Nov. 13, 1934. S. G. DOWN 1,980,325

LOCKING ANGLE COCK DEVICE

Filed May 13, 1933

Fig.1.

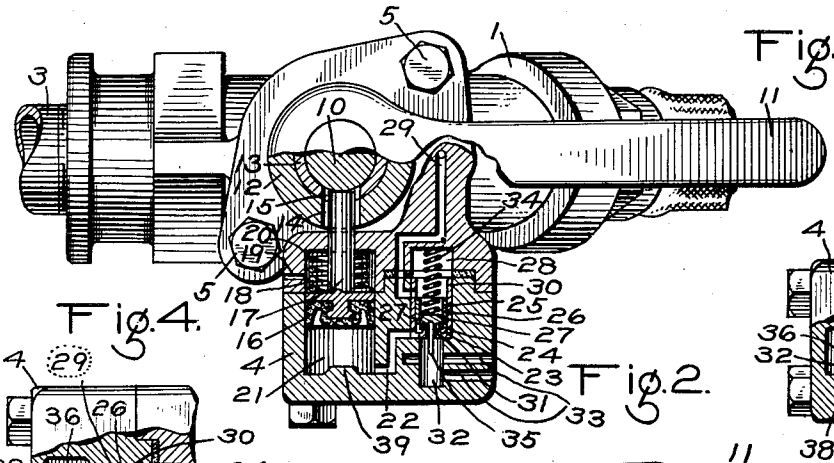


Fig.4.

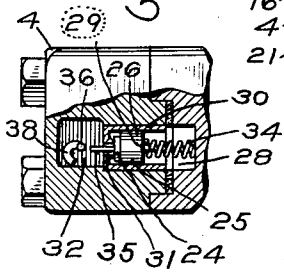


Fig.2.

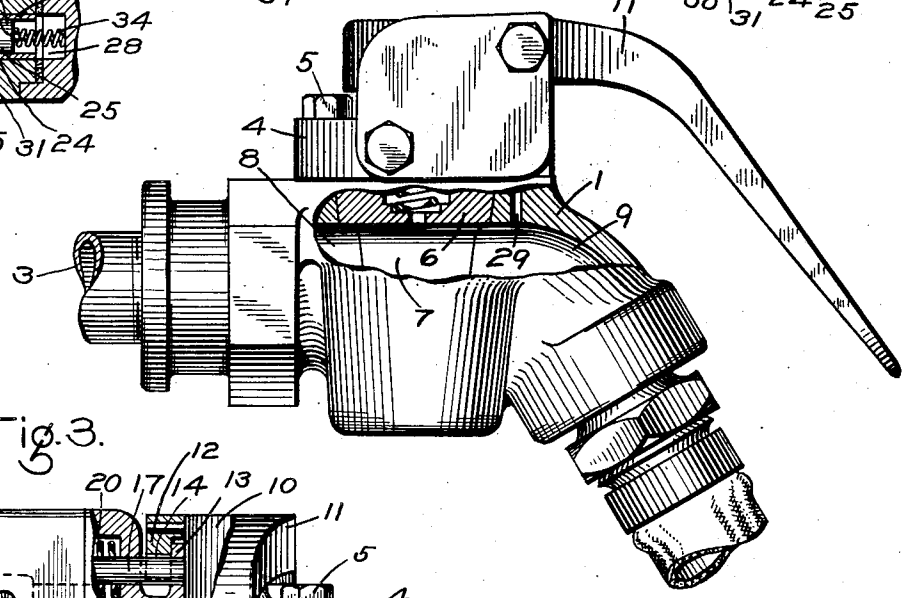


Fig.5.

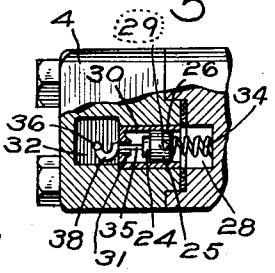


Fig.3.

