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BRUSH CLEANING DEVICES

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This invention relates to cleaning devices and more particularly to devices for cleaning brushes.

An object of the invention is to provide a new and improved cleaning device having a pair of shafts provided with radially extending spaced meshing teeth for combing through the bristles of a brush to remove hair or other extraneous matter from the bristles.

Another object is to provide a cleaning device for brushes or the like having a pair of shafts rotatable in opposite directions provided with spaced meshing teeth for stripping hair and other extraneous matter from the bristles of a brush inserted between the teeth and having stripper teeth for stripping hair or other extraneous material from between the cleaning teeth to prevent clogging of the cleaner teeth with such extraneous matter.

Still another object is to provide a cleaning device having stripper teeth for automatically removing hair or other extraneous matter which extend to a shaft provided with radially extending cleaner teeth to strip extraneous matter such as hair from the cleaner teeth and the shaft.

A further object is to provide a cleaning device for hair brushes or the like having a pair of parallel shafts, provided with radially extending spaced meshing teeth, which are removably mounted in a housing provided with an aperture through which brushes or the like may be inserted between the meshing teeth as the shafts rotate in opposite directions.

A still further object is to provide a device for cleaning hair brushes or the like having a pair of parallel shafts provided with radially extending spaced meshing teeth which are simultaneously driven by an electric motor having means for de-energizing the motor upon the jamming or overloading of the cleaner device.

Another object of the invention is to provide a cleaning device for hair brushes and the like which is of simple economical construction and wherein the operative parts thereof are easily removable from the housing in which they are mounted for cleaning or repair.

Additional objects and advantages of the invention will be readily apparent from the reading of the following description of a device constructed in accordance with the invention, and reference to the accompanying drawings thereof, wherein:

FIGURE 1 is a perspective view of the cleaning device embodying the invention;

FIGURE 2 is a top view, with some parts broken away and other parts shown in section, of the cleaning device of FIGURE 1;

FIGURE 3 is a sectional view taken on line 3—3 of FIGURE 2;

FIGURE 4 is an end view taken on line 4—4 of FIGURE 2 with some portions broken away;

FIGURE 5 is a fragmentary sectional view taken on line 5—5 of FIGURE 2; and

FIG. 6 is a fragmentary sectional view taken on line 6—6 of FIG. 2.

Referring now to the drawings, the cleaning device 10 includes a housing 11 having a central substantially rectangular motor housing section 12. The motor housing section includes a bottom wall 13, side walls 14 and 15 and end walls 16 and 17. An electric motor 18 is rigidly secured to the bottom wall 13 of the motor housing section by any suitable means, such as bolts 20. The housing 11 has an arcuate upwardly open brush cleaner section 22 which includes an upwardly opening arcuate shell or

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wall 24, one of whose ends is integral with the end wall 16 of the motor housing section 12 and whose other end is closed by an end wall 25. A comb cleaner housing section 27 extends longitudinally outwardly from the end wall 17 of the motor housing section 12 and includes an upwardly opening arcuate shell 28 one of whose ends is integral with the end wall 17 and whose other end is closed by an end wall 30. The housing sections 12, 22 and 27 may be formed of a single integral piece which may be of cast construction if desired.

A cover 35 may be pivotally secured to the housing 11 by means of a piano hinge 36 and includes a top wall 36 provided with a continuous peripheral dependent flange 37. The cover may be held in its closed position by any suitable means, such as the latches 38. The piano hinge 36 extends along the upper edge of the hair cleaner housing section 22 and the motor housing section 12 since the comb cleaner housing section 27 is of lesser width. The cover is also provided with a pair of intermediate transverse flanges 40 and 41 which overlie the end walls 16 and 17 of the motor housing section. The end sections 37a and 37b of the dependent peripheral flange of the cover 35 overlie the end walls 25 and 30 of the brush cleaner section and the comb cleaner section, respectively.

The end wall 16 is provided with a pair of upwardly opening arcuate recesses 44 and 45 which are aligned with similar downwardly opening arcuate recesses 46 and 47 in the transverse flange 40 of the cover whereby these two pair of recesses form annular apertures when the cover is closed in which are received the sleeve bearings 50 and 51. The sleeve bearings have laterally outwardly extending end flanges 52 which abut opposite vertical surfaces of the end wall 16 and the transverse flange 40 to retain the sleeve bearings in position. The gear shafts 53 and 54 extend rotatably through the bearings and are provided with gear teeth 55 and 56 which mesh with one another so that rotation of the gear shaft 53 in a clockwise direction will cause simultaneous rotation of the gear shaft 54 in a counter-clockwise direction. The gear shaft 53 is also provided with a gear 57 which meshes with a gear 58 rigidly secured to one end of the drive shaft 60 of the electric motor 18. It will thus be apparent that energization of the motor 18 will cause simultaneous rotation of the gear shafts 53 and 54.

