

March 28, 1967

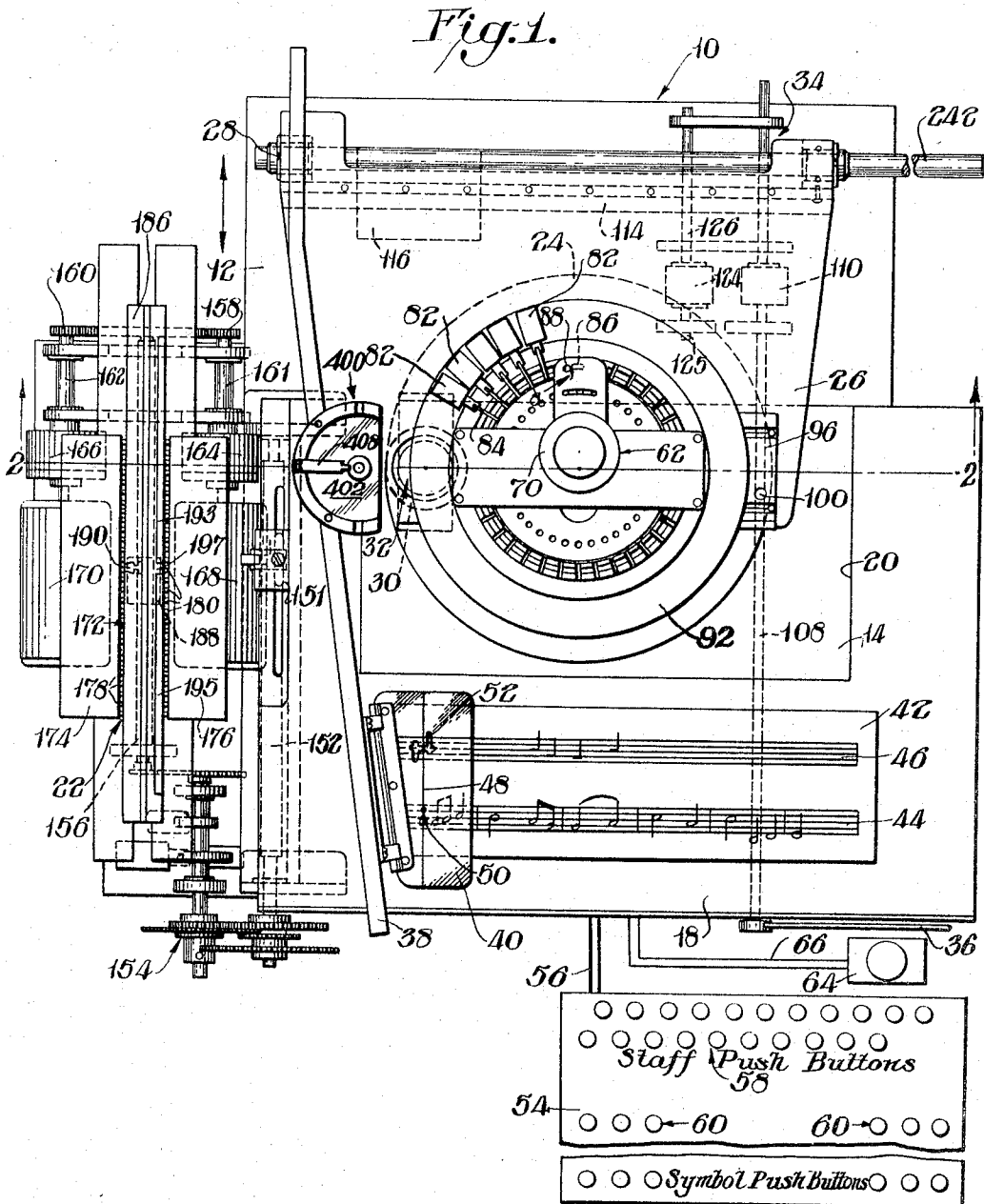
H. B. WILSON ET AL

3,311,036

APPARATUS FOR COMPOSING MUSIC COPY

Filed Jan. 4, 1965

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

Fig. 3.

