Sept. 8, 1931. C. J. LOWEN 1,821,979

APPARATUS FOR INCREASING CIRCULATION OF THE SCALP

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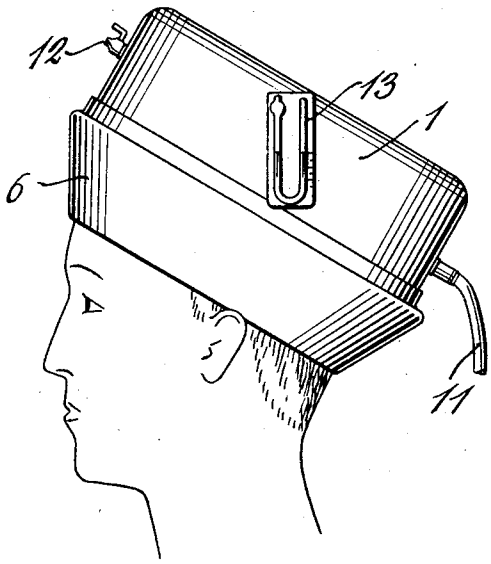


Fig. 1.

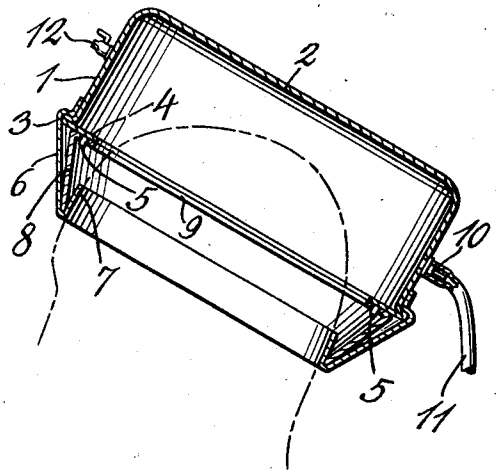


Fig. 2.

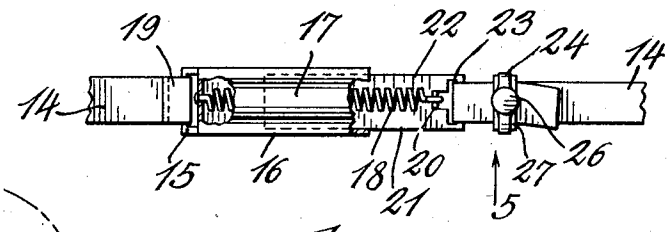


Fig. 4.

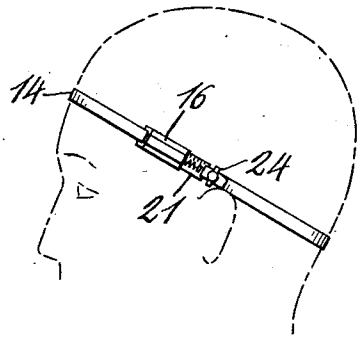


Fig. 3.

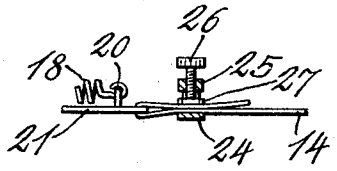


Fig. 5.

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APPARATUS FOR INCREASING CIRCULATION OF THE SCALP

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This invention relates to improvements in methods and apparatus for promoting the growth of hair.

Baldness is quite common among men, whereas it is a rarity among women, showing that it is due to some difference in the manner of treating the scalp and after a long investigation, the cause has been ascribed to the effect that tight hatbands have, of retarding the circulation and cutting off the nutrition that is dependent on the free circulation of blood.

The scalp is supplied with blood through two sets of superificial arteries which are branches of the external carotid artery and which include the superficial temporal artery and its branches and the occipital artery and its branches. The arteries are connected with the veins by capillaries. The veins, like the arteries, lie on the outside of the skull. It is evident that if pressure is applied to the skull, as by a too tight hat band, the arteries will be compressed to such an extent that the supply of blood to the scalp will be interfered with. If it were possible to apply pressure to the veins without at the same time applying pressure to the arteries, the return flow would be retarded and an increased pressure applied to the capillaries that would produce a marked hyperemia which, in turn, would produce an increased nutrition and promote hair growth. Owing to the location of the veins and arteries, it is difficult, if not impossible, to compress the veins without at the same time compressing the arteries, but I have found that if the pressure is carefully regulated so as to permit the arterial blood to flow while applying a retarding force to the return flow, it is possible to increase the volume in the capillaries and thereby to produce the desired hyperemia.

