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VACUUM CLEANER WITH MOTOR AND HANDLE MOUNTED ON TRUNNIONS

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2 SHEETS—SHEET 1

Fig. 1.

Fig. 2.

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VACUUM CLEANER WITH MOTOR AND HANDLE MOUNTED ON TRUNNIONS

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8 Claims. (Cl. 15—383)

1. This invention relates to vacuum cleaners and has for one of its primary objects to provide an improved mounting arrangement for various parts of a vacuum cleaner.

A further object of the invention is to provide an improved mounting arrangement for a motor-fan unit of a vacuum cleaner.

Another object of the invention is to provide an improved pivotal mounting for the handle of a vacuum cleaner.

The invention consists in the devices, combinations and arrangements of parts hereinafter set forth and illustrated in the accompanying drawings of a preferred embodiment of the invention, from which the several features of the invention and the advantages attained thereby will be readily understood by those skilled in the art.

In the accompanying drawings:

Fig. 1 is a plan view of a vacuum cleaner embodying this invention, parts being broken away to show internal construction;

Fig. 2 is a side elevational view of the vacuum cleaner shown in Fig. 1, parts also being broken away;

Fig. 3 is a sectional view taken substantially on the line 3—3 of Fig. 1 and looking in the direction of the arrows;

Fig. 4 is a sectional view taken along the line 4—4 of Fig. 3;

Fig. 5 is a partly exploded view of a portion of the mechanism shown in Fig. 3; and

Fig. 6 is a sectional view on the line 5—5 of Fig. 1 and shows means for securing the handle to the trunnion arms.

In the preferred embodiment of the invention illustrated in the drawings, the vacuum cleaner is shown as having an ambulatory casing or chassis 10 formed from a lower chassis shell 11 and an upper chassis shell 12; these two shells being joined on a line inclined slightly to the horizontal and indicated by the numeral 13. The lower shell 11 is held to the upper shell 12 by a screw 14 that is rotatably supported in a pair of bosses 15 formed integral with the lower shell 11. The threaded end of the screw 14 enters a threaded hole in a boss 17 integral with the upper shell 12. The lower end of the screw 14 is provided with a knurled head 18.

A combination electric motor and fan unit 19 is supported in the chassis 10 and the vacuum cleaner is a frame which is supported on front and rear wheels 21 and 22. The front wheels are rotatably supported on axles carried by the lower chassis shell 11, whereas the rear wheels 22 are journaled on axles secured to rearwardly extend-
A hub 59 of the fan impeller 51 is extended sufficiently to pass through the eye 57 and beyond the end of the trunnion on the fan casing 53. A pulley formed on the outer end of the hub extension 59 drives a belt 61, which in turn drives a rotary brush 62 which may be of conventional form. Each of the trunnions 55, which are formed integral with the fan casings 53 and 54, respectively, are concentric with the fans 51 and 52, as well as being concentric with the motor frame members 43 and 44 and the motor shaft 48.

The combination motor-fan unit 19 is primarily supported in the vacuum cleaner chassis 10 by having the two opposite trunnions 55 clamped (Figs. 3, 4 and 5) between the upper and lower chassis shells 12 and 11 which for this purpose are each formed with a pair of semi-cylindrical engaging surfaces 63 and 64, respectively. Each of the surfaces 64 on the lower shell 11 is so formed that when the two chassis shells are clamped together each of the surfaces 64 will be complementary to one of the surfaces 63 on the upper shell 12, thereby forming two cylindrical trunnion engaging surfaces. Each of the surfaces 63 terminates in a semi-circular abutting surface 65. These surfaces are spaced apart transversely of the chassis shells 11 and 12 a distance that is substantially equal to the distance between outside ends 58 of the two trunnions 55 formed on opposite ends of the motor-fan unit 19. This assures that the unit 19 will be positioned properly with respect to the chassis shells. The motor unit 19 is additionally secured to the upper chassis shell 12 by a pair of screws 66 which pass through bosses 57 formed as part of the exhaust ports 22. These screws enter threaded holes in the upper chassis shell 12. In addition to acting as a means for positioning and supporting the combination motor and fan unit 19 in the chassis 10, the two trunnions 55 provide a means for pivotally mounting a vacuum cleaner handle 70, only a lower portion of the handle being here shown. The handle 70 has an inverted box portion 71 which is covered by a lower cover 75 secured thereto by a means not herein shown. A pair of flat trunnion arms 72 and 73 are provided, and each trunnion arm has an aperture 74 into which is press fitted a bearing bushing 75, with the outer bearing surface being abutting on a pair of semi-cylindrical surfaces in spaced portions of the motor-fan unit 19. The bearing bushing 76 is attached to the handle 70 to be detached from the trunnion arms 72 and 73. Then the lower chassis shell 11 is removed by unscrewing the thumb screw 14. Then the two screws 66, the heads of which can be engaged by a screw driver passed through holes 95 provided in the cover 75, are loosened. Loosening the screws 66 permits the handle 70 to be detached from the trunnion arms 72 and 73. Then the lower chassis shell 11 is removed by unscrewing the thumb screw 14. This exposes the motor-fan unit 18, the two screws 66 as well as the belt 61; the latter being easily removed from the hub 59. The two screws 65 completely frees the motor-fan unit 19 from the upper chassis shell 12. Since the trunnion arms 72, 73 are pivoted on the trunnions 55, which are part of the motor-unit 19, it is obvious that the legs 78 of the trunnion arms will be pulled through the slots 35 as the motor-fan unit is removed from the chassis shell 12.

