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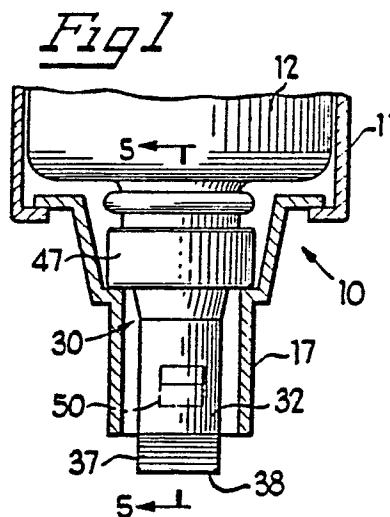
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54 **Discharge assembly for liquid soap dispenser.**

57 A dispenser (10) for liquid soap containing grit includes a cylindrical, flexible, resilient nipple (31) mountable on a soap container (12) in communication with the outlet opening (16) thereof, and clamping therebetween a check valve assembly (40) including a slitted flexible membrane (45). The nipple has a duckbill-shaped tip (38) with a discharge slit (39) therein. Soap (20) fills the nipple. For dispensing soap, an actuator (50) laterally compresses the nipple in directions perpendicular to its longitudinal axis and to the discharge slit. The increased pressure in the nipple holds the check valve closed and ejects soap from the discharge slit. When the actuator is released the nipple expands to its normal position, closing the discharge slit and opening the check valve to draw a new charge of soap into the nipple.



DISCHARGE ASSEMBLY FOR LIQUID SOAP DISPENSER

Background of the Invention

The present invention relates to apparatus for dispensing liquid soap, normally in discrete small quantities or charges. The invention has particular application to the dispensing of liquid soap containing grit for scouring purposes.

One type of soap dispenser is disclosed in my U.S. Patent No. 4,018,363 and includes a flexible pump bowl which receives soap from a container through a diaphragm-type check valve. When the bowl is compressed it closes the check valve and forces the soap in the bowl out through a passageway to a discharge outlet. This structure is relatively complex and is not well suited to the dispensing of soap containing grit, since the grit tends to clog the passageways in the device.

A similar type of dispenser using a compressible pump bowl or nipple is disclosed in U.S. Patent No. 1,326,880, the dispenser ejecting soap directly from a slit in the pump nipple. This dispenser utilizes a custom-made check valve stopper in the soap container outlet, and depends on distortion of the slit in the nipple for dispensing of soap therefrom. Thus, the nipple is compressed in the direction of the slit. This has the disadvantage that the slit can be opened permitting soap to drip therefrom before pressure in the nipple has been raised sufficiently to close the check valve.

Summary of the Invention

It is a general object of the invention to provide an improved discharge assembly for a liquid soap dispenser which avoids the disadvantages of prior devices while affording additional structural and operating advantages.

An important object of the invention is the provision of a discharge assembly for a liquid soap dispenser which is suitable for dispensing liquid soap containing grit.

Another object of the invention is the provision of a discharge assembly of the type set forth, which is of simple and economical construction, and is characterized by ease of assembly.

Still another object of the invention is the provision of a discharge assembly of the type set forth, which is dependent upon an increase in pressure within a discharge nipple for operation of the discharge assembly.

It is another object of the invention to provide a liquid soap dispenser which includes a discharge assembly of the type set forth.

These and other objects of the invention are attained by providing a discharge assembly for a liquid soap dispenser including a liquid soap container having an outlet opening, the discharge assembly comprising: an elongated flexible resilient nipple having a normal expanded condition defining a discharge chamber for accommodating a charge of liquid soap and having a longitudinal axis, the nipple having an inlet opening at one end thereof and being provided at the other end thereof with a normally closed discharge slit extending generally perpendicular to the axis, means mounting the nipple on the container with the inlet opening disposed in registry with the container outlet opening, and check valve means disposed between the inlet opening and the container outlet opening, the nipple being laterally compressible in a direction substantially perpendicular to the axis and to the discharge slit to a compressed condition, movement of the nipple to the compressed condition thereof raising the pressure in the discharge chamber for closing the check valve and ejecting liquid soap from the discharge slit, movement of the nipple back to the expanded condition thereof lowering the pressure in the discharge chamber for closing the discharge slit and opening the check valve to draw a new charge of liquid soap into the discharge chamber.

The invention consists of certain novel features and a combination of parts hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the details may be made without departing from the spirit, or sacrificing any of the advantages of the present invention.

