Jan. 28, 1969 R. S. BREMSON, JR 3,424,527

METHOD AND APPARATUS FOR PHOTOGRAPHIC PRINTING

Filed Dec. 27, 1966

Fig. 1.

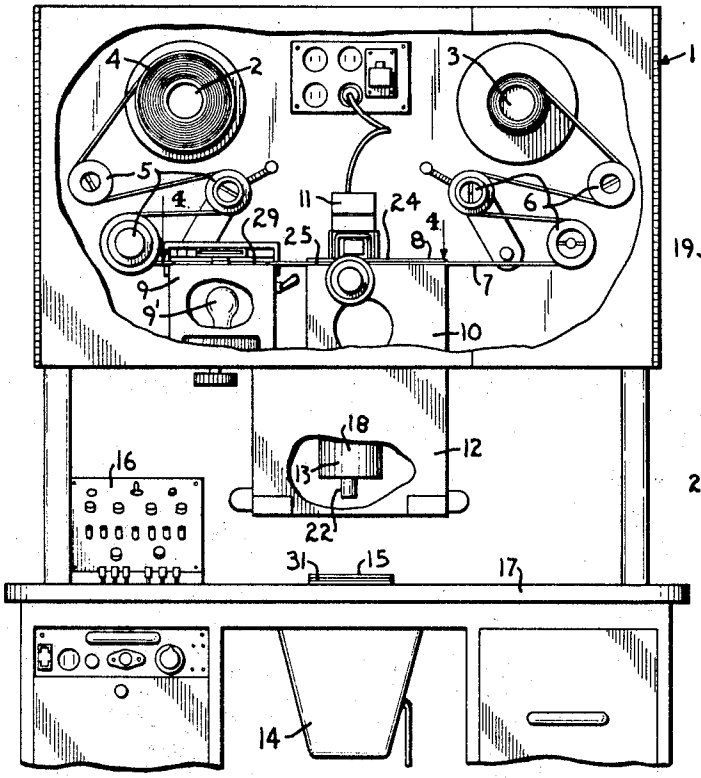


Fig. 2.

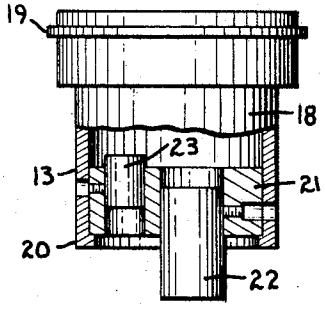


Fig. 3.

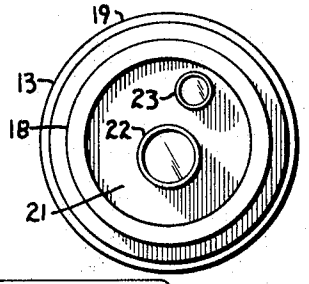


Fig. 5.

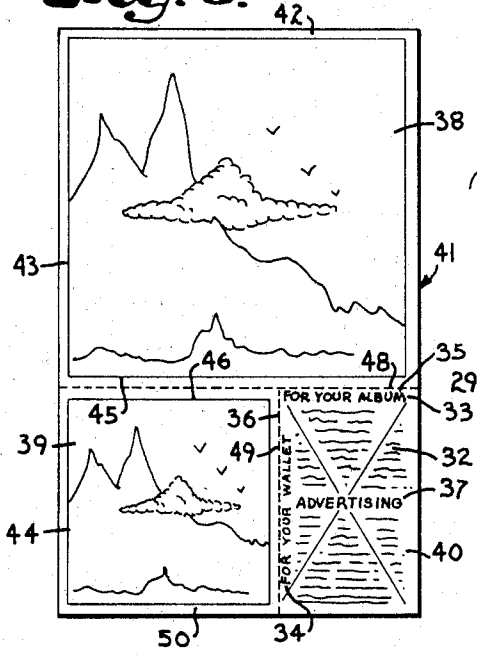
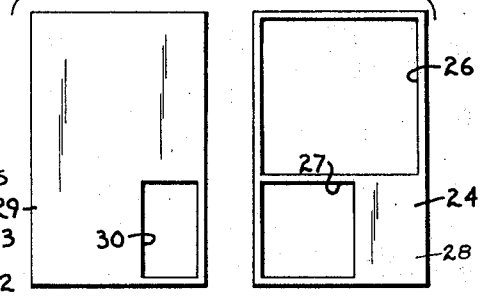


Fig. 4.



