July 3, 1934. E. D. PARKER 1,965,052

STEAM BOILER CONTROL

Filed Aug. 24, 1932 2 Sheets-Sheet 1

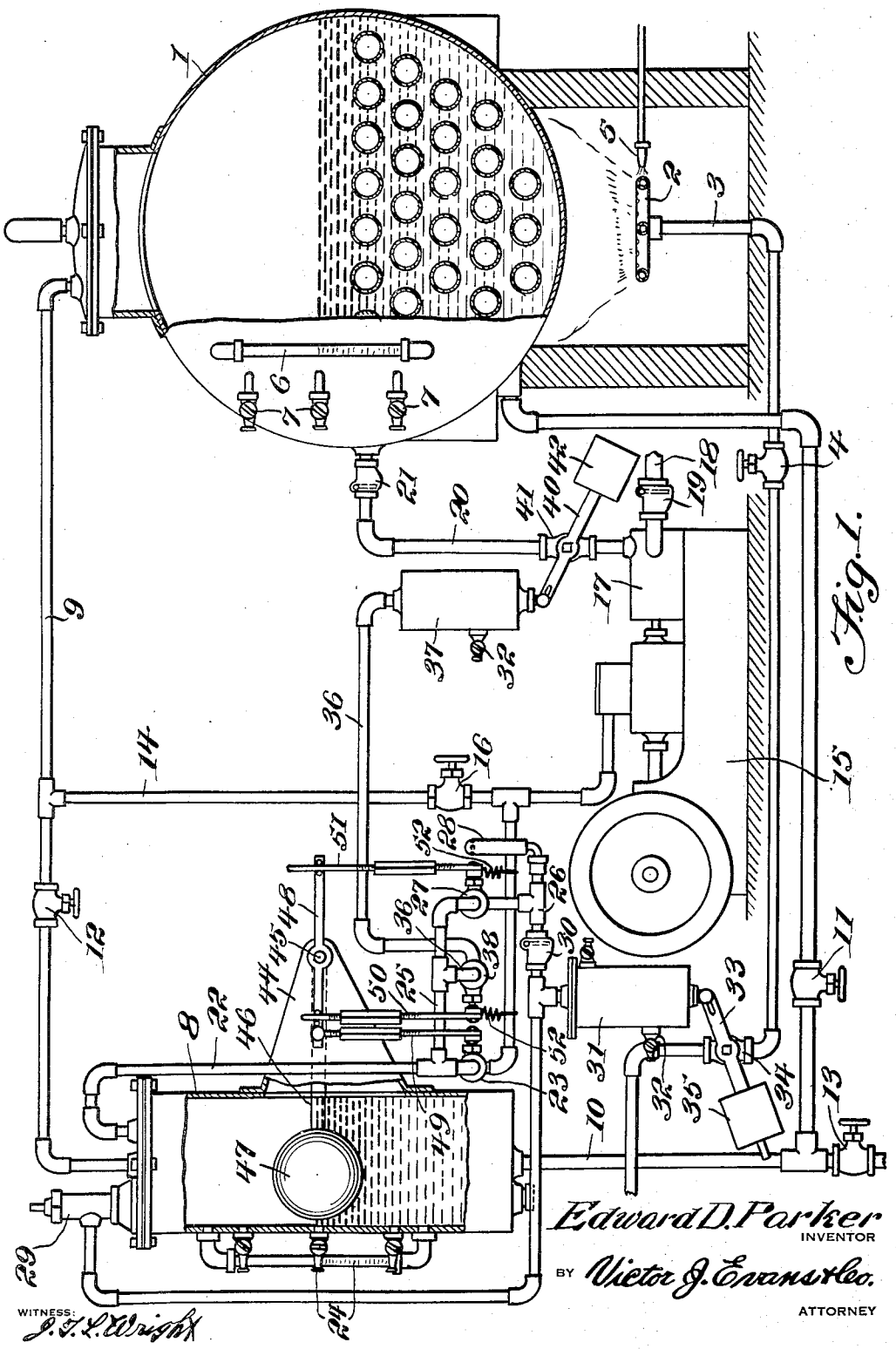


Fig. 1.

