April 20, 1937. R. W. ALBRIGHT 2,077,453

THERAPEUTICAL APPLIANCE

Filed March 29, 1934

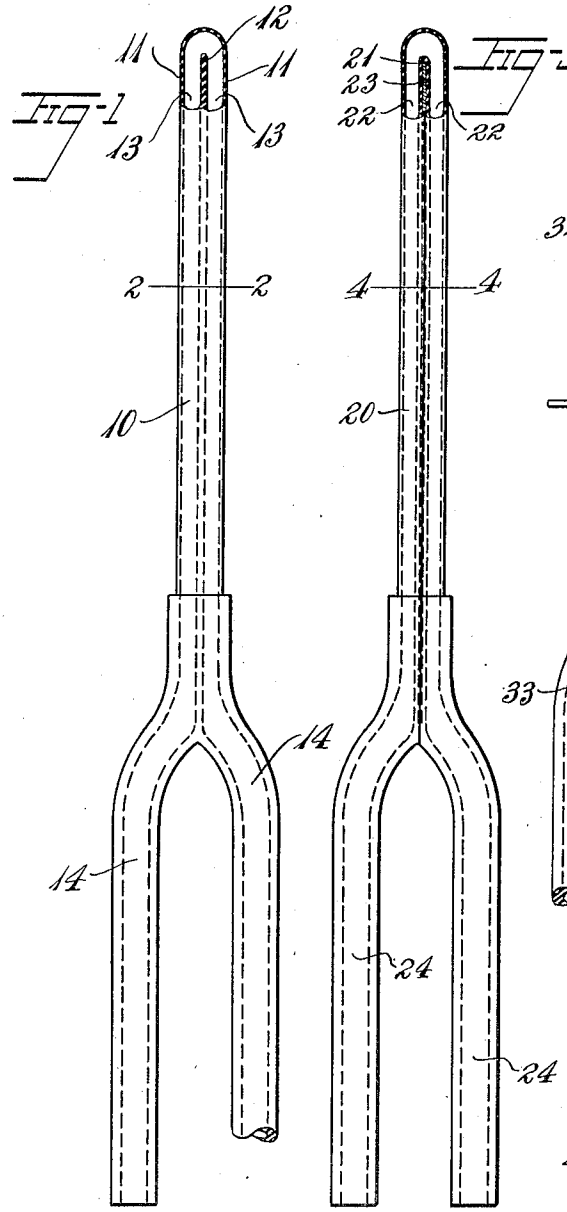


Fig-1

Fig-3

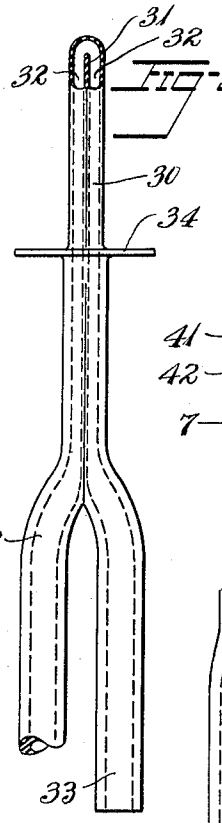


Fig-5

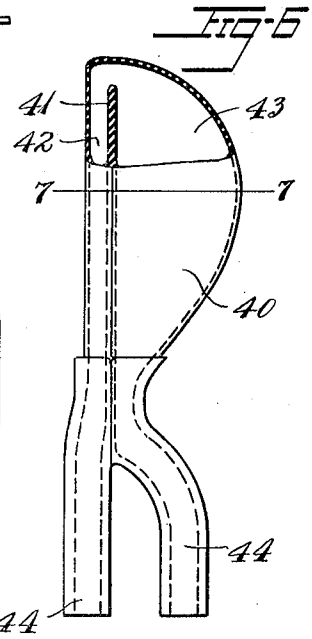


Fig-6

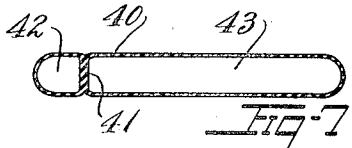


Fig-7

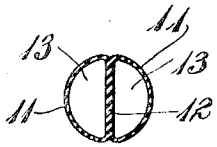


Fig-2

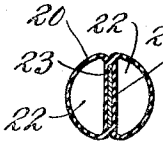


Fig-4

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UNITED STATES PATENT OFFICE

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THERAPEUTICAL APPLIANCE

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Application March 29, 1934, Serial No. 717,943

5 Claims. (Cl. 128—254)

This invention relates to therapeutical appliances and particularly to applicators adapted for insertion into various natural bodily cavities for application of heat treatment to diseased areas thereof, the heat being supplied by hot water circulated through the applicator.

