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Kovach

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[54] **SKIN MASSAGING INSTRUMENT**

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[52] **U.S. Cl.** **128/66**
[51] **Int. Cl.** **A61h 9/00**
[58] **Field of Search** ..... 128/66, 62 A, 366

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Attorney, Agent, or Firm—William R. Liberman, Esq.

[57] **ABSTRACT**

A confined area of skin, not exceeding about 1½ sq. inches, is treated by exposing it to an aqueous jet pulsating at between 2,200 and 3,200 cycles per minute and being incident on the skin at a velocity of between 9 feet/sec. and 18 feet/sec. The massage device includes a hollow handle containing a reservoir and housing a piston pump and a drive motor. A tubular cylindrical shield extends radially from the top of the handle and has an open distal end and supports an axial nozzle at its proximate end which communicates by a passageway in the handle member to the pump cylinder and an adjustable by-pass valve connecting the passageway to the reservoir. The pump cylinder communicates with the reservoir bottom through a check valve, and the rear of the shield communicates by a drain pipe with the top of the reservoir.

9 Claims, 5 Drawing Figures

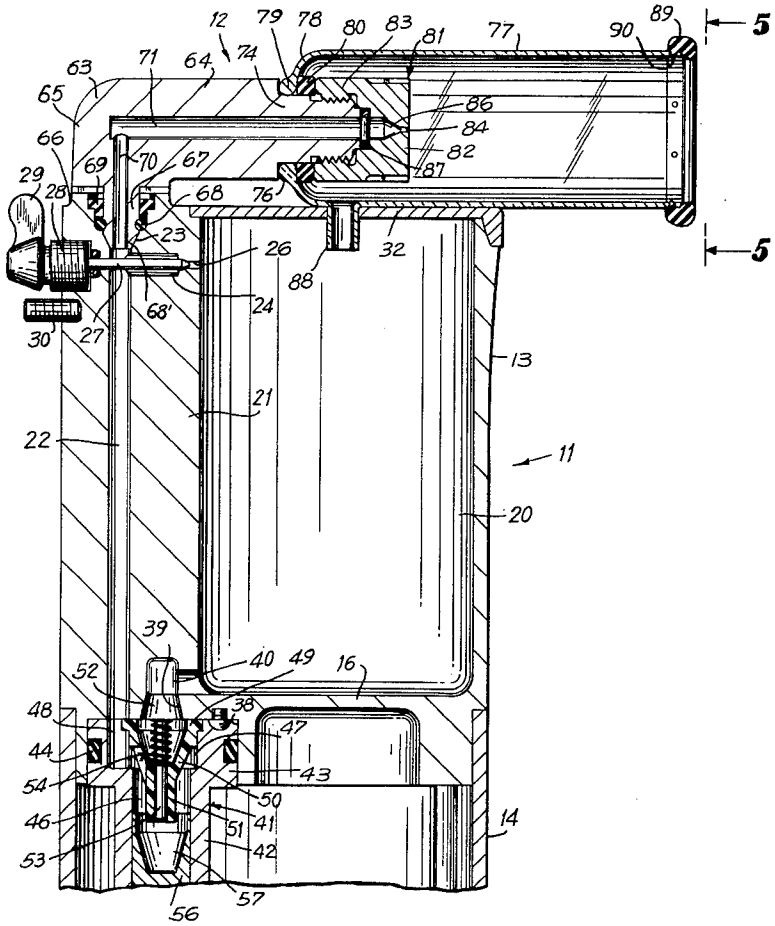

FIG. 1

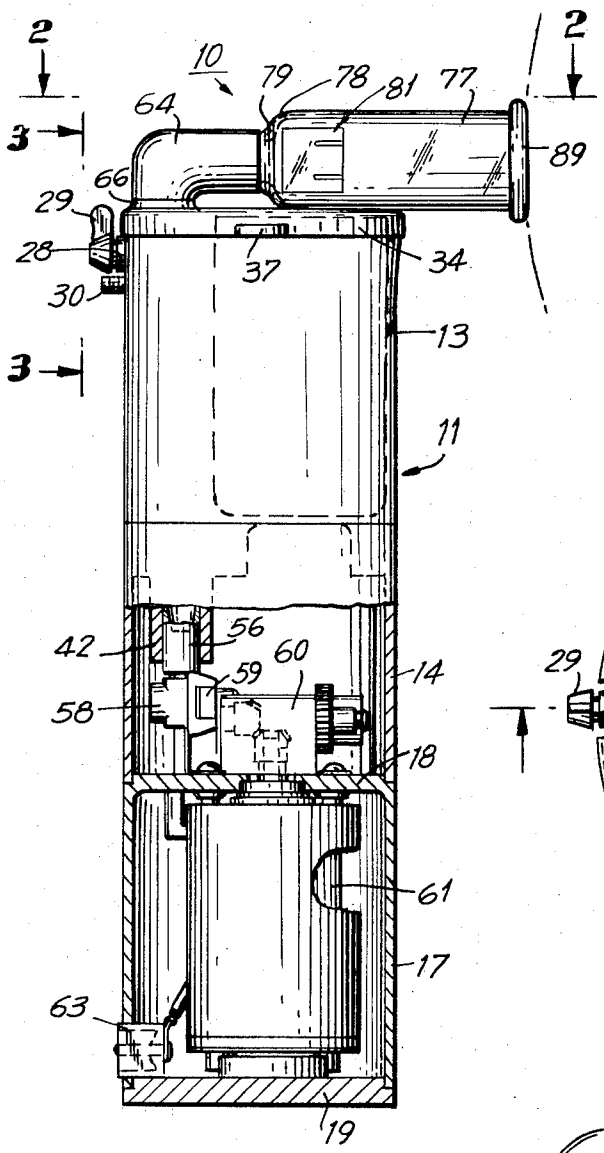

FIG. 2

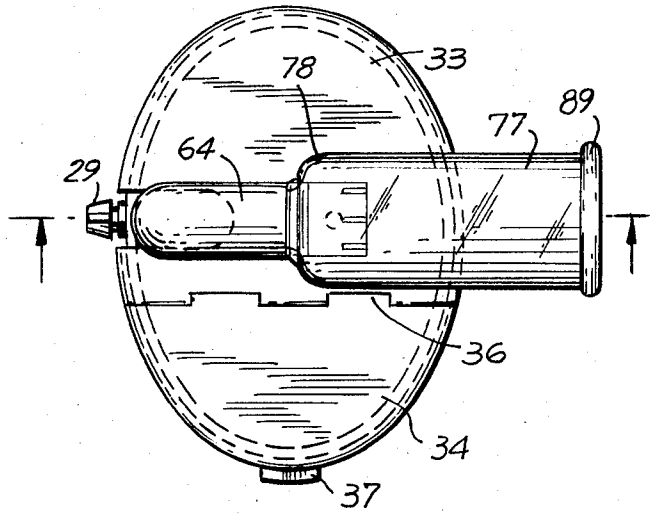

FIG. 3

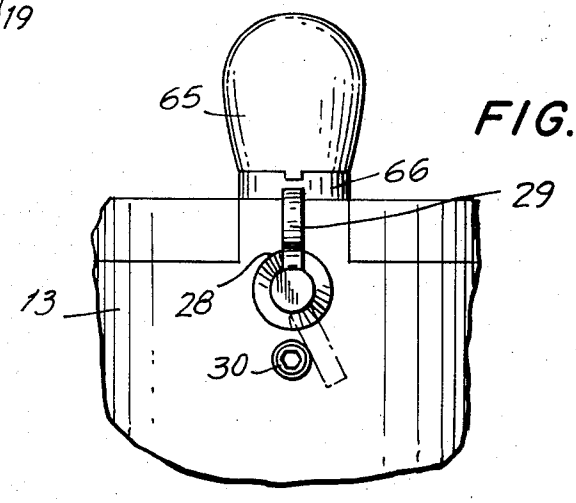

FIG. 4

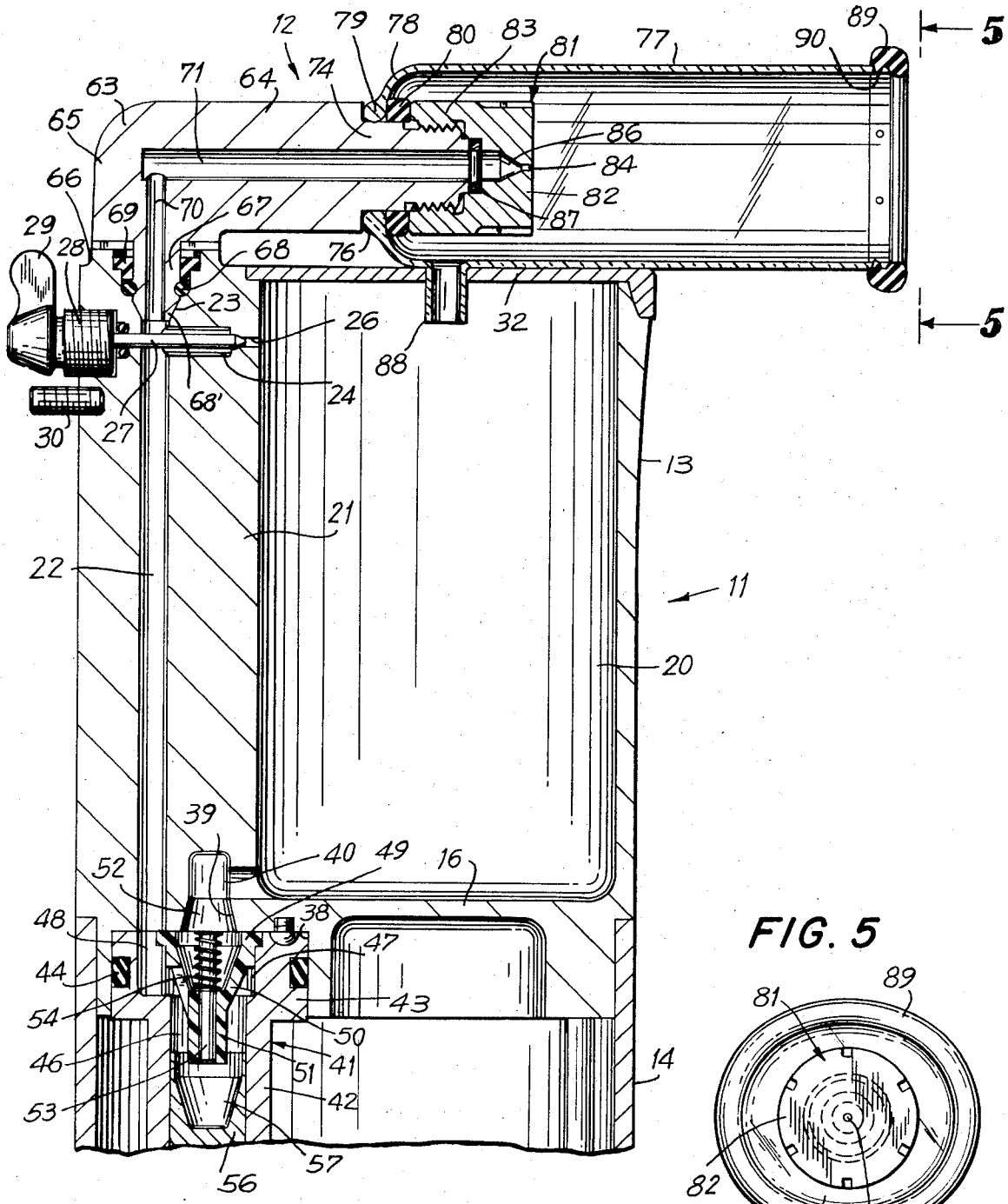
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FIG. 5

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SKIN MASSAGING INSTRUMENT

BACKGROUND OF THE INVENTION

The present invention relates generally to improvements in methods and devices for the treatment of tissue and it relates particularly to an improved method and device for treating the skin to improve the condition and appearance thereof.

Many forms and types of procedures and devices have been employed to improve the appearance and physical condition of portions of the skin in such areas which are either wrinkled or prone to wrinkle. A conventional procedures involves the local massage or physical treatment of the skin area to be treated. However, the devices and processes employed in effecting such physical treatment possess numerous drawbacks and disadvantages. They are generally unreliable and usually ineffective, are difficult to apply, particularly in confined areas, and highly uncomfortable and inconvenient, are of little versatility and adaptability and otherwise leave much to be desired.

SUMMARY OF THE INVENTION

It is a principal object of the present invention to provide an improved method and device for treating tissue.

Another object of the present invention is to provide an improved method and device for treating skin to improve the condition and appearance thereof.

Still another object of the present invention is to provide an improved method and device for massaging the skin.

