J. P. GRAY.

CYLINDER COCK.

APPLICATION FILED JAN. 31, 1916.

1,206,216.

Patented Nov. 28, 1916.

2 SHEETS—SHEET 1.

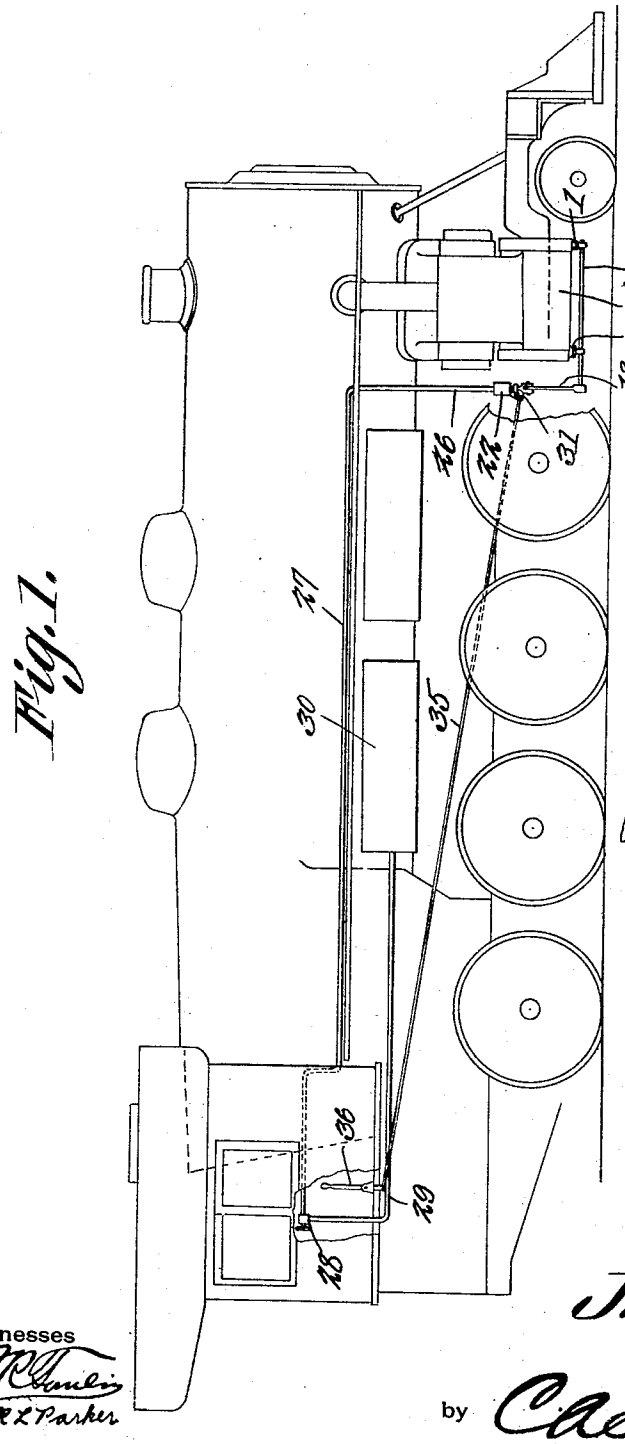


Fig. 1.

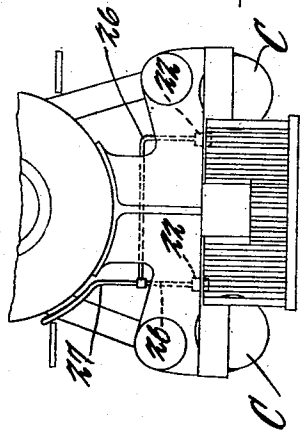


Fig. 2.

Witnesses

J. P. Gray

R. L. Parker

Inventor,

by C. A. Snow & Co.

Attorneys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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2 SHEETS—SHEET 2.

Fig. 5.

