Nov. 4, 1930. C. GROSSE 1,780,876

VIBRATORY APPARATUS

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Fig. 1.

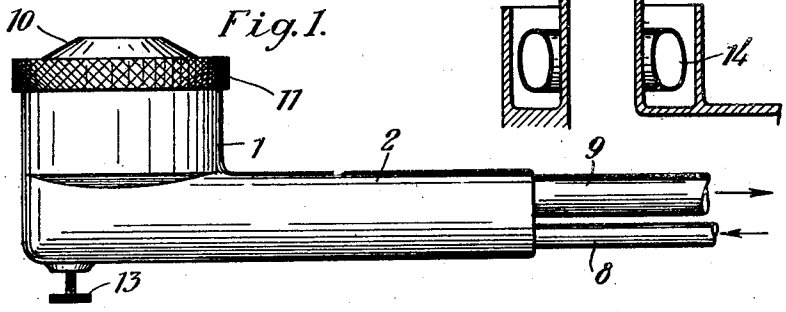


Fig. 4.

Fig. 2.

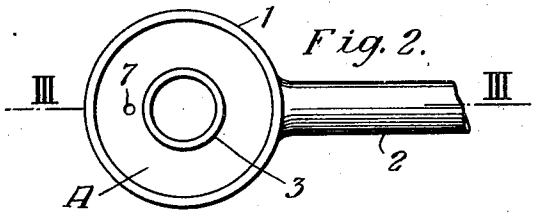


Fig. 5.

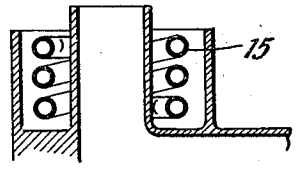


Fig. 3.

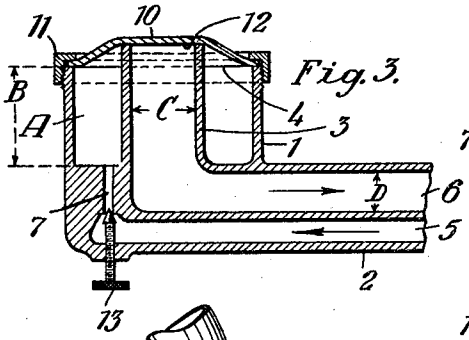


Fig. 6.

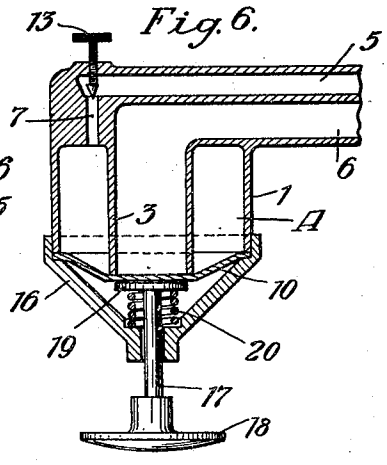
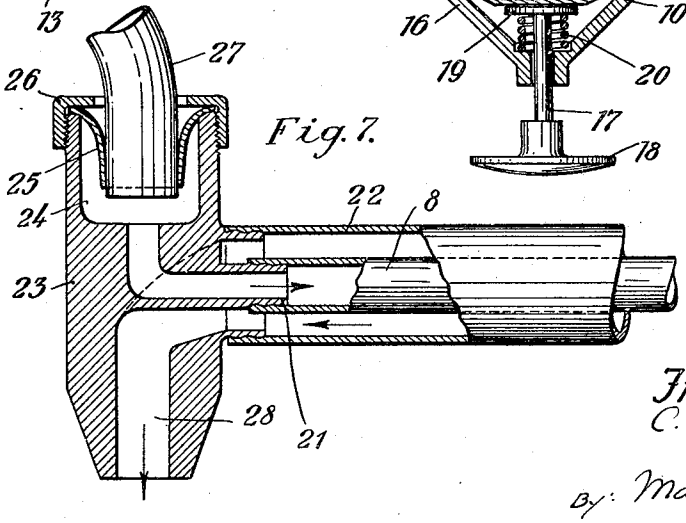


Fig. 7.



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Fig. 8.

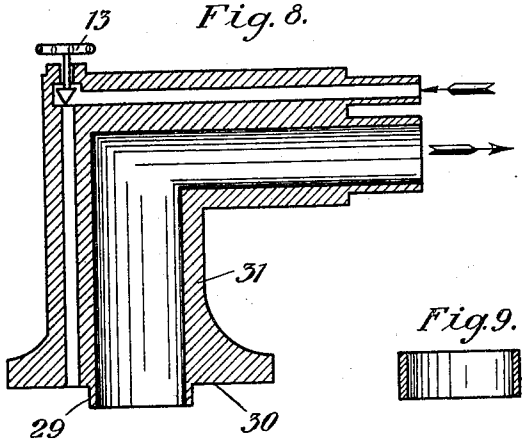


Fig. 9.

