March 21, 1961 E. S. BREMERMAN 2,975,769

PORTABLE ELECTROLYTIC WATER TREATMENT DEVICE

Filed July 28, 1958 2 Sheets-Sheet 1

Fig. 1.

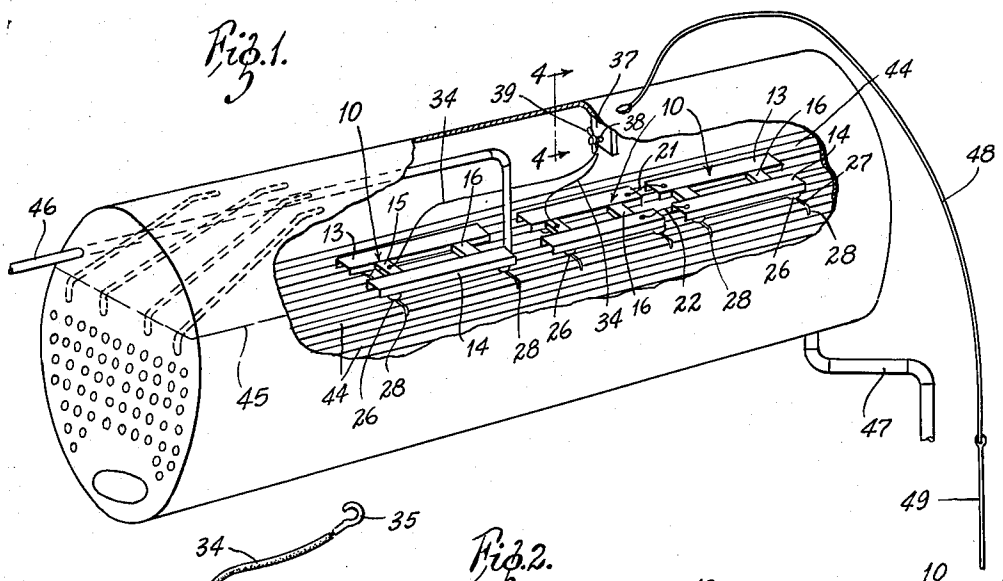


Fig. 2.

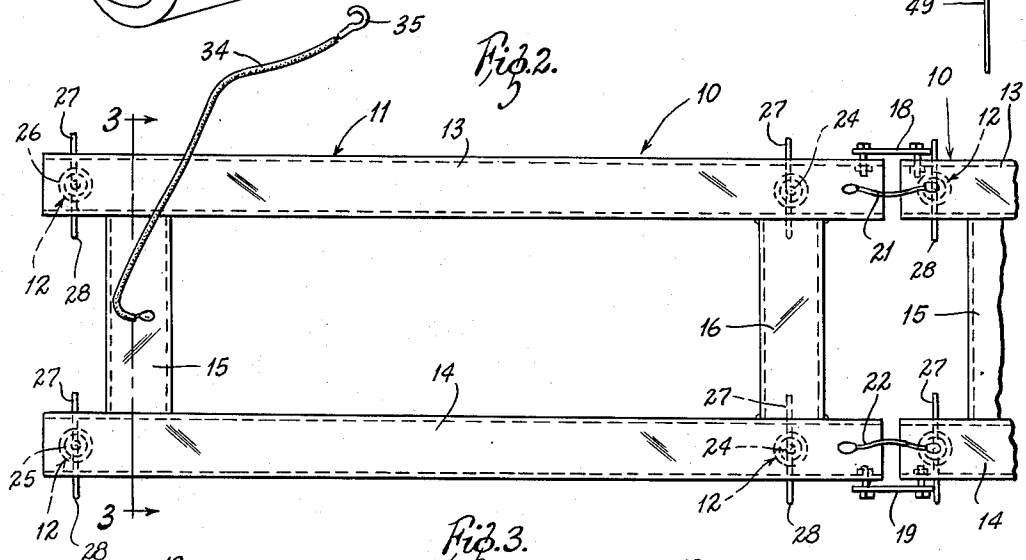
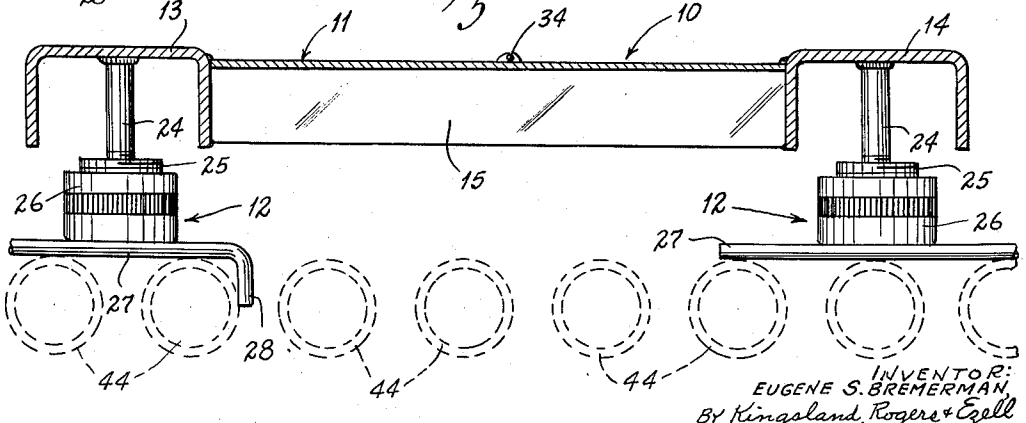


