Aug. 22, 1967 L. D. GUTHRIE 3,336,864

SILK SCREENING APPARATUS FOR PRINTING BOTH SIDES OF WORK

Filed Oct. 28, 1963 3 Sheets-Sheet 1

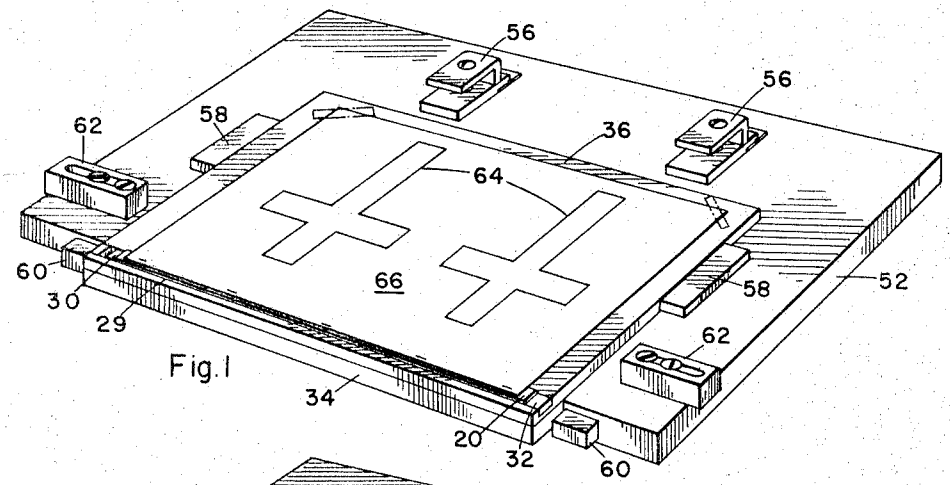


Fig. 1

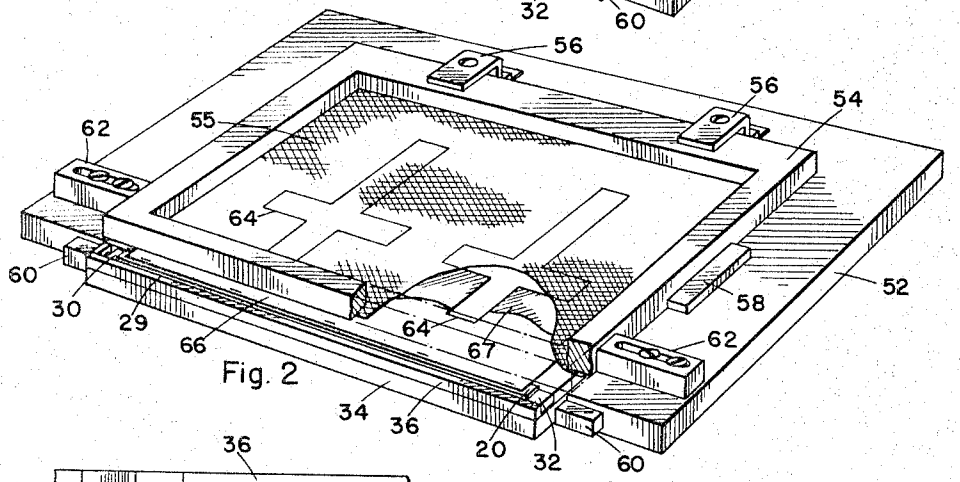


Fig. 2

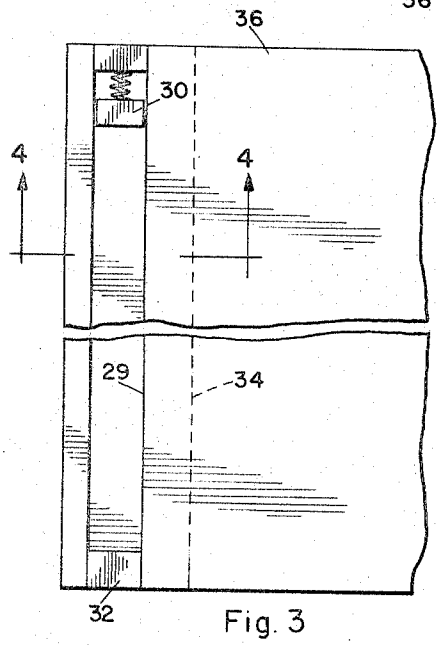


Fig. 3

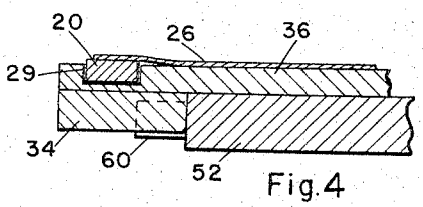


Fig. 4

INVENTOR.
LYLE D. GUTHRIE
BY
Knox & Knox

SILK SCREENING APPARATUS FOR PRINTING BOTH SIDES OF WORK

Filed Oct. 28, 1963 3 Sheets-Sheet 2

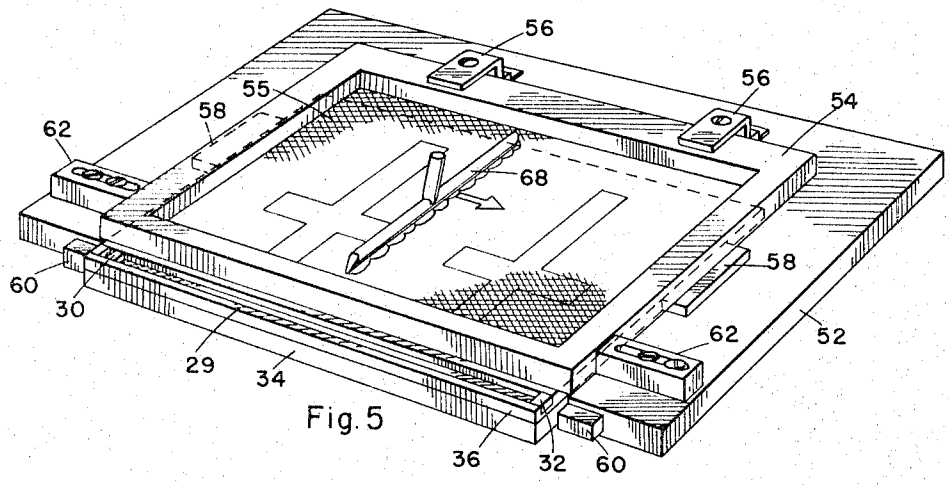


Fig. 5

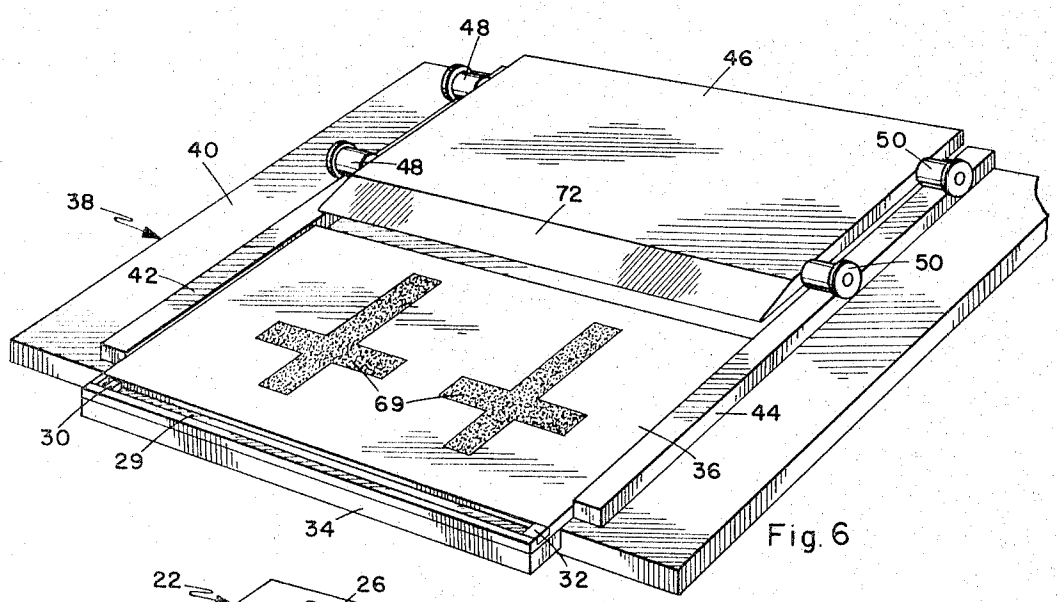


Fig. 6

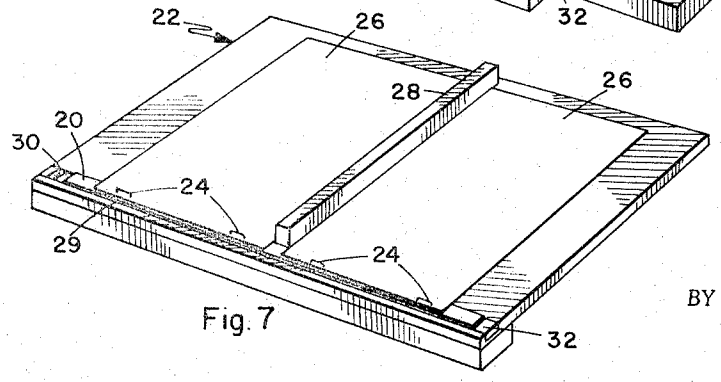


Fig. 7

INVENTOR.
LYLE D. GUTHRIE
BY Knox & Knox

Aug. 22, 1967 L. D. GUTHRIE 3,336,864

SILK SCREENING APPARATUS FOR PRINTING BOTH SIDES OF WORK

Filed Oct. 28, 1963 3 Sheets-Sheet 3

