May 27, 1947. C. H. JACOBSON 2,421,150

CONTACT PRINTER

Filed Feb. 19, 1944 2 Sheets-Sheet 1

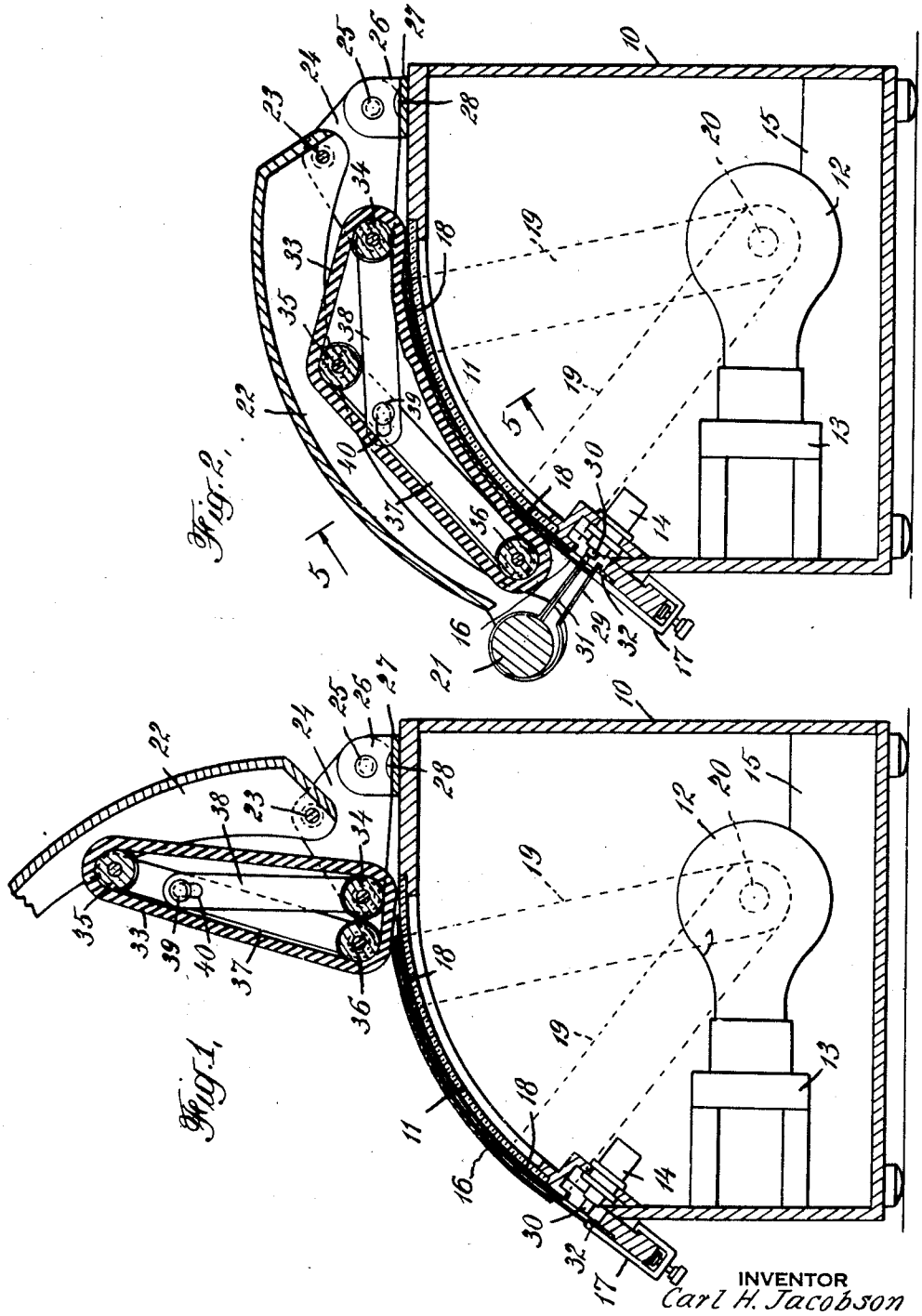


Fig. 2.

Fig. 1.

