May 10, 1949. E. M. BUTLER 2,469,545

SELF-ENERGIZING ELECTROLYTIC WATER CORRECTION DEVICE

Filed Sept. 24, 1945 2 Sheets-Sheet 1

Fig. 1.

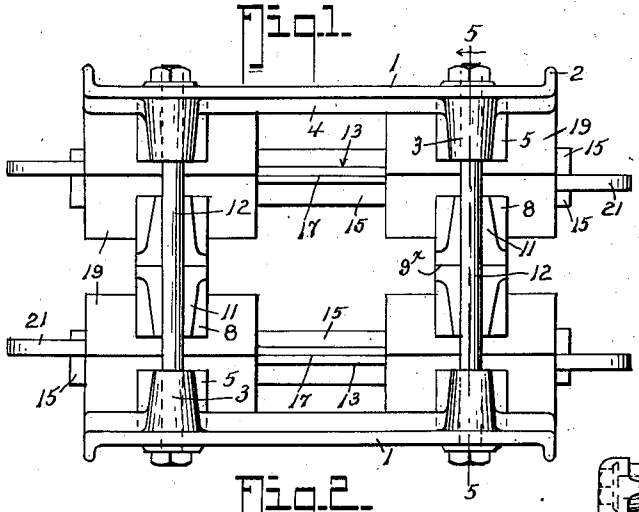


Fig. 2.

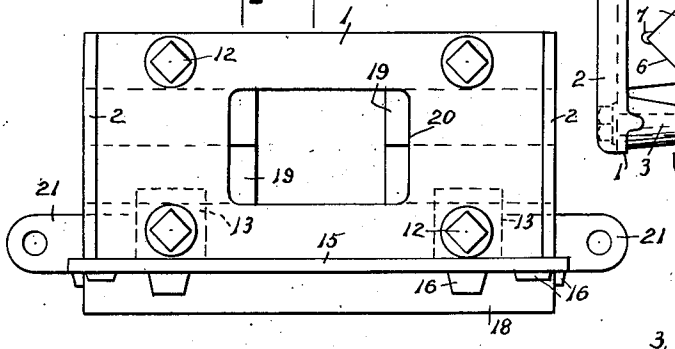


Fig. 4.

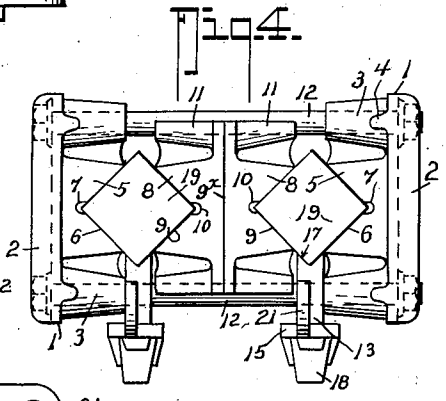


Fig. 5.

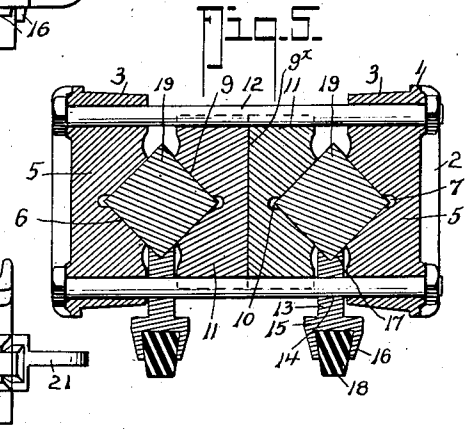
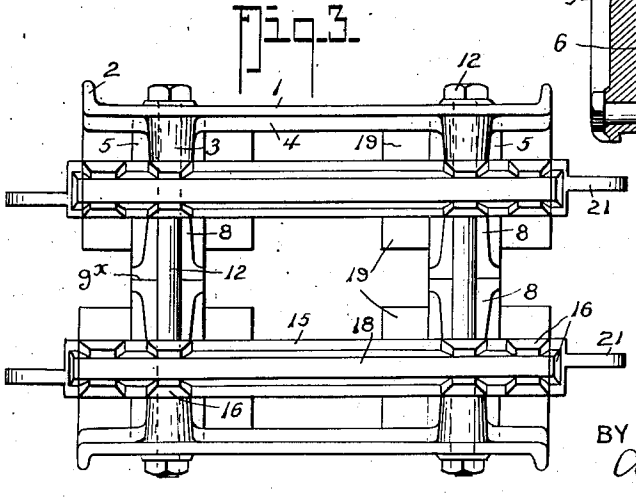


Fig. 3.



