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TWIN GRID CASTING

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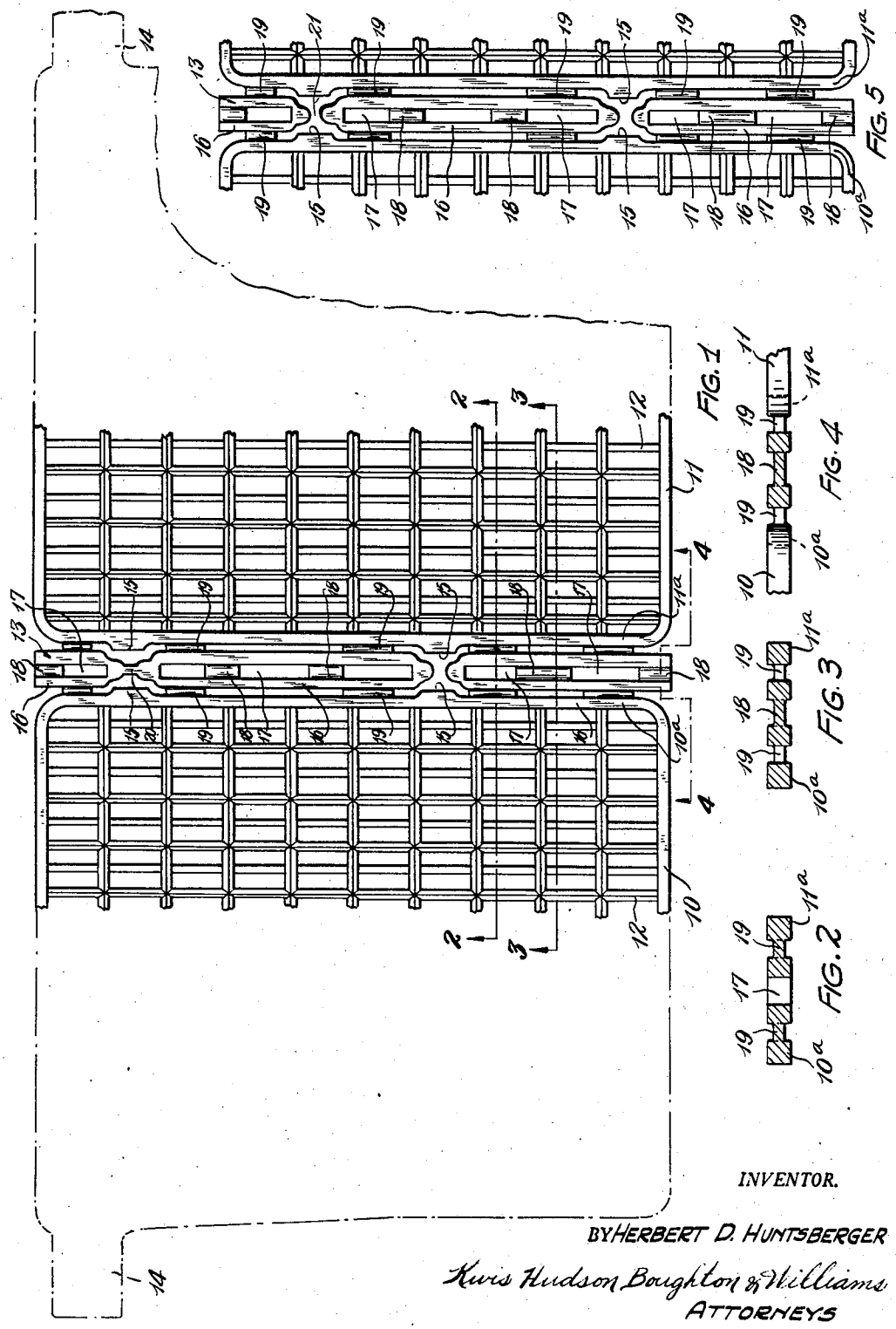


FIG. 1

FIG. 5

FIG. 4

FIG. 3

FIG. 2

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TWIN GRID CASTING

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3 Claims. (Cl. 136—36)

This invention relates to a breakapart section between double or twin storage battery grids, and has for its chief object to provide a section which, after the grid pasting (and charging) operation has been completed, can be broken to separate the grids instead of being punched or sheared as heretofore.

