

Oct. 8, 1963

L. HUTCHINS
CONTACT PRINTING DEVICE

3,106,145

Filed May 9, 1962

4 Sheets-Sheet 1

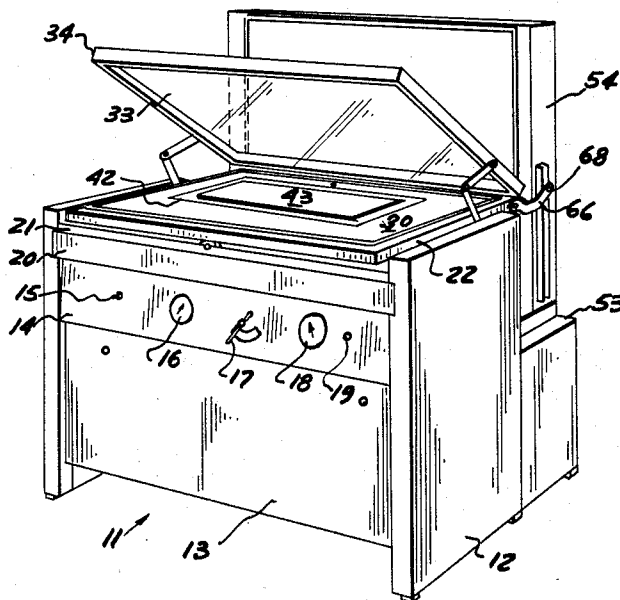


Fig. 1

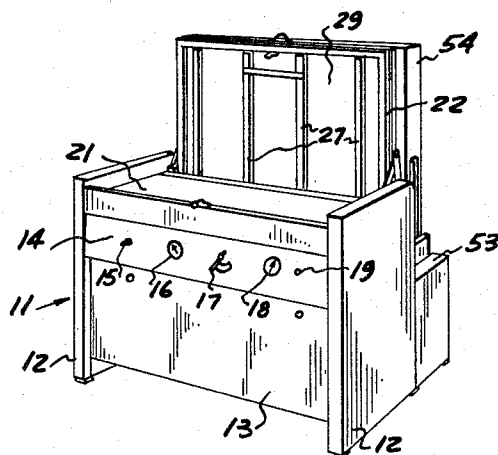


Fig. 2

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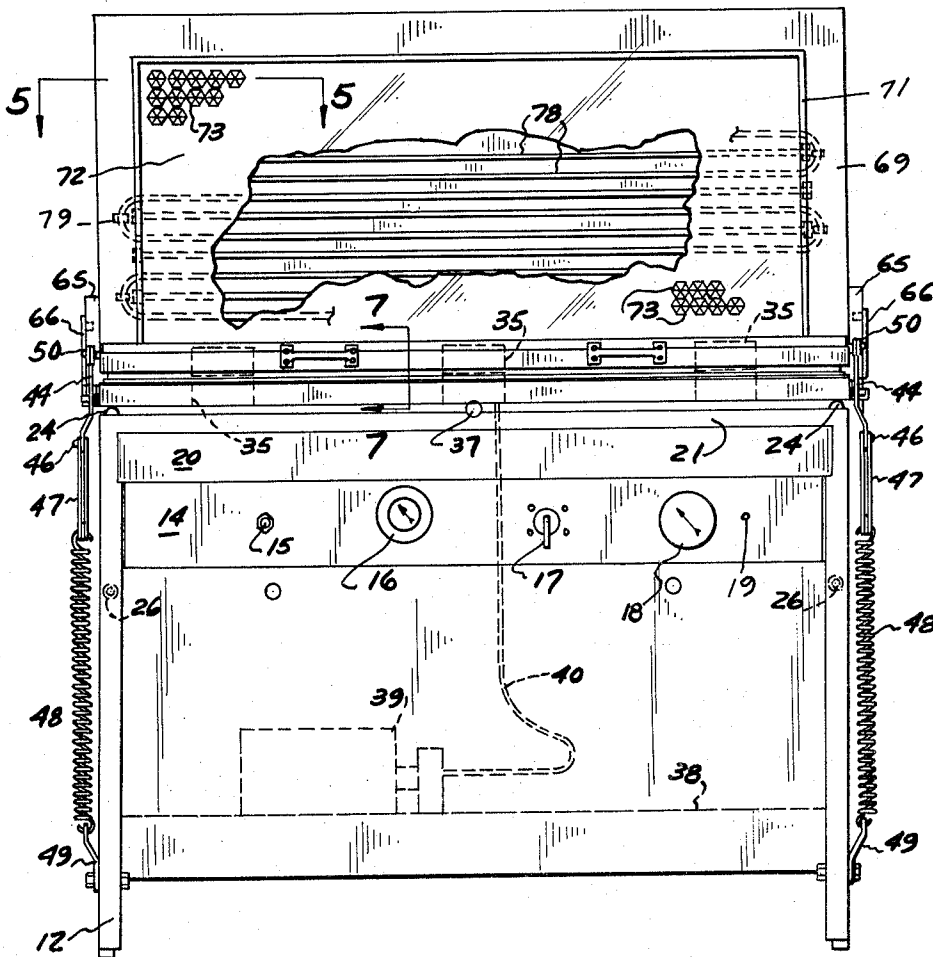
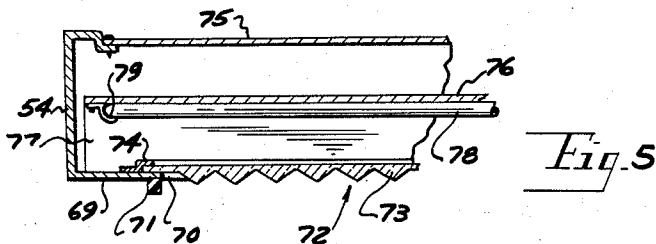
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4 Sheets-Sheet 3

