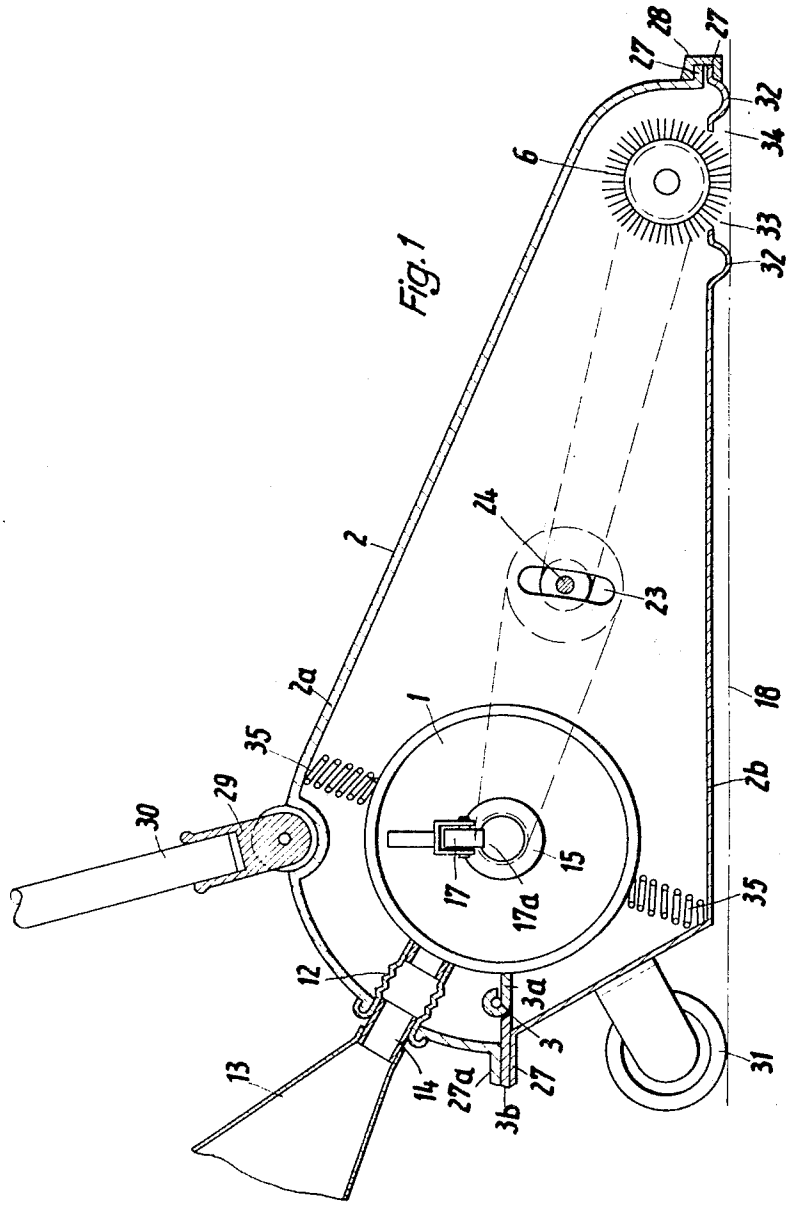
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SWEEPER

