H. W. AYLWARD.

WHISTLE.

APPLICATION FILED JAN. 22, 1908.

908,063. Patented Dec. 29, 1908.

Fig. 1

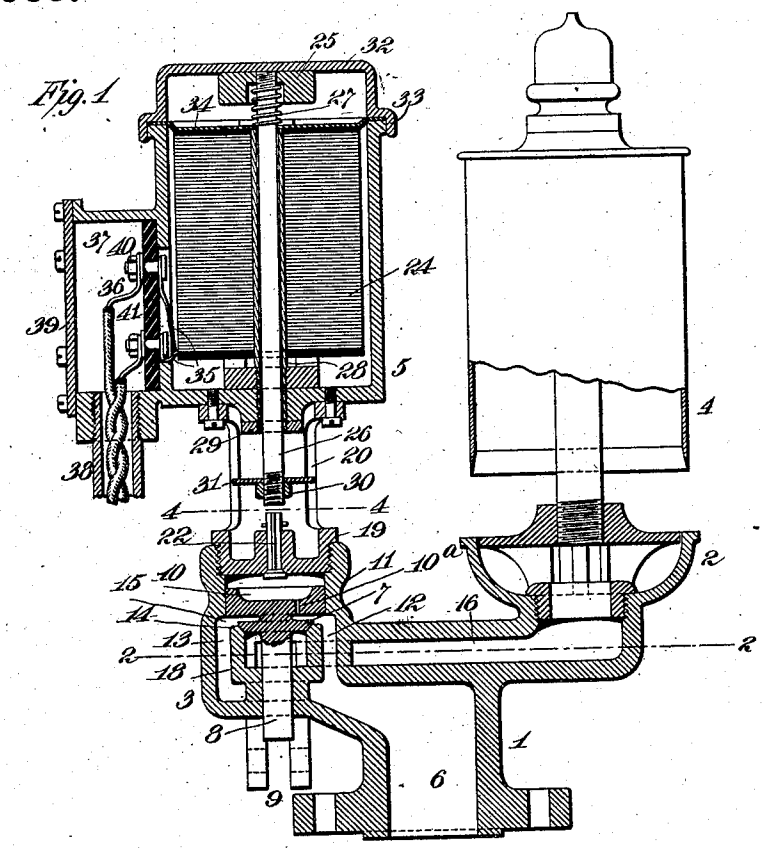


Fig. 3

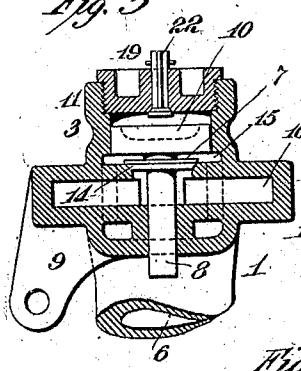


Fig. 2

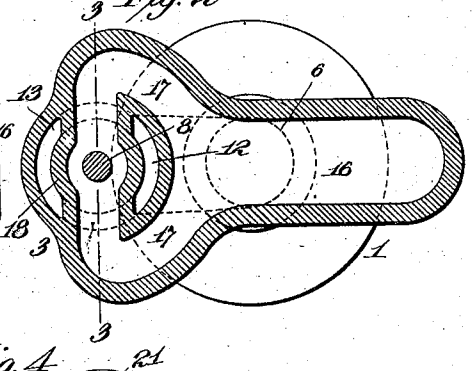
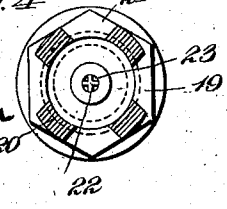


Fig. 4



Witnesses:

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UNITED STATES PATENT OFFICE.

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WHISTLE.

No. 908,063. Specification of Letters Patent. Patented Dec. 29, 1908.

Application filed January 22, 1908. Serial No. 412,140.

