March 19, 1957 C. W. LE GATE 2,785,747

MATRIX REGISTERER AND TRIMMER

Filed March 14, 1955 2 Sheets-Sheet 1

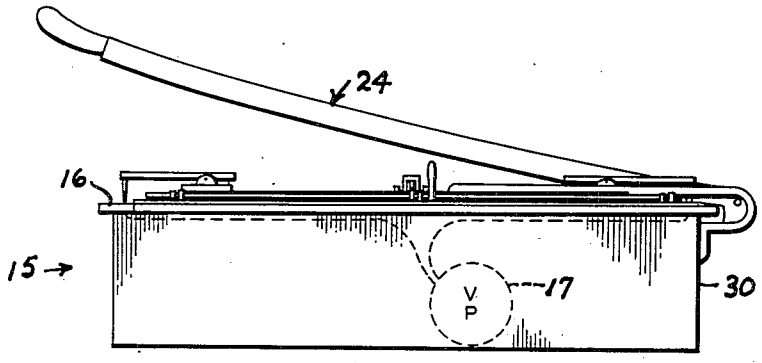


FIG. 1

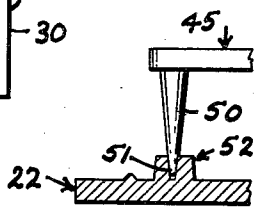


FIG. 4

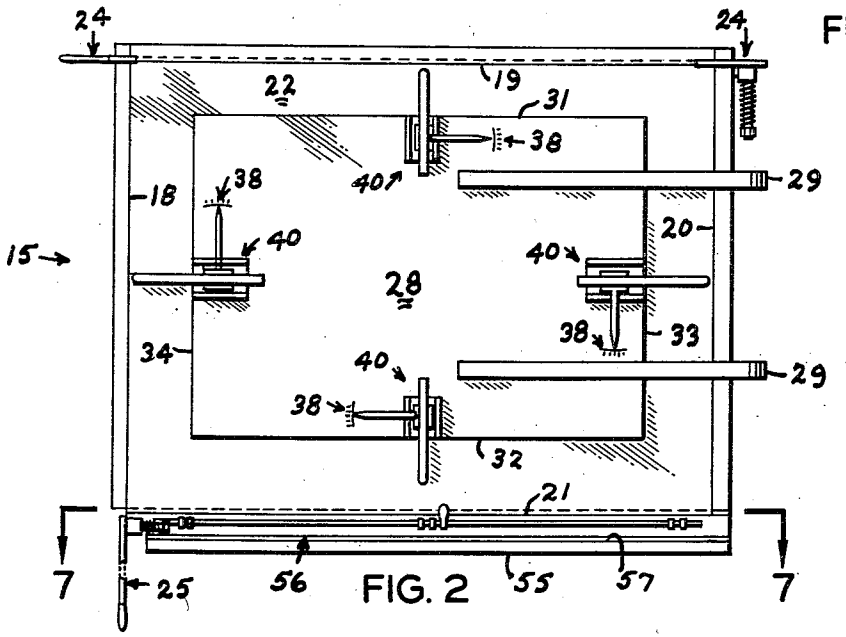


FIG. 2

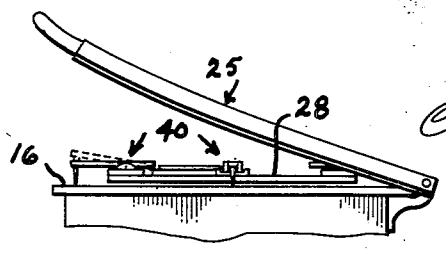


FIG. 3

Clifford W. LeGate

INVENTOR.

