

April 12, 1966

C. T. FROMKNECHT

3,245,698

LATCHING MEANS

Filed Nov. 4, 1963

Fig.1.

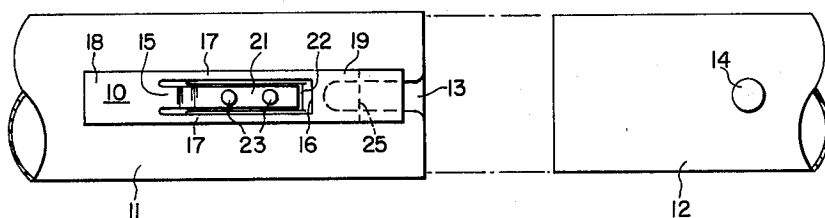


Fig.2.

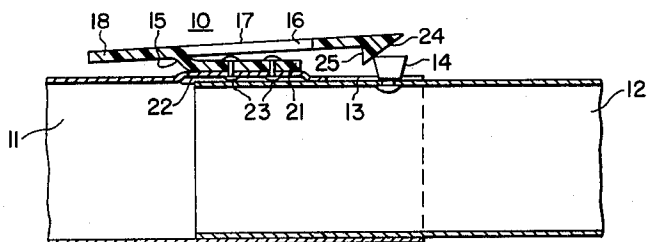


Fig.3.

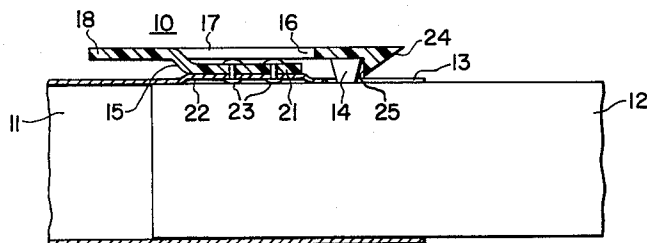
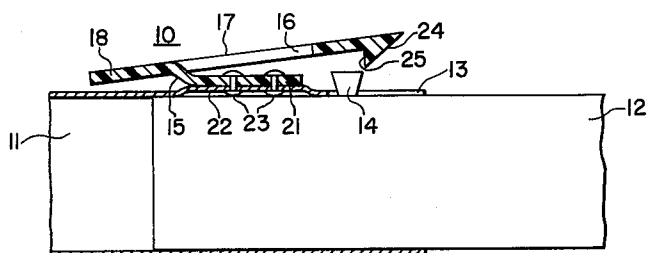


Fig.4.



WITNESSES

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3,245,698

LATCHING MEANS

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Filed Nov. 4, 1963, Ser. No. 321,313
1 Claim. (Cl. 285—7)

This invention relates, generally to latching means and, more particularly, to means for latching telescoped tubular sections or wands of a type utilized for attaching cleaning tools to suction or vacuum cleaners.

Various cleaning attachments or tools are usually connected to a suction cleaner by means of a flexible hose having a sectional tube or wand at one end to which each tool is removably attached and an object of this invention is to provide a latch for securing two sections of the tube or wand together.

Another object of the invention is to provide a self-engaging latching means for releasably retaining tubular members in telescoped relation.

A further object of the invention is to provide a latch which shall be simple and easy to operate and which may be economically manufactured and installed.

Other objects of the invention will be explained fully hereinafter or will be apparent to those skilled in the art.

In accordance with one embodiment of the invention, two tubular members are releasably retained in telescoped relation by latching means composing a one-piece latch member having an integral base disposed in an opening between two side portions joined at one end by an operating portion and at the other end by a latch portion having a cam surface which engages a rivet or projection on the tubular member telescoped inside the tubular member to which the latch member is attached. The rivet is disposed in a slot in the end of the outer tubular member. The base is attached to the outer tubular member by two rivets spaced longitudinally of the tube. The latch is released by pressing on the operating end causing the member to bend at the junction of the base with the latch member, thereby raising the other end to disengage the latch from the rivet.

