Oct. 9, 1945. S. SODERBERG 2,386,513

STEAM WHISTLE

Filed June 19, 1943 2 Sheets-Sheet 1

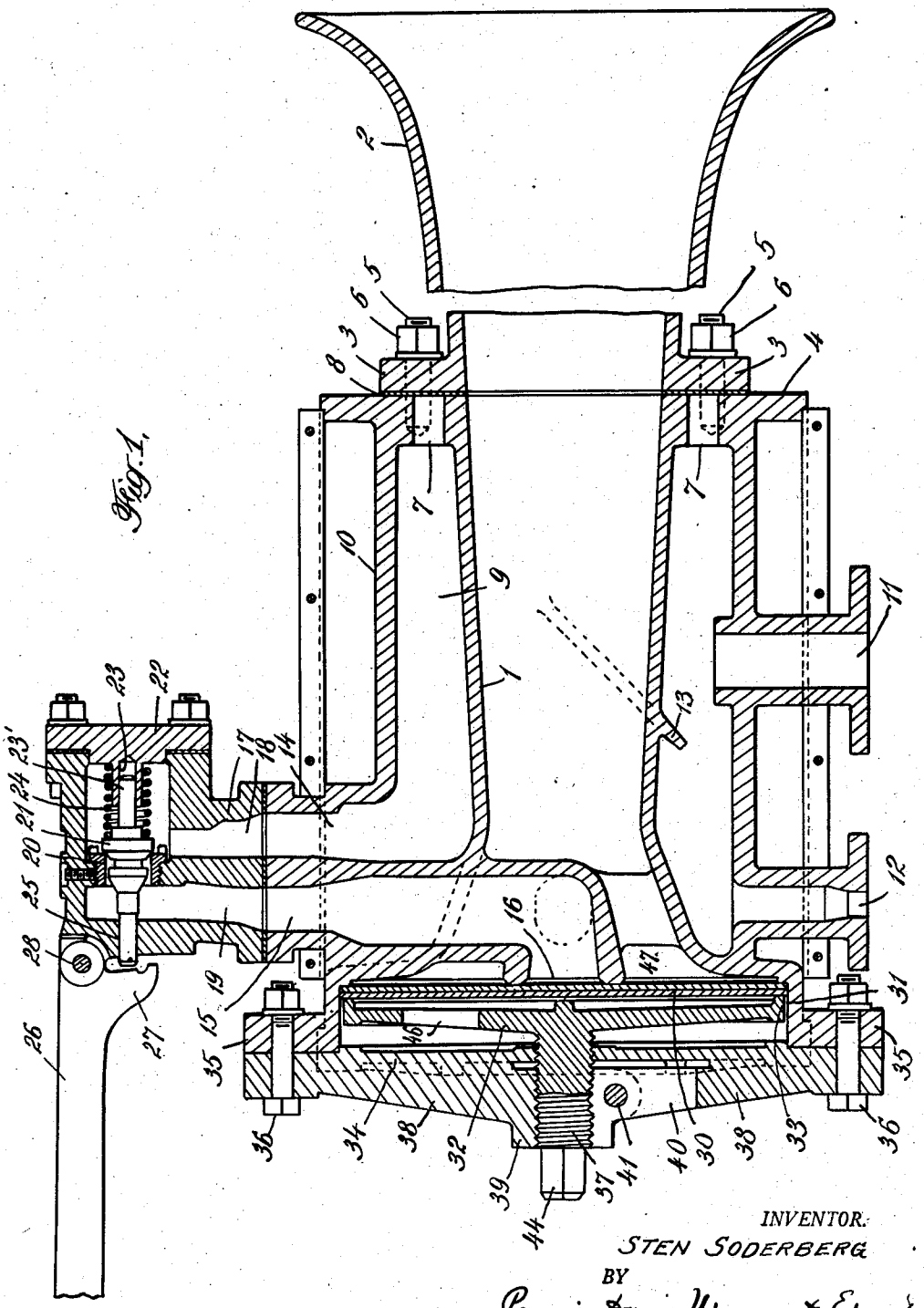


Fig. 1.

