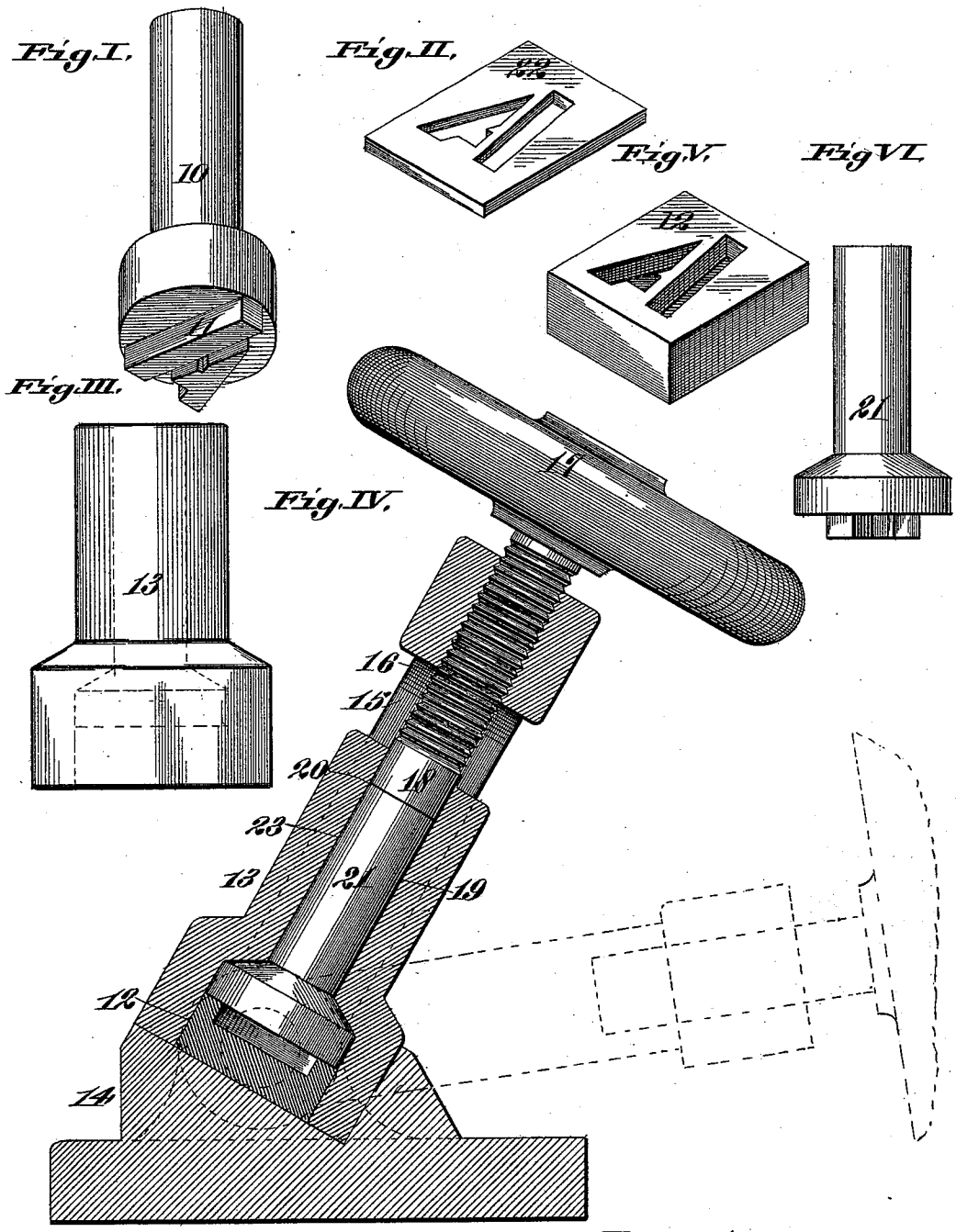
(No Model.)

J. A. HOFF & C. K. PICKLES.

APPARATUS FOR MAKING DIES.

No. 541,438. Patented June 18, 1895.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR MAKING DIES.

SPECIFICATION forming part of Letters Patent No. 541,438, dated June 18, 1895.

Application filed September 18, 1894. Serial No. 523,447. (No model.)

