United States Patent

Daugherty

[15] **3,677,638**

[45] **July 18, 1972**

[54] PHOTOGRAPHIC PRINTING APPARATUS

[72] Inventor: **Arthur J. Daugherty**, Belton, Mo.

[73] Assignee: **Bremson Photo Industries, Inc.**, Kansas City, Mo.

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[52] **U.S. Cl.** **355/74**, 355/125

[51] **Int. Cl.** **G03b 27/58**

[58] **Field of Search** 355/72, 74, 122, 125

[56] **References Cited**

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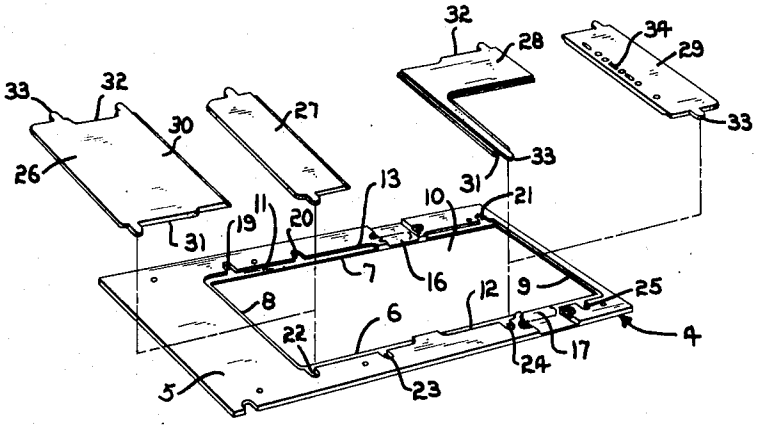
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Primary Examiner—Joseph F. Peters, Jr.
Attorney—Fishburn, Gold and Litman

[57] **ABSTRACT**

Rapid conversion of commercial photographic projection printing apparatus for producing different print sizes, including multiprint formats, comprises a paper mask frame with a plurality of interchangeable mask members adapted to selectively assemble with the frame for modifying the light transmission opening.

5 Claims, 7 Drawing Figures



Patented July 18, 1972 3,677,638

2 Sheets-Sheet 1

Fig. 1.

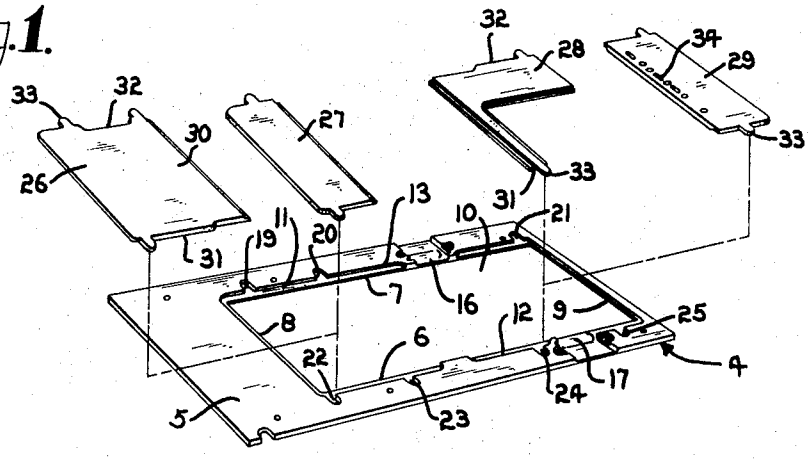


Fig. 2.

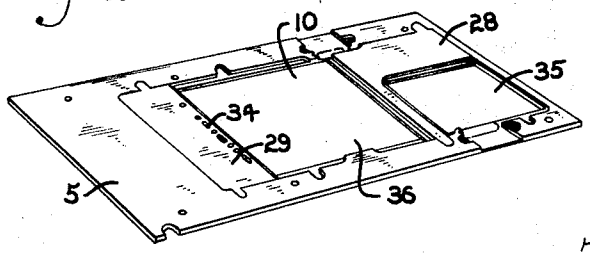


Fig. 3.

