(No Model.) 2 Sheets—Sheet 1.

E. G. SHORTT.

HIGH PRESSURE ALARM SYSTEM.

No. 538,548. Patented Apr. 30, 1895.

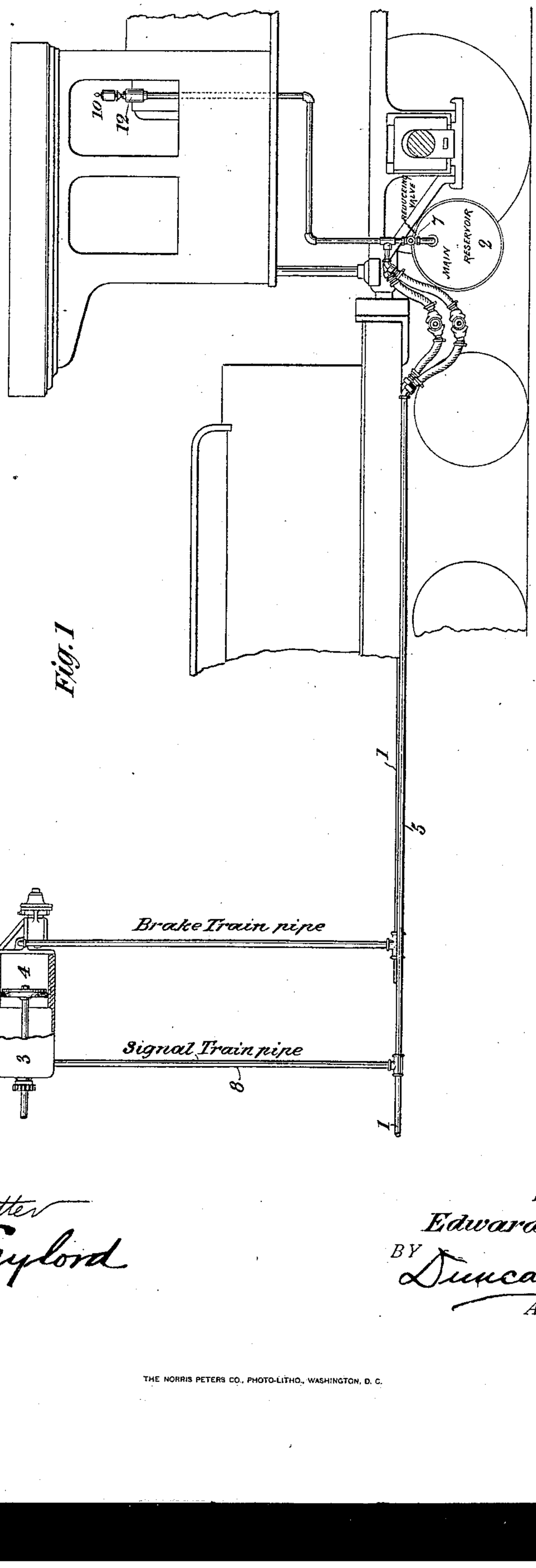

Fig. 1

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2

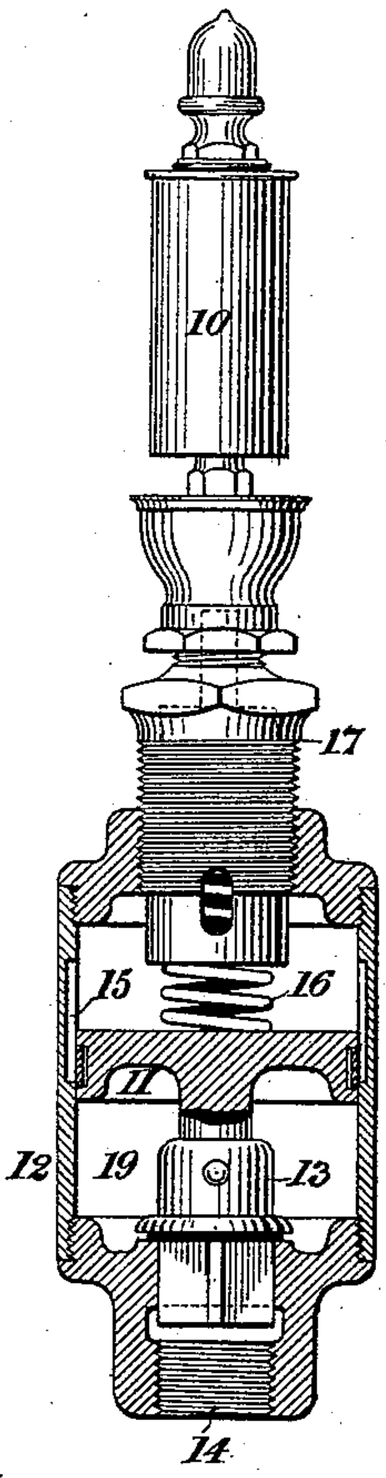


Fig. 3

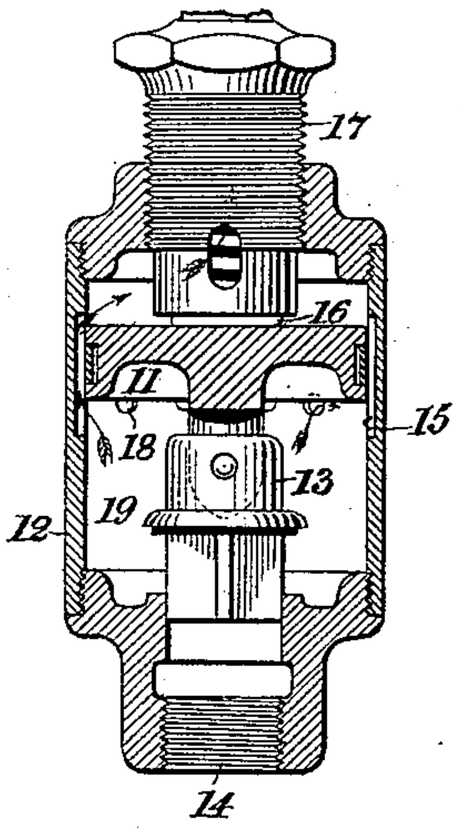
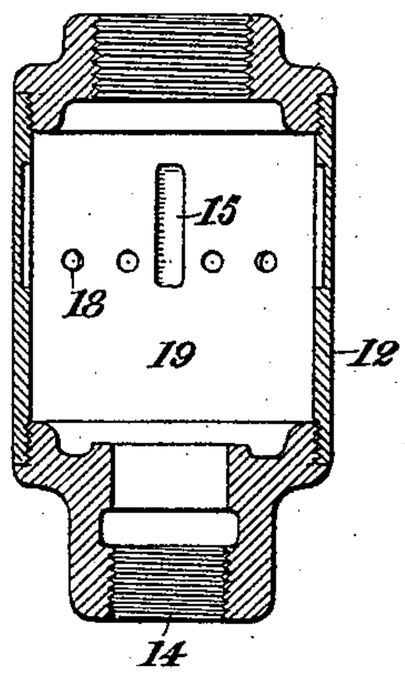


Fig. 4



WITNESSES:
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Robt. F. Gaylord

INVENTOR.
Edward G Shortt.
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UNITED STATES PATENT OFFICE.

EDWARD G. SHORTT, OF CARTHAGE, ASSIGNOR TO CHARLES GOODWIN EMERY, TRUSTEE, OF NEW YORK, N. Y.

HIGH-PRESSURE ALARM SYSTEM.

SPECIFICATION forming part of Letters Patent No. 538,548, dated April 30, 1895.

Application filed November 20, 1894. Serial No. 529,368. (No model.)

To all whom it may concern:

Be it known that I, EDWARD G. SHORTT, of Carthage, in the county of Jefferson and State of New York, have invented certain new and useful Improvements in Air Signal Mechanism for Railway-Trains, of which the following is a specification, reference being had to the accompanying drawings.

The present invention relates to fluid signal mechanism, especially adapted to be operated for the purpose of signaling from any one car of a railway train to the locomotive.

