April 21, 1942. C. H. SPARKLIN 2,280,269

SUCTION CLEANER

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Fig. 1.

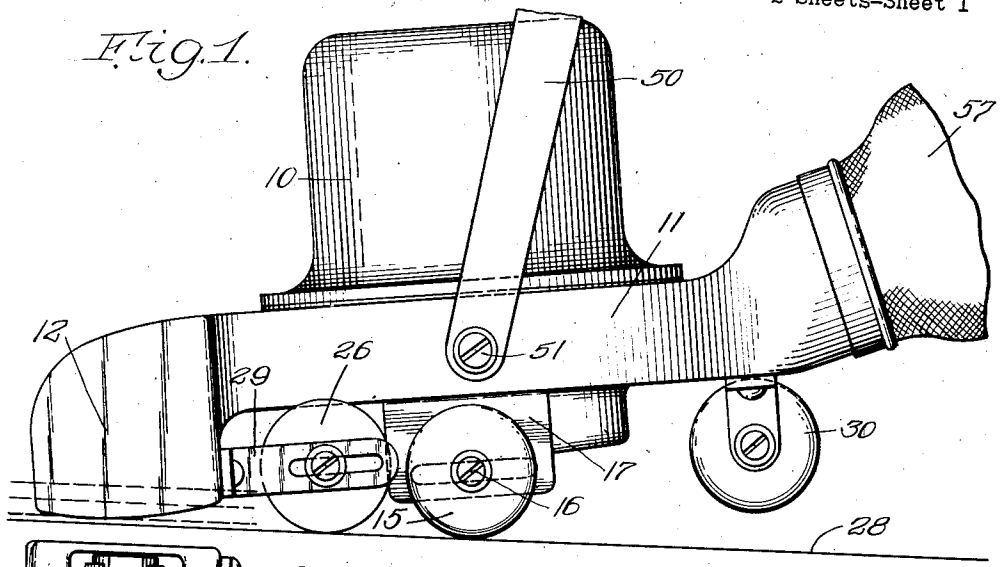
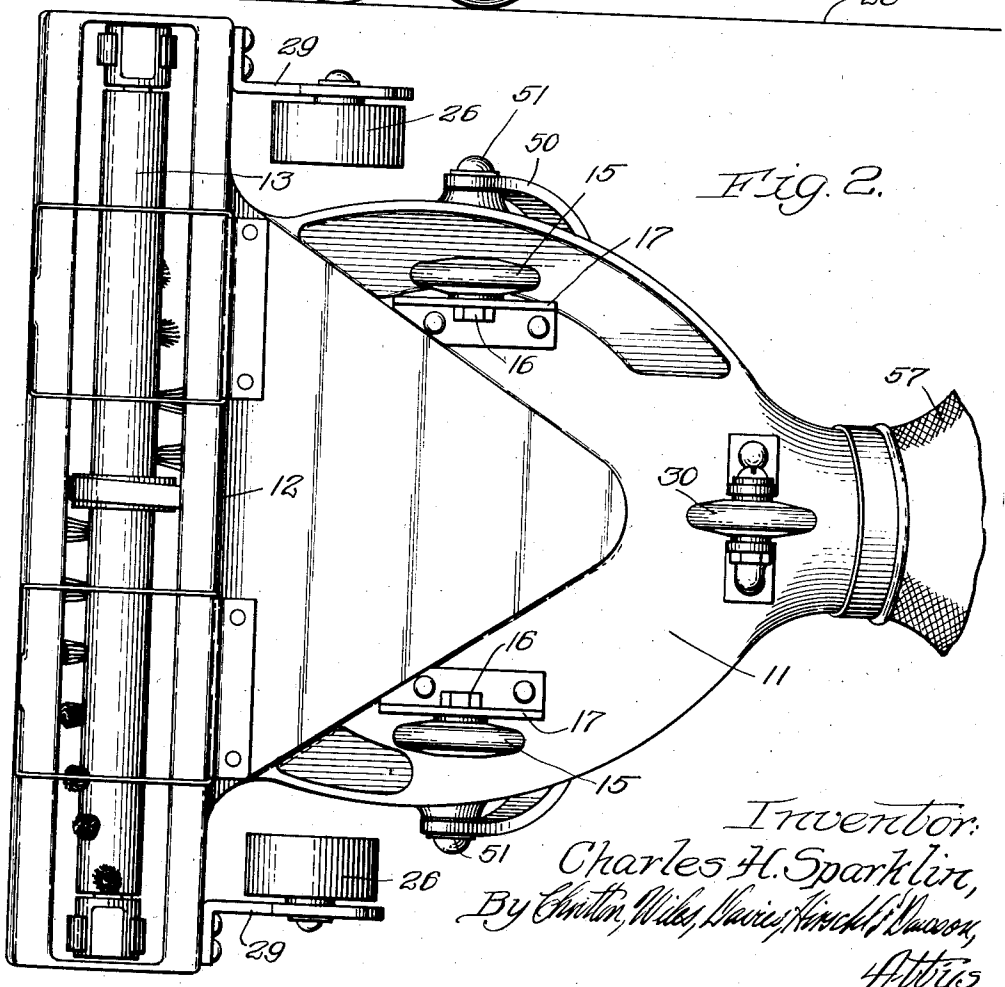


