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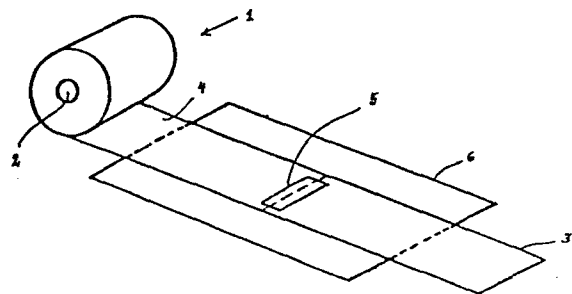
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54 **Light-tight roll package.**

57 This invention relates to the packaging of rolls of light-sensitive material, e.g. strips of photographic film or paper, for roomlight loading into a camera or other apparatus in which the material is to be exposed.

The packaging comprises opaque material which protects the rolled material from light while leaving a leader of the rolled material exposed and which can be torn by pulling on such leader to cause the light-sensitive material to commence unwinding from the roll. A piece of heat-shrunk sheet material extends from between the outermost pair of convolutions in the roll and around the outer periphery of the roll and also extends over the opposed radial end faces of the roll, said piece having been heat-shrunk in situ so that it light-tightly seals the enclosed light-sensitive material.



This invention relates to the packaging of rolls of light-sensitive material e.g. strips of photographic film or paper for roomlight loading into a camera or other apparatus in which the material is to be exposed.

Such rolls are often packaged in light-tight lidded containers from which the roll must be removed preparatory to loading it into the exposure apparatus and there is a risk of the material being spoiled by environmental light unless this loading is carried out under safelight conditions.

In order to avoid such spoiling risks, proposals have been made to envelop end portions of each roll by opaque end covers which are adhered to the ends of the roll or to the ends of a core on which the light-sensitive material is wound and which can be torn by pulling on a leader of the rolled material after loading the packaged roll into the exposure apparatus. Such packages are described in, e.g., United States Patent 4 148 395 and Research Disclosure, May 1983, page 190.

The known tearable packages have disadvantages from the production standpoint. It is desirable to avoid sticking the end covers to the edges of the rolled light-sensitive material and for that to be possible the end covers have to be stuck to the ends of the roll core and to have rims which are folded over and secured to the outer surface of the roll. The adhesion of the covers to the roll and its core are critical for ensuring the light-tightness of the package. And there is a risk of the covers becoming adhered to the edges of at least the innermost convolution of the light-sensitive material. The packaging operation is complicated by the adhesion requirements and the need to assemble different packaging components to the roll.

It is an object of the present invention to provide a more convenient and economical package and packaging method.

According to the present invention there is provided a packaged roll of light-sensitive material, the packaging comprising opaque material which protects the rolled material from light while leaving a leader of the rolled material exposed and which can be torn by pulling on such leader to cause the light-sensitive material to commence unwinding from the roll, characterised in that the packaging comprises a piece of heat-shrunk sheet material which extends from between the outermost pair of convolutions in the roll and around the outer periphery of the roll

and also extends over the opposed radial end faces of the roll, said piece having been heat-shrunk in situ so that it light-tightly seals the enclosed light-sensitive material.

Such a package can be produced easily and cheaply. All that is required for the packaging operation is a single piece of heat-shrinkable material which is opaque to actinic radiation. And no adhesive is required. It suffices to sandwich a marginal portion of the piece of packaging material between the outermost pair of convolutions in the roll, wrap the remainder of such piece around the roll without however totally enclosing the leader, and then heat shrink the resulting packaging tube.

The invention includes a method of light-tightly packaging a roll of light-sensitive strip material so that a leader of the rolled light-sensitive material is exposed, the packaging material being tearable by pulling on such leader to start unwinding of material from the roll, which method comprises sandwiching a medial part of one end portion of a piece of heat-shrinkable sheet material between the outermost pair of convolutions in the roll, wrapping the remainder of the length of such piece around the periphery of the roll to form an enclosing tube from which a leader of the roll projects, and heat-shrinking such tube and thereby causing its projecting end portions to collapse inwardly against the radial end faces of the roll.

The leader of the rolled material is preferably an integral portion of the rolled light-sensitive material, but it can be formed by a piece of some other material which has been attached to the outer end of that rolled material.

An embodiment of the present invention, selected by way of example, is illustrated in the accompanying diagrammatic drawings, wherein :

Fig. 1 represents the first stage in the formation of a package according to the invention;

Fig. 2 shows the roll of light-sensitive material after being wrapped around by the packaging material preparatory to the heat-shrinking of this material; and

Fig. 3 shows the finished package.

