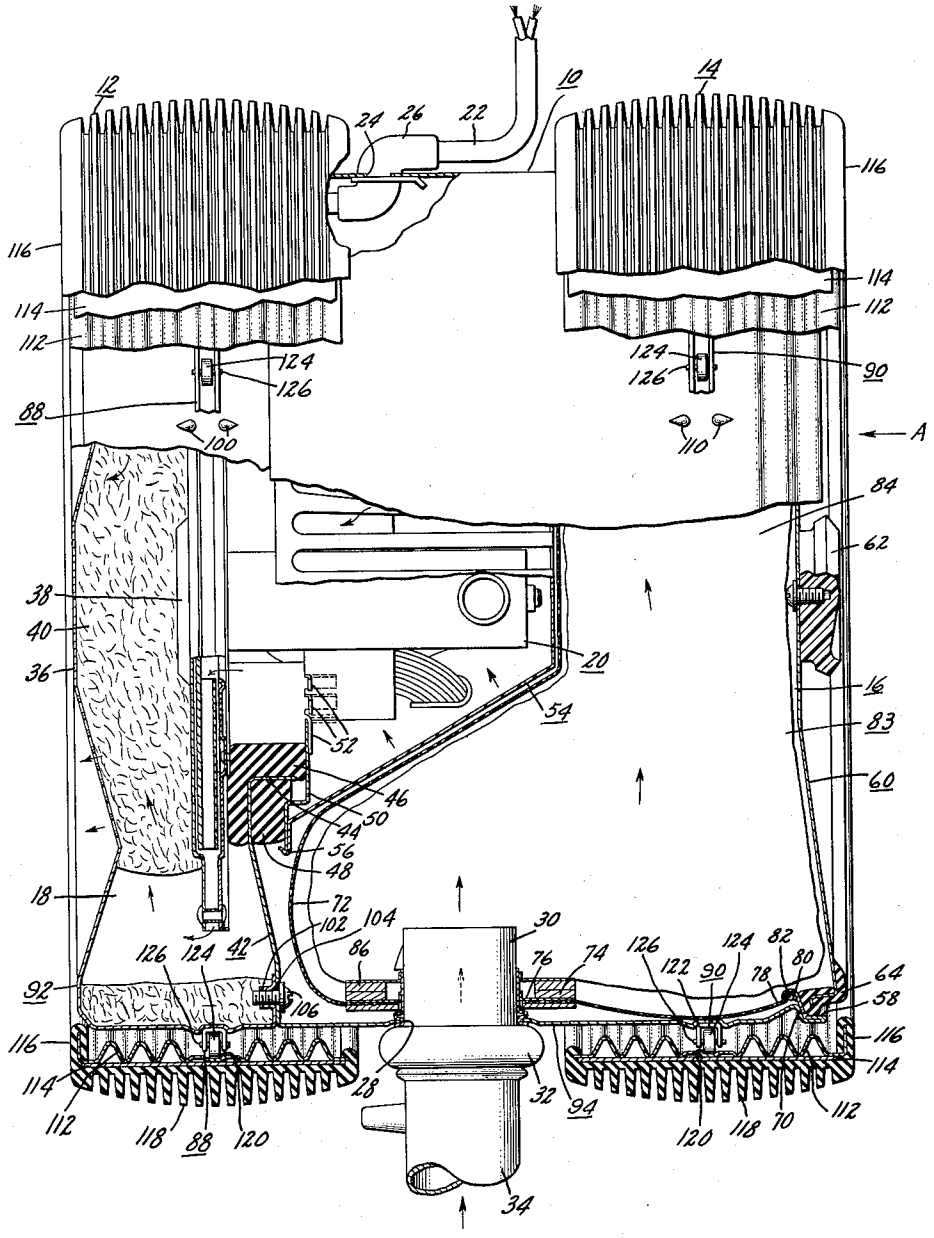
July 11, 1961 G. H. BRAMHALL 2,991,928

LOW COST MOBILE VACUUM CLEANER

Filed May 20, 1958 4 Sheets-Sheet 1

Fig. 1.



