

Description

The present invention relates to hand or power tools, and more particularly to a hand or power tool having a plurality of different tips for use in performing work on a workpiece.

Various types of hand tools have been known and developed over the years, including such implements as screw drivers, chisels, awls, and the like. These types of implements have become standard instruments in performing specific work tasks such as driving a screw into a workpiece, or chiseling away undesired material. There are occasions, however, in which a workman uses a number of tools in completing a task. For example, a workman may need to alternately use a straight edge screw driver and a Phillips screw driver. In order to address such situations, a number of multi-purpose tools have been developed. Multi-purpose tools not only provide versatility and time savings, but usually save on tool storage space.

Many types of multi-purpose tools have been developed. There are tools in which a plurality of working tips are freely stored within the handle. With these tools, the desired tip is selected and taken from its storage compartment and manually placed in its working position. In most cases, the working tip must be secured in its working position by a spring-loaded detent, a locking screw, or a chuck. To exchange the working tip being used for another working tip, the securing means must be disengaged before the working tip being used may be removed. Once it is removed, a new working tip may be positioned and secured into its working position. If the workman must interchangeably used various working tips, he must repeatedly go through the involved procedure of disengaging the securing means, removing the working tip, replacing the working tip with another working tip, and then engaging again the securing means.

Other types of multi-function tools have avoided the time consuming and frustrating problems created by having a plurality of working tips which must be attached or detached to the tool. Such tools typically position and secure the working tip in its operating position by some mechanical means which is manually operated without manually removing and independently handling the working tip. Tools which fall within this category include those in which the working tip is connected to the tool by a wire support or extension means which permits the working tip to be extracted from its storage compartment and slidably positioned to be secured within a socket. Other such tools include those in which a magazine retains a plurality of working tips within the handle of the instrument. The working tip is removed from its storage position into its working position in a number of ways. Some tools position the working tip over a stationary chute which directs the working tip into its operating position. Once the working tip is disposed over the chute, the tip is released and under the force of gravity it

drops into its operating position where it is appropriately secured. Other such tools have a stationary magazine and a movable chute in which the chute is positioned under the desired working tool before such tool is released to drop into its working position. Still another of such tools has a rotating magazine in which the working tip is captured by a sliding button assembly which may be slidably moved to position the working tip for use.

Frequently, the mechanisms used to secure the working tip are delicate and particularly susceptible to breakage under a large torque force because the mechanisms bear a large portion of the force. This makes such multi-purpose tools particularly unsuitable for connection with a power source such as a power drill. Also, due to such forces, the mechanisms sometimes bind making it difficult to exchange working tools, or sometimes strip which may render the tool virtually useless.

Illustrative of the various types of multi-purpose tools are United States Patent Nos. 4,273,173; 4,241,773; 4,227,430; 4,010,663; 3,683,984; 2,749,953; 2,635,661; 2,629,413; 532,823; and 438,150.

A further such tool is shown in United States Patent No. 2,765,013. That document discloses a multi-purpose tool comprising a cylinder assembly for housing a plurality of working tips; a shaft engaging a cylinder of said cylinder assembly in longitudinal sliding engagement, said shaft and said cylinder being relatively movable longitudinally between a loading position and a working position; and means for coupling one of said working tips to said shaft when in said loading position, said working tip coupled to said shaft being advanced to said working position as said shaft and said cylinder move relatively from said loading to said working position.

Such tool has both operating and constructional limitations, and the invention seeks to provide a tool wherein the shaft and the cylinder have an improved relationship, and in which the working tips may be interchanged simply and rapidly without having to remove the working tips from the tool and without reliance upon gravity to position the tool.

According to a first aspect of the invention, in a multi-purpose tool as aforesaid, the construction is such that said shaft is permitted to rotate independently of said cylinder assembly when in said working position.

According to a second aspect of the invention, in a multi-purpose tool as aforesaid said cylinder assembly comprises a first barrel having a first bore, a second barrel spaced from said first barrel and having a second bore aligned with said first bore, a cylinder rotatably disposed between said first and second barrels, a plurality of chambers formed in said cylinder, each chamber housing one of said working tips, said cylinder having an axis of rotation offset from and substantially parallel to the longitudinal axes of said first and second bores such that each chamber can, in turn,

be aligned with said first and second bores as said cylinder is rotated, said shaft being slidable in said first and second bores and an aligned chamber to effect said relative movement between said loading and working positions.

Tools according to the invention may be constructed so that no securing screw, chuck or the like is required to hold the working tip in position and/or bear the torque force incident to using such a tool. Such forces, as well as head-on forces, are borne by the shaft.

A tool according to the invention may be designed to be either hand operated or used in connection with a power tool.

When a selected chamber of the cylinder is aligned with the bores of the first and second barrels of the cylinder assembly the shaft, in its loading position, may engage the working tip within the aligned chamber in coupling engagement. The shaft may then be extended into the chamber thereby pushing the working tip or tool from its stored position in the chamber into the bore of the first barrel of the cylinder assembly, and then into its working position protruding from the first barrel.

When the shaft is thus fully extended it can be free to rotate independent of the cylinder assembly. Thus, the torque or rotational forces that are applied to the handle are transmitted to the working tip to perform the desired work on the workpiece.

The cylinder assembly may be secured in its position wherein the shaft is fully extended by a sleeve and catch mechanism that may be push-button released. Once the cylinder assembly is released, it may slide longitudinally on the shaft to the position where the shaft is fully retracted and another working tool may be selected.

When the shaft is fully retracted into the bore of the second barrel portion of the cylinder assembly, the cylinder may be rotated in order to select the next tip. The cylinder is again rotated until the chamber holding the next desired tip is in alignment and is coupled with the end of the shaft. The coupling may be accomplished by a tongue-in-groove arrangement in which the end of the shaft captures a connecting end of the working tip when it is properly aligned with the shaft. The selected tip is then positioned in its working position by again extending the shaft through the chamber and into the bore of the forward barrel portion of the cylinder assembly, as described above.

For a more complete understanding of this invention, specific embodiments of the invention will now be described in more detail, by way of example only, with reference to the accompanying drawings in which:—

Figure 1 is a perspective view of one presently preferred embodiment of this invention wherein the shaft is in its fully extended position and a portion of the forward barrel of the cylinder assembly is cut away to reveal the coupling of the shaft to the selected tip;

Figure 2 is a perspective view showing the shaft

in its fully retracted position with a portion of the cylinder assembly broken away to illustrate the tip when it is retracted into a cylinder chamber;

Figure 3 is an exploded perspective view of the cylinder assembly and a pair of working tips;

Figure 4 is an enlarged perspective view of a portion of the instrument showing the shaft fully retracted into the rear barrel portion of the cylinder assembly and illustrating a plurality of tips set in an annular channel which assists in feeding each tip to the shaft for coupling engagement;

Figure 5 is a partial longitudinal section view taken along line 5—5 of Figure 1 wherein the shaft is in a fully extended position and portions of the shaft are broken away to show the pin guide and the coupling of the shaft to a working tip;

Figure 6 is a partial longitudinal section view of the invention shown in Figure 5 wherein the shaft is partially retracted so as to show the pin guide within the keyway used to lock the shaft;

Figure 7 is a partial longitudinal section view of an alternative embodiment of the invention adapted for attachment to a power tool and showing the shaft in its fully extended position; and

Figure 8 is an enlarged perspective view of a portion of the instrument shown in Figure 7 showing the shaft fully retracted into the rear barrel portion of the cylinder assembly and illustrating a guide ring for holding the working tips within the annular channel.

Referring now specifically to the drawings, wherein like numerals indicate like parts throughout, a multi-tip tool is generally designated 10 in Figures 1 and 2, and comprises a handle 12, a shaft 14, a cylinder assembly generally designated at 16, and a plurality of tips 18. The shaft 14 is firmly affixed to the handle 12 such that angular rotation of the handle 12 imparts such rotation to the shaft 14. The shaft 14 is preferably cylindrical so that it may freely rotate about its longitudinal axis independent of the cylinder assembly 16. However, it should be understood that the shaft 14 could have a polygonal cross-section. A shaft 14 having a polygonal cross-section will not rotate free and independent of the cylinder assembly 16 if it is mounted in a corresponding polygonal bore and will rotate free and independent of the cylinder assembly if mounted within a circular bore.

