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Long-Handled Nail Groomer with a Stand Configured to Cradle a Toe for Initial Centering of a Filing Bit on the Toenail

Abstract

A toenail groomer includes: a grooming head, shaft, and handle configured to be grasped by a user's hand to manipulate the groomer. The grooming head has a housing and motor configured to rotatably support a filing bit with an abrasive surface, usable to abrade portions of a toenail. An opening in the housing receives one end of the shaft with an adjustable length that may be selected to position the filing bit at a user's toenail when the handle is manipulated by the user's hand. The housing includes a concaved surface configured to rest upon and receive a portion of the user's toe to initially align the axis of the filing bit with the corresponding toenail. The motor supports the filing bit's axis of at an obtuse angle to an axis of the shaft, and at an acute angle with respect to the toenail.

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Background/Summary

FIELD OF THE INVENTION

[0001] The present invention relates to nail grooming for the elderly and other flexibility challenged persons (e.g., pregnant women) and/or physically disabled individuals (e.g., a paraplegic) who would otherwise experience difficulty in utilizing traditional toenail trimmers, and more particularly relates to a long-handled nail groomer with motorized filing bit supported by a motor that is housed in a particularly shaped housing configured to occupy a first (cradling) “use” position on a toe for initial centering of the filing bit on the toe, and is further configured to occupy a second (forward-rotated, uncradled) “use” position on the toe permitting side-to-side pivoting for ease in filing of the entire edge of the toe nail.

BACKGROUND OF THE INVENTION

[0002] A traditional nail clipper is designed for convenience of clipping fingernails but may be difficult to use to clip toenails for an elderly person, even for the larger sized nail clippers intended for use on a person's toenails. When clipping toenails, the user usually has to manipulate his or her body into various positions, such as bending over one's legs by pivoting at the hips, retracting one's legs by bending at the knee, and/or lifting the foot/leg to rest on a table or chair. These positions are very uncomfortable or may be impossible to achieve for those who are elderly, disabled, ill, or pregnant. These users may risk injury when attempting to cut their toenails because of poor body positioning, which users may therefore be forced to rely on help from family, friends, and other caregivers. Conventional toenail trimming is also challenging for people with diabetes, and people with foot neuropathy who are in danger of cutting themselves with a traditional toenail clipper since they have no sensation in the foot. Other challenges for toenail trimming are presented by: 1) obesity; 2) arthritis (because of reduced hand dexterity); 3) hip replacement surgery or hip precautions (user's hip joint is limited to 90 degrees in flexion); 4) knee replacement surgery (user's knee joint has certain movement restrictions); 5) back pain or back surgery; 6) lung disease (COPD) due to bendopnoea, i.e., they can't breathe when they bend down; 7) congestive heart failure (CHF) due to breathlessness upon minimal physical exertion, and/or 8) short arms, inflexible.

[0003] Also, toenail trimming is conventionally performed with small handheld clippers which require exertion of physical force to cut through toenail keratin. This aspect of the traditional method of toenail clipping serves as an additional obstacle for the elderly, and the handicapped, who may lack the required physical strength. Further exacerbating these problems are the limited vision, and decreased fine motor skills to accurately position the trimmer. The factors may contribute to an increased prevalence of foot fungus, nail deformation, and ingrown toenails among individuals who are unable to address their difficulties and maintain proper toenail care.

[0004] There is a long felt but unmet need in the art of toenail trimmers for apparatus that provides greater assistance for individuals with physical deficiencies, particularly with respect to providing support for the device while being held by the user's hand during the process, which may eliminate ineffective nail trimming and eliminate the cuts and bruises that may result from such ineffective nail trimming. There is also a long felt but unmet need in the art of toenail trimmers for apparatus that permits toenails to be trimmed in a safe and easy manner, while permitting the individual to assume a comfortable position throughout the toenail trimming process. Lastly, there is also a long felt but unmet need for a toenail grooming device that is configured to easily center a filing bit upon the toenail of the toe that the user seeks to file.

[0005] The apparatus disclosed herein addresses the deficiencies with respect to prior art toenail trimmers/groomers.

