Feb. 7, 1956 G. M. GIBSON 2,733,711

HYDROTHERAPY MASSAGE APPARATUS

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Fig. 1

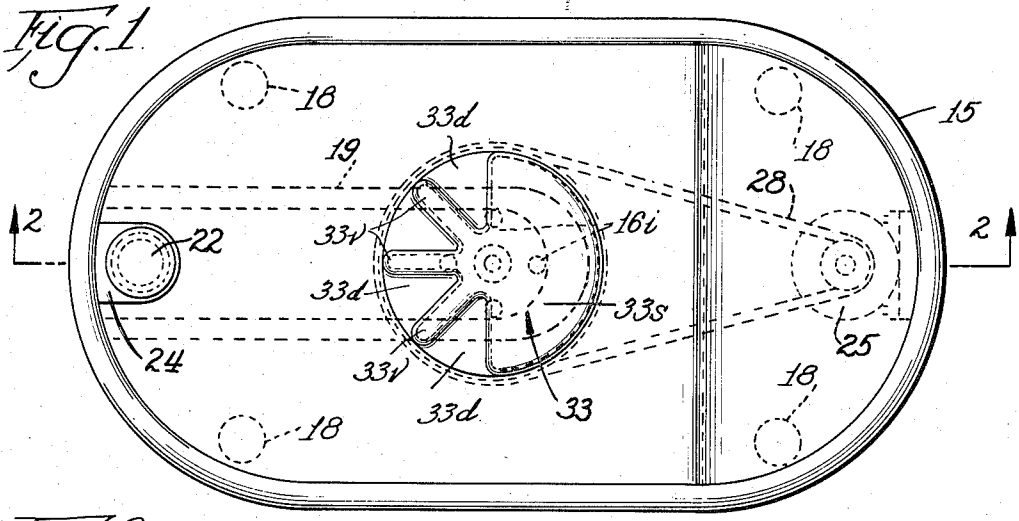


Fig. 2

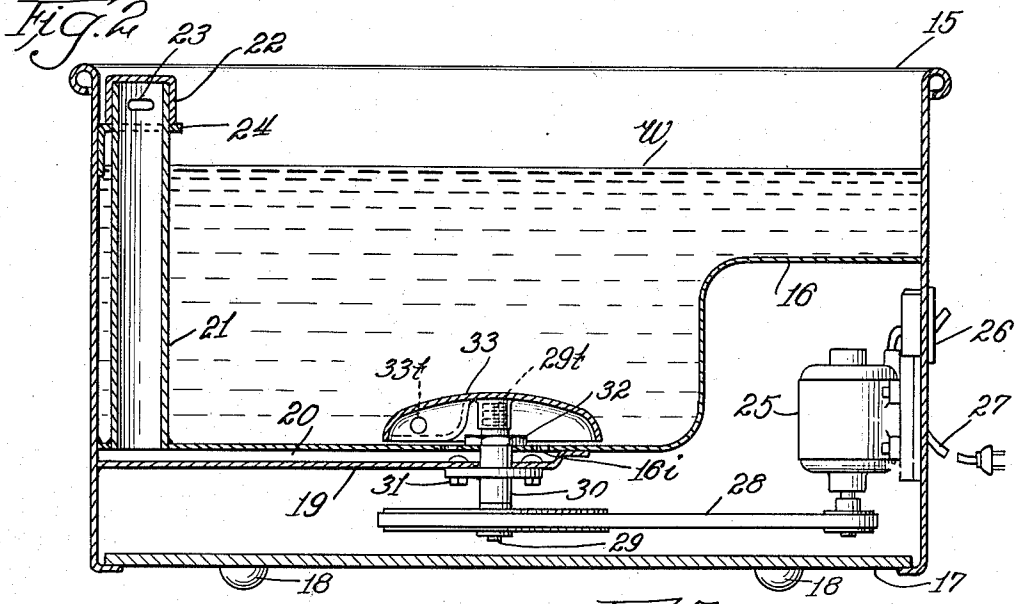


Fig. 3

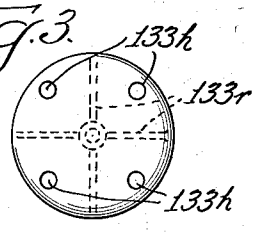


Fig. 5

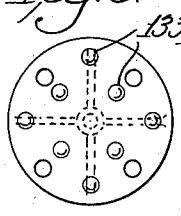


Fig. 7

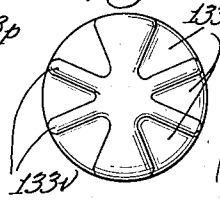


Fig. 8

