Aug. 5, 1952 C. L. MOURFIELD 2,605,675

DEVICE FOR MAKING MULTIPLE EXPOSURES OF IMAGES

Filed July 31, 1950 2 SHEETS—SHEET 1

Fig. 1

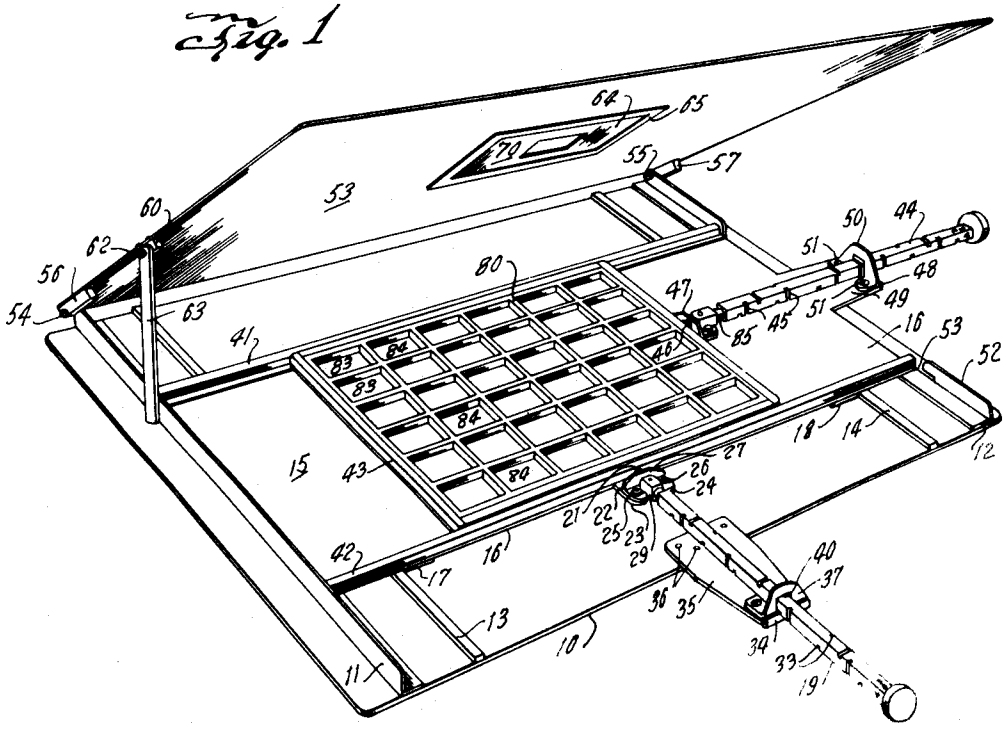
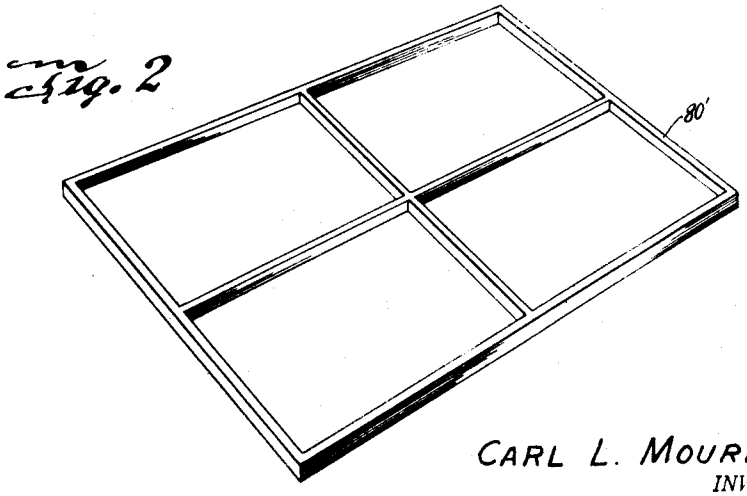


