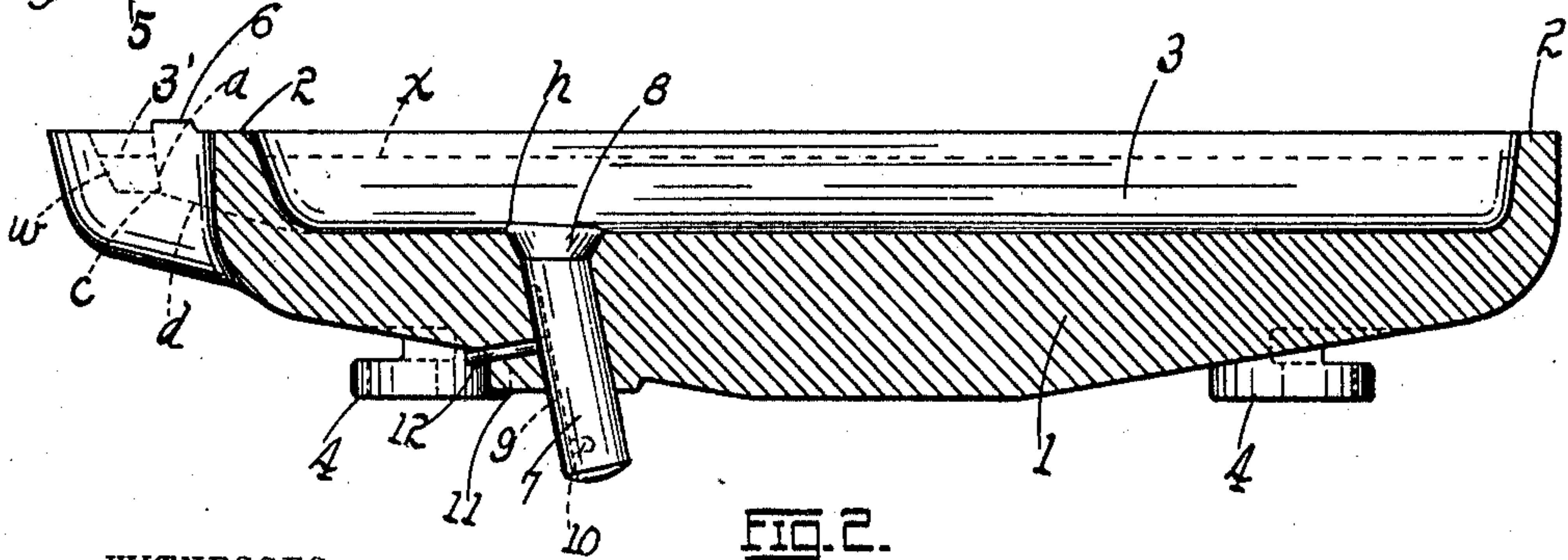
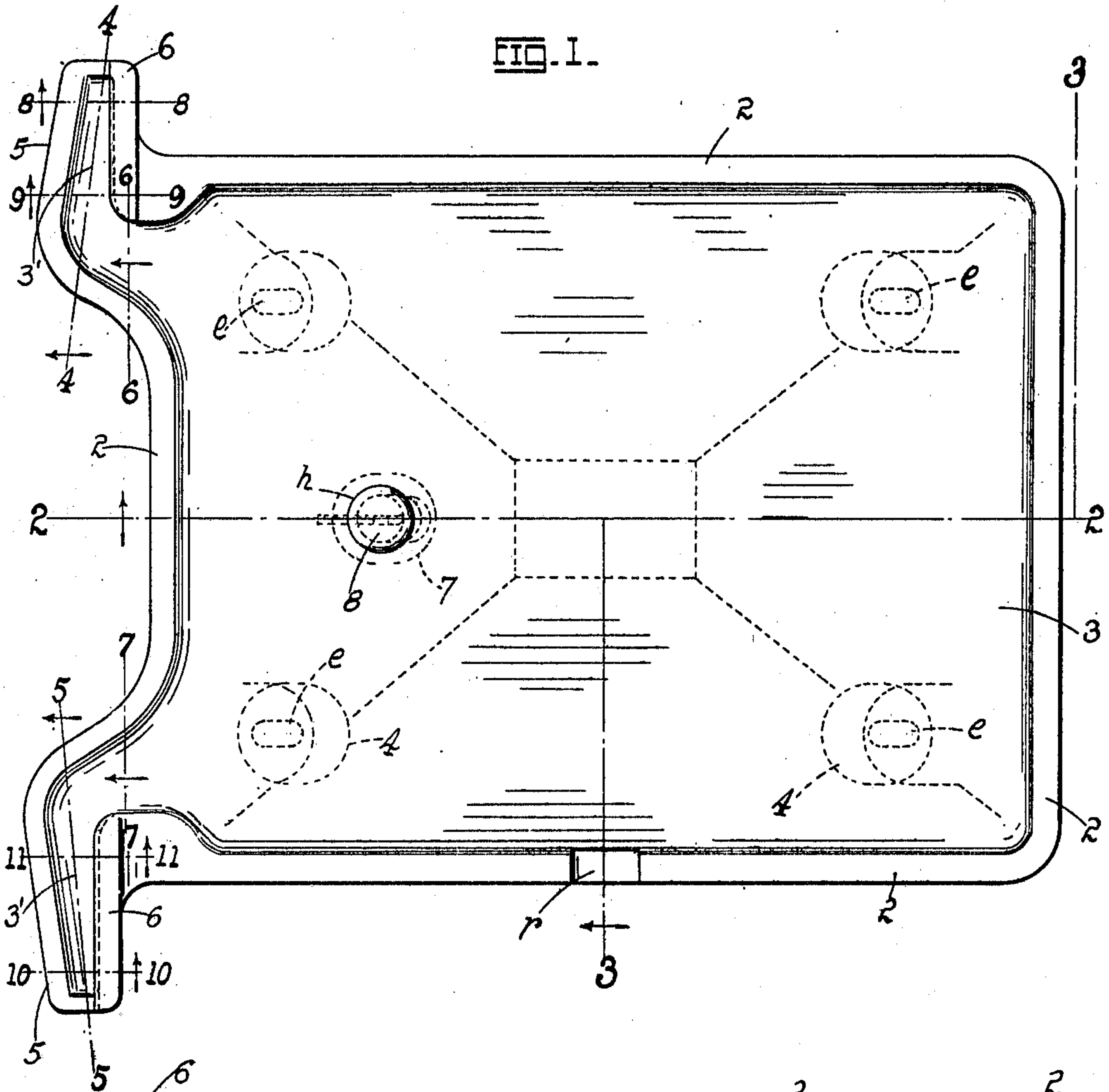


U. A. GARRED.
 ANODE MOLD.
 APPLICATION FILED DEC. 12, 1910.

988,564.

