May 30, 1950 G. R. COSS 2,509,964

SUCTION CLEANER NOZZLE ADJUSTMENT

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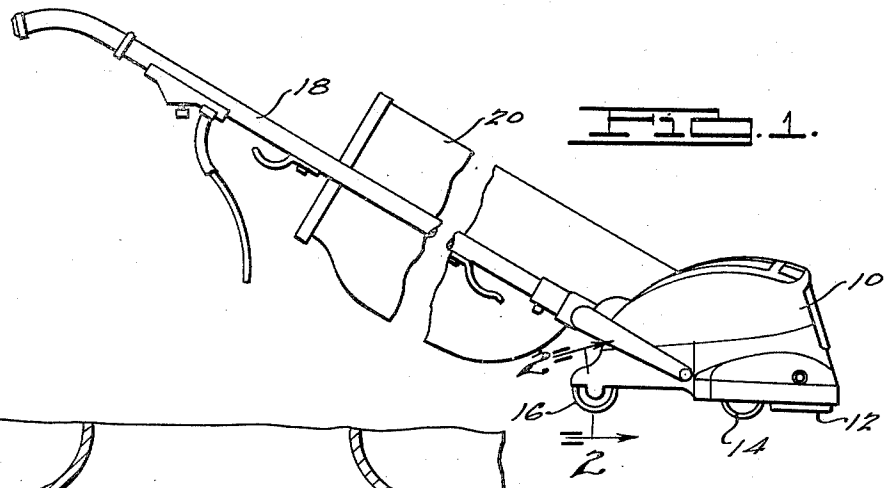


Fig. 1.

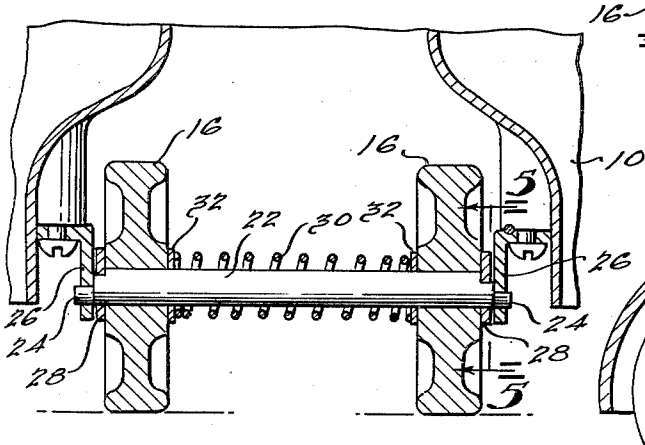


Fig. 2.

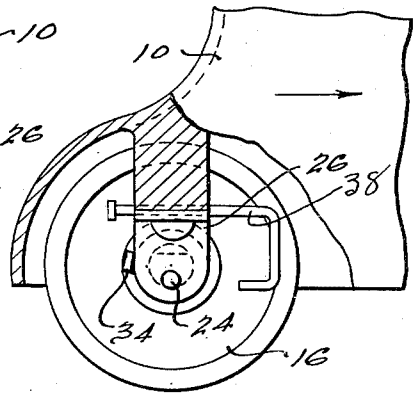


Fig. 3.

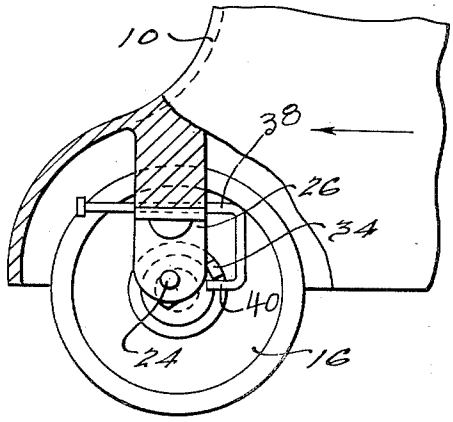


Fig. 4.

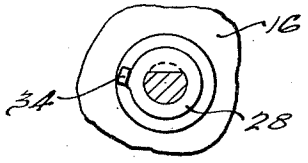


Fig. 5.

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SUCTION CLEANER NOZZLE ADJUSTMENT

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2 Claims. (Cl. 15—354)

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This invention relates to suction cleaners and has particular reference to a means for automatically adjusting the nozzle thereof in order to compensate for variations in height thereof due to changes in the loading of the wheels due to pushing and pulling the cleaner back and forth.

