This invention relates to methods and means for reproduction in photographic type composing, and in particular to that kind of photographic type composing in which a photographic image of the impression surface is produced by photographic means by means of individual reproductions of making-up units which are already in themselves ready for printing. This invention is not concerned with the manner in which the impression forms are then produced from the impression surface images thus obtained.

The object of the invention is to ensure the exactness of the partial projections, irrespectively of whether the making-up units are provided with fitting means or not.

Another object of the invention is to vary the means required for sighting, and furthermore the repetition of partial reproductions.

Another object of the invention is to supervise the partial reproductions by means of projecting back.

Another object of the invention is to provide a device for the photographic reproduction of making-up units for forme surface images, irrespectively of whether the same are provided with fitting means or not.

Another object of the invention is to equip the said production apparatus with means for rotating individual parts thereof.

Yet another object of the invention is to equip the reproducing apparatus in question with a plurality of projection windows.

Further details of the invention will appear in the course of the description.

One example of construction of the reproduction apparatus according to the invention is diagrammatically illustrated in the accompanying drawings, in which:

Figure 1 shows a horizontal longitudinal section through the apparatus, with the dark slide or holder drawn out;

Figure 2 is a horizontal longitudinal section of the back portion of the apparatus, with the slide pushed in;

Figure 3 is a vertical longitudinal section corresponding to Figure 1;

Figure 4 is a view of the rear portion of Fig. 1 from the back;

Figure 5 is a back view similar to Fig. 4, but with the slide rotated through 45°, and with a sketch covering the ground glass screen, and

Figure 6 is a front view of the apparatus.

The object of the invention is to render possible a movability, exchangeability, divisibility, in short a convertibility, and an articulation, extending right to the forme surface units, of the forme to be employed for the composition for the forme surface image, and at the same time to relieve as far as possible the forme surface units carriers of the fitting means, which, according to the rules of typography pertain to an accurate assembling of the various concrete parts of the forme surface. It proposes to take up step-by-step the stepwise projections of the individual forme surface units, which are already in themselves ready for printing, on a pattern or preliminary image, introduced into the exposure position of the light-sensitive forme surface carrier and illuminated by the projection light, and to adapt the adjustments of the individual forme surface units at their taking position to this pattern, before photographing the particular forme surface unit on to the forme surface carrier in question.

By “ready for printing” is to be understood in this specification, already ready for reproduction, that is to say, ready for duplication according to the rules of typography. By “forme surface units” are to be understood not only making-up units but also elements of making-up units (though not ordinarily such small elements as single letters), and in general all those patterns which admit of being reproduced upon the light-sensitive forme surface carrier by photographic means. The forme surface units themselves, the lines for example, may be set photographically or produced in any other desired manner. They are most advantageously translucent photographic images consisting of film or the like. The forme surface units ready for printing therefore need no further treatment beyond the mere photographic incorporation thereof in the forme surface image.

Beyond the usual sharp focusing of photographic projections by the aid of the focusing screen, the present invention comprises first the employment in conjunction therewith of a pattern at the exposure point, which can there assume any desired position, and always remains sharp and correct, and then the agreement of the partial projections with the corresponding parts of the pattern, not merely as regards sharpness, but even more as regards the image, the position of the image and the order of magnitude of the type, and finally the regulating of the adjustment of the forme surface units at their photographing position according to the nature of the pattern located at the exposure point. It is therefore a question of the stepwise backward rectification of typographically dismembered partial projections. The exactitude requisite for the assembling of the forme surface units on the forme.
surface carrier is here to be yielded by the pattern, which may here be a draft or some other complete sketch of the forme surface image to be prepared, but if necessary may only be an outline pattern or another network of co-ordinates thereof. Positive patterns are intended to be printed by being very accurately suspended in the light, falling on them in an outward direction from within, of the projection rays that necessarily bring the negatives thereof. The photographic composing process described is intended to restrict to a minimum the requirements as regards equipping of the forme surface units. The forme surface units are to be capable of being allocated without special rules to individual loose forme surface unit carriers, and the most varied forme surface units of the most manifold sizes on type are to be admitted of being introduced in any desired sequence and arrangement into the particular forme surface image, which will be particularly advantageous for jobbing work.

In the reproducing apparatus according to the invention, the photographic position of the forme surface units, and the exposing and supervision position of the sensitized forme surface carrier can be freely adjusted in relation to one another according to one or more or even all of the co-ordinates of the particular pattern or of the forme surface carriers, and also in the direction of the axis of projection in relation to the objective lens employed for the projecting, in order that it may be possible to adapt the individual projections and the individual adjustments of the forme surface units to all the patterns that occur.

The apparatus illustrated in Figures 1 and 3 is substantially a photographic reproducing camera. A standard 1 carries an objective lens 2, and also a shutter 4, actuated by means of a key 3, and is connected with a light-tight manner with a front standard 5 and with a rear plate 7 projecting upwards from an underframe 6, by means of extensible bellows 8 and 9. The standards 1 and 5 are slidable on an upper rail or bar 10 of the underframe 6, and also along a dovetail-shaped straight line guide not shown in the drawings, so that they can never yield in a vertical direction.

