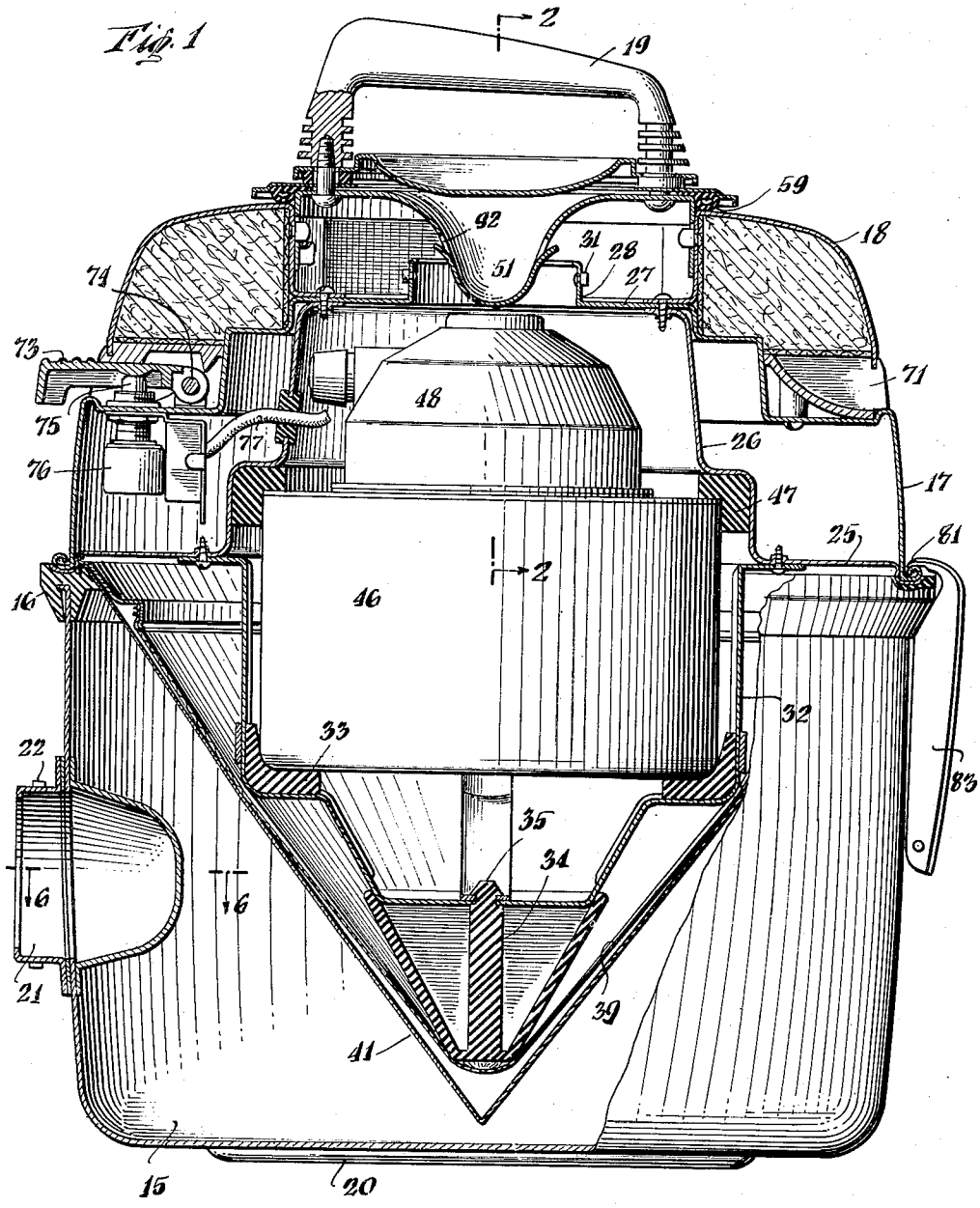
July 25, 1950 A. M. LEWYT ET AL 2,516,707

