

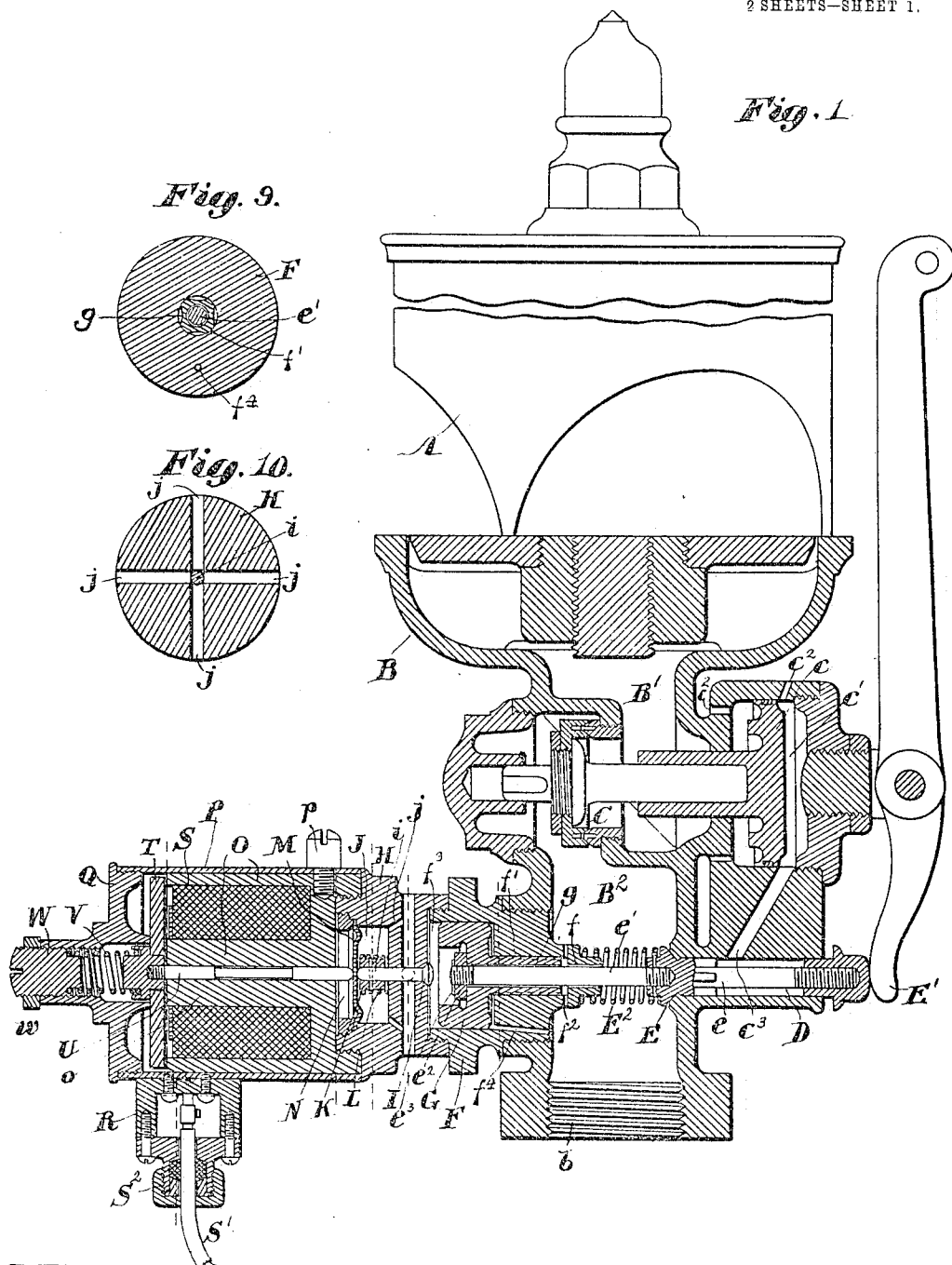
No. 787,422.

PATENTED APR. 18, 1905.

F. L. WOLFE.
WHISTLE VALVE.

APPLICATION FILED FEB. 15, 1904.