Fig. 3.



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Fig. 4.

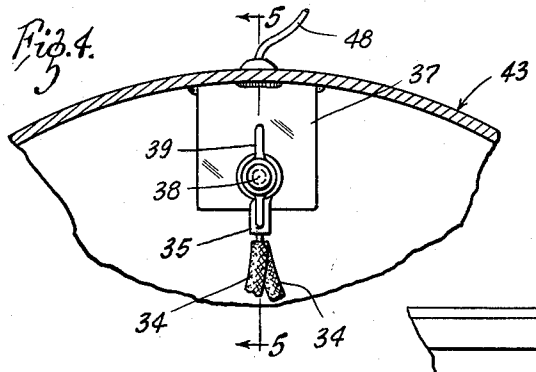


Fig. 5.

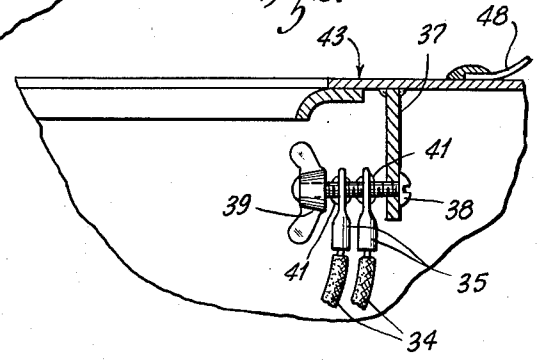


Fig. 6.

