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MUZZLE LOADING GREASE GUN

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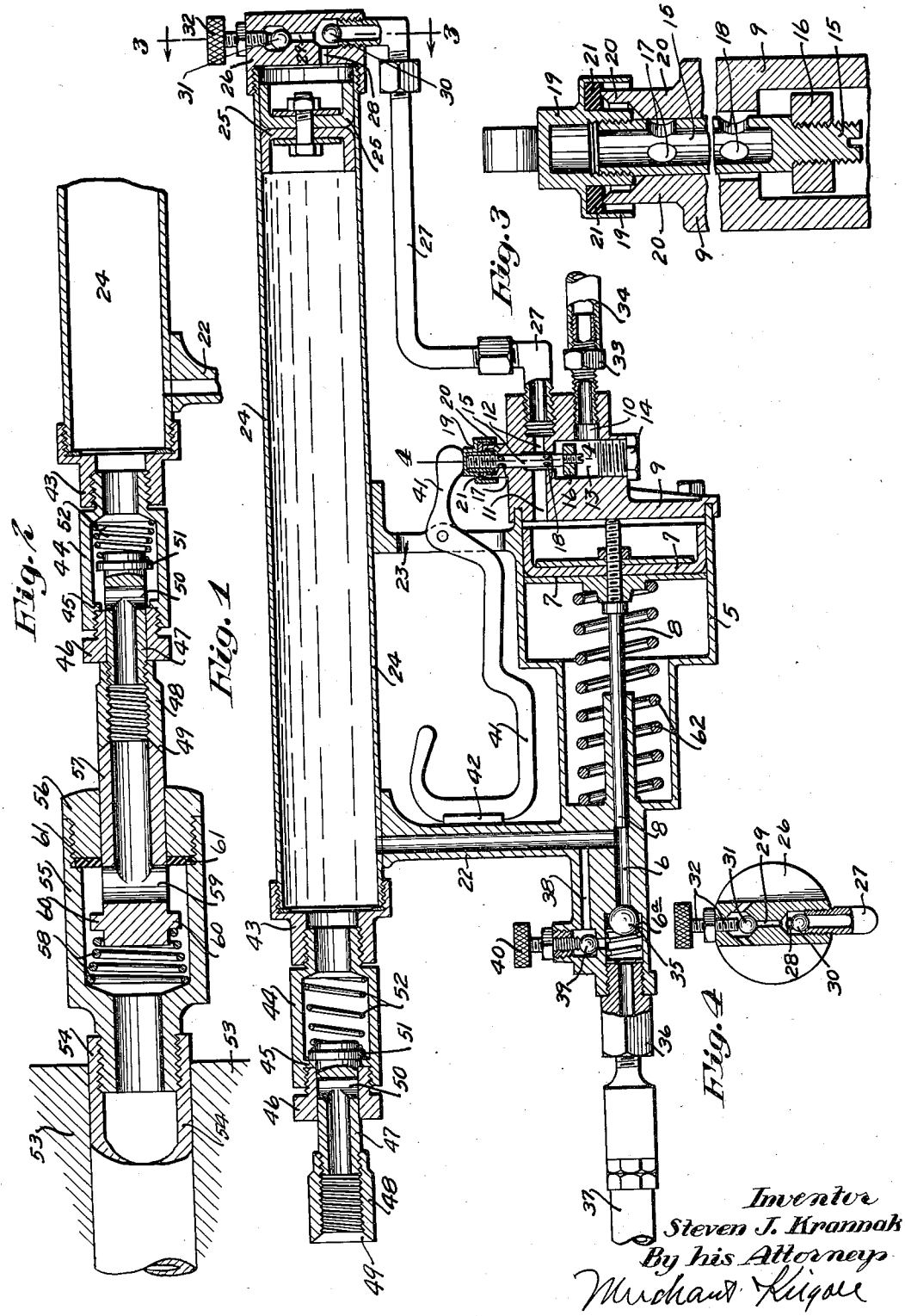


