G. M. POINT.

VALVE.

APPLICATION FILED JULY 31, 1916.

1,260,246.

Patented Mar. 19, 1918.

Fig. 1.

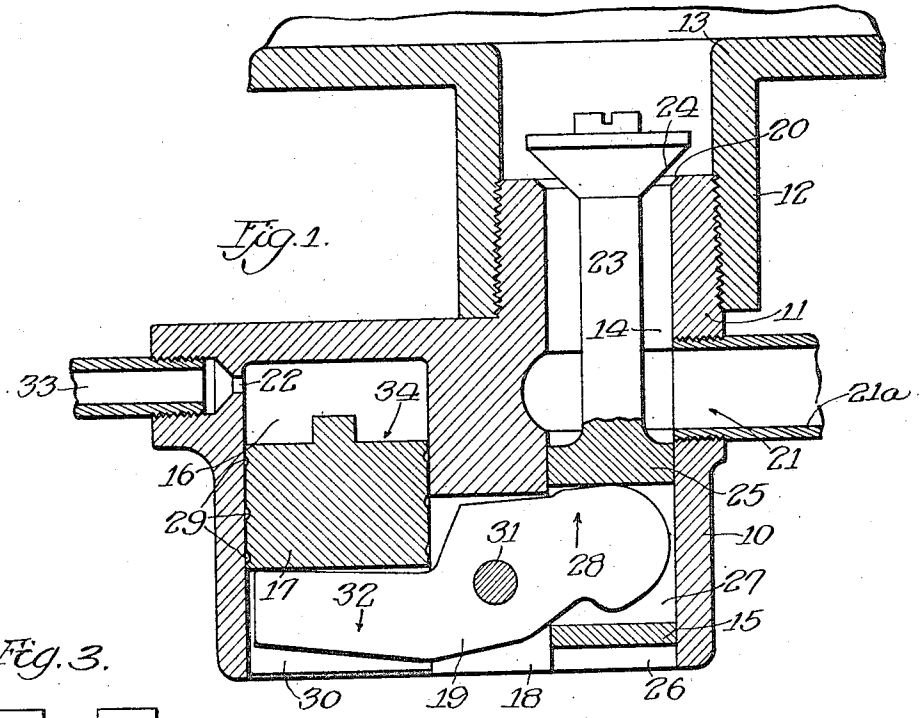


Fig. 3.

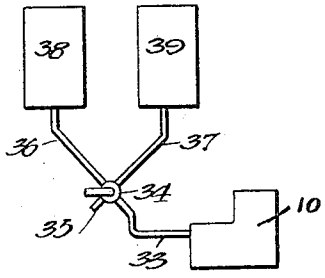


Fig. 2.

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VALVE.

1,260,246. Specification of Letters Patent. Patented Mar. 19, 1918.

Application filed July 31, 1916. Serial No. 112,309.

To all whom it may concern:

Be it known that I, GEORGE M. POINT, a citizen of the United States, and a resident of Huntington, in the county of Cabell and State of West Virginia, have invented certain new and useful Improvements in Valves, of which the following is a specification.

My present invention relates in general to valves, and more particularly to check valves, and has special reference to the provision of an improved form of device of the character referred to adapted for use as a cylinder relief or drain valve.

The principal objects of my present invention are the provision of an improved device of the character referred to adapted to remain closed at all times when the pressure on one side of the valve is above a certain predetermined point, but to open when the pressure falls below such point, either toward equalization with atmospheric pressure, or in the case of the establishment of a partial vacuum, and vice versa; the provision in a valve device of certain automatically acting means for the accomplishment of the purposes referred to; the provision of means whereby the valve may be manually operated when and if desired; the provision of means whereby the time of opening the valve may be varied; the provision of an improved counterweighted actuating device for check valves; the provision of an improved piston device for the purpose referred to; and generally, to improve, simplify and cheapen the cost of production of devices of the character referred to, together with such other objects as may hereinafter appear.

In gaining the benefits above referred to, and attaining certain further advantages to be below pointed out, I have provided a construction, a preferred embodiment of which is shown in the accompanying drawing, wherein:—

Figure 1 is an illustration of my improved structure, taken in vertical section, the parts being shown in the relation assumed when the valve is in "open" position;

Fig. 2 is a similar view showing the relation the parts assume when the valve is in "closed" position.

