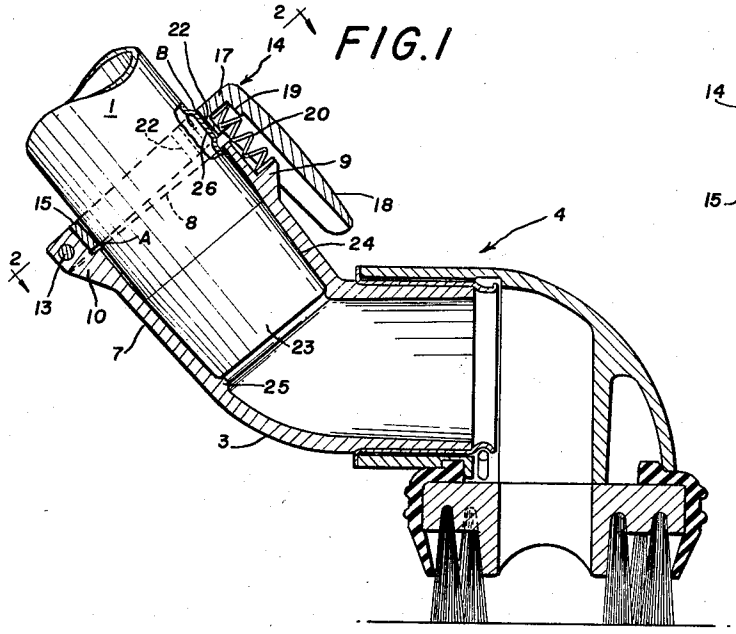
Dec. 1, 1964 R. DESCARRIES 3,159,412

WAND ASSEMBLY FOR SUCTION CLEANER

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FIG. 1



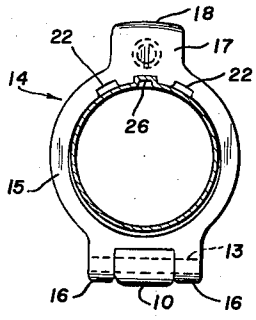


FIG. 2

FIG. 3

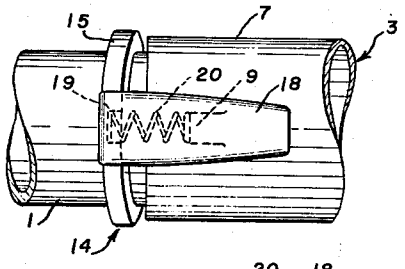
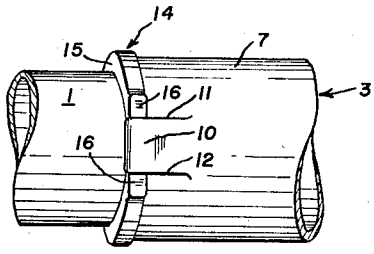


FIG. 4



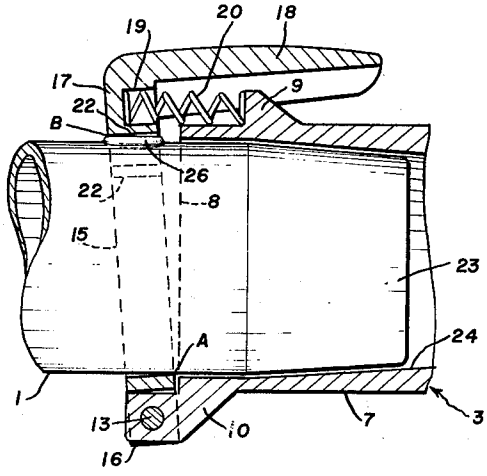


FIG. 5

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WAND ASSEMBLY FOR SUCTION CLEANER

