J. M. WIGHT.

ELECTRICAL RECORDING OR INDICATING APPARATUS FOR BOILERS.

APPLICATION FILED MAR. 9, 1917.

1,373,474.

Patented Apr. 5, 1921.

2 SHEETS—SHEET 1.

Fig. 1.

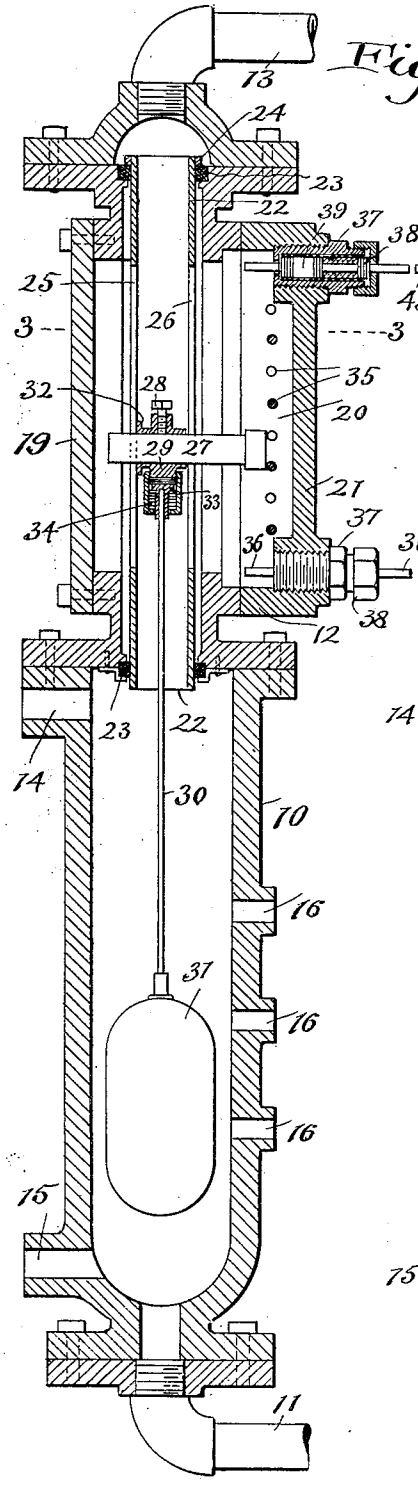


Fig. 2.

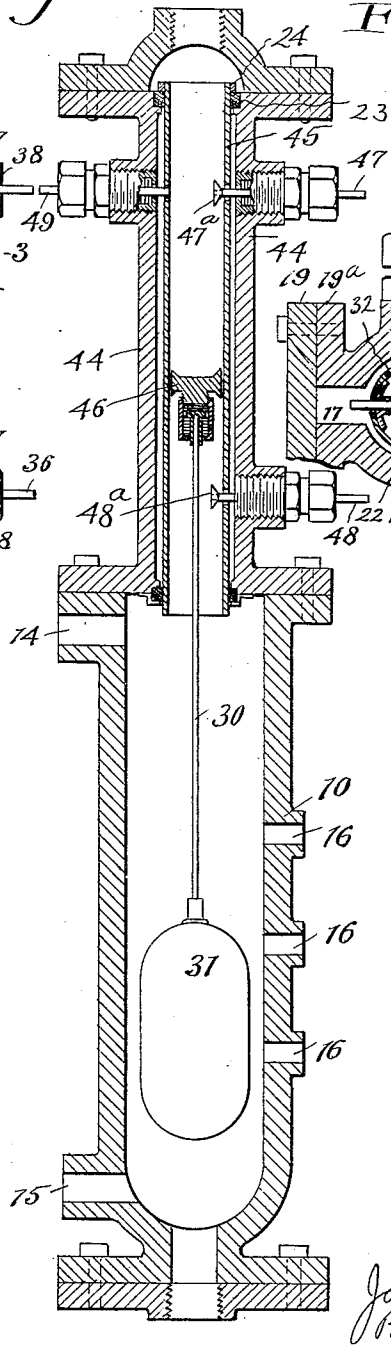
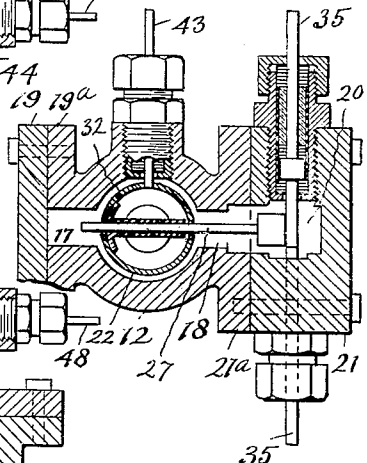


