

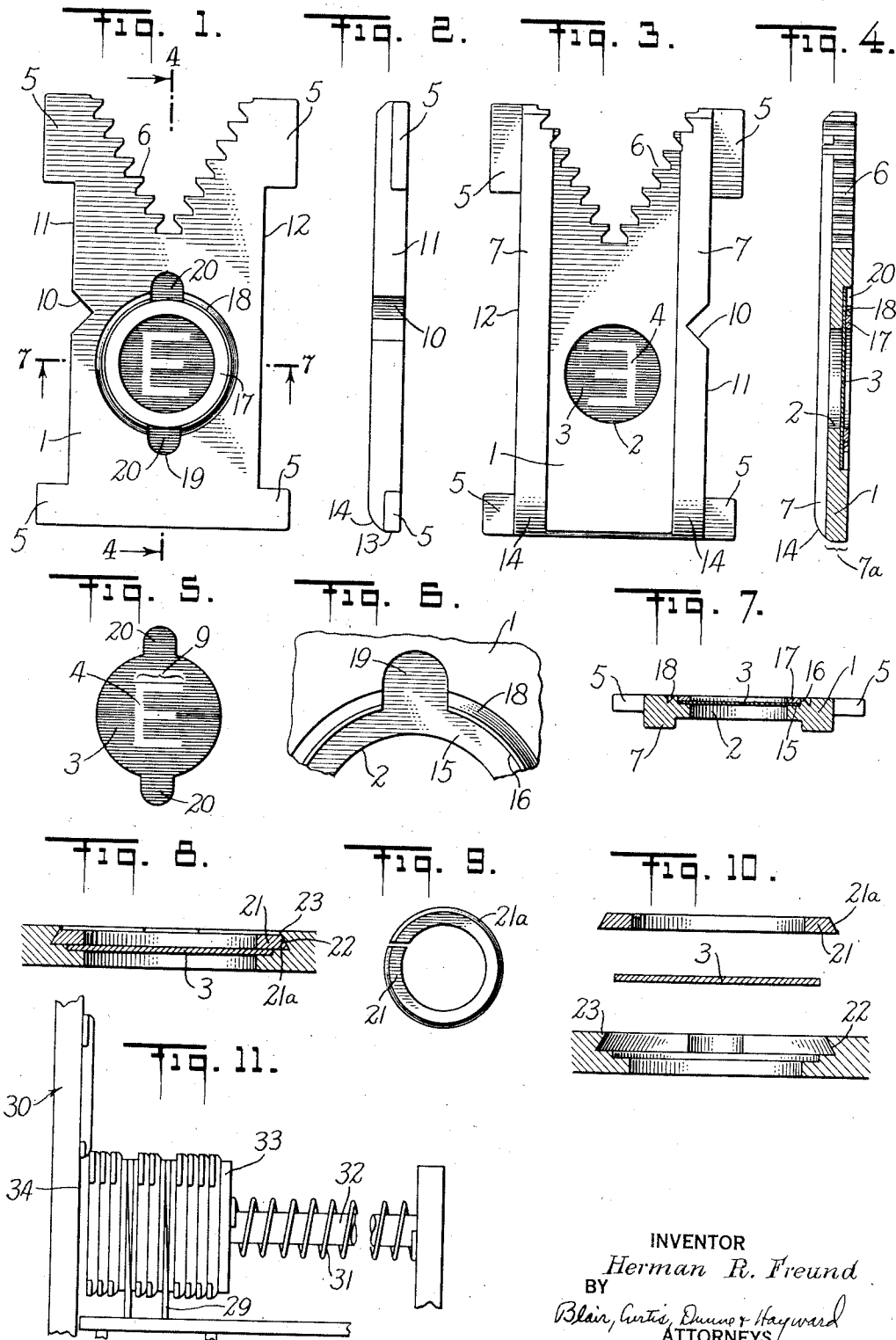
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MATRIX AND METHOD OF MAKING THE SAME

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MATRIX AND METHOD OF MAKING THE SAME

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This invention relates to character bearing elements or matrices for use in the photographic production of type copy for printing processes by composing lines of the character bearing matrices and justifying the lines and subsequently successively photographing the character of each matrix upon a sensitized surface.