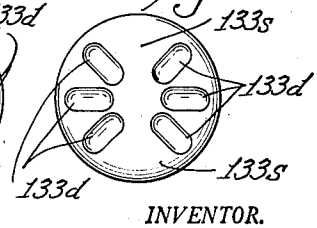


Fig. 4

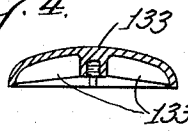
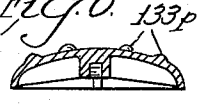


Fig. 6



INVENTOR.
George M. Gibson
BY
Agent

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Fig. 9.

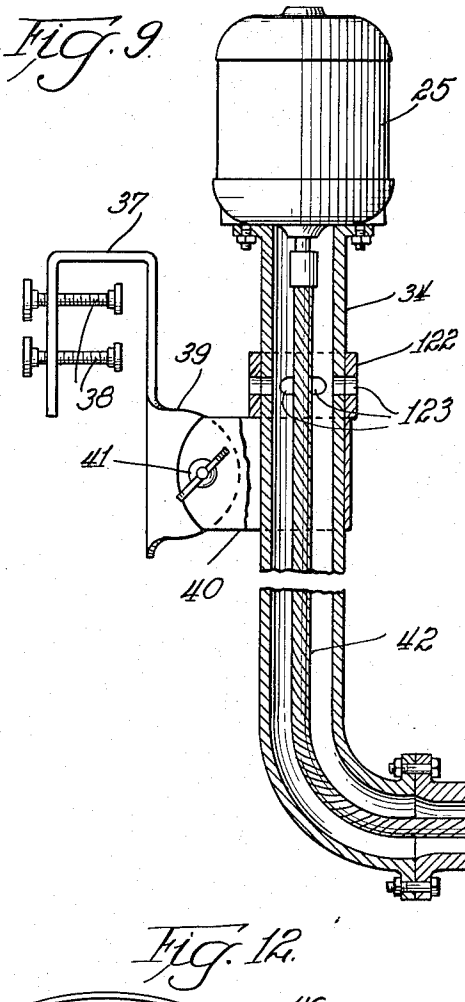


Fig. 11.

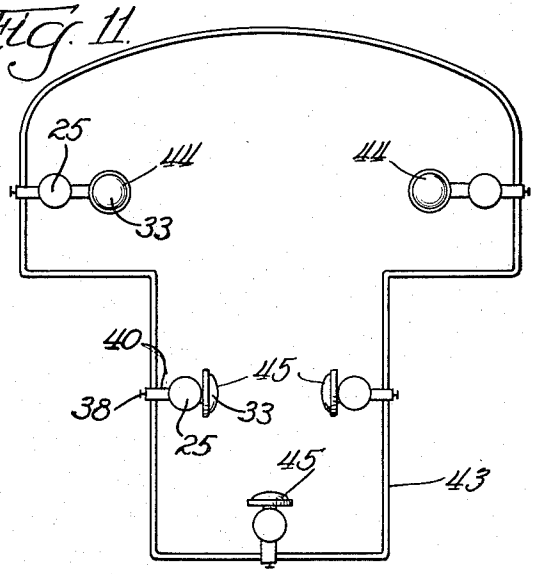
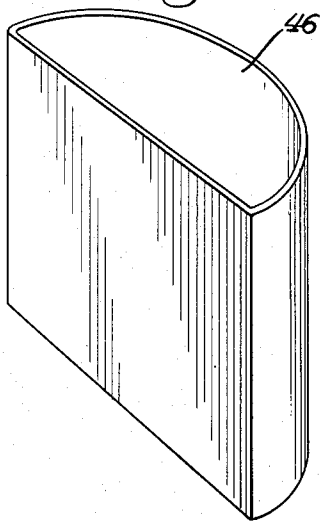


Fig. 12.