BY Loyal J. Miller

ATTORNEY

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MATRIX REGISTERER AND TRIMMER

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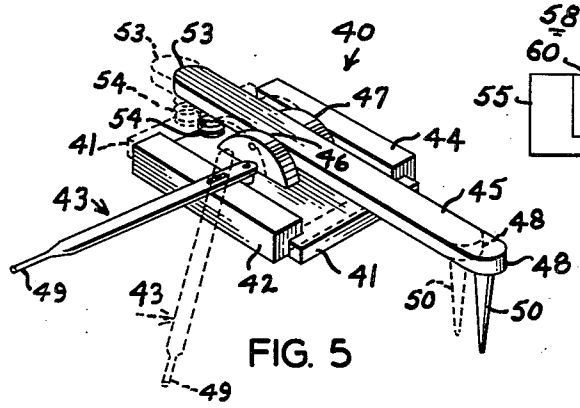


FIG. 5

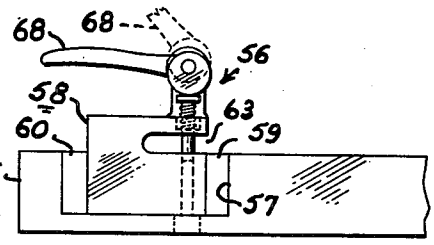


FIG. 6

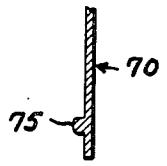


FIG. 9

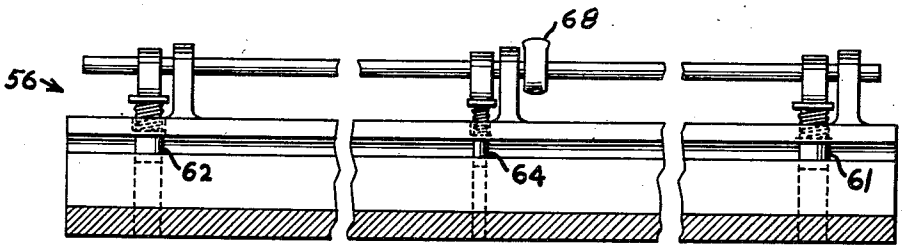


FIG. 7

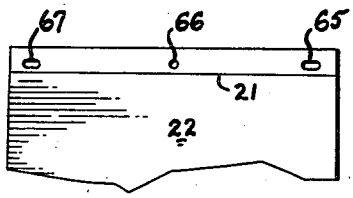


FIG. 10

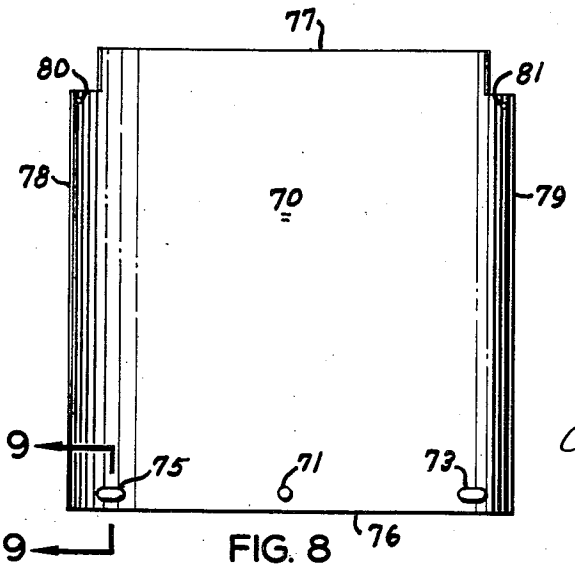


FIG. 8

Clifford W. Le Gate
INVENTOR.

BY Loyd J. Miller

ATTORNEY

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2,785,747

MATRIX REGISTERER AND TRIMMER

Clifford W. Le Gate, Edmond, Okla.

Application March 14, 1955, Serial No. 494,185

13 Claims. (Cl. 164—45)

The present invention relates to the art of newspaper publication and more particularly to a device for trimming to an identical size the several matrices of a color series for securing accurate registration of the stereotype plates cast therefrom.

This application is a continuation in part of a former application filed by me in the United States Patent Office on February 15, 1954, Serial Number 410,251, Division 17, for an improvement in Registering of Matrices and Registering of Stereotype Plates.

