United States Patent

[11] 3,593,363

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[54] **VACUUM CLEANING SYSTEM WITH HOSE PLUG-IN AND HOSE RETRACTING OUTLETS**
11 Claims, 22 Drawing Figs.

[52] **U.S. Cl.** **15/315**
[51] **Int. Cl.** **A47l 5/38**
[50] **Field of Search** 15/314, 315, 323

[56] **References Cited**

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Primary Examiner—Walter A. Scheel
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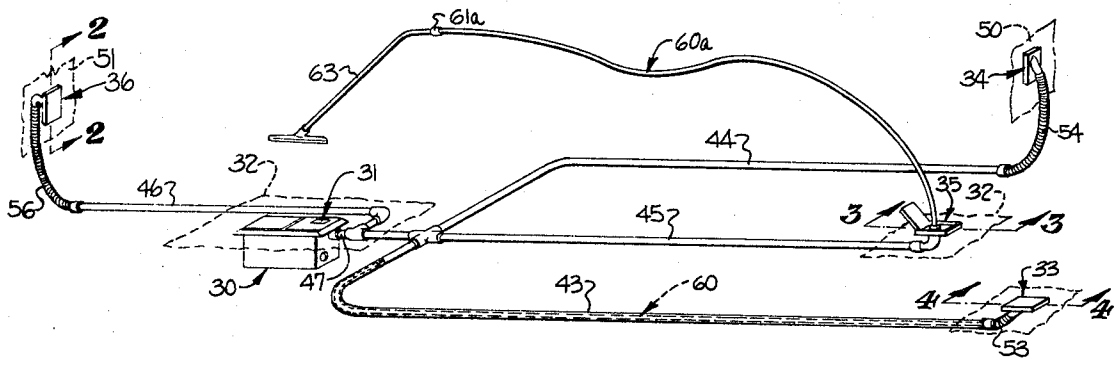
ABSTRACT: A self-contained vacuum cleaner unit, having its own plug-in suction outlet receptacle, is installed in a building and has a plurality of auxiliary suction outlet receptacles connected thereto by suction conduit means. At least one of the auxiliary outlet receptacles is of the hose-retracting type, and a specially designed flexible suction hose is adapted for selective connection to the plug-in and auxiliary outlet receptacles as well as being adapted to be stored within the retracting-type auxiliary outlet receptacle and a corresponding suction conduit extending from the latter receptacle. Various forms of foot-end adapters are provided to facilitate such selective connection of the flexible hose to the plug-in and retracting types of suction outlet receptacles.