The cylinder assembly 16 comprises a rear barrel portion 20, a forward barrel portion 22, and a cylinder 24. As shown best in Figure 3, the rear barrel portion 20 has a neck 26 with a bore 28, a flange 30, and a spindle 32. The bore 28 of neck 26 is shaped to align with and to receive in sliding longitudinal engagement the shaft 14. The spindle 32, which is attached to or constructed unitary with the flange 30, is disposed such that its longitudinal axis is substantially parallel to and offset from the longitudinal axis of the bore 28 (which is also the longitudinal axis of shaft 14 when the tool 10 is assembled). The forward barrel portion 22 has a neck 34 with a bore 36, and

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a flange 38. The flange 38 of the forward barrel portion 22 is held in spaced relationship from the flange 30 of the rear barrel portion 20 by the spindle 32. The bore 36 of neck 34 aligns with the bore 28 of neck 26. Disposed between the flange 30 of rear barrel portion 20 and the flange 38 of forward barrel portion 22 and about the spindle 32 is the cylinder 24. The cylinder 24 comprises a plurality of chambers 40 arranged circumferentially about a central conduit 42. The central conduit 42 receives the spindle 32 of rear barrel portion 20 thereby permitting the cylinder 24 to rotate about the spindle 32. As the cylinder 24 is rotated about spindle 32, each of the chambers 40, in turn, aligns with bore 28 of the rear barrel portion 20 and bore 36 of the forward barrel portion 22.

Although the spindle 32 has been described as part of rear barrel portion 20, it should be understood that other types of spindles or axes may be used. For example, the spindle could be a separate component positioned between the two barrel portions or it could be part of the forward barrel portion 22.

Each tip 18 has a forward end 44 and a connecting end 46 and is stored within a chamber 40 of the cylinder 24. The forward end 44 of each tip 18 may be configured in any of a variety of ways such as a straight edge screw driver, a Phillips screw driver, an awl, a chisel, a socket, or the like. The forward end 44 may also be a variety of sizes of the same type of working tip. For example, the cylinder 24 may house a plurality of tips 18 having various sizes of straight edge screw driver ends.

The cylinder assembly 16 is disposed to receive shaft 14 in slidable, longitudinal engagement. Figure 1 shows the shaft in its fully extended position, extending through the bore 28 of rear barrel portion 20, through a chamber 40 of cylinder 24, and into the bore 36 of forward barrel portion 22. In a preferred embodiment, the handle 12, shaft 14, and the tip 18 coupled to the shaft 14 are free to rotate independent of the cylinder assembly 16 in this fully extended position, as will be explained more fully below. As the handle 12 is retracted, the shaft 14 is withdrawn from its fully extended position. When fully retracted, shaft 14 is positioned so that it may release the tip 18 to which it is coupled prior to engaging a new tip 18 in coupling engagement. It is preferred that the shaft 14 not be permitted to rotate during retraction or once it is fully retracted, as shown in Figure 2. This assures that the shaft 14 will be properly positioned for release and coupling engagement with the various tips 18 stored within the cylinder 24.

To assure that the shaft 14 is prevented from rotation during retraction, it is preferred that shaft 14 have a pin guide 48 (shown in Figs. 5 and 6) which protrudes from the side of the shaft 14. As shown best in Figure 3, 5 and 6, keyway 50 in the neck 26 of rear barrel portion 20 and a plurality of slots 52 disposed about the periphery of central conduit 42 and each communicating with a chamber 40 are provided to slidably receive the

pin guide 48 and to prevent any angular rotation of the pin guide 48 during retraction or extension of the shaft 14 between the fully extended and fully retracted positions. Figure 6 shows the shaft 14 in a partially retracted position in which the pin guide 48 is disposed in keyway 50.

When the shaft 14 is fully retracted, as shown in Figures 2 and 4, the distal end 54 of the shaft 14 is positioned for engagement or disengagement with each tip 18 stored within chambers 40 of the cylinder 24. In the preferred embodiment of the invention, the distal end 54 of the shaft 14 has an arcuate groove 56 for receiving, in turn, the connecting end 46 for each of tips 18. The connecting end 46 for each tip 18 has an arcuate tongue 59 which effects a tongue and groove engagement with the arcuate groove 56 of the shaft 14 when the tip 18 is rotated into alignment with the shaft 14.

Although it is preferred that tip 18 have arcuate tongue 59 and the shaft 14 have arcuate groove 56, it should be understood that other means for coupling each tip 18 to the shaft 14 may be implemented without departing from the spirit and scope of the present invention. For example, the shaft may have an arcuate tongue and each tip may have an arcuate groove. It is also preferred that the tongue and groove arrangement described above be arcuate in order to reduce the likelihood of binding the tip 18 against the shaft 14 during rotation of the cylinder 24 to select the appropriate tip 18.

In addition, it is preferred that the flange 30 of rear barrel portion 20 have an annular channel 60, as shown in Figure 4, for receiving the end 46 of each tip 18. This annular channel 60 prevents each tip 18 from twisting and provides proper alignment between the tongue 59 of each tip 18 and the groove 56 of the shaft 14 as the cylinder 24 is rotated. The tongue and groove arrangement may have any configuration; however, it is preferred that the arcuate tongue 59 rests on the flange 30 and assists in properly positioning the arcuate tongue 59 for engagement with the arcuate groove 56 of shaft 14.

To facilitate the proper engagement of the tongue and groove assembly a transverse duct 62 (shown best in Fig. 3) is provided at the end of the keyway 50 to permit limited angular rotation or wiggling of the shaft 14. Such wiggling is provided to compensate for any slight misalignment of the tongue and groove assembly. In this way, as each tip 18 is rotated into alignment with the shaft 14, the arcuate tongue 59 engages the arcuate groove 56 and the shaft 14 may be rotated slightly (as permitted by transverse duct 62) to accomplish the positive coupling of the tip 18 to the shaft 14.

Once the desired tip 18 is coupled to the shaft 14, the shaft 14 may be extended through the chamber 40 and into the bore 36 of the forward barrel portion 22. As with retraction of the shaft 14, extension of the shaft 14 is also guided by the pin guide 48 sliding in keyway 50 and the slot 52 associated with the aligned chamber 40. When

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fully extended, the pin guide 48 enters into a recess (64 (shown best in Fig. 3) formed about the opening of bore 36. Recess 64 permits the pin guide 48 to freely rotate when the shaft 14 is turned about its longitudinal axis. Thus, the handle 12 and shaft 14, as well as the selected tip 18 which is coupled to the shaft 14, may rotate freely and independently of the cylinder assembly 16. This permits the torque applied to the handle 12 to be directly transmitted to the working tip 18 without interference from the cylinder assembly 16. Further, the cylinder assembly 16 may serve as a stabilizing handle or grip which can be held to position the tool for the work to be performed.

In the preferred embodiment, a mechanism is provided to secure the cylinder assembly 16 to the handle 12 to prevent longitudinal sliding of the cylinder assembly 16 on shaft 14 while permitting rotation of the shaft 14. This mechanism comprises a sleeve 66 with an annular lip 68 attached to the neck 26 of rear barrel portion 20, and a corresponding catch mechanism located internally within handle 12. This catch mechanism preferably comprises a button 70 and a spring latch 72 (see Figures 5 and 6) with a hook 74. As the cylinder assembly 16 moves such that the shaft 14 approaches its fully extended position, the lip 68 of sleeve 66 engages the hook 74. The hook 74 captures the edge of the lip 68, as shown in Figure 5, when the shaft is fully extended. Since the lip 68 is annular, the workman utilizing the tool may rotate the cylinder assembly 16 about the longitudinal axis of the shaft 14 without disengaging the sleeve 66 from the spring latch 72.

The button 70 is held adjacent the spring latch 72 by a cap 76 shown in Figures 5 and 6. To release the sleeve 66 from the spring latch 72, the workman depresses button 70 which actuates the spring latch 72 to remove hook 74 from the annular lip 68 of sleeve 66. When so released, the cylinder assembly 16 may slidably move along shaft 14 provided that guide pin 48 enters slot 52 and keyway 50.