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FIG. 6

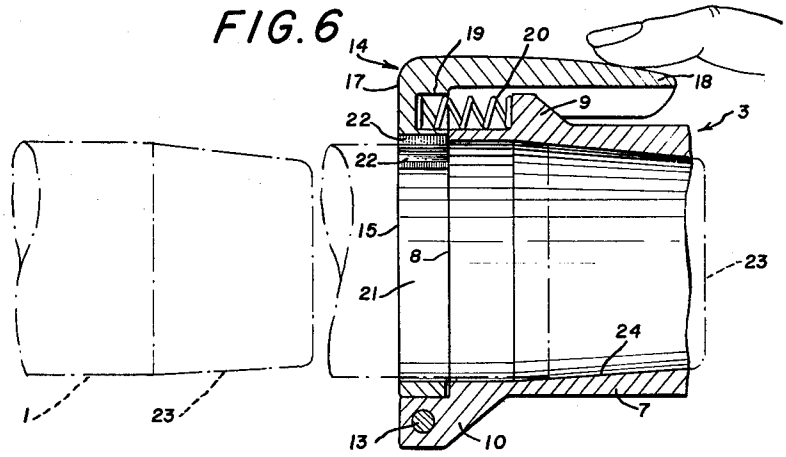


FIG. 7

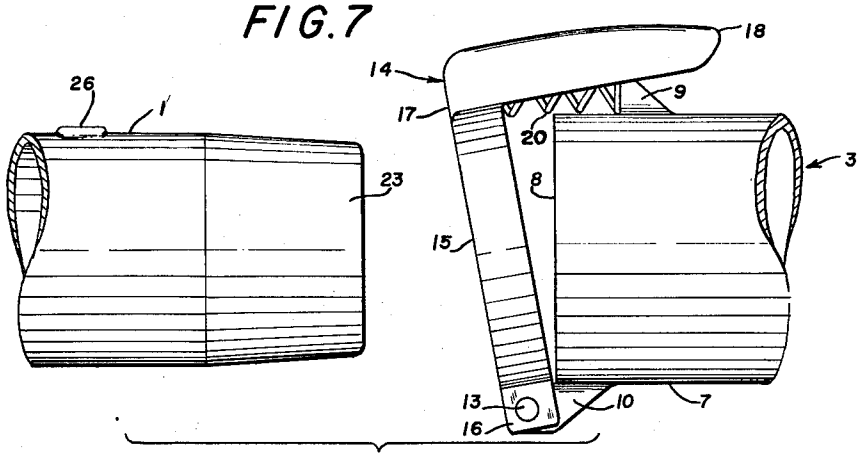
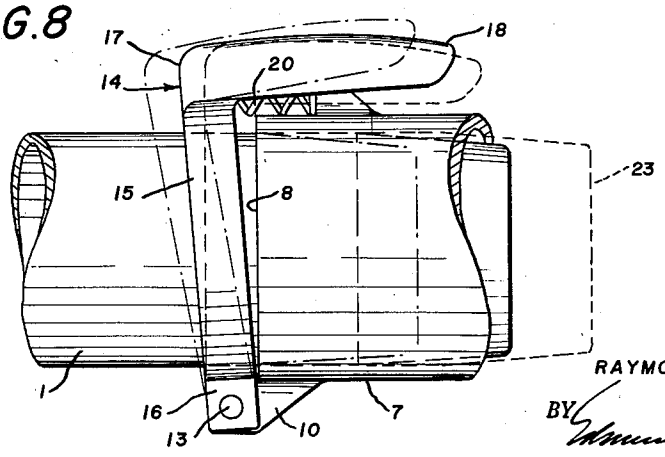


