Jan. 28, 1936. C. A. BETTS 2,028,965

APPARATUS FOR REGISTERING AND ALIGNING PRINTERS' FORMS, PLATES AND THE LIKE

Filed Feb. 16, 1934 2 Sheets-Sheet 1

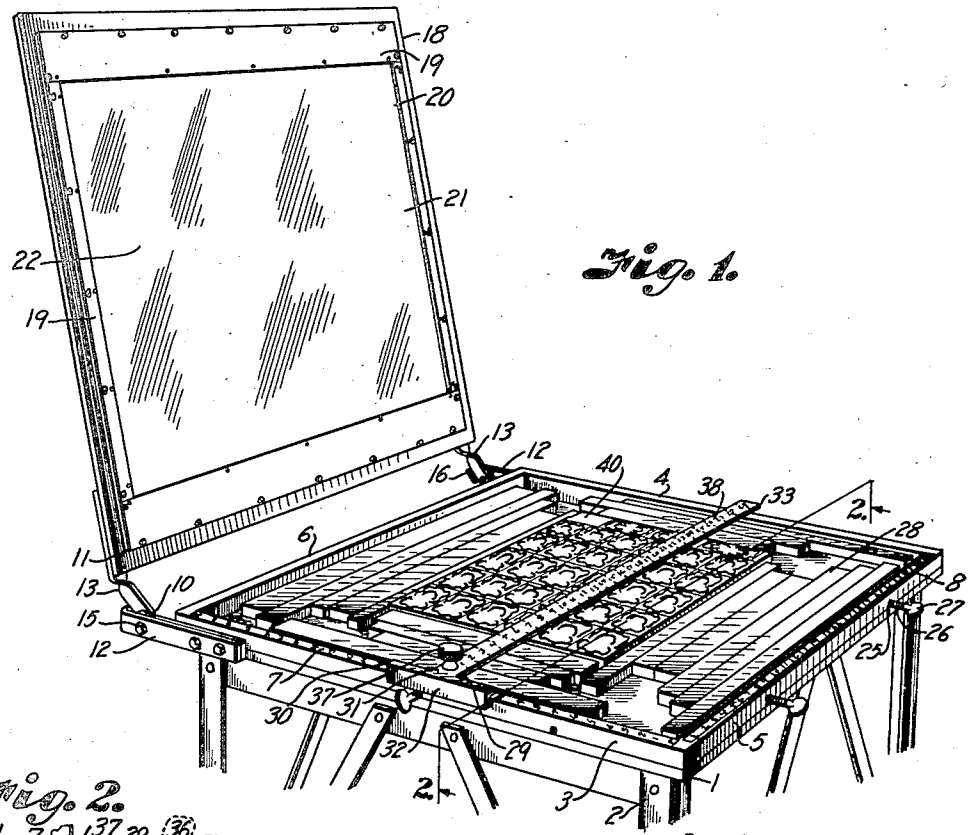


Fig. 1.

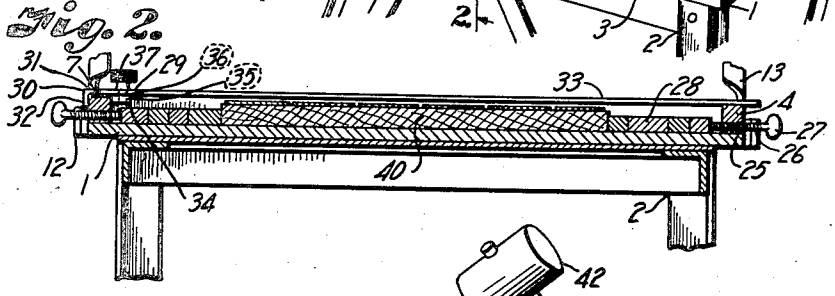


Fig. 2.

