June 15, 1965 B. C. BLAIR 3,188,667

REBINDING GRINDER

Filed June 10, 1963 4 Sheets-Sheet 1

Fig. 1.

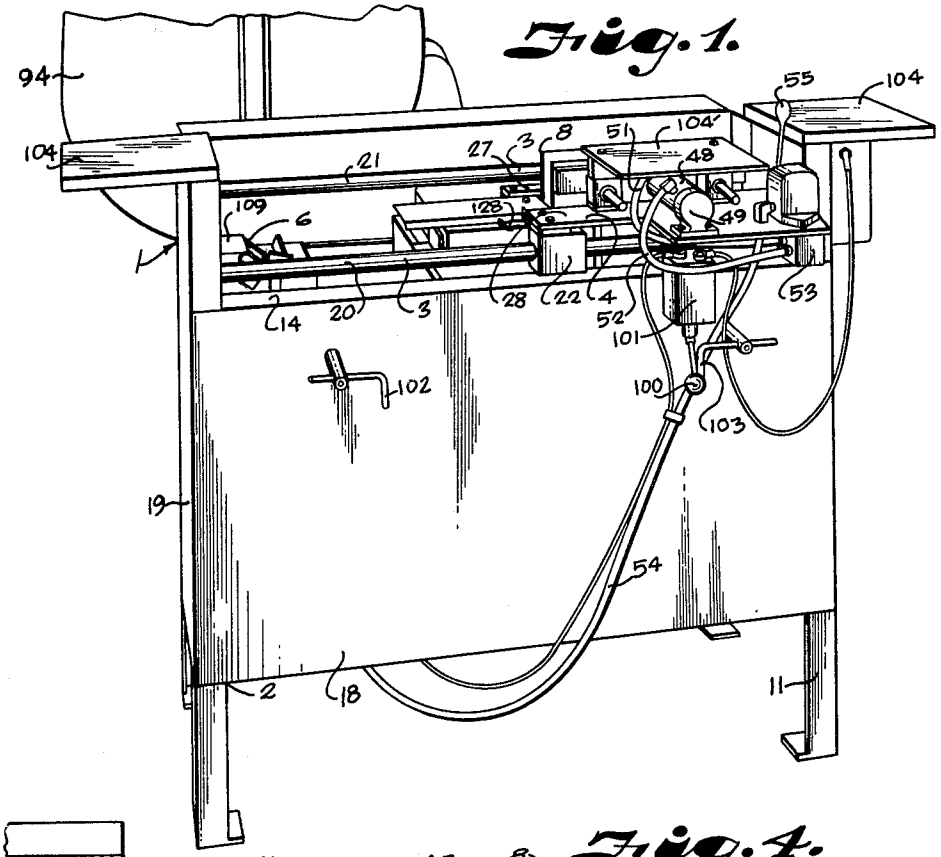
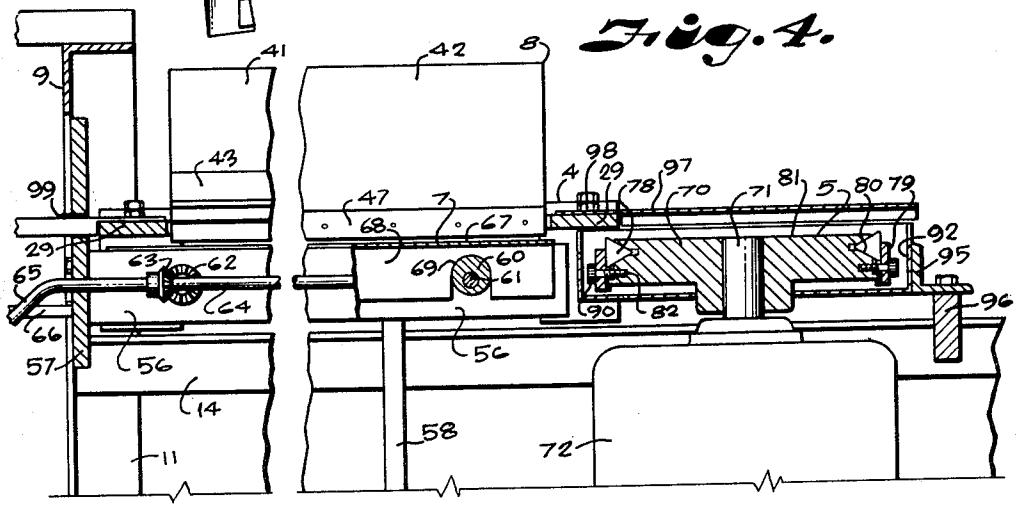


Fig. 4.



INVENTOR.
BOYD C. BLAIR
BY
Fishburn and Gold
ATTORNEYS

June 15, 1965 B. C. BLAIR 3,188,667

REBINDING GRINDER

Filed June 10, 1963 4 Sheets-Sheet 2

Fig. 2.

