

TREATMENT DEVICE AND METHOD OF USING THE SAME

The present invention relates to a treatment device and method of using the same, and more particularly, but not exclusively, to a container assembly and method of using the assembly for the treatment of fingernail and toenail conditions.

Onychauxis is an abnormal thickening of the toenail, increasing from the nail base to the free edge of the nail. It may be accompanied by yellow or slight brown colour changes in the nail plate and the nail may also become ridged. Often only the nail of the hallux (commonly known in humans as the big toe) is affected, but the condition may affect other nails as well. The excessive growth makes nail cutting difficult and makes the affected nail cosmetically unattractive. Pressure on the thickened nail, for example from shoes, may also cause pain and discomfort.

Onychauxis occurs following damage to the nail matrix, for which there may have been one or more of several causes:

- A single major trauma from a heavy blow or severe stubbing or repeated minor trauma from shallow shoes or pressure from footwear.
- Dermatological conditions such as eczema or psoriasis
- Poor peripheral circulation
- Systemic conditions such as Darier's disease (keratosis follicularis)

Trauma to the nail matrix results in the excessive production of onychocytes and the nail becomes progressively thicker as it grows along the nail bed. The proximal nail fold becomes shortened and unable to exert pressure on newly formed cells in order to flatten them as in a normal nail plate. Evidence also suggests that there is a greater vascularity in the nail fold and nail matrix areas. The nail matrix also produces an epidermal type of keratin with increased thickness of the nail plate and results in a thicker but softer intermediate nail layer.

Onychogryphosis is a more substantial thickening of the nail and is usually accompanied by significant nail curvature. As with Onychauxis, it is usually the result of damage to the nail matrix, sometimes accompanied by a long-term fungal infection. It is also commonly seen in the hallux but may occur in other toes as well as the fingernails. The affected nail is usually discoloured (brownish), grooved and ridged, and grows more quickly on one side than on the other leading to curvature.

A wide variety of toenail treatments are currently available that claim to neutralise, cover up or prevent toenail discolouration caused by keratin debris build-up, thickening of the nail or staining by nitrocellulose-based varnishes. A full treatment regime for optimum effectiveness should incorporate the following:

- Debridement of thickened nail keratin
- Chemical removal of discoloured keratin and/or bleaching of discoloured keratin
- Nail protection and masking of discolouration with a varnish covering

No single prior art treatment device allows for all three of these stages to be completed.

It is an object of the present invention to provide a container assembly and method which allows a more convenient treatment of fingernail and toenail conditions.

A first aspect of the present invention provides a container assembly comprising first and second containers and a closure element common to the containers, wherein each container comprises an opening for permitting access to the interior thereof, and wherein the assembly further comprises means for selectively securing each container to the closure element independently of the other container so as to close the opening of the container so secured, the closure element comprising a first applicator associated with the first container and a second applicator associated with the second container, wherein each applicator

extends through the opening of the associated container when said opening is closed by the closure element.

One of the two containers may be used to contain a composition for the chemical removal of discoloured keratin and/or bleaching of discoloured keratin. The other of the containers may contain a covering to protect a nail and possibly to also mask discolouration. It will be understood that, in use, a first container may be removed from the remainder of the container assembly. The contents of this container may then be applied to a nail with the first applicator. The second container may remain secured to the closure element and held by a user to allow the user to more readily manipulate the first applicator. Once the contents of the first container has been applied to a nail, the first container may be closed by again securing it to the closure element. The second container may then be removed from the closure element and the contents thereof applied to the nail with the second applicator. The first container may be held during this process so as to allow a more ready manipulation of the second applicator. Once the contents of the second container has been applied to the nail, the second container may be closed by again securing it to the closure element. The quantity of composition held in the first and second containers may be such that this process may be repeated several times on the same nail and/or on other nails.

Further features of the first aspect of the present invention are provided as recited in any of the appended dependent claims 2 to 12.

A second aspect of the present invention provides a method as recited in the appended claim 13.

A third aspect of the present invention provides a method as recited in the appended claim 14.

Further features of the second and third aspects of the present invention are provided as recited in any of the appended dependent claims 15 to 17.

A fourth aspect of the present invention provides a container assembly as recited in the appended independent claim 18.

Further features of the fourth aspect of the present invention are provided as recited in any of the appended dependent claims 19 to 31.

