

May 21, 1963

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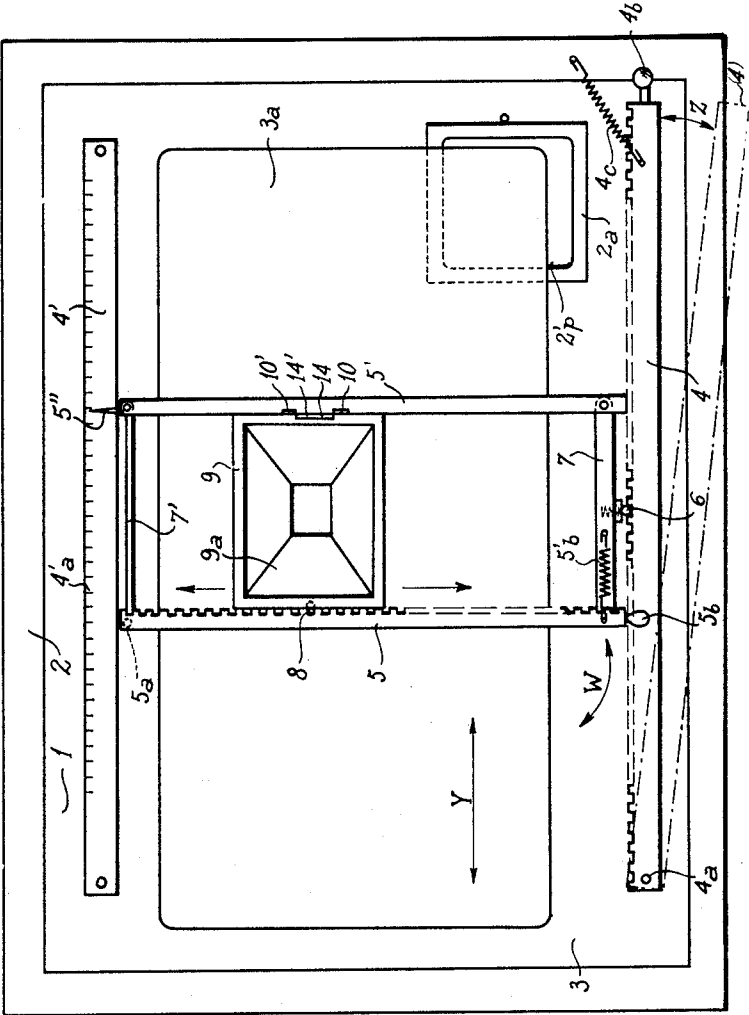
3,090,288