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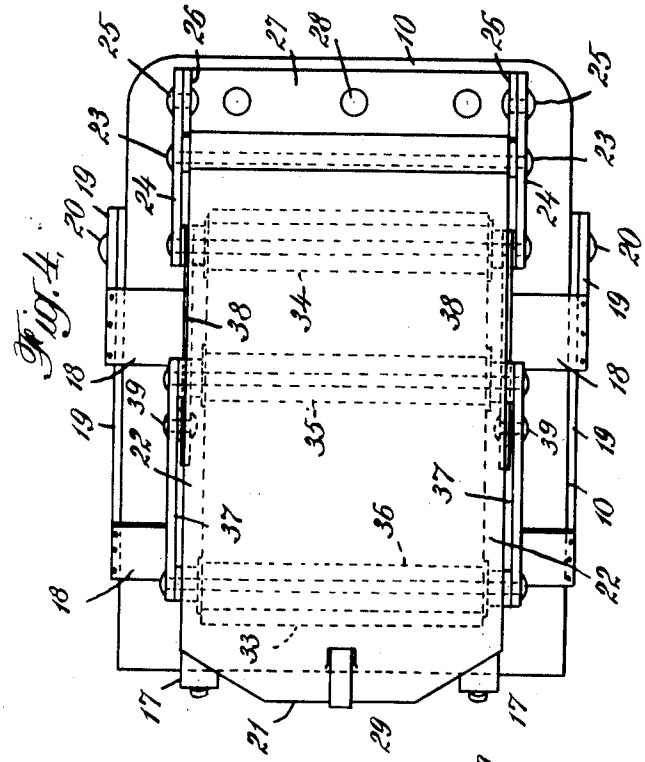


Fig. 4.

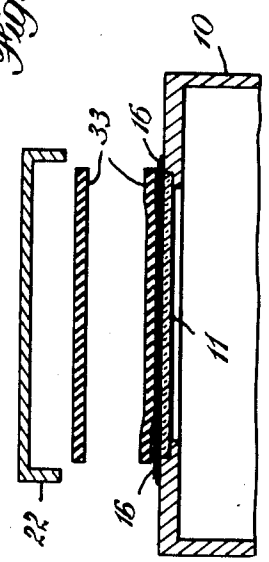


Fig. 5.

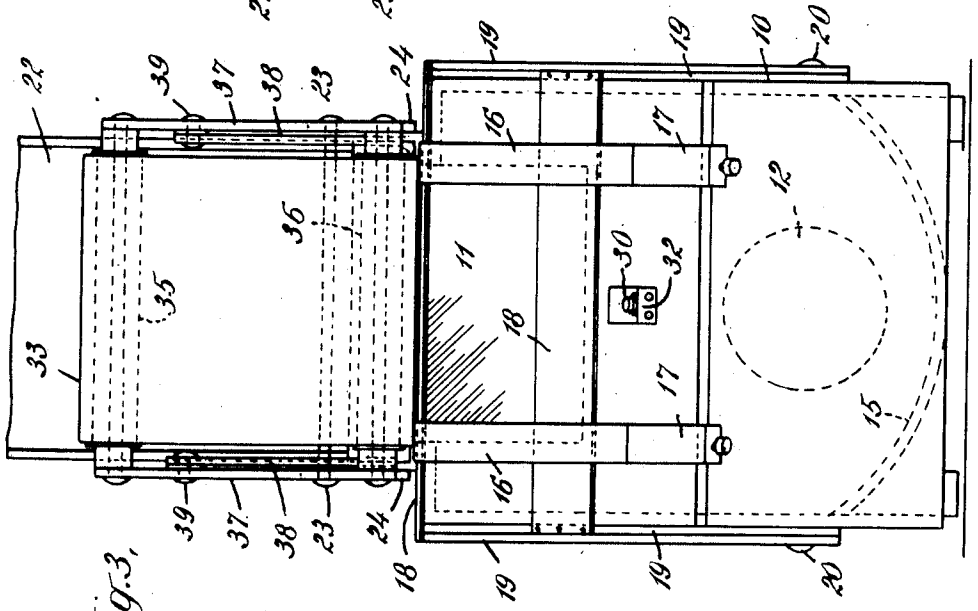


Fig. 3.