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Fig. 6.

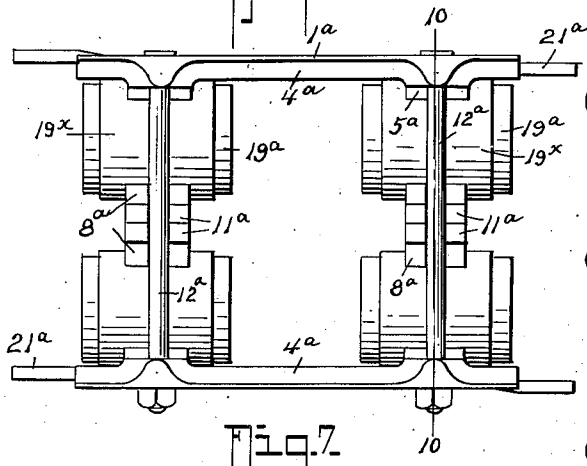


Fig. 9.

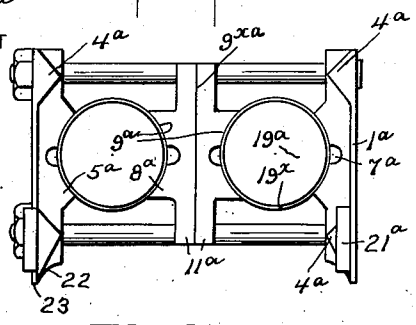


Fig. 10.

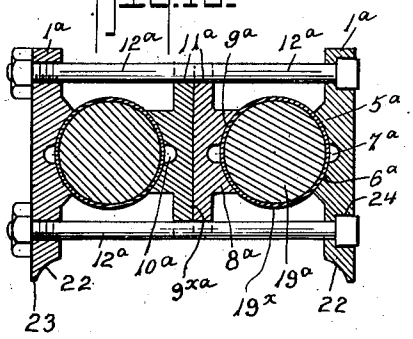


Fig. 7.

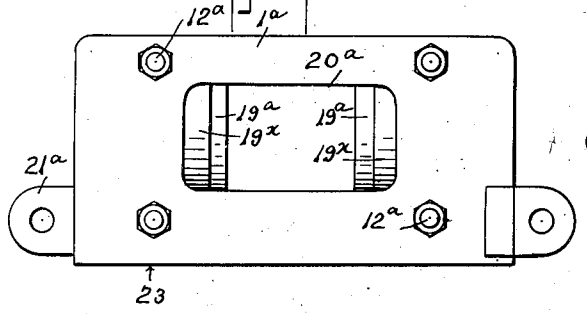


Fig. 8.

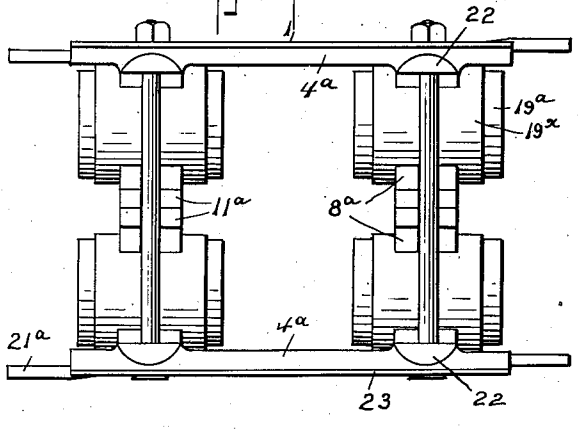
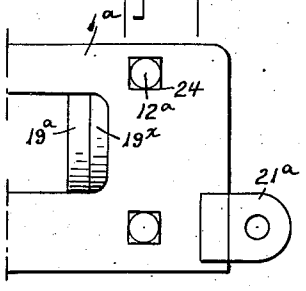


Fig. 11.



