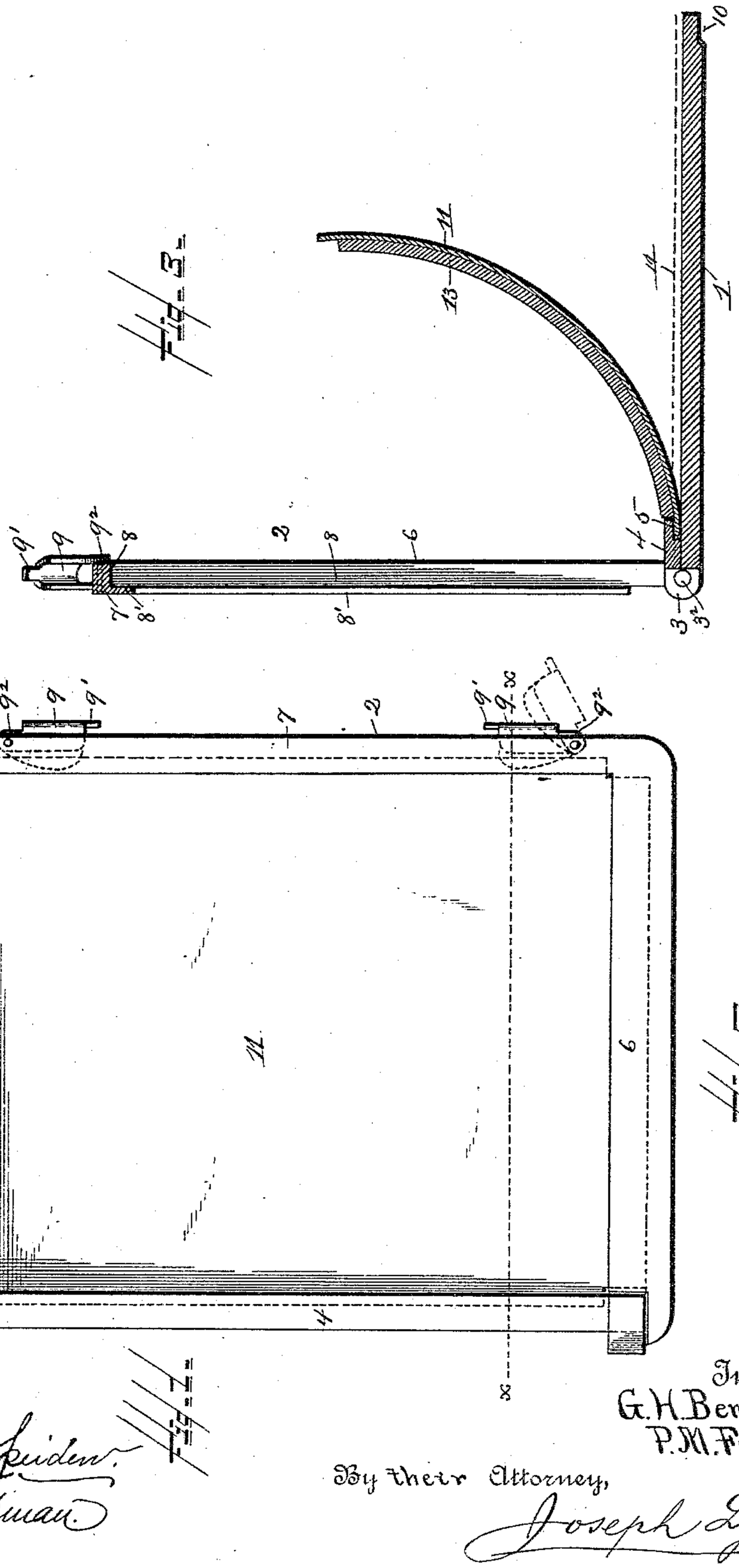
(No Model.)

G. H. BENEDICT & P. M. FURLONG.

CLAMP FOR MATRIX PLATES.

No. 411,883. Patented Oct. 1, 1889.



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UNITED STATES PATENT OFFICE.

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CLAMP FOR MATRIX-PLATES.

SPECIFICATION forming part of Letters Patent No. 411,883, dated October 1, 1889.

Application filed April 19, 1889. Serial No. 307,705. (No model.)

To all whom it may concern:

Be it known that we, GILBERT H. BENEDICT and PATRICK M. FURLONG, citizens of the United States, residing at Ellenville, county of Ulster, and Albany, county of Albany, both in the State of New York, respectively, have invented certain new and useful Improvements in Clamps for Matrix-Plates, of which the following is a specification.

Our invention relates to improvements in clamps used in the production of curved electrotype-plates, the curvatures of which must conform to that of the surface of the printing-cylinders in cylinder-presses, upon which these plates, when produced, are mounted in a manner well understood by those skilled in the art of printing.

