March 14, 1967 J. H. BEACH 3,309,113

COUPLING FOR SUCTION CLEANER ATTACHMENTS

Filed Feb. 24, 1966

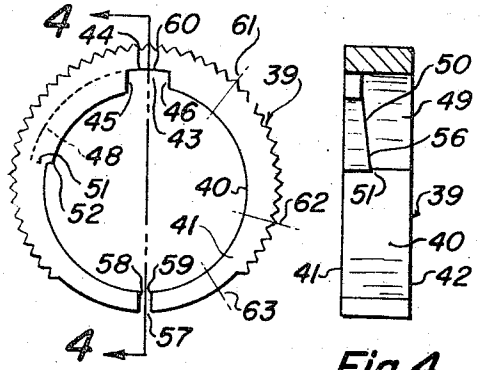


Fig. 3

Fig. 4

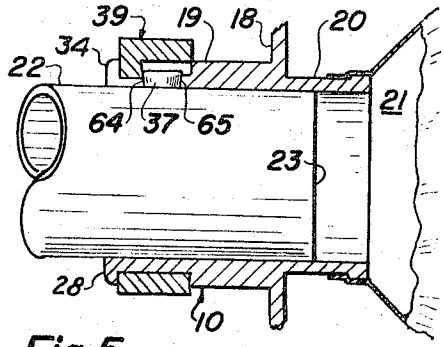


Fig. 5

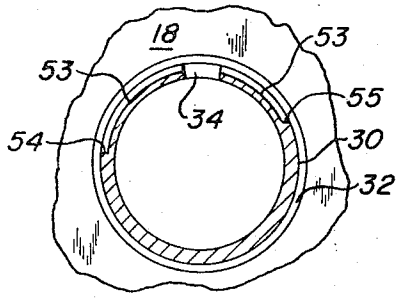


Fig. 6

Fig. 2

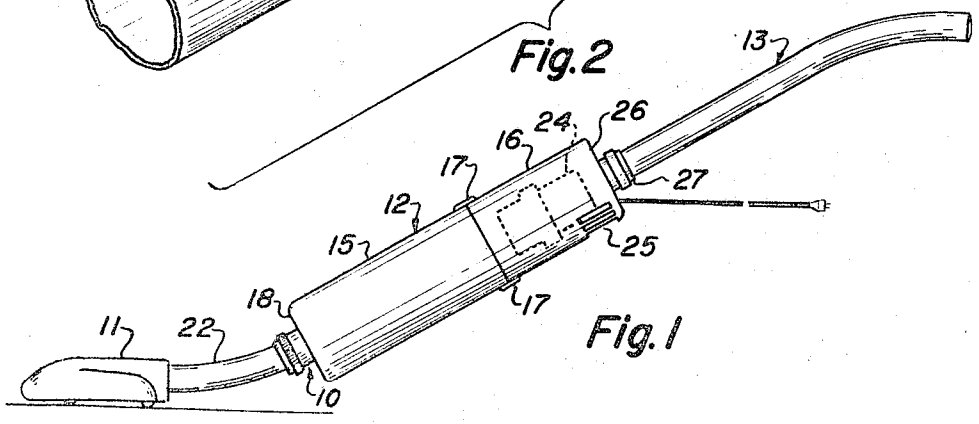


Fig. 1

United States Patent Office 3,309,113
Patented Mar. 14, 1967

3,309,113
COUPLING FOR SUCTION CLEANER ATTACHMENTS

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Filed Feb. 24, 1966, Ser. No. 529,767
2 Claims. (Cl. 285—7)

The present invention relates to couplings adapted to detachably connect an elongated member to a tubular member on a suction cleaner casing.

An object of the invention is to telescopically connect a cleaning tool to a tubular member of a cleaner casing by a coupling device having a locking collar on the tubular member and which positions a locking lug on the tool to transmit the propelling forces applied to the cleaner casing directly to the tool without placing a stress on the locking collar.

Another object is to provide the foregoing coupling with a split locking collar whereby the latter may be spread apart for assembly onto the casing tubular member.

A further object is to provide a coupling comprising a minimum of parts which are easily assembled and inexpensive to manufacture.

