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Bar

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[54] **APPARATUS FOR DERMATOLOGICAL TREATMENT WITH A STEAM-OZONE MIXTURE**

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[51] **Int. Cl.** **A61m 13/00**

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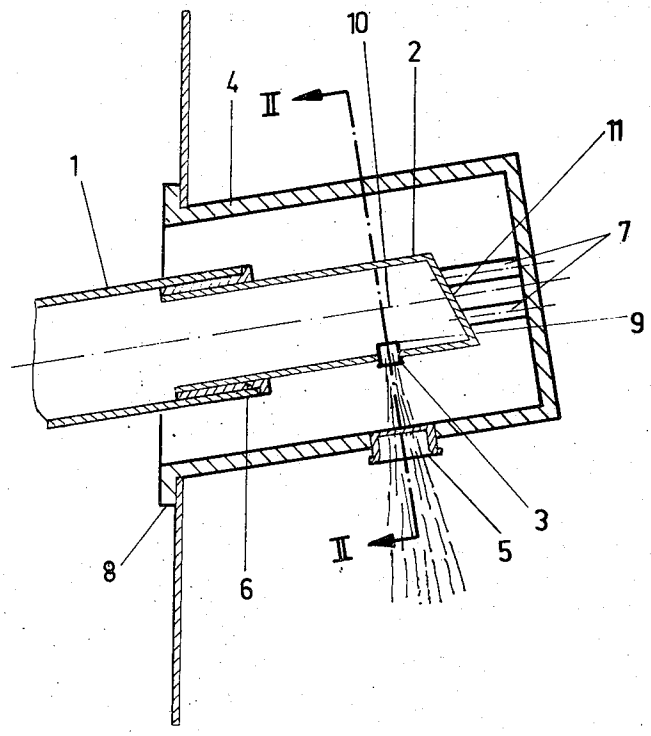
[57] **ABSTRACT**

Cosmetic apparatus for dermatological treatment with a steam-ozone mixture, with a first pipe conducting the steam and comprising a discharge nozzle, and a second pipe which surrounds the first pipe, conducts the ozone or ozone-enriched and ionised air, and comprises a mixing nozzle, the mixture being formed by an ejector effect, the apparatus being characterised in that the steam pipe is arranged with an upward inclination towards the discharge nozzle, and the discharge nozzle comprises an inwardly-projecting collar.