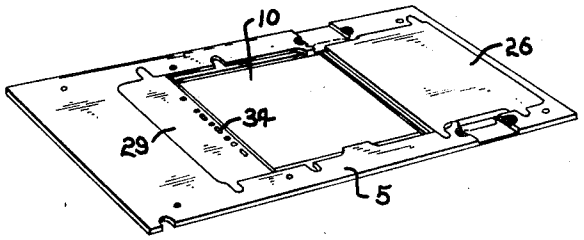
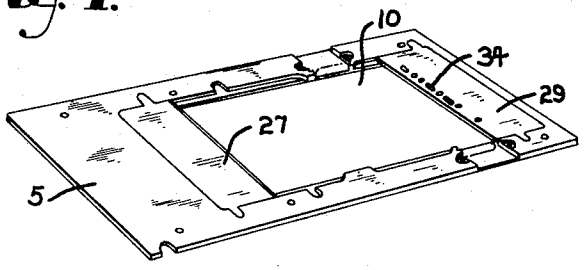


Fig. 4.



INVENTOR.
Arthur J. Daugherty
BY
Fishburn, Gold & Litvin
ATTORNEYS

Fig. 5.

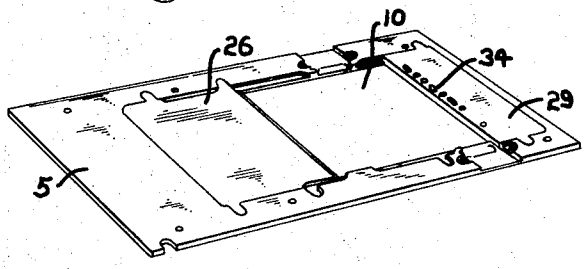


Fig. 6.

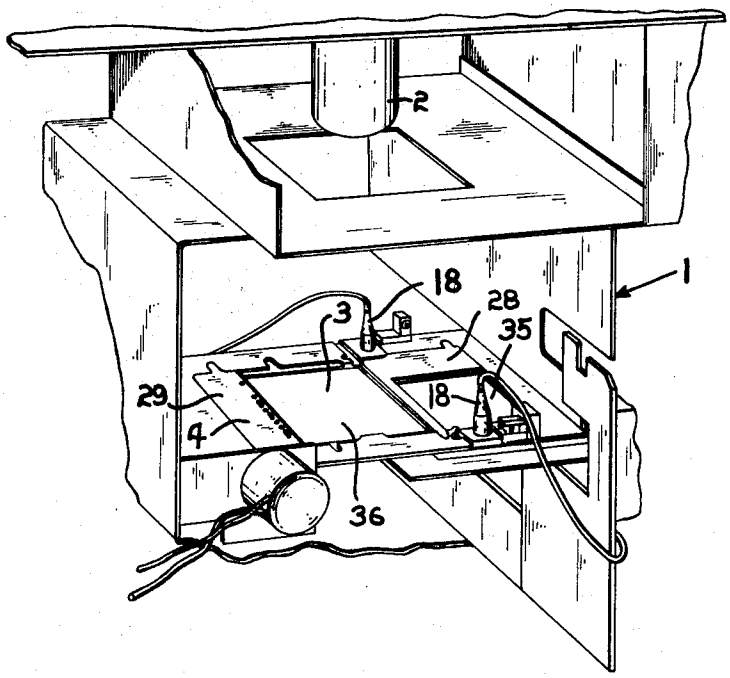
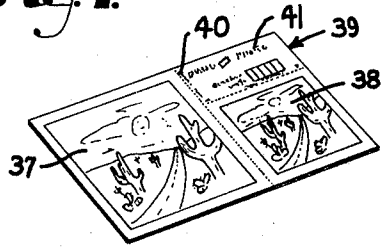


Fig. 7.



INVENTOR.
Arthur J. Daugherty
BY
Fishburn, Gold & Litman
ATTORNEYS

PHOTOGRAPHIC PRINTING APPARATUS

This invention relates to commercial photographic finishing services for amateurs and more particularly to the rapid conversion of print size and format in high speed roll paper projection printers.

In producing finished prints from film exposed by amateur photographers, it is often necessary to make modifications in the printing apparatus so that different print sizes may be produced. The removal and replacement of the print framing mask in modern complex printers, such as the Eastman Kodak Model No. 2620 and 2620A often is time-consuming, requires highly skilled personnel and necessitates an inventory of several masks.

In the practice of this invention, a paper mask frame of greater than the maximum print size continuously remains in the projection printing apparatus and print size conversion is quickly and easily carried out through the use of a plurality of selected interchangeable mask members, thereby producing the desired variations in the borders of the mask frame opening. The paper mask assembly of this invention is particularly suitable for converting the projection printing apparatus to and from the increasingly popular multiple print arrangement.