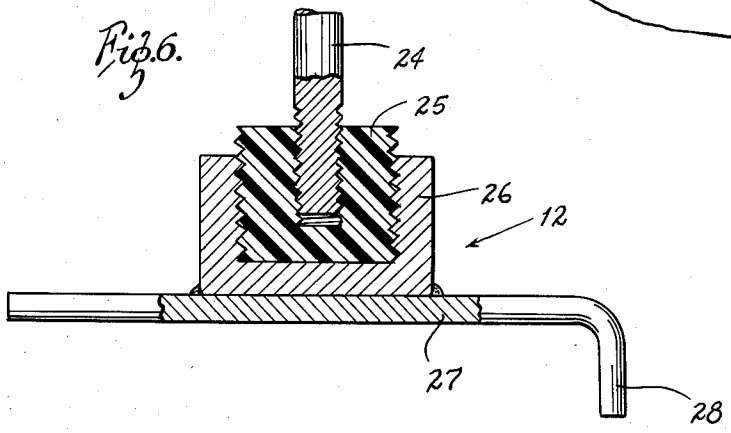
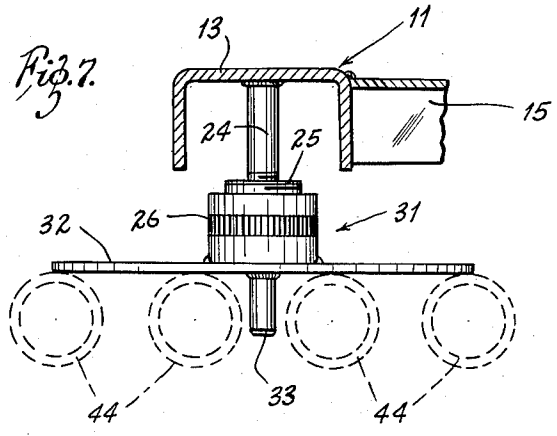


Fig. 7.



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PORTABLE ELECTROLYTIC WATER TREATMENT DEVICE

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3 Claims. (Cl. 122—4)

This invention relates to a portable device which may be used in boilers to prevent electrolytic corrosion and other types of deleterious water action, including the elimination of pitting and foaming so frequently encountered.

In the George S. Neeley patent for boiler device, United States Patent No. 2,499,670, granted March 7, 1950, a boiler device is shown that is operable to minimize electrolytic action and foaming. This device operates successfully to perform the job for which it is designed, but requires the supporting of a device from the top of the boiler shell and, in general, it is a custom application that must be manufactured to each individual application. Once installed, it is difficult to expand the application to vary the size of the unit or remove it for servicing.

By means of this invention, there has been provided a portable device which may be used in boilers and the like which is adapted to be employed with other such devices for increasing the effective action for varying sized boilers. The device is one that can be simply placed upon the tubes within the boiler and requires no special fabrication within the boiler other than the simple attachment of ground cables to the shell of the boiler. The frame of the device may be made of conventional steel construction of the same electrolytic properties as the boiler construction. The device may be installed, maintained or removed through the conventional manholes which are found in the boiler shell. Special support means are provided whereby the device may be supported upon the boiler shell in stable fashion without electrolytic currents passing therethrough through the provision of specially constructed insulated feet which may be adjusted to fit varying structural conditions.

The portable device of this invention is simple in construction and nature, yet rugged in its characteristics, and is adapted to be used by relatively unskilled personnel in an expeditious manner.

It is accordingly an object of this invention to provide a portable device for accomplishing the above-mentioned objectives to increase the efficiency of boilers.

It is another object of this invention to provide a portable boiler device which may be used in multiple with other such devices by a very simple electrical connection without the requirement of any complicated construction by service personnel.

It is still another object of this invention to provide a portable boiler device having adjustable supports whereby the device may be placed upon boiler tubes in insulated relationship with provisions for adjusting the support to meet varying boiler tube constructions.

Yet another object of this invention is to provide a portable boiler device which is rugged in construction, simple to install and maintain, and is effective in operation.

Still further objects of this invention will appear in

the detailed description which follows and will be further apparent to those skilled in the art.

For the purpose of illustration of this invention, there is shown in the accompanying drawings a preferred embodiment of this invention. It is to be understood that these drawings are for the purpose of example only and that the invention is not limited thereto.

In the drawings:

Figure 1 is a perspective view of a boiler shell with part of the shell broken away to show the boiler tubes and a plurality of the boiler devices of this invention connected therein;

Figure 2 is a top plan view of the boiler device of this invention shown connected to another such device in tandem;

Figure 3 is an enlarged view in section taken on the line 3—3 of Figure 2, showing the construction of a boiler device and the attachment of the supports;

Figure 4 is an enlarged view in section taken on the line 4—4 of Figure 1, showing the attachment of a ground cable from the device to the shell of the boiler;

Figure 5 is a view in section taken on the line 5—5 of Figure 4, showing the shell connection;

Figure 6 is an enlarged view in section of the insulated connection between the boiler device support and the framework of the boiler device; and

Figure 7 is an elevational view of a modified form of support.