A further object of the present invention is to provide an improved method and device for the liquid massage of sharply delineated areas of the skin.

Still a further object of the present invention is to provide an improved method and device of the above nature characterized by high effectiveness and reliability, greater versatility and adaptability, and ease and convenience of application.

The above and other objects of the present invention will become apparent from a reading of the following description taken in conjunction with the accompanying drawings which illustrate a preferred embodiment thereof.

It has been discovered that sharply delineated restricted areas of skin are effectively massaged or treated by confining the area to be treated under peripherally applied pressure and directing thereon a pulsating jet of liquid, preferably an aqueous liquid which may contain dissolved or dispersed additives such as emoluments or the like. The pulse frequency is advantageously between 2,000 and 3,200 pulses per minute; the velocity of the jet directed toward the skin is advantageously between 9 feet/sec. and 18 feet/sec., and the area subjected to the pulsating liquid jet is confined by a rim pressed against the border of skin being treated and delineating an area between 0.75 and 1.5 square inches.

The improved device for the practice of the above method basically comprises a liquid confining shield member having an opening at its distal end, a nozzle directed toward the distal opening in the shield member and means for producing a pulsating liquid flow through the nozzle.

In the preferred form of the device there is provided a hollow handle having a liquid reservoir therein and housing a piston pump connected to the reservoir by way of a check valve, an electric motor for driving the pump and a battery energizing the motor through a switch. The shield is a tubular cylinder with an open front end provided with a margining elastomeric ring, and is mounted atop the handle and projects radially therefrom. A nozzle is coaxially supported in the rear of the tubular cyliner, and is connected by a passageway formed in the handle to the pump cylinder, a pressure adjusting by-pass valve connecting the passageway to the reservoir. A drain pipe connects the rear portion of the tubular cylinder to the reservoir, and the reservoir is provided with a closure member affording access thereto. Advantageously, the distance between the nozzle orifice outlet and the plane of the shield distal opening is between 1.0 inch and 1.75 inch, and the diameter of the nozzle orifice preferably is between 0.055 inch and 0.065 inch.

The improved method and device are highly effective and reliable, simple and convenient to use and apply and are of great versatility and adaptability.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a side elevational view, partially in section, of a liquid massage device embodying the present invention;

FIG. **2** is a top plan view thereof;

FIG. **3** is an enlarged fragmentary view taken along line **3—3** in FIG. **1**;

FIG. **4** is an enlarged section view taken along line **4–4** in FIG. **2**; and

FIG. **5** is a front elevation view taken along **5 — 5** in FIG. **4.**

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, which illustrate a preferred embodiment of the present invention, reference numeral **10** generally designates the improved skin treatment device which includes a reservoir and houses a battery-energized motor driven pulsating pump and is of the nature of that described in compending application Ser. No. 254,458, filed May 18, 1972, in the name of Leslie J. Kavach. A nozzle and shield assembly **12** mounted atop handle member **11.** Handle member **11** is formed of any suitable material and includes an open topped top reservoir section a coaxial tubular intermediate section delineated from top section **13** by the bottom wall **16** of top section **13** and engaging in inwardly offset skirt wall depending from bottom wall **16** and a coaxial tubular bottom section delineated from intermediate section **14** by a top wall **18** of bottom section **17.** The open bottom section **17** is closed by a separable cover, so to permit access to the interior of bottom section **17.**

A reservoir-defining well **20** is formed in upper section **13** and included a thickened side wall **21** having a vertical passageway or bore **22** terminating at its top in an enlarged coaxial coupling socket **23** having a downwardly tapered lower face. A transverse bore **24** extends inwardly from bore **22** directly below socket **23** and terminates in a coaxial bore section **26** of reduced diameter extending into well **20,** a tapered peripheral shoulder defining a valve seat delineating the bores **24** and **26.** A needle valve stem **27** having a tapered end registering with the valve seat rotatably registers with a bore coaxial with and opposite to bore **24** and terminates in an externally threaded enlarged head **28** en-

gaging a tapped counter bore coaxial with bore **24** and extending to the outer face of wall **21.** A finger piece **29** is formed on the outerface of head **28** and is rotatable slightly less than 360° as restricted by an outwardly projecting stop **30** located in the path of finger piece **29.** An **0**-ring nests in a well at the base of the counter bore and engages valve stem **27** to effect a watertight seal. The angular adjustment of finger piece **29** effects the adjustment of valve stem **27** between a position closing communication between bore **22** and reservoir **20** and a maximum open position providing communication between bore **22** and reservoir **20** by way of narrow bore **26.**

The top of the reservoir **20** is closed by a top wall **32** including a first side section **33** of greater than half the transverse cross section of the handle top section **13** and a second side section **34** connected by hinges **36** to the first section **33.** The top wall section **34** defines a lid or door provided with a finger tab **37** permitting the swinging of the lid **34** being open and closed positions providing access to and sealing the reservoir cavity **20** respectively.