FIG. 8



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FIG. 9

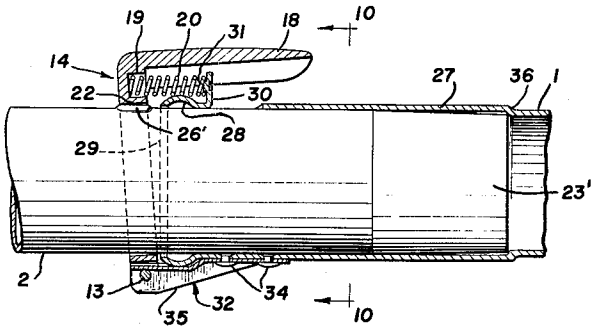


FIG. 14

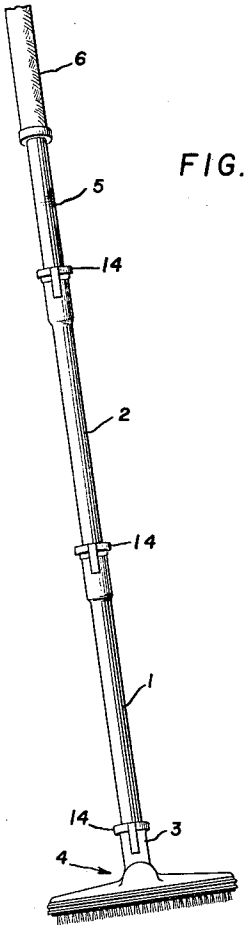


FIG. 10

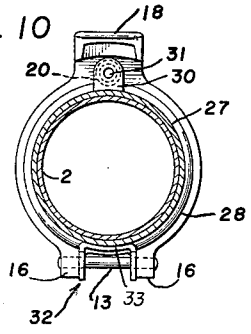


FIG. 13

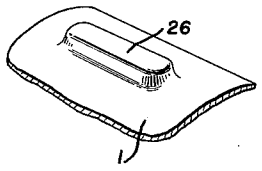
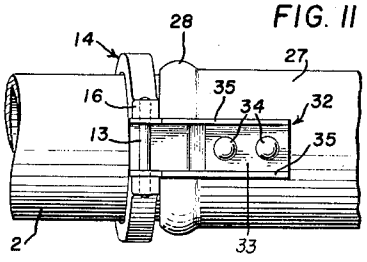


FIG. 11



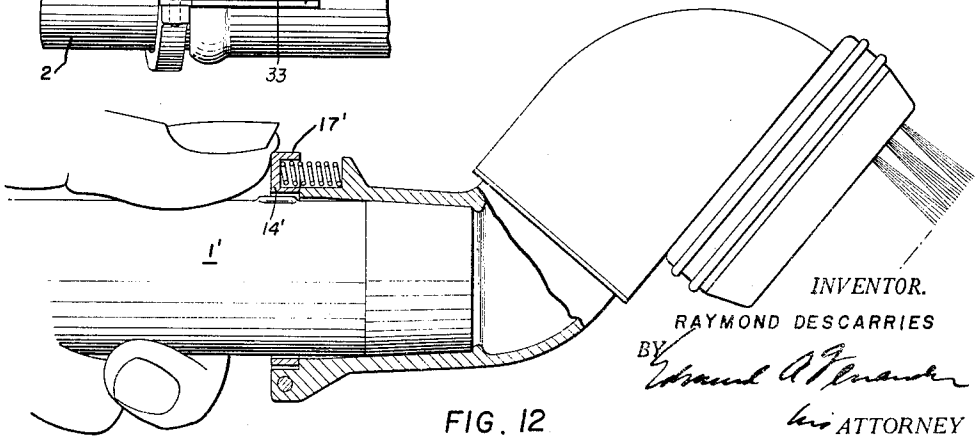


FIG. 12

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3,159,412

WAND ASSEMBLY FOR SUCTION CLEANER

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Filed June 15, 1960, Ser. No. 36,237
2 Claims. (Cl. 285—7)

This invention relates to suction cleaners and more particularly to an improved manipulating wand assembly useful with tank type suction cleaners, for example, and to coupling means employed therein.

It has become common practice to construct suction cleaners in such fashion that the fan, driving motor and filter are mounted in a unitary casing having an air inlet fitting and an air outlet, a flexible hose being connected to the air inlet fitting of the casing and extending to a stiff tubular structure to which the attachments, such as the usual nozzles of various forms, depending upon the surface to be cleaned, are connected for use. The stiff tubular structure, serving both to conduct air from the attachment to the flexible hose and to provide an elongated handle by which the attachment can be manipulated, has become known in the trade as a "wand."