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Patented May 10, 1949

2,469,545

UNITED STATES PATENT OFFICE

2,469,545

SELF-ENERGIZING ELECTROLYTIC WATER CORRECTION DEVICE

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Application September 24, 1945, Serial No. 618,114

3 Claims. (Cl. 204—248)

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My invention relates to water correction devices of the self-energizing kind and it particularly has for its objects to provide such a device as will be inexpensive to manufacture, the parts of which may be easily assembled and disassembled for replacements of negative elements; to provide a device whose negative-element-supporting structure may be used to support negative elements of different lengths, diameters and cross-sectional shapes in an efficient manner.

Other objects will in part be obvious and in part be pointed out hereinafter.

To the attainment of the aforesaid objects and ends the invention further resides in those novel details of construction and arrangement of parts all of which will be first fully described and then be specifically pointed out in the appended claims, reference being had to the accompanying drawings in which:

Fig. 1 is a top plan view of one embodiment of the invention.

Fig. 2 is a side elevation of the same.

Fig. 3 is a bottom plan view of the same.

Fig. 4 is an end view of the same.

Fig. 5 is a cross section on the line 5—5 of Fig. 1.

Fig. 6 is a top plan view of another embodiment of my invention.

Fig. 7 is a side elevation of the same.

Fig. 8 is a bottom plan view of the same.

Fig. 9 is an end view of the same.

Fig. 10 is a cross section on the line 10—10 of Fig. 6.

Fig. 11 is a detail side elevation of a portion of the same, looking at the side opposite that shown in Fig. 7.

In the drawings in which like numerals of reference indicate like parts in all the figures, 1 represents a pair of side plates having opening 20 of considerable area and provided with bored lugs 3 and saddles 5, the surfaces 6 of which are shaped to conform to the particular cross sectional shape of the negative element 19 that may be used.

Reinforcing or stiffening ribs 4 may be provided and extend lengthwise of the plates 1 adjacent the top and bottom edges of the same, and ribs 2 along the end edges of the plates may also be provided.

The saddles 5 have cross grooves 7 of sufficient cross sectional area to serve as liquid circulating ducts.

The particular unit described in Figs. 1 to 5 is designed to contain four short negative elements 19.

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8 designates intermediate saddle blocks having their back surfaces 9 shaped to conform to the cross sectional shape of the particular negative element used. Each block has a flat face 9^x and a pair of saddles 11, the axes of which lies transversely to that of a surface 9.

Each saddle block also has a liquid circulating groove 10 which lies opposite a groove 7. It also has a flat face 9^x so that two blocks 8 can be placed back to back with the faces 9^x in contact. The faces 6 and 9 are preferably machined smooth so as to give good electrical contact with the surfaces of the elements with which they engage. The surfaces 9^x are also preferably machined smooth for the same purpose.

Tie bolts 12 pass through the lugs 3 and lie in the saddles 11 and serve to draw the plates 1 toward one another and thereby clamp the parts firmly together.

13 designates inverted T bars which have bolt holes 14, and from which project linking lugs 21 and clamping lugs 16, the latter serving to secure insulating bars 18 to the bases 15 of the T bars. Each T bar has a groove 17 in its upper edge. This groove conforms in cross section to the surface of the negative element that it engages. The width of a T bar 13 is less than the space between the lugs 3 and 11 (Figs. 4 and 5) so that ample pressure can be applied between the parts 5, 19 and 8 for an obvious purpose. The contact between the elements 19 and 13, however, is a pressure contact.

It will be obvious to those skilled in the art that the unit may be constructed to take two long negative bars, or four short bars (as illustrated) and such bars may be of different cross sections as desired (Figs. 6 et seq.)

In Fig. 6 is shown a modification of the invention. Those parts which correspond to like parts in the preceding figures and perform the same functions bear the same reference numbers plus the index letter *a*, so a further description of the same here is unnecessary.

