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(54) **TIP FOR SKIN CLEANSING DEVICE**

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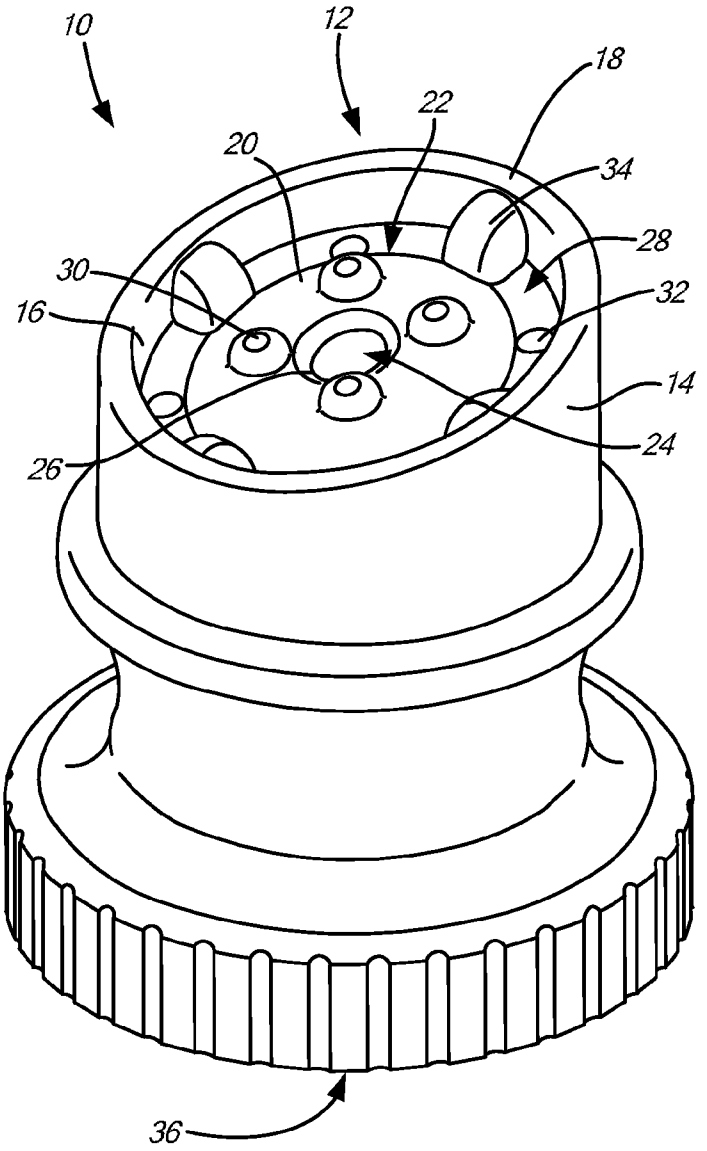
(57) **ABSTRACT**

A method and device for non-abrasively cleansing and exfoliating skin in combination with a cleansing solution. A cylindrical housing comprises a base for engagement with a fluid source and a vacuum source and a skin interface positioned on an end opposing the base and configured to contact and traverse a surface of the skin. The skin interface comprises non-abrasive, or rounded, smooth surfaces for contacting the skin. A combination of variable cleansing fluid delivery to the tip and vacuum pressure removal cleanses and exfoliates skin tissue or debris.



