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Declarations under Rule 4.17:

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- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- of inventorship (Rule 4.17(iv))

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(54) Title: BOOK WITH PAGES BACKLIT BY A LED LIGHT CHAIN

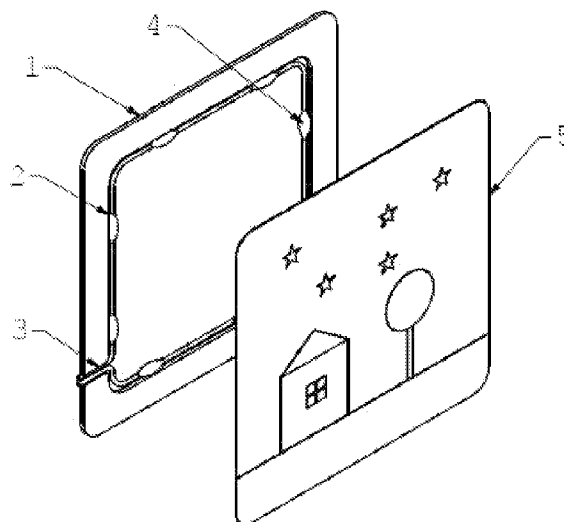


Fig. 1

(57) Abstract: A method is described for backlighting pages of a book, particularly children's illustrated book, by means of a LED light chain (4) which is wound in a cut-out (2) of a cardboard frame (1), thus backlighting the sheet (5), which is glued to the frame (1).



Book with pages backlit by a LED light chain

Field of the art

The invention relates to the specific backlighting of books, children's picture books in particular, but also books with text. For this purpose, the invention utilizes LED technology in its minimalistic form.

Prior art

Currently, there are a number of books on the book market utilizing LED technology for various lighting effects. With these solutions, LEDs are directly inserted into the page of a book at a specific location within the illustration, where they create a spot light effect. Similarly, optical fibers with end-beam are also utilized, where the emitting end of the fiber is used instead of the LEDs themselves. However, this does not allow illuminating more complex planar objects within the illustration. Moreover, it is impossible to illuminate blocks of text to make them comfortably readable even in the dark. The use of LEDs or optical fibers with end-beam emission is also technologically demanding, as the LEDs or the ends of the optical fibers must be placed and anchored in a precisely defined spot on each individual page of the book.

Summary of the invention

The aforementioned shortcomings are eliminated by backlighting pages of a book using LED light chain. The essence of this type of book backlighting lies in the insertion of a LED light chain into the cardboard frame of the books' page. This cardboard frame has an inner rectangle shaped recess with rounded edges. Through this

inner recess, a LED light chain winds around its edge, entering this space through a hole in the frame in the inner edge of the page towards the book-back. In this way, one LED light chain winds through all the pages of the book, with its end connected to a power source with battery or rechargeable battery power supply. However, an unspecified number of LED light chains can be used to achieve advanced color and lighting effects. Depending on the lighting effect we want to achieve, the LED light chain or chains can be single-colored, multi-colored, dimmable, automatically or manually changing their properties (brightness, color) and so forth. The power supply(s) are located in the back of the book.

A sheet of translucent material is glued to the cardboard frame and LED light chain. This sheet contains the content of a book, i.e. the text and/or illustrations. This content is printed via the appropriate printing process, with color and thickness of the printed layer, which allows achieving the desired final light effect. The translucent and printed sheet can be placed on both sides of the cardboard frame with LED light chain winding, as this frame is universal. Between the frame and the translucent sheet, a shielding layer made of material that does not transmit light from the LED light chain (e.g. metallic foil) can be inserted. This layer is provided with shaped cutouts of varying complexity, which correspond to the imprint on the translucent sheet. In this way, a special light effect is achieved, where only selected areas or selected parts of the illustration are lit.

This effect can be achieved even without a shading layer by making the inner cutout in the cardboard frame of the desired shape, corresponding to the imprint. By doing so, the frame loses its versatility, but under certain conditions, this design can be advantageous. It is possible to omit the cardboard frame completely and insert the LED light chain directly between the two shading layers with the translucent sheets glued on them. Another way to

employ this method of backlighting a book page is to cover a single cardboard frame containing LED light chain with several layers of translucent sheets. However, these must be of a highly translucent material, e.g. a film. With partial imprinting and overlaying these sheets, we can achieve complex patterns that are changed and unwrapped by flipping through the sheets. The book itself may utilize only one method of backlighting with LED light chain, or it may utilize a combination of these methods.

Overview of images in the drawings

The invention will be further explained with reference to the drawings, wherein Fig. 1 shows a cardboard frame with LED light chain, which overlay a translucent sheet with an illustration and together forms one backlit page of a book. Figure 2 shows a variant with a shading layer. Figure 3 shows a variant of a cardboard frame with contoured cutouts. Fig. 4 shows the variant without a cardboard frame. The invention is shown in these figures in a disassembled form. Fig. 5 is a variant with a single cardboard frame with LED light chain and multiple transparent sheets.

