C. D. LANNING.

MOBILE SUPPORT FOR SUCTION CLEANER APPARATUS.

APPLICATION FILED MAY 13, 1918.

1,405,924.

Patented Feb. 7, 1922.

3 SHEETS—SHEET 1.

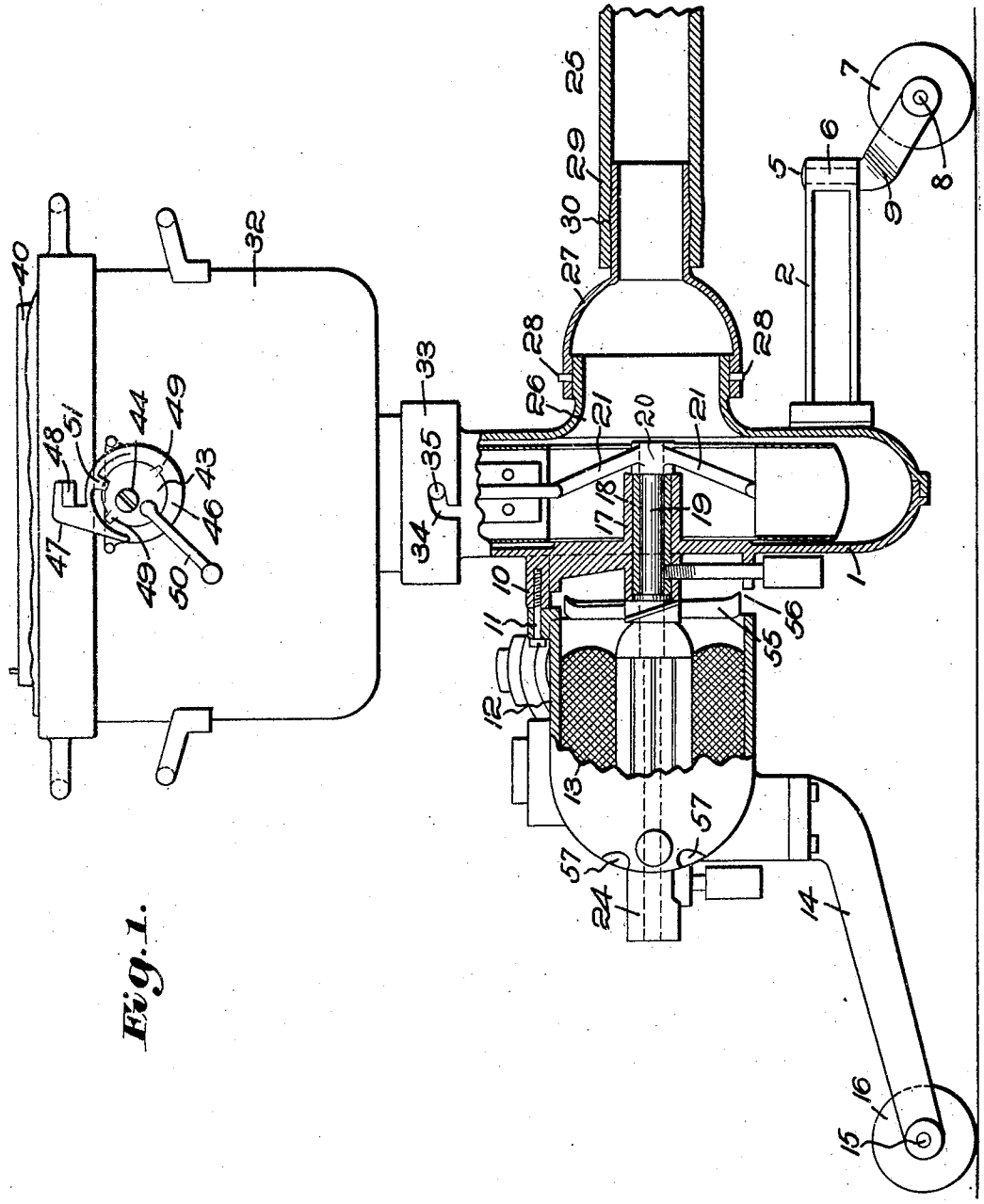


Fig. 1.