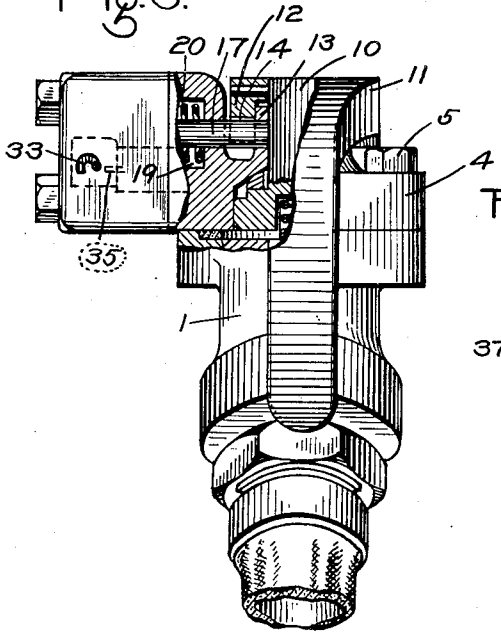


Fig.6.

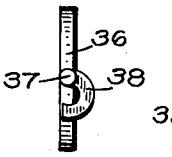
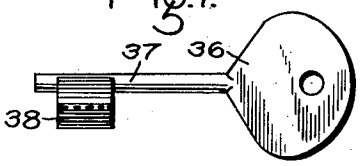


Fig.7.



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Patented Nov. 13, 1934 1,980,325

UNITED STATES PATENT OFFICE

1,980,325

LOCKING ANGLE COCK DEVICE

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Application May 13, 1933, Serial No. 670,875

17 Claims. (Cl. 251—164)

This invention relates to cock devices and more particularly to angle cock devices for use in the fluid pressure brake equipments of railway rolling stock.

In order to insure the proper control of the fluid pressure brakes of a train, it is vitally important that the brake pipe be closed to the atmosphere at the rear end of the last car of the train and that all of the angle cock devices which are interposed in the brake pipe between the engineman's station and the last car of the train be open, and in making up a train, it is the trainman's duty to see that this is done.

It will be understood, that if one of the angle cock devices should be closed the control of the fluid pressure brakes on the cars at the rear of the closed angle cock device is completely cut off, so that the brakes on the rear cars cannot be applied when the engineman initiates an application of the brakes. This loss of brakes on a portion of the train is very dangerous, especially when the train is descending a grade, in that the brakes which are effective may not be adequate to prevent the train from getting beyond control and may result in the wrecking of the train. Heretofore, train wrecks have been caused by the loss of the train brakes on a portion of the train due to someone maliciously closing an angle cock in the train after the train has been made up.

The principal object of my invention is to provide an improved cock device which, when the pipe in which it is interposed is charged with fluid under pressure, will be locked in open position and which cannot be operated to its closed position, while the pipe is charged, until unlocked by the use of a special key which will be in the possession of an authorized person.

Another object of my invention is to provide pneumatically controlled means for locking the angle cock device of a railway car fluid pressure brake equipment in its open position when the brake pipe of the equipment is charged with fluid under pressure and for unlocking the device when fluid is completely vented from the brake pipe.

A further object of my invention is to provide means controlled by fluid under pressure to lock the angle cock device of a railway car fluid pressure brake equipment in its open position when the brake pipe of the equipment is charged with fluid under pressure, and controlled manually while the brake pipe is charged, by means of a special key for unlocking the device and also controlled automatically for unlocking the device when fluid under pressure is completely vented from the brake pipe.

Other objects and advantages will apear in the following more detailed description of the invention.

In the accompanying drawing, Fig. 1 is a plan view, partly in section, of an angle cock device embodying my invention; Fig. 2 is a side elevational view of the angle cock device, a portion of the casing of the device being broken away to show certain fluid conducting passages; Fig. 3 is an end elevational view, partly in section, of the angle cock device; Fig. 4 is a fragmentary end elevational view, mainly in section, of the angle cock device, illustrating a key in position to unlock the device; Fig. 5 is a view similar to Fig. 4, but showing the key and associated parts in unlocking position; and Figs. 6 and 7 are end and side elevational views, respectively, of the key for unlocking the angle cock device.

