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COUPLER FOR LUBRICANT FITTINGS

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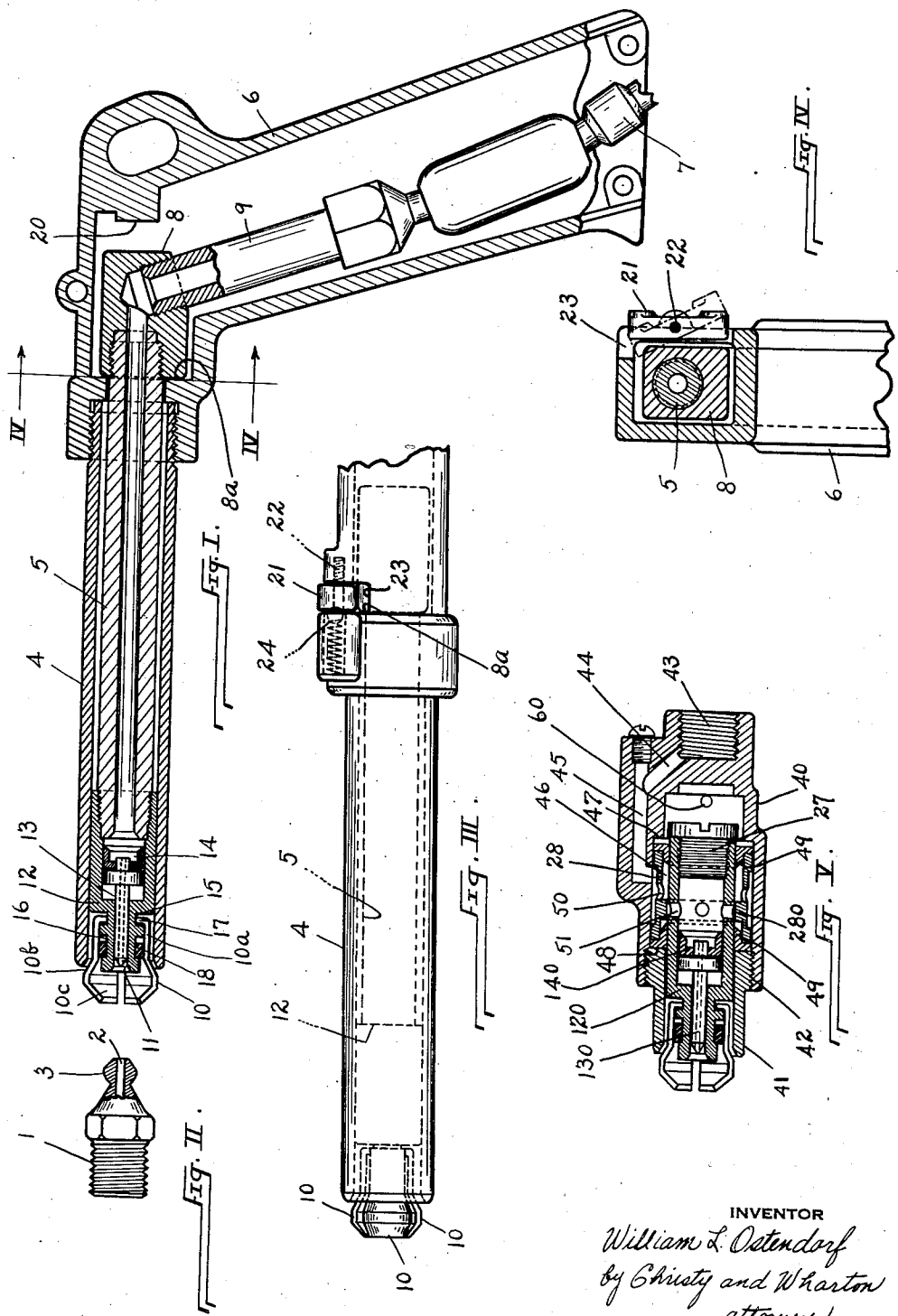


Fig. I.

Fig. II.

Fig. III.

Fig. IV.

Fig. V.

INVENTOR

William L. Ostendorf

by Christy and Wharton

attorneys

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COUPLER FOR LUBRICANT FITTINGS

William L. Ostendorf, Rayland, Ohio

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6 Claims. (Cl. 284—19)

My invention relates to lubricating apparatus, particularly to an adapter or coupler for connecting a grease-gun, or other high pressure lubricant-feeding device, to the conventional lubricant fittings. More particularly, the invention is directed to refinements and improvements in a coupler of the sort that includes a chuck or clamp for locking the coupler upon the fittings.

