

Aug. 30, 1932.

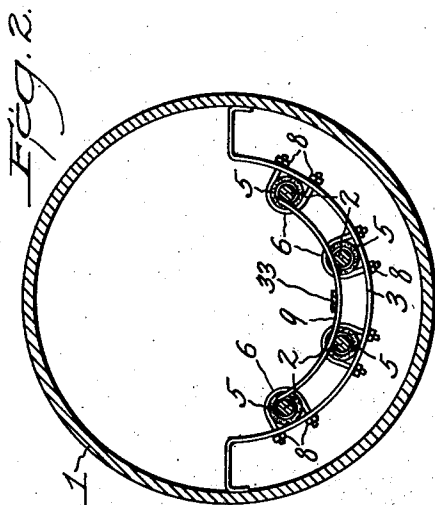
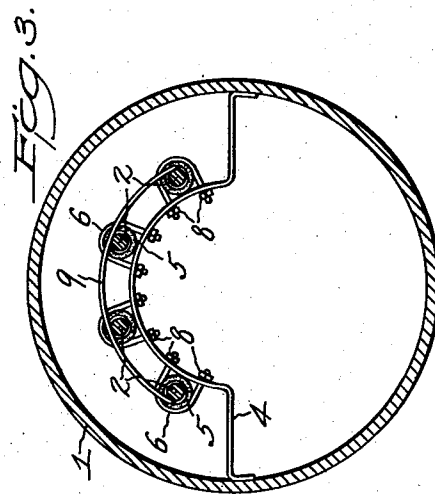
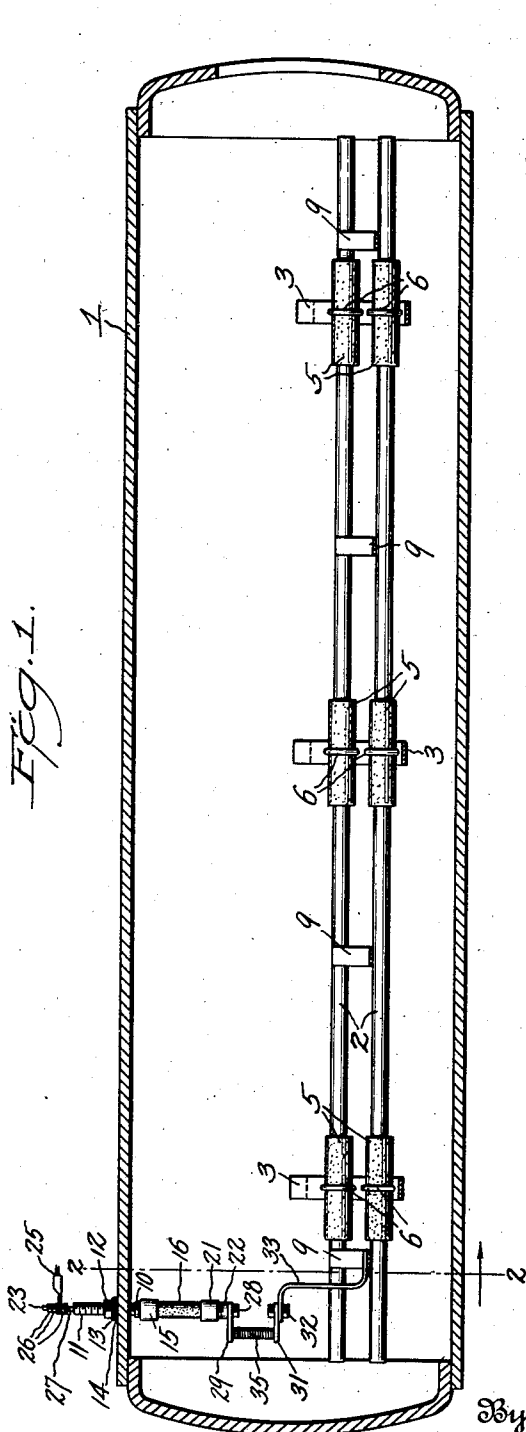
A. KIRKALDY

1,874,759

ELECTROLYTIC MEANS FOR THE PROTECTION OF BOILERS

Filed May 3, 1930

2 Sheets-Sheet 1



Inventor
ALEXANDER KIRKALDY

By his Attorney
Frederick W. Baker

Aug. 30, 1932.