To all whom it may concern:

Be it known that we, JOHN A. HOFF and CHARLES K. PICKLES, of St. Louis, Missouri, have made a certain new and useful Improvement in Apparatus for Making Dies, of which the following is a full, clear, and exact description, reference being made to the accompanying drawings, forming part of this specification.

Our invention relates to improvements in apparatus for making dies and has special reference to a device for producing punches conveniently, quickly and economically and our invention consists in novel features of construction hereinafter described and claimed.

Referring to the drawings, Figure I is a perspective view of a finished patrix formed by our apparatus. Fig. II is a perspective view of a matrix formed by the patrix. Fig. III is an elevation of a mold, the dotted lines indicating a concavity therein, in which the patrix is cast. Fig. IV is an elevation, partly in section, of a frame in which the mold is mounted and by which the molten mass is treated. Fig. V is a perspective view of a combined base and matrix employed in conjunction with the mold. Fig. VI is an elevation of a finished patrix formed by our apparatus.

Heretofore in this art it has been the practice to form punches by casting the relieved or embossed portion thereof, and thereafter affixing thereto a stem or shank by which the same was sustained and impelled; or the punch was formed by milling away the body of a section of metal of sufficient size to form the entire device, leaving the configuration thereof in relief on one end of said section of metal, but either manner of production is lacking in many desirable qualities.

In the construction of the apparatus preliminary to the operation of the process, a patrix 10 (Fig. I), is made in any common manner and provided with an embossed letter or symbol 11 on one end thereof. (It is understood that a separate patrix should first be made for each letter, symbol or configuration desired.) The patrix thus formed is mounted in a chuck (not shown), and forcibly impacted with and caused to penetrate a block of metal, or is placed in a mold and molten metal cast in contact with the face thereof, thus producing the matrix 12. Shown in Fig. V. The matrix 12 is placed in the lower portion of a cavity or bore in a mold 13, which mold is seated on a base 14 and has its axial plane inclined approximately thirty degrees from the perpendicular. A bifurcated frame 15 is provided, the extreme ends of which frame are pivotally connected to the base 14, the yoke of said frame having an orbit, or plane of travel, across the upper end of the mold 13. A compressing screw 16 is mounted in a screw seat, formed in the yoke of the frame 15, and is provided at one end with a hand wheel 17, whereby it is manually rotated, and at the other end with a head 18, the diameter of the head 18 being coincident with the diameter of the upper portion of the bore in the mold 13.

The frame 15 being positioned as shown by dotted lines in Fig. IV, the bore in the mold 13 is flushed with lead, or analogous suitable substance, the matrix is positioned as shown, and the patrix material, in a molten condition, introduced slowly into the upper end of said bore, said molten material traveling down the line 19 of said bore into contact with the matrix, and gradually filling the configurated indentation of the matrix and the bore to a point slightly above the demarcation line 20. While the patrix material is yet plastic, the frame 15 and the screw 16 are positioned, as shown by solid lines in Fig. IV, and the head 18 introduced into the bore, and caused to contact with said plastic material by the manual rotation of said screw and consequent longitudinal travel thereof, the continued rotation of the screw effecting a gradual application of great compressing force on said material, thus rendering the same slightly homogeneous, and insuring the uniform contact thereof with the matrix and resultant formation of a perfect male die in exact reproduction of the indentation of the matrix. After cooling, the mold 13 and now perfectly formed patrix 21, said patrix is removed with the matrix from the said mold, and thereafter conjunctively employed with the matrix 22 (Fig. II) to form a complete die, the matrix 22 being formed by the original patrix 10.

By reason of the inclined positioning of the

mold 13 and slow pouring of the patrix material along the line 19, the air and other gases escape from the mold along the line 23 in advance of the metal, thus insuring more perfect results than are otherwise obtainable.

By means of our apparatus, punches and dies may be produced in any form of any metallic substance with great rapidity and convenience, and at a minimum expense.

What we claim is—

An apparatus for making dies, comprising a base provided with an inclined upper surface, a bifurcated frame pivoted to said base and carrying a compressing screw, and a mold adapted to receive a matrix in its lower end, and to be supported upon the inclined surface of the base, substantially as described.

JOHN A. HOFF.
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In presence of—
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