Instead of applying pressure by means of a band, somewhat better results can be obtained by subjecting the scalp to a reduced air pressure and carefully regulating the partial vacuum so as to retard, but not prevent the return flow of blood while permitting the arterial blood to flow into the capillaries quite unobstructed. I have found that for the best results a vacuum of about 20 mm of mercury gives the most desirable results.

In order to explain this invention so that it can be clearly understood it is necessary to first explain more clearly the cause underlying most baldness which, in brief, can be ascribed to undernourishment due to insufficient blood being brought to the top of the scalp. When people reach an age approximately thirty-five years changes take place in the caliber of the capillaries of the scalp, due in most cases to improper care, and which produces a retardation of the circulation and cuts down the amount of blood to the scalp. The capillaries are normally small and therefore any change that makes them smaller interferes greatly with the amount of blood that can flow through them and the hair follicles are thus undernourished.

It is evident that if the circulation of blood in the scalp can be restored to normal or increased, the hair follicles that are still alive will become active and the hair will again grow.

For the purpose of increasing the circulation, various expedients have been resorted to, such as massage, the applications of irritating drugs and the use of heat and light waves, but such treatments as a rule have no permanent effect because they cannot be measured physiologically. It has even been proposed to employ a vacuum appliance for increasing the circulation, but this is not satisfactory unless the vacuum is carefully regulated in a manner that will hereinafter be fully described and which regulation forms parts of this invention.

It has been pointed out above that if the veins are compressed so as to retard the return flow of blood without cutting off the arterial supply a flood damming action is obtained that tends to stretch the walls of the capillaries and produce a marked stimulating hyperemia and it is the application of this principle to the treatment of the scalp to which this invention relates.

If an air tight helmet is placed on the head and sealed by a suitable rubber skirt and the air exhausted so as to produce a vacuum of 20 to 40 mm of mercury, the capillaries will be

engorged and stretched so as to increase their caliber and in this way a permanently increased circulation is obtained. The arterial blood pressure of the arteries of the scalp is about 80 to 90 mm of Hg. and if the vacuum is regulated so that the pressure necessary to produce a return flow through the veins is less than the arterial pressure, circulation will continue and at the same time a stretching of the capillary walls be obtained. When the proper vacuum is used, there will be a pink glow over the area of the scalp subjected to the vacuum, but if the vacuum is high enough to stop the return flow, the blood will not circulate and the scalp will soon assume a dark appearance.

The use of the vacuum apparatus, owing to the great care that must be taken to maintain the proper pressure, is not suitable for home use and should be supervised by a trained technician. For home use and as an auxiliary to the vacuum treatment, a cephalic band is used. This band encircles the head above the ears and is provided with a tensioning device that is calibrated to correspond to certain atmospheric pressures and when such a band, properly tensioned, is worn, it produces an effect similar to that produced by the vacuum only in that it increases blood volume in the constricted area. The tension of this band must be carefully adjusted so that it will exert a retarding effect equivalent to a pressure of about 2 to 6 mm of Hg. which is sufficient to compress the veins so as to retard the return flow to some extent but which does not interfere with the arterial flow.

The method described above is carried out by means of an apparatus which has been especially designed for the purpose and which will now be described, reference for this purpose being had to the accompanying drawings in which it has been illustrated, and in which:

Fig. 1 is a side view of my improved vacuum helmet showing the same in place on a patient's head;

Fig. 2 is a view similar to the one shown in Fig. 1 but which shows the helmet in cross section;

Fig. 3 is a view showing the tension band that is used as an auxiliary to the vacuum helmet;

Fig. 4 is a view partly in section showing the tensioning device employed with the band illustrated in Fig. 3; and

Fig. 5 is a view looking in the direction of arrow 5, Fig. 4.

