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(54) **Hair treating implement.**

(57) A hair treating implement having an electrical heating wire (3), a support which tensely supports the heating wire (3) and a hand grip (2) which is connected to the support. Electrical power is supplied to the heating wire (3), and a hair is cut by the heating wire (3) heated by the electrical power.

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HAIR TREATING IMPLEMENT

BACKGROUND OF THE INVENTION

1. FIELD OF THE INVENTION

The present invention relates to a hair treating implement, and more precisely it relates to a new hair remover or hair dresser which can be advantageously used to cut an unwanted hair or dress the body hair.

2. DESCRIPTION OF RELATED ART

A conventional cutting tool, such as scissors or a razor is used to treat a hair of head or a body hair or to cut an unwanted hair, in particular before a woman wears a hi-leg swim suit. However, the conventional cutting tool is dangerous because cutting portions are exposed. Further, the tips of the cut hair are sharp due to shearing cutting, so that the sharp tips easily thrust into clothes (e.g. swim suit) which he or she wears to come out or cause him or her to feel pain upon touching.

SUMMARY OF THE INVENTION

The primary object of the present invention is to provide a hair treating implement which eliminates the above-mentioned drawbacks and which has an electrical heating wire which burns and cuts the hair so as to have a round tip of hair.

To achieve the object mentioned above, according to the present invention, there is provided a hair treating implement comprising an electrical heating wire, a support which tensely supports the heating wire and which is provided with terminals at the opposite ends of the heating wire to supply an electrical power thereto, and a hand grip which is connected to the support.

With this arrangement, since the hair is burnt and cut by the heat of the electrical heating wire, unlike the prior art in which the hair is cut by the shearing by a cutting tool, such as a razor or scissors, the tips of the hair are rounded, and accordingly, the round tips create a smooth stream of hair and have a natural feeling. Furthermore, in particular, in case of treatment of flagged or split ends of hair of a human head, the round tips of the cut hair can be easily dressed, permed and arranged, so that a desired hair style can last for a long time.

BRIEF DESCRIPTION OF THE DRAWINGS

A detailed description of the present invention will be made below in detail based on preferred embodiments shown in the attached drawings, in which:

Figures 1A and 1B are a side elevational view and a plan view of a hair treating implement, according to a first embodiment of the present invention, respectively;

Figs. 2A and 2B are an enlarged side elevational view and a front end view, of a comb tooth portion of a hair treatment implement shown in Figs. 1A and 1B, respectively;

Fig. 2C is a longitudinal sectional view taken along the line 2C-2C in Fig. 2A;

Figs. 3A and 3B are an enlarged side elevational view and a front end view, of a comb tooth portion of a hair treatment implement with a removed heater cassette (cartridge) shown in Figs. 1A and 1B, respectively;

Fig. 3C is a longitudinal sectional view taken along the line 3C-3C in Fig. 3A;

Fig. 4 is a perspective view of a heater cassette used in the present invention;

Fig. 5 is a sectional view of a receptacle and a supplier (plug) used in the present invention;

Fig. 6 is a partially broken side elevational view of a hair treating implement, according to a second embodiment of the present invention;

Figs. 7, 8, 9, 10, 11 and 12 are a side elevational view, a plan view, a bottom view, a front elevational view, a back view and a perspective view, of a hair treating implement, according to a third embodiment of the present invention, respectively;

Fig. 13 is a partially broken side elevational view of a comb tooth portion with a removed heater cassette of a hair treating implement, according to the third embodiment shown in Figs. 7 through 12;

Fig. 14 is a partially broken side elevational view of a comb tooth portion with a heater cassette attached thereto, according to the third embodiment shown in Figs. 7 through 12;

Fig. 15 is a schematic view of an electrical power supply circuit of a heater cartridge shown in Fig. 14;

Fig. 16 is an exploded perspective view of a heater cartridge, according to the third embodiment of the present invention;

Fig. 17 is a side elevational view of a heater cartridge in an inactive position in which no electrical power is supplied to a nichrome wire, in the third embodiment of the present invention;

Fig. 18 is a side elevational view of a heater cartridge in an active position in which an electrical power is supplied to a nichrome wire, in the third embodiment of the present invention;

Fig. 19 is a perspective view of a rear base plate of a heater cartridge and a leaf spring, in the third embodiment of the present invention; and,

Figs. 20 and 21 are views similar to Fig. 19, showing a notch and notches which is and are additionally provided on a rear base plate shown in Fig. 19, respectively.

DESCRIPTION OF PREFERRED EMBODIMENTS

Figs. 1A and 1B show a first embodiment of the present invention in which a hair treating implement of the present invention essentially has a comb tooth portion 1 and a hand grip 2 which is connected to one end of the comb tooth portion 1. The comb tooth portion 1 has a pair of first and second comb tooth plates 1a and 1b which are spaced from one another at a distance W (e.g. about 5 mm) and which are symmetrically opposed to each other with respect to a longitudinal center line of the hair treating implement. In a space W defined by and between the comb tooth plates 1a and 1b is provided an electrical heating wire 3 which extends in the longitudinal direction of the hair treatment implement in the vicinity of the base portions of the comb teeth. The electrical heating wire 3 is included in an interchangeable heater cassette (cartridge) 30 which is provided between the comb tooth plates 1a and 1b. The hand grip 2 has a hollow portion which defines a battery room 2a in which batteries B are stored. In the illustrated embodiment, two or three SUM-3 batteries B as a power source are received in the battery room 2a of the grip 2 which is closed by a plug cap 4 detachably attached to the open end of the battery room 2a. The grip 2 has thereon a push button switch 5 to start the operation of the hair treatment implement, so that the power supply of the battery B is applied to the heating wire 3.

Figs. 2A through 2C and Figs. 3A through 3C show a comb tooth portion 1 in the first embodiment of the present invention. Fig. 4 shows the heater cassette 30 used in the hair treatment implement.

The heater cassette 30 has a generally arched substrate 31 which has a shape corresponding to the shape of the spine portion of the comb tooth plates 1a and 1b, first and second electrical conductive terminals 32 and 33 which are provided to project from the inner faces at front and rear end portions of the substrate 31, the above-mentioned electrical heating wire 3 which tensely extends between the terminals 32 and 33, first and second projecting terminals 34 and 35 which project to rearward from the substrate 31, a first conductor (connecting line) 36 for connecting the first conductive terminal 32 and the first projecting terminal 34, a second conductor (connecting line) 37 for connecting the second conductive terminal 33 and the second projecting terminal 35, longitudinally extending elongated guide projections 38a and 38b which are provided on the right and left side faces of the substrate 31, and a front lug 39 which is provided on the front face of the substrate 31.

In the illustrated embodiment, the first conductive terminal 32, the first conductor 36 and the first projecting terminal 34 are made of a single annealed aluminium wire which is properly bent, and similarly, the second conductive terminal 33, the second conductor 37 and the second projecting terminal 35 are made of a single annealed aluminium wire which is properly bent. The first and second conductors 36 and 37 are embedded in the substrate 31 which is molded of heat-resisting resin, such as polycarbonate-delrin (polyacetal resin), together with the elongated guide projections 38a and 38b and the front lug 39. The heating wire 3 is made of nichrome fine wire of about 0.1 ~0.14 mm ø or may be a sheathed heater. In the illustrated embodiment, the effective length ℓ of the nichrome wire 3 is 40 ~50 mm and has a high electrical resistance, so that when a voltage of 3 ~4.5 V is applied to the opposite ends of the heating wire 3, the wire 3 generates a red heat or is heated without being burnt and broken.

