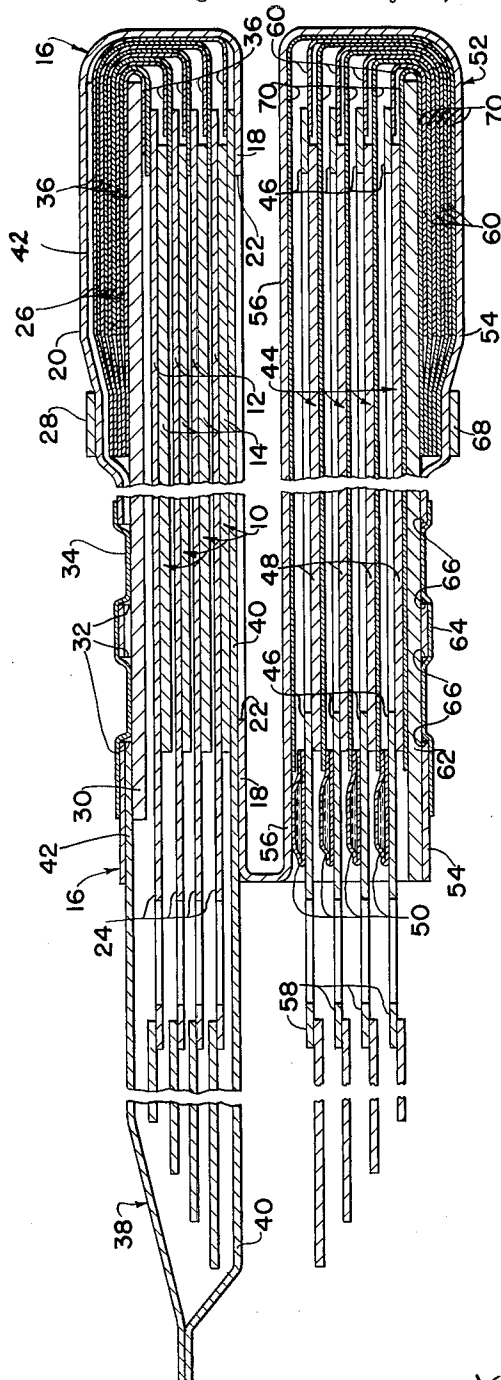


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V. K. ELORANTA
PHOTOGRAPHIC PRODUCT

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PHOTOGRAPHIC PRODUCT

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15 Claims. (Cl. 95-13)

This invention is concerned with photography and, more particularly, with novel photographic film assemblages.

Objects of the invention are: to provide, in a photographic film assemblage including an envelope or magazine containing a plurality of photographic elements adapted to be withdrawn therefrom, one at a time, novel means for releasably retaining the elements in the envelope or magazine so as to assure their withdrawal, one at a time, and in proper sequence; and to provide retaining means as described which is consistent and dependable in its operation and which permits the photographic elements to be withdrawn easily and smoothly from the envelope or magazine in which they are contained.

Other objects of the invention are: to provide retaining means as described useful in film assemblages of the type wherein a fluid processing agent is distributed in a layer between a pair of superposed elements and which is adapted to function as means for trapping excess fluid; and to provide retaining means having a simple and inexpensive construction and which is easy to fabricate and assemble.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the product possessing the features, properties and the relation of components which are exemplified in the following detailed disclosure, and the scope of the application of which will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawing wherein:

The FIGURE is a somewhat schematic sectional view taken through a typical film assemblage embodying the invention, the section being taken substantially along a line midway between the sides of the assemblage with the thicknesses of the materials comprising the assemblage being exaggerated for clarity of illustration.

The present invention finds application in photographic film assemblages wherein a plurality of photographic elements, particularly photosensitive sheets, are contained in an envelope or magazine and are adapted to be withdrawn therefrom, one at a time, in proper sequence. The herein disclosed means for releasably retaining the photographic elements in an envelope or magazine is particularly useful in photographic film assemblages such as are shown and described in copending application Serial No. 667,882, filed June 25, 1957, in the name of Edwin H. Land, now Patent No. 2,903,951, wherein a sequence of photosensitive elements is exposed in the envelope in which they are contained and, following exposure, are withdrawn, one at a time, from the envelope and undergo a subsequent processing. This subsequent treatment may include superposing a photosensitive element with a second element and distributing a fluid processing agent in a layer between the two elements. Accordingly, the assemblage may include a plurality of second elements which also may be releasably retained by the means of the invention in a suitable envelope or magazine from which they are adapted to be withdrawn in succession.