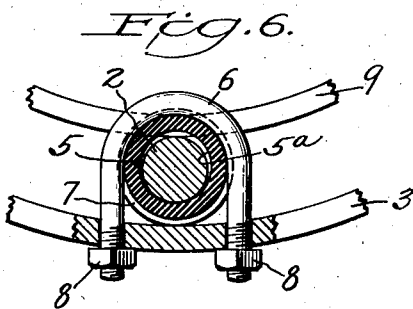
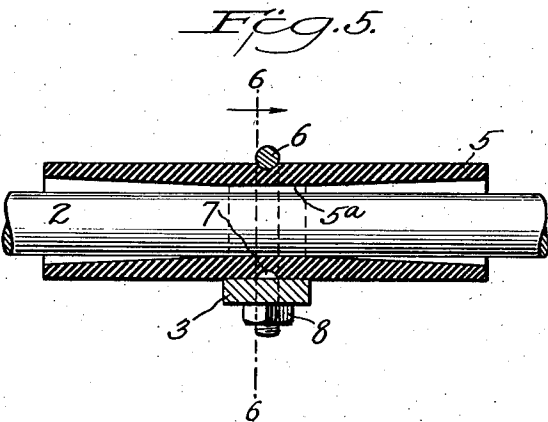
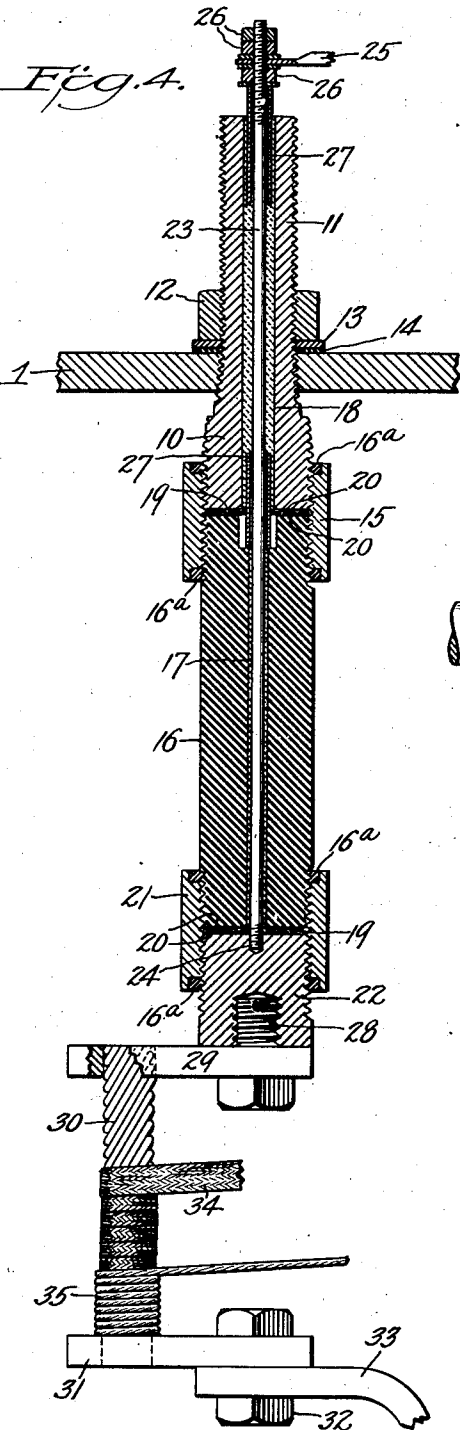
A. KIRKALDY