On the inner side faces of the spine portions of the right and left comb tooth plates 1a and 1b of the comb tooth portion 1 are provided longitudinally elongated guide grooves 11a and 11b in which the corresponding left and right guide projections 38a and 38b of the heater cassette 30 can be slidably engaged. On the front face of the hand grip 2 are provided first and second power supplying receptacles (suppliers) 51 and 52 in which the corresponding first and second projecting terminals 34 and 35 are received to establish an electrical connection therebetween.

The comb tooth portion 1 and the hand grip 2 are made of a heat-resisting resin material, similar to the heater cassette 30.

The heater cassette 30 is inserted in the space between the comb tooth plates 1a and 1b from the front end side of the comb tooth portion 1 in such a way that the guide projections 38a and 38b of the heater cassette 30 are slid in the associated guide grooves 11a and 11b of the comb tooth portion 1. When the heater cassette 30 is completely inserted in the body of the hair treating implement, the first and second projecting terminals 34 and 35 are engaged in the corresponding first and second receptacles 51 and 52 of the hand grip 2, so that the electrical connection is established. Upon inserting the heater cassette 30, the leading end thereof is the end on which the projecting plugs 34 and 35 are provided. When the heater cassette 30

is attached to the comb tooth portion 1, the heating wire 3 extends between the left and right comb tooth plates 1a and 1b with a tension to be close to the base portion of the comb teeth, as can be seen from Figs. 1B and 2A.

When a user who grasps the hand grip 2 pushes the push button switch 5 to make the switch ON, a closed electrical circuit of the switch 5→ the batteries B housed in the battery room 2a of the hand grip 2→ a line 53 (Fig. 2A) → the first receptacle terminal 51 → the first projecting terminal 34 → the first conductor 33 → the first conductive terminal 32 → the heating wire 3→ the second conductive terminal 33 → the second conductor 37→the projecting terminal 35→ the second receptacle 52 → the switch 5 is formed. Consequently, the heating wire 3 immediately becomes a red-heat state through the whole length thereof.

When the push button switch 5 is released, the above-mentioned electrical circuit is broken, so that the heating wire 3 stops generating red-heat and rapidly decreases in temperature due to its small heat capacitance.

Thus, when the heating wire 3 is brought into contact with the body hair at a desired length of the hair, while combing the hair by the comb tooth portion 1, if the push button switch 5 is pushed down, the heating wire 3 generates red-heat, so that the body hair with which the heating wire comes into contact is easily burnt and cut. The tip edges of the burnt and cut hair are not sharp but round, unlike the case where the hair is cut by shearing by a cutting tool (scissors etc.), thus resulting in no drawback of prior art mentioned before.

It should be noted that no direct contact of the heating wire 3 with a user's skin occurs, since the heating wire 3 is placed in the space between the right and left comb tooth plates 1a and 1b.

If the heating wire is broken, the front lug 39 of the heater cassette 30 is grasped with user's fingers to pull the heater cassette out in the opposite direction thereby to disengage the same from the comb tooth portion 1, so that the heater cassette 30 can be exchanged with a new cassette. The interchangeability of the heater cassette or the heating wire has an economical merit.

The batteries B received in the hand grip 2 provide an easily operable cordless hair treating implement. Alternatively, it is possible to provide a receptacle 6, for example, on the rear end of the hand grip 2, so that a detachable plug 7 which is connected to a separate battery holder 9 with batteries through a cord 8 can be inserted in the receptacle 6 to supply the power to the hair treatment implement, as shown in Fig. 5. The separate battery holder 9 makes the hair treatment implement lighter and more operable. It is possible to directly connect the hair treatment implement to the separate battery holder through the connecting cord without using the receptacle and the plug. It is also possible to connect the hair treating implement to a commercial power source through a voltage reducer by a connecting cord.

Fig. 6 shows another embodiment of the present invention, in which the components corresponding to those in Figs. 1 through 4 are designated with the same numerals as those in Figs. 1 through 4. In the embodiment shown in Fig. 6, the heating wire 3 strings between the opposite ends of an archwise body member 10, like a chord of a circle. The plug cap 4 provided on the rear end of the hand grip 2 serves also as a rotary switch to make the hair treating implement ON and OFF. The archwise body member 10 having the heating wire 3 which strings like a chord is detachably attached to the front end of the hand grip 2, so that the archwise body member 10 can be exchanged, for example, in case of a breakage of the heating wire 3. When the archwise body member 10 is attached to the hand grip 2, the first and second projecting terminals 34 and 35 of the archwise body member 10 are electrically connected to the first and second supplier recessed terminals 51 and 52 of the hand grip 2.

The hair treating implement shown in Fig. 6 can be particularly advantageously used as a hair dressing tool in a barber culture or a beauty culture. Namely, the heating wire 3 is brought into slide-contact with the tips of the dressed hair to burn and cut the same, so that the cut tips are rounded, curled, or frizzled to obtain a desired hair style.

The hair treating implement shown in Figs. 1 through 4 can be also used, of course, as a hair dressing tool in a barber culture or a beauty culture.

Figs. 7 through 12 show a third embodiment of the present invention, in which the hair treating implement essentially includes a comb tooth portion 1 and a hand grip 2 connected to one end of the comb tooth portion 1. The comb tooth portion 1 has a pair of comb tooth plates 1a and 1b which are spaced from one another at a distance W (e.g. about 5 mm), in a symmetrical arrangement with respect to the longitudinal axis of the comb tooth portion 1, as shown in Fig. 9. The electrical heating wire 3 strings close to the base end portion of the comb teeth, in the space (distance W) defined between and by the comb tooth plates 1a and 1b. The heating wire 3 is included in the interchangeable heater cassette 30 (Fig. 12) which can be detachably inserted in the space between the comb tooth plates 1a and 1b. The hand grip 2 has a hollow body which constitutes a battery room 2a in which the batteries B (e. g. three SUM-2 bat-

teries) are stored and which is closed by the plug cap 4. Left and right push button switches 5a and 5b are provided on the opposite side faces of the hand grip 2 adjacent to the comb tooth portion

The comb tooth plates 1a and 1b, the hand grip 2, and the plug cap 4 are molded of synthetic resin such as ABS resin, polycarbonate resin or delrin resin or the like.

As can be seen in Fig. 16, the heater cassette 30 has an elongated substrate having electrically insulated front and rear base plates 3_1 and 3_1 of for example, glass epoxy which are split from one another at the center portion of the substrate along an oblique line, predetermined patterns of conductor layers (Cu) 3_3, 3_4, 3_5, and 3_6 formed on the side faces of the front and rear base plates 3_1 and 3_2, the electrical heating wire 3 (e.g. nichrome fine wire of 0.1~0.14 mm Ø) which strings between a front upward projection 3_7 of the front end of the front base plate 3_1 and a rear upward projection 3_8 of the rear end of the rear base plate 3_2, and elongated left and right side plates 3_9 and 3_{10} which hold therebetween the substrate (i.e. the front and rear base plates 3_1 and 3_2) in a sandwich fashion and which have a generally inverted L-shaped cross section.

The substrate consisting of the front base plate 3_1 and the rear base plate 3_2 forms a printed circuit board. Namely, the conductor pattern layers 3_3 and 3_4 are formed on the substantially whole right side face of the front base plate 3_1 and the left side face of the projection 3_7 thereof, respectively, and the conductor pattern layers 3_5 and 3_6 are formed on the substantially whole left side face of the rear base plate 3_2 and the right side face of the projection 3_8 thereof, respectively.

