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(54) Benevnelse **APPARATUS FOR ELECTRICALLY ASSISTED SKIN TREATMENT WHICH CAN BE HELD**

(56) Anførte publikasjoner

US-B1- 6 385 487
EP-A1- 2 384 707
EP-A2- 2 277 585
WO-A1-2005/087308

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Description

The invention relates to a hand-held device for electrically assisted skin treatment, comprising:
a housing,
a first outer electrode disposed on the housing, the first outer electrode being in contact with the hand when the device is held in the user's hand for use,
a second outer electrode disposed on the housing, and
an electrical energy source in the form of batteries contained in the housing, the poles of the batteries being electrically connected to the electrodes during operation of the device.

This sort of device is described in the document WO 2005/087308 A1. To use the device, the user picks it up and places a cap functioning as an electrode on the areas of skin to be treated. An electrically conductive contact to the hand is produced by the first electrode, and an electrically conductive contact to the area of skin to be treated is produced by the second electrode. Since the two electrodes are each connected to a pole of an electrical energy source, an electric circuit is produced which includes the user's body, a positive or a negative electric current flowing from the cap into the area of skin to be treated, depending on polarity.

This can be used to increase the efficacy of treatment creams and cleansing creams, since the active ingredients of a treatment cream are transported into the skin by means of the electric current and, with opposite polarity, dirt is transported from the skin into a cleansing cream.

The device is further provided with a multiplicity of exchangeable caps, the design of these caps being adapted to the skin surface to be treated. There is a first cap having a relatively smooth surface, a second cap, which is formed in a comb-like manner and which can be used, above all, to treat the scalp, and a third cap having an undulating structure, which is associated with a massaging effect. Good results have been achieved with the device, both in the case of skin cleansing and in the case of introduction of active ingredients. However, this is to be improved further.

The document EP 2 384 707 A1 describes a tongue cleaning device, which has a cylindrical handle body for gripping the device. In the axial extension of the handle

body there is a head which can be set into oscillation, the flat outer side of which is provided with contact electrodes and mechanical abrasion aids.

US 6,385,487 B1 describes a device for the introduction of active substances into the skin. This also consists of a cylindrical handle body, one end of which is designed as a pot-shaped electrode, in which there is a sponge which is impregnated with the active substances to be applied.

EP 2 277 585 A2 describes a strip which contains an active ingredient and has a grid structure, the strip being stretched over the end face of a cylindrical handle body.

The invention is therefore based on the object of further improving the efficacy of such a device.

To achieve the object, it is proposed that

the housing is a shallow housing having an underside and an upper side,

the second electrode is located on the underside of the housing and takes up almost the entire underside,

the first electrode is located peripherally on the outer edge of the upper side of the housing,

a vibrator is located within the housing, and that

the vibrator is fixed by a socket on the lower wall of the housing centrally above the second electrode and thus, when operated, vibrates the wall together with the second electrode so that during operation of the device, the device produces an intensified massaging effect on the skin to be treated, thereby widening the pores of the skin.

Such a vibrator vibrates the device so that, during operation, the device produces an intensified massaging effect by which the skin pores are widened and the dirt is better passed from the skin, or the active ingredients are better passed into the skin.

The massaging effect is especially strong when the vibrator is arranged in the direct vicinity of the second electrode since then the part of the device located on the area of skin to be treated vibrates particularly intensely.

Preferably, the invention is used with a device which has a display on its topside and a button for choosing a program for treatment.

The energy source may be batteries or accumulators, which are inserted into a compartment in the base. Insofar as accumulators are to be provided for the device, it is conceivable to also provide the device with a charging apparatus with which the accumulators in the device can be charged.

Since - as explained above – the device allows the polarity of the electrodes to be exchanged, this means that the polarity of the power supply of the vibrator is also reversed. The vibrator must therefore have an electric drive which is not sensitive to a swapping of polarity. In the simplest case, the vibrator is an electric motor, a cam being fastened to the shaft of said electric motor. However, vibration exciters in which a mass is drawn first in one direction and then in the other direction in quick succession by electromagnets are also conceivable.

