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3,308,498

BATTERY-POWERED CLOTHES BRUSH

Filed March 1, 1965

3 Sheets-Sheet 1

Fig. 1.

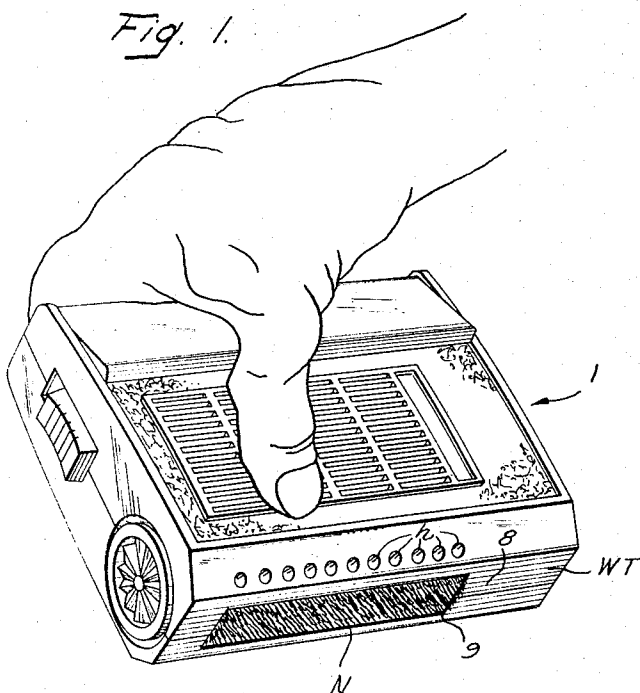
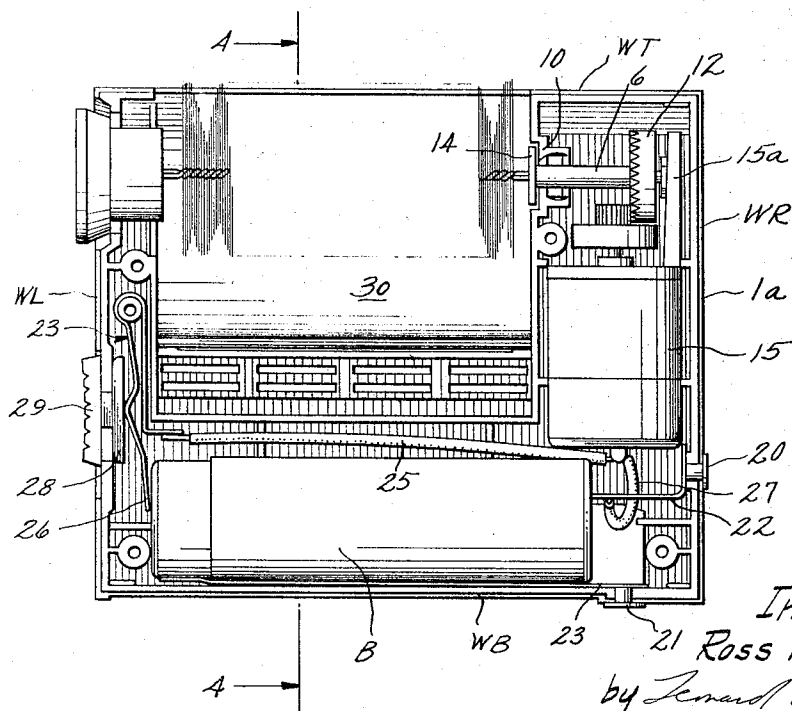


Fig. 2.