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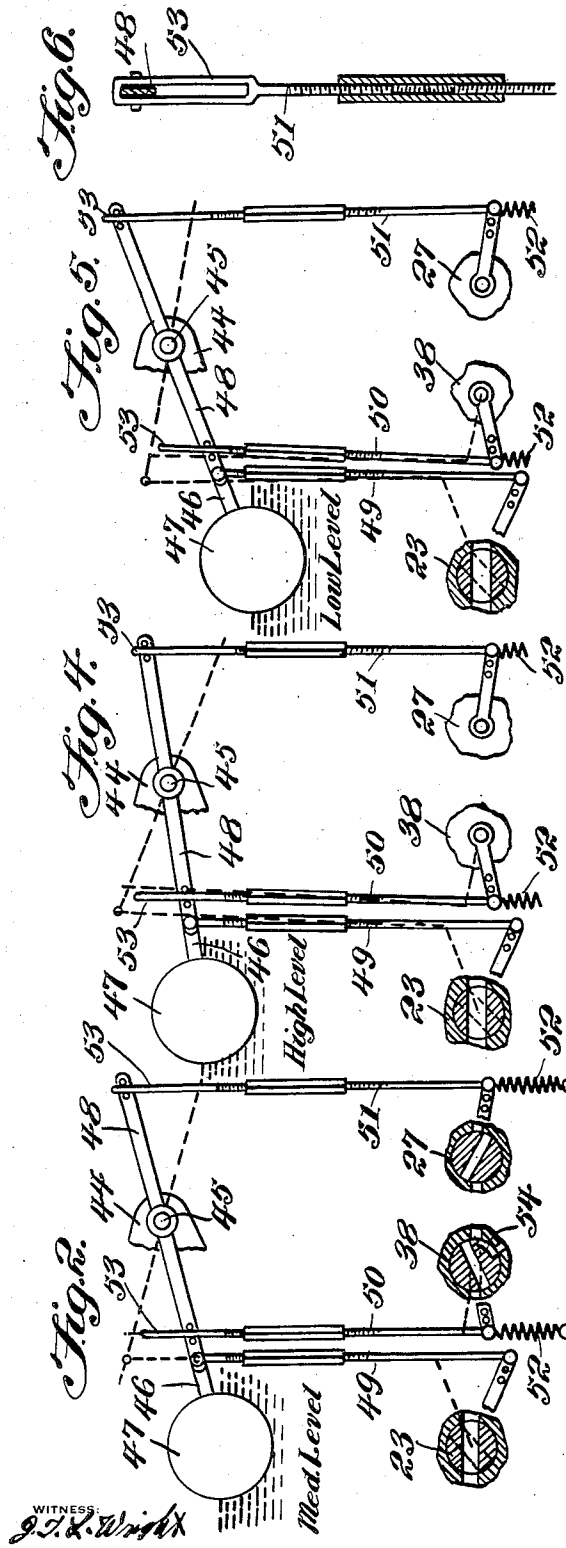
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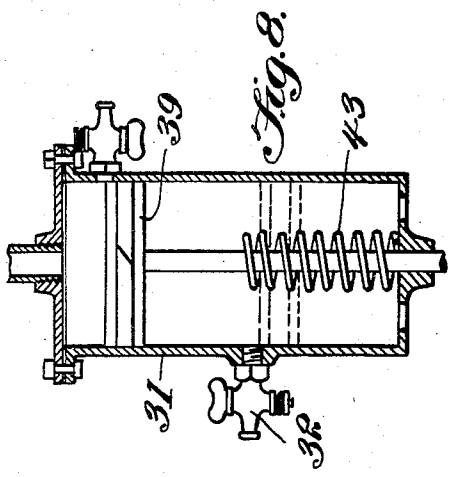
WITNESS:
J. F. L. Wright

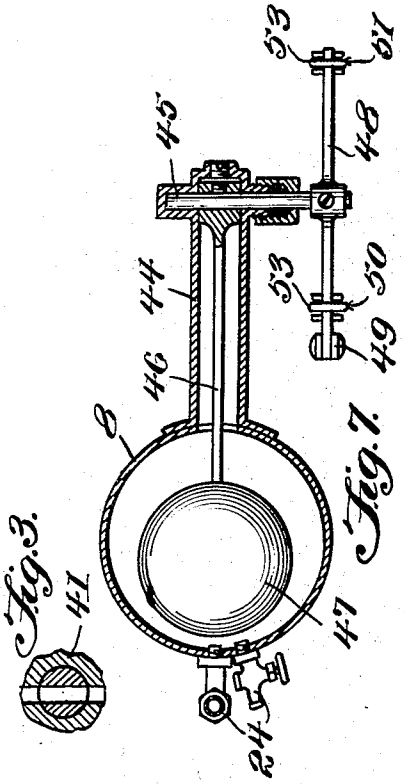
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STEAM BOILER CONTROL

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WITNESS:
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Patented July 3, 1934 1,965,052

UNITED STATES PATENT OFFICE

1,965,052

STEAM BOILER CONTROL

Edward D. Parker, Whittenberg, Tex.

Application August 24, 1932, Serial No. 630,291

1 Claim. (Cl. 122—448)

This invention relates to a steam boiler control and is especially adapted for use on boilers employing liquid or gaseous fuel for a heating medium, and has for the primary object the provision of means for automatically feeding water into a boiler as needed and to automatically interrupt the supply of fuel to the boiler should the water therein reach a dangerous low level or should the pressure of steam within the boiler exceed a safe poundage.

