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(54) RETROFIT SYSTEM FOR TETHERING A HAND TOOL

NACHRÜSTSYSTEM ZUM ANBINDEN EINES HANDWERKZEUGS

SYSTÈME DE RATTRAPAGE D'ATTACHE D'OUTIL À MAIN

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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates generally to hand tools. Particularly, the present invention relates to hand tools and tethering of the same.

2. Description of the Prior Art

[0002] It is a generally accepted safety practice to secure a workman's tools in some manner when working from a ladder or above ground level. Over the years different types of devices for preventing the accidental dropping and/or loss of a tool and a tool accessory have been attempted when working in overhead situations. A dropped tool or tool accessory could be hazardous for personnel working below or the dropped tool or tool accessory could potentially damage a vital piece of equipment. This can occur when the tool is mishandled, bumped, or jarred, becoming dislodged from the users hand and free to fall to whatever is beneath the worker. In some cases, this can be a passerby, another worker or even vital plant equipment.

[0003] Typically, the tools are secured to the worker with a tether or in a holster of some sort. Generally, tethers are lightweight, optionally retractable, and have light duty snap hooks at each end for snap connection to the tool and to the worker's belt or harness. Some such tethers even use plastic snaps. In some cases a loop is formed around the worker's wrist with the free end having a snap connectable to a tool. Others have disclosed the use of hook and loop type fasteners to secure the tool to the worker's hand. The use of such safety tethers and lanyards is becoming increasingly necessary, especially in industrial centers where workers are constantly exposed to the hazards of falling tools, sometimes from many feet.

[0004] Many attempts have been made to secure tools to tethers and users. Some are successful and easy to use while others are makeshift and lack the quality needed to sustain heavier tools. Devices have been created to allow for lanyard attachment to hand tools. Some devices include using eye hooks, or D-rings with webbing secured by tape or heat shrink tubing. Other devices are tubular and used over the butt end of screw drivers and other tools with handles such as, for example, pliers, hammers, cutters, etc. These tubular devices are normally heat shrinkable onto the tool or are self-insertable device made of a resilient material that provides a suction force when the tool handle or butt end is inserted into the tubular device. The suction force created upon insertion of the tool into the tubular device prevents the tool from being easily pulled out or separated from the tubular device.

[0005] One such device is a bracelet type tool drop

preventing device disclosed in Japanese Patent Application JP08-108538 and published as JP09-272077. Drawing 5 of the Japanese patent application discloses a screwdriver with a rotary ring that is attached to the screwdriver using a rubber stopper.

[0006] In some cases, provisions are made on the tool itself for making such attachments. In most cases when tools are provided with an eyelet, however, it is typically provided as a means for storing on a wall hook or the like.

[0007] Therefore, what is needed is a system that will retrofit a hand tool for coupling to a tool lanyard or tether.

SUMMARY OF THE INVENTION

[0008] Currently available retrofit systems are tubular devices that typically use an eyelet secured to the tool intended to be tethered. There are disadvantages to these tubular retrofit systems. The eyelet is always attached to the non-working end of the tubular device or the tool. For example, when used on screw drivers, the eyelet interferes with the full usefulness of the tool. With most screw drivers, the butt end is designed to fit in the palm of the user's hand to allow the user to press down while tightening or loosening a screw. If the eyelet is at the end of the tool, this cannot be accomplished successfully. This is also true for other types of tools such as pliers, hammers, other hand tools, and the like where the palm of the user's hand grips the end of the tool to apply gripping pressure and/or transfer greater impacting force through the tool. For tubular devices relying on the suction caused by insertion of the tool into the tubular, flexible material, another disadvantage arises. For these devices, the suction force holding the tool such as a screw driver to the tethering device may be abruptly relieved when attempting to pull/remove the screw driver from the tethering device. This abrupt release causes the tool to quickly release with accelerating force due to the amount of force required to pull the screw driver or other tool necessary to counter the suction force created when applying the tubular device to the tool. If a tool has a sharp end such as most screw drivers, the user/worker and/or bystander could be injured. In screwdriver devices using a rotary ring with a rubber stopper, such devices suffer from various disadvantages. For instance, the rubber stopper must be of a low enough durometer to allow sliding the stopper to a position adjacent the handle. Unfortunately, this also allows the rubber stopper to be pulled off either intentionally or inadvertently, which would cause the screwdriver to become separated from the tethering device. The use of a rubber stopper having sufficient durometer to prevent the stopper from being inadvertently removed from the screwdriver, however, makes it practically impossible to manually apply the rubber stopper onto the screwdriver and move it to the proper position on the screwdriver.

[0009] It is an object of the present invention to provide a retrofit system for tethering a tool. It is another object of the present invention to provide a retrofit system for

tethering a tool that allows for the full intended use of the tool. It is a further object of the present invention to provide a retrofit system for tethering a tool that minimizes the entanglement of the tool lanyard with the tool during use. It is another object of the present invention to allow manual installation of the retrofit system onto a hand tool.

[0010] The present invention achieves these and other objectives by providing a retrofit system with the features of claim 1 that includes a tool collar and a tethering tab.

[0011] The collar body may be longer than the skirt.

[0012] The second tab opening of the tethering tab may be spaced from the first tab opening a predefined distance sufficient to position the second tab opening beyond the largest cross-section of the tool collar when the tool collar and the tethering tab are connected to the hand tool to be tethered.

[0013] The second body end of the tool collar may have a flange extending axially with the bore having a diameter smaller than the first tab opening of the tethering tab and a length greater than the thickness of the tethering tab.

[0014] The tool collar may be made of a resilient material and the tethering tab is made of a rigid or semi-rigid material.

[0015] The tool collar may be made of a rigid or semi-rigid material with a bore liner or coating made of a resilient material.

[0016] The tool collar may be made of a material having a Shore A hardness selected from the group consisting of a range of about 20 to about 45, a range of about 25 to about 40, a range of about 25 to about 35, and a range of about 30 to about 35.

[0017] The collar body and the skirt may have a length ratio of collar body to skirt of about 0.5:1 or greater.

[0018] The collar body and the skirt may have a length ratio of the collar body to the skirt selected from the group consisting of 1:1, 2:1, 3:1, 4:1, and greater than 4:1.

[0019] The skirt may have a thickness in a range of about 0.06 inches (1.52 mm) to about 0.2 inches (5.08 mm).

[0020] The collar body may have a wall thickness in a range of about 0.0625 inches (1.59 mm) to about 0.175 inches (4.45 mm).

[0021] A junction of the collar body and the skirt may have a radius selected from the group consisting of about 0.08 inches (2.03 mm) to about 0.1 inches (2.54 mm), about 0.089 inches (2.26 mm) to about 0.099 inches (2.51 mm), and 0.094 inches (2.38 mm). The radius provides for improved resistance to tearing with manually applying the tool collar to a hand tool.

[0022] It is understood that the selection of a tool collar dimensional characteristic is dependent on the size of the tool on which the retrofit system is applied. In other words, the tool diameter must be slightly larger than the bore of the collar body of the present invention. For example, a tool collar with a 0.031 inch diameter bore may be used on a tool diameter in the range of about 0.035 inches to about 0.094 inches.

[0023] A retrofit kit for tethering a hand tool may include

a tool collar made of a resilient material, a tethering tab and instructions for assembling the tool collar and the tethering tab to the hand tool. The tool collar has a collar body, a first body end, a second body end, a skirt at the second body end that has an outer diameter larger than an outer diameter of the collar body, and a bore extending between the first body end and the second body end, the bore having a cross-sectional area that is less than the cross-sectional area of a first tool portion of the hand tool providing a snug fit of the tool collar on the first tool portion, the tool collar being made of a material having a Shore A hardness in the range of about 20 to about 50

[0024] In a further embodiment of the present invention, a method of retrofitting a hand tool for use with a tool lanyard is disclosed with the features of claim 13.

