Nov. 25, 1958 C. C. BAKER ET AL 2,861,334

METHOD AND MEANS FOR ACCURATELY POSITIONING MATRICES FOR TRIMMING OR CASTING

Filed Dec. 23, 1955

4 Sheets-Sheet 1

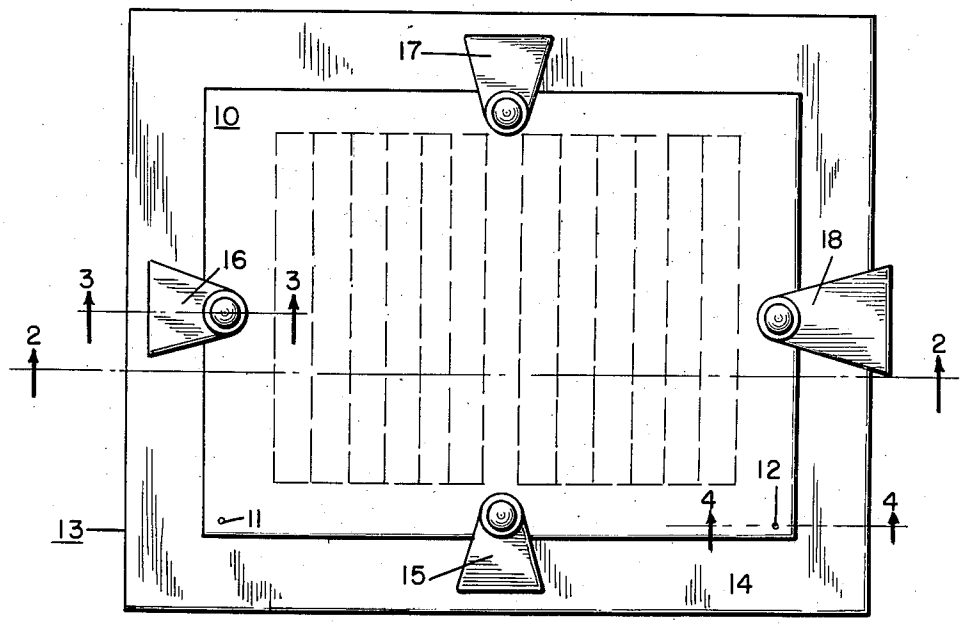


Fig 1

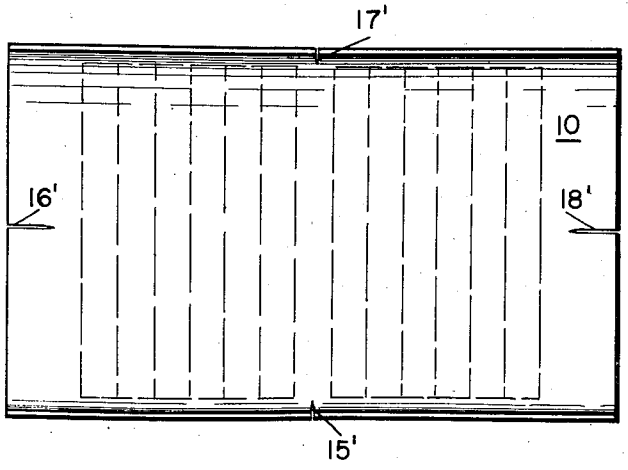


Fig 5

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4 Sheets-Sheet 2

