United States Patent [19]

Maurer et al.

[11] **3,885,267**

[45] **May 27, 1975**

[54] **FLOOR CARE APPLIANCE HANDLE WITH A BUTTON-OPERATED PISTON AND CYLINDER**

[75] Inventors: **Edgar A. Maurer,** Canton; **Arne J. Diehl,** North Canton, both of Ohio

[73] Assignee: **The Hoover Company,** North Canton, Ohio

[22] Filed: **Sept. 13, 1973**

[21] Appl. No.: **397,152**

[52] **U.S. Cl.** ..... **15/339;** 15/410; 200/81 H; 200/340; 285/7

[51] **Int. Cl.** **A47l 9/00**

[58] **Field of Search** ..... 15/314, 321, 339, 341, 15/350, 377, 410; 200/81 H, 82 R, 340; 285/7

[56] **References Cited**

UNITED STATES PATENTS

1,633,598	6/1927	McClatchie	15/339 X
2,064,397	12/1936	White	285/7
3,031,710	5/1962	Huening	15/350 UX
3,667,084	6/1972	Valbona et al.	15/350 X

FOREIGN PATENTS OR APPLICATIONS

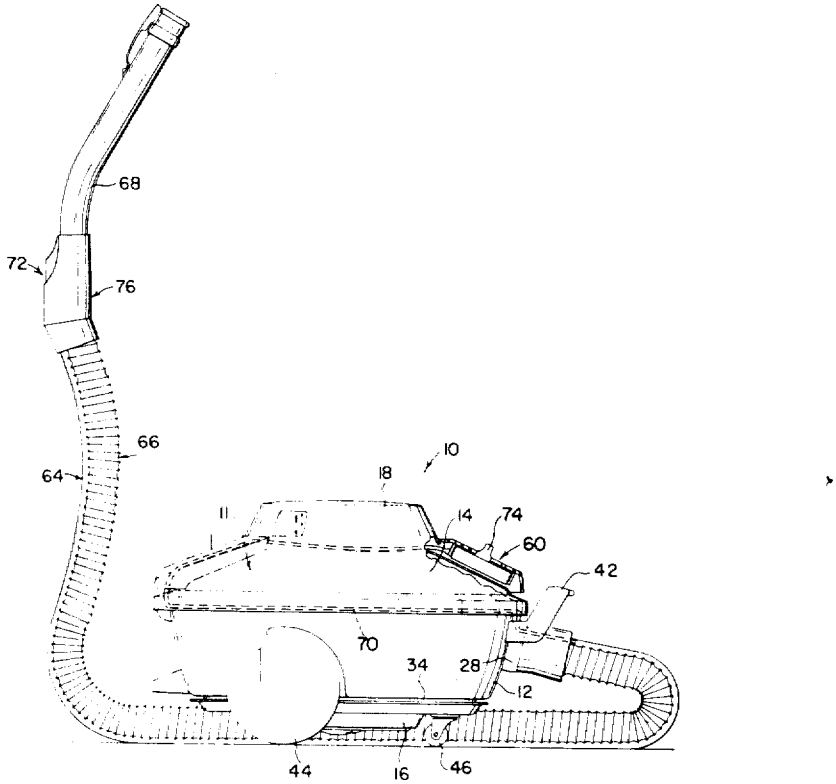
102,290	11/1916	United Kingdom	15/341

Primary Examiner—Harvey C. Hornsby
Assistant Examiner—C. K. Moore

[57] **ABSTRACT**

A floor care appliance handle is provided which is remotely located and includes an easily operated button that initiates action of a cylinder and piston to provide a pressure pulse which may be utilized to actuate a floor care appliance switch and initiate cleaner action or the like. The handle is formed from two major parts, with the actuating button captured between one of the parts and a wand to which it is attached.