It is well known to those skilled in the art that a separate cut or printing plate must be used for printing each color of a colored picture being reproduced, including black, if black is used. Each one of the several stereotype casts or plates must be properly lined-up or registered on the press cylinder in order that the picture will be properly printed. Out-of-register plates create a displeasing effect in a color picture. Registration of circular printing plates or stereotype casts, as used on the cylinders of rotary printing presses, is often difficult to obtain, because the plates cannot be easily moved and in many cases cannot be moved far enough to effect a proper register with the mating plates of the color series.

In newspaper work human error as well as mechanical failure may easily enter into the making of out-of-register stereotype casts. The several matrices rolled from the properly composed type chases may not shrink evenly or alike; the operator may make an uneven trim along the edge of one or more of the matrices; one or more of the several matrices of a series may not be properly placed within the stereotype casting box, resulting in a stereotype cast with its image twisted, or out of line, with its longitudinal direction of roll when on the press cylinder. Any one or more of these and other factors may cause the plates to be out-of-register when placed upon the printing cylinders. This out-of-register will not be detected until the presses have been started and a number of papers printed. Some corrective adjustment may then be made, as stated hereinabove, which amounts to approximately a total of thirty-thousandths of an inch of movement from top to bottom with respect to the page being printed. It is necessary to stop the presses each time such an adjustment is made. Quite often this small amount of adjustment is not sufficient to correctly align the several plates to secure a correctly printed color picture, thus making it necessary to remake the plates.

One method of producing better registry of the plates has been devised in the scoring or placing of grooves along the four sides of the type chase used, which is recorded by the matrix as a raised line thereon serving as a guide for trimming the matrix prior to its insertion within the stereotype casting box. This helps to effect an approximate register of the plates, but human error in trimming all the matrices exactly alike is most prevalent at this stage of the plate making operation.

Another improvement has been the use of thermostatically controlled heat in the vacuum operated shrinking machines. Theoretically all matrices should shrink

alike, but some matrices contain more moisture than others and consequently all do not shrink alike. This variation in shrinkage is so slight that it will not easily be detected until the plates have been made and the presses started printing.

The present invention overcomes the above defects in producing registered rotary color plates by providing a means of individually accurately centering each one of the several matrices of a series and identically trimming at least two of their sides to size.

The principal object of the present invention is to provide a device for centrally and identically positioning each one of several matrices of a series by the register marks moulded into the edges of the matrix and trimming each matrix to the identical size.

Another important object of this invention is to provide a matrix edge-trimming device which utilizes register marks centrally moulded into the side edges of the matrix and which plurally perforates one side edge of the matrix for effecting a proper connection with the pouring sheet of the stereotype casting machine.

An additional object of this invention is to provide a means of checking the variation in shrinkage, if any, of the several matrices of a color series.

A further object is to provide a matrix trimming device which utilizes the pull of a vacuum pump to insure that the matrix does not move from its registered position while trimming the same.

The present invention accomplishes these and other objects by providing a table-like stand having a foraminated top operatively connected to a vacuum pump for securely holding the matrices thereon. Register pins adjustably carried by the table top indicate the relative position of the matrix by contact with co-operatingly disposed register marks moulded into the matrix. The table is further provided with a conventional punch for plurally perforating one side edge of the matrix while centered on the top. Shearing knives carried by the stand trim two adjoining sides of the matrix.

Other objects will be apparent from the following description when taken in conjunction with the accompanying two sheets of drawings, wherein:

Figure 1 is a side elevational view of the device with one shearing knife removed;

Figure 2 is a top view of the device with a matrix thereon and showing the end shearing knife in raised position;

Figure 3 is an end elevational view of the device as shown in Fig. 2 with the side shearing knife removed;

Figure 4 is a fragmentary elevational view of one of the register pins operatively contacting a register mark in a matrix, as shown in cross-section;

Figure 5 is a perspective view of one of the registering devices;

Figure 6 is an end elevational view of the punch perforating means;

Figure 7 is a side elevational view, partly in section, of the punch means;

Figure 8 is an elevational view of the convex side of a modified stereotype pouring sheet;

Figure 9 is a vertical cross-sectional view taken substantially along line 9—9 of Fig. 8; and,

Figure 10 is a framentary elevational view of a matrix after having been perforated.

