Dec. 6, 1955 L. C. SNYDER 2,725,802

PHOTOGRAPHIC MEANS AND METHOD FOR COMPOSING TYPE

Filed Aug. 16, 1952 4 Sheets-Sheet 1

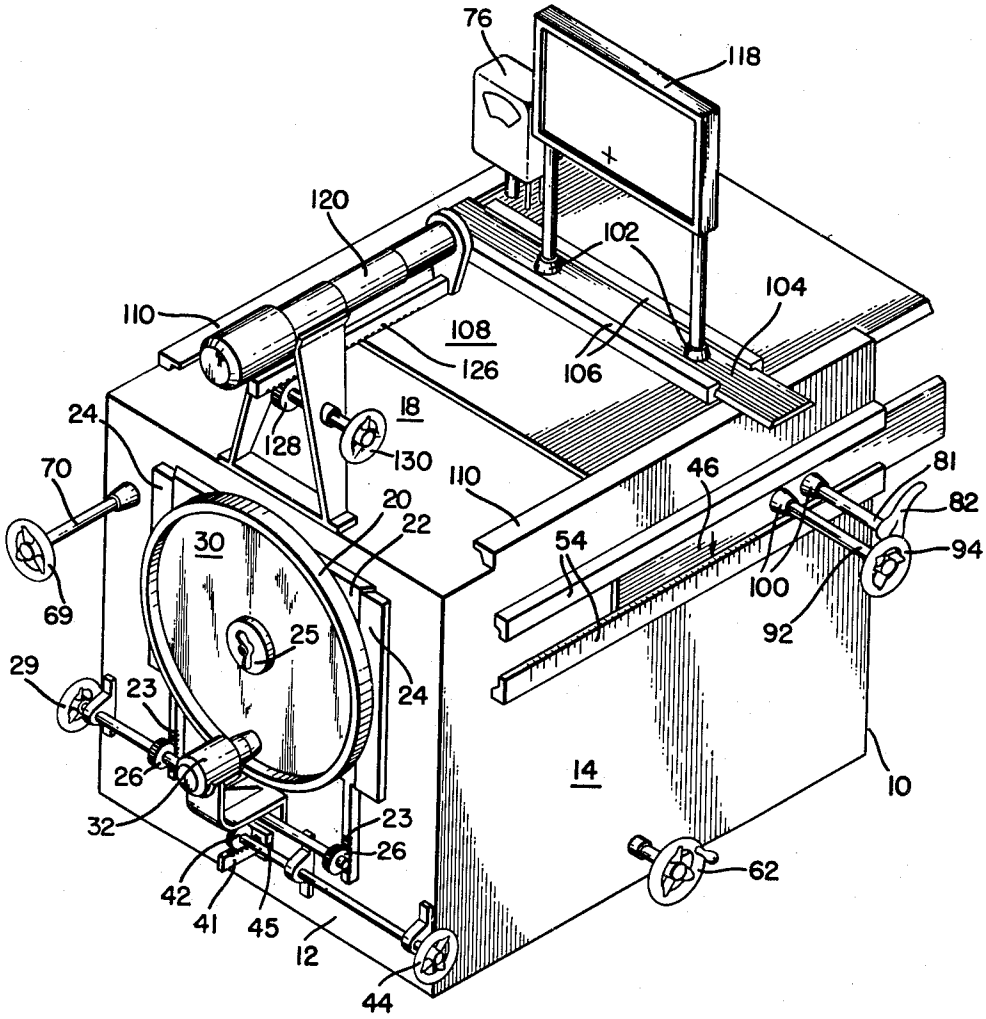


FIG. 1

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PHOTOGRAPHIC MEANS AND METHOD FOR COMPOSING TYPE

Filed Aug. 16, 1952 4 Sheets-Sheet 2

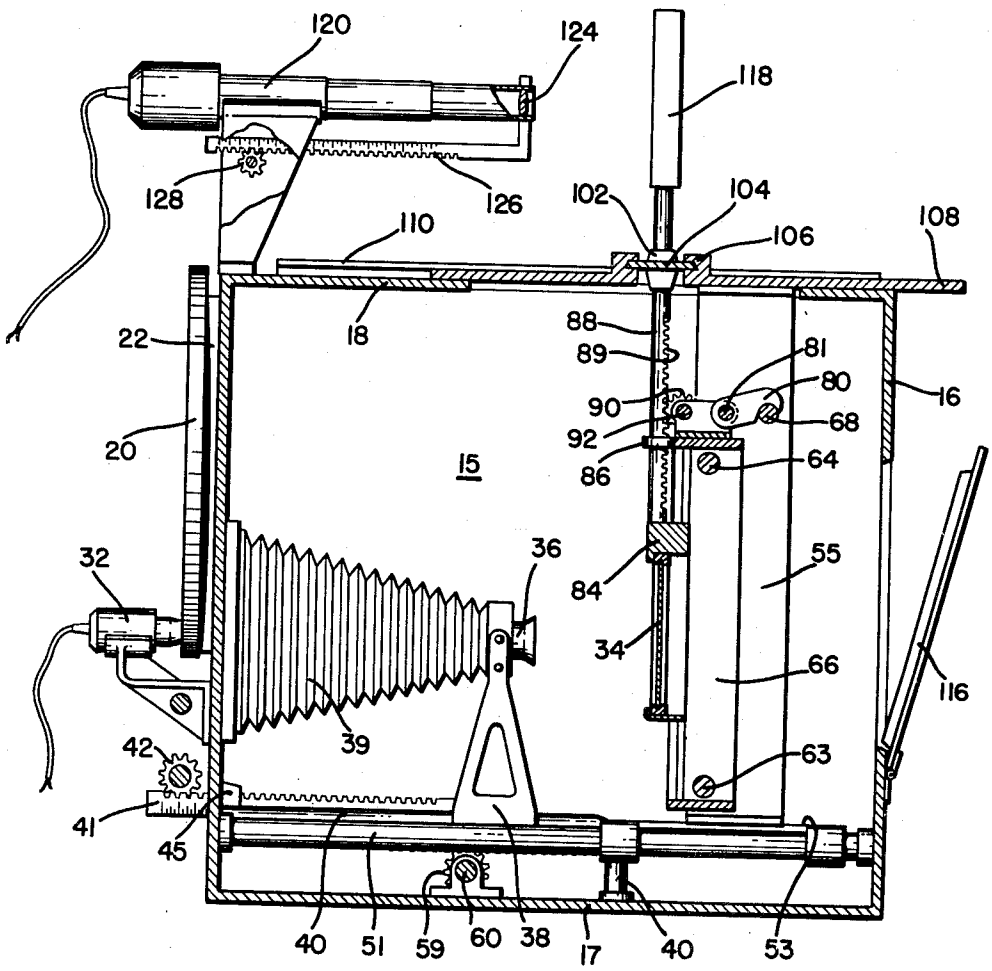


FIG. 2

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PHOTOGRAPHIC MEANS AND METHOD FOR COMPOSING TYPE

Filed Aug. 16, 1952 4 Sheets-Sheet 3

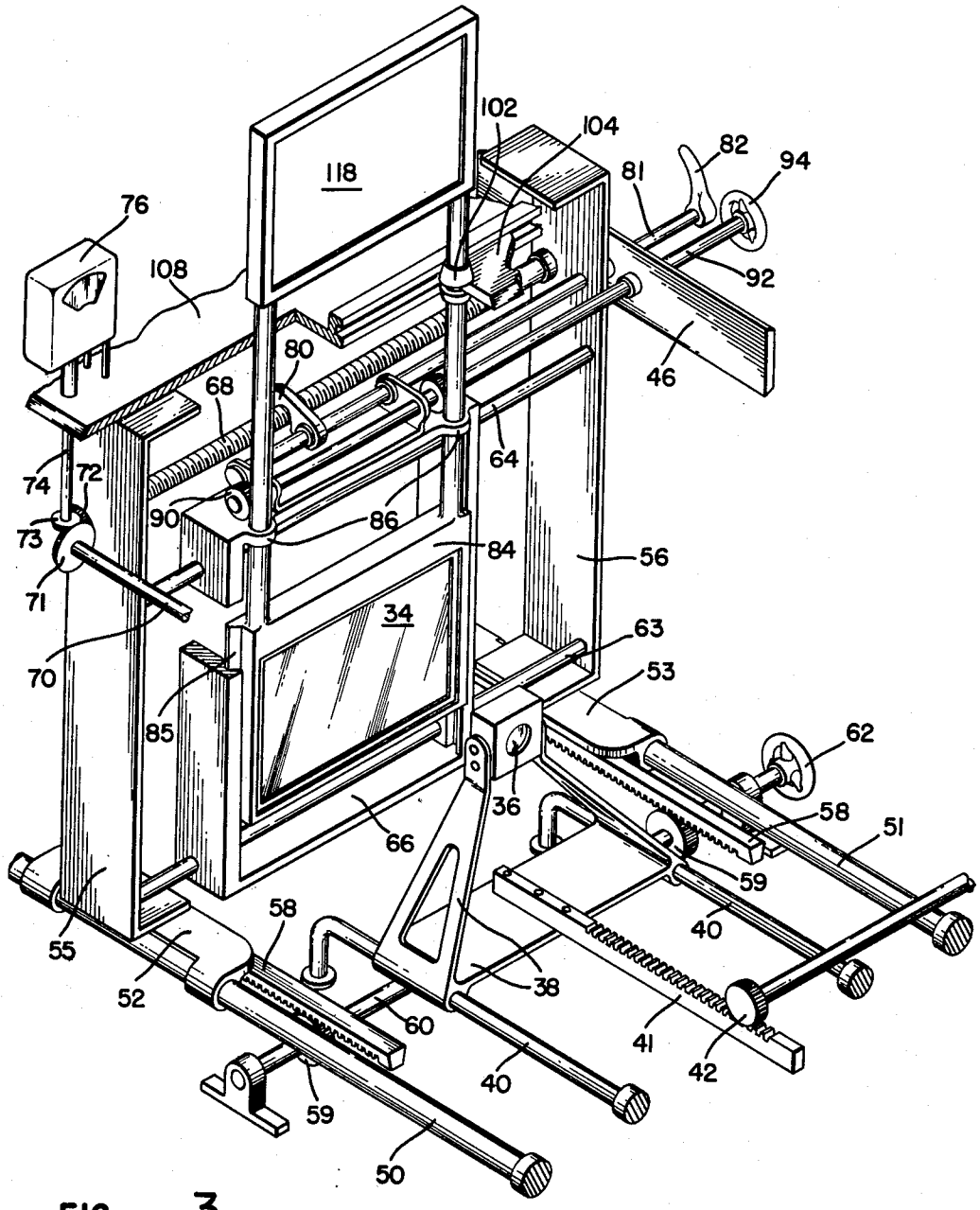


FIG. 3

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PHOTOGRAPHIC MEANS AND METHOD FOR COMPOSING TYPE

Filed Aug. 16, 1952 4 Sheets-Sheet 4

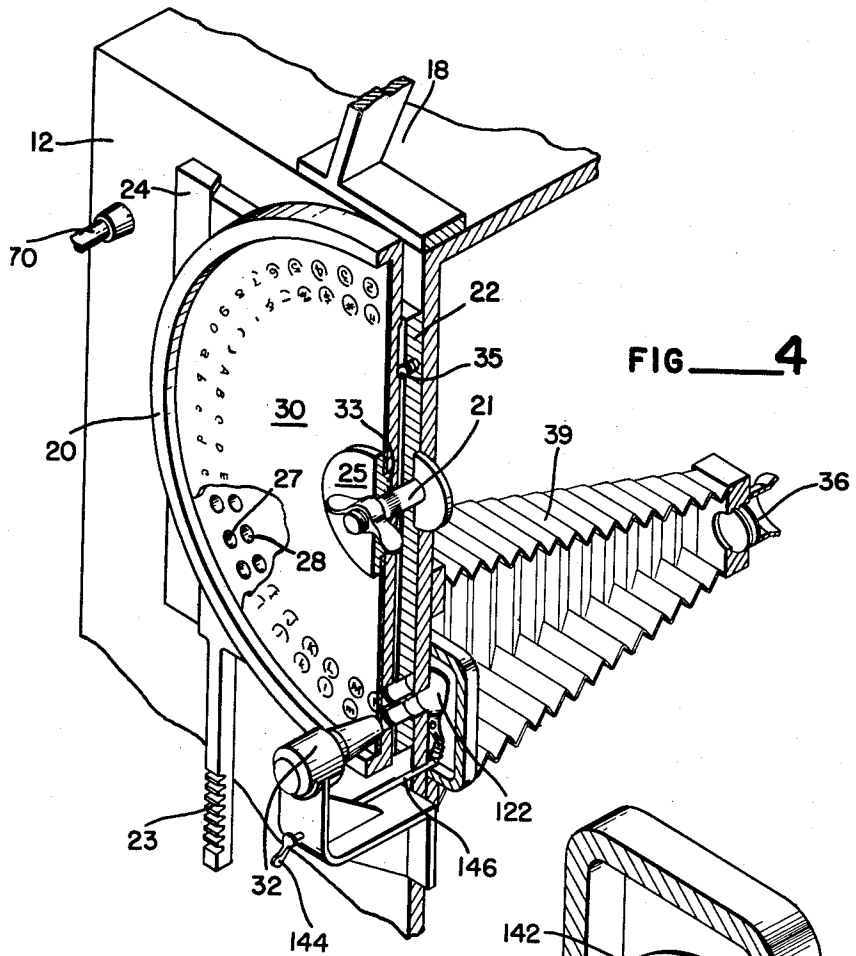


FIG. 4

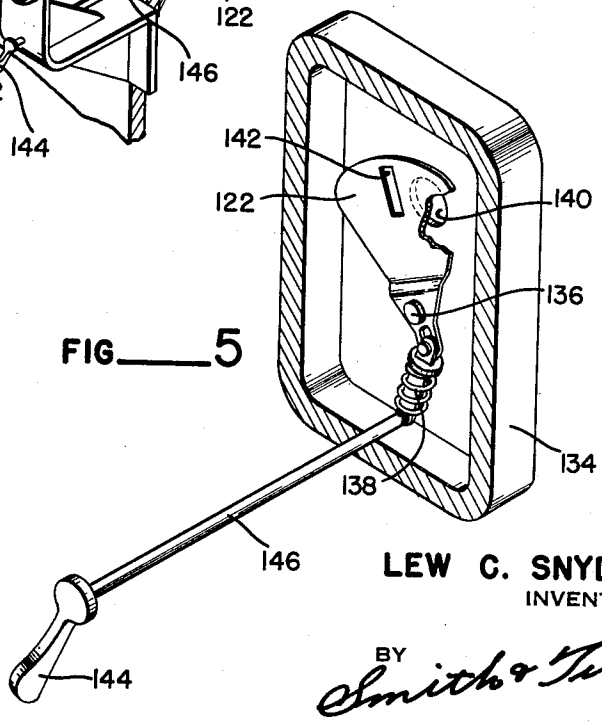


FIG. 5

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United States Patent Office 2,725,802
Patented Dec. 6, 1955

2,725,802

PHOTOGRAPHIC MEANS AND METHOD FOR COMPOSING TYPE

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Application August 16, 1952, Serial No. 304,801

7 Claims. (Cl. 95—4.5)

