

Dec. 22, 1970

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3,548,431

BOOK REPAIR DEVICE AND METHOD

Filed May 14, 1969

3 Sheets-Sheet 1

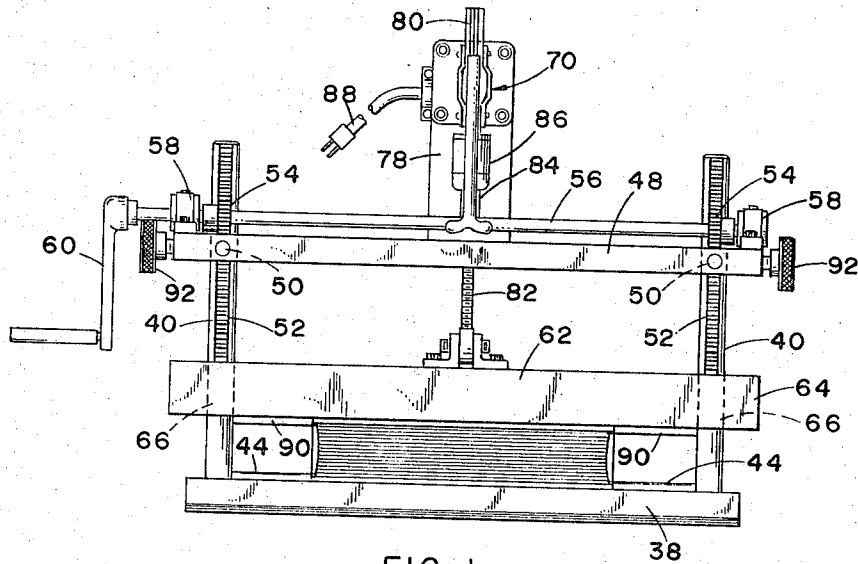


FIG. 1

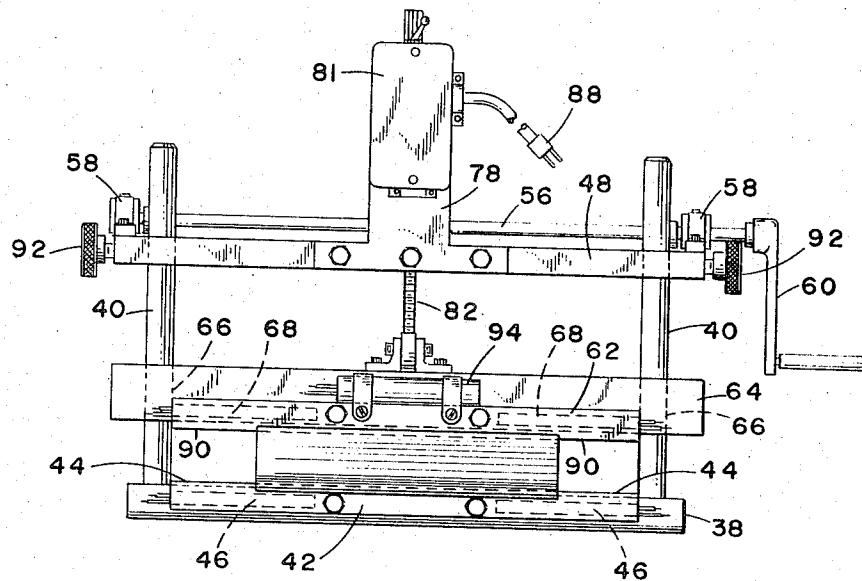


FIG. 2

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3 Sheets-Sheet 2

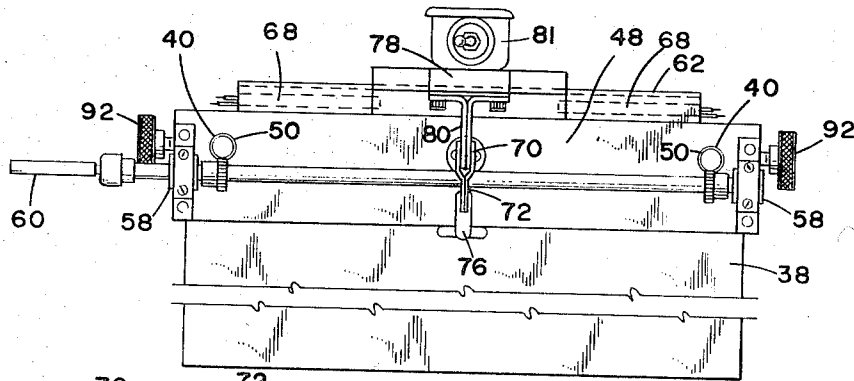


FIG. 3

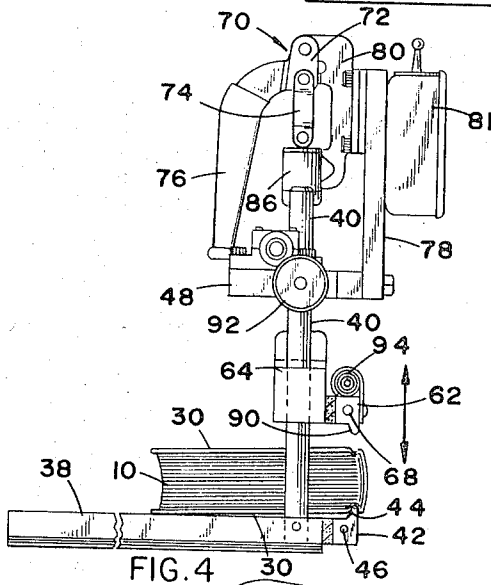


FIG. 4

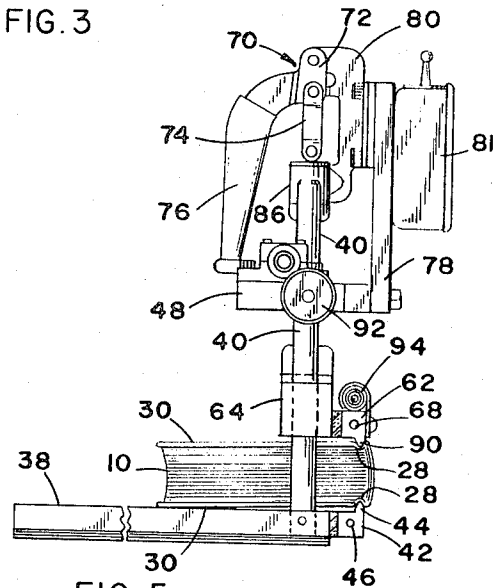


FIG. 5

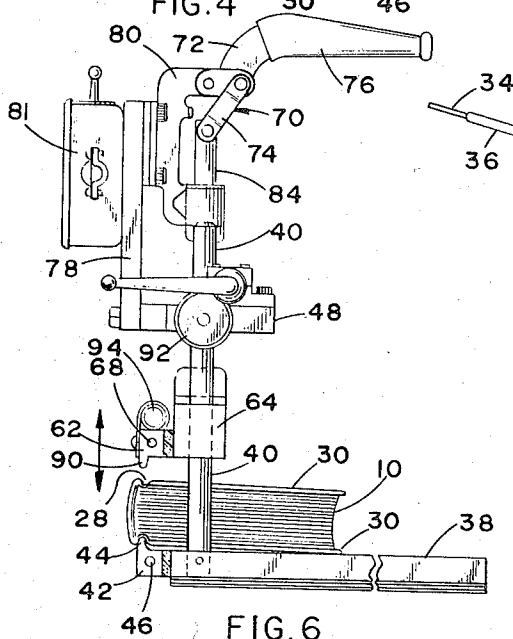


FIG. 6

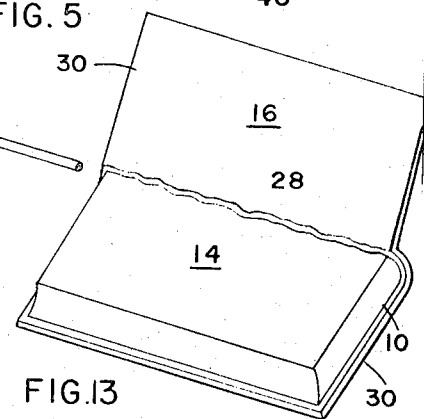


FIG. 13

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3 Sheets-Sheet 3

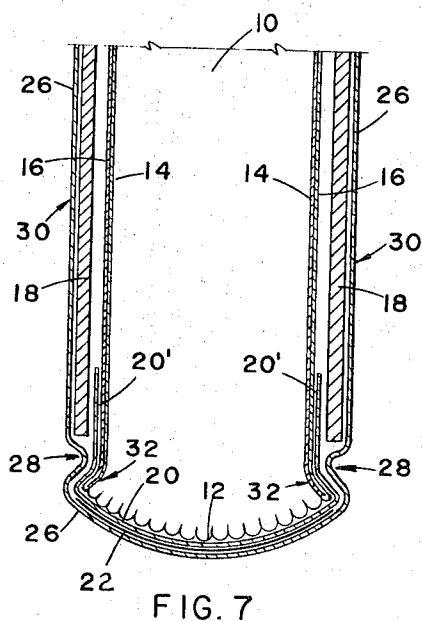


FIG. 7

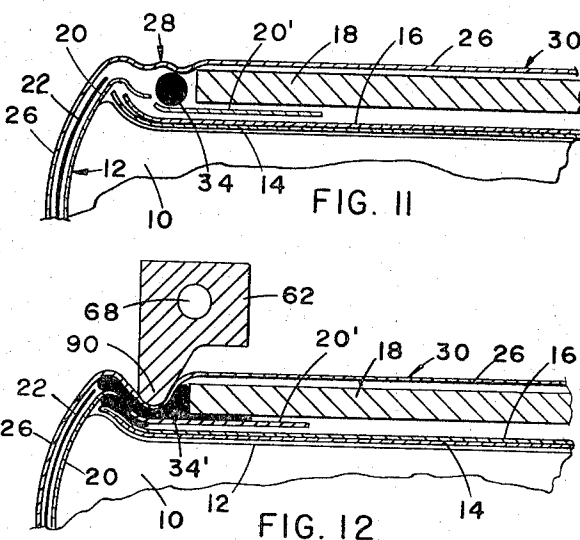