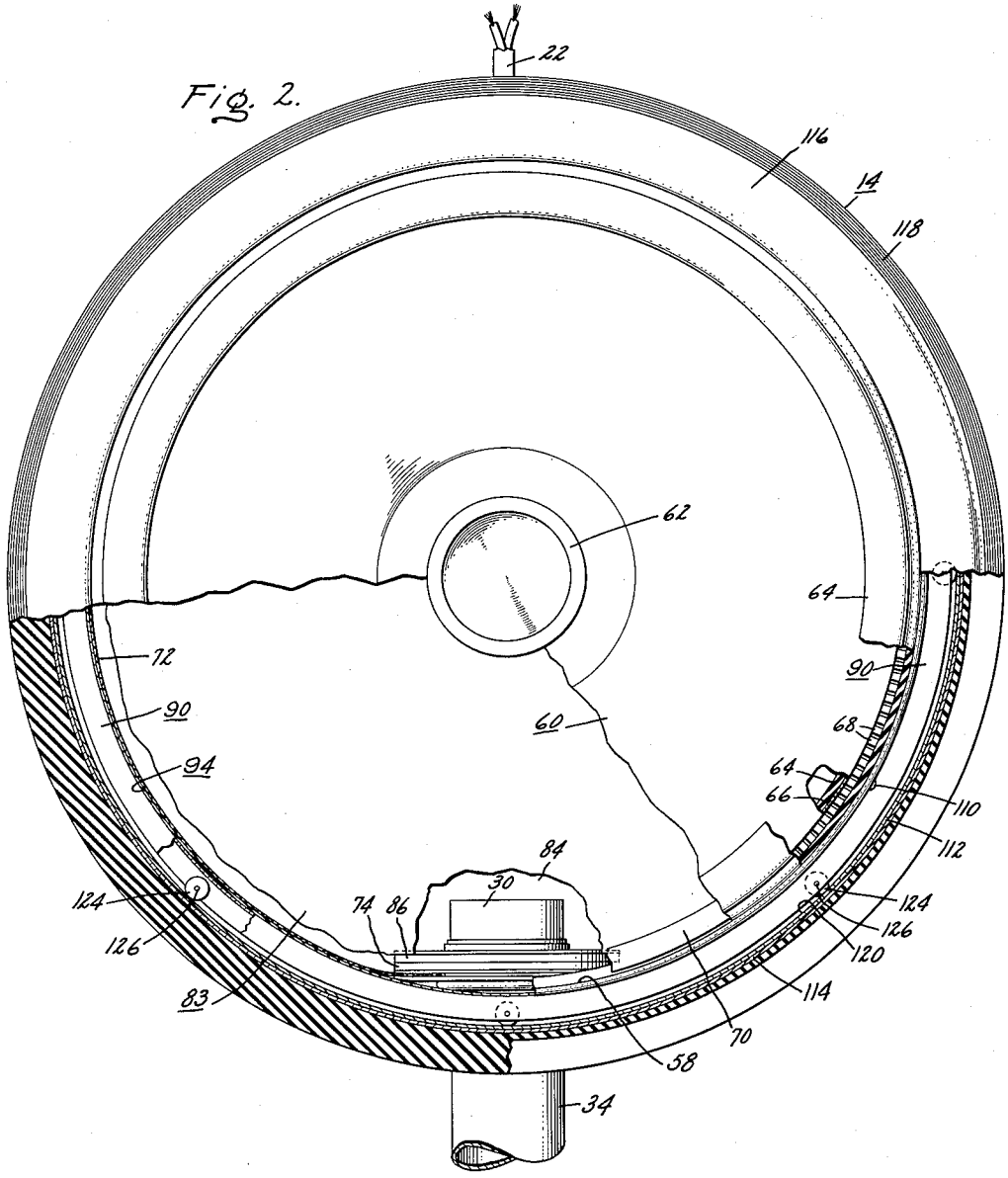
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LOW COST MOBILE VACUUM CLEANER

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Fig. 2.



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LOW COST MOBILE VACUUM CLEANER

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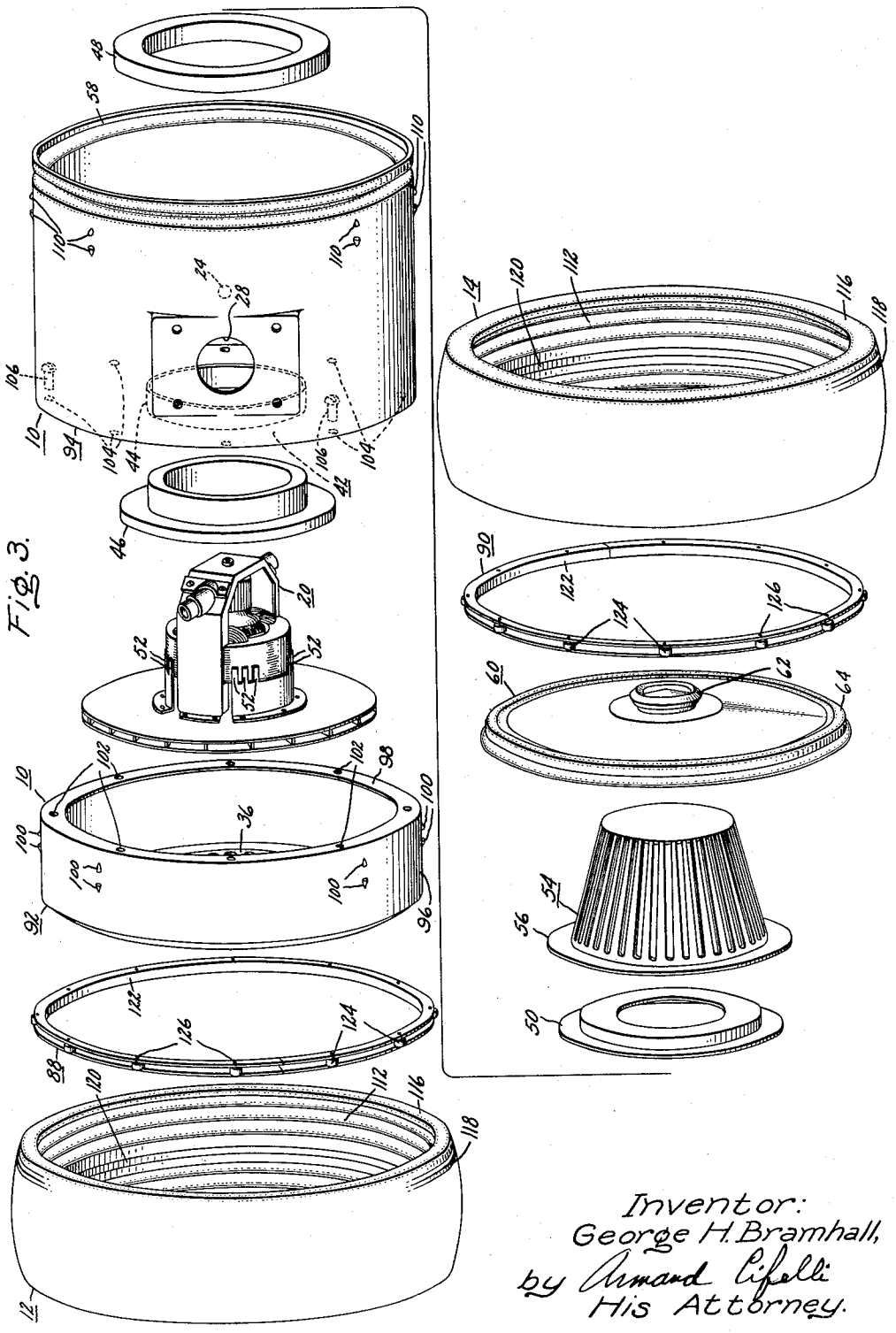