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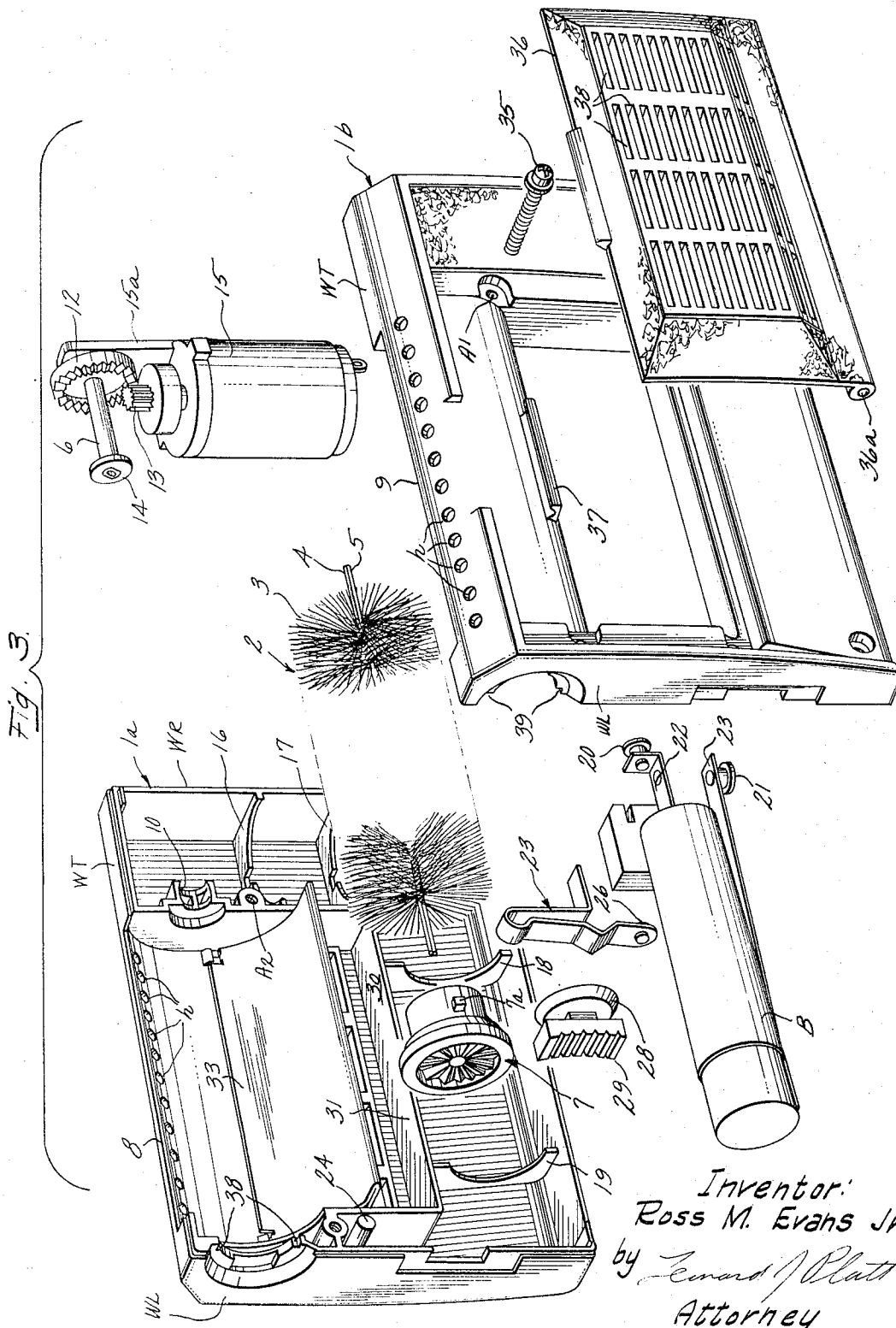
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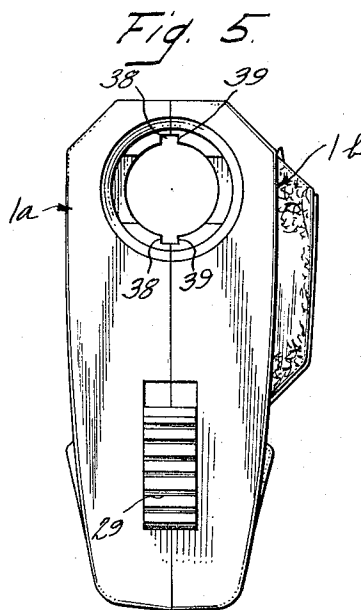
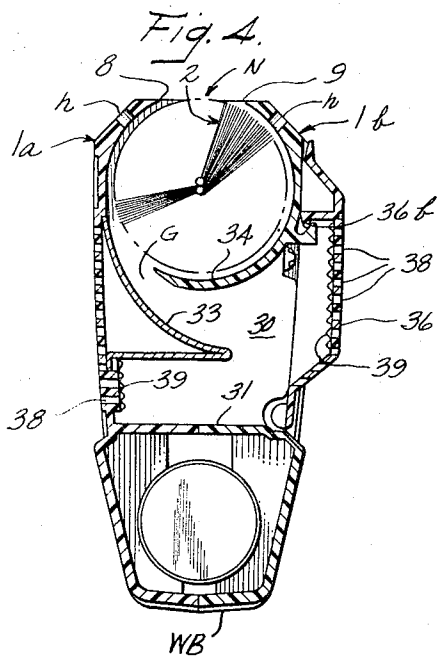
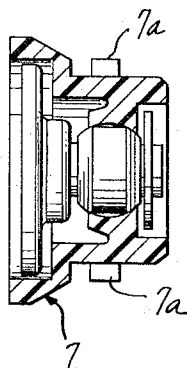


Fig. 6.