VACUUM CLEANER

Filed Jan. 11, 1947 4 Sheets-Sheet 1

Fig. 1



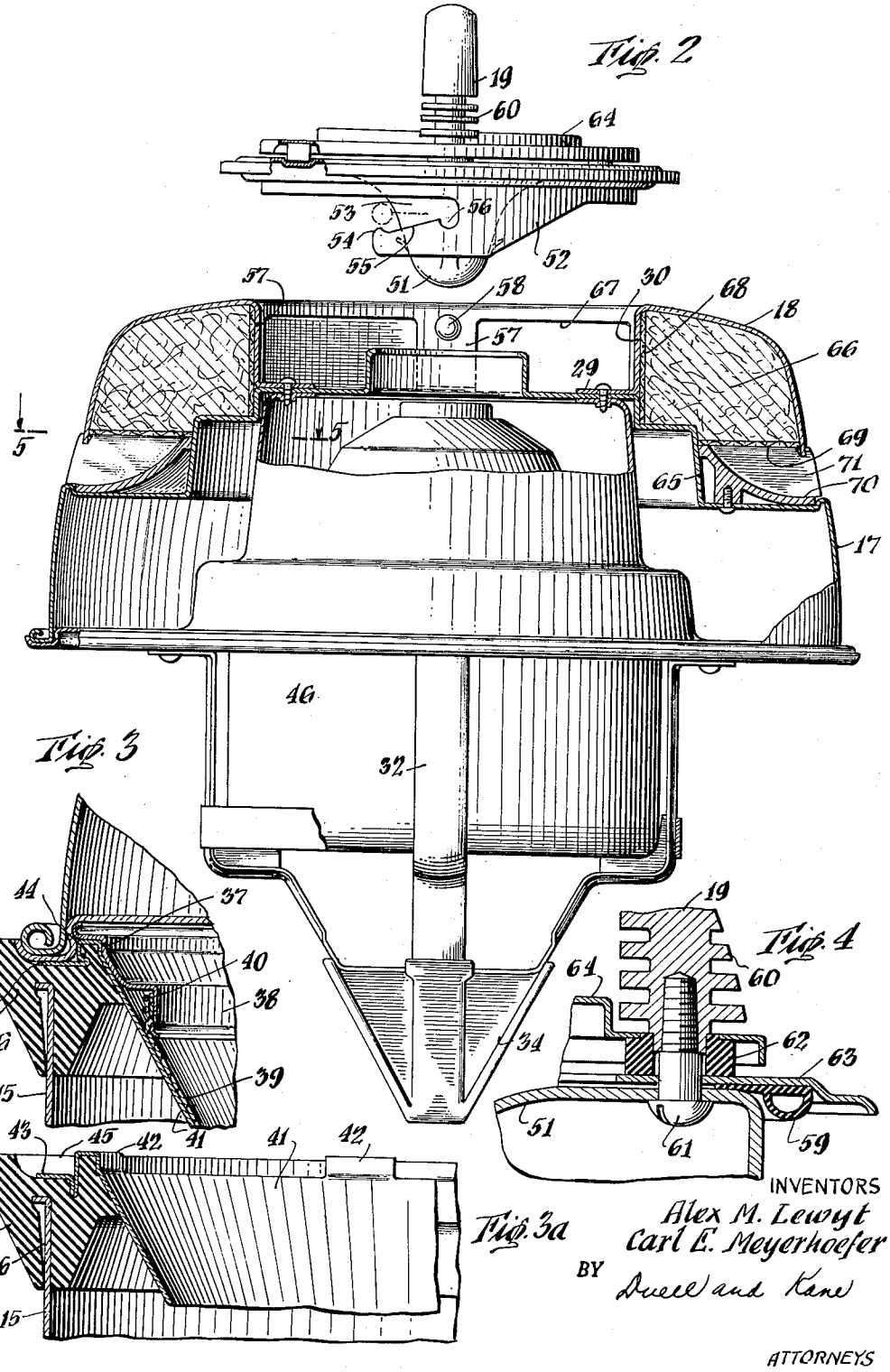
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Filed Jan. 11, 1947 4 Sheets-Sheet 2



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Filed Jan. 11, 1947 4 Sheets-Sheet 3

Fig. 5

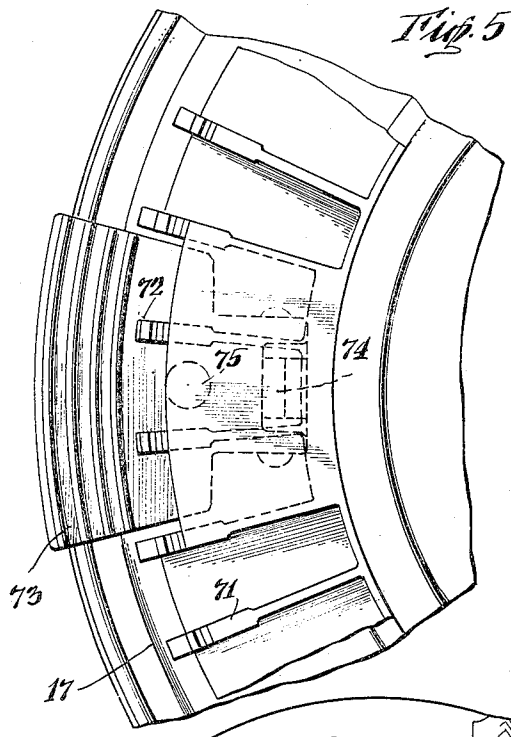
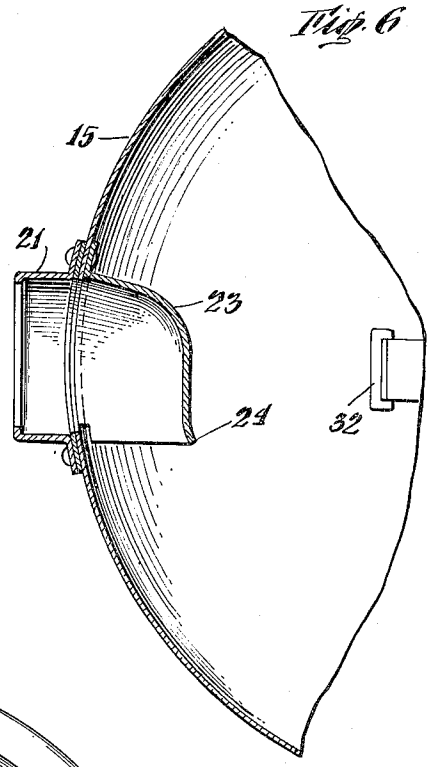


