Sept. 30, 1952 A. W. BARRY 2,612,162

SCARIFYING APPLICATOR

Filed May 15, 1950

FIG.1.

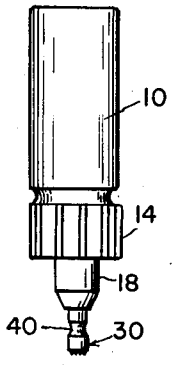


FIG.2.

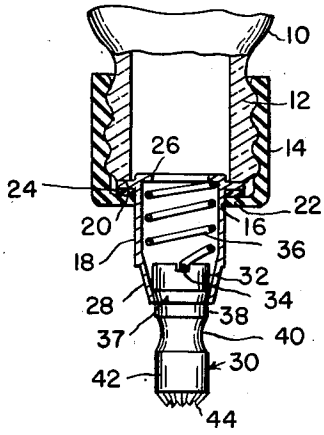


FIG.3.

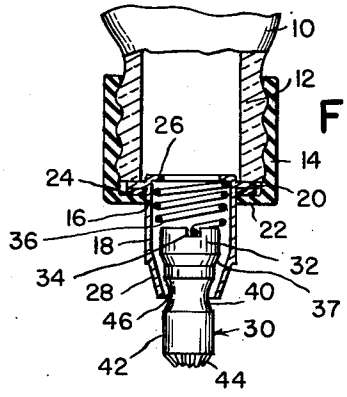


FIG.4.

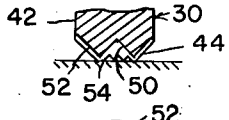
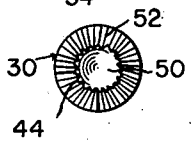


FIG.5.



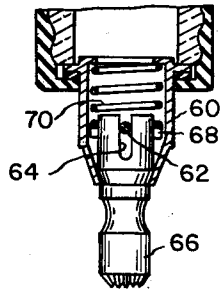


FIG.6.

INVENTOR.

AARON W. BARRY

BY Whittemore, Hulbert & Belknap

ATTORNEYS

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SCARIFYING APPLICATOR

Aaron W. Barry, Grosse Pointe Farms, Mich.

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6 Claims. (Cl. 128—253)

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The present invention relates to a scarifying applicator, and more particularly to one which is adapted to contain a liquid such as a vaccine or serum to be applied through the skin.

It is an object of the present invention to provide a scarifying applicator comprising a container for the liquid to be applied in combination with a scarifier relatively movable thereto and adapted upon such relative movement to release liquid for application to the scarified zone.

More specifically, it is an object of the present invention to provide a scarifying applicator comprising a container, a scarifying applicator movable longitudinally of the container, and valve means associated therewith for releasing a substantially predetermined amount of liquid upon movement of the scarifier relative to the container.

Other objects and features of the invention will become apparent as the description proceeds, especially when taken in conjunction with the accompanying drawings, wherein:

Figure 1 is a side elevation of the scarifier in operating position.

Figure 2 is an enlarged section through the scarifier and associated mechanism illustrating the scarifier implement in operative position.

Figure 3 is a view similar to Figure 2 showing the scarifier in an intermediate position.

Figure 4 is an enlarged fragmentary section through the operating end of the scarifying implement.

Figure 5 is a bottom plan view of the end of the scarifying implement.

Figure 6 is a view similar to Figure 2 showing a second embodiment of the invention.

Referring now to the drawings, the scarifying applicator comprises a container 10 which may be an ordinary small glass bottle having a threaded neck 12. A screw cap 14 is provided having a central opening 16 therethrough.

Located within the opening is a sleeve 18 having a radially outwardly extending flange 20 adapted to be clamped against the neck 12 of the bottle by the inwardly extending flange 22 of the cap. A suitable sealing gasket is indicated at 24. The sleeve 18 at its inner end has an inturned annular flange or spring seat 26, and adjacent its outer end it is inwardly tapered to provide a restricting flange 28.

Longitudinally movable within the sleeve 18 is a plunger 30 having an enlarged head 32 provided with a slot 34 for receiving one end of a coil compression spring 36. The slot 34 and the end of spring 36 received therein constitute

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means for preventing relative rotation between the plunger 30 and spring 36. The other end of the compression spring 36 is engaged on the spring seat 26. The convolutions of the spring are closely adjacent to the inner wall of sleeve 18.