[0025] The method may further include forcibly sliding a tool collar along the first tool portion before the step of sliding the tethering tab to a position on the first tool portion beyond but adjacent to the predefined distance described in the step of sliding the tethering tab.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026]

FIGURE 1 is a perspective view of one embodiment of the present invention retrofit to a screw driver.

FIGURE 1A is a perspective view of the embodiment in Fig. 1 showing the present invention with the tool collar removed to illustrate the tethering tab on the first tool portion.

FIGURE 2 is a perspective view of one embodiment of a tool collar illustrated in Fig. 1.

FIGURE 2A is an enlarged, partial perspective view of the first body end of the tool collar showing the liner in the bore of the tool collar when the tool collar is made of a rigid or semi-rigid material.

FIGURE 3 is a side view of the embodiment of the tool collar illustrated in Fig. 2 showing a tapered elongated collar body.

FIGURE 4 is a rear view of the tool collar illustrated in Fig. 2 showing the recess into the collar body from the second collar end.

FIGURE 5 is a side view of another embodiment of the tool collar of the present invention.

FIGURE 6 is a side view of another embodiment of a tool collar of the present invention showing a straight elongated collar body.

FIGURE 7 is a perspective view of one embodiment of a tethering tab illustrated in Fig. 1.

FIGURE 8 is a front view of the embodiment of the tethering tab illustrated in Fig. 5.

FIGURE 9 is a perspective view of another embodiment of the present invention retrofit to a pair of pliers showing use of two tool collars.

FIGURE 10 is a plan view of one example of a retrofit system kit for tethering a hand tool.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0027] The preferred embodiment(s) of the present invention is illustrated in Figs. 1-10. Figure 1 illustrates one embodiment of a retrofit system 10 of the present invention connected to a hand tool 1. Retrofit system 10 includes a tool collar 20 and a tethering tab 40. As illustrated, tethering tab 40 is mounted on a first tool portion 2 adjacent a second tool portion 3 of hand tool 1. In Fig. 1, hand tool 1 is represented by a screw driver. Tethering tab 40 freely rotates around first tool portion 2, which is indicated by arrows A. Figure 1A shows tethering tab 40 without tool collar 20 on hand tool 1 to more clearly show the rotational relationship between tethering tab 40 and first tool portion 2. When a lanyard/tether (not shown) is connected to tethering tab 40, the free rotation of tethering tab 40 around first tool portion 2 does not interfere with the use of hand tool 1. The freely rotating tethering tab 40 permits rotation of hand tool 1 when inserting or removing a screw fastener (not shown) without causing the lanyard/tether to twist or tangle on itself or with/around hand tool 1. Furthermore, a user will typically apply force using the palm of the hand to the end of second working portion 3 (also known as the handle of the screw driver) of hand tool 1 while tightening or loosening a screw fastener. The present invention permits full use of the tool without interference with such use.

[0028] Figure 2 illustrates a perspective view of one embodiment of tool collar 20. In this embodiment, tool collar 20 has a collar body 22, a first body end 24, a second body end 26, a skirt 30 at second body end 26 that has an outer diameter larger than an outer diameter of collar body 22 and a bore 28 extending longitudinally therethrough. As shown in Fig. 2, skirt 30 preferably extends transversely away from the circumference of second body end 26. Bore 28 has a cross-sectional area that is less than the cross-sectional area of first tool portion 2 of hand tool 1 providing a snug fit of tool collar 20 on first tool portion 2. Skirt 30 extends a predefined distance to provide a larger cross-sectional area at second body end 26 for retaining tethering tab 40 on first tool section 2 of hand tool 1.

[0029] Figure 3 illustrates a side view of tool collar 20 shown in Fig. 2. As can be seen, bore 28 extends through the entire length of tool collar 20. Second body end 26 may optionally include a recess 32 forming a tapered opening 33 that is axially aligned with bore 28. Optional tapered opening 33 facilitates centering of the first tool portion 2 into bore 28 when tool collar 20 is forcibly slid onto first tool portion 2 from second from end 26. This is more clearly shown in Figure 4, which is rear view of tool collar 20. Tool collar 20 is preferably made of a resilient material but may also be made of a rigid or semi-rigid material so long as bore 28 has a layer or insert or liner 29 of a resilient material securely attached to bore 28 to provide a snug fit between tool collar 20 and first tool portion 2. Fig. 2A illustrates an enlarged view of first body

end 24 showing the liner 29. Examples of acceptable materials include rubber, silicone and materials having the same or similar resilient characteristics.

[0030] Figure 5 illustrates a side view of another embodiment of tool collar 20. In this embodiment, tool collar 20 includes a collar body 22, a first body end 24, a second body end 26, and a bore 28 extending longitudinally therethrough. Like the tool collar shown in Fig. 2, bore 28 has a cross-sectional area that is less than the cross-sectional area of first tool portion 2 of hand tool 1 providing a snug fit of tool collar 20 on first tool portion 2. Tool collar 20 may optionally also include a skirt 30 that extends transversely away from the circumference of second body end 26. Skirt 30 extends a predefined distance to provide a larger cross-sectional area at second body end 26 for retaining tethering tab 40 on first tool section 2 of hand tool 1. Also provided in this embodiment is an optional flange 34. Optional flange 34 extends longitudinally from second body end 26 and has a length greater than the thickness of tethering tab 40.

[0031] Figure 6 illustrates a side view of another embodiment of tool collar 20. In this embodiment, tool collar 20 has a straight, elongated collar body 22. This configuration reduces the amount of material used in tool collar 20 but may provide the transition point or junction between skirt 30 and collar body 22 with less strength. This becomes important when the force applied to tool collar 20 for seating tool collar to the predefined location on first tool portion 2 is applied to skirt 30 instead of collar body 22. Depending on the amount of force applied to skirt 30 and the amount of resistance caused by the snug fit of bore 28 around first tool portion 2, this transition point or junction could tear.

[0032] Tool collar 20 is made of a semi-rigid and resilient material. Preferably, the material is a silicone rubber material. To provide a sufficient gripping characteristic of tool collar 20 to a hand tool to prevent inadvertent or accidental removal of tool collar 20 from the hand tool yet be capable of manual installation of tool collar 20 onto the hand tool, tool collar 20 is made of a material having a hardness on the Shore A scale in a range of about 20 or greater and about 50 or lower. Preferably, the material has a Shore A hardness in a range selected from 20 to about 45, from about 25 to about 40, from about 25 to about 35, and, more preferably, from about 30 to about 35. Most preferably, the tool collar is made of a material having a Shore A hardness of 35.

[0033] Most importantly, it was discovered that when a tool collar having a size and shape similar to that disclosed in Figure 5 of Laid-Open Japanese Patent Application No. JP09-272077, the Shore A hardness must be less than 20 and typically in the range of about 10 to about 15 in order to be able to manually slide the tool collar onto the screwdriver shown in Fig. 5. A disadvantage of such a tool collar was the ease with which the tool collar could be removed. A tool that is accidentally or inadvertently dropped attached with such a tool collar has a higher probability that the stress imparted against

the tool collar from the falling weight of the tool would be sufficient to pull the tool collar off. This creates a safety hazard for anyone or any equipment below the dropped tool. When a tool collar was made with a Shore A hardness of 20 or higher and having a similar shape as that disclosed in JP09-272077, it was impossible to manually apply the tool collar to the screw driver. The hardness of the material and the wall thickness of the tool collar prohibited its manual application onto the screwdriver.

[0034] Skirt 30 also has a preferred range for the thickness of the peripheral edge of skirt 30. Preferably, skirt 30 has a peripheral edge thickness in a range of about 0.062 inches (1.57 mm) to about 0.15 inches (3.81 mm).

[0035] The junction or transition point between collar body 22 and skirt 30 preferably has radius in a range of about 0.08 inches (2.03 mm) to about 0.1 inches (2.54 mm), in a range of about 0.089 inches (2.26 mm) to about 0.099 inches (2.51 mm), and of about 0.094 inches (2.38 mm).

