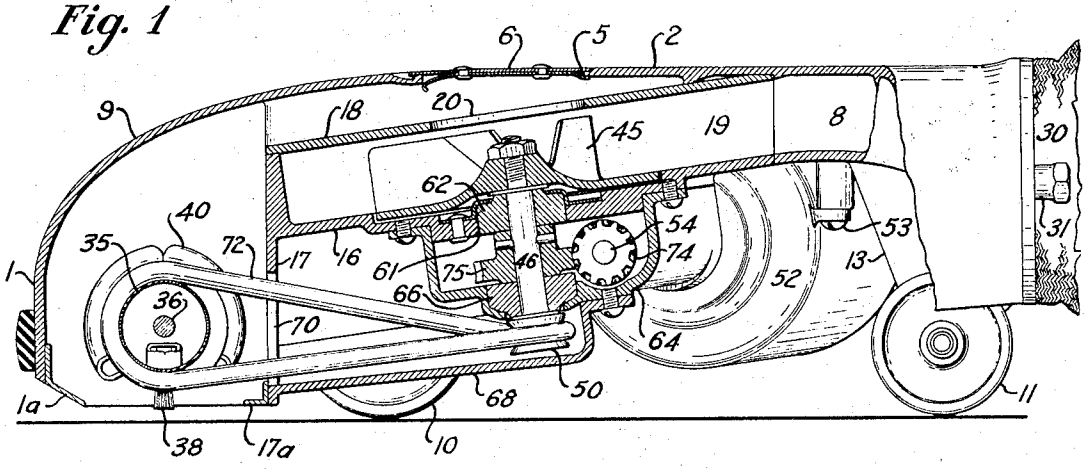
Sept. 26, 1944. W. H. KITTO 2,359,223

SUCTION CLEANER

Filed Dec. 30, 1940

Fig. 1



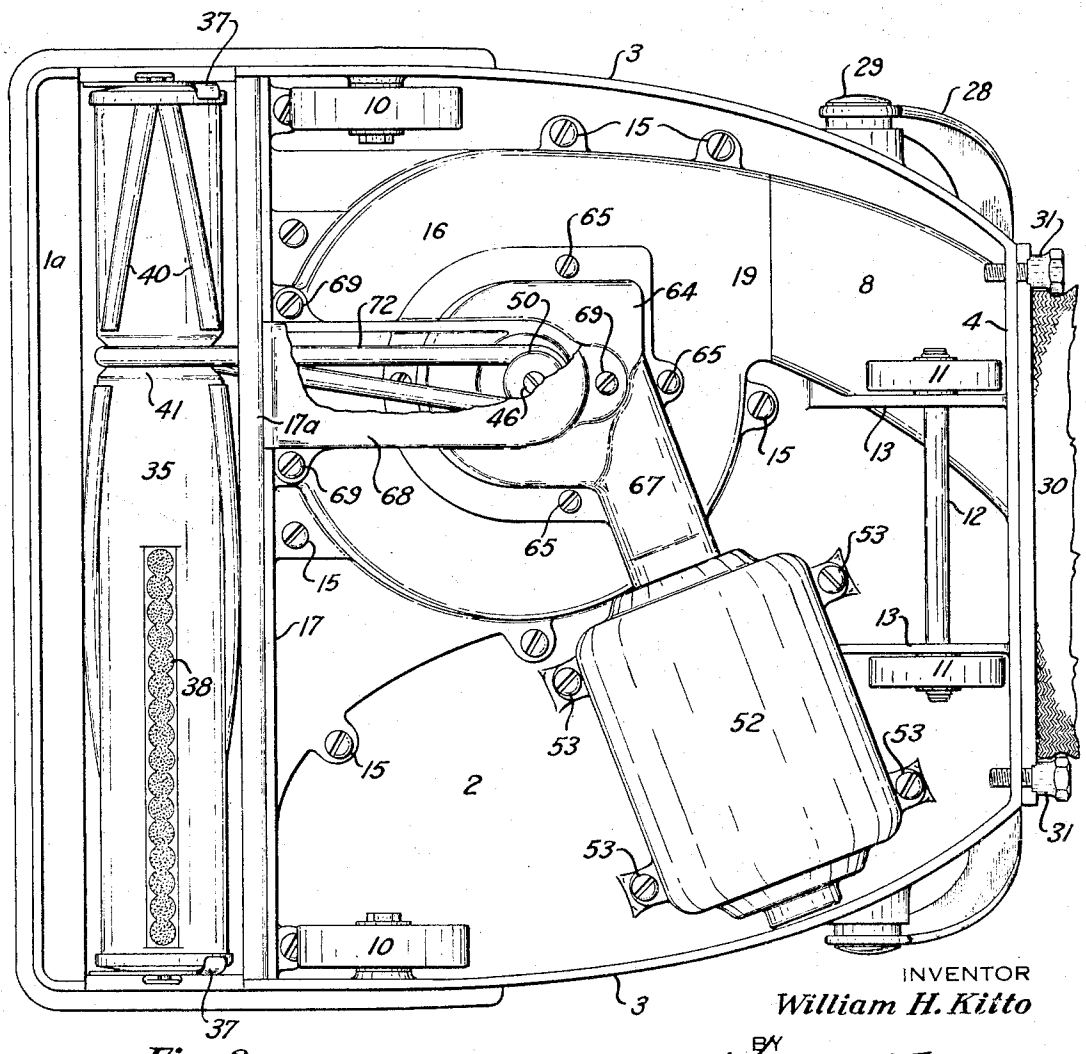


Fig. 2

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SUCTION CLEANER

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3 Claims. (Cl. 15—6)

The present invention relates to suction cleaners in general and particularly to a new and novel arrangement of parts in a suction cleaner. More specifically the invention comprises new and novel arrangements of the functionally essential elements of a suction cleaner in a manner to provide decreased over-all cleaner height, thereby increasing the range of cleaner usefulness.

It is an object of the present invention to provide a new and improved suction cleaner. It is another object of the invention to provide a new and improved suction cleaner characterized by low over-all height. A further object of the invention is to provide a suction cleaner in which the cleaner motor, fan and agitator are arranged in a novel relationship to insure decreased cleaner height. Still another object of the invention is to provide a suction cleaner in which the agitator and the suction-creating fan are driven by the cleaner motor which is positioned in a novel relationship relative thereto. Still another object of the invention is to provide a suction cleaner in which the driving motor shaft is connected to the shaft of the suction-creating fan, the latter being connected from an immediately adjacent point to the agitator. These and other more specific objects will appear upon reading the following specification and claims and upon considering in connection therewith the attached drawing to which they relate.

Figure 1 is a longitudinal cross section through a cleaner constructed in accordance with the invention;

Figure 2 is a bottom view of the cleaner illustrated in Figure 1.

The range of usefulness of a suction cleaner in its on-the-floor cleaning operation is dependent to a considerable degree upon the height of the cleaner. A cleaner of great height is unable to pass under objects of furniture to remove foreign material from the surface covering thereunder, while a cleaner of lesser height could perform that service. Accordingly it is desirable that suction cleaners for such use shall have a minimum vertical height. The arrangement of cleaner parts to effect this desirable result is of extreme importance, and any novel relationship of parts which effects a lower cleaner height, or which makes possible low cleaner height at no sacrifice of cleaner efficiency, or which insures low cleaner height without sacrifice of other desirable characteristics, is a meritorious contribution. In the suction cleaners constructed in accordance with the present invention the cleaner is designed so that the over-all vertical height of the machine is a minimum. The functionally essential parts are related in such a manner that they are capable of functioning with maximum efficiency and yet their positions are such that the cleaner height is a minimum.

