

Jan. 29, 1963

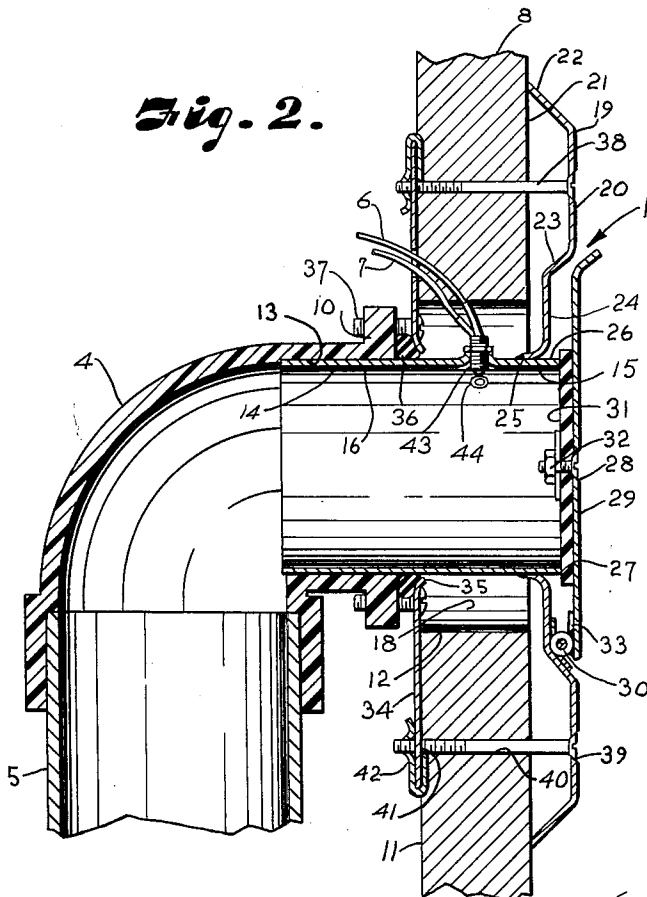
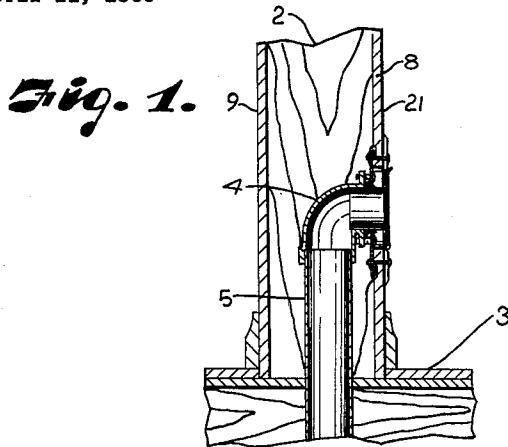
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3,076,068

WALL FITTING AND CONTROL FOR VACUUM CLEANING SYSTEMS

Filed April 11, 1960

2 Sheets-Sheet 1



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Fig. 3.

