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**[54] ADJUSTABLE CUTTER AND MOUNTING
POSITIONER FOR FILM TRANSPARENCIES
5 Claims, 13 Drawing Figs.**

[52] **U.S. Cl.**..... **83/247,**
83/203, 83/277, 83/520, 83/522

[51] **Int. Cl.**..... **B26d 5/20**

[50] **Field of Search**..... **83/241,**
244, 245, 247, 207, 277, 520, 522; 156/514, 521

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ABSTRACT: A device for cutting transparencies from strips of film of standard width but with picture areas of different size, the device having means for adjusting the length of the sections cut off from the filmstrip to correspond to the length of the individual transparencies, and having adjustable means controlling the positioning of the cutoff sections on the corresponding transparency mounts.

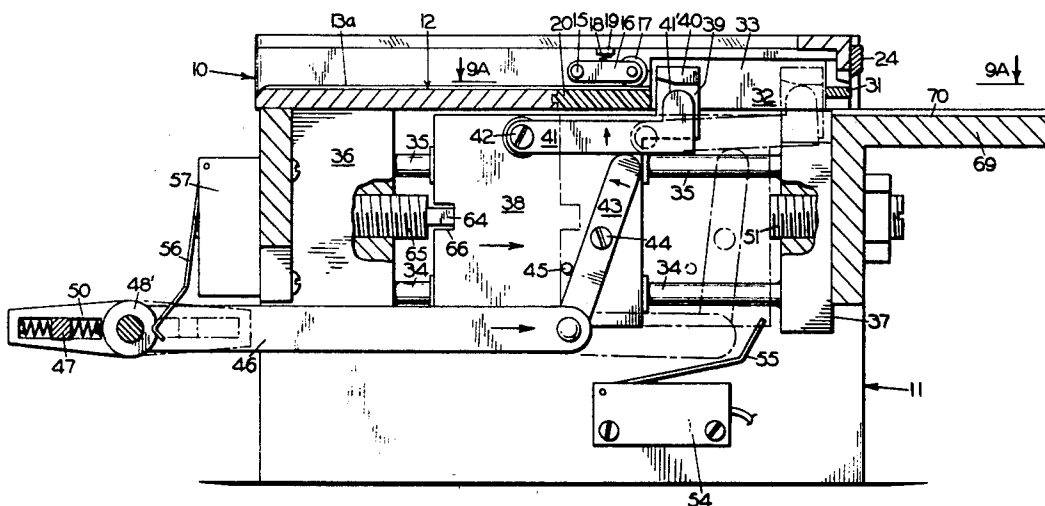
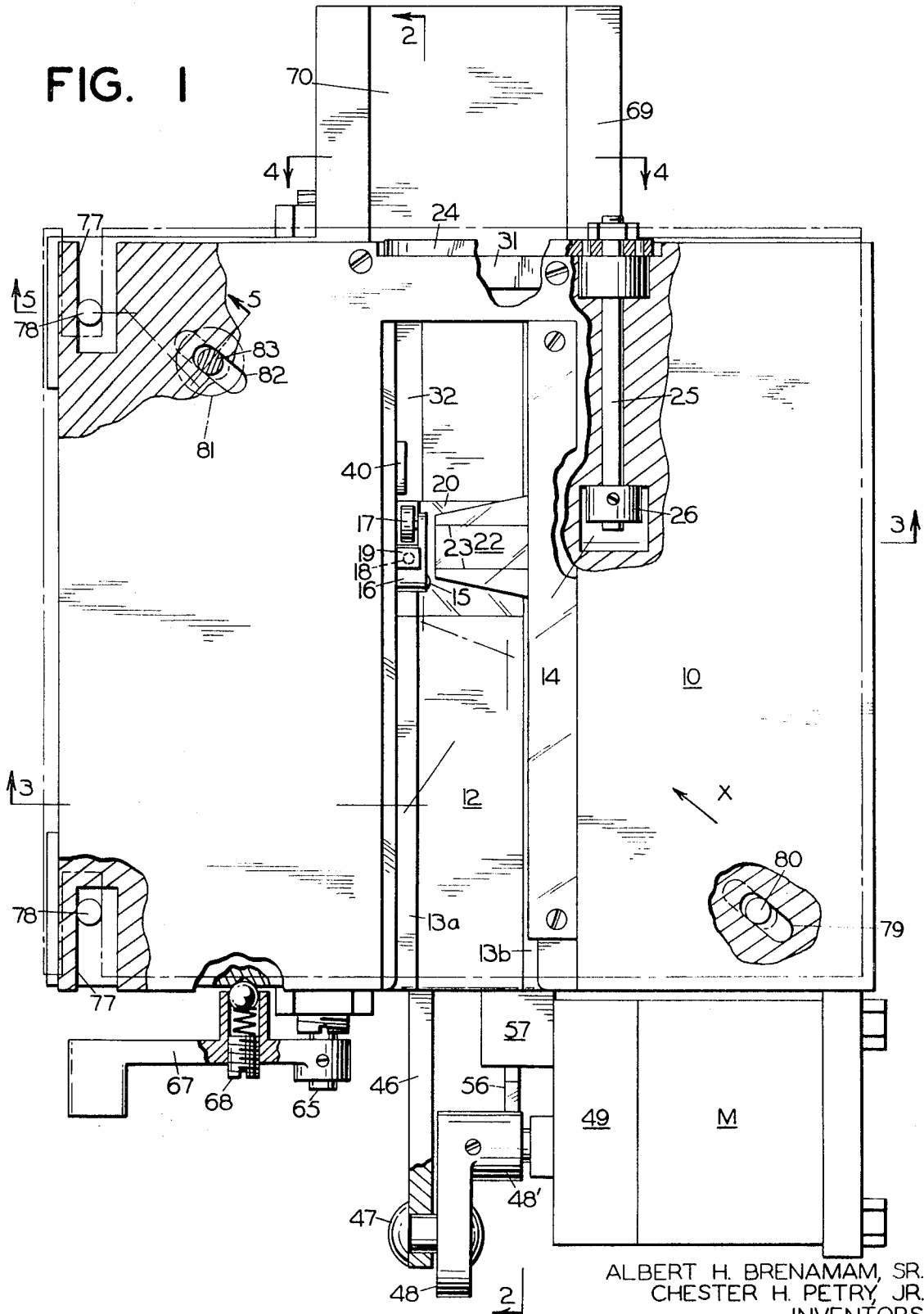