6 Claims, 3 Drawing Figures



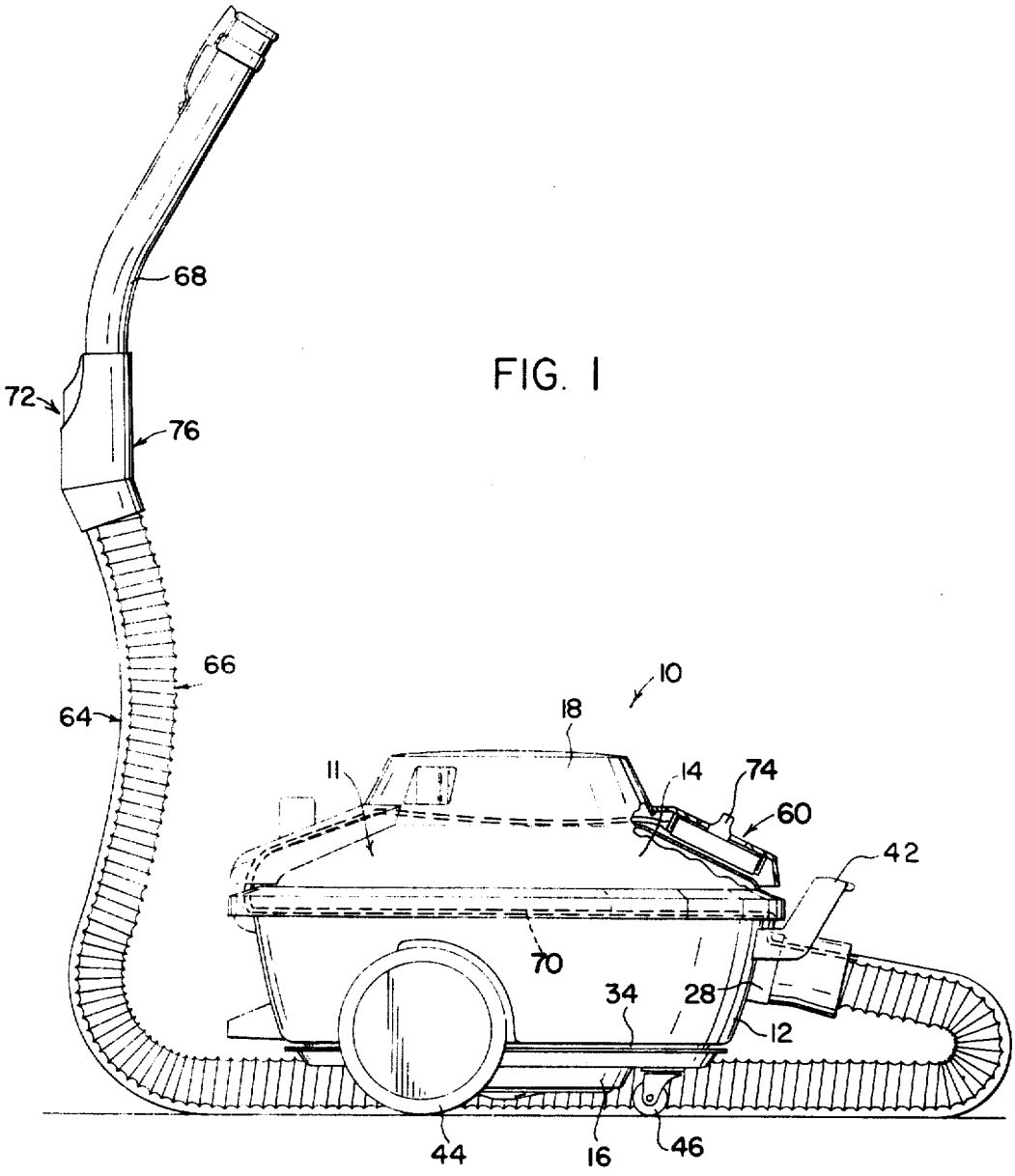


FIG. 1

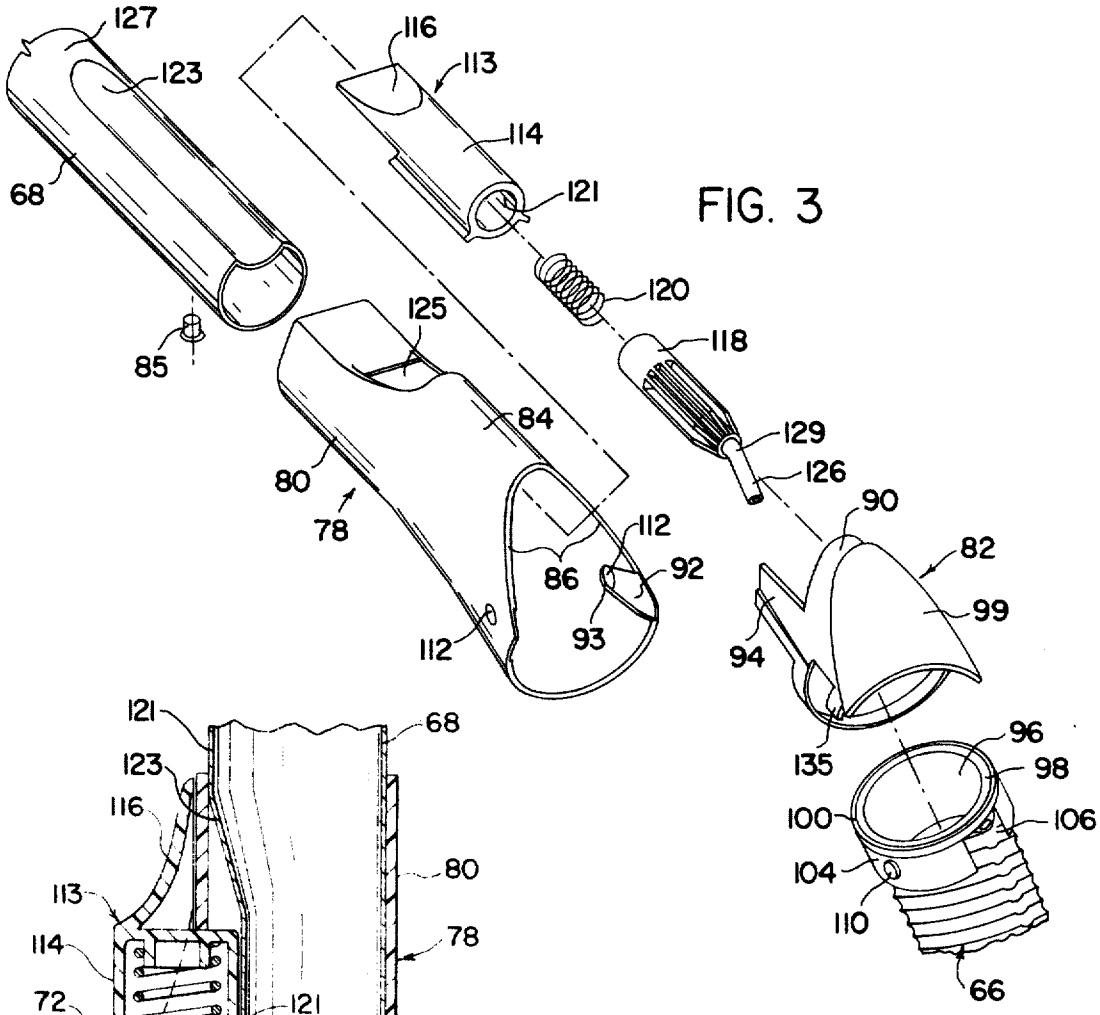

127
123
68
116
113
114
121
120
118
129
126
90
82
99
94
135
96
98
100
106
104
110
66
125
85
84
80
78
112
86
92
93