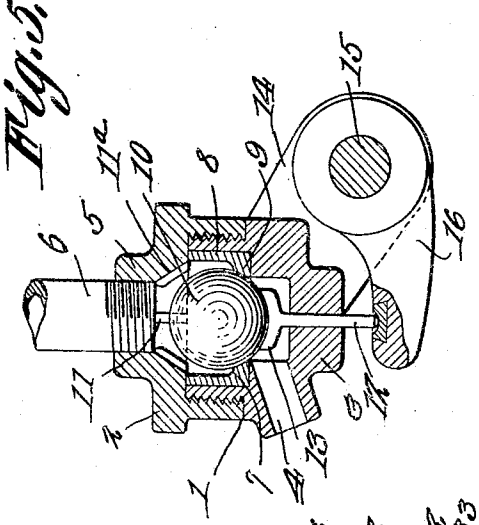


Fig. 6.

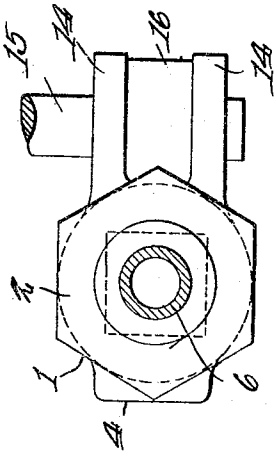


Fig. 4.

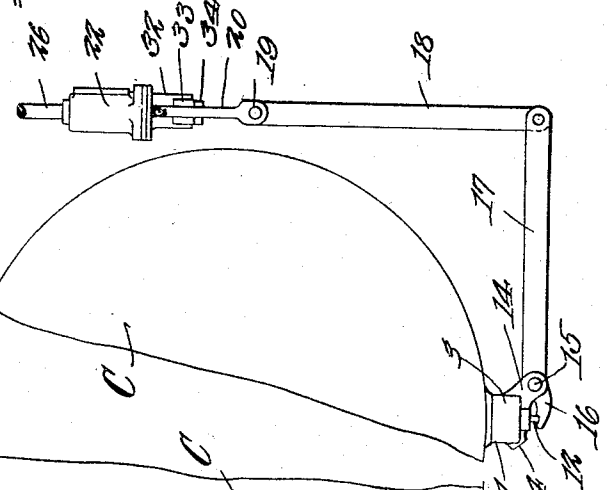
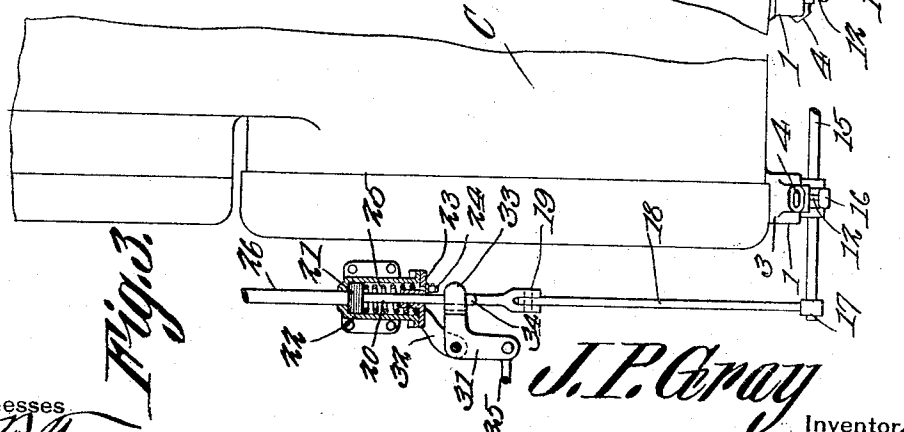


Fig. 3.



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J. P. Gray

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UNITED STATES PATENT OFFICE.

JOSEPH P. GRAY, OF PITTSBURG, KANSAS.

CYLINDER-COCK.

1,206,216. Specification of Letters Patent. Patented Nov. 28, 1916.

Application filed January 31, 1916. Serial No. 75,399.

To all whom it may concern:

Be it known that I, JOSEPH P. GRAY, a citizen of the United States, residing at Pittsburg, in the county of Crawford and State of Kansas, have invented a new and useful Cylinder-Cock, of which the following is a specification.

The present invention appertains to drain cocks for the cylinders of steam engines, especially locomotives, and aims to provide a cylinder cock of novel and improved construction, which is simple, compact and inexpensive in construction, and which is durable, efficient, desirable and serviceable in use.

