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FILM PACK STRUCTURE AND APPARATUS FOR HANDLING SAME

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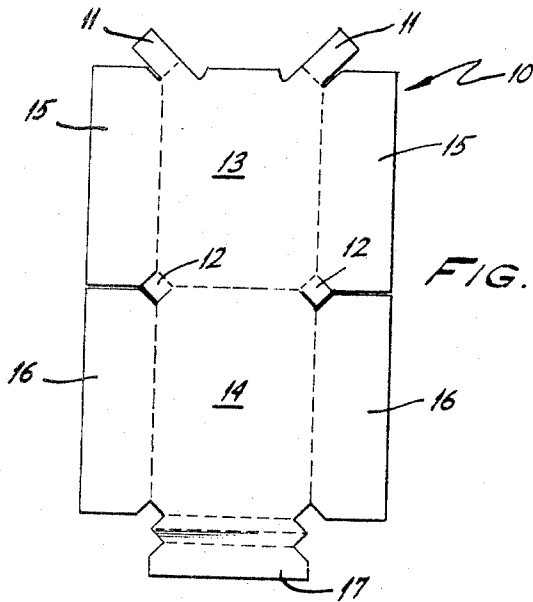


FIG. 1.

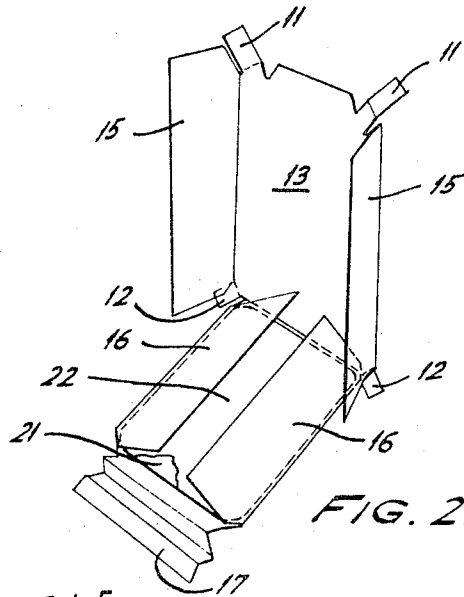


FIG. 2.

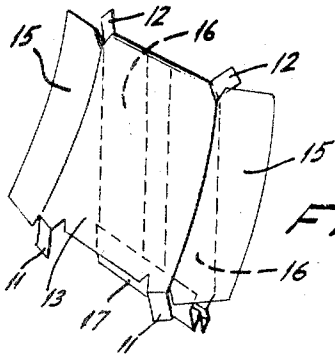


FIG. 3.

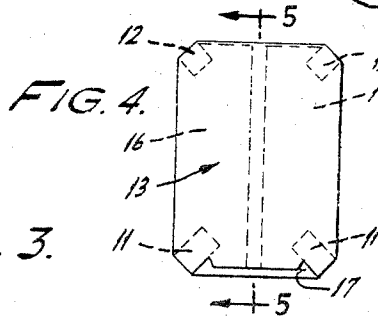


FIG. 4.

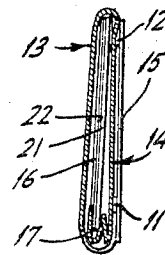


FIG. 5.

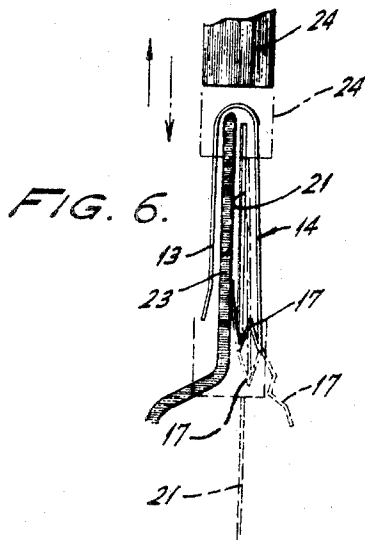


FIG. 6.

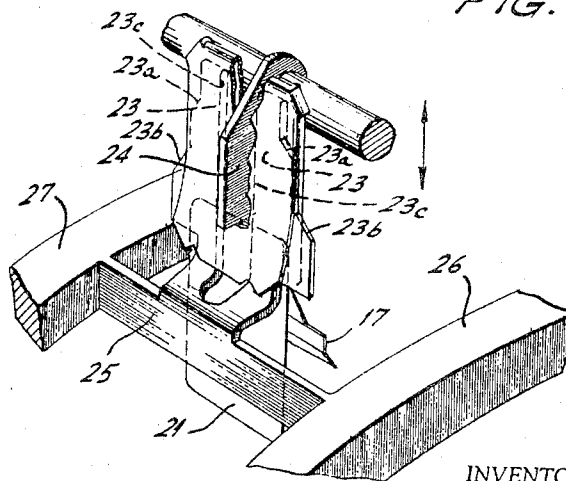


FIG. 7.