Suction cleaner wands are usually made up of at least two sections of thin walled metal tubing connected together endwise to form a relatively long assembly, the nozzle or like attachment being connected to one end of this assembly and the other end thereof being connected to a tubular fitting on the end of the flexible hose leading to the tank or casing of the suction cleaner. Thus, a wand usually employs at least three couplings, one between a tubing section and the elbow of the attachment and the others being between straight tubular parts. Prior art workers have proposed various ways for coupling together the several parts making up the wand assembly. Frequently, plain tubular portions are simply telescoped together, being held in coupled relation by the frictional forces between the telescopically engaged parts. It has also become common practice to employ simplified screw threaded couplings, particularly between the straight sections of metal tubing making up the wand itself. While many of the structures heretofore adopted have achieved extensive commercial acceptance, none has been without some disadvantage. Where simple telescopic engagement of parts is employed, relying upon friction to maintain the coupling, the parts are frequently either too loosely engaged or are so tightly jammed together as to make disengagement exceedingly difficult. Where screw threaded couplings have been used, the arrangement has frequently been cumbersome and it has been difficult to maintain proper alignment of the parts.

A general object of the invention is to provide an improved manipulating wand assembly of the type referred to wherein the parts can be simply and easily coupled, without requiring unusual skill or strength, by the ordinary user and, when so coupled, will retain their desired relationship throughout use of the device.

Another object is to devise such a structure wherein the likelihood of the couplings involved becoming jammed is substantially completely eliminated.

A further object is to provide an improved manipulating wand assembly which allows the operator to position an attachment, such as a combined nozzle and brush, in a positively determined angular disposition with respect to the normal position of use of the wand.

Yet another object is to provide an improved coupling for the components of a manipulating wand assembly.

In order that the manner in which these and other objects are attained in accordance with the invention can be understood in detail, reference is had to the accompanying drawings, which form a part of this specification, and wherein:

FIG. 1 is a vertical longitudinal sectional view, with some parts shown in elevation, of a coupling, constructed in accordance with one embodiment of the invention, between the end tube section of a manipulating wand and the elbow of a suction cleaner attachment;

FIG. 2 is a sectional view taken on line 2—2, FIG. 1, with some parts shown in elevation;

FIG. 3 is a top view of the coupling employed in the device of FIG. 1;

FIG. 4 is a bottom view of the coupling employed in the device of FIG. 1;

FIGS. 5 and 6 are sectional views and FIGS. 7 and 8 are side elevational views, of the coupling employed in the device of FIG. 1, illustrating the manner in which the coupling is operated;

FIG. 9 is a vertical longitudinal sectional view, with some parts shown in elevation, of a coupling, constructed in accordance with the invention, between the end portions of two tube sections of the manipulating wand;

FIG. 10 is a sectional view taken on line 10—10, FIG. 9, with some parts shown in elevation;

FIG. 11 is a bottom view of the coupling shown in FIG. 10;

FIG. 12 is a side elevational view showing a modified form of the coupling of FIG. 1;

FIG. 13 is a fragmentary perspective view illustrating a detail of the coupling of FIG. 1 and applicable also to the coupling of FIG. 9, and

FIG. 14 is a front elevational view of a complete manipulating wand, with a suction cleaner attachment coupled thereto, constructed in accordance with the invention and embodying the couplings shown in FIGS. 1 and 9.

Turning now to the drawings in detail, and first to FIG. 14, it will be seen that the invention provides a wand and attachment assembly wherein the wand includes two relatively short cylindrical tubular sections 1 and 2, one end of section 1 being detachably joined to the elbow 3 of a suction cleaner nozzle 4 by means of the coupling illustrated in FIGS. 1–8, and mating ends of sections 1 and 2 being detachably joined together by means of the coupling shown in FIGS. 9–11. Also provided is a curved tubular section 5 having a straight end portion detachably joined at one end to section 2 by means of the coupling illustrated in FIGS. 9–11, the other end of section 5 being connected to the end of the usual flexible hose 6 which extends to the casing of a tank type suction cleaner.

As will be clear from FIG. 1, nozzle 4 is illustrated as a floor brush and is conventional, save for the end portion 7 of elbow 3 connected to wand section 1. End portion 7 is in the form of a plain cylindrical tube presenting a flat, transverse circularly extending end face 8 disposed at right angles to the axis of portion 7. At what can be considered as the top edge of end portion 7 of the elbow, the wall thereof is provided with an outwardly projecting abutment 9 having a flat face directed toward the tip of the end portion and lying in a plane parallel to but spaced from the plane defined by end face 8. At a point diametrically spaced from abutment 9, the wall of elbow portion 7 is provided with a boss 10 which projects outwardly from the wall of portion 7 and also forwardly from end face 8 and has flat, parallel side surfaces 11 and 12, FIG. 4, extending parallel to the axis of portion 7. Boss 10 is provided with a bore extending between side surfaces 11, 12 at right angles thereto, so that the bore extends approximately tangentially

with respect to the cylindrical outer surface of portion 7, said bore being located beyond end face 8 and serving to receive a pivot pin 13 which mounts a lock ring indicated generally at 14.

