June 24, 1941. L. L. KROMHOLZ 2,246,920

VARIABLE PHOTOGRAPHIC MASK FOR MAINTAINING CONSTANT PROPORTIONS OF A VISIBLE AREA

Filed March 15, 1940 2 Sheets-Sheet 1

FIG. 1.

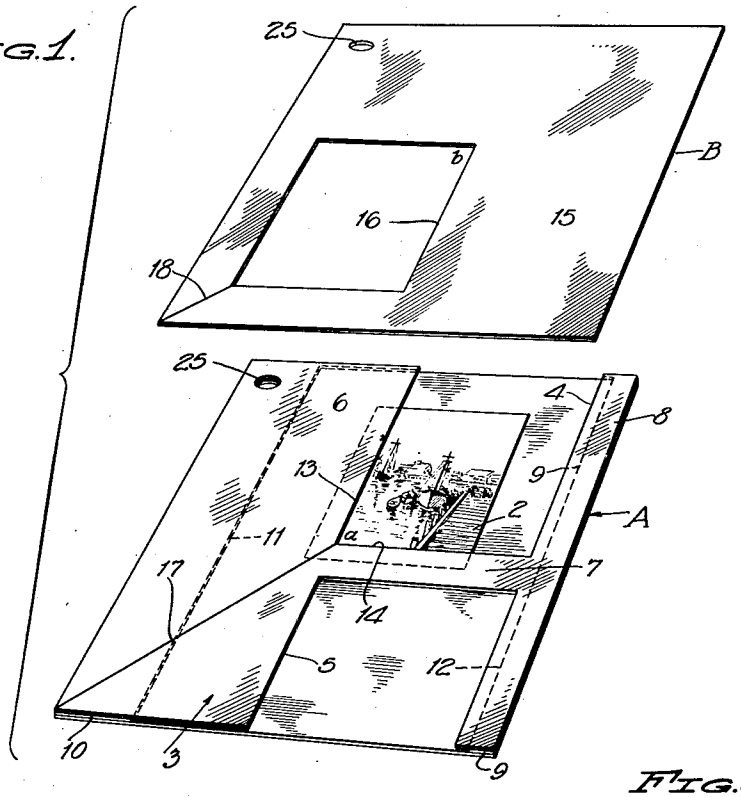


FIG. 2.

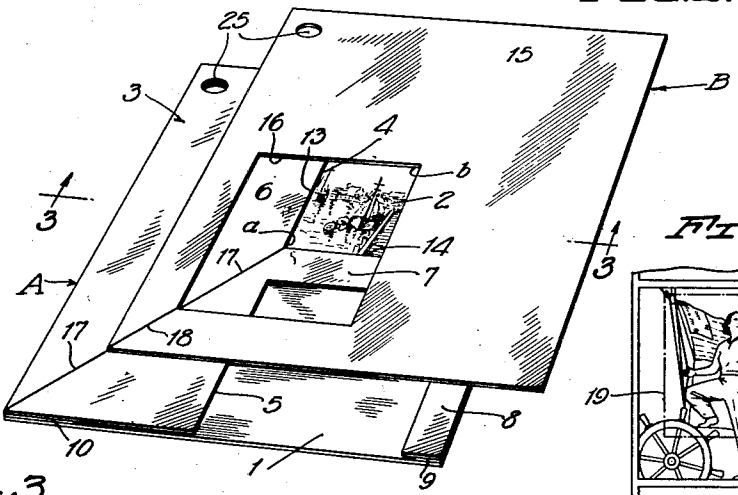


FIG. 3.

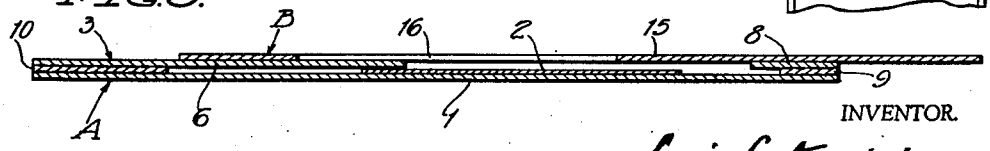


FIG. 4.



INVENTOR.

BY Louis L. Kromholz

ATTORNEYS.

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FIG. 4.