REGISTERING OF PLATES, TRANSFERS AND THE LIKE

Filed March 31, 1960

6 Sheets-Sheet 1

Fig. 1



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6 Sheets-Sheet 2

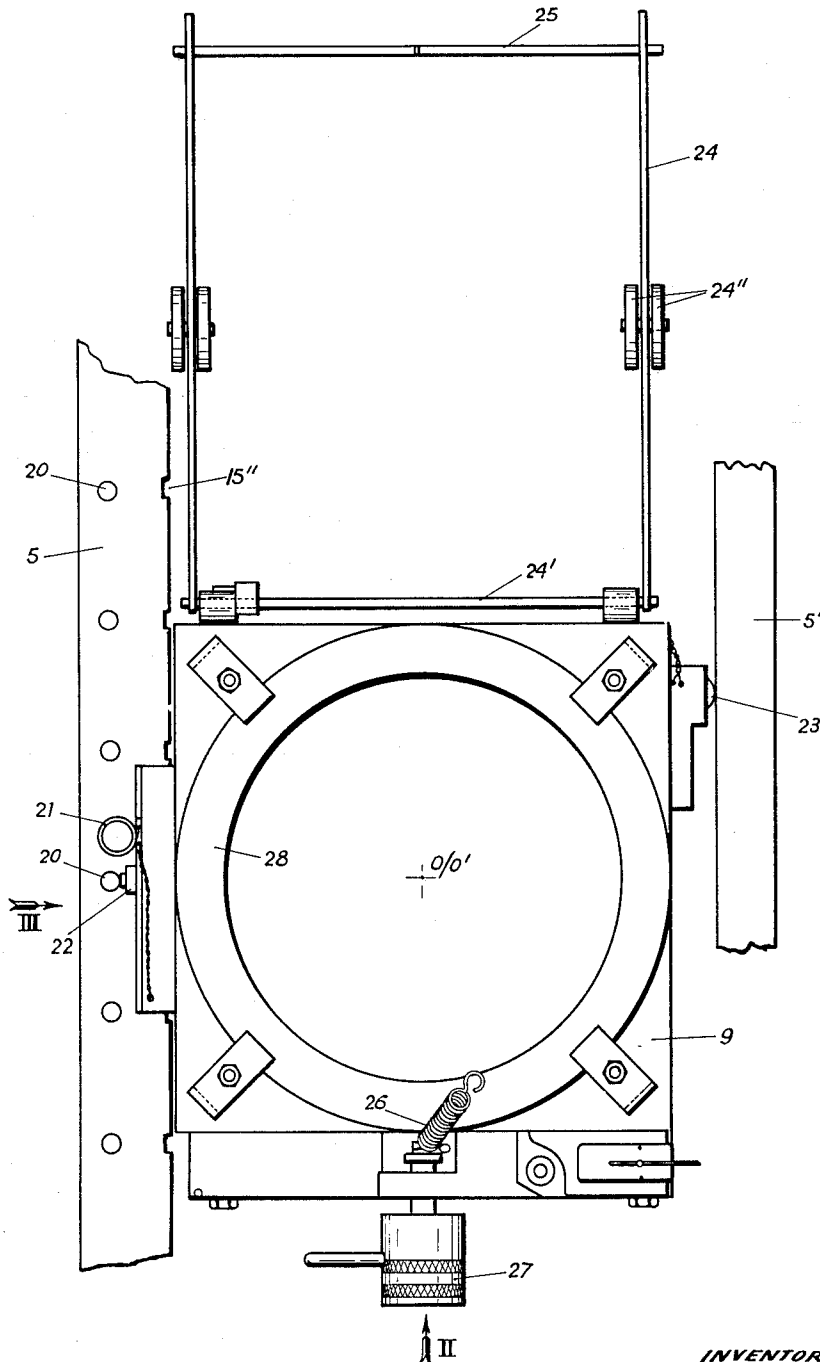


Fig. 2

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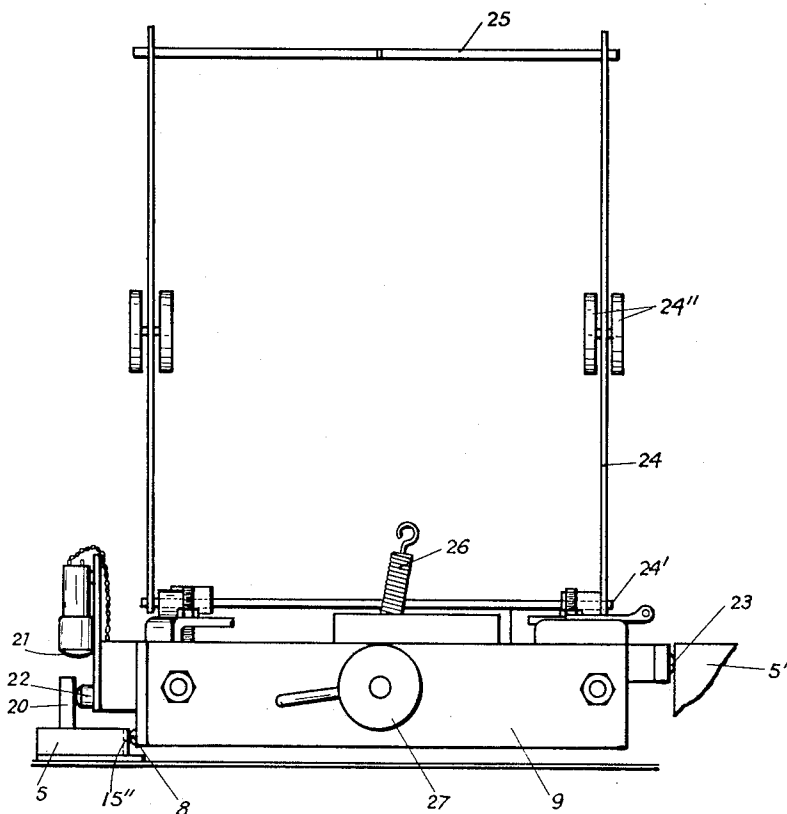
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REGISTERING OF PLATES, TRANSFERS AND THE LIKE