In order to keep the design of the device simple, a switching device, which can be adjusted by the user of the device, is provided in the housing and produces the electrical connections between the energy source and the electrodes, and the vibrator is also connected to the electrical energy source by means of the switching device. There is thus a common energy source for the electrodes and the vibrator.

The switching device is preferably provided with an electronic memory, in which the parameters of operating states to be selected are stored and can be selected by the user by means of a button, one of the parameters relating to the polarity of the electrodes and the vibrator being of the kind that operates independently of the polarity of the applied voltage.

To keep the interval between charging of the batteries as long as possible, it must be ensured that the power consumption of the device is minimised to the greatest extent possible. This is the case in particular if the device has a vibrator that causes the second electrode, which is placed on the skin area to be treated, to shake. In order to minimise the power consumption of such a device, the invention provides a device for detecting a current flow through the second electrode, a switch in the connection of the drive of the vibrator to the batteries, and a control device that is designed so that the switch is only closed when a current flows through the second electrode.

In other words, the vibrator is switched on only if the second electrode is placed onto the skin area to be treated and via the second electrode a current flows through the skin. This current flow is detected and used by a control device in order to activate the switch. The device can be implemented electronically. This means that the switch is designed as a transistor.

In the following, the invention is explained in more detail with reference to an exemplary embodiment shown in Fig. 8. The additional Figs. 7 and 16 are related to the possible interconnection of the electrodes and Fig. 4 is related to the vibrator. The

embodiments according to Figs. 1 – 3 do not form in themselves part of the subject matter of the claims.

Fig. 1 a, b, c show views of a device, wherein a rounded structure is provided as a cap,

Fig. 2a, b, c show different cap designs for use with the device,

Fig. 3 shows the cross-section of a cap design which is particularly suitable for operation with a vibrator,

Fig. 4 shows a motor having a cam,

Fig. 7 shows an electrical circuit for operating the device,

Fig. 8 shows a further embodiment of the device according to the invention which is, however, not the subject of this patent,

Fig. 16 shows a circuit for controlling a vibrator motor.

Reference is first made to Fig. 1. As shown in the three views, the device 1 is approximately as large as the palm of a hand and has a flat, rectangular design. It comprises a base 2 and a cap 3 fitted thereon. A compartment 4 for accommodating batteries, which in this exemplary embodiment serve as the energy source to operate the device 1, is located at the lower, short end of the base 2.

The exchangeable cap 3 is fitted on the opposite, upper short end of the base 2, this end being narrower than the lower end. A button 5 for selecting a treatment program is arranged on the front side of the base 2, the selected treatment program being shown on a display 6 positioned there above. A first electrode 7 having a large surface area is located on the rear side and, above this, a press key 8 for actuating a catch, by means of which the cap 3 is held on the base 2.

Different cap designs are illustrated in Fig. 2 in longitudinal section. Fig. 2a shows the cap 3 already illustrated in Fig. 1, this cap having a rounded upper edge.

The cap 3a according to Fig. 2b has a comb-like structure and is therefore particularly suitable for treating the scalp. Fig. 2c shows a cap 3b having an undulating edge with which it is possible to intensify the pressure on the skin at certain points so that a massaging effect is produced on the skin when the cap 3b is moved back and forth.

A further cap 9 is illustrated in cross-section in accordance with Fig. 3 and illustrates a modification of the cap 3 according to Fig. 2a. Two tongues 10, 11 are formed on the upper edge of the cap 9 and together form a platform 13 which is inclined to the

base 12 of the cap 9. The upper face of the platform 13 forms a continuous surface which can be placed on the skin and is provided with ribs 14.

This design is particularly suitable for connection to a vibrator 15. This is either fixed preferably in the acute angle between one tongue 11 and the base 12 of the cap 9 (dot-dash line), or in the head of the base 12 of the cap 9 (solid line). Placement in one of the tongues 10, 11 is also conceivable.

In the simplest case, according to Fig. 4, the vibrator 15 comprises an electric motor 16, a cam 17 being fixed to the shaft of said electric motor. The shaft can be oriented in relation to the device in any manner. An orientation parallel to the upper edge of the cap 9 is possible, for example.