Fig. 2



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Fig. 3

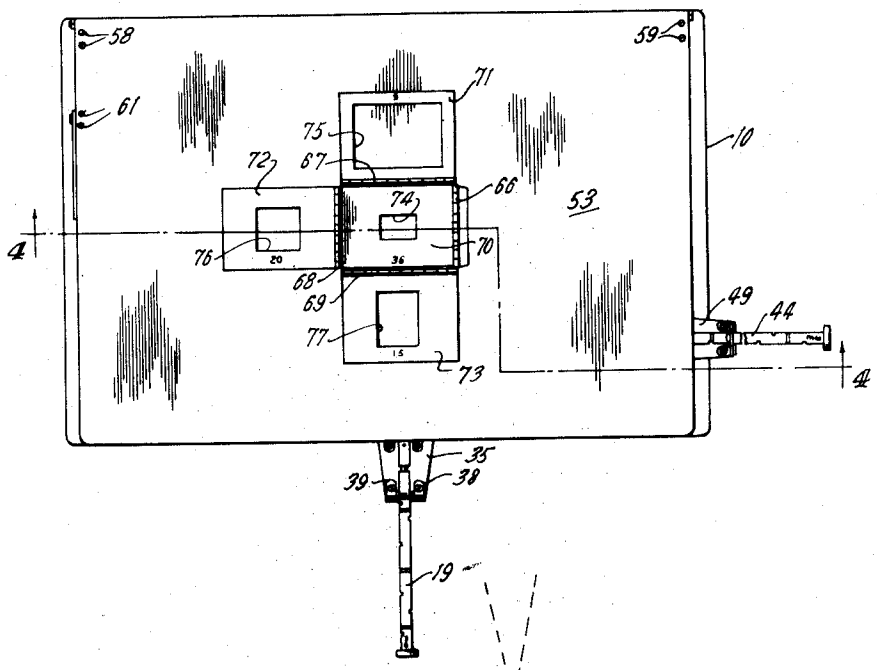


Fig. 4

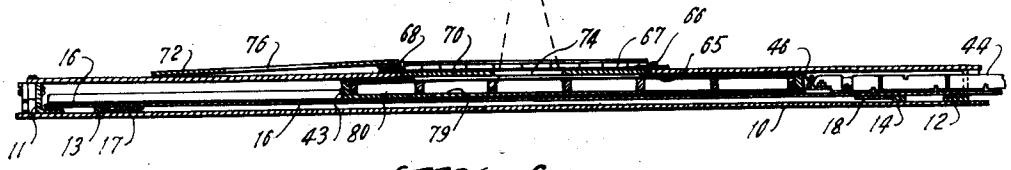


Fig. 6

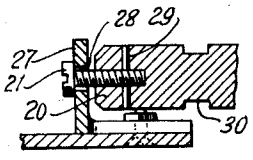
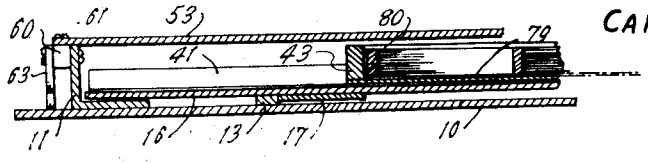


Fig. 5



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DEVICE FOR MAKING MULTIPLE EXPOSURES OF IMAGES

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Application July 31, 1950, Serial No. 176,790

4 Claims. (Cl. 88—24)

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This invention relates to photographic apparatus and more particularly to an apparatus for making multiple regularly spaced exposures on a sheet of sensitized paper.

In the practice of photography, it is often necessary to make multiple reproductions or prints of an image from an original. Since the reproductions must necessarily be made in a dark room, the apparatus employed must be capable of being easily manipulated by touch alone successively to make a plurality of regularly spaced exposures of an original film or plate on a sheet of sensitized paper.

Accordingly, it is an object of my invention to provide a new and improved apparatus for making a plurality of regularly spaced exposures on a sheet of sensitized paper.

It is another object of my invention to provide a new and improved apparatus for making a plurality of regularly spaced exposures on a sheet of sensitized paper which can be easily manipulated by touch alone.

It is another object of my invention to provide a new and improved apparatus for making a plurality of regularly spaced exposures of a selected size on a sheet of sensitized paper.

Briefly stated, my new and improved apparatus for making a plurality of regularly spaced exposures on a sensitized surface comprises a substantially rectangular base plate having a cover pivotally secured to one edge of the base plate and adapted to be disposed over said base plate. The cover is provided with an aperture through which an image may be projected toward the base plate. Mounted on the base plate for sliding movement along and transverse with respect to the base plate is a platform on which is mounted a tray for sliding movement in a direction perpendicular with respect to the direction of movement of the platform. Means are provided successively to move the tray and the platform a plurality of predetermined distances with respect to the base plate and the aperture in the cover. The tray is adapted to receive a sheet of sensitized paper over which is disposed a masking frame which holds the sheet down and insures that the reproductions formed on the sheet have regular sharply defined edges.

