

No. 745,274.

PATENTED NOV. 24, 1903.

F. W. BÜHNE.
ACCUMULATOR PLATE.
APPLICATION FILED OCT. 6, 1900.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.

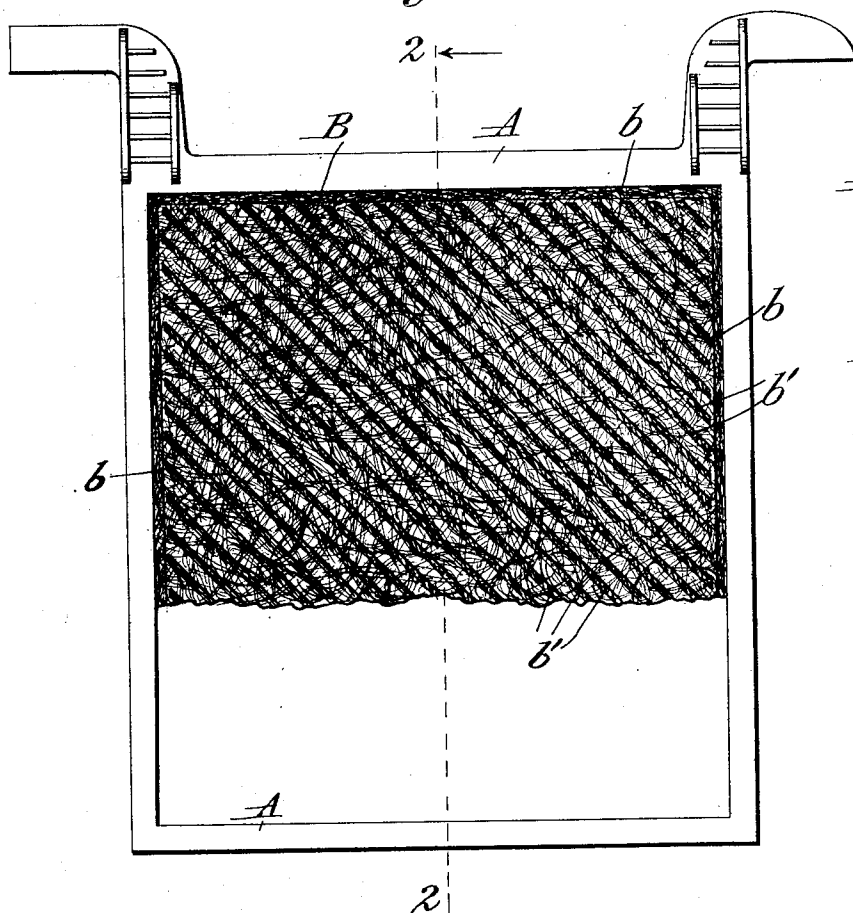


Fig. 2.

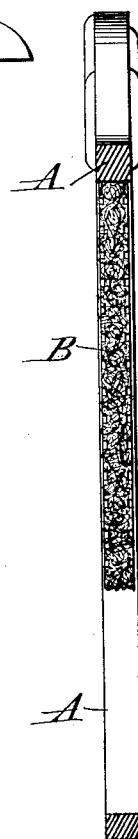


Fig. 3.



