April 27, 1954 O. S. HERSHEY 2,676,347

POWER-OPERATED SCALP BRUSH

Filed March 2, 1949

2 Sheets-Sheet 1

Fig. 1.

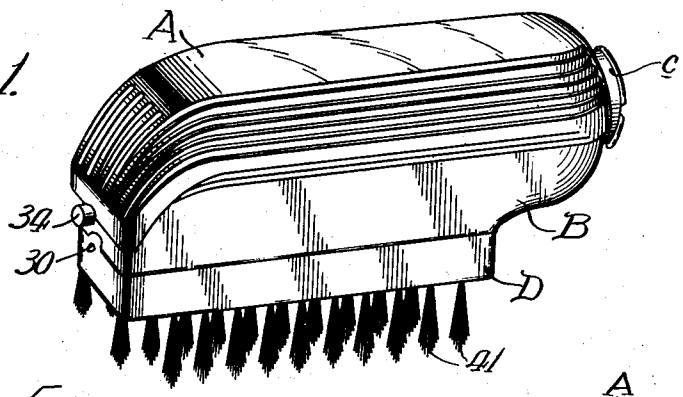
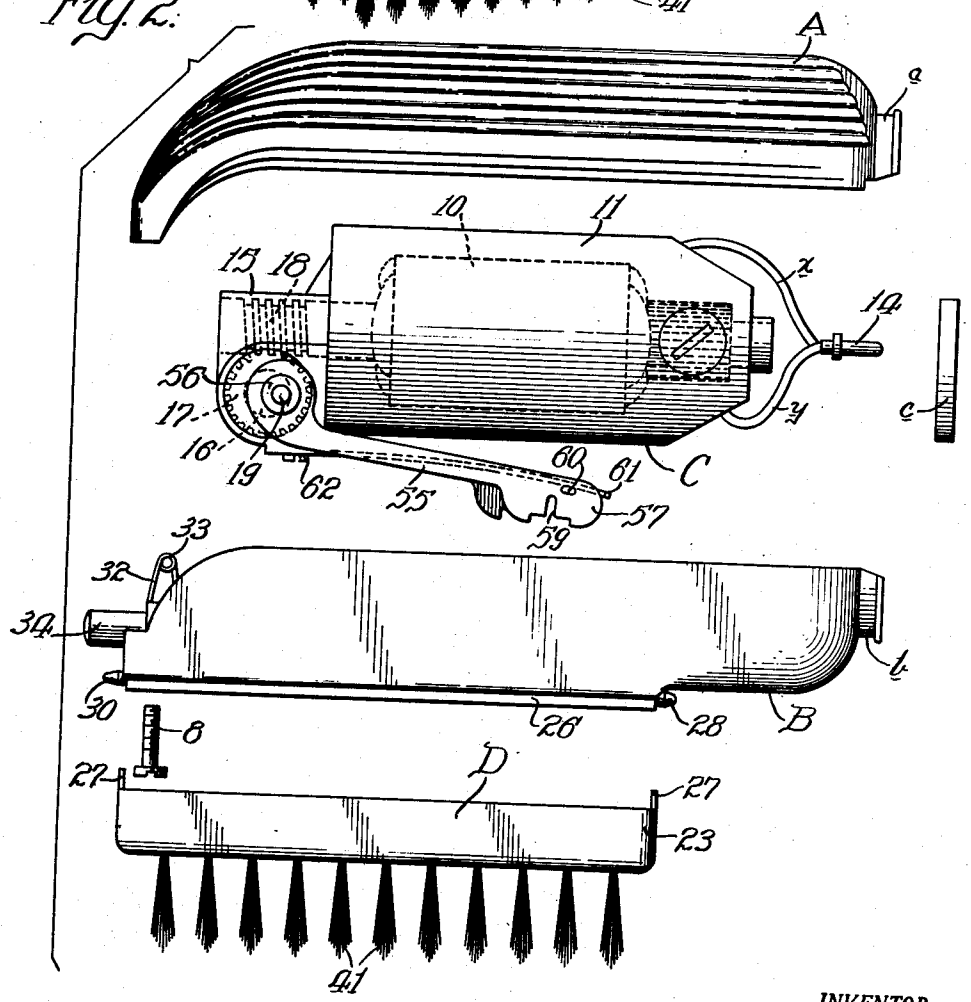


Fig. 2.



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Fig. 3.