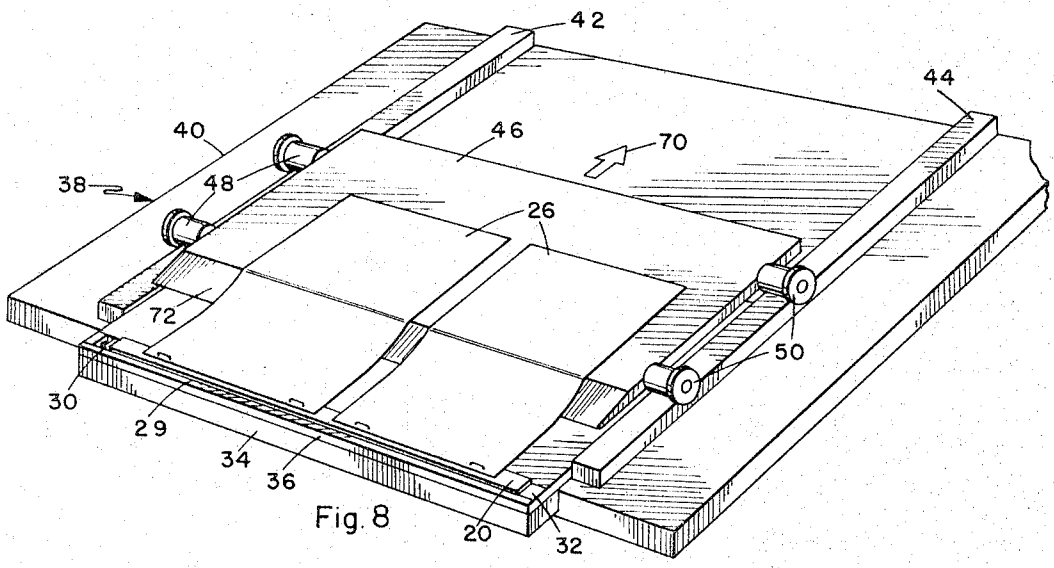


Fig. 8

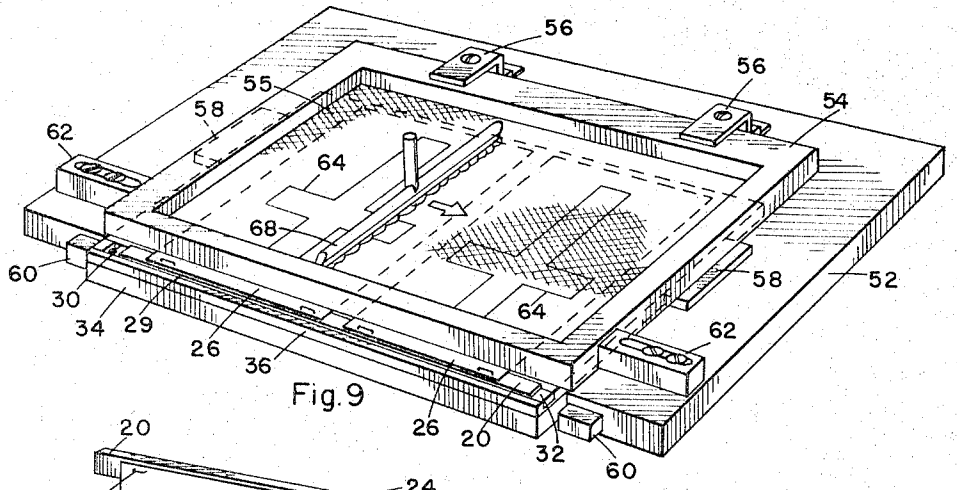


Fig. 9

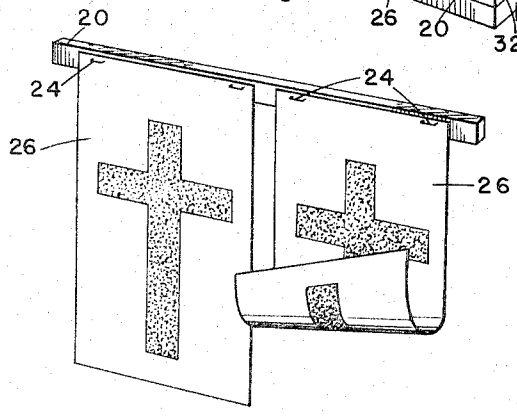


Fig. 10

INVENTOR.
LYLE D. GUTHRIE
BY
Knox & Knox

United States Patent Office 3,336,864
Patented Aug. 22, 1967

3,336,864

SILK SCREENING APPARATUS FOR PRINTING BOTH SIDES OF WORK

Lyle D. Guthrie, 1801 Moore St.,
San Diego, Calif. 92110

Filed Oct. 28, 1963, Ser. No. 319,112
2 Claims. (Cl. 101—114)

The present invention relates generally to a silk screening process and apparatus and more particularly to such a process by which correct registration may be obtained when silk screening a similar design on opposite surfaces of either porous or non-porous material.

Background

The art of silk screening inks and dyes directly onto the surface of cloth, paper, ceramics or metal is an old one and numerous methods have been proposed for proper registration of the master drawing or design. In one process that is extensively used a silk screen table surface is formed of one or more pieces of thick glass and a bank of lights is installed beneath this surface. The master drawing or registration points or lines are positioned on the underside or between the layers of glass. By positioning the material to be silk screened on the glass directly over the drawing or registration points, the operator may manually position the material so each successive color or design may be reasonably accurately registered.

In the other general process boundary lines or registration marks are drawn on the silk screen table surface, or tape or cardboard is used to define physical boundaries and contours.

With the equipment indicated above two general practices are followed in applying the ink or dye to the material. One is to silk screen the material as it lies directly on the glass or table surface. After being silk screened the material is carefully lifted off the surface of the table and hung up to dry. The residue of ink which penetrated through the material is then carefully cleaned from the table surface with solvent and rags and the whole process of registering and silk screening is repeated.

In the more common procedure paper is laid on top of the table and the material to be silk screened is positioned on top of the paper. After silk screening, the material is carefully lifted off the paper, and the paper is discarded. A new piece of paper is laid down and the whole procedure is repeated.

