Feb. 22, 1944. R. H. FULLERTON 2,342,394

DEVELOPER

Filed Aug. 26, 1940 2 Sheets-Sheet 1

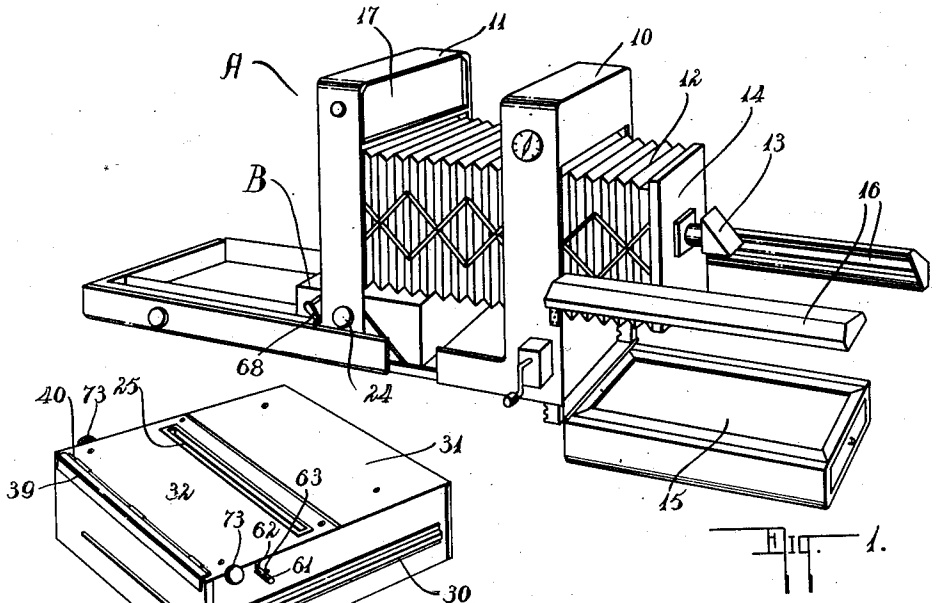


Fig. 1.

Fig. 3.

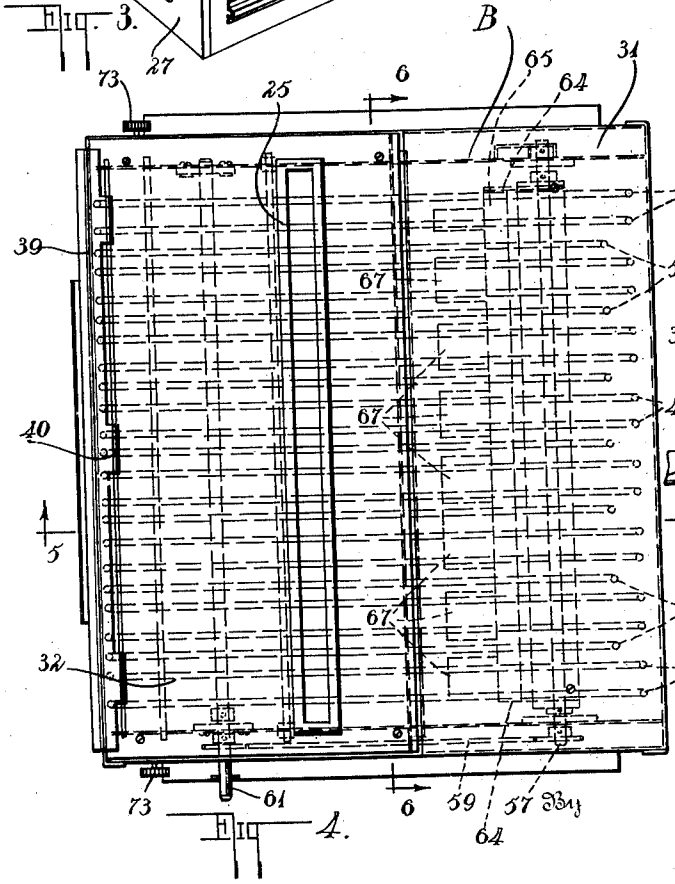


Fig. 4.

