

[54] **PORTABLE ELECTRIC APPLIANCE**
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 [51] Int. Cl. **A61h 7/00**
 [58] Field of Search **128/48, 49, 32, 51,**
128/52; 30/247, 43.92, 43.9

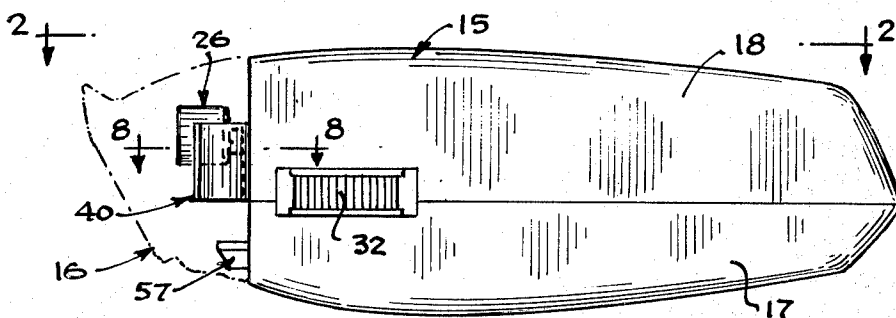
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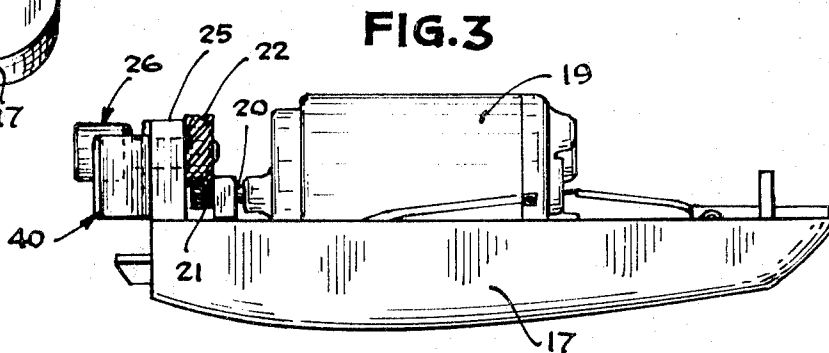
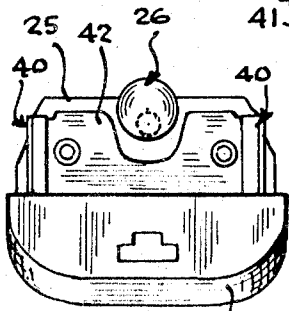
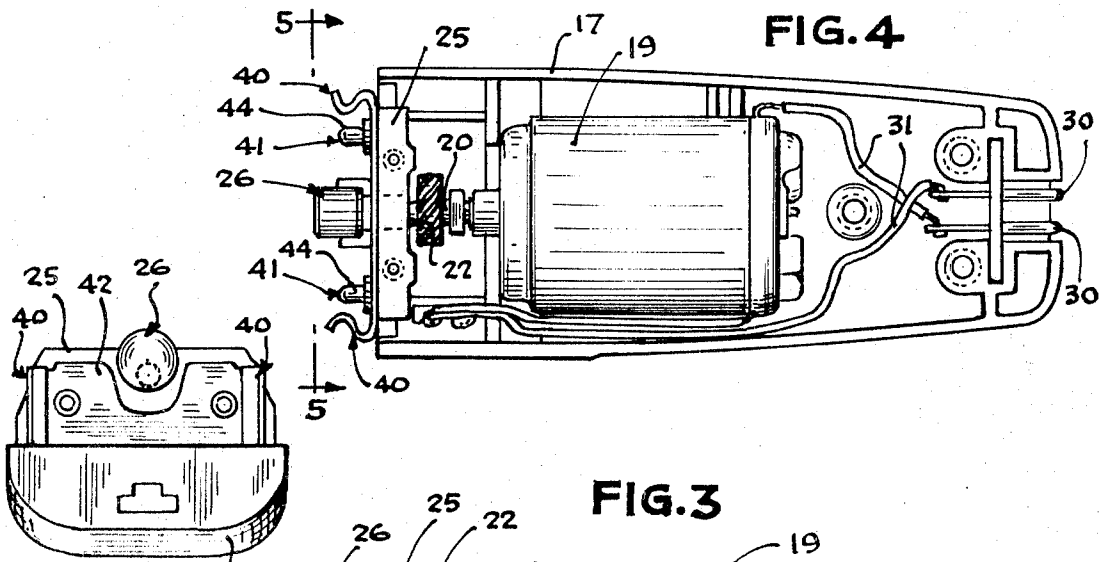
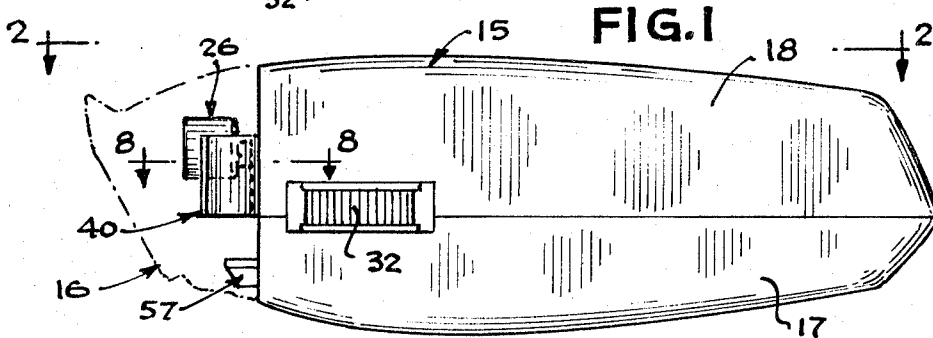