As can be seen from Fig. 2a to Fig. 2c, two metal pins 18, 19 are located inside the cap 3, 3a, 3b, one of the pins 18 being electrically connected to the cap 3, and the other pin 19 being insulated with respect to the cap 3, 3a, 3b. The caps 3, 3a, 3b consist of a conductive material or at least have a coating made of a conductive material, this material forming the second electrode 20. The first pin 18 is thus connected to this material, whereas the second pin 19 is insulated with respect thereto.

A circuit diagram is illustrated schematically in Fig. 7. The drive of the vibrator, that is to say the electric motor 16 in the exemplary embodiment, is connected between the two pins 18, 19 in the cap 3, 9, whereas the first pin 18 is merely connected to the second electrode 20 on the cap 3, 9.

The two counter-pins 21, 22, which are connected to a power source 30 (batteries) by a switching device in the form of a changeover switch 29, are located on the base 2. The counter-pin 21, which contacts the insulated pin 18 in the cap 3, 9, has a connection to the first electrode 7 on the base 2.

If the cap 3, 9 is then fitted onto the base 2 – as indicated in Fig. 7 – (a coding prevents the contacts from being swapped), a first electric circuit comprising the power source 30 and the electric motor 16 is produced and runs through the two pairs of pins, and a second electric circuit, which runs through the first contact of the second electrode 20, to the first electrode 7 via the user’s body, and back to the power source 30, is produced during operation.

The changeover switch is provided in the form of a transistor circuit which is controlled by a control device 31. The control device 31 contains an electronic memory in which

a plurality of operating modes is stored. The operating modes are determined by the parameters (duration of the treatment, polarity of the electrodes, connection of the vibrator). The user can select a specific operating mode by actuating the button 5, this operating mode being shown on the display 6.

A skin treatment generally comprises a first step in which a cleansing cream is first applied and the device is operated with a first polarity, dirt thereby passing from the skin into the cleansing cream by the flow of current. Caps 3 which do not contain a vibrator are used in this case because the creams are not to be worked into the skin. In a second step, once the cleansing cream has been removed, a treatment cream is applied and the device 1 is operated with a second polarity so that the active ingredients from the treatment cream can penetrate into the skin. With this approach, caps 9 are used which do comprise a vibrator 15 so that, in addition to the effect of the current which transports the active ingredients into the skin, a rubbing-in effect is also provided by means of which the active ingredient is massaged into the skin. In addition to the increased efficacy, a pleasant feeling during the treatment process is also produced since the user finds a vibrating massage pleasurable.

Fig. 8 shows a device 40 in cross-section, said device being suitable in particular for cellulite treatment of large areas of the skin.

A second electrode 20, which takes up almost the entire underside, is located on the underside of a flat housing 41 and is placed on the area of skin to be treated. A display 6 and a button 5 for selecting a treatment program are located on the upper side.

A first electrode 7, which is in contact with the hand holding the device 40, is located peripherally on the outer edge of the upper side of the housing 41. A power source 30 in the form of batteries, and a vibrator 15, which comprises an electric motor 16 having a cam 17, are located inside the housing 41. The vibrator 15 is fixed centrally above the second electrode 20 by means of a socket (not illustrated) on the lower wall of the housing 41, and thus vibrates the wall together with the second electrode 20 when put into operation.

The circuitry of the electrodes 7, 20 of the electric motor 16 and of the power source 30 corresponds to that shown in Fig. 7, however the pins 18, 19; 21, 22 are replaced by continuous connections. The pins are not necessary since the device 40 does not have any exchangeable caps 3, 9 with second electrodes 20 in this embodiment.

As can be derived from Fig. 16, the drive 90 of a vibrator is connected in series with the collector/emitter/path of a transistor 91. A control voltage is applied to the base 92 of the transistor 91. If this control voltage is present, the transistor connects through, and consequently current flows through the motor. If no voltage is present at the base 92, the transistor 91 blocks, and consequently the drive 90 is switched off.
The switching voltage at the base is supplied by a control circuit which by means of a detector detects whether a current flows to the second electrode.