INVENTOR.
ROBERT S. BREMSON

BY
Frishburn and Gold
ATTORNEYS

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METHOD AND APPARATUS FOR PHOTOGRAPHIC PRINTING

Robert S. Bremson, Jr., Mission Hills, Kans.
(16 E. 43rd St., Kansas City, Mo. 64111)

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Int. Cl. G03b 27/02, 27/32

ABSTRACT OF THE DISCLOSURE

A projection type roll paper photographic printer having a contact line printer associated therewith is combined with a cluster type projection lens whereby multiple identical projected images of different sizes are formed on an elongated rectangular portion of the paper roll together with contact printed matter during a single operational cycle of the apparatus. The contact printed matter includes instructions extending along borders of the respective projected images relating to the use of the images upon separation.

Background of the invention

Heretofore, apparatus has been constructed which is adapted to produce so called "package prints" from roll paper whereby multiple prints of various sizes are simultaneously produced from a single negative. For example, reference is made to the "Kodak Automatic Package Printer, Model 6" manufactured by Eastman Kodak Company, Rochester, N.Y. It has also been known to combine photographic contact or "line" printers with projection type roll paper printers, reference being made, for example, to the "Kodak Contact Printing Attachment, Model 5–S" for use on the "Kodak Roll Paper Color Printer, Model 5–S and Model 5–S–2," both also constructed by the Eastman Kodak Company. To applicant's knowledge, however, all roll paper projection printers which include contact printing apparatus have heretofore projected a single image from a negative.

Summary of the invention

In the practice of this invention, a cluster type projection lens having a multiple lens projected system is used in combination with roll paper printing apparatus having contact printing ability. The masking structures on the contact printer and projection printer are suitably modified and coordinated whereby multiple images of varying size are simultaneously projected on predetermined portions of the paper roll and remaining space not covered by the projected images receives the contact printing which contains information relative to the use of the projected images after processing.

The principal objects of the present invention are: to provide photographic roll paper printing apparatus adapted to project identical multiple images of various size together with contact printed informational matter on a rectangular print; to provide such apparatus adapted to produce exposures at a high rate of speed suitable for the commercial processing of amateur film; to provide such apparatus which is relatively inexpensive to produce either as original equipment or by modifying existing printers; to provide unique, elongated rectangular prints from square amateur negatives, which prints include identical square projected images of different size together with contact printed informational matter relating to the respective projected images; and to provide a novel and highly desirable system of processing amateur photographic film.

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.

Brief description of the drawings

FIG. 1 is a fragmentary front elevation showing a projection type roll paper photographic printer having a contact printing portion and a cluster type projection lens.

FIG. 2 is a front elevation on an enlarged scale showing the cluster lens removed from the printer with a portion broken away revealing separate lens systems.

FIG. 3 is a bottom view of the cluster lens shown in FIG. 2.

FIG. 4 is a cross-sectional fragmentary plan view taken on the line 4—4, FIG. 1 showing the contact printer mask, the projection printer mask and the relationship therebetween.

FIG. 5 is a plan view showing a typical print containing two identical multiple images of different size together with associated informational material, all formed on an elongated rectangular surface.

Description of the preferred embodiment

The reference numeral **1** generally indicates a projection type roll paper photographic printer embodying this invention. The printer **1** includes an idler spindle **2** and driven spindle **3** respectively adapted to simultaneously carry portions of a sensitized paper roll **4**. Rollers **5** and **6** direct unbroken portions of the roll **4** in the form of a web **7** along a path **8** which carries the web horizontally through a contact printer **9**, containing a light source **9'**, and a projection printer **10** while traveling toward the spindle **3**. A number stamp **11** is provided to identify the position of exposure sets on the roll **4** which are subsequently developed and cut to form separate prints.

A lens housing **12** depends directly beneath the projection printer **10** and contains a cluster projection lens **13**, described more fully below. The lens housing **12** also contains suitable associated equipment such as shutter mechanisms, filters, focusing members, and exposure calculating devices which control the transmission of light into the cluster lens **13**.

A lamp housing **14** contains a light source (not shown) which is directed upwardly through a square negative holder **15** toward the lens housing **12**. A control panel **16** is placed on the printer table **17** and suitable foot operated controls (not shown) are provided for the convenience of the operator.

The cluster lens **13** comprises a barrel **18** provided with a suitable mounting flange **19** adapted to be received in a predetermined position within the lens housing **12**. The barrel **18**, near the lower end **20** thereof, supports a plate **21** on which is mounted a pair of projection lenses designated **22** and **23**. The lenses **22** and **23** are of different focal lengths and are supported at different relative distances between the path **8** of the web and the negative holder **15**, whereby the projected images formed by light being directed upwardly through a negative contained in the negative holder **15** are focused simultaneously in different places and in different sizes onto the plane of the path **8**.

A mask **24** rests on the upper surface **25** of the projection printer **10** just beneath the web **7** and has respective square openings **26** and **27** therethrough adapted to block out all light reaching the web **7** except the desired images projected by the lenses **22** and **23** respectively. An opaque portion **28** of the mask **24** completely covers a corner area adjacent to an edge of each of the openings **26** and **27**. The contact printer **9** has a mask **29** thereon which blocks out all light reaching the web **7** therefrom except for that transmitted through an open-

ing 30 which, except for a thin border, corresponds to the portion 28 on the mask 24.

