

[54] VACUUM INTAKE SAFETY MEANS

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Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 35,490, May 7, 1970, abandoned.

[52] U.S. Cl. 15/339, 15/421, 285/7, 285/328

[51] Int. Cl. A47I 9/24

[58] Field of Search 15/327 R, 420, 421, 15/339; 285/7, 330

[56] References Cited

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Primary Examiner—Billy J. Wilhite

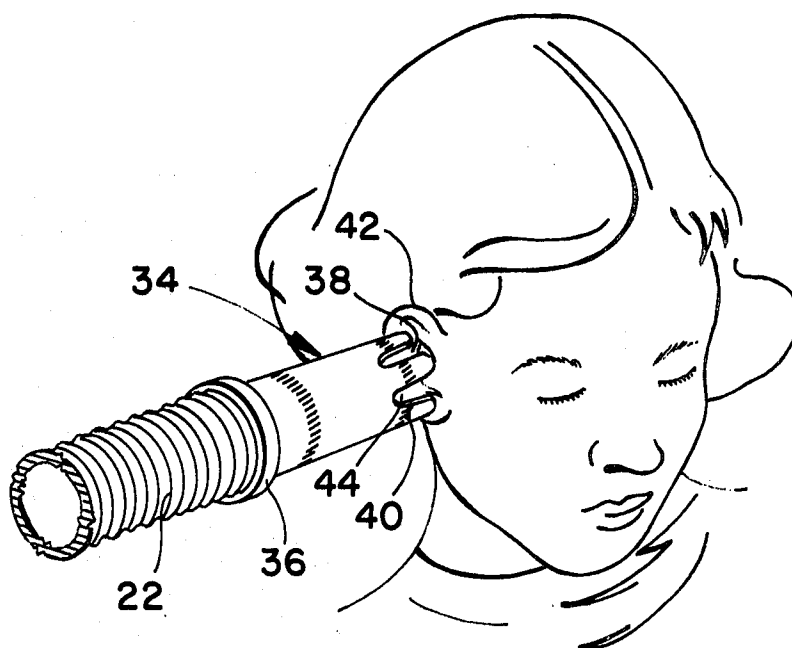
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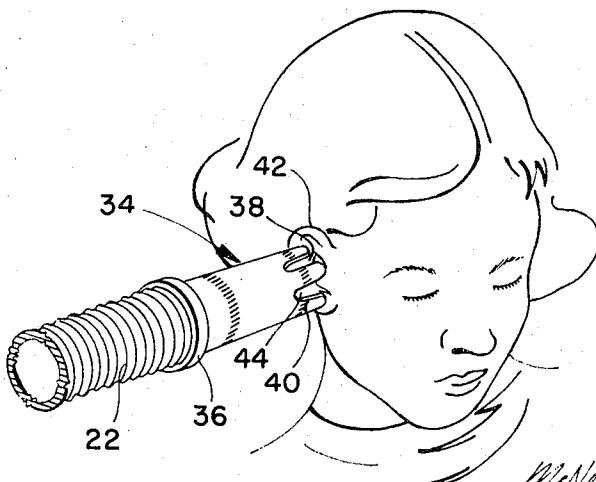
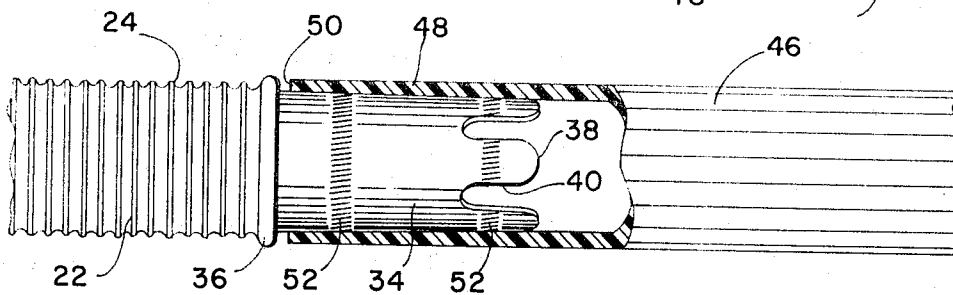
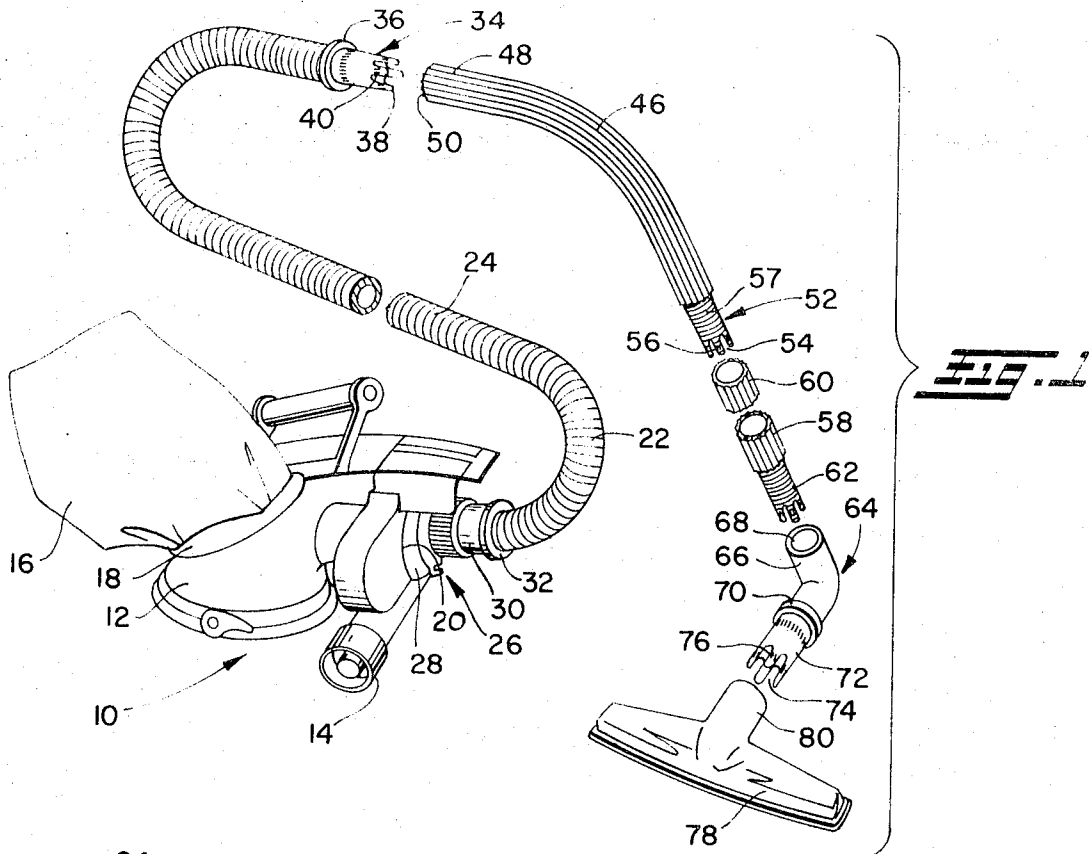
[57] ABSTRACT