As shown in the drawing, the angle cock device comprises a casing having a body section 1 which is adapted to be screwed on the end of the brake pipe 3 of a fluid pressure brake equipment of a railway car, and also having a cap section 4 which is secured to the body section by bolts 5 or any other desired means.

Rotatably mounted in the body section 1 is a plug valve 6 having a passage 7 which, when the valve is in its open position, as shown in detail in Fig. 2 of the drawing, connects passages 8 and 9 in the body section, thus establishing an open communication through the angle cock device.

The plug valve 6 is adapted to be rotated by a key or stem 10 which is journaled in the cap section 4 and which, at its inner end, has a driving connection with the valve. For the purpose of rotating the stem 10, an operating handle 11 is provided, which is secured in any desired manner to the outer end of the stem. The inner end of the handle is provided with a depending annular flange 12, the inner surface of which has sliding contact with the outer surface of a sleeve 13 on the cap section, said sleeve encircling and forming a bearing for the stem 10. The flange 12 is provided with an opening 14 which is adapted to register with an opening 15 in the sleeve 13 when the valve 6 and handle are in their open position.

Mounted in the cap section 4, to move at right angles to the axis of the stem 10, is a piston 16 having a stem 17, which stem, when the openings 14 and 15 in the flange 12 of the handle and sleeve 13, respectively, are in registration, is adapted to be projected into the openings, as shown in Fig. 1. It will be seen that when the stem is in this position, it will prevent the rotation of the handle 11 and consequently the stem 10 and valve 6 from their open position to their closed position.

At the stem side of the piston 16 there is a chamber 18 which is open to the atmosphere through a port 19. This chamber contains a spring 20 which is interposed between and engages the piston and cap section and which tends to urge the piston and thereby the stem 17 to unlocking position.

At the other side of the piston 16 is a chamber 21, which is open through a passage 22 to a valve chamber 23 containing a valve 24 carried by a valve member 25 which is slidably mounted in a bushing 30 secured in the cap section. The valve member 25 is provided with an annular flange or skirt 26, and is further provided with ports 27, through which the valve chamber 23 is in constant communication with a chamber 28, to which the passage 9 in the body section 1 is normally open through a passage 29 formed in the body section, cap section and bushing 30.

The bushing 30 is provided with an exhaust passage 31 which leads from the valve chamber 23 to a chamber 32 in the cap section, said chamber being open to the atmosphere through an opening 33 in the cap section.

Contained in the chamber 28 is a spring 34 which, acting through the medium of the valve member 25, normally maintains the valve 24 seated on an annular seat rib formed on the bushing 30 and consequently maintains the communication from the valve chamber 23 to the passage 31 closed.

The valve member 25 is provided with a stem 35 which extends through the bushing 30 and into the chamber 32, where the end thereof is adapted to be operatively engaged by a key 36 which is insertable into the chamber 32 through the opening 33.

The key 36, illustrated, comprises a shank 37 having an integral operating cam 38 adjacent one end. The opposite end of the shank terminates in an enlarged flat end portion, by means of which the key may be rotated.

In operation, when the handle 11 and plug valve 6 of the device are in their open position, as shown in the drawing, and the brake pipe 3 is being charged, fluid under pressure flows from the passage 9 of the body section 1 to the piston chamber 21 by way of passage 29, chamber 28, ports 27 in the valve member 25, valve chamber 23 and passage 22. Fluid under pressure thus supplied to the chamber 21 causes the piston 16 to move forwardly compressing the spring 20 and moving the stem forwardly through the registering openings 14 and 15 in the handle 11 and sleeve 13 of the cap section, respectively, the forward movement of the piston being stopped by the piston stem engaging the valve operating stem 10.

If for any reason it is desired to close the angle cock device while the brake pipe is charged with fluid under pressure, an authorized person inserts the key 36 through the opening 33 into the chamber 32. It will here be noted, that the opening 33 is shaped to correspond to the shape of the cam 38 and is so disposed that upon the insertion of the key the cam will, as shown in Fig. 4, be properly positioned for operation.

