No. 613,236. Patented Nov. 1, 1898.

A. J. BRADLEY.

PROCESS OF MAKING PUNCHES.

(Application filed Dec. 18, 1894.)

(No Model.)

Fig. I.

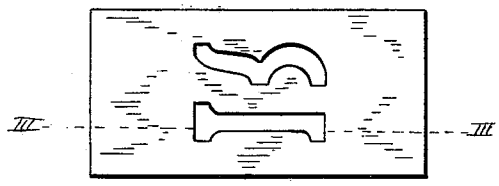


Fig. II.



Fig. III.

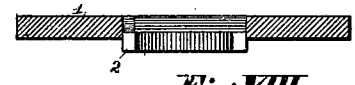


Fig. VIII.

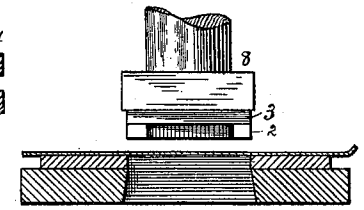


Fig. IX.

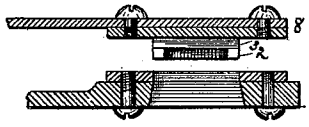


Fig. IV.

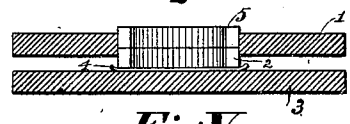


Fig. V.

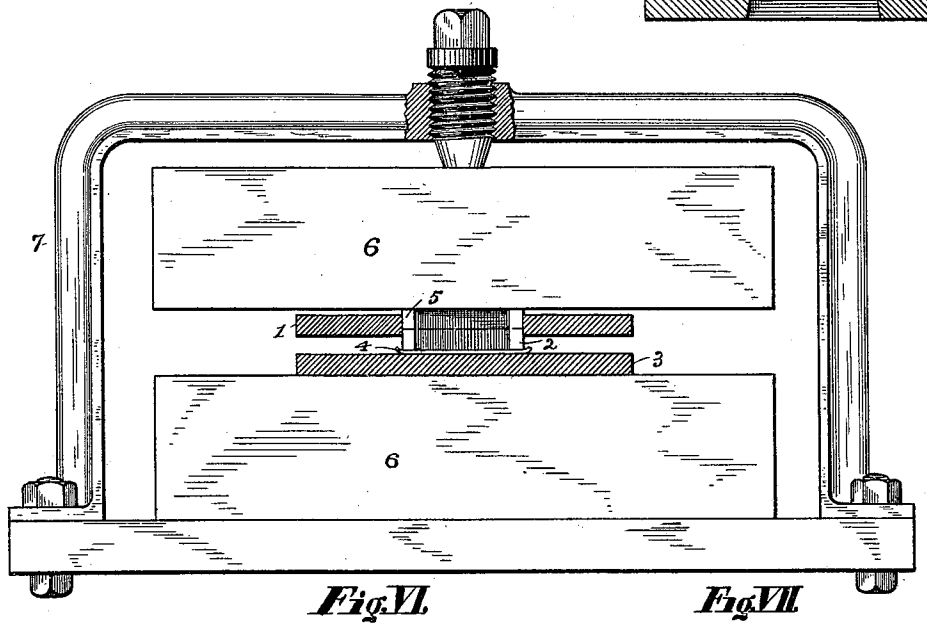


Fig. VI.

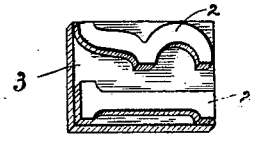


Fig. VII.



Attest:-

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UNITED STATES PATENT OFFICE.

ANDREW J. BRADLEY, OF ST. LOUIS, MISSOURI, ASSIGNOR TO THE BRADLEY STENCIL MACHINE COMPANY, OF MISSOURI.

PROCESS OF MAKING PUNCHES.

SPECIFICATION forming part of Letters Patent No. 613,236, dated November 1, 1898.

Application filed December 18, 1894. Serial No. 532,239. (No model.)

To all whom it may concern:

Be it known that I, ANDREW J. BRADLEY, residing in the city of St. Louis, State of Missouri, have invented a new and useful Improvement in Processes of Making Punches, of which the following is a specification.

My invention relates to the art of making punches whose cutting-faces are separate pieces from their respective shanks.

The principal object of my invention is to insure that the piece or pieces constituting the face-plate shall be accurately mounted to coöperate with the corresponding die. My invention consists in the process hereinafter described.

In the accompanying drawings, which form part of this specification, Figure I is a face view of the die. Fig. II is a view of two pieces fitting the holes in said die and adapted to constitute the face-plate of a punch to cooperate with such die. Fig. III is a sectional view of the die on the line III III of Fig. I with the face-pieces of the punch part way inserted therein. Fig. IV shows the same view as Fig. III with fillets laid in the die-holes on the punch-pieces and said punch-pieces resting on a mounting-plate with a piece of solder intervening. Fig. V shows the same view as Fig. IV with hot blocks applied to the fillets and the mounting-plates, respectively. Fig. VI is a face view, and Fig. VII is a side view, of the face-pieces mounted on the mounting-plate; and Fig. VIII is a view showing a finished punch coöperating with a die, said die being shown in section. Fig. IX is a view showing a special modification wherein the face-pieces are carried on the side or face of the punch-shank.