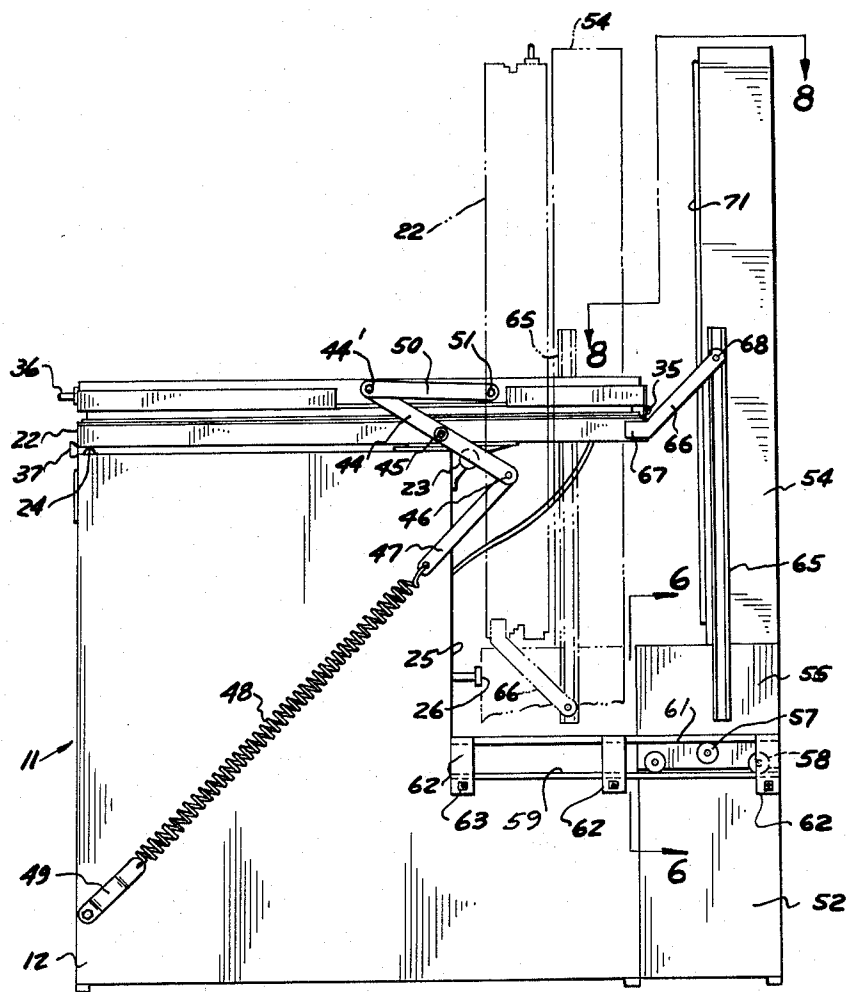
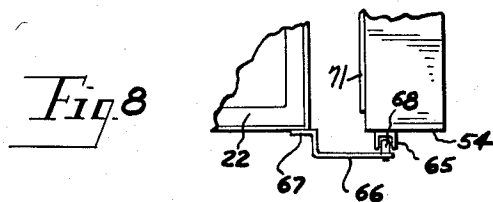


