

Jan. 3, 1950

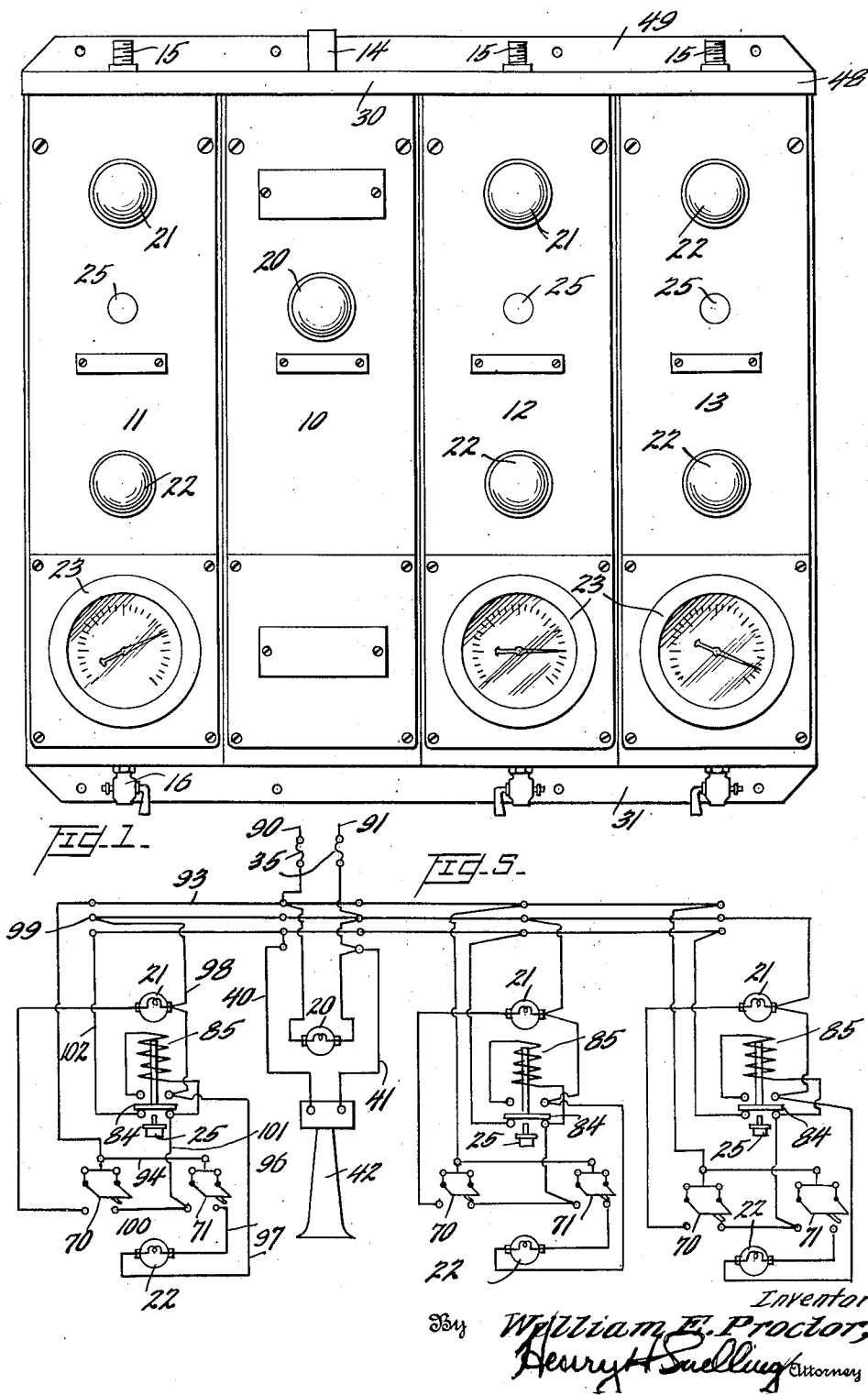
W. E. PROCTOR

2,493,548

BOILER LEVEL ALARM SYSTEM

Filed May 27, 1946

3 Sheets-Sheet 1