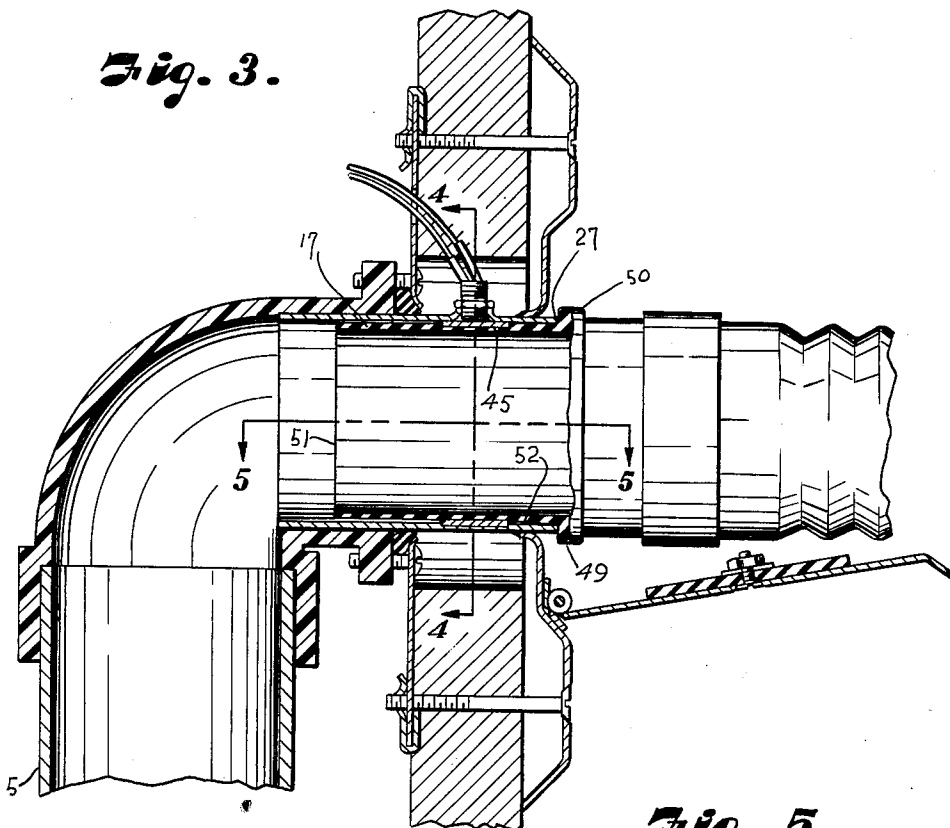


Fig. 4.

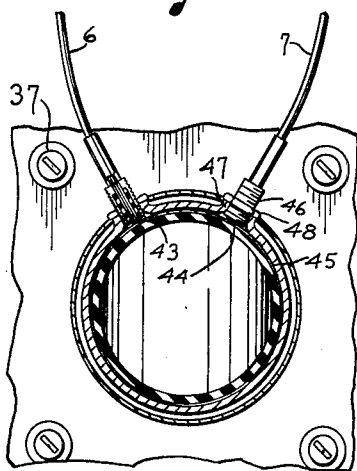
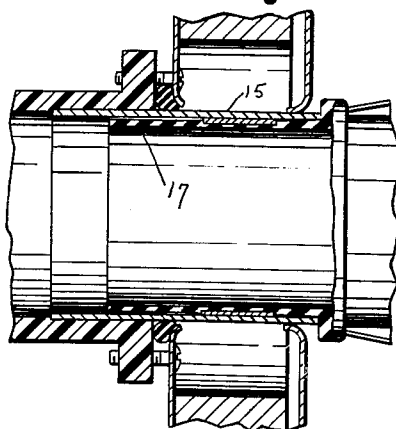


Fig. 5.



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WALL FITTING AND CONTROL FOR VACUUM CLEANING SYSTEMS

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4 Claims. (Cl. 200—61.6)

This invention relates to vacuum cleaning systems having an exhaust blower and receptacle in which dust and other litter are collected when the apparatus is in operation, and wherein said blower and receptacle are usually located in a basement or other remote area and several main and branch lines or conduits extend throughout the building and lead to hose connecting stations or fittings in each of several rooms for connection of a hose of a suction cleaning device. The invention more particularly relates to an outlet assembly such as wall or floor fittings and an electrical control or switch for completing and interrupting electrical circuits to a motor driving the exhaust blower of a dust separator and receptacle.