Fig. 4

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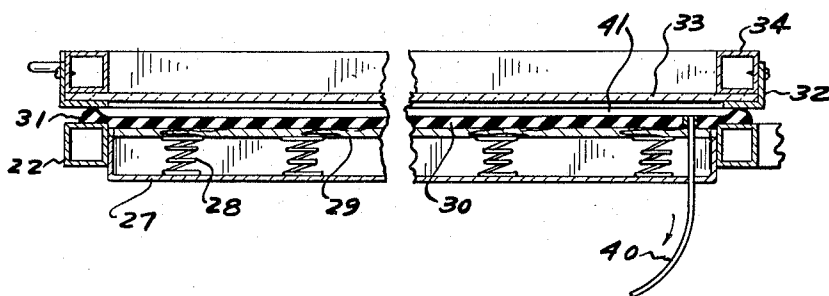
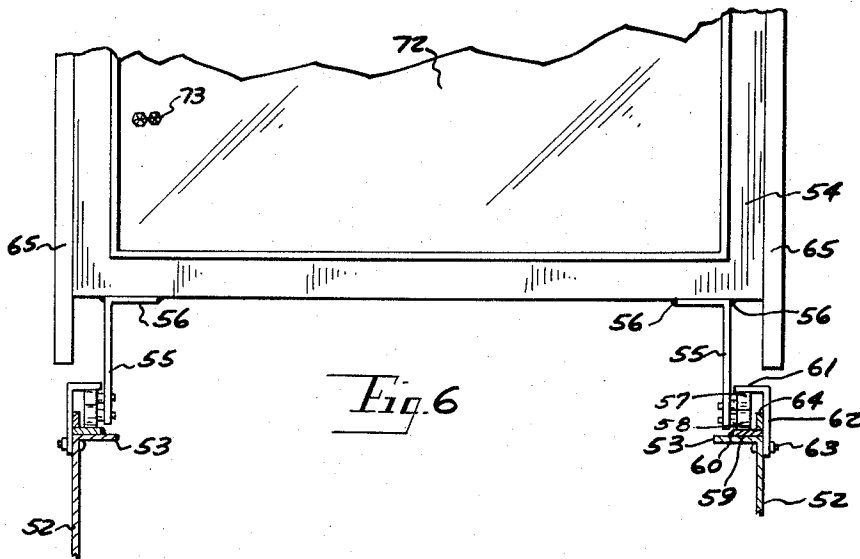
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3,106,145

CONTACT PRINTING DEVICE

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Filed May 9, 1962, Ser. No. 193,500
8 Claims. (Cl. 95-73)

The present invention relates to a vacuum printing device and more particularly to a graphic art printer.

Heretofore in this industry, the light source employed has normally been a high voltage or 220 volt arc lamp wherein the carbons had to be replaced from time to time, heavy wiring was required and there was always the danger of a electric overloading.

Other complaints in the use of arc lighting for this purpose have been directed to the odor of the arc lamps, as well as the nerve jangling stray light and noise produced thereby. Accordingly, one of the objects of the present invention is to provide an improved type of light source which eliminates the use of arc lighting and wherein cathode lighting is employed at normal 110 input voltage.

This has many advantages, including low cost of operation, long life of the tubes employed, and as hereunder set forth production of a compact unit which incorporates the light source within a diffusing light frame to form an integral part of the printer, if desired.

It is an object therefore of the present invention to provide a light frame for use in conjunction with a vacuum printer wherein the light source is self-contained within the light frame and wherein means are employed for using a series of cold cathode lighting tubes in a low voltage input circuit and with means for concentrating and diffusing the light for uniform direction to the assembled glass and blanket frames which form a part of the vacuum printer.

