Jan. 18, 1938. SAMU-EL ISH-SHALOM ET AL 2,105,555

MATRIX FOR PHOTO COMPOSING MACHINES

Filed June 30, 1936 5 Sheets-Sheet 1

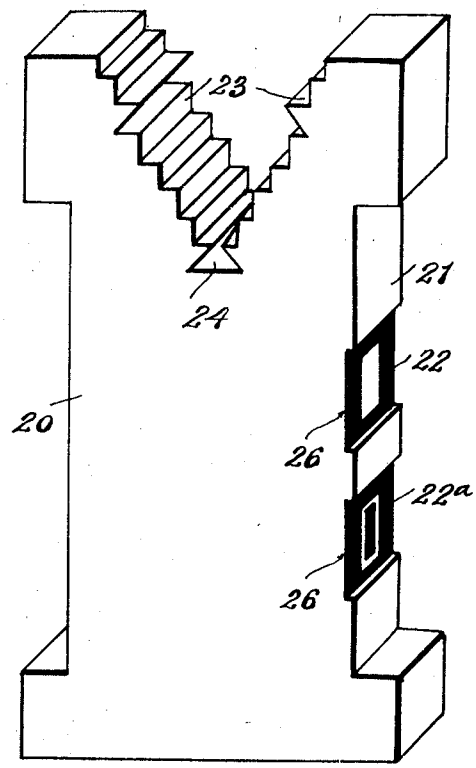


FIG. 1.

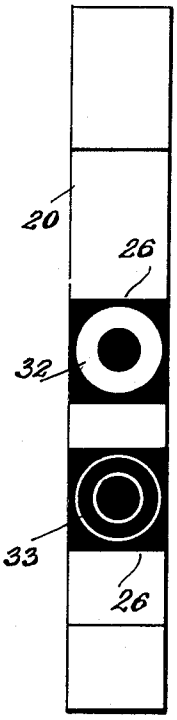


FIG. 2.

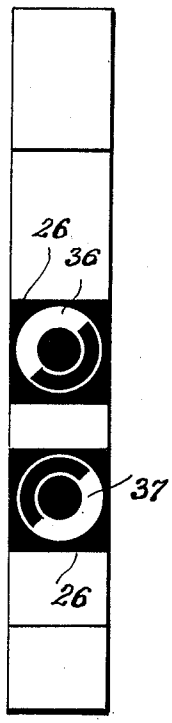


FIG. 3.

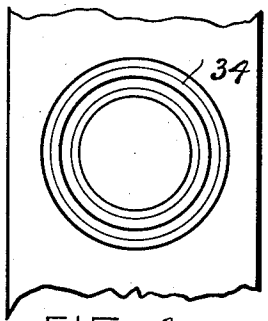


FIG. 4.

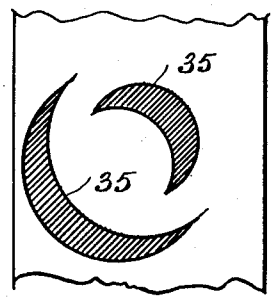


FIG. 5.

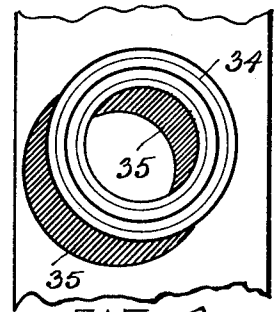


FIG. 6.

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MATRIX FOR PHOTO COMPOSING MACHINES