A circular cylindrical well **38** is formed in the side underface of wall **16** underlying wall **22** and is provided at its base with a coaxial conical check valve seat **39** which communicates with the bottom of reservoir **20** by elbow passageway **40** formed in walls **16** and **21.** a reciprocating piston pump **41** includes a vertical cylinder section **42** having an enlarged upper cylindrical head **43** nesting and suitably secured in well **38** and hermetically sealed by an elastomeric **0**-ring **44** registering with a peripheral groove in head **43.** The cylindrical section **42** has a vertical axial piston bore **46** enlarged at its upper section as at **47,** which communicates by a vertical side port **48** with passageway **22.**

An annulus **49** is firmly entrapped between a stepped peripheral shoulder about the upper edge of bore upper section and the base of well **38** and supports, by a depending spider **50,** a tubular slide bearing member **51** coaxial with the bore **46.** A frustoconical check valve member **52** mating the valve seat **39** is coaxial with the valve seat and includes a depending axial rod **53** slidably engaged by bearing member **51.** A helical impression spring **54** encircles rod **53** and is entrapped between the confronting faces of bearing member **51** and valve member **52** resiliently to urge valve member **52** into closing engagement with valve seat **39.** A piston **56** having an axial well **57** in its top face to form an upper skirt wall reciprocably engages the cylinder bore **46.**

A piston rod coaxially depends from piston **56** and is limited to axial reciprocation and has mounted thereon a crosshead **58** provided with a transverse track. An eccentric rotatable follower **59** slidably engages the crosshead track and is fixed to the output shaft of a transmission **60** mounted in the wall **18.** The input to transmission **60** is connected to the drive shaft of an electric motor **61** housed in the handle section **17** and mounted in wall **18.** Also housed in the handle section **17** is a rechargeable battery which is connected to the motor **61** by way of a normally open externally finger operable switch, not shown. The battery is also connected to a two prong electrical coupling **63** located on the wall of section **17** to permit the coupling of the battery to a suitable charger. The structure assembly and relationship of the pump, drive transmission, motor and battery are similar to those of the device described in the above identified patent application.

The nozzle and shield assembly **12** is replaceably mounted in and coupled to the handle section **11** and comprises an elbow member including a diametrically extending horizontal leg **64** located shortly above handle top wall **32** and a depending skirt leg **65** having a serrated underface engaging a mating horizontal top face of a raised annular platform **66** on wall **21.** A nipple **67** coaxially depends from elbow leg **65** and includes a frustoconical tip matingly engaging the base of socket **23.** An elastomeric **0**-ring **68** effecting a liquid tight seal between nipple **67** and socket **63** engages a peripheral groove in nipple **67** above tip **68'** and is secured in position by a plastic lock ring **69.**

An axial bore **70** extends from tip **68'** through leg **65** into communication with an axial bore **71** extending to the front end of leg **64.** The leg **64** terminates in a front section **74** of reduced diameter delineated from the rear section by a peripheral shoulder **76** and externally threaded at its distal end. A tubular shield member **77** is mounted in and projects coaxial from the leg **64** beyond the handle section **13,** resting in top wall **32.** The rear of shield **77** includes an inwardly rearwardly directed curved peripheral flange **78** terminating in a beaded section **79** which encircles leg section **74** and is tightly embraced between the shoulder **76** and an elastomeric washer **80.**

A cap shaped nozzle member **81** includes a front wall **82** and an internally threaded skirt wall **83** engaging the threaded portion of leg section **74** and bearing on the front face of and compressing the washer **80.** A cylindrical orifice **84** is formed in the nozzle wall **82** coaxial with shield **77** and nozzle **81** and communicates through a coaxial well **86** having a conical base tapering to orifice **84** and formed in the rear face of nozzle wall **82.** An elastomeric **0**-ring **87** nesting in a rear counterbore of well **86** in engaged by a forward projection of leg section **74** to effect a liquid tight seal.