Fig. 3.



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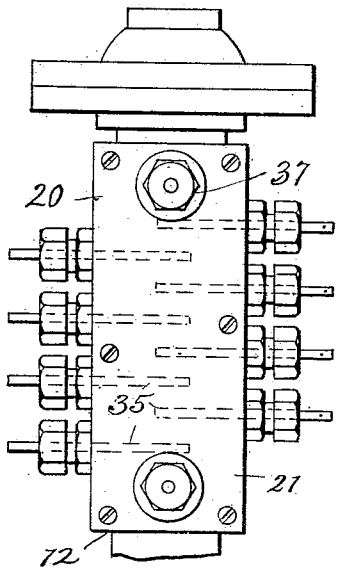


Fig. 4.

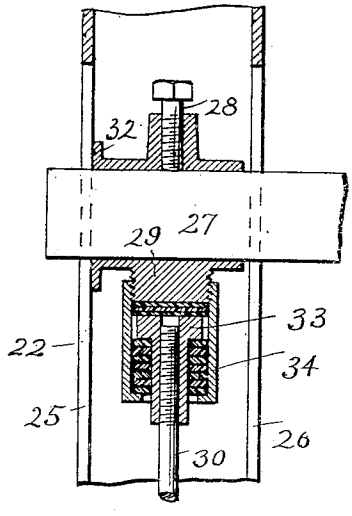


Fig. 5.

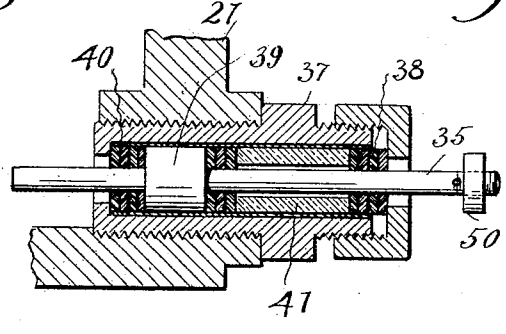


Fig. 6.

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UNITED STATES PATENT OFFICE.

JAMES M. WIGHT, OF LAKEWOOD, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE UNITED BANKING & SAVINGS COMPANY, TRUSTEE, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

ELECTRICAL RECORDING OR INDICATING APPARATUS FOR BOILERS.

1,373,474. Specification of Letters Patent. Patented Apr. 5, 1921.

Application filed March 9, 1917. Serial No. 153,610.

To all whom it may concern:

Be it known that I, JAMES M. WIGHT, a citizen of the United States, residing at Lakewood, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Electrical Recording or Indicating Apparatus for Boilers, of which the following is a full, clear, and exact description.

This invention relates to electrical recording, indicating and alarm mechanisms for boilers, designed especially for use in the recording of the water level of a boiler and for giving a visible and audible indication or alarm when certain high and low levels are reached. In certain aspects this invention is an improvement over the subject matter of my prior Patent No. 1,179,486, granted to me on the 18th day of April, 1916, for water level recorder.

The principal object of this invention is to provide in connection with a float chamber of such recording and alarm mechanism, contact mechanism which eliminates the necessity for grounding one side of the source of current, or for grounding any part of the column itself.