A coupling is provided for a vacuum cleaner including a male connector member adapted for sliding fit with an associated female connector member. One of the connector members is integrally connected to the vacuum intake tube or hose adjacent the intake end thereof and forms a vacuum intake mouth having a notched or apertured configuration adapted to prevent sealing engagement when the intake mouth is pressed against portions of the human body while the vacuum cleaner is running. The connector members are designed to interfit and form a fluid-tight seal, closing off the notched or apertured configuration, and transmitting the suction effect of the vacuum cleaner.

5 Claims, 5 Drawing Figures



SHEET 1 OF 2



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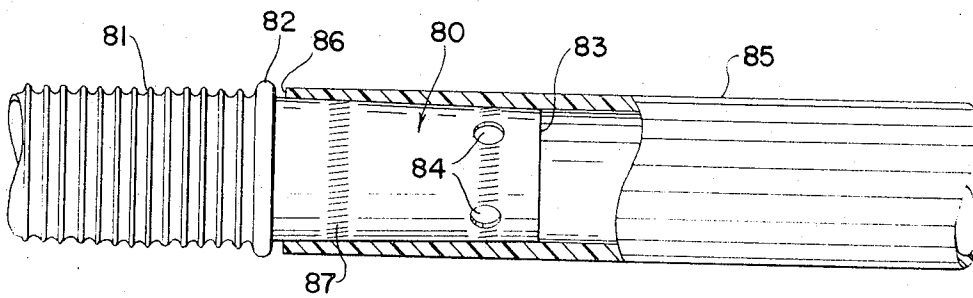
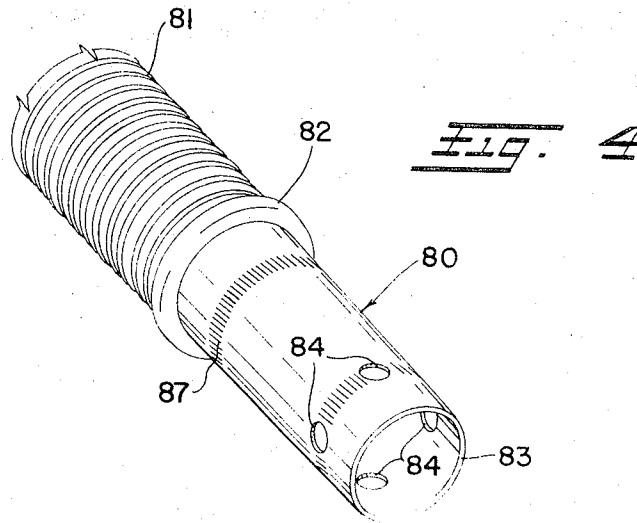


Fig. 5

VACUUM INTAKE SAFETY MEANS RELATED APPLICATION

This is a continuation-in-part of my copending application Ser. No. 35,490, filed May 7, 1970 and now abandoned.

FIELD OF THE INVENTION

This invention relates generally to couplings for vacuum cleaner hose and tube components and, more particularly, to a novel and improved coupling having axially extending notch means or spaced apertures adjacent the vacuum intake mouth.

PRIOR ART

The vacuum cleaner is a versatile household appliance which is adaptable to be used with a variety of accessory equipment. In many instances, such accessory equipment includes the use of multisectional hose and tube components or elements to transmit the suction effect to off-the-floor attachments as well as surface nozzles. The multisectional hose and tube components are provided with couplings which permit the components to be quickly and easily connected and disconnected.

The prior art disclosed a variety of couplings including male-female type connectors which utilize bayonet and split ring type fittings. The couplings are typically cylindrical and extend to an open-ended vacuum intake mouth having a substantially planar end face. Reference may be had to U.S. Pat. Nos. 1,005,153; 2,326,439; and 2,925,289, for examples of such couplings. Although such prior art couplings mechanically serve their intended function in a satisfactory manner, they are not entirely satisfactory from a safety standpoint.

The safety problems which exist with respect to prior art couplings relate to the planar end face configuration of the vacuum intake mouth. In particular, the planar end face forms a substantially fluid-tight seal when it is pressed against a similarly planar or a relatively flexible surface such as the human body while the vacuum cleaner is operating. Consequently, a significantly large pressure drop or suction effect is developed.

The sealing effect and corresponding pressure drop are undesirable and, in fact, may be dangerous when young children having a tendency to play with such appliances are in the household. Specifically, an infant or unknowing child may place the intake mouth against delicate portions of the human body. For example, the infant or child may accidentally or intentionally contact the eye or ear with the intake mouth of an operating vacuum cleaner or cause damage to his own body or that of a playmate. In some instances, the resulting damage to the body may be permanent and can conceivably include total or partial loss of vital human senses.

In view of the growing number of vacuum cleaners in use today and the young child's inquisitive nature of the carelessness of adults, the occurrence of such injuries is becoming more than a remote possibility. In fact, the possibility of an increasing number and severity of such injuries has been recognized as a safety problem which may face the entire industry.

SUMMARY OF THE INVENTION

A coupling for a vacuum cleaner comprising male

and female connector members is provided. According to one aspect of the invention, one of the connector members is connected to a vacuum intake tube or hose adjacent its intake end and extends to form a vacuum intake mouth including notch means. According to another aspect of the invention, the vacuum intake mouth includes aperture means spaced from a planar end portion of the mouth. The notch means and the aperture means are both adapted to substantially eliminate a pressure drop which otherwise occurs when the intake mouth is pressed against a relatively flexible surface such as the human body while the vacuum cleaner is running. The associated members are dimensioned to engage in a sliding fit wherein the female connector member encircles the male member, closing off the notch means or the aperture means, to form a fluid-tight seal and transmit the suction effect of the vacuum cleaner.

