June 6, 1939. R. S. HOPKINS 2,161,352

COPY HOLDER FOR A COPYING MACHINE

Filed March 5, 1937 2 Sheets-Sheet 1

Fig. 1.

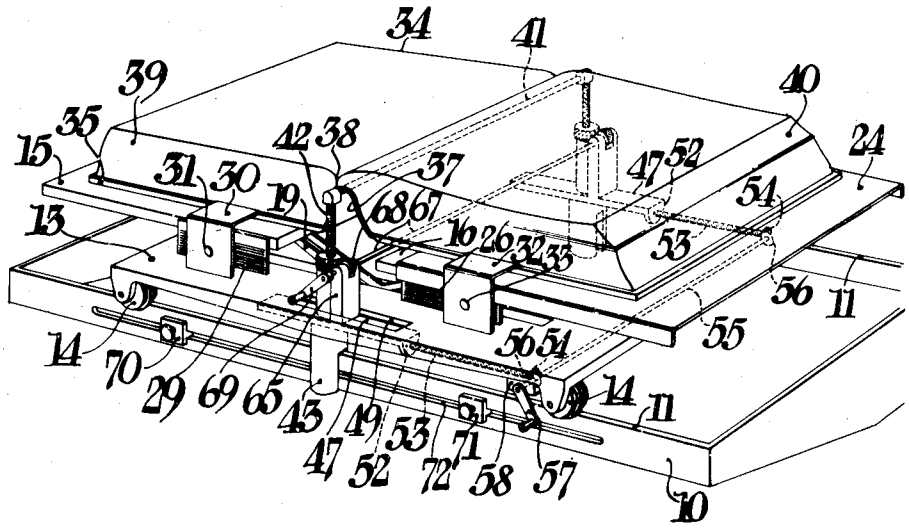

Fig. 2.

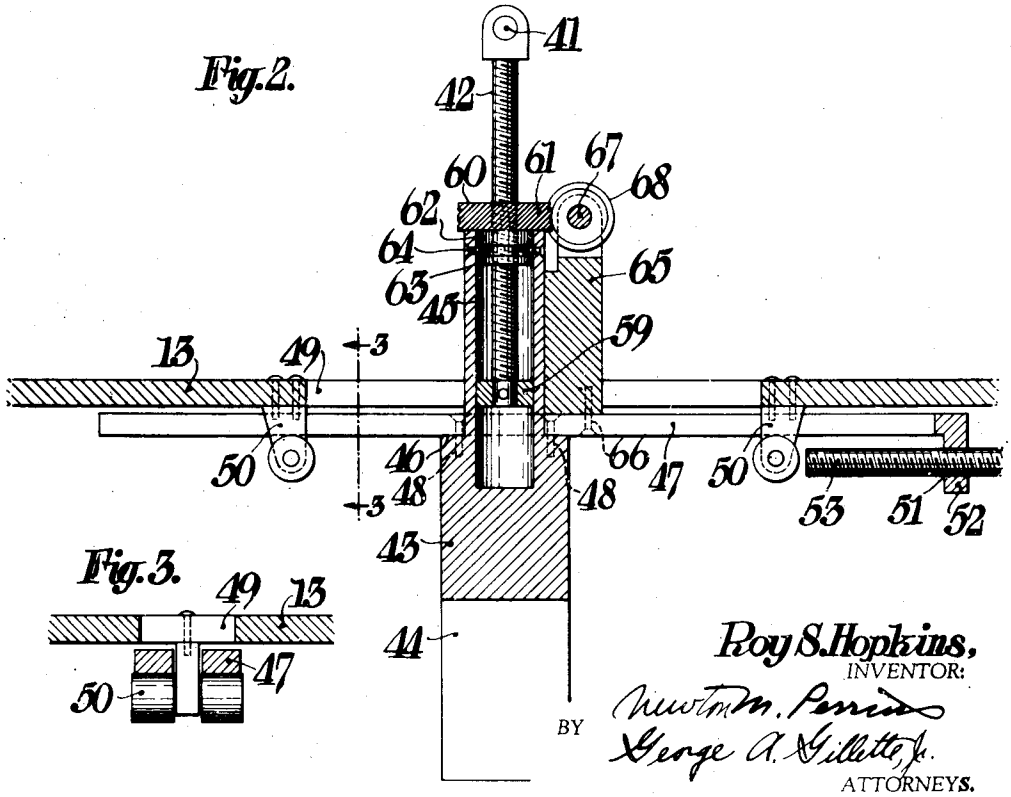

Fig. 3.

