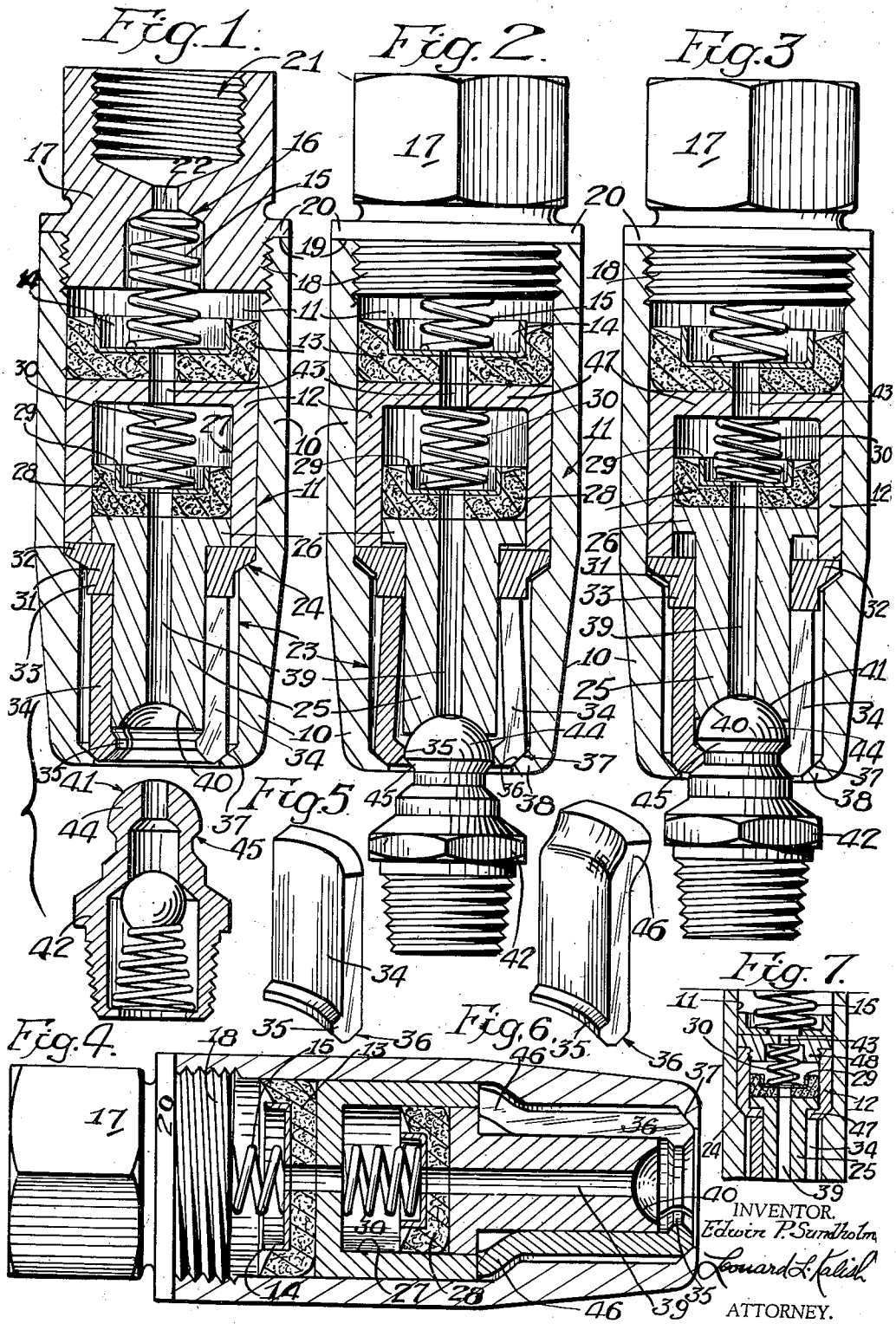
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MULTIJAWED CHUCK-TYPE HYDRAULIC SNAP-ON COUPLER

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MULTIJAWED CHUCK-TYPE HYDRAULIC SNAP-ON COUPLER

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1 Claim. (Cl. 285—169)

The following invention relates to a certain new and useful multi-jawed hydraulic snap-on chuck-type coupler for use in connecting the discharge hose or conduit of a grease-gun or lubricant-dispensing device or pump onto a headed lubricant-receiving "fitting" or "nipple."