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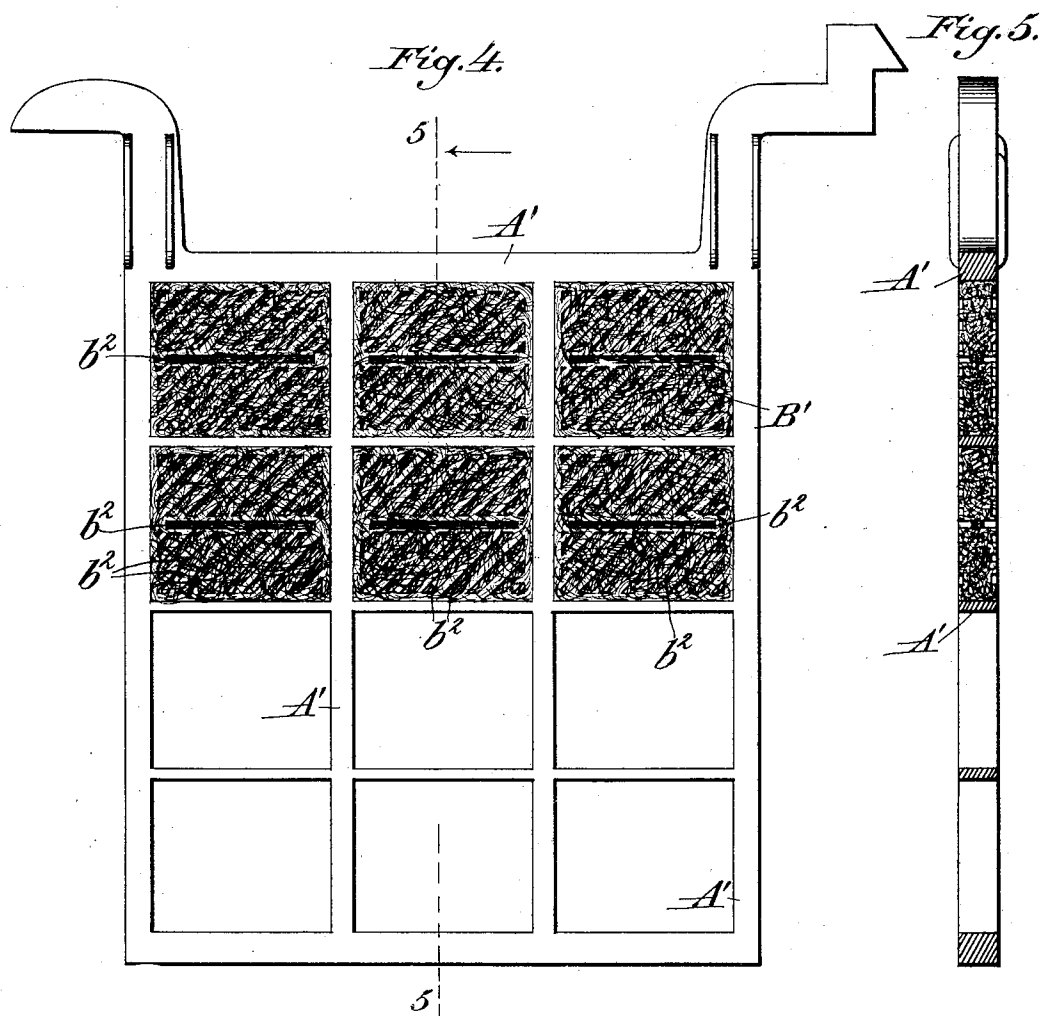
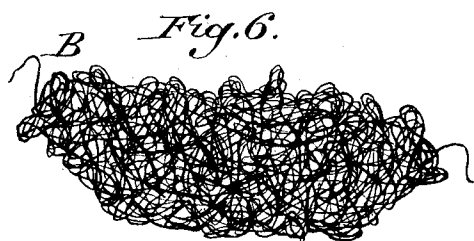
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UNITED STATES PATENT OFFICE.

FRIEDRICH WILHELM BÜHNE, OF FREIBURG, GERMANY.

ACCUMULATOR-PLATE.

SPECIFICATION forming part of Letters Patent No. 745,274, dated November 24, 1903.

Application filed October 6, 1900. Serial No. 32,295. (No model.)

To all whom it may concern:

Be it known that I, FRIEDRICH WILHELM BÜHNE, a subject of the Grand Duke of Baden, and a resident of Freiburg, in the Empire of Germany, (whose post-office address is the same,) have invented a new and useful Improvement in Accumulator-Plates, of which the following is a specification.

My invention relates to improvements in accumulator-plates.

Many attempts have been made heretofore to provide large porous surfaces in accumulator-plates, and for this purpose it has been common to manufacture plates by putting small pieces of lead together in various ways. For example, accumulator-plates have been made of straight and corrugated strips of lead, and many attempts have been made to manufacture plates from leaden threads or filaments, these threads being produced by pouring melted lead, highly superheated, through a revolving sieve into water, in which the lead solidified; but none of these attempts have resulted in more practical success than has been attained with leaden balls or powdered lead because of the fact that such plates did not have sufficient durability, but, in fact, gradually dissolved and crumbled away, owing to their swelling. In order to render such plates durable and practical to any extent, they either had to be inclosed in perforated casings, grids, or the like of sheet-lead or at least to be compressed with such force that the increase of surface obtained by subdivision of the lead was almost entirely lost, and there was no advantage in the use of such plates at all commensurate with the labor and cost of production.

It is the object of my invention to avoid the above-mentioned disadvantages, and thereby produce an accumulator-plate of great porosity and durability, relatively light weight, and consequent high efficiency.

With this object in view my invention consists in the features, details of construction, and combination of parts, which will first be described in connection with the accompanying drawings and then more particularly pointed out in the claims.