It has been customary for storage battery manufacturers to cast the grids in pairs or twin sections with an intervening section to facilitate subsequent economical processing, but the grids must be separated before final use. The twin grids are pasted, dried and then generally charged, and then the individual grids (now known as battery plates) are separated by punching or shearing the section joining them. This has resulted in distortion of the grids and jarring of the active material or paste and at times in the dislodgment of the paste from the grids next to the section which is sheared. In some instances, particularly where the plates are charged in the battery container, the grids are separated as explained above in their pasted and dried condition without being charged.

In accordance with my invention, the grids are cast in pairs, the pairs of grids being joined by a section which, after the pasting and drying operations or pasting, drying and charging operations are completed, is simply broken out instead of being sheared or punched out from between the grids. This is accomplished by providing between the twin grids a so-called breakapart section which is provided centrally thereof with slots and reduced or half-thickness portions so arranged that the breakpart section may be rolled out on a splitting machine without any appreciable distortion of the bottom grid borders adjoining the breakapart section, without any dislodgment of paste or active material from the interstices of the grid, and without damage to the feet of the grids, thus resulting in more perfect plates.

In the accompanying sheet of drawings wherein I have illustrated two embodiments of my invention,

Fig. 1 is a plan view of a twin grid casting after the trimming operation and ready for the pasting operation, portions of the twin grids being shown diagrammatically;

Figs. 2 and 3 are transverse sectional views on an enlarged scale through the breakapart section and through the adjoining bottom portions of the grids, said views being taken substantially along the lines 2—2 and 3—3 looking in the direction indicated by the arrows;

Fig. 4 is a sectional view also on an enlarged scale through one end portion of the breakapart section showing the adjoining edge portions of the two grids in elevation, the section being taken substantially along the line 4—4 of Fig. 1 looking in the direction indicated by the arrows; and

Fig. 5 is a fragmentary view showing a modified form of breakapart section and adjoining portions of the grids.

The twin grid casting here shown consists of twin grid sections 10 and 11, the casting having been trimmed ready for the pasting operation. Ribs 12 are shown on portions of the grids only, the remainder of the grids being shown diagrammatically by dot and dash lines, but it will be understood that the remaining portions of the grids are also ribbed. Between the grid sections is my improved breakapart section 13 which, as is customary, is attached to what is normally the bottoms of the grids which in this instance are designated 10a and 11a. Opposite sides of the twin grid casting have lugs 14 provided at what are normally the upper ends of the grids. The lower portions of the grids, next to the breakapart section, are provided with feet 15 which are adapted to engage upstanding ribs on the bottom of the battery container.

As the twin grids were formed heretofore, the center section holding the two grids together and which was adapted to be sheared or punched from the lower or base portions of the grids was formed substantially as shown in the Lormor Patent No. 2,253,280 and in the Kerns Patent No. 2,277,234, that is to say, the center section consisted of three solid portions of substantially the same thickness as the grid, these portions being spaced from the feet of the grids, however, and being connected to the bases of the two grids by several spaced reduced or half-thickness portions, that is by portions approximately one-half the thickness of the grids. The objection to this type of center or breakapart section is that it is too thick and rigid or stiff to be readily broken from the bottoms of the grids, and hence the center section was required to be sheared off or punched out, with the attendant disadvantages of distortion of the grid frame and vibration and jarring, frequently resulting in loosening and dislodgment of the paste or active material in the grid.

