Aug. 20, 1935. S. C. HULETT 2,011,637

BOILER FEED AUTOMATIC CONTROL

Filed April 25, 1932

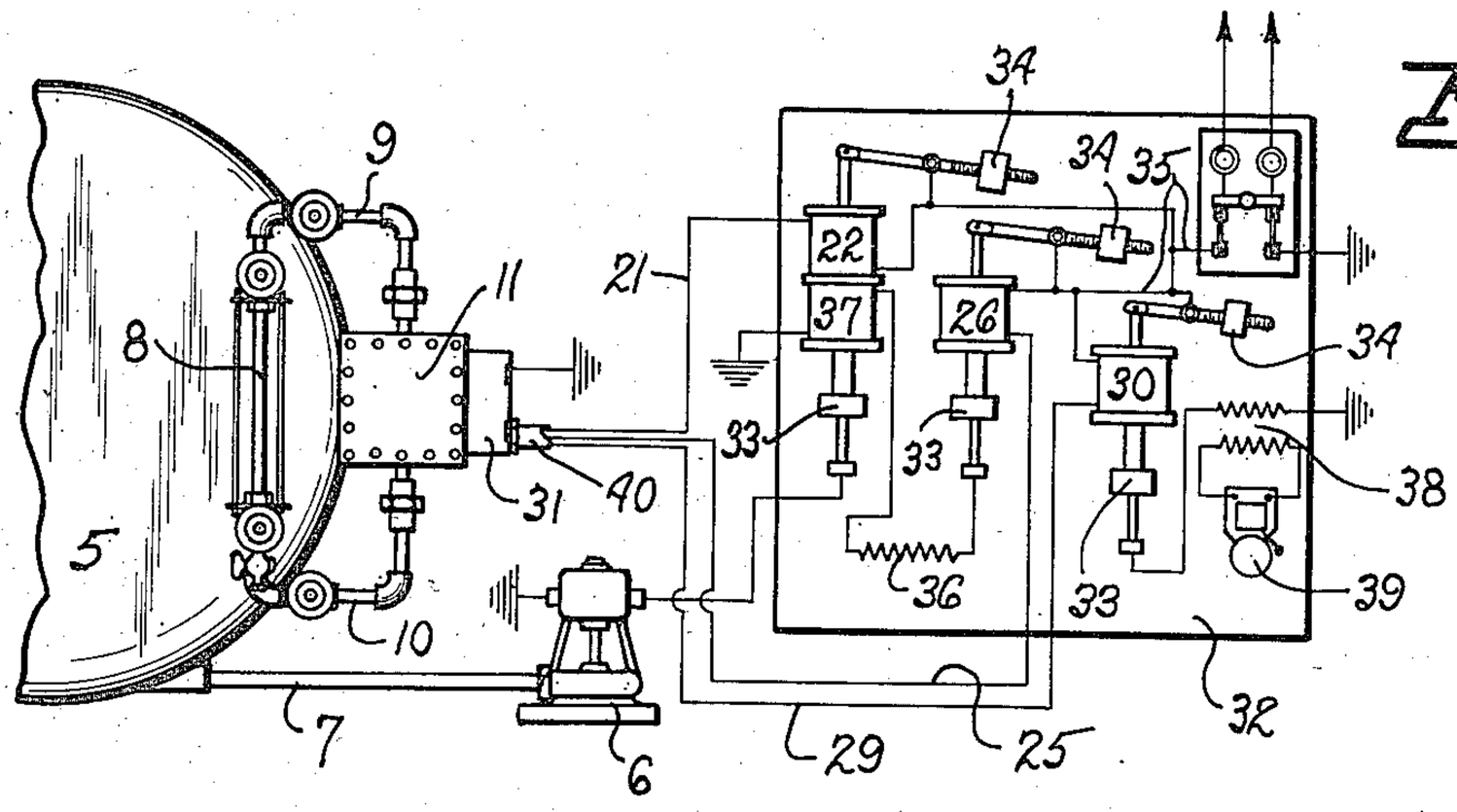

Fig. 1

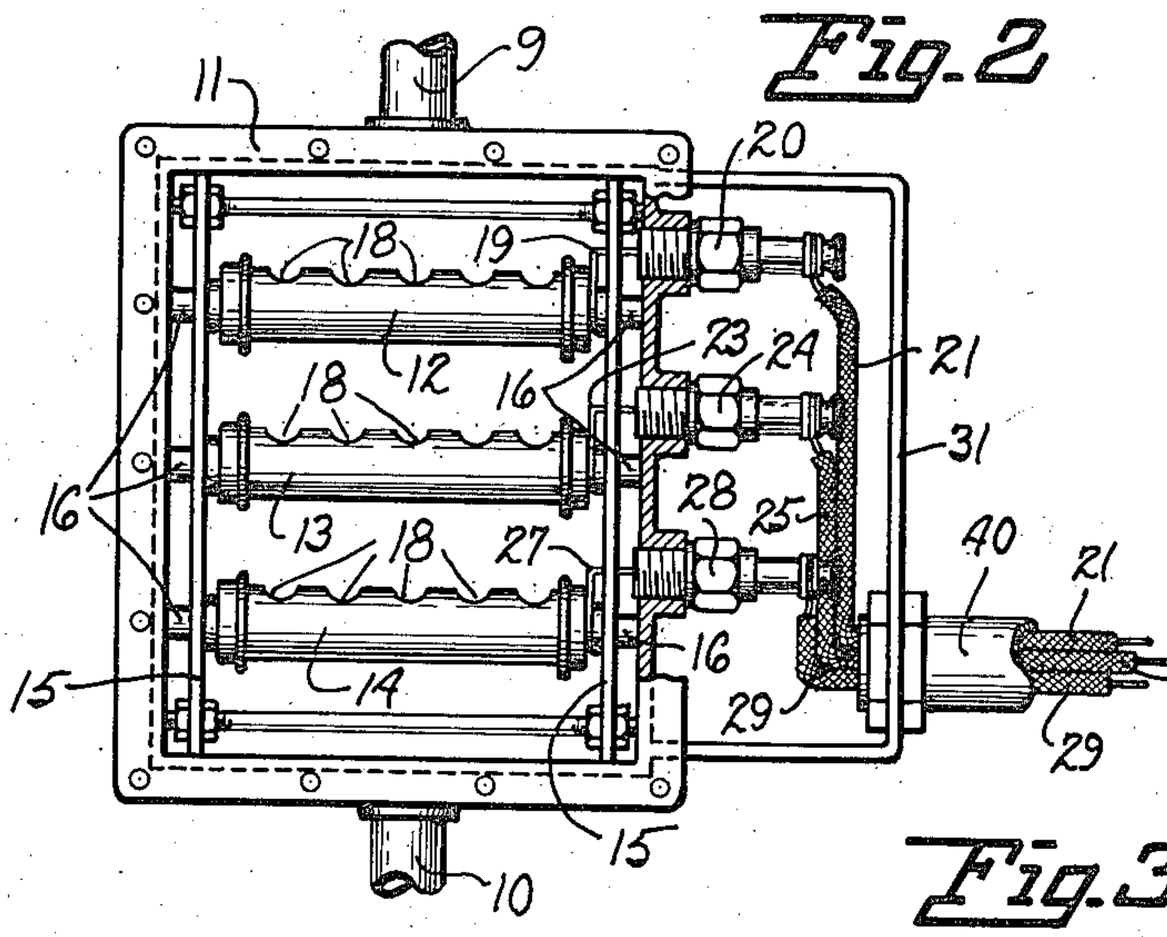

Fig. 2

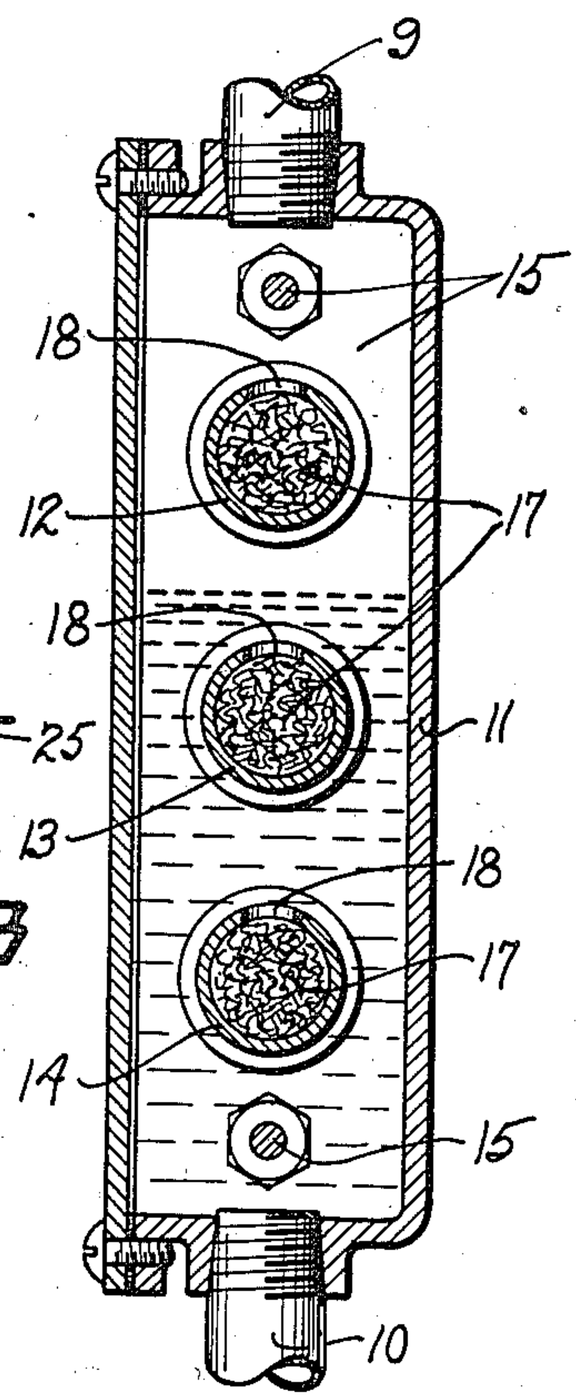

Fig. 3

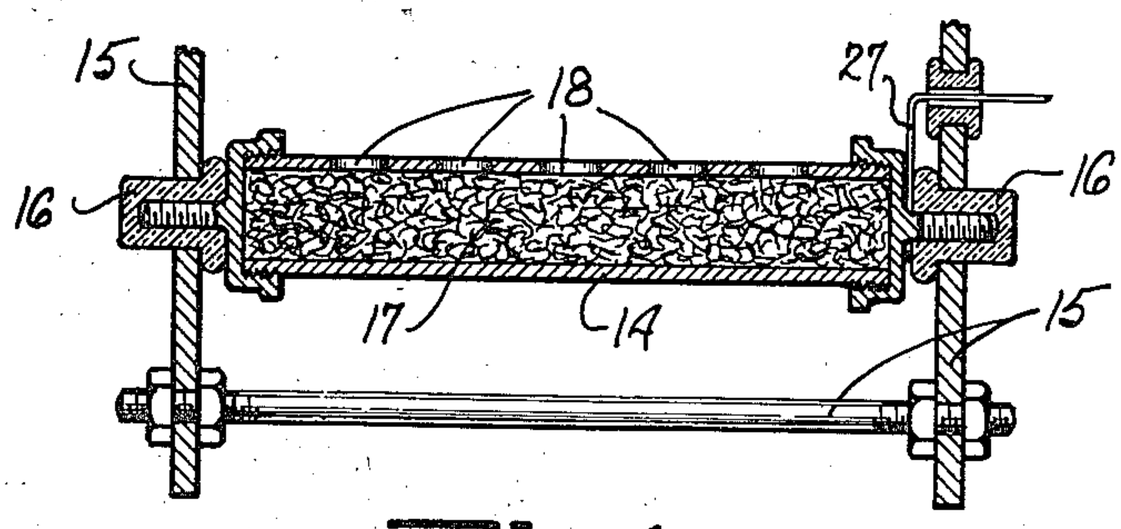

Fig. 4

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BOILER FEED AUTOMATIC CONTROL

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Application April 25, 1932, Serial No. 607,276

2 Claims. (Cl. 200—152)

My present invention relates to boiler feed automatic controls and is an improvement over the device disclosed in my co-pending patent application entitled "Automatic boiler feed controls", Serial Number 585,941 and filed January 11, 1932. The primary objects of my present invention are to improve and simplify the device embodied in my prior application by eliminating the pivotally mounted float and associated elements and substituting therefor a plurality of stationary contact tubes, preferably filled with iron clippings, and whereby the water is used as a direct agent in carrying the current through the device at different levels to cause its functioning in automatically maintaining water supply within a boiler.

The above and other objects are accomplished by the devices shown in the accompanying drawing; wherein: Figure 1 is a general view in elevation showing a portion of a boiler with my device installed thereon and also showing a wiring diagram; Fig. 2 is a view in elevation of the control casing with its cover removed and showing certain parts broken away; Fig. 3 is an enlarged view in transverse vertical section through Fig. 2; and Fig. 4 is an enlarged detail view in vertical section showing the lowermost one of the metal contact tubes and associated parts.

Referring to the drawing, the numeral 5 designates a boiler which is supplied with water by a motored pump 6 through a pipe 7. A water glass 8 is connected to said boiler in the usual manner and upper and lower pipes 9 and 10 respectively connect said water glass with the top and bottom of a control casing 11 which is disposed in parallel relation with the water glass whereby the water level within the boiler is maintained within the glass and casing as will be understood.

