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Description

The invention relates to a battery-operated electric hand appliance in accordance with the preamble to claim 1.

Hand lamps or pocket lamps have already been provided with a plug-in power supply unit which, when removed, can simply be inserted into a mains socket for recharging purposes (DE-U-7 615 360). Also, in order to permit such consumer articles to be recharged from a car battery as required and with no mains connection, the rear side of the lamp has been provided with a special car plug which, after removal of a protective cap, permits the lamp to be inserted into the car socket which is usually provided for the cigar lighter (DE-U-6 920 231). In addition, it has also already been suggested that the lamp, which is only rechargeable as such from the car battery, can be recharged in an auxiliary manner from the AC mains supply system by using a special charging device (DE-A-2 159 202). Conversely, another lamp which is rechargeable from the AC mains supply system after removal of the protective cap can also be recharged from the car battery by means of a separate additional plug with a suitably designed charging circuit (US-A-3 109 132).

Furthermore, a communications appliance having a power consumer and a power supply unit, which comprises a battery and a charging device, permits a light-emitting head, a radio receiver and a power supply unit to be accommodated in interlockable housing parts. In this case, however, a special connection-piece is also required to permit the appliance or its power supply unit to be recharged on its own, possibly also from a car battery (DE-C-1 093 839).

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Irrespective of the function of the electric appliance operated by such arrangements, there is the disadvantage that either such arrangements are only designed for one specific type of charging or, however, a separate additional appliance is required for the other charging possibility, though, when needed, such additional appliance is often not to hand, is easily mislaid or even lost. To assist in these circumstances, the basic object of the invention is to provide a desirable electric hand appliance in such a manner that the accumulator, which is contained in the housing of the appliance, can be charged selectively and without any additional means both from the AC mains supply system and from the car battery.

With a battery-operated hand appliance in accordance with the preamble to claim 1, this object is achieved according to the invention by the features which are contained in the characterising part of claim 1. Accordingly, the hand appliance in question, in the form of a lamp, etc., basically consists of the particular functional part and the power supply unit which is provided with mains- and battery-charging means, both the functional part and the power supply unit being interlockable by means of an intermediate member, which is contained in the appliance or is fully integrated, so as to be ready for use. When in its position of use, this intermediate member thereby ensures that power is supplied to the functional part from the accumulator contained in the appliance. When removed, this intermediate member is interlocked with the power supply unit and ensures that said unit can be charged from the car socket, whereas the power supply unit, when removed later from the intermediate member, is rechargeable on its own from a mains socket.

The arrangement of these components which are essential to the invention and their advantageous development are found in the sub-claims.

The immediate scope of the invention does of course also include the arrangement whereby the power supply unit of the battery-operated hand appliance and its intermediate member are interconnected in a compact manner to form an appliance part, so that said appliance part can be inserted into the functional part with one of the "charge plugs" provided. In such a case, this appliance part accommodates the NC accumulator and the charging device and, in accordance with the features of claims 6 and 7, the appliance part has, on the plug-in side, the car plug which is additionally provided with a head contact and has, on the rear side, the normal (flat) mains plug, or vice versa. In the reverse case, the appliance part has a plug-in socket connected to an accumulator and charging device on the plug-in side between the two plug pins of the flat plug, a two-pole plug pin engaging in said plug-in socket from sides of the functional part, while the car plug does not need to have any head contact here. In both cases, however, for safety reasons, it is advisable to have protective isolation between the plug devices on both sides, such isolation being relatively easy to achieve by circuit-wiring measures, such as by using an isolating transformer, or similar means. In this way it is also possible to achieve, without any exceptional, additional expenditure, a hand appliance which is formed from only two component parts, but which then has to be sealed on its rear side by means of a special cover cap or which then has to be suitably adapted to the design of the car plug.

