May 13, 1930. J. C. McCUNE 1,758,711

SIGNAL VALVE DEVICE

Filed Feb. 16, 1929

Fig. 1.

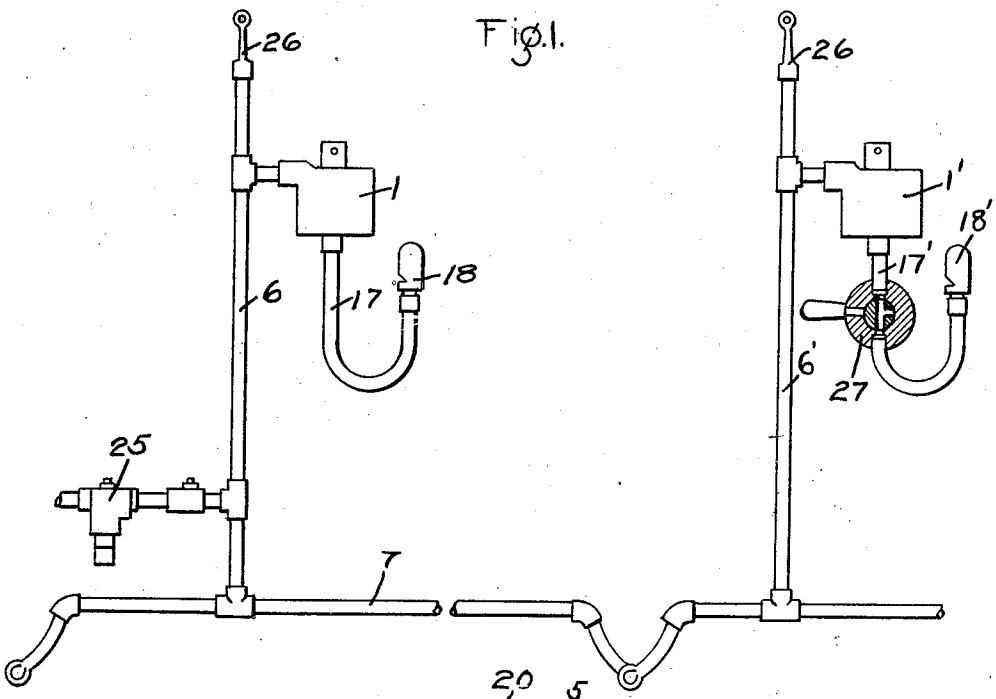
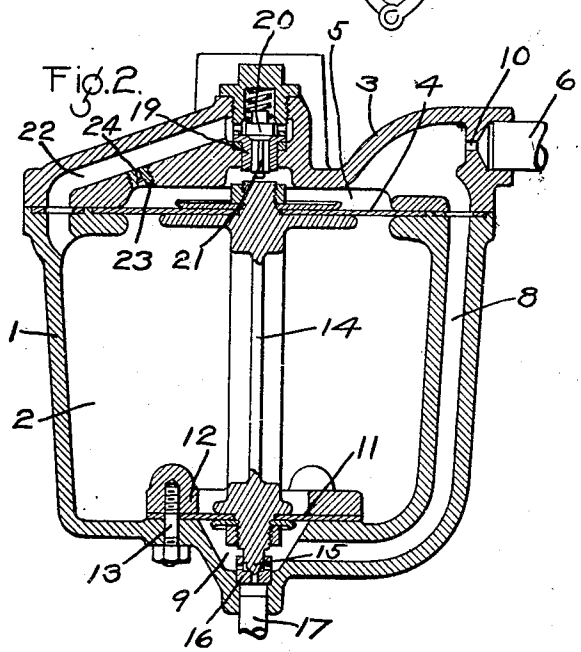


Fig. 2.



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SIGNAL-VALVE DEVICE

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This invention relates to signal systems and more particularly to a fluid pressure railway train signal system.

One object of my invention is to provide an improved fluid pressure operated signal valve device.

Another object of my invention is to provide a fluid pressure train signal system having means for accelerating the transmission of signal impulses through the train.

Another object of my invention is to provide a fluid pressure train signal system in which a signal may be transmitted from the locomotive or head car to cars of the train as well as from cars of the train to the locomotive.

In the accompanying drawing; Figure 1 is a diagrammatic view of a fluid pressure train signal system as applied to a locomotive and a car of a train, and embodying my invention; and Fig. 2 a sectional view of my improved signal valve device.

In the fluid pressure train signal system as now employed, a train signal pipe extends through the train, the train pipe being connected between cars by means of the usual flexible hose and couplings.

