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ADAPTER MEANS FOR RELEASABLY CONNECTING TOOLS TO MANIPULATING HANDLES

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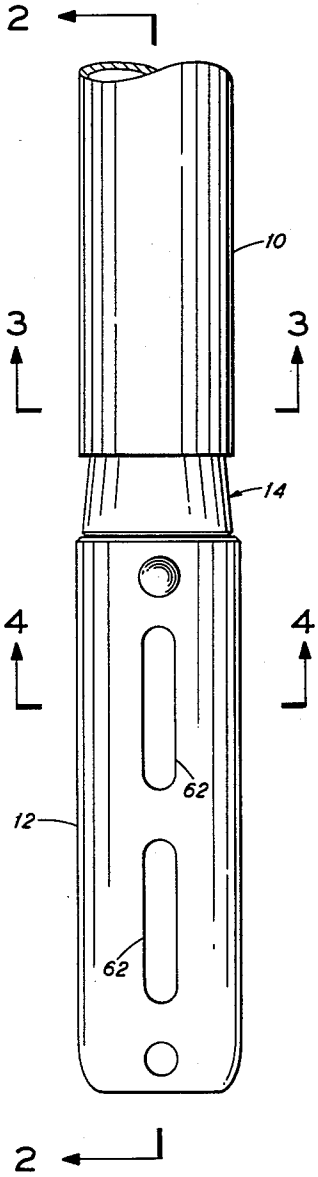


FIG. 1

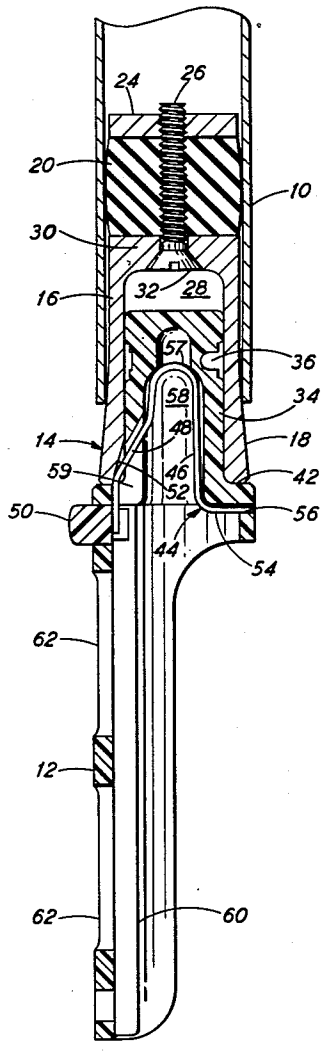


FIG. 2

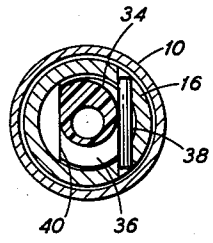


FIG. 3

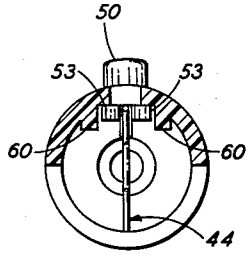


FIG. 4

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This invention relates to tool handles and more particularly to a new adapter by which a tool may be detachably mounted on an elongated tubular handle.

In many situations it is desirable to employ a single tool handle for a plurality of tools. Thus, in the field of cleaning equipment for swimming pools, the cleaning tools employed must be mounted on very long handles when in use, but the provision of a separate long handle for each of the many cleaning tools, brushes, leaf sweepers, etc., is both expensive and creates a substantial storage problem.

Accordingly, it is a principal object of this invention to provide an adapter for detachably connecting a tool to a long, tubular manipulating handle in order that a single handle may be employed for a plurality of tools.

It is another object of this invention to provide such an adapter which may be employed with a variety of tubular handles having different diameters.

It is another object of this invention to provide such an adapter which can be quickly and securely attached to a tool and which may be quickly detached from a tool.

