a cooperating member on the other thereof, the said projection and cooperating members providing corresponding surfaces that are generally radially-disposed with respect to the said axis and are disposed and adapted to engage one another after rotation of a predetermined extent from the fully-closed condition in the said opening direction and upon such engagement to prevent further rotation in the opening direction, at least the one of the said projection and cooperating members carried by the cap having at least a part providing the said radially-disposed surface manually deflectable out of its general plane for disengagement of the said surface to permit the said further relative rotation in the opening direction, the said member carried by the cap comprising a first part thereof providing the said engaging surface and another part thereof connecting the member to the cap, the said another part having at least a portion thereof of reduced dimensions to constitute a hinge portion between the said first part and the remainder of the said another part, about which hinge portion the said deflection out of the general plane can take place.

5. In combination with a screw-capped container wherein the cap and the container are rotatable relative to one another about an axis from a fully-open condition in a closing direction for securing the cap on the container, and from a fully-closed condition in the opposite opening direction for removing the cap therefrom, means for preventing accidental removal of the cap from the container comprising a projection member on one of the cap and the container and a cooperating member on the other thereof, the said projection and cooperating members providing corresponding surfaces that are generally radially-disposed with respect to the said axis and are disposed and adapted to engage one another after rotation of a predetermined extent from the fully-closed condition in the said opening direction and upon such engagement to prevent further rotation in the opening direction, at least the one of the said projection and cooperating members carried by the cap having at least a part providing the said radially-disposed surface manually deflectable out of its general plane for disengagement of the said surfaces to permit the said further relative rotation in the opening direction, the said member having an extension thereof constituting a lever arm adapted upon manual displacement thereof in one direction to cause the deflection of the said part in the direction required to effect disengagement of the radially-disposed surfaces.

6. In combination with a screw-capped container wherein the cap and the container are rotatable relative to one another about an axis from a fully-open condition in a closing direction for securing the cap on the container, and from a fully-closed condition in the opposite opening direction for removing the cap therefrom, means for preventing accidental removal of the cap from the container comprising a projection member on one of the cap and the container and a cooperating member on the other thereof, the said projection and cooperating members providing corresponding surfaces that are generally radially-disposed with respect to the said axis and are disposed and adapted to engage one another after rotation of a predetermined extent from the fully-closed condition in the said opening direction and upon such engagement to prevent further rotation in the opening direction, at least the one of the said projection and cooperating members carried by the cap having at least a part providing the said radially-disposed surface manually deflectable out of its general plane for disengagement of the said surfaces to permit the said further relative rotation in the opening direction, the pitch of the screw-thread between the cap and the container and the axial extent of the said projection and cooperating members being such that the said radially-extending surfaces of the projection and cooperating members cannot again engage after a single turn from the fully-closed position.

7. In combination with a screw-capped container of the kind wherein the cap and the container are rotatable relative to one another about an axis from a fully-open condition to a fully-closed condition, means for preventing accidental removal of the cap comprising an axially and downwardly extending projection member on the cap and having at least a part thereof providing a generally radially-extending surface, and a cooperting member on the continer having a generally radially-extending surface engageable with the radially-extending projection surface after rotation of a predetermined extent from the fully-closed condition toward the fully-open condition, such engagement preventing further rotation toward the fully-open condition, the said projection member being capable of and requiring manual deflection of the said

part providing the radially-extending surface out of its general plane against the resilience of the material thereof for disengagement of the said surfaces to permit further relative rotation toward the fully-open condition, the said cooperating member providing a ramp surface adapted to engage the said part of the other member providing the radially-disposed surface upon rotation toward the fully-closed condition and to deflect the said projection part out of its general plane to permit rotation to the fully-closed condition, the pitch of the screw-thread between the cap and the container and the axial extent of the said projection and cooperating members being such that the said radially-extending surfaces of the projection and cooperating members cannot again engage after a single turn from the fully-closed position.

8. In combination with a screw-capped container of the kind wherein the cap and the container are rotatable relative to one another about an axis from a fully-open condition to a fully-closed condition, means for preventing accidental removal of the cap comprising an axially and downwardly extending projection member on the cap and having at least a part thereof providing a generally radially-extending surface, and a cooperating member on the container having a generally radially-extending surface engageable with the radially-extending projection surface after rotation of a predetermined extent from the fully-closed condition toward the fully-open condition, such engagement preventing further rotation toward the fully-open condition, the said projection member being capable of and requiring manual deflection of the said part providing the radially-extending surface out of its general plane against the resilience of the material thereof for disengagement of the said surfaces to permit further relative rotation toward the fully-open condition, the said projection member providing a ramp surface adapted to engage the said cooperating member upon rotation toward the fully-closed condition and to deflect itself out of its general plane to permit rotation to the fully-closed condition, the pitch of the screw-thread between the cap and the container and the axial extent of the said projection and cooperating members being such that the said radially-extending surfaces of the projection and cooperating members cannot again engage after a single turn from the fully-closed position.

