

H. E. BEACH.
ELECTROLYTIC ANODE.
APPLICATION FILED MAR. 13, 1911.

1,019,588.

Patented Mar. 5, 1912.
3 SHEETS—SHEET 1.

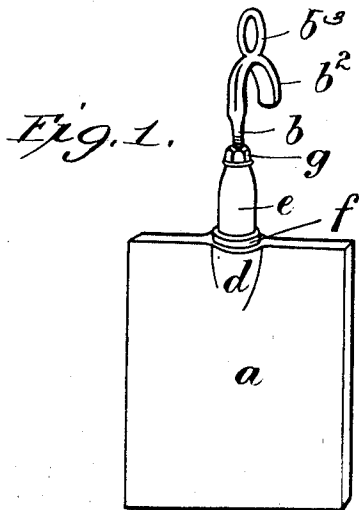


Fig. 2.

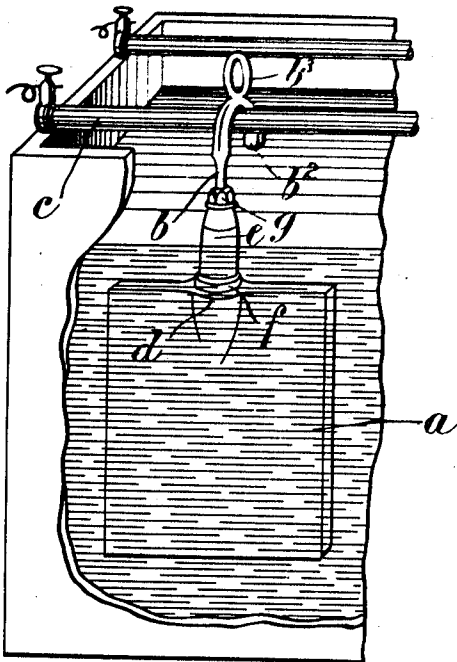
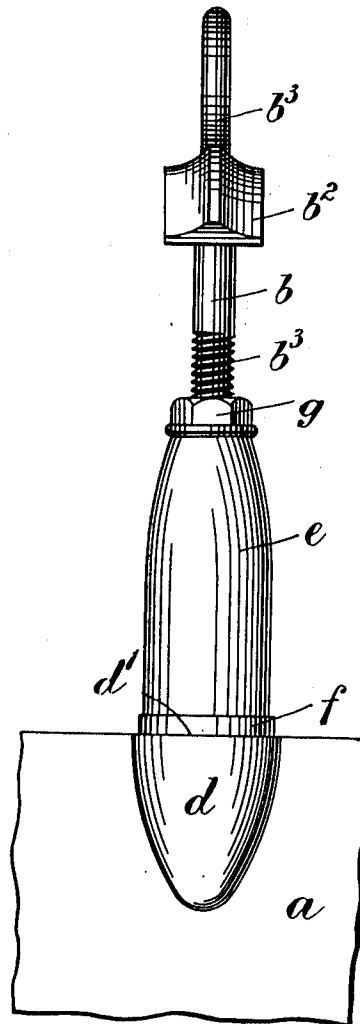


Fig. 3.



Witnesses:

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3 SHEETS—SHEET 2.

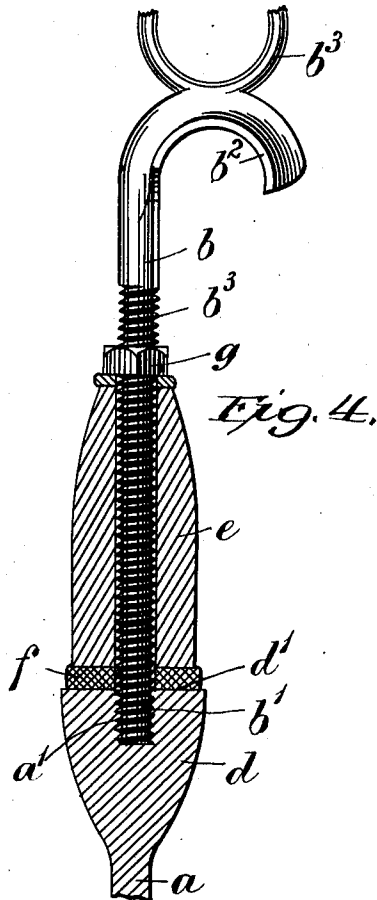


Fig. 4.

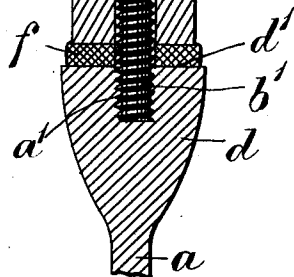


Fig. 5.