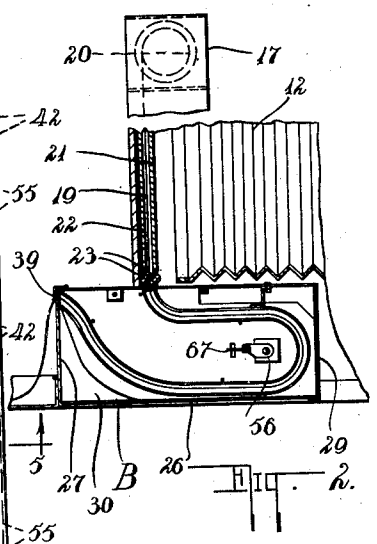


Fig. 2.

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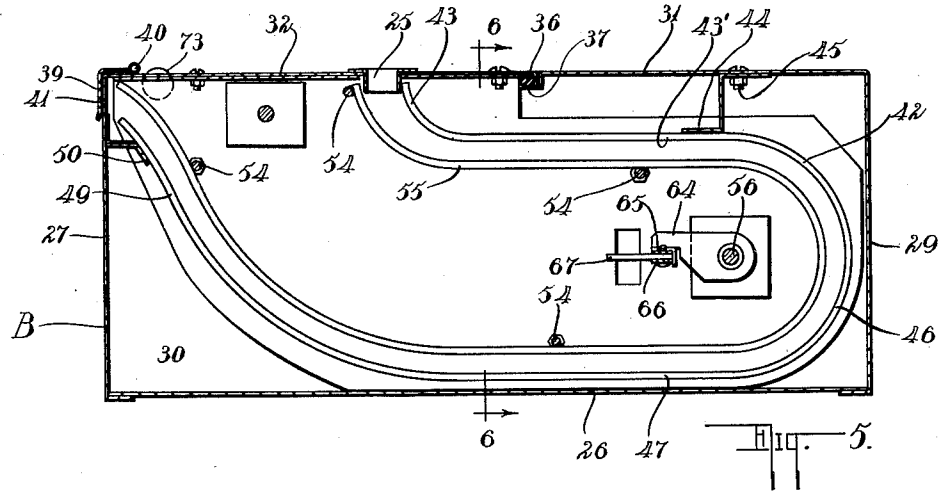


Fig. 5.

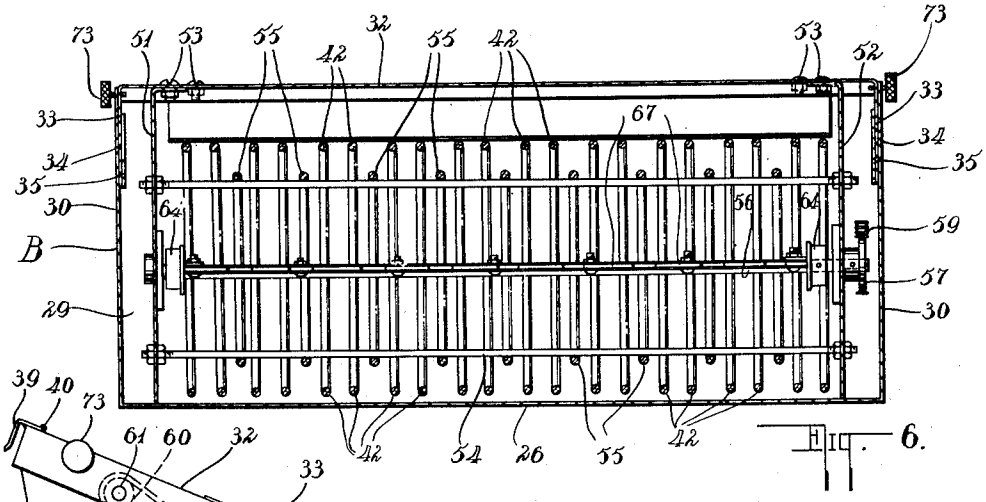


Fig. 6.