In one illustrated embodiment of the present invention, the male connector member is connected to an open ended vacuum intake tube adjacent its intake end and the notch means is formed by four symmetrically disposed notches in the male connector member adjacent the intake mouth. The notches are dimensioned to effectively prevent sealing engagement between the vacuum intake mouth and portions of the human body when it is pressed against the human body while the vacuum cleaner is running. In addition, the notches are smoothly rounded to prevent the penetration or puncture of the human body. The notches may be formed in the shape of a sinusoidal curve or they may be formed simply as reversed semi-circles or as other similar preferably smooth and continuous curves.

In another illustrated embodiment of the present invention, the male connector member is connected to an open ended vacuum intake tube adjacent its intake end and aperture means is formed by four symmetrically disposed openings in the male connector member adjacent the intake mouth but spaced from a planar end portion of the mouth. This arrangement prevents sealing engagement between the vacuum intake mouth and portions of the human body when it is pressed against the human body while the vacuum cleaner is running. The provision of openings spaced from the planar end portion of the mouth maximizes frictional engagement between the male connector member and the female connector member while eliminating any projections on the male connector member which might tend to penetrate or puncture the human body.

In the illustrated embodiments, each of the open ended vacuum intake ends of the components of the multisectional hose and tube is provided with notches or openings adjacent the intake mouths thereof. Thus, the flexible hose, the curved tube extension, the straight tube extension, and the surface nozzle swivel elbow each terminates in a male connector member adjacent the intake end having axially extending notches or openings about the intake mouth.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a vacuum cleaner including a multisectional hose and tube having couplings according to one aspect of the present invention, wherein the couplings have been separated for purposes of illustration;

FIG. 2 is a perspective view of a male connector member having notch means according to one aspect

of the present invention pressed against a portion of a human body;

FIG. 3 is a sectional view of a coupling with the male and female members connected according to one aspect of the present invention;

FIG. 4 is a perspective view of a male connector member having aperture means according to another aspect of the present invention; and

FIG. 5 is a sectional view of a coupling with the male and female members connected according to the aspect of the invention illustrated in FIG. 4.

DETAILED DESCRIPTION OF THE DRAWINGS

Referring to FIG. 1, there is illustrated a vacuum cleaner 10 having a chassis 12 mounted on wheels 14 for movement of the cleaner. The vacuum cleaner 10 includes a dust bag 16 connected to the chassis 12 at the blower outlet 18.

The chassis 12 provides a blower inlet or suction opening 20 which is adapted to detachably lock and seal with a flexible hose 22. The flexible hose 22 includes an inner spiral wire 24 which adds circumferential rigidity to the hose. In order to obtain sealing engagement between the blower inlet 20 and the hose 22, the hose is provided with an outlet connector 26 having an outer adapter sleeve 28 and an inner adapter sleeve 30. An annular clip 32 is provided at the juncture of the inner adapter sleeve 30 as a means to further detachably lock the hose 22 in place. Reference may be had to my U.S. Pat. No. 3,279,828 for a detailed description of such an outlet connector.

The hose 22 extends to a male connector member 34 adjacent its vacuum intake end. A second annular clip 36 is provided at the juncture of the hose and the male connector member to permit rotational movement of the male portion with respect to the hose and form a fluid-tight seal therebetween. The male connector member 34 is formed of metal; however, it may also be formed of a suitable plastic material as described below.

The male connector member 34 terminates at a vacuum intake mouth 38 having a series of symmetrically disposed notches indicated by the numeral 40 adjacent thereto. The notches 40 are generally defined by a sinusoidal curve having two complete cycles at 180° about the intake mouth 38 so that four notches are formed about the entire intake mouth. The outside diameter of the male connector member 34 progressively decreases from the end thereof adjacent the hose 22 to the opposite end forming intake mouth 38.

As best illustrated in FIG. 2, the notches 40 are dimensioned so as to prevent sealing engagement between the male connector member 34 and a relatively flexible surface such as a human ear 42. The notched configuration provides relatively large openings 44 which axially extend from the leading end face of the vacuum intake mouth 38 and therefore are not closed off when the intake mouth is pressed against the ear 42 by an unattended child or careless adult. Consequently, intake mouth 38 is not sealed against the ear 42 and no substantial pressure drop or suction effect is developed. In this manner, the ear drum and inner ear are protected and any possibility of physiological damage is substantially eliminated.

