

(No Model.)

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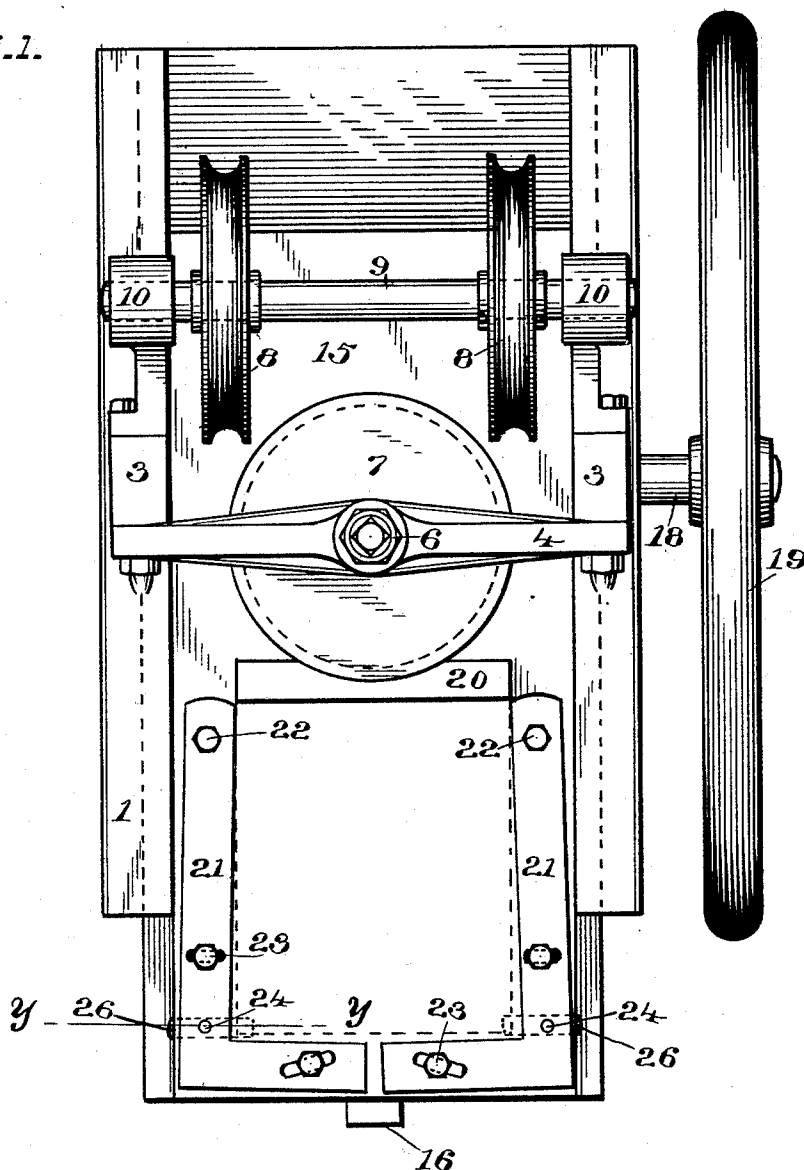
A. F. MADDEN.

FINISHING GRIDS FOR SECONDARY BATTERIES.

No. 485,128.

Patented Oct. 25, 1892.

Fig. 1.