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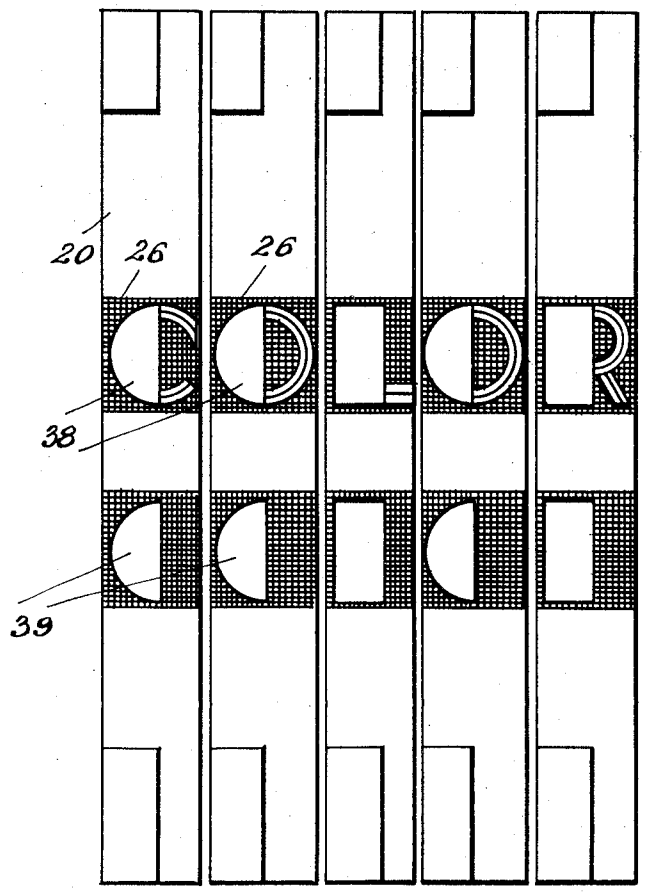


FIG. 8.

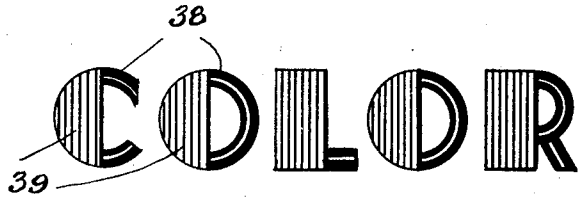


FIG. 7.

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MATRIX FOR PHOTO COMPOSING MACHINES

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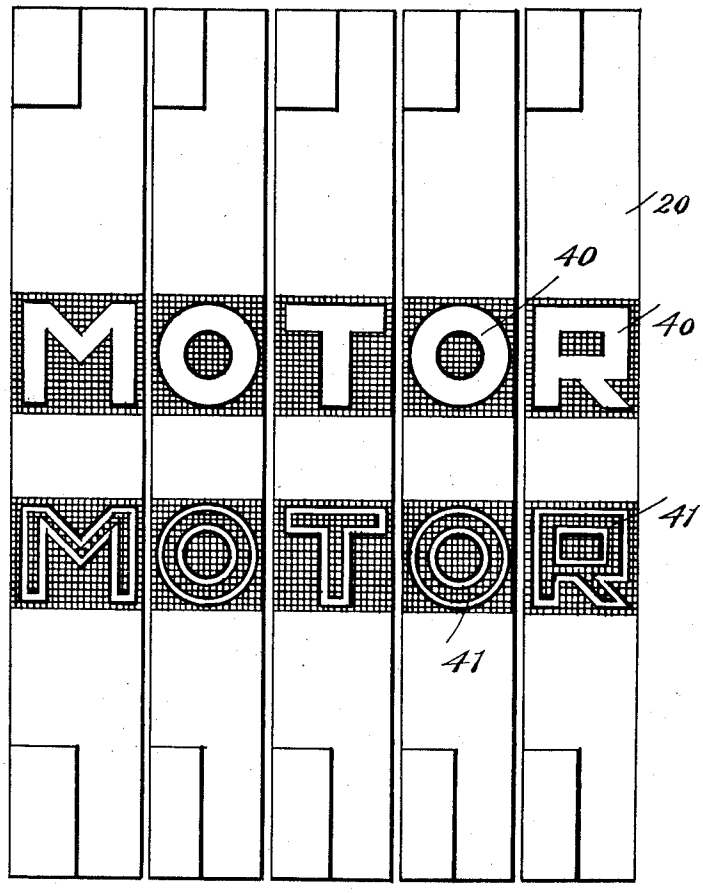


FIG. 10.