Brief Description of the Drawings

For the purpose of facilitating an understanding of the invention, there is illustrated in the accompanying drawings a preferred embodiment thereof, from an inspection of which, when considered in connection with the following description, the invention, its construction and operation, and many of its advantages should be readily understood and appreciated.

FIG. 1 is a fragmentary, sectional view of a liquid soap dispenser including a discharge assembly constructed in accordance with and embodying the features of the present invention;

FIG. 2 is a perspective view of the discharge assembly of FIG. 1;

FIG. 3 is an exploded perspective view of the discharge assembly of FIG. 2, rotated 180 degrees;

FIG. 4 is an enlarged sectional view of the discharge assembly of FIG. 2, taken along the line 4-4 therein;

FIG. 5 is an enlarged fragmentary view in vertical section taken along the line 5-5 in FIG. 1, and illustrating the discharge assembly in its normal rest position;

FIG. 6 is a view similar to FIG. 5, illustrating the discharge assembly in its compressed discharge position;

FIG. 7 is a view similar to FIGS. 5 and 6, illustrating the discharge assembly in its recharging condition;

FIG. 8 is an enlarged bottom plan view of the discharge assembly in FIG. 5; and

FIG. 9 is a view similar to FIG. 8, illustrating the discharge assembly in its compressed condition of FIG. 6.

Description of the Preferred Embodiment

Referring to FIGS. 1 and 5, there is illustrated a liquid soap dispenser, generally designated by the numeral 10, including a discharge assembly 30, constructed in accordance with and embodying the features of the present invention. The dispenser 10 includes a housing 11, which may be mounted by suitable means (not shown) on a wall or other support surface, and in which is disposed a container 12 of liquid soap. The container 12 may be in the form of a bottle or the like which is replaceably mounted in the housing 11, so that when it is empty it can be replaced with a full container. The container 12 has a cylindrical neck 13 at its lower end provided with an annular flange 14 extending radially outwardly therefrom around the circumference thereof. The neck 13 has a flat annular end surface 15 at its distal end and defines a cylindrical outlet opening 16 of the container 12. The housing 11 includes a generally cylindrical retainer 17 which is disposed for substantially enclosing the neck 13 and the associated discharge assembly 30, the retainer 17 having an opening 18 in the side thereof for a purpose to be explained more fully below.

The container 12 contains liquid soap 20, which is preferably of the type container particles 21 of grit suspended therein, the grit particles 21 being of a suitable material for providing an abrasive or scouring function, in a known manner.

Referring now also to FIGS. 2 through 4 of the drawings, the discharge assembly 30 includes an elongated, generally circularly cylindrical nipple 31 formed of a suitable flexible, resilient material, such

as rubber. The nipple 31 has a cylindrical side wall 32 provided at one end thereof with a radially outwardly extending annular flange 33, integral at the outer periphery thereof with an upstanding cylindrical wall 34 which defines an inlet opening into the nipple 31. The cylindrical wall 34 has an annular groove 35 formed on the inner surface thereof adjacent to the flange 33, the wall 34 also being provided with two diametrically opposed and axially extending part-cylindrical notches 35a communicating with the groove 35. The nipple 31 defines a discharge chamber 36 therein, and is provided at its distal end with a pair of radially inwardly sloping concave walls 37 which cooperate to form a flat, narrow duckbill-shaped tip 38 at the distal end of the nipple 31 closing the discharge chamber 36. Formed in the tip 38 and extending longitudinally thereof, substantially diametrically of the nipple 31, is an elongated discharge slit 39, which is normally held closed by the resilient bias of the nipple 31.

Seated in the upper end of the nipple 31 is a valve assembly 40, which includes a circular backing disk 41 which is disposed in the groove 35 and has a circular opening 42 formed therethrough centrally thereof. Also disposed in the groove 35 and seated on the annular flange 33 beneath the backing disk 41 is a circular membrane 45 formed of a suitable flexible resilient material impermeable to liquid soap. The membrane 45 has a straight-line slit 46 formed therein extending substantially diametrically thereof in registry with the opening 42 in the backing disk 41. It will be appreciated that the notches 35a in the nipple wall 34 facilitate flexure thereof to permit insertion of the backing disk 41 and the membrane 45 in the groove 35.