FIG. 11

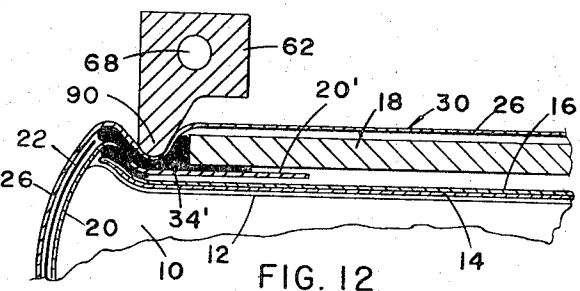


FIG. 12

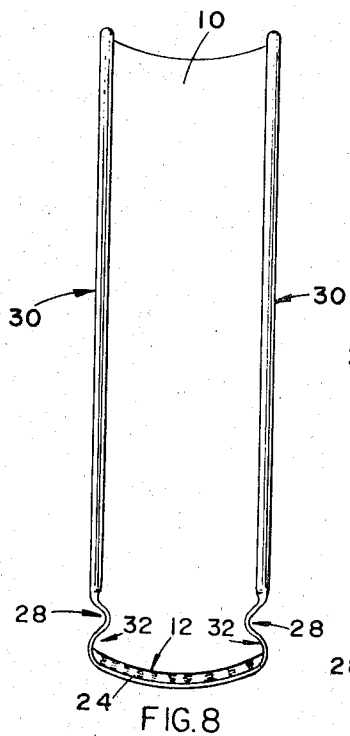


FIG. 8

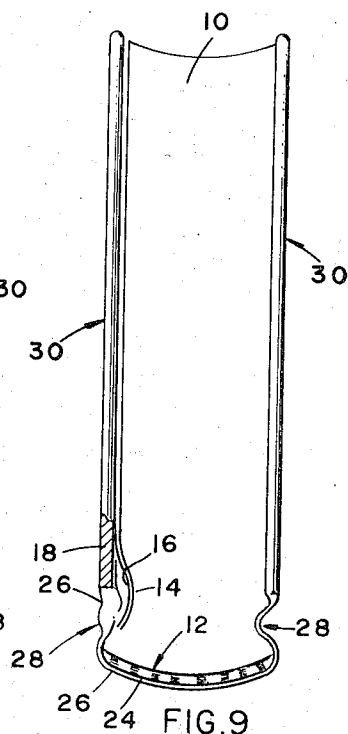


FIG. 9

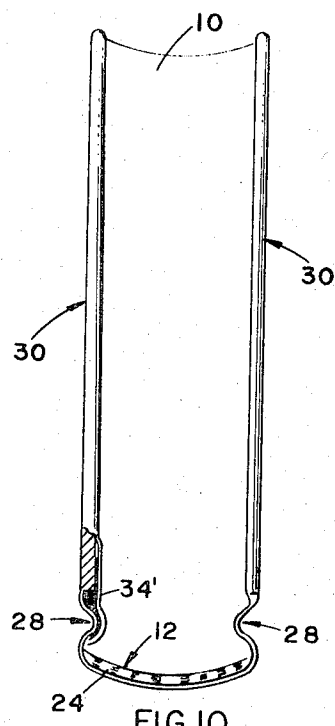


FIG. 10

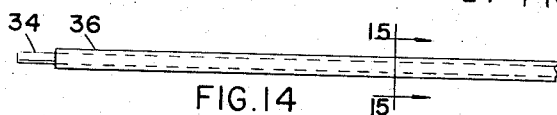


FIG. 14

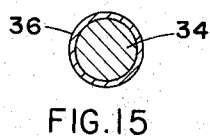


FIG. 15

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3,548,431

BOOK REPAIR DEVICE AND METHOD

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Int. Cl. B42c 17/00

U.S. Cl. 11—1

11 Claims

ABSTRACT OF THE DISCLOSURE

A device and a method of repairing a damaged or weakened joint of a casebound book comprising inserting along said joint a strand of adhesive which is normally either fluid or solid at room temperature, clamping the spine portion of the book by engaging the exterior of at least the joint to be repaired by a clamping member having means to heat the same to a temperature at least sufficient to dry a fluid adhesive or melt a heat-sensitive adhesive and cause the same to adhere to and unite the case cloth and adjacent elements at the edge of the spine of the book to reestablish the joint, and when a heat-sensitive adhesive is used, permit the adhesive to cool, while the joint is clamped until the adhesive is sufficiently solid to hold the reestablished joint stable. Convenient clamping, heating and operating mechanism is included in the device which is adjustable to accommodate a wide range of books of different thicknesses.

BACKGROUND OF THE INVENTION

Casebound books, whether gutter-sewn or side-sewn, as well as so-called perfect-bound caseback books and side-sewn flat back books have covers or sides which are connected to the assembly of bound pages comprising the books by a hinge-like joint comprising a laminated structure which includes the portions of the outermost case cloth which covers the case board of the book; the crash or super which is of a textile nature and surrounds the spine and extends along the inner surface of the caseboard for connection thereto; and the end sheet on the assembly of book pages which are bound together, and comprise the book, all of which are connected by adhesive at the joint. The strength of this joint depends upon three principal factors in the joint area, namely, (1) the suitable width and angle of the joint flange, (2) the use of an adhesive capable of adhering together and forming a laminated structure of the foregoing elements in the joint flange area, and (3) the correct and careful forming of the joint to bring all of the foregoing items in the joint area together into a stable, laminated bond which is formed by the adhesive.

It is frequently found in regard to school books and library books that, either through extended use or carelessness such as by dropping the books, one or the other hinges of the covers will become weakened and damaged or destroyed. This usually results in the case cloth in the vicinity of the joint becoming loosened from the laminated joint flange referred to above which then results in the paper end sheet of the book and/or the textile type crash maintaining the cover precariously connected to the adjacent edge of the spine of the book. After this, very little additional use usually results in the end sheet or the crash becoming torn or weakened to such an extent that the joint of one or both covers or sides of the book are completely useless.

If books have sustained substantial damage to the joints thereof, such as described above, one customary manner of repairing the same is to have them rebound. Rebinding in professional binderies at the present time is very expensive and the average school or library normal-

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ly cannot afford to have this done to any appreciable extent. Accordingly, there are available on the market certain relatively inexpensive book repair means such as either heavy paper or gummed linen strips intended to be adhesively joined to a book cover or side adjacent the joint edge thereof and the adjacent portion of the end sheet of the body of the book which comprises the assembly of signatures sewn or otherwise connected together to form the book. Such a repair device is by no means as effective as the original joints provided in the book when newly manufactured. However, this type of repair means affords a somewhat temporary and inexpensive expedient to permit a school or library to make a damaged book last a little longer in use if care is exercised.

SUMMARY OF THE INVENTION

It is the principal object of the present invention to provide a device which performs a method by which a weakened or damaged joint for the cover or side of a book may be effectively repaired to restore the joint to an even more durable condition than the original joint by utilizing currently available adhesive material commonly referred to as "hot melt" adhesive or glue which is prepared into a rod or strandular form of different cross-sectional sizes and shapes, such adhesive or glue normally being solid at room temperature but capable of being heated and melted to firmly adhere to the elements of the cover and book adjacent the joints thereof and thereby reestablish the flexible lamination of materials comprising the joint of a casebound book. If preferred, liquid or fluid adhesive or glue may be used in lieu of the aforementioned hot melt glue, and the same is introduced by suitable means. Mechanism is also provided to perform the reestablishment of the joint and comprises combination clamping and heating members which exert pressure upon the joint portion of a book during repair thereof simultaneously while the adhesive is being heated to melt it and thereby cause it to flow into firm adherence with the case cloth, portions of the end sheet, and the crash or super of the binding of the book to form a firmly connected laminate which comprises the joint flange associated with the joint which flexibly connects the cover to the spine portion of the book. When using fluid adhesive, such heating means are employed to dry the adhesive while the joint remains clamped.

It is another object of the invention to provide in the mechanism or device, by which the clamping and heating is effected, adjustable means to support one of the clamping members with respect to the other one and thereby permit the device to accommodate a wide range of books of different thicknesses from as little as approximately 1/4 inch up to 4 or 5 inches, or more in bulk.

It is a further object of the invention to provide in the aforementioned device means by which an initial operative position of combination heating and clamping bars is established, followed by separation of the same to permit the insertion of a book therebetween, and then moving the bars relative to each other to and from working position in which the spine portion and joints of a book are firmly clamped under the necessary pressure required to hold one or both of the joints accurately in position with the remaining portions of the book while the adhesive is being melted, or dried, depending on the type used, as well as while the adhesive is cooling or drying adequately to render the reestablished joint stable, following which the clamping members are released from the book to permit removal thereof from the device.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front elevation of a repair device embodying the principles of the present invention.

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FIG. 2 is a rear elevation of the device shown in FIG. 1.