Fig. 1

Fig. 2

Fig. 3

Fig. 4

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MUZZLE LOADING GREASE GUN

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2 Claims. (Cl. 221—47.3)

My invention provides a highly efficient grease gun capable of delivering grease under high pressure and being quickly reloaded with grease. The grease container or barrel is provided with means whereby it may be quickly reloaded through its muzzle or discharge end; and hence this grease gun is herein designated as a muzzle loading grease gun, to distinguish it from other grease guns such as those disclosed and broadly claimed in prior patents issued to V. A. Boker, the one No. 1,801,069 of April 14, 1931, and the other No. 1,803,312, of May 5, 1931.

Generally stated, the invention consists of the novel devices, combinations of devices and arrangement of parts hereinafter described and defined in the claims.

Referring to the drawing, which illustrates the invention, wherein like characters indicate like parts throughout the several views:—

Fig. 1 is a vertical axial section taken through the complete grease gun, some parts being shown in full;

Fig. 2 is an enlarged vertical section taken axially through the filling nozzle of the barrel or grease container of the gun and showing also in section the grease discharge nozzle of a source of grease supply such as a large tank in which the grease is contained under pressure;

Fig. 3 is a detail in section taken on the line 4—4 of Fig. 1; and

Fig. 4 is a detail in section taken on the line 3—3 of Fig. 1.

The ejector portion of the grease gun is in the form of a differential cylinder and differential piston, in which the relatively very small plunger or stem of the piston works in the small grease-ejecting cylinder, and wherein the large piston head is actuated by air pressure.

The large cylinder 5 is axially aligned with and rigidly connected to the relatively very small gun cylinder 6. The large piston 7 works in the large cylinder 5 and its relatively very small plunger or stem 8 works in the small gun cylinder 6. A cylinder head 9 is bolted or otherwise rigidly secured to the outer end of cylinder 5 and is formed with air ports 10, 11, and 12 and with a valve head chamber 13, the lower end of which is normally closed by a screw-threaded plug 14. A tubular valve stem 15 works through the top of the cylinder casting 9 and at a point below the contracted upper portion of the valve chamber 14 is formed with a valve head 16, which when raised, cuts off communication between ports 10 and 11, but which, when depressed, opens up communication between said ports. Valve stem 15 is provided with upper lateral ports 17 and lower ports 18. To the extreme upper end of valve stem 15 is secured a cap 19 that loosely fits over the hub 20 that surrounds the upper portion of said stem 15. This cap is provided with a gasket 21 which, when the cap and stem are depressed, is tightly seated against the hub 20. The operation of this valve will be considered later on.

The cylinders 5 and 6 are rigidly secured respectively by columns 22 and 23 to the bottom of the cylindrical grease container or barrel 24. Column 22 is tubular so that it affords communication between the delivery end of grease-containing barrel 24 and the bore of small cylinder 6. Working in the barrel 24 is a follower-acting piston 25. To the rear end of barrel 24 is rigidly secured a cylinder head 26. An air pipe 27 connects the port 12 of cylinder head 9 to ports 28 and 29 of cylinder head 26. A check valve, shown as in the form of a ball 30, rests on the upper end of pipe 27 and checks the flow from port 28 backward into pipe 27. The port 29 is normally closed by a valve 31 which, as shown, is of ball type, and is pressed against its seat by its screw 32 applied through the top of the head 26. The numeral 33 indicates a nipple screwed into the head 9 and leading to the port 10 thereof. This nipple 33, in practice, will be connected by a flexible pipe or hose 34 to a source of air supply under pressure such as a compressed air tank.

The gun barrel 6, at its delivery end, is enlarged to form a recess 6a to receive a check valve 35 shown as in the form of a ball that permits a flow of grease from barrel 6 under pressure, but checks a backward flow. The coupling nipple 36 is screwed into the large cavity 6a of the barrel 6 and is connected to a flexible grease delivery pipe or hose 37.