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6 Sheets-Sheet 3

FIG. 3



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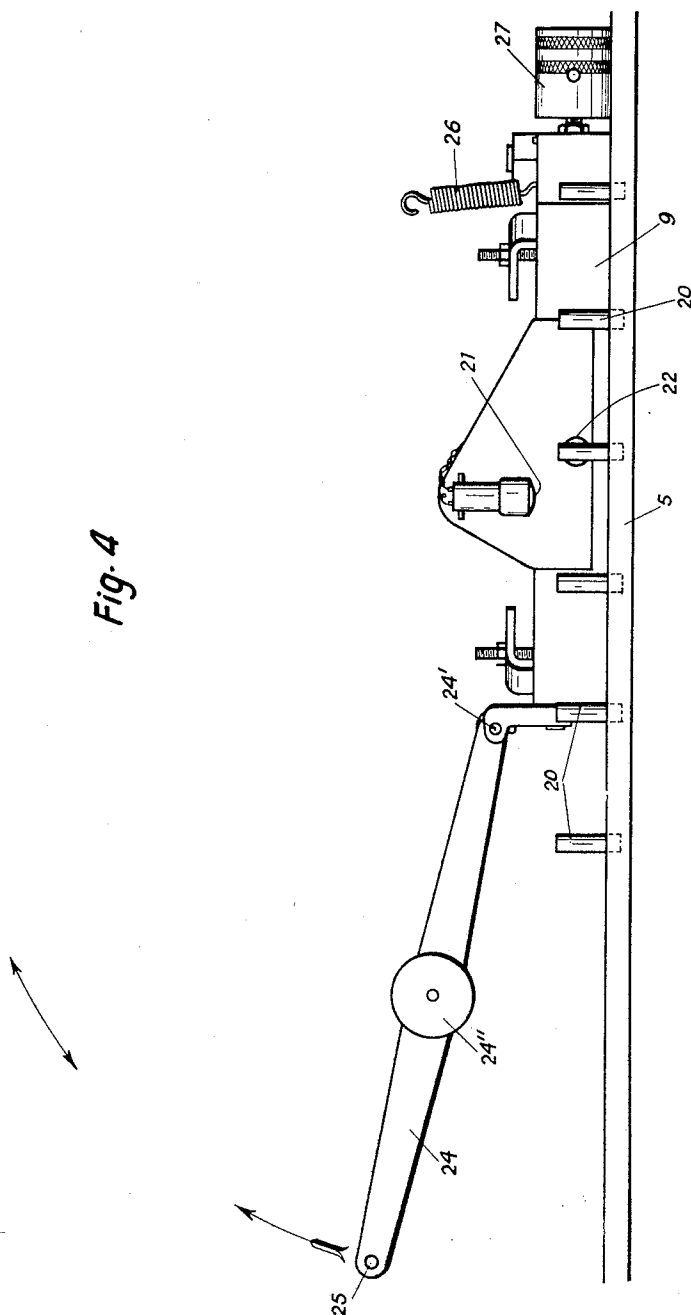
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REGISTERING OF PLATES, TRANSFERS AND THE LIKE

