July 5, 1955 J. W. QUADT 2,712,247

MANUFACTURE OF TYPE BARS

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Fig. 1.

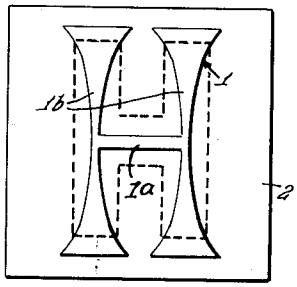


Fig. 2.

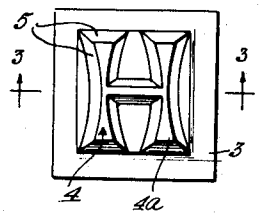


Fig. 5.

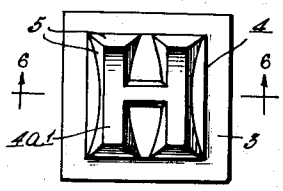


Fig. 3.

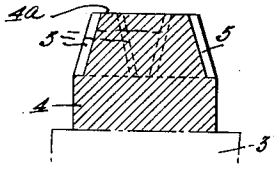


Fig. 4.

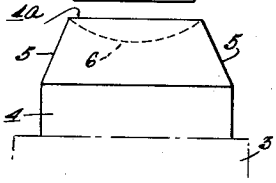


Fig. 6.

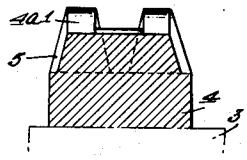


Fig. 7.

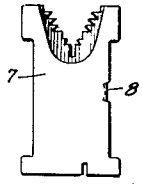


Fig. 8.

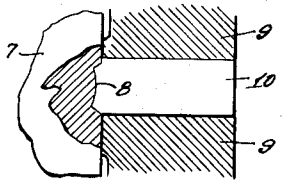
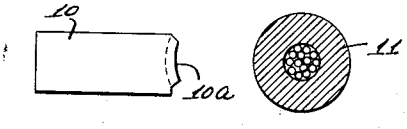


Fig. 9.



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MANUFACTURE OF TYPE BARS

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Application October 19, 1953, Serial No. 386,785

2 Claims. (Cl. 76—107)

This invention relates to character bearing matrices for typecasting machines. In typecasting machines, such as Linotype machines of the general organization represented in U. S. Letters Patent No. 436,532, the matrices are released from a storage magazine and assembled in line in the order in which their characters are to appear. The assembled line of matrices is then presented in front of a slotted casting mold and molten metal is introduced into the mold and against the matrix line to produce a type bar or slug. The matrices are then automatically returned to their appropriate places in the magazine for further use.

The present invention is particularly directed to matrices bearing curved character configurations for producing type bars having concave shaped raised characters thereon which may be used for printing longitudinally on curved or cylindrical surfaces, including wire and cable, as well as to means for manufacturing such matrices.

The details of the present invention will best be understood by reference to the description which follows and the accompanying drawings.

Referring to the drawings:

Fig. 1 is a face view of a pattern used for making a punch member;

Figs. 2 and 5 illustrate face views of the punch member at different stages of production;

Fig. 3 is a cross-section taken along the line 3—3 of Fig. 2, looking in the direction of the arrows;

Fig. 4 is a side view of the punch member;

Fig. 6 is a cross-section taken along the line 6—6 of Fig. 5, looking in the direction of the arrows;

Fig. 7 is an illustration of a matrix produced by the present invention;

Fig. 8 shows a slug as cast in the mold and against a line of matrices; and

Fig. 9 is an end view of the type bar and a cross-sectional view of a cable to be printed upon by the type bar.

In the manufacture of Linotype matrices, the characters are punched into the edges thereof to form type casting cavities. The punch characters are formed by a pantograph cutting machine using brass patterns of the characters to be formed as masters or originals.

Referring to Fig. 1, the brass punch pattern comprises, as usual, a raised character 1 formed on a flat rectangular base or plate 2. The pattern character ordinarily is several times the size of the actual punch character to be produced. According to the present invention, however, the raised character 1 is not an exact original of the character to be reproduced in the matrix, but rather a distorted character wherein the elements or configurations thereof are wider at the top and bottom of the character, progressively narrower toward the center, and narrowest at the horizontal centerline. Only the capital letter "H" is represented in the drawings, but the design of all block type would follow the same general rule. Of course, if it were desired to print both capital letters and small letters having ascenders and descenders, such as "b," "d," "j," "p," etc., the design of the font of characters would be such that the widest portions of the characters would be at the top of the highest ascender or capital letter and at the bottom of the lowest descender or capital character, and the narrowest portions midway therebetween. In the discussion of the present invention, it will be assumed that all of the characters are the same height having the same upper and lower limits.