2 SHEETS—SHEET 1.



Witnesses:

W. L. William

A. L. Mathew

Inventor:

Frank F. Wolfe

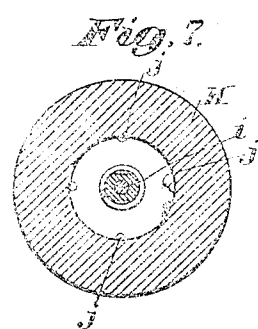
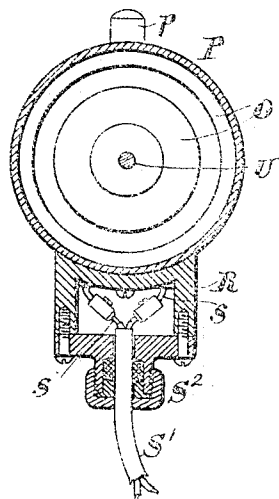
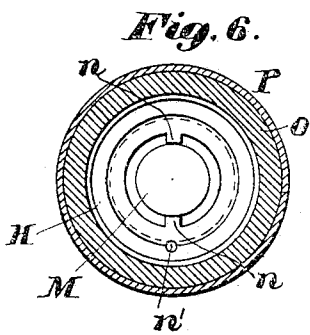
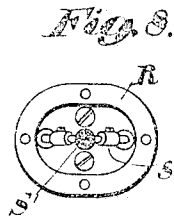
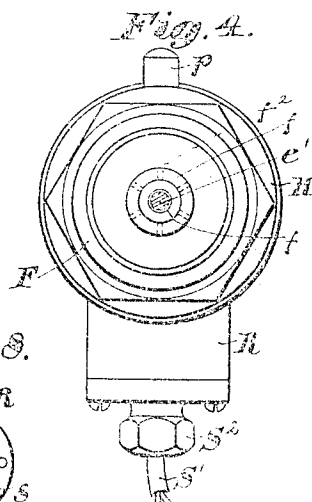
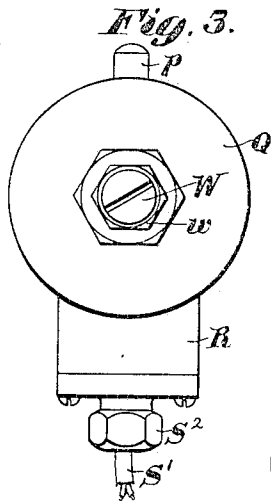
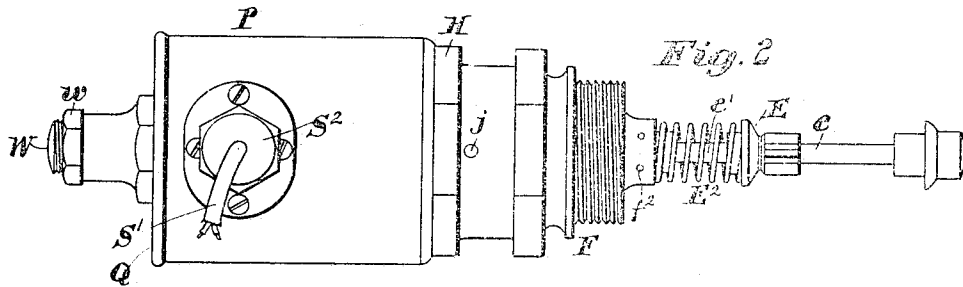
by his attorney
Ralph W. White

No. 787,422.

PATENTED APR. 18, 1905.

F. L. WOLFE.
WHISTLE VALVE.
APPLICATION FILED FEB. 15, 1904.

2 SHEETS—SHEET 2.



Witnesses:
W. L. Williams
A. L. Gathman.

Inventor:
Frank L. Wolfe
by his attorney
Ralph W. Fournier

UNITED STATES PATENT OFFICE.

FRANK L. WOLFE, OF MEDFORD, MASSACHUSETTS, ASSIGNOR TO CROSBY STEAM GAGE AND VALVE COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

WHISTLE-VALVE.

SPECIFICATION forming part of Letters Patent No. 787,422, dated April 18, 1905.

Application filed February 15, 1904. Serial No. 193,760.

To all whom it may concern:

Be it known that I, FRANK L. WOLFE, a citizen of the United States, and a resident of Medford, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Whistle-Valves, of which the following is a specification.

My invention relates to whistle-valves; and its object is to provide means for easily, accurately, and at such intervals as may be desired operating such valves and securing their conformity to the requirement, when imposed, that they be adapted to sound according to a given code for signaling purposes.

