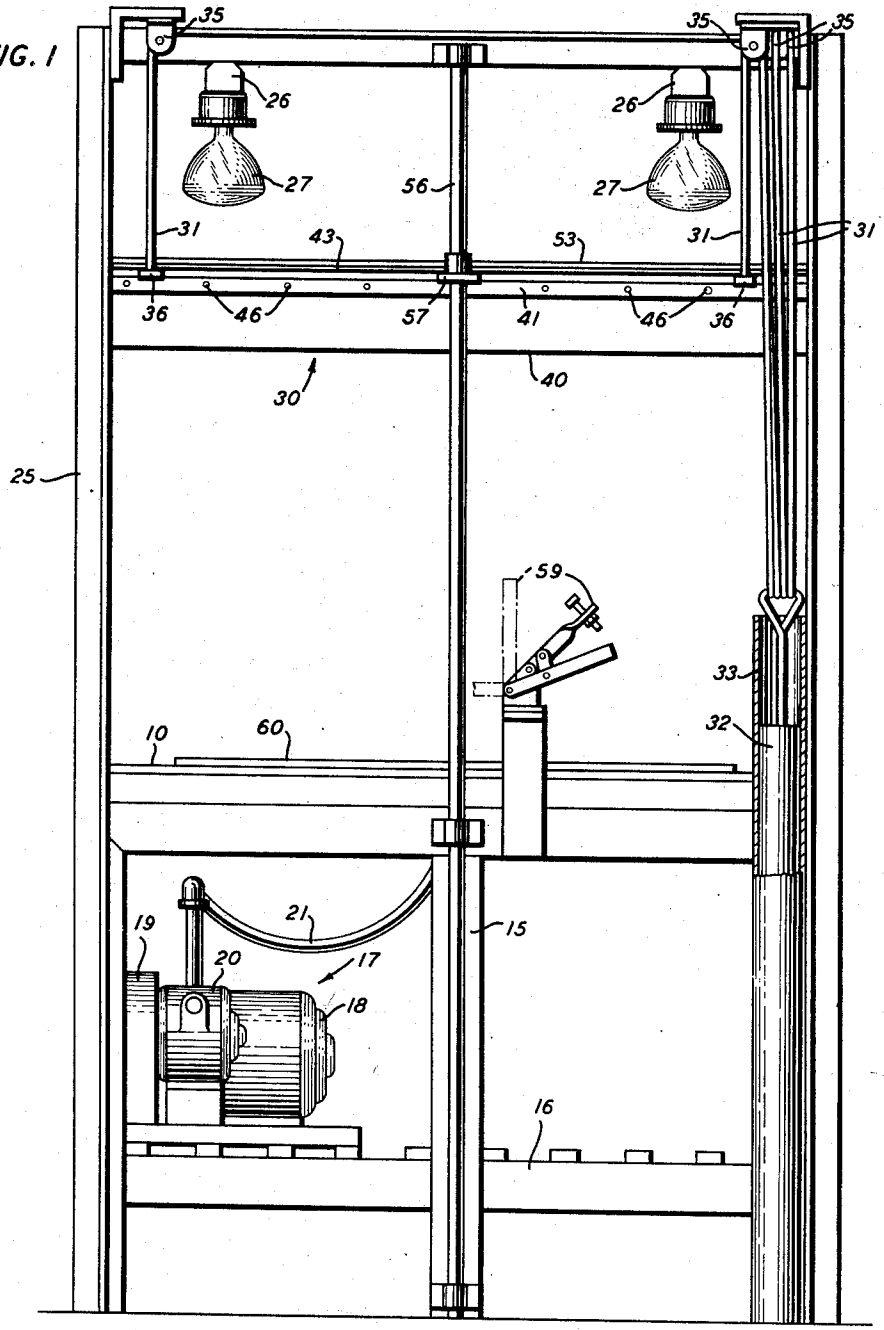
March 16, 1954 J. DAVIDSON 2,672,080

VACUUM PRINTING APPARATUS

Filed Dec. 1, 1950 4 Sheets-Sheet 1

FIG. 1



