Aug. 9, 1932. P. WILLIAMSON, JR 1,870,393

MEASURING DEVICE

Filed Jan. 19, 1931

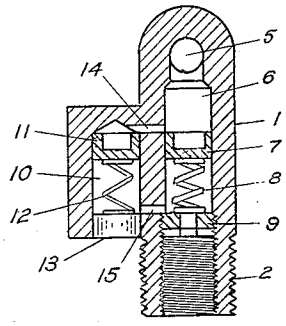


FIG. 2

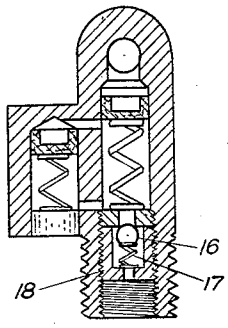


FIG. 1

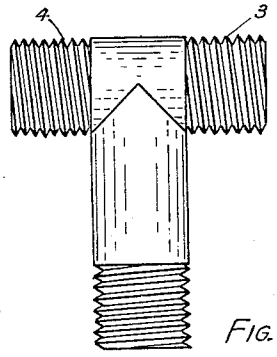


FIG. 5

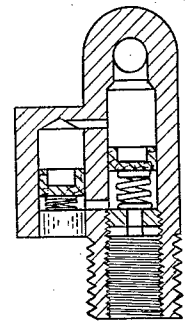


FIG. 3

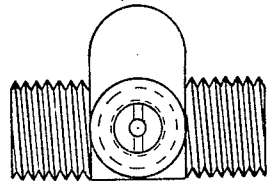


FIG. 6

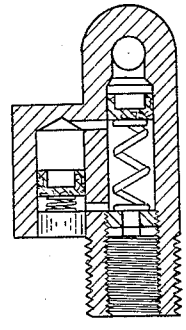


FIG. 4

INVENTOR

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UNITED STATES PATENT OFFICE

PETER WILLIAMSON, JR., OF EVERETT, MASSACHUSETTS

MEASURING DEVICE

Application filed January 19, 1931. Serial No. 509,815.

My invention relates to measuring devices and particularly to measuring devices for centralized lubricating systems. It may also be used as a dispensing device for fluids of various kinds and particularly liquids.

One object of the invention is to provide a novel and efficient fluid measuring device for use in lubricating systems of the intermittent pressure type.

A more general object of the invention is to provide an efficient and accurate device for accurately measuring predetermined quantities of liquids of any kind.

The following is such a full, clear, and complete description of my invention as will, after consideration of the accompanying drawing, enable any mechanic skilled in the art to make and use the device.

In the drawing Figure 1 shows a cross sectional view of the preferred embodiment of the device.

Figure 2 is a cross sectional view of a modification, the parts being the same, except for the omission of the check valve, and taken with the parts in a different position.

Figure 3 is a cross sectional view of the same parts, except the check valve, but in a still different position.

Figure 4 is a cross sectional view of the parts shown in Figures 2 and 3 with the parts in another position.

Figure 5 is a side elevation of the device.

Figure 6 is a plan view of the device.

The reference numeral 1 indicates a body member, preferably formed as a die casting and having threads 2 by means of which it may be connected to any device to which lubricant or any other fluid is to be supplied. The body member is also provided with screw threads 3 and 4 by means of which it may be connected into any suitable pipe line. It will be understood that the lubricant or fluid may pass directly through the device by means of the passageway 5 so that the conduit may pass on to other devices which are to be supplied with lubricant in the same manner.

If the device is to be used singly or if the particular device is at the end of a pipe line, it will be understood that a pipe cap may be used to plug the end of the conduit at 3 or 4 by simply screwing the pipe cap on to the thread instead of connecting the pipe thereto. The body member 1 is provided with a cylindrical bore 6 communicating at its inlet end with the passageway 5. A piston, preferably of the cup leather type, as indicated at 7, is slidably fitted to the bore 6, and a comparatively strong spring 8 held in position by a perforated member 9 is provided to normally hold the piston 7 at the inlet end of the bore.

A second bore 10 is formed in the body member 1 and a piston 11 preferably of the cup leather type is fitted to the bore. A comparatively weak spring 12 held in position by the plug 13 normally holds the piston 11 at the inlet end of the bore. It should be noted that the plug 13 completely seals the lower end of the bore as shown in Figure 1.

A pair of cross passages 14 and 15 are formed in the body member connecting the bore 6 and 10. It will be understood that these cross passages are drilled through both walls of one of the bores and then the holes through the outer wall are plugged up. The holes through the outer wall are not shown because they have nothing to do with the invention and any mechanic may improvise means for forming the bores 14 and 15.

A ball check valve 16 is yieldably held in closed position by a spring 17 which is in turn retained by the perforated threaded plug 18. This check valve may be of any type and does not necessarily embody a ball and spring.

The bores 6 and 10 may, if desired, be made with a slight taper toward the lower end, as shown in Figures 1 and 2. This is particularly desirable if a die casting is used for making the body member. The slight flexing of the pistons 7 and 11 as they move up and down the bores is quite desirable, maintaining the leathers in a soft and flexible condition.

It will be further understood that the above mentioned pipe line will be connected to a source of intermittent fluid pressure so that a varying fluid pressure will exist in the passageway 5 in the body member 1. The degree of pressure is not important, but for

proper operation of the device, the pressure should fluctuate from atmospheric or very little over that, to a considerably higher pressure, for instance, not less than 25 pounds per square inch.