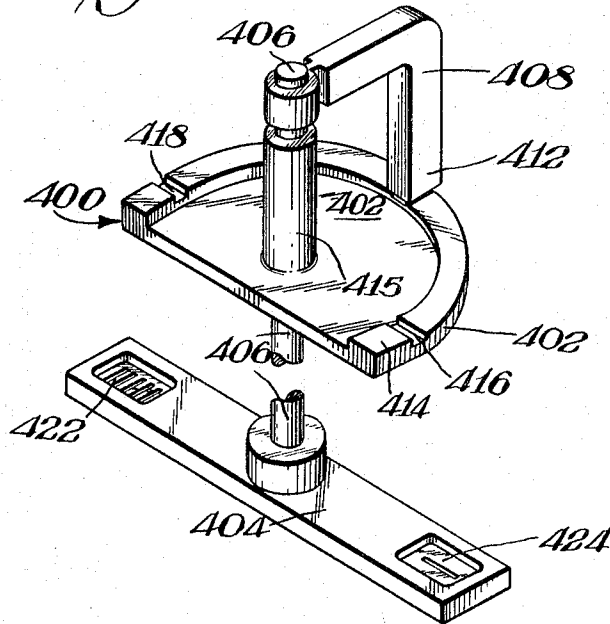
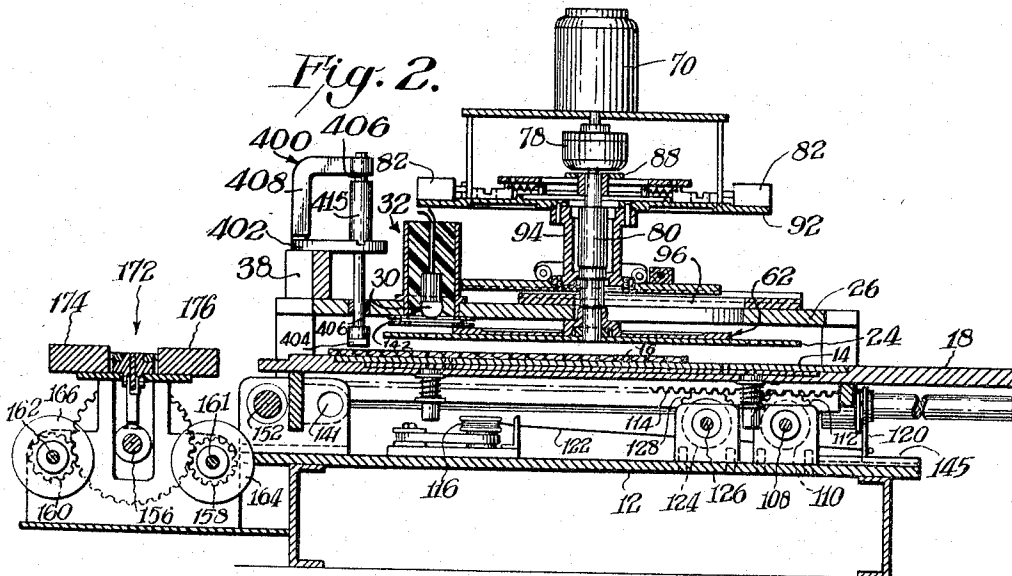


Fig. 2.