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CONTACT PRINTER

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Application February 19, 1944, Serial No. 523,001

8 Claims. (Cl. 95—73)

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This invention relates to contact printing mechanisms, more especially, to the construction of such mechanisms so as to illuminate the negative and printing material with an even distribution of light, and to improvements in the platen for holding the negative and printing material flat and in contact during printing.

Contact printers of this type are normally provided with a glass through which light is projected and this glass is flat or planar, even distribution of the light being obtained in so far as possible, by finishing the inside of the printer with aluminum paint or in some other way, providing for diffusing and reflecting the light upwardly through a glass window to the negative and printing material. The source of light is kept as far from the glass window as practicable, but evening the illumination that way is difficult unless the size of the mechanism is increased beyond practical dimensions. According to the invention herein described, a window is employed which is curved in one plane, the radius of curvature being centered at approximately the source of light. This assures even illumination at the sides of the negative and printing material as well as at the central portions, that is, considering one plane only. To compensate in the other plane, if an elongated coaxial light source is not used, a curved reflector serves to distribute the light evenly in such a manner that the sides of the negative and printing material are illuminated with a light of practically the same intensity as the central portions.

In printing it is always desirable to hold the negative flatly or smoothly against the window and also to maintain the printing material in absolute contact with the negative and free from wrinkles and other distortions such as would affect the quality of the print obtained. To accomplish this a platen has been so designed that it progressively engages the paper or other printing material after the same has been placed in contact with a negative to be printed; it also imparts an ironing effect as it is closed. The platen in the form of a belt of rubber or other resilient and preferably stretchable material, is so controlled that as it is closed or pressed down over the transparent window, one end of the paper and negative will be engaged and then the elastic belt will be stretched and progressively brought into contact with the remaining surface of the printing material. The belt is passed over rollers carried by a system of levers hinged in such a manner as to impart to the belt the proper degree of stretch and to cause it to be

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rolled over and to iron the paper onto the negative in a manner to be described in greater detail in the following paragraphs.

The invention will be described with respect to one embodiment of the same illustrated in the accompanying figures of drawings in which:

Figure 1 is a section through a contact printer embodying the invention, the platen being raised or withdrawn from the printing material.

Figure 2 is a similar section in which the platen has been closed as it would be when the negative and printing material are subjected to light.

Figure 3 is an elevation of the front of the printer with the platen in raised position.

Figure 4 is a plan view, the platen being closed.

Figure 5 is a section at line 5—5, Figure 2.

Now referring to Figures 1 and 2, the printer consists of a box-like structure 10 made of wood, metal or plastics and being light tight except for a translucent window 11 set in the top surface of the printer. This window may be of frosted or diffusing type glass. A source of light 12 is provided and may be a tungsten lamp of the usual type, preferably with a frosted glass bulb or a bulb of the elongated tubular type. This lamp is held within a socket 13 and by suitable connections (not shown) to a source of current, will be lighted when contact is made within a switch 14. Normally such a printer is merely plugged in the usual wall type outlet and operates from the ordinary 110 volt circuit.

The window 11, preferably of a type of glass adapted to diffuse the light passing through it, is curved in one plane, the center of its radius of curvature being located at about the center of the light source. As shown in Figure 3, especially in the case where a point light source is utilized, the bottom of the printer is provided with a reflector 15 which is curved in one plane, the curvature of this reflector being in a plane opposite or perpendicular to the plane in which the transparent window 11 is curved. The entire surface at the inside of the printer is painted or otherwise finished with a reflecting material such as aluminum paint thereby to flood the window with as much light as possible. The curvature of the window itself provides even illumination of the negative and printing material in one plane and the curved reflector 15 serves that purpose in the plane perpendicular to the plane of window curvature.

Masking blades are provided so that margins may be formed at the edges of the prints and

to determine the portion of any negative which is to be printed. One set of blades 16 is mounted in slides 17 which are retained in position by the usual springs. These blades 16 are curved to correspond with the surface of the glass window 11 and may be arranged above or beneath the opposite pair of blades 18 which serve to mask the negative at the edges not covered by blades 16. Blades 18 are fixed to radial arms 19, there being two such arms at either side of the printer although in certain instances arms at one side only may suffice. These arms are pivoted at 20 which is the same center about which the transparent window is curved. As the arms 19 are swung about the pivot 20, the blades move to cover different portions of the window 11. Blades 18 may be curved to fit the surface of the window.

