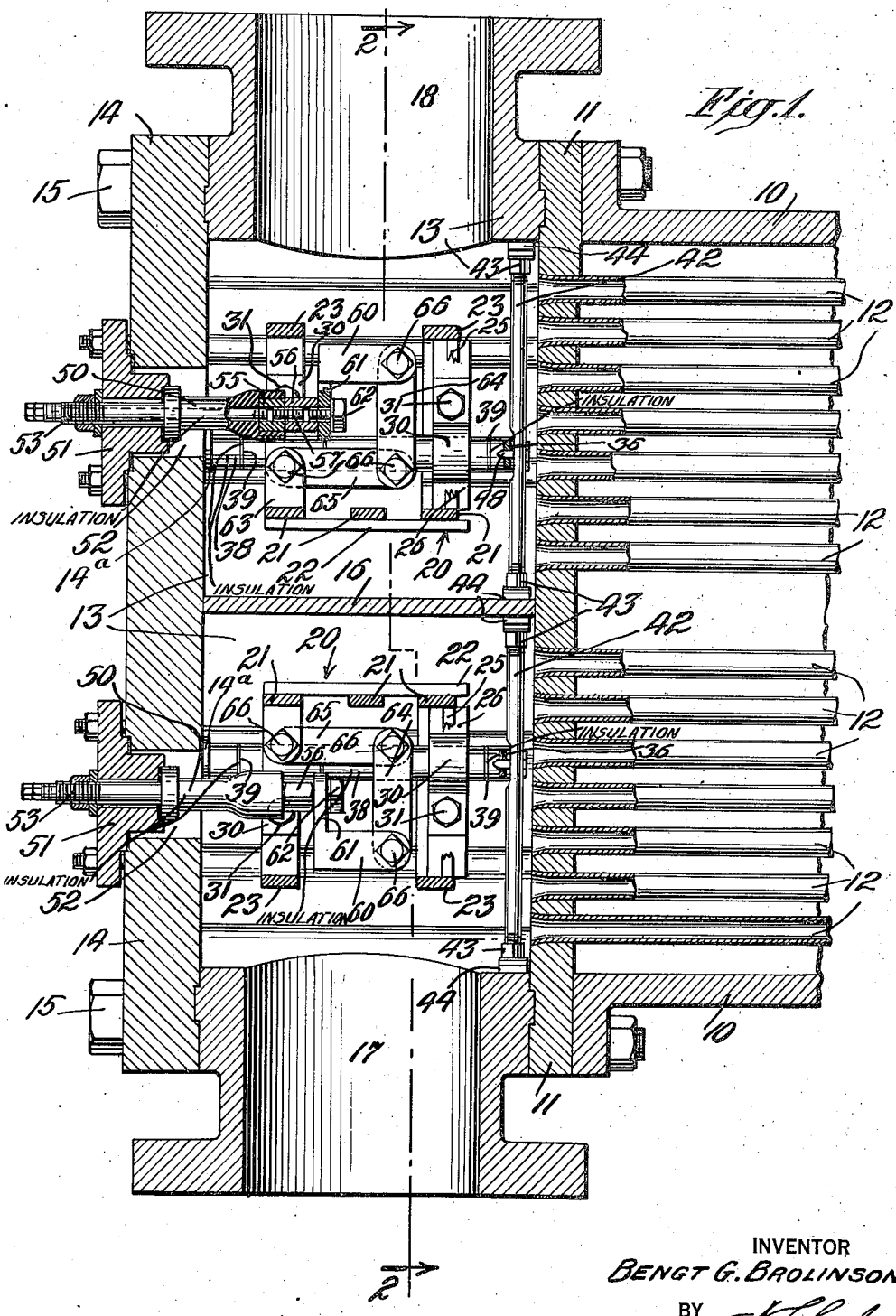
Aug. 13, 1946. B. G. BROLINSON 2,405,776

ANODE FOR THE ELECTROLYTIC PROTECTION OF CLOSED CONTAINERS

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Fig. 1.