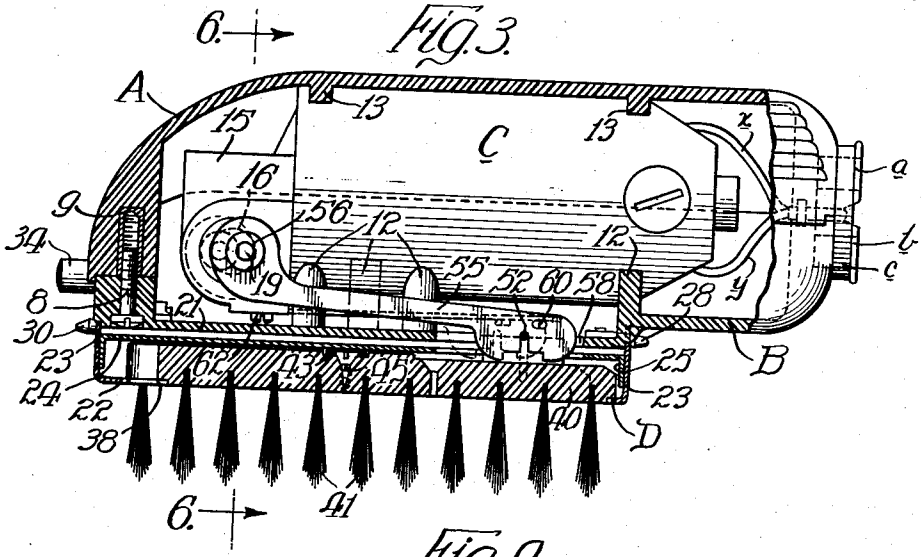


Fig. 4.

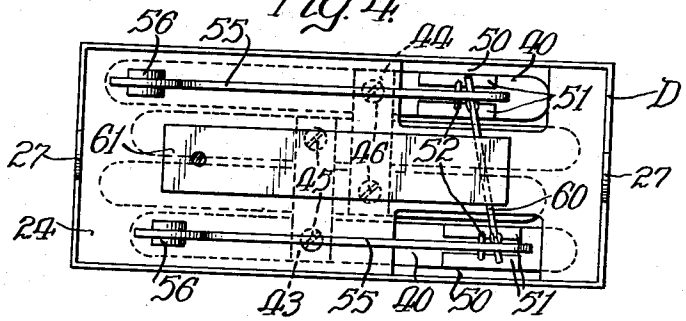


Fig. 5.

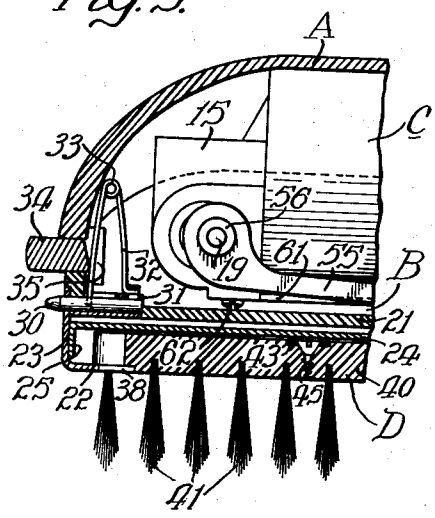
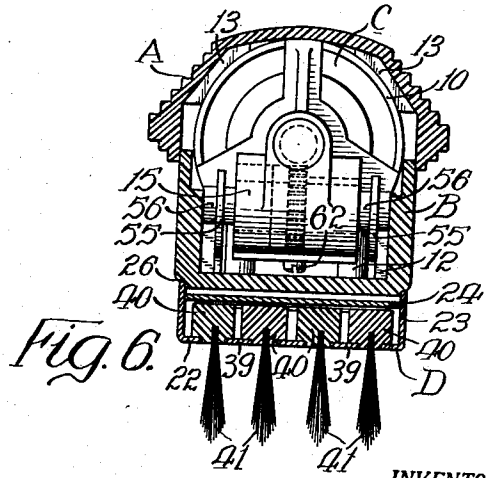


Fig. 6.



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POWER-OPERATED SCALP BRUSH

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8 Claims. (Cl. 15—22)

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This invention relates to a brush incorporating in a unitary structure an electrically driven motor, a brush head, and a transmission extending between the motor and brush head for operation of the latter, the brush head being removable from the motor and the transmission being freely separable either from the motor or from the brush head to permit of ready separation of one from the other. In the illustrated construction, the brush is designed particularly for use on the scalp where special considerations apply.

