

(No Model.)

G. HEFFNER.
LOW PRESSURE ALARM.

No. 550,884.

Patented Dec. 3, 1895.

Fig. 1.

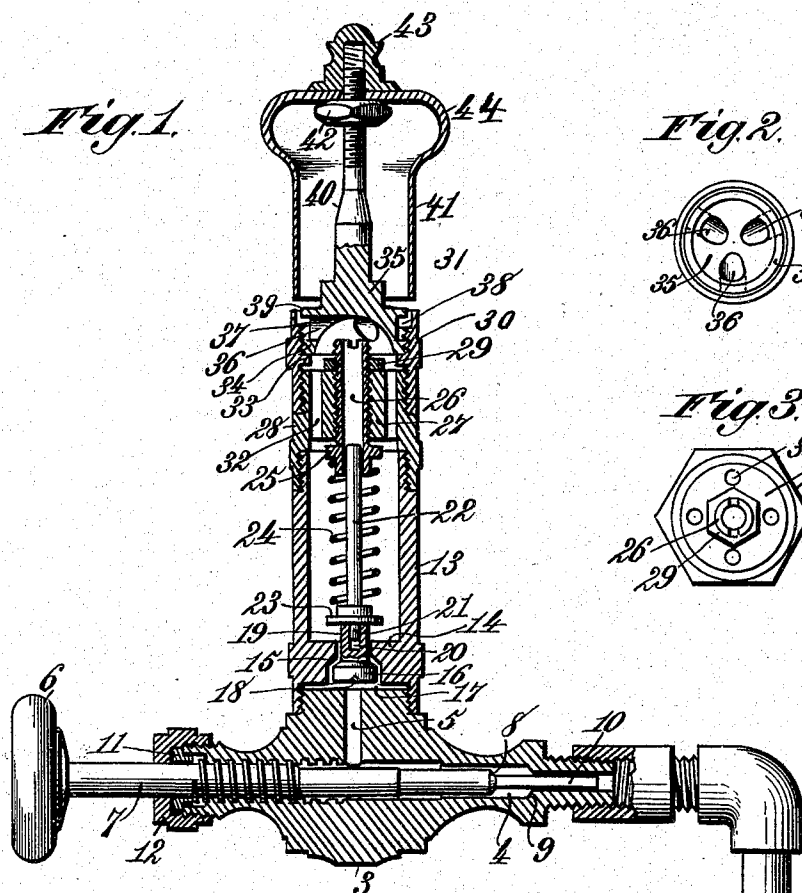


Fig. 2.

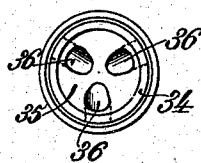


Fig. 3.

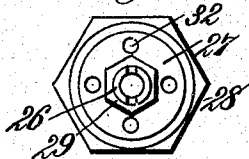


Fig. 4.

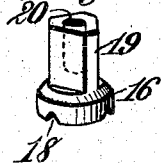
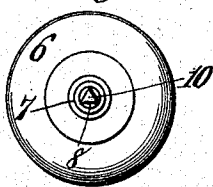


Fig. 5.



Fig. 6.



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UNITED STATES PATENT OFFICE.

GEORGE HEFFNER, OF CLIFTON, KENTUCKY.

LOW-PRESSURE ALARM.

SPECIFICATION forming part of Letters Patent No. 550,884, dated December 3, 1895.

Application filed July 17, 1895. Serial No. 556,286. (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 Automatic Low-Pressure Alarms, of which the following is a specification.

This invention relates to improvements in the automatic low-pressure alarm for which were granted to me Letters Patent No. 525,206, dated August 28, 1894, the said alarm being of that class in which a whistle or like audible signal is connected with a source of air-pressure in a railway air-brake system 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 air-pressure falls below a standard pressure to which the spring is adjusted.

My present invention consists in a novel construction of the whistle; also, in the construction of an automatic whistle-controlling valve having a pivot-bearing on its valve-stem to increase its efficiency and accuracy in seating; also, in the means for supporting and adjusting the spring that opens the whistle-valve whenever the air-pressure falls below a predetermined standard, and, further, in the novel combinations of the parts of a low-pressure alarm, 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 air-reservoir of a railway air-brake system. Fig. 2 is an inverted plan of the base of the whistle. Fig. 3 is a plan of an upper section in which is supported the regulating screw-plug for adjusting the spring of the whistle-controlling valve. Fig. 4 is a detail perspective view of the automatic whistle-controlling valve. Fig. 5 is a plan of the under side of said whistle-valve. Fig. 6 is a view of the hand-valve detached.