Fig. 3.

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LOW COST MOBILE VACUUM CLEANER

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Fig. 4.

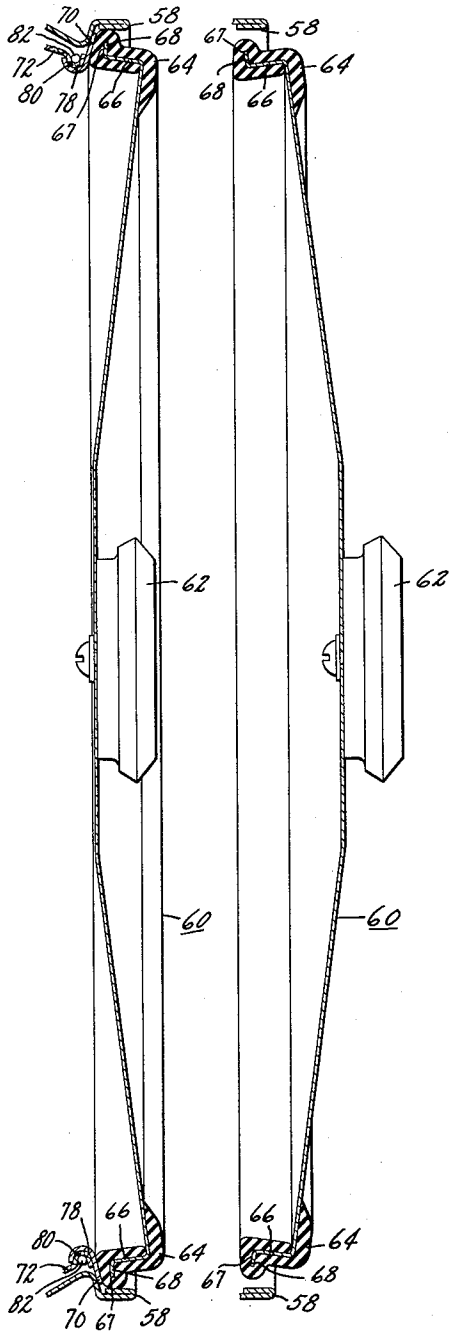
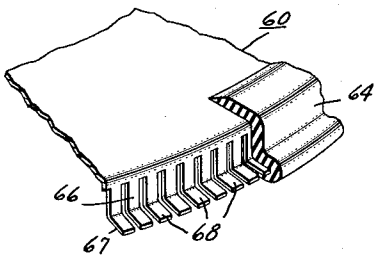


Fig. 5.

Fig. 6.



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United States Patent Office 2,991,928 Patented July 11, 1961

2,991,928

LOW COST MOBILE VACUUM CLEANER

George H. Bramhall, Chagrin Falls, Ohio, assignor to General Electric Company, a corporation of New York

Filed May 20, 1958, Ser. No. 736,518
6 Claims. (Cl. 230—117)

My invention relates to domestic, mobile vacuum cleaners.

The vacuum cleaner art is highly competitive and constantly strives to reduce the cost of producing vacuum cleaners in order that vacuum cleaner manufacturers might operate on a profitable basis. The intense competition extends not only to the area of price, which in turn is largely dependent upon the cost of producing vacuum cleaners, but also to the functional area of operational features. Currently the vacuum cleaner art has stressed the operational feature of mobility in vacuum cleaners. One highly successful, contemporary, mobile vacuum cleaner comprises a generally cylindrical, horizontally oriented casing which is supported on a pair of large wheels for movement over a floor surface. The challenge of providing a vacuum cleaner which is highly attractive to the consumer due to its desirable operational features, and yet one which is simple in construction and easy to manufacture, and therefore, inexpensive to produce, constantly faces the vacuum cleaner art.