FIG. 3

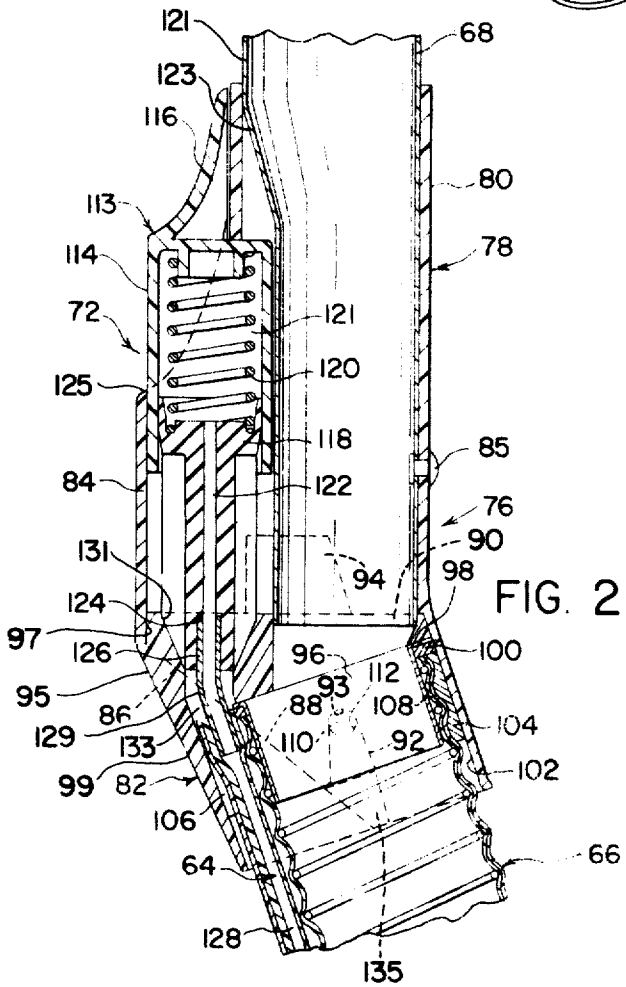

121
123
116
113
114
72
125
84
131
124
97
126
95
86
129
133
99
82
106
64
128
135
68
80
78
120
118
85
122
76
90
94
98
100
96
93
112
88
108
110
92
104
102
66

FIG. 2

FLOOR CARE APPLIANCE HANDLE WITH A BUTTON-OPERATED PISTON AND CYLINDER

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a handle for use with a floor care appliance and, more specifically, relates to a handle having a button-operated piston and cylinder combination intimately associated therewith.

2. Description of the Prior Art

One common type of vacuum cleaner is a canister or tank-type cleaner. In such a unit, a housing, which normally rests on the floor, includes a motor, dirt-storing bag and fan system therein for creating a partial vacuum and filtering dirt-laden air drawn into it by reason of the vacuum. A hose extends from this housing, and is normally provided, at its opposite end, with some type of cleaning nozzle such as a crevice tool, furniture tool or floor nozzle.

Actuation of such a cleaner is generally occasioned by manipulation of a switch mounted on the cleaner housing by either the hand or foot of the user so as to provide suction at the tool end of the suction hose. Such an arrangement requires user effort in moving between the cleaner housing and the manipulative end of the suction hose when the cleaner is turned on and off. Thus, a remotely actuated cleaner, with the initiating button for cleaning action mounted proximate the tool end of the hose, would provide the advantage of greater user efficiency since initiation or termination of cleaner operation would not require user movement between the cleaner hose end and the cleaner, per se.

Such a cleaner is disclosed in application Ser. No. 397,151, filed concurrently herewith, invented by Charles C. Coons anad titled "A Fluid or Pneumatically Actuated Floor Care Appliance." In this cleaner, remote actation of it is dependent entirely upon the use of a pressure pulse created at the tool end of the suction hose. The pressure pulse created may be either pneumatic or fluidic but, in either case, some means must be provided for creating the pressure pulse, and this means ideally should be mounted adjacent to or with that portion of the wand which the user would normally grasp in performing a cleaning function.

Accordingly, no such structure now being present in the prior art, it would be advantageous to provide an easily usable handle arrangement and button-operated piston and cylinder configuration to enable easy user actuation of a pneumatically actuated floor care appliance with which it would be used.

It would be additionally advantageous to provide such a structure in which the various components of the handle and button-operated piston and cylinder configuration were easily assembled to the wand and hose extending from the cleaner.

It would be further advantageous to provide such a structure which permitted capture of the hose and wand and the button operating the piston and cylinder by the handle parts in a manner that was simplified and yet quite effective.

SUMMARY OF THE INVENTION

The invention is provided in a canister cleaner, as exemplary of a floor care appliance, with the same including an electric switch mounted within the canister cleaner housing and including the provision for either

manual actuation at the cleaner housing or remote, pneumatic pulsing actuation.

The pneumatic or fluidic pulse is led through a flexible conduit of relatively small diameter, mounted with the suction hose, proper, so that the pressure pulse may be communicated down the hose towards the cleaner housing and electric switch. Hose coupler parts are provided between the cleaner and the near (cleaner) end of the hose which include communication means for the pneumatic pulse so that the same may be communicated inwardly of the housing to the switching mechanism.

Creation of the required pressure pulse or impulse is had by a button-operated piston and cylinder arrangement, formed as an integral portion of a handle housing, situated at the far end of the suction hose. The handle housing is also attached to a wand which may be utilized for the mounting of cleaning tools that are suitable for a variety of cleaning functions, such as a crevice tool, a furniture brush and a floor nozzle.

The housing forming the handle portion for the cleaner comprises two main portions, both of generally tubular configuration, with the first of the portions fixedly attached to the wand member by a rivet or the like and with the second of the portions attached to the hose by means of a clamp ring that engages against the hose while telescoped within the second portion so that a compressive force maintains the hose clamping ring and second portion of the housing in assembled condition.