Patented Apr. 4, 1911.

2 SHEETS—SHEET 1.



WITNESSES:

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 A. H. Powell

FIG. 2.

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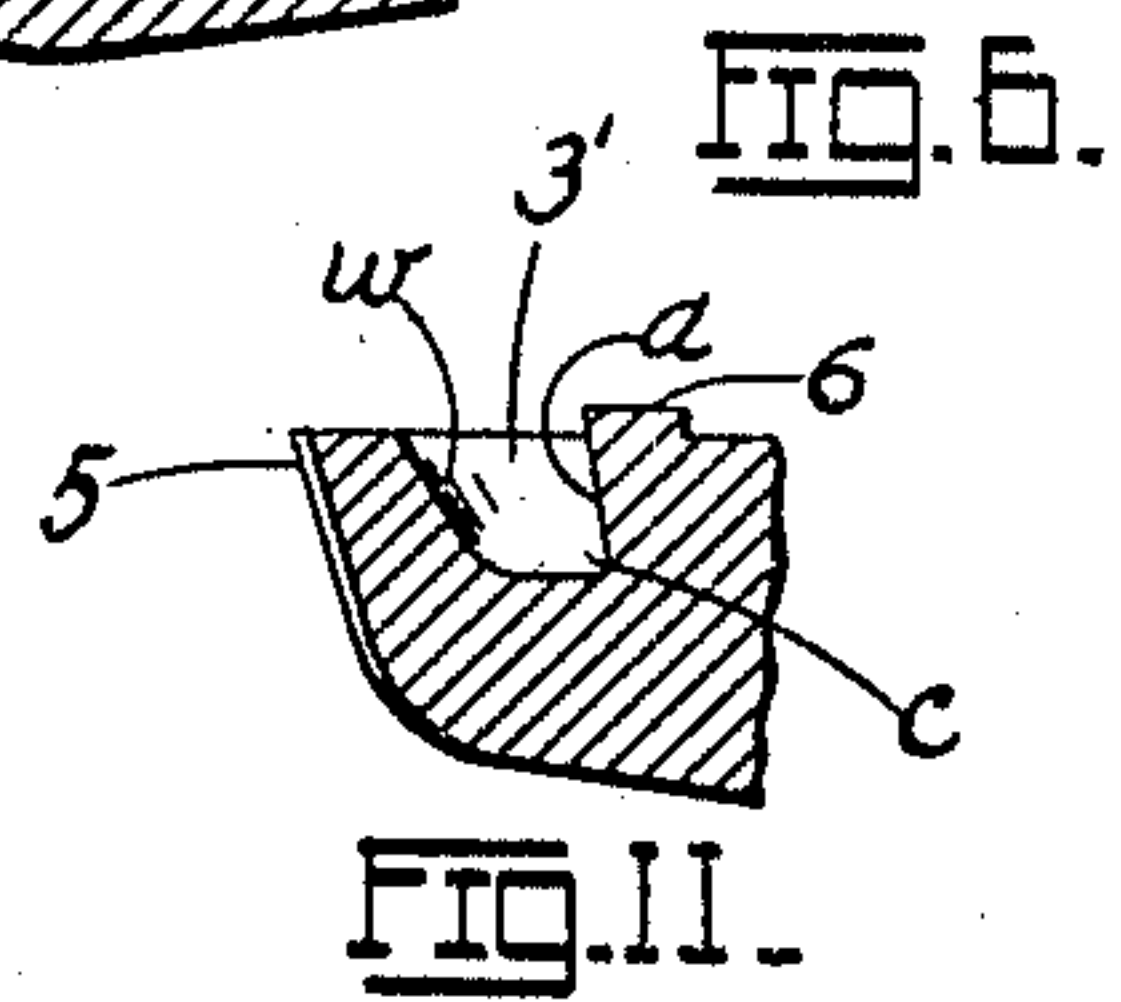
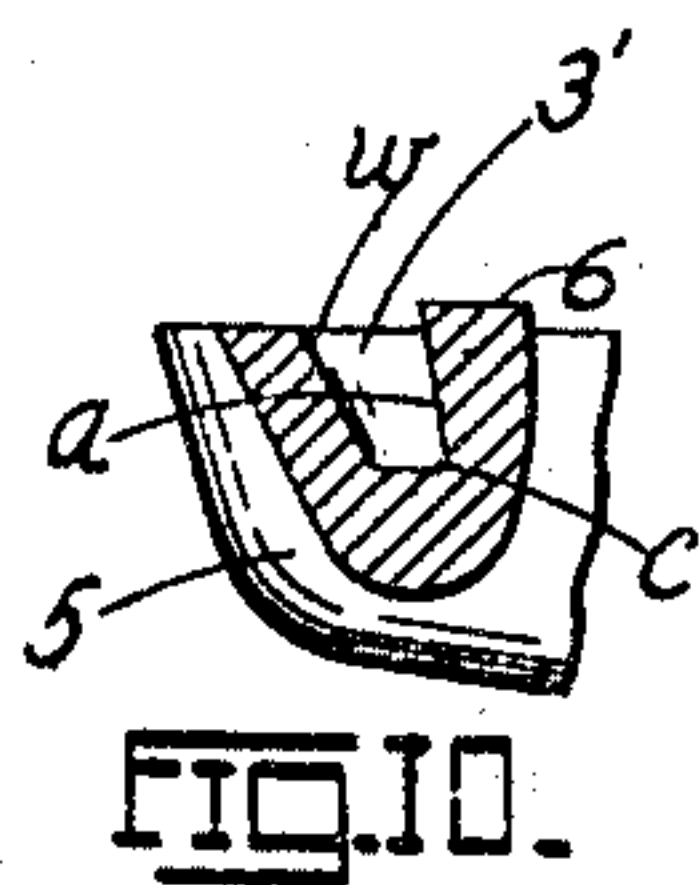