In the production of curved electrotype-plates it is our practice to bend a rectangular plate made of sheet-steel, hard-rolled brass, or other highly-elastic metal to set to the arc of a circle whose radius is slightly larger than the radius of the cylinder of the press upon which the electrotype-plate is intended to be used. This plate is then unbent and clamped to a rigid flat bed-plate in such manner that its original curved set is not affected, so that when released from the clamp it will again assume its original curvature. The curved elastic plate thus flattened out upon a rigid support is then used as the support upon which the molding material is poured in a layer of uniform thickness, and after this material has attained the desired hardness and its surface has been well impregnated with graphite or other suitable conductor of electricity an impression of the type or other relief printing-form is produced upon the molding material. This furnishes a matrix, which is then shaved, trimmed, built up, and otherwise prepared to receive an additional treatment with graphite. The elastic plate is then released from the clamp, and it again assumes the original curvature, thereby bending the matrix which it supports to the curvature of the cylinder of the printing-press, or nearly so. From this matrix electrotype-plates are made by inserting the same into a depositing-bath in proper relation to a convex anode, as is well understood by those skilled in the art.

In practicing the process thus briefly described it has been necessary, prior to our present invention, to place the curved plate on the flat bed-plate. Then, by an inconvenient, awkward, and difficult operation, the plate was flattened by the direct pressure thereon of the hands of the operator, and while being held in such flattened position clips were manipulated to engage over the edges of the said flattened plate and secure it to the bed-plate during the formation of the matrix. Separate guards, composed of strips of metal, were built around the edges of the plate to retain the matrix material when poured on. On releasing the plate and matrix thereon from the clamping devices, so that the said plate might assume its original curvature, the operator was obliged to first remove the guards, then press with his hands on the plate supporting the matrix while he released its edges from the side clips, and then allow it to slowly return to its normal curvature. This latter operation was even more awkward than the first-mentioned operation of flattening the plate.

It is the object of our present invention to produce a clamping device by the use of which the operations of flattening and releasing the plate are rendered comfortable and expeditious, and the inconvenience and awkwardness attending operations requiring direct hand-pressure on the plate are avoided. We attain this object by adapting to the bed-plate a clamp-frame of suitable size and shape so constructed that its inner edges will overlap the corresponding outer edges of the curved plate, and when this frame is applied to the bed-plate it engages the edges of the curved plate, and the latter is moved with the frame until flattened out on the said bed-plate, when the frame is locked to the said bed-plate by suitable clasps. The clamping-frame is so constructed that when in position to clamp a curved elastic matrix-support upon the bed-plate its sides, in addition to their function of holding the matrix-support flattened out, also serve as guards of uniform height to retain the matrix material.

The construction and operation of the improved clamping device will fully appear from the following detail description, reference being had to the accompanying drawings, in which we illustrate, in—

Figure 1, a plan view of the improved matrix-clamp in the closed position, with a plate inserted and flattened out preparatory to applying the matrix material; Fig. 2, a section on the line *x x* of Fig. 1, and Fig. 3 a similar section with the movable frame of the clamp lifted and the curved plate released and having assumed its normal curvature.

Like numerals of reference indicate like parts in all the figures of drawings.

Referring to the drawings, the matrix-clamp is shown as composed of the bed-plate 1, which has the general quadrangular shape indicated by the whole clamp in Fig. 1, and of the open frame 2, hinged to one edge of the bed-plate, as indicated. These hinges are composed of perforated ears 3 3, formed on and projecting from one side of the bed-plate 1, and similar ears 3′ 3′, projecting from the frame 2. The frame and bed-plate are held together by the pintles 3″, extending through the perforations in the ears 3 and 3′. A bar 4, provided with an offset on its under side and extending between the hinges 3 3, is secured to the bed-plate, so that a recess or groove 5 is formed near the rear edge of the bed-plate for the insertion of one edge of the curved matrix-plate, as will hereinafter more fully appear.

The hinged open frame 2 consists of two side bars 6 6 and a front bar 7, which are either joined together or which may all be made in one piece of L-iron and of such size that the depending flanges 8 of the L will just pass over the edges of the bed-plate. Two clasps 9 9, pivoted to the front bar 7, are each constructed of a metallic blank bent to U form in cross-section, with one end reduced to form a handle or thumb-piece 9′ and with one jaw extended to form a lug 9″, at which the clasp is pivoted, as stated. These clasps are adapted to secure the open frame to the bed-plate when the former is turned down upon the latter, as shown in Figs. 1 and 2, the under side of the front edge of the bed-plate being formed with offsets 10, as shown, to allow the lower jaws of the clasps to pass under said edge, and in the depending flange 8 of the front bar 7 of the frame are formed corresponding slots 10′, to receive the upper jaws of the clasps.

