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C. H. MacFARLAND
DETACHABLE MOUNTING FOR VACUUM CLEANER
NOZZLES WITH POWER DRIVEN BRUSH

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2 Sheets-Sheet 1

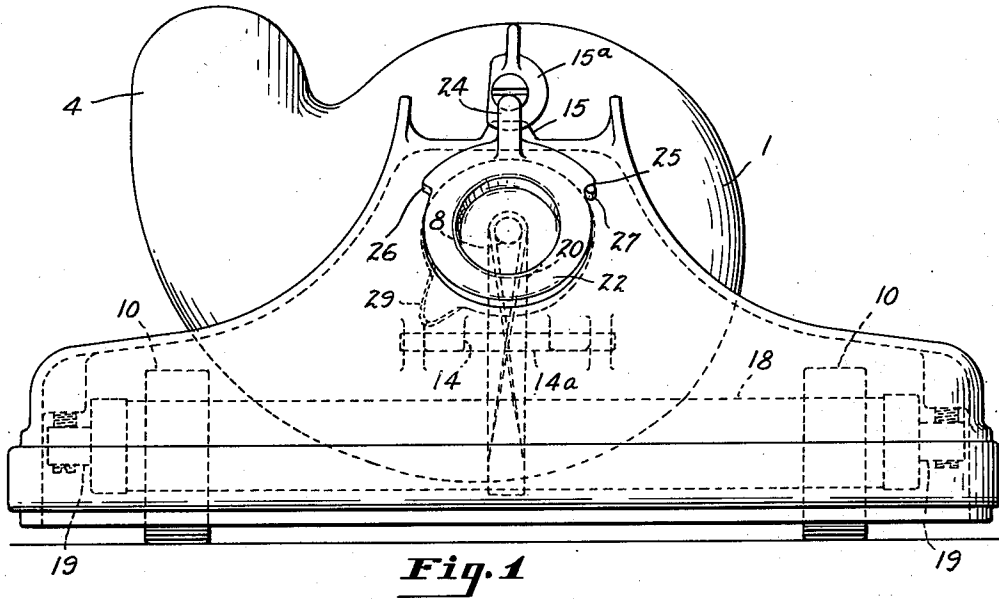


Fig. 1

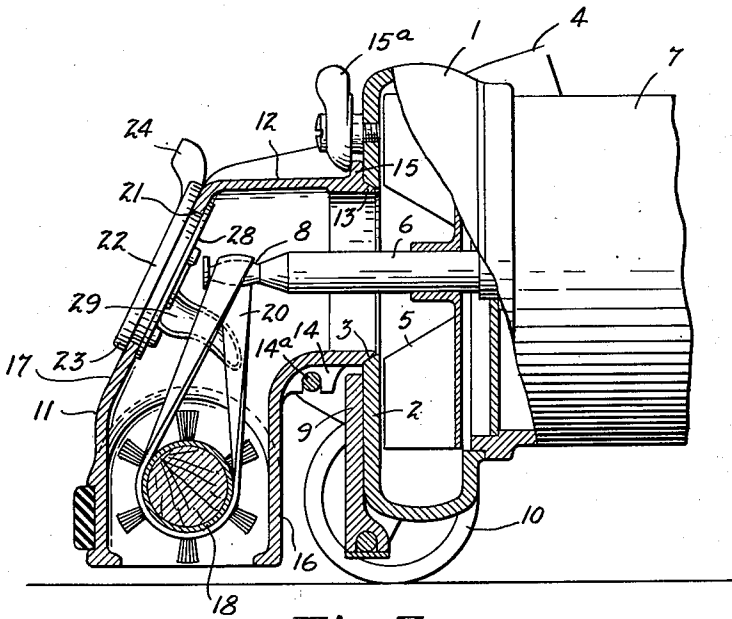


Fig. 2

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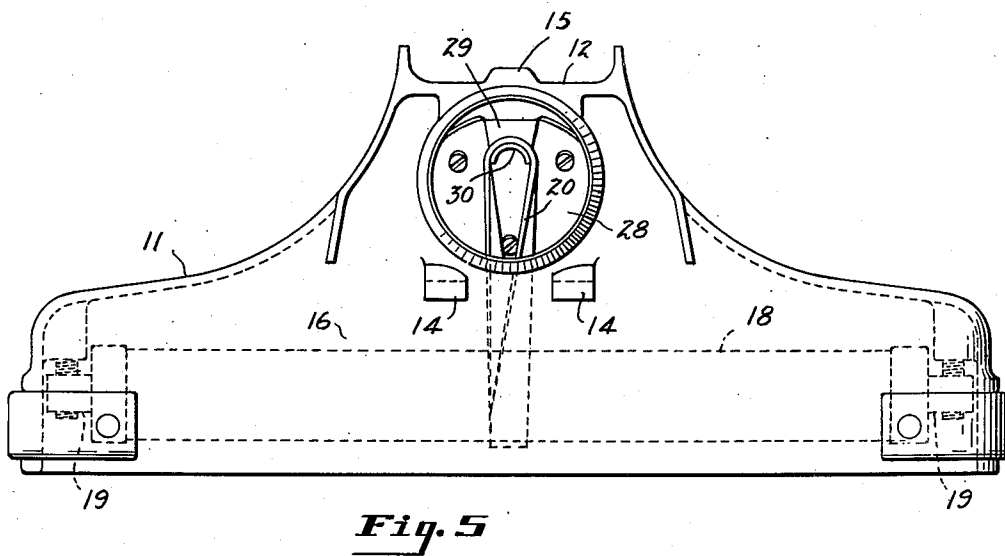
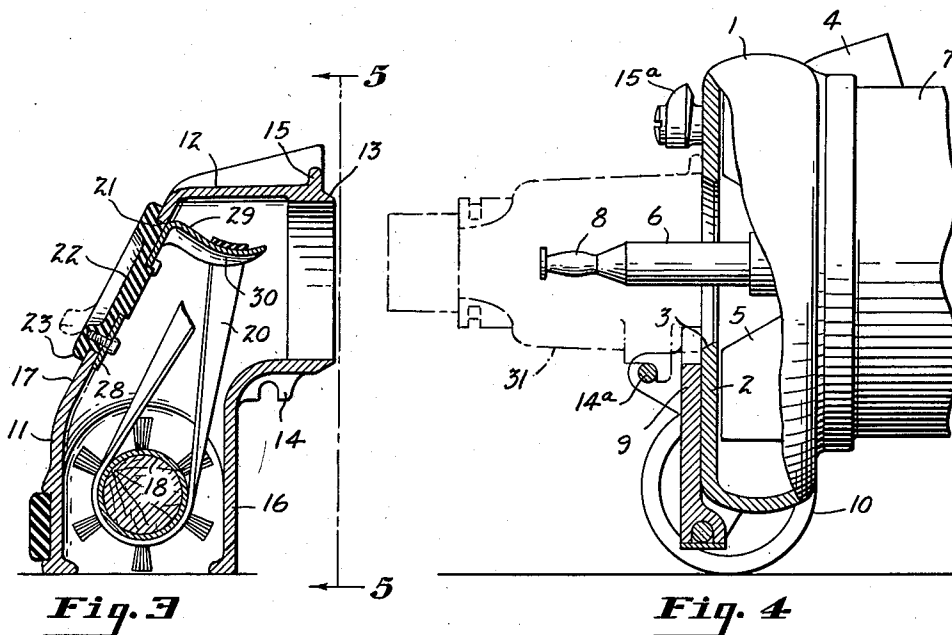
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UNITED STATES PATENT OFFICE

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DETACHABLE MOUNTING FOR VACUUM
CLEANER NOZZLES WITH POWER-DRIVEN
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5 Claims. (Cl. 15-390)

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This invention relates to vacuum cleaners of the type in which a suction nozzle is detachably connected to the inlet of a fan casing and is provided with a brush that is driven from the fan shaft by means of a belt within the nozzle, the nozzle being detachable from the casing so that it may be replaced by a different type of nozzle.

The present invention has for an object to provide an adjustable belt engaging member on the nozzle that is movable from a position clear of the belt into engagement with the belt and to a position overlying the outer end of the fan shaft so as to support the upper loop of the belt clear of the fan shaft so that the belt is supported wholly by the nozzle in a position such that the fan shaft is free to move out of or into the upper belt loop as the nozzle is detached from or attached to the fan casing and that is movable from its belt supporting position to reengage the belt with the fan shaft.

With the above and other objects in view, the invention may be said to comprise the vacuum cleaner as illustrated in the accompanying drawings, hereinafter described and particularly set forth in the appended claims, together with such variations and modifications thereof as will be apparent to one skilled in the art to which the invention pertains.

Reference should be had to the accompanying drawings forming a part of this specification, in which:

Figure 1 is a front elevation of the vacuum cleaner embodying the invention;

Fig. 2 is a central vertical section through the nozzle of the cleaner;

Fig. 3 is a vertical central section through the nozzle detached from the fan casing showing the brush driving belt supported within the detached nozzle in position to receive the fan belt upon attachment of the nozzle to the fan casing;

Fig. 4 is a side elevation of the fan casing with the nozzle detached, a portion of the casing being broken away to show the front wall in vertical section and hose attachment which may replace the nozzle being shown in dotted lines, and

Fig. 5 is a rear elevation of the detached nozzle.