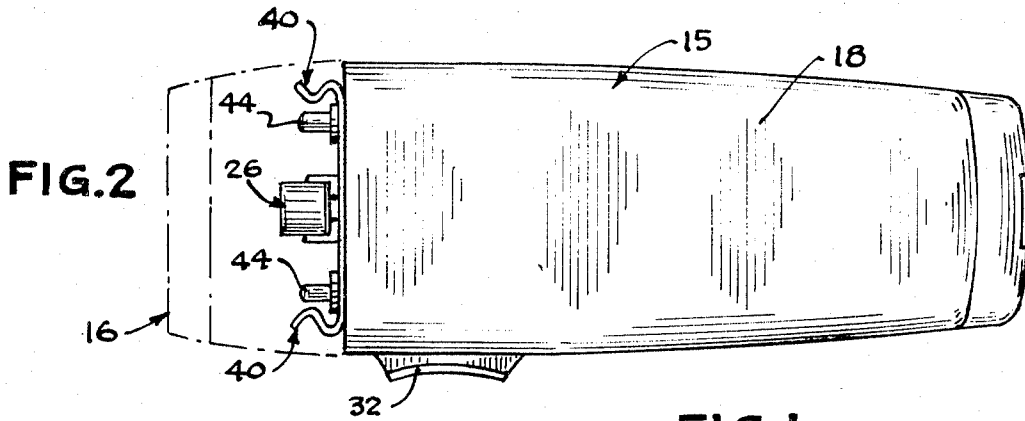
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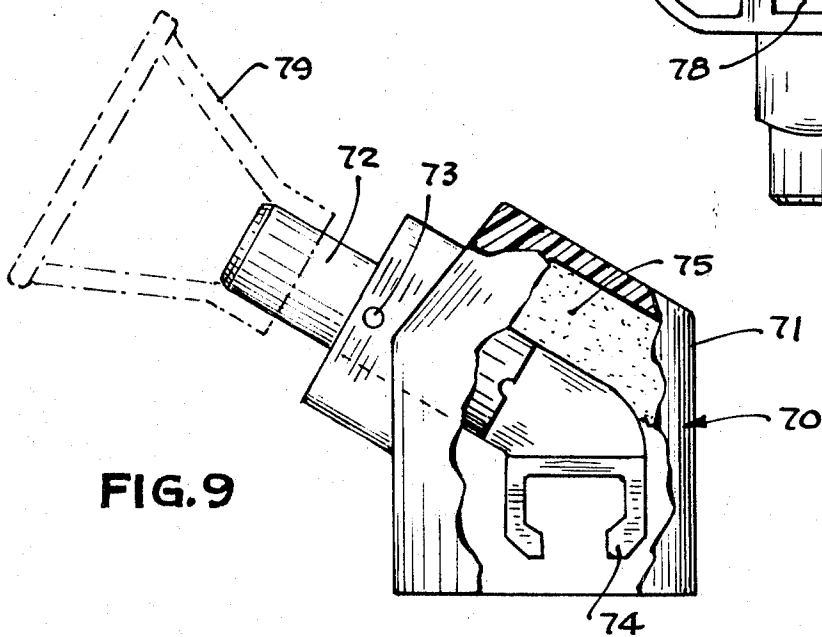
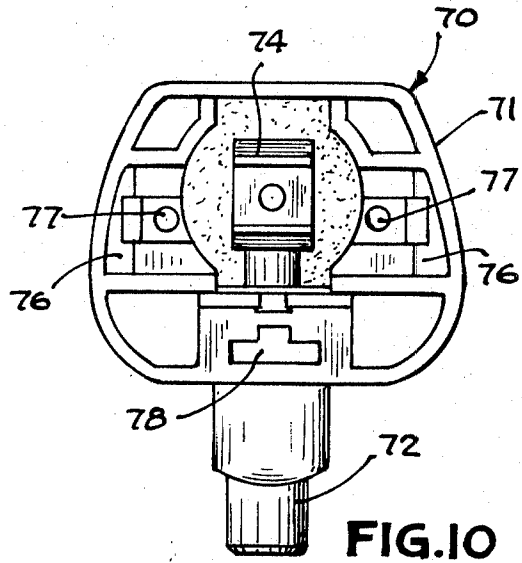
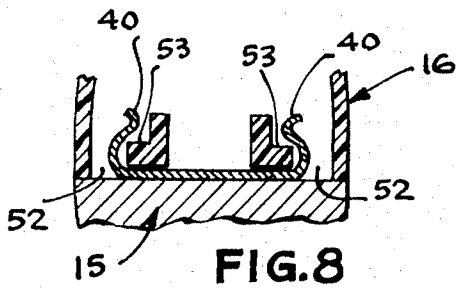
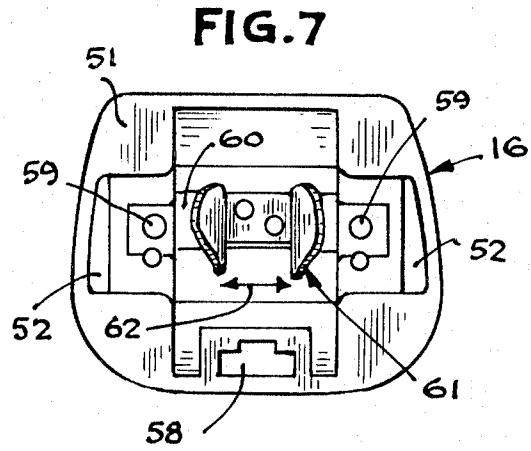
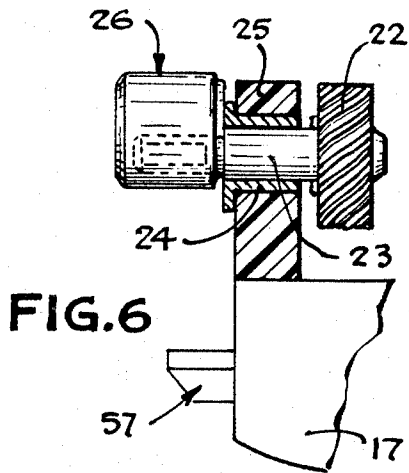
Primary Examiner—Lawrence W. Trapp
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[57] **ABSTRACT**
 The appliance includes a hand-held motor unit with a motor output end for receiving a plurality of interchangeable working tool heads wherein the motor transmits power to the heads for operating same. An eccentric is provided on the output shaft of the motor for engagement with a yoke on a work tool head to convert rotary motion of the motor to reciprocating or oscillating motion. A releasable clip engages with socket means on the heads for attaching and retaining the head in place on the motor unit.