At its forward end the head 32 includes a conically tapered portion 37 adapted to engage the inner surface of the tapered portion or flange 28 of the sleeve. This tapered portion serves the double function of providing a stop limiting outward movement of the plunger and also providing an effective seal against the escape of liquid contained in the bottle 10.

Outwardly from the conically tapered portion 37 the plunger has a first cylindrical portion 38, a reduced portion 40, and a second cylindrical portion 42. At its extreme outer end the scarifying teeth 44 are provided.

The coil compression spring 36 is freely rotatable within the sleeve 18 when a force tending to rotate the spring is applied in a direction to wind up the spring. However, when a force is applied tending to rotate the spring in the opposite direction the spring expands and frictionally grips the inner surface of the sleeve. This results in preventing rotation of the scarifying element or plunger in one direction while permitting its rotation in the other direction.

Inward movement of the plunger 30 is limited by the compression spring. Preferably, the spring is so selected that when the plunger has moved inwardly the desired amount, the convolutions of the spring are in contact and form a substantially rigid abutment.

When the implement is applied to the skin and pressure is applied thereto, the plunger 30 moves inwardly to the position illustrated in Figure 3. At this time it will be observed that the annular reduced portion 40 of the plunger has clearance with respect to the tapered open end of the sleeve 18, thus defining a passage 46 for the escape of fluid. Further movement of the plunger inwardly moves the reduced portion 40 inwardly of the outer end of the restricting flange 28 and brings the outer cylindrical portion 42 into the end of the sleeve 18 and brings adjacent convolutions of spring 36 into abutment, thus effectively sealing the opening against the escape of further liquid, and supporting the plunger for the application of pressure against the skin of the patient.

Reference is now made to Figures 4 and 5. In these figures the scarifying end of the plunger 30 is indicated. The end of the plunger 30 is pro-

vided with a conical recess **50**. Outwardly from the conical recess beveled teeth **52** are provided which intercept the central conical recess **50** to provide the sharp points indicated at **54**. As pressure is applied to the scarifier the pointed teeth **54** first engage the skin. As more pressure is applied the skin is forced upwardly into the conical recess **50**, thus causing the skin to be drawn radially inwardly over the points **54**. At the same time the bottle **10** is rotated and this rotation is imparted to the plunger **30** thus causing the pointed teeth to move in a circular arc. The operation as above described scarifies the skin and permits the serum or vaccine released during the operation to be effective.

Referring now to Figure 6 there is illustrated a somewhat different embodiment of the present invention. In this case the construction is the same except that the sleeve **60** is provided with a cross pin **62** extending into a slot **64** located in the upper end of the plunger **66**. Thus rotation of the sleeve **60** in either direction will result in corresponding rotation of the scarifier. At the same time the plunger **60** is provided with pins or similar elements **68** against which the compression spring **70** engages to urge the plunger to its normal outward position.

The drawings and the foregoing specification constitute a description of the improved scarifying applicator in such full, clear, concise and exact terms as to enable any person skilled in the art to practice the invention, the scope of which is indicated by the appended claims.

What I claim as my invention is:

1. A scarifying applicator comprising a container, an apertured cap therefor, a sleeve extending through said cap and having a radially extending flange to be clamped against the container by said cap, said sleeve having an annular spring seat at its inner end and an inwardly tapered outer end, a headed plunger in said sleeve, the head of said plunger seating against the tapered end of said sleeve, the inner end of said plunger having a slot therein, a compression spring on said seat having one end received in said slot, said plunger having a generally cylindrical body normally closing the outer end of said sleeve, and a reduced portion intermediate its ends having clearance with the outer end of said sleeve upon motion of said plunger inwardly of said sleeve, and scarifying teeth on the outer end of said plunger.

2. A scarifying applicator comprising a container, an apertured closure for said container, said closure including a tubular sleeve having an inwardly extending restricting flange at its outer end and a spring seat located inwardly from its outer end, a plunger slidable in said tubular sleeve and having a headed inner end adapted to engage the restricting flange to limit outward movement of said plunger, said plunger having a cylindrical shank dimensioned to fit tightly within said restricting flange to seal said tubular sleeve, an annular reduced portion intermediate the ends of said shank permitting flow of fluid out of said container when in registry with said restricting flange, the outer end of said plunger comprising scarifying elements thereon operable by pressure axially of said plunger and by rotation of said plunger, a coil spring in said tubular sleeve having one end on said spring seat and its other end engaging said plunger, means preventing relative rotation between said plunger and the end of said spring in engagement therewith, the convolutions of said spring being closely adjacent to the inner wall of said tubular sleeve, the end of said spring on said spring seat being in frictional engagement therewith, whereby initial rotation of said plunger in a direction to unwind said spring expands said spring laterally into tight frictional engagement with said wall and thereby locks said plunger against further rotation.

