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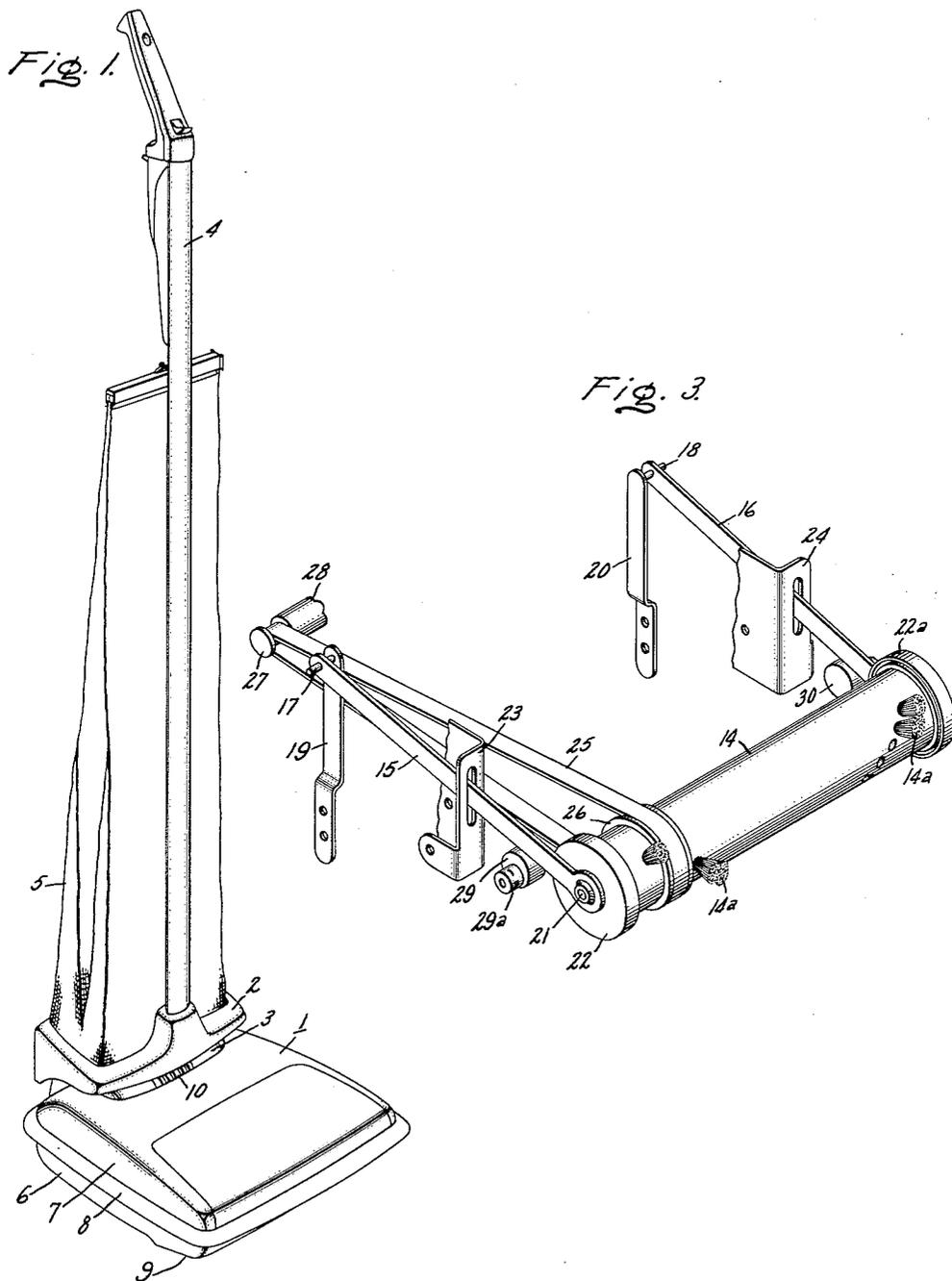
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VACUUM CLEANER WITH MOVABLE NOZZLE BRUSH

