Sept. 2, 1941. R. C. OSBORN 2,254,663

SUCTION CLEANER

Filed Dec. 21, 1940 2 Sheets-Sheet 1

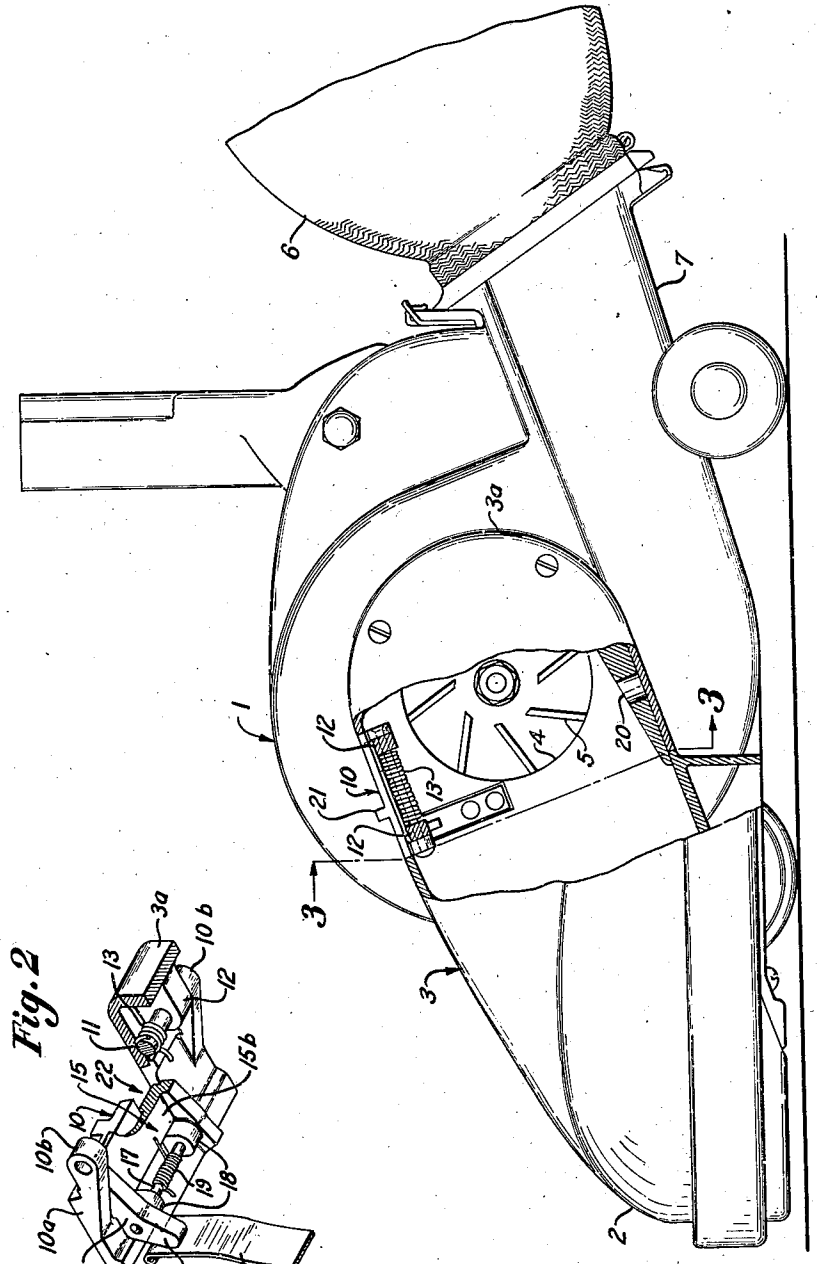



Fig. 1




Fig. 2

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SUCTION CLEANER

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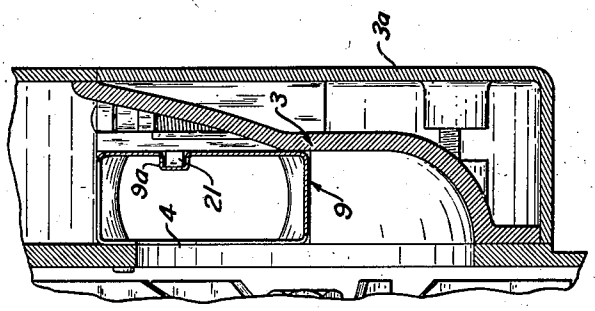