The above processes are not only time-consuming to obtain reasonably good registration but extremely wasteful of material.

Objects and drawings

Accordingly it is the primary object of this invention to provide an improved apparatus and process of silk screening which will greatly reduce, if not eliminate, the loss in time and material occasioned by human error in non-registrations.

It is a still further object of this invention to provide an improved apparatus and process of silk screening which will eliminate the waste of paper underlay.

It is a further and important object of this invention to provide an apparatus and improved process of silk screening which will insure correct registration and screening of multiple pieces in each cycle.

With these and other objects definitely in view, this invention consists in the novel constructions, combination and arrangement of elements and portions, as will be hereinafter fully described in the specification, particularly pointed out in the claims, and illustrated in the drawings, which form a material part of this disclosure and in which:

FIGURE 1 is a perspective view of a silk screening table with a registration board in place thereon and a master drawing, secured to a registration bar, in position on the registration board;

FIGURE 2 is a view similar to FIGURE 1 showing the stencil and silk panel, constituting the silk screen, with its frame, in position;

FIGURE 3 is a plan view of a registration board, on an enlarged scale, with parts broken away;

FIGURE 4 is a section on the lines 4—4 of FIGURE 3;

FIGURE 5 is a perspective view illustrating the application of a design in ink on the surface of a registration board;

FIGURE 6 is a perspective view of a material laying carriage with an inked registration board in position therein;

FIGURE 7 is a perspective view of a jig used for mounting material on a registration bar, with a registration bar and blank material in position thereon;

FIGURE 8 is a view of the material laying carriage in position to apply the material to the inked registration board;

FIGURE 9 is a view of the silk screening table and frame showing the final step of silk screening the design and

FIGURE 10 is a view showing the finished article.

Like reference numerals refer to the same or similar parts throughout the specification.

Briefly the novel process of the instant invention involves two basic steps. First the design to be imprinted on the material is silk screened directly onto a table top or, as will be referred to hereafter, the smooth surface of a registration board. The material is then laid directly on and into the fluid ink on the table. With nonporous material it is obvious that the design will be imprinted on only the side that is in contact with the ink. With porous materials such as fabric some ink will impregnate the material and appear on the other surface. In the next step the silk screen frame is lowered over the material and the design is impressed on the other surface. Again with porous material, the ink will be forced completely through thereby securing the desirable complete saturation of the design through the material.

With reference to the drawings the various elements of the apparatus used to practice the improved process will now be described.

Apparatus

The material to be silk screened is first secured to an elongated bar of rigid material, preferably wood of rectangular cross section. For purposes of description this bar, which is illustrated as **20** in FIGURE 10, will be hereinafter referred to as the registration bar. A number of these bars, determined by the number of sections of material to be silk screened, are provided all of the same length and of approximate width and thickness. The sections of material to be screened are stapled to the registration bar in a jig **22** shown in FIGURE 7. For ease of removal the staples **24** are inserted approximately half way into the material of the registration bar. Any number of sections of material may be attached to the registration bar dependent on the length of the bar. As here shown, I apply two sections **26, 26** which are accurately positioned by means of a guide bar **28** secured to the jig **22**. The sections of material here shown are sheer nylon organdy and will be hereinafter referred to as pennants it being understood however that other, generally sheet material, either porous or non-porous, may be substituted therefor. The forward edge of the upper surface of jig **22** is provided with a closed end groove or gutter **29** of approximately the same cross sectional area and length as the

registration bar **20**. A spring stop **30** in one end of the gutter accurately locates the registration bar **20** against a fixed stop, as shown in FIGURE 7. A positioning bar **34** is secured to the underside of jig **22**.

FIGURES 3 and 4 illustrate the details of a board **36**, hereinafter referred to as a registration board, upon which the sections of material **26** and registration bar **20** are mounted for the silk screening process. Registration board **36**, shown positioned against the edge of a silk screening table in FIGURE 4, is substantially the same size and construction as jig **22**. However guide bars **28** are omitted from the registration board. Otherwise registration board is provided with a gutter **29**, for reception of a registration bar **20**, spring stop **30**, fixed stop **32**, and positioning bar **34**. Registration boards **36** may be formed of any suitable material having a smooth hard surface. Tempered Masonite has been found to be entirely satisfactory.