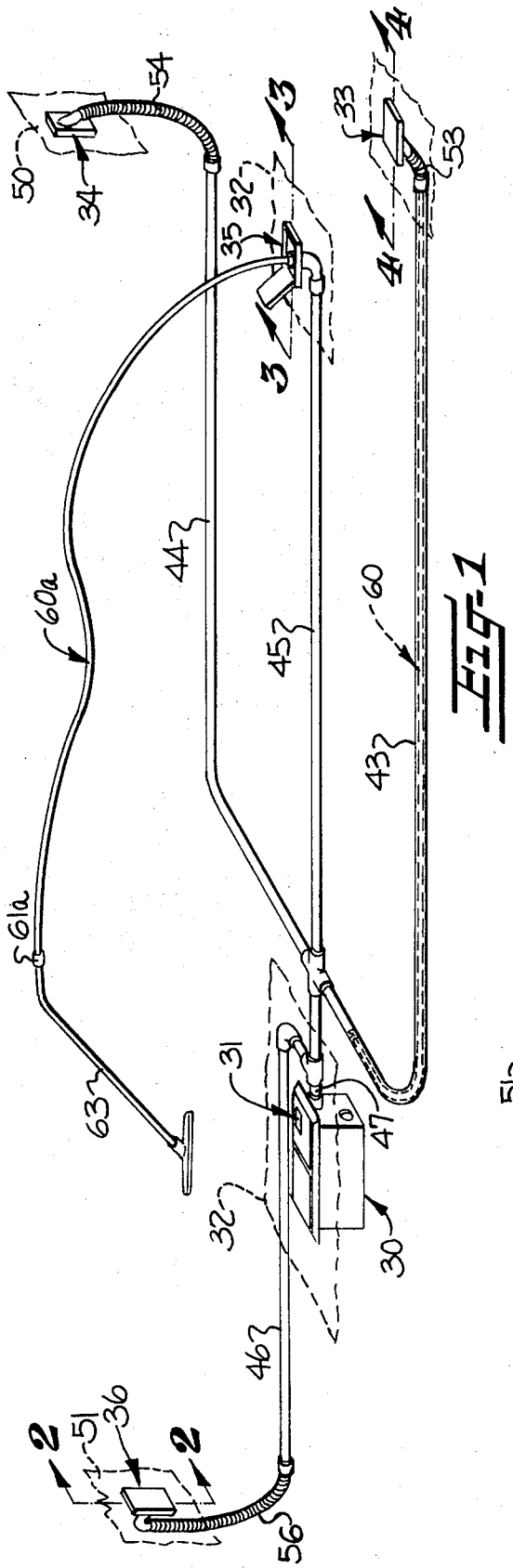


FIG-1

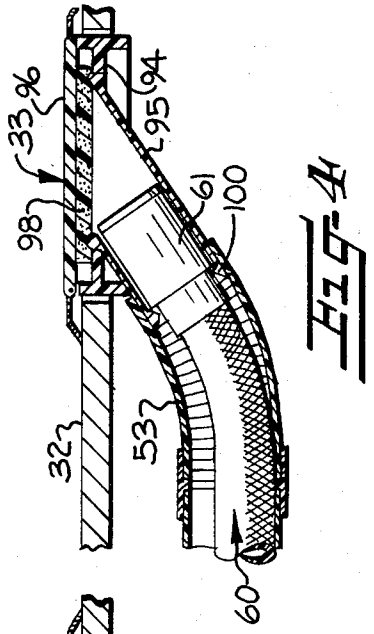


FIG-4

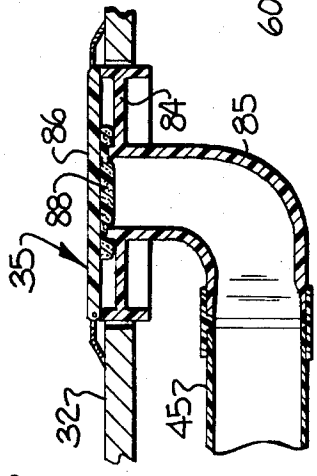


FIG-3

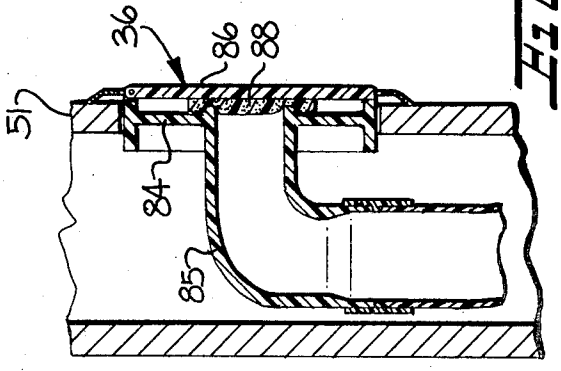


FIG-2

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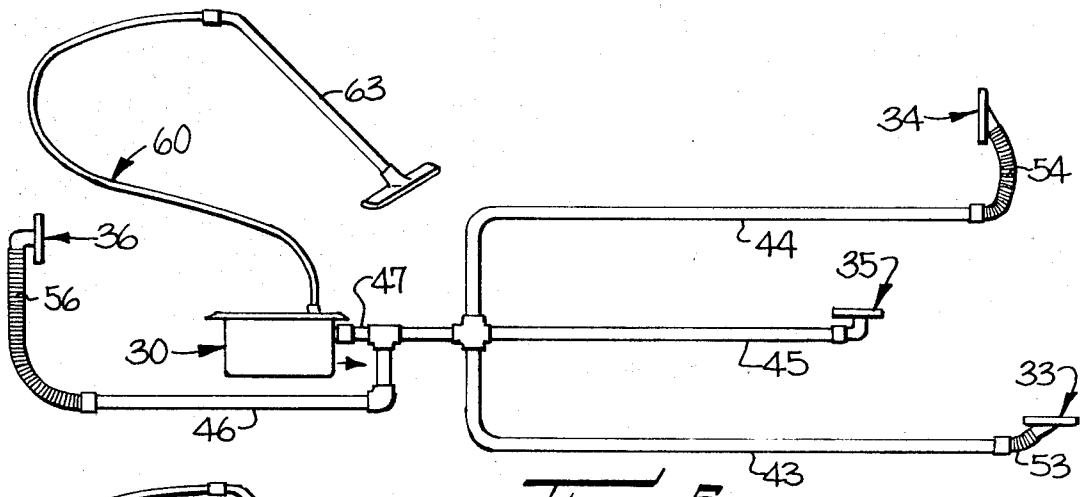

Fig-5

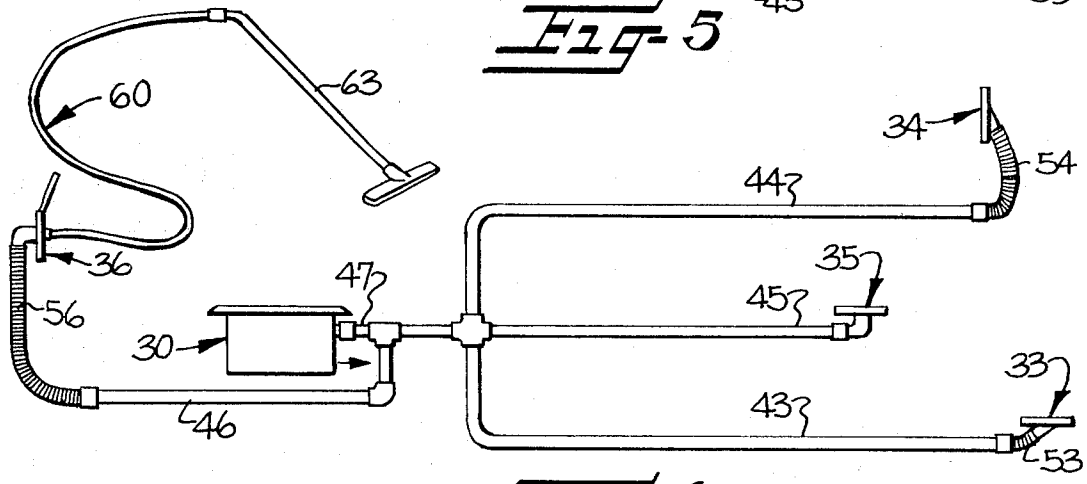

Fig-6

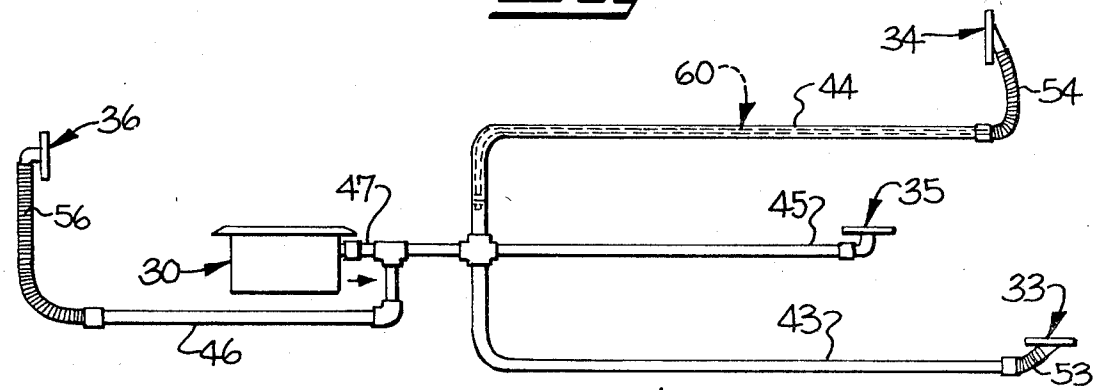

Fig-7

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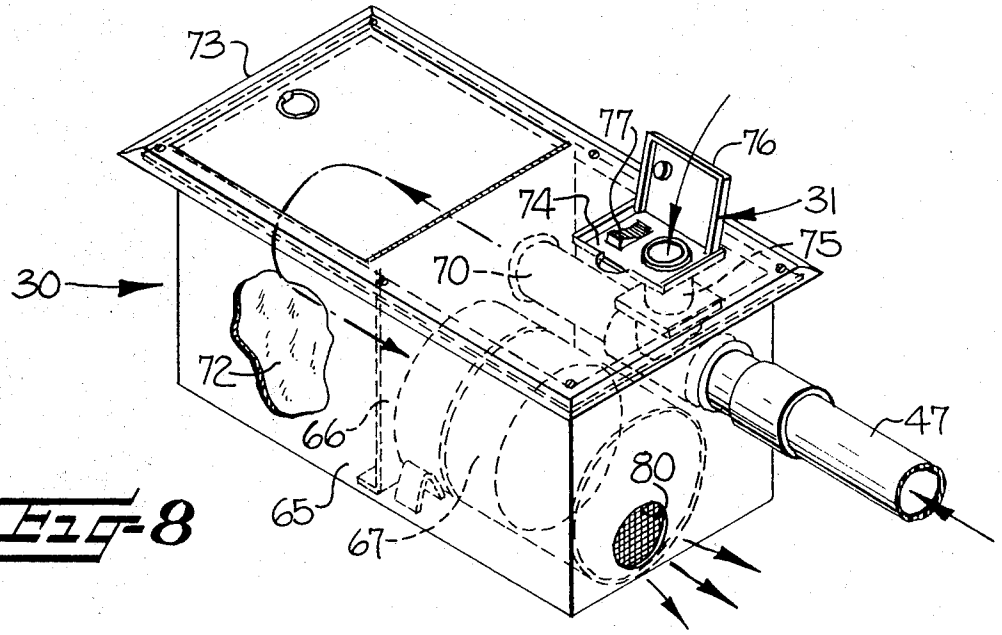