FIG. 3 is a top plan view of the device shown in FIGS. 1 and 2 with a portion of the base being foreshortened to better accommodate the view to the sheet.

FIG. 4 is a side elevation of the device shown in FIG. 3 with the base also foreshortened and illustrating the mechanism in the position in which the upper assembly and clamping bar are being moved into initial operative position relative to the joint of a book to be repaired.

FIG. 5 is similar to FIG. 4 but illustrating the entire upper assembly of the device at a lower level than in FIG. 4 and in which the upper clamping bar is engaged with the joint of the book to be repaired.

FIG. 6 is a view from the opposite end of the device from that shown in FIGS. 4 and 5 and illustrates an exemplary elevated position of the upper clamping bar per se to which it has been moved by operating appropriate portions of the mechanism and thereby permit a book to be withdrawn from the clamping means.

FIG. 7 is a fragmentary, enlarged sectional view, slightly exploded, and illustrating the basic elements of a portion of the binding of a casebound book which comprise the joints thereof that connect the covers to the book.

FIG. 8 is a view similar to FIG. 7 but showing an exemplary book on a smaller scale than FIG. 7.

FIG. 9 is a view similar to FIG. 8 but illustrating in exemplary manner a typical type of damaged joint or hinge for one cover of a book which requires repairing and showing a typical rod or strand of solid-type adhesive inserted in position to be heated by the device shown in FIGS. 1-6, in accordance with the invention.

FIG. 10 is a view similar to FIG. 9 but showing the re-established joint after the adhesive has been heated and thereby caused to be firmly adhered to the disconnected portions of the joint as illustrated in FIG. 9.

FIG. 11 is an enlarged fragmentary sectional view of a book having an extensively damaged joint within which a strand of solid adhesive has been inserted preparatory to repairing the joint and showing in greater detail the various elements of the joint as compared with the view of FIG. 9.

FIG. 12 is a view similar to FIG. 11 but showing the repaired joint and illustrating in exemplary manner the flow of the adhesive which has firmly connected all of the separated portions of the damaged hinge shown in FIG. 11 and in which position they have been held by the upper clamping bar while the adhesive has melted as well as while it is being set.

FIG. 13 is a perspective view showing a book with one cover partially opened to expose an exemplary broken joint and further illustrating a strand of solid adhesive mounted within an inserting tube and in position to be inserted within the broken joint of the book.

FIG. 14 is a side elevation on a larger scale than in FIG. 13 and illustrating a strand of solid adhesive mounted within a stiff inserting tube.

FIG. 15 is a further enlarged sectional view of the assembled adhesive and inserting tube shown in FIG. 14 as seen on the line 15-15 thereof.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Attention is first directed to FIGS. 7-12 to explain necessary details of the binding of a book and particularly the joint by which the covers are hingedly connected to the spine portion of the book in order to appreciate some of the things that occur when a joint of a book cover becomes damaged or completely ruined and, further, what is involved in regard to repairing the same so as to reconstitute the joint for useful purposes. Referring to FIG. 7 in particular, the spine and joint portions of the binding of a book which connect the covers to the spine are shown in somewhat expanded position in order

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to render the various components more readily observable.

In FIG. 7, according to professional book technology, the body of the book 10 is normally referred to as the book. It consists of a number of signatures, each of which comprise a plurality of leaves folded upon themselves along a common line and stitched together in one of several manners variously referred to in the industry as gutter-sewn or side-sewn. For purposes of simplicity, the spine portion 12 of said body of the book is illustrated as consisting of a plurality of exemplary signatures individually represented by small arcs adjacent the spine 12 in FIG. 7. Opposite sides of the book 10 are overlaid respectively by an end sheet 14, each of which are folded upon themselves, the outer portion 16 of each end sheet ultimately being glued to the inner face of the caseboard 18 which comprises a stiffening means for the cover on each face of the book 10. The spine portion 12 of the book also includes a strip of textile material 20 known technically as crash or super. Usually, this is in the nature of sized cheese cloth and the opposite edges 20' thereof extending along the inner surfaces of the caseboards 18 for a suitable distance of approximately an inch and are firmly glued to the adjacent surfaces of said caseboards.

Affixed by glue to the outer surface of the strip of crash 20 is a narrow sheet of heavy paper 22, such as kraft, which primarily is for purposes of providing additional book strength and having decorative head bands 24, see FIGS. 8-10 connected thereto. Overlying the kraft strip 22, which is only as wide as the spine 12 of the book, is the case cloth 26 which not only extends across spine 12 but also covers the entire outer surface of each of the caseboards 18 and is firmly adhered thereto by appropriate adhesive. The joints 28 by which the covers or sides 30 of the book are hingedly connected to the spine 12 are formed by suitably gluing the laminated arrangement of the portions of the case cloth 26, crash 20 and end sheets 14 firmly to each other in the vicinity of the joints 28. This is done by using appropriate conventional adhesive which penetrates said connected portions sufficiently to firmly hold them together, whereby they are in intimate adhering relationship with each other as shown in exemplary manner in FIG. 8. For uniformity, the covers or sides 30 of the book will be hereinafter referred to as covers 30. Also, in FIG. 7, the same elements are in somewhat expanded manner to provide a clearer illustration of such individual elements comprising the joints 28.

