

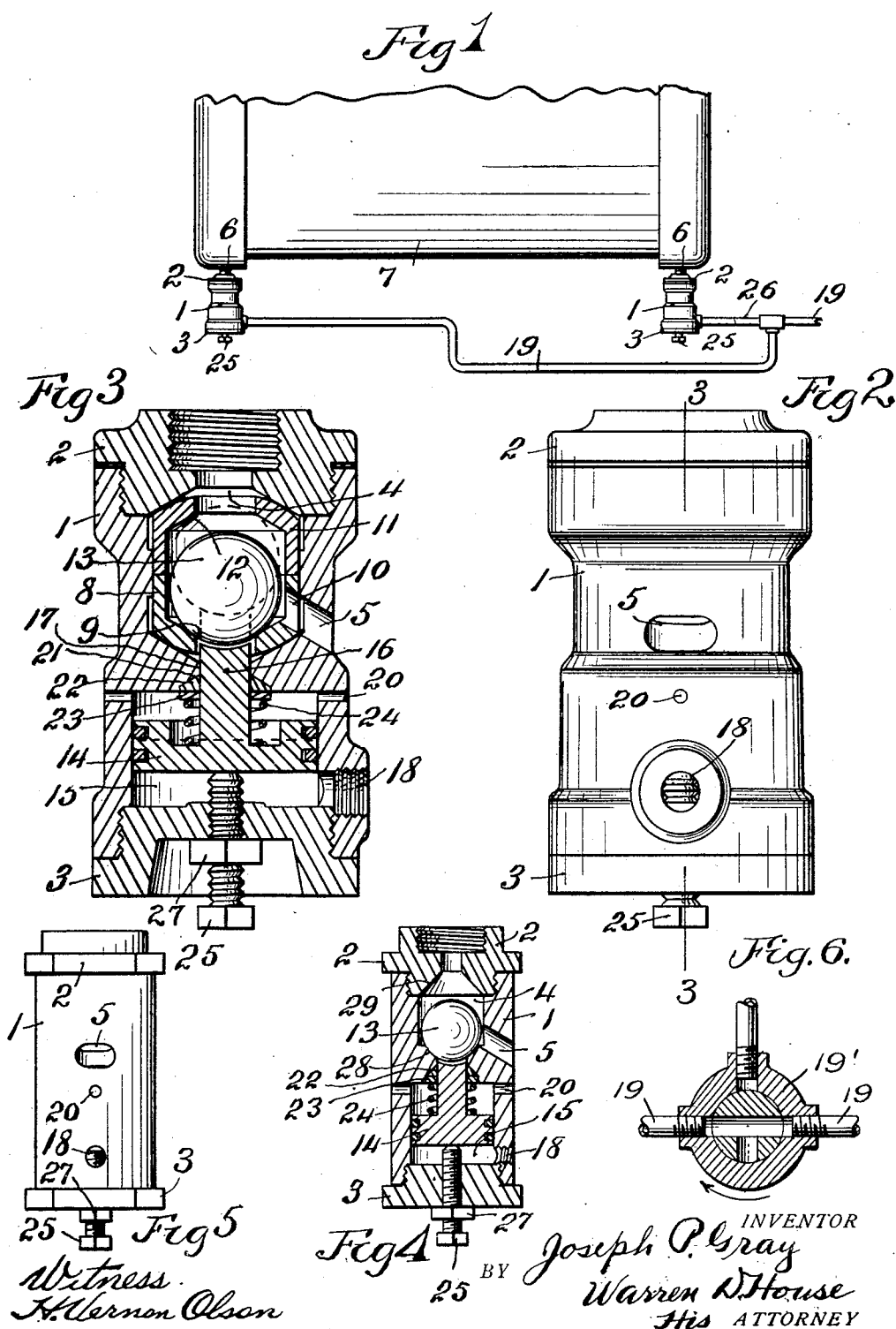
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CYLINDER COCK

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CYLINDER COCK

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My invention relates to improvements in cylinder cocks for draining locomotive and other steam engine cylinders.

One object of my invention is to provide a cylinder cock having a valve and novel means for closing it independently of atmospheric pressure and suction in the cylinder, thus preventing air entering the cylinder through the cylinder drain opening, when steam pressure is off and the engine is drifting, and eliminating burning of oil in the cylinder with consequent liability of cutting of the cylinder and broken or badly worn packing rings; said closing means also holding the valve closed when the engine is working steam.