A principal object of the invention is to provide a means for compensating for changes in the position of the nozzle that normally occur when the cleaner is pushed and pulled over a surface covering to be cleaned.

Other objects and advantages of the invention will be apparent from a consideration of the following specification taken in conjunction with the accompanying drawings, of which there is one sheet and wherein:

Fig. 1 is an elevational view of a cleaner embodying the invention;

Fig. 2 is a sectional view taken along the line 2—2 of Fig. 1;

Fig. 3 is a side elevational view of the rear wheel mounting and the rear wheels and showing the latter in their position when the cleaner is being pushed forwardly;

Fig. 4 is a view similar to Fig. 3 but showing the position of the rear wheels when the cleaner is being pulled rearwardly; and

Fig. 5 is a sectional view taken along the line 5—5 of Fig. 2.

Referring now to Fig. 1, a cleaner embodying the invention may comprise in general a body or casing 10 provided with a floor nozzle 12, front wheels 14, rear wheels 16, a handle 18, and a bag 20.

The nozzle 12 is adapted to be supported by the wheels 14 and 16 above the surface covering on which the cleaner is being operated, and the flow of air into such nozzle is adapted to lift the surface covering up against the mouth thereof so as to efficiently clean the surface covering during the operation of the cleaner. A rotary agitator or brush may be operatively associated with the nozzle 12 for beating and/or sweeping the surface covering in order to expedite the cleaning thereof.

In practice the cleaner is maneuvered over a surface covering by means of a handle and is pushed forwardly and pulled backwardly. The wheels 14 and 16 are adapted to position the nozzle and optimum distance above the surface covering, but due to the changes in the loading of the wheels 14 and 16 due to pushing the cleaner forward and pulling it backward, the wheels 14 and 16 will sink further into the surface covering when the cleaner is pushed forwardly than when it is pulled backwardly. This is so because the

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vertical component of the force applied to the handle 18 for pushing the cleaner forwardly adds weight to or increases the loading of the wheels 14 and 16, whereas the vertical component of the force applied to the handle 18 for pulling it rearwardly decreases the loading of the wheels 14 and 16. Such changes in loading of the wheels varies the penetration of the wheels 14 and 16 into the nap of the surface covering, and consequently changes the position of the nozzle 12 with respect to the surface covering.

In order to compensate for such changes in loading of the front and rear wheels 14 and 16 I have devised the hereinafter described compensation means. The front wheels 14 may be non-adjustably connected to the cleaner 10. The rear wheels 16 are rotatable upon an axle 22, the axle being rotatably supported by its trunnions 24 in bearing surfaces suitably provided in brackets 26, such arrangement providing an eccentric mounting for the rear wheels. Brackets 26 are suitably affixed to the body of the cleaner. In order to cause the axle 22 to tend to rotate with the wheels 16, a slipping clutch or friction drive is provided between the axle 22 and the wheels 16, and this comprises a collar 28 fixed to each end of the axle 22 so as to rotate therewith and the hub of each of the wheels 16 which are spring pressed against the collar 28 by a spring 30.

Spring 30 is arranged around the axle 22 and confined between washers 32 which bear against the inside hubs of the wheels 16, thereby pressing the outside faces of the hubs of the wheels 16 against the collars 28. The ends of the axle 22 may have flattened sides so as to fit within a complementary shaped hole in the collars 28 which may be pressed on such ends of the axle 22. Each of the collars is provided with a laterally extending lug or tab or stop 34 which projects into the path of one of the brackets 26. Thus the brackets 26 in cooperation with the tabs 34 form a means to limit the rotation of the axle 22 with the wheels 16.

The frictional drag between the outside hubs of the wheels 16 and the collars 28 is relatively light so as not to offer any appreciable resistance to the forward or backward movement of the cleaner after the brackets 26 have cooperated with the tabs 34 to limit the rotation of the axle 22, the wheels 16 thereafter turning about their own bearing surfaces on the axle 22.

