

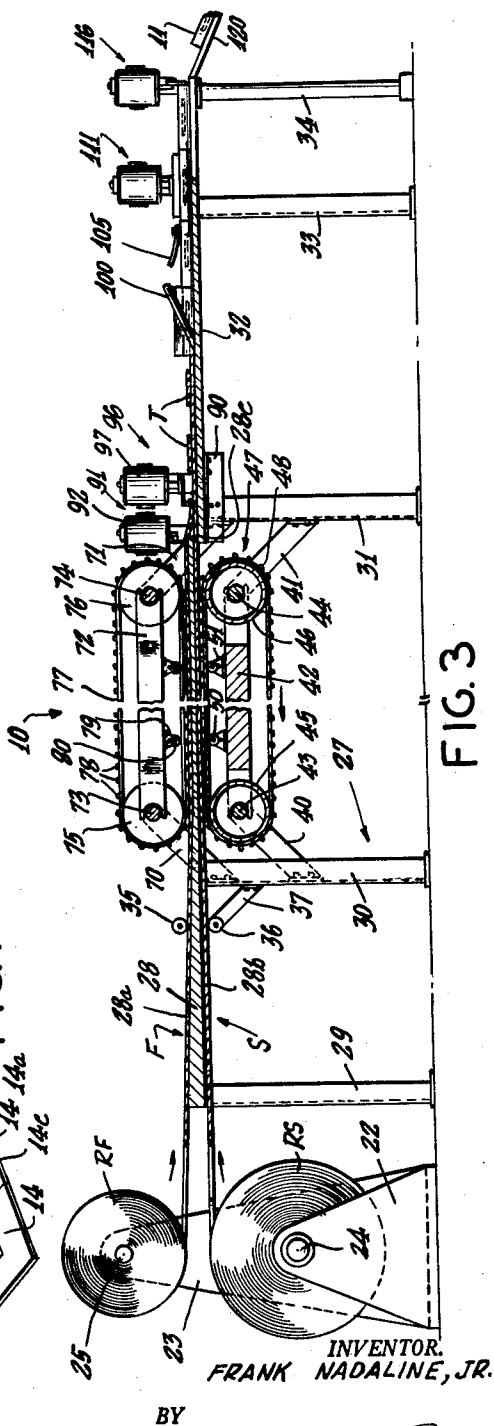
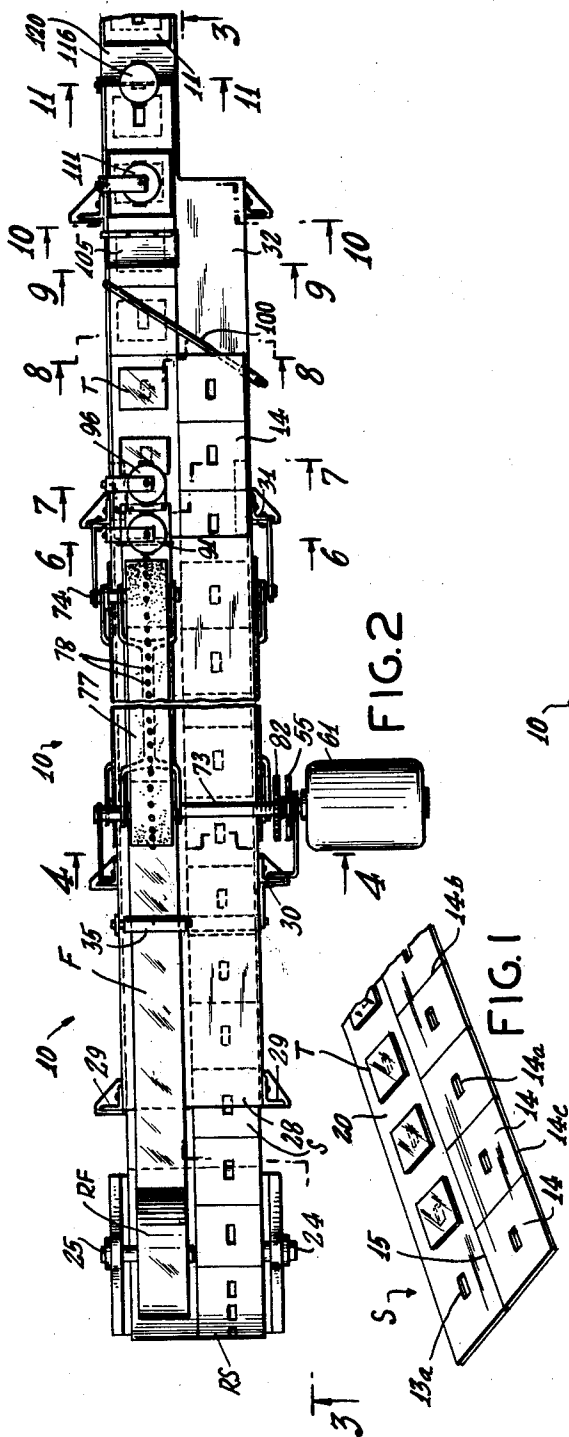
Nov. 10, 1964

F. NADALINE, JR
APPARATUS FOR AND PROCESS OF MAKING
TRANSPARENCY SLIDES

3,156,597

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3 Sheets-Sheet 1



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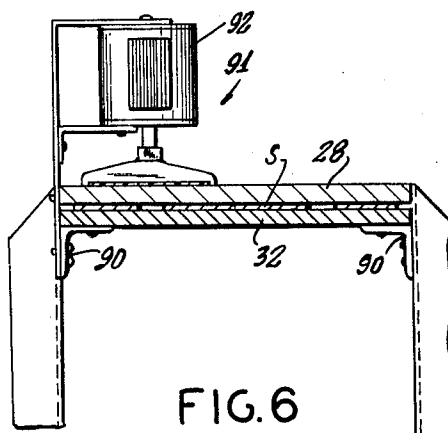
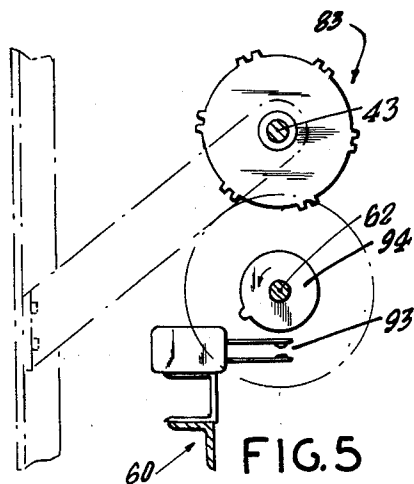
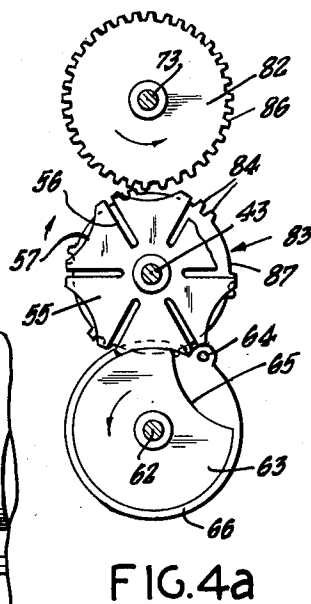
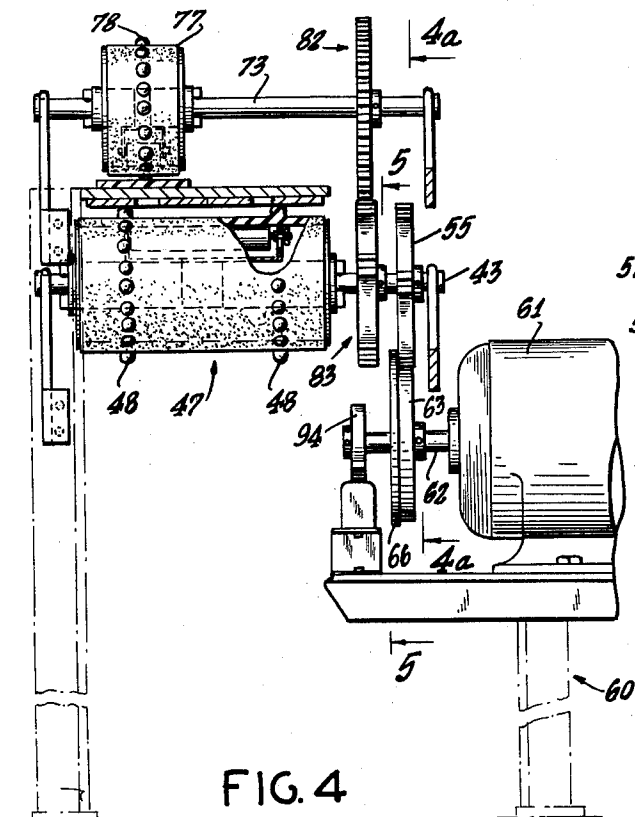
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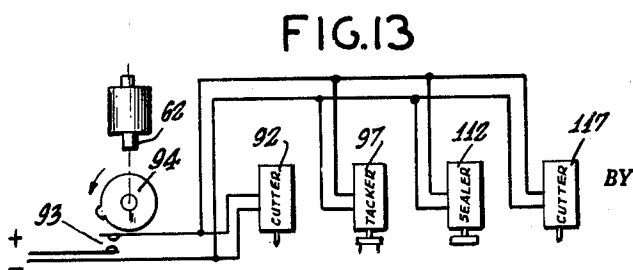
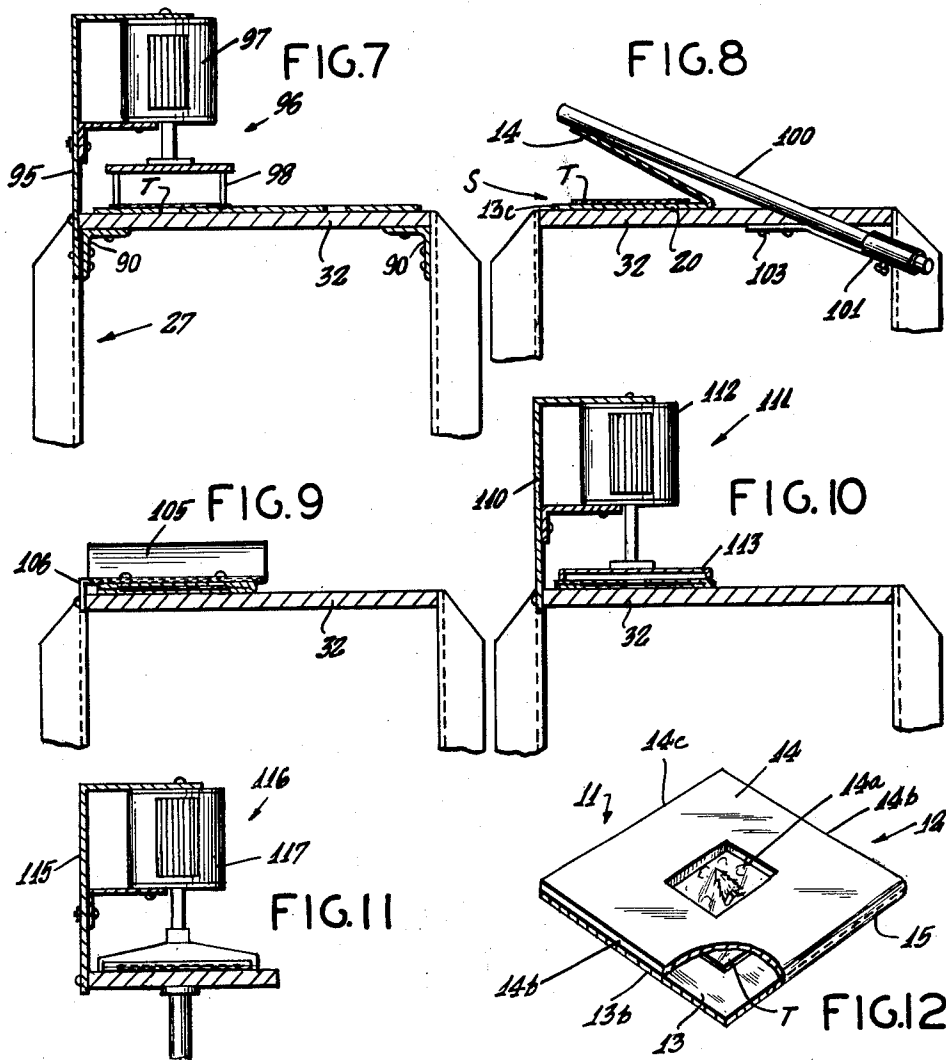
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3 Sheets-Sheet 3



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3,156,597

APPARATUS FOR AND PROCESS OF MAKING TRANSPARENCY SLIDES

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23 Claims. (Cl. 156-108)

This invention relates to apparatus for and process of making transparency slides.

Machines for making transparency slides have been known. Such machines were provided with means for assembling individual cardboard mount blanks with film pieces being cut from a strip. The cardboard mount blanks each comprised of two sections foldable about a creasing or scoring between said sections, and said sections being formed with window openings which registered when the blank was folded about its crease or score line. The film strip was fed in the window in one section of the blank, and the strip then cut to leave a piece of film (a picture frame, or transparency) over said window, and the other section was then folded over the cut piece of film and first section. Difficulties and shortcomings are involved in this prior process mainly because individual fully precut blanks were used.

It is hence an object of this invention to provide a more fully automatic machine, in which a roll of cardboard is used from which the individual mounts are cut after the film pieces are assembled therewith.

A further object of this invention is to provide a highly improved process for making slides for transparencies, comprising feeding a strip of processed film onto one longitudinal side of a strip of cardboard coming from a roll. The strip of cardboard is formed with equally spaced parallel transverse slits on one side of a central, longitudinal scored or creased fold line. The film is fed longitudinally to the uncut side of the sheet strip. The transverse slits provide flap sections formed with window openings foldable about the longitudinal crease or score line. The uncut side of the cardboard strip has window openings to register with the windows in the folded over flap sections. The film is cut into pieces or frames overlying the windows of the uncut portion, and each frame is tacked to the strip of cardboard; each folded over section is sealed to the lower section; it is folded over with the film frame between the windows, and the mounts are then cut off at the lines of the slits into individual slides.

A yet further object of this invention is to provide a strong and durable machine of the character described which shall be inexpensive to manufacture and economical to operate and which shall be practical and efficient to a high degree in use.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists in the features of construction, combinations of elements, and arrangement of parts and steps, which will be exemplified in the construction and method hereinafter described, and of which the scope of invention will be indicated in the following claims.

In the accompanying drawings in which is shown an illustrative embodiment of this invention,

FIG. 1 is a partial, perspective view of a piece of cardboard strip with pieces of film thereon;

FIG. 2 is a top plan view of a machine embodying the invention for carrying out my improved process;

FIG. 3 is a cross-sectional view taken on line 3-3 of FIG. 2;

FIG. 4 is a cross-sectional view taken on line 4-4 of FIG. 2;

FIG. 4a is a cross-sectional view taken on line 4a-4a of FIG. 2;

FIG. 5 is a cross-sectional view taken on line 5-5 of FIG. 4;

FIG. 6 is a cross-sectional view taken on line 6-6 of FIG. 2;

FIG. 7 is a cross-sectional view taken on line 7-7 of FIG. 2;

FIG. 8 is a cross-sectional view taken on line 8-8 of FIG. 2;

FIG. 9 is a cross-sectional view taken on line 9-9 of FIG. 2;

FIG. 10 is a cross-sectional view taken on line 10-10 of FIG. 2;

FIG. 11 is a cross-sectional view taken on line 11-11 of FIG. 2;

FIG. 12 is a perspective view of a transparency slide made with the improved apparatus and by the process embodying the invention; and

FIG. 13 is a wiring diagram illustrating the electrical system for the machine embodying the invention.

Referring now in detail to the drawing, 10 designates a machine embodying the invention for making slides 11 (FIG. 12) for transparencies T.

The slides 11 each comprise a mount 12 made of a piece of cardboard or the like material. Said material comprises a bottom square section 13 from which extends a top square section 14 of similar size folded thereover in superimposed relation, about a score or crease line 15. The sections 13 and 14 are formed with superposed rectangular windows 13a, 14a, respectively, of similar shape and size.

Section 13 has parallel edges 13b and an end edge 13c. Section 14 has parallel edges 14b and an end edge 14c. Between the sections 13, 14 is the transparency or piece of processed film T covering the registering windows 13a, 14a.

The mount 12 is cut, as will appear hereinafter, from a strip S of cardboard which may come from a roll RS, and the transparency or film piece T (which is a single frame) may be cut, in the manner hereinafter described, from a strip F coming from a roll RF. The flap sections 14 are provided with the window openings 14a and extend from an uncut longitudinal portion 20 of the strip S which is later cut from the strip to form edges 13b aligned with edges 14b. Strip S is formed with longitudinal crease or score line 15 separating flap sections 14 from portion 20. Portion 20 is formed with windows 13a aligned with windows 14a. Windows 13a and 14a are equidistant from crease or score line 15.

The machine 10 for making the slides 11 comprises supports 22 and 23 for parallel spaced horizontal shafts 24, 25, to carry the rolls RS and RF, respectively.

Adjacent the supports 22, 23 is a stand 27 comprising a table 28 mounted on longitudinally spaced legs 29, 30, 31 and a table 32 extending longitudinally of table 28 and supported on legs 31, 33, 34 and spaced below the level of table 28.

Table 28 may taper, gradually becoming thinner away from the supports 22, 23. The upper surface 28a of table 28 may incline downwardly to the right (FIG. 2) while its undersurface 28b is horizontal.

The film strip F coming from roll RF, passes over surface 28a while strip S coming from roll RS passes under surface 28b. A pair of rollers 35, 36 on bracket 37 fixed to leg 27, may keep strips F and S against surfaces 28a, 28b, respectively.

Means is provided to feed the strips S and F intermittently with the strip F overlying the uncut section 20 of strip S and covering the windows 13a. The feed is such, as will appear hereinafter, that each time the strip S is fed

a distance equal to the length of a section 14, the film strip F is fed a distance equal to the length of one picture frame or transparency of said film strip. The feed is such furthermore, as will appear hereinafter, that the strip S is first fed alone for a distance which is the difference in the lengths that the strips S and F are fed, and then both strips are fed together for the length that the film strip is fed. Thus the strip S is fed alone a distance equal to the difference in the lengths of one section 14 and one transparency T.

To this end, there is mounted on brackets 40, 41 fixed to legs 30, 31, respectively, a horizontal support 42, located beneath table 28. On support 42 are mounted for rotation, spaced transverse shafts 43 and 44 carrying rollers 45 and 46, respectively, supporting a belt 47 provided with small projections 48. The upper run of the belt is pressed against the strip S to move or feed it relative to the table, as the belt is moved in the direction of the arrow in FIG. 3. Said upper run of the belt is held up against strip S by idler rollers 50 on brackets 51 supported by support 42.

On shaft 43 is a Geneva wheel 55 having a plurality of equiangularly spaced radial slots 56 and inwardly curved edges or notches 57 between said slots. On a support 60 below the belt is an electric motor 61 having a drive shaft 62 carrying a Geneva gear member 63 provided with a pin 64 to engage in successive slots 56 as the motor shaft rotates. Member 63 also has a usual notch 65 to permit intermittent rotation of wheel 55 as the wheel 63 rotates continuously. The annular edge 66 of member 63 between the ends of notch 65 engages in successive notches 57, to keep the wheel 55 from turning except when pin 64 is in a slot 56. The operation of the Geneva gear is well known. By its use, shaft 43 is caused to rotate one-sixth of a revolution each time the motor shaft makes a complete revolution. Rotation of shaft 43, intermittently will cause intermittent movement of belt 47 and hence intermittent feed of strip S. The parts may be so designed that strip S is fed a distance equal to the length of each flap section 14 each time the strip is fed.

Mounted on suitable brackets 70, 71 fixed to legs 30, 31 respectively, is a support 72 located above table 28 and above film strip F. On support 72 are parallel transverse, horizontal rotary shafts 73, 74 aligned with shafts 43, 44 respectively. Shafts 73, 74 carry rollers 75, 76 respectively, on which is mounted a belt 77 also having small projections 78 engaging the film strip F. On support 72 are brackets 79 carrying idler rollers 80 which press the lower run of the belt 77 against the film strip.

On shaft 73 is a gear 82. On shaft 43 is a gear 83 having equiangularly spaced sets or groups of gear teeth 84 to mesh intermittently with teeth 86 of gear 82. Between adjacent sets of teeth 84 is a space 87 with no teeth.

The gear 83 is fixed to shaft 43 and hence to wheel 55 in such angular relation that at the inception of rotation of wheel 55 and gear 83, said gear 82 will not rotate (due to toothless zone or space 87) until a set of teeth 84 meshes with teeth 86 of gear 82. Thus, gear 82 is rotated only during the last parts of the periods of rotation of shaft 43. Hence, during each feed period, the strip S is first fed alone, and then both strips S and F are fed together, and then both stop feeding simultaneously. The gearing is so arranged that the film strip F is fed for the requisite distance, that is for the requisite part of the feed of strip S (length of transparency T).

Means is provided to cut the film strip F into picture frame portions or transparencies T in positions overlying the windows 13a of strip S. To this end there is mounted on bracket 90 fixed to leg 31, a film cutter 91 actuated by a solenoid 92. The transparency T is cut just before the right end 28c of table 28. When the transparency is cut, it is located just over window 13a in proper relation

thereto. The film strip is cut while both strips S and F have stopped being moved or fed.

The cutter solenoid 92 is in series with a switch 93 (FIG. 13) which is closed by a switch cam 94 on the motor shaft 62. Each time the motor makes one revolution, switch 93 is closed to energize the cutter solenoid 92 to actuate the cutter 91 for cutting the film. The cam 94 is so arranged as to cut the film as soon as the feed for both strips S and F stops, and pin 64 has just left a slot 56. At this time a full length of film strip has just been fed over and with the portion of the strip S which it is to cover. The cutting operation hence deposits a transparency T in the strip S covering a window 13a. After this cut, the strip S is fed alone until the film strip is fed again therewith.

Means is provided to tack the cut transparency T to the strip S. To this end there is fixed to the stand 27, a bracket 95 located just beyond the cutter 91. Bracket 95 supports a tacker 96 actuated by a solenoid 97. The tacker may comprise heating elements 98 to press edge portions of the cut transparency T to portion 20 of the strip S. The tacking may be done by application of adhesive if desired. Tacker solenoid 97 is connected in parallel circuit to cutter solenoid 92, so that both solenoids are concurrently actuated upon closing switch 93.

Means is provided to fold sections 14 over the cut and tacked transparencies T and over sections 13 of portion 20 of strip S, as the strip with the transparencies tacked thereto, are fed. To this end, beyond the tacker 96, there is provided a folder or flipper rod 100 which is inclined downwardly, rearwardly and toward the near side of the machine (FIG. 2) and intersecting the plane of sections 14. Thus the leading edges 14b of sections 14 contact the rod as the strip S moves to the right (FIG. 1) to fold or flip said sections up and over (see FIGS. 1, 3 and 8). The rod 100 may be fixed to the stand 27 by any suitable bracket 101 attached to the underside of table 32 as at 103. Sections 14 fold about crease line 15.

The folded over sections 14 may be pressed down onto the transparencies T and uncut sections 13 of portion 20 of the strip S, by a guide plate 105 inclined downwardly and forwardly and overlying portion 20 and located forwardly of flipper bar 100. Guide plate 105 is fixed to stand 27 by means of socket 106 (FIG. 9).

Means is provided to seal the folded over sections 14 to uncut sections 13 of strip S. To this end there is fixed to stand 27, a bracket 110 (FIG. 10) supporting a sealer 111 actuated by a solenoid 112 connected in parallel circuit with solenoids 92 and 97. The sealer 111 may comprise an electric heating plate 113 to press down on section 14 when solenoid 112 is energized. Sealer 111 is located beyond the guide 105, as shown in the drawing.

Means is provided to cut the sealed sections 13, 14 with the transparency therebetween. To this end, there is mounted on table 32, beyond the sealer 111, a bracket 115 (FIG. 11) carrying a cutter 116 actuated by a solenoid 117 connected in series circuit with the solenoids 92, 97 and 112. The cutter 116 is located to cut the portion 20 of strip S along edges 14b of sections 14, so as to produce cut edges 13b, thereby dividing portion 20 in sections 13 and severing off completed slides 11.

The severed slides 11 may then drop and slide down a chute 120.

It will thus be seen that there is provided an apparatus and method in which the several objects of this invention are achieved and which is well adapted to meet the conditions of practical use.

As possible embodiments might be made of the above invention, and as various changes might be made in the embodiment above set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. A machine for making transparency slides, compris-

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ing means for intermittently feeding a sheet strip having a longitudinal uncut portion on one side thereof formed with window openings, and similar square flap sections of width similar to the width of said uncut portion, extending from said uncut portion to one side thereof and foldable about a fold line between the uncut portion and said sections and formed with window openings adapted to register, upon folding said sections about said fold line, into superposition over said uncut portion, for distances equal to the lengths of said sections, and for intermittently feeding a strip of processed film longitudinally and in the same direction onto the uncut portion of said sheet strip and over said windows therein, for distances less than the lengths of intermittent feed of said sheet strip, said feeding means comprising means to first feed the sheet strip alone and then feed both said sheet strip and said film strip together, and to stop the feed of both simultaneously, means to cut the film strip at the end of each movement of said sheet and film strips together, means to tack the cut piece of film strip to the uncut portion of said sheet strip, means to fold said flap sections, seriatim over the cut and tacked piece of film and over the uncut portion of the sheet strip, with the windows of the folded sections registering with the windows of the uncut portion, and with the pieces of cut film between said windows, means for sealing the folded over sections to the uncut portion, and means for cutting the uncut portion of the sheet strip along lines defining the parallel ends of said folded over and sealed sections.

2. The combination of claim 1, in combination with means to actuate the film strip cutting means, the tacking means, the sealing means and the sheet strip cutting means simultaneously and while the feed of the sheet strip and film strip is stopped.

3. In a machine for making transparency slides, means to feed a film strip and a strip of mounting sheet material, together longitudinally in the same direction, with the strip of film on one longitudinal side of a longitudinal fold line spaced between the longitudinal side edges of the mounting strip, means for folding the other longitudinal side of the mounting strip over the film strip and over the first side of the sheet strip, means for severing pieces of film, and means for severing pieces of said mounting strip with pieces of film between the folded together sides of the mounting strip, said feed means including means to feed the mounting strip at a higher longitudinal velocity than the film.

4. A machine for making transparency slides comprising means for intermittently feeding a sheet strip having a longitudinal uncut portion on one side thereof formed with equally spaced windows, and flap sections extending from said uncut portion to one side thereof about a longitudinal fold line, and formed with windows adapted to register with the windows in the uncut portion upon folding said flap sections over the uncut portion, means to feed a film strip intermittently longitudinally together in the same direction with said sheet strip and overlying the windows in said uncut portion of the sheet strip, means for cutting pieces of the film strip of less length than the flap section in overlying portion relative to said windows of the uncut portion, means for folding said sections about said fold line over said cut pieces of film strip and over the uncut portion of said sheet strip.

5. The combination of claim 4, in combination with means for tacking said pieces of film strip to said uncut portion, prior to folding over said flap sections.

6. The combination of claim 5, in combination with means for sealing said folded over flap sections to said uncut portion.

7. The combination of claim 4, in combination with means for cutting said uncut portion along lines defining the parallel ends of said folded over flap sections.

8. The combination of claim 7, in combination with means for sealing said folded over sections to said uncut portion, before cutting said uncut portion.

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9. A process for making transparency slides comprising transversely cutting pieces from a strip of film and depositing the cut pieces in spaced relation to each other on equally spaced windows formed on one longitudinal side of a central fold line in a sheet strip by feeding the film strip and sheet strip together longitudinally in the same direction, folding the other side of said sheet strip about said fold line to overlie the first side, and said cut pieces, said other side having windows registering with the first windows upon folding said other side, and transversely cutting said sheet strip between registering windows.

10. The process of claim 9, in combination with the step of tacking the cut pieces to the first side of the sheet strip, before folding.

11. The process of claim 10, in combination with the step of sealing the folded over side to the first side of the sheet strip, before cutting the sheet strip.

12. A process for making transparency slides comprising intermittently longitudinally feeding a sheet strip formed with a longitudinal center fold line providing an uncut portion on one side of said fold line, and formed with parallel cuts extending from the fold line, providing flap sections extending from said uncut portion, said uncut portion being formed with equally spaced windows, said sections being formed with windows adapted to register with the windows in the uncut portion upon folding said sections about said fold line over said uncut portion, intermittently feeding a film strip longitudinally of the sheet strip in the same direction over the windows of the uncut portion of said sheet strip at a longitudinal velocity less than the feed velocity of the sheet strip, and cutting said film strip to provide spaced pieces of film on said windows of the uncut portion of said sheet strip.

13. The process of claim 12, in combination with the step of tacking the pieces of film to said sheet strip.

14. The process of claim 13, in combination with the step of folding said sections over the cut and tacked pieces of film on the uncut portion.

15. The process of claim 14, in combination with the step of sealing the folded over sections to said uncut portion.

16. The process of claim 15, in combination with the step of severing the uncut portion along the parallel lines defining the ends of said folded over, sealed sections.

17. A machine for making transparency slides comprising means for feeding longitudinally together and in the same direction and sandwiching spaced pieces of processed film between longitudinally folded together portions of a strip of sheet slide mount material having registering windows on opposite sides of said pieces, and means for cutting the folded sheet material transversely, between registering windows.

18. The combination of claim 17, in combination with means to seal the folded together portions of said sheet strip, prior to severing said sheet strip.

19. The combination of claim 18, in combination with means to tack the pieces of film to one side of said sheet strip prior to folding said strip about opposite sides of said cut pieces.

20. A machine for making transparency slides comprising means to longitudinally feed together in the same direction a strip film and spaced relation to each other a strip of sheet material having windows on one side of a central longitudinal fold line, means to cut pieces of film from said film strip and deposit them over said windows, means for folding the other side of said sheet strip about said fold line and over said cut pieces of film and over the first side, said other side having windows adapted to register with the windows in the first side, upon folding said other side over said first side, and means for cutting said sheet strip transversely between registering windows.

21. A machine for making transparency slides comprising means for longitudinally feeding a sheet strip formed

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with portions on opposite sides of a central longitudinal fold, said portions having equally, longitudinally spaced similar window openings, with the windows of said portions being in alignment so that when one portion is folded over the other portion about said longitudinal fold, the windows of one portion register with the windows of the other portion, means for longitudinally feeding a film strip, in a direction parallel to the direction of feed of the sheet strip, means for cutting pieces of said film strip of less length than the distances between the midportions of windows of each portion, means for causing said severed film pieces to be sandwiched between said portions in folded condition and between and covering registering window openings of said portions, means to seal said portions together with the film pieces sandwiched therebetween, and means for cutting said sheet strip transversely equally between adjacent longitudinally spaced windows.

22. The combination of claim 21, said means for feeding said sheet strip comprising an intermittent feed means, and said means for feeding said film strip comprising an intermittent feed means to feed said film strip for distances less the length of intermittent feed of the sheet feed means.

23. The combination of claim 22, said severing means comprising, means to slit said film strip, and said cutting means comprising means to slit said sheet strip.

References Cited in the file of this patent

UNITED STATES PATENTS

1,276,990	Swift	Aug. 27, 1918
2,889,066	Alberty	June 2, 1959