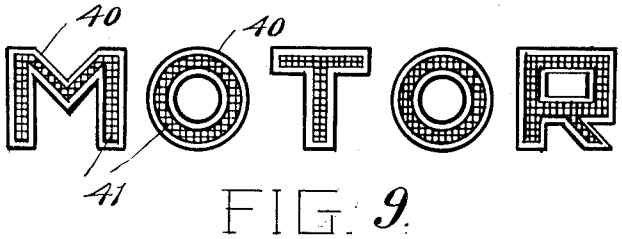


FIG. 9.

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MATRIX FOR PHOTO COMPOSING MACHINES

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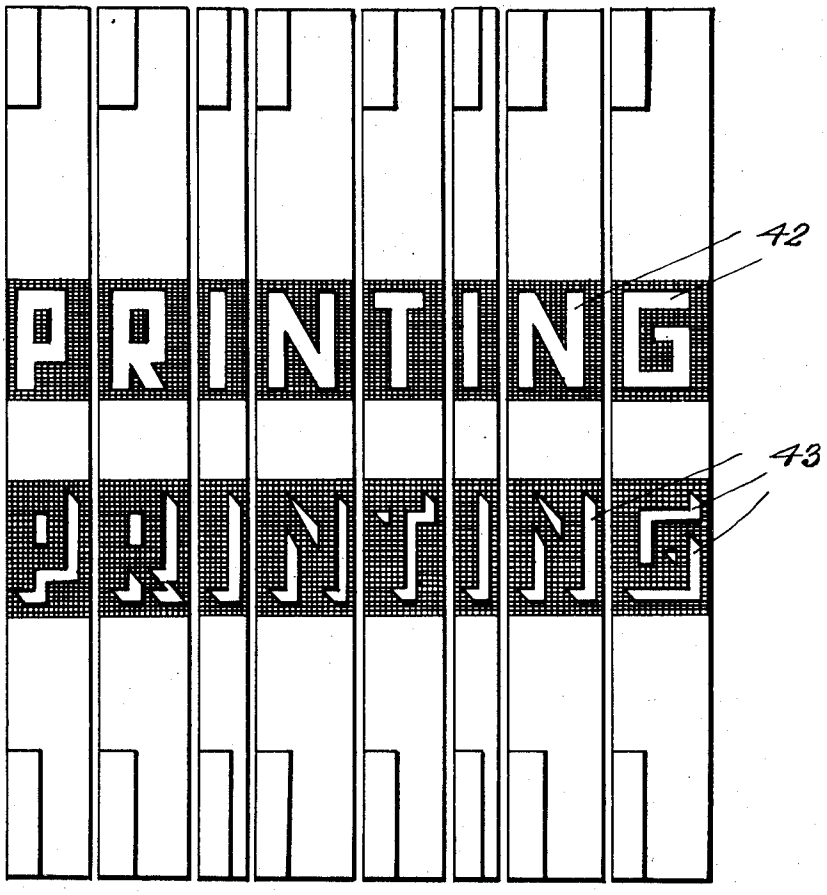


FIG. 12.



FIG. 11

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MATRIX FOR PHOTO COMPOSING MACHINES