A brush of this character must be light and compact so as to be easily handled in use. It is desirable also that the brush utilize a plurality of bars movable back and forth through a fixed path and each mounting a series of tufts, and that means be provided in the transmission for converting rotary movement of the motor to back and forth movements of the brush bars. Such a movement, whether in a straight or curved path, is hereinafter referred to as "reciprocating." It is furthermore important that the brush head wherein the bars are mounted be readily removable from the remainder of the structure, and that the driving connection for the brush bars also be freely separable. In use, the brush head should from time to time be cleaned and sterilized, hence the need for its facile removability.

The present brush meets all these special requirements very effectively. It embodies a minimum of working parts all of which are enclosed within a housing which is of compact size and convenient shape to be held in the hand during use. This housing comprises two elongated parts which are held fixedly together at one end and adjustably at the other end, the motor unit being clamped firmly in place therebetween upon certain supports which are therein provided. Because of the ease with which the housing may be opened up, access to the motor unit and the parts of the transmission connected therewith may be readily gained.

An instrument which embodies my invention in a preferred form is illustrated in the accompanying drawings in the manner following:

Figure 1 is a view in perspective of the brush implement;

Fig. 2 is an exploded view in elevation of the principal components of the brush implement which are shown in disassembled relation;

Fig. 3 is a longitudinal vertical section through the brush implement in an off-center plane;

Fig. 4 is a top plan view of the brush head with

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the reciprocable operating arms therefor added thereto;

Fig. 5 is a fragmentary vertical section, taken centrally through one end portion of the brush implement; and

Fig. 6 is a transverse section therethrough, taken on line 6—6 of Fig. 3.

As indicated most clearly in Figs. 1 and 2, the power-operated brush of this invention is characterized by a handle-casing of two complementary parts A and B, one superposed on the other and both extending for the full length of the implement to provide a protecting enclosure for a motor unit C therewithin, and exteriorly thereof on its under face a base for attachment thereto of a brush head D. Extending from the casing parts A and B at one end thereof are complementary necks *a* and *b*, each extending through about 180°, adapted to receive thereon a collar *c* whereby to secure the two casing parts together at this point. At the opposite end corner fillets are provided internally of the two casing parts, and coaxial openings are provided therethrough each to receive a screw 8 when entered from the bottom of the lower casing part B, the threaded shank of each screw being engageable with a sleeve 9 which is anchored in the other casing part A. By some such means, I provide for holding together in unitary relation the two casing parts which may advantageously be molded from any suitable plastic material.

The motor unit comprises an electric motor 10 enclosed within a cylindrical housing 11 which is fitted closely between the side walls of the handle casing upon a plurality of supports 12 forming a seat therefor. These supports which are provided interiorly of the lower casing B are supplemented by webs 13 carried by the upper casing part A. Wire connections *x* and *y* in the motor circuit are extended to posts 14 which are fixedly held between end walls of the casing parts A and B to project into the space defined by the necks *a* and *b* where they may be engaged by a plug (not shown) in connection with a current source. The cylindrical wall enclosing the motor is provided at opposite ends with shaft supporting bearings from one of which is extended a housing 15 wherein a cross shaft 16 mounting a worm wheel 17 in engagement with a worm 18 that is formed on the motor shaft (see Fig. 2). At opposite ends of the cross shaft are crank pins 19 extendsd outwardly at widely spaced points, preferably 180° apart.

The brush head D which is releasably affixed to the lower casing part B lies adjacent its bot-

tom wall 21 which provides a base therefor. This head may comprise a casing of stainless steel or the like having an elongated under wall 22 with an enclosing wall 23 upstanding from its periphery on all four sides, and a top wall 24 with depending marginal flanges 25 at its two ends which interfit with the enclosing wall 23. Any suitable means, such as an instruck ear-slot interlock (not shown), may be utilized to hold the top wall fixedly in place. The marginal edges of the enclosing wall 23 abut the base wall 21 of the lower casing part B where an inset 26 is provided (see Figs. 2 and 6) to center the brush head relative to the handle-casing. At opposite ends of the brush head are upstanding apertured ears 27, one to receive a fixed locking pin 28 that is anchored to the lower casing part B adjacent an inset in its base wall 21, and the other a complementary locking pin 30 that is axially movable in a guideway provided by a fitting 31 that is affixed to the same base wall. The movable pin 30 is in connection with the free end of a wire spring 32 which extends upwardly, thence through a coil 33, and thence downwardly to be anchored at its opposite end to the fitting 31. A push button 34 having a head with a diametric slot 35 to receive the outer spring leg, is slidingly mounted at the proximate end of the handle-casing so as to present its exposed end exteriorly thereof. When finger-pressed inwardly against the tension of the spring, the locking pin 30 will be concurrently retracted, thereby freeing the brush head D for removal from the implement; when the pressure is released, the locking pin will advance outwardly again to the extent permitted by engagement of its head with the proximate end wall of the handle casing.

