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1,957,864

METHOD FOR REPRODUCING ON PHOTOGRAPHIC STRIP MATERIAL

Filed Nov. 6, 1931

2 Sheets-Sheet 1

Fig.1.

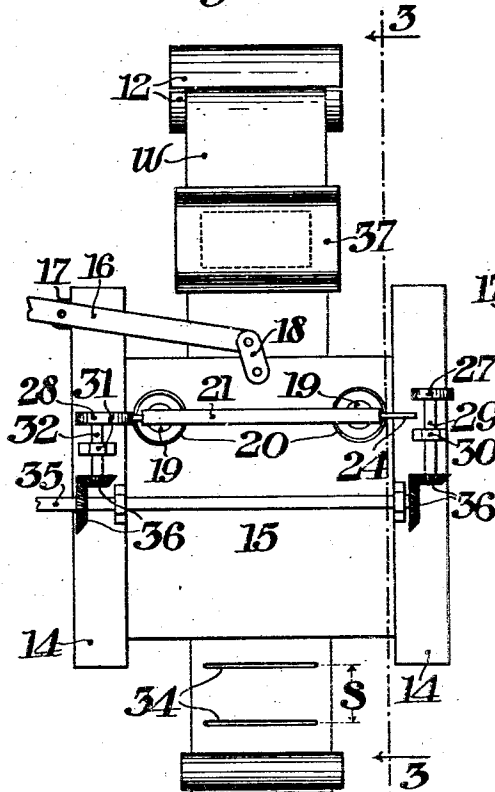


Fig.2.

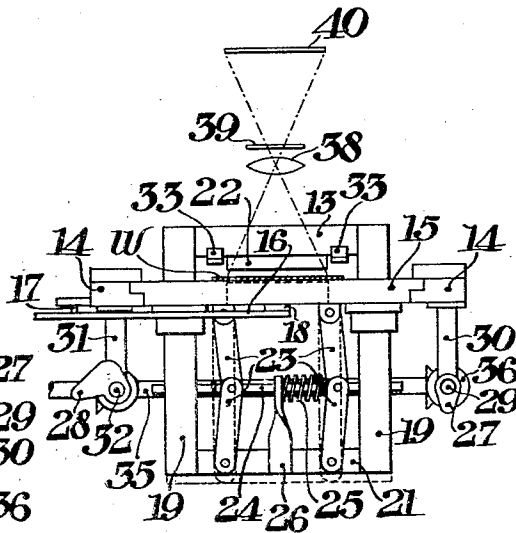


Fig.4.

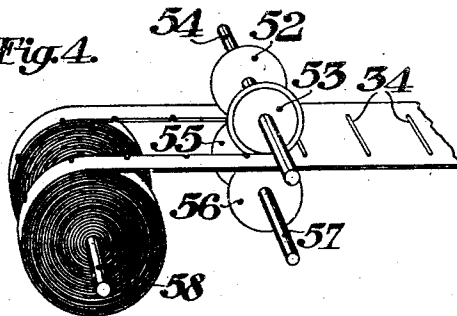
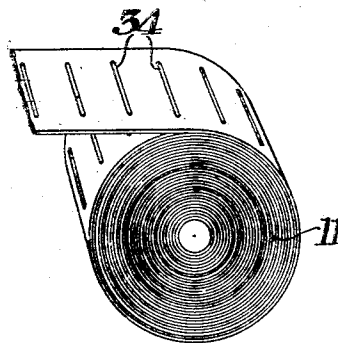


Fig.5.