Another object of my invention is the provision of novel means by which steam may be discharged through the cylinder cock by way of an outlet that can not be closed by the valve, the valve opening automatically or by means of said steam, thereby preventing accidental starting of the engine due to a leaking throttle valve.

A further object of my invention is to provide a simple, novel cylinder cock which is cheap, strong, durable, not likely to get out of order, which is efficient and attachable to engines now in use.

The novel features of my invention are hereinafter fully described and claimed.

In the accompanying drawing illustrating my invention,

Fig. 1 is a side elevation of a portion of an engine cylinder to which are applied two of my improved cylinder cocks.

Fig. 2 is an enlarged elevation of one cock shown in Fig. 1.

Fig. 3 is a section on the line 3—3 of Fig. 2.

Fig. 4 is a vertical section of a modification of my invention.

Fig. 5 is an elevation of the cock shown in Fig. 4.

Fig. 6 is a sectional view of a three way valve in the fluid supply source.

Similar characters of reference designate similar parts in the different views.

Referring to Figs. 1 to 3, the cylinder cock comprises a casing having a central portion

1 and two end portions 2 and 3 having respectively threaded connection with the ends of the central portion 1.

The casing has a passage 4 extending vertically through the upper end portion 2 into the upper portion of the central portion 1, and having in the side of the portion 1 an outlet 5 which communicates with the atmosphere.

The upper end of the upper end portion 2 is internally threaded and has fitted in it a nipple 6, Fig. 1, mounted in one of the drain openings of the engine cylinder 7.

Mounted in the passage 1 is a lower seat member 8 having a central annular seat 9 in its lower end and provided with a lateral opening 10 which communicates with the outlet 5.

Mounted on the lower seat member 8 in the passage 1 is an inverted cup shaped upper seat member 11 having in its upper end a central seat 12.

In the members 8 and 11 is mounted a ball valve 13, which is adapted to rest by gravity on the lower seat 9. The diameter of the valve 13 is less than the inner diameter of the seat members 8 and 11. The valve 13 is adapted to be moved to rest against the upper seat 12. When not resting on the seat 12, a clear passage is afforded from the engine cylinder 7 through the nipple 6 and passage 1 to the atmosphere by way of the opening through the seat 12, the seat members 8 and 11, the lateral opening 10 and the outlet 5, whereby the cylinder 7 may be drained through the cylinder cock.

In order that the ball valve 13 may be lifted to rest against the upper seat 12, when the engine is drifting and when the engine is working steam, there is provided a vertically reciprocative piston 14 in a cylinder 15 in the lower portion of the portion 1, Fig. 3, the lower end of said cylinder 15 being closed by the lower end member 3.

Said piston 14 is provided with an upwardly extending central stem 16 which is reciprocative in a central vertical hole 17 connecting the cylinder 15 with the passage 1. Said stem 16 has a concave upper end adapted to engage and lift the ball valve 13

from the lower seat 9 and hold the valve against the seat 12 against steam pressure from the engine cylinder 7.

To lift the valve 13, the cylinder 15 below the piston 14 has a fluid intake opening 18 in which is fitted a pipe 19 which is connected with a source of fluid pressure, not shown, but which may be the air brake system with which the engine is provided.

As shown in Fig. 6, the supply pipe 19 may include a three way valve 19' of the usual type, for the supply of fluid to and the discharge of fluid from the cylinder 15.

Or the pressure fluid may be a liquid, such as oil held under pressure.

When the pressure fluid is admitted, by the engineer or other operator on the engine, into the cylinder 15, the pressure of the fluid will lift the piston 14 and cause the stem 16 to engage the valve 13 and lift it from the lower seat 9 and hold the valve 13 seated against the upper seat 12. The area of the lower end of the piston 14 is enough greater than the area of the opening in the seat 12 that the fluid pressure lifting the piston will be greater than the steam pressure downwardly on the valve 13.

Peripheral air outlets and inlets 20 communicating with the cylinder 15 above the piston 14 are provided in the portion 1.

Encircling the stem 16 and resting in an annular seat 21 in the upper end of the cylinder 15 is a packing ring 22 which is held in place by a collar 23 on the stem 16, said collar being held against the packing ring 22 by a coil spring 24 encircling the stem 16 and resting at its lower end on the top of the piston 14, Fig. 3.

Fitted in a central threaded vertical hole in the lower end portion 3 of the cylinder cock is a vertical screw 25, the upper end of which is normally disposed so as to hold the piston 14 above the fluid intake opening 18.

A similar cylinder cock is connected to the other end of the engine cylinder 7 by another nipple 6, the intake opening 18 in the central portion of the cock being connected by a branch pipe 26 to the air supply pipe 19, Fig. 1.

