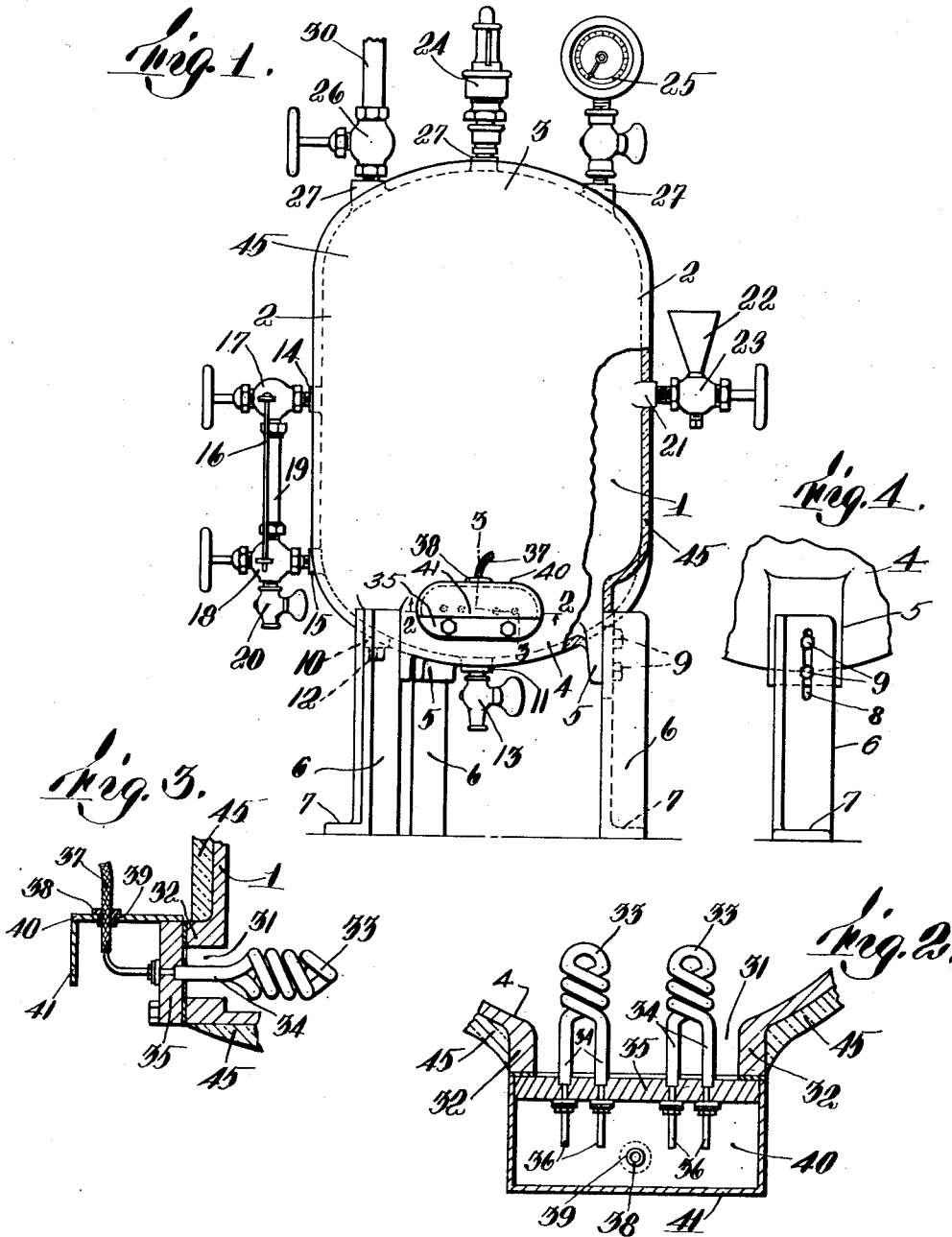


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E. L. EMERSON
ELECTRIC STEAM BOILER

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UNITED STATES PATENT OFFICE

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ELECTRIC STEAM BOILER

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This invention relates to steam boilers and is illustrated as embodied in a boiler particularly intended for use in connection with machines employed in the manufacture or repair of boots or shoes, although boilers embodying the invention may be employed to advantage for other uses where steam is required.