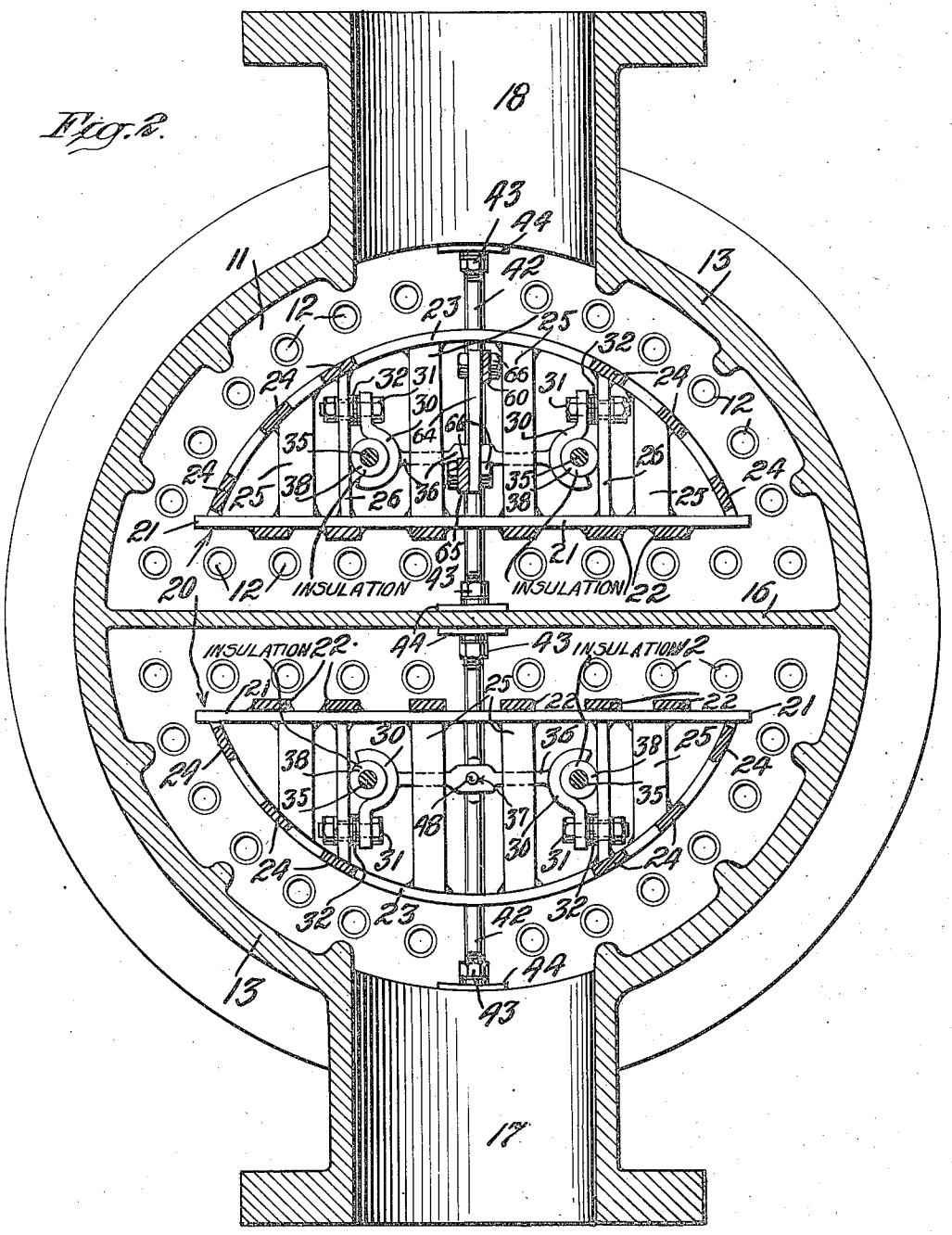
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Fig. 2.



