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INHALATION APPARATUS

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Fig. 1

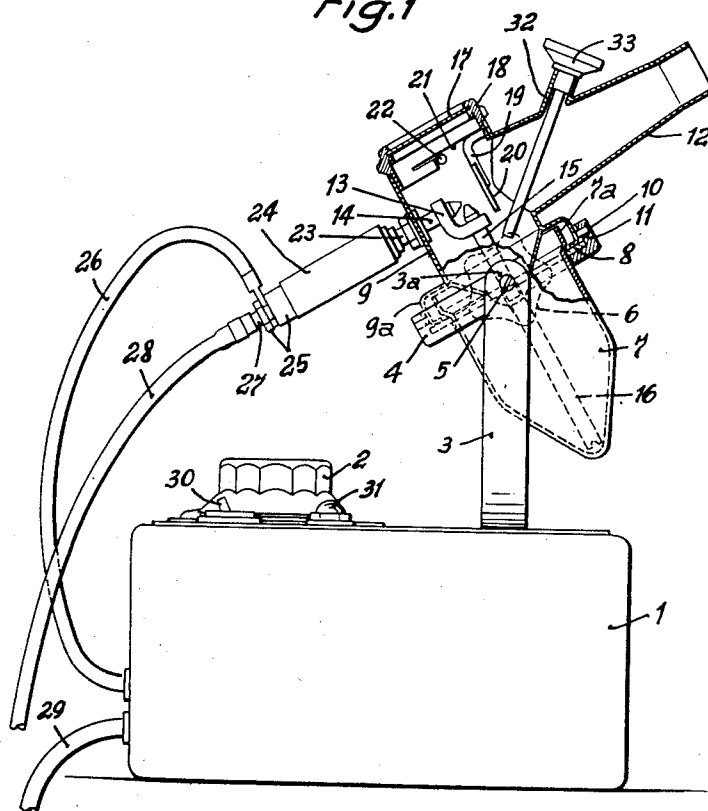
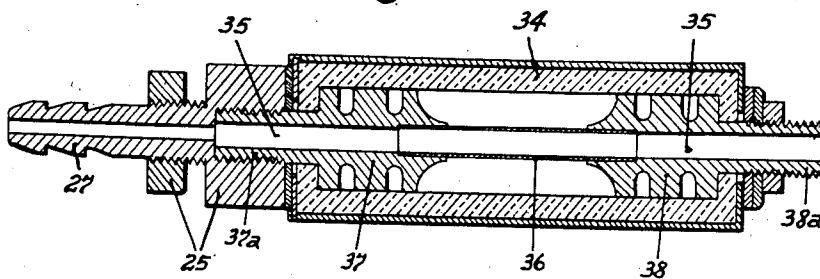


Fig. 2



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INHALATION APPARATUS

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4 Claims. (Cl. 128—192)

The present invention relates to an inhalation apparatus with device for atomizing by compressed air liquid medicaments or liquids to which medicaments have been added.

To avoid harmful cooling of the respiratory organs it is recommended to adequately warm up the inhalation stream as is known with vapor inhalation apparatuses. With compressed air inhalation apparatuses the warming of the inhalation stream takes place by heating the liquid medicament before it is atomized.

The inhalation apparatus according to the invention is distinguished from these known compressed air apparatuses in that the inhalation stream and not the liquid medicament is heated, for which purpose an electric heating element is incorporated in the compressed air piping.

Considering the fact that to the atomizing air only little liquid medicament is mixed, it is necessary to heat up the latter to a rather high degree if an appreciable tempering of the inhalation stream shall be obtained. There is, however, the risk that the active component of the medicament is impaired in its therapeutic activity to such an extent that it often becomes ineffective, which practically means partial destruction of the often expensive medicament.

Preferably, the inhalation apparatus has arranged therein a baffle plate adapted to be selectively brought in front of the atomizer nozzle or swivable into the air current issuing therefrom and to which medicaments have been added. This makes it possible to a certain extent to vary the moisture content of the atomizing air current in that, with the baffle plate brought in front of the atomizer nozzle, larger liquid particles will be deposited thereon and hence be withdrawn from the atomizing air current.

The accompanying drawing illustrates by way of example a preferred form of embodiment incorporating the invention.

Fig. 1 is a lateral part-sectional view of the inhalation apparatus;

Fig. 2 is a longitudinal section through the heating element on a larger scale.

The inhalation apparatus as shown in the drawing comprises a base 1 designed as casing which accommodates a transformer and a rheostat adjustable by turning a knob 2 arranged on top. Also mounted on the casing is a bifurcated bearing 3 with centers 3a supporting a holding ring 4 by means of pivots 5. Said holding ring 4 can be frictionally set to any desired position by means of a nut 6 designed as knob threadedly engaging the pivot 5. Removably located in said holding ring on interposed gasket 8 is a glass vessel 7 for the medicament, having an enlarged opening rim 7a. The holding ring 4 carries moreover a cylindrical atomizer casing 9 mounted on the gasket 8 with a rim 9a forming a circular enlargement at the lower end of the casing and engaging

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over the rim 7a of said vessel. The circularly enlarged rim 9a of the atomizer casing carries two diametrically opposite pins 10 adapted to engage slots 11 of the holding ring 4 in a bayonet joint-like fashion.