Fig. 6



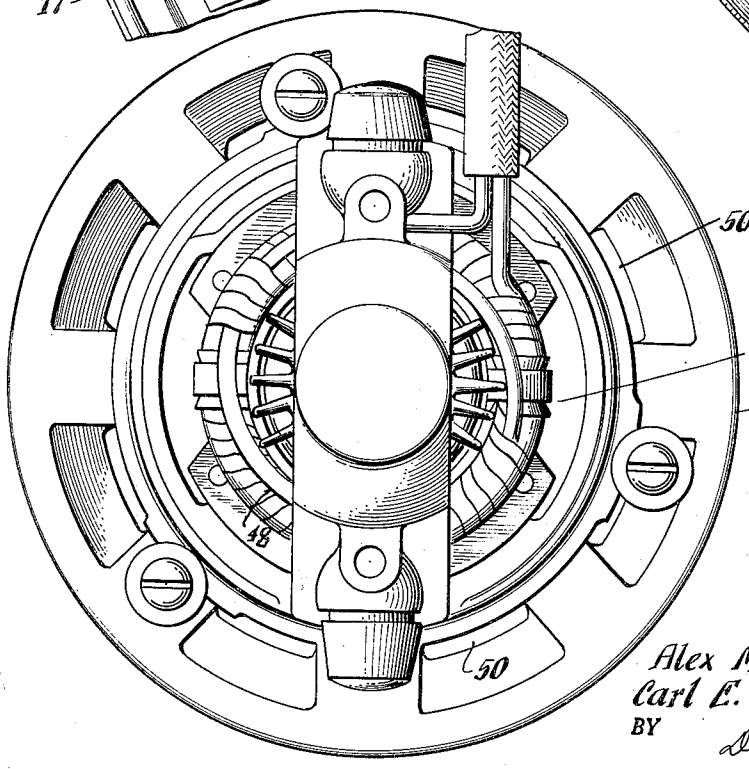


Fig. 7

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July 25, 1950 A. M. LEWYT ET AL 2,516,707