Another object of the invention is the provision of novel means for operating the cylinder cocks either manually or by means of air, steam or other pressure fluid controlled from the cab of the locomotive.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

The invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a side elevation of a locomotive equipped with the present improvements. Fig. 2 is a fragmental front end view of the locomotive illustrating the small cylinders of the pressure fluid device for operating the drain cocks. Fig. 3 is an enlarged fragmental view illustrating one drain cock and one cylinder. Fig. 4 is an elevation of the parts illustrated in Fig. 3 looking at right angles to the line of view in said figure. Fig. 5 is an enlarged sectional view of one drain cock. Fig. 6 is a plan view of the drain cock.

Each cylinder C of the locomotive, supposing that the present invention is applied to a locomotive, is equipped according to the prevailing practice with a pair of drain cocks, one at each end of the cylinder and at the bottom thereof for draining off the condensate. Each of the drain cocks embodies a casing 1 composed of upper and lower sections 2 and 3, respectively. The lower section 3 is of cup-shape, and the upper section 2 is of cap-shape, and is threaded upon the rim of the section 3, whereby the rims of the two sections are overlapped and threaded together. The sections can be readily assembled and separated. The lower section 3 is provided at any suitable point below the section 2 with an outlet 4, and the section 2 is provided with an upstanding nipple 5 to which is connected the lower end of a short pipe section 6 which is attached to the cylinder as usual, so that any water within the cylinder will flow downwardly into the pipe section 6 and valve casing. The interior of the section 3 is double diametered with the larger diametered portion uppermost, thus providing an upwardly facing shoulder or ledge 7. The outlet 4 communicates with the smaller diametered portion below the shoulder 7. Fitted removably within the larger diametered portion is a sleeve or ring 8 of suitable metal, and having at its lower end an inturned annular flange 9 seated upon the shoulder 7 and forming a seat for a ball valve 10. The valve 10 is of slightly smaller diameter than the interior of the ring 8, and the flange 9 is beveled slightly to accommodate the valve. The upper edge of the ring 8 is flush with the upper edge of the section 3 whereby the section 2 seats upon the upper end of the ring 8 to hold it snugly in place. The upper section 2 is provided with an inverted frusto-conical recess 11^a, the smaller portion of which communicates with the nipple 5 and pipe 6, and the larger portion of which communicates with and is of practically the same diameter as the upper edge of the ring 8. The section 2 is provided around the walls of the recess 11^a with inwardly projecting ribs 11, which limit the upward movement of the valve 10 whereby it cannot close the nipple 5 or pipe 6 when the valve is raised.

The cock is of compact and durable construction, which are desirable attributes of a device of this character, and the valve 10 will ordinarily be seated by the pressure of the steam, to prevent the accidental discharge of the steam.

As a means for unseating the valve 10, a lift rod or stem 12 is slidable through the bottom of the section 3 below the valve 10, and is provided at its upper end with a shoe 13 adapted to contact with the lower surface of the valve, whereby when the rod 12 is raised, it will unseat the valve 10. This will also permit the valve to turn when it

is unseated, whereby the valve will present a new surface to its seat, thereby providing uniform wear throughout the surface of the valve which is highly desirable.

The two cocks of each cylinder C are operated simultaneously, and to this end the section 3 of each drain cock casing is provided at one side with outstanding ears 14, and a longitudinal rock shaft 15 is journaled through the ears 14 of the two drain cocks. Arms 16 are secured upon the shaft 15 between the ears 14 and project under the casings to contact with the lower ends of the rods 12. The outlets 4 are preferably located at those sides of the casings opposite the ears 14, so that the water discharged through the outlets 4 will fall clear of the other parts of the cocks.

As a means for operating the rock shaft 15, a relatively long outstanding arm 17 is attached to the rear end of the shaft 15, and the free end of the arm 17 is connected by an upwardly projecting link 18 with the lower end of a piston rod 20, as at 19, and the piston rod 20 has a piston 21 at its upper end working within a small vertical cylinder 22 disposed in rear of the locomotive cylinder C. The head 23 is attached to the lower end of the cylinder 22 through which the piston rod 20 is slidable, and the head 23 is provided with an automatic drip valve 24 to allow the water to drain from the cylinder 22. A coiled wire expansion spring 23 is disposed within the cylinder 22 and is confined between the piston 21 and head 23 to normally raise the piston and piston rod, thereby to raise the link 18 and swing the arm 17 upwardly. This will swing the arms 16 downwardly to permit the lift rods 12 to move downwardly, for allowing the valves 10 to be seated ordinarily.