Fig. 3 is a diagrammatic view of the connections of my improved structure to a source of fluid pressure or vacuum.

Referring now more particularly to Fig. 1, it will be observed that in carrying out my present invention I provide a valve casing 10, which conveniently may have an externally threaded extension 11 whereby it may be attached to a nipple 12 provided at the lower part of a cylinder or other fluid container 13. Within the casing 10 are provided, in the preferred form of my invention, three relatively moving parts, first:— the valve device preferably in the form of a puppet valve; second:—an actuating device for the valve device, preferably in the form of a piston arranged to act as an overbalancing counterweight; and third:—a suitable actuating connection between the actuating device and the valve device, preferably in the form of an oscillating lever adapted to transmute downward movement of one of the devices into upward movement of the other. In order to economize space the valve and piston devices may be arranged in parallelism, and the actuating connection take the form of a rocker pivoted between the valve device and the actuating device. To receive the parts just referred to, the casing 10 is provided with a passage 14 extending longitudinally therethrough for the accommodation of the valve device 15, with a chamber 16 for the reception of the valve actuating device 17, and with a recess 18 within which is suitably mounted the actuating connection 19 between the valve device 15 and the actuating device 17. For convenience in manufacture and for facilitating operation the passage 14 and the chamber 16 are preferably disposed vertically and in parallelism with each other. At the upper end of the passage 14 a suitable valve seat 20 is arranged, and at some convenient point in the passage 14 a drain port or atmospheric vent 21 is placed. Similarly, at some convenient point in the chamber 16 a port 22 is provided, which port may be either an equalizing port in communication with the atmosphere or a connection to a source of pressure, or a means for establishing a vacuum, for purposes to be hereinafter described. For this purpose an arrangement similar to that shown in Fig. 3 may be employed in which the port 22 is connected by a pipe 33 to a 4-way valve. This valve is arranged to connect the pipe 33 either with the atmosphere by pipe 35, with a source of fluid pressure 38 by pipe

36 or with vacuum chamber 39 by pipe 37 as desired.

Referring now to the valve device 15, it will be noted that at the upper end of the stem 23 there is provided a head 24 adapted to form a valve which when it rests against the seat 20 closes communication between the cylinder and the atmosphere through the passage 14. The lower end of the stem 23 is enlarged to form a shank 25 having a sliding fit in the lower part of the passage 14, indicated at 26, whereby the valve device is maintained in proper relation to the passage 14. The shank has a slotted portion, as indicated at 27, for the reception of one end 28 of the actuating connection 19. The valve actuating device 17 in the preferred form comprises a piston which may be grooved, as indicated at 29, having a sliding fit in the chamber 16, the lower end of the member 17 being provided with a slotted bifurcation 30 adapted to receive the other end 32 of the actuating device 19.

On inspection of the drawing it will be apparent that in the assembly of the structure above described the valve device 15 may be inserted in the passage 14 from above, and the actuating device 17 inserted in the chamber 16 from below. The slotted portions 27 of the valve device, and 30 of the actuating device being then placed in line with the recess 18, one end 28 of the actuating connection 19 may be placed in the slotted portion 27, and the opposite end 32 of the member 19 placed within the bifurcation 30. A pivot pin 31 is then passed through the casing 10 and the actuating connection 19, such pin being held in position by any convenient means, such as a cotter (not shown).

Inasmuch as in the preferred construction the weight of the actuating device 17 will be in excess of the weight of the valve device 15, the parts will normally be in the position indicated in Fig. 1, since the piston will have descended to the position shown in Fig. 1, forcing down the end 32 of the actuating connection 19, and causing the opposite end 28 thereof to swing around the pivot 31 and to rise, thereby lifting the valve device, which permits, for example, either drainage of the water of condensation from the cylinder 13 through the passage 14 and vent 15 to the atmosphere, or, if such procedure be desired, the introduction of fluid into the cylinder in reverse order of flow, as by means of the emplacement of a pipe 21^a in the port 21. When, however, pressure is admitted into the cylinder 13 and strikes against the head of the valve 24, the valve 24 will descend and seat against the part indicated at 20, thereby causing the end 28 of the rocker 19 to descend, swinging the opposite end 32 thereof around the pivot 31, and lifting the piston 17, the parts now assuming the position shown in Fig. 2. At any time thereafter when the pressure in the cylinder 13 decreases until the weight of the piston 17 counter-balances the pressure on the head 24, the valve device will again open, unless such action be modified, as by means for such modification now to be described.