It consists of an additional valve operated electrically, and is illustrated by the accompanying drawings, which show, with one or two modifications, the whistle-valve patented by Lane, November 14, 1899, No. 636,907; and my invention may be regarded as an improvement on that of Lane, though adaptable to any whistle-valve. It is illustrated by the accompanying drawings, in which—

Figure 1 is a central vertical section of a whistle-valve equipped with my improvement. Fig. 2 is an elevation showing my improvement attached to the whistle-valve E. Fig. 3 is an end view of the improvement looking from the left. Fig. 4 is a similar view looking from the right. Figs. 5, 6, 7, 8, 9, and 10 are detailed views of its several parts.

A is the whistle-bell.

B is the whistle-bowl, threaded at its base for attachment to the steam or any fluid reservoir and divided into two communicating chambers B' and B². Seated in chamber B² is the valve C, operated by the piston c, located in the laterally-projected cylinder c', from which there are passages c² to the open air and other passages c³ to the laterally-projected cylinder D. In the chamber B² is also seated the valve E, with its stem e operated by the lever E' against the action of the spring E², which Lane fixes to a plug which he screws into the wall of chamber B². This is substantially Lane's device without my improvement, and its operation is, as described by Lane, as follows:

When the whistle-valve is attached to a

steam-boiler, the steam from the boiler fills the lower chamber B² and by pressure upon the valves C and E holds them to their respective seats, the spring E² assisting to hold the valve E to its seat. To sound the whistle, the operator pulls the lever E', thereby forcing the valve E from its seat and allowing the steam to escape from chamber B² into the cylinder D, thence through the passages c³ into that part of the cylinder c' above the piston c. The pressure of the steam upon the piston c being practically of the same degree as that of the steam in chamber B² it follows that as the surface of the piston is greater than the surface of the valve C this pressure will force the valve C from its seat and allow steam to escape from chamber B² into chamber B', and thence upward through the whistle-bowl B to the whistle-bell A. If the pressure by the lever E' be removed, the valve E will return immediately to its seat, being forced thereto by the steam-pressure in chamber B², assisted by the recoil of the spring E². The steam remaining in the cylinder D, passages c³, and space above the piston c in cylinder c' instantly dissipates through the passages c² into the open air, thus removing the pressure from the piston c and allowing the valve C to be forced to its seat by the pressure of the steam in chamber B². This cuts off the supply of steam to chamber B' and the whistle ceases to blow or sound.

To operate the valve E electrically, I employ the following described mechanism: In the outer wall of chamber B' is fixed the cylinder F, which has a contracted inner end f, a larger middle portion f' with passages f² leading therefrom to chamber B², and a much larger outer portion f³, which constitutes the cylinder proper, with a passage f⁴ leading therefrom to the chamber B². In this cylinder is the balanced piston G, having the tubular-grooved stem g, adapted to slide into the middle portion f' of the cylinder F. This piston G slides freely in the cylinder F, so that steam from chamber B² quickly surrounds it and it becomes balanced in said steam, and when the pressure is removed from the outer side of said piston by opening valve I the

piston becomes unbalanced and moves outward, opening valve E. The valve E is furnished with the valve-stem e' , which passes through and is in sliding contact with the inner end f' of the cylinder F and the piston-stem g and piston G, and on its outer end is placed the nut e'' , held in place by the pin e^3 . On the valve-stem e' is arranged the spring E^2 , confined by the valve E and a shoulder on the cylinder F. To the cylinder F is screwed the bushing H, constituting the magnet-base and the outer end of the cylinder F, through which there is a passage normally closed by the valve I, held to its seat by the spring L, arranged on the valve-stem i , which extends through said passage into the chamber J and has fixed to its outer end the spring-head K. Passages j lead from the chamber J to the open air. In the chamber J is an annular shoulder on which rests the diaphragm M, which rests also against the outer end of the valve-stem i . This diaphragm M is held against the shoulder by the threaded annulus N, furnished with the lugs n for convenience in rotating it. This annulus N may be locked in place by inserting a screw in the cut-out portions n' of the annulus and bushing H, which are threaded for that purpose. Mounted upon the magnet-base is the magnet-shell O, including the core o , and surrounding this magnet-shell O is the casing P, held in place by the stud p and having the cap Q and the insulator-box R affixed to it. Within the magnet-shell O is the electromagnet-spool S, whose terminals s and s' are connected in the insulator-box R with the cable S' , which passes through the stuffing-box S^2 , attached to said insulator-box. The armature T of the electromagnet carries the stem U, which passes through the core o into the magnet-base and rests against the diaphragm M directly opposite the outer end of the valve-stem i . The outside of the armature has affixed to it the spring V, which is secured to the threaded bolt W, which engages the hub of the cap Q, being held in position by the lock-nut w .