The invention in one of its aspects includes the provision of a tube of good conducting material located in, but wholly insulated from the float chamber or the extension thereof which incloses the contacts, this tube receiving a movable sliding contact which is actuated by the float, and which is designed to engage insulated contacts which are connected to the magnets of the recorder proper, or to an alarm or signaling device such as a lamp, bell, or both. Either the movable contact or the insulated contacts which are engaged by the latter, extend through the wall of the tube so that the proper electrical contacts and connections are made as the float rises and falls. In either event the construction is such that when the movable contact engages one of the insulated contacts, the connection or circuit is from the insulated contact so engaged, to the movable contact, then to the insulated tube and conductor which is connected to the the tube, and to the source of current, such as a battery, lighting circuit, or other source.

The invention may be further briefly summarized as consisting in certain novel details of construction and combinations and arrangements of parts which will be described in the specification and set forth in the appended claims.

In the accompanying sheets of drawings wherein I have shown two forms of my invention, Figure 1 is a vertical sectional view through the column or float chamber showing the contact mechanism embodying my invention and the parts inclosing and supporting the same; Fig. 2 is a similar view showing a modification; Fig. 3 is a transverse sectional view substantially along the line 3—3 of Fig. 1; Fig. 4 is a side view looking toward the right of Fig. 1, showing the upper part of the structure only; Fig. 5 is a detail sectional view on an enlarged scale showing the sliding contact and the manner in which it is connected to the float rod; and Fig. 6 is a sectional view on an enlarged scale, showing one of the stationary contacts and the manner in which it is supported and insulated from the surrounding metal parts.

In the drawings, 10 represents a float chamber, which at the bottom is designed to be connected by a pipe 11 to the water side of a boiler. The chamber 10 has at its top an extension 12, which at the top is designed to be connected by a pipe 13 to the steam side of a boiler so that the water will at all times stand in the chamber 10 to the level of the water in the boiler. The chamber 10 has suitable openings 14 and 15, to which an ordinary gage glass may be connected, and it has other openings 16, to which trycocks may be connected. The float chamber extension 12, as will be observed from the cross sectional view of Fig. 1, includes an upright cylindrical middle portion from which extend outwardly, diametrically opposite slots 17 and 18, the former being closed by a plate 19 which engages flanges 19^a, and the latter, that is the slot 18, leading or extending into an upright contact chamber 20 in which contact is designed to be made between certain stationary insulated contacts and the movable contact which is actuated by the float. This contact chamber is formed by a slotted plate 21 secured to flanges 21^a, similar to, but oppositely disposed with reference to the flanges 19^a.

Seated in the cylindrical central portion of the float chamber extension 12 is a tube

22 of brass or other good conducting material which is carefully insulated from the inclosing member or extension 12. In this case the tube is centered and insulated from the extension 12, by two rings of insulating material 23 which are preferably of glass, and the tube is held at the desired position in the member 12 by a nut 24, screwed onto the upper end of the tube and resting against the upper glass ring 23. This tube has diametrically opposite vertical slots 25 and 26, through which extends a transverse vertically movable or sliding contact member 27 which is secured by a set screw 28 to a head 29 at the upper end of a rod 30, extending vertically upward from a float 31 in the float chamber 10. The movable contact 27 is not insulated from the head 29, but the latter, which is electrically connected to the tube 22 by reason of the fact that it has flange-like extensions 32, which slide up and down along the inner surface of the tube 22, is carefully insulated from the rod 30 which supports it. For the purpose of insulating the head 29 from the rod 30, and at the same time to provide a good mechanical connection, the upper end of the rod is provided with a T-head 33 which is received in a cap 34, screwed on to a boss on the lower end of the head 29, the head 33 being spaced from this cap 34 and being separated from the boss on the lower end of the head 29 by insulating material preferably in the form of disks of mica which will withstand, without disintegration, the high degree of heat encountered in the tube 22.

