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R. D. HILL ET AL

3,377,647

CRACK-CLEANING SUCTION ATTACHMENT FOR A VACUUM CLEANER
OF THE UPRIGHT TYPE HAVING AN ON-THE-FLOOR, DOWNWARDLY
DIRECTED, MAIN SUCTION AND CLEANING NOZZLE

Filed March 1, 1966

2 Sheets-Sheet 1

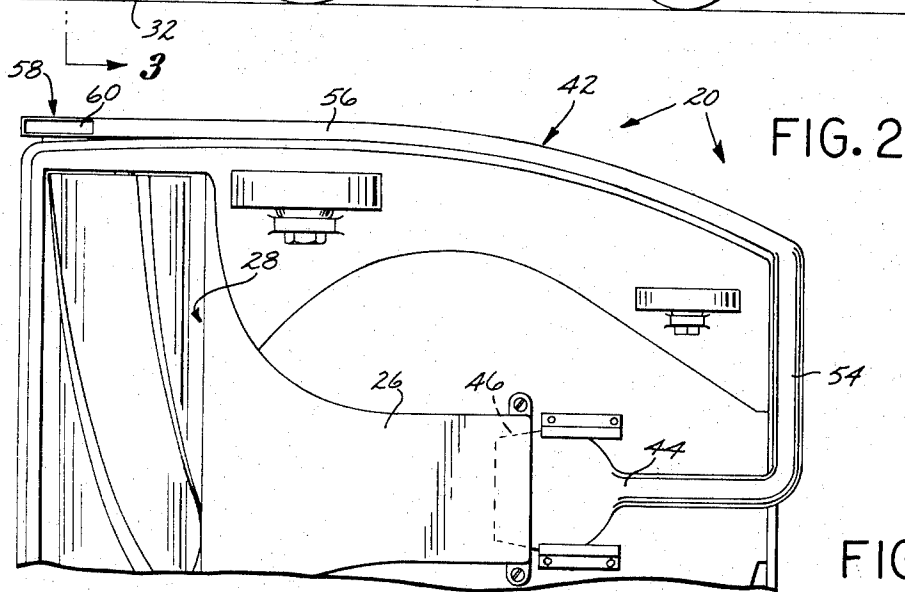
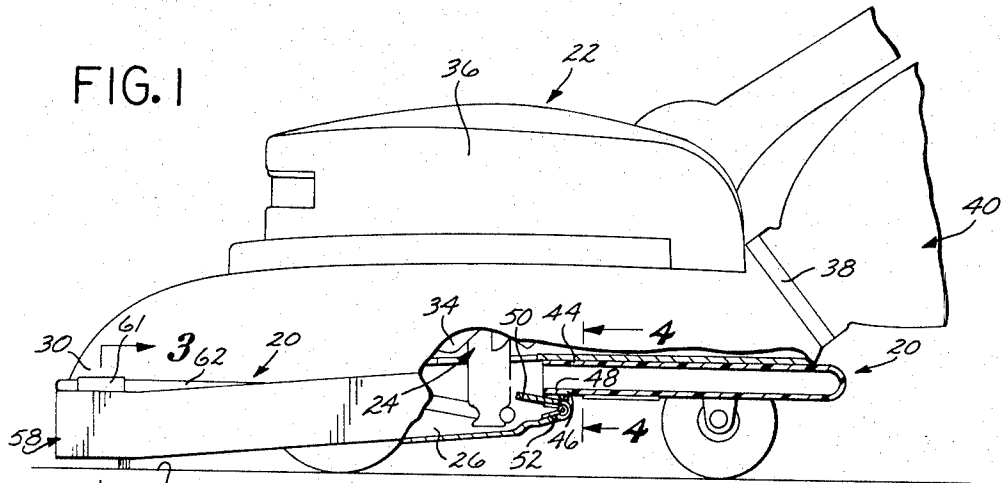
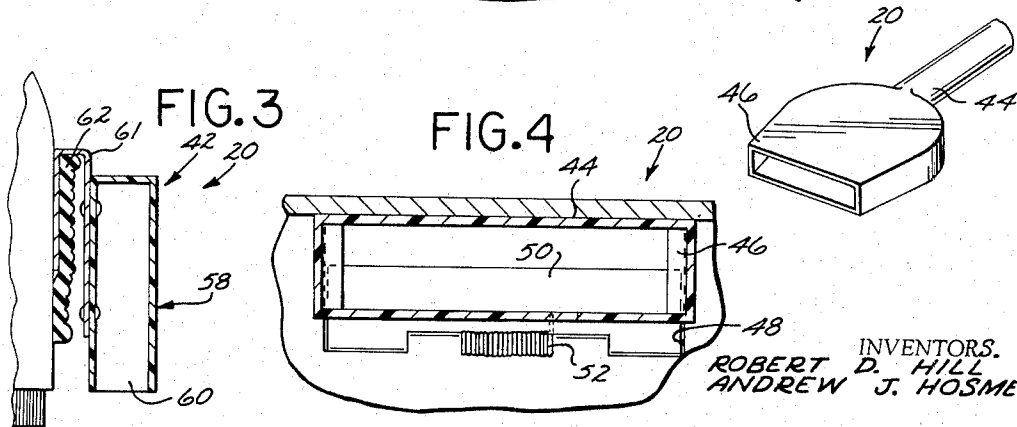