Like characters of reference designate like parts in those figures of the drawings in which they occur.

In the drawings:

The reference numeral 15 indicates, as a whole, a rectangular box or table-like support stand (Fig. 1) having a substantially flat foraminated top 16 operatively connected to a vacuum pump 17 in a conventional manner. The dimensions of the top 16 are of a desired size which

is substantially equal to the area enclosed by the conventional trim lines **18, 19, 20** and **21** moulded on the matrix **22** (Fig. 2).

The matrix moulding operation in which register marks are moulded on the longitudinal and transverse center lines adjacent each respective edge is fully covered in my copending application as disclosed hereinabove. One of such register marks is shown in cross-section in Fig. 4.

The longitudinal side of the top **16** lying under the matrix trim line **19** is equipped with a conventional shearing edge for co-operating with a paper shearing knife **24** in a conventional manner. Similarly the end of the top **16** lying under the matrix trim line **18** is equipped with a shearing edge and co-operating knife **25**. As is illustrated in Fig. 2, the knife **25** is in raised position while the knife **24** is actuated to shear the edge of the matrix **22**, and similarly the knife **24** must be in raised position while using the knife **25** as more fully explained hereinbelow.

A substantially flat rectangular plate **28** of selected dimensions substantially smaller than the top **16** is held in fixed spaced superposed relation to the top **16** by a pair of elongated bracket arms **29** which are attached at opposing ends, as by welding, to the end **30** of the stand and to the upper surface of the plate **28**. The plate **28** has side edges **31—32** and end edges **33—34** which are substantially parallel with the side and end edges, respectively, of the top **16**.

A register indicator **40**, comprising a flat rectangular base **41** which is longitudinally slidably disposed upon the longitudinal and transverse center lines of the plate **28** adjacent each side edge **31—32** and end edge **33—34**, respectively, between a pair of co-operating parallel guide rails **42** and **44** (Fig. 5), rigidly connected, as by welding to the upper surface of the plate **28**. An elongated register arm **45** is pivotally connected, at a selected point intermediate its ends, to the upper surface of the base **41** between a pair of co-operating upstanding bosses **46** and **47**. Each register arm **45** is longitudinally disposed and centrally aligned on each respective longitudinal and transverse center line of the plate **28**. An inverted conical register pin **50** is rigidly connected by its base to the under side of each arm **45**, respectively, adjacent its outwardly disposed end **48** and depends therefrom toward the top **16**.

Each pin **50** is preferably long enough to allow the apex **51** of the pin **50** to contact the bottom of a register mark **52** in the matrix **22** (Fig. 4) while the arm **45** is substantially horizontally disposed. Diametrically the taper pin **50** is substantially equal with relation to the recess of the register mark **52** to be closely received therein. A helical expansion spring **54** carried by the base **41** under the arm **45** adjacent its end **53** acts to vertically pivot the arm **45** and urge the register pin **50** downwardly into the register mark **52**.

A laterally extending index arm **43** is pivotally connected at one end to the upper surface of the base **41** and is pivotally connected intermediate its ends to the guide rail **42**. Indicia **38** is scored upon the upper surface of the plate **28** below the outermost end **49** of the index arm **43**. Longitudinal movement of the base **41** relative to the guide rails **42** and **44** pivots the index arm **43** as shown by dotted lines (Fig. 5) and any such movement however slight is readily seen by the relative position of the index end **49** relative to the indicia **38**.