VACUUM CLEANER

Filed Jan. 11, 1947 4 Sheets-Sheet 4

Fig. 8

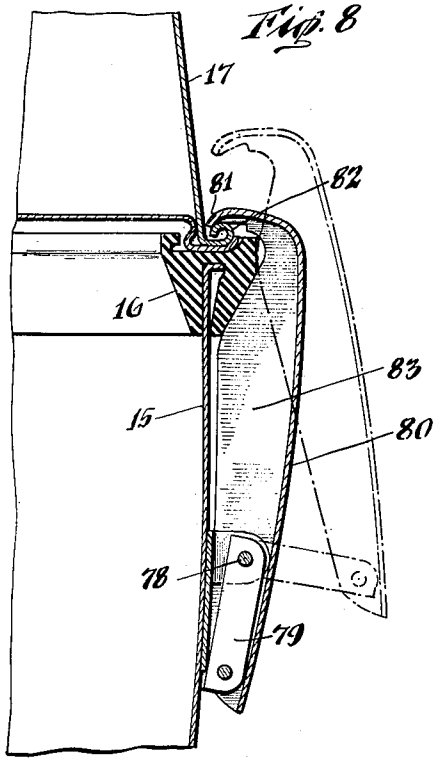


Fig. 9

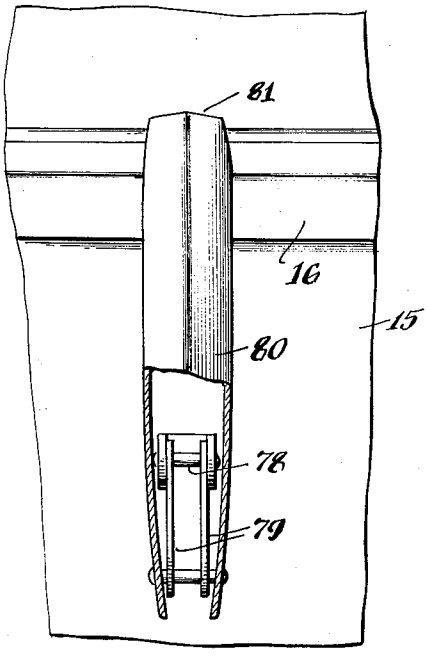


Fig. 10

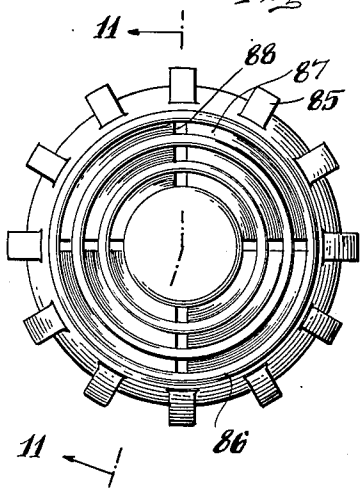
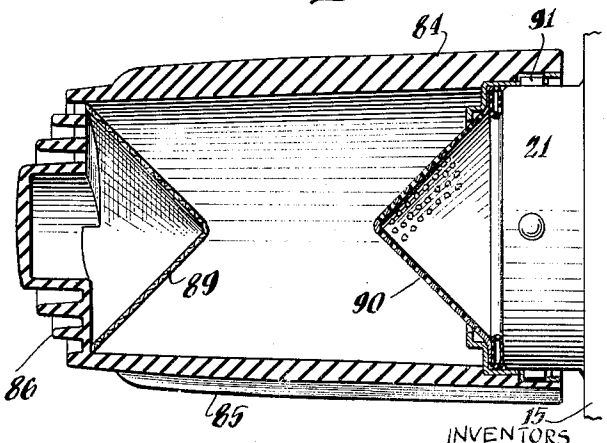


Fig. 11



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VACUUM CLEANER

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Application January 11, 1947, Serial No. 721,608

8 Claims. (Cl. 183—37)

1

This invention relates to a structurally and functionally improved vacuum cleaner apparatus and aims to furnish a unit of this character which will be extremely compact and readily portable, aside from the fact that the unit will develop an air flow of maximum velocity, while at the same time generating a minimum amount of noise.

It is an object of the invention to furnish a vacuum cleaner which will have the foregoing advantages and in which an improved filtering structure will be furnished, such that there will be no danger of the mechanism's becoming coated with or being detrimentally contacted by dust and other waste particles. Additionally, the structure will be such that dirt will be substantially completely retained within a proper compartment and the filtering structure, which assures such retention, may readily be renewed with minimum expense and skill.

A further object is that of furnishing a unit of this type, the exposed parts of which will remain cool under all operating conditions. Therefore, an operator may freely manipulate the apparatus without danger of painful contact with the surfaces, controls or handles of the assembly.

Another object is that of furnishing a vacuum cleaner which may be employed to advantage and without damage to its mechanisms, in connection with so-called "shampooing" operations of rugs, upholstery and the surfaces of other units and in which procedure a certain amount of moisture is employed.

Still another object is that of providing a machine which may be advantageously used in demothing or other operations where gases or fumes are to be distributed for control purposes.

Among other objects of the invention are those furnishing an apparatus embracing relatively few parts, each individually simple and rugged in construction, such parts being capable of ready manufacture and assemblage to furnish a unitary cleaning apparatus capable of ready control by a relatively inexperienced operator and which apparatus will function efficiently over long periods of time with freedom from all difficulties.

With these and other objects in mind, reference is had to the attached sheets of drawings illustrating practical embodiments of the invention and in which:

Fig. 1 is a sectional side view of the apparatus;

Fig. 2 is a transverse sectional view taken along the lines 2—2 and in the direction of the

2

arrows as indicated in Fig. 1, the parts being shown in separated condition;

Fig. 3 is an enlarged fragmentary view of a detail of the assembly as illustrated in Fig. 1 but showing an alternative form of construction;

Fig. 3A is a view of the parts similar to that in Fig. 3, but showing another form of structure;

Fig. 4 is an enlarged fragmentary sectional view of the handle mounting which may be employed;

Fig. 5 is a sectional plan view taken along the lines 5—5 and in the direction of the arrows as indicated in Fig. 2;

Fig. 6 is a sectional plan view taken along the lines 6—6 and in the direction of the arrows as indicated in Fig. 1;

Fig. 7 is a plan view of the motor-blower assembly;

Fig. 8 is a fragmentary sectional side view showing in detail the latch or clamping structure which may be utilized;

Fig. 9 is a side elevation of the parts as shown in Fig. 8 and with a certain portion of the handle broken away to disclose underlying construction;

Fig. 10 is an end view of an attachment for association with the cleaner and

Fig. 11 is a sectional side view taken along the lines 11—11 and in the direction of the arrows as indicated in Fig. 10.

Primarily referring to Figs. 1 and 2, it will be observed that the numeral 15 indicates the body of the unit, which body may support a gasket 16 upon which rests a band 17 supporting an upper or dome portion 18. The body 15, band 17 and cover 18 in effect provide a single unitary container. The latter may be shifted by manipulating a handle 19 and the base of the body 15 may be furnished with out-struck portions 20, in effect providing runners permitting of such manipulation or movement.