It is common to employ a signal train pipe connected to a main or supply reservoir by a valve mechanism adapted to maintain in the pipe an artificial or greater than atmospheric pressure, and to effect signals by suddenly reducing the signal pipe pressure, as at one of the cars, thereby operating a valve to let signal pipe air escape and sound a signal whistle or otherwise actuate a signal mechanism at the locomotive. Such a signal system is limited in practical use to passenger trains, and this limitation is essentially because of the time that must elapse between successive signals. After a reduction of pressure, the tendency is for the train pipe to be recharged from the main reservoir, and hence the time consumed between two signals should be that of the forward travel of the reduction wave together with that of the backward travel of the recharging wave—that is, in practice this is true, the common rule being, even in the case of short trains, to slowly count four between successive signal reductions. Experience shows that such an air signal system can not be successfully employed for trains of greater length than from ten to fifteen cars; whereas it is highly desirable to have an efficient air signal mechanism adapted to operate practically on trains of any length, as well as to operate more certainly and rapidly than do the common signal mechanisms. Another cause of the uncertainty of the desired action in common systems is that a balance diaphragm whistle-valve is usually employed, which if not forcibly actuated is likely to respond to the reservoir or to recurrent wave impulses and effect a plurality of whistle signals for one train pipe reduction, especially if such reduction is quickly and sharply made. It will be readily understood that if the signal column of air be of relative high pressure, fluctuations thereof will be transmitted along the column at a greater speed than would be the case with a column of lower pressure, and that a pressure impulse will be transmitted more rapidly than a reduction impulse; as also, that, if the pressure impulse or added air be allowed to escape from the column, as for sounding a whistle and restoring the column to standard pressure, recurrent or reservoir-supply wave action will be avoided, the time of restoring column pressure, as commonly, will be eliminated, and properly-timed successive signal pressure impulses can be added to the column without waiting for the first impulse to be vented or exhausted therefrom.

It is the object of my invention to avail of these principles; and my invention consists, generally, of an air signal train pipe, means for adding to or increasing the pressure therein, and signal devices adapted to be operated by such increase pressure to exhaust the same from the train pipe.

In the drawings, Figure 1 is a diagrammatic view of a mechanism embodying my invention. Fig. 2 is a central section of the whistle-valve in closed position. Fig. 3 is a like section with the valve open. Fig. 4 is a like section of the valve casing or shell, the valve being removed.

Referring to the views in detail, 1 represents the train pipe of an automatic brake system; 2, the main reservoir thereof; 3 and 4, one of the auxiliary reservoirs and one of the brake cylinders of an equilibrio construction; 5, the air signal train pipe; 7, a reducing valve connecting the signal pipe to the main reservoir 2; 8, a branch from the signal pipe to the auxiliary reservoir 3; and 9, a conductor's valve and operating handle whereby the branch signal pipe can be opened or closed to effect or cut off flow of air from the said reservoir to the signal pipe.

10 is the whistle, which is in open communication, above the reacting piston 11, with the interior of casing 12 of the whistle valve mechanism. This mechanism consists of the direct acting valve 13 normally closing the train pipe passage 14, and of said piston 11 attached to the valve; 15 being elongated ports

in the inner face of the casing, which normally are closed by said piston as to communication between the casing spaces above and below the piston. The valve 13 is held closed under the tension of spring 16, bearing on the piston and resting in the screw nut 17, which is threaded in the casing, opens to the whistle, and is adjustable to govern the opening of the valve at various train pipe pressures. Exhaust ports 18 are also provided, which open the chamber 19 below the piston to the atmosphere, and which are normally closed by the piston. This combination of a valve with a piston of greater diameter, produces in effect a differential or reactionary valve mechanism, or one that is acted on to open at a certain pressure, is again acted on more powerfully to hold open or to open more widely until it has exhausted to below that pressure before closing. The chamber 19 is essential to the use of this valve for exhausting air from a signal pipe, in that it forms a space in which the escaping air can collect and form a cushion to steady and maintain the valve in open position and prevent its vibratory, or rapid opening and closing, movement under slight variations of exhaust pressure.

In the running condition of the air brake and signal mechanisms, the main and auxiliary reservoirs are to be charged at a considerably higher pressure than the signal pipe—say at seventy and thirty pounds respectively, the latter pressure being maintained by the reducing valve between the signal pipe and the main reservoir of the brake system, and the whistle valve is to be set to move from its seat at a pressure slightly above that of the signal pipe.

When it is desired to signal the engineer, the conductor's signal valve will be turned for a moment to open the pipe connecting between the auxiliary reservoir and the signal pipe, and immediately closed, which will result in sending a pressure impulse or wave along the signal pipe. When this added pressure or pressure impulse wave arrives at the whistle valve, the latter is raised and admits signal pipe pressure under the piston attached thereto, which piston being of greater area is yet more strongly acted upon and is raised to position shown in Fig. 3, at which position of the parts the signal pipe air escapes to the whistle, and also to the atmosphere, depending upon the amount of pressure added in the signal pipe. The whistle valve is to be set so that it will exhaust signal pipe air until the pressure of the same is slightly below that at which the valve will open—the normal or standard pressure carried in the signal pipe.