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Fig. 1



Inventor:
Eberhard Wörwag
By Walter Berber

June 10, 1969 E. WÖRWAG 3,448,485

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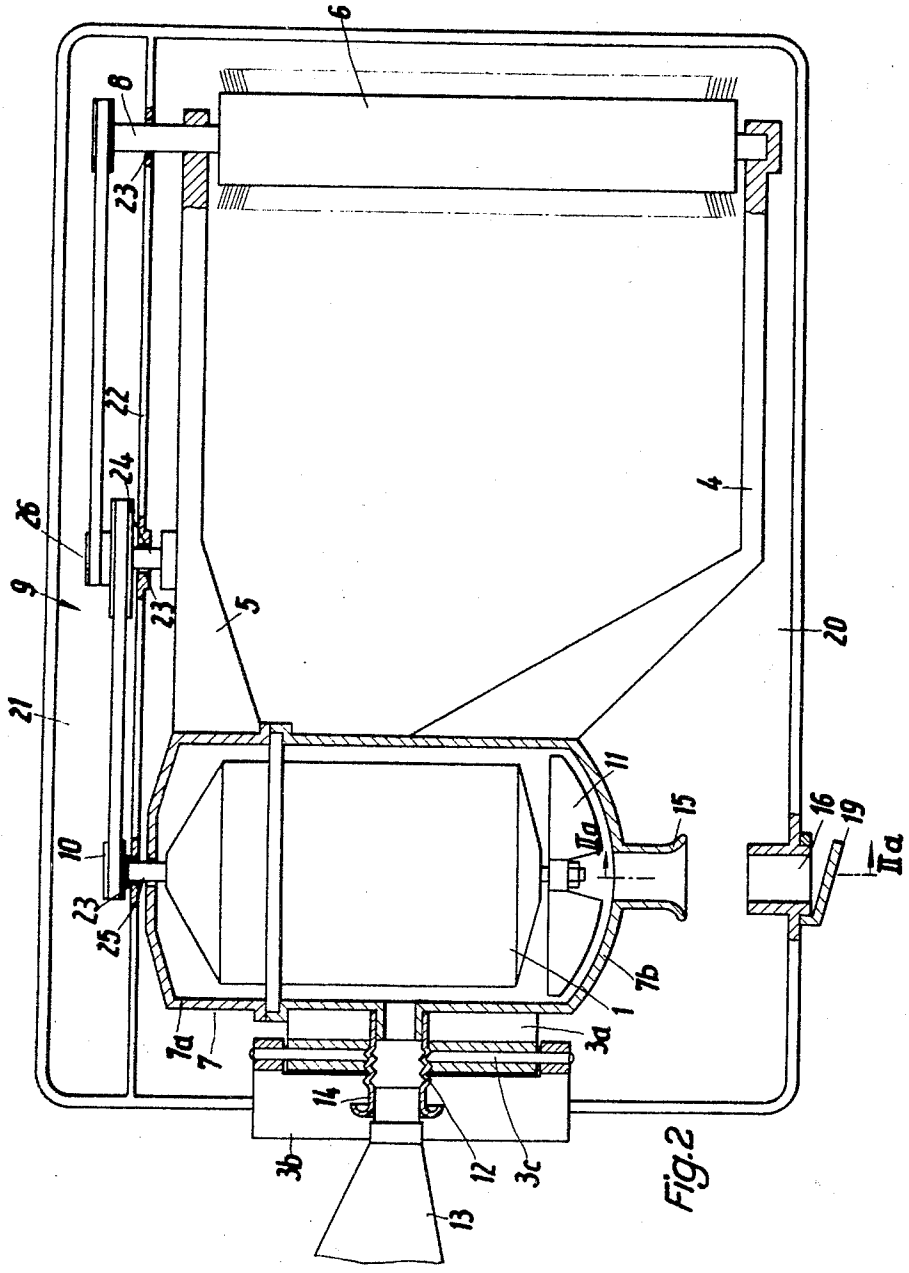


Fig.2

Inventor:
Eberhard Wörwag
By Walter Becker

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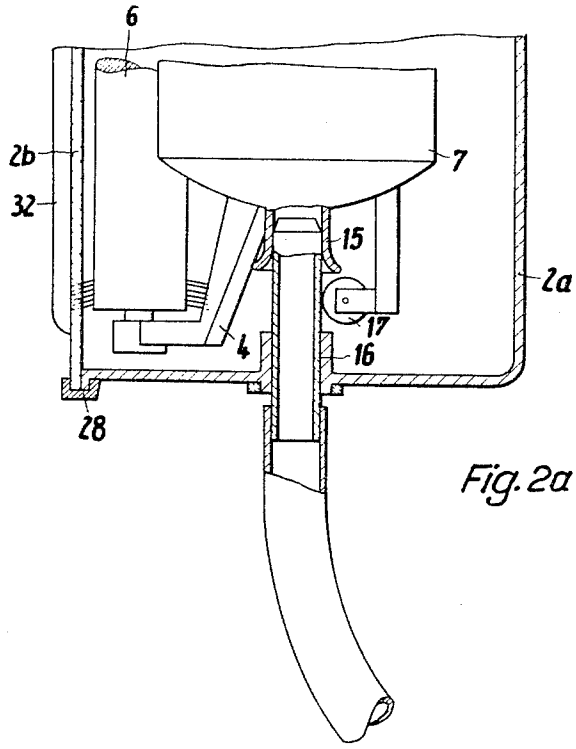