1,874,759

ELECTROLYTIC MEANS FOR THE PROTECTION OF BOILERS

Filed May 3, 1930

2 Sheets-Sheet 2



Inventor
ALEXANDER KIRKALDY

By his Attorney
Frederick W. Parker

UNITED STATES PATENT OFFICE

ALEXANDER KIRKALDY, OF YORKTOWN HEIGHTS, NEW YORK, ASSIGNOR TO ELECTRO ANTI-CORROSION CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

ELECTROLYTIC MEANS FOR THE PROTECTION OF BOILERS

Application filed May 3, 1930. Serial No. 449,393.

This invention relates to electrical means for the protection of boilers, and my improvements are directed to the use of anode rods disposed and supported longitudinally within a boiler, together with an electrode that is introduced through the boiler shell to communicate electrical current to said rods.

One of the objects of my invention is to provide non-conductive supports for the anode rods of such character that said rods may be free to expand and contract thereon, and a further object is to provide flexible connecting, electrically conductive means between the current communicating element of the electrode and the anode bars, to the end that said connecting means may yield in accommodation with the expansion and contraction of said rods under temperature changes.

Still further my invention comprises a novel form of electrode with its contained and insulated current conveying element, whose construction is simple, and which is highly efficient and durable.

Other features and advantages of my invention will hereinafter appear:

In the drawings:

Figure 1 is a side sectional view of a boiler, in which is contained a group of metallic rods, to serve as anodes, supports therefor, an electrode extended through the boiler shell, and flexible connecting means between the electrode and anodes.

Fig. 2 is a section on the line 2—2 of Fig. 1.

Fig. 3 is a similar sectional view wherein the anode rods are disposed in the upper part of the boiler.

Fig. 4 is a vertical section of the electrode employed for communicating current to the anodes.

Fig. 5 is an enlarged sectional view of one of the insulating sleeves forming part of the anode supporting means, and

Fig. 6 is a section on the line 6—6 of Fig. 5. In said figures let 1 indicate a boiler shell and 2 each of a group of metallic rods which serve as anodes. These rods are disposed longitudinally, in spaced parallelism, and in Figs. 1 and 2 they are shown as arranged

in the lower portion of the shell, while in Fig. 3 they are shown as arranged in the upper portion of the shell.

Suitable hangers, which may be in the form of straps, secured to opposite sides of the shell, serve to support the rods 2. In Figs. 1 and 2 these hangers are indicated by the reference character 3, and in Fig. 3 by the reference character 4. Since the securing means for the anode rods shown in Figs. 2 and 3 are alike, they will bear the same reference characters.

Relatively short length tubes of insulating material 5 are placed loosely around each of the rods 2, and U-shaped bolts 6 that fit over tubes 5, seating in grooves 7 therein, bind said sleeves to straps 3 and 4, respectively, the ends of bolts 6 being threaded and extended through holes in said straps, where they are engaged by securing nuts 8.

The rods 2 are united by metallic straps 9, suitably secured to said rods, which maintain them in their predetermined, spaced, parallel relation.

The rods 2, as stated, lie loosely in the tubes 5, whose internal diameter exceeds the diameter of said rods, so that the latter may be free to expand and contract without affecting said tubes. Also the interior diameter of tubes 5 tapers inwardly from their opposite ends toward the centre, where a cylindrical seat 5a is formed in the vertical plane of engagement by strap 3 and the U-bolts 6. Thereby a minimum degree of frictional contact occurs between the tubes and rods and in consequence the opposition to elongation and contraction of the rods becomes negligible.

The electrode employed for communicating electrical current to the anode rods aforesaid includes a tubular member which is generally of two different outside dimensions, its larger portion being indicated at 10 and its smaller portion at 11. The portion 11 is tapered and threaded to screw into a threaded orifice in the boiler shell, said portion 11 extending outside said shell, where it is provided with a nut 12, which, with an interposed washer 13, and jointing material 14, firmly secures this tubular member in place.