Although a continually increasing number of shoe machines are being equipped with individual electrical heating means incorporated in the machines so as to employ electricity directly for heating, there are still many factories with steam heating systems, and in such factories it is not infrequently found economical and otherwise desirable to utilize these heating systems during most of the year and to use electricity for generating steam for heating machines during the summer months. With this in view, the present invention provides a boiler in which steam may be developed by electricity to heat machines when desired, but which may be readily adapted to utilize steam taken from the usual factory heating system.

In accordance with features of the invention, the illustrated boiler comprises an integral cast shell which is relatively inexpensive. In form, the shell is generally cylindrical, with rounded ends, furnishing great strength. When this is set with the longitudinal axis of the cylinder vertical, it gives at the upper extremity a steam dome, while an opening at one side of the lower extremity carries upon its closure heating means, which may consist of one or more electrical elements. This heating means, projecting horizontally into the lower rounded portion of the shell, requires a minimum quantity of water for its submersion. The heating means acts efficiently whenever it is desired to generate steam by its use, and at the same time the apparatus may be permanently piped to the factory heating system, and steam from that utilized merely by opening and closing suitable valves. I also provide in the shell, in proximity to the heating opening, a smaller opening, normally closed by a fusible plug. The direct action upon the plug of the heat from the element facilitates

its prompt fusing in an emergency, with the resultant release of pressure from the boiler. A flange surrounding the opening admitting the heating means may determine the depth of the layer of heat-insulating material upon the shell, this material extending substantially to the surface upon its outer extremity on which the closure is secured. To prevent accidental contact with the conductors which may be employed to deliver current to the electrical heating element, a hood is mounted upon the carrier-plate of the element, being held thereon with its open side down. Through this opening, access may be had to the connections or inspection made for water-leaks, without the necessity of handling the boiler-parts.

For a more complete understanding of the invention reference may be had to the accompanying drawings in which

Figure 1 is a front elevation of the boiler.

Figure 2 is a section on line 2—2 of Figure 1.

Figure 3 is a section on line 3—3 of Figure 1.

Figure 4 is a detail elevation of one of the supporting standards.

The boiler comprises a hollow shell 1 formed as an integral casting having a substantially cylindrical side wall 2 merging at top and bottom with rounded or dome-shaped ends 3 and 4. Spaced about the lower end are lugs 5 outstanding and depending from the shell 1 to which may be fastened supporting standards or legs 6. As shown each standard comprises an angle member having a flat base 7 and a slot 8 near its upper end through which are passed bolts 9 threaded into the lugs 5. As shown three such legs or standards are provided by which a three point support for the boiler is produced so that it may find a firm support on a table or other suitable surface. These standards serve to support the boiler above the table or other surface with the longitudinal axis of the cylinder substantially vertical, so that clearance may be had for various fittings which may be applied to the boiler. The lower end of the boiler is provided with bosses 10 and 11 integral with the shell which are preferably

perforated and threaded, the lug 10 being for the purpose of leading in to the boiler condensed steam coming back from the source of use of the steam, or for any similar purpose desired and is herein shown as closed by means of a threaded plug 12 which may be fusible. An additional boss (not shown) for receiving the fusible plug may be employed if desired. The boss 11 is positioned centrally of the lower end of the shell and is perforated and threaded for connection to a blow off valve 13 by which the boiler may be drained when desired.

Extending outwardly from the side of the boiler is a pair of bosses 14, 15 which are threaded for the reception of the inner ends of a water level indicator fixture of any suitable construction indicated at 16, this indicator being shown as provided with valves 17 and 18 at its upper and lower ends so that communication to the gage glass 19 may be cut off at will, and a drain valve 20 at its lower end. The side wall 2 has also a perforated boss 21 for connection with any suitable type of filling mechanism. As herein shown this mechanism consists of a funnel 22 leading to a valve 23 connecting with the boss 21.

Connected with the steam space or dome furnished by the upper rounded portion is a safety valve 24, a pressure gage 25, and a steam supply valve 26, these outlet fittings having threaded connection with bosses 27 integral with the shell 1. The provision of the water level gage, pressure gage and safety valve insures that this boiler complies with the usual regulations in regard to the use of such apparatus. The valve 26 is intended to control communication with a pipe line indicated at 30 which leads to the mechanism for which steam is desired.