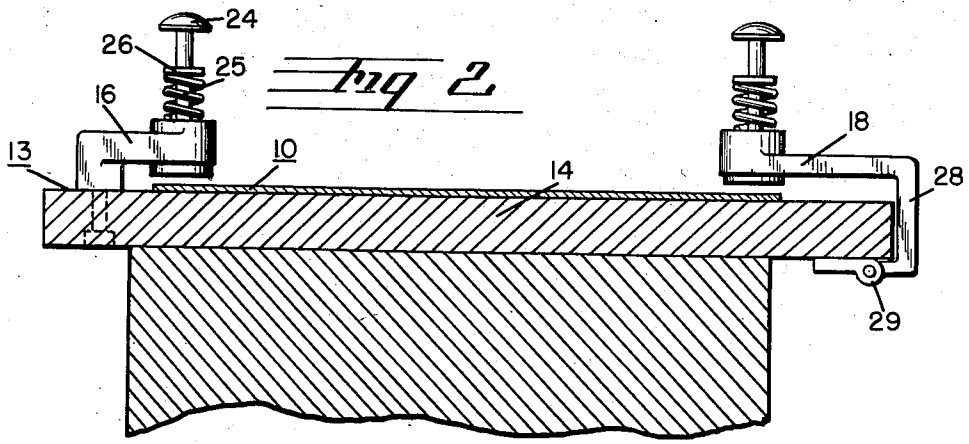


Fig 2.

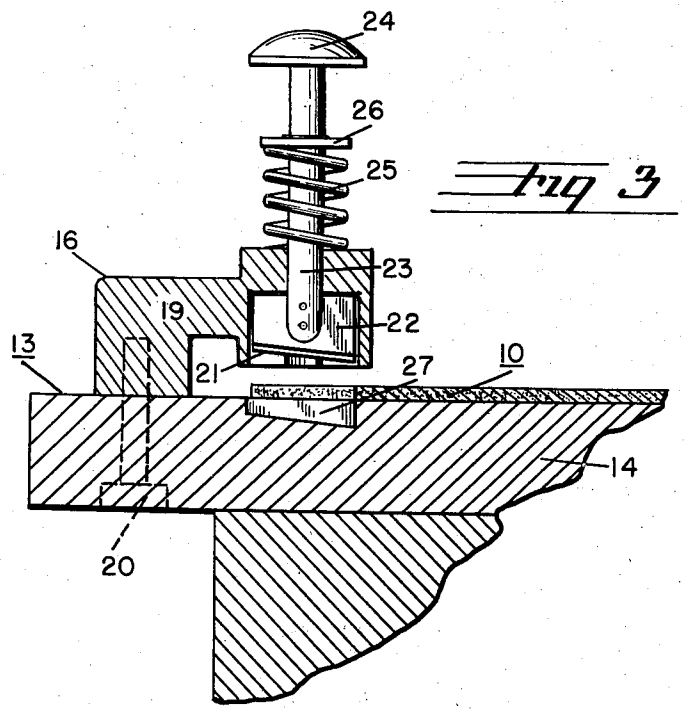


Fig 3

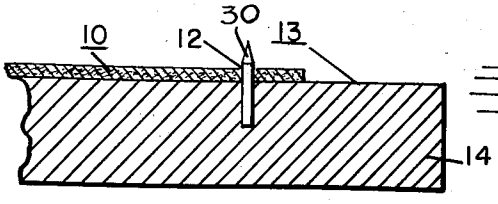


Fig 4

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4 Sheets-Sheet 3

Fig 1

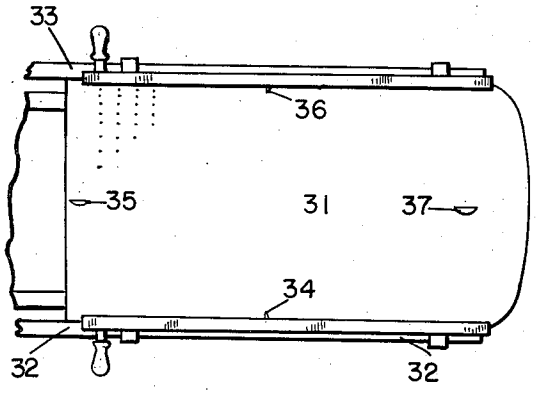
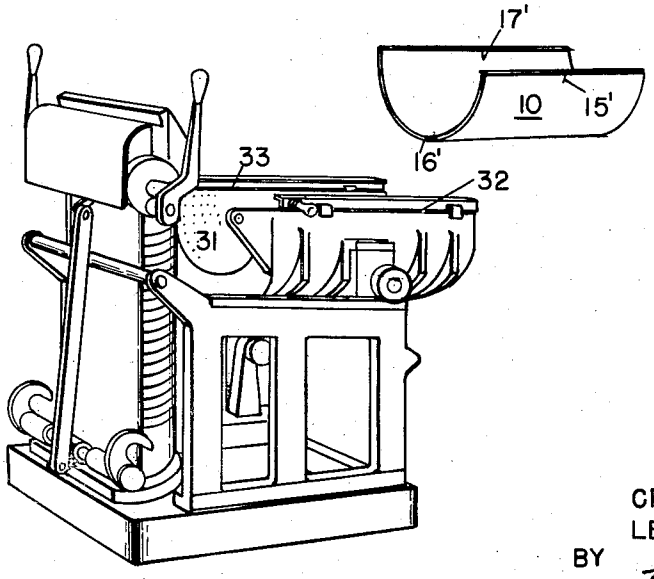