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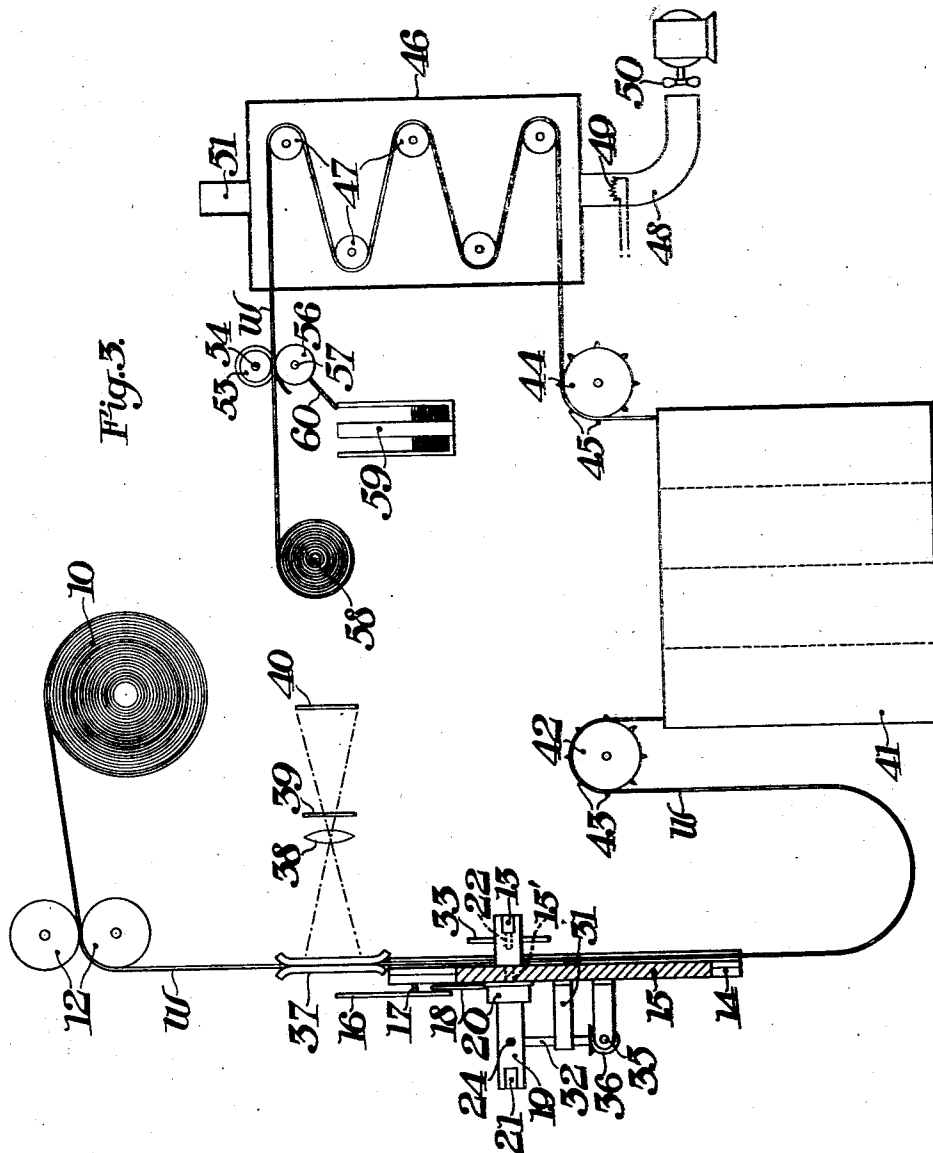
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UNITED STATES PATENT OFFICE

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METHOD FOR REPRODUCING ON PHOTOGRAPHIC STRIP MATERIAL

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Application November 6, 1931, Serial No. 573,409

5 Claims. (Cl. 95—5)

The present invention relates to a method of reproducing a large number of documents on to photographic strip material, and more particularly to a method of handling said strip material continuously to process the same and/or to sever the individual image areas from the strip material. 60

At the present time the duplication of documents such as catalogs or filing cards in large sets require individual and laborious handling of the reproduced card, whereas the originals of the card may be automatically passed through the reproducing apparatus in any one of a number of known ways.

The primary object of the present invention is the provision of a method for severing a plurality of image areas from a strip of photographic material. 65

Another object of the present invention is the provision of a method for processing a continuous strip of photographic material to develop a plurality of latent image areas thereon and for severing the developed image areas from said strip material. 70

A further object of the present invention is the provision of a method for providing transverse slots in light sensitive photographic material between latent images thereon, processing the strip materials to develop said latent images and slitting or cutting the strip material along the margins of the strip material and along the side edges of the image areas completely to sever the same from the strip material. 75

Still another object of the present invention is the provision of light sensitive strip material provided with transverse slots and the method of creating latent images between said transverse slots and of processing said slotted light sensitive material to develop the latent images thereon. 80

A still further object of the present invention is the provision of a method for providing transverse slots in light sensitive strip material, said transverse slots being utilized for intermittent advancement of said strip material during the creation of latent images thereon and being utilized for continuous advancement of said strip material during development of the latent images thereon. 85

Other objects of the invention will be suggested to those skilled in the art as the invention is more fully described hereinafter.