The second portion of the housing is received, generally, in telescopic relationship within the first portion of the housing, with diametrically extending pins on the hose clamp ring lodging in diametrically opposed bores in the first portion of the housing so that the total configuration is relatively fixed and rigid.

The piston and cylinder arrangement of the button-operated piston and cylinder is generally lodged in the first portion of the housing, with the same including, specifically, a fixed piston and a collapsible cylinder bounded by the piston face and a closure piece for the actuating button. The actuating cylinder is spring-urged to place the cylinder in expanded condition and, upon collapse of the cylinder by movement of the piston button, a pulse or impulse is forced outwardly of the cylinder, through a central bore located in the piston and into the conduit arrangement which carries the impulse to the cleaner, proper.

The button which creates the impulse is captured between the first housing portion and an expanded portion of the wand so that its outward, expansive movement is limited by engagement of a part of the button with the expanded portion of the wand. Inward movement, of course, is limited by the compressed spring and piston face.

It can be easily seen that the structure just described provides for ease in assembly. The first portion of the housing is placed over and attached to the wand cylinder by a rivet or the like so that the first portion of the housing captures the wand. The button and cylinder are placed in the first portion of the housing and the fixed piston mounted in the cylinder. The button means is thereby captured between the wand and first housing portion.

The suction hose is telescopically captured by the crimping ring within the second portion of the housing and the second portion of the housing is telescopically

captured within the first portion of the housing by the diametrically opposed pins of the crimping ring engaging in the diametrically opposed bores of the first housing portion to provide a final, easily assembled structural configuration.

DESCRIPTION OF THE DRAWINGS

Reference may now be had to the accompanying drawings for a better understanding of the invention, both as to its organization and function, with the illustration being of a preferred exemplary embodiment only and in which:

FIG. 1 is a perspective view of a cleaner embodying the handle and integral button-operated cylinder and piston of the instant invention;

FIG. 2 is a cross-sectional view of the handle and button-operated cylinder and piston; and

FIG. 3 is an exploded perspective view of the main parts making up the handle and button-operated cylinder and piston.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now more specifically to FIG. 1 of the appended drawings, it can be seen that a canister cleaner **10** is provided having a housing **11** comprised of medial housing section **12**, an upper housing section **14**, a lower housing section **16** and a medallion section **18**, with these sections cooperating to form the housing **11** for the canister cleaner **10**. Conveniently disposed therein are a motor (not shown), a fan system (not shown), and a dirt-collecting bag (not shown), as is conventional, to provide the required suction flow of air for cleaning purposes.

A housing coupling fitting **28** communicates with the interior of the cleaner housing **11**, with the same being mounted on the medial housing section **12** so that communication is afforded to the interior of the cleaner. Flow of cleaner air, then, is through the housing coupling fitting **28**, the dirt-collecting bag (not shown) and thence to the motor (not shown) as motivated by the internal fan system (not shown). Air is then discharged through a slot **34** formed between the bottom of the medial housing setion **12** and the lower housing section **16**.

Canister cleaner **10** also includes a handle **42** fixedly attached to the medial housing section **12** and providing a grasping means so that the cleaner **10** may be pulled along a floor or carried in a manner similar to a suitcase. Additionally, in order to provide for easy transportation of cleaner **10**, a pair of large rollers **44**, 44 (only one shown) are mounted on the cleaner at the rearward portion thereof and a single small caster wheel **46** is mounted in the front portion of the cleaner so that a three-point floor-engaging arrangement is utilized.

A push-push switch mechanism **60**, located beneath the medallion section **18** of housing **11**, is motivated by a pressure pulse or impulse that is carried by a first pressure pulse conduit **64** mounted to and carried by a suction hose **66** that engages with the suction coupling fitting **28** to provide a flow path for suction cleaning air outwardly of the cleaner.

Suction hose **66**, conveniently has a handle, wand or hose tube **68** attached thereto at its outer end so that cleaning tools or the like may be mounted on the end of the handle, wand or hose tube for various cleaning operations by the user of the canister cleaner **10**.

A second pressure pulse conduit **70** extends around and within the cleaner **10** and is connected to the push-push switch mechanism or means **60** so as to provide a pulse signal for energization of the same. The impulse or pressure pulse wave carried by the first and second pressure pulse conduits **64** and **70** is created by a handle and button-operated piston and cylinder means **72** that is the object of this Application and that is mounted on the wand **68** proximate to the suction base **66**. Thus, creation of a pressure surge or pulse by the button-operated piston and cylinder means **72** provides a pressure wave flowing through the first pressure pulse conduit **64** and the second pressure pulse conduit **70** to the push-push switch mechanism or means **60** so that a user of the cleaner **10** may turn the same on and off at the remote, wand location, as desired.