FIGURES 6 and 8 illustrate the details of the material laying carriage assembly, indicated generally by the reference character **38** employed during two stages of the hereindisclosed process. Carriage and support assembly **38** consists essentially of a smooth surfaced and generally flat supporting member **40** having generally parallel spaced apart guide rails **42** and **44**. Material laying carriage **46** is movably mounted on rails **42**, **44** by pairs of spaced rollers **48** and **50**. Rails **42**, **44** are spaced apart a distance just equal to the width of registration board **36** so that they act to center and accurately position the registration board on supporting member **40**.

The silk screen table and frame are illustrated in FIGURES 1, 2, 5 and 9 with reference to several of the steps in the novel process hereinafter described. With particular reference to FIGURES 1 and 2 a silk screen table **52** is essentially a flat work surface of sufficient size to support a silk screen frame **54**. The rear portion of work surface **52** is provided with a pair fo clamp hinges **56**, **56** of conventional construction which permit ready removal and substitution of one silk screen frame for another. Spaced apart on the surface of table **52** a distance equal to the width of registration board **36** are a pair of guide blocks or rails **58**, **58** defining parallel edges of a wide slot in the table **52**, this slot opening to one edge of the table and accurately dimensioned to receive the registration board **36**. A pair of guide blocks **60**, **60** spaced the same distance apart as blocks **58**, **58** may, if desired, be positioned on the front edge of table surface **52**, further defining said slot. A pair of adjustable guide blocks **62**, **62** are positioned on table **52** for engagement with opposite edges of silk screen frame **54**, for a purpose which will be hereinafter described.

Operation

For purposes of describing the novel silk screening process, the design to be silk screened on a section of material **26** is shown as a cross **64** which may be of any color, red for example, on a field of white, the material being, for example, sheer white nylon organdy. A number of registration bars **20** are provided, all having approximately the same length and cross sectional dimension. The nylon material is cut to the proper size. A registration bar **20** is placed in gutter **29** of jig **22**, a strip of material **26** is laid on either side of the guide bar **28** and stapled to the registration bar at **24**. The registration bar with the sheets of material attached is now removed and may be rung on a rack ready for the first step in the silk screening process. This step is repeated until all strips of material have been secured, usually in multiple or at least in pairs, to registration bars.

In preparing the silk screen **55**, a master drawing **66** is stapled to a registration bar, which is positioned in the gutter of a registration board. This assembly is then placed on the silk screen table in position shown in FIGURE 1. Then, as indicated in FIGURE 2, a negative film or a hand stencil is accurately positioned over the master drawing and the silk screen frame after having been correctly located in the hinged clamps is lowered over and onto the stencil. The stencil is then adhered to the silk by conventional methods and the rest of the screen not covered by the stencil conventionally blocked out. It should be understood that where multiple color designs are to be silk screened a different stencil will be prepared and applied to a frame for each color desired. The silk screen frame is now raised and the master drawing is removed leaving the plain registration board in place and the silk screen again lowered into position. Ink of the desired color is placed in the opening of the silk screen frame and drawn across the frame, in the usual manner by the squeegee **68**, FIGURE 5, to apply the inked design **69** corresponding exactly with the original design **64**, directly on the surface of the registration board. The frame **54** is now lifted and the registration board with the inked design thereon is removed and placed in position, as shown in FIGURE 6, on the surface **40** of the carriage assembly **38** with the carriage **46** located in the rearward position, as clearly shown. The carriage **46** is now moved forward to cover the design and a registration bar, with blank sections **26** of material secured thereto, is positioned in the gutter **29** of the registration board, as shown in FIGURE 8, with the material draped over the carriage **46** as indicated in the same figure. Carriage **46** is now moved in the direction of arrow **70** and the material **26** will be slightly tensioned, to remove any wrinkles, as it moves over the surface of the carriage and down the sloping front edge **72** to be laid directly on the inked design **69** on the registration board. It will be evident that, in this position, the undersurface of the material will be completely coated with ink and, since the material is porous, some of the ink will be absorbed into and completely through it.