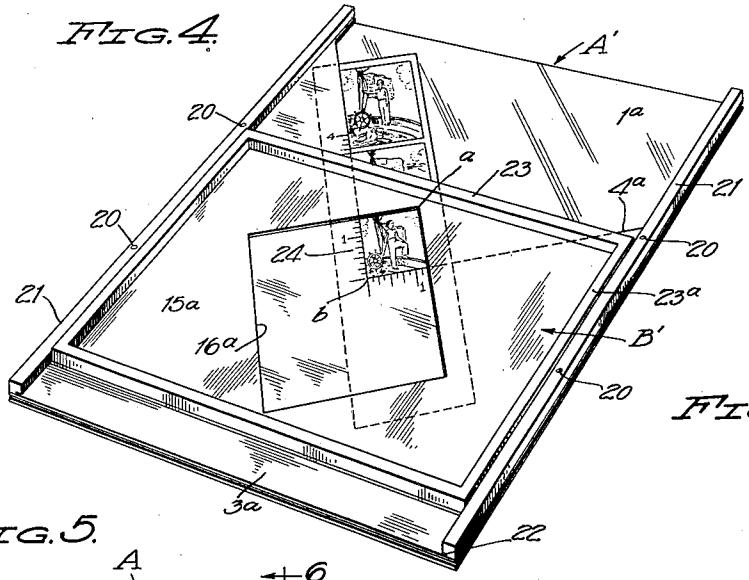


FIG. 5.

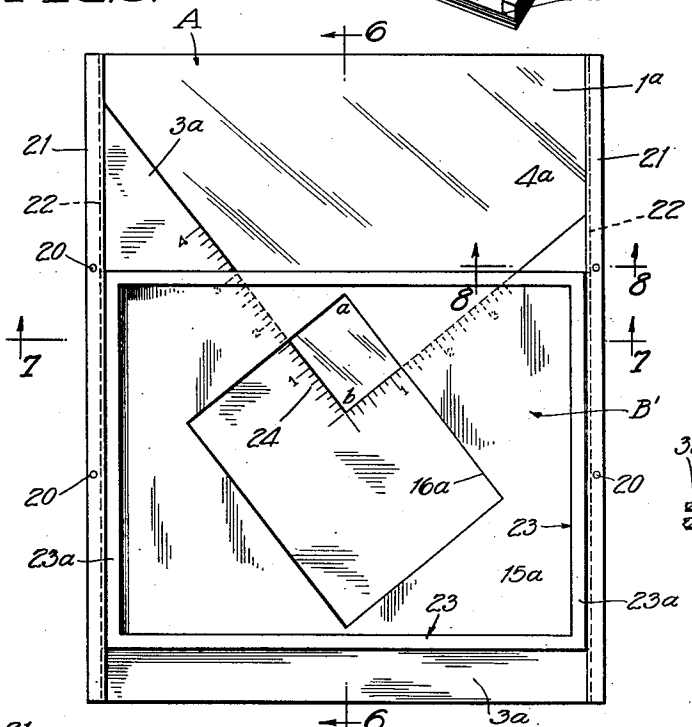


FIG. 6.

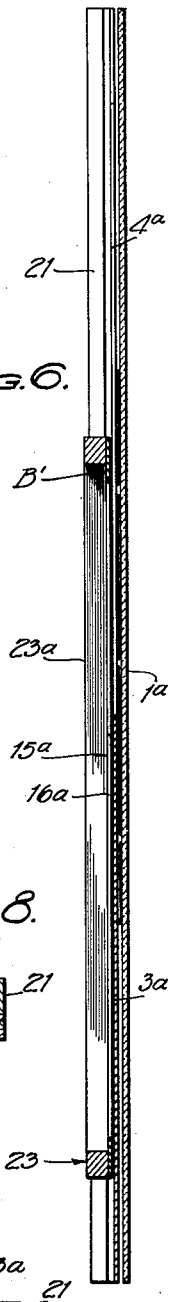


FIG. 8.