Referring to the drawings, the numeral 1 designates an air-reservoir of a railway air-brake system, and 2 is a pipe or passage that may constitute an outlet from said reservoir.

The base portion 3 of the low-pressure alarm consists of a chambered casting adapted to

be connected with the pipe 2 in any convenient manner. In this casting or base-section 3 of the alarm are formed an inlet air-passage 4 and an outlet-passage 5, which passages are controlled by a hand-valve 6, comprising a screw-shank 7, engaging an interiorly-threaded portion of the valve-casing 3, a cone-faced valve portion 8, corresponding with a similarly-formed valve-seat 9, and a valve extension 10, that is triangular in cross-section and which projects into the inlet air-passage 4 and is adapted to keep the same clear from accumulations of dirt. On one end of the base-section or casting 3 is engaged a screw-cap or collar 12, that serves to attach the hand-valve to its casing. A washer 11 on the shank of the hand-valve, intermediate the screw 7 and cap or collar 12, will serve to limit the outward movement of the valve and prevent its withdrawal from the casing except after unscrewing the cap or collar. The triangular cross-sectional shape of the valve extension 10 will assist in controlling the access of air to the valve and is a useful feature in keeping the air-inlet passage free from obstruction. By the provision of the washer 11 this triangular valve extension 10 is never drawn wholly out of the air-regulating inlet 4 while the parts of the valve are in operative connection. The hand-valve is intended to be left normally open while the low-pressure alarm is in operative condition; but it may be quickly closed should occasion require or whenever it is desired to prevent a waste of air-pressure.

To the base-section 3 of the alarm there is attached, preferably by screw connection, a tubular body or section 13, having a centrally-perforated partition 14 near its lower end. In the central perforation of this partition is formed a valve-seat 15 for an upwardly-seating valve 16, that is normally seated by air-pressure when the hand-valve 6 is open. Below the partition 14 is a chamber 17 of sufficient depth to afford a play for the valve 16 and permit it to open downward and admit air to the whistle. The under side of the valve 16 is provided with radial grooves 18, that prevent the said valve from closing the outlet-passage 5 of the base-section. The upper portion or shank 19 of the valve 16 is triangular in cross-section to permit the passage

of air along its sides and into the upper portion of the casing or section 13 when the valve is open. In the top of the triangular valve-shank 19 is a step-recess 20 to receive a pivot-bearing 21 on the lower end of the valve-stem 22, which is provided with a collar or shoulder 23 above said pivot-bearing. This collar 23 is arranged above the partition 14 and forms the lower bearing for a spiral spring 24, with which the valve-stem 22 is surrounded. At its upper end the valve-spring 24 has a bearing against the under side of a collar 25, formed on a tubular regulating screw-plug 26, which serves as a guide for the valve-stem and by which the pressure of the valve-spring 24 may be adjusted to any required standard.

The spring-adjusting screw-plug 26 is supported centrally in the perforated head 27 of the upper valve-casing section 28, which has a screw-threaded connection with the section 13 next below. On the shank of the screw-plug 26 above the head 27 is a nut 29, by which the said screw-plug is securely locked in adjusted position, so that it cannot turn in the threaded central perforation of the head 27 unless the nut 29 is first loosened.

To the head portion of the upper valve-casing section 28 is attached, preferably by screw-threaded connection, the base portion or bowl 30 of a whistle 31, arranged to sound an audible alarm when the spring 24 opens the whistle-valve 16 upon a decrease of standard air-pressure below said valve. In the head 27 is a series of perforations 32 for passage of air to the bowl 30 or base portion of the whistle.

The bowl 30 is provided with an internal collar or annular flange 33, that will seat on the top edge of the head 27 when the bowl is screwed into place. Above this collar or flange 33 the bowl 30 is interiorly screw-threaded to engage an exteriorly-threaded depending annular flange 34 on a vertically-adjustable head or disk 35, that forms the top of the whistle-bowl. The under side of this head or disk 35 is concaved and provided with radial air-passages 36, terminating in openings 37, formed through the annular depending flange 34, the upper portion of which is of less diameter than the disk or head 35 to which it pertains. There is thus formed between the interior upper portion of the bowl 30 and the outside of the depending annular flange 34 an annular recess or chamber 38 for passage of air to an annular exit-passage 39 between the rim of the bowl 30 and the edge of the vertically-adjustable head or disk 35, and by screwing this head or disk 35 out or in the area of the whistle passage or vent 39 can be increased or diminished, as required.

The vertically-adjustable head or disk 35 supports a vertically-extended screw-stem 40, on which is adjustably mounted the bell portion 41 of the whistle. By means of a nut 42 below the top of the bell portion and a nut 43 above the same the said bell can be adjusted to vary its distance from the bowl, as required. I prefer to provide the top por-

tion of the bell with an annular enlargement 44 to increase its vibrating surface.

