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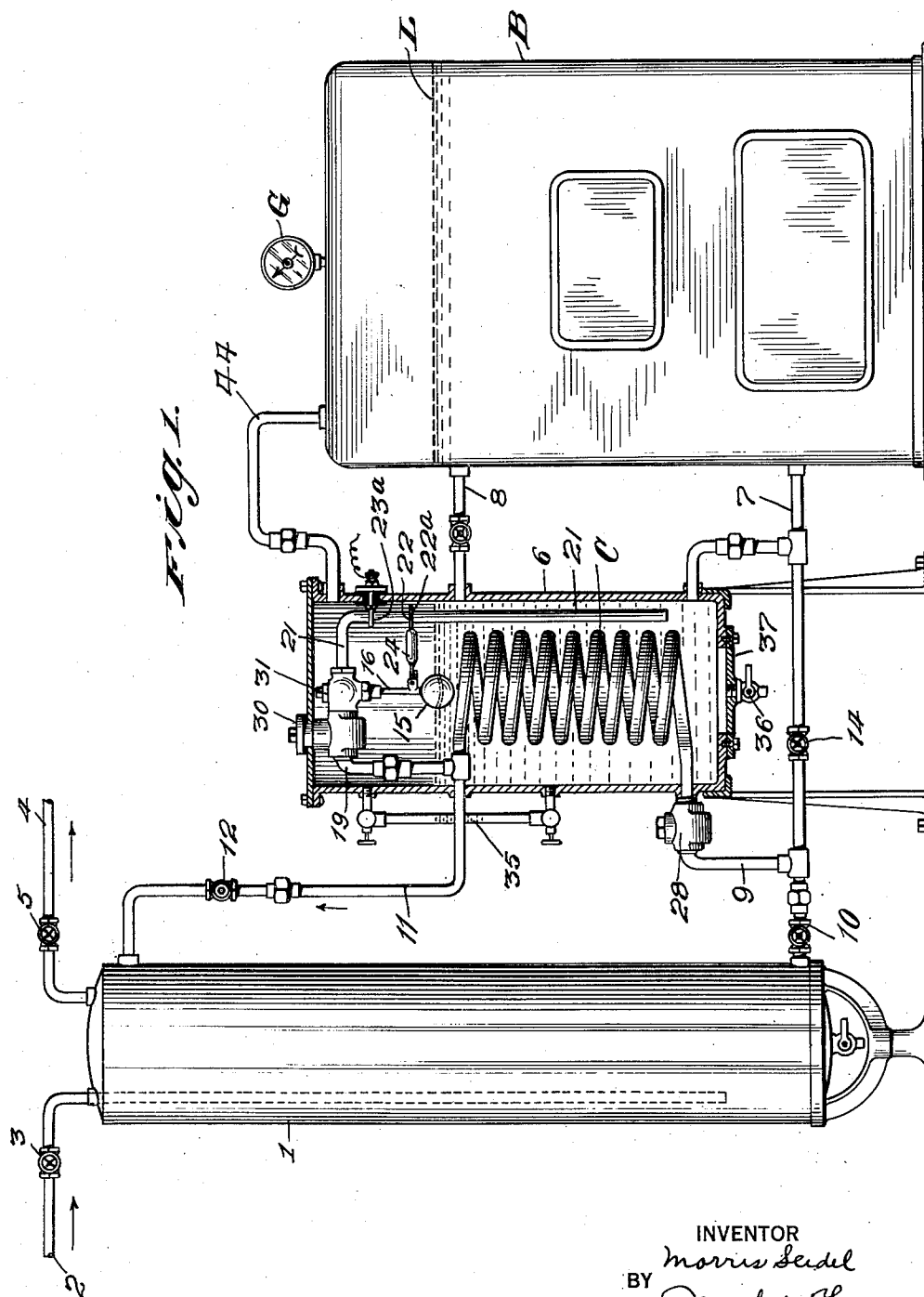
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AUTOMATIC BOILER CONTROL AND WATER HEATING DEVICE