The front base plate 3_1 and the left side plate 3_9 are interconnected by a pin 3_{11} which extends through the front base plate 3_1 and the left side plate 3_9 and which is calked. Similarly, the front base plate 3_1 and the right side plate 3_{10} are interconnected by a pin 3_{12} which extends through the front base plate 3_1 and the right side plate 3_{10} and which is calked. Accordingly, the front base plate 3_1 and the left and right side plates 3_9 and 3_{10} are integrally connected to each other by the pins 3_{11} and 3_{12}.

The left and right side plates 3_9 and 3_{10} are made of metal plates, such as iron plates and the pins 3_{11} and 3_{12} are also made of metal, in the illustrated embodiment. To prevent the left and right side plates 3_9 and 3_{10} from being electrically connected to each other through the metal pins 3_{11} and 3_{12}, the right side plate 3_{10} is provided with a through hole 3_{13} which has a diameter larger than the associated pin 3_{11}, so that the pin 3_{11} which secures the front base plate 3_1 to the left side plate 3_9 does not contact the right side plate 3_{10}. Similar, the left side plate 3_9 is provided with a through hole 3_{14} which has a diameter larger than the associated pin 3_{12}, so that the pin 3_{12} which secures the front base plate 3_1 to the right side plate 3_{10} does not contact the left side plate 3_9. Alternatively, it is possible to make the side plates 3_9 and 3_{10}, and the pins 3_{11} and 3_{12} of an electrically insulated material, so that the above-mentioned through holes 3_{13} and 3_{14} can be dispensed with.

The rear base plate 3_2 and the left and right side plates 3_9 and 3_{10} are connected by a single electrically insulated pin 3_{15}, so that the rear base plate 3_2 can rotate about the pin 3_{15} between the side plates 3_9 and 3_{10}.

The nichrome thin wire 3 is firmly connected to the front and rear projections 3_7 and 3_8 of the front base plate 3_1 and the rear base plate 3_2 to have an effective length of for example 40 ~50 mm.

Due to the tension of the nichrome wire 3, the rear base plate 3_2 is biased to have a rotational moment about the insulation pin 3_{15} in the clockwise direction in Fig. 17, so that a downward inclined edge (lower oblique edge) of the inclined front end of the rear base plate 3_2 is pressed against an upwardly inclined edge (upper oblique edge) of the rear oblique end of the front base plate 3_1.

The spine portion of the left and right comb tooth plates 1a and 1b of the comb tooth portion 1 is provided, on its inner side faces, with elongated guide grooves 11a and 11b (Figs. 10, 12 and 13) in which the left and right guide projections 3_{16} and 3_{17} of the heater cassette 30 are slidably engaged.

The heater cassette 30 is inserted from the front end of the comb tooth portion 1 into the space between the left and right comb tooth plates 1a and 1b, with the front base plate 3_1 being a leading end upon insertion (Figs. 12 and 14). Upon insertion, the guide projections 3_{16} and 3_{17} of the heater cassette 30 are slidably guided in the corresponding left and right guide grooves 11a and 11b of the comb plates 1a and 1b.

When the heater cassette 30 is fully inserted in the comb tooth portion 1, front ends of elastically deformable left and right electrode plates 6a and 6b (Figs. 13~16) which are provided on the inner side faces of the spine portion of the left and right comb tooth plates 1a and 1b are brought at their front ends into elastic contact with the conductor pattern layers 3_5 and 3_3 through recessed windows 3_{18} and 3_{19} which are formed on the left and right side plates 3_9 and 3_{10} of the heater cassette 30 to establish an electrical connection therebetween, respectively. On the other hand, a leaf spring 7 which is provided in the comb tooth portion 1 to be placed below the heater cassette 30 inserted in the space between the left and right comb tooth plates 1a and 1b is brought at its front end into elastic

contact with the front end of the lower edge of the rear base plate 3_2, as shown in Figs. 14 and 17, so that the rear base plate 3_2 is biased to rotate about the pin 3_{15} in the counterclockwise direction (Fig. 17) against the tension of the heating wire 3.

When the heater cassette 30 is mounted to the comb tooth portion 1 (Figs. 9 and 14), the heating wire 3 tensely extends in the space (distance W) between the comb tooth plates 1a and 1b, close to the base end of the comb teeth.

When an operator who grasps the hand grip 2 pushes one of or both the push button switches 5a and 5b, the power supply circuit 58 (Fig. 15) is made ON, so that an electrical connection of the batteries B, the electrode plate 6a, the conductor pattern layer 3_5, the heating wire 3, the conductor pattern layer 3_3 and the electrode plate 6b is established.

As a result, the heating wire 3 immediately is heated through the whole length thereof. When the push button switch 5a and/or 5b is released, the power supply circuit 58 is made OFF, so that no current is fed to the heating wire 3 from the batteries B. Consequently, the nichrome wire 3 is no longer heated, and decreases in temperature due to a small heat capacitance thereof.

Thus, at the operation of the push button switch 5a and/or 5b, when the nichrome wire 3 is brought into contact with the body hair to be treated at a desired length thereof, while combing the hair by the comb tooth portion 1, the nichrome wire 3 is heated, so that the hair brought into contact therewith is burnt and cut. Unlike the shearing by a cutting tool, the tips of the hair thus burnt and cut are not sharp but round.

As the nichrome wire 3 is guarded by the comb tooth plates 1a and 1b, there is no danger that a man or women who is treated by the present implement or an operator directly touch the heated wire 3.

The nichrome wire 3 which extends between the front and rear projections 3_7 and 3_8 of the front and rear base plates 3_1 and 3_2 of the heater cassette 30 is slightly elongated due to a thermal linear expansion upon heating. The elongation of the heating wire 3 causes the rear base plate 3_2 to rotate about the pin 3_{15} with the help of the spring force of the leaf spring 7 in the counterclockwise direction, as shown in Fig. 18, resulting in an increase of the distance between the front and rear projections 3_7 and 3_8 to which the heating wire 3 is connected. Consequently, the elongation of the heating wire 3 due to the thermal linear expansion can be absorbed by an increase of the distance of the projections 3_7 and 3_8, so that the heating wire 3 is always kept in a tensioned state. Therefore, the comb tooth plates 1a and 1b can be prevented from being thermally damaged by the heating wire 3 which would be otherwise repeatedly loosened and elongated due to the thermal linear expansion, resulting in a direct contact with or coming very close to the left and right comb tooth plates 1a and 1b.

When the power supply to the nichrome wire 3 is broken, the nichrome wire 3 is linearly contracted due to a decrease in temperature thereof, so that the rear base plate 3_2 rotates about the pin 3_{15} in the clockwise direction in Fig. 18 against the leaf spring 7 from a position shown in Fig. 18 to a position shown in Fig. 17 in which the nichrome wire 3 extends with a tension between the projections 3_7 and 3_8. Namely, the nichrome wire 3 is always kept tensioned in both the active position of the hair treating implement in which an electrical power is supplied and the inactive position in which no electrical power is supplied.