Fig-8

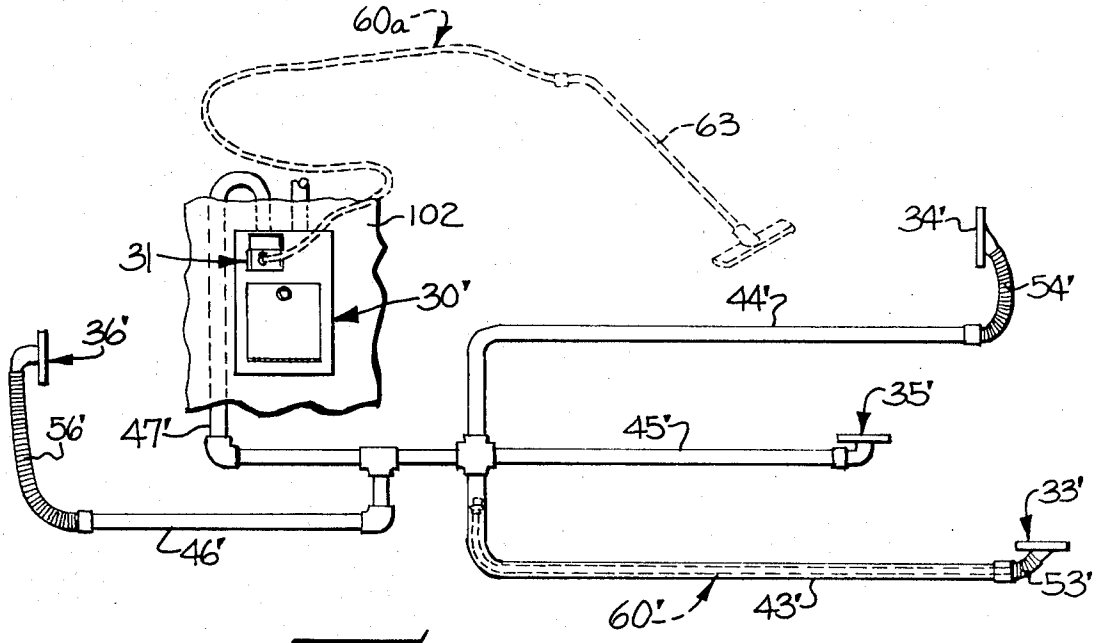

Fig-9

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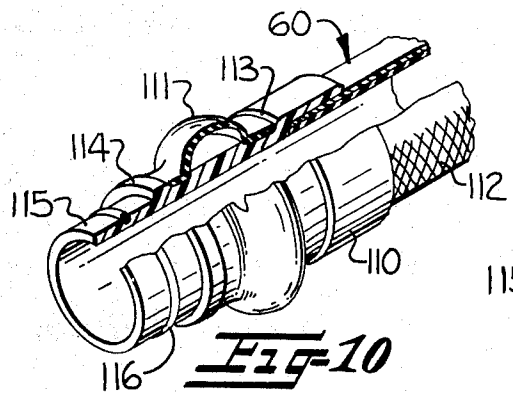


Fig-10

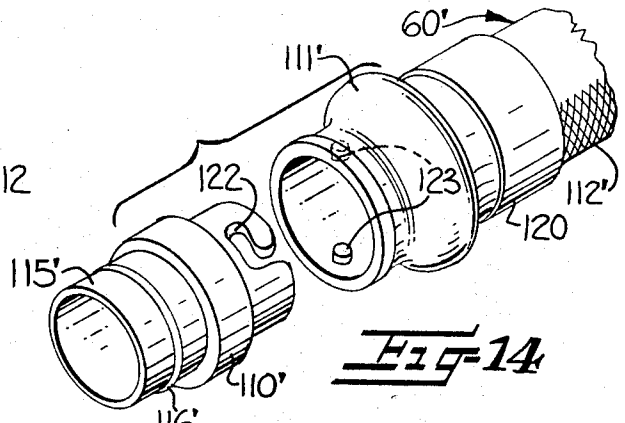


Fig-14

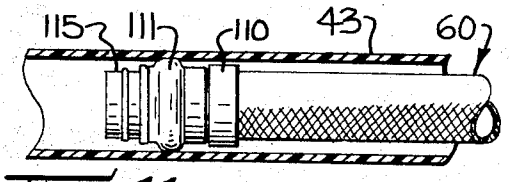


Fig-11

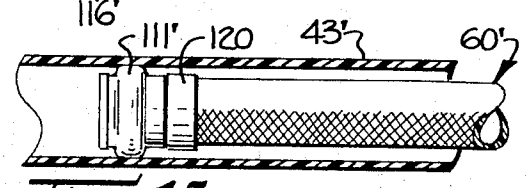


Fig-15

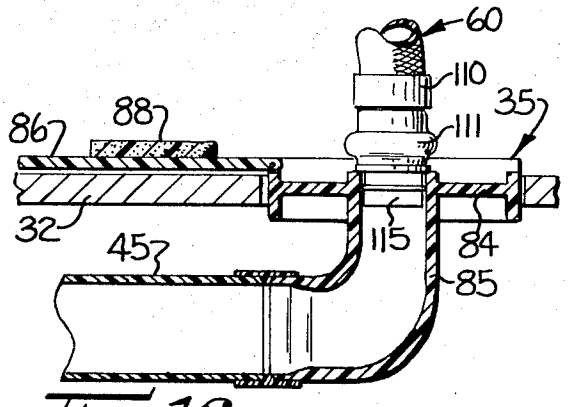
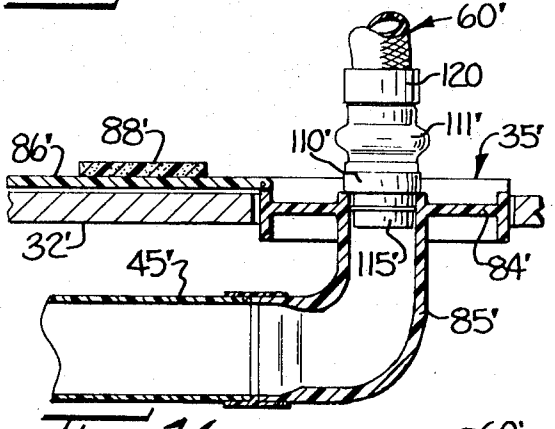


Fig-12



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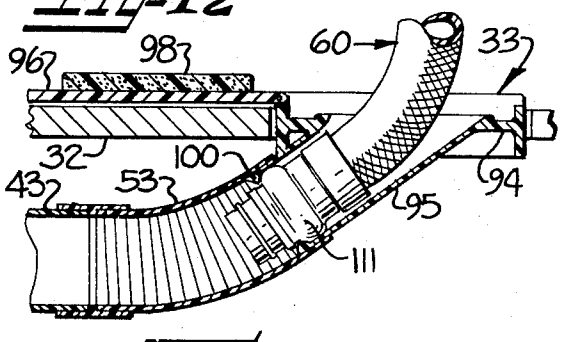