At the same time, manual manipulation of a manual switch button **74**, extending outwardly from the medallion housing section **18** and mounted with the push-push switch mechanism **60**, will accomplish the same purpose, with this manual switch button operating in conjunction with push-push switch mechanism **60** to energize and de-energize the canister cleaner **10** manually.

The pneumatic or fluidic actuating system and components, above briefly described, is more specifically described in the Patent Application of Charles C. Coons, filed concurrently herewith, and titled "A Fluidic or Pneumatically Actuated Floor Care Appliance." Reference to that Application may now be had for a more thorough understanding of the pneumatic or fluidic actuating system and its components which operate in cooperation and conjunction with the handle and button-operated piston and cylinder means **72** of the instant invention.

Handle and button-operated piston and cylinder means **72** (FIGS. **2** and **3**) include a handle portion **76** that provides a convenient grasping arrangement to facilitate use of the cleaner **10** and any cleaning tools (not shown) attached to the remote non-cleaner end of the hose tube **68**.

Handle portion **76** is formed by a handle housing **78** mounted fixedly with respect to the hose tube **66** and comprising, generally, a hose tube housing part **80** and a hose connector part **82**. The hose tube housing part **80** is roughly cylindrical and slightly downwardly bent (approximately 30°) near its bottom tip, adjacent to the hose connector part **82**. It includes an enlarged bulbous portion **84** that is integral and disposed in the upper half of the hose tube housing part **80**. A rivet **85** fixedly connects the hose tube housing part **80** to the wand or hose tube **68** at the bottom of the hose tube housing part so that the hose tube housing part and wand **68** act as a single element during the cleaning function.

The upper side of the enlarged bulbous portion **84** of the hose tube housing part **80** terminates angularly at about a 45° angle to provide an angularly disposed abutting surface **86** on each side of hose tube housing part **80**, against which an oppositely angled and inclined abutting surface **88** on each side of hose connector part **82** engages. Hose tube housing part **80** also includes a pair of grooves **92, 92** on its internal bore that extend towards hose connector part **82** and open towards the hose connecting part at the angularly disposed abutting surface **86**. These grooves are generally

triangular in shape with a rounded apex **93**, the purpose of which will soon become apparent.

Hose connector part **82** is also generally cylindrical with an upper half **95** thereof of substantially greater axial length than the remainder of the hose connector part **82**. This lengthened extent provides sufficient bearing area between the hose **66**, the hose tube housing part **80** and the hose connector part **82**, when assembled, to insure proper interengagement and additionally, a slightly rigidifying effect to the end of the hose **66**, occasioned by the elongation of an upper half **95** of the cylindrical shape of hose connector part **82**.

Axially displaced from the inclined abutting surface **88** on hose connector part **82**, a tab portion **90** of the hose connector part **82** extends inwardly into a bore (space) **97** formed in the hose tube housing part **80**. The tab portion **90** is radially inwardly offset relative to a surface portion **99** of hose connector part **82** that extends between the inclined abutting surfaces **88, 88** and the forward termination of hose connector part **82**. Thus, the tab portion **90** of hose connector part **82** telescopes within hose tube housing part **80** to align and interfit with the same with respect to the housing part, while the surface portion **99** serves as a continuation of the outside, graspable surface of handle portion **76**. Axially extending tab-shaped ends **94** of tab portion **90** aid in the first of these functions.

Disposed on the end of the suction hose **66**, proximate to the handle housing **78**, is a hose connector collar **96** which takes the form of a hollow cylinder having a radially extending circular flange **98**. The outer diameter of the cylinder is sligtly smaller than the internal diameter of the suction hose **66** for ease in insertion, while the outer diameter of the flange **98** is substantially equal to the outer diameter of the suction hose **66** so that both may be easily assembled in the handle housing **78**. A felt gasket **100**, of slightly larger outside diameter, is captured between the flange **98** and the termination of the suction hose **66**, with this gasket sealing the gap between flange **98** and the end of suction hose **66** and with the flange **98**, in turn, abutting against a roughly annular facing surface **102** internally located in the hose connector part **82**.

