June 19, 1945. J. M. SHERRER 2,378,587

CONVERTER ATTACHMENT

Filed Oct. 12, 1942 2 Sheets-Sheet 1

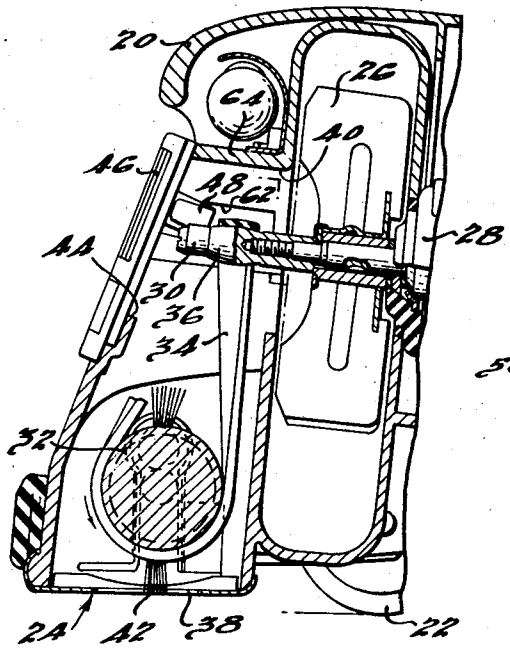


Fig. 1.

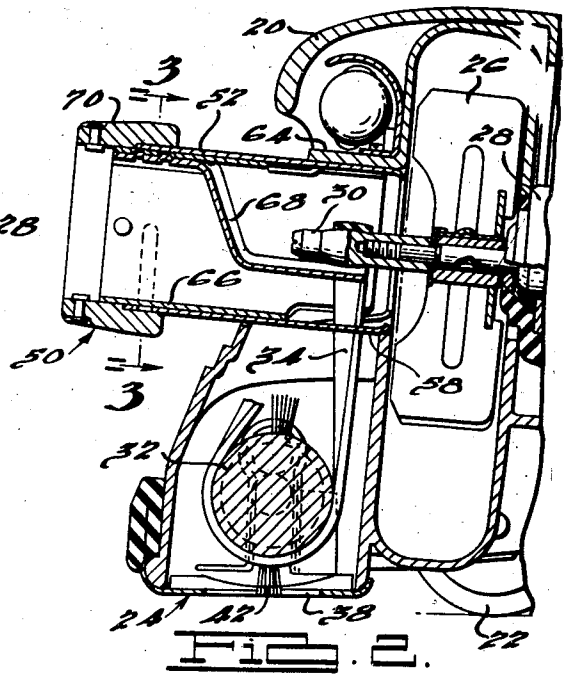


Fig. 2.

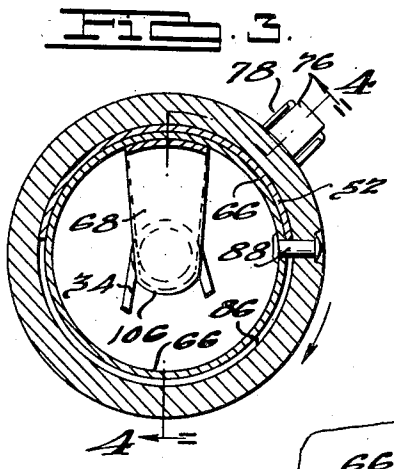


Fig. 3.

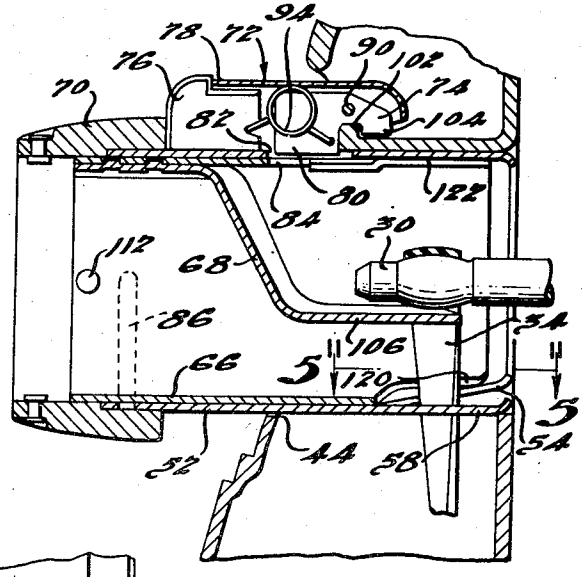


Fig. 4.