The notches 40 similarly prevent sealing engagement of the vacuum intake mouth 38 with other parts of the body. For example, the notches are sufficiently deep so

as to prevent sealing engagement about the human eye and any damage which might thereby result.

The notches 40 are also sufficiently rounded adjacent the end face of the vacuum intake mouth 38 to prevent penetration or rupture of the human body. Consequently, the infant or young child is not exposed to a relatively pointed or sharp object which could cause other types of damage.

In order to transmit the suction effect of the vacuum cleaner, the male connector member 34 must, of course, form a fluid-tight seal with the other tube components or cleaning nozzles. As shown in FIGS. 1 and 3, a curved tube extension 46 provides a female connector member 48 extending to an end face 50.

As best shown in FIG. 3, the female connector member 48 is dimensioned to receive the male connector member 34 in a sliding fit and close off the notches 40. To that end, the inside diameter of the female connector 48 is progressively increased towards the end face 50. Thus, the female connector member receives and encircles the male connector member so as to engage it at a location spaced the vacuum intake mouth 38 and the notches 40 and thereby close off the notches so as to form a fluid-tight seal. The male connector member may be provided with serrations 52 which enhance the gripping action of the female connector member and thereby form a more secure connection.

The vacuum intake end of the tube 46 is provided with a male connector member 52 which has a configuration similar to that of the male connector member 34. Accordingly, the male connector member 52 extends to a vacuum intake mouth 54 having four symmetrically disposed notches 56 adjacent thereto. The notches 56 function in the same manner as the notches 40 to prevent sealing engagement when pressed against portions of the human body.

The tube 46, including the male connector member 52, is formed entirely of plastic and the notches 54 are subsequently cut in the male connector member. The male connector member 52 has dimensions identical to those of the male connector member 34 and forms a fluid-tight seal when inserted into an associated female connector member in an identical manner. In addition, the male connector member has annular serrations 57 to augment the gripping thereof by an associated female connector member.

As shown in FIG. 1, the tube 46 is being used with a straight extension tube 58. The extension tube 58 includes a female connector member 60 which has a configuration identical to that of the female connector member 48. Therefore, female connector 60 is dimensioned to receive the male connector 52 of the tube 46 or the male connector member 34 of the hose 22. The other end of vacuum intake end of the tube 58 is provided with a male connector member 62 which is identical to the male connector member 52.

A surface swivel elbow 64 having a female connector member 66 extending to define an end face 68 is also shown in FIG. 1. The female connector member 66 has dimensions identical to those of female connector members 60 and 48 and, therefore, forms a fluid-tight seal with any of the male connector members described above.

The elbow 64 includes an integrally formed annular lip 70 which remains a male connector member 72 and permits rotational movement of the male connector member with respect to the elbow. The male connector

member 72 extends to a vacuum intake mouth 74 having notches 76 adjacent thereto. The function of the notches 76 is identical to that of the notches described above, and the male connector member 72 is dimensioned to interfit in any of the female connector members.

As shown in FIG. 1, a surface cleaning nozzle 78 provides a female connector member 80 for receiving a male connector member 72. The female connector member 80 is, of course, dimensioned to receive any of the male connector member described.

Since each of the male connector members is dimensioned to interfit in any of the female connector members and form a fluid-tight seal, the various components or elements can be assembled in a variety of arrangements to facilitate the particular cleaning operation. Of course, one or more of the components can be omitted and a number of different cleaning nozzles can be employed. Irrespective of the particular arrangement of components employed, the open-ended vacuum intake tube terminates in a vacuum intake mouth having a notch configuration as described above.

In addition, the relationship of the male and female connector members and the notch means of the present invention are reversible or interchangeable. Specifically, the vacuum intake mouth may be provided with a female connector type configuration having notch means adjacent the intake mouth. Accordingly, the male connector member is dimensioned to interfit within the female connector member and form a fluid-intake seal at a location axially spaced from the notch means.

Referring now to FIGS. 4 and 5, a male connector member 80 is illustrated. The connector member 80 is attached to a hose 81 by an annular clip 82 which permits rotational movement of the member 80 with respect to the hose and forms a fluid-tight seal therebetween.

The member 80 terminates at a planar vacuum intake mouth 83 and a series of symmetrically disposed circular openings 84 which are spaced from but are adjacent to the mouth 83. The openings 84 are dimensioned so as to prevent suctional sealing engagement between the mouth 83 and a relatively flexible surface such as a human ear 42 or other parts of the human body and are positioned about the circumference of the member 80 so that it is substantially impossible to completely close those openings by one's hands or fingers. It has been found that four symmetrically disposed, circular openings each having a diameter of one-half inch are suitable for the purposes set forth herein.