The matrix storing and line composing portion of the apparatus for carrying out this method of photographically producing type copy may be similar to that commonly used in line casting machines. That is, the font or fonts of matrices of the invention may be stored in a magazine and composed into lines with spacer elements by matrix releasing and assembling mechanism and subsequently justified by expanding the spacer elements. The body thicknesses of the matrices embodying the invention are proportioned to the setwise widths of the characters borne by the matrices as is the practice in the line casting art.

After the matrices are composed into a line and the line is justified, the matrices are successively and separately photographed and removed from the composed line, and the line formation of the photographically reproduced characters on the sensitized surface is controlled by the body thicknesses of the matrices photographed.

One of the objects of the present invention is to provide an improved matrix or character bearing element having wear-resisting characteristics, interchangeability, lightness, and other features which materially aid in the production of phototype.

In the drawing, which shows several embodiments of my invention,

Figure 1 is a front elevation of a matrix embodying my invention;

Figure 2 is a side or setwise width elevation looking from the left hand side of Figure 1;

Figure 3 is a back elevation of the matrix of Figure 1;

Figure 4 is a vertical section taken on line 4-4 of Figure 1;

Figure 5 is an elevation of a character bearing plaque;

Figure 6 is a detailed view of a portion of the matrix body or frame of Figure 1;

Figure 7 is a section taken on line 7-7 of Figure 1;

Figure 8 is a section of a matrix showing another embodiment of my invention;

Figure 9 shows a lock ring used in the matrix of Figure 8;

Figure 10 shows the parts of Figure 8 separated and ready for assembly; and

Figure 11 diagrammatically illustrates how the matrices may be separately removed from a composed line and illustrates further certain features of the matrices embodying the invention.

Corresponding reference characters refer to corresponding parts throughout the several views of the drawing.

Referring to Figures 1, 2, 3 and 4, the character bearing element or matrix comprises a supporting frame or matrix body 1 which has the general shape of a matrix such as is employed in the line casting art. This body has a recess 2 which, in the present embodiment, is shown as an opening or window. The recess supports a character-carrying plaque 3, which, in the present embodiment, is shown as a piece of photographic film negative on which has been developed a character 4 which is the matrix per se.

The matrix body 1, shaped as it is, may be adapted to line composing as carried out in a line casting machine and is provided with ears 5 useful in moving the matrix during the line composing operation and during the redistribution of the matrix to the magazine. It also has distributing teeth 6, such as are commonly used for the selective distribution of the matrices to magazine storage channels of the line casting machine. As shown in Figure 1, the front broad side face of the matrix body may be formed substantially flat. Referring to Figures 3 and 4, the back face may be provided with ridges 7 rising from the main body of the frame which is made as thin as strength and assembly requirements permit. The ridges 7, together with the main body thickness 7-a, determine the body thickness of the matrix, and in any given font of matrices embodying the invention this thickness is proportioned to the character width 9 of the character 4 on the film 3.

By making the thickness 7-a thick enough to permit the assembly of the plaque 3 in the frame 1, and also making it of the same thickness as the matrix of the font having the smallest body thickness, and employing ridges 7 of different heights to vary the overall body thickness of the matrix, fonts of matrices may be made up having the various requisite differences in effective body thickness but with a minimum of material, and consequently a minimum of weight.

I have discovered that in the separate photographing of each matrix an accurate alignment of the matrix with respect to the camera and

sensitized surface may be aided by providing a notch 10 in one edge 11 of the matrix body, and establishing a standard relationship between the vertex of the notch and a standard reference point on the plaque 3 carried by the matrix body 1. In the photographing operation, when an aligning detent of the photographing mechanism enters the vertex of the notch 10 and forces the opposite edge 12 of the matrix body against an aligning abutment of the photographing mechanism, each successive matrix is similarly positioned for photographing with a minimum of force and a minimum of wear of the matrix body surfaces.