Filed Dec. 8, 1959

3 Sheets-Sheet 1



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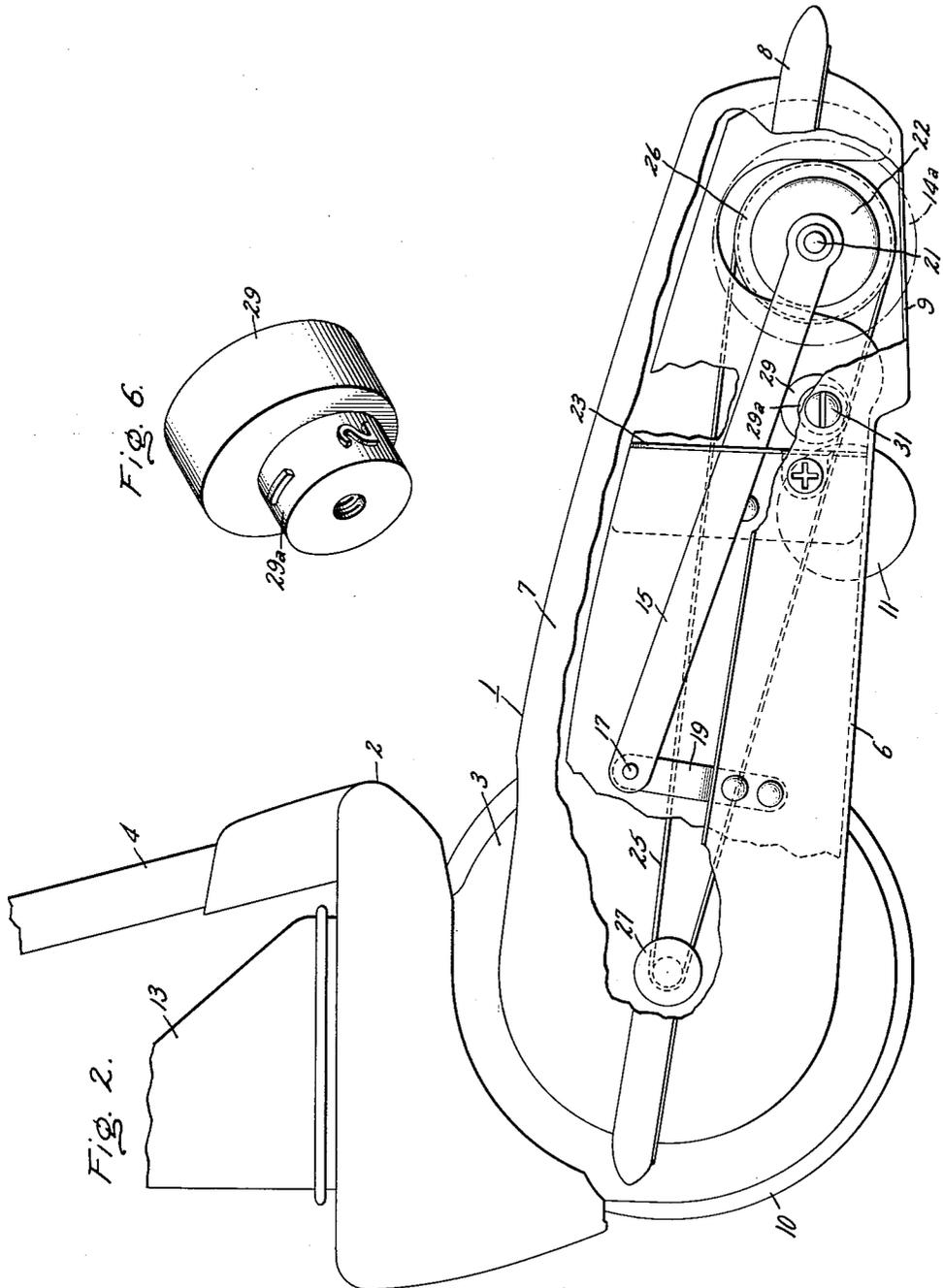
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3 Sheets-Sheet 2