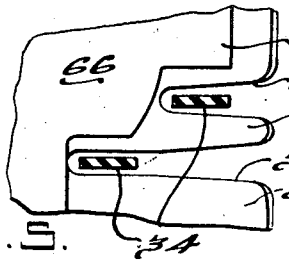


Fig. 5.

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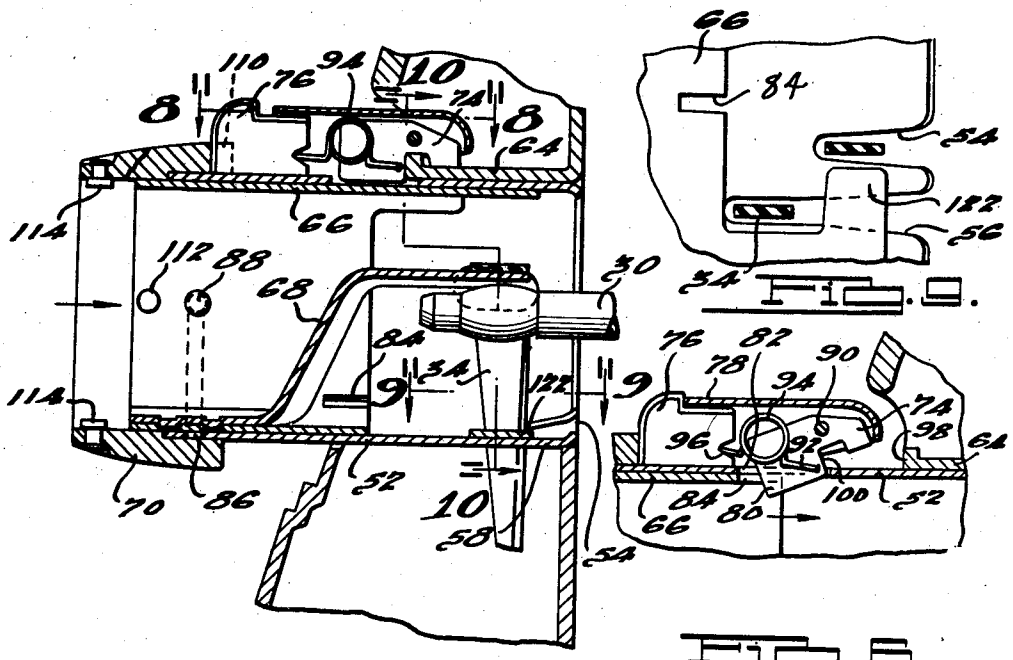


FIG. 7.

FIG. 6.

FIG. 9.

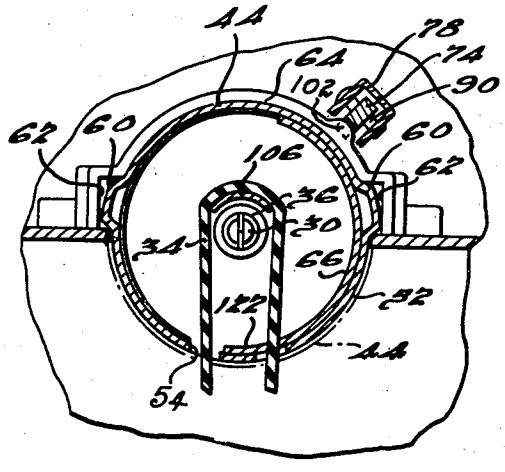


FIG. 10.