15 Claims, 2 Drawing Figures



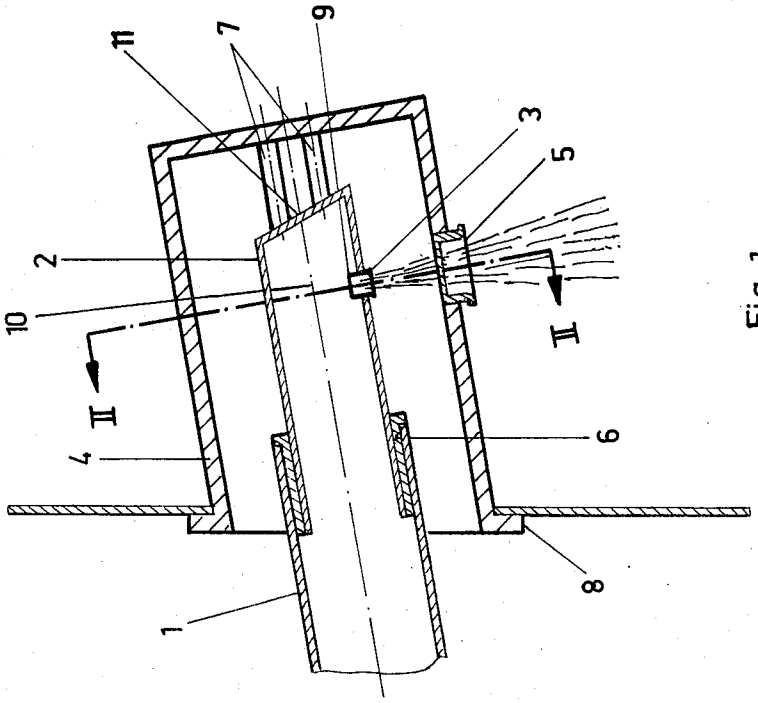


Fig. 1

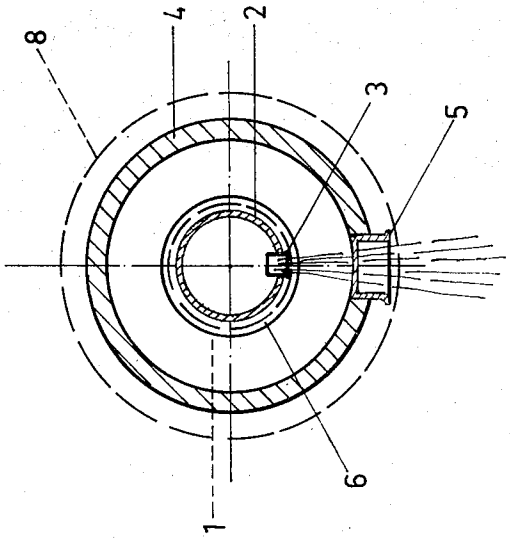


Fig. 2

APPARATUS FOR DERMATOLOGICAL TREATMENT WITH A STEAM-OZONE MIXTURE

The invention relates to an apparatus for dermatological treatment with an ionised steam-ozone mixture, having a first pipe conducting the steam and comprising a discharge nozzle, and a second pipe which surrounds the first pipe, conducts the ozone or ozone-enriched air, and comprises a mixing nozzle, the mixture being formed by an ejector effect.

Such apparatus for cosmetic or therapeutic purposes are nowadays included for example in the standard equipment of a beauty salon. The apparatus are used more especially for treatment of the face, neck and neckline portions of the body or for the treatment of bacterial skin infection. These apparatus comprise steam and ozone producers, the steam being supplied to a nozzle from which it flows out into an ozone chamber and issues from the said chamber together with the ozone through a mixing nozzle. The fan of steam enriched with air-ozone issuing from the mixing nozzle is directed on to the part of the body to be treated.

With these apparatus, there are always a few problems involved, of which only the more important will be indicated briefly herein. The mixture must not impinge as a closely bunched jet on the parts of the body being treated but instead a kind of fan or curtain of steam should be used. Consequently, the outlet pressure must be comparatively low. This fact and the further requirement that the temperature should not be too high, make it impossible to use greatly superheated steam. For this reason, water of condensation forms not only inside the steam-conducting pipe but also in the nozzle owing to the throttling effect provided therein. This water of condensation which usually is still at a relatively high temperature, either drips off at the nozzle or is even thrown out under the action of the steam pressure, so that it strikes the person being treated.

In order to obviate this disadvantage, a number of measures have already been proposed, but these must be regarded as stop-gap measures. For example in one known apparatus a drip-catcher is arranged at the nozzle, collecting the water of condensation which flows out under the action of gravitational force. But this cannot prevent water of condensation being thrown out under the action of steam pressure, since such drops are carried beyond the drip-catcher. In order to prevent accumulations of water of condensation being thrown out in this way, in known apparatus a nozzle with a comparatively large cross-section has been provided. But this cross-section increase has again the disadvantage that owing to the reduced suction power of the steam the ejector effect of the nozzle is reduced, and a mixture relatively poor in ozone is produced. At the same time, the fan of steam loses some of its length, so that the nozzle has to be pressed relatively near to the patient, which is not desirable on treatment technique and psychological grounds. The same effect occurs with known nozzles wherein the outlet aperture is opened in the manner of a trumpet tube and is likewise intended to ensure that the water of condensation will only drip out.

Realising these disadvantages, nozzles have also been proposed with a relatively small cross-section, thus having a good mixing power. In this case, an additional measure has been used in that the nozzle pipe is additionally heated, i.e. the steam is locally superheated.