Now when the key 36 is properly positioned, it is turned in a clockwise direction, rotating the cam 38 to the position in which it is shown in Fig. 5. As the cam is thus rotated, it engages the end of the stem 35 and moves the stem and thereby the valve member 25 outwardly against the resistance offered by the spring 34. When the valve member is thus moved, the valve 24 is unseated and the annular flange 26 covers the passage 29, closing communication from the passage 9 to the piston chamber 21. With the valve 24 unseated, fluid under pressure flows from the piston chamber 21 to the atmosphere by way of passage 22, valve chamber 23, passage 31 in the bushing 30, chamber 32 and opening 33, so that the spring 20 will act to cause the piston 16 and thereby the stem 17 to move inwardly until the piston stops against a projection 39 carried by the cap. With the piston in this position, the piston stem 17 will be entirely out of the path of travel of the flange 12 of the handle, so that the handle may be moved to closed position.

If, when the handle 11 is in its closed position, the key 36 is rotated in a counter-clockwise direction from the position in which it is shown in Fig. 5 to the position in which it is shown in Fig. 4, the spring 34 will act to operate the valve member 25 to seat the valve 24 and to open the communication from the passage 29 to the chamber 28, so that fluid under pressure will again flow from the passage 9 to the piston chamber 21, causing the piston to move outwardly until the end of the piston stem abuts against the outer surface of the flange 12 of the handle. Now when the handle 11 is moved from its closed position to its open position, and the opening 14 in the flange 12 is brought in line with the piston stem 17, the piston 16 will move forwardly and project the stem 17 to its locking position.

When a car equipped with my improved angle cock device is set out from a train, as on a siding, the brake pipe is devoid of fluid under pressure and, since the piston chamber 21 is open to the brake pipe passage 9 of the body section 1 of the device, by way of passage 22, valve chamber 23, ports 27 in the valve member 25, chamber 28 and passage 29, it will also be devoid of fluid under pressure, so that the spring 20 acts to maintain the piston 16 in its unlocking position and thereby the stem 17 out of the path of travel of the handle 11, so that the handle may be moved to its closed position without the use of the key 36.

It will be apparent from the foregoing description, that I have provided an angle cock device which, when in open position and the brake pipe charged with fluid under pressure, will be locked in this position against movement except by an authorized person provided with the proper key, and it is intended that the trainman in charge of the train shall keep possession of the key and be held responsible for the same.

While one illustrative embodiment of the invention has been described in detail, it is not my intention to limit its scope to that embodiment or otherwise than by the terms of the appended claims.

Having now described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a cock device, the combination with a casing having a communication through which fluid under pressure is adapted to flow, of means operable to one position to close said communication and operable to another position to open said communication, means subject to fluid under pressure for locking the first mentioned means in the second mentioned position when there is fluid under pressure in said communication and operable upon the relief of the pressure of fluid for unlocking the first mentioned means, valve means operable to relieve the second mentioned means of the pressure of fluid while said communication is charged with fluid under pressure, and means insertable in said casing for actuating said valve means.

2. In a cock device, the combination with a casing having a communication through which fluid under pressure is adapted to flow, of means operable to open and close said communication,

means operable by fluid under pressure, when the first mentioned means is in position to open said communication and there is fluid under pressure in said communication, for locking the first mentioned means in open position and operable upon the relief of the pressure of fluid for unlocking the first mentioned means, valve means operable to relieve the second mentioned means of the pressure of fluid while said communication is charged with fluid under pressure and means insertable in said casing for manually actuating said valve means.

3. In a cock device, the combination with a casing having a communication through which fluid under pressure is adapted to flow, of means operable to open and close said communication, means operable by fluid under pressure, supplied from said communication, when the first mentioned means is in position to open said communication, for locking the first mentioned means in open position and operable upon the venting of fluid therefrom for unlocking the first mentioned means, valve means operable to close off the flow of fluid from said communication to the second mentioned means and to vent fluid under pressure from the second mentioned means, and means insertable in said casing and operated manually for actuating said valve means.