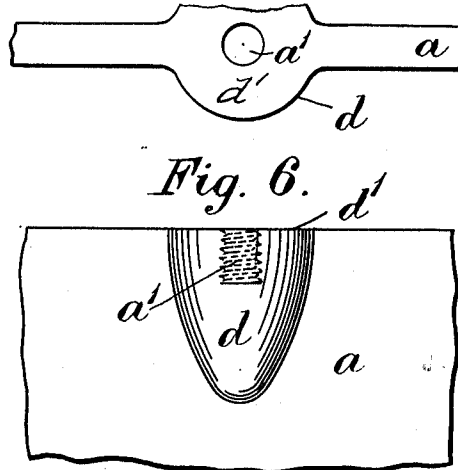
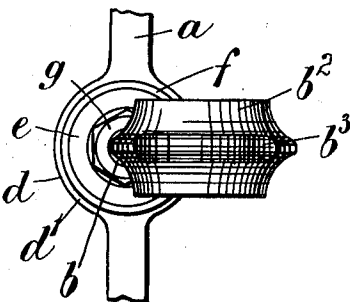


Fig. 6.

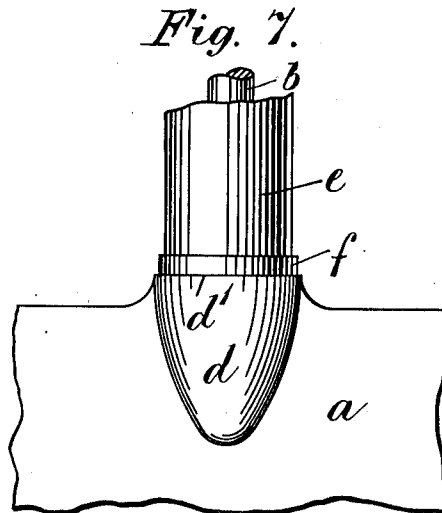


Fig. 7.

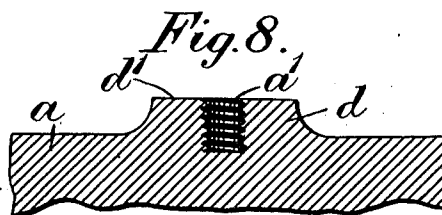


Fig. 8.

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3 SHEETS—SHEET 3.

Fig. 9.

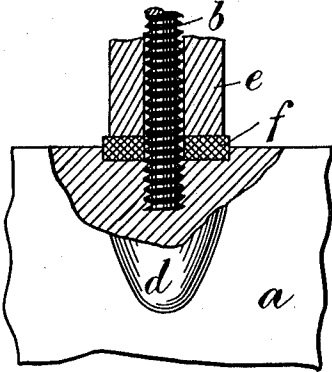


Fig. 10.

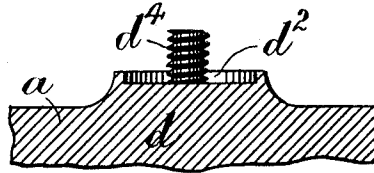
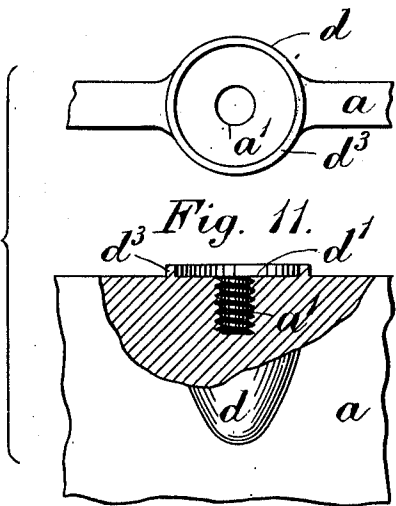
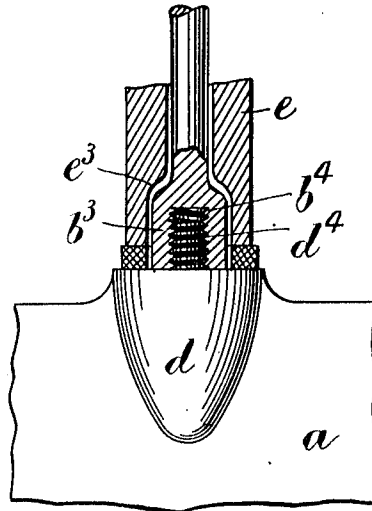


Fig. 12.



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UNITED STATES PATENT OFFICE.

HERBERT EDWARD BEACH, OF BIRMINGHAM, ENGLAND.

ELECTROLYTIC ANODE.

1,019,588.

Specification of Letters Patent.

Patented Mar. 5, 1912.