Other objects and advantages of the invention will become apparent from the following description and drawings, wherein:

FIGURE 1 is an elevational view of a suction cleaner embodying one form of the invention,

FIGURE 2 is an exploded view of the coupling device,

FIGURE 3 is a front elevational view of the locking collar detached from the coupling,

FIGURE 4 is a section along the line 4—4 in FIGURE 3,

FIGURE 5 is a sectional view of the coupling in locked position, and

FIGURE 6 is a section along the line 6—6 in FIGURE 2 and is taken transversely of the tubular member on the front wall of the cleaner casing.

The embodiment of the coupling 10 herein disclosed is illustrated in connection with a surface cleaning tool or nozzle 11 and a tank type suction cleaner 12 having a propelling handle 13. The cleaner 12 comprises an elongated casing formed in two sections 15 and 16 secured together with suitable clamps 17. The casing sections 15 and 16 may be formed of suitable plastic material. The casing section 15 has a front end wall 18 through which extends a tubular member 19 on the inner end 20 of which is suitably mounted a dust bag 21 disposed in the casing section 15. An elongated member or nozzle tube 22 has one end 23 telescopically arranged within the tubular member 19 and its opposite end is connected to the cleaning tool 11 which engages the surface to be cleaned. A conventional motor-fan unit 24 is mounted in the casing section 16 and provides suction to draw dirt-laden air from the surface being cleaned through the cleaning tool 11 and the tubular inlet member 19 into the bag 21 and the air is discharged through a plurality of outlets 25 in the casing section 16. The casing section 16 has a rear end wall 26 provided with a tubular member 27 in which the handle 13 is secured to propel the tool 11 forwardly and rearwardly over the surface to be cleaned.

The coupling 10 may also be formed of plastic and includes the outer end portion 28 of the casing tubular member 19 which is provided with an externally facing annular recess 29 having a bottom wall 30 and opposed side walls 31 and 32 the latter defining an entrance to the recess 29. A slot 34 is provided radially through the tubular member 19 and extends from the extreme end 28 of the member 19 longitudinally of the latter and transverse of the recess 29 to an end wall 36 in the tubular

member 19 for reception of a lug 37 projecting from the elongated tubular member 22, and the lug 37 is spaced inwardly from the free end 23 of the elongated tube 22.

Rotatably mounted in the annular recess 29 is a plastic locking collar 39 provided with an inner surface 40, and opposed side wall surfaces 41 and 42 the latter slidably engaging respectively the side walls 31 and 32 of the annular recess 29, and the inner surface 40 engaging the bottom wall 30 of the recess 29. A groove 43 in the collar 39 extends longitudinally of the tubular inlet 19 and is defined by an outer wall 44 and opposed side walls 45–46 the latter walls providing an entrance to the groove 43.

The groove 43 in the collar 39 provides an entrance to a locking recess 48 extending radially outwardly of the inner surface 40 of collar 39 to a wall 49 and from the collar side wall surface 42 to an inwardly projecting wall 50 adjacent the other side wall 41 of the collar 39. The locking recess 48 extends peripherally along the collar 39 between the point 51 and the side wall 46 of the entrance groove 43. The side wall 50 of the locking recess 48 projects below the bottom surface 40 of the collar 39 as indicated at 52 and is movable in a recessed area 53 formed in the bottom wall 30 of the annular recess 29 and such recess 53 extends on opposite sides of the slot 34 to stops 54 and 55.

The wall 50 of the collar locking recess 48 is provided with a cam surface 56 extending from the point 51 to the entrance groove 43. The cam surface 56 inclines in a direction from the point 51 outwardly from the cleaner casing and is such that upon clockwise rotation of the collar 39, as viewed in FIGURE 5, the cam surface 56 is advanced toward the end wall 36 of the slot 34. It will be noted the locking lug 37 is tapered slightly in the form of an inverted truncated cone and the cooperating surfaces of the cam 56 and end wall 36 of the slot 34 are correspondingly inclined.

The locking collar 39 is split at 57 to provide spaced ends 58 and 59. The collar 39 is assembled in the annular recess 29 by spreading the ends 58–59 apart and sliding the collar over the outer end 28 of the tubular member 19 into the recess 29. In order to more easily spread the ends 58–59 apart the radial thickness of the plastic material forming the collar 39 is progressively reduced from the midsection 60 at the groove 43 to the ends 58–59 as indicated by the lines 61, 62 and 63.

In order to connect the cleaning tool 11 to the cleaner 12 the locking collar 39 is rotated counterclockwise as viewed in FIGURE 2 to first align the collar groove 43 with the slot 34 in the casing inlet tube 19, whereby the tubular member 22 may be telescoped into the tube 19 with the free end 23 thereof positioned as shown in FIGURE 5 and the locking lug 37 in the slot 34 adjacent the end wall 36.