In order that the suction hose **66** remains in assembled condition relative to handle housing **78**, a hose crimp ring **104** is provided. This ring is of split configuration and may include a living hinge (not shown) at its bottom for easy encompassing assembly around the suction hose **66**. The hose crimp ring is less than a full circumference to provide a gap **106** at its top that accommodates a bulge occasioned by a part of the first pressure pulse conduit **64**. It also includes an inner periphery **108** having a helix surface so as to conform to the outer helix surface of suction hose **66**.

Inwardly of the end of hose **66**, a flexible tubing **128** of first pressure pulse conduit **64** terminates. Attached to this tubing is a short, rigid, hollow tube **126** over which flexible tubing **128** is telescoped to provide a sealed configuration. Hollow tube **126** has a slight bend **129** therein which is situated proximate the exposed face of circular flange **98** so that hollow tube **128** extends out of the hose **66**, proper, angularly relative to the normal axis of the hose to conform to the angular disposition of handle portion **76**.

In order to conform to the projecting end of hollow tube **128**, hose connector part **82** includes a substantially frustoconical bore **131**, with a small end **133** of this bore slightly larger than the outside diameter of hollow tube **126** at the hollow tube receiving end of hose connector part **82**.

Hose crimp ring **104** also includes a pair of integral, molded diametrically opposed pins **110** (only one shown) that extend radially outwardly from the outer periphery of crimp ring **104**. These pins are received in corresponding shaped bores **112** (only one shown) formed in hose tube housing part **80**.

In more detail, the suction hose **66** and handle housing **78** are assembled in the following manner. First, the hose connector collar **96** and felt gasket **100** are assembled to the end of the suction hose **66** and the short rigid tube is inserted into flexible tubing **128**. The hose crimp ring **104** is disposed around the end of the suction hose **66** and it and the suction hose are inserted compressingly into the already assembled hose tube housing part **80** and against hose connector part **82** until the now-deformed pins **110** snap into the bores **112** in the hose tube housing part. The entire assembly of the handle housing **78** and suction hose **66** is then maintained in attached condition by the interengagement of the pins **110** in the bores **112** and also the outward expanding force of crimp ring **104** and suction hose **66** against the handle housing elements. The manual button **113**, biasing spring **120** and stationary piston **118** are, of course, assembled in the hose tube housing part **80** prior to its assembly to hose connector part **82**.

As set out previously, the motive force for controlling the on-off operation of the canister cleaner **10** is supplied by a button-operated piston and cylinder means **72** which is also mounted to and within the handle housing **78**. Button-operated piston and cylinder means **72** includes a manual button **113** having a generally cylindrical portion **114** and a button portion **116** at and integral with its rear termination. The button portion, exteriorly, is shaped so as to make easy user manipulation thereof to either energize or de-energize the canister cleaner **10**. The cylindrical portion **114** is, of course, closed at its front end and open at its rear to form a cylinder that cooperates with a stationary piston **118**. A biasing spring **120** is disposed between the piston **118** and the closed front end of cylindrical portion **114** to constantly urge the cylindrical portion **114** and its integral button portion **116** forwardly (rightwardly) into the position shown in FIG. **2**.

As was noted earlier in this description, the manual button **113** is captured by the hose tube housing part **80** and wand **68**, similarly to the hose tube housing part **80** being captured by the wand **68**, and, similarly to the hose **66** being captured by the hose connector part **82**, this last capture being through the aegis of the bulge of the lower portion of crimp ring **104** beneath the semi-coverage of this crimp ring by the hose connector part **82** so that a pair of downwardly, diametrically opposed integral extending tabs **135, 135** on hose connector part **82** engage against the rearward face of hose crimp ring **104**.

The manual button **113** is captured in the following manner: The wand or hose tube **68** includes an enlarged portion **127**, joined to the major inserted portion thereof by a single taper-sided portion **123**. The hose tube housing part **80**, on its upper side, terminates short of the taper-sided portion **123** of wand **68** to provide an opening **125** in hose tube part **80**. Manual button **113** is lodged within this opening, free to move leftwardly from its position in FIG. **2** against the bias of spring **120**

and then to return rightwardly to the FIG. 2 position, but abutment of the bottom surface of manual button **113**, with the enlarged portion **127** of wand **68**, prevents additional travel rightwardly from the FIG. 2 position. Thus, assembly of the wand **68** to the hose tube housing part **80** provides a capture means for the manual button to prevent its escape outwardly through the opening **125** in hose tube housing part **80**.

