June 13, 1950 B. E. CLOUSER 2,511,102

PHOTOCOPY DEVICE HAVING A TRANSLUCENT PRISM SUPPORT

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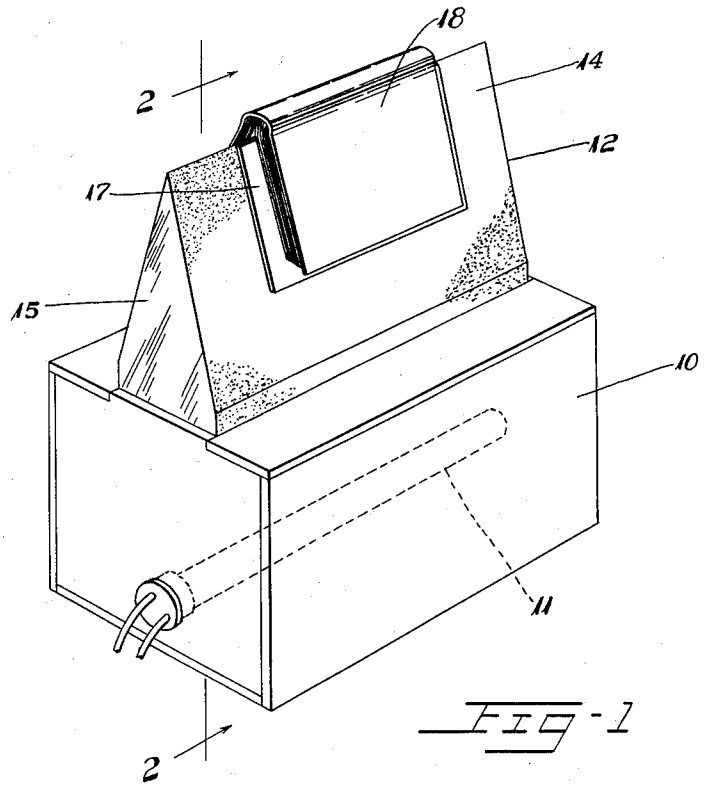


Fig - 1

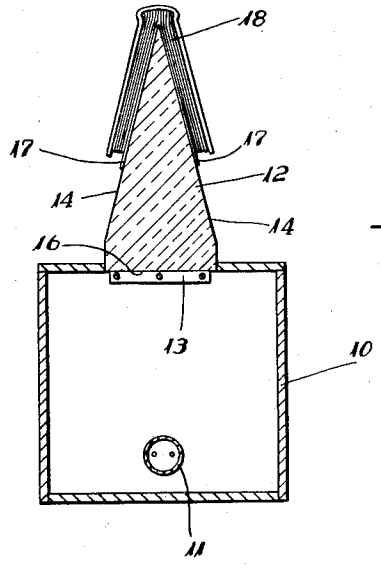


Fig - 2

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PHOTOCOPY DEVICE HAVING A TRANSLUCENT PRISM SUPPORT

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3 Claims. (Cl. 95—73)

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This invention relates to an apparatus for making photographic contact copies, and pertains more specifically to an apparatus for making simultaneous copies of two adjacent pages of a book, magazine, or other bound volume of printed or written pages.

One object of the invention is to provide a simple and inexpensive device for making contact photocopies. Another object is to provide a photocopy device which is light in weight and readily portable. Another object is to provide an apparatus for making a sharp and clear-cut contact copy of a page in a bound volume, such as a book or magazine, without damage to the binding of the volume. Another object is to provide an apparatus for simultaneously making clear-cut contact photocopies of two adjacent pages in a bound volume without damage to the binding. Other and further objects will become apparent from the description which follows.

The objects of this invention are attained by making use of a generally wedge-shaped light-conductive element which is inserted edge-first between the pages of a book, for example, and which serves to transmit light from a source opposed to the base of the wedge to the pages which overlie the converging faces of the wedge.

The invention may be best understood by reference to the accompanying drawing which shows a preferred embodiment of my invention. In the drawing:

Fig. 1 is a view in perspective of one embodiment of the invention showing a book and photocopy paper mounted for making copies; and

Fig. 2 is a vertical section along line 2—2 of Fig. 1.

As shown in the drawing, the apparatus includes a light box 10 which serves as a support for a tubular incandescent bulb 11 which may be connected to any suitable source of power (not shown). Light box 10 may be made of any suitable material such as wood, sheet metal, or the like, and may be provided with a light-reflective inner surface, if desired, although this feature is not essential. The top of light box 10 is provided with an opening into which is fitted the base of a generally wedge-shaped light-conductive element 12 resting at its ends on supporting members 13, and having converging faces 14, generally triangular end-faces 15, and base 16.