For a better understanding of my invention reference may be had to the following description taken in connection with the accompanying drawing and its scope will be pointed out in the appended claims.

In the drawing,

Figure 1 is a perspective view of a preferred

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embodiment of my apparatus for making a plurality of regularly spaced exposures on a sheet of sensitized paper;

Figure 2 is a perspective view of a masking frame employed with the apparatus illustrated in Figure 1;

Figure 3 is a top plan view of the apparatus with the cover in closed position;

Figure 4 is a sectional view taken along line 4—4 of Figure 3;

Figure 5 is a fragmentary sectional view of the apparatus showing a sheet of sensitized paper in the tray; and

Figure 6 is a fragmentary sectional view of a portion of the apparatus.

Referring now to the drawing, the apparatus comprises a substantially rectangular base plate 10 provided with L-shaped guides 11 and 12 which are rigidly secured to plate 10 adjacent the ends of plate 10. A pair of spaced bars 13 and 14 which lie parallel and between guides 11 and 12 are also secured to plate 10. Guides 11 and 12 and bars 13 and 14 may be secured to plate 10 in any conventional manner such as welding or riveting.

A platform 15 is slidably mounted on plate 10 between guides 11 and 12 and has a bottom 16 which is supported by bars 13 and 14. Bottom 16 is provided with a pair of bars 17 and 18 which abut bars 13 and 14 and prevent horizontal movement of platform 15 in directions perpendicular to bars 13 and 14.

In order to enable platform 15 successively to be moved predetermined distances parallel to bars 13 and 14, I provide a rectangular rod 19 having an end 20 provided with a threaded bore in which is engaged a screw 21. The screw 21 is pivotally and rotatably secured to bottom 16 of platform 15 by means of a bracket 22 which is secured to projecting ears 23 and 24 of bottom 16 by means of bolts 25 and 26. The bracket 22 has a leg 27 extending perpendicularly from bottom 16 which is provided with an aperture 28 through which extends the screw 21. It will be apparent that rod 19 is retained in place by the leg 27 of bracket 22 since the end 20 of rod 19 and the head of screw 21 abut opposite sides of leg 27 adjacent the aperture 28. The aperture 28 is of such dimension that vertical pivotal movement of rod 19 about the portion of screw 21 extending through aperture 28 may take place. The screw 21 is secured to end 20 of rod 19 against rotary movement with respect to rod 19 by a pin 29 which extends through suitable registering apertures in end 20 and screw 28. Rod 19 is also pro-

vided with an annular recess 30 whose function will be described below.

Rod 19 is rectangular in shape and provided with a plurality of spaced transverse notches 33 in each side. The distances between the notches 33 in any one side of rod 19 are equal but the distances between the notches 33 in one side are not equal to the distances between the notches 33 in any of the other three sides of rod 19. A catch 34 adapted to engage in one of the notches 33 is rigidly secured to an extension 35 rigidly secured to plate 10 by means of rivets 36 or any other suitable fastening means. In order to limit the upward movement of rod 19, a bracket 37 having ears 38 and 39 is secured to extension 35. Rod 19 passes through a slot 40 in bracket 37. Slot 40 is sufficiently large to allow free longitudinal movement of rod 19 without engaging the notches 33 with the top of sides of slot 40 while permitting rod 19 to be moved upwardly to disengage a notch 33 from catch 34 and allowing rod 19 to be moved through slot 40 until another notch 33 is engaged by catch 34. Slot 40, however, is of such dimensions that rod 19 may not be rotated about its longitudinal axis unless rod 19 is moved to a position where the annular recess 30 is disposed in slot 40.

Platform 15 is provided with a pair of L-shaped guides 41 and 42 which are rigidly secured to bottom 16 adjacent its sides and which lie perpendicular to bars 13 and 14. A rectangular tray 43 is mounted for sliding movement along and between guides 41 and 42. It will be apparent that the horizontal movement of tray 43 is in a direction perpendicular to the direction of horizontal movement of platform 15.

I provide a means for successively moving tray 43 predetermined distances parallel to guides 41 and 42 and along platform 15 which is similar to rod 19 and its associated structures for moving platform 15. Briefly, a rod 44 provided with notches 45 is pivotally and rotatably secured to tray 43 by means of a screw 46 and bracket 47. The notches 45 are adapted to be engaged by a catch 48 rigidly secured to an extension 49 of bottom 16. To limit the upward movement of rod 44 a slotted bracket 50 is secured to extension 49 by means of bolts 51. The vertical leg 52 of guide 12 is cut away at 53 to permit extension 49 and rod 44 to be moved horizontally and perpendicularly with respect to platform 15.