List of Reference Numbers

1	Device
2	Base
3	Cap
3a	Cap
3b	Cap
4	Compartment
5	Button
6	Display
7	First electrode
8	Press key
9	Cap
10	Tongue
11	Tongue
12	Base of a cap
13	Platform
14	Ribs
15	Vibrator
16	Electric motor
17	Cam
18	Pin
19	Pin
20	Second electrode
21	Counter-pin

22 Counter-pin

26 Slot

29 Changeover switch

30 Power source

40 Device

41 Housing

90 Drive

91 Transistor

92 Base

P a t e n t k r a v

1. Håndholdbar anordning til elektrisk drevet hudbehandling, som oppviser:

et hus (41),

en første ytre elektrode (7) på huset (41), som står i kontakt med hånden når brukeren holder anordningen i hånden for å bruke den,

en andre ytre elektrode (20) på huset (41), som kan settes på hudområdet som skal behandles, og

en elektrisk spenningskilde i form av batterier (30) inne i huset (41), der batteripolene ved drift av anordningen står i elektrisk forbindelse med elektrodene (7, 20),

k a r a k t e r i s e r t v e d at

huset er et flatt hus (shallow housing) (41) med en under- og en overside,

den andre elektroden (20) er plassert på undersiden av huset (41), der den opptar nesten hele undersiden,

den første elektroden (7) er plassert omløpende på ytterkanten av husets (41) overside,

en vibrator (15) plassert inne i huset, og

vibratoren (15) er fiksert sentralt ovenfor den andre elektroden (20) ved hjelp av en sokkel på husets (41) nedre vegg og dermed får veggen til å vibrere sammen med den andre elektroden (20) når den settes i drift, slik at når anordningen er i drift, oppstår en forsterket massasjeeffekt på huden som skal behandles, slik at hudporene utvides.

2. Anordning ifølge krav 1, k a r a k t e r i s e r t v e d at vibratoren (15) er fiksert i nærheten av den andre ytre elektroden (20).

3. Anordning ifølge krav 1 eller 2, k a r a k t e r i s e r t v e d at et display (6) og en tast (5) til å velge et behandlingsprogram befinner seg på oversiden.

4. Anordning ifølge et hvilket som helst av de foregående kravene, k a r a k t e r i s e r t v e d at vibratoren (15) består av en elektrisk motor (16) som en eksentrikk (17) er festet på akselen til.

5. Anordning ifølge et av de foregående kravene, k a r a k t e r i s e r t v e d at en bryterinnretning som brukeren av anordningen kan stille inn, er til stede i huset (41) og lager de elektriske forbindelsene fra energikilden til elektrodene (7, 20), at også vibratoren (15) via bryterinnretningen er forbundet med den elektriske energikilden, at bryterinnretningen er utstyrt med et elektronisk minne der parameterne til driftstilstander som kan velges, er lagret og kan velges av brukeren ved hjelp av en tast (5), der én av parameterne gjelder elektrodenes polaritet, og at vibratoren (15) er av en slik type at den opererer uavhengig av polariteten til spenningen som anlegges.

6. Anordning ifølge et hvilket som helst av de foregående kravene, k a r a k t e r i s e r t v e d at det er tilveiebrakt en innretning for å detektere en strømninger gjennom den andre elektroden (20), en bryter i forbindelsen fra vibratorens drev til batterier, og en styring, der styringen er innrettet slik at bryteren bare er lukket når det går en strømning gjennom den andre elektroden (20).