[0036] The wall thickness of collar body 22, the length ratio of collar body 22 to skirt 30 as well as the thickness of skirt 30 are also important. The wall thickness of collar body 22 is preferably in the range of about 0.06 inches (1.52 mm) to about 0.2 inches (5.08 mm). Preferably, the wall thickness of collar body 22 is in a range of about 0.0625 inches (1.59 mm) to about 0.175 inches (4.45 mm). The length ratio of collar body 22 to skirt 30 is in the range of about 0.5 to 1 or greater. Preferably, the length ratio is selected from a range of about 1 to 1, 2 to 1, 3 to 1, 4 to 1, and greater than 4 to 1.

[0037] Figures 7 and 8 illustrate one embodiment of tethering tab 40. Tethering tab 40 includes a tab body 42 with a first tab end 43 and a second tab end 45, a first tab opening 44 and a second tab opening 46 where tab openings 44, 46 are transverse to the longitudinal axis B-B of tethering tab 40. Second tab opening 46 is spaced from first tab opening 44 and both tab openings 44, 46 extend completely through tab body 42. First tab opening 44 has a cross-sectional area larger than the cross-sectional area of first tool portion 2 to provide for free rotation of tethering tab 40 around first tool portion 2. Second tab opening 46 is spaced from second tab end 45 providing a retaining edge 47 around which a tether clip (not shown) is attached. The size of first tab opening 44 to second tab opening 46 is dependent on the diameter of first tool portion 2 and the size of the tether clip. Although tethering tab 40 shown in Figs. 7 and 8 have semi-circularly shaped first and second tab ends 43 and 45, respectively, it is contemplated that the shape of first and second tab ends 43, 45 may be any configuration so long as tethering tab 40 can be used for its intended purpose. The intended purpose being that tethering tab 40 is connectable to a first tool portion 2 and can freely rotate about first tool portion 2 while presenting a second tab end 45 for attachment to the clip of a tool tether. It is also contemplated that the peripheral shape of tethering tab 40 may also have any configuration so long as tethering tab 40 can be used for its intended purpose. Tethering tab 40 is

made of a rigid or semi-rigid material. Examples of such materials are metal, plastic and the like.

[0038] For tools that offer an abrupt change in cross-sectional area between first tool portion 2 and second tool portion 3, only one tool collar 20 is necessary so that tethering tab 40 is "sandwiched" between second collar end 26 and second tool portion 3. For tools that do not have an abrupt change in cross-sectional area between first tool portion 2 and second tool portion 3, a second tool collar 20 is used to "sandwich" tethering tab 40 therebetween. Figure 9 illustrates one example of a tool that may require two tool collars 20. As can be seen, second collar ends 26 are opposed to each other with tethering tab 40 therebetween. In this embodiment, tethering tab 40 also freely rotates around first tool portion 2.

[0039] Figure 10 illustrates a plan view of a kit containing the retrofit system 10 of the present invention. The kit contains one or more tool collars 20, a tethering tab 40 and instructions 60 for attaching the one or more tool collars 20 and the tethering tab 40 to a hand tool.

[0040] To use the present invention, a hand tool 1 that is not equipped to be attached to a tool lanyard but is to be retrofitted for attaching a tool lanyard is provided. For a hand tool that has an abrupt change in cross-sectional area between a first tool portion 2 and a second tool portion 3 such as, for example, a screw driver, first tab opening 44 of tethering tab 40 is slid onto first tool portion 2 up to and adjacent to second tool portion 3. Next, bore 28 of second body end 26 of tool collar 20 is forcibly slid onto first tool portion 2 to a predefined distance adjacent tethering tab 40 so as to permit tethering tab 40 to freely rotate around first tool portion 2. The snug fit of tool collar 20 prevents tethering tab 40 from sliding off of first tool portion 2.

[0041] For a hand tool that does not have an abrupt change in cross-sectional area between a first tool portion 2 and a second tool portion 3 such as, for example, a pair of pliers, a bore 28 of a first body end 24 of tool collar 40 is forcibly slid onto first tool portion 2 to a predefined distance. Next, first tab opening 44 of tethering tab 40 is slid onto first tool portion 2 up to and adjacent to second body end 26 of tool collar 20 that was already installed on first tool portion 2. Next, bore 28 of second body end 26 of another tool collar 20 is forcibly slid onto first tool portion 2 to a predefined distance adjacent tethering tab 40 so as to permit tethering tab 40 to freely rotate around first tool portion 2 between the first tool collar 20 and the second tool collar 20. The snug fit of the first and second tool collars 20 prevents tethering tab 40 from sliding off of first tool portion 2.

[0042] Although the preferred embodiments of the present invention have been described herein, the above description is merely illustrative. Further modification of the invention herein disclosed will occur to those skilled in the respective arts and all such modifications are deemed to be within the scope of the invention as defined by the appended claims.

Claims

1. A retrofit system (10) for tethering a hand tool (1), the system (10) comprising:

a tool collar (20) having a collar body (22), a first body end (24), a second body end (26), and a bore (28) extending longitudinally therethrough, the bore (28) having a cross-sectional area that is less than a cross-sectional area of a first tool portion (2) of the hand tool (1) and providing a snug fit of the tool collar (20) on the first tool portion (2); and

a tethering tab (40) having a first tab opening (44) and a second tab opening (46) transverse to a longitudinal axis (β - β) of the tethering tab (40), the second tab opening (46) being spaced from the first tab opening (44), the first tab opening (44) having a cross-sectional area larger than the cross-sectional area of the first tool portion (2) providing for free rotation of the tethering tab (40) around the first tool portion (2);

characterized in that

the tool collar (20) has a skirt (30) at the second body end (26) that extends a predefined distance transversely away from the collar body (22),

wherein the skirt (30) of the tool collar (20) has a larger cross-sectional area at the second body end (26) than the first tab opening (44) of the tethering tab (40) to retain the tethering tab (40) on the first tool portion (2) while permitting the free rotation of the tethering tab (40) around the first tool portion (2).
2. The system (10) of claim 1, wherein the tool collar (20) is made of a material having a Shore A hardness in the range of about 20 to about 50.
3. The system (10) of any one of claims 1 or 2, wherein the second tab opening (46) is spaced from the first tab opening (44) a predefined distance sufficient to position the second tab opening (46) beyond the largest cross-section of the tool collar (20) when the tool collar (20) and the tethering tab (40) are connected to the tool (1) to be tethered.
4. The system (10) of any one of claims 1 to 3, further comprising a flange (34) at the second body end (26) extending axially with the bore (28) and having a diameter smaller than the first tab opening (44) of the tethering tab (40) and a length greater than the thickness of the tethering tab (40).
5. The system (10) of any one of claims 1 to 4, wherein the tool collar (20) is made of a resilient material having a Shore A hardness selected from the group consisting of a range of about 20 to about 45, a range of about 25 to about 40, a range of about 25 to about 35, and a range of about 30 to about 35.
6. The system (10) of any one of claims 1 to 5, wherein the tool collar (20) is made of a resilient material having a Shore A hardness of about 35.
7. The system (10) of any one of claims 1 to 6, wherein the collar body (22) and the skirt (30) have a length ratio of collar body to skirt of about 0.5:1, 1:1, 2:1, 3:1, 4:1, and greater than 4:1.
8. The system (10) of any one of claims 1 to 7, wherein the collar body (22) has a wall thickness in a range of about 0.0625 inches (1.59 mm) to about 0.175 inches (4.45 mm).
9. The system (10) of any one of claims 1 to 8, further comprising a junction of the collar body (22) and the skirt (30) wherein the junction has a radius selected from the group consisting of about 0.08 inches (2.03 mm) to about 0.1 inches (2.54 mm), about 0.089 inches (2.26 mm) to about 0.099 inches (2.51 mm), and 0.094 inches (2.38 mm).
10. The system (10) of any one of claims 1 to 9, wherein the tool collar (20) is made of a rigid or semi-rigid material and contains a liner fixed in the bore.
11. The system (10) of any one of claims 1 to 10, wherein the tethering tab (40) is made of a material selected from the group consisting of metal, plastic and composite.
12. The system (10) of any one of claims 1 to 11, further comprising a second tool collar (20) for placement wherein the tethering tab (40) is between the tool collar (20) and the second tool collar (20).
13. A method of retrofitting a hand tool (1) for use with a tool lanyard, the method comprising:

providing a hand tool (1) having a first tool portion (2) and a second tool portion (3);

providing a tethering tab (40) and a tool collar (20) of a retrofit system (10) for tethering a tool (1), the tool collar (20) having a collar body (22), a first body end (24), a second body end (26), and a bore (28) extending between the first body end (24) and the second body end (26), the bore (28) having a cross-sectional area that is less than the cross-sectional area of a first tool portion (2) of the hand tool (1) providing a snug fit of the tool collar (20) on the first tool portion (2), to retain the tethering tab (40) on the first tool portion (2) while permitting the free rotation of the tethering tab (40) around the first tool portion (2);

sliding the first tab opening (44) of the tethering tab (40) over a first tool portion (2) of the hand tool (1) to a predefined position on the first tool portion (2);

forcibly attaching the tool collar (20) to the first tool portion (2) of the hand tool (1) by inserting the first tool portion (2) into the bore (28) at the second body end (26) of the tool collar (20); and forcibly sliding the tool collar (20) a predefined distance along the first tool portion (2) until the second body end (26) of the tool collar (20) is adjacent the tethering tab (40) and positioned to permit the free rotation of the tethering tab (40) about the first tool portion (2),

characterized in that

the tool collar (20) has a skirt (30) at the second body end (26) that has an outer diameter larger than an outer diameter of the collar body (22), wherein the skirt (30) of the tool collar (20) has a larger cross-sectional area at the second body end (26) than a first tab opening (44) of the tethering tab (40).

14. The method of claim 13, further comprising forcibly sliding a second tool collar (20) along the first tool portion (2) before the tethering tab sliding step to a position on the first tool portion (2) beyond but adjacent to the predefined distance in the tethering tab sliding step.
15. The method of claims 13 or 14, further comprising selecting a material for the tool collar (20) having a Shore A hardness in the range of about 20 to about 50.

Patentansprüche

1. Nachrüstsystem (10) zum Fixieren eines Handwerkzeuges (1), wobei das System (10) folgendes umfasst:

einen Werkzeugaufsatz (20), der einen Aufsatzkörper (22), ein erstes Körperende (24), ein zweites Körperende (26) und eine Bohrung (28) aufweist, welche sich der Länge nach durch den Aufsatzkörper (22) erstreckt, wobei die Bohrung (28) eine geringere Querschnittfläche aufweist als die Querschnittfläche eines ersten Werkzeugteils (2) des Handwerkzeuges (1) und für einen festen Halt des Werkzeugaufsatzes (20) auf dem ersten Werkzeugteil (2) sorgt; und eine Fixierlasche (40), welche eine erste Laschenöffnung (44) und eine zweite Laschenöffnung (46) aufweist, welche jeweils quer zur Längsachse (β - β) der Fixierlasche (40) verlaufen, wobei die zweite Laschenöffnung (46) von der ersten Laschenöffnung (44) beabstandet ist,

wobei die erste Laschenöffnung (44) eine größere Querschnittfläche aufweist als die Querschnittfläche des ersten Werkzeugteils (2), um eine freie Drehung der Fixierlasche (40) um den ersten Werkzeugteil (2) des Werkzeuges (1) zu ermöglichen;

dadurch gekennzeichnet,

dass der Werkzeugaufsatz (20) eine am zweiten Körperende (26) befindliche Schürze (30) besitzt, welche sich über eine vorgegebene Entfernung in Querrichtung weg vom Aufsatzkörper (22) erstreckt,

wobei die Querschnittfläche der Schürze (30) am zweiten Körperende (26) größer als die erste Laschenöffnung (44) der Fixierlasche (40) ist, um die Fixierlasche (40) auf dem ersten Werkzeugteil (2) zu halten, während die freie Drehung der Fixierlasche (40) um den ersten Werkzeugteil (2) ermöglicht wird.

2. System (10) nach Anspruch 1, bei welchem der Werkzeugaufsatz (20) aus einem Material mit einer Shore-A-Härte im Bereich von etwa 20 bis etwa 50 hergestellt ist.
3. System (10) nach einem der Ansprüche 1 oder 2, bei welchem die zweite Laschenöffnung (46) um einen vordefinierten Abstand von der ersten Laschenöffnung (44) beabstandet ist, welcher ausreichend ist, um die zweite Laschenöffnung (46) jenseits der größten Querschnittfläche des Werkzeugaufsatzes (20) zu positionieren, wenn der Werkzeugaufsatz (20) und die Fixierlasche (40) mit dem zu fixierenden Werkzeug (1) verbunden werden.
4. System (10) nach einem der Ansprüche 1 - 3, welches weiter einen Flansch (34) am zweiten Körperende (26) umfasst, welcher sich in axialer Richtung mit der Bohrung (28) erstreckt und einen Durchmesser aufweist, der kleiner ist als der der ersten Laschenöffnung (44) der Fixierlasche (40), und eine Länge aufweist, die größer ist als die Dicke der Fixierlasche (40).
5. System (10) nach einem der Ansprüche 1 - 4, bei welchem der Werkzeugaufsatz (20) aus einem elastischen Material hergestellt ist, welches eine Shore-A-Härte aufweist, die aus der Gruppe ausgewählt ist, die besteht aus: einem Bereich von etwa 20 bis etwa 45, einem Bereich von etwa 25 bis etwa 40, einem Bereich von etwa 25 bis etwa 35, und einem Bereich von etwa 30 bis etwa 35.
6. System (10) nach einem der Ansprüche 1 - 5, bei welchem der Werkzeugaufsatz aus einem elastischen Material mit einer Shore-A-Härte von etwa 35 hergestellt ist.

7. System (10) nach einem der Ansprüche 1 - 6,
bei welchem das Längenverhältnis des Aufsatzkörpers (22) in Bezug auf die Schürze (30) von etwa 0,5:1, 1:1, 2:1, 3:1, 4:1, oder größer als 4:1 beträgt. 5
8. System (10) nach einem der Ansprüche 1 - 7,
bei welchem der Aufsatzkörper (22) eine Wandstärke im Bereich von 0,0625 Zoll (1,59 mm) bis 0,175 Zoll (4,45 mm) aufweist. 10
9. System (10) nach einem der Ansprüche 1 - 8,
weiter umfassend eine Verbindung des Aufsatzkörpers (22) mit der Schürze (30), wobei die Verbindung einen Radius aufweist, der aus der Gruppe ausgewählt ist, die aus folgendem besteht: einem Radius zwischen etwa 0,08 Zoll (2,03 mm) bis etwa 0,1 Zoll (2,54 mm), etwa 0,089 Zoll (2,26 mm) bis etwa 0,099 Zoll (2,51 mm) und 0,094 Zoll (2,38 mm). 15
10. System (10) nach einem der Ansprüche 1 - 9,
bei welchem der Werkzeugaufsatz (20) aus einem starren oder halbstarren Material besteht und eine in der Bohrung fixierte Auskleidung besitzt. 20
11. System (10) nach einem der Ansprüche 1 - 10,
bei welchem die Fixierlasche (40) aus Material besteht, welches aus der Gruppe ausgewählt ist, die aus folgendem besteht: Metall, Kunststoff, Verbundstoff. 25
12. System (10) nach einem der Ansprüche 1 - 11,
welches weiter einen zweiten Werkzeugaufsatz (20) umfasst, wobei die Fixierlasche (40) zwischen dem ersten Werkzeugaufsatz (20) und dem zweiten Werkzeugaufsatz (20) platziert werden kann. 30
13. Verfahren zum Nachrüsten eines Handwerkzeugs (1), um es mit einer Abzugsleine zu verwenden, wobei das Verfahren Folgendes umfasst: 35

