

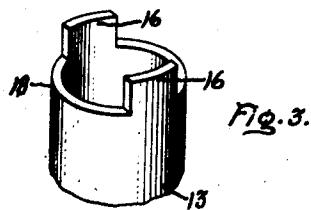
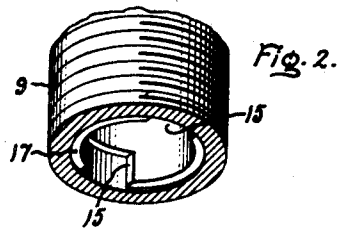
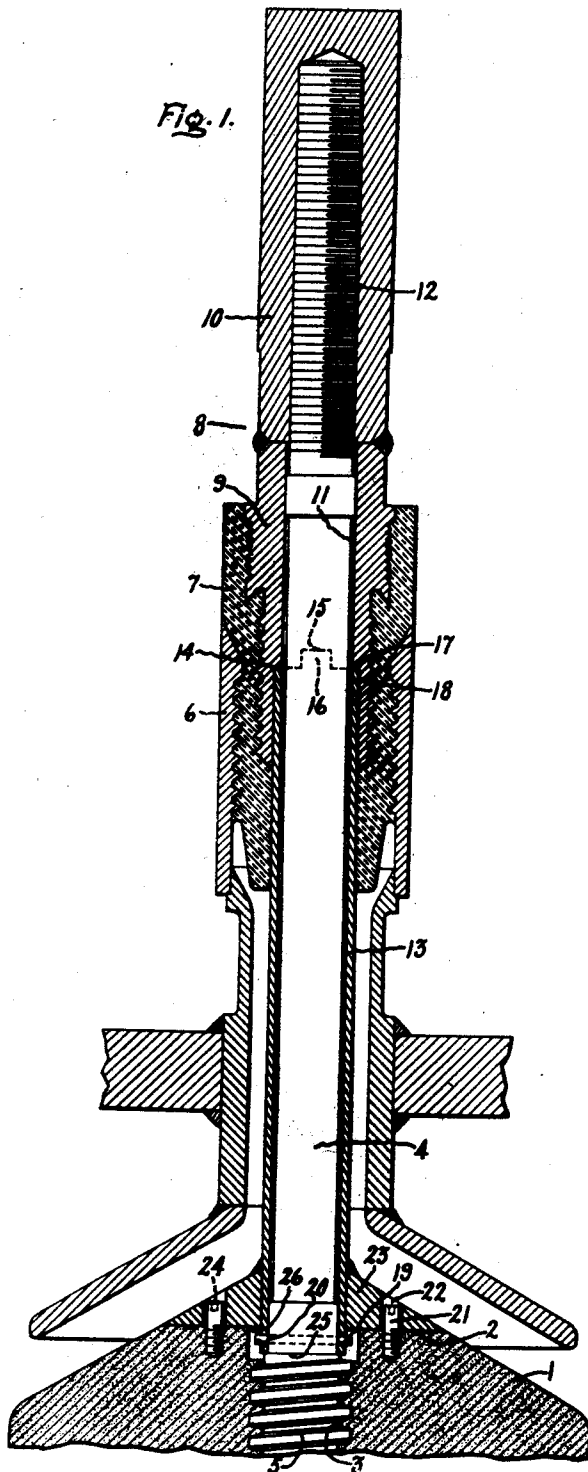
**June 16, 1942.**

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**2,286,802**

## LOCKING MEANS FOR ANODE STRUCTURES

Filed Nov. 21, 1941



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## UNITED STATES PATENT OFFICE

2,286,802

## LOCKING MEANS FOR ANODE STRUCTURES

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Application November 21, 1941, Serial No. 419,918

4 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 the supporting anode stems or studs of such rectifiers, and its general object is to provide an improved locking means for the component members of 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 a long anode stem or stud, to the lower or inner 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 member to which the anode stem is secured projects within this insulating member.

The metal member above referred to preferably includes an insert member of a suitable alloy molded into the seal insulating member, and a terminal member of suitable material welded to the insert member, the hole in the insulating member for the passage of the anode stem being continued through the insert member and into the terminal member and the anode stem being screwed into the terminal member.

In such anode structures as above described difficulties have been encountered due to the tendency of the anode tip to shake loose during shipment or during operation and to unscrew from the anode stem, and also to the tendency of the anode stem under like conditions to shake loose from the metal member which projects within the seal.

In accordance with my present invention the above mentioned and other difficulties are overcome by providing disengageable means locking the anode stem to the metal member which projects within the anode seal and which comprises the metal insert and the terminal member. A disengageable means is further provided for locking the anode tip to the first-mentioned disengageable locking means.

In practicing the invention, for disengageably locking the anode tip and the anode stem against unscrewing, a locking member or sleeve surrounding the anode stem is preferably provided and the anode seal, stem and tip assembly is locked preferably at three points, the above mentioned sleeve being locked for this purpose at its upper or outer end to the metal member which projects into the seal and at its lower or inner end to the anode stem, if desired, and to the anode tip.

The novel features which are considered to be 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 fur-

ther 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 preferably constituted by a metal insert portion 9 which is moulded into and projects a considerable distance within the insulating member, and a metal terminal portion 10 welded or otherwise fastened to the upper extremity of the insert portion 9. A hole 11 is bored through the lower portion of insulating member 7 and the metal insert 9, and a hole is bored partly through the terminal member 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 and projecting upwardly to a predetermined point 14 within the metal insert 9. The sleeve 13 is adapted to be locked to the insert 9 by cutting a keyway 15 in the inner wall of the insert, as better shown in Fig. 2, and providing on the end of the sleeve 13 a locking means in the form of a key 16, better shown in Fig. 3, which fits into the keyway. To provide space for the sleeve 13 the hole 11 is drilled to a suitably larger diameter from the lower end of the insulating member 7 to the point 14 of the insert 9, leaving a shoulder 17 on the insert against which the upper end 18 of the sleeve 13 abuts.