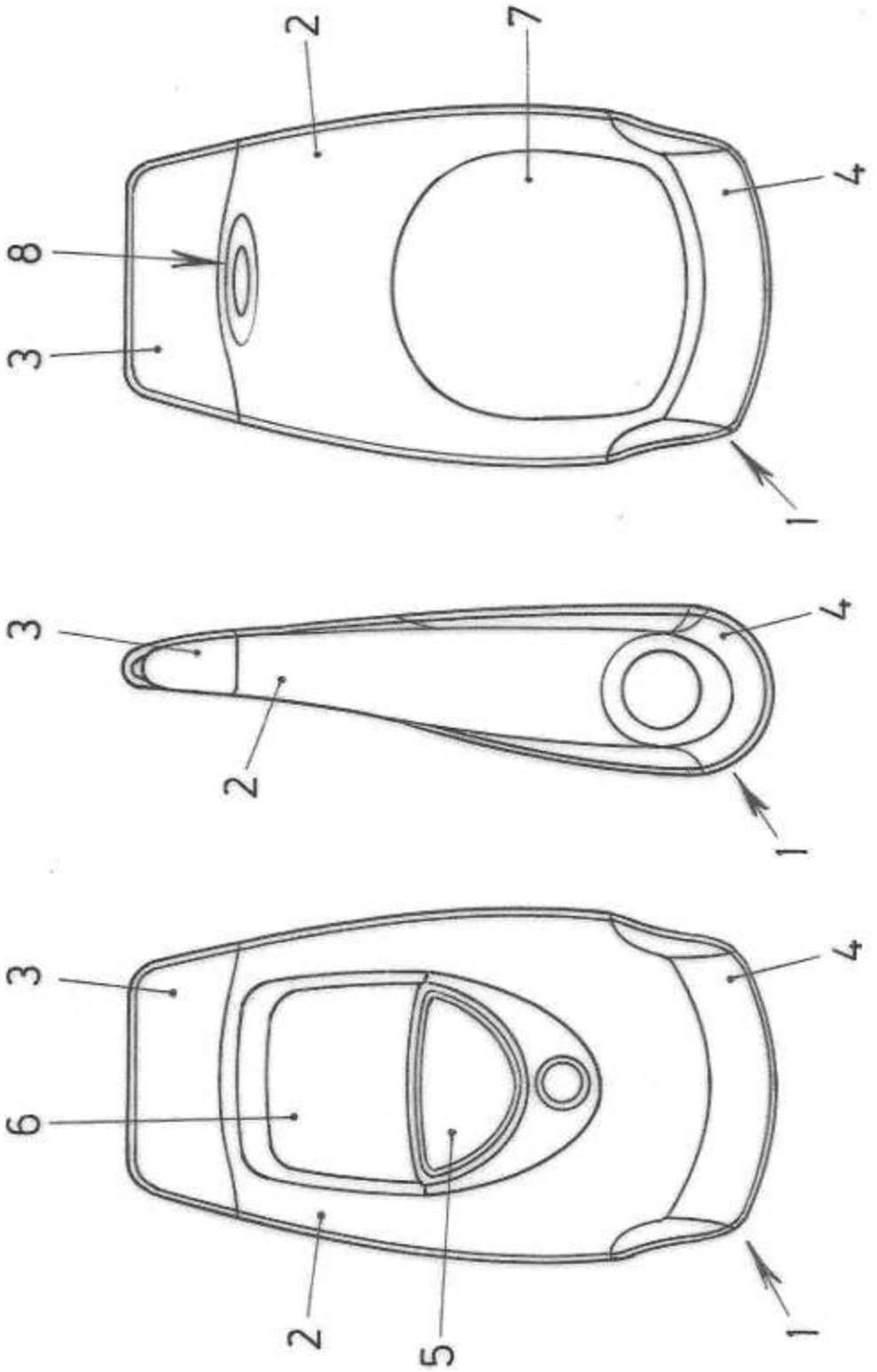

Fig. 1c

Fig. 1b

Fig. 1a

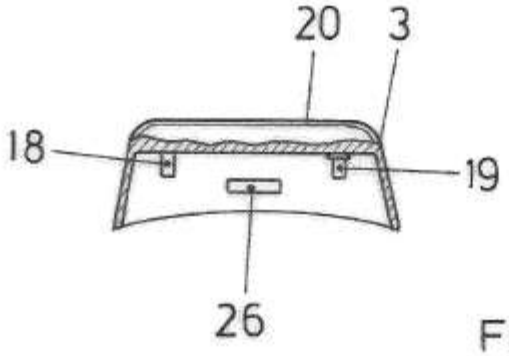

Fig. 2a

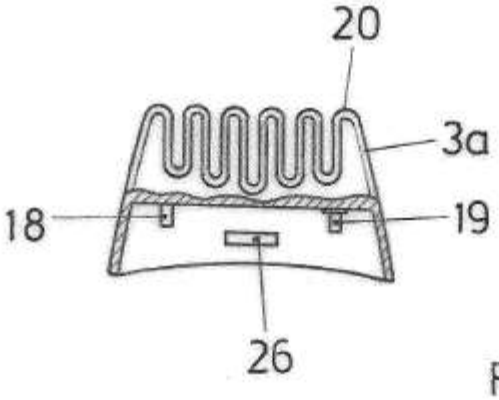

