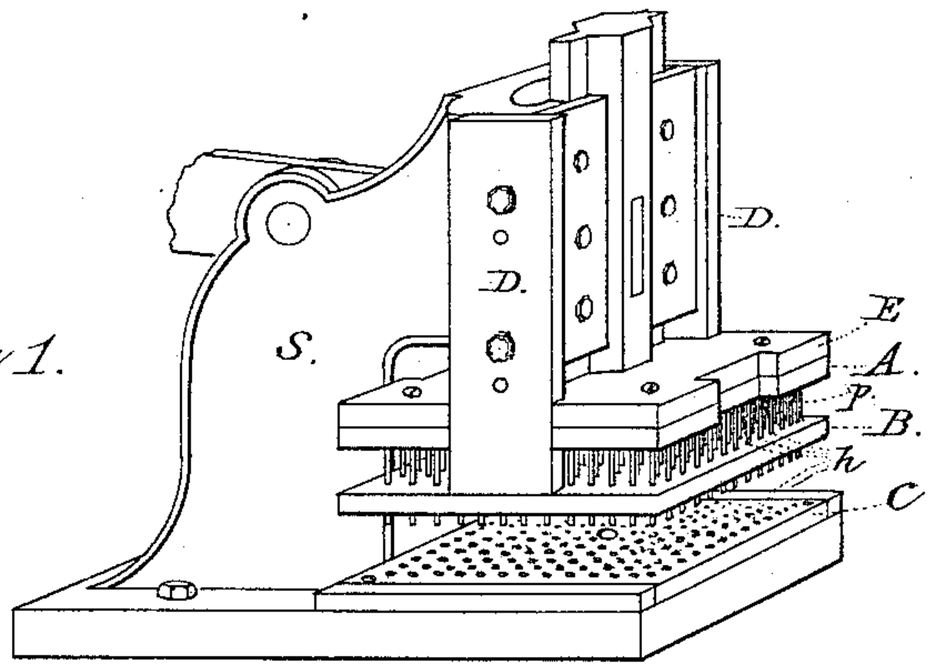
(No Model.)

H. H. CARPENTER.

MACHINE FOR THE MANUFACTURE OF SECONDARY BATTERY PLATES.

No. 414,288. Patented Nov. 5, 1889.

Fig 1.



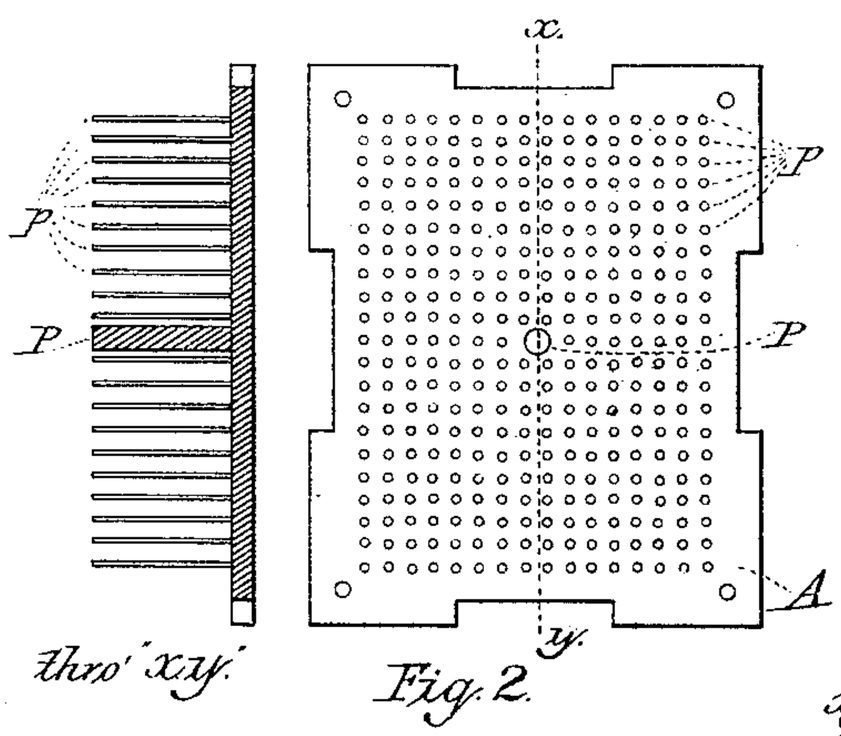


Fig. 2.

