

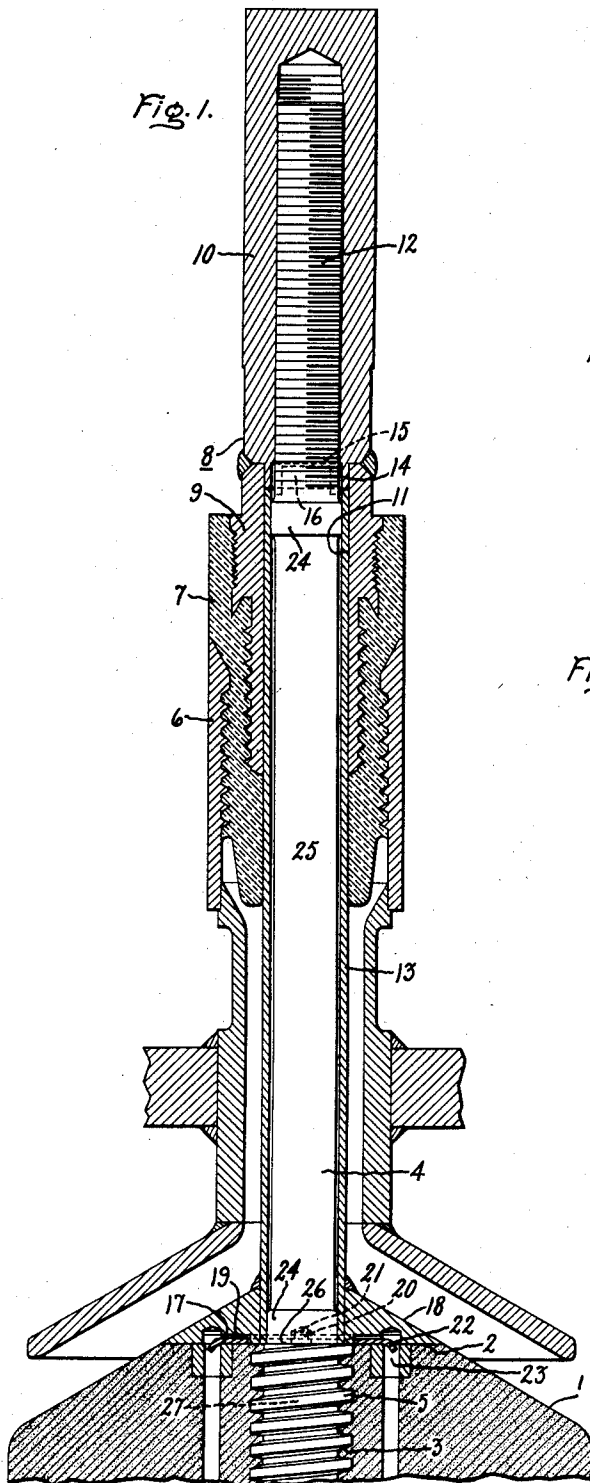
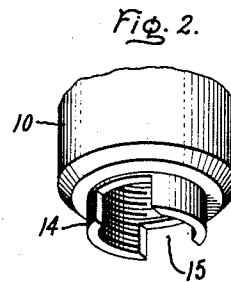
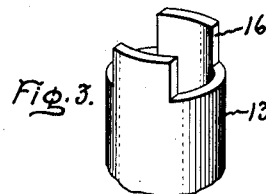
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ANODE LOCKING MEANS

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ANODE LOCKING MEANS

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6 Claims. (Cl. 250—27.5)

My invention relates to anode structures for mercury arc rectifiers of the iron tank type or like devices, particularly to locking means for the anodes and anode stems or studs of such rectifiers, and its object is to effect improvements in locking means for structures of this character.

