Aug. 22, 1950 W. H. QUINN 2,519,790

MASSAGING APPARATUS

Filed Dec. 9, 1948

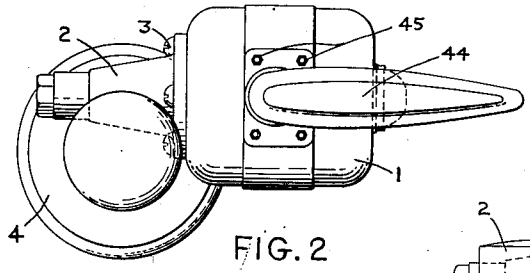

FIG. 2

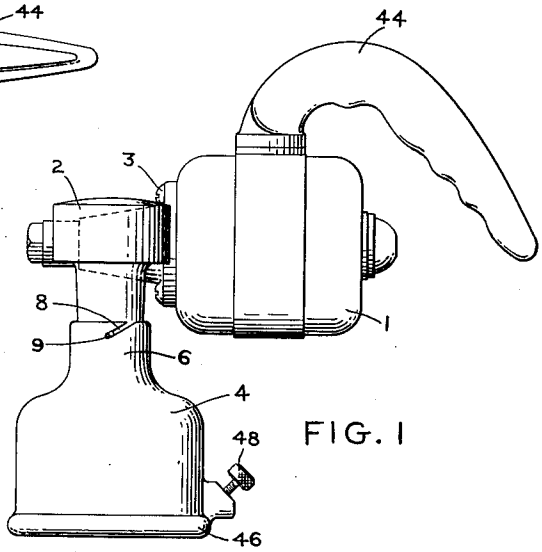

FIG. 1

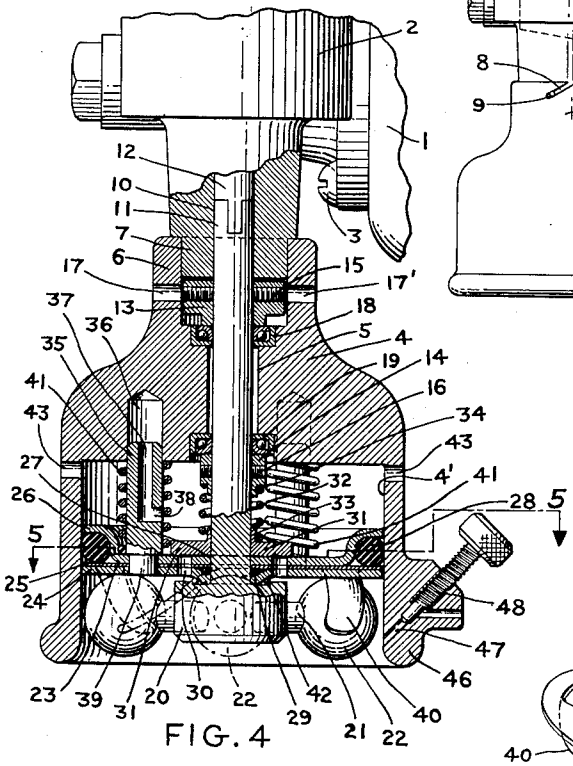

FIG. 4

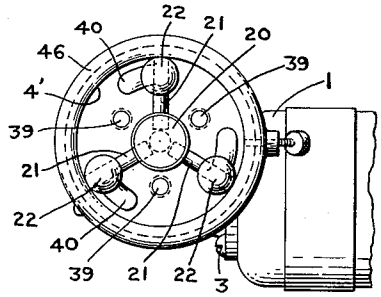

FIG. 3

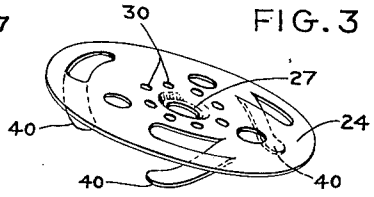

FIG. 6

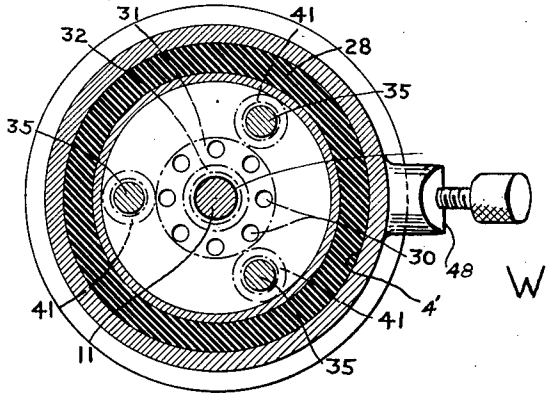

FIG. 5

WILLIAM H. QUINN
INVENTOR.