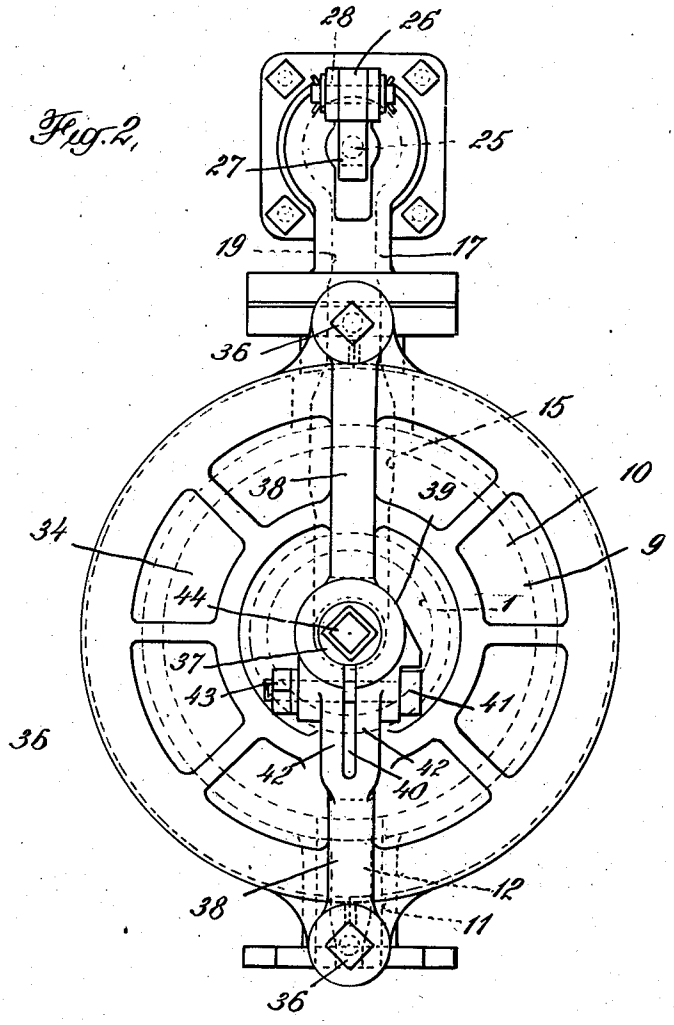
INVENTOR.
STEN SODERBERG
BY
Pennie, Davis, Marvin & Edmonds
ATTORNEYS

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Fig. 2.



INVENTOR.
STEN SODERBERG
BY
Pennie, Davis, Marvin & Edmonds.
ATTORNEYS

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STEAM WHISTLE

Sten Soderberg, Passaic, N. J., assignor to Leslie Company, Lyndhurst, N. J., a corporation of New Jersey

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4 Claims. (Cl. 116—142)

This invention relates to fluid operated whistles and more particularly to improvements in diaphragm-operated, steam whistles of the jacketed type.

In the construction of steam whistles, a diaphragm is mounted in a horn, and the flow of steam to actuate the diaphragm in controlled by a valve. It has been found that better operation is obtained if the body of the horn is surrounded by a steam jacket to which the steam is delivered from the source to maintain the diaphragm at a desired temperature regardless of the temperature to which the exterior of the whistle is subjected in use, as on a boat, a railway locomotive or the like. In the construction of jacketed steam whistles, heretofore, the valve has been arranged in the body of the horn and this valve controls communication between the steam jacket and the diaphragm to permit operation of the whistle. Such construction has been highly satisfactory and has given desired results when the whistle has been made of metals or alloys that are easily workable.

In the present invention, I have provided a fluid operated whistle of the jacketed type of a more simple construction, which facilitates manufacture and also provides greater accessibility of the parts for purpose of repair or replacement. One of the features of my improved whistle is the arrangement of the valve in a separate casing from the body of the whistle. The body of the whistle is provided with a steam jacket, as heretofore, and this jacket communicates with a passage extending through the exterior of the body. A second passage is arranged adjacent the first passage and the second passage communicates with the diaphragm. The valve to control the passage of steam from the steam jacket to the diaphragm is arranged in a separate chamber adapted to be secured to the body of the whistle and having inlet and outlet passages forming continuations of the passages in the body when the two parts are assembled.

A further feature of the invention is the arrangement of the valve mechanism in a separate casing which communicates with the steam jacket at a point remote from the delivery of steam to the jacket. When the steam for the operation of a diaphragm is drawn directly from the supply line, there is a tendency to trap any water of condensation that may be in the supply line in the steam and the effect might be injurious to the diaphragm. By delivering steam to the steam jacket, which is provided with a drain for condensed steam, and withdrawing the steam from the steam jacket through the valve casing at a point remote from the delivery point, the possibility of deliverying water of condensation to the diaphragm, in admixture with the steam, is reduced to a minimum.