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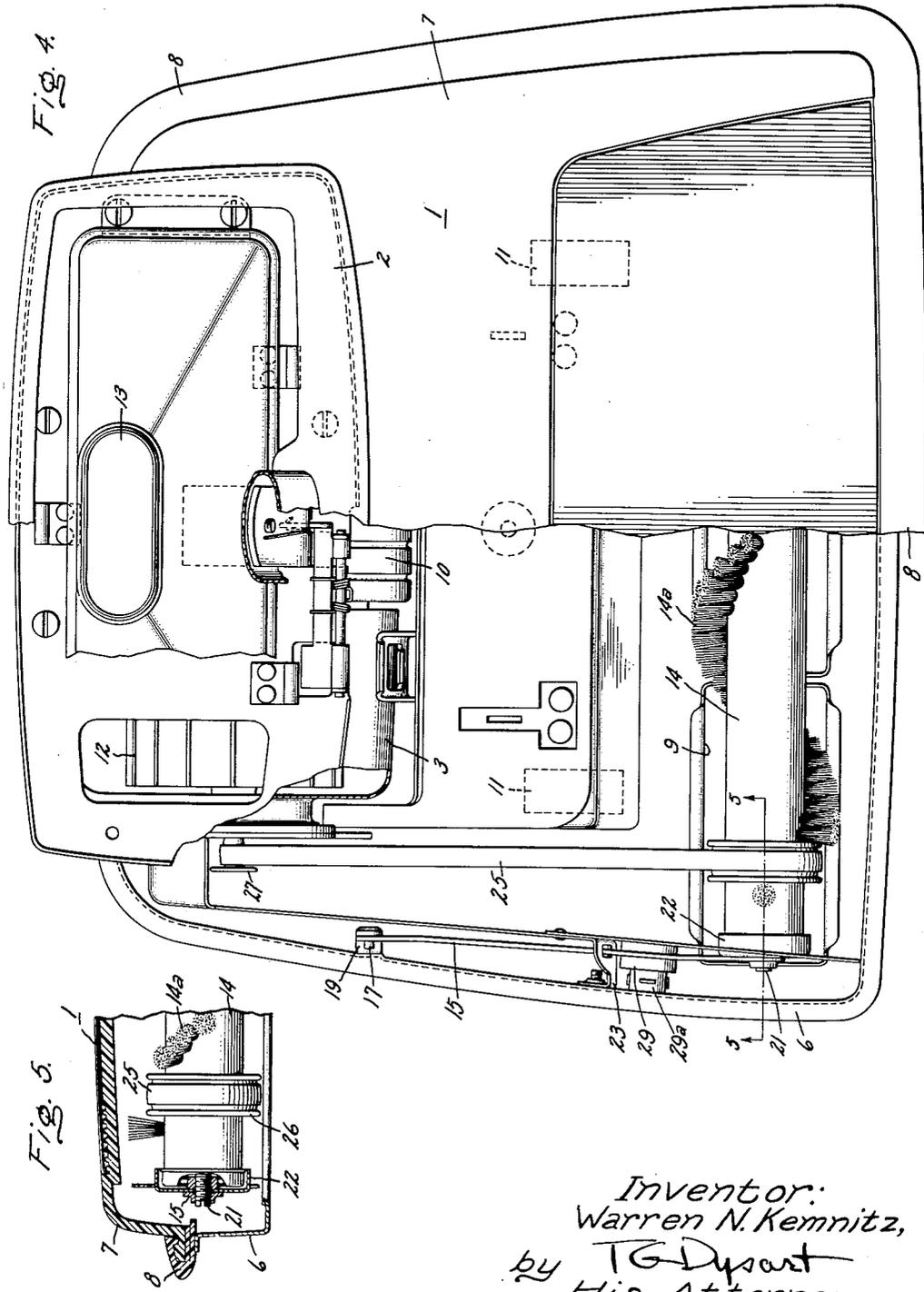
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3 Sheets-Sheet 3



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3,012,267

VACUUM CLEANER WITH MOVABLE NOZZLE BRUSH

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Filed Dec. 8, 1959, Ser. No. 858,104

1 Claim. (Cl. 15—372)

This invention relates to vacuum cleaners of the type having a rotary brush mounted in a floor nozzle, and has as its principal object the provision of improved means for movably mounting and positioning a rotary brush in a floor nozzle so as to attain highly efficient cleaning action.

Further objects and advantages of the invention will become apparent as the following description proceeds, and the features of novelty which characterize the invention will be pointed out with particularity in the claim appended to and forming a part of this specification.