BY Robert Mayer
Attorney

Patented Aug. 22, 1950

2,519,790

UNITED STATES PATENT OFFICE

2,519,790

MASSAGING APPARATUS

William H. Quinn, West Orange, N. J.

Application December 9, 1948, Serial No. 64,299

9 Claims. (Cl. 128—38)

1

This invention relates generally to a massaging apparatus and in particular to an improved massaging apparatus which will apply a vacuum to the same area it is massaging.

Massage has for countless centuries been a means of treating the human body for remedial or hygienic purposes and usually consists of rubbing, stroking, kneading, tapping, etc. with either the hand or an instrument.

It was discovered early in the use af massage that more effective results could be secured if the area being massaged could be placed under a vacuum or partial vacuum as this tends to increase the circulation still further in the area being massaged.

Accordingly, the principal object of the present invention is to provide a massaging apparatus which will create a fluctuating suction over an area which it is massaging.

It is an object of the present invention to provide an apparatus which will have massaging elements and means for creating a fluctuating suction over the area which the massaging elements are manipulating by the operation and rotation of the massaging elements.

It is another object of the present invention to provide an apparatus which with a single driving means will impart movement to the massaging elements which in turn will activate means for creating a fluctuating suction over the area being massaged.

It is a further object of the present invention to provide an apparatus with a combination cam follower and piston to be activated by the massaging elements for creating a fluctuating suction over the area being massaged.

With these and other objects in view, as may appear from the accompanying specification, the invention consists of various features of construction and combination of parts, which will be first described in connection with the accompanying drawings, showing a massaging apparatus of a preferred form embodying the invention, and the features forming the invention will be specifically pointed out in the claims.

In the drawings:

Figure 1 is a side elevation of the invention.

Figure 2 is a top view of the invention.

Figure 3 is a bottom view of the vacuum and massage chamber of the invention.

Figure 4 is an enlarged side view partly in section of the chamber portion of the invention.

Figure 5 is a section through the said chamber portion taken on a line 5—5 of Figure 4.

Figure 6 is a perspective view of the cam holder disc.

2

Referring more particularly to the drawings, a housing 1 having a gear cover 2 connected thereto by threaded members 3 is shown in Figure 1 and Figure 2. The housing 1 encloses an electric motor (not shown) of any suitable type which constitutes the driving means for the present invention.

A gear reduction assembly (not shown) is located inside the gear cover 2 and is connected between the driving means and the rotatable shaft 11, to rotate and regulate the number of revolutions of said shaft and the massaging elements 22 attached thereto, as will be discussed hereinafter. The gear reduction assembly may be of any suitable type, several of which are well known and easily purchasable on the open market.

Figure 4 shows a combination vacuum and massaging chamber 4 having a substantially hollow cylindrical cup shape, containing massaging apparatus mounted therein and provided with a bore 5 running through the central portion thereof. At one end of the bore the opening is enlarged to form a collar 6 which snugly engages an annular step 7 on the gear cover 2, the chamber 4 being detachably connected to the gear cover 2 by a biased slot 8 in the collar portion 6 and a pin 9 on the annular step 7 so that the vacuum and massaging chamber 4 may be assembled and disassembled by manually rotating the entire chamber. It is intended that the massaging chamber 4 and the elements contained therein shall be detachable for the purpose of cleaning or sterilizing or for utilizing as an attachment on a flexible shaft drive by the same pin and slot arrangement above described. Accordingly, bore 5 lies in the axis of a parallel bore 10 located in the gear cover 2 so that a rotatable shaft 11 lying lengthwise along the axis of bore 5 and extending into bore 10 can connect by a tongue and slot arrangement to a driven shaft 12 which leads from the gear reduction assembly and thus receive rotational motion from the shaft 12 and at the same time be easily removable with the chamber 4. It is understood that while this type of construction is shown other detachable connections embodying the same idea may be utilized for effecting this result.