It is an object of this invention to provide a domestic, mobile vacuum cleaner which is simple in construction, easy to assemble and, yet, which possesses many desirable operational features.

The object of this invention is achieved in one form by the provision of a domestic, mobile vacuum cleaner comprising an essentially cylindrical, main casing which is made of two cup-shaped parts that cooperate when assembled to provide a mounting for the vacuum cleaner motor and fan unit, an air filtering chamber and an air discharge chamber, that are adapted to support a pair of large wheels on their exterior, one associated with each part, and wherein one part is adapted to receive a disk-like cover which operates on an "oil can" principle to close the casing.

The above and other objects and further details of that which I believe to be novel and my invention will become apparent from a consideration of the following specification and drawings wherein:

FIG. 1 is a top plan view, with portions cut away and shown in section for the sake of clarity, of a completely assembled, domestic, mobile vacuum cleaner which incorporates the instant invention;

FIG. 2 is an end elevational view looking in the direction of the arrow A in FIG. 1, with portions cut away and shown in section for the sake of clarity;

FIG. 3 is an exploded view of the entire vacuum cleaner;

FIG. 4 is a vertical sectional view taken centrally through the lid and a portion of the vacuum cleaner casing which cooperates therewith, showing the lid in its closed condition;

FIG. 5 is a view similar to FIG. 4 showing the lid in its open condition; and

FIG. 6 is a fragmentary perspective view of the lid.

Referring to the drawings, and particularly FIG. 1, it will be seen that the improved, domestic, mobile vacuum cleaner generally comprises an essentially cylindrical, main casing **10**, and a pair of wheels **12** and **14**. Within the casing **10** there is provided an air filtering chamber **16** and an air discharge chamber **18**. Resiliently supported within the casing **10** is an air-flow producing means in the form of a motor and fan unit **20**, the detailed construction of which will not be disclosed in this patent application. The particular construction of the motor and fan

unit is not a specific part of the instant invention, and therefore, it will be understood that various motor and fan units could be employed as long as they have appropriate mounting portions for cooperating with the remainder of the vacuum cleaner structure to mount the motor and fan unit properly in the vacuum cleaner casing. For a disclosure of a particularly effective motor and fan unit which may be utilized with the instant invention, reference may be had to my co-pending patent application Serial No. 736,519, entitled Low Cost Electric Motor, filed concurrently herewith, and assigned to the assignee of the instant application.

The motor and fan unit **20** is appropriately wired and is electrically connected to electrical cord **22**, which extends through an opening **24** in the casing **10** to the exterior thereof, where it has a conventional electrical plug (not shown) at its free end, which may be manually inserted into a conventional, domestic electrical outlet. The opening **24** is sealed by the air seal **26** and thereby rendered air tight. At another location in the casing **10** there is provided an opening **28** in which, and extending into the interior of the casing, is disposed an air inlet tube **30**. The coupling end **32** of a flexible air hose **34** is adapted to be removably inserted into the opening **28** and to thereby place the air filtering chamber **16** in communication with the interior of the air hose **34**. It will be understood that the free end of the air hose **34** (not shown) may have a vacuum cleaning tool connected to it for use in a conventional manner on the object being vacuum cleaned. The details of the coupling **32** form no specific part of my invention, and therefore, will not be described. However, a particularly effective coupling which may be utilized with the instant invention is disclosed and claimed in Patent No. 2,755,106 (Brennan et al.), assigned to the assignee of the instant invention. It will be understood that, if desired, other couplings could be utilized with the instant invention.

One axial end of the casing **10** is formed by a disk-like wall **36** that is centrally perforated and comprises an air discharge means for the air discharge chamber **18**. In the peripheral portion of the air discharge chamber **18** and located radially outwardly of the motor base **38** of the motor and fan unit **20**, and in the space between the motor base **38** and wall **36**, are masses of sound deadening and heat insulating material **40**, which may be any suitable material, such as glass fiber mats.

The interior of the casing **10** is compartmented into the previously mentioned air filtering chamber **16** and air discharge chamber **18** by an internal, centrally apertured, disk-like wall **42**. In addition to compartmenting the casing, wall **42** also supports, in a resilient manner, the motor and fan unit **20**. Specifically, the motor and fan unit is supported on the tubular portion **44** of the wall **42** by a pair of resilient annular cushions **46** and **48** which are designed to cooperate with the wall **42** and the motor and fan unit **20** to resiliently support the latter. The motor and fan unit is retained in its supported position on the wall **42** by the ring **50**, which in turn is retained in place by the fingers **52**, which are part of the motor and fan unit, and are adapted to be deformed from their FIG. 1 dotted line position to their FIG. 1 solid line position. As can best be seen in FIG. 1, the motor and fan unit is supported from the wall **42** by the annular cushions **46** and **48**, which jointly are captured on one side (the left-hand side as seen in FIG. 1) by one side of the motor base **38**, and on the other side by the ring **50**, which in turn is firmly retained in position by the deformed fingers **52** of the motor and fan unit.