Filed May 31, 1929

2 Sheets-Sheet 1



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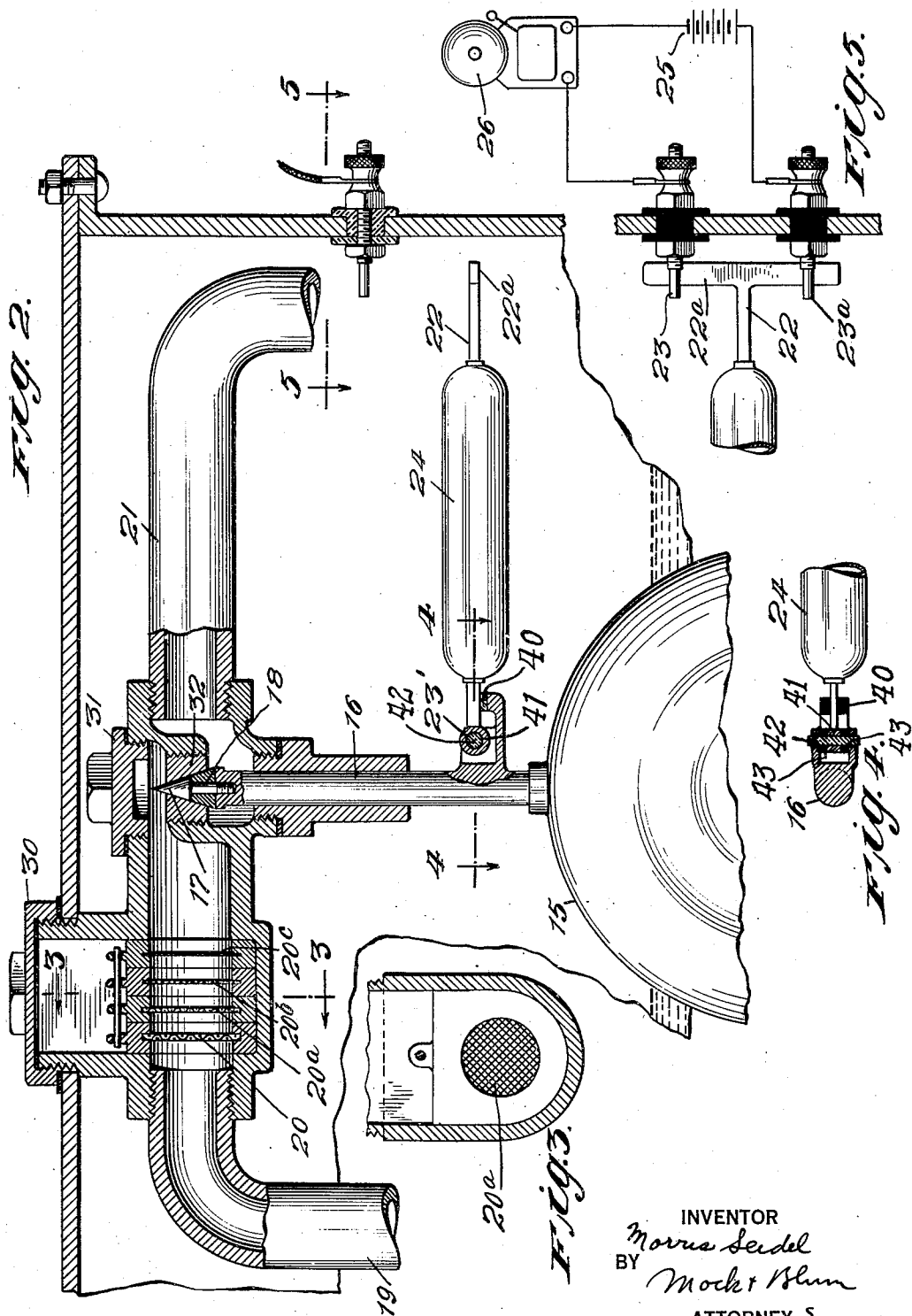
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2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE

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AUTOMATIC BOILER CONTROL AND WATER-HEATING DEVICE

Application filed May 31, 1929. Serial No. 367,498.

My invention relates to a new and improved automatic boiler control and water heating device.

One of the objects of my invention is to provide an improved boiler control which may be used in conjunction with the water heating device or as a separate accessory to a boiler.

Another object of my invention is to provide a combined boiler, hot water heating device, and an automatic control for the water sent into the boiler.