Fig-13

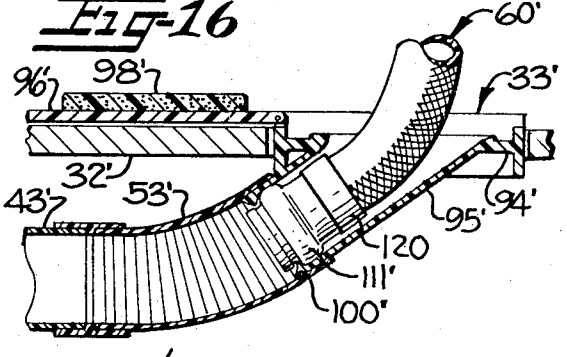

Fig-17

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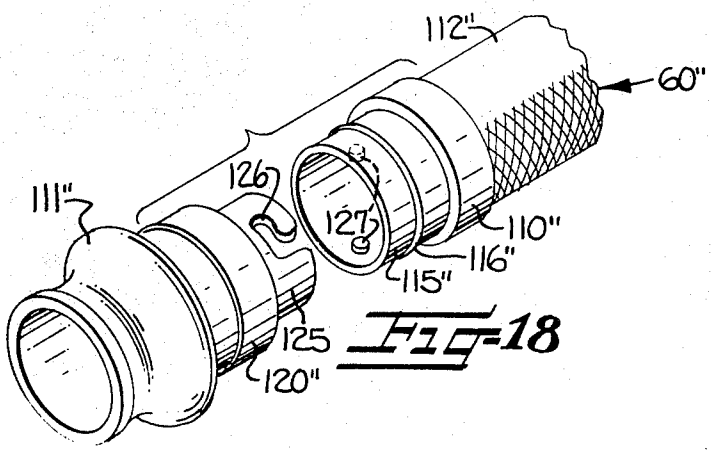

Fig-18

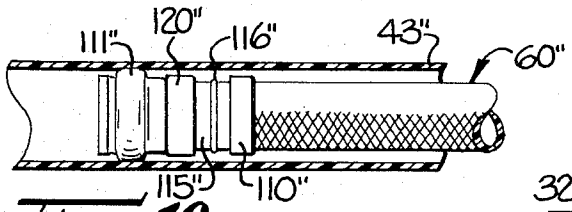

Fig-19

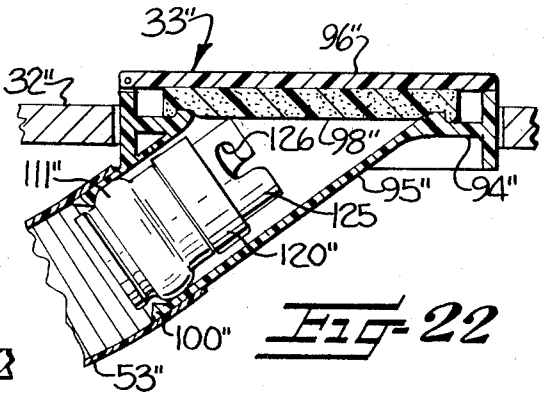

Fig-22

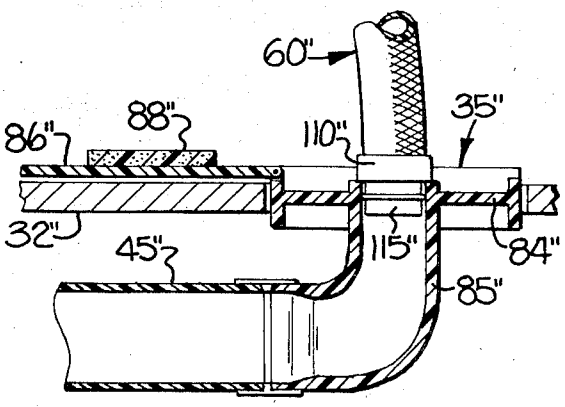

Fig-20

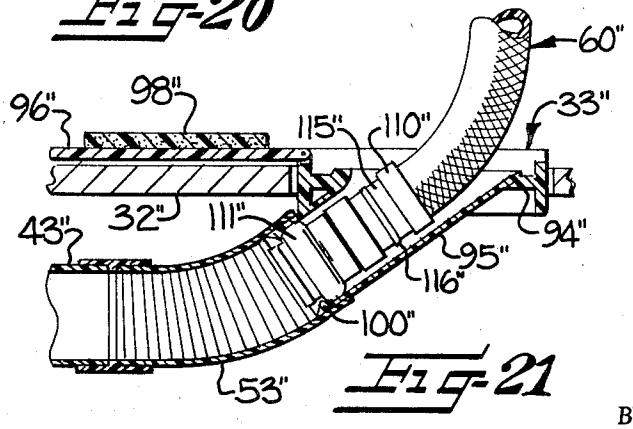

Fig-21

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VACUUM CLEANING SYSTEM WITH HOSE PLUG-IN AND HOSE RETRACTING OUTLETS

This application discloses subject matter having certain features in common with my copending application Ser. No. 567,615, filed July 25, 1966, now U.S. Pat. No. 3,422,482 and entitled Wall-mounted Vacuum Cleaner Unit.

It is a primary object of this invention to provide an improved vacuum cleaning system of the type having a wall mounted or floor installed, self-contained vacuum cleaner unit with at least one auxiliary outlet receptacle for accommodation and storage of a suction hose therein. As is well known, such self-contained vacuum cleaner units heretofore have never been provided with auxiliary outlet receptacles for the storage of the suction hose but merely with auxiliary outlet receptacles for accommodating plugging in of the suction hose for cleaning. This has necessitated the need for rolling up the suction hose and separately storing the same in a closet or some remote location when the cleaner unit was not being utilized.

Briefly stated, this improved vacuum cleaning system has been achieved by providing the suction hose with adapter means on the end thereof for ready accommodation in the plug-in receptacle conventionally provided on the self-contained cleaner unit and with piston means for accommodation in an auxiliary outlet receptacle of the retracting type for permitting the hose to be moved into retractably stored position in the conduit connecting the auxiliary outlet receptacle to the vacuum cleaner unit.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds when taken in connection with the accompanying drawings, in which

FIG. 1 is a schematic perspective view of one embodiment of the improved cleaning system in which a floor installed, self-contained vacuum cleaning unit having its own plug-in outlet receptacle has a plurality of auxiliary receptacles connected thereto, and showing a hose stored in the conduit associated with an auxiliary receptacle of the hose-retracting type, and also showing another flexible suction hose operatively connected to a plug-in type of outlet receptacle;

FIG. 2 is an enlarged fragmentary vertical sectional view taken substantially along line 2–2 in FIG. 1 and showing a plug-in outlet receptacle mounted in a vertical wall structure of the building;

FIG. 3 is a fragmentary vertical sectional view taken substantially along line 3–3 in FIG. 1 and showing a plug-in outlet receptacle mounted in the floor structure of the building;

FIG. 4 is an enlarged fragmentary vertical sectional view taken substantially along line 4–4 in FIG. 1 and showing a floor-installed, hose-retracting outlet receptacle with a flexible suction hose stored within the corresponding conduit and the head-end adapter of the hose positioned within the receptacle;

FIGS. 5, 6 and 7 are schematic views of the vacuum cleaning system of FIG. 1, but showing one of the flexible suction hoses thereof connected to different plug-in receptacles in FIGS. 5 and 6 showing the flexible suction hose in FIG. 7 stored in a different conduit from that in which it is shown stored within in FIG. 1;

FIG. 8 is an enlarged perspective view of the floor installed, self-contained vacuum cleaner unit shown in the left-hand portion of FIG. 1;

FIG. 9 is a view similar to FIG. 1 illustrating a second embodiment of the vacuum cleaning system of the instant invention, wherein the self-contained vacuum cleaner unit is installed in a vertical wall of the building;

FIG. 10 is an enlarged perspective view of the foot end of the flexible suction hose shown in the lower portion of FIG. 1, but wherein the hose is removed from the suction conduit, and showing a first form of foot-end adapter means on the hose, wherein a plug-in adapter and a flexible piston are both fixed with respect to the foot end of the suction hose;