Fig 6



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4 Sheets-Sheet 4

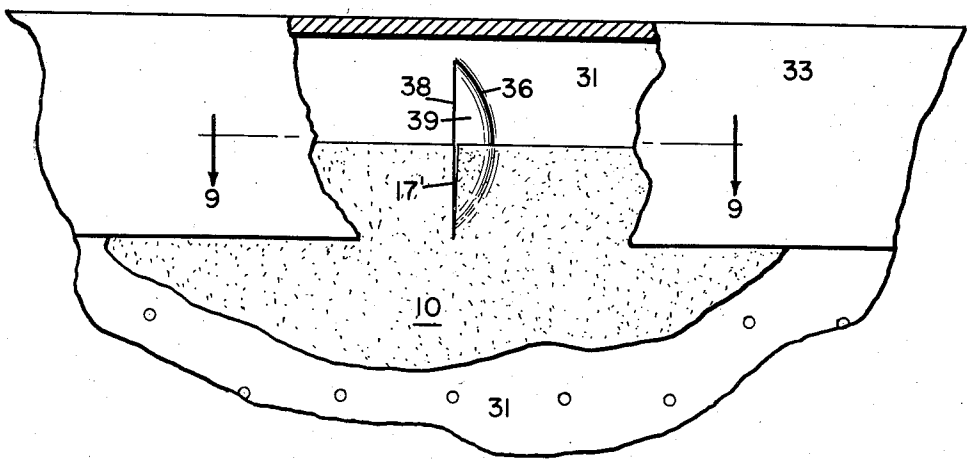


Fig 8

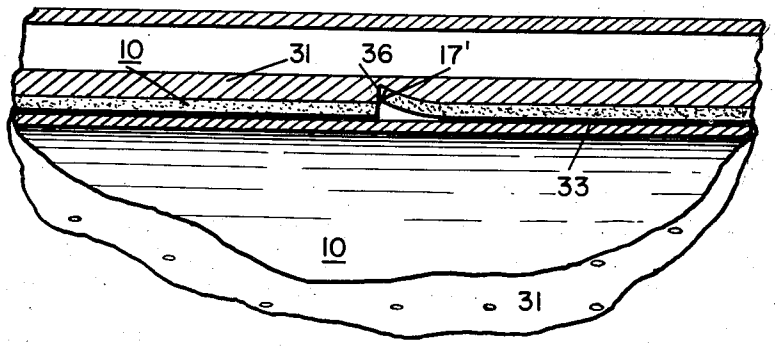


Fig 9

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2,861,334

METHOD AND MEANS FOR ACCURATELY POSITIONING MATRICES FOR TRIMMING OR CASTING

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Application December 23, 1955, Serial No. 554,976

3 Claims. (Cl. 29—533)

This invention relates in general to the employment of matrices in the casting of stereotype plates, and relates in particular to matrices used for the forming or casting of the stereotype plates for cylindrical newspaper presses and the like.