On the air filtering chamber side of the motor and fan unit, the latter is surrounded by a perforate hood **54** which is tapered and cup-shaped, and the free peripheral

edge 56 of which is bent over the radially outer edge of the ring 50 to secure the hood in place. It will be understood that the hood 54 constitutes a protective guard for the motor.

The axial end of the casing 10 opposite to the perforate wall 36 is open to permit access to the interior of the casing, particularly the air filtering chamber 16 for the purpose of inserting or removing disposable dirt bags. The free edge of the casing 10 is deformed to form an annular seat 58 for a closing lid. The closing lid 60, the details of construction and operation of which can best be seen in FIGS. 4 and 5, comprises a dished metal disk having a knob 62 secured centrally on one side thereof, and having its periphery formed in a particular manner to support a resilient annular grommet 64. As can best be seen in FIG. 6, the periphery of the lid disk is bent to form a cylindrical flange 66, the extremity of which is in turn bent reversely to form a generally radially extending flange 67. Both flanges 66 and 67 are slotted to form a plurality of tabs 68, the free end portions of which extend generally radially.

The lid 60 operates on an "oil can" principle. When the lid is removed from the casing, it occupys the position shown in FIG. 5. It will there be observed that the lid disk forms a continuous concave dish, and that the flange 66 extends slightly radially inwardly. To close the casing, the lid 60 is juxtaposed to the seat 58, and the knob 62 is urged axially toward the casing. Upon exertion of a sufficient amount of force on the knob 62, the lid disk is snapped to its position illustrated in FIG. 4, wherein the direction of its concavity has been reversed. When in the FIG. 4 condition, it will be observed that the flange 66 extends slightly radially outwardly. A comparison of FIGS. 4 and 5 will indicate that the transition from the FIG. 5 to the FIG. 4 condition also results in the tabs 68 being moved radially out. This movement is utilized to urge the grommet 64 radially outwardly against the seat 58 to thereby firmly lock the lid in closed position and to air seal the opening in the casing. It will be understood that all that is required to remove the lid from the casing is to pull the knob 62 axially away from the casing, and this results in the lid disk ultimately changing its direction of concavity from its FIG. 4 condition to its FIG. 5 condition, which has the effect of moving the grommet 64 radially inwardly to break the air seal and release the lid from the casing.

In FIGS. 1 and 4 it will be observed that closely associated with the seat 58 is a formed ring 70. The ring 70 is utilized to mount a cloth filter bag 72 in the air filtering chamber 16. The cloth filter bag 72 supports a resilient collar 74 which surrounds an opening 76 in the cloth filter bag. The collar 74 of the cloth filter bag may be slipped over the inlet tube 30 and disposed in the air filtering chamber 16 in substantially the manner which is illustrated in FIG. 1. The remainder of the cloth filter bag is in the nature of a deformable pliable receptacle, and has an open neck portion 78 which is adapted to be disposed in the circular groove 80 formed in the ring 70 and which may be retained therein by wire 82.

Disposable dirt bags may be utilized with the improved, domestic, mobile vacuum cleaner if desired. These bags may take various forms, one particularly effective one is illustrated and identified by reference numeral 83; it comprises a dirt bag receptacle portion 84, made preferably of a filtering paper composition, and a dirt bag mounting portion 86, which may comprise a resilient collar. It will be understood that the mounting portion 86 may also be disposed aboutt he inlet tube 30, and that when the vacuum cleaner is fully assembled, the relationship of the disposable dirt bag and cloth filter bag to the inlet tube 30 and the coupling 32 of an air hose is as illustrated in FIG. 1.

Near the axial ends of the casing 10 are mounted the wheels 12 and 14; these wheels are mounted, respectively, on bearing assemblies 88 and 90, which in turn are supported on the casing. It will be understood that when fully assembled as illustrated in FIG. 1, the casing may be disposed on the wheels 12 and 14 and propelled about a floor surface, as by pulling on the air hose 34. It will also be understood that in order to gain access to the interior of the vacuum cleaner casing it is solely necessary to remove the lid 60 by pulling on its knob 62. The improved, domestic, mobile vacuum cleaner when operated possesses the advantages of easy movement over a floor surface and easy insertion and removal of dirt bags. It will be apparent to those skilled in the art that due to the unique general organization of the vacuum cleaner, vacuum cleaners of relatively small size can be built without sacrificing functional features or advantages. In addition to the functional advantages of the improved vacuum cleaner set forth, a principal advantage resides in the simplicity of its construction and assembly, and therefore, in its low production cost compared with other vacuum cleaners of its type.

The simplicity of construction and assembly perhaps can best be gleaned from a consideration of FIG. 3. It will there be observed that the casing 10 is made up of three major parts, namely, a pair of generally cup-shaped members 92 and 94, which may be drawn metal shells, and the previously mentioned lid 60. The cup-shaped member 92 includes the previously mentioned perforated, disk-like wall 36, the cylindrical wall 96, and the radially inwardly extending, annular flange 98. About the periphery of the cylindrical wall 96 on the exterior thereof are disposed circumferentially aligned pairs of spaced protuberances 100, and in the flange 98 are formed a plurality of openings 102.