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BATTERY-POWERED CLOTHES BRUSH

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6 Claims. (Cl. 15-23)

This invention concerns a battery-powered clothes brush and, more particularly, a more compact and self-powered device for removing dirt and lint particles from clothing.

Various examples of mechanically and electrically powered devices have been disclosed by the prior art for removing dirt and lint particles from clothing. The earliest examples include spring-powered rotating scrapers, while more recent examples have employed externally-powered electric motors within the cleaner for rotating the brushes and for rotating a vacuum-inducing device. The electrically powered clothes brushes provide more effective cleaning power but are not universally portable since an external source of electric power must be available, and the length and very existence of an electric cord is an additional inconvenience.

It is therefore one object of this invention to provide a universally portable, self-powered clothes cleaner.

Another object is to provide a rechargeable, self-powered clothes cleaner requiring no external power source. A further object is to provide a structurally compact, lightweight clothes cleaner easily stored in a suitcase or briefcase.

In accordance with this invention in one form thereof, a rotatable brush is supported within a hollow, substantially rectangular-shape housing with a peripheral surface portion of the brush projecting outwardly through one side of the housing for contacting garments. The brush is rotated by a motor mounted within the housing. Also within the housing is a rechargeable battery for powering the motor, and a switch having a switch button projecting outwardly through the housing to enable control of the motor. The particles picked up by the brush are discharged into a collection-chamber within the housing, and a cleanout door is provided through the housing for disposing of the accumulated particles. A unique split housing structure provides firm, compact support for the internal components while affording easy access for repairs.

While this specification concludes with claims particularly pointing out and distinctly claiming my invention, other objects achieved and further details of what I believe to be novel and included in my invention will be evident when considering the concluding description and claims in conjunction with the accompanying drawings, of which:

FIG. 1 is a perspective view illustrating the relative size of the compact battery-powered clothes brush when manually grasped during operation thereof;

FIG. 2 is an elevation view in section showing the components of the battery-powered clothes brush;

FIG. 3 is an exploded perspective view of the clothes brush housing and components when disassembled;

FIG. 4 is a vertical section view along the lines 4-4 of the elevation view of FIG. 2;

FIG. 5 is a left end view of the battery-powered clothes brush with the brush retainer member removed;

FIG. 6 is an enlarged elevation view in section of the brush retainer member which is releasably secured to the housing for permitting withdrawal of the brush.

Referring to FIG. 1, a compact clothes brush according to one embodiment of the invention is illustrated while manually held during operation thereof. It can readily be appreciated that the compact size facilitates manual

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grasping of the housing structure 1, and the absence of an electric cord enables complete freedom of operation.

The structural details of the compact self-powered clothes brush are shown clearly in FIGS. 2 and 3. FIG. 2 illustrates the internal components when mounted on a housing base-portion 1a which together with the separable housing cover-portion 1b, illustrated in FIG. 3, forms the overall housing 1. The housing base- and cover-portions are constructed of molded plastic, although lightweight metal, hard rubber, or other suitable materials may be employed.

A cylindrical brush 2, consisting of a plurality of bristles 3 secured between helically twisted wires 4 and 5, is rotatably mounted along the top wall W_T of the housing 1. The right end of the brush 2 is releasably secured to a brush drive shaft 6, and rotates therewith. The left end of the brush is releasably secured in a brush retainer element 7 which is, in turn, releasably secured through a brush insert operation A_b in the left end wall W_L of the housing 1. The retainer 7 is secured in the housing 1 by inserting studs 7a on the retainer 7 into radial extensions of the brush insert aperture A_b formed by cooperating recess portions 38 and 39 on the housing base- and cover-portions, respectively, as illustrated in FIG. 5. By employing the releasable brush retainer 7, the brush 2 may be easily withdrawn from the housing to facilitate cleaning or replacement of the brush.

The housing base- and cover-portions 1a and 1b have mutually adjacently disposed recessed edges 8 and 9, respectively, lengthwise along the top wall W_T of the housing as illustrated in FIGS. 1, 3, and 4. The mutually cooperating recessed edges 8 and 9 define a rectangular nozzle N through which the tips of the bristles 3 on the brush 2 extend for extracting particles from garments. A plurality of air inlet holes h through the canted portions of the top wall W_T along both sides of the nozzle N allow air flow into the casing when the nozzle N is covered by a garment.