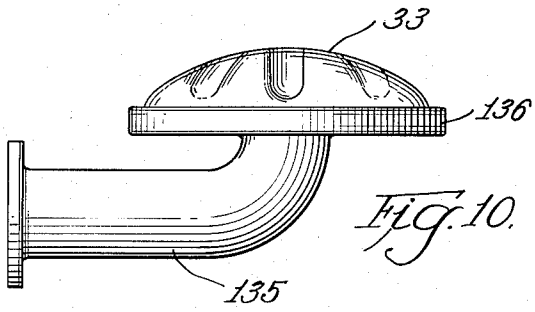


Fig. 10.

INVENTOR.
George M. Gibson
BY
Agent

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HYDROTHERAPY MASSAGE APPARATUS

George M. Gibson, Bellevue, Iowa

Application July 7, 1949, Serial No. 103,453

12 Claims. (Cl. 128—56)

This invention relates to hydrotherapy apparatus and particularly to such apparatus employing mechanical and pneumatic auxiliary massage means in addition to the conventional therapeutic action of water currents.

Hydrotherapy apparatus employing water currents are old in the art and have been accomplished by enclosed pump apparatus directing water currents into a therapeutic bath either with or without the auxiliary use of air entrained in water currents for additive massage effects. I have discovered that more adjustable and effective water currents can be effected by an exposed vaned pump that may be utilized for either mechanical or pneumatic additional massage effects or a combination of them. This is particularly true because the patient may adjust his contact with the apparatus to attain the most desirable results.

It is the particular object of the present invention to provide hydrotherapy apparatus employing an exposed vaned pump wherein mechanical and pneumatic means are combined with circulating water currents to provide hydrotherapy treatments.

Other objects and benefits will be disclosed in the following descriptions and drawings in which:

Fig. 1 is a top plan view of my hydrotherapy apparatus applied for the treatment of feet;

Fig. 2 is a longitudinal cross sectional view of the apparatus as it would appear on the section lines 2—2 of Fig. 1;

Figs. 3 and 4 are top and sectional views respectively of an optional form of massage impeller as will later be explained;

Similarly Figs. 5 and 6 are top and cross sectional views of another form of massage impeller;

Fig. 7 is a top plan view of a massage impeller similar to that shown in Fig. 1 as will later be explained;

Fig. 8 likewise is a top plan view of a still further form of massage impeller employing lower depressions;

Fig. 9 is a cross sectional view of an optional form of a massage impeller device designed for application to a hydrotherapy tank as will later be explained;

Fig. 10 shows a massage substitute impeller attachment for use at the impeller end on the device shown in Fig. 9;

Fig. 11 is a top plan view of a complete horizontal submergence tank utilizing massage impellers of both vertical and horizontal dispositions as illustrated in Figs. 9 and 10; and

Fig. 12 is a perspective view of an upright submergence tank to which massage impellers may be applied as in the tank illustrated in Figure 11.

Now referring to the drawings, and at the outset to Figs. 1 and 2, I show a conventional tub having a side wall **15** with an offset recess tub bottom **16** mounted therein. Together they form a unitary tub which is supported by a bottom support member **17** resting on support buttons **18** as shown. Below the tub bottom **16** there is fixed an air intake flanged conduit **19** which encloses an air intake passageway **20**. Into this intake passageway **20** is mounted an air intake tube **21** having an adjustment cap **22** mounted on its top. In the cap **22** and tube **21** there are formed coacting air adjustment inlets **23**. By rotating the cap **22** the amount of the air flow into tube **21** may be regulated at the will of the operator. The air inlet tube **21** is supported on the side of the tub **15** by a bracket **24**. It will be observed that the air intake into tube **21** is above the normal water level W as indicated in Figure 2. On the side wall of the tub **15** is mounted an electric motor **25**, which is controlled by an off and on switch **26** which is connected to a service cord **27** as shown. By this arrangement the operator may either stop or start the motor at will. The motor **25** is connected to the impeller drive shaft **29** by a conventional belt and pulley drive **28**. The drive shaft **29** is rotatably mounted in a sealed drive shaft bearing bracket **30**. The bracket **30** is mounted on the air intake flanged conduit **19** by bolts **31** and extends through the air intake passageway **20**, being sealed at its top by a clamp nut **32** as shown. The upper end of the drive shaft **29** is provided with a suitably threaded end **29***t* which removably threads into and carries a massage impeller **33** as clearly shown in Fig. 2. By this arrangement it will be appreciated that the operator may remove the impeller **33** and substitute other impellers as desired.