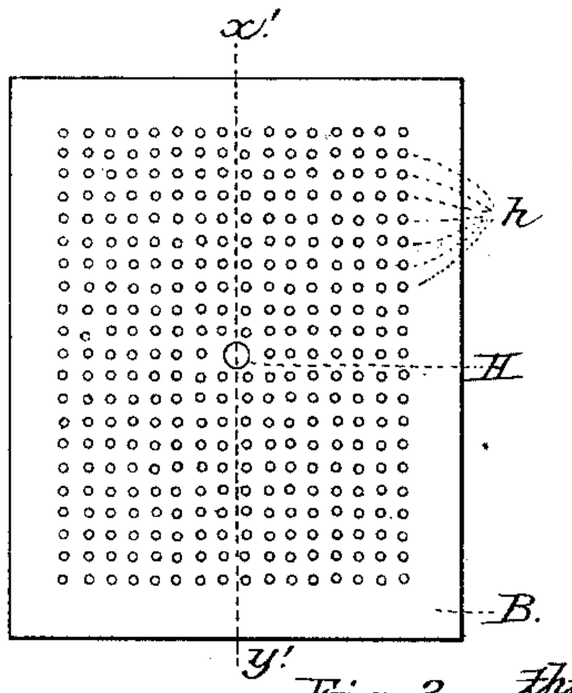
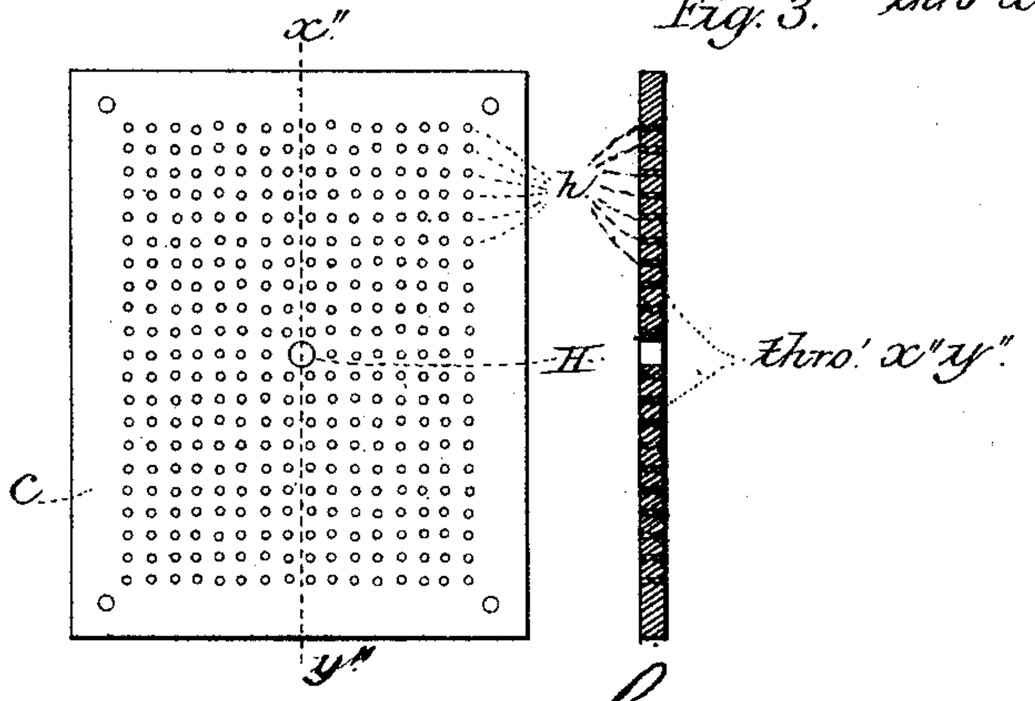


Fig. 3.

Thro' x'y'.

Thro' xy.

Fig. 4.



WITNESSES:

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UNITED STATES PATENT OFFICE.

HIRAM H. CARPENTER, OF DENVER, COLORADO.

MACHINE FOR THE MANUFACTURE OF SECONDARY-BATTERY PLATES.

SPECIFICATION forming part of Letters Patent No. 414,288, dated November 5, 1889.