Lock ring 14 comprises a circularly extending body 15 provided with a pair of spaced outwardly projecting ears 16 which are disposed each in slidable engagement with a different one of the side surfaces 11, 12 of boss 10, ears 16 being provided with coaxial bores, the pivot pin 13, being substantially longer than the width of boss 10, projecting through the bores in ears 16. Such pivotal mounting of ring 14 can be completed by upsetting the ends of pin 13 into fixed engagement with ears 16.

At a point opposed diametrically from boss 10 is an ear 17 which lies in the plane defined by the circularly extending body 15 and projects outwardly in generally radial fashion. At its tip, ear 17 rigidly carries a manipulating tongue 18 which extends generally at right angles to the plane of body 15 from the side thereof facing end face 8 of elbow portion 7. Since tongue 18 projects from the outer end portion of ear 17, the tongue extends along the side of end portion 7 of the elbow and passes above abutment 9. Advantageously, tongue 18 has a transverse cross-section generally in the form of an inverted U, so that the side flanges of the tongue project toward the elbow 3 each on a different side of abutment 9. Ear 17 and body 15 have the same thickness and ear 17 is provided with a socket 19 facing abutment 9. A helical compression spring 20 is provided, one end of spring 20 being disposed within socket 19 and the other end of the spring being seated on the flat face of abutment 9, as will be clear from FIGS. 1 and 3.

The inner surface 21 of body 15, best seen in FIG. 6, extends as a plain cylindrical surface of slightly larger diameter than the outer diameter of tubular section 1 of the wand. Surface 21 is interrupted by a plurality of axially extending grooves 22, one groove being centered with respect to ear 17 and the other grooves being spaced each on a different side thereof by a substantial angular distance, as will be clear from FIG. 2. At its tip, tubular section 1 of the wand has a tapered portion 23, FIGS. 1 and 7 adapted to fit snugly within a large frusto-conical seat 24, FIG. 6, in portion 7 of elbow 3, an interior shoulder 25 being provided to be engaged by the tip of tubular section 1. The portion of tubular section 1 adjacent the tapered tip 23 is of plain cylindrical configuration and, as has been indicated, has an outer diameter materially less than the inner diameter of the circularly extending body 15 of lock ring 14. This portion of tubular section 1 is provided with a radially outwardly protruding, axially extending key 26. Seen in detail in FIG. 13, the key 26 can be formed in the wall of tubular section 1 by an embossing operation and, as shown in FIG. 2, has a width and height slightly less than the width and depth, respectively, of grooves 22. Thus, the tip of tubular section 1 can be seated in portion 7 of elbow 3, with key 26 freely entering any desired one of the three grooves 22. To accomplish such insertion, tubular section 1 is held in one hand, the elbow is held in the other hand and tapered tip portion 23 is inserted into end portion 7, the two parts being relatively rotated to bring key 26 into alignment with the desired one of grooves 22. Before such insertion, spring 20 biases lock ring 14 to the forwardly pivoted position seen in FIG. 7 so that, as the insertion proceeds, the lock ring tends to bind frictionally on the tubular section. However, a relatively small axial force applied on tubular section 1 toward the elbow is effective to compress spring 20, pivoting the lock ring toward the elbow, so that the lock ring occupies the position seen in FIG. 1 when the tip of the tubular section is seated against shoulder 25. In this position, the lock ring lies in a plane at a slight angle with respect to end face 8, so that shoulder portions, indicated at A and B, FIG. 1, frictionally engage the outer surface of the tubular section. In this position, lock ring 14 can be considered to be

pivoted slightly away from the elbow. Withdrawal of the tube tends to pivot the lock ring further in this same direction and so tends to jam the lock ring into tighter engagement with the tubular section. For practical purposes, the effect of this relationship is to prevent withdrawal of the tubular section from the elbow so long as lock ring 14 is not pivoted toward the elbow.