9. In combination with a screw-capped container of the kind wherein the cap and the container are rotatable relative to one another about an axis from a fully-open condition to a fully-closed condition, means for preventing accidental removal of the cap comprising an axially and downwardly extending projection member on the cap and having at least a part thereof providing a generally radially-extending surface, and a cooperating member on the container having a generally radially-extending surface engageable with the radially-extending projection surface after rotation of a predetermined extent from the fully-closed condition toward the fully-open condition, the said such engagement preventing further rotation toward the fully-open condition, the said projection member being capable of and requiring manual deflection of the said part providing the radially-extending surface out of its general plane against the resilience of the material thereof for disengagement of the said surfaces to permit further relative rotation toward the fully-open condition, the said projection member being provided with a radially- and axially-extending surface for engagement by a manual operator to effect the said deflection of the part providing the radially-extending surface, the pitch of the screw-thread between the cap and the container and the axial extent of the said projection and cooperating members being such that the said radially-extending surfaces of the projection and cooperating members cannot again engage after a single turn from the fully-closed position.

10. In combination with a screw-capped container of the kind wherein the cap and the container are rotatable relative to one another about an axis from a fully-open condition to a fully-closed condition, means for preventing accidental removal of the cap comprising an axially and downwardly extending projection member on the cap and having at least a part thereof providing a generally radially-extending surface, and a cooperating member on the container having a generally radially-extending surface engageable with the radially-extending projection surface after rotation of a predetermined extent from the fully-closed condition toward the fully-open condition, such engagement preventing further rotation toward the fully-open condition, the said projection member being capable of and requiring manual deflection of the said part providing the radially-extending surface out of its general plane against the resilience of the material thereof for disengagement of the said surfaces to permit further relative rotation toward the fully-open condition, the said cooperating member providing a ramp surface adapted to engage the said part of the other member providing the radially-disposed surface upon rotation toward the fully-closed condition and to deflect the said projection part out of its general plane to permit rotation to the fully-closed condition, the said projection member having a first part thereof providing the said radially-extending engaging surface and another part thereof connecting the member to the cap, the said other part having at least a portion thereof of reduced dimensions to constitute a hinge portion between the said first part and the remainder of the other part, about which hinge portion the said deflection out of the general plane can take place.

11. In combination with a screw-capped container of the kind wherein the cap and the container are rotatable relative to one another about an axis from a fully-open condition to a fully-closed condition, means for preventing accidental removal of the cap comprising a radially outwardly extending projection member on the cap and having at least a part thereof providing a generally radially-extending surface, and a cooperating member on the container having a generally radially-extending surface engageable with the radially-extending projection surface after rotation of a predetermined extent from the fully-closed condition toward the fully-open condition, such engagement preventing further rotation toward the fully-open condition, the said projection member being capable of and requiring manual deflection of the said part providing the radially-extending surface out of its general plane against the resilience of the material thereof for disengagement of the said surfaces to permit further relative rotation toward the fully-open condition, the said cooperating member providing a ramp surface adapted to engage the said part of the other member providing the radially-disposed surface upon rotation toward the fully-closed condition and to deflect the said projection part out of its general plane to permit rotation to the fully-closed condition, the said projection member having a first part thereof providing the said radially-extending engaging surface and another part thereof connecting the member to the cap, the said other part having at least a portion thereof of reduced dimensions to constitute a hinge portion between the said first part and the remainder of the other part, about which hinge portion the said deflection out of the general plane can take place.

12. In combination with a screw-capped container of the kind wherein the cap and the container are rotatable relative to one another about an axis from a fully-open condition to a fully-closed condition, means for preventing accidental removal of the cap comprising an axially and downwardly extending projection member on the cap and having at least a part thereof providing a generally radially-extending surface, and a cooperating member on the container having a generally radially-extending surface engageable with the radially-extending projection surface after rotation of a predetermined extent from the fully-closed condition toward the fully-open condition, such engagement preventing further rotation toward the fully-open condition, the said projection member being capable

of and requiring manual deflection of the said part providing the radially-extending surface out of its general plane against the resilience of the material thereof for disengagement of the said surfaces to permit further relative rotation toward the fully-open condition, the said projection member providing a ramp surface adapted to engage the said cooperating member upon rotation toward the fully-closed condition and to deflect itself out of its general plane to permit rotation to the fully-closed condition, the said projection member having a first part thereof providing the said radially-extending engaging surface and another part thereof connecting the member to the cap, the said other part having at least a portion thereof of reduced dimensions to constitute a hinge portion between the said first part and the remainder of the other part, about which hinge portion the said deflection out of the general plane can take place.

13. In combination with a screw-capped container of the kind wherein the cap and the container are rotatable relative to one another about an axis from a fully-open condition to a fully-closed condition, means for preventing accidental removal of the cap comprising an axially and downwardly extending projection member on the cap and having at least a part thereof providing a generally radially-extending surface, and a cooperating member on the container having a generally radially-extending surface engageable with the radially-extending projection surface after rotation of a predetermined extent from the fully-

closed condition toward the fully-open condition, such engagement preventing further rotation toward the fully-open condition, the said projection member being capable of and requiring manual deflection of the said part providing the radially-extending surface out of its general plane against the resilience of the material thereof for disengagement of the said surfaces to permit further relative rotation toward the fully-open condition, the said projection member being provided with a radially- and axially-extending surface for engagement by a manual operator to effect the said deflection of the part providing the radially-extending surface, the said projection member having a first part thereof providing the said radially-extending engaging surface and another part thereof connecting the member to the cap, the said other part having at least a portion thereof of reduced dimensions to constitute a hinge portion between the said first part and the remainder of the other part, about which hinge portion the said deflection out of the general plane can take place.

References Cited by the Examiner

UNITED STATES PATENTS

2,827,193	3/1958	Martin	215—9
3,019,931	2/1962	Thornton	215—9

JOSEPH R. LECLAIR, *Primary Examiner.*

FRANKLIN T. GARRETT, *Examiner.*