# United States Patent

[11] 3,633,727


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[21] Appl. No. **808,729**
[22] Filed **Mar. 20, 1969**
[45] Patented **Jan. 11, 1972**



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[32] Priority **Sept. 7, 1968**
[33] **Germany**
[31] **P 17 86 262.3**


[54] **DEVICE FOR FEEDING BOOK PADS TO A TRIMMING MACHINE**
**10 Claims, 1 Drawing Fig.**


[52] **U.S. Cl.** ..... **198/27, 11/1**
[51] **Int. Cl.** ..... **B65g 47/00**
[50] **Field of Search** ..... 198/20, 27, 28; 214/1 B, 1 R; 11/1, 5



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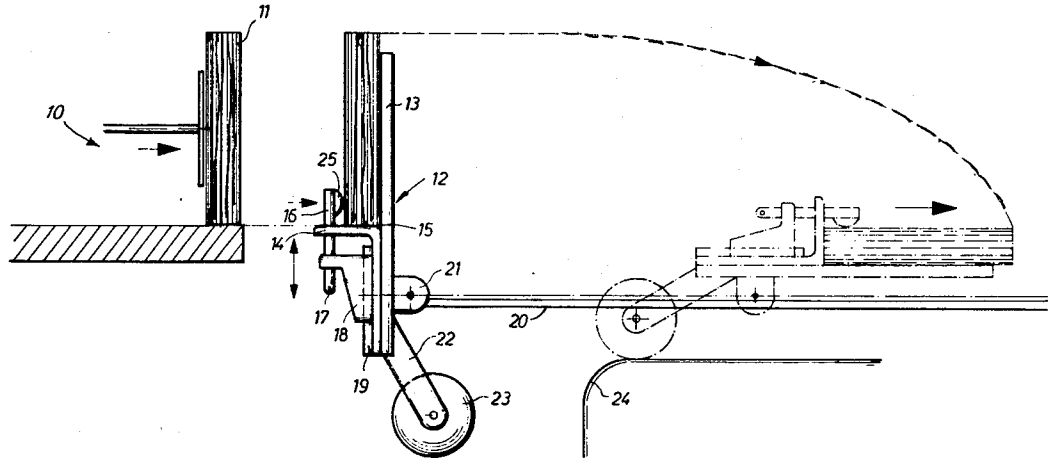
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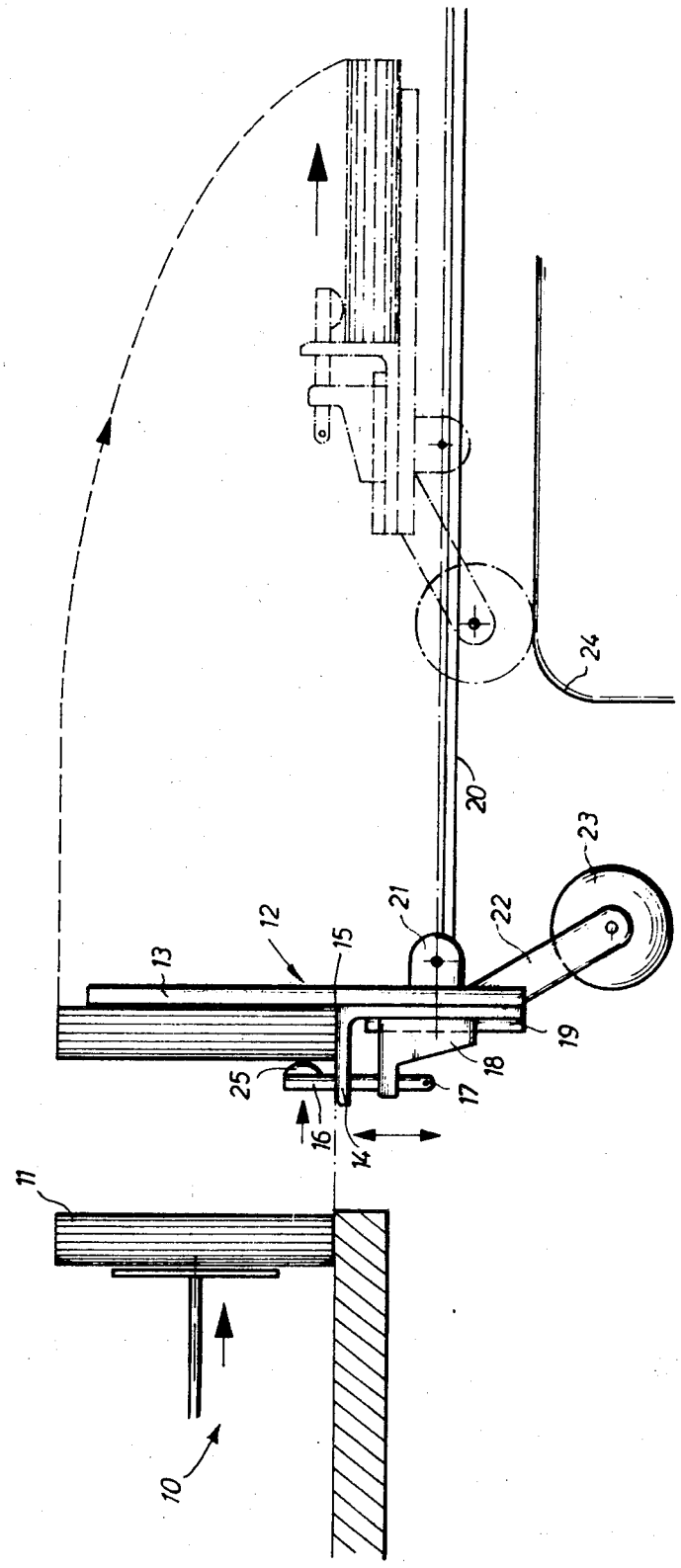


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**ABSTRACT:** A device for feeding book pads to a trimming machine in which a book pad is conveyed horizontally, while maintained in a vertical position, to an alignment angle means which clamps the book pad and transports same to a trimming machine by means of a sled and track arrangement. During transport, the book is rotated to a horizontal position by means of a swing axle associated with the angle alignment means.


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# DEVICE FOR FEEDING BOOK PADS TO A TRIMMING MACHINE

## BACKGROUND AND OBJECTS

This invention relates to a feeding device which guides book pads to a trimming machine so that the book's three cutting surfaces can be trimmed.

In mechanical bookbinding, the individual sheets, which are connected in themselves and among each other into a book pad by means of a binding thread, are glued along the back or ridge of the book pad and, after drying, they are trimmed to the proper format by a trimming machine (also called three-knife automat). In consideration of the subsequent work operations, for instance, in a trim-dyeing machine, in a rounding machine for rounding off the straight book ridge, in a back-gluing machine, etc., it is important to perform the format trimming with maximum possible dimension accuracy and angle correctness. Of necessity, only the ridge of the book (in addition to the head bar) can constitute the critical reference side with respect to which the other three sides are to be cut at the correct angle. As book pads emerge from a glue-drying station held by clamping tongs, they can be released from the latter and laid out flat for movement into a trimming machine by the use of feeding and alignment mechanisms. In this connection, rotating brushes have been used in which a gently acting shifting force is exerted on the book pads in the direction toward the angle stops on the trimming machine. This known method is unsuitable for guaranteeing identical accuracy in format trimming for a number of reasons. Firstly, since the glue on the book back has not yet completely hardened, twisting or other misalignment of the book back coming from a dryer cannot be avoided even when the book is simply tilted into a flat position. Furthermore, the book ridge, which serves as a reference side, lies freely and is exposed to even greater bending and twisting, without any guidance, primarily as a result of the action of the feeding and alignment means. Finally, the moisture which is still partly present in the paper as a result of the application of glue contributes to a situation in which the book pad has a tendency to widen in the area of the ridge, so that the feeding accuracy of the flat-lying book pad in the cutting machine is adversely influenced.

The invention is based on the task of eliminating the above-mentioned disadvantages and providing means which would exclude any shifting of the individual book layers within a book pad and thus reliably eliminate the possibility of any inaccurate format trimming. The invention comprises a method and device for feeding book pads into a trimming machine, such as one of the three-knife automat type. The book pads are transferred from the glue-drying station in a vertical, upright position with its ridge pointing downwardly. The pads are successively clamped in an angle mechanism which serves to both convey and tilt the pads horizontally in feeding same to a trimming machine. The essential characteristic of this proposal consists in the alignment and clamping of the book pad with the ridge pointing downward and in the transfer of the book pad, in a pressed and aligned condition, into the trimming machine. The feeding, clamping, and tipping with the back downward assures the best possible angular and measurement accuracy in the cutting process.

A feeding device, for carrying out the procedure according to the invention, is characterized by an alignment angle with a horizontal plate in receiving position so as to support a book pad standing upright, with the ridge pointing downward, a perpendicular plate for the placement of one lid side surface of the book pad and a clamping part which can be moved against the perpendicular plate against the book pad standing in front of it. A sled is provided for moving the pads horizontally into the area of the knives of the cutting machine. The alignment angle is swingably attached to the sled about a horizontal axis and has a followup roller which is rotatably positioned at the alignment angle. Associated with this followup roller is a fixed guide curve for the purpose of laying flat the alignment angle and the book pad, clamped therein, upon the table of the trimming machine.



The horizontal plate and the perpendicular plate of the alignment angle are preferably made smaller than the book pad dimensions in terms of book height and book width, whereby, in the receiving position of the alignment angle, an adjustable stop is opposite to a lateral book-cutting surface. Since the alignment angle moves forward into its receiving position by means of spring return devices, identical accuracy may be achieved in the clamping of the book pads fed in.

The effective feeding surface or clamping part should preferably consist of a strip which is horizontal in the receiving position of the alignment angle and which is in the vicinity of and above the book pad ridge. This type of clamping is used here to compensate for the previously mentioned tendency of the book pad to widen in the range of the glue moisture which has penetrated the paper material from the book pad ridge and which has not yet completely dried out. The feeding surface or clamping part can be covered with a resilient material such as a pillow.

In one preferred version of this invention, a pneumatically controllable clamping part or feeding surface can be flexibly attached to a horizontal axle of a sled which can be moved perpendicularly along a lower prolongation of the alignment angle.

## BRIEF DESCRIPTION OF THE DRAWING

The invention is described in greater detail by means of an example illustrated in the drawing. The drawing shows, in a schematic side view, how a book pad is fed from the glue-drying installation, and how the book pad is fed and clamped as well as tipped and laid flat, in the clamped state by means of the feeding device which forms the basis of this invention.

## DETAILED DESCRIPTION OF THE DRAWING

An automatic conveyor device, indicated at **10** brings glued book pads from a drying device, one after the other, in a continual fashion. The book pads are moved vertically upright, with the ridge facing down. In a preferred version, a so-called plate transport chain may be employed which grips the book pads on both lid side surfaces so that additional guide rollers are arranged under the book pad ridge only for safety purposes.

The conveyor device **10** for book pads **11** ends at an alignment angle **12** which consists of a perpendicular plate **13** and a horizontal plate **14**. The book pad ridge **15** is supported on horizontal plate **14** while perpendicular plate **13** serves for the feeding of a book lid side. When a plate transport chain or some other conveyor device moves the book pads over from a direction perpendicular to the plane of the drawing, then the conveyor track is limited by a stop (not shown). This stop is adjustable and can be provided either on the alignment angle **12** or in the latter's drawn-in reception position, within the corresponding radius of action. The alignment angle **12** furthermore contains a horizontal clamping part or feeding surface **16** which can be swung around a horizontal axle **17** and which can be driven by any suitable desired means known. In order to perform the clamping of the book pad at the required height within the most efficient range above the book ridge **15**, clamping part or feeding surface **16** is supported on a slide **18** which can be moved perpendicularly in a guide **19** of the alignment angle **12**.

The alignment angle **12** is guided along a transport means or sled **26** which can be moved along a guide or movement track **20** into the range of the knives of the trimming machine **27** by means of a horizontal swing axle **21**. A projection **22** is provided on the underside of the alignment angle **12**. A followup roller **23**, secured to the end of projection **22**, serves to contact a fixed guide curve **24**.

When a book pad **11** is moved in by virtue of conveyor **10**, it contacts the vertical plate **13** of the alignment angle **12**, thereby actuating a control mechanism (not shown) which in turn causes the clamping part or feeding surface **16** to move from a horizontal to a vertical position. The book pad is thus clamped in the alignment angle **12** and a suitable timing

mechanism (not shown) then activates the sled **26** which carries the alignment angle **12** and its associated book pad along track **20** to the guide curve **24**. During this movement, followup roller **23** is placed against guide curve **24** so that, during the forward movement of the sled **26**, the alignment angle **12** is simultaneously and gradually moved into a horizontal position, indicated in the drawing with the dot-dash lines. The drawing furthermore shows the movement track of the upper edge of book ridge **11** which results from the combined translation and rotation.

Guide curve **24**, and all other individual parts of the device, are drawn here only schematically. The shape of the guide curve **24** can be varied so that the book pad can achieve its subsequent horizontal position earlier if it is decided that such a situation expedite the feeding and aligning of the pad into the trimming machine **27**.

The feeding surface or clamping part **16** is preferably provided with a resilient material or a pillow **25**. The clamping takes place in the lower surface area of the book pad, and whose purpose has been explained above, offers the advantage that the downholder, which provides additional clamping action, finds a sufficiently large contact surface on the book pad in the trimming machine **27**. Upon the insertion of the book pad into the trimming machine **27**, the clamping part or feeding surface **16** is automatically released and the alignment angle **12** is returned back to its original position to receive another book pad.

I claim:

**1.** Device for feeding book pads into a trimming machine which device comprises, in combination:

a. conveyor means for conveying said book pads in a vertical position and along a linear direction,

b. alignment angle means cooperating with said conveyor means for receiving and holding said vertical book pads from said conveyor means along said linear direction,

c. clamping means for clamping said vertical book pads against said alignment angle means, and

d. guide means cooperating with said alignment angle means for conveying and guiding said alignment angle means into said trimming machine along said linear direction.

**2.** Device as set forth in claim **1** in which said alignment means comprises a perpendicular plate means and a horizontal plate means.

**3.** Device as set forth in claim **1** in which said clamping means comprises a horizontal axle means, a feeding surface means pivotally connected at one end to said horizontal axle means and a resilient means secured to the other end of said feeding surface means.

**4.** Device as set forth in claim **1** in which said guide means comprises:

a. transport means adapted for transporting said alignment angle means,

b. track means adapted for guiding said transport means to said trimming machine.

**5.** Device as set forth in claim **4** further comprising followup control means which comprises a guide curve means and a roller means secured to said alignment angle means, said roller means being adapted to contact said guide curve means for pivoting said alignment angle means.

**6.** Device as set forth in claim **4** further comprising a horizontal swing axle means adapted to move said transport means into a horizontal position during forward movement of said transport means along said track means.

**7.** The device as set forth in claim **2** wherein both said plate means have free edges which are within the edges of the vertical book pads clamped therein.

**8.** The device as set forth in claim **3** wherein said feeding surface means and said horizontal axle means are secured to a slide means adapted to permit the vertical adjustment of the position of said feeding surface means.

**9.** Device for feeding book pads which device comprises in combination:

b. means for receiving said vertical book pads from said positioning means,

c. means for clamping said vertical book pads against said receiving means,

d. means for guiding said receiving means, and

e. means for rotating said receiving means for positioning said vertical book pads in a horizontal position.

**10.** Device as set forth in claim **9** wherein said receiving means comprises:

a. a perpendicular plate means, and

b. a horizontal plate means adjacent said perpendicular plate means.

a. means for positioning said book pads in a vertical position,

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