At the lower portion of the shell 1 is an opening 31 of considerable size surrounded by an outstanding marginal flange 32. The opening 31 may be used in the casting of the shell to remove the core therefrom and it also furnishes a means for introducing the heating elements. As shown in Figures 2 and 3 the heating elements 33 are of the electric resistance type and have spaced terminal arms 34 extending through and suitably insulated therefrom a closure plate 35 bolted against a gasket on a plane surface at the extremity of the flange 32. When the plate 35 is made fast in position the resistance elements 33 project into the lower rounded portion of the shell where a minimum amount of water is required to cover the elements. This rounded receptacle also contains, in an opening through it, the fusible plug 12 in close proximity to the heating elements. The plug is thus quickly affected by the elements when its fusing is necessary to relieve pressure on the shell. The outer ends of the arms 34 project from the outer face of the closure 35 and

form terminal connections 36 for current supply wires which are preferably assembled in a cable 37 and pass out through an insulating bushing 38 inserted in an opening 39 in a hood 40 which preferably partly encloses the terminals 36. This hood, as shown, fits about the outer edge of the plate 35 and has a depending forward wall 41 projecting below the level of the terminals 36. Inspection of and access to the electrical connections is permitted through the open lower side of the hold. The flange 32 and the various lugs and bosses also provide a means for permitting a heat insulating covering 45 to be placed about the shell to a thickness determined by the extent to which these project. There is thus given the protection necessary to retain within the boiler, for the formation of steam, the heat generated by the element, while insuring the proper connection for the pipe fittings and supporting legs or standards and for the closure 35, which may be removed or replaced without disturbing the heat insulation, the flanges, lugs, and bosses projecting therethrough.

Having thus described one embodiment of this invention it should be evident to those skilled in the art that many changes and modifications might be made therein without departing from the spirit or scope of the appended claims.

I claim:

1. A device of the class described comprising an integral cast hollow shell, a heat insulating covering for said shell, and a member integral with said shell projecting through said covering for supporting a heating element extending within said shell.

2. A boiler comprising an integral cast shell of generally cylindrical form with rounded ends, there being an opening in a rounded portion of the shell, means for mounting the shell with the longitudinal axis of the cylinder substantially vertical and the opening at one side of the bottom, a closure for the opening, and heating means carried by the closure and extending horizontally into the shell within the lower rounded portion.

3. A boiler comprising an integral cast shell of generally cylindrical form with rounded ends, there being an opening in a rounded portion of the shell, means for mounting the shell with the longitudinal axis of the cylinder substantially vertical and the opening at one side of the bottom, the upper rounded end of the shell furnishing a dome, a closure for the opening, heating means carried by the closure and extending horizontally into the shell within the lower rounded portion, and outlet connections from the boiler in the dome.

4. A boiler comprising an integral cast shell having an opening at the side of one extremity, said opening being surrounded by an outwardly projecting flange terminating in a plane surface, a plate secured upon said sur-

face to close the opening, heating means carried by the plate, and heat-insulating material covering the surface of the boiler and extending into proximity with the plate-receiving surface of the flange.

5 5. A boiler comprising an integral cast shell of generally cylindrical form with rounded ends, there being an opening in a rounded portion of the shell and a flange
10 integral with the shell surrounding the opening and terminating in a plane surface, means for mounting the shell with the longitudinal axis of the cylinder substantially vertical and the opening at one side of the bottom, a clo-
15 sure for the opening secured to the plane surface of the flange, heating means carried by the closure and extending horizontally into the shell within the lower rounded portion, and heat-insulating material upon the surface
20 of the shell and extending from said shell into proximity with the plate-receiving surface of the flange.

6. A boiler comprising a shell having a plurality of openings in its lower portion, a
25 fusible plug normally closing one opening, a closure for another opening, and heating means mounted upon the closure and lying in proximity to the plug.

7. A boiler comprising an integral cast
30 shell of generally cylindrical form with rounded ends, there being an opening in a rounded portion of the shell and an associated smaller opening, means for mounting the shell with the longitudinal axis of the
35 cylinder substantially vertical and the openings at the bottom, a fusible plug normally closing the smaller opening, a closure for the larger opening, and heating means mounted upon the closure and lying close to the plug
40 in the lower rounded portion of the shell.

8. A boiler comprising a shell having an opening in its lower portion and a flange surrounding the opening and terminating in a plane surface, a plate secured to said surface,
45 an electric heating element mounted upon the plate and extending into the boiler, conductors connected with the element, and a hood mounted upon the plate above the connections to the unit, said hood being open at the bot-
50 tom and there being an additional opening in the hood to allow the passage of the conductors.

In testimony whereof I have affixed my signature.

55 EDWIN L. EMERSON.