The exposed under wall 22 of the brush head is provided with a plurality of parallel slots 38 extending for nearly the full length thereof, the intervening strips 39 (see Fig. 6) supporting between them a like number of bars 40 of which four are indicated. From each bar are depended aligned tufts of bristles 41 constituting the brush elements of the implement. Each bar which is desirably formed of a plastic material is inset along opposite sides adjacent its bottom so as to present the central part of its body between the two strips 39 which support it, thereby providing a means for guiding the bar for reciprocable movements in a straight path.

As herein shown, each pair of alternate bars is interconnected for concurrent movement, and for this purpose I may employ a pair of cross plates 43 and 44 (see Fig. 4) which are arranged over the tops of the cross bars, the first plate 43 being connected as by screws 45 with the first and third bars and the second plate 44 by screws 46 with the second and fourth bars. These cross plates may be countersunk in recesses formed in the tops of the bars so as to assure rigidity in their connection therewith. If this is done, however, the upper surface of the center bars must be cut away to provide clearance for the cross plates. By some such means as this the several bars are so joined as to provide for concurrent reciprocatory movements of those which are alternately disposed lengthwise of the brush head.

The top wall 24 of the brush head in one end region thereof is formed with a pair of elongated slots 50, one opposite each outer brush bar 40 (see Fig. 4). Rising from each of these outer bars is a pair of spaced side-by-side lugs 51 which support between them the cross wire 52 of a staple whose two legs are extended into the bar for

anchorage therewithin. The length and location of each slot 50 is such that the lugs 51 projected upwardly therethrough are free to reciprocate therein when impelled to do so, as will shortly be explained, thereby producing a like motion of the associated outer brush bar 40 and the second removed bar in operative connection therewith.

The transmission by which the motor unit acts to reciprocate the brush bars remains now to be considered. This comprises a pair of like links 55 arranged in parallel spaced relation below the motor unit C, lengthwise thereof, and oppositely with respect to the vertical plane which intersects its axis. Each link at one end is extended upwardly to support a bushing 56 of bronze or the like wherein is received one of the crank pins 19, and at its opposite end is formed with a head 57 adapted to depend through on elongated slot 58 in the casing wall 21, opposite one of the slots 50 in the top wall 24, the head 57 being formed with a slot 59 open at its lower end to receive therein the cross wire 52 which upstands from the proximate brush bar top. If the two crank pins 19 be located 180° apart, then the links 55, together with the brush bars connected thereto, will always occupy opposite positions. To assure maintenance of operative connections with the brush bars the two links 55 are interconnected by a cross pin 60 which is extended loosely through holes in their heads 57, the cross pin being confined against endwise movement by the proximate side walls of the lower casing part B, and by a leaf spring 61 whose free end is rested upon the cross pin 60 to exert thereupon a downward pressure which is transmitted also to the free ends of the two links which support this pin. The spring 61 which is extended lengthwise of the motor unit to its underside is anchored thereto as by a screw 62 which is entered into the gear housing 15 from below.

The brush mechanism of this invention provides a transmission from the motor unit to the several brush bars such that the operative connection therewith is free to be disestablished whenever the brush head D is removed. This comes about through the ready disconnection of the two links 55 from the cross wires 52 of the brush bars. When the brush head D is to be replaced, these links are repositioned with their slots 59 in engagement with the cross wires, and the brush head is then advanced to its final position where it is secured in place by the two pins 28 and 30. When so disposed, the spring 61 exerts a continuing pressure on the cross pin 60 so as to maintain the operative connection of each link with its associated brush bar.

The term "brush" as employed herein has a broad meaning since the present invention may be utilized in constructions which differ widely from each other. A scalp brush is one example. There are various specialized uses for which the brush may be designed. Other places of use are surfaces of wood, metal, compositions, etc. which require treatment by a scraping, smoothing, or polishing operation. For example, a wooden floor may be advantageously scraped or smoothed or polished by the present implement, provided that its operating head be equipped with a suitable working face, such as bristles, pads, etc. Rugs, fabrics, upholstery, furs, hides, etc. are other examples.