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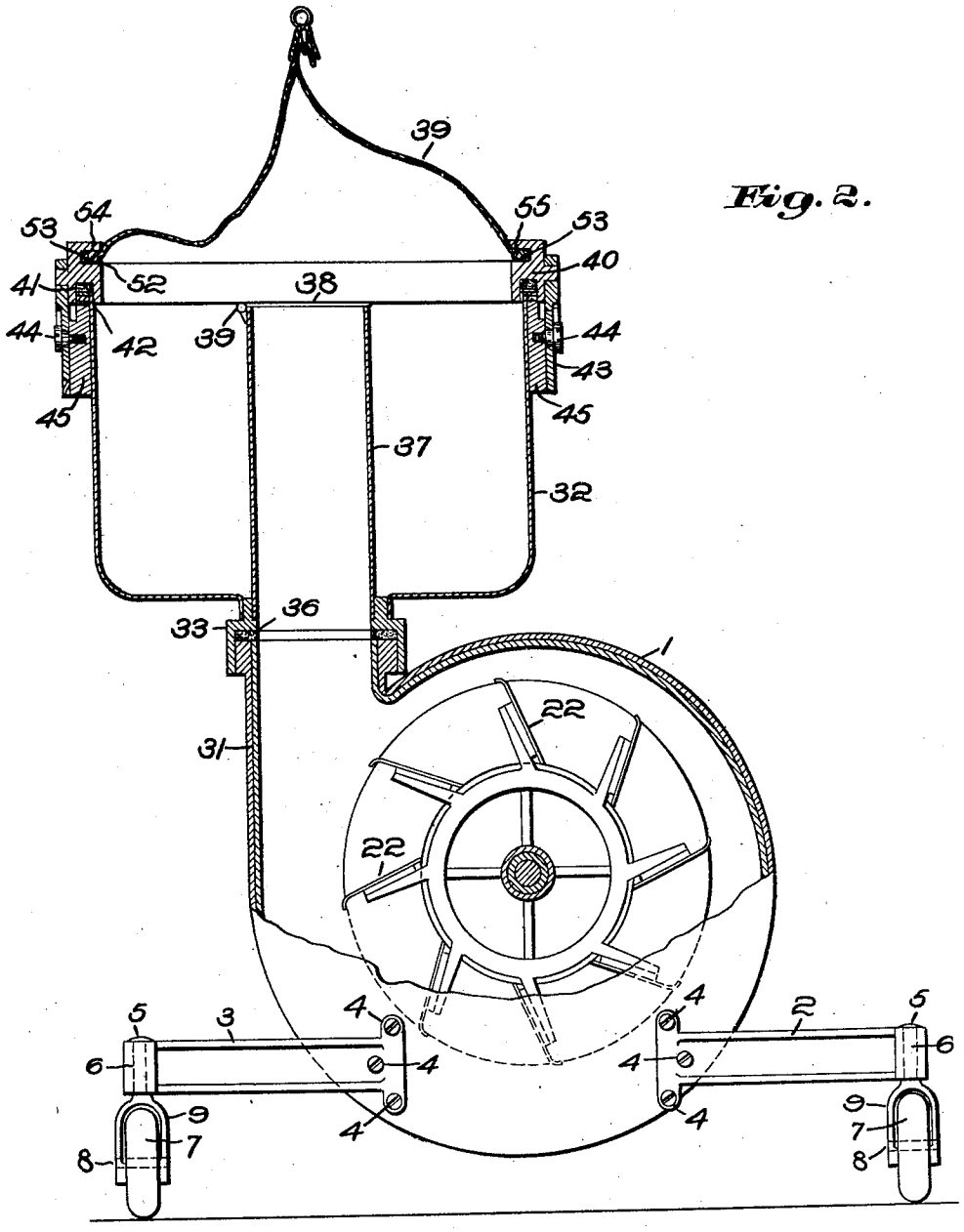


Fig. 2.

