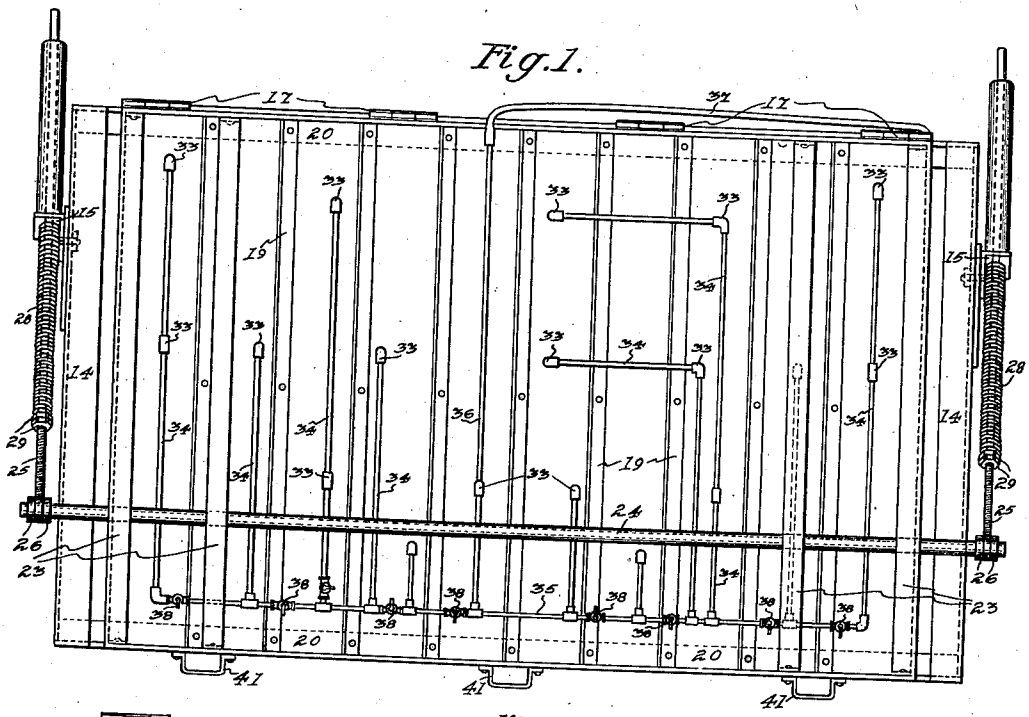
Dec. 3, 1940. P. M. NAHMENS 2,223,357

REFLECTOR SET-UP AND REGISTER TABLE

Filed July 17, 1939 3 Sheets-Sheet 1

Fig. 1.