As a typical embodiment of the invention, an electric hand appliance in the form of a hand lamp or pocket lamp is illustrated in the accompanying drawing, in which:

Fig. 1 is a side elevational view of the functional part, the intermediate member and the power supply unit in their separated state;

Fig. 2 is a plan view of the lamp shown ready for use, such a view being cut in the region of the power supply unit;

Fig. 3 is a simplified, longitudinal sectional view of the lamp of Fig. 2;

Fig. 4 is the wiring diagram for the electrical equipment of the whole lamp; and

Fig. 5 shows the distribution of this electrical equipment over the three individual parts of the lamp.

The structure and assembly of the lamp can best be seen from Fig. 1 of the drawing. Accordingly, this hand appliance consists basically of the functional part 1, which contains the bulb plus reflector and a desirable switch, the intermediate member 2 which acts as a plug- or plug-in arrangement towards both sides, and the power supply unit 3 which contains the NC accumulator and the special charging equipment.

As shown in Fig. 2, these three components are attachable in and on one another to form an appliance ready for use, and Fig. 3 of the drawing schematically shows the co-operation of the power supply unit 3 and the functional part 1 by means of the intermediate member 2 which is placed upon the unit 3 and, together with said unit, is inserted into the part 1.

As illustrated in this Figure, the intermediate member 2 is provided, on its rear side, with a profiled plug-in opening for receiving the flat plug from sides of the power supply unit 3, while, on its front side, the so-called car plug (5) is provided in an eccentrically (downwardly) offset manner. This car plug 5 is pierced centrally by a two-pole lead which is in the form of a coaxial plug 4 in the region of the plug-in opening so as to extend through a bore between the two plug pins of the flat plug and through suitably internally located jack contacts in conductive connection with the NC accumulator and the circuit arrangement of the power supply unit 3. On the front side of the car plug, this lead terminates in a head contact of same and at the annular outer contact, whereby, inside the functional part 1 via its resilient countercontact members, the electrical connection is established, on the one hand, directly and, on the other hand, by the incorporation of the slider switch which is adjustable from outside, with the bulb (holder) disposed on the front side in the middle of a reflector cover of the hand lamp. In this respect, the bulb - just like any other functional component, of course, in the sense of the invention - can be fed or operated from the NC accumulator of the power supply unit 3 via the intermediate member 2, which is fully integrated in the housing, with appropriate switching when the appliance is in its assembled state ready for use.

To permit the NC accumulator of the appliance to be recharged, if required, from the AC mains supply system, it is merely necessary to remove the power supply unit 3 from the other parts (1 and 2) so that it can be inserted, with its flat plug, into one of the

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conventional mains sockets. As can be seen from the wiring diagram of Fig. 4, the single-phase alternating current which is suitably reduced by an RC member is thereby supplied directly to the NC accumulator to be charged via a rectifier arrangement in bridge connection, whereby, in this case, the series resistance which is also illustrated is only attributed with an importance which slightly supplements the resistance already present to the full height.

If, however, the NC accumulator should be charged from a car battery, it is necessary to extract the power supply unit 3, together with the intermediate member 2, from the functional part 1. In this arrangement, the intermediate member 2 also serves as an adapter, by means of which the power supply unit 3 can be plugged into the car socket which almost always exists in motor vehicles for the cigar lighter. In such a case, the annular outer contact at the end of the car plug and the plug pin of the power supply unit 3 which, for this purpose, is exposed in the outward direction in front of its catch projections come into conductive contact with the corresponding cup* contacts of the car socket and, as shown in Fig. 4 of the drawing, connect the NC accumulator, via the appropriately dimensioned series resistance and a bridge branch of the rectifier arrangement, to the 6 V or 12 V battery of the motor vehicle. In this connection, the appropriate polarity of the attached power supply unit 3 is ensured by the shape of the common housing or by an interchange lock which corresponds in profile to the intermediate member 2.

As can readily be seen from these statements, the design of the hand appliance according to the invention is in no way limited to the arrangement, which is only outlined here as an example, in the form of a hand or pocket lamp.

*Translator's note

Perhaps "Topf.." (cup) is a clerical error for "Kopf.." (head) used elsewhere in the German text.