Examples of the invention embodiments

The product in Fig. 1 is composed of a cardboard frame 1 in which there is a rectangular cutout 2. Through the opening 3 the LED light chain 4 is fed into the cutout in the cardboard frame 1. Through the same opening 3 the LED light chain 4 also leaves the frame 1. A translucent sheet 5 with text and/or illustration is glued to the frame 1. The completed assembly forms one separate backlit page of the book. In the Fig. 2, a shading layer 6 is additionally inserted between the frame 1 and the translucent sheet 5. The Fig. 3 shows a variant where the LED light chain 4 is wound

in a cardboard frame 1 with a shaped cutout 7. In the Fig. 4, the LED light chain 4 is inserted between two shading layers 6 with glued backlighting sheets 5. A book consisting of a single page 5, backlit by LED light chain 4, which backlights the page 5 and several pages of easy translucent material 8 is shown in the Fig. 5.

Industrial applicability

The product utilizing the invention may be used to backlight books, which may then be read even in the dark, without the use of an additional light source. Together with a sophisticated and complex design, this invention can be used to enhance the attractiveness of illustrated books by using a variety of lighting effects.

CLAIMS

1. Backlighting of page in a book that features at least one LED light chain (4) powered by any electrical source.
2. Backlighting of a page in a book according to the claim 1, that features the LED light chain (4) which is wound in an inner recess (2) of the cardboard frame (1) having a non-specific shape, usually a rectangle, and on this frame a sheet of translucent material (5) containing the text of the book and/or an illustration glued on one or both sides.
3. Backlighting of a page in a book according to the claim 1, that features the LED light chain (4) which is wound in an inner recess (2) of the cardboard frame (1), having a shape corresponding to the illustration in a sheet of translucent material (5) containing the text of the book and/or the illustration in question, and this sheet glued to the frame (1) on one or both sides.
4. Backlighting of a page in a book according to the claims 2 or 3, that features a shading layer of non-transparent material (6) placed between the cardboard frame (1) and the sheet of translucent material (5), on which cut-outs corresponding to the illustration on the sheet (5) are made.
5. Backlighting of a page in a book according to the claim 1 features the LED light chain (4) positioned between two shading layers (6), wherein at least one of the recesses corresponds to an illustration in a sheet of translucent material (5) which is adhered to at least one shielding layer (6).

6. Backlighting of a page in a book according to the claim 2 or 3 or 4 or 5, that features at least one additional sheet of translucent material (8) that is added to one or both sides of the book with the sheet (5) glued to it, which can be removed or turned over as a page in a book, thus compose various complex patterns.