Jan. 3, 1950

W. E. PROCTOR

2,493,548

BOILER LEVEL ALARM SYSTEM

Filed May 27, 1946

3 Sheets-Sheet 2

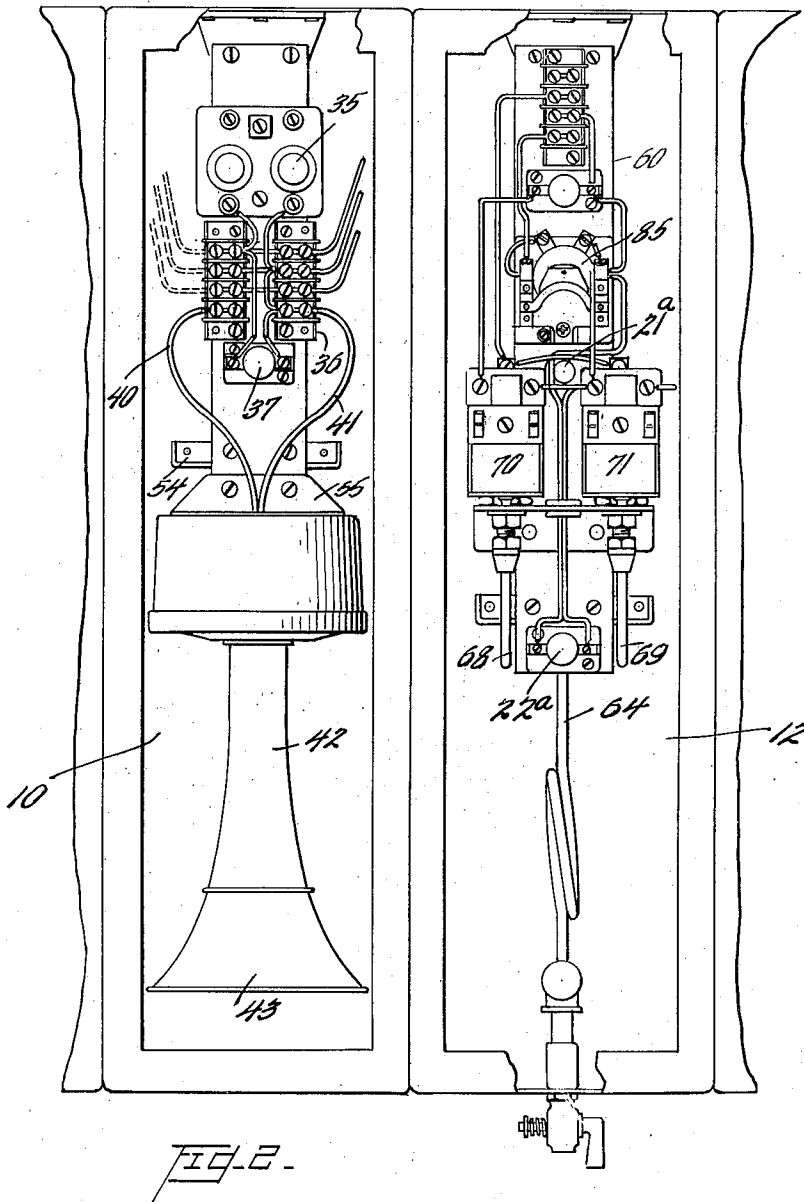


FIG. 2.