In this, the second embodiment, the T bars are omitted and the lower edges of the saddles 5^a are bevelled as at 22, thereby providing with the bevelled ribs 4^a at the bottom of the plates 1^a thin edges 23 to set on the boiler tubes.

In both embodiments the plates 1, 1^a, and saddle blocks 8, 8^a are made of copper while the negative elements 19, 19^a are made of zinc.

As shown in Figs. 6 to 11, inclusive, the negative elements may be made of zinc 19^a with copper jackets 19^x. In the latter event it will not be necessary to machine the saddle surfaces 9^a

smooth as any slight roughness will, when bolts 12a are taken up, indent themselves in the copper jackets and thus full electrical contact between such surfaces can be obtained.

I find that by silver plating the positive elements 1, 8, 13 or 1a, 8a, 19x as the case may be, the effective voltage of the device is increased over what it would be were those copper elements not silver plated.

I desire to call attention to the fact that the jackets, belts or shields 19x play an important part in making a positive electrical contact over about three-quarters of the total surface area of the negative elements 19a. Recent research has proven that this added contact area greatly improves the water correction efficiency of the unit, promotes more even disintegration of the negative element 19a, and forces a greater percentage of the metallic oxides into the water or electrolyte, which is principally responsible for the water correction values received when the devices are being used for correcting water in either boiler or hot water systems.

From the foregoing description taken in connection with the accompanying drawings it is thought the construction, operation and advantages of the invention will be clear to those skilled in the art.

What I claim is:

1. A self-energizing electrolytic water correction device for use in water boilers, comprising a pair of opposed apertured side plates having integral projections forming transversely aligned inner saddles and having bolt holes lying on either side of said saddles, intermediate saddle blocks positioned in abutting relationship and in transverse alignment with said saddles, said blocks having bolt-receiving end grooves, said side plates and saddle blocks being formed of electro-positive metal, bars of electro-negative metal positioned between said opposed and aligned saddles and saddle blocks, bolts passing through said bolt holes and end grooves, and means coacting with said bolts for tightly clamping said bars between said saddles and saddle blocks, said saddles and saddle blocks having clamping surfaces conforming to the contour of said bars and in extended surface engagement with opposed intermediate portions thereof but with less than full peripheral contact to provide for tight clamping action to prevent displacement of said bar while exposing the ends of said bar to electrolytic attack.

2. A self-energizing electrolytic water correction device for use in water boilers comprising a pair of opposed apertured side plates having integral projections forming transversely aligned V-shaped jaws and having bolt holes on either side of said jaws, separate saddle blocks arranged in pairs in back-to-back relationship and interposed between said plates defining V-shaped jaws in alignment with said first mentioned V-shaped jaws and having bolt-receiving portions for guiding and aligning purposes, said plates and saddle blocks having exposed surfaces of electro-positive metal, electro-negative metal cartridges between pairs of opposed V-shaped jaws, bolts passing through said bolt holes and said bolt-receiving saddle block portions, and means coacting with said bolts for tightly clamping said cartridges between said transversely aligned jaws, said jaws engaging an extended surface area of opposed intermediate portions of said cartridges to prevent displacement of said cartridges while exposing the ends thereof to electrolytic attack.

3. A self-energizing electrolytic water correction device for use in water boilers, comprising a pair of opposed apertured side plates having integral projections forming transversely aligned V-shaped jaws and having bolt holes on either side of said jaws, separate saddle blocks arranged in pairs in back-to-back relationship and interposed between said plates and defining V-shaped jaws in alignment with said first mentioned V-shaped jaws and having bolt-receiving portions for guiding and aligning purposes, said plates and saddle blocks having exposed surfaces of electro-positive metal, electro-negative metal cartridges, each of said cartridges having a jacket of electro-positive material enclosing an intermediate portion thereof, one of such jacketed cartridges being positioned between a pair of cooperating V-shaped jaws, bolts passing through said bolt holes and said bolt-receiving saddle block portions, and means coacting with said bolts for tightly clamping said cartridges between said transversely aligned jaws, said jaws tightly engaging extended surface areas of opposing intermediate portions of said cartridge jackets to prevent displacement of said cartridges while exposing the ends thereof to electrolytic attack.

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