It may be observed that horizontal lines, such as the cross connection 1^a of the capital letter "H," are formed by straight lines, although the width thereof is narrower in proportion to the size of the character than is desired in the character to be printed, whereas vertical lines, such as the vertical legs 1^b of the capital letter "H," are narrowest at the center and grow to full width at the top and bottom. The dotted lines in Fig. 1 represent the actual shape of the character to be printed.

Using the pattern as a master, the character 1 on the pattern is reproduced in much smaller size on the punch by means of a punch cutting machine. The punch is formed from a bar of steel stock 3, and to save work on the punch cutting machine, one end of the stock is rough milled to the general outline of the character to form the body 4 of the character. The punch cutter is a pantograph type machine, and after setting it to the proper reduction ratio, the outline of the character 4^a is produced to the depth desired on the top surface of the raised body portion 4 of the character by following the outline of the master character 1. The cutting tool is tapered, so that the outline of the raised typographical character formed on the punch slopes outwardly toward the base, the sloped outline of the character 4^a being represented by the reference numeral 5 in the drawings. The punch bearing the typographical character thus produced is represented in Figs. 2, 3 and 4.

The face of the character 4^a on the punch is then either radially cut or ground transversely across its entire width to produce a curved concave typographical face 4^{a1} (see Figs. 5 and 6). Fig. 4 is a side view of the punch, and the dotted line 6 in that figure denotes the shape and depth of the cut. To insure that the faces of the typographical characters are of the desired curvature, the diameter of the cutter or grinder should be the same as the diameter of the cylindrical surface to be printed.

Because of the taper or inclined slope 5 around the face 4^a of the character on the punch, the transverse grinding operation forms an undistorted character 4^{a1} from the distorted character 1. Thus, the cut is deepest across the central portion of the character, so that the elements or configurations of the character at the center are substantially widened; the extreme upper and lower edges of the character are not cut away at all or, if they are, the cut is very shallow, so that the widths of the elements or configurations of the upper and lower ends of the character are not substantially affected or widened. The widening effect of the elements of the character above and below the horizontal centerline of the character is gradually less. The shape or outline of the undistorted character 4^{a1} created on the punch is clearly apparent in Fig. 5.

The punch, as above prepared, is then employed to impress the character into the edge of the metal stock from which a matrix 7 is made (see Fig. 7). Consequently, as shown in Figs. 7 and 8, the character impressed in the matrix, represented by the reference numeral 8, has a curved convex contour.

As explained above, and as illustrated in Fig. 9, the matrices containing the characters to appear in print are positioned in front of a slotted mold 9, and molten metal is introduced into the mold and into the intaglio characters of the matrices to produce a type bar or slug 10, the printing face 10^a thereof being raised as usual but cast

in concave and curved outline to correspond to the surface of the cable or wire **11** to be printed upon.

To produce matrices and type bars for cylindrical surfaces of different diameters, a proportionately larger or smaller character would be formed on the punch from the same master pattern by changing the reduction ratio of the punch cutter machine; furthermore, the diameter of the cutter employed to make the concave cut **6** in the face of the character on the punch would be the same as the diameter of the cylindrical surface to be printed.

The invention has been shown and described in preferred form and by way of example only, and many modifications and variations may be made therein and in its mode of application which will still be comprised within the spirit of the invention. It is to be understood, therefore, that the invention is not to be limited to any specific form or embodiment, except insofar as such limitations are specified in the appended claims.

What is claimed is:

1. A method of making a punch with a matrix forming character concavely curved from top to bottom, comprising the steps of producing a distorted punch character tapered toward the base with a flat face and with the elements of the face widened at the top and bottom and narrowest midway therebetween, and milling said distorted punch character latitudinally across the face thereof to the appropriate depth to produce an undistorted character with a concave face.

2. A method of making a punch with a matrix forming character concavely curved from top to bottom, comprising the steps of producing a master character with a flat face and with the elements of the face wider at the top and bottom and narrower at the middle, cutting a reproduction of the master character on a punch member, said reproduced character having a flat face and an outline sloping outwardly toward the base, and milling the face of the punch character to produce a concave face, the curvature of which is approximately the same as the curved surface to be printed upon, said milling operation serving to widen the narrower elements of the punch character in proper proportion to the wider elements thereof.

References Cited in the file of this patent

UNITED STATES PATENTS

166,205	Howard	Aug. 3, 1875
335,334	Brady	Feb. 2, 1886
374,993	Page	Dec. 20, 1887
935,519	Kayle	Sept. 28, 1909
1,092,475	Diss	Apr. 7, 1914
1,718,921	Freund	June 25, 1929