If it be desired to open the valve at other times, such, for example, as when there is pressure in the cylinder 13 counter-balancing the weight of the piston 17, fluid pressure may be introduced from the source of fluid pressure 38 through the pipe 33, into the chamber 16, and onto the head 34 of the piston 17, thereby forcing it down and causing the operation above described. If, on the other hand, it be desired to keep the valve closed when the pressure in the cylinder 13 decreases, this may be effected by establishing a partial vacuum in the pipe 33 by connecting it to the vacuum chamber 39.

Any operation hereinabove described may be varied by making the actuating device 17 of less weight than the valve device 15, or by increasing or decreasing the relative weights of the parts 15 and 17.

While the structure above described is of prime utility as a relief valve for locomotive engine cylinders, obviously it has a wide field of usefulness in other situations, such, for example merely, as a drain-cock for air compressors and the like.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is:—

1. A structure of the character described comprising in combination a cylinder, a casing provided with a passage therethrough, a valve for controlling the movement of fluid from said cylinder through said passage and a device operated by gravity for normally holding said valve in one position, the parts being arranged to cause the valve to move into another position when the valve is subjected to fluid pressure.

2. A structure of the character described comprising in combination a cylinder, a casing provided with a passage therethrough, a valve for controlling the movement of fluid from said cylinder through said passage and an actuating device of relatively high inertia for normally holding said valve in one position, the parts being arranged to cause the valve to move into another position when the valve is subjected to fluid pressure, and an actuating connection between said actuating device and said valve.

3. A structure of the character described comprising in combination, a casing, means for connecting said casing to a cylinder, said casing having a passage therethrough, a chamber and recess communicating with said passage and with said chamber, a valve

device disposed in said passage, an actuating device for normally holding said valve device in one position arranged in said chamber, and an actuating member located in said recess arranged to communicate movement from said actuating device to said valve device and vice versa, the parts being arranged to cause the valve to move into another position when the valve is subjected to fluid pressure.

4. A structure of the character described comprising in combination, a casing, means for connecting said casing to a cylinder, said casing having a passage therethrough, a chamber and a recess communicating with said passage and with said chamber, a valve device disposed in said passage, an actuating device for normally holding said valve device in one position arranged in said chamber, and an actuating member located in said recess arranged to communicate movement from said actuating device to said valve device and vice versa, said valve device and actuating device being disposed in substantial parallelism and said actuating member being arranged to transmute downward movement of one of said devices into upward movement of the other of said devices and vice versa, the parts being arranged to cause the valve to move into another position when the valve is subjected to fluid pressure.

5. A structure of the character described comprising in combination, a casing, means for connecting said casing to a cylinder, said casing having a passage therethrough, a chamber and a recess communicating with said passage and with said chamber, a valve device disposed in said passage, an actuating device for normally holding said valve device in one position arranged in said chamber, and an actuating member located in said recess arranged to communicate movement from said actuating device to said valve device and vice versa, said valve device and actuating device being disposed in substantial parallelism and said actuating member being pivoted to the casing intermediate its ends whereby it may oscillate and thereby transmute downward movement of one of the said devices into upward movement of the other said devices and vice versa, the parts being arranged to cause the valve to move into another position when the valve is subjected to fluid pressure.

6. A structure of the character described comprising in combination a cylinder, a casing provided with a passage therethrough, a valve for controlling the movement of fluid from said cylinder through said passage and an actuating device of relatively high inertia for normally holding said valve in one position, the parts being arranged to cause the valve to move into another position when the valve is subjected to fluid pressure, and means for actuating said device at will.