Fig. 10.



Fig. 11.



Fig. 12.

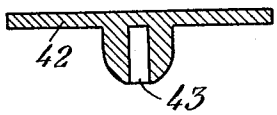


Fig. 13.

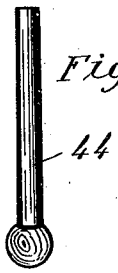
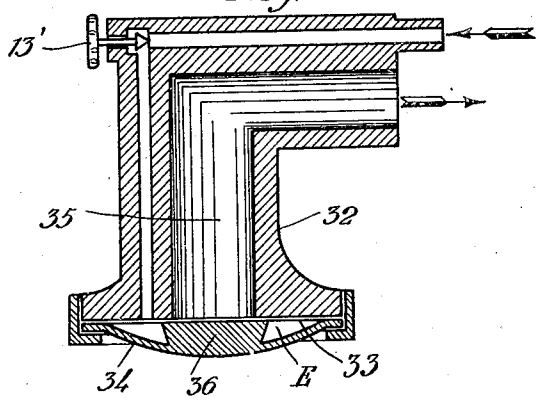


Fig. 14.



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UNITED STATES PATENT OFFICE

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VIBRATORY APPARATUS

Application filed March 8, 1928, Serial No. 260,129, and in Germany May 12, 1927.

Vibratory apparatus, for instance for massage purposes, are known, in which a diaphragm is set in vibration by an operating medium, for instance a stream of water, a water pressure being produced in a casing closed by the diaphragm, and being temporarily suspended by moving the diaphragm. For the purposes referred to the vibratory apparatus is connected by a flexible inflow tube to a watercock and by a flexible outflow tube to any suitable drain for the water.

Such appliances have the disadvantage, that the vibrations of the diaphragm produced by a vibratory apparatus of this kind give relatively hard blows, so that the appliance cannot be used for massaging sensitive parts of the body. Furthermore, the downwardly flowing operating medium sets up such oscillations in the outflow tube that it is difficult to hold the massaging apparatus steadily and, what is even more important, it becomes impossible to treat sensitive parts of the body in a soft and gentle manner. These oscillations may at the best be reduced by means provided for this purpose in the outflow tube.

These disadvantages are eliminated by the present invention, according to which a vibratory apparatus is provided, with which it is possible to produce besides heavy blows slight and gentle vibrations of the diaphragm, which will still be felt as having a beneficial effect when sensitive parts of the body, such as the nose, the ear and the temples are being treated and when massaging cavities in the body.

The invention is illustrated by way of example in the accompanying drawings, in which:

Fig. 1 is a side elevation of the vibratory apparatus,

Fig. 2 a view from above with the diaphragm removed,

Fig. 3 a longitudinal section on line III—III of Fig. 2,

Figs. 4 and 5 similar partial longitudinal sections as in Fig. 3, but through different constructional forms,

Fig. 6 a longitudinal section through the main part of the vibratory apparatus of another constructional form,

Fig. 7 a view partly in elevation and partly in longitudinal section through the attaching piece of the vibratory apparatus,

Fig. 8 a longitudinal section through the body of the vibratory apparatus in a somewhat different constructional form,

Fig. 9 a cross-section through a detail belonging to the apparatus shown in Fig. 8,

Figs. 10 to 12 cross-sections through different diaphragms for the vibratory apparatus,

Fig. 13 a view of a detail and

Fig. 14 a longitudinal section through the body of a vibratory apparatus of different constructional form.

The vibratory apparatus according to the invention consists of a cylindrical casing 1 and a handle 2 mounted thereon. From the bottom of the cylindrical casing rises a tubular piece 3 preferably above the top rim 4 of the cylindrical casing. An annular space A is thus produced. In the handle 2 is a bore 5 for the inflow of the operating medium and a greater bore 6 for the outflow of the same. The bore 5 is in communication through a relatively small opening 7 with the bottom of the annular space A, while the interior of the tubualr piece 3 is in communication with the bore 6 for the outflow of the operating medium. To the bore 5 a flexible tube 8 of corresponding diameter is connected and to the bore 6 a flexible tube 9 of corresponding diameter. The tube 8 is connected in any suitable manner to the cock for the operating medium, for instance a watercock, while the water flows away through the tube 9. The annular space A is closed to the outside by a diaphragm 10 which is held on the casing 1 by an annular cover 11 and rests firmly on the outer edge 12 of the tubular piece 3.

A throttling device 13 is preferably provided on the side of the vibratory apparatus lying remote from the diaphragm, but may alternatively be located at any other place, for instance in alinement with the handle 2 as indicated at 13'.