This type composing camera is designed to accept a perforated disc in whose perforations are disposed the upper and lower case letters of a complete alphabet made after some particular style of type. Means are provided for moving the perforated disc selectively so that light may be projected through either the upper or lower case letter selected and the image projected upon a sensitized surface where the letter will be photographically reproduced. Means are provided for changing the projected size of the letters' image so that a full range of type sizes in any particular style selected may be projected and reproduced. Means are further provided whereby letters may be projected in a composition group varying the size of the letters if desired to meet the composition requirements. Means are further provided so that the user of the camera will at all times have full control over the horizontal and vertical spacing of the letters forming any composition.

Printing as an art or craft is still practiced by a great number of people with little change from its initial conception centuries ago. This consists normally in its simplest form of having individual metal type for each letter of the alphabet, and then in order to make composition of any magnitude possible, it is necessary to have many types of a single character. Usually type are sold as a font of type in which the various letters occur in about the expected frequency. It therefore requires quite an investment and considerable storage space to house one font of type and this one font of type would hardly serve the needs of even a hand print shop. Customers require type of different sizes and each size would require another font of type. Then too, there are many styles of type, and for a printer to equip his plant with the various sizes of type, and a few styles of type, would soon magnify the number of fonts of type to a point where he can no longer amortize the investment let alone take care of the storage requirement therefor.

There is a second consideration in handling printing and that is the labor or time of the operator which is involved in each printing job. In a typesetting print shop it is necessary to have, as noted, a very substantial collection of type sizes and type styles, and when these are to be composed into a subject for printing, the individual letters are hand placed in the forms together with the slugs and spacer members, and clamped up ready for printing. Then when printing has been finished it is necessary to redistribute these type to their original storage positions. This entails a great deal of time on the part of the printer if he is to use the metal type form of printing.