Distribution of the fluid processing agent is usually effected by manually drawing a photosensitive and sec-

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ond element from their respective envelopes or means in which they are contained into superposition and between a pair of pressure-applying members. It is important that only the exposed photosensitive element be withdrawn and that the two elements be moved at a substantially uniform rate without hesitation or sudden jerks between the pressure-applying members. Accordingly, the means for retaining the elements should be positive and dependable in its operation and should release each element in proper sequence gradually rather than abruptly and without the application of considerable tension. As a general rule, in order to insure distribution of the processing fluid over a predetermined area of a photosensitive element, an excess amount of fluid is provided, and the retaining means of the invention also provides means for trapping this excess fluid so that the fluid does not collect on the pressure-applying members or on other parts of the apparatus in which the photosensitive elements are processed.

Reference is now made to the drawing wherein there is illustrated a typical photographic film assemblage of the type disclosed in the aforementioned copending application and embodying the present invention. The film assemblage shown in the drawing comprises a plurality of photosensitive elements contained in one envelope and a plurality of second elements contained in a second envelope apart from the photosensitive elements. The two envelopes may or may not be connected as shown and are adapted to be positioned apart from one another during exposure of the photosensitive elements. The photosensitive and second elements may be provided in some other form of container or magazine as an alternative to the envelope shown and the second element need not be provided in any envelope or container. In the form shown, each photosensitive element, designated 10, comprises a carrier sheet 12 and a photosensitive sheet 14 attached to the carrier sheet. Photosensitive sheets 14 may comprise any suitable photosensitive material, such as a silver halide emulsion, carried on a support and carrier sheets 12 are of a relatively thin sheet material, such as paper, on which the photosensitive sheets are mounted.

A plurality of photosensitive elements 10 are arranged in stacked relation in an open-ended envelope 16 comprising a front wall 18 and rear wall 20. Front wall 18 is provided with an aperture 22 through which the photosensitive elements can be exposed. The photosensitive elements are arranged with photosensitive sheet 14 facing and underlying this aperture and, since the sheets are intended to be exposed while in the envelope in stacked relation, at least all of the photosensitive elements located in front of the rearmost element are sufficiently opaque to prevent exposure of photosensitive sheets underlying the foremost photosensitive element located closest front wall 18 in position for exposure across the aperture. Each photosensitive element includes a leading end portion 24 which may comprise a section of a carrier sheet 12 and a trailing end portion 26 which may also comprise a section of carrier sheet 12 or may comprise another sheet attached thereto adjacent the trailing end of photosensitive sheet 14. Leading end portions 24 project from the open end of the envelope and provide means whereby the photosensitive elements may be grasped for withdrawing them from the envelope.

The assemblage comprising envelope 16 and the elements contained therein is intended to be introduced as a unit into apparatus such as a camera wherein the photosensitive elements are exposed. This apparatus preferably includes means, such as a spring and pressure plate, for urging the assemblage against means for positioning the foremost photosensitive sheet contained in the envelope for exposure. The apparatus also includes means

for cooperating with a portion of the envelope for retaining the envelope and its contents in the apparatus during withdrawal of a photosensitive element from the envelope. The cooperating portion of the envelope is shown as comprising a pad or engagement member 28 secured to rear wall 20. Engagement member 28 can be formed of any suitable material, such as cardboard, organic plastics and the like, which is comparatively thick and is engageable with means in the camera. Other embodiments of engagement means on the envelope for retaining it in the photographic apparatus are known to the art and include, for example, grommets, projections, tabs, etc.

To facilitate the uniform distribution of pressure on the photosensitive elements and hold them substantially flat during exposure, there is provided a backing element 30 in the envelope behind the stack of photosensitive elements. Backing element 30 comprises a relatively inflexible material, such as cardboard, metal, plastic and the like, and is at least coextensive in area with that of the photosensitive sheets.