A further improvement forming a part of my invention is in the means for mounting and adjusting the diaphragm. Heretofore the diaphragm has been held in position by a threaded cap adapted to engage threads formed on a portion of the casing. Various means have been provided for retaining the cap in adjusted position to exert the proper force on the diaphragm and hold it under the proper tension. Wear on the threads has however required adjustment of the diaphragm after the diaphragm has been in service. In the present invention, I provide an end cap adapted to be bolted to the casing or body of the whistle, having a spider formed thereon carrying an internally, threaded opening. A plate is mounted within the casing and engages the diaphragm to hold it in position under proper tension. This plate is provided with a stud which is received in the internally, threaded opening carried by the spider. One of the arms of the spider is slotted and is provided with a clamping bolt to permit the internally threaded opening to be contracted after the stud has been adjusted to retain the parts in adjusted position.

In the accompanying drawings I have shown one embodiment of the invention. In this showing:

Fig. 1 is a central, longitudinal, sectional view; and

Fig. 2 is an end elevation.

Referring to the drawings, the reference numeral 1 designates the body portion of the whistle. Instead of making the entire horn of a single casting, as heretofore, the body portion 1 is of a length sufficient to include the steam jacket, the diaphragm chamber and the communicating passages. The outer flared end 2 of the horn is formed of a separate casting. This flared end is provided with a flange 3 and the end wall 4 of the body portion is arranged normal to the axis of the horn to permit assembly of the two sections. The end member is secured to the horn by bolts 5 and nuts 6. One of the advantages of the simplified construction resides in the formation of the body 1 and the end member 2 in separate sections. Heretofore in casting the body of the whistle in a single piece it was necessary to provide openings which receive core prints during the casting operation and which had to be later closed by threaded plugs. In constructing the

whistle of the present invention, I arrange the core prints so that they form openings 7 in the end wall 4. A gasket 8 is arranged between the end wall 4 and the flange 3 thereby making it unnecessary to plug the opening 7.

The body 1 of the horn is surrounded by a jacket or steam chamber 9 formed by an outer wall 10 surrounding the body portion 1. This steam jacket is provided with an inlet 11 and with an outlet 12, preferably arranged at the lowest point to permit drainage of condensed steam. A baffle 13 may be arranged in the steam jacket to separate any moisture from the steam delivered from the inlet 11.

The jacket is provided with a passage 14 extending through the exterior wall and adjacent the passage 14 I provide a second passage 15 extending to the rear of the body or casing. The passage 15 extends through the wall 1 and terminates at 16 adjacent the rear of the casing and substantially centrally thereof.

A valve casing 17 is secured to the main casing adjacent the ends of the passages 14 and 15 and is provided with an inlet passage 18 communicating with the passage 14 and an outlet passage 19 communicating with the passage 15. The valve structure may be conventional, comprising a valve seat 20 arranged between the inlet passage 18 and the outlet passage 19 and a valve member 21 cooperating therewith. The valve casing is closed by a bonnet 22 carrying a sleeve 23 on its inner face to receive the valve stem 23'. Coil spring 24 normally retains the valve in closed position. Valve stem 25 projects from the opposite side of the casing into proximity to an operating lever 26. The operating lever is provided with a toe or projection 27 and is pivotally mounted at 28 on the valve casing. When the operating lever 26 is swung on its pivot by the conventional means (not shown) the valve is opened to permit steam to pass from the jacket 9 to the passage 15.

A diaphragm 30 is arranged in the casing adjacent the end 16 of the steam passage 15. This diaphragm may be of any desired construction but is preferably formed of several laminations and is normally convex on its inner face. When the diaphragm is placed in position, pressure is exerted on its periphery to flatten it and place it under proper tension. As shown, the rear end of the casing is provided with a substantially cylindrical portion 31 against which the diaphragm sits and the proper tension is placed on the diaphragm by a tensioning plate 32, the outer edge of which is flanged as at 33 to engage the edge portion of the diaphragm. This plate is arranged within a cover member 34 which is secured to a flange 35 on the end of the casing by bolts 36. The cover plate is provided with a central opening through which a threaded stud 37, carried by the tension plate 32, extends. A pair of arms 38 are secured to the cover plate, extending across the cover plate at an angle to the plane thereof. These arms terminate in a sleevelike member 39 having a threaded opening to receive the stud 37. One of the arms is slotted as at 40 (see Fig. 2). A bolt 41 extends through openings between the two portions 42 on each side of the slot and the bolt is provided with a nut 43 on its end. The tension plate 32 is adjusted by rotating the stud 37 in the threaded opening 39, the stud being provided with a squared end 44 for the reception of a wrench or other operating tool. After the diaphragm has been adjusted, the bolt 41 may be tightened to contract the slot 40 and thus cause firmer engagement between the stud 37 and the threaded opening. The tension plate may be provided with an opening 46 to permit escape of any steam leaking around the edge of the diaphragm. On the operating side of the diaphragm the casing is provided with a passage 47 through which steam delivered through the passage 15 passes into the body portion of the whistle and is exhausted in the usual manner.