Application filed March 13, 1911. Serial No. 614,179.

To all whom it may concern:

Be it known that I, HERBERT EDWARD BEACH, a subject of the King of Great Britain, residing at Britannia Works, Hospital street, Birmingham, England, have invented certain new and useful Improvements Relating to Electrolytic Anodes, of which the following is a specification.

My invention has reference to anodes for use in electro-plating and other electrolytic operations, and relates in particular to anodes of the type wherein the current-conducting suspension rod is insulated to prevent leakage of current and to protect the rod from corrosive action when the anode itself is completely immersed in the electrolyte. Hitherto such suspension rods have been sheathed with a non-conducting covering which, in order to exclude the solution when submerged, has to be sealed by applying shellac or other cement to its lower end: this cement seal is, however a practical disadvantage, since care and skill has to be exercised in applying the cement in order to obtain a joint, while after an anode has been used up, it is necessary to provide the rod with a fresh insulation and to re-seal the joint with cement before the said rod can be applied and used again in connection with a fresh anode. It has also been proposed to use a sheathed rod having a female thread at its lower end adapted to screw onto a stud on the anode and to compress a washer which surrounds the said stud, but in this arrangement, also, the outer sheath has to be independently sealed with cement and the compression of the washer can only be effected by the undesirable method of rotating the rod itself when connecting the same to the anode.

The object of my invention is to obviate the disadvantages above referred to, and to provide an improved form or construction of anode and an improved insulation and sealing arrangement whereby the joints in the submersible insulation can be readily and perfectly sealed without the aid of cement, and independently of the application and adjustment of the rod to the anode; and whereby it is also rendered possible for a screwed suspension rod and its insulation devices to be used interchangeably and repeatedly with a succession of anodes without risk of current leakage and without risk of the said rod being weakened or its screw thread damaged by corrosion under elec-

trolytic action. This object is attained in accordance with my invention first, by the use in conjunction with a screwed conductor rod, of a rigid and impervious sleeve to insulate and protect the same, together with a sealing washer which is compressed (for the purpose of sealing the submersible joints) by pressure which is applied and maintained mechanically, and is transmitted through the said sleeve after the rod itself has been screwed and adjusted to the anode; and secondly, by forming or providing the top of the anode with an attachment lug or boss whose sectional area considerably exceeds the thickness of the body of the said anode and which not only assists in the effective sealing of the insulation by affording a large seating for the washer and a rigid bearing to take the sealing pressure, but also provides an additional thickness of metal which surrounds the attached end of the rod and protects the same from electrolytic erosion, so that an anode may be left in a solution until the whole of the body thereof has been used up (thus avoiding waste of anode metal) without risk of the suspension rod being weakened, or the screw thread thereof being damaged, with the result that the rod is preserved intact for subsequent interchangeable use with other anodes.

Figure 1 of the accompanying drawings represents, in perspective, an anode with its insulated suspender constructed in accordance with my invention. Fig. 2 is a view showing the arrangement in use, with the whole of the anode and the lower part of the suspension rod and its insulation submerged in the electrolyte. Fig. 3 represents the said anode and its suspension upon an enlarged scale, and in elevation. Fig. 4 is a sectional elevation of Fig. 3. Fig. 5 is a plan of the same, and Fig. 6 is a plan and elevation of the top part of the anode separately.

The same letters of reference indicate corresponding parts in the said Figs. 1 to 6.

The anode *a* is of the plate form usually employed in nickel plating and similar electrolytic operations, and is adapted to be suspended within the solution bath by means of the current-conducting rod *b*, which hangs from the positive conductor *c*, of the said bath, as shown in Fig. 2. The lower end of the rod has a screw thread at *b*¹, and is designed to be connected to the anode

by screwing the same direct into the tapped hole a^1 , in the top of the anode, while the upper end of the said rod is formed with a broad hook b^2 , to engage the conductor c , and make an effective electrical contact therewith, and also, if desired, with a finger loop b^3 , to facilitate the lowering and lifting of the anode into and from the solution.

The upper part of the anode is formed with a circular-sectioned boss or enlargement d , in the center of which, the tapped hole a^1 , is formed, so that the said hole is surrounded by a thickness of metal which preferably exceeds the thickness of the plate-like body of the anode, and which is adapted to protect the end b^1 , of the rod from corrosion when submerged, owing to the fact that the body-metal will be entirely used up before the electrolyte can penetrate the thicker walls of the lug and attack the screw. The said lug has also a flat top d^1 , which, in the arrangement shown in Figs. 1 to 6, is flush with the top edge of the anode, and serves as a seating for the sealing washer as hereinafter described.

