C. E. BUCK.

THERAPEUTICAL VACUUM APPARATUS.

APPLICATION FILED NOV. 11, 1913.

1,107,888. Patented Aug. 18, 1914.

Fig. 1.

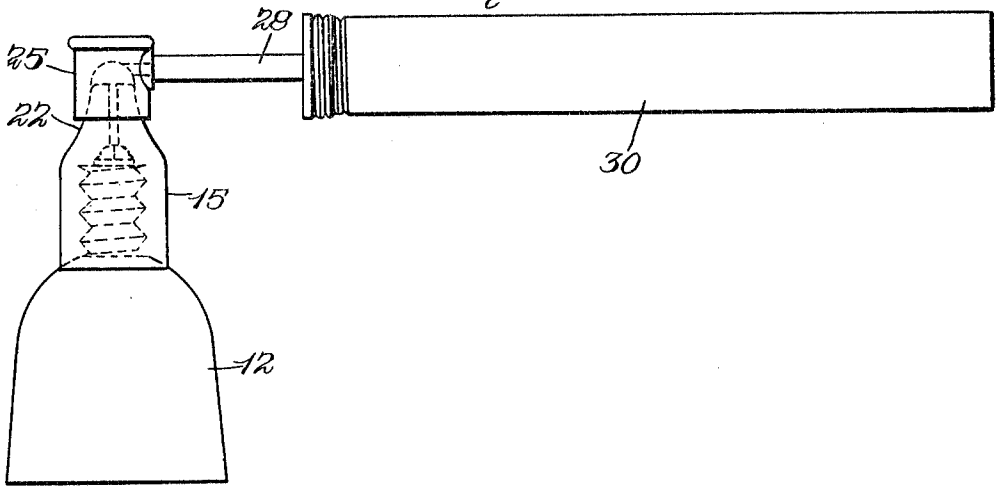


Fig. 2.

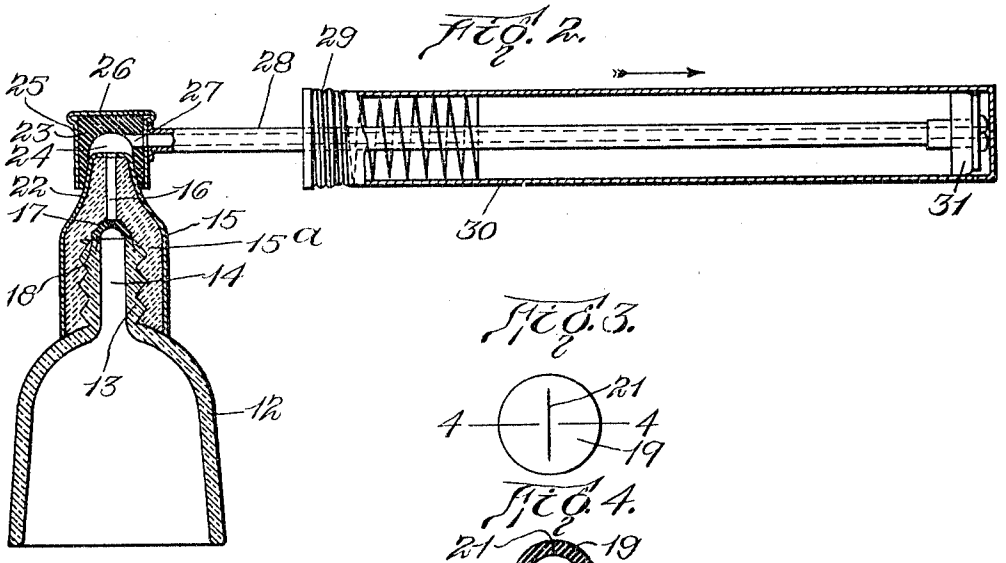


Fig. 3.

Fig. 4.



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THERAPEUTICAL VACUUM APPARATUS.

1,107,888. Specification of Letters Patent. Patented Aug. 18, 1914.

Application filed November 11, 1913. Serial No. 800,297.

To all whom it may concern:

Be it known that I, CHARLES E. BUCK, a citizen of the United States, and a resident of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Therapeutical Vacuum Apparatus, of which the following is a specification.

This invention relates to apparatus for creating a vacuum on the external surface of a part of the human body for therapeutical purposes, and it is embodied in a simple and effective apparatus of this character including a suction cup adapted to bear on the skin, and an air pump adapted to exhaust air from the cup, the pump being quickly engageable with and removable from the cup so that the cup may be left in position on the skin while a vacuum is maintained therein, and the relative arrangement of the cup and pump being such that the operation of the pump does not tend to lift the cup from the skin.

Of the accompanying drawings: Figure 1 represents a side elevation of a vacuum apparatus embodying my invention. Fig. 2 represents a longitudinal section of the same. Fig. 3 represents an enlarged side view of the valve shown in section in Fig. 1 and Fig. 4 represents a section on line 4—4 of Fig. 3.

The same reference characters indicate the same parts in all the figures.