More especially the invention relates to such matrices which are used for producing color plates, wherein the matrix for each individual color plate must necessarily be very carefully and accurately positioned for casting the respective plate in order that the resulting separate color plates will be in exact registration in the printing of the superimposed color reproductions. The problem of insuring proper accuracy of registration of such color plates, and thus of securing accurate positioning of the matrices from which the plates are cast is a serious and most important one, for, as is only too well known, if a single color plate is even slightly out of registration the resulting composite print will be marred.

Various methods and devices have been employed from time to time in efforts to insure more accurate positioning of stereotype matrices, either in the matrix trimmer for trimming the matrix edges preparatory to the placing of the matrix in an automatic casting box, or for direct positioning of the matrix in a hand casting box without such previous trimming. In either case it has been customary to provide and note guide markings in identical spots on the matrices, or to make pin holes in identical spots on border portions of the matrices, so as to have these markings or pin holes serve as the necessary guides for the setting of each matrix successively in proper position, and to employ means for determining when such markings are in exactly the correct position. In the matrix trimmer, for example, described in U. S. Patent No. 2,631,669, issued under date of March 17, 1953, focusing light assemblies or projectors, which project cross hairs in a small field of focused light, are employed so that exact predetermined points on each successive matrix may be brought into registration with the projected cross hairs. However, even this improved positioning procedure takes time and requires careful attention on the part of the operator. The use of positioning pins in either the matrix trimmer or in the hand casting box for engagement with pin holes placed at identical predetermined points in the matrices, which method might ordinarily suggest itself upon first thought, has been found to be quite impractical because of the impossibility of making proper allowance for matrix shrinkage, and the difficulty of setting a matrix properly on the pins, and the danger of tearing the matrix at the pin holes as shrinkage continues, and also the difficulty of retracting the positioning pins in a hand casting box.

In general the object of the present invention is to provide more practical, more satisfactory, and simplified method and means by which the necessary accurate positioning of each matrix can be obtained.

A related object is to provide improved method and

means for positioning stereotype matrices which will require less time and skill on the part of the operator.

A further object of the invention is to provide novel means for this purpose which will enable allowance to be made at all times and under all conditons for the shrinkage of the matrix.

An additional object is to provide positioning means which can be used equally satisfactory either for positioning the matrix in the trimmer, as a necessary prerequisite for casting the stereotype plate in an automatic casting box, or for positioning the matrix when placed directly in a hand casting box.

The manner in which these objects and other incidental advantages are attained with the employment of the present invention will be readily understood from the following brief description with reference to the accompanying drawings, wherein:

Figure 1 (Sheet 1) is a top plan view of a special matrix slitter employed in the carrying out of the present invention, with the matrix shown in position on the same;

Figure 2 (Sheet 2) is a slightly enlarged sectional elevation taken on line **2—2** of Figure 1;

Figure 3 (Sheet 2) is a further enlarged fragmentary sectional elevation taken on line **3—3** of Figure 1;

Figure 4 (Sheet 2) is a fragmentary sectional elevation on line **4—4** of Figure 1;

Figure 5 (Sheet 1) is a plan view of a stereotype matrix after removal from the matrix slitter and after the matrix has been dried and formed to fit a casting box;

Figure 6 (Sheet 3) is a perspective view of a conventional hand casting box showing the slitted matrix in the act of being placed in the hand casting box;

Figure 7 (Sheet 3) is a fragmentary plan view of the hand casting box showing the side gages in raised position and the ring gage removed preparatory to the setting of the matrix in place in the box;

Figure 8 (Sheet 4) is an enlarged fragmentary elevation of the wall of the casting box at one side, with the matrix and side gage in place, but with a portion of the side gage broken away to show the slit in the matrix and the underlying groove in the wall of the casting box; and

Figure 9 (Sheet 4) is a fragmentary enlarged sectional plan view taken through the side gage, the matrix and the matrix-supporting wall of the hand casting box, the section being taken on line **9—9** of Figure 8.

