(No Model.)

G. HEFFNER.

LOW PRESSURE ALARM.

No. 525,206. Patented Aug. 28, 1894.

Fig. 1.

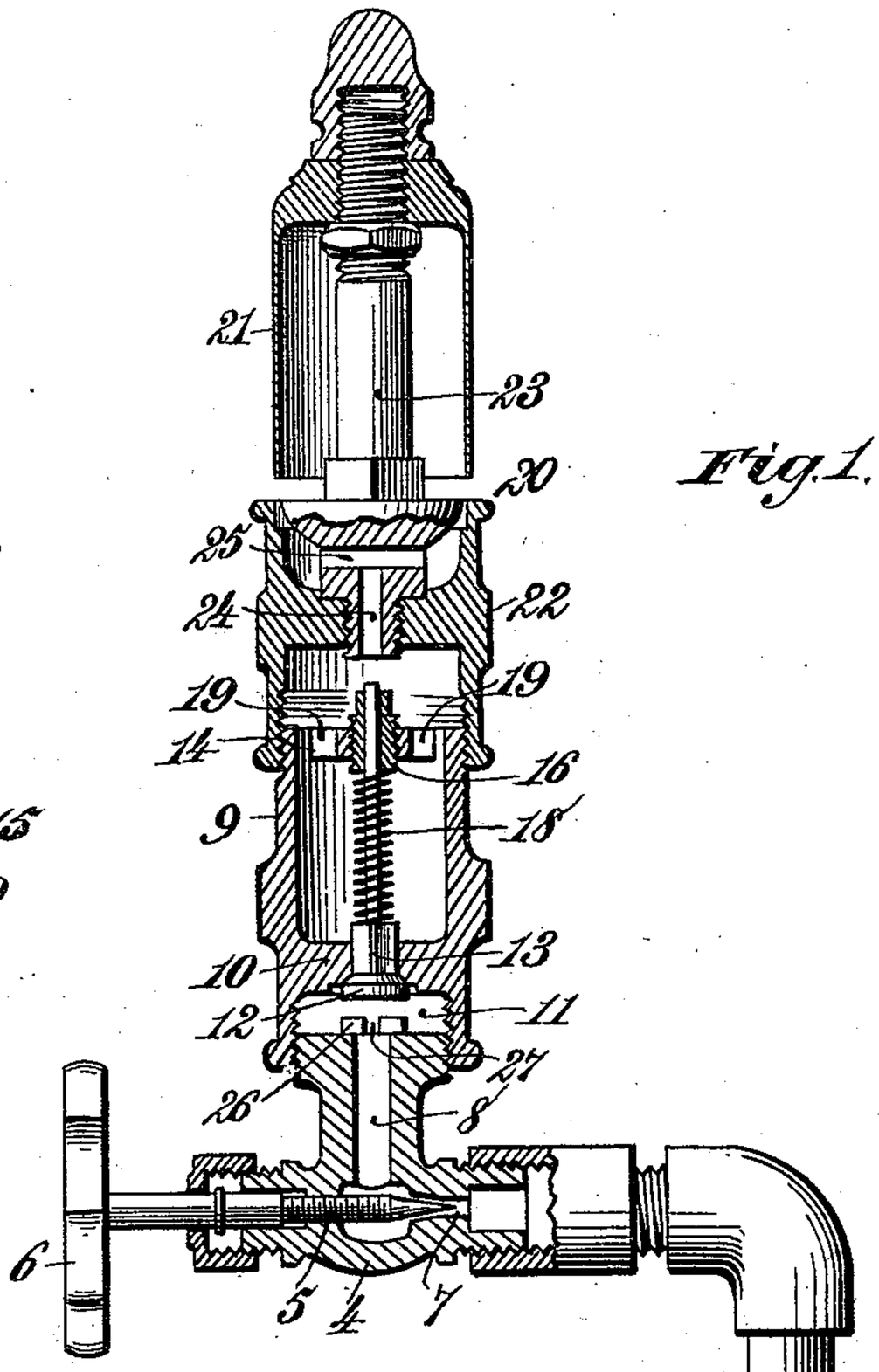


Fig. 2.