OBJECTS OF THE INVENTION

[0006] It is an object of the invention to provide a device that may be used to assist a person that has reduced arm strength and/or dexterity to more easily groom/file his/her toenails.
[0007] It is another object of the invention to provide a device that may be used by the elderly and flexibility challenged individuals to groom/file his/her toenails without having to bend excessively to reach the toenails.
[0008] It is an object of the invention to provide a device that may be used by the elderly and flexibility challenged individuals to more safely groom/file his/her toenails.
[0009] It is another object of the invention to provide a device that may be used by the elderly and flexibility challenged individuals to groom/file his/her toenails, without the use of clippers or shears that may inadvertently cause injury to the sides of the user's toes.
[0010] It is a further object of the invention to provide a motorized nail groomer/filer that provides a simplified/easy nail filing experience for both fingernails and toenails.
[0011] It is another object of the invention to provide a toenail grooming device that is configured for initial centering a filing bit upon the toenail of the toe that the user seeks to groom/file.
[0012] Further objects and advantages of the invention will become apparent from the following description and claims, and from the accompanying drawings.

SUMMARY OF THE INVENTION

[0013] This Summary is provided to introduce a selection of concepts in a simplified form that are further described below in the Detailed Description. This Summary is not intended to identify key features or essential features of the claimed subject matter, nor is it intended to be used to limit the scope of the claimed subject matter.
[0014] A toenail grooming device is disclosed herein, and includes a shaft, a handle, and a grooming head. The handle may be secured to or integrally formed with the shaft. The handle is configured to be grasped by a hand of a user to manipulate the toenail groomer so that a filing bit may be moved to file the toenail of each of the toes of the user. The grooming head includes a housing and a motor housed in the housing. A second end of the shaft, being an end that is opposite the handle, is secured to the housing, and may be fixedly secured to the housing or may be releasably coupled to the housing. A portion of the motor, e.g., a portion of the shaft of the motor, may be configured to releasably couple to a portion of a filing bit, so that various different sized and/or shaped filing bits may be used to selectively file the user's toenails (and fingernails). The motor is thus configured to rotate the filing bit to abrade a portion of the toenail. The housing of the grooming head of the toenail grooming device has very particularly formed lower contours. A first bottom portion of the housing includes a concaved downward surface that forms a cradle that is configured to receive a portion of one toe of the user therein, so that it may align the axis of the filing bit to be co-planar with respect to an axis of the toe that it rest upon, and which has a toenail that needs to be filed. This structure permitting the centering functionality alleviates a bad tendency (a deficiency) of users of the device, who may have poor motor skills in addition to poor flexibility, in which the user otherwise struggles to properly position the filing bit in proximity to a toenail to be filed.
[0015] However, once the full depth of the cradle has been used to accomplish the general alignment described above (i.e., by contacting a portion of the side of the toe), it may tend to inhibit rotation/pivoting of the grooming head about a substantially vertical axis so that the filing bit can be rotated side to side to abrade the toenail of the cradled toe from a first side of an edge of the toenail across to a second side of the edge of the corresponding toenail, so that it may be filed uniformly. Therefore, a second portion of the housing may be formed to include a secondary surface, where the concave surface of the cradle transitions into the secondary surface that may be generally flat or even concaved upwardly. The user, once the filing bit has been aligned with the toe using the cradle, may move the handle forward to pivot the grooming head to then rest upon the secondary surface, so that the cradle no longer may limit rotation of the device, which rotation/pivoting of the grooming head may nonetheless be minimal in order to accomplish

positioning and moving of the filing bit from a first side of an edge of the corresponding toenail across to a second side of the edge of the corresponding toenail for filing of that toenail.
[0016] In another embodiment, the cradle may narrow in moving towards the front of the housing, and a small portion of this narrowed structure cradle structure may contact an upper portion of the toe (rather than the sides and thus would not tend to inhibit pivoting) and may therefore also serve the purpose of “anchoring” (i.e., providing some rotational support for) the device with respect to the toe during the trimming process in which the device is being pivoted side to side.
[0017] The shaft of the device may include an extension arm, which may telescope to adjust a length of the shaft so that it may be customized according to the size and proportions of each user.
[0018] This shaft of the device may also be attachable and removable from the grooming head via a one-quarter turn, quick-release attachment scheme, which permits easier of storing of the apparatus, and which detachable aspect may also permit use of the device upon the fingernails of the user.