The power supply circuit 58 has a timer function in which a power supply to the nichrome wire 3 is automatically stopped in a predetermined time (e. g. 30 ~60 second) after the push button switch 5a and/or 5b is made ON, so that even if the push button switch 5a and/or 5b continues to be pushed down, no over-heat of the nichrome wire 3 takes place. The timer function is reset every time the push button switch 5a or 5b is pushed down. When the power supply to the nichrome wire 3 is automatically broken by the timer function, the power supply can be effected again by pushing the push button switch 5a or 5b.

Fig. 20 shows a modified embodiment in which the rear base plate 3_2 is provided, on its lower edge against which the leaf spring 7 bears, with a notch 3_2, of for example about 0.3 mm depth. In a variant shown in Fig. 21, additional notches 3_{22} are provided on the lower edges of the left and right side plates 3_9 and 3_{10} corresponding to the above-mentioned notch 3_{21} of the rear base plate 3_2. The notch 3_{21}' shown in Fig. 21 is deeper than the notch 3_{21} shown in Fig. 20.

The provision of the notch 3_{21} (3_{21}') and/or the notches 3_{22} not only provides a click upon completion of attachment of the heater cassette 30 to the comb tooth portion 1 but also contributes to a stable hold of the heater cassette 30. Furthermore, the notch 3_{21} (3_{21}') and the notches 3_{22} permit the rear base plate 3_2 to rotate about the pin 3_{15} within an increased angular displacement.

Means for absorbing the looseness and elongation of the heating wire 3 as a heat generating means due to the thermal expansion to always maintain the heating wire 3 in a tensioned state is not limited to the illustrated embodiments. For instance, it is possible to provide a spring or springs (not shown) which is or are connected to one end or both ends of the heating wire 3 to tension the same.

In Fig, 15, a pilot lamp unit (e.g. LED) 59 of green lamp and red lamp is provided on the front end of the comb tooth portion 1. The pilot lamp unit 59 is controlled by the power supply circuit 58, so that when the electrical power is supplied to the heating wire 3 by the operation of the push button switch 5a and/or 5b, the green lamp is lightened. When the batteries B are consumed and when the push button switch 5a or 5b is pushed down, the red lamp is continuously or discontinuously lightened to indicate that the batteries B must be exchanged.

When the nichrome wire 3 is broken, a lever 10 (Figs. 9, 12 ~14) which is provided on the connecting portion of the comb tooth portion 1 and the hand grip 2 so as to rotate about a shaft 10a provided on the comb tooth portion 1 is rotated with an operator's finger in the counterclockwise direction to a position shown by an imaginary line in Fig. 14. As a result, the heater cassette 30 which is attached to the comb tooth portion 1 is pushed out at the front end thereof by the lever 10, so that the lug 3_{23} provided on the rear end of the rear base plate 3_2 projects from the comb tooth portion 1, so that the lug 3_{23} can be grasped by operator's fingers to pull the heater cassette 30 in the direction opposite to the insertion direction upon attachment thereof in order to disengage the heater cassette 30 from the comb tooth portion 1. Consequently, the heater cassette 30 can be exchanged with another.

When the hair treatment implement is not used, the plug cap 4 of the battery room 2a of the hand grip 2 is rotated by about 45 ° from an operative position shown in Fig. 8 in which a mark 4c of the plug cap 4 is registered with a mark 4a of the hand grip 2 to an inoperative position in which the mark 4c is registered with a mark 4b of the hand grip 2, so that a switch 11 (Fig. 15) which is associated with the plug cap 4 is opened to open the battery circuit. In this position, no power is supplied to the heating wire 3, even if the push button switch 5a or 5b is actuated. When the plug cap 4 is rotated by 45° in the reverse direction (clockwise direction), so that the mark 4c meets the mark 4a, the switch 11 is closed to close the battery circuit.

When the plug cap 4 is detached from the hand grip 2 to load or unload the batteries B into and from the battery room 2a of the hand grip 2, the plug cap 4 is rotated by about 90° in the clockwise direction from a position shown in Fig. 8 in which the mark 4c is registered with the mark 4a.

The batteries B received in the hand grip 2 can realize a cordless hair treating implement which can be easily operated. Alternatively, it is possible to provide a receptacle an a plug as shown in Fig. 5. Namely, for example, a receptacle is provided on the rear end of the hand grip 2 while a a detachable plug is provided with a separate battery holder through an electrical connecting cord, so that the plug can be inserted in the receptacle to supply the power to the hair treatment implement. The separate battery holder makes the hair treatment implement lighter and more operable.

It is possible to directly connect the hair treatment implement to the separate battery holder through the connecting cord without using the receptacle and plug.

It is also possible to connect the hair treating implement to a commercial power source through a voltage reducer by an electrical connecting cord.

Claims

1. A hair treating implement characterized in that it comprises an electrical heating wire (3), a support which tensely supports the heating wire (3), said support being provided with terminals (32, 33) to which the opposite ends of said heating wire (3) are connected to supply an electrical power thereto.

2. A hair treating implement according to claim 1, characterized in that it comprises a hand grip (2) which is connected to said Support.

3. A hair treating implement according to claim 2, characterized in that said hand grip (2) comprises a power source receiving portion in which a power source (B) is stored.

4. A hair treating implement according to claim 3, characterized in that said hand grip (2) comprises a power switch which makes the power source (B) ON and OFF.

5. A hair treating implement according to claim 3 or 4, characterized in that the power source (B) is a predetermined number of battery or batteries stored in the power source receiving portion of the hand grip (2).

6. A hair treating implement according to anyone of claims 2 to 5, characterized in that said hand grip (2) comprises a connecting portion which can be connected to an external power source.

7. A hair treating implement according to anyone of claims 1 to 6, characterized in that it comprises a comb tooth portion (1) having a pair of opposed and spaced comb tooth plates (1a, 1b), said heating wire (3) stringing in a space between said comb tooth plates (1a, 1b), and a

hand grip (2) connected to said comb tooth portion (1).

8. A hair treating implement according to anyone of claims 1 to 7, characterized in that it further comprises a heater cassette (30) in which the heating wire (3) and a substrate serving as support for the wire are included.

9. A hair treating implement according to claim 8, characterized in that said heater cassette (30) comprises electrical terminals (34, 35) to which an electrical power is supplied to supply the electrical power to the heating wire (3).

10. A hair treating implement according to claim 9, characterized in that said hand grip (2) comprises supplier terminals (51, 52) which can be connected to said electrical terminals (34, 35) to supply the electrical power to the heating wire (3).

11. A hair treating implement according to anyone of claims 1 to 10, characterized in that there is provided an absorbing means for absorbing the looseness and elongation of said heating wire (3) due to the thermal expansion upon heating.

12. A hair treating implement according to claim 11, characterized in that said support comprises a stationary base plate (31) and at least one movable base plate (32) movable relative to said stationary base plate, said movable base plate (32) being connected to one end of said heating wire (3) and which constitutes the absorbing means.

13. A hair treating implement according to claim 11 or 12, characterized in that said absorbing means comprises a biasing means (7) for biasing the movable base plate (32) in one direction.

14. A hair treating implement according to anyone of claims 1 to 13, characterized in that it further comprises a first power supply circuit (58) in the support.

15. A hair treating implement according to anyone of claims 1 to 14, characterized in that it further comprises a second power supply circuit in the hand grip.

16. A hair treating implement according to claims 14 and 15, characterized in that said first or second power supply circuit (58) controls the time of supply of the electrical power to the heating wire.

17. A hair treating implement according to claims 14 and 16, characterized in that it comprises an indicating means (59) on the support for indicating the supply of the electrical power to the heating wire (3).