In use, when the discharge assembly 30 has been assembled as described above, it is mounted on the container 12. More specifically, the cylindrical wall 34 is fitted over the distal end of the neck 13 in surrounding relationship therewith, until the wall 34 abuts the flange 14, and the end surface 15 of the neck 13 engages the upper surface of the backing disk 41, as illustrated in FIG. 5. In this mounted configuration, the check valve assembly 40 is disposed for controlling the flow of liquid soap between the outlet opening of the container 12 and the inlet opening of the nipple 31. A generally cylindrical retaining clip 47 is then applied to hold the discharge assembly 30 in place on the neck 13, the clip 47 having parallel, spaced-apart, annular upper and lower flanges 48 and 49, respectively engaging the outer surfaces of the flanges 14 and 33, securely to clamp the cylindrical wall 34 of the nipple 31 against the flange 14 of the neck 13. Preferably, the retainer 17 is detachable from the housing 11 to facilitate mounting of the discharge assembly 30. There is also provided an actuator 50 which is carried by the housing 11 by

suitable means (not shown). The actuator 50 projecting through the opening 18 in the retainer 17 for engagement with the outer surface of the nipple 31, as indicated in FIGS. 1 and 5.

Referring now also to FIGS. 6-9, the operation of the dispenser 10 and the discharge assembly 30 will be explained. Preferably, the discharge assembly 30 is assembled on the container 12 when the neck 13 is disposed upwardly. Then, after assembly, the container 12 is inverted and mounted in the housing 11, as indicated in FIG. 1, with the nipple 31 projecting downwardly through and from the bottom of the retainer 17. The nipple 31 is oriented so that the discharge slit 39 is substantially parallel to the opening 18 in the retainer 17, so that the actuator 50 engages the nipple 31 toward one side of the slit 39, rather than at an end thereof.

The container 12 may be vented, so that atmospheric pressure plus the weight of the liquid soap 20 on the membrane 45 will force the slit 46 open, allowing liquid soap to flow through the opening 42 in the backing disk 41 and through the slit 46 into the discharge chamber 36 in the nipple 31. This flow will continue until the discharge chamber 36 is filled, at which point the pressure on the opposite sides of the membrane 45 will be equalized, thereby allowing the slit 46 to close in an equilibrium condition, illustrated in FIG. 5. The nipple 31 is so constructed that in this normal equilibrium condition, the natural resilient bias of the nipple 31 will hold the discharge slit 39 closed against the weight of the charge of liquid soap 20 contained in the discharge chamber 36.

When it is desired to dispense a charge of liquid soap, a user operates the actuator 50 for compressing the side of the nipple 31 in the direction of the arrows in FIGS. 6, 8 and 9. This compression of the cylindrical wall 32 of the nipple 31 raises the pressure in the discharge chamber 36, so that it holds the slit 46 of the valve assembly 40 closed, and forces the ejection of a charge 55 of liquid soap from the discharge slit 39, as illustrated in FIGS. 6 and 9.

When the actuator 50 is released, it will return to its normal rest position under the urging of suitable bias means (not shown), and the compressed wall of the nipple 31 will tend to return to its normal expanded condition, illustrated in FIG. 7, as a result of the natural resilience of the nipple 31. This reexpansion of the nipple 31 will lower the pressure therein to a pressure below that in the container 12, so as to allow the discharge slit 39 to reclose and to open the valve assembly slit 46 and draw in a new charge of liquid soap from the neck

13, as indicated in FIG. 7. When the discharge chamber 36 is filled, the discharge assembly 30 returns to its equilibrium position, illustrated in FIGS. 5 and 8.

It will be appreciated that, because the actuator 50 engages the nipple 31 in a direction perpendicular to the longitudinal axis thereof and perpendicular to the direction of the slit 39, the initial compression of the nipple 31 will not cause the discharge slit 39 to be directly distorted into an open condition, as would be the case if the nipple 31 were to be compressed from an end of the slit 39. Thus, liquid soap cannot be discharged from the discharge slit 39 until the pressure within the discharge chamber 36 has been raised sufficiently to force the ejection of liquid soap through the discharge slit 39, at which pressure the valve slit 46 will be held closed.

Because the liquid soap 20 is discharged directly from the nipple 31, there are no narrow passages to be clogged by the grit particles 21. Furthermore, the pumping action of the nipple 31 during the discharge operation serves to flush accumulated grit particles 21 from the discharge chamber 36 during each dispensing operation.

In a model of the present invention, the nipple 31 is of unitary, one-piece construction, and may be formed by molding. The container 12 may be formed of a suitable plastic, and the housing 11, the retainer 17 and the actuator 50 may be formed of plastic or metal. It will be appreciated that the discharge assembly 30 can readily be assembled and mounted on the container 12 without the use of tools.

From the foregoing it can be seen that there has been provided an improved liquid soap dispenser and discharge assembly therefor, which is of simple and economical construction, and is uniquely suited for the discharge of liquid soap containing grit particles without clogging, and without leakage of soap from the discharge apparatus until the check valve thereof has been closed.