In central vacuum cleaning systems, it is common practice to have wall or floor fittings with hose connecting sleeves or bushings cemented or otherwise permanently secured in air-tight relation to inlets of branch conduits whereby disconnection for repair or replacement of the wall fitting is substantially impossible without damage or breakage of portions of the branch conduit inlets, resulting in expensive and difficult replacement. Also, various switches have been located adjacent to or in each wall fitting for manual operation by the user and each such switch can complete a circuit to the blower motor, and in such structures small children can raise the closure or door on the fitting and actuate the switch and effect operation of the blower motor which is usually in a remote area, such as a basement or garage, where it may run for a substantial period of time without knowledge of others on the premises. Also, in large installations, such as hotels, motels and the like, a plurality of areas may be served from one central collecting apparatus with a number of maids or persons cleaning different areas simultaneously whereby the blower motor would continue to operate until all of the switches are in off position and, if one person fails to actuate a switch to break the circuit, it is then necessary to go through the various units or areas to find the switch that is still turned on as such switches may be operated without the cleaning hose being connected or with the inlet valve closed.

The principal objects of the present invention are to provide a connector fitting that eliminates the aforementioned difficulties; to provide a connector or outlet assembly for vacuum cleaning systems in the form of a removable fitting, a number of which may be mounted in walls of a building and connected by vacuum conduits to a central suction apparatus and a cleaner hose end fitting or jack which cooperates with the outlet assembly to connect a vacuum cleaner to said conduits; to provide such an outlet assembly which is closed except when a vacuum cleaner is connected therethrough so loss of suction will not occur through any outlet assembly not in use or unattended and that is opened when a vacuum cleaning hose fitting is operatively associated therewith; to provide such an outlet assembly with electrical terminals which are automatically connected in a control circuit for a suction blower motor for operation when the hose is connected therewith and is in circuit interrupting position when the hose is disconnected; to provide such an outlet fitting and hose connection with switch elements wherein a portion of the switch is fixed on the hose end whereby a circuit to the blower motor is completed only when the hose end is inserted in the connector socket or sleeve in any rotative position of said hose end; to pro-

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vide an outlet fitting with a separable sleeve connection with a conduit inlet with a substantially air-tight joint provided by a compressible resilient seal surrounding the sleeve between the conduit inlet and a portion of the outlet assembly; and to provide an outlet fitting and hose connector that is economical to manufacture, easily installed or replaced, that is simple and durable in construction and positive and efficient in operation.

Other objects and advantages of this invention will become apparent from the following description taken in connection with the accompanying drawings wherein are set forth by way of illustration and example certain embodiments of this invention.

FIG. 1 is a vertical sectional view through an outlet assembly and suction conduit in position within the wall of a room.

FIG. 2 is an enlarged vertical sectional view through the outlet assembly with the closure in closed position.

FIG. 3 is an enlarged vertical sectional view through the outlet assembly with a suction hose connected therewith.

FIG. 4 is a transverse sectional view through the outlet sleeve and control terminals, taken on the line 4—4, FIG. 3.

FIG. 5 is a horizontal sectional view through the fitting on the line 5—5, FIG. 3.

Referring more in detail to the drawings:

1 designates an outlet assembly adapted to be mounted in a wall 2 or floor of a room or enclosure 3 of a building structure, with a portion connected to a fitting such as an elbow fitting 4 which has one end suitably secured to an adjacent end of a vacuum conduit or pipe 5 leading to a central suction apparatus (not shown) which includes a suction fan or pump and an electric motor for driving same with electrical conductors leading from the motor to a relay switch or control which have electrical leads 6 and 7 in the control circuit (not shown). The leads 6 and 7 extend to the outlet assembly 1 whereby operation of the suction apparatus motor can be controlled from the outlet assembly.

In the structure illustrated in FIG. 1, the vacuum pipe 5 extends upwardly in the wall 2 having opposite wall facings or panels 8 and 9, and the elbow 4 which is usually molded from synthetic resin has a flanged end 10 facing and slightly spaced from the back surface 11 of the wall panel 8 and in alignment with an opening 12 in said panel 8. The flanged end 10 preferably has a cylindrical bore 13 which forms a sliding fit for an end portion 14 of a sleeve or bushing 15 having a bore 16 forming a socket for receiving a hose jack or end 17 in close fitting substantially air-tight relation, as later described. The flanged end 10 of the elbow fitting 4 is in alignment with the opening 12 whereby the sleeve 15 extends through the wall panel 8, said opening 12 being substantially larger than the sleeve 15 to provide a space 18 therearound.