The boiler device of this invention is designated by the numeral **10** in Figures 1, 2 and 3. It consists of two main components, the frame **11** and support members **12**.

The frame **11** is composed of two longitudinally extending channel members **13** and **14**. The longitudinal members are connected to one another by cross members **15** and **16**. These channel members perform the dual purpose of providing strength and rigidity as well as a large surface area to enhance the corrosion and scale forming inhibition action of the invention. Connecting links **18** and **19**, as shown in Figure 2, are adapted to be connected to the ends of the longitudinal members **13** and **14** so that adjacent boiler devices may be connected in tandem. In order to provide proper electrical contact between these units, the longitudinal members in the adjacent units are connected together by brazing a copper cable, or the like, to the adjacent ends as shown in the connecting cables **21** and **22** in Figure 2.

The supporting members **12** are best shown in Figures 3 and 6 with a modified form of support member being shown in Figure 7. In the embodiments of Figures 3 and 6, the support member includes a plurality of studs **24** welded to the underneath side of the longitudinal members and having threaded ends receiving an internally and externally threaded insulating member, which may be made of any conventional insulating material that is desirably made of a plastic, such as Teflon, or other similar non-conducting composition. The insulating member **25** is threadedly received in a socket **26** attached to a support leg **27** which is hooked at the end **28** in order that the leg may fit over the boiler tubes and catch thereon, as shown in Figure 3. By means of the threaded relationship of the socket **25** with the stud **24** and the socket **26** with respect to the insulating plug, it will readily be seen that the leg **27** may be rotatably adjusted with respect to the frame and that vertical adjustment may also be made by this means.

A modification of the support member shown in Figures 3 and 6 is shown in Figure 7 and identified by the reference numeral **31**. In this device, similar components previously identified in Figures 3 and 6 will be given the same reference numerals, but it will be noted that the support leg which is identified by the reference

numeral **32** is of a different construction. In the embodiment of Figure 7, the support leg is made of a plate-like disc which has a pin member **33** attached to its center. In this manner, the pin may be caught between adjacent boiler tubes and the support leg will not rotate and slip should the boiler device **10** be located in an inclined manner as may be desirable in some installations.

In order to attach the boiler device **10** to the boiler shell for proper grounding, a cable **34** is provided as shown in Figure 2. One end of this cable is brazed to a cross member **15** while the other end is provided with a contact hook **35**. The connection to the shell is best shown in Figures 1, 4 and 5, and as there shown is effected through the use of a connecting plate member **37** which is brazed or welded to the interior of the shell, or otherwise suitably secured with a good electrical contact between these components. The plate **37** is provided with a connecting bolt **38** and a wing nut **39**. The connecting hooks **35** of the cable **34** are hooked upon the bolt **38** and drawn up tight through the use of the wing nut. In order to provide a good firm electrical contact, solder may be added at the points of contact as shown at **41** in Figure 5 before the wing nut **39** is drawn up tight.

Use

The boiler device **10** of this invention is shown in typical use in a boiler **43** in Figure 1. The boiler shown is a conventional one having a plurality of tubes **44** with a water line maintained somewhere around the line indicated at **45**. It will be understood that there is a feed pipe **46** and a steam outlet (not shown) with a blow-off pipe **47** for removing mud, sludge, and the like. Conventionally, such boiler shells are provided with manholes at the top in the broken-away portion of Figure 1 or at other convenient points of access.