Inventor

William E. Proctor,

By Henry H. Snelling

Attorney

Jan. 3, 1950

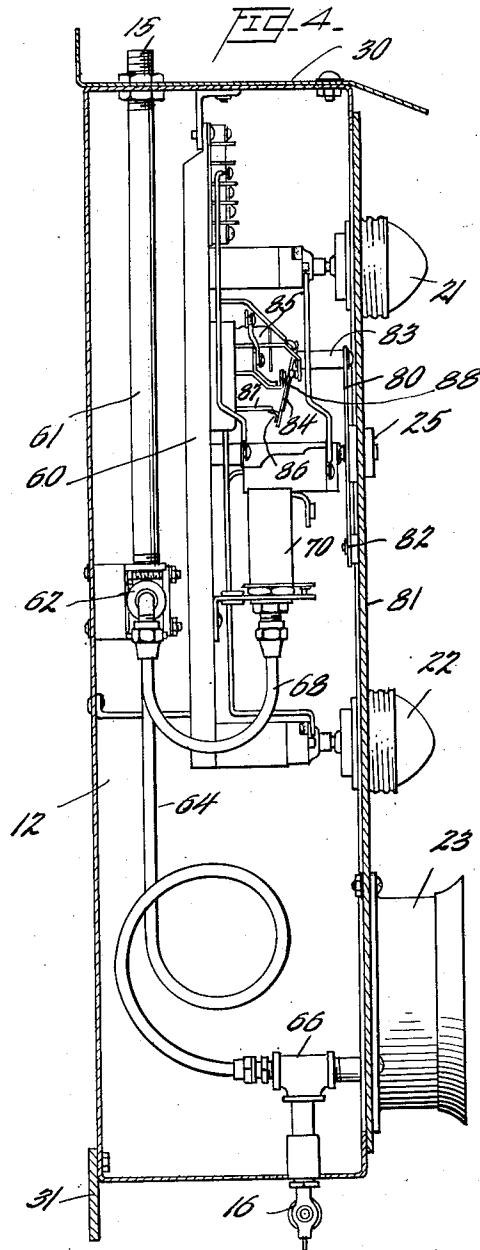
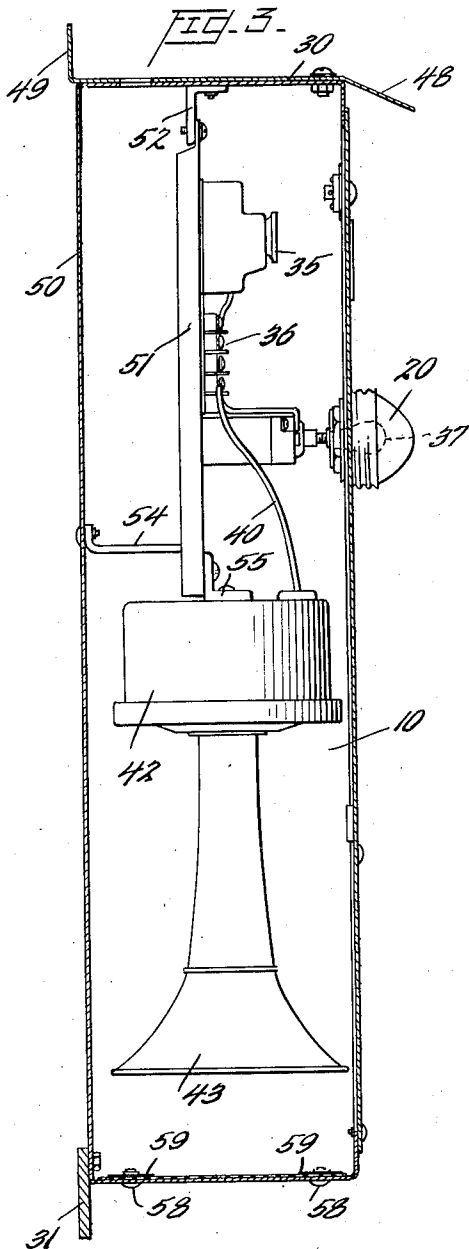
W. E. PROCTOR

2,493,548

BOILER LEVEL ALARM SYSTEM

Filed May 27, 1946

3 Sheets-Sheet 3



Inventor
William E. Proctor,
Henry H. Snelling
By Attorney

UNITED STATES PATENT OFFICE

2,493,548

BOILER LEVEL ALARM SYSTEM

William E. Proctor, Baltimore, Md.

Application May 27, 1946, Serial No. 672,574

3 Claims. (Cl. 177-311)

1

2

This invention relates to expansible boiler level alarm panels and has for its principal object the provision of an extremely compact panel which will serve for one, two, three, or more boilers, recording the pressure in each boiler and warning of either high or low level and in addition, sounding an audible alarm to draw attention to the panel board whenever the water in any boiler is either too high or too low.