It is another object of the present invention to provide in conjunction with a graphic art printer a combination blanket frame and glass frame which for printing purposes may be tilted to an upright position and wherein the light frame mounted upon the base of the device is movably mounted so as to move into close contact and sealing engagement with the glass frame automatically when the glass frame and associated blanket frame has been tilted to an upright exposure position.

Another object in the present invention in the use of the self-contained diffusing cold cathode lighting system is to eliminate objectionable fumes and the blinding flash of light characteristic of arc lighting heretofore employed in constructions of this type. It is therefore another object of the present invention to provide a light source for vacuum printing in the nature of a light frame which is mounted upon the printer and which contains a diffusable but concentrated light source therein by which the sensitized plate or material during the printing process is exposed to a strong, extremely well-distributed light.

This cool light source reduces exposure time and provides results equal to, if not better than the quality produced by the slower arc lamps heretofore employed, and wherein further the lamplight has an average of 7000 to 10,000 hours of operation as contrasted with the relatively shorter life of the arc lamp lighting source heretofore employed.

Another object of the present invention resides in the fact that there is incorporated into the present printer a base with associated horizontally disposed bed upon which the blanket frame is normally mounted horizontally in a work position and which has hingedly connected thereto a separately pivotal glass plate which may be raised relative to a blanket plate and which for printing operation is moved down into parallel sealed relation with respect thereto and thereafter the entire assembly tilted to an upright position for an exposure, or a printing operation.

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The present invention therefore incorporates a light frame which is mountable on the same base, though which normally spaced rearwardly of the tiltable frames above referred to, is automatically moved into sealing parallel engaging relation with the glass and blanket frames when the two have been tilted to an upright position. The advantage of this construction is that the light source provided and built into the present machine is utilized entirely within the confines of the machine for the exposure of the sensitized material between the glass and blanket frames to thus overcome many of the objections of conventional types of printers known to the art.

These and other objects will be seen from the following specification and claims in conjunction with the appended drawings in which:

FIG. 1 is a front perspective view of the present printer with the glass frame partially elevated with respect to the horizontally disposed blanket frame in work position.

FIG. 2 is a similar perspective view on a slightly reduced scale and wherein the glass and blanket frames have been tilted to an upright exposure position and the light frame has been automatically moved into sealing juxtaposition with respect to the said tilted frames.

FIG. 3 is a front elevational view of the printer shown in FIG. 1, and wherein the glass frame has been pivoted to the horizontal work position and wherein portions of the light frame have been broken away for illustration of the interior construction.

FIG. 4 is a right side elevational view thereof with the outer wall covering of the one end of the base removed to permit illustration of the toggle mounting for the glass and blanket frames.

FIG. 5 is a fragmentary section on an enlarged scale taken on line 5-5 of FIG. 3, particularly directed to the construction of the light frame.

FIG. 6 is a fragmentary section taken on line 6-6 of FIG. 4, illustrating the mounting of the light frame with respect to the base of the printer.

FIG. 7 is a transverse fragmentary section taken on line 7-7 of FIG. 3, on an increased scale illustrating the construction of the glass and blanket frames.

FIG. 8 is a fragmentary section taken on line 8-8 of FIG. 4, illustrating the bracket connection between the blanket frame and the light frame.

It will be understood that the above drawings illustrate merely a preferred embodiment of the invention, and that other embodiments are contemplated within the scope of the claims hereinafter set forth.

The present vacuum graphic art printer includes a base, generally indicated at 11, with upright side walls 12, the removable upright front wall 13, instrument panel 14 and the drawer 20 positioned below the horizontally disposed bed 21 interposed between said end walls 12.

Said instrument panel includes switch 15, the vacuum gage 16, the vacuum control valve 17, timer 18 and the safety light 19, which will glow while electrical contact is established to the lighting source hereinafter described.

The present blanket frame, generally indicated at 22, is constructed of a seamless steel tubing, for illustration, suitably welded into a unit, and intermediate its front and rear, is pivotally mounted at 23 upon the bed 21, forming a part of the base and is adapted to tilt to the dotted line position shown in FIG. 4, as well as that which is shown in FIG. 2, for a printing operation hereafter described, suitable cushion stops 24, being provided, as shown in FIG. 4 for supporting the blanket frame 22 in the horizontally disposed work position.