4. In a cock device, the combination with a casing having a communication through which fluid under pressure is adapted to flow, of means operable to one position to close said communication and operable to another position to open said communication, means subject to fluid under pressure supplied from the communication for locking the first mentioned means in the second mentioned position when there is fluid under pressure in said communication and operable upon the relief of the pressure of fluid for unlocking the first mentioned means, valve means operable to close off the supply of fluid from said communication to the second mentioned means and for venting fluid under pressure from the second mentioned means, means insertable in said casing and operable manually for actuating said valve means.

5. In a cock device, the combination with a casing having a communication through which fluid under pressure is adapted to flow, of means operable to one position to close said communication and operable to another position to open said communication, means subject to fluid under pressure for locking the first mentioned means in the second mentioned position when there is fluid under pressure in said communication, means operable to relieve the second mentioned means of the pressure of fluid, and a key insertable in said casing and operable to actuate the last mentioned means, the second mentioned means being automatically movable to unlocking position upon the relief of fluid pressure.

6. In a cock device, the combination with a casing having a communication through which fluid under pressure is adapted to flow, of means operable to open and close said communication, and means operable by fluid under pressure supplied from said communication, when the first mentioned means is in position to open said communication, for locking the first mentioned means in open position, normally seated valve means operable to close off the supply of fluid under pressure to the second mentioned means and for venting fluid under pressure from the second mentioned means, and a key separate from the cock device and insertable therein and operable to actuate said valve means, the second mentioned means being automatically movable to unlocking position upon the venting of fluid therefrom.

7. In a cock device, the combination with a casing having a communication therethrough adapted to be charged with fluid under pressure, of a valve mounted in said casing operable to one position to open said communication and operable to another position for closing said communication, a handle for actuating said valve, means movable by fluid under pressure into the path of travel of said handle for maintaining the handle and thereby the valve in open position when said communication is charged with fluid under pressure, and means operable by a key insertable in the casing for venting fluid under pressure from the first mentioned means, the first mentioned means being movable automatically out of the path of travel of the handle when the second mentioned means is operated by said key.

8. In a cock device, the combination with a casing having a communication therethrough adapted to be charged with fluid under pressure, of a valve mounted in said casing operable to one position to open said communication and operable to another position for closing said communication, a handle for actuating said valve, a locking member movable into the path of travel of said handle for maintaining the handle and thereby the valve in open position, a movable abutment operable by fluid under pressure supplied from said communication for moving said locking member into the path of travel of said handle, means operable to relieve said abutment of the pressure of fluid acting thereon, means insertable in said casing and operable manually for actuating said means, and means cooperating with said abutment for moving the locking member out of the path of travel of the handle when the abutment is relieved of the pressure of fluid.

9. In a cock device, the combination with a casing having a communication therethrough adapted to be charged with fluid under pressure, of a valve mounted in said casing operable to one position to open said communication and operable to another position for closing said communication, a handle for actuating said valve, a locking member movable into the path of travel of said handle for maintaining the handle and thereby the valve in open position, a movable abutment operable by fluid under pressure supplied from said communication for moving said locking member into the path of travel of said handle, means operable to relieve said abutment of the pressure of fluid acting thereon, said means being operable only by a key separate from the cock device which is adapted to be inserted in said casing, and means cooperating with said abutment for moving the locking member out of the path of travel of the handle when the abutment is relieved of the pressure of fluid.

10. In a cock device, the combination with a casing having a communication therethrough adapted to be charged with fluid under pressure, of a valve mounted in said casing operable to one position to open said communication and operable to another position for closing said communication, a handle for actuating said valve, a locking member movable into the path of travel of said handle for maintaining the handle and thereby the valve in open position, a movable abutment operable by fluid under pressure supplied from said communication for moving said locking member into the path of travel of said handle, valve means operable manually to close off the supply of fluid from the communication

to said abutment and to relieve the pressure of fluid acting on the abutment, said valve means being inaccessible for operation except by a key which is separate from the cock device, and means for causing said locking member to move out of the path of travel of the handle when the abutment is relieved of the pressure of fluid.