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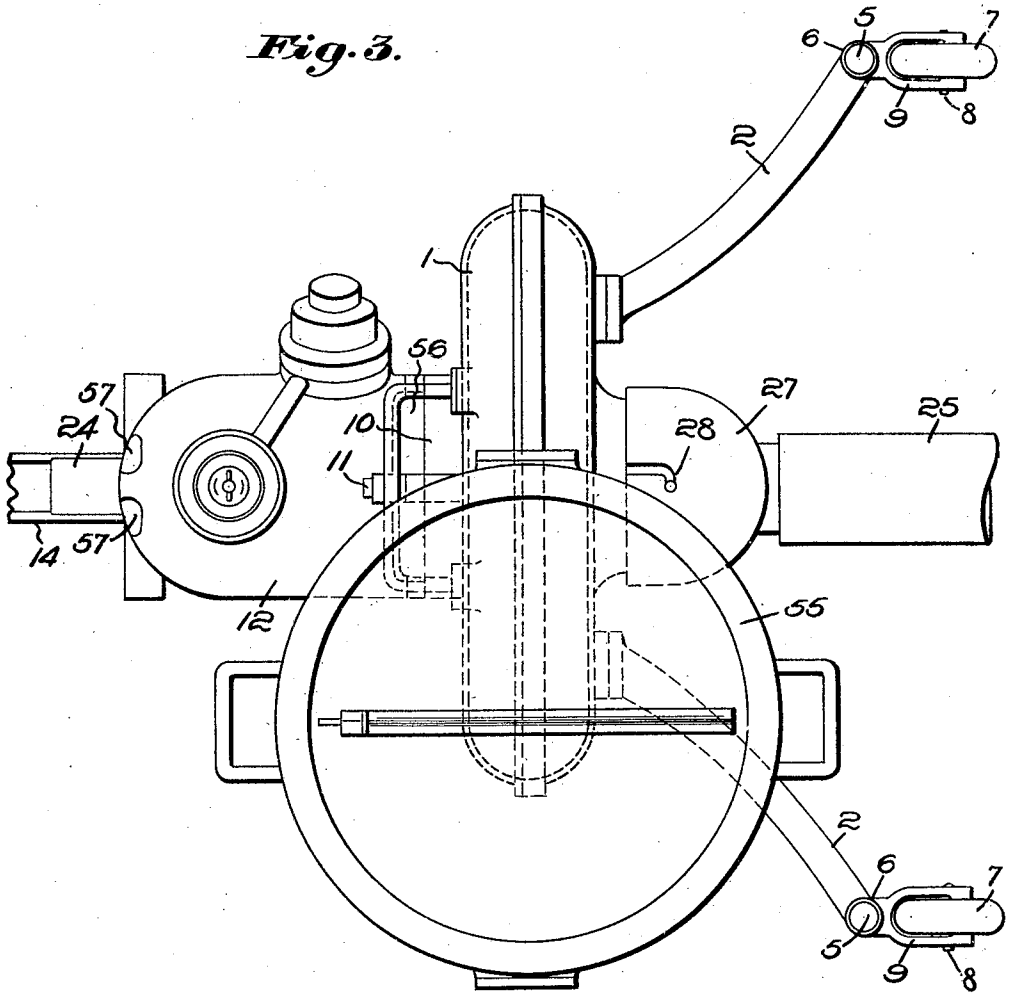
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3 SHEETS—SHEET 3.

Fig. 3.



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UNITED STATES PATENT OFFICE.

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MOBILE SUPPORT FOR SUCTION CLEANER APPARATUS.

1,405,924. Specification of Letters Patent. Patented Feb. 7, 1922.

Original application filed November 24, 1916, Serial No. 133,238. Divided and this application filed May 13, 1918. Serial No. 234,357.

To all whom it may concern:

Be it known that I, CHARLES D. LANNING, a citizen of the United States, and a resident of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Mobile Supports for Suction Cleaner Apparatus, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This application is a division of my copending application Serial No. 133,238, filed November 24, 1916, now Patent No. 1,267,348, dated May 21, 1918.

This invention relates to mobile supports and particularly to mobile supports for suction cleaner apparatus.

In order that the principle of the invention may be readily understood, I have disclosed a single embodiment thereof in the accompanying drawings, wherein—

Fig. 1 is a view partly in side elevation and partly in vertical section of a mobile support for suction cleaner apparatus embodying my invention;

Fig. 2 is a view of said apparatus mainly in vertical transverse section with part of the base in elevation; and

Fig. 3 is a plan view of said apparatus.

While my invention relates to mobile supports and particularly to mobile supports for suction cleaner apparatus, it more specifically relates to apparatus of the sort that is designed to be freely movable about the floor as part of or in connection with the cleaning work being performed, and to that end the apparatus is desirably light and compact, in order to facilitate its convenient removal from place to place and its free movement about the floor in operation. Still more specifically my invention relates to that type or form of suction apparatus in which an intake suction member acts also as a draft member.