It is to be noted that the excess pressure or signal wave escapes at the whistle valve leaving the retained signal pipe air at normal pressure, and hence there is practically no recurrent or backward wave; also, the signal pipe supply is not drawn upon (rather, it is cut off) by the action of the pressure impulse, and hence the time between successive signals need be that only of the exhaust of a pressure impulse from the pipe, and a series of successive impulses can be sent along the pipe by the conductor without regard to their reception at the locomotive, and with the certainty that they will effect a corresponding number of separate signals.

A large number of practical tests of this signal mechanism on a standard train-pipe line of fifty cars in length, has proved that successive signals can be sent from one end to the other of such a line with a pause between signals not greater than is now required in common systems when used on short trains; also, that one or more impulses can be traveling the line while, for example, an impulse is being sent in and one taken off the line.

When it is deemed necessary, as for a long signal line, the signal impulses may be prolonged and thereby their speed and certainty of transmission made more sure. I prefer to use such a signal system with an equilibrio brake system, since the air drawn from an auxiliary reservoir in such a system cannot undesirably affect the brakes, and the supply to the reservoir from the brake train pipe is as rapid as ordinarily would be the exhaust therefrom for the purpose of signaling—the train brake line acting as an extension of the main reservoir from which to draw the signal impulses to be sent along the signal line, though it is obvious that, while a convenience, the brake train pipe is not a necessary means for maintaining at a car or cars the fluid pressure employed to effect the signal pressure-impulses.

What is claimed as new is—

1. In combination in a fluid signal mechanism for railway trains, a signal train-pipe and air pressure mechanism connected thereto and acting to maintain therein an artificial standard air pressure, a signal mechanism connected to said pipe and actuated by an increase of pressure to the pressure of the signal pipe above its normal pressure, a chamber or reservoir normally containing air under pressure greater than that in the signal pipe, and a valve mechanism connecting said chamber and signal pipe and operable to increase the signal pipe pressure for the purpose of actuating said signal mechanism, substantially as set forth.

2. In combination in a fluid signal mechanism for railway trains, a main reservoir and an automatic valve acting to supply said pipe from said reservoir and to maintain in the pipe a normal air pressure less than that normally held in the reservoir, a signal mechanism connected to said pipe and actuated by an increase of the signal pipe pressure above its normal pressure, a second train pipe (or air-brake train pipe) connected to said reservoir and normally containing air under pressure greater than that in the signal pipe, and mechanism operating when acted upon

to openly connect the two pipes whereby to increase the signal pipe pressure and actuate said signal mechanism, substantially as set forth.

3. In combination with the main reservoir, train-pipe and auxiliary reservoir of an air-brake system, a signal pipe and valve mechanism connecting the same to said main reservoir and acting to maintain in the signal pipe a pressure less than that in the main reservoir, signal mechanism connected with the signal pipe and operable upon and by an increase of signal pipe pressure above its normal pressure, and valve connections between the signal pipe and the auxiliary reservoir whereby air can be drawn from the auxiliary reservoir for the purpose of adding to the signal pipe pressure and actuating said signal mechanism, substantially as set forth.

4. In combination in a fluid signal mechanism for railway trains and with the signal pipe thereof, mechanism for maintaining a certain stored or normal air pressure therein, mechanism for increasing said air pressure, and a differential signal valve controlling an exhaust passage from the signal pipe, whereby when the normal pressure in the signal pipe is increased said valve is operated to effect a signal and reduce the signal pipe pressure to its standard or normal condition.

EDWARD G. SHORTT.

Witnesses:
JOHN UNSER,
H. B. EDMONDS.

Letters Patent No. 538,548.

Correction in

It is hereby certified that in Letters Patent No. 538,548, granted April 30, 1895, upon the application of Edward G. Shortt, of Carthage, New York, for an improvement in "High-Pressure Alarm Systems," an error appears in the printed specification requiring the following correction, viz: In line 123, page 2, the words *signal pipe and* should be inserted before the words "main reservoir;" and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 21st day of May, A. D. 1895.

JNO. M. REYNOLDS,
Assistant Secretary of the Interior.

[SEAL.]

Countersigned:

JOHN S. SEYMOUR,
Commissioner of Patents.