The movable contact 27 has its rear end extending out through the slot 25, and has its forward portion extending through the slot 26 of the tube 22, the extreme forward end of this contact being enlarged to form a contact face or head which engages several insulated contacts in the contact chamber 20. These contacts include a series of contacts 35, (see particularly Figs. 3 and 4) which in this case extend laterally inward from opposite sides of the plate 21, these contacts preferably extending inwardly alternately from one side and then the other, and being arranged so that the forward face of the enlarged end of the movable contact 27 will slide over and thus make electrical connection with the inner portions of these contacts. These contacts 35, eight of which are here shown, are designed to be connected to the magnets of a recorder, substantially as shown in my prior patent.

Additionally, high and low water alarm ontacts 36 are provided at the upper and lower ends of the contact chamber 21, these contacts preferably extending in from the front wall of the contact chamber 21, and being arranged so that the enlarged end of the movable contact 27 will abut against them when it reaches respectively its uppermost permissible movement and its lowermost permissible movement.

Each of these contacts 35 and 36 (see Fig. 6) is carefully insulated from the walls of the contact chamber 21, and in this case each extends through a bushing 37, threaded into the wall of the contact chamber and is clamped in position by a cap 38, the contact member 35 or 36 (designated 35 in Fig. 6) being insulated from all metal parts by mica and glass which are clamped between the inner end of the bushing 37 and the cap 38. In this case, each contact 35 or 36 has between its ends, within the bushing, a shoulder 39 between which and the inner end of the bushing are disks 40 of mica, the shoulder 39 being separated from the cap 38 by similar disks of mica and a glass tube 41 which surrounds a portion of the contact, the inner surface of the bushing being lined with mica so that the contact member is very effectively held in position and so insulated from the metal parts surrounding or holding it that there is no likelihood of a ground taking place.

As before stated, the tube 22 is connected to one side of the source of current. The connection is made with the tube by means of a contact 43 which is preferably mounted and insulated precisely as are the contacts 35 and 36, the inner end of this contact 43 being in engagement with the end of the tube, and the outer end being adapted to have an electric conductor attached thereto. Preferably the inner end of the contact or conductor 43 is received in an opening formed in the tube, but does not extend beyond the inner surface of the tube as shown in Fig. 3. The advantage of extending the inner end of the contact or conductor 43 into the wall of the tube is that not only is a good electrical connection obtained between the contact and tube, but the contact 43 anchors the tube against turning movement in the float chamber extension 12.

With this construction the circuit is completed through the sliding contact and the stationary contacts which the former engages without grounding one side of the circuit or grounding any part of the float chamber including the chamber extension 12.

In Fig. 2 I have shown a construction which is adapted for high and low water recording or indicating only. In this case the float chamber proper is precisely like that of the construction first described, and there is mounted on this chamber an extension constituting a contact chamber 44 which is simpler than the float chamber extension or contact chamber 12 of Fig. 1. The member 44 is simply a column or cylinder which is flanged at both ends, the lower flange being secured to a corresponding flange on the upper end of the float

chamber, and the upper flange being secured to a flanged cap similar to that shown in Fig. 1, and to which the steam pipe 13 will be connected. The column or cylinder 44 receives a tube 45 of brass or other good conducting material which is mounted precisely as the tube 22 of Fig. 1, and which is insulated from the metal walls surrounding it. In this case the tube 45 is not slotted as is the tube 22, but it receives a disk-like float actuated contact 46 which is connected to the float rod 30 and engages the inner wall of the tube as the contact is raised or lowered by the float 31. Instead of the movable contact 46 extending through the wall of the tube, the stationary contacts extend inwardly through the wall of the tube into the interior thereof, so that they may be engaged by the movable contact 46. In this instance I employ only two stationary contacts 47 and 48, the former being the high level contact, and the latter the low level contact. These contacts 47 and 48 are supported and insulated precisely as are the contacts 35, 36 and 43 of the first described construction, but their inner ends project through openings in the tube so that when the movable or sliding contact 46 reaches its upper limit of movement it will engage the high level contact 47, and when it reaches its low limit of movement it engages the low level contact 48. Preferably the contact disk 46 is beveled or tapered at its periphery on both its upper and lower surfaces, and preferably the inner ends of the contacts 47 and 48 have beveled portions which may be formed by screwing beveled nuts 47^a and 48^a on the inner ends of the contacts, and which are adapted to receive the beveled peripheral portions of the sliding contact so that when the contact disk 46 engages either contact 47 or 48, it will be pulled firmly against the tube 45. This does away with the necessity of having a close sliding fit between the tube and the contact 46.