The advantages and objects of the invention will be understood upon considering the structure illustrated in the accompanying drawing, in which:

Fig. I is a view partly in section and partly in side elevation of a lubricant gun which in service is arranged at the delivery end of a high pressure lubricant-delivering conduit, and in which the refinements of the invention are in exemplary way embodied.

Fig. II is a view partly in side elevation and partly in vertical section of a typical lubricant fitting.

Fig. III is a fragmentary view, showing the barrel of the gun in elevation, as viewed from above in Fig. I.

Fig. IV is a fragmentary view, showing the gun in cross section, on the plane IV—IV of Fig. 1.

And Fig. V is a view in axial section of a modified and elaborated form of the structure in which the invention is found.

Referring to the drawing the reference numeral 1 is applied to a known form of lubricant fitting which in conventional way is secured in the mouth of a passage leading to the bearing or other parts of a machine or piece of apparatus to be lubricated. The fitting includes an inlet passage 2 through which lubricant may be fed; within the body of the fitting a ball-valve (not shown) is provided; and such valve, normally held in passage-closing position by a spring, is adapted to yield under the pressure of injected lubricant into open position. The body of the fitting adjacent to the inlet end of the passage is externally fashioned, as at 3, to be engaged by a chuck carried at the discharge end of the lubricant-delivering device.

In this case the coupler of the invention is embodied in the pistol-shaped device shown in Fig. I. The device includes a barrel 4; the barrel includes a rigid-walled tube 5; and the handle 6 of the device is hollow, permitting the delivery end of a flexible conduit 7, leading from a high pressure lubricant-delivering pump (not shown), to be connected to the inner end of the tube 5. The tube 5 is at its inner end secured in a ported header block 8, and connection between the flexible conduit 7 and the tube is established through the header block and a nipple 9, as shown.

The muzzle of the pistol-like structure includes means for securing the delivery end of the tube 5 in sealed communication with the inlet end of the lubricant-receiving fitting 1. Such means consist in a known organization of chuck-jaws 10 that externally engage the fitting head portion 3 and lock a socket portion 11, provided in a cylinder member 12 at the outlet end of the lubricant-delivering passage, in seated position over the mouth of passage 2 in the fitting. When such union has been established, lubricant is fed through the conduit 7 and tube 5 into the fitting. In refinement of this generally known structure, I may provide, and in this case I do provide, a hollow plunger rod 13 in cylinder 12. The hollow rod 13 is pointed at its outer end and at its inner end is secured to a piston 14 in the bore of the cylinder.

When the muzzle of the gun is locked upon the fitting and flow of lubricant has been initiated, the pressure of the lubricant upon the piston 14 moves the plunger rod 13 outward, and forces its pointed end into tightly seated position in the mouth of the passage 2. The lubricant flows through the plunger rod into the fitting.

Whereas in many couplers of this sort, the pressure of the lubricant is employed to close the chuck-jaws upon the head of the fitting, I advantageously operate the jaws manually; that is, I provide jaw-operating means which are moved into jaw-closing position by manually applied force. With this feature in mind, I shall turn to a more minute description of the improvements of the invention.

It will be perceived that the cylinder 12 is rigidly secured upon the outer end of tube 5, and fits snugly within the barrel 4 of the gun. The body of the cylinder member 12 is of reduced diameter between the portion in which piston 14 is arranged and the outer end in which the socket 11 is formed; two circumferential, axially spaced-apart grooves, 15 and 16, are provided in this reduced body portion of the cylinder member; and one of such grooves 15 receives in the assembly in-turned portions 17 provided on the jaws 10, while the other 16 receives and holds in position a ring 18 formed of such elastic material as rubber—a rubber resistant to petroleum and its distillates. More specifically, each jaw 10 includes a body portion 10a which in form comprises a section of the wall of a cylindrical tube; the inner edge of such portion 10a is folded inward, providing the flange portion 17 that is engaged

in groove 15 in the body of the cylinder member 12; and, extending outward from the portion 10a, the body of each jaw tapers first outward, as at 10b, and then inward, as at 10c. The circumferential continuity of the chuck is in this case completed with three jaws, and, as is manifest in the illustration, the jaws are secured in the assembly between the bodies of the cylinder member 12 and the barrel 4. And it is important to note that the jaws bear radially upon the elastic ring 18.