WITNESSES

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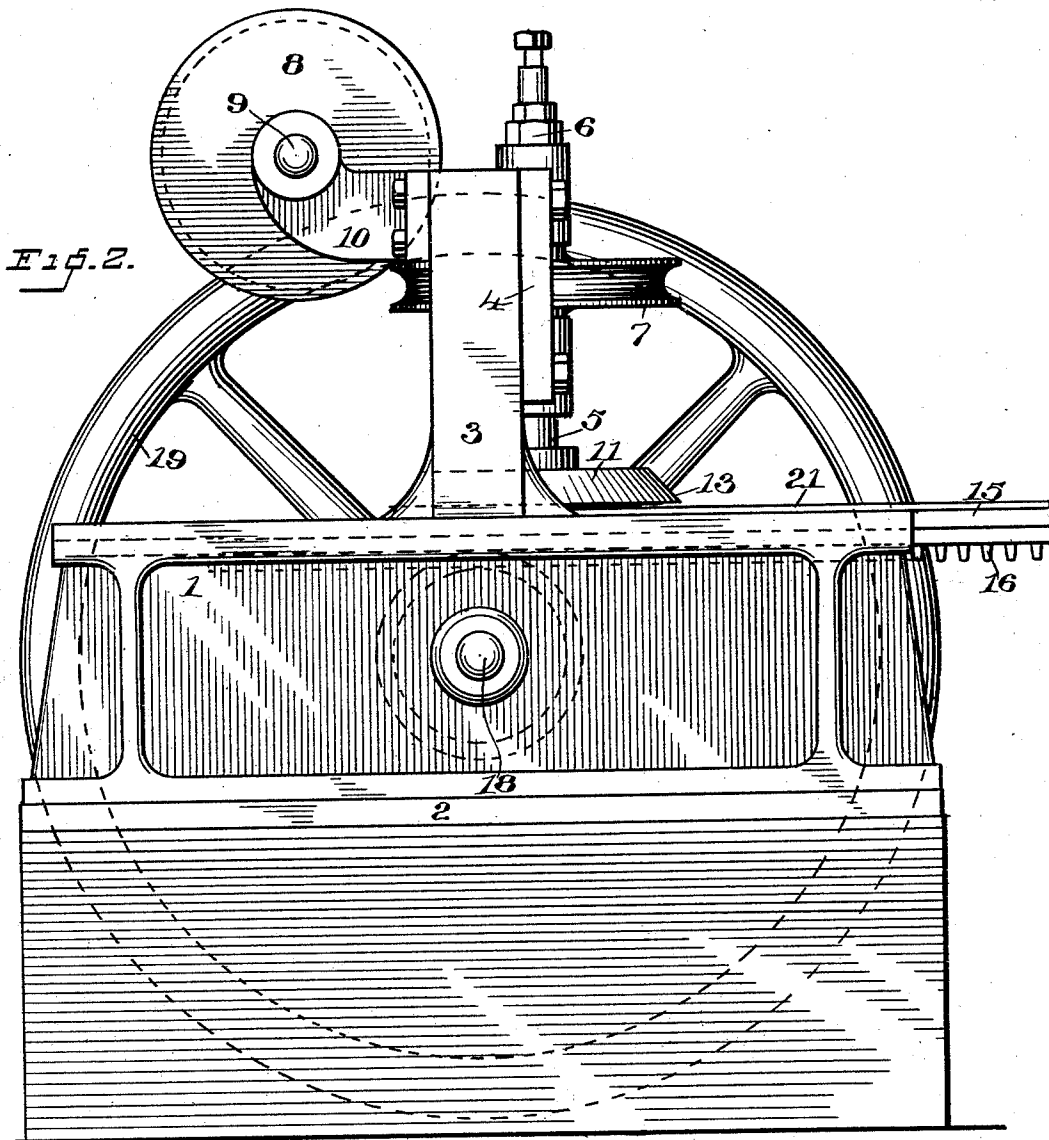


Fig. 5.

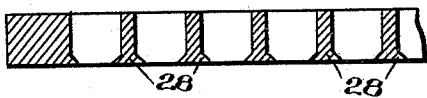
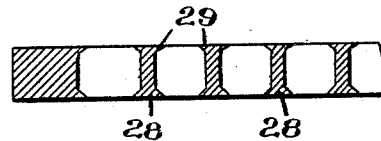


Fig. 7.