The massage impeller **33** as clearly shown in Figs. 1 and 2 is a preferred form of impeller and I will now describe its structure and operation. It will be observed that one half of the impeller has a smooth convex face **33***s*. The other half of the impeller has been formed to include four depressions **33***d* to provide three vanes **33***v*. The formation of the vanes **33***v* provides internal radial cavities and vanes under the face of the impeller and by rotating the impeller rapidly unidirectionally by the motor drive structure, it will be observed that a suction under the impeller will be created. This internal suction is transferred through four inlet openings **16***i* leading to the air intake passageway **20** and thence through the air tube **21** as shown. It will thus be obvious that when air intake is permitted through the air adjustment cap **22** and air inlets **23** that air will be drawn through tube **21** and air passageway **20** into the impeller **33** through openings **16***i* and will then be expelled through the holes **33***t* located in the sides of the impeller vanes **33***v*. The three vanes **33***v* will create a pulsating water current adjacent the rotary path of the impeller **33** and thus the massage impeller **33** is adapted to normal hydrotherapy water action, together with the combined air action through the openings **33***t* and the natural massage action of the convex face of the impeller **33***s* assisted by the vanes **33***v*. The massage impeller **33** can be readily removed from the top of the threaded end **29***t* on the shaft **29** and various other massage impellers can be mounted upon shaft **29** by threading thereon.

Now referring to Figs. 3 and 4, the impeller here shown comprises a convex faced impeller **133** having on its inner side four ribs **133***r*. Also on the face of the impeller **133** are four holes **133***h* which are utilized to expel air into the massage bath. This type of impeller is used for moderate mechanical massage effect and its use is indicated under conditions indicating very light mechanical massage effects.

However, if a mechanical massage of greater intensity is desired, it is feasible to use an impeller as shown in Figs. 5 and 6, which includes the added surface projections **133***p* which in this instance are shown as rounded projections.

Fig. 7 illustrates an impeller that has two series of depressions **133***d* divided by vanes **133***v*, while Fig. 8 shows an impeller having two sets of depressions **133***d* separated by smooth areas **133***s*.

From the above descriptions it will be appreciated that impellers of many kinds may be designed to give almost any desired combination of mechanical, circulatory and pneumatic hydrotherapy treatments.

Now referring to Figs. 9 and 10, I show a similar hydrotherapy massage unit to that shown in Figs. 1 and 2 except that this unit is designed for adjustable mounting on the rim of hydrotherapy tanks of various kinds. This mounting of hydrotherapy units on the rim of tanks is common practice for hydrotherapy apparatus employing pump vanes enclosed in pump housings in the conventional manner. On a vertical hollow support tube **34** is mounted a massage impeller housing **35** having a protector flange **36** as shown. The housing **34** is supported from a tank bracket **37** extending over the rim of the tank and secured thereto by clamp screws **38**. Near the bottom of the inside leg of the bracket **37** is a pivotal attachment flange **39** and on this is supported a clamp bracket **40** extending around the support tube **34** and securely clamping it in the desired adjusted position by a thumb bolt **41** as shown. By this structure it will be understood that the support tube **34** may be adjusted vertically and in tilted position at the will of the operator. Within the protector flange **36** there is mounted a massage impeller **33** on a conventional drive shaft **29** by the threaded connection **29***t* on the end of the shaft **29**. By this structure it will be understood that various massage impellers may be substituted at the will of the operator. On the top of the support tube **34** an electric motor **25** is mounted as shown. To the electric motor **25** is attached a flexible drive shaft **42** connecting with the drive shaft **29** so that the massage impeller **33** is rotated as previously described. The rotation of the massage impeller **33** will cause a suction in the hollow tube **34** to induce air in the water through an adjustable air inlet **122** and **123** exactly in the same manner as described for the air inlets **22** and **23** in the apparatus described in Figs. 1 and 2. The air is inducted into the bath through air inlets **16***i*, the same as previously described.

