A steam activated whistle for use with a pressure cooker or similar apparatus is disclosed. The whistle includes a pair of bimetallic disc-operated valves in separate chambers, with one chamber producing a high-pitched whistle upon activation by a low steam pressure and the other chamber producing a low-pitched whistle upon activation by a high steam pressure.

4 Claims, 2 Drawing Figures
LOW AND HIGH PITCH STEAM WHISTLE

BACKGROUND AND SUMMARY OF THE INVENTION

The present invention relates to a steam whistle for use on pressure cookers and the like. More particularly, the present invention relates to a steam activated whistle for use such as with pressure cookers, the whistle including a pair of pop-off valves employing bimetallic discs in a combination of a high-pressure, low-pitched whistle and a low-pressure, high-pitched whistle.

Previous steam activated whistles have included various configurations employing valves which are opened by pressure created by steam generated through the boiling of water such as in a common tea kettle or pressure cooker. In the field of such prior art devices, there has been a need for a steam whistle which will produce an initial relatively faint whistle alarm, followed by a second, much louder blast of sound if the heat being applied to the pressure cooker or the like is not reduced following the initial alarm.

By the present invention, there is provided an improved steam whistle, which includes a combination of low-pressure, high-pitched whistle and a high-pressure, low-pitched whistle, both of said whistles being operated by means such as bimetallic discs which provide pop-off valve means. The pair of whistles may be set to operate with pressures commonly generated, such as 5 pounds for the low pressure whistle and 15 pounds for the high pressure whistle, and the whistles may be mounted either in a stacked configuration or a back-to-back arrangement.

BRIEF DESCRIPTION OF THE DRAWINGS

The advantages and features of the steam whistle of the present invention will be more clearly understood from the following description of the preferred embodiments, taken in conjunction with the accompanying drawings, wherein:

FIG. 1 is a front elevational view in partial cross-section of the steam whistle of the present invention; and

FIG. 2 is a side elevational view in cross-section of the steam whistle shown in FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the embodiment of the present invention as shown in FIGS. 1 and 2, there is provided apparatus 10 which includes a column 11 having a bell-shaped lower portion 12 and a cylindrical-shaped upper portion 13. As an alternative, the lower portion 12 could be cylindrical-shaped so that the entire whistle would appear as a straight-sided cylinder. A threaded portion 24 in the lower end of the column 11 allows the apparatus to be connected to a pressure cooker or other device with which the apparatus is employed. Located within the bell-shaped lower portion 12 is a bimetallic disc 30, of generally circular horizontal cross-section, the disc 30 resting upon a seat in the form of an O-ring 31 which is mounted in shoulders 32 in the lower end of the bell-shaped portion 12 of the column 11.

This whistle in the lower portion of the column 11 is of the high volume type for secondary pressure release, and is designed to open upon being subjected to a predetermined pressure, as shown by the dashed line position of the bimetallic disc 30, and to close when the pressure drops below this value. The valve 14 may be constructed so as to open at a gauge pressure of 15 pounds per square inch, for example.

Any of various bimetallic discs which are well known in the art may be employed in the apparatus of the present invention. The bimetallic discs employed in the present invention are generally assembled at higher than ambient temperatures so that, when the disc is allowed to cool to ambient temperature, the deformation of the metal will cause the disc to assume a concave shape when viewed from the side of the valve seat. After installation, when the bimetallic disc is subjected to higher temperatures and pressures due to contact with steam, the disc will tend to flatten out, thus opening the valve. One such disc which may be employed in the present invention is that known under the trade name Klaxon, such discs being commonly employed in electrical switches.

Located immediately above the valve 14 on the wall of the column 11 is an arch-shaped steam outlet orifice 15 which is in fluid communication with the chamber 21 formed by the bell-shaped portion 12 of the column 11 and that portion of the cylindrical-shaped portion 13 up to wall 22 which extends laterally across the column 11. Located in the wall opposite the orifice 15 is a shaped plug 33. In this manner, there is provided a knife-edge modulator configuration which allows a low pitch sound to be emitted as steam moves upward around the plug 33 into the resonant portion of chamber 21 and out of the upper portion 13 of column 11 through outlet orifice 15 to the surrounding atmosphere.