In that specific type of my invention here illustrated, I have represented and in said Patent No. 1,267,348 have claimed a compact arrangement of the necessary elements, whereby a dirt receptacle and air screen are provided as separately removable elements with the dirt receptacle arranged for quick detachment from the main base portion without other adjustment or change in the apparatus, and wherein also the air screen is reliably secured to but quickly detachable from the dirt receptacle, the arrangement being such that the dirt receptacle and the air screen are positioned and connected to be most efficient in operation and to afford great convenience in use, while retaining the desired lightness and compactness of this specific type of suction cleaner apparatus.

To this end I so construct the apparatus that it is freely mobile about the floor under the draft of a flexible intake hose connecting a terminal intake tool with the intake orifice of the fan casing, the dirt receptacle being preferably supported above and connected to the outlet of the fan casing and herein claim the same as matter divisible from the matter claimed in my said application Serial No. 133,238.

Inasmuch as it is important to provide a mobile apparatus that may be readily trailed about a room without liability of overturning, I have provided a structure having a widely extended support and preferably a three point support so constructed that substantially all parts of the apparatus fall within a triangle joining the three points of support. Not only do I preferably provide such a construction, but the operative parts mounted upon the base or support are so arranged or are mainly so arranged that they fall within a pyramid that is described by a triangle constituting the base of the pyramid and connecting the three points of support, and the apex of which may roughly be described as the top of the air screen when the latter is distended. Moreover the operative parts of the apparatus are positioned low as hereinafter set forth to overcome liability of over turning, and the connection of the suction hose is preferably made sufficiently low to permit the ready drawing or pushing of the apparatus about by movement of the suction hose. The said features, while peculiarly applicable to mobile supports for suction cleaner apparatus, are of advantage in mobile supports for other purposes.

I shall proceed to describe in detail a suction cleaner apparatus to which my invention is especially adapted.

Referring more particularly to the drawings, I have in the several figures represented a fan casing 1 which preferably is vertically positioned so as to bring its weight well within the basal support. Formed with

or secured to the lower part of the fan casing are two roller supporting members 2, 3, herein shown as secured by bolts 4 to said fan casing. The outer ends of said members 2, 3 are provided with vertical sockets or openings 5—5 having mounted therein swivelling members 6—6 of two roller-like devices 7—7 which may be casters or other suitable rolling members. Each of said members 7—7 is provided with a transverse axle 8—8 mounted in a yoke 9—9 forming a portion of the swivelling members 6—6, and viewing Fig. 1, it will be observed that said yokes 9—9 are offset forwardly from the vertical or axial line of said swivelling members 6—6, thus permitting said roller-like device readily to turn about the members 6 as an axis. Said members 7—7 may if desired be formed as small wheels having rubber tires. As shown most clearly in Figs. 1 and 3, one lateral wall of the fan casing 1 has a lateral extension 10, to which is secured by bolts 11 or other means the casing 12 of a motor 13 which is preferably electrical, and which is connected by suitable flexible wiring to any source of electrical supply. Preferably the motor and its casing are horizontally arranged, thus keeping the weight thereof low and assisting in preventing accidental overturning of the apparatus.

A third point of support is provided, and preferably by securing to or otherwise forming rigid with the motor casing 12, a rearwardly and downwardly extending leg or foot 14, at the end 15 of which is mounted a roller like member 16 which, as clearly shown in Fig. 1 is not swivelled, as are the front roller members 7—7, but which turns only upon its horizontal axis 15.

The length of the members 2, 3 and 14 is such and the construction and arrangement of the fan casing and motor casing with reference to said roller supports are such that the apparatus cannot readily be overturned, and viewing Fig. 3, it will be noted that the parts thus far described are positioned within a triangle formed by lines joining the roller members 7—7 and 16.

The two forward roller members 7—7 are in a transverse line that is at right angles to the line of draft, while the rear roller member 16 is in the line of draft and preferably also in line with the shaft of the fan casing and motor casing. I have found that this arrangement provides a most efficient form of mobile apparatus and particularly one that may be readily shifted either to the right or to the left about the roller member 16, as well as moved backward and forward in the line of draft.