The objects of the present invention include the provision of applicators adapted especially for insertion into bodily cavities or passages such as the nasal and ear passages, the antrum, and the urethra; the provision of such applicators which shall be capable of applying heat uniformly to all areas of a diseased cavity or passage undergoing treatment; the provision of such an applicator which shall be so constructed that a stream of water or other fluid heated to a desired temperature may be caused to flow continuously through the applicator to maintain all portions thereof at a uniform temperature; to provide such an applicator which shall be somewhat distensible under internal pressure to provide for accommodating the applicator to fit and contact with all surfaces to be subjected to heat treatment; to provide such an applicator having integral connecting rubber tubes for conveying water or other fluid to and from the applicator; and other objects which will be apparent from the following description of the invention which will be made with reference to the accompanying drawing.

Of the drawing,

Fig. 1 is an elevation of one type of applicator embodying the principles of the present invention, the walls of the applicator being broken away in places for clarity of illustration;

Fig. 2 is a vertical section taken on line 2—2 of Fig. 1;

Fig. 3 is an elevation of an applicator generally similar in construction to the applicator of Fig. 1, but embodying a stiffening element;

Fig. 4 is a vertical section taken on line 4—4 of Fig. 3;

Fig. 5 is an elevation of a modified form of applicator embodying a stop to prevent insertion of the applicator too great a distance into a bodily passage;

Fig. 6 is an elevation of another form of applicator designed especially for treatment of the antrum lining;

Fig. 7 is a vertical section taken on line 7—7 of Fig. 6.

The appliance of Fig. 1 comprises a relatively long tubular applicator 10 shaped to conform generally to the passage into which it is to be inserted, and having relatively thin elastic rubber walls 11 about 0.01 inch thick, for efficiency of heat transfer and to permit distension of the applicator under internal fluid pressure. The tubular applicator is closed at its tip end and is provided with a central integral rubber web 12 extending longitudinally of the interior of the applicator except for a short distance at the tip end, the web being integrally joined to the walls of the applicator along approximately diametrically opposed lines and thereby serving to divide the interior of the tubular applicator into two parallel channels 13, 13 communicating at the tip of the applicator and providing a continuous fluid conduit extending down one side of the applicator and up the other side. Communicating with the openings of the aforesaid two channels, are provided a pair of connecting tubes 14, 14, preferably relatively heavy rubber tubes integrally joined to the walls of the applicator to provide means for conducting water or other fluid to and from the applicator. For convenience, the tubes 14, 14 may be simply heavier and less distensible continuations of the divided tubular applicator, so constructed that the two channels diverge gradually to form the two separate tubes.

The applicator portion of the above described appliance may be inserted, for example, into a nasal passage, and water or other fluid at a desired temperature may be circulated continuously through the appliance. If the water is forced through the applicator under slight pressure, the thin walled applicator will be distended somewhat and will adapt itself to fit irregularities of the area being treated to insure uniform contact of the applicator with such areas. The possible distension is limited however by the integral rubber web which in addition to providing the two fluid channels, serves also to prevent undue distension of the applicator which might cause injury. Thus, it will be seen that the applicator provides means for applying heat of controlled uniform intensity to portions of a human body which would be extremely difficult to reach with ordinary means for applying thermal treatments.