Description

BRIEF DESCRIPTION OF DRAWINGS
[0019] FIG. **1** is a perspective view of a first embodiment of a long-handled toenail grooming device.
[0020] FIG. **2** is a side view of the toenail grooming device shown in FIG. **1**.
[0021] FIG. **3** is a top view of the toenail grooming device shown in FIG. **1**.
[0022] FIG. **4** is a bottom view of the toenail grooming device shown in FIG. **1**.
[0023] FIG. **5** is a front view of the toenail grooming device shown in FIG. **1**.
[0024] FIG. **6** is a rear view of the toenail grooming device shown in FIG. **1**.
[0025] FIG. **7** is an enlarged detail view of just the grooming head of the device shown in FIG. **1**, where the shaft and handle have been removed to permit use of the grooming head and filing bit for filing of a user's fingernails.
[0026] FIG. **8** is a side view of the grooming head shown in FIG. **7**.
[0027] FIG. **9** is a top view of the grooming head shown in FIG. **7**.
[0028] FIG. **10** is a bottom view of the grooming head shown in FIG. **7**.
[0029] FIG. **11** is a front view of the grooming head shown in FIG. **7**.
[0030] FIG. **12** is a rear view of the grooming head shown in FIG. **7**.
[0031] FIG. **13** is a front view of the grooming head shown in FIG. **7**, shown just prior to the two housing sections being joined together.
[0032] FIG. **14** is a side view showing the interior of the first one of the two housing sections of FIG. **13**, just prior to receiving the motor therein.
[0033] FIG. **15** is a side view showing the interior of the second of the two housing sections.
[0034] FIG. **16** is the side view of FIG. **14**, but is shown after the motor has been installed therein.
[0035] FIG. **17** is a perspective view of the one-quarter turn connector usable to couple the shaft to the grooming head.
[0036] FIG. **18** is a front view of the one-quarter turn connector shown in FIG. **17**.
[0037] FIG. **19** is an end view of the one-quarter turn connector shown in FIG. **17**.
[0038] FIG. **20** is a top view of the one-quarter turn connector shown in FIG. **17**.
[0039] FIG. **21** is a perspective view of the handle member.
[0040] FIG. **22** is a front view of the handle member of FIG. **21**.
[0041] FIG. **23** is an end view of the handle member of FIG. **21**.
[0042] FIG. **24** is a top view of the handle member of FIG. **21**.
[0043] FIG. **25** is a side view of the handle member of FIG. **21**, the one-quarter turn connector of FIG. **17**, and the extendable shaft, all shown just prior to being joined together.

[0044] FIG. **26** is the side view of FIG. **25**, but shown after the handle member, the one-quarter turn connector, and the extendable shaft have been fixedly joined together.
[0045] FIG. **27** is a front view of the joined handle member, one-quarter turn connector, and extendable shaft as shown in FIG. **26**.
[0046] FIG. **28**A is a perspective view of a cylindrical shaped filing bit that is usable with the nail groomer of FIG. **1** using a first attachment arrangement.
[0047] FIG. **28**B is a perspective view of a cone-shaped filing bit that is usable with the nail groomer of FIG. **1** using a first attachment arrangement.
[0048] FIG. **29**A is a perspective view of third shaped filing bit that is usable with the nail groomer of FIG. **1** using a second attachment arrangement.
[0049] FIG. **29**B is a front view of the filing bit of FIG. **29**A.
[0050] FIG. **29**C perspective view of fourth shaped filing bit that is usable with the nail groomer of FIG. **1** using the second attachment arrangement.
[0051] FIG. **29**D is a front view of the filing bit of FIG. **29**C.
[0052] FIG. **30** is a front view of a portion of the nail groomer of FIG. **1**, shown with the cradle of the grooming head after having received a baby toe and/or a great toe therein, for centering of the device upon the respective toe.
[0053] FIG. **31** is a top view of a portion of the nail groomer of FIG. **1**, shown with the cradle of the grooming head just prior to being set upon a great toe of the user.
[0054] FIG. **32** is a top view of a portion of the nail groomer of FIG. **1**, shown with the cradle of the grooming head just after receiving a great toe therein, for centering of the filing bit of the device with respect to the big toe.
[0055] FIG. **33** is a perspective view showing the nail groomer of FIG. **1** being utilized by a user, being shown with the cradle portion of the housing engaged with the big toe to initially align the axis of the filing bit to be in substantially the same plane as the axis of the toenail, whereat the filing bit is displaced from the toenail.
[0056] FIG. **34** is the perspective view of FIG. **33**, but is shown after the nail groomer has been pivoted forward about a horizontal axis into a second position, in which the cradle is disengaged from the big toe, and a secondary surface of the housing of the nail groomer contacts and is free to pivot upon the big toe, about an axis that may be nearly vertical.
[0057] FIG. **35** is the top view of a portion of the nail groomer as seen in FIG. **32**, but is shown after the nail groomer has been pivoted forward into the second position in which the cradle is disengaged from the big toe, and the nail groomer has also pivoted upon the big toe to be in position to trim a first side of an edge of the toenail.
[0058] FIG. **36** is the top view of FIG. **35**, but is shown after the nail groomer has pivoted upon the big toe about a nearly vertical axis, to be in position to trim a second side of an edge of the toenail.
[0059] FIG. **37** is an enlarged perspective view showing the nail groomer of FIG. **1** being utilized by a user for trimming of the toenail of the big toe.
[0060] FIG. **38** is a perspective view illustrating use of the nail groomer of FIG. **1** in which the cradle portion narrows at the front portion of the housing and nonetheless still contacts a portion of the toe to provide some support during the filing process.
[0061] FIG. **39** is a front view showing an alternate embodiment of a housing usable for the grooming head of the long-handled toenail grooming device, and which housing has a pair of parallel bulbous protrusions configured to provide centering and support upon the toe for grooming of its toenail.
[0062] FIG. **40** is the front view of FIG. **39**, showing the pair of parallel bulbous protrusions as they may contact each of a big toe and a pinky toe of a user.
[0063] FIG. **41** is a top view of a big toe, showing representative contact thereon of the pair of parallel bulbous protrusions of the housing shown in FIG. **39**.

DETAILED DESCRIPTION OF THE INVENTION

[0064] As used throughout this specification, the word “may” is used in a permissive sense (i.e., meaning having the potential to, or being optional), rather than a mandatory sense (i.e., meaning must), as more than one embodiment of the invention may be disclosed herein. Similarly, the words “include”, “including”, and “includes” mean including but not limited to.
[0065] The phrases “at least one”, “one or more”, and “and/or” may be open-ended expressions that are both conjunctive and disjunctive in operation. For example, each of the expressions “at least one of A, B and C”, “one or more of A, B, and C”, and “A, B, and/or C” herein means all of the following possible combinations: A alone; or B alone; or C alone; or A and B together; or A and C together; or B and C together; or A, B and C together.
[0066] Also, the disclosures of all patents, published patent applications, and non-patent literature cited within this document are incorporated herein in their entirety by reference. However, it is noted that the citing of any reference within this disclosure, i.e., any patents, published patent applications, and non-patent literature, is not an admission regarding a determination as to its availability as prior art with respect to the herein disclosed and claimed apparatus/method.
[0067] Furthermore, any reference made throughout this specification to “one embodiment” or “an embodiment” means that a particular feature, structure or characteristic described in connection therewith is included in at least that one particular embodiment. Thus, the appearances of the phrases “in one embodiment” or “in an embodiment” in various places throughout this specification are not necessarily all referring to the same embodiment. Therefore, the described features, advantages, and characteristics of any particular aspect of an embodiment disclosed herein may be combined in any suitable manner with any of the other embodiments disclosed herein.
[0068] Additionally, any approximating language, as used herein throughout the specification and claims, may be applied to modify any quantitative or qualitative representation that could permissibly vary without resulting in a change in the basic function to which it is related. Accordingly, a value or recitation modified by a term such as “about” is not to be limited to the precise theoretical characteristic or value specified, and may include values that differ from the specified value in accordance with design variations that may be described in the specification, as well as applicable case law. Also, in at least some instances, a numerical difference provided by the approximating language may correspond to the precision of an instrument that may be used for measuring the value or characteristic. A numerical difference provided by the approximating language may also correspond to a manufacturing tolerance associated with production of the aspect/feature being quantified/described (see e.g., *Ex Parte Ollmar*, Appeal No. 2014-006128 (PTAB 2016)). Furthermore, a numerical difference provided by the approximating language may also correspond to an overall tolerance for the aspect/feature that may be derived from variations resulting from a stack up (i.e., the sum) of a multiplicity of such individual tolerances.
[0069] Similarly, the term “substantially” means that the recited characteristic, parameter, or value need not be achieved exactly, but that deviations or variations, including for example, tolerances, measurement error, measurement accuracy limitations and other factors known to those of skill in the art, may occur in amounts that do not preclude the effect the characteristic was intended to provide.
[0070] Any use of a friction fit (i.e., an interface fit) between two mating parts described herein indicates that the opening (e.g., a hole) is smaller than the part received therein (e.g., a shaft), which may be a slight interference in one embodiment in the range of 0.0001 inches to 0.0003 inches, or an interference of 0.0003 inches to 0.0007 inches in another embodiment, or an interference of 0.0007 inches to 0.0010 inches in yet another embodiment, or a combination of such ranges. Other values for the interference may also be used in different configurations (see e.g., “Press Fit Engineering and Design Calculator,” available at: www.engineersedge.com/calculators/machine-design/press-fit/press-fit-calculator.htm).
[0071] Any described use of a clearance fit indicates that the opening (e.g., a hole/recess) is larger than the part received therein (e.g., a shaft/protrusion), enabling the two parts to move (e.g. to slide