Embodiments of the present invention will now be described with reference to the following drawings, in which:

Figure 1 is a perspective view of a first embodiment of the present invention arranged in a closed configuration;

Figure 2 is a perspective view of the first embodiment arranged in an open configuration;

Figure 2a is an enlarged view of a portion of the first embodiment highlighted in Figure 2 with circle A;

Figure 3 is a side view of the first embodiment;

Figure 3a is an end view of the first embodiment;

Figure 4 is a front view of the first embodiment;

Figure 5 is a cross-sectional front view of the first embodiment;

Figure 6 is a side view of a first container of the first embodiment;

Figure 6a is an enlarged view of a portion of the first embodiment highlighted in Figure 6 with circle A;

Figure 7 is a side view of a second container of the first embodiment;

Figure 8 is a perspective view of a second embodiment of the present invention arranged in a closed configuration;

Figure 9 is a cross-sectional front view of the second embodiment; and

Figure 10 is a side view of a second container of the second embodiment.

A first treatment device 1 according to the present invention is shown in Figures 1 to 7 of the accompanying drawings. The treatment device 1 comprises first and second containers 3, 5 which, in use, contain a substance or composition to be applied to a part of the body (for example, a fingernail or toenail) of the user.

The containers 3, 5 have different shapes, but are similar in appearance in as much as they are both generally cylindrical and have a similar length and diameter. The shape of the two containers 3, 5 is most clearly illustrated in Figures 3, 4 and 5 of the accompanying drawings. It will be seen that each container 3, 5 tapers at one end so as to close said end, whereas an opposite end is

provided with an opening 7, 9 by means of which access may be gained to the interior 11, 13 of the container 3, 5 (see Figures 6 and 7).

The opening 7, 9 of each container 3, 5 is surrounded by a cylindrically shaped neck portion 15, 17 having an outer diameter which is less than that of the remainder of the container 3, 5. The neck portion is provided for receiving a generally cylindrically shaped closure element 19 (described in greater detail below). The dimensions and contours of the container and closure element are such that, when the container is closed by the closure element, the two components abut one another without any discontinuity or step at the junction of their outer cylindrical surfaces. In other words, the outer surface of the closure element forms a smooth contour line with the outer surface of the associated container. This ensures the closure element and container combine to have a pleasant aesthetic appearance. The arrangement is also comfortable for a user when, for example, carried in a pocket against the skin, and reduces the risk of the container being inadvertently opened during general handling.

The exterior cylindrical surface of the neck portion 15, 17 of each container 3, 5 is provided with an external screw thread 21 for screw threadedly engaging with an internal screw thread 23 provided on a interior cylindrical surface of the closure element 19. As will be understood from the following description, the closure element 19 may be thereby securely fastened to each container 3, 5.

The closure element 19 comprises a body portion 25 having a generally cylindrical shape. An interior cylindrical surface at each end of the body portion 25 is provided with the abovementioned screw threads 23 so that the first container 3 may be screw threadedly secured to one end of the closure element 19 whilst the second container 5 is screw threadedly secured to the other end of the closure element 19.

A gasket (not shown) is provided about each neck portion 15, 17 so as to provide a seal between the body portion 25 and the associated container 3, 5. The provision of the gaskets assists in preventing the contents of the containers 3, 5 from leaking and from drying out during storage. Nevertheless, in order to allow excess internal pressure within the containers 3, 5 to be relieved, appropriate gas

venting means is provided. This gas venting means takes the form of a slot or cut 43 in the external screw threads 21 extending along the length of the neck portion 15, 17. The slot extends longitudinally along the neck portion 15 (as shown in Figure 2), but alternatively may extend helically along the neck portion 15, 17.

The internal screw threads 23 provided on the body portion 25 may be provided with a similar venting means in addition to or as an alternative to the venting means of the external screw threads 21. It will be understood that the provision of a slot extending across the screw threads provides a small clearance gap through which gasses may pass under pressure, even when the containers 3, 5 are screw threadedly engaged with the closure element 19. A slot, groove or aperture may be provided in the neck portion 15, 17 and the body portion 25 so as to allow gas under pressure (i.e. in excess of the exterior atmospheric pressure) to pass from the interior of the respective container 3, 5 to the slot of the screw thread and so as to allow this gas to flow past the body portion 25 to the atmosphere.

First and second lateral walls 27, 29 extend across the interior of the closure element 19 and prevent fluid communication within the closure element 19 between the opposite ends thereof (see Figure 5). The lateral walls 27, 29 are positioned relative to the internal screw threads 23 so that, when each container 3, 5 is screwed into a closed position relative to the closure element 19, the walls 27, 29 abut the free end of a neck portion 15, 17 so as to sealingly close the associated container 3, 5.

An elongate wand 31, 33 extends from the centre of each wall 27, 29. The position of each wand 31, 33 on the associated lateral wall 27, 29, and the length and cross-sectional size/shape of the wand, is such that each wand 31, 33 extends through the neck portion 15, 17 of its associated container 3, 5 so as to locate in the interior 11, 13 of said container 3, 5 when the container 3, 5 is closed by the closure element 19. Each wand 31, 33 may be manufactured integrally with the associated lateral wall 27, 29 and the remainder of the closure element 19 or may be a separate component connected to its associated lateral wall 27, 29 with appropriate means (for example, adhesive).