Thus, for example, the functional part 1 of the appliance may be suitably designed also as a blower, which is driven by an electric motor, for the kindling of grills or fireplaces. It may also be designed as an electric dry razor or as a high-voltage flashlight appliance, etc., without departing from the basic inventive concept. In addition, there is even the possibility of limiting the functional part 1 to an electro-mechanical coupling component, instead of its being of a specific appliance. Such a coupling component permits the functional attachments, which differ in type, to be combined in an interchangeable manner so as to achieve thus a universal appliance which can be used everywhere.

A further possibility offered according to the invention is to combine the intermediate member 2 and the power supply unit 3, as shown in Fig. 1, to form a joint appliance part (2/3) which has, on one side, the car plug and, on the other side, the (flat) mains plug, without the need for a separate drawing thereof. Depending on whether this appliance part (2/3) is to be designed to be attachable to the functional part 1 via the car plug or via the flat plug, it is necessary to either equip the normal car plug shown in Figs. 3 and 5 with an additional head contact and leave the flat plug unchanged, or, however, provide the flat plug between its plug pins additionally with a two-pole jack socket in which a coaxial plug engages from sides of the functional part 1 in order to connect the bulb arrangement of the lamp to the NC accumulator of the appliance part (2/3), whereas this arrangement does not require the car plug to have a head contact. In addition, no special information is needed about the means for protecting the appliance part (2/3) in the form of suitable protective isolation from the car and mains plug and its form-fit incorporation into the lamp housing by means of a cover cap or the like at this location.

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Claims

1. A battery-operated electric hand appliance, such as a lamp, blower, dry razor, etc., consisting of a functional part (1) and a plug-in power supply unit (3) which is connected in an interlocking and electrically conductive manner, said unit (3) containing an accumulator which is chargeable from the AC mains supply system or from a car battery by means of a charging device built into the power supply unit (3) and by means of a mains plug designed to fit the power supply unit (3), characterised in that an intermediate member (2) is provided which is built into the housing of the appliance and connects the electric functional part (1) to its power supply unit (3) in a plug-in manner, said intermediate member (2) having on its front side a car plug (5) contacting the power supply contacts of the functional part (1), and in that the intermediate member (2) has a two-pole plug pin (4) on its rear side within a plug-in opening for the (flat) mains plug of the power supply unit (3) for connecting the car plug contacts to the battery- and mains-charging device of the accumulator on the supply unit side.

2. An electric hand appliance as claimed in claim 1, in which the intermediate member (2), which is insertable into the functional part (1) in an interlocking manner, engages in corresponding wall recesses in the functional part (1) by means of catch projections on the opposite outer surfaces.

3. An electric hand appliance as claimed in any one of claims 1 and 2, in which the plug-in opening in the intermediate member (2) corresponds, on the rear side of said member, to the profile of the flat plug of the power supply unit (3), and the car plug (5) of the intermediate member (2)



is designed to fit on the front side of said member in an eccentrically offset manner.

4. An electric hand appliance as claimed in any one of claims 1 to 3, in which the functional part (1) is in the form of an electrical consumer, such as a lamp, blower, razor, etc., or has its own built-in mechanical-electrical coupler for corresponding appliance attachments.

5. An electric hand appliance as claimed in claim 1, in which the power supply unit (3) and the intermediate member (2) are connected, in a plug-in and catch manner, to form an appliance part (2, 3) which contains the accumulator and the charging device and is insertable into the functional part (1), the car plug (5), which is additionally provided with a head contact, being disposed on the plug-in side of said appliance part (2,3), and the flat plug, which is coverable by a sealing cap, being disposed on the rear side of said appliance part (2, 3).

6. An electric hand appliance as claimed in any one of claims 1 and 5, in which a plug-in socket, which co-operates with a two-pole plug pin on sides of the functional part (1), is disposed on the plug-in side of the appliance part (2, 3) between the plug pins of the flat plug, said appliance part (2, 3) being formed in a plug-in and catch manner from the power supply unit (3) and the intermediate member (2), and the car plug (5), which is possibly coverable by a sealing cap, is disposed on the rear side of the appliance part (2, 3).