Backing element 30 also comprises means for retaining the photosensitive elements in envelope 16 and for this reason is secured to rear wall 20 of the envelope. A convenient means for securing the backing element to rear wall 20 and which also facilitates assembly of the assemblage includes a strip 34 of an adhesive material, such as a pressure-sensitive tape, secured to rear wall 20 across apertures 32 in the rear wall, so that adhesive strip 34 adheres to the portions of backing element 30 underlying apertures 32. Trailing end portions 26 extend around the end of backing element 30 between the latter and rear wall 20. The retaining means also comprises a plurality of interleaf sheets 36 secured to the rear of backing element 30 and extending between trailing end portions 26 around the end of backing element 30. The sharp bending of the trailing end portions around the end of backing element 30 has a tendency to cause these portions to bind and resist withdrawal from the envelope. This resistance to withdrawal is increased by the application of compressive pressure to the entire assemblage, as by a pressure plate in the apparatus in which the elements are exposed. Interleaf sheets 36 are provided for facilitating withdrawal of one element at a time from the envelope by separating the end portions and preventing frictional engagement therebetween which would tend to cause more than one element to move at the same time. These interleaf sheets do not, however, eliminate the resistance to withdrawal which is the smallest for the foremost photosensitive element and greater for subsequent elements, making it appreciably more difficult to withdraw any but the foremost element. To further facilitate withdrawal of the elements, trailing end portions 26 and interleaf sheets 36 are preferably formed of a material which is smooth and offers very little frictional resistance. Paper, which is the preferred material, should have a hard, smooth and highly calendered surface, glassine paper being especially suited for this purpose.

Means are provided for sealing envelope 16 against the admission of light before and during introduction into photographic apparatus in which the assemblage is to be employed. This light-sealing means comprises an envelope 38 open at one end and adapted to surround the photosensitive element and backing element and extend inside envelope 16. Envelope 38 includes a forward wall 40, providing a closure for aperture 22, and a rear wall 42. Rear wall 42 includes an elongated slot extending to the open trailing end of envelope 38 whereby backing element 30 can be secured directly to rear wall 20 and envelope 38 can be withdrawn from envelope 16 wherein it surrounds the contents of envelope 16.

As previously noted, the assemblage may comprise a plurality of second elements adapted to be superposed with the photosensitive elements during processing. In

the form shown each second element, designated 44, comprises a carrier sheet 46 and a second or print-receiving sheet 48. The second sheets may be adapted merely to aid in spreading a fluid processing agent on the photosensitive sheets with which they are superposed, or, in a preferred form, are adapted to receive and provide a support for a positive transfer print formed by one of the methods well known in the art. Each second element 44 also may include a container 50 of a fluid processing agent capable, for example, of producing a positive silver transfer print when spread in a thin layer between a photosensitive sheet containing a photosensitive silver halide emulsion and a suitable print-receiving sheet superposed with the photosensitive sheet.

The photosensitive sheet 14 of each photosensitive element 10 is intended to be processed by drawing it in superposition with a second element 44 between a pair of pressure-applying members for spreading the fluid processing agent from a container 50 in a thin layer between the photosensitive and print-receiving sheets. The construction of the photosensitive the second elements and the pressure-applying members is preferably such as to insure spreading of the fluid in a layer of predetermined thickness. This construction includes mounting each print-receiving sheet 48 on the outside of each carrier sheet 46, that is, on the side of the carrier sheet which is furthest from the photosensitive sheet, and providing an aperture in the carrier sheet corresponding substantially to the exposure frame of the photo-sensitive sheet. The container 50 of fluid processing agent is mounted on the inside of the carrier sheet adjacent the leading end of the print-receiving sheet and the edge of the aperture in position to discharge its contents toward the photosensitive sheet and print-receiving sheet between the two sheets when the container is subjected to compressive pressure.