18. A hair treating implement according to claims 15 and 16, characterized in that it comprises an indicating means on the hand grip for indicating the supply of the electrical power to the heating wire.

19. A hair treating implement according to claim 17, characterized in that it further comprises an indicating means on the support for indicating the consumption of the electrical power to the heating wire.

20. A hair treating implement according to claim 18, characterized in that it further comprises an indicating means on the hand grip for indicating the consumption of the electrical power to the heating wire.

21. A hair treating implement according to anyone of claims 8 to 20, characterized in that said heater cassette (30) is detachably attached to the comb tooth portion (1).

22. A hair treating implement according to anyone of claims 1 to 21, characterized in that said support comprises a predetermined pattern (33 - 36) of electrical conductor.

23. A hair treating implement comprising a hand grip (2) having a comb tooth portion (1), characterized in that there is provided a heater cassette (30) in which a heating wire (3) is supported and which is detachable to said hand grip (2), said heating wire (3) being located at said comb tooth portion (1) when said heating cassette (30) is attached to said hand grip.

24. A hair treating implement according to claim 23, characterized in that said comb tooth portion (1) has a pair of opposed and spaced comb tooth plates (1a, 1b), said heating wire (3) supported by said heater cassette (30) being located in a space between said comb tooth plates (1a, 1b) when said heating cassette (30) is attached to said hand grip (2).

25. A hair treating implement comprising a hand grip, and a heater cassette (30) in which a heating wire (3) is supported and which is

detachable to said hand drip (2).