The massaging mechanism is best described by starting at shaft 11 lying lengthwise in bore 5 and held in position by an upper thrust collar 13 and a lower thrust collar 14 positioned on the shaft 11 by set screws 15 and 16 respectively. Openings 17 and 17' are provided in the side of chamber 4 to enable the set screws 15 to be adjusted to position the upper thrust collar 13, and shaft

11 accordingly, for adjusting the position of the end of the said shaft 11 where necessary for proper operation of the apparatus. The upper thrust collar 13 abuts and revolves on roller or ball bearings 18 and the lower thrust collar 14 similarly abuts and revolves on roller or ball bearings 19, these elements being used to reduce the amount of friction and to render the operation as quiet as possible. On the lower end of the shaft 11, a flange 20 is provided having a plurality of supporting and carrying members 21 each fixedly connected at one end to the flange 20 and each carrying a fixed or rotatable, spherical massaging element 22 at the other end thereof, all of which is clearly shown in Figure 4 of the drawings. The massaging elements 22 are connected directly to shaft 11 through carrying members 21 and flange 20 and will rotate when shaft 11 is rotated by the driven shaft 12 at the predetermined number of revolutions set up in the gear reduction assembly used and thus a simple effective massaging mechanism is formed inside the chamber 4.

The supporting members 21 and the massaging elements 22 attached thereto are circumferentially spaced around the flange 20 as shown in Figures 3 and 4. This circumferential spacing must be such that in addition to performing their massaging function the massaging elements 22 will be able to perform a dual function af activating the vacuum pump to secure the desired vacuum as is hereinafter described.

The vacuum pump is formed from a cylinder 4', which is in fact the inner surface of the chamber 4, and a cam follower and piston member 23 which is an annular plate-like member having a flared rim which comprises a lower annular cam follower holder 24 fixedly connected to an annular fiber-like gasket member 25 and an upper annular ring retaining disc 26. A centrally located opening 27 is provided so shaft 11 may be passed therethrough in assembling the apparatus to position the said member 23 and to serve as a supporting member along which the said cam follower and piston plate 23 can reciprocate. When thus positioned the cam follower and piston member 23 will at all times divide the cylinder 4' into an upper chamber and a lower chamber and will contact the walls of said cylinder 4' by the fiber-like gasket member 25. However, to insure substantially air-tight relationship between the piston member 23 and the cylinder 4' an annular rubber-like compressible sealing ring 28 is provided on the outer circumference of the cam follower and piston plate 23 which is held in position just above the gasket member 25 by the upper annular ring retaining member 26 so that it abuts the walls of cylinder 4' at all times. Opening 27 is lined by a similar rubber-like compressible sealing ring 29 although smaller in circumference which is held between the gasket member 25 and the lower annular cam follower holder 24 so that it abuts the shaft 11 for the same purpose.

The cam follower and piston plate 23 is further provided with a plurality of circumferentially spaced valve ports 30 concentric to the opening 27. A valve disc 31 of substantially washer-like construction operates as a closure means for said valve ports 30 by surface-to-surface contact with the inner surface of the cam follower and piston plate 23, and is sufficiently large to cover and seal the valve ports 30 when in surface-to-surface contact to prevent the passing of air through the cam follower and piston plate 23. Valve disc 31

is operated by a valve spring 32 coiled around shaft 11 and held against the inner surface of the said valve disc by a collar extension 33 thereon and a shoulder 34 on the lower thrust collar 14.

To secure the fluctuating suction pressure the cam follower and piston plate 23 will be reciprocated in the cylinder 4' traveling up and down on shaft 11 which passes therethrough. It will be held at all times during said reciprocation in a plane substantially perpendicular to the axis of shaft 11 by a plurality of circumferentially spaced plunger guides 35. Plunger guides 35 are substantially elongated cylinders having axis parallel to shaft 11 and connected to the cam follower and piston plate 23, so that when said member 23 is in its lowest position the said plunger guide 35 will still have a portion of its length extending into bores 36 and clearly shown in Figure 4 of the drawings. Bores 36 lead inwardly from the uppermost inner portion of the chamber 4 and receive the plunger guides 35 when the cam follower and piston plate 23 is reciprocated. The plunger guides 35 are further provided with a passage 37 and an outlet 38 so that as the plunger guides 35 move in and out of their respective bores 36 the air therein will escape through the passage 37 and outlet 38 to prevent the compression thereof effecting the operation of the cam follower and piston plate 23.

The plunger guides 35 may be fixedly connected to the cam follower at 39 by any suitable manner and may if desired be so connected as to join the lower cam holder disc 24, the gasket member 25 and the retainer ring 26 into one unit to form the cam follower and piston member 23. It is understood that other means of connecting these members embodying the same idea may be utilized for this purpose.