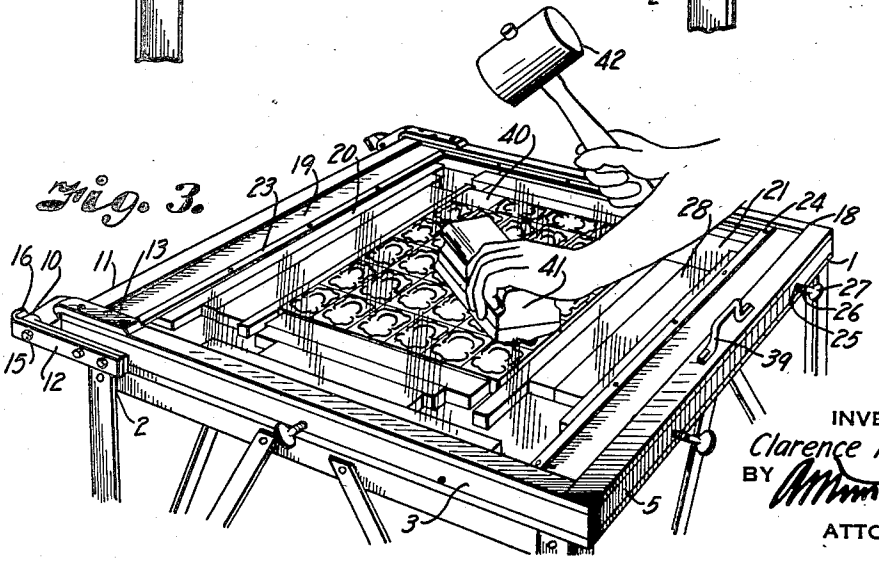


Fig. 3.

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APPARATUS FOR REGISTERING AND ALIGNING PRINTERS' FORMS, PLATES AND THE LIKE

Filed Feb. 16, 1934 2 Sheets-Sheet 2

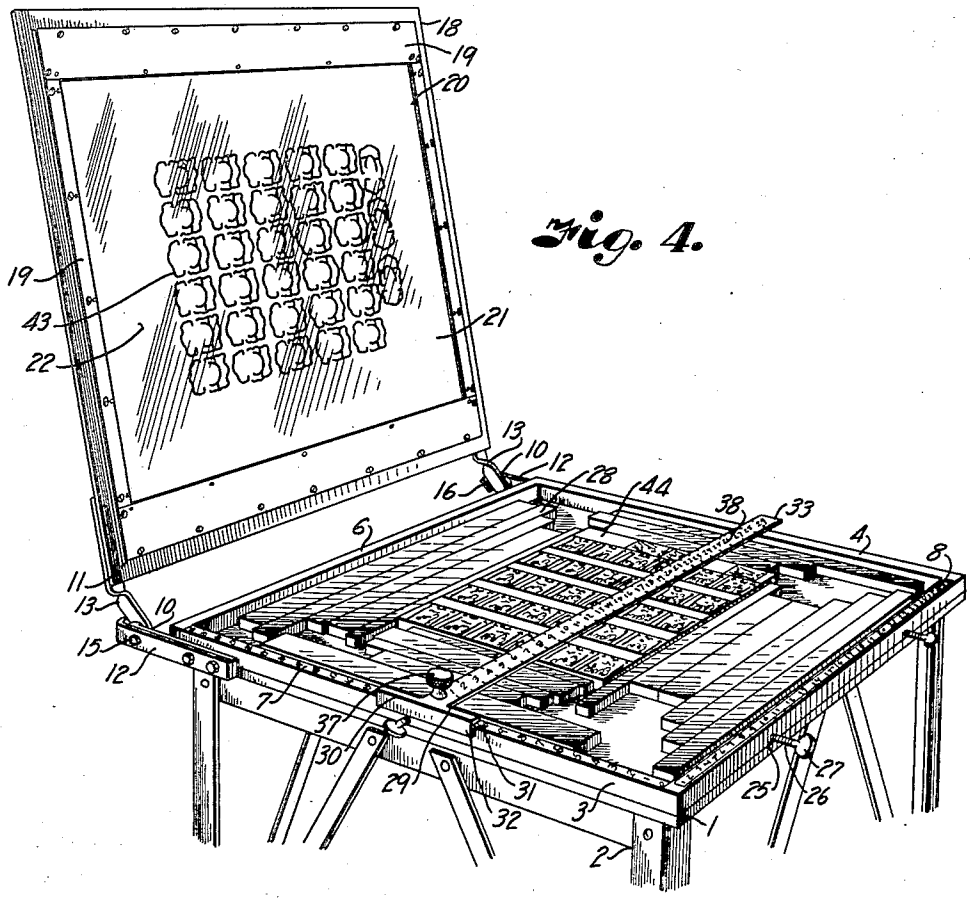


Fig. 4.