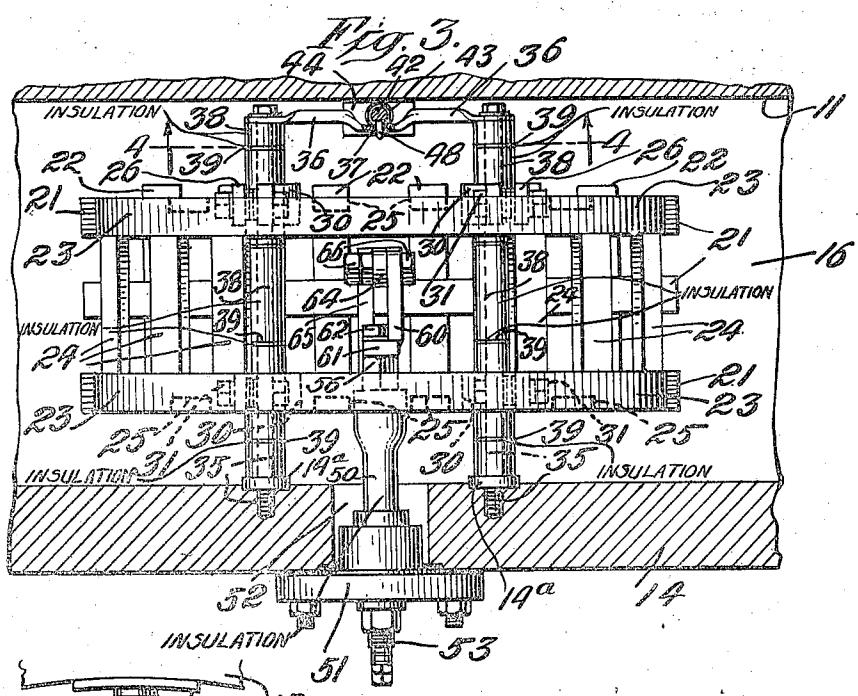
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ANODE FOR THE ELECTROLYTIC PROTECTION OF CLOSED CONTAINERS

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Fig. 3.



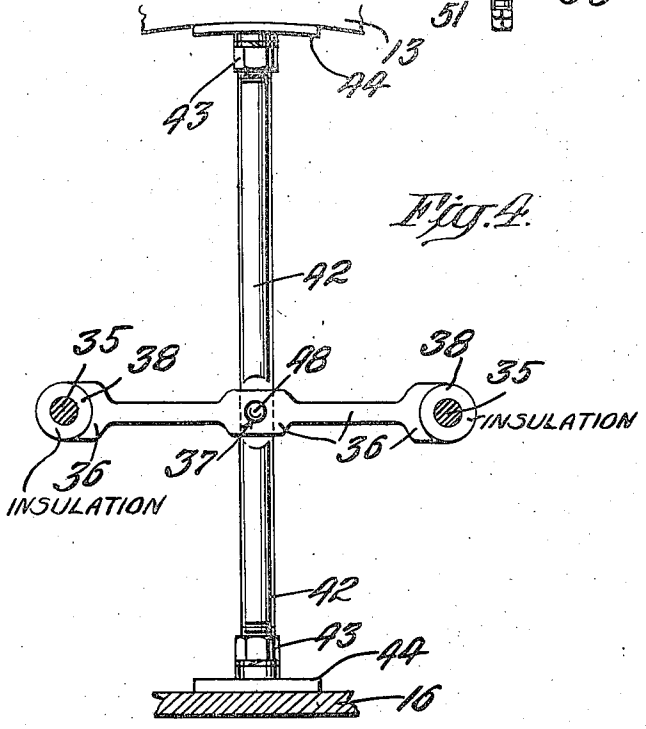


Fig. 4.