The end of each wand 31, 33 distal to the lateral walls 27, 29 is provided with an appropriate applicator. The applicator is secured to the wand with appropriate means (for example, adhesive) and is selected depending upon the type of composition/substance to be transported and applied by the applicator. The applicator provided for location in the first container 3 is a resiliently deformable wiper 35. The wiper 35 has a doe-foot shape. The applicator provided for location within the second container 5 is a brush 37. The combined length of the wand and applicator allows the applicator to be positioned at the end of the associated container distal to the container opening 7, 9.

Appropriate means may be provided for ensuring that a particular end of the body portion 25 is connectable with only one of the two containers 3, 5. For example, the neck portions 15, 17 may have different diameters and/or the pitch of the screw threads 21 on the containers 3, 5 may differ. In these examples, the ends of the body portion 25 of the closure element 19 will be adapted so as to be securable with its associated container 3, 5. For example, where different screw threads are provided on the containers 3, 5, the internal screw threads 23 on the body portion 25 will also be different so as to mate appropriately with their associated container 3, 5. It will be understood that screw threads of different pitches will not be threadably engageable with one another and, accordingly, the connection of a container 3, 5 with the wrong end of the body portion 25 will be prevented.

Indicator means may also be provided to indicate to the user which container 3, 5 is to be received by a particular end of the closure body portion 25. For example, colour coding may be used wherein each end of the closure body portion 25 has a different colour which is the same colour as that provided on the associated container 3, 5.

The closure body portion 25 is provided with an area 39 for displaying a trade name relating to the device 1.

The treatment device 1 further comprises an abrasive area provided on an exterior surface thereof. The abrasive area is sufficiently coarse to readily debride nail keratin. The abrasive area may be positioned anywhere on the external

surface of the device 1, but is preferably located at one end of the device as shown in the accompanying drawings.

With reference to Figures 2 and 2a in particular, it will be seen that the device 1 is provided with an abrasive area 41 positioned on the end of the first container 3 distal to the opening 7 of said container 3. The abrasive area 41 is planar and arranged so that the longitudinal access of the device 1 is at an angle to the abrasive area 41 (rather than extending perpendicularly thereto). The angled arrangement of the abrasive area 41 at the end of the device 1 allows the ergonomic use of the abrasive area 41. For example, a user may hold the device 1 like a pen/pencil in one hand and conveniently rub the abrasive area 41 against the fingernails of the other hand.

It will be understood that an abrasive area 41 may be provided at both ends of the device 1.

The abrasive nature of said area 41 may be provided by moulding the surface of the treatment device 1 with a plurality of small raised elements. A roughened surface is thereby provided. Alternatively, the abrasive area 41 may be provided as an abrasive patch which is originally separate from the device 1 and secured to an external surface of the device 1 with suitable means (for example, adhesive). Suitable materials from which the abrasive patch may be manufactured include corundum, etched metal, diamond etched metal and emery paper.

The containers 3, 5 and the closure element 19 (including the wands 31, 33) may be manufactured from any suitable plastics material such as PP, PE, ABS, SAN, PET, PETG. The applicator 35, 37 may be manufactured from a different material to that of the associated wand 31, 33. For example, the wiper 35 may be manufactured from TPE, POM or nylon. The containers 3, 5 may alternatively be manufactured from glass. This is particularly advantageous where it will be of interest or assistance to the user to be able to view the contents of the container 3, 5 whilst said container 3, 5 remains closed. For example, this will be the case where a container 3, 5 holds nail varnish.

The types of material used to manufacture the treatment device 1 will, in part, depend on the compositions/substances to be held by the containers 3, 5. For

example, a glass container may be more suitable than a plastics container for holding a solvent-based varnish.

The first container 3 may contain either a keratolytic agent or a bleaching agent. Alternatively, the first container may contain both a keratolytic agent and a bleaching agent. The keratolytic agent will be understood to chemically break down and remove discoloured keratin whilst a bleaching agent acts to lighten the colour of discoloured keratin which remains. The keratolytic agent may be urea or an hydroxy-acid. The hydroxy-acid may be salicylic acid or lactic acid. The bleaching agent may be hydrogen peroxide.

The wiper applicator 35 associated with the first container 3 is particularly adapted for the transporting and applying the keratolytic agent and/or bleaching agent. Application may be assisted by providing the composition as a gel.

The second container 5 contains a covering varnish which may be solvent-based or water-based and may also contain an optical brightener.

In use of the treatment device 1, the abrasive area 41 is first used to physically remove thickened nail keratin. Treatment gel from the first container 3 is then applied with the wiper 35 to the nail undergoing treatment. Finally, covering varnish from the second container 5 is applied to the nail with the brush 37.