The cylinders 22 at the opposite sides are preferably supplied with air, steam or other pressure fluid simultaneously, whereby the drain cocks at the opposite sides will be operated in unison, and to this end, the branches 26 of a pressure fluid pipe 27 are attached to the upper ends of the cylinders 22. The pipe 27 extends into the cab of the locomotive, and is connected to the controlling valve 28, and said valve is in turn connected by means of a pipe 29 with the air tank or reservoir 30, although the pipe 29 can be supplied with steam or other pressure fluid, which when the valve 28 is opened, will flow into the pipe 27 and its branches 26, to pass into the upper ends of the cylinders 22. The engineer or operator can thus readily unseat the valves of the drain cocks, by simply opening the valve 28, and the pressure fluid in passing into the upper ends of the cylinders 22, will force the pistons 21 downwardly, thereby swinging the arms 17, downwardly, and the arms 16 upwardly to lift the rods 12 and unseat the valves 10. This allows the water within the cylinders to be forced out by the steam, or to flow out by gravity. As soon as the valve 28 is closed, thereby shutting off the pressure fluid from the cylinders 22, the pistons 21 are raised under the influence of the springs 25, thereby restoring normal conditions.

The drain cocks at each side can also be operated manually, and to this end a bell crank lever 31 has its elbow fulcrumed to brackets 32 projecting from the lower head 23 of each cylinder 22, the upper horizontally projecting arm of the bell crank lever 31 having a bifurcated portion 33 straddling the piston rod 20 and bearing downwardly against opposite outstanding lugs 34 with which said piston rod is provided. The depending arm of the lever 31 is connected by a rod 35 with a lever or handle 36 mounted within the cab, whereby the lever or handle 36 can be operated for pulling the rod 35, to thereby swing the lever 31. The lever 31 in being swung by the rearward movement of the rod 35 will cause the bifurcated portion 33 to swing downwardly and thus depress the piston rod 20 for unseating the valves 10.

There is no interference between the pressure fluid and manual means for unseating the valves, since each may be used independent of the other.

With the present structure, a suitable clearance is provided between the track and the drain cocks and their operating devices to reduce to a minimum the liability of the apparatus being injured by obstructions upon the track.

The valve seats of the drain cocks can be readily removed and renewed from time to time.

Having thus described the invention, what is claimed as new is:

1. A drain cock embodying a casing comprising a lower cup-shaped section and an upper cap-shaped section, the upper section having its rim fitted detachably upon and surrounding the rim of the lower section, the lower section having an upwardly facing shoulder and an outlet below said shoulder leading to one side, the upper section having an inlet, a ring fitted within the lower section having its upper edge flush with the edge of the lower section and having its lower edge provided with an inturned flange seating upon said shoulder and providing a valve seat, the upper section seating upon the edge of the lower section and the upper edge of said ring, a ball valve within and surrounded by said ring and seatable upon said seat, and a lift rod slidable through the bottom of the lower section for unseating the valve.

2. In a device of the character described, a drain cock having a casing and a normally seated valve therein, a lift rod slidable through the bottom of said casing for un-

seating said valve, a rock shaft having an arm projecting under said rod for raising it and having a second relatively long outstanding arm, a vertical cylinder, a piston working within said cylinder and having a downwardly projecting piston rod, a vertical link connecting the lower end of said piston rod and free end of the second mentioned arm, the piston rod having opposite outstanding lugs, a bracket projecting from the cylinder, a bell crank lever having its elbow fulcrumed to said bracket, one arm of said lever having a bifurcated portion straddling the piston rod and bearing downwardly against said lugs, means connected to the other arm of the bell crank lever for manually oscillating it, and a pressure fluid supply pipe attached to the other end of the cylinder.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

JOSEPH P. GRAY.

Witnesses:
W. O. VAN PELT,
H. R. FLYNN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."