Another object of the invention is to provide a device of the type above described having a simple and automatically operated pressure reduction valve for controlling the inlet of water into the apparatus.

Another object of my invention is to provide a device of the type above described having an improved alarm to indicate an abnormal variation from the desired water level.

Another object of my invention is to provide a simple and efficient device which can be cheaply and conveniently manufactured and assembled.

Other objects of my invention will be set forth in the following description and drawings which illustrate a preferred embodiment thereof, it being understood that the above general statement of the objects of my invention is intended to generally explain the same and not to limit it in any manner.

Fig. 1 is a side elevation partially in section showing the complete device.

Fig. 2 is a detail sectional view of the essential parts of the water heat and the control valve.

Fig. 3 is a sectional view on the line 3—3 of Fig. 2 showing the straining device.

Fig. 4 is a sectional view on the line 4—4 of Fig. 2 showing a detail view of the alarm.

Fig. 5 is a diagrammatical view showing the operation of the alarm.

The boiler B is of any suitable type and it is provided with a pressure gauge G. The normal and predetermined level of the water in said boiler B is indicated by the line L. The hot water tank or reservoir 1 is of any suitable type and it is provided with a water

inlet pipe 2 controlled by valve 3 and with a water outlet pipe 4, controlled by valve 5. The outlet pipe 4 is connected to the piping of the house and the inlet pipe 2 is connected to the main which delivers water under suitable pressure into the apparatus. The boiler is connected to a hot water heater 6 having a heat-absorbing coil C through which the water in the reservoir 1 can circulate in order to absorb heat. The circulation of the water in the tank 1, through the coil C, is accomplished in the ordinary manner due to the fact that cold water has a higher specific gravity than hot water. The water space of the boiler B is connected to the bottom of the heater 6 by means of a pipe 7 and a branch pipe which is shown in Fig. 1. This branch pipe communicates with heater 6 above the bottom thereof, so that sediment can collect in the bottom of the heater, to be cleaned out whenever desired.

The upper part of the water space of the boiler B is also connected to the heater 6 by means of a valve controlled pipe. Hence, the level of the water in the heater 6 is the same as the level of the water in the boiler B. The bottom of the tank 1 is connected to the heater 6 by means of a pipe 9 controlled by valve 10. The pipe 9 is connected to the coil C through a strainer casing 28 which is provided with suitable straining means, of the type later described. The upper end of the coil C is connected to the top of the reservoir 1 by means of a pipe 11 controlled by valve 12. The heater 6 is also provided with an ordinary water gauge 35.

A vertical pipe 19 is connected to the upper end of the coil C and this pipe 19 is connected to a casing which is provided with filters 20, 20a, 20b, and 20c, clearly shown in Fig. 2. These filters are progressively finer so that they exclude rust and impurities from the water which passes through said casing.

The passage of water through the pipe 19 is normally prevented by a valve 17 having a threaded shank 18 which is screwed to a valve rod 16 connected to a float 15. This valve 17 is of the needle valve type and it is provided with a frustro-conical member made of rub-

ber or similar material through which the threaded shank 18 passes.

If the valve 17 is opened, under conditions which will be later more fully described, then the water can pass through the opening in the removable valve seat 32 to pass through the pipe 21 and thus raise the water level in the heater 6. The valve casing is provided with a removable cap 31 and the filter casing is provided with a removable cap 30 to permit ready access to these parts in order to inspect or clean the same or to replace any parts. It would not be departing from my invention if the cap 30 would extend into the filter casing, like cap 31.

The heater 6 is provided with a removable bottom plate 37 provided with an outlet valve 36 in order to remove any sediment from the heater 6 or for any other purpose.

The valve rod 16 is provided with a lever 22 pivoted thereto but insulated therefrom. The lever 22 is provided with a float 24, and the inner end of the lever 22 is provided with a pivotal connection 23' to a forked extension of the valve rod 16. This pivotal connection comprises a pin 42 made of insulating material which passes through the collar or eye 41 provided at the inner end of the alarm lever 22. Collars 43 prevent contact between the collar or eye 41 and the extension of the valve rod 16. The inner end of the lever 22 normally rests upon a piece of insulating material 40. The outer end of the lever 22 is provided with a switch extension 22a, which under proper circumstances, can touch the contacts 23 and 23a to close the circuit of a bell of the other signal device 26 which is operated by a source of electricity 25. This may be a battery, a transformer, or the like. It would not be departing from my invention to provide the strainer casing 28 with a removable bottom cap similar to cap 30, or to locate said strainer casing 28 within the heater 6.