Referring still to Figures 2, 3 and 4, the lower edge portions 14 of the ridges 7 are curved or tapered. Providing such curved or tapered surfaces on the withdrawing edge portions of the matrix body permits of smoother manipulation of the matrices as they are successively withdrawn from a composed line for photographing, as will be described in greater detail hereinafter.

Referring now to Figures 5, 6 and 7, the frame 1 supports the film 3 bearing the character 4 in the recess or window 2 on an inner annular supporting shoulder 15. Concentric with the supporting shoulder 15 is an outer shoulder 16 against which a clamping ring or washer 17 may rest. Shoulder 16 is spaced from shoulder 15 a distance approximately equal to the thickness of the plaque 3 so that when the ring is locked in place it firmly locates the plaque without crushing its edges. Around the periphery of the opening 2 is also provided during manufacture of the frame a thin rib 18 which may be bent over the washer 17 to lock it and the film in place.

Also formed in the shoulder 16 are oppositely disposed curved aligning notches 19, shown in enlarged detail in Figure 6. These notches, during assembly of the plaque and matrix body, coact with corresponding ears 20 (Figure 5) on the plaque 3 to align the above mentioned reference point of the plaque 3 with respect to the matrix body and notch 10. Further, after assembly, the notches and ears coact to keep the plaque from rotating with respect to the matrix body and so upsetting the standard relationship.

The plaque-locating shoulder 15 is preferably spaced inwardly from the front face of the matrix body a predetermined distance which is standard in all the matrices of a font so that, providing the plaque thickness of each matrix is the same, the distance from the front face of the plaque to the front face of its supporting matrix body is always the same. This permits the front face of the matrix to be used as a reference face which may be placed against a stationary abutment for photographing so that the characters 4 of the matrices will always be the same distance from the sensitized surface during the photographing operation regardless of the different setwise widths of the matrices making up a font.

The plaque and matrix body may be assembled by simply dropping the plaque into the recess 2 of the matrix body and onto the supporting shoulder 15, placing the washer 17 over the plaque, and then bending the top of the rib 18 over the washer. As shown in Figure 7, the inner diameters of the washer 17 and of the recess 2 are preferably equal, and the thickness of the washer is such that its outer surface does not protrude from the face of the matrix body.

Referring to Figures 8, 9 and 10, another embodiment of the invention is shown in which the

character bearing plaque 3 is held in place in recess 2 by an expansible spring lock washer 21 having a sloping side wall 21-a which coacts with an undercut wall 22 concentric with the recess 2. In this modification, referring to Figure 10, the plaque is first inserted against the shoulder 15 with the ears 20 aligned with the notches 19, as above described, and the split lock washer 22 is sprung inwardly so as to pass the outer edge 23 of the undercut annular recess 22, and is then allowed to spring outwardly, which action causes it to slide down the inclined wall 22 and against the plaque to locate it tightly against the shoulder 15.

With this type of assembly, in the event that it is desired to change the plaque carried by the matrix body, it is necessary only to spring the washer 21 inwardly to remove it from the recess 2, remove the plaque and replace it with a new one and lock it in place with the lock washer 21. Such a change may be necessitated by the character carried by the plaque, or the plaque itself becoming scratched or otherwise damaged so that it does not photograph properly.

A matrix, such as above described, and carrying a character bearing plaque on its broad side indented from both front and back faces of the matrix body, has many advantages, one of which is that the character borne by the matrix is protected from wear or scratching in the usual course of handling of the matrices because the plaque is fully protected from scratching or wearing contacts.

In phototype processes or apparatus where the photographic reproduction is made by reflected light, both the character and the background of the plaque, or either of them, may be made opaque, but provided with different light reflecting properties so that light reflected from the plaque reproduces on the sensitized surface the character 4 carried by the plaque. If, however, the photographic reproduction is made by transmitted light, as above described the plaque may comprise a film negative, and the character carried by the film may be itself transparent against an opaque background, or the character may be opaque and the background transparent. If matrices of this type are used, the recess 2 preferably comprises an opening or window extending through the matrix body.