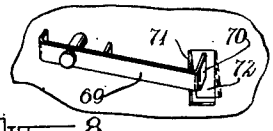


Fig. 8.

Fig. 7.

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2,342,394

UNITED STATES PATENT OFFICE

2,342,394

DEVELOPER

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Application August 26, 1940, Serial No. 354,190

2 Claims. (Cl. 95—94)

My invention relates to an improvement in developers wherein it is desired to provide a developer for a photostatic copy machine or the like, through which the sensitized paper may pass for development purposes without the necessity of handling the paper during this process.

In photostatic copy machines it is common practice to pass the sensitized paper after exposing the same, into a developing tank for sufficient time to permit the developing process to be accomplished. As the procedure must take place without further exposing the sensitized paper, it is essential that the developer be secured in the path of the paper as it leaves exposing position, and it is also essential that the sensitized sheet be maintained in darkness until the developing process has been completed. Accordingly, some means must be provided for moving the paper through the developing tank so that the paper may be urged through the tank and properly developed.

It is an object of the present invention to provide a developer which is designed to receive a sheet of paper and which includes a means for guiding the paper from the inlet of the developer to the outlet of the same. The path followed by the sensitized paper is preferably a curved path so that the developer requires a minimum of space. If the developer were formed in an elongated box or container, the construction of the sensitized paper moving means would be greatly simplified, but in a device of this type where the machine in which the developer is used is preferably of the portable type, space is valuable and a curved path for the paper to follow is decidedly preferable.

It is an object of the present invention to provide a developer in which the paper is guided through a path around a curve and to provide a means of propelling the paper around this curved path. The paper travels easily along the portion of the path which is straight and the propelling means is so devised as to guide the paper over the portion of its path which would normally be difficult for the paper to follow.

It is a feature of my invention to provide a developer having a guide track arrangement extending from the inlet to the outlet of the developer. This guide track is formed of two spaced guide elements between which the sensitized paper may pass. My developer is so arranged that one of these sets of tracks is mounted upon a removable section of the developer container. Thus if by any chance paper should become caught within the developer this paper can be easily removed by withdrawing from the developer the removable section of the container bearing one set of tracks. When this is done, the paper may be merely picked out of the developing solution by hand and it is not necessary to attempt to maintain the paper between the tracks until it is removed. It will be understood that should the paper become caught within the developer the paper usually becomes folded or crumpled and in such a condition could not easily be forced to the outlet between the tracks.

It is a feature of my invention that the operating mechanism for propelling the paper through the developer tank is mounted upon the removable section of the developer container and is removable with this removable section. Thus when the removable section is separated from the remainder of the developer, all of the operating mechanism of the developer is exposed and may be adjusted or repaired without difficulty should such adjustment or repair be found necessary.

It is a further feature of my invention to provide a means for propelling the paper through the developer which will engage the paper to move the same in one direction, but which is so constructed that movement in one direction only is permitted. This construction is such that while the paper may be reciprocated slightly when in developing position, it cannot be forced back out through the inlet and once in the developer must pass through the outlet.

These and other objects and novel features of my invention will be more clearly and fully set forth in the following specification and claims.

In the drawings forming a part of my specification:

Figure 1 is a perspective view of a photostat machine, embodying my developer.

Figure 2 is a diagrammatic section through the developer and through a portion of the photostat machine, illustrating the manner in which the developer receives the sensitized paper from the supply roll after passing through exposure position.

Figure 3 is a perspective view of the developer removed from the photostat machine.

Figure 4 is a top plan view of the developer.

Figure 5 is a longitudinal section on the line 5—5 of Figure 4.

Figure 6 is a transverse section through the developer, the position of the section being indicated by the lines 6—6 of Figures 4 and 5.

Figure 7 is a side view of the developer, illustrating the removable section partially removed therefrom.

Figure 8 is a perspective detail showing the ratchet mechanism for preventing rotation of the film moving apparatus in one direction.