Fig. 6

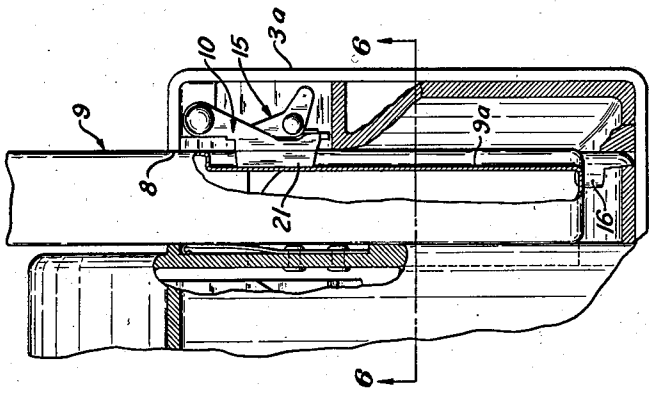



Fig. 5

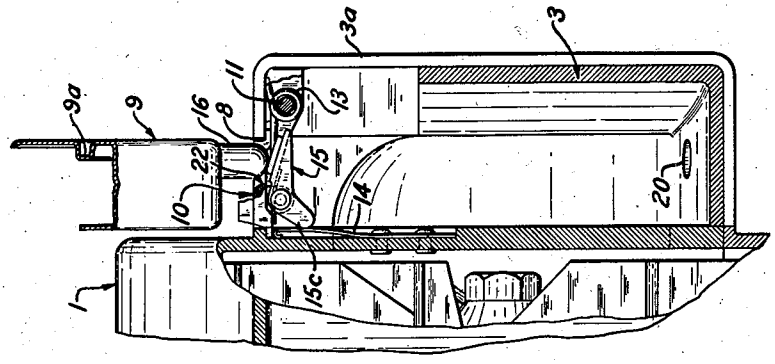



Fig. 4

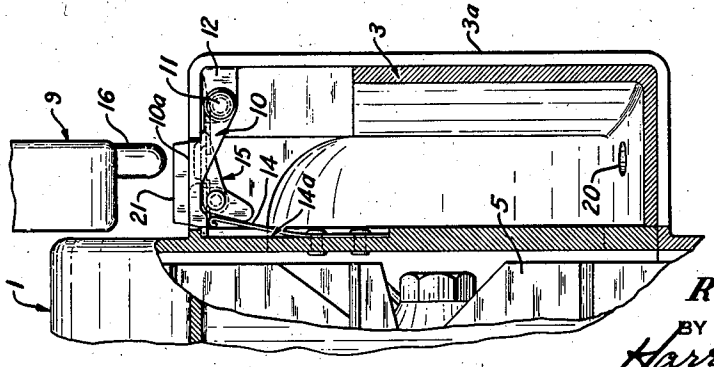



Fig. 3

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# UNITED STATES PATENT OFFICE

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## SUCTION CLEANER

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Application December 21, 1940, Serial No. 371,119

7 Claims. (Cl. 15—9)

This invention relates to improvements in suction cleaners, and more particularly to suction cleaners adapted for conversion to off-the-floor cleaning operations by the attachment of a dusting tool hose.

"Conversion" is a convenient term to describe the operation of arranging a cleaner for operation with dusting tools and similarly, "converter" identifies the parts associated with the conversion operation. This terminology will be adopted in describing the novel features of the present disclosure which has to do with a novel type of closure for the port into which a converter tool or fitting is inserted as the initial step in completing the conversion.

In earlier types of suction cleaners, conversion was performed by attaching a converter fitting to the underside of the cleaner casing and, in more recent designs, a laterally opening converter port has been provided along one side of the casing thereby eliminating the necessity of lifting or turning the cleaner over in order to complete the converting operation. But in the type of cleaner herein disclosed, it is now proposed to provide a converter port on top of the cleaner casing and while it is at once obvious that such an arrangement has its advantages from the standpoint of convenience, at the same time it might prove to be a potential source of danger if not locked so that children cannot open the closure member and their fingers encounter the rapidly rotating fan blades.