Briefly stated, in accordance with one aspect of my invention I provide a floor nozzle casing having a suction mouth in the forward portion thereof and a rotary brush located therein, a pair of arms pivotally mounted at the sides of the casing and extending forwardly so as to support the ends of the brush for limited up and down movement, and a belt for driving the brush from a motor driven pulley positioned at the rear of the nozzle casing. By locating the pivotal mounting points of the arms above the center line between the axis of the brush and the pulley, belt tension is utilized to exert a downward force on the brush, and in this way proper contact between the brush and the floor surface is assured. Further, adjustable stop members associated with the brush supporting arms are utilized to limit the lowermost position of the brush, thus permitting adjustment for brush wear.

For a better understanding of this invention reference may be made to the following description and the accompanying drawings in which:

FIG. 1 is a perspective view of a vacuum cleaner embodying the present invention;

FIG. 2 is a fragmentary side elevation view of the cleaner shown in FIG. 1, some of the parts being broken away to show details of construction;

FIG. 3 is a fragmentary perspective view of the brush mounting arrangement of the present invention;

FIG. 4 is a top plan view of the portion of the cleaner shown in FIG. 2, some of the parts being broken away to show details of construction;

FIG. 5 is a fragmentary cross-sectional view taken along the line 5—5 in FIG. 4, and

FIG. 6 is a perspective view of the brush positioning cam utilized in the present invention.

Referring to the drawings, the vacuum cleaner illustrated in FIG. 1 includes a nozzle casing 1 of generally rectangular configuration, a frame 2, a motor housing 3 fixedly attached to the frame but pivotally secured with respect to the nozzle casing, and a handle 4 for a dust bag enclosure 5. Certain features of the vacuum cleaner illustrated in FIG. 1 are disclosed in detail and claimed in application Serial No. 858,103, filed on Dec. 8, 1959, by Robert M. Smith and assigned to the assignee of the present application, to which reference may be made for additional details of the general organization of the vacuum cleaner in which the presently preferred embodiment of my invention is utilized.

Floor nozzle casing 1 comprises a base shell 6 and a mating hood shell 7 joined at their edges, with a combined sealing gasket and peripheral bumper 8 interposed therebetween, so as to form a hollow nozzle having a suction mouth 9 horizontally disposed when the casing is operatively positioned on a floor surface. The cleaner is supported on the surface to be cleaned by a relatively

large wheel 10 encircling the central peripheral portion of motor housing 3 and arranged to rotate freely with respect thereto, and a pair of smaller wheels 11 secured to the forward portion of base shell 6. Mounted within motor housing 3 is an electric motor (not shown), a suction fan 12 (see FIG. 4) at one end of housing 3 and a corresponding fan (not shown) at the opposite end thereof. These suction fans are provided with axial air intake openings which communicate with the interior of nozzle casing 1 so as to draw air through suction mouth 9 and into the casing during operation. A common outlet 13 for suction fan 12 and its counterpart at the opposite end of housing 3 is provided, and a dust bag (not shown) is enclosed in bag enclosure 5 and secured to outlet 13 so as to collect the dust entrained in the air which passes through casing 1 and the suction fan structure. As more clearly disclosed in the above mentioned Smith application, nozzle casing 1 is pivotally mounted with respect to motor housing 3 so that it is free to engage the floor surface in a floating relationship. However, it should be understood that the present invention is not limited in its application to vacuum cleaners of this type and it is believed that this will become apparent as the present description proceeds.

In order to loosen the dirt on the surface being cleaned it is desirable to provide an agitator in the form of a rotary brush 14 positioned adjacent to suction mouth 9 and arranged to project downwardly through the suction mouth and into engagement with the floor surface. In accordance with the present invention brush 14, provided with spirally arranged bristles 14a, is supported within nozzle casing 1 in floating relation therewith, and is biased downwardly toward the floor surface so as to assure highly efficient cleaning action. The means for achieving this objective include a pair of brush supporting arms 15 and 16 each mounted at the rear end thereof on pivot members 17 and 18 respectively, the pivot members being fixedly secured by means of brackets 19 and 20 to base portion 6 of nozzle casing 1. Supporting arms 15 and 16 extend forwardly to suction mouth 9 and support brush 14, which is rotatably mounted by means of suitable bearings (not shown) on axial shaft 21, which in turn is secured to the ends of the arms. Also secured to the ends of arms 15 and 16 are a pair of cup-shaped thread guards 22 and 22a arranged to prevent threads and the like from interfering with free rotation of the brush. In order to provide added stability, supporting arms 15 and 16 extend through guide members 23 and 24 respectively, which are fixedly secured to nozzle casing 1.