Many attempts have been made to produce equipment to overcome the slow, time-consuming operations required in the setting of type for printing. One solution has been to employ machines which will mechanically handle the various type and so place them that they can be used, that is these special type, to produce type composition cast in a single block or unit. Such machines however are subject to the limitations of the great difficulty in changing type styles or sizes and have found their principal use-

fulness in newspaper printing and the like. Such equipment is necessarily very expensive in first cost and does not serve the needs of the job printer.

To assist in reducing the time consumed in printing, many improved forms of printing have been developed using such aids as photography, rotogravure, or photoengraving as illustrative. Such printing presses however must have the copy that they are to print composed in some manner. Of course simple art work is very easily reproduced photographically, but the text or subject matter has always been a problem and in the smaller plants only finds a solution by the laborious hand-setting of type.

This present invention provides a camera means which is particularly adaptable for the composition of material for use with the more recently developed and more generally used styles of printing.

This present device finds its greatest acceptance economic-wise with the small printing establishment, or the larger establishments called upon to compose irregular copies as distinguished from the straight periodical field. For instance, a small printer may conveniently store his complete camera, developing room, and everything needed for composition, in a floor space of approximately 8 square feet. This is largely because the projection disc upon which he can have a full master alphabet, in small and upper case letters, is very small and compact and should cost through present trade channels somewhere between $10.00 and $25.00. This would be the full equivalent for composition purposes of eight fonts of type. Such an array of type would be a very expensive proposition, as even the metal which is required to make them would, under the present market, cost approximately $600.00. This is a very sound, economical arrangement therefore for the small or job shop operator and becomes increasingly noticeable as additional styles of type are required. With this present photographic means each additional style of type should not cost in excess of twenty-five dollars on the present market, and this takes the place of eight fonts of type as now conceived. A very worthwhile saving however is that in storage space and the cabinets and the like required. A third and very important feature in this present equipment however is that it can actually be employed in the composition of certain matters to effect a saving of about one-half against the ordinary typesetting technique and saving of 25% or 30% in time over the type casting equipment, when the same is used on work to which this equipment is especially suitable.

The principal object of this present invention is to provide a photographic means for the accurate composition of printed materials.

A further object of this invention is to employ a single alphabetic master in the form of a disc or platen which by projection methods contained within the equipment can easily produce the full range of type sizes from 12-point to 72-point.

A further object is the provision of using a single master alphabet which affects a great savings in first cost, in storage space, and in time consumed over conventional forms of composition.

A further object of this invention is to provide photogaphic means which are capable of exact setting well within the capacity and observation of the operator which will insure the exact spacing and placement of the various characters in the composition.

A further object of this present device is to provide within a single lighttight cabinet all the essential functions and movements necessary to create, from a master set of characters, an exposed sensitized composition sheet, the exact composition of which has been indicated to the

operator by indicating devices outside of the lighttight cabinet.

Further objects, advantages and capabilities will be apparent from the description and disclosure in the drawings, or may be comprehended or are inherent in the device.

In the drawings:

Figure 1 is a perspective view showing a photographic composition camera made after the teachings of this present invention;

Figure 2 is a vertical longitudinal section taken through the center of the device of Figure 1;

Figure 3 is a perspective view showing the mechanism employed to carry the sensitized material upon which projection is made, with certain other parts broken away or sectioned, or entirely removed, to more fully illustrate certain details of structure;

Figure 4 is a perspective view taken along the vertical plane passing through the projection light source and the projection lens, certain parts are broken away and shown in section; and

Figure 5 is a perspective view, partly in section, showing the shutter means used for making photographic exposures in this camera.

Referring more particularly to the disclosure in the drawings, the numeral 10 designates the box or housing for my camera. This consists of the front wall 12, the side walls 14, and 15, the end wall 16, and the bottom 17 and the top 18. To these various wall surfaces are attached bearing or support members for the various elements employed in this photographic production of type composition material. Disposed adjacent the front wall 12 is the revolvable master disc 20, this disc is revolvably positioned on bolt 21 which in turn is secured to a slipper member 22. This disc member is guided and secured to the front panel 12 as by the beveled rails 24 which coact with the beveled edges of member 22. Suitable friction means is provided as in washer 25 and its associated wing nut so that the desired frictional resistance can be provided for disc 20. Disposed in one or more concentric circles near the periphery of disc 20 are through openings as 27 and 28. It is conceivable that more than the two circles could be employed if it were desirable. However, the two circles provide ample space for capital letters and lower case letters of a complete alphabet together with other necessary characters. It is preferable that the capital is on the outer margin as indicated because of the increased size of the letters and that the smaller case letters be disposed in radial and inner positions. As a matter of convenience, the alphabet, which is, in effect, to form a font of type including the numerals and characters associated therewith is placed upon a circular film 30 so arranged that the characters will correspond with appropriate openings 27 and 28 in disc 20. Film 30 may be positioned on disc 20 by means of a deformed or keyed hub 33 formed as part of washer 25. The images on this film 30 are projected by means of a light source and suitable lenses at 32 upon the sensitized paper or film at 34. To insure proper registry of the openings with the axis of the light source a resiliently urged detent or ball 35 is employed, there being an elongated depression, radially disposed, for this detent to seat into for each of the radially aligned sets of projection openings 27 and 28. Disc 20 may be selectively positioned vertically by means of rack gear 23 and gear pinion 26 operated by handwheel 29.