Filed June 30, 1936 5 Sheets-Sheet 5

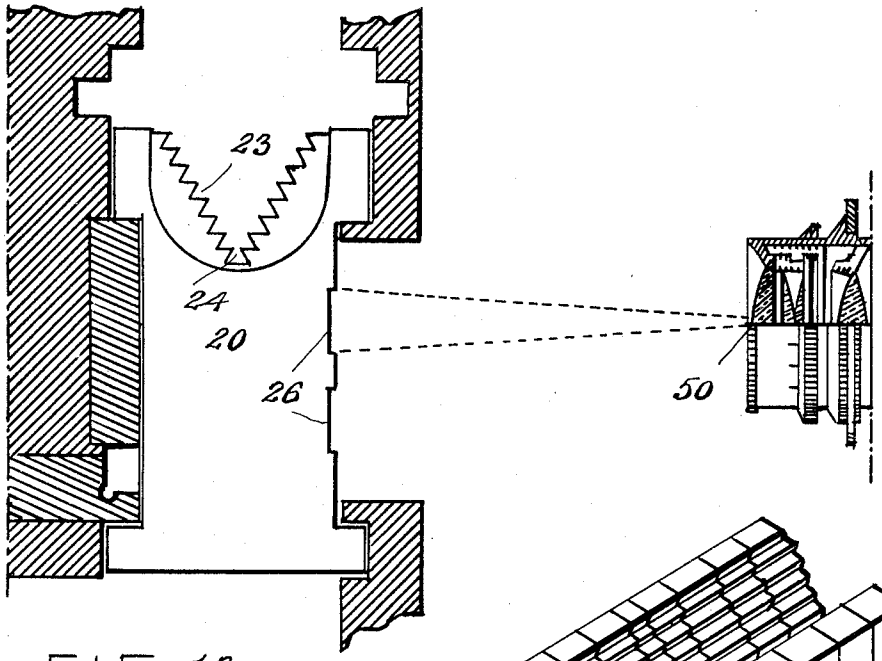


FIG. 13.

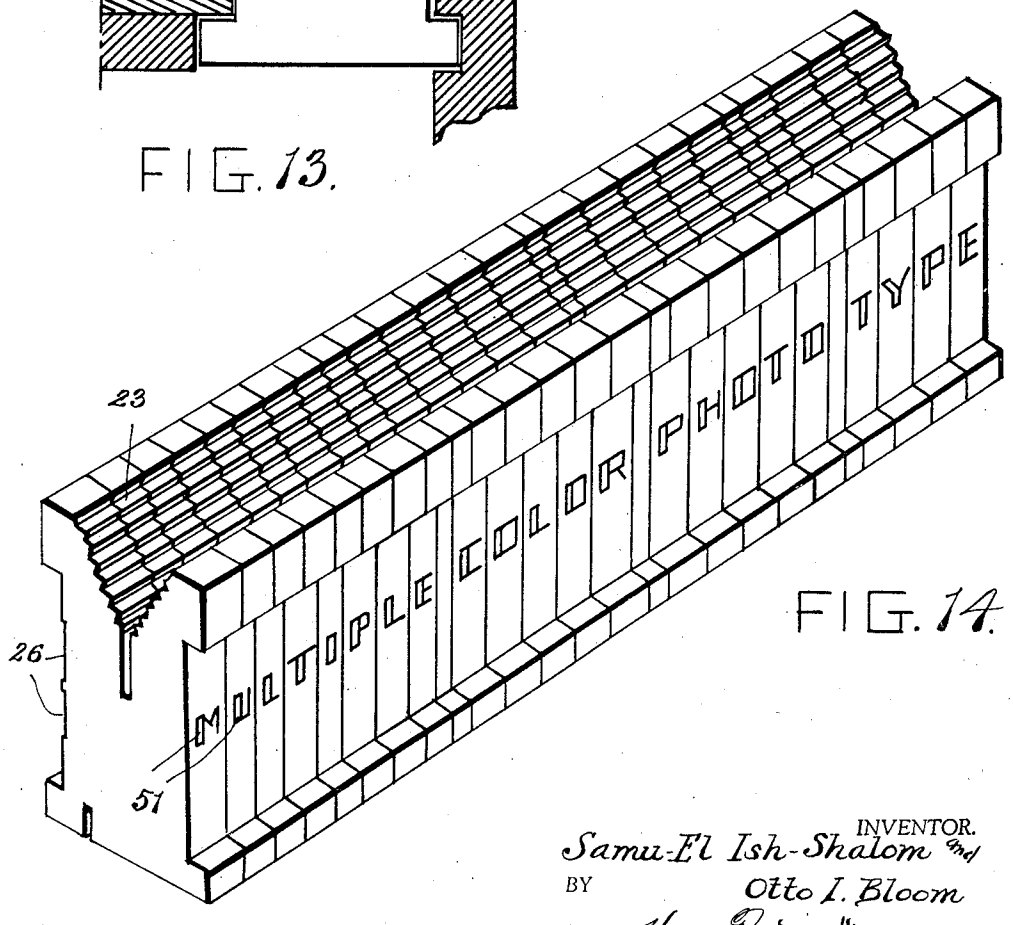


FIG. 14.