On the locomotive, a signal valve device is provided which is subject to the pressure of fluid which is normally carried in the train signal pipe. When the pressure in the signal pipe is reduced at any point in the train, the signal valve device on the locomotive is operated to blow a whistle.

According to one feature of my invention an improved signal valve device is provided and as shown in Fig. 2 of the drawing, may comprise a casing 1 having a chamber 2. A cover plate 3 is secured to the upper face of the casing 1 and clamped between the cover plate and the casing is a flexible diaphragm 4.

Chamber 5 above the diaphragm 4 is connected, through a restricted port 10 with a pipe 6, which in turn is connected to the usual train signal pipe 7, as shown in Fig. 1. A passage 8 in casing 1, of relative large capacity, connects chamber 5 with a chamber 9 at the base of the casing and chamber 9 is sealed from chamber 2 by a flexible diaphragm 11, which is clamped to the casing at its periphery by a ring 12 and studs 13.

Secured at the upper end to diaphragm 4 and at the lower end to diaphragm 11 is a stem or rod 14 and carried by and below the diaphragm is a poppet valve 15 adapted to engage a seat provided in a bushing 16, for controlling the venting of fluid from chamber 9 to pipe 17, which leads to the usual signal whistle 18.

Mounted in the cover plate 3 is a bushing 19 having a seat for a poppet valve 20 and said valve is provided with a fluted stem 21 which is adapted to be engaged by the stem 14 when said stem moves upwardly. The valve 20 controls communication from chamber 5 to a passage 22, of large capacity, which leads to chamber 2.

A plug 23 is secured in a wall separating passage 22 from chamber 5 and said plug is provided with a restricted port 24 which connects chamber 5 with passage 22 and consequently with chamber 2.

On the locomotive is provided the usual reducing valve device 25, through which fluid at the desired reduced pressure is supplied to the signal pipe 7.

When the signal pipe 7 is charged with fluid under pressure, fluid flows from pipe 6 to chamber 5 of the signal valve device and thence through the restricted port 24 to passage 22 and chamber 2.

In order to signal the engineer, a car discharge valve 26 on a car of the train is operated in the usual manner to vent fluid from the signal pipe 7. A reduction in fluid pressure is thus effected in chamber 5 of the signal valve device 1 on the locomotive and since the pressure in chamber 5 is reduced at a greater rate than fluid can flow from the chamber 2 through the restricted port 24, the higher fluid pressure in chamber 2 will act to deflect the diaphragm 4 upwardly, so that the valve 15 is unseated.

Fluid under pressure is then supplied from the signal pipe, through passage 8 to pipe 17 and thus the whistle 18 is blown to signal the engineer. The upward movement of diaphragm 4 causes the stem 14 to engage stem 21, so that valve 20 is unseated. As soon as

valve 20 is unseated, fluid pressure in chamber 2 quickly equalizes with the fluid pressure in chamber 5, by flow through the large capacity passage 22 and past the open valve 20. The fluid pressures being equalized on opposite sides of the diaphragm 4, the diaphragm is deflected back to its normal position, in which the valve 15 is returned to its seat. A positive opening and closing movement of the valve 15 is thus effected.

Another feature of my invention consists in providing means for accelerating the transmission of signals, and for this purpose there is provided an accelerator valve device on each car of the train.

The accelerator valve device may be of the same construction as the signal valve device hereinbefore described, although the invention is not limited to use of any particular accelerator valve device.

The reference numeral 1′ indicates an accelerator valve device on a car of a train and interposed in the pipe 17′ connecting the accelerator valve device to the whistle 18′ is a cock 27, having one position in which the signal whistle 18′ is connected to the signal valve device and another position, in which the section of pipe 17′ leading to the signal valve device is connected to the atmosphere.

When the cars of a train are equipped with accelerator valve devices, as above described, upon operating a car discharge valve 26, fluid under pressure is vented from the signal pipe 7 and the reduction in signal pipe pressure then first acts on the accelerator valve device nearest the opened car discharge valve to cause the opening of valve 15 in the same manner as the signal valve device on the locomotive operates, as hereinbefore described. Fluid under pressure is thus vented from the signal pipe 7 either to the whistle 18′ or to the atmosphere at the cock 27.

A local reduction in pressure in the signal pipe is thus effected and the same action takes place on the succeeding cars, so that the transmission of the signal impulse is serially accelerated and a more positive and pronounced reduction in signal pipe pressure on the locomotive is assured, even on a long train.

The engineer may also signal to a car of the train by operating a car discharge valve 26 on the locomotive and the signal pipe pressure is then reduced and the accelerator valve device on a car of the train will then be operated as a signal valve device, so as to blow the whistle associated with the accelerator valve device.