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VACUUM PRINTING APPARATUS

Filed Dec. 1, 1950 4 Sheets-Sheet 2

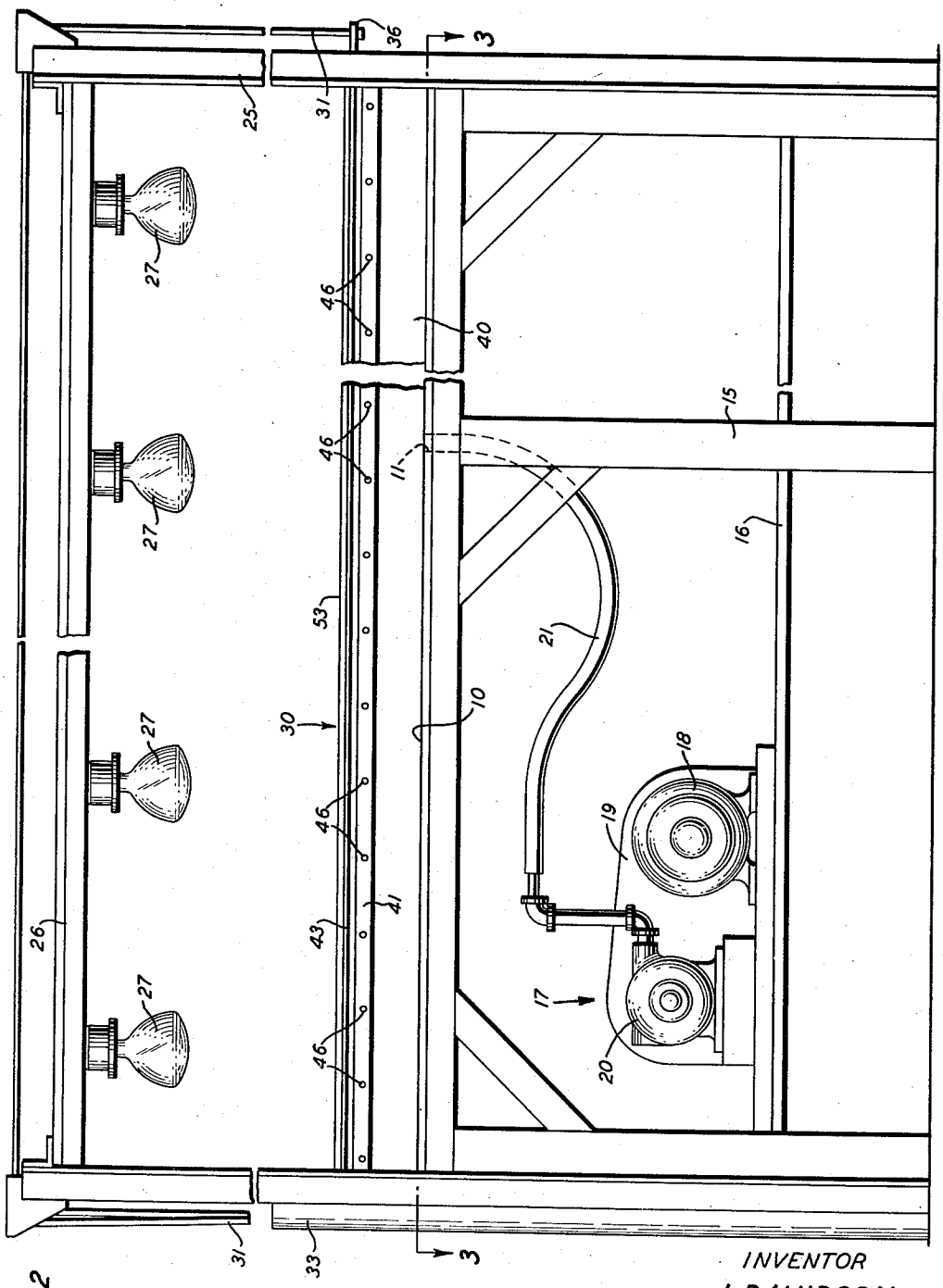


FIG. 2