Bereitstellen eines Handwerkzeugs (1) mit einem ersten Werkzeugteil (2) und einem zweiten Werkzeugteil (3);
Bereitstellen einer Fixierlasche (40) und eines Werkzeugaufsatzes (20) eines Nachrüstsystems (10) zum Fixieren eines Werkzeugs (1) wobei der Werkzeugaufsatz (20), der einen Aufsatzkörper (22), ein erstes Körperende (24), ein zweites Körperende (26) und eine Bohrung (28) aufweist, welche sich zwischen dem ersten Körperende (24) und dem zweiten Körperende (26) erstreckt, wobei die Bohrung (28) eine geringere Querschnittfläche aufweist als die Querschnittfläche eines ersten Werkzeugteils (2) des Handwerkzeugs (1) und für einen festen Halt des Werkzeugaufsatzes (20) auf dem ersten Werkzeugteil (2) sorgt, um die Fixierlasche (40) an dem ersten Werkzeugteil (2) zu halten, während

die freie Drehung der Fixierlasche (40) um den ersten Werkzeugteil (2) ermöglicht wird;
Schieben einer ersten Laschenöffnung (44) der Fixierlasche (40) über den ersten Werkzeugteil (2) des Handwerkzeugs (1) bis zu einer vorgegebenen Position auf dem ersten Werkzeugteil (2);
unter Kraftausübung erfolgendes Anbringen des Werkzeugaufsatzes (20) an dem ersten Werkzeugteil (2) des Handwerkzeugs (1), indem der erste Werkzeugteil (2) in die Bohrung (28) am zweiten Körperende (26) des Werkzeugaufsatzes (20) eingeschoben wird;
unter Kraftausübung erfolgendes Schieben des Werkzeugaufsatzes (20) um eine vorgegebene Entfernung entlang des ersten Werkzeugteils (2) bis das zweite Körperende (26) des Werkzeugaufsatzes (20) neben der Fixierlasche (40) liegt und so positioniert ist, dass die freie Drehung der Fixierlasche (40) um den ersten Werkzeugteil (2) ermöglicht wird,
dadurch gekennzeichnet,
dass der Werkzeugaufsatz (20) eine Schürze (30) am zweiten Körperende (26) aufweist, welche einen größeren Außendurchmesser aufweist, als der Außendurchmesser des Aufsatzkörpers (22) hat,
wobei die Querschnittfläche der Schürze (30) am zweiten Körperende (26) größer ist als die Querschnittfläche der ersten Laschenöffnung (44) der Fixierlasche (40).

14. Verfahren nach Anspruch 13,
welches weiter beinhaltet, dass durch Kraftausübung vor dem Schritt zum Verschieben der Fixierlasche ein zweiter Werkzeugaufsatz (20) entlang des ersten Werkzeugteils (2) bis zu einer Position auf dem ersten Werkzeugteil (2) verschoben wird, welche jenseits der in dem Schritt zum Verschieben der Fixierlasche vorgegebenen Entfernung liegt, aber an diese angrenzt. 40

15. Die Methode der Ansprüche 13 oder 14,
weiter umfassend das Auswählen eines Materials für den Werkzeugaufsatz (20) mit einer Shore-A-Härte im Bereich von etwa 20 bis etwa 50. 45

Revendications

1. Système de rattrapage (10) pour attacher un outil à main (1), le système (10) comprenant :

une bague d'outil (20) ayant un corps de bague (22), une première extrémité de corps (24), une seconde extrémité de corps (26), et un alésage (28) s'étendant longitudinalement à travers celle-ci, l'alésage (28) ayant une section transver-

sale qui est inférieure à une section transversale d'une première partie d'outil (2) de l'outil à main (1) et assurant un ajustement serré de la bague d'outil (20) sur la première partie d'outil (2) ; et une languette d'attache (40) ayant une première ouverture de languette (44) et une seconde ouverture de languette (46) transversale à un axe longitudinal (β - β) de la languette d'attache (40), la seconde ouverture de languette (46) étant espacée de la première ouverture de languette (44), la première ouverture de languette (44) ayant une section transversale supérieure à la section transversale de la première partie d'outil (2) assurant une rotation libre de la languette d'attache (40) autour de la première partie d'outil (2) ;

caractérisé par le fait que

la bague d'outil (20) a une jupe (30) à la seconde extrémité de corps (26) qui s'étend d'une distance prédéfinie transversalement à l'opposé du corps de bague (22),

la jupe (30) de la bague d'outil (20) ayant une plus grande section transversale à la seconde extrémité de corps (26) qu'à la première ouverture de languette (44) de la languette d'attache (40) pour retenir la languette d'attache (40) sur la première partie d'outil (2) tout en permettant la rotation libre de la languette d'attache (40) autour de la première partie d'outil (2).

2. Système (10) selon la revendication 1, dans lequel la bague d'outil (20) est faite d'un matériau ayant une dureté Shore A dans la plage allant d'environ 20 à environ 50.
3. Système (10) selon l'une quelconque des revendications 1 ou 2, dans lequel la seconde ouverture de languette (46) est espacée de la première ouverture de languette (44) d'une distance prédéfinie suffisante pour positionner la seconde ouverture de languette (46) au-delà de la section transversale maximale de la bague d'outil (20) lorsque la bague d'outil (20) et la languette d'attache (40) sont reliées à l'outil (1) à attacher.
4. Système (10) selon l'une quelconque des revendications 1 à 3, comprenant en outre une bride (34) à la seconde extrémité de corps (26) s'étendant axialement avec l'alésage (28) et ayant un diamètre inférieur à la première ouverture de languette (44) de la languette d'attache (40) et une longueur supérieure à l'épaisseur de la languette d'attache (40) .
5. Système (10) selon l'une quelconque des revendications 1 à 4, dans lequel la bague d'outil (20) est faite d'un matériau élastique ayant une dureté Shore A choisie parmi le groupe constitué d'une plage allant d'environ 20 à environ 45, d'une plage allant

d'environ 25 à environ 40, d'une plage allant d'environ 25 à environ 35, et d'une plage allant d'environ 30 à environ 35.

6. Système (10) selon l'une quelconque des revendications 1 à 5, dans lequel la bague d'outil (20) est faite d'un matériau élastique ayant une dureté Shore A d'environ 35.
7. Système (10) selon l'une quelconque des revendications 1 à 6, dans lequel le corps de bague (22) et la jupe (30) ont un rapport de longueur corps de bague à jupe d'environ 0,5:1, 1:1, 2:1, 3:1, 4:1 et supérieur à 4:1.
8. Système (10) selon l'une quelconque des revendications 1 à 7, dans lequel le corps de bague (22) a une épaisseur de paroi dans une plage allant d'environ 0,0625 pouce (1,59 mm) à environ 0,175 pouce (4,45 mm).
9. Système (10) selon l'une quelconque des revendications 1 à 8, comprenant en outre une jonction du corps de bague (22) et de la jupe (30), la jonction ayant un rayon choisi parmi le groupe constitué d'environ 0,08 pouce (2,03 mm) à environ 0,1 pouce (2,54 mm), d'environ 0,089 pouce (2,26 mm) à environ 0,099 pouce (2,51 mm), et de 0,094 pouce (2,38 mm).
10. Système (10) selon l'une quelconque des revendications 1 à 9, dans lequel la bague d'outil (20) est faite d'un matériau rigide ou semi-rigide et contient une doublure fixée dans l'alésage.
11. Système (10) selon l'une quelconque des revendications 1 à 10, dans lequel la languette d'attache (40) est faite d'un matériau choisi parmi le groupe constitué de métal, de plastique et de composite.
12. Système (10) selon l'une quelconque des revendications 1 à 11, comprenant en outre une seconde bague d'outil (20) à placer, la languette d'attache (40) se trouvant entre la bague d'outil (20) et la seconde bague d'outil (20).
13. Procédé de rattrapage d'un outil à main (1) destiné à être utilisé avec un cordon d'outil, le procédé comprenant :
fournir un outil à main (1) ayant une première partie d'outil (2) et une seconde partie d'outil (3) ;
fournir une languette d'attache (40) et une bague d'outil (20) d'un système de rattrapage (10) pour attacher un outil (1), la bague d'outil (20) ayant un corps de bague (22), une première extrémité de corps (24), une seconde extrémité de corps (26), et un alésage (28) s'étendant entre

