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F. J. CASHIN ET AL
PRESSURE APPLICATOR FOR PLASTIC
BINDINGS OF HARD CASED BOOKS
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2,572,243

Fig. 1

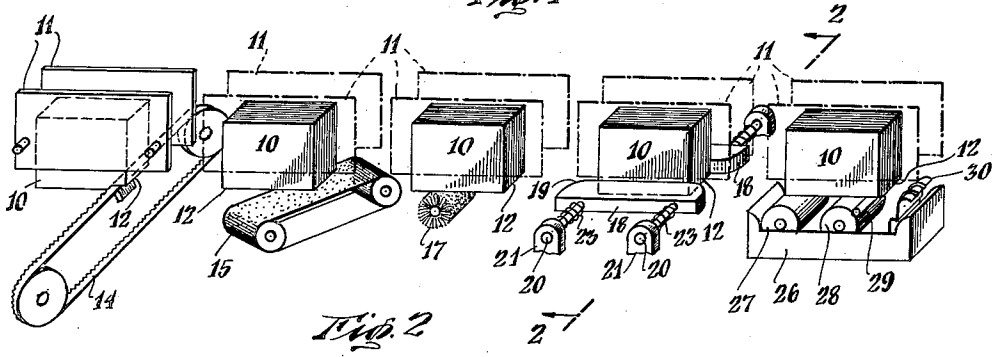


Fig. 2

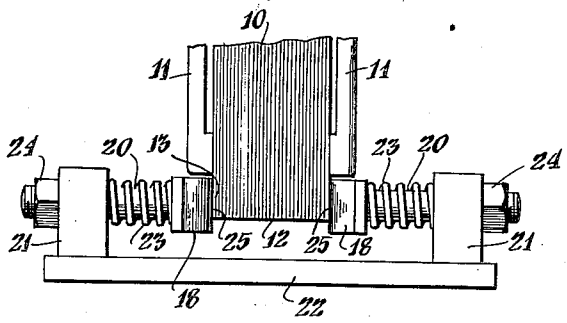


Fig. 4

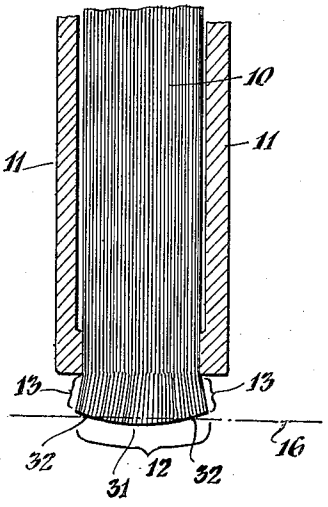
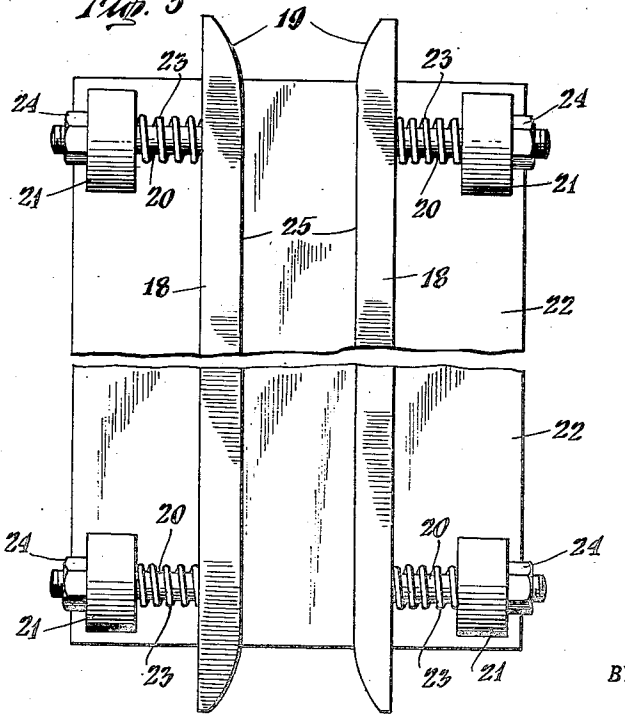


Fig. 3



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PRESSURE APPLICATOR FOR PLASTIC BINDINGS OF HARD CASED BOOKS

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4 Claims. (Cl. 11—1)

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This invention relates to the adhesive binding of books and more particularly to a new and improved method of and apparatus for preparing the binding surface to receive an adhesive binding.

In the preparation of a page block, consisting of a plurality of loosely assembled signatures, to receive an adhesive binding, the block is securely held by a clamp with its binding edge exposed and conveyed over a cutting means and the folds are cut from the binding edge to expose each of the leaves of the page block, and thereafter an adhesive coating is applied to the surface of the edge. A suitable method of effecting these operations is described and claimed in the co-pending application of Luis deFlorez, Peter deFlorez and Owen L. Gore, Serial No. 24,494, filed May 1, 1948.

