

May 28, 1929.

A. ZÜND-BURGUET

1,714,898

PUMP FOR MASSAGE APPARATUS

Filed Feb. 11, 1926

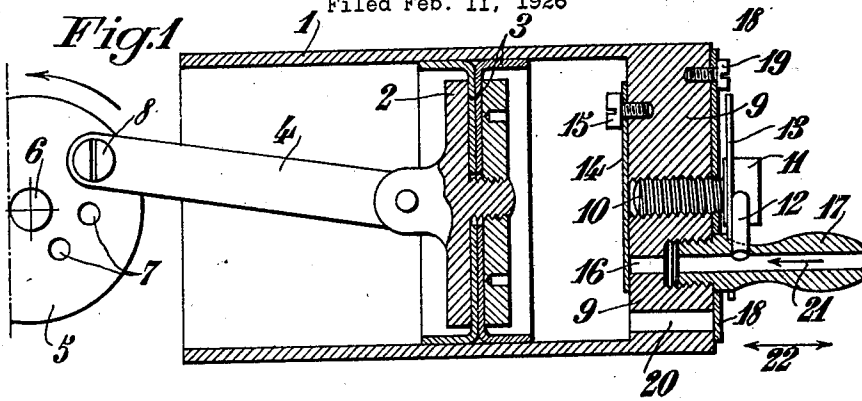


Fig. 2.

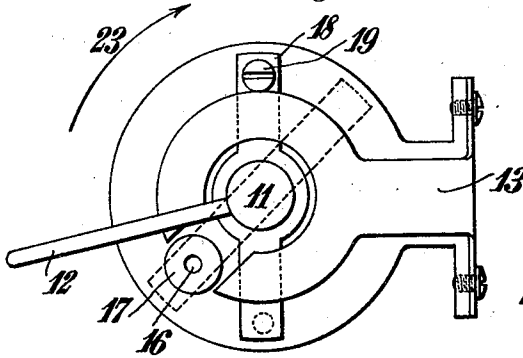


Fig. 3.

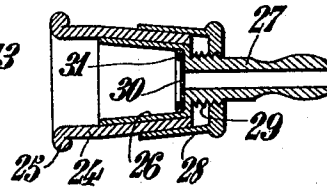


Fig. 5. *Fig. 4.* *Fig. 7.* *Fig. 6.*

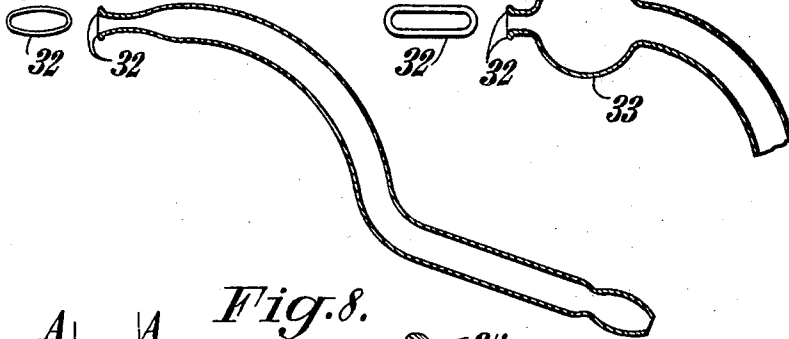
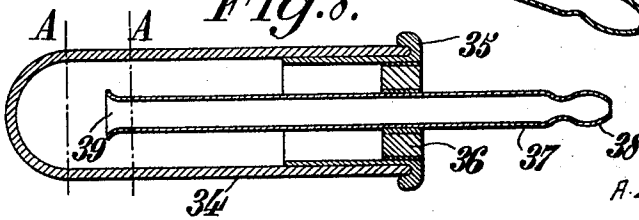


Fig. 8.



A. Zünd-Burguet
INVENTOR

By: *Markes & Clark*
ATTYS

Patented May 28, 1929.

1,714,898

UNITED STATES PATENT OFFICE.

ADOLPHE ZÜND-BURGUET, OF PARIS, FRANCE.

PUMP FOR MASSAGE APPARATUS.

Application filed February 11, 1926, Serial No. 87,702, and in France February 13, 1925.

This invention relates to a massage apparatus for effecting a massaging action in the following manner:—air or another gas contained in a cup near the zone to be massaged is, at will, successively rarefied or compressed or receives a vibratory movement of adjustable period and amplitude, so that the part to be massaged is subjected, either to a sucking action, or to vibratory pneumatic hammering, by direct contact with the gas, or by contact with a flexible wall or partition subject to the variations in pressure of the gas.

The accompanying drawing illustrates, by way of example, a constructional embodiment of my apparatus.

Figs. 1 and 2 diagrammatically illustrate, in axial section and end view, a pump adapted to impart to a volume of air a suitable movement for massaging purposes.

Figs. 3 to 8 illustrate in longitudinal section, various details of the intermediate apparatus inserted between the pump of Figs. 1 and 2, and the parts to be massaged.