Base 11, as shown in FIG. 4, includes the upright rear wall portion 25 from which projects one or more cushion stops 26 adapted to cooperatively engage the blanket frame 22, when tilted to the upright printing position

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shown in FIG. 4 and for limiting such pivotal movement.

The said blanket frame includes, as shown in FIGS. 2 and 7, a series of hollow channels 27 which are secured within the blanket frame 22, and which include a series of compression springs 28 to supportably and yieldably engage the platform 29, preferably constructed of wood, over which is positioned the preferably rubber flexible blanket 30 which includes the outer peripheral sealing bead 31 adapted for cooperative sealing engagement with the glass frame 34 when tilted into cooperating engaging relation, as shown in FIGS. 4 and 7.

The said glass frame, which is reasonably conventional in construction, includes the peripheral stripping 32 formed of angle members and secured to the frame 34 for the purpose of mounting the clear glass plate 33 upon the undersurface of the said glass frame 34.

The said glass frame is pivotally or hingedly mounted as at 35 at its rear to a rear portion of the blanket frame 22 and is therefore adapted for relative angular movements with respect to the said blanket frame, as best illustrated in FIG. 1, a suitable handle at 36 being employed to facilitate initial lifting of the said glass frame 34 for pivoting the same upwardly. With the catch 37 disengaged, however, and with the glass frame and the blanket frame in assembled relation, application of the handle 36 facilitates tilting of the two frames simultaneously to the upright position shown in FIG. 2, or in dotted lines in FIG. 4.

Upon the platform indicated at 38, FIG. 3, there is provided a suitable vacuum source with associated vacuum tank, generally indicated at 39, and which includes the conduit 40, which at its upper end extends through the blanket frame 22, and terminates at the upper surface of the said blanket frame in the space 41 between the glass and blanket frames.

In the conventional operation of the present vacuum printer, a sensitized sheet of material 42, or a sensitized plate is properly positioned upon the blanket frame as shown in FIG. 1. Superimposed thereover is a suitable negative 43, after which the glass frame is tilted downwardly to sealing engagement with the blanket frame, as best shown in FIG. 7. At that time the vacuum source is energized, such as by the switch 15, and by creating the vacuum or low pressure condition within the space 41, it is seen that the flexible blanket 30 will move upwardly bringing the negative 43 and assembled sensitized sheet 42 into intimate contact with the glass of the glass frame, ready for the exposure operation, which is conventional.

The present printer includes a suitable toggle linkage, as shown in FIG. 4, which incorporates the lever 44, pivoted at 45 to the blanket frame and at 46 pivotally connected with the link 47 and its free end joined to the spring 48, anchored by spring clip 49 to the base of the printer. The upper end of the lever 44 is pivotally connected at 44' to the link 50, whose free end is pivoted at 51 to the glass frame, completing the toggle linkage.

By this construction, the glass frame 36 may be manually elevated and after a short upward movement, the toggle assembly including the spring 48 facilitates the automatic opening movement of the glass frame, for example, to the position shown in FIG. 1. By the same token, after the glass frame has been assembled with respect to the blanket frame for the printing operation with the negative and sensitized material snugly nested therein, on release of the latch 37, both glass and blanket frames may be tilted upwardly to the printing position shown in FIG. 2 with the spring 48 assisting in the tilting operation.

A separate toggle linkage may be employed upon opposite ends of the base of the printer, as desired. It is pointed out in this connection, however, that applicant does not make a claim herein to the assembly of the

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glass-blanket frames with respect to the base, and the toggle linkage associated therewith.

The base of the printer includes, as shown fragmentarily in FIG. 6, the framework 52, which has suitably bolted thereto, as at 63, a suitable mounting track assembly. The track assembly includes the upright longitudinally spaced mounting lugs 62 to which is secured at the upper ends of the said lugs, the horizontally disposed top track 61. This track arranged upon opposite sides of the base as shown in FIG. 4 is parallel respectively to the bottom tracks 59, which are mounted upon the said frame and extend forwardly thereof, and are fixedly secured thereto as by the welds 60. The said bottom tracks 59 overlie the horizontally disposed platform portions 53, which form a part of the frame or base of the printer.