5 The atomizer casing 9 carries at right angles thereto a tubular mouth piece 12 for the outlet of the atomized mixture. The casing 9 includes an atomizer nozzle assembly 13 working on the principle of Berson's tubes, which, by its connection 14 to the compressed air piping is attached in the axis of the mouth piece 12 and to the adjacent atomizer casing. The riser 15 of the atomizer nozzle assembly has a hose 16 attached thereto which, through a funnel-shaped constriction of the atomizer casing, projects into the vessel 7 containing the medicament. 15 At top the atomizer casing 9 is closed by a cover 18 having an inspection window 17. Attached to the rim of said cover is an offset arm 19 carrying the baffle plate 20 which, by turning the cover, can be selectively swivelled in front of the atomizing nozzles or therefrom. The cover 18 has, to the extent of approximately 90 degrees of its circumference, a marginal recess 21 which is engaged by a pin 22 fast on the atomizer casing 9. Due to the recess 21 and its associated pin 22 the displacement of the cover 18 is limited to an angle of 90 degrees, whereby, in one end position of its angular displacement, the baffle plate 20 comes out of reach of the emerging air current mixed with medicament, while in the other end position it is brought in front of the compressed air nozzle, when larger liquid particles will be deposited on the baffle plate and thus be withdrawn from the atomizer air current. The compressed air nipple 14 carries on the outside of the atomizer casing 9 an internally threaded connection 23 to which is connected an electric heating cartridge 24 with air delivery channel 35 extending axially therethrough. A terminal 25 at the rear end of the heating cartridge is connected through cable 26 and rheostat with the positive pole of the transformer supplying low-tension current. The forward end of the heating cartridge is connected with the negative pole of the transformer through the body of the apparatus. The rear end of the heating cartridge communicates through connection piece 27 and hose 28 with a source of compressed air. Numeral 29 designates a cable with plug for connection to the main circuit, said cable being connected through switch 30 to the primary winding of the transformer. 31 is a control lamp in the low tension heating circuit. Removably arranged on a sleeve 32 on top of the mouth piece 12 is a thermometer 33 extending into the mouth piece 12.

50 The heating cartridge comprises a sleeve 34 of electrically insulating material, having two inserts 37, 38 with connections 37a, 38a each provided with an axial air channel 35 and interconnected through a platinum tube 36. Said platinum tube, through which flows the low-tension current, constitutes the heating element of the heating cartridge and embodies at the same time a part of the compressed air piping.

The aforescribed inhalation apparatus is very easy in use. For filling the container 7 with the required medicament, the atomizer casing 9 with bayonet joint has to be taken off and afterwards replaced. When inhaling through the nose, the mouth piece 12 can be stuck on a specially shaped nasal end piece known per se. 60 When the apparatus is ready for use, it is connected to the main circuit by means of the cable 29 with plug, and the valve for the source of compressed air having the hose 28 connected thereto, is opened. At the same time the circuit of the heating cartridge is closed by means of the switch 30, the required temperature of the atomized mixture readable on the thermometer 33 being adjusted by turning the knob 2, whereupon inhalation 70

may begin. By turning the cover 18 the moisture content of the mixture may be varied within certain limits.

What I claim is:

1. In an inhalation apparatus adapted for atomizing liquids by compressed air, in combination, a casing; an atomizer nozzle mounted in said casing; a mouthpiece communicating with the interior of said casing and mounted thereon; and a baffle plate movably mounted in said casing, said baffle plate being gradually movable between a first position in which said baffle plate is located in front of said atomizer nozzle and adapted to be located in the stream of air mixed with liquid emerging from the nozzle and a second position in which said baffle plate is located laterally of said atomizer nozzle and adapted to be located outside of said stream of air mixed with liquid.

2. In an inhalation apparatus adapted for atomizing liquids by compressed air, in combination, a casing; an atomizer nozzle mounted in said casing; a mouthpiece communicating with the interior of said casing and mounted thereon; a cover removably and turnably mounted on said casing; an inspection window provided in said cover; and a baffle plate mounted on said cover, said cover being gradually movable between a first position in which said baffle plate is located in front of said atomizer nozzle and adapted to be located in the stream of air mixed with liquid emerging from the nozzle and a second position in which said baffle plate is located laterally of said atomizer nozzle and adapted to be located outside of said stream of air mixed with liquid.

3. An inhalation apparatus adapted for atomizing liquids by compressed air comprising, in combination, a vessel adapted to contain a liquid to be atomized; an atomizer casing formed with an inspection window and detachably mounted on said vessel; an atomizer nozzle assembly arranged within the atomizer casing and attached thereto; pipe means connected to said atomizer nozzle assembly for supplying compressed air thereto;

an electric heating element located in said pipe means; a tubular mouthpiece communicating with the interior of said atomizer casing; and a baffle plate mounted in said casing for gradual movement between a first position in which said baffle plate is located in front of the atomizer nozzle and adapted to be located in the stream of air mixed with liquid emerging from the nozzle and a second position in which said baffle plate is adapted to be located outside of said stream of air mixed with liquid.

4. An inhalation apparatus adapted for atomizing liquids by compressed air comprising, in combination, a vessel adapted to contain a liquid to be atomized; an atomizer casing detachably mounted on said vessel; an atomizer nozzle assembly arranged within the atomizer casing and attached thereto; pipe means connected to said atomizer nozzle assembly for supplying compressed air thereto; an electric heating element located in said pipe means; a tubular mouthpiece communicating with the interior of said atomizer casing; a cover removably and turnably mounted on said casing; an inspection window provided in said cover; and a baffle plate mounted on said cover, said cover gradually movable between a first position in which said baffle plate is located in front of the atomizer nozzle and adapted to be located in the stream of air mixed with liquid emerging from the nozzle and a second position in which said baffle plate is adapted to be located outside of said stream of air mixed with liquid.

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