The higher temperature resulting is undesirable not only for treatment reasons but also has the further disadvantageous effect that the ozone which of course is not stable to heat decomposes to a relatively considerable proportion, so that the amount of ozone in the mixture is also reduced as a result.

The present invention has as its object to construct an apparatus of the type described above in such a manner that the escape of water of condensation from the mixing nozzle is reliably prevented.

This object is achieved according to the present invention primarily in that the steam pipe is arranged with an upward inclination towards the discharge nozzle, and the discharge nozzle itself has an inwardly projecting collar.

The water of condensation produced during operation or in the inoperative state in the steam pipe is always conducted into the interior of the apparatus by the slight inclination of the pipe. The inwardly projecting collar prevents the water of condensation getting into the nozzle and dripping off it. Thus, there is no need for any additional measure such as a drip-cup or nozzle heating, and it is guaranteed that no water of condensation will be carried out by gravitational force or by flow pressure.

In a preferred constructional embodiment of the invention the steam discharge nozzle and the mixing nozzle are arranged in alignment with one another in the circumferential wall of the respective pipes. This construction guarantees that the fan of steam issuing from the nozzle can be directed immediately on to the patient who is lying down or lying back in a seated position, without water of condensation issuing or being thrown out.

Preferably, the steam discharge nozzle is spaced from the end wall of the steam pipe. It has been found particularly advantageous to incline the end wall relatively to the radial plane of the steam pipe. It would in fact also be possible for the end wall to be situated in the radial plane, but in that case the spacing of the nozzle from the end wall and the height of the collar would have to be relatively considerable. The inclination out of the radial plane presumably causes a turbulence or flow formation which cannot be explained in detail but results in water of condensation forming at the end wall being able to pass out without entering the nozzle. If the collar is made correspondingly high, this feature can be dispensed with.

The spacing between the steam discharge nozzle and the mixing nozzle and also the ratio between their diameters are such according to a further feature of the invention that the steam passes as a free jet through the mixing nozzle. This not only provides an optimum ejector effect, but at the same time this arrangement prevents the steam coming into contact with and condensing on the wall surfaces of the outer pipe which contains the ozone or ozone-enriched air.

Finally, in an advantageous constructional form of the invention the two pipes are securely connected to one another and mounted so as to be rotatable, so that the nozzle may be brought into any desired position relatively to the patient. This variability is often not possible with known nozzles since the water of condensation can only be controlled in certain positions. Since the water of condensation however cannot enter the nozzle in any position with the construction provided by the

invention, the invention provides a suitable adjustment facility.

One constructional form of the invention is shown, by way of example, in the accompanying drawing, wherein:

FIG. 1 shows an axial sectional view through the nozzle arrangement and

FIG. 2 is a section on the line II—II in FIG. 1.

The steam produced in a steam generator (not shown) flows through a pipe 1 into the nozzle pipe 2 which in its circumferential wall contains a discharge nozzle 3. The steam issuing from the nozzle flows into a chamber which surrounds the nozzle pipe 2 and may be formed, for example, likewise by a pipe 4, which surrounds the nozzle pipe 2 concentrically or even eccentrically. The ozone produced within the apparatus is introduced into the concentric pipe 4. Instead, the inner pipe may also be surrounded directly by the housing of an ozone producer. The ozone pipe 4 is equipped at its circumferential wall with a mixing nozzle 5 which is arranged in alignment with the steam discharge nozzle 3 of the nozzle pipe 2. The cross-section of the mixing nozzle 5 is considerably larger than that of the steam discharge nozzle 3, so that the steam issuing from the latter passes in a free jet out through the mixing nozzle 5 as a fan of steam.

The steam nozzle pipe 2 is mounted so as to be rotatable in the supply pipe 1 and, for example, a sleeve 6 made of a hydrogen halide is interposed. Furthermore, the nozzle pipe 2 is connected by means of webs 7 fixed to rotate with the ozone pipe 4, which itself is mounted so as to be rotatable at 8 so that the entire nozzle arrangement can be turned in the same direction.

