D. E. BLAIR AND D. K. MACLEOD.

SIGNAL.

APPLICATION FILED JUNE 13, 1919.

1,339,685. **Patented May 11, 1920.**

2 SHEETS—SHEET 1.

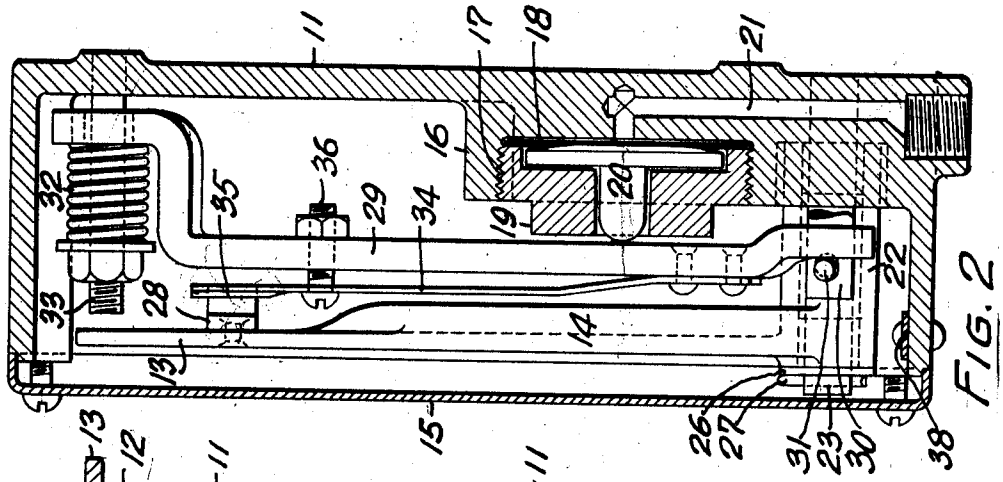


FIG. 2

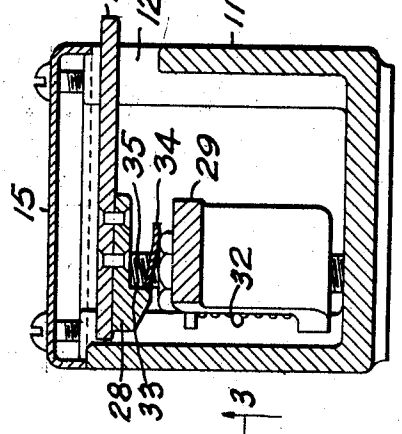


FIG. 3

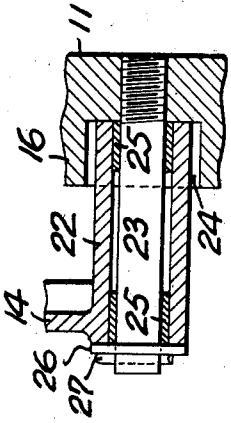


FIG. 4

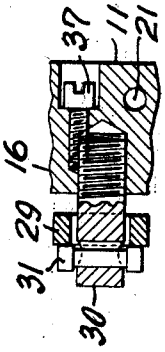


FIG. 5

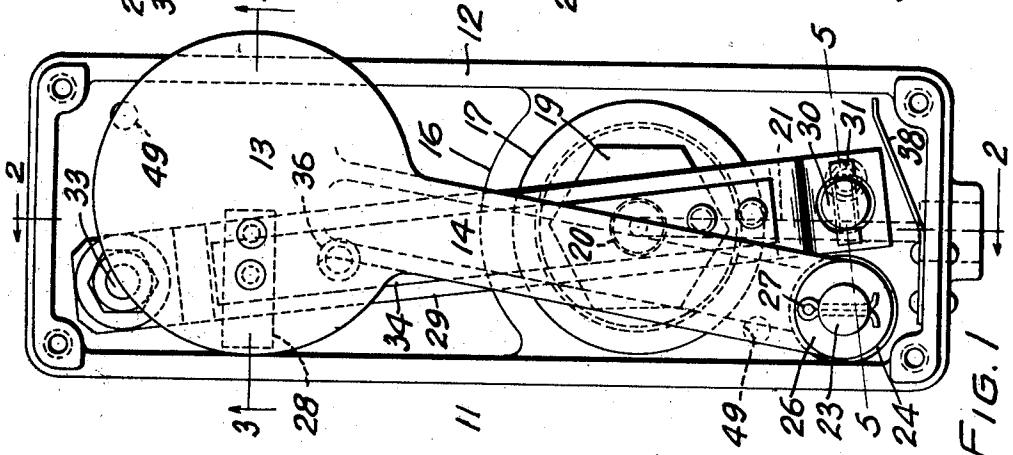


FIG. 1

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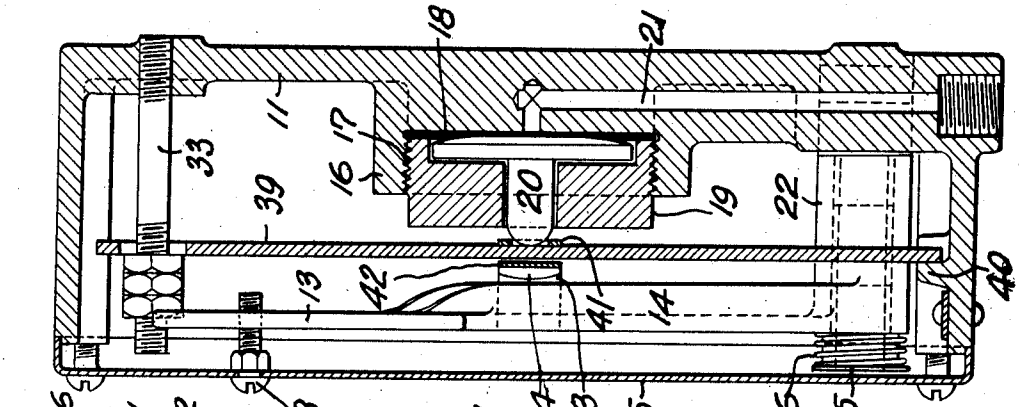


FIG. 7

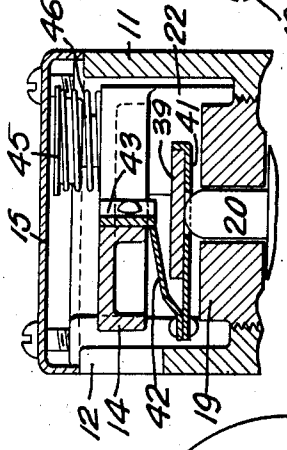


FIG. 8

FIG. 6

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UNITED STATES PATENT OFFICE.

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SIGNAL.

1,339,685. Specification of Letters Patent. Patented May 11, 1920.

Application filed June 13, 1919. Serial No. 303,928.

To all whom it may concern:

Be it known that we, DAVID E. BLAIR and DONALD K. MACLEOD, both subjects of the King of Great Britain, and residents of the city of Montreal, in the Province of Quebec and Dominion of Canada, have invented certain new and useful Improvements in Signals, of which the following is a full, clear, and exact description.

This invention relates to improvements in fluid pressure signals for use in connection with air brake systems and the like, and the object of the invention is to provide a signal which will operate automatically when the pressure in an air brake system drops below a predetermined amount, in order that the operator's attention may be particularly directed to a possible shortage of air supply for braking purposes.

A further object is to provide a device which will in effect maintain the air reservoir and pipes normally communicating therewith under constant test.

At the present time, air brake systems installed on steam and electric railways include a gage indicating to the engineer or motorman the amount of air pressure in the reservoir. The purpose of this gage is obviously to keep the engineer or motorman advised as to the pressure of air in the system and also as to the proper operation of the system on street railways especially the capacity of the compressors which are automatic in their operation is greatly in excess of the air requirements for braking purposes, so that the pressure is maintained very near the maximum even during a most liberal use of air for braking purposes. Any considerable drop in pressure, while not immediately affecting the braking efficiency is due to some disorganization of the system which should be immediately remedied to insure safe operation. On street railways especially, there is a tendency to disregard the gage, with the result that a motorman may not become aware of the disorganized condition until the air pressure drops below the point at which the brakes operate satisfactorily.