Therefore, the object of the present invention is to provide a tamper-proof closure for the converter port and one which is securely latched under normal floor cleaning operation but can be unlatched in the act of inserting the converter fitting.

A preferred embodiment of the port-closure arrangement is disclosed in the accompanying drawings, in which:

Figure 1 is a general view in side elevation of a suction cleaner of more or less standard design except for the provision of an upwardly opening converter port located in the top wall of the air passage leading from the nozzle chamber to the inlet opening to the fan chamber just below the converter port;

Figure 2 is a perspective fragmentary view of the port closure assembly from the underside;

Figure 3 is an enlarged detail view in vertical section through the air passage and just in advance of the converter port as taken on line 3—3 of Figure 1;

Figure 4 is a view similar to Figure 3 showing the manner in which the converter member actuates the release lever to depress the spring latch and release the port closure member;

Figure 5 is also a view similar to Figure 3 showing the converter member in its fully inserted position; and

Figure 6 is a view in horizontal section through the conduit with the converter member in place, as taken on line 6—6 of Figure 5.

The suction cleaner, as shown in Figure 1, presents a variation of the standard cleaner design characterized by a motor and fan unit rotative about a horizontal transverse axis, the motor and fan being enclosed within a cylindrical housing 1 forming the central element of the cleaner body. A nozzle 2 extends across the front of the cleaner body and is formed as an integral part of the housing 1. The nozzle has the usual downwardly opening suction mouth and the dirt-laden air passing therethrough is conducted to a conduit 3 leading from one end of the nozzle upwardly and rearwardly to the annular inlet opening or "eye" 4 of the fan chamber occupying the adjacent end portion of the cylindrical housing 1. The fan 5 is located just beyond the opening 4 and, rotating at a high speed by its motor, creates the suction that draws the dirt-laden air from the nozzle and thence discharges it into the filter bag 6 detachably mounted at the outer end of the rearwardly directed exhaust passage 7 from the fan chamber.

As clearly shown in Figures 1 and 3, the conduit 3, forming the air passage from the nozzle to the fan chamber, is rectangular in cross sectional contour with its vertical dimension somewhat greater than the diameter of the inlet opening 4 to the fan chamber. As preferably designed, the conduit becomes narrower as it approaches the inlet opening with a section along the top cut away as shown in Figures 5 and 6. Therefore, it is necessary to complete the entire upper end section of the conduit by applying a removable end section 3a which carries out the uniform semi-circular contour of the conduit exterior. However, the structural details of the conduit 3 are of no particular importance beyond the fact that the air passage is reduced in width immediately around the inlet to the fan chamber and that the converter port is actually formed in the top wall of the removable conduit section 3a.

Now, in order to complete the conversion operation, it is necessary to close off the air passage from the nozzle by inserting a suitable con-

verter fitting through a port 8 located in the top wall of the conduit 3 and across the air passage, at the same time establishing a direct connection through the fitting between the fan chamber and the dusting tool hose.

In the present arrangement, the converter port 8 is located in the top wall of the conduit 3 at a point just above and a little forward of the fan eye 4. The port is rectangular in shape with its longer dimension in the direction of the air passage, in fact, its shorter dimension is approximately one-half the width of the air passage and its innermost edge is almost flush with the end face of the housing 1, as clearly shown in Figures 4 and 5.

The converter fitting 9 is a light metal shell, rectangular in cross section and uniformly dimensioned throughout that portion of its length designed to extend across the air passage within the conduit 3. The portion of the converter member 9 that projects from the port 8 is not shown, although it is sufficient to say that it preferably terminates in a tubular end adapted for connection with the dusting tool hose.

Referring now to the converter port closure member, the same may be described generally as an inwardly swinging hinged gate member 10 normally seating in the port from the underside and held in closed position by a spring latch member which must be pressed out of latching position before it is possible to swing the gate member downwardly and permit the entrance of the converter member.