A cover 53 is pivotally mounted on guides 11 and 12 by means of bolts 54 and 55 which extend through suitable apertures in guides 11 and 12 and blocks 56 and 57, respectively. Blocks 56 and 57 are secured to cover 53 by means of screws 58 and 59, respectively. A block 60 is secured to cover 53 adjacent one end of cover 53 by means of screws 61. Pivotally secured to block 60 by means of a bolt 62 is a prop bar 63 which is employed to maintain cover 53 in the partially open position illustrated in Figure 1.

Cover 53 is provided with a central aperture 64 which is partially closed by a rectangular frame 65 secured to the bottom side of cover 53 for a purpose to be described below. Four hinges 66, 67, 68 and 69 are secured to the top surface of cover 53 adjacent the four sides of aperture 64. Masks 70, 71, 72 and 73 are secured to hinges 66, 67, 68 and 69, respectively, and are adapted to be moved pivotally about their respective hinges into a position parallel to top 53 and within aperture 64. Mask 70 is shown in aperture 64 in Figures 1, 3 and 4. Masks 70, 71, 72 and 73 are provided with rectangular apertures

74, 75, 76 and 77, respectively, which are of unequal dimensions. Frame 65 prevents the passage of light between the edges of the masks 70 and 73 and the edges of the aperture 64 of cover 53.

In order that the sensitized paper 79 which is placed in tray 43 may be kept smoothly on the bottom of tray 43 and in order that the exposed portions of the sensitized paper have clearly defined edges, I provide a masking frame 80 for each of the masks 70 to 73. The masking frame 80 is a grill which divides the sensitized paper into a plurality of areas of equal size and of such dimensions as to suitably conform with the dimensions of its associated mask 70, 71, 72 or 73. In any case, the correlation between the exposure orifices or apertures 74 to 77 of masks 70 to 73 and the corresponding areas defined by the cross-members of the masking frames 80 is the factor determining the size of the exposed portion of the sensitized paper, as well as insuring a clean cut margin for the finished picture. The notches 33 and 45 in one side of rod 19 and 44, respectively, are separated by a distance which will bring successive areas of the sensitized paper as defined by the masking frames 80 into centered position below the aperture of its associated mask 70, 71, 72 or 73. It will be obvious that the number of areas into which the paper is divided will vary with the sizes of the apertures in the masks 70 to 73 and therefore a separate masking frame must be provided for each mask 70 to 73. For example, the masking frame 80 of Figure 1 employed with mask 70 divides the sensitized paper 79 into 36 equal areas. Each of the rods 19 and 44 must therefore have one side which is provided with six appropriately spaced notches 33 and 45, respectively. If the mask 71 is employed, the masking frame 80'' must be employed and the rods 19 and 45 must each have a side provided with two appropriately spaced notches 33 and 45, respectively.

In operation, a sheet 79 of sensitized paper is placed in tray 43 and an appropriate masking frame 80 is placed over the sensitized paper 79. The masking frame 80 fits snugly in tray 43 and prevents movement of the paper 79. The cover 53 is then closed and the image on a film or plate which is to be reproduced is projected through the aperture 74 in mask 70 onto the sensitized paper 79. Any suitable projecting means may be employed. The projecting means has been generally indicated by a lens 81 in Figure 4. Rods 19 and 44 are then pulled outwardly and the catches 34 and 48 engaged in the notches 33 and 45, respectively which are nearest screws 21 and 46 of rods 19 and 44, respectively. The tray 43 is then so positioned that the area 82 defined by masking frame 80 is directly beneath aperture 74. The exposure is then made, the projected image falling on area 82. Since the masking frame rests on the paper 79, the edges of the exposed area 82 will be sharply defined when the sensitized paper 79 is developed. After one exposure is made, one of the rods, say rod 19, is moved inwardly until the notch next closest to screw 21 is engaged by catch 34. This will bring area 83 directly beneath aperture 74. After area 83 is exposed, rod 19 is again moved inwardly until the next notch 33 is engaged by catch 34. After the areas in the outermost left row defined by masking frame 80 have been exposed, rod 44 is moved inwardly until the catch 48 engages the notch 45 second closest screw 46. This will bring

the areas 84 successively underneath aperture 74 as rod 19 is moved successively outwardly. By manipulation of rods 19 and 44, all the areas defined by masking frame 80 can be successively exposed to the image projected through lens 81. The sensitized paper 79 is then removed and developed. The plurality of reproductions thus formed on the successively exposed areas of the paper 79 can then be separated by appropriately cutting paper 79 into thirty six pieces.