The trunnions 24 are arranged parallel to but off center with respect to the axis of the axle 22. Thus when the cleaner is pushed forward, the forward rotation of the wheels 16 will, through

the friction drive heretofore described, cause the axle 22 to turn in a clockwise direction (looking at Fig. 3) until the tab 34 comes up against the bracket 26. In this position it will be observed that the trunnions 24 are below the axis of the axle 22 so that the wheels 16 will be in what might be termed a position closest to the body of the cleaner. With the wheels 16 in such position the nozzle 12 will be in its highest position, that is, in its position farthest away from the surface covering as the body of the cleaner will pivot about the front wheels 14. In this position the nozzle of the cleaner may be approximately $\frac{7}{32}$ of an inch above the plane surface defined by the bottom surfaces of the wheels 14 and 16.

As the cleaner is pulled backwardly the friction drive between the wheels 16 and the axle 22 will cause the axle 22 to rotate in a counterclockwise direction (looking at Fig. 4) and until the tab 34 comes up against the other side of the bracket 26. In this position the trunnion 24 is above the axis of the axle 22 so that the wheels 16 are farther away from the cleaner. With the wheels in this position the nozzle 12 is positioned closer to the surface covering than with the wheels 16 in the position illustrated in Fig. 3. With the wheels 16 in the position illustrated in Fig. 4 the nozzle 12 may be positioned approximately $\frac{5}{32}$ of an inch above the plane defined by the bottom of the wheels 14 and 16. However, due to the change in loading of the wheels 14 and 16 when the cleaner is pushed forwardly and pulled backwardly, such wheels will sink into the surface covering less when the cleaner is being pulled rearwardly. The amount of adjustment of the nozzle 12 obtained by shifting the wheels 16 between the several positions illustrated is calculated to compensate for the differences in the sinkage of the wheels during forward and reverse movement of the cleaner so as to position the nozzle 12 substantially in the same relative position with respect to the surface covering when the cleaner is pushed forwardly and pulled backwardly.

Under some conditions it may be desirable to lock out the means for automatically adjusting the nozzle, such as when the cleaner is operated over an extremely thin rug or carpet or when a polishing brush attachment for wood or linoleum floors is operatively associated with the cleaner. At such time a lock out may be employed to lock the adjusting mechanism in one of its positions, and this may comprise a hook-shaped pin 38 slidable in a suitably formed guide provided on the cleaner. With the pin 38 arranged as illustrated in Fig. 3, the adjusting mechanism is free to operate. However, with the pin 38 arranged as illustrated in Fig. 4, the adjusting mechanism is locked out by the end 40 of the pin which, as illustrated, is arranged to cooperate with the tab 34 to prevent shifting thereof and hence to prevent operation of the adjusting mechanism. The pin 38 thus comprises a lock out for the adjusting mechanism, and while with the particular construction illustrated the lock out is adapted to lock the adjusting mechanism and hence the nozzle in one position, it is obvious that the lock out means may be arranged to lock the adjusting mechanism and the nozzle in any particular or desired position. The pin 38 should have a frictional fit in its guide so that it will stay in whatever position it may be arranged in.

While the invention has been described with some detail, it is to be understood that the description is for the purpose of illustration only and is not definitive of the limits of the inventive idea. The right is reserved to make such changes in the details of construction and arrangement of parts as will fall within the purview of the attached claims.

I claim:

1. In a suction cleaner having a floor nozzle, front and rear wheels adapted to support said cleaner and nozzle, an eccentric mounting for one of said wheels and a friction drive between said wheel and said mounting operable upon and by rotation of said wheel to vertically adjust the cleaner relative to said one wheel so as to lower said nozzle relative to said cleaner upon rearward rotation of said wheel and to raise said nozzle relative to said cleaner upon forward rotation of said wheel, said friction drive including a stop engaging different parts of said mounting upon rotation of said wheel in opposite directions as aforesaid.

2. In a suction cleaner having a floor nozzle, front and rear wheels adapted to support said cleaner and nozzle, an eccentric mounting for one of said wheels and a friction drive including a movable stop between said one wheel and said mounting, said stop being operable upon and by rotation of said wheel and in response to the operation of said friction drive by said wheel to vertically adjust the cleaner relative to said one wheel to lower said nozzle upon rearward rotation of said wheel and to raise said nozzle upon forward rotation of said wheel, said movable stop being engageable with fixed portions of said cleaner to hold said eccentric mounting in different vertical positions of adjustment.

GEORGE R. COSS.

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