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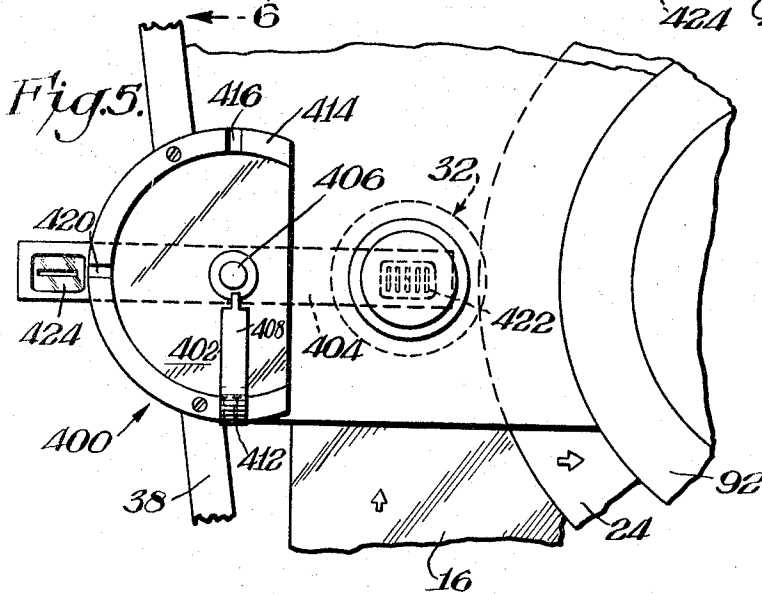
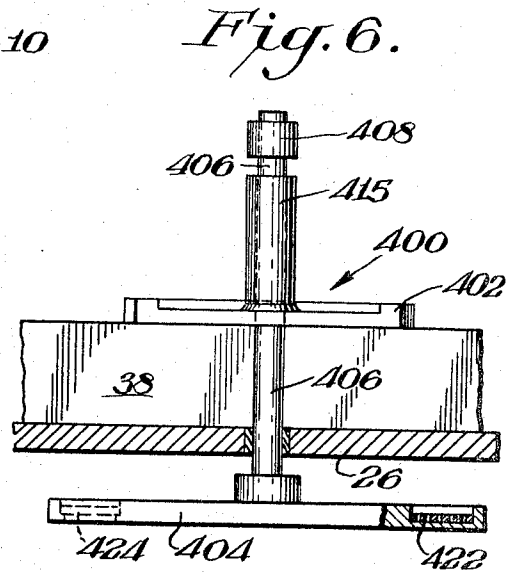
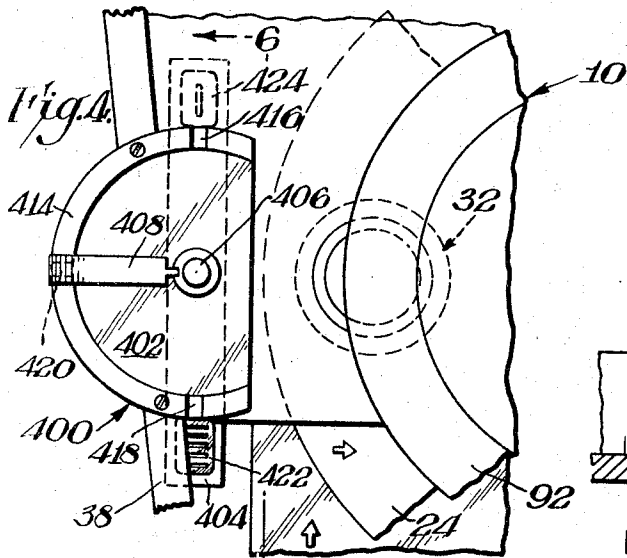
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**APPARATUS FOR COMPOSING MUSIC COPY**

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Filed Jan. 4, 1965, Ser. No. 423,040

8 Claims. (Cl. 95—4.5)

This application is a continuation-in-part of copending application Serial No. 98,959, filed Mar. 28, 1961, now Patent No. 3,169,458.

This invention relates to an apparatus for composing music copy by photographic means, and it more particularly relates to such an apparatus which utilizes a contact photographic process.

Fine music copy has been produced for centuries by means of hand engraved metal plates prepared by expert engravers who must have many years of training. In recent years, attempts have been made to provide newer methods and apparatus, which are better adapted to rapid mass production such as numerous varieties of musical typewriters. However, none of these typewriters can compose copy precisely enough to satisfy the needs of discriminating musicians, particularly where the music is complicated. The notes of fine music copy must be evenly spaced in integral measures upon each line, and extreme accuracy is required in the application of bridging symbols such as slurs and hooks. Anything short of perfection in the production of fine music copy is unacceptable.