Operation of the handle and button-operated piston means **72** should now be evident. As can be easily seen, movement of cylindrical portion **114** of means **72** rearwardly from its FIG. **2** position, through user pressure on button portion **116**, will tend to move the cylindrical portion into telescoping engagement over the stationary piston **118**, thus providing a collapsing chamber **121** between the front end of the stationary piston **118** and the closed front end of cylindrical portion **114**. The air compressed by such movement moves through a central bore **122** provided in stationary piston **118** and extending centrally, axially along its length. Central bore **122** receives, at its rear end, in generally sealing relationship, the short, rigid, hollow tube piece **126** that also extends rearwardly (leftwardly) from the stationary piston **118** and juts outwardly therefrom to connect to the first flexible, hollow tube **128** that is mounted with suction hose **66** and provides, along with short, hollow tube **126**, a conduit means for the flow of pressure pulses, waves or impulses towards the canister cleaner **10**.

The outer configuration of the handle and button-operated piston means **72** also provides a dual function since the downwardly angled portion **76** places tools inserted into wand **68** at a convenient angle and also permits easier and more compact storage of the connected hose **66**, handle and button-operated piston and cylinder means **72** and wand **68**.

It should be obvious that all the advantages set out for the invention in the beginning portion of the description have been satisfied by the structure related, and, further, it should be obvious that many modifications to the invention could be made which would still fall within the spirit and purview of the invention described.

What is claimed is:

1. A handle arrangement for use with a floor care appliance including;

a. a hose extending from said floor care appliance,

b. a first handle part capturing the remote end of the hose,

c. a tubular member provided for the easy attachment of cleaning tools,

d. a second handle part capturing the end of said tubular member,

e. said first and second handle parts being telescoped together to provide an assemblage for easy operator manual manipulation,

f. said assemblage receiving nestingly therein a piston and cylinder means for providing a pressure pulse for said floor care appliance,

g. a button, integral with one of said piston and cylinder means, extending from said assemblage for easy manual manipulation, and

h. conduit means connected to said cylinder and piston means and extending within at least a part of said assemblage for conveying said pressure pulses generated by said piston and cylinder means towards a location outwardly of said assemblage.

2. The handle arrangement for use with a floor care appliance as set forth in claim **1** wherein;

a. one of said first and second handle parts includes an angled portion disposed at an angle relative to the remainder of said assemblage whereby user manipulation of said tubular member is facilitated.

3. The handle arrangement for use with a floor care appliance as set forth in claim **1** wherein;

a. said tubular member includes an enlarged portion disposed in the path of movement of said manually operated button to limit its movement in at least one direction of travel.

4. A handle arrangement for use with a floor care appliance having a hose extending therefrom including;

a. a grasping means provided for operator manual manipulation,

b. said grasping means including a first means for capturing an end of said hose,

c. a tubular member extending from said grasping means for providing a wand for said floor care appliance,

d. said grasping means including a second means for capturing an end of said tubular member,

e. a piston and cylinder means nestingly received within at least a portion of said handle arrangement for providing a pressure pulse for said floor care appliance,

f. a button connected with said piston and cylinder means and extending outwardly of the general confines of said grasping means for easy manual manipulation to thereby actuate said piston and cylinder means, and

g. conduit means connected with said piston and cylinder means and extending outwardly of said handle arrangement for conveying pressure pulses generated by said piston and cylinder means towards a location outwardly of said handle arrangement.

5. A handle arrangement for use with a floor care appliance including;

a. a suction hose extending from said floor care appliance,

b. a portion of said handle arrangement capturing an end of said suction hose,

c. said handle arrangement including a grasping means for operator manual manipulation,

d. a cylinder and piston means nestingly received in said handle arrangement and providing pressure pulses for said floor care appliance,

e. operator engageable means connected to said cylinder and piston means and extending outwardly from said handle arrangement for actuation of said cylinder and piston means, and

f. conduit means fluidically communicating with said cylinder and piston means and attached to and extending outwardly of said handle arrangement for conveying said pressure pulses away from said handle arrangement towards said floor care appliance.

6. A handle arrangement for use with a floor care appliance as set out in claim **4** wherein;

a. said button moves axially relative to said tubular member, and

b. said tubular member includes an enlarged portion disposed in the axial path of movement of said button to thereby limit its movement in at least one direction of travel, and

c. said button being limited in its other direction of movement by abutment means mounted with said grasping means.

* * * * *