The outlet assembly includes a face plate 19 preferably formed of sheet metal or the like and including a wall portion 20 normally spaced from the outer face 21 of the wall panel 8 and having an intumed peripheral flange 22 adapted to engage said surface 21 of the wall panel 8, as illustrated in FIG. 2. The central portion of the wall 20 is inset as at 23 to form a recessed wall portion 24 with an opening 25 through which the sleeve 15 extends. The wall portion 24 at said opening 25 is suitably secured to the sleeve 15 by welding or the like whereby the outer end 26 of the sleeve 15 extends outwardly beyond the recessed wall portion 24, as illustrated in FIG. 2, and terminates in an edge 27 adapted to be sealingly engaged by a closure member 28. The closure preferably consists of a door plate 29 swingably mounted on a hinge

means 30 secured at an offset relation to the sleeve 15 as, for example, below said sleeve, as illustrated in FIG. 2. The closure door plate 29 has a resilient gasket or disc 31 secured to the inner face thereof by suitable fastening means 32 whereby when the closure is swung to closed position the gasket 31 engages the end edge of the sleeve to provide a tight joint. A suitable spring 33 is preferably arranged at the hinge means 30 and engaged with the face plate 19 and the closure member 28 to bias the closure towards closing position of the outer end of the sleeve 15.

A back plate 34 is preferably arranged adjacent the opposite face 11 of the wall panel 8 from the face plate 19 and has a central aperture 35 slightly larger than the outer diameter of the sleeve 15 whereby said sleeve extends through the aperture. A resilient gasket such as an O-ring 36 is sleeved on the sleeve 15 in encircling relation between the flanged end 10 of the elbow 4 and the back plate 34, and said back plate is adjustably connected to said flanged end 10 as by adjusting screws 37 whereby the back plate is moved toward the flanged end 10 of the elbow 4 to compress the gasket ring 36 into sealing engagement with said flanged end 10 and the sleeve 15 to form a tight joint to eliminate leakage of air thereby into the vacuum line or conduit. The face plate 19, together with the sleeve 15 and the closure 28, are all secured in position on the wall panel 8 by means of suitable fastening devices such as screws 38 which extend through apertures 39 in the face plate and through registering apertures 40 and 41 in the wall panel 8 and the back plate respectively. Suitable nuts or other fastening devices 42 are threaded on the ends of the screws 38 whereby the face plate is drawn toward the back plate until the face plate engages the face 21 of the wall panel 8.

The sleeve 15 is provided with circumferentially spaced terminals 43 and 44 that are insulated from said sleeve and extend into the socket to engage with a connecting strip 45 as later described. In the illustrated structure, each of the terminals 43 and 44 are mounted in externally threaded bushings 46 formed of electrical insulating material such as synthetic resin. The bushings 46 are threaded into threaded bores 47 of the sleeve 15 until the terminals extend into the socket the desired distance, and then a lock nut 48 is threaded on each of the bushings 46 to lock same in the selected position whereby the leads 6 and 7 from the motor control circuit and the respective terminals 43 and 44 form an interrupted circuit when the closure 28 is closed and the respective outlet assembly is not in use for cleaning purposes. A suction hose 49 communicating with a vacuum cleaning device (not shown) has a hose end 17 or jack adapted to be inserted into the sleeve 15 to communicate the suction hose with the suction conduit or pipe 5. The hose end or jack 17 is preferably formed of synthetic resin such as nylon or other suitable resilient electrical insulating material, said hose end preferably having a flanged portion 50 spaced from the open end 51 and with a slightly tapered outer surface 52 whereby the inner or open end portion 51 may be easily inserted into the socket in the sleeve 15 and, as said end member is moved into the socket, the portion 52 adjacent the flange 50 will tightly engage the inner surface of the sleeve 15 to make a tight joint when the flange 50 engages the end edge 27 of said sleeve.