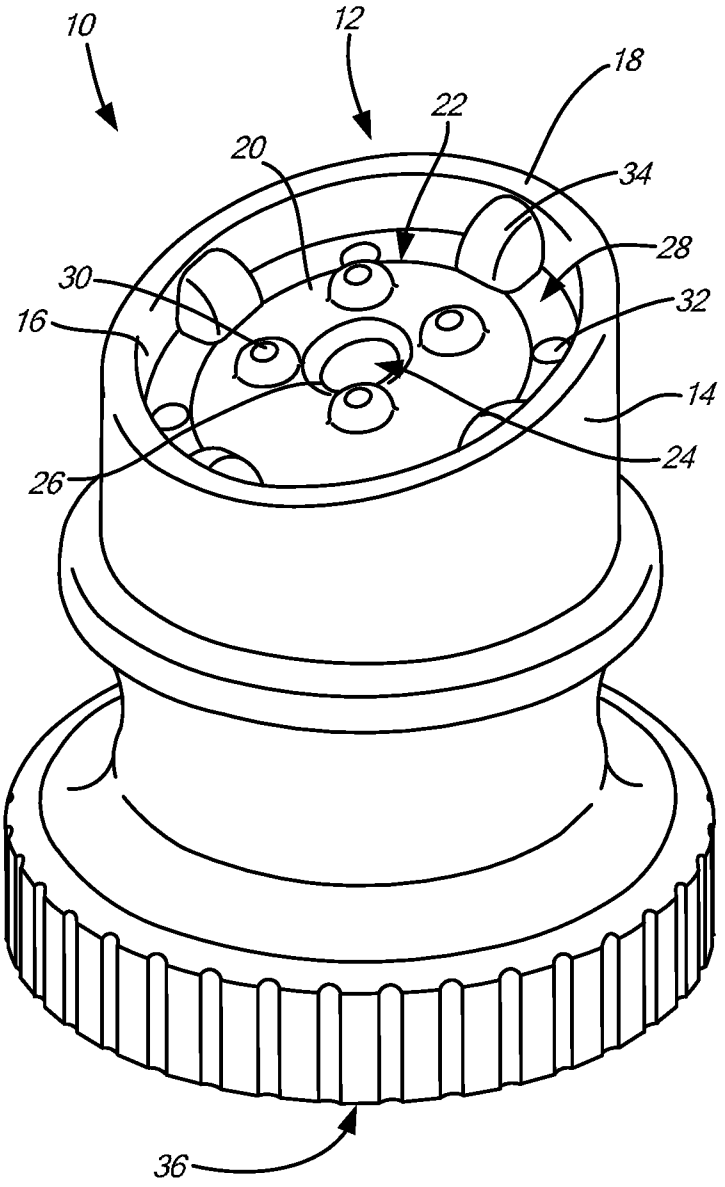


FIG. 1

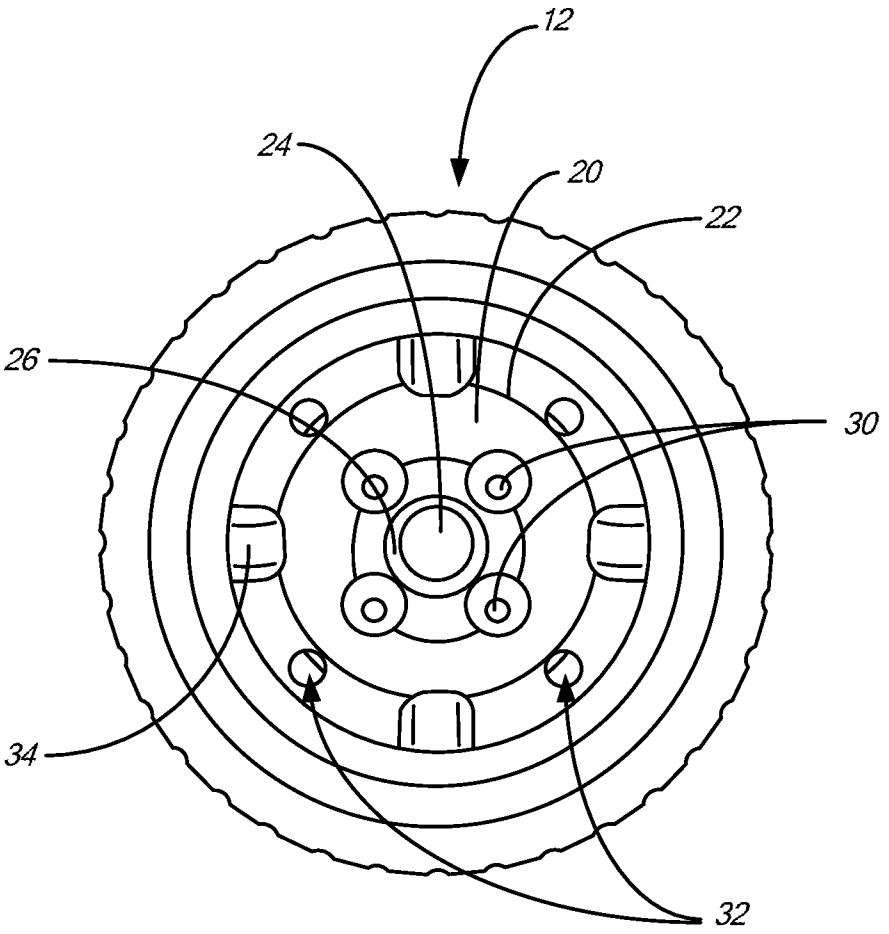


FIG. 2

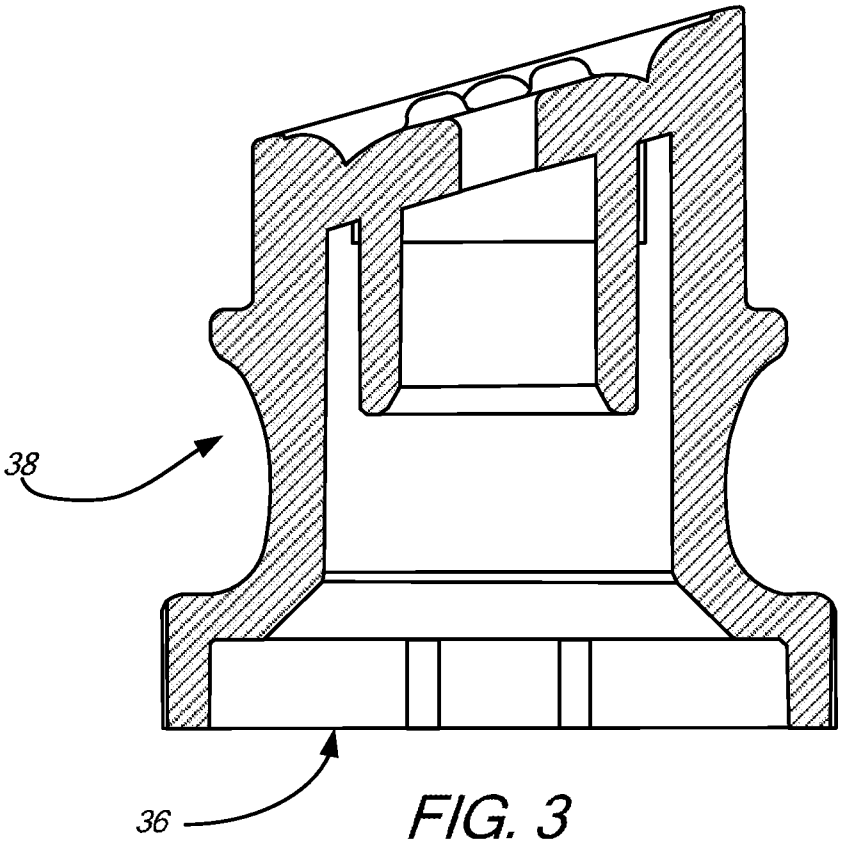


FIG. 3

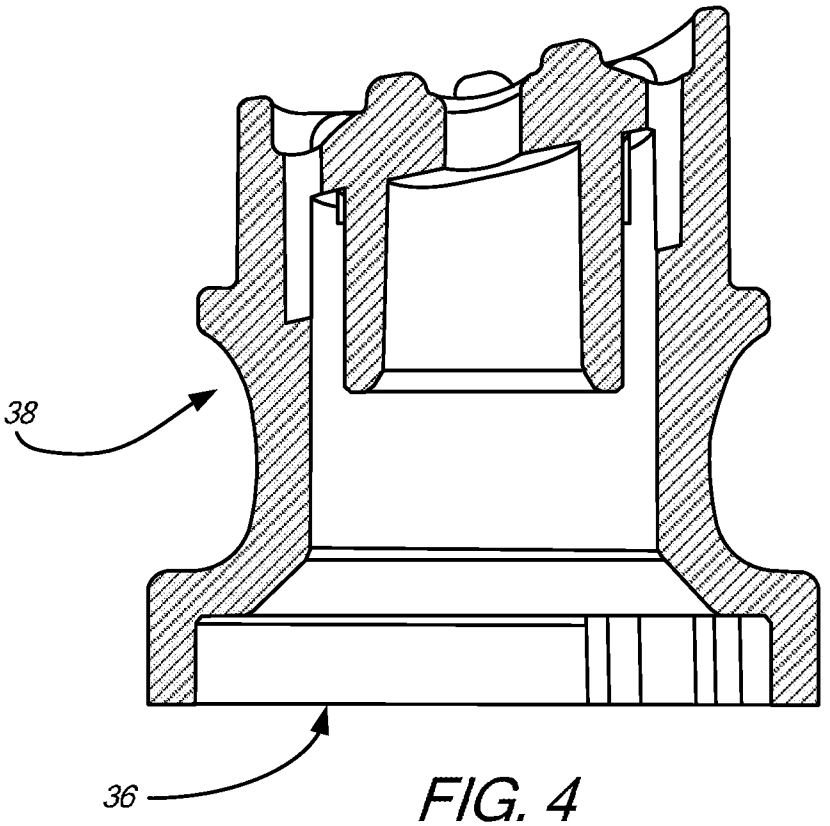


FIG. 4

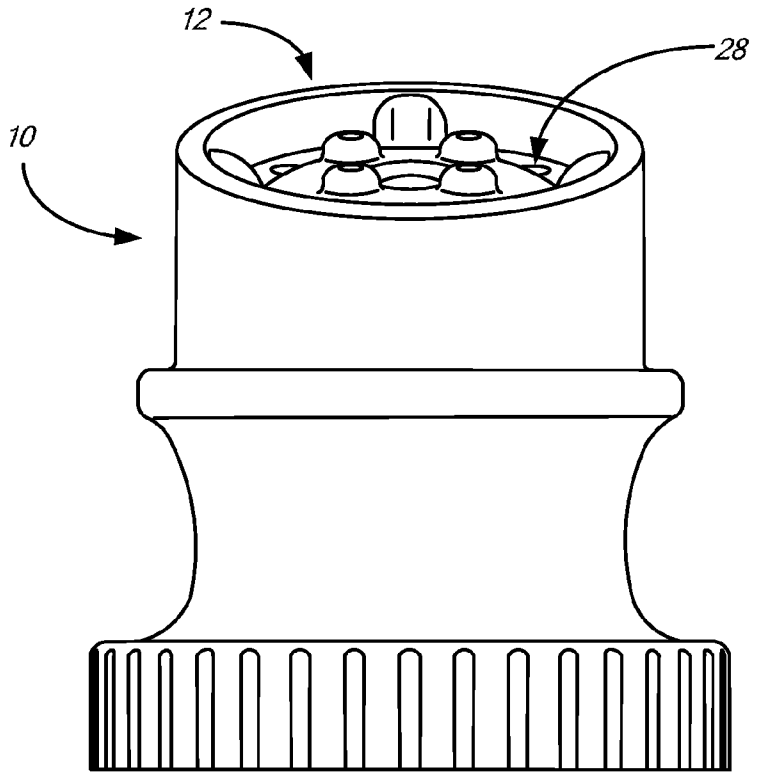


FIG. 5

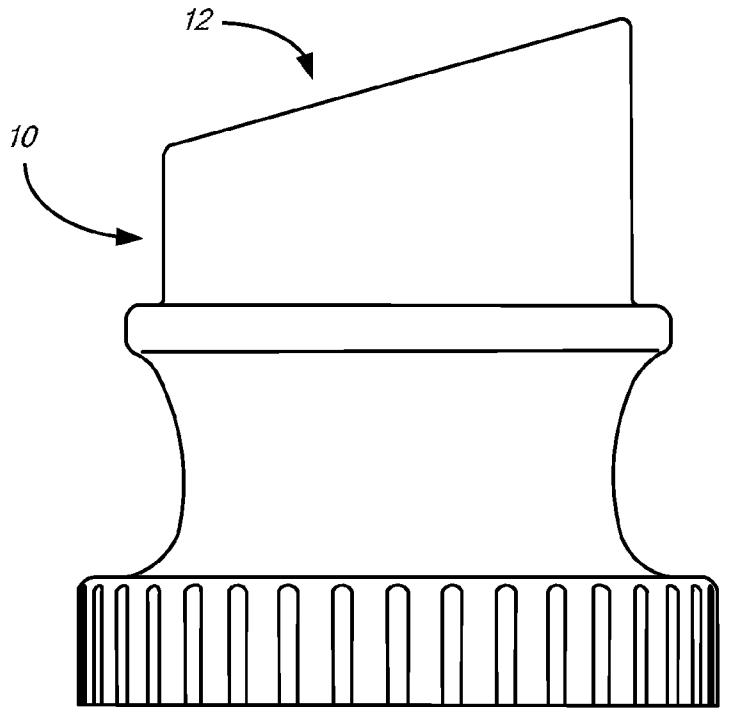


FIG. 6

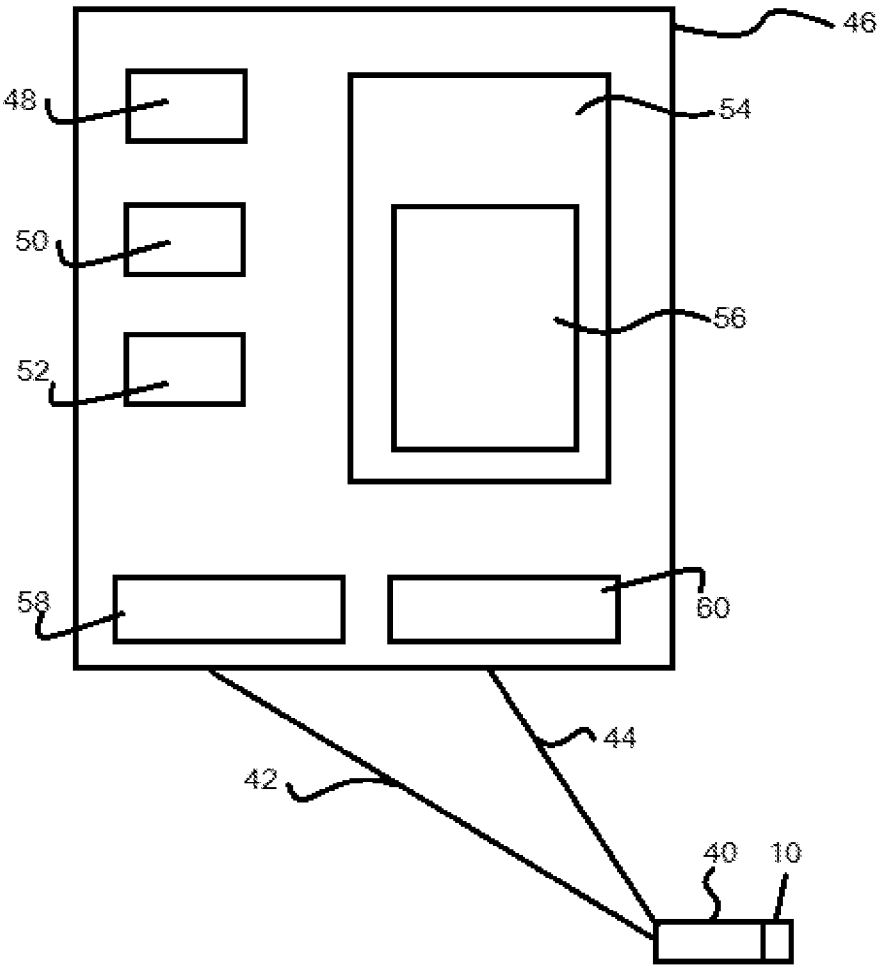


FIG. 7

TIP FOR SKIN CLEANSING DEVICE

CROSS REFERENCE TO RELATED APPLICATION

[0001] The present application is based on and claims the benefit of U.S. provisional patent application Ser. No. 62/115,471, filed Feb. 12, 2015, the content of which is hereby incorporated by reference in its entirety.

BACKGROUND

[0002] The present disclosure relates to devices for cleansing and rejuvenating the skin of a person. More specifically, the present disclosure relates to a replaceable tip for a cleansing fluid delivery device wherein the tip interfaces with the skin.

[0003] Maintaining the skin and/or surface of the skin in good condition requires proper washing for removal of dirt, debris and other pore clogging particles as well removing aged and/or dead skin cells or layers. Compounds such as sebum, which is secreted through the skin pores, is known to be superior in skin protection and refinement to any artificial skin conditioners. It is thus beneficial to remove particles, organisms, debris and dead or dying skin cells in order to support to the normal secretion of sebum from the skin surface, as these particles can accumulate and clog the skin pores. Further, the particle accumulation can also hinder skin respiration (dermal respiration) resulting in pimples, blackheads and rashes.