Fig. 2b

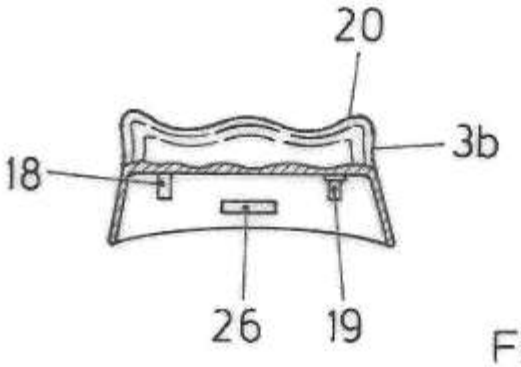

Fig. 2c

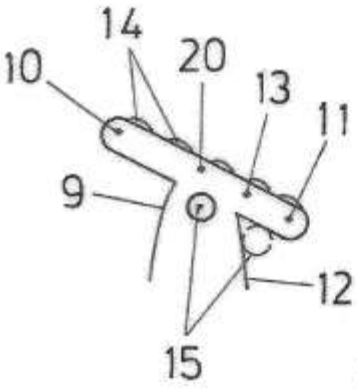

Fig. 3

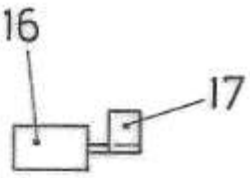