The final step in the process may now be completed. With the carriage **46** in its rearward position the registration board, with the registration bar and sections **26** of material already inked on one side, may be removed and re-positioned on the silk screen table as shown in FIGURE 9. Ink is drawn across the silk screen **55** by the squeegee **68** in the usual manner and the design is impressed on the upper surface of the sections of material **26**. During this step some of the ink will be forced through the material onto the registration board so that there will always be an adequate supply of ink on the board for the next cycle of operation. After completing this step the registration bar, with the finished pennants thereon, is removed and hung on any suitable drying rack.

It will be evident that, in a multi-colored design, the above steps should be repeated, a separate stencil and silk screen frame being provided for each color. Thereafter for the reuse of the silk screen frames to assure correct registration with the master drawing a frame is correctly positioned over the master drawing aligning the stencil therein with the master drawing, the clamp hinges **56** are then secured and guide blocks **62** are adjusted to contact the edges of silk screen frame **54** so that said frame is fixedly positioned.

From the above description it will be seen that the improved process insures equal distribution of inks or dyes on both top and bottom surfaces of material and complete impregnation of porous material. Correct registration and screening makes possible a vastly accelerated production rate per man hour. A further savings in cost is effected by the elimination of paper underlay and the elimination of wasted ink in the saturation of such underlay.

It is understood that minor variation from the form of the invention disclosed herein may be made without departure from the spirit and scope of the invention, and that the specification and drawings are to be considered as merely illustrative rather than limiting.

I claim:

1. Silk screening apparatus comprising:

a table having a wide slot defined in a substantially

flat surface thereof and opening to one edge of the table;

a registration board dimensioned to fit accurately and removably into said slot and having a substantially flat smooth surface area;

silk screen means on said table to apply a design in ink on said area;

a supporting member having a slot dimensioned to receive said registration board accurately positioned therein so that said registration board may be removed from said slot and placed in said supporting member;

registration means on said supporting member to locate one edge of a section of sheet material accurately with respect to said supporting member;

shiftable means, in one position thereof, holding said section of material out of contact with said area, said shiftable means being movable to a second position and laying said section of material flat and progressively onto said area to apply said design to one side of said section of material;

locating means to guide the replacement of said silk screen means in the first mentioned slot in the exact position assumed when said design was applied in ink to said area, whereby said registration board with said section of material thereon may be replaced in said table and the same design silk screened onto the other side of said section of material.

2. Apparatus according to claim 1 wherein said silk screen means includes a silk screen frame, and said locating means includes a hinge connecting said frame to said table.

References Cited

UNITED STATES PATENTS

112,871	3/1871	Walters	101—381
511,113	12/1893	Bruer	101—407
768,021	8/1904	Allers	101—413
1,197,874	9/1916	Wagner et al.	101—426
1,473,524	11/1923	Stockstrom.	
1,508,116	9/1924	Nantus	101—126 X
1,951,947	3/1934	Pistocco	101—129
2,076,474	4/1937	Luckie	101—123
2,122,043	6/1938	Pollard	101—129
2,178,259	10/1939	Kjell	101—123
2,386,962	10/1945	Low	101—252
2,462,376	2/1949	Fleisher	101—123
2,679,695	6/1954	Bungay	101—426
2,830,533	4/1958	Verderber	101—126
2,892,398	6/1959	Sutliff	101—126
2,928,340	3/1960	Stein et al.	101—116 X
3,017,823	1/1962	Farwell	101—123

FOREIGN PATENTS

60,043	3/1954	France.
5,472	4/1915	Great Britain.

ROBERT E. PULFREY, *Primary Examiner.*

WILLIAM B. PENN, *Examiner.*

N. A. HUMPHRIES, H. P. EWELL,

Assistant Examiners.