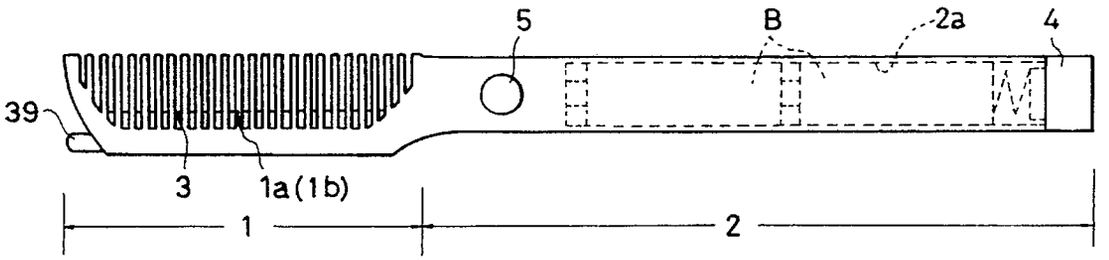


FIG. 1A

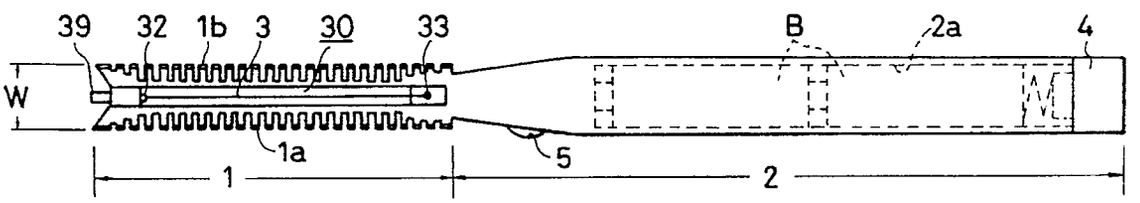


FIG. 1B

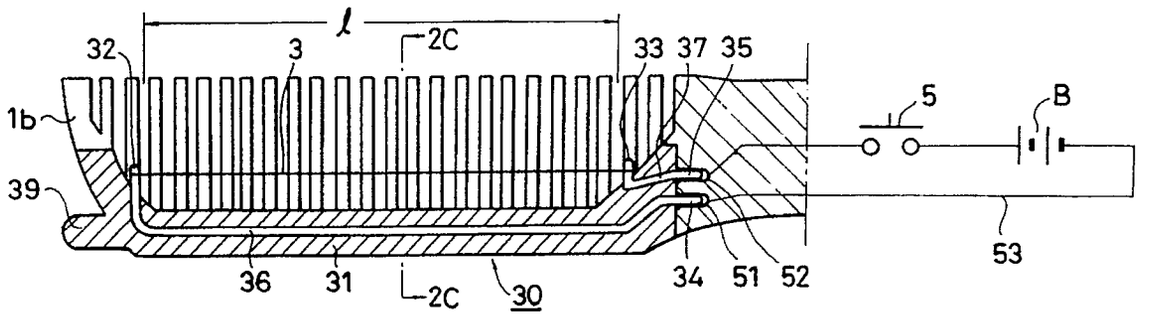


FIG. 2A

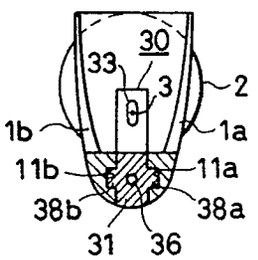


FIG. 2C

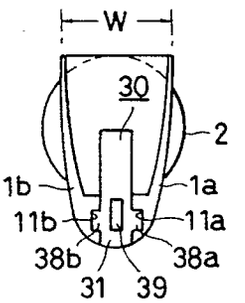


FIG. 2B

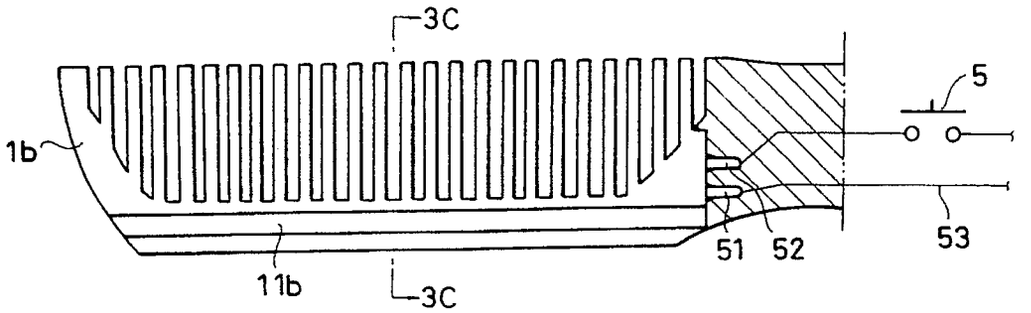


FIG. 3A

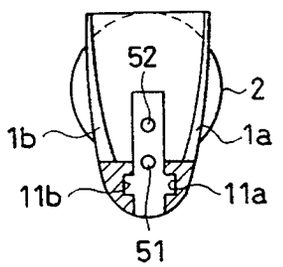


FIG. 3C

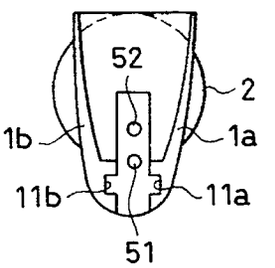


FIG. 3B

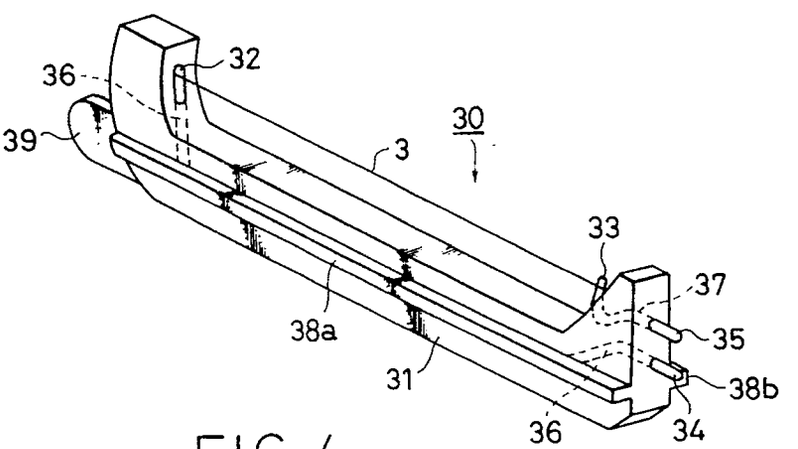


FIG. 4

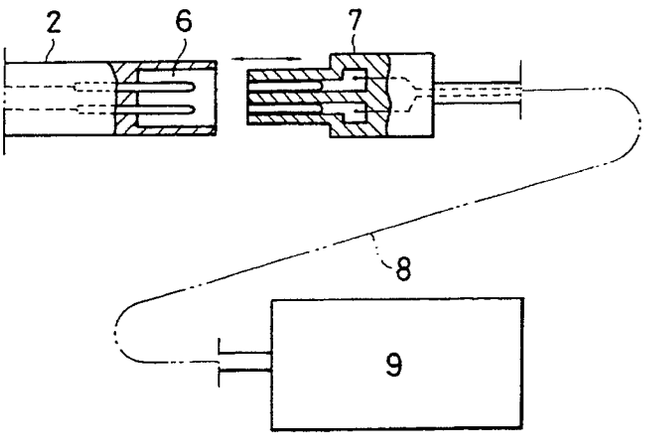


FIG. 5

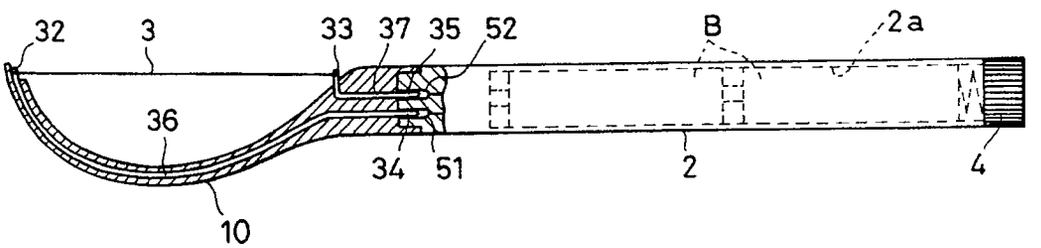


FIG. 6

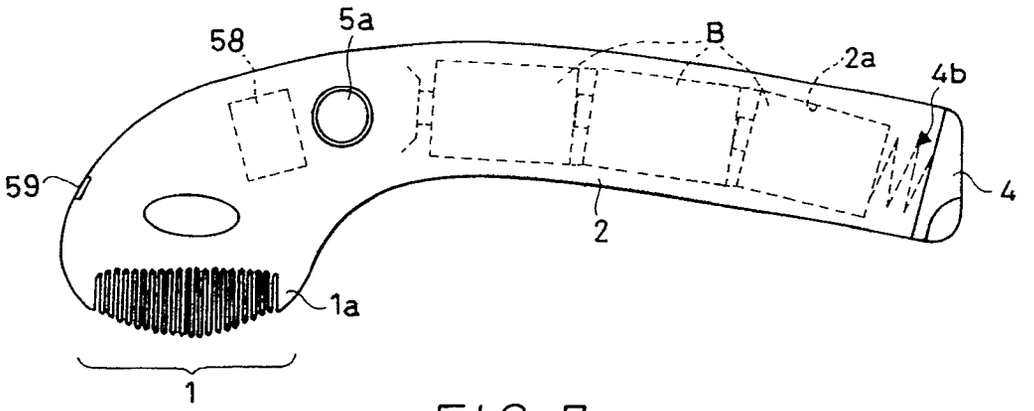


FIG. 7

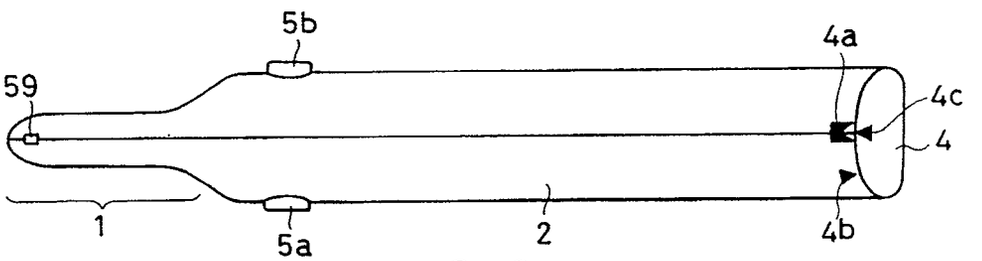


FIG. 8

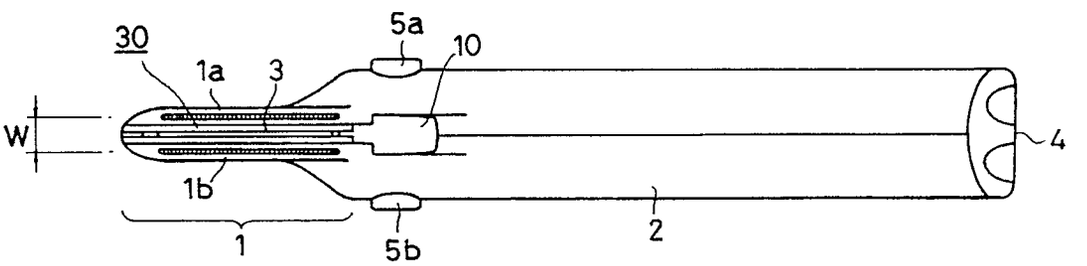


FIG. 9

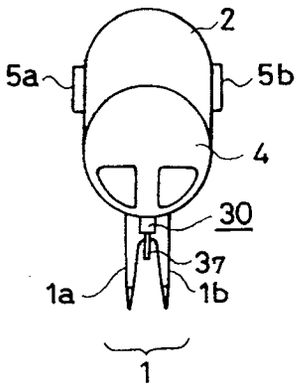


