No. 850,788. PATENTED APR. 16, 1907.

L. N. J. ROSELLE.

SECONDARY BATTERY PLATE AND METHOD OF MAKING SAME.

APPLICATION FILED FEB. 13, 1905.

Fig. 1

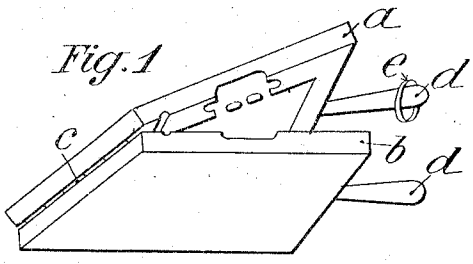


Fig. 4

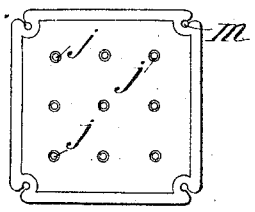


Fig. 2

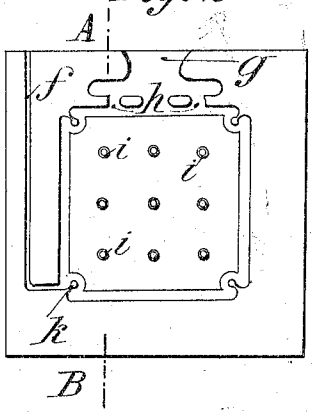


Fig. 3

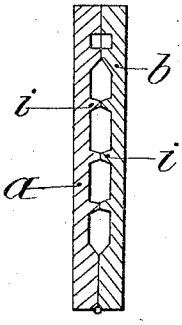


Fig. 5

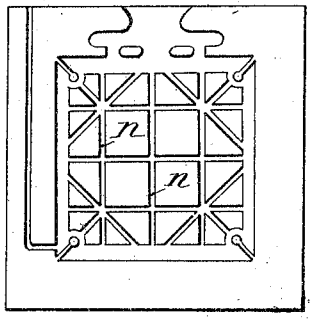
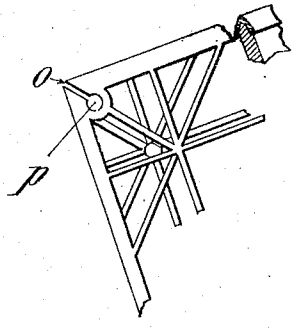


Fig. 6



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SECONDARY-BATTERY PLATE AND METHOD OF MAKING SAME.

No. 850,788. Specification of Letters Patent. Patented April 16, 1907.

Application filed February 13, 1905. Serial No. 245,474.

To all whom it may concern:

Be it known that I, LOUIS NESTOR JOSEPH ROSELLE, a citizen of the French Republic, residing at Paris, 14 Rue de la Fidélité, have invented certain new and useful Improvements in Secondary-Battery Plates and Method of Making the Same, of which the following is a specification.

This invention has for its object a process for the manufacture of plates for secondary electric batteries comprising a core obtained by fusion, casting, and molding and a support formed by casting around the said core.

The invention consists, broadly, in forming by fusion, casting, and molding a core of active material and in casting around this core a support presenting the form of a grid with multiple ramifications, this support being cast in a mold the core of which is constituted by the core of active material itself, which, as indicated, has previously been cast; and in order that my invention may be more fully understood I will describe hereafter a form of mold by means of which the process is carried into practice. Such molds, which do not form a part of the invention claimed, are illustrated in the accompanying drawings, of which—

Figure 1 is a perspective view of the mold for casting the core. Fig. 2 shows one of its inner walls with the grooves and projections thereon. Fig. 3 is a cross-section through line A B of Fig. 2. Fig. 4 shows the core of active material after casting. Fig. 5 represents one of the inner walls of the mold for casting the grid or support for the core. Fig. 6 is a perspective view of a part of said grid or support.

The process according to this invention consists in first casting the core or segment of active material in a mold formed of two parts *a* and *b*, connected one with the other—for example, by means of a hinge *c*—and each provided with a handle *d*, permitting the closing of the mold. During the casting operation the closing of the mold is insured by means of a suitable device, such as a ring *e*.

The internal arrangement of the mold, which may be seen in Fig. 2, comprises two air holes or vents *f*, a principal casting channel or geat *g*, and small casting-channels *h*, giving rise to a casting, which is removed after cooling.