Punches in which the face-plate is a separate piece or pieces mounted on a mounting-plate are very liable to have their face-plate distorted when subjected to the heat required to solder or braze it to the mounting-plate, and when the face-plate consists of several pieces they are very difficult to mount accurately in relation to each other. My invention overcomes these difficulties and is especially advantageous in mounting the face-pieces formed by punching, as described in Letters Patent granted to me July 10, 1894. As set forth in said Letters Patent, a metallic blank 1 is punched, and the punched-out pieces 2 are mounted on a suitable shank with its sharp edge outermost.

In carrying out my present process these punched-out pieces 2 are inserted part way back into the holes in the blank 1, out of which they were punched, as shown in Fig. III, and in which they fit precisely. The sharp edge of the punched-out pieces should be innermost—that is, inside of said holes—and the dull edge should project from the sharp-edged face of the blank or female die 1. The face-pieces 2, with the blank or die 1 thus fitted thereon, are then laid on a mounting-plate 3, with a piece of solder 4 intervening between them. This solder is preferably silver solder or a thin sheet of brass, the meeting or contact surfaces of the face-pieces and mounting-plate being cleaned off before the solder is applied.

Small pieces or fillets 5, of the form of the die-holes and adapted to fit loosely therein, are inserted therein to rest against the tight-fitting pieces 2. The loose-fitting pieces 5 project from the dull-edged face of the blank or female die 1. While the parts are thus arranged, heavy blocks 6, of hot metal or other suitable material, are applied to the mounting-plate 3 and the projecting ends of the loose-fitting pieces 5. For this purpose one of the hot blocks 6 is laid on the frame 7, the several parts assembled as above described are laid on this hot block, with the mounting-plate resting directly thereon, and the second hot block is laid upon the projecting faces of the loose-fitting pieces 5. A screw working in a yoke on said frame above the block serves as a clamp to press the blocks together. By this arrangement the heat of the block is communicated by conduction to the meeting portions of the surfaces to be soldered together and leaves the rest of said surfaces comparatively cool. The heat of the blocks should be high enough to fuse the solder when applied as above set forth; but it is desirable not to heat them much higher than this. The parts thus arranged should be permitted to cool with the face-pieces still in the holes of the die or blank. As the upper hot block does not come into contact with the blank or die 1, said die is heated only on its dull-edged

face and by radiation, except for the portion around its holes, which portion is in contact with the face-pieces of the punch and is heated by conduction. The blank or die 1 is therefore comparatively cool and retains its shape accurately upon cooling. The face-pieces 2 being in the holes in said blank or die 1 and fitting perfectly therewith have no room to become distorted and when cooled down still fit precisely in said die-holes.

The mounting-plate 3 is preferably of about the same thickness with the face-pieces 2, in order that they may expand and contract equally and simultaneously as the temperature varies. After the parts have cooled the mounting-plate, with the face-pieces firmly adhering thereto, is laid on a die with the face-pieces projecting into the die-holes and punched any desired shape, as shown in Fig. VI.

As before stated, I prefer, on account of the small contact-surface available in punches for stencil-machines, to use brass or silver solder in mounting the face-pieces on the mounting-plate. The back of the mounting-plate furnishes a broad surface which can be united by any suitable means to any suitable punch-shank—as, for instance, directly by means of a soft solder, as shown in Fig. VIII, or by being soldered to a back plate which is fastened to the shank, as shown in Fig. IX. It is practicable to solder the face-pieces directly to the shank; but it requires more skill and attention than to solder them to a comparatively thin mounting-plate and then soldering the mounting-plate to the shank.

Fig. IX illustrates one of the special applications of the process, resulting in a punch which operates perpendicularly to its shank. This form of punch is particularly advantageous in rotary stencil-machines, for which I filed an application for Letters Patent on or about the 15th of December, 1894. In this form the punch portion is mounted flatwise on the side of a shank, which may be a rigid bar or a flexible resilient plate.

What I claim as new, and desire to secure by Letters Patent, is—

1. The process of making dies which consists in inserting the pieces constituting the face-plate part way into an accurately-fitting form, bringing together the mounting-plate and such pieces while so held in position with a strip of solder intervening, and fusing the solder by heating said mounting-plate and a metallic mass in contact with the pieces of the face-plate, substantially as and for the purpose described.

2. The process of making punches which consists of punching a metallic blank, inserting the punched-out portion part way into the openings so made in the blank, and inserting conducting-pieces into said openings from the other side to rest upon said punched-out portions, bringing the projecting faces of the punched-out portions and the back plate of like thickness together with a layer of solder intervening, and applying hot blocks against said back plate and conducting-pieces, respectively, substantially as and for the purpose set forth.

ANDREW J. BRADLEY.

Witnesses:
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