4 Claims, 13 Drawing Figures







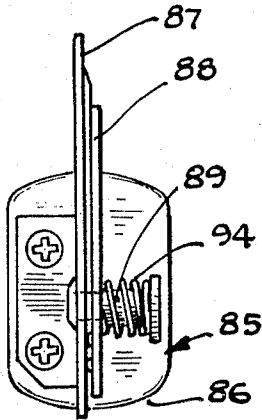


FIG. 12

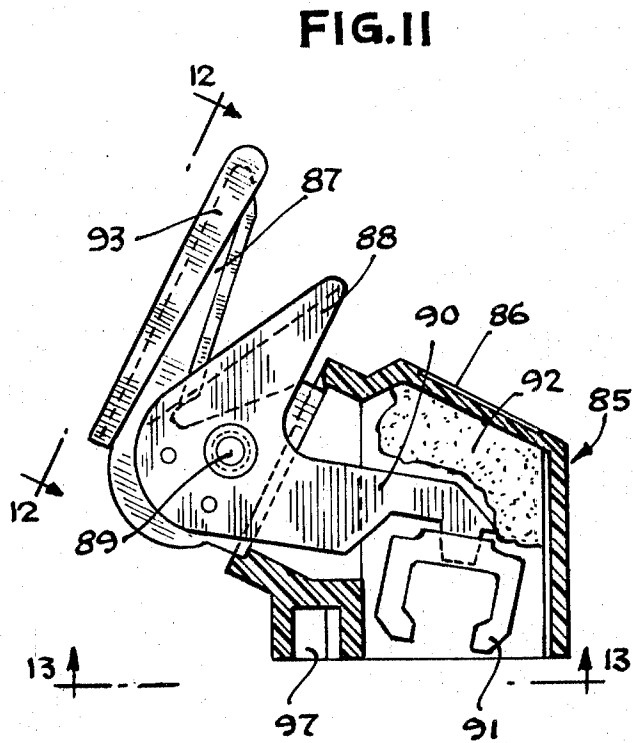


FIG. 11

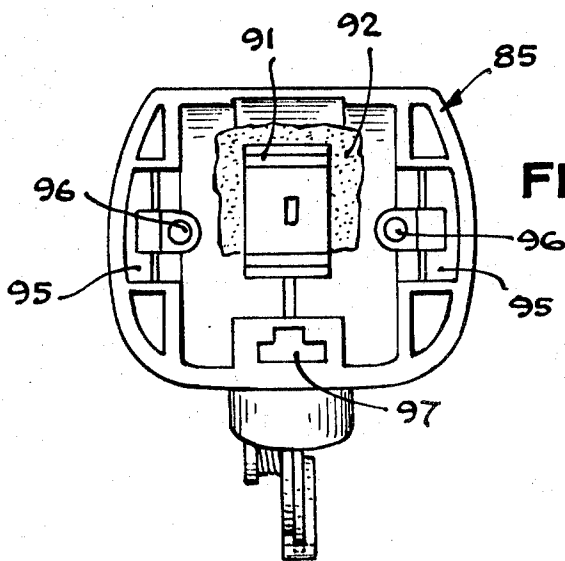


FIG. 13

PORTABLE ELECTRIC APPLIANCE

This invention relates in general to a power driven hand-held appliance and, more particularly, to an appliance including a power unit capable of having a plurality of work tool heads that may be interchangeably attached.