Fig. 2a

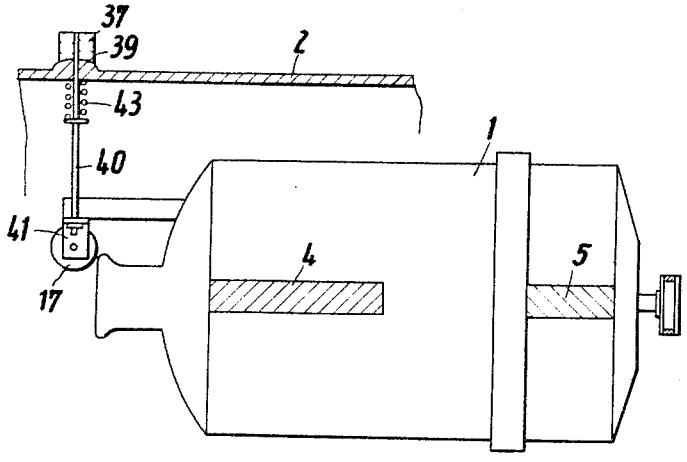


Fig. 4

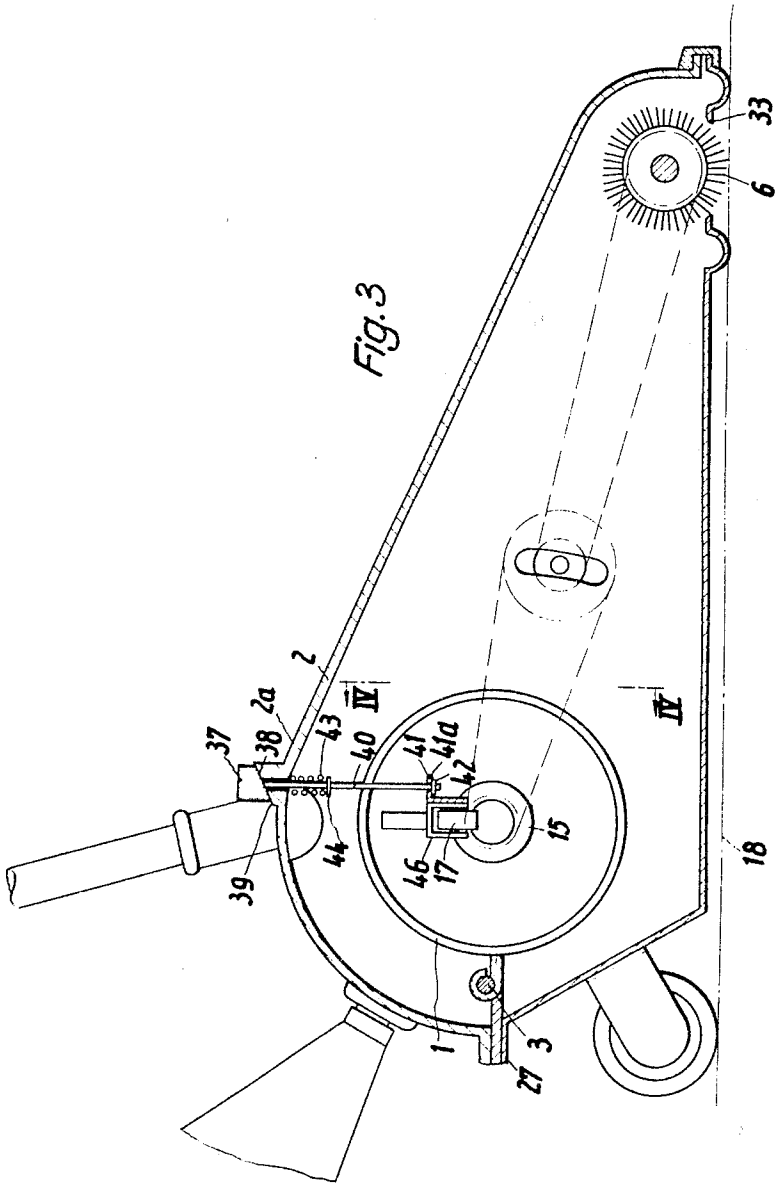
Inventor:
Eberhard Wörwag
By Walter Becker.

June 10, 1969 E. WÖRWAG 3,448,485

SWEEPER

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Fig. 3



Inventor:
Eberhard Wörwag
By Walter Becker

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SWEEPER

Eberhard Wörwag, Stuttgart, Germany, assignor to Mauz & Pfeiffer, Stuttgart-Botnang, Germany

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Int. Cl. A47l 5/00, 9/00
U.S. Cl. 15—332 6 Claims

ABSTRACT OF THE DISCLOSURE

A sweeper with dust withdrawal in which the motor for driving the brush roller is supported by a casing of a fan unit which in its turn is pivotally connected to the sweeper housing and carries supporting means fixedly connected to said casing and supporting said brush roller.