The invention in the broadest aspect includes the provision of successive images on photographic strip material, the provision of transverse slots between and at least co-extensive with said images, and subsequent longitudinal cutting or 90

splitting of the strip material along the edges of the images and across the ends of said transverse slots to sever the images from the strip material. The images on the strip material may be latent or real images and may be created upon the strip material either before or after the transverse slots are provided therein. 95

The great advantage of effecting the severance of the images in two steps, transverse slotting and longitudinal cutting, is that the strip material may be readily processed when only transversely slotted. The transverse slots in the strip material permit better circulation and better drainage of the developing reagent with respect to the strip material during processing. The marginal connections between the image areas also greatly facilitate the advancement of the same through the processing stage. 100

The provision of light sensitive strip material already transversely slotted is within the contemplation of the present invention and would permit the use of known forms of intermittent advancing mechanisms to advance the strip material past the camera means for creating latent images between slots. 105

In the preferred form of the invention, a plurality of successive latent images are created on light sensitive strip material, transverse slots at least co-extensive with the image areas are provided therebetween, the slotted light sensitive material is processed to develop the latent images thereon and is then cut along the margins or side edges of the developed images to sever the individual images from the strip material. 110

One form of apparatus for practicing the present invention is illustrated, by way of example only, in the accompanying drawings, wherein like numerals of reference designate similar elements and wherein:

Fig. 1 is a front elevation of the slotting and the advancing mechanism for the strip material. 115

Fig. 2 is a plan view of the slotting and advancing mechanism shown in Fig. 1.

Fig. 3 is a partial vertical cross-section on the line 3—3 of Fig. 1 and a partial diagrammatic side elevation of the remaining apparatus for practicing the invention. 120

Fig. 4 is a perspective view of a known form of longitudinal cutting or slitting mechanism for performing the final step of the method of the invention. 125

Fig. 5 is a perspective view of a supply of strip material previously provided with transverse slots.

The strip material *w* may be supplied in the 130

form of a supply roll 10, see Fig. 3, and is preferably in light sensitive condition. The strip material may, however, be supplied with real images thereon and/or previously transversely slotted. A supply roll 11 of previously slotted light sensitive strip material which may be substituted for supply roll 10 is shown in Fig. 5.

The strip material *w* is conducted from the supply roll 10 or 11, between a pair of tension rolls 12, to the slotting and intermittent advancing mechanism.

The slotting and intermittent advancing mechanism comprises a pair of guideways 14 which slidably engage the edges of a plate 15. A lever arm 16 is pivotally mounted at 17 upon one of guideways 14, is pivotally connected to plate 15 by a link 18 and is actuated to have a reciprocating motion, with pauses at each end of the stroke, by a mechanism not here disclosed but fully described in our co-pending application for improvements in an apparatus for handling photographic strip material, Serial No. 573,408 filed on even date herewith.

A carriage member is mounted to slide perpendicularly to plate 15 and includes slides 19, moving in bushings 20 on plate 15, as well as end members 21 and 31. A set of toggle levers 23 are connected between plate 15 and end member 21, while the center joints of toggle levers 23 are pivotally connected to a rod 24. A coil spring encircles rod 24 between a pin 25' and a yoke member 26 which is mounted on end 21 so that the carriage member is urged by spring 25 into the full line position shown in Fig. 2.

Rod 24 is reciprocated back and forth by a pair of cams 27 and 28. Cam 27 is mounted upon a shaft 29 turning in a bracket 30 on one guideway 14 and is located so as to operate rod 24 when plate 15 is in uppermost position. Cam 28 is mounted upon a shaft 32 turning in a bracket 31 on the other guideway 14 and is located so as to operate rod 24 when plate 15 is in lowermost position. The shafts 29 and 32 are driven by a main shaft 35 through two sets of beveled gears 36, the main shaft being driven by the actuating mechanism for plate 15 as fully described in our aforementioned co-pending application.

Cams 27 and 28 are shaped and timed so that cam 27 will move rod 24 to the left, see Fig. 2, when plate 15 is at the top of the stroke and so that cam 28 will move rod 24 to the right when plate 15 is at the bottom of the stroke. Coil spring 25 is of such strength as to be overcome by the toggle action in toggle levers 23 so that rod 24 will remain in the position to which it is moved by cam 27 during the down-stroke of plate 15. However, coil spring 25 will act to hold rod 24 in the position to which it is moved by cam 28 during the upstroke of plate 15.

An elongated knife 22 and a pair of cross members 33 are mounted upon end member 13 so that when rod 24 is moved to the left by cam 27, the knife 22 is moved to penetrate the strip material *w* and cross members 33 are moved to abut the surface of the strip material. Plate 15 is provided with an elongated slot 15' to receive knife 22 and to provide shearing surfaces therefor. While the knife 22 penetrates the strip material *w*, the plate 15 is moved downwardly and at the bottom of the stroke cam 28 actuates rod 24 so that the knife 22 is retracted from the strip material and remains so during the upstroke of the plate whereupon the cycle may be repeated.

The strip material *w* is provided with transverse slots 34 by the mechanism just described, such transverse slots 34 are spaced at intervals equal to the height of an image area plus the width of a slot, as indicated by the dimension *S* in Fig. 1. Slots 34 are furthermore equal in extent or greater than the width of the image areas.