The present invention is not limited to specific embodiment described above. Alternative arrangements and suitable materials and compositions will be apparent to a reader skilled in the art. For example, a modified treatment device 101 is shown in Figures 8, 9 and 10 of the accompanying drawings. The modified treatment device 101 is identical to the first treatment device 1 other than in that the second container 105 has been modified to comprise a flattened end 106 which lies in a plane perpendicular to the longitudinal axis of the treatment device 101. The flattened end 106 allows the treatment device to be stood vertically upright (i.e. with the longitudinal axis thereof orientated vertically). It will be understood that this is of benefit when the contents of the second container 105 is being applied. In other words, the end 106 allows the second container 105 to be placed on a horizontal surface whilst open, thereby obviating the need for said container

105 to be held in the hand of a user which potentially requires treatment. In a further modification, the end of the first container may be flattened in a similar fashion.

Claims

1. A container assembly comprising first and second containers and a closure element common to the containers, wherein each container comprises an opening for permitting access to the interior thereof, and wherein the assembly further comprises means for selectively securing each container to the closure element independently of the other container so as to close the opening of the container so secured, the closure element comprising a first applicator associated with the first container and a second applicator associated with the second container, wherein each applicator extends through the opening of the associated container when said opening is closed by the closure element.
2. A container assembly according to any of the preceding claims, wherein the closure element comprises two applicators extending in opposite directions.
3. A container assembly according to claim 2, wherein one of said applicators comprises a brush.
4. A container assembly according to claim 2 or 3, wherein one of said applicators comprises a wiper.
5. A container assembly according to any of the preceding claims, further comprising vent means.
6. A container assembly according to claim 5, wherein at least one of said containers comprises said vent means.
7. A container assembly according to claim 5 or 6, wherein said vent means comprises a groove cutting across screw threads for securing one of said containers to the closure element.

8. A container assembly according to any of the preceding claims, further comprising a treatment surface, which preferably comprises an abrasive element.
9. A container assembly according to claim 8, wherein the abrasive element is provided as a patch secured to the remainder of the container assembly.
10. A container assembly according to claim 8 or 9, wherein the container assembly has an elongate cylindrical shape and the abrasive element is located at one end of the container assembly.
11. A container assembly according to claim 10, wherein the abrasive element is located in a plane arranged at an angle to a longitudinal axis of the container assembly.
12. A container assembly according to any of claims 8 to 11, wherein the abrasive element is made from carborundum, etched metal, diamond etched metal or emery paper.
13. A method of using the container assembly of any of the preceding claims, comprising the steps of applying, with the associated applicator, a first substance stored in said first container to an area of the body of a user; and applying, with the associated applicator, a second substance stored in said second container to said area of the body.
14. A method of using the container assembly of any of claims 8 to 12, comprising the steps of applying, with the associated applicator, a first substance stored in said first container to an area of the body of a user; and applying, with the associated applicator, a second substance stored in said container to said area of the body, wherein prior to the application of said first substance, said area of the body is rubbed with the abrasive element.

15. A method according to claim 13 or 14, wherein the area of the body is a toenail or fingernail.
16. A method according to claim 13, 14 or 15, wherein the substance stored in at least one of said containers is a nail coating.
17. A method according to claim 16, wherein said nail coating is a varnish, nail paint or lacquer.
18. A container assembly comprising two or more containers and an applicator associated with each of at least two of said containers for applying the contents thereof to a surface during use, wherein at least one container comprises a composition for the medical treatment of a user.
19. A container assembly according to claim 18, wherein the containers are releasably connected to one another.
20. A container assembly according to claim 19, wherein the containers are releasably connected to one another by means of a connector separate from the containers.
21. A container assembly according to claim 20, wherein the connector comprises first and second closure elements which respectively close said first and second containers releasably connected therewith.
22. A container assembly according to claim 21, wherein each closure element comprises one of said applicators.
23. A container assembly according to any of claims 18 to 22, wherein said composition is for the treatment of a disorder of the fingernail or toenail.

24. A container assembly according to any of claims 18 to 23, wherein said composition is for the treatment of thickening or hypertrophy of the fingernail or toenail.
25. A container assembly according to any of claims 18 to 24, wherein said composition is for the treatment of a disorder selected from onychauxis and onychogryphosis.
26. A container assembly according to any of claims 18 to 25 wherein said composition comprises a keratolytic agent.
27. A container assembly according to claim 26, wherein said keratolytic agent is selected from urea and a hydroxy-acid.
28. A container assembly according to claim 27, wherein said hydroxy-acid is salicylic acid or lactic acid.
29. A container assembly according to any of claims 18 to 28, wherein said composition comprises a bleaching agent
30. A container assembly according to claim 29, wherein said bleaching agent is hydrogen peroxide.
31. A container assembly according to any of claims 18 to 30, wherein said composition for the medical treatment of a user is a gel.