Because of the increasing costs of labor and manufacturing materials, it becomes more necessary to develop an appliance that will accomplish more than one function and be less costly than a plurality of individual appliances. It therefore can be appreciated that economy is enjoyed where a single power unit can be utilized for interchangeably operating a plurality of work tools. It has been known to provide electrical appliances having a power unit with capabilities of selectively attaching thereto a number of different work tool heads, but such appliances have required complex and costly mechanisms for attaching the heads to the power unit.

The present invention solves some of the problems of heretofore developed multi-purpose appliances in providing a simple and inexpensive appliance capable of satisfying a number of functions. More specifically, the appliance of the invention includes a single power unit having a plurality of interchangeable, detachable and selectively usable heads, each of which provide different functions. While the appliance of the invention includes a power unit with interchangeable heads that will provide hair-clipping, body-massaging and material-cutting operations, it should be appreciated that other interchangeable heads providing any suitable function could be employed. A rotary motor is provided in the power unit which coacts with yokes in the work tool heads, where the yokes are connected to movable parts to which it is desired to impart reciprocating or oscillating motion. Thus, the drive coupling between the work tools and the motor converts rotary motion to reciprocating or oscillating motion. A releasable clip and guide means on the power unit coacts with guide means and clip socket means on the work tool heads to enable easy interchanging of work tool heads.

It is, therefore, an object of the present invention to provide a new and improved portable electric appliance having a plurality of work tool heads capable of being driven individually by the power unit and being easily interchanged when desired.

A further object of this invention is in the provision of a new and improved simple and low-cost coupling means for detachably coupling interchangeable work tool heads to a single power unit.

FIG. 1 is a side elevational view of the power unit according to the invention and illustrating in phantom the hair clipper head in attached position;

FIG. 2 is a top plan view of the power unit and illustrating the hair clipper attachment in attached position;

FIG. 3 is a side elevational view of the power unit with the cover removed;

FIG. 4 is a top plan view of the power unit as shown in FIG. 3;

FIG. 5 is an end elevational view of the power unit as shown in FIG. 4 looking at the drive or output end;

FIG. 6 is a fragmentary enlarged detailed view illustrating the eccentric shaft mounting arrangement;

FIG. 7 is a back view of the hair clipper attachment head showing the end that couples to the power unit;

FIG. 8 is a detailed sectional view taken substantially along line 8—8 of FIG. 1 showing only the interaction between the spring clips on the power unit and clip sockets on the hair clipper attachment;

FIG. 9 is a side elevational view of the massager head with some parts broken away to show underlying parts;

FIG. 10 is a back view of the massager head showing the end that couples to the power unit;

FIG. 11 is a side elevational view of the scissors head attachment showing some parts in section for purposes of clarity;

FIG. 12 is an end view of the scissors head looking at the scissors blades and with the guard blade attachment removed; and

FIG. 13 is a back view of the scissors head showing the end coupling to the power unit.

Referring now to the drawings and in particular to FIGS. 1-7, the appliance of the invention includes generally a power unit 15 and a detachable head 16 which is illustrated in FIGS. 1-7 as a hair clipper head. The head is detachable so that a head having a different work tool may be interchanged and powered by the same power unit 15, such as the detachable head shown in FIG. 9 which performs a massage function, and the detachable head shown in FIG. 11 in the form of a scissors for cutting materials. Thus, it is a simple matter to interchange heads and perform various functions with a single power unit thereby providing an appliance for performing plural operations at a lesser cost than a plurality of individual appliances.

The detachable hair clipper head 16 is merely illustrated in phantom, but it will be understood that it includes fixed and movable blades of the usual configuration where the movable blade is powered by the power unit 15. It should be recognized that detachable heads performing functions other than those disclosed could be used and are contemplated within the scope of the invention. For example, the massage head could serve to receive a polishing tool for polishing leather goods, automobiles, or the like. It should be further recognized that the appliance of the invention provides a plurality of motor driven work tools wherein rotary motion generated by the power unit is converted to reciprocating or oscillating motion in the detachable head.