A switch connector member or strip 45 is arranged on the end member 17 and preferably consists of a metal having good electrical conducting characteristics such as copper positioned whereby when the hose end is inserted into the sleeve 15, as illustrated in FIG. 3, the connector strip will engage the terminals 43 and 44 to complete the motor control circuit which, in turn, will actuate a suitable relay or the like to effect energization of the motor to drive the blower and create a suction in the vacuum conduit 5. The current necessary for the control circuit of which the terminals 43 and 44 are a part is preferably of low voltage-low amperage type so as to

present no hazard from human contact across the terminals. Also, while the connector 45 may merely extend around a portion of the circumference of the hose end, it is preferred that it be a continuous band and be positioned in a groove in said hose end 17 whereby the outer surface of the connector strip 45 is substantially even with or slightly below the outer surface of the respective portion of the hose end, and by being continuous around the hose end it will effect circuit connecting engagement with the terminals 43 and 44 with any rotative position of the hose. It is also preferred that the terminals 43 and 44 have a resilient mounting in the bushings 46 to assure that the terminals will be projected sufficiently to have circuit making contact with the connector band 45 and yet not mar the hose end as it passes the terminals.

With this arrangement, when it is desired to connect the cleaning device to the vacuum cleaning system, the closure 28 is swung outwardly to open the socket or sleeve 15 and the hose end 17 is inserted into said socket until the connector band 45 engages the terminals 43 and 44 which effects closing of the circuit and energizing of the vacuum cleaning system motor. When the cleaning at that particular station is completed, the hose end 17 is pulled from the socket, and as it moves therefrom the connector band 45 is disengaged from the terminals 43 and 44, interrupting the circuit to the motor from that station. After the hose is removed, the closure 28 swings to closing position to make a seal to prevent loss of vacuum through that assembly in the event another cleaning device is being used at the same time on the system at that time or is used at a later period.

In the event the outlet assembly needs repair, the fastening devices 38 may be removed and the face plate, together with the sleeve 15, pulled from the mounting, the sleeve having a slidable mounting in the elbow 4 and gasket ring 36. When the repair is completed, the sleeve is reinserted into the inlet of the elbow 4 and the face plate remounted as shown and described with the resilient gasket 36 forming a seal around the sleeve.

It is to be understood that while I have illustrated and described one form of my invention, it is not to be limited to the specific form or arrangement of parts herein described and shown except insofar as such limitations are included in the claims.

What I claim and desire to secure by Letters Patent is:

1. An outlet assembly for vacuum cleaning systems comprising, a face plate adapted to be positioned on a wall of an enclosure, a bushing having a through bore with an open end exposed in said enclosure and extending through the face plate and the wall, a vacuum conduit having an open end, said bushing being slidably and removably mounted at its opposite end in said open end of the vacuum conduit, a resilient gasket encircling said bushing at said open end of the vacuum conduit, means compressing said resilient gasket into sealing engagement with said bushing and vacuum conduit to form a tight joint, a closure member movably mounted on the face plate and biased toward the open end of the bushing to normally close same, said bushing having circumferentially spaced apertures in a wall thereof intermediate the ends thereof, switch terminals of an electric circuit, means mounting a switch terminal in each of said bushing apertures in insulated relation thereto whereby said terminals extend into said bushing bore in circumferentially spaced relation, a flexible hose having an elongate electrical non-conducting tubular sleeve portion to be inserted into the open end of said bushing bore in peripheral engagement therewith to establish fluid communication with said conduit, and a strip of electrical conducting material extending circumferentially around said hose sleeve portion in a position to engage said spaced terminals when said hose sleeve portion is in said fluid communication position in the bushing to complete the circuit between said terminals.