The planar end of the vacuum intake mouth 83 presents a smooth surface so that the infant or young child is not exposed to any projections at the intake mouth which could cause other types of damage.

A female connector member 85 similar to the member 46 is dimensioned to receive the male connector member 80 in a sliding fit and close off the openings 84. To that end, the inside diameter of the female connector 85 is progressively increased towards its end face 86. Thus, the female connector member receives and encircles the male connector member so as to engage it at a location spaced from the vacuum intake mouth 83 and the openings 84 and thereby close off the openings so as to form a fluid-tight seal. The male connector member 80 may be provided with serrations 87 which enhance the gripping action of the female connector

member and thereby form a more secure connection. However, the provision of openings in the connector member maximizes the available surface-to-surface contact between the male and female connector members, thus enhancing the gripping action. Moreover, the provision of such openings results in a circumferentially stable male connector member which will not tend to flex radially inwardly to thereby decrease the frictional contact between the members.

It should be appreciated that similar male connector member having openings therein would be provided on the male connecting ends of tube sections such as the tubes 46 and 58 and on the male connecting end of the swivel elbow 64. It should also be appreciated that the openings 84 may have configurations other than circular and that a single male connector element may be provided with a combination of notches and openings.

Although preferred embodiments of this invention are illustrated, it is to be understood that various modifications and rearrangements may be resorted to without departing from the scope of the invention disclosed and claimed.

What is claimed is:

1. In combination with a vacuum cleaner having means defining a suction opening and sectionalized tube means fixed to said opening, a coupling for joining sections of said tube means together comprising a male connector member at the end of one tube section and a female connector member at the end of a cooperating tube section, said members being designed for sliding fit with each other to be held together solely by friction, each section of said tube means comprising an open-ended vacuum intake element terminating at its intake end in one of said connector members, said one connector member forming a vacuum intake mouth for said vacuum intake element, a plurality of notches formed in said one connector member at said mouth, each of said notches being of sufficient width and depth to substantially eliminate the pressure drop which otherwise occurs when the vacuum cleaner is running and said intake mouth is pressed or held or positioned against a child's or adult's eye, ear, or other body part, said notches defining axially projecting tongues between each circumferentially attached notch pair, each tongue having axially extending, substantially parallel side edges and having a smoothly curved projecting end edge, said one edge comprising a semicircle, said notches being substantially closed off by insertion of the male connector member into the female connector member.

2. A device as in claim 1 wherein said male connector member forms the vacuum intake mouth and has the notches formed therein at said mouth.

3. A device as in claim 1 in which four wide and deep smoothly rounded notches are symmetrically disposed about said mouth.

4. In combination with a vacuum cleaner having means defining a suction opening and sectionalized tube means fixed to said opening, a coupling for joining sections of said tube means together comprising a male connector member at the end of one tube section and a female connector member at the end of a cooperating tube section, said members being designed for sliding fit with each other to be held together solely by friction, each section of said tube means comprising an open-ended vacuum intake element terminating at its intake end in one of said connector members, said one con-

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connector member forming a continuously planar vacuum intake mouth for said vacuum intake element, a plurality of openings formed in said one connector member and spaced from said mouth, each of said openings being of sufficient area to substantially eliminate the pressure drop which otherwise occurs when the vacuum cleaner is running and said intake mouth is

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pressed or held or positioned against the child's or adult's eye, ear, or other body part, said openings being substantially closed off by insertion of the male connector member into the female connector member.

5 5. A device as in claim 4 in which four circular openings are symmetrically disposed about said member.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,781,941 Dated January 1, 1974

Inventor(s) Charles H. MacFarland

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 53, "or" should be --and--; and
line 59, "of" should be --or--.

Column 2, line 49, "tned" should be --tend--.

Column 3, line 43, "indicates" should be --indicated--.

Column 4, line 54, "of" (first occurrence) should be --or--.

Column 5, line 31, "intake" should be --tight--.

Column 6, line 44, "attached" should be --adjacent--.

Column 8, line 1, "the" should be --a--.

Signed and sealed this 9th day of July 1974.

(SEAL)
Attest:

McCOY M. GIBSON, JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents