



## DEVELOPMENT OF A CUSTOM BINDING FOR A BOOK

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At the moment, the Ukrainian publishing and printing industry uses the long-established designs of bindings and covers [1], experimenting with materials, the composition of these materials, or carving certain elements on the front cover. Moving elements are used less frequently, mostly for children's books. However, these changes do not distinguish the binding from the general features of the usual designs. Creating a new type of binding can not only provide a significant aesthetic effect and arouse the reader's curiosity, but also solve the problems of readability that the reader faces.

The paper analyses the readability and considers the option of integrating a book stand into the binding of a book publication. The aim of the study is to develop a non-standard binding for a book publication that also serves as a book stand.

Before starting the development, we researched the existing patents on this topic, all the variants found came from foreign inventors, let's consider two of these patents US3383120A [2] and US6234533B1 [3]. The variants from the US3383120A patent are complex in design, which complicates mass production, and does not facilitate possible further attempts to partially automate the manufacturing process. The variant from the US6234533B1 patent is much simpler in design, but its strength and materials used are not suitable for a voluminous edition, as it will rest on the bottom of the binding stand, so the covering material connecting the two moving parts of the stand must support the weight of the block. Therefore, a much simpler and more reliable binding design is proposed, which is partially based on the concept used in the US6234533B1 patent, namely a two-layer frame, where the first layer is the main binding into which the block is inserted, and the second layer forms the stand. The design of the binding is shown in Fig. 1.

The main binding is a type 7 binding [1], to which the block and elements of the second layer are attached. The second layer is formed of two cardboard sides that act as supports for the publication. Their dimensions correspond to those of the cardboard sides used in the first layer, but they can potentially be narrower. The supports themselves are attached to the first layer by folding the upper fold of the covering material of the sides over a structural element (similar to a Type 7 binding) before the single cover is attached to it. The last elements in the design are two fabric bands that keep the sides from moving apart and set the angle of the publication with their length. They are attached to the inside of a structural element (similar to a Type 7 binding) before the flyleaf is attached to the binding and to the front side of the support sides before the cover material is glued. To ensure the strength of the binding, paper tapes are also glued to the fabric bands.

The length of the tape is determined by:

$$L = 2 \times a \times \cos b + 150,$$

where  $L$  is the length of the tape, mm;

$a$  is the height of the sides, mm;

$b$  is angle of inclination of the publication;

150 is parts of the tape attached to the binding and sides, mm.

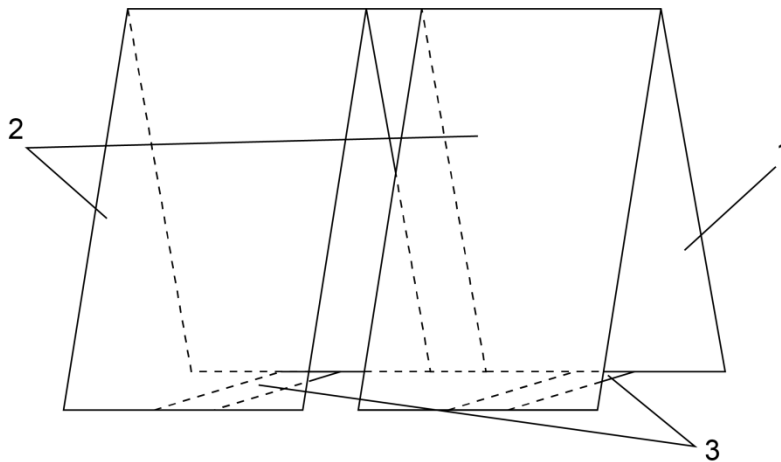


Figure 1 – Graphical representation of the designed binding: 1 – structural element (type 7 binding); 2 – support sides; 3 – two fabric bands connecting the parts of the binding

The size of the angle at which the publication should be placed for comfortable reading was determined based on a survey of a group of book readers about the ease of reading at different angles of placement of a book in a non-standard binding stand. Respondents were offered several options for tilting the book, namely  $35^\circ$ ,  $45^\circ$ ,  $55^\circ$ ,  $65^\circ$ , and were asked to rate them from 1 to 4, where 4 is the most comfortable angle and 1 is the least comfortable angle. The survey results showed that the most convenient angle for placing a book in a non-standard binding is  $45^\circ$ , so the final formula for calculating the length of the ribbon is:

$$L = 2 \times a \times \cos 45 + 150.$$

#### References

1. Covers and bindings. Types. (2001). (DSTU 29.4-2001). State Standard of Ukraine.
2. Guiles, J.S. (1968). Article support (United States Patent No. 3383120A).
3. Torimoto, N. (2001). Cover or card (United States Patent No. 6234533B1).