To indicate the proper disposition of cylinder assembly 16 with respect to handle 12 in aligning pin guide 48 with slot 52 and keyway 50, a pair of aligning indicators are provided. One alignment indicator 78 is provided on the exterior of neck 26 of rear barrel portion 20 and a second alignment indicator 80 is provided on handle 12. When alignment indicators 78 and 80 are aligned, the shaft 14 may be longitudinally retracted or extended within cylinder assembly 16 because the pin guide 48 will slidably engage a slot 52 and keyway 50.

Although the invention described above is particularly adapted for hand manipulation, it should be understood that the multi-purpose tool 10 may be connected to a power driven tool such as a power drill or a power screw driver. With the power driven embodiment, as shown in Figure 7, the shaft 14 would extend beyond the handle 12 and have an attachment end 100 to be coupled to the power tool (not shown) and a distal end 54 to

slide longitudinally within a cylinder assembly 16. The connection of the attachment end 100 of shaft 14 to a power tool could be accomplished in any number of conventional ways such as tightening a chuck onto the shaft 14 or tightening a locking screw. Thus, when the shaft 14 is fully extended into and free to rotate independently of the cylinder assembly 16 and locked into that position (via a locking mechanism such as the sleeve and catch described above), the power tool could be activated to rotate the working tip 18. In this manner, the working tip 18, shaft 14 and handle 12 would rotate per the rotation imparted by the power tool. The cylinder assembly 16, however, would not rotate but would serve as a stabilizing grip to position and support the tool. With this embodiment, there is no eccentric rotation of the cylinder assembly 16, if rotation were present this could make the tool difficult to handle or even dangerous to use.

The power tool embodiment, shown in Figure 7, may be used as a hand tool or a power tool. Further, the power tool embodiment makes it particularly advantageous to house within the cylinder assembly 16 a plurality of various sized drill bit working tips 18 to be coupled to the shaft 14 and advanced to the appropriate working position. Thus, various sized drill bits can be used interchangeably without having to repeatedly go through the procedure of removing the unwanted bit, replacing it with another bit, and securing the selected bit to the power tool.

Figures 7 and 8 also illustrate a feature of another embodiment of the present invention. This feature makes it possible to interchange tools in rapid succession no matter the orientation in which the multi-tip tool is held. The feature comprises a guide ring 102 adjacent to and concentric with the annular channel 60, the guide ring 102 is split to accommodate shaft 14. This guide ring 102 holds the connecting end 46 of each tip 18 from displacement within annular channel 60 when the tool 10 is held in any orientation. The guide ring 102 has a projecting rim 106 which defines a groove 104. The groove 104 and annular channel 60 are adapted for receiving the arcuate tongue 59 of each tip 18, as best shown in Figure 8. The guide ring 102 cooperates with each tip 18 to assist the aligned delivery of each tip 18 to the distal end 54 of shaft 14 for smooth coupling engagement.

The guide ring 102 may be constructed unitary with the flange 30 of rear barrel portion 22 or it may be constructed of a separate piece of material disposed in the position described above. Further, although the embodiment showing the guide ring 102 is the power tool embodiment, it should be understood that the guide ring 102 could also be used with the hand tool embodiment.

Several other features are provided in the most preferred embodiment of the invention. First, the cylinder assembly 16 is held together by a single screw or bolt 82 which extends through the flange 38 of forward barrel portion 22 and engages, in

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threaded engagement, the spindle 32. By removing this single screw 82 the entire cylinder assembly 16 may be dismantled and the tips 18 may be exchanged for other tips within the cylinder 24. This feature greatly increases the versatility of the tool 10, because it provides a way in which other tips can be used with the tool. Thus, if a workman knows in advance that he will require a certain contingent of working tips 18, he may hand load the cylinder 24 with the desired tips 18, thereby customizing the implement for his desired use.

Further, flange 38 of forward barrel portion 22 has a cup 84 with an indentation 86 for receiving a protrusion 88 on spindle 32. Engagement of protrusion 88 with indentation 86 assures that bores 28 and 36 are aligned when the cylinder assembly 16 is assembled and further prevents rotation of the barrel portions 20 and 22 out of mutual alignment.

A plurality of gripping grooves 90 (see Figures 1 and 2), disposed about the periphery of cylinder 24 and which may extend slightly into the adjacent flanges 30 and 38, facilitate the visual alignment and the manual rotation of the cylinder 24 within the cylinder assembly 16. Moreover, if the cylinder 24 is made of a see-through or transparent material, the workman using the tool 10 may visually select the appropriate tip 18 without having to make a series of trial-and-error selections until he arrives at the tip 18 he desires.

Another feature enhancing the versatility, flexibility and operations of the multi-purpose tool 10 of the present invention is the plurality of cut-outs 92 (see Figures 1—3) disposed along the lower edge of cylinder 24 between each of the chambers 40. These cut-outs 92 provide access to the connecting end 46 and the tongue 59 for each of the tips 18 so that the workman may adjust the alignment of the connecting ends 46 into the annular channel 60 (see Fig. 4), if necessary. This is particularly helpful while reassembling the cylinder assembly 16 after exchanging tips 18. The cut-outs 92 may not be necessary when a guide ring 102 is used, as shown in Figures 7 and 8.

To facilitate the proper alignment of a chamber 40 with respect to the shaft 14, a spring loaded detent is provided. A cavity 94 in flange 38 of forward barrel portion 22 is provided which houses a spring 96 and a detent cap 98. The spring 96 provides resiliency to the detent cap 98 such that the detent cap 98 slightly enters each chamber 40 of cylinder 24, in turn, as the cylinder 24 is rotated. The detent cap 98 makes a "clicking" sound as it engages each chamber 40, thus indicating that the chamber 40 directly opposite the chamber 40 in which the detent cap 98 has entered is in alignment with the shaft 14. As the cylinder 24 is rotated out of alignment, the detent cap 98 withdraws from that chamber 40 and enters the next chamber 40 when alignment is next achieved.

To operate the multi-tip tool 10 of this invention a workman would grasp the tool and align indi-

cators 78 and 80. He would then depress button 70 to release spring latch 72 thereby freeing sleeve 66 and the cylinder assembly 16 for longitudinal sliding movement along shaft 14. Holding button 70 depressed until sleeve 66 is releasably displaced, the workman would then retract shaft 14 to its fully retracted position (as shown in Fig. 2). Next, the workman would select the desired tip 18 by rotating the cylinder 24 about the spindle 32 until the desired tip 18 is brought into alignment with the shaft 14 and the arcuate tongue 59 engages the arcuate groove 56 of shaft 14 in coupling engagement. If necessary, the shaft 14 may be wiggled slightly in this position (via pin guide 48 and transverse duct 62) to assure that the tongue and groove coupling is positively effected. The shaft 14 may then be extended through the aligned chamber 40 and into bore 36 such that the end 44 of tip 18 protrudes beyond neck 34 of forward barrel portion 22. When shaft 14 is fully extended, pin guide 48 enters recess 64 thereby permitting the free rotation of handle 12, shaft 14, and the selected tip 18. Thus, the working end 44 may engage a workpiece (not shown) to provide the work desired.

When the workman desires to use a different tip 18, he merely aligns indicators 78 and 80 and depresses the button 70 to release the cylinder assembly 16 to longitudinally slide along shaft 14. The workman then retracts the shaft 14 fully and selects the next desired tip 18 by rotating cylinder 24 until the desired tip 18 aligns with the engages the shaft 14. The shaft 14 can then be extended exposing the working end 44 of the selected tip 18 so that it can be used to perform the desired work on the workpiece.

It will be understood that the described embodiments are examples only, and that modifications may be made thereto within the scope of the invention.

Claims

1. A multi-purpose tool comprising: a cylinder assembly (16) for housing a plurality of working tips (18); a shaft (14) engaging a cylinder (24) of said cylinder assembly (16) in longitudinal sliding engagement, said shaft (14) and said cylinder (24) being relatively movable longitudinally between a loading position and a working position; and means (46, 54) for coupling one of said working tips (18) to said shaft (14) when in said loading position, said working tip coupled to said shaft being advanced to said working position as said shaft (14) and said cylinder (24) move relatively from said loading to said working position; characterised in that the construction is such that said shaft (14) is permitted to rotate independently of said cylinder assembly (16) when in said working position.