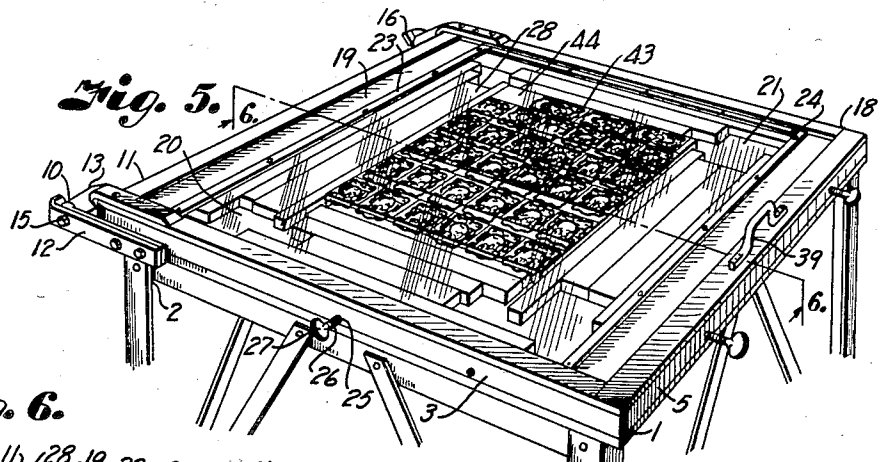


Fig. 5.

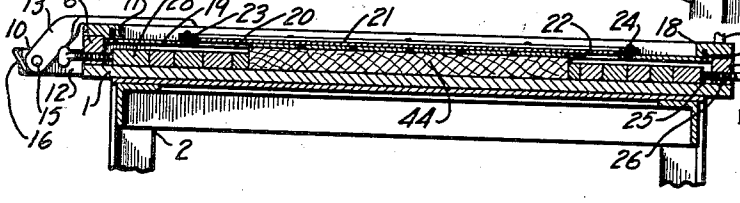


Fig. 6.

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APPARATUS FOR REGISTERING AND ALIGNING PRINTERS' FORMS, PLATES, AND THE LIKE

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Application February 16, 1934, Serial No. 711,529

3 Claims. (Cl. 33—184.5)

This invention relates to an apparatus for registering and aligning printers' forms, plates and the like as used in multi-colored printing, so that the color impressions made thereby will have perfect registry in that there are no overlaps or irregular spaces between the colors forming a printed composition.

As is well known in present printing practices, a key form is prepared by assembling a plurality of plates on a mounting base or a type form within a chase and the forms for the other colors are prepared by placing the plates or type for those colors on their mounting bases or with the chase in as near the same position as the corresponding plates or type of the key form. Mounting of the plates or assembly of the type is more or less a hit and miss process with the object to place the plates or type as near as possible in their desired location, after which the final registry is attained on the printing press. Consequently, it is necessary to take the press out of profitable production for a substantial period of time while the respective plates of the forms are brought into registry.

This results in high cost of printed matter because of long periods of time during which the press is out of operation and wastage of materials necessary in taking impressions on strike sheets incidental to registering of the plates.

Owing to the time required, the resultant registry is more or less a compromise in order to place the press in operation as soon as possible. The printed material is thus of inferior quality due to poor registration of the colors.

It is, therefore, the principal object of the present invention to provide for assembling the respective sets of color plates or type in proper position so that each set of forms is in substantially perfect relative registry with those of the key form.

Then when the forms are placed in the press, the colors struck therefrom will be in desired registry without further adjustment so that the press is out of production only for the time required in positioning the forms therein, thereby reducing the production time and cost of multi-colored and similar printed compositions.

In accomplishing this object, I employ a novel registering and aligning apparatus as illustrated in the accompanying drawings, wherein:

Fig. 1 is a perspective view of an aligning and registering apparatus showing my improved method of measuring the location of the plates on the key form.

Fig. 2 is a detail longitudinal sectional view on the line 2—2, Fig. 1.

Fig. 3 is a perspective view of the apparatus showing the method of taking a proof of the key form wherefrom the subsequent color plates are mounted in registry on their mounting bases.

Fig. 4 is a perspective view of the apparatus showing the method of setting up the second color form.

Fig. 5 is a similar view showing the impression proof moved into position for checking location of the respective plates in the second form.

Fig. 6 is a longitudinal sectional view on the line 6—6, Fig. 5.

Referring more in detail to the drawings:

1 designates a table top that is supported in substantially horizontal position on a frame 2 of any suitable construction. Supported on the edges of the table are side rails 3 and 4 and front and back rails 5 and 6 to form a rectangular recess in the table top of substantially the same depth as the mounting bases employed in constructing the forms.