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VACUUM PRINTING APPARATUS

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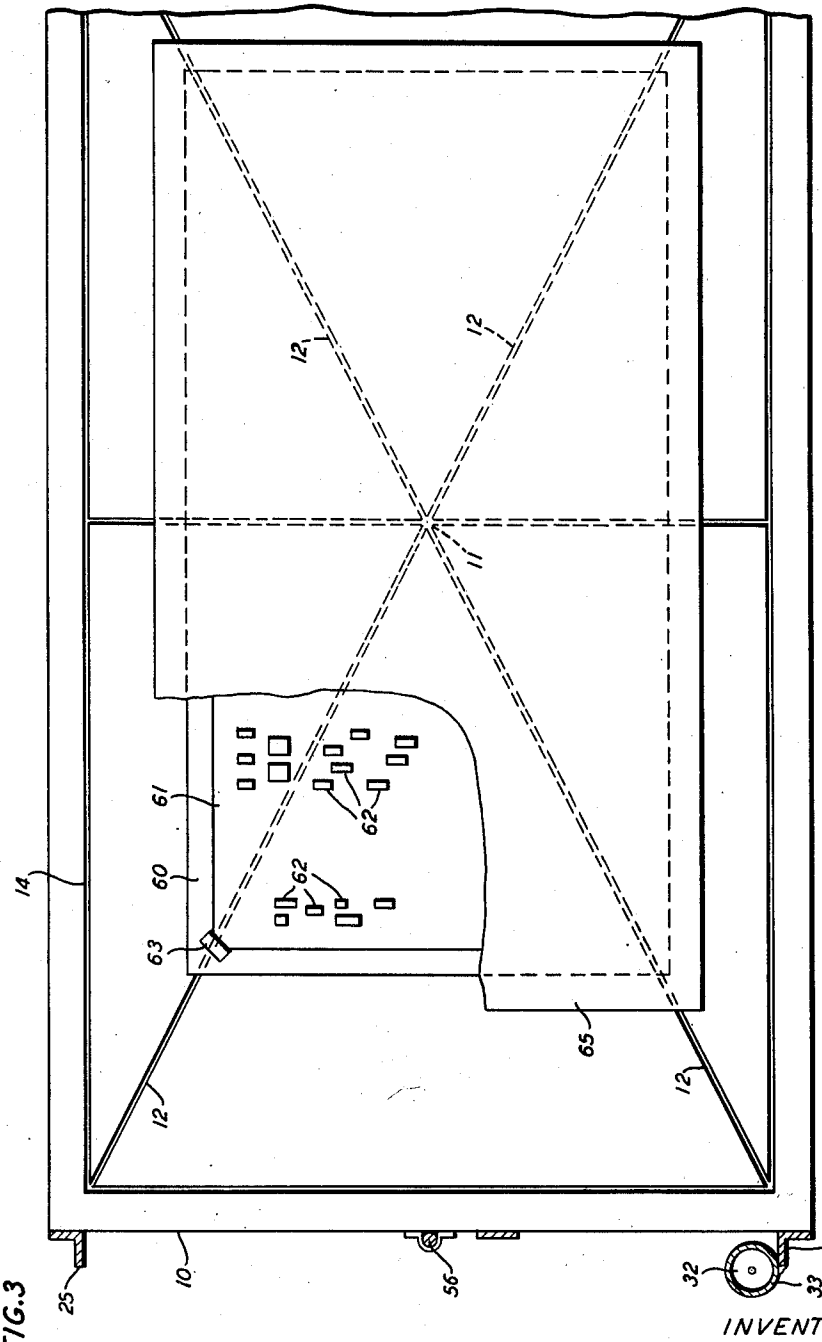