Throughout the drawings the matrix is indicated by the reference character **10** and is assumed to be a customary matrix prepared for the casting of a stereotype plate for a newspaper printing machine or the like. It is also assumed that this matrix **10** has been provided, at exact predetermined points, with pin holes which are indicated at **11** and **12** in Figure 1. A means by which such marking pin holes may be placed at exactly the same spots in each of a series of matrices for making superimposed color reproductions is described in the co-pending application, Serial No. 386,968, filed under date of October 19, 1953, and entitled "Comparator and Method for Printing," now U. S. Patent No. 2,786,385.

A special matrix slitter **13** is provided which includes a rectangular board or base **14** of somewhat larger dimensions than the matrix, as shown in Figure 1, and which carries slitting knife assemblies centrally positioned along each of the four sides of the board or base, these slitting knife assemblies being designated by the reference characters **15**, **16**, **17** and **18**.

The slitting knife assemblies **15**, **16** and **17** are substantially identical and their construction and mounting on the base **14** will be readily understood from Figure 3 in which a sectional elevation of the assembly **16** is shown. Each of these 3 assemblies **15**, **16** and **17** includes a bracket arm **19** (Figure 3), made of metal or other rigid material, which is firmly secured to the base **14** by suit-

able means such as the screw 20, and which is so arranged as to extend inwardly over the top face of the base 14 spaced a slight distance therefrom. The bracket arm 19 has a recess or slot 21 extending upwardly from the underside and located above the surface of the board 14 (and thus above the face of the matrix when placed on the board), and this recess 21 slidably accommodates a slitting knife 22. A plunger rod 23, the bottom end of which is bifurcated and which is secured to the knife 22, extends upwardly through an aperture in the top of the bracket 19, in which it is slidably mounted, and carries a manual thrust knob 24 at the top. A spring 25 is carried on the plunger rod 23 and is held under compression between the top of the bracket 19 and a collar or washer 26 which is held in place on the rod by a suitable pin or screw. The board 14 has a shallow slot 27 located in the same plane as the knife blade to accommodate the edge of the knife when the knife is pushed downwardly against the force of the spring 25 by a manual thrust on the knob 24. Preferably the bottom or cutting edge of the knife 22 is inclined slightly with respect to the top edge of the board 14 since such sloping edge facilitates the making of the desired slit in the matrix 10 when the matrix is set in position on the board 14.

The knife assembly 18 (Figure 2) is similar to the knife assemblies 15, 16 and 17 except that the bracket arm 23 is somewhat longer and extends down around the edge of the board 14 and is attached to the underside of the board by a mounting hinge 29.

The knife assemblies are not only centrally positioned on the respective sides of the board 14 but the knife blades of each pair of opposite assemblies, thus the knife blades of the assemblies 15 and 17 (Figure 1) and the knife blades in assemblies 16 and 18, are in exact alignment with each other.

The board 14 of the matrix slitter 13 is provided with stationary pins, such as the pin 30 shown in Figure 4, to engage the pin holes, such as those indicated at 11 and 12 in Figure 1, of the matrix when the matrix is placed on the board, the pins being accurately located to correspond exactly to the pin holes placed in each matrix.

When the pin holes have been placed in a matrix, for example in the manner and by the means described in my above mentioned Patent No. 2,786,385, the matrix is immediately placed on the marker or slitter 13, the knife assembly 18 being swung back on its hinge 29 in order to permit the matrix 10 to be slid into place beneath the other 3 knife assemblies, and the pin holes in the matrix are brought into position on the pins, such as the pin 30, of the slitter. Then the knife assembly 18 is swung back into place above the corresponding edge portion of the matrix. With the matrix 10 now positioned on the slitter 13, as illustrated in Figure 1, the knife assemblies are operated manually and as a result produce two pairs of centrally and oppositely positioned slits in the border portions of the matrix. The matrix is then immediately removed from the slitter and is dried and preformed preparatory to being trimmed in a master trimmer for use in an automatic casting box, or preparatory to being placed directly, without trimming, in a hand casting box. Figure 5 illustrates the slitted matrix at this stage with the 4 slits made by the knife assemblies of the slitters being indicated at 15', 16', 17' and 18', respectively.

