No. 828,326. PATENTED AUG. 14, 1906.

C. W. MANZEL.

OIL PUMP.

APPLICATION FILED JAN. 21, 1903. RENEWED MAR. 14, 1906.

Fig. 3.

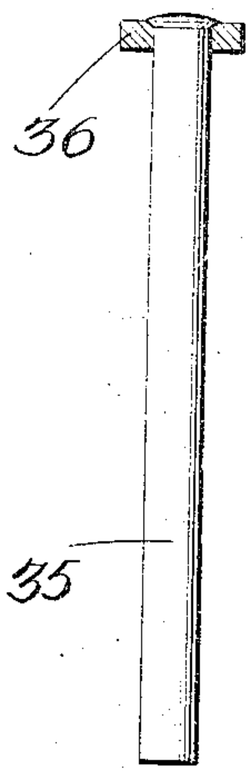


Fig. 1.

Fig. 2.

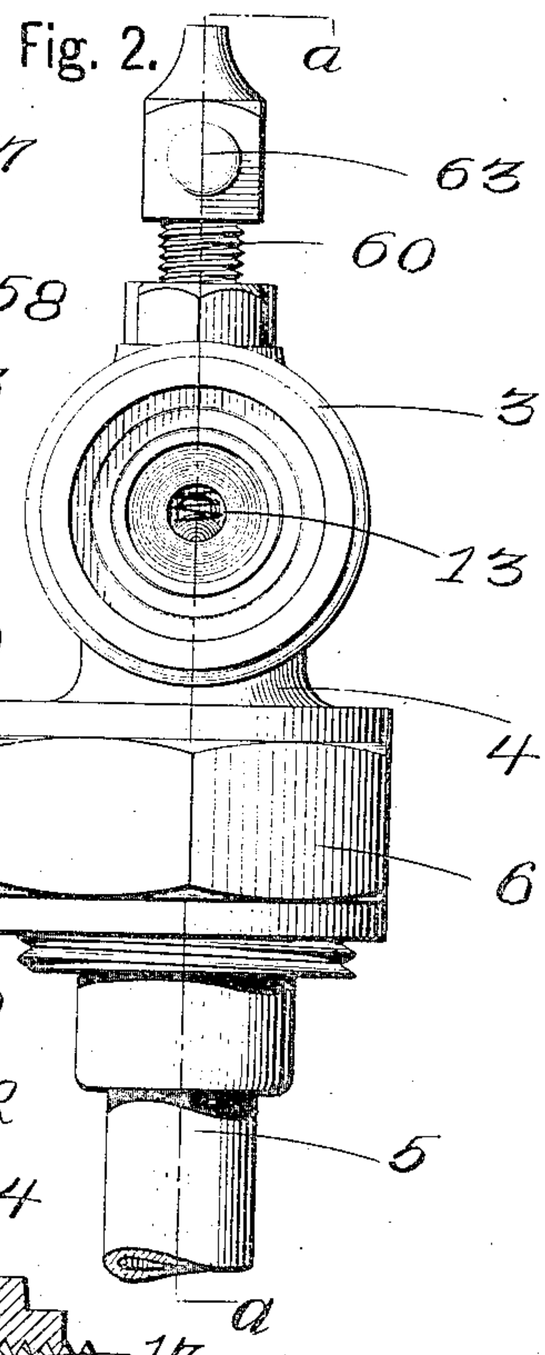


Fig. 4.

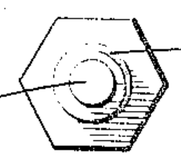


Fig. 5.

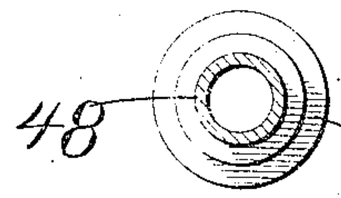


Fig. 6.

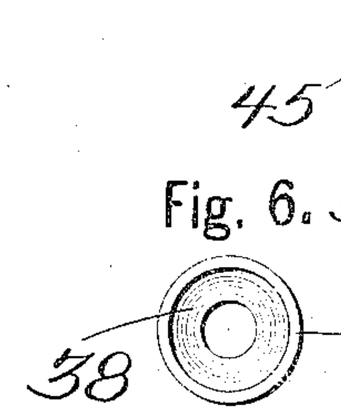


Fig. 7.

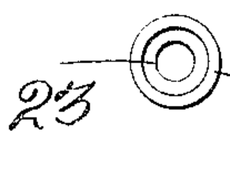


Fig. 8.

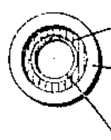


Fig. 9.