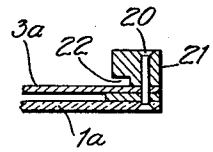
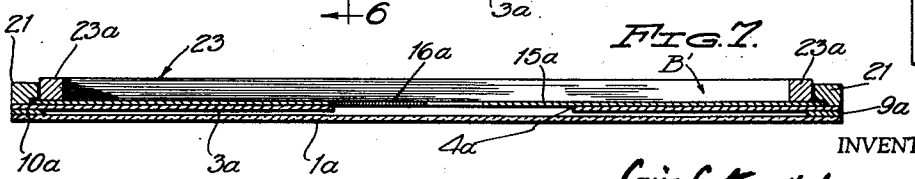


FIG. 7.



INVENTOR.

BY Louis L. Kromholz

Kenyon & Kenyon

ATTORNEYS.

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UNITED STATES PATENT OFFICE

2,246,920

VARIABLE PHOTOGRAPHIC MASK FOR MAINTAINING CONSTANT PROPORTIONS OF A VISIBLE AREA

Louis L. Kromholz, White Plains, N. Y.

Application March 15, 1940, Serial No. 324,078

5 Claims. (Cl. 33—174)

My invention has been especially devised and is here described as intended for use in making photographic enlargements from prints or films, but it may be applied in any instance in which a selected area of a surface is to be reproduced or projected, either with or without enlargement, the object of my invention being to effect the selection from the print of an area of dimensions proportionate to those desired on the reproduction, whatever be the size of the area selected.

When an enlargement is to be made of a print or negative, it is often desired to confine the reproduction to a part, sometimes of very limited area, of the original picture, either because it will reproduce better or will give a more artistic result than a reproduction of the whole, or because the interest is confined to that area, or because it is desired to show an object or individual in a slightly altered pose from that of the original, or for other reason. Enlargements are usually to certain standard dimensions—eight by ten inches being a favored size and proportion. The selected area should conform, on its smaller scale, to the proportions, the relation of height to width, of the proposed enlargement or other reproduction.

It is now a well-known practice, when an enlargement is to be made of part of a print or film, to employ two masks, each mask being an L-shaped plate of about the shape of a machinist's square. The print or other matter to be duplicated is laid on a flat surface and one of the masks is laid upon it with its inside angle defining the selected area on two sides and masking all of the print outside the inner edge of the mask. The other mask is inverted over the print with its inside angle facing that of the first mask, and is shifted thereon until the second mask defines the remaining two sides of the part to be reproduced, and masks all of the print on those sides which are not to be reproduced. There is thus enclosed by the two masks an uncovered portion of the print, whose size and shape depend on the adjustment of the L-shaped masks toward or away from each other, and by great care and much practice the operator may succeed in giving to the sides of the selected area such proportion that the enlargement made therefrom will have approximately the desired relative dimensions, as for example eight by ten inches, though other proportions may be used. But with that system, depending on no positive control, the result can only approximate accuracy.

My present invention relates to masks of improved form and to means for controlling the adjustment of one mask upon the other when they are being shifted one over the other until a position is reached which includes, between the opposed angles of the two masks, all of the print which is to be enlarged or duplicated, so that a fixed ratio of side to end of the area of the print which is being isolated will be maintained. This is done by guiding or controlling the movement of one mask relatively to the other so that the movement is in or parallel to a line joining the apices of opposite angles of the two masks. The masks thus comprise a self-contained unit for demarcating a selected rectangular portion of a photograph or the like, so that the duplicate, as for enlargement, of the selected area may be made, of predetermined proportional dimensions.

The accompanying drawings illustrate my invention in two forms—

Figure 1 showing in perspective one form of the masks in separated condition, and

Figure 2 (in perspective also) the same combined for use.

Figure 3 is a sectional view taken in the direction indicated by the arrows 3—3, Figure 2.

Figures 4 to 8 illustrate another form of the invention, Figure 4 showing it in perspective, Figure 5 in plan, Figure 6 in section on the line 6—6, Figure 5, and Figure 7 in section on the line 7—7, Figure 5. Figure 8 is a detail sectional view on the line 8—8, Figure 5.

Figure 9 is a view of the print as marked for enlargement.

