R. ARMSTRONG.

COMPRESSED AIR SIGNAL.

APPLICATION FILED MAR. 12, 1909.

934,785. **Patented Sept. 21, 1909.**

Fig. 1.

Fig. 3.

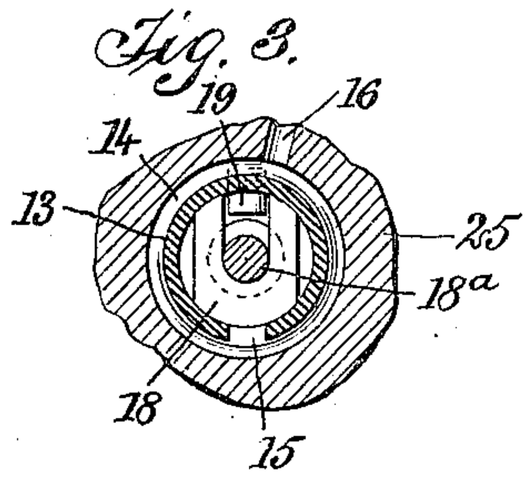
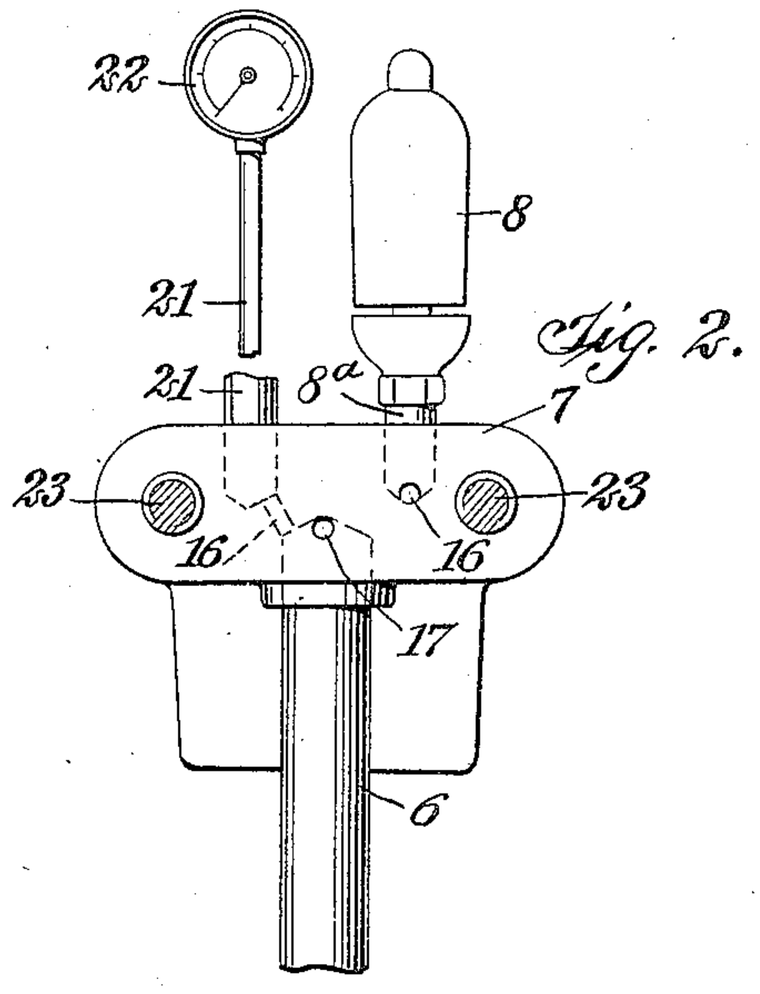


Fig. 2.



WITNESSES

L. Bruford Hardie

Walton Harrison

INVENTOR

Robert Armstrong

BY Munn & Co.

ATTORNEYS

UNITED STATES PATENT OFFICE.

ROBERT ARMSTRONG, OF VICTORIA, BRITISH COLUMBIA, CANADA.