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6 Sheets-Sheet 4

Fig. 4



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REGISTERING OF PLATES, TRANSFERS AND THE LIKE

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6 Sheets-Sheet 5

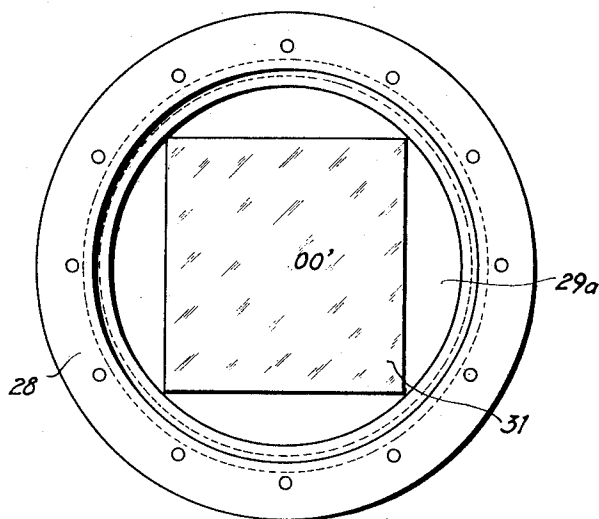


Fig. 5

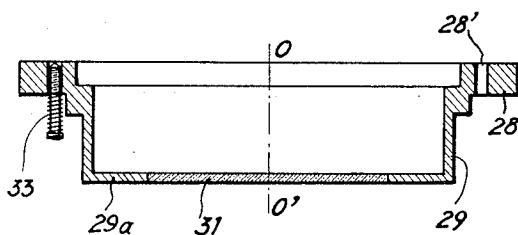


Fig. 6

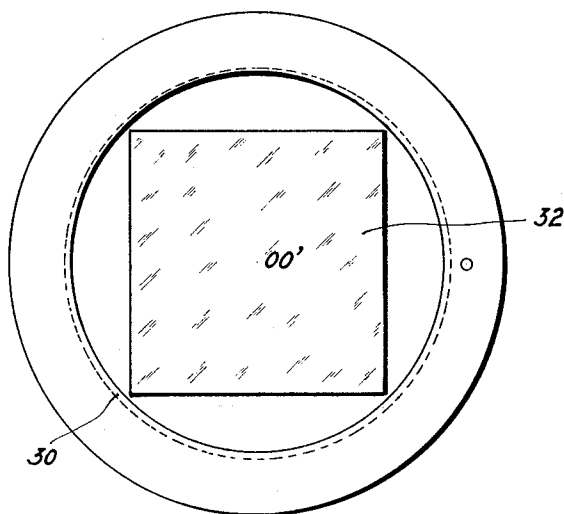


Fig. 7

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REGISTERING OF PLATES, TRANSFERS AND THE LIKE

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6 Sheets-Sheet 6

Fig. 8

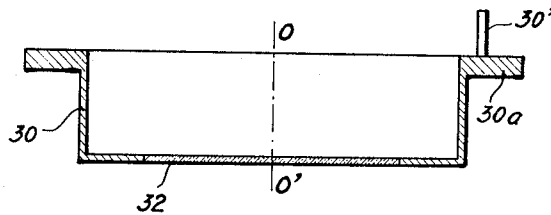
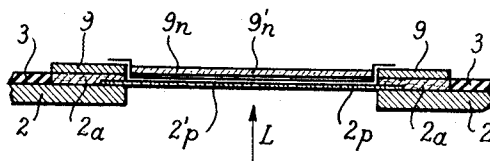


Fig. 9



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3,090,288 REGISTERING OF PLATES, TRANSFERS AND THE LIKE

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2 Claims. (Cl. 95-73)

The present invention has for its object a device for registering plates, more particularly photographic plates and industrial transfers for the reproduction of a large number of copies, and more particularly for the reproduction of subjects comprising more than one colour.

It is known that the registering of negatives in the frame of a plate holder is difficult and that an accurate centering is absolutely indispensable if overlapping of the various coloured zones on their intermediate lines is to be avoided. Further, in order to make up a type block, it is necessary to print photographically as many positive elements as there are elements in the type block.

Such centering can be obtained with known methods but it requires much time as it must be repeated for each plate with the risk of the reappearance of the overlapping of the colours which, even if it does not exceed one tenth of a millimetre, is unpleasant to the eye. Finally, the known methods do not take advantage of the maximum of the available surface, by reason of the presence of necessary marginal gluing strips along the edges of the positive elements comprising each image.