The front portion of the apparatus serves as the photographic position of the forme surface units to be incorporated in the forme surface image to be prepared, but the exposure and supervision position of the sensitized forme surface carrier. The back plate 7 forms a vertical guide for a slide-piece 11, and the latter in its turn forms a horizontal guide for a slide 12, in which there is a circular rotatable insertion 13. To the latter is fitted a frame 14, with a dark slide or holder 16 enclosing a sensitized forme carrier 15, and a focusing screen 17, in the usual manner, that is to say, in such a way as to be longitudinally slidable, so that the forme carrier 15 and the focusing screen 17 alternate with one another in the exposure position Y.

According to Figures 1 and 3 the glass screen 17 is located in the exposure position Y, and the glass screen 17 is located in the exposure position Y, and Figure 2 shows how the sensitized forme carrier 15, pushed into the exposure position Y, is uncovered for exposure by pulling out the cover 18 of the dark slide. The sliding piece 11 is kept in a position of equilibrium by a counterweight 19, which hangs from a cord 21 passing round a roller or pulley 20. Since the insertion 13 that carries the dark slide is rotatably arranged, the exposure and inspection position of the light-sensitive forme surface carrier 15 can be rotated in its own plane into any position in order that it may be directly adapted to an oblique forme, a sheet forme, and so forth. Figure 4 shows the focusing screen 17 in the normal position, and Figure 5 shows it rotated through an angle of 45°, it being in both cases in the exposure or verifying position.

The front portion of the apparatus, that is to say, the photographing position of the forme surface units, may according to the invention be constructed in the same manner as the rear portion, which has just been described. In Figures 1, 3 and 6, merely the standard 5 has been shown as a horizontal guide for the slide 22, in which again the frame 23 is longitudinally displaceable. The latter is pierced by several projection windows 24, 25, 26, which are exchangeable with one another, if any position of the forme surface units at their photographing position X. The projection windows 24, 25 and 26 are provided with separate lenses or the like 27 for guiding and securing the forme surface unit carriers, which may for example be film strips 28, so that the most varied forme surface unit carriers can be prepared, and, by merely sliding the frame 23, can be brought into the photographing position X, and adjusted there into any position required.

A pencil of rays from a glowlamp 29 mounted on the standard 5 has been indicated in Figure 1 by dotted lines. The path of the projection rays is left free everywhere in the usual manner.

The process described is carried out by the aid of this reproduction apparatus in the following manner:

A draft or a sketch 30 (Fig. 5) of the forme surface image to be produced, is stretched upon the glass screen 17, and a correspondingly large forme surface carrier 15 is placed in the same position in the dark slide 16. If the sketch 30 has been drawn upon a somewhat translucent paper, it may be made transluce by coating it with oil. In either case the sketch may be stuck to the glass plate 17 with transparent varnish or the like. The text portions of the sketch 30 can be set up in successive forme surface units line by line for instance, photographically or otherwise, the corresponding projection window 24 or 25 will be brought into the photographing position X, the shutter 4 open, and the focussing screen 17 far screened that only the adjusted forme surface unit will be projected, and the partial projection in question will be received and examined at the corresponding part of the draft 30 with the shutter 4 open and with the focusing screen 17 pushed into the exposure and inspection position Y. The forme surface unit carrier 28 is pushed into the guide 40 and rotated in the photographing position X until the projection of the adjusted forme surface unit agrees with the corresponding position of the draft 30. If necessary the latter may also be pushed to and fro or rotated in the exposure and inspection position Y.