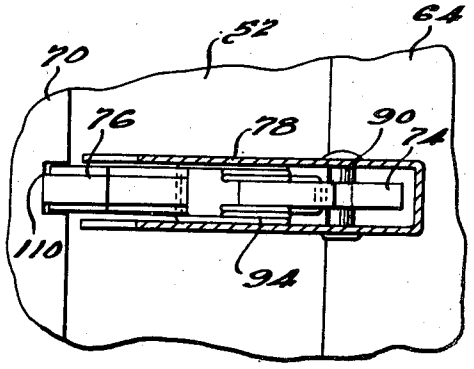


FIG. 8.

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2,378,587

CONVERTER ATTACHMENT

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Application October 12, 1942, Serial No. 461,705

7 Claims. (Cl. 15—9)

This invention relates to vacuum cleaners and has particular reference to a novel and improved form of converter attachment for connecting suction cleaning tools to a floor type cleaner having a motor driven brush operatively associated with the floor nozzle thereof.

A principal object of the invention is to provide a converter attachment which is adapted to be connected to the suction creating means of the cleaner and which is operative for expeditiously disengaging the belt, which drives the agitator, from its driving means and reengaging such belt with its driving means, said converter attachment also operating to break the suction communication between the floor nozzle of the cleaner and the suction creating means.

Another principal object of the invention is to provide a converter attachment of the type herein disclosed which is efficient and dependable in operation and which is constructed and arranged so as to be fool-proof.

Another object of the invention is to provide a converter attachment of the type herein disclosed which is locked in its inoperative position when disengaged from the cleaner, the act of engaging the attachment with the cleaner serving to unlock the attachment and permit the operation thereof for breaking the driving connection between the agitator of the cleaner and the driving means therefor.

Other objects and advantages of the invention will be apparent from a consideration of the following specification taken in conjunction with the accompanying drawings, of which there are two sheets and wherein:

Fig. 1 is a vertical sectional fragmentary view of a part of a floor type vacuum cleaner;

Fig. 2 is a view similar to Fig. 1 and illustrating the position of the converter attachment relative to the parts of the cleaner after the attachment has been inserted in the attachment port of the cleaner;

Fig. 3 is a cross-section of the converter taken along the line 3—3 of Fig. 2, looking in the direction of the arrows;

Fig. 4 is a sectional view along the staggered line 4—4 of Fig. 3, looking in the direction of the arrows, and illustrating the converter parts in the same position as illustrated in Fig. 2;

Fig. 5 is a horizontal section taken along the line 5—5 of Fig. 4, looking in the direction of the arrows;

Fig. 6 is a fragmentary view of a part of the converter and cleaner and illustrating the position of the locking mechanism just before the converter has been inserted all the way into the cleaner port;

Fig. 7 is a view similar to Fig. 4 and illustrating the position of the converter parts with the belt disengaged from the driving shaft thereof;

Fig. 8 is a view of the locking mechanism taken along the line 8—8 of Fig. 7, looking in the direction of the arrows;

Fig. 9 is a horizontal section taken along the line 9—9 of Fig. 7; and

Fig. 10 is a sectional view taken generally along the staggered line 10—10 of Fig. 7, looking in the direction of the arrows.

Referring now more particularly to Figs. 1 and 2, there is illustrated a part of a floor type vacuum cleaner which generally comprises a body 20 movably supported by wheels such as 22 and including a floor nozzle 24, a fan 26, an electric motor 28, a shaft 30 driven by the motor, a rotary agitator or brush 32 operatively associated with the nozzle and disposed therein, and a belt 34 forming a driving connection between a pulley 36 on the shaft 30 and a pulley formed on the rotary brush 32 for driving the same.