When practically no pressure exists in the passageway 5, the pistons 7 and 11 will assume the positions shown in Figure 1. When the pressure is built up in the conduit 5, the piston 7 is forced back against the comparatively strong spring 8 until it reaches the position shown in Figure 2. At this point, lubricant or other fluid from the passageway 5 flows in past the end of the piston 7, which has now uncovered the passageway 14, and the fluid then flows through the passageway 14 into the cylinder 10 and there displaces the piston 11 and moves it to the end of its stroke. As the pressure continues to increase, the piston 7 is moved to the end of its stroke also, and the pistons 7 and 11 are then in the positions shown in Figure 3, in which position they remain until the pressure in the passageway 5 is released.

When the pressure is released in the passageway 5, the pressure exerted by the strong spring 8 returns the piston 7 to the inlet end of the stroke, as shown in Figure 4. During this time, the piston 11 is maintained at the outlet end of its stroke. After the parts have assumed the positions as shown in Figure 4, the comparatively weak spring 12 returns the piston 11 to the position shown in Figure 1. During this movement, the lubricant is displaced by the piston 11, returning through the passageway 14 behind the piston 7 and into the lower or outlet portion of bore 6. From there it flows back through the passageway 15 into the lower portion of the cylinder 10, thus taking up the empty space which is left behind the piston 11.

The parts remain in the position shown in Figure 1 until after the next impulse of pressure, and when this impulse occurs, the movement of the pistons 7 and 11 toward the outlet end of the device discharges a predetermined quantity of lubricant through the perforation in the member 9. The outer side of this perforation forms a check valve seat with which cooperates a ball check valve 16 which is held in closed position by a spring 17 mounted in the member 18 which is threaded in the lower end of the bore 6. After the parts have been moved to the position shown in Figure 3 and the lubricant discharged from the cylinder 6 which may be termed the discharging cylinder, the comparatively strong spring 8 returns the piston 7 to the inlet end of the cylinder 6 leaving a vacuum behind it in the lower or outlet portion of the discharging cylinder. The piston 11 is then returned by the comparatively weak spring 12 to the inlet end of the cylinder 10, thereby reloading the cylinder 6 with lubricant and transferring the vacuum to the lower end of the cylinder 10. The parts have then returned to the position shown in Figure 1 and when the next impulse of pressure occurs, the piston 7 is moved to the position shown in Figure 2 and then the piston 11 is moved to the position shown in Figure 3, filling up the vacuum behind it and taking in a charge of lubricant in the upper portion of the cylinder 10. The continued flow of lubricant through the passageway 5 then overcomes the strength of the spring 8 and moves the piston 7 to the position shown in Figure 3 discharging a predetermined quantity of lubricant through the check valve 16. It will be understood that this check valve 16 may be of any formation as long as it serves the purpose of an outwardly opening check valve.

In brief, it may be said that the device operates to, first, segregate a charge of lubricant to be discharged at the next operation; second, to discharge positively under pressure a charge of lubricant which was segregated at the previous operation; third, to reload the charging cylinder with the predetermined charge of lubricant which was last measured and to repeat this series of operations as long as the pressure is applied and relieved.

Having described my invention, the following is what I claim:

1. In a device of the class described, means forming a discharging cylinder and a reloading cylinder, pistons in each of said cylinders, means for supplying lubricant to said discharge cylinder under intermittent pressure, and a pair of cross passages connecting said cylinders, the piston in said discharging cylinder traversing one of said cross passages the other of said passages being constantly open.

2. In a device of the class described, means forming a discharging cylinder and a reloading cylinder, pistons in each of said cylinders, means for supplying lubricant to said discharge cylinder under intermittent pressure, a pair of cross passages connecting said cylinders, the piston in said discharging cylinder traversing one of said cross passages, and a check valve in the outlet end of the discharging cylinder.

3. In a device of the class described, a body member having a pair of parallel cylinders therein, a pair of cross passages connecting said cylinders, pistons in said cylinders, one of said pistons traversing one of said cross passages, said last named piston being held in one position by a comparatively strong spring and the other said pistons being held in one position by a comparatively weak spring.

4. In a device of the class described, a body member having a discharging cylinder and a reloading cylinder of substantially equal size therein, pistons in each of said cylinders, cross passages connecting said cylinders at two different points, the piston in said dis-

charging cylinder traversing one of said cross passages, a strong spring for normally holding the piston in said discharging cylinder in one position, and a weak spring for holding the piston in said reloading cylinder in one position.

5. In a device of the class described, a body member having a pair of parallel cylinders therein, one of said cylinders being a discharging cylinder and the other of said cylinders being a reloading cylinder, pistons in each of said cylinders, a strong spring for operating the piston in the discharging cylinder, a weak spring for operating the piston in the reloading cylinder and passageways connecting said cylinders, one of said passageways being traversed by one of said pistons.

6. In a device of the class described, a body member having a pair of parallel cylinders therein, passageways connecting said cylinders one of said cylinders being a discharging cylinder and the other of said cylinders being a reloading cylinder, pistons in each of said cylinders, a strong spring for operating the piston in the discharging cylinder, and a weak spring for operating the piston in the reloading cylinder, and an outwardly opening check valve in the outlet end of the discharging cylinder.

In testimony whereof I affix my signature.

PETER WILLIAMSON, JR.