One of the objects of the present invention is to increase the efficiency of the coupler and to facilitate and enhance its various functions in gripping and sealing against the "fitting" and in quickly releasing the fitting when release is desired.

With the above and other objects in view, the present invention consists of certain novel features and details of construction all of which will appear more fully from the following description and accompanying drawing.

For the purpose of illustrating the invention, there is shown in the accompanying drawing forms thereof which are at present preferred, since the same have been found in practice to give satisfactory and reliable results, although it is to be understood that the various instrumentalities of which the invention consists can be variously arranged and organized and that the invention is not limited to the precise arrangement and organization of the instrumentalities as herein shown and described.

In the accompanying drawing, in which like reference characters indicate like parts,

Figure 1 represents a cross-sectional view of a coupler embodying my present invention shown in relation to a standard type of lubricant-receiving "fitting" or "nipple," shown in the inoperative position, that is, detached from the fitting.

Figure 2 represents a cross-sectional view of the coupler shown in Figure 1, but partly superimposed upon the head of the "fitting" before the jaws have quite passed over the head and before the jaws have locked beneath the head.

Figure 3 represents a cross-sectional view of the coupler shown in Figures 1 and 2 in the coupled position in respect to the "fitting" or "nipple."

Figure 4 represents a cross-sectional view similar to that shown in Figure 1, but of a modified form of construction embodying my present invention.

Figure 5 represents a perspective view of one of the nipple-gripping jaws of the form of construction shown in Figures 1, 2 and 3.

Figure 6 represents a perspective view of one of the nipple-gripping jaws of the form of construction shown in Figure 4.

Figure 7 represents a further modified form of construction.

The main body housing or shell 10 of the coupler is of generally tubular formation having a generally cylindrical bore 11, in which is slidably mounted the jaw-actuating dual-purpose cylinder-piston 12 which is generally cup-shaped and preferably made of metal. The cup-shaped cylinder-piston 12 may be pressed out of sheet metal or may otherwise be formed of metal (as by casting or drawing or machining out of solid metal).

A generally cup-shaped leather or suitable composition washer 13 is superimposed upon the rear end of the metallic cylinder-piston 12 so as to form a fluid-tight seal between the cylinder-piston 12 and the cylinder wall 11. A thin metallic cup-shaped washer 14 may be inserted within the leather washer 13, in order to keep it spread open and in order to act as a better seat for the helical compression spring 15 which is interposed between the cylinder-piston 12 and the spring seat 16 in the rear plug 17 which forms part of the body or housing of the coupler.

The plug 17 is screw-threadedly telescoped into the rear end of the shell 10 as at 18 to form a fluid-tight seal therewith between the terminal wall 19 of the shell 10 and the lateral flange 20 of the plug 17. If desired, a sealing gasket or washer (preferably a soft copper washer) may be interposed between the end 19 of the shell 10 and the flange 20 of the plug 17 so as further to insure a fluid-tight seal resistant to high pressure.

The plug 17 is likewise generally tubular and is provided with any suitable internal or external thread 21 at the rear end thereof for screw-threaded connection with any hose terminal or conduit to which the coupler is to be attached and is also provided with a passageway 22.

The interior of the shell 10 is reduced in diameter towards the outer end to provide the generally cylindrical jaw-chamber 23 with any suitable shoulder 24 intermediate the two different diametered cylindrical portions 21 and 23.

A generally tubular sealing plunger 25 having an enlarged rear end 26 slidably mounted in the inner cylindrical bore 27 of the cylinder-piston 12 is disposed partly within the zone of the cylindrical bore 11 of the shell 10, but largely within the cylindrical bore 23 of the shell 10, as indicated in the drawing.