3. A scarifying applicator comprising a container, an apertured closure for said container, said closure including a tubular sleeve having an inwardly extending restricting flange at its outer end and a spring seat located inwardly from its outer end, a plunger slidable in said tubular sleeve and having a headed inner end adapted to engage the restricting flange to limit outward movement of said plunger, said plunger having a cylindrical shank dimensioned to fit tightly within said restricting flange to seal said tubular sleeve, an annular reduced portion intermediate the ends of said shank permitting flow of fluid out of said container when in registry with said restricting flange, the outer end of said plunger comprising scarifying elements thereon operable by pressure axially of said plunger and by rotation of said plunger, a coil spring in said tubular sleeve having one end on said spring seat and its other end engaging said plunger, means preventing relative rotation between said plunger and the end of said spring in engagement therewith, the convolutions of said spring being closely adjacent to the inner wall of said tubular sleeve, the end of said spring on said spring seat being in frictional engagement therewith, whereby initial rotation of said plunger in a direction to unwind said spring expands said spring laterally into tight frictional engagement with said wall and thereby locks said plunger against further rotation, the convolutions of said spring being spaced apart a distance such that inward movement of said plunger to a position where its annular reduced portion is located inwardly of said restricting flange causes adjacent convolutions to abut to provide a substantially rigid abutment preventing further inward movement of said plunger.

4. In apparatus of the character described, a sleeve having a first inwardly extending flange at its inner end forming a spring seat, a cylindrical intermediate portion, and a second inwardly extending flange at its outer end forming a plunger guide, a plunger having a cylindrical shank fitting closely within said guide and having a head at its inner end within said sleeve engageable with said second flange to limit movement of said plunger outwardly from said sleeve, a reduced portion intermediate the ends of said shank defining a fluid flow passage with said second flange when in registry therewith, a cylindrical coiled spring in said sleeve having its inner end seated in frictional contact on said spring seat and its outer end engaging the inner end of said plunger, means preventing relative rotation between said plunger and the outer end of said spring, the convolutions of said spring being closely adjacent to the inner wall of said sleeve, whereby expansion of the spring due to rotation of said plunger in a direction to unwind the spring causes the spring to lock by friction against the inner wall of said sleeve.

5. In apparatus of the character described, a sleeve having a first inwardly extending flange at its inner end forming a spring seat, a cylindrical intermediate portion, and a second inwardly extending flange at its outer end forming a plunger

guide, a plunger having a cylindrical shank fitting closely within said guide and having a head at its inner end within said sleeve engageable with said second flange to limit movement of said plunger outwardly from said sleeve, a reduced portion intermediate the ends of said shank defining a fluid flow passage with said second flange when in registry therewith, a cylindrical coiled spring in said sleeve having its inner end seated in frictional contact on said spring seat and its outer end engaging the inner end of said plunger, means preventing relative rotation between said plunger and the outer end of said spring, the convolutions of said spring being spaced apart a distance such that adjacent convolutions abut upon inward movement of said plunger an amount sufficient to cause the reduced portion of its shank to move inwardly beyond said second flange.

6. In apparatus of the character described, a sleeve having a first inwardly extending flange at its inner end forming a spring seat, a cylindrical intermediate portion, and a second inwardly extending flange at its outer end forming a plunger guide, a plunger having a cylindrical shank fitting closely within said guide and having a head at its inner end within said sleeve engageable with said second flange to limit movement of said plunger outwardly from said sleeve, a reduced portion intermediate the ends of said shank defining a fluid flow passage with said second flange when in registry therewith, a cylindrical coiled spring in said sleeve having its inner

end seated in frictional contact on said spring seat and its outer end engaging the inner end of said plunger, means preventing relative rotation between said plunger and the outer end of said spring, the convolutions of said spring being closely adjacent to the inner wall of said sleeve, whereby expansion of the spring due to rotation of said plunger in a direction to unwind the spring causes the spring to lock by friction against the inner wall of said sleeve, the convolutions of said spring being spaced apart a distance such that adjacent convolutions abut upon inward movement of said plunger an amount sufficient to cause the reduced portion of its shank to move inwardly beyond said second flange.

AARON W. BARRY.

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