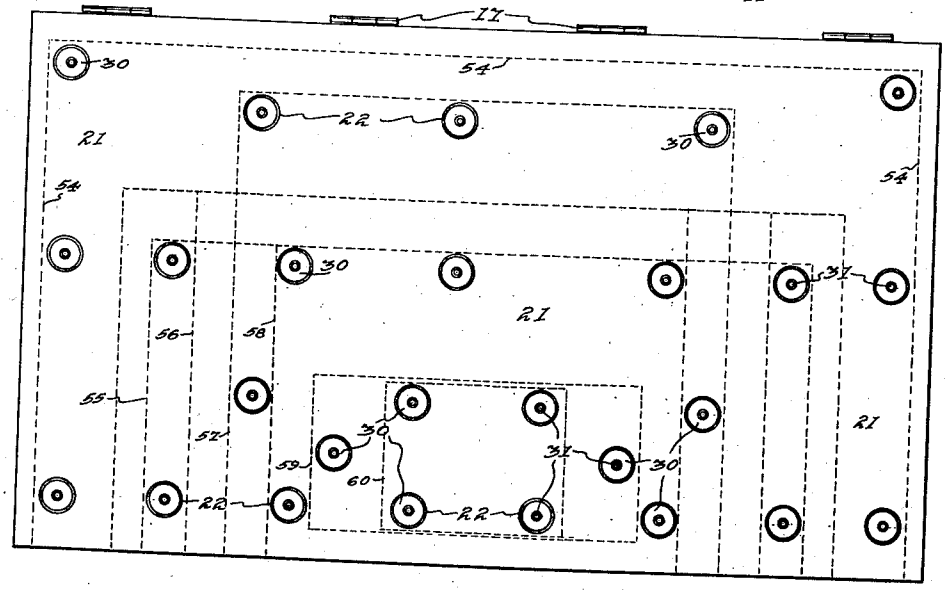


Fig. 2.

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REFLECTOR SET-UP AND REGISTER TABLE

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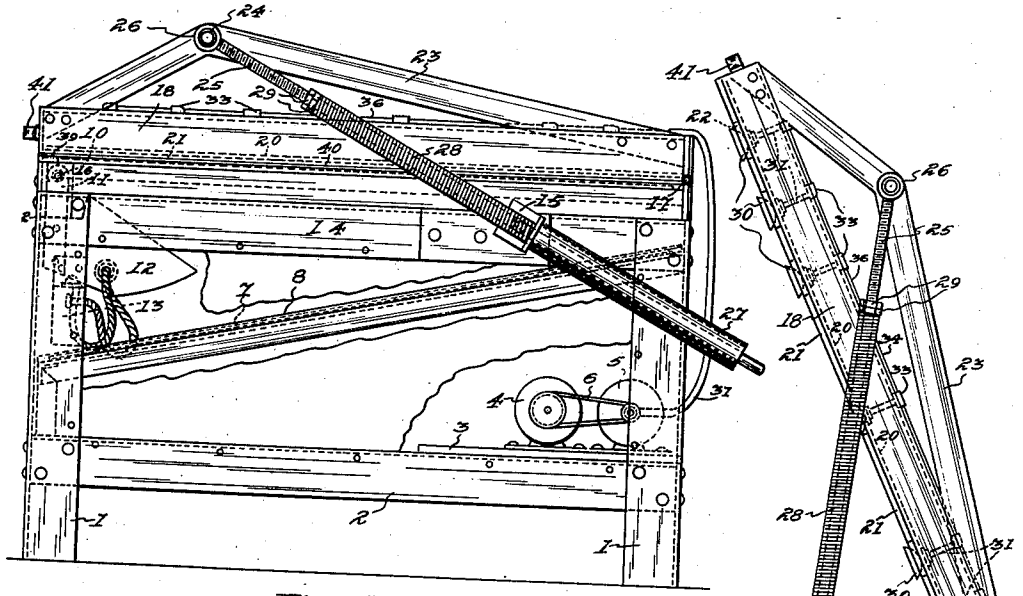


Fig. 3.

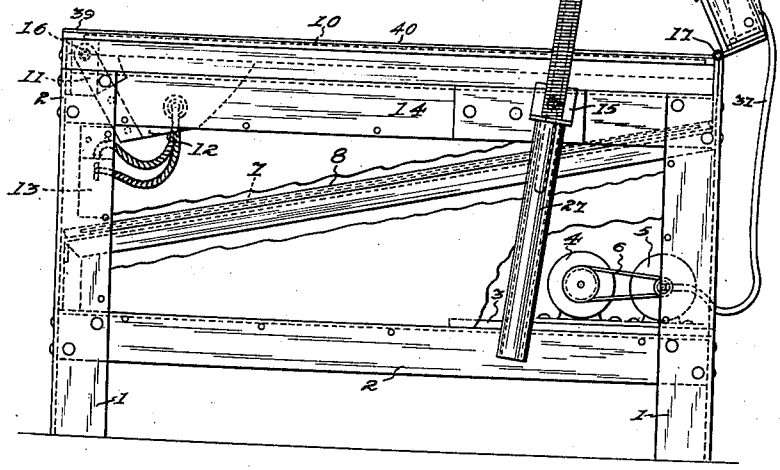


Fig. 4.