For the purpose of this description it is assumed that the matrix 10 is to be used in a hand casting box. Such a hand casting box is illustrated in Figure 6 and includes the semi-cylindrical matrix-supporting wall or backing plate 31 which is provided with hinged side gages 32 and 33 and with the usual removable end or ring gage (not shown), which are placed over the corresponding edge portions of the matrix for defining the edges of the cast stereotype plate and for aiding in the removal of the plate after the casting.

In the carrying out of the present invention four segmental depressions 34, 35, 36 and 37 (Figure 7) are provided in the matrix-supporting wall or backing plate 31 of the hand casting box, as shown in the plan view of this plate in Figure 7, these depressions being centrally positioned in the corresponding edge portions of the matrix-supporting wall or backing plate and being similar. Each of these depressions consists of a straight wall 38 (see Figure 8) and a sloping recess 39 formed with an arcuate surface extending from the face of the plate to the wall 38. The straight walls 38 of the two oppositely positioned depressions in each of the two pairs extend in the same plane. Thus, referring to Figure 7, the straight walls of the depressions 34 and 36 extend in the same plane which is perpendicular to the axis of the semi-cylindrical matrix-supporting wall or backing plate 31, and the straight walls of the depressions 36 and 37 extend substantially in the same plane as the axis of the semi-cylindrical backing plate.

When the slitted matrix is placed in the hand casting box on the semi-cylindrical backing plate 31 an edge portion of each slit 15', 16', 17' and 18' is brought into engagement with the straight wall of the respective depressions 34, 35, 36 and 37. The operator does this easily and quickly by placing his finger down on each slit in the matrix in succession and pressing the matrix down into the underlying depression while shifting the matrix slightly, if necessary, until one edge of the slit is in abutment with the straight wall of the depression, as illustrated by the edge of the slit 17' in the depression 36 in Figures 8 and 9. It will now be readily apparent that when an edge of each of the four slits of the matrix is thus brought into engagement with the straight wall of the corresponding depression in the casting box, the matrix will then be very accurately set in the desired predetermined position, and, when the side gages 32 and 33 are swung into position over the adjacent edge portions of the matrix and the customary end or ring gage is set in place, the matrix is ready for the casting operation. Also, it will be evident that the bringing of the matrix accurately into position in the casting box in this manner does not require any particular skill or the expenditure of much time and effort on the part of the operator.

The fact that the slits in the matrix (and the corresponding straight walls of the depressions in the casting box) are centrally located in each edge makes certain the accurate positioning of the matrix regardless of the amount of shrinkage which occurs in the drying of the matrix, for, since such shrinkage takes place over the entire matrix, the oppositely located slits of each pair of slits in the matrix can move towards each other as a result of the shrinkage without moving out of alignment and without in any way influencing the accurate setting of the matrix in place. Also, since the lines of the slits cross each other at the center of the matrix, the matrix can be turned end for end, if desired, when being inserted into the casting box and will still be accurately positioned.

Although thus far this invention has been described and illustrated when a so-called hand casting box is employed for the casting of the stereotype plate, in which case, as previously mentioned, the matrix may be placed directly in the hand casting box without first being placed in the matrix trimmer, the invention is intended also to be used when the matrix is to be placed first in a trimmer preparatory to use in an automatic casting box. The matrix trimmer, such as the trimmer described in U. S. Patent No. 2,631,669, will have a supporting plate, generally a substantially semi-cylindrical or curved matrix-supporting plate, on which the matrix must first be accurately positioned preparatory to the trimming of the matrix edges. Accordingly, in the carrying out of the invention in such case four depressions, similar to the depressions 34, 35, 36 and 37, as described for the hand casting box, are provided in each of the four side edges of the matrix-supporting plate or backing plate in the trimmer and preferably placed in the center of each side edge. Since the arrangement is the same, the same procedure is then fol-

lowed in positioning the slitted matrix in the trimmer and no further description is necessary. It will be obvious that the desired accurate result is attained with the same saving of time and labor on the part of the operator for the accurate positioning of the matrix in the trimmer as is true with the placing of the matrix directly in a hand casting box.