The term "trunnion," as herein used, refers to the two opposite cylindrical projections or similar structures 65 formed on opposite sides of the motor-fan unit 19. The term "trunnion" is not intended to convey the idea that the motor-fan unit turns on the trunnions as an axis. The trunnion arms 72 and 73 rotate with respect to the trunnions, but in the preferred form of construction there is no relative rotary motion between the trunnions and the chassis shells 11 and 12.

Having thus set forth the nature of my invention, what I claim herein is:

1. A vacuum cleaner comprising an upper chassis shell, a lower chassis shell, means for securing said lower shell to said upper shell, a pair of semicylindrical surfaces in spaced portions of said upper shell, an abutting surface formed adjacent each of said semicylindrical surfaces, a pair of semicylindrical surfaces in spaced por-
tions of said lower chassis shell, an axial abutting surface adjacent each of said semicylindrical surfaces in said lower shell, said two pairs of semicylindrical surfaces being so constructed and arranged as to form two cylindrical surfaces when said lower shell is clamped to said upper shell, a motor-fan unit supported in said chassis, a pair of spaced cylindrical trunnions formed on said motor-fan unit, said trunnions being of such diameter as to fit into said cylindrical surfaces and said trunnions being so spaced as to be axially positioned by said axial abutting surfaces.

3. A vacuum cleaner comprising an upper chassis shell, a lower chassis shell, means for securing said lower shell to said upper shell, a pair of semicylindrical surfaces in spaced portions of said upper shell, a first axial abutting surface adjacent each of said semicylindrical surfaces, a second axial abutting surface adjacent each of said semicylindrical surfaces, a pair of semicylindrical surfaces in spaced portions of said lower chassis shell, an axial abutting surface adjacent each of said semicylindrical surfaces in said lower chassis, a second axial abutting surface adjacent each of said semicylindrical surfaces in said lower chassis, a motor-fan unit housed in said chassis shells, a trunnion formed on opposite ends of said motor-fan unit, end abutting surfaces on each of said trunnions, outer cylindrical surfaces on each of said trunnions, said outer cylindrical surfaces of said trunnions being contacted by said semicylindrical surfaces, and said first axial abutting surfaces being contacted by the end surfaces of said trunnions, a cylindrical bearing bushing rotatably carried on each of said trunnions, a trunnion arm secured to each of said bushings, one side face of each of said bushings being in contact with said second abutting surfaces, and a vacuum cleaner handle detachably secured to said trunnion arms.

4. A vacuum cleaner comprising an upper chassis shell having a pair of long narrow slots formed therein; a lower chassis shell secured to said upper chassis shell; a horizontal motor-fan unit supported by said upper and lower chassis shells; a pair of trunnions formed on opposite ends of said motor-fan unit; a pair of trunnion arms, one being pivotally mounted on each of said trunnions; and a handle member secured to said trunnion arms.

5. A vacuum cleaner comprising an upper chassis shell having a pair of long narrow slots formed therein; a lower chassis shell secured to said upper chassis shell, a plurality of supporting and abutting surfaces formed on spaced portions of said upper and lower chassis shells; a horizontal motor-fan unit having a pair of trunnions formed on opposite ends thereof, said motor-fan unit being positioned and spaced by said plurality of surfaces; a pair of trunnion arms, one being pivotally mounted on each of said trunnions and extending through one of said slots; and a handle member secured to said trunnion arms.

6. A vacuum cleaner comprising an upper chassis shell having a cupola formed as a part thereof, said upper shell being provided with a pair of long narrow slots adjacent said cupola; a lower chassis shell secured to said upper shell; a pair of semicircular surfaces on said upper shell; a pair of semicircular surfaces on said lower shell, formed complementary to said semicircular surfaces on said upper shell; a motor-fan unit housed by said two shells; a pair of opposed trunnions formed on said motor-fan unit, said trunnions engaging said semicircular surface in such a manner as to position said motor-fan unit with respect to said shells; a bearing member rotatably carried on each of said trunnions; a trunnion arm secured to each of said bearing members; a leg formed integral with each of said trunnion arms, each of said legs extending through one of said long narrow slots; and a handle member secured to the said pair of legs.

7. A vacuum cleaner comprising an upper chassis shell having a pair of long narrow slots formed therethrough, a lower chassis shell secured to said upper shell, a pair of cylindrical members engaged in said chassis shells and positioned within said chassis shells, a motor-fan unit attached to and concentric with said cylindrical members, a pair of arms pivotally carried on said cylindrical members and projecting through said pair of slots, and a handle member detachably secured to said arms at a point outside said upper chassis shell.

8. An ambulatory type vacuum cleaner arranged for to-and-fro movement on a floor, comprising, a hollow chassis shell having a pair of long narrow slots formed adjacent opposite sides thereof, said slots extending in a direction that is parallel to the direction of the to-and-fro movement; a plurality of supporting wheels rotatably mounted on said chassis shell; a dual-fan motor-unit supported by said chassis shell, said motor unit having a horizontal shaft that extends transversely of the direction of the to-and-fro movement, and said dual-fan motor-unit being symmetrically located in the chassis transverse to the direction of the to-and-fro movement; a brush rotatably supported within said chassis shell and extending at right angles to the direction of the to-and-fro movement; means for driving said rotary brush from said motor shaft; a pair of trunnions located within said chassis shell and at opposite ends of said dual-fan motor-unit; a pair of trunnion arms, one being pivotally mounted on each of said trunnions and extending through the slots in said chassis shell; and a handle member attached to said trunnion arms.

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