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B. BRILL, JR.

WARNING SIGNAL FOR AIR BRAKE SYSTEMS.

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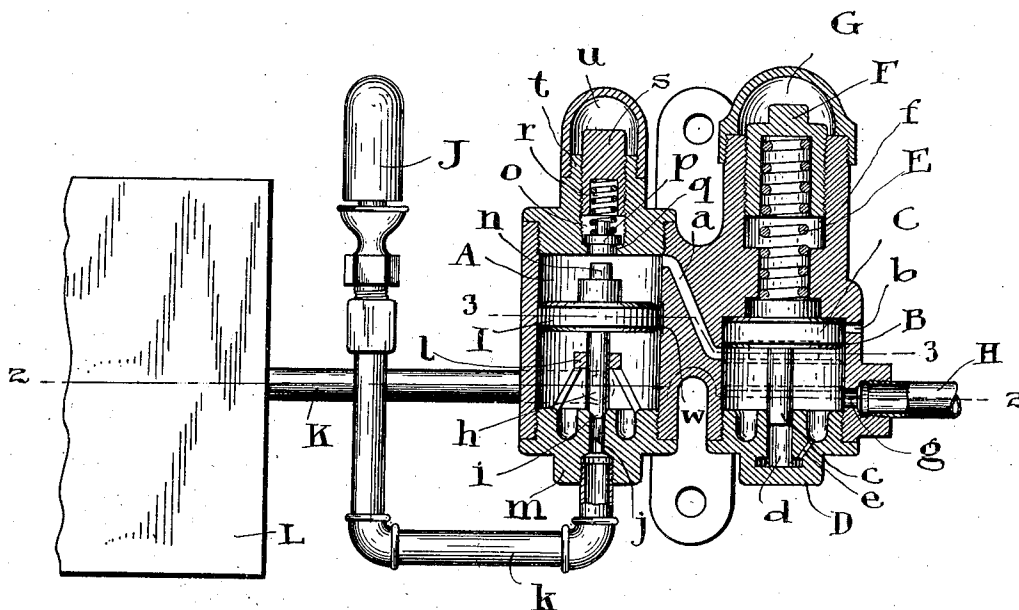


FIG. 1.

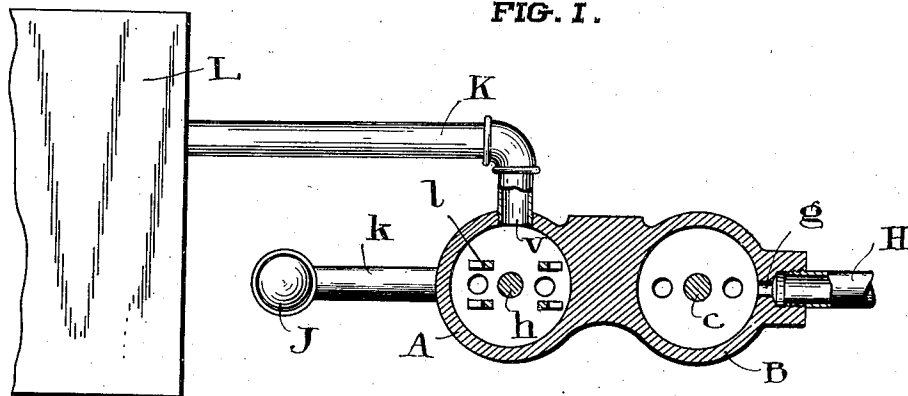
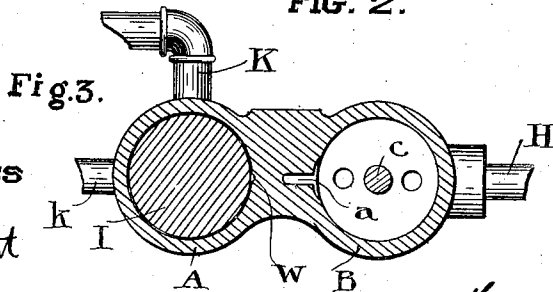


FIG. 2.



WITNESSES

Russell Smart

Wm. G. Weyman

INVENTOR
B. BRILL, JR.

BY

Frank Salomon

ATT'Y.

UNITED STATES PATENT OFFICE.

BENJAMIN BRILL, JR., OF NORTH BAY, ONTARIO, CANADA.

WARNING-SIGNAL FOR AIR-BRAKE SYSTEMS.

No. 893,605.

Specification of Letters Patent.

Patented July 21, 1908.

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To all whom it may concern:

Be it known that I, BENJAMIN BRILL, JR., of North Bay, in the district of Nipissing, Province of Ontario, Canada, have invented certain new and useful Improvements in Warning-Signals for Air-Brake Systems, of which the following is a specification.