Thus, as clearly shown in Figures 2 and 3, the closure member 10 consists of a rectangular plate 10*a* having ears 10*b*, 10*b* projecting laterally from the ends thereof and having pivotal mounting on a pivot pin 11 supported at its ends in bosses 12, 12 formed integral with the inner face of the conduit end section 3*a* at the junction of its top and outer side walls. A torsion spring 13 surrounds the pin 11 with its longer free end bearing against the underside of the gate member to hold it in closed position and to constantly oppose its downward swinging movement into open position.

Now, riveted to the end wall of the housing 1 immediately below the closure member 10 is the latch member 14 consisting of a thin strip of spring steel with its free upper end portion bent outwardly just beneath the inner edge of the plate 10*a* to hold the same in closed position. However, pressing the latch member 14 against the wall to which it is attached will release or unlatch the closure member and this operation is actually performed by a spring-actuated release lever 15 mounted on the underside of the plate 10*a* and adapted to be actuated by a pin-like projection 16 carried at the end of the converter member 9, to displace the spring latch 14 just before the converter member is inserted into the converter port 8.

As clearly shown in Figure 2, this spring latch depressing release lever 15 has pivotal mounting on the underside of the closure plate 10*a*, being mounted on one end of a hinge pin 17 supported by spaced lugs 18, 18 depending from the underside of the plate. The arm 15*a* of the lever 15 lying immediately below the plate 10*a* includes a flat plate or pad 15*b* normally held pressed against the underside of the closure plate 10*a* by a torsion spring 19 carried on the hinge pin 17 supporting the spring latch release lever.

The shorter arm 15*c* of the lever 15 projects downwardly from the closure plate 10*a* and has a rounded cam-like end bearing against the spring latch 14 so that by imparting a slight rocking movement to the lever in a clockwise direction, the latch spring 14 will be pressed against the end wall as clearly shown in Figure 4, thus permitting the hinged closure to swing open as the end of the converter member 9 is pushed downwardly into the port. It will be noted in this connection, that the latch spring 14 is preferably seated within a shallow recess 14*a* in the end wall of the housing 1, thus permitting the spring to assume a position substantially flush with the wall surface when the same has been pressed out of latching position by the lever 15.

Now, as previously explained, the spring latch release lever 15 is actuated by contact with the projecting finger 16 carried at the end of the converter member 9. More definitely, this contact takes place between the flat pad-like plate 15*b* of the release lever through a notch 22 cut in the outer marginal portion of the closure plate 10*a* and so positioned that it is possible for the contact finger to actuate the release lever and the latter displace the spring latch before the body of the converter member comes into contact with the closure plate.

Thus, once the converter member has properly been presented to the port 8, it is simply a matter of pushing it downwardly therethrough and to the full depth of the passageway below. And, to insure the correct positioning of the converter member a socket 20 is provided in the bottom wall of the conduit to receive the contact pin 16, as shown in Figure 5.

It is also to be noted that after the converter member has been inserted, there still remains ample space between it and the outer wall of the conduit to accommodate the port closure assembly when swung downwardly and to one side of the path of the converter member 9.

And in further connection with the insertion of the converter member into converting position, some means for guiding the converter member to its seat is quite desirable. For this purpose the converter member is provided with a channel 9*a* extending lengthwise throughout its outwardly facing side wall. Likewise, there is formed as an integral part of the hinged closure plate a transversely arranged rib 21 located in direct line with the open end of the channel 9*a* when the converter member is presented to the port. Thus, after contact is made with the converter member, the closure plate swings downwardly with the rib 21 sliding in the channel 9*a*, thereby acting as a guide to keep the converter member in the line which ultimately brings the contact finger 16 into the socket 20, as clearly shown in Figure 5.

With this latching arrangement applied to the converter port closure member, it is obvious that it would be quite impossible to open the converter port accidentally, although obviously it would be possible to do so intentionally by pressing some blunt instrument into contact with the latch spring release lever. However, bearing in mind that the present closure arrangement is intended to bar the exploring fingers of children and other persons not aware of the proximity of rotating fan blades, it is quite apparent that with the contact finger at the end of the converter acting as a key to release the latch, the present closure arrangement will function quite effectively as a safety device.