The device according to the invention lessens these inconveniences by simplifying the adjustment: an auxiliary glazed frame, lit from underneath, is accurately centered under the base of the chamber plate holder. This rectangular frame can advantageously be permanently set in rubber in the horizontal sheet forming a cover under the chamber and the carriages, as will be further detailed. The squaring of this frame will be accurate, and its sides, in opposite pairs, will be strictly parallel to each other and parallel to the sides of the general framework of the device. There is glued under the stationary glass sheet of the above mentioned auxiliary frame, a positive film serving to successively register and locate on their respective basic position the various negatives respectively corresponding to one of the desired colours starting with the negative establishing the maximum details and, preferably, showing the most contrast (black or dark coloured). At the time of its centering, each negative is first applied directly on the positive for the registering, and immediately rendered integral to the auxiliary frame, as will be seen from the description. The chamber itself acts as a "film-press" as well as a safety switch cutting the light when it is not in the film-press position. This function of interrupting the current is provided by the very displacement of the chamber, using known means such as contacts, brushes and the like. This assembly is displaceable, and secureable in any chosen position, between a graduated groove and a slider forming with the latter a large carriage displaceable and secureable in any chosen position, along a large rack bar and along a slider parallel to the latter, forming a course perpendicular to the course of the previously mentioned assembly, hereafter named "the small carriage." Thus, the chamber can move between the said long rack bar and the slider parallel thereto and also between the graduated groove and the slider which forms a carriage therewith. These two movements are perpendicular to one another, each being further provided with a scale, as will be seen later.

This double course, combined with the centering of the auxiliary frame, allows the centering once and for all of each negative and the subsequent displacement of a

reproduction without risking de-registering which would, each time, make verification necessary. It further allows to rationally and accurately make use of the maximum available surface of the positive.

The accompanying drawing represents schematically a non-limitative example of the realization of the invention; one sees:

FIG. 1, schematic plan of the complete register;

FIG. 2, the register, plan view, the classical light box having been removed to assist understanding;

FIG. 3, the same, elevation at the arrow II of FIG. 2;

FIG. 4, the same, elevation at the arrow III of FIG. 2;

FIG. 5, plan view of the upper part of the double tray;

FIG. 6, vertical axial section of FIG. 4;

FIG. 7, plan view of the lower part of the double tray;

FIG. 8, vertical axial section of FIG. 1;

FIG. 9, section of the mounting of the frames during a registering on the positive register.

The known block 1 is mounted horizontally on the generally rectangular framework 2; it carries a horizontal sheet plate 3 (FIG. 9) made of rubber or of an appropriate synthetic material, which receives the gelatine to be printed. This is held onto that surface by any suitable means.

Through this sheet plate and within the framework, is reserved a rectangular, preferably square opening, surrounded by a frame (called "the auxiliary frame") 2a in which is fixed a transparent or ground glass sheet 2'p. It is on this glass sheet that the positive register is fixed (by temporary glueing for example). It is lit from underneath by means of a light source independent of the invention.

The framework 2 carries, in addition, a rack bar plate 4, the indentations of which are turned inwardly of the framework, as shown in FIG. 1. This rack bar can be pivoted horizontally about a fixed axis 4a shown by the double arrow Z. The end opposite axis 4a may be provided with a ball point 4b for the manual displacement of the rack bar which then pivots to the mixed line position shown in FIG. 1, assisted by the return spring 4c.

Between the rack bar 4 and the slider 4', can be displaced and fixed in any desired position, a carriage (named "the large carriage") constituted by two rails or sliders 5 and 5', parallel to each other, perpendicular to the rack bar 4 and mounted in such a way that they do not travel the top surface of the virgin film applied on the cover 3. This large carriage is fixed in the desired position on rack bar 4, by a ratchet pawl 6, for instance, placed on stay 7. One of these rails extends with an index 5" associated with scale 4'a of slider 4.

The rail 5 is simply ratcheted, by its ball point end 5b, on the extremity of the slider 7, assisted by the auxiliary spring 5'b. It can then pivot, as shown by the double arrow W, about a vertical axis 5a, located at its junction with the slider 7', and its indentations turned towards the slider 5' receive the ratchet pawl 8 integral with the frame 9 constituting the base of the "small carriage" supporting the chamber 9a. This chamber has its general optical axis vertical, that is to say perpendicular to the block. It can be displaced, as it has been stated, along the carriage 5, 5', the ball 8 assuring its precise position on the said carriage.