When the folds have been removed from the binding edge, by any suitable cutting means such as a rotary knife in combination with sanders or a band saw in combination with sanders or sanders alone, the leaves of the page block extending beyond the clamp tend to flare out, the folds no longer acting to restrain them. With the leaves in a flared condition causing a rounder configuration of the binding edge, it is difficult to apply adhesive coating of equal thickness to the entire binding edge of the page block. Therefore, one important object of this invention is to provide a method of and apparatus for constituting the trimmed binding edge as a plane surface so that the adhesive binding may be more effectively applied, in a coating which has substantially the same thickness throughout. Other objects and advantages arising from the use of the invention will be apparent from a consideration of the description of the method and apparatus of this invention.

To effect the objects of the invention a pair of stationary parallel ironing bars are positioned, one on each side of the path of travel of the trimmed binding edge, and arranged to engage and compress the leaves of the binding edge under relatively high or heavy pressure into a plane surface suitable to receive the adhesive coating.

For a more detailed description reference is made to the drawing in which:

Fig. 1 is a schematic perspective view of a portion of an adhesive binding operation showing the position with respect thereto of one form of apparatus of this invention;

Fig. 2 is an end elevation of the apparatus, as viewed from the line 2—2 in Fig. 1;

Fig. 3 is a plan view of the apparatus; and

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Fig. 4 is a cross-section of the page block in the conveyor showing the flared condition of the leaves of the page block after the folds have been removed.

Referring to Fig. 1 the page block 10, consisting of a plurality of loosely assembled signatures, is securely held between clamp plates 11, and while so held is continuously advanced along a predetermined path and through a series of sequentially positioned work stations, the movement being from left to right in Fig. 1. Successive page blocks 10 are processed in close order by being passed in single file along the established path. Each page block 10 is supported in a vertical position with its binding edge 12 down and with a portion 13 of the page block 10 adjacent to the biding edge extending below the clamp plates 11.

The page block 10, securely held by the clamps 11, is advanced into engagement with a fold trimming station, which consists of a suitable means for cutting the folds from the binding edge 12. In Fig. 1 the fold trimming station comprises a band saw 14 arranged to move transversely to path of page block and to cut the folds from the binding edge 12 as the page block 10 is advanced along the path into engagement with and through the band saw. Thereafter, the page block 10 is moved over an abrading surface 15 to effect a smoothing of binding edge 12.

After the folds are removed from the binding edge 12 by the band saw 14, the pages of the book block 10, in the portion 13 extending below the clamp plates 11, assume a rounded and flared configuration similar to that shown in Fig. 4. The flaring results probably from the release of the restraint of the signature folds.

As the binding edge 12 is smoothed by an abrading means such as sanding belt 15, the normal plane of the sanding belt will be as indicated by the dash line 16 in Fig. 4. It will be noted from the plane 16 of the sanding belt that a portion of the curved binding edge 12 will be removed and the surface partially levelled.

The page block 10, thereafter, is passed over the rotating brush 17 which removes loose particles of paper fiber and abrasive grit from the surface of the binding edge 12.

In order to achieve the desired plane surface of the binding edge, before the adhesive coating is applied thereto, the page block 10 is next conveyed between the pressing bars 18 which engage the page block 10 at the binding edge 12 as shown in Fig. 2. The flared leaves of the page block 10 are gathered together by the outwardly curved ends 19 of the bars 18 as the page

block is conveyed between the bars. Compression of the flared leaves in the portion 13 of the page block 10 forces the ends of the leaves of the binding edge 12 into a plane surface suitable to receive the adhesive coating. The pressing bars 18 are supported by horizontal shafts 20 which are slidably mounted in studs 21 which in turn are supported by the frame of the machine or a suitable fixed platform such as 22. Springs 23 are mounted on the shafts 20 and act to press the bars 18 together, effecting the compression of the portion 13 of the page block 10 as the latter is conveyed between the bars. The shafts 20 extend through the studs 21 to the outboard side and are threaded in bolts or stop nuts 24 so that the bars 18 may be adjusted toward and away from page blocks by adjusting the bolts. The page block engaging faces 25 of the bars 18 are vertical and parallel and have a sufficient vertical extent to engage substantially the whole portion 13 of page block 10 which extends beyond the clamp plates 11, as shown in Fig. 2. The faces 25 also extend a distance below the binding edge 12 to insure that the latter is effectively compressed.

After the page block 10 is conveyed through the bars 18 it is advanced to a suitable adhesive applying station. One satisfactory means of applying the adhesive is that described and claimed in the co-pending application of Peter de Florez, Serial No. 770,726, filed August 26, 1947, wherein the binding edge is passed over a pair of adhesive applying rollers, such as 27 and 28. Roller 27 forces a thin layer of adhesive against the ends of leaves at the binding edge 12 and roller 28, together with stationary bar 29, applies a thick layer of latex over the surface of the binding edge. Thereafter, doctor blade 30 removes the excess adhesive and allows a layer or coating of adhesive of the desired thickness to remain. The rollers 27 and 28 are positioned so that they are partially immersed in a bath of adhesive contained in reservoir 26.