The principal objects of the present invention are: to provide simple and rapid print size and format conversion of commercial photographic roll paper projection printing apparatus; to provide a paper mask assembly which includes a frame adapted to receive several combinations of mask members for producing various masking arrangements without the necessity of removing the mask frame; to provide such a paper mask assembly wherein the interchangeable mask members are positively located upon assembly, thus reducing the possibility of error; to provide such a paper mask assembly wherein light leakage through the masked portions is virtually eliminated without affecting the ease of mask modification; and to provide such a paper mask assembly which is well suited for its intended purpose.

Other objects and advantages of this invention will become apparent from the following description taken in connection with the accompanying drawings wherein are set forth by way of illustration and example, certain embodiments of this invention.

FIG. 1 is an exploded perspective view of a paper mask assembly embodying this invention showing the mask frame and four selectively interchangeable mask members.

FIG. 2 is a perspective view of the paper mask assembly arranged for the production of a multiple print of the type having one larger print and an adjacent, identical smaller print.

FIG. 3 is a perspective view of the paper mask assembly arranged for producing single prints of a size known as 3S using the cluster lens required for the multiple print of FIG. 2.

FIG. 4 is a perspective view of the paper mask assembly arranged for producing single prints of a size known as 3R using standard 127, 620 or 35MM lenses.

FIG. 5 is a perspective view of a paper mask assembly arranged for producing single 3S prints using standard 126, 127 or 620 lenses.

FIG. 6 is a fragmentary perspective view showing a portion of a typical commercial photographic projection printing apparatus with the mask arrangement of FIG. 2 therein.

FIG. 7 is a perspective view showing a multiple print produced using the mask arrangement of FIG. 2.

Referring to the drawings in more detail:

The reference numeral 1 (FIG. 6) generally indicates a commercial photographic roll paper projection printing apparatus, for example, the Eastman Kodak Model 2620 color printer. The portion of the printer 1 illustrated, is the projection section and includes the necessary projection lens 2 for producing an image at the paper printing section 3. The paper printing section 3 is adapted to receive a mask for blocking the projected light where desired to produce borders on the finished print and protect the sensitive paper from unwanted exposure. In this example the mask takes the form of a paper mask assembly 4 embodying this invention.

The mask assembly 4 comprises a substantially flat opaque metallic frame 5 having longitudinal, inner edges 6 and 7 and lateral, inner edges 8 and 9 defining a rectangular opening 10 of greater length than any desired print arrangement and of equal width to the maximum print width of any desired print arrangement. A flat ledge 11 extends into the frame from said inner edges 6–9 and has longitudinal, vertical walls 12 and 13 and laterial, vertical walls 14 and 15 spaced outwardly respectively from the longitudinal and lateral inner edges 6–9. The vertical walls 12–15 generally surround the opening 10 with certain exceptions, noted below.

The longitudinal, vertical walls 12 and 13 are respectively interrupted by cut-out portions 16 and 17 which form conventional sockets for receiving marker light assemblies 18 in a known manner, FIG. 6. The longitudinal, vertical walls 12 and 13 are further interrupted by a plurality of ledge protuberances which respectively recess through the longitudinal, vertical walls 12 and 13 into the frame 5 and form spaced locating notches 19–25 in the plane of the ledge 11.

In the illustrated example, four substantially flat opaque metallic mask members 26–29 are adapted for selective assembly with the frame 5. The mask members 26–29 respectively have bodies 30 with opposed ends 31 and 32. The distance or length between the opposed ends 31 and 32 is slightly less than the dimension between the longitudinal, vertical walls 12 and 13, but greater than the dimension between the longitudinal, inner edges 6 and 7.

The mask member body ends 31 and 32 each have at least one ear 33 projecting therefrom for receipt into at least one of the locating notches 19–25 upon locating the respective mask member body between the longitudinal, vertical walls 12 and 13. The ears 33 and locating notches 19–25 are positioned to permit limited predetermined interchangeability between the location of the respective mask members to produce desired variations in the borders of the rectangular opening 10. Thus, the mask member 26, which is substantially greater in width than the members 27 and 29, is receivable in the right-hand portion of the opening 10, as viewed in FIG. 3, or the left-hand portion of the opening 10, as viewed in FIG. 5. The mask members 27 and 29 are similar in peripheral shape and are, therefore, generally interchangeable, however, the member 29 is used where dating and coding projections are to be made through the openings 34 onto the edge of a print. Therefore, the member 27, which may be used at the left-hand portion of the opening 10 as viewed in FIG. 4, may be interchanged with the member 29 in the same position, as shown in FIG. 2, when such dating and coding along that particular edge is desired. Note that the mask member 29 is received at the right-hand portion of the rectangular opening 10 in the arrangements of FIGS. 4 and 5.