When pieces of film are used as the plaque the character may first be photographed in series on a strip of film provided with perforations along the edges of the film. Then pieces of the film may be punched out bearing the character, as shown in Figure 5, using the perforations on the strip for locating the strip with respect to the punch to locate properly the ears 20 with respect to the standard reference point of each plaque or film piece. Simultaneously each piece as it is cut may be dropped into the recess 2 of a matrix body placed beneath the punch and properly registered therewith by any suitable mechanism. In a subsequent step locking washers 17 or 21 may be inserted in the recess and secured to hold the film in place.

The characters 4 may be placed upright or recumbent according to the direction of feed of the sensitized surface of the apparatus in which they are to be photographed, either by varying their positions on the strip of film from which they are to be punched or by changing the relative positions of the strip and matrix bodies, the latter being fed preferably in the direction of their length.

Referring to Figure 11, there is diagrammatically shown a portion of a composed line of matrices embodying the invention with spacer elements 29 expanded into line justifying position. As shown, the front faces of the matrices face to the left. Mechanism, generally indicated at 30, successively and separately removes matrices from the front end of the composed line to photographing apparatus not shown. This mechanism successively pushes each leading matrix upwardly along an abutment 34, as shown in dotted lines. A spring 31, operating on a rod 32 having a pushing face 33 pushes the remaining matrices against the stationary abutment 34. As each matrix is raised, the withdrawing curved or tapered edges 14 of ridges 7 acting on the top edge of the next succeeding matrix eases the said next succeeding matrix into position against the abutment 34 to be picked up in the next operation of the mechanism 30. The curved edges 14 serve to prevent the matrices remaining in the composed line from being pushed too violently by the spring 31 against the abutment 34, or from momentarily being freed from the pressure of the spring 31 which latter operation might upset the justifying position of the spacer elements.

I claim:

1. A line composing matrix for use in photographic production of type matter, said matrix comprising, in combination, a matrix body provided with a recess on its broad side, a character bearing plaque, the bottom surface of said recess supporting said plaque and being spaced a standard distance from the face surface of said matrix body, and means for locking said plaque in said recess, said plaque and recess being substantially circular and said plaque being provided with ears adapted to be received by corresponding notches in said matrix body for accurately aligning said plaque with said matrix body.

2. A line composing matrix for use in photographic production of type matter, said matrix comprising, in combination, a matrix body provided with a recess on its broad side, a character bearing plaque, the bottom surface of said recess supporting said plaque and being spaced a standard distance from the face surface of said matrix body, and means for locking said plaque in said recess, said plaque and matrix body being provided with aligning means for accurately aligning said plaque with said matrix body and said matrix

body being provided with an aligning notch for aligning said matrix for photographing purposes.

3. A line composing matrix for use in photographic production of type matter, said matrix comprising, in combination, a matrix body provided with a recess on its broad side, a character bearing plaque, the bottom surface of said recess supporting said plaque and being spaced a standard distance from the face surface of said matrix body, and ring means for holding said plaque in said recess, and said matrix body being provided with a shoulder concentric with said recess and spaced from said recess bottom an amount approximately equal to the thickness of said plaque, and means for locking said ring means against said shoulder.

4. A line composing matrix for use in photographic production of type matter, said matrix comprising, in combination, a matrix body provided with a recess on its broad side, a character bearing plaque, the bottom surface of said recess supporting said plaque and being spaced a standard distance from the face surface of said matrix body, and said matrix body having a front flat face and raised ridges on its back face providing an overall body thickness for said matrix body proportioned to the width of the character borne by said plaque.

5. A line composing matrix for use in photographic production of type matter, said matrix comprising, in combination, a matrix body provided with a recess on its broad side, a character bearing plaque, the bottom surface of said recess supporting said plaque and being spaced a standard distance from the face surface of said matrix body, said matrix body having a front flat face and raised ridges on its back face providing an overall body thickness for said matrix body proportioned to the character width borne by said plaque, and at least one set of edge portions of said ridges being tapered.

6. The method of fabricating a matrix for use in a photo-composing machine comprising the steps of photographically reproducing a series of characters on a strip of film; forming a matrix body with an opening therethrough; simultaneously punching a character from said film and inserting it into the hole of a matrix body aligned with the punch and subsequently securing the piece of film thus punched in said opening.

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