With these and other objects in view this invention consists in certain novel features of construction, combination and arrangement of parts to be hereinafter more fully described and claimed.

For a complete understanding of my invention, reference is to be had to the following description and accompanying drawings, in which

Figure 1 is a side elevation partly in section illustrating a steam boiler control constructed in accordance with my invention.

Figure 2 is a diagrammatic view showing a float control adjusted for a medium level of water in the boiler of the furnace.

Figure 3 is a detail sectional view illustrating a water control valve.

Figure 4 is a view similar to Figure 2 showing the float adjusted for high level of water in the boiler.

Figure 5 is a view similar to Figure 4 showing the float adjusted to low level of water in the boiler.

Figure 6 is a detail sectional view illustrating the connecting rod.

Figure 7 is a sectional view illustrating the mounting of the float.

Figure 8 is a fragmentary vertical sectional view illustrating the steam cylinder and the piston therein.

Referring in detail to the drawings, the numeral 1 indicates a conventional type of steam boiler employing liquid or gaseous fuel as a heating medium, which fuel is fed to a burner 2 by a supply pipe 3 having a cut-off valve 4. Arranged adjacent the burner 2 is a pilot 5 for igniting the fuel from the burner 2. The boiler 1 is provided with the usual sight gage 6 for the purpose of indicating the height of water in the boiler and also the boiler is provided with a series of pet cock gages 7 providing additional means whereby the operator may determine the height or amount of water in the boiler.

Located adjacent to the boiler 1, is a water control device consisting of a cylinder 8 having its upper end connected to the steam dome of the boiler by a steam pipe 9.

A water circulating pipe 10 is connected to the lower end of the cylinder 8 and to the lower portion of the boiler 1 and has a control valve 11. A similar control valve 12 is provided in the steam pipe 9. A drain valve 13 is placed in the water pipe 10 whereby sediment and other foreign matter may be removed from the cylinder 8 when necessary.

A branch steam pipe 14 is connected to the steam pipe 9 and to a steam engine 15 and is also provided with a control valve 16. The engine 15 operates a water pump 17 connected to a water main 18 having a check valve 19 and to an outlet pipe 20 which is in turn connected to the boiler. The outlet pipe 20, adjacent the boiler is provided with a check valve 21 to prevent pressure within the boiler from acting against the pump 17. The valve 16 in the branch steam pipe 14 is normally closed for cutting off the steam to the engine 15 while the valves 12 and 11 are normally open.

A steam pipe 22 is connected to the upper end of the cylinder 8 and to the steam pipe 14 between the valve 16 and the engine and has therein a control valve 23 operated by a float actuated mechanism which will be hereinafter more fully described. The cylinder 8 is provided with gages 24 similar to and alined with the gages 6 and 7 so that the operator may easily determine the exact amount of water in the boiler 1 and in the cylinder 8, it being understood that the water circulates between the boiler 1 and the cylinder 8 by the pipe 10, the water in the boiler and cylinder always being at the same level.

A branch steam pipe 25 is connected to the steam pipe 22 and to a steam pipe 26 and is provided with a control valve 27 actuated by the float operated mechanism. One end of the steam pipe 26 is connected to a whistle 28, while the other end of the pipe 26 is connected to a pop-off valve 29 connected to the upper end of the cylinder 8 so that when the steam pressure in the cylinder 8 exceeds a predetermined amount, the valve 29 will open. A check valve 30 is located in the pipe 26 and connected to said pipe 26 between the check valve 30 and the valve 29 is a steam cylinder 31 having a drain valve 32. A piston is reciprocally mounted in the steam cylinder 31 and the stem thereof is connected to a lever 33 of a control valve 34 located in the fuel pipe 3. The lever 33 carries a weight 35 for normally positioning the control valve 34 in an open position with the piston in its uppermost position within the steam cylinder 31. However, when the steam in the cylinder 8 exceeds a predeter-

mined pressure, steam will be admitted to the cylinder 31 by the opening of the pop-off valve 29 for forcing the piston downwardly, closing the valve 34 and interrupting the flow of fuel to the burner so as to permit the boiler 1 to cool. As the steam pressure in the cylinder 8 or boiler 1 recedes to a predetermined amount, the pop-off valve 29 closes and the weight 35 opens the valve 34, allowing the fuel to flow to the burner where it is ignited by the pilot 5.

A branch steam pipe 36 is connected to the steam pipe 25 and to a steam cylinder 37. A control valve 38 is located in the branch steam pipe 36 and actuated by the float control mechanism. A piston 39 is located in the steam cylinder 37 and the stem thereof is pivoted to a control lever 40 of a control valve 41 located in the water outlet pipe 20. A weight 42 is carried by the lever 40 for normally positioning the valve 41 in an open position. The steam cylinders 31 and 37 and their associated parts are identical to the construction as shown in Figure 8, each having a cushioning spring 43 for its respective piston to engage on the downward stroke thereof. Each steam cylinder is provided with a bleed valve manually actuated.