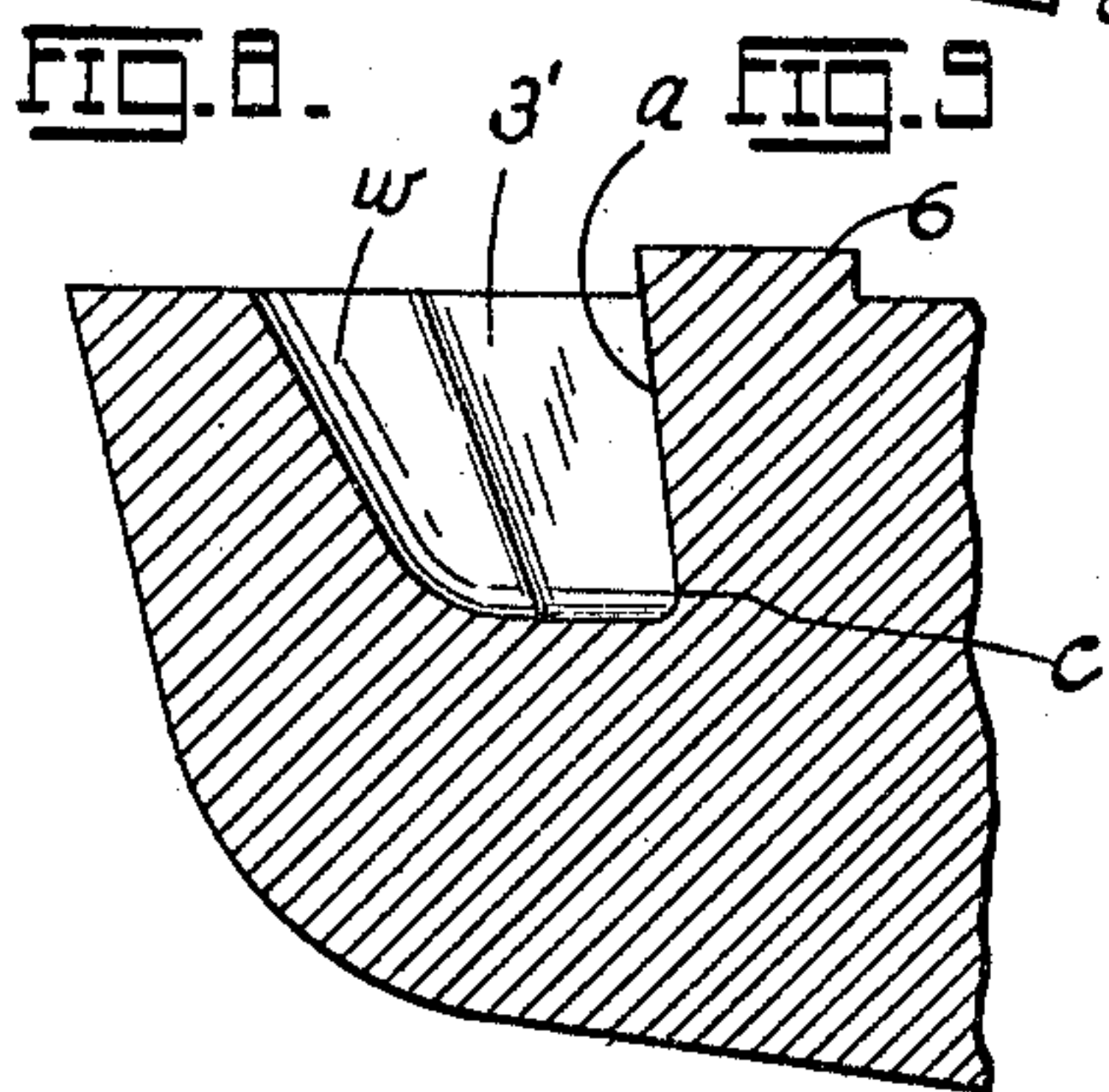
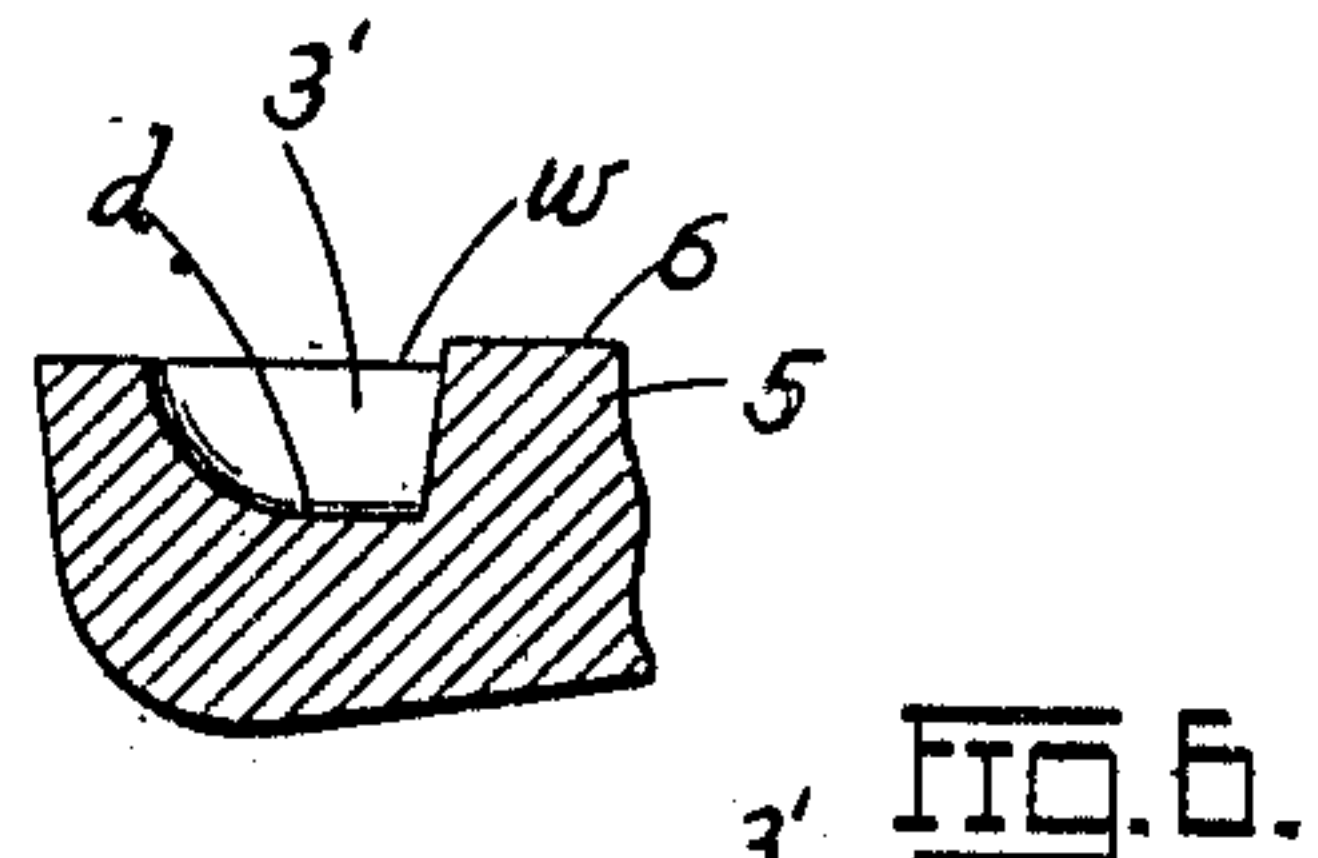
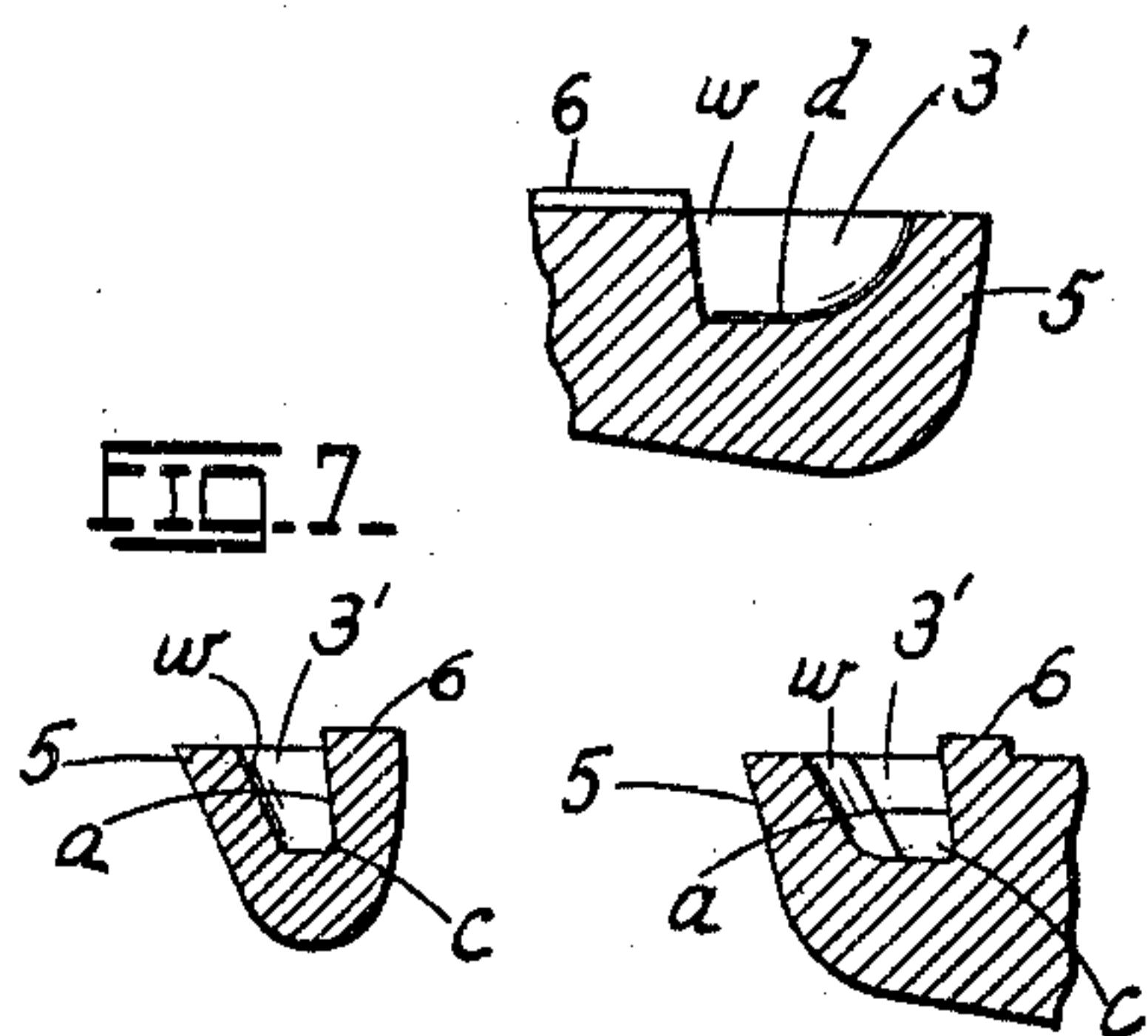