A recently developed apparatus which is described in parent application Ser. No. 98,959, filed Mar. 28, 1961, has effectively fulfilled the needs indicated above. In this apparatus a light source is mounted over a table upon which a light sensitive sheet is mounted. A feeding means selects predetermined light-passing musical images from a magazine and places them at an exposure station between the light source and the sensitive material to print selected symbols upon this material. A vertical and lateral translating means reacts between the exposure station and the table to vary their vertical and lateral orientation relative to a staff positioned upon the table for placing the symbols and notes in their proper positions relative to a staff applied to the light sensitive material.

With this apparatus the staff is pre-formed on the light sensitive paper, rather than placing a light passing image of the staff on the magazine. One reason for omitting the staff from the magazine is that the relatively large staff would otherwise occupy too much valuable space on the magazine. However, pre-forming the staff on the light sensitive paper results in a number of problems. For example, the staff and magazine symbols must be exactly aligned for accurate placement of the symbols on the staff. Where the staff is not formed by the apparatus itself, however, such alignment is difficult to achieve. Additionally, pre-forming the staff can also be a time-consuming operation.

An object of this invention is to provide an auxiliary symbol mounting device for the apparatus described in parent application Ser. No. 98,959, filed Mar. 28, 1961, to increase the number of symbols which may be copied by the apparatus.

Another object is to provide such an auxiliary symbol mounting device which facilitates the printing of a staff for the music copy.

In accordance with this invention the aforescribed apparatus for composing music copy is provided with an auxiliary symbol mounting device which is secured to the support which moves over the light sensitive material. This device includes a staff symbol which may be selectively disposed at the exposure station and carried along

with it. Accordingly although the staff is not carried by the magazine, the problem of orienting the symbols from the magazine on the staff is obviated.

The auxiliary mounting device may also include removable inserts of infrequently-used symbols to supplement the symbols on the magazine. Such infrequently-used symbols might for example be the normal symbols on the magazine but printed in a different style to suit a particular composer. Accordingly, by use of the auxiliary symbol mounting device, it is unnecessary to construct a special expensive disc or magazine to contain symbols which might be used only once.

In an advantageous form of this invention, a fixed plate is secured to the same support which carries the magazine and exposure station. A rotatable shaft extends through the plate and a support bar is secured to one end of the shaft below the support means. The support bar may mount the staff symbol at one end, while the other end may receive the removable inserts for selectively holding a countless number of the infrequently used symbols. A manually operable handle may be secured to the other end of the shaft above the plate for rotating each end of the support bar into the exposure station. The shaft may be axially slidable through the plate with one end of the handle contacting the plate to limit the downward movement of the shaft. The plate may advantageously include stop elements such as spaced notches for receiving the free end of the handle. Two of the notches may be disposed 180° apart from each other with a third notch provided along the same arc as, and between the two notches. Accordingly, one end of the bar may be disposed at the exposure station when the handle is in one of the end notches, and the opposite end of the bar may be disposed at the exposure station when the handle is in the other end notch. Additionally, the bar may be disposed in its inactive position when the handle is in the central notch. The end notches may be deeper than the central notch to maintain the bar close to the light-sensitive paper when the handle is disposed in either of these two notches, and to assure the bar being spaced above the light-sensitive paper when the handle is in the central notch and the bar in its inactive position.

Novel features and advantages of the present invention will become apparent to one skilled in the art from a reading of the following description in conjunction with the accompanying drawings wherein similar reference characters refer to similar parts and in which:

FIG. 1 is a plan view of one embodiment of this invention;

FIG. 2 is a cross-sectional view in elevation taken through FIG. 1 along the line 2—2;

FIG. 3 is a perspective view of the auxiliary mounting device shown in FIG. 1;

FIG. 4 is an enlarged plan view of a portion of the embodiment shown in FIG. 1;

FIG. 5 is an enlarged plan view similar to FIG. 4 in a different phase of operation; and

FIG. 6 is a cross-sectional view taken through FIG. 4 along the line 6—6;

In FIG. 1 is shown an apparatus 10, which is described in detail in parent application S.N. 98,959, filed Mar. 28, 1961. Apparatus 10 is for composing musical copy and includes a stationary frame 12. A platen 14 is mounted within a table 18 supported upon frame 12 for receiving sheets of light-sensitive material 16, as shown in FIG. 2, upon which music copy is composed by the photographic methods described in parent application S.N. 98,959, filed Mar. 28, 1961. Platen 14 is inserted within a rectangular recess 20, in table 18. A vertical translating means 22, which is for example automatically activated moves platen 14 and table 18 in their plane in a vertical direction relative to a musical staff disposed and exposed

upon them. Translating means 22 is, therefore designated as a vertical translating means even though its direction of movement is parallel to ground level.