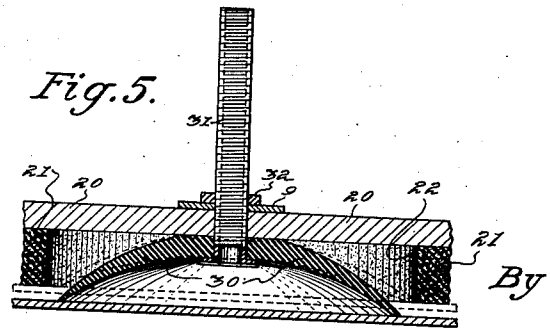


Fig. 5.

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REFLECTOR SET-UP AND REGISTER TABLE

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Fig. 6.

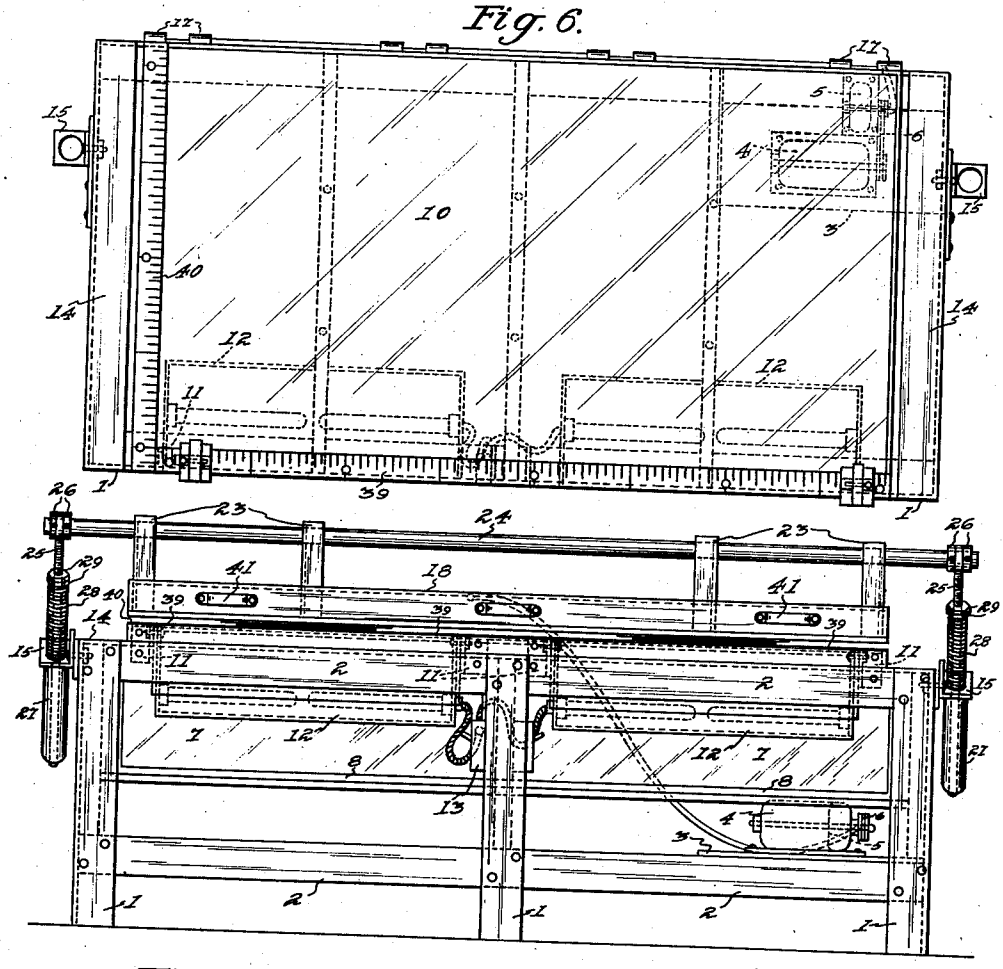


Fig. 8.

