B. ZYTTKOWSKI.

PROCESS OF MAKING ACCUMULATOR PLATES.

APPLICATION FILED DEC. 11, 1911.

1,075,958. Patented Oct. 14, 1913.

FIG. 1.

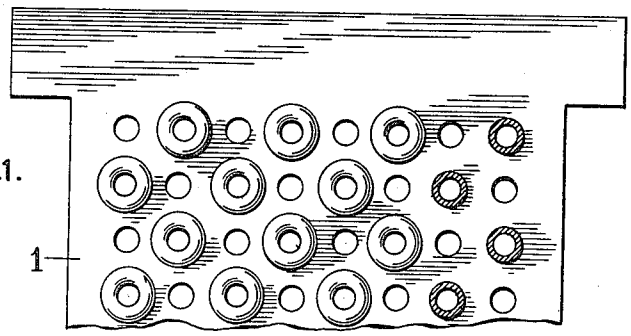



FIG. 2.

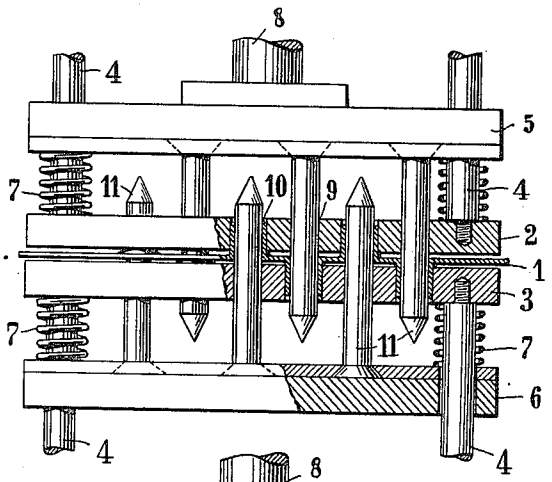



FIG. 3.

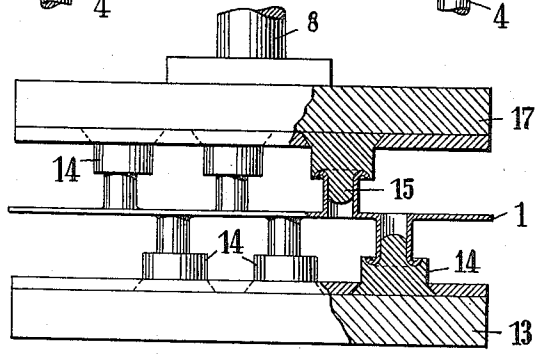



FIG. 4.

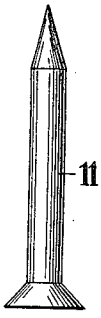
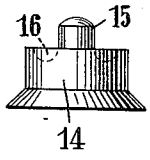



FIG. 5.




Witnesses
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# UNITED STATES PATENT OFFICE.

BRUNO ZYTTKOWSKI, OF TEMPELHOF, NEAR BERLIN, GERMANY.

## PROCESS OF MAKING ACCUMULATOR-PLATES.

1,075,958. Specification of Letters Patent. Patented Oct. 14, 1913.

Application filed December 11, 1911. Serial No. 665,147.

*To all whom it may concern:*

Be it known that I, BRUNO ZYTTKOWSKI, workmaster, a subject of the German Emperor, and resident of Tempelhof, near Berlin, Germany, (whose post-office address is Kaiserin-Augusta strasse 70,) have invented a new and useful Improved Process of Making Accumulator-Plates, of which the following is a specification.

This invention relates to the manufacture of accumulator plates from metal, such as rolled lead, or the like, and has for its object to provide a process which will produce these plates in a simple, quick, and efficient manner.

To these ends the invention consists in the novel steps constituting my process more fully hereinafter disclosed and particularly pointed out in the claim.

According to the new process, the metal plate is perforated by pointed punches or mandrels, and the metal forced from said plate, is forced into the clearance space located between the punches and the hollow spaces of a die plate, and forms projections with thin walls. The projections thus obtained, can be stretched or drawn as far is allowed by the nature of the metal of the plate, and thus can be made very long and with thin walls. In carrying out this new process, the projections are preferably formed in a staggered order on both sides of the plate, and flanged over at their edges.

In order that my process may be understood, a construction of an accumulator plate with tubular projections, and the apparatus used for its manufacture, are illustrated by way of example in the accompanying drawing in which:

Figure 1 shows the accumulator plate in plan and partly in section, Fig. 2 shows the apparatus used for stamping out the projections, Fig. 3 the device for flanging over the projections after they are formed, Fig. 4 shows a press punch, and Fig. 5 the flanging-over punch.

In the apparatus shown in Fig. 2 and used for carrying out the first portion of the process, namely the stamping out of the projections, the metal plate 1 to be treated, is placed between two dies 2 and 3 on which are mounted at a suitable point guide rods 4 guiding the outer die plates 5, 6, while intermediate helical springs 7 normally keep the two parts of the die apart. The driving spindle 8 is used for operating the apparatus. The inner die plates 2 and 3 are provided with a series of staggered small and large perforations 9, 10 and the outer parts of the dies, namely the plates 5, 6, are provided with punches 11 corresponding to the said holes and arranged so that the punch 11 of the plate 5 is, for instance, guided by the small perforation 9 of the adjoining die plate through the plate 1; and during further compression of the outer die or stamping out plate, while the punch passes through the large perforation 10 of the opposite die plate, the material of the accumulator plate is forced into the hollow space formed between the punch and the die, and a cylinder is formed.

Fig. 2 clearly shows an arrangement and its working, partly in elevation, and partly in section, with the punches partly withdrawn. When the pressure on the driving spindle ceases, the outer die or stamping out plates are forced apart by the helical springs 7, so that after the two die plates 2 and 3 are taken apart, the metal plate 1 is obtained with projections drawn out.

For flanging over or curving the edges of the hollow cylindrical projections, a stamp shown in Fig. 3 is preferably used in which on one bottom plate 13 are mounted the flanging over stamps 14 provided with a projecting cylindrical central head 15 fitting exactly into the previously drawn out hollow cylinders of the metal plate and terminating at the root in an annular groove 16. The upper plate 17 is provided with similar flanging over stamps 14. The arrangement and distribution of the said stamps on their plates 13 and 17 correspond exactly to the arrangement of the cylindrical projections on the metal plate. The metal plate is then placed on the bottom stamp 13 so that the heads 15 project exactly into the hollow cylinders, and in the same way the upper stamp plate 17 is arranged to fit the upper hollow cylindrical projections of the metal plate. A slight pressure is then effected on the outer stamp 17, and the latter bends outward the upper edges of the hollow cylindrical projections in the groove 16, and forms the curved lateral flanges for improving the adhesion of the mass to the accumulator plate.

By means of the apparatus described, the tubular projections of the metal plates can be drawn out to the thickness of thin paper, so that for instance, in a metal plate of

about 1 mm. thickness, projections flanged over at their ends, of a length of about 10 mm. on each side, can be obtained.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

The process of making accumulator plates with projections adapted to receive the active mass, which consists in supporting a metal plate upon a die provided with a set of cylindrical walled perforations; and in passing a set of cylindrical punches of a less size than said perforations through said metal plate and perforations of the die, thereby drawing out the metal of the said plate in thin walled projections occupying the spaces between said punches and the walls of said perforations, and forming cylindrical tubes perpendicularly erected on the plate, substantially as described.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two witnesses, this 28th day of November, 1911.

BRUNO ZYTTKOWSKI.

Witnesses:
WOLDEMAR HAUPT,
HENRY HASPER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."