The ends of the shafts 53 and 54 are provided with square or non-circular recesses into which extend the ends 63 and 64, of similar non-circular configuration, of the brush cleaner shafts 65 and 66, respectively. Spring loaded detent means 67 and 68 detachably secure the brush cleaner shafts to the gear shafts. The detent means may include a spring 69 received in suitable transverse bores of the gear shafts which are biased towards the non-circular ends of the brush cleaner shafts 65 and 66 into suitable recesses provided in the non-circular ends thereof.

The end wall 25 of the brush cleaner housing section 22 is provided with a pair of upwardly opening arcuate recesses 70 and 71 in which are receivable the opposite ends of the brush cleaner shafts 65 and 66, respectively. The end section 37a of the peripheral flange of the cover 35 is provided with similar corresponding downwardly opening recesses 72 and 73 alignable with the recesses 70 and 71, respectively, to hold the shafts against vertical movement when the cover is in closed position.

It will thus be apparent that when the cover is moved to its open position, the brush cleaner shafts 65 and 66 may be tilted slightly upwardly at the ends remote from the end wall 16 of the motor housing section 12 and pulled therefrom to remove the shafts for cleaning, inspection or repairs, the detent means permitting such outward movement of the shafts from the non-circular recesses in the gear shafts 53 and 54. The non-circular

ends 63 and 64 of the shafts are slightly smaller in dimensions than the recesses to permit such slight tilting or movement of the shafts necessary to clear the end wall 25 of the brush cleaner housing section 22.

The recesses 45 and 47 in the end wall 16 and the transverse flange 40, respectively, are elongated horizontally toward the wall 15 of the motor housing section to permit lateral outward movement of the bearing sleeve 51 and therefore the gear shaft 54. The bearing sleeve is biased inwardly by a spring 75 which bears against a micro switch 77 disposed in the recess 45. The micro switch 77 is normally closed but when laterally outwardly acting forces are exerted on the gear shaft 54, which moves the gear shaft 54 laterally outwardly, the micro switch 77 opens to de-energize the electric motor 18.

The end of the hair brush cleaner shaft 66 opposite the end 64 thereof may be also moved laterally outwardly since the arcuate recesses 71 and 73 have lateral outward extensions in which is disposed a spring 82 which biases a follower block 83 having a concave surface abutting the shaft 66 to hold the shaft 66 in parallelism with the shaft 65. The shaft 66 is thus biased horizontally toward the shaft 65 along its complete length by the springs 82 and 75.

The shaft 65 is provided with sets of teeth 90 which are longitudinally spaced along the length of the shaft. Each set of teeth comprises four teeth extending radially outwardly of the shaft and disposed in a plane normal to the longitudinal axis of the shaft. The shaft 66 is provided with similar sets of teeth 91 which are also spaced longitudinally along the shaft 66 but are disposed between the sets of the teeth 90 on the shaft 65. The teeth 90 and 91 are of such lengths so that the teeth of each shaft extend past and between the teeth of the other shaft in spaced meshing relation therewith so that the cleaner teeth 90 and 91 will tend to brush or clean the bristles of a brush which are interposed between the two shafts through the opening 94 of the cover 35.

A pair of sliding doors 97 and 98 which close the aperture 94 are adapted to slide outwardly on inwardly extending flanges 100 and 101 rigidly secured in any suitable manner, as by welds, to the transverse flange 40 of the cover and on the slides 102 and 103 rigidly secured to the end section 37a of the dependent flange of the cover 35. The doors 97 and 98 may be provided with handles 105 and 106, respectively, by means of which they may be slid laterally outwardly.

The arcuate shell wall 28 of the brush cleaner housing section 22 is provided with two sets of stripper teeth 105 and 106 which extend angularly upwardly toward the shafts 65 and 66, respectively, the forward pointed edges of the teeth extending past the central longitudinal axes of the shafts and abutting the shafts. A stripper tooth 105 extends between adjacent sets of teeth 90 of the shaft 65 and a stripper tooth 106 extends between adjacent sets of cleaner teeth 91 of the shaft 66. It will thus be apparent that the stripper teeth 105 and 106 at all times provide for the cleaning of the cleaner teeth and of the shafts 65 and 66 from hair or other material which might otherwise tend to clog the cleaner teeth or wind about the shafts thus reducing the efficiency of operation of the cleaning device. The teeth 105 are integral with a longitudinal support strip 110 which is rigidly secured to the shell 24 by rivets or in any suitable manner and the teeth 106 are integral with a support strip 111 similarly secured to the shell 24. The cleaner and stripper teeth may be formed of any suitable substance, such as nylon, which is easily cleaned but which is of relatively great strength.