My invention does not need a stationary table for supporting the print or other matter to be enlarged. In the form of the invention shown in Figures 1 to 3, the instrument comprises two relatively movable masks A and B, of which A, conveniently held by the left hand in an approximately constant position, I refer to as the holding or stationary mask, while B, referred to herein as the moving or covering mask, may be held conveniently in the right hand and be moved over the mask A, to control the dimensions of the part of a print or negative selected for enlargement. The mask A has a one-piece imperforate, preferably rectangular, back sheet 1 of stiff, light material, cardboard for example. I provide means to hold adjustably on the back 1 a print or negative 2, a portion of which is to be selected for enlargement. This holding means may conveniently be a cardboard upper or front sheet 3 of outside dimensions equal to back sheet 1. Enough of the material of sheet 3 is removed to form windows 4, 5, leaving vertical and hori-

zontal masking portions 6, 7 and an attaching strip 8. These parts may have conveniently about the relative sizes shown. The outside vertical edges of the portions 6 and 8 are cemented to the corresponding edges of the back sheet 1, preferably with the interposition at each edge of spacer strips 9, 10, so that the central portions of the sheets 1 and 3 between the strips 9, 10 (indicated by the dotted lines 11, 12 on Figure 1) will have enough space between them to allow a print to be inserted and shifted about—but not so loosely but that the print will be lightly held by friction in any position to which it may be moved. Band 7 and the upper part of 6, with their rectangularly-disposed edges 13, 14, form an L which performs practically the same function as the corresponding L-shaped mask used with the area-determining method above referred to as that now practiced, here, however, being united to the back sheet 1. They have the additional function of cooperating with the latter in holding the print to a position to which it is set. The print is adjusted under the edges 13, 14 by manipulating it through the window 4 (or window 5 if the print is of strip form) until all the undesired part of the print beyond said edges is masked by the portions 6, 7 of the sheet 3. The setting of the print may be upright, or slightly rotated, if it be desired to alter the pose of the figure or part selected for enlargement. Figure 1 illustrates a print so positioned as to mask lower and left-hand parts of the print. It is obvious that for manipulating the form and size of print here shown, the window 5 is not essential.

Cooperating with the mask A is the cover mask B, which is a sheet 15 of cardboard or other material, preferably of approximately the size of mask A and provided with a rectangular window 16 formed with edges parallel to those of the mask B, and it may be moved over the mask A so that the inverted L, formed by the portion of the sheet above and to the right of the window 15, and the L-shaped part of mask A exposed between them only that portion of the print which it is desired to reproduce in the enlargement, as for instance the part of the print appearing in Figure 2 through window 4.

Movement of the mask B over the mask A in or parallel to a line diagonal to the apices of opposite angles *a* and *b* on respective masks A and B, will alter the size without changing the proportional dimensions of the unmasked area. Such a controlled movement is accomplished according to my invention by producing the said diagonal in the form of a guide line on the surface of mask A as indicated at 17 and a similar guide line 18 on mask B. By always keeping line 18 directly over line 17 when the mask B is moved on mask A, the correct shape of the exposed part of the print will be maintained whatever be the distance apart of the masks. Instead of depending on guide lines whose register must be maintained by the operator, the two members may be positively engaged as by tongue on mask A and groove on mask B, or vice versa, taking the place of the lines 17 and 18, to insure that the mask B shall be positively maintained in the right path. When the isolation has been made of the area selected for enlargement, the outline is marked on the print, as by running a red pencil (or other color contrasting with the color of light used) around the inner edges of the masks as indicated by the rectangular dotted line 19 on Figures 2 and 9, and this line enables the setting of the enlarging camera so as to reproduce, exactly to proportion, the selected area.

Means, as for example hole 25, in the corner of the instrument, may be used to hang it up.