The barrel 4 is axially movable over the assembly within it, and in the pistol-like device chosen for illustration in this case, the entire outer body structure is movable as a unit on the axis of tube 5 within the barrel. In such relative movement of the parts, the muzzle of the barrel operates the chuck jaws. In service the device is held in the hand as a pistol is held. So held, it is brought to axially aligned position with the fitting 1, and the open-chuck jaws are placed over the head of the fitting, with the socket 11 pressed into seated position upon the outer end of such head. Then the device is thrust forward and the barrel 4 moved axially toward the fitting, with the consequence and effect that the muzzle end of the barrel engages and slides over the tapered faces 10b of the jaws 10, thereby forcing the jaws radially inward, compressing the body of the elastic ring 18, and closing the chuck upon the head of the fitting. The relative movement of the parts is through such interval that the chuck jaws are brought to position entirely within the muzzle end of the barrel. The jaws of the chuck are by the encompassing body of the barrel locked, with their portions 10c in tight engagement beneath the head. And it will be noted that adequate clearance is provided between the header block 8 and the body of the gun, to admit of relative movement of the parts through such interval. Indeed, the body of the gun is provided with an accurately machine lug 20, to insure that the movement shall not exceed the intended limit.

When the chuck has been thus locked upon the fitting, the device is operated in the manner already described, to charge lubricant into the fitting, the flow of lubricant being initiated and controlled in any one of several known ways.

When a sufficient quantity of lubricant has been charged into the fitting, the flow is interrupted, and the gun is pulled away from the fitting. Under such pull the barrel is shifted outward relatively to the chuck, and, while the parts are thus being returned to the relative positions shown in Fig. I, the radial pressure of the barrel on the inclined jaw portions 10b is relieved. The elastic ring 18, relieved of compressive stress, expands and returns the jaws into open positions. This positive opening of the chuck is an important and valuable feature of my structure, and it is by virtue of such feature that the chuck may be readily disengaged from the fitting. The tendency for the chuck to stick and remain locked on the fitting is eliminated.

In view of the foregoing description, it will be understood that the barrel 4 is a chuck-operating member which is accessible to manually applied thrust; that the barrel is movable externally of the chuck assembly between a position in which the chuck is closed and a position in which the chuck is open; that the barrel is responsive to positive, manually applied force in both directions of its movement axially of the assembly; and that the ring 18 provides means for positively swinging the jaws radially outward when the barrel is drawn into chuck-releasing position.

In refinement, I may provide means for securing the barrel in either of its alternate positions of service. In this case, I provide a thumb operated latch 21. The latch 21 is mounted on an axis 22 in a window 23 in the body of the gun, and is adapted to be turned on its axis between the full-line and broken-line positions indicated in Fig. IV. When the gun is locked upon the fitting and the header block 8 within the body of the gun has moved into abutment upon the lug 20, the latch is pressed into its broken-line position, in which position the body of the latch at its inner end laterally engages the body portion 8a of the header block—the body portion that extends radially outward from the tube 5, as shown. Manifestly the latch locks the barrel against movement relatively to the chuck assembly. When it is desired to open the chuck and remove thhe gun from locked engagement with the fitting, the latch is restored to release (full-line) position.

A spring-backed ball 24 may be organized in known way with the latch, yieldingly to stay the latch in either of the alternate positions described.

As shown in Fig. V, the coupler of the invention may be embodied in a more compact structure, and may be elaborated in certain details, to adapt it for use with various types of lubricating apparatus. The counterpart of the barrel 4 shown in Figs. I and III is found in a sleeve or casing formed of two cylindrical members 40 and 41, united in a threaded joint 42, and including a coupler assembly essentially the same as that already described. This sleeve or casing 40, 41 is movable telescopically of the chuck assembly for operating the jaws after the manner in which barrel 4 operates them. As distinguished from the device first described, the lubricant is delivered to the cylinder member 120 through passages 44, 45, formed in the body of the outer casing or barrel portion 40, and in exemplary way I show a threaded socket 43, by means of which the terminal of a lubricant-delivering conduit or hose may be connected to such passages. The passages 44, 45 lead to a chamber 46 within the casing, and the lubricant supplied under pressure to such chamber flows through certain ports, presently to be described, into the cylinder member in which the piston 140 is arranged.

The pressure of lubricant entering between the telescopic assembly of casing and cylinder tends to expand such telescopic structure axially, in such manner that when the chuck has been locked on a fitting, the casing will be forced outward into chuck-releasing position. My structure advantageously includes means for neutralizing this undesirable effect of lubricant pressure.

