

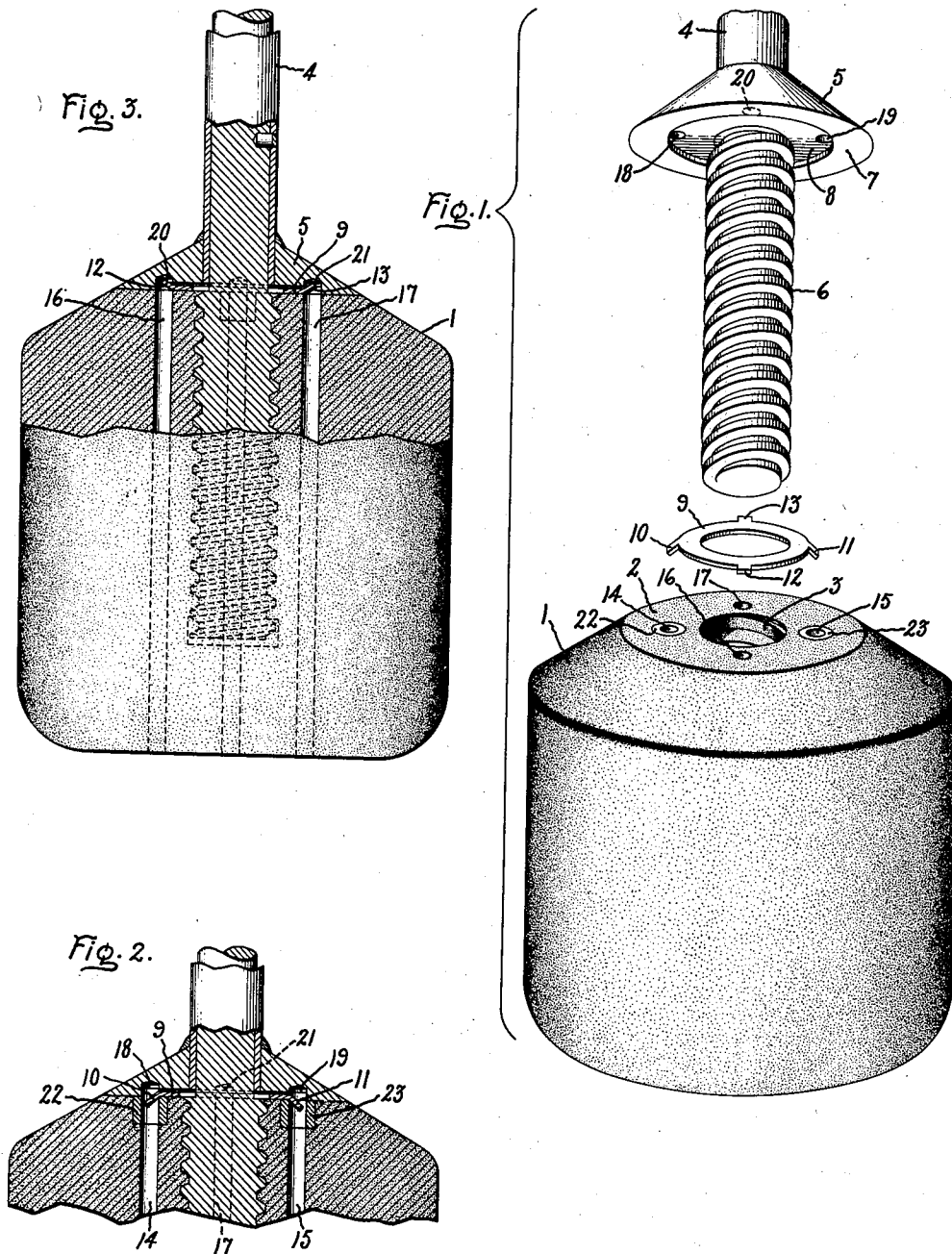
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ANODE LOCKING SYSTEM

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ANODE LOCKING SYSTEM

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Our invention relates to means for and methods of locking in position on a stem, stud, or like member, a member which is screwed thereto, particularly to such means and methods applied in connection with the locking and unlocking of graphite or other anode tips which are screwed to their metal stems or studs, and the general object of the invention is to provide an improved means and method for this purpose.