The essential feature is that the diaphragm

is stretched so as to bridge over a space, for instance an annular space and is put in motion by the whole mass of water in the annular space. The annular space may be made relatively deep so that the dimension B will be large as compared with the diameter of the casing 1 as in Fig. 3. This constructional form has the advantage that expansion bodies, for instance in the form of an annular member 14 or of a closed tubular helix 15 may be introduced into the interior of the space A. A further essential feature is that the internal diameter C of the tubular piece 3 shall be greater than the internal diameter D of the bore 6 for the escape of the operating medium and that the said bore 6 shall impart a definite change of direction to the outflowing operating medium, for instance shall branch off as in the example shown in the drawing at right angles to the tubular piece 3.

The handle 2 of the vibratory apparatus is preferably made with flat side walls, so as to ensure the diaphragm being held in the correct position with respect to the parts of the body to be massaged.

In the example shown in Fig. 6 a separate cover 16 is provided for the diaphragm 10, the cover forming a guide for the shank 17 of a separate massaging plate having a convex surface. The shank is suitably provided with a disc 19 which rests against the diaphragm 10 and between the said disc and the casing cover a spring 20 is preferably introduced.

In the example shown in Fig. 7 the attaching piece of the vibratory apparatus is so constructed that the tube 8 for the supply of operating medium is attached to a nozzle 21 within a second tube 22 for the outflow of the operating medium, which tube 22 is made somewhat wider for this purpose.

For connecting this double tube to the watercock an attaching piece 23 is employed, in the upper part of which is a hollow space 24. Into this hollow space there extends a sealing sleeve 25, for instance of rubber, which is held in position in a known manner by a cap nut 26 or the like. When the attaching piece 23 is slipped over the end 27 of a watercock, the sealing sleeve 25 presses against the outlet end of the watercock. As soon as the watercock is opened, pressure will be produced in the interior of the hollow space 24, which will press the sealing sleeve 25 firmly against the outlet end of the watercock, thus holding the attaching piece firmly to the watercock. In the lower part of the attaching piece 23 a corresponding bore 28 is provided for the outflow of the water used in the vibratory apparatus.

The constructional examples shown in Figs. 8 and 14 show a particularly simple construction of the body of the vibratory apparatus, whereby the weight of the latter may be reduced to a minimum. The annular space in which the water acts on the diaphragm is in this case made relatively small and constitutes a space having a triangular cross-section, see the space E in Fig. 14. The space is given this shape either by a short nozzle 29 extending beyond an otherwise flat surface 30 of the body 31 of the vibratory apparatus, or by a body 32 having an entirely flat surface 33 and a boss 36 being provided on the inside of the diaphragm 34, which closes the outlet 35. In the constructional example shown in Fig. 8 a short tubular piece 37 or a plurality of such pieces is provided which can be slipped over the nozzle 29, so that with the same body 31 of the vibratory apparatus, the diaphragm may be given different tensions, for the purpose of varying the strength of the blows imparted by the diaphragm.

Fig. 10 shows a diaphragm 38 with a boss 39 for local massage, Fig. 11 a diaphragm 40 with a suction cup and Fig. 12 a diaphragm 42 with a suction cup 43 which may also be used for the insertion of a massaging ball 44.

In a special constructional form of the vibratory apparatus the body of the vibratory apparatus is made of non-heat-conducting, light, non-metallic material, for instance from a condensation product of phenol and formaldehyde, such as is procurable under the name of trolite, bakelite and the like. Such a construction has the advantage that the hand working with the apparatus cannot become fatigued through the weight being too great, and also that the coldness of the water will not be transmitted to the hand or to the parts of the body being massaged, which is of particular advantage when using the vibratory apparatus in the winter.

What I claim is:

1. Fluid-driven vibratory apparatus for massage purposes comprising in combination a casing, a duct for the inflow of the fluid, a duct for the outflow of the fluid, a handle preferably having flat side walls and having an outflow and an inflow duct communicating with the aforesaid ducts, both ducts in the handle being connected to the ducts in the casing with a sharp change of direction preferably a right angle, the casing forming an annular space, a yielding diaphragm for receiving the fluid stretched freely movable over the annular space, said diaphragm shutting off the space externally and adapted to be simultaneously influenced by the entire fluid contained in the annular space, and tubes connected with the ducts of the handle.

2. A fluid-driven vibratory apparatus for massage purposes including a casing, a duct for the inflow of the fluid, a duct for the outflow of the fluid, a handle having inflow and outflow ducts communicating with the first mentioned ducts, both ducts in the handle

being connected to the ducts in the casing with a sharp change of direction, said casing forming an annular space, a yielding diaphragm for receiving the fluid stretched freely movable over the annular space, the portion of the diaphragm overlying said annular space being freely movable inwardly and outwardly.

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

CARL GROSSE.