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1

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FILM PACK STRUCTURE AND APPARATUS FOR HANDLING SAME

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8 Claims

ABSTRACT OF THE DISCLOSURE

A dental X-ray film pack constructed to facilitate removal of the film from the pack by mechanical means. Film packs are impaled upon a series of forked blades arranged on suitable support structure, such as may be disposed in the light-tight enclosure of an automatic film processing machine. The films are forced from their packs sequentially by means of a pusher blade, and the empty envelope portions are then discarded to make way for installation of a new set of packs.

The invention herein described was made in the course of or under a contract or subcontract thereunder with the Department of the Army.

CROSS REFERENCE TO RELATED DISCLOSURE

Some features of the invention disclosed and specifically claimed in the present invention are claimed broadly as elements of the invention disclosed in the copending U.S. patent application of Richard S. Kampf and Elmer J. Land, Ser. No. 656,381 filed July 27, 1967, entitled "Film Developing Apparatus," and assigned to the assignee of the present invention. It therefore follows that subject matter of the present invention has particular utility in apparatus of the type to which the referenced disclosure is directed.

BACKGROUND OF THE INVENTION

This invention relates to film packs and apparatus for handling the same. The invention has particular utility in apparatus for automatically developing exposed films, such for example as dental X-ray films.

A general objective of the present invention is provision of improved X-ray film pack construction that lends itself especially to automatic handling by self contained film processing apparatus.

It is a further objective to provide improved means for handling the above-mentioned film pack in processing apparatus of the above-mentioned type.

SUMMARY OF THE INVENTION

In achievement of its objectives, a preferred embodiment of the invention comprises a film pack including a light impervious envelope portion for containing the film, a second envelope portion for receiving blades which support the pack, and a closure flap arranged to close both envelope portions. The support blades are so constructed and arranged as to present the packet for engagement by a pusher blade that tears through the packet envelope portions, engaging the film and pushing it from the envelope for subsequent feeding into suitably positioned developing apparatus.

The closure flap is so constructed and arranged, and the film is of such rigidity, as to accommodate unfolding of the flap and passage of the film from the envelope under the urging of the pusher blade.

The manner in which the above-mentioned objectives and advantages of the invention may best be achieved

2

will be appreciated from a consideration of the following description, taken in light of the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIGURE 1 is a plan view of an envelope blank prior to folding and insertion of a film to form a film pack embodying the invention;

FIGURE 2 is a perspective showing of the envelope blank seen in FIGURE 1, including its film contents and illustrating portions of the envelope folded thereover;

FIGURE 3 is a perspective showing of a substantially completed film pack;

FIGURE 4 is a plan view of a completed film pack;

FIGURE 5 is a sectional view of the film pack illustrated in FIGURE 4, taken generally along the line indicated by arrows 5—5 applied to FIGURE 4;

FIGURE 6 is a sectional view of the film pack, in combination with apparatus for stripping film from the pack; and

FIGURE 7 is a perspective showing, with parts removed, of apparatus shown in FIGURE 6, and illustrating operational features of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Film pack structure that achieves the objectives and advantages of the invention will be more fully understood from the following description directed to the preferred manner of fabricating the pack.

With detailed reference to FIGURE 1, an envelope blank 10 is cut from a suitable paper stock that is provided with a layer of material (not shown) that is impervious to light but transparent to X-rays. Blank 10 includes diagonally extending corner tabs 11 and 12, panels 13 and 14, side flaps 15 and 16, and a closure flap 17 affixed to panel 14. With reference to FIGURE 2, it is seen that an X-ray film 21 of conventional shape and size is disposed upon panel 14, and a layer of lead foil 22 is placed over the film. The adjacent flaps 16 are then folded along the broken lines onto foil 22, and are cemented thereto. Thereafter, as is shown in FIGURE 3, panel 13 is folded, and is cemented to the previously folded flaps 16 and to the confronting portion of folded closure flap 17. The diagonally extending corner tabs 11 and 12 are folded onto the rear of panel 14, and the outwardly extending flaps 15 are folded over corner tabs 11 and 12 onto the panel 14, and are cemented to the latter to form the pack seen in FIGURE 4.

It will be appreciated from FIGURE 5 that panel 13 and flaps 16 cooperate to define an empty compartment adjacent the film-containing compartment defined by foil 22, flaps 16 and panel 14. Both compartments are closed by the folded flap 17 provided with a re-entrantly folded portion as shown.

As best seen in FIGURE 6, the above described empty envelope compartment is so constructed and arranged that support means comprising a pair of parallel blades 23 are insertable therein to support the film pack. With reference also to FIGURE 7, blades 23 are supported upon a transversely extending base 25 that forms a spoke of a carrier wheel defined by hub 26 and rim 27.