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Patented Jan. 18, 1938 2,105,555

UNITED STATES PATENT OFFICE

2,105,555

MATRIX FOR PHOTO COMPOSING MACHINES

Samu-El Ish-Shalom and Otto I. Bloom, New York, N. Y.

Application June 30, 1936, Serial No. 88,080

7 Claims. (Cl. 95—85)

This invention relates to an improvement in circulating matrices for use in a photographic composing and reproducing device such as shown in our Letters Patent of the United States, No. 2,042,041, dated May 26, 1936 and issued to Friedman (now legally known as Ish-Shalom) and Bloom. In said patented device matrices bearing photographically reproducible typographic characters are stored in a magazine, released one at a time by a manual or automatically operated key board mechanism, composed in a line in an assembling elevator and transferred for presentation before a photographic camera. The line of matrices is then automatically justified and directly photographed by reflected light onto a sensitized surface and then returned by means of a distributor mechanism to the magazine from which they had been released.

The object of this invention is to permit composition of text on an automatic composing and reproducing device for the purpose of subsequent printing in mutiple colors, with the ease and facility of single color printing.

As practiced today, multiple-color printing is achieved through the medium of photo-engraving or through lithography. Two or more drawings, complementary to each other are made of the text, and these are separately photographed. A cut or a plate is made of each photograph and each cut or plate printed in its appropriate color.

This process is costly, time-consuming and does not assure perfect registration. Because of these difficulties multiple-color printing is limited in application.

One object of this invention is to provide a matrix bearing on its longitudinal operative edge a character which is photographically reproducible by reflected light.

A further object is to provide a photographically reproducible matrix bearing on its longitudinal operative edge two characters which are dependent upon or complementary to each other.

A further object is to provide means by which single characters, words, or justified lines of reading matter may be reproduced in multiple colors from the same matrices without readjustment of the mechanism of the machine or changing of magazines.

A further object is to provide a matrix carrying two characters or symbols complementary to and dependent upon each other so that the use of both of them is required to produce a complete character in multiple colors.

A further object is to provide matrices of the character and for the purpose described adaptable for employment in various photographic and typographic machines in which circulating or handset matrices are employed.

A further object is to provide a photographically reproducible matrix of a non-actinic color in which the surface bearing the photographically reproducible character is not exposed to wear and damage in passing through the machine.

A further object is to provide matrices of the character and for the purpose described bearing on their operative longitudinal edge a complete character or a character part and a shading complementary to that character or character part to be used in composing successive justified lines of reading matter for subsequent printing of shaded characters in one or in multiple colors.

With the foregoing and other objects in view, this invention consists of such novel features, combination and arrangement of parts as will be more fully described and illustrated. In the accompanying drawings the invention has been shown merely in preferred form and by way of example but obviously many changes and variations may be made therein and in its mode of application which will still be comprised within its scope. It is therefore to be understood that the invention is not limited to any specific form or embodiment except so far as such limitations are specified in the claims.

In the accompanying drawings, Fig. 1 is a perspective view of a matrix constructed in accordance with this invention; Figs. 2 and 3 are front views of matrices also made according to the invention; Fig. 4 is a front view of a reproduction of a letter element as it appears in printing; Fig. 5 is a reproduction of a complementary letter element; Fig. 6 is a view showing the two letter elements of Figs. 4 and 5 as reproduced together to form the completed letter; Fig. 7 is an example or specimen of a certain kind of artistic lettering; Fig. 8 is a front view of a number of matrices of the character used to produce printing of the style shown in Fig. 7; Fig. 9 is another specimen of a type of fancy character and an outline forming artistic lettering and Fig. 10 shows matrices of the character required for the production of such lettering; Fig. 11 is another form of character and shading and Fig. 12 shows the kind of matrices employed for the production of such character and shading; Fig. 13 is a diagrammatic view illustrating the manner in which the matrices are photographed; and Fig. 14 is a perspective view of a number of matrices placed together for being photographically reproduced.