Brush 14 is motor driven during the operation of the vacuum cleaner by means of a belt 25 made of any suitable flexible material. At its forward end belt 25 is trained over a pulley 26 secured to brush 14 and at its rear end is trained over a pulley 27 secured to motor shaft 28 on which both fan 12 and the motor rotor are mounted. Thus during operation of the cleaner both the suction producing fans and brush 14 are driven by a common motor.

As best shown in FIG. 2, the pivotal axis of the rear end of supporting arms 15 and 16 provided by pivot members 17 and 18 is vertically spaced above a plane intersecting the rotary axis of brush 14 and the axis of symmetry of belt 25, which in the present embodiment passes through the rotary axis of motor shaft 28 as well as the rotary axis of the brush. Belt 25, being in driving engagement with pulleys 26 and 27, is under tension, and thus it will be seen that a force is exerted on brush 14 tending to rotate both it and arms 15 and 16 in a clockwise direction, as seen in FIG. 2, about pivot members 17 and 18. Hence, a downward force is thereby exerted on brush 14 which tends to press the brush into engage-

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ment with the floor surface on which the cleaner is supported, and firm contact with the surface being cleaned is thereby assured.

In order to provide means for compensating for the decreasing length of bristles 14a of brush 14 as a result of ordinary wear, I provide a pair of adjustable eccentric stops 29 and 30 which are supported on base portion 6 of nozzle casing 1 so as to limit the lowermost position of supporting arms 15 and 16. Adjustable stop members 29 and 30 are each secured to casing 1 by a screw 31 which may be loosened by the user so that the stop members may be rotated from the position shown in FIG. 2 so as to lower the lowermost position of brush 14. As shown in FIG. 4, stop members 29 and 30 may be arranged to provide three positions, corresponding to three stages of wear on bristles 14a of the brush, and these positions may be conveniently indicated by numerals on the shank portion 29a of the stop member. Thus, as the bristles 14a wear to such an extent that they no longer project sufficiently far through suction mouth 9 to function properly, stop members 29 and 30 may be manually adjusted to lower the lowermost position of brush 14 and expose a sufficient portion of the bristles to achieve efficient cleaning. It will now be apparent that by locating the pivot members 17 and 18 above a plane intersecting the rotary axis of brush 14 and the axis of symmetry of belt 25 these members cooperate with supporting arms 15 and 16 to exert a downward force on brush 14 and further cooperate with adjustable stop members 29 and 30 in locating and defining the lowermost position of the brush.

While I have shown and described a particular embodiment of my invention, I do not desire the invention to be limited to the particular construction disclosed, and I intend by the appended claim to cover all modifications within the true spirit and scope of my invention.

What I claim is:

A vacuum cleaner comprising a floor nozzle casing

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having a suction mouth horizontally disposed when the casing is operatively positioned on a floor surface, a motor driven pulley in said casing, a pair of horizontal axis pivot members carried by said casing, said pulley and said pivot members being located to the rear of said suction mouth, a pair of spaced brush supporting arms each mounted at one end thereof on one of said pivot members and extending forwardly toward said suction mouth, a rotary brush positioned adjacent said suction mouth and supported on the free ends of said arms for rotation about a horizontal axis, manually adjustable stop means on said casing for limiting the lowermost position of said arms, said adjustable stop means including a pair of rotatable stop members each engageable with one of said arms, each of said stop members including a shank portion carried by said casing and an eccentric portion located in the path of movement of the arm adjacent thereto, and a belt for driving said brush from said pulley, said pivot members being vertically spaced above a plane intersecting the rotary axis of said brush and the axis of symmetry of said belt, whereby the tension of said belt exerts a downward force on said brush, and the lowermost position thereof in relation to said casing may be manually adjusted.

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