To all whom it may concern:

Be it known that I, HENRY W. AYLWARD, a citizen of the United States, residing in the borough of Brooklyn, city of New York, and State of New York, have invented a new and useful Whistle, of which the following is a specification.

My invention relates to improvements in electrically operated whistles, such whistles being particularly adapted for signaling purposes on ships of war, although they are applicable for other uses.

The objects I have in view are to produce a whistle which will be cheap to manufacture, certain in its operation, and the parts so made as not to be likely to get out of order, and which will be protected from moisture and from freezing. These and other objects will more fully appear from the following specification and accompanying drawings, considered together or separately. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation partly in section of a whistle and its operating mechanism embodying my invention. Fig. 2 is a horizontal section of the same on the line 2—2 of Fig. 1. Fig. 3 is a vertical section on the line 3—3 of Fig. 2; and Fig. 4 is a horizontal section on the line 4—4 of Fig. 1.

In all of the views like parts are designated by the same reference characters.

In carrying out my invention, I provide a base 1, which is preferably made integrally with the whistle bow 2, and the valve chamber 3. Upon the whistle bowl is carried the bell 4 of the usual steam whistle. The magnet casing 5 is carried upon the base above the valve chamber and lies alongside of the bell. The main steam inlet 6, as shown, lies substantially in the center of the base. A line drawn through the center of this inlet and extending upward above the base will lie substantially equidistant between the bell and the magnet casing. The bell and magnet casing are substantially of the same size, and lying as they do, equidistant from the center line of the base, they produce a symmetrical and well balanced structure. The main valve 7 is a puppet valve and moves to open and close in a vertical direction. The valve is provided with a stem 8, which extends through the valve chamber a short distance below the latter. This stem may be engaged by a lever (not shown) which may be supported upon the ears 9—9 which depend from the base below the valve chamber. This is for operating the valve mechanically when it is desired to do so.

The main valve is provided with a piston 10, which plays within a cylindrical extension 11, formed upon the valve chamber 3. The piston 10 is provided with a port 10^a, permitting communication between the two sides of the piston. The upper face of the piston is dished, as shown. The port 10^a is much smaller than the passage exposed by the opening of the pilot valve, which will be described further on. The piston 10 is preferably considerably larger than the main valve 7. The main steam valve is balanced by the pressure on the opposite sides of the piston 10. The valve, valve stem and piston are preferably integrally formed, as shown. The main steam inlet 6, where it enters the valve chamber 3, divides into two branches 12 and 13, which pass up on opposite sides of the valve seat 14, uniting together in an annular chamber 15 above the valve seat, and in communication with the cylindrical extension 11. The valve exhaust port 16, which communicates directly with the bowl 2 of the whistle, branches at 17, and passes through each side of the central standard 18, as shown in Fig. 2, such standard lying within the valve chamber 3, and carrying the valve seat 14 thereon. The interior of this standard communicates with the branches 17 and the annular chamber 15. The cross-sectional areas of the branches 12, 13 and 17 are preferably made the same so that there will be no choking action of the steam in passing through the whistle. The arrangement of the ports and the branches in the steam passages produces a very compact structure and can by suitable coring be made of a single casting.

The valve chamber 3 is inclosed at the top by a plug 19, which carries, preferably formed integrally with it, a standard 20, for supporting the magnet casing 5. This standard 20 is provided with a plurality of longitudinally extending ports 21, four being illustrated in Fig. 4.

The pilot valve 22 is a puppet valve, opening when moving downward. Its stem is provided with longitudinal ports 23 (see Fig 4) for escape of steam from the valve chamber when the pilot valve is opened. The pilot valve is shown as arranged immediately

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above, with its center line in line with the center line of the main valve, producing a symmetrical construction.