The driven spindle 3 and selected rollers 5 or 6 are suitably coordinated so as to move the web portion, which previously rested over the mask 29, into exact register with the mask 24 during a complete exposure cycle. Thus, assuming that a square negative 31 is suitably positioned in the negative holder 15, a complete print image is formed as follows: A portion of the web 7 is stopped over the contact printer 9 where a minor portion 32 of the surface thereof is exposed through the mask opening 30. The contact printer 9 has been previously loaded with a suitable negative for directing a contact image including legends 33 and 34 along respective rectangular edges 35 and 36 defined by the opening 30. Additional printed informational or advertising matter 37 is included between the legends 33 and 34 and throughout substantially the remainder of the space defined by the opening 30.

The portion of the web which overlayed the mask 29 is then displaced to the right along the path 8 as viewed in FIG. 1 until it rests in exact register with the mask 24. The image from the negative 31 is then projected upwardly and focused simultaneously by the lens 22 and 23 of the cluster lens 13 into two images 38 and 39 which are identical except that they are different in size. The images 38 and 39 are respectively received on the web 7 through the openings 26 and 27 while the portion 28 of the mask 24 blocks the surface of the web which was previously exposed through the opening 30. The web is then moved to the right, presenting a new web surface to both the contact printer 9 and the projection printer 10. If desired, the contact image 40 may be applied simultaneously with the application of the projected images 38 and 39 on succeeding portions of the web 7.

After exposure, the roll 4 may be developed by conventional paper roll handling equipment and is then cut into elongated, rectangular prints 41, each having a major portion of the surface 42 thereof covered by a substantially square projected image 38, a minor portion covered by a projected image 39 which is identical in shape and content, but reduced in size from the major portion image 38, and a minor portion 32 covered by the contact image 40. The projected images 38 and 39 respectively have first edges 43 and 44 spaced apart longitudinally in aligned relation and second edges 45 and 46 spaced apart laterally in adjacent parallel coextensive relation. The contact image 40 is of elongated rectangular shape and has the edge 35 spaced apart laterally in adjacent parallel coextensive relation to the major image second edge 45. The edge 36 of the contact image 40 is adjacent the minor projected image 39 and normal to the major image second edge 45.

Suitable scored tear lines 48 and 49 are placed between the respective images to permit easy separation of the various portions of the print 41 in accordance with the legends 33 and 34 and, if desired, the matter 37. Upon separation, the major and minor projected image portions of the print 41 continue to contain suitable borders 50 surrounding the images 38 and 39.

Thus, through use of the above described apparatus, prints may be produced from a single negative which include a large image, for example, suitable for mounting in an album, a small image, for example, suitable to be carried in a billfold, instructional matter for informing the recipient as to the suggested use of the developed images, and valuable advertising space for the benefit of the merchant or processor handling the development of amateur photographic film. Variations in the relative size of the images 38, 39 and 40 may be easily made without departing from the scope of this invention.

Further, 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.

What I claim and desire to secure by Letters Patent is:

1. The method of making photographic prints in an automatic photographic emulsion roll paper printer which comprises:
   (a) roll driving said roll paper to a position presenting a first section thereof adjacent a first mask having a first opening therethrough,
   (b) photographically contact printing a first image on said first section through said first opening,
   (c) roll driving said paper to a position presenting said first section adjacent a second mask having separate second and third openings therethrough but blocking the entire area exposed during said contact printing, said last named driving step presenting a second section of said roll paper adjacent said first mask,
   (d) simultaneously photographically projection printing second and third images on said first section through said second and third openings, and
   (e) photographically contact printing said first image on said second section through said first opening.

2. The method of making photographic prints as set forth in claim 1, wherein identical but different size images are projected for said second and third images.

3. Apparatus for making photographic prints from photographic emulsion roll paper comprising:
   (a) means for roll driving said paper along a path,
   (b) a photographic contact printer in said path and receiving said paper therethrough,
   (c) a photographic projection printer in said path and spaced from said contact printer and receiving said paper therethrough,
   (d) a mask associated with said contact printer having a first opening therethrough for contact printing an image on said paper,
   (e) a mask associated with said projection printer and having a second and third opening therethrough and having means blocking the entire area corresponding to said first opening, and
   (f) cluster lens means on said projection printer simultaneously projecting images through said second and third openings.

4. The apparatus as set forth in claim 3, wherein:
   (a) said cluster lens means simultaneously projects images of different size through said second and third openings.

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NORTON ANSHER, *Primary Examiner.*

R. L. MOSES, *Assistant Examiner.*

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