COMPRESSED-AIR SIGNAL.

934,785. Specification of Letters Patent. **Patented Sept. 21, 1909.**

Application filed March 12, 1909. Serial No. 482,900.

To all whom it may concern:

Be it known that I, ROBERT ARMSTRONG, a subject of the King of Great Britain, and a resident of Victoria, in the Province of British Columbia, Dominion of Canada, have invented a new and Improved Compressed-Air Signal, of which the following is a full, clear, and exact description.

My invention relates to compressed air signals, such as are employed upon railway trains, my more particular purpose being to produce a simple, convenient and easily operated mechanism for sounding an alarm whenever the pressure of the compressed air used in a signal pipe is suddenly reduced below a predetermined normal amount.

More particularly stated, my invention comprehends a whistle operated by compressed air from the signal pipe, and valve mechanism controllable by variations in the pressure of air within the signal pipe for controlling automatically the supply of air to the whistle.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a substantially vertical section through the valve mechanism and parts associated with it; Fig. 2 is a reduced section upon the line 2—2 of Fig. 1, looking in the direction of the arrow; and Fig. 3 is an enlarged section upon the line 3—3 of Fig. 1, looking in the direction of the arrow, and showing a portion of the valve stem and parts immediately associated therewith.

A signal pipe 4, which may be of the construction ordinarily used upon railway trains, is provided with a tee 5, and extending upwardly from this tee is a pipe section 6 which is connected with a casing 7. A whistle 8 is connected with the casing 7 by aid of a pipe 8^a. Extending away from the casing 7 is a cylinder 9 which is kept normally closed by aid of a closure plug 10. Disposed within the cylinder 9 is a piston 11 provided with an annular packing ring 11^a, the piston and packing being fitted within a sleeve 12 which forms a lining internally of the cylinder 9. At the left of the piston is a compartment 9^a adapted to contain compressed air.

Disposed adjacent to the sleeve 12 and concentric to the same is a smaller sleeve 13. This sleeve is provided with an annular groove 14 having an opening 15 into the space within the sleeve. A duct 16 communicates with the pipe 8^a and is used to supply air for the purpose of blowing the whistle 8. This duct is always in communication with the annular passage 14. At 17 is another duct which is in communication with the pipe 6 and leads directly into the sleeve 13.

At 18 is a slide valve and extending through the same is a stem 18^a carried by the piston 11. When the piston moves to the right or left, the slide valve 18 is moved accordingly and may cover and uncover the opening 15 which thus serves as a port and ultimately controls the whistle 8. Extending through the upper portion of the sleeve 13 is a guide 19 which projects into the valve 18, as will be understood from Fig. 3, and serves to maintain this valve in a predetermined working relation to various other parts.

A closure plug 20 is screwed into the casing and when removed renders the valve 18 and stem 18^a readily accessible to the operator. Connected with the casing 7 and extending upwardly therefrom is a pipe 21, and mounted upon the latter is a pressure gage 22 for indicating the pressure within the signal pipe 4.

At 23, 23 are bolts which are fitted with nuts 24, the purpose of the bolts being to secure different portions of the casing together. For convenience in construction I make the cylinder 9 integral with a face plate 25 which is secured directly to the casing 8 by aid of the bolts 23 and nuts 24. The various connections for the signal pipe 4 are already used in this art and need not here be described in detail.

The operation of my device is as follows: Normally the signal pipe 4 contains air at a predetermined normal pressure, and it is desirable that when this pressure is reduced beyond a predetermined amount, the whistle 8 shall sound a warning. When the parts are in their usual or normal position, the pressure finds its way up the pipe 6 and