My invention relates to improvements in warning signals for air brake systems, and the objects of my invention are to provide a simple, effective and extremely sensitive signal designed to give a clear and distinct signal to the engineer on a train, whenever the pressure on the air brake system or in the main reservoir shall sink below a predetermined amount, and such a signal as will not unduly waste or lower the air pressure. The difficulty experienced with signals of this type in the past has been that being operated from the main supply of compressed air they considerably reduce the pressure therein and not infrequently apply the air brakes. In general, it is not desirable that the air brakes should be immediately applied when the pressure sinks, below the given point, for the running conditions may be such that such a sudden stoppage would be extremely disadvantageous. Also these devices usually signal whenever the brakes are applied in ordinary use.

In this invention, the difficulty is overcome by providing a separate supply of compressed air for operating the warning signals, the operation being controlled by an equalizing piston operative between the main supply of compressed air and the auxiliary reservoir for the signal, in combination with a suitable whistle and signaling means adapted, when the pressure in the main reservoir, is reduced, to be thrown into operation by the movement of the equalizing piston.

The invention is described in detail in the accompanying specification and drawings, in which,

Figure 1 is an elevation partly in section. Fig. 2 is a sectional view along the line 2—2, Fig. 1. Fig. 3 is a sectional view along the line 3—3, Fig. 1.

In the drawings like letters of reference indicate corresponding parts in each figure.

Referring to the drawings, A and B represent two cylinders preferably formed integral with each other, and having a conducting port *a* extending from the top of the cylinder A to substantially the center of the cylinder

B. At the top of the cylinder B a port *b* is provided communicating with the open air and within the cylinder a piston C is provided preferably having a guiding piston rod *c* thereon, operating in a cylindrical recess *d* and a cap nut D forming one end of the cylinder. As usual in constructions of this class, the base of the recess *d* is placed in communication with the interior of the cylinder by means of a small passage-way *e* by means of which the pressure is equalized.

The top of the piston is abutted by a compression spring E which, in the construction illustrated, is located in a recess *f* at one end of the cylinder having a thimble F in screw-threaded engagement with the end of the same, and adapted to hold the end of the compression spring and afford a means of regulating the same. This thimble is preferably inclosed by a semi-spherical cap having screw-threaded engagement with the exterior of the cylinder.

Near the base of the cylinder a port *g* is provided communicating with a conducting pipe H which extends to the main reservoir or supply of compressed air for the system in the train.

The piston C is adapted to control the communication between the ports *a*, *b* and *g*; that is to say, when the piston is in its uppermost position, the ports *a* and *g* are in communication with each other, but when the piston is in its lower position as indicated in dotted lines, the port *a* communicates with the port *b* while the port *g* is shut off from the port *a*, the latter port remaining, however, in communication with the end of the cylinder.

Within the cylinder A is located the equalizing piston I which carries a rod *h* having a conical end *i* adapted to seat against and close a port *j*, which communicates with a conducting pipe *k* leading to a whistle J or other signaling device, which may be pneumatically operated. The rod *h* is guided by a suitable bracket *l* formed on the cap nut *m* which constitutes the end of the cylinder.

The top of the piston I has a cylindrical projection *n* formed thereon adapted, when the piston is moved upwardly, to extend into a cylindrical recess *o* in which there is located a movable disk *p*, normally pressed outwardly by a spring *r* but retained in position by a flange *q* at the mouth of the recess. The tension of the spring is regulated by a

thimble *s* having screw - threaded engagement with the cap nut *t*, forming the end of the cylinder and is covered by a suitable cap *u*.

Below the piston a port *v* is provided, which communicates with a conducting pipe *K* which leads to a small auxiliary air reservoir *L*.

At substantially the center of the wall of the cylinder, a small groove *w* is provided adapted to afford communication from one side of the piston to the other when the same is in its lowest position with the port *j* closed as indicated in the drawings.

Having now described the various parts of my construction I will briefly point out the method of operation of the same.