FIG. 2A



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2 Sheets-Sheet 2

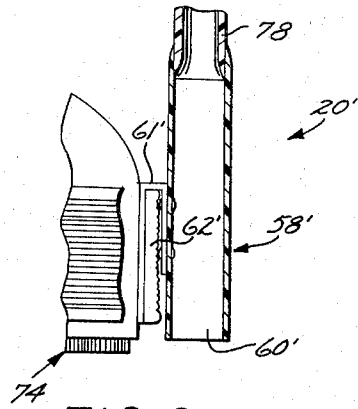
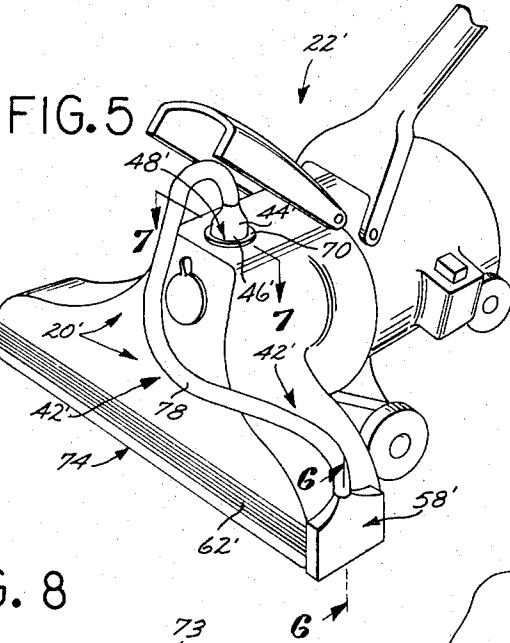


FIG. 8

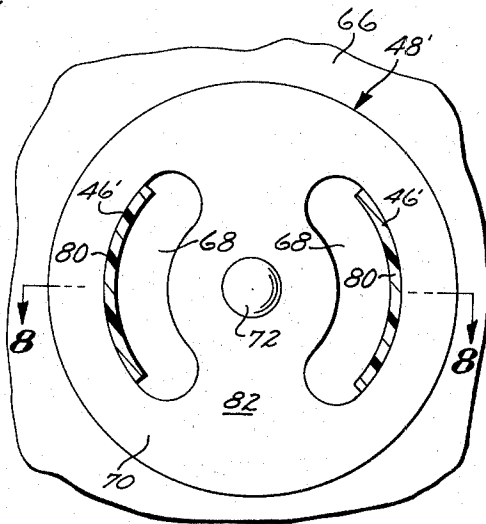
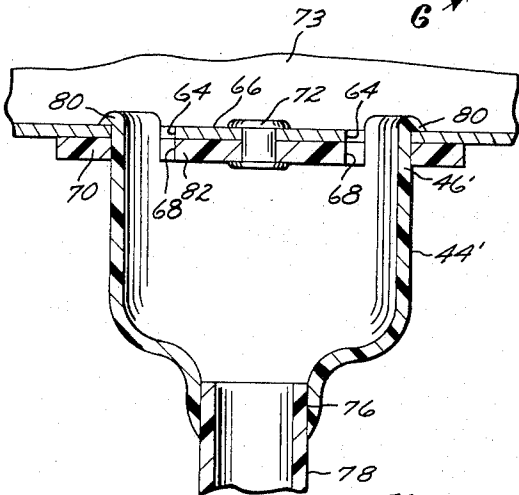