The photostat machine A is of the portable type employing a central fixed section 10, a longitudinally adjustable focal plane unit 11 and a bellows 12 supported by the fixed section 10 and the focal plane unit 11. A lens 13 is mounted upon the front 14 of the bellows 12 and this lens directs light from a copy holding board 15 into the interior of the machine when the shutter is opened. Lights 16 provide illumination for material on the copy holder board 15.

The developer box B is mounted beneath the focal plane unit 11 and is adjustable therewith in order to maintain cooperable relationship with the paper which is supplied by the paper supply roll in the compartment 17 at the upper extremity of the focal plane unit. As best illustrated in Figure 2 of the drawings, the sensitized paper 19 is fed from the supply roll 20 within the paper compartment 17 between the clear glass plate 21 and the ground glass plate 22, or between two transparent elements 21 and 22 and is fed by the feed rollers 23 downwardly from exposure position between the plates 21 and 22. A paper cutting means not specifically illustrated in the drawings, is provided adjacent the rollers 23 to cut off the paper from the supply roll 20 so that a section of paper may be developed at a time. The feed rollers 23 are operated by the hand controlled knob 24 or other suitable means and feed through a receiving slot 25 forming the inlet to the developer tank B.

The developer tank B is provided with a bottom 26, end walls 27 and 29, and side walls 30. A closed top 31 is secured between the side walls 30 and the end wall 29 and partially encloses the top of the container. The remainder of the top of the container is enclosed by a top enclosing wall 32 which is equipped with side flanges 33 which extend down within the side walls 30 and are received in channels 34 formed by plates 35. A sealing gasket 36, illustrated in Figure 5 of the drawings, extends between an edge of the top enclosing wall 32 and an off-set channel 37 formed along the edge of the top 31. An angular closure 39 is pivoted at 40 to the top closure wall 32 and this angular closure 39 extends over the outlet slot 41 in the end wall 27 of the developer B. Thus when the slot 25 is in close proximity to the rollers 23 and is sealed from light, no light can enter the developer when the angular closure 39 is closed.

Secured within the developer body, I provide a series of spaced outer track member 42. These outer track members 42 are provided with an upwardly curved end 43 which is positioned adjacent the inlet slot 25 and a horizontally extending section 43' which is secured to a bracket 44 which in turn is supported by the top 31 through the bolts 45. The tracks 42 are then bent through approximately a 180° turn 46 and are provided with a horizontally extending portion 47 extending substantially parallel to the bottom 26 of the developer. The ends of the tracks 42 extend upwardly at 49 to a point which is below the outlet slot 41. The forward ends of the tracks 42 are supported by brackets 50 which are secured to the end wall 27 of the developer. Thus the tracks 42 are secured in fixed relation within the developer and extend from the inlet 25 to the outlet slot 41.

A pair of side partition plates 51 and 52 are secured by the bolts 53 to the removable top wall 32. A series of horizontally extending rods 54 connect the partition walls 51 and 52 and form a support for tracks 55 which extend in spaced relation to the tracks 42. The tracks 55 are bent similarly to the tracks 42 and are in spaced relation thereto being held in fixed position by the rods 54 supported by the partition plates 51 and 52. These tracks 55, as best illustrated in Figure 6 of the drawings, are in staggered relation with the tracks 42 so that the film propelling means extend between the tracks 55 and engage the film, pressing the same against the outer tracks 42 and drawing the film longitudinally of the tracks.

At the center of curvature of the portions 46 of the tracks 42 I provide a transversely extending shaft 56 which extends between and is supported by the partition plates 51 and 52. Upon one end of the shaft 56 I provide a sprocket 57 engageable with a chain 59 by means of which the shaft 56 may be rotated. The chain 59 extends over a sprocket 60 on a drive shaft 61 which extends through a slot 62 in the side wall 30 of the developer. This shaft 61 is equipped with a key or pin 63 by means of which a crank handle such as 68 may be engaged to rotate the shaft 61.