The pressure in the main reservoir being raised to the desired amount, the air will flow in through the port *g* and raise the piston *C*, pass through the port *a* and exert a downward pressure on the equalizing piston *I* to hold the same against its seat. This piston not moving downwardly the air will gradually pass through the groove *w* to the opposite side and from thence, through the port *b* and conducting pipe *k* into the auxiliary reservoir *L* and after a few minutes, the pressure on both sides of the piston will be equalized, rendering it very sensitive to slight differences made in the pressure on either side. Should the pressure in the main reservoir fall below a predetermined amount, the spring *E*, which will be designedly tensioned for the purpose will move the piston *C* downwardly, cutting off the port *g* from the port *a* and placing the ports *a* and *b* in communication with each other. This will allow the air to flow quickly from the upper side of the equalizing piston out to the atmosphere. The flow of this air will also assist to move the piston downwardly. As the groove *w* is very considerably less in cross-section than the cylinder *A*, the air cannot flow through it sufficiently fast to equalize the pressure and the piston operated by the supply of air in the auxiliary reservoir, will move upwardly which will open the port *j* and allow the air to flow through the pipe *k* and operate the whistle *J*, which will blow until the supply of air in the auxiliary reservoir is exhausted, when the valve will again seat. It will be observed that this operation of the signal, in no wise affects the pressure of air in the main reservoir, and after having once given a clear and sharp signal, will cease, enabling the engineer to attend to the leak in the main reservoir as soon as convenient to him.

The balanced equalizing piston *I* is extremely sensitive in character and will operate on a difference of a very few pounds in pressure. As soon as the air supply of the main reservoir is raised to the desired pressure the various parts of the device will assume their original position.

While the invention has been described herein with great particularity of detail, yet, it will be readily understood that in carrying out the construction of the same, changes, within the scope of the appended claims, may be made, without departing from the spirit of the invention.

What I claim as my invention is:—

1. In an air brake warning signal, the combination with a pneumatically operated signal, of an auxiliary reservoir, and means for automatically placing the auxiliary reservoir in communication with the signal when the pressure in the air brake system falls below a determined amount.

2. In an air brake warning signal, the combination with the conducting means communicating with the main supply of compressed air, of an auxiliary reservoir, a pneumatically operated warning signal, conducting means extending from the auxiliary reservoir to the signal, a valve therefor and means for opening the valve when the pressure in the conducting means communicating with the main supply falls below a determined amount.

3. In an air brake warning signal, the combination including an equalizing piston, a cylinder inclosing the same having a constricted passage-way communicating at the opposite sides of the piston, means for placing one side of the piston in communication with the supply of air for the air brake system, and pneumatically operated signaling means communicating with the opposite side of the piston, a valve controlling the same operated by movement of the piston, and means operated by the reduction of pressure in the air brake system, for placing the side of the piston opposite to that with which the signal is connected in communication with the open air.

4. In an air brake warning signal, the combination including an equalizing piston, a cylinder inclosing the same having a constricted passage-way communicating with the opposite sides of the piston, means for placing one side of the piston in communication with the supply of air for the air brake system, and pneumatically operated signaling means communicating with the opposite side of the piston, a valve controlling the same operated by movement of the piston, and spring controlled means for placing the opposite side of the piston to that with which the signal is connected, in communication with the open air, when the pressure in the main system falls below a determined amount.

5. In an air brake warning signal, the combination including an equalizing piston, a cylinder inclosing the same having a constricted passage-way communicating with the opposite sides of the piston, means for placing one side of the piston in communication

tion with the supply of air for the air brake system, and pneumatically operated signaling means communicating with the opposite side of the piston, a valve controlling the same operated by movement of the piston, a second cylinder having a port communicating with the open air, a conducting passage-way between the opposite side of the first cylinder to that with which the signal communicates, and the second cylinder, conducting means extending from a port in the second cylinder to the supply of compressed air for the system, and a spring-operated valve member operating in the second cylinder adapted, when the pressure in the main system, falls below a determined amount to afford communication between the passage from the first cylinder and the port communicating with the open air.

6. In an air brake warning signal, the combination with the cylinder, and movable piston therein, of a pneumatically operated warning signal in communication with one side of the piston, a valve operated by the piston, and controlling the admission of fluid to the signal, an auxiliary air reservoir communicating with the same side of the cylinder as the signal, means for supplying the same from the main reservoir, means for supplying the pressure of the main reservoir to the opposite side of the piston to that with which the auxiliary reservoir communicates, means operated by a reduction of pressure in the

main reservoir for cutting off the communication between the auxiliary and the main reservoirs, and placing the side of the piston opposite to that with which the auxiliary reservoir communicates, in communication with the open air.

7. In an air brake warning signal, the combination, including an equalizing piston, a cylinder inclosing the same, having a constricted conducting passage-way communicating with both sides of the piston, a pneumatically operated warning signal, communicating with one side of the piston, a valve for the same carried by the piston, an auxiliary reservoir communicating with the cylinder on the same side as that with which the signal communicates, a second cylinder having a port communicating with the open air, a conducting passage-way extending between the two cylinders, conducting means extending from the second cylinder to the supply of compressed air for the system, and a spring-operated valve adapted when the pressure in the main supply falls below a given amount to place the passageway from the first cylinder in communication with the port leading to the open air.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

BENJAMIN BRILL, JR.

Witnesses:

R. L. SMART,
MARY C. LYON.