2. A multi-purpose tool as claimed in claim 1 in which said cylinder (24) has a plurality of chambers (40), each chamber for housing one of said working tips (18).

3. A multi-purpose tool as claimed in claim 1 or

threaded engagement, the spindle 32. By removing this single screw 82 the entire cylinder assembly 16 may be dismantled and the tips 18 may be exchanged for other tips within the cylinder 24. This feature greatly increases the versatility of the tool 10, because it provides a way in which other tips can be used with the tool. Thus, if a workman knows in advance that he will require a certain contingent of working tips 18, he may hand load the cylinder 24 with the desired tips 18, thereby customizing the implement for his desired use.

Further, flange 38 of forward barrel portion 22 has a cup 84 with an indentation 86 for receiving a protrusion 88 on spindle 32. Engagement of protrusion 88 with indentation 86 assures that bores 28 and 36 are aligned when the cylinder assembly 16 is assembled and further prevents rotation of the barrel portions 20 and 22 out of mutual alignment.

A plurality of gripping grooves 90 (see Figures 1 and 2), disposed about the periphery of cylinder 24 and which may extend slightly into the adjacent flanges 30 and 38, facilitate the visual alignment and the manual rotation of the cylinder 24 within the cylinder assembly 16. Moreover, if the cylinder 24 is made of a see-through or transparent material, the workman using the tool 10 may visually select the appropriate tip 18 without having to make a series of trial-and-error selections until he arrives at the tip 18 he desires.

Another feature enhancing the versatility, flexibility and operations of the multi-purpose tool 10 of the present invention is the plurality of cut-outs 92 (see Figures 1-3) disposed along the lower edge of cylinder 24 between each of the chambers 40. These cut-outs 92 provide access to the connecting end 46 and the tongue 59 for each of the tips 18 so that the workman may adjust the alignment of the connecting ends 46 into the annular channel 60 (see Fig. 4), if necessary. This is particularly helpful while reassembling the cylinder assembly 16 after exchanging tips 18. The cut-outs 92 may not be necessary when a guide ring 102 is used, as shown in Figures 7 and 8.

To facilitate the proper alignment of a chamber 40 with respect to the shaft 14, a spring loaded detent is provided. A cavity 94 in flange 38 of forward barrel portion 22 is provided which houses a spring 96 and a detent cap 98. The spring 96 provides resiliency to the detent cap 98 such that the detent cap 98 slightly enters each chamber 40 of cylinder 24, in turn, as the cylinder 24 is rotated. The detent cap 98 makes a "clicking" sound as it engages each chamber 40, thus indicating that the chamber 40 directly opposite the chamber 40 in which the detent cap 98 has entered is in alignment with the shaft 14. As the cylinder 24 is rotated out of alignment, the detent cap 98 withdraws from that chamber 40 and enters the next chamber 40 when alignment is next achieved.

To operate the multi-tip tool 10 of this invention a workman would grasp the tool and align indi-

cators 78 and 80. He would then depress button 70 to release spring latch 72 thereby freeing sleeve 66 and the cylinder assembly 16 for longitudinal sliding movement along shaft 14. Holding button 70 depressed until sleeve 66 is releasably displaced, the workman would then retract shaft 14 to its fully retracted position (as shown in Fig. 2). Next, the workman would select the desired tip 18 by rotating the cylinder 24 about the spindle 32 until the desired tip 18 is brought into alignment with the shaft 14 and the arcuate tongue 59 engages the arcuate groove 56 of shaft 14 in coupling engagement. If necessary, the shaft 14 may be wiggled slightly in this position (via pin guide 48 and transverse duct 62) to assure that the tongue and groove coupling is positively effected. The shaft 14 may then be extended through the aligned chamber 40 and into bore 36 such that the end 44 of tip 18 protrudes beyond neck 34 of forward barrel portion 22. When shaft 14 is fully extended, pin guide 48 enters recess 64 thereby permitting the free rotation of handle 12, shaft 14, and the selected tip 18. Thus, the working end 44 may engage a workpiece (not shown) to provide the work desired.

When the workman desires to use a different tip 18, he merely aligns indicators 78 and 80 and depresses the button 70 to release the cylinder assembly 16 to longitudinally slide along shaft 14. The workman then retracts the shaft 14 fully and selects the next desired tip 18 by rotating cylinder 24 until the desired tip 18 aligns with the engages the shaft 14. The shaft 14 can then be extended exposing the working end 44 of the selected tip 18 so that it can be used to perform the desired work on the workpiece.

It will be understood that the described embodiments are examples only, and that modifications may be made thereto within the scope of the invention.

Claims

1. A multi-purpose tool comprising: a cylinder assembly (16) for housing a plurality of working tips (18); a shaft (14) engaging a cylinder (24) of said cylinder assembly (16) in longitudinal sliding engagement, said shaft (14) and said cylinder (24) being relatively movable longitudinally between a loading position and a working position; and means (46, 54) for coupling one of said working tips (18) to said shaft (14) when in said loading position, said working tip coupled to said shaft being advanced to said working position as said shaft (14) and said cylinder (24) move relatively from said loading to said working position; characterised in that the construction is such that said shaft (14) is permitted to rotate independently of said cylinder assembly (16) when in said working position.

2. A multi-purpose tool as claimed in claim 1 in which said cylinder (24) has a plurality of chambers (40), each chamber for housing one of said working tips (18).

3. A multi-purpose tool as claimed in claim 1 or



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claim 2 in which said cylinder assembly (16) comprises a first barrel (20) having a first bore (28), a second barrel (22) spaced from said first barrel (20) and having a second bore (36) aligned with said first bore (28), a cylinder (24) rotatably disposed between said first and second barrels (20, 22), a plurality of chambers (40) formed in said cylinder, each chamber (40) housing one of said working tips (18) said cylinder (24) having an axis of rotation offset from and substantially parallel to the longitudinal axes of said first and second bores (28, 36) such that each chamber (40) can, in turn, be aligned with said first and second bores (28, 36) as said cylinder (24) is rotated, said shaft (14) being slidable in said first and second bores (28, 36) and an aligned chamber (40) to effect said relative movement between said loading and working positions, and means (48, 50) for locking said shaft (14) against rotation relative to said first and second barrels (20, 22), when the shaft is in said loading position.

4. A multi-purpose tool comprising: a cylinder assembly (16) for housing a plurality of working tips (18), a shaft (14) engaging the cylinder assembly (16) in longitudinal sliding engagement, said shaft (14) and said cylinder assembly (16) being relatively movable longitudinally between a loading position and a working position; and means (46, 54) for coupling one of said working tips (18) to said shaft (14) when in said loading position, the working tip coupled to said shaft being advanced to said working position as said shaft (14) and said cylinder assembly (24) move relatively from said loading to said working position; characterised in that said cylinder assembly (16) comprises a first barrel (20) having a first bore (28), a second barrel (22) spaced from said first barrel (20) and having a second bore (36) aligned with said first bore (28), a cylinder (24) rotatably disposed between said first and second barrels (20, 22), a plurality of chambers (40) formed in said cylinder, each chamber (40) housing one of said working tips (18), said cylinder (24) having an axis of rotation offset from and substantially parallel to the longitudinal axes of said first and second bores (28, 36) such that each chamber (40) can, in turn, be aligned with said first and second bores (28, 36) as said cylinder (24) is rotated, said shaft (14) being slidable in said first and second bores (28, 36) and an aligned chamber (40) to effect said relative movement between said loading and working positions.

5. A multi-purpose tool as claimed in claim 4 and including means (48, 50) for locking said shaft (14) against rotation relative to said first and second barrels (20, 22), when said shaft is in said loading position.

6. A multi-purpose tool as claimed in claim 4 or claim 5 and including means (20, 22) for permitting rotation of said shaft independently of said cylinder assembly (16) when in said working position.