The means to this end include a closure 27 for the inner end of the cylinder member 120, and a pressure-equalizing valve 28 in the chamber 46. The closure 27 in this case consists in a threaded plug, and the valve 28 consists in a cylindrical sleeve positioned between shoulders 47 and 48 in casing 40, 41. The sleeve is arranged externally of the cylinder member 120, and at its opposite ends is provided with cup-washers 49, 49 that snugly engage the wall of the cylinder member. The sleeve includes ports 50, and the wall of the cylinder includes ports 51, all of such ports being arranged between the washers 49, 49.

When the chuck-operating member **40**, **41** is shifted axially of the cylinder member within, the sleeve **28** and sealing washers **49**, **49** move with it. The sleeve includes a body portion **280** that, when the chuck is open, closes the ports **51** and cuts off the flow of lubricant between the passage **45** and the chamber within cylinder member **120**. And when the casing **40**, **41** is thrust forward into position to close the chuck on a fitting, the sleeve **28**, moving with the casing, carries the valve portion **280** from position of closure over such ports. Thus, when the device is locked on a fitting, the line of lubricant flow between passages **44**, **45** and cylinder member **120** is opened. The lubricant flows through ports **50**, **51** into the cylinder member **120**, whence it is delivered through the hollow plunger **130** into the fitting. Upon drawing the casing **40**, **41** outward into chuck-releasing position, the valve portion **280** is returned to port-closing position, so that the coupler may be removed from the fitting without loss of lubricant.

A vent **60** in the wall of the casing portion **40** prevents the formation of an air-pocket behind the cylinder.

It will be perceived that, by virtue of the structure described, the pressure of the lubricant within the device is prevented from acting in such manner as to shift the cylinder assembly within the casing. The casing may be locked upon the fitting, with no danger of the pressure within the structure moving the parts from adjusted positions.

Numerous modifications in the structure and organization of the particular means in which my invention lies are permissible within the terms and intent of the appended claims.

I claim as my invention:

1. In a coupler for connecting a lubricant-delivering duct in assembly with a lubricant fitting, which coupler includes a cylinder, a plunger in said cylinder, a hollow plunger rod connected to said plunger and extending from the plunger through the wall of said cylinder, a chuck, and means for locking said chuck upon a lubricant fitting, with the end of said plunger rod in communication with the inlet of said fitting; the herein described refinement in which said chuck-operating means comprises a tubular housing movable axially outward of the cylinder and plunger assembly, under the influence of axially applied thrust, into chuck-closing position.

2. The structure of claim 1, in which said tubular housing consists in the muzzle of a pistol-shaped casing.

3. The structure of claim 1, together with means for locking said tubular housing in chuck-closing position.

4. In a coupler including a set of jaws arranged at the outlet of a lubricant-delivering member and adapted to secure such member in conventional assembly with a lubricant-receiving fitting, a jaw-operating member accessible to manually applied thrust and movable relatively to the assembly, under the influence of such thrust, between a position in which said jaws are locked in engagement with said fitting and a position in which said jaws are released from said engagement; the refinement herein described that consists in a valve movable with said jaw-operating member between a position in which the line of flow of lubricant to said outlet is open and a position in which said line is closed.

5. In a coupler including a set of jaws arranged at the outlet of a lubricant-delivering member and adapted to secure such member in conventional assembly with a lubricant-receiving fitting, a member movable between a position in which said jaws are secured in engagement with said fitting and a position in which the jaws are released from such engagement, and a lubricant-delivering element extending axially within said set of jaws; the refinement herein described that consists in an elastic body positioned between said jaws and said lubricant-delivering element, said elastic body, yielding to said jaws when they move into closed position, providing means for restoring said jaws to open position when the jaws are relieved of jaw-closing stress.

6. In a device for securing a lubricant-delivering member in conventional assembly with a lubricant-receiving fitting, said device including a cylinder closed at one end and including an outlet at its opposite end, means for securing the cylinder with its outlet connected to the lubricant-receiving inlet of said fitting, a casing assembled upon said cylinder and movable axially thereof, a lubricant-receiving port opening through the side wall of said cylinder within said casing, a passage in said casing for establishing communication between said lubricant-delivering member and said port, and two sealing rings spaced one from the other axially of the assembly and engaging the side wall of said cylinder on opposite sides of said port in an engagement permissive of relative movement between cylinder and casing.

WILLIAM L. OSTENDORF.