The above description for Fig. 9 illustrates a massage impeller **33** held in a vertical manner. However, by substituting an impeller housing **135** as shown in Fig. 10, the massage impeller may be fixed in horizontal position. Thus by a combination of apparatus as shown in Figs. 9 and 10, I provide a portable flexibly mounted massage impeller apparatus for both horizontal and vertical massage impellers. Now when such apparatus is applied to hydrotherapy tanks as illustrated in Figs. 11 and 12, various massage impellers may be used in the tanks to give horizontal massage impeller action as illustrated at **44** or vertical massage impeller action as at **45**. The impellers **44** and **45** may be applied to a full submergent hydrotherapy tank **43** wherein the patient can be almost completely submerged in a horizontal position. Hydrotherapy tanks are made in another form such as tank **46** illustrated in Fig. 12 which is a tall submergence tank to accommodate a patient in upright position and to which various massage impellers such as **44** and **45** may also be applied as illustrated in Figs. 1, 2 or 11.

The devices described are all directed to rotationally operable impellers that provide air expulsion and water pulsation in the areas surrounding the submerged impeller.

In principle all the forms described operate similarly. As in Fig. 1, rapid rotation of impeller **33** by the motor drive produces internal suction within the impeller causing air to be drawn into tube **21**, along passageway **20** and through openings **16***i* into the impeller. Such air will then be centrifugally discharged through openings such as **33***t* to enter the water bath adjacent the impeller and into the pulsating waves of water generated by the surface vanes of the impeller. All this and the actual mechanical massage of the impeller surface make up the therapeutic treatment device of this invention.

Having thus explained my invention, I now claim as new:

1. An apparatus for hydro-therapy comprising a liquid tank, a hollow impeller rotatably supported within the liquid in said tank, means to drive said impeller at relatively high speeds, said impeller having a portion thereof arranged and positioned to directly massage a contacting body part, and air conduit means arranged to communicate with the interior of said impeller, said impeller having internal means arranged to draw air into the interior thereof, and having openings in certain portions thereof to expel said air into said tank liquid during rotation of the impeller.

2. An apparatus for hydro-therapy comprising a liquid tank, a hollow rotatable impeller submerged within the liquid in said tank and supported for rotation by said tank, means to drive said impeller at relatively high speeds, and air conduit means arranged to communicate with the interior of said impeller, said impeller having internal vanes arranged to draw air into the interior thereof, and having openings in certain portions thereof to expel said air into said tank liquid during rotation of the impeller, said impeller also having an externally deformed surface portion to function as a direct mechanical message for a contacting body part during the rotation of said impeller.

3. An apparatus for hydro-therapy comprising a liquid tank, a hollow rotatable impeller submerged in exposed position within the liquid in said tank, means to drive said impeller at relatively high speeds, and air conduit means arranged to communicate with the interior of said impeller, said impeller having internal vanes arranged to draw air into the interior thereof, and having openings in certain portions thereof to expel said air into said tank liquid during rotation of the impeller, said impeller being further provided with radial vanes upon its surface to form high and low contours to massage a contacting body part and to also create water pulsations to supplement the air discharge through said impeller openings.

4. An apparatus for hydro-therapy comprising a fluid tank, a hollow impeller having a convex top, said impeller being supported for rotation adjacent one wall of said tank with the hollow side toward said wall, air conduit means connected with said wall and through openings therein to the hollow of said impeller, and operative means to rotate said impeller, said impeller having vanes in the interior thereof to draw air into the same, and having openings in the surface thereof to radially expel such air into the tank liquid.

5. An apparatus for hydro-therapy comprising a rotatable impeller supported in a fluid bath, said impeller having an outer surface contour designed to present a variable surface to provide a rotary massage unit for a body part, certain portions of said variable surface comprising deformations that generate fluid impulses adjacent said impeller, said impeller having a deformed inner surface portion oppositely related to the outer surface fluid impulse portion thereof, and air supply means terminating adjacent its inner surface portion of said impeller for air dispersion into said bath fluid about said impeller by said inner deformations of the impeller.