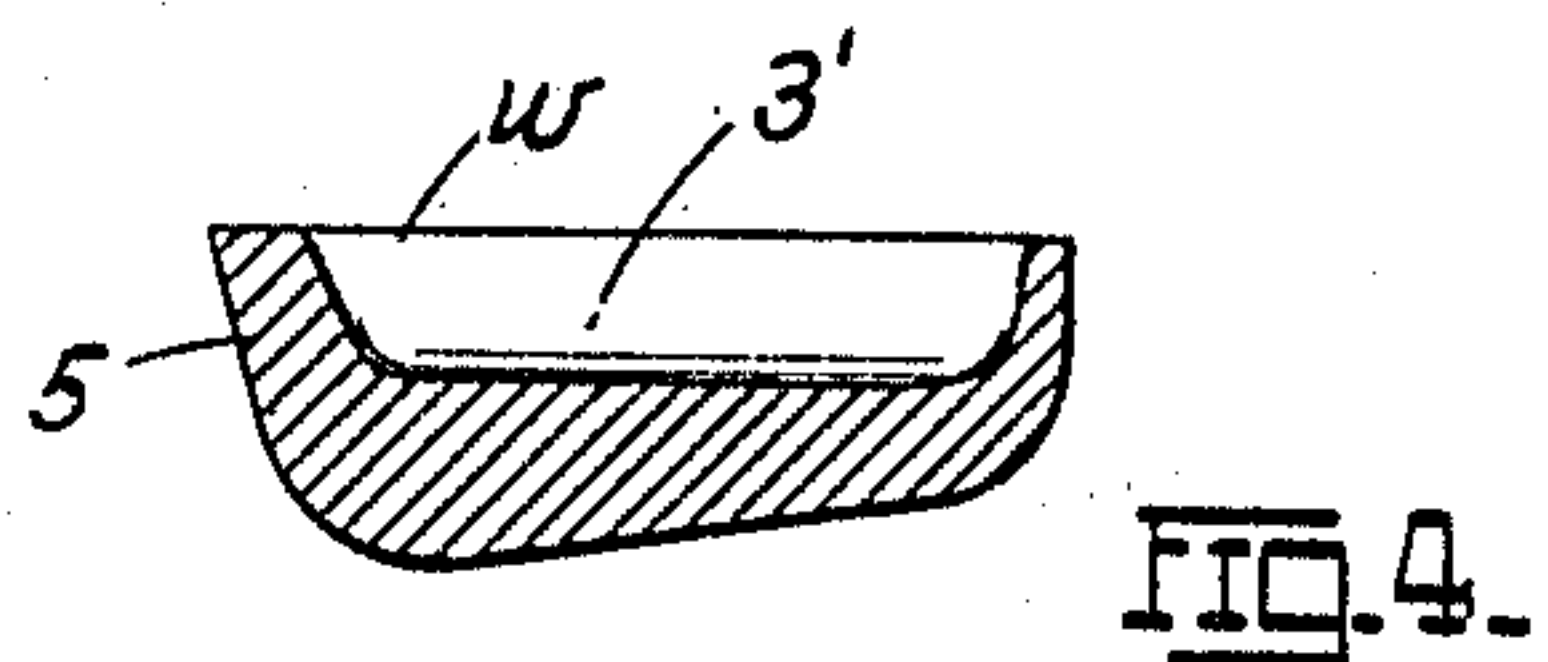
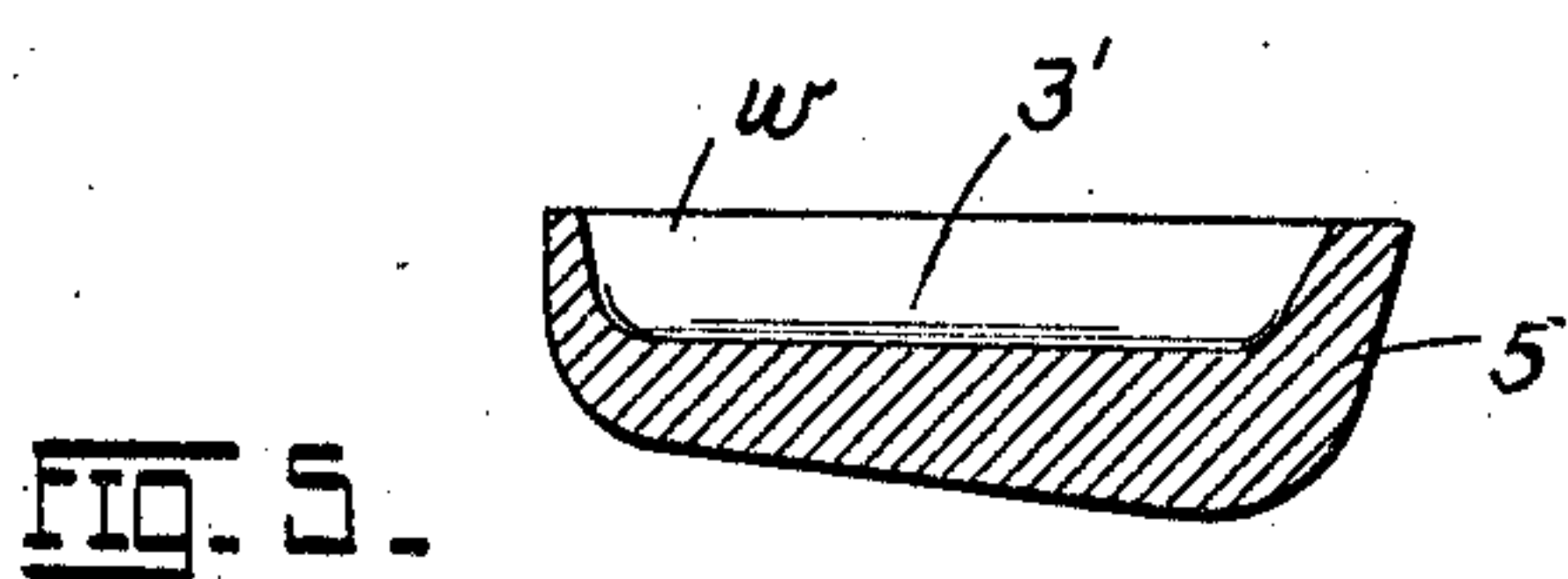
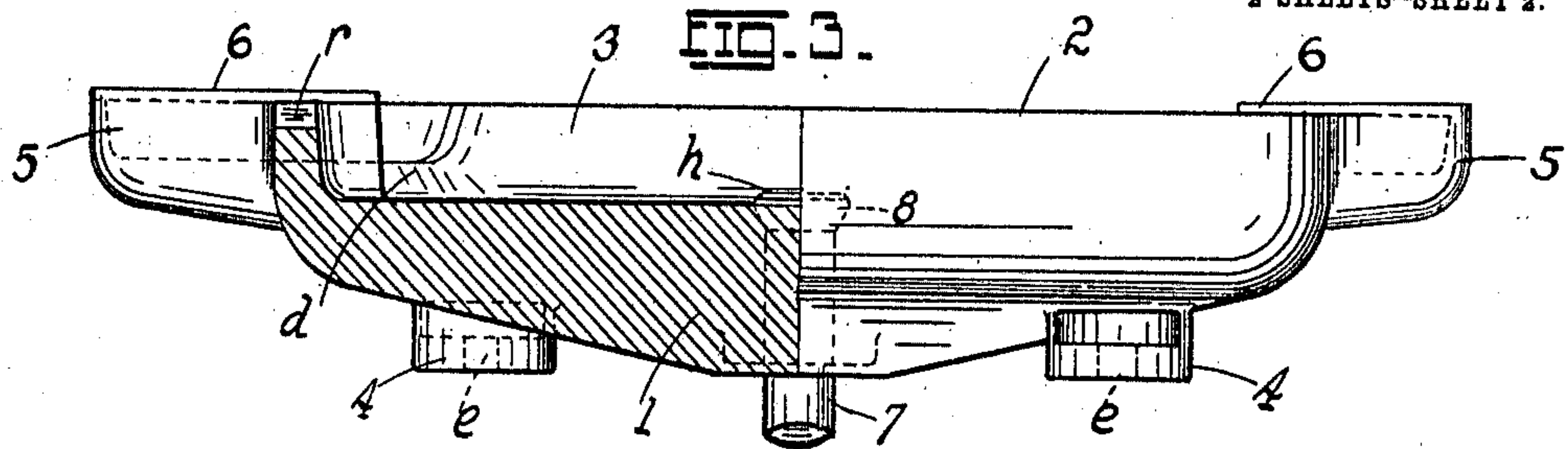