The gate 37 may be located above or below the slotting and advancing mechanism, but is preferably located above the same as illustrated. Such a gate 37 will outline the latent image which may be created upon the strip material *w* at this point by means of known equipment such as a lens 38 and shutter 39, the object 40 such as a library card being placed in photographic relation to the lens 38 and shutter 39.

As the strip *w* leaves the slotting and intermittent advancing mechanism it is conducted in the customary loop to a processing apparatus 41 by means of a roll 42 which has properly spaced fins 43 on the periphery thereof. The processing apparatus 41 may be of any known form and will accomplish the developing, rinsing, fixing and washing of the strip material *w*. After processing, the strip material *w* is conducted by a roller 44 having fins 45 to a drying chamber 46.

The strip material *w* is conducted through the drying chamber 46 in a serpentine path over rollers 47 while the chamber 46 is supplied with a current of warm air blown through the intake 48 and over a heating coil 49 by means of a motor driven fan 50. A vent 51 is provided at the top of the drying chamber 46.

After the strip material *w* leaves the drying chamber 46 it is passed between a pair of cutters located so as to longitudinally cut the strip material along the margins thereof to trim the side edges of the image areas and to complete the severance of the individual areas from the strip material. The pair of cutters are composed of beveled disks 52 and 53 mounted upon a rotating shaft 54 above the strip material and of beveled disks 55 and 56 mounted upon a rotating shaft 57 below the strip material. Disks 52 and 55 cooperate to trim one side of the image area while disks 53 and 56 also cooperate in a known manner to trim the other side of the image area.

The margins of the strip material *w* are wound upon a take-up shaft 58 which also functions to draw the strip material evenly through the cutter. The severed image areas may be conducted into any suitable receptacle 59 by means of a chute 60.

The operation of our method in its preferred form will be described in the following:

The unperforated light sensitive material is conducted from supply roll 10 and past a reproducing apparatus which creates latent images upon the strip material *w*. The slotting and advancing mechanism provides transverse slots in the strip material *w* between the latent images thereon while the strip is also advanced intermittently so that the reproducing apparatus may be operated during the pauses. The latent images are developed by the passage of strip material through a processing apparatus whereupon the strip material is dried in a drying chamber. The conduction of the material through the processing apparatus is greatly facilitated by the provision of a transverse slot in the material. The dried slotted strip material is finally cut longitudinally or slitted by the cutters which are spaced to trim the side edges of the picture area and which complete the severance thereof from the strip material.

The provision of transverse slots in the strip material before introduction to the process presents many economies such as saving or reclamation of silver emulsion and simplification of the advancing mechanism. Such provision of transverse slots in photographic strip material has been previously disclosed but the slots so provided were merely for the purpose of advancing the strip materials and not being co-extensive with the image or picture areas did not trim the upper and lower edges of said areas. This distinction in the length of the slot has been included in the appended claims by stating that the slots are at least as long as the picture area or that the slots are at least co-extensive with the picture area. Since many modifications of the method according to our invention will be suggested to those skilled in the photographic art by the foregoing description, the present disclosures are to be construed in an illustrative and not in a limited manner.

Having now particularly described our invention, what we claim as new and desire to secure by Letters Patent of the United States is:

1. A method of photographic recording on light sensitive strip material which comprises creating successive latent images on said light sensitive material, slotting said strip material transversely to trim the adjacent edges of adjacent images, processing the slotted strip material photographically to develop said latent images and then cutting said strip material along the margins thereof to trim the side edges of the developed images.
2. A method of photographic recording on light sensitive strip material which comprises creating successive photographic latent images on said light sensitive strip material, slotting said strip material transversely for removing the frame lines of adjacent images, advancing said strip material by means of the transverse slots therein,

processing the slotted strip material to develop the latent images thereon, and then cutting said strip material along the margins thereof and across the ends of said slots to trim the side edges of the developed images and to sever said images from said strip material.

3. A method of photographic recording on light sensitive strip material which comprises creating successive photographic latent images on said light sensitive strip material, slotting said strip material transversely to trim adjacent edges of adjacent images, developing the latent images on said strip material drying said strip material, and cutting the same longitudinally to trim the side edges of the developed images.

4. A method of continuous photographic recording on light sensitive strip material which comprises creating successive photographic latent images on said strip material, slotting the same transversely to trim adjacent edges of adjacent images, processing said strip material to develop the latent images thereon, advancing said strip material intermittently during slotting and continuously during processing by means of the transverse slots therein and cutting said strip material longitudinally to trim the side edges of said images.

5. A method of finishing photographic strip material provided only with transverse slots and having latent photographic images on said strip material between each pair of slots, which comprises moving said strip through a processing bath whereby the transverse slots permit free circulation of the bath with respect to the strip material, drying the transversely slotted strip material, and cutting the same longitudinally to trim the side edges of the developed images.

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