The remaining mask member in this illustration, is member 28, which is substantially L-shaped and reduces the width or lateral dimension of the rectangular opening 10 where located. Referring to FIGS. 2 and 6, the mask member 28 is shown in operative position partially blocking an area between the longitudinal inner edges 6 and 7 in the right-hand portion of the rectangular opening 10, and further extending entirely thereacross. The use of the mask member 28 produces a rectangular opening 35 entirely separate from an opening 36 which constitutes the unblocked balance of the total rectangular opening 10 when the mask member 29 is used in conjunction with the mask member 28. The openings 35 and 36 permit the transmission to photo-sensitive paper therebeneath of multiple images so as to produce multiple image prints of the type licensed for production and sale under the trademark Bonus Photo by Bremson Research, Inc., Kansas City, Missouri. An example of the multiple print is shown in FIG. 7 and constitutes a larger image 37 and a smaller image 38 respectively obtained through the openings 36 and 35 onto a single card 39. Normally suitable tear perforations 40 and advertising matter 41 are added to the multiple print 39, as described in more detail in U.S. Pat. No. 3,424,527, dated Jan. 28, 1969 and owned by the same assignee herein.

By use of the mask assembly above described, the various popular amateur print sizes including multiple prints are easily available for production on the printing apparatus. The cooperation between the ledge **11** and periphery of the various mask members blocks unwanted light leakage through the mask and high flexibility is maintained for dating and coding in conventional positions. With the structure above described, multiple prints may be easily and quickly brought into and out of production together with standard single 3S and 3R prints obtained from the well known 126, 127, 620 or 35MM films.

It is to be understood that although one form of this invention has been illustrated and described, it is not to be limited thereto except insofar as such limitations are included in the following claims.

I claim:

1. In combination with photographic projection printing apparatus, a printing mask assembly permitting rapid conversion to a plurality of mask arrangements, said mask assembly comprising:

a. a frame having longitudinal and lateral inner edges defining a rectangular opening, and

b. a plurality of mask members adapted for selective assembly with said frame and producing variations in the borders of said rectangular opening,

c. a flat ledge extending into said frame from said inner edges and having longitudinal and lateral vertical walls spaced outwardly respectively from said longitudinal and lateral inner edges and generally surrounding said opening,

d. said mask members engaging said ledge during assembly with said frame,

e. a plurality of ledge protuberances recessing through said longitudinal vertical walls into said frame and forming spaced locating notches in the plane of said ledge,

f. said mask members respectively having a body with opposed ends, the length between said body ends being slightly less than the dimension between said longitudinal vertical walls but greater than the dimension between said longitudinal inner edges,

g. said body ends each having at least one ear projecting therefrom for receipt into at least one of said locating notches upon positioning the mask member body between said longitudinal vertical walls, and

h. said ears and locating notches being positioned to permit limited predetermined interchange-ability between the location of selected mask members to produce desired variations in the borders of said rectangular opening.

2. In combination with photographic projection printing apparatus, a printing mask assembly permitting rapid conversion to a plurality of mask arrangements, said mask assembly comprising:

a. a frame having longitudinal and lateral inner edges defining a rectangular opening,

b. a plurality of mask members adapted for selective assembly with said frame and producing variations in the borders of said rectangular opening,

c. ledge means extending into said frame from said inner edges and having longitudinal and lateral walls spaced outwardly respectively from said longitudinal and lateral inner edges and generally surrounding said opening,

d. said mask members engaging said ledge means during assembly with said frame,

e. a plurality of locating means in said frame,

f. said mask members respectively having a body with opposed ends, the length between said body ends being slightly less than the dimension between said longitudinal walls but greater than the dimension between said longitudinal inner edges,

g. said body ends each having at least one locating member adapted for engagement with at least one of said locating means upon positioning the mask member body between said longitudinal walls, and

h. said locating members and locating means being positioned to permit limited predetermined interchangeability between the location of selected mask members to produce desired variations in the borders of said rectangular opening.

3. The combination as set forth in claim **2** wherein:

a. said locating means comprises ledge protuberances recessing through said longitudinal walls into said frame and forming spaced locating notches in the plane of said ledge, and

b. said locating members are ears projecting from said body ends.

4. The combination as set forth in claim **2** wherein:

a. said rectangular opening is of greater length than any desired print arrangement and of equal width to the maximum print width of any desired print arrangements.

5. The combination as set forth in claim **2** wherein:

a. one of said mask members is "L" shaped so as to produce a separate opening in said rectangular opening.

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