Referring now to Figures 1 and 2, the cleaner casing is seen to comprise a front wall 1, a flat top wall 2 which is joined to wall 1 and extends rearwardly therefrom, side walls 3, 3 which merge in smooth curves with the walls 1 and 2, and a rear wall 4 which extends parallel to front wall 1 and is connected to side walls 3, 3 and the top wall 2. Top wall 2 is formed with a centrally located opening 5 which is normally closed by a removable cover plate 6 for a purpose which will hereinafter be explained. The walls 1, 2, 3 and 4 form a downwardly facing open bottomed shell which is a unitary construction together with a passageway 8 which extends along the underside of the top wall 2 and opens through the rear wall 4. This shell or main casting of the machine is indicated generally by the reference character 9 and is movably supported by front wheels 10, 10, which are rotatably mounted on the side walls 3, and by rear wheels 11, which are rotatably mounted upon an axle 12 carried in brackets 13 formed upon the underside of wall 2.

Fixedly secured to the underside of the main body 9 by means of a plurality of screws 15, are a fan chamber 16 and a rear nozzle wall 17 which preferably comprise a unitary construction, although the fan chamber 16 may be provided with a separate top wall 18 formed with an eye 20 which wall is secured in place by any suitable securing means. The fan chamber is formed with a cut-off or outlet 19 of the same size and shape as the passageway 8 and, with the fan chamber 16 in position, this cut-off is in exact alignment with the passageway 8 so that the two form the exhaust passageway or exhaust outlet of the fan chamber.

As in the usual suction cleaner, a handle 28 is pivotally mounted upon pins 29 at the opposite sides of the casing and provides means by which the machine can be propelled. There is provided, also in the usual manner, a dust bag 30 which is removably secured to the rear wall 4 of the body 9 by manually releasable screws 31, 31, and which is open therethrough to the end of the fan chamber exhaust outlet 8.

The dynamic parts of the cleaner are interrelated with the casing parts aforedescribed in the following manner. Within the nozzle, defined by the front and rear nozzle walls 1 and 17, is positioned a rotary agitator 35 which comprises the usual cylindrical body which is rotatably mounted upon a stationary supporting shaft 36 carried in the nozzle end walls in which it is removably retained by suitable means such as 37. Agitator 35 includes flexible brushing elements 38 and rigid beating elements 40 and there is provided in the body of the agitator a pulley surface 41 of reduced diameter which serves to receive a rotating force for the agitator.

The fan chamber 16 is formed with a central opening 61 seating a bearing 62. The latter rotatably supports a downwardly and rearwardly in-

clined shaft 46 which carries the suction-creating fan 45. A gear housing 64 is secured to the underside of the fan chamber 16 by means of screws 65 and seats, at a point below the bearing 62, a second bearing 66 through which the shaft 46 extends to carry a driving pulley 50. A second detachable housing element 68 extends rearwardly from an aperture 70 in the rear nozzle wall 17, being secured in place by means of screws 69, to enclose the driving pulley 50 and to form a belt passageway which is interiorly open to the nozzle. The power-transmitting belt 72 extends through the passageway formed by the housing element 68 to seat upon the agitator pulley surface 41.

A driving motor 52 is secured in place beneath the casing wall 2 by means of screws 53 with the axis of rotation arranged angularly relative thereto in order that the motor shaft 54 may extend through a passageway 67, formed integrally with the housing element 64, and to a position immediately adjacent the fan shaft 46. At that point shaft 54 carries a gear 74 which meshes with a second gear 75 carried by the fan shaft 46 between the bearings 62 and 66, the relationship being such that upon the rotation of the motor shaft the fan shaft will be rotated and in an obvious manner.

In operation upon the energization of the motor the rotation of the motor shaft 54 directly drives the fan shaft 46, through being geared thereto, and the rotation of the latter element effects rotation of the agitator within the cleaner nozzle through the pulley 50 and the power-transmitting belt 72. The positioning of the cleaner motor at one side of the fan chamber, with only the motor shaft extending thereunder and into juxtaposition relative to the fan shaft, provides a construction which is of reduced height and the drive of the agitator from the motor through the fan shaft results in a construction in which a double reduction of speed can be obtained before reaching the agitator.