Accordingly there is provided for the light frame 54 the pairs of forwardly extending vertically spaced tracks 59 and 61, which are secured to the said base upon its opposite sides adjacent the rear portion thereof, as best shown in FIG. 4. The said light frame 54 includes an upright hollow body with suitable support means provided depending therefrom, as shown in FIG. 6 for guidably and movably mounting the said light frame upon the base of the printer for movements towards the glass and blanket frames, when the said latter frames have been tilted to the upright position shown in FIGS. 2-4, for illustration.

For this purpose, the said support means for the light frame includes a pair of transversely spaced upright angle plates 55 which extend forwardly with respect to the undersurface portions of the light frame, being fixedly secured thereto as by welds as at 56, lower portions of the said plates 55 mounting a series of longitudinally and vertically spaced guide rollers 57 and 58, which respectively engage the top and bottom tracks 59 and 61 of the guide means for the purpose of movably mounting the said light frame with respect to the base and for maintaining the same at all times in the upright position shown.

Accordingly, the said rollers, as best shown in FIG. 4, provide a means for movably and guidably positioning the light frame for forward and rearward movement relative to the tracks 59 and 61, arranged upon opposite sides of rear portions of the base of the platemaker. Mounted within and between the said tracks 59-61, there is provided the elongated forwardly extending bearing guide plate 64 which is adapted to operatively engage edge portions of the rollers for maintaining the light frame against transverse movements relative to the track assembly.

Of primary importance in the present construction is the means by which the light frame 54 is automatically moved forwardly and rearwardly upon the frame 52-53, which forms a part of the base of the platemaker. For this purpose there are arranged upon opposite end walls of the light frame the pair of upright outwardly extending channels 65, suitably secured thereto.

The formed brackets 66 are anchored at their one ends to portions of the blanket frame adjacent their rear, as shown at 67, FIGS. 4 and 8, and the opposite end portions of the said brackets 66 mount the roller elements 68 which are movably and guidably positioned within the upright channels 65. Accordingly, it is seen that in view of the slide support mounting for the light frame 54 in the upright position shown, as the assembled glass and blanket frames 34 and 22 are tilted from the horizontal work position to the upright printing position, as shown in FIG. 4, in dotted lines, by virtue of the said brackets 66, the upright light frame 54 will be moved forwardly upon its supports until the sealing bead 71 on the front face 69 of the light frame cooperatively and sealingly engages peripheral portions of the upright glass frame, after which there is energization of the light source hereafter described for the purpose of exposing the sensi-

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tized sheet and with respect to the negative within the assembled glass and blanket frames.

By the present construction, the power source to the lighting means is not energized until the said light frame has been brought into sealing engagement with the upright glass frame, as shown in FIG. 4.

The said light frame is in the nature of an opaque body which is provided with an opening 70 in its front face 69, the said peripheral yielding or sealing beading 71 being mounted on the said front face around the said rectangular opening 70. A light diffusing irregularly surfaced glass plate, generally indicated at 72, with the irregularities or angular surface elements being shown at 73, FIG. 5, is positioned within the body of the light frame, and peripherally retained with respect to the opening 70 in the front wall 69 thereof by a series of retaining clips or fastening flanges 74, shown in FIG. 5. The said light frame also includes the removable opaque backplate 75. The glass plate or lens is a prismatic type of glass for concentrating the light as well as for producing a diffused light source.

Upright mounting plate 76 is positioned within the body of the light frame 54 and includes at its lower end a right angular mounting flange 77, which is suitably secured within the said light frame.

As shown in FIGS. 3 and 5, a suitable light source is contained in the light frame in the nature of a series of elongated U-shaped cathode lighting tubes 78, which are horizontally disposed with respect to the upright mounting plate 76 and fixedly secured thereto by a series of mounting clips 79. Suitable means are employed of a conventional nature for providing electrical connection to a power source including a suitable ballast connection by which the cathode tubes may be activated or energized in a conventional manner.

In the illustrative embodiment of the invention, the tubes are arranged so that the free ends of one tube are spaced within and between end portions of adjacent tubes to provide a lighting panel consisting of a series of the said lighting tubes arranged upon the interior of the opaque body of the light frame 54.