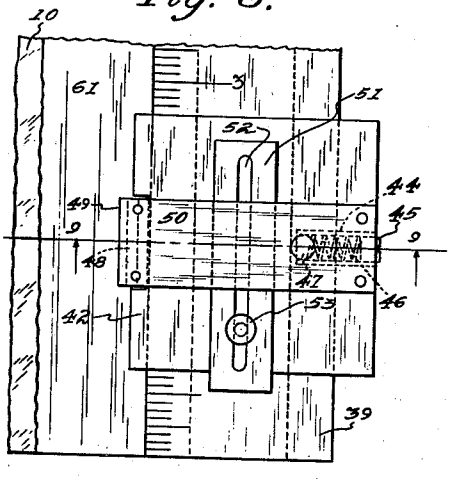
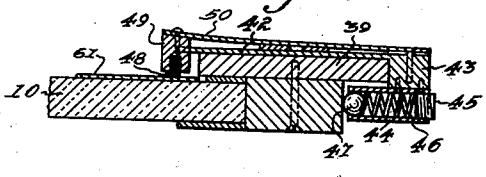


Fig. 7.

Fig. 9.



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UNITED STATES PATENT OFFICE

2,223,357

REFLECTOR SET-UP AND REGISTER TABLE

Paul Martin Nahmens, Evanston, Ill.

Application July 17, 1939, Serial No. 285,021

7 Claims. (Cl. 33—184.5)

This invention relates to improvements in reflector set-up and register tables for printers' use. The table is used in the corrugated box printing industry as well as in letter press and manifold printing and in such other industries as use rubber dies on backing board. The table provides a method of quickly and accurately attaching set-up and pre-registered dies on the backing board ready for printing, thus eliminating the costly and time wasting method of registering, time and again, dies when on the press cylinder. The method employed with the present table is simple and direct and does not require the services of an expert.

One object is to provide mechanism of this type that is almost entirely automatic in operation, that effects a great saving in time and labor and that functions very accurately. This is particularly true where color register is concerned, the saving of time and labor running from twenty-five to ninety per cent. A substantial saving of material is also effected.

The graphic arts industry, that is the letter press and offset lithographing use register tables wherein the printed sheet is laid printed side up and straight edges are used for determining the straightness of the printed pages or form. Means particularly adapted for use here are also provided. Particularly is the present table adapted for use in the corrugated box printing industry where rubber dies are used to print on corrugated paper as this paper would not stand up if metal dies were used under the pressure then required. The corrugated box industry today uses a graduated rule straight edge and marks out the position of the rubber dies on paper first, then glues these dies down on a mat which is ruled. This, however, is a slow and tedious method and not accurate, particularly when a second color is to be registered into the first. It is practically a hit or miss method. The present table is designed to overcome the weak points of the old procedure.

More specifically the invention consists in the combination and arrangement of parts to be hereinafter fully described, pointed out in the claims and illustrated in the accompanying drawings, in which—

Fig. 1 is a plan view of the present reflector set-up and register table.

Fig. 2 is an inverted plan view of the cover or pressure frame removed, showing the vacuum cups employed; various sizes of sheets to be printed being shown in dotted lines.

Fig. 3 is a view, slightly enlarged, in end elevation of the table with the pressure frame down, part of the enclosing sheathing being omitted.

Fig. 4 is a view similar to Fig. 3 but with the pressure frame in raised position.

Fig. 5 is an enlarged cross sectional detail view illustrating the vacuum cup assembly.

Fig. 6 is a top plan view of the table with the pressure frame removed.

Fig. 7 is a view in front elevation of the complete table in use and with the pressure frame down.

Fig. 8 is an enlarged fragmentary plan view of the setting attachment employed.

Fig. 9 is a vertical cross sectional view through Fig. 8, taken on the line 9—9 thereof.

Like reference characters denote corresponding parts throughout the several views.