In order that one master film 30 can be used to create type of any of the desired sizes, focusing arrangements must be provided as the lens at 36 which is a projection lens and is normally equipped with a suitable shutter so that the duration of exposure can be accurately controlled. In order that maximum range of sizes can be obtained in the projected letters and still keep the equipment at a minimum size, means are provided for the movement along its optical axis of lens 36 and the carrier for the sensitized material 34 is likewise capable of being moved to and away from the light source 32.

In photo reproduction work it is necessary that the equipment used operate with exactness and be capable of being operated quickly without vibration. This calls for substantial construction and careful attention to making all the parts rigid in their operation. With this end in view, I have provided that lens 36 be mounted on a substantial carriage 38 which is disposed for reciprocation upon spaced guideways 40. These guideways are rigidly secured at their inboard ends to the floor 17 of the housing and at their outer ends they are securely attached to the front wall 12. Reciprocation is achieved by providing, preferably, a rack gear bar 41 which is operably engaged by the gear pinion 42 which is, in turn, controlled by the external handwheel 44. A light trap 45 forms a through tunnel so that as rack gear 41 is moved in and out of the housing no light can enter which might fog or partially expose this sensitized material 34. Such an arrangement provides for the full range movement of lens 36. In order to effect final adjustment between the image in disc 20 or in 36 and the sensitized material 34, the carrier for the sensitized material is also capable of lineal adjustment along the axis of the lens. It is to be understood that there are two factors that enter into this adjustment. One is the necessary physical proportioning between the distances from the lens to the image plate 20, and from the lens to the sensitized material. The position of lens 36 between these two expressed as a ratio determines the size of the projected image upon the sensitized paper. Then because of the laws of optics incidental to the use of the lens, after the size desired has been obtained, it is then necessary to get the parts in proper focal registry so that the images will be sharp. It therefore follows that these two adjustments must be fully made so as to be fully compensating for each other and it must be possible for the operator to make these adjustments with certainty both as to focus and as to size. A convenient way of arranging for this determination so as it can be easily made by the operator is to provide a graduated scale which will show the operator the position of the lens and the position of the sensitized surface 34. One convenient way to indicate the position of the lens is to graduate rack 41 and likewise any external parts secured to the sensitized surface supporting framework may be similarly graduated as this index. One such convenient means is the slide cover 46.

The structure which supports the sensitized surface 34 must be capable of lineal travel along the axis of the lens assembly and must be capable of vertical and horizontal movement so that the entire sensitized surface can be employed for the composition of text. To achieve this purpose the entire mechanism, as probably best illustrated in Figure 3, is disposed for lineal movement upon spaced rails 50 and 51. These two rails are disposed in parallel relationship and are fixedly secured at each end to the camera housing as to the front face 12 and the rear wall 16. Adapted for reciprocation on rails 50—51 are the slide members 52 and 53. The main frame members 55 and 56 are secured to and supported by the slide members and also secured to the slide members are gear racks 58 each of which is engaged by its own pinion 59 which pinions in turn are fixedly secured to transverse shaft 60 and are turned with it. Shaft 60 is under control of the operator by means of external handwheel 62.

Side frames 55 and 56 are joined together by the parallel rods 63 and 64 which secure the same in fixed space relationship. These rods which are horizontally disposed provide the vertical positioning means for the horizontally movable frame 66.

Frame 66 by itself is free to slide the full length of rods 63 and 64. This movement is effected by revolving a heavy threaded rod, as screw 68. This screw is turned by means of a handwheel 69 and the associated shaft 70, which engages screw 68 by means of the miter gears 71 and 72. This arrangement places handwheel 69 out in

the front of the camera where it is most convenient for the operator's use. A third miter gear 73, driving upwardly through shaft 74, drives the dial indicator 76. This dial indicator gives the operator a measure of the position horizontally of frame 66 and its purpose will be more fully explained. Inasmuch as carriage 66 must be repeatedly moved transversely of the camera, or horizontally as viewed, it is necessary to have means to disengage the traveling mechanism from screw 68 and a convenient arrangement for this function is provided by having a segmental threaded pawl member 80, which pawl member is fixedly secured to shaft 81, and this shaft is secured against axial movement with respect to frame 66 but may be revolved partially, and to this end, shaft 81 extends outside the housing where the lateral shift handle 82 is convenient for the operator's use. It is to be understood it is believed that by merely rocking handle 82 will similarly raise or lower pawl 80 so as to cause it, at will, to either engage or disengage screw 68. It is necessary to disengage it when carriage 66 is being repositioned after a line has been composed.

Within frame 66 is disposed a vertically slidable frame 84. This is the frame that gives direct support to the sensitized material 34. It therefore must be capable of vertical movement, lateral movement, and lineal movement along the axis of the optical system. Vertical movement of frame 84 is effected by providing a guiding system between frame 84 and frame 66. As illustrated it is provided in part by the tongue and groove guideway illustrated at 85 and by the loops 86 which encircle vertically disposed posts which extend upwardly from frame 84. The upwardly extending posts 88 are provided with rack gears at 89 and these rack gears, one on each post 88, are engaged by pinion gears 90. Pinion gears 90 are fixedly secured to shaft 92. Shaft 92 is controlled by means of external handwheel 94. The two posts are equally engaged so that frame 84 will be moved vertically without danger of binding. Posts 88 provide convenient means of having an exact indication external of the camera box which will show the relative position of the sensitized material 34. This is essential if accurate composition is going to be obtained upon a surface that is not visible by the operator.