The foregoing parts—excepting only the gasket 16—are preferably all formed of suitable metal. The body 15 has an opening in its side wall, beyond which opening a collar portion 21 may extend. This collar portion may be provided with outstanding pins or lugs 22 which, in cooperation with recesses formed in attachments may serve to couple the latter to the collar. Disposed in line with the collar and interiorly of the body 15 is a scoop shaped member or deflector baffle 23. As especially shown in Fig. 6 the discharge or inner end of this member has its axis extending substantially parallel to the inner

face of the body 15. Accordingly, any air entering through the collar 21 and scoop 23 has imparted to it a rotary movement. The deflector baffle adjacent its inner end portion is preferably bent to extend tangentially as indicated at 24. It has been found that with such a construction the noise generated by inrushing air may be minimized. Also, such air will flow within the body and through the filtering structure (hereinafter described) in a proper manner.

As especially shown in Figs. 1 and 2, the band 17 has a ring-shaped member 25 secured to it. This ring is continued in the form of a stepped portion 26 which extends inwardly and upwardly to a point, within the area of the dome or upper portion 18. At that point, it is interrupted so that in effect an opening is furnished. This opening is partially obstructed by a plate 27 from which a collar portion 28 extends upwardly. The plate 27 may form an integral part of the ring 17 or be otherwise fixedly connected thereto. As will be observed, a flange 29 may overlie and be secured to the plate 27; the area of this flange being conveniently the same as the area and size of the flange which defines the upper end of the portion 26. Flange 29 is continued in the form of an upwardly extending portion 30 which may be integral with the dome 18. Finally, with reference to this assembly of parts it will be observed that pins or extended portions 31 may be mounted by the collar 28 and that the latter is preferably of the same circumference as the collar 21.

A frame in the form of channeled straps 32 may extend downwardly from the ring 25. The lower or central parts of the straps overlie and are connected to each other so as in effect to provide two supporting elements conveniently spaced 90° from each other. These supporting elements may mount cushioning pads or layers of rubber 33. At their point of contact the straps may be welded or otherwise secured together and be formed with an opening. A nose portion 34 conveniently of rubber forms a downwardly extending continuation of the straps and is secured at this point by being provided with a grommet 35. The latter may pass through the opening at the point of intersection of the straps so as to mount the nose portion 34.

As will be observed, especially in Figs. 3 and 3A, the gasket 16 is formed with a slit 36 which conveniently receives the upper edge of the body 15 and serves to retain the gasket against displacement therefrom. Mounted by the ring 25 is a band 37 having an inwardly and downwardly inclined surface. The lower portion of this band may extend parallel to the inner inclined face of gasket 16. The band 37 may terminate in a portion 38 extending parallel to the axis of the unit and such portion may serve as a mounting for a cone 39. The latter is conveniently formed of a closely woven cloth material which will be completely air-porous but at the same time will present a sufficiently fine mesh to intercept or filter any particles entrained within the column of air flowing through the apparatus. This cloth cone as especially shown in Fig. 1 is maintained in distended condition by the frame furnished by the straps 32 and the nose piece 34. It may conveniently be formed of a number of panels and be secured to the mounting portion 38 by wire or string strands 40. In this manner it will be firmly maintained in position and normally not detachable from the frame. However, should—under exceptional circumstances—a renewal of the cloth cone be necessary, this will be entirely feasible with the expenditure of a minimum amount of time and effort.

Normally the only element in the filter assembly which will be renewed is the cone 41. The latter is conveniently formed of air-porous paper and has a dimension such that it will lie in contact with the outer face of the cloth cone. As shown especially in Figs. 1, 3 and 3A, this paper cone will be interposed between the inclined face of the gasket and the adjacent inclined face of the band 37. Thus, it will be pinched between these parts and an airtight seal will be provided. As shown in Fig. 1 the paper cone may be provided with extended rim portions or tabs 42 which are accommodated within slits formed in the upper face of the gasket 16. Preferably however, these tabs are continued as indicated at 43 in Figs. 3 and 4. In the former figure the gasket 16 may be undercut so that the base portions of these tabs may be tucked into the corresponding recesses as indicated at 44. In Fig. 3A, the base portion of the tabs are folded upon themselves and extended into a slit formed in the base of the trough portion 45 of the gasket. In any event, it will be appreciated that with such construction the filter paper is mounted so as not to be susceptible to accidental displacement. At the same time should a renewal of this element be desirable this may readily be achieved by simply grasping the cone 41 and elevating it, which will in effect detach it from the gasket.

As will be understood, the filter paper 41 need not necessarily be associated with the gasket or its equivalent by tucking the tabs into the slits or recesses formed in that gasket. Rather, if desired, the cone of paper may, for example, be disposed upon the cloth cone 39. Thereafter, the entire upper portion of the assembly may be supported upon the gasket. Such support will be assured during the positioning of the parts, for example, due to the adhesion of the paper with the face of the cloth. Thereafter, as the parts operate—in a manner hereinafter described—dirt will be deposited upon the paper filter. Consequently, the latter will increase in weight and this increase will be adequate to assure that the paper cone will remain mounted upon the body 15, should the upper assembly of parts be again dismounted. Prior to such dismounting, it will be apparent that the clamping action occurring between the surfaces of the band 37, the adjacent face of the gasket and the intervening layer of paper will assure retention of the latter. Under such procedure, it is apparent that the tabs may be deliberately employed for lifting the paper cone from the body 15 when it is desired to remove the filter.

