Feb. 12, 1952 R. J. TAYLOR, SR 2,585,188

PHOTOGRAPHIC COMPOSING MACHINE

Filed March 10, 1949

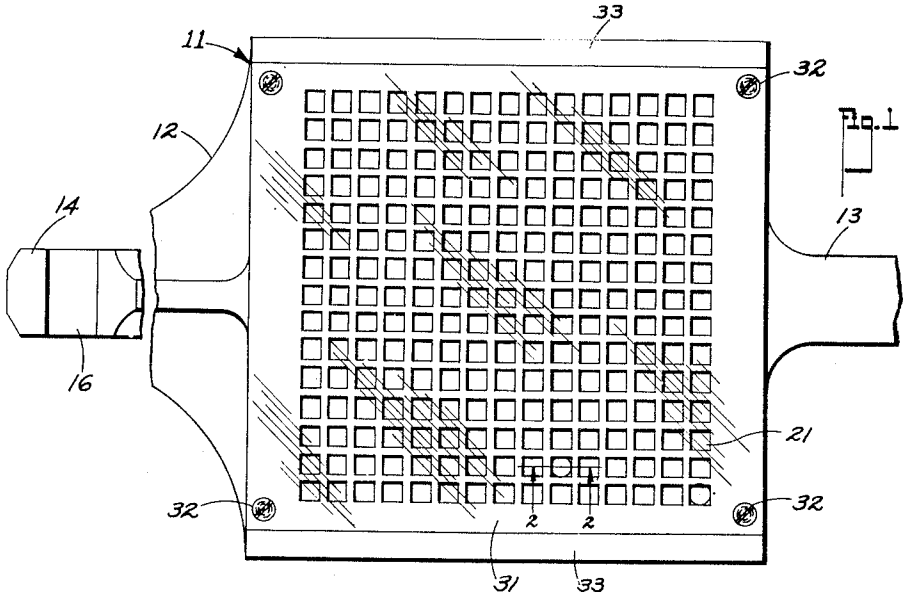


Fig. 1

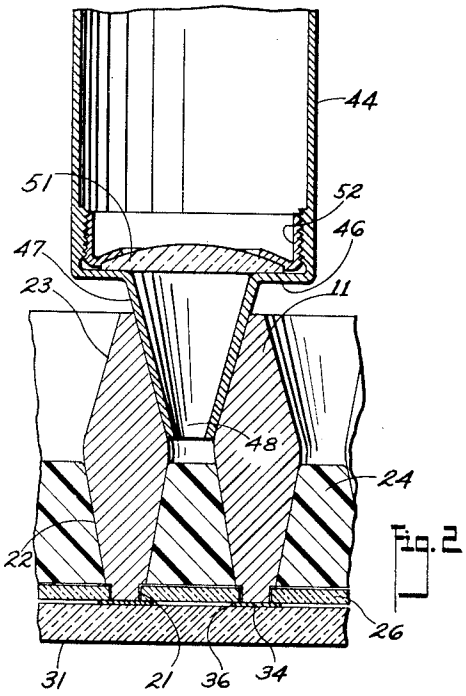


Fig. 2

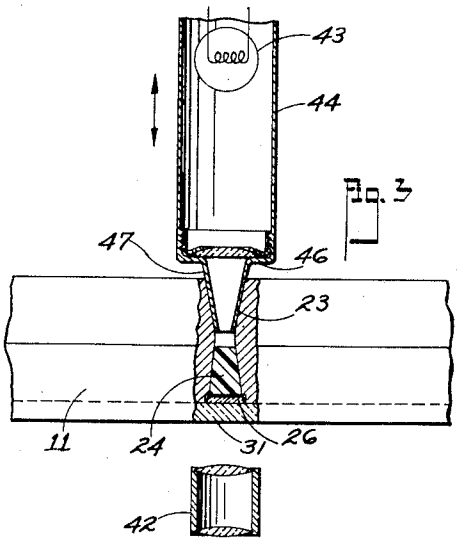


Fig. 3

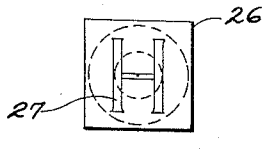


Fig. 4

INVENTOR.
RALPH JOHN TAYLOR, SR.