The platen is caused to cover or uncover the transparent window as an operating handle 21 is lowered or raised. This handle projects transversely of the printer and between the parallel sides of a platen carrier 22, each of which is pivoted as at 23 to a link 24. The link 24 pivots at 25 to lugs 26 bent upwardly from a piece of strip steel or other suitable material. This strip projects along the top of the printing closure at 27 and is fixed thereto by rivets 28 or other suitable attaching means.

A latch 29 is formed by bending a piece of strip spring steel as illustrated in Figure 2, this strip of steel also continuing about the handle and serving as a means for pushing in the plunger 30 of the switch 14 whenever the platen is closed. The strip material passes about the handle 21 and is doubled as at 31 for engaging the plunger. The bent end of the latch 29 engages a catch 32. Whenever it is desired to stop the exposure and raise the platen, the operator merely presses against the latch 29 releasing it, whereupon the resiliency in the platen will lift it slightly thereby allowing the plunger 30 to return to its original position turning off the light. The entire platen assembly may then be raised.

The platen consists of a belt 33 preferably of resilient, flexible and stretchable material such as rubber. However, other materials may be used, for example, the belt may be of a laminated construction in which rubber and fabric are combined. The surface of the belt should be of a type adapted to conform to the surface to be covered thereby to confine the light and to retain the negative and printing paper in a flattened and perfectly contacting relationship. If desired, the belt may be of rubber or other material and its surface covered with softer rubber such as sponge rubber or with felt or plush material.

The belt 33 passes about a plurality of rollers, the first being a roller 34 extending between links 24. This roller is preferably held against turning on its axis and thus serves to maintain the adjacent portion of the platen belt in a relatively fixed position. In other words, fixing roller 34 frictionally retards movement of the adjacent portion of belt 33 so that the negative and printing material may be held at their upper ends and the ironing and rolling action of the belt progressed from that point.

A roller 35 extends across between the sides of platen carrier 22 and is freely rotatable on its axis. Roller 36 is freely rotatable on an axis but that axis is retained at its ends by parallel arms or levers 37 which are hinged at the axis of roller 35. Another pair of arms 38 are likewise hinged at the axis of roller 34 and connect to the first mentioned levers 37 by the engagement of shouldered rivets 39 within slots 40.

The length of these arms 37 and 38, and the centers about which they pivot, in combination with the carrier 22 movable about pivot 23, is such as to cause stretching of the belt 33 as the platen is closed, but allows it to contract as the handle 21 is lifted to the position of Figure 1. By suitably designing this system of levers, any desired amount of stretch in the belt can be obtained, or if desired, the construction may be such that there will be no stretch provided for and the only action of the platen will be that of flattening or ironing as it is progressively rolled over the surface of the printing material.

While it has not been shown here, a safe light is to be provided within the printer casing and the electrical connections are such that when the printer is being used, the safe light will be lighted continuously. Of course, the printing lamp 12 is lighted only when a contact is made within the switch 14. The platen is especially adapted to use with a curved window such as window 11, but it is to be understood that the platen may be used to advantage in printers having the usual planar window, the levers and their pivots being proportioned for action with that particular type of surface. The masking blades and their supporting means are especially useful with a curved window and would be used regardless of whether the platen were of a type as described here, or of some other type.