An important feature of the present invention is the provision of means for indicating visually that the water is either too high or too low, simultaneously sounding an alarm and including means whereby the attendant, as soon as he finds from the panel which boiler is at improper level, he may instantly silence the horn but may leave on the light, indicating either high level or low level and of course indicating which boiler is at fault.

Contrary to other systems, the correction of the level in the boiler restores the audible alarm to operative position simultaneously with the going out of the lamp or other visual signal.

In the drawings:

Figure 1 is a front elevation of a board, consisting of four panels.

Figure 2 is a front elevation of the two central panels with their covers removed.

Figure 3 is a side elevation of the mechanism for the horn panel.

Figure 4 is a side elevation of the boiler panels.

Figure 5 is a wiring diagram.

In Figure 2 the two central panels have their covers removed. For each installation there is a single horn panel 10 and as many pressure panels as there are boilers, the latter being numbered 11, 12, and 13, all identical. The fourth pressure panel, if used, would be at the left of the panel 11. It is not contemplated to apply the system to more than six boilers as it is more convenient in such cases to have two separate boards. The electric power lines enter through the sleeve 14 at the top of panel 10. A threaded connection 15 in each of the boiler panels is connected to the pressure connection swivel of the boiler level regulating element. At the bottom of each pressure panel there is a petcock 16 for emergency use.

In the center of the horn panel there is a lamp 20 which, when lighted, indicates that the electric power is on and the absence of light in this lamp indicates that the panels are not in use. In each of the other panels, 11, 12, etc. there is an upper amber lamp 21 which indicates that the water level is too high and a lower red light

22 which indicates that the water level is too low and below there is the usual retard gauge 23 which indicates the pressure in the respective boiler. In each of the pressure panels there is a manually-operated push button 25 which, when pressed in, disconnects the horn from the electric circuit, but does not turn out whichever of the two lights, 21 or 22, may have been lit. Disconnecting the horn enables the workman to correct the error without the annoyance of the continually sounding horn, and still enables a second workman, who has heard the sound, to come to the board and determine at once which boiler is out of order and whether the water is too high or too low. The push button 25 is so connected that while the horn is temporarily disconnected, whenever the water level reaches normal limits, the light goes out and simultaneously with this the horn is restored to duty and will sound again as soon as the water in any of the boilers rises too high or falls too low. The boards are secured together by a unit visor 30 which is made in several sizes, that is, to accommodate the proper number of units, 2, 3, 4, 5 or more.

A bottom tie bar 31 aids in combining the several panels into a unit and with the visor top provides the means for securing the board to a vertical wall or bulkhead.

Referring particularly to the horn panel in Figures 1 and 2, the electric line wires are led through the fuses 35 to the four-point terminal block 36 and to the clear lamp 37 which, as will be noted, always burns if power is delivered to the unit. The lamp 37 is covered by a green beehive lens 20. Wires 40 and 41 lead from the terminal block to a horn 42 of well-known type, having its bell 43 spaced slightly from the bottom of the panel casing.

Referring more particularly to Figure 3, the visor top 30 has on one side the visor 48 and at the rear end an upturned bracket member 49, preferably extending slightly rearward of the base box 50. A sub-base panel 51 is supported at the bottom by the fairly sturdy channel-shaped bracket 54, secured between the rear of the base box and the sub-base quite close to the angular bracket 55 which supports the fairly heavy horn 42. The bottom of the horn panel has a very large hole, preferably circular, and a wire mesh bolted to the panel casing as by the aluminum rivets 58 passing through fiber bushings 59.

Referring more particularly to Figure 4, a sub-base 60, divides the power channel into a

forward section and a rearward section, the latter accommodating the pressure pipe 61, which connects at its threaded portion with a pressure pipe leading from the boiler regulator.

The pressure pipe 61 leads to a brass cross 62, the central opening of which leads to an expansion tube 64 of soft copper and leading through the brass T 66 to the pressure gauge 23 and the petcock 16. The two side openings of the cross 62 lead through soft copper pressure tubing 68 and 69 to the high and low pressure switches 70 and 71, respectively.