Since the second elements are not photosensitive, they need not be provided in a lighttight envelope, but are shown as being contained in an envelope as a matter of convenience in handling and to prevent damage. Second elements 44 are contained in an open-end envelope 52 having walls characterized, for purposes of description, as a front wall 54 and rear wall 56, the latter being disposed closest front wall 18 and, in the form shown, being secured thereto adjacent the open ends of the envelopes. Each carrier sheet 46 includes a leading end portion 58 which projects from the open end of the envelope to provide means for manually withdrawing the second elements, and a trailing end portion 60 which may be substantially the same as trailing end portions 26. A backing element 62 is provided in envelope 52 behind the stack of second elements and is secured in the envelope to forward wall 54 by such means as an adhesive strip 64 which projects through apertures 66 in forward wall 54. An engagement member 68 may be provided on forward wall 54 for retaining envelope 52 against movement within the apparatus in which it is employed.

Trailing end portions 60 extend around the end of backing element 62 between the latter and forward wall 54 for retaining the elements in the envelope. A plurality of interleaf strips 70 are provided between the trailing end portions and are secured to the rear of backing element 62. Interleaf strips 70 are substantially the same as interleaf strips 36 except that they are of sufficient length to extend between the print-receiving sheets 48 of the second elements toward the leading ends thereof and behind the leading end of each print-receiving sheet 48 between leading end portion 38 of each element and a portion of container 50 of the next successive element. In this way, the interleaf strips further facilitate withdrawal of the second elements by preventing the leading end of each print-receiving sheet 48 from catching on the edges of the container 50 of the next successive element as each element is withdrawn from the envelope.

The combined thicknesses of a superposed photosensitive element and a second element are substantially greater in the regions of the photosensitive and print-receiving sheets than in the region of the trailing end portions. This characteristic can be utilized for trapping excess processing fluid. In one arrangement the pressure-applying members can be so constructed as to have a fixed, minimum spacing which is greater than the combined thicknesses of two trailing end portions 26 and 60 whereby a space is provided between the trailing end portions as they move between the pressure-applying members in which excess fluid is trapped and retained.

The present invention may be embodied in other forms of film assemblages or magazines in addition to those which include an envelope. For example, the invention finds utility in a magazine of the type which may be substantially rigid and includes a chamber which may also be provided with a spring and pressure plate. In this case the pressure plate may perform the same function as the backing elements shown. In another embodiment the photosensitive and second sheets may comprise a single element or two elements secured together and provided in the same envelope or magazine chamber. The photosensitive and second elements may be of the type adapted to be drawn from the apparatus directly into the light for processing and hence comprise materials which are opaque to actinic light in order to prevent exposure of the photosensitive sheet.

This application is a continuation of my copending application entitled "Photographic Products," Serial No. 673,727, filed July 23, 1957, now abandoned.

Since certain changes may be made in the above product without departing from the scope of the invention herein involved, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. A photographic film assemblage comprising, in combination, a container having an opening in one end, a plurality of photographic sheets arranged in stacked relation in said container, and means for releasably retaining said photographic sheets in said container so as to restrict said sheets to being withdrawn from said container through said opening one at a time and in proper sequence, said means for releasably retaining said photographic sheets comprising portions of said photographic sheets extending therefrom in the form of flexible trailing ends, compression-applying means bearing against the opposed outer surfaces of at least said trailing ends to provide a given resistance to withdrawal of said photographic sheets from the container, and a plurality of interleaf sheets each of which is positioned between adjacent surfaces of said trailing ends, said interleaf sheets being secured within the container to remain in a fixed position as said photographic sheets are selectively withdrawn.

2. A photographic film assemblage, as defined in claim 1, wherein said portions and said interleaf sheets are arranged to provide a differential resistance to withdrawal of said photographic sheets.

3. A photographic film assemblage, as defined in claim 1, wherein said portions and said interleaf sheets have smooth abutting surfaces.

4. A photographic film assemblage comprising, in combination, a container having an opening in one end, a plurality of photographic sheets arranged in stacked relation in said container, and means for releasably retaining said photographic sheets in said container so as to restrict said sheets to being withdrawn from said container through said opening one at a time and in proper sequence, said means for releasably retaining said photographic sheets comprising portions of said photographic sheets extending therefrom in the form of flexible trailing ends, compression-applying means bearing against the op-

posed outer surfaces of at least said trailing ends to provide a given resistance to withdrawal of said photographic sheets from the container, and a plurality of flexible interleaf sheets each of which is positioned between adjacent surfaces of said trailing ends, said interleaf sheets having their trailing ends secured within the container to maintain the interleaf sheets in a fixed position as said photographic sheets are selectively withdrawn.

5. A photographic film assemblage comprising, in combination, a container means having an opening in one end, a plurality of photographic sheets arranged in stacked relation in said container means and means for releasably retaining said sheets in said container means so as to restrict said sheets to being withdrawn from said container means through said opening one at a time and in proper sequence, said means for releasably retaining said sheets comprising a backing element, means securing said backing element within said container means against one side of said stack of sheets, flexible trailing end portions comprised by said sheets folded around an end edge of said backing element on the side thereof opposite said sheets between said backing element and a portion of said container means, and a plurality of flexible interleaf sheets secured adjacent one of their extremities to said side of said backing element facing said portion of said container means and extending between said trailing end portions of said sheets around said end edge of said backing element to a point more proximate said opening than said trailing end portions.

6. A photographic film assemblage comprising a container, a plurality of photosensitive sheets each having an exposure frame arranged in stacked relation in said container, said container having an opening in one side wall overlying said exposure frames through which light may be transmitted for exposing said exposure frames and an opening in one end through which said sheets are adapted to be withdrawn singly and in proper sequence, said photosensitive sheets including leaders extending from said container through the last-mentioned opening at said one end and means for releasably retaining said photosensitive sheets in said container so as to restrict said sheets to being withdrawn singly and in proper sequence, the last-mentioned means comprising flexible retaining sheets extending from the trailing ends of said photosensitive sheets, a relatively inflexible backing element, at least coextensive in area with said exposure frames, secured within said container against the side of said stack of photosensitive sheets furthest from said opening through which said sheets are exposed, said retaining sheets extending from said photosensitive sheets adjacent one side of said backing element around an end edge of said backing element remote from said one end of said container to the other side of said backing element between the latter and a portion of said container, and flexible interleaf sheets secured to said other side of said backing element and extending between said retaining means around said end edge of said backing element.

7. A photographic film assemblage as defined in claim 6 wherein is provided removable closure means for said opening in one end of said container.

8. A photographic film assemblage as defined in claim 6 wherein is provided removable closure means for said opening in one side wall of said container.

9. The film assemblage of claim 6 wherein the retaining sheet of each of said photosensitive sheets comprises sheet material which is substantially thinner than said photosensitive sheets in the region of said exposure frame.

10. A photographic film assemblage comprising a container having an opening at one end, a plurality of photographic sheets arranged in stacked relation in said container and adapted to be withdrawn therefrom through said opening singly and in proper sequence, said photographic sheets including leaders attached to their leading ends and extending through said opening, and means for retaining said photographic sheets in said container so as

to restrict said sheets to being withdrawn singly and in proper sequence, the last-mentioned means comprising flexible retaining sheets extending from the trailing ends of said photographic sheets located nearest the end of said container opposite said opening, a relatively inflexible backing element secured within said container adjacent the side of said stack of photographic sheets furthest from the first of said photographic sheets to be withdrawn, said retaining sheets extending from said photographic sheets adjacent one side of said backing element around an end edge of said backing element to the other side thereof so as to be disposed between the backing element and a portion of said container, a plurality of flexible interleaf sheets secured adjacent one of their extremities to said other side of said backing element facing said portion of said container means and extending between said retaining sheets around said end edge of said backing element, and an engagement member secured to the outside of said container on the side thereof closest to said backing element whereby said container can be retained against movement in a photographic apparatus.