The operation of the device will be apparent from the foregoing description and the simplicity of the construction will also be apparent. Steam is delivered to the steam jacket 9 through the inlet passage 11 from a suitable source of supply, and condensate is drained from the jacket through the drainage pipe 12. Steam in the jacket retains the whistle at an elevated temperature and therefore prevents variations in the operation of the whistle due to the effect of temperature changes on the diaphragm. The whistle may be actuated by hand operated lever 26. When the valve 21 is moved from its seat, steam from the steam jacket flows through passages 14, 18, 19 and 15 into contact with the diaphragm to vibrate it and cause the production of sound. Most of the steam escapes through the passage 47 into the central portion of the body and then to the atmosphere. Any steam which leaks around the diaphragm flows through the passage 46 into the space between the tension plate 32 and the cover plate 34 and is exhausted therefrom to atmosphere through a suitable vent (not shown).

When the whistle is to be assembled, the diaphragm is placed in position and, in its original form, it is flexed or bent so that the inner side is convex. The flange 33 of the tension plate 32 engages the edge of the diaphragm and as this plate is adjusted, it places the diaphragm under tension by flattening it if the diaphragm is the type that is originally curved in cross section or by distorting it into a curved cross section if it is originally flat. In normal position, the inner face of the diaphragm contacts with the end of the passage 15. After the diaphragm has been properly adjusted, nut 43 is tightened on bolt 41, contracting the slot 40 in the arm 38 and at the same time contracting the threaded opening in the sleeve 39 through which the stud 37 passes. If adjustment of the diaphragm is required at any time, the nut 43 may be loosened which will then permit the stud 37 to be rotated in the threaded opening in the sleeve 39 to move the tension plate toward or away from the diaphragm and thus change the tension. The baffle 13 prevents direct passage of steam from the inlet 11 to the outlet 14 and thus prevents any condensate which may form in the supply lines from being delivered to the diaphragm. Any such condensate strikes against the baffle 13 and is thrown toward the forward part of the body portion 1 whence it eventually collects on the bottom of the steam jacket and is discharged through the drain 12.

It will be apparent from the foregoing description that the fluid operated whistle of the present invention is of a much more simple construction than the constructions heretofore employed. Frequently in use such whistles are arranged at relatively inaccessible places, such as on the side of a stack, and when it is necessary to repair or replace parts, difficulties are presented if the valve and valve parts have to be removed from the casing to obtain access to them. With the

present construction it will be apparent that the entire valve casing can be removed from the body portion and then taken to a more convenient place for making repairs or replacements of the valve parts.

I claim:

1. A steam whistle comprising a horn, a steam jacket surrounding the horn, the jacket being provided with an inlet opening and an outlet opening, a valve casing arranged adjacent the whistle, the steam jacket being provided with a passage connected to the valve casing at a point remote from the inlet opening of the steam jacket, a valve in the casing, and a diaphragm mounted in the body portion of the whistle adjacent the rear end of the horn, the body portion of the whistle being provided with a passage connected to the valve casing and extending to the diaphragm whereby steam for the operation of the diaphragm is withdrawn from the steam jacket through the valve casing and delivered to the diaphragm through the last mentioned passage.

2. A steam whistle comprising a horn, a steam jacket surrounding the horn, the steam jacket being provided with an inlet and an outlet, a valve casing arranged adjacent the whistle, a valve in the casing, a diaphragm mounted in the body portion of the whistle adjacent the rear of the horn, the steam jacket being provided with a passage remote from the inlet opening and communicating with the valve casing, the body portion of the whistle being provided with a passage connected to the valve casing and extending to the diaphragm.

3. A steam whistle comprising a horn, a steam jacket surrounding the horn, a valve casing arranged adjacent the whistle, a valve in the casing, a diaphragm mounted in the body portion of the whistle adjacent the rear end of the horn, and passages between the steam jacket, the valve casing and body portion to deliver steam to the diaphragm from the steam jacket, the passage from the steam jacket to the valve casing being remote from the inlet opening of the steam jacket.

4. A steam whistle comprising a horn, a steam jacket surrounding the horn, a valve casing arranged adjacent the whistle, a valve in the casing, a diaphragm mounted in the body portion of the whistle adjacent the rear end of the horn, passages between the steam jacket, the valve casing and body portion to deliver steam to the diaphragm from the steam jacket, the passage from the steam jacket to the valve casing being remote from the inlet opening of the steam jacket, and a baffle in the steam jacket arranged to prevent direct passage from the inlet of the steam jacket to the valve casing.

STEN SODERBERG.