The longitudinal side portion **55** of the top **16** opposite the knife **24** is provided with punch means **56**. A rectangular groove **57** is longitudinally cut in the top **16** adjacent the edge **55** for loosely receiving a substantially rectangular punch body **58**. The body **58** is substantially of equal length with relation to the side **55** and transversely is narrower than the width of the groove **57**. Suitable spacers **59** and **60** rigidly hold the body **58** against transverse movement within the groove. The punch means **56** is conventional with paper punching means with the exception of the shape of the punch body **58**, as disclose above, and the shape of the punch pins **61** and **62** adjacent opposing ends of the punch. The punch has a lateral slot **63** co-operatingly horizontally disposed with relation to the top **16** for receiving one side edge of the matrix **22** therein. The central punch pin **64** is circular and is positioned exactly on the transverse center line of the top **16** and in alignment with the register pins **50** on the opposing sides **31** and **32** of the plate **28** for the purpose which will be presently apparent. Cross-sectionally the punch pins **61** and **62** are somewhat elliptical having semi-circular ends longitudinally disposed with relation to the body **58** and paralleling opposing sides and are equally spaced in alignment with and from the center pin **64** adjacent opposite ends of the punch body **58**. The punch body **58** is laterally positioned within the groove **57** by adjustment of the spacers **59** and **60** to position the punch pins **61, 62** and **64** to punch apertures in the matrix **22** as indicated at **65, 66** and **67**, respectively (Fig. 10) when the handle **68** of the punch is depressed.

A conventional stereotype casting pouring sheet **70** which is used to position a matrix within a stereotype casting machine is centrally provided on the convex side adjacent its lowermost edge, with a cylindrical knob or button **71**. Diametrically the knob **71** is substantially equal with relation to the aperture **66** punched by the pin **64** and projects outwardly from the sheet a distance substantially equal with relation to the thickness of the matrix **22**. Elongated knobs or buttons **73** and **75** having the same general configuration and spacing-apart as the punch pins **61** and **62** are disposed on the convex side of the pouring sheet adjacent each vertical edge, respectively. The knobs **71, 73** and **75** are alignedly disposed parallel with the bottom edge of the pouring sheet **70**. Lengthwise the knobs **73** and **75** are slightly shorter than the perforations **65** and **67**. Adjacent each corner formed by the top **77** and sides **78** and **79** the pouring sheet is provided with a comparatively small perforation **80** and **81**, respectively, for engagement over co-operating pins, not shown, on the concave side of a stereotype casting machine for indicating when the pouring sheet **70** is properly positioned therein, as more fully explained hereinbelow.

Operation

Matrices to be used with the instant invention are moulded from chases made in accordance with the above referred to copending application. These matrices have a raised register mark **52** (Fig. 4), having a central conical depression therein, located adjacent each edge and inwardly of the conventional trim lines on the exact longitudinal and transverse center lines of the type area. After the matrix has been shrunk, as desired, and packed or backed for stereotyping it is placed upon the top **16** with the register marks **52** presented upwardly and with the trim knives **24** and **25** in raised position. Each register pin **50** is placed within its respective register mark **52** on the matrix. The matrix is then adjusted to centrally position the same relative to the top **16**. If the matrix has been properly shrunk all the indicator arm tips **49** will point to a similar figure of the indicia **38**, for example, zero. After centering the matrix on the top **16** the vacuum pump **17** is started and which exerts a vacuum pull upon the back or downwardly disposed side of the matrix through the foraminated top thus firmly holding the matrix. The knives **24** and **25** are then individually actuated to shear or trim the side of the matrix adjacent the trim line **19** and the end trim line **18**, respectively, and the punch handle **68** is depressed for plurally perforating the side of the matrix adjacent the trim line **21**. Each of the matrices of a series are similarly centered, trimmed and perforated. If all matrices of a series have identical variations in shrinkage, then printing plates cast therefrom will register; but if one or more of the matrices show variation in shrinkage when attempt-

ing to center the same, then that particular matrix or matrices may be remoulded from the chase to correct the error.