Each blade 23 includes an upper, generally diagonally extending cutting edge 23a and a lower generally diagonally extending cutting edge 23b. The cutting edges are so arranged as to be symmetric about a vertical line equally spaced from the straight confronting edges 23c of blades 23. According to one aspect of the invention, and as is best seen in FIGURE 6, the tips of blades 23 are initially inserted between the end of flap 17 and the confronting edge of panel 13, thereby to break the cemented joint or seal therebetween. As will be under-

stood from FIGURE 7, continued insertion of the blades 23; as achieved by further forcing of the pack onto the blades, causes cutting edges 23a to engage and sever corner tabs 11. Final forcing of the pack causes cutting edges 23b to engage and sever substantial portions of the lateral edges of flap 13. While but one such film pack support blade structure is shown, it will be understood that the carrier wheel preferably includes a plurality of such blade structures. The wheel of the present disclosure corresponds to the loading tray of the referenced Kampf and Land disclosure in which the present invention has particular utility.

Blade means 24, driven by any suitable reciprocatory power apparatus (see Kampf and Land disclosure) is movable between the confronting edges 23c of blades 23, to slit the envelope and to push film 21 in such direction as to open flap 17 in achievement of removal of the film from the envelope as is illustrated sequentially in broken lines in FIGURE 6.

It will be appreciated that the re-entrantly folded flap 17 accommodates simultaneous tearing of the envelope and pushing of the film by blade means 24. As is seen to advantage in FIGURE 6, film 21 in being moved downwardly engages folded flap 17 to cause it to swing down and to the right, which movement is facilitated by the reverse, or "accordion" fold in the flap between the flap portion engaged by the film and the edge about which the flap swings or unfolds. In other words, the folds in flap 17 in relation to the position of film 21 result in an off-center condition of the flap, so that it can be easily unfolded by the film. This novel sequence of unfolding afforded by the pack structure tends to eliminate undue stressing of the relatively fragile film 21, with possible resultant damage thereto, as it is pushed from its envelope compartment by pusher blade 24.

Advantageously, film pack support means of the type disclosed can be loaded prior to insertion into the film processing apparatus, since insertion of the support blades 23 into the separate compartment section, while initially weakening the closure flap by breaking its seal, does not impair the light-tightness of the film-containing section. Moreover, the empty envelopes are retained neatly by the removable support means so that they may be discarded with minimum effort for subsequent installation of new film packs to be processed.

I claim:

1. Apparatus for stripping photographic film from a packet of a type having a double compartment envelope at least one compartment of which is light tight and has such film disposed therein, and a flap folded along the edge of the light tight compartment and inserted into the other compartment to close the packet, said apparatus comprising: a bifurcate blade insertable past said flap into said other compartment to support said packet, and blade means operable to tear through said envelope, move between the bifurcations of said blade and engage said film to force it against said flap, thereby to unfold the latter and to effect consequent removal of the film from the envelope.

2. Apparatus according to claim 1 and characterized in that said bifurcate blade includes lateral, diagonally extending cutting edges operable to engage and to sever lateral edge portions of said other envelope compartment into which said bifurcate blade is inserted.

3. A photographic film pack comprising: an envelope having a pair of adjacent individual compartment sections including adjacent open end portions; photographic film in one compartment section; and a folded flap affixed along an edge of said envelope, covering said adjacent open end portions of the individual compartment

sections, and including a free edge portion extending into the other compartment section; the construction and arrangement being such that spaced support elements are insertable past said free edge portion of said flap into the other compartment section to support said pack and accommodate movement of blade means transversely of said envelope between said spaced support elements, whereby to slit said envelope and move the film against the flap to open the latter and remove the film.

4. Apparatus for stripping a dental X-ray film from an envelope provided with a closure flap projecting over an edge of said film and into said envelope, said apparatus including a pair of spaced blade elements insertable past said flap and into said envelope for supporting the latter, and blade means extending transversely of the plane of said envelope and mounted for movements between said pair of spaced blade elements to tear through said envelope while urging said film past said closure flap and out of said envelope.

5. A photographic film pack comprising an envelope having a pair of compartment sections, at least one of which is light-tight, and including adjacent open end portions, a flap affixed along an edge of said envelope and folded to cover said open end portions of the compartment sections, said flap including a reentrantly folded portion intermediate the recited fold and the free edge portion of the fold, said free edge portion extending into the empty compartment section and said reentrantly folded portion extending into said one, light-tight compartment section, and photographic film in the recited one light-tight compartment section, the construction and arrangement being such that support means is insertable into the other compartment section to support said pack while accommodating movement of blade means operable to slit said envelope and push the film to open the flap.

6. A film pack according to claim 3 and characterized in that: said film is X-ray sensitive; said light-tight compartment is X-ray transparent; and a layer of lead foil is included intermediate said film and said other compartment section.

7. Apparatus for stripping a dental X-ray film from an envelope including a pair of adjacent, confronting compartment sections having adjacent openings, one of said sections containing said film, and a closure flap extending over said adjacent openings, said apparatus including a pair of spaced blade elements for supporting said envelope and insertable into the other of said sections of said envelope past said closure flap, and blade means movable between said spaced blade elements and operable to tear through said envelope while urging said film past said closure flap and out of said envelope, said film being operable to open said envelope flap as the film is urged from the envelope.

8. An envelope according to claim 7, and characterized further in that said closure flap includes a re-entrantly folded portion that extends into the recited film containing section.

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HUGO O. SCHULZ, Primary Examiner

U.S. Cl. X.R.

206—41.5; 229—72