FIG. 3

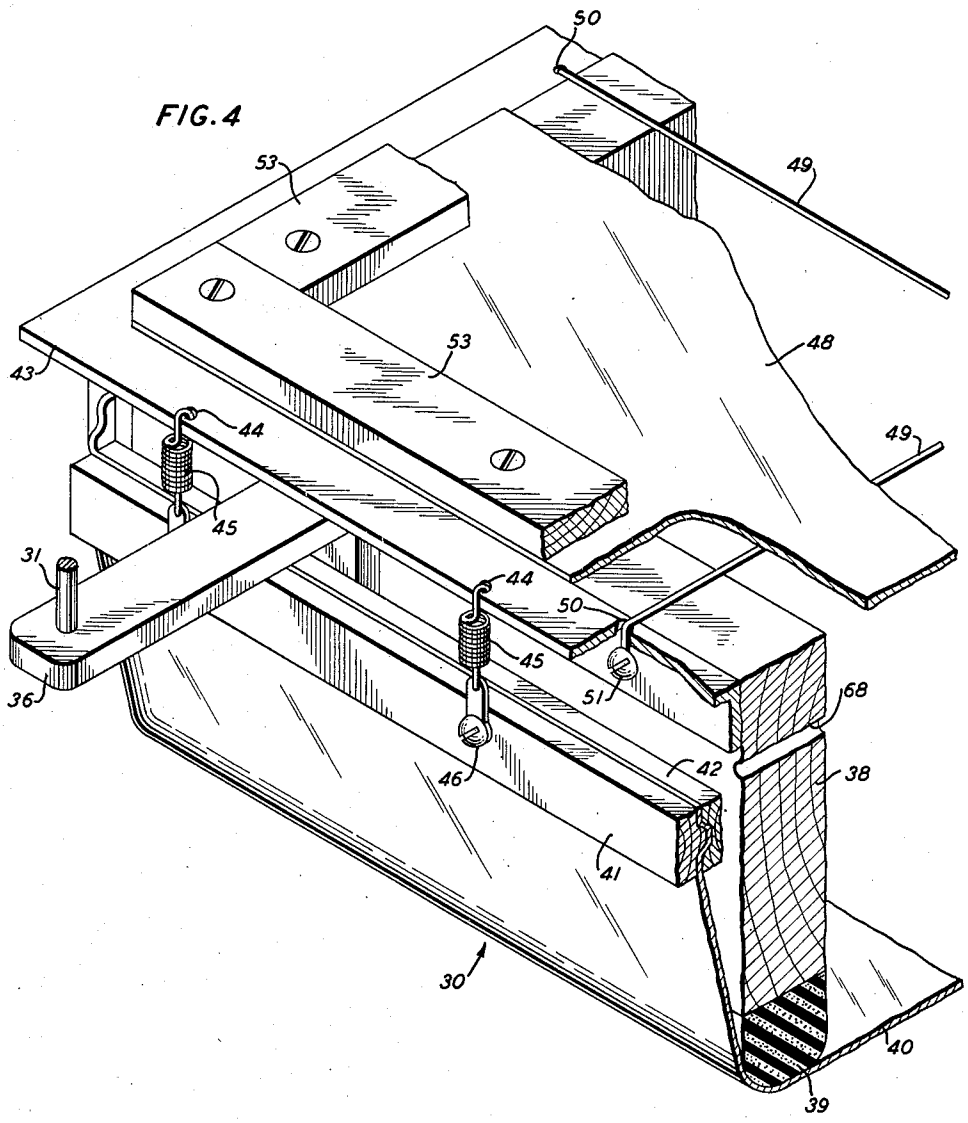
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FIG. 4



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VACUUM PRINTING APPARATUS

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3 Claims. (Cl. 95—76)

1

This invention relates to printing apparatus for reproducing prints of drawings or the like and more particularly to apparatus for rapidly reproducing prints of loose template floor plan layouts.

In manufacturing plants as well as in stores of considerable size and numerous industries, it is frequently necessary to make changes in the layouts or locations of machines, desks, or other equipment. In manufacturing concerns it has been the practice for an engineer in laying out a given area to do preliminary planning with templates on a floor plan of that area. In making proposed layouts of the templates representing the furnishings or machines required to be placed in the area, the engineer would either make drawings of the layout or obtain photographs thereof. In making drawings of the layouts, the time required and considerable added expense were disturbing factors. Photographing also involved delays and could be used only for the smaller layouts, the larger or complete layouts being too large to be photographed. Furthermore, if there should be the slightest change in the layout, including the removal or movement of any one of the templates or the addition of one or more templates, the entire work had to be duplicated or the drawing modified, requiring additional prints and/or photographs.

An object of the invention is to provide a printing apparatus which is simple in structure yet efficient in rapidly reproducing prints of drawings or the like.