Fig. 2.



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Fig. 3.

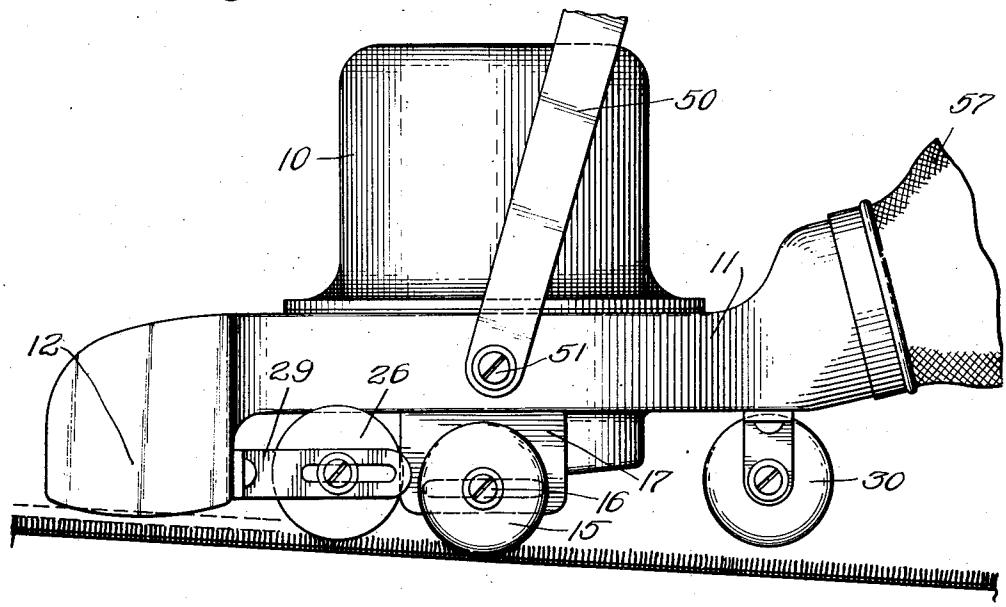
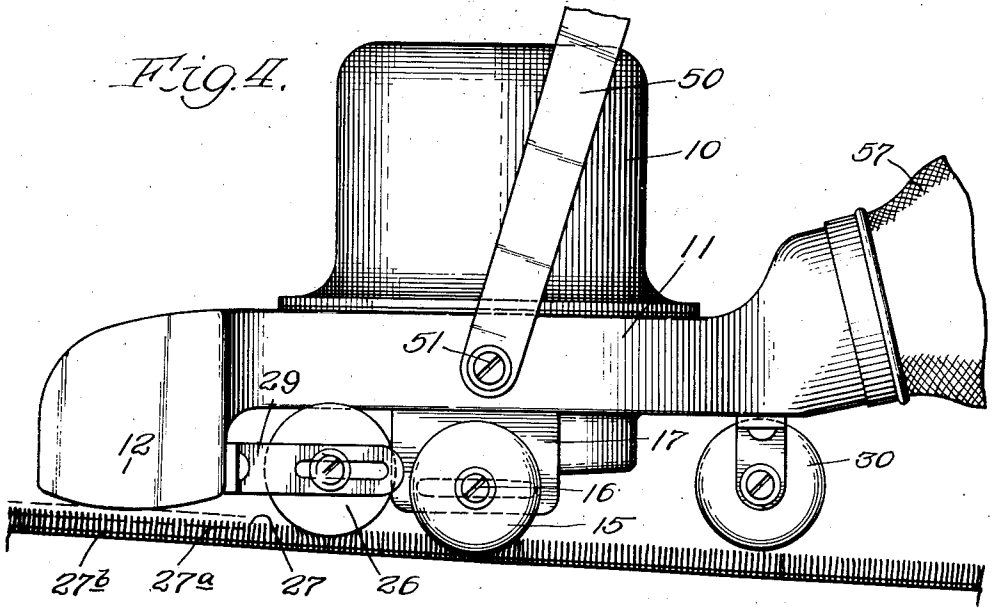


Fig. 4.