In anode structures for mercury arc rectifiers of the iron tank type the anode proper or anode tip is commonly insulatingly mounted on the tank by means of an anode stem or stud to the lower end of which the anode tip is screwed. The anode seal, connected to the tank cover or wall, includes an insulating member having a hole formed therethrough for the passage of the anode stem, and a metal insert moulded into the insulating member. A terminal member of suitable material is welded to the insert, the hole in the insert for the passage of the anode stem is continued through the insert and into the terminal member, and the anode stem is screwed into the terminal member.

In the use of anode structures as above described difficulties have been encountered due to the tendency of the anode tip to shake loose during shipment or operation and to unscrew from the anode stem, and also to the tendency of the anode stem under like conditions to shake loose in the terminal member.

In copending application, Serial No. 419,918, of Carl C. Herskind, filed November 21, 1941, and assigned to the same assignee as the present application, for overcoming the above-described difficulty in the use of the above-described and like anode structures a disengageable means for locking the anode stem to the metal member which projects within the seal insulating member is disclosed, and further, disengageable means for locking the anode tip against rotation with reference to the anode stem. For this purpose, in the above mentioned copending application, a sleeve surrounding the anode stem is provided, the sleeve being disengageably locked at its lower end to the anode stem and tip. The sleeve extends upwardly, however, only to a point within the metal insert which is moulded within the seal insulation. Cooperating disengageable locking means are provided at this point which include a shoulder and a keyway formed in the inner wall of the metal insert and a corresponding key formed in the end of the sleeve.

It has been found that in the manufacture of the locking means thus provided in the sleeve and metal insert as above described, considerable difficulties are encountered caused, among other

reasons, by the relative inaccessibility of the inner wall of the metal insert in which the keyway is formed, the operation of machining the insert to provide the keyway being preferably performed after the insert is moulded into the insulation and the seal is in otherwise finished condition.

The present invention is an improvement on the anode structure locking means of the above entitled application. In accordance with the present invention the last-mentioned difficulty and other difficulties are overcome by extending the locking sleeve of the above-entitled prior application upwardly entirely through the metal insert and into engagement with the terminal member which is present above the metal insert and is fastened thereto, in the process of manufacture, by welding.

The novel features which are characteristic of my 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 sectional view of an anode structure in which my invention has been embodied, and Figs. 2 and 3 are detail views illustrating a disengageable locking means.

Referring to Fig. 1, the numeral 1 designates an anode tip preferably of graphite having a flat upper surface 2 and a threaded central opening 3, and the numeral 4 designates an anode stem or stud having a threaded portion 5 to which the anode tip 1 is adapted to be screwed. The numeral 6 designates an anode seal which includes an insulating member 7. A metal member 8 which is mounted upon the insulating member 7 and projects upwardly therefrom is constituted by a metal insert 9 which is moulded into and projects a considerable distance within the insulating material and also projects above the upper surface thereof, and by a metal terminal member 10 which is welded to the upper extremity of the insert 9. A hole 11 is bored through the lower portion of insulating member 7 and this hole continues on through the insert 9, no shoulder or keyway being required in the insert. A hole is bored also partly through the terminal 10, the latter member being threaded to receive the threaded upper portion 12 of the anode stem 4.

To lock disengageably the anode stem 4 against rotation with respect to the metal member 8, a

metal member or sleeve 13 is provided surrounding a portion of the anode stem 4 and projecting upwardly from the anode tip 1. The sleeve 13 projects upwardly through the lower part of the insulating member 7 as in the locking means disclosed in the above-mentioned copending application Serial No. 419,918. However, instead of the sleeve continuing only to a shoulder formed at a point in the lower portion of insert 9, as provided in the above-mentioned application, in accordance with my present invention the sleeve 13 projects through the insert 9 and abuts against the lower extremity of the terminal 10.

The sleeve 13 is adapted to be locked to the terminal 10 by providing on the inner extremity of the terminal, as better shown in Fig. 2, a downwardly depending annular or like portion 14 fitting within the upper extremity of the insert 9, and by cutting a keyway, as 15, in this annular portion, a corresponding key 16 adapted to fit into the keyway being formed on the upper extremity of the sleeve 13, as better shown in Fig. 3.