FIG. 12.

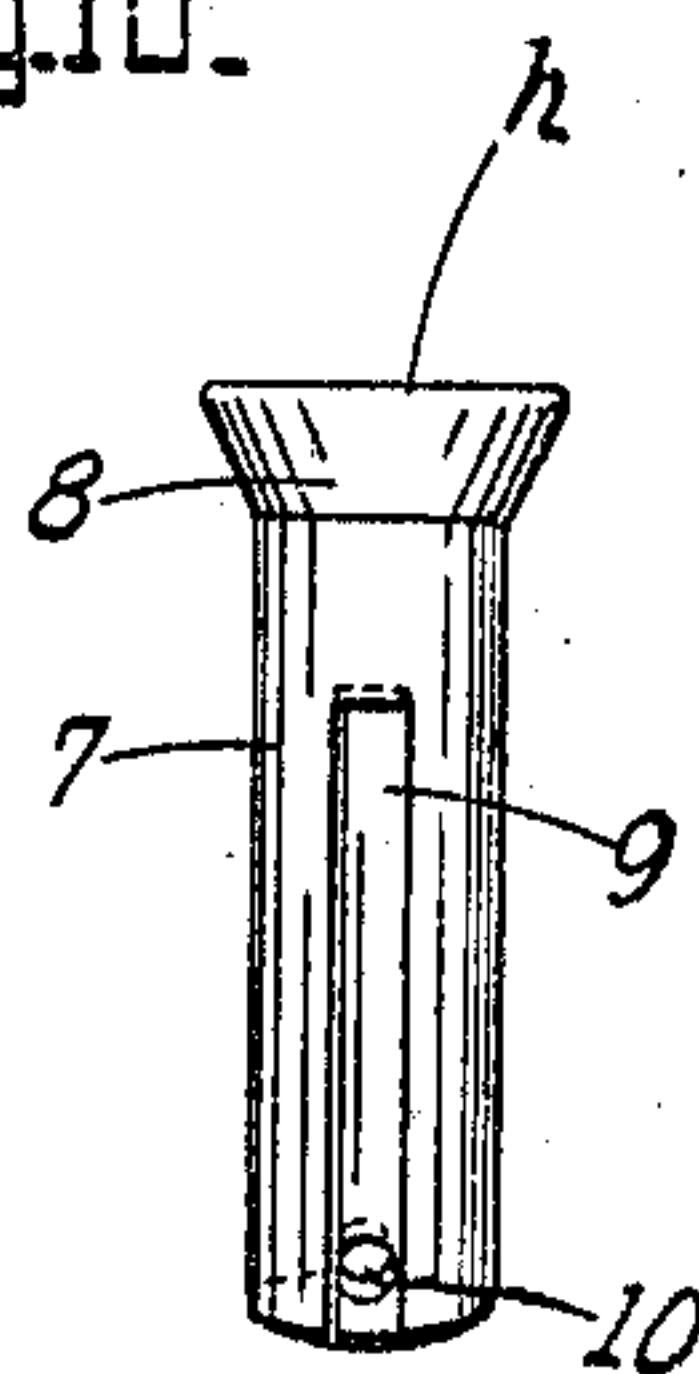


FIG. 13.

