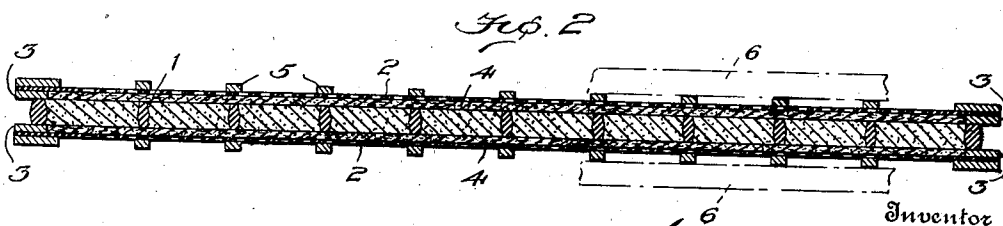
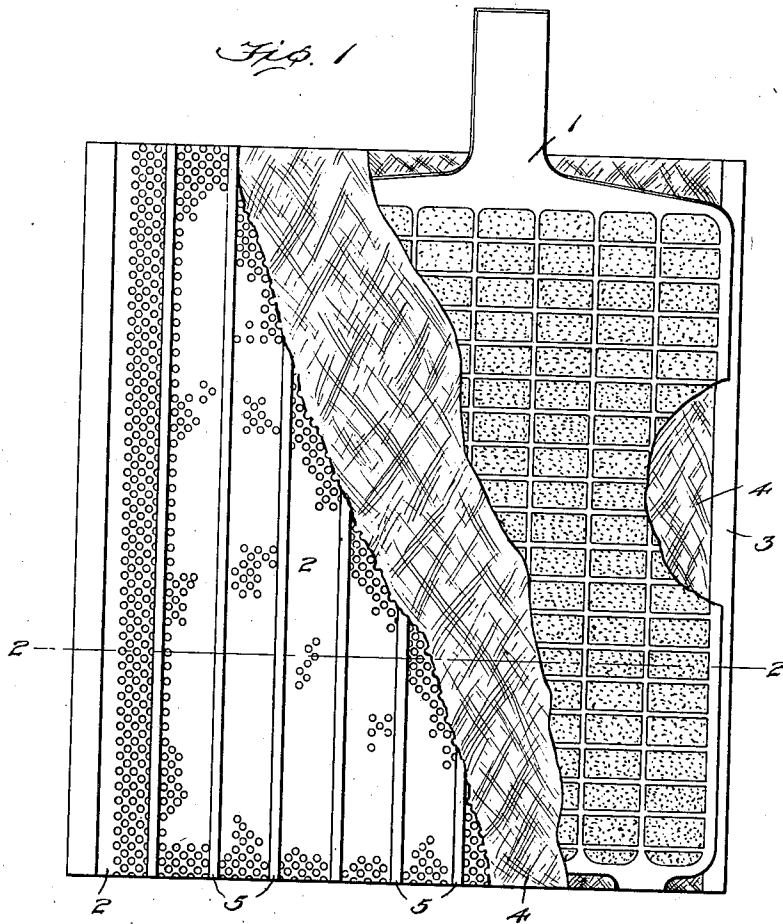


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SEPARATOR FOR STORAGE BATTERIES

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SEPARATOR FOR STORAGE BATTERIES

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This invention relates to separators for storage batteries, and more especially to separators comprising two or more elements.

The principal object of our invention is to provide a separator composed of two or more elements in which the position and compression of one of said elements is controlled.

Another object of our invention is to provide in a compound separator a spacing member which shall have marginal portions adapted to confine a fibrous member.

Another object, also, is to provide a compound separator with a member having projections from a face adapted to limit the compression to which a fibrous member of said separator may be subjected.

Still another object is to provide a separator comprising a supporting member, preferably of rubber, which may have marginal strips adapted to position a fibrous mat of glass wool, and further to limit the extent to which the glass wool may be compressed.

A further object is to provide a separator comprising a supporting member having on one side portions adapted to position a fibrous mat and on the other side spacing strips adapted to ensure adequate circulation of the electrolyte.

A still further object is to provide under certain circumstances a separator of glass wool, wood and a supporting member of relatively inert material.

Other objects of our invention will become readily apparent on consideration of the drawing which shows a preferred form of our invention, in which,—

Figure 1 is a vertical longitudinal view with portions of the several elements removed to show those parts in their interrelation.

Figure 2 is a horizontal sectional view on the line 2—2 of Fig. 1.

In the development of compound separators it has been found very advantageous to use a mat of glass wool or similar inert fibrous material in contact with the positive plate 1. The difficulty has hitherto been to protect this mass of brittle fibers and to insure that the mat is of a uniform density which will freely permit the passage of electrolyte but prevent the passage of finely divided particles from the positive plate which might cause a short circuit. The density of this fibrous mass is largely controlled by the degree to which it is compressed. To control this degree of compression we may provide a supporting member 2, preferably of rubbered or other insulating material, having marginal strips

3 spaced to enclose a mat of felted glass wool 4. Disregarding for a moment the other characteristics of the mat 4 which effects its permeability, such as the size of the individual strands, it will be readily seen that by varying the thickness of these strips 3 in conjunction with the thickness of the mat 4, a desired degree of compression and, hence, a desired degree of density and permeability, may be obtained.

