Aug. 9, 1932. H. SIEB 1,870,348

MACHINE FOR APPLYING STRIPS TO BOOKS

Original Filed Dec. 31, 1928 4 Sheets-Sheet 1

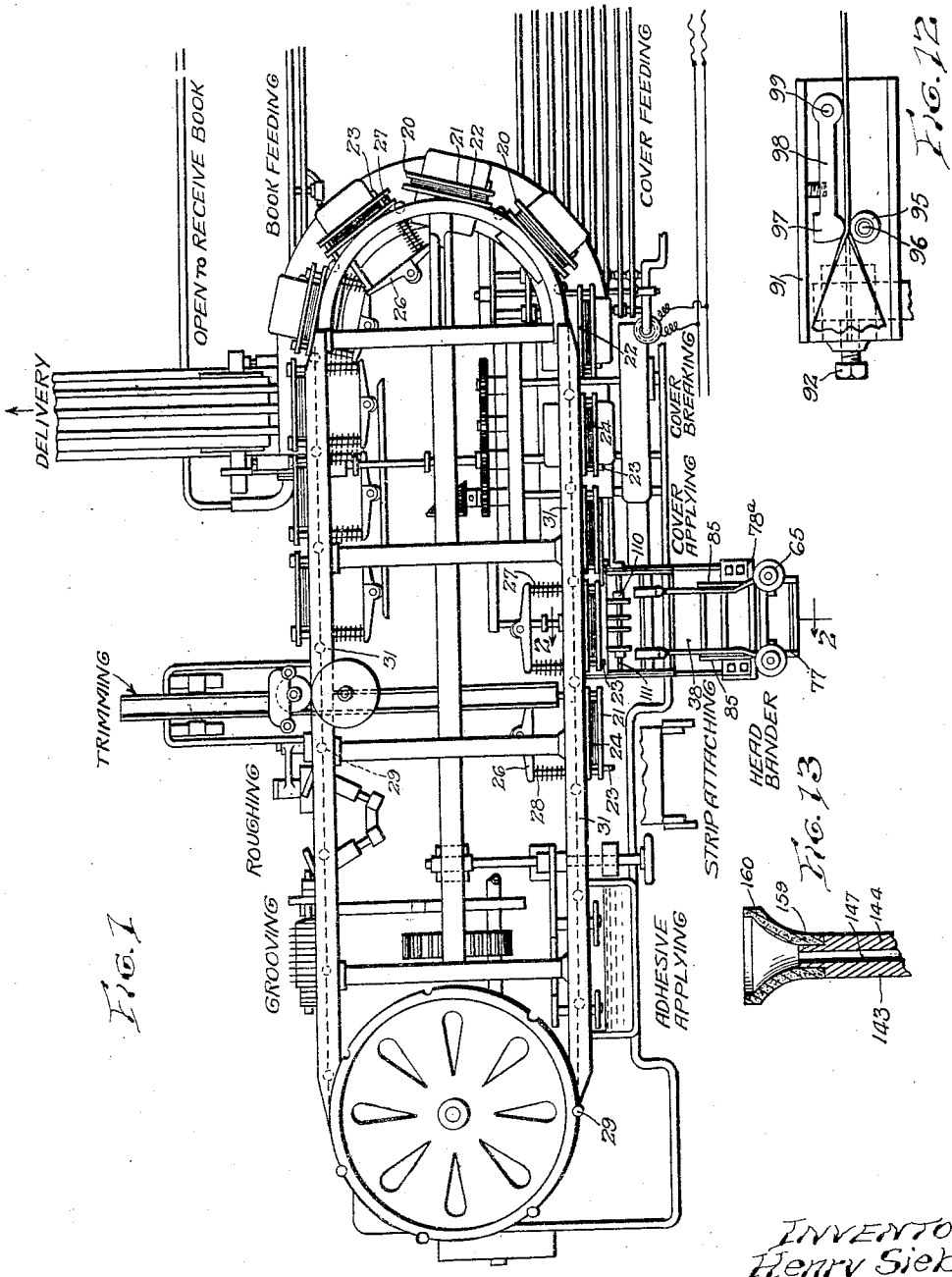


Fig. 1

Fig. 12

Fig. 13

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MACHINE FOR APPLYING STRIPS TO BOOKS

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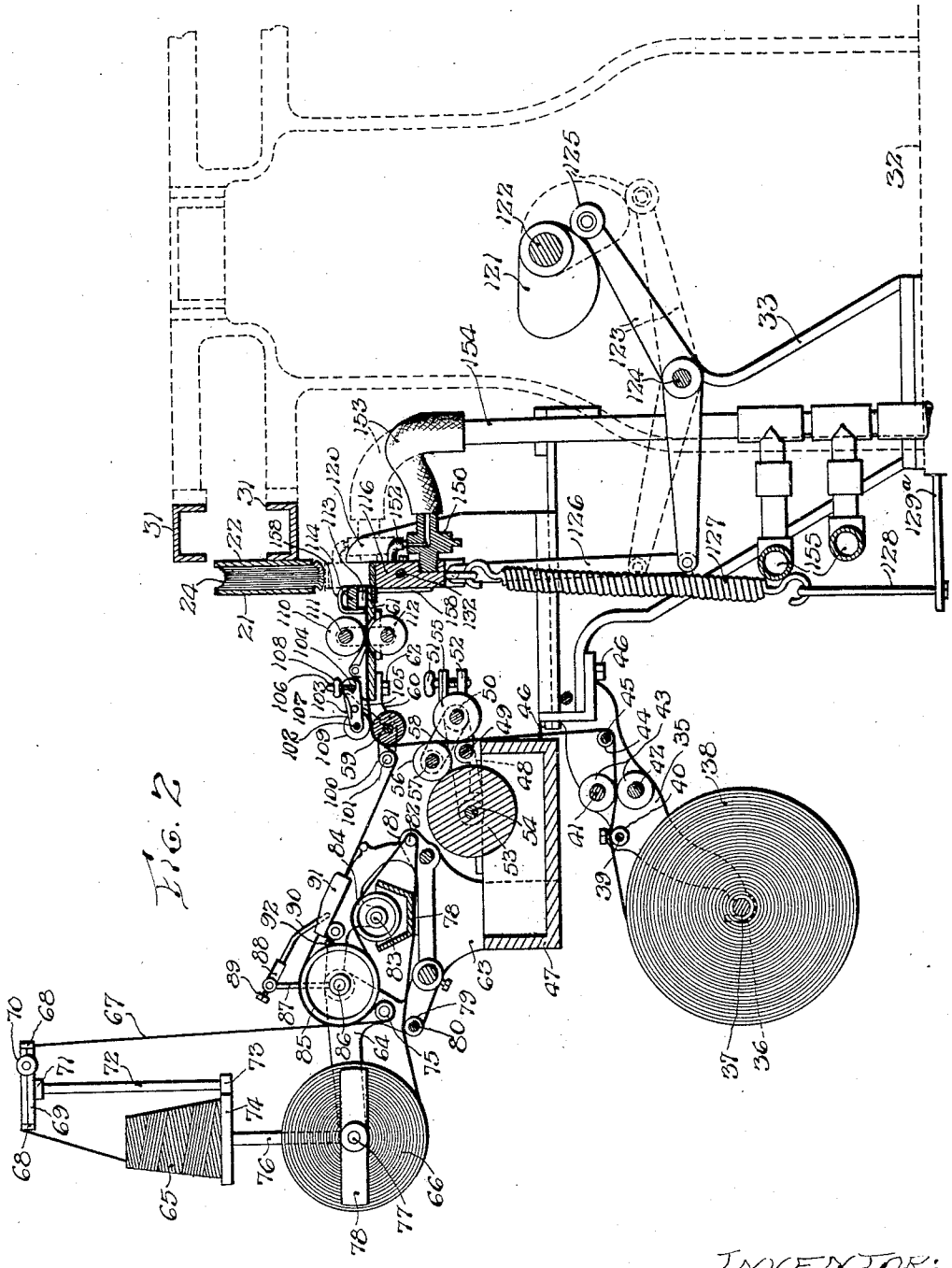


FIG. 2

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MACHINE FOR APPLYING STRIPS TO BOOKS

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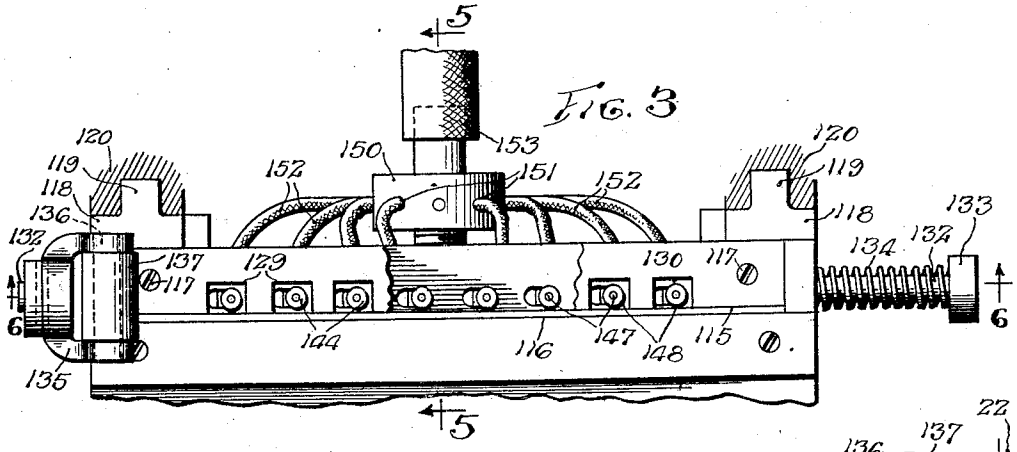


FIG. 3

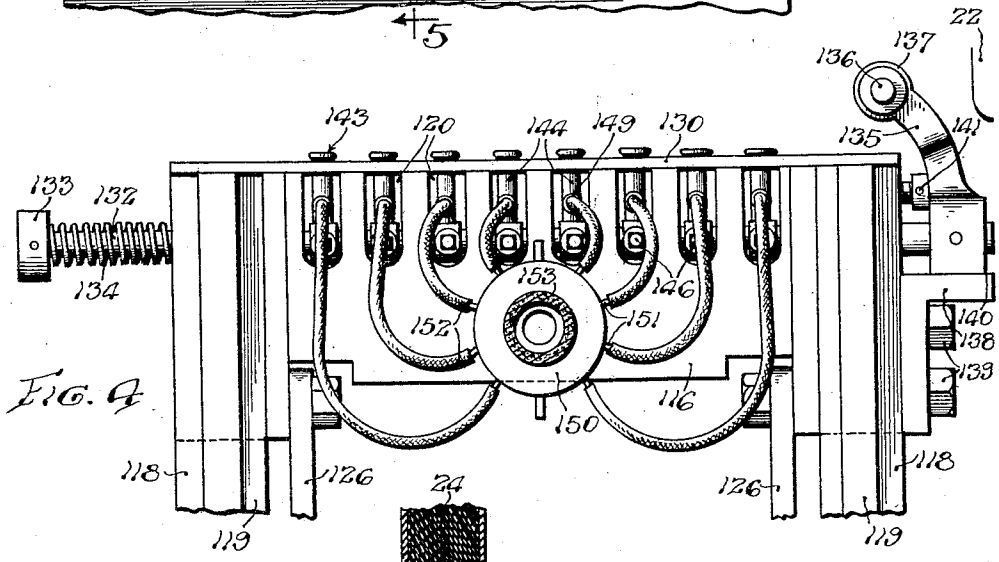


FIG. 4

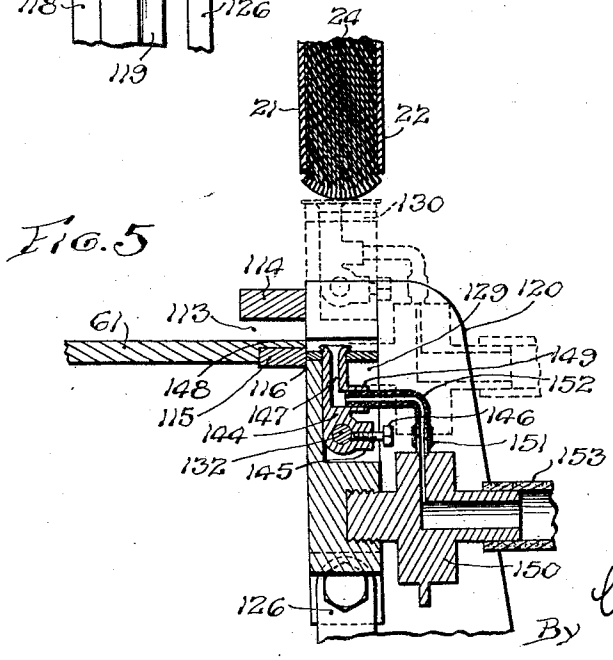


FIG. 5

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MACHINE FOR APPLYING STRIPS TO BOOKS

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FIG. 6

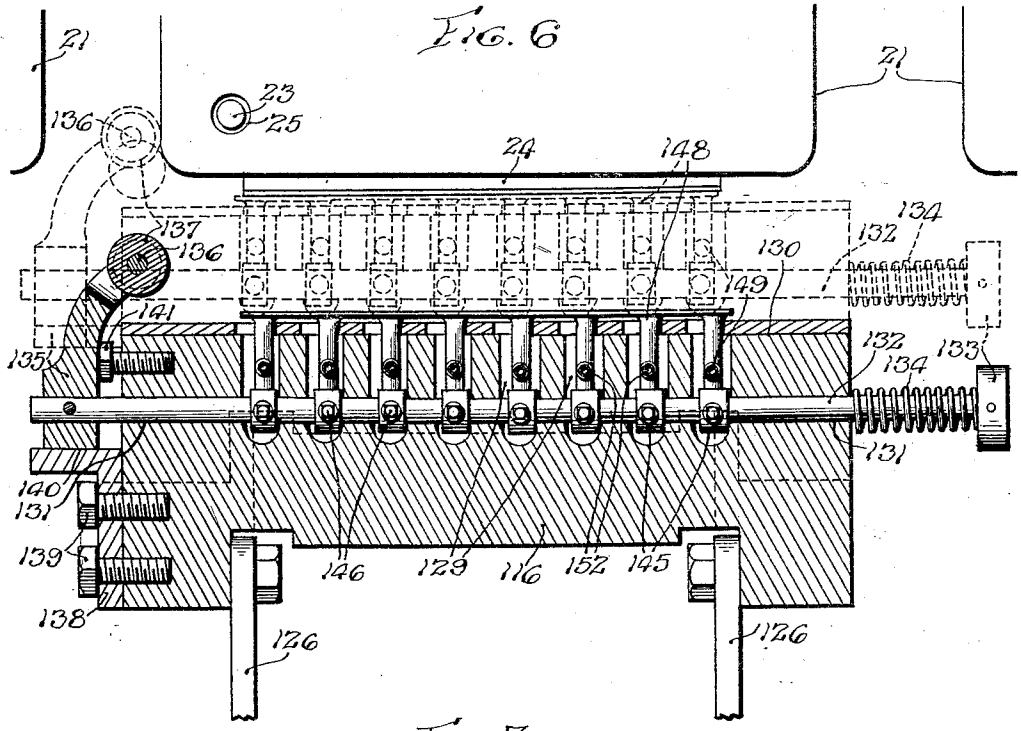


FIG. 7

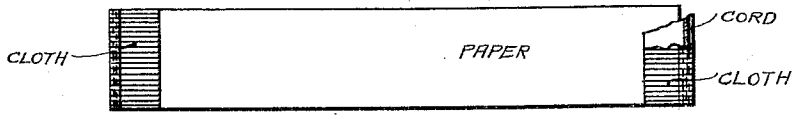


FIG. 8

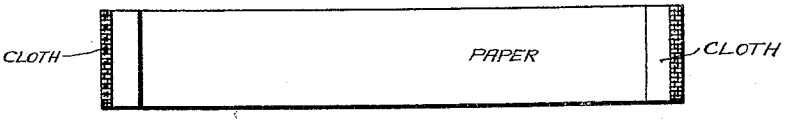
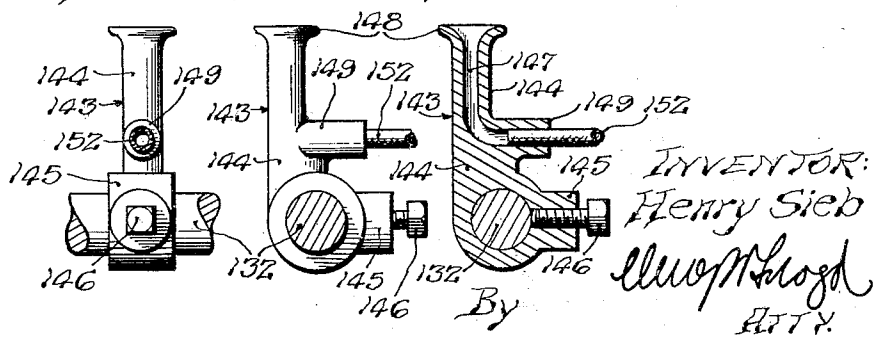


FIG. 9 FIG. 10 FIG. 11



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1,870,348

UNITED STATES PATENT OFFICE

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MACHINE FOR APPLYING STRIPS TO BOOKS

Original application filed December 31, 1928, Serial No. 329,466. Divided and this application filed March 7, 1929, Serial No. 345,179. Renewed September 1, 1931.

This invention is a novel machine for applying strips to books, and is shown embodied in a machine designed particularly for the applying or affixing of headband strips to the backs of signature groups in the process of being made into round back books, although the invention is of utility for attaching analogous strips to various types of books. This application is a division of application Serial No. 329,466, filed December 31, 1928.

The present invention is an accessory and an improvement to be used in connection with a book-binding machine such as is illustrated and described in the patent to B. Gitzendanner, numbered 1,380,294, entitled Bookbinding machine, and also adapted for use upon numerous other bookbinding machines described in other patents and now in general use.

The book-binding process upon such machines is now substantially a continuous operation. A plurality of signatures are picked up by carriers, generally over thirty in number, and conveyed as a group along a predetermined path of travel past a number of successive instrumentalities whereby a fabric lining, a paper lining, and other elements which are employed for the purpose of maintaining the signatures in bound relation are applied.

The present invention is substituted for the conventional paper strip or back-lining attaching device, and adds to the paper strip backing apparatus means for the attachment of headbands to the paper backing and to the group of signatures. It also facilitates the addition of headbands to a group of signatures, for the device automatically brings together the paper strip, the headbands, and the cord which is inserted into and comprises a part of the headbands.

The present apparatus permits of the application of the headbands to the paper strip backing with glue, the preferred method of causing adherence, and does not in any way slow up or interfere with the operation of the book-binding machine or with its efficiency as applied to any other operation which it is called upon to perform.

A book-binding machine is shown generally, it being sufficient to state that the device hereinafter described is shown at a station upon the endless path or track of the book-binding machine. A plurality of carriers or clamps within each of which a group of signatures is firmly held are arranged upon such track, the signatures always being disposed with one vertical edge contacting upon a peg or pin so that the position of the group of signatures in each of the series of carriers is always the same. The carriers are moved about upon the track. Because of the great weight of the machinery, it has been impossible to devise a means whereby each carrier registers in the precise position of its predecessors when the machine is stopped as is required for its operation at the different stations for the application of linen and paper linings, and for the additional operations required.

One of the greatest difficulties in procuring the proper attachment of a headband to a group of signatures in a machine of the character herein referred to is the impossibility, heretofore, of registering each carrier in exactly the same position which its predecessors occupied, with the result that any device intended to apply headbands to the book in process of binding has affixed such headband in an irregular manner or varying position upon the book back.

Instead of endeavoring to cause each carrier to stop in a predetermined position for registry with the device applying the headband, the present invention comprises means for affixing the headbands to a web of paper lining and then registering the paper lining to which the headbands are attached in its proper relation upon the partly bound group of signatures. The registration occurs subsequent to the time when the headbands are secured by glue to the paper lining web, so that the paper lining with the glue attached headbands thereon may be adhesively secured to the partly bound group of signatures by glue in the manner conventional in the art and consistent with the character of the machine here disclosed.

Such a method has a distinct advantage

over the hand application of headbands in that it is cheaper, and because the attachment of the headbands to the book is more regular, there being no misplaced, crooked or ill-fitted headbands resulting from the operation of the present apparatus.

In the course of the attachment of the headbands to a group of signatures, the present apparatus contemplates the preattachment of the headbands to the paper lining, the severing of the headbands so attached and a portion of paper lining from a roll of such latter material and the manipulation of the severed portion until it correctly registers with a group of signatures whereupon it is affixed thereto.

All of these steps are accomplished through the agency of the herein described machine, which, as has already been stated, is an accessory device adapted to be made a part of the machine illustrated and described in the above referred to patent, and of other book-binding machines.

The objects of the invention, therefore, include forming a paper lining having headbands at its edges and affixed thereto with glue, and attaching such a paper lining to a group of signatures, and correctly registering such lining and its headbands with the end edges of the back of the group of signatures.

These objects and such other objects as may hereinafter appear, are obtained by the novel construction, combination and arrangement of the elements some of which of themselves are novel, shown in the accompanying sheets of drawings, hereby made a part of this specification, and in which one embodiment of the invention is disclosed.

In the drawings:

Figure 1 is a plan view of a book binding machine upon which the invention hereinafter described may be used, the headbanding device forming the subject matter of the present invention being shown at the side thereof and marked "headbander."

Figure 2 is a vertical section of the headbander shown in Figure 1 taken along the line 2—2 of said Figure 1.

Figure 3 is a fragmentary top view of the back lining holding mechanism forming a part of said headbander, a central portion thereof being broken away to show the internal construction thereof.

Figure 4 is a fragmentary elevation of the lining or web holding mechanism as viewed from the direction of the book-binding machine.

Figure 5 is a transverse section through said lining holder taken along the line 5—5 of Figure 3, one extreme position of the holder being in full lines and the other extreme position thereof being shown in dotted lines.

Figure 6 is a longitudinal vertical section through said holder taken along the line 6—6 of said Figure 3, the machine being shown in full lines in one extreme position, that of rest, and in dotted lines in the position which said holder occupies when the headband and lining associated therewith are conjointly applied to the backs of signatures.

Figure 7 is a plan view of a lining having headbands at its ends as formed in the present machine and ready for application to a group of signatures, one corner being broken away to detail its construction.

Figure 8 is the reverse view of the assembled lining shown in Figure 7.

Figure 9 is a rear elevation of an individual holding member for the lining shown in Figures 7 and 8.

Figure 10 is a side elevation of the same holding member.

Figure 11 is a vertical section through such holding member.

Figure 12 is a fragmentary plan view of the strip folding trough employed in forming the headbands shown in Figures 7 and 8.

Figure 13 is a fragmentary sectional view showing the suction holding member provided with a rubber cup as is usual.

The present invention may be employed in association with other book binding machines than that illustrated in Figure 1 of the drawings, but such machine being typical of the high developments in the art, the present headbander has been applied thereto, and in this application forms a part of a device of the character and type illustrated in the patent to B. Gitzendanner, numbered 1,380,294, issued May 31, 1921, and entitled "Book binding machine."

Figure 1 of the above referred to patent to Gitzendanner has been substantially reproduced as Figure 1 of the drawings in the present application, there being a few deletions, and there also being in addition to the machine there illustrated, and at the near side of Figure 1, the headbander forming the present invention which for convenience is hereinafter sometimes referred to as a back lining machine and also as a headbanding device.

Reference to Figure 1, in conjunction with reference to the patent to Gitzendanner, above referred to, discloses a book binding machine having a plurality of signature holding clamps 20, connected in train. While conveyed therein each signature group is trimmed, roughened, and grooved. Adhesive is applied thereto, a lining or super of open meshed cloth, attached, and in the present instance, next, headbands and a paper lining are affixed. Later a cover may be applied, the cover broken, and a completely bound book delivered at a station adjacent to the position at which the group of signatures was originally received. Means are employed at the loading station to cause the signatures at one end to engage a stop or gauge member in the holding device so that all

groups of signatures occupy the same relative space in the clamp.

While the machine is intended to bring each of these clamps, one after another, into a definite stationary position at the stops or stations provided therefor, there is always a variation, sometimes but slight and at other times highly appreciable, in the position at which each separate carrier or clamp comes to full stop at any of the stations named. This uncertainty of the position of rest increases or decreases with respect to the speed at which the device is operated, the amount of wear thereon, i. e. age of the device, and, of course, with the dimensions and weight of the group of signatures to be bound therein.

In each of the clamps or carriers, 20, there are sides 21 and 22, which may be called a front and a back. There is also a pin 23 against which the group of signatures 24 contact. Within the carrier 20, the group of signatures 24, as explained above, always occupies the same relative position and if an operation with respect to a group of signatures 24 is to be carried out, it is reasonable, feasible and proper to have such operation gauged with respect to the pin 23 which is secured to plate 22 and which projects through an opening in plate 21 in order that an element, such as a crash or paper lining, will register upon such group of signatures 24 in direct relation to the position thereof with respect to said transverse pin 23 and thus provide uniformity.

Figure 1 discloses the association of a plurality of carriers 20 each comprising an outer plate 21, an inner plate 22, and a yoke 26 in association with two transverse bolts 27. Said bolts are surrounded by coil springs 28, one end of each of which is adapted to bear against the inner face of said yoke 26 and the other end to rest against said inner plate 22, said latter plate being firmly anchored upon pivot studs 29 traveling in a track formed of opposed U-shaped members 31.

An adhesive applying device of the usual character may be employed upon the machine as modified, and there is no necessity for supplying such a mechanism of special character.

As is usual in book binding, there is an arrangement called and marked "strip attaching" for securing of pervious material or fabric lining to the book, this material comprising a length of crash or other widely meshed tough woven material which is affixed to the back of the group of signatures 24 after glue has been spread over the back edge of the group of signatures.

Reference should now be had to the headbanding device hereinabove so frequently referred to. Suitably attached to a base 32 within the book binding machine and separated one from another are vertical frame members or standards 33, suitably joined together. All of the mechanism hereafter described as forming a part of the headbanding device depends upon and/or is between said frame members 33. Said frame members 33 project outwardly from the base 32 of the book binding machine and beneath the track 30 provide mountings for brackets and reservoirs.

Two brackets 35 are provided and are spaced apart, one upon each frame member 33, and these each terminate in an open ended U-shaped bearing 36, in which a shaft or core 37 for a roll 38 of strip material, generally paper, is disposed for free rotation. Also upon said brackets 35 and journalled therein is a shaft 39 to which adjustably secured guide roller 40 one at each end of shaft 39 between which and over shaft 39 the strip of material passes on its journey from the roll 38.

Paper webs for back linings usually comes in rolls of many yards in length. There are several widths for such paper rolls but it is seldom that a standard width of paper is the correct size for a particular bookbinding job. To prepare in advance a great number of widths of paper would be impracticable both for the manufacturer of the paper and also for the bookbinder both of whom would have a large amount of money tied up in the many sizes required. From handling, too, the paper while in roll develops irregular edges due to blows on its flat sides, so that a few standard widths of paper are provided and these are trimmed to size in the bookbinding machine during the binding operation. Guide rollers 40 are provided to maintain the alignment of the paper strip as it advances toward slitters or cutters.

In the present instance, the cutters are mounted upon shafts 41 and 42 journalled in brackets 35, and upon each of said shafts 41 and 42 are circular knives, cutters or slitters 43 which may be disposed on said shafts in any selected position and firmly attached whereby the paper web taken from roll 38 is trimmed to size and sharply defined edges are obtained thereon while passing intermediate the shafts 41 and 42.

A second series of guide rollers 44 are adjustably disposed upon a shaft 45 also journalled in brackets and the paper passing around said shaft 45 and between said rollers 44 one of which is adjacent each end of said shaft 45 changes its direction of movement from the substantially horizontal to a vertical direction.

Brackets 35 are secured to the outer end and under side of standards 33 by any suitable fastening means, as per example the machine bolts 46 shown in Figure 2 of the drawings.

Pivoted to the tank 47, at one side thereof and at opposite ends, are two arms 48, the pivotal supports therefor being marked 49.

Upon the inner end of arm 48 is a reduced section 50. In association therewith is a thumb screw 51 which is also associated with a mixed member 52 whereby rotation of screw 51 raises or lowers the opposite ends of arms 48, the rotation being about pivot 49, to raise or lower a glue roller 53 riding on a shaft 54 journalled in arms 48 in respect to the level of glue in pot or tank 47. The amount of glue picked up by roller 53 is thus accurately regulated.

Adjacent the reduced section 50 of arms 48 a roller 55 is journalled. Such roller is of greater width than the paper web and forms a guide therefor to insure the application of glue to the edges of such paper from a pair of glue-carrying rollers 56 which are adjustably mounted upon a shaft 57 journalled in one end of links 58 which have their other ends pivotally supported about roller 55.

Rollers 56 contact roller 53 and take glue therefrom and transfer a sufficient quantity thereof to the edge of the paper taken from roll 38 as such paper travels vertically from guide rollers 44 to the station where it is joined to the headband material. Some short space of time elapses between the application of the adhesive to the edges of the paper and the application of the headbanding strip thereto, and likewise an added period of time intervenes before the combined bands and strip are affixed to the group of signatures 24. This allows adequate time for the glue to dry and become properly set.

Passing beyond the glue applying rollers 56, the strip continues upwardly and outwardly with its wet adhesive edges outermost until it passes over a roller 59 journalled in brackets 60 affixed to the upper part of a horizontal bed 61 over which the paper passes horizontally to the book-binding machine, the joinder members being machine bolts 62. Because outwardly projecting, roller 59 insures contact between the paper and rollers 53 because the paper is drawn upwardly at an angle formed about said glue carrying rollers 56.

Upon the other side of tank 47 and which tank forms a support therefor is a second pair of brackets 63 projecting upwardly and forming journals for a number of shafts and rollers, and also supporting a second tank in which water is generally stored. Extending from the brackets 63 is a second pair of brackets 64 which provide holders for two balls of twine 65 and two rolls of headbanding material 66. It is, of course, understood that headbands are affixed at opposite ends of the book, and are oppositely disposed structurally with respect to such book.

From each ball of twine 65, twine 67 is unwound through a suitable means for preventing an accumulation of slack, but not offering excessive resistance to the unwinding of the end 67 from the ball 65. These members, comprising a guide means 68 at opposite ends of a horizontal member 69, and an intermediate grooved roller 70 may be disposed upon a pivoted support 71 upon a standard 72 as is shown, such standard 72 being supported from a lug 73 projecting from the base 74 upon which the ball of twine 65 is disposed. Horizontal member 69 is angularly adjustable upon standard 72 because of the pivotal support 71 therefor and thus may be used to compensate for different widths of paper used in the device.

The twine 67 is caused to travel downwardly and about a grooved pulley 75 from whence its travel is upwardly and around a guide pulley for the headband material, the twine being caused by grooved pulley 75 to be guided to the center of such material which is later folded over with the twine 67 in the folded over edge section. Said pulley is journalled in brackets 64 which brackets extend to the left of Figure 2 to concurrently support a standard 76 which supports twine ball base 74 and the spool of headband material in the form of a tape or strip as will be described.

As previously stated, there are two spools of headband material 66 which are secured in an adjustable position upon a shaft 77 which is journalled in brackets 64.

In the present apparatus these spools 66 may be disposed to align with the cord 67 after it is unwound from spools 65. Suitable brake and guide means, such as the members 78ª at the opposite side of the spools 66, are arranged to prevent a too rapid unwinding of the material and to keep said material from side-slipping.

The headband material generally referred to herein is now made in narrow strips. This material, except silk headbands, later to be mentioned, is made of cloth with an inner unfinished surface to which an adhesive has been applied and then dried. After the adhesive has dried, the material is rolled into spools. The present machine takes such strips from spools, moistens the inner surface, applies a cord to the center of the moist strip, folds the strip so that its two edges abut and its finished surface only is exposed and keeps the cord confined within the folded edge.

In this machine, when not using the cord parts and the strip moistening and folding parts, a silk headband which comprises a preformed single thickness of material having one corded edge, may be fed directly from its spool to the point where the paper lining and headband are joined, and where such silk headband may be united with glue to such paper web preliminarily to attachment to the group of signatures 24.

The spools of headband material are unwound from underneath, and are drawn over and about a plurality of rollers beneath the

smaller water pot heretofore referred to and numbered 78. In its travel, it passes over guide rollers 79 adjustably secured to shaft 80 journalled in bracket 63, and under guide rollers 81, secured to a shaft 82 journalled at the opposite of said water pot 78.

Above the water pot 78 is a shaft 83 also journalled in brackets 63 upon which are water carrying rollers 84 which are adapted to ride in said water reservoir so that the inner side of the headbanding material becomes thoroughly moistened with water to re-establish the adhesiveness of the glue coating thereon.

From rollers 84 about which the material travels about a quarter turn, the moistened material passes to a pulley or flanged roller 85 adjustably secured to a shaft 86 also journalled in brackets 63. This roller is in juxtaposition to pulley 75 and as the material of the headband travels about pulley 85, the cord 67 is being made to adhere to the center of said strip.

Also depending from brackets 63 is a vertical standard 87 having at its top a holding member 88 adjustably secured to said standard by a thumb screw 89. From holder 88 depends an arm 90 having a bifurcated end through which the cord 67 now riding on the adhesive surface of the headband strip must pass. Such arm 90 extends into a chute or guide 91 for folding one half of the headband material longitudinally over the other half, such member 91 being secured by fastening member 92 intermediate brackets 63. Such folding means comprises a conventional folding chute whereby one half of a flat strip of paper or the like is twisted over until it lays flat upon the other half of the strip with the edges of both sections in parallelism.

In the chute 91 is a roller 95 disposed on a fixed vertical stud 96 and in juxtaposition thereto is a roller 97 carried by an arm 98 journalled on another vertical stud 99 disposed at a point in saw chute 91 below stud 96. The strip as it approaches rollers 95 and 97 at its center and about the cord 67 is held down by the bifurcated member 90 while the edges of the strip are twisted upwardly until joined one to another as they pass between rollers 95 and 97.

In the present instance, the folded strip with the cord within the folded edge passes to rollers 95 and 97, to rollers 100 adjustably disposed upon a shaft 101 journalled in the end of bracket 60 and in juxtaposition to roller 59. Said rollers 100 comprise a grooved section for the thickened end of the folded headband (and for the corded side of a silk headband when used) and thus guides the assembled head evenly in the direction of the book binding device.

Above the roller 59, is a shaft 102 journalled in links 103, such links being rigidly secured to a shaft 104 journalled in arms 105 extending upwardly from bracket 60.

A lever 106 is secured to shaft 104 by means of a spring 107 the tension of which is adjustable at the will of the operator by a thumb screw 108, rollers 109 on shaft 102 and having tracked portions to allow for the varying thicknesses of the headband in transverse section, are forced into resilient engagement with the headband material and paper strip as it passes over roller 59 to secure an adhesive binder therebetween. One side only of the folded headband is secured to the paper and the corded edge projects a predetermined distance there beyond.

A series of spaced apart driver rollers 110 is disposed upon a shaft 111 journalled above and in lugs upon horizontal bed 61 and therebeneath is an idler 112, generally knurled to insure positive movements of the paper, between rollers 110 and idler 112. Suitable gearing (not shown) is provided to drive shaft 111, such gearing providing for the intermittent movement of said shaft to advance the paper between rollers 110 and idler 112 a predetermined distance when the machine is in the position shown in the full lines of Figure 2. Any suitable gearing by which the proper synchronism is obtained will serve for this purpose, and for this reason it is thought unnecessary to detail the specific gearing, generally of the chain type, which is required therefor. Such gearing is driven by the same prime mover by which the main book binding machine is driven which facilitates the necessary synchronism of the movement of the headbander with the remainder of the book binding devices.

As already noted, the associated strip and headband pass over the horizontal bed or platform 61. At the end of the platform 61 and secured to said platform by end members 113 is a flat knife 114 which spans the paper and headband that pass thereunder.

Normally disposed beyond at the end of said platform 61 and when at rest with its top in the same horizontal plane as that of the platform 61 is the knife 115 which constitutes a top member of the movable apparatus comprising the main features of the present invention. This apparatus comprises a main body 116, having at its top the bar knife 115 secured thereto by screws 117 and having extending therefrom lugs 118 which narrow to provide tongues 119 to ride in a groove track 120 formed in the fixed body associated with the apparatus disposed on standards 33 and of which bed 61, is the top, the course of movement of the movable member relative to the fixed portion associated therewith being upward in the direction of the group of signatures 24 to which the associated lining and headband are to be affixed and to which a section thereof is affixed, and then a return

to pick up an additional section of such material.

This motion or movement is made only when the main book binding apparatus is stationary, so that the action of the prime mover may be so arranged by cams or otherwise to actuate first one and then the other in the order required.

In the apparatus, a cam 121 shown in Figure 2, is carried on a driven shaft 122 and is adapted to actuate a lever 123 pivoted at 124 upon the standard 33 supporting the device to lift the movable body 116 during such periods of time as the main book binding apparatus or the carriers 20 are stationary. As the cam 121 rotates with the shaft 122, its periphery engages a roller 125 at one end of the lever 123, causing the lever to move on its pivot 124 whereby to cause the opposite end of the lever to rise, such opposite end being connected by a link 126 which is pivotally connected to the main body member 116. The main body member 116 is thus made to rise in a vertical direction until the top surface of the knife 115 comes in contact with a group of signatures 24. To insure a prompt and a smooth return of body members 115 as the cam 121 changes its position with the rotation of shaft 122 with respect to the inner end of the lever 123, there is provided a spring 127, one end of which is affixed by hook and eye or otherwise to said main member 116, the other end thereof being secured to a U-bolt 128 anchored to a lug 129[a] extending from the frame 32 of the book binding machine.

The said main body member 116 may comprise a shell or it may be hollowed out by tooling, there being at the top thereof, a rectangular opening extending almost from end to end which is covered at its top by the knife 115 and by a plate 130 in which there is a plurality of openings, 129, generally rectangular, the purpose of which will shortly appear. Said main member 116 in its vertical movement upwardly and downwardly must maintain air connections with members which are stationary. Coincidentally with its initial upward movement, it is adapted to cut off a predetermined amount of the paper strip with the headband material at its sides, the desired section being severed by the intersection of knives 114 and 115, these sections to be carried upwardly one at a time to be joined to or attached to the group of signatures 24.

Such cutting off is obtained by close interfit of the two knives, one 114 being attached to and bridging said platform 61 with its cutting edge just thereabove, and the other forming the outer and upper edge of said member 116. Thus, as an incident to the rise of the main member 116, there is sharply sheared from the associated lining and headbands the necessary amount thereof for each group of signatures 24, the amount so removed being regulated by the movement of the feed rollers 110 upon shaft 111.

During the interval of time while said main member 116 is at rest and in juxtaposition to said bed 61, the gears associated with shaft 111, hereinabove referred to, are actuated and advance the lining and associated headbands over the top surface of the knife 115 on said main member ready to be cut off for the next group of signatures to be approached. If desired, the top of said main member 116 may comprise only a knife 115 and it may be in the knife 115 that the rectangular openings 129 hereinabove referred to are formed.

Cut off sections of linings with headbands are shown in Figures 7 and 8. The parts thereof are lettered to show the paper section, which is marked "paper", the cloth section which is marked "cloth", and one figure is partly broken away to show the cord center, marked "cord".

Extending through said main member 116 are end openings 131 to receive a sliding rod 132. Said sliding rod 132 has at one end a collar, 133, firmly secured thereto, and intermediate said collar and the adjacent end of said main member 116 is a coil spring 134 encircling said rod 132 whereby to urge it in a right hand position with respect to Figure 3.

At its other end, said rod 132 has associated therewith a yoke or bracket, 135, firmly secured thereto, and which in the present instance in normal position extends upwardly and above the main member 116. At its top, said yoke 135 has means for journalling a shaft 136 and upon said shaft is a roller bearing 137, said bearing being adapted to engage the outermost plate 21 of said signature holder 20 as each one of such holders is at rest above the main member 116 and while said main member 116 is rising under the influence of the cam actuated lever 123.

Said yoke 135 is secured to said rod 132 in such a manner that there is no possibility of relative movement in an axial direction along said rod 132, so that when the roller bearing 137 engages the end surface of member 21, the only movement possible for said yoke is in a horizontal plane, carrying with it the rods 132, either in a left hand direction with respect to Figure 3 or a right hand direction with respect to Figure 4. To insure that no undue stress will be applied to rod 132 when roller 137 impinges plate 21, a bracket 138 is secured to body 116 by screws 139, the top surface 140 of said bracket forming bearing surface for the yoke 135 to slide along.

Intermediate the main member 116 and said yoke 135 is an adjustment member 141 which acts as a stop to determine the left hand movement of said rod 132 in respect

to Figure 4 under the urging of said coil spring 134. This stop 141 may be adjusted to compensate for different sizes of books or for other purposes as is required.

Disposed upon said shaft 132 and secured thereto by suitable fastening means, a screw in this instance, and generally equidistantly spaced apart are a plurality of suction cups 143. These are shown in detail in Figures 9, 10 and 11. Each comprises a main body section 144 which is adapted to surround the rod 132. From this projects a lug or sleeve 145 through which a fastening member or machine screw 146 passes, the tightening of said screw 146 upon said rod 132 fixing the position which said suction member 143 will occupy on said rod. This, of course, must be regulated with respect to the openings 129 and the anticipated movement of members 143 therein. The main body 144 of said suction member 143 comprises a tubular portion or perforate body 147 which extends upwardly opening to form a flaring orifice 148, and terminating below in an elbow 149, said elbow 149 and upper portion 147 forming a continuous tube through which a vacuum may be applied to anything which rests upon the plate 130 forming a part of the top of said main member 116. As shown in Figure 6, the main member 116 may comprise a plurality of hollowed out sections instead of one large open section, but either structure may be employed with equal facility. In a structure shown like Figure 6, where the entire body of the main member is not open, the suction members 143 are disposed upon the rod 132 in such a position that these members do not impinge the walls of the main member 116 and the flanged tops 148 do not engage the rectangular openings 129 best shown in Figure 3. When the suction cups 143 are properly disposed, the rod 132 may be moved against the force of the spring 134 and within certain limits, to move the plurality of suction cups 143 disposed thereon a required distance to the left in Figure 3 or to the right in Figure 4 for purposes of procuring proper registration of one of the sections shown in Figures 7 and 8 with a group of signatures 24 in a holder 20.

When the traveling clamp train comes to a stop, one of the carriers 20 is disposed above the member 116, and immediately thereafter the cam 121 engaging the lever 123 begins to push the main body upwardly. At this time, there is disposed over the knife 115 and plate 130, a predetermined length or portion of the paper lining with headbands. Suction is applied through the suction members 143 just referred to just at the moment the member 116 begins to rise so that the paper lining with headband thereon will be held against displacement upon the top surface of said main member 116.

As said main member 116 rises under the influence of said above referred to cam 121, a predetermined section or width of said paper lining with headband is sheared by the blades 114 and 115. The suction continues. The main member 116 continues to rise in the direction of the group of signatures 24 in the flexible holder. As such main member continues the roller 137 contacts the rounded end of the outer plate 21 of said flexible holder 20.

Such end is always a predetermined distance from the group of signatures 24 contained therein, for such group of signatures is in contact against the guide pin 23 forming a part of such flexible holder. Irrespective of the inaccuracies of the positioning of the member 20 above member 116 when stopped, the rod 132 will be moved by the interaction of yoke 135 and face plate 21 to compensate for such irregularity or inaccuracy carrying with it the detached section of paper having at its end the headband.

As the main member 116 continues to rise, the suction continuing, said bearing 137 rolls along the vertical edge of said binder plate 21, stopping at a predetermined point when said detached paper and headband are positioned upon the group of signatures. The glue on the latter is sufficient to hold the paper and headbands in position, and these parts become adhesively applied to the group of signatures for further journey in the bookbinding machine.

At this instant, the suction is released, and immediately thereafter the main body 116, under the urging of the spring 127, drops to its normal position whereupon the gears associated wth the headbanding device again begin to function and advance the associated lining with headband over the knife 114 and plate 130 of said main member 116.

When the roller 137 ceased to have engagement with said plate 21, the rod 132 was urged into its normal position by the spring 134, and said rod 132 returned to the position regulated by the adjusting screw 141 shown at the right hand side of Figure 4 and at the left hand side of Figure 6.

As is shown in Figure 2 and better illustrated in Figures 3 and 4, rigidly associated with the body 116 is a distributor or head 150 out of which projects a plurality of nipples 151. Intermediate said nipples 151 and the nipple or elbow 149 shown upon the suction members 143, is a flexible tubing 152, so that the valves arranged in association with the suction line to said head control all individual suction members 143 at one time, without requiring a plurality of individual control members for each of said suction members 143. The flexible tubing 152 permits of the movements of member 132 carrying with it suction cups 143 relative to member 116 without breaking the suction line.

The connection intermediate the main suction line and the head 150 shown in Figure

2 comprises a short section of flexible pipe 153 which extends from the main suction pipe 154 to said head 150. It provides flexibility to take care of the vertical movement of said head 150 with said main member 116 when the latter reciprocates vertically.

To cause suction to be applied to the cups 143 at the proper time and such suction terminated when the lining with headbands is applied to the group of signatures 24, any suitable valve may be employed in suction line 154, such valves being indicated 155. It is operated by a suitable cam driven by shaft 122 and intermediate said cam and shaft 122 is a suitable link, these parts being shown more or less schematically.

In association with the bed 61, a blow pipe 158 may be arranged. This is useful to direct a continuous or broken flow of air upon the paper lining with headbands, while the glue is drying thereon. The air therefor may come from the exhaust of the pump for obtaining the suction through cups 143 or be supplied by an independent pump or blower. The air so directed hastens the drying of the glue when atmospheric conditions tend to retard the rapid drying thereof.

The flaring end 148 of the suction members, instead of being integral with said members, may be a rubber bell which is frictionally or otherwise secured to said suction members 143 and which provides a continuation of the passage 147. Such form of device is shown in Figure 13 wherein there is disclosed a suction member 143 having a nipple or small sleeve extension 159 over which a flexible or soft rubber bell or cup 160 is seated to provide the part of the holder engaging the liner with the headbands attached thereto.

The application of which this is a division having been in interference with an application of W. C. Schmidt, Serial No. 206,723, filed July 18, 1927, and priority having been awarded to said Schmidt application, this applicant hereby disclaims invention of all subject matter which is disclosed in common by this and said Schmidt applications.

I claim:

1. In a book-binding machine having a holder for a group of signatures, means supplying a continuous strip of material to be affixed to the back of a signature group, means for severing a section from said strip, means for applying such section to the signature group, the same movable toward and from said holder, and means for adjustably shifting said applying means and section longitudinally of said holder into a predetermined registry with said holder and signature group prior to the affixing of such section to the signature group.

2. A strip applying means adapted to be used in association with strip severing means, comprising a carrier adapted to move toward and from a group of signatures in a holder, and means for adjusting the carrier longitudinally of said holder during its movement towards the holder to register the strip in a predetermined position in respect to the back of the signature group.

3. A strip applying means comprising a carrier having means for holding headband material and movable toward and from a held group of signatures, and means associated with the group of signatures for adjusting said holding means and the material held thereon longitudinally of such group of signatures into predetermined registry therewith.

4. In combination, means for supplying a strip of sheet material having headbands at its edges, means for holding such strip of material and movable transversely of said strip of material, and means for holding a group of signatures and adapted to cooperate with said strip holding means to cause an adjusting movement of said strip longitudinally.

5. Strip applying means for bookbinding machines, comprising a carrier, means for shifting said carrier toward a group of signatures in said bookbinding machine, a member carried by and movable relatively to said carrier, suction means upon said member for holding a strip, holding means associated with a signature group and cooperating with said member to adjust said member longitudinally of said holding means and signature group, and means for creating and releasing suction in said suction means.

6. Strip applying means for bookbinding machines, comprising a carrier, means for shifting said carrier toward a group of signatures in said bookbinding machine, a member carried by and movable longitudinally of said carrier, suction means upon said member, holding means associated with such signature group and cooperating with said member to adjust said member longitudinally of said holding means to register said member and strip with said holding means and group of signatures, and means for creating suction in said suction means at predetermined intervals.

7. Strip applying means for bookbinding machines, comprising a carrier upon which a continuous strip may be supplied, means for shifting said carrier toward and from a group of signatures, suction means on said carrier for holding said strip and movable longitudinally of said carrier, means associated with the signature group cooperating with said suction means to adjust said suction means and strip longitudinally of said signature group, means for severing sections of said strip as said carrier is shifted, and means for creating and releasing suction.

8. In combination with a bookbinding machine having a holder for holding a group of signatures, means for cutting off prede-

termined portions of a book lining strip having headband material at its edges, and means cooperating with said holder for adjusting said cut off portions of material to a predetermined position longitudinally of a signature group.

9. Strip applying means for bookbinding machines, comprising a shiftable suction device upon which a strip may be supplied, means for shifting said device toward a group of signatures, means associated with a signature group cooperating with said device to adjust it longitudinally of said signature group, and means for creating and releasing suction in said device.

10. Strip applying means for bookbinding machines, comprising a suction device shiftable relatively to said bookbinding machine and upon which a strip may be supplied, means for shifting said device toward and from a group of signatures, means cooperating with said device to adjust said device and strip longitudinally of said signature group, and means for creating and releasing suction in said device.

11. A holder for a group of signatures, means for positioning a signature group in a predetermined position therein, a member for holding a strip to be affixed to said signature group, and means for shifting said member toward the signature group, said holder having means for adjusting said member into registry with said signature group.

12. A bookbinding machine having in combination, means for holding a book with its back exposed, means for applying a backing component to the book back comprising an applier receiving the component in a retracted position and movable toward the book, and a registering device operating in timed relation with the approach of the applier to the book, comprising a first member taking a position corresponding with that of the end of the book and a second member for adjusting the component accordingly.

13. A bookbinding machine as in claim 12 and wherein is a carrier carrying both the applier and registering device to the book and means operated by reason of the approach of the carrier to the book to cause the operation of the registering device.

14. A bookbinding machine as in claim 12 and wherein the first member cooperates with a part of the book holder during the approach of the registering device to the book, and thereby causes relative adjustment of the device which is communicated by the second member to the component.

15. A bookbinding machine as in claim 12 and wherein is a carrier carrying the applier to the book, the applier being adjustably mounted on the carrier, and the registering device operating to adjust the applier on the carrier according to the position of the book.

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