United States Patent [19]

Tout

[11] **3,896,603**

[45] **July 29, 1975**

[54] **FILM STRIP JACKET SYSTEM AND EQUIPMENT**

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[73] Assignee: **Bell & Howell Company,** Chicago, Ill.

[22] Filed: **Jan. 8, 1974**

[21] Appl. No.: **431,644**

[52] **U.S. Cl.** **53/123;** 40/158; 53/187; 53/384; 83/521

[51] **Int. Cl.** **B65b 43/26**

[58] **Field of Search** 53/123, 187, 384

[56] **References Cited**

UNITED STATES PATENTS

2,892,295	6/1959	McArthur	53/123
3,154,899	11/1964	Burns	53/384 X
3,716,295	2/1973	Nakajima et al.	53/123 X

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Attorney, Agent, or Firm—Benoit Law Corporation

[57] **ABSTRACT**

An article of manufacture provides a plurality of pockets for receiving transparencies. That article comprises two essentially transparent strips interconnected at predetermined intervals to provide the pockets, with one strip being longer than the other strip between successive points of interconnection. An apparatus for cutting pieces of material from a strip comprises a die having cutting portions surrounding a space where the pieces are cut. Viewing equipment enables the strip to be viewed through the die, and a punch is located adjacent the die for cutting the pieces of material from the strip. An apparatus for inserting a transparency into a pocket releasably retains the pocket at a loading station. A spacing device is insertable into the pocket to open the pocket for an insertion of a transparency. A separate device advances the transparency into the open pocket, and the spacing device may be withdrawn while the transparency is being inserted.

13 Claims, 12 Drawing Figures

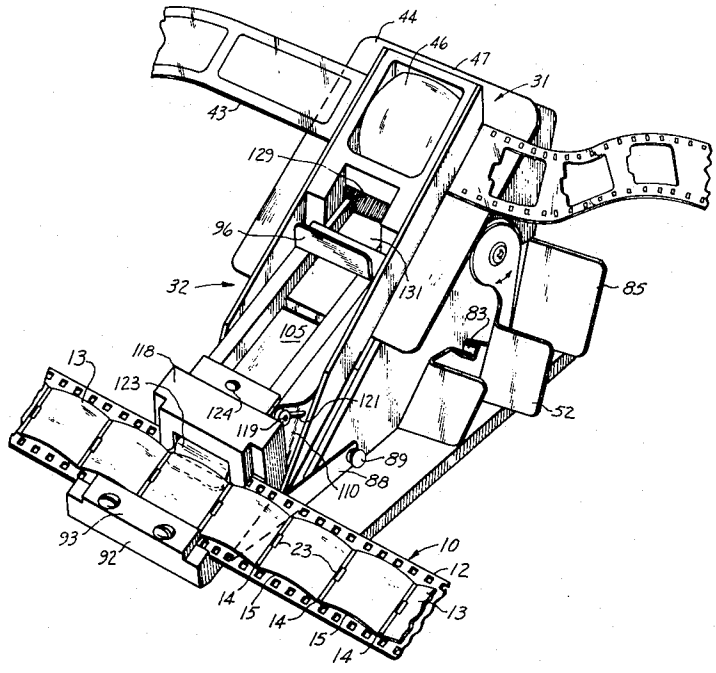


FIG. 4

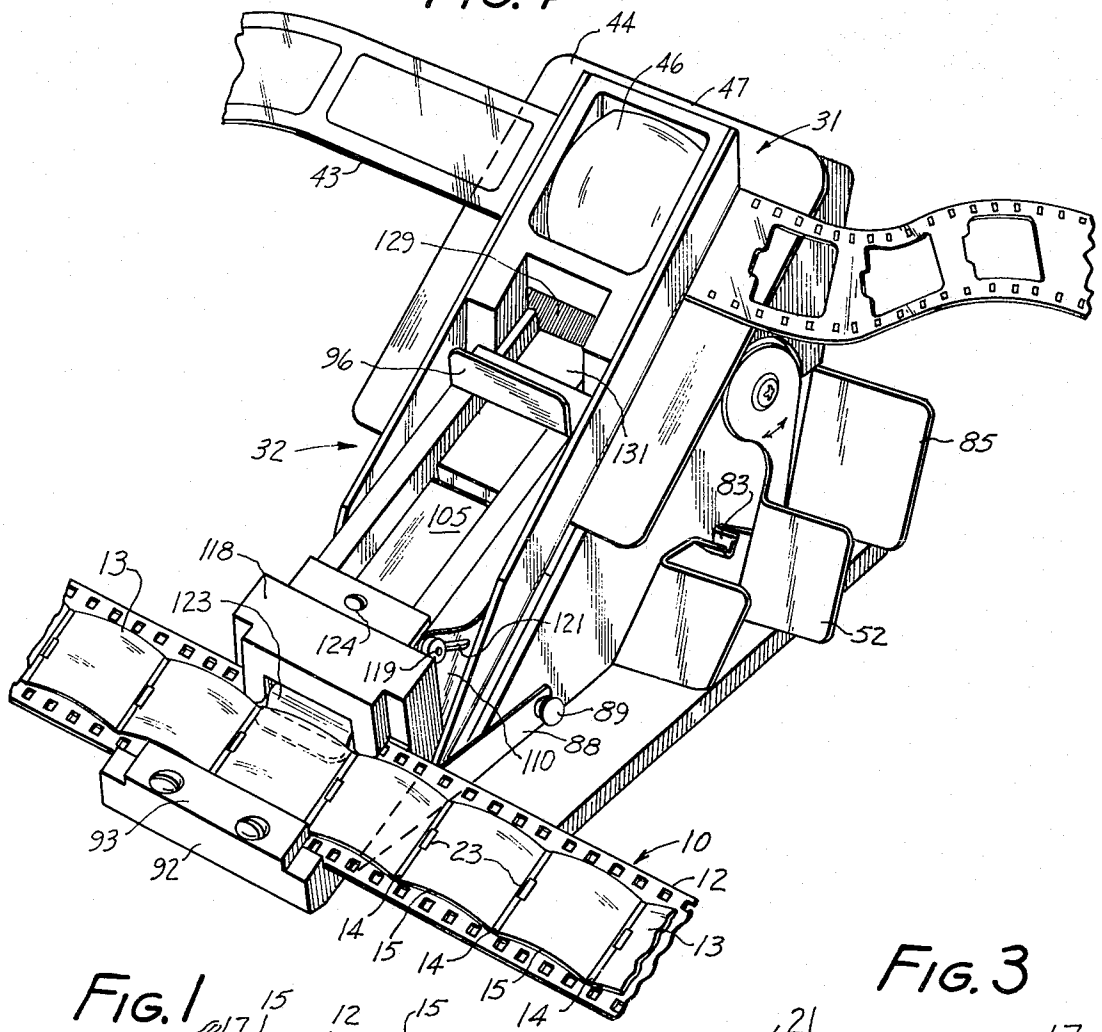


FIG. 1

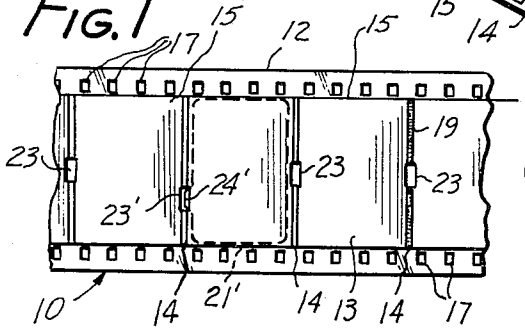


FIG. 3

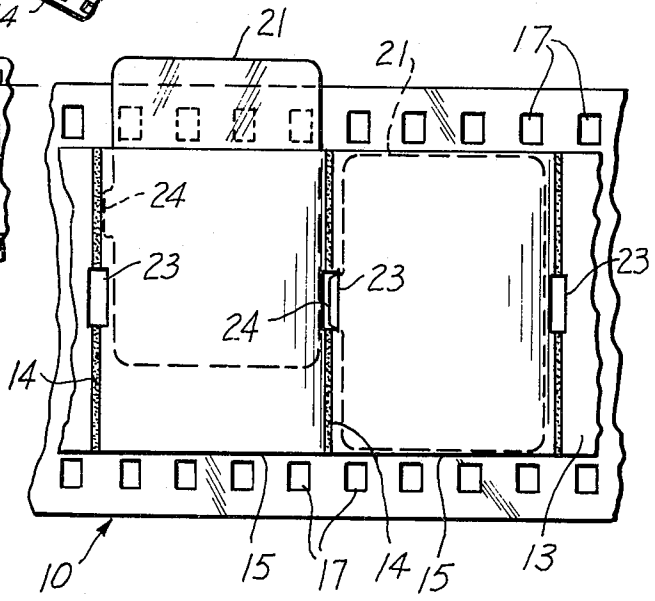
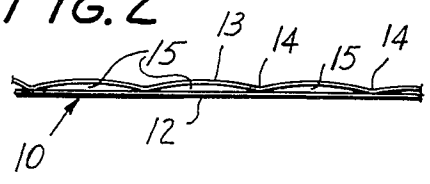


FIG. 2



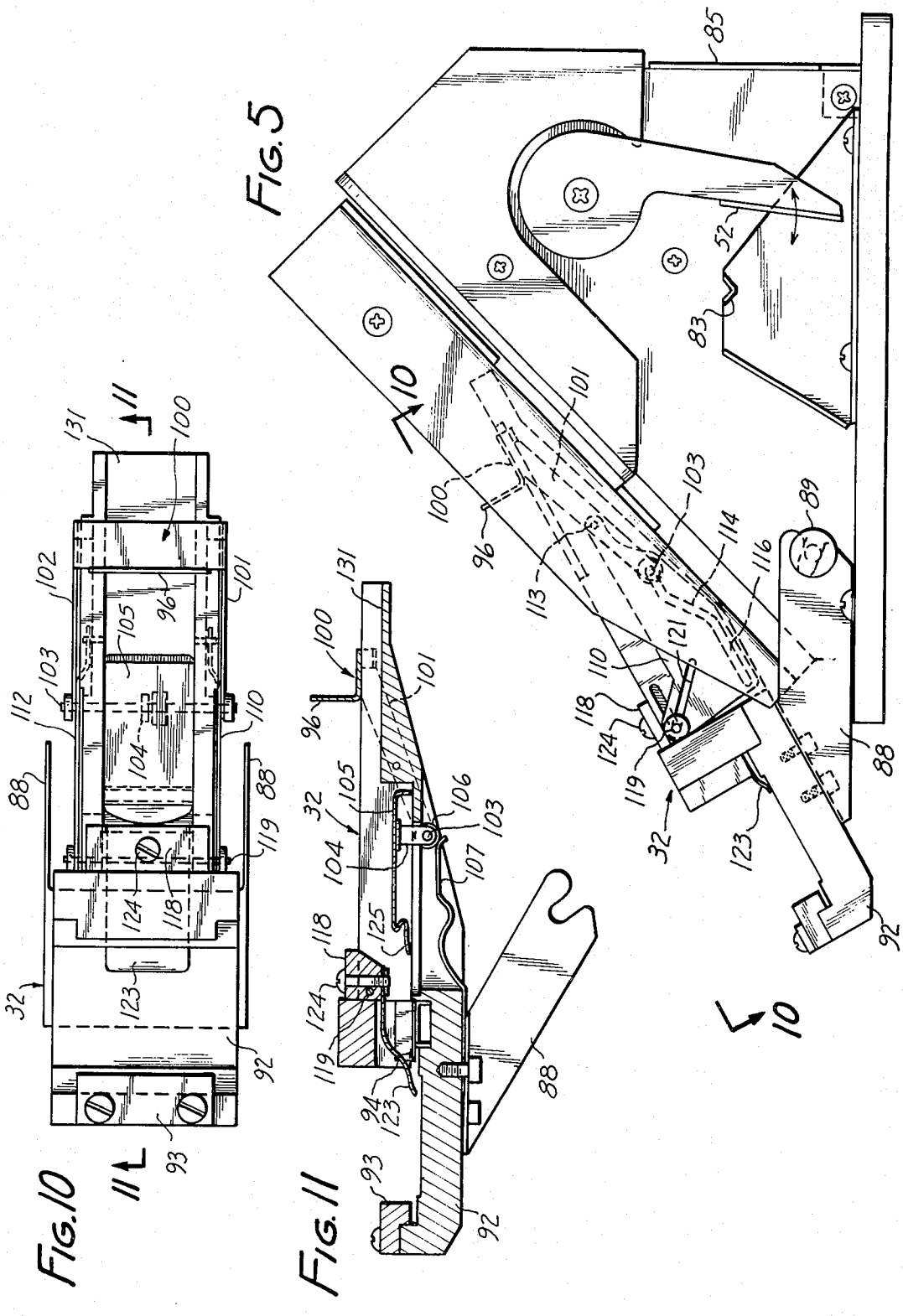
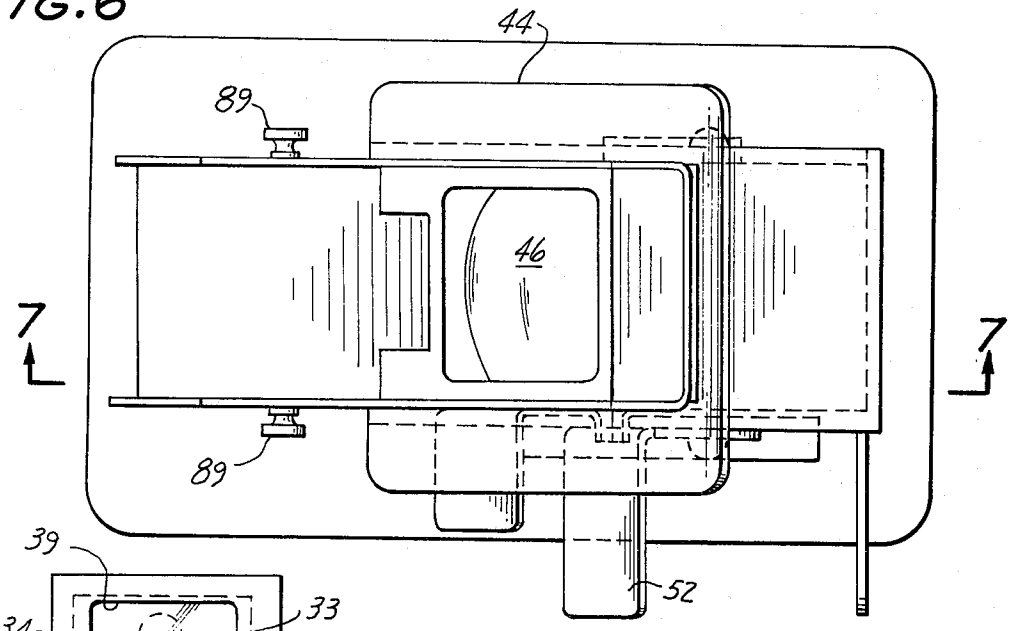

FIG. 5
FIG. 10
FIG. 11
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FIG. 6



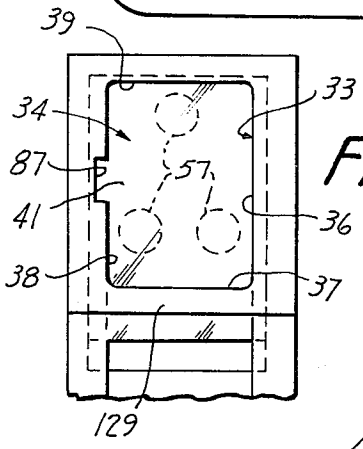


FIG. 8

FIG. 7

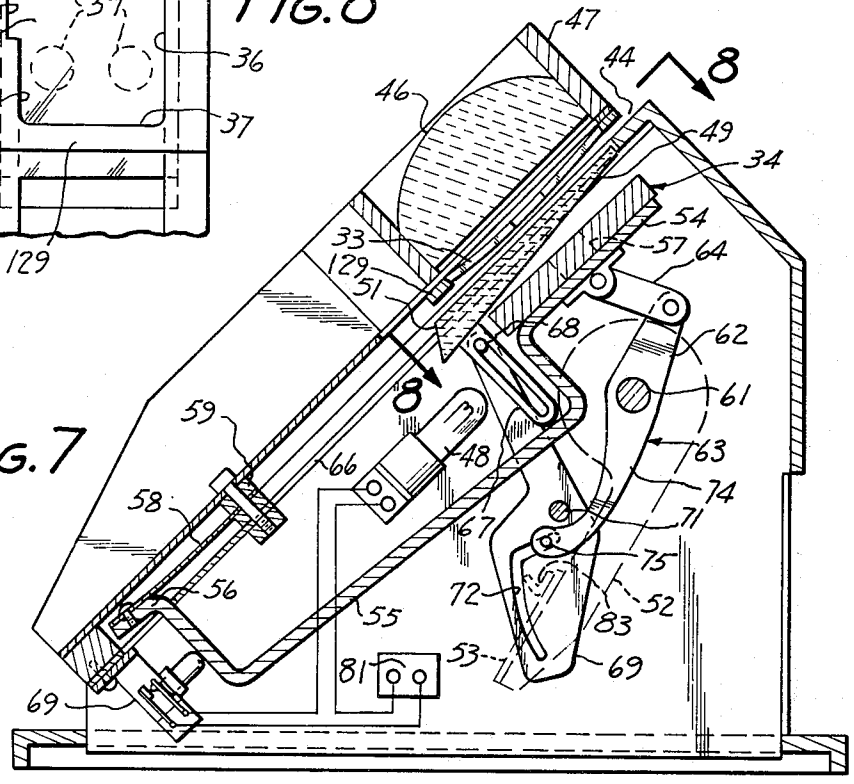


FIG. 9

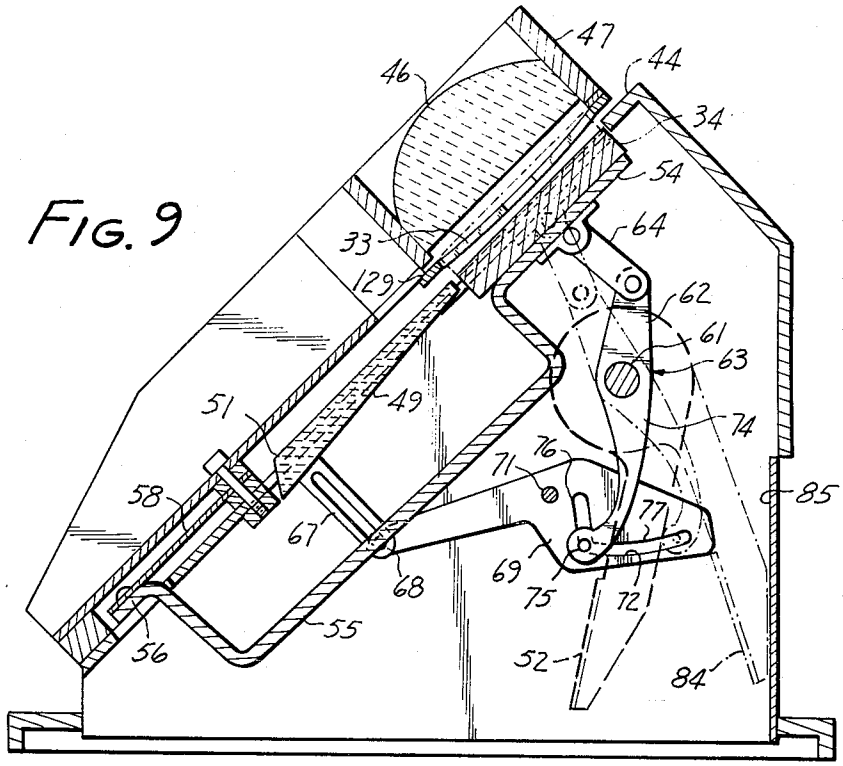
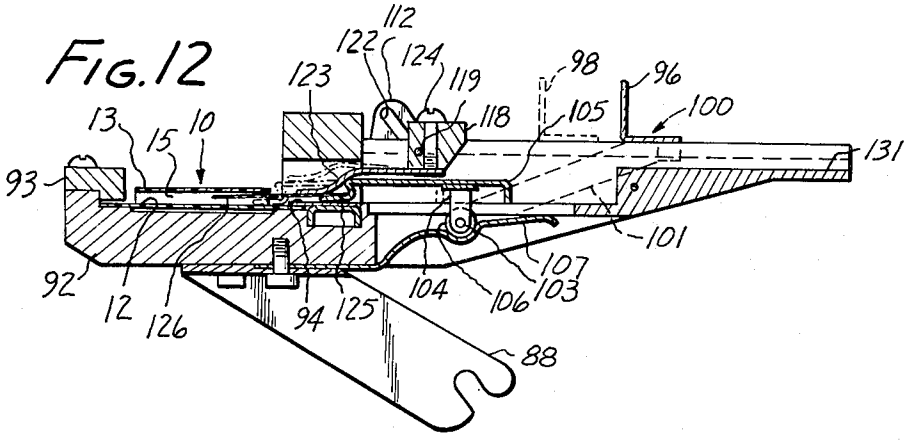

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FIG. 12


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FILM STRIP JACKET SYSTEM AND EQUIPMENT

BACKGROUND OF THE INVENTION

1. Field of the Invention

The subject invention relates to an article of manufacture providing a plurality of pockets for receiving transparencies, apparatus for cutting pieces of material from a strip (such as transparencies from a film), and equipment for inserting a transparency at a loading station into a pocket of a film strip or similar system. By way of example, the subject invention may be employed in a film strip jacket system.

2. Description of the Prior Art

Throughout the years several systems have evolved for displaying photographic images and similar material.

One popular system employs a mounting frame for each image. This system enjoys widespread application, particularly in the color slide area. A drawback of this system is that the slides are relatively bulky and need special slide handling and changer equipment for their display. Also, considerable manual labor or then expensive special machinery is required for mounting the images in individual holders or frames.

The latter disadvantages are considerably alleviated when a film strip system is used. In that system, successive images are photographed or printed on a film strip. A drawback of film strip systems is their inflexibility which generally precludes a change in the image sequence or an exchange of images on the film strip. Moreover, special equipment is needed to compose a film strip of images from various sources.

Unfortunately, microimage jacket systems do not offer an adequate solution, since those systems are generally tailored to the different needs of the micro-image field. Similar comments apply to existing equipment for cutting pieces of material from a strip, and to equipment for inserting cut pieces of material into jackets.

Accordingly, while the subject disclosure is primarily styled in terms of film strip jacket systems, it sould be understood that the utility of the various disclosed techniques and apparatus is not so limited, but extends, for instance, to punching, cutting and material inserting techniques and equipment in general.

SUMMARY OF THE INVENTION

Broadly, it is an object of this invention to overcome the above mentioned disadvantages.

It is also an object of this invention to provide an improved film strip system.

It is a further object of this invention to provide an improved article of manufacture having a plurality of pockets for receiving transparencies or other pieces of material.

It is an object of this invention to provide improved apparatus for cutting pieces of material from a strip or sheet.

It is a related object of this invention to provide apparatus for cutting transparencies from a film strip.

It is a further object of this invention to provide an improved punch mounting system.

It is a further object of this invention to provide apparatus for inserting transparencies into pockets of a film strip or similar system.

It is a related object of this invention to provide apparatus for cutting transparencies from a master and inserting the cut transparencies into pockets of a film strip or similar system.

Other objects of the invention will become apparent in the further course of this disclosure.

From one aspect thereof, the invention resides in an article of manufacture providing a plurality of pockets for receiving transparencies, comprising, in combination, two essentially transparent strips interconnected at predetermined intervals to provide pockets, with one strip being longer than the other strip between successive points of interconnection.

From another aspect thereof, the invention resides in apparatus for cutting pieces of material from a strip. The invention according to this aspect resides, more specifically, in the improvement comprising, in combination, a die having cutting portions surrounding a space where said pieces are cut, means adjacent said die for viewing said strip through said die and through said surrounded space, a punch located adjacent and corresponding to said die, and means for actuating said punch relative to said die.

From another aspect thereof, the invention resides in apparatus for cutting pieces of material from a strip and, more specifically, resides in the improvement comprising, in combination, a die, a punch corresponding to said die, an arm having a first free end and a second free end, means for mounting said punch on said first free end, a spring, means for mounting said arm with said spring including means for connecting said spring to said second free end, and means for actuating said punch relative to said die.

From another aspect thereof, the invention resides in apparatus for inserting a transparency at a loading station into a pocket formed by essentially transparent interconnected first and second strips. The invention according to this aspect resides, more specifically, in the improvement comprising, in combination, first means for releasably retaining said strips at said loading station, said first means including means for releasably retaining an edge portion of said first strip, actuable second means for spacing said second strip from said first strip whereby to open said pocket for an insertion of said transparency, actuable third means separate from said second means for advancing said transparency into said open pocket, said third means including transparency inserting means and means for guiding at least a portion of said transparency inserting means over said edge portion retaining means, and fourth means coupled to said second and third means for actuating said second and third means.

From another aspect thereof, the invention resides in apparatus for inserting a transparency at a loading station into a pocket formed by essentially transparent interconnected first and second strips. The invention according to this aspect resides, more specifically, in the improvement comprising, in combination, first means for releasably retaining said strips at said loading station, actuable second means including a first tongue for spacing said second strip from said first strip whereby to open said pocket for an insertion of said transparency, actuable third means including a second tongue separate from said second means for advancing said transparency into said open pocket, and fourth means coupled to said second and third means for actuating said second and third means, said fourth means including means for withdrawing said first tongue from and

subsequently inserting said second tongue into, said pocket.

From another aspect thereof, the invention resides in apparatus for inserting a transparency at a loading station into a pocket formed by essentially transparent interconnected first and second strips. The invention according to this aspect resides, more specifically, in the improvement comprising, in combination, first means for releasably retaining said strips at said loading station, actuable second means for spacing said second strip from said first strip whereby to open said pocket for an insertion of said transparency, actuable third means separate from said second means for advancing said transparency into said open pocket, and fourth means coupled to said second and third means for actuating said second and third means, said fourth means having a first position, a second position and a third position, and said fourth means including means for maintaining said second and third means spaced from said pocket in said first position, for activating said second means upon activation of said fourth means to said second position, and for deactivating said second means and activating said third means upon activation of said fourth means to said third position.

From another aspect thereof, the invention resides in apparatus for inserting a transparency into a pocket formed by essentially transparent interconnected first and second strips. The invention according to this aspect resides, more specifically, in the improvement comprising, in combination, means defining a pathway for receiving and guiding said transparency, means defining a loading station at a location spaced from said pathway, means at said loading station for releasably retaining said strips at said loading station, a tongue constructed to be insertable into said pocket for maintaining said pocket open, means for advancing said transparency from said pathway to said loading station, said advancing means include means for receiving said transparency from said pathway, and means for actuating said tongue and said advancing means, said actuating means including means for inserting said tongue into said pocket and alternatively withdrawing said tongue from said pocket, and means for advancing said transparency receiving means with said received transparency to said pocket in synchronism with said tongue withdrawal whereby to insert said transparency into said pocket.

From yet another aspect thereof, the invention resides in apparatus for cutting a transparency from a master and inserting the cut transparency into a pocket. The invention according to this aspect resides, more specifically, in the improvement comprising, in combination, a die, a punch corresponding to said die, means for actuating said punch relative to said die to cut said transparency from said master, means for releasably retaining said pocket, means for maintaining said pocket in an open condition including a tongue insertable into said pocket, means for advancing said cut transparency from said die to said open pocket, said advancing means includes means for receiving said cut transparency, means for moving said received transparency toward said pocket to insert said transparency into said pocket, and means for withdrawing said tongue from said pocket during insertion of said received transparency past the withdrawing tongue into said pocket.

BRIEF DESCRIPTION OF THE DRAWINGS

The subject invention will become more readily apparent from the following detailed description of preferred embodiments thereof, illustrated by way of example in the accompanying drawings, in which like reference numerals designate like or functionally equivalent parts, and in which:

FIG. **1** is a top view of part of a jacket type film strip in accordance with a preferred embodiment of the subject invention.

FIG. **2** is a side view of the film strip shown in FIG. **1**;

FIG. **3** is an enlarged view of the film strip of FIG. **1** illustrating the insertion and retention of transparencies in the film strip pockets;

FIG. **4** is a perspective view of an apparatus in accordance with a preferred embodiment of the subject invention for cutting transparencies from a conventional film strip and for inserting the cut transparencies into a jacket type film strip of the kind shown in FIG. **1**;

FIG. **5** is a side view of the apparatus shown in FIG. **4**;

FIG. **6** is a top view of the apparatus shown in FIG. **4**;

FIG. **7** is a section through the apparatus shown in FIG. **4**, taken along the line **7** — **7** in FIG. **6**;

FIG. **8** is a detail view taken along the line **8** — **8** in FIG. **7**;

FIG. **9** is a view similar to FIG. **7** showing the apparatus in a different operating position;

FIG. **10** is a top view of a transparency inserter in accordance with a preferred embodiment of the subject invention, as seen from the line **10** — **10** in FIG. **5**;

FIG. **11** is a section taken along the line **11** — **11** in FIG. **10**; and

FIG. **12** is a view similar to FIG. **11** showing the transparency inserter in another operating position.

DESCRIPTION OF PREFERRED EMBODIMENTS

The jacket type film strip **10** according to the preferred embodiment of the invention shown in FIGS. **1** to **3** and seen in perspective also in FIG. **4** is composed of two essentially transparent strips **12** and **13**, interconnected at predetermined intervals **14** to provide a series of pockets **15**. The expression "essentially transparent" as herein employed means sufficiently transparent for the intended purpose of viewing or displaying the transparencies. This expression tolerates incidental instances of opacity, such as may be present in the form of interframe maskings, manufacturer's designations, control markings and the like.

The strip **12** may be of conventional film stock, such as a standard **35**mm **0.004** inch thick Mylar motion picture leader. The strip **13** is preferably thinner than the base strip **12** to provide improved ease of handling, enhanced optical qualities, and the possibility of contact printing inserted transparencies. By way of example, the top strip **13** may be made from **0.002** inch thick clear Mylar stock.

In accordance with an important feature of the subject invention, the top strip **13** is longer than the base strip **12** between successive points of interconnection **14**. In accordance with the illustrated preferred embodiment, the top strip **13** is curved relative to the base strip **12** between the successive points of interconnection **14**.

This important feature renders it possible for the loaded film strip to be coiled into a roll for ease of handling and storage despite the presence of transparencies in the pockets 15. Without this feature, the inserted transparencies would prevent the loaded film strip from being conveniently coiled without buckling into a small diameter roll. The feature under consideration also facilitates considerably the insertion of transparencies into the film strip pockets, as will become more fully apparent in the further course of this disclosure.

In accordance with another feature of the illustrated preferred embodiment, the top strip 13 is narrower than the base strip 12. This has the advantage that the base strip 12 may be retained independently of the top strip 13 during an insertion of transparencies into the film strip pockets 15, whereby the loading of the film strip is facilitated, as will also more readily become apparent in the further course of this disclosure. In addition, film sprocket holes 17 may be provided in one or both free margins of the base strip 12 to provide a convenient means for advancing the film strip 12, particularly in viewing or display equipment. Conventional film strip viewing apparatus or projectors may then be employed for handling the loaded film strip according to the subject invention.

Any of various techniques may be employed for periodically interconnecting the strips 12 and 13 at 14. A convenient method is to weld these strips to each other at the intervals 14. By way of example, an impulse heat welder fitted with an appropriate heating element may be employed for this purpose. Sonic welding techniques may also be used to advantage. Spacers (not shown) may be placed at the intended locations of the pockets 15 prior to the interconnection of the strips at the intervals 14. Base strip 12 may then be pulled taught so that the requisite slack is formed in the top strip 13. The strips are then welded to each other at 14 and the spacers are thereafter removed from the now formed pockets 15.

If desired, opaque interframe spacing portions as shown at 19 in FIG. 1 may be provided between the pockets 13 at the locations 14 in order to provide a demarcation between the inserted transparencies during viewing or projection thereof.

As best seen in FIG. 3, transparencies 21 are inserted into the pockets 15. These transparencies are dimensioned to fit into these pockets, such as by the cutting techniques hereinafter disclosed.

In accordance with the illustrated preferred embodiment of the invention, at least one of the strips 12 and 13 has means for locking the transparencies 21 in place inside the pockets 15. To this end, and in accordance with the illustrated preferred embodiment, at least one of the strips 12 and 13 has an aperture 23 at each pocket 15 for receiving a corresponding tab 24 of a transparency 21 inserted in that pocket and for locking that inserted transparency in place inside the particular pocket.

As seen in FIGS. 1, 3 and 4, the locking apertures 23 are situated at the locations where the strips 12 and 13 are interconnected at 14.

The tab 24 on the transparency 21 in conjunction with a corresponding aperture 23 also serves as a reference to orient the picture displayed from the particular transparency in the correct up-down position.

According to FIGS. 3 and 4, the apertures 23 are conveniently situated on a longitudinal center line extending along the strips 12 and 13. By way of contrast, FIG. 1 shows an aperture 23' which is situated at a location spaced laterally from a longitudinal center line extending along the strips 12 and 13. In connection with a similarly offset tab 24' on a transparency 21', the aperture 23' then provides a left-right reference for the transparency 21' having the corresponding tab 24'. In this manner, a correct location of transparencies in both up and down and right and left positions is assured.

If desired, the apertures 23 or 23' may extend through both strips 12 and 13 for ease of manufacture. However, tests have shown that a sufficient locking effect is achieved with apertures 23 or 23' that extend through only one of the strips 12 and 13. In practice, this facilitates provision of uninterrupted interframe masking strips 19 between the pockets 15.

In a similar vein, there need not be an aperture physically extending through either of the strips 12 and 13. Rather, the apertures 23 or 23' and its transparency orienting effect may be achieved by providing a break at each pocket 15 in the interconnection 14 of the strips 12 and 13. This break may, for instance, be provided by an appropriate shaping of the welding tool. For instance, when welding with a tool having a heated edge portion is employed, a gap may be provided at the location of the apertures 23 or 23'. In either case, the apertures 23 or 23' or their corresponding breaks in the interconnections 14 provide receptacles for the corresponding tabs 24 or 24' of the transparencies 21 inserted into the pockets 15, so as to lock the inserted transparencies in place inside these pockets.

The jacket type film strip system according to the invention exhibits excellent performance in practice. Focusing problems are absent, especially if the top strip 13 is made wide enough for the foot of the projectore gate to press directly on the edge of the transparency through the top strip 13 whereby the transparency is positioned sufficiently flat in the gate. Even though the top strip 13 is typically curved when located in the gate, this does not adversely affect picture display, since the above mentioned thinness of the top strip 13 renders refraction effects negligible and incapable of impairing a flat focus.

Moisture problems which may occur at higher ambient humidity levels are easily solved by coating the affected parts of the film strip system, notably the top strip 13, with one of the well-known anti-fog surfactants or wetting agents which are commercially available for causing condensation on objects to spread into a continuous thin layer which is invisible. In a projector, such thin humidity layer would evaporate or dry out from the heat of the projector.

Methods and equipment for loading the jacket type film strip system 10 with transparencies will now be disclosed with the aid of FIGS. 4 to 12. Among these, FIGS. 6 to 9 concentrate on the cutter, while FIGS. 10 to 12 elaborate on the loader, with FIGS. 4 and 5 being generic to both of these equipment components.

The cutting part 31 of the composite transparency cutting and loading apparatus 32 has a die 33 and a punch 34 corresponding to the die 33 and located adjacent thereto. As best seen in FIG. 8, the die 33 has cutting portions or edges 36, 37, 38 and 39 surrounding a space 41 where the transparencies are cut. In this man-

ner, transparencies may be cut from any available film format. This favorably distinguishes the cutter of the illustrated preferred embodiment from prior-art cutters which would accept and handle only one standard width of film format.

By way of example, FIG. 4 shows a developed photographic film 43 of a given format, such as the popular 35mm format, from which transparencies for the film strip system 10 are cut. It is, however, to be well understood that other film or picture formats are readily handled by the cutter 31 of the illustrated preferred embodiment.

The cutter 31 has a platform 44 on which the film or other pictorial material to be cut is located so as to be situated between the die 33 and punch 34.

According to the illustrated preferred embodiment of the invention, equipment is located adjacent the die for viewing the master strip or film 43 located on the platform 44 through the die 33 and space 41 surrounded by the cutting portions or edges 36, 37, 38, and 39.

In the illustrated preferred embodiment, this viewing equipment further includes film illuminating devices. More specifically, and as seen in FIG. 7, the illustrated apparatus includes a source of light in the form of a small electric incandescent lamp 48. A diffuser plate 49 has a prismatic edge portion 51 for receiving light from the lamp 48 and for transmitting such light from the lamp 48 to the film strip 43 to be cut.

In the quiescent position of the apparatus, the prismatic diffuser plate 49 is in a retracted position as shown in FIG. 9, completely withdrawn from the space between the die 33 and the punch 34. An actuating handle 52 is then in an intermediate or rest position as shown in FIGS. 4, 5 and 6.

In order to insert the diffuser plate 49 between the die 33 and the punch 34 and behind the strip 43 on the platform 44, the handle 52 is rotated clockwise to an active position 53 as seen in FIG. 7. In the illustrated preferred embodiment, actuation of the handle 52 to the active position 53 also withdraws the punch 34 away from the die 33 to make room for the diffuser plate 49.

More specifically, the punch 34 is mounted on a free end 54 of a rigid arm 55 having another free end 56. Screws or other suitable fasteners 57 are indicated in FIGS. 7 and 8 as means for mounting the punch 34 on the free end 54 of the arm 55. The punch mount further includes an essentially flat leaf spring 58 which has one end interconnected with the free end 56 of the arm 55 and which has its other end rigidly clamped at 59.

Rotary movement of the handle 52 imparts translatory movement to the punch 34 via a shaft or crankpin 61, an arm 62 of a lever 63 attached to the shaft or crankpin 61 and a link 64 articulately connected to the lever 63 and the punch mounting arm 55 at the free end 54. Accordingly, clockwise rotation of the handle 52 as seen in FIG. 7 withdraws the punch 34 from the die 33 to provide sufficient room for the diffuser plate 49.

The diffuser plate 49 is movable between and along a pair of rails, one of which is apparent at 66 in FIG. 7.

A slotted bracket 67 is attached to the diffuser plate 49 and coacts with a pin on a lever plate 69.

The lever plate 69 is pivoted for rotary movement about a shaft 71. An arm 74 of the lever 63 has a pin 75 which rides in the cam slot 72 of the lever plate 69.

When the actuating handle 62 is in its rest position, the pin 75 is in a midposition between branches 76 and 77 of the cam slot 72. This midposition, shown in FIG. 9, is provided by the lowest energy state of the spring 58. In that rest position, the diffuser plate 49 is withdrawn from the space between the die 33 and the punch 34 and the punch 34 is located proximately to the die 33 for rapid punching action.

When the handle 52 is rotated clockwise as seen in FIG. 7, the lever 63, in addition to withdrawing the punch 34 as previously described, also rotates the lever plate 69 clockwise by action of the pin on the lever plate 69 at the branch 76 of the cam slot 72. The pin 68 on the lever plate 69 thereby is caused to act on the slotted bracket 67 thereby pushing the diffuser plate 49 into the free space between the die 33 and punch 34.

At the same time, the arm 55, to which movement is imparted by the handle 52 when the punch 34 is withdrawn, actuates an electric switch 69 to energize the lamp 48 from an electric power receptacle 81. In this manner, the lamp 48 lights up and illuminates the diffuser plate 49 which, in turn, then illuminates the master film or image located on the platform 44 between the die 33 and the activated diffuser plate 49. The entire portion of the master image to be cut and the die cutting edges 36 to 39 are illuminated, rendering all visible prior to cutting.

Due to this important feature of the illustrated preferred embodiment, each image or scenery can be viewed on the master film as an aid to a convenient and accurate selection of the best image area which is to appear on the cut transparency. This is a considerable advantage since it aids in improving the quality of the loaded film strip and in avoiding irretrievable losses from erroneous cuts in unique film material.

A stop 83 shown in FIG. 4 limits the amount of clockwise travel of the actuating lever 52, so as to avoid damage to the diffuser plate 49 from overtravel.

In order to cut a transparency 21 from a viewed master film 43, the handle 52 is rotated counterclockwise to a position 84 shown in FIG. 9 against a stop 85. This counterclockwise movement of the handle 52 has no effect on the withdrawn position of the diffuser plate 49, since the pin 75 on the arm 74 of the lever 63 then simply rides in the branch 77 of the cam slot 72 in the lever plate 69. However, such counterclockwise movement transmits forces from the handle 52 to the free end 54 of the mounting arm 55 via the shaft 61 and the lever arm 62 and linkage member 64. This action pushes the punch 34 through the master film on the platform 44 into the die 33. Several factors considerably improve the cutting action of the illustrated equipment over that of comparable prior-art apparatus.

First, the motion of the arm 55 is angular from the spring vertex to the punch 34. The resulting arc covered by the advancing punch is small enough to avoid alignment problems between the punch 34 and the die 33. It will be noted in this connection that the illustrated leaf spring 58 extends from the second free end 56 of the arm 55 in a direction toward the first free end 54 on which the punch 34 is mounted. Also, the leaf spring 58 is located essentially in a plane extending through the cutting surface of the punch 34 when the punch enters the die 33.

Secondly, the member 64 is oriented essentially perpendicular to the cutting surface of the punch 34 when the cutting action commences, whereby the punching

force is, of course, also perpendicular so that there is no tendency of the punch to sideslip on the master film. This also increases the mechanical advantage at an instant where considerable mechanical power is needed to sheer the master film.

Thirdly, as seen in FIGS. 7 and 9, the die 33 is curved relative to the punch 34. The resulting progressive sheering action greatly reduces the force required to punch the film.

By way of recapitulation, it may be said that the handle 52 has a rest position (see FIGS. 4, 5 and 6) and first and second active positions 84 (see FIG. 9) and 53 (see FIG. 7), respectively.

Members 62 and 64 are coupled to the handle 52 and to the punch 34 for actuating the punch relative to the die 33 in response to actuation of the handle from its rest position to its first active position 84 shown in FIG. 9. A further linkage including members 67, 69 and 74 is coupled to the handle 52 and to the light transmitting diffuser plate 49 for inserting the light transmitting diffuser plate between the die 33 and the punch 34 in response to actuation of the handle 52 from its rest position to its active position 53 shown in FIG. 7, and for withdrawing the light transmitting diffuser plate 49 from in between the die 33 and the punch 34 in response to release of the handle 52 from the second active position 53 to its rest position.

As best seen at 87 in FIG. 8, the die 33 has a lateral notch and the punch 34 has corresponding corresponding lateral projection in order to provide the locking and orientation tabs 24 on the transparencies 21 shown, for instance, in FIG. 3. The punching equipment 31 so far described thus provides the requisite transparencies which, if desired, may then be manually inserted into the pockets 15 of the film strip system 10. Alternatively, such insertion may be effected automatically or mechanically.

For this purpose, the subject invention provides a loader mechanism 32 which, in the illustrated embodiment, may be attached to the illustrated equipment by means of mounting brackets 88 and screws 89.

FIGS. 4 and 5 show the loader attached to the illustrated apparatus, while FIGS. 10, 11 and 12 show the loader in a detached condition.

The loader has a loading station 92 at which the strips 12 and 13 of the jacket film strip system 10 are releasably retained. To this end, an attached bracket 93 and a thin metal plate or rail 94 (see FIG. 11) define lateral passage ways for receiving marginal portions of the base strip 12 whereby to locate the pockets 15 into their proper loading positions. The metal plate or rail 94 releasably retains an edge portion of the base film strip 12.

Preparatory to the insertion of a film strip system 10 into the loading station 92, an actuating handle 96 of the loader is placed into a midposition as shown in FIG. 12. This clears the loading station from all active members so that the film strip can be inserted without impediment.

To prepare the loader for the reception of a cut transparency, the handle 96 is moved to its upper active position shown in FIGS. 4, 5, 10 and 11. Conversely, the loader actuating handle 96 is moved to a lower active position shown in FIG. 12 at 98 to effect an insertion of a cut transparency into a pocket 15 of the strip film system 10. For a better understanding of these operations, the mechanism of the loader will presently be considered in greater detail.

In particular, the loader actuating handle 96 is formed from a bracket 100 having two extensions 101 and 102, best seen in FIG. 10.

The bracket extensions 101 and 102 carry a shaft 103 which extends through a lug 104 depending from a loading ram 105 and which carries a roller 106.

As seen in FIG. 12, the roller 106 rests in a detent of a leaf spring 107 when the handle 96 is in its rest position.

The shaft 103 also extends through cam plates 110 and 112.

As best seen in FIG. 5, the cam plate 110 is pivoted relative to the frame of the loader about a pin 113 and has a cam slot 114. The cam plate 112 is pivoted in a like manner and has a like cam slot. Extending through the cam slot 114 and through the corresponding cam slot (not shown) in the cam plate 112, the shaft 103 causes clockwise rotation of the cam plates 110 and 112 when the loader handle 96 is advanced downwardly from its upper active position shown in FIGS. 4 and 5 for a loading of a transparency into a film strip pocket 15.

Conversely, the cam plates 110 and 112 are rotated counterclockwise when the handle is advanced from its rest position shown in FIG. 12 to its upper active position shown in FIGS. 4 and 5. Due to the configuration and orientation of the lower branch 116 of the cam slot 114, no significant rotation of the cam plates 110 and 112 takes place when the handle 96 is moved between its rest position and its lower active position 98 shown in FIG. 12.

In either of the latter two positions of the handle 96, the cam plates 110 and 112 are in their proper rotational positions as shown for the cam plate 112 in FIG. 12.

A carriage 118 has a rod 119 extend through further cam slots 121 and 122 in the cam plates 110 and 112. A tongue-like spacer device 123 is attached to the carriage by a screw 124. The ram 105 also has a tongue-like member 125 for supporting a transparency 126 during its insertion into a pocket 15 of the film strip system 10.

Initially, the loader handle 96 is placed into the rest or midposition shown in FIG. 12. In that position, both tongues 123 and 125 are withdrawn from the loading station 92 so that a film strip 10 with pockets 15 may be inserted thereat. The loader handle is then moved to the upper active position shown in FIGS. 4, 5, 10 and 11. This rotates the cam plates 110 and 112 counterclockwise as seen in FIG. 5, so that the carriage 118 is actuated toward the loading station 92 via the cam slots 121 and 122 and the shaft 119. In this manner, the tongue of the spacer device 123 is inserted into the jacket 15 then positioned at the loading station. Due to the curved nature of the top strip 13 at the pockets 15, such insertion proceeds without any danger of malfunction or damage to the film strip system. As its name implies, the chief purpose of the tongue-like spacer 123 is to maintain the top strip 13 spaced relative to the base strip 12, whereby to keep the particular pocket 15 in an open condition for the reception of a transparency.

In addition, the spacer member 123 serves with its tongue-like configuration as a guide for cut transparen-

cies 126 during their insertion thereof, as indicated in FIG. 12.

Reverting now to the illustrated apparatus as a whole, a transparency cutting and loading procedure will now be described.

Initially, the master 43 from which a transparency is to be cut is located on the platform 44 below the magnifying lens 46 while the handle 52 is in the neutral or rest position shown in FIGS. 4 and 5. The handle 52 is then actuated toward and against the stop 83 to the active position 53 shown in FIG. 7, whereby the lamp 48 is energized and the diffuser plate 49 is inserted between the die 33 and the punch 34 as described above.

The lit master 43 is then viewed through the magnifier 46 and, if necessary, is positionally adjusted relative to the die 33 until the most desirable location for cutting the transparency from the illuminated image has been found. Due to the fact that the subject invention provides for a viewing of the master through the die and due to the fact that the die completely surrounds the space in which the transparency is cut, all misalignment errors and all danger of waste of irretrievable master material is avoided in a convenient and effective manner.

Once the master 43 has been positioned as desired, the handle 52 is moved to its other active position 84 toward and against the stop 85 as shown in FIG. 9.

This results in a withdrawal of the diffuser plate 49 from the space between the die 33 and punch 34 and in the cutting of a transparency from the master 43 by the punch 34 advancing toward and into the die 33. The resulting cut transparency slides by force of gravity over a lip 129 of the die 33. The inclined position of the die 33 and its lip 129 relative to a horizontal plane aid this movement of the cut transparency.

The loader 32 defines a pathway 131 in the form of a slide or gravity chute for receiving the cut transparency from the lip 129 and for guiding such received transparency over the surface of the ram 105 and onto its tongue-shaped portion 125. The ram 105 has a platform-like surface which is located adjacent the pathway 131 when the handle 96 is in its upper active position shown in FIGS. 4, 5, 10 and 11. Due to the inclined orientation of the loader 32 in its mounted condition, the transparency thus slides from the pathway 131 along the platform portion of the ram 105 and into the recess at the tongue 125. The handle 96 is then advanced to its lower active position shown at 98 in FIG. 12 whereby the spacer tongue 123 is withdrawn from the pocket 15 while the ram 105 pushes the cut transparency 126 past the withdrawing tongue 123 into the pocket 15 of the film strip system 10, as shown in FIG. 12, with the parts 100 to 104 and 110 to 113 assuring synchronism of the ram 105 and cut transparency 126 with the withdrawal of the tongue 123.

The tongue-like extension 125 of the ram 105 thereby supports the cut transparency 126. The tongue-like extension 125 thereby slides across the thin metal strip or rail 94 which precludes any interference by the base strip 12 with the loading process.

During the insertion just described, the tab 24 of the transparency will seek the corresponding receptacle at the aperture 23 and will thus be automatically locked in its proper position in the film strip system 10. The apparatus may then be readied for the next cutting and loading operation by moving the loader handle 96 to the neutral or rest position shown in FIG. 12 whereby the tongue-like ram extension 125 is withdrawn from the jacket 15 without any disturbance of the inserted transparency which has been locked in place as just described. The film strip system 10 may then be moved until a further pocket is located in the loading station.

In this manner, the film strip system may be completely loaded with transparencies. Inserted transparencies may at any time be removed with the aid of tweezers or other suitable implements. If desired, the loader 32 may be employed for reinserting removed transparencies into any empty pocket 15 of the film strip system 10. In that case, the removed transparency may be directly located onto the pathway 31 or the ram 105 while the handle 96 is in its upper active position shown in FIGS. 4 and 5.

In this operation, the user will have to orient the tab 24 of the transparency in the proper relation to the aperture 23 whereby the correct orientation of the transparency in the film strip system is automatically assured.

In terms of the illustrated preferred embodiment, it will be noted that the loader handle 96 with associates parts simultaneously operates the ram 105 and spacer device 123 whereby the spacer device 123 is withdrawn from the pocket 15 as the ram 105 with its tongue 125 approaches and, sliding in between the edge portion retainer member 94 and the tongue of the spacer member 123, enters the pocket 15, thereby carrying and inserting a cut transparency into that pocket. Considering the apparatus herein disclosed, it will be noted that the cutter 31 and the loader 32 are not limited in their utility to the disclosed applications. Rather, the cutter 31 may be employed to cut pieces other than transparencies for various purposes from strip-like or sheet-like stock. Similarly, the loader 32 may be employed for loading pieces other than transparencies into receptacles other than pockets of film strip systems.

Various modifications and variations within the spirit and scope of the subject invention will become apparent from, or be suggested by, the subject extensive disclosure to those skilled in the art.

For instance, the diffuser plate 49 could be made to be located in between the punch 34 and die 33 as seen in FIG. 7 when the handle 52 is in a rest position, such as adjacent the stop 83. A manually actuable light switch (similar to swith 69) would then be provided to energize the lamp 48 when viewing of the picture to be cut is desired. The handle 52 would then be actuated from the stop 83 to the stop 85 to effect withdrawal of the diffuser 49 and actuation of the punch 34 as seen in FIG. 9.

I claim:

1. In apparatus for inserting a transparency at a loading station into a pocket formed by essentially transparent interconnected first and second strips, the improvement comprising in combination:

first means for releasably retaining said strips at said loading station, said first means including means for releasably retaining an edge portion of said first strip;

actuable second means for spacing said second strip from said first strip whereby to open said pocket for an insertion of said transparency;

actuable third means separate from said second means for advancing said transparency into said open pocket, said third means including transparency inserting means and means for guiding at least

a portion of said transparency inserting means over said edge portion retaining means; and

fourth means coupled to said second and third means for actuating said second and third means.

2. An apparatus as claimed in claim 1, wherein:

said means for guiding said transparency inserting means include means for guiding said transparency inserting means in between said edge portion retaining means and said spacing means.

3. An apparatus as claimed in claim 1, wherein:

said fourth means include means for actuating said second and third means simultaneously.

4. In apparatus for inserting a transparency at a loading station into a pocket formed by essentially transparent interconnected first and second strips, the improvement comprising in combination:

first means for releasably retaining said strips at said loading station;

actuable second means including a first tongue for spacing said second strip from said first strip whereby to open said pocket for an insertion of said transparency;

actuable third means including a second tongue separate from said second means for advancing said transparency into said open pocket; and

fourth means coupled to said second and third means for actuating said second and third means, said fourth means including means for withdrawing said first tongue from and subsequently inserting said second tongue into, said pocket.

5. An apparatus as claimed in claim 4, wherein:

said third means include a transparency insertion ram, with said second tongue being combined with said insertion ram to support a transparency during advancement into said pocket.

6. An apparatus as claimed in claim 4, wherein:

said fourth means include means for inserting said first tongue into said pocket whereby to open said pocket, and means for advancing said second tongue into said pocket together with a transparency and for simultaneously withdrawing said first tongue from said pocket, and for subsequently withdrawing said second tongue without said transparency from said pocket.

7. In apparatus for inserting a transparency at a loading station into a pocket formed by essentially transparent interconnected first and second strips, the improvement comprising in combination:

first means for releasably retaining said strips at said loading station;

actuable second means for spacing said second strip from said first strip whereby to open said pocket for an insertion of said transparency;

actuable third means separate from said second means for advancing said transparency into said open pocket; and

fourth means coupled to said second and third means for actuating said second and third means, said fourth means having a first position, a second position and a third position, and said fourth means including means for maintaining said second and third means spaced from said pocket in said first position, for activating said second means upon activation of said fourth means to said second position, and for deactivating said second means and activating said third means upon activation of said fourth means to said third position.

8. In apparatus for inserting a transparency into a pocket formed by essentially transparent interconnected first and second strips, the improvement comprising in combination:

means defining a pathway for receiving and guiding said transparency;

means defining a loading station at a location spaced from saidi pathway;

means at said loading station for releasably retaining said strips at said loading station;

a tongue constructed to be insertable into said pocket for maintaining said pocket open;

means for advancing said transparency from said pathway to said loading station, said advancing means include means for receiving said transparency from said pathway; and

means for actuating said tongue and said advancing means, said actuating means including means for inserting said tongue into said pocket and alternatively withdrawing said tongue from said pocket, and means for advancing said transparency receiving means with said received transparency to said pocket in synchronism with said tongue withdrawal whereby to insert said transparency past the withdrawing tongue into said pocket.

9. An apparatus as claimed in claim 8, wherein:

said actuating means include means for simultaneously withdrawing said tongue from said pocket and advancing said transparency receiving means to said pocket.

10. An apparatus as claimed in claim 9, wherein:

said transparency receiving means have a projecting member for supporting said received transparency; and

said actuating means include means for inserting said projecting member into said pocket together with said supported transparency.

11. In apparatus for cutting a transparency from a master and inserting the cut transparency into a pocket, the improvement comprising in combination:

a die;

a punch corresponding to said die;

means for actuating said punch relative to said die to cut said transparency from said master;

means for releasably retaining said pocket;

means for maintaining said pocket in an open condition including a tongue insertable into said pocket;

means for advancing said cut transparency from said die to said open pocket, said advancing means include means for receiving said cut transparency, means for moving said received transparency toward said pocket to insert said transparency into said pocket, and means for withdrawing said tongue from said pocket during insertion of said received transparency into said pocket.

12. An apparatus as claimed in claim 11, wherein:

said receiving means include means for supporting said received transparency; and

said transparency moving means include means for moving said supporting means at least partially into said pocket.

13. An apparatus as claimed in claim 11, including:

means at said die for viewing said master through said die.

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