June 15, 1943. E. M. BUTLER 2,321,797

ELECTROLYTIC WATER CORRECTION DEVICE

Filed June 13, 1940

Fig. 1

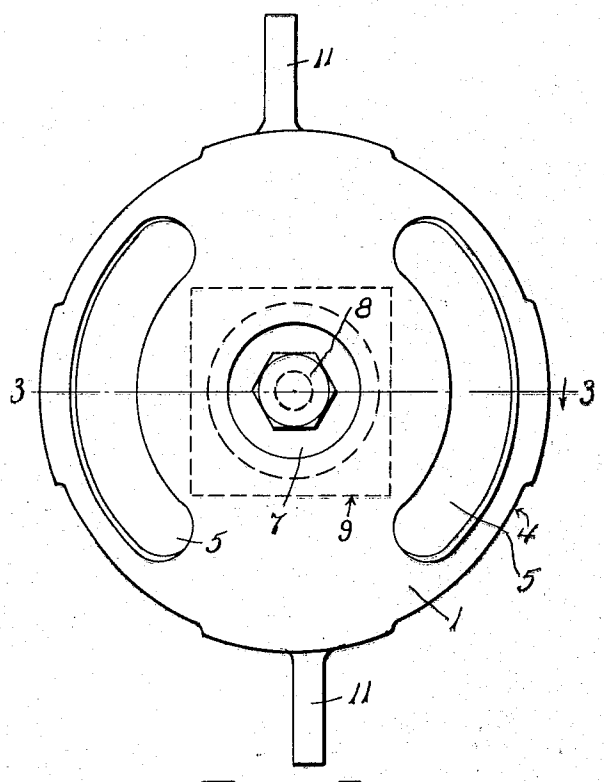


Fig. 2

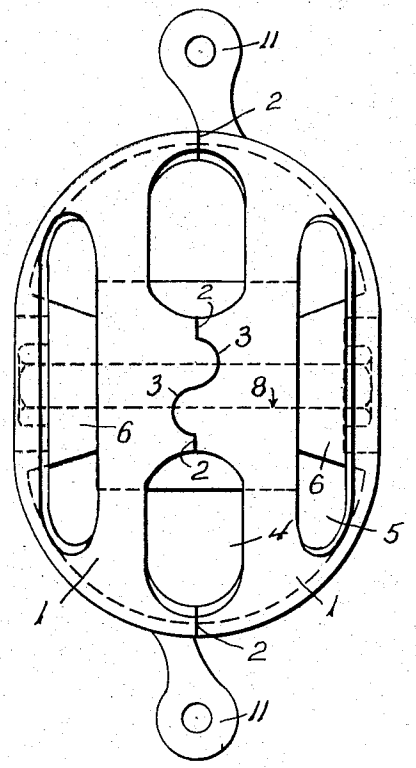


Fig. 3

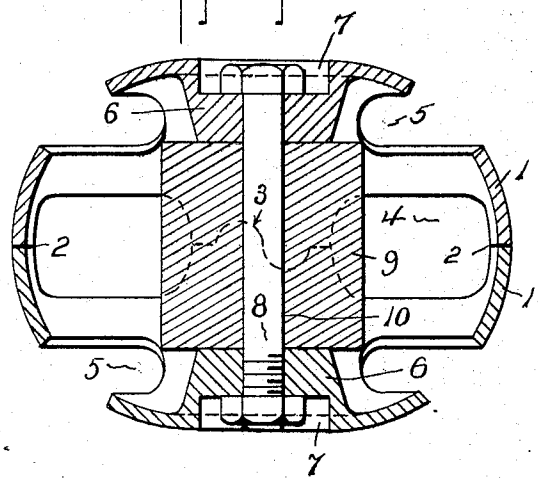
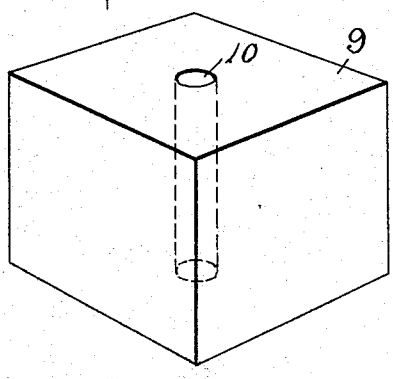


Fig. 4



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ELECTROLYTIC WATER CORRECTION DEVICE

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Application June 13, 1940, Serial No. 340,389

6 Claims. (Cl. 204—248)

My present invention which, in general, relates to the art of water purification, especially has relation to a certain new, useful and improved electrolytic unit for converting soluble mineral matter, found in most water, into small solid particles.