la première extrémité de corps (24) et la seconde extrémité de corps (26), l'alésage (28) ayant une section transversale qui est inférieure à la section transversale d'une première partie d'outil (2) de l'outil à main (1), assurant un ajustement serré de la bague d'outil (20) sur la première partie d'outil (2), pour retenir la languette d'attache (40) sur la première partie d'outil (2) tout en permettant la rotation libre de la languette d'attache (40) autour de la première partie d'outil (2) ;

coulisser la première ouverture de languette (44) de la languette d'attache (40) sur une première partie d'outil (2) de l'outil à main (1) jusqu'à une position prédéfinie sur la première partie d'outil (2) ;

attacher avec force la bague d'outil (20) à la première partie d'outil (2) de l'outil à main (1) par introduction de la première partie d'outil (2) dans l'alésage (28) au niveau de la seconde extrémité de corps (26) de la bague d'outil (20) ; et

coulisser avec force la bague d'outil (20) sur une distance prédéfinie le long de la première partie d'outil (2) jusqu'à ce que la seconde extrémité de corps (26) de la bague d'outil (20) soit adjacente à la languette d'attache (40) et positionnée pour permettre la rotation libre de la languette d'attache (40) autour de la première partie d'outil (2),

caractérisé par le fait que

la bague d'outil (20) a une jupe (30) à la seconde extrémité de corps (26) qui a un diamètre externe supérieur à un diamètre externe du corps de bague (22),

la jupe (30) de la bague d'outil (20) ayant une plus grande section transversale à la seconde extrémité de corps (26) qu'à une première ouverture de languette (44) de la languette d'attache (40).

14. Procédé selon la revendication 13, comprenant en outre coulisser avec force une seconde bague d'outil (20) le long de la première partie d'outil (2), avant l'étape de coulisser de languette d'attache, jusqu'à une position sur la première partie d'outil (2) au-delà mais adjacente à la distance prédéfinie dans l'étape de coulisser de languette d'attache.
15. Procédé selon la revendication 13 ou 14, comprenant en outre sélectionner un matériau pour la bague d'outil (20) ayant une dureté Shore A dans la plage allant d'environ 20 à environ 50.