When an adhesive binding operation is carried out without pressing the binding edge 12 prior to the application of adhesive, the doctor blade 30, in order to leave a coating of desired thickness at the center (31 in Fig. 4) of the flared binding edge will allow a coating of substantially greater thickness on the binding edge near the sides 32. As an example, in treating the binding edge without pressure, a normal setting of the doctor blade 30, to allow a coating of adhesive .008" thick (wet) in the center section 31, will result in leaving a coating of .010" to .015" thick (wet) in the side sections 32. The excess adhesive in the side sections 32 increases the total drying time and also is a waste of the adhesive.

When the pressure apparatus of this invention is used, the binding edge is constituted as a plane surface and the adhesive coating which is applied by the rollers 27, 28 and the cooperating bar 29 can be doctored to a uniform thickness over the entire surface of the binding edge within the exacting limits required for efficient drying, so that no boiling or bubbling occurs in the adhesive coating.

As noted above the binding edge 12 may be partially levelled and the rounded effect of the flaring leaves somewhat corrected by the sanding belt 15 which reduces the crown of the center portion 31 of the binding edge, as shown in Fig. 4. However, it has been found that raising the cutting or abrading plane of the sanding belt 15, in an attempt to effect a planar cut surface, increases the pressure between the sanding belt 15 and the page block 10 and causes further flaring of the pages near the sides 32 and an uneven surface after sanding.

It is considered undesirable to extend the pressing bars 18 through the adhesive applying station because of the tendency of the adhesive to cake on the bars and interfere with the application of uniform coatings of adhesive to the page blocks. However, it has been found that by employing the pressing bars 18 and placing them adjacent to and immediately before the adhesive applying station, a sufficient compressive force can be exerted on the page block so that the leaves remain in a cohesive condition, the ends of the leaves constituting a binding edge which is a plane surface.

It is to be understood that certain parts of the description herein have been included to show the manner in which apparatus and method of this invention may be used in cooperation with other apparatus. Also, it should be noted that the description is set down to explain the principle of the invention and the best mode in which the applicants have contemplated applying the principle of the invention, but that the invention is not limited to the specific mode and apparatus herein described.

We claim:

1. In the manufacture of adhesive bound books that method of preparing a page block of folded leaves, to receive the adhesive binding, comprising, trimming the folds from the binding edge, abrading the trimmed surface, brushing the surface clean, applying high pressure to the sides of the page block at the binding edge by passing the page block into sliding engagement with compressive members, disposed at either side of the page block adjacent the binding edge, and thereafter applying adhesive to the compressed binding edge.

2. In an apparatus for manufacturing adhesively bound books wherein page blocks consisting of loosely assembled signatures are securely clamped so as to expose the folds of the signatures at the binding edge and the portion of the page blocks adjacent to said edge and wherein the securely held page blocks are conveyed successively along a predetermined path into engagement with a cutter, to trim the folds from the binding edge, and an abrader to smooth the surface of the binding edge, an auxiliary clamp adapted to compress the leaves of the page block at the binding edge, comprising, a pair of parallel, horizontal, compressing bars, one positioned on each side of the path of the page block, said bars having vertical page block engaging faces extending along the said path and sized to engage the portion of the page block extending below the conveying clamp, and to extend below the binding edge, springs associated with said bars adapted to urge said bars together to exert heavy pressure against the sides of the page block at the binding edge.

3. In the manufacture of books, an apparatus for applying an adhesive coating to the binding edges of page blocks which are successively conveyed along a predetermined path in a vertical endwise array with their binding edges exposed, said apparatus having several work stations sequentially positioned along the path of the page blocks, including a trimming means to trim the folds from the binding edge and smooth the trimmed edge, and an adhesive applying means to apply a layer of adhesive to the trimmed edge,

a compressing means positioned between the trimming means and the adhesive applying means and adjacent to said adhesive applying means, said compressing means comprising a pair of parallel horizontal bars having vertical page block engaging faces to engage the sides of the page block adjacent to the binding edge, said faces extending along said path for a distance at least equal to the length of the binding edge of the page blocks, one of said bars being positioned on each side of the said path, springs associated with said bars to urge them together and adjustable stop nuts to limit the movement of each bar toward the path.

4. In the manufacture of adhesive bound books that method of preparing a page block from folded leaves, to receive the adhesive binding, comprising, trimming the folds from the binding edge, abrading the trimmed surface, brushing the surface clean, applying heavy compressive force to the sides of the page block at the binding edge by passing the page block into sliding engagement with compressive members, disposed at either side of the page block adjacent the binding edge to cohesively join the ends of the leaves in the trimmed surface to constitute a plane binding edge, and immediately thereafter applying adhesive to the compressed binding edge.

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