Supported upon the cushioning pads 33 is a motor-blower assembly indicated at 46. The compressor or blower may be of the multi-stage type and the motor may be directly connected to the rotor element thereof. An upward movement of this assembly is prevented by employing a ring 47 of rubber or other suitable material beyond the upper edges of the compressor casing and the inner face of the stepped member 26. As a consequence of this ring and the pads 33, the blower motor unit will have what in effect, is a floating support which will cushion it from shocks or other rough usage. Also, it will be understood that this unit will in substance be a permanent part of the assembly embodying the dome 18 and the ring 17. With the mass or weight thus provided, it is apparent that such pressure will be exerted by the inclined outer face of the ring 37 against the ad-

jacent face of the gasket 16, that the interposed filter element portions will be tightly sealed between these surfaces.

As especially shown in Fig. 7, the upper end of the motor may—with the cover 48 removed—present passages 49 and 50. A major portion of the air discharged by the blower beyond the casing 46 will flow through the passages 49 which are defined between the armature of the motor and its field. A minor portion of the air will flow through the passages 50 but will nevertheless be sufficient in volume to maintain the motor structure at a relatively low temperature. Such air will be discharged from the upper opening of cover 48 through the collar 28.

Extending within the latter may be a cone shaped member 51 which forms a part of a cover assembly and is continued downwardly and outwardly to provide side flanges 52. These flanges may be formed with notches 53 having the general configuration of bayonet slots. As shown especially in Fig. 2 these notches may be flared outwardly and the flanges 52 conveniently have projecting portions 54 adjacent each of their entrance ends. To the rear of these projections the edges are inclined upwardly as at 55 and terminate in notched keeper portions 56. The adjacent vertical wall 57 of the dome 18 mounts cooperating pins 58. If a pair of the notches is provided, these pins are furnished at diametrically opposite points in the wall 57.

It is apparent that the cone member 51 may be projected until it occupies a position within the collar 28 as shown in Fig. 1. Thereupon by rotating this member with respect to the cover 18, the pins 58 will be caused to enter the flared notches 53. As indicated in dot-and-dash lines in Fig. 2, such entrance will not result in the pins engaging with the projecting portions 54. Rather continued rotation will cause the pins to engage with the inner portions of the inclined edges 55 and to come in contact with the same until the pins enter the notched keeper portions 56. A yielding structure assuring the maintenance of the parts in this manner may conveniently be provided by employing a gasket 59 adjacent the cone 51. This gasket is mounted in a manner hereinafter described. However, it will be appreciated that should an operator carelessly manipulate the handle 19, the cone member will not become accidentally detached from the dome 18. Rather the pins 58 will ride down the inclined surface 55 until they are engaged by the projecting portions 54. Thereupon, no detachment of the parts will occur. Consequently if the entire apparatus is lifted by the handle 19 it will, under these circumstances, not fall and become damaged. At the same time, however, by deliberately manipulating the handle 19 to rotate the cone 51, the pins 58 may be brought into positions at which they will clear the notches 53 so that the entire assembly may be detached from the dome.

The cone member forms a part of the cover assembly. As shown especially in Fig. 4, the handle 19 which also forms a part of the assembly, may be provided with reduced portions adjacent its ends. In this manner heat-dissipating fins 60 are furnished. Bolts 61 may extend through the body of the cone member and be secured by engagement with the threaded bores at the ends of the handle. Heat-insulating rings 62 may be interposed between the cone member 51 and the handle to prevent the transmission of heat to the latter. A ring 63 may also be mounted by

these parts and provide a backing for the gasket 59. Finally it will be noted that a cover portion 64 may also be furnished with openings, through which the bolts 61 pass to be thus retained as part of the assembly. Accordingly, the handle together with its associated parts may be moved as a unit. Normally, these parts will be disposed in the position shown in Fig. 1.

The dome 18 together with its vertical wall 57 forms in conjunction with the extension 65 of the band 17, a space which conveniently receives a sound-deadening material. This material has been indicated at 66 and may actually comprise a plurality of layers of proper air-porous substance. A suitable material is shreaded balsam wood. As will be observed, the wall 57 is formed with openings 67 and these openings may be guarded by a layer of mesh 68. The lower zone of this space is closed by, for example, a ring 69 of mesh. Thus the mass of material 66 is held under a slight amount of compression. However, such compression should not be of sufficiently high degree to in effect obstruct air flow therethrough.