Cup-shaped member 94 includes a centrally apertured, disk-like bottom wall, which is the previously mentioned wall 42. Near the periphery of the wall 42 are formed a plurality of openings 104 which are located to coincide with the openings 102 of the cup-shaped member 92 when the casing is fully assembled; securing members 106 cooperate with openings 102 and 104 to secure members 92 and 96 to each other to effect assembly of the cup-shaped members. The cup-shaped member 94 also includes a cylindrical wall 108 which has the previously mentioned openings 24 and 28 that accommodate the electrical cord 22 and the air inlet tube 30, respectively. The open end of the cylindrical wall 108 is deformed to form the previously mentioned lid seat 58, and near said open end on the exterior of wall 108 are formed a plurality of circumferentially aligned pairs of spaced protuberances 110.

With an understanding of the three main component parts of the casing 10, the simple manner of assembling the vacuum cleaner will be readily understood. Starting with the cup-shaped member 92, and let us say, allowing it to rest with its perforated wall 36 on a horizontal surface, the masses of sound deadening and heat insulation material 40 may be placed in the interior of this part. The fan and motor unit 20 may then be placed in the cup-shaped member 92 and supported in such a manner that its motor base 38 is supported on some of the material 40. It will be understood that when in this stage of assembly, all of the fingers 52 of the motor and fan unit extend axially on axes which are parallel to the major axis of the motor and fan unit. The annular cushion 46 is then slipped over the motor and fan unit in its position illustrated in FIG. 1. The cup-shaped member 94 is then placed over the motor and fan unit on top of the cup-shaped member 92. The openings 102 and 104 are aligned and the securing means 106 are disposed to rigidly secure the cup-shaped members together in their FIG. 1 position. The annular cushion 48 is then placed about the tubular portion 44 of the wall 42 of the cup-shaped member 94. The ring 50 is then placed in its FIG. 1 position, and it will there be seen that its has portions which contact portions of both cushions 46 and 48. Some of the fingers 52 are then deformed from their positions illustrated in dotted

lines in FIG. 1 to their positions illustrated in solid lines in FIG. 1. It will be understood that at this time the assembled motor and fan unit and cushions **46** and **48** are securely supported by the wall **42**, because the cushions and said wall are trapped between the motor base **38**, the ring **50** and the deformed fingers **52**. The perforate hood **54** is then disposed about the motor and fan unit **20**, and its free peripheral edge **56** is bent over the peripheral edge of the ring **50**. At this point, the casing is fully assembled other than for the manually removable closing lid **60**, and it will be apparent that the air discharge chamber **18** is formed by the perforate wall **36**, cylindrical wall **96**, wall **42** and motor base **38**, and that the air filtering chamber **16** is formed by the wall **42**, cylindrical wall **108**, and lid **60**, when it is assembled.

It will be understood that the cloth filter bag **72** may be mounted as illustrated in FIG. 1 by having its collar **74** slipped over the air inlet tube **30**, and by having its neck portion **78** wired in the groove **80** by the wire **82**. Further, a disposable dirt bag may have its mounting portion **86** slipped over the air inlet tube **30** also. With both the cloth filter bag and the disposable dirt bag mounted as illutsrated in FIG. 1, the closing lid **60** is then mounted in its closed position illustrated in FIGS. 1 and 4.

At this time, the vacuum cleaner casing is completely assembled and is ready for use. Although the wheels **12** and **14** will not have been assembled yet, as far as the operational aspects of the vacuum cleaner other than mobility are concerned, it is ready for operation. In this condition, the air filtering chamber **16** is substantially air tight, and on actuation of the motor and fan unit, a flow of air through the casing is caused as illustrated by the schematic arrows in FIG. 1. The air flows into the cleaning tool (not shown), through the air hose **34** and the air inlet tube **30**, through the disposable dirt bag **83**, through the cloth filter bag **72**, through the perforate hood **54**, through the motor and fan unit **20**, which discharges the air into discharge chamber **18**, where it passes through the sound deadening and heating insulating material **40**, and out the perforate portion of wall **36** to the atmosphere. The manner in which motor and fan unit **20** functions to move air therethrough is set forth in further detail in the above mentioned application, Serial No. 736,519.

In order to achieve the desirable feature of mobility, it is, of course, necessary to provide for the mounting of the previously mentioned wheels. The wheels **12** and **14** are constructed and mounted in the following manner. Each wheel comprises a corrugated metal ring **112**, a flat ring **114**, which may be cardboard, and a resilient tire **116**, which may be molded and have a tread formation **118**. The tires **116** are adapted to be assembled to the rings **112** and **114** to form unitary wheels as illustrated in FIG. 1. Centrally within each corrugated ring **112**, there is formed a channel-shaped, bearing surface **120** which is adapted to make bearing contact with a bearing assembly that is mounted on the casing. These bearing assemblies are the previously mentioned bearing assemblies **88** and **90**, which are similar, and each of which comprises an annular ring **122** that is channel-shaped in cross-section, and that rotatably supports a plurality of sleeve bearings **124** on pins **126**. The base portion of the channel of the rings **122** is disposed on the radially inner side of the rings **122**, and is adapted to be received and positioned about and on the casing **10** in a relatively stationary position. In the case of wheel **12**, the channel-shaped ring of the bearing assembly **88** is adapted to be received and positioned by the pairs of protuberances **100**, whereas the channel-shaped ring of the bearing assembly **90** is adapted to be received and positioned by the pairs of protuberances **110**.