To protect the rod b , from electrolytic action and prevent current leakages from the submerged part thereof direct to the electrolyte, the said rod is provided with a long sleeve or covering e , made of suitably-treated wood, vulcanite, glass or other rigid non-conducting material which is impervious to liquid, while between the base or foot of this sleeve and the attachment boss or enlargement d , on the anode, there is interposed a sealing washer f , made of fiber, rubber or other compressible substance, which surrounds the rod b , immediately above the boss d . This washer, which is of considerable diameter, is everywhere supported by the flat-topped surface of the enlargement on the anode, while the lower end of the sleeve e , where it bears on the washer, is also of considerable diameter or thickness, so that the contacting surfaces of the parts d , e , and f , are of sufficiently ample area to insure perfectly liquid-tight joints when compressed.

In addition to providing a protective insulation for the rod, the sleeve e , also serves as the medium for transmitting mechanical pressure for compressing the washer f , between the base of said sleeve and the boss on the anode after the attachment of the said rod; such pressure being applied and maintained, in the arrangement shown, by a nut g , which is screwed onto the wormed upper part b^3 of the rod and bears directly against the upper end of the sleeve as represented, or the nut may be arranged to act indirectly on the sleeve through an intermediate washer or sleeve having a D-shaped or similar hole engaging on a correspondingly-shaped part of the rod, which prevents the compressible washer f , being damaged

by twisting when the nut is tightened up. Thus when the nut g , is screwed down the rod after the various parts a , b , e , f , have been assembled, the consequent compression of the washer by pressure transmitted through the said sleeve mechanically closes and seals the joint between the parts e , f , d , so that when the anode is suspended in the electrolyte, not only is perfect electric insulation obtained, but it is impossible for the solution to penetrate the sealing washer and attack the parts of the rod surrounded by the sleeve, while the end of the said rod which is screwed into the anode is protected by the surrounding thickness of metal in the boss or enlargement. As a further precaution, the contacting surfaces of the sleeve, washer, and anode may be covered with some plastic insulating material which is also compressed when the mechanical pressure is applied. The outside of the boss d , may also be covered or surfaced with a protective insulating material to delay the action of the electrolyte on the part of the anode to which the rod is attached.

If necessary, in the case of large anodes, two or more bosses such as d , may be provided, each of which is furnished with a suspension rod and a mechanically-sealed insulation as described.

Instead of the flat top of the boss d , being flush with the edge of the anode a , as in Figs. 1 to 6, the said boss may be of the elevated form shown in Figs. 7 and 8; or it may be formed with a circular recess d^2 , to receive and confine the sealing washer as in Figs. 9 and 10; or the top of the said boss may be provided, for the same purpose, with a ring or collar d^3 , as shown in Fig. 11, to surround the washer.

Instead of the lower end of the rod being screwed into a tapped hole in the anode boss, the latter may be furnished, as shown in Fig. 12, with a screwed stud d^4 , see also Fig. 10, while the rod has an enlarged end b^3 , and a female screwed socket b^4 , which is engaged with the stud in attaching the rod to the anode. In this case, the inside of the insulating sleeve has a clearance e^3 , sufficient to admit of the movement of the said sleeve e , relative to the enlargement on the rod when sealing pressure is applied by the nut.

It is obvious that the improvements herein described can be applied to anodes made of any metal and of any form, size or pattern, as well as to plate anodes such as represented in the drawings.

Having described my invention, what I desire to claim and secure by Letters Patent is:—

1. In a device of the class specified, the combination of an anode, a current conducting suspension rod removably fitted in the upper end of the anode and having a hook

at its upper extremity and screw-threads on the body thereof, a non-conducting rigid sleeve mounted over the suspension rod, a washer of a compressible structure surrounding the rod and interposed between the lower end of the sleeve and the upper edge of the anode, and a single nut engaging the screw-threads on the body of the rod and adjustable to tightly bear on the upper end of the sleeve to institute a tight engagement between the lower end of the sleeve and the washer and a non-leakable joint between the said washer and the upper edge of the anode adjacent to the point of attachment of the rod for the latter.

2. In a device of the class specified, an electrolytic anode having an enlargement at the center of the upper edge thereof around a screw socket, a current conducting suspension rod having a lower screw-threaded end removably fitted in the socket

of the anode and also provided with a hook at its upper end and screw-threads on the body thereof, a non-conducting rigid sleeve mounted over the suspension rod, a non-conducting compressible washer interposed between the lower end of the sleeve and the central enlarged portion of the anode, and a nut engaging the screw-threads on the body of the rod and movable toward and adapted to clamp tightly against the upper end of the sleeve and set up a tight engagement between the lower end of the latter and the washer and the enlarged portion of the anode.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

HERBERT EDWARD BEACH.

Witnesses:

ARTHUR SADLER,
ALFRED WARD.