The fan 26 is arranged in a suitable fan chamber and therewith forms a suction creating means driven by the motor 28 which operates to induce a flow of dirt laden air inwardly through the mouth 38 of the nozzle, upwardly through the space within the nozzle, and thence through the inlet opening 40 to the fan chamber. From the fan chamber dirt laden air is delivered into a suitable dust collecting receptacle. The shaft 30 which is driven by the motor 28 and carries the fan 26 extends through the fan eye or fan opening 40 and into the space in the nozzle above the agitator 32. The agitator 32 is journaled in suitable bearings within the nozzle and during the operation of the fan, the brushes 42 of the agitator 32 are brought into contact with the surface covering being cleaned so as to aid in dislodging dirt therefrom.

The forward wall of the nozzle 24 is provided with a circular opening 44 closed by a removable plate 46, the plate 46 having fingers 48 on the sides thereof which frictionally engage portions of the walls about the opening 44 for removably securing the plate 46 in a position to close the opening. When it is desired to connect suction cleaning tools to the machine the plate 46 is removed, thereby exposing the opening 44, and a sleeve-like converter attachment indicated generally at 50 (Fig. 2) is inserted through the opening 44.

The converter attachment 50 as illustrated com-

prises a sleeve 52 which is adapted to extend through the opening 44 and to have its inner end seated or terminate in the fan eye 40. The inner end of the sleeve 52 has a fairly close fit in the opening or the fan eye 40 and when positioned in the cleaner as illustrated in Fig. 7 effectively breaks the communication between the mouth 42 of the nozzle and the fan. As illustrated in Fig. 5, the sleeve 52 is cut away to provide slots 54 and 56 with a tongue 58 therebetween, the slots 54 and 56 accommodating the strands of the belt 34. In the various figures of the drawings the size of the belt 34 has been illustrated somewhat smaller than it actually is relative to the size of the slots 54 and 56 for the sake of clarity.

The outer sleeve 52, as illustrated in Fig. 10, is formed to provide a pair of axially extending guides 60 which are adapted to be accommodated within complementarily shaped channels 62 formed in the wall 64 which defines the upper half of the openings 44 and 40 and which closes the upper end of the space within the nozzle 24. The guides 60 and channels 62 are spaced less than 180° apart and form means for guiding the converter attachment 50 during insertion into the cleaner. The guides 60 and channels 62 also prevent relative rotation between the sleeve 52 and the cleaner body. The spacing of the guides 60 and channels 62 also makes it possible to insert the converter attachment 50 into the opening 44 in only one way, that is, in the way in which the guides 60 will fit within the channels 62. The lower half of the opening 44 is circular in shape, as illustrated in dotted lines in Fig. 10, and the walls which define this opening will engage the guides 60 when an attempt is made to improperly introduce the converter into the opening 44 and prevent the insertion of the converter attachment 50 into the cleaner.

The converter further includes an inner sleeve 66, a belt lifter 68, a control knob or handle 70, and a double locking mechanism indicated generally at 72 (Fig. 4) and comprising a latch or locking member 74 and a latch or locking member 76. The locking mechanism is arranged within a housing 78 and is secured to the outer sleeve 52. When the converter attachment is separated from the cleaner the double latching mechanism is positioned as illustrated in Fig. 6. In this position one end 80 of the latch or locking member 74 projects through aligned slots 82 and 84 in the outer and inner sleeves 52 and 66 respectively. The inner sleeve 66 is arranged in the outer sleeve 52 so as to be rotatable relative thereto, the outer sleeve 52 as illustrated in Fig. 3 being provided with a slot 86 and the inner sleeve 66 being provided with a pin 88 extending through the slot 86, the pin 88 and slot 86 limiting relative rotation between the inner and outer sleeves to 180° from the position in which the parts are illustrated in Fig. 3.