In order to assemble the wheels, assuming that the casing has been fully assembled in all respects other than that of having its wheels mounted on it, the bearing assembly **88**, which at this time is in the form of a non-continuous, annular channel **122**, is broken at one point in its periphery and reduced in diameter, as by forcing one end onto the other, so that it may be placed inside the wheel **12** until its sleeve bearings contact the bearing surface **120**. When the sleeve bearings are properly located in relation to the bearing surface **120**, the channel **122** is then brought to its normal diameter and has its ends fastened together in any conventional manner to form a continuous annulus. It should be understood that at this time the wheel **12** will have the bearing assembly **88** mounted within it. In order to mount the assembled wheel **12** and bearing assembly **88** on the casing, they are forced over the casing so as to temporarily deform some of the protuberances **100** until the ring **122** is uniformly located within the seat formed by these protuberances. When the wheel **12** and its bearing assembly **88** are fully mounted, they are disposed as is illustrated in FIG. 1. It will be readily understood that the wheel **14** may be mounted with relation to its bearing assembly **90** and the protuberances **110** in substantially the same manner. When fully mounted, the wheels **12** and **14** are disposed as illustrated in FIG. 1, and it will be understood that they may rotate independently about the casing **10** on the sleeve bearing **124** of their respective bearing assemblies.

It is believed to be apparent that applicant has provided an improved, domestic, mobile vacuum cleaner which is extremely simple in construction and easy to assemble, and therefore, inexpensive to produce. Notwithstanding the latter, it should be apparent that the improved vacuum cleaner contemplated by the instant invention has many operational advantages, including, but not limited to, those of mobility, ease of insertion and removal of dirt bags, and a resiliently mounted motor and fan unit. As is evident from the foregoing description, certain aspects of my invention are not limited to the particular details of construction of the example illustrated, and I contemplate that various and other modifications and applications will occur to those skilled in the art. It is, therefore, my intention that the appended claims shall cover such modifications and applications as do not depart from the true spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In a vacuum cleaner: a generally cylindrical casing including a disk-shaped wall at one end thereof; a motor and fan unit disposed in said casing, said casing having an opening at its other end for permitting access to the interior thereof; said casing having wall portions forming a circular seat which is disposed about said opening; means associated with said circular seat for supporting a filter bag within said casing; a lid for closing said opening; said lid comprising a thin circular disk having a cylindrical flange formed near its periphery, and a plurality of radially extending tabs formed at its periphery; said disk being normally configured so as to be concave in one axial direction and being made of a springy material which renders the disk capable of being deformed into a condition in which the disk is concave in the other axial direction; said disk when in one condition being configured so that said flange extends slightly radially inwardly and said tabs are retracted radially relative to their positions when said disk is configured in the other condition wherein said flange extends slightly radially outwardly and said tabs are projected radially; and tabs supporting an annular resilient grommet at the periphery of said disk; the casing and lid being dimensioned so that when said disk is in said one condition, the outer diameter of said grommet is less than the inner diameter of said seat, whereby said lid may be inserted within or withdrawn from said seat; and when said disk is in said other condition, the outer diameter of said grommet is greater than the inner diameter of said

seat, whereby when said lid is disposed within said seat said grommet makes air sealing contact with said seat and said disk will retain said lid on said casing disposed to close said casing; and manually grippable means on said disk for snapping said disk from one condition to the other to effect the desired disk configuration to either mount or remove said lid.

2. In a vacuum cleaner: a casing; and a motor and fan unit mounted within said casing; said casing being formed by two cup-shaped members and a removable disk-like lid; the first cup-shaped member comprising a cylindrical wall having a radially extending disk-like wall at one of its ends and having its other end open; said disk-like wall having a tubular portion formed centrally thereof that is coaxially spaced within said cylindrical wall; the second cup-shaped member comprising a cylindrical wall having a radially extending disk-like wall at one of its ends and having its other end open; said first cup-shaped member adapted to be secured to said second cup-shaped member with its disk-like wall closing the open end of the cylindrical wall of said second cup-shaped member, said motor and fan unit adapted to be rceeived in said tubular portion and be supported by said first cup-shaped member's disk-like wall, and the cylindrical wall of said first cup-shaped member having a means formed about its open end which is adapted to removably receive said lid; said lid being selectively manually positionable so as to cooperate with said last-mentioned means to close said last-mentioned open end.

3. In a vacuum cleaner as defined in claim 2: means for moving said casing over a floor surface; said moving means comprising a plurality of wheel assemblies; each of said wheel assemblies comprising an annular wheel and a bearing assembly; each of said wheels having an annular bearing surface groove facing radially inwardly; each of said bearing assemblies having a bearing supporting ring and a plurality of rotatable bearings supported by said ring and projecting radially outwardly thereof; and said casing having means for supporting said rings and locating them in spaced relation to each other; said rings, bearings and wheels being dimensionally correlated to allow said bearings to be received in said bearing surface grooves in bearing contact therewith, whereby said wheels are rotatably mounted on said bearings when the vacuum cleaner is fully assembled.