FIG. 7

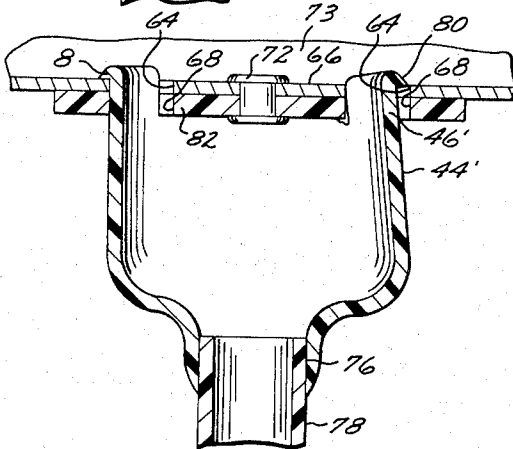


FIG. 9

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CRACK-CLEANING SUCTION ATTACHMENT FOR A VACUUM CLEANER OF THE UPRIGHT TYPE HAVING AN ON-THE-FLOOR, DOWNWARDLY DIRECTED, MAIN SUCTION AND CLEANING NOZZLE

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ABSTRACT OF THE DISCLOSURE

The specification discloses a crack-cleaning suction attachment for an upright type of vacuum cleaner which comprises an auxiliary suction duct means having a rear connection end provided with a connection and coupling portion cooperable for connection and coupling suction attachment with respect to the internal suction system of the vacuum cleaner, and having a forward remote operative end provided with a suction tip means and means removably mounting it at one side of the main suction head of the vacuum cleaner with a slot defined by the suction tip means being downwardly directed at a location as to lie immediately above the level of the floor underlying the vacuum cleaner when it is in an operative position for movement along an edge crack where such an underlying floor joins an upstanding wall.

Generally speaking, the present invention relates to the vacuum cleaner art and, more particularly, to a crack-cleaning suction attachment for what is conventionally known as an upright type of vacuum cleaner—that is, the type of vacuum cleaner which has a downwardly directed, on-the-floor, main suction and cleaning nozzle (usually at the forward end of the vacuum cleaner), suction creating means, and a suction air passageway between said main cleaning nozzle and said suction-creating means. Throughout this application, the word "upright" used as identifying a particular type of vacuum cleaner, is intended to mean the type of vacuum cleaner which is broadly defined above and should be so construed.

The upright prior art type of vacuum cleaner referred to above has one major disadvantage arising from the fact that all of the cleaning suction is applied to an underlying horizontal floor surface by the main suction and cleaning nozzle and, therefore, it is extremely difficult, if not impossible, to adequately clean the type of crack defined at the edge of a horizontal floor where said floor is joined to an upstanding wall. This is so because the exterior portions of the vacuum cleaner strike the wall when one attempts to place the downwardly directed main suction and cleaning nozzle close enough to said crack to clean same, and this normally results in either damage occurring to the wall, such as chipping away a piece of plaster, or damaging paint, and also effectively prevents the main suction or cleaning nozzle from actually getting into overlying relationship with respect to the crack to a sufficient extent to allow it to be well-cleaned.

The purpose of the present invention is to remedy the above-mentioned prior art disadvantage of a conventional upright vacuum cleaner by providing a crack-cleaning suction attachment which can be easily engaged in operative relationship with respect to such a conventional upright type of vacuum cleaner so as to apply suction through the suction attachment to a crack-cleaning, slot-defining suction tip means mounted at one side of the main suction head portion defining the main suction and cleaning nozzle of the conventional prior art vacuum cleaner and with the slot defined by said suction tip means being downwardly

directed at said laterally offset location in a position such as to lie immediately above the level of a floor underlying the vacuum cleaner when the vacuum cleaner is in an operative use position for movement along an edge crack where the underlying floor joins an upstanding wall and in an optimum cleaning relationship with respect thereto.

Thus, it will be understood that such an edge crack can be cleaned very effectively and thoroughly while the main suction and cleaning nozzle of the upright vacuum cleaner is cleaning an adjacent portion of the underlying floor. In other words, all that is necessary in order to thoroughly clean such an edge crack at the junction of a floor and a wall is to merely move the vacuum cleaner along the floor immediately laterally adjacent to and parallel to the surface of the wall, with the side of the main cleaning nozzle carrying the suction tip means being the one adjacent to the wall so that said suction tip means will directly overlie the crack which is to be cleaned.

Since the novel crack-cleaning suction attachment of the present invention is intended for use on conventional upright vacuum cleaners, it assumes several different forms corresponding to the particular type of upright vacuum cleaner with which it is adapted to cooperate and includes what might be termed an auxiliary suction duct means having a rear connection end provided with an effective connection and coupling portion cooperable for connection and coupling attachment with respect to the suction system or suction air passageway of an upright vacuum cleaner in a manner such as to apply suction to the interior of said auxiliary suction duct means while still leaving a substantial degree of suction produced by the conventional suction-creating means of such a conventional upright vacuum cleaner for the conventional application thereof to the main forwardly positioned and downwardly directed suction and cleaning nozzle so that both the main suction and cleaning nozzle and the auxiliary suction tip means will have suction applied thereto simultaneously.

Also, the auxiliary suction duct means of the crack-cleaning suction attachment of the present invention may assume different configurations and may be adapted to be differently positioned with respect to the main body portion of different types of upright vacuum cleaners between the rear effective connection and coupling portion at the rear end of the suction duct means and the forward or remote operative end of said suction duct means, which is provided with the previously-mentioned crack-cleaning slot-defining suction tip means.

Additionally, the entire crack-cleaning suction attachment device and/or various portions thereof may be mounted with respect to the main body portion, or to an exterior bumper portion, of a conventional upright vacuum cleaner by suitable resilient mounting clip means or various other functionally equivalent mounting means at any desired locations.

One well-known prior art upright type of vacuum cleaner comprises what is known as a Hoover vacuum cleaner and, in one form, it is manufactured with a rearwardly facing valve engagement port at the rear end of the vacuum cleaner head which is adapted for receiving engagement with respect to a converter tool, such as is clearly disclosed in U.S. Patent No. 2,724,140, which issued on Nov. 22, 1955, to G. P. Daiger et al. and which functioned to effectively cut off all suction from the main suction nozzle and divert it into the auxiliary tool for connection to a flexible duct, conduit, or tubing means whereby to effectively convert the conventional Hoover upright vacuum cleaner temporarily into the equivalent of a conventional prior art tank-type vacuum cleaner having an off-the-floor suction port for connec-

tion to any of a plurality of different suction-applying attachments so that suction can be applied to a variety of surfaces other than just floor surfaces, such as the surfaces of upholstered furniture, draperies, lamps, walls, ceilings, and the like. The converter tool disclosed in said U.S. patent also was provided with an underlying skid portion which acted to effectively lift the front portion and the main cleaning nozzle of the conventional Hoover upright vacuum cleaner off the floor. In other words, the converter tool disclosed in said patent was adapted to effectively convert the conventional upright Hoover vacuum cleaner effectively into the other conventional type of vacuum cleaner referred to above.

The novel crack-cleaning suction attachment of the present invention utilizes the above-mentioned rearwardly facing valved engagement port provided in such a conventional prior art Hoover-type of upright vacuum cleaner.

Another conventional prior art upright type of vacuum cleaner comprises what is known as a Kirby vacuum cleaner, and, in certain models thereof, it is provided at an upper front location thereof with a controllably adjustable air suction by-pass valve means for effectively modifying the amount of suction applied by the main cleaning nozzle to an underlying floor surface, and it is this conventional air suction by-pass valve means to which the connection and coupling portion of the auxiliary suction duct means of the novel crack-cleaning suction attachment of the present invention is adapted to be connected for applying suction therethrough to the crack-cleaning slot-defining suction tip means at the remote or opposite end of the auxiliary suction duct means.

With the above points in mind, it is an object of the present invention to provide a novel crack-cleaning suction attachment for an upright type of vacuum cleaner of the character referred to herein generically and/or specifically and which may include any or all of the features referred to herein, either individually or in combination, and which is of extremely simple, inexpensive, maintenance-free, easy-to-mount, and easy-to-use construction which is adapted for mass manufacture at a very low cost-per-unit and for use with pre-existing conventional upright vacuum cleaners of various different types and, if desired, as original equipment provided in association with newly-manufactured vacuum cleaners of the upright type, whereby to be conducive to widespread manufacture, distribution, and use of the invention.

Further objects are implicit in the detailed description which follows hereinafter (which is to be considered as exemplary of, but not specifically limiting, the present invention), and said objects will be apparent to persons skilled in the art after a careful study of the detailed description which follows.

For the purpose of clarifying the nature of the present invention, two exemplary embodiments of the invention are illustrated in the hereinbelow-described figures of the accompanying two sheets of drawings and are described in detail hereinafter.

FIG. 1 is a fragmentary view, partly in elevation, partly broken away, and partly in section illustrating a conventional main body portion of a conventional prior art upright type of vacuum cleaner—the particular one illustrated comprising one form of what is known as a Hoover upright vacuum cleaner. In this view, one form of the novel crack-cleaning suction attachment of the present invention is shown in mounted operative relationship with respect to said Hoover vacuum cleaner.

FIG. 2 is a fragmentary bottom plan view of the apparatus illustrated in FIG. 1.

FIG. 2A is a perspective view of the front end of the novel connection and coupling portion at the rear end of the auxiliary suction duct means of the crack-cleaning attachment of the present invention.

FIG. 3 is an enlarged fragmentary view partly in elevation and partly in vertical section taken substantially

along the plane indicated by the arrows 3—3 of FIG. 1.

FIG. 4 is an enlarged fragmentary view taken substantially along the plane indicated by the arrows 4—4 of FIG. 1 and specifically illustrates the detailed structure of the connection and coupling portion at the rear end of the auxiliary suction duct means and the engaged relationship thereof within the conventionally provided rearwardly facing valved engagement port means carried underneath and at the rear of the main body portion of the conventional prior art upright Hoover vacuum cleaner.

FIG. 5 is a fragmentary, three-dimensional, exterior pictorial view illustrating another slightly modified form of the novel crack-cleaning suction attachment of the present invention in mounted operative relationship with respect to another type of conventional prior art upright vacuum cleaner of the type known as a Kirby upright vacuum cleaner.

FIG. 6 is an enlarged fragmentary view, partly in elevation and partly in vertical section, taken substantially along the plane indicated by the arrows 6—6 of FIG. 5.

FIG. 7 is an enlarged fragmentary view, taken substantially along the plane indicated by the arrows 7—7 of FIG. 5.

FIG. 8 is a front view, largely in cross-section, taken substantially along the plane indicated by the arrows 8—8 of FIG. 7.

FIG. 9 is a view similar to FIG. 8 but shows one of the flanged engagement projections of the connection and coupling means in a partially deflected and partially disengaged relationship such as occurs during connection and/or disconnection of the connection and coupling portion relative to the air by-pass valve means of the Kirby vacuum cleaner illustrated in FIG. 5.

The novel crack-cleaning suction attachment of the first form of the present invention illustrated in FIGS. 1—4 is generally designated by the reference numeral 20, as is perhaps best shown in its most complete form in FIG. 2, and is mounted on a conventional main vacuum cleaner head or main body portion, generally designated at 22, of the type provided on one form of upright Hoover vacuum cleaner which is additionally provided with suction-creating means, a fragment of which is shown in FIG. 1 as generally designated by the reference numeral 24.

Said main body portion 22 is also provided with a main suction duct means 26 having its rear end connected to the previously-mentioned suction-creating means 24 and having its forward end connected to a main suction and cleaning nozzle, such as is generally designated at 28 in FIG. 2 and which underlies the forward part 30 of the main body portion 22 and which is downwardly directed toward an underlying floor surface such as is indicated by the reference numeral 32 in FIG. 1.

The suction-creating means 24 may include a fan, a blower, or an air-impelling means of one type or another as fragmentarily illustrated by the reference numeral 34 in FIG. 1 and driven by an electric motor, which is not shown but which is adapted to be contained within the upper housing part 36 of the main vacuum cleaner body portion 22.

It should be noted that the opposite side of the suction-creating means 24 is adapted to be connected through a removable fitting 38 to an air pervious, dirt impervious, air filtration and dirt storage bag, shown fragmentarily in FIG. 1 and generally designated by the reference numeral 40.

The above description of the conventional Hoover-type vacuum cleaner shown in FIGS. 1—4 is rather general but is believed to be entirely adequate in view of the well-known structure thereof.

The crack-cleaning suction attachment generally indicated at 20 comprises an auxiliary suction duct means, generally designated by the reference numeral 42, which has a rear connection end 44 provided with an effective

connection and coupling portion 46 coöperable for connection and coupling suction attachment with respect to the internal suction system, which may be said to be a synonym for the combination of the main suction duct 26 and the suction-creating means 34 of the vacuum cleaner main body portion 22, so as to be provided with a measure of suction thereby when the main cleaning nozzle 28 is also being provided with cleaning suction.

In the exemplary first form of the invention illustrated, said connection and coupling portion 46 is shaped in a manner similar to the shape of the corresponding rearwardly facing valved port 48 provided underneath the Hoover vacuum cleaner main body portion 22 in a rearwardly facing direction. Thus, when the front end of the connection and coupling portion 46 is inserted forwardly through said valved engagement port 48, the pivotally mounted valve or gate member 50 is pivoted forwardly against the action of a biasing spring 52 into a position such as is best shown in FIG. 1. Of course, it should be understood that the fit of the connection and coupling portion 46 within the valved engagement port 48 should be of a mechanically frictionally interlocked and pneumatically sealed type, and this may be effected by providing either a slightly cooperating taper of the engagement parts, compressible gasketing material in the engagement region (on either engagement member) or the resilient nature of the two parts engaged may be relied upon for providing the proper frictionally interlocked and pneumatically-sealed engagement thereof. Also, if desired, a mechanical latch of the type disclosed in the hereinbefore-mentioned Patent No. 2,724,140 may be employed for further enhancing the locked relationship of the connection and coupling portion 46 and the valved engagement port 48.

The auxiliary suction duct means 42 extends rearwardly from the connection and coupling portion 46 and then is bent laterally and has a laterally extending portion 54 which lies along the rear of the main vacuum cleaner body 22 until the left side thereof is reached, at which portion the auxiliary suction duct mean 42 bends forwardly and has a forwardly extending duct portion 56 extending along the side of the vacuum cleaner main body portion 22 until it reaches a location laterally adjacent to the main suction nozzle 28, where said auxiliary suction duct means is provided with a downwardly directed crack-cleaning, slot-defining, suction tip means, generally designated at 58, and defining a downwardly facing slot 60 therein which is at a location immediately above the corresponding portion of the underlying floor surface 32 and is downwardly directed toward same for effective use in cleaning an edge crack where the underlying floor 32 joins an upstanding side wall (not shown).

It should be noted that, in the exemplary form illustrated, the auxiliary suction duct mean 54 may change cross-sectional shapes at various locations along the complete length thereof and at various change-of-shape locations, or at various other convenient locations, may be provided with pneumatic coupling means so that the complete auxiliary suction duct mean 42 may comprise several different sections, if desired. This may also be true where said suction duct means 42 joints the suction tip means 58, if desired. Such pneumatic coupling means are not shown in the figures of the drawing since they are well-known in the art and would add nothing to the disclosure.

Various portions of the auxiliary suction duct mean 42 may be mounted by mounting clips or other functionally equivalent mounting means with respect to the main vacuum cleaner body portion 22. As is best shown in FIG. 3, this may be accomplished by a mounting clip 61 of what might be termed a hanger or hook type effectively hooked over the conventional rubber bumper strip 62 carried by the vacuum cleaner body portion 22. However, said mounting clips may be modified or eliminated entirely, and various other mounting structures and/or ar-

rangements employed within the broad scope of the present invention.

FIGS. 5-9 illustrate a modified form of the invention, and parts which are structurally or functionally identical to, similar to, or equivalent to corresponding parts of the first form of the invention are designated by similar reference numerals, primed, however.

In this modification, the main vacuum cleaner body portion 22' is a part of what is known in the prior art as a Kirby upright vacuum cleaner and its structure is somewhat differently arranged from the Hoover-type upright vacuum cleaner shown in the first form of the invention illustrated in FIGS. 1-4 and is provided with a controllably adjustable air suction by-pass valve means generally designated by the reference numeral 48', which comprises a pair of arcuate slots 64 in the housing wall 66 controllably alignable or misalignable to any desired degree with a corresponding pair of arcuate slots 68 provided in a rotary disc-shaped valve opening and closure member 70, which is pivotally mounted by a rivet comprising an effective pivot pin 72 connecting said disc member 70 outwardly of the corresponding portion of said wall 66.

It will be noted that the interior region 72 inside of said wall 66 communicates directly with the main suction or cleaning nozzle generally designated at 74 and acts to shunt or by-pass air so as to modify the effective suction applied by the suction-creating means (not specifically shown) to said main cleaning nozzle 74. Thus, it will be understood that the air suction by-pass valve means, indicated generally at 48', is in many ways functionally equivalent to the valved engagement port 48 illustrated in connection with the first form of the invention as being carried at the rear bottom of a conventional Hoover-type vacuum cleaner main body portion 22 of the first form of the invention shown in FIGS. 1-4. Therefore, it is to the air suction by-pass valve means 48' that the modified connection and coupling portion 46' of the auxiliary suction duct mean 42' is attached, as is clearly shown in FIGS. 5 and 7-9.

The above attachment is accomplished by reason of the fact that the modified connection and coupling portion 46' comprises a cylindrical flexible cup-shaped member connected as indicated at 76 to the tubing 78 comprising the intermediate portion of the auxiliary suction duct means 42', with the forward portion of said cup 46' being provided with a pair of arcuate and outwardly flanged resiliently deflectable fastening hook portions 80 adapted to be extended through the aligned arcuate slots 68 and 64 into an inserted relationship such as is shown in FIGS. 7, 8, and 9, whereby to effectively mount the coupling cup 46' with the recessed sealing abutment edge portion 82 thereof in effective sealing engagement with the outside surface of the disc member 70. This effectively places the interior of the auxiliary suction duct means 42' in sealed communication with the interior suction-applying region 73 overlying the main cleaning nozzle 74 so that some measure of suction will be applied through the suction duct means 42' to the suction tip means 58' in a manner similar to that described hereinbefore in connection with the first form of the invention.

The deflection of the resilient fastening hooks 80, which allow attachment and detachment thereof relative to the wall portion 66, is illustrated in the process of occurrence with respect to the right one of said fastening hook means 80 in FIG. 9, and it will be understood that the operation of the left one is similar thereto.

FIG. 6 illustrates the fact that the suction tip means 58' may be mounted by a hanger or hook type mounting or fastening clip 61' to the conventional rubber bumper 62' in a manner very similar to that of the first form of the invention illustrated in FIG. 3. However, the intermediate tubing portion 78 of the auxiliary suction duct means 42' is of relatively short length and may be un-

ported except at the opposite ends thereof, if desired. However, additional mounting means may be provided for firmly fastening said intermediate tubing portions 78 in a selected relationship with respect to the front part of the main body portion 22', if desired.

The attachment means of the present invention may be made of plastic material of either a relatively rigid pre-shaped type or of a flexible substantially elastomeric type, and it should be noted that it may be modified for operative mounting relationship with respect to a variety of upright types of vacuum cleaners other than the two specific forms illustrated, which are exemplary only of others with which the crack-cleaning suction attachment of the present invention may cooperate.

It should be understood that the figures and the specific description thereof set forth in this application are for the purpose of illustrating the present invention and are not to be construed as limiting the present invention to the precise and detailed specific structure shown in the figures and specifically described hereinbefore. Rather, the real invention is intended to include substantially equivalent constructions embodying the basic teachings and inventive concept of the present invention.

We claim:

1. A crack-cleaning suction attachment for an upright type of vacuum cleaner, comprising auxiliary suction duct means having a rear connection end provided with an effective connection and coupling portion cooperable for connection and coupling suction attachment with respect to the internal suction system of a power-driven vacuum cleaner and having a forward remote operative end provided with a suction tip means and means for removably mounting same at one side of the main suction head portion of an upright vacuum cleaner with the slot defined by the suction tip being downwardly directed at a location such as to lie immediately above the level of a floor underlying the vacuum cleaner when the vacuum cleaner is in an operative use position for movement along an edge crack where such an underlying floor joins an up-standing wall.

2. A device as defined in claim 1, wherein said auxiliary suction duct means has an intermediate portion adapted to extend along a side portion of a vacuum cleaner immediately outwardly adjacent to a conventional side bumper provided around a conventional vacuum cleaner and provided with mounting means for mounting attachment with respect to the side bumper.

3. A device as defined in claim 1, wherein said auxiliary suction duct means has an intermediate portion adapted to extend along a side portion of a vacuum cleaner immediately outwardly adjacent to a conventional side bumper provided around a conventional vacuum cleaner and provided with resiliently engageable mounting clip means for mounting attachment with respect to said side bumper.

4. A device as defined in claim 1, wherein said auxiliary suction duct means has a flexible intermediate tubing portion adapted to extend effectively downwardly and laterally along a portion of a vacuum cleaner main suction head between said suction tip means and a controllably adjustable air suction by-pass valve means carried by

the vacuum cleaner main suction head and effectively comprising the portion of the vacuum cleaner's suction system to which the connection and coupling end of said auxiliary suction duct means is adapted to be removably attached.

5. A device as defined in claim 1, including, in combination therewith, an upright vacuum cleaner having a main body portion provided with motor means, suction pump means driven by the motor means, a main suction head portion positioned for rolling overlying suction engagement with respect to an underlying floor surface and main suction duct means interconnecting said main suction head portion and said suction pump means, and an air pervious and dirt impervious dirt-storing air filtration bag connected to the opposite end of said suction pump means, said suction duct means being provided with a controllably openable engagement valve means for the reception of, and suction communication with said connection and coupling portion of said auxiliary suction duct means.

6. A device as defined in claim 5, wherein said engagement valve means comprises a valved engagement port facing the rear end of the vacuum cleaner and positioned thereunder for receiving engagement with respect to a forwardly inserted part of said effective connection and coupling portion of said auxiliary suction duct means.

7. A device as defined in claim 5, wherein said engagement valve means comprises a top-front-positioned rotary-type controllably adjustable suction-modifying air by-pass valve means effectively connected to said main suction duct means in parallel to said main suction head portion for controllably modifying the effective suction applied to said main suction head portion.

8. A device as defined in claim 5, wherein said vacuum cleaner main body portion is provided along each side thereof with a compressible protective side bumper strip, said auxiliary suction duct means having an intermediate portion extending along said side portion of said vacuum cleaner main body portion immediately outwardly adjacent to said side bumper strip and provided with mounting clip means resiliently engaged in mounting attachment with respect to said side bumper strip.

9. A device as defined in claim 5, wherein said vacuum cleaner main body portion is provided along each side thereof with a compressible protective side bumper strip, said auxiliary suction duct means having a flexible intermediate tubing portion extending effectively downwardly and laterally along a portion of the vacuum cleaner main suction head between said suction tip means and said engagement valve means, which comprises a controllably adjustable air suction by-pass valve means carried by a top front part of said main body portion of said vacuum cleaner.

References Cited

UNITED STATES PATENTS

| | | | |
|-----------|---------|----------|-----------|
| 2,416,419 | 2/1947 | Pickford | 15—337 XR |
| 2,487,443 | 11/1949 | Hough | 15—337 XR |
| 2,525,801 | 10/1950 | Howard | 15—337 |

60 ROBERT W. MICHELL, *Primary Examiner.*