It is another object of this invention to provide such an adapter which may be securely and relatively permanently attached to one end of an elongated tubular handle.

It is another object of this invention to provide such an adapter which may be manufactured simply and inexpensively.

Other objects and advantages of the invention will become apparent from the following description read in conjunction with the attached drawings in which:

FIG. 1 is a plan view of the adapter of this invention as it is employed to connect a tool to an elongated tubular handle;

FIG. 2 is a longitudinal sectional view of the apparatus of FIG. 1;

FIG. 3 is a cross-sectional view of the apparatus of FIG. 2 taken along the lines 3—3 in FIG. 2; and

FIG. 4 is a view in cross-section taken along lines 4—4 in FIG. 1.

Broadly stated this invention comprises an adapter for releasably connecting tools to tool manipulating handles which comprises a body having an outer surface a portion of which is generally frusto-conical in shape, a resilient member mounted on said body on the side of said outer surface adjacent the vertex of said generally frusto-conical surface, mounting means for compressing said resilient member toward said surface while expanding said resilient member in a direction perpendicular to the direction in which it is compressed, and connecting means carried by said body accessible from the end of said body remote from said resilient member for detachably connecting said body to a tool.

Referring now in detail to the drawing, an elongated tubular handle **10** is connected to a tool holder **12** by means of an adapter indicated at **14** in FIG. 1 and illustrated in greater detail in FIGS. 2–4.

The adapter **14** comprises a main body **16** which is generally cylindrical in shape and provided with an outer surface portion **18** which is generally frusto-conical. As illustrated herein surface portion **18** is truly frusto-conical, but its shape may deviate from a true cone; it may be, for instance, frusto-parabolic or frusto-hyperbolic, and, accordingly, the term "generally frusto-conical" is employed herein as denoting surfaces of rotation which diverge axially and radially from a given point on the axis of body **16**. Body **16** extends into the end of tubular handle **10**, with the mouth of handle **10** contacting surface **18**.

A sleeve **20** made of a resilient material is provided in handle **10** on the end of body **16** adjacent the vertex of generally frusto-conical surface **18**. A stop plate **24** is held against the end of sleeve **20** by a screw **26** extending through sleeve **20**. The inner end of body **16** is provided with a flange **30** to retain the head **32** of screw **26** against movement out of body **16**.

Adapter **14** is mounted on handle **10** by: first, loosening screw **26** until sleeve **20** is not under compression, screw **26** being turned by a suitable screw driver inserted in body **16**; second, inserting sleeve **20** and body **16** into tube **10** to the position illustrated in FIG. 2, and then tightening screw **26** to compress sleeve **20** axially and expand it radially so that sleeve **20** firmly grips the inner surface of handle **10**.

The provision of generally frusto-conical surface **18** permits the adapter **14** to be used on tubular handles of different internal diameters while providing a very rigid connection between the handle and the adapter; the fact that handle **10** contacts surface **18** adds rigidity to the connection between the handle and the adapter since such contact prevents relative pivoting of the two members about the center of sleeve **20**.

Tool holder **12** is detachably connected to adapter **14** by means of a shank **34** on tool holder **12** which extends into passageway **28** of body **16**. Shank **34** is provided with a spiral groove **36** in the outer surface thereof, groove **36** lying in a plane perpendicular to the axis of shank **34** and being progressively deeper from one end to the other. Body **16** is provided with a retaining bar **38** extending therethrough spaced radially from the axis of body **16** and spaced axially from screw head **32**. Bar **38** extends through groove **36** retaining shank **34** in passageway **28**. A chordal keyway **40** is provided on shank **34** to provide clearance for bar **38** when body **16** is rotated to a position where bar **38** lies parallel to and adjacent keyway **40**. Tool holder **12** is provided with a shoulder **42** thereon positioned to contact the end of body **16** when tool holder **12** is mounted on body **16**.