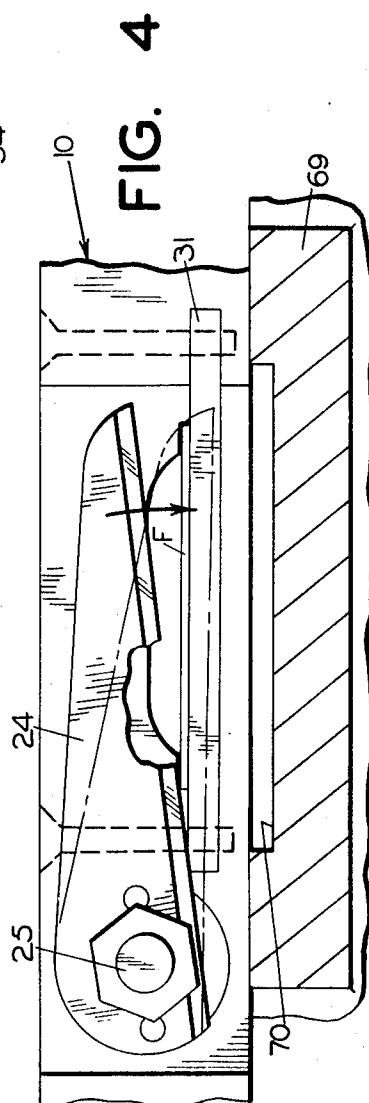
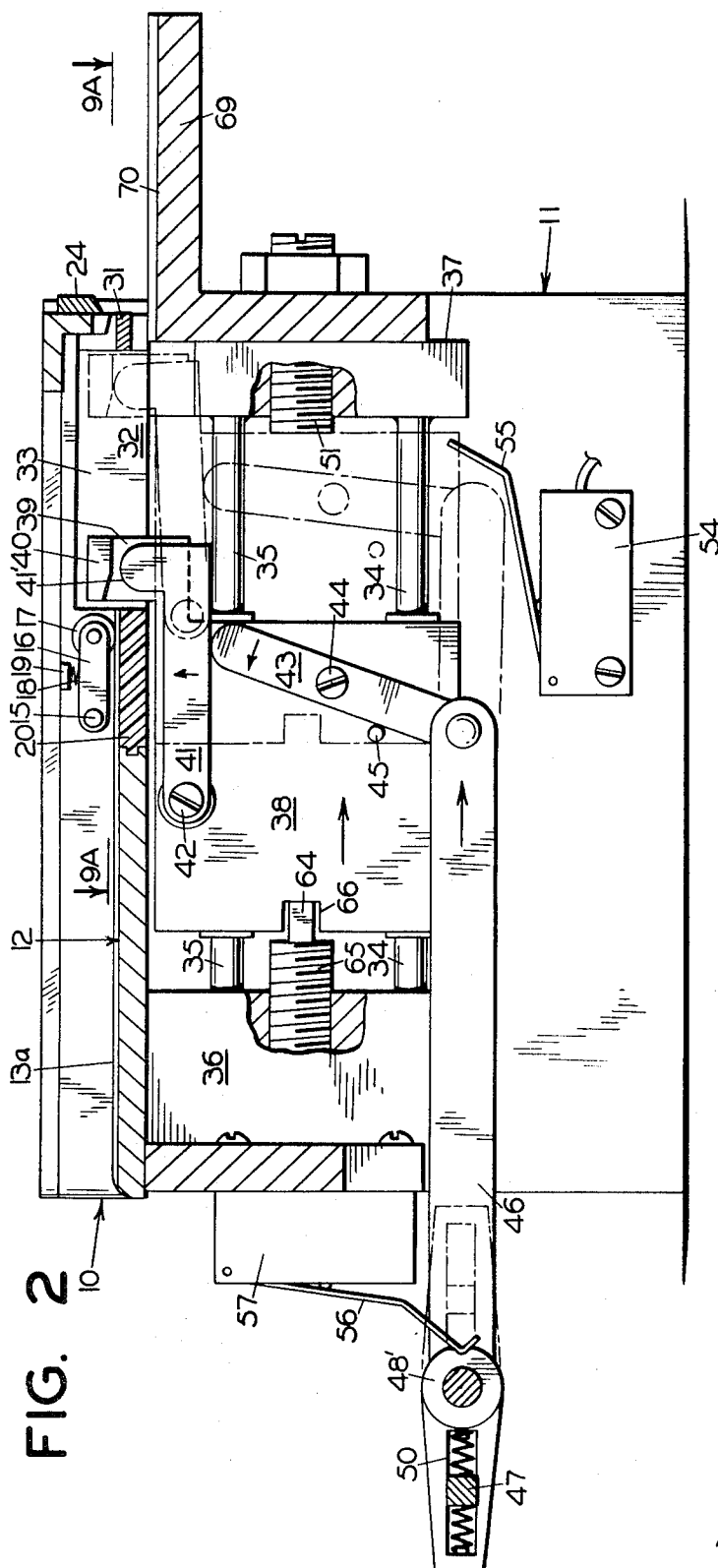
FIG. 1