An object of the present invention is to provide an inexpensive device of a compact nature for insertion into cells (boilers, vessels and circulating systems) having only small openings through which a device of this character can be passed into and removed from the cell; to this end the device is of a biscuit or flattened globe shape.

Another object is to provide a device of the character stated which, by virtue of the form or design of the case parts, requires but one pattern for casting the halves of the case, thereby reducing cost of manufacture.

Further, it is an object to provide a device in which the negative element is a block of rolled or drawn metallic substance, held in place by a single bolt and nut which also holds the halves of the case together.

Again, it is an object to so construct the meeting edges of the case halves that they will be interlocked when assembled to prevent swivelling on the bolt which secures the halves together in assembled position.

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 still further resides in the novel details of construction, combination and arrangement of parts, all of which will be first fully described in the following detailed description, and then be particularly pointed out in the appended claims, reference being had to the accompanying drawing, in which:

Fig. 1 is a view of the device looking from left to right in Fig. 2.

Fig. 2 is an elevational view of the device looking from right to left in Fig. 1.

Fig. 3 is a section on the line 3—3 of Fig. 1.

Fig. 4 is a detail perspective view of the negative element.

In the drawing, in which like numbers of reference indicate like parts in all the figures, 1 designates the two halves of the case (positive element). These are preferably made alike and are interchangeable, being in the form of cups whose rim edges 2 meet and are provided with sinuous portions 3 constituting interprojecting edge portions which serve to prevent swivelling of one half on the other half about the axis of the tie bolt 8.

The two sections have recessed edge portions which, when the halves are assembled together, constitute equatorial openings 4. Each half also has complete elongated openings 5 between the polar regions and the equatorial region of the case. These large openings 4 and 5 serve to permit free circulation of electrolyte and render the device self-cleaning when in use, in that the precipitates or sludge formed within the case are readily washed out by the circulating or agitated electrolyte (water, etc.).

Each half of the case has an axially disposed, inwardly projected boss 6 which extends in beyond the width of the openings 5 (see Figs. 2 and 3).

The negative element 9 fits between the bosses 6, the adjacent surfaces of bosses 6 and element 9 being plane so that good contact can be made between the entire surfaces of the ends of the bosses and the negative element.

The negative element 9 has a bolt hole 10 and the bosses 6 have aligning holes through which the bolt 8 passes.

The structure is such that when the parts are assembled and the nut is drawn tight on the bolt 8, the bosses 6 will be held in tight physical and electrical contact to afford as near a noncorroding surface contact as possible, by excluding—as much as possible—electrolyte from between the contacting surfaces of 6 with 9.

By extending the bosses over the width of the openings 6 when the "biscuit" is laid on a polar end in use sufficient precipitate cannot accumulate below the negative element to build up to the same and thereby reduce the efficiency of the device.

The case is usually made of copper, while the negative element is metallic substance (such as zinc, bismuth, lead, tin, aluminum, antimony, alone or in whatever combination with one another—one or more—and/or with mercury, may be found most effective under varying conditions of water, steam pressure, heat transfer, etc.).

I have found that, in order to produce the most effective action by the device, the negative element should be of a compact, close-grained or dense mass, and to that end I make the negative element of the device of rolled or drawn metallic substance, preferably zinc.

By making the positive and negative elements as nearly one hundred per cent opposite in electrical potentiality as possible, adjusting the metallic composition of the negative element properly, and by making a tight physical and good electrical contact between the end surface of the

bosses 6 and those of the element 9 the internal resistance is reduced to the minimum and consequently the effective voltage is maintained as high as possible.