WITNESSES

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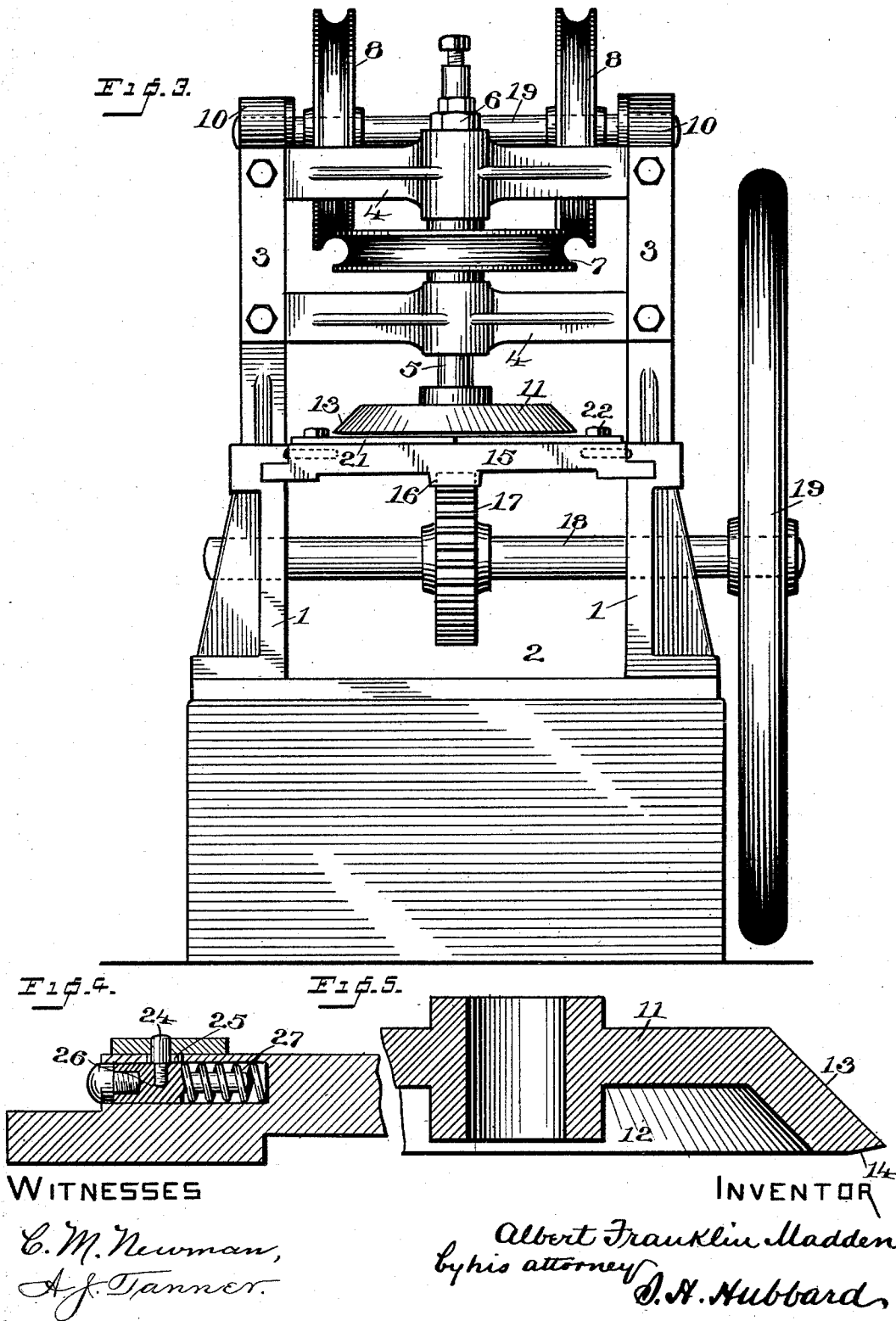
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3 Sheets—Sheet 3.

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UNITED STATES PATENT OFFICE.

ALBERT FRANKLIN MADDEN, OF NEWARK, NEW JERSEY.

FINISHING GRIDS FOR SECONDARY BATTERIES.

SPECIFICATION forming part of Letters Patent No. 485,128, dated October 25, 1892.

Application filed June 17, 1891. Serial No. 396,605. (No model.)

To all whom it may concern:

Be it known that I, ALBERT FRANKLIN MADDEN, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Machines for Finishing Grids for Secondary Batteries; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to certain novel and useful improvements in machines for operating upon the surfaces of grids for secondary-battery elements; but more particularly has my invention reference to grids of the character manufactured by the machine which forms the subject-matter of a certain application for United States Letters Patent, Serial No. 394,010, filed by me the 25th day of May, 1891.

The objects of my invention are to provide a machine whereby the surface of the grid may be reduced to an absolutely-plane surface and whereby the separating partitions may be so operated upon as to greatly increase the holding power of the grid upon the active material therein to be contained.

With these ends in view my invention consists in the construction and combination of elements hereinafter fully explained, and then recited in the claims.

In order that those skilled in the art to which my invention appertains may fully understand its construction and method of operation, I will now describe the same in detail, reference being had to the accompanying drawings, and the numerals marked thereon, which form a part of this specification.

Figure 1 is a plan view of my machine; Fig. 2, a side elevation; Fig. 3, an end view; Fig. 4, a detail section upon the line *yy* of Fig. 1; Fig. 5, a partial detail section through the surfacing-disk; Fig. 6, a detail section through a grid prior to the operation of my machine, and Fig. 7 a similar sectional view after the operation of my machine. Both Figs. 6 and 7 are somewhat enlarged and exaggerated for purposes of illustration.