Fig. 4

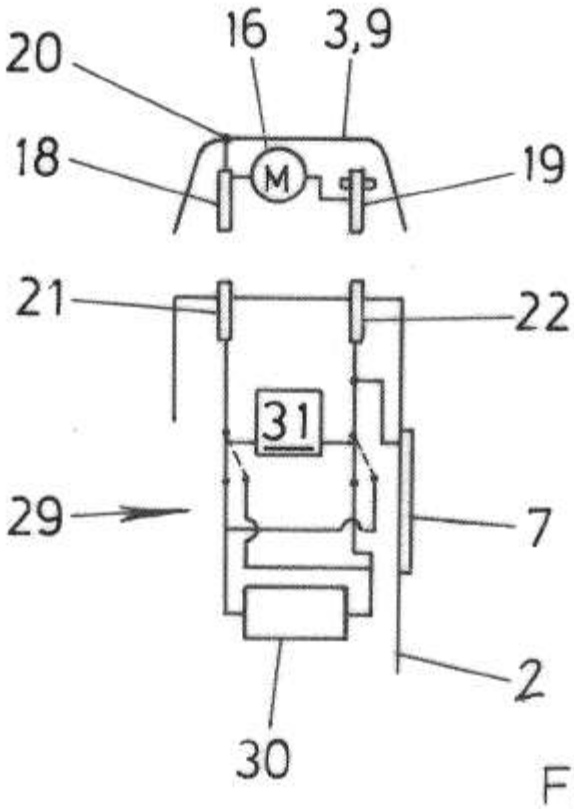

Fig. 7

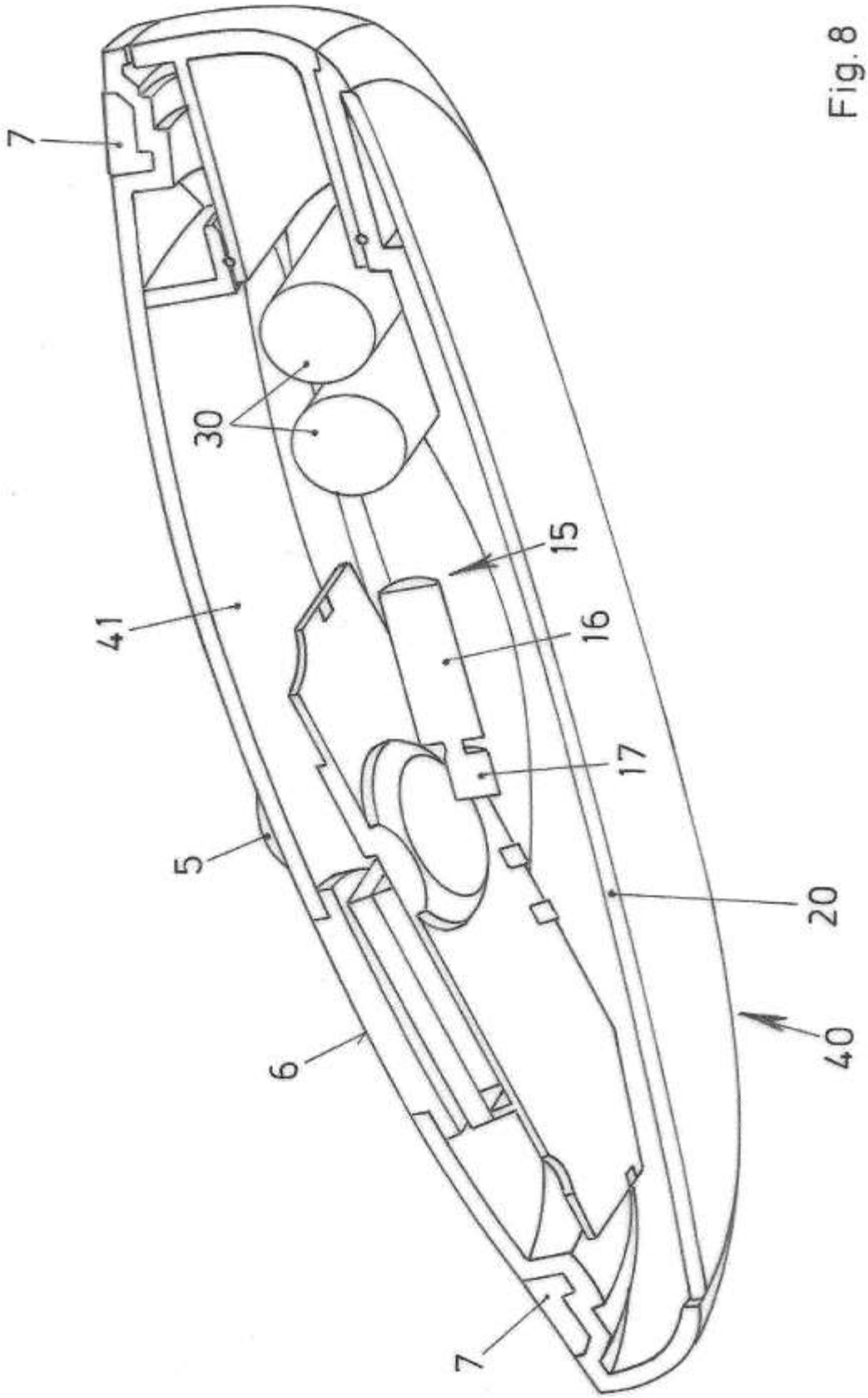

Fig. 8

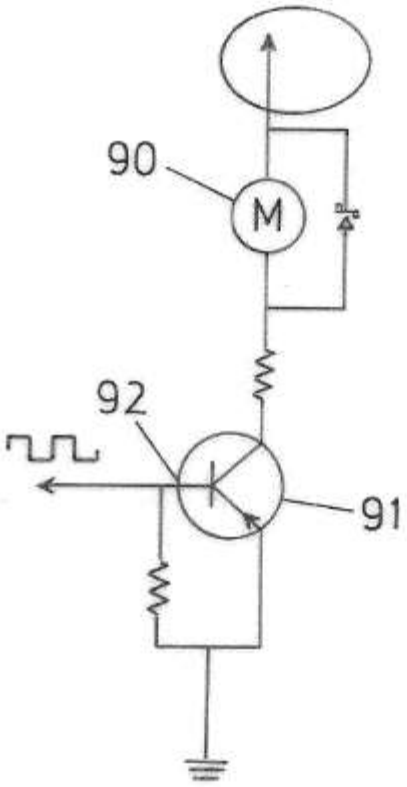

Fig. 16