A depending drain pipe **88** is integrally formed at the rear portion of shield **77** and project through a mating opening in wall **32** into the upper part of reservoir **20.** A soft elastomeric ring **89** encircles the front border of tubular shield **77** and projects forwardly of and overlies the front edge of shield **77** and is secured thereto by integrally formed peripherally spaced nipples projecting inwardly from ring **89** into engagement with correspondingly openings formed in shield **77.**

As a specific example of the preferred important dimensions and parameters of the device **10,** the orifice **84** has a diameter of 0.055 inch and is spaced between 1 inch and 1.75 inch from the front face of ring **89** which encloses an area between 0.75 and 1.50 square inches. The pumps **41** and the drive motor, battery and transmission, the valve **26, 27** and the various passageways are dimensioned and interrelated (or related) to produce a pulse frequency of between 2,200 and 3,200 per minute and a liquid velocity through orifice **84** of between 13 feet/sec. and 18 feet/sec. as adjustable by means of finger piece **29.**

Considering now the operation and application of the device **10** in practicing the improved method, the reservoir **20** is filled with water or an aqueous solution containing any desired solutes or dispersants through the open lid **34,** which is then closed. The finger piece **29** is then adjusted to vary the opening of the by-pass valve from passageway **22** into reservoir **20** and thereby adjust the jet velocity and pulse frequency. The rubber ring carrying end opening of shield **77** is pressed against

the skin, for example, the facial skin, to surround the area to be treated and effect a liquid tight seal between the shield and the skin and the motor energizing swith is then closed. The piston **56** is reciprocated by the energized motor by way of transmission **60** to draw liquid during its downward suction stoke from reservoir **20** by way of the suction-opened check valve **52** and to urge the liquid through the upward pressure stoke of piston **56** through the orifice **84** as a sharp jet. The pulsating liquid jet impinges on the skin delineated by the ring **89** and flows back through shield **87** and drain pipe **88** into reservoir **20** where it may be recirculated. It has been found that a highly effective treatment is achieved by exposing the confined area of the skin to the pulsating jet of the above frequency and at a velocity just below an uncomfortable pain level for a period of 20 to 40 seconds duration.

While there have been described and illustrated preferred embodiments of the present invention, it is apparent that numerous alterations, omissions and additions may be made without departing from the spirit thereof.

I claim:

1. A massage device comprising a liquid confining shield member having an opening at its distal end and a drain opening, a nozzle directed through said shield member toward said distal opening, a liquid reservoir, and means for producing a pulsating liquid flow from said nozzle and including a positive displacement intermittent pump having an outlet communicating with said nozzle and an inlet communicating with the lower part of said reservoir, said drain opening communicating with said reservoir.

2. The massage device of claim **1** wherein the pulse frequency of said liquid pulsating means is between 2,200 and 3,200 cycles per minute.

3. The massage device of claim **1** comprising a hollow handle member having said liquid reservoir therein, the shield member being mounted proximate the top of said handle member and having a drain opening therein, rearwardly of said distal opening, and an electric motor housed in said handle member and drive coupled to said pump.

4. The massage device of claim **3** wherein said pump is a reciprocating piston pump having a cylinder connected to said reservoir by way of a check valve.

5. The massage device of claim **4** including a tubular passageway in said handle connecting said cylinder to said nozzle and an adjustable by-pass valve between said passageway and reservoir.

6. The massage device of claim **3** wherein said shield member is of cylindrical tubular configuration and is mounted atop and projects radially from said handle member, said nozzle being coaxially disposed at the proximate end of said shield member.

7. The massage device of claim **6** including an elastomeric annular member engaging the front peripheral edge of said shield member.

8. The method of treating skin comprising confining a predetermined area of said skin by applying pressure to a peripheral border thereof, directing a liquid jet pulsating at between 2,200 and 3,200 cycles per minute at said confined area of skin, recovering the liquid incident on said skin and redirecting said recovered liquid as said pulsating liquid jets onto said skin.

9. The method of claim **8** wherein the velocity of said liquid jet incident on said skin is between 9 feet/sec. and 18 feet/sec.

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