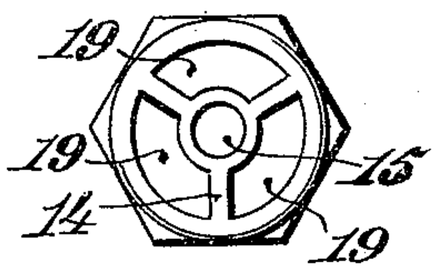
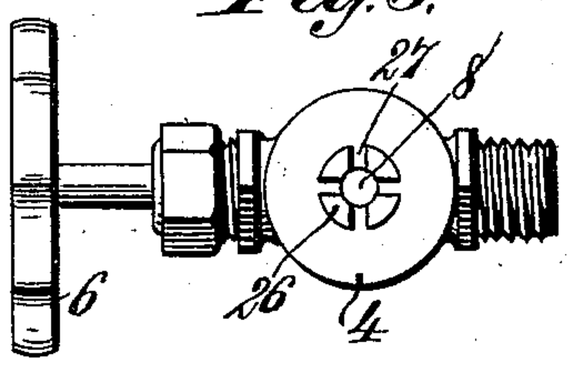
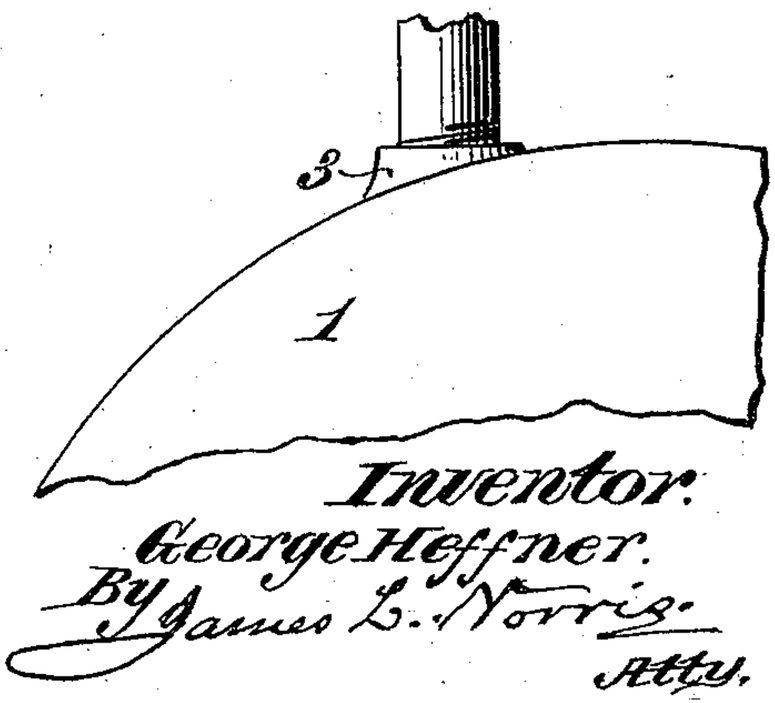


Fig. 3.





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UNITED STATES PATENT OFFICE.

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LOW-PRESSURE ALARM.

SPECIFICATION forming part of Letters Patent No. 525,206, dated August 28, 1894.

Application filed February 21, 1894. Serial No. 501,023. (No model.)

To all whom it may concern:

Be it known that I, GEORGE HEFFNER, a citizen of the United States, residing at Clifton, in the county of Jefferson and State of Kentucky, have invented new and useful Improvements in Low-Pressure Alarms for Air-Brake Systems, of which the following is a specification.

This invention relates to an automatic low pressure alarm for railway air brake systems in which a whistle or like audible signal is connected with an air reservoir and controlled by a valve that is ordinarily seated by air pressure but which will open under the action of a spring and admit air to the whistle when the pressure in the air reservoir falls below the standard pressure to which the spring is adjusted.