A symbol magazine or disc 24 is mounted upon support plate 26 which is connected to slide laterally relative to frame 12 upon a pair of hinged slide bearings 28. Plate 26 is raised and lowered about hinge bar 242. A light source 30 is mounted upon support plate 26 adjacent disc 24, and an exposure station 32 is under light source 30.

A lateral translating means 34 reacts between frame 12 and support plate 26 for varying the relative lateral orientation of exposure of printing station 32 and platen 14 and light-sensitive material 16 mounted upon it. Lateral translating means 34 is for example manually actuated through a forwarding lever 36 in a manner described in parent application S.N. 98,959, filed Mar. 28, 1961.

A reference arm 38 is connected to support plate 26, and its extends over reference table 18 to provide through the position of reference plate 40 relative to table 18 a visible indication of the relative positions of exposure station 32 and the light-sensitive material 16. Reference sheet 42 upon table 18 scanned by reference plate 40 includes for example a substantially accurately spaced layout staff 44 and a record staff 46. The precise lateral position of printing station 32 is indicated by reference line 48 inscribed upon reference plate 40, and horizontal reference line 50 crossing line 48 indicates the relative positions of the centerline of exposure station 32 relative to the staff on light-sensitive sheet 16. Angular aperture 52 on plate 40 indicates the corresponding position of exposure station 32 on record staff 46 through which a record of each exposed note is accurately applied to record staff 46.

A control panel 54 is electrically connected to apparatus 10 through electric conduit 56, and it includes a set of twenty-one push buttons 58 for activating vertical translating means 22 to position exposure station 32 at each of the vertical positions provided by and between the lines of a musical staff. Another set of thirty-six push buttons 60 is provided for actuating turntable 62 which automatically rotates each of the light passing images upon symbol disc 24 to exposure station 32 in a manner as is described in detail in parent application S.N. 98,959, filed Mar. 28, 1961. A foot-operated switch 64 is connected to operate light source 30 through a central circuit including an electrical conduit 66 (not fully shown) as also described in parent application S.N. 98,959, filed Mar. 28, 1961. Foot switch 64 also actuates a solenoid to lift platen 14 upwardly into contact with disc 24.

FIG. 2 illustrates the front elevational disposition of the elements shown in FIG. 1 which include motor 70 for rotating turntable 62 to which it attached disc 24. Rows of light-passing images are formed about the periphery of disc 24 whose body is, for example, opaque or black with the images of musical symbols being relatively light-transparent. These symbols include notes with and without stems which are superimposed in combinations to form all types of chords.

Motor 70 rotates continuously, and it is connected to rotate turntable 62 through a magnetic slip clutch 78 and a connecting shaft 80. The circular array of solenoids 82, shown in FIGS. 1-2, actuate plungers 84 to engage lug 86 upon radial arm 88. Plungers 84 include cutout sections, which in the extended condition permit free passage of lug 86. In the retracted phase of solenoids 82, plungers 84 obstruct passage of the lug 86 thereby arresting turntable 62 in a position disposing a preselected symbol image at printing station 32.

Solenoids 82 are mounted upon a non-rotating base plate 92 supported upon a tubular column 94, which is in turn mounted upon sliding carriage 96. Sliding carriage 96 is laterally shifted to several stations provided

by detent lugs and depressions which separately align each of the three rows of images upon disc 24 with printing station 32. A four detent 100 is shown in FIG. 1 for moving carriage 96 and the elements that it supports out of the path of light source 30. The sliding movement of carriage 96 is actuated by a hand-operated wheel as described in parent application S.N. 98,959, filed Mar. 28, 1961.