In order to move the cam follower and piston plate 23 in an upward direction the annular cam follower holder 24 has connected to the undersurface thereof a plurality of cam followers 40, circumferentially spaced, concentric to the opening 27 and equal in number and in the same angular relationship as the massaging elements 22. The massaging elements 22 have a dual function of activating the vacuum mechanism and thus as they rotate they will act as cams and contact the cam followers 40 to drive them upwardly, at each successive angular position but the cam follower 39 is connected to the cam follower and piston plate 23 by the holder 24 so that it too moves upwardly until the massaging elements fail to contact the cam followers 40.

Each downward movement is effected by spring returning members 41 which are coiled around each plunger guide 35. As the cam follower and piston plate 23 is moved upwardly on each stroke thereof, the spring returning members 41 are compressed against the uppermost inner portion of the chamber 4. When the massaging elements 22 are no longer in contact with the cam followers 40 the compression is released which results in the springs 41 expanding to return the cam follower and piston plate 23 in a downward direction to await the next upward movement by the massaging elements 22. This upwards and downwards motion constitutes the reciprocation above referred to and while this type of cam and spring return mechanism is shown and described, it is understood that other types of cam and resilient returning means embodying the same idea could be utilized for this purpose.

The cam follower and piston member 23 when in the lowest position of the downward stroke as

shown in Figure 4 of the drawings will abut the flange 20. To avoid contact between the under surface of the piston member 23 and the upper surface of the flange 20 a cushion ring 42 of any suitable material is provided on the upper surface of the flange 20.

During the reciprocation of the cam follower and piston member 23 at the opening and closing of valve ports 30 therein will control the flow of air from the lower chamber to the upper chamber of the cylinder 4' to establish the vacuum in the lower chamber when the apparatus is placed on an area to be massaged. The operation of the valve disc 31 which is the opening and closure means for valve ports 30 is dependent on the relative strength of valve springs 32. Thus, as cam follower and plunger member 23 is moved upwardly the valve springs 32 are compressed forcing the valve disc 31 into surface to surface engagement with the cam follower and piston member 23 so that any air above the said cam follower and plunger member will be unable to pass therethrough and will be forced outwardly through a plurality of circumferentially spaced exhaust ports 43 provided in the walls of the upper chamber of cylinder 4 to atmosphere. On the downward stroke the strength of the spring 32 is so adjusted relatively to that of the spring returning member 41 that the cam follower and piston member 23 is returned more rapidly than the valve disc 31 which results in opening the valve ports 30 to allow air to pass from the lower chamber to the upper chamber on this stroke.

The forcing of air out of the upper chamber of the cylinder 4' through the exhaust ports 43 on the upward stroke causes a slight reduction in pressure in the upper chamber so that as the downward stroke occurs and the valve disc 31 opens the valve ports 30, air will move from the lower chamber to the upper chamber by the combined effect of the compressive action of the cam follower and piston member 23 and the area of reduced pressure in the upper chamber of the cylinder 4'. As the next upward stroke occurs, however, the partial vacuum in the lower chamber is increased due to the increased volume which the upwardly moving piston will produce which causes the suction or reduced pressure therein to fluctuate on each movement of the piston member 23 while still retaining the desired vacuum during the massaging operation.

While this type of closure means to effect this result is shown and described, other types of closure means, as for example, an annular leather flap-type closure means embodying the same idea may be utilized for this purpose.

A handle 44 held in position by bolts 45 is provided on the housing 1 for the purpose of manipulating the massaging apparatus. It is understood that other types of gripping members embodying the same idea may be utilized for this purpose.

Although an upper chamber and lower chamber have been referred to above, no lower chamber is formed until such time as the apparatus is placed on the area to be massaged as one wall of the lower chamber will constitute the flesh portion being massaged against which the mouth or lip portion 46 will be placed. The mouth or lip portion 46 is therefore rounded and smoothed to prevent bruising of the skin during the massaging operation. If desired, the lip portion 46 may be covered with a protective coating such as hard rubber or similar substance also rounded and smoothed for still further protection.

Accordingly, in the operation of the above described invention, the gripping member 44 is manually grasped and the electric motor is started by passing an electric current (not shown) therethrough. This constitutes the driving means for the gear reduction assembly which will in turn cause shaft 12 to rotate. The massaging elements 22 are connected through shaft 11 to shaft 12 and accordingly will also rotate, and as above described, will activate the cam follower and piston member 23 into reciprocal action with the spring returning members 41.