In operation, the printer is set up and the electrical connection plugged into some suitable source of current. That causes the safe light to be lighted whereupon a negative is placed on the window 11 and the masking blades are moved along the surface of the window to cover the edges of the negative masking off that part thereof which it is not desired to print, or at least, defining the edges of the actual image on the negative. A sheet of printing material such as the usual contact printing paper is then superimposed upon the negative and above the masking blades whereupon the operator, by means of handle 21, lowers the platen. Starting from the position of Figure 1 the links or levers 37 and 38 separate the rollers 34, 35 and 36 thereby stretching the belt 33 and rolling it over the paper. Since the roller 34 is not allowed to turn on its axis, that end of the belt is maintained substantially fixed relatively to the surface of the window and as the top edge of the paper is gripped by the surface of the belt, that edge will be held or pressed against the negative or against the masking blades so that the ironing action progresses from that point. After the belt has reached its extent of travel, the contact member 31 engages the switch plunger 30 and, more or less simultaneously, the latch 29 engages projection 32 locking the platen assembly in the position shown in Figure 2. During that time the light 12 remains lighted thereby subjecting that part of the negative and a corresponding area of the printing paper contained within the masking blades to the action of the printing light. Then the platen assembly can be raised whereupon the printing paper is removed and according to the usual practice will be developed and subjected to other appropriate treatment.

The invention has been described by reference to a more or less specific example and, of course, many variations will occur to those skilled in this art, but will fall within the scope of the invention as originally conceived. The term "flat-

tened" or "flattening" has been used in describing the action of the belt **33** as it is rolled or progressed over the surface of the printing material, and that term is employed without a special reference to a plane surface since the window **11** is curved in a cylindrical manner. It is to be understood that the platen belt irons and flattens out wrinkles or imperfections tending to arise in the paper or negative whether the printing surface or window be of planar or curved construction.

The invention is not to be limited other than by the scope of the appended claims.

I claim:

1. A contact printer having in combination, a frame, a light source, a curved window and masking blades, one set of said blades being curved to conform to the curvature of the window and the other set being movable along the curved window surface by pivoting them at the center of curvature of said window.

2. A contact printer having in combination, a frame, a light source, a curved window and masking blades, one set of said blades being curved to conform to the curvature of the window and being slidable along the surface of said window, the other set of blades being straight and mounted to swing on radial supports pivoted at the center of curvature of the window.

3. A contact printer having in combination, a frame, a light source, a window and a platen for pressing a sheet of sensitized paper and a negative against said window, said platen comprising an endless, elastic belt, a series of rollers over which said belt is passed and a system of levers for supporting said rollers so pivoted and proportioned that as the platen is moved to engage the paper and negative, contact is first made at one end of the paper and then the resilient belt is progressively stretched and rolled over the paper surface.

4. A contact printer having in combination, a frame, a light source, a curved window having its center of curvature at substantially the center of the light source and a platen for pressing a sheet of sensitized paper and a negative against said window, said platen comprising an endless elastic belt, a series of rollers over which said belt is passed and a system of levers for supporting said rollers so pivoted and proportioned that as the platen is moved to engage the paper and negative, contact is first made at one end of the paper and then the resilient belt is progressively stretched and rolled over the paper surface.

5. A contact printer having in combination, a frame, a light source, a curved window, masking blades for said window and a platen for pressing a sheet of sensitized printing paper and a negative into contact with said window, said platen having hinges, interconnected levers, an operating handle and guiding rollers over which is passed a resilient, endless belt, the construction being such that when said operating handle is moved to close the platen, the levers are spread to stretch and progressively roll the belt over the paper and negative to iron them against the window surface, and when opened, said levers are folded to relax the belt and lift it from the paper and negative.

6. A platen for a contact type printer having in combination a platen carrier adapted to be hinged to a printer frame, an operating handle, interconnected pivoted levers at either side of said platen carrier and connections between them including rollers, and a flexible, resilient, endless belt passed about and retained by said rollers and between said levers.

7. A contact printer having in combination, a frame, a light source, a window and a platen for pressing a sheet of sensitized paper and a negative against said window, said platen being formed as an endless belt of resilient material, and means for retaining and guiding said belt which includes a plurality of rollers and supporting means for said rollers including an articulated linkage by which said rollers are spaced and by which they may be so controlled as to cause the belt of resilient material to hold one edge of the paper and negative in place on the window and progressively to make contact across the paper and negative for smoothing and flattening the paper and negative against the window.

8. A contact printer having in combination, a frame, a light source, a window and a platen for pressing a sheet of sensitized paper and a negative against said window, said platen comprising an endless belt of flexible material, rollers upon which said belt is retained and guided and an articulated linkage for supporting said rollers and for moving them to different positions for progressively rolling the belt over the paper and negative to be printed and for removing the belt from contact therewith.

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