The present invention relates to a sweeper for carpets and the like with a motor driven rotary brush or the like which is rotatable about an axis parallel to the sweeping plane. The said rotary brush partially protrudes from the housing of the sweeper, and is journalled so as to be tiltable about an axis which is parallel to but spaced from the axis of rotation of said rotary brush. The said rotary brush is at least by its own weight urged toward the sweeping plane.

The above mentioned way of journalling a rotary brush is known in connection with a carpet beater according to which the rotary brush is oscillated about a tilting axis toward and away from the carpet. With a carpet beater of this type, the rotary brush is journalled on two one-arm levers which are tiltably connected to the housing of the beater. The rotary brush is driven by a motor which is rigidly connected to the sweeper housing.

This heretofore known arrangement has, however, the drawback that the axis of the drive motor must be located as precisely as possible in the tilting axis of the one-arm lever because otherwise, when tilting the rotary brush, the driving belt passing from the driving motor to the rotary brush will change its tention. Thus, the heretofore known carpet beater or the like requires a relatively complicated and expensive construction.

According to another heretofore known carpet beater, the drive motor is likewise connected to one-arm levers which are tiltably journalled in the machine housing. In this instance special bearings are necessary on the one-arm levers for the motor.

It is, therefore, an object of the present invention to provide a sweeper of the above mentioned type, which will overcome the above mentioned drawbacks.

It is another object of this invention to provide a sweeper which will assure a simple cleaning of carpets and the like.

It is also an object of this invention to provide a sweeper as set forth in the preceding paragraphs, in which the rotary brush will adjust itself automatically for the most favorable height with regard to the carpet to be cleaned.

Still another object of this invention consists in the provision of a sweeper which is inexpensive to manufacture and simple in assembly.

It is a further object of this invention to provide a sweeper as set forth above which may also be employed as vacuum cleaner.

These and other objects and advantages of the invention will appear more clearly from the following specification in connection with the accompanying drawings, in which;

FIG. 1 is a section through a sweeper according to the present invention.

FIG. 2 is a top view, partially in section, of the sweeper according to FIG. 1.

FIG. 2*a* is a section taken along the line II*a*—II*a* of FIG. 2.

FIG. 3 is a modification of the arrangement shown in FIG. 1 and differs therefrom primarily in the means of tilting the motor.

FIG. 4 illustrates a section taken along the line IV–IV of FIG. 3.

A sweeper for carpets and the like according to the present invention is characterized primarily in that the motor is through the intervention of hinge means pivotally connected to the housing and is furthermore characterized in that at least one arm supporting the rotary brush is connected to a housing surrounding the motor housing. In an arrangement of this type the motor together with the supporting arms for the rotary brush and the hinge means form a single structural unit which can be tilted about a tilting axis. As a result thereof, the rotary brush is always under a load by which it is urged toward the sweeping plane.

Referring now to the drawings in detail, the sweeper illustrated therein comprises primarily a sweeper housing **2** with a motor **1** therein. As will be seen from the drawing, motor **1** is surrounded by a fan housing **7** which latter by hinge means **3**, **3***a*, **3***b* is tiltably connected to the housing **2**. The fan housing **7** is provided with two arms **4** and **5**, preferably rigidly connected to said housing **7**, for journalling a rotary brush **6**. Fan housing **7** comprises two housing sections **7***a* and **7***b* radially subdivided with regard to the motor axis, the bearing arms **4** and **5** preferably forming one piece with one of said housing sections **7***a* and **7***b*, respectively. Housing section **7***b* which is connected to bearing arm **4** has at the same time connected thereto or formed therewith from one piece a hinge plate **3***a* of the hinge means **3**.

The free ends of bearing arms **4** and **5** support the bearings for shaft **8** of the rotary brush **6**. In view of this arrangement of the sweeper, the hinge pin **3***c* of the hinge means **3** and the rotary brush **6** are located at opposite ends of the sweeper housing **2** so that a relatively large tilting arm and therefore a large curvature of the titlting path of the rotary brush **6** will be assured.