Claims

1. A discharge assembly for a liquid soap dispenser including a liquid soap container having an outlet opening, said discharge assembly comprising: an elongated flexible resilient nipple having a normal expanded condition defining a discharge chamber for accommodating a charge of liquid soap and having a longitudinal axis, said nipple having an inlet opening at one end thereof and being provided at the other end thereof with a normally closed discharge slit extending generally perpendicular to said axis, means mounting said nipple on the container with said inlet opening

disposed in registry with the container outlet opening, and check valve means disposed between said inlet opening and the container outlet opening, said nipple being laterally compressible in a direction substantially perpendicular to said axis and to said discharge slit to a compressed condition, movement of said nipple to the compressed condition thereof raising the pressure in said discharge chamber for closing said check valve and ejecting liquid soap from said discharge slit, movement of said nipple back to the expanded condition thereof lowering the pressure in said discharge chamber for closing said discharge slit and opening said check valve to draw a new charge of liquid soap into said discharge chamber.

2. The discharge assembly of claim 1, wherein said nipple is substantially circularly cylindrical in shape.

3. The discharge assembly of claim 2, wherein said discharge slit extends diametrically of said nipple.

4. The discharge assembly of claim 3, wherein the distal end of said nipple is generally duckbill-shaped, including sloping wall portions which converge to a thin flat rectangular tip, said discharge slit being formed in said tip.

5. The discharge assembly of claim 1, wherein said check valve means includes a diaphragm extending across said inlet opening and having a valve slit formed therein centrally thereof.

6. The discharge assembly of claim 5, wherein said check valve means further includes a flat backing disk overlying said membrane and having an opening therein centrally thereof disposed in registry with said valve slit.

7. The discharge assembly of claim 1, wherein said nipple includes a mounting portion extending therefrom adjacent to one end thereof for coupling to the soap container in surrounding relationship with the outlet opening.

8. The discharge assembly of claim 7, and further including attachment means for securing said mounting portion to the container.

9. A liquid soap dispenser comprising a liquid soap container having an outlet opening, an elongated flexible resilient nipple having a normal expanded condition defining a discharge chamber for accommodating a charge of liquid soap and having a longitudinal axis, said nipple having an inlet opening at one end thereof and being provided at the other end thereof with a normally closed discharge slit extending generally perpendicular to said axis, means mounting said nipple on said container with said inlet opening disposed in registry with said container outlet opening, check valve means disposed between said inlet opening and said container outlet opening, and actuating means engageable with said nipple for effecting lateral

compression thereof in a direction substantially perpendicular to said axis and to said slit to a compressed condition, movement of said nipple to the compressed condition thereof raising the pressure in said discharge chamber for closing said check valve and ejecting liquid soap from said discharge slit, movement of said nipple back to the expanded condition thereof lowering the pressure in said discharge chamber for closing said discharge slit and opening said check valve to draw a new charge of liquid soap into said discharge chamber.

10. The liquid soap dispenser of claim 9, and further including a housing accommodating said soap container therein.

11. The liquid soap dispenser of claim 10, wherein said housing includes an outlet portion accommodating said nipple therein.

12. The liquid soap dispenser of claim 11, wherein said outlet portion has an opening therein accommodating said actuating means.