While I have shown the low-pressure alarm as connected with an air-reservoir such as usually employed in railway air-brake systems, it is obvious that the alarm may be connected to a train-pipe; but in such arrangement the alarm 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 is often objectionable. The unnecessary waste of air resulting from connection of the alarm to the train-pipe gives rise to the further and more serious objection 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. I therefore prefer to connect the low-pressure alarm to the main air-reservoir that is usually located beneath or adjacent to the locomotive; but it may be connected directly with the train-pipe at any part of the train or with an air-reservoir at any suitable or convenient point.

As described in my before-named prior patent, the spring 24 of the whistle-controlling valve 16 is to be adjusted, by means of the screw-plug 26, to a standard pressure of, say, seventy pounds, or somewhat less than the normal pressure in the air-reservoir 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.

When beginning to charge the air-reservoir, the hand-valve 6 of the alarm is first left open for a time, and while there is insufficient air-pressure to seat or close the valve 16 it will be held open by its spring 24, 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 6 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 16 will seat upward and be closed by the normal air-pressure beneath it, which is in excess of the downward pressure exerted by the valve-spring. Now whenever the air-pressure on the under side of the valve 16 falls below the standard to which the spring 24 is adjusted the said valve 16 will be opened by said spring and the escaping air will sound the whistle or alarm and warn the engineer, conductor, and trainmen, so that steps may be taken to restore the air-pressure in the reservoir and train-pipes, or to move the train to a point of safety on the road in case the air-brake system is disabled. If it should not be possible to immediately restore the standard air-pressure, the hand-valve 6 may be closed to prevent a waste of air through the alarm mechanism and to retain in the train-pipes a sufficient pressure of air for control-

ling the brakes until the train can be taken to a point of safety and the difficulty investigated and remedied. By connecting the low-pressure alarm to an air-reservoir instead of a train-pipe the warning will be given long before the pressure in the train-pipe reaches a dangerously-low point and while there is yet an ample supply of air to work the brakes and time to look out for the safety of the train.

The arrangement of the whistle-controlling valve 16 upon a pivot-bearing, as 21, enables the said valve to seat accurately and closely, so that it will not permit a waste of air, as might occur with a rigidly-connected valve and stem in case of an imperfection in fitting. The collars on the valve-stem 22 and adjusting screw-plug 26 afford firm and reliable bearings for the valve-spring 24 and permit its ready adjustment to the required pressure after loosening the nut 29, which serves as a lock for said screw-plug after it has been properly adjusted. It will be observed that the whistle-controlling valve 16 to spring 24 and adjusting screw-plug 26 are all completely inclosed and concealed and that access thereto for tampering with or changing the adjustment cannot be obtained except with some difficulty. The construction of the whistle is simple and effective and permits any required adjustment to the desired force and intensity of blast.

In my before-named patent, No. 525,206, I have shown an automatic low-pressure alarm connected with an air-reservoir and comprising a sectional casing, a whistle-controlling valve inclosed in said casing and rigidly connected with its valve-stem, 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 tubular or 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 valve-spring,

and a hand-valve intermediate the air-reservoir and automatic whistle-controlling valve, and I would have it understood that I do not herein claim the construction and arrangement of parts set forth in said patent.

What I claim as my invention is—

1. In a low pressure alarm for air brake systems, the combination with a whistle, a sectional valve casing with which the whistle communicates, and a centrally perforated partition located in said casing and provided with a valve seat, of an upwardly seating whistle controlling valve provided on its upper side with a shank triangular in cross-section and having a step bearing therein, a valve stem having on its lower end a pivot bearing for loose engagement with the step bearing of the valve shank and provided with a collar above the valve seat, a spring surrounding the valve stem and having at its lower end a bearing on said collar, a tubular adjusting screw plug supported in the top of the valve casing to serve as a guide for the valve stem and having a collar to afford a bearing for the upper end of the valve spring, and a lock nut on said screw plug, substantially as described.

2. In a low pressure alarm for air brake systems, the combination with an automatic valve and a casing having its upper end provided with a perforated head, of a whistle bowl or base section engaged with said valve casing and having an internal collar seating on the top edge of said head, a vertically adjustable disk concaved on its under side and having an annular depending flange engaging the interior of the bowl above its internal collar and provided with radial air passages, and a whistle bell mounted on a stem carried by said disk, substantially as described.

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

GEORGE HEFFNER.

Witnesses:

JAMES E. SIMCOE,
GEORGE SCHANGE.