Heretofore low pressure alarms for air-brake systems have comprised a valve controlling an outlet from the train pipe, a spring to open the valve when the air pressure in the train pipe falls to a dangerously low point, the said outlet and train pipe communicating continuously while the valve remains open, and a whistle that is sounded by the escaping air on the opening of the valve. In such arrangement of the alarm the whistle is liable to be unnecessarily sounded whenever there is a diminution of normal pressure in the train pipe, as in applying the brakes, and this frequent sounding of the alarm is objectionable. It is a more serious objection to such connection of the alarm with the train pipe that when the whistle is sounded the air pressure in the reservoir as well as the train pipe may, through some defect in the action of the pump have become already so much reduced or otherwise rendered unavailable as to be insufficient or useless for applying the brakes.

My invention consists in an improved low pressure alarm comprising a novel construction, arrangement and combination of parts and in the combination of the said alarm with the air reservoir of an air-brake system for railway trains, as hereinafter more particularly described and claimed.

In the annexed drawings illustrating the invention—Figure 1 represents a sectional elevation of my improved low pressure alarm connected with an outlet from the main air reservoir of a railway air brake system. Fig. 2 is a plan of a spider frame constituting the upper end of a lower tubular section of the alarm. Fig. 3 is a plan of the lowermost section of the alarm in which a hand valve is supported, and showing stops for an upper vertically movable valve that controls the whistle or alarm, said stops alternating with radial passages for access of air to the upper valve.

Referring to the drawings, the numeral 1 designates the main air reservoir of a railway air-brake system. This reservoir is preferably located beneath a locomotive, as usual, and may be of an suitable or well known construction.

A pipe or passage 2 of any suitable character is connected at its lower end with an outlet 3 from the air reservoir.

Connected with the pipe 2 at a convenient point, and preferably arranged within or adjacent to the locomotive cab, is a casting 4 that serves as a casing for a hand valve 5 and, also constitutes the lowermost or supporting section of the automatic low pressure alarm. I have shown the hand valve 5 in the form of a needle or tapered stem or plug having a handle or wheel 6 at one end, but this valve may be of any other suitable form that will serve to shut off the alarm from communication with the air reservoir as, for instance, while the reservoir is being filled with compressed air in readiness for use.

In the casing or section 4 is formed an inlet passage 7 adapted to communicate with the pipe 2 leading from the air reservoir. When the valve 5 is open the inlet passage 7 is adapted to communicate with an outlet passage 8 formed in the section or casing 4 and leading to the alarm mechanism that is supported on said section.

The upper end of the valve casing or section 4 is externally screw threaded for attachment of the internally screw threaded lower end of a tubular section 9 that is provided with a centrally perforated diaphragm 10 near its lower end. In the lower end of the tubular section or casing 9, intermediate the supporting section 8 and perforated diaphragm 10, is a chamber 11 of sufficient depth

to afford play for a valve 12 that is normally seated upward against the under side of the central opening in the diaphragm 10 by the pressure of air from the reservoir.

The valve 12 is preferably formed with wings 13 extended into the opening in the diaphragm to serve as guides for the valve and at the same time afford passages for the air when the valve is open. At its upper end the casing or section 9 is formed with a spider frame 14 having a central internally threaded perforation 15 to receive a centrally perforated screw plug or adjusting screw 16 in which the stem 17 of the valve 12 is guided.

The valve stem 17 is surrounded by a spirally coiled spring 18 having one end bearing against the upper side of the valve 12 and its other end bearing against the under side of the adjusting screw plug 16 by means of which the pressure of the spring is adjusted.

In the spider 14, surrounding the screw plug or adjusting screw 16, are openings 19 for access of a blast of air to the whistle 20 when the valve 12 is opened by a downward pressure of the spring 18 in excess of the pressure of air against the under side of the valve.

The whistle 20 may be substantially in the form usually employed except that its bell portion 21 is supported from a tubular casing or section 22 having a screw threaded connection with the upper end of the section 9 and arranged to cover or conceal the adjusting screw plug 16 so that access thereto for tampering with or changing the adjustment of the spring 18 cannot be obtained without some difficulty and trouble. In the lower part of the screw bolt 23 to which the bell portion 21 is attached are formed the openings 24 and 25 for the passage of the air blast to the whistle.