through the duct 17, and passing upon both sides of the valve 18 (see Fig. 3) encounters the piston 11. When the pressure is first thrown on, the piston, according to Fig. 1, is moved to the left. This is very easily accomplished for the reason that the piston is comparatively light. Having been once moved to the left, however, and the air pressure continuing against it, the air finds its way past the annular packing 11^a and fills the compartment 9^a to a density approximating that of the air contained in the signal pipe 4. That is to say, the air in the compartment 9^a is compressed, but not until after the piston 11 has completed its initial movement due to the air pressure first thrown upon it. The parts may remain in the various positions described for any length of time. Suppose, now, that for any reason (as, for instance, a pull upon the bell cord and a consequent diminution of air pressure in the signal pipe 4) the air pressure is reduced in the duct 17. The pressure of the air in the compartment 9^a, causing this air to expand, immediately forces the piston 11 to the right according to Fig. 1. In doing this the valve 18 uncovers the port 15 and the confined air escapes through this port and through the duct 17 to the pipe 8^a and whistle 8, thereby causing the whistle to sound. When the device is operating under ordinary conditions and the pressure within the signal pipe 4 is maintained approximately constant, or at least, its variations are not sudden, the whistle can not be sounded for the reason that in such case the valve 18 always covers the port 15. It is only when the valve 18 uncovers the port 15 that the whistle can sound, and this can never take place except when the pressure of the air in the compartment 9^a is greater than the air pressure in the signal pipe. Hence, if the signal pipe leaks, or gradually loses its pressure, the whistle is not sounded, whereas if the signal pipe should burst, or even should be used in the ordinary course of work, so as to reduce the air pressure within it, say a couple of pounds, the whistle immediately blows and apprises the operator of the sudden drop in the air pressure of the signal pipe.

Among the many practical advantages afforded by my improved compressed air signal above described are the following: No diaphragm is necessary, and hence a good deal of trouble from this source is avoided. The slide valve 18, by its motions, tends to cleanse itself and to maintain itself in good working order. The slide valve, the piston, the ring 11^a and various other movable parts are easily and quickly changed. The entire device has all of its parts readily accessible for purposes of repairs or inspection. A comparatively slight reduction in the pressure of the air contained in the signal pipe is sufficient to operate the whistle if this reduction be abrupt and it is not desirable to have the whistle sounded unless the reduction be of the general character here required. The mechanism requires but little room and is quicker to act, other things being equal, than some other mechanisms now in use. No strainer is required, the piping is reduced to a minimum, and there are practically no joints embodied. The device moreover permits of using air from the straight air brake reducing valve, thus doing away with any necessity for a signal reducing valve.

I do not limit myself to the particular construction of mechanism shown, for the reason that variations may be made therein without departing from the spirit of my invention—the scope of the invention being commensurate with the claims.

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

1. The combination of a whistle, mechanism provided with a duct leading to said whistle for sounding the latter, said mechanism being further provided with a port, a valve for opening and closing said port, a piston connected with said valve for actuating the same, a cylinder inclosing said piston, means for applying an air pressure to said piston and for allowing the gradual escape of air around said piston and into a compartment upon one side thereof, and a signal pipe for permitting the abrupt escape of air from the side of said piston opposite said compartment in order to allow the air within said compartment to move said piston so as to uncover said port.

2. The combination of a sounding member, mechanism provided with a duct leading to said sounding member for the purpose of actuating the latter, said mechanism being further provided with a port, a valve for opening and closing said port, a piston connected with said valve for actuating the same, a cylinder inclosing said piston, means for applying an air pressure to said piston and for allowing the gradual escape of air around the same and into a compartment adjacent thereto, and a signal pipe for permitting the abrupt escape of air from the side of said piston opposite said compartment.

3. The combination of a casing, having a portion formed into a cylinder, a piston movably mounted within said cylinder, a plug detachably engaging said cylinder for permitting access to said piston, a valve connected with said piston and mounted within said casing, a plug detachably connected

with said casing and disposed adjacent to said valve for promoting access thereto, means including a signal pipe for liberating compressed air from said casing at a point adjacent to said piston for the purpose of reducing the air pressure upon one side of said piston in order to induce the same to travel.

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

ROBERT ARMSTRONG.

Witnesses:
MOSES MUNN,
EVERARD B. MARSHALL.