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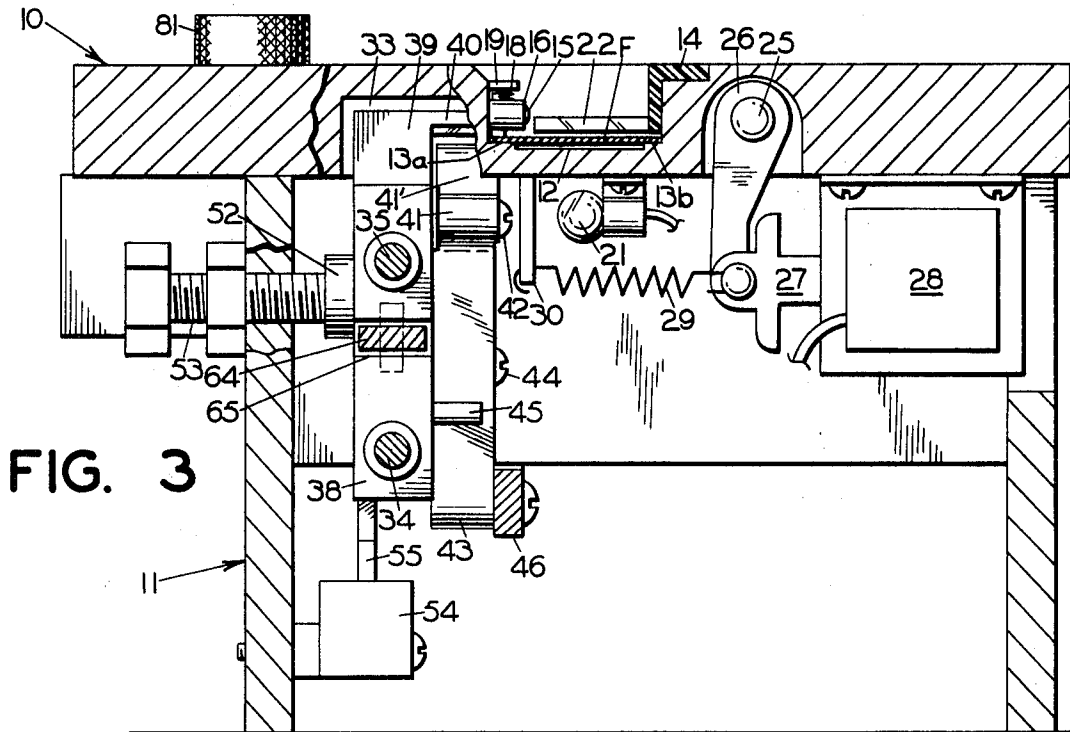