The casting 10 of the fan casing is provided with a bearing portion 17 having therein a sleeve 18 in which is mounted a shaft 19 to the inner end of which is secured a hub 20 having the spokes 21 of a fan, the blades whereof are indicated at 22 and which may be of any suitable construction. Also mounted upon said shaft 19 is the motor 13 which may be of any suitable construction and which is driven as hereinbefore stated from any suitable source of electrical current supply. The shaft 19 at its outer end is mounted in a bearing 24 preferably formed in the rear end of the motor casing 12.

The suction hose 25 with which is used any suitable device for applying suction to the floor or other surface to be cleaned is preferably connected with the fan casing in axial line with the shaft 19. I have herein represented the fan casing 1 as having a laterally extending opening 26 of relatively wide area, to which is connected a removable spout 27 in any suitable manner and preferably by a bayonet joint connection 28—28. The outer end of the spout 27 is contracted as shown at 29 and preferably is provided with an annular swell 30, over which the rubber hose 25 fits and is tightly held. This provides means for quickly and yet securely attaching the hose 25 to the said spout. The spout 27 is removable and is so constructed that it may be readily positioned upon the air outlet of the fan chamber for blowing, if desired.

I preferably provide means for collecting and holding the dirt in a separate, rigid, imperforate chamber having a quick-detachable dust-proof connection to the main portion of the apparatus, and I also provide an air screen having a quick-detachable dust-proof connection to the dirt chamber.

Herein for the purpose I have represented the fan casing 1 as having upwardly extending therefrom an outlet passage 31. In Fig. 2, I have represented said outlet passage 31 as upwardly extending from one side of the fan casing, but if desired I may so construct the fan casing that the passage 31 upwardly extends from the top or central portion of the said fan casing, so that the dirt chamber is substantially centrally positioned over the fan casing, and its weight is thus brought substantially centrally with respect to the three roller-like supports 7—7 and 16. In either case, I provide a dirt chamber 32 which is preferably metallic and is rigid and imperforate. The said chamber has a quick-detachable, dust-proof connection with the walls of the passage 31, and for that purpose I have represented the said chamber 32 as having formed therewith or secured thereto a downwardly extending, substantially centrally positioned, collar or sleeve-like member 33 having a bayonet joint connection with the walls of said passage 31. Herein for the purpose I have represented said collar or sleeve portion as having opposite bayonet slots 34 engaging pins 35 laterally extending from the walls of said passage 31. In order to render the connection wholly dust-proof, I provide any suit-

able means, as for example a packing 36 between the upper edge of the walls of the passage 31 and the collar or sleeve-like member 33.

Preferably the dirt chamber 32 has an upwardly extending tubular portion 37 in alignment with the passage 31, and the upper end thereof is provided with suitable means permitting the passage of dirt or dust and preventing its return to the fan. For this purpose I have represented a valve or clapper 38 pivoted at 39.

Upon the dirt receptacle 32 I position an air screen preferably in the form of a cloth or other suitable fabric bag 39 which is provided with means for securing it thereto in such a manner that it may be quickly detached and yet entirely prevents the escape of dirt or dust between it and the said dirt chamber.

While any suitable means may be provided for this purpose, I have herein represented a rigid ring 40 adapted to be fitted upon the upper edge of the receptacle 32 and herein shown as having in its lower edge an annular groove 41 receiving the upper rim of said receptacle and having a packing ring 42 rendering the construction entirely dustproof. While in order to connect the ring 40 with the receptacle 32, I may provide any suitable means, I have preferably at opposite sides of the receptacle 32 provided locks herein represented as disks 43 eccentrically pivoted at 44 to lateral projections 45 upon the receptacle 32. Mounted upon the disks 43 are annular members 46 formed with the upper portion of each of which is a hook 47 adapted to engage a lug 48. Each disk 43 is provided with one or more substantially radial projections 49 and a handle 50, the said projections 49 being adapted alternately to engage an inwardly extending lug 51 upon the annulus 46. The construction and relation of parts are such that when the disk 43 is rotated in a clockwise direction, viewing Fig. 1, the hook 47 is swung forwardly or to the right, viewing Fig. 1, and then downwardly into engagement with the lug 48, thus locking the ring 40 to the upper edge of the receptacle 32. The rotation of each disk 43 contraclockwise lifts each hook 47 from its lug 48 and moves it rearwardly viewing Fig. 1.

