R. N. CHAMBERLAIN.

TOOL OR MACHINE FOR MAKING STORAGE BATTERY GRIDS.

APPLICATION FILED JAN. 5, 1906.

929,386. Patented July 27, 1909.

Fig. 2.

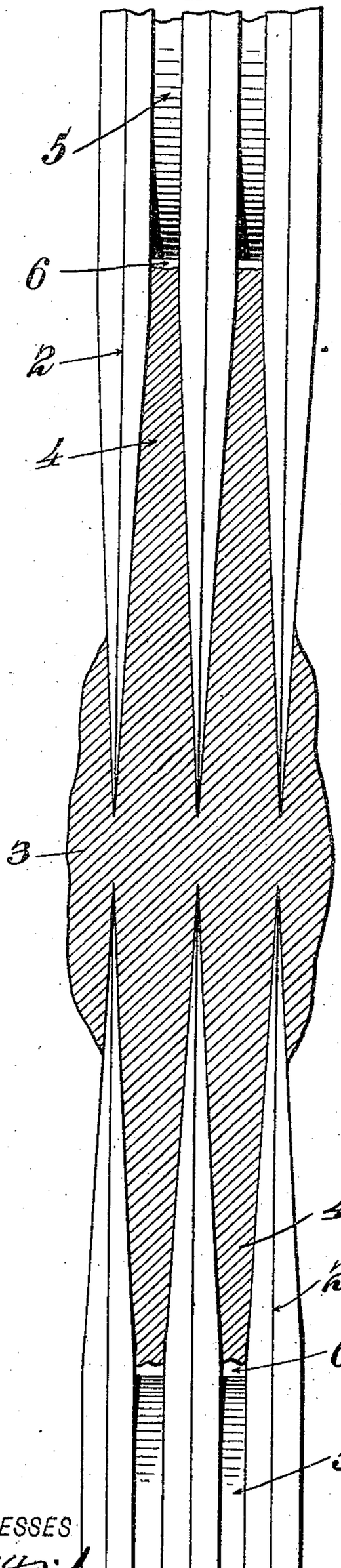


Fig. 1.

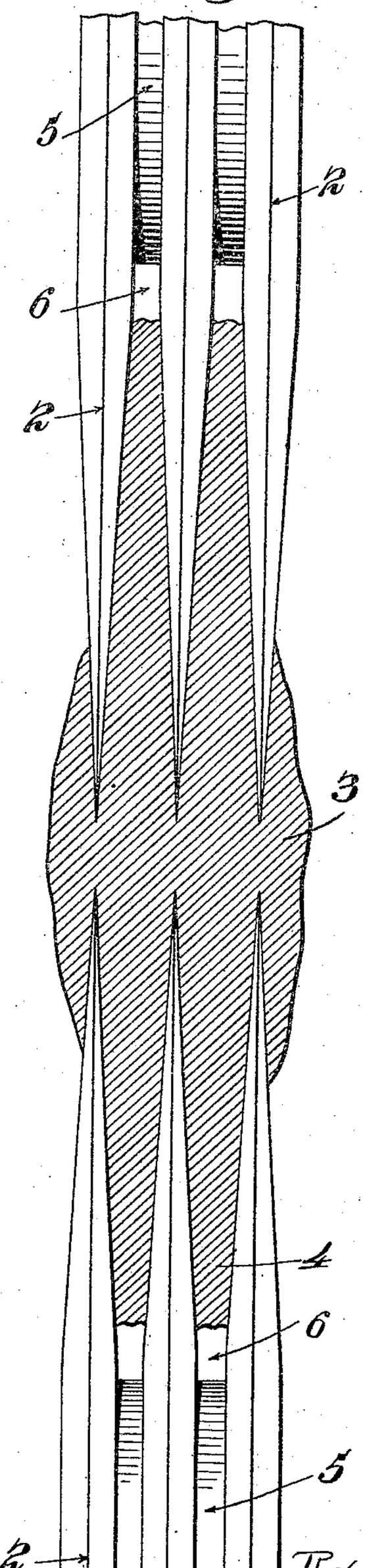
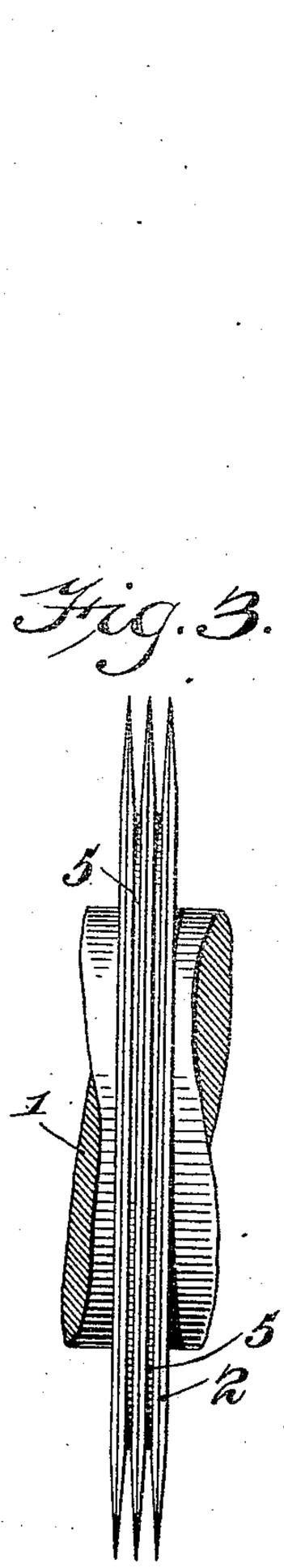