The enlarged rear end 26 of the plunger 25 serves as a part of a piston slidable within the

cylindrical bore 27 of the cylinder-piston 12. A cup-shaped leather or suitable composition washer 28 is superimposed upon the end of the piston-like portion 26 within the cylindrical bore 27 to form a fluid-tight piston-like seal between the portion 26 and the cylindrical bore 27. A relatively thin metallic cup-shaped washer or spreader member 29 may also be provided within the cup-shaped leather or composition washer 28, in order to keep it spread open and in order also to act as a seat for the helical compression spring 30 which is interposed between the cylinder-piston 12 and the plunger 25.

An annular metallic member 31 loosely surrounds the smaller diametered portion of the plunger 25 with a lateral portion 32 thereof extending outwardly into the larger cylindrical bore 11 of the shell 10 while the smaller diametered portion 33 thereof extends into the smaller diametered cylindrical portion 23 of the shell 10. The lateral flange 32 is adapted to rest on the shoulder 24 when the device is in a generally inoperative position. A plurality, preferably three, nipple-gripping jaw members 34, each curved to form approximately a third of the circumference, surround the major portion of the plunger 25 and extend therebeyond to a suitable extent and terminate in the inwardly extending nipple-gripping fingers 35 and the inclined camming surfaces 36—the latter being adapted to ride upon and to be actuated by the inclined annular camming surface 37 on the inturned end 38 of the shell 10.

The plunger 25 is provided with a central aperture 39 for conducting grease or lubricant from within the cup-shaped cylinder-piston 12 to the outer end of the plunger 25. The outer end of the plunger 25 is preferably terminated in a generally concave spherical sealing surface 40 or any other suitably shaped sealing surface 40 according to the sealing surface 41 of the fitting or nipple 42 in which the coupler is adapted to be used.

The cup-washers 13 and 14 as well as the cup-washers 28 and 29 are likewise perforated as is also the cylinder-piston 12 as indicated at 43, so that a continuous passageway is provided for lubricant from the rear end of the coupler to the front end.

The fitting 42 is of the form now well known and in common use, and having a head portion 44 with either a spherical or other suitably shaped sealing surface 41 and having an undercut shoulder 45 which is adapted to be engaged by the jaw fingers 35 when the jaw fingers are contracted in an inward radial direction by the action of the cam surface 37 upon the cam surfaces 36 of the jaws.

The action of the coupler of the present invention is shown generally in the successive Figures 1, 2 and 3. In Figure 1 the coupler is shown at rest. In Figure 2 the coupler is shown partly applied to the fitting. In this condition, the fingers 35 of the jaws 34 have been engaged and pressed back slightly into the coupler by the head 44 of the fitting, the maximum diameter of which is too large to permit it passing between the jaws when the jaws are in their fully contracted position shown in Figure 1. In this condition also, the head of the fitting contacts the sealing surface 40 of the plunger 35 and presses it rearwardly. This action causes the plunger 25 to be pushed rearwardly into the hollow cup-shaped cylinder-piston 12 to a slight extent and also causes the hollow cup-shaped cylinder-piston to be moved rearwardly to a slight extent by the jaws 34 acting through the annular member 31. In Figure 3, the coupled condition of the coupler is shown, in which condition the plunger 25 has been pushed further rearwardly but in which the jaws and the cylinder-piston 12 has been permitted to come forward to a slightly greater extent. It should be understood that these three figures are merely illustrative in a general way and are not intended as a dimensionally accurate showing of the precise clearances assumed between the parts in the three different conditions.

When it is desired to uncouple the coupler, the coupler is merely twisted or "cocked" to a suitable angle in relation to the fitting, thereby causing one or two of the jaws to ride over the head and to uncouple therefrom.

In Figures 4 and 6 a somewhat modified form of construction is shown in which the annular member 31 may be eliminated by so shaping the rear ends 46 of the jaws 34 as to be bent outwardly slightly so as to engage both the end of the cylinder-piston 12 as well as the enlarged piston-like portion 26 at the rear end of the plunger 25.