To free the tubular section 1 for withdrawal from the elbow, the thumb or forefinger is applied to manipulating tongue 18, in the manner seen in FIG. 6, pressure on the manipulating tongue toward the body of the elbow being effective to compress spring 20 and pivot the lock ring into engagement with end face 8 of the tubular end portion 7 of the elbow. Since face 8 lies in a plane at right angles to the axis of tubular portion 7, such pivotal movement is effective to bring body 15 of the lock ring into a position in which the plane of body 15 also extends at right angles to the axis of tubular portion 7. It will thus be seen that, when the lock ring occupies the "release" position illustrated in FIG. 6, the inner surface 21 thereof is concentric with the outer surface of tubular section 1. There is accordingly then no bind action between the lock ring and tubular section 1, so that the latter is free for removal from the elbow. After the tubular section 1 has been withdrawn from the lock ring 14 the coil spring 20 becomes effective to move the lock ring to the inclined position shown in FIG. 7. In such inclined position the bottom portion of the lock ring body 15, at its forward edge, is wedged against the top surface of the projection 10, as best illustrated in FIG. 5. Hence, a part of the projection 10 is in the path of movement of the lock ring 14 to arrest movement thereof and limit the extent to which the lock ring can be tilted forward by the biasing action of the coil spring 20.

In FIG. 8, the lock ring 14 is illustrated in solid lines for a typical position occupied thereby during insertion of tubular section 1 into the elbow. In addition, broken line illustrations of the lock ring show the same in the "free" position of FIG. 7, prior to insertion of the tubular section and in the "release" position of FIG. 6.

Elbow 3 is advantageously made by die casting from a suitable aluminum alloy, for example, so that abutment 9 and boss 10 are integral with the elbow. Similarly, lock ring 14 is advantageously made by die casting from a suitable aluminum alloy, for example, body 15, ears 16 and manipulating tongue 18 all being integral. Circularly extending body 15 has a substantial axial thickness adequate to allow socket 19 to be of material depth and grooves 22 to be of such length as to provide adequate cooperation with key 26. Spring 20 is retained in place by the relation between parts 14 and 9 and by the fact that the end of the spring is seated in socket 19. Additionally, it will be noted that the manipulating tongue 18, being of U-shaped transverse cross-section, surrounds the spring.

Now referring to FIGS. 9–11, it will be seen that a coupling having substantially the same features just described with respect to FIGS. 1–8 is employed in accordance with the invention to detachably connect tubular sections 1 and 2. As seen in FIG. 9, tubular section 2 has a tapered, frusto-conical tip portion 23', the portion of section 2 adjacent thereto being of plain cylindrical configuration. The end portion 27 of tubular section 1 opposite tip 23' is slightly enlarged and is of plain cylindrical configuration. At the free tip of portion 27, there is provided a circularly extending outwardly projecting portion 28, as will be clear from FIG. 9. The inner diameter of portion 27 is such as to slidably receive the plain cylindrical portion of tubular section 2 adjacent tip 23'. Portion 28 presents an end face 29 which lies in a plane transverse and at right angles to the axis of tubular section 1.

Struck from the wall of portion 27, at a point spaced axially a small distance from portion 28, is an abutment tongue 30, the main body portion of which lies in a

plane parallel to end face 29 and projects outwardly from portion 27. At a point spaced from the wall of portion 27, the body of abutment tongue 30 is provided with a raised portion 31 which is circular in plan and which is offset toward the plane of end face 29 so as to project from the main body of tongue 30.

At a point diametrically opposite abutment tongue 30, there is secured to the wall of portion 27 a lock ring mounting bracket 32. Bracket 32 is formed of sheet metal and includes a base web 33 of arcuate transverse cross-section, web 33 being secured directly to the wall of portion 27 of tubular section 1, as by riveting at 34, FIG. 11. Base web 33 is angularly offset, away from the wall of portion 27, so that the end thereof adjacent end face 29 clears outwardly projecting portion 28, as will be clear from FIG. 9. Bracket 32 includes a pair of parallel side flanges 35 lying in planes extending parallel to the longitudinal axis of tubular section 1, side flanges 35 being provided with aligned openings adapted to receive the pivot pin 13.