4. In a vacuum cleaner: a casing; a motor and fan unit mounted within said casing; and means for moving said casing over a floor surface; said casing being formed by two cup-shaped members and a removable disk-like lid; the first cup-shaped member comprising a cylindrical wall having a radially extending disk-like wall at one of its ends and having its other end open; said disk-like wall having a tubular portion formed centrally thereof that is coaxially spaced within said cylindrical wall; the second cup-shaped member comprising a cylindrical wall having a radially extending disk-like wall at one of its ends and having its other end open; said first cup-shaped member adapted to be secured to said second cup-shaped member with its disk-like wall closing the open end of the cylindrical wall of said second cup-shaped member, said motor and fan unit adapted to be received in said tubular portion and be supported by said first cup-shaped member's disk-like wall; said motor and fan unit having a major axis and normally disposed in said casing so as to have said axis extend in a generally horizontal direction, said motor and fan unit having a generally vertically extending base and a plurality of fingers that are axially spaced from said base and extend generally axially prior to being disposed in their final positions, but which are deformable to extend generally vertically when disposed in their final positions; resilient cushioning means supported by said tubular portion and adapted to contact said motor and fan unit between said base and said fingers; and means engaged by said fingers when the latter are deformed into their final positions and biased thereby against said resilient cushioning means; whereby said resilient cushioning means is securely positioned on said tubular portion between said base and said deformed fingers and said motor and fan unit is resiliently supported by said resilient cushioning means on the disk-like wall of said first cup-shaped member.

5. In a vacuum cleaner: a casing; a motor and fan unit mounted within said casing; and means for moving said casing over a floor surface; said casing being formed by two cup-shaped members and a lid; the first cup-shaped member comprising a cylindrical wall having a radially extending disk-like wall at one of its ends and having its other end open; said disk-like wall having a tubular portion formed centrally thereof that is coaxially spaced within said cylindrical wall; the second cup-shaped member comprising a cylindrical wall having a radially extending disk-like wall at one of its ends and having its other end open; said first cup-shaped member adapted to be secured to said second cup-shaped member with its disk-like wall closing the open end of the cylindrical wall of said second cup-shaped member, said motor and fan unit adapted to be received in said tubular portion and be supported by said first cup-shaped member's disk-like wall, said first cup-shaped member having wall portions forming a circular seat which is disposed about its open end; said lid comprising a thin circular disk having a cylindrical flange formed near its periphery and a plurality of radially extending tabs formed at its periphery; said disk being normally configured so as to be concave in one axial direction and being made of springy material which renders it capable of being deformed into a condition in which the disk is concave in the other axial direction, said disk when in one condition being configured so that said flange extends slightly radially inwardly and said tabs are retracted radially relative to their positions when said disk is configured in its other condition wherein said flange extends slightly radially outwardly and said tabs are projected radially; said tabs supporting an annular resilient grommet at the periphery of said disk; said circular seat and lid being dimensioned so that when said disk is in said one condition the outer diameter of said grommet is less than the inner diameter of said seat whereby said lid may be inserted within or withdrawn from said seat, and when said disk is in said other condition the outer diameter of said grommet is greater than the inner diameter of said seat whereby when said lid is disposed within said seat said grommet makes air sealing contact with said seat and said disk is retained on said casing and disposed to close said opening in said first cup-shaped member; and manually grippable means on said disk for snapping said disk from one condition to the other to effect the desired disk configuration to either mount or remove said lid from said casing.

6. In a vacuum cleaner: the structure defined in claim 5 wherein said moving means comprises a plurality of wheel assemblies; each of said wheel assemblies comprises an annular wheel and a bearing assembly; each of said wheels has an annular bearing surface groove facing radially inwardly; each of said bearing assemblies has a bearing supporting ring and a plurality of rotatable bearings supported by said ring and projecting radially outwardly thereof; the cylindrical walls of said cup-shaped members have means for supporting the rings and locating them in spaced relation to each other; said rings, bearings and wheels are dimensionally correlated to allow said bearings to be received in said bearing surface grooves in bearing contact therewith, said motor and fan unit has a major axis and is normally disposed in said casing so as to have said axis extend in a generally horizontal direction; said motor and fan unit has a generally vertically extending base and a plurality of fingers that are axially spaced from said base and extend generally axially prior to being disposed in their final positions, but

which are deformable to extend generally vertically when disposed in their final positions; resilient cushioning means are supported by said tubular portion and adapted to contact said motor and fan unit between said base and said fingers; and means are provided which are engaged by said fingers when the latter are deformed into their final positions and biased thereby against the resilient cushioning means to securely position the latter on said tubular portion between said base and said deformed fingers; whereby said motor and fan unit is resiliently supported by said cushioning means on the disk-like wall of said first cup-shaped member.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 2,991,928 July 11, 1961

George H. Bramhall

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 3, line 68, for "aboutt he" read -- about the --; column 4, line 73, for "its" read -- it --; column 6, line 68, for "and" read -- said --.

Signed and sealed this 5th day of December 1961.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

DAVID L. LADD
Commissioner of Patents

USCOMM-DC