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UNITED STATES PATENT OFFICE

2,405,776

ANODE FOR THE ELECTROLYTIC PROTECTION OF CLOSED CONTAINERS

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Application August 1, 1940, Serial No. 349,126

1 Claim. (Cl. 204—196)

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This invention relates to a system for the electrolytic protection of metal surfaces in containers such as feed water heaters, heat exchangers, condensers or the like, in which an anode which is inserted in the liquid within the container, and the surface to be protected is made cathodic, and more particularly to an anode for use in a system of the above type wherein only limited space is available for the anode.

An object of the invention is to provide a novel and improved anode structure for a system of the above type which may be used in a limited space without unduly restricting the flow of liquid therein.

Another object is to provide a novel and improved anode structure wherein a substantial surface area is obtained within the confines of a limited space.

Another object is to provide an anode structure suitable for use in the water head of containers, such as condensers, feed water heaters, heat exchangers, boilers, and the like.

Another object is to provide an anode for the above purpose which is of open construction and has a large surface area.

A further object is to provide a novel and improved means for supporting the anode and for supplying current thereto.

Another object is to provide an anode for the above purpose having novel and improved details of construction and combinations of parts.

Other objects and advantages will be apparent as the nature of the invention is more fully disclosed.

Although the novel features which are believed to be characteristic of this invention will be pointed out more particularly in the claims appended hereto, the invention itself may be better understood by referring to the following description, taken in connection with the accompanying drawings in which a specific embodiment thereof has been set forth for purposes of illustration.

In the drawings:

Fig. 1 is a longitudinal vertical section through the water head of a feed water heater embodying the present invention;

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

Fig. 3 is a top plan view of the anode with a portion of the housing broken away to show the details of construction thereof; and

Fig. 4 is a section taken on the line 4—4 of Fig. 3 showing the post for supporting the anode.

In the following description certain specific

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terms are used for convenience in referring to various details of the invention. These terms, however, are to be given as broad an interpretation as the state of the art will permit.

Referring to the drawings more in detail, the invention is shown as applied to a feed water heater comprising a shell 10 having a tube sheet 11 in which a plurality of water tubes 12 are secured. The heater is supplied with a water head comprising a housing 13 and a cover 14 which is secured thereto by suitable means, such as bolts 15. A horizontal partition 16 is formed in the housing 13 to divide the same into an inlet chamber 17 and an outlet chamber 18.

It is to be understood that the feed water heater thus far described is of standard construction, and only so much thereof has been disclosed herein as is necessary to an understanding of the present invention. The feed water heater may be of the tube and shell type in which heat exchange fluid is passed through the shell in the space around the tubes. The feed water is received in the inlet chamber 17, passes through the tubes communicating with said chamber below the partition 16, and returns through the tubes communicating with the outlet chamber 18 above the partition 16, and is thence discharged.

It is to be understood that a feed water heater is referred to herein for purposes of illustration only, and that the invention is also applicable to other containers having similar construction, such for example, condensers, or the like.

In accordance with the present invention anodes are mounted in the inlet chamber 17 and in the outlet chamber 18. Each of these anodes comprises a cage 20 which is formed by a pair of horizontal rails 21 connected by cross members 22, and a pair of arcuate rails 23 attached at their ends to the rails 21, and also connected by suitable cross members 24. Suitable vertical members 25 and 26 may also be provided for strengthening the assembly and for providing additional anode surface.

It will be noted that the anode cage above described is generally semi-cylindrical in form and conforms in outline to the section of the chambers 17 and 18. The open cage construction provides a maximum of anode surface without substantial interference with the water flow in the head.

For supporting the anode cage 20, clamps 30 are provided which are shown as secured to the vertical members 26 by means of bolts 31. Suitable washers 32 may be provided to facilitate

tightening of the clamps 30 and to provide the necessary adjustment.

A pair of rods 35 are secured in the cover 14 by suitable means. In the form shown these rods are threaded into tapped holes in said cover and extend horizontally substantially through the water head. At their free ends the rods 35 are joined by a cross member 36 having an aperture 37 formed therein for the purpose to be described.