Under certain conditions it is desirable to have free circulation of the electrolyte between the plates. We may insure this condition by providing the member 2 with a number of spacing strips 5 on the opposite side from the marginal strips 3 which would form vertical open spaces against the negative plate 6.

The beneficial effect of the use of wood or wood elements in storage batteries is now generally recognized, especially with respect to the effect on the negative plate. This beneficial effect may be accomplished by associating wood or wood elements with the active materials of the plates or, as is the more common practice, by using a wood diaphragm. In our invention we may secure the beneficial effect of wood elements by making the supporting member of wood, one form of which is shown in the drawing, or we may use a wood diaphragm interposed between the supporting member 2 and the mat 4. Another manner in which wood or wood elements may be introduced is to insert a layer of vegetable fiber in the fibrous mat or to associate with the glass wool vegetable fiber or wood elements.

A valuable feature of our invention is the fact that while the active material of the positive plate is held in place by the compressible mat of glass wool, which allows for the required expansion, the marginal columns of the plate and the separators may be adapted to be rigidly and mutually supporting. Further, should the plate warp, the strips 3 will prevent the mat from being crushed or cut through with the accompanying danger of short circuiting.

While Figs. 1 and 2 embody a preferred form of our invention, the number and position of the spacing strips 3 and 5 may be varied to suit the requirements of the particular battery.

Having described our invention, we claim:—

1. In a storage battery embodying positive and negative plates, a separator comprising a sheet of material provided with perforations throughout the major portion of its area with its side edges imperforate, relatively rigid strips secured to said sheet at the marginal portions thereof and adapted to bear against the edges of the posi-

tive plate, said strips spacing the sheet away from the plate to define a recess of slightly less dimensions than the plate, and a mat of felted fibrous material located within and filling said recess and contacting with the positive plate.

2. In a storage battery embodying positive and negative plates, a separator comprising a sheet of material provided with perforations throughout the major portion of its area with its side edges imperforate, relatively rigid strips secured to said sheet at the marginal portions thereof and adapted to bear against the edges of the positive plate, said strips spacing the sheet away from the plate to define a recess of slightly less dimensions than the plate, and a mat of felted fibrous material located within and filling said recess and contacting with the positive plate, the mat comprising glass wool.

3. In a storage battery embodying positive and negative plates, a separator comprising a sheet of material provided with perforations throughout the major portion of its area with its side edges imperforate, relatively rigid strips secured to said sheet at the marginal portions thereof and adapted to bear against the edges of the positive plate, said strips spacing the sheet away from the plate to define a recess of slightly less dimensions than the plate, and a mat of felted fibrous material located within and filling said recess and contacting with the positive plate, the mat comprising glass wool having wood fiber incorporated therein.

4. In a storage battery embodying positive and negative plates, a separator comprising a sheet of material provided with perforations throughout the major portion of its area with its side edges imperforate, relatively rigid strips secured to said sheet at the marginal portions thereof and adapted to bear against the edges of the positive plate, said strips spacing the sheet away from the plate to define a recess of slightly less dimensions than the plate, a mat of felted fibrous material located within and filling said recess and contacting with the positive plate, and spaced vertical strips on the outer side of said sheet adapted to contact with the adjacent negative plate to define vertical openings for the passage of the electrolyte.

5. In a storage battery embodying positive and negative plates, a separator comprising a sheet of material provided with perforations throughout the major portion of its area with its side edges imperforate, relatively rigid strips

secured to said sheet at the marginal portions thereof and adapted to bear against the edges of the positive plate, said strips spacing the sheet away from the plate to define a recess of slightly less dimensions than the plate, and a mat of felted fibrous material located within and filling said recess and contacting with the positive plate, the sheet being of greater dimensions than the plates whereby to project beyond the edges thereof.

6. In a storage battery embodying a positive plate, a negative plate and electrolyte, a separator located between the plates and comprising a mat of yielding material and a supporting member, said member having on one side a plurality of marginal portions coextensive with the mat and located beyond the edges thereof to restrain the mat against lateral displacement with respect to said member and to coact with marginal portions of said positive plate to limit the compression of the mat by said plates, said supporting member having on the other side vertical spacing portions adapted to coact with marginal and intermediate portions of said negative plate to provide vertical passages for the circulation of said electrolyte.

7. In a storage battery, a positive plate, a negative plate, electrolyte, and a separator located between the plates and comprising a mat of felted inert yielding material and a supporting member, said member having on one side a plurality of portions extending the full length thereof adapted to position said mat and to coact with portions of said positive plate to limit the compression of the mat by the plates, said supporting member having on the other side projecting portions engaging against portions of said negative plate to provide spaces for the circulation of said electrolyte, the edges of the positive plate being exposed.

8. A separator for the plates of a storage battery comprising a sheet of rigid material having relatively rigid strips carried by certain of the edges thereof adapted to bear against and project beyond the side of a storage battery plate, said strips spacing the major portion of the sheet away from the plate to define a recess, and a felted fibrous mat located within the recess and contacting throughout flatly with the sheet and plate.

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