Difficulties have been encountered heretofore in the use of the anodes of mercury arc rectifiers due to the tendency of the anode tips to shake loose during shipment or during operation and to unscrew from their metal stems or studs. Various means have been proposed for remedying this condition but none so far as we are aware has been entirely free of defects.

Any means which may be successfully employed to solve this problem, in addition to being inexpensive and reliable, must provide for ready assembly of the anode tip and stem structure, and what is as important or even still more important, must provide for ready disassembly at a later time after operation in the rectifier. It is the meeting of this latter condition which has caused especial difficulty in the past.

In accordance with our present invention the above mentioned difficulties are overcome by providing a locking member mounted between an extension of the anode stem and a face of the anode tip and having portions adapted to be bent into openings in the anode tip and in the stem extension, and by so arranging the openings that the anode tip may be locked in position after being screwed tightly on the stem, and that subsequently the anode tip may be readily released from its locked position on the stem.

The novel features which are considered to be characteristic of our invention are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and method of operation together with further objects and advantages thereof may best be understood by reference to the following description taken in connection with the accompanying drawing in which Fig. 1 is a perspective view of anode structure embodying our invention and showing the anode tip, the stem or stud, and the locking member before assembly; Fig. 2 is a side elevational view partially in section of the assembled anode structure; and Fig. 3 is a view identical with that of Fig. 2 but with the structure rotated 90 degrees from its position shown in Fig. 2.

Referring to Fig. 1, the numeral 1 designates

an anode tip preferably of graphite having the usual flat upper face 2 and threaded central opening 3, and the numeral 4 designates an anode stem or stud having an extension or flange portion 5 and a threaded portion 6 to which the anode tip 1 is adapted to be screwed until the face 7 of the flange portion 5 is brought into close contact with the face 2 of the anode tip.

To provide means for locking the anode tip or member 1 in its determined tightly screwed-on position on anode or stem member 4 and for subsequently unlocking the tip from the stem, in accordance with our present invention a shallow recess 8 is formed preferably in the face 7 of stem 4 to provide space between the flange 5 and the anode tip 1 for a locking member. The latter member, preferably having the form of a flat washer 9, is provided with at least two and preferably more than two movable locking members or extension members which may be in the form of bendable tabs 10, 11, 12 and 13 spaced preferably evenly around the washer 9. In the anode tip 1 holes 14, 15, 16, 17 are provided there-through parallel to the threaded opening 3 and spaced radially and circumferentially to correspond with the extensions or tabs 10-13 of locking member or washer 9. Also in the recessed portion of the anode stem extension or flange 5, corresponding holes are provided, of which 18, 19 and 20 are shown in Fig. 1, the other, 21, being shown in Figs. 2 and 3. The holes 18-21 are so placed as to be adapted to align exactly with holes 14-17 respectively of anode tip 1 when the latter is in its tightly screwed on position with reference to the anode stem 4. Two opposite holes as 14 and 15 of the anode tip are preferably provided with metal inserts 22 and 23 if the tip is formed of a material such as graphite.

In assembling the anode structure hereinabove described in connection with Fig. 1, the locking member or washer 9 is first placed on the face 2 of the anode tip 1 and one or more of the movable extension members or tabs, as 10 and 11, are bent into the corresponding holes, 14 and 15, of the anode tip which are provided with the inserts 22 and 23. The anode tip 1 with the washer 9 in position thereon is then screwed to the portion 6 of the stem 4 until the faces 2 and 7 of the anode tip and the stem flange 5 respectively are in close contact, the tip being screwed on to the stem until the other two holes 16 and 17 of the anode tip are in alignment with a pair of the oppositely placed holes of stem flange 4, for example the pair of holes 20 and 21. Next the other pair of oppositely disposed tabs 12 and

13 of washer 9 are bent into these holes 20 and 21, preferably by a long punch or rod (not shown) inserted through the corresponding holes 16 and 17 of the anode tip.

Therefore, as best shown in Fig. 2, the two tabs 10 and 11 of the washer 9 will extend into the inserts 22 and 23 of holes 14 and 15 of anode tip 1, and also, as best shown in Fig. 3, two other tabs 12 and 13 of washer 9 will extend into the holes 20 and 21 of the flange or extension portion 5 of anode stem 4. The anode tip 1 will thus be locked by means of the locking members or tabs of washer 9 against loosening or unscrewing on the anode stem 4.