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UNITED STATES PATENT OFFICE

2,280,269

SUCTION CLEANER

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Application April 11, 1938, Serial No. 201,382

3 Claims. (Cl. 15—16)

This invention relates to improvements in suction cleaners and more especially to cleaners of the character disclosed in my Patent 2,055,734 issued September 29, 1936.

Among the features of my invention is the making of a simplified specific form of cleaner of the type shown in my prior patent.

Another feature of my invention is the provision of a two-wheeled supporting means or carriage for the cleaner. The vertical movement of the nozzle is accomplished by pivoting the cleaner proper on the axis of the two supporting wheels.

The cleaner itself carries a wheel at the rear, acting as a stop to limit rearward pivoting of the cleaner and thus limiting upward movement of the nozzle.

Another feature of my invention is the provision of a unit motor casing, fan casing, and nozzle pivotally mounted on two wheels back of the nozzle whereby pivoting of the unit on the wheels will cause vertical movement of the nozzle.

Other features and advantages will appear more fully as I proceed with my specification.

In that form of device embodying the features of my invention, shown in the accompanying drawings: Fig. 1 is a view in side elevation; Fig. 2 is a bottom plan view; and Figs. 3 and 4 are views similar to Fig. 1 showing the cleaner in different positions.

As shown in the drawings **10** indicates a motor casing, **11** the usual fan casing, **12** the nozzle, and **13** a motor driven brush in the nozzle. The motor casing, fan casing, and nozzle are made in a unit.

15, 15 indicate two supporting wheels with aligned axes placed some distance back of the nozzle. The unit, including the motor casing, fan casing, and nozzle, is pivotally mounted on the supporting wheels **15** by means of the stub axles **16, 16** adjustably secured to the plates **17** carried by the unit. This construction permits forward or backward adjustment of the wheels **15**. That is, the pivotal axis of the unit coincides with the axes of the wheels.

The nozzle **12** is vertically adjustable with respect to the surface being cleaned. This is accomplished by pivotally supporting the unit including the motor casing, fan casing, and nozzle, on the wheels **15** which lie rearwardly of the nozzle. This pivotal connection permits the nozzle at the forward end of the cleaner to be moved upwardly or downwardly.

In order to counterbalance the nozzle **12**, the unit, consisting of the nozzle, fan casing, and motor casing, is pivoted on the wheels **15, 15**. The stub axles **16, 16** are so located that the weight of the motor and motor casing back of said axles substantially counterbalances the weight of the nozzle **12** and other parts of the unit located forward of the axles. Preferably the axles are slightly back of the center of gravity so the nozzle will normally rock forwardly or downwardly. It is to be understood, however, that the axles **16, 16** are so located that the weight of the unit back of the axles or pivots substantially balances the forces of gravity acting on the nozzle throughout its range of movement.

The two rollers **26, 26** form the nozzle support. These rollers are wide enough so that they will ride more or less on the surface of thick carpet and, consequently, elevate the nozzle. For example, as shown in Fig. 4, the surface being cleaned is indicated as a rather thick carpet. The topmost surface of this carpet is indicated by **27**. As here shown, the rollers **26** have sunk down into the carpet to some extent; that is, to the level of the line indicated by **27*a***; but they have not sunk down as low as the wheels **15** which are at the level of the line **27*b*** which may be very near the bottom surface of the thick carpet.

The cleaner is shown in Fig. 1 as operating upon a hard floor **28** and here the rollers **26** naturally rest at the same level as the wheels **15** and it will be seen that the nozzle consequently is also lowered.

The rollers **26** are adjustably secured to the nozzle on the slotted brackets **29** so that forward and backward adjustment of the rollers is permitted.