With this and other objects in view, the invention comprises a printing apparatus for reproducing prints or drawings or the like wherein a table, to support a drawing and a sheet of sensitized paper superimposed on the drawing, has an outlet leading to an exhaust machine, and grooves, extending from the outlet in different directions beyond the drawing so that a transparent blanket mounted for movement relative to the table may be drawn by vacuum into the grooves surrounding the drawing to pull the blanket into intimate engagement with the paper and force it into close engagement with the drawing so that a source of light may be directed through the blanket and the contact paper to reflect from the drawing, causing reproduction of the drawing on the contact paper.

In the present embodiment of the invention, the drawing includes a floor plan upon which numerous templates, representing objects to be placed at selected positions in the building or room represented by the floor plan are positioned

2

loosely on the drawing. Furthermore, the blanket is drawn beneath the bottom of a rectangular frame having a foam rubber cushion or gasket to be compressed by clamps acting on the frame to press the blanket into intimate engagement with the periphery of the table surrounding the drawing, the templates, the contact paper and all of the grooves in the table, so that the vacuum may draw the blanket into close engagement with the paper and cause it to conform to the templates and drawing.

Other objects and advantages will be apparent from the following detailed description when considered in conjunction with the accompanying drawings wherein:

Fig. 1 is an end elevational view of the apparatus;

Fig. 2 is a front elevational view of the apparatus;

Fig. 3 is a horizontal sectional view taken along the line 3—3 of Fig. 2; and

Fig. 4 is a fragmentary isometric view of the blanket supporting unit.

Referring now to the drawings, the apparatus includes a table 10 which is formed of suitable material, preferably metal, rectangular in general contour and of sufficient size to receive the largest article or drawing to be reproduced. The table has an outlet 11 at its center with grooves 12 extending diagonally through the top surface of the table and connected at their outer ends by a rectangular arrangement of connected grooves 14, terminating short of the outer edges of the table and forming a complete circuit, joining the grooves 12 with the outlet 11. The table 10 is supported on a bench-like structure 15 which has a shelf 16 upon which a vacuum creating unit 17 is mounted. The unit 17 includes a motor 18 to drive a speed reducing unit 19 which in turn drives the vacuum pump 20 connected to the outlet 11 of the table through a line 21.

A frame structure 25 has a horizontal portion 26 supporting a series of floodlights 27 which may be included in one or more circuits to be closed so as to illuminate the floodlights for a given length of time during printing of a drawing or other articles as hereinafter described.

A blanket unit 30 is movable within the framework 25 from the position shown in Fig. 1 above the table to the printing position shown in Fig. 2. The unit 30 is supported by chains or cables 31 extending from a counterbalancing weight 32, housed in a tubular member 33, over pulleys 35 to their respective corners of the unit 30 where

they are connected to outwardly extending flanges 36.

The unit 30 is composed of a rectangular frame 38, similar in size and contour to the table 10 and having a cushion-like gasket 39 secured to its lower surface and formed of a suitable material such as foam rubber. A blanket 40, formed of a transparent flexible material, has its edges, along the four sides of the frame 38, connected to sets of interlocking strips 41 and 42, provided with longitudinal tongues and grooves to assure positive connection with the blanket. A rectangular flange 43, angular in cross section, is secured to the upper portion of the frame 38 and has spaced apertures 44 to receive the upper ends of springs 45, the lower ends of the springs being connected at 46 to the sets of strips 41 and 42.

A sheet of transparent colored filtering material 48 extends across the top of the frame 38. At selected spaced positions, over the top of the frame 38, fine music wires 49 are strung longitudinally and laterally with respect to the frame, having their ends extending through apertures 50 in the angular flange 43 and secured by the aid of screws 51 to support the filter 48 against sagging. The edges of the filter 48 are firmly secured to the frame 38 by strips 53.

Parallel guide rods 56, disposed at opposite ends of the bench 15 and frame 25 and secured thereto, serve to guide the unit 30 in its movement toward or away from the table 10. The unit 30 carries brackets 57 to slide on the guide rods 56 and be engaged by their hold down clamps 59 mounted on the bench at the ends thereof and actuable into engagement with the brackets 57 when the unit 30 is in the position shown in Fig. 2.