and/or rotate) when assembled, where the gap between the opening and the part may depend upon the size of the part and the type of clearance fit—i.e., loose running, free running, easy running, close running, and sliding (e.g., for a 0.1250 inch shaft diameter the opening may be 0.1285 inches for a close running fit, and may be 0.1360 inches for a free running fit; for a 0.5000 inch diameter shaft the opening may be 0.5156 inches for a close running fit and may be 0.5312 inches for a free running fit). Other clearance amounts are used for other clearance types. See "Engineering Fit" at: en. wikipedia.org/wiki/Engineering_fit; and "Three General Types of Fit," available at mmto.org/˜dclark/Reports/Encoder%20Upgrade/fittolerences%20%5BRead-Only%5D.pdf.

[0072] As used herein, the term "hand-held" and "graspable" describes that at least one part of the toenail trimmer is easily and conveniently held and handled by even the average small-sized human hand.

[0073] It is further noted that any use herein of relative terms such as "top," "bottom," "upper," "lower," "vertical," and "horizontal" are merely intended to be descriptive for the reader, and may be based on the depiction of those features within the figures for one particular position of the apparatus, and such terms are not intended to limit the orientation with which the disclosed nail trimmer may be utilized.

[0074] FIG. **1** shows a nail grooming device **100**. The nail grooming device **100** may include a shaft/handle member **150**, and a grooming head **110** that may cooperate with one of more filing bits for the user to more easily and safely file his or her toenails, and also his/her fingernails.

[0075] The nail grooming device **100** is shown in more detail in FIGS. **2-6**, while the grooming head is shown by itself in detail in FIGS. **7-12**.

[0076] The shaft/handle member **150** may be formed as a single unitary part, one end of which may be fixedly or releasably secured to the grooming head **110**. Alternatively, as seen in FIGS. **25-27**, the shaft/handle member **150** may be formed of a handle portion **160**, an extendable shaft **170**, and a connector member **180**, which may all be joined together.

[0077] The handle portion **160** is shown in detail in FIGS. **21-24**. A first portion **161** of the handle portion **160** may be ergonomically configured to be grasped and held by a hand of the user. A bottom end **162** of the handle portion **160** may have an opening (e.g., a hole) that may receive, and may be fixedly secured to, a portion of the extendable shaft **170** proximate to its first end **171**, which first end may be cylindrical. The extendable shaft **170** may be a telescoping shaft that is configured to be adjusted in length by loosening of the ring **173**, followed by extending or collapsing of the telescoping shaft portions **174** and **175**. Thereafter, the ring **173**, which may be threadably coupled to the shaft portion **175**, may be tightened to collapse the end of that that portion and maintain the adjusted position of the shaft portion **174** relative to the shaft portion **175** using compression forces.

[0078] The connector member **180** is shown in detail in FIGS. **17-20**. The connector member **180** may include a cylindrical portion that may extend from a first end **181** to a second end **182**. The cylindrical portion may have a diameter D**1** at the first end **181**, and may have a reduced diameter D**2** at the second end **182**. The reduced diameter D**2** at the second end **102** may be configured to be received in, and be fixedly secured within, a corresponding opening at the second end **172** of the extendable shaft **170** (FIG. **25**). The connector member **180** may also use any suitable releasably attachment mechanism known in the art for releasably securing of the connector member to the housing of the grooming head **110** (e.g., a spring biased ball detent mechanism, such as the one described in U.S. Pat. No. 6,016,594 to Frey). In one embodiment, the connector member **180** may use a one quarter-turn quick connection arrangement for releasable securement to the housing of the grooming head **110**. The one-quarter turn connection arrangement may be formed by a spring clip **183** that may protrude (e.g., cantilever) outwardly from the larger diameter D**1** proximate to the first end **181** of the connector member **180**, and which may have a pin **185** protruding therefrom. The pin **185** may be cylindrical, or may simply be bulbous shaped. The distal (free) end of the spring clip **183** may have a protrusion **184** protruding therefrom, which may make actuating