Rotation of the fan 45 effects a reduction in the pressure existing within the nozzle between the walls 1 and 17, thereby causing air to be drawn therefrom, through the fan chamber eye 20 and exhausted through the outlet, comprising the passageways 19 and 8, into the dust bag 30. The agitator 35, being rotated by the belt 72, contacts, beats and brushes the surface covering positioned therebelow which has been lifted by the reduced pressure in the nozzle into contact with the nozzle lips 1a and 17a on the front and rear nozzle walls 1 and 17, respectively. This action of the agitator functions to dislodge from the surface covering undergoing cleaning the embedded foreign material therein and the cleaning air, rushing into the nozzle under the lips, carries that material away to deposit it within the lltering bag 30. During this operation the user propels the machine back and forth upon the surface covering, in accordance with the usual cleaning practice with suction cleaners, by means of force exerted through the handle 28. Should the operator desire to use the machine for the off-the-floor cleaning, that is, in cleaning drapes, furniture, etc., he need only remove the cover plate 6, insert the usual converter in the opening 5 into sealing engagement with the fan chamber eye 20 whereupon the cleaner suction is made effective through the converter to the dusting tools which are, of course, attached thereto. This type of conversion is in accordance with well known suction cleaner practice.

I claim:

1. In a suction cleaner, a cleaner body having a nozzle at its forward end, a rotary agitator in said nozzle, a substantially horizontal fan chamber connected to said nozzle and arranged rearwardly of said nozzle and along one side wall of said body, said fan chamber depending downwardly below the top wall of said cleaner body to provide a space beneath the body top wall between a depending wall of said fan chamber and the opposite side wall of said cleaner body, a fan in said fan chamber with its shaft projecting below the closed bottom wall of said fan chamber, a substantially horizontal motor below the top wall of said body and positioned in said space between said fan chamber and said opposite side wall of said cleaner body, said motor having its driving shaft connected beneath said fan chamber to said fan shaft adjacent said closed bottom wall of said fan chamber, a belt housing extending between said fan shaft and said agitator and having a downwardly exposed closable opening, a power transmitting belt in said belt housing below said motor-fan shaft connection and connected to said fan shaft and said agitator, and a cover for said belt-housing opening and removable for connecting and disconnecting said belt on said fan shaft without disturbing said connection of said motor shaft to said fan shaft.

2. In a suction cleaner of the type having a body provided with a nozzle, a substantially horizontal fan chamber connected to said nozzle, an agitator movably mounted in said nozzle and comprising: a fan in said fan chamber having its shaft extended below the closed wall of said fan chamber, a substantially horizontal motor adjacent the vertical wall of said fan chamber and having its shaft in a substantially horizontal plane passing beneath said fan chamber, a gear on said extended fan shaft at a point adjacent to said closed wall of said fan chamber and connected to said substantially horizontal motor shaft, and a belt connected to said agitator and to a pulley on said extended fan shaft at a point below said motor-fan shaft gear connection, whereby said belt may be disconnected from said extended fan shaft without disturbing said motor-fan shaft gear power transmitting connection.

3. In a suction cleaner of the type having a body provided with a nozzle, a substantially horizontal fan chamber connected to said nozzle, an agitator movably mounted in said nozzle and comprising: a fan in said fan chamber having its shaft supported in the closed bottom wall of said fan chamber and extended therebelow, said extended fan shaft being unsupported at its lower end, a substantially horizontal motor adjacent the vertical wall of said fan chamber and having its shaft in a substantially horizontal plane passing beneath the closed bottom wall of said fan chamber, a gear on said extended fan shaft at a point adjacent to said closed wall of said fan chamber and connected to said substantially horizontal motor shaft, a belt pulley at the lower unsupported end of said extended fan shaft beneath said motor-fan shaft gear connection, and a resilient belt connected to said agitator and pulley whereby said belt may be slipped off of said pulley over the unsupported end of said extended fan shaft to disconnect said belt without disturbing said motor-fan shaft gear power transmitting connection.

WILLIAM H. KITTO.