The steam discharge nozzle 3, arranged in the circumferential wall of the nozzle pipe 2, is provided with an inwardly-projecting collar 9. The water of condensation forming at the inner walls of the nozzle pipe 2 runs into the region of the lower vertex line of the pipe. In order to return this water of condensation into the apparatus, the axis 10 of at least the nozzle pipe 2 is arranged with an inclination upwards towards the nozzle opening. The water collecting in the lower vertex line of the pipe consequently flows about the nozzle collar 9 without being able to enter the nozzle 3 itself.

As shown in the drawing, the steam discharge nozzle 3 is spaced from the end wall 11 of the nozzle pipe 2. Furthermore, and this has been found particularly advantageous, the end wall 11 is inclined out of the radial plane of the pipe. It has been found to be advantageous to incline the end wall 11 in the opposite direction to the inclination of the nozzle pipe 2. This measure may be dispensed with if the collar projects to a sufficient distance into the pipe 2.

I claim:

1. Cosmetic apparatus including a steam producing means and an ozone producing means for dermatological treatment with a steam-ozone mixture, comprising: a first pipe having an end wall and a discharge nozzle provided in the circumferential walls thereof spaced from said end wall, said first pipe being connected with the steam producing means for conducting the steam to and through said discharge nozzle, a second pipe surrounding said first pipe and defining between the outer surface of the circumferential wall of said first pipe and the inner surface of the circumferential wall of said second pipe an ozone chamber connected with said ozone producing means, said second pipe being provided with a mixing nozzle arranged in alignment with said discharge nozzle with the steam-ozone mixture being formed by an ejector effect, said first pipe being arranged with an upward inclination toward said discharge nozzle, and said discharge nozzle being provided with a collar inwardly projecting into said first pipe.

2. Apparatus as claimed in claim 1, wherein said end wall of first pipe is inclined relatively to its radial plane.

3. Apparatus as claimed in claim 2, wherein said end wall is inclined oppositely to the upward inclination of said first pipe.

4. Apparatus according to claim 3, wherein the cross section of said mixing nozzle is larger than the cross section of said discharge nozzle and said discharge nozzle and said mixing nozzle are spaced at a predetermined distance to permit the steam to flow as a free jet through said mixing nozzle.

5. Apparatus according to claim 3, wherein said first and second pipes are securely connected to one another and are mounted so as to be rotatable.

6. Apparatus according to claim 2, wherein the ozone producing means includes a housing and wherein said housing constitutes said second pipe.

7. Apparatus according to claim 2, wherein the cross section of said mixing nozzle is larger than the cross-section of said discharge nozzle and said discharge nozzle and said mixing nozzle are spaced at a predetermined distance to permit the steam to flow as a free jet through said mixture nozzle.

8. Apparatus according to claim 2, wherein said first and second pipes are securely connected to one another and are mounted so as to be rotatable.

9. Apparatus as claimed in claim 1, wherein the cross section of said mixing nozzle is larger than the cross section of said discharge nozzle and said discharge nozzle and said mixing nozzle are spaced at a predetermined distance to permit the steam to flow as a free jet through said mixture nozzle.

10. Apparatus as claimed in claim 1, wherein said first and second pipes are securely connected to one another and are mounted so as to be rotatable.

11. Apparatus according to claim 1, wherein the ozone producing means includes a housing and wherein said housing constitutes said second pipe.

12. Apparatus according to claim 11, wherein the cross section of said mixing nozzle is larger than the cross section of said discharge nozzle and said discharge nozzle and said mixing nozzle are spaced at a predetermined distance to permit the steam to flow as a free jet through said mixture nozzle.

13. Apparatus according to claim 12, wherein said first and second pipes are securely connected to one another and are mounted so as to be rotatable.

14. Apparatus according to claim 13, wherein said first pipe is eccentrically disposed in said second pipe.

15. Apparatus according to claim 1, wherein said first pipe is eccentrically disposed in said second pipe.

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