To lock disengageably the anode tip 1 to the anode stem 4, the sleeve 13 may first be fastened to the anode stem 4 as by a pin 19 traversing the sleeve and stem preferably at a point 20 of the anode stem closely adjacent to the threaded portion 5 thereof, and the anode tip is prevented from rotation with respect to the sleeve 13 as by pins 21 extending into the tip through holes 22 formed in an extension or flange member 23 of sleeve 13.

In order to facilitate removal of the anode tip, the pins 21 are preferably threaded into the tip but not into the flange 23 and a hexagonal hole 24 is provided in the pins so that a suitable hexagonal key may be used for unscrewing the pins

from the graphite anode tip. Since the pins 21 are threaded into the graphite they will not weld in place in operation as might be the case if they were threaded into the metal of the flange 23. Further, pins 21 being threaded into the anode tip 1 will not fall out if the anode structure is turned upside down during factory assembly.

It is not absolutely essential in practicing my present invention that the anode stem 4 be locked to the sleeve 13 by the pin 19. However, provision of the stem and sleeve locking means constituted by the pin 19 makes possible the removal of the anode tip, if desired, from the threaded portion 5 of the stem 4 without danger of unscrewing the stem from the terminal member 10. In the absence of the pin 19 the stem 4 would be "floating," or unsecured against rotation, within the sleeve 13 and the terminal member 10 when the tip 1 was unscrewed from the stem.

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 over the anode stem 4 and the stem is then inserted into the seal 6. The sleeve 13 is next pushed into the lower end of the insulating member 7 and on into the insert member 9 up to the shoulder 17 and rotated until the key or tab 16 fits into the slot or keyway 15 and the sleeve is firmly abutted against the shoulder. The anode stem 4 is then screwed into the terminal member or cap 13 as far as it will go. The various parts are so proportioned that when the anode stem 4 bottoms in the terminal member 10 the sleeve 13 abuts against a shoulder 25 formed on the stem 4 at the beginning of the threaded portion 5 thereof.

Thus when the anode stem 4 is fully threaded into its terminal member 10 the sleeve 13 is held in final position longitudinally so that it is firmly locked to the insert member 9 and cannot be rotated with respect thereto.

The anode stem 4 is, preferably, next locked against rotation with respect to the sleeve 13 by means of the pin 19 which traverses the stem and the sleeve at point 20. The anode tip 1 is then screwed onto the threaded portion 5 of the anode stem until the upper flat surface 2 is in place in contact with the flange portion 23 of sleeve 13. In the upper face of the anode tip 1 a recess 26 is preferably provided into which projects the lower portion of sleeve 13 in which the pin 19 is provided. It is not necessary therefore to peen over the ends of this pin as it is held in place by the walls of the recess 26.

After the anode tip is screwed into place on the anode stem, the tip is secured against rotation with respect to the anode stem and the sleeve 13 by means of the pins 23 which pass through the flange portion 23 of sleeve 13 and are screwed into the tip.

It will be seen that the hereinabove described anode structure locking arrangement in accordance with the present invention avoids the undesirable weld required if the anode stem is locked against rotation relative to its terminal cap by means of a pin set in, for example, from the top of the terminal cap. Further, it will be seen that in the use of the hereindescribed arrangement any type of thread may be utilized in the terminal cap without affecting the locking means, thus permitting the use of the thread having the highest electrical conductivity.

The anode structure thus assembled may be readily disassembled by reversing the above-described 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 member projecting within said insulating member, an anode tip, an anode stem screwed at one of its extremities to said metal member, and at its other extremity to said anode tip, and means to prevent rotation of said anode tip with respect to said metal member, said means including a member extending between said tip and a predetermined point of said metal member and disengageably connected at its opposite extremities respectively to said tip and to said metal member at said predetermined point to lock disengageably said stem to said metal member and to said anode tip.

2. In combination, an insulating member for an anode seal, a metal member projecting within said insulating member, an anode stem screwed to said metal member, an anode tip screwed to said stem, and means to prevent rotation of said anode tip with respect to said metal member, said means including a sleeve enclosing a portion of said anode stem and disengageably connected to said metal member and to said anode tip.

3. In combination, an insulating member for an anode seal, a metal member projecting within said insulating member, an anode stem screwed into said metal member, an anode tip screwed to said stem, and means to prevent rotation of said anode tip with respect to said metal member, said means including a sleeve enclosing a portion of said stem and disengageably connected at one extremity to said metal member and at its other extremity to said anode stem, a flange member connected to said stem at said other extremity thereof, and means associated with said flange member and said anode tip to prevent rotation of said tip with respect to said flange member.

4. In combination, an anode terminal member, an anode seal comprising an insulating member and a metal insert therein connected to said terminal member, an anode stem projecting through said insulating member and said insert and screwed at one extremity of said stem into said terminal member, a metal sleeve on said stem having a flange portion and extending to a point within said insert, locking means at said point on said sleeve and said insert to prevent relative rotation thereof and disengageable when said stem is unscrewed from said terminal member, an anode tip screwed to said anode stem at the other extremity thereof, locking means comprising a member engaging said stem and sleeve to prevent relative rotation thereof, and locking means comprising a member engaging said sleeve flange portion and said anode tip to prevent relative rotation thereof.

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