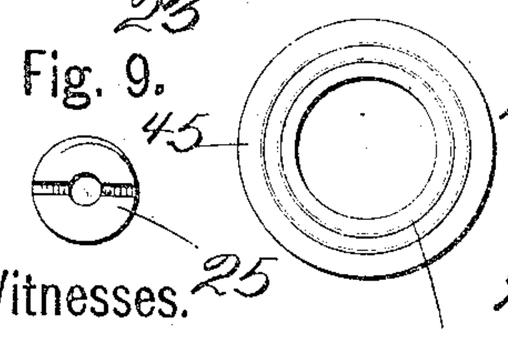


Fig. 10.

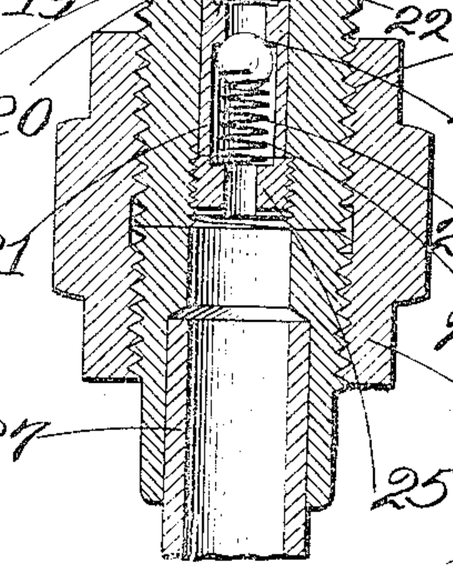


Fig. 11.

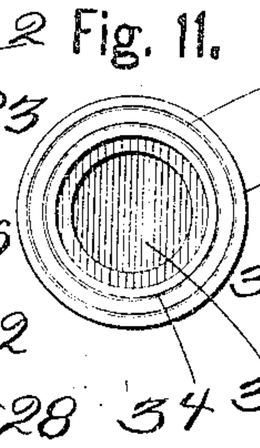
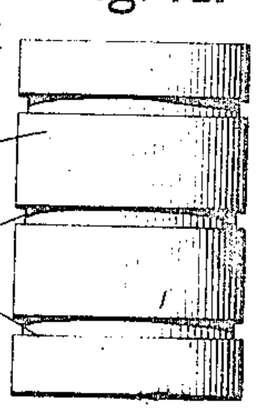


Fig. 12.



Witnesses.

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UNITED STATES PATENT OFFICE.

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OIL-PUMP.

No. 828,326. Specification of Letters Patent. Patented Aug. 14, 1906.

Application filed January 21, 1903. Renewed March 14, 1906. Serial No. 306,012.

To all whom it may concern:

Be it known that I, CHARLES W. MANZEL, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a certain new and useful Improvement in Oil-Pumps, of which the following is a specification.

This invention relates to a pneumatically-operated oil-pump which is adapted to feed oil from an oil-reservoir to any desired point—such, for instance, as the steam-chest of a locomotive.

The object of the invention is to provide a comparatively simple and efficient means for automatically pumping oil by pneumatic mechanism, such as compressed-air mechanism.

The invention also relates to certain details of construction, all of which will be fully and clearly hereinafter described and claimed, reference being had to the accompanying drawings, in which a preferred adaptation of the invention is shown.

Figure 1 is a central vertical section through the pump on line *a a*, Fig. 2. Fig. 2 is a top view of the body of the pump with the air-cylinder and pump-plunger removed. Fig. 3 is a detached view of the plunger with a section through the washer thereon. Fig. 4 is a detached view of the tensioning-screw for the suction-valve. Fig. 5 is a detached section through the air-conducting pipe, also showing an end view of the tail-pipe thereon. Fig. 6 is a detached end view of the spring-inclosing sleeve. Fig. 7 is a detached top end view of one of the valve-casings. Fig. 8 is a detached bottom end view of one of the valve-casings. Fig. 9 is a detached bottom view of the plug for holding the valve-casings in place. Fig. 10 is a detached top view of the leather washer. Fig. 11 is a detached bottom view of the piston-block. Fig. 12 is a detached side view of the piston-block.

In referring to the drawings for the details of construction like numerals designate like parts.