The present invention is applied to a vacuum cleaner of a conventional type that includes a fan casing 1 which has a vertical front wall 2 provided with a central inlet opening 3. The fan casing also has a tangential outlet 4 and a fan 5 is mounted therein on a shaft 6 that may be driven by a motor (not shown) in a suitable housing 7 attached to the fan casing. The fan shaft 6 projects forwardly through the opening 3 and

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has a forward end portion 8 formed to provide a belt pulley.

The fan casing 1 is mounted upon a suitable carriage 9 that is provided with supporting wheels 10. A nozzle 11 is detachably secured to the fan casing 1, being provided with a horizontal portion 12 which receives the fan shaft 6 and which has an end portion 13 that fits within the opening 3. The nozzle 11 has slotted lugs 14 on the under side of the portion 12 that engage a horizontal pin 14a carried by the fan casing. The nozzle 11 is also provided on the upper side thereof with a laterally projecting flange 15 which bears against the outer face of the front wall 2 of the fan casing and which is engaged by a clamping member 15a to secure the nozzle to the fan casing. The nozzle 11 has a downwardly flaring inlet portion 16 at the outer end of the horizontal portion 12 which has an inclined front wall 17 that overlies the forward end of the fan shaft 6. Within the widened inlet portion 16 of the nozzle 11 there is mounted a tubular brush shaft 18 which is disposed at right angles to the fan shaft 6 and supported at its ends by suitable bearings 19. The brush shaft 18 is driven by means of a belt 20 which is twisted to provide an upper loop engaging the pulley portion 8 of the shaft 6 and a lower loop which extends around the tubular shaft 18. The tubular shaft 18 is larger than the pulley 8 and is disposed with its axis forwardly of the pulley 8 so that one run of the belt 20 is inclined forwardly and downwardly from the pulley 8 to the front side of the shaft 18 while the opposite run of the belt is in substantially vertical position.

The front wall 17 of the nozzle has a round opening 21 in front of the forward end of the shaft 6 and a rotatable closure member 22 is mounted in this opening. The closure member 22 has an outer flange 23 that bears against the outer face of the wall 17 and a suitable handle 24 which may be integral with the flange 23 is provided to facilitate the turning of the closure member. The flange 23 is provided with laterally projecting shoulders 25 and 26 which are engageable with a stop pin 27 on the wall 17 to limit the angular movement of the closure member. The closure member is retained in the opening by means of a plate 28 attached to the inner face of the closure member and having edge portions bearing against the interior of the wall 17 along the margin of the opening 21.

A suitable arm 29 which may be formed integrally with the plate 28 projects inwardly from the rotatably mounted closure member 22.

and is adapted to be moved into and out of engagement with the belt 20. As shown in Figs. 1 and 2, the closure member 22 turns about an axis which is disposed at an angle to the axis of the fan shaft 6 and the arm 29 is so positioned on the member 22 that when the shoulder 25 is engaged with the pin 27 the arm 29 is positioned laterally of and entirely clear of the belt 20. Upon turning movement of the member 22 in a counter-clockwise direction from the position shown in Fig. 1, the arm 29 is swung inwardly past the rear run of the belt 20 into engagement with the inner side of the forward run of the belt, as illustrated in the dotted and full lines in Fig. 2. Further movement of the closure member 22 to bring the shoulder 26 into engagement with the stop pin 27 swings the arm 29 to the position shown in Figs. 3 and 5 where it closely overlies the pulley portion 8 of the fan shaft 6.

As shown in Fig. 5, the arm 29 has a belt engaging portion 30 of arcuate externally convex form which is substantially concentric with the shaft 6 when the arm is in its uppermost position, so that when the member 22 is turned to engage the shoulder 26 with the stop pin 27 and position the arm 29 as shown in Figs. 3 and 5, the upper loop of the belt 20 is supported clear of the fan shaft and the fan shaft is free to move axially out of the belt loop when the nozzle 11 is detached from the fan casing. The arm 29 also serves to support the belt 20 while the nozzle 11 is detached from the fan casing in a position such that the forward end of the fan shaft will freely enter the loop of the belt when the nozzle 11 is again attached to the fan casing.

When the brush carrying nozzle 11 is detached from the fan casing a suitable fitting 31 to which a flexible hose may be attached may be attached to the fan casing in the same manner as the nozzle 11 as shown in Fig. 4.