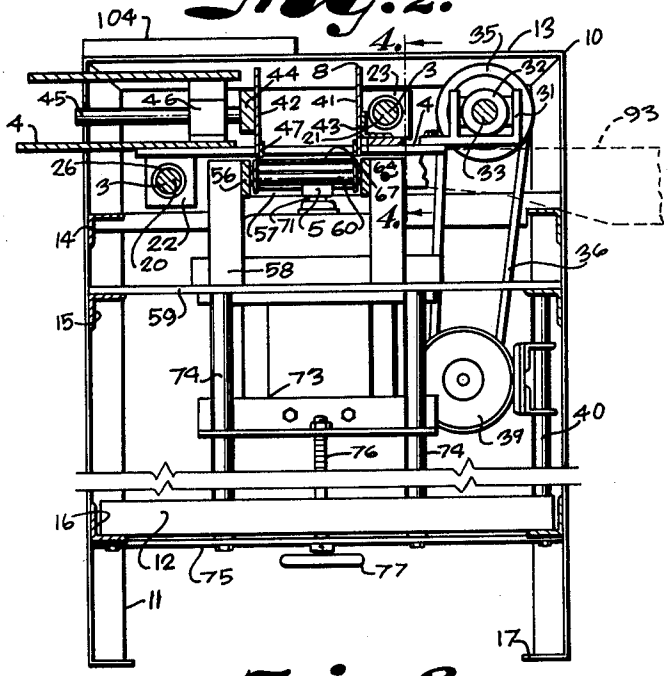
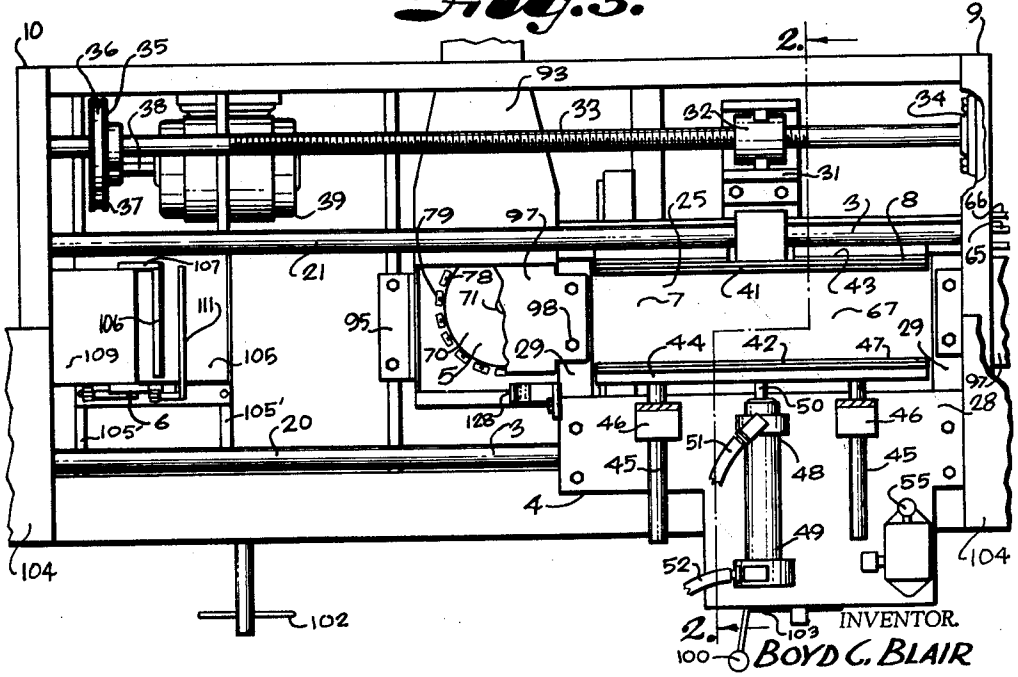


Fig. 3.



INVENTOR.
BOYD C. BLAIR
BY
Frishauf and Holt
ATTORNEYS

June 15, 1965 B. C. BLAIR 3,188,667

REBINDING GRINDER

Filed June 10, 1963 4 Sheets-Sheet 3

Fig. 5.

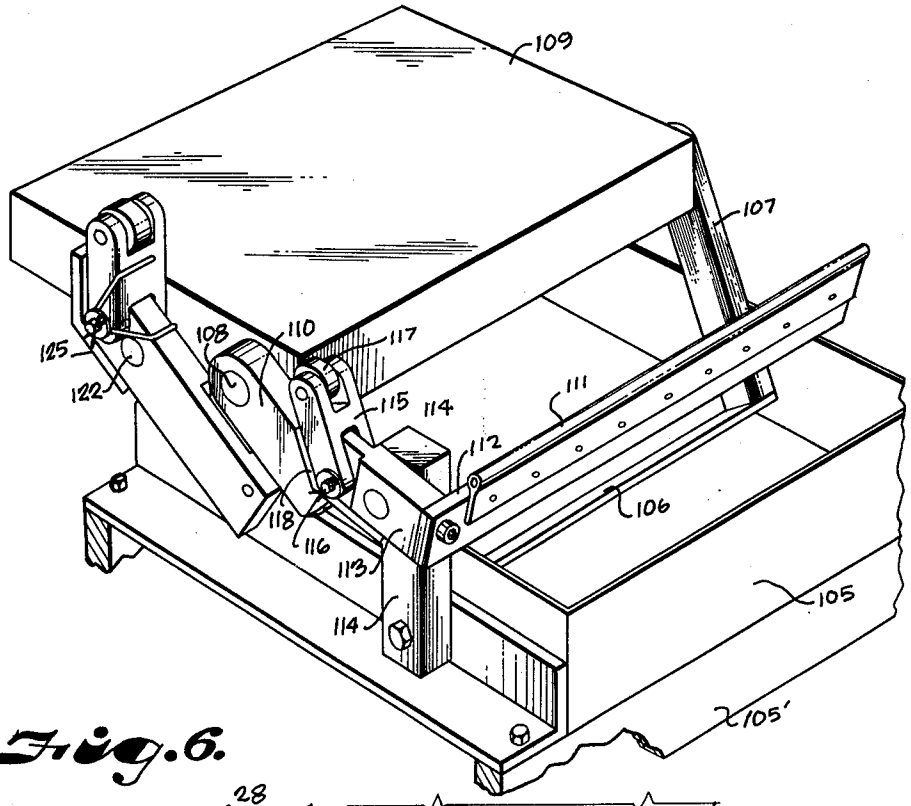
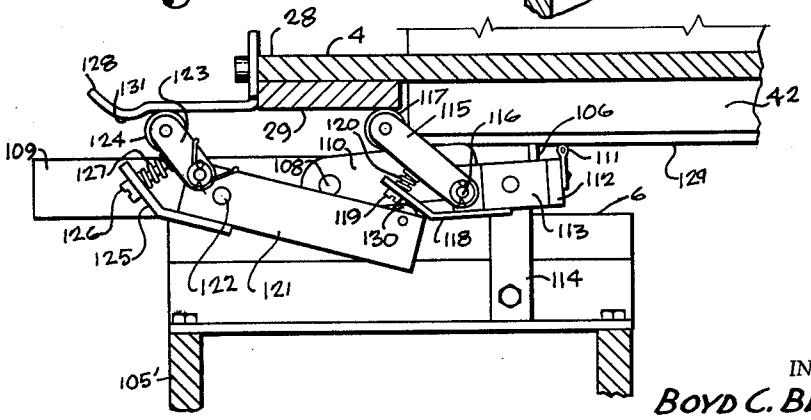


Fig. 6.



INVENTOR.
BOYD C. BLAIR
BY
Fishburn and Gold
ATTORNEYS

June 15, 1965 B. C. BLAIR 3,188,667

REBINDING GRINDER

Filed June 10, 1963 4 Sheets-Sheet 4

Fig. 7.

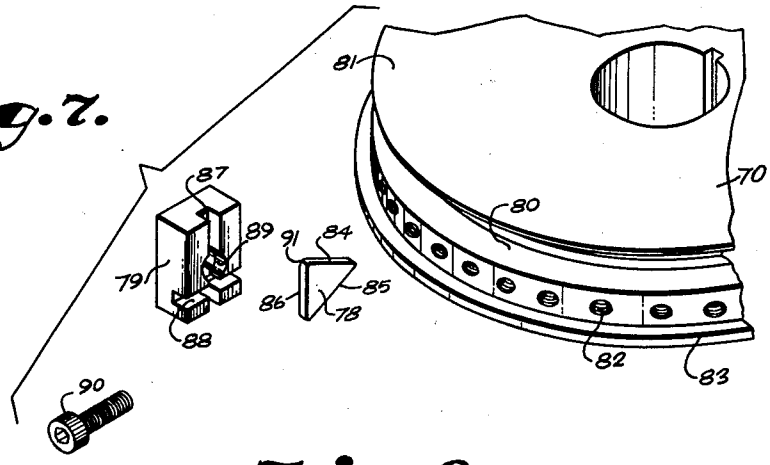


Fig. 8.

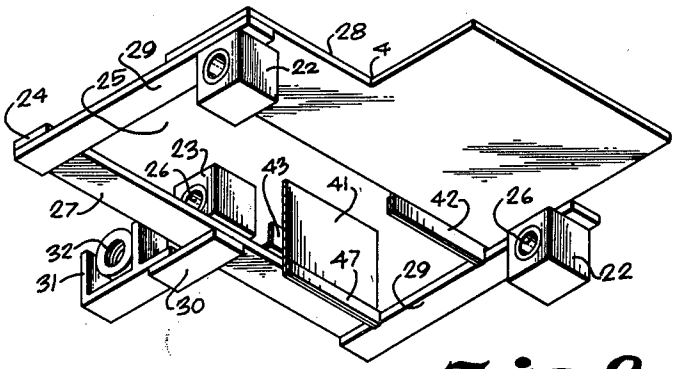


Fig. 10.

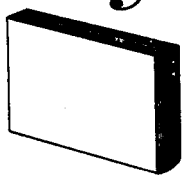


Fig. 9.

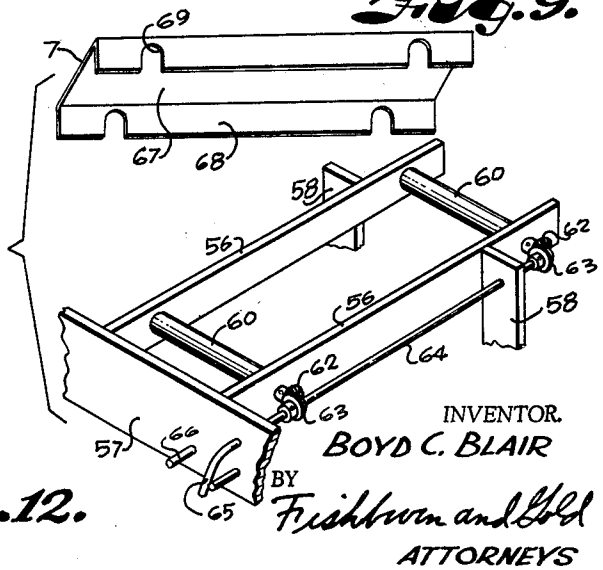


Fig. 11.

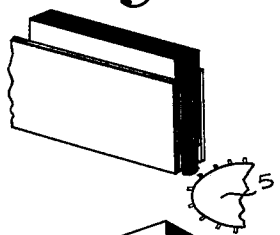
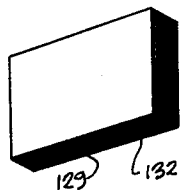


Fig. 12.



INVENTOR.
BOYD C. BLAIR
BY
Fishburn and Gold
ATTORNEYS

United States Patent Office

3,188,667

Patented June 15, 1965

3,188,667

REBINDING GRINDER

Boyd C. Blair, Topeka, Kans., assignor to Brackett Stripping Machine Co., Inc., a corporation of Kansas

Filed June 10, 1963, Ser. No. 286,621
7 Claims. (Cl. 11—1)

This invention relates to the rebinding of books and the like, and more particularly to a machine for removing the binding edges of pages of a book preparatory to rebinding the book.

Bound books usually have a plurality of signatures each consisting of a plurality of sheets folded in a group to form pages with the signatures secured together at the binding edges or folds and a fabric member secured to said binding edges and a suitable cover which may have hard backs or other conventional members secured in a conventional manner at the outermost signatures to complete the book. Of course, it is to be understood that the binding of books varies, and this description of a bound book is not intended to be conclusive or in specific detail. After use, book covers may become worn, or the book otherwise deteriorate, whereby it is desirable to rebind the book. In rebinding operations, as contemplated by the present invention, the old cover and the fabric strip at the binding edges of the signatures may be torn or otherwise separated and removed from the signatures or the grinding operation may be performed prior to removing the old cover. The signatures or the signatures and cover are clamped to hold same in a relative position and a portion of the pages at the signature folds or binding edges are removed to present even binding edges all in one plane. The book is then removed from the clamp and, if the cover was left on during the grinding, it can then be easily separated and removed from the signatures. The ground signatures are then divided in sections and the respective sections sewed or otherwise secured at the binding edges of the pages whereby the number of pages of the respective sections are similar to the normal number in the signatures. The sections of the book are then assembled, fabric applied to the binding edges and then a new cover applied in a similar manner to the method of applying same in making the original bound book. This invention also contemplates the binding of sheets, magazines or the like in books wherein the quantity of sheets or magazines or the like are clamped and a portion of the binding edges removed with the remainder of the binding operation substantially the same as above described in rebinding of a book. After the cutting of the portions of the binding edges from the pages, there can be difficulty in handling the pages of the book when removed from the clamping device and processed for separating into sections. This invention contemplates the application of a strip of glue or the like while the pages are still clamped together to aid in maintaining the pages in their relative position while being separated into sections and further processed.

The principal objects of the present invention are to provide for holding old books, with or without covers, and grinding or cutting the portion where the pages are connected together from said book in preparation of rebinding the pages with new covers; to provide an apparatus for holding a plurality of sheets or pages to be bound in a book with a portion adjacent the binding edges thereof exposed and effecting relative movement of said held pages and a cutter to remove some of said exposed portion whereby said binding edges are in a single plane in preparation for further processing and binding said pages into a book; to provide such an apparatus or machine with clamping members to engage outer faces of a book or a plurality of pages or sheets to be bound in a book to clamp

same together and a support associated therewith and on which said pages are positioned when placed between the clamping members to adjust the extent of a portion adjacent the binding edges that is exposed or extends from the clamping members; to provide such a machine or apparatus wherein the support is adjustable to vary the extent of the exposed portion and thereby the amount removed or cut from the pages with the cut edges forming new binding edges of the pages; to provide such a structure with mechanism actuated by the relative movement of the cutter and the clamped pages after cutting or grinding of the edges thereof for applying glue or adhesive to a portion of said cut edges to retain same in registry in further handling after removal from the clamping apparatus; to provide such an apparatus with a rotatable cutter wheel having cutter blades and cutter holders removably mounted therearound with blade points exposed to cut or grind the binding edges of the sheets as they are moved by the cutter; to provide such a cutter structure with triangular blades with angularly disposed faces on the cutter wheel cooperating with the blade holders to accurately position the blades thereon; to provide such a machine wherein the page-clamping members are on a mobile carriage with a reversible motor drive and controls with stops whereby a control is actuated to initiate movement of the carriage in one direction and on completion of its travel in said one direction the movement of the carriage is reversed and returned to the starting position and then stopped; and to provide a machine for holding book pages and grinding the binding edges thereof and adhering portions of said edges together for further processing in rebinding said pages in a book which machine is economical to manufacture and is fast, efficient, positive and substantially safe in operation.

Other objects and advantages of this invention will become apparent from the following description taken in connection with the accompanying drawings wherein are set forth by way of illustration and example certain embodiments of this invention.

FIG. 1 is a perspective view of apparatus embodying the features of the present invention for removing the binding edges of a book prior to rebinding of same.

FIG. 2 is a vertical transverse sectional view through the machine taken on the line 2—2, FIG. 3.

FIG. 3 is a plan view of the machine with portions broken away to better illustrate the cutter location and shaft supports.

FIG. 4 is a partial longitudinal sectional view through the machine taken on the line 4—4, FIG. 2, with portions broken away to show the cutter structure.

FIG. 5 is a partial perspective view of a glue applicator and actuating means therefor.

FIG. 6 is a partial sectional view through the machine showing the book carriage in glue-applying position.

FIG. 7 is a disassembled partial perspective view of the cutter wheel, cutter blade and holder.

FIG. 8 is a partial perspective view of the book carriage.

FIG. 9 is a disassembled partial perspective view of the adjustable book support.

FIG. 10 is a perspective view representing a book to be rebound.

FIG. 11 is a diagrammatic perspective view representing the book clamped and being moved over the grinding cutter.

FIG. 12 is a perspective view representing the book after grinding with adhesive on the ground edges.

Referring more in detail to the drawings:

The reference numeral 1 generally designates a book grinding machine for removing the binding edges of pages of a book preparatory to rebinding of the book. The

machine 1 generally includes a frame 2 supporting spaced longitudinal ways 3, a carriage 4 and a cutter 5 relatively movable along said ways to remove edge portions of a book on said carriage. The machine also includes glue-applying apparatus 6 for applying a strip of glue to the cut edges of the book to aid in holding the pages thereof in their relative positions. The machine also includes a book support 7 that is adjustable relative to a book clamp 8 on the carriage 4 to adjust the extent of the book extending from the clamping members and thereby the amount to be removed by the cutter 5 as the book is moved thereby.

In the structure illustrated, the frame 2 includes end frames 9 and 10 each of which have legs or posts 11 connected by suitable transverse members 12 including a top member 13 to form a rigid structure. The end members 9 and 10 are connected by a plurality of vertically spaced longitudinal side members 14, 15 and 16 which, in the illustrated structure, are angle members extending along each side of the machine to provide support for transverse members, as later described. The upper side frame members 14 are preferably spaced below the top membes 13 of the end members 9 and 10, as illustrated in FIG. 2. It is also preferred that the lowermost side members 16 be spaced upwardly from the feet 17 at the lower ends of the posts or legs 11 and that side wall panels 18 be suitably secured to close the sides of the machine between the side members 14 and 16. It is also preferred that end wall panels 19 be secured to the end frame members with the lower edges at the same height as the lower edges of the side wall members and with the end wall panels extending to the top of the end frame members.

The carriage guides or ways 3, in the illustrated structure, are laterally spaced cylindrical rods 20 and 21 having their ends fixed to the end frame members 9 and 10 to slidably mount guide bearings 22 and 23 respectively of the carriage 4. In the structure illustrated, the carriage 4 includes a platform 24 having a longitudinally extending opening 25 with two guide bearings 22 depending below the platform and the guide bearing 23 extending upwardly therefrom, each of said guide members having bearing bushings 26 forming bores that slidably receive the respective guide rods 20 and 21, the guide rod 20 being on a lower level than the guide rod 21 whereby the guide rod 20 is below the platform and the guide rod 21 is above the platform 24. In the structure illustrated, the platform has spaced plate members 27 and 28 rigidly connected at their ends by transverse bars 29 to define the opening 25, the length of which is greater than that of any book to be processed. The guide members 22 are mounted on the bars 29 below the end portions of the plate 28. The guide members 23 is preferably mounted on the plate portion 27 substantially midway the length thereof whereby the bearing members 22 and 23 provide a substantial three-point mounting of the carriage 4 for guided movement longitudinally of the machine.

It is preferred that the carriage be moved under power. Therefore, the carriage has a rearward extension 30 from the plate member 27, said extension having spaced upstanding flanges 31 between which is pivotally mounted a threaded nut 32 that is threaded on a feed screw 33 that extends therethrough. The ends of the feed screw are rotatably mounted in bearings 34 carried by the end frame members 9 and 10 whereby the screw is rotatably mounted and parallel to the guide rods 20 and 21. In the structure illustrated, the screw 33 has a pulley 35 fixed thereon and operatively connected by a belt 36 with a pulley 37 on a shaft 38 of a reversible motor 39. In the structure illustrated, the motor is adjustably mounted on spaced frame members 40 whereby the motor can be selectively moved up and down to tighten the belt 36 and operation of the motor drives the screw 33 and moves the carriage 4 longitudinally of the guide rods 20 and 21.

The clamp mechanism 8 on the carriage preferably consists of clamp plates 41 and 42, one preferably being stationary and the other movable. In the structure illustrated, the clamp plates extend substantially the length of the opening 25, the plate 41 preferably being stationary and fixed to the carriage plate 27 by means of an angle member or bracket 43 with the lower part of said clamp plate 41 extending downwardly through the opening 25 as later described. The movable clamp plate 42 substantially corresponds in size to the clamp plate 41 and also extends downwardly in the opening 25. The clamp plate 42 preferably is fixed to a longitudinal reinforcing member 44 from which spaced parallel guide rods 45 extend, said guide rods being slidably mounted in upstanding guide blocks 46 on the carriage plate 28, said guide rods and blocks cooperating to maintain the clamp plates 41 and 42 in parallel relation.

In the machine illustrated, the books are clamped between the clamp plates 41 and 42 with a portion extending downwardly therefrom, the downwardly extending portion being that from which the material is to be cut. In order to have positive clamping of the book or pages thereof, particularly where the book structure is of non-uniform thickness, it is desired to have the portion of the book clamped positively adjacent the cut to be made. In the structure illustrated, the lower portion of the clamp plates 41 and 42 each have rails or strips 47 on their inner faces at the lower edges and extending longitudinally thereof as illustrated in FIGS. 2 and 8. For ordinary books, it is preferred that these strips be in the nature of ¾-inch wide and 1/16-inch thick. It is preferred that substantial force be applied in clamping of the book as well as high speed operation. Therefore, the movable plate 42 in the illustrated structure is actuated by a suitable ram 48. The ram includes a cylinder 49 fixed on the carriage plate 28 with its piston rod 50 connected to the reinforcing member 44 of the clamp plate 42. The ram is preferably pneumatic, the cylinder being connected by hoses 51 and 52 to a valve member 53 that has communication through a hose 54 with a suitable source of fluid pressure. The valve 53 is actuated by a lever 55 to selectively apply air to the ends of the cylinder 49 and move the clamp plate 42 to and from book-clamping positions.

In the structure illustrated, the carriage 4, when in loading and unloading position, is at the right end of the machine (FIG. 3) or adjacent the end member 9. In the loading position of the carriage, there is a book support 7 positioned under the opening 25 in the carriage, said book support being adjustable toward and away from the lower end of the clamp plates 41 and 42 to vary the portion of the book that will extend below the clamp plates. In the structure illustrated, there are laterally spaced rails 56 each having one end fixed to a transverse plate member 57 of the end frame member 9 and their other end portions fixed to upright members 58 that extend upwardly from a transverse frame member 59 mounted on the angle frame members 15. The spacing between the rails 56 is greater than the maximum spacing of the clamp plates 41 and 42 and extending therebetween are spaced eccentric cylinders 60 eccentrically mounted on shafts 61 which are rotatably mounted in the rails 56. Each of said eccentric cylinders are preferably rotated by means of gears 62 fixed on each of the shafts 61 and meshing with gears 63 on the shaft 64 that is rotatably mounted in the plate 57 and one of the members 58 as illustrated in FIG. 9. In the structure illustrated, the shaft 64 extends outwardly of the end member 9 and has a downturned end portion 65 movable between stops 66 to limit the rotative movement of the shaft 64 as between the upper and lower maximum positions.

The book support 7 includes a platform 67 that has downturned side flanges 68 with spaced U-shaped cutouts 69 whereby the flanges will engage over the cylin-

drical eccentrics 60. The flanges at the upper portion of the cut-outs will rest on said eccentric cylinders 60 and rotation of said eccentric cylinders will move the platform up and down relative to the clamp plates 41 and 42. It is preferred that the spacing be adjustable for approximately ⅛ to ¼-inch below the lower edges of the clamp plates, it being contemplated that the cut to remove material from the extending portion of the book be in the nature of 1/16 to 3/16 inch.

The cutter 5 is adjacent the carriage when in book loading and unloading position and in the path of the travel of the carriage as it is moved from said position. In the structure illustrated, the cutter 5 includes a wheel 70 adapted to be rotated on a vertical axis, said wheel preferably being fixed to a shaft 71 of a motor 72, said motor being mounted on a frame 73 that is movable vertically on guides 74 carried by spaced transverse frame members 75, the frame 73 being movable under control of an adjusting screw 76 rotatable on the frame 2 and having a hand wheel 77 to move the motor 72 vertically to adjust the position of the cutter and clearance between the cutter and the lower edges of the clamping plates 41 and 42.

The grinding or cutting wheel preferably includes a plurality of separable cutting elements 78 of tungsten carbide or other suitable high speed cutter material and a holder 79 for each cutting element arranged to cooperate with the periphery of the cutter wheel to hold the cutting elements in proper position. In the structure illustrated, the wheel periphery has a V-shaped groove 80 adjacent the upper surface 81 and a plurality of circumferentially spaced threaded holes 82 below the groove 80. An annular flange 83 extends outwardly from the wheel below the apertures 82. The cutting elements 78 are flat triangular pieces with edges 84 and 85 in angular relation corresponding to the included angle of the groove 80 and with an edge 86 substantially perpendicular to a bisector of the angle between the edges 84 and 85 whereby said edge 86 will extend into and be positioned in a groove 87 in the holder 79. The holder has a groove 88 adapted to receive the flange 83 and a bore 89 adapted to register with an aperture 82 whereby a screw shank 90 will extend through the bore 89 and into the threaded aperture 82 to draw the holder toward the periphery of the wheel 70 and clamp the cutting element edges between the bottom of the groove 87 and the faces of the groove 80. With this arrangement, the corner 91 of the cutting element extends upwardly above the face 81 and forms a cutting edge, said point being ground whereby the adjacent portions of the edges 84 and 86 incline in trailing relation to the point to provide necessary clearance or relief for proper cutting. It is preferred that the cutting element 78 be equilateral so that each of the points may serve as cutting points and when one wears it is only necessary to remove the holder, turn the cutting element to present another point, and then replace the holder.

An open top housing 92 is arranged around and under the cutter, said housing communicating with a duct 93 that leads to a dust collector 94 having a suitable suction device whereby the cuttings from the books are withdrawn to the dust collector. The housing 92 is preferably supported by a bracked 95 secured to a transverse frame member 96. A guard plate 97 is mounted on each of the bars 29 of the carriage by suitable fastening devices 98, said guards extending away from the carriage so as to be positioned over the cutter when the carriage is moved to either end of its travel. The end plates 57 of the frame end members have apertures 99 through which the guards 97 extend when the carriage is at the end of its movement adjacent the respective frame end member.

With a book positioned between the clamping plates, a switch lever 100 of a switch 101 mounted on the carriage is moved to close the circuit to the motor 39 which rotates the screw 33 causing the carriage to move longitudinally of the machine. The motor 72 drives the cutter so that as the book moves across the cutter the extending edges of the book are cut in a single plane. When the carriage reaches the end of its movement from right to left (FIG. 3), the switch lever 100 strikes a stop 102 so that continued movement of the carriage 4 causes the switch lever to move to motor-reversing position, reversing the circuit to the motor 39 so it turns the screw 33 in a reverse direction to move the carriage back toward the right end of the machine (FIG. 3). As the carriage moves to book loading and unloading position, the switch lever strikes a stop 103 so that continued movement of the carriage causes the switch arm 100 to move to a neutral or circuit-breaking position whereby movement of the carriage then stops. It is preferred that flat platforms 104 be placed on each of the end frames 9 and 10 to extend outwardly therefrom, forming shelves for supporting materials. It is also preferred that a plate-like member 104' be mounted on the guides 46 to extend over the cylinder 49 serving both as a guard and as a work support.

While the machine constructed and operated as described will cut the book or group of pages, it is preferred that the machine be provided with means for applying adhesive to the cut edges to aid in holding the sheets or pages in their registered position and, also, to hold the groups of sheets when divided into sections for sewing or otherwise securing of the binding edges whereby the sections correspond to signatures of the finished book. It is preferred that only a small amount of glue be applied and then wiped to a thin film that will quickly dry and permit handling of the cut group of sheets in further processing for the rebinding of the book. In the structure illustrated, an open top pan or container 105 is supported by transverse frame members 105' adjacent the end frame member 10 and under the path of the adjacent end of the book clamped in the carriage as it moves to its limit of travel toward the end member 10. The container 105 is adapted to contain a quantity of glue with an applicator bar 106 immersed therein. The bar 106 is carried on an arm 107 pivotally mounted on a shaft 108 that extends through a bearing plate 109 and has an actuating lever 110 fixed on the other end thereof. In the illustrated structure, the arm 107 is on one side of the bearing plate 109 and the lever 110 is on the other side, with the bar 106 fixed to the arm 107 and extending therefrom transversely of the container 105, the opposite end of the bar being free. A resilient wiper 111 is fixed to a bar 112 carried on an arm 113 that is pivotally mounted on a bearing post 114 at the side of the container 105, said arm having a lever 115 pivotally mounted thereon by a pin 116, the other end of the lever having a roller 117 rotatably mounted thereon. The arm 113 has a bar portion 118 extending therefrom and turned upwardly in spaced relation to the lever 115, a screw 119 and a spring 120 being arranged on the bar 118 to urge the lever 115 away from the bar and provide a lost motion action thereto. An actuating lever 121 is pivotally mounted as at 122 to the bearing block 109 between the frame end 10 and the lever 110. A lever 123 has a roller 124 at one end and the other end pivotally mounted on the arm 121. A bar 125 is fixed on the arm and extends therefrom in spaced relation to the lever 123 and a screw 126 and spring 127 cooperate with the bar 125 to urge the lever 123 therefrom.

The carriage has an extension cam 128 extending therefrom at the end toward the end frame member 10 so that as the carriage moves to the glue-applying position the cam bar 128 engages the roller 117, swinging the lever 115 downwardly to raise the wiping member 111 up against the cut edge 129 of the book between the clamping plates. Further movement of the carriage causes the cam bar 128 to engage the roller 124 to swing the arm 121 upwardly and move a roller 130 on said arm into engagement with the arm 110 in spaced relation to the shaft 108. This swings the lever arm 110 upwardly, rotating the shaft 108 to swing the arm 107 and applicator bar 106 upwardly until the bar engages the cut edge

129 of the book to apply glue thereto. The lever arrangement and spring 127 assures that the applicator bar 106 will engage the cut edge of the book even though there is some variation in the elevation thereof, but it is preferred that the cam bar 128 have a downwardly extending low portion 131 whereby there is only a periodic contact of the applicator bar with the cut edge thereby limiting the amount of adhesive applied thereto. Then, as the carriage returns to the opposite end of the machine, the roller 117 and lever 115 engaging the under side of the carriage and the cam bar maintain contact with the wiping member 111 and the book so as to spread the adhesive. It should be noted that on return movement of the carriage the cam bar quickly is disengaged with the actuating lever of the arm 121, allowing the applicator bar 106 to return to its lowered position while the wiping element is maintained in its upper position to assure that it will contact the glue and spread same.

In using a machine constructed as described, in the preparation of books or a plurality of sheets for binding, the machine is connected to a suitable source of power and fluid pressure, the power for the dust collector 94 is then started, and the cutter motor 72 is energized to drive the cutter wheel. Then, with a book, as for example a book that has the bound edge rounded and with backs, the backs or covers may be removed or the entire book may be placed between the clamp plates 41 and 42 with the bound edge down and resting on the support platform 67. It is desirable to cut all of the rounded portion off. Therefore, the shaft 64 is rotated to move the platform 67 up or down to obtain the desired removal from the bound edges of the book. The valve lever 55 is then actuated to apply air pressure to the ram cylinder 49, moving the plate 42 toward the plate 41 to clamp the book therebetween. The rails 47 concentrate the pressure of clamping adjacent the edge to be cut to be sure that all of the pages will be positively held in position and eliminate possibility of one edge portion moving relative to another. The switch lever 100 is then moved toward the stop 102, closing the circuit to the motor 39 to effect rotation of the feed screw 33, causing the carriage to move, carrying the book across the cutter 5. As the book is moved, the cutter rotates to cut substantially all of the portion of the book that projects downwardly from the lower edges of the clamping plates, cutting the edge in a plane. This removes any fabric back and the stitched edges of the signatures of the book. Continued movement of the carriage toward the frame end 10 causes the cam bar to engage the roller 117 to move the wiper arm 113 into wiping position as the carriage is substantially at the end of its travel in that direction. The cam bar engages the roller on the lever 123 to swing the arm 121, lever arm 110 and arm 107 to move the glue applicator bar 106 into engagement with the cut edge 129 of the book to deposit some glue thereon. At that time, the switch lever 100 engages the stop 102 so the last carriage movement causes the switch arm to move to circuit-reversing position to the motor 39 to reverse the rotation of the screw 33 and move the carriage back to the book loading and unloading position. At the start of its return travel, the cam bar 128 is disengaged from the lever 123, but the lever 115 is still engaged so that the wiper element 111 will move over the glue, spreading the glue into a thin film, forming a stripe 132 that extends transversely of the cut edge 129 of the book. As the carriage continues to move back to its position adjacent the frame end 9, the switch lever 100 engages the stop 103 whereby the carriage movement moves the switch arm to neutral or circuit-breaking position to stop the carriage movement. Then, the operator moves the lever 55 whereby air is applied to the ram cylinder 49 to move the clamp bar 42 away from the clamp bar or plate 41, releasing the ground or cut book. If the cover had been left on, the removal at the backing would be such that the hard covers would be free and could be removed. The pages of the book then consist of a plurality of separate pages held together only by the glue strip 132, but this glue is sufficient to maintain the orientation. The group of pages is then removed from the clamp as a unit and taken to a divider which separates the book into a plurality of sections, each of which preferably has a number of pages substantially corresponding to a number of pages of the signatures that originally made up the book. These sections are then suitably sewed, gathered together and secured, and new covers placed thereon to complete the rebinding. It is to be understood that this machine can be used for grinding a group of magazines that are to be bound in a book or that a book can have the hard covers removed and merely the pages clamped and ground.

It is to be understood that while I have illustrated and described one form of my invention, it is not to be limited to the specific form or arrangement of parts herein described and shown except insofar as such limitations are included in the claims.

What I claim and desire to secure by Letters Patent is:

1. In a book grinding machine, a frame, a carriage, laterally spaced guides in said frame engaged by said carriage and defining a linear path of travel of said carriage, said carriage having an opening therethrough with dimensions larger than the length and thickness of a book to be bound, opposed clamping plates on said carriage with corresponding edges of said plates extending through the opening in the carriage, means for effecting relative movement of said clamping plates toward and away from each other to selectively clamp and release a plurality of book pages therebetween in face-to-face relation with the bound edges of said book pages longitudinally of the linear path of travel of said carriage, said carriage having a loading and unloading position in its path of travel, a book support adjacent to the corresponding edges of said clamping plates that extend through the carriage opening and adapted to be engaged by a portion of said book pages extending from said edges of the clamping plates to position said pages as they are clamped between the clamping plates when the carriage is in loading position, a reversing motor mounted on said frame, means operatively connecting said reversing motor to the carriage whereby when the motor is energized it moves the carriage along its path of travel and then upon reversal returns the carriage along its path of travel, a rotating cutter in the frame in the path of the carriage and operable to cut the book pages below the edges of the clamping plate in a plane parallel thereto as the carriage moves the book by the cutter, motor control switch means carried on the carriage, and stop means on said frame positioned to be engaged by the motor control switch means to actuate same in response to movement of the carriage whereby upon actuation of the switch means the carriage is moved in one direction along its path of travel until the switch means is engaged by the stop means and is reversed to reverse the motor and thereby reverse the travel of the carriage back to its original position.