BY Richey & Watts.

ATTORNEYS

Patented Feb. 12, 1952

2,585,188

UNITED STATES PATENT OFFICE

2,585,188

PHOTOGRAPHIC COMPOSING MACHINE

Ralph John Taylor, Sr., Salem, Ohio

Application March 10, 1949, Serial No. 80,730

3 Claims. (Cl. 95—4.5)

1

This invention relates to photographic composing machines and is particularly directed to an improvement in the character-bearing and character-illuminating portions of such machines.

The need for a machine by which text matter could be set photographically rather than by the casting of type and printing from type or by the use of typewriters and analogous machines has long been felt. The recognition of this need is evidenced by numerous disclosures of proposed machines which were intended to produce directly by optical and photographic means lines or pages of text material without the use of type or inks. Text material so composed can be reproduced by the methods of off-set printing or in other ways.

The proposed machines for this purpose have been of many types, but so far as I am aware, none of them has ever reached the stage of commercial exploitation, so that at the present there is no available way of producing justified lines of type other than by manual type setting, the use of type-casting machines, or use of special typewriters incorporating a justifying mechanism. It is well recognized that text material of satisfactory appearance can only be produced by justifying the lines and by varying the space allowed individual characters is accordance with the form of the characters. Neither of these is accomplished in the ordinary typewriter and the typewriting machines which include justification have not produced results comparable with that obtainable by the use of set or cast type.

The system, of which the well-known Monotype machine is a part, provides justified lines of type through the provision of appropriate casting mechanism and the use of a separate keyboard machine by which a controlling tape is punched to control the selection of characters in the type casting machine and the spacing for justification purposes. Although the Monotype machine is complex and expensive, it is widely used and highly satisfactory, and therefore there are many advantages to an approach to the solution of photographic composing involving the use as far as possible of the principles of the Monotype system. This fact also has been recognized, as will be apparent from the disclosures in U. S. Patents No. 2,229,689 and 2,229,690 of Westover and U. S. Patent No. 2,383,961 of Elliott et al. These patents propose phototypograph machines which do, in a large measure, utilize the mechanism of the Monotype machine or analogous mechanisms and which are adapted for control by the Monotype keyboard.

2

This invention is directed to an improved type matrix assembly and to novel means for centering and illuminating the characters as they are projected onto the sheet or film. It is contemplated that the invention may be employed in machines of the character of those disclosed in the above-mentioned patents and additionally that it may be utilized with appropriate optical and sensitive paper supporting and advancing mechanisms as an attachment to Monotype casting machines.

The principal objects of the invention are to improve phototypograph machines; to provide an improved character bearing matrix for such machines; and to improve the means for centering and illuminating the characters.

Other objects and advantages, more or less ancillary in nature, and the preferred manner in which the objects are achieved will be apparent to those skilled in the art from the description herein of the preferred embodiment of the invention.

Referring to the drawings:

Fig. 1 is a plan view of the under-surface of a matrix plate in accordance with the invention with certain parts broken away;

Fig. 2 is an enlarged vertical section of a portion of the matrix plate and centering pin on the plane indicated in Fig. 1;

Fig. 3 is an elevation view, with certain parts in section, certain parts being illustrated diagrammatically; and

Fig. 4 is a detail.

The matrix case, as illustrated in Fig. 1, comprises a square, relatively heavy matrix plate 11, preferably a bronze casting, which may be of the same dimensions and proportions as the matrix case of the Monotype machine. The matrix case is formed with two arms 12 and 13 extending therefrom, the outer ends of which are formed with heads 14, only one of which is illustrated. The heads 14 are formed with slots 16 on their undersurface so that the matrix case may be supported for movement along a horizontal axis on longitudinally extending ways or tracks. These tracks form part of a member which may be shifted at right angles to the direction on the tracks so that the matrix carrier may be moved in either of two directions at right angles to each other, which movement may be accomplished by means such as that now used in the Monotype machine and which is generally described in the above-mentioned Elliott et al. patent. The matrix plate is designed to carry transparent matrices representing 225 characters in fifteen