The apparatus is next placed on the area to be massaged to form the lower chamber. As piston member 23 is reciprocated air will move through the valve ports 30 from the lower chamber to the upper chamber in the cylinder 4' reducing the pressure and creating the pulsating effect above the area being massaged.

As the pressure is reduced the flesh will move upwardly into the lower chamber of the cylinder 4' and into contact with the massaging elements 22 which are shown in Figure 4 of the drawings, spaced inwardly of the mouth or lip portion 46 of the chamber 4. The effective pressure produced on the area being massaged and the relative position of the massaging elements 22 inwardly of the lip portion 46 will control the effective massaging action produced by the massaging elements 22. Further means therefore is provided in the lower chamber portion of the cylinder 4' for controlling the pressure therein comprising an opening 47 to atmosphere having a manually adjustable member 48 for controlling the size of opening 47 to permit bleeding of air into the interior of the lower chamber of cylinder 4' to regulate the pressure therein.

While one form of the invention has been illustrated and described, it is obvious that those skilled in the art may vary the specific construction or arrangement of parts shown without departing from the spirit of the invention and, therefore, it will be understood that it is not to be so limited but that it may be widely modified within the invention defined by the claims.

What is claimed is:

1. In a massaging apparatus, a housing containing driving means therein, a massage and vacuum chamber connected to said housing, driven means mounted in said chamber connected to and rotated by said driving means, massaging elements connected to said driven means to rotate therewith, a cam follower and piston member slidably mounted in said chamber, means on said cam follower and piston member to be operated by said massaging elements for reciprocating said piston member in said chamber, and means on said piston member for creating a fluctuating suction over a surface being massaged by said apparatus when said piston is reciprocated.

2. In a massaging apparatus, a housing containing driving means therein, a massage and vacuum chamber connected to said housing, driven means mounted in said chamber connected to and rotated by said driving means, massaging elements connected to said driven means to rotate therewith, a cam follower and piston member slidably mounted in said chamber, means on said cam follower and piston member to be operated by said massaging elements for reciprocating said piston member in said chamber, means for holding said piston member in a substantially perpendicular plane to the axis of said driven means at all times, means for cre-

ating a substantially air-tight relationship between said piston member and said member, and means on said piston member for creating a fluctuating suction over a surface being massaged by said apparatus when said piston is reciprocated.

3. In a massaging apparatus, a housing containing driving means therein, a massage and vacuum chamber connected to said housing, driven means mounted in said chamber connected to and rotated by said driving means, massaging elements connected to said driven means to rotate therewith, a cam follower and piston member slidably mounted in said chamber, at least one plunger guide connected to said piston member for holding said piston member in a substantially perpendicular plane to the axis of said driven means, means on said cam follower and piston member to be operated by said massaging elements for reciprocating said piston member in said chamber, means for creating a substantially air-tight relationship between said piston member and said chamber, and means on said piston member for creating a fluctuating suction over a surface being massaged by said apparatus when said piston is reciprocated.

4. In a massaging apparatus, a housing containing driving means therein, a massage and vacuum chamber connected to said housing, driven means mounted in said chamber connected to and rotated by said driving means, massaging elements connected to said driven means to rotate therewith, a cam follower and piston member slidably mounted in said chamber, at least one plunger guide connected to said piston member for holding said piston member in a substantially perpendicular plane to the axis of said driven means, sealing members mounted on said cam follower and piston member for creating a substantially air-tight relationship between said piston member and said chamber, at least one spring returning member mounted on said plunger guides, means connected to said piston member to coact with said massaging elements whereby said massaging elements and said spring returning members will reciprocate said piston member, and means on said piston member for creating a fluctuating suction over a surface being massaged by said apparatus when said piston is reciprocated.

5. In a massaging apparatus, a housing containing driving means therein, a massage and vacuum chamber connected to said housing, driven means mounted in said chamber connected to and rotated by said driving means, massaging elements connected to said driven means to rotate therewith, a cam follower and piston member slidably mounted in said chamber, at least one plunger guide connected to said piston member for holding said piston member in a substantially perpendicular plane to the axis of said driven means, sealing members mounted on said cam follower and piston member for creating a substantially air-tight relationship between said piston member and said chamber, at least one spring returning member mounted on said plunger guides, at least one cam follower connected to said piston member to coact with said massaging elements to move said piston member in an upward direction, said spring returning members to coact with said massaging elements to move said piston member in a downward direction, and means on said piston member for creating a fluctuating suction over a surface being massaged by said apparatus when said piston is reciprocated.