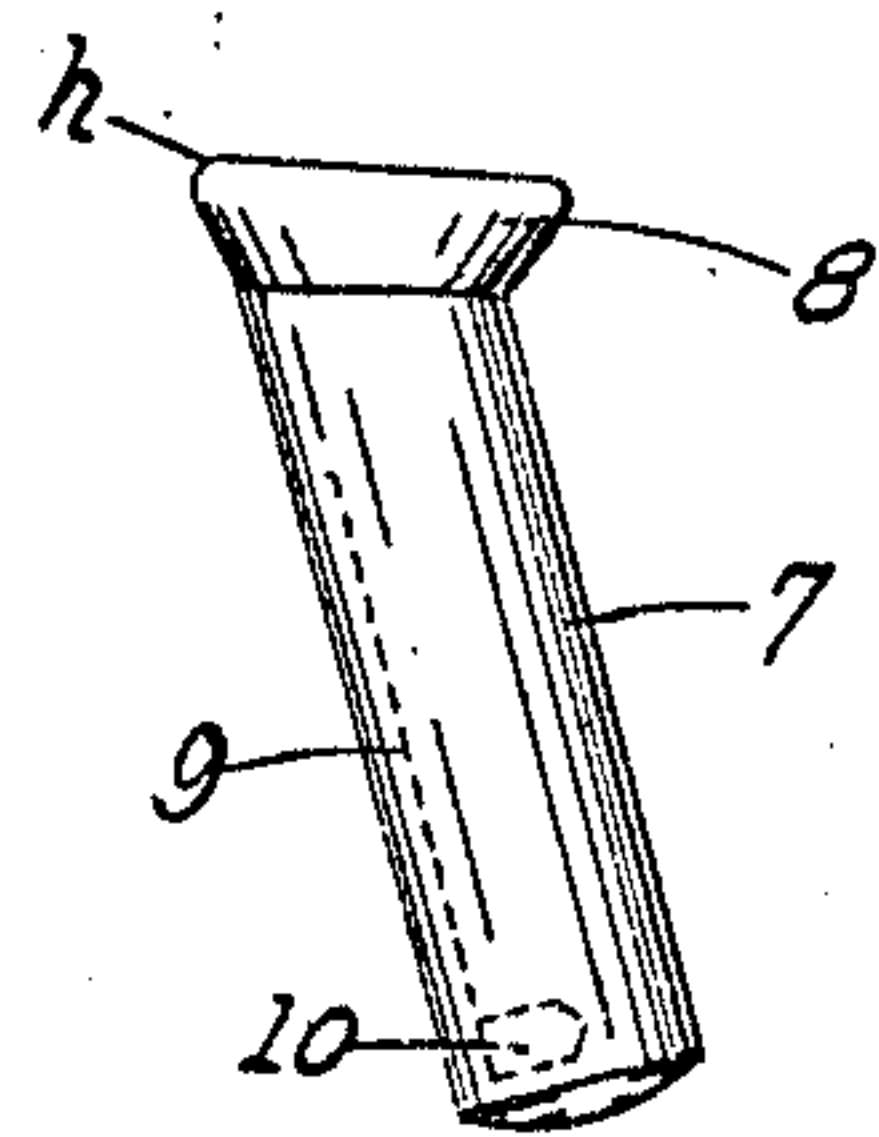


FIG. 14.

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UNITED STATES PATENT OFFICE.

ULYSSES A. GARRED, OF ANACONDA, MONTANA.

ANODE-MOLD.

988,564.

Specification of Letters Patent.

Patented Apr. 4, 1911.

Application filed December 12, 1910. Serial No. 596,817.

To all whom it may concern:

Be it known that I, ULYSSES A. GARRED, citizen of the United States, residing at Anaconda, in the county of Deerlodge and State of Montana, have invented certain new and useful Improvements in Anode-Molds, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention has relation to improvements in anode molds; and consists in the novel construction of mold more fully set forth in the specification and pointed out in the claims.

In the drawings, Figure 1 is a top plan of the mold; Fig. 2 is a longitudinal middle section on the line 2—2 of Fig. 1; Fig. 3 is a combined end view and transverse section on the broken line 3—3 of Fig. 1; Figs. 4, 5, 6, 7, 8, 9, 10 and 11 are detail sections on the lines 4—4, 5—5, 6—6, 7—7, 8—8, 9—9, 10—10 and 11—11 respectively on Fig. 1; Fig. 12 is an enlarged sectional detail similar to Fig. 9; Fig. 13 is a face view of the driving or ejecting pin; and Fig. 14 is a side elevation thereof.

The mold forming the subject-matter of the present application is designed specially for the casting of copper anodes, which, as well understood in the art, constitute the positive electrodes in electrolytic refining processes, the copper being attacked and dissolved in the electrolyte and redeposited in a refined state on the cathode or negative electrode.

Among the objects sought by the present invention is a mold that will cast an anode which can be suspended in a truly perpendicular position in the solution tank; to provide substantially a knife-edge from which the anode may be suspended, said edge coming directly over the center of gravity of the casting; to provide a mold which will dispense with the necessity of coping or cooling blocks; one containing a minimum number of parts; one in which the suspending edge of the anode cast therefrom is free from "fins" or rough edges; one making special provision for the ejection of the cast anode out of the mold; one which may be manufactured cheaply, and one possessing further and other points of advantage better apparent from a detailed description of the invention, which is as follows:—

Referring to the drawings, 1 represents an

oblong mold made of cast metal provided with marginal walls or flanges 2 forming with the top plane surface of said casting a basin or mold 3 into which the main body of the anode is poured and in which it is cast. The section of the mold is substantially as shown in Figs. 2 and 3, the bottom of the mold being provided with feet 4 having slots *e* elongated longitudinally of the mold, said slotted feet serving as means to adjustably secure the mold to the tables of a suitable platform conveyer not here shown and forming no part of the present invention. Extending outwardly from the mold 1 at one end thereof and from two contiguous corners of the mold are arms 5, 5, each arm having formed therein a basin or matrix 3' communicating with the main matrix or basin 3, said basins 3' thus forming extensions or bays for the main basin 3. One of the side walls 2 of the mold is provided with a recess *r* which serves as a gate for the metal poured into the mold, and keep the same at a uniform level, the bottom of said recess being disposed in the horizontal plane indicated by the dotted line *x* in Fig. 2, said line indicating the highest level of the metal poured into the mold, and corresponding to the outer face of the anode cast in the mold, the opposite or inner face of the anode being defined by the bottom of the basin 3 or upper face of the mold 1.

The bays or basins 3' into which the metal (from which the anode is cast) runs from the main basin 3 are shallower than the available depth of the basin 3 (the depth between the bottom of the gate *r* and the bottom of the basin 3), the bottoms of the basins 3' being disposed substantially midway between the plane of the line *x* and the bottom of the basin 3. As best shown in Figs. 8, 9, 10, 11, it will be seen that the outer side wall *w* of the basin 3' slopes inwardly toward the bottom of the basin and merges with said bottom, the line of convergence being a more or less rounded corner. The opposite or inner side wall *a* of the basin 3' is slightly recessed so as to bring its lower edge to one side of a vertical plane passed through its upper edge, this recessing resulting in a slight slope or inclination for the wall *a*, that is to say, the wall *a* is slightly inclined (outwardly) to a plane drawn perpendicular to the face of the anode to be cast, or to the plane in which the line *x* is disposed. The upper edge of

the wall a corresponds to the outer edge of the reinforcing rib 6 projecting a slight distance beyond the plane of the upper edges of the walls 2. The acute angle c formed at the corner or intersection between the inclined wall a and the bottom of the basin 3' results in the formation of a knife-edge at the corresponding corner or edge of the arm (of the anode) cast in said basin; and since these corners are disposed on a line substantially midway between the planes of the opposite faces of the anode cast in the main basin 3, it follows that the knife edges of suspension for the complete anode as cast will lie in a plane passing through the center of gravity of said anode, and be relatively above said center, thereby permitting the anode to hang perpendicularly in the solution tank (not shown) from the walls of which the anode arms cast in the basins 3' are suspended. The bottom of the basin 3 leads up to the bottoms of the basins 3' along an incline d as shown to best advantage in Figs. 2 and 3.