rows and fifteen columns in accordance with the Monotype system, although, of course, different numbers of rows and columns could be employed. To this end the matrix plate is formed with fifteen rows and fifteen columns of shallow square recesses 21 in its undersurface, each recess, as shown most clearly in Fig. 2, being concentric with an hour-glass shaped bore through the matrix case comprised by a lower tapered bore 22 and an upper tapered bore 23, the tapers meeting approximately at the median plane of the matrix plate. The bores 22 are filled substantially to the upper ends thereof by plugs 24 of a light-transmitting material, preferably a plastic material. Each recess 21 provides for a character bearing unit 26, shown also in Fig. 4, which is a square of transparent or translucent material bearing a negative image of a character 27 such, for example, as the letter H illustrated in Fig. 4, on its lower surface. The character bearing unit 26 may be a small glass plate, or may be Celluloid or other plastic, and the lower surface is opaque except in the area representing the character. The character is preferably an exposed and developed image in any suitable photographic emulsion, although the character could be formed in other ways.

The 225 spaces of the matrix case are provided with suitable characters which may be arranged according to any convenient system to utilize the advantages of the Monotype system. The arrangement usual to that system are preferred. It is unnecessary to go into the details of this arrangement but it may be desirable to point out that its significant feature is that characters and spaces of a given width occupy certain portions of the area of the matrix carrier so that all the characters in a particular row are such as require the same spacing lengthwise of the line of composed matter. The important requirements insofar as the characters 27 and character units 26 are concerned are that the characters be of accurate shape and size, that the background be opaque or substantially so, and that the characters be accurately located. This last requirement involves both accurate location of the characters on the units 26 and accurate location of the units in the matrix case, which may be obtained by maintaining a minimum clearance between the units 26 and the recesses 21 for the units. These requirements are important because accurate alignment of the characters is essential to good appearance of the work composed. The character units 26 are retained in place and protected by a glass plate 31 which may be retained on the matrix case by machine screws 32 and is preferably disposed between flanges 33 of the matrix case which may extend below the glass if desired. A thin opaque sheet or mask 34 of paper or the like formed with apertures 36 over the characters may be disposed between the glass plate 31 and the character units and may be tacked to the plate 31 with cement. Alternatively, the mask may be a photographic deposit on the plate 31.

As illustrated in Fig. 3, the characters are illuminated from above by a mechanism which will be described, and images of the characters are projected onto a light-sensitive sheet indicated schematically at 41 in Fig. 3 by a lens 42, also illustrated schematically. The characters are illuminated by a light source illustrated schematically as 43 mounted in or in communication with a cylinder 44 formed with a shoulder 46 at its lower end and opening into a conical hollow centering pin 47 which is dimensioned to enter the conical bores 23 in the upper surface of the matrix carrier as illustrated most clearly in Fig. 2. The lower end of the centering pin 47 is open as indicated at 48 for the transmission of light to the characters.

The details of the optical system are immaterial to the invention, but by way of example, a condensing lens 51 is shown retained at the bottom of the cylinder 44 by a threaded ring 52. This lens converges the light from the source 43 through the opening 48 from which it diverges to illuminate the characters 27. Light from the characters 27 is then projected to the receiver 41 by the lens 42. The cylinder 44 must of course be raised to permit shifting from one character to another and this may be accomplished by a mechanism of the sort now used in the Monotype machine, which employs a centering pin in the same location as the centering pin 47. The cylinder 44 is accurately guided for vertical reciprocation in ways (not shown) so that the location of its axis is held constant.

In the operation of the machine, when the matrix case is shifted to present the desired character below the light source the cylinder 44 is lowered, inserting the centering pin in the opening 23 and thus definitely and positively locating the matrix case in the exact position to center the character accurately. When the character has been selected, located, and centered, its image is projected onto the sheet 41, which may be accomplished by a brief energization of the light source or by a shutter synchronized with the other operations of the machine.