In the drawings, Figure 1 is a side elevation of one form of plate embodying my invention, a portion of the lower part of the

plate being removed. Fig. 2 is a vertical section of the same; Fig. 3, a detail view intended to represent a portion of the material employed by me in the manufacture of my improved plates after such material has been slightly compressed. Fig. 4 is a side elevation of another form of plate embodying my invention, the lower half of the grid not being filled with active material; Fig. 5, a vertical section of the same, and Fig. 6 a detail view intended to illustrate a felted single filament of metal in its condition prior to compression.

In carrying out my invention an entirely new product is employed—namely, felted metal—which is produced from the fibers obtained by the process described in the United States Patent No. 662,392, and also by the process described in United States Patent No. 684,043, filed by me December 19, 1900. These can be produced in the form of the finest spinning fibers which can be made into felted plates having large porous surface and little weight, but possessing sufficient durability. The metal fibers which lie across one another in all directions and are thoroughly felted together, and which need only to be compressed slightly at the edges of the plate are sufficiently elastic to hold together even when the plate swells without any crumbling of the plate to pieces. If desired, the entire plate may be made of a single long, uniformly cut, felted-metal shaving or filament, and in this case a support for the felted material may be dispensed with; but obviously there is no objection to the use of a support of any desired form having its cavities or interstices filled with the felted-metal fibers, or the plate consisting of the metal fibers might be compressed generally, but more firmly along lines like those of a support—that is to say, the plate may be compressed more firmly along certain lines, whereby the density of the material will be increased along such lines, which denser portion will be more rigid than the intermediate lightly-compressed material, and thus serve in place of stiffening or supporting devices to hold the material in place in the grid.

In Figs. 1 and 2, A is a grid, which serves to support the material B, which is formed of a felted mass of long fine-cut filaments, a

portion only of said felted mass being shown in place in the grid. This mass is shown as lightly compressed generally, but more firmly compressed adjacent to the grid, as indicated at *b*, and also more firmly compressed along inclined lines to impart further rigidity to the mass, as indicated at *b'*.

Fig. 3 is intended to illustrate a portion of the felted mass as it appears when slightly compressed and before being provided with a grid.

The plate shown in Figs. 4 and 5 comprises a multicellular grid *A'* of well-known form, provided with material embodying my invention, said material being indicated at *B'*, the more firmly compressed lines being indicated at *b*².

Fig. 6 is intended to indicate a felted mass of material formed from one fine long cut filament of metal prior to being lightly compressed.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. An accumulator-plate consisting of a felted mass of cut filaments of metal compressed along lines arranged to form a support, and an open grid for supporting said mass.
2. An accumulator-plate consisting of a slightly-compressed felted mass of one or more fine, long, cut filaments of metal, and means for supporting said felted mass.
3. An accumulator-plate consisting of a felted mass of one or more fine, long cut filaments of metal compressed along lines arranged to form a support, and means for supporting said felted mass.
4. An accumulator-plate consisting of a felted mass of one or more fine long cut filaments of metal slightly compressed generally and more firmly compressed along lines arranged to form a support, and means for supporting said mass.
5. An accumulator-plate consisting of a slightly-compressed felted mass of one or more fine, long, cut filaments of lead, and means for supporting said felted mass.
6. An accumulator-plate consisting of a

felted mass of one or more fine, long, cut filaments of lead, compressed along lines arranged to form a support, and means for supporting said mass.

7. The combination, with a metallic grid having an opening, of a felted mass of one or more fine, long, cut filaments of metal secured in the grid-opening, said mass being lightly compressed generally, and more firmly compressed adjacent to the grid.

8. An accumulator-plate consisting of a felted mass of one or more cut filaments of metal in the form of fine spinning fibers, and means for supporting said mass.

9. An accumulator-plate consisting of a slightly-compressed felted mass of one or more cut filaments of metal in the form of fine spinning fibers, and means for supporting said mass.

10. An accumulator-plate consisting of a felted mass of one or more cut filaments of metal in the form of fine spinning fibers, slightly compressed generally and more firmly compressed along the lines like those of a support, substantially as described, and means for supporting said mass.

11. An accumulator-plate consisting of a felted mass of one or more cut filaments of metal in the form of the finest spinning fibers, and means for supporting said mass.

12. An accumulator-plate consisting of a slightly-compressed felted mass of one or more cut filaments of metal in the form of the finest spinning fibers, and means for supporting said mass.

13. An accumulator-plate consisting of a felted mass of one or more cut filaments of metal in the form of the finest spinning fibers, slightly compressed generally and more firmly compressed along lines like those of a support, substantially as described, and means for supporting said mass.

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

FRIEDRICH WILHELM BÜHNE.

Witnesses:

CARL FECHNER,
BENJ. F. LIEFELD.