The brush drive shaft 6 is primarily rotatably secured in a bearing 10 molded as an integral part of a first vertical partition member 11 on both of the housing portions 1a and 1b. A face gear 12 is secured on the brush drive shaft 6 for rotation therewith. The brush 2 is driven through the brush drive shaft 6 by a motor driven pinion 13 which meshes with the face gear 12 as illustrated in FIGS. 2 and 3. A thread guard 14 is press fitted onto the shaft 6 on the brush side of the bearing 10 to prevent thread or lint accumulation between bearing and journal.

An electric motor 15 drives the pinion 13. The motor 15 is mounted along the right end wall W_R of the housing 1. The motor 15 has an extended portion 15a which acts as a bearing for the right end of the brush drive shaft 6. A pair of complementary horizontal shelf members 16 and 17 formed integrally with the housing portions 1a and 1b operate to secure the motor 15 from movement, and thereby aid in maintaining the pinion 13 in positive meshed engagement with the face gear 12.

The electric motor is powered by a rechargeable electric battery B which is mounted along the bottom wall W_B of the housing 1. A pair of complementary vertical shelf members 18 and 19 formed integrally with the housing portions 1a and 1b operate to secure the battery B from moving within the housing. The battery B is connected to a pair of recharging contact members 20 and 21 by a pair of conductors 22 and 23, respectively. The contact members 21 and 22 project outwardly through the housing wall for engaging recharging apparatus (not shown).

A switch element 23 is mounted on a stud member 24 formed integrally with the housing base-portion 1a ad-

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adjacent the left end wall W_L of the housing 1. One end of the switch element 23 is connected to the motor 15 by a first motor conductor 25 as illustrated in FIG. 2. The other end of the switch element 23 has a contact member 26 which is engageable with the battery B to complete an electric circuit to the motor 15 through a second motor conductor 27. The switch element 23 is actuated by a sliding cam member 28 formed as an integral part of a switch button 29 which projects outwardly through the left end wall W_L of the housing 1.

The housing 1 has a particle collection-chamber 30, as illustrated in FIG. 4, which is defined on the right side by the first vertical partition member 11, on the lower side by a horizontal partition member 31, on the left side by a second vertical partition member 32, on the upper side by a brush scroll member 33, and on the front and rear by the inner walls of the housing portions 1b and 1a, respectively. The scroll member 33 may be formed as a snap fitted element on the housing base-portion 1a.

As is best illustrated in FIG. 4, the brush 2 is substantially enclosed by the scroll member 33, the adjacent inner wall structure of the housing portions 1a and 1b, and by a brush enclosure extension 34 on the housing cover-portion 1b. A small tangential gap G between the tip of the brush enclosure extension 34 and the scroll member 33 provides a discharge passageway tangentially oriented to the cylindrical brush 2 through which particles collected on the brush are discharged into the collection-chamber 30.

The housing portions 1a and 1b are secured together by screw members 35 which project through apertures A_1 in the housing cover-portion 1b and are threaded into complementary apertures A_2 in the housing base-portion 1b. When the housing 1 is assembled, access to the collection-chamber 30 is achieved through a clean-out door 36 on the housing cover-portion 1b. The clean-out door 36 is pivoted to the housing cover-portion 1b by smooth studs 36a which project into recesses on the housing cover-portion 1b. The clean-out door 36 is releasably locked to the housing cover-portion 1b by engaging a lip 36b on the clean-out door 36 with a snap ledge 37 on the housing cover-portion 1b, as illustrated in FIG. 4. Exhaust slots 38 are provided through the clean-out door and the portion of the housing base-portion 1a adjacent the collection-chamber 30 and cooperate with the air inlet holes h to accomplish a vacuum effect which is more fully described in a co-pending application by Joseph F. Kravos, Ser. No. 435,835 and assigned to the assignee of this invention. Filter membranes 39 are disposed over the exhaust slots 38 to maintain dirt and lint particles within the collection-chamber 30 from which they may be conveniently cleaned.

The over-all dimensions of an assembled compact clothes brush constructed in accordance with this invention are approximately $4\frac{1}{2}$ inches long, $3\frac{3}{4}$ inches high, and $1\frac{3}{4}$ inches in thickness, and the over-all weight is less than 11 ounces.

The operation of the brush simply involves actuating the switch button and lightly applying the nozzle portion to a garment with a reciprocating or rotary motion. Accumulated dirt and lint particles are removed from the collection-chamber by opening the clean-out door and wiping the collection-chamber with a small brush or similar device. To remove the brush, the brush retainer 7 is released by twisting it to align the studs 7a with the cooperating recesses 38 and 39 in the aperture A_b , thus disengaging the studs 7a from the housing 1, and also affording withdrawal of the brush 2 for cleaning or replacing the same. After replacing the brush, the brush retainer element is secured by twisting the retainer after the studs are inserted through the brush inlet aperture A_b so that the studs frictionally engage the inner surface of the left end wall W_L of the housing 1.