Electrical connection is made from the outside of the column 44 to the tube by means of a contact or conductor 49, which is supported and mounted precisely as are the other stationary contacts including the contact or conductor 43 of the first described construction, this contact being here shown as having its inner end entering an opening in the tube so that it will not only make good electrical connection with the tube, but will prevent the tube turning in the column 44.

It will be understood that in use, the contacts 47 and 48 will be connected to one side of a source of current, and to the high and low level recording or signaling device or devices which may consist of magnets, or of lamps or bells, or both, and that the other side of the source of current will be connected to the conductor or contact 49 leading to the tube 45. It will be understood also that when the float actuated sliding contact engages either of the stationary contacts 47 or 48, the circuits will be completed through such contact to the sliding contact 46, then to the tube, and then to the contact or conductor 49. The conductors leading to and from this apparatus may be connected to the contacts 35, 36, 43, 47, 48 and 49 in any desired manner such as by extending the conductor through an opening in the contact and screwing a nut 50 down on the wire (see Fig. 6).

With both of the described constructions there is avoided the necessity of grounding the circuit or of connecting it to the outer inclosing walls of the float chamber including the extensions 12 and 44. At the same time, the desired electrical connections are obtained effectively, without danger of grounding or short circuiting, so that an electrical recorder, such for example, as shown in my prior patent and high and low level indicating or alarm devices will be actuated through the engagement of the float actuated contact with the stationary contacts.

The two constructions described, wherein the float actuated contact in one instance extends through the wall of the tube, and wherein the stationary contacts in the other instance extend through the wall of the tube, are illustrative of the fact that my invention in its broad aspects may be modified considerably. Not only may my invention be embodied in either of the forms here shown, but the form or embodiment thereof may be changed in other respects such as in the details of construction, including the arrangement and manner of supporting and insulating the several contact members. I therefore aim in my claims to cover all changes and modifications which do not involve a departure from the spirit and scope of my invention.

Having thus described my invention, what I claim is:

1. In a water level recording or indicating apparatus for boilers, a float chamber including a portion adapted to receive contacts, a conducting tube on the interior of, and extending lengthwise of said portion of the chamber and insulated therefrom, a float, a movable contact adapted to engage and to be moved lengthwise of said insulated conducting tube, a set of stationary contacts adapted to be successively engaged by said movable contact and normally insulated from the tube, and means for making electrical connection with said tube.

2. In a water level recording or indicating apparatus for boilers, a float chamber including a portion adapted to receive contacts, a conducting member on the interior of, and extending lengthwise of said portion of the chamber and insulated there-

from, a float, a movable contact adapted to engage and to be moved lengthwise of said insulated conducting member, a stationary contact adapted to be engaged by said movable contact, one of said contacts extending through an opening in said insulated conducting member, and means for making an electrical connection with said member.

3. In a water level recording or indicating apparatus for boilers, a float chamber including a portion adapted to receive contacts, a conducting tube on the interior of, and extending lengthwise of said portion of the chamber and insulated therefrom, a movable contact adapted to be engaged and to be moved lengthwise of said insulated conducting tube, a stationary contact adapted to be engaged by said movable contact, one of said contacts extending through the wall of the tube, and means for making an electrical connection with said tube.

In testimony whereof, I hereunto affix my signature.

JAMES M. WIGHT.