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2,797,804

LIGHT AND MOISTUREPROOF PROTECTION FOR ROLLS
OF LIGHT-SENSITIVE PHOTOGRAPHIC MATERIAL

Filed Jan. 27, 1955

2 Sheets-Sheet 1

FIG. 1.

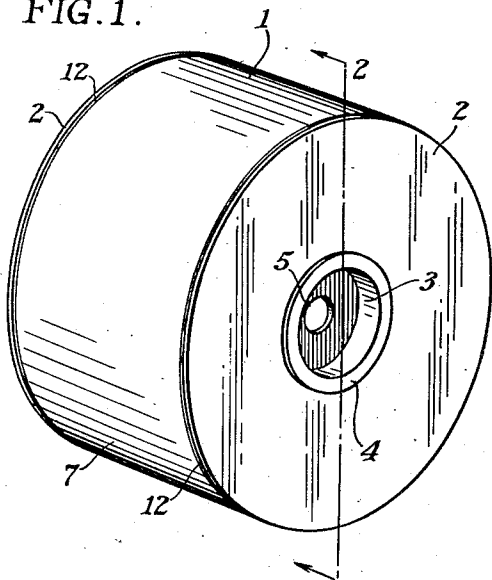


FIG. 2.

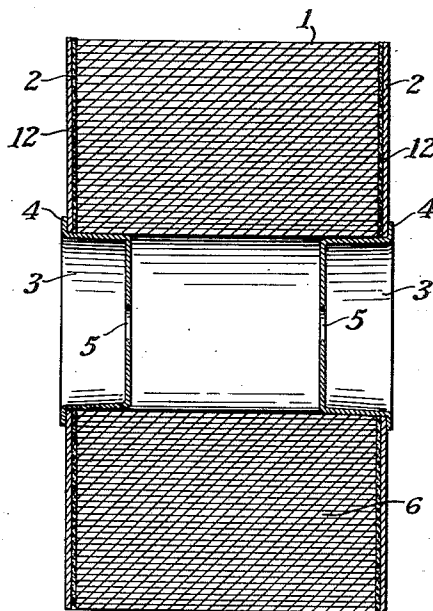


FIG. 4.

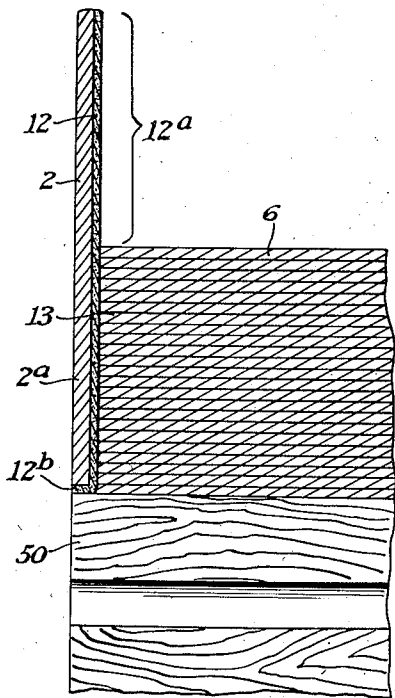
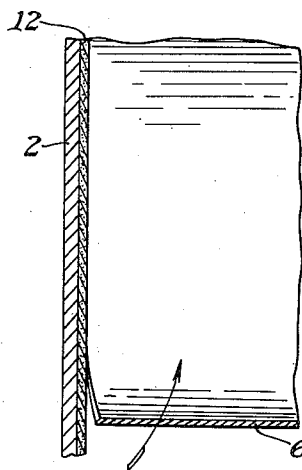


FIG. 3.



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FIG. 5.

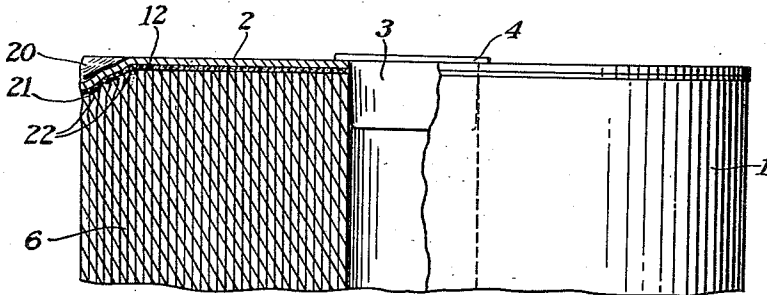


FIG. 6.

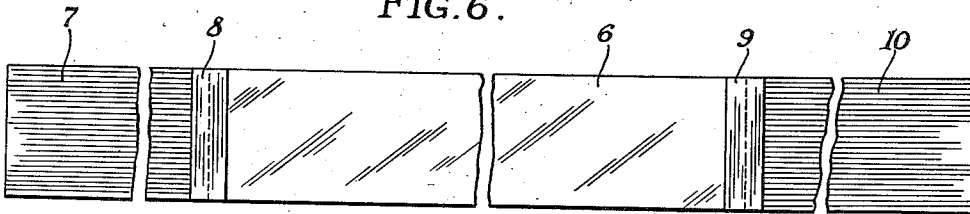


FIG. 7.

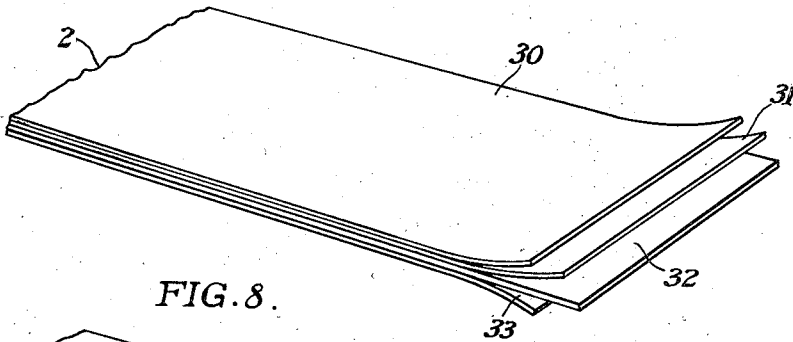
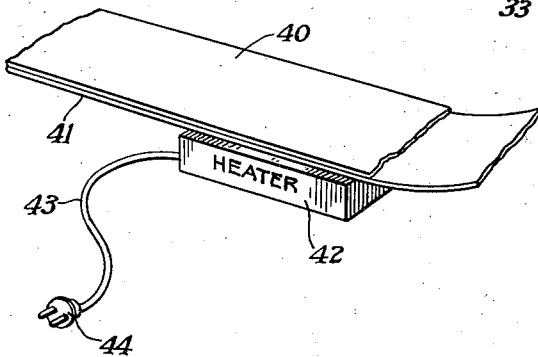


FIG. 8.



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LIGHT- AND MOISTUREPROOF PROTECTION FOR ROLLS OF LIGHT-SENSITIVE PHOTOGRAPHIC MATERIAL

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Application January 27, 1955, Serial No. 484,366

1 Claim. (Cl. 206—59)

This invention relates to the packaging of light-sensitive photographic material such as light-sensitive paper and light-sensitive film.

In the past rolls of light-sensitive material have generally been mounted on hub members having flanges so that the light-sensitive material may be wound upon these spools or spool-like members to protect the edges of the sensitive material against light. It has been customary to provide leader strips and sometimes trailer strips of lightproof material to protect the ends of the roll of sensitized material against light. In some instances the leader strips and trailer strips have been made moisture resistant or moistureproof but ordinarily such packages have not been very satisfactory because moisture and/or light could usually enter between the flanges and the end convolutions of the sensitized material and thus become more or less fogged or spoiled by moisture. Even if the paper fitted snugly between the flanges when packed, expansion and contraction sometimes occurs and fogging may occur in use. It has been proposed to package such coils of light-sensitive material in packages which pass completely around and enclose the spools and coils, and to waterproof such a package either by using waterproof material alone or by spraying with waterproof varnish or the like. While this may greatly improve the package before it is opened, it is not effective if a limited amount of sensitized material is drawn from a roll and the roll has to be taken out in a light room since the waterproof package above described must be torn apart to utilize the material.

Any type of package embodying spools with metal flanges has a disadvantage in that in shipping or through other causes the flanges may become bent, marred, dented or distorted and if this occurs and the flanges are bent inwardly, as is usually the case, the edges of the paper convolution are marred. If the paper is withdrawn from such a reel, the bent flange damages each convolution of the paper as it unwinds from the reel. Since small deformation of the flanges may occur unnoticed, sometimes a considerable amount of damaged material may be used before noticing the defects.

It is an object of this invention to overcome some of these difficulties. One object of our invention is to provide a very inexpensive, durable package of light-sensitive material which is at least substantially moistureproof and which offers good light protection. Another object of our invention is to provide a package so arranged that if the periphery of the roll of light-sensitive material is dented or damaged, the damaged portion may be unrolled and the remainder utilized without further damaging the edges of the roll. Another object of our invention is to provide a roll in which each convolution of the light-sensitive material is adequately protected against light leak. A still further object of our invention is to provide a roll of light-sensitive material which can be partially used, removed in daylight and reused with a loss of only a few outer convolutions of paper which may be light

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struck by light passing through the paper itself. A further object is to provide a moisture and light seal for the end convolutions of a coil of paper which may expand and contract with the paper and still remain in light-tight and moisture-tight relation thereto. A still further object of our invention is to provide a roll of light-sensitive material which is not readily damaged and other objects will appear from the following specification, the novel features being particularly pointed out in the claims at the end thereof.

In the drawings, wherein like reference characters denote like parts throughout:

Fig. 1 is a perspective view of a preferred form of our improved light-sensitive package;

Fig. 2 is a section taken on line 2—2 of Fig. 1;

Fig. 3 is an enlarged fragmentary section shown partially in elevation indicating the lightproofing arrangement for the edges of the roll of light-sensitive material;

Fig. 4 is a similar enlarged section showing a different form of invention from that in the preceding figures;

Fig. 5 is a part section, part elevation of a coil of photographic sensitive material which has been damaged;

Fig. 6 is a schematic, top plan view of an unrolled piece of sensitized material with leader and trailer strips attached;

Fig. 7 is a view of a desirable type of material which may be used to form a seal between the end convolutions and an end covering member for the coiled sensitized roll of material; and

Fig. 8 is a view of another type of material which may be used for the same purpose.

In all the views the scale is exaggerated to better illustrate the invention.

Our invention comprises providing a roll of sensitized material wound on a hub, this material preferably having the ends of the coil covered by light and moistureproof material which is temporarily adhered to the coils of the ends of the roll. There are a number of materials which are suitable for this purpose such as, for instance, a laminated wrapping which consists of paper, foil and thermoplastic material. Such material may include a pressure-sensitive material which is affected by heat or solvent so that it may firmly adhere to the ends of the convolutions. This material, if of the heat and pressure-sensitive type, may be made in the form of disks or doughnut-shaped portions which are pressed directly against the ends of the rolls. These rolls can then be unwound and the paper will peel away from the adhesive contact with the paper disks and the roll may be removed in daylight, fogging only the outer few convolutions of paper since the remainder of the end convolutions of the roll will be adequately protected from light and moisture by the adhering laminated disks. The expansion and/or contraction of the paper will not destroy the seal between the disks and the end convolutions since the two are adhered up to the time of use.

More specifically, as indicated in Fig. 1, a suitable package may comprise a roll of material 1 mounted between two cover members or disks 2 of light and moistureproof material which are caused to adhere to the end convolutions of the material 1. The inside of the coil may be supported by a known type of support, such as a cup-shaped member 3, two of these being provided, one at each end. These may have the usual flanges 4 (or the flanges may be omitted) and openings 5 by which they are supported in the photographing machines. If desired, the sensitized strip 6 may, as shown in Fig. 6, have a light and moistureproof leader strip 7 attached, as by a paster 8, and a similar paster 9 may be used for a trailer strip 10 although these trailer strips are very seldom used in packages of the preferred type.

The cover members 2 are preferably laminated disks, as indicated in Fig. 3, and may include an inner layer 12 which may be a heat and pressure-sensitive material or it may be an adhesive which can be softened with a solvent or it may be one of the types of materials which can be preheated and which will retain its tackiness for some time after heating so that it may be applied to the end convolutions 13 of the strip of sensitized material 6, as shown in Fig. 4. When such a package is used, the sensitized strip 6 may be pulled from the adhesive 12 without difficulty, peeling the paper from the adhesive without marring the edges, but at the same time this tight connection between the adhesive and the ends 13 of the sensitized strip will definitely prevent light from entering between the edges of the paper and the adhesive 12. The disks 2 are preferably quite thin and flexible and, consequently, can readily be pressed into intimate contact with the ends of the core of sensitive paper. Thus the flexibility is a desirable feature because any small inaccuracies in the location of different convolutions can be readily taken care of when the light and moistureproof adhesive is pressed against the ends of the roll of sensitized material.

With such a package, if the package is dropped or dented in shipment or otherwise, as indicated in Fig. 5 there may be an imperfection 20 where the flexible end protecting member 2 is dented and where a number of convolutions of a sensitized material 6 may also be marred, as shown at 21. In such a case, by unwinding the marred portions of the paper 6 through the convolutions 22 the remainder of the sensitized material may be readily used without damage since the flexible end covering members 2, even though distorted by being mashed inwardly, will straighten out as the sensitized material is unwound to remove the damaged portion. The end protecting members 2 do not have sufficient rigidity to damage the remaining portion of the sensitized material which can then be readily used in the normal manner.