The bag or air screen 39 may be connected in any suitable manner to the ring 40, preferably providing a quickly detachable connection. For this purpose, I have represented the ring 40 as having in its inner wall an annular recess 52, wherein is positioned a packing ring 53, herein shown as vertically positioned and receiving thereagainst an outwardly acting spring ring 54 which is preferably permanently connected to the lower edge of the bag 39 as by providing a suitable hem.

The mounting and positioning of the mouth of the bag 39 are such that all the dust or dirt is compelled to fall into the receptacle 32, and while the bag 39 may be readily separated from the dirt receptacle 32 by unlocking the rigid ring 40, the said bag 39 cannot be readily torn from the flexible ring 54 because of the overhanging horizontal wall 55 of the said rigid ring 40.

The apparatus herein described is of very compact form and is constructed for free movement about the floor by pushing or dragging without any liability of overturning, as the center of gravity of the apparatus is very low and close to a horizontal plane cutting the three rollers, or more definitely stated is cut or nearly cut by a horizontal plane passing through the axis of the motor 13, that is, through the drive shaft 19, and may as desired be readily moved either in a straight line direction or at any angle thereto without necessity of touching the body of the apparatus, but merely by proper movement of the hose 25. Said center of gravity is also cut or substantially cut by a vertical plane passing through said drive shaft. It will be understood that the weight of the parts both above and below said drive shaft, taken with their relative distance from said shaft, is such as to position the center of gravity substantially as stated.

The dirt collecting chamber 32 is preferably vertically positioned with respect to the fan casing 1 and is preferably interposed between the fan and the air screen or bag 39.

After the apparatus has been used and the motor has been stopped, the dirt receptacle 32 may be quickly detached from the walls of the passage 31, and by shaking or lightly beating upon the bag 39 all the dirt clinging to the inner surface of the latter is at once deposited in the receptacle 32. Because of the valve 38, there is no possibility of dirt or dust being discharged downwardly through the upwardly extending tubular member 37. When it is desired to empty the dirt receptacle 32, the bag 39 is detached from said receptacle by unlocking the ring 40 therefrom as hereinbefore described. The dirt and dust may then be poured from the receptacle 32 and the latter quickly replaced upon the upper end of the passage 31.

So far as I am aware I am the first to provide a suction apparatus with a roller like support as herein set forth and which may be moved readily not only in a straight line but at any angle thereto without liability of overturning and by a pulling or pushing movement upon the hose connection, and am also the first to provide a support such as herein set forth, having functioning, driven parts mounted thereon, whether employed as a suction apparatus of general application or for other purposes.

The provision of a three-point roller base with two front vertically pivoted rollers positioned in a line at right angles to the longitudinal line of the apparatus and forward of the body thereof, and the inner fixed roller at the rear of the apparatus, with a low basal support for the functioning parts, secures an effective arrangement for carrying out one of the important objects of my invention. The apparatus is thus permitted to run freely over uneven surfaces and turns or swings freely about the single rear roller, the spreading of the end rollers rendering the apparatus immune against any tendency to capsize. In the specific form of apparatus shown with the arrangement of the fan casing in a vertical plane and the arrangement of the motor and its casing in a horizontal plane at the rear of the fan casing, the three-point support gives a most efficient and reliable mounting, permitting free trailing about the floor over the edges of rugs, etc., and eliminates all tendency to capsize even under a sharp turning movement given by changing the line of draft of the intake hose.

That embodiment and adaptation of the invention herein shown gives as light a construction as is practical, so that not only may the apparatus be readily trailable about the floor, but also so that in moving from place to place, there is but a limited weight to transfer. To this end, I have effected a marked lightness of motor construction, and I have disclosed means whereby if desired cooling of the motor may be effected. In Fig. 1, I have represented a motor cooling fan 55 fast upon the shaft 19, and in proximity thereto I have provided three equally spaced ventilating openings 56. The arrangement is such that the cooling fan 55 moves air through the motor casing without operative relation to the main fan. To insure the circulation of air through the motor, I may and preferably do provide openings 57, herein shown as four in number and equally spaced about the end of the motor casing 12. I may if desired further simplify the disclosed construction while retaining the desired lightness of the motor, and may do so by joining the motor casing 12 to the fan casing 1 without openings at the juncture and by providing small openings from the motor shell enclosed space into the main fan casing, positioned near the center of the main fan.

By providing openings of appropriate size a small volume of air is moved by the main fan in and through the space enclosed by the motor shell and without detrimental effect upon the main suction efficiency of the large fan 22.