The metal (copper) poured into the basins 3, 3', 3', of the mold thus formed, in cooling naturally binds on the surfaces of the walls a , a , so that in ejecting the anode or casting from the mold, it must be ejected in such a way as to permit the suspension arms (cast in the basins 3', 3',) to pass freely over the free edges of said inclined walls a , a . To accomplish this the casting must be moved not only vertically (or at right angles to the plane of the mold bottom) but horizontally to pass around the undercut or recess which imparts the slight inclination alluded to, to the wall a , the comparative increased inclination imparted to the wall w over the wall a allowing for such horizontal movement. This ejection is accomplished as follows:—Located in the bottom of the mold midway between the sides of the mold, and to one side of the center thereof, and on the side nearest the arms 5, 5, is an inclined opening which freely receives the shank 7 of a driving pin, the inner end of the opening terminating in a conical socket or enlargement which receives the correspondingly shaped or conical head 8 of the pin, the base of the cone being so inclined as to leave a heel h slightly raised above the bottom of the mold, said heel engaging the bottom of the casting or anode poured into the mold. The periphery of the shank of the pin is provided with a longitudinal groove 9 open at the free end of the shank, a socket 10 leading from the groove at right angles thereto near the end of the shank. The boss 11 through which the shank of the pin passes has loosely mounted thereon a key or guide pin 12 whose inner end traverses the groove 9 of the shank of the ejecting pin. It will be seen (Fig. 2) that the heel h is on the side toward the arms

5, 5. When the anode has been cast and has cooled the operator drives the pin 7 upward, the pin following the inclination of the opening which receives it, and since the axis of said opening is inclined upwardly toward that end of the casting carrying the lugs or arms cast in the basins 3', 3', the entire casting is lifted in such a way as to permit the knife-edges of the lugs to freely pass around the upper edges of the recessed or inclined walls a , a , the ejection of the casting imparting thereto a movement which is a resultant of the vertical and horizontal movements above alluded to. The knife-edges formed on the resulting lugs of the anode being at the bottom or on the inside of the mold while being cast, it follows that these edges are clean cut and sharp, and though slightly rounded, they serve the purpose of knife-edges for the perpendicular suspension of the anode. When the casting is lifted to clear the upper edge of the wall a , the key or pin 12 may be shoved into the socket 10 to temporarily hold the casting in position to be seized and subsequently removed from the mold. Obviously, the mold need not be restricted in its application to the casting of anodes.

It will be seen that in order to serve as suspension edges, said edges must necessarily be disposed at substantially right angles to the longitudinal axis of the casting, so that necessarily the corners formed at the convergence of the walls a and bottoms of the basins 3' must be substantially at right angles to the longitudinal axis of the mold or basin 3.

It will be noticed (Fig. 1) that one of the arms 5 is a trifle longer than the other, so that the suspending arms of the anode cast in the respective basins 3', 3', will be unequal in length. The longer arm reaches to, and rests on, the bus-bar (or electric contact) whereas the shorter arm does not. The cathode (not shown) likewise has one suspending arm longer than the other contacting with the opposite bus-bar, so that the current passes from one bus-bar into the long arms of the anodes, thence from the anodes through the electrolyte, thence into the cathodes, and through the long arms of the latter and finally emerging from the opposite bus-bar. All this is standard construction however, and no novelty is claimed therefor herein.

Having described my invention, what I claim is:—

1. An anode-mold comprising a main basin having a bottom and inclosing walls for receiving the charge to be cast, outwardly projecting arms disposed on opposite sides of a line passing through the center of the mold and provided with basins inclosed by said walls but of shallower depth than the main basin, and in communication therewith, the

sides of the arm-basins inclining outwardly from the bottoms thereof, the inner sides merging with said bottoms along corners disposed substantially at right angles to the central line aforesaid, and a movable ejecting pin in the mold bottom inclined toward the end carrying the arms for lifting the anode cast in the mold clear of the inclined sides of the arm-basins.

2. An anode-mold comprising a main basin having a bottom and inclosing walls for receiving the charge to be cast, outwardly projecting arms disposed on opposite sides of a line passing through the center of the mold and provided with basins inclosed by said walls but of shallower depth than the main basin and in communication therewith, the sides of the arm-basins inclining outwardly from the bottoms thereof, the inner sides merging with said bottoms along corners disposed substantially at right angles to the central line aforesaid, and a movable ejecting member mounted to one side of the center of the mold on the central line aforesaid and on that side of the center nearer the arms for lifting the anode cast in the mold clear of the inclined sides of the arm-basins.

3. An anode mold comprising a main basin having a bottom and four inclosing walls for receiving the charge to be cast, outwardly projecting corner arms provided with basins inclosed by the same walls but of shallower depth than the main basin, and in communication with the main basin, the side walls of the shallow basins inclining outwardly from the bottoms thereof, the inner side walls merging with said bottoms along corners disposed substantially at right angles to the axis of the mold, and a movable ejecting pin in the bottom of the mold mounted to incline toward the end carrying the corner arms for lifting the casting out of the mold, substantially as set forth.

4. An anode mold comprising a main oblong basin having a bottom and inclosing walls for receiving the charge to be cast, outwardly projecting terminal corner arms provided with basins communicating with the main basin and of a depth shallower

than the main basin, the inner and outer side walls of the corner basins being inclined outwardly from the bottoms of the basins, the inner bottom corners of the corner basins forming suspension edges for the anode arms cast therein and disposed substantially at right angles to the vertical axis of the anode when suspended, an ejecting pin mounted movably in the bottom of the main basin on the longitudinal axis of the mold and to one side of the center of the mold, and nearest the end carrying the corner arms, the pin inclining toward the arms, and adapted to lift the casting out of the mold, substantially as set forth.

5. In combination with a mold provided with a basin for receiving the charge to be cast, an ejecting pin provided with a shank and an inner terminal head movably mounted in the mold bottom, the head being provided with a heel to engage the bottom of the casting, the shank being provided with a longitudinal groove, and a guide pin or key carried by the mold bottom and positioned on the outside of the mold, for the purpose set forth.

6. In combination with a mold, an ejecting pin mounted in the mold bottom and provided with a shank and terminal head, the shank having a longitudinal groove, and a socket leading from the same near the outer end of the groove, and a movable guide pin for engaging said groove and socket for the purpose set forth.

7. In combination with a mold, an ejecting pin loosely passed through the mold bottom at an incline to the plane of said bottom, and comprising a grooved shank terminating in a conical head, the latter having a heel formation to engage the charge introduced into the mold, and a guide pin on the mold for engaging the groove of the pin-shank.

In testimony whereof I affix my signature, in presence of two witnesses.

ULYSSES A. GARRED.

Witnesses:

M. E. RUTLEDGE,
L. M. SHERIDAN.