Fig. 3.



WITNESSES

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TOOL OR MACHINE FOR MAKING STORAGE-BATTERY GRIDS.

No. 929,386. Specification of Letters Patent. Patented July 27, 1909.

Application filed January 5, 1906. Serial No. 294,783.

To all whom it may concern:

Be it known that I, RUFUS N. CHAMBERLAIN, a citizen of the United States, residing at Depew, Erie county, State of New York, have invented certain new and useful Improvements in Tools or Machines for Making Storage-Battery Grids, of which the following is a specification.

In the type of battery grids known as the Gould, a large number of thin ribs ridges or leaves, closely set together and separated by narrow grooves, are spun or rolled up from the body of the grid-blank to provide a greatly extended surface for the action of the electrolyte. For making such grooves it has been customary to use flat sided steel disks, closely assembled together upon a shaft—the result of the operation of which is the production of similarly flat sided ribs or leaves upon the grid separated from each other by spaces equal only to the thickness of the disks. A form of machine adapted to the making of such grids is shown in the patent of Richards, No. 699814 granted May 13, 1902. Such disks or knives, in order to produce ribs or leaves of the desired fineness and close arrangement are made of thin steel liable to break or crack near the base before it is worn out on its spinning or rolling surface and to bend and deflect from the work while in operation, and so produce imperfections in the grids; furthermore, the weakness of the disks limits the pressure at which the rolls may be operated and consequently the speed at which the grids may be made. These are some of the defects of the old form of machine, so far as the cutting, spinning or rolling knives or disks themselves are concerned. As to the product made by them I have found that the parallel sided ribs or leaves are weak mechanically owing to their height and thinness. Furthermore, the parallel sides of the ribs of the grid seem to succumb to the extra electro-chemical activity developed near the base of the rib with the result that they are eaten through and loosened from the main body of the plate in many cases. It seems that with the deep parallel-wall grooves the diffusion of the acid which allows a more even action decreases, more or less in proportion to the depth of the groove. The rib, therefore, is weak from an electro-chemical standpoint, as well as weak from a mechanical standpoint, and it is likely also that the parallel sides of the knife or disk destroy to a certain extent the molecular structure of the ribs near the base allowing the electro-chemical action to penetrate more actively at that point. It may be that the lead at that point assumes more the structure of cast lead than rolled lead.