The wedge-shaped element or generally triangular prism 12 may be made of any suitable hard or rigid light-conductive material such as glass or the like. It is preferred to use a material having a high light-transmissivity such as optical glass, high molecular weight transparent methyl methacrylate polymer, or other material which exhibits the phenomenon of edge-lighting. The precise angle at which the two converging faces 14, 14 meet is not critical, but it will generally be found most convenient to have this angle less than a right angle, particularly when the apparatus is used to make copies of tightly bound volumes. Excellent results have been obtained using prisms in which the angle at the top is an angle between 10° and 50°.

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The several faces of the prism 12 may be provided with a highly polished surface finish, if desired, although it is generally preferred to have at least the two converging faces 14 provided with a light-diffusing surface finish such as may be obtained by etching, sand blasting, or the like. It has been found that if all faces of the prism have a polished finish, internal reflections from faces 14 are such that only the upper portion of the prism is uniformly lighted so that only that portion of the prism is usable. However, when these converging faces 14 are provided with a light-diffusing surface finish, there is no substantial variation in the intensity of illumination of these faces from top to bottom.

The end faces 15 of the wedge-shaped prism member 12 preferably have either a specular surface or a polished surface. It is usually desirable that these faces reflect light inwardly in order to avoid insufficient illumination of small areas in the upper corners of the wedge-shaped prism. Indeed, the end faces may be silvered or painted in order to increase the proportion of light internally reflected, although this step is not necessary. For best results, it is usually desirable that the bottom of the prism have a highly polished surface finish.

It has been found that very satisfactory results are obtained by machining the prism from a block of high molecular weight methyl methacrylate polymer on a shaper without any additional polishing or finishing operations. In this case, it is preferred that the fine lines or grooves left upon the converging faces and bottom of the prism by the shaper be parallel to the longitudinal axis or edges of the prism, and that the grooves on the triangular end-faces be perpendicular to the bottom face through which the light enters. In this embodiment, it is found that faces 14 are uniformly lighted throughout their extent even though bottom face 16 does not have a smooth highly polished surface.

In using the apparatus, a sheet of reflex photocopy paper 17 is folded emulsion side out and

inserted between the pages of the book 18 desired to be copied. The book and paper are then placed over the edge of the wedge-shaped prism as shown in Fig. 1, and the light is turned on for the length of time necessary to give the desired exposure. If desired, of course, the paper may first be placed upon the prism and the book placed over it. In some cases, it is desirable to place a sheet of light-weight cardboard behind each of the pages to be copied in order to ensure contact with the photocopy paper throughout the area to be copied. It has also been found advisable in some cases for the operator to press the book or other paper being copied against the prism, either manually or by means of suitable clamps or weights.

It will be noted that by means of this invention there is obtained close contact between the pages of the volume being copied and the photocopy paper over the whole area of each page up to its juncture with the adjacent page. As a result, the copies obtained by the use of this invention are free from the distorted or blurred areas commonly found near the inner margin of the page being copied when the copies are made by conventional methods. Furthermore, by means of this invention substantially uniform intensity of illumination is obtained throughout the extent of the page being copied so that there are no dark areas in the copy. It has been found that the precise location of the light source has little effect upon the uniformity of illumination, although it is obviously desirable to use an elongated light source, as shown in the drawing, instead of a spot source. The distance between the light source and the base of the prism is subject to considerable variation. With a prism ten inches high, fifteen inches long, and two and one-half inches wide at its base, made of methyl methacrylate polymer, best results have been obtained by using an incandescent bulb from six to twelve inches long spaced about eight inches from the base of the prism. Satisfactory results have been obtained, however, even when the bulb is within one inch of the base of the prism, but care must be exercised to avoid overheating the prism in this case.

Although specific embodiments of my invention have been described herein, I do not intend to limit myself solely thereto, but to include all of the obvious variations and modifications falling within the spirit and scope of the appended claims.

I claim:

1. Photocopy device for making reflex photocopies by exposing photocopy paper in contact with the material to be copied, which device comprises a box having a light-reflecting inner surface and a generally rectangular opening in its top, a light source disposed within and supported by said box, and a solid prism of light-conductive high molecular weight methyl methacrylate polymer adapted to support said photocopy paper and material to be copied upon its convergent faces, said prism being supported by said box with the base of said prism in said opening opposed to and spaced from the light source and the apex thereof extending upwardly from said box, the convergent faces of said prism having a light-diffusing uniformly roughened surface finish and having an included angle of 10° to 50° at the apex.

2. Photocopy device for making reflex photocopies by exposing photocopy paper in contact with the material to be copied, which device comprises a chamber having a light-reflecting inner surface and having an opening in its upper face, a light source disposed within said chamber, and a solid prism of light-conductive material adapted to support said photocopy paper and material to be copied upon its convergent faces, said prism being supported by said chamber with the base of said prism substantially filling said opening opposed to and spaced from the light source and the apex of said prism extending upwardly from said chamber, the convergent faces of said prism having a light-diffusing uniformly roughened surface finish and having an included angle of 10° to 50° at the apex.

3. The device of claim 2 in which said light-conductive material is a high molecular weight methyl methacrylate polymer.

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