The operation of the device is as follows:

The valve 14 is closed so that the heater 6 communicates with the upper and with the lower part of the water space in the boiler B. The hot water in the boiler B thereupon fills the heater 6 to the level L. Any steam or air in the heater 6 can escape to the steam space of the boiler through the pipe 44. Since the water in the heater 6 is in constant communication with the water in the boiler B, the water in the heater 6 maintains a sufficiently high temperature to effectively heat the water in the reservoir 1 in the ordinary manner. In addition to the installation specified herein, the so-called "instantaneous" heating system has been well known. In this system the coil C is made sufficiently long so that the use of the tank 1 is unnecessary. In the "instantaneous" system, it is merely necessary to force water through the coil C, and the water is heated sufficiently to pass to the hot

water line of the house or the like. If the level of the water in the boiler (which is the same as the level of the water in the heater 6) is at or close to the predetermined level, then the float 15 is operated to keep the needle valve 17 in the closed position. Of course, the valves 10 and 12 are open to permit free communication between the coil C and the reservoir 1. If however, the level of the water in the boiler B, and hence in the heater 6, falls below the desired level, then the float 15 descends so as to open the valve 17. Since the valve casing is below the level of the top of the tank 1, water is free to enter from the tank or reservoir 1 to pass upwardly through the pipe 19, through the strainer casing, and into the pipe 21 to raise the level of the water in the heater 6. If the water in the heater 6 is above the level of the water in the boiler B, the water in the heater 6 is free to pass immediately into the boiler B, so that the float 15 will not be pushed upwardly to seat the valve 17 until the water level in both boiler and heater is at the desired height. The pressure of the water which enters from the mains through the pipe 19 normally tends to unseat the valve 17, but this pressure is exerted over a comparatively small area, because a needle valve 17 is employed so that it does not require a very large float 15 to make the device fully operative. Likewise, since the float 15 is directly connected to the valve rod 16, instead of being connected thereto by a system of levers of the customary kind, a more positive and reliable action is secured because the weight of the float 15 and the positive pressure of the water entering from the mains positively unseats the valve 17, if the water level falls too low.

Under certain circumstances the rise of the float 15 may fail to seat the valve 17 due to the presence of some impurity in the water, or the like. If the water is permitted to steadily flow into the heater 6, it would flood the boiler and the radiators connected thereto. However, if the water level rises too high in the heater 6, then the float 24 causes the lever 22 to turn in the counter-clockwise direction until the head 22a closes the circuit of the alarm 26, which may be audible, visible, or the like. Likewise, when the circuit of the source of electricity 25 is closed, this may operate to close the valve 3 so as to prevent the admission of any more water into the apparatus, while simultaneously operating the alarm which is continuously operated until the device is adjusted or repaired. If the lever 22 fails to operate for any reason, then connection between the contact points 23 and 23a is caused by the water itself. Likewise, instead of causing the lever 22 to operate as a contact lever, the upward turning movement of the lever 22 can be caused to operate any of the ordinary switches having an operating part which extends within the cas-

ing, the live parts of said switch being exterior to the casing of the heater 6. If for any reason the heater 6 does not operate or if an abundant supply of hot water is temporarily desired, then the valve 14 may be opened in which event hot water from the boiler B can directly enter the reservoir 1.

When the coil C is used in the ordinary manner to heat the water, the flow of water through said coil is slow, so that sediment gradually clogs said coil. However, when valve 17 is opened due to the lowering of the water lever in the boiler, the water passes through and out of said coil C into pipes 19 and 21, with sufficient velocity to clean out the coil C. In the normal operation of the device, the coil C will thus be flushed so that the cleansing thereof will be eliminated or minimized.

Since the inlet or feed water is fed to the bottom of the pool of water in the heater, the top of said pool always being hot, the fresh water for the boiler will be mainly supplied from the top of said pool, so that hot water will be fed to the boiler.