A small oil return duct 38 leads from the recess 6a outward of the valve 35 back into the conduit of the tubular column 22. This conduit is normally closed by a valve 39, shown as in the form of a ball that is tightly seated by a screw 40. A finger-operated valve-actuating lever 41 is pivoted to the column 23 with its short end resting on the cap 19. The long end of this lever 41 is shown as guided against lateral movements but free for vertical movements by flanges 42 on the column 22, and its back-turned free end stands in position to be engaged by a finger of a hand holding the grease gun by gripping of barrel 24 in the space between the columns 22 and 23.

To the front or muzzle end of the barrel 24 is secured a head 43 into which is tightly screwed

the threaded tubular end of a valve casing 44, which, near its threaded outer end, is provided with an inwardly projecting annular stop flange 45. A thimble 46 is screwed into the outer end of valve casing 44 and against the flange 45. Working slidably through the thimble 46 is a valve-acting nozzle 47 and onto the end of the latter is screwed the tubular nozzle tip 48. This nozzle tip 48 may be variously formed but, as shown, is internally threaded and provided with an internally beveled rim 49.

The nozzle 47 is tubular except at its inner end, which is left solid and is provided with a diametrical port 50 that is normally closed by the thimble 46. The solid inner end of nozzle 47 is provided with an outstanding annular flange 51 that is normally seated against the flange 45 by a coiled spring 52 compressed between said flange 51 and the base of casing 44.

In Fig. 2, the numeral 53 indicates part of a grease-containing tank in which grease will be maintained under considerable pressure. As shown, this tank is provided with an internally threaded grease discharge tube 54, into which is screwed the tubular externally threaded stem of a valve casing 55, the outer end of which is closed by screw-threaded plug 56. A tubular grease discharge nozzle 57 works slidably through the plug 56 and is spring-pressed forward by a coiled spring 58, compressed between the inner end of the same and the base of valve casing 55. The extreme outer end of this tubular nozzle 57 is conically bevelled so as to closely fit the internally bevelled surface 49 of the nozzle tip 48. The extreme inner end of nozzle 57 is closed but its axial passage is provided with a diametrical port 59 located just in front of an outstanding annular flange 60 formed on the solid inner end portion of said nozzle. As shown, a gasket 61 is seated against the inner end of the plug 60. Normally, spring 58 would press nozzle 57 outward to its limit, with its flange 60 seated against the gasket 61 and with its port 59 closed by the plug 56.

A quite heavy coiled spring 62 is located in the large cylinder 5 and its reduced extension reacts against the base of said extension and against piston 7, and yieldingly holds the same and the plunger 8 retracted as shown in Fig. 1.

Operation

Normally, valve head 16 will be pressed upward to its limit, thereby cutting off communication between the air supply port 10 and the inlet port 11 to the large cylinder 5; and at such time, the rear end of large cylinder 5 will be open to the atmosphere through the tubular valve stem 15 and its ports 17 and 18. When the free end of lever 41 is raised, valve head 16 and its stem 15 will be moved downward as shown in Fig. 1, thereby closing upper ports 17 and cutting off the cylinder 5 from communication with the atmosphere, but opening the supply of compressed air from port 10 around stem 15 and through port 11, to said cylinder 5 and through port 12, and pipe 27 and port 28 to the rear end of grease-containing barrel 24. Normally, of course, the valve acting end of the nozzle 27 will close the discharge end of barrel 24 against the discharge of grease through said nozzle 47. When air is admitted to the rear end of cylinder 5 and to the rear end of barrel 24, air will be admitted into the latter, which will cause forward movement of the follower piston 25, thereby keeping the grease in barrel 24 under pressure and cause the same to flow through the tubular column 22 into the small gun barrel or cylinder that is in front of plunger 8, and by the said air pressure admitted into cylinder 5, large piston 7 will be forced forward, causing plunger 8 to eject the grease from gun barrel 6 under very high pressure. Obviously, the difference in cross-sectional area of piston 7 that comparatively low air pressure on the latter will produce a very high pressure per square inch on the grease in the gun barrel 6.