A hollow extension 44 is carried by the cylinder 8 and in communication with the interior thereof and rotatably supports a shaft 45 to which a float arm 46 is secured carrying at its free end a float 47, operable within the cylinder 8. A lever 48 is secured to the shaft 45 intermediate its ends and has pivoted to one end an adjustable connecting link 49 which is in turn pivotally and adjustably secured to the control valve 23. A connecting link 50 is connected to the lever 48 adjacent to the connecting link 49 and is pivotally and adjustably connected to the control valve 38. A connecting link 51 is connected to the lever 48 at the end opposite to the connection of the connecting link 49 to said lever 48. The connecting link 51 is pivotally and adjustably connected to the control valve 27. The control valves 27 and 38 are urged into open positions by springs 52 or if desired, weights may be employed in lieu of the springs 52. By adjusting the lengths of the connecting links 49, 50 and 51 the device may be made to operate at various water levels as indicated in Figures 2, 4 and 5. As shown in Figure 2 the connecting links are adjusted for the operation of the device to maintain a medium level of water within the boiler and the cylinder 8, while Figure 4 illustrates the connecting links adjusted to cause the actuation of the float to maintain a high level of water in the boiler. Figure 5 illustrates the links adjusted so that the float will maintain a low level of water in the boiler. Each link includes threaded sections connected by a turn buckle whereby the operator may adjust the link as to length. The links 50 and 51 at their upper ends are provided with slotted heads 53 to receive the lever 48. As shown in Figure 1 the lever 48 when the water in the boiler is at the proper level engages the lower wall of the slotted head of the connecting link 51 and the upper wall of the slotted head of the connecting link 50. As the water in the boiler is consumed in the generation of steam, the water in the cylinder 8 recedes in accordance with the water in the boiler and the float 47 lowers, causing the lever 48 to be rocked. The rocking of the lever 48 opens the valve 23, thereby admitting steam to the engine 15 for operating the latter. The engine through the pump 17 forces water into the boiler 1 due to the fact that the valve 41 is in an open position by the influence of the weight 42, thus replenishing the water to the boiler. The control valve 38 is provided with a vent 54 normally maintaining the steam cylinder 37 under atmospheric pressure and allowing the weight 42 to maintain the control valve 41 of the outlet water pipe 20 in an open position. As the water fills the boiler 1 to a proper level, the float 47 closes the valve 23, stopping the engine 15 and opening the valve 38, admitting steam to the steam cylinder 37 which automatically closes the valve 41 to cut off further flow to the boiler so that the engine and pump may be employed for furnishing water to other boilers, it being understood the engine may not necessarily be limited in use to one boiler but can be employed in connection with a series of boilers (not shown). It is to be understood that when the float 47 moves downwardly to open the valve 23 it closes the valve 38 and vents the steam cylinder 37 to the atmosphere and due to the weight 42 the control valve 41 is open.

Should the water in the boiler 1 fall to a low danger mark, a greater movement of the float 47 in a downward direction will be had, causing the rod 51 to open the valve 27 and admit steam to the whistle 28 for actuating the latter, thus warning the operator. Some steam may pass the valve 30 and enter the cylinder 31 to close the fuel control valve 34 and cut off fuel until the water in the boiler is again built up to the proper working level.

Should it be desired to render the automatic control inoperative at any time, the valves 12 and 11 are closed and when, under these conditions, it is desired to force water to the boiler the valve 16 is opened, allowing steam to reach the engine 15 for actuating the latter.

While I have shown and described the preferred embodiment of my invention, it will be understood that minor changes in construction, combination and arrangement of parts may be made without departing from the spirit and scope of my invention, as claimed.

Having described the invention, I claim:

A boiler control including a steam boiler and a self-igniting heating medium therefor furnished with liquid or gaseous fuel from a supply means, a water inlet pipe connected to the boiler, a pump connected to said pipe and to a water supply, a steam engine for operating the pump, a cylinder located adjacent the boiler and the engine, means for admitting water and steam to the cylinder from the boiler, a steam pipe connected to the cylinder and to the engine, a control valve in the steam pipe, a float control mechanism actuated by the amount of water in the cylinder and connected to the control valve for starting and stopping the engine, and means under the control of the float actuated mechanism for stopping and starting the flow of fuel to the heating medium in accordance with the amount of water in the boiler and the cylinder, a normally open control valve in the water inlet pipe, means actuated by the float control mechanism to close said control valve when the water in the boiler and cylinder reach a predetermined amount to permit the engine and pump to be employed for other purposes, and a manually controlled means for admitting steam from the boiler to the engine for actuating of the latter when desired.

EDWARD D. PARKER.