The table is in the present instance of oblong shape and includes the supports or legs 1 that are connected and braced by the sides and rails 2. A platform 3 is provided for the motor 4 and air pump 5, within the frame, operatively connected by the belt 6, the table being enclosed on three sides and open only in front. Disposed above the platform and supported by the legs 3 is the mirror 7 arranged in a frame 8 and disposed at an oblique angle. The mirror is of substantially the same width but slightly less length than the table with its higher end at the back and its lower end at the front thereof. Top rails connect the legs 1 and provide a support for the horizontally disposed glass table top 10 secured thereto by the angles 11 and rivets, said top being of the same size as said mirror. The table top is of a predetermined thickness and the angular position or inclination of the mirror 7 has a direct relation thereto so that a true reflection is had.

Adjustably supported by the angles 11 below the table top are the reflectors 12, preferably two in number, disposed along the front of the table and preferably equipped with four twenty-four inch fluorescent mercury vapor lamps thus providing ample light and due to the structure and arrangement of said reflectors designed especially for the table an even light diffusion results. An Alcona aluminum specular lighting reflector formed in the shape of a double parabola with welded steel housing lamp receptacles is provided, the reflectors being adjustable toward and away from the table top on pivots 16 carried by the frame of top 10.

The lamps are operated from a single light switch 13 mounted to the front center leg of the

table. The end legs are connected by an angular metal sheathing 14, or continuation of the side sheathing, and to the same the angular perforated guide brackets 15 are pivotally secured for a purpose to be hereinafter set forth. Secured to the back of the table by hinges 17 is the top or pressure frame 18 reinforced by angular braces 19 extending from front to back across the bed 20 of the frame, said angles being disposed upon the upper or outer side of the same. Received upon the under side of the bed of the frame is a blanket 21 of sponge rubber or a like material but not too porous and formed with a plurality of rather large perforations 22 disposed in a predetermined manner. Handles 41 are provided for the frame.

Secured at their ends to the front and rear sides of the pressure frame are the arched bars 23, preferably four in number, the highest point in said bars being nearer the front than the back of said pressure frame, said bars being arranged in pairs near opposite ends of the frame and receiving through their highest points the tubular lift rod 24 that extends longitudinally of the table and beyond the ends thereof. Pivotally secured to the ends of said rod 24 are the eye-forming terminals of the threaded piston rods 25 secured in adjusted position by the stop collars 26, said piston rods extending through the perforated guide brackets 15 and through the sleeves 27, open at both ends, secured at one end to said brackets.

An expansion coil spring 28 receives each piston, one end of each spring abutting a bracket 15 and the other end abutting the lock nuts 29 adjustably arranged upon each piston rod between a spring and the pivoted end of the rod thus forming a weight-compensating support for the very heavy pressure frame. Arranged in each perforation in the sponge rubber blanket is a rubber suction cup 30 with its base disposed upon the floor 20 of the pressure frame and its mouth disposed outwardly, the diameter of said cup mouth being normally but lightly less than that of the perforation so that when pressure is applied upon the up it will partly flatten or broaden out at its mouth and close the blanket perforation, the exteriorly threaded hollow stem 31 of said cup extending through the floor, said stem being flanged interiorly of said cup and provided with a washer 9 and nut 32 whereby it may be releasably and operatively secured to said pressure frame. Each cup stem 31 is screwed into an elbow coupling 33 connecting it to a branch air pipe 34 coupled to a distribution pipe 35 connected to and fed through a supply pipe 36 connected by the flexible air hose 37 to the said air pump 5. Air cocks 38 are provided throughout the system in the distribution pipe 35 and one or more branch pipes as desired to control the air.