A set of insulating sleeves 38 are disposed on the rods 35 and are clamped between the cross member 36 and the collars 14a. Suitable sealing gaskets 39 are inserted between the sections of the insulating sleeves 38 so as to effect a watertight insulating seal. The clamps 30 are secured over the insulating sleeves 38 to support the anode cage 20 thereon.

For securing the inner ends of the rods 35 and thereby strengthening the assembly, a post 42 is provided which is clamped by nuts 43 against supporting blocks 44 which are attached to the partition 16, and to the inside of the housing 13. This post 42 is provided with a central pin 48 which extends longitudinally and engages the aperture 37 in the cross member 36 above mentioned. The post may be adjusted vertically by means of the nuts 43 so as to properly align the pin 48 with the aperture 37.

It will be noted that in the above construction the anode cage 20 and the supporting rods 35 are removed as a unit with the cover 14. The cross member 36 is releasably supported by the post 42 so that the unit may be removed with the cover without mechanical manipulation but is rigidly supported when in operating position.

In order to conduct current to the anode cage, a lead-in assembly is provided which comprises an insulating sleeve 50 mounted on a cover plate 51, which is secured over an opening 52 in the cover 14. A lead-in rod 53 extends through the sleeve 50 and engages at its inner end a connector block 55. A coupling sleeve 56 is secured to the connector block 55 by means of a threaded stud 57 which is threaded into tapped holes in the connector block and in the coupling sleeve.

In the embodiment shown, the insulating sleeve 50 covers and protects the connector block 55. It is understood that the block 55 may be suitably sealed in said sleeve so as to prevent leakage of water therein, and to prevent the water from contacting with the lead-in rod 53.

A link 60 is shown as provided with an ear 61 which is secured to the coupling sleeve 56 by means of a bolt 62. The link 60 is connected by means of links 64 and 65 to an ear 63 attached to the anode cage 20. The links 60, 64, 65 are pivotally connected by suitable bolts 66, which are suited to provide for limiting movement between the various links so as to compensate for

expansion or contraction of the parts, and at the same time to make an electrical connection for supplying current from the lead-in rod 53 to the anode cage.

It will be noted that the above described anode may be applied to water heads of standard feed water heaters or the like without substantial change in the construction thereof. The anodes are mounted on the cover 14 whereby the assembly and installation is facilitated. The rear supports, including the posts 42, serve to strengthen the assembly and hold the insulating cage in a fixed position without in any way interfering with the removability of the anode. It is to be understood that the lead-in rods 53 may be connected to a suitable source of current, and that the metal shell and/or tubes may be connected to said source of current so as to make the tubes and shell cathodic. The lead-in structure serves to completely insulate the lead-in rod so as to prevent the same from corroding due to contact with the water in the water head.

The links 60, 64 and 65 may be wrapped with insulation, if desired, so as to prevent corrosion thereof. However, in the construction shown the links form a part of the active anode surface, and accordingly serve a useful protective function in addition to supplying current to the anode cage.

Although a specific embodiment of the inventin has been shown for purposes of illustration, it is to be understood that the invention is capable of various uses, and that changes and modifications may be made therein as will be readily apparent to a person skilled in the art. The invention is only to be limited in accordance with the following claims.

What is claimed is:

An anode for the electrolytic protection of a container having a water head provided with a housing forming peripheral walls and with a cover adapted to be secured to said housing, said anode comprising a cage structure having a contour conforming in general to the contour of said walls, a pair of insulating members attached to said cover and extending transversely into said head, means attaching said cage to said insulating members whereby said cage is entirely supported by said cover and may be removed therewith, a cross member connecting the free ends of said insulating members, a fixed supporting rod attached to said housing, said rod having means engaging said cross member when said cover and anode are in assembled position to impart rigidity to said structure, said cross member being slidable into or out of engagement with said last means as said head is assembled or removed.

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