The invention relates generally to treating and massaging parts of the human body, and more particularly to novel methods and apparatus for treating parts of the body with liquid under pressure.

In the treatment of infections, such as cases of blood poisoning, it is customary to apply and maintain wet dressings containing a medicant or antiseptic on the infected part, and these dressings are required to be changed at frequent intervals of say fifteen minutes over relatively long periods of time. Such treatment requires the substantially continuous services of a nurse or attendant, and the effectiveness of the treatment is retarded during the changing of the dressings, and also depends to a great extent upon the efficiency and capability of the person applying the dressings.

It is therefore a general object of the present invention to provide a means and method for treating infections for subjecting an infected part of the body to a constant and uniform treatment, without requiring the services of an expert attendant.

In certain cases it has been found that massaging the body or parts thereof under water has certain beneficial effects. Prior apparatus have been provided for immersing all or substantially all of the body in a receptacle and circulating water into and out of the same, but such treatment has not resulted in any particular benefits for a number of reasons, including the fact that the pressure of the water is not localized or effective at the area to be massaged.

Moreover, in cases where a patient is recovering from infantile paralysis, it has been found beneficial to manually massage the limbs under water to aid in restoring the use of them, but such treatment usually requires the time and services of an expert masseur in order to obtain the desired results.

Accordingly, it is a further object of the present invention to provide a method and apparatus for massaging the limbs of the human body in a novel and improved manner, without requiring the services of an experienced person or expert masseur.

And finally, it is an object of the present invention to provide a simple and inexpensive apparatus which can be used by any experienced persons, or even by the patient himself, to treat or massage parts of the human body according to the novel method described herein.

These and other objects are accomplished by the parts, combinations, methods and apparatus comprising the present invention, which is represented by way of example in the drawing and hereinafter described and claimed.

Stated in general terms, a preferred apparatus for carrying out the invention may include a closed container adapted for enclosing a part of the body such as an arm or leg, and being connected to means for circulating liquid therethrough at a constant temperature and pressure, said container being so constructed as to impart a spiral or helical circulatory motion to the liquid, thereby subjecting the body part within the same to a spirally moving hydraulic pressure.

Referring to the drawing forming part hereof, Figure 1 is a more or less diagrammatic view of the improved apparatus applied for treatment of a human arm, the container enclosing the arm being shown in section;

Fig. 2 is an enlarged transverse sectional view of the container detached from the arm; and

Fig. 3 is a detached perspective view looking into the open end of the container.

The same numerals refer to the same parts throughout the drawing.

The improved apparatus shown by way of example in the drawing preferably includes a rigid tube 5 which may be tapered or somewhat conical in shape as shown, and circular in cross section as indicated in Fig. 2. The tube is preferably constructed of a rigid transparent material such as glass, so that the effects of the treatment on the body part within the tube may be observed.

The tube 5 is shown of a size and shape suitable for enclosing a patient's arm 6, although the size and shape may be varied to suitably enclose a leg, as desired. One end of the tube 5, preferably the small end, is closed as indicated at 7 and the other end is open to permit telescoping the tube over the patient's arm.

Means for providing a liquid tight seal around the arm 6 at the open end of the tube may include a soft rubber ring 8 which is detachably mounted on the open end of the tube in any suitable manner, as by the flanged ring 9 fitting over the open end of tube 5 and having the soft rubber ring 8 secured thereto. When the tube 5 is applied to the arm 6, the soft rubber ring 8 compresses easily to allow entrance of the arm and has sufficient resiliency to provide a liquid tight seal around the same.

Preferably, supports 10 of semi-soft material are provided within the tube 5 to support the arm 6 in a comfortable position so that the arm may be enclosed in the tube for long periods without tiring the patient.
The tube 5 is provided preferably at its larger end with an inlet pipe or duct 11, and at its other end with an outlet pipe or duct 12. A liquid reservoir 13 is provided for being placed at a location conveniently adjacent to the tube 5, and a flexible pipe or hose 14 conducts liquid from the reservoir through inlet pipe 11 into the tube 5. A flexible conductor or hose 15 is connected to the outlet pipe 12 for returning fluid from the other end of the tube 5 to a suitable pump 16 which pumps the liquid from conductor 15 back into the reservoir 13. By operating the pump at a constant speed by any suitable driving means, the fluid in the system will be circulated at a constant pressure, thereby providing for a uniform fluid pressure being applied to and around the arm 6 immersed within the tube 5.

Means for heating the fluid in the reservoir and maintaining it at a constant temperature may include an electric heating element indicated diagrammatically at 17 having the usual electric conductor cord 18 attached thereto for connection with an electric current supply. The electric heating element may be thermostatically controlled in a well-known manner to maintain the temperature of the fluid circulating through the reservoir substantially constant.

Means for imparting a spiral or helical motion to the fluid as it is circulated through the tube 5 preferably includes a series of spirally arranged ribs on the inner surface of the tube 5, or a single continuous helical rib 19 as indicated in the drawing. This rib may be formed integral with the tube 5 as shown or may be formed as a separate element secured or mounted on the inner surface of the tube. Thus, as the fluid enters inlet 11 and circulates through the tube to pass out of outlet 12 it is given a spiral or helical circulating motion by the rib or ribs 19, so that the arm 6 or other body part enclosed within tube 5 is subjected to the action of liquid circulating or moving in a helical path under constant pressure, and at a constant temperature if desired.

We have discovered that in the case of treating infections and particularly where there is an open wound, if the usual medicants or antiseptics are introduced into the fluid helically circulating through tube 5, the antiseptic and curative effect on the infected part is greatly enhanced as compared with the results obtained by the customary wet dressings now in use. Consequently, an infection can be cured in less time with less discomfort to the patient, and without requiring the services of a skilled attendant.

Moreover, due to the fact that the arm or other body part is subjected to a continuous helically circulating action of the fluid under constant pressures and temperatures the antiseptic curative effect is more positive in its action.

In the case of massaging limbs we have discovered that the helical massaging action of the fluid under constant pressure is very beneficial, and especially in infantile paralysis cases it aids in restoring the natural use of the limb much more rapidly than any prior method or massaging action of which we are aware. Moreover, the improved spiral or helical massaging pressure can be applied by the most inexperienced person without requiring any manual exertion or the services of an expert masseur.

We claim:

Apparatus for treating a part of the human body including a tube closed at one end for engirdling the body part, means at the open end of said tube for providing a seal around said body part, said tube being provided with an inlet at one end and an outlet at the other end thereof, a liquid reservoir communicating with said inlet and outlet, means for maintaining the tube full of liquid and circulating the liquid under constant pressure from the reservoir through said tube and back to the reservoir, and helical ribs on the interior of the tube and integral therewith for imparting a helical motion to the liquid circulating therethrough.

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