7. A multi-purpose tool as claimed in any one of claims 3 to 6, in which said first barrel (20) has a first integral circular flange (30) at one end

thereof, said second barrel (22) has a second integral circular flange (38) at one end thereof, and said cylinder (24) is rotatably disposed between said flanges (30, 38) and is of substantially the same diameter as said flanges (30, 38).

8. A multi-purpose tool as claimed in claim 7 in which a spindle (32) projects from said first flange (30) in a direction parallel to the axis of said first bore (28) and said cylinder (24) is rotatably mounted on said spindle (32).

9. A multi-purpose tool as claimed in any one of claims 3 to 8, in which said cylinder (24) can be rotated to feed a desired working tip (18) into coupling engagement with said shaft (14) only when in said loading position.

10. A multi-purpose tool as claimed in any one of the preceding claims wherein said means (46, 54) for coupling a selected one of said working tips (18) to said shaft (14) comprises an arcuate tongue and groove assembly (59, 56).

11. A multi-purpose tool as claimed in claim 10 wherein each working tip (18) has an arcuate tongue (59) for coupling engagement with an arcuate groove (56) at a first end of said shaft (14).

12. A multi-purpose tool as claimed in claim 11 wherein said cylinder assembly (16) has an annular channel (60) for receiving said arcuate tongue (59) of each working tip (18) and for maintaining each working tip in alignment for coupling engagement with said shaft (14).

13. A multi-purpose tool as claimed in claim 12 wherein said cylinder assembly (16) further comprises a guide ring (102) for holding said arcuate tongue (59) of each working tip (18) in arcuate alignment for coupling engagement with said shaft (14).

14. A multi-purpose tool as claimed in any one of claims 3 to 8 wherein said means (48, 50) for locking said shaft (14) against rotation relative to said first and second barrels (20, 22) comprises a pin guide (48) which protrudes from said shaft (14) and a longitudinal keyway (50) in said cylinder assembly (16) for receiving said pin guide in sliding engagement, thereby preventing rotation of said shaft independently of said barrels (20, 22) when said pin guide (48) is within said keyway (50).

15. A multi-purpose tool as claimed in claim 14, wherein said means (20, 22) for permitting rotation of said shaft (14) independently of said cylinder assembly (16) comprises a recess (64) within said cylinder assembly (16) disposed for receiving said pin guide (48) and being positioned to accommodate rotation of said pin guide when said shaft (14) is rotated about its longitudinal axis and said shaft (14) and said cylinder assembly (16) are in said working position.

16. A multi-purpose tool as claimed in claim 14 or claim 15 wherein said keyway (50) has a transverse duct (62) disposed for receiving said pin guide (48) when said shaft (14) and cylinder assembly (16) are in said loading position, said transverse duct (62) thereby permitting limited rotation of said shaft (14) with respect to said



cylinder assembly (16) to assure positive engagement of the selected working tip (18) to said shaft (14).

17. A multi-purpose tool as claimed in any one of claims 3 to 8 wherein said first barrel (20) further comprises a first flange (30) for supporting said cylinder (24) and having an annular channel (60) for receiving and maintaining alignment of said connecting end (59) of each said working tip (18).

18. A multi-purpose tool as claimed in claim 17 wherein said shaft (14) is cylindrical and wherein said shaft further comprises a pin guide (48) which protrudes from said shaft, and said first barrel (20) further comprises a longitudinal keyway (50) for receiving said pin guide (48) in sliding engagement, thereby preventing rotation of said shaft (14) within said first bore (28) when said pin guide (48) is within said keyway (50).

19. A multi-purpose tool as claimed in claim 18 wherein said cylinder assembly (16) further comprises a recess (64) disposed for receiving said pin guide (48) when said shaft (14) is in said working position, said recess (64) being formed at the opening of said second bore (36) and being positioned to accommodate rotation of said pin guide (48) when said shaft (14) is rotated about its longitudinal axis.

20. A multipurpose tool as claimed in claim 18 or claim 19 wherein said keyway (50) has a transverse duct (62) disposed for receiving said pin guide when said shaft (14) and cylinder (16) are in said loading position, said transverse duct (62) thereby permitting limited rotation of said shaft (14) to assure positive engagement of said connecting end (59) of said tip to said first end (54) of said shaft.

21. A multi-purpose tool as claimed in any one of claims 17 to 20 and further comprising means (66 to 74) for releasably locking said cylinder assembly (16) and said shaft (14) against relative longitudinal movement when said cylinder assembly (16) and shaft (14) are in said working position, thereby preventing movement to said loading position until said locking means (66 to 74) is released.

22. A multi-purpose tool as claimed in claim 21 wherein said releasable locking means comprises a sleeve and catch assembly (66 to 74).

23. A multi-purpose tool as claimed in claim 22 wherein said sleeve and catch assembly comprises a sleeve (66) affixed to said cylinder assembly (16) and a catch (70 to 74) connected to said shaft (14), said catch releasably capturing said sleeve (66) when said shaft and cylinder assembly are in said working position.

24. A multi-purpose tool as claimed in claim 23 wherein said catch comprises a spring (72) and a button (70), said button actuating said spring to release said sleeve (66) when said button is depressed.

25. A multi-purpose tool as claimed in any one of claims 3 to 8 and further comprising a chamber indicator (98) which releasably engages in turn each said chamber of said cylinder so as

to position the engaged chamber in alignment with said first and second bores.

26. A multi-purpose tool as claimed in claim 25 wherein said chamber indicator is a spring-loaded detent (98).

27. A multi-purpose tool as claimed in any one of the preceding claims and further comprising a handle assembly (12) at the end of the shaft remote from the section to which said working tips (18) may be coupled.

28. A multi-purpose tool as claimed in claim 27 insofar as dependent on claim 23 or claim 24 in which said catch (70 to 74) is located within said handle assembly (12).

29. A multi-purpose tool as claimed in any one of the preceding claims in which the end (100) of said shaft (14) remote from the section to which said working tips (18) may be coupled is formed so that it may be engaged by a power tool (Fig. 8).

Patentansprüche

1. Mehrzweckwerkzeug mit einer Zylinderanordnung (16) zwecks Aufnahme einer Mehrzahl von Werkzeugspitzen (18), mit einem in einem Zylinder (24) der Zylinderanordnung (16) eingreifenden Schaft (14), die in Längsrichtung zwischen einer Lade- und einer Arbeitsstellung relativ zueinander beweglich sind, und mit Mitteln (46, 54) für das Kupplern einer der Werkzeugspitzen (18) mit dem Schaft (14) in der Ladestellung, wobei die mit dem Schaft gekuppelte Werkzeugspitze in die Arbeitsstellung vorgeschoben wird, sobald der Schaft relativ zum Zylinder (24) aus der Lade- in die Arbeitsstellung bewegt wird, gekennzeichnet durch eine solch Ausbildung, daß der Schaft (14) in seiner Arbeitsstellung unabhängig von der Zylinderanordnung (16) drehbar ist.

2. Mehrzweckwerkzeug nach Anspruch 1, dadurch gekennzeichnet, daß der Zylinder (24) eine Mehrzahl von Kammern (40) aufweist, von denen jede eine Werkzeugspitze (18) aufnimmt.

3. Mehrzweckwerkzeug nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die Zylinderanordnung (16) eine erste Schafthülse (20) mit einer ersten Bohrung (28) sowie eine im Abstand davon angeordnete zweite Schafthülse (22) mit einer zweiten fluchtenden Bohrung (36) aufweist, daß zwischen der ersten und der zweiten Schafthülse ein Zylinder (24) drehbar angeordnet ist, der eine Mehrzahl von eingeformten Kammern (40) aufweist zwecks Aufnahme der Werkzeugspitzen, wobei der Zylinder (24) eine zur Längsachse der ersten und zweiten Bohrung (28, 36) abgesetzte und im wesentliche parallel liegende Drehachse aufweist, derart, daß jede Kammer (40) in Aufeinanderfolge mit der ersten und zweiten Bohrung zum Fluchten gebracht werden kann, sobald der Zylinder (24) gedreht wird, und wobei der Schaft (14) in der ersten und zweiten Bohrung (28, 36) und einer ausgerichteten Kammer (40) längsbeweglich zwischen der Lade- und der Arbeitsstellung ist, und daß Mittel (48, 50) für



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das Festlegen des Schaftes relativ zu der ersten und zweiten Schafthülse (20, 22) in der Ladestellung vorgesehen sind.