It is also noted that if a quantity of the roll of sensitized material is used, the remaining portion is not materially damaged by removing the roll in a light room since the edges of the sensitized material always remain attached to the adhesive 12 in such a way that they will be held against unwinding or clock springing and, in addition, in such a way that the ends are perfectly sealed against the entrance of light. The little paper fogged by light passing through the paper itself can be readily unwound when the roll is again used.

Fig. 7 shows one of the preferred types of material which may be used for the end protecting cover members 2. Thus an outer sheet 30 of paper may be laminated to a layer such as polyethylene 31 and this layer in turn may be laminated to a layer of foil 32. This layer 32 includes on the opposite side a second layer such as polyethylene 33, which under heat and pressure will adhere to each of the convolutions of sensitized material 6 when pressed thereagainst.

Fig. 8 shows another example of a laminated protective sheet which may consist of several laminations and which includes a substantially water and lightproof layer 40 to which there is a layer of adhesive 41 of the type which becomes soft and tacky under heat and which will remain tacky for a sufficient time for it to be placed in position on the ends of the convolutions of sensitized material 6. This has the advantage that when dealing with sensitized material, the heat can be so controlled that it will not desensitize the emulsion as may occur if too much heat is used with an ordinary heat and pressure type of adhesive. A typical example of an adhesive composition suitable for this type of sealing is described in U. S. Patent 2,462,029, Nashua Gummed and Coated Paper Company, granted February 15, 1949. The laminated material may be drawn over a heater 42 which

may include a conductor 43 and plug 44 all as diagrammatically shown in Fig. 8.

There are still other types of suitable materials which are light-tight and moistureproof and which have a layer which becomes adhesive upon the application of a solvent. Since some solvents do not damage a sensitive emulsion, such materials are quite suitable for use. A typical example of a suitable adhesive is cellulose acetate butyrate containing 38% butyryl groups dissolved in a solvent or thinner of 48% toluene, 24% acetone, 20% denatured ethyl alcohol, 8% #1 naphtha. No plasticizer is required and solvent level is not critical.

In this specification and in the claims where sensitized strip material is referred to, it is to be understood that it covers a sensitized layer on any suitable flexible base such as paper or film which can readily be rolled into a coil for shipment and use. It is, however, particularly adapted for use in a coil of sensitized paper used in photographic copying machines, particularly where the width of the coil may be of considerable dimensions, such as from one to four or five feet wide, because in such instances the package is quite a heavy one and there is no possibility of some of the layers slipping laterally relative to others. However, the dimensions are unimportant since this can also be successfully used in comparatively narrow widths of film and paper sensitized strips.

It may be noted from Fig. 4 that the sensitized material 6 may be wound on a wooden or plastic core 50 which has no flanges corresponding to the flanges 4 of the cup-shaped members of Fig. 1. Such cores are quite satisfactory and the protective disks 2a may readily be used on this type of package, as indicated in Fig. 4. If desired, the bottom portion 12b of the adhesive layer 12 may be turned under so as to adhere to the core 50 but this is not necessary as the layer of adhesive 12 only needs to come down against the edge of the hub 50 to form a satisfactory light-tight and a relatively moisture-proof joint. If an amount of the sensitized material 6 has been drawn off the reel as shown in Fig. 4, the upper portion of the material 12a may be torn off or folded over the outer convolution left on the roll if it has to be removed in daylight. Even if it is torn off, the light will only penetrate a few of the outer convolutions so that a material amount of the sensitized material will remain in good condition for future use.

While we have described a preferred embodiment of our invention which is well adapted for use on existing machines utilizing sensitized material and an embodiment which will form a quite efficient light-tight and moisture-proof package, it is obvious that various changes will suggest themselves to those skilled in the art. We consider as within the scope of our invention all such forms as come within the scope of the appended claim.

We claim:

A package including a coil of strip material having a light-sensitive coating thereon comprising a supporting hub on which the convolutions of strip material are wound with an edge of the strip material lying in convolutions of gradually increasing size, a cover for the edge convolutions of the strip material including a flexible member opaque to light affecting the light-sensitive surface of the strip material and an adhesive and moistureproof layer between and contacting both the flexible member and the edge convolutions and causing adherence therebetween to prevent the passage of light and moisture therebetween, said convolutions being strippable from the adhesive and moistureproof layer as the strip material is unwound from the supporting hub.

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