Since the terminal 10 is a piece of the metal member 8 which is initially entirely separate from the other piece, insert 9, of member 8, therefore the annular portion 14 and keyway 15 are easily formed on the end of terminal 10 before assembly, the finished terminal piece then being welded to the insert piece and thus bringing the locking means, keyway 15, associated with the terminal 10 into proper position within hole 11 to receive the cooperating locking means, key 16, of sleeve 13.

To lock disengageably the anode tip 1 to the sleeve member 13 any suitable means may be employed, such, for example, as disclosed in the before-mentioned copending application, Serial No. 419,918, wherein the sleeve is pinned if desired at its lower extremity to the anode stem and relative rotation of the anode tip and the sleeve is prevented by screws traversing an extension or flange portion of the sleeve and threaded into the anode tip. Preferably, however, the anode tip is locked against rotation relative to the sleeve by means similar to those disclosed in copending application Serial No. 396,584, filed June 4, 1941, wherein the locking means includes, essentially as shown in Fig. 1 of the present application, a flat washer 17 mounted between the anode tip 1 and a sleeve extension or flange portion 18 in a recess 19 formed therein. Tabs or ears, as 20, on the washer 17 extend upwardly into corresponding holes, as 21, in the flange 18, and other tabs or ears, as 22, extend downwardly into corresponding holes, as 23, in the anode tip 1.

In assembling the illustrated anode structure incorporating the locking means in accordance with my present invention, the metal member or sleeve 13 is first slid on to the anode stem 4 which, to prevent binding of the sleeve 13 thereon and to permit greater ease of assembly, is preferably provided with short shoulder portions 24, 24, between which is a relieved section 25 or section of reduced diameter.

The anode stem 4 is then inserted into the seal 6. The sleeve 13 is next pushed through the lower portion of the insulating member 7 and on through the insert 9 up to the lower extremity of the terminal member 10 and rotated until the key or tab 16 fits into the slot or keyway 15 formed in the annular downwardly projecting portion 14 of terminal member 10. The anode stem 4 is then screwed into the terminal member

10, the parts being so proportioned that when the stem 4 is in its desired position in the terminal 10 the upper extremity of the sleeve 13 abuts against the lower extremity of the terminal 10 while the lower extremity of the sleeve 13 abuts against a shoulder 26 formed on the stem 4 at the beginning of the threaded portion thereof.

The hole 11, as shown in Fig. 1 of the present application, is a straight hole which is drilled through the lower portion of the insulating member 7 and then entirely through the insert 9, instead of a hole requiring a shoulder in the interior of the insert as in the system disclosed in the above-mentioned application, Serial No. 419,918. Therefore, a close fit is easily made possible between the sleeve 13 and the insert 9, thereby materially facilitating the accurate alignment of the sleeve 13 and the anode stem 4.

When the anode stem 4 is threaded into its desired position in terminal member 10, as above described, the sleeve 13 is held in final position longitudinally so that it is firmly locked to the terminal member 10 and cannot be rotated with respect thereto.

The washer 17 is next placed on the face 2 of the anode tip 1 with ears or tabs, as 22, of the washer bent down into the corresponding holes 23 of the tip. The anode tip 1 is then screwed to the threaded portion 5 of the anode stem 4 until the stem flange portion 18 and the surface 2 of the tip are in close contact, with holes, as 21, of the stem flange portion in alignment with corresponding holes, as 27, in the anode tip. Other ears or tabs, as 20, are then bent up into their corresponding holes, as 21, in the stem flange portion 18 by means of a rod (not shown) inserted through the holes 27 provided for that purpose in the tip 1.

The anode tip 1 is thus locked against rotation with respect to the sleeve 13, and as the sleeve 13 is locked by the key 16 and keyway 15 against rotation with respect to terminal 10, therefore the anode tip 1 is also locked against rotation with respect to the terminal member.