In order subsequently to disassemble the anode tip 1 from the anode stem 4 a long punch (not shown) is inserted into the holes, 14 and 15, of the tip into which the two tabs 10 and 11 extend and the latter tabs are driven out of holes 14 and 15 by the punch. The anode tip 1 is thus unlocked from the anode stem and may be unscrewed therefrom. The lock washer may thereafter be removed and discarded and a new washer employed, in the manner hereinabove described, for the required reassembly of anode tip 1 and anode stem 4.

Our present invention is particularly useful in solving the problem of secure locking of a graphite anode to its metal stem or stud and subsequent disassembly of the anode structure as described herein. It is apparent, however, that the invention is not limited to use in connection with anode structures, and it will be understood in general that while the invention has been described herein in a particular embodiment for purposes of illustration the invention is susceptible of various changes and modifications and that by the appended claims we intend to cover any such modifications as fall within the true scope and spirit of our invention.

What we claim as new and desire to secure by Letters Patent of the United States is:

1. In combination, a member having a threaded opening therein and at least two holes therethrough parallel to said opening, a member having an extension portion and a threaded portion adapted to be screwed into said opening, said extension portion having holes formed therein adapted to align respectively with the corresponding holes of said first member, and a locking member between said extension portion and a face of said first member having a portion adapted to enter one of said holes of said first member and a portion adapted to be moved into the hole in said extension portion corresponding to the other of said holes of said first member after said holes of said second member are in alignment respectively with the corresponding holes of said first member.

2. In combination, a member having a threaded opening therein and two holes therethrough parallel to said opening, a threaded member comprising a lateral extension and screwed into said opening to press said extension into close contact with a face of said first member, said extension having two holes in alignment respectively with said first two holes, and a washer on said threaded member and mounted in a recess between said extension and said face, said washer having a locking element extending into one of said first holes and another locking element extending into that one of said second holes in alignment with the other of said first holes.

3. In combination, an anode tip, an anode stem screwed to said tip and comprising a member extending therefrom adjacent a face of said tip, two holes through said tip respectively in alignment with corresponding holes in said member, and an element mounted between said member and said face having a portion extending into one of said first-named holes and a second portion in alignment with and adapted to be moved into that one of said second-named holes in alignment with the other of said first-named holes whereby said member locks said tip in position on said stem, said first-named portion being adapted to be moved back subsequently out of said one of said first-named holes whereby said tip is unlocked from said position on said stem.

4. In combination, an anode tip, an anode stem screwed to said tip and comprising a flange having a surface in close contact with a face of said tip and having a recess therein, two holes through said tip respectively in alignment with corresponding holes in the recessed portion of said flange, and a washer on said stem within said recess, said washer having a tab bent into one of said first-named holes and a second tab in alignment with and adapted to be bent into that one of said second-named holes in alignment with the other of said first named holes whereby said washer locks said tip in position on said stem, said first-named tab being adapted to be bent back subsequently out of said one of said first-named holes whereby said tip is unlocked from said position on said stem.

5. In combination, an anode stem and an anode tip, said stem including an extension adapted to fit against a face of said tip, a first hole and a second hole each formed in and extending through said tip, a third hole formed in said extension and adapted to be aligned with said second hole when said tip is screwed to operative position on said stem, and a washer on said tip face having a first tab extending initially into said first hole and a second tab in alignment with and adapted to be bent into said third hole by means passing through said second hole when said tip is in operative position on said stem thereby to lock said tip on said stem, said first tab being adapted to be moved out of said first hole by means passing therethrough to release said tip from said stem.

6. In combination, an anode stem, an anode tip adapted to be screwed thereto, said stem comprising a flange having a surface in contact with a face of said tip, a recess formed in said surface, a first and a second hole formed in and extending through said tip parallel to the axis thereof, a third hole formed in said recessed surface of said flange and adapted to align with said second hole when said tip is in operative position on said stem, and a washer adapted to surround said stem within said recess, said washer having a first tab bent initially into said first hole and a second tab in alignment with and adapted to be bent into said third hole by means passing through said second hole when said tip is in operative position on said stem thereby to lock said tip on said stem, said first tab being adapted to be bent back subsequently out of said first hole by means passing therethrough to unlock said tip from said stem.

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