The embodiment of the present invention, as shown in the drawings, includes a stacked arrangement with a second whistle, of the low-pressure, high-pitched type, being located immediately above the high-pressure, low-pitched whistle and being in fluid engagement with the chamber 9 in the lower end of the column 11. Such fluid engagement is provided by a channel 17 extending longitudinally through the column 11 from an aperture in the center of the valve 14 and through the wall 22. The lower end of the channel 17 is swaged to the underside of the bimetallic disc 30 and serves to maintain the disc 30 in position upon the O-ring 31 until sufficient conditions of steam temperature and pressure are provided to raise the edges of the disc 30, thus allowing steam to enter the chamber 21. The second or upper whistle is also provided with a bimetallic disc-operated pop-off valve 16 which is similar to valve 14, and this valve 16 is constructed so as to open at a lower pressure than the first valve 14, such as five pounds per square inch gauge pressure, for example. Thus this upper valve 16 will actually open first when the apparatus is in operation, as described hereinafter. The second valve 16 includes a bimetallic disc 34 and an O-ring 35, the O-ring 35 being mounted on the upper surface of the wall 22 and within a chamber 18 in the upper portion 13 of the column 11. A support rod 19 extends downwardly from the inner sidewall of the column 11 to provide support for mounting the bimetallic disc portion 34 of the valve 16. An arch-shaped steam outlet orifice 24, similar to outlet orifice 15, is located in the wall of the column 11 above the valve 16, and a shaped plug 36 is mounted opposite the orifice 20, in a manner and for the same purpose as the plug 33 in the lower chamber 21. Plugs 33 and 36 may be either of hollow or solid construc-
tion. The column 11 of the whistle may be constructed of any suitable material, such as copper, nickel-plated brass or stainless steel, which will withstand the temperatures and pressures to be encountered when operating with steam.

In an alternative embodiment, these two whistle arrangements may be mounted in a side by side relationship, with the upper whistle adjacent the lower whistle, in order to reduce the height of the overall whistle configuration. Such a configuration can be provided by separating the upper and lower whistles at the lateral wall 22 and extending the channel 17 sufficiently to interconnect the top of the lower whistle with the bottom of the upper whistle in the side by side arrangement. Also, in an alternative embodiment, the low pressure whistle may employ a ball-type tone modulator, of the police whistle type, including a freely moving ball. As another alternative, the pop-off valves may be of the spring-loaded ball type, for use with the side by side configuration only. Such ball type valves are generally well known in the art, being responsive to pressure rather than temperature.

In operation, as pressure builds up in a pressure cooker due to the generation of steam, the installed whistle apparatus 10 of the present invention will have its low pressure valve 16 activated by steam passing upwardly through channel 17, at a pressure of 5 pounds gauge pressure, for example, and a relatively faint, high-pitched warning whistle will result. As the pressure continues to build up without action being taken to remove the pressure cooker from the heat source, the high pressure valve 14 will then be activated, emitting a loud whistle signal of low pitch which will continue until the steam pressure is caused to drop below the activation pressure for this valve 14, by removing the pressure cooker from the source of heat or by turning down the heat. The difference in the pitch of the two whistles is due to the difference in volume of the two chambers 18 and 21, with the larger volume chamber 21 resulting in a lower pitch whistle when valve 14 is activated.

Inasmuch as steam pressure varies in direct proportion to steam temperature, the temperature applied to the valves 14 and 16 will be proportionate to the pressure created in the pressure cooker or other device with which the steam whistle of the present invention is employed. Thus the bimetallic discs will sense changes in temperature and respond to open the valves 14 and 16 at the required temperature and pressure. Although the invention has been described as being operated by steam pressure, any other suitable working gas may also be employed, said working gas preferably being injected into the apparatus at an elevated temperature and pressure close to that of steam.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing its material advantages, the forms hereinbefore described being merely preferred embodiments thereof.

We claim:

1. A steam activated whistle means for use with a pressure cooker or the like, comprising: a hollow column defining an upper and lower chamber separated by a wall extending transversely across the upper portion of the column, said lower chamber having a greater volume than said upper chamber; a first pop-off valve operatively located in said lower chamber and a second pop-off valve operatively located in said upper chamber, said second valve being in fluid communication with the lower end of the column through a channel extending longitudinally through said column, said second valve being operable to allow steam to pass at a preselected lower pressure than said first valve; a pair of arch-shaped steam outlet orifices, one of said orifices being located in the wall of said column adjacent each of said chambers; a pair of plug members to selectively restrict passage of steam through said column, one of said plug members being mounted on the inner wall of said column opposite each of said steam outlet orifices; and means for connecting the lower end of said column to said pressure cooker.

2. The steam whistle of claim 1, wherein said second valve is operable at the lower gauge pressure of 5 psi and said first valve is operable at the gauge pressure of 15 psi.

3. The steam whistle of claim 1, wherein said first and second pop-off valves are of the bimetallic disc-operated type.

4. The steam whistle of claim 1, wherein said upper and lower chambers are arranged in a side by side relationship.