The side and front rails 3 and 5 are provided on their upper edges with standard scales 7 and 8 suitably marked in inches and preferably calibrated in $\frac{1}{32}$ inch markings. The inch designations on the side scale 7 preferably start at the front of the table and are numbered consecutively toward the rear, while the designations on the front scale 8 preferably start at the side of the table and are numbered toward the opposite side, as clearly shown in Fig. 1.

The rails thus described are constructed straight and true and are arranged so that the adjacent ends thereof are at exactly 90 degree angles.

Fixed to the rear ends of the side rails 3 and 4 are hinge members 10 for hingedly supporting a lid member 11. The hinge members include pairs of arms 12 and 13 fixed to the rear ends of the side rails and to the lid member respectively, the arms being pivotally connected by bolts 15 extending through aligning openings in the ends thereof, as shown in Fig. 1.

The arms 12 carry laterally extending lugs 16 forming stops for engagement of the arms 13 to support the lid 11 in slightly rearwardly inclined position when the lid is moved away from the top of the table 1.

The lid 11 includes a rectangular frame 18 of substantially the same dimensions as the table 1 so that the edges thereof are adapted to lie flatly on the upper edges of the front, rear and side rails when the lid is in closed position on the table. Inset from the outer edges of the lid frame 18 at a distance substantially equal to

the width of the rails are plates 19 forming a rectangular opening 20 of smaller dimensions than the inner dimensions of the frame 18.

Stretched over the opening 20 is a transparent panel 21 preferably formed of sheet celluloid or some similar shatter-proof material having its inner face 22 capable of receiving an ink impression of the key form as hereinafter described.

The edges of the transparent panel 21 overlap the upper face of the plates 19 and are secured thereto by clamping strips 23, the clamping strips being retained in position by fastening devices 24 extending therethrough and into suitable openings in the strips 19.

The front and rear rails 5 and 6 and the side rails 3 and 4 are provided with threaded horizontally positioned openings 25 for receiving the threaded shanks 26 of thumb screws 27 whereby printing forms are moved into substantially central position within the rails and retained by spacing blocks 28 as hereinafter described.

Used in conjunction with the table 1 is a T-square 29 including a substantially angle shaped head 30 having a horizontal flange portion 31 adapted to overlie the scales and a depending flange portion 32 adapted to engage against the outer face of the rails.

The T-square also includes a flat plate 33 having one end fixed to the horizontal flange portion of the head 30 and its opposite end extending across the top of the table and resting on the opposite rail to form a straight edge for aligning printing forms in horizontal and vertical rows, as hereinafter described.

The T-square is adapted to be selectively clamped to the rails by means of an eccentric 34 fixed on a shaft 35 that is rotatably mounted in a bearing opening 36 in the blade 33 at a point spaced from the head 30 thereof, the eccentric being positioned to engage against the inner face of one of the rails to draw the flange portion 32 of the head into clamping engagement with the opposite side of the rail and prevent movement of the head longitudinally thereof. The eccentric 34 is moved into and out of clamping engagement with the rail by a knurled nut 37 fixed to the end of the shaft 36 which projects above the blade of the T-square as best shown in Figs. 1 and 2.

The blade of the T-square also carries a scale 38 marked in inch designations numbering from one end toward the other and calibrated in 32nds of an inch similar to the scale 8 on the rail 5 as previously described.

In order to facilitate movement of the lid to and from position for mounting the impression thereon for testing location of the subsequent color forms, the frame thereof is provided with a suitable handle 39 that is shown in Fig. 5.

In using the apparatus above described, in setting up a key form from which the base color is printed, a base mounting 40 is positioned on the table 1 and retained with the side and end edges thereof in parallel relation with the rails of the table by spacing blocks 28 which are moved into clamping position with the edges of the mounting base upon manipulation of the thumb screws 27.

The edges of the mounting base may be checked to ascertain if they are in proper parallel relation with the rails by means of the T-square which may be used with the head engaging one of the side rails 3 or 4 to test the front and rear edges of the base and with the head on the front rail 5 to test the side edges thereof. If not in proper position, the base may be readily adjusted to bring the edges into alignment with the edge of the T-square by readjusting the thumb screws 27.

In arranging and spacing the plates, a point may be selected thereon that is common to all of the plates required for the respective colors and all of the calculations are made from these points, as now described.

In assembling the plates to complete the key form, the operator may start with the first plate in the lower row and position it so that the selected point thereon aligns with one of the scale marks on the blade of the T-square when the head thereof is snugly engaging the outer face of the rail 3 and the upper edge thereof extends over the desired point on the plate.