This coupling, like the coupling described with reference of FIGS. 1–8, embodies clamping ring 14 which is in all respects identical with that element as hereinbefore described. Thus, the mounting ears 16 of the clamping ring embrace mounting bracket 32 and lie each in sliding engagement at a different one of the side flanges 35, the lock ring being pivotally retained by pin 13. In this embodiment, the end of spring 20 opposite socket 19 surrounds the projection 31 carried by abutment tongue 30, so that the spring is positively retained at both of its ends. At the proper location, the cylindrical wall of tubular section 2 is provided with a key 26' and in all respects identical to key 26, FIGS. 1 and 13, this key being adapted to be received by any of the three grooves 22 provided in lock ring 14.

From the foregoing, it will be clear that the coupling illustrated in FIGS. 9–11 serves to detachably secure the telescoped ends of tubular sections 1 and 2 in the same fashion hereinbefore described with reference to the coupling shown in FIGS. 1–8. In this connection, it will be noted that the main body portion of tubular section 1 is joined to larger end portion 27 by a short transverse wall portion 36 which serves as an interior shoulder to be engaged by tip portion 23' of tubular section 2 during insertion of the latter.

Referring again to FIG. 14, it will be seen that the end of tubular section 2 opposite tip 23' is connected to curved tubular section 5 by means of a coupling, in all respects identical to that just described with reference to FIGS. 9–11.

The complete wand assembly thus employs the couplings hereinbefore described to securely join the various parts of the assembly in such fashion that, for practical purposes, the tubular sections and the nozzle cannot be detached except by manually manipulating the lock rings 14 to their "release" positions in the manner hereinbefore described. In addition to thus providing for secure attachment of the various parts of the wand assembly, the invention has the advantage of allowing the tubular sections to be connected in various selected angular relations because of the cooperation between keys 26, 26', and grooves 22. Thus, considering FIG. 2, it will be understood that the nozzle 4 will have a normal disposition, which can be termed horizontal, when key 26 is inserted in the intermediate one of the three grooves 22. Insertion of key 26 in one of the end ones of the three grooves 22, however, will provide an angular disposition of the nozzle, assuming that the wand is held in the normal position of use. In this connection, it is to be understood that the key 26 on tube section 1 and the groove 22 in the lock ring of FIG. 9 lie in a single plane containing the longitudinal axis of tube section 1. The key on the tube section 2 and the groove in the lock ring mounted thereon also lie in a common plane containing the longitudinal axis of the tube section. Accordingly, the couplings assure that curved section 5 and elbow 3 lie in a common plane.

It will be observed that, in the embodiment of the invention illustrated, simplicity of both operation and manufacturing is achieved. All lock rings 14 for the assembly seen in FIG. 14 are identical die castings. Tube sections 1 and 2 are identical and the configuration of the tip of section 5 is of course identical with the corresponding end portions of sections 1 and 2, so that forming operations are standardized for these parts. The structures are also constructed for maximum strength commensurate with simplicity and economy. Thus, for example, the simple annular bead 28 is effective to reinforce the tip portion of tube 1 adjacent abutment tongue 30.

It will be understood that various modifications in the structure shown are possible without departing from the scope of the invention. Thus, as seen in FIG. 12, the lock ring, indicated at 14', can be simplified by omission of the manipulating tongue 18 hereinbefore described with reference to FIG. 1. In such event, the lock ring is manually pivoted to "release" position by grasping the inserted tubular section, indicated at 1' in FIG. 12, in one hand and pushing against ear 17' with the thumb. With this construction, the outwardly disposed face of ear 17' can be provided with suitable serrations to allow more positive engagement of the ear by the user's thumb. Similarly, in the construction shown in FIGS. 1 and 9, the outer surface of manipulating tongue 18 can be roughened in any suitable fashion to aid in manipulation thereof.