The appliance of Fig. 3 is generally quite similar in construction to the appliance described above, and comprises a tubular applicator 20 closed at its tip end and having a central web 21 dividing the interior of the applicator into two channels 22, 22. To facilitate insertion of the applicator into a relatively long and restricted passage such as the male urethra, a stiffening element 23, which may be a thin strip of metal, whalebone, or equivalent material substantially as long as the applicator, is embedded in the

central rubber web. Integral connecting tubes 24, 24 are provided as before for conducting water or other fluid to and from the applicator. The appliance illustrated in Fig. 5 is designed especially for applying heat treatment to the lining of the female urethra and the passages of the ear, and comprises a tubular applicator 30, somewhat smaller in size and shorter in length, but otherwise similar to those previously described in that it is made of thin elastic rubber and has a central integral web 31 dividing the interior of the applicator into two channels 32, 32 which communicate with connecting tubes 33, 33. For limiting the distance to which the applicator may be inserted into a passage to be treated, a stop 34 is provided at a desired point along the length of the tubular applicator. The stop 34 preferably consists of an integral circular rubber flange extending radially outward from the applicator for say ½" to 1".

In addition to the symmetrical tubular configuration of the applicators heretofore illustrated, various other shapes of applicators may be provided as required for effectively treating diseased areas of various bodily cavities of different shapes. For example, the appliance of Fig. 6, designed especially for heat treatment of diseased areas within the antrum, comprises a thin rubber walled hollow applicator portion 40 of substantially semi-circular outline, having an integral rubber web 41 joining the sides of the applicator and extending parallel to the flat side of the semi-circular outline, thereby dividing the interior of the applicator into a long tubular channel 42 extending along the flat side of the outline up to the tip of the applicator and a larger somewhat bulbous channel or chamber 43 occupying the rounded portion of the semi-circular outline. Communicating with the openings of the two channels are provided, as before, two preferably integral rubber connecting tubes 44, 44 the tubes preferably consisting of diverging heavier continuations of the divided applicator as previously described.

The appliances of this invention may be manufactured by immersing suitable forms into a liquid dispersion of rubber, preferably compounded rubber latex, in the manner described in the copending application of George L. Winder, Serial No. 717,765, filed March 28, 1934, which has now matured into U. S. Patent No. 2,053,357, granted September 8, 1936, although the present invention is by no means limited to any particular method of manufacturing the appliances.

As has been indicated, the appliances of the present invention provide means for uniformly applying heat of a desired intensity to difficultly accessible portions of the human body. Uniform treatment is assured by circulation of the water through all portions of the applicator and by providing for distending the applicator to fit the passage or cavity being treated. Water may be heated and circulated through the appliance in any convenient manner, as by means of the "Elliott" apparatus designed especially for that purpose, while now is available, although such auxiliary apparatus forms no part of the present invention. It is obvious that the appliances hereof may also be used, if desired, for applying cold treatments to bodily cavities, by circulating cold water or other fluid through the applicator inserted within the cavity to be treated.

Numerous modifications may be made in the appliances hereinabove described without departing from the scope of the invention as defined in the appended claims.

I claim:

1. A therapeutical appliance adapted for insertion into a natural body cavity or passage, said appliance comprising a relatively thin-walled hollow applicator made of flexible elastic material having substantially the properties of rubber and being shaped to conform generally to the cavity or passage to be treated but being capable of distension under internal pressures for more nearly perfect conformance, a web of rubber extending substantially throughout the length of the interior of the hollow applicator but terminating short of one end thereof and having its edges integrally attached to the walls of the applicator in such manner as to limit distension of the hollow applicator and also to divide the interior of the applicator into at least two fluid channels communicating at the said end for directing a fluid stream through the applicator, and connecting tubes communicating with each of the said channels at the other end of the applicator for conducting fluid to and from the applicator, said applicator being closed except for openings communicating with the aforesaid tubes.

2. A therapeutical appliance as defined in claim 1, in which the appliance is structurally integral and consists substantially entirely of vulcanized unmasticated latex rubber.

3. A therapeutical appliance as defined in claim 1 having a stiffening element imbedded in the web.

4. A therapeutical appliance as defined in claim 1 in which the applicator is of relatively long and slender tubular configuration, said appliance comprising an integral flange extending radially outward from the tubular applicator at a point removed from the tip thereof.

5. A therapeutical appliance as defined in claim 1 in which the appliance is structurally integral and consists substantially entirely of vulcanized rubber and in which the connecting tubes are heavier integral continuations of the divided applicator.

RAYMOND W. ALBRIGHT.