Referring to Fig. 1, there is shown in perspec-

tive a matrix **20** intended for photographic reproduction and provided on its longitudinal operative edge **21** with superimposed or engraved characters **22** and **22***a* of a non-actinic color adapted for machines employing the most common form of circulating matrices, having font distributing teeth **23** in their upper edge located in V-shaped recess **24** operating with ridged bars of a second elevator and distributing box (not shown in the drawings) and a ridge and permuted V-shaped distributing bar along which the matrices **20** travel. The number and arrangement of the combinations **23** differ according to the characters on the matrices **20**.

The longitudinal operative edge **21** of the matrix **20** may be provided with a horizontal recess **26** for each character or character part. Both complementary characters may be in one recess or may have separate recesses on the operative edge **21** of the matrix **20**. Not only does this not prevent the matrix **20** in any way from performing its part in the general operation of the photo-composing machine, but it also protects the photographically reproducible character **22** or character parts **22***a* from rubbing against the magazine plates, assembler entrance or other parts of the photo-composing machine.

It is not necessary to illustrate the modified forms of auxiliary parts or photographic cameras suitable to be used in these machines in connection with the matrices shown in Figs. 4 to 10. It is also obvious that it would involve unnecessary multiplexity of views and amount to no more than an exhibition of ingenuity were we to design details and forms which are unessential in this particular phase of the application, such as the replacement of a casting box by a photographic camera which is broadly described in our Letters Patent No. 2,042,041. It is further obvious that the step by step movement of a sensitized plate or film through the camera may be achieved automatically when the justified lines are brought to the exposure position of the camera in the composing machine, and that this mechanism is quickly adaptable to a composing device regardless of the distributing features of the matrices or modification of minor parts in the machine.

In Fig. 2 of the drawings is shown an example of a matrix constructed in accordance with the invention. The upper letter element **32** constitutes a part only of a finished letter and the lower letter element **33** is a complementary portion thereof. When the element **32** has been photographically reproduced and a print made therefrom, the co-operating or complementary element **33** is similarly reproduced and printed in proper relationship to the element **32**, and the finished product results. It will be obvious that if the elements **32** and **33** are printed in different colors, or one in black and the other in color, many artistic results can be attained and a perfect registration of the letter elements or parts with respect to one another is assured. An example of the manner in which the reproduction takes place is shown in Figs. 4 to 6 inclusive. There **34** indicates a reproduction of a letter element, corresponding in function to the letter element **32** of Fig. 2. Fig. 5 shows several segments or shading sections **35** corresponding in purpose to the letter element shown at **33** in Fig. 2. When the letter elements **34** and **35** are printed in juxtaposition or in their proper relationship as shown in Fig. 6 and possibly in different colors, the result is the finished letter composed of the co-operating elements **34** and **35** of Figs. 4 and 5.

In Fig. 3 is shown an upper letter element **36** and a lower complementary element **37** resulting, when properly printed together, in a finished and complete letter. Further examples will be found in the other views of the drawings. For example in Fig. 8 a type of lettering is shown which is printed by the utilization in co-operative relationship of the letter elements **38** and **39** of Fig. 8 appearing on the assembled matrices **20**. In Fig. 9 is shown another type of printing wherein the outline of the letters is reproduced by using the letter elements or outlines **40** of Fig. 10 and filling in the letter outlines by the cross-hatched shading obtained by the use of the letter elements **41** appearing on the same matrices as those shown at **40**. In Fig. 11 is shown a type of shaded printing having the letter outlines produced by the letter elements **42** of Fig. 12 and the shading of said letters produced by the elements **43**.