After centering, trimming and perforating all matrices of a series they are further trimmed to length adjacent the end trim line **20**, in a conventional manner. The matrix, properly heated prior to pouring a stereotype cast, is placed within the top portion of the concave casting box, not shown, with the perforated or top edge upwardly. The lower edge **76** of the pouring sheet **70** is placed on the concave side of the matrix and the knob **71** placed within the perforation **66** of the matrix. Since the sides **78** and **79** of the pouring sheet are accurately positioned within the casting box by the grooved edges thereof, as is conventional, fastening the central perforation **66** to the centrally disposed knob **71** properly centers the matrix within the casting box. The parallel sides of the elongated knobs **73** and **75** are closely received by the parallel sides of the perforations **65** and **67**, respectively, and each knob **73** and **75** is placed within its respective perforation **65** and **67** of the matrix thus positively aligning the matrix edge in parallel relation with the lower edge **76** of the pouring sheet. The lower edge **76** of the pouring sheet rests against the trim line **21** on the matrix, as is conventional, while the pouring sheet is manually pushed downwardly to its position within the casting machine. To insure that the pouring sheet has been properly placed a pair of small pins, not shown, located within the casting box enter the perforations **80** and **81**, respectively, adjacent each upper corner of the pouring sheet when the same has reached the lower limit of its travel.

Obviously the invention is susceptible to some change or alteration without defeating its practicability, and I therefore do not wish to be confined to the preferred embodiment shown in the drawings and described herein, further than I am limited by the scope of the appended claims.

I claim:

1. In a matrix registerer and trimmer for matrices having register marks moulded thereon the combination with a table-like stand having a substantially flat rectangular foraminated top connecting a vacuum pump and having two sides equipped with shearing knives, said top properly proportioned and disposed for allowing trimming of the matrix to size without moving the same, of: a plate rigidly carried by said table in spaced superposed relation with said top, the sides of said plate spaced inwardly of the edges of said table; and register means carried by said plate for individually and identically positioning each one of the several matrices of a series, whereby a matrix placed upon said table is centrally positioned by said register means and held in place by the action of said vacuum pump for trimming two sides of the matrix by the action of said knives.

2. In a matrix registerer and trimmer for matrices having register marks centrally moulded thereon adjacent its edges the combination with a table-like stand having a substantially flat rectangular foraminated top operatively connected to a vacuum pump and having shearing means provided along two adjoining side edges of said top for trimming a matrix, of: a plate rigidly carried by said table in spaced superposed relation with said top, the sides of said plate being spaced inwardly with relation to the edges of said top; and register means carried by the upper surface of said plate centrally disposed adjacent each of its outer edges, respectively, and engaged with said moulded register marks for individually and identically positioning the several matrices of a series, whereby a matrix placed upon said table top is centrally positioned and held in this position by said pump for trimming the two sides of the matrix.

3. In a matrix registerer and trimmer for matrices having register marks moulded thereon adjacent its edges the combination with a table-like stand having a substantially flat foraminated top operatively connected to a vacuum pump and having at least two edges equipped with shearing knives, said top properly portioned for allowing trimming of the matrix to size without moving the same, of: a plate rigidly carried in spaced superposed relation with said top, the edges of said plate spaced inwardly with relation to the edges of said top; register means carried by said plate for individually and identically positioning each one of the several matrices of a series, said means including an arm pivotally mounted for vertical and longitudinal movement on said plate adjacent each edge on the longitudinal and transverse center lines thereof, respectively, said arms projecting outwardly beyond and in perpendicular relation to each said edge, respectively, a depending pin rigidly carried by the outermost end of each said arm, respectively, for engagement with each said register mark, respectively, of each said matrix; and indicia means carried by said arm for registering variations between different ones of said several matrices, whereby said matrices may be individually centrally positioned on said top and held in place thereon by the action of said pump while said shearing means trims the matrix to size.

4. In a matrix registerer and trimmer for matrices having register marks centrally moulded thereon adjacent its edges, the combination with a table-like stand having a substantially flat rectangular foraminated top operatively connected to a vacuum pump and having shearing means provided along two adjoining edges of said top for trimming a matrix to size, of: a plate rigidly carried in spaced superposed relation with said top, the edges of said plate being spaced inwardly with relation to the edges of said top; and register means carried by said plate for engaging with said moulded register marks of said matrices, said means including an arm pivotally mounted for vertical and longitudinal movement on said plate adjacent each edge thereof on the longitudinal and transverse center lines, respectively, of the same, said arms projecting outwardly beyond and in perpendicular relation to each said edge, respectively, a depending pin rigidly carried by the outermost end of each said arm, respectively, for engaging with each said register mark, respectively, of each said matrix, each said arm marked indicially with relation to said plate for registering variations between different ones of said several matrices, whereby said matrices may individually be disposed centrally on said top and held securely thereon by the action of said pump thereby permitting said shearing means to actuate in trimming the matrix to size.