While stiffness of the breakapart or center section is necessary in order to maintain the two grids in proper condition to withstand the handling necessary incident to trimming, pasting,

drying and in some cases charging, without danger of bending and while a thin breakapart section would not serve the intended purpose, my invention is a compromise between the two, and, in accordance with my invention, the breakapart section, while containing less lead than the breakapart section previously employed, still gives the desired stiffness to the twin grid casting while at the same time separation of the grids is possible without any punching or shearing operation and therefore without distortion of the bottom sections or borders of the grids and without otherwise damaging the plates by reason of loosening of the paste or active material. However, it is not simply a problem of reducing the amount of lead in the breakapart section to facilitate separation of the grids, but involves employing a sufficient amount of lead to secure the desired rigidity but so distributed that the unit will not be too difficult to separate on the breakapart machine without damage, distortion or jarring.

In order to obtain these results, I provide the three portions 16 of the breakapart section 13 with alternate slots 17 and reduced or half-thickness portions 18. The three portions 16 are joined to the bottoms of the twin grids by reduced or half-thickness portions 19, and, as in the case of the grids disclosed in the Lormor and Kerns patents referred to above, these three portions are spaced from the feet 15 of the grids.

After the twin grids have been pasted and dried or pasted, dried and charged, my improved breakapart section enables the two grids to be readily separated by a breaking operation since the stiffness of the center sections 16, while sufficient for the handling of the casting including the operations of pasting, and drying or pasting, drying and charging, has been greatly reduced.

The mechanism for breaking the plates apart and for removing the center section consists of two lower wheels and an upper wheel between which the plates are fed. The lower wheels have flanges adapted to bear against the bottom frames or borders 10*a* and 11*a* of the plates, while the upper wheel has a flange which extends below the plane of the grids and is between the flanges of the lower wheels and bears down upon and depresses or bends the center of the breakapart section at the reduced thickness portions 18, this bending serving to bend and break off the reduced thickness portions 19 at the borders of the plates. The twin plates are simply fed between the lower wheels and the upper wheel. Instead of employing two lower wheels, I may utilize a single wheel having spaced flanges.

In accordance with the invention, the portions 19 of reduced thickness are broken from the bottom frames or border portions 10*a* and 11*a* without distortion of the grids and without sufficient jarring or vibration to cause loosening of the paste or active material from any portions of the plates, as well as without damage to the feet 15.

In Fig. 1 the top and middle portions 16 of the breakapart section 13 are joined by a narrow full-thickness section 20 opposite the upper feet 15, 15 of the two grids, this being done to facilitate the flow of molten lead in the grid casting mold. However, if desired, these two portions of the breakapart section may be entirely separated opposite the upper feet 15, as shown at 21 in Fig. 5. Otherwise the twin grids and the breakapart section are exactly the same as shown in Fig. 1.

Above I have used the expression "half-thickness portions" but I do not desire to be limited to this as such portions may be greater or less than half the thickness of the grids.

From the foregoing it will be seen that the object of my invention is very effectively attained, and while I have shown two forms of the invention, I do not desire to be confined to the precise details shown and described but aim in my claims to cover all modifications which do not involve a departure from the spirit and scope of my invention.

Having thus described my invention, I claim:

1. In a twin grid casting for storage batteries, a breakapart section between the grids, said section consisting of center portions connected at intervals by portions of reduced thickness to adjoining portions of the grids, said center portions being provided with alternate slots and portions of reduced thickness extending longitudinally of the breakapart section.

2. In a twin grid casting for storage batteries, a breakapart section between the grids, said section consisting of center portions connected at intervals by portions of reduced thickness to adjoining portions of the grids, said center portions being provided with alternate slots and portions of reduced thickness extending longitudinally of the breakapart section, the adjoining portions of the grids having feet which are wholly spaced from the center portions of the grids.

3. In a twin grid casting for storage batteries, a breakapart section connected to adjoining portions of the grids by portions of reduced thickness, the adjoining portions of the grids having feet, the breakapart section consisting of center portions which are spaced apart adjacent the feet of the grids and each center portion being provided with one or more open slots and one or more portions of reduced thickness extending longitudinally of the breakapart section.

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