The operation of my device is as follows: When the whistle-valve is attached to a steam-boiler, the steam fills chamber B^2 and thence flows into cylinder F and presses equally on the inner and outer surfaces of piston G. (The steam from chamber B^2 flows through passages f^2 and surrounds the tubular-grooved piston-stem g (see Fig. 9) and escapes past the piston G into the cylinder f^3 . The steam flows also from chamber B^2 through the passage f^4 and thence escapes past the piston G into the cylinder f^3 . The piston G, as described above, slides freely in the cylinder F, and none of the bearings are steam-tight, thus permitting the steam to act as described. The valves E and I are seated. The springs E^2 , L, and V are inactive or normal. The valve-stem e' has a very slight longitudinal play, so as to insure the seating of valve E. The valve-stem i , di-

aphragm M, and armature-stem U are in contact. When the electric circuit is closed, the armature forces the valve I from its seat, compressing spring L and extending spring V and permitting the steam to escape from cylinder F to the open air. The balanced piston G is forced by the steam outward, thereby unseating the valve E and compressing the spring E^2 . The whistle sounds, as above described. When the circuit opens, the springs recoil, forcing the valves to their seats and stopping the sound of the whistle, as above described. The principal features of my invention are the diaphragm M in combination with the armature-stem U and the valve-stem i and the balanced piston G. The diaphragm being cemented in place prevents moisture from getting into the electromagnet, while the balanced piston makes the valve E quickly responsive to pressure of steam or spring.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a whistle-valve the combination, with the valve-chamber and valve seated therein, of a cylinder outwardly projected from said valve-chamber and having passages leading thereto; a balanced piston located in said cylinder and attached by a rod or stem to said valve; a diaphragm-chamber, outwardly projected from said cylinder, with exhaust-passages and with a passage leading to said cylinder; a diaphragm arranged as a packing in said chamber; a valve normally seated in said cylinder having a stem extending into said diaphragm-chamber and resting against said diaphragm; an electromagnet attached to said diaphragm-chamber and furnished with an armature-stem resting against said diaphragm at a point opposite said valve-stem; together with springs arranged on said piston-rod or stem, on said valve-stem, and above said armature; substantially as described.

2. In a whistle-valve the combination, with the valve-chamber and valve seated therein, of an outwardly-projected cylinder with passages leading therefrom to said valve-chamber; a balanced piston located in said cylinder; an outwardly-projected diaphragm-chamber with exhaust-passages and with a passage into said cylinder; a diaphragm arranged in said diaphragm-chamber; a valve normally seated in said cylinder and closing said passage from the diaphragm-chamber; and an electromagnet attached to said diaphragm-chamber; together with intermediate mechanism; substantially as described.

3. In a whistle-valve the combination, with the valve-chamber and valve seated therein, of a cylinder and balanced piston; a diaphragm-chamber connecting with said cylinder, a diaphragm, and an electromagnet, together with intermediate mechanism; substantially as described.

4. In a whistle-valve the combination, with the valve-chamber B^2 and valve E seated there-

in, of the cylinder F laterally projected therefrom, piston G located in said cylinder, valve I seated in said cylinder, chamber J communicating with the exhaust, diaphragm M arranged in said chamber J, and an electromagnet arranged to actuate said valve I, together with intermediate mechanism; substantially as described.

5. In a whistle-valve the combination, with the valve-chamber B² and valve E seated therein, of the cylinder F laterally projected from said chamber, piston G located in said cylin-

der, valve I seated in said cylinder, chamber J communicating with the exhaust, and diaphragm M arranged in said chamber J, together with intermediate mechanism, and with means for operating said valve I; substantially as described.

In testimony whereof I have affixed my signature in presence of two witnesses.

FRANK L. WOLFE.

Witnesses:

W. L. WILLIAMS,

ADOLPH L. ZATHMARY.