It is not absolutely necessary that the slits in the matrix and the corresponding straight walls of the depressions in the matrix-supporting plate of the hand casting box or trimmer be positioned at the center of each of the four sides, although we consider this to be preferable, as previously explained, since any shrinkage will then be equalized on both sides of each slit and the center point of the matrix will not vary. In ordinary practice the placing of the slits and corresponding depressions and straight walls at any predetermined points along the sides will produce satisfactory results since generally the shrinkage which will take place in the individual matrices for the color plates of a composite color print will be substantially identical.

Various modifications could, of course, be made in the form of the matrix-engaging depressions in the matrix-supporting plate of the trimmer or hand casting box without departing from the principle of the invention, and similarly modifications in the construction of the slitting knife assemblies or in the manner in which they are operated would be possible. However, the form of the depressions and the simple means which we have illustrated for producing the desired slits in the matrix we have found to be highly satisfactory and consider the same as the preferred means for the carrying out of the invention.

We claim:

1. In the producing of stereotypes from matrices, the improved method for accurately and removably positioning a series of matrices successively on the matrix-supporting plate in a trimmer or casting box which method consists in cutting a straight slit in each edge of each matrix, the exact location of the corresponding slits in the matrices being identical, providing segmented depressions in said plate corresponding in position to said slits respectively, each depression having a straight wall adapted to be engaged by an edge of the corresponding slit in a matrix, and, when placing each matrix in turn on said plate, adjusting each matrix so that slits spaced 180° apart will over-lie segmental depressions spaced 180° apart, then manually depressing the edges of said slits to move said slit edges into said segmental depressions and against the straight wall of said segmental depressions, thereafter adjusting the other two slits spaced 180° apart over the other two underlying segmental depressions

spaced 180° apart, and manually depressing the edges of said slits into said segmental depressions so as to accurately position and secure said matrix to said plate.

2. In the producing of stereotypes from matrices, the improved method for accurately and removably positioning a series of matrices successively on the matrix-supporting plate in a trimmer or casting box which method consists in cutting a slit at the approximate center point of each side of the matrices, the lines of said slits intersecting at the center points of said matrices, providing segmented depressions in said plate corresponding in position to said slits respectively, each depression having a straight wall adapted to be engaged by an edge of the corresponding slit in a matrix, and, when placing each matrix in turn on said plate, adjusting each matrix so that slits spaced 180° apart will over-lie segmental depressions spaced 180° apart, then manually depressing the edges of said slits to move said slit edges into said segmental depressions and against the straight wall of said segmental depressions, thereafter adjusting the other two slits spaced 180° apart over the other two underlying segmental depressions spaced 180° apart, and manually depressing the edges of said slits into said segmental depressions so as to accurately position and secure said matrix to said plate.

3. In an assembly for producing stereotypes from matrices, the combination of a plurality of matrices having a straight slit centrally located in each border portion, the lines of said slit in each matrix intersecting at right angles at the center point of the matrix, and a curved matrix-supporting plate having segmental depressions with straight walls adapted to register with said slits in each matrix in succession when the matrix is brought into exact predetermined position on said plate, each of said straight walls adapted for engagement by an edge of the corresponding slit of the superimposed matrix, said walls located in a pair of intersecting planes with the line of intersection of said planes passing through the approximate center of the face of said plate, said planes being perpendicular to each other and said segmental depressions extending to said walls, whereby each matrix can be quickly and accurately positioned on said plate by causing an edge of each slit to engage the wall of the underlying depressions regardless of shrinkage of the matrix.

References Cited in the file of this patent

UNITED STATES PATENTS

604,472	Horgan	May 24, 1898
2,095,985	Huck	Oct. 19, 1937
2,134,529	Phillips	Oct. 25, 1938
2,728,982	Merrill	Jan. 3, 1956