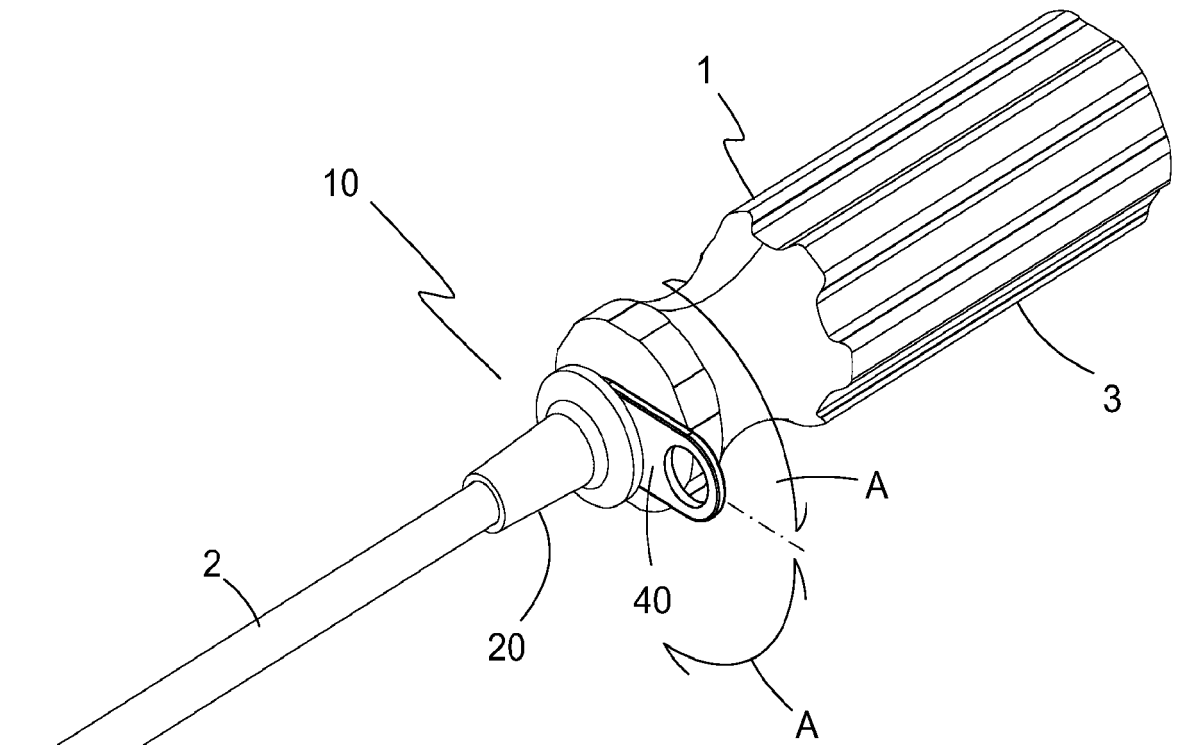


Fig. 1

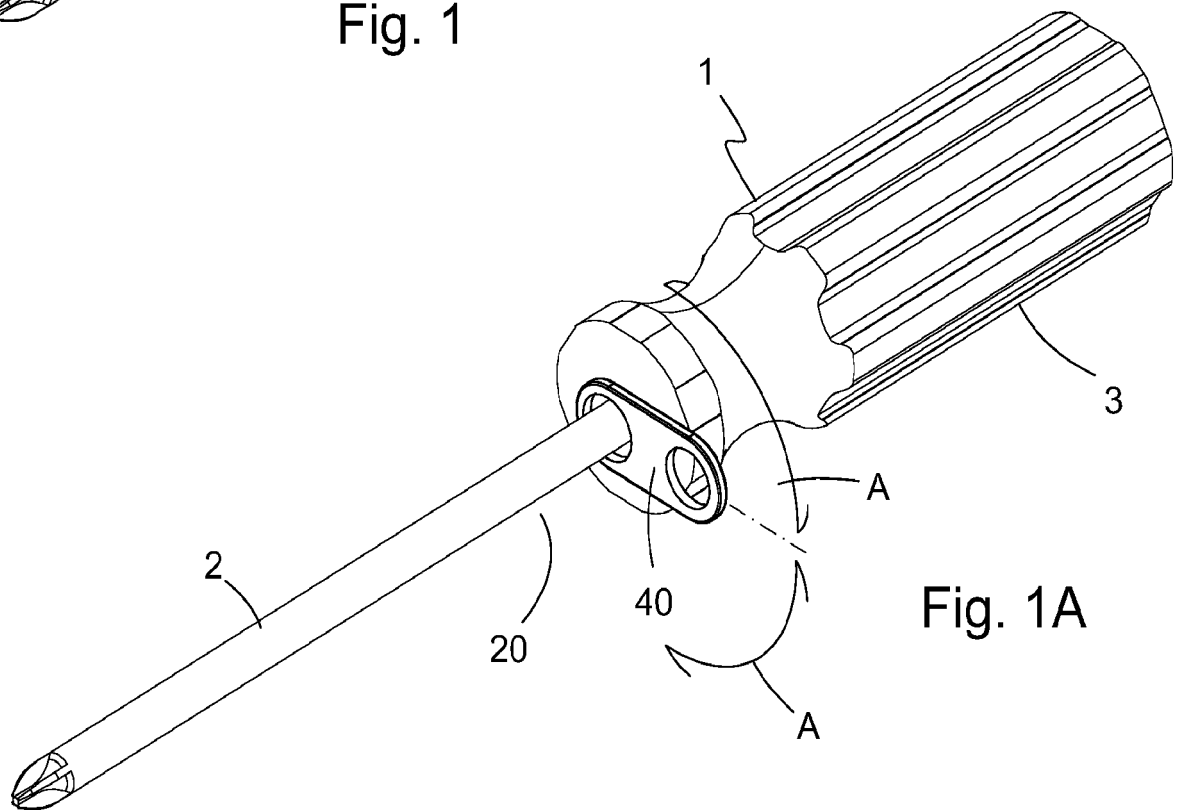


Fig. 1A

Fig. 2

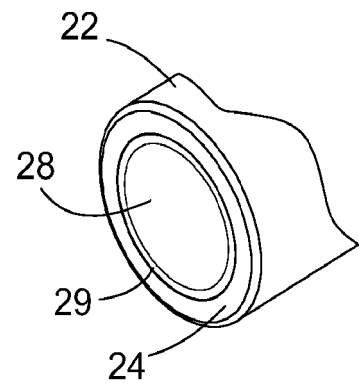
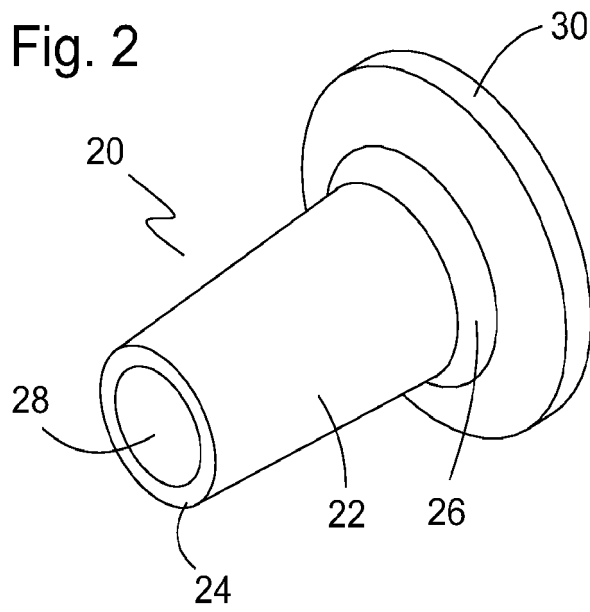


Fig. 2A

Fig. 3

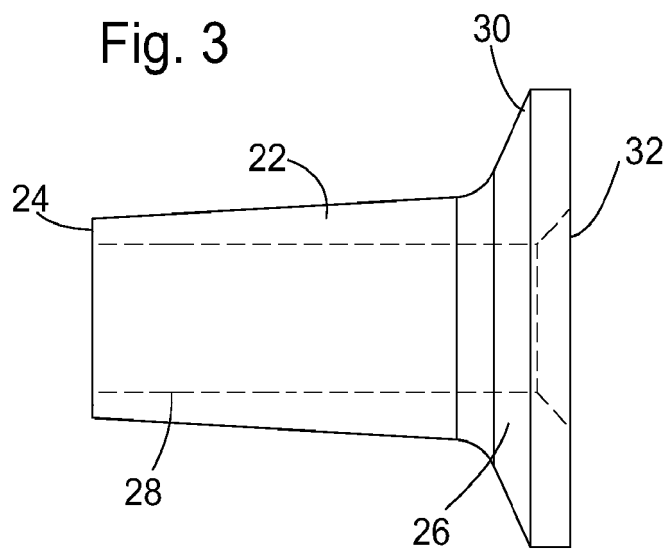


Fig. 4

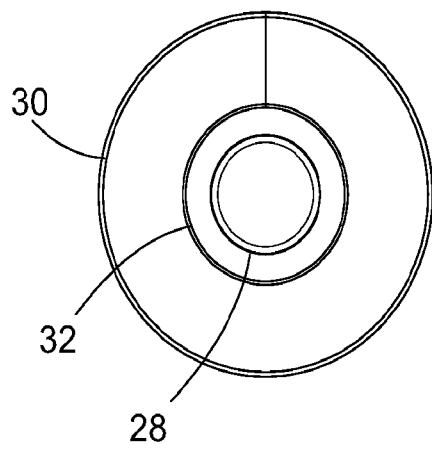


Fig. 5

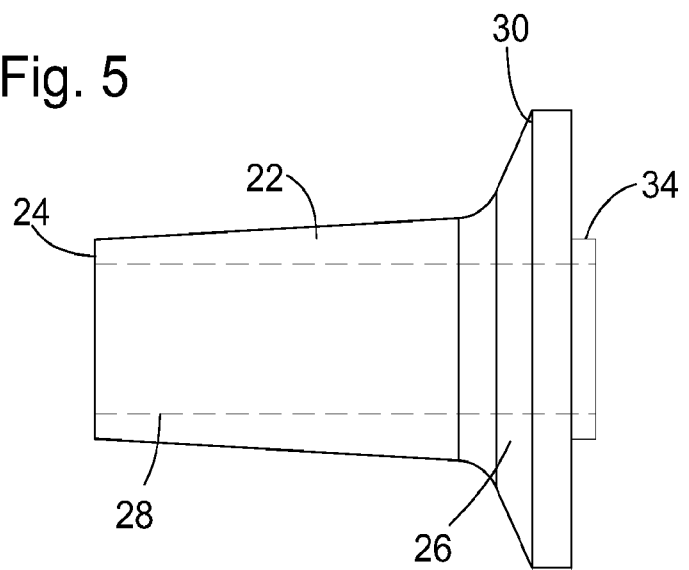
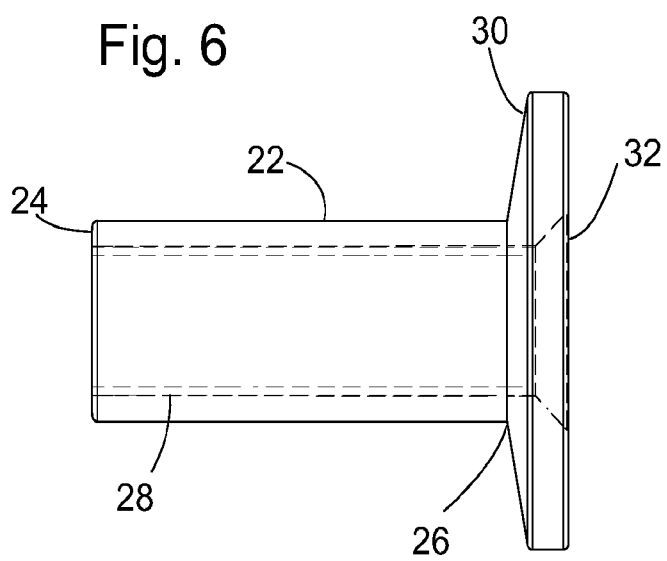