2. An outlet assembly for vacuum cleaning systems

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comprising, a back plate having a central aperture and adapted to be positioned in a wall of an enclosure, a vacuum conduit means having a fitting terminating in an open end adjacent said back plate and in alignment with said central aperture, an inlet bushing extending through said wall and said central aperture in the back plate and having one open end slidably mounted in said open end of said fitting, a resilient seal member encircling said bushing between said fitting and back plate, means adjustably connecting said back plate to said fitting and operable to draw the back plate toward said fitting to compress the seal member in sealing engagement therebetween and with said bushing, a front plate adapted to be positioned on the opposite side of said wall from the back plate and having an opening through which said bushing extends, means connecting said front plate and back plate for drawing same toward each other and against respective sides of said wall to secure said plates thereto, said bushing having another open end extending from said front plate and exposed in said enclosure, a valve member movably mounted on said front plate and having a resilient portion for engaging and closing said other open end of said bushing, and means biasing said valve member into bushing closing position.

3. An outlet assembly for vacuum cleaning systems comprising, a back plate having a central aperture and adapted to be positioned in a wall of an enclosure, a vacuum conduit means having a fitting terminating in an open end adjacent said back plate and in alignment with said central aperture, an inlet bushing having a through bore and extending through said wall and said central aperture in the back plate and having one open end slidably mounted in said open end of said fitting, a resilient seal member encircling said bushing between said fitting and back plate, means adjustably connecting said back plate to said fitting and operable to draw the back plate toward said fitting to compress the seal member in sealing engagement therebetween and with said bushing, a front plate adapted to be positioned on the opposite side of said wall from the back plate and having an opening through which said bushing extends, means connecting said front plate and back plate for drawing same toward each other and against respective sides of said wall to secure said plates relative thereto, said bushing having another open end extending from said front plate and exposed in said enclosure, a valve member movably mounted on said front plate and having a resilient portion for engaging and closing said other open end of said bushing, means biasing said valve member into bushing closing position, a switch having spaced resiliently urged terminals insulated from said bushing and extending into the bore therein, a suction hose having an elongate electrical non-conducting tubular sleeve insertable into said bushing in tight relation thereto to establish fluid

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communication with said conduit means, and an electrical conductor on said sleeve and engaging said terminals to complete the circuit therebetween when the hose sleeve is inserted into said bushing to the position for fluid communication of said sleeve with the vacuum conduit means.

4. An outlet assembly for vacuum cleaning systems comprising, a back plate having a central aperture and adapted to be positioned in a wall of an enclosure, a vacuum conduit means having a fitting terminating in an open end adjacent said back plate and in alignment with said central aperture, an inlet bushing having a through bore and extending through said wall and said central aperture in the back plate and having one open end slidably mounted in said open end of said fitting, a resilient seal member encircling said bushing between said fitting and back plate, means adjustably connecting said back plate to said fitting and operable to draw the back plate toward said fitting to compress the seal member in sealing engagement therebetween and with said bushing, a front plate adapted to be positioned on the opposite side of said wall from the back plate and having an opening through which said bushing extends, means connecting said front plate and back plate for drawing same toward each other and against respective sides of said wall to secure said plates relative thereto, said bushing having another open end extending from said front plate and exposed in said enclosure, a valve member swingably mounted on said front plate and having a resilient portion for engaging and closing said other open end of said bushing, means biasing said valve member toward said other open end of the bushing to normally close same, said bushing having circumferentially spaced apertures extending therethrough intermediate the ends thereof, switch terminals of an electric circuit, means mounting a switch terminal in each of said apertures in said bushing in insulated relation thereto whereby said terminals extend into the bushing bore in circumferentially spaced relation, a flexible suction hose having an elongate electrical non-conducting tubular sleeve insertable into said bushing bore in tight engagement therewith to establish fluid communication with said conduit means, and a strip of electrical conducting material extending circumferentially of said hose sleeve in a position to engage said spaced terminals to complete the circuit therebetween when the hose sleeve is inserted into said bushing to the position of fluid communication of said sleeve with the vacuum conduit means.

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