FIG. 3

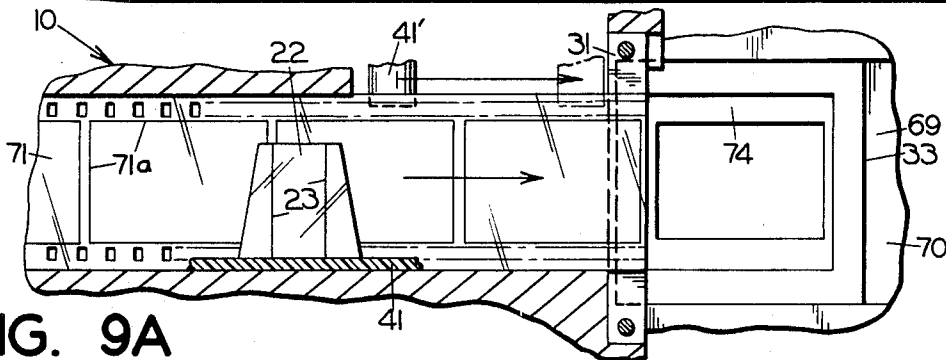


FIG. 9A

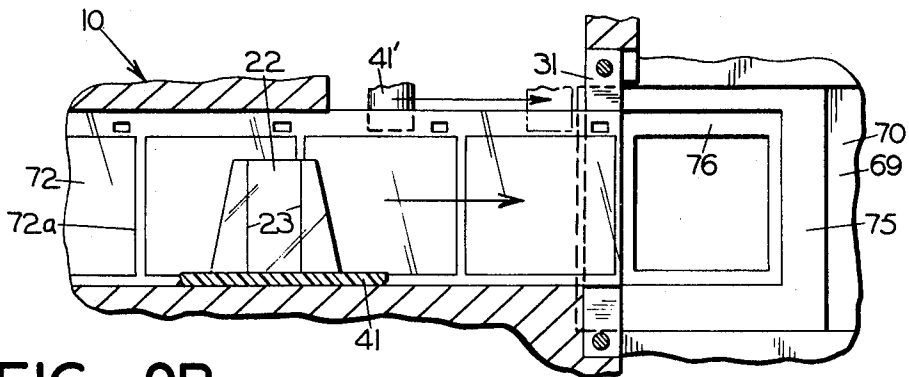


FIG. 9B

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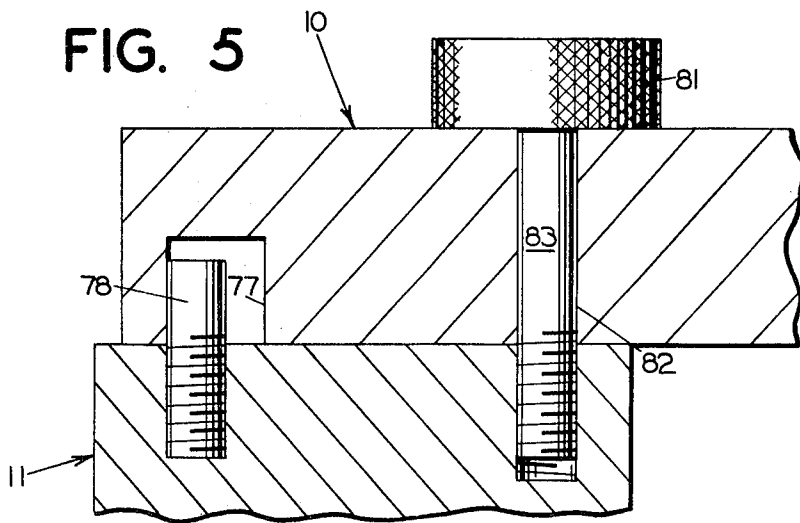


FIG. 8B

FIG. 8A

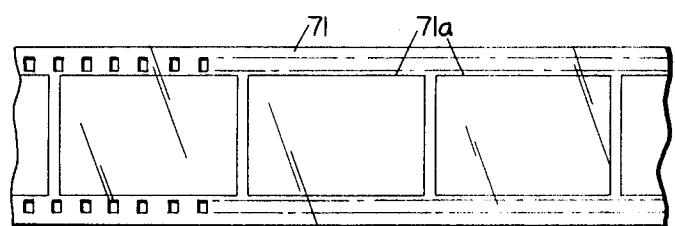
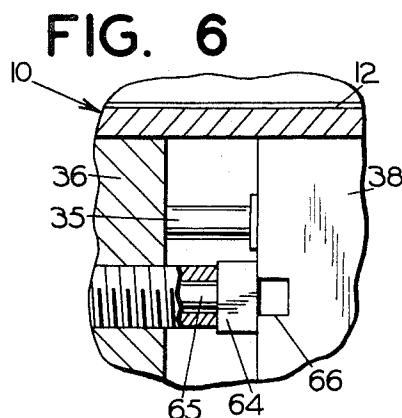
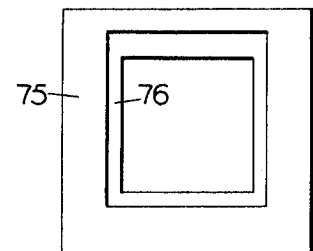
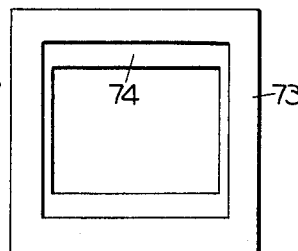


FIG. 7A

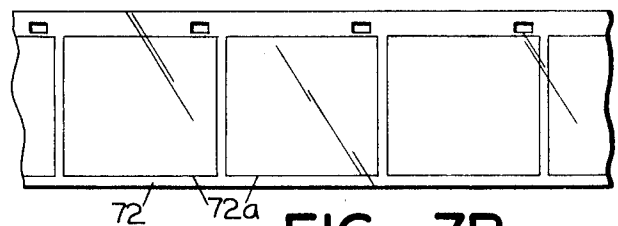
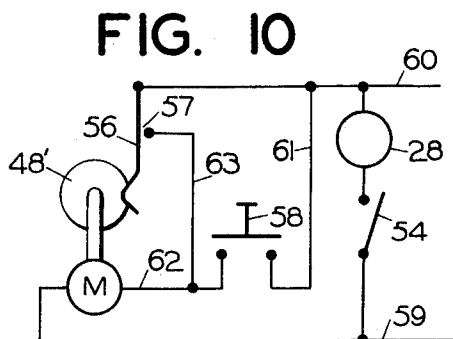


FIG. 7B

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ADJUSTABLE CUTTER AND MOUNTING POSITIONER FOR FILM TRANSPARENCIES

BACKGROUND OF THE INVENTION

Various devices are currently used for automatically cutting off sections of predetermined length from filmstrips. Generally the means by which the filmstrip is intermittently advanced for cutting includes a wheel having radially extending fingers on its periphery for engaging the perforations along one border edge of the filmstrip. Such devices are not adjustable for strips having differently spaced border perforations nor are they adjustable for varying the length of the sections to be cut. One object of the invention is to have the advancing of the filmstrip caused by means which can be adjusted to vary the length of the sections to be cut and to have the filmstrip engaged by means other than means engaging border perforations of the filmstrip.

Devices are also in use for automatically cutting off sections or transparencies from filmstrips and depositing the same on mounts, but these are not adjustable to accommodate transparencies of more than one size. The object of the present invention is to provide an improved device which can quickly and easily be reset so that the transparencies of at least two sizes can be properly deposited on conventional mounts having window openings of corresponding size.