The control casing 11 is provided with a plurality of metal contact tubes as designated by the numerals 12, 13, and 14. Said tubes are mounted in horizontal spaced apart relation, one above the other, in a frame 15 within the casing and insulated from the frame by porcelain bushings 16 on the ends of the tubes as most clearly shown in Fig. 4. Said tubes are preferably filled with iron clippings or filings, as shown at 17, and are provided with a plurality of holes 18 so that the water within the casing has ready access to the clippings within the tubes. It may here be remarked that, while the iron clippings are not absolutely essential for the purpose of making contact as hereinafter set forth, they increase the surface area of contact by the water thus ensuring and making a better contact.

Referring to Figs. 1 and 2, the contact tube 12 is connected at 19 to a plug 20 having a wire 21 leading to a solenoid coil 22; the tube 13 is connected at 23 to a plug 24 having a wire 25 leading to a solenoid 26; and the tube 14 is connected at 27 to a plug 28 having a wire 29 leading to a solenoid 30. Said plugs are somewhat similar to a spark plug and are threadedly connected to the casing 11 and are mounted within a sub-casing 31 that is connected to the main casing. The solenoid coils are mounted on a switchboard 32 and are similar to those described in my above-named co-pending patent application so that no description in detail of same is believed necessary herein. The pivoted switches 33 of the solenoids are of the mercury contact type and are normally closed by a counterweight 34 and the passage of current through the coils of said solenoids causes said switches to open thus shutting off the current. As set forth in the aforesaid co-pending application the lower ends of the switches are immersed in mercury when they are closed by electrical energy and the counterweights normally retain said switches raised and out of contact with the mercury.

Referring now to Fig. 3 of the drawing, the normal level of the water within the boiler is coincident with a point between the contact tubes 12 and 13 within the casing 11 and the tubes 13 and 14 are therefore submerged. Said casing being grounded on the boiler, current will flow through the solenoids 26 and 30 from the outside source over the wire 35 and its connections thus holding the mercury switches of said solenoids open. Now should the water level drop below the tube 13 no current will flow through the solenoid 26 and the counterweight will close the switch of said solenoid causing the current to flow through a resistance 36 and to a solenoid 37 which will close its mercury switch, as in my former application, whereby current will flow through the motor of the pump 6 and cause said pump to raise the water level within the boiler.

When the water level within the boiler 5 reaches a height whereby the contact tube 12 is submerged current will flow through the solenoid 22 thus opening its switch and cutting off the current supply to the motor of the pump 6. If for any reason the water level should drop below the contact tube 14 the current to the solenoid 30 will be disrupted and the switch of said solenoid will be closed by its counterweight 34 thus throwing the current through a transformer 38 to a bell 39 and sounding the alarm, or if the boiler is fired by a stoker the current will or may be made to shut off the stoker motor as in my prior patent application.

A metal conductor pipe 40 extends from the sub-casing 31 to the switchboard 32 and houses the three wires 21, 25, and 29.

While the foregoing brief description is made in order to convey a general idea of the application and operation of my present invention, it will be understood that the novelty of this invention resides essentially in the contact tubes and their connections. Said tubes eliminate the necessity of using a pivotally mounted float, as used in my prior patent application, and thus simplify the device by doing away with this movable element.

Having thus described my invention, it being understood that such changes in its construction and arrangement may be resorted to as do not constitute a departure from the scope and spirit of the invention, what I claim and desire to secure by Letters Patent is:

1. In a boiler feed automatic control, a switch mechanism comprising a main metal casing, pipe connections at the top and bottom of the casing, a metal frame mounted within the casing, a plurality of metal contact tubes horizontally and insulatively supported by the frame, a plurality of plugs threadedly connected through a side of the casing in associated relation with the contact tubes, a wire connecting each of said plugs with its associated tube, and a wire connected to and leading from each of said plugs.

2. In a boiler feed automatic control, a switch mechanism comprising a main metal casing, pipe connections at the top and bottom of the casing, a metal frame mounted within the casing, a plurality of metal contact tubes horizontally and insulatively supported by the frame, each of said tubes having a series of holes in its upper surface, a filling of iron filings for each of said tubes, a sub-casing connected to one side of the main casing, a plurality of plugs threadedly connected through the side of the main casing in associated relation with the contact tubes and projecting into the sub-casing, a wire connecting each of said plugs with its associated tube, and a wire leading from each of said plugs exteriorly of the sub-casing.

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