The anode structure thus assembled may be readily disassembled by first bending up the ears or tabs 22 of washer 17 to free the anode tip, and thereafter reversing the above described steps of the assembly process.

My invention has been described herein in a particular embodiment for purposes of illustration. It is to be understood, however, that the invention is susceptible of various changes and modifications and that by the appended claims I intend to cover any such modifications as fall within the true spirit and scope of my invention.

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

1. In combination, an insulating member for an anode seal, a metal insert projecting within said insulating member, a terminal member fastened to the outer extremity of said insert, an anode stem traversing said insulating member and said insert and screwed to said terminal member, an anode tip screwed to said stem, and means to prevent rotation of said anode tip with respect to said terminal member, said means including a member extending from said tip to the inner extremity of said terminal member to lock disengageably said last-named member to said terminal member and to said anode tip.

2. In combination, an insulating member for an anode seal, a metal insert projecting within said insulating member, a terminal member fastened to the outer extremity of said insert, an

anode stem traversing said insulating member and said insert and screwed to said terminal member, an anode tip screwed to said stem, and means to prevent rotation of said anode tip with respect to said terminal member, said means including a sleeve enclosing the portion of said anode stem between said tip and said terminal member, said sleeve being disengageably connected at its outer extremity to said terminal member, and means to prevent relative rotation of said tip and said sleeve.

3. In combination, an insulating member for an anode seal, a metal insert projecting within said insulating member, a terminal member connected to the outer extremity of said insert, an anode stem screwed to said terminal member, an anode tip screwed to said stem, and means to prevent rotation of said anode tip with respect to said terminal member, said means including a sleeve enclosing a portion of said stem, said sleeve being disengageably connected at its outer extremity to the inner extremity of said terminal member and having an extension at its other extremity abutting against said anode tip, and means associated with said tip and said extension of said sleeve to prevent relative rotation of said tip and said sleeve.

4. In combination, an anode terminal member, an anode seal including an insulating member and a metal insert therein fastened to said terminal member, an anode stem projecting through said insulating member and said insert and screwed to said terminal member, an anode tip screwed to said stem, a metal sleeve on said stem having a flange portion and extending from said tip to said terminal member, means associated with said terminal member and the outer extremity of said sleeve to lock said terminal member to said sleeve to prevent relative rotation thereof and disengageable when said stem is unscrewed from said terminal member, and means associated with said anode tip and said sleeve flange portion to lock said tip to said flange portion to prevent relative rotation thereof.

5. In combination, an anode stem, a sleeve sur-

rounding a portion of said stem, an anode seal including an insulating member having an insert therein projecting therefrom, said insert and a portion of said insulating member having a hole of uniform diameter therethrough to receive said sleeve, a terminal member having a threaded hole adapted to have said stem screwed therein, said terminal member being adapted to be attached at its inner extremity to the outer extremity of said insert, cooperating means to lock detachably said sleeve against rotation with respect to said terminal member, said means including a member formed on said terminal member at the inner extremity thereof before said attachment thereof to said insert and adapted to engage a corresponding member formed on said outer extremity of said sleeve, an anode tip screwed to the inner extremity of said stem, and means to prevent rotation of said tip with respect to said sleeve.

6. In combination, an anode stem, a sleeve surrounding a portion of said stem, an anode seal including an insulating member having an insert therein projecting therefrom, said insert and a portion of said insulating member having a hole of uniform diameter therethrough to receive said sleeve, a terminal member having a threaded hole adapted to have said stem screwed therein, said terminal member being adapted to be attached at its inner extremity to the outer extremity of said insert, means to lock detachably said sleeve against rotation with respect to said terminal member including a portion of said sleeve projecting from the outer extremity thereof and engaging a corresponding portion of said terminal member projecting from the inner extremity thereof into said hole of said insert, said last-named portion being adapted to be formed on said terminal member before said attachment thereof to said insert, an anode tip screwed to the inner extremity of said stem, and means to prevent rotation of said tip with respect to said sleeve.

EUGENE H. REID.