The body 1 of the pump has screw-threaded lower and upper ends 2 and 3 and a central longitudinal opening. A short pipe 4 extends laterally from the body and is coupled to a pipe 5, extending from a source of oil-supply by a sleeve 6. The short pipe 4 is preferably cast integrally with the body, and a transverse opening 7 extends entirely through the body and communicates at an intermediate point with the longitudinal opening in the body and at one end with the opening 8 in the short pipe 4. A portion of the wall of the opening 7 adjacent to the longitudinal opening is cut away to form a seat 9 for a valve-ball, which forms the suction-valve and is retained in place by a spiral spring 10. A portion of the opening 7 on the side opposite the short pipe is screw-threaded, and a screw 11 is threaded into said portion, said screw having a reduced inner end 12, on which the spiral spring 10 is partially supported. That portion of the longitudinal opening through the body above the suction-valve is of the same diameter throughout to permit the passage of an operating-plunger and is indicated by 13 in Fig. 1. The opening reduces in diameter below the suction-valve, as shown at 14 in Fig. 1, and then enlarges abruptly a short distance below to form a chamber 15 for the top discharge-valve. The top discharge-valve consists of a ball 16, slightly smaller in diameter than the chamber 15, which seats against the shoulder 17 at the top of the chamber 15, which then forms a valve-seat, and a spiral spring 18 for retaining the ball 16 against said seat. The opening again enlarges below the chamber 15 to form a pocket 19 for the casings of the lower discharge-valves.

Three of the discharge-valves are preferably employed, one of which is located in the chamber 15, as before described, and the others in separate casings 20 and 21, which are fitted one upon the other in the pocket 19. Each of the casings has a longitudinal opening 22 through it, which reduces abruptly near the top to form a shoulder 23, which constitutes a valve-seat. The longitudinal opening through each casing is substantially similar in diameter to the chamber 15, so that all of the discharge-valves are substantially equal in size. The top surface of the casing 20 of the middle valve forms a bottom support for the spring 18 of the top discharge-valve, the top surface of the casing 21 of the bottom valve forms a bottom support for the spring 24 of the middle discharge-valve, and a screw-plug 25, fitted in the lower screw-threaded end of the longitudinal opening, serves to hold the casings in place and also as

a bottom support for the spiral spring 26 of the bottom discharge-valve. (See Fig. 2.)

A pipe 27 for conducting the oil to the desired lubricating-point is attached to the lower end 2 of the body 1 by a sleeve 28, and an air-cylinder 29 is secured to the upper end by a sleeve 30. A piston-block 31 is slidably arranged in the air-cylinder and has a deep recess 32 extending nearly throughout its length and a series of peripheral grooves 33. The bottom edge of the block 31 is also provided with circular concentric grooves 34. A feeding-plunger 35, which has a washer 36 secured to its upper end to form a head, is arranged in the recess 32 and has its lower end extending down into the upper portion 13 of the longitudinal opening in the body. The head of the plunger is retained in contact with the top wall of the recess 32 by a spiral spring 37. A cylindrical case 38, partially inclosing the lower portion of the spring 37, is closed at the bottom with the exception of a central opening for the passage of the plunger. An enlarged opening 39 is formed above the portion 13 of the longitudinal opening to receive the lower end of the case 38, the lower wall of which is tapered, as shown at 40, and a bushing 41 is fitted between the lower end of the case 38 and the taper wall 40 to pack the plunger.

To carry the compressed air from the channel-opening 42 at the lower end of the case 38 into the outer atmosphere, an opening 44 is cut through the side of the upper portion 3 of the body 1. The top of the upper portion 3 of the body is provided with a shallow seat in which a lever-packing washer 45 is placed, which fits around the case 38 and prevents the passage of air exteriorly around the case.

A screw-threaded extension 46 projects laterally from the upper portion of the air-cylinder 29 and has an opening 47, which communicates with the interior of the cylinder at the top thereof. This extension 46 is coupled to a compressed-air-conducting pipe 48 by a union or coupling 49, the pipe 48 being provided with an enlarged tail portion 50, which fits against the shoulder 51 of the union, as shown in Fig. 1.

The cylinder 29 is closed at the top, as shown at 52 in Fig. 1, and an exteriorly-screw-threaded extension 53 projects vertically up from said top, in which a device for regulating the length of the stroke of the piston block and plunger is located. This device consists of a rod the lower portion 54 of which is screw-threaded and is adapted to screw in an opening in the top 52 and the upper portion 55 of which is plain-surfaced and is adapted to be guided in a cylindrical recess in the extension 53 and an operating-handle 57 on the upper end of the rod. The rod is packed to prevent air-leakage by a bushing 58, which is fitted around the rod and is held in place by a screw-cap 59, fitted on the extension 53. (See Fig. 1.) The lower end of the rod extends down into the air-chamber and into the part of the top of the piston-block, thereby limiting its upward movement, substantially as shown in Fig. 1. The stroke of the piston-block can be lengthened or shortened by turning the handle 57 and vertically adjusting the rod. This regulates the volume of oil-feed.

A device for determining the amount of and the rapidity of the oil-feed is attached to the pump and consists of a test-cock 60, which is provided with a passage or opening 61, extending longitudinally through from its outer end to near its inner end, where it bends and extends out through the side, as shown at 62 in Fig. 1. This cock is provided with a handle 63 to turn it and is screw-threaded from the handle to a point in proximity to the side opening 62.