FIG. 11

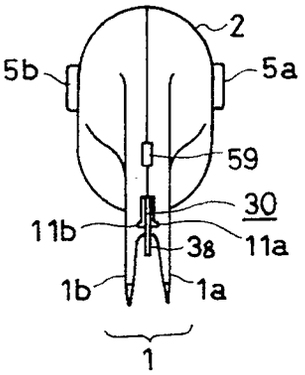


FIG. 10

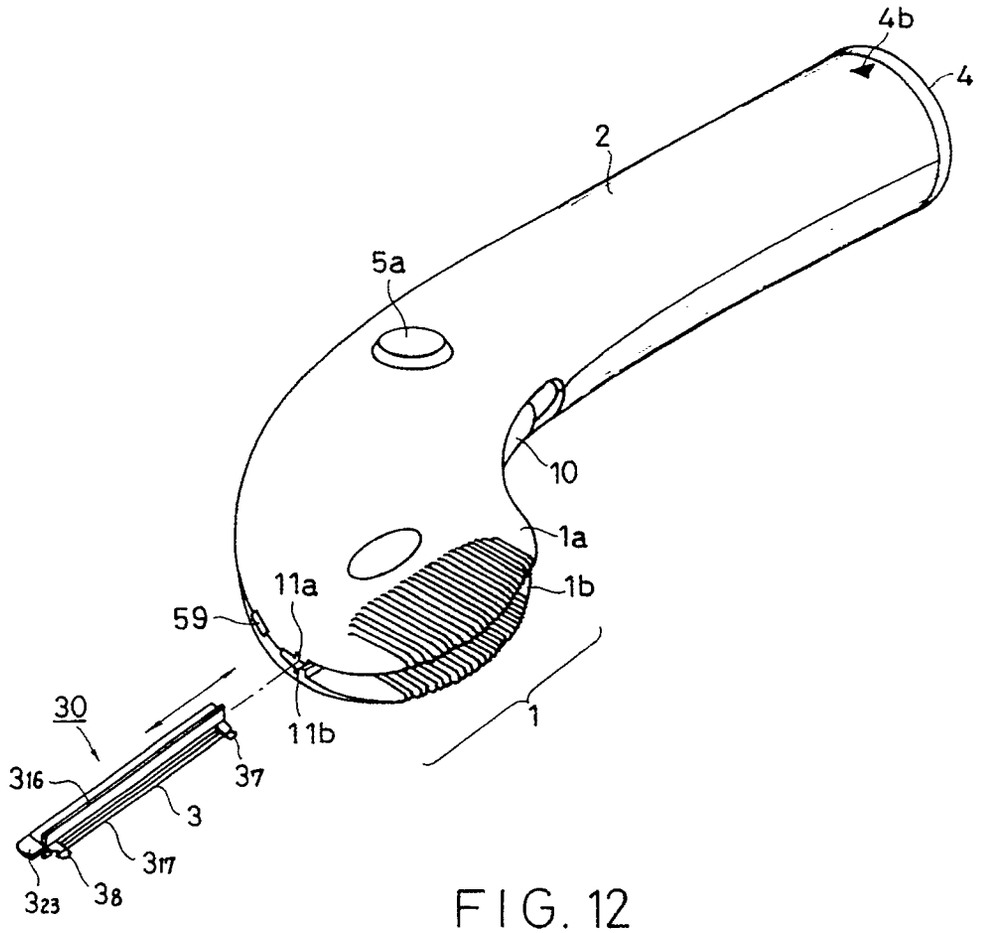


FIG. 12

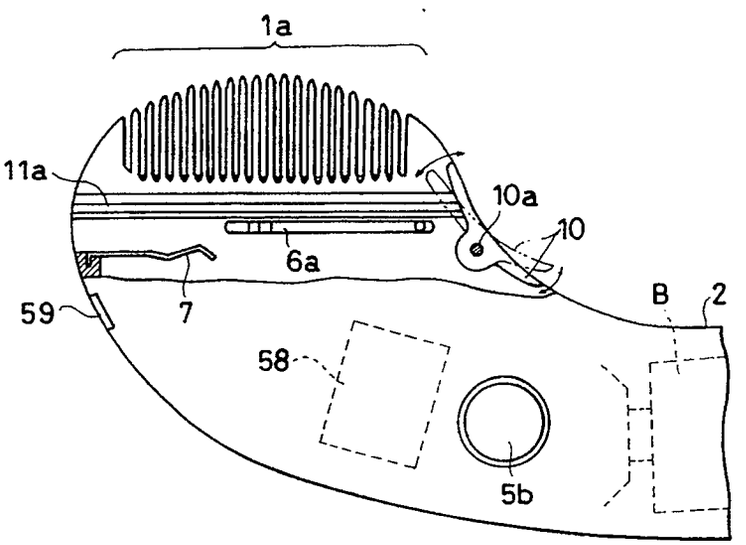

1a
11a
10a
10
6a
7
59
B
2
58
5b

FIG. 13

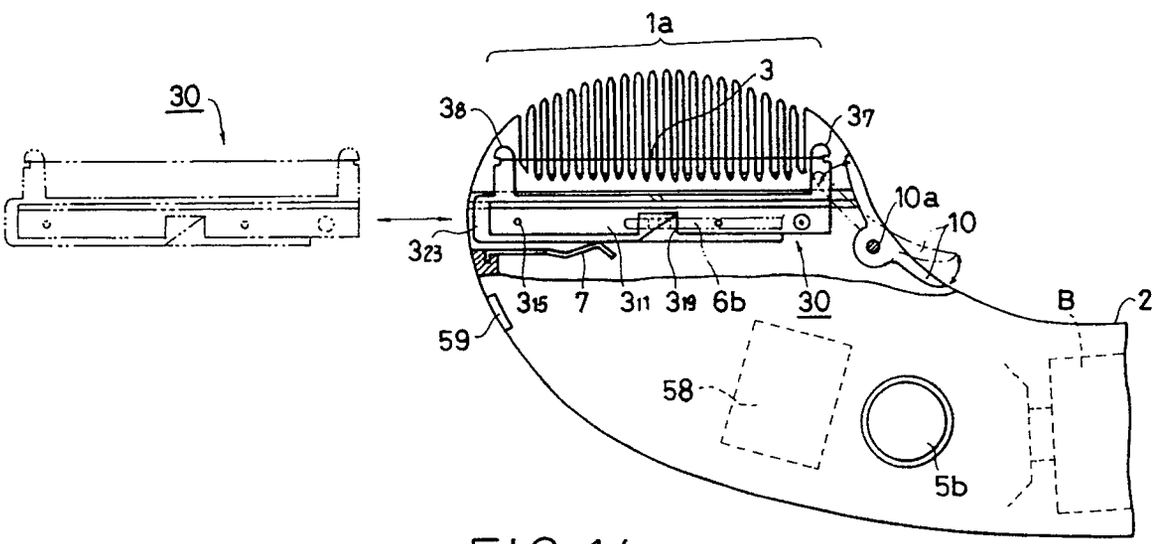

30
1a
3
38
37
10a
10
323
315
7
311
319
6b
30
B
2
59
58
5b

FIG. 14

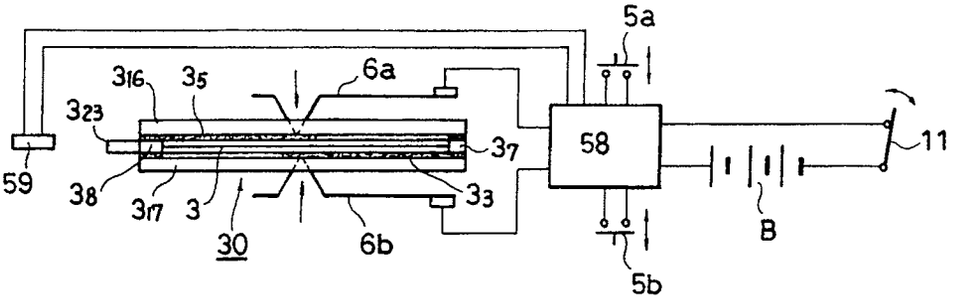
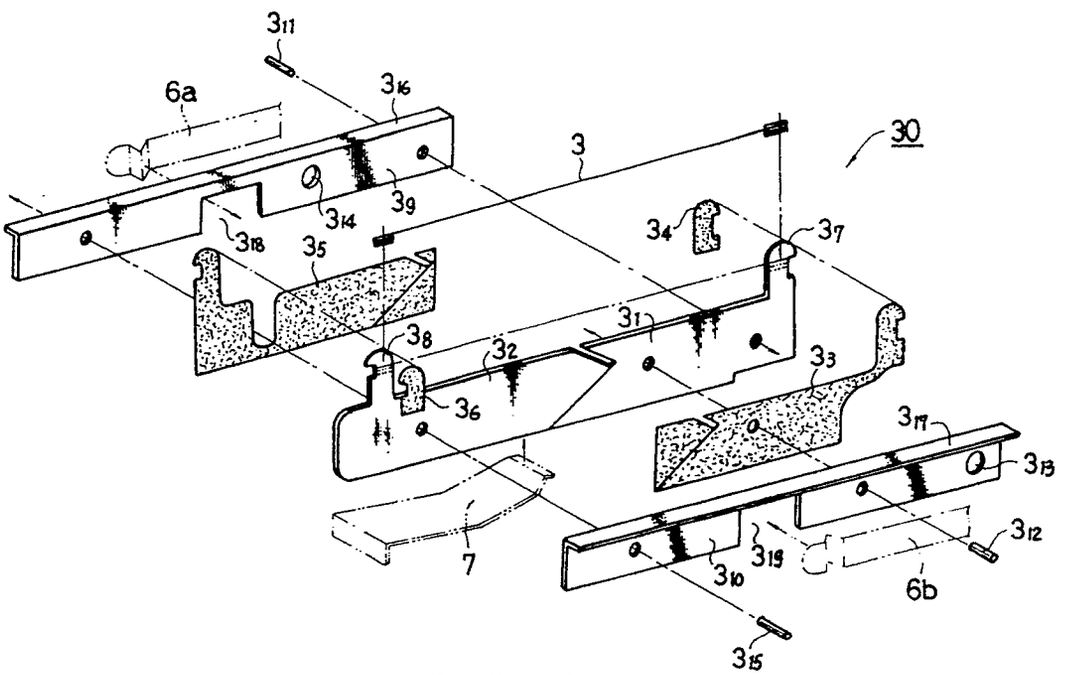

5a
316
35
6a
323
37
58
11
59
38
317
3
33
30
6b
B
5b

FIG. 15


311
6a
316
3
30
314
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37
31
38
32
33
36
317
313
312
319
310
7
6b
315

FIG. 16

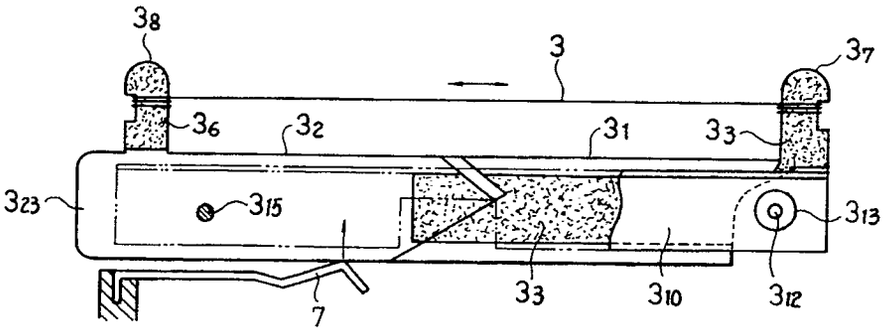

FIG. 17

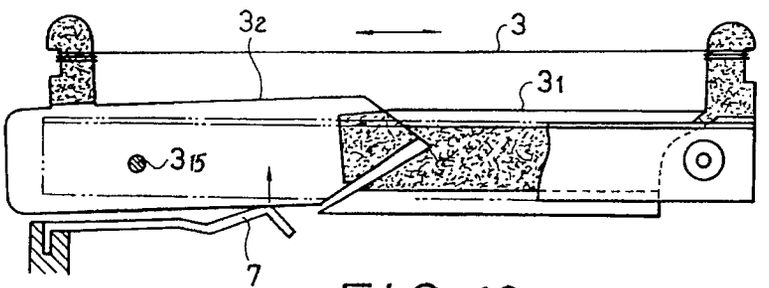

FIG. 18

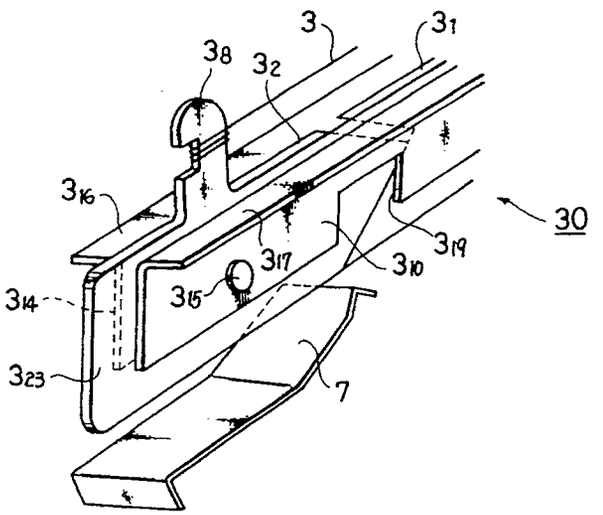

FIG. 19