The particular means by which the matrix case is located may be those employed in the Monotype machine and are not material to the invention. Likewise the means by which the record receiving sheet 41 is moved in two dimensions to compose the characters on the sheet, or the light is deflected to achieve the same end, are not material to this invention. The means by which this may be accomplished are well-known and reference may be made to the above-mentioned patents for examples of mechanisms which could be employed for this purpose.

As will be seen from the foregoing description of the preferred embodiment of this invention, it is inherently characterized by the important advantages of accurate centering of the characters by use of the centering pin 47, which, from the standpoint of its use as a centering pin, is analogous to the pin now used on Monotype machines and therefore embodies the advantages of this mechanism, which has already been proved to be entirely satisfactory as well as simple. The matrix carrier and character units possess the inherent advantage that characters may be changed freely since, if an odd or unusual character is necessary, it may be employed by removing the cover plate 31 and substituting it for some other character which is not required. Thus, with a relatively small number of character units a very wide range of possible characters and styles of type may be obtained.

Many variations of structure within the scope of the invention are possible, although the construction described above is believed to be the most desirable. The light source need not be within the cylinder 44, since the light may be transmitted from the light into the cylinder. The centering pin may be offset from the optical axis of the machine, although this requires additional openings 23. A transparent centering pin is pos-

sible, but transparent materials of which I am aware are not of high strength.

I claim:

1. In a phototypograph, the combination of a matrix plate comprising a body member having a top side and a bottom side, an array of spaced openings extending through the body from the top side to the bottom side, the body of the matrix forming walls for the openings and each opening having tapered walls to form a constricted central portion, and character bearing means associated with the lower side of the body, each opening having a light modifying character adjacent thereto, a centering pin comprising a member having a tapered lower portion for engagement in the openings of the matrix plate to fix the position of the matrix, and an opening extending longitudinally through the pin member, the openings through the pin and the body of the matrix plate forming a path for the transmission of light, a source of light associated with the pin, and means associated with the pin for directing light from the source through the openings in the pin and the matrix whereby the characters may be successively projected upon a light sensitive medium in a predetermined order relationship.

2. Apparatus for converting a record controlled type-casting machine into a phototypograph including a matrix plate comprising a body member having a top side and a bottom side, an array of spaced openings extending through the body from the top side to the bottom side, the body of the matrix forming walls for the openings and each opening having tapered walls to form a constricted central portion, and character bearing means associated with the lower side of the body, each opening having a light modifying character adjacent thereto, and an insert of transparent light-guiding material for conducting light from the constricted portion of the opening to the character, a centering pin comprising a member having a tapered lower portion for engagement in the openings of the matrix

plate to fix the position of the matrix, and an opening extending longitudinally through the pin, the openings through the pin and the body of the matrix plate forming a path for the transmission of light, a source of light mounted in the opening in the pin member, and a lens mounted in the opening in the pin member between the light source and the end of the pin adjacent the matrix for directing light from the source through the openings whereby the characters may be successively projected upon a light sensitive medium in a predetermined order relationship.

3. A matrix for a phototypograph comprising a body having a top side and a bottom side, an array of openings extending through the body from the top side to the bottom side, the body of the matrix forming continuous walls for the openings, each wall being doubly frustroconical to form a constricted central portion of the opening between the sides, a recess in the bottom side of the body associated with each opening and circumscribing the opening, a character plate fitted in each recess, the plate including a light modifying portion forming a character to be reproduced, and means associated with the matrix body for retaining the character plates in position in the recess.

RALPH JOHN TAYLOR, SR.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,989,237	Lilly et al.	Jan. 29, 1935
2,105,555	Ish-Shalom et al.	Jan. 18, 1938
2,158,039	Wenczler	May 9, 1939
2,178,380	Spievak	Oct. 31, 1939
2,229,689	Westover	Jan. 28, 1941
2,229,690	Westover	Jan. 28, 1941
2,241,263	Koppe	May 6, 1941
2,368,839	Jansen	Feb. 6, 1945