The power unit 15 includes a casing preferably molded of a suitable plastic material having a base 17 and a cover 18 coacting to define a chamber within which a motor 19 is mounted having an output shaft 20. A pinion drive gear 21 is carried on the motor shaft 20 and in meshing engagement with a larger pinion driven gear 22, which is in turn mounted on an eccentric shaft 23. A metal sleeve bearing 24 press fit in a hole formed in the support flange 25 bearingly supports the eccentric shaft 23. The support flange is integrally molded with the casing base. An eccentric drive cam member 26 is mounted on the eccentric shaft 23 whereby rotation of the shaft causes the drive member to move eccentrically relative to the shaft.

Terminal pins 30 connected to the motor 19 through conductors 31 enable a removable plug-in cord assembly to be used for connecting the motor to a source of electrical energy. A slide switch 32 mounted on the side of the casing may be manipulated by the hand to turn the motor on and off.

The interchangeable attachments are detachably mounted on the power unit 15 wherein a pair of spring clips 40 are secured to the support flange 25 by guide

pin studs 41. The spring clips 40 are formed on the opposite ends of a base plate 42 which is secured flush against the support flange 25 in a properly oriented relationship with respect to the eccentric drive cam 26. The stud portion of each guide pin stud extends through the base plate 42 and through the support flange 25 to a seated position defined by a shoulder 43, thereby leaving the guide pin portion 44 protruding from the base plate 42. The inner ends of the guide pin studs are deformed to lock the studs in place wherein the studs thereby take the form of a rivet to fasten the spring clips 40 in place on the support flange 25 of the casing. As seen particularly in FIG. 7, the housing 50 of the clipper head 16 is formed with a junction face 51 that meets with the power output unit 15 and in which is provided spring clip sockets or holes 52 formed with notches or shoulders 53 (FIG. 8) which coact with the spring clips to lock the head 16 onto the power unit as seen in FIG. 8. The spring clip holes 52 are of sufficient size to permit expansion of the spring clips 40 as they are forced into the holes and wherein the spring clips come together to lock on the shoulders 53 when they have seated as shown in FIG. 8. Detachment of the head 16 from the power unit 15 is easily accomplished by separating the head from the power unit which causes spreading of the spring clips 40 so that they ride over the shoulders 53 as the clips are retracted from the holes 52.

To further orient an interchangeable head with respect to the power unit, a tongue 57 is integrally formed on the support flange 25 of the power unit casing which coacts with a tongue opening 58 formed in the housing 50 of the clipper head 16. While the tongue and mating opening are formed to facilitate movement of the tongue into the opening and to provide a coupling that inhibits relative movement between the casing and the housing in any direction except movement of the tongue and housing toward and away from each other, it can be appreciated that the tongue may be otherwise formed. Further, the tongue provides a guiding movement and alignment of the clipper head to the power unit in a similar fashion as the guide pins 41 and pilot pin holes 59 which are formed in the clipper housing 50.

The moveable blade 60 of the clipper head has attached thereto a yoke 61 which coacts with the eccentric cam drive member 26 as a coupling to effectively connect the motor of the power unit to the movable clipper blade. The eccentric cam drive member 26 is sized with respect to the yoke 61, such that it will reciprocate the movable cutter blade 60 in the directions designated by the double-ended arrow 62 during driving of the motor.

A massager head 70 (FIGS. 9 and 10) may be readily mounted on the power unit 15 in place of the clipper head 16 so as to convert the appliance into a massager for facial, scalp or muscle treatment. The massager head 70 includes a housing 71 having mounted therein and extending therefrom a shaft 72 which is pivotally mounted to the housing by means of a pivot pin 73. Within the housing a yoke 74, positioned and suitably connected to the inner end of the shaft 72, is sized to coact with the eccentric 26 whereby driving of the eccentric will cause oscillation of the yoke and shaft 72. The yoke 74 receives and coacts with the eccentric drive cam member 26 when the massager head 70 is attached to the power unit 15, whereby driving the power