Referring again to the glass table top the same is provided along its forward edge, top side, with a steel rule 39 graduated in inches and fractions thereof and along its left end with a shrink rule 40 graduated .962 to the inch. This ratio allows for cylinder circumference, plus backing board and die on a 52" cylinder. Shrink rules for other size cylinders, such as 32" and 42" are, of course, readily provided. Slidably mounted upon opposite sides of the rule 39 are the removable setting attachments, manually operated and each of which includes a thin flat carriage 42, substantially square in shape, that extends across the rule and slightly therebeyond, said carriage having a thickened portion 43 of greater thickness than the rule which extends below the same and has secured thereto a guide consisting of a sleeve 44 having a threaded plug 45 in its outer end engaging the inner threaded periphery of said sleeve and receiving the inner end of the coil spring 46 in said sleeve.

The opposite end of said spring 46 is secured to the ball bearing 47 that abuts the glass frame. The rearward side of the carriage is bifurcated to provide clearance for the rubber foot 48 carried in a recessed portion of the lug 49 secured to the free end of the resilient finger 50 secured to the thickened portion 43 of said carriage, an elongated wedge 51 formed with the longitudinal slot 52 being inserted between said finger and carriage and releasably retained in adjusted position by means of the set screw 53 disposed in said slot and engaging the carriage.

Referring again to the vacuum suction cups the arrangement of the same upon the under side of the pressure frame is shown in Fig. 2. These cups are arranged in series to enable the pressure frame to pick up and retain backing boards of various sizes. The outermost series of cups are arranged close to the dotted line 54 denoting a backing board of substantially the area of the face of the pressure frame and they are connected by the two outermost branch air pipes 34 and distribution pipe 35 through supply pipe 36 and hose 37 to the air pump. The successively narrower backing boards denoted by the dotted lines 55, 56, 57, 58, 59, 60 are connected by the corresponding branch air pipes 34, pipe 35, supply pipe 36 and hose 37 to the pump also. The air cocks 38 are so located in the system, Fig. 1, that the series of cups from the outermost to the narrowest or innermost may be cut off from the pump as desired and depending upon the backing board being used.

In corrugated box printing a layout is first made by ruling the required lines on the glass top with china pencil, according to the graduated rules on the left and bottom of the glass top. One line is made for the top and one for the left side of the backing board, which is then lined up to these lines. The bottom of the board is lined against the bottom rule. All backing boards, regardless of size, are lined against the bottom rule as the vacuum cups are arranged in the blanket for this layout and in this manner a straight edge from which to work is provided. The backing board, now lined up, the pressure frame is manually lowered gently upon the board into horizontal position.

The very material weight of the pressure frame will cause the vacuum cups to assume the dotted somewhat flattened position shown in Fig. 5. The air cocks controlling any series of vacuum cups not contacting the board, due to the size of the backing board, are cut off. The other air cocks are open and the motor is started thus causing the pump to draw vacuum. A gentle manual pressure is now applied to the pressure frame to cause the cups to take hold. The pressure frame is manually raised to topmost position, Fig. 4, and manually released. The compression springs will retain the pressure frame in raised position and the vacuum being still on, the backing board will remain supported by the cups. The dies are now laid upon the glass top, face down. The backs of the dies are swabbed with blue and by looking into the mirror below where the dies are seen reflected they may be lined up with the top and left side ruled

guide lines into their correct position. The dies now being glued and registered, face down upon the glass top, the backing board, still held against the sponge rubber blanket by the vacuum cups is swabbed with glue. The pressure frame is now gently lowered until it rests upon the dies. The motor and pump are now shut off and a few seconds permitted to elapse after which a slight pressure with both hands is applied upon the handles. The pressure frame now rests in this position to permit the dies to set on the backing board. The pressure frame is now raised again to topmost position and the backing with dies removed from the glass top ready for the press.

The foregoing is for a one color job. To register a second, or additional colors, the one color job is permitted to remain for a short time with the pressure frame upon it and with the vacuum operating. The frame is now raised again together with the job and ink is supplied to the dies. The pressure frame is now lowered with the job upon the glass top and a slight manual pressure applied to said frame in order that the dies may make an ink impression upon the glass top. The vacuum is now released and the pressure frame manually raised. The job is carefully removed from the surface of the glass top and an image of the job will be found upon the glass. Now, to register a second and subsequent colors: When the dies are set for the first color on backing, instead of shutting off vacuum, it is left on and the pressure frame raised back into position with the completed first color on it.