The double positioning of the large carriage 5, 5' between the fixed elements 4 and 4', and of the small carriage, with the chamber 9a, on this large carriage, constitutes one of the elements of which the combination forms the object of the present invention.

The chamber 9a affords this particularly by playing a triple role: its proper role of the photographic chamber, that of a film-press and that of an electric interrupter,

and this constitutes a second element of the inventive combination claimed.

The chamber 9a is moveably mounted on the plate holder 9 which can be positioned with precision between the rails 5 and 5', as it has been stated. The chamber is glazed at its lower part, and its horizontal glazing is lit in a classical manner by a light source placed in its upper part. The frame 9 is rectangular, preferably square, and its dimensions correspond to those of the frame 2a of the positive-register. It receives each negative under a moveable glass plate. One appreciates that, as a result of the double positioning of the chamber, the virgin film will receive successively accurately centered impressions notwithstanding the changing of the negatives; on the other hand, the action of the various rack bars allows the effecting on the film of the impressions in series of which the different colours do not overlap, from which results a considerable saving of time and which is not detrimental to the accuracy of the final positive.

By referring moreover to FIGS. 2, 3 and 4, it is seen the frame 9 forming the base of the "small carriage" is capable of being displaced horizontally and parallel to itself between the parallel rails 5 and 5': the rail 5 is profiled as a rack turned towards the frame 9, and of which the slots 15'' receive, depending on the position of the frame 9, the locking stud 8. A series of vertical stubs 20 are also provided along rail 5, each placed opposite a slot 15'', with the result that the positioning of the frame 9 along the rails is confirmed by the lighting of a bulb 21 when the terminal 22 is in contact with the stub 20 corresponding to the slot 15'' in which the ball 8 is locked. The electric circuit in which is connected the bulb 21 is fed by the conductor of the rail 5' which touches a second terminal 23 united—as the terminal 22—with the frame 9. A similar contact on one of the ends of rail 5' and a series of ring stubs or equivalents, placed at predetermined intervals along the slider 4', produces the lighting of a second pilot lamp playing the same part as the bulb 21, but for the positioning of the large carriage along the rails 4 and 4'.

The clamp 24, when pressed down around the axis 24' is secured by spring 26 holding on to the transverse member 25. Spring 26 is held or released by the eccentric lever 27 (forming at the same time an electric contact). The clamp is applied strongly on the seat constituted by the upper circular crown plate 28 of the tray 29 constituting the upper part of the double tray 29/30. The tray 29 presents, at the middle of its base 29a, a glass 31, preferably ground-glass and of square contour identical to the square glass 32 provided at the base of the lower tray 30, in such a way as to permit accurate centering of the negative on the film. The horizontal angular positioning of the two trays, the one with respect to the other, is facilitated by a series of holes 28' cut parallel to the general axis OO' of the double tray and concentric to this axis, in the crown 28, and receiving as many of the stubs 30' as are fixed in the crown 30a of the lower plate 30; the springs 33 compensate elastically the movement toward each other under the pressure of the discs 24'' of the clamp 24.

The frame 9 can be removed from the film in order to change the negative, or on the contrary can be brought nearer for the execution of the positives; it is then that it plays the part of a "film-press."

Finally the vertical displacements of the frame and of the chamber automatically actuate an electric interrupting device, so that the lamp will only be lit during the work of printing the positive film. This interrupter is not described here and can be of any known type, acting by contact, by brush, etc.

Assuming, for example, that a positive comprising five colours is desired, a first registering of general position of the chamber above the positive-register is effected. At the start of this work, the chamber is separated from the small carriage, that is to say from the frame 9; the latter

remaining gripped in the large carriage, in whatever position is most favourable for the work of registering. The large carriage itself is withdrawn between the elements 4 and 4'. The rack bar 4 is then displaced by pivoting about the axis 4a until the position 4 indicated by the mixed line. The large carriage/frame 9 assembly is returned in such a way that the frame 9 is applied on the fixed auxiliary frame 2a (FIG. 9) on which have previously been glued the positive-register 2p applied against the fixed glass plate 2'p. The negative 9n is applied on the positive 2p, centered by hand, and immediately glued to the edge of the frame 9', the glass plate 9'n is brought back on it and, preferably, glued, on the same edges of the frame 9, with an adhesive paper or tissue that can be fixed and removed rapidly. One would choose as the first negative, that which shows the maximum of graphic elements.