As will be seen from FIGS. 1 and 2, motor **1** adapted to rotate the rotary brush **6** through the intervention of a belt drive **9** has that end of its shaft which is remote from the pulley **10** provided with a blade wheel **11** so that drive motor **1** is adapted to function as a blower or suction device for drawing in the dirt and dust loosened by the rotary brush **6**. In this way the sweeper according to the present invention may be of relatively small dimensions and its liability to disorders is reduced over that of heretofore known sweepers comprising a plurality of motors.

Fan housing **7** has connected thereto a flexible conduit **12** which protrudes from the sweeper housing **2**. Conduit **12** is provided with a tubular connection **14** into which may be introduced a dust bag **13** located outside the sweeper housing **2**. Fan housing **7** has that and thereto which is adjacent the blade wheel provided with an aperture or tubular connection **15** extending into the sweeper housing **2** and through which air may be withdrawn from the sweeper housing **2**. Sweeper housing **2** is provided with a tubular connection **16** for a suction hose or the like. This tubular connection **16** is axis-parallel to the connection **15** and when the rotary brush **6** is in its working position, is slightly above the connection **15**. Connection **15** on fan housing **7** has arranged thereon a roller **17** (FIG. 2*a*) the rolling surface of which is located within the range of the upper confinement of the passage of connection **15**. It will be thus evident that when the mouthpiece of a suction hose is introduced through the tubular connection **16**, this mouthpiece will during its introduction engage roller **17** so that

the blower motor **1** and thus also the rotary brush **6** will be tilted upwardly. In this way rotary brush **6** will disengage the sweeping plane **18** so that the sweeper may now be employed as vacuum cleaner. When no suction hose is connected to the sweeper, connection **16** is closed for instance by a rubber-elastic closure member **19**.

As will also be seen from FIG. 2, the belt transmission **9** is arranged in a chamber **21** of housing **2** which is separated from suction chamber **20** so that the belt transmission **9** will be protected against dust and dirt. Partition **22** which separates the two chambers **20** and **21** from each other is provided with slots **23** for the passage of shafts **8, 24, 25**. These slots are so arranged that they permit a tilting of shafts **8, 24** and **25** about the hinge pin **3c**.

According to a further feature of the present invention, the sweeper housing comprises an upper section **2*a*** and a lower section **2*b***. The outwardly directed marginal portions **27, 27*a*** are held together by a rubber-elastic ring **28**. Between the two housing sections **2*a*** and **2B** there is arranged plate **3*b*** of hinge means **3**. By withdrawing the upper housing section from the lower section, the tiltable unit can easily be removed. The upper housing section **2*a*** preferably consists of synthetic material, as for instance thermoplastic material like Polystyrol; housing section **2*a*** has tiltably journalled thereon a sleeve **29** to which a handle **30** or the like, for instance in the form of a guiding means, is connected.

The lower housing section **2*b*** is preferably formed by a bottom plate of sheet metal and has its rear end provided with at least one roller, preferably two rollers **31**. Within the range of the rotary brush **6** there are pressed out from the lower housing section **2*b*** two skids **32** which protrude downwardly and while being arranged in front and behind the rotary brush **6** extend over the entire length of said brush. Between the two skids **32**, the lower housing section **2*b*** is provided with a cutout **33** for the rotary brush **6**. In view of the skids **32** in front and behind the rotary brush **6** there is formed a closed chamber **34** between the rotary brush **6** and the sweeping plane **18** by means of which a highly satisfactory suction effect and a proper cleaning or sweeping will be assured.

As will be evident from FIG. 1, supporting springs **35** may be arranged between housing **2** and the fan housing **7** or bearing arms **4, 5**. By means of said supporting springs **35** it is possible precisely to determine the force at which the rotary brush **6** is pressed against the sweeping plane **18**.

Instead of the two arms **4, 5** for journalling the rotary brush **6**, there may also be provided a plate which carries the bearings for the rotary brush **6**. The provision of such plate has the advantage that the dust and dirt loosened and moved by rotary brush **6** and suction unit **1, 11** will not adhere as easily to such plate. Moreover, such plate can easily be cleaned.

Referring now to FIGS. 3 and 4 representing a modification of the arrangement of FIGS. 1 and 2, it will be noted that within the range of motor **1**, at the upper housing section **2**, there is journalled a knurled disc **37** which is rotatable about a vertical axis. Disc **37** has an end face **38** sweeper housing **2** and being inclined to its axis of rotation. The said inclined end face of disc **37** engages a correspondingly inclined surface **39** of upper housing section **2*a***. Connected to knurled disc **37** is an arm or shaft **40** which is located in the vertical axis of rotation of disc **37**. Arm **40** extends through housing **2** in a downward direction. The lower end of arm **40** extends through a plate **41** which is rigidly connected to the motor. Within the range of the bottom side **41*a*** of plate **41**, arm **40** has connected thereto an abutment **42** in the form of a disc.