The magnets 24 (but one being illustrated) lie within the magnet casing 5. The armature 25 is above the magnets, and is immediately over their pole pieces. This armature is supported upon a vertically movable rod 26, which is kept normally elevated by means of a spring 27, such rod lying within a sleeve 28. This sleeve is screwed into the bottom of the magnet casing, and makes a tight joint therewith, a nut 29 clamping the lower end of the sleeve. The rod 26 extends down below the magnet casing, through an opening in the bottom thereof, and lies within the standard 20, immediately above the stem of the pilot valve. The rod may be moved some distance before it strikes the pilot valve, whereby a lost motion connection is produced. This is an important feature of my invention, as the parts are moved by the excitation of the magnets, namely, the rod and armature may acquire sufficient momentum to open the pilot valve against the pressure of the steam, which causes it to remain seated, and also to open the valve, if it has any tendency to stick. The extent of movement of the rod, caused by the attraction of the armature of the magnets, is sufficient to engage it with the stem of the pilot valve and open the same a sufficient distance to permit the ready escape of steam from the va ve chamber 3. The extent of movement, however, is not so great that the valve will not close when the engagement of the rod ceases. The lower end of the rod 29 is provided with a nut 30, which nut engages with the lower side of a diaphragm 31, supported by the standard 20. This diaphragm is for the purpose of preventing the escaping steam from striking the center of the bottom of the magnet casing and thereby entering the space between the rod 26 and sleeve 28. The cover 32 of the magnet casing is provided with a depending flange 33, which produces a small chamber above the magntes 24. Above the magnets 24 is arranged a diaphragm 34, such diaphragm (as shown) being clamped between the cover 32 and the body of the magnet casing 5, producing a tight joint to prevent the entrance of moisture to the magnets. The joint between the upper end of the sleeve 28 and the diaphragm 34 is also made moisture tight.

The leads 35 of the magnets are connected to the mains 36 in a junction box 37, such junction box lying at one side of the magnet casing, and preferably being formed integrally therewith, as shown. The mains 36 are screwed into the bottom of the junction box, and the latter is provided with a cover 38, which upon being removed will expose the connections between the leads 35 and mains 36. These two are connected together by binding posts 40, which pass through a diaphragm 41 made of insulation, such diaphragm serving as a partition to close the opening between the junction box and the magnet casing.

In operation, the parts normally rest in the position as shown in the drawings, the steam inlet 6 being connected to a source of steam supply, and the steam under the pressure of such supply lying within the branches 12 and 13 and the annular chamber 15. The same pressure of steam exists in the cylindrical extension 11, above the piston 10, as the steam has free passage through the port 10^a to both sides of the piston. The main steam valve 7 will be closed by its own weight and by the pressure of the steam. The armature 25 is normally kept away from the magnets 24 by the action of the spring 27, and the pilot valve 2 is kept in closed position by the pressure of steam within the valve chamber 3. Upon the magnets being energized for the purpose of actuating the whistle, the armature 25 is attracted, which depresses the rod 26, and causes its lower end to engage with the stem of the pilot valve 22, opening the latter. The steam then freely escapes above the piston 10, the port 10^a being smaller than the opening exposed by the pilot valve 22, preventing the accumulation of pressure above such valve. The presusre of the steam, therefore, on the lower face of the piston opens the main valve 7 against the pressure of the steam in the annular chamber 15, and permits the free escape of steam through the branches 17—17 into the valve exhaust port 16, and from thence to the whistle. The upper face of the piston 10 being dished will permit the piston to rise until its edge strikes against the plug 19, which determines the limits of its upward movement and at the same time permits the pilot valve to remain open. There will be no mechanical engagement between the valve and the piston. The main valve will remain open so long as the magnets 24 are excited. As soon as these magnets are deënergized, the armature 25 is released and elevated by the action of the spring 27. The pilot valve 22 is then no longer kept open and is closed by the pressure of steam upon its lower face. The steam will now pass into the space above the piston 10 through the port 10^a, and will accumulate therein until the pressure on both sides of the piston is balanced. The weight of the parts, together with the pressure of the steam upon the top of the main valve 7, will close the latter, interrupting the supply of steam into the whistle. During the operation of the whistle the steam freely escapes through the port which is opened by the pilot valve 22, but striking the diaphragm 31, it is deflected, and does not come into immo-

diate contact with the bottom of the magnet casing 5. Should any moisture enter the space between the rod 26 and sleeve 28, at most it can pass into the space below the cover 22 and above the diaphragm 34, so that the magnets 24 are effectively protected from moisture.