11. In a cock device, the combination with a casing having a communication therethrough adapted to be charged with fluid under pressure, of a valve mounted in said casing operable to one position to open said communication and operable to another position for closing said communication, a handle for actuating said valve, a locking member movable into the path of travel of said handle for maintaining the handle and thereby the valve in open position, a movable abutment operable by fluid under pressure supplied from said communication for moving said locking member into the path of travel of said handle, valve means operable manually to close off the supply of fluid from the communication to said abutment and to relieve the pressure of fluid acting on the abutment, said valve means being inaccessible for operation except by a key which is separate from the cock device, and means for causing said locking member to move out of the path of travel of the handle when the abutment is relieved of the pressure of fluid, said valve means establishing a communication through which the fluid under pressure acting on said abutment is vented to said communication when fluid under pressure is completely vented from the first mentioned communication.

12. In a cock device, the combination with a casing having a communication through which fluid under pressure is adapted to flow, a valve mounted in said casing and operable to a position to open the communication through said casing, a pressure chamber, a communication through which fluid under pressure is supplied from the first mentioned communication to said chamber and through which fluid under pressure is adapted to be vented when fluid under pressure is vented from the first mentioned communication, means subject to the pressure of fluid in said chamber for locking said valve in its open position and operable upon the venting of fluid from said chamber for unlocking said valve, means operable manually to vent fluid under pressure from said chamber when the first mentioned communication is charged with fluid under pressure, and means insertable in said casing and operable to actuate the manually operable means.

13. In a cock device, the combination with a casing having a communication through which fluid under pressure is adapted to flow, a valve mounted in said casing and operable to a position to open the communication through said casing, a pressure chamber, a communication through which fluid under pressure is supplied from the first mentioned communication to said chamber and through which fluid under pressure is adapted to be vented when fluid under pressure is vented from the first mentioned communication, means subject to the pressure of fluid in said chamber for locking said valve in its open position and operable upon the venting of fluid from said chamber for unlocking said valve, means operable manually to close the second mentioned communication and to vent fluid under pressure from said chamber when the first mentioned communication is charged with fluid under pressure, and means insertable in said casing and operable to actuate the manually operable means.

14. In a cock device, the combination with a casing having a communication through which fluid under pressure is adapted to flow, a valve mounted in said casing and operable to a position to open the communication through said casing, a pressure chamber, a communication through which fluid under pressure is supplied from the first mentioned communication to said chamber and through which fluid under pressure is adapted to be vented when fluid under pressure is vented from the first mentioned communication, means subject to the pressure of fluid in said chamber for locking said valve in its open position and operable upon the venting of fluid from said chamber for unlocking said valve, and means operable manually to vent fluid under pressure from said chamber when the first mentioned communication is charged with fluid under pressure, the last mentioned means being inaccessible for manual operation except by a key separate from the cock device.

15. In a cock device, the combination with a casing having a communication through which fluid under pressure is adapted to flow, a valve mounted in said casing and operable to a position to open the communication through said casing, a pressure chamber, a communication through which fluid under pressure is supplied from the first mentioned communication to said chamber and through which fluid under pressure is adapted to be vented when fluid under pressure is vented from the first mentioned communication, means subject to the pressure of fluid in said chamber for locking said valve in its open position and operable upon the venting of fluid from said chamber for unlocking said valve, and means operable manually to close the second mentioned communication and to vent fluid under pressure from said chamber when the first mentioned communication is charged with fluid under pressure, the last mentioned means being inaccessible for manual operation except by a key separate from the cock device.

16. In a controlling cock device, the combination with a casing having a fluid pressure conduit and valve means for controlling the flow of fluid under pressure through said conduit, of a locking means for locking said valve means against movement and normally subject to and urged to locking position by fluid under pressure, manually operable means for releasing fluid under pressure from said locking means, and means separate from said device insertable in said casing and operable to actuate said manually operable means.

17. In a controlling cock device, the combination with a casing having a fluid pressure conduit and valve means for controlling the flow of fluid under pressure through said conduit, of a spring, a locking element for locking said valve means against movement and normally subject to fluid under pressure urging said locking means to its locking position and subject to the pressure of said spring urging said locking element from its locking position, manually operable means for releasing fluid under pressure from said locking element, and a key insertable in said casing and operable to actuate said manually operable means.

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