

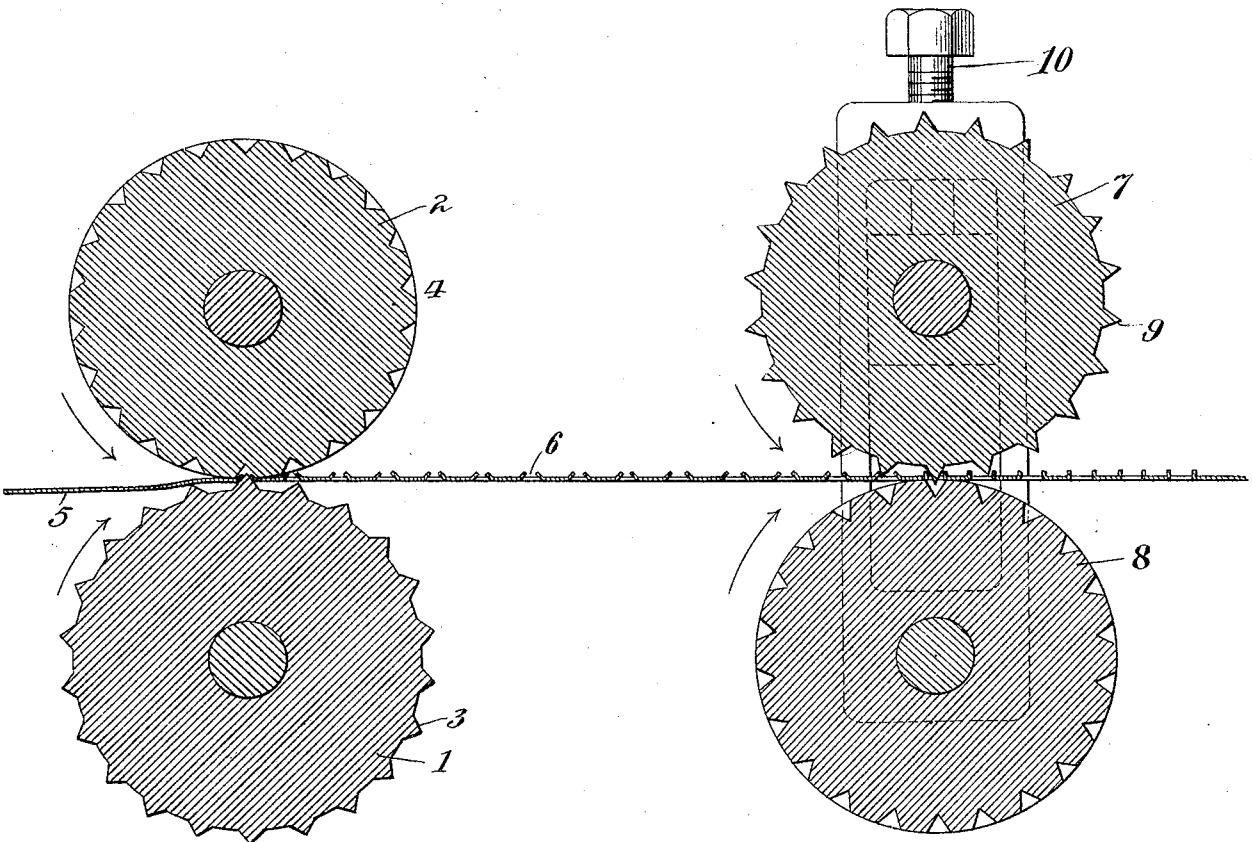
No. 804,799.

PATENTED NOV. 14, 1905.

T. A. EDISON.

APPARATUS FOR PERFORATING SHEET METAL.

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# UNITED STATES PATENT OFFICE.

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## APPARATUS FOR PERFORATING SHEET METAL.

No. 804,799.

Specification of Letters Patent.

Patented Nov. 14, 1905.

Original application filed July 23, 1904, Serial No. 217,881. Divided and this application filed March 20, 1905, Serial No. 251,002.

*To all whom it may concern:*

Be it known that I, THOMAS A. EDISON, a citizen of the United States, residing at Llewellyn Park, Orange, Essex county, New Jersey, have invented certain new and useful Improvements in Apparatus for Perforating Sheet Metal, of which the following is a description.

This application is a division of an application filed July 23, 1904, Serial No. 217,881.