The cleaner is shown in Fig. 3 as operating upon a carpet of medium thickness in which it will be seen that the supporting wheels **15** have again sunk nearly to the bottom, whereas the rollers **26** ride substantially on the surface of the material being cleaned. Again it will be seen that the nozzle **12** is thus supported by the rollers **26** a slight distance above the upper surface of the carpet.

The rollers **26** are wide enough to thus support the nozzle a slight distance above the surface of the material being cleaned regardless of its character and regardless of the degree of sink of the supporting wheels **15** into the material being cleaned.

30 indicates a rear wheel carried by the unit acting as a stop to limit the rearward pivoting of the cleaner and thus limit the upward move-

ment of the nozzle. The wheel **30** serves to prevent undue backward tipping of the device. If this wheel were not provided the device might be tipped way back with the nozzle high in the air which would cause it to look rather ungainly. Besides, the wheel **30** serves to keep the nozzle rather close to the carpet so that when the suction is started, either by suction alone or by slight movement of the cleaner, the nozzle will readily be brought down into proper cleaning position.

With the construction shown the rollers **26** provide additional supporting means for the nozzle or means limiting the downward movement of the nozzle operative especially when the cleaner is in operation. They are adapted to float or ride substantially on the surface of the material being cleaned. With this construction the nozzle will automatically be adjusted to the correct height, depending upon the kind, nature, softness, and thickness of the material being cleaned and yet will not be drawn down against or into the material by the suction to an objectionable extent.

Ordinarily the nozzle is supported some distance above the normal height of the surface of the material, and when the fan is operated the suction ordinarily raises the material into contact with the nozzle. By "normal height" I mean the height when the fan is not operating and the material is not raised by suction.

It has been stated that the rollers **26** are additional supporting means for the nozzle. It is to be understood, however, that the greater part of the dead weight of the nozzle is really carried or supported by the supporting wheels **15**. That is, the nozzle and the motor casing with the motor inside, and fan casing, are formed as a unit as is customary with portable suction cleaners, and the entire unit is carried by the two wheels **15, 15**.

The unit, however, is pivotally mounted on the wheels as explained above so that the nozzle itself is vertically movable with respect to the surface being cleaned. The nozzle supporting means, therefore, in the form of the rollers **26, 26**, act to limit downward movement of the nozzle, particularly under suction. This support for the nozzle is obtained by the rollers floating or rolling substantially on the surface of the carpet. In using the word "carpet" I mean to indicate any surface being cleaned. The invention is particularly valuable when a cleaner is used on carpets of varying degrees of thickness and softness, and, consequently, this word may be used. The rollers **26, 26** will sink into the carpet only to a very small extent, if at all; and not nearly as much into soft carpet as the supporting wheels **15, 15**. Being in the form of rollers, they will slide easily over the surface of the carpet and thus lessen the friction. The rollers preferably have considerable width, thus giving at least a line contact of considerable length and in all probability a surface contact of considerable area; thus preventing the rollers from sinking into the surface of even soft thick carpets to any great extent. By "surface" is meant the very top of the carpet. It is contemplated that the rollers will rest substantially on the upper ends of the threads forming the pile of a thick carpet without bending them over or crushing them down to any considerable extent.

It is realized, of course, that even with wide rollers the same will sink into a soft carpet to some extent, and therefore I have placed the rollers at such height that even when they thus sink into the surface to some extent, as shown in Figs. 3 and 4, the nozzle will still be held slightly above the surface. This construction may be made as desired. For example, the parts can be so made that the nozzle will just lie in contact with the surface before or after suction or even be drawn more or less tightly against the surface or into it under the force of suction. As shown in the drawings, the construction may be so that the nozzle **12** lies slightly above the surface when there is no suction. In such case suction may draw the nozzle down slightly or even draw the carpet up slightly to cause contact between the nozzle and the carpet.

50 indicates the bail of the handle pivoted to the cleaner at the points **51, 51**. The pivot points **51, 51** are preferably so located that forward and backward movement and acceleration imparted to the cleaner by the handle will not cause undue rocking of the cleaner on the wheels **15**. That is, the resistance caused by the weight of the parts below the pivot points **51, 51** and the friction of the wheels **15**, is balanced against the resistance caused by the weight of the parts above the points **51, 51**, so that pressure on the pivot points **51, 51** by the handle in operating the cleaner backwardly and forwardly will not cause undue pivoting on the wheels **15**, and therefore will not unduly affect the vertical movement of the nozzle **12**. In speaking of the resistance offered by the weight of the parts, I refer to the inertia of the same.