By making the block 9 of greater spread laterally than as shown in the drawing the time between replacements of the negative unit may be increased. The case 1 will permit the use of negative elements 9 of different sizes as desired.

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

What I claim is:

1. In a self-energizing electrolytic water conditioning and scale preventing device, a case of globular shape comprising two halves of cup-like form with their rim edges in contact, said rim edges having interengaging portions, an axially disposed tie bolt with nut passing through said case in a direction normal to the plane of contact of the halves for securing said halves together, said case having equatorially disposed elongated openings formed in part in one half and in part in the other half of the case, and having other annular openings adjacent the polar areas of the case, each case half having an inwardly projecting apertured boss through which said bolt passes, and a negative element secured between the ends of said bosses by means of said tie bolt.

2. A self-energizing electrolytic water conditioning and scale preventing device, comprising in combination a positive element and a negative element, said negative element comprising a drawn block of a metallic composition having an aperture, and said positive element comprising a case of apertured two halves of cup-like form fitted together in rim to rim contact to constitute a globular structure, said case having annularly disposed elongated slots between its polar extremities and its equator and having other elongated openings at the equatorial region formed in part in each half of the case, and axially disposed means passing through the apertures of said case and said block for securing said case parts together with the rims in pressure contact and to secure said negative element between the case parts.

3. A self-energizing electrolytic water conditioning and scale preventing device, comprising in combination a positive element and a negative element, said negative element comprising an axially disposed drawn block of a metallic composition having an aperture, and said positive element comprising a case of apertured two halves of cup-like form fitted together in rim to rim contact to constitute a globular structure, said case having annularly disposed elongated slots between its polar extremities and its equator and having other elongated openings at the equatorial region formed in part in each half of the case, and axially disposed bolt with nut, the bolt passing through the apertures of said case and said block for securing said case parts together with the rims in pressure contact and to secure said negative element between the case parts, said case halves having axially disposed inwardly projecting recessed bosses between the end faces of which said negative element is mounted, the bolt head and the nut lying, respectively, in said recesses.

4. A self-energizing electrolytic water conditioning and scale preventing device, comprising in combination a positive element and a negative element, said negative element comprising a drawn block of a metallic composition, and said positive element comprising a case of two halves of cup-like form fitted together rim to rim to constitute a globular structure, said case having annularly disposed elongated slots between its polar extremities and its equator and having other elongated openings at the equatorial region formed in part in each half of the case, and axially disposed means for securing said case parts together and to said negative element, said case halves having axially disposed inwardly projecting bosses between the end faces of which said negative element is mounted, said bosses extending in part at least across the plane of said elongated slots, whereby if the device is mounted with its axis vertical precipitates forming within the case will not build up to the negative element but will pass out through said elongated slots.

5. A self-energizing electrolytic water conditioning and scale preventing device, comprising in combination a positive element and a negative element, said negative element comprising a drawn block of a metallic composition, and said positive element comprising a case of two halves of cup-like form fitted together rim to rim to constitute a globular structure, said case having annularly disposed elongated slots between its polar extremities and its equator and having other elongated openings at the equatorial region formed in part in each half of the case, and axially disposed means for securing said case parts together and to said negative element, said case halves having axially disposed inwardly projecting bosses between the end faces of which said negative element is mounted, each case half having an apertured ear, the ears of the two halves being disposed diametrically opposite one another when the case is assembled.

6. A self-energizing electrolytic water conditioning and scale preventing device, comprising in combination a positive element and a negative element, said negative element comprising a drawn block of a metallic composition, and said positive element comprising a case of two halves of cup-like form fitted together rim to rim to constitute a globular structure, said case having annularly disposed elongated slots between its polar extremities and its equator and having other elongated openings at the equatorial region formed in part in each half of the case, and axially disposed means for securing said case parts together and to said negative element, said case halves having axially disposed inwardly projecting bosses between the end faces of which said negative element is mounted, said bosses extending in part at least across the plane of said elongated slots, whereby if the device is mounted with its axis vertical precipitates forming within the case will not build up to the negative element but will pass out through said elongated slots, each case half having an apertured ear, the ears of the two halves being disposed diametrically opposite one another when the case is assembled.

EDGAR M. BUTLER.