11. A photographic film assemblage comprising an envelope having first and second walls and an opening at one end, a plurality of photographic sheets arranged in stacked relation between said first and second walls and adapted to be withdrawn from said envelope through said opening singly and in proper sequence, said photographic sheets comprising leaders extending from said envelope through said opening whereby said sheets can be withdrawn from said envelope and means for releasably retaining said photographic sheets in said envelope so as to restrict said sheets to being withdrawn singly and in proper sequence, the last-mentioned means comprising flexible retaining sheets extending from the trailing ends of said photographic sheets remote from said opening in said envelope, a relatively inflexible backing element secured within said envelope adjacent said first wall thereof with said stack of photographic sheets arranged between said backing element and said second wall of said envelope and the first of said photographic sheets to be withdrawn being disposed closest said second wall, said retaining sheets extending from said photographic sheets at one side of said backing element around an end edge of said backing element to the other side thereof between said backing element and said first wall of said envelope, and flexible interleaf sheets secured to said backing element between it and said first wall and extending between said retaining sheets around said end edge of said backing element.

12. A photographic film assemblage comprising an envelope having first and second walls and an opening at one end, a plurality of photosensitive sheets each having an exposure frame arranged in stacked relation between said first and second walls and adapted to be withdrawn from said envelope through said opening singly and in proper sequence, said photosensitive sheets having leaders extending from said envelope through said opening whereby said photosensitive sheets can be manually withdrawn from said envelope, said first wall of said envelope having an aperture through which said photosensitive sheets can be exposed and means for releasably retaining said photosensitive sheets in said envelope so as to restrict said sheets to being withdrawn singly and in proper sequence, the last-mentioned means comprising flexible retaining sheets extending from the trailing ends of said photosensitive sheets located at the end of said envelope opposite said opening, a relatively inflexible backing element, at least coextensive with said exposure frames, secured within said envelope adjacent said second wall with said stack of photosensitive sheets arranged between said backing element and said first wall and the first of said photosensitive sheets to be withdrawn being disposed

closest said first wall, said retaining sheets extending from said photosensitive sheets around an end edge of said backing element to the other side thereof between said backing element and said second wall of said envelope, and flexible interleaf sheets secured to said backing element between it and said second wall and extending between said retaining sheets around said end edge of said backing element.

13. A photographic film assemblage comprising a first envelope having first and second walls and an opening at one end, a plurality of photosensitive sheets each having an exposure frame arranged in stacked relation in said envelope between said first and second walls and adapted to be withdrawn from said envelope through said opening singly and in proper sequence, a second envelope having an opening in one end, a plurality of second sheets, each having an area adapted to be superposed with an exposure frame of a photosensitive sheet, arranged in stacked relation within said second envelope and adapted to be withdrawn from said second envelope through said opening singly and in proper sequence, said photosensitive and second sheets having leaders extending from their respective first and second envelopes through said openings therein whereby said sheets can be manually withdrawn from said envelopes, said first wall of said first envelope having an aperture through which said photosensitive sheets can be exposed, means for releasably retaining said photosensitive sheets in said first envelope and retaining said second sheets in said second envelope so as to restrict said photosensitive and second sheets to being withdrawn from their respective envelopes singly and in proper sequence, the last-mentioned means comprising flexible retaining sheets extending from the trailing ends of said photosensitive and second sheets and located at the ends of said envelopes opposite said openings, a relatively inflexible backing element in each of said envelopes at least coextensive with said exposure frames and areas, one of said backing elements being secured within said first envelope adjacent said second wall with said stack of photosensitive sheets arranged between said backing element and said first wall with the first of said photosensitive sheets to be withdrawn being disposed closest said first wall, the other of said backing elements being secured within said second envelope against the side of said stack of second sheets furthest from the first of said second sheets to be withdrawn from said second envelope, said retaining sheets extending from their respective photosensitive and second sheets around an end edge of one of said backing elements to the other side thereof between said backing element and a wall of the envelope, and flexible interleaf sheets secured to said backing elements and extending between said retaining sheets around said end edges of said backing elements.

14. The photographic film assemblage of claim 13 wherein each of said second sheets includes a rupturable container of a fluid processing agent secured to said sheet adjacent the leading end thereof and said area, and wherein said interleaf sheets in said second envelope extend between said second sheets across said areas thereof to a point between each of said containers and the next successive second sheet.

15. The photographic film assemblage of claim 13 wherein said retaining sheets comprise sheet material which is substantially thinner than said photosensitive and second sheets in the regions thereof comprising said exposure frames and said areas superposable with said exposure frames.

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