6. A portable apparatus for hydro-therapy comprising a rotatable body part massaging impeller adapted for submersion into a water container, an air duct leading to said impeller, said impeller having suction means to draw air through said duct and to disperse the air into the water of said container, and clamp means connected with said duct to secure the duct to said container and to position said impeller in a predetermined exposed location within said container.

7. A portable apparatus for hydro-therapy comprising a rotatable body part massaging impeller adapted for submersion into a water container, an air duct leading to said impeller, said impeller having suction means to draw air through said duct and to disperse the air into the water of said container, impeller drive means mounted upon

said duct and extending therethrough for connection with said impeller, and clamp means carried by said duct to fasten the same to the container with the impeller disposed in operative exposed relation within the water of said container.

8. A hydro-therapy apparatus comprising a fluid carrying tank, a massaging rotor mounted for rotation within the fluid in said tank, and operable drive means connected to rapidly revolve said rotor, said rotor having a portion of the surface thereof deformed to present a predetermined surface contour to directly massage a rotor contacting body part, said deformed surface portion of said rotor providing vane like elements comprising water agitating means generating water pulsations adjacent said body part massaging rotor, and an air supply means having one end thereof open to atmosphere at a point above the fluid level of said tank and the other end thereof arranged for direct communication to a point within the peripheral confines of said massaging rotor for direct dispersion of air by said rotor and into the tank fluid surrounding said rotor.

9. A hydro-therapy apparatus to directly massage a body part comprising a walled liquid tank, a rotatable massage unit presenting a convexly formed massaging surface, pivotal means connected with one wall of said tank to mount said unit adjacent said wall with the convexly formed surface thereof disposed in contiguous relation with respect to said one tank wall, operable means connected with said massage unit to rotate the same at predetermined speeds, and an air supply means provided with a terminal portion having connection through said one tank wall at said unit for communication and air deliverance adjacent the underside of said rotary massage unit.

10. A hydro-therapy apparatus to directly massage a body part comprising a walled liquid tank, a rotatable massage unit presenting a convexly formed massaging surface, pivotal means connected with one wall of said tank to mount said unit adjacent said wall with the convexly formed surface thereof disposed in contiguous relation with respect to said one tank wall, operable means connected with said massage unit to rotate the same at predetermined speeds, said convexly formed massaging surface including high and low massaging deformities thereon to stimulate the contacting body part and to generate pulsating vibrations in the liquid surrounding said massage unit to supplement the mechanical massage action of said unit, said one wall being provided with ports adjacent the underside of said massage unit, and an air

supply means communicating with the underside of said massage unit through said wall ports to admit air for rotary dispersion into the adjacently disposed tank liquid by said massage unit.

11. A hydro-therapy apparatus to directly massage a body part comprising a walled liquid tank, a rotatable massage unit presenting a convexly formed massaging surface, pivotal means connected with one wall of said tank to mount said unit adjacent said wall with the convexly formed surface thereof disposed in contiguous relation with respect to said one tank wall, and operable means connected with said massage unit to rotate the same at predetermined speeds, and air conduit means arranged for communication with said massage unit, said unit including vane means to draw air out of said conduit and to discharge said air into the liquid surrounding said massage unit.

12. A hydro-therapy apparatus to directly massage a body part comprising a walled liquid tank, a rotatable massage unit presenting a convexly formed massaging surface, pivotal means connected with one wall of said tank to mount said unit adjacent said wall with the convexly formed surface thereof disposed in contiguous relation with respect to said one tank wall, and operable means connected with said massage unit to rotate the same at predetermined speeds, said convexly formed massaging surface including high and low massaging deformities thereon to stimulate the contacting body part and to generate pulsating vibrations in the liquid surrounding said massage unit to supplement the mechanical massage action of said unit, and air conduit means arranged for communication with said massage unit, said unit including vane means to draw air out of said conduit and to discharge said air into the liquid surrounding said massage unit.

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