The final formation of said joints is accomplished by holding the spine portion of the book firmly clamped between suitable press means which permit the adhesive to connect all of the laminated elements of said joint and in so doing, a joint flange 32 is formed at each joint. The strength of the joint depends primarily upon the proper width and angle of said joint flange, the angle thereof being illustrated in exemplary manner and especially in FIGS. 7 and 8. Said strength also depends upon the use of an adhesive capable of adhering and forming a durable laminated structure in the hinged flange in which the case cloth, crash and end sheet are all connected firmly together. Further, the strength of the joint also depends upon the proper formation of the joint in order to bring said laminated elements thereof together in such stable arrangement as to bond the same into a substantially unitary joint.

As exemplary illustration of typical damage to a broken joint is illustrated in FIG. 11. Said illustration is more or less exemplary of a rather badly damaged point and in which it will be seen that the case cloth 26 in the region of the joint 28 has become completely separated from the crash 20, the crash 20 has been separated from the outer end portion 20' and the inner end sheet 14 has become separated or torn from the outer portion 16 of the end sheet. When in this condition, the cover 30 is practically only dangling from the book 10 comprising the assembly of signatures of printed pages.

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In accordance with the principles of the present invention, even such a badly damaged joint 28 may readily be repaired by inserting a strand 34 of preferably so-called hot melt adhesive or glue within the region of the damaged joint 28 which is illustrated in exemplary manner in FIG. 11. A similar situation is shown in exemplary manner on a smaller scale in FIG. 9.

To illustrate the preferred manner of inserting the strand of adhesive 34, attention is directed to FIGS. 13-15, wherein one cover 30 of the book is shown in partially opened position to expose the damaged hinge 28. The strand of adhesive 34 is selected to be of appropriate diameter and length, preferably slightly longer than the length of the book 10, and is inserted within a stiff tube 36, somewhat resembling a soda straw in size and preferably formed from metal or stiff plastic. Such an exemplary tube is best illustrated in FIGS. 14 and 15. When the adhesive is inserted within the tube, the assembly is then introduced into the interior of the damaged joint 28, longitudinally, for the full length of the joint. Then, by holding a projecting end of the strand of adhesive 34 and pulling the first inserted end of the tube 36 from the opposite end of the joint 28, the strand of adhesive 34 will be left within the joint, generally within the region shown in FIG. 11. The opened cover 30 then is closed so as to dispose it against the book 10 comprising the body of leaves thereof, and such assembly then is subjected to heat and pressure provided by the mechanism illustrated in FIGS. 1-6, details of which are as follows.

If preferred, fluid adhesive 34' may be used, the same being introduced in the form of a suitable stream of uniform diameter, such as by being drawn into a suitable tube similar to tube 36 by an elongated plunger, similar in shape to strand 34, which is used to discharge the adhesive in the damaged joint by withdrawing the tube therefrom, while holding the plunger stationary, and thereby dispose the stream of adhesive in the joint, to be dried by a heater to be described.

The preferred embodiment of repair apparatus or device illustrated in FIGS. 1-6 comprises a suitable sturdy base 38. Adjacent one edge and opposite ends thereof, guide means in the form of a pair of posts 40 extend perpendicularly from the upper face of the base 38. The size of the base and distance between the posts 40 are such that books of substantial size may be accommodated. The length of the post also is selected so as to accommodate books of appreciable thickness, even of the order of as much as 5 or 6 inches. Extending along the side of base 38 nearest the post 40 is a combination joint positioning and heating member 42. The upper edge thereof is provided with a longitudinally extending, joint-positioning and heating rib 44. Suitable bores extend longitudinally inward of the member 42 from opposite ends thereof to accommodate suitable heaters 46 which, for example, may be of the electric resistance type.

Mounted upon and extending between the upper portions of the posts 40 is a supporting bar 48 which preferably is a metallic plate of suitable width and thickness. A pair of guide bearing holes 50 are formed therein as can be seen from FIG. 3 for purposes of slidably receiving the posts 40. The supporting bar 48 is movable upon the posts 40, toward and from the base 38 and always in parallel relationship therewith, by operating means comprising two racks 52 extending along similar sides of the posts 40 which are respectively engaged by a pair of pinion gears 54 which respectively are fixed to opposite ends of a shaft 56. Appropriate bearings 58 are mounted upon the opposite ends of supporting bar 48 and rotatably support the shaft 56 therein. One end of the shaft 56 projects beyond one of the bearings 58 and a manually operable crank 60 is connected thereto. It will be seen that, by suitable rotation of the crank 60 in the desired direction, the supporting bar 48 will be moved either toward or from the base 38.