The motor 18 is energized through the serially connected micro switch 77 and the manually operable switch 113 secured to the wall 15 of the motor housing. A motor speed control 116 of the rheostat type may also be connected in series relation with the switches in order to vary the speed of rotation of the shaft 60 of the motor. It will be apparent that since the micro switch and the manual

switch are connected in series with the motor 18, opening of either of the switches will result in the de-energization of the motor 18. If an object becomes lodged between the teeth of the shafts 65 and 66, the rotation of the teeth will tend to force such object between the shafts and thus exert laterally outwardly directed forces on the shafts. Since the shaft 66 is free to move laterally outwardly it will move in this direction causing the micro switch 77 to open and stop operation of the motor 18. As a result, the motor 18 is never overloaded and the cleaner device is protected against breakage or damage due to overloads.

The end of the drive shaft 60 adjacent the end wall 17 is provided with a connector fitting 120 which telescopes over the drive shaft and is rigidly secured thereto in any suitable manner as by a set screw 121. One end of the shaft 122 of the brush 125 telescopes into the other end of the connector fitting and is rigidly secured thereto in any suitable manner, as by a set screw 126. The connector fitting extends through aligned arcuate recess 127 in the transverse flange 41 of the cover 35 and the arcuate recess 128 of the end wall 17. The opposite end of the shaft 122 is supported in similar arcuate recesses 130 of the wall 30 and the arcuate recess 131 of the end section 37b of the cover.

The cover is provided with a longitudinal slot 140 which communicates with an angularly extending slot 142 in the end section 37b of the peripheral dependent flange 37 of the cover 35 whereby a comb may be inserted through the slots 140 and 142 into engagement with the bristles of the brush 125 when the motor is rotating to clean the comb. It will be apparent that when the cover is in open position, the brush 125 may easily be removed for inspection, cleaning or replacement by unscrewing the set screw 126.

It will now be seen that a new and improved device for cleaning brushes, combs and the like has been illustrated and described which includes a supporting structure or housing having a pair of parallel shafts 65 and 66 provided with meshing cleaner teeth and a means for rotating the shafts in opposite directions whereby when the bristles of a brush are inserted between the shafts, the spaced meshing teeth comb through the bristles and remove any extraneous matter, such as hair, from the brush bristles.

It will further be seen that stripper teeth 90 and 91 extend between adjacent longitudinally spaced sets of teeth of each shaft to a point past the longitudinal central axis of the shaft.

It will further be seen that the shafts are removably secured in the housing above the stripper teeth whereby the cleaner shafts may be easily removed to permit their inspection, cleaning or replacement and whereby the stripper teeth may be easily cleaned.

It will further be seen that the cleaner shafts 65 and 66 are connected by suitable gear means to one end of the shafts of an electric motor and that the other end of the motor shaft is connected to a brush disposed below a slot in the cover whereby a comb inserted through said slot is engaged by the bristles of the brush and cleaned thereby.

It will further be seen that one of the cleaner shafts is mounted for limited lateral outward movement from the other shaft and that a switch means mounted in the housing is actuated to de-energize the electric motor upon the insertion of any articles between the cleaner shafts to cause such lateral outward movement of the shaft which would otherwise subject the shafts and the motor to an overload.

It will further be seen that a new and improved cleaning device of simple, economical construction has been illustrated and described whose operative elements are easily removable for inspection, repair or cleaning.

The foregoing description of the invention is explanatory only, and changes in the details of the construction

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illustrated may be made by those skilled in the art, within the scope of the appended claims, without departing from the spirit of the invention.

What is claimed and desired to be secured by Letters Patent is:

1. A cleaning device including: a housing; a pair of parallel spaced shafts rotatably mounted in said housing; means for rotating said shafts in opposite directions, each of said shafts being provided with longitudinally spaced sets of radially extending rigid cleaner fingers, the fingers of one shaft extending between the fingers of the other shaft as the shaft rotates, said housing have an aperture disposed above said shafts whereby the bristles of a brush may be inserted into the housing to be engaged by the cleaner teeth of said shafts; and a plurality of stripper teeth extending convergently upward toward said shafts and between adjacent sets of cleaner fingers of each shaft to strip the shaft and the fingers of extraneous matter which may be lodged thereon, said stripper teeth having pointed free ends extending past the central longitudinal axes of the shafts and engaging the shafts, said housing having walls provided with arcuate upwardly opening recesses, said shafts extending into said recesses to be supported therein, said housing having a cover engageable with said side walls and overlying said re-

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cesses for preventing displacement of the shafts from said recesses of the housing when the cover is in closed position.

2. A cleaning device including: a housing; a pair of parallel spaced shafts rotatably mounted in said housing; means for rotating said shafts in opposite directions, each of said shafts being provided with longitudinally spaced sets of radially extending cleaner fingers, the fingers of one shaft extending between the fingers of the other shaft as the shafts rotate, one of said shafts being movable laterally of said housing; and means responsive to outward lateral movement of said one of said shafts operatively associated with said means for rotating said shafts for stopping rotation of said shafts upon such outward lateral movement of said one of said shafts.

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