4. Mehrzweckwerkzeug mit einer Zylinderanordnung (16) zwecks Aufnahme einer Mehrzahl von Werkzeugspitzen (18), mit einem in einem Zylinder (24) der Zylinderanordnung (16) eingreifenden Schaft (14), die in Längsrichtung zwischen einer Lade- und einer Arbeitsstellung relativ zueinander beweglich sind, und mit Mitteln (46, 54) für das Kuppeln einer der Werkzeugspitzen (18) mit dem Schaft (14) in der Ladestellung, wobei die mit dem Schaft gekuppelte Werkzeugspitze in die Arbeitsstellung vorgeschoben wird, sobald der Schaft relativ zum Zylinder (24) aus der Lade- in die Arbeitsstellung bewegt wird, durch gekennzeichnet, daß die Zylinderanordnung (16) eine erste Schafthülse (20) mit einer ersten Bohrung (28) und eine hierzu im Abstand angeordnete zweite Schafthülse (22) mit einer zur ersten Bohrung fluchtenden zweiten Bohrung (36) aufweist, daß ein drehbar zwischen der ersten und der zweiten Schafthülse angeordneter Zylinder (24) vorgesehen ist, der eine Mehrzahl von angeformten Kammern (40) aufweist, von denen jede eine Werkzeugspitze (18) aufnimmt, daß der Zylinder (24) eine zur Längsachse der ersten und zweiten Bohrung (28, 36) abgesetzte und im wesentlichen parallele Drehachse aufweist, derart, daß jede Kammer (40) in Aufeinanderfolge mit der ersten und zweiten Bohrung zum Fluchten gebracht werden kann, sobald der Zylinder (24) gedreht wird, und wobei der Schaft (14) in der ersten und zweiten Bohrung (28, 36) und einer ausgerichteten Kammer (40) längsbeweglich zwischen der Lade- und der Arbeitsstellung ist.

5. Mehrzweckwerkzeug nach Anspruch 4, dadurch gekennzeichnet, daß Mittel (48, 50) für das Festlegen des Schaftes (14) in der Ladestellung gegenüber Drehbewegungen relativ zur ersten und zweiten Schafthülse (20, 22) vorgesehen sind.

6. Mehrzweckwerkzeug nach Anspruch 4 oder 5, gekennzeichnet durch ein Drehen des Schaftes in der Arbeitsstellung unabhängig von der Zylinderanordnung (16) zulassende Mittel (20, 22).

7. Mehrzweckwerkzeug nach einem der vorhergehenden Ansprüche 1 bis 6, dadurch gekennzeichnet, daß die erste Schafthülse (20) an einem Ende eine ersten integralen ringförmigen Flansch (30) und die zweite Schafthülse (22) an einem Ende einen zweiten integralen ringförmigen Flansch (38) aufweist, und daß der Zylinder (24) drehbar zwischen beiden Flanschen angeordnet ist und im wesentlichen den gleichen Durchmesser wie die Flansche aufweist.

8. Mehrzweckwerkzeug nach Anspruch 7, dadurch gekennzeichnet, daß eine parallel zur Achse der ersten Bohrung (28) sich erstreckende Spindel (32) an dem ersten Flansch (30) angeordnet ist, auf der der Zylinder (24) drehbar gelagert ist.

9. Mehrzweckwerkzeug nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß der Zylinder (24) nur in der Ladestellung

zwecks Bewegung einer gewünschten Werkzeugspitze (18) in die gekuppelte Lage mit dem Schaft (14) drehbar ist.

10. Mehrzweckwerkzeug nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die Mittel (46, 54) für das Kuppeln einer ausgewählten Werkzeugspitze (18) mit dem Schaft (14) eine gekrümmte Zungen- und Nut-Anordnung (59, 56) umfassen.

11. Mehrzweckwerkzeug nach Anspruch 10, dadurch gekennzeichnet, daß jede Werkzeugspitze (18) eine gekrümmte Zunge (59) zwecks Kupplung mit einer entsprechend gekrümmten Nut (56) an dem einen Ende des Schaftes (14) aufweist.

12. Mehrzweckwerkzeug nach Anspruch 11, dadurch gekennzeichnet, daß die Zylinderanordnung (16) einen ringförmigen Kanal (60) zur Aufnahme der gekrümmten Zunge (59) einer jeden Werkzeugspitze (18) und zwecks Aufrechterhaltung der Kupplungszuordnung zwischen Werkzeugspitze (18) und Schaft (14) aufweist.

13. Mehrzweckwerkzeug nach Anspruch 12, dadurch gekennzeichnet, daß die Zylinderanordnung (16) einen Führungsring (102) zur Halterung der gekrümmten Zunge (59) einer jeden Werkzeugspitze (18) und zwecks Aufrechterhaltung der Kupplungszuordnung zwischen Werkzeugspitze (18) und Schaft (14) aufweist.

14. Mehrzweckwerkzeug nach einem der vorhergehenden Ansprüche 3 bis 8, dadurch gekennzeichnet, daß die Mittel (48, 50) zum Festlegen des Schaftes (14) gegenüber einer Drehbewegung relativ zu der ersten und zweiten Schafthülse (20, 22) einen vom Schaft abstehenden Führungsstift (48) und eine längliche Keilnut (50) in der Zylinderanordnung (16) zur geleitenden Aufnahme des Führungsstiftes zwecks Verhinderung einer Drehbewegung des Schaftes unabhängig von den Schafthülsen (20, 22), sobald der Führungsstift in die Keilnut eingreift, umfassen.

15. Mehrzweckwerkzeug nach Anspruch 14, dadurch gekennzeichnet, daß die das Drehen des Schaftes (14) unabhängig von der Zylinderanordnung (16) ermöglichenden Mittel (20, 22) eine Ausnehmung (64) innerhalb der Zylinderanordnung (60) zwecks Aufnahme des Führungsstiftes (48) aufweisen und so angeordnet sind, daß ein Drehen des Führungsstiftes ermöglicht wird, wenn der Schaft in der Arbeitsstellung von Schaft und Zylinderanordnung um seine Längsachse gedreht wird.

16. Mehrzweckwerkzeug nach Anspruch 14 oder 15, dadurch gekennzeichnet, daß die Keilnut (50) einen querliegenden Kanal (62) aufweist zwecks Aufnahme des Führungsstiftes (48), sobald der Schaft (14) und die Zylinderanordnung (16) in der Ladestellung sind, wobei der Kanal (62) eine begrenzten Drehbewegung des Schaftes in bezug auf die Zylinderanordnung (16) zwecks Sicherstellung eines vollständigen Ineingriffkommens von ausgewählter Werkzeugspitze (18) und Schaft (14) ermöglicht.

17. Mehrzweckwerkzeug nach einem der Ansprüche 3 bis 8, dadurch gekennzeichnet, daß



die erste Schafthülse (20) einen ersten Flansch (30) für das Halten des Zylinders (24) und einen ringförmigen Kanal (60) zwecks Aufnahme und Aufrechterhaltung der Ausrichtung der Verbindungsenden (59) einer jeden Werkzeugspitze (18) aufweist.

18. Mehrzweckwerkzeug nach Anspruch 17, dadurch gekennzeichnet, daß der Schaft (14) zylindrisch ausgebildet ist und einen abstehenden Führungsstift (48) aufweist, daß längs der ersten Führungshülse (20) eine Keilnut (50) zwecks längsbeweglicher Aufnahme des Führungsstiftes (48) und zur Verhinderung von Drehbewegungen des Schaftes (14) in der Bohrung (28) vorgesehen ist, sobald der Führungsstift (48) in die Keilnut (50) eingreift.

19. Mehrzweckwerkzeug nach Anspruch 18, dadurch gekennzeichnet, daß die Zylinderanordnung (16) eine der Aufnahme des Führungsstiftes (48) dienende Ausnehmung (64) aufweist, sobald der Schaft (14) in der Arbeitsstellung ist, wobei die Ausnehmung (64) an der Öffnung der zweiten Bohrung (36) derart angeordnet ist, daß eine Drehbewegung des Führungsstiftes (48) möglich ist, sobald der Schaft (14) um seine Längsachse gedreht wird.