6. In a massaging apparatus, a housing containing driving means therein, a massage and vacuum chamber connected to said housing, driven means mounted in said chamber connected to and rotated by said driving means, massaging elements connected to said driven means to rotate therewith, a cam follower and piston member slidably mounted in said chamber, at least one plunger guide connected to said piston member for holding said piston member in a substantially perpendicular plane to the axis of said driven means, sealing members mounted on said cam follower and piston member for creating a substantially air-tight relationship between said piston member and said chamber, at least one spring returning member mounted on said plunger guide, at least one cam follower connected to said piston member, said cam follower to coact with said massaging elements and said spring returning members for reciprocating said cam follower and piston member, valve ports in said cam follower and piston member for allowing air to pass therethrough, a valve disc slidably mounted on said driven means for opening and closing said valve ports, and a valve spring mounted on said driven means, said valve spring and said valve disc being constructed and arranged to coact with said piston member and spring returning members for creating a fluctuating suction pressure over a surface being massaged by said apparatus when said piston member is reciprocated.

7. In a massaging apparatus, a housing containing a driving means therein, a massage and vacuum chamber connected to said housing, a shaft mounted in said chamber connected to and rotated by said driving means, a flange at the outer end of said shaft, carrying members connected at one end to said flange, massaging elements mounted on the other end thereof, a cam follower and piston member mounted for slidable movement on said shaft and in said chamber inwardly of said flange, plunger guides connected to said piston member for holding said piston member in a substantially perpendicular plane to the axis of said shaft at all times, a first sealing ring on the outer diameter of said piston member, a second sealing ring on said piston member, said first and second sealing ring abutting said chamber and said shaft respectively for creating substantially air-tight relationship between said piston member and said chamber, means operated by said massaging elements for reciprocating said piston member in said chamber, and means on said piston members for creating a fluctuating suction over a surface being massaged by said apparatus when said piston is reciprocated.

8. In a massaging apparatus, a housing containing driving means therein, a massage and vacuum chamber connected to said housing, driven means mounted in said chamber connected to and rotated by said driving means, massaging elements circumferentially spaced around said driven means and connected to said driven means to rotate therewith, a cam follower and piston member slidably mounted in said chamber, plunger guides connected to said piston member for holding said piston member in a substantially perpendicular plane to the axis of the driven means, sealing members mounted on said cam follower and piston member for creating a substantially air-tight relationship between the piston member and the chamber it is mounted in, spring returning members

mounted on said plunger guides, cam followers connected to the lower portion of said piston member in the same number and in the same circumferential spacing as said massaging elements and to coact with said massaging elements and said spring returning members for reciprocating said cam follower and piston member, and means on said piston member for creating a fluctuating section over a surface being massaged by said apparatus when said piston is reciprocated.

9. In a massaging apparatus, a housing containing a driving means therein, a massage and vacuum chamber connected to said housing, a shaft mounted in said chamber connected to and rotated by said driving means, a flange at the outer end of said shaft, circumferentially spaced carrying members connected at one end to said flange, massaging elements connected to the other ends of said circumferentially spaced carrying members, a cam follower and piston member slidably mounted in said chamber, plunger guides connected to said piston members for holding said piston members in a substantially perpendicular plane to the axis of the shaft, sealing members mounted on said cam follower and piston member for creating a substantially air-tight relationship between the piston member and the chamber it is mounted in, spring returning members mounted on said plunger

guides, said cam follower and piston member comprising a lower cam follower holder, a fiber-like gasket member and an upper annular retaining ring member, cam followers connected to the lower surface of said cam follower holder in circumferential spacing and in number equal to the massaging elements, said cam followers to coact with said massaging elements and said spring members to reciprocate said piston member, and means on said piston member for creating a fluctuating suction over a surface being massaged by said apparatus when said piston is reciprocated.

WILLIAM H. QUINN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
915,251	Vanderslice	Mar. 16, 1909
1,091,585	Motter	Mar. 31, 1914
1,201,767	Schimek	Oct. 17, 1916
1,668,364	Gilbert	May 1, 1928
1,980,803	Johnson	Nov. 13, 1934

FOREIGN PATENTS

Number	Country	Date
117,209	Austria	Nov. 13, 1934