of the spring clip easier for a user. A pair of these spring clips **183** may be used on opposite sides of the connector member **180**, being clocked 180 degrees apart.
[0079] For one-quarter turn, quick joining of the shaft/handle member **150** to the housing of the grooming head **110**, the spring clip(s) **183** may be depressed and the side of the cylindrical pin **185** (or pins) may be aligned with the slot(s) **111**A (and **121**A) in the opening of the housing portion(s) (see FIG. **14**/FIG. **15**), and the connector member **180** may be inserted until the pin(s) dead ends in those tracks, at which time the user my rotate the connector member **180** of the shaft/handle member **150** so that the pin(s) **185** may then move within the track **111**B (and track **121**B). Once the pin(s) **185** dead ends in the track **111**B (and track **121**B) the user my release the spring clip(s) so that each is self-biased away from the shaft, and the cylindrical pin(s) **183** is/are then received (i.e., biased) into a hole (or holes) **112**/**122** in the housing portions, to releasably and quickly join the shaft/handle member **150** with respect to the housing of the grooming head **110**. Separation of the shaft/handle member **150** from the housing of the grooming head **110** may proceed in the reverse manner, by first depressing of the spring clip(s) **183**, then rotating of the shaft, and finally extracting of the shaft from the grooming head **110**.
[0080] The housing of the grooming head **110** may be formed of a single unitary part, and may be formed using any suitable manufacturing process, including, but not limited to, an injection molding process, a casting process, etc. Alternatively, as seen in FIGS. **13-16**, the grooming head **110** may be formed of a first housing portion **110** and a second housing portion **120**, which two housing portions may be joined together using any joining method known in the art, including, but not limited to, using mechanical fasteners (e.g., screws **110**S, bolts and nuts, etc.), adhesive, a fricton fit, welding techniques, hook and loop fastening materials sold under the trademarked name VELCRO®, etc. The housing portions may be formed to accommodate mounting therein of a motor **130**, any suitable on/off switch **140** (e.g., a slidable switch, a push-button switch, etc.), a light **150** (FIG. **7**) that may be positioned in the housing and oriented to illuminate the filing bit and underlying toe nail during the filing process, and any other necessary electronic components. The motor may have a shaft with a coupler **131** (see FIG. **16** and FIG. **29**E-**29**F), that may releasably couple to the end of a filing bit, e.g., filing bit **99** (FIG. **16**), or filing bit **98** that has a particularly shape abrasive surface **98**F (FIG. **28**B), or filing bit **97** that has an abrasive surface **97**F (FIG. **28**A). The coupler **131** may be configured to releasably receive and securely hold a filing bit using any arrangement known in the art of releasable atachement of such bits, including, but not limited to, use of a fricton fit, a spring-biased detent arrangement, a threaded arrangement, etc.
[0081] The bottom of the joined housing portions is particularly formed, as may best be seen in FIG. **2**, FIG. **4**, FIG. **5** and FIG. **6** (and as shown enlarged in FIG. **8**, FIG. **10**, FIG. **11**, and FIG. **12**). The bottom of the joined housing portions of the grooming head **110** is configured to form a cradle feature **115**. As such, the nail grooming device **100** may be positioned in a first (preliminary) use position at which the lower exterior (concave) surfacing of the cradle **115** is configured to receive a portion of one toe of the user therein (see e.g., FIG. **30**), to initially align the axis **99**X of the filing bit **99** with an axis **95**TX of the corresponding toe **95**T (see FIG. **31** and FIG. **32**), i.e., the axes may be substantially co-planar, so that the filing bit may initially be centered upon the toenail of the one toe upon which the grooming head **110** rests, but is displaced therefrom. This greatly aids an elderly user who may otherwise struggle with and take a long time to initially position the nail grooming device **100** at each toe prior to initiating filing of the corresponding toenail. The radius of curvature R of the concave surface of the cradle may be formed so that it may cradle and center the filing bit **99** with respect to the great toe **95**GT of the user, as well as the baby toe **95**BT of the user's foot.
[0082] In addition, the exterior (lower) surfacing of the cradle **115** may be configured to transition, moving toward the forward-most portion of the housing, into a secondary surface **116** (see e.g., FIG. **11**), where the secondary surface is configured to support the grooming head upon a portion of the toe of the user after the concaved surface of the cradle used for alignment has been moved

upward and away from contact the one toe (i.e., the user pushes the handle forward away from his/her body to locate the nail grooming device **100** in a second use position—compare FIG. **33** and FIG. **34**), to permit pivoting of the toenail groomer with respect to a "vertical" axis passing through the toe. As such, the filing bit **99** may then be pivoted through manipulation of the handle **160** by the user, to abrade the corresponding toenail of the one toe from a first side of an edge of the corresponding toenail (FIG. **25**) across to a second side of the edge of the corresponding toenail (FIG. **36**). Such re-positioning may result in the axis **99**X of the filing bit **99** being changed from the acute angle θ with respect to the toenail (see e.g., FIG. **33**) to the larger acute angle β at which the toenail may be filed by the filing bit (see e.g., FIG. **34**).

[0083] The secondary surface may be substantially flat, or may be slightly concave, and may generally be concaved upwardly, whereas the cradle may be formed to be concave downwardly.

[0084] To provide for better support and comfort of the secondary surface **116** upon the toe, i.e., to provide a better grip, so that it may not tend to slip off during pivoting of the device thereon, it may be coated with silicone that may have a high coefficient of friction. Alternatively, the silicone may be molded onto the secondary surface **116**. In addition, the silicone may also be utilized on the entire cradle feature **115**. The silicone may also be attached as a separate pad. The silicone utilized may also be a medical-grade silicone because it's skin-contact safe, durable, flexible, and soft to the touch.

[0085] As mentioned above, in another embodiment, the cradle feature **115** may narrow towards the front of the housing (see e.g., FIG. **10**), and a small portion of this narrowed cradle structure may remain in contact with a top portion of the toe (rather than the sides as with the wider cradle portion) during filing, and may therefore also serve the purpose of "anchoring" (i.e., providing some stability/support for) the device with respect to the toe during the trimming process in which the device is pivoted side to side. In this embodiment, as seen in FIG. **38**, the angularity of the support provided by the coupler **131** at the angle β (FIG. **34**) for the filing bit may be such that a first portion **115**P*i* and a second portion **115**P*ii* of the forward narrowed region of the cradle feature **115** may then be positioned to contact the toe (e.g., big toe **99**BT) on opposite sides of the centerline of the toe, but may be resting substantially towards the top of the toe, being so positioned as to not inhibit pivoting of the device, but may nonetheless provide support while the user pivots the device to accomplish filing as seen in FIGS. **34**-**36**.

[0086] Use of the medical grade silicone for the first portion **115**P*i* and the second portion **115**P*ii* of the forward narrowed region of the cradle feature **115** may allow the provision of support by those portions, while its softness may not inhibit the pivoting motion being applied to the device by the user's hand, as those portions may also tend to deform slightly as a result of its contact with the top of the toe.

[0087] It is noted that as seen in FIG. **33**, the user may have his/her foot resting on a horizontal surface (e.g., a floor surface) and the extendable shaft **170** of the nail grooming device **100** may be clear of the leg of the user, and when rotated forward into the filing position shown in FIG. **34**, the shaft may be oriented substantially vertically, being positioned farther away from the user's leg. However, the user need not use the nail grooming device **100** only with his/her foot resting on a ground surface, e.g., the foot may be resting on an angled stool, so that the shaft would not longer be oriented "vertically." In addition, the extendable shaft **170** need not be straight, and may have one or more curved upper portions (not shown) to provide for clearance with the user's leg, while permitting the user to hold the handle portion **160** of the nail grooming device **100** closer to his/her torso than is illustrated in FIG. **33**.

[0088] FIG. **39** is a front view showing an alternate embodiment that uses a different housing for a grooming head **210** of the long-handled toenail grooming device, which housing may have a pair of parallel protrusions **215**A and **215**B that may generally be bulbous in shape (e.g., having a circular cross-section or part of a circular or elliptical cross-section), and which are configured to provide centering and support upon the toe for grooming of its toenail. The two protrusions may be spaced

apart sufficiently a distance D**1** so that may both protrusions may contact the top portion of each of a big toe **99**BT and also a pinky toe **99**PT of a user. In one embodiment, the spacing D**1** may be such that the protrusion may contact the top of the big toe at a position that is less than a radial angle of 45 degrees, and may even be at a position of contact that is slightly less than a radial angle of 22.5 degrees (see e.g., FIG. **40**). Such a spacing D**1** may also position the point(s) of contact on the pinky toe at a position being less than the 45-degree radial position, and may which may be between the 45 degree and 22.5 degree radial positions. In another embodiment, the point(s) of contact on the pinky toe may instead be at a position being at or even less than the 22.5-degree radial positions. It is noted that the first (forward-most) portions of the parallel protrusions **215**A and **215**B (e.g., first portion **215**A*i*) may be formed the same as the forward most protrusion portion of the housing for the grooming head **110** (see e.g., FIG. **38**). However, for the housing of the grooming head **210** the second (rearward) portions of the protrusions **215**A and **215**B (e.g., second portion **215**A*ii*) may remain parallel and would remain in contact with the upper part of the toes even when the shaft **170** is held by the user in the first alignment position, whereas the protrusions **115**P*i* and **115**P*ii* may instead diverge and grow farther apart in distance (see FIG. **10**), so that they may tend contact and better cradle portions of the sides of the toes (e.g., being at the 45 degree radial position for the big toe or even farther down) when the shaft is held in the alignment position, as described hereinabove and as may be seen in FIG. **30**.

[0089] The parallel bulbous protrusions **215**A and **215**B may be formed of a suitable material, and in one embodiment may be a resilient material. The parallel bulbous protrusions **215**A and **215**B may be formed of silicone, or may be formed of rubber, etc. FIG. **41** is a top view of a big toe, showing representative contact thereon of the pair of parallel bulbous protrusions of the housing shown in FIG. **39**. The parallel bulbous protrusions **215**A and **215**B may be formed to have a circular cross-sectional shape, or an elliptical cross-sectional shape, or any other suitable cross-sectional shape, which may tend to deform slightly when the device rests upon the toe of the user (compare FIG. **39** and FIG. **40**).

[0090] While illustrative implementations of one or more embodiments of the disclosed system are provided hereinabove, those skilled in the art and having the benefit of the present disclosure will appreciate that further embodiments may be implemented with various changes within the scope of the disclosed system. Other modifications, substitutions, omissions and changes may be made in the design, size, materials used or proportions, operating conditions, assembly sequence, or arrangement or positioning of elements and members of the exemplary embodiments without departing from the spirit of this invention.

[0091] Accordingly, the breadth and scope of the present disclosure should not be limited by any of the above-described example embodiments, but should be defined only in accordance with the following claims and their equivalents.

Claims

1. A toenail groomer comprising: a shaft; a handle; said handle configured to be grasped by a hand of a user to manipulate said toenail groomer; and a grooming head, said grooming head comprising: a housing; wherein said shaft is mounted to a portion of said housing; a motor and a coupler, said coupler being configured to couple to a portion of a filing bit, and said motor being configured to rotate the coupler and the filing bit to abrade a portion of the toenail; and wherein said housing comprises: a concave surface; and a first protrusion and a second protrusion each configured to protrude from a first portion of said concave surface, said first protrusion and said second protrusion being spaced apart a distance configured to contact a first top portion of one toe of the user at a first toenail groomer position, to align an axis of the filing bit with an axis of the corresponding toenail of the one toe, when the filing bit is proximal to the corresponding toenail.

2. The toenail groomer according to claim 1, wherein said first protrusion and said second

protrusion each comprise second portions configured to protrude from a second portion of said concave surface, said second portions of said first and second protrusions being configured to contact a second top portion of the one toe of the user at a second toenail groomer position, to align an axis of the filing bit with an axis of the corresponding toenail of the one toe, when the filing bit is distal from the corresponding toenail of the one toe; and wherein when said toenail groomer is rotated from said second toenail groomer position to said first toenail groomer position, said housing is repositioned to move the filing bit proximity to the corresponding toenail and permits pivoting of the toenail groomer upon the one toe to abrade the corresponding toenail of the one toe from a first side of an edge of the corresponding toenail across to a second side of the edge of the corresponding toenail.

3. The toenail groomer according to claim 2, wherein an axis of said motor is configured to support the axis of the filing bit at an obtuse angle with respect to an axis of said shaft.

4. The toenail groomer according to claim 3, wherein a length of said shaft is configured to position the filing bit in proximity to the corresponding toenail of the one toe when said handle is grasped and manipulated by the user, to permit filing of the corresponding toenail.

5. The toenail groomer according to claim 4, wherein said obtuse angle between the axis of said motor and the axis of said shaft is configured to position the filing bit at an acute angle with respect to a tip of the corresponding toenail.

6. The toenail groomer according to claim 5, wherein said a handle is fixedly secured to said shaft.

7. The toenail groomer according to claim 5, wherein said handle and said shaft are integrally formed as a single unitary part.

8. The toenail groomer according to claim 5, wherein said motor of said toenail groomer is configured to be powered by one or more rechargeable batteries; and wherein said toenail groomer comprises: a USB recharging socket.