The supporting bar 48 is for purposes of supporting as

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well as moving a combination heating and clamping member 62 which is supported by a carriage bar 64 which extends between posts 40 and preferably is provided with a pair of bearing holes 66 which slidably receive the posts 40 to guide the bar 64 in its movement toward and away from the base 38. The heating and clamping members 62 need not be as long as the carriage bar 64, as is best seen from FIG. 2. Also, the member 62 is provided with elongated bores extending inward from opposite ends thereof for purposes of receiving elongated heaters 68, similar to heaters 46 in positioning member 42, said heaters also preferably being of the electric resistance type.

The heating and supporting rib 44 affixed to base 38, as well as clamping and heating rib 90 on clamping member 62, are shown as being V-shaped in cross-section. This shape is best suited for use with gutter-sewn or side-sewn casebound books. Other types of books have gutters which are somewhat rectangular in cross-section, such as side-sewn flat-back books. Under such circumstances, the ribs 44 and 90 should be shaped in complementary manner to the joint gutter or groove of the book which is to be repaired. Hence, the shapes of these ribs, as illustrated, is not to be considered restrictive.

Further, the ribs 44 and 90, while capable of melting the above-described hot-melt adhesive, also are useful to dry, and thus solidify, fluid or cold-flow adhesive after it has been inserted in a damaged joint, such as described above, and said ribs also clamp the joints while such adhesive is being dried.

The carriage bar 64 is movable in opposite directions by actuating means comprising linkage preferably in the form of toggle 70. The toggle comprises a combination link and handle member 72 to which one end of another link 74 is pivotally connected. A hand grip 76 is connected to the outer end of link and handle member 72.

Extending upward from one side of supporting bar 48, midway of the length thereof is a vertical post-like plate 78 provided for the dual purpose of supporting a bracket 80, to the upper ends of which one end of the link and handle member 72 is pivotally connected. The plate 78 also supports an electric switch 81 which is connected in and controls the circuit to the heaters 46 and 68. Said circuit is not illustrated in detail but it will be understood that it is a simple, conventional electric circuit connectable to a source of current by means of a conventional electric cord and plug 88 shown in FIG. 1.

Extending upward from the intermediate portion of carriage bar 64 is a link 82, the upper end 84 of which, see FIGS. 1 and 6, is of larger diameter than the lower part and is smoothly cylindrical for slidably vertical movement within a bearing 86 which is supported by a lower branch of the bracket 80. The upper end 84 of link 82 is pivotally connected to the lower end of link 74 of the toggle mechanism. Accordingly, with reference to FIGS. 4 and 5, when the hand grip 76 is extended downward as shown in said figures, the toggle 70 will be extended so as to project the carriage bar 64 and clamping member 62 thereon the maximum distance below the supporting bar 48. When the hand grip 76 is moved to the outwardly projected position such as shown in FIG. 6, the toggle 70 will be contracted so as to elevate the upper end 84 of link 82 and thereby raise carriage bar 64 and the heating and clamping member 62 thereon toward the supporting bar 48, for purposes to be described. Heating and clamping member 62 also is provided longitudinally thereof with a downwardly extending rib 90 which is similar to rib 44 on the positioning member 42 and is for similar purposes.

The device described hereinabove for repairing the damaged or broken joint or joints of a book is capable of simultaneously repairing either one or both joints of a book, depending upon which of them require repairing. When such repairing of a joint is to be effected, the damaged book is initially placed upon base 38 with the lowermost joint 28 disposed upon the rib 44 of the lower posi-

tioning member 42, as shown in FIG. 4 for example. The toggle 70 is disposed in downwardly extended position under such circumstances, as shown in FIGS. 4 and 5. The crank 60 then is rotated in a direction to lower the supporting bar 48 and, correspondingly, the carriage bar 64 and clamping member 62 carried thereby, until the rib 90 of clamping member 62 is firmly disposed within the uppermost joint 28 of the book, as shown in FIG. 5.

When this has been completed, a pair of locking members 92 are tightened. Said members may simply be thumb screws threaded into opposite ends of the supporting bar 48 a sufficient extent that the inner ends of the thumb screws clampingly engage the guide posts 40. When the locking members 92 are screwed into firm engagement with the post 40, the supporting bar 48 will be releasably fixed to said post 40 against vertical movement.

When the mechanism is arranged, as above described, the link and handle member 72 is then moved to the exemplary position thereof shown in FIG. 6 so as to raise the carriage bar 64 and clamping member 62 thereon to the elevated position shown in FIG. 6 which will permit removal of the book 10 such as, for example, to permit inserting the adhesive strand or strands 34 within the weakened or damaged joints 28, as required. Such strands of adhesive are inserted therein in the manner described above and when this has been accomplished, the book is then replaced within the device, such as in the position shown in FIG. 6, following which the link and handle member 72 is lowered to the position shown in FIG. 5, for example. The switch 81 then is closed to complete the circuit to the heaters 46 and 68 which then will transmit adequate heat to the ribs 44 and 90 to melt the strands of adhesive 34 in the joints within a few seconds, sufficiently to cause the adhesive to flow into engagement with all damaged portions of the joint 28 and interconnect the same together again as illustrated in exemplary manner in FIGS. 10 and 12. If initially fluid adhesive is used, a slightly longer time may be required to dry it. Such repaired joint will be at least as strong, and generally stronger, than the joint when originally manufactured.

In actual operation, when the adhesive has been dried or melted, depending upon the type used, the switch 81 may be opened to permit the heaters and clamping bars and ribs thereon to cool enough to render the adhesive 34' substantially solid, while clamping bar 62 is maintained in clamping position. After this has occurred, the bar 62 is raised and the repaired book is removed. The device is then ready for operation with the next book to be repaired. The heaters also may be rendered safe against overheating by including a temperature-sensitive safety switch 94 in the circuit thereof. Thus, in general, the heating and clamping bars and ribs 44 and 90 thereon are for purposes of transforming the adhesive from its initial condition to one in which it bonds to the components of the joint to be repaired and secures them to each other to form a strong joint and thus greatly prolong the life of the book.

We claim:

1. A manually operable device to repair one or both of the broken joints of case-bound books comprising in combination, a base to support said device and having a surface to support a damaged book to be repaired, a joint positioning member extending along said base adjacent one edge thereof and having a rib thereon operable to engage the joint of one cover of a damaged book, guide members extending upward from said base adjacent opposite ends of said joint positioning member, a support bar extending between and adjustably positionable upon said guide members in parallel relationship to said positioning member, means to secure said support bar upon said guide members at a desired adjusted position thereon, a joint clamping member positioned for movement between and parallel to said positioning member and

support bar and having a rib thereon in opposition to said rib upon said positioning member and adapted to engage the joint of the other cover of a damaged book when said joint clamping member is moved toward said positioning member, a manually operable handle carried by said support bar, and linkage means connected between said handle and joint clamping member and operable to move said joint clamping member toward and from said joint of the other cover of a damaged book when said support bar has been adjustably positioned upon said guide members in accordance with the thickness of said damaged book.

2. The device according to claim 1 further including operating means interconnected to said support bar and engageable simultaneously with said guide members to move the opposite ends of said support bar equally upon said guide posts toward and from said base.

3. The device according to claim 2 in which said operating means for said support bar comprise racks upon said guide members and pinion gears meshing therewith and mounted on a shaft supported by said support bar and rotatable relative thereto, and a crank connected to said shaft to rotate the same.

4. The device according to claim 1 in which said support bar has openings in the opposite ends thereof complementary to said guide members and slidably receiving the same for guiding movement thereby.

5. The device according to claim 1 in which said linkage means is supported by said support bar midway between the ends thereof, said device also including a bearing carried by said support bar and a guide member extending upwardly from said joint clamping bar and slidable within said bearing, and said linkage being connected to said guide member to move said joint clamping bar toward and from said book.

6. The device according to claim 5 in which said linkage comprises a part of one end of said handle and an additional link connected thereto.

7. The device according to claim 6 in which a bracket is connected to said support bar and said one end of said handle is connected thereto and said bracket also supporting said bearing for said guide member on said joint clamping bar.

8. The device according to claim 1 further including heater means extending longitudinally within at least one of said ribbed members and having a heating potential adequate to melt and at least render tacky a strand of hot melt adhesive when inserted within the joint region of a book and thereby permit said adhesive to flow to and connect separated portions of a damaged joint of a book cover.

9. A method of repairing a damaged or weakened joint of a cover of a case-bound book comprising inserting a strand of solid hot melt type adhesive along the joint to be repaired, clamping said joint exteriorly while the cover connected to said joint is positioned in normally closed position upon the book, heating said joint to transform said adhesive from its initial solid condition into one in which it flows into contact with and firmly adheres to and connects the joint edge of said cover and adjacent portions of the spine and adjacent leaves of the book to reestablish said joint, and cooling said joint to render said adhesive stable while said joint remains clamped.

10. The method according to claim 9 in which said strand of adhesive is inserted between the case cloth of the cover of a book at the joint of the cover and the edge of the spine of a book adjacent said joint.

11. The method according to claim 9 including the additional step of inserting said strand of adhesive in a stiff guide tube and inserting said assembled tube and strand of adhesive in said joint to position said adhesive therein, followed by the further step of withdrawing said tube from said strand of adhesive while disposing said

strand of adhesive to the interior of said joint for bonding
to components thereof.

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5 LAWRENCE CHARLES, Primary Examiner

U.S. Cl. X.R.

112—265; 100—288