Each inner face carries a series of projections *i*, presenting the form of a truncated cone and arranged and guide-marked in such a manner that when the mold is closed these projections touch at their extremities, as in Fig. 3, for the purpose of forming cavities or bores *j* in the cast core, which pass right through it, as seen in Fig. 4. The mold is also provided at its angles with notches *k*, serving to form slots *m* in the core, each of which slots terminates in an eye.

When the core of active material is cast in the manner described, it is removed from the mold, and before it is completely cool (preferably in as hot a state as possible) it is placed in a second mold, when the support or grid is cast around said core and in the cavities or bores *j*.

The external shape of the mold for casting the support or grid is substantially the same as that of the mold for casting the core, Fig. 1. Its inner face is provided with air-holes or vents *f*, Fig. 5, and casting-channels *g*, and they are cut or grooved in such a manner as to present ramifications which as a whole are intended to form the faces of the grid or support. The mold is formed in such a manner as to constitute at the angles of the frame of the cast support slots *o*, terminating in eyes *p*, corresponding with the slots and eyes *m* of the core.

The process is carried out in following manner: The formation of the core consists in an ordinary casting operation in the mold of Figs. 1 and 2, care being had to avoid any sudden cooling in order that the molecular condition of the material may not be modified, so as to leave the finished plate in a strain or to cause the same to warp.

In order to cast the support or grid, which is preferably formed of antimonic lead, there is placed within the second mold, Fig. 2, and while yet in a hot state the core of active material, which has already been prepared, the mold being then closed. When the mold has been filled with the metal in a state of fusion, there is formed around the core a support in a single piece, the bars of which constitute the faces of the support and rest upon the faces of the core and are united one with the other by means of as many biconical transverse bars as there are cavities *j* in the core. These bars form in the active material so many contactors or collectors for the current. In addition a difference of thickness between the interior of the mold and the core permits of the formation upon the entire surface of the core of a thin film of metal, which

serves to obviate sudden cooling after removal from the mold. When the natural cooling is finished, the thin film is removed by means of a scraper in such a manner as to leave around the core only the support formed by the bars and the frame of the support or grid.

It is advantageous to proceed with the casting of the support around the core immediately after removal from the mold of this latter—that is to say, while it is still hot enough to prevent injury to or exhaustion of its surface on contact with the metal in fusion. The final product is therefore a secondary-battery plate the core of active material of which and its support are united by casting, so as to form a single piece.

The slots and eyes provided at the angles impart to the whole, especially to the frame, sufficient elasticity to permit of free expansion of the plate during charging and contraction during discharging. If desired, the number of these slots provided with eyes may be increased, forming them upon the sides of the frame itself.

The contacts or collectors, which extend right through the active material, may be of any form other than that described, if desired. For example, they may present a double conical, cylindrical, prismatic, or polyhedral formation. In the same way the form and disposition of the bars of the grid may vary widely in accordance with requirements. Finally, the process may also be carried into practice by means of a multiple mold for casting in a single operation several supports around their respective cores.

Having now particularly described and ascertained the nature of my invention and in what manner it may be performed, I declare what I claim is—

1. The process of manufacturing plates for secondary electric batteries, which consists in casting or molding in a mold a core of active material, casting around said core while being in hot condition a ramified grid in a second mold, at the same time forming on the entire surface of said core between the ramifications of the grid a thin film of metal, then allowing the whole to cool slowly and finally removing the thin film of metal.

2. The method herein described of manufacturing plates for secondary batteries, which consists in casting a core of active material, and casting about said core a grid provided with ramifications, said grid being provided between said ramifications with a comparatively thin film of metal, allowing the entire mass to cool, and finally removing said thin film of metal.

3. The process of manufacturing plates for secondary electric batteries which consists in molding or casting a core of active material in the first mold shaped so as to form at the angles of the core notches terminating in an eye, then casting around said core while in a hot condition a ramified grid or support in a second mold shaped so as to form at the angles of the grid notches terminating in an eye, which eye corresponds to the notches in the core, the said grid having a thin film of metal between the ramifications thereof, permitting the plates to cool slowly and removing the film from the grid.

In testimony of which I have hereunto set my hand, at Paris, the 30th day of January, 1905.

LOUIS NESTOR JOSEPH ROSELLE.

In presence of—
HENRY SCHWAB,
HANSON C. COXE.