For the mechanical make-up of my improved iron-nickel battery I employ a large number of small pockets of nickel-plated sheet metal, in which the active materials are held under pressure. Heretofore sheet metal has been first perforated by means of dies, after which it is nickel-plated and finally cut into blanks which are bent into the proper shape to form the pocket-sections. Two of these sections for each pocket are then nested together, with the active material between them, and subjected to very great pressure, by which the active material will be compressed into a small coherent briquet, with which the elastic walls of the pocket are always in contact. In forming the perforations in the sheet metal a bur is struck up around each perforation, since the metal is merely displaced without being removed as when a punch is used. I find that after the pockets are assembled the great pressure to which they are subjected tends to return the burs thus formed to their original position, thereby closing the perforations more or less and interfering with the effective circulation of the electrolyte.

The object of the present invention is to provide an apparatus by means of which perforations of the character described may be first formed, but which by means of a second operation will cause the burs to be more or less upset, whereby the objection noted will be overcome.

In order that the invention may be better understood, attention is directed to the accompanying drawing, forming a part of this specification, and in which I illustrate a diagrammatic view of a suitable apparatus for carrying the invention into effect, the perforating and upsetting rolls and strip of sheet metal being shown in section and the projections and depressions of the said rolls being greatly magnified.

In the drawing, 1 and 2 represent the perforating-dies, the former being provided on its periphery with the projections 3, properly arranged and of the correct size to perforate

the metal properly, and the latter being provided with corresponding notches or grooves 4 for accommodating the displaced metal.

5 represents the long sheet-metal strip, which after being perforated is nickel-plated and cut into blanks of the desired size. It will be observed that after the metal strip has passed the perforating-dies 1 and 2 it will be provided with burs 6, which are inclined more or less over the openings, so that any pressure applied to the strip will tend to return them toward their original position to thereby close the openings more or less with the objection noted. To overcome this, I make use of a pair of upsetting-dies 7 and 8, corresponding substantially with the dies 1 and 2, except that the upsetting-dies are oppositely arranged, so that the projections 9 of the die 7 will enter between the burs 6 of each opening and exert a pressure thereon by which the burs will be upset, as shown, and brought at least to a perpendicular position. It will be evident that by subjecting the sheet metal to this treatment there will be no tendency whatever of the openings to be closed when pressure is exerted thereon. Preferably the upsetting-die 7 is made adjustable toward and away from the cooperating female member 8 in order that the extent to which the upsetting operation may be carried can be regulated; but in practice it is not desirable to bend the burs to any great extent beyond the perpendicular position shown, as that might tend to tear the metal around the perforations, and thus enlarge the openings. The adjustability of the die 7 may be effected by connecting its bearings with adjusting-screws 10, as shown.

Having now described my invention, what I claim as new therein, and desire to secure by Letters Patent, is as follows:

1. In an apparatus of the character described, the combination of two sets of rolls and means for passing a strip of metal continuously therebetween, the rolls of one set being provided with cooperating projections and depressions, whereby perforations which are surrounded by burs are formed, and the rolls of the other set being provided with cooperating projections and depressions which are reversed with respect to the strip, whereby the metal surrounding the perforations is eyeleted or upset, substantially as set forth.

2. In an apparatus of the character described, the combinations of two sets of dies

and means for passing a strip of metal continuously therebetween, the dies of one set being provided with cooperating projections and depressions, whereby perforations which are surrounded by burs are formed, and the dies of the other set being provided with cooperating projections and depressions, which are reversed with respect to the strip, whereby the metal surrounding the perforations is eyeleted or upset, substantially as set forth.

3. In an apparatus of the character described, the combination of two sets of rolls, means for passing a strip of metal continuously therebetween, the rolls of one set being provided with cooperating projections and depressions, whereby perforations which are surrounded by burs are formed, and the other set comprising a roll which is provided with projections which correspond to the projections of the perforating-roll, but which are reversed with respect to the strip, whereby

the metal surrounding the perforations is eyeleted or upset, substantially as set forth.

4. In an apparatus of the character described, the combination of two sets of dies, means for passing a strip of metal continuously therebetween, the dies of one set being provided with cooperating projections and depressions, whereby perforations which are surrounded by burs are formed, and the other set comprising a die which is provided with projections, which correspond to the projections of the perforating-die, but which are reversed with respect to the strip, whereby the metal surrounding the perforations is eyeleted or upset, substantially as set forth.

This specification signed and witnessed this 17th day of March, 1905.

THOS. A. EDISON.

Witnesses:

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