20. Mehrzweckwerkzeug nach Anspruch 18 oder 19, dadurch gekennzeichnet, daß die Keilnut (50) einen querliegenden Kanal (62) zwecks Aufnahme des Führungsstiftes (48) aufweist, sobald der Schaft (14) und die Zylinderanordnung (16) in der Ladestellung sind, und daß der Kanal (62) eine begrenzte Drehbewegung des Schaftes (14) ermöglicht zwecks Sicherstellung einer vollständigen Kupplung des Verbindungsendes (59) jeder Werkzeugspitze (18) mit dem einen Ende (54) des Schaftes (14).

21. Mehrzweckwerkzeug nach einem der Ansprüche 17 bis 20, dadurch gekennzeichnet, daß Mittel (66 bis 74) für ein lösbares Sperren der Zylinderanordnung (16) und des Schaftes (14) gegenüber relativer Längsbewegung vorgesehen sind, sobald die Zylinderanordnung (16) und der Schaft (14) in der Arbeitsstellung sind, zwecks Verhinderung einer Bewegung in die Ladestellung, bis diese sperrenden Mittel (66 bis 74) gelöst sind.

22. Mehrzweckwerkzeug nach Anspruch 21, dadurch gekennzeichnet, daß die lösbaren sperrenden Mittel (66 bis 74) als Hülsen-Klauen-Anordnung ausgebildet sind.

23. Mehrzweckwerkzeug nach Anspruch 22, dadurch gekennzeichnet, daß die Hülsen-Klauen-Anordnung eine an der Zylinderanordnung (16) befestigte Hülse (66) und eine an dem Schaft (14) angeordnete Klaue (70 bis 74) umfaßt, wobei die Klaue die Hülse lösbar umfaßt, sobald der Schaft und die Zylinderanordnung in der Arbeitsstellung sind.

24. Mehrzweckwerkzeug nach Anspruch 23, dadurch gekennzeichnet, daß die Klaue eine Feder (72) und einen Knopf (70) umfaßt, durch dessen Betätigung die die Hülse (66) sperrende Feder freigegeben wird.

25. Mehrzweckwerkzeug nach einem der

Ansprüche 3 bis 8, dadurch gekennzeichnet, daß ein Kammer-Fühler (98) vorgesehen ist, der lösbar nacheinander mit jeder Kammer des Zylinders in Eingriff gelangt zwecks jeweiliger Ausrichtung der betreffenden Kammer in bezug auf die erste und zweite Bohrung (28, 36).

26. Mehrzweckwerkzeug nach Anspruch 25, dadurch gekennzeichnet, daß der Kammer-Fühler als federbelastete Raste (98) ausgebildet ist.

27. Mehrzweckwerkzeug nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß an dem den Werkzeugspitzen (18) zugeordneten Kupplungsende abgewandten Ende des Schaftes eine Handgriff-Anordnung (12) vorgesehen ist.

28. Mehrzweckwerkzeug nach Anspruch 27, sofern abhängig von Anspruch 23 oder 24, dadurch gekennzeichnet, daß die Klaue (70 bis 74) in der Handgriff-Anordnung (12) angeordnet ist.

29. Mehrzweckwerkzeug nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß das den Werkzeugspitzen (18) abgewandte Ende (100) des Schaftes (14) derart ausgebildet ist, daß es mit einem motorischen Antriebswerkzeug kuppelbar ist.

Revendications

1. Outil à fonction multiple comprenant: un dispositif à barillet (16) pour le logement d'une pluralité d'embouts (18); une tige (14) qui s'engage dans un barillet (24) dudit dispositif à barillet (16) en contact longitudinalement coulissant, ladite tige (14) et ledit barillet (24) étant mobiles longitudinalement l'un par rapport à l'autre entre une position de chargement et une position de travail; et des moyens (46, 54) pour accoupler l'un desdits embouts (18) à ladite tige (14) lorsqu'elle est dans ladite position de chargement, ledit embout accouplé à ladite tige étant avancé à ladite position de travail lorsque ladite tige (14) et ledit barillet (24) se déplacent l'un par rapport à l'autre de ladite position de chargement à ladite position de travail; caractérisé en ce que la construction est telle que ladite tige (14) est autorisée à tourner indépendamment dudit dispositif à barillet (16) lorsqu'elle est dans ladite position de travail.

2. Outil à fonction multiple suivant la revendication 1, dans lequel ledit barillet (24) comporte une pluralité de chambres (40), chaque chambre étant prévue pour le logement d'un desdits embouts (18).

3. Outil à fonction multiple suivant la revendication 1 ou la revendication 2, dans lequel ledit dispositif à barillet (16) comprend un premier canon (20) comportant un premier alésage (28), un deuxième canon (22) espacé dudit premier canon (20) et comportant un deuxième alésage (36) aligné avec ledit premier alésage (28), un barillet (24) disposé de façon tournante entre lesdits premier et deuxième canons (20, 22), une pluralité de chambres (40) ménagées dans ledit barillet, chaque chambre (40) recevant l'un desdits embouts (18), ledit barillet (24) avant un axe



La rotation décalée des axes longitudinaux desdits premier et deuxième alésages (28, 36) et sensiblement parallèle à ces derniers de sorte que chaque chambre (40) peut être alignée successivement avec lesdits premier et deuxième alésages (28, 36) lorsque ledit barillet (24) tourne, la dite tige (14) pouvant coulisser dans lesdits premier et deuxième alésages (28, 36) et dans une chambre alignée (40) pour effectuer ledit mouvement relatif entre lesdites positions de chargement et de travail, et des moyens (48, 50) pour bloquer ladite tige (14) contre une rotation par rapport auxdits premier et deuxième canons (20, 22) lorsque la tige est dans ladite position de chargement.

4. Outil à fonction multiple comprenant: un dispositif à barillet (16) pour le logement d'une pluralité d'embouts (18), une tige (14) qui s'engage dans le dispositif à barillet (16) de façon longitudinalement coulissante, ladite tige (14) et ledit dispositif à barillet (16) étant mobiles longitudinalement l'un par rapport à l'autre entre une position de chargement et une position de travail; et des moyens (46, 54) pour accoupler l'un desdits embouts (18) à ladite tige (14) lorsqu'elle est dans ladite position de chargement, l'embout accouplé à ladite tige étant avancé à ladite position de travail lorsque ladite tige (14) et ledit dispositif à barillet (24) se déplacent l'un par rapport à l'autre de ladite position de chargement à ladite position de travail, caractérisé en ce que le dispositif à barillet (16) comprend un premier canon (20) comportant un premier alésage (28), un deuxième canon (22) espacé dudit premier canon (20) et comportant un deuxième alésage (36) aligné avec ledit premier alésage (28), un barillet (24) disposé de façon tournante entre lesdits premier et deuxième canons (20, 22), une pluralité de chambres (40) formées dans ledit barillet chaque chambre (40) recevant l'un desdits embouts (18), ledit barillet (24) ayant un axe de rotation décalé des axes longitudinaux des dits premier et deuxième alésages (28, 36) et sensiblement parallèle à ces derniers de sorte que chaque chambre (40) peut être alignée à son tour avec lesdits premier et deuxième alésages (28, 36) lorsqu'on fait tourner ledit barillet (24), ladite tige (14) pouvant coulisser dans lesdits premier et deuxième alésages (28, 36) et dans une chambre alignée (40) pour effectuer ledit mouvement relatif entre les dites positions de chargement et de travail.

5. Outil à fonction multiple suivant la revendication 4 et comprenant des moyens (48, 50) pour bloquer la dite tige (14) contre une rotation par rapport auxdits premier et deuxième canons (20, 22) lorsque ladite tige est dans la dite position de chargement.

6. Outil à fonction multiple suivant la revendication 4 ou la revendication 5 et comprenant des moyens (20, 22) pour permettre la rotation de ladite tige indépendamment dudit dispositif à barillet (16) lorsqu'elle est dans ladite position de travail.