A short branch 63 projects from the body 1 at a short distance below the suction-valve and on the side opposite the short pipe 4, which has a horizontal opening extending through it and into communication with the valve-chamber 15 of the longitudinal opening in the body. This horizontal opening has an outer screw-threaded portion 64, which merges in an enlarged intermediate chamber 65, and said chamber 65 merges in a reduced opening 66, which extends through into communication with the chamber 15. The shoulder 67 at the merging-point of the chamber 65 and the opening 66 is formed to constitute a seat for the rounded end 68 of the bar 60. The screw-threaded portion 60 engages in the screw-threaded portion 64 of the horizontal opening, substantially as shown in Fig. 1.

The object in having one horizontal suction-valve and three vertically-alined discharge-valves is to absolutely prevent any back leak, as when it is desired to ascertain the quantity of oil flowing the cock 60 is partially unscrewed, thereby bringing the end 68 away from the seat 67 and leaving a free passage for the oil in the chamber 15 through the opening 66, the chamber 65, and the side opening 62 and longitudinal opening 61 in the bar into the surrounding atmosphere, which of course would leave also a free passage for the back pressure in the oil-conducting pipe, which usually communicates with the steam-pressure in the device to be lubricated, were it not for the middle and bottom discharge-valves which close the passage.

The bottom valve is an extra or emergency valve, so that the pump will still work if either of the discharge-valves are disabled.

The packing-washer 45 is provided with circular concentric raised rings 69 on its top face, as shown in Fig. 10, similar to the grooves 34 on the bottom of the block 31, which are formed by the contact of the block

edge with the washer-face and serve to make a tighter connection when the block is forced against the washer at the limit of its downward stroke.

The purpose of the grooves 33 in the block 31 is to lubricate the periphery of the block and also to obstruct the passage of air between the periphery of the block and the wall of the chamber in which it is contained.

The operation of the pump is as follows: Compressed air or any other suitable fluid under pressure being admitted into the air-chamber when the piston-block is in the elevated position, (shown in Fig. 1,) it presses against the top of the piston-block, forcing it down and carrying the plunger with it. When the piston reaches the limit of its downward stroke, it strikes the packing-washer and remains there until the pressure is removed, when the piston-block and the plunger is automatically elevated by the spiral spring. The upward stroke of the plunger creates a partial vaccuum which opens the suction-valve and draws oil into the longitudinal opening in the body.

This improved pump is designed to be used in connection with a valve for alternately admitting and exhausting the compressed air. My preferred type of valve is shown in a companion application.

One of the great advantages of this pump is the ease and readiness with which it can be dismounted for cleaning or repairing.

I claim as my invention—

1. In an oil-pump, a body having a longitudinal opening and a transverse oil-inlet communicating with the longitudinal opening, a plurality of discharge-valves in vertical alinement in the longitudinal opening, a suction-valve at the junction of the oil-inlet and the longitudinal opening and adapted to close the oil inlet and feeding mechanism.

2. In an oil-pump, a body having a longitudinal opening and a transverse oil-inlet communicating with the longitudinal opening, a discharge-valve in the longitudinal opening, a suction-valve at the junction of the oil-inlet and the longitudinal opening and pneumatic feeding mechanism.

3. In an oil-pump, a tubular body, feeding mechanism, a plurality of valves, and a tubular cock for testing the oil-flow having connection to the tubular body between the valves.

4. In an oil-pump, a tubular body having a side oil-inlet, a bottom oil-outlet and a top opening, a plurality of valves, an air-cylinder upon the body registering with the top opening thereof, a piston-block in the air-cylinder, and a plunger extending into the air-cylinder and adapted to be operated by the movement of the piston-block.

5. In an oil-pump, a tubular body having a side oil-inlet and a bottom oil-outlet, an air-cylinder upon said body, at least three vertically-alined discharge-valves arranged longitudinally in the body, a horizontally-arranged suction-valve, and pneumatic feeding mechanism.

6. An oil-pump having a body provided with a longitudinal opening, a side oil-inlet opening and a side test-opening, a plurality of discharge-valves in the longitudinal opening, on one side of the test-opening, a suction-valve for closing the oil-inlet opening, a tubular testing-cock in the test-opening and pneumatic feeding mechanism.

7. In an oil-pump, a tubular body, valves in said body, an oil-chamber formed in the upper portion of the body, a feeding-piston in said chamber having a recess, a plunger having a head fitting in said recess, a spring around said plunger and a cylindrical case partially inclosing the lower portion of the spring, substantially as set forth.

8. In an oil-pump, a tubular body having a side oil-inlet and a bottom oil-outlet, an air-cylinder upon said body, a plurality of discharge-valves arranged longitudinally in the body, a suction-valve, and pneumatic feeding mechanism.

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