Upon the shaft 56, I provide a pair of arms 64 secured adjacent the partition walls 51 and 52. Between these arms 64 I provide a pair of clamping plates 65 and 66 between which may be clamped a series of resilient paddles 67. The paddles 67 are of proper width to fit readily between the tracks or rods 55 and to clamp a film sheet against the tracks or rods 42. Thus in the rotation of the shaft 56 in a clockwise direction, the paddles 67 are moved between the tracks 55 and against a sheet of sensitized paper or film, between the tracks 55 and 42, clamping the paper against the tracks 42. As the coefficient of friction between the paddles 67 and the film sheet 19 is much greater than the coefficient of friction between the paper sheets and the tracks 42, the film sheet is moved longitudinally of the tracks and toward the outlet end 41. After the sheet or film has been developed, the closure 39 may be pivoted out from in front of the outlet slot 41 and the film sheet may be propelled out through this outlet slot.

A means is provided for preventing rotation of the shaft 56 more than one revolution in a counterclockwise direction. This means comprises a spring arm 69 which is secured for rotation with the shaft 56. This spring arm is provided with an inturned end 70 which engages against the partition plate 51. The partition plate 51 is provided with a slot 71 therein provided with an ear 72 which is integral with the upper end of the slot and which is bent inwardly from the partition plate 51. When the shaft 56 is rotated in a clockwise direction, the spring end 70 drops into the slot 71 and is sprung outwardly by the slope of the ear 72. However, when the shaft 56 is rotated in a counterclockwise direction the end 70 of the spring arm 69 engages against the bottom of the slot 71 which acts as a shoulder to prevent further counterclockwise rotation.

When the developer is assembled the removable top wall section 32 together with the partition walls 51 and 52, the tracks 55 and the film propelling mechanism is removably secured with

respect to the remainder of the developer. This removable top wall section 32 is normally held in place by thumb screws 73 which normally hold this section in its proper position. The thumb screws 73 are threaded to the top wall section 32 of the developer, and extend through slots 74 in the side walls 30. By screwing inwardly the thumb screws 73, the heads of these screws may be clamped against the side walls 30, holding the top wall section in its proper position. When it is desired to clean the developer tank or when a sheet of paper becomes wedged between the track 42 and 55, it is possible to quickly remove the wedged sheet of film by lifting the top wall section 32 together with the inner track assembly and the paper propelling mechanism out of the developer tank. When this inner track assembly has been removed, the paper may be easily grasped by the hand of the operator. As the paper propelling mechanism is all contained on the removable section, easy access may be afforded to this film moving mechanism when it is desired.

In accordance with the patent statutes I have described the principles of construction and operation of my developer and while I have endeavored to set forth the best embodiments thereof, I desire to have it understood that these are only illustrative of a means of carrying out my invention and that obvious changes may be made within the scope of the following claims without departing from the spirit of my invention.

I claim:

1. A film developer comprising a container having an opening in the top thereof at one end thereof, a closure therefor, said closure having an inlet therein, an outlet formed in the end of the container adjacent the opening in the top thereof, a pair of parallel supports secured to said closure and extending through said opening into said container, a first track means secured to said supports, a second track means secured to said casing in spaced relationship to said first track means, each of said track means extending from said inlet parallel to the top of the container to the other end of said container, reversing at an 180 degree angle at said other end, returning adjacent the bottom wall of said container and thence extending upwardly through said outlet, a shaft mounted between said supports, a series of finger means on said shaft extendable through said first track means to engage a film between said track means, a drive shaft mounted on said parallel supports parallel to said first named shaft, and means connecting said shafts to drive the same in unison, said shafts, connecting means, parallel supports and first track means removable through said opening when said closure is removed.

2. A film developer, comprising a casing having a top extending over an end portion thereof, a removable closure closing the remainder of the top of said casing at the other end, an inlet in said closure, an outlet adjacent said closure, a series of curved tracks secured to said closure, a second series of curved tracks in spaced relation to said first-named tracks secured to said casing, said first and second-named series of tracks providing a curved path from said inlet to the opposite end of the container, and back again to said outlet, and a series of finger means extending through said first-named track means adapted to engage a film between said track means when the film is passed around the curved path.

ROBERT H. FULLERTON.