7. Outil à fonction multiple suivant l'une quelconque des revendications 3 à 6, dans lequel ledit premier canon (20) comporte à une de ses extré-

mités une première bride circulaire solidaire (30), ledit deuxième canon (22) comporte à une de ses extrémités une deuxième bride circulaire solidaire (38), et ledit barillet (24) est disposé de façon tournante entre lesdites brides (30, 38) et son diamètre est sensiblement le même que celui des dites brides (30, 38).

8. Outil à fonction multiple suivant la revendication 7, dans lequel une broche (32) fait saillie à partir de ladite première bride (30) dans une direction parallèle à l'axe dudit premier alésage (28) et ledit barillet (24) est monté de façon tournante sur ladite broche (22).

9. Outil à fonction multiple suivant l'une quelconque des revendications 3 à 8, dans lequel on peut faire tourner ledit barillet (24) pour amener en embout désiré (18) en prise d'accouplement avec ladite tige (14) seulement lorsque celle-ci est dans ladite position de chargement.

10. Outil à fonction multiple suivant l'une quelconque des revendications précédentes, dans lequel les dits moyens (46, 54) pour l'accouplement d'un embout choisi parmi lesdits embouts (18) à ladite tige (14) comprennent un assemblage à languette et rainure courbes (59, 56).

11. Outil à fonction multiple suivant la revendication 10, dans lequel chaque embout (18) comporte une languette courbe (59) pour l'engagement d'accouplement avec une rainure courbe (56) prévue à une première extrémité de ladite tige (14).

12. Outil à fonction multiple suivant la revendication 11, dans lequel ledit dispositif à barillet (16) comporte un canal annulaire (60) pour recevoir ladite languette courbe (59) de chaque embout (18) et pour maintenir chaque embout en alignement pour l'engagement d'accouplement avec ladite tige (14).

13. Outil à fonction multiple suivant la revendication 12, dans lequel ledit dispositif à barillet (16) comprend en outre un anneau de guidage (102) pour maintenir la dite languette courbe (59) de chaque embout (18) en alignement courbe pour l'engagement d'accouplement avec ladite tige (14).

14. Outil à fonction multiple suivant l'une quelconque des revendications 3 à 8, dans lequel lesdits moyens (48, 50) pour le blocage de ladite tige (14) contre une rotation par rapport auxdits premier et deuxième canons (20, 22) comprennent un ergot de guidage (48) qui fait saillie à partir de ladite tige (14) et une rainure de clavetage longitudinale (50) ménagée dans ledit dispositif à barillet (16) pour recevoir ledit ergot de guidage en engagement coulissant, ce qui empêche la rotation de ladite tige indépendamment desdits canon (20, 22) lorsque ledit ergot de guidage (48) se trouve dans ladite rainure de clavetage (50).

15. Outil à fonction multiple suivant la revendication 14, dans lequel lesdits moyens (20, 22) pour autoriser la rotation de ladite tige (14) indépendamment dudit dispositif à barillet (16) comprennent un logement (64) à l'intérieur dudit dispositif à barillet (16), situé de manière à rece-



voir ledit ergot de guidage (48) et dans une position qui permet la rotation dudit ergot de guidage lorsqu'on fait tourner ladite tige (14) autour de son axe longitudinal et que ladite tige (14) et ledit dispositif à barillet (16) sont dans ladite position de travail.

16. Outil à fonction multiple suivant la revendication 14 ou la revendication 15, dans lequel ladite rainure de clavetage (50) comporte un passage transversal (62) disposé pour recevoir ledit ergot de guidage (48) lorsque ladite tige (14) et ledit dispositif à barillet (16) sont dans ladite position de chargement, ledit passage transversal (62) permettant ainsi une rotation limitée de ladite tige (14) par rapport audit dispositif à barillet (16) pour assurer un engagement positif de l'embout choisi (18) avec la dite tige (14).

17. Outil à fonction multiple suivant l'une quelconque des revendications 3 à 8, dans lequel ledit premier canon (20) comprend en outre une première bride (30) pour supporter ledit barillet (24) et comportant un canal annulaire (60) pour recevoir et maintenir l'alignement d'une dite extrémité de connexion (59) de chaque embout (18).

18. Outil à fonction multiple suivant la revendication 17, dans lequel ladite tige (14) est cylindrique et dans lequel ladite tige comprend en outre un ergot de guidage (48) qui fait saillie à partir de ladite tige, et ledit premier canon (20) comprend en outre une rainure de clavetage longitudinale (50) pour recevoir ledit ergot de guidage (48) en engagement coulissant, ce qui empêche la rotation de ladite tige (14) dans ledit premier alésage (28) lorsque ledit ergot de guidage (48) se trouve dans ladite rainure de clavetage (50).

19. Outil à fonction multiple suivant la revendication 18, dans lequel ledit dispositif à barillet (16) comporte en outre un logement (64) disposé pour recevoir ledit ergot de guidage (48) lorsque ladite tige (14) est dans la dite position de travail, ledit logement (64) étant ménagé à l'orifice dudit deuxième alésage (36) et étant situé pour permettre la rotation dudit ergot de guidage (48) lorsque ladite tige (14) tourne autour de son axe longitudinal.

20. Outil à fonction multiple suivant la revendication 18 ou la revendication 19, dans lequel ladite rainure de clavetage (50) comporte un passage transversal (62) disposé pour recevoir ledit ergot de guidage lorsque ladite tige (14) et ledit barillet (16) sont dans ladite position de chargement, ledit passage transversal (62) permettant ainsi une rotation limitée de ladite tige (14) pour assurer un engagement positif de ladite extrémité de connexion (59) dudit embout avec ladite première extrémité (54) de la dite tige.

21. Outil à fonction multiple suivant l'une quelconque des revendications 17 à 20 et comprenant en outre des moyens (66 à 74) pour bloquer de façon libérable ledit dispositif à barillet (16) et ladite tige (14) contre un mouvement longitudinal relatif lorsque ledit dispositif à barillet (16) et ladite tige (14) sont dans ladite position de travail, ce qui empêche le mouvement vers ladite position de chargement jusqu'à ce que lesdits moyens de blocage (66 à 74) soient libérés.

22. Outil à fonction multiple suivant la revendication 21, dans lequel lesdits moyens de blocage libérable comprennent un assemblage à manchon et verrou (66 à 74).

23. Outil à fonction multiple suivant la revendication 22, dans lequel ledit assemblage à manchon et verrou comprend un manchon (66) fixé audit dispositif à barillet (16) et un verrou (70 à 74) connecté à ladite tige (14), ledit verrou retenant de façon libérable ledit manchon (66) lorsque ladite tige et ledit dispositif à barillet sont dans ladite position de travail.

24. Outil à fonction multiple suivant la revendication 23, dans lequel ledit verrou comprend un ressort (72) et un bouton (70), ledit bouton actionnant ledit ressort pour libérer ledit manchon (66) lorsqu'on appuie sur ledit bouton.

25. Outil à fonction multiple suivant l'une quelconque des revendications 3 à 8, et comprenant en outre un indicateur de chambre (98) qui s'engage de façon libérable successivement dans chaque chambre dudit barillet, de manière à positionner la chambre, ainsi engagée, en alignement avec lesdits premier et deuxième alésages.

26. Outil à fonction multiple suivant la revendication 25, dans lequel ledit indicateur de chambre est un enclenchement à rappel par ressort (98).

27. Outil à fonction multiple suivant l'une quelconque des revendications précédentes et comprenant en outre une poignée (12) à l'extrémité de la tige opposée à la partie à laquelle lesdits embouts (18) peuvent être accouplés.

28. Outil à fonction multiple suivant la revendication 27, lorsqu'elle dépend de la revendication 23 ou de la revendication 24, dans lequel ledit verrou (70) à (74) est situé à l'intérieur de ladite poignée (12).

29. Outil à fonction multiple suivant l'une quelconque des revendications précédentes, dans lequel l'extrémité (100) de ladite tige (14), opposée à la partie à laquelle lesdits embouts (18) peuvent être accouplés, présente une forme telle qu'ou outil d'entraînement peut s'y engager (figure 8).