When the said tubes are simultaneously energized upon contact of the light frame in its forward position with respect to the assembled glass and blanket frames, light produced within the said opaque light frame is diffused and projected through the irregularly surfaced glass plate 72-73 of FIG. 5 to provide the printing or exposure means for the assembled sensitized plate 42 and negative 43, shown in FIG. 1.

By this construction the diffused and efficient light source is uniformly and well-distributed in such strength as to provide for a proper exposure of the said sensitized plate, or other sensitized material.

In conjunction with the vacuum gauge 16, though not forming a part of the present invention, there is provided an automatic switch in conjunction with the vacuum source 39, FIG. 3 by which a reserve vacuum is maintained at all times for the vacuum printing operation.

The automatic reset and repeat timer 18 is actuated when the glass frame is brought into contact with the light frame, as the said blanket and glass frames have been tilted to the upright position shown. If this contact should be broken before the preset timing interval has elapsed for the exposure, the timer stops until the contact has been reestablished. The ruby safety light 19 on the control panel 14 will glow, while electrical contact has been established with the lighting means or cathode tubes 78, above described.

Having described my invention, reference should now be had to the following claims.

I claim:

1. In a graphic art printer, a base including a horizontal bed, a blanket frame horizontally disposed on said bed, means pivotally mounting the blanket frame on the bed for tilting to an upright position, a glass frame

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juxtaposed over the blanket frame in sealing registry therewith and hingedly connected thereto for relative opening movements and for tilting movements therewith into an upright printing position, an upright light frame including a diffusable light source mounted on said bed, support means guidably and movably mounting said light frame for movements towards and away from said glass and blanket frames, and a control linkage interconnecting said blanket frame and said light frame for moving the light frame forwardly into parallel sealing registry with said glass frame, as said blanket frame is tilted to an upright position.

2. In the printer of claim 1, the blanket frame being pivotally mounted intermediate its front and rear, so that its rear portion tilts below said bed, and a stop projecting rearwardly of said base limiting pivotal movement of said blanket frame to an upright position.

3. In the graphic art printer of claim 1, the support means for said light frame including forwardly extending vertically spaced tracks secured to said base on its opposite sides, forwardly extending plates depending from the light frame adjacent its opposite sides, and a series of longitudinally and vertically spaced guide rollers journaled upon said plates movably and guidably positioned between said tracks maintaining the light frame in an upright position.

4. In the graphic art printer of claim 1, the support means for said light frame including forwardly extending vertically spaced tracks secured to said base on its opposite sides, forwardly extending plates depending from the light frame adjacent its opposite sides, and a series of longitudinally and vertically spaced guide rollers journaled upon said plates movably and guidably positioned between said tracks maintaining the light frame in an upright position, said vertically spaced tracks including a top and bottom track, said rollers being so spaced that some cooperatively engage one track and others the other track, and a bearing guide plate on said tracks cooperatively engaging said rollers.

5. In the printer of claim 1, said control linkage including an upright channel on the end of said light frame, a bracket arm at one end secured to said blanket frame, and a guide roller on the other end of said bracket arm movably and operatively positioned in said channel, whereby said light frame is moved towards said glass frame, as said blanket frame is tilted to an upright position.

6. In the printer of claim 1, said light frame including an opaque body having an opening in its front face, said diffusable light source including a mounting plate within said body, a series of cold cathode lighting tubes supported on said mounting plate, and an irregularly surfaced prismatic light diffusing glass plate mounted and retained upon the body and spanning its opening.

7. In the printer of claim 1, said light frame including an opaque body having an opening in its front face, said diffusable light source including a mounting plate within said body, a series of cold cathode lighting tubes supported on said mounting plate, an irregularly surfaced light diffusing glass plate mounted and retained upon the body and spanning its opening, and a continuous flexible beading on said front face extending around said glass plate for sealing engagement with said glass frame.

8. In the printer of claim 1, said control linkage including upright channels on the ends of said light frame, bracket arms at their one ends secured to opposite end portions of said blanket frame, and a guide roller on the other end of each bracket arm movably and operatively positioned in a channel respectively, whereby said light frame is moved towards and into contact with said glass frame, as said blanket and glass frames are tilted to upright position.

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