OUTLINE OF THE INVENTION

The device of the present invention includes a top plate having a guideway along which the filmstrip is moved. Means is provided in the supporting frame, on which the top plate rests, for gripping the side edge of the filmstrip, moving the strip forwardly, and releasing the grip on the filmstrip at the end of each forward movement and then moving back rearwardly to starting position. This film gripping and moving means extends up through an opening along the side of the guideway in the top plate. The travel of the film-moving means is produced by a sliding block operated by a reciprocating rod. When the sliding block and film-moving means reach the end of the forward travel a knife automatically cuts off the portion of the film extending beyond the end of the guideway. The amount of movement permitted the sliding block is adjustable, thus enabling the amount of travel of the filmstrip with each operation to be correspondingly adjusted. A supporting shelf for the lower half of the mount on which each transparency is deposited as it is cut off is secured to the supporting frame for the top plate. The top plate is slidably adjustable on the supporting frame thereby enabling the position of the discharging end of the filmstrip guideway to be adjusted with respect to the supporting shelf and to the mount resting thereon.

BRIEF DESCRIPTION OF THE DRAWINGS

Referring to the drawings:

FIG. 1 is a top plan view of the device with portions broken away and shown in section for clarity;

FIG. 2 is a section on line 2-2 of FIG. 1;

FIG. 3 is a section on line 3-3 of FIG. 1;

FIG. 4 is a section on line 4-4 of FIG. 1, drawn to a larger scale;

FIG. 5 is a fragmentary section on line 5-5 of FIG. 1, drawn to a larger scale;

FIG. 6 is a fragmentary section corresponding in part to FIG. 2 but showing the device adjusted for shorter travel of the film-moving elements;

FIG. 7A and FIG. 7B are illustrations of portions of filmstrips of standard width having different size picture areas;

FIG. 8A and FIG. 8B are illustrations of the lower halves of the mounts for the transparencies cut from the filmstrips of FIGS. 7A and 7B respectively;

FIG. 9A is a fragmentary plan section on line 9A-9A of FIG. 2 showing the filmstrip of FIG. 7A and the amount of FIG. 8A on the device;

FIG. 9B is a corresponding plan section showing the device adjusted to accommodate the filmstrip of FIG. 7B and the mount of FIG. 8B; and

FIG. 10 is a wiring diagram.

Referring first to FIGS. 1, 2 and 3, the device includes a top plate 10 which is slidably adjustable, to a limited extent, as later explained, on a composite base frame assembly indicated in general by the reference 11. A guideway 12 for the filmstrip to be cut is formed in the top plate 10 and extends longitudinally across the top plate, the width of the guideway corresponding to the overall width of the filmstrip to be cut. The bottom of the guideway is formed with slightly raised ledges 13a and 13b along each side to provide tracks on which the opposite edge portions of the filmstrip are slidably supported.

A member 14, mounted in the top plate 10, at one side of the guideway 12, has a flange which extends partway down along one wall of the guideway as shown best in FIG. 3, and terminates a short distance above the track 13b, allowing the edge of the filmstrip on that side to pass along beneath the bottom of the flange. The bottom of the flange serves as a guard to keep the film edge down on the track.

A pin 15 (FIG. 2) mounted in the opposite sidewall of the guideway 12, pivotally supports arm 16 which in turn carries the roller 17. The roller 17 bears down on the opposite edge of the filmstrip passing beneath it. A coil spring 18, interposed between the top of the arm 16 and a lug 19 secured in the sidewall of the guideway, causes the roller 17 to press down on the edge of the film sufficiently to keep that edge of the film down on its track. The manner in which and the means by which the filmstrip is caused to move along in the guideway will be described later.

A portion of the bottom wall of the guideway 12 is provided with a window 20 (FIGS. 1 and 2) of translucent material, and a light bulb 21 (FIG. 3), mounted in a fixture attached to the bottom face of the top plate 10 near the window 20, causes light to shine up through the window and through the portion of the filmstrip as it passes over the window. A transparent indicator guide 22 (FIGS. 1 and 3) is rigidly secured to, or formed integral with, the wall of the member 14 and extends horizontally into the guideway spaced a slight distance above the window 20 and above the filmstrip passing over the window. The indicator guide 22 is provided with a pair of parallel indicating guidelines 23 which, as explained later, serve as guides indicating the relative position of the division lines between a pair of successive picture transparencies on the film strip F.

A cutter knife 24 (FIGS. 1, 2 and 4) is mounted on the edge of the top plate 10 at the discharging end of the guideway 12. The knife is secured on a shaft 25 (FIGS. 1 and 3) supported in bearings mounted in a recess in the bottom face of the top plate 10. An arm 26 (FIG. 3), secured to the shaft 25, extends down below the top plate and is connected with the plunger element 27 of a solenoid 28 which operates to swing the knife downwardly (in clockwise direction as viewed in FIG. 4) to form a cutting operation on the filmstrip beneath the knife whenever the solenoid is energized. A spring 29 (FIG. 3), having one end attached to the plunger 27 and the other attached to a stationary arm 30 extending down from the top plate 10, returns the plunger 27 and arm 26 to normal position and therewith returns the knife 24 to raised position as soon as the energizing of the solenoid 28 ceases. In its downward swing and cutting operation the knife 24 moves against the edge of an anvil plate 31 (FIGS. 2 and 4) mounted in the edge of the top plate 10 at the end of the bottom of the guideway 12 and in alignment therewith.

A portion of the sidewall and adjoining edge of the bottom wall of the guideway 12 is cut away in the top plate 10 as indicated at 32 in FIGS. 1 and 2, opening into a recess 33 (FIG. 3) in the underside of the top plate 10. This opening and recess accommodate the upper members of the assembly by which the filmstrip in the guideway is moved forwardly to a predetermined distance with each operation of the device as presently explained.

In the composite base frame assembly 11, on which the top plate 10 is mounted, a pair of stationary horizontal rods 34 and 35 (FIG. 2) are mounted in vertical alignment, the ends being secured in a pair of end members 36 and 37 of the base frame. A block 38 is slidably mounted on the rods 34, 35. The upper portion of this sliding block is extended forwardly and then upwardly, as indicated at 39 in FIGS. 2 and 3, and is provided with a top lip 40 which extends a short distance into the guideway 12 spaced slightly above the corresponding edge of the filmstrip in the guideway. An arm 41 (FIG. 2) is pivotally mounted on the slidable block 38 on the pivot bolt 42. The forward end of this arm 41 is formed with an upwardly extending finger 41', located below the lip 40 and adapted to cause the side edge of the filmstrip in the guideway 12 to be engaged between the finger 41' and the lip 40 when the arm 41 is raised.

A lever arm 43 is pivotally mounted on the slidable block 38 by means of the pivot bolt 44. The upper end of this lever arm 43 is rounded, as shown in FIG. 2, and engages the arm 41. The arrangement is such, as illustrated in FIG. 2, that any rotation of the lever arm 43 (in counterclockwise direction as viewed in FIG. 2) will result in the arm 41 being swung upwardly and thereby causing the finger 41' to engage the edge of the filmstrip and to press it against the lip 40. A stop 45 limits the movement of the lever arm 43 in a reverse clockwise direction.

An operating rod 46 (FIGS. 1, 2 and 3) is pivotally attached to the lower end of the lever arm 43. The outer end of this rod 46 is connected with a pivot bolt 47 on the crank arm 48 (FIG. 1) on a shaft driven by a motor M through the intermediary of a gear reduction 49. The pivot bolt 47 on the crank arm 48 extends through a longitudinal slot 50 (FIG. 2) in the operating rod 46. The slot 50 is spring-loaded on opposite sides of the pivot bolt 47 to allow for some adjustment to take place in the stroke of the operating rod 46 when the extent of the stroke is forcibly restricted in the manner later explained.

From FIG. 2 it will be apparent that with the forward stroke of the operating rod 46 (from left to right as viewed in this FIG.) the lever arm 43 will first be moved in counterclockwise direction and will cause the top arm 41, and its upwardly extending finger 41', to be raised to the extent permitted by the top lip 40 of the slidable block 38. Then continued forward movement of the operating rod 46 will cause the slidable block 38, and with it the top lip 40, arm 41 and finger 41' to move forwardly (to the right) to the broken line positions indicated in FIG. 2. Upon the return stroke of the operating rod 46 the opposite (clockwise) movement of the lever arm 43 (to the extent permitted by the stop 45) first results in lowering the arm 41 and finger 41' and then causes the slidable block 38 and arm 41 to be moved (to the left) to the full line starting position shown in the FIG.

Thus, when the filmstrip is positioned in the guideway 12, with one side edge of the filmstrip extending along between the finger 41' and the lip 40, the forward stroke of the operating rod 46 will result in the filmstrip in the guideway 12 being moved forwardly to the extent that the finger 41' and lip 40 move forwardly, and during the return movement of the finger 41' and lip 40 the filmstrip remains at rest. The forward movement of the slidable block 38 and thus the forward movement of the finger 41' and lip 40 and of the engaged filmstrip is limited by a stop 51. In order to prevent any inadvertent or undesired movement of block 39, lip 40 and arm 41, a stationary friction element or brake 52 (FIG. 3) bears against the side of the block 38, being held in place by an adjusting screw 53.

A switch 54 (FIGS. 2 and 3), controlling the circuit to the solenoid 28 which operates the cutter knife 24, is mounted in the base frame assembly 11. This switch is operated by a spring-controlled arm 55 which is arranged and positioned as shown in FIG. 2 in such manner that it will be temporarily engaged by the end of the operating rod 46 when the latter momentarily reaches the extent of its forward travel. Thus when the strip of film in the guideway has been moved forwardly in the manner described, the cutter knife is automatically

operated to cut off the portion of the filmstrip which extends beyond the guideway and anvil plate 31. The filmstrip is moved forwardly in a positive manner with each operation of the device due to the fact that the side edge of the filmstrip is gripped firmly between the finger 41' and the lip 40. This movement of the filmstrip takes place regardless of the spacing of the perforations along the border edge of the filmstrip and regardless of whether the particular filmstrip which is being cut has any border perforations or not. This is one of the important features of the device.

Referring now to FIGS. 1, 2 and 10, a spring contact arm 56 for a switch 57 in the circuit to the motor M has an angularly shaped end which rides on the hub portion 48' of the crank 48 on the shaft driven from the motor and associated gear reduction. The hub portion 48' is formed with a notch for receiving the end of the spring contact arm 56, the arrangement being such that the end of the contact arm 56 will be received into the notch at the end of each complete rotation of the crank and hub and cause the switch 57 to open, the switch otherwise being closed during the entire rotation of the crank and hub.

The operation of the device is started by momentarily closing a pushbutton starter switch control 58 (FIG. 10) which is placed at any convenient location on the device. From the wiring diagram of FIG. 10 it will be noted that the closing of the pushbutton starter 58 causes the circuit to pass from the two lines 59 and 60, which are connected with an outside source of energy, to the motor M, the line 60 being connected with the motor through branch line 61, starter switch 58 and branch line 62. Operation of the motor M, causing rotation of the hub 48', results in the closing of switch contact 57 due to the fact that the spring-actuating arm 56 is pushed out of the notch in the hub 48'. The closing of switch contact 57 causes the motor to remain connected with the line 60 through the branch lines 63 and 62, and the motor then continues in operation until the end of the spring arm 56 is again received into the notch and causes the switch contact 57 to open. As apparent from FIGS. 1 and 2, with each cycle of operation of the motor and crank 48 the operating rod 46, and therewith the slidable block 38, is moved forward and back and the strip of film is advanced an amount equal to the distance which the film-gripping elements 41' and 40 move forwardly.

The return movement of the slidable block 38 (thus the movement of 38 to the left as viewed in FIG. 2) is limited by a rectangular stop 64 carried on the end of an adjusting shaft 65. The stop 64, when in the position shown in FIG. 2, engages a notch 66 in the rear side of the block 38. However, rotation of the shaft 65 90°, bringing the stop into the position shown in FIG. 6, prevents the stop 64 from entering the notch 66 and thereby reduces the extent of rear travel of the slidable block 38 and its associated members. The adjusting rotation of the shaft 65 is attained by manual movement of a control arm 67 (FIG. 1) on the outer end of the shaft 65. The control arm 67 carries a spring-pressed ball assembly 68 arranged for engagement with socket recesses in the outside face of the base frame so as to maintain the shaft 65 and stop 64 in desired positions. Due to the fact that the pivot bolt 47 (FIG. 2), by which the operating rod 46 is connected with the crank 48 of the driving shaft, is mounted in the longitudinally extending slot 50 in the rod 46 and subject to opposed longitudinal spring pressure, an adjustment in the length of travel of the rod 46 is compensated by the shifting of the relative position of the pivot bolt 47 in the slot 50 against the opposing spring force.

From a comparison of FIGS. 2 and 6 it will be apparent that the rearward travel of the block 38 in FIG. 6 has been reduced to an amount equal to the depth of the notch 66. However, reducing the extent of rearward travel of the block 36, and therewith of the rearward and subsequent forward travel of the film-gripping elements 41' and 40, reduces the extent to which the filmstrip is moved forwardly and consequently the length of the sections severed from the filmstrip with the operation of the device. The fact that the length of the sections cut from the filmstrip can be adjusted is another feature of the device.

The base frame assembly 11 is provided with a shelf or rest support 69 (FIGS. 1 and 2) for holding the lower half of the film mount onto which the severed film transparency is deposited after being discharged from the guideway 12. The top of this shelf 69 is positioned in a horizontal plane a short distance below the level of the guideway 12 and below the corresponding top surface of the anvil plate 31 (FIG. 2), and the top face of the shelf 69 is formed with a shallow recess or groove 70, corresponding in width to the outside width of standard film mounts, so as to position the lower half of the film mount properly to receive the severed film transparency deposited thereon. The film mounts are delivered successively by well-known means which are not shown since these do not constitute part of the present invention, and this is true also of the means by which the two halves of each mount are subsequently pressed together over the mounted transparency.

While the film mounts in question have the same outside dimensions their window areas differ depending on the size of the transparencies to be mounted. A well-known problem heretofore in the mechanical cutting and mounting of film transparencies has been the fact that transparencies may differ in size with different filmstrips even though the filmstrips themselves are in standard size or width. This has necessitated the use of different devices for cutting and positioning the transparencies from different filmstrips. For example, there are standard filmstrips now in common use having picture areas of two different sizes. FIG. 7A shows a portion of a common filmstrip 71 having picture areas 71a of one size, and FIG. 7B shows a portion of another common filmstrip 72 of the same overall width having picture areas 72a of entirely different size. Similarly, FIG. 8A shows the lower half of the standard mount 73 for transparencies from filmstrip 71, and FIG. 8B shows the lower half of a corresponding standard mount 75 for transparencies from filmstrip 72. The mounts 73 and 75 have the same outside dimensions but their window areas differ to correspond to the size of the picture areas 71a and 72a respectively. The mounts 73 and 75 are formed with the customary shallow recesses 74 and 76 respectively for receiving the edge portions of the transparencies. An important feature of the present device is that it is adjustable to accomplish not only the cutting of the transparencies from either of the filmstrips 71 or 72 but also the proper positioning of the severed transparencies in the corresponding mounts 73 or 75. The manner in which this is done will now be briefly described:

The top plate 10 (FIG. 1), with the guideway 12 and cutter knife assembly, is so mounted on the base frame assembly 11 as to enable its position to be slightly shifted and adjusted manually to a limited extent with respect to the base frame assembly 11 and the film mount support rest 69. In FIG. 1 the top plate 10 is shown in full lines in one position and an adjusted position is indicated in part by the broken lines. The bottom face of the top plate 10 is formed with a pair of parallel rectangular slots 77 near two of the corners respectively for receiving a pair of upstanding pins 78 in the top of the base frame assembly, the slots 77 being larger than the pins 78, as shown in FIG. 1 and also in FIG. 5, thus permitting and limiting shifting of the top plate 10 on the base frame assembly. The top plate 10 is also formed with a slot 79 in the bottom face and with a slot 82 extending through the plate both of which extend in the same diagonal direction. The slot 79 is engaged by a pin 80 and the slot 82 is engaged by the pin 83, which pins extend up from the top of the base assembly, the diameter of the pins 80 and 83 being approximately equal to the width of the slots 79 and 82, the pin 83 extending up beyond the top of plate 10 and having a threaded top end which receives a clamping knob 81 for clamping the top plate in desired adjusted position.

FIG. 9A illustrates the device with the plate 10 set for the cutting of transparencies from the filmstrip 71 of FIG. 7A and for the proper depositing of each severed transparency in the mount 73 of FIG. 8A in the recess groove 70 of the mount support rest 69. On the other hand, FIG. 9B illustrates the top

plate 10 shifted to an adjusted setting for the cutting of transparencies from the filmstrip 72 of FIG. 7B and the depositing of each transparency in the corresponding mount 75 of FIG. 8B. It will be noted that the top plate 10, as viewed in these FIGS. 9A and 9B, has been shifted slightly upwardly and to the right from the position of FIG. 9A to that of FIG. 9B, and also that the amount of travel of the filmstrip (to the right) with each operation of the device has been reduced, as indicated by the movement of the finger 41' (and the top lip 40) from that of FIG. 9A to that of FIG. 9B to accommodate the shorter length of the transparencies in the filmstrip 72 in FIG. 9B. The shifting of the top plate 10 in FIG. 9B and the adjustment of the travel of the filmstrip enable the severed transparency also to be accurately deposited in the mount 75 in which the window opening and its recessed border differ from that in the mount 73 in FIG. 9A.

In the indicator guide 22 (FIGS. 9A and 9B) the distance between the parallel guide lines 23 is equal approximately to the difference in length between the picture area 71a in filmstrip 71 and the picture area 72a in filmstrip 72. Thus, in the adjusting of the top plate 10 and in the adjusting of the travel of the filmstrip 71 in the guideway 12 of the top plate 10 (FIG. 9A), the dividing mark between a pair of successive picture areas is brought into substantial registration with the left guideline 23, while in making corresponding adjustments for the filmstrip 72 the dividing mark between a pair of picture areas has been brought into substantial registration with the right guideline 23.

However, as apparent from FIGS. 9A and 9B, merely adjusting the length of the sections into which the filmstrip is cut to correspond to the length of the transparencies would not be sufficient to cause the severed transparency to be automatically properly positioned in the lower half of the corresponding mount, since the window areas of the mounts differ to correspond to the different size transparencies. Consequently, the accurate depositing of the severed transparency automatically in proper position in its mount requires the proper setting of the top plate 10 with respect to the support or rest 69 on which the bottom of the mount is positioned. This desired setting of the top plate 10 is achieved by shifting the top plate in a diagonal direction, as indicated by the arrow X in FIG. 1, which direction may be described graphically as corresponding to the direction of the diagonal of a rectangle having dimensions corresponding to the differences in the corresponding dimensions of the window areas of the two mounts (thus the differences in the size of the transparencies of the two filmstrips). The slots 79 and 82 in the top plate 10 and the corresponding pins 80 and 83 in the top of the base frame assembly 11, which engage the slots 79 and 82 respectively, are so positioned and arranged as to provide the guiding means for controlling this shifting of the top plate with respect to the base frame assembly and mount support, thus, in combination with the adjusting of the length of the sections cut from the filmstrip, enabling the transparencies in either of the two sizes illustrated to be automatically cut off and accurately deposited in their mounts.

We claim:

1. A device for cutting transparencies from a filmstrip including a base frame assembly, a top plate mounted on said base frame assembly, a guideway in said top plate for the filmstrip, a cutter knife and anvil plate mounted on said top plate at the discharging end of said guideway, a transparency mount rest secured on said base frame assembly and positioned below and beyond the discharging end of said guideway reciprocating film-advancing means mounted in said base frame assembly, film edge gripping elements in said film-advancing means, said guideway formed with a longitudinally extended slot to accommodate said gripping elements, said gripping elements extending up into said slot for movement along therein, means in said film-advancing means causing said elements to grip the film upon each forward stroke of said advancing means and to release the grip upon the return stroke, means for automatically producing a reciprocating

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stroke of said advancing means with each operation of the device, means automatically causing operation of said cutter knife when said advancing means reaches the forward end of its travel, and means for adjusting the travel of said film advancing means and therewith of said film-gripping elements whereby to adjust the extent to which the filmstrip is advanced and the length of the section cut off from the filmstrip with each operation of the device.

2. The device of claim 1 with said means for adjusting the travel of said reciprocating film-advancing means consisting of an adjustable stop restricting the rear return stroke of said reciprocating film-advancing means.

3. The device of claim 1 with the addition of an illuminated window in the bottom of said guideway, and a substantially transparent indicator spaced above said window having suitable marking thereon to enable the relative positioning of the

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division lines between consecutive transparencies in the filmstrip beneath said indicator with respect to said indicator marking to serve as a guide in adjusting the travel of said film-advancing means.

4 The device of claim 1 with said top plate shiftably mounted on said base frame assembly to enable the discharging end of said guideway and therewith the position of the cutoff transparency discharged from said guideway to be adjusted relatively with respect to the inside dimensions of the corresponding transparency mount positioned on said mount rest.

5. The device as set forth in claim 4 with the addition of means for guiding and restricting the shifting of said top plate on said base frame assembly.

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