The roll 1 comprises light-sensitive strip material wound onto a core 2. A piece 3 of non-light-sensitive material for forming a leader is attached to the outer end of the light-sensitive strip 4 by a piece of

GV.1328

adhesive tape 5. A sheet 6 of opaque heat-shrinkable material is positioned under the outer end portion of the strip 4 and an adjacent part of the leader piece 3 as shown by Fig. 1. The length of the sheet 6, i.e. its dimension measured parallel with the longitudinal edges of the light-sensitive strip, and its positioning in relation to the end portion of that strip which projects from the roll, are such that when that projecting strip portion and the sheet 6 are now wound onto the roll, the part of the sheet 7 which will then project from between the outer pair of convolutions of the light-sensitive material is of sufficient length completely to encircle the roll as shown in Fig. 2. The packaging sheet thus forms a tube from which a part of the leader piece 3 projects. The width of the packaging sheet 6 is sufficiently in excess of the width of the light-sensitive strip 4 to ensure that the end portions 7,8 of this tube which project from the ends of the roll will completely cover the ends of the roll of light-sensitive material when those end portions are caused to collapse inwardly against the roll. This collapse is caused by heat-shrinking the packaging sheet. In this actual embodiment the extent to which the tube ends project from the ends of the roll is such that following the heat-shrinking operation the said end portions 7,8 also extend over the ends of the core 2. If it is necessary for the core ends to be exposed, for example if they are formed to co-operate with a winder key or the like, the portions of the sheet which actually cover those core ends are then cut away, taking care not to impair the light-tight coverage of the ends of the roll itself.

The parameters governing the heat-shrinking operation are preferably such as to achieve a uniform shrinking of the sheet 6. It is preferred to subject the wrapping tube as a whole to a uniform heat treatment to cause its shrinkage though it is possible to achieve the light-tight enclosure of the roll by selectively heating the end regions of the tube.

The heat shrinking, and the subsequent removal (if necessary) of packaging material from against the ends of the core completes the essential packaging steps. In the illustrated embodiment, a strip of adhesive tape 9 is secured onto the margin of the packaging sheet from which the leader piece 3 projects, and onto an adjacent portion of the leader piece itself. This strip acts as a reinforcement to prevent premature tearing of the packaging sheet at this region during handling of the roll. The strip is peeled away before inserting the packaged film

GV.1328

into an exposure apparatus. The strip 9 can be secured in position before or after the heat-shrinking operation.

When it is required to start withdrawing material from the roll it is merely necessary to exert on the leader, while restraining the roll against accompanying bodily movement, a pull force sufficient to cause the packaging sheet to tear. This can be done for example when the packaged roll has been installed with its leader projecting through the exit slot of a cassette. It is of course essential for the leader to be more resistant to tearing than the packaging sheet itself. The packaging becomes preferentially torn along the junctions between its tubular part and its marginal portions which cover the ends of the roll. At those junctions there will generally be, in consequence of the heat-shrinking operation, a change in the thickness of the packaging material, its thickness being greater in the regions covering the ends of the roll than in the tubular part encircling the periphery of the roll.

It is not necessary for the roll of light-sensitive material to be wound onto a core.

When packaging a coreless roll or a roll wound onto an open-ended core component, the heat-shrunk packaging material can extend over the ends of the central passage defined by the wound material or by such core component or can even become deformed into the ends of such passage and thereby more effectively shield the light-sensitive material from any light which might otherwise reach it via such passage.

Suitable heat-shrinkable sheet materials for use in the present invention are e.g. low density polyethylene, high density polyethylene, linear low density polyethylene, polyvinylchloride, polypropylene, ethylvinylacetate and mixtures or copolymers thereof. These sheet materials can be made opaque to actinic radiation e.g. by incorporation of carbon black and can either be mono- or biaxially oriented.

The invention can be applied in the packaging of rolls of light-sensitive material of various kinds and for various purposes. Certain examples of uses for such rolls are referred to in the prior art references hereinbefore cited.

CLAIMS

1. A packaged roll of light-sensitive material, the packaging comprising opaque material which protects the rolled material from light while leaving a leader of the rolled material exposed and which can be torn by pulling on such leader to cause the light-sensitive material to commence unwinding from the roll, characterised in that the packaging comprises a piece of heat-shrunk sheet material which extends from between the outermost pair of convolutions in the roll and around the outer periphery of the roll and also extends over the opposed radial end faces of the roll, said piece having been heat-shrunk in situ so that it light-tightly seals the enclosed light-sensitive material.

2. A packaged roll according to claim 1, wherein the leader is formed by a piece of material which has been secured to the outer end portion of the rolled light-sensitive material.

3. A packaged roll according to claim 1 or 2, wherein the roll of light-sensitive material is coreless or has an open-ended core component and the said piece of heat-shrunk material also extends into the ends of the passageway defined by the rolled material or by such core component.

4. A method of light-tightly packaging a roll of light-sensitive strip material so that a leader of the rolled light-sensitive material is exposed, the packaging material being tearable by pulling on such leader to start unwinding of material from the roll, which method comprises sandwiching a medial part of one end portion of a piece of heat-shrinkable sheet material between the outermost pair of convolutions in the roll, wrapping the remainder of the length of such piece around the periphery of the roll to form an enclosing tube from which a leader of the roll projects, and heat-shrinking such tube and thereby causing its projecting end portions to collapse inwardly against the radial end faces of the roll.

5. A method according to claim 4, wherein the light-sensitive material is wound onto a core; the initial width of the piece of heat-shrinkable material, i.e. its dimension measured parallel with the length of the roll, is such that after the heat-shrinking operation the said piece extends over the ends of such core; and following that operation portions of the heat-shrunk material covering the ends of said core are cut away.

6. A method according to claim 4, wherein the light-sensitive

GV.1328

material is coreless or is wound onto an open-ended core component and wherein the initial width of the piece of heat-shrinkable material, i.e. its dimension measured parallel with the length of the roll, is such, and the heat-shrinking operation is so effected that that operation causes portions of the heat-shrunk material to enter the ends of the passage defined by the wound material or by said core component.

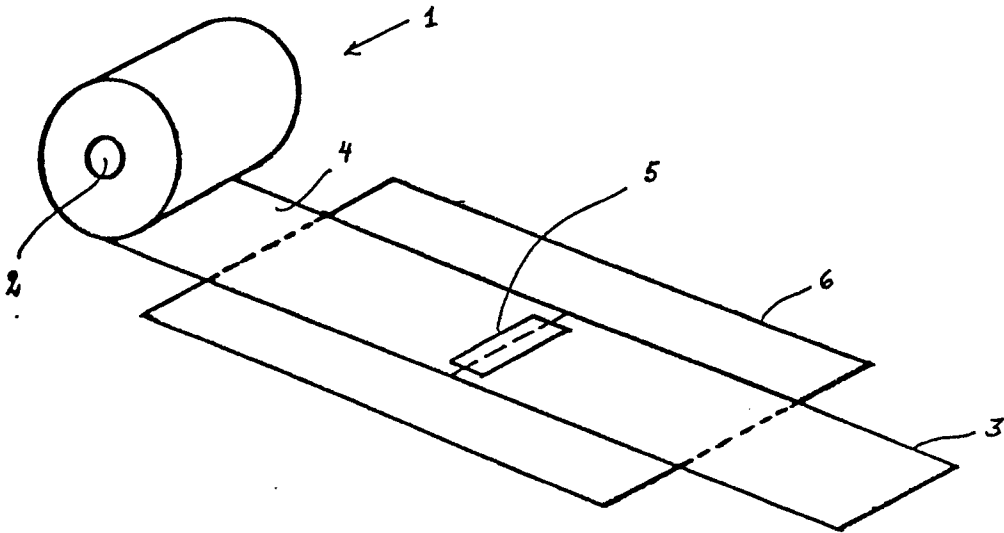


Fig. 1

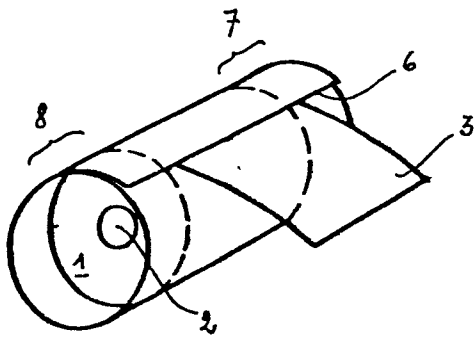


Fig. 2

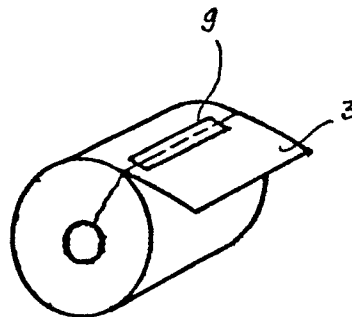


Fig. 3



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 4)
Y	US-A-3 458 033 (K. ARIYASU et al.) * Whole document *	1	G 03 C 3/00 B 65 D 75/00 B 65 D 65/16
Y,D	RESEARCH DISCLOSURE, no. 229, May 1983, page 190, disclosure no. 22932, Havant Hampshire, GB; "Roll package" * Whole document *	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl. 4)
			G 03 C 3/00 B 65 D 75/00 B 65 D 65/16
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 19-07-1985	Examiner RASSCHAERT A.
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
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