The arrangement of the pilot valve below the rod 26, with a space separating the two, is important in not only producing the lost motion connection, whereby the blow delivered against the valve will surely open it under all conditions, but it effectively prevents the device being put out of operation by freezing. If any steam is condensed upon the diaphragm 31, the nut 30, or end of rod 36, it may freeze thereon, but not in sufficient quantity to prevent the movement of the rod 26. If any water runs down the end of the rod 26 and freezes upon the end thereof, the ice so formed cannot come in contact with the pilot valve, as the latter is kept warm enough by the presence of the steam below the plug 19, and in contact with the head of the valve, hence no ice can form between the end of the rod 26 and the upper end of the pilot valve, and therefore the lost motion connection can be relied upon at all times. The arrangement just described is advantageous in that the head of the pilot valve and the lower end of the rod 26 can be reached for adjustment and examination, through the ports in the standard 20, and are visible at all times.

The vertical moving valves are an important improvement over the prior art, in that they require no springs to move them in one direction, such movement being caused by the action of gravity. The main valve 7 will respond more quickly than will a horizontally moving valve, unless the latter is provided with a seating spring. The use of a spring is objectionable, as the action of the steam and the changes in temperature within the valve chamber will seriously affect the sensitiveness of the spring and render the action of the whistle erratic and unsuitable for signaling purposes.

I have described my invention in connection with a whistle, but it is to be understood that certain parts of it may be employed in other situations, for instance, the arrangement of valves and actuating magnets described may be used for other purposes than admitting steam to a whistle, such means being shown to illustrate a certain feature of my invention; I wish it understood that certain features of my invention may therefore be used in other situations than with a steam whistle.

In accordance with the provisions of the patent statutes, I have described the principle of my invention, together with the apparatus which I now consider to represent the best embodiment thereof, but I desire to have it understood that the apparatus shown is merely illustrative and that the invention can be carried out in other ways.

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

1. A whistle having a valve, means for actuating the valve, the said means including magnets, a magnet casing surrounding the magnets, a sleeve passing through the casing, an armature in coöperative relation to the magnets, a rod passing through the sleeve and carrying the armature, a cover for the magnet casing and a diaphragm interposed between the cover and casing, the said stem engaging with the diaphragm and the said rod passing through the said diaphragm.

2. A whistle, having a steam valve and means for actuating the valve, a pilot valve, a ported standard, magnets, a support therefor, the said support being carried by the standard, means actuated by the magnets for actuating the pilot valve, and a diaphragm on the standard, the said diaphragm serving to deflect steam issuing by the pilot valve from contact with the magnet support.

3. A whistle having a steam valve, a pilot valve, a plug carrying the pilot valve, a ported standard supported by the plug and connecting with the valve, in such a manner that the steam escaping from the pilot valve will exhaust through the ports, and a magnet casing on the standard, there being operative means between the magnet and the pilot valve.

4. In a whistle, a main valve therefor, opening in one direction, a pilot valve opening in the direction toward the main valve, the main valve having an operating piston, a chamber in which the piston moves, and into which the pilot valve extends, one face of the piston adjacent to the pilot valve being dished, to permit the pilot valve to be free to move without engaging with the piston, irrespective of the position of the latter.

5. In a whistle, a pilot valve and magnetically operated means for operating the pilot valve, there being lost motion connection between such means and the pilot valve for imparting a blow to the latter and unseating it.

This specification signed and witnessed this 17th day of January, 1908.

HENRY W. AYLWARD.

Witnesses:

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