52 indicates the usual bag for the cleaner.

While there are shown and described certain embodiments of the invention, it is to be understood that it is capable of many modifications. Changes, therefore, in the construction and arrangement may be made without departing from the spirit and scope of the invention as disclosed in the appended claims, in which it is intended to claim all novelty inherent in the invention as broadly as permissible, in view of the prior art.

What I claim as new, and desire to secure by Letters Patent, is:

1. A vacuum cleaner comprising, in combination: a casing; suction means, an electric motor, and driving connections therebetween housed in said casing; a transversely elongated suction nozzle at the forward portion of the casing; rolling, major-load-bearing means presenting a relatively small area for contact with a material to be cleaned, operating on a single axis parallel with said nozzle in a vertical plane slightly rearward of a parallel vertical plane through the center of gravity of the device, and of a size and shape to sink to a depth determined by the characteristics of resistance to penetration of the material to be cleaned; minor-load-bearing means spaced from and forming no part of said nozzle, presenting a relatively large area to contact with the material to be cleaned, connected to said casing to contact said material forwardly of said center-of-gravity plane a substantially greater distance than the spacing of the major-load-bearing means from said plane, and projecting slightly below the opening of said nozzle to preserve a minimum spacing of the nozzle from the normal height of the surface of said material; the relationship of the areas and shape of the respective load-bearing means being such that the nozzle is automatically maintained at a substantially uniform spacing from the normal height of the surface to be cleaned irrespective of said characteristics.

2. A vacuum cleaner comprising, in combina-

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tion: a casing; suction means, an electric motor, and driving connections therebetween; a transversely elongated suction nozzle at the forward portion of the casing; rolling, major-load-bearing means presenting a relatively small area for contact with a material to be cleaned, operating on a single axis parallel with said nozzle in a vertical plane slightly rearward of a parallel vertical plane through the center of gravity of the device, and of a size and shape to sink to a depth determined by the characteristics of resistance to penetration of the material to be cleaned, into a material to be cleaned; minor-load-bearing means spaced from and forming no part of said nozzle, presenting a relatively large area to contact with the material to be cleaned, connected to said casing to contact said material forwardly of said center-of-gravity plane a substantially greater distance than the spacing of the major-load-bearing means from said plane, and projecting slightly below the opening of said nozzle to preserve a minimum spacing of the nozzle from the normal height of the surface of said material; the relationship of the areas and shapes of the respective load-bearing means being such that the nozzle is automatically maintained at a substantially uniform spacing from the normal height of the surface to be cleaned irrespective of said characteristics.

3. A vacuum cleaner comprising in combination, a casing including a transversely extending elongated suction nozzle with a mouth lying in a substantially horizontal plane at its forward portion, an electric motor, suction-creating means operatively connected to said motor and internally connected to said nozzle to draw cleaning air therethrough and to create a covering-lifting suction therein, rolling major-load-bearing means presenting a relatively small area for contact with a supporting covering being cleaned, said bearing means having their supporting axis extended parallel with said nozzle and positioned below and in a vertical plane very slightly to the rear of a parallel vertical plane through the center of gravity of the device and being of a size and shape to sink into said supporting covering to a depth dependent upon the characteristics of the pile thereof, rolling minor-load-bearing means spaced rearwardly of said nozzle and forwardly of said center of gravity and presenting a relatively large area to contact the said supporting covering with a force determined by the slight unbalance of the device about said major-load-bearing means plus the suction load resulting from the lifting effect of the suction in said nozzle upon said covering undergoing cleaning, said minor-load-bearing means projecting slightly below the plane of said nozzle mouth to preserve a minimum spacing of the nozzle above the normal position of the top surface of said covering, auxiliary-load-bearing means positioned rearwardly of said major-load-bearing means to prevent said device from pivoting over backwardly about said major-load-bearing means, said auxiliary-load-bearing means being carried by said casing at a position such that the plane of the mouth of said nozzle is prevented from rising above the top surface of a supporting covering to an extent such that the suction in said nozzle is ineffective to draw said nozzle and said covering together, the relationship of the areas and shapes of the respective major and minor load-bearing means being such that the nozzle is automatically maintained at a substantially uniform spacing above the normal position of the top surface of said covering irrespective of the character of the pile thereof.

CHARLES H. SPARKLIN.