As is evident from the foregoing description, certain aspects of my invention are not limited to the particular

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construction details of the example illustrated, and I contemplate that various and other modifications and applications will occur to those skilled in the art. For example, a fluid motor could be employed to rotate the brush and power could be supplied by a rechargeable cartridge of compressed gas. It is, therefore, my intention that the appended claims shall encompass such modifications and applications which do not depart from the true spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A compact clothes cleaner comprising:

- (a) a hollow rectangular housing having top, bottom, side and end walls and dimensioned so that the top and bottom walls may be readily gripped by the hand of a user, said housing having separable housing portions, two of said housing portions having a recessed edge which mutually cooperate to form a nozzle through a side of said housing;
- (b) a brush within said housing, said brush being rotatably secured within said housing lengthwise along a first side of said housing with a peripheral portion of said brush projecting outwardly through said nozzle;
- (c) an electric motor secured within said housing adjacent a first end of said housing;
- (d) means in said housing for drivingly connecting said motor to said brush for rotating said brush;
- (e) battery means within said housing located adjacent a second side of said housing opposite said brush;
- (f) a switch in said housing electrically connected to said motor and said battery for operating said motor in response to movement of a switch actuator member extending outwardly through said housing;
- (g) wall means behind said brush defining a dirt-collecting chamber in said housing for receiving particles forced from said brush, said dirt-collecting chamber being disposed in said housing partially surrounded by said brush, said motor and said battery means; and
- (h) a clean-out door mounted on said housing for providing easy removal of particles collected in said dirt-collecting chamber.

2. A compact clothes cleaner as recited in claim 1 wherein said wall means includes a first arcuate wall conforming to the shape of said brush positioned immediately behind said brush, and a second arcuate wall having a curvature greater than said first arcuate wall, a portion of said second arcuate wall extending behind and overlappingly spaced from said first arcuate wall.

3. A compact clothes cleaner as recited in claim 1 wherein said battery means is mounted so close to the side of said housing opposite said brush that when said clothes cleaner is held in the palm of the hand the relatively heavy battery means is spaced behind the tips of the thumb and fingers of the hand to permit the clothes brush to be readily manipulated by the hand of the user.

4. A compact clothes cleaner comprising:

- (a) a hollow molded plastic housing having an over-all length less than five (5) inches, a width less than four (4) inches, and a depth less than two (2) inches, said housing having separable first and second housing-portions, each of said housing portions having a recessed edge which mutually cooperate to form a nozzle through said housing;
- (b) a brush within said housing, said brush being rotatably secured between said first and second housing-portions lengthwise along a first side of said housing with a peripheral portion of said brush projecting outwardly through said nozzle;
- (c) an electric motor in said housing, said motor being secured between said first and second housing-portions along a first end of said housing, the axis of rotation of said motor being substantially perpendicular to the axis of rotation of said brush;

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- (d) means in said housing for drivingly connecting said motor to said brush for rotating said brush;
- (e) a rechargeable battery in said housing, said battery being mounted between said first and second housing-portions lengthwise along a second side of said housing opposite said brush, said battery being electrically connected to first and second contact members projecting outwardly through said housing for engaging recharging apparatus;
- (f) a switch in said housing, said switch being mounted between said first and second housing-portions along a second end of said housing opposite said motor, said switch being electrically connected to said motor and said battery for operating said motor in response to movement of a switch actuator member extending outwardly through said second end of said housing;
- (g) a dirt collecting-chamber in said housing for receiving particles forced from said brush, said collecting-chamber being disposed in a central cavity of said housing surrounded by said brush, said motor, said switch, and said battery; and
- (h) a pivotable clean-out door on said housing, said clean-out door being pivotally mounted on said second housing-portion so that said first and second housing-portions when assembled enclose a compact clothes cleaner requiring no external power source and providing easy removal of particles ingested by said brush.

5. A compact clothes cleaner as recited in claim 4

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wherein said means for drivingly connecting said motor to said brush comprises:

- (a) a pinion member, said pinion being secured to the rotating shaft of said motor;
- (b) a brush drive shaft for releasably engaging and rotating said brush; and
- (c) a face gear secured to said brush drive shaft, said face gear engaging said pinion for transmitting torque from said motor to said brush drive shaft for rotating said drive shaft and said brush.

6. A compact clothes cleaner as recited in claim 4 including means for enabling withdrawal of said brush from said housing without separating said first and second housing-portions.

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