5. In a matrix registerer and trimmer for matrices having register marks centrally moulded thereon adjacent its edges, the combination with a table-like stand having a substantially flat rectangular foraminated top operatively connecting a vacuum pump, of: a shearing edge provided along one side and one end of said top; matrix shearing knives carried by said stand for shearing along said one side and said one end, respectively, by downward movement of said knives; a plate rigidly carried by said stand in spaced superposed relation with said top, the sides of said plate being spaced inwardly with relation to the edges of said top; and register means carried by the plate centrally disposed adjacent each of its outer edges, respectively, and engaged with said moulded register marks for individually and identically positioning the several matrices of a series, whereby a matrix placed upon said top is centrally positioned thereon and held in this position by said pump for trimming the two sides of the matrix.

6. In a matrix registerer and trimmer for matrices having register marks centrally moulded thereon adjacent its edges, the combination with a table-like stand having a substantially flat rectangular foraminated top operatively connected to a vacuum pump, of: a shearing edge provided along one side and along one end of said top; shearing knives carried by said stand and co-operating with said shearing edges for shearing one side and one end

respectively, of a matrix; matrix perforating punch means carried by said top along one longitudinal side thereof opposite said side-shearing edge for plurally perforating the adjacent edge of a matrix; a plate rigidly carried by said stand in spaced superposed relation with said top, the sides of said plate being spaced inwardly with relation to the edges of said top; and register means carried by the plate centrally disposed adjacent each of its outer edges, respectively, and engaged with said moulded register marks for individually and identically positioning the several matrices of a series, whereby a matrix placed upon said top is centrally disposed thereon and held by said pump for trimming the two sides of said matrix and plurally perforating one side of the matrix by actuation of said punch means.

7. In a matrix registerer and trimmer for matrices having register marks centrally moulded thereon adjacent its edges, the combination with a table-like stand having a substantially flat rectangular foraminated top operatively connected to a vacuum pump, of: a shearing edge provided along one side and along one end of said top; matrix shearing knives carried by said stand for shearing along said one side and said one end, respectively, by downward movement of said knives; a plate rigidly carried by said stand in spaced superposed relation with said top, the sides of said plate being spaced inwardly with relation to the edges of said top; register means carried by said plate for engaging with said moulded register marks of said matrices, said means including an arm pivotally mounted for vertical and longitudinal movement on said plate adjacent each edge thereof on the longitudinal and transverse center lines, respectively, of the same, said arms projecting outwardly beyond and in perpendicular relation with each said edge, respectively, a depending pin rigidly carried by the outermost end of each said arm, respectively, for engagement with each said register mark, respectively, of each said matrix; said plate marked indicially relative to said arm for registering variations between different ones of said several matrices, whereby said matrices may be individually and centrally positioned on said top and held in place thereon by said pump while said shearing means is actuated for trimming the matrix to size.

8. In a matrix registerer and trimmer for matrices having register marks centrally moulded thereon adjacent their edges, the combination with a table-like stand having a substantially flat rectangular foraminated top operatively connected to a vacuum pump, of: a shearing edge provided along one side and one end of said top; shearing knives carried by said stand and co-operating with said shearing edges for shearing one side and one end, respectively, of a matrix; matrix perforating punch means carried by said top along one longitudinal side thereof opposite said side shearing edge for plurally perforating the adjacent edge of a matrix; a plate rigidly carried by said stand in spaced superposed relation with said top, the sides of said plate being spaced inwardly with relation to the edges of said top; and register means carried by said plate for engaging with said moulded register marks of said matrices, said register means including an arm pivotally mounted for vertical and longitudinal movement on said plate adjacent each edge thereof on the longitudinal and transverse center lines, respectively, of the same, said arms projecting outwardly beyond and in perpendicular relation with each said edge, respectively, a depending pin rigidly carried by the outermost end of each said arm, respectively, for engagement with each said register mark, respectively, of each said matrix, each said arm marked indicially relative to said plate for registering variations between different ones of said several matrices, whereby said matrices may be individually and centrally positioned on said top and held in place thereon by the action of said pump while said shearing means is actuated in trimming the matrix to size and said punch means simultaneously plurally perforates one side thereof.