In the drawings reference numeral 1 represents a metal container which forms part of the vacuum helmet and which is preferably cylindrical in shape and has one end closed by a member 2. The open edge of the container has been shown as folded outwardly and then inwardly so as to produce an annular flange 3 which extends beyond the outer surface of the cylindrical portion. The lower edge of the container is bent inwardly so as to provide an annular flange 4. Flange 4 is provided with a plurality of pins 5, whose purpose will hereinafter appear. Secured to the open end of the container is a rubber skirt 6, the upper end of this skirt encircles the flange 3 and since the skirt is so proportioned with respect to the container that it must be stretched before it can be put in place, an airtight seal is formed between the upper edge of the skirt and the container. The skirt has conical sides and terminates in an upwardly extending flange 7, which is of the proper size to fit a person's head. In order to make it possible to fit heads of varying sizes and avoid more than 40 mm of Hg. pressure of constriction the apparatus is preferably provided with a number of skirts of different sizes that can be substituted, one for the other when necessity requires. Located within the skirt and between the bottom of the groove, between the sides of the skirt and flange 7, is a spacer 8. This spacer is conical and has its upper edge bent inwardly as indicated by reference numeral 9. Flange 9 is provided with openings for the reception of pins 5 and the spacer and container are therefore held against relative movement when the parts are assembled. The container is provided with a nipple 10 to which a tube 11 is connected. This tube extends to a vacuum pump of suitable construction by means of which the pressure within the container is reduced to any extent desired. A pet cock or valve 12 is provided in the helmet for the purpose of admitting air thereinto when the vacuum is to be reduced. For the purpose of measuring the amount of vacuum within the helmet, I have provided a mercury manometer 13 which is connected with the interior of the helmet and indicates the extent of the vacuum therein. As set out above, the optimum vacuum maintained in the helmet is between 20 and 40 mm of Hg. and during the time that the apparatus is in use, the vacuum should be carefully controlled and maintained at a value that gives the best results with the patient that is operated on. As pointed out above, it is necessary to maintain a circulation of blood in the scalp and this can be accomplished only when the vacuum within the helmet is lower than the arterial blood pressure so that blood may freely enter and so that the return flow will not be completely shut off by pressure on the veins, when these conditions prevail, the capillaries will be engorged with blood and stretched and this will tend to increase their diameter so as to permit a freer circulation of blood under normal conditions.

The helmet above described is not suitable for home use because its successful operation

depends on a careful maintenance of the proper vacuum and this can best be accomplished by a technician in charge of the operation. The vacuum treatment should only be used several days apart and it is therefore desirable for the patient to have some means of producing gentle hyperemia without the use of the vacuum apparatus, and for this purpose I have provided a cephalic band that encircles the head in the manner shown in Fig. 3 and which can be carefully adjusted as to tension so as to get the most desirable results. The band is composed of a piece of suitable webbing that has been indicated by reference numeral 14, one end of which is secured to a loop 15 at one end of the tensioning device 16. The tensioning device consists of a casing having a flat bottom and having a top whose center portion is provided with a substantially semicylindrical outwardly extending groove 17 within which is located a coil spring 18, one end of which is anchored at 19 and the other end of which is anchored to the upstanding tongue 20 of the slide 21. This slide is of the proper size to fit in the casing of the tensioning device and has one edge provided with graduations forming a scale 22 that indicates tension corresponding to certain atmospheric pressures. The end of slide 21 has an opening 23 through which the other end of the web 14 extends. This end of the web is held together by means of a clamp comprising a rectangular member 24 whose upper portion 25 has a threaded opening for the reception of a screw 26. A clamping plate 27 is secured to the inner end of the screw and engages one side of the double web in such a manner that when the screw is tightened, the web will be clamped together and held in adjusted position.

The cephalic band must be adjusted so that the tension will overcome venous pressure of the patient which is from negative to 5 mm of Hg. pressure so as to get the proper hyperemia without interfering with the blood circulation, and this adjustment is preferably regulated by the comfort of the patient somewhere between 2 and 6 mm Hg. of pressure, and after the band has been adjusted, it can be applied to the head at night or at any suitable time and worn over an extended period, thereby supplementing the effect of the helmet and getting daily treatment, and in this way the hair follicles will receive extra nourishment, whereby normal circulation will tend to be restored and maintained without the use of appliances.

I desire to call particular attention to the fact that the seal employed in connection with my vacuum helmet is controlled only partly by the elasticity of the portion 7 but mainly by the vacuum employed and therefore the blood supply cannot be cut off or retarded as would frequently be the case if the seal constriction could not be measured.

Having described the invention what is claimed as new is:

An apparatus for use in treating the scalp by subjecting it to a pressure below atmospheric, comprising a metal container having its open end provided with an external bead and an internal flange, a removable ring having its wall inclined with respect to its axis, the end of the ring having the larger diameter being provided with an inwardly extending flange, means for interconnecting the ring and the container so as to prevent relative rotation, and a wide elastic band having one edge located over the outwardly extending bead on the container and having its other edge curved over the lower edge of the ring and terminating within the ring whereby a skirt is formed which is adapted to engage the head of the wearer.

In testimony whereof I affix my signature.

CHARLES J. LOWEN.