Tool holder **12** is attached to body **16** by first aligning shank **34** with passageway **28** with keyway **40** in alignment with bar **38**, inserting shank **34** into passageway **28** and rotating tool holder **12** relative to body **16** until bar **38** is firmly seated in groove **36**. As illustrated in FIG. 3, such firm seating is accomplished by rotation of tool holder **12** about 180° so that attachment of tool **12** to body **16** is accomplished very easily.

Locking means are provided to ensure against undesired relative, i.e., loosening, movement taking place between shank **34** and body **16**, said means comprising a spring **44** having a fixed leg **46**, a movable leg **48**, an operating button **50** against which the movable leg **48** presses, and a slot **52** formed in adapter **14** complemental to a portion of leg **48**. Button **50** is provided with stop members **53** which prevent it from being urged fully out of holder **12**. Spring **44** is anchored in place by means of a laterally extending foot portion **54** which extends into aperture **56** in holder **12**, by means of its bight portion **57** engaging the end of counterbore **58** formed in shank **34**, and by means of leg **48** residing in slot **59** formed in shank **34**.

When shank **34** is turned to tightly engage bar **38** in groove **36**, the movable leg **48** of spring **44** snaps into engagement with slot **52**. When it is desired to disengage shank **34** from body **16**, button **50** is depressed to bring leg **48** out of slot **52** and shank **34** is turned to bring the

chordal keyway **40** into alignment with bar **38**. Shank **34** and body **16** may then be axially separated.

Tool holder **12** is provided with strengthening ribs **60**. It is also provided with slots **62** through which bolts may extend to secure the selected tool, not shown, to holder **12**.

What is claimed is:

1. A tool comprising an elongated tubular handle, an elongated body mounted in said handle and extending from one end of said handle, said body having an outer generally frusto-conical surface portion diverging from and contacting the end of said tube, a resilient sleeve mounted on said body at the end thereof inside said handle, a plate abutting the end of said sleeve remote from said body, a passageway leading into said body from the end thereof outside of said handle, a screw mounted with its head retained in said passageway and its shank threadably engaged in said plate securing said plate to said body with said sleeve compressed therebetween, the outer surface of said compressed sleeve grasping the tubular wall of said handle, and a tool detachably mounted on the end of said body outside of said handle.

2. The tool of claim 1 in which a bar extends through said passageway spaced from the axis of said body and from said head of said screw; said tool comprises a working portion and a shank mounted on said working portion, and said shank is provided with a circumferentially extending retaining notch spaced from the end of said shank with said bar retained in said notch, and an axially extending chordal keyway therein extending from said notch to the end of said shank remote from said working portion providing clearance for said bar when said shank is removed from said passageway.

3. Quick connect and disconnect connector means for a tool whereby said tool may be manipulated comprising a generally cylindrical shank portion connected to said tool, a socket member into which said shank portion may

be complementally fitted, a bar carried transversely within said socket member in offset relation to the longitudinal axis of said socket member, a groove formed peripherally in said shank portion in spaced relation to the terminal end thereof, said shank portion being chordally relieved sufficiently between its terminal end and said groove to enable it to be inserted into said socket member to the point where said bar and groove are aligned and where said bar rides in said groove upon subsequent relative rotation between said socket member and said shank portion, said groove being progressively deeper from one end to the other whereby relative rotation in one direction between said socket member and shank portion will tightly bind said bar within said groove.

4. The combination of claim 3 including stop means formed on one of said socket member and shank portion limiting movement of said shank portion inwardly of said socket member to the point where said bar is in alignment with said groove.

5. The combination of claim 3 including complemental locking means carried by said shank portion and socket member operable to positively interlock said shank portion and socket member together when said bar is in relatively tightly binding engagement with said groove.

6. The combination of claim 5 including means accessibly mounted on one of said shank portion and socket member whereby said complemental locking means may be disengaged to enable loosening movement of said shank portion within said socket member.

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