The larger portion 10 of the tubular mem-

55

60

65

70

75

80

85

90

95

100

ber is threaded and thereby is screwed into a tubular coupling 15, which latter has previously been screwed upon an insulating distance member 16, which is provided with a lengthwise bore 17 that is coaxial with the bore 18 through tubular member 10—11.

The opposed ends of portion 10 and member 16 are flat and separated by a corrugated gasket 19 which is faced on both sides with cementitious material 20.

The opposite end of distance member 16 is threaded into a metallic coupling 21, and a metallic plug 22 is also screwed into said coupling, the opposed faces of member 16 and plug 22 having an interposed gasket 19 with jointing material 20.

A current conveying rod 23, which lies within the bores 17 and 18 has a projecting end 24 that is screwed into the plug 22, its other end being extended beyond portion 11 of the tubular member, where it engages an electrical connection 25, being secured thereto as by nuts 26, electrical current of positive sign being applied to the rod 23 by means of connection 25.

The bore 18 is of greater diameter than bore 17 and it contains porcelain tubes 27 that serve to centre the rod 23, said tubes 27 respectively projecting beyond the opposite ends of bore 18, as a further precaution against leakage of current.

Connected to the plug 22, as by a bolt 28, is a metallic bar 29, and secured to bar 29 is one end of a coiled iron cable 30 that projects therefrom, the other end of said iron cable being connected to an anode bar 31, to which there is secured, as by bolt 32, a bracket 33 which engages one of the straps 9.

Hence current is supplied to the anode rods 2 by way of the rod 23, plug 22, bar 29, cable 30, anode bar 31 and bracket 33.

The space between the rod 23 and the bores 17, 18 is filled in with cementitious insulating material, and the ends of couplings 15, 21 are recessed to receive jointing material 16a.

The cable 30 is employed as the conductive connection between the electrode and bracket 33 because of its flexible nature, whereby longitudinal movement of the anode rods 2, in expanding and contracting will cause said cable to flex and thus avoid any liability of rupturing the associated elements.

To prevent leakage of current from the cable 30 it is insulated as by being wrapped with suitable tape 34, then the tape is wound with a covering 35 of twine, and finally the twine is coated with a suitable insulating material.

The current conveying rod 23 may, if desired, be coated with insulation material throughout its length.

Variations within the spirit and scope of my invention are equally comprehended by the foregoing disclosure:

I claim:

1. The combination with a receptacle of an anode rod extending lengthwise therein, hangers secured within said receptacle, and insulating tube carried by said hangers and slidably supporting said anode rod, a connector projecting into said receptacle, and means for communicating electrical current from said connector to said anode.

2. The combination with a receptacle of a group of anode rods extending lengthwise therein; hangers secured within said receptacle, insulating tubes carried by said hangers and slidably supporting said anode rods, conductive means which connect said anode rods and hold them in spaced parallelism, a connector projecting into said receptacle, and means for communicating electrical current from said connector to said anode.

3. The combination with a receptacle of an anode extending lengthwise therein, fixed insulating means which loosely support said anode, a connector projecting into said receptacle, a coiled metallic cable, constituting yieldable conductive means connecting said connector and anode, and adapted to yield with the expansion and contraction of the anode, and means for communicating electrical current from said connector, by way of said yieldable means, to said anode.

4. The combination with a receptacle of an anode therein which is loosely supported in manner to freely expand and contract, of a connector projecting into said receptacle, said connector comprising an insulated current conveying rod, a metallic fitting upon said connector, a coiled metallic cable extending from said fitting, insulating material surrounding said cable, and rigid metallic connecting means between said cable and anode, said cable being adapted to yield with the expansion and contraction of said anode.

New York, N. Y., May 2, 1930.

ALEXANDER KIRKALDY.