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 fluid pressure signal system, the combination with a train signal pipe, of a signal valve device comprising a signal controlling valve, a diaphragm, subject to the opposing pressures of the signal pipe and a chamber for operating said valve, and a restricted port, independent of the moving parts of said valve devices, through which said chamber is charged with fluid under pressure from the signal pipe.

2. In a fluid pressure signal system, the combination with a train signal pipe, of a signal valve device comprising a signal controlling valve, a diaphragm, subject to the opposing pressures of the signal pipe and a chamber, for operating said valve, and a valve operated upon movement of said diaphragm to open said signal valve for venting fluid from said chamber.

3. In a fluid pressure signal system, the combination with a train signal pipe, of a signal valve device comprising a signal controlling valve, a diaphragm, subject to the opposing pressures of the signal pipe and a chamber, for operating said valve, a restricted port through which said chamber is charged with fluid under pressure, and a valve operated by said diaphragm for venting fluid from said chamber.

4. In a fluid pressure signal system, the combination with a train signal pipe, of a signal valve device comprising a signal controlling valve, a diaphragm, subject to the opposing pressures of the signal pipe and a chamber, for operating said valve, a restricted port through which said chamber is charged with fluid under pressure from the signal pipe, and a valve operated by said diaphragm upon a reduction in pressure in the signal pipe for venting fluid from said chamber to the signal pipe.

5. In a fluid pressure signal system, the combination with a train signal pipe, of a signal valve device comprising a signal controlling valve mounted in a valve chamber, a diaphragm subject to the opposing pressures of the signal pipe and a chamber for operating said valve, and a diaphragm separating the valve chamber from the other chamber.

6. In a fluid pressure signal system, the combination with a train signal pipe, of a signal valve device comprising a signal controlling valve mounted in a valve chamber, a diaphragm subject to the opposing pressures of the signal pipe and a chamber for operating said valve, a diaphragm separating said valve chamber from the other chamber, and a stem connecting said diaphragm.

7. In a fluid pressure signal system, the combination with a train signal pipe, of means on one vehicle of a train operated upon a reduction in pressure in the signal

pipe for operating a signal and means on other vehicles of the train operated upon a reduction in pressure in the signal pipe for venting fluid under pressure from the signal pipe.

8. In a fluid pressure signal system, the combination with a train signal pipe normally charged with fluid under pressure, of a signal valve device on one vehicle of a train operable upon a reduction in pressure in the signal pipe for operating a signal, and an accelerating valve device on another vehicle of the train operable upon a reduction in pressure in the signal pipe for venting fluid from the signal pipe.

9. In a fluid pressure signal system, the combination with a train signal pipe normally charged with fluid under pressure, of a signal valve device on one vehicle of a train operable upon a reduction in pressure in the signal pipe for operating a signal, and accelerating valve devices on a plurality of other vehicles of the train operable upon a reduction in fluid pressure in the signal pipe for effecting a local reduction in pressure in the signal pipe.

10. In a fluid pressure signal system, the combination with a train signal pipe normally charged with fluid under pressure, of a signal valve device on one vehicle of a train operable upon a reduction in pressure in the signal pipe for operating a signal, an accelerating valve device on another vehicle operated upon a reduction in fluid pressure in the signal pipe for effecting a reduction in pressure in the signal pipe, and a signal on said other vehicle operable by fluid under pressure vented from the signal pipe.

11. In a fluid pressure signal system, the combination with a train signal pipe normally charged with fluid under pressure, of a signal valve device on one vehicle of a train operable upon a reduction in pressure in the signal pipe for operating a signal, an accelerating valve device operated upon a reduction in pressure in the signal pipe for effecting a local reduction in pressure in the signal pipe, a signal operable by fluid under pressure vented from the signal pipe, and means for venting fluid from the signal pipe either to said signal or to the atmosphere.

12. In a fluid pressure signal system, the combination with a train signal pipe normally charged with fluid under pressure, of a signal valve device on one vehicle of a train operable upon a reduction in pressure in the signal pipe for operating a signal, an accelerating valve device operated upon a reduction in pressure in the signal pipe for effecting a local reduction in pressure in the signal pipe, a signal operable by fluid under pressure vented from the signal pipe, and manually operated means having one position in which fluid vented from the signal pipe is supplied to said signal and another position in which fluid vented from the signal pipe is vented to the atmosphere.

In testimony whereof I have hereunto set my hand, this 14th day of February, 1929.

JOSEPH C. McCUNE.