While it is not intended here to suggest that the above noted defects are sufficient to prevent the successful making and use of such grids, they nevertheless present serious disadvantages in operation and I have in an application filed Sept. 7, 1905, Serial No. 277421, pointed out means for overcoming them and the present invention relates to a still further improvement designed to extend the range of operation of the spinning, cutting or rolling machine. In my said application I have shown and described disks or knives beveled to a point remote from the cutting edge and substantially to the depth of the cut desired, resulting in the strengthening and stiffening of the disks or knives and the consequent shortening of the spinning or rolling operation, and also in important results as to the grid formed thereby, especially in the resulting openness of the grooves and consequent better distribution of the electrolyte throughout their depth and equalizing of the action of the current on the ribs; in the thickening of the bases of the ribs and consequent strengthening of them mechanically while affording a greater mass of material at the point where uneven action occurs, and the compacting of the lead at the base of the rib, just where under the old method, the action of the disks or cutters apparently resulted in a weakening of the molecular structure of the rib. All of the above is fully described in my aforesaid application but it is necessary to repeat it here to render distinct the present improvement, which concerns merely a modified form of that invention. The disks or cutters of said pending application are tapered to the entire depth of their exposed surfaces. There is no possibility of burying the cutters deeper in the lead blank than the depth of the beveled surfaces. Thus the disks are best adapted to working only on a single thickness of blank and the tendency, if the disks be forced in too deep or there be slight irregularity of action due to the shape

of the knife, is to force the apex up into the sharp angle between the disks and so tear it from the plate.

In my present invention the disks are as before set forth in said application, beveled to a point remote from the cutting edge and substantially to the depth of cut desired. But from that point a flat sided channel is provided between the disks into which the apex of the rib may flow—to a greater or less extent according to the thickness of blank employed and the depth of cut desired—thus forming higher ribs if need be and larger capacity grooves by allowing the disks to feed deeper into the blank and preventing the partial destruction of the rib which would occur if it struck the base of the groove between the disks.

In the accompanying drawing Figure 1 is a sectional view of portions of cutting, spinning or rolling rolls constructed in accordance with my present invention, and showing also in section a portion of a grid in which the cutting disks are embedded to the normal depth of cut; Fig. 2 is a similar view showing the effect produced by more deeply embedding the cutting tools in the blank. These two views are to a greatly enlarged scale. Fig. 3 is an elevation of a part of the roller, substantially twice the full size.

Upon the arbor or shaft 1 are placed a series of cutting disks or knives 2 whose cutting edges are beveled as shown in Fig. 1, to a depth substantially equal to the depth of cut desired, and I have shown at 3 a portion of a lead blank in which the cutting tool has been embedded by the action of the machine until the apex of the rib 4 has reached the end of the beveled portion of the disks.

It will be noticed that if by reason of too great penetration of cut due either to an effort to obtain greater capacity or to slight irregularities of the action of the machine, or of the form of the cutting disk, the apex of the lead leaf or rib ascending into the converging angle between the disks is apt to be torn thereby, and in any event to be prevented from sufficient expansion to allow slight changes of depth of cut and capacity. In the present form, however, the bevel ends at the point x where it meets the flat side of the disk, the angle between the two surfaces being rounded more or less as may be desired, and the disks being separated from each other, as for example, by the washers 5, there is thus provided a channel 6 into which any expansion of the rib due to accidental or intentional excess depth of cut takes place.

In Fig. 2 is shown the result when the embedding of the tool into the lead blank is sufficient to cause the apex of the lead rib to pass slightly beyond the beveled face of the tool and into the channel 6. It is in any case not intended that there shall be any great flow of metal into the channel 6 but only sufficient to provide for necessary irregularities of action and slight modifications in capacity and thickness of blank.

Other means than those shown for separating the disks may be employed, the disks and washers are clamped upon the shaft in the usual manner, and in other respects the general construction of the machine may be of the usual or preferred construction, for example, that shown and described in the said Letters Patent of Richards.

Having thus described the invention what I claim as new and desire to secure by Letters Patent is:—

1. A cutting, spinning or rolling tool for the forming of lead storage battery grids of large capacity from flat blanks, comprising a shaft or roller and a series of relatively thin disks closely set thereon having cutting edges tapered or beveled substantially to the depth of cut of the tool forming inwardly converging spaces between them and having relatively thin, parallel-walled overflow channels between the disks and extending inward toward the roller axis from the beveled portion of the disks.

2. A cutting, spinning or rolling tool for the forming of lead storage battery grids of large capacity from flat blanks, comprising a shaft or roller, a series of relatively thin disks closely set thereon, having cutting edges tapered or beveled substantially to the depth of cut of the tool forming inwardly converging spaces between them and relatively thin circular washers separating the disks to form thin, parallel-walled overflow channels between the disks extending inward toward the roller axis from the beveled portion of the disks.

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Witnesses:
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