FIG. 11 is a fragmentary vertical sectional view through a portion of the lowermost conduit of FIG. 1 with the foot-end of the suction hose positioned within the conduit and having the adapter means of FIG. 10 mounted on the foot end thereof;

FIG. 12 is a fragmentary vertical sectional view of a floor installed plug-in outlet receptacle such as that shown in FIG. 3, but showing the hose of FIG. 10 and its adapter means operatively connected to the plug-in outlet receptacle;

FIG. 13 is a fragmentary vertical sectional view through the hose-retracting outlet receptacle of FIG. 4, but showing the foot-end adapter means of the hose of FIG. 10 positioned partially within the hose-retracting receptacle;

FIGS. 14—17 are views similar to the respective FIGS. 10—13, but showing a second form of hose foot-end adapter means in which the piston and its tubular adapter are fixed to the foot end of the suction hose, and the plug-in adapter is removably connected to the foot-end adapter on which the piston is mounted;

FIGS. 18—21 are views similar to the respective FIGS. 10—13, but wherein the foot-end plug-in adapter is fixedly secured to the foot end of the hose and the piston-carrying adapter is removably connected to the outer end of the plug-in adapter, the piston adapter being removed whenever the hose is operatively connected to a plug-in receptacle; and

FIG. 22 is an enlarged fragmentary vertical sectional view similar to FIG. 21, but showing the door of the outlet receptacle occupying closed position with the piston adapter stored within the hose-retracting receptacle, as might be the case when the hose is being used with the foot-end adapter thereof plugged into a plug-in outlet receptacle as in FIG. 20.

Referring more specifically to the drawings, with particular reference to FIGS. 1—8, the first embodiment of the improved vacuum cleaning system of this invention comprises a self-contained vacuum cleaner unit 30 having its own plug-in outlet receptacle 31, and is shown as being of a type which is installed in the floor 32 of a building. A plurality of auxiliary outlet receptacles 33-36 are positioned at various locations in the corresponding building and are connected, by suitable conduit means, to the air inlet of vacuum cleaner unit 30. As shown, the conduit means includes elongate suction conduits 43—46 for the respective auxiliary outlet receptacles 33—35. All the suction conduits 43—46 may be communicatively connected to the air inlet of vacuum cleaner unit 30 by a common suction conduit 47.

In the particular exemplary arrangement of auxiliary outlet receptacles shown in FIGS. 1, 5, 6 and 7, outlet receptacles 33, 34 are of the hose-retracting type and outlet receptacles 35, 36 are of the plug-in type. The auxiliary outlet receptacles may be positioned in any desired location and, by way of example, outlet receptacles 33, 35 are shown positioned in the floor 32 and outlet receptacles 34, 36 are positioned in respective substantially vertical wall structures 50, 51. The ends of the suction conduits 43—46 remote from vacuum cleaner unit 30, may be directly connected to tubular members of the respective auxiliary outlet receptacles 33—36, as is the case with respect to suction conduit 45. However, the suction conduits 43, 44, 46 are shown connected to the tubular members of the respective auxiliary outlet receptacles 33, 34, 36 by means of respective flexible sleeves or suction conduit extensions 53, 54, 56.

The term "hose-retracting outlet receptacle" is used in the specification and appending claims to distinguish the same from the plug-in outlet receptacles and means that the hose receiving tubular portion of the receptacle is adapted for passage of substantially the entire length of the suction hose therethrough, with exception of a head-end adapter on the hose, and that the associated suction is of such internal cross-sectional configuration and length as to receive and store therein substantially the entire length of a corresponding suction hose. On the other hand, the term "plug-in outlet receptacle" is used in the specification and appending claims to mean that the receptacle is adapted for the connection of the

foot end of a flexible suction hose thereto, but that the hose would not be stored normally within the associated conduit or other tubular member to which the receptacle is connected, and/or the internal diameter or configuration of the hose receiving tubular portion of the receptacle is such that only a relatively short length of the foot end of the hose, or the reduced portion of a foot-end adapter thereon, can be accommodated by the receptacle. In FIGS. 1 and 4, for example, a hand-operated flexible suction hose **60** is shown stored within suction conduit **43** with an enlarged head-end adapter **61** on the suction hose **60** being positioned within the hose-retracting receptacle **33**.

Also, in FIG. 1, an additional hand-operated flexible suction hose **60***a* is shown connected to the auxiliary plug-in outlet receptacle **35**, although hose **60***a* is omitted in FIG, 3. The tubular head-end adapter **61***a* of the second flexible suction hose **60***a* has a suitable cleaning implement **63** attached thereto, which cleaning implement is removed from the hose **60***a* when the hose **60***a* is to be stored in one or the other of the conduits **43, 44**.

The floor-installed vacuum cleaner unit **30** of the first embodiment of the vacuum cleaning system shown in FIGS. **1—7** may be of the type disclosed in my copending application Ser. No. 788,395, entitled Floor Installable Vacuum Cleaner, filed concurrently with this application, and comprises a substantially rectangular casing **65** (FIG. **8**) having a substantially vertical partition **66** therein which divides casing **65** into a power compartment and a vacuum or dust collection compartment. An electrically operable suction device or fan **67** and an air inlet fitting **70** are positioned within the power compartment of casing **65**. The inlet fitting **70** penetrates one exterior end wall of casing **67** and serves as the air inlet of the vacuum cleaner unit **30**, to the extent that the air inlet fitting **70** has one end of the common suction conduit **47** communicatively connected thereto. The other end of the air inlet fitting **70** extends through partition **66** into the dust collection compartment and is communicatively connected to a suitable dust collector or filter bag **72** positioned within the collection compartment.

The top wall **73** of the vacuum cleaner unit **30** may be substantially flush with the upper surface of floor **32** (FIG. **1**) and has a substantially rectangular body **74** of the main plug-in outlet receptacle **31** mounted therein. The main plug-in receptacle **31** further comprises a tubular member **75** which is communicatively connected to air inlet fitting **70** and projects upwardly through the substantially rectangular body **74**. A door **76** is pivotally mounted on the substantially rectangular body **74** so that it may be moved to closed position to close the open upper end of tubular member **75** when the main outlet receptacle **31** is not being used. The body **74** of main outlet receptacle **31** carries a suitable switch **77** for operating the electric suction device **67**. The exhaust side of the suction device **67** communicates with the atmosphere exteriorly of casing **65** through a suitable exhaust opening **80** in one of the end walls of casing **67**.

The two auxiliary plug-in outlet receptacles **35, 36** are each quite similar to main plug-in receptacle **31** in that each of the auxiliary plug-in receptacles **35, 36** includes a body **84** having a tubular member **85** connected thereto and projecting outwardly a small amount therefrom, with the open end of tubular member **85** being closed by a door **86** when the corresponding plug-in receptacle is not in use. The tubular members **85** of the auxiliary plug-in receptacles **35, 36** differ from the tubular member **75** of main plug-in receptacle **31** in that they are formed with a right-angular bend therein, or are in the form of what is generally called an elbow, to facilitate connection of the corresponding suction conduit thereto.

While all the conduits **43—46** may be of substantially the same external and internal diameter, the open ends of the tubular members **75** and **85** of the plug-in outlet receptacles **31, 35, 36** are of substantially lesser internal diameter than at least those suction conduits **43, 44**, which are adapted for storage of a flexible suction hose therein. A resilient sealing member **88** may be adhesively or otherwise secured to the inner surface of each door **86** for engaging the outer end of the corresponding tubular member **85** when the door **86** occupies closed position so as to prevent leakage of air through the corresponding tubular member **85** when the plug-in outlet receptacle is not being used. A similar sealing member may be provided on the door **76** of main plug-in receptacle **31**.

As preferred, each hose-retracting outlet receptacle **33, 34** is shown as being of a type similar to that disclosed in my copending application Ser. No. 573,707, filed Aug. 19, 1966, now U.S. Pat. No. 3,464,859 and entitled Method And Apparatus For Vacuum Cleaning. Each of the auxiliary hose-retracting outlet receptacles **33, 34** also comprises a body **94**, a tubular hose-receiving member **95**, a hinged cover **96** and a sealing member **98**, which are arranged somewhat similar to the corresponding elements **84, 85, 86, 88** of the auxiliary plug-in outlet receptacles. However, the tubular hose-receiving member **95** of each hose-retracting outlet receptacle **33, 34** extends at a steep angle with respect to the body **94** and also is of substantially greater internal diameter than the internal diameter of the outer end of the tubular members **85** of the auxiliary plug-in receptacles **35, 36** so as to loosely receive therein the enlarged head-end adapter **61** or **61***a* of the corresponding flexible suction hose **60** or **60***a*, and also to facilitate passage of a flexible piston means, to be later described, which is of substantially greater diameter than the body of the flexible hose, into and out of the corresponding suction conduit through each auxiliary hose-retracting outlet receptacle **33, 34**.

Each hose-retracting outlet receptacle **33, 34** also differs from the plug-in receptacles **31, 35, 36** in that the lower end of each tubular member **95** is provided with an internal annular abutment **100** thereon whose internal diameter is less than the external diameter of the head-end adapter **61, 61***a* of each hose **60, 60***a*, but whose internal diameter is greater than the external diameter of the body of each flexible hose **60, 60***a*. Thus, when either head-end adapter is loosely positioned within tubular member **95** as shown in FIG. **4**, the head-end adapter will engage and be restrained from further inward movement by the corresponding annular abutment **100** when the flexible hose occupies fully retracted or stored position within the corresponding suction conduit **43** or **44**.

In FIGS. **5, 6** and **7**, the second flexible suction hose **60***a* has been omitted, although it may be in use at outlet receptacles not shown being used in these views or it may be stored within that suction conduit **43** or **44** which is not then being used. FIGS. **5, 6** and **7** particularly illustrate how the suction hose **60** may be used selectively at different outlet receptacles. For example, in FIG. **5**, the foot end of suction hose **60** is shown connected to the main plug-in outlet receptacle **31** of the self-contained vacuum cleaner unit **30**. As another example, in FIG. **6**, the foot end of suction hose **60** is connected to the auxiliary plug-in receptacle **36** and, in FIG. **7**, suction hose **60** is stored in the conduit **44** extending from the auxiliary hose-retracting receptacle **34**.

In the embodiment of the vacuum cleaning system shown in FIG. **9**, a wall installed vacuum cleaner unit is employed, which unit is mounted in a substantially vertical wall **102**. The vacuum cleaner unit of FIG. **9** is broadly designated at **30'** and includes a main plug-in outlet receptacle **31'** as well as a suction device and collector not shown in FIG. **9**, but which may be arranged in a manner somewhat similar to that shown in FIG. **8**. Also, reference is made to my said copending application Ser. No. 567,615, filed July 25, 1965, now U.S. Pat. No. 3,422,482, for further details of a wall mounted vacuum cleaner unit such as shown in FIG. **9**. Accordingly, a further description thereof is deemed unnecessary.

In all other respects, the vacuum cleaning system of FIG. **9** is substantially the same as that disclosed in FIGS. **1** through **7** and, therefore, those parts in FIG. **9** which correspond to similar parts shown in FIGS. **1** through **7** will bear the same reference characters with the prime notation added and a further description thereof will not be given in order to avoid repetitive description.

Various forms of hose foot-end adapter means are provided to adapt each flexible suction hose for connection selectively to all the suction outlet receptacles. A first form of hose foot-end adapter means is shown in FIGS. 10—13 in which both a rigid, tubular, plug-in adapter 110 and a flexible, collapsible, annular piston 111 are fixed with respect to the foot end of the elongate flexible tubular body 112 of hose 60. In fact, as preferred, the foot-end plug-in adapter 110 serves also as a piston-carrying adapter, although it is to be understood that piston 111 may encircle and be secured directly to hose body 112.

As shown in FIG. 10, hose body 112 is of fabric-covered flexible rubberlike tubular construction, and one end of plug-in adapter 110 encircles and is adhesively or otherwise fixedly secured to hose body 112. Piston 111 is formed from a thin-walled resilient material and is positioned around a medial portion of adapter 110 between suitable retaining annular shoulders 113, 114 on adapter 110. The free or outer end of plug-in adapter 110 has a relatively short reduced portion 115 thereon which is adapted to fit loosely within the plug-in outlet receptacles 31, 35, 36. Reduced portion 115 may be provided with a resilient annular sealing ring or O-ring 116 thereon to provide a seal between the plug-in adapter and the tubular member of the corresponding plug-in outlet receptacle.

The diameter of adapter 110 is less than the internal diameter of the hose-storage suction conduits 43, 44, their respective flexible sleeves 53, 54, and the annular shoulder 100 in the tubular member 95 of each auxiliary hose-retracting receptacle 33, 34. However, the external diameter of piston 111 normally is about the same as or slightly greater than the internal diameter of the hose-storage suction conduits 43, 44 and their respective tubular flexible extensions 53, 54, as well as being of greater diameter than the annular shoulder 100 in the tubular member 95 of each auxiliary hose-retracting receptacle 33, 34.

By way of example, the auxiliary hose-retracting outlet receptacle 33 is shown in FIG. 13, wherein it will be observed that, while the hose 60 is in use, piston 111 may engage the outer surface of annular shoulder 100 so that, in normal use, such interengagement of the piston 111 with annular shoulder 100 will prevent hose 60 from creeping into suction conduit 43 through sleeve 53 and hose-retracting receptacle 33 due to the suction in conduit 43. However, the collapsible or resilient nature of piston 111 is such that the hose 60 may be twisted slightly and/or a greater than normal linear pushing force may be applied thereto by the operator to cause the piston 110 to move past annular shoulder 100. Thereupon, plug-in adapter 110, piston 111 and the body 112 of hose 60 may be retracted into stored position within sleeve 53 and suction conduit 43 by suction, and the head-end adapter then may be positioned within tubular member 95 of hose-retracting receptacle 33 as shown in FIG. 4. It will be noted in FIG. 11 that piston 111 yieldably engages the inner peripheral surface of suction conduit 43 so as to prevent the flow of air past piston 111 while the hose is being retracted and while it is being used and is only partly withdrawn from suction conduit 43 during such use. It is apparent that hose 60 with the piston 111, plug-in adapter 110 and head-end adapter 61 thereon also may be readily entirely withdrawn from hose-retracting receptacle 33 when the flexible suction hose 60 is to be used at any of the other outlet receptacles shown in FIG. 1.

While utilizing suction hose 60 with the piston 111 and foot-end plug-in adapter 110 positioned within suction conduit 43 or its flexible sleeve 53, or with the piston positioned within tubular member 95 and the plug-in adapter 110 projecting into sleeve 95 as shown in FIG. 13, dust tends to collect on and adhere to those exterior surfaces of adapter 110 and piston 111 which face toward the source of suction embodied in suction device 67 of FIG. 8. Consequently, in the course of subsequently transferring hose 60 from the corresponding auxiliary hose-retracting outlet receptacle 33 to another of the outlet receptacles in the vacuum cleaning system of FIGS. 1—7, it may be necessary for an operator to wipe the accumulated dust off of the plug-in adapter 110 and the piston 111 so as to avoid soiling the operator's hand while the plug-in adapter is being plugged into another of the plug-in outlet receptacles 31, 35, 36, or while the piston 111 on the hose 60 is being inserted into the hose-retracting receptacle 34 of FIGS. 1, 5, 6 and 7. Also, the dust adhering to the adapter might soil areas of the floor or carpet thereon if the hose is dragged along the floor during transfer thereof from either of the hose-retracting outlet receptacles to another of the outlet receptacles.

Although the adherence of dust to foot-end plug-in adapter 110 may not present a serious problem, second and third forms of hose foot-end adapter means are illustrated in the respective FIGS. 14—17 and 18—22 which will substantially eliminate the problem of dust adhering to the foot-end plug-in adapter means by providing adapters which are detachably connected to the foot ends of the flexible suction hoses.

Referring now to the second form of hose foot-end adapter means shown in FIGS. 14—17, for the purpose of description it may be assumed that suction hose 60′ of FIGS. 14—17 is the same hose as that shown positioned in the suction conduit 43′ and auxiliary hose-retracting receptacle 33′ in FIG. 9. Accordingly, the auxiliary plug-in receptacle of FIG. 16 is indicated at 35′ and the auxiliary hose-retracting outlet receptacle of FIG. 17 is indicated at 33′ to correspond with the embodiment of FIG. 9. Elements 32′, 45′, 84′, 85′, 86′, 88′ in FIG. 16 correspond with elements 32, 45, 84, 85, 86, 88 in FIG. 3, and elements 32′, 53′, 94′, 95′, 96′, 98′, 100′ correspond with elements 32, 53, 94, 95, 96, 98, 100 in FIG. 4.

Essentially, the second form of hose foot-end adapter means differs from the first form in that piston 111′ thereof is fixed to the body 112′ of hose 60′, and the plug-in adapter 110′ is detachably connected to the hose body 112′ through an intervening rigid tubular adapter 120 serving as a piston adapter in this instance. Here again, it is to be understood that the piston 111′ of FIGS. 14—17 may encircle and be secured directly to hose body 112′.

It is preferred, however, that piston 111′; which may be identical to piston 111, is mounted on piston adapter 120 in the same manner as that in which piston 111 is mounted on the adapter 110 of FIG. 10. The separate plug-in adapter 110′ is adapted to be detachably connected to piston adapter 120 in substantially axial alignment therewith. Like plug-in adapter 110, adapter 110′ is provided with a reduced outer end portion 115′ having an O-ring 116′ thereround. Any suitable means may be provided for detachably connecting plug-in adapter 110′ to the outer end of piston adapter 120. As shown, the inner end of plug-in adapter 110′ is provided with a reduced tubular extension 121 which is adapted to be slidably received within tubular piston adapter 120 and which is provided with a pair of opposed bayonet slot 122 therethrough (only one of which is shown) for engagement with respective pins 123 projecting inwardly from diametrically opposed portions of tubular piston adapter 120.

It is apparent by referring to FIG. 16, that plug-in adapter 110′ is connected to piston adapter 120 when the hose 60′ is plugged into tubular member 85′ of a plug-in outlet receptacle. However, when hose 60′ is to be connected to a hose-retracting outlet receptacle, such as receptacle 33′ in FIG. 17, and/or hose 60′ is to be stored in the corresponding suction conduit 43′ (FIG. 15), the plug-in adapter 110′ may be removed from piston adapter 120, as shown in FIGS. 15 and 17, and stored at any convenient location. Thus, dust then may collect on only a very small area of piston 111′ and adapter 120 while utilizing suction hose 60′ with a portion thereof positioned within suction conduit 43′ and auxiliary hose-retracting outlet receptacle 33′.

The third form of hose foot-end adapter means shown in FIGS. 18—22 has the piston 111″ and its adapter 120″ separable from the foot-end plug-in adapter 110″. However, the third form of adapter means differs from the second form in that plug-in adapter 110″ is secured directly to the body 112″ of flexible suction hose 60″, and piston adapter 110″ is adapted to be readily detachably connected to the outer end of the foot-end plug-in adapter 110″.

As is the case with respect to the foot-end plug-in adapters 110, 110', the third form of plug-in adapter 110'' includes a reduced outer end portion 115' about which a resilient sealing ring or O-ring 116'' is positioned. The foot-end plug-in adapter 110'' is secured directly to the foot end of hose body 112'' as is the case with respect to the first form of foot-end plug-in adapter 110 of FIG. 10. However, piston 111'' is mounted on its own separate piston adapter 120'' and may be held in the desired position on piston adapter 120'' in the same manner as that described with respect to the piston 111 in FIG. 10.

In order to readily removably connect piston adapter 120'' to the free end of and in axial alignment with plug-in adapter 110'', suitable connection means are provided on piston adapter 120'', which is embodied in a reduced tubular extension 125 provided with a pair of diametrically opposed bayonet slots 126 therein, only one of which is shown in FIGS. 18 and 22. The tubular extension 125 of piston adapter 120'' in FIG. 18 is adapted to be slidably received in the outer end portion of foot-end plug-in adapter 110'', and the bayonet slots 126 thereof are engaged by a pair of diametrically opposed pins 127 for locking the piston adapter 120'' in engagement with the plug-in adapter 110''.

In FIGS. 20 and 21, respective suction outlet receptacles 35'', 33'' are shown which may be identical to and may correspond with respective outlet receptacles 35, 33 of the first embodiment of the vacuum cleaning system shown in FIGS. 1 through 8. Thus, the elements 32', 45'', 84'', 85'', 86'', 88'' of FIG. 20 correspond to the respective elements 32, 45, 84, 85, 86, 88 shown in FIG. 3, and the elements 32'', 43'', 53'', 94'', 95'', 96'', 98'', 100'' of FIGS. 21 and 22 correspond to the respective elements 32, 43, 53, 94, 95, 96, 98, 100 shown in FIG. 4. Further, a portion of the hose-storage suction conduit 43'', extending from the hose-retracting receptacle 33'', is shown in FIG. 19.

By referring to FIG. 20, it is apparent that piston adapter 120'' is removed from foot-end plug-in adapter 110''whenever hose 60''is being used at a plug-in receptacle. While hose 60'' is being used at a plug-in receptacle, such as the plug-in receptacle 35'' of FIG. 20, piston adapter 120'', with its piston 111'' thereon, may be stored in any desired location. Conveniently, the detached piston adapter 120'' may be stored in a hose-retracting outlet receptacle, such as the receptacle 33'', with the piston 111'' resting against the annular abutment 100'' as shown in FIG. 22, and during which the door 96'' of hose-retracting outlet receptacle 33'' may occupy closed position.

After cleaning room areas adjacent plug-in receptacle 35''for example, piston adapter 111'' is coupled to plug-in adapter 110'' in the manner heretofore described, and hose 60'' then may be positioned in and stored in suction conduit 43'' as shown in FIG. 19. It is apparent that, during use of hose 60'' at the corresponding hose-retracting receptacle 33'', piston 111'' will prevent dust from getting onto exterior surfaces of plug-in adapter 110'' so that, upon removal of suction hose 60'' from the hose-retracting outlet receptacle 33''the operator may readily remove piston adapter 120'' from plug-in adapter 110'' and again store the same in outlet receptacle 33'' while the hose 60'' is being used at another plug-in outlet receptacle.

From the foregoing description, it is apparent that, considering both the second and third forms of adapter means, the foot-end adapter which is secured to the hose body need not necessarily be in the form of either a plug-in adapter or a piston adapter, and in which instance, the piston adapter 120'' of FIG. 18 and the foot-end plug-in adapter 110' of FIG. 14 may be alternatively connected to that foot-end adapter then secured to the hose body, without departing from the invention.

The vacuum cleaning system of this invention is disclosed herein as having a plurality of auxiliary outlet receptacles in addition to a main plug-in outlet receptacle which is a part of a self-contained vacuum cleaner unit, and wherein at least one of the auxiliary outlet receptacles is of the hose-retracting type facilitating storage of a flexible suction hose in the corresponding conduit when the hose is not in use. Also a plurality of flexible suction hoses may be used with the system as shown in FIG. 1. Essentially, however, one of the outstanding advantages of the cleaning system of this invention resides in the fact that it lends itself to the use of a single flexible suction hose, if desired, and only a single hose-retracting type of auxiliary outlet receptacle and associated suction conduit need be included in the system, if desired, in addition to a self-contained vacuum cleaner unit having its own plug-in outlet receptacle, for storage of the flexible suction hose in the latter suction conduit when the hose is not in use. Also, because of the novel adapter means associated with the hose, the hose may be selectively operatively connected to both the plug-in and hose-retracting types of outlet receptacle when being used for cleaning adjacent areas.

In the drawings and specification there have been set forth preferred embodiments of the invention and although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation.

I claim:

1. A vacuum cleaning system comprising a vacuum cleaner unit installed within a building and including a suction device provided with an air inlet and an air outlet, and a main plug-in outlet receptacle carried by said vacuum cleaner unit and communicating with said air inlet of said suction device, at least one auxiliary outlet receptacle of the hose-retracting type installed in said building, a stationary suction conduit communicatively connecting said auxiliary outlet receptacle to said air inlet of said suction device, a flexible suction hose normally stored within said suction conduit and having a head end normally stored in said auxiliary outlet receptacle whereby said suction hose may be partially withdrawn through said auxiliary outlet receptacle for cleaning areas adjacent the same and said suction hose also may be fully withdrawn from said auxiliary outlet receptacle, and adapter means for removably connecting said suction hose thus fully withdrawn to said main outlet receptacle for cleaning areas adjacent said main outlet receptacle.

2. A vacuum cleaning system comprising a vacuum cleaner unit installed within a building and including a suction device provided with an air inlet and an air outlet, main plug-in outlet receptacle carried by said vacuum cleaner unit and communicating with said air inlet of said suction device, at least one elongate flexible hose, a plurality of auxiliary outlet receptacles installed in spaced apart locations within the building, suction conduit means communicatively connecting said auxiliary outlet receptacles to said air inlet of said suction device, at least one of said auxiliary outlet receptacles being of the hose-retracting type, said suction conduit means including an individual suction conduit extending from said one of said auxiliary outlet receptacles, a flexible suction hose normally stored within said suction conduit extending from said one of said auxiliary outlet receptacles and having a head end normally stored in said one auxiliary outlet receptacle whereby said suction hose may be partially withdrawn through said one auxiliary outlet receptacle for cleaning areas adjacent the same and said suction hose also may be fully withdrawn from said one auxiliary outlet receptacle, and adapter means for removably connecting said suction hose thus fully withdrawn to said main outlet receptacle for cleaning areas adjacent said main outlet receptacle.

3. A structure according to claim 2 wherein said flexible hose includes a hose body having a foot end, and wherein a flexible piston and said adapter means are carried by the foot end of said hose body, said adapter means having a portion remote from said hose body adapted to removably connected to said main outlet receptacle, and said piston being of external diameter greater than that of said hose body and adapted to sealingly engage the inner surface of said suction conduit.

4. A structure according to claim 3 wherein said flexible piston encircles and is fixedly secured on a portion of the foot

end of said hose body, and wherein said adapter means is of tubular form and is positioned axially outwardly of said piston.

5. A structure according to claim 3 including a piston adapter also carried by the foot end of the hose body, and wherein said piston is mounted on said piston adapter and encircles the same.

6. A structure according to claim 5, wherein said adapter means is generally circular in cross section, and wherein one of said adapter means and said piston adapter is fixedly secured to said hose body and the other is removably connected to the fixedly secured one, and said piston being of greater external diameter than said adapter means.

7. A structure according to claim 6 wherein said adapter means is fixedly secured to said hose body.

8. A structure according to claim 6 wherein said piston adapter is fixedly secured to said hose body.

9. A structure according to claim 2, wherein another of said auxiliary outlet receptacles is of the plug-in type.

10. A structure according to claim 2, wherein said flexible hose includes a hose body, tubular adapter means secured to one end of said hose body, the outer end of said tubular adapter means having a plug-in portion thereon adapted to removably connected to said plug-in outlet receptacle, a flexible piston encircling and secured to said adapter means, and said piston being of external diameter greater than said hose body and said plug-in portion of said adapter means and being adapted to engage the inner surface of said conduit.

11. A vacuum cleaning system installed in a building and comprising a self-contained vacuum cleaner unit installed in the building and having a vacuum compartment and a power compartment, a suction device within said power compartment and having a suction side and an air exhaust side, and wherein said suction side communicates with said vacuum compartment, a tubular inlet fitting within said vacuum cleaner unit and communicating with said vacuum compartment, a main tubular outlet receptacle having one end facing outwardly with respect to said vacuum cleaner unit and having its other end communicatively connected to said inlet fitting for communication with said vacuum compartment, an auxiliary tubular outlet receptacle mounted in a fixed part of said building and spaced a substantial distance away from said main outlet receptacle and said vacuum cleaner unit, a stationary suction conduit having one of its ends communicatively connected to said auxiliary outlet receptacle and having its other end communicatively connected to said inlet fitting, a flexible suction hose normally stored within said suction conduit and having a head end normally stored in said auxiliary outlet receptacle whereby said suction hose may be partially withdrawn through said auxiliary outlet receptacle for cleaning areas adjacent the same and said suction hose also may be fully withdrawn from said auxiliary outlet receptacle, and adapter means for removably connecting said suction hose thus fully withdrawn to said main outlet receptacle for cleaning area s adjacent said main outlet receptacle.

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,593,363 Dated July 20, 1971

Inventor(s) James C. Hamrick

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, Line 36, after "improved", insert --vacuum--;
Column 2, Line 70, after "suction", insert --conduit--;
Column 4, Line 67, after "as", insert --is--;
Column 6, Line 50, change "slot" to --slots--;
Column 7, Line 14, change "connection" to --connecting--;
Line 29, change "32' " to --32"--;

IN THE CLAIMS:

Column 8, Line 70, after "to", insert --be--;
Column 9, Line 22, after "to", insert --be--.

Signed and sealed this 25th day of April 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents