

Sept. 8, 1964

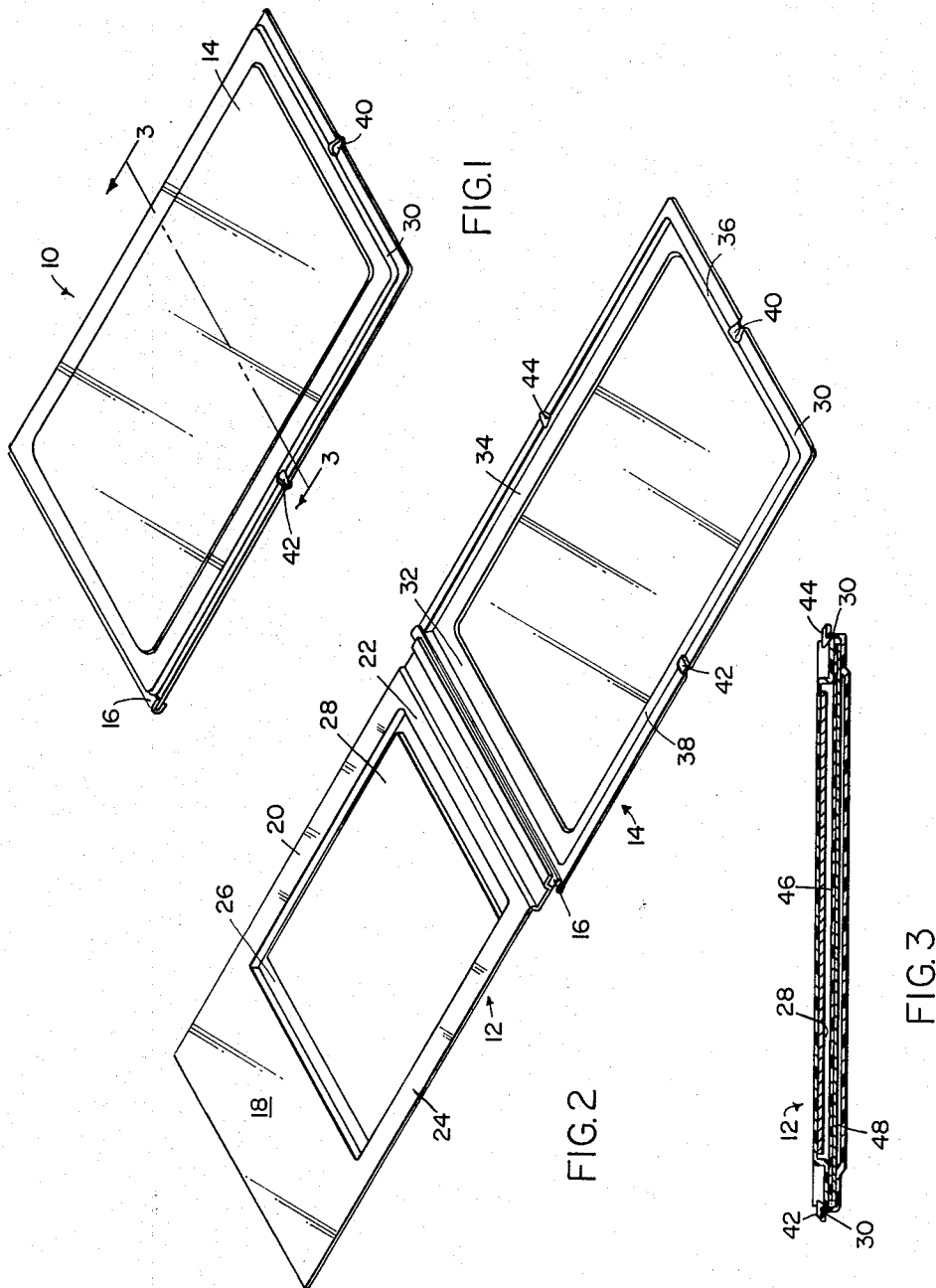
W. R. BUCKLEY ETAL

3,147,688

PRODUCT FOR PROTECTING PHOTOGRAPHIC SHEET MATERIALS

Filed March 10, 1961

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

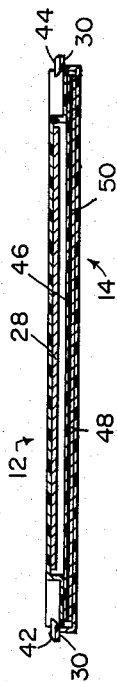


FIG. 5

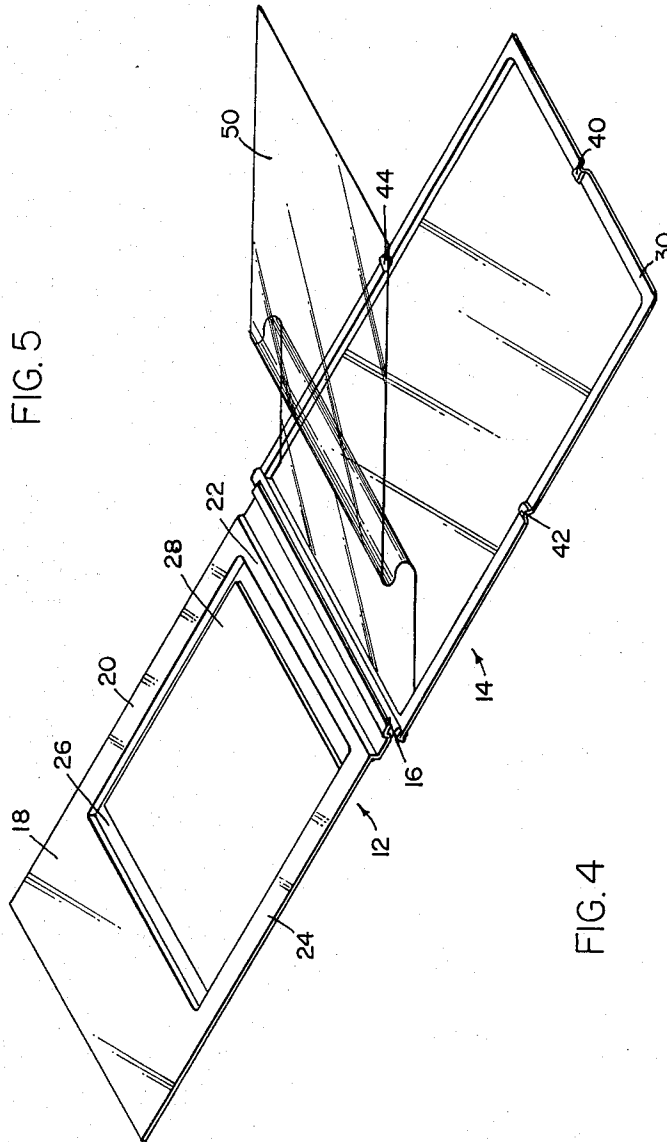


FIG. 4

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PRODUCT FOR PROTECTING PHOTOGRAPHIC SHEET MATERIALS

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2 Claims. (Cl. 95—100)

The present invention relates to photography and more specifically to methods and articles of manufacture useful in holding, drying and protecting photographic sheet materials which have been treated with a fluid processing composition.

A variety of forms of photographic products have been proposed wherein a photosensitive sheet is adapted to be exposed in conjunction with a camera or other appropriate exposure means and subsequently processed by a fluid-processing composition which is distributed between the photosensitive sheet and a second sheet superposed therewith. The second sheet may merely aid in the distribution of the processing liquid, but is preferably adapted to serve as a support for an image-receiving layer in which may be produced a positive print of an image formed in the photosensitive sheet by exposure. The photosensitive sheet preferably comprises a layer of photosensitive material, such as an emulsion of silver halide in a colloid stratum, disposed upon a suitable base or support such as paper, cellulose acetate or other materials commonly used for photosensitive material supports. Means are provided for maintaining the photosensitive and second sheets in superposed relation during treatment with the fluid processing composition for a predetermined period, at the expiration of which the sheets are separated. Examples of photographic materials suitable for use in such photographic processes are set forth in detail in Patents Nos. 2,543,181; 2,559,643; 2,614,926; 2,647,049 and 2,647,056, all issued to Edwin H. Land.

The latent image formed by exposure in the photosensitive material may be only partially developed by the action of the fluid-processing composition, a density magnification occurring in the image-receiving layer of the second sheet, or it may be fully developed, requiring no conventional fixing to remove unexposed silver halide. In the processes described in the above-mentioned patents where only partial development of the photosensitive material is accomplished, the positive transfer image is generally regarded as the end result and the photosensitive material is discarded after the sheets have been separated. However, as disclosed in the copending application of Edwin H. Land et al., Serial No. 94,451, filed March 9, 1961, the processed photosensitive material, when separated from the positive sheet at the end of the processing period, contains a fully developed and fixed negative which is essentially insensitive to further exposure to light. Hence, the negative may be a further desirable product of the process. The layer of fluid-processing composition remains adhered to the photosensitive sheet upon separation thereof from the second or positive sheet. In order to obtain full usefulness of the negative thus formed, the fluid-processing composition should be removed or dried before it hardens on the surface of the processed negative. Suitable methods of removing the processing fluid include washing in water and evaporation in a dry atmosphere.

It has also been previously proposed to provide positive prints thus formed with protective coatings by applying to said prints a thin layer of a liquid composition containing a protective material in solution or in suspension. The coating composition is designed to wash away any residue of reagents remaining on the print surface after processing

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is complete and to protect the silver comprising the photographic image from marring or scratching or from reaction with sulfides present in the atmosphere. Examples of suitable materials for protectively coating such photographic prints are disclosed in U.S. Patents Nos. 2,719,791; 2,830,900; and 2,866,705, all issued to Edwin H. Land et al. Although this approach is essentially satisfactory, occasions may arise where it is inconvenient to apply the protective coating immediately after processing, or to protect the exposed tacky surface of the print while the applied coating dries.

Thus, at the end of the processing period, the operator may have as an end result of the process a positive photographic print to which a protective coating should be applied to extend the life of the image. Alternatively, he may have a fixed photographic negative to which is adhered a layer of fluid-processing composition which should be removed or dried in order to obtain maximum usefulness of the negative. According to the process of the above-cited application Serial No. 94,451, the operator may be provided with both a fully developed and fixed negative, and a positive transfer image. In the latter case, the positive print may be protectively coated to impart permanence, or it may be used in the uncoated condition as a "proof" and to identify easily the associated negative.

It is a principal object of the present invention to provide novel methods and means of holding, protecting and/or drying recently processed photographic sheet materials.

A further object of the present invention is to provide a simple and efficient method for protecting and drying photographic sheet materials, with special application to such sheet materials shortly after being processed according to the well-known "diffusion transfer" method.

It is a further object to provide simple, inexpensive means for protecting the surface of photographic sheet materials which have been treated with a fluid-processing composition, said means including a drying agent for absorption of said fluid processing-composition from the photographic sheet whereon it is retained after processing is completed.

Another object is the provision of means for holding a fully developed photographic negative and an associated positive print formed from said negative by the action of a fluid-processing composition, said means affording protection to the processed surfaces and aiding in drying the processing composition.

Still another object is the provision of means for holding recently processed photographic sheet materials which extends the time for which said materials may be kept before further operations are performed thereon.

A still further object is to provide means for temporarily mounting or storing a photographic print to which a protective coating has been applied to prevent contact with the coated surface during drying of the coating.

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

The invention accordingly comprises the several steps and the relation and order of one or more of such steps with respect to each of the others, and the product possessing the features, properties, and relation of elements which will be 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 drawings wherein:

FIGURE 1 is a perspective view of a preferred embodiment of a holder comprising the present invention shown in the closed position;

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FIG. 2 is a perspective view of the holder of FIG. 1 shown in the open position;

FIG. 3 is a cross section on the line 3—3 of FIG. 1, showing photographic sheet materials contained by the holder;

FIG. 4 is a perspective view of an alternate embodiment of the holder; and

FIG. 5 is a cross section, similar to FIG. 3, of the holder shown in FIG. 4.

The present invention is directed to a protective compartment or holder, indicated generally by 10, comprising a first section 12 and a second section 14 pivotally attached by any appropriate hinge means, such as flexible strip 16. Holder 10 may be formed of any suitable sheet material, such as paper, plastics, metal or the like, preferably having a slight resiliency. The invention also contemplates the use of first and second sections formed of a single piece of sheet material, the hinge means being merely a fold or crease between the sections.

First section 12 comprises a generally rectangular sheet conforming to or larger than the photographic sheet to be retained by holder 10. A centrally-disposed portion of first section 12, conforming to or larger than the processed portion of the photographic sheet, is depressed to form a shallow cavity or recess bounded on four sides by inner surfaces 18, 20, 22 and 24. Fixedly attached, by a suitable adhesive or other known retaining means, to the inner surface 26 of the recess, is drying sheet 28, comprising a sheet of porous material, such as paper, fabric or the like, preferably containing a drying agent. Any conventional desiccant which remains chemically stable while absorbing and giving off moisture is suitable for use as the drying agent, typical examples being calcium chloride and cobaltous chloride. Drying sheet 28 may be prepared for example by soaking a porous material in a solution containing the desiccant and drying in an oven.

Second section 14 comprises a generally rectangular sheet, conforming to or larger than first section 12, bounded on four sides by raised flange 30. As seen in FIGS. 1 and 2, second section 14 also contains a centrally-disposed shallow recess, conforming to or larger than the processed portion of the photographic sheet, bounded on four sides by inner surfaces 32, 34, 36 and 38. When in the closed position, first section 12 fits within raised flange 30 of second section 14 (FIG. 1) being held in place by appropriate retaining means such as lip 40. Additional retaining means such as lips 42 and 44 may also be provided. Lips 40, 42 and 44 may be formed integrally with raised flange 30, projecting inwardly a short distance over the edges of first section 12 when holder 10 is in the closed position, being releasable merely by pressing on raised flange 30 due to the resiliency of the material of holder 10. Other previously known latches or clips may also be used for releasably retaining holder 10 in the closed position.

When in the closed position, holder 10 is adapted to contain photographic sheet materials which have been recently processed by a fluid-processing composition. As best seen in FIG. 3, negative sheet 46 is held with the treated surface, to which the processing fluid adheres when the sheets are separated, facing drying sheet 28 of first section 12. Second sheet or positive 48 is held with the image layer facing second section 14. Thus, the two sheets are held in back-to-back relationship, marginal portions thereof being retained between surfaces 18, 20, 22 and 24 of first section 12 and surfaces 32, 34, 36 and 38 of section 14. The processed portions of each sheet are adjacent the recesses of first section 12 and second section 14, thereby protecting them from contact with other surfaces or materials. The fluid-processing composition on the surface of negative 46 is absorbed by the desiccant in drier sheet 28.

The more protection from the atmosphere is given photographic sheet materials processed in the previously

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described manner, the longer they may be kept before subsequent operations, such as washing and hardening the negative and applying a protective coating to the positive, are performed thereon. First and second sections 12 and 14 should therefore mate as closely as possible in the areas bounding the recesses to afford maximum protection to the processed surfaces of the photographic sheets. It may also be desirable to provide means for separating the two sheets within holder 10. For this purpose, flap 50, (FIG. 4) substantially equal in size to first section 12, may be included to be placed between negative 46 and positive 48 within holder 10. Flap 50 may be secured by any appropriate means to holder 10 and preferably comprises a flexible sheet of moisture-impervious material such as polyethylene. Other means, such as a moisture-impervious bag into which positive sheet 48 could be inserted, could be provided within holder 10 as an alternate to flap 50. Also, it will be noted that there is no recess in second section 14 of the embodiment shown in FIGS. 4 and 5. As previously mentioned, it may be desired to use positive 48 merely as a proof, taking no additional steps to preserve the image. If such a print is enclosed by holder 10, the image will be given more protection by being in contact with the inner surface of second section 14, separated from negative 46 by flap 50. Second section 14 may be made of a transparent material, as shown, positive 48 serving also to identify the associated negative 46. If a protective coating is applied to positive 48 before insertion in holder 10, of course, the recess in second section 14 is preferable.

If drying sheet 28 is substantially equal in size to the processed area of negative 46 and contains a sufficient amount of desiccant, for example, .2 gram of calcium chloride per square inch of processed surface, it has been found that several negatives, processed according to techniques described in the above-cited patents and application, may be dried by a single drying sheet. When the drying sheet has become saturated, it may be regenerated by removing the moisture in a dry atmosphere, such as an oven or desiccator jar, or by placing a stronger desiccant in contact with drying sheet 28. In this manner, the same drying sheet may be reused after it has become saturated, or, if desired, it may be replaced by a fresh drying sheet. It is desirable that at least a portion of the drying agent in drying sheet 28 be a desiccant which changes in color as it becomes saturated, such as cobaltous chloride, thus giving a visible indication of the relative moisture content of drying sheet 28.

The invention also contemplates the use of materials for first section 12 which may be treated in the area of surface 26 with a desiccant, thus obviating the need for an additional element such as drying sheet 28. Means such as a moisture-impervious coating on the exterior of holder 10 would be provided to prevent saturation of the desiccant by moisture in the air.

In addition to providing compact, readily available means for holding and storing photographic sheet materials processed in the field, holder 10 offers the advantage of removing excess processing fluid from the surface of the sheet whereon it is retained after processing. Also, since excess moisture is removed and the surfaces of the sheets are protected, the length of time for which the sheet materials may be kept without further treatment, such as removal of processing fluid, hardening of the emulsion, treatment with protective coatings, etc., is thus greatly extended.

Since certain changes may be made in the above process and 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 drawings shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. A protective holder for a pair of photographic

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sheet materials which have been treated with a fluid processing composition which adheres to a central area of one of said sheets, said holder comprising, in combination:

(a) a substantially flat, rectangular first section having a first planar surface with an external periphery co-extensive with that of said first section; 5

(b) a substantially flat, rectangular second section having a second planar surface and hingedly connected to said first section and movable between open and closed positions with respect thereto; 10

(c) means for releasably securing said first and second sections in said closed position with said first and second surfaces in substantially continuous contact; 15

(d) a rectangular, centrally disposed recess in said first section bounded by the internal periphery of said first surface; 20

(e) a flexible sheet of moisture-impervious material attached to said holder and having marginal portions which are engaged between said first and second surfaces when said holder is in said closed position, whereby said flexible sheet lies in a plane with one surface toward said recess;

(f) a chemically stable drying agent;

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(g) a porous sheet containing said drying agent and secured to said first section within said recess; and

(h) said porous sheet being of substantially the same length and width as said recess and having a flat surface facing said one surface of said flexible sheet and spaced a short distance therefrom relative to the length and width of said holder.

2. The invention according to claim 1 wherein said second section also includes a centrally disposed second recess bounded by the internal periphery of said second surface.

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