According to this invention, a signal is provided which is normally concealed and held in such concealed position by air pressure in the apparatus. When the air pressure drops below a predetermined amount, the signal is operated and the engineer's or motorman's attention is thereby particularly directed to the depletion of pressure in the reservoir, so that he may determine the cause and take precautions to insure safe operation.

The device comprises a casing having a signal pivotally mounted therein and normally concealed from view by the casing and held within the casing by a latch which is operated by normal air pressure against spring pressure to engage the signal.

In the drawings which illustrate the invention;—

Figure 1 is a front elevation of the signal, the cover being removed.

Fig. 2 is a section on the line 2—2, Fig. 1.

Fig. 3 is a section on the line 3—3, Fig. 1.

Fig. 4 is a fragmentary sectional view showing the mounting of the signal.

Fig. 5 is a section on the line 5—5, Fig. 1.

Fig. 6 is a view similar to Fig. 1 showing a modified form of the device.

Figs. 7 and 8 are sections on the lines 7—7 and 8—8 respectively of Fig. 6.

Referring more particularly to the drawings, 11 designates a casing, preferably cast, having one of its sides lower than the other to provide a passage 12 for a signal 13 and its supporting arm 14. The casing is provided with a cover 15. The bottom of the casing is provided with a boss 16 having therein a recess 17 in the bottom of which a diaphragm 18 is held by a flange plug 19 screwed into the boss. A plunger 20 bears against one side of the diaphragm and projects beyond the outer surface of the plug. An air passage 21 is provided leading to the opposite side of the diaphragm from the plunger.

The signal arm 14 is provided with a hub 22 of sufficient length to insure smooth operation, mounted on a post 23 fixed to the casing bottom. In order to obtain the maximum hub length the boss 16 may be recessed at 24 to receive the hub. The bore of the hub will preferably be larger than the post and provided at opposite ends with bushings 25 so that friction is reduced without sacrificing any of the extended support and steadying. The signal may be retained in place by a washer 26 and split pin 27. The back of the signal is provided with a catch 28.

A lever 29 is pivotally mounted at one end on a post 30 by means of a pin 31 and bears

adjacent its pivoted end on the plunger 20. The opposite end of this lever is pressed upon by a spring 32 adjustably mounted on a post 33 projecting from the casing, so that the lever is urged toward the plunger and presses the plunger against the diaphragm 18. As will be readily seen this lever is located behind the signal and is urged by air pressure transmitted through the diaphragm and plunger toward the signal, while it is also urged by the spring 32 away from the signal. The lever carries a resiliently mounted latch 34 adapted to engage the catch 28. The catch engaging edge 35 of this latch is preferably bent toward the catch out of the plane of the remainder of the latch so that when disengagement occurs the catch will be entirely free from the latch and will not track across the surface thereof. The position of the latch relative to the catch may be adjusted by a screw 36 passing through the latch and lever. The method of securing the pin 31 in the post 30 may be varied but the construction shown in Fig. 5 has the advantages of simplicity, easy separation and secure assembly. The pin 31, which projects beyond the post 30, is reduced in diameter in its central portion for a length equal to slightly more than the diameter of the post so that the diameter of the pin is less in the center than at the ends so that when the pin is inserted in the post it may be moved to a position eccentric with respect to the aperture through which it passes. The thrust of the lever against the pin will hold it in this eccentric position so that it can not be moved endwise and escape from the post. In order to keep the post 30 from rotating and throwing the axis of the pin out of normal position to the axis of the lever a lug screw 37 is inserted from the back of the casing and engages in the periphery of the post so that it can not rotate.

A cushion spring 38 is secured to the casing in the path of the signal arm 14 to receive the arm when it has dropped to nearly its lowered position.