It will now be understood that if a rectangular plate of any kind having the size of the bed-plate as limited by the rear end of recess 5 be placed in position upon said bed-plate, with one edge inserted into said recess, and the open frame be then turned down and clasped, said rectangular plate will be securely clamped in position upon the bed-plate. In this position there will be a guard of uniform height all around the clamped plate, formed on three sides by the upper flanges 8′ of the L-irons and on the fourth (the rear) side by the bar 4, extending between the hinges 3 3. If, however, such a plate be formed of elastic material—such as steel or spring-brass—and be curved, as shown in Fig. 3, the frame when moved downward will first engage the corners of the upper end of such curved plate under the flanges 8′. As the downward movement of the frame in planes at right angles to the face of the bed-plate is continued, the end of the curved plate will slide along the flanges 8′, the said plate becoming more and more flattened as the said frame approaches the bed-plate. The movement of the frame is continued until the curved plate lies flat on the bed-plate with one end in the groove 5, the other end between the under side of the flange 8′ of the front bar 7 and the bed-plate, and the two sides between the flanges 8′ of the side bars 6 and the bed-plate. The resiliency of the curved plate resists the downward movement of the hinged frame, and consequently the operator must exert more or less force in order to flatten the plate preparatory to forming the matrix. This force he can easily and comfortably apply by grasping the frame with one hand and pressing down upon it, the curved plate being held by the flanges 8′, and the force tending to flatten it being applied at more than one point. The operator, having one hand free during this operation, can readily manipulate the clasps 9 to secure the frame in the lowered position by moving them on their pivots so that the wings engage in their respective seats in the front bar 7 and under the bed-plate.

As stated above, when clamped in position the flanges 8′ of the open frame, together with the bar 4, form a guard of uniform height around the edges of the matrix-plate, so that the frame constitutes at the same time a molding-clamp and a molding-pan, and in this molding-pan the molding material 13 is poured and is allowed to set to the required hardness or consistency. The surface of the molding or matrix material is then impregnated with graphite, the impression with the type or other relief form is made, and then an additional treatment with graphite is ordinarily resorted to, whereby the matrix surface becomes highly polished and in condition to receive the galvano-plastic deposit of copper or other metal. The object of the use of a curved elastic matrix-plate, however, is to curve the matrix to conform to the surface of the cylinder of the printing-press, and this curvature is produced before the matrix is inserted into the electro-depositing bath. This is done, as before stated, by unclamping the matrix-plate, as shown in Fig. 3, when by its own elasticity it will curve back to its original form and will bend the plastic matrix to the same curvature, as shown. This statement should be modified in so far as the curvature of the concave exposed surface of

the matrix is concerned, which, being concentric with the concave surface of the matrix-plate, will be curved upon a slightly smaller radius than the matrix-plate, so as to conform exactly to the surface of the cylinder of the press. The matrix is then removed from the elastic matrix-plate, and the electrotype-plates are produced in any ordinary or improved manner well understood by those skilled in the art.

To release the curved plate after the matrix material has been applied, the operator exerts sufficient pressure on the frame to relieve the clasps of strain, then moves such clasps out of their seats and allows the frame to be slowly lifted by the curved plate as it assumes its normal curvature, carrying with it the matrix material and giving to the latter the curve necessary.

While the clamp constructed according to our invention is applicable to any matrix-plate, we prefer to use it in connection with matrix-plates constructed as set forth in our application, Serial No. 297,625, filed January 26, 1889, in which application is also shown and described, but not claimed, the clamp forming the subject-matter of this application.

Although we have shown and described but one form of clamp, it is evident that various other forms may be constructed in accordance with our invention, and that we are, therefore, not limited to the exact details herein shown and described.

Having now fully described our invention, we claim and desire to secure by Letters Patent—

1. A clamp for curved elastic matrix-supports, consisting, essentially, of a flat bed-plate and a frame fitted to the bed-plate and constituting a clamp-jaw and a molding-guard for the same, substantially as described.

2. In a combined clamp and molding-pan for curved elastic matrix-supports, the combination of a flat bed-plate having one edge provided with a molding-guard with a frame fitted to the bed-plate, constituting a clamp-jaw and a guard for the other sides of the same, substantially as described.

3. In a combined clamp and molding-pan for curved elastic matrix-supports, the combination of a flat bed-plate having one edge provided with a molding-guard recessed on its under side for the reception of one edge of the matrix-support with a three-sided open frame fitted to the bed-plate, constituting a clamp-jaw and molding-guard for the other sides of the same, substantially as described.

4. In a combined clamp and molding-pan for curved elastic matrix-supports, the combination of a flat bed-plate with a frame hinged to move in planes at right angles to the face of the bed-plate and constituting a clamp-jaw and a molding-guard for three sides of the same, substantially as described.

5. In a combined clamp and molding-pan for curved elastic matrix-supports, the combination of a flat bed-plate having one edge provided with a molding-guard recessed on its under side for the reception of one edge of the matrix-support with a three-sided open frame fitted to the bed-plate, constituting a clamp-jaw and a molding-guard for the other sides of the same, and clasps for holding the frame to the bed-plate and for releasing it from the same, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

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Witnesses to the name of Gilbert H. Benedict:

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