As will be evident from the description and drawings, our photographically-reproducible matrix differs from the conventional type-composing machine matrix in many respects. The conventional matrix is intended for line casting; our matrix is intended for photographic reproduction. The conventional matrix bears on its operative edge two complete and independent characters usually roman and italic; our matrix bears characters or character parts which are not independent of but, on the contrary, are complementary to each other. The characters of the conventional matrix may be printed exclusively either all roman or all italics or intermixed roman and italics on one line, yet maintain their individuality; the two characters or character parts on our photographically reproducible matrix being interdependent are not intended to be printed individually and must perforce be printed together in order to produce the desired character. Furthermore, each of the characters engraved on the conventional type-casting machine matrices is intended for printing in one color; both of the characters on our matrix are intended to be used together to produce a single character in multiple colors.

Finally, our photographically reproducible matrix makes it possible to give to multiple-color printing of text matter certain advantages which the art has hitherto not possessed. These, among others, are the elimination of metal plates and cuts, perfect registration of character parts, outlines and shadings and of colors and shades and the ability to obtain type-matter of any size from but a single font of matrices.

Perfect registration of color is possible because both the main character part such as indicated at **22**, **34**, **36**, **38**, **40** and **42** and its complementary part or shading indicated at **22***a*, **37**, **39**, **41** and **43** are reproduced from the same matrix and in the same spacing and justification. As for example, should it be required to print the line of any text in two colors the procedure would be to first set up the characters in say, the upper half of the matrices of which **22**, **34**, **36**, **38**, **40** or **42** are examples, and photograph them on film. This is diagrammatically illustrated in Fig. 13, the lens of the camera or photographic device being indicated at **50**. A line of matrices for photo reproduction is shown in Fig. 14. Thereafter the complementary characters of the second line of which **22***a*, **37**, **39**, **41** and **43** are examples, would be set up and photographed on a second film, these elements of course appear-

ing on the lower half of the same matrices. Subsequently the line set up on the first film would be printed in one color, following which the line set up on the second film would be printed in another color complementary to the first printing. Inasmuch as both halves of this complete line of complete characters are obtained from the same matrices the registration would of course be perfect. How any number of type-sizes may be obtained from a font of matrices of but one size has already been explained in our Patent No. 2,042,041.

The matrices, of course, are assembled in the same manner as in the conventional linotype, linograph or intertype machines and are provided with means by which they may be shifted to and from various operative positions.

For identifying purposes the back or indicator edge of each matrix bears a representation at 51 of the finished letter as produced by uniting the two complementary elements thereof appearing on the operative face of the matrix (see Fig. 14).

Although the drawings show the characters and character parts on the photographically reproducible matrix as letters or letter parts, it is to be understood that they could be digits, words, designs, figures or other characters or parts of characters of any language or script.

The examples given are only by way of illustration since it is evident that this matrix may be used in producing offset or gravure printing in more than two colors and it may also be used in machines of the nature of the linotype wherein the matrices by bearing intaglio characters, slugs would be produced for the purpose of multiple-color letter press printing.

What we claim is:

1. A matrix consisting of a metal plate bearing on its longitudinal edge a character and a supplemental character part, reproducible by direct photography as type-impressions for subsequent printing in multiple colors.

2. A matrix adapted for circulation in a typographical composing machine and having on its longitudinal operative edge a character and a supplemental character part positioned one above the other, any one of which may be brought firstly into operative position.

3. A matrix according to claim 2 having on its longitudinal edge a character and a supplemental character part, which are located one above the other for the purpose specified.

4. A matrix according to claim 1 having on its longitudinal operative edge a negative character and a supplemental character part, said character and character part located one above the other and being of a non-actinic color, photographically reproducible for the purpose specified.

5. A matrix bearing on its longitudinal edge a positive character and a supplemental character part, said character and character part being of a non-actinic color for the purpose specified.

6. A matrix provided on its operative edge with a character and a supplemental character part, said character and character part being complementary to each other, said longitudinal operative edge being of a non-actinic color for the purpose specified.

7. A matrix consisting of a metal plate bearing on its longitudinal edge a character and a supplemental shading, said character and shading being positioned over one another and reproducible by direct photography as type-impressions for subsequent printing in multiple colors.

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