Referring to the drawings the apparatus comprises a cylinder 1 which receives a piston 2 and is provided with two cup shaped leather packings 3 as illustrated. A connecting rod 4 is pivoted directly to the piston 2 and connected to a crank plate 5 the shaft 6 of which latter being adapted to be continuously rotated by a suitable source of power such as a manually controlled mechanism. This source of power may advantageously be derived from a small electric motor connected to the lighting mains.

The crank-plate 5 is provided with a series of holes 7 situated at different distances from the center of rotation and adapted to receive a removable crank pin 8 coupling the connecting rod 4 with the plate 5.

The radial position of the pin 8 with respect to the shaft 6 may thus be varied and hence change the stroke of the piston 2 at will by placing the pin 8 in the desired hole 7.

The valve member of the pump is disposed on a head 9 of the pump cylinder 1. In said cylinder head is provided a screw threaded hole receiving a screw 10 the exteriorly projecting head 11 of which carries an operating lever 12 adapted to be held in the desired angular position, by contact with a spring 13.

On the inner face of cylinder head 9 is applied a resilient valve plate 14 secured at one of its ends by a screw 15 and normally closing by its other end, a channel 16 provided in the cylinder head 9. A nipple 17 is coaxially

disposed in the channel 16 and is adapted to receive a conduit pipe leading to the enclosure used for the massage treatment. A second resilient valve plate 18 is fitted on the outer face of the cylinder head 9 at one of its ends by a screw 19 and controls by its free end a channel provided in the cylinder head and opening within the pump cylinder.

In operation the reciprocating movements of the piston 2 cause the volume of air in cylinder 1 to vary and through channel 16 passes either aspirated air in the direction of the arrow 21 or air in vibratory motion in the direction of the double arrow 22.

In the position of screw 10 shown on the drawing it will be seen that the pump being started, the piston 2 in moving away from the cylinder head 9 will admit through the channel 16, a certain quantity of air which the valve plate 14 allows to pass. In its return stroke, the piston 2 drives back through the channel 20, the air previously aspirated. During this stroke, the valve plate 18 rises whilst the valve plate 14 is pressed upon the cylinder head 9. Under these conditions, a suction is constantly exerted through the conduit 21. If the lever 12 is moved in the direction of the arrow 23 (Fig. 2) so as to unseat the valve plate 14 and to press the valve plate 18 upon the outer face of the bottom 9, the channel 21 remains constantly in communication with the interior of the pump cylinder, whilst the channel 20 remains constantly obturated. It is obvious, therefore, that the reciprocal displacement of the piston 2 aspirates and pushes back through the channel 16 a body of air which receives a vibratory movement whose characteristics depend on the periodic reciprocating movement imparted to the piston.

The frequency of this vibratory movement depends on the number of revolutions per minute of the plate 5 and its amplitude depends on the crank radius adopted for driving the connecting rod 4.

By connecting to the nipple member 17 suitable end pieces, such as those illustrated in Figs. 3 to 8 of the accompanying drawing, a suction massage treatment may be obtained, by placing the said end pieces upon the part of the human body to be massaged. The suction being continuous and perfectly adjustable in intensity, the massaging effect is also continuous and adjustable in intensity. The end pieces applied on the epidermis for instance, can be gradually displaced, thus per-

mitting a nervous fibre, a blood vessel or a muscle to be followed throughout its length without any fatigue to the operator, and with perfect continuity, precision and regularity.

5 With the lever 12 shifted, the rapid alternation of the column of gas effects a pneumatic vibratory massage treatment which is variable at will and which no hand is capable of equalling. By its softness it distinctly
10 differentiates from the effect produced by apparatus having an eccentric or the like which act only by periodical percussions.

It will be noted that the lever 12, acting on the screw 10 for determining, at its extreme
15 positions, respectively constant suction and a vibrating gas column also permits, in each of its intermediate positions, all the intermediate effects, between constant suction and a vibrating gas column. These effects are
20 easily controlled with great accuracy.

The shape given to the end pieces will depend on the parts to be massaged.

Fig. 3 shows an end piece for massaging relatively wide external zones. This end
25 piece comprises a socket 24, made of rubber for instance, with rounded front edges 25. The socket 24 is mounted on a slightly tapered rigid bell 26 provided with a nipple 27. A cap-nut 28 screwed on a screw thread 29 of
30 the nipple 27 firmly holds the socket 24 on the bell 26. A perforate member 30 held at the bottom of the bell 26 by means of a resilient ring 31, prevents any matter detached from the epidermis from being drawn into the
35 pump of Figs. 1 and 2, the nipple 17 of which is connected to the corresponding nipple of the end piece by a flexible conduit.

Figs. 4 to 7, show rigid glass end pieces adapted for the massaging of narrow facial
40 zones. Figs. 5 and 7 respectively illustrate the shape of the nose of the end pieces of Figs. 4 and 6 respectively. The nose 32 fits on the epidermis and the operator moves it for following a wrinkle, a nervous fibre or a muscle,
45 throughout its length.