7. A structure of the character described comprising in combination a cylinder, a casing provided with a passage therethrough, and with a piston chamber, a valve for controlling the movement of fluid from said cylinder through said passage and a piston device in said chamber for normally holding said valve in one position by the action of gravity, the parts being arranged to cause the valve to move into another position when the valve is subjected to fluid pressure.

8. A structure of the character described comprising in combination a cylinder, a casing provided with a passage therethrough, and with a piston chamber, a valve for controlling the movement of fluid from said cylinder through said passage and a piston device in said chamber for normally holding said valve in one position by the action of gravity, the parts being arranged to cause the valve to move into another position when the valve is subjected to fluid pressure and means for varying the pressure upon said piston.

9. A structure of the character described comprising in combination a cylinder, a casing provided with a passage therethrough, and with a piston chamber, a valve for controlling the movement of fluid from said cylinder through said passage and a piston device in said chamber for normally holding said valve in one position by the action of gravity, the parts being arranged to cause the valve to move into another position when the valve is subjected to fluid pressure and a connection to a source of fluid pressure for varying the pressure in the piston chamber behind said piston, whereby said valve may be caused to move in a predetermined direction.

10. A structure of the character described comprising in combination a cylinder, a casing provided with a passage therethrough, a check valve device for controlling the movement of fluid from said cylinder through said passage and an actuating device for normally holding said valve device in one position by the action of gravity, said casing being provided with means whereby fluid pressure may be introduced into said passage and thereby said valve device moved from its original position.

11. A structure of the character described comprising in combination a cylinder, a casing provided with a passage therethrough, and with a piston chamber, a check valve device for controlling the movement of fluid from said cylinder through said passage, and a piston arranged in said chamber for normally holding said valve device in one position by the action of gravity, said casing being provided with means whereby fluid pressure may be introduced into said

passage, and thereby said valve device moved from its normal position, and said casing being further provided with a connection to a suitable source of fluid pressure for varying the pressure in said piston chamber whereby the movement of said valve may be controlled.

12. A structure of the character described comprising, in combination, a cylinder, a casing provided with a passage therethrough and adapted to receive a valve for controlling the movement of fluid from said cylinder through said passage, and with a piston chamber, a valve device for controlling the movement of fluid through said passage, a piston device in said chamber having operative relation to the valve device, said piston device being of a weight different from said valve device whereby one of said devices may be moved by the other.

13. A structure of the character described comprising, in combination, a cylinder, a casing provided with a passage therethrough and adapted to receive a valve for controlling the movement of fluid from said cylinder through said passage, and with a piston chamber, a valve device for controlling the movement of fluid through said passage, a piston device in said chamber having operative relation to the valve device, said piston device being of a weight different from said valve device whereby one of said devices may be moved by the other, said piston chamber being provided with a connection to a source of fluid pressure whereby said valve device may be moved by said piston device.

14. A structure of the character described comprising, in combination, a cylinder, a casing provided with a passage therethrough and adapted to receive a valve for controlling the movement of fluid from said cylinder through said passage, and with a piston chamber, a valve device for controlling the movement of fluid through said passage, a piston device in said chamber having operative relation to the valve device, said piston device being of a weight heavier than said valve device whereby said valve device may be moved by said piston device.

15. A structure of the character described comprising, in combination, a cylinder, a casing provided with a passage therethrough and adapted to receive a valve for controlling the movement of fluid from said cylinder through said passage, and with a piston chamber, a valve device for controlling the movement of fluid through said passage, a piston device in said chamber having operative relation to the valve device, said piston device being of a weight different from said valve device whereby one of said devices may be moved by the other, said casing having a connection to a source of fluid pressure whereby said valve may be opened or closed at will.

16. A structure of the character described comprising, in combination, a cylinder, a casing provided with a passage therethrough, and adapted to receive a valve for controlling the movement of fluid from said cylinder through said passage, a valve device for controlling movement of fluid through said passage, a device operated by gravity for acutating the valve device, the parts being arranged to cause said valve device to assume one position when one of the devices is subjected to operating pressure, and another position when such pressure is varied, and connections with a source of fluid pressure for moving said actuating device at will.

In testimony whereof I have hereunto signed my name in the presence of the two subscribing witnesses.

GEORGE M. POINT.

Witnesses:
H. M. BROWN,
J. A. PACK.

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