In order to limit the downward movement of the whistle controlling valve 12 and prevent it from closing the passage 8 through the casing 4 of the hand valve, I provide a series of radially arranged stops 26 alternating with passages 27 through which air can pass from the passage 8 into the chamber 11 and thence into the passages above the diaphragm 10 when the valve 12 is lowered. Although I have shown these stops 26 and passages 27 arranged on the top of the casing or section 4 it is obvious that they may be formed on the under side of the valve 12, if preferred.

The spring 18 of the whistle controlling valve 12 is to be adjusted to a standard pressure of, say, seventy pounds, or somewhat less than the normal pressure in the air reservoir with which the alarm is connected and from which the train pipes are supplied. The normal pressure in the air reservoir may be from ninety to one hundred pounds, more or less, and is in excess of the standard pressure to which the spring 18 is adjusted.

In preparing the apparatus for use and when beginning to charge the air reservoir the hand valve 5 is first left open for a time; and while there is insufficient air pressure to seat or close the valve 12 it will be held open by the downward pressure of its spring 18 so that the escaping air will sound the whistle and the engineer may thus know that the alarm is in good working order. The hand valve 5 is then closed and the charging of the air reservoir completed, after which the said hand valve is permanently opened so that the whistle controlling valve 12 will be closed by the excess of pressure beneath it.

Whenever the pressure in the air reservoir falls below the standard to which the spring 18 is adjusted the valve 12 will be opened by said spring and the escaping air will sound the whistle and warn the engineer and trainmen. By connecting the alarm with the air reservoir, instead of a train-pipe the warning is given long before the pressure reaches a dangerously low point and while there is yet an ample supply of air to work the brakes and time in which other steps may be taken for the safety of the train. Again, the alarm is not sounded every time the pressure in the train pipes is reduced, as on applying the brakes, but only when the air in the reservoir falls below the standard pressure to which the alarm is adjusted.

What I claim as my invention is—

1. In a low pressure alarm for air-brake systems, the combination with an air reservoir, a whistle, a valve for automatically controlling an outlet from said air reservoir to the whistle, and a spring to open said valve when the pressure in the air reservoir falls below a standard to which the spring is adjusted, of a casing surrounding said valve and its stem and provided with a spider frame having openings for passage of air to the whistle, and a centrally perforated adjusting screw plug supported in said frame and adapted to serve as a guide for the valve stem and a means for adjusting the pressure of the spring that opens the valve, said screw plug and its supporting frame being inclosed by the casing substantially as described.

2. In a low pressure alarm for air brake systems, the combination with an air reservoir, of a sectional casing connected with an outlet from the air reservoir, a valve inclosed in said casing for automatically controlling the outlet from the reservoir, a spring to open said valve when the pressure in the air reservoir falls below a standard to which the spring is adjusted, a whistle communicating with the valve casing, a spider frame supported in the casing and having openings for passage of air to the whistle, a centrally perforated adjusting screw plug mounted in said spider frame to serve as a guide for the valve stem and as a means for adjusting the pressure of the spring that opens the valve, said screw plug being concealed in and covered by the casing, and stops located intermediate the valve and the outlet from the reservoir and adapted to limit the opening of the valve and

provide a series of air passages to and around the opened valve, substantially as shown and described.

3. In a low pressure alarm for air brake systems, the combination of an air reservoir, a whistle, a valve for automatically controlling an outlet from said air reservoir to the whistle, a spring to open the valve when the pressure in the air reservoir falls below a standard to which the spring is adjusted, a screw plug for adjusting the pressure of the spring, a casing that wholly incloses and conceals the said valve and its adjusting screw plug, and a hand valve intermediate the air reservoir and automatic whistle controlling valve, substantially as described.

In testimony whereof I have hereunto set my hand and affixed my seal in presence of two subscribing witnesses.

GEORGE HEFFNER. [L. S.]

Witnesses:
JAMES L. NORRIS,
THOS. A. GREEN.