In each occasion, where shafts extend through the housing and which while the different adjustments are being made must change positions, each of these must be provided with means that would assure that no light will find its way into the camera box. Otherwise sensitized material might be fogged or damaged by extraneous light and thus interfere with accurate exposure. In the case of shafts 81 and 92 which effect the raising and lowering of the sensitized material, and which make it possible to reset the same in a new transverse position, these shafts rotate and must move bodily both laterally and lengthwise of the camera box. Shielding against the rotary motion is achieved by extended hub bearings as 100 through which the shafts may slide longitudinally of themselves and a lightproof slide 46 is provided with overlapping guideways as 54 so that the elongated opening in side 14 of the camera box will at all times be covered in a lightproof manner. In the case of the upwardly extending shafts 88 there are again three motions to be guarded against; one the vertical movement of shaft 88 which is guarded as by the hubbed bearings 102; the transverse light shield is provided in the sliding shutter arrangement 104, and this shutter, together with its enclosing guide rails 106, is disposed on a large shutter 108, which in turn is free for longitudinal movement and retains its position by guide members 110. In the rear wall 16 a light trap door 116 is provided so that access can be had to the camera box for the removal of the sensitized surface 34 and the supporting holder after the same has been exposed, or to replace it with an unexposed one.

On the upper ends of shafts 88 a sight board 118 is provided. This has a free surface equal in size to the

sensitized material 34. Guide lines or other reference marks may be placed upon this board and then an image is projected on it by the self-lighted telescoping arrangement 120, the lens of which may be adjusted to the same vertical plane as lens 36. This arrangement permits the operator to position the various characters in the alignment and spacing desired. One requirement is encountered where letters or figures of different size from the body of the text are employed and it has been necessary to space the same above or below the vertical control or base line at the point desired. This same means can be employed to determine transverse spacing and is particularly useful where unusual characters are employed or in letters larger than those of the normal context.

In order to provide the proper space between the various letters the master disc 30 can have provided on it a reference chart showing the width of the various letters, or rather the width of the space that each letter occupies. The operator then, by turning handwheel 69 moves the sensitized surface transversely of the camera until the desired spacing is obtained. It could be done by reference to the printing board. However a more convenient means is to employ the counter dial 76. This dial is gear-connected by gear 73 to the gear-controlling shaft 68 and consequently the operator need only to turn the handwheel 69 until the proper indices show in the dial. The operator then knows that the proper space has been achieved. By way of explanation, it is desired to bring out that printing differs from typewriting largely in that the letters in typing all occupy the same lateral space thus giving more space between certain letters. In printing however, the type are made to a standard and those wide letters such as M's and W's and the like actually are accorded more longitudinal space in the composition than the short letter as I's for instance. The arrangement, as noted, however, gives an easy solution of this problem.

Method of operation

The purpose of this photo type composing device is to compose type for offset photography, rotogravure, or photo-engraving, and a typical operation of the same should in general follow the procedure to be described. The device is charged with a sheet of sensitive material 34. Many forms of material might be used, for the present it will be considered as a direct positive paper. The operator then determines the point size of type he wishes to reproduce and he positions lens 36 according to the scale calibrated on rack bar 41. He secondly then positions frame 84 which carries the sensitized paper first lineally of the axis of the optical system. This is achieved by use of handwheel 62 and a suitable scale which may be incorporated in slide 46 and one of the guideways 54. The lens is moved by turning handwheel 44 which through the rack and pinion arrangement moves the lens standard and contracts or extends the bellows or equivalent arrangement, 39. My device is now set with the lens in accurate focus and with the proper spacing relative of the master disc 30, lens 36 and the sensitive surface so that type of the desired point size will be reproduced.

The next requirement is that the sensitive material 34 be positioned vertically and laterally so that the first type or character reproduced will be at the exact place the user desires it. Frame 84 which carries the sensitive surface is moved upwardly or downwardly by handwheel 94 and is moved transversely of the optical axis by means of handwheel 69. The determination of when the exact starting point is arrived at is determined by the image projected by the telescopic projector arrangement 120 which has a light source, a projection lens, and an index usually a cross of two lines one vertical and one horizontal. This projection is made on board 118 which is directly connected to frame 84, moving with it, and is the same size and gives a ready reference. Assuming that a capital letter is the first letter to be formed, disc 20 is turned until the

proper letter is under the projection lamp 32, detent 35 engaging a suitable depression on the underside of plate 20 will hold the adjustment once obtained. It will of course be necessary to use the outermost opening showing the letter desired based upon the description previously outlined. The beam of light from source 32 is normally interrupted by shutter 122 which may be merely a pivoted disc. Opening and closing shutter 122 to give the desired exposure forms the projected image of the capital letter on screen 34. The next step usually would be the reproduction of a lower case letter. In this instance disc 20 must be positioned so that the desired letter is under light source 32 and the vertical adjustment made so as to engage the opening containing the lower case letter. The exposure would then be made as previously. However before exposure is made, it is necessary to determine the spacing along the line of type which this letter will require. This spacing which will vary of course for different point sizes, and for different letters, should, as a matter of convenience, be tabulated and secured adjacent the letter on disc 20, normally in a radial arrangement in line with the letter or character opening.

Spacing within the line is controlled by handwheel 69 and the amount of movement is indicated upon the dial indicator 76 so that an exact setting can be quickly achieved. The operator also has vertical control which he can use if he wishes the capital to extend down below the base line of the type which in this instance would mean that he would in effect move his base line up, or he might have an established base line on the sighting board 118, and would then have possibly moved the lower portion of the capital down if that fitted into the style of composition. This vertical movement to bring projected image on the desired vertical line of sheet 34 is achieved by handwheel 94.

When one line of composition has been completed, sheet 34 would normally be on the lefthand side of the camera as viewed in Figure 3 and it would be necessary to move the sheet to the right to start a new line. To achieve this handle 82 is raised upwardly, disengaging pawl 80 from screw 68 and then the entire carriage 84 is free to move to the new starting position. When the new position is reached handle 82 is released, pawl 80 reengages screw 68 and this part of the adjustment is complete normally, but might be checked by the viewing camera device 120.