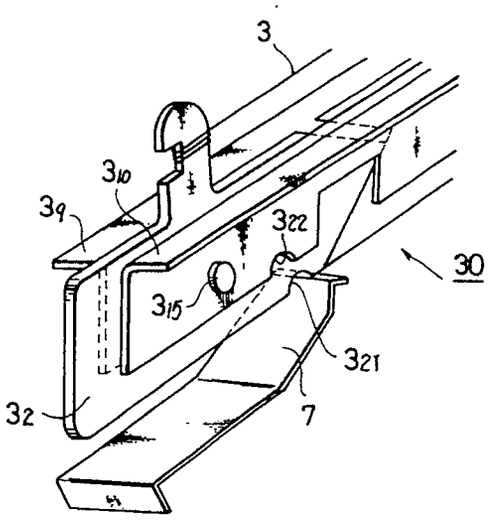

FIG. 21

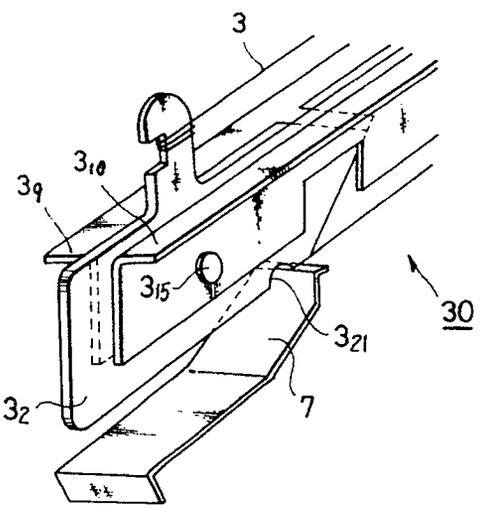

FIG. 20

European Patent Office

EUROPEAN SEARCH REPORT

Application Number EP 90116790.8

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	DE - A1 - 2 107 951 (ALLMACHER) * Claims * --	1-20	A 45 D 26/00
A	EP - A1 - 0 102 289 (SOLVINTO) * Claims; fig. * --	1-20	
A	GB - A - 7 896/A.D.1896 (FRANK MERRILL BELL) * Totality * --	1	
A	US - A - 2 491 708 (G.H. BRADLEY) * Totality * --	1	
A	US - A - 1 744 525 (S.O. CHASE) * Totality * ----	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

A 45 D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	14-12-1990	NETZER

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

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