The entire job is now inked, the pressure frame brought down again upon the glass top, an image made of it, the vacuum released, and the first or key color taken off the table. All subsequent colors are registered in this key form by looking into the mirror and then repeating the same operations performed on the first color. Each backing will have the same margins, left and bottom side, because the backings were laid to a predetermined guide line and shifting will not be necessary nor will there be any occasion for shifting dies if they have been carefully registered by the reflection in the mirror. The weight of the pressure frame is such that it anneals the board and die together and it is backed by a sponge rubber blanket of sufficient thickness to compensate for any differential or variations in the dies, thus making sure that all dies will contact the backing when the pressure frame is lowered. The compression springs balance the weight of the pressure frame and when raising or lowering same no effort is required. These springs can be loosened or compressed thus increasing or lessening the tension as desired.

In letter press and offset lithographing, register tables wherein the printed sheet is laid, printed side up, the layout sheet 61 is applied to the glass top and held in position by the setting attachments described, the mirror 7 not being required. The layout of the dies is made upon this sheet. The attachment, Fig. 9, used in this type of work is not employed for corrugated box printing but is removed from the table.

What is claimed is:

1. In a reflector set-up and register table, a support, a transparent top therefor, a mirror carried by said support beneath said top and disposed at an angle to the latter, lamps carried by said support between said mirror and top, a pressure frame adjustably secured to said support, and vacuum operated pickup and support means arranged in said pressure frame.

2. In a reflector set-up and register table, a support, a transparent top therefor, a mirror carried by said support beneath said top and disposed at an angle to the latter, the angle of said mirror being determined by the thickness of said top, lamps adjustably carried by said support between said mirror and top, a pressure frame adjustably secured to said support above said transparent top for movement to and from the same, and vacuum operated pickup and support means arranged in said pressure frame.

3. In a reflector set-up and register table, a support, a transparent top therefor, marginal rules for said top, a mirror carried by said support beneath said top and disposed at an angle to the latter, lamps carried by said support between said mirror and top, a pressure frame adjustably secured to said support, a flexible blanket in said pressure frame, vacuum operated pickup and support means arranged in said pressure frame, said means including suction cups disposed in said flexible blanket, and weight-compensating means connecting said pressure frame and support.

4. In a reflector set-up and register table, a support, a transparent top therefor, marginal rules for said top, a mirror carried by said support beneath said top, lamps carried by said support between said mirror and top, a pressure frame adjustably secured to said support above said transparent top, a flexible blanket in said pressure frame, vacuum operated pickup and support means arranged in said pressure frame, said means including suction cups disposed in said blanket, said cups being arranged in series operative independently of each other whereby objects of different sizes placed upon said transparent top may be engaged.

5. In a reflector set-up and register table, a support, a pressure frame adjustably carried thereby, a perforated flexible blanket carried by said pressure frame, resilient suction cups arranged in the perforations in said blanket, said cups closing said blanket perforations in their operative position, hollow stems for said cups, and air suction means operatively connected to said stems to actuate said cups when the same are in engagement with an object.

6. In a reflector set-up and register table, a support, a transparent top therefor, marginal rules for said top, lamps adjustably carried by said support beneath said top, a setting attachment for layout paper adjustably secured to opposite ends of one of said rules, said attachment including a carriage directly movable upon said rule, a paper-engaging foot carried thereby and resiliently supported, and a wedge adjustably received between said carriage and foot carrier.

7. In a reflector set-up and register table, a support, a transparent top therefor, a pressure frame adjustably carried by said support, and vacuum operated pickup and support means arranged in said pressure frame for engagement with objects disposed upon said transparent top, said means including a resilient blanket of sufficient thickness to absorb inequalities in the thicknesses of objects engaged.

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