In the drawings, 12 represents a glass cup having an open end or mouth adapted to be seated on a portion of the surface of a human body and a shank portion 13 at the opposite end, the shank portion being integral with the cup and provided with an air passage 14.

To the inner shank portion 13 is attached an outer shank portion preferably composed of a metallic casing 15 and a filling 15ª composed of a suitable cement adapted to harden around a shoulder on the inner shank portion 13 and rigidly connect the two shank portions. The outer shank portion is provided with an air passage 16 in line with the passage 14 and of smaller diameter than the latter. The inner end of the passage 16 has a concave enlargement 17 surrounding the passage 16 and forming a concave wall of a valve chamber. The outer end of the inner shank portion 13 forms an annular valve chamber wall 18 surrounding the passage 14 and opposed to the concave wall 17.

19 represents a cup shaped valve composed of elastic rubber and having an annular rim 20 surrounding the concave side of the valve and formed to bear on the annular wall 18. The convex side of the valve 19 is formed to bear on the concave wall 17. The valve is provided with a slit 21 formed by cutting through the crown of the valve with a sharp edged blade without removing any of the material. The said slit extends across the air passage and is adapted to be opened by air pressure on the concave side of the valve, thus permitting escape of air from the cup, and to be closed by air pressure on the convex side of the valve, thus preventing air from entering the cup through the passage 16. The outer end of the outer shank portion is tapered externally to form a male coupling member 22 through which the air passage 16 extends.

The apparatus includes an air pump, the intake end of which is provided with an elastic compressible bushing 23 having a recess 24 which forms the wall of a female coupling member adapted to frictionally and detachably engage the male coupling 22 and form an air tight joint therewith. In the embodiment of my invention here shown, the bushing 23 is inserted in a metal casing 25 which is closed at one end by a head 26 and has an air passage 27 communicating with a tubular piston rod 28. Said rod passes through a guide 29 at one end of a pump barrel 30. The rod 28 is provided with a piston 31 having a close sliding fit on the interior of the barrel 30. The air passage through the rod 28 extends through the piston as indicated by dotted lines in Fig. 2 so that when the barrel is moved on the rod in the direction indicated by the arrow, air will be exhausted from the cup 12, the valve 17 opening to permit air to pass from the cup, and closing when the exhausting movement of the barrel ceases. The barrel is preferably elongated so that a single movement in the direction indicated will produce a sufficient vacuum in the cup. The casing 25 and the recess 24 are arranged crosswise of the rod 28 so that the said rod and the barrel 30 stand at substantially a right angle with the cup 12. This arrangement prevents the movement of the barrel in the direction of the arrow from pulling the cup outwardly from the surface on which it bears, so that the operator in holding the cup will exert only sufficient force to prevent the cup from tipping sidewise.

In other words, the recess 24 faces at substantially a right angle with the pump, and consequently operation of the pump, when the cup 12 is in its location of utility, will not tend to detach the cup from such location. This is because such endwise movement as might be imparted to the rod 28, during the operation of the pump for producing a vacuum in the cup 12, is not sufficient to more than slightly rock the cup without detaching it, while the same amount of movement, if imparted in a direction toward and from the cup, or in the line of its longitudinal center, resulting from the operation of the pump, would be likely to either separate the two members of the coupling or detach the cup from the location which has been given to it for purposes of creating a vacuum on the surface of a part of the human body.

The described construction of the cup and its two-part shank is simple and relatively inexpensive and enables an elastic valve of the character shown to be employed, said valve requiring no spring and being of very simple construction. The outer male coupling member on the cup shank and the recessed elastic bushing 23 on the piston rod enable the shank and barrel to be quickly connected and disconnected without the use of screw threads. In practice a number of cups 12 can be employed, the cups being of different sizes and each having a male coupling member 22 on its shank adapted to engage the bushing 23. The inner shank portion 13 may be provided with an external screw thread as shown by Figs. 1 and 2, said thread forming the above-mentioned shoulder around which the cement filling 15ª hardens. The outer shank portion is therefore adapted to be unscrewed from the inner shank portion to permit the removal and renewal of the valve.

I claim:—

1. A vacuum apparatus comprising a cup having a shank provided with an air passage and a coupling member, a valve to permit air to pass from the cup and to prevent air from passing into the cup, and an air pump having at its intake end a coupling member to coöperate with the coupling member of the cup, the coupling member carried by the pump facing at substantially a right angle with said pump whereby operation of the latter will not tend to detach the cup from its location of utility.

2. A vacuum apparatus comprising a cup having a rigid shank tapered at its outer end to form a male coupling member, the shank being provided with an air passage extending through said member and enlarged between its ends to form a valve chamber, a valve in said chamber adapted to permit air to pass from the cup and to prevent air from passing into the cup, and an air pump having at its intake end a compressible elastic female coupling member adapted to frictionally and detachably engage the said male coupling member and form an air tight joint therewith, the coupling member carried by the pump facing at substantially a right angle with said pump whereby operation of the latter will not tend to detach the cup from its location of utility.

In testimony whereof I have affixed my signature, in presence of two witnesses.

CHARLES E. BUCK.

Witnesses:
ALICE C. RYAN,
IVORY F. FRISBEE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."