A cavity 33 is provided on the end piece (Fig. 6) so as to provide an expansion chamber the effects of which combine with the vibration of the column of air under the action of the pump for realizing particular
50 pulsions substantially in phase with the reciprocating movements of the pump piston. Perforate members similar to members 30 may also be disposed in the end pieces shown
55 in Figs. 4 to 6.

It is obvious that the end pieces utilized in special cases are numerous and it will be sufficient to mention one of these devices by way of example. Fig. 8 shows a device for mas-
60 saging the prostate gland. This device comprises a fluid-tight enclosure having a resilient or flexible wall 34, preferably of rubber, which is introduced in the anus of the patient and is placed so as to be properly in
65 contact with the muscular zone adjacent to

the prostate gland. At its rear part, the enclosure 34 is secured on a rigid tubular mounting 35 provided with a base 36 axially perforated for the passage of a tube 37 adapted to slide longitudinally in a fluid-tight man-
70 ner, relatively to the base 36, so that its end within the enclosure 34 may be placed at will at any required point along the length of said enclosure.

The outer end of the tube is provided with
75 a nipple 38 and receives the flexible conduit pipe for connecting it to the pump. When the column of air within the enclosure 34 is vibrated, its effect on the flexible wall is particularly noticeable in the neighborhood of
80 the inner end 39 of the tube 37, this being due to the inertia of the wall 34 and the frequency of the vibrations. It is therefore easy, from the longitudinal position of the tube 37, to determine the zone A—A' of the
85 enclosure 34 where the vibratory movement effecting the massage is most efficient. For that purpose and for giving clear indications to the practitioners, the tube 37 may be graduated at its rear part, the outer face of the
90 base 36 serving as an index for the graduations.

While I have shown what I deem to be the preferable form of my device I do not wish to be limited thereto as there might be
95 various changes made in the details of construction and the arrangement of parts without departing from the spirit of the invention comprehended within the scope of the appended claims.

What I claim as my invention and desire to secure by Letters Patent is:

1. In a pump for massage apparatus, in combination, a cylinder, a reciprocable piston in said cylinder, a cylinder head for said
105 cylinder, a pair of orifices formed in said head extending therethrough, a flexible valve plate covering the inner end of said orifices, a nipple in the outer end of one of said orifices, a valve adjusting screw in the other of said
110 orifices adapted to abut said plate when rotated, a third orifice formed in and extending through said cylinder head, a second flexible valve plate covering the outer end of said last mentioned orifice, means on said screw
115 for rendering said last mentioned valve plate inoperative when said screw is rotated and means for resiliently holding said screw in position.

2. In a pump for massage apparatus, in
120 combination, a cylinder, a reciprocable piston in said cylinder, a cylinder head for said cylinder, a pair of orifices formed in said head extending therethrough, a flexible valve plate covering the inner end of said orifices,
125 a nipple in the outer end of one of said orifices, a valve adjusting screw in the other of said orifices adapted to abut said plate when rotated, a third orifice formed in and extending through said cylinder head, a sec- 130

ond flexible valve plate covering the outer end of said last mentioned orifice, means on said screw for rendering said last mentioned valve plate inoperative when said screw is rotated and a leaf spring on said cylinder head for resiliently holding said screw in position.

3. In a pump for massage apparatus, in combination, a cylinder, a reciprocable piston in said cylinder, a cylinder head for said cylinder, a pair of orifices formed in said head extending therethrough, a flexible valve plate covering the inner end of said orifices, a nipple in the outer end of one of said orifices, a valve adjusting screw in the other of said orifices adapted to abut said plate when rotated, a third orifice formed in and extending through said cylinder head, a second flexible valve plate covering the outer end of said last mentioned orifice, means on said screw for rendering said last mentioned valve plate inoperative when said screw is rotated, means for resiliently holding said screw in position and an operating handle extending from said screw.

4. In a pump for massage apparatus, in combination, a cylinder, a reciprocable piston in said cylinder, a cylinder head for said

cylinder, a pair of orifices formed in said head extending therethrough, a flexible plate covering the inner end of one of said orifices, a flexible plate covering the outer end of the other of said orifices, an adjusting screw extending through said outer plate and said cylinder head adapted to abut said inner plate when rotated, a head on said screw overlapping said outer plate and means for resiliently opposing rotation of said screw.

5. In a pump for massage apparatus, in combination, a cylinder, a reciprocable piston in said cylinder, a cylinder head for said cylinder, a pair of orifices formed in said head extending therethrough, a flexible plate covering the inner end of one of said orifices, a flexible plate covering the outer end of the other of said orifices, an adjusting screw extending through said outer plate and said cylinder head adapted to abut said inner plate when rotated, a head on said screw overlapping said outer plate, means for resiliently opposing rotation of said screw and means for regulating the length of stroke of said piston.

In testimony whereof I have signed my name to this specification.

ADOLPHE ZÜND-BURGUET.