Considering now the operation of the apparatus, the description of the apparatus has not included a layout board 60 which may be employed as a direct support for the drawing 61 and the templates 62. Normally, the unit 30 is in its upper position shown in Fig. 2. The article to be printed may be placed on the layout board 60 and held in place by suitable means, such as Scotch tape 63, supporting the templates 62 loosely on the drawing at their predetermined positions. A sheet 65 of sensitized paper is placed over the drawing after which the unit 30 is lowered to a position in engagement with the table. The clamps 59, when moved into engagement with the brackets 57, compress the cushion-like gasket 39 to force the blanket 40 into intimate engagement with that portion of the table which surrounds the grooves 12 and 14. Apertures 68, disposed at spaced positions about the frame 38, assure maintenance of air within the unit 30 at atmospheric pressure.

The operator may then energize the motor 18 to create a vacuum in the numerous grooves 12 and 14 connected to the outlet 11 whereby the blanket will be drawn throughout this area into close engagement with the sensitized paper 65, forcing it into close engagement with the templates and drawing, holding the templates against displacement and assuring their proper positions while the reproduction of the templates and drawing is being made. The operator then causes the illumination of the floodlights 27 for a given length of time. The rays of light from the lamps 27 will be filtered by the element 48 and directed through the blanket 40 and the sensitized paper 65, where the rays will be reflected by the drawing 61 and the templates 62 to cause reflex printing of the drawing and templates on the underside or emulsion surface of the paper. When the printing has been completed, the circuit to the lamps may be opened after which the unit 30 may be raised, at which time the exposed paper 65 may be removed and the necessary steps applied for its development and the making of prints therefrom which are not included in this apparatus.

While the drawing with the original arrangement of templates remains on the table, subsequent arrangements of the same templates or with additional may be made, and additional prints taken thereof before removing the drawing from the apparatus. All that is necessary is the provision of new sheets of sensitized paper 65 for each print, the placing of the paper over the drawing and templates, and carrying out of the printing operation by closing the unit 30, sealing it about the drawing and illuminating the lamps for a given length of time. Through this arrangement, recordings or prints may be made of each preliminary plan as well as the final plan for layout regardless of the size. Furthermore, the apparatus facilitates the making of changes as new objectives or ideas are considered, eliminating the necessity of making duplicate sets of templates to illustrate previous layouts, various proposed layouts and final layouts.

Whether the apparatus reproduces positive or negative prints depends mainly upon the type of sensitized paper employed. In either instance the light rays must pass through the sensitized paper and be reflected by the white areas of the drawing and templates back to the emulsion surface of the paper.

It is to be understood that the above described arrangements are simply illustrative of the application of the principles of the invention. Numerous other arrangements may be readily devised by those skilled in the art, which will embody the principles of the invention and fall within the spirit and scope thereof.

What is claimed is:

1. A printing apparatus for reproducing prints of drawings or the like, the apparatus comprising a supporting frame-work composed of a plurality of vertically extending members secured together at the upper extremities thereof, a table secured within said frame-work to support a drawing and a sheet of sensitized paper with its emulsion surface on the drawing, said table having an outlet and grooves extending from the outlet in different directions beyond the drawing and paper, a transparent blanket, an open frame similar in size and contour to the periphery of said table, means including guide rods attached vertically to said frame-work and means on said frame slideably connected to said guide rods to secure said frame within said frame-work above said table for movement relative to said table, a resilient gasket fastened to the lower extremity of said frame, means for securing said blanket to the outside of said frame with said blanket passing under and in taut engagement with said resilient gasket, whereby when said frame is moved into engagement with said table said blanket will be drawn more taut and a pneumatic seal will be created between said blanket and said table, a vacuum pump connected to said outlet and grooves to draw said blanket toward said table to cause it to hold the sensitized paper in close engagement with the drawing, and a lamp secured within said frame-work and above said

frame to direct rays of light through said blanket and the sensitized paper to the drawing where they will reflect from the drawing onto the emulsion surface of the paper to create a reproduction of the drawing on the paper.

2. A printing apparatus according to claim 1 further including pulleys connected to said frame-work and ropes passing over said pulleys and each connected to said frame at one extremity and to a counterbalancing weight at the other extremity thereof.

3. A printing apparatus according to claim 1 in which the means for securing said blanket to the outside of said frame includes resilient fastenings.

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