The low pressure switch is set to close at 30 pounds and the high pressure switch is set to close at 80 pounds although obviously these figures can be altered at will. The closing of the high pressure switch causes the light 21a to burn. These lights are covered with beehive lenses 21 and 22 which are colored amber and red respectively to distinguish over the green lens 20 which indicates that the power is "on."

The button 25, the pressing of which has the effect of silencing the horn, engages a flat spring 80 anchored to the removable front 81 of the panel as at 82. The spring 80 carries an insulating pin 83 which engages the armature 84 of the coil 85. The armature is mounted on a flexible hinge 86 on bracket 87. When the button 25 is pushed all the way in the armature is held to the coil by virtue of the electric current passing from the switch 70 or 71 to the lamp 21a or 22a but if the button is not pressed far enough in to hold the armature against its magnet, the armature will fall away from the coil and the horn will continue to sound. The spring hinge 86 opens the connection between the armature and contact 88 just as soon as the current is broken to the lamp and consequently the spring 80 having already returned, permits the armature 84 to fall free of the pin 83 and quite distant from the pin 88.

Referring now to the wiring diagram, Figure 5: The electric power supply is conveyed to the system through the wires 90 and 91 which are always connected to the "power on" pilot light 20. The power line 90 is connected through wire 93 to the high level switch 70 and through wire 94 with the low level switch 71, each of course having two sets of contacts.

Assuming that the water level in the boiler corresponding to the left-hand panel in Figure 4 has dropped below the safe point, the current flows through line 90, wires 93 and 94, through the closed switch points 96, wire 97, to lamp 22, returning by wire 97 and 98 to the second point 99 of the connecting terminal plug of panel 11. The other switch points 100 of low pressure switch 71 close at the same time and this conveys current through wire 101, armature 84, wire 102 to the third point of the terminal plug just below point 99 and this is connected through wire 40 to the horn returning through wire 41 to line wire 91. Thus the horn 42 sounds and the light 22 burns. The attendant now rushes to the board, ascertains the trouble, and then presses the button 25. This lifts the armature 84 (as seen in Figure

4) bringing it into contact with the two terminals of the coil 85. With the rise of the armature 84 the current passes through the coil and consequently magnetizes it, "locking" the armature 84 to the coil. This breaks the current flowing through wire 102 and consequently the horn ceases to sound but the light is still lit. When the feed water pump (not shown) has been operated to raise the water level in the boiler the switch 71 opens at both sides, 96 and 100, and consequently current no longer flows through the coil 85 and the armature 84 as seen in Figure 5 drops. Actually it is pressed away from the coil by the spring 86 as seen in Figure 4.

Having described my invention, what I claim is:

1. In combination, a pair of visual signals one to indicate a departure on one side of a chosen range, and the other visual signal to indicate a departure on the other side of said chosen range, a third signal adapted to call attention to the lighting of one of the visual signals, two pressure operated switches, each having two pairs of contacts, one pair of contacts operating the associated visual signal, the other pair of contacts operating the common third signal, said other pair of contacts which operate the third signal, being in parallel with each other, manual means to render the third signal inoperative, without extinguishing the visual signal, and means for restoring the manual means to initial position upon the extinguishing of the visual signal.

2. The device of claim 1 in which the pressure operated switches respond to high or low water in the boiler of a ship and the third signal is an electrically operated horn.

3. The device of claim 1 in which the visual signals are electric lights both controlled by a single pressure pipe, each light being connected to one of the pressure operated switches, and the switches being set to operate at different chosen pressures, whereby one light may indicate that the water in a boiler is too high and the other may indicate that the water has fallen below a safe level.

WILLIAM E. PROCTOR.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
841,186	Sandcross	Jan. 15, 1907.
1,221,963	Blundell	Apr. 10, 1917.
1,689,294	Potts	Oct. 30, 1928
2,116,947	Ketay	May 10, 1933
2,129,261	Chase et al.	Sept. 6, 1938
2,368,471	Horan	Jan. 30, 1945
2,456,286	Kennelly	Dec. 14, 1948

FOREIGN PATENTS

Number	Country	Date
475,248	Great Britain	Nov. 16, 1937