[0004] Prior art methods of cleansing the skin have been superficial, limited to washing with known face cleansers which are considered effective by temporarily keeping the face clean. However, such face washing is insufficient in that it fails to remove particles which have accumulated in the skin pores. Some cleansers even include chemicals including various types of acid (e.g. glycolic acid) to remove outer layers of skin and accumulated cells through chemical dissolution of the tissue. Such cleansers are not appropriate for those with sensitive skin and cause irritation and redness when used.

[0005] Alternative prior art methods of cleansing the skin to remove accumulated waste have also include physical exfoliation with abrasive surfaces for contacting the skin to remove the outer most layers of skin. These abrading methods cause pain during and after cleansing. Patients with sensitive skin may experience pain, itching, redness and or sensitivity long after the cleansing has been completed. In some instances, physical abrasion removes layers of skin too deep to be considered effective, opening areas of the skin surface up to infection.

SUMMARY

[0006] An aspect of the present disclosure relates to a system and device for non-abrasively cleansing and exfoliating the skin in combination with a fluid. The system comprises a handheld housing having a removable non-abrasive tip configured for contacting the skin. The tip has a recessed area bounded by a raised outer perimeter having a rounded outer surface, a convex domed feature within the outer perimeter, and a plurality of smooth rounded surfaces positioned within the perimeter. The system further comprises a liquid source connected to the handheld housing and configured to deliver liquid to the handheld housing as well as a vacuum suction source connected to the handheld housing and configured to remove used liquid and debris from the tip and handheld housing and to provide suction between the non-abrasive tip and the skin. A controller is configured for selectively adjusting liquid turbulence, bubble formation, frequency pulsation, air pressure variances, or combinations thereof thereby non-abrasively cleansing and exfoliating the user's skin.

[0007] The tip is a removable and replaceable non-abrasive tip configured for contacting the user's skin. The tip comprises a cylindrical housing having a skin interface portion at a first end and a base end at a second opposing end, the base end being configured for connection to a handle or wand that supplies at least a fluid and/or vacuum to the tip. The skin contact surface is configured to make contact with the skin surface and form a seal with the skin via a smooth round surface perimeter of the tip when vacuum suction is applied. The perimeter surface comprises an upwardly extending perimeter wall defining an interior space therein. The perimeter wall terminates in an upwardly or outwardly facing smooth rounded surface. This surface is the skin contact surface which contacts the skin during cleansing and exfoliation. A seal is formed between the skin contact surface and the surface of the skin to allow for the cleansing fluid to circulate in the interior space bounded by the perimeter wall and the skin surface.

[0008] An inlet aperture is provided for introducing fluid flow into the recessed area and a plurality of outlet apertures are configured for removing fluid and debris from the recessed area during cleansing. The inlet aperture may be positioned within the center of a convex dome feature positioned within the interior space. The outlet apertures may then be positioned around the perimeter thereof.

[0009] A first plurality of smooth rounded spacers protrude from the interior space on the skin interface portion bounded by the perimeter wall. The spacers have smooth rounded surfaces and may comprise upwardly extending rounded prongs positioned on a convex domed feature positioned within the interior space. The first plurality of spacers are fluid intake spacers and are thus positioned around the inlet aperture, which may be a fluid inlet, or fluid discharge port, and are configured to space the skin from the fluid inlet to allow the fluid to freely enter and circulate within the interior space. The inlet spacers may make intermittent or continuous contact with the skin surface during cleansing and exfoliating.

[0010] A second plurality of smooth rounded spacers may be outlet aperture spacers. The outlet aperture spacers may have a rounded length and may be spaced apart around an outer perimeter of the interior space of tip. The outlet spacers may be positioned between a perimeter of the domed fixture and the inner surface of the perimeter wall of the skin contact surface. These spacers are configured to space the skin from the vacuum ports, thus allowing the outlet apertures, or exit ports to allow for the suction and removal of fluid and debris from the interior area and to prevent the skin from clogging or covering an exit port positioned between two adjacent spacers. The outlet spacers may make intermittent or continuous contact with the skin surface during cleansing and exfoliating.

[0011] Another aspect of the present disclosure relates to a method for non-abrasively cleansing a surface of skin. The method comprises placing a tip having a skin contact portion in contact with the surface of skin, forming a sufficient vacuum seal between the skin and the skin contact surface, and continuously delivering a fluid, such as a cleansing fluid mixture, through an inlet aperture in the tip and into an interior space formed between the skin interface portion and the

surface of skin. Cleansing and exfoliating further comprises traversing the tip in a selected pattern across the surface of the skin while maintaining a seal between the skin and the skin contact surface while continuously providing fluid and removing used fluid and debris from the interior space through at least one outlet aperture in the tip by vacuum pressure or negative fluid pressure. Further, cleansing and exfoliating can be controlled by adjusting at least one of a fluid delivery turbulence, fluid bubble formation, fluid pulsation, sound frequencies, negative pressure (vacuum), flow rate, fluid velocity or a mixture thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] FIG. **1** is a perspective view of a tip for a skin cleansing device according to the present disclosure.

[0013] FIG. **2** is a top view of the tip.

[0014] FIG. **3** is a sectional side view of the tip.

[0015] FIG. **4** is an alternative sectional side view of the tip.

[0016] FIG. **5** is a front perspective view of the tip.

[0017] FIG. **6** is a side view of the tip.

[0018] FIG. **7** is a schematic view of a skin cleaning system according to the present disclosure.

DETAILED DESCRIPTION

[0019] The present disclosure is directed to a device for cleansing the skin safely and comfortably utilizing a liquid cleanser without abrading the skin. The cleansing and exfoliating device of the present disclosure includes a skin contact tip **10** configured for use with a liquid cleansing system. The tip **10** is configured for operable connection with a distal end of a handheld wand **40** or umbilical cord which is also operably connected to a machine for fluid delivery and for providing vacuum suction through the wand **40** to the tip **10**. The system delivers liquid through the wand and to an aperture in the tip **10** and also removes fluid from the tip **10** through at least one aperture for vacuum suction and removal.

[0020] The system, including the tip **10**, allows for exfoliation of the skin surface, which can occur without scraping and without an abrasive structure. For example, the tip **10** of the present disclosure is configured for use with a non-abrasive chemical solution, or a cleansing solution/fluid. The cleansing fluid cooperates with the tip **10**, which can traverse the skin surface. The tip **10** forms a seal with the skin surface and traverses the skin surface while the cleansing fluid is simultaneously delivered to the tip. Delivery of the cleansing fluid can be selectively controlled and thus may be delivered in variable combinations and patterns of flow rates, flow velocities, liquid turbulence, bubbles, frequency pulsation, variations in sound frequencies, fluid temperature and/or air pressure variances to achieve exfoliation of the skin surface without an abrasive structure or abrasive surface component in the tip **10**. This allows the tip **10** and cleansing fluid to gently exfoliate and cleanse pores by a non-abrasive, liquid only method where exfoliation is achieved by flow rates, flow velocities, fluid turbulence, temperature controlled fluid bubbles and pulsation, sound frequencies and/or adjustable negative air pressure (vacuum) to tip **10**.

[0021] The tip **10** of the skin cleansing device as illustrated in FIGS. **1-6** comprises a skin surface interface **12**. Interface **12** comprises a continuous, raised outer ring **14**. The outer ring **14** is defined by a wall **16** having a suitable thickness in the range of about 0.8 to about 1.8 mm, where in the embodiment illustrated in the figures, the thickness of outer ring **14** is about 1.2 mm. The outer ring **14** comprises an upper ring or skin-contact surface **18** having a radius in the range of about 0.3 mm to about 0.7 mm, where in the embodiment illustrated in the figures, the radius of the upper ring surface **18** is about 0.5 mm. The upper ring surface **18** may have a radius at least two times smaller than the thickness of the outer ring **14**, thus the diameter of the upper ring surface may generally be less than the thickness of the outer ring **14**, providing a rounded skin contact surface to tip **10**. However, due to the raised surface of the upper ring or interface **18** no edge of the outer ring **14** or the surface or interface **18** contacts the skin and forms a seal therewith.

[0022] Tip **10** further comprises a convex domed main body **20** having a perimeter **22** that is spaced from outer ring **14**. The domed body **20** comprises at least one inlet port **24** with a concave **26** surface for directing cleansing solution into an interior cavity **28** formed between the tip **10** and the skin surface. The domed body **20** comprises a plurality of spaced about hemispheres **30**, each hemisphere having a radius in the range of about 0.5 mm to about 1.5 mm, where in the embodiment illustrated in the figures, each has a radius of about 0.8 mm. Each hemisphere **30** protrudes outwardly from the outer surface of domed body **20**. The hemispheres **30** may be a first plurality of spacers. These spacers are fluid intake spacers, and are thus positioned around the inlet port **24**. The hemispheres **30** are configured to space the skin from the inlet port **24** during use to allow the fluid to freely enter and circulate within the interior space as a seal is formed between skin-contact surface **18** and the skin. The inlet spacers may make intermittent or continuous contact with the skin surface during cleansing and exfoliating. While a hemisphere **30** is illustrated, other non-abrading protuberances are also within the scope of the present disclosure.

[0023] In a surface separating the perimeter **22** of the domed main body **20** and the inner surface of the outer ring **14** are a plurality of outlet ports **32** for removal of cleansing solution. The outlet ports **32** may be intake holes that comprise integral apertures in said surface, allowing for vacuum drainage or suction removal of the cleansing solution and skin. The illustrated embodiment comprises three outlet ports **32**, however two or more outlet ports may also be used and spaced along the surface at selected locations.

[0024] Said surface also provides a space in which a plurality of spaced protuberances **34** are positioned. Each protuberance **34** has at least one rounded surfaced and each protuberance has a radius in the range of about 0.7 mm to about 1.5 mm, where in the embodiment illustrated, the radius is above 1.0 mm. The protuberances are positioned in the space so as to extend from an inner wall of the outer ring **14** to the perimeter **22** of the domed main body **22**. The illustrated example comprises four protuberances, however three or more protuberances may be incorporated and up to eight protuberances may be optionally spaced around the perimeter and incorporated into the tip **10**. The protuberances **34** comprise a second plurality of smooth rounded spacers, which may be outlet port **32** spacers. The outlet port spacers are configured to space the skin from the outlet ports, allowing the vacuum suction through the outlet ports to remove used fluid and debris from the interior area without obstruction. These outlet port spaces are also configured to prevent the skin from clogging or covering an outlet port **32** positioned between two adjacent spacers **34**. The outlet spacers may

make intermittent or continuous contact with the skin surface during cleansing and exfoliating and are thus, rounded and smooth.

[0025] The interior hemispheres **30** may have a radius larger than a radius of the outer ring **14** and/or at least larger than a radius of the upper ring surface **18**. The upper ring surface **18**, the hemispheres **30** and the protuberances **34** each provide a substantially smooth, rounded surface, without edges, where the rounded surfaces may contact the skin surface when the tip **10** is used with the cleansing system. Tip **10** is thus configured to provide a non-abrasive cleansing system including delivery of a liquid cleansing solution to the skin surface or tissue, where the delivery tip **10** glides smoothly across the skin surface via substantial contact of at least substantially the entire upper ring skin contact surface **18** with the skin surface, forming a seal between the contacted skin surface and tip **10**. Tip **10** may then traverse the skin surface by moving the wand with manual force, maintaining contact and a seal with the skin and in combination with vacuum pressure used to deliver and remove the cleaning solution through the inlet port **24** and outlet ports **32**, respectively. Tip **10** may be comprised of a durable, lightweight and substantially smooth material, for example, tip **10** may be a molded plastic tip. Tip **10** may also be a disposable tip, designed for a single use, such that tip **10** can be removed from the system and disposed of after or between uses.

[0026] As illustrated in FIGS. **5-6**, skin interface **12** may be positioned at a slant or angle with respect to tip **10** and base **36** which is generally horizontal, providing an angled interface for contact with the skin surface. The skin interface **12** comprises the upper ring surface **18**, the hemispheres **30**, and the protuberances **34**, any or all of which may contact skin during operation. Depending on levels of vacuum pressure and skin elasticity or integrity when traversing the skin a portion of the protuberances **34** may also contact the skin surface. These surface may all be smooth surfaces for allowing ease of movement of tip **10** along the skin surface. Skin interface **12** is also angled such that a first side may be lower height that a directly opposing side, where the interior space **28** remains bounded by height of the skin interface **12**.

[0027] An operator causes tip **10** to traverse the user's skin surface in a selected treatment area while substantially maintaining the seal between the skin contact surface **18** of the tip **10** and the skin surface. The tip **10** may be traversed in selected patterns configured for treatment in connection with adjusting sound frequencies of the cleansing system or while pulsing delivery of the cleansing fluid. Tip **10**, in combination with the skin cleansing device is configured for delivery of a non-abrasive cleansing solution and vacuum suction which cleanses and revitalizes the skin, including exfoliation of the skin surface and dermal tissue without physical abrasion or the need for an abrasive surface. The system is configured to utilize fluid turbulence, controlled fluid bubbles and pulsation, sound frequencies and adjustable negative air pressure (vacuum) delivered to and/or through tip **10**.

[0028] The tip **10** is also configured with a base section **36** and a tubular length **38** which separates the skin interface portion and the upper ring surface **18** from the base **36** connection. The base **36** is configured for threaded connection, snapping or other operable engagement with a delivery wand or handle **40**. The operator handles the wand or umbilical cord **40** which allows the operator to move the tip **10** across the skin in selected patterns. The tip **10** is thus generally a hollow cylinder in overall shape, providing an opening to the interior of the cylindrical portion of tip **10**. The wand **40** allows the operator to select a tip, secure the tip **10** to the wand **40** and traverse the tip **10** across the person's skin. The wand **40** carries tubing **42** connected to a liquid supply reservoir and tubing **44** which is connected to a vacuum source **52** for removal of used cleansing fluid. The vacuum source **52** is provided with a controller and adjustable valve means for adjusting the pressure level setting to any suitable range. The operator will be able to adjust the setting based on the user's skin condition and other factors which allows the operator to select a vacuum pressure sufficient to achieve and maintain the selected level of suction against the user's skin.

[0029] Referring to FIG. **7**, the base **36** of the tip **10** is configured for operable connection to the wand **40**. The tubing **42** and **44** is carried by the wand **40** and is connectable to appropriate inlet and outlet apertures within the tip **10** and extending to the interior area of the tip **10**. Conduits allow for connection of the tubing **42** to inlet port **24** for cleansing fluid flow through tip **10** to the interior area and for connection to tubing **44** for vacuum pressure and thus removal of used cleansing fluid and dermal tissue from the skin surface and the tip **10**. Opposing terminal ends of the tubing **42** and **44** connects the tip **10** via wand **40** to a machine **46** comprising at least a liquid warming or heating element **48** and a pump component **50** as well as the vacuum or suction component **52**. The machine **44** is also configured with a controller **54** which may include a user interface **56** which allows the operator to selectively control fluid turbulence, fluid bubbles and pulsation, temperature, and/or sound frequencies of the fluid delivered to the tip **10** and/or air pressure (vacuum) of the fluid removed from the tip **10**. The machine **44** is further connected to or comprises a refillable liquid supply or reservoir **58** and connection to a waste reservoir **60** for collection or disposal of used cleansing fluid removed from the tip **10**.

[0030] Although the present disclosure has been described with reference to preferred embodiments, workers skilled in the art will recognize that changes may be made in form and detail without departing from the spirit and scope of the disclosure.

1. A device for non-abrasively cleansing and exfoliating the skin in combination with a fluid flow comprising:

a removable housing having a skin interface portion at a first end and a second opposing end configured for connection to a handle wherein the skin interface surface comprises:

an interior space bounded by an outer wall providing an interior space;

a plurality of substantially smooth rounded spacing elements protruding upwardly from within the interior space;

an inlet aperture for introducing fluid flow into the recessed area; and

a plurality of outlet apertures for removing fluid and debris from the recessed area.

2. The device of claim **1**, wherein the inlet aperture is substantially centered in a convex domed fixture positioned within the interior space and is configured for connection to a fluid source for selectively controlling delivery of a supply of fluid into the recessed area.

3. The device of claim **2**, wherein the fluid is a cleansing fluid solution.

4. The device of claim **2**, and wherein the plurality of substantially smooth rounded elements comprises at least one inlet aperture spacer positioned on the convex domed feature,

wherein one or more of the at least one inlet aperture spacers is configured to maintain a space between the skin surface and inlet aperture.

5. The device of claim **2**, wherein the plurality of substantially smooth rounded elements comprises at least one outlet aperture spacer positioned between a perimeter of the domed fixture and the outer wall and adjacent an outlet aperture wherein one or more of the at last one outlet aperture spacers are configured to maintain a space between the skin surface and the outlet aperture.

6. The device of claim **1**, wherein the plurality of outlet apertures are configured for connection to a vacuum source for suction, drainage and removal of the fluid and skin debris.

7. The device of claim **1**, wherein the plurality of outlet apertures are spaced circumferentially around a perimeter of the interior area.

8. The device of claim **1**, wherein the outer wall comprises an upwardly facing perimeter surface for contacting the skin and wherein the perimeter surface is rounded.

9. The device of claim **1**, wherein the skin interface portion is configured to make a substantially sealed contact with the skin surface wherein no edge portions are in contact with the skin for non-abrasively cleansing and exfoliating the skin by circulating fluid within the interior space and traversing the device across the skin surface.

10. A system for non-abrasively cleansing and exfoliating a user's skin in combination with a fluid flow comprising:

a handheld housing having a removable non-abrasive tip configured for contacting the skin wherein the tip comprises a recessed area bounded by a raised outer perimeter having a rounded surface configured to form a seal with the user's skin, a convex domed feature within the outer perimeter, and a plurality of smooth rounded protuberances positioned within the perimeter;

a liquid source connected to the handheld housing and configured to deliver liquid to the handheld housing;

a vacuum suction source connected to the handheld housing and configured to remove used liquid from the handheld housing and to provide suction between the non-abrasive tip and the skin; and

a controller configured for selectively adjusting flow rate, flow velocity, liquid turbulence, bubble formation, frequency pulsation, pressure variances. or combinations thereof thereby non-abrasively cleansing and exfoliating the user's skin.

11. The system of claim **10**, wherein the liquid is a non-abrasive cleansing solution.

12. The system of claim **10**, wherein the removable tip further comprises at least one liquid flow inlet aperture and at least one outlet aperture configured for removal of used liquid and exfoliated skin debris.

13. The system of claim **12**, wherein the plurality of smooth rounded protuberances comprise a combination of at least one inlet spacer configured to maintain a space between the skin surface and inlet aperture and at least one outlet spacer configured to maintain a space between the skin surface and the at least one outlet aperture.

14. A method for non-abrasively cleansing a surface of skin comprising:

providing a handheld housing having a removable tip, wherein the handheld housing is operably connected to a fluid supply and a vacuum source;

placing the removable tip in contact with the surface of skin to form a seal with the surface of the skin wherein the removable tip comprises a non-abrasive skin interface portion;

delivering fluid through an inlet aperture in the tip and into an interior space formed between the skin interface portion and the surface of skin;

traversing the handheld housing in a selected pattern across the surface of the skin with the tip in contact with the skin while maintaining the seal;

continuously removing used fluid and debris from the interior space through at least one outlet aperture in the tip by selectively controlling vacuum pressure; and

adjusting at least one of a flow rate, flow velocity, fluid delivery turbulence, fluid bubble formation, fluid pulsation, sound frequencies, negative air pressure (vacuum) or a mixture thereof.

15. The method of claim **14**, wherein the fluid is a cleansing fluid.

16. The method of claim **14**, wherein the skin interface portion comprises a plurality of substantially smooth rounded surfaces for contacting the skin.

17. The method of claim **16**, wherein the skin interface portion has a perimeter wall having a smooth rounded outwardly facing surface for contacting the surface of the skin when traversing the tip across the surface of the skin to enclose the interior space between the tip and the surface of the skin.

18. The method of claim **16**, wherein the plurality of substantially smooth rounded surfaces comprises at least one inlet aperture spacer positioned on the convex domed feature, wherein one or more of the at least one inlet aperture spacers is configured to maintain a space between the skin surface and inlet aperture.

19. The method of claim **16**, wherein the plurality of substantially smooth rounded surfaces comprises at least one outlet aperture spacer positioned between a perimeter of the domed fixture and the outer wall and adjacent an outlet aperture wherein one or more of the at last one outlet aperture spacers are configured to maintain a space between the skin surface and the outlet aperture.

20. The device of claim **16** wherein the plurality of substantially smooth surfaces comprise a combination of at least one inlet spacer and at least one outlet spacer configured to provide a space between the skin and the inlet and outlet apertures.

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