The lateral translation of support plate 26 with respect to table 18 and platen 14 is controlled by lever 36 of lateral translating means 34. Lever 36 is connected through a shaft 108 to magnetic clutch 110 which rotates pinion 112 through a one-way drive. Pinion 112 is engaged with rear rack 114, attached to the underside of plate 26. This permits an infinite variation in the relative lateral positions of table 18 and exposure station 32 by an operator. A resiliently biased reel 116 reacts upon arm 120 connected to plate 26 through a cable 122 to resiliently bias plate 26 to the extreme left position. The force of reel 116 is resisted by magnetic brake 124, anchored to frame 12 through its shaft 125, which engages rear rack 114 through shaft 126 and pinion 128. While brake 124 remains energized, plate 26 is held laterally motionless. However, when brake 124 is deenergized, reel 116 acting through cable 122 against arm 120 pulls plate 26 to the extreme left, which is permitted by deenergization of one-way magnetic clutch 110. This provides a rapid means for returning plate 26 and printing station 32 and magazine 24 to the extreme left starting position.

Vertical translating means 22 moves platen 14 and table 18 to slide together vertically upon bearing shaft 141 supported upon frame 12 and a roller which moves over horizontal surface 145 of frame 12. Table 18 is connected to a nut 150 engaged with a table-driving lead screw 152. Nut 150 is engaged with table 18 through an adjustable bracket 151 to permit shifting of the relative positions of table 18 and exposure station 32 for exposing a number of successive staffs upon sheet 16 if desired. Lead screw 152 is rotated through gear train 154. The ratio of gear train 154 may be varied by changing its gear to adjust the size of its staff movement. Control lead screw 156 drives train 154, and it is rotated as shown in FIG. 2 alternatively through a pair of pinions 158 and 160 respectively rotated by shafts 161 and 162 connected to magnetic slip clutches 164 and 166. Slip clutches 164 and 166 are respectively connected to the shafts of continuously running electric motors 168 and 170, which operate in opposite directions. The direction of rotation of control lead screw 156 is therefore, governed by energizing one or the other of magnetic clutches 164 or 166, and this selective energization is accomplished through control device 172.

Control device 172 includes a pair of stationary control bars 174 and 176, and includes an array of contact brush rods 178 and 180 arranged in opposed positions. Each set of oppositely disposed pairs of control rods or brushes 178 and 180 are connected to each other through a vertical staff contact array and associated relays. Each set of contacts is actuated by a corresponding staff spacing push buttons 58 which are shown in FIG. 1. Movable contact rod 186 is connected to control lead screw 156 through nut 188 to cause it to move in synchronism with table 18. Movable control bar 186 includes on one side a central contact 190 which engages one set of brushes 178. On its other side a pair of elongated contact surfaces 193 and 195 which engage brushes 180 are separated by an insulated space 197.

The above described structure is also described in detail in parent application Ser. No. 98,595, filed Mar. 28, 1961 which is incorporated herein by reference thereto.

As shown in FIGS. 1-2 apparatus 10 includes an auxiliary symbol mounting device 400 which is mounted on reference arm 38 by fixed plate 402. The operation of mounting device 400 will be better understood by reference to FIGS. 3-6. As shown most clearly in FIG. 3

mounting device 400 also includes a symbol carrying bar 404 which is secured to shaft 406 and is rotated by handle 408. Plate 402 has an arcuate rim 414 which has a plurality of V-shaped notches 416, 418, and 420. Bar 404 is held in its various positions when the tapered free end 410 of handle 408 is in one of the notches. Bar 404 is moved to each position by raising handle 408, and accordingly lifting shaft 406 which is axially slidable in upstanding boss 415 on plate 402. Handle 408 is then rotated to the desired position and free end 410 is lowered into the appropriate notch.

Each end of bar 404 carries auxiliary symbols to supplement the symbols on magazine 24. One end, for example, carries staff symbol 422, while the other end carries removable inserts 424 so that an infinite variety of symbols can be carried by bar 404 in accordance with the desires of a particular compositor.