It will now be understood that an improved coupling has been provided for detachably connecting thin-walled hollow tubular members forming part of a movable cleaning assembly adapted to be connected to a suction cleaner to produce air flow therethrough. The lock ring in each embodiment pivots about an axis adjacent to and beyond the end opening of a hollow thin-walled tubular member and intersects the air passage at a zone removed from the longitudinal axis of the tubular member a radial distance greater than the outer surface of the tubular member at a region thereof removed from the end opening. In FIGS. 1 to 8, for example, the lug 10, ears 16 and pin 13 provide the pivotal connection for the lock ring body 15 which is at a zone a greater radial distance from the longitudinal axis of the tubular portion 7 than the outer surface of the tubular portion 7.

What is claimed is:

1. In a coupling for detachably connecting thin-walled hollow tubular members forming part of a movable cleaning assembly adapted to be connected to a suction cleaner to produce air flow therethrough, a hollow thin-walled tubular member of cylindrical form having an air passage terminating at an end opening, a thin-walled hollow air tube insertable within said tubular member, said air tube having a wall of cylindrical form, a lock ring having an opening substantially equal in size to the air passage, means for pivoting said lock ring about an axis intersecting the air passage adjacent to the end opening, means including a coil spring for biasing said lock ring to a first position at an acute angle to the longitudinal axis of the air passage, said lock ring being manually movable about said pivoting means against the biasing action of said coil spring toward the end opening to a second position where the opening in said lock ring is in alignment with the air passage to permit the insertion of said air tube in said hollow tubular member, the release of said lock ring effecting the locking of the air tube in said hollow tubular member, and the inner surface of said lock ring and the wall of said air tube having coacting parts forming an axially extending tongue and groove fit whereby, when said lock ring is moved about its pivoting means to the second position where the opening therein is in alignment with said air passage, said hollow tubular member will axially receive said air tube when said coacting parts are in axial alignment, said air tube being angularly immovable about its longitudinal axis when inserted in

said tubular member with said coacting parts in axial alignment.

2. In a coupling for detachably connecting thin-walled tubular hollow members forming part of a movable cleaning assembly adapted to be connected to a suction cleaner to produce air flow therethrough, a hollow thin-walled tubular member of cylindrical form having an air passage terminating at an end opening, a lock ring having an opening substantially equal in size to the air passage, means for pivoting said lock ring about an axis which is adjacent to and beyond the end opening and intersects the air passage at a zone removed from the longitudinal axis of said tubular member a radial distance greater than the outer surface of said tubular member, means including a coil spring for biasing said lock ring away from the open end of said tubular member to a first position at an acute angle to the longitudinal axis of the air passage, said lock ring being manually movable about said pivoting means against the biasing action of said coil spring toward the end opening to a second position where the opening in said lock ring is in alignment with the air passage to permit the insertion of a thin-walled air tube in said tubular member, the release of said lock ring effecting the locking of the air tube in said thin-walled tubular member, the outer peripheral edge of said lock ring and said pivoting means and said coil spring being at the immediate vicinity of the outer surface of said thin-walled hollow tubular member and forming a compact bundle of parts about said hollow tubular member, said hollow tubular member at its outer surface having a lug adjacent to and projecting beyond the end opening,

said lock ring and said lug having cooperating apertured parts and a pin therefor comprising said pivoting means, said tubular member at a region removed from the opening having a projection at its outer surface which forms a part of said biasing means, the opposite ends of said coil spring coacting with said projection and said lock ring adjacent to its periphery and extending axially of said tubular member and hugging its outer surface to bias said lock ring to its first position, said lug having a part in the path of movement of said lock ring to arrest movement thereof against the biasing action of said coil spring and hold said lock ring in its first position, and the inner surface of said lock ring and the wall of said air tube having coacting parts forming an axially extending tongue and groove fit whereby, when said lock ring is moved about its pivoting means to the second position where the opening therein is in alignment with said air passage, said hollow tubular member will axially receive said air tube when said coacting parts are in axial alignment, said air tube being angularly immovable about its longitudinal axis when inserted in said tubular member with said coacting parts in axial alignment.

References Cited in the file of this patent

UNITED STATES PATENTS

556,106	Schiele	Mar. 10, 1896
2,634,451	Dow	Apr. 14, 1953
2,819,733	Maisch	Jan. 14, 1958
2,912,260	Wray	Nov. 10, 1959
2,916,305	Sherman	Dec. 8, 1959