It is clear that the boiler is connected to the water inlet pipe through a simple and efficient automatic valve control and that such connection could be either through the heater 6 as specifically illustrated herein, or it could be direct, if desired. The valve rod 16 is slidably guided in a bushing which has an externally threaded end which engages the threaded wall of an opening in the valve casing. The valve stem can be made in two pieces or in any suitable manner, so that it can be assembled with its bushing.

I have shown a preferred embodiment of my invention, but it is clear that numerous changes and omissions could be made without departing from its spirit.

I claim:

1. In combination, a boiler, a hot water heater in communication with the water space of said boiler, a heat-absorbing coil located in said heater, a hot water reservoir connected to said heat-absorbing coil, said water reservoir having a water inlet pipe and a water outlet pipe connected thereto, a pipe connected to said reservoir and communicating with said heater, and a float controlled valve adapted to control the flow of water through said pipe into the heater.

2. In combination, a boiler, a hot water heater connected to the water space of the boiler, said heater having a heat-absorbing coil located therein, the ends of said heat-absorbing coil being connected to a hot water reservoir, said reservoir having a water inlet pipe and a water outlet pipe connected thereto, a control pipe located within the heater and having one end freely communicating with said heater, and having the other end connected to the upper end of said coil, and a

float controlled valve adapted to control the flow of water in said control pipe.

3. In combination, a boiler, a hot water heater in communication with the water space of the boiler and having an inlet pipe, a heat-absorbing coil located in said heater, a hot water reservoir connected to the ends of said heat-absorbing coil, said reservoir having a water inlet pipe and a water outlet pipe connected thereto, and control means located within said heater and adapted to automatically control the flow of water through the inlet pipe connected to said heater, said heater and said boiler being in free communication so that the water level in each of them is substantially the same.

4. In combination, a boiler, a hot water heater connected to the water space of the boiler, a heat-absorbing coil located in said heater, a hot water reservoir connected to the ends of said heat-absorbing coil, said hot water reservoir having a water inlet pipe and a water outlet pipe connected thereto, the top of said hot water reservoir being above and being connected to the top of said heat-absorbing coil, a control pipe connected to the upper part of said heat-absorbing coil, said control pipe communicating with said hot water heater, the highest point of said control pipe being below the highest point of said hot water reservoir, and a float controlled valve adapted to control the flow of water in said control pipe into the heater.

5. In combination, a hot water reservoir, a heat-absorbing coil having pipes at its ends which communicate with said hot water reservoir, a heater in which said heat-absorbing coil is located, said heater being adapted to hold a body of water therein which surrounds said heat-absorbing coil, so that when said body of water is heated, it can impart the heat thereof to said heat-absorbing coil, one of the pipes which connect said heat-absorbing coil to said reservoir having an outlet to said heater, and a valve control for said outlet operable by a float located in said heater.

6. In combination, a boiler, a heater having means communicating with the water and steam space of said boiler, said heater being arranged at such a level relative to the boiler as to contain a body of water therein, a heat-absorbing coil located within said heater, a hot water reservoir connected to the ends of said heat-absorbing coil, and an automatic water feed connected to said heater and operable by the change in level of the body of water therein.

7. In combination, a boiler, a heater having means communicating with the water and steam space of said boiler, said heater being arranged at such a level relative to the boiler as to contain a body of water therein, a heat-absorbing coil located within said heater, a hot water reservoir connected to

the ends of said heat-absorbing coil, and an automatic water feed connected to said heater and operable by the change in level of the body of water therein, said automatic water feed being connected to said reservoir so as to introduce additional liquid into said heater from said reservoir, said reservoir having an inlet pipe and an outlet pipe connected thereto.

8. In a feed water system, the combination with a boiler, of an intermediate member including a heating chamber in communication with said boiler, a coil positioned within said member, and means including a bypass for passing water through said coil for treatment by heat in said heating chamber, and for delivering a portion of said water simultaneously through said heating chamber for transmission to said boiler.

9. In combination with a boiler, a heater connected to said boiler so that said heater receives heating fluid from said boiler, means arranged to pass water through said heater, and a float located in said heater and arranged to control the supply of feed water for said boiler into said heater from said means, so that said boiler receives its feed water from said heater.

In testimony whereof I affix my signature.

MORRIS SEIDEL.