If the reproductions desired are to be of larger size, the mask 70 is pivoted about its hinge 66 and out of aperture 64. Mask 71 is then pivoted into aperture 64. A sheet 79 of sensitized paper is placed in tray 79 and the mask 80', Figure 2, is placed over paper 79. Rods 19 and 44 are then pulled outwardly until the annular recesses 30 and 85 of rods 19 and 44, respectively, register with the slots in brackets 37 and 50, respectively. The rods 19 and 44 are then rotated until the sides of rods 19 and 44 which are provided with only two notches 33 and 45, respectively are in a position in which catches 34 and 48 will engage in their notches. Rods 19 and 44 are then moved inwardly until catches 34 and 48 engage in the notches 33 and 45, respectively, which are nearest screws 21 and 46, respectively. The rods 19 and 44 are then manipulated as above to bring the four areas of sheet 79 defined by frame 80' directly and successively beneath aperture 75 of mask 71.

During each movement of tray 43, the rod 19 or 44 is lifted just enough to disengage catch 34 or 48 from the notch 33 or 45, respectively, in which it was engaged. The rod 19 or 44 is then moved sufficiently to place the notch 33 or 45 in non-alignment with the catch 34 or 48. The rod 19 or 44 is allowed to rest on the catch 34 or 48 so that as the rod 19 or 44 is moved relative to catch 34 or 48, the rod will fall as the next notch 33 or 45 passes the catch 34 or 48 to engage the catch 34 or 48 and stop further movement of rods 19 or 44. In this manner, the areas defined by the masks 80 can be easily and surely centered by touch alone beneath the aperture in the mask 70, 71, 72 or 73 which is in operative position in aperture 64 of cover 53. The rods 19 and 44 cannot be rotated unless they are in their outermost positions in which the annular recesses 29 and 85 register in the slots in brackets 37 and 50. Accidental rotation of the rods during the process of exposing a particular sheet 79 is thereby prevented. The various parts of the apparatus are painted black to prevent reflection of light onto the sensitized paper.

It will be apparent that among the advantages of the above described apparatus are its simplicity of construction, its ease of manipulation even in the dark, the prevention of accidental rotation of the rods 19 and 44, and the clearly defined edges formed by the use of masking frames 80.

While I have illustrated and described a preferred embodiment of my invention, it will be

apparent that various changes and modifications can be made without departing from the spirit and scope of my invention and I, therefore, aim in the appended claims to cover all changes and modifications as fall within the true spirit and scope of my invention.

What is claimed is:

1. A photographic apparatus comprising: a base; a platform slidably mounted on said base; a first rod pivotally secured to said platform for adjustably moving said platform in one direction along said base; said first rod being of polygonal cross section and having notches in its side faces; a first bracket secured to said base and having a slot slidably receiving said first rod to limit its vertical, pivotal movement, a first catch disposed beneath said first rod and secured to said base, said first catch being selectively engageable in said notches to limit movement of said first rod; an open topped tray slidably mounted on said platform; a second rod pivotally secured to said platform for adjustably moving said tray in a direction perpendicular to said one direction, said second rod being of polygonal cross section and having notches in its side faces; a second bracket secured to said platform and having a slot slidably receiving said second rod to limit its vertical pivotal upward movement; a second catch disposed beneath said second rod and secured to said platform, said catch being selectively engageable in said notches of said second rod to limit movement of said second rod; and a movable cover provided with an aperture adapted to be disposed above and parallel to said tray, said platform and said base.

2. The device of claim 1, and a masking frame adapted to be disposed in said tray for dividing the total area of said tray into a plurality of spaced areas.

3. The device of claim 1, said notches in each side face of each of said rods being spaced uniformly, said notches in one of said side faces of each of said rods being spaced a distance from each other which differs from the distance spacing of said notches in the other side faces of each of said rods.

4. The device of claim 3, said first and second rods being rotatably secured to said platform and said tray, each of said rods being provided with a reduced portion, each of said first and second brackets preventing rotary movement of said first ad second rods when said reduced portions are not disposed in said brackets.

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