The instrument shown in Figures 4 to 8 carries this idea of positive guidance of the upper mask further, and illustrates additional modifications. The construction shown has stability while maintaining light weight. Here the stationary mask A' has preferably a back plate 1^a of translucent sheet material, such as Formica, to better adapt the instrument to use with photographic negatives. A front sheet 3^a of cardboard or the like is connected at its lateral edges to the lateral edges of back plate 1^a by cement or by bolts or rivets 20 which fasten side wood, metal or plastic guide rails 21 to the lateral edges of back plate 1^a, spacers 9^a, 10^a separating the back plate and front plate sufficiently to permit entry of the print between them and allow it to be moved about in the pocket so constituted and yet be held lightly by friction in any position to which it is shifted. A window 4^a, whose lower edge is a right angle, is cut in the upper or front sheet 3^a. The upper mask B' comprises the sheet 15^a of cardboard or the like material with its four sides stiffened by a frame 23 which may be of wood, or other suitable material, and the side rails 23^a of which lie in contact with and are guided by the rails 21. The lateral edges of plate 15^a project beyond the side rails 23^a of the frame to enter the grooves 22 in the inner edges of rails 21 and hold the upper mask in close but light contact with the plate 3^a of the lower mask. The sheet 15^a has a window 16^a and the two windows 4^a and 16^a are so placed and oriented with respect to the guide rails 21 that a line diagonal to the opposite angles *a* and *b* of the two windows, if produced, will meet the apex of the opposite angle of window 16^a, and of course, if produced in the opposite direction, will meet the opposite angle—not shown—of window 4^a, and movement of the upper mask A' in the path restricted by the rails 21 will cause an expansion of the area of the print exposed to be always constant in the proportion of its dimensions. When the adjustment of the two masks has achieved the desired extent of unmasked area, the outline is marked as before by running a line on the print around the edges of the window to preserve for use in the enlarging operation the exact part of the print desired. The area so marked, irrespective of dimensions, will enlarge to the proportions of the standard size photographic paper.

A scale, as 24, may be marked upon the inner edge of window 4^a, to inform the operator as to the size of the selected area on each side.

There need be only one operative angle on mask A and one on mask B, and these are interior angles arranged oppositely so as to present between them a visible area of the print or negative of size depending on the distance apart to which the angles are set. Any of the lines forming the angle which extend beyond the length necessary for defining the surfaces which are to be encompassed by the masks are unnecessary, as are also all of the windows beyond that required by the size of the area to be made visible. The upper part of window 4 and the lower part of window 16 may, therefore, be changed in size and shape, in any way, so long as the position and shape of the operative parts of the angles are not affected. However, the arrangements shown are such as to take advantage of the inactive parts of the masks to stiffen and

strengthen the structure. The use of the terms right and left refers to an instrument constructed for a right-handed person. It may be desirable to reverse certain parts of the mask for a left-handed person.

Except where they otherwise specifically appear, the words print, negative and positive are used interchangeably in this specification.

I claim:

1. A self-contained apertured unit for demarcating a selected portion of a photograph or the like, comprising in combination a pair of demarcating plates, one of said plates having upon its outer margins tracks through which it is shiftably interconnected with and positively guides the other plate, without restricting relative movement between the plates as a unit and the photograph, in the plane of the photograph; said plates having portions through which they overlap, constructed with reentrant edges forming rectangular recesses therein and assembled with said recesses diagonally aligned and composing a rectangular space constituting the aperture of the unit, and the said tracks being positioned to restrict the shifting of the plates with respect to each other to a direction parallel with a diagonal of said rectangular space.

2. A self-contained unit for demarcating a selected rectangular portion of a photograph or the like, comprising in combination, a pair of plates having portions through which they overlap upon and slide relatively to one another; said portions being constructed with reentrant edges that define rectangular recesses therein; said plates being assembled with said recesses presented toward each other, and diagonally aligned so that together said recesses compose a rectangular aperture through the unit; and one of said plates having means engaging the other to hold them together as a unit for unrestricted relative movement between the photograph and the unit and to positively guide the sliding movement of one plate with respect to the other in a direction parallel with a diagonal of the said rectangular aperture.

3. In a unit for demarcating a selected portion of a photograph and the like, the combination of a back-plate, an aperture unit and means uniting said back-plate and aperture unit with a space between them into which the photograph or the like may be introduced with freedom to move in any direction parallel with the aperture unit; said aperture unit comprising a pair of demarcating plates having portions through which they lap upon and slide relatively to one another, constructed with reentrant edges that define in said portions respectively, rectangular recesses opposed to each other on a diagonal line and together composing a rectangular space that constitutes the aperture of the aperture unit; the relative sliding movement of the demarcating plates being parallel with said diagonal line.

4. A unit as described in claim 3, in which the back plate is made of a substance having the capacity to transmit light for illuminating a photographic negative.

5. A unit as described in claim 3, having upon its margins tracks that embrace at least one of the demarcating plates and positively guide the same in its shifting relatively to the other demarcating plate.

LOUIS L. KROMHOLZ.