The T-square is then clamped in position so that it will not be accidentally moved from its selected position and the succeeding plates in the first row are placed in alignment under the T-square and secured in position with the points in regular spaced relation as determined by the scales.

The measurements of these points are noted on the scales of the T-square and side rail and made of record for reference when locating the corresponding points on the other color plates as later described.

The first plate in the next upper row is positioned on the mounting base with the point thereon directly in vertical alignment with the point of the corresponding plate in the lower row and with the plates in alignment with the blade of the T-square. This may be ascertained by placing the head of the T-square on the front rail and aligning the point with the point on the lower plate.

After this plate is in position and secured to the base, the T-square is then replaced on the rail 3 and the other plates in the row are aligned and secured with the points in the same spaced relation as corresponding plates in the first row.

The remaining rows of plates are then applied in the same manner to complete assembly of the key form.

After the key form is completed and the location of the points for all of the plates made of record, the T-square is removed and the plates are inked in ordinary manner.

The lid is then swung downwardly over the top of the table until the transparent panel lies in super-incumbent position over the plates.

A proof is then made on the contacting face of the transparent panel by means of a planer 41 and mallet 42 as indicated in Fig. 3, the planer being placed on the upper surface of the transparent panel and struck with the mallet to cause the under face of the transparent plate to be pressed into forcible contact with the printing surfaces of the plates.

If desired, the proof may be made on the transparent panel by pressing a roller over the upper surface of the transparent panel instead of using the planer and mallet.

After the proof is made, the lid is swung back to its original position as shown in Fig. 4.

The impression 43 of the key form is then plainly discernible on the transparent panel in the same relation as it will appear on a strike sheet printed in the press.

The key form is then removed and the base mounting 44 for the second color is clamped on the table in the same manner and same relative location as the base mounting for the key form.

The selected points on the second color plates are then located according to the markings on the T-square and rails to the dimensions that have been made of record and the plates secured to the base mounting in customary manner.

After the individual plates have been mounted, the lid is moved onto the table to ascertain whether or not the impressions on the transparent panel are in proper alignment with the printing surfaces on the plates. This may be readily observed since the ink impression and plates are clearly observable through the transparent panel.

If any of the plates do not properly align with the impression, they are moved to position until they align with the impressions on the transparent panel.

The forms for the other colors are then set up in similar manner so that when the forms are ready for the press each individual plate on one form will align with the corresponding individual plates on the other forms.

If desired, imprints of all the forms may be produced on the transparent panel so that a complete color composition is set up on the panel.

After the forms are finished, it is then only necessary to mount them in proper position in the printing press so that the printing operations may be started as soon as the plates are in place.

From the foregoing, it is apparent that I have provided an apparatus whereby the various forms may be quickly assembled in exact registering relation so that when the forms are inserted in the press the colors when printed therefrom will be in perfect registration with each other.

While I have particularly described the invention as applied to color plates, it is obvious that the apparatus may be used in aligning various types of printing forms and plates incidental to printing practice.

What I claim and desire to secure by Letters Patent is:

1. In an apparatus of the character described, a support for removably retaining printing forms, rails on the support enclosing the forms and having graduations, means for aligning the forms in relation to the rail graduations, means eccentrically connected to one of the rails and having graduations for indicating the position of the forms relative to the side rails, and a transparent shatter-proof panel hingedly mounted on the support for receiving an imprint from the forms, whereby succeeding forms may be placed and aligned in the support in exact relation to each other.

2. In an apparatus of the character described, a support for removably retaining printing forms, rails on the support enclosing the forms and having graduations, means for aligning the forms in relation to the rail graduations, a T-square eccentrically connected to one of the rails and having graduations for indicating the position of the forms relative to the side rails, and a transparent, shatter-proof panel hingedly mounted on the support for receiving an imprint from the forms, whereby succeeding forms may be placed and aligned in the support in exact relation to each other.

3. In an apparatus of the character described, a support for removably retaining printing forms, rails on the support enclosing the forms and having graduations, means for aligning the forms in relation to the rail graduations, a T-square eccentrically connected to one of the rails and having graduations for indicating the position of the forms relative to the side rails, means for adjusting the eccentric connection to render the T-square slidable on said rail, and a transparent, shatter-proof panel hingedly mounted on the support for receiving an imprint from the forms, whereby succeeding forms may be placed and aligned in the support in exact relation to each other.

CLARENCE A. BETTS.