The locking member 74 is pivotally mounted on a pin 90 carried by the housing 78 and with the locking member 74 in the position as illustrated in Fig. 6, the inner and outer sleeves 52 and 66 are locked against relative movement and in the position shown in Fig. 3. The locking member 74 is biased into the position in which it is illustrated in Fig. 6 by one arm 92 of a coil spring 94 arranged within the housing, the other arm 96 of the spring reacting against the latch member 76 and urging it toward the left, looking at Fig. 6. The end 92 of the spring 94 may be turned over and passed through a suitable opening in the locking member 74 so that when the converter attachment is disengaged from the cleaner the locking member 74 will project through the slots 82 and 84 and lock the sleeves against relative rotation. When the converter attachment 50 is inserted all the way in the cleaner, or in other words, when the converter has been moved to the right from the position illustrated in Fig. 6 to the position illustrated in Fig. 4, the locking member 74 will be shifted due to the fact that the edge 98 of the opening 44 will engage a part 100 of the locking member 74 and cause the same to swing in a clockwise direction from the position illustrated in Fig. 6 to the position illustrated in Fig. 4. The edge 98 of the opening is provided with a lug or catch 102 which obstructs the path of movement of the end 104 of the catch 74 when the same is positioned as illustrated in Fig. 4. The locking member 74 is maintained in this position by moving the slot 84 out of alignment with the slot 82, which is effected by turning the inner sleeve 66 relative to the outer sleeve 52 which can now be done since the end 80 of the locking member 74 has been moved out of the slot 84.

When the converter is inserted into the cleaner the belt lifter 68 is positioned as illustrated in Fig. 4. The belt lifter 68 includes a horizontally extending finger 106 which passes under the end of the shaft 30 and between the strands of the belt 34 as shown in Figs. 3 and 4. The belt lifter 68 is affixed to the inside of the inner sleeve 66 and when the inner sleeve 66 is rotated 180° from the position illustrated in Fig. 4 the finger 106 will move from below the shaft 30 around the same and engage the belt 34 and lift the same out of driving relation with the pulley 36. The sleeve may be rotated by manipulation of the knob or handle 70 and when the belt lifter 68 is in the position as illustrated in Fig. 7 a notch 110 in one edge of the knob 70 will move into the path of the latch or locking member 76, thereby permitting the same to move from the position as illustrated in Fig. 4 to the position as illustrated in Fig. 7. In this position the engagement of the locking member 76 with the notch 110 will lock the inner sleeve against rotation relative to the outer sleeve. The inner sleeve projects beyond the outer sleeve and is fastened to the knob by means of pins 112. The latch member 76 is moved by the action of the spring 94. The latch member 76 is positioned so that it can be engaged by a thumb or finger of an operator and disengaged from the notch 110 so as to enable the inner sleeve to be returned from the position illustrated in Fig. 7 to that illustrated in Fig. 4. The latch member 76 prevents the accidental rotation of the inner sleeve 66 due to a turning movement which might be imparted thereto by means of a hose or suction tool which is adapted to be connected to the converter attachment 50. The knob 70 may be provided with any suitable coupling means for detachable engagement with cooperating coupling means carried by a hose or cleaning tool, such as with pins 114 which may comprise a part of a bayonet type of coupling.

With the parts positioned as illustrated in Fig. 7 the suction communication between the nozzle 24 and the fan 26 is broken and the driving connection between the shaft 30 and the agitator 32 is also broken. Upon operation of the motor and fan with the converter positioned as illustrated in Fig. 7, the entire suction effect of the fan will induce a flow of air through the inner sleeve 66 of the converter and into the fan chamber and from thence to the dirt collecting receptacle. Note

that the belt lifter 68 is arranged on the upstream side of the end of the shaft 30 and the belt 34 and is positioned so as to shield the same from the dirt entrained in the air which flows through the sleeve 66. The inner sleeve 66 is cut away at its inner end so as to avoid interference with the belt 34 and as clearly shown in Figs. 5 and 9. When the converter is initially inserted into the cleaner, one end 120 of the sleeve 66 is shaped so as to lie adjacent to the slots 54 and 56, as illustrated in Fig. 5. The other side of the cut away part of the inner sleeve is shaped as illustrated in Fig. 9 and is arranged to provide a part 122 which is adapted to overlie a part of the slot 56 not occupied by the belt 34. Thus the walls of the converter are formed so as to accommodate the strands of the belt 34 and to substantially prevent any appreciable leakage of air through the slots 54 and 56, the strands of the belt being of such size as to effectively prevent any great leakage of air between the same and the walls of the slots 54 and 56.