The air entering the openings or ports 67 after flowing through the mass of material 66 is discharged through the interstices of the mesh 69. Below that layer a downwardly and outwardly curved deflector ring 70 is arranged. This ring may be provided with integral or otherwise attached fins 71 extending radially therefrom. These fins will divide the air flow and also serve to disperse any heat which may be conducted to the ring 70.

The fins 71 may be interrupted through part of the circumference of the ring or else the heighth of these fins may be reduced at that point. This has been indicated by the reference numeral 72 in Fig. 5. At that point, an actuator in the form of a plate 73 is pivotally supported as at 74. This actuator may cooperate with the plunger 75 of a switch 76. The latter has leads 77 connected to the motor so that the operation of this unit may be controlled. Also in this assembly a condenser may be connected to prevent objectionable radio interference when the cleaner is operated.

Now, with a view to securing the upper portion of the assembly including the band 17 and dome 18 against movement with respect to the body 15, a number of different structures may be employed. Preferably, however, securing units as shown in detail in Figs. 8 and 9 are utilized. As shown in these figures, the body 15 has pivotally secured, as at 78, to its exterior face, pairs of links 79. The outer ends of these links are pivotally connected to handle portions 80. The latter terminate in hooks 81 overlying the outwardly extending bead 82 of the band 17. Accordingly, when the parts are in the position shown in Fig. 8, the upper part of the assembly will be maintained in substanially airtight sealing contact with the body 15. At the same time it will be noted that these fastening elements may readily be shifted to the position shown in dot-and-dash lines in this figure, so that the upper portion of the assembly may readily be detached from the lead 82 of band 17. Due to the fact that each of the handles 80 is formed with side flanges 83, a guiding contact will be established between the latter and the exterior face of the gasket, such that no contact will occur between the band 17 and the hook portions 81, as the fastening members or catches are shifted. Also due to the contact between and mounting of the handles 80 and links 79, the handles may not swing out-

wardly to points to which they will scar the exterior face of body 15. Accordingly, no marring of the surfaces will result.

The attachment shown in Figs. 10 and 11 is especially intended for de-mothing purposes or for otherwise distributing fumes or gases by means of an apparatus constructed in accordance with the present teachings. This attachment conveniently embraces a cylindrical body 84 which may be provided with rib portions 85. Adjacent its end concentrically disposed rings 86 may extend. Between the base portion of these rings, the inclined end wall section 87 may be formed with slits 88. These slits will assure a rotary travel of air which flows axially of the attachment. Inwardly of the end wall a mesh 89 of cone shape may be mounted. A similar mesh 90 may be disposed adjacent the opposite end of the attachment. At this inner end a mounting recess 91 may also be provided and have a diameter slightly in excess of collar 21. The recess 91 is formed with indentations to accommodate the pins or lugs 22. Therefore, the attachment may readily be mounted with respect to the body 15. If it is desired to obtain access to the interior of body 84, this may readily be achieved by dismounting the cone 90.

In use, it will be understood that under ordinary procedure, a filter paper 41 will be mounted to be associated with the filter cloth or its equivalent in a manner such as has been aforedescribed. Thereupon, the fasteners or catches 80 will be shifted to securing positions. Consequently, the sealing effect achieved incident to the normal contact between the band 37 and the adjacent face of the gasket 16 will be enhanced. If now, a hose (not shown) is coupled to the collar 22, the motor may be started by operating the actuator 73 and thus the switch 76. With the motor operating, air will be drawn through the collar 22 and the body of the filter assembly. This air will thereby have all entrained particles of foreign matter removed from it and the air will flow upwardly through the ports or passages 49 and 50. It will be deflected by the cone 51 as it emerges from the collar 58. Thereupon it will flow through the ports 67, the mass of sound-deadening material 66 and in radial directions outwardly between the fins 71.

If it is found despite the heat-dissipating and insulating structures, that too much heat is conducted to the handle and adjacent portions then parts of the cone may be instruck as indicated at 92. Such a provision will result in ports being established through which outside air will be sucked in small quantities to thus dissipate heat. Irrespective of such a structure however, it is apparent that an assembly is furnished in which noise will be reduced to a minimum. This will be not alone because of the mass of sound-deadening material 66 but also because of the cushioned mounting provided at 33 and 47 as well as the manner in which the incoming air is guided by the deflector 23 and especially the edge portion 24 thereof. Moreover incident to the deflector or scoop 23, the air will have imparted to it a rotary motion such that because of centrifugal force, heavier particles of foreign matter will be distributed in a circumferential direction and come to rest upon the inner face of the base of body 15. It will only be the lighter particles which flow inwardly and are deposited on the surface of the filter paper.