2. In a book grinding machine as set forth in claim 1 wherein one of said opposed clamping plates is fixed on the carriage and the other is movably supported on the carriage and guide with the means for effecting relative movement of said plates being a pneumatic ram mounted on the carriage and operatively connected with said other clamping plate.

3. A book grinding machine as set forth in claim 1 including means for applying glue to the cut book edge, said means consisting of a glue container, a glue applicator bar adapted to dip into glue in the container, means mounting said glue applicator bar for movement from said glue container to contacting relation with the cut edge of the book, and means actuated by movement of the carriage for moving the applicator bar mounting means to glue-applying position.

4. In a book grinding machine, a frame, a carriage,

laterally spaced guides in said frame engaged by said carriage and defining a linear path of travel of said carriage, opposed clamping plates on said carriage, means for effecting relative movement of said clamping plates toward and away from each other to selectively clamp and release a plurality of book pages therebetween in face-to-face relation with the bound edges of said book pages longitudinally of the linear path of travel of said carriage, said carriage having a loading and unloading position in its path of travel, a book support substantially parallel to adjacent edges of said clamping plates and adapted to be engaged by a portion of said book pages extending from said edges of the clamping plates to position said pages as they are clamped between the clamping plates when the carriage is in loading position, means for adjusting the spacing between said book support and said clamping plate edges to vary the amount of the pages extending from between said clamping plates, a feed screw operatively connected with said carriage, a reversing motor mounted on said frame, means operatively connecting said reversing motor to the feed screw whereby when the motor is energized it drives the feed screw to move the carriage along its path of travel and then upon reversal returns the carriage along its path of travel, and a rotating cutter mounted in the frame and operable to cut in a plane between the clamping plate edges and the book support and substantially parallel to the plane of the edges of the clamping plates whereby said cutter cuts material from the extending portion of the book pages as the carriage passes in its path of travel.

5. In a book grinding machine, a frame, a carriage, laterally spaced guides in said frame engaged by said carriage and defining a linear path of travel of said carriage, said carriage having an opening therethrough with dimensions larger than the length and thickness of a book to be ground, opposed clamping plates on said carriage with corresponding edges of said plates extending through the opening in the carriage, means for effecting relative movement of said clamping plates toward and away from each other to selectively clamp and release a plurality of book pages therebetween in face-to-face relation with the bound edges of said book pages longitudinally of the linear path of travel of said carriage, said carriage having a loading and unloading position in its path of travel, a book support adjacent to the corresponding edges of said clamping plates that extend through the carriage opening and adapted to be engaged by a portion of said book pages extending from said edges of the clamping plates to position said pages as they are clamped between the clamping plates when the carriage is in loading position, means for adjusting the spacing between said book support and said clamping plate edges to vary the amount of the pages extending from between said clamping plates, opposed ribs on the page-engaging faces of the clamping plates along said corresponding edges thereof for concentration of clamping force adjacent the said edges, a feed screw operatively connected with said carriage, a reversing motor mounted on said frame, means operatively connecting said reversing motor to the feed screw whereby when the motor is energized it drives the feed screw to move the carriage along its path of travel and then upon reversal returns the carriage along its path of travel, a rotating cutter supported in the frame to cut in a plane between the clamping plate edges and the book support and substantially parallel to the plane of the edges of the clamping plates, motor means operatively connected to said rotating cutter to drive same whereby said cutter cuts material from the extending portion of the book pages as the carriage passes in its path of travel.

6. A book grinding machine as set forth in claim 5 including means for applying glue to the cut book edge which means consists of a glue container, a glue applicator bar adapted to dip into glue in the container, means swingably mounting said glue applicator bar for movement from said glue container to contacting relation with the cut edge of the book, means including a lost motion connection actuated by movement of the carriage for swinging the applicator bar mounting means, a glue spreader and means actuated by movement of the carriage for moving said spreader into engagement with the cut end of the book to spread the glue applied thereto for a portion of the length of the book.

7. In a book grinding machine, opposed clamping plates, means for effecting relative movement of said plates toward and away from each other to selectively clamp and release a plurality of book pages therebetween in face-to-face relation, a book support adjacent to corresponding edges of said clamping plates adapted to be engaged by a portion of said book pages extending from said edges of the clamping plates to position said pages as they are clamped between the clamping plates, means for adjusting the spacing between said support and said clamping plate edges to vary the amount of the pages extending from between said clamping plates, opposed ribs on said page-engaging faces of the clamping plates along said edges thereof for concentration of clamping force adjacent the said clamping plate edges, a rotating cutter operable to cut in a plane between said book support and said clamping plate edge and substantially parallel to the plane of said edges of the clamping plates, said cutter being spaced from said support in a direction longitudinally of the clamping plates, means moving the clamping plates relative to said cutter for cutting the extending book pages to form a planar edge thereto, said rotating cutter consisting of a cylindrical disc member having an end face and a V-shaped groove in the periphery adjacent said end face, a plurality of clamp plates circumferentially spaced around the periphery of the disc with portions extending in overlying relation to a portion of the peripheral groove spaced from said end face, said overlying portions of each clamp plate having a groove therein facing said V-shaped groove and extending transversely thereof, and a triangular cutter member for each clamp plate positioned in said peripheral groove and the respective clamp plate groove with a corner edge extending beyond said end face, and means securing the respective clamp plates to the disc to clamp the cutter members therebetween.

References Cited by the Examiner

UNITED STATES PATENTS

1,741,269	12/29	Alger	11—1
1,988,208	1/35	Martin	11—1
2,572,243	10/51	Cashin et al.	11—1
2,697,236	12/54	McCain et al.	11—1
2,969,554	1/61	McCahon	11—1

FOREIGN PATENTS

580,161	7/59	Canada.
289,711	3/53	Sweden.

JEROME SCHNALL, *Primary Examiner.*

LAWRENCE CHARLES, *Examiner.*