13. The liquid soap dispenser of claim 9, wherein said nipple is substantially circularly cylindrical in shape.

14. The liquid soap dispenser of claim 13, wherein said discharge slit extends diametrically of said nipple.

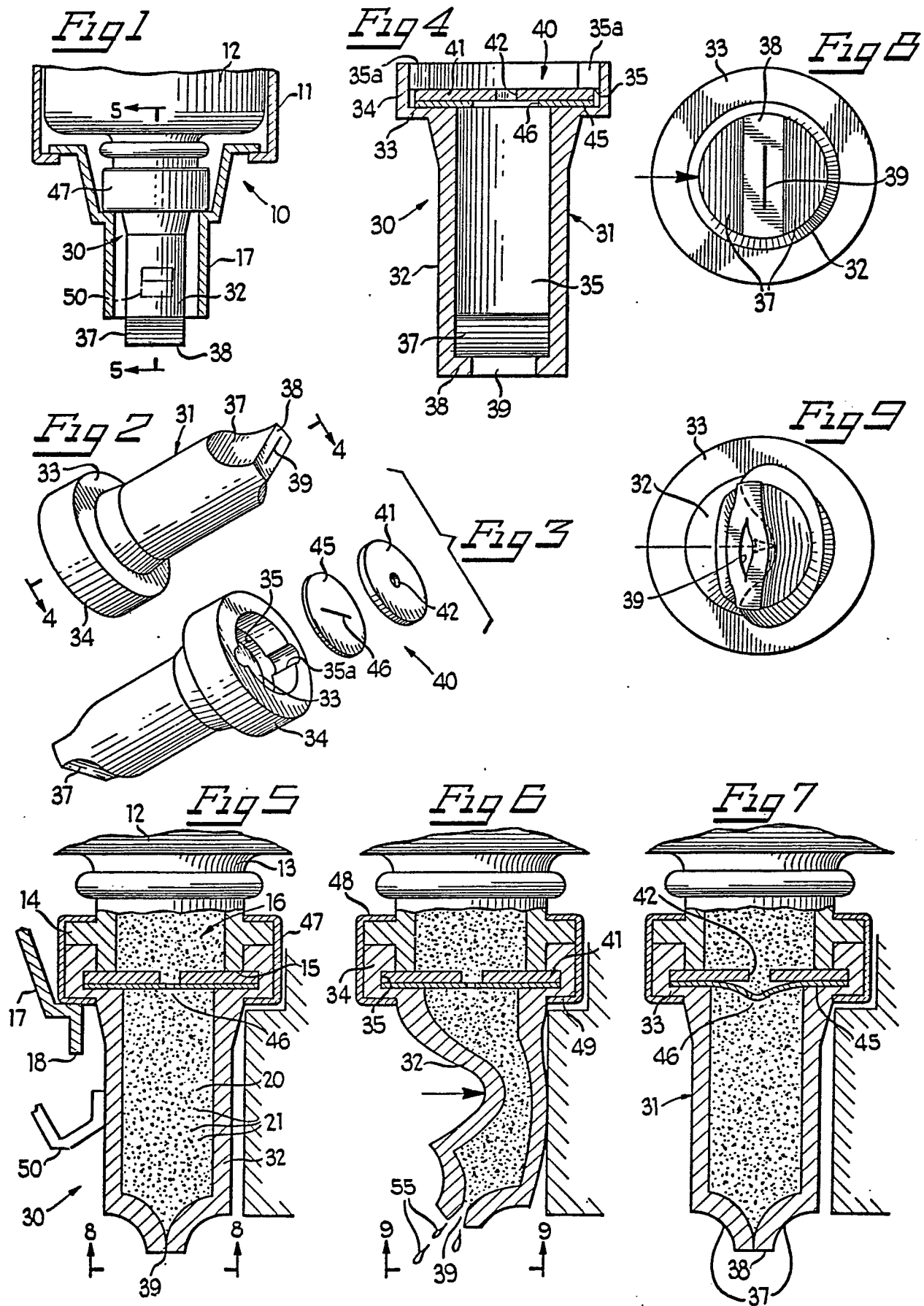
15. The liquid soap dispenser of claim 14, wherein the distal end of said nipple is generally duckbill-shaped, including sloping wall portions which converge to a thin flat rectangular tip, said discharge slit being formed in said tip.

16. The liquid soap dispenser of claim 9, wherein said check valve means includes a diaphragm extending across said inlet opening and having a valve slit formed therein centrally thereof.

17. The liquid soap dispenser of claim 16, wherein said check valve means further includes a flat backing disk overlying said membrane and having an opening therein centrally thereof disposed in registry with said valve slit.

18. The liquid soap dispenser of claim 9, wherein said nipple includes a mounting portion extending therefrom adjacent to one end thereof for coupling to the soap container in surrounding relationship with the outlet opening.

19. The liquid soap dispenser of claim 18, and further including attachment means for securing said mounting portion to the container.





EP 86 30 0742

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	FR-A-1 206 034 (NEWTON) * Page 2, column 1, lines 32-58; column 2, lines 1-58; page 3, column 1, lines 1-53; column 2, lines 1,2; figures 1,2 *	1-3	A 47 K 5/12
A	---	5-14, 16,17	
A	FR-A-1 399 087 (ROMA) * Page 2, column 1, lines 6-58; column 2, lines 1-38; figures 1-4 *	1-5,9, 13-16	
A	--- US-A-4 560 093 (CASSIA) * Column 2, lines 21-68; column 3, lines 1-40; figures 1-4 *	1,2,9	TECHNICAL FIELDS SEARCHED (Int. Cl.4)
	-----		A 47 K 5
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 25-09-1986	Examiner SCHOLS W.L.H.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	