By disengaging the latch 76 from the notch 110 the converter can be returned to the position illustrated in Fig. 4 as previously described, and thereafter may be withdrawn from the cleaner. Due to the arrangement of the slots 82 and 84, the converter cannot be withdrawn from the cleaner until the sleeve 66 is returned to the position illustrated in Fig. 4, in which position the belt is properly reengaged with its driving pulley. When the slots 82 and 84 are lined up, the end 80 of the latch member 74 may shift from the position illustrated in Fig. 7 to that illustrated in Fig. 6 and permit the withdrawal of the attachment from the cleaner.

The latching member 74 is arranged so that it can only effectively be released by inserting the attachment in the cleaner, and hence when the converter attachment is separated from the cleaner it will always be in the same position. The latching member 74, the shoulder 102, and the slot 84 form an interlocking means which prevent the operation of the belt lifter except when the converter is locked to the cleaner and which prevent the separation of the converter from the cleaner except when the belt lifter is inoperative, that is, when the belt is engaged with its pulley.

While the invention has been described with some detail, it is to be understood that the description is for the purpose of illustration only and is not definitive of the limits of the inventive idea. The right is reserved to make such changes in the details of construction and arrangement of parts as will fall within the purview of the attached claims.

I claim:

1. A converter attachment for connecting cleaning tools to a suction cleaner having a driving motor, suction creating means driven thereby, a port communicating with said suction creating means, a nozzle communicating with said suction creating means through said port, an agitator operatively associated with said nozzle and a driving connection between said motor and agitator for driving the latter; said attachment comprising an air conducting member adapted for seating on said port and which is adapted when so positioned to break the communication between said nozzle and said suction creating means, means operable for breaking and remaking said driving connection when said air conducting member is seated on said port, a manually actuated operator for said means, and a lock between said operator and said air conducting member normally operable for locking said operator against actuation and with said means in a position with said driving connection unbroken, said lock having a part positioned to be engaged by a portion of the cleaner upon seating said air conducting member on said port for releasing said lock to permit manual actuation of said operator.

2. A converter attachment for connecting suction cleaning tools to a vacuum cleaner having a motor, suction creating means driven thereby, a port communicating with said suction creating means, a nozzle communicating with said suction creating means through said port, a cleaning member associated with said nozzle, a driving connection between said motor and said member for driving the latter, said driving connection extending through said port and including a belt and pulley, said converter attachment comprising; air conducting tubular means adapted for connection with and disconnection from said port, a member operable, when said tubular means are connected to said port, for disengaging and engaging said belt and pulley and having one position, relative to said air conducting tubular means, when said belt and pulley are engaged and another relative position when said belt and pulley are disengaged, locking means operative for holding said member in said one position relative to said air conducting tubular means when the latter is disconnected from said port, said locking means having a part positioned to be engaged by a portion of the cleaner so that said locking means can be released only by positioning said tubular means on said port, locking means operative for clamping said converter to said vacuum cleaner with said tubular means positioned on said port, said locking means being constructed and arranged relative to each other so that one is operative when the other is inoperative.

3. A converter attachment for connecting suction cleaning tools to a vacuum cleaner having a motor, suction creating means driven thereby, a port communicating with said suction creating means, a nozzle communicating with said suction creating means through said port, a cleaning member associated with said nozzle, a driving connection between said motor and said member for driving the latter, said driving connection extending through said port and including a belt and pulley, said converter attachment comprising; an air conducting tubular member adapted for connection with and disconnection from said port, a manually actuated member operable, when said tubular member is connected to said port, for disengaging and engaging said belt and pulley and having one position, relative to said air conducting member, when said belt and pulley are engaged and another relative position when said belt and pulley are disengaged, locking means operative for holding said manually actuated member in said one position relative to said air conducting tubular member when the latter is disconnected from said port and comprising a latch carried by one of said members and a keeper provided on the other of said members, said latch being arranged to be released from said keeper by engagement of said latch with a part of said cleaner upon positioning said tubular member on said port, locking means operative for clamping said converter to said vacuum cleaner with said tubular member connected to said port, said locking means

being constructed and arranged relative to each other so that one is operative when the other is inoperative.