I claim:

1. A power-operated brush for scalps and the like wherein is combined with a casing enclosing a motor and exteriorly thereof a pair of side-

by-side reciprocable brush bars carried in a head which is removably affixed to the casing, a transmission driven by the motor comprising a gear mechanism, a pair of eccentric pins rotated thereby about a common axis at points spaced widely apart, a pair of links connected to the pins, a freely separable connection between each link and one brush bar, and a spring exerting a yielding pressure against the two links to maintain the same in operative connection with the brush bars.

2. A power-operated brush according to claim 1 wherein means loosely interconnect the two links and are engaged by the spring to transmit its yielding pressure thereto.

3. A motor-driven brush for scalps and the like comprising a two-part casing with means for securing the casing parts together, a motor fixedly mounted in the casing, a brush head with means for securing it releasably to a wall of one of the casing parts, a pair of interconnected brush bars reciprocably mounted in the head and having bristles extending therefrom, and a transmission between the motor and one brush bar arranged to convert rotary movements of the one into reciprocations of the other, the transmission extending in part lengthwise of the casing between the motor and the casing wall to which the brush head is affixed and including means extending through an opening in said casing wall in freely separable driving connection with one of the brush bars.

4. A motor-driven brush for scalps and the like comprising a motor unit, an elongated casing of two superposed parts enclosing the motor unit and adapted to be manually held, said casing parts having complementary necks extending therefrom at one end, a collar engaging said necks for securing the casing parts together at said one end, screw means adjustably connecting the two casing parts at the other end arranged to clamp the motor unit fixedly therewithin, a brush head removably affixed to one casing part exteriorly thereof, a brush bar reciprocably mounted in the brush head and having a plurality of tufts of bristles depending therefrom, and a transmission between the motor and the brush bar arranged to convert rotary movements of the one to reciprocations of the other.

5. A motor-driven brush for scalps and the like comprising a two-part elongated casing with means for securing the casing parts together, a motor fixedly mounted longitudinally within the casing, a brush head with means for securing it releasably to a longitudinal wall of one of the casing parts, at least one pair of interconnected brush bars reciprocably mounted in the head, and a transmission interconnecting the forward end of the motor and one brush bar of each pair of brush bars arranged to convert rotary movements of the one into reciprocations of the other, the transmission extending rearwardly and lengthwise of the casing between the motor and the casing wall to which the brush head is affixed and including means extending through an opening in said casing wall in freely separable driving connection with one of the brush bars of each pair of brush bars.

6. A power-operated brush for scalps and the like comprising, in combination, an elongated casing, a motor within the casing having its longitudinal axis lengthwise thereof, a link extending lengthwise of the motor and adjacent thereto within the casing, a driving connection between the motor and one end of the link arranged to convert rotary movements of the one to reciprocations of the other, a brush head releasably affixed to the motor casing exteriorly thereof, a brush bar reciprocably carried in the brush head, a freely separable connection between the link free end and the brush bar for reciprocating the latter, a second link extended lengthwise of the motor and adjacent thereto within the casing, a second brush bar reciprocably carried in the brush head, the driving connection being extended also between the motor and one end of the second link for reciprocating the latter oppositely with respect to the first link, a freely separable connection provided between the free end of the second link and the brush bar for reciprocating the latter, and a spring means for normally maintaining an operative connection between the free ends of the two links and the brush bars associated therewith.

7. A power-operated brush for scalps and the like wherein is combined with a casing enclosing a motor and exteriorly thereof a brush bar reciprocable in a direction parallel with the longitudinal motor axis, a brush head wherein is mounted the brush bar, said brush head being removably affixed to the casing, a transmission comprising a worm coaxial with the motor shaft, a worm wheel driven thereby about an axis which is transversely of the motor shaft, a crank pin connected with the worm wheel exteriorly thereof to be driven thereby, and a link in a plane parallel with the vertical plane passing through the central longitudinal axis of the motor adjacent the motor and lengthwise thereof, interconnecting the crank pin and the brush bar in the brush head to reciprocate the brush bar, the connection between the link and the brush bar being freely separable whereby to avoid interference with removal of the brush head.

8. A power-operated brush according to claim 7 wherein the connection between the link and brush bar includes a cross pin on the one engaging an open slot on the other, and a spring urges the link toward the brush bar to maintain continuance of the cross pin and slot connection.

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