Referring now particularly to Figs. 1, 2, and 3, 1 denotes a pair of edge standards mounted upon a plate 2 and forming the base of my

machine. Upon this base is mounted a frame consisting of posts or standards 3, between which are transverse bars 4. These two bars are provided with vertical bearings, in which is journaled a shaft 5, provided with nuts 6, by means of which it may be adjusted slightly in the direction of its length. A band-wheel 7 is secured upon this shaft in a horizontal plane, and idle-wheels 8, journaled on a shaft 9, held in brackets 10, projecting from the standards 3, serve to permit the band-wheel 7 to be operated by a belt driven from overhead. This, however, is merely for the sake of convenience and forms no part of my present invention. A surfacing-disk 11 is borne upon the lower end of the shaft 5 and is carried thereby in a horizontal plane. Said disk is concave upon its lower side, as shown at 12, Fig. 5, and its periphery is beveled backward from its edge at an angle of substantially forty-five degrees, as shown at 13. The bottom of the disk is a plane ring, except that it at its outside edge is beveled upward or chamfered very slightly, as appears at 14, Fig. 5. A sliding carriage 15 is held in ways in the standards 1, as is shown at Figs 1 and 3. This carriage is provided upon its under side with a rack 16, and a gear 17, carried on a shaft 18, meshes with and serves to operate the rack and the carriage. The shaft 18 is journaled through the edge standards and bears a hand wheel or crank 19. Upon the surface of this carriage, as shown at Fig. 1, is a clamp for holding the grid during the operation of the surfacing-disk. This clamp consists of an abutment-strip 20 and two L-shaped levers 21, the whole forming a rectangle whose interior dimensions are substantially that of the grid to be operated upon. The levers 21, which form the jaws of the clamp, are fulcrumed at 22 and are provided with guides 23, which consist of screws or bolts let into the carriage through elongated slots in the levers. Each of the levers is provided with a pin 24, which projects downward through a slot 25 in the surface of the carriage, and is secured in a round-headed plunger 26, which is normally spring-actuated outward from its socket, by means of a spring 27. This holds the levers 21 normally apart in the position shown in full lines at Fig. 1; but when the carriage is carried forward in

its ways the plungers are forced inward by the surfaces of the ways, so as to close the levers 21 inward to the position shown in dotted lines at Fig. 1.

- 5 In the manufacture of grids it would be highly advantageous that the openings or perforations should have the sectional shape which is shown at Fig. 7, because active material in the form of paste or cement when
10 once forced into a grid of that form and dried would very forcibly resist ejection. It is not feasible, however, to produce a grid having that sectional shape by casting or by the rolling process described in my pending application above referred to. It is, however, feasible to make a practical and merchantable grid, such as is shown at Fig. 6—namely, one having lateral projections 28 from the partitions upon one side.
- 20 In accordance with my present invention I take a grid, preferably formed as shown at Fig. 6, and the carriage of the machine being in the position shown at Fig. 1, I lay said grid with its smooth side up within the clamp.
- 25 The surfacing-disk 11 is then rotated at a very high rate of speed. Then by means of the hand-wheel I move the clamp and carriage forward, which, as before explained, automatically closes the clamping-levers upon the
30 grid and holds the latter firmly. As the carriage travels beneath the surfacing-disk, the sharp edge of the latter will trim off any rough or projecting particles of lead, and the under surface of said disk will by its rapid rotary
35 action slightly thin the grid and at the same time by the contact of the narrow annular under surface of the disk soften the lead and upset or spread the tops of the partitions, thereby reducing said grid to the sectional
40 shape shown at 29, Fig. 7. This spinning action of the disk also solidifies the lead of which the grid is composed and imparts thereto a very smooth and even surface. For the purpose of this operation the grid, still
45 held in the clamp, may be passed beneath the surfacing-disk as many times as is required. When this treatment is finished, the active

material may be inserted therein in any desired manner. If desired, the shape shown at Fig. 7 may be imparted to a grid whose partitions are of uniform thickness by first surfacing one side thereof and then the other side. Vertical adjustment of the shaft 5 will admit of variation in the height of the disk from the carriage, both for the purpose of the double-surfacing operation just described and for use in connection with grids intended for the positive and negative plates of a secondary battery, which to be in proper proportion should vary slightly in thickness. 60

I claim—

1. In a machine of the character described, the combination, with the reciprocating carriage having means for the support of the grid, of the vertical shaft, a concave surfacing-disk supported upon said shaft, with its face parallel with the carriage, means for rotating said shaft, and additional means for actuating the carriage, substantially as described. 70

2. In a machine of the character described, the combination, with the carriage and means thereon for grasping the grid, of the rotative disk concave as to the central portion of its lower surface and beveled as to its extreme edge, a shaft secured to and adapted to carry said disk, and means for rotating said shaft. 75

3. In a machine of the character described, the combination, with the reciprocating carriage and means for operating the same, of the L-shaped levers fulcrumed upon said carriage and spring-actuated away from each other, a pair of plungers connected to said levers and adapted to impart to them their closing movement, a concave finishing-disk with its face parallel with the surface of the carriage, a shaft whereon said disk is borne, and means for rotating said shaft. 85

In testimony whereof I affix my signature in presence of two witnesses.

ALBERT FRANKLIN MADDEN.

Witnesses:

JOHN D. WRIGHT,
EDWD. CHASE.