At the beginning of a printing operation for a line, apparatus 10 may be for example in the position shown in FIG. 4 with disc 24 positioned at exposure station 32. Bar 404 is in the inactive position shown in FIGS. 2 and 4. Disc 24 is then removed from exposure station 32 in the manner described in parent application Ser. No. 98,959, filed Mar. 28, 1961. Handle 408 is raised to remove free end 410 from notch 420 and is rotated with free end 410 being inserted in notch 418. Bar 404 is thereby rotated so that staff symbol 422 is at exposure station 32 as shown in FIG. 5. Lateral translating means 34 is actuated in the manner described in parent application Ser. No. 98,959, filed Mar. 28, 1961, and the staff is inscribed on light sensitive paper 16. Lateral translating means 34 is actuated to inscribe the staff completely across light sensitive paper 16. Handle 408 is then rotated to move bar 404 to the inactive position shown in FIG. 4 and the operator then selects the various symbols from, for example, magazine 24 to be inscribed on paper 16.

Advantageously, notches 416 and 418 are deeper than central notch 420. Accordingly, when free end 412 of handle 408 is in notch 416 or 418 to dispose staff 422 or insert 424 at exposure station 32, the staff or insert is disposed close to light sensitive paper 16. However, when free end 412 is in central notch 420, bar 404 is spaced a greater distance above paper 16 because notch 420 is not as deep as notches 416 and 418. Accordingly, bar 404 is maintained above and out of contact with paper 16 while symbols from magazine 24 are inscribed on the light sensitive paper 16, and support bar 404 is moved across the light sensitive paper.

What is claimed is:

1. An apparatus for composing musical copy comprising a stationary frame, a table mounted upon said frame for supporting a sheet of light sensitive material, movable support means connected to said frame, a symbol magazine incorporating light passing images of a variety of musical symbols connected to said support means, a source of light mounted upon said support means for directing light upon the light sensitive material, an exposure station on said support means positioned in front of said source of light, symbol image feeding means connected to said magazine for selecting a predetermined symbol image and disposing it at said exposure station between said light source and the light sensitive material, translating means reacting between said exposure station and said table through said frame for varying the vertical and lateral orientation of said exposure station relative to the sheet disposed upon said table, auxiliary symbol mounting means on said support plate for selectively disposing an auxiliary light passing image of a musical symbol at said exposure station, a musical staff symbol light passing image in said mounting means for imprinting a musical staff upon the light sensitive material when said symbol image is disposed at said exposure station, said auxiliary symbol mounting means including a symbol supporting bar disposed under said support means and above said light sensitive material, rotat-

ing means being connected to said bar for selectively disposing auxiliary musical symbols at said exposure station, a fixed plate being secured on said support means, said rotating means comprising a shaft extending through said plate and connected at one end to said bar, a handle being connected at the opposite end of said shaft above said plate for controlling the rotation of said bar, stop means being on said handle and said fixed plate for selectively maintaining said bar accurately positioned with each end disposed at said exposure station and for maintaining said bar in an inactive position with both of said ends of said bar disposed away from said exposure station.

2. An apparatus for composing musical copy comprising a stationary frame, a table mounted upon said frame for supporting a sheet of light sensitive material, movable support means connected to said frame, a symbol magazine incorporating light passing images of a variety of musical symbols connected to said support means, a source of light mounted upon said support means for directing light upon the light sensitive material, an exposure station on said support means positioned in front of said source of light, symbol image feeding means connected to said magazine for selecting a predetermined symbol image and disposing it at said exposure station between said light source and the light sensitive material, translating means reacting between said exposure station and said table through said frame for varying the vertical and lateral orientation of said exposure station relative to the sheet disposed upon said table, auxiliary symbol mounting means on said support plate for selectively disposing an auxiliary light passing image of a musical symbol at said exposure station, a musical staff symbol light passing image in said mounting means for imprinting a musical staff upon the light sensitive material when said symbol image is disposed at said exposure station, said auxiliary symbol mounting means including a symbol supporting bar disposed under said support means and above said light sensitive material, rotating means being connected to said bar for selectively disposing auxiliary musical symbols at said exposure station, a fixed plate being secured on said support means, said rotating means comprising a shaft extending through said plate and connected at one end to said bar, a handle being connected at the opposite end of said shaft above said plate for controlling the rotation of said bar, said shaft being axially slidable through said plate, one end of said handle contacting said plate to limit the downward axial movement of said shaft, a pair of symbol disposing notches being in said plate 180° apart from each other, said notches being shaped to receive said one end of said handle, one end of said bar being at said exposure station when said one end of said handle is positioned in one of said symbol disposing notches, and the other end of said bar being at said exposure station when said one end of said handle is positioned in the other of said symbol disposing notches.