unit imparts an oscillating movement to the shaft 72 about the pivot pin 73. In order to dampen movement of the yoke and shaft to reduce noise, a damper pad 75 of a suitable resilient material, such as foam plastic, is mounted within the housing 71 and against which the yoke and shaft are driven when they are oscillated relative the pivot pin 73. As particularly illustrated in FIG. 10, spring clip sockets or holes 76 are provided in the massager head housing 71 to receive the spring clips 40 of the power unit for locking the massager head to the power unit in the same manner that the clipper head 16 coacts with the power unit. Similarly, pilot pin holes 77 and a tongue opening 78 are provided in the massager head housing 71 to respectively receive the guide pins 44 and the tongue 57 of the power unit casing, so that the mounting of the massager head on the power unit is guidably accomplished in order to correctly align the yoke 74 with the eccentric cam drive member 26. A conventional rubber massaging cup 79 is shown mounted on the end of the massager drive shaft 72, but it may be appreciated that any type of massaging tool may be used and easily substituted for the cup 79. This interchangeable head may be attached and detached in the same manner as the clipper head.

Another form of interchangeable head is illustrated in FIGS. 11-13 in the form of a scissors head 85 which may be used to cut materials such as cloth or paper. The scissors head includes a housing 86, one end of which is attached to be mounted on the power unit and the other end of which includes the working end. The scissors includes a fixed blade 87 suitably secured to one end of the housing and having pivotally mounted thereto a movable blade 88 on a pivot shaft 89 extending from the fixed blade. The movable blade 88 includes a drive arm 90 extending within the housing and having mounted on the end thereof a yoke 91. As in the other interchangeable heads, the yoke 91 is sized to coact with the eccentric drive cam member 26, wherein driving of the power unit causes an oscillation of the movable blade 88 about the pivot shaft 89 and a coaction between the stationary and movable blades of the scissors to effect a cutting action on any material entering the cutting bite. A resilient damper pad 92, similar to pad 75, is mounted within the housing 86 to dampen movement of the movable blade arm 90 and to reduce noise in the same manner as already described in connection with the massager head 70. When using the scissors on material lying on a flat surface, in order to prevent marring of the surface, a guard 93 of a suitable soft material such as nylon or the like is mounted on the fixed blade 87. As seen particularly in FIG. 12, a coil spring 94 is provided on the pivot shaft 89 in order to bias the movable blade 88 against the fixed blade 87 so that the cutting edges are mounted in cutting engagement during operation of the scissors.

Similarly, with respect to the clipper attachment 16 and the massager attachment 70, the scissors attachment housing 86 is provided with spring clip sockets or openings 95 coacting with the spring clips 40 of the power unit, pilot pin holes 96 coacting with the guide pins 44 of the power unit and a tongue opening 97 coacting with the tongue 56 of the power unit, in order to guide attachment of the scissors head to the power unit and to assure interaction between the yoke 91 and the eccentric cam drive member 26. Thus, the scissors head 85 may likewise be easily attached or detached from the power unit 15 as desired.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention, but it is understood that this application is to be limited only by the scope of the appended claims.

I claim:

1. A portable electric appliance comprising a power unit adapted to receive interchangeable heads and a detachable head, said power unit including a motor mounted in a casing rotationally driving an eccentric, orientation means extending from the casing in the form of guide pins for orienting the head relative the unit, and releasable coupling means carried by the casing in the form of spring clips for detachably securing the head to the power unit, said detachable head including a housing, said housing including guide holes for receiving said pins and sockets coacting with said clips, a work tool mounted on the housing for move-

ment relative the housing, yoke means within the housing connected to the work tool and coacting with the eccentric to transmit power to the work tool.

2. A portable electric appliance as defined in claim 1, wherein the work tool of said detachable head includes a massaging member attached to a pivotable shaft carried by the housing, and said yoke means being mounted on the shaft, whereby oscillating motion is applied to the shaft.

3. A portable electric appliance as defined in claim 2, wherein dampening means is provided in the housing between the housing and yoke to dampen movement of the yoke and shaft and thereby reduce noise.

4. A portable electric appliance as defined in claim 3, wherein said dampening means includes a resilient pad.

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