Application filed January 2, 1888. Serial No. 295,216. (No model.)

To all whom it may concern:

Be it known that I, HIRAM H. CARPENTER, a citizen of the United States, residing in the city of Denver, county of Arapahoe, and State of Colorado, have invented a new and useful Machine or Punch for Manufacturing Electrodes for Secondary or Electric Storage Batteries; and I do hereby declare the following to be a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, in which—

Figure 1 shows a perspective of my new machine for the manufacture of electrodes or plates for secondary or storage batteries. Fig. 2 shows the head of punches for the perforation of electrodes and a section of the same through *x y*. Fig. 3 shows the stripper or device for freeing the punches from the material or electrode punched, and which also serves to hold the punches in position, with a section through *x' y'* of the same. Fig. 4 represents the die to receive the punches as well as the material or plug punched out after passing through the material or electrode so perforated, with a section of the same through *x'' y''*.

Letters of like name and size refer to like parts in each of the figures.

The object of my invention is to provide a means for perforating electrodes for secondary or electrical storage batteries, and to provide a machine or punch whereby several hundred holes or punctures can be made with one impression; and to this end my invention consists in a perforation-punching machine with a head of several hundred punches, a stripper B, and die C, the construction thereof, the use or application, the arrangement, and combination of the several parts thereof, as hereinafter specified.

A represents the head or plate into which the punches *p* P are fastened or headed, which is made of steel or other hard metal and firmly bolted to the lower side of the plate E, against which the heads of the several punches *p* P rest or butt. The under side of the plate E presents a perfectly-smooth surface for the heads of the punches to rest against, and is preferably made of steel, but any hardened iron will answer. The sockets or holes in the plate A to receive the punches *p* P, Fig. 2, are reamed at the upper ends, so as to permit the heads of the punches to be sunken even with the surface of the plate.

B is what I call a "stripper," which not only frees the punches from the material or plate punched, but also serves to hold the punches in a staunch and firm position, preventing them from bending or breaking. This stripper B is made of steel, through which of course are drilled as many holes *h* H, Fig. 3, as there are punches, in the same position and of the same size as are the punches. The stripper is attached merely on two sliding bolts or loose bolts (which are not shown in the drawings) passed in a convenient place through the plates A and E, and is so regulated that when the punches are at their highest position the stripper cannot drop off; but the punches recede only far enough into the stripper to free them from the material punched.

D D are strips of iron bolted onto the frame of the punch, extending downward, against which the stripper strikes in the upward movement of the punches. These pieces or strips of iron D D hold the stripper B, as represented in Fig. 1, until the punches are released. They may be adjusted to suit the thickness of the material punched by raising or lowering them.

C shows the die or steel plate, through which are drilled holes the same as the stripper, and into which holes the punches protrude after having passed through the material punched. This die is bolted upon the frame, as shown in Fig. 1, leaving a space underneath it into which the plugs or material punched out drop. The material or electrode to be perforated is placed upon the die C, pressure brought to bear upon the head either by lever, as shown in Fig. 1, or by means of any power desirable, and the punches pressed through, carrying the plugs punched out into and through the dies or holes H *h*, Fig. 4, dropping them beneath. The punches P *p* are made of the best steel and have a "four-side" point, and are of any length or size desirable and practicable, according to the thickness of the material to be perforated. The ones I am now using are an inch and a quarter in length and about a sixteenth of an

inch in diameter. They are all separate and can be replaced one by one whenever necessary. The punch P, Fig. 2, is much larger than the punches *p*, and is intended for making a larger hole in the center of the plate or electrode as a means of fastening them together.

This machine I have tried with nine hundred and eighteen punches to a plate five by four inches, and find it perfectly practicable.

Having thus described my invention, what I claim, and desire Letters Patent to issue for, is—

The herein-described machine for perforating by punching electrodes for secondary batteries, comprising the frame, the plate E, mounted to slide thereon, the head A, secured to said plate E and carrying the series of punches, the part B, acting as a stripper and a guiding-support for the punches, and the die C, all arranged and combined substantially as shown.

In testimony that I claim the foregoing I have hereunto set my hand this 27th day of December, A. D. 1888.

HIRAM H. CARPENTER.

Witnesses:

WM. E. DOYLE,
MASON B. CARPENTER,
HARVEY RIDDELL.