When the engine is working steam or drifting the operator on the engine admits air through the pipe 19 and branch pipe 26 into the cylinders 15 of the two cylinder cocks. The fluid thus admitted will lift the valves 13 against the seats 12, through the intermediacy of the pistons 14 and their stems 16.

When the engine is standing with steam pressure off, the closed valves 13 prevent air entering the engine cylinders 7, thus eliminating the burning of the oil in the heated cylinders, and eliminating liability of the cylinders being cut and packing collars injured, due to such burning of the oil.

When the engine is standing with steam up, the engine operator cuts off the fluid pressure from the cylinders 15, and the pressure of the steam forces the valves 13 open, thus preventing a leaky throttle starting the engine accidentally. The fluid pressure is also turned off to permit the engine cylinders to discharge water through the cylinder cocks, when the engine is standing without steam and is cold, as when in the round house. It may also be turned off when the engine is started to permit the steam to blow out water of condensation from the engine cylinders. It is also turned off when water rises in the boiler and goes out through the throttle into the cylinders, thus permitting the valves 13 to lower so that such water is discharged through the passages 1 to the atmosphere, as before described.

After the cylinders are drained the operator again admits fluid pressure through the pipe 19 and branch pipe 26 to the cylinders 15, thus causing the pistons 14 to rise and seat the valves 13 against the upper seats 12.

The screw 25 normally holds the piston 14 in a position such that the stem 16 will permit the ball valve 13 to rest on the lower seat 9, when fluid pressure is off the lower end of the piston 14. The valve will then permit passage of water through the passage 1 and out of the outlet 5. The ball valve 13, when resting on the seat 9, prevents water from passing downwardly through the seat 9 and hole 17 into the cylinder 15, past the stem 16. By having the ball valve 13 separate and independent in its operation from the piston 14, in case of wear in the hole 17 or in the upper seat 12, the valve will, nevertheless, accommodate itself to such wear, and properly seat against the seat 12, and the same precision of alinement between the piston 14 and the valve seat 12 is not required, as would be the case, if the valve and piston were integral. Furthermore, the valve 13, being a ball, will, with use, change as to the portions contacting with the seat 12, thus avoiding excess wear on such contacting portions. In case the pipe 19 should break, so that fluid pressure could not be admitted to the cylinder 15 for closing the valve 13, the screw 25 is turned so as to lift the valve against the upper seat 12 and hold it there until the pipe 19 could be repaired. The screw 25 may have fitted on it a lock nut 27, which bears against the under side of the lower end portion 3 and retains the screw in its adjusted position.

In the modification shown in Figs. 4 and 5, the construction is substantially the same as that shown in Figs. 1 to 3, excepting that the separate valve seat members are eliminated. In the structure shown in Figs. 4 and 5, there is provided the same assemblage as is shown in Figs. 1 to 3, the valve seat members 8 and 11, however, being omitted,

the valve 13 being adapted to seat in its lower position on a concave seat 28 in the middle portion 1 of the cock. In its upper closed position, it is adapted to seat against a concave seat 29 in the lower end of the upper end portion 2. In other respects the construction and mode of operation are the same as has been described with reference to the form shown in Figs. 1 to 3.

I do not limit my invention to the structures shown and described, as many other modifications, within the scope of the appended claims, may be made without departing from the spirit of my invention.

What I claim is:—

1. A cylinder cock having a passage provided with an inlet end adapted for communication with a drain opening of a steam cylinder and having two seats one above the other and an outlet between said seats discharging to the atmosphere, a valve in said passage adapted to rest alternately against said seats for closing said passage at said seats, and means movable independently of said valve through said lower seat and independent of atmospheric pressure for forcing said valve against said one of said seats next adjacent to said inlet end and against steam pressure in said cylinder, and when inactive permitting said valve to rest on and close said lower seat to prevent water passing downwardly therethrough.

2. A cylinder cock having a passage provided with an inlet end adapted for communication with a drain opening of a steam cylinder, and provided with a cylinder with which connects the lower end of said passage, and having an upper seat adjacent to said inlet end and a lower seat above said cylinder, and having an outlet between said seats, a piston reciprocative vertically in said cylinder, a valve in the path of and movable by said piston to close said upper seat, said valve resting on said lower seat to close the latter when the piston lowers to a predetermined position, and means for supplying fluid pressure to said cylinder below said piston.

In testimony whereof I affix my signature.
JOSEPH P. GRAY.