The collar 39 is then rotated clockwise as viewed in FIGURE 2 and which causes the cam wall 56 to close the tube slot 34 and the cam wall 56 to engage the outer surface 64 of the lug 37. Continued rotation of the collar 39 causes the cam surface 56 to exert a force on the lug 37 in a direction toward the cleaner casing and shifts the tool tube 22 inwardly of the tubular member 19 until the inner surface 65 of the lug 37 abuts the end wall 36 of the tubular member 19 on the cleaner casing end wall 18.

Thus the locking lug 37 is anchored between the cam surface 56 on the locking collar 39 and the wall 36 forming part of the tubular member 19 on the casing end wall 18. In addition the opposite side walls 41–42 of the locking collar 39 intimately engage the adjacent side walls 31 and 32 of the annular recess 29 which is a part of the tubular member 19 and thus the end wall 18 of the cleaner 12.

When the operator exerts a forward propelling force

on the handle **13** to move the tool **11** over the surface being cleaned, such force is transmitted through the cleaner casing to the front end wall **18**, then to the end wall **36** on the tubular member **19**, and then directly to the surface **65** of the locking lug **37** to the tool **11** without placing any stress on the locking collar **39** and its cam surface **56**, or the extreme end **23** of the nozzle tube **22**.

When the operator pulls the nozzle **11** rearwardly the force is transmitted through the cleaner **12**, its front end wall **18**, tubular inlet member **19**, thence to the side wall **41** of the locking collar **39** which is in engagement with the side wall **31** of the annular recess **29** to thereby support the locking collar **39** while the cam surface **56** transmits such pulling force to the surface **64** of the locking lug **37** and thus to the nozzle **11**.

The nozzle **11** is disconnected from the cleaner **12** by rotating the locking collar **39** counterclockwise as viewed in FIGURE 2 until the end **52** on the depending cam wall **50** abuts the end **54** of the recessed area **53** and which indicates the collar **39** is in its unlatched position with the groove **43** and slot **34** aligned so that the tool tube **22** can be removed.

Although the handle **13** has been shown connected in a conventional manner to the tubular portion **27** of the casing section end wall **26**, the coupling **10** can be arranged in the tubular portion **27** to removably attach the handle **13** to the cleaner casing.

The coupling device has been described in relation to a suction cleaner casing however it is obvious it can be employed as a connection for two telescopically arranged members divorced from a casing.

While I have shown and described but one embodiment of my invention it is to be understood that this embodiment is to be taken as illustrative only and not in a limiting sense. I do not wish to be limited to the specific method and apparatus shown and described but wish to include all equivalent variations thereof except as limited by the scope of the claims.

I claim:

1. A coupling adapted for use with a suction cleaner comprising:

(a) a tubular member,

(b) an elongated member telescoped into one end of said tubular member,

(c) an externally facing recess in said tubular member adjacent said one end,

(d) a locking collar mounted in said recess for rotation in opposite directions to locked and unlocked positions,

(e) said collar being split longitudinally of said tubular member so that the ends of said split may be spread apart to telescope said collar over said one end of said tubular member into said recess to assemble said collar in the latter,

(f) means defining a slot in said tubular member extending from said one end thereof into said recess and terminating in an end wall integral with said tubular member, and arcuate recesses formed in the bottom wall of said externally facing recess on opposite sides of said slot, said arcuate recesses having end walls which limit the rotation of said collar in both directions,

(g) a locking lug on said elongated member movable through said slot and transversely of said recess into abutting engagement with said end wall on said tubular member during telescopic connection of said members,

(h) means defining a groove in said collar extending longitudinally of said members and adapted to receive said lug when said collar is in its unlocked position,

(i) a cam surface on said collar depending into said external recess and arranged at one side of said groove adjacent said one end of said tubular member,

(j) said collar when rotated to its unlocked position having its groove in alignment with said slot for receiving said lug on said elongated member and upon rotation of said collar to its locked position said cam surface engaging said lug to effect movement of said elongated member inwardly of said tubular member with said lug abutting said end wall on said tubular member.

2. A coupling as described in claim **1**, and said collar being of flexible material and having a transverse thickness which decreases toward said split ends to thereby facilitate spreading said ends apart to assemble said collar in said recess.

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