The form shown in Figs. 6, 7 and 8 differs from the forms shown in the preceding figures in that the lever and load-spring are combined in one. In such a construction the plunger 20 is preferably located midway between the points of end support of the spring lever 39. The post 30 is replaced by a socket lug 40 formed on the casing. The point of maximum movement of the spring lever 39 is at the point of engagement with the plunger 20 and therefore, the latch is mounted at this point and comprises an arm 41 secured at one end to the spring and extending transversely thereof and carrying on its free end a latch spring 42. The free end of this spring 42 is adapted to engage a catch 43 secured to the signal arm 14 and the spring is arranged at an incline to prevent dragging of the catch thereover in the releasing movement. The extremity of this spring may be slightly rounded as shown at 44, Fig. 7 to reduce the bearing area between the latch and catch. The signal post 23 may be provided with an outwardly flanged cup washer 45 between the flange of which and the hub 22 a light spring 46 may be arranged. A pin 47 passes through the post within the cup and is held against dislodgment by the cup. The spring 46 serves the double purpose of giving a yielding support for the signal and of holding the cup in pin-retaining position. To remove the pin the cup is pressed down on the post until clear of the pin.

A stop 48 for the signal may be provided on the cover to limit return movement of the signal.

The casing may be secured in position by screws or bolts passing through the apertures 49.

The operation of the device is extremely simple. The signal is normally in the position shown in full lines Figs. 1 and 6. Air reservoir pressure is admitted through the passage 21 and forces the diaphragm and plunger toward the signal so that the levers 29 or 39 are held close enough to the signals for the latch thereon to engage the signal catches and hold the signals up in the casings. When the pressure in the air reservoir drops below the point determined by the load of the spring 32 or the tension of the spring lever 39 the springs assert themselves and force the plungers back against the air pressure thus withdrawing the latches from the signal catches and releasing the signals which fall by gravity to the position shown in dot and dash lines, Fig. 6. The signal may be brilliantly colored or arranged to drop into the motorman's or engineer's line of vision or both so that attention is immediately directed to the low air pressure. The levers 29 or 39 must be returned to normal position before the latches will be in position to hold up the signals and therefore, the engineer or motorman can not make the signal remain out of his line of vision until the air pressure is returned to normal. When the air pressure is normal the signals may be manually raised and the catches thereon will ride over and depress the latch springs which will then rise behind the catches and hold the signals up.

It is obvious that as the retention of the signal in concealment depends upon maintenance of a predetermined pressure in the reservoir and train line or its equivalent in a street railway car that any leakage of air from this will cause operation or display of the signal. The result is that the signal maintains the air brake system under constant test.

Having thus described our invention, what we claim is;—

1. In a device of the class described, the combination with an air brake system and a gravity signal of an air pressure operated latch arranged to hold up the signal, and a spring urging said latch to signal releasing position.

2. In a device of the class described, a gravity signal, a latch arranged to hold up said signal, a member carrying said latch, an air pressure operated plunger urging the latch carrier and latch to signal holding position and a spring urging said carrier and latch to releasing position.

3. In a device of the class described, a gravity signal, a latch arranged to hold up said signal, a latch carrying device operative to move the latch to signal releasing position and an air operated plunger operative to hold said carrying device in signal holding position.

4. In a device of the class described, a casing, an air passage therein, a diaphragm over the mouth of said passage, a flange plug screwed into the casing and holding said diaphragm at its periphery, a plunger mounted in the plug bearing on said diaphragm, a signal, a latch adapted to hold said signal within the casing, and operative connection between said latch and plunger opposing the operation of the plunger and operative by itself to disengage the latch from the signal.

5. In a device of the class described, a signal, a latch holding said signal, a latch carrier, an air pressure operated diaphragm, a plunger in compression between said diaphragm and latch carrier arranged to maintain the latch in signal engaging position and a spring arranged to urge the carrier and latch out of signal engaging position.

6. A device according to claim 5, in which the latch is resiliently mounted on the carrier and means for adjusting the latch relative to the carrier.

7. A device according to claim 5, in which the latch carrier is pivotally mounted at one end and spring-pressed at the opposite end, said plunger engaging the carrier nearer its pivoted end than its spring-pressed end.

8. In combination with a device according to claim 5, an apertured post passing through said latch carrier, a pin passing through said post and forming a bearing for the carrier, said pin being reduced in diameter intermediate its ends and held eccentric with respect to the post aperture by the latch carrier whereby the pin is held against movement in its longitudinal direction by engagement of its end portions with the post.

9. A device according to claim 5, in which the signal is provided with a catch and the catch engaging edge of the latch is located closer to the signal than the remainder of the latch.

In witness whereof, we have hereunto set our hands.

DAVID E. BLAIR.
DONALD K. MACLEOD.