If desired, the generally cup-shaped cylinder-piston 12 may be reversed as shown in Figure 7 so that the closed end 47 thereof will face the outer end of the coupler with the hole sufficiently enlarged therein to permit the passage therethrough of the reduced diameter portion of the plunger 25. In this form of construction, the open end of the cup-shaped cylinder-piston 12 would be closed by a suitable metallic plug 48 having merely a small central perforation corresponding to the perforation 43.

If desired, a ball check valve may be interposed between the upper end of the spring 15 and the seat 16 in the plug 17, so as to prevent the free return of fluid into the conduit rearwardly of the coupler. If desired, instead of the check valve being placed as just indicated, it may be placed between the spring 30 and the edge of the hole 43 and the end wall 47 of the cylinder-piston 12. If desired, the check valve may be either of the fully closed type or may be of the "bleeder" type which permits a slight by-pass through the valve seat.

The component elements of the coupler are so proportioned that the diameter of the piston head 26 will be substantially larger than the effective diameter of the sealing surface 40, so that the hydraulic force tending to press the sealing end 40 of the plunger 25 into sealing contact with the head 44 of the nipple 42 will be substantially greater than the hydraulic force tending to separate the plunger from the nipple head.

The springs 15 and 30 may be suitably proportioned. They may be equal or unequal in strength. Thus, for instance, the spring 15 may be somewhat stronger than the spring 30, so that the compression of the spring alone will not, in and of itself, cause a compression of the spring 15 or will cause only a lesser compression of the spring 15.

The more or less cylindrical or flange-like portions of the metallic cup-shaped washers 14 and 29 are preferably of an axial extent as great or slightly greater than the axial extent of the leather or composition cup-washers 13 and 28, respectively, within which they are disposed, so that the free edge of the metallic washer flange will strike the juxtaposed metallic part of the coupler (upon an extreme compression of the corresponding spring 15 or 30) before the free

edge of the washer 13 or 28 strikes, thereby protecting the latter.

The present invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and it is therefore desired that the present embodiments be considered in all respects as illustrative and not restrictive, reference being had to the appended claim rather than to the foregoing description to indicate the scope of the invention.

Having thus described the invention, what is hereby claimed as new and desired to be secured by Letters Patent, is:

A multi-jawed hydraulic snap-on lubricant-delivery coupler for use on headed lubricant-receiving "nipples," including a generally tubular housing shell, a perforated cup-like metallic member slidably mounted within said housing shell and serving the dual functions of a piston in relation to the housing shell, and in relation to nipple-gripping jaws contained therein, and as a cylinder for the reception within it, of a seal-actuating piston, a generally tubular metallic sealing plunger having a relatively hard metallic outer concave end-sealing surface, for sealing contact with the head of the "nipple" and having an enlarged rear piston-like portion slidably disposed within the cylindrical bore of the aforesaid dual cylinder-piston; the effective cross-sectional area of said piston-like rear portion of said sealing plunger being substantially greater than the effective cross-sectional area embraced within the sealing contact which the outer end of the sealing plunger is adapted to make with the head of the "nipple," spring means urging the aforesaid dual cylinder-piston and said sealing-actuating piston in the same direction towards the discharge end of the coupler, a plurality of circumferentially distributed more or less rigid jaw members, each having an in-turned claw for interlockingly engaging beneath the head of the lubricant-receiving "nipple," said jaws being formed separately and in non-integral relation to the aforesaid dual cylinder-piston but being arranged to be propelled forwardly thereby into interlocking engagement with the head of the "nipple," said jaws being disposed between said tubular housing shell and said tubular metallic sealing plunger; said tubular housing shell having an in-turned camming flange at its discharge end for cammingly engaging the outer surfaces of the in-turned claw portions of said jaws, without engaging the rest of said jaws rearwardly of the in-turned claws thereof.

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