Fig. 6



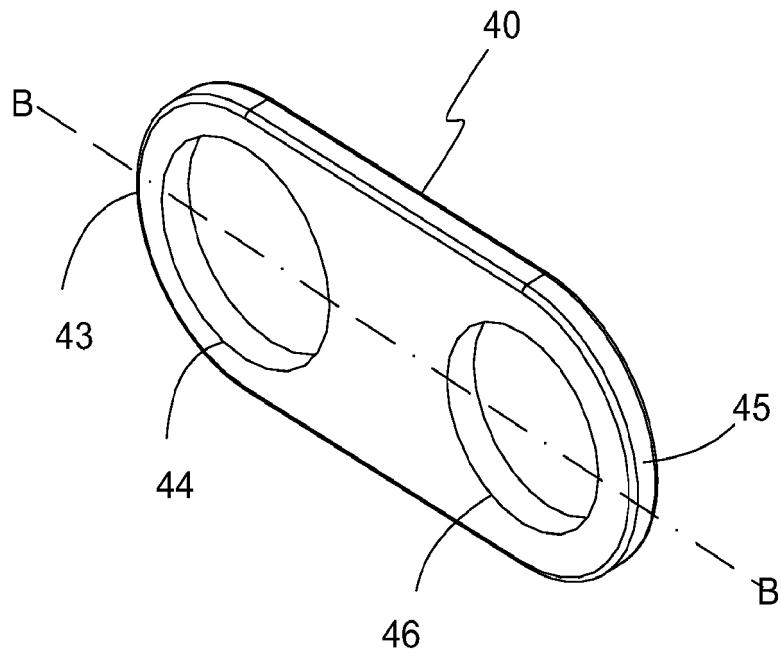


Fig. 7

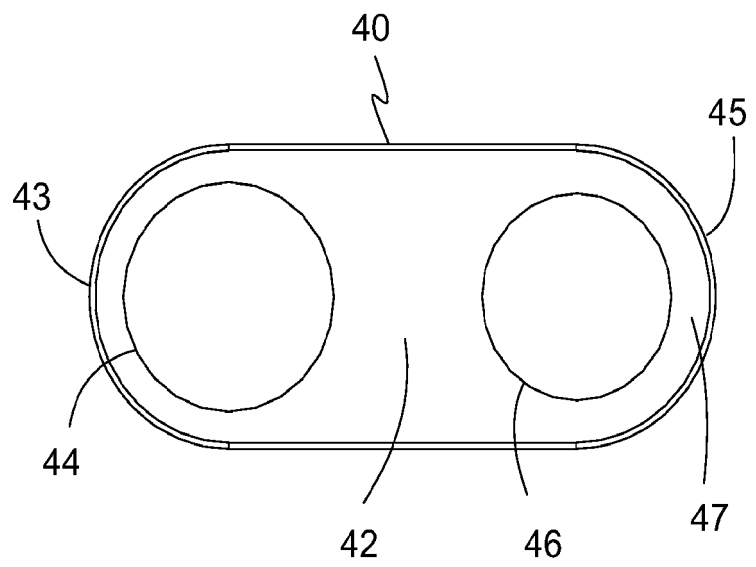


Fig. 8

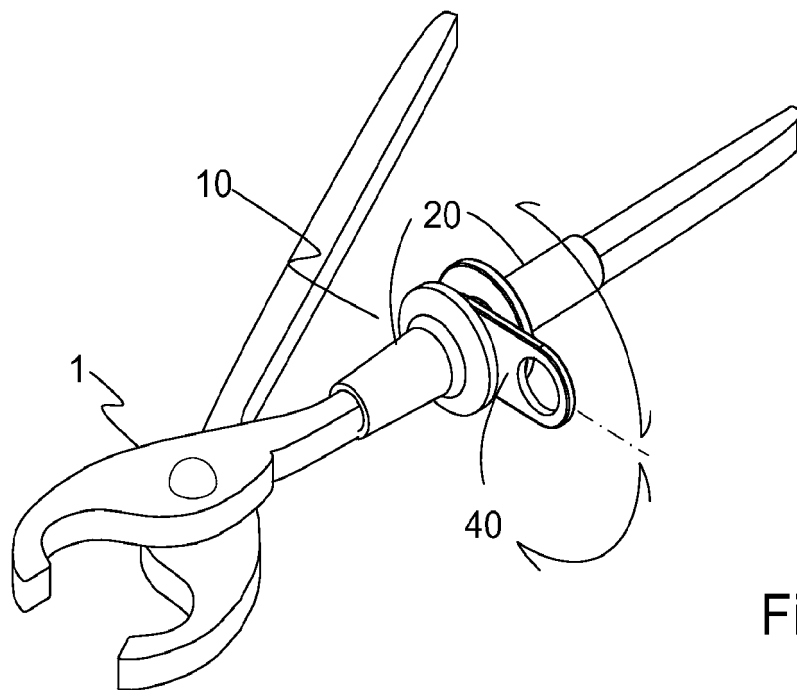


Fig. 9

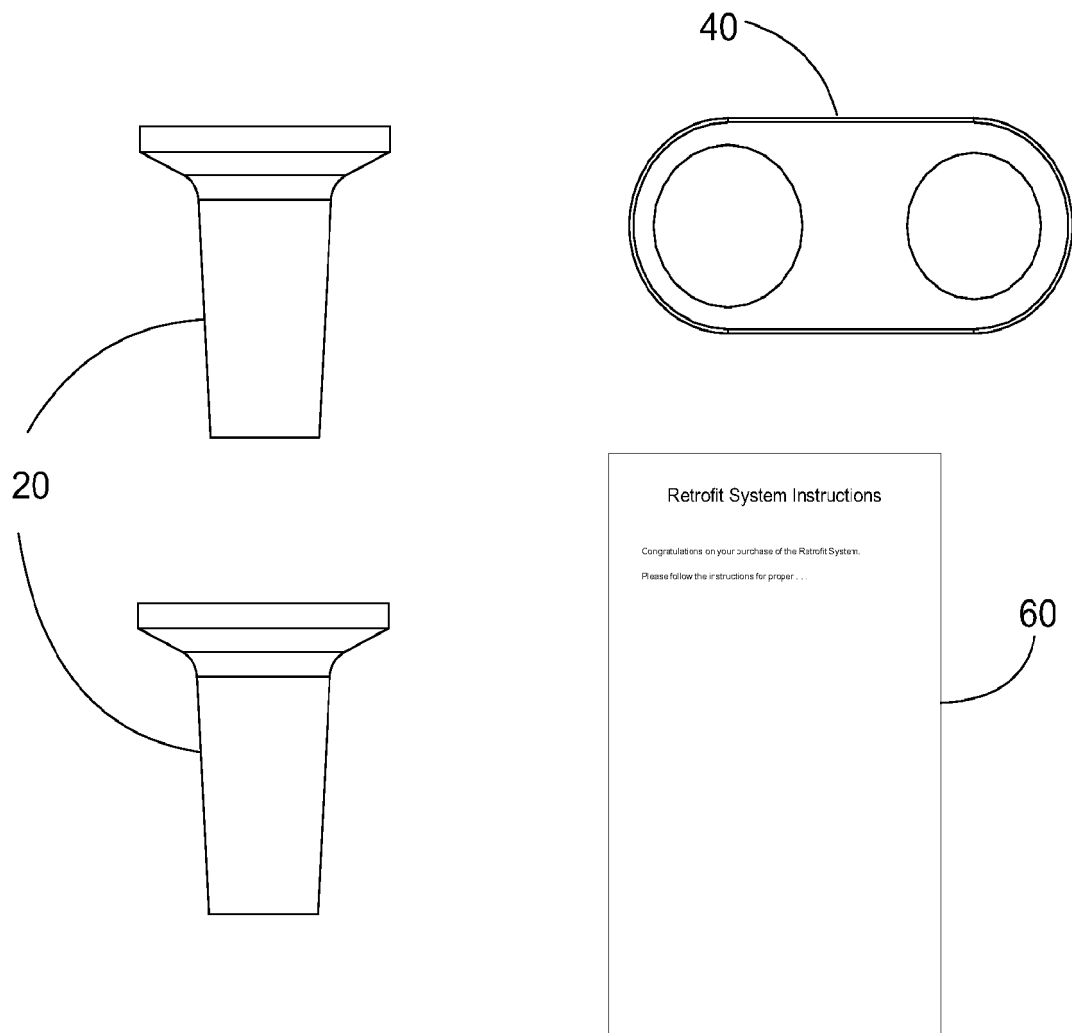


Fig. 10

REFERENCES CITED IN THE DESCRIPTION

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