When knurled disc **47** is rotated, it will due to the inclined surfaces **38** and **39** carry out a movement in its axial direction. This movement is through the intervention of arm **40** conveyed to plate **41** and thus to the tiltable unit comprising motor **1**, arms **4** and **5** and rotary brush **6**. Depending on the angle by which disc **37** is rotated, rotary brush **6** will be more or less moved away from or toward the sweeping plane **48**.

In view of the fact that the point of attack of the lifting device is located at the tiltable unit **1, 4, 5, 6**, for instance near the hinge pin **3**, only a relatively slight adjustment of arm **40** by disc **37** is necessary in order to lift or lower the rotary brush **6** to a considerable extent.

Knurled disc **37** the inclined surface **39** of which engages the counter surface **38** on housing **2** remains automatically in any adjusted position so that the rotary brush **6** can be adjusted stepwise. Furthermore, the automatic arresting of the lifting device assures a simple handling of the sweeper.

As has been illustrated in FIGS. 3 and 4, knurled disc **37** is spring-loaded by a spring **43** so as to be urged toward housing **2**. Pressure spring **43** extends around arm **40** and has one end in engagement with the inner side of housing **2** while its other end rests on abutment **44** of arm **40**. In this way a safe stop and a proper functioning of the lifting device will be assured. According to the specific embodiment shown in the drawing, the angle plate **41** is connected to the bearing means **46** for rollers **17** on motor **1**.

What I claim is:

1. A sweeper especially for carpets, which comprises: sweeper housing means having a bottom with an opening therein and having upper and lower housing sections detachably connected to each other, motor means having a motor shaft and being arranged within said housing while being movable relative thereto, a fan unit including fan means drivingly connected to said motor shaft and also including a casing surrounding both said fan means and said motor means and supporting the latter, hinge means interposed between and firmly supported by said housing sections and pivotally connecting said casing to said housing means for pivotal movement of said casing relative to said housing means, supporting means with one end portion and other end thereof arranged within said housing means and having the one end portion connected to said casing, a brush roller arranged within said housing means and supported by the other end of said supporting means so as to be adapted to extend partially through said bottom opening for engagement with a surface to be swept, and power transmitting means drivingly connecting said motor shaft with said brush roller for driving the latter.

2. A sweeper according to claim **1**, in which said lower housing section forms said bottom and has its outside adjacent said opening provided with skid means for supporting said bottom near said bottom opening.

3. A sweeper according to claim **1**, in which said upper housing section is adjacent said casing provided with an aperture for receiving the mouth of a dust bag, and in which said casing is adjacent said aperture provided with passage means extending through said casing, and flexible conduit means establishing communication between said passage means and said aperture.

4. A sweeper especially for carpets, which comprises: sweeper housing means having a bottom with an opening therein, motor means having a motor shaft and being arranged within said housing means while being movable relative thereto, a fan unit including fan means drivingly connected to said motor shaft and also including a casing surrounding both said fan means and said motor means and supporting the latter, said casing having a tubular connection forming substantially coaxial inlet with respect to said fan means, said sweeper housing means having a closable passage therethrough approximately in axial alignment with said tubular connection, means pivotally connecting said casing to said housing means for pivotal movement of said casing relative to said housing means, supporting means with one end portion and other

end thereof arranged within said housing means and having the one end portion connected to said casing, a brush roller arranged within said housing means and supported by the other end of said supporting means so as to be adapted to extend partially through said bottom opening for engagement with a surface to be swept, and power transmitting means drivingly connecting the said motor shaft with said brush roller for driving the latter.

5. A sweeper according to claim 4, in which said closable passage has its axis located slightly higher than the axis of said tubular connection when said sweeper is on the floor, whereby when introducing the mouthpiece of a suction bore through said passage into said tubular connection the fan unit with said supporting means and said brush roller is slightly lifted to space said brush roller from the floor on which the sweeper stands.

6. A sweeper according to claim 5, which includes: guiding means having a guiding surface located approximately at the upper line of confinement of said tubular connection for guiding thereinto the mouthpiece of a suction hose to be introduced into said tubular connection.

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ROBERT W. MICHELL, *Primary Examiner.*

U.S. Cl. X.R.

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