It is next necessary to move sheet 34 vertically for the next line position. This is achieved through handwheel 94 and the vertical position can be checked by viewing the image projected upon sighting board 118. The operator is now ready to repeat the sequence of projecting and making the proper exposure for each letter or symbol desired in the final composition.

During the photographic operations, lens 124, of the telescopic projector 120, is moved in step with lens 36 of the camera. A convenient means to achieve this is by the gear rack 126, the gear pinion 123 and the handwheel 130. The rack bar 126 is graduated similarly to gear rack 41, to assist in this operation.

Photographic exposure is conveniently controlled by the toggle type shutter shown in detail in Figure 5 and in place on the camera in Figure 4. In this arrangement a lighttight housing 134 fits with a lighttight contact to the inside of front panel 12. Pivotably mounted on pivot 136 is a shutter member 122. A spring toggle 138 holds plate 122 in either of its two extreme positions, in both of which the light aperture 140 is closed. Exposure is made as slot 142 moves quickly past aperture 140 under urgence of the spring toggle mechanism 138. An operating handle 144 is suitably connected, by rod 146 so the shutter may be operated from outside of cabinet 10.

The above description is more time-consuming than the physical operation, of course. However each letter must be individually impressed upon the sensitive surface 34 and the estimate of saving in time over conventional methods as previously noted has been accurately determined. There is of course one consideration that must not be lost sight of, there is no type to be broken up and be redistributed so that it may be used again. Then, in comparison with certain other methods there is no type metal that has been set and molded which must again be melted up and made available for remolding. The only additional operation on the part of the operator is to remove the exposed sheet 34 as out through door 116, and develop the same in accordance with the form of sensitized material used.

It is believed that it will be clearly apparent from the above description and the disclosure in the drawings that the invention comprehends a novel construction of a photographic means for composing type.

Having thus described my invention, I claim:

1. Photographic means for composing type images on a photographically sensitive sheet, comprising: a housing substantially excluding light; a first projector including a source of light positioned to pass a beam of light in said housing; a photographically sensitive sheet positioned within said housing in the path of travel of said beam; type image forming means interposed between said source of light and said sheet and having a series of portions movable into line with said beam which are capable of passing light in such configurations as to form various type images when projected on said sheet; means permitting changing of the relative position of said beam and said sheet in a manner so that type images projected on said sheet may be arranged in composed lines; a target sighting board disposed externally of said housing and having a fixed position in relation to said sheet and a second separate projector disposed externally of said housing and having a fixed position in relation to said first projector, whereby said sighting board and second projector change relative position in the same manner as said sheet and said first projector, said second projector including a source of light positioned to throw a target image on said sighting board, thereby providing indicia externally of said housing of the alignment of said first projector with said sheet; said first projector including first lens means interposed between said type image forming means and said sheet and aligned with said beam of light, said first lens means being movable toward and away from said sheet and being operative thereby to change the size of type images projected on said sheet; said second projector including second lens means adjustable to change the size of said target image to correspond to the size of the type images projected on said sheet and means to determine correspondence of the positions of said first and second lens means.

2. Photographic means for composing type images on a photographically sensitive sheet, comprising: a housing substantially excluding light; a first projector including a source of light positioned to pass a beam of light in said housing; a photographically sensitive sheet positioned within said housing in the path of travel of said beam; type image forming means interposed between said source of light and said sheet and having a series of portions movable into line with said beam which are capable of passing light in such configuration as to form various type images when projected on said sheet; means manually operable to move said sheet longitudinally and in two directions laterally of said beam in a manner so that type images projected on said sheet may be arranged in composed lines; a target sighting board disposed externally of said housing and having a fixed position in relation to said sheet and a second separate projector disposed externally of said housing and having a fixed position in relation to said first projector, whereby said sighting board and second projector change relative position in the same manner as said sheet and said first projector, said second projector including a

source of light positioned to throw a target image on said sighting board, thereby providing indicia externally of said housing of the alignment of said first projector with said sheet; said first projector including first lens means interposed between said type image forming means and said sheet and aligned with said beam of light, said first lens means being movable toward and away from said sheet and being operative thereby to change the size of type images projected on said sheet; said second projector including second lens means adjustable to change the size of said target image to correspond to the size of the type images projected on said sheet, and means to determine correspondence of the positions of said first and second lens means.

3. Photographic means for composing type images on a photographically sensitive sheet, comprising: a generally right-rectangular housing having end, side and top and bottom walls substantially excluding light from the interior of the housing; a first projector including a source of light connected to one end of said housing disposed to pass a horizontal beam of light in said housing toward the other end thereof; a photographically sensitive sheet positioned within said housing at said other end thereof in the path of travel of said beam; type image forming means interposed between said source of light and said sheet and having a series of portions movable into line with said beam which are capable of passing light in such configurations as to form various type images when projected on said sheet; means manually operable to move said sheet horizontally longitudinally of said beam and means manually operable to move said sheet horizontally and vertically laterally of said beam in a manner so that type images projected on said sheet may be arranged in composed lines; a target sighting board disposed externally of said housing on its top and connected to said sheet to move therewith in a manner so as to have a fixed position in relation to said sheet and a second separate projector disposed externally of said housing on its top and connected to said first projector in a manner so as to have a fixed position in relation thereto, whereby said sighting board and second projector change relative position in the same manner as said sheet and said first projector, said second projector including a source of light positioned to throw a target image on said sighting board, thereby providing indicia externally of said housing of the alignment of said first projector with said sheet; said first projector including first lens means interposed between said type image forming means and said sheet and aligned with said beam of light, said first lens means being manually operable to move toward and away from said sheet and thereby changing the size of type images projected on said sheet; said second projector including second lens means manually operable to move toward and away from said sighting board to change the size of said target image to correspond to the size of type images projected on said sheet, and means to determine correspondence of the positions of said first and second lens means.