It is to be understood that variations and modifications of the specific devices herein shown and described for purposes of illustration may be made without departing from the spirit of the invention.

What I claim is:

1. In a vacuum cleaner, a fan casing having an inlet, a suction nozzle detachably connected to the fan casing inlet, said nozzle having an inlet at its lower end and a passage from its inlet to said fan casing inlet, a fan shaft projecting into the nozzle passage, a brush shaft mounted in the nozzle below and transverse to said fan shaft, a belt having an upper loop receiving said fan shaft and a lower loop receiving said brush shaft, a member adjustable in the nozzle beyond the end of said fan shaft, and an arm carried by said member and projecting into said passage and toward the fan casing inlet, said arm being movable into engagement with the interior of the fan belt and to a position closely overlying said fan shaft to support the upper loop of the belt on the nozzle and clear of the fan shaft to permit the outer end of the fan shaft to be withdrawn from the belt upon detachment of the nozzle from the fan casing and to be entered into the upper loop of the belt when the nozzle is again attached to said fan casing.

2. In a vacuum cleaner, a fan casing having an inlet, a suction nozzle detachably connected to the fan casing inlet, said nozzle having an inlet at its lower end and a passage from its inlet to said fan casing inlet, a fan shaft projecting into the nozzle passage, a brush shaft mounted in the nozzle below and transverse to

said fan shaft, a belt having an upper loop receiving said fan shaft and a lower loop receiving said brush shaft, a member rotatably adjustable in the nozzle and mounted beyond the end of said fan shaft to turn about an axis at an angle to the axis of the fan shaft, and an arm rigidly attached to said member and projecting into said nozzle passage, said arm being movable in an arcuate path upon adjustment of said member from a position at one side of said belt to a position in engagement with the interior of the belt above said fan shaft to support the upper loop of the belt on the nozzle and clear of the fan shaft to permit the outer end of the fan shaft to be withdrawn from the belt upon detachment of the nozzle from the fan casing and to be entered into the upper loop of the belt when the nozzle is again attached to said fan casing.

3. In a vacuum cleaner having a fan casing with an inlet in its front wall, a suction nozzle detachably connected to the inlet, said nozzle having an inlet at its lower end and a passage from said inlet to the fan casing inlet, a fan shaft extending forwardly through the fan casing inlet into the nozzle passage, a brush shaft in the nozzle transverse to and below the fan shaft and a driving belt having a lower loop in which the brush shaft is received and an upper loop in which the outer end of the fan shaft is received, a manually operable member mounted for angular adjustment on the nozzle outwardly of the fan shaft and having an arm movable into and out of engagement with the interior of the upper loop of said belt and to a position directly over the outer end of the fan shaft to disconnect the upper loop of the belt from the fan shaft and support the same wholly on the nozzle and clear of the fan shaft for movement with the nozzle so that the fan shaft may move out of and into the upper loop of the belt as the nozzle is detached from or attached to the fan casing.

4. In a vacuum cleaner having a fan casing with an inlet in its front wall, a suction nozzle detachably connected to said inlet, said nozzle having an inlet at its lower end and being formed to provide a passage from its inlet to said fan casing inlet, a fan shaft extending forwardly through the fan casing inlet into the nozzle, a brush shaft in the nozzle transverse to and below the fan shaft and a driving belt having a lower loop in which the brush shaft is received and an upper loop in which the outer end of the fan shaft is received, a manually operable member mounted upon said nozzle beyond the end of the fan shaft to turn about an axis inclined with respect to the fan shaft axis, said member having an arm projecting into the nozzle passage and movable in an arcuate path from a position laterally clear of the belt into engagement with the interior of the upper loop of the belt and upwardly to a position over the outer end of the fan shaft where it supports the upper loop of the belt clear of the fan shaft.

5. The combination with a vacuum cleaner having a fan casing with an inlet in its front wall, a suction nozzle detachably connected to the inlet and having a front wall provided with a circular opening, a fan shaft extending forwardly through the inlet into the nozzle with its outer end within the nozzle adjacent said opening, a brush shaft in the nozzle transverse to and below the fan shaft and a driving belt having a lower loop receiving the brush shaft and an upper loop receiving said fan shaft, of a closure member rotatably mounted in said open-

ing, and an inwardly projecting belt supporting arm carried by said closure member, said member being movable angularly from a position where said arm is positioned laterally of the belt into engagement with the interior of the upper loop of the belt and to a position where said arm overlies said fan shaft and supports the upper loop of the belt on the nozzle and clear of said shaft.

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