Viewing Figs. 1 and 3, it will be observed that the mounting for the receptacle is in the form of an isosceles triangle having the short side forward, that is, nearest the air inlet and cutting the intake pipe 25. This construction gives a more effective and satisfactory linear trailing of the apparatus than if the base thereof were in the form of an equilateral triangle, or were in the form of an isosceles triangle having one side longer than the other two, such longer side being forward and cutting the intake pipe 25.

Having thus described one illustrative embodiment of my invention, I desire it to be understood that although specific terms are employed, they are used in a generic and descriptive sense and not for purposes of limitation, the scope of the invention being set forth in the following claims.

Claims:

1. A mobile suction cleaner having a connected, flexible suction or intake pipe, whereby draft is applied to move the cleaner about the floor, said cleaner having a fan, a motor therefor, and means to collect the intaken dirt-laden air, and a three point roller support for and constituting a part of said cleaner, comprising a single roller movable only upon its own axis, said roller extending substantially rearwardly of the cleaner and positioned on the longitudinal axis of said cleaner, and two forward rollers pivoted substantially forwardly of the point of connection of the intake pipe to the cleaner and on a line at right angles to the longitudinal axis of the cleaner and equidistant from said longitudinal axis, each of said two forward rollers being movable upon its own axis and also upon an upright axis, the sides of the triangle formed by the points of contact of said rollers with the floor lying outside the fan and motor casing of the cleaner, whereby the cleaner may freely follow the movements of the said connected intake pipe by swinging at its front end about the point of contact of said single roller as a pivot.

2. A mobile suction cleaner having a connected, flexible suction or intake pipe, whereby draft is applied to move the cleaner about the floor, said cleaner having a fan, a motor therefor, and means to collect the intaken dirt-laden air, and a three point roller support for and constituting a part of said cleaner, comprising a single roller movable only upon its own axis, said roller extending substantially rearwardly of the cleaner and positioned on the longitudinal axis of said cleaner, and two forward rollers pivoted substantially forwardly of the fan and motor, and on a line at right angles to the longitudinal axis of the cleaner and equidistant from said longitudinal axis, each of said two forward rollers being movable upon its own axis and also upon an upright axis, the sides of the triangle formed by the points of contact of said rollers with the floor lying outside the fan and

motor casing of the cleaner, whereby the cleaner may freely follow the movement of the said connected intake pipe by swinging at its front end about the point of contact of said single roller as a pivot.

3. A suction cleaner mounted upon a readily mobile self support therefor and comprising two forward and one rearward rollers arranged triangularly at the base and adapted to rest at all times upon and to be moved over the floor, the said forward rollers each having an offset vertical pivotal support, said cleaner carrying a motor drive suction creating means including a horizontally arranged drive shaft positioned at about a horizontal plane and also at about a vertical plane cutting the center of gravity, and a suction hose extending from said suction creating means at about said horizontal plane and extending forwardly between said forward rollers whereby movement of said hose transversely to its length will cause the pivotal supports of said forward rollers to turn and enable the cleaner to be drawn easily about the floor without upsetting, said hose adapted to have a suction nozzle applied thereto for manual use in cleaning either the floor or walls without changing said nozzle, whereby a single suction nozzle is provided for cleaning both the floor and walls, and the hose directly supporting said nozzle constitutes not only the handle for moving the cleaner but also the means for applying the suction nozzle to the part to be cleaned.

4. A mobile suction cleaner having a connected, flexible suction or intake pipe, whereby draft is applied to move the cleaner about the floor, said cleaner having a fan, a motor therefor, and means to collect the intaken, dust-laden air, and a three-point roller support for and constituting a part of said cleaner, comprising a single roller movable upon its own axis, said roller extending substantially rearwardly of the cleaner and positioned on the longitudinal axis of said cleaner, and two forward rollers pivoted substantially forwardly of the fan and motor and on a line at right angles to the longitudinal axis of the cleaner and equidistant from said longitudinal axis, said two forward rollers each being movable upon its own axis and also upon an offset, vertical, pivotal support, the sides of the triangle former by the points of contact of said three rollers with the floor lying outside the fan and motor casing of the cleaner, whereby the cleaner may freely follow the movement of the said connected, intake pipe by swinging at its front end about the point of contact of said single roller as a pivot.

In testimony whereof, I have signed my name to this specification.

CHARLES D. LANNING.