The magnitude of projection is adjusted during this operation, preferably by means of a device which automatically preserves the sharpness of the image at every projection ratio. Such a device is indicated by way of example in Fig. 3 in the following manner. The two longitudinally displaceable standards 1 and 5 are pivoted by means of guiding links 31 and 32 respectively to a carriage 33, which rolls on a guide rail 36 secured at 34 and 35 to the underframe 6. This
guide rail is so shaped that each position of the carriage 33 on the guide rail 36 is positively associated with a different displacement of the two standards 1 and 5 in relation to one another and to the exposure position Y involving different projection magnifications and reductions with unaltered sharpness of image. The carriage 33 admits of being shifted by a handwheel 37, by the aid of which adjustment of the carriage 33 and thereby of the position of being shifted by a handwheels, by the relation to the original. The production of the cities with a means of a pivoted link 39. Partial projections and partial adjustments of the carriage 33 on the guide rail 36 is positively associated with the position of the carriage 33. For instance an image of lettering and a hatched or otherwise ornamented surface, are examined at each adjustment in the manner of the other partial adjustments and partial projections, that is to say, as the other parts of the form surface units. In this manner an entire tail piece can be assembled from one element thereof, or a closed frame from lines or the like, and the photographic impressions of the existing patterns can be obtained with the most valuable units in partial projection. The pattern 30 of the formation image to be produced may be projected back in portions from the exposure position Y of the formation surface image to be produced, introduced into the exposure position of the light-sensitive form carrier, and the rectification of the adjustments of the individual formation surface units with respect to their photographic position in relation to this complete pattern. 2. In photographic type composing as claimed in claim 1, the receiving of the partial projections on a translucent complete pattern of the formation surface image to be produced, introduced into the exposure position of the light-sensitive form carrier, and the rectification of the adjustments of the individual formation surface units with respect to their photographic position in relation to this complete pattern. 3. In photographic type composing as claimed in claim 1, the receiving of the partial projections on a translucent outline drawing of the formation surface image to be produced, introduced into the exposure position of the light-sensitive form carrier, and the rectification of the adjustments of the individual formation surface units with respect to their photographic position in relation to this complete pattern. 4. In photographic type composing as claimed in claim 1, the receiving of the partial projections on a translucent network of co-ordinates of the formation surface image to be produced, introduced into the exposure position of the light-sensitive form carrier, and the rectification of the adjustments of the individual formation surface units with respect to their photographic position in relation to this network of co-ordinates. 5. In photographic type composing as claimed in claim 1, the step by step repetition, effected in the manner of the adjustment and verification of formation surface units, of the adjustment and verification of those parts of the formation surface which are to be reproduced on the light-sensitive form carrier by means of corresponding repetition of partial exposures. 6. In photographic type composing as claimed in claim 1, the step by step repetition, effected in the manner of the adjustment and verification of formation surface units, of the adjustment and verification of those parts of the formation surface which are to be reproduced on the light-sensitive form carrier by means of a plurality of formation surface units superposed stratified in the photographic position. 7. In photographic type composing in which the image of the formation surface is compiled step-by-step by means of individual photographic reproductions of formation surface units that are already in themselves ready for printing, the step by step receiving of the partial projections on a translucent pattern introduced into the exposure position of the light-sensitive form carrier, and the rectification of the adjustments of the individual formation surface units with respect to their photographic position in relation to this pattern, the said receiving and the said rectification both being effected before the particular formation surface unit is photographed into the light-sensitive formation carrier in question.
wise by means of individual photographic reproductions of forme surface units that are already in themselves ready for printing, the introduction of a translucent pattern of the forme surface image to be reproduced into the exposure position of the light sensitive forme carrier, the step by step projecting of this pattern in portions back from the exposure position of the forme carrier to the photographing position of the forme surface units to be reproduced, the receiving of the partial back-projections of the said pattern step by step on the corresponding forme surface units located at their photographing position, and the rectification of the relative adjustment of the said pattern and of the said corresponding forme surface units on the latter in relation to the particular partial back-projections of the said pattern.

In reproduction apparatus for photographic type composing in which the image of the forme surface is compiled stepwise by means of individual photographic reproductions of forme surface units that are already in themselves ready for printing, means for the free adjustment of the forme surface units to be reproduced photographically, in their plane, at the photographing position thereof, in relation to the exposure and verification position of the light sensitive forme carrier, means for the free adjustment of the light sensitive forme carrier, in its plane, at the exposure and verification position thereof, in relation to the photographic position of the forme surface units to be photographically reproduced, and means for the free adjustment of the said photographing position as well as of the said exposure and verification position in relation to the projection objective lens, in the direction of the axis of projection.

In reproducing apparatus for photographic type composing as claimed in claim 8, means for freely rotating in its own plane the photographing position of the forme surface units to be photographically reproduced.

10. In reproducing apparatus for photographic type composing as claimed in claim 8, means for freely rotating in its own plane the exposure and verification position of the light-sensitive forme carrier.

11. In photographic type composing in which the image of the forme surface is compiled stepwise by means of individual photographic reproductions of photographically produced forme surface units that are already in themselves ready for printing, the step by step receiving of the partial projections on a translucent pattern introduces into the exposure position of the light-sensitive forme carrier, and the rectification of the adjustments of the individual forme surface units with respect to their photographing position in relation to this pattern, the said receiving and the said rectification both being effected before the particular forme surface unit is photographed on to the light-sensitive forme carrier in question.

12. An auto-focus camera for producing composite photographs stepwise from units, comprising means for the free adjustment of the units in their plane at the photographing position thereof, in relation to the exposure and verification position of the light sensitive carrier, means for the free adjustment of the light sensitive carrier, in its plane, at the exposure and verification position thereof, in relation to the photographic position of the units to be photographically reproduced, and means for the free adjustment of the said photographing position, as well as of the said exposure and verification position in relation to the projection objective lens, in the direction of the axis of projection.

13. In reproducing apparatus for photographic type composing as claimed in claim 8, a plurality of projection windows at the photographing position of the forme surface units to be photographically reproduced, each of said projection windows equipped with separate means for the attachment of any desired forme surface units at will, and means for bringing said projection windows into the projection position alternatively.

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