4. Photographic means for composing type on a photographically sensitive sheet, comprising: a generally right-rectangular housing having end, side and top and bottom walls substantially excluding light from the interior of the housing; a first projector including a source of light connected to a first end of said housing disposed to pass a horizontal beam of light in said housing toward the second end thereof; said top having a first broad opening therein and a first slide member covering said opening in a manner excluding light and guides on said housing permitting movement of said first slide member in an end forward direction along the top of said housing and said first slide member having sufficient material at its ends to cover said top opening in all positions thereof; said first slide member having a second opening therein and a second slide member mounted on said first slide member covering said second opening in a manner excluding

light and guides on said first slide member permitting movement of said second slide member sideways of said housing and said second slide member having sufficient material at its sides to cover said second opening in all positions thereof; a photographically sensitive sheet positioned within said housing in the path of travel of said beam and depending from said second slide member and having a fixed position relative thereto in horizontal directions and movable vertically thereof; a target sighting board positioned above said housing and extending upward from said second slide member and having a fixed position relative thereto in horizontal directions and movable vertically thereof and connected to said sheet to move vertically therewith whereby said sheet and said board have fixed positions relative each other; a second separate projector disposed externally of said housing on its top and connected to said first projector in a manner so as to have a fixed position in relation thereto, said second projector including a source of light positioned to throw a target image on said sighting board, thereby providing indicia externally of said housing of the alignment of said first projector with said sheet; type image forming means interposed between said source of light of said first projector and said sheet and having a series of portions movable into line with said beam which are capable of passing light in such configurations as to form various type images when projected on said sheet; and means operative to move said sheet horizontally and vertically laterally of said beam and horizontally longitudinally of said beam.

5. Photographic means for composing type images on a photographically sensitive sheet, comprising: a generally right-rectangular housing; a first projector including a source of light disposed to pass a horizontal beam of light in said housing from a first end of said housing toward the second end of said housing; said housing having a first opening therein in one side wall and a first slide member covering said opening in a manner excluding light and guides on said housing permitting movement of said first slide member in an end forward direction along said housing and said first slide member having sufficient material at its ends to cover said first opening in all positions thereof; said first slide member having a second opening therein and a second slide member mounted on said first slide member covering said second opening in a manner excluding light and guides mounted on said first slide member permitting movement of said second slide member sideways of said housing and said second slide member having sufficient material at its sides to cover said second opening in all positions thereof; a photographically sensitive sheet positioned within said housing in the path of travel of said beam and secured to said second slide member in a manner permitting relative movement therebetween only in movement of said sheet in a direction perpendicular to said second slide member; a target sighting board positioned outside of said housing and secured to said second slide member in a manner permitting relative movement therebetween only in movement of said target board in a direction perpendicular to said second slide member, said second slide member having a through opening therein and a connecting member between said target board and said sheet extending through said through opening and securing them together in fixed positions relative each other; a second projector means including means operative to throw a target image on said sighting board on a line parallel to and in fixed relation to said beam of light thereby providing indicia external of said housing of the alignment of said first projector with said sheet; type image forming means positioned at said first end of said housing between said source of light and said sheet and means manually operable to move said sheet horizontally and vertically laterally of said beam and horizontally longitudinally of said beam; first lens means in said housing interposed between said image forming means and said sheet and manually op-

erable means to move said first lens means toward and away from said sheet and a bellows between said first lens and the first end of said housing; and said second projector means including second lens means movable toward and away from said sighting board to change the size of the target image to correspond to the size of type images projected on said sheet.

6. Photographic means for composing type images on a photographically sensitive sheet, comprising: a housing and a first projector including a source of light disposed to pass a beam of light in said housing from a first end of said housing toward the second end of said housing; said housing having a first opening therein in one side wall and a first slide member covering said opening in a manner excluding light and guides on said housing permitting movement of said first slide member along said housing; said first slide member having a second opening therein and a second slide member mounted on said first slide member covering said second opening in a manner excluding light and guides mounted on said first slide member permitting movement of said second slide member on said first slide member in a direction at right angles to the direction of movement of said first slide member; a sighting board positioned outside of said housing and a frame member positioned inside of said housing and said second slide member having a through opening therein and a rigid connecting member between said sighting board and said frame member fixedly connecting them together, said connecting member being positioned in said through opening and permitting movement of said connecting member, sighting board and frame member in relation to said second slide member only in a direction perpendicular to the face of said second slide member; a first guide member in said housing for said frame permitting movement of the same in said direction perpendicular to said second slide member and manually operable means to move said frame along said first guide member; a second guide member permitting movement of said first guide member in the same direction as said second slide member and manually operable means for so moving said first guide member along said second guide member; a third guide member permitting movement of said second guide member in the same direction as said first slide member and manually operable means for so moving said second guide member along said third guide member; type image forming means positioned between said source of light and said sheet; second projector means having a fixed position in relation to said first projector operative to throw a target image on said sighting board and a photographically sensitive sheet positioned in said frame in the path of travel of said beam whereby indicia is provided external of said housing showing the position of said beam relative said sheet.

7. The subject matter of claim 6 in which one of said guide members is moved at right angles to said beam in a manner so that composed lines of type are formed on said sheet by such movement of said one guide member and in which said manually operable means for said one guide member includes a manually rotatable threaded rod positioned in said housing and an arm on said one guide member engageable with the threads of said rotatable rod, manually operable means for pivoting said arm out of engagement with said rotatable rod and for returning of said one guide member at the end of a composed line, and a counter dial gear-connected to said rotatable rod operative to indicate the movement of said one guide member along said threaded rod to indicate position along a composed line.

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