The boiler device **10** is adapted to be very easily inserted through the conventional manhole or hand hole, and the supports may be positioned in such a manner that the leg members **27** and the hooked end portions **28** engage the tubes to hold the boiler device above them as shown in Figures 1, 3 and 7. The boiler device is of a low flat construction so it may be simply placed upon these tubes while still being kept under the water surface level. As shown in Figure 1, there are three boiler devices employed, it being understood that additional devices may be installed where desired. The boiler device **10** shown at the left hand end of the boiler is connected directly to the plate **37** by a separate cable **34**. The two boiler devices **10** shown at the right end of the boiler are connected together in tandem by the use of copper cables **21** and **22** and employ a single cable **34** extending from the middle boiler device to the plate **37**. It will be readily understood that all three of the boiler devices may be connected together in tandem with the employment of only a single cable **34** or, alternatively, three separate cables may be used while maintaining the boiler devices otherwise separate.

The installation is completed by connecting a ground cable **48** to the boiler shell adjacent the plate **37** by a weldment, such as shown in Figure 4, and the driving of the ground rod **49** into a good firm positive ground connection.

It will be understood that when the boiler device **10** with the support **12**, as shown in Figures 3 and 6, is employed, the legs **27** and hooked end portions **28** can be rotated with respect to the frame so as to insure that a proper grabbing contact of the boiler tubes is obtained. Where it is desired to provide for relative adjustment of one support with respect to another, the support members can be screwed in and out by means of the thread connection between the stud **24**, the insulating member **25**, and the socket **26**.

The support member **31** of Figure 7 may also be employed where the boiler device **10** is to be positioned in a slanting relationship, or where there is any vibration that might tend to dislodge the legs **27** and **28** in the support **12**. A stable relationship for such a situation is thereby provided by this embodiment.

When the boiler device **10** is installed in the boiler as above described, a good electrical contact is provided between the frame of the device and ground through the cables **34**, the soldered connections on the connecting plate **37**, and through the ground cable and ground rod. The frame of the device is well insulated from the boiler by means of the insulating plug **25** and it will be seen that the installation is relatively simple and expedient. For service and maintenance or replacement, ready access may be made to the boiler device and no complicated structure or technique is required.

Once installed in the manner described, the boiler device operates very effectively for the minimization of electrolytic corrosion and inhibition of pitting and scale formation. The success of the apparatus has been demonstrated by many successful applications and the substantial advance provided by the convenience and use of the boiler device of this invention has greatly improved the efficiency of boiler operations and longevity.

Various changes and modifications may be made in this invention as will be apparent to those skilled in the art. Such changes and modifications are within the scope and teaching of the invention as defined by the claims appended hereto.

What is claimed is:

1. A portable protector device removably positioned in a metallic boiler having a metallic shell-like container and horizontally extending boiler tubes contained therein below a water level, said device comprising a low relatively flat elongated frame having a plurality of elongated metallic members connected by metallic cross-members, means supporting the frame upon the boiler tubes in spaced relation thereto beneath the water level, said supporting means comprising a plurality of metallic studs connected to the bottom of the frame, an adjustable insulating member threadedly adjustable on the lower end of the stud, and horizontally extended metallic support element having a threaded socket adjustable upon an exterior threaded surface of the insulating member, said metallic support element having a vertical end element adapted to catch between the horizontal boiler tubes to hold the device upon the tubes, and electrical cable means electrically connecting the frame to the interior of the container above the liquid level.

2. The device of claim 1 in which the metallic support element consists of an elongated horizontal member rigidly connected to the bottom of the socket and having an offset downwardly directed vertical end element at one side.

3. The device of claim 1 in which the metallic support element consists of a flat horizontally disposed disc having a diameter substantially greater than the distance between laterally adjacent boiler tubes with a pin member depending vertically from the center of said disc.

References Cited in the file of this patent

UNITED STATES PATENTS

507,710	Horton et al.	Oct. 31, 1893
1,041,188	Stewart	Oct. 15, 1912
1,449,991	Gunderson	Mar. 27, 1923
2,499,670	Neeley	Mar. 7, 1950