The large carriage—with the frame 9 fixed to it—is replaced in position between the rack bar 4 and the slider 4'; the rack bar is replaced in its working position, indicated by the plain line in FIG. 1; after this the large carriage is positioned with respect to itself and locked by the stud 6, practically to the left of FIG. 1. Then, by "opening" temporarily, if there is any reason, the plate 5 as shown by the arrow W, the frame 9 of the small carriage is positioned with respect to the large carriage, that is to say, towards the base in FIG. 1. In this way the frame 9 is found at the base and to the left of the sheet 3 supporting the positive of reproduction 3a. The rack bar 5 is replaced once again, the photographic chamber 9a is instantaneously, forced in its accurate position on said rack bar; then one flattens the frame 9 with chamber, one gives the flash for the first plate; then, after having easily and quickly relifted the frame and the chamber, and without touching the negative in position, one displaces the frame and the chamber a number of teeth or notches along the elements 5 and 5'; one applies afresh the frame on the film and gives the second flash, and thus one continues in order to furnish in the positive a first range of images of the first colour. One then displaces—after the same relifting of the chamber—the assembly of the carriage 5—5' with the frame and the chamber, the desired number of teeth of the rack bar 4, and one executes as previously, a second range of images of the same first colour, parallel to the first range, and continues until the virgin film is completely printed by the first negative.

Then only, temporarily removing the chamber 9a, one changes the negative and, the negative of the second colour being put in place of the first, one brings back into its original position the carriage 5, 5' with the frame 9 and the chamber 9a, and one recommences the execution of the successive sets of images. One acts in the same way for the five negatives. As has previously been described, the double positioning of the carriage 5, 5' and of the frame 9, prevents any irregularities in the imbrication of the successive colours. There is no need to adjust at each or nearly at each flash, as in the previous technique.

Improvements in or variations of the device can be applied to that which has been described, particularly in the construction of the chamber itself and in its interior lighting, as well as in the means of locking and of unlocking the moveable pieces without departing from the spirit of the present invention.

I claim:

1. A plate registering device for the making of photographic plates intended for mass copying, said device comprising, in combination:

- (a) a horizontal main frame;
- (b) an auxiliary frame mounted within and smaller than said main frame;
- (c) a light sensitive horizontal sheet plate within said main frame;
- (d) a horizontal rack bar in said main frame and outside said sheet plate; said rack bar being pivotable

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horizontally at one end thereof and spring urged to operative position;

- (e) a horizontal ruler fixed in said main frame, outside said sheet plate and opposite said rack bar;
- (f) a large carriage, displaceable over and above said sheet plate, having two lateral members extending, in operative position of the carriage, normal to said rack bar and ruler and two transverse members connecting said lateral members together; one of said lateral members being pivotable at one end thereof;
- (g) first cooperating means on said rack bar and the adjacent transverse member of said large carriage to fix the latter in selective position along said rack bar;
- (h) a small carriage displaceably mounted between said lateral members;
- (i) second cooperating means on said pivotable lateral members and on an adjacent side wall of said small carriage for fixing the latter in selective position along said pivotable lateral member;
- (j) said pivotable lateral member of said large carriage

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being provided with lighting means operable when said second cooperating means is in engagement in one of a series of predetermined positions.

- 2. A device as claimed in claim 1 wherein said small carriage supports a circular double tray means comprising:
 - (a') telescoping first and second cup-shaped trays;
 - (b') a square glass at the bottom of each tray;
 - (c') guiding means on said trays to place said square glasses in complete registry;
 - (d') spring means between said trays to keep them apart, and
 - (e') a pressing lever mechanism on said small carriage adapted to press one of said trays against the other.

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