For a better understanding of the nature and objects of the invention, reference may be had to the following detailed description, taken in conjunction with the accompanying drawing in which:

FIGURE 1 is an exploded view showing portions of two disconnected tubular members, one of which has a latch member embodying the invention attached thereto and the other of which has a rivet thereon for engagement by the latch;

FIGURE 2 is a view, in section, showing the tubular members being connected;

FIGURE 3 is a view, in section, showing the tubular members locked together by the latching means; and

FIGURE 4 is a view, in section, showing the latch released to permit separation of the tubular members.

As explained hereinbefore, the invention may be utilized to connect together two tubular members of a type utilized in the air line of a vacuum or a suction cleaner. The drawing shows the two tubular members as being sections of a vacuum cleaner wand which may be utilized to connect a cleaning tool to a flexible hose which, in turn, is connected to a cleaner tank. However, the latching means herein described may be utilized to attach the cleaning tool to the wand, or the wand to the hose, or the hose to the tank.

As shown in the drawing, a latch member 10 is attached to an outer tubular member 11 into which an inner tubular member 12 may be partly inserted or telescoped. The tubular members are preferably composed of a

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metal, such as steel, but they may be composed of a relatively light metal such as aluminum, or of a suitable plastic material.

As shown in FIGURE 1, the tube 11 has a slot 13 at one end which extends longitudinally of the tube underneath a portion of the latch member 10. The tube 12 has a projection 14 thereon near its one end. The projection 14 may be a large headed rivet attached to the tube 12. At least one end of the tube 12 is of a slightly smaller diameter than the tube 11.

The latch member 10 is of a one-piece construction and is preferably molded from a resilient plastic material, such as "Acetal." However, the latch member may be formed from a metal, such as spring steel. The latch member has an integral base 15 joined to the latch member at one end of an opening 16 between two spaced side portions 17 which are joined at one end by an operating portion 18 and at the other end by a latch portion 19. The base 15 has a depressed portion 21 which is attached to a raised portion 22 on the tube 11 by means of two rivets 23 spaced longitudinally of the tube.

As shown most clearly in FIGURE 2, the latch portion 19 has a cam surface 24 which terminates in a hook surface 25. The cam surface 24 engages the rivet 14 when the tube 12 is inserted into the tube 11 with the rivet disposed in the slot 13. The latch member is bent at the junction of the base with the latch member, as shown by the arrow in FIGURE 2, thereby permitting the cam surface to ride over the rivet 14. After the cam surface passes over the rivet the latch member returns to a relaxed position, as shown in FIGURE 3, and the tubular members are locked together by the hook surface 25 engaging the rivet 14. Rotation of the tube 11 relative to the tube 12 is prevented by the rivet 14 engaging the sides of the slot 13.

In order to prevent the side portions 17 from bending when the cam surface 24 engages the rivet 14, the two side portions and the base 15 where it joins the latch member 10 at the end of the opening 16 should be of such cross sections that only the base appreciably bends and the side portions remain relatively stiff during latching operations. The latch can be released by pressing on the operating portion 18, thereby bending the latch member at the junction of the base 15 with the latch member to disengage the hook surface 25 from the rivet 14, as shown in FIGURE 4, and permit the tube 12 to be removed from the tube 11. It will be noted that the latch member functions as a spring, a lever and a cam during operation of the latch.

From the foregoing description it is apparent that the invention provides a latch which is disposed on the outside of the wand tubing rather than inside the tubing. Thus, it does not impair the airflow through the tubing. The latch assures positive latching of the connected members. It is quick acting, both in connecting and releasing. It requires a minimum number of parts and is, therefore, inexpensive to manufacture and install.

Since numerous changes may be made in the above-described construction and different embodiments of the invention may be made without departing from the spirit and scope thereof, it is intended that all the matter contained in the foregoing description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

I claim as my invention:

A one-piece latch member comprising a body portion having a cam surface at the forward end thereof, said cam surface terminating in a rearwardly-facing hook surface, an integral mounting base portion being offset out of the plane of said body portion, means defining an opening in said body portion and having spaced side portions, said base portion being attached to said body

portion by a lip portion integral with said base and body
portion and defining one end of said opening between
said spaced side portions, an operating portion rearward
of the point of juncture of said lip and said body portion,
said operating portion being depressible to move said
latch member about said lip portion as a pivot.

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