3. An apparatus as set forth in claim 2 wherein a central notch is in said plate, said central notch being concave with and between said symbol disposing notches for receiving said one end of said handle when said bar is in an inactive position.

4. An apparatus as set forth in claim 3 wherein said symbol disposing notches are deeper than said central notch for disposing said bar closer to said light sensitive material.

5. An apparatus as set forth in claim 4 wherein said notches are V-shaped, and said one end of said handle has a complementary taper for accurate positioning of said bar.

6. An apparatus as set forth in claim 3 wherein an upstanding arcuate rim is on said fixed plate, and said notches being in said rim.

7. An apparatus for composing musical copy comprising a stationary frame, a table mounted upon said frame for supporting a sheet of light sensitive material, movable

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support means connected to said frame, a symbol magazine incorporating light passing images of a variety of musical symbols connected to said support means, a source of light mounted upon said support means for directing light upon the light sensitive material, an exposure station on said support means positioned in front of said source of light, symbol image feeding means connected to said magazine for selecting a predetermined symbol image and disposing it at said exposure station between said light source and the light sensitive material, translating means reacting between said exposure station and said table through said frame for varying the vertical and lateral orientation of said exposure station relative to the sheet disposed upon said table, auxiliary symbol mounting means on said support plate for selectively disposing an auxiliary light passing image of a musical symbol at said exposure station, a musical symbol light passing image in said mounting means for imprinting the musical symbol image upon the light sensitive material when said symbol image is disposed at said exposure station, said auxiliary symbol mounting means including a symbol supporting bar disposed under said support means and above said light sensitive material, rotating means being connected to said bar for selectively disposing auxiliary musical symbols at said exposure station, a fixed plate being secured on said support means, said rotating means comprising a shaft extending through said plate and connected at one end to said bar, a handle being connected at the opposite end of said shaft above said plate for controlling the rotation of said bar, stop means being on said handle and said fixed plate for selectively maintaining said bar accurately positioned with each end disposed at said exposure station and for maintaining said bar in an inactive position with both of said ends of said bar disposed away from said exposure station.

8. An apparatus for composing musical copy comprising a stationary frame, a table mounted upon said frame for supporting a sheet of light sensitive material, movable support means connected to said frame, a symbol magazine incorporating light passing images of a variety of musical symbols connected to said support means, a source of light mounted upon said support means for directing light upon the light sensitive material, an exposure station on said support means positioned in front

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of said source of light, symbol image feeding means connected to said magazine for selecting a predetermined symbol image and disposing it at said exposure station between said light source and the light sensitive material, translating means reacting between said exposure station and said table through said frame for varying the vertical and lateral orientation of said exposure station relative to the sheet disposed upon said table, auxiliary symbol mounting means on said support plate for selectively disposing an auxiliary light passing image of a musical symbol at said exposure station, a musical symbol light passing image in said mounting means for imprinting the musical symbol image upon the light sensitive material when said symbol image is disposed at said exposure station, said auxiliary symbol mounting means including a symbol supporting bar disposed under said support means and above said light sensitive material, rotating means being connected to said bar for selectively disposing auxiliary musical symbols at said exposure station, a fixed plate being secured on said support means, said rotating means comprising a shaft extending through said plate and connected at one end to said bar, a handle being connected at the opposite end of said shaft above said plate for controlling the rotation of said bar, said shaft being axially slidable through said plate, one end of said handle contacting said plate to limit the downward axial movement of said shaft, a pair of symbol disposing notches being in said plate 180° apart from each other, said notches being shaped to receive said one end of said handle, one end of said bar being at said exposure station when said one end of said handle is positioned in one of said symbol disposing notches, and the other end of said bar being at said exposure station when said one end of said handle is positioned in the other of said symbol disposing notches.

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JOHN M. HORAN, *Primary Examiner.*