Each time the lever 41 is raised as above described, one grease-ejecting impulse will be imparted to plunger 8 and a step of forward movement will be given the follower piston 25. Check valve 30 maintains the pressure in the rear end of barrel 24 when the rear end of cylinder 5 is being open to the atmosphere to permit return of piston 7 under the action of spring 62.

When grease delivery pipe 37 is connected to a receiving nipple, after a grease-delivery operation, the pressure in the pipe 37 will be very high so that with some types of nipples and adapters or couplers, the release of the latter from the former will be difficult. This however, is made an easy matter when valve 39 is unseated so as to permit the escape of surplus grease through conduit 38 back into tubular column 22.

The filling or refilling of the grease-containing barrel 24 may be very quickly accomplished with the device shown and described and by an operation illustrated in Fig. 2, and which is as follows:

The nozzle tip of the grease gun is engaged with and then pressed against the projecting end of nozzle 57 under sufficient pressure to open the port 50 of grease-receiving nozzle and to open the port 59 of grease supply nozzle. These nozle port-opening sections will, of course, be produced by compression of springs 52 and 58, to permit a displacement of air back of the follower-acting piston 25 so that said piston will be moved from the front back to the rear of the grease-containing barrel 24, valve 31 must first be opened by releasing of screw 32, and under pressure from the supply tank 53, the grease will be forced into the barrel 24, causing the backward movement of piston 25 and complete filling of the barrel 24 with grease. When this filling has been accomplished, valve 31 should then be again forced to its seat by screw 32, so as to close port 29.

In practice, the supply nozzle from the supply tank will advisably be located where it is close to or accessible from the place where the grease gun would be used in greasing of cars and the like. This makes it possible by the simplest kind of an action above described, to almost instantly refill the grease-containing barrel of the grease gun. Not only can the refilling of the grease gun be very quickly accomplished, but the discharge of grease for lubricating purposes by the means of the grease-ejecting mechanism of the gun is made an easy matter, and positive delivery of grease under high pressure is insured. From what has been said, it is obvious that various alterations and changes in details of construction may be made within the scope of the invention herein disclosed and broadly claimed.

What I claim is:

1. In a grease gun, a grease-containing barrel provided at one end with a grease inlet and at its opposite end with an air inlet passage and between said two noted passages a grease-outlet passage, a normally closed valve in said grease intake passage having a projecting nozzle which, when pressed toward the interior of the barrel, opens said grease intake valve, a valve in said air intake passage arranged to be opened by

pressure toward the interior of said barrel, a floating piston working in said barrel between said air intake port and said grease outlet passage, means for controlling the discharge of grease from said grease-discharge passage, and means for releasing the air pressure in said barrel between said piston and said air intake valve, so that said piston may be retracted when grease pressure is applied to said barrel past the pressure-opened intake valve of said grease intake passage.

2. In a grease gun, a grease-containing barrel provided at one end with a grease inlet and at its opposite end with an air inlet passage and between said two noted passages a grease-outlet passage, a normally closed valve in said grease intake passage having a projecting nozzle which, when pressed toward the interior of the barrel, opens said grease intake valve, a valve in said air intake passage arranged to be opened by pressure toward the interior of said barrel, a floating piston working in said barrel between said air intake port and said grease outlet passage, means for controlling the discharge of grease from said grease-discharge passage, comprising a normally closed outwardly opening check valve, and means for releasing the air pressure in said barrel between said piston and said air intake valve, so that said piston may be retracted when grease pressure is applied to said barrel past the pressure-opened intake valve of said grease intake passage.

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