4. A converter attachment of the character described for connecting suction cleaning tools to a suction cleaner comprising an air conducting member adapted for connection with and disconnection from a suction port of a cleaner, a manually actuated belt lifting member carried by said air conducting member and operable by movement relative thereto and interlocking means between said air conducting member and said belt lifting member and operable by detaching said converter attachment from a suction cleaner for preventing the operation of said belt lifting member, said interlocking means having a releasing member therefor arranged to be released only by engagement with a part of said cleaner by positioning said air conducting member on the port of said cleaner.

5. A converter attachment for connecting suction cleaning tools to a vacuum cleaner having a motor, suction creating means driven thereby, a port communicating with said suction creating means, a nozzle communicating with said suction creating means through said port, a cleaning member associated with said nozzle, a driving connection between said motor and said member for driving the latter, said driving connection extending through said port and including a belt and pulley, said converter attachment comprising; an air conducting tubular member adapted for connection with and disconnection from said port, a manually actuated member operable, when said tubular member is connected to said port, for disengaging and engaging said belt and pulley and having one position, relative to said air conducting member, when said belt and pulley are engaged and another relative position when said belt and pulley are disengaged, locking means operative for holding said manually actuated member in said one position relative to said air conducting member when the latter is disconnected from said port and comprising a latch carried by one of said members and a keeper provided on the other of said members, locking means operative for clamping said converter to said vacuum cleaner with said tubular member connected to said port and comprising a part of said latch which is formed to engage a part of said cleaner, said latch being arranged to be released from said keeper and to engage said cleaner part upon positioning said tubular member on said port.

6. A converter attachment for connecting a suction cleaning tool to a vacuum cleaner having a motor, suction creating means driven thereby, a port communicating with said suction creating means, a nozzle communicating with said suction creating means through said port, a cleaning member associated with said nozzle, a driving connection between said motor and said member for driving the latter, said driving connection extending through said port and including a belt and pulley, said converter attachment comprising; an air conducting tubular member adapted for connection with and disconnection from said port, a manually actuated member operable, when said tubular member is connected to said port, for disengaging and engaging said belt and pulley and having one position, relative to said air conducting member, when said belt and pulley are engaged and another relative position when said belt and pulley are disengaged, locking means operative for holding said manually actuated member in said one position relative to said air conducting member when the latter is disconnected from said port and comprising a latch carried by one of said members and a keeper provided on the other of said members, locking means operative for clamping said converter to said vacuum cleaner with said tubular member connected to said port and comprising a part of said latch which is formed to engage a part of said cleaner, said latch being arranged to be released from said keeper upon positioning said tubular member on said port, a manually releasable latch on said one of said members engageable with a keeepr on said other of said members for releasably locking the said members in a position with said belt and pulley disengaged when said converter is connected to said port, and a spring arranged between said latches urging both of said latches into their respective keeper engaging positions.

7. A converter attachment of the character described for connecting suction cleaning tools to a suction cleaner comprising an air conducting member having one end thereof adapted for connection with and disconnection from a suction port of a cleaner, the other end of said member having provisions by means of which suction cleaning tools can be connected thereto, a manually actuated belt lifting member carried by said attachment and operable by movement relative thereto and interlocking means between said air conducting member and said belt lifting member and operable when said converter attachment is detached from a suction cleaner for preventing the operation of said belt lifting member, said interlocking means having a part arranged to be engaged and actuated only by a portion of the cleaner upon connecting said air conducting member to said port for releasing said interlocking means to permit movement of said belt lifter relative to said air conducting member.

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