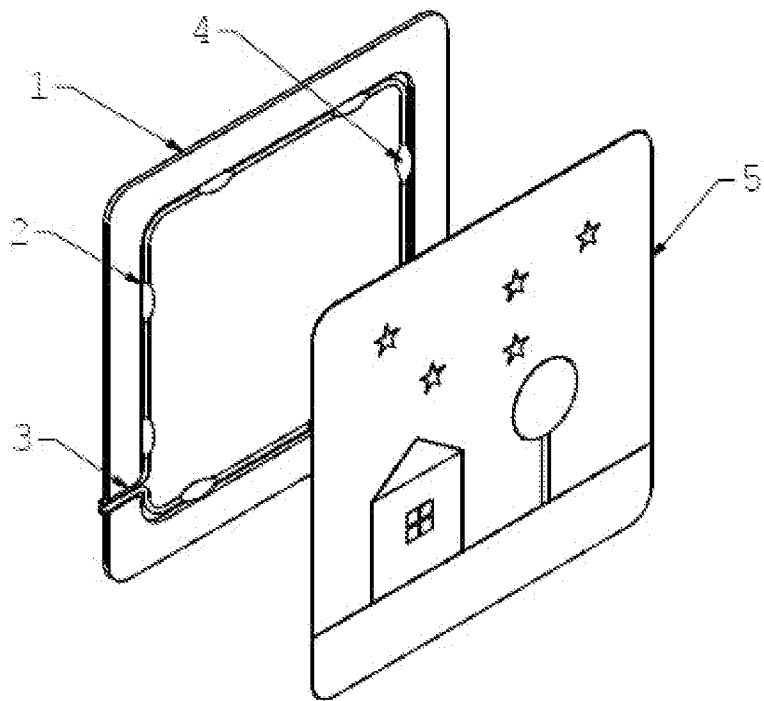


Fig. 1

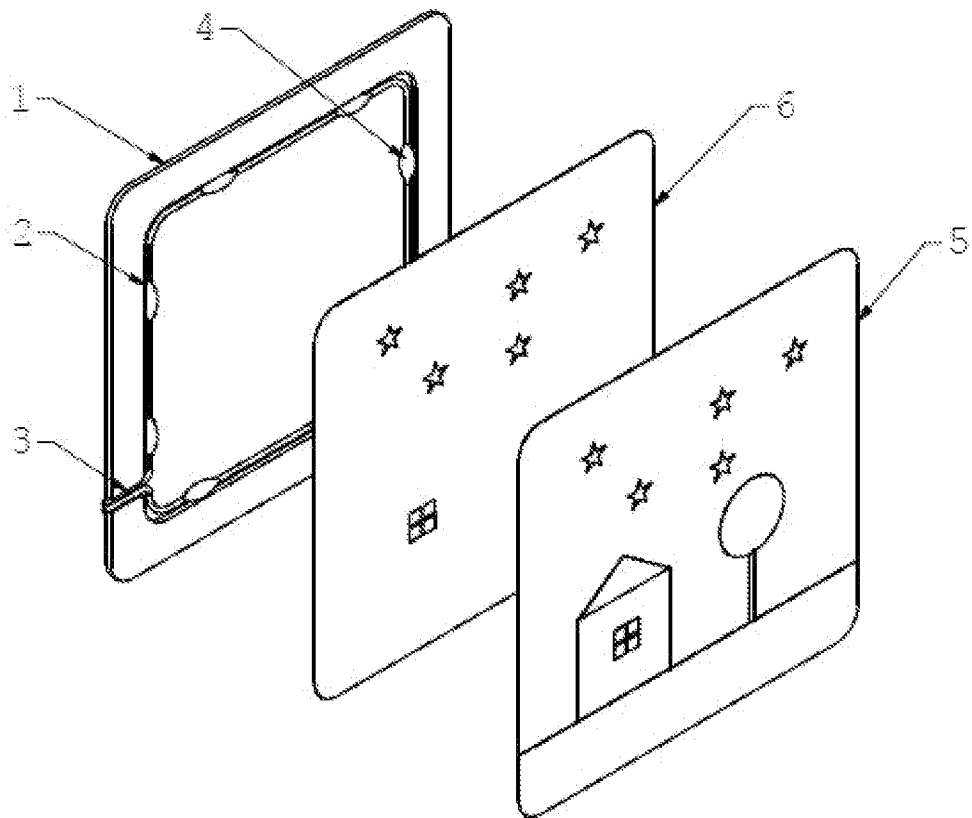


Fig. 2

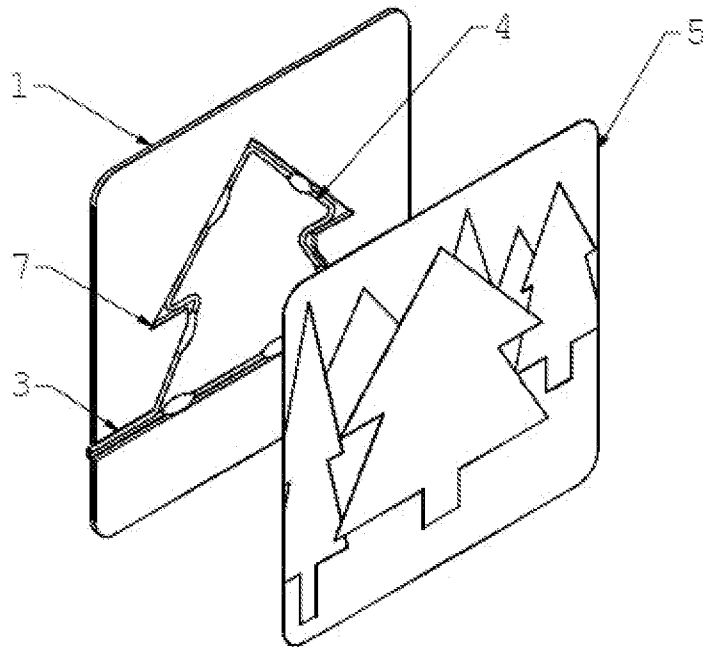


Fig. 3

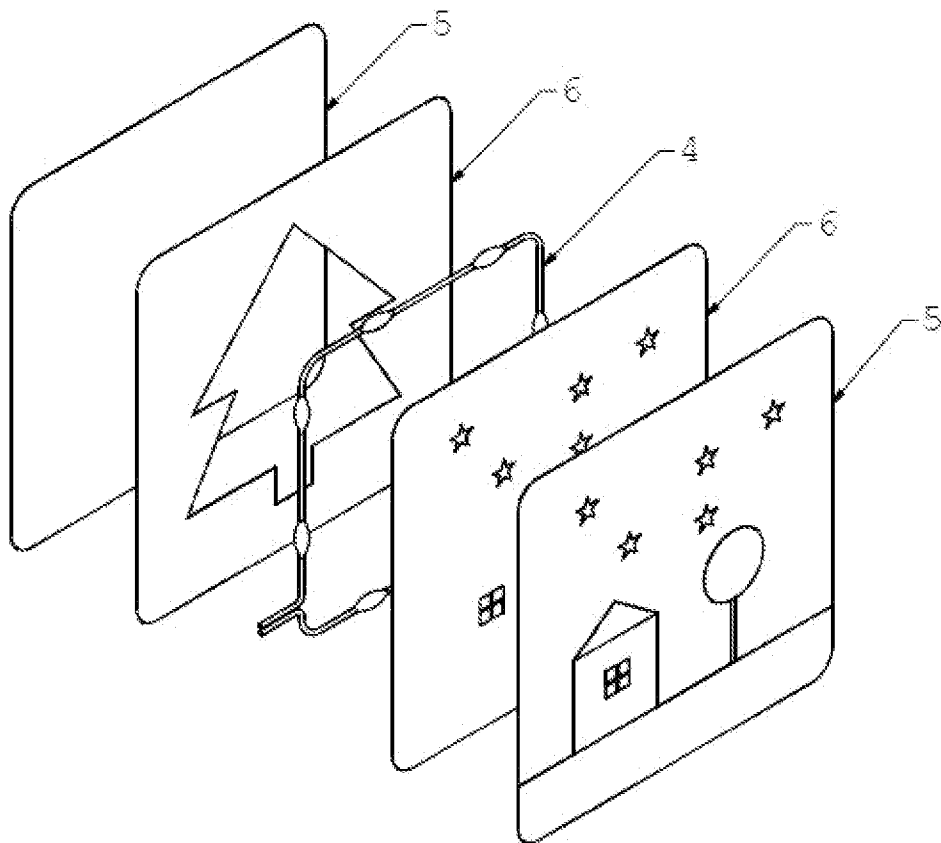


Fig. 4

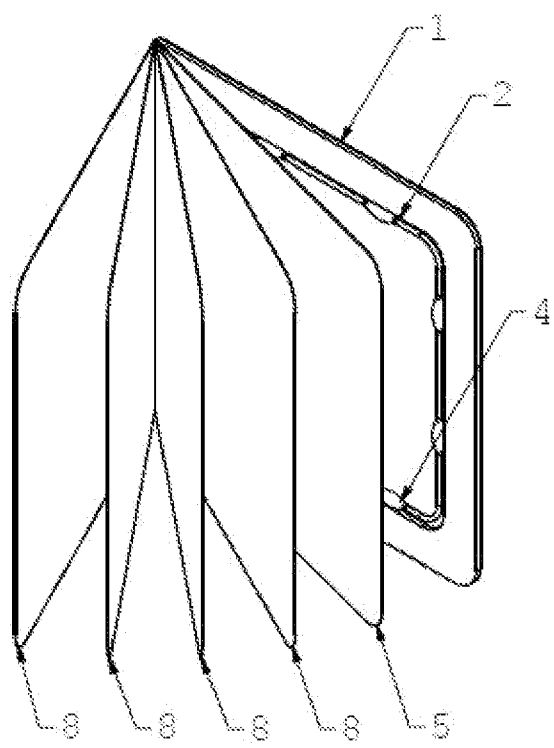


Fig. 5

INTERNATIONAL SEARCH REPORT

International application No.
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A. CLASSIFICATION OF SUBJECT MATTER B42D3/12, B42D3/00, B42D15/00 According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC: B42D Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched SK documentation: B42D Electronic database consulted during the international search (name of database and, where practicable, search terms used) EPODOC, WPI, X-FULL (full text databases), SK documentation		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US2006066094 A1 (BOOKSMART LTD) 2006-03-30	4
Y	title, abstract, paragraphs [0050], [0093], [0094], [0119], [0126], figures	1,2,3,6
Y	US2006007699 A1 (HWANG I) 2006-01-12 abstract, paragraph [0021]	2,3
Y	US8960936 B1 (MALCOLM SHELLEY A) 2015-02-24	3
X	column 5, lines 50-60, fig. 7	5
Y	US2018215186 A1 (HUDACHEK SUSAN FRANCESCA) 2018-08-02 paragraphs [0119], fig. 13	1,6
☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
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Date of the actual completion of the international search 12 December 2023 (12.12.2023)		Date of mailing of the international search report 21 December 2023 (21.12.2023)
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INTERNATIONAL SEARCH REPORT
Information on patent family members

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US2006066094	A1	2006-03-30	EP1658995A3	2006-06-07
US2006007699	A1	2006-01-12	none	
US8960936	B1	2015-02-24	none	
US2018215186	A1	2018-08-02	none	