9. In a matrix registerer and trimmer for matrices having register marks centrally moulded thereon adjacent their edges, the combination with a table-like stand having a horizontally disposed substantially flat rectangular foraminated top operatively connected to a vacuum pump, of: a shearing edge provided along one side and along one end of said top; shearing knives carried by said stand and co-operating with said shearing edges for shearing one side and one end, respectively, of a matrix; matrix perforating punch means carried by said top along one longitudinal edge thereof opposite said shearing edge for plurally perforating the adjacent edge of a matrix; a plate rigidly carried by said stand in spaced superposed relation with said top, the sides of said plate being spaced inwardly with relation to the edges of said top; and register means carried by said plate for engaging with said moulded register marks of said matrices, whereby said matrices may be individually and centrally positioned on said top and held in place thereon by said pump while said shearing means is actuated for trimming the matrix to size and the matrix is perforated by said punching means.

10. Structure as specified in claim 9 in which the register means includes: spaced-apart pairs of parallel guide rails rigidly connected to the upper surface of said plate adjacent each edge, respectively, and are adjacent and parallel with the longitudinal and transverse center lines of said plate; a base longitudinally slidably disposed between each said pair of guide rails, respectively, an arm pivotally connected intermediate its ends to the upper surface of each said base, respectively, and extending outwardly beyond the edges of said plate on the longitudinal and transverse center lines of said plate for vertical movement relative to the same; a depending register pin rigidly carried by the outermost end of each said arm for engagement within each said moulded register mark, respectively, spring means for urging the outer end of each said arm downwardly; and an indexing arm pivotally carried by each said base for indicating the longitudinal position of each said register arm relative to said plate.

11. A gauge for checking the registry of each matrix of a series, said matrices having register marks molded therein adjacent each respective side edge, including: a table-like matrix receiving support; a plate rigidly carried by said support in spaced superposed relation to the upper surface thereof; and register means adjustably carried by said plate adjacent its edges for engagement with the register marks of each said matrix, respectively, whereby the several matrices of a series may be consecutively centered with relation to said plate and said support by said register means for recording the variation of the spacing between the register marks of each said matrix relative to the register marks of the other matrices of the series.

12. A guage for checking the registry of each matrix of a series, said matrices having centrally disposed register marks molded therein adjacent each respective side edge, including: a table-like support; a plate rigidly carried by said support in spaced superposed relation with the upper surface thereof, the sides of said plate being spaced inwardly with relation to the edges of said support; and register means adjustably carried centrally by each respective side edge of said plate for engagement with the register marks of each said matrix, respectively, each respective register means adjustable with respect to said plate and said matrix only along the respective transverse and longitudinal center line of said matrix, whereby the several matrices of a series may be consecutively centered with relation to said plate and said support by said register means for recording the variation of the spacing between the register marks of each said matrix relative to the register marks of the other matrices of the series.

13. A gauge for checking the registry of each matrix of a series, said matrices having centrally disposed register marks molded therein adjacent each respective side edge, including: a table-like matrix receiving support; a plate rigidly carried by said support in spaced superposed relation with the upper surface thereof, the sides of said plate

being spaced inwardly with relation to the edges of said support; and register means adjustably carried centrally by each respective side edge of said plate for engagement with the register marks of each said matrix, respectively, said register means comprising an arm pivotally and slidably mounted on said plate adjacent each edge thereof on the respective transverse and longitudinal center line of the same, said arms projecting outwardly beyond and in perpendicular relation with each said edge, respectively, a depending pin rigidly carried by the outermost end of each said arm, respectively, for engagement with each respective register mark of each said matrix, each said arm indicially marked relative to said plate for recording variations of the spacing between the register marks of each said matrix relative to the register marks of the other matrices of the series.

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