Where it is desired to exert a blowing action, then the cover assembly may be detached by manipulating the handle 19 as aforedescribed. Thereupon, the collar 28 will be accessible for coupling with a hose or other connecting unit. Obviously under these circumstances air will be blown through that unit. Where shampooing or similar operations are resorted to, then it is obvious that due to the nose portion 34 no damage to the parts will occur even if water accumulates to a substantial depth within the body 15. Where an attachment such as has been shown in Figs. 10 and 11 is employed it is, of course, coupled to the collar 21. Thereafter the entire assembly may be disposed in a closet or room. At that time the motor may be energized. Thereupon the fumes will be drawn through the assembly and distributed radially through the passages between the fins 71. Incident to such a distribution it is apparent that a far more effective action occurs than would be the case if the attachment were coupled in a hose line which would simply discharge a concentrated blast. Also, the operator may leave the machine unattended during this operation and will accordingly not be subjected to the dangers or unpleasant effect incident to constantly inhaling the fumes.

Thus, among others, the several objects of the invention as specifically aforenoted are achieved. Obviously, numerous changes in construction and rearrangements of the parts may be resorted to without departing from the spirit of the invention as defined by the claims.

We claim:

1. In a vacuum cleaner a motor-blower assembly, a casing portion, spaced straps secured to said portion and extending below said assembly to support the same, a nose piece secured to said straps and projecting below them, a cone of air pervious material mounted by said casing portion and maintained in distended position by said straps and nose piece, a further layer of air pervious material disposed beyond said cone, a gasket to receive said casing portion, said gasket being formed with slits and tabs forming a part of said further layer and adapted to be extended into said slits to be retained therein.

2. In a vacuum cleaner a motor-blower assembly, a casing portion, spaced straps secured to said portion and extending below said assembly to support the same, a nose piece secured to said straps and projecting below them, a cone of air pervious material mounted by said casing portion and maintained in distended position by said straps and nose piece, a further layer of air pervious material disposed beyond said cone, a gasket to receive said casing portion, said gasket being formed with slits, tabs forming part of said further layer and adapted to be extended into said slits to be retained therein and means supported by said casing portion and presenting a surface to clamp the adjacent portion of said further layer between it and said gasket.

3. In a vacuum cleaner a body, a casing portion supported by said body, a motor-blower assembly mounted by said casing portion and extending into said body, a filtering means interposed between said assembly and said body, said body being formed with an opening, said assembly being formed with an outlet opening, a cone shaped member supported by said casing portion and in line with said outlet opening, said casing portion being formed with a plurality of radially extending outlets at a point beyond said cone shaped member and said cone member being formed with openings through which outside air may be

drawn to be discharged through said radially extending openings.

4. In a vacuum cleaner a body formed with an opening, a casing portion supported by said body, a motor-blower assembly supported by said casing portion, a filtering structure interposed between said assembly and the opening of said body, said assembly being formed with an outlet, deflector means disposed in line with said outlet, said casing portion presenting a substantially vertical surface, pins extending from said surface, a handle secured to said deflector means, a vertically extending flange also secured to said member and being formed with notches to receive such pins and said notches defining in their edges relatively projecting portions, inclined edge portions and inner recesses providing keeper portions.

5. In a vacuum cleaner a body, a casing portion supported by said body, a motor-blower assembly mounted by said casing portion and extending into said body, a filtering means interposed between said assembly and said body, said body being formed with an opening, said assembly being formed with an outlet opening, a cone shaped member supported by said casing portion and in line with said outlet opening, said casing portion being formed with a plurality of radially extending outlets at a point beyond said cone shaped member, fins defining said radial outlets, said fins being interrupted throughout a certain zone, a switch controlling the motor of said assembly and a switch actuator mounted by said casing within the zone of interruption of said fins.

6. A vacuum cleaner including in combination upper and lower casing sections, a framework secured to said upper section and extending into said lower section, a motor and pump assembly carried by the framework, a downwardly and inwardly projecting band also carried by said upper section and encircling said framework, an air filter mounted by said band to extend below the same and be supported by said framework, and a gasket carried by said lower casing section and presenting a surface to bear in supporting relationship against the downwardly and inwardly inclined face of the band.

7. A vacuum cleaner including in combination upper and lower casing sections, a framework secured to said upper section and extending into said lower section, a motor and pump assembly carried by the framework, a downwardly and inwardly projecting band also carried by said upper section and encircling said framework, a cylindrical portion adjacent the lower edge of said band, an air filter overlapping said cylindrical portion and being secured thereto, said framework supporting said filter and a gasket carried by said lower casing section and presenting a surface to bear in supporting relationship against the downwardly and inwardly inclined face of the band.

8. A vacuum cleaner including in combination upper and lower casing sections, an inwardly extending ring mounted by said upper casing section adjacent its lower edge, a pair of straps having their ends secured to said ring adjacent the inner edge of the latter and their bodies extending downwardly into the lower casing section, said bodies being spaced from each other excepting only at a point substantially midway of their lengths and at that point being overlapped, inwardly extending portions forming a part of said bodies and from whence they extend downwardly and inwardly to their point of overlapping, a motor and blower assembly resting upon the inwardly extending portions of said straps, a nose piece secured to said straps at their point of overlapping and projecting below the same, a filter having its upper edge secured to said upper casing section and its body extending around and being supported by said straps and nose piece and said upper casing section being supported upon said lower casing section.

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