Having therefore set forth a preferred embodiment of the invention, I claim:

1. In a suction cleaner adapted for conversion to and from off-the-floor cleaning operation, the combination of suction-creating means including a motor-driven fan, a nozzle communicating with said suction-creating means through a connecting air passage having a port opening thereinto from the exterior of the cleaner and adapted to receive a converter member, a closure member normally closing said port, latching means normally acting to hold said closure member in port-closing position, and latch-releasing means forming a part of the converter member and operative in the act of applying said converter member to said port to effect the opening of said closure member.

2. In a suction cleaner adapted for conversion to and from off-the-floor cleaning, the combination of suction-creating means including a motor-driven fan, a nozzle communicating with said suction-creating means through a connecting air passage having a converter port opening thereinto from the exterior of said passage, a closure member for said converter port, latching means normally holding said closure member in port-closing position, and latch-releasing means responsive to contact with the converter member in the act of entering the same in said port to displace said latch member and allow said closure member to open.

3. In a suction cleaner adapted for conversion to and from off-the-floor cleaning operation, the combination of a motor-driven fan mounted in a fan chamber, a nozzle communicating with the inlet opening to said fan chamber through an air passage having a port opening thereinto from the exterior of the cleaner adjacent the inlet to the fan chamber and adapted to receive a converter member, a spring-actuated closure member for said port, a spring latch normally acting to hold said closure member in port-closing position, and latch-releasing means carried by said converter member and operative in the act of inserting said converter member into said port to displace said latch member and permit said closure member to open.

4. In a suction cleaner adapted for conversion to and from off-the-floor cleaning, the combination of suction-creating means including a motor and fan unit having its axis extending horizontally, a nozzle communicating with the fan chamber of said unit through a conduit having a port adapted to receive a converter member, a hinged spring-actuated closure member for said converter port, latching means normally holding said closure member in port-closing position, and manually inaccessible latch-releasing means operative by said converter member in the act of inserting the same into said port to displace said latch member and allow said closure member to open.

5. In a suction cleaner adapted for conversion to and from off-the-floor cleaning, the combination of suction-creating means including a motor-driven fan, a nozzle communicating with said suction-creating means through an air passage having a port adapted to have a converter member inserted therein, a closure member adapted to swing to and from port-closing position, a latch member normally positioned to prevent the movement of said closure member into open position, and a latch-releasing lever carried by said closure member and manually inaccessible from the exterior of said cleaner, said converter member having a lever-engaging portion insertable through an opening in said closure member to effect the displacement of said latch member and the opening of said closure member in the act of inserting said converter member into said converter port.

6. In a suction cleaner adapted for conversion to and from off-the-floor cleaning, the combination of suction-creating means including a motor-driven fan mounted within a fan chamber, a nozzle communicating with the inlet opening to said fan chamber through a conduit having a port opening thereinto from the exterior thereof adjacent said fan chamber inlet opening and adapted to receive a converter member, a spring-actuated closure member pivotally mounted inside said conduit and normally closing said port, a resilient latch member mounted inside said conduit and normally acting to hold said closure member in port-closing position, and a latch release lever pivotally mounted on the underside of said closure member and positioned to displace said latch member from latching position when actuated, said converter member having a projecting contact finger at its forward end insertable through an opening in said closure member to actuate said release lever and displace said latch member preparatory to the opening of said closure member by said converter member.

7. In a suction cleaner adapted for conversion to and from off-the-floor cleaning, the combination of a motor and fan unit mounted to rotate about a horizontal transverse axis, a nozzle communicating with the inlet opening to the fan chamber of said unit through a conduit having a port in the top wall thereof adjacent said inlet opening and adapted to have a converter member inserted therethrough, a spring-actuated closure member pivotally mounted inside said conduit and normally closing said port, a resilient latch member mounted inside said conduit and normally acting to hold said closure member in port-closing position, and a latch release lever pivotally mounted on the underside of said closure member and positioned to displace said latch member from latching position when actuated, said converter member having a contact finger projecting beyond its forward end and insertable through an opening in said closure member and into actuating contact with said release lever to unlatch said closure member in the act of inserting said converter member.

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