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COPY HOLDER FOR A COPYING MACHINE

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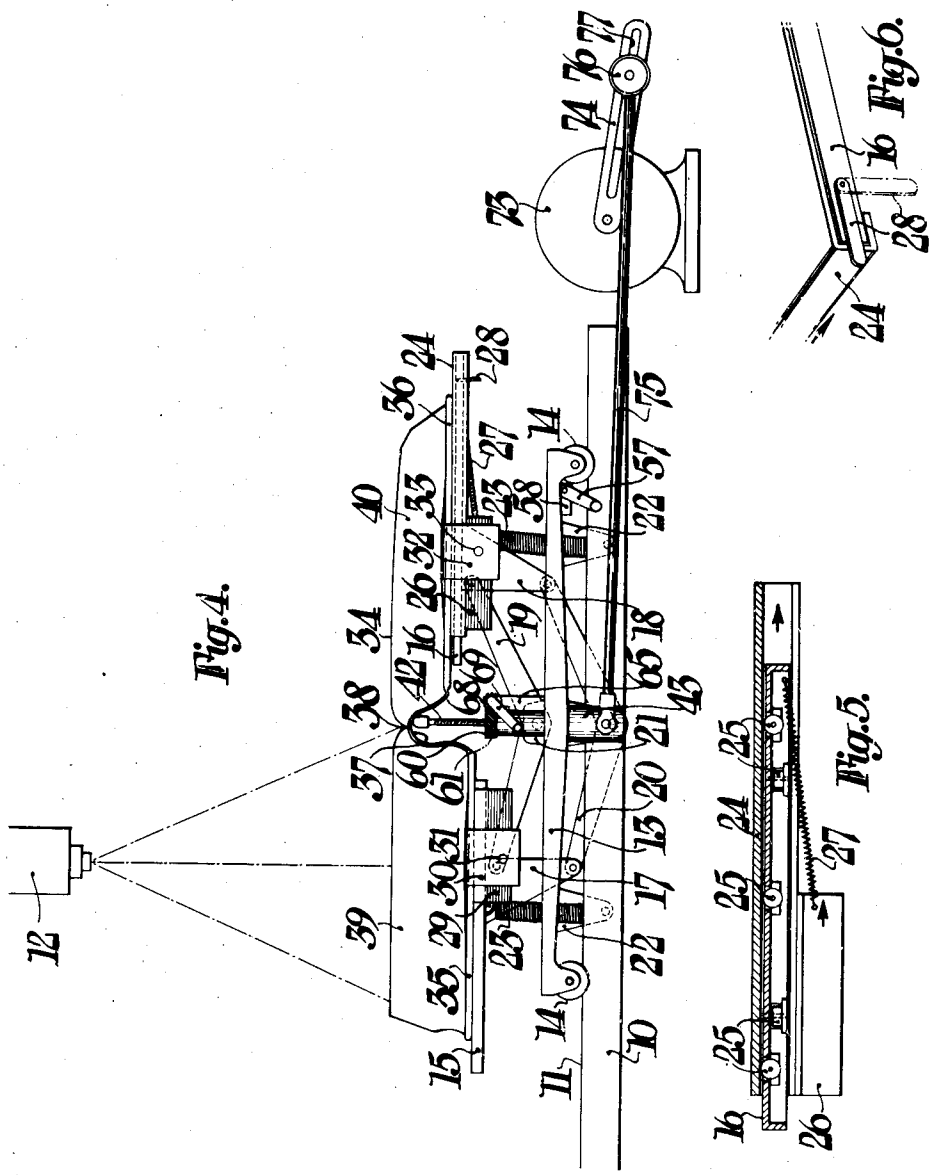

Fig. 4.

Fig. 6.

Fig. 5.

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COPY HOLDER FOR A COPYING MACHINE

Roy S. Hopkins, Rochester, N. Y., assignor to Eastman Kodak Company, Rochester, N. Y., a corporation of New Jersey

Application March 5, 1937, Serial No. 129,241

17 Claims. (Cl. 88—24)

The present invention relates to a copyholder for a copying machine and more particularly to a copyholder for supporting bound volumes or books in a horizontal plane.

It is well recognized that when thick books are placed on a copyholder that the back of the book will lie in approximately the same plane as the covers of the book so that there will be a deep valley at the juncture of the open pages. At the same time a distinct curve will be produced in the portions of the open pages.

The primary object of the present invention is the provision in a copyholder for bound volumes or books of a back rest means which may engage the back of the book to be copied and raise the juncture between the open pages so that said pages will lie in a flat horizontal plane.

Another object of the invention is the provision of adjustable means between the copyholder and the back rest means so that the back rest for the book back may be elevated to engage and support the back of the book and/or which may be moved across the back of the book to be opposite the juncture of the open pages as the pages are turned through the book.

A further object of the invention is the provision of a pair of supports upon which respective halves of the bound volume or book are placed and of a cover member slidably mounted upon one support, fastened to one cover of the book, and resiliently urged away from the other support to place the back of the book under tension and hold the open pages in a flat plane.

Still another object of the invention is the provision of a locking means between said support and said cover member so that the cover member may be moved to an extreme position under tension, while the respective cover of the book is being fastened to said cover member.

A still further object of the invention is the provision of a shifting means which is connected to the back rest means and which operates to present alternative halves of the bound volume or book to the copying camera.

Other and further objects of the invention will be apparent to those skilled in the art upon an understanding of the following disclosure.

To these and other ends, the invention consists of certain parts, and combinations of parts, all of which will be hereinafter described, the novel features being pointed out in the appended claims.

Reference is hereby made to the accompanying drawings wherein similar reference characters designate similar elements and wherein:

Fig. 1 is a perspective of the copyholder according to the invention illustrating a book on the copyholder and the back rest means in engagement with and supporting the back of the book opposite the juncture of the open pages thereof.

Fig. 2 is a vertical section through one end of the book rest means showing the slidable connection with the frame member and the details of the elevating means.

Fig. 3 is a detail cross section taken on the line 3—3 of Fig. 2.

Fig. 4 is a front elevation of the copyholder illustrating the operation of the shifting means alternatively to present respective halves of the book to the photographic field of the copying camera.

Fig. 5 is a transverse cross section through the support carrying the slidable cover member and showing the resilient means for urging said slidable cover member to tension the back of the book.

Fig. 6 is a fragmentary perspective of the locking means for maintaining the cover member in an extreme position during fastening of the book thereto.

The copy machine is fundamentally of conventional design and includes a base member 10 having tracks 11 forming a guideway for the copyholder and includes a copying camera 12 which is adjustably supported above the copyholder in any well known fashion, not necessary to be illustrated, and which includes the photographic field to the extent indicated by the dot-dash lines of Fig. 4.

The copyholder comprises a frame member 13 in which are journaled a plurality of rollers 14 for engaging the tracks or guideway 11 movably to support the copyholder upon said base member 10. A pair of supports 15 and 16 each include downward projecting fins 17 and 18, respectively, see Fig. 4, and to which a plurality of links 19 and 20 are pivoted. A vertical plate 21 is affixed to frame member 13 and links 19 and 20 are pivotally connected at vertically spaced points to said vertical plate 21. A pair of stirrups 22 are also fastened to frame member 13 and a pair of tension springs 23 each have one end connected to each of the stirrups 22 and each have the other end connected to the respective supports 15 and 16 so that both supports 15 and 16 are normally drawn toward the frame member 13.

Said tension springs 23 are designed so that when supports 15 and 16 are at the same level, the tension on each support is equal but when,

as shown in Fig. 4, one support is above the other then the tension springs 23 assert more tension upon the higher support. Such arrangement of supports 15 and 16 and the operatively connected links 19 and 20 imparts opposite movement to the supports 15 and 16 in a well known manner. For instance, when the support 15 is moved downwardly, this movement is transmitted through the parallelogram linkages formed by fins 17 and 18, links 19 and 20, and vertical plate 21 so that plate 16 is moved upwardly.

A cover member 24 is formed to fit over support 16 and is movably mounted thereon. A plurality of rollers 25, see Fig. 5, are journaled in the support 16 and engage the central portion and overhanging edges of cover member 24 so that it is supported and freely movable upon support 16. Ribbed portions 26 are attached to respective sides of cover member 24.

A resilient means is provided between the cover member 24 and its support 16 and is arranged so that said cover member 24 is normally moved away from the other support 15. Such a resilient means may comprise one or more springs 27 having one end attached to support 16 and the other end attached to the ribbed portions 26 of the cover member 24.

A locking means is also provided between cover member 24 and its support 16. Such a locking means may conveniently comprise a latch 28 which is pivotally mounted to the end of support 16 and which may extend beyond the edge of cover member 24, see Fig. 6. When said cover member 24 is moved to its extreme inner position, the outer edge of cover member 24 is then flush with the outer edge of support 16 and the springs 27 are under a maximum tension. Movement of latch 28 out over the edge of cover member 24 will block the return of said cover member 24 under the action of springs 27 and latch 28 will be frictionally held in such locking position.

Attaching means are provided for fastening the respective covers of the book to the support and to the cover member. Ribbed portions 29 are provided along the front and rear edges of support 15. Said attaching means also includes a U-shaped clamp 30 provided in each leg with a tooth 31 for engaging the ribs on portions 29 and includes a second U-shaped clamp 32 having a tooth 33 for engaging the ribbed portions 26 of cover plate 24.

The book 34 including covers 35 and 36 may be arranged upon the copyholder in the following manner. The book cover 35 is laid upon support 15 and the U-shaped clamp 30 is laid over said cover 35 and its ends are pressed downwardly so that teeth 31 engage ribbed portions 29 securely to clamp said cover 35 to support 15. The cover member 24 is placed in its extreme inner position with the latch 28 in the position shown in Fig. 6 whereupon the other book cover 36 is attached to cover member 24 by placing the U-shaped clamp 32 thereover and pressing its ends down so that the teeth 33 thereof engage the ribbed portions 26 of said cover member 24. In this fashion book cover 36 is securely fastened to the cover member 24, while book cover 35 is securely fastened to the other support 15.

A back rest means is mounted upon the frame member 13 between the supports 15 and 16 and supports the back 37 of the book 34 opposite the juncture 38 between the respective halves 39 and 40 of said book 34. Said back rest means comprises a back rest member including a rod 41 extending along the back 37 of book 34 and includes threaded members 42. Said back rest means also includes a pair of vertical posts 43 located opposite each end of rod 41 and each provided with slots 44 so that each post 43 may straddle the tracks 11 of base member 10. Said vertical posts 43 each have an axial bore 45 for supporting respective threaded members 42 in a manner later to be described and each post 43 has a shoulder 46 upon which a cross member 47 is attached by screws 48. The frame member 13 is provided adjacent its forward and rearward edges with an elongated slot 49 through which the vertical posts 43 extend and within which they may move.

The back rest means according to the invention is supported for transverse movement with respect to the book back 37 and for this purpose a sliding connection is provided between said back rest means and said frame member 13. Said sliding connection comprises roller assemblies 50 below frame member 13 and located at each end of elongated slot 49. Said roller assemblies engage and support said cross member 47 and the vertical post 43 connected thereto so that said post 43 may move within slot 49. This movement of the vertical post 43 within slot 49 is accomplished by a transversing means including a threaded opening 51 in the flanged end 52, see Fig. 2, of cross member 47 and a threaded member 53 rotatably mounted upon frame member 13 in any suitable manner. A miter gear 54 is mounted upon the end of each of threaded members 53 and a crank member for rotating said threaded members 53 includes a rod 55 carrying gears 56 for engaging said miter gears 54 and including a crank handle 57 connected to said rod which is journaled upon frame member 13 in bearing members 58. It is now apparent that rotation of crank arm 57 will cause rotation of the front and rear ends of threaded members 53 and in turn to cause transverse movement of front and rear cross members 47 which carry with them the vertical posts 43 and rod 41, the entire arrangement constituting a transversing means between the back rest means and the frame member 13 and for moving the back rest means across the back of the bound volume or book 34.

An elevating means is also provided between the back rest means and the frame member 13 and one detailed construction thereof will now be described. The threaded member 42 which is attached to the end of rod 41 fits into the axial bore 45 of a vertical post 43 and has a collar 59 on its inner end making a sliding fit with the interior of bore 45. Said elevating means also includes a nut member 60 which is internally threaded for engagement with threaded member 42. Said nut member 60 is cut externally to form a spiral gear 61 and includes a sleeve 62 provided with an annular recess 63 into which pins 64 of post 43 project. A bracket 65 is fastened to cross member 47 by screw 66 and is recessed at its upper end to form a journal for a rod 67 upon which is a spiral gear 68 in engagement with the spiral gear 61 formed on the exterior of nut member 60. A crank arm 69 is attached to the forward end of rod 67. Said elevating means comprises a pair of elevating assemblies as just described and located at each end of rod 41 so that said rod may be moved toward and away from the book back 37 in a horizontal position.

After the book covers 35 and 36 have been attached in the manner previously described to sup-

port 15 and cover member 24 and after the book 34 has been opened to the desired page or pages, the back rest means should be adjusted so that the rod 41 engages and supports the book back 37 opposite the juncture 38 between the open pages. Such adjustment will be accomplished in a transverse direction by rotating crank 57 to move the vertical posts 43 transversely of the frame member 13 and also by rotation of crank 69 to raise threaded member 42 and rod 41 against the book back 37. When the back rest means has been properly adjusted either by elevation or transverse movement, or both, the locking means is released by rotation of latch 28 to the position shown in Fig. 4 and the resilient means attached to cover member 24 now urges said cover member 24 away from the other support 15 so that the back of the book is placed under tension and so that the open pages of the book will lie in the same horizontal plane. It should be noted that the flat arrangement of the open pages of the book 34 is a function both of the support of the book back by the back rest means and of the resilient action imparted to cover member 24 by the springs 27.

As the pages of book 34 are turned, it is obvious that the juncture 38 between the open pages will move transversely and that it will be necessary to move the back rest means transversely so that rod 41 is at all times opposite the juncture between the pages. At the same time one-half of the book will become thicker than the other half of book 34 but the supports 15 and 16 and the linkages 19 and 20 will operate to lower the appropriate support and raise the other support so that the top pages of the book are maintained in the same horizontal plane. As the pages of the book are turned and depending upon the character of the book binding, it may be necessary also to re-elevate the back rest means so that the juncture 38 between the pages is maintained at the proper level to keep the open pages in flat condition.

The copyholder of the present invention is also designed for transverse movement upon the base member 10 so that the individual pages of the book may be separately copied. For this purpose the frame member 13 is moved along the tracks 11 first to bring one-half of the book under the camera 12 and then to bring the other half of the book into the photographic field of camera 12. Two arrangements for facilitating such movement of the copyholder are provided according to the invention. Adjustable stops 70 and 71 are movable within a slot 72 and may be located so as to abut vertical post 43 and stop the copyholder with the pages of the book in the photographic field of camera 12.

The copyholder or frame member 13 may be reciprocated upon the tracks or guideway 11 by a shifting means. Such shifting means may comprise a prime mover or motor 73 having a rotating member 74. A driving link 75 is pivoted at one end to the vertical post 43 and at the other end to said rotating member 74. To compensate for different sizes of books, an adjustable connection is provided between link 75 and rotating member 74 and may comprise a thumb screw connection 76 movable within a slot 77 in member 74 to vary the stroke imparted to driving link 75. It is also important to note that said shifting means is connected to the vertical post of the transversing means so that as said transversing means is moved across the book back 37, the shifting means will still move the copyholder so that the juncture 38 between the open pages of the book is always brought to the same relative position with respect to the copying camera 12.

By virtue of the various means provided upon the copyholder, according to the invention, it is very easy to copy all of the pages of a bound volume or book and it is a simple matter to maintain the open pages of the book always in a flat horizontal plane merely by adjusting the back rest means either transversely or by elevation. The shifting means also facilitates the copying of an entire book, page by page, and its operation is not affected by the adjustments of the transversing or elevating means for the back rest means.

Other modifications of the structures disclosed to accomplish the same or similar purposes are evident but any such modifications which accomplish the same objects are deemed to be within the scope of the invention which is defined in the appended claims.

Having now particularly described my invention what I desire to secure by Letters Patent of the United States and what I claim is:

1. In a copyholder for a copying camera having a photographic field, the combination with a base member, a frame member movably mounted upon said base member, a pair of supports, and a plurality of links operatively connected between said frame member and said supports and for imparting opposite movement to said supports so as to support the respective halves of an open book with its top pages in the same plane, the back of said book being between said supports, of a cover member movably mounted upon one of said supports, attaching means for fastening respectively one cover of said book to said cover member and the other cover of said book to the other support, resilient means between said cover member and its support and for normally spreading the halves of said book and placing the back thereof under tension, a back rest means on said frame member between said supports, adjustable means between said back rest means and said frame member and for moving said back rest into position to support any portion of the back of said book, and a shifting means connected to said back rest means of said copy holder and for alternatively moving the respective halves of said book into said photographic field.

2. In a copyholder, a combination with a base member, a frame member movably mounted upon said base member, a pair of supports, and a plurality of links operatively connected between said frame member and said supports and for imparting opposite movement to said supports so as to support the respective halves of an open book with its top pages in the same plane, the back of said book being between said supports, of a cover member movably mounted upon one of said supports, attaching means for fastening respectively one cover of said book to said cover member and the other cover of said book to the other support, resilient means between said cover member and its support and for normally spreading the halves of said book and placing the back thereof under tension, a locking means between said cover member and its support and adapted to lock said cover member in one extreme position with said resilient means under tension, a back rest means on said frame member between said supports, and an adjustable means between said back rest means and said frame member and for moving

said back rest means into position to support any portion of the back of said book.

3. In a copy holder for a bound volume or book, the combination with a frame member, a pair of supports, and a plurality of links operatively connected between said frame member and said supports and for supporting said supports in spaced relation to receive respective halves of the bound volume with the back of said volume between said supports, of a back rest means on said frame member between said supports and adjacent the back of said volume, and laterally adjustable means between said back rest means and said frame member and for laterally moving said back rest means into position to support any longitudinal portion of the back of said book.

4. In a copy holder for a bound volume or book, the combination with a frame member, a pair of supports, and a plurality of links operatively connected between said frame member and said supports and for imparting opposite movement to said supports and the respective halves of a book thereon so that the top pages of the open book are always in the same horizontal plane, the back of said book being between said supports, of a back rest member between said supports and for engaging the back of said book, and lateral transversing means connected to said back rest member and for laterally moving the same across the back of said book so that the back rest member may engage the longitudinal portion of the back of said book opposite the juncture of the open pages thereof.

5. In a copy holder for a bound volume or book, the combination with a frame member, a pair of supports, and a plurality of links operatively connected between said frame member and said supports and for imparting opposite movement to said supports and the respective halves of a book thereon so that the top pages of the open book are always in the same horizontal plane, the back of said book being between said supports, of a back rest member between said supports and including a threaded member slidably supported from said frame member, an elevating means including a nut member mounted for rotation on said frame member and engaging said threaded member, and a crank member connected to said nut member and for rotating the same.

6. In a copy holder for a bound volume or book, the combination with a frame member, a pair of supports, and a plurality of links operatively connected between said frame member and said supports, and for imparting opposite movement to said supports and the respective halves of a book thereon so that the top pages of the open book are always in the same horizontal plane, the back of said book being between said supports, of a back rest member between said supports and including a threaded member slidably supported from said frame member, and an elevating means including a nut member engaging said threaded member and provided with an external spiral gear, a second spiral gear engaging said spiral gear on said nut member, and a crank connected to said second-mentioned spiral gear for turning the same.

7. In a copy holder for a bound volume or book, the combination with a frame member, a pair of supports, and a plurality of links operatively connected between said frame member and said supports and for imparting opposite movement to said supports and the respective halves of a book thereon so that the top pages of the open book are always in the same horizontal plane, the back of said book being between said supports, of a back rest member between said supports and for engaging the back of said book, a sliding connection between said frame member and said back rest member which is provided with a threaded opening, a threaded member rotatably mounted on said frame member and engaging the threaded opening in said back rest member, and a crank member connected to said threaded member and for rotating the same to move said back rest member with respect to said frame member.

8. In a copy holder for a bound volume or book, the combination with a frame member provided with an elongated opening, a pair of supports, and a plurality of links operatively connected between said frame member and said supports and imparting opposite movement to said supports and the respective halves of a book thereon, the back of said book being between said supports, of a back rest member between said supports, including a post extending through the elongated opening in said frame member and including a cross member which is provided with a threaded opening, a plurality of rollers engaging said cross member and supporting said post for movement within said opening, and a threaded member mounted on said frame member, engaging the threaded opening in said cross member and for relatively moving said cross member and post with respect to said frame member.

9. In a copy holder for a bound volume or book, the combination with a frame member, a pair of supports, and a plurality of links operatively connected between said frame member and said supports and for imparting opposite movement to said supports and the respective halves of a book thereon so that the top pages of the open book are always in the same horizontal plane, the back of said book being between said supports, of a slide movably mounted upon said frame member, a back rest member supported by said slide between said supports, a transversing means between said slide and base member for moving said back rest member across the back of said book, and an elevating means upon said slide and for elevating said back rest member to engage and support the back of said volume and transversely movable with said transversing means.

10. In a copy holder for a bound volume or book, the combination with a base member having a guideway, a frame member having a plurality of rollers engaging said guideway, a pair of supports, and a plurality of links operatively connected between said frame member and said supports, the back of said book being between said supports when the halves of the book are supported thereby, of a back rest member between said supports and including a post adjacent said guideway, transversing means connected to said back rest member and for moving the same across the back of said book to engage said book opposite the juncture of the open pages of the book, and an adjustable stop on said guideway located to engage said post to stop said copy holder in a position corresponding to the location of said juncture and to the proportions of the halves of said book.

11. In a copy holder for a bound volume or book, the combination with a base member having a guideway, a frame member having a plurality of rollers engaging said guideway, a pair

of supports, and a plurality of links operatively connected between said frame member and said supports, the back of said book being between said supports when the halves of the book are supported thereby, of a back rest member between said supports and for engaging the back of said book, transversing means connected to said back rest member and for moving the same across the back of said book to engage said book opposite the juncture of the open pages thereof, and a shifting means connected to said back rest member and for moving said copy holder from one extreme position to another, said extreme positions corresponding to the location of said juncture and to the proportions of the halves of said book.

12. In a copy holder for a bound volume or book, the combination with a base member having a guideway, a frame member having a plurality of rollers engaging said guideway, a pair of supports, and a plurality of links operatively connected between said frame member and said supports, the back of said book being between said supports when the halves of the book are supported thereby, of a back rest member between said supports and for engaging the back of said book, transversing means connected to said back rest member and for moving the same across the back of said book to engage said book back opposite the juncture of the open pages of said book, and a shifting means including a prime mover having a rotating member, a driving link connected at one end to said back rest member and at the other end to said rotating member, and an adjustable connection at one end of said link.

13. In a copy holder for a bound volume or book, the combination with a frame member, a pair of supports, and a plurality of links operatively connected between said frame member and said supports, of a cover member slidably mounted upon one of said supports, attaching means for fastening respectively one cover of said book to said cover member and the other cover of said book to the other support, and resilient means between said cover member and its support and for normally spreading the halves of said book.

14. In a copy holder for a bound volume or book, the combination with a frame member, a pair of supports, and a plurality of links operatively connected between said frame member and said supports, of a cover member slidably mounted upon one of said supports, attaching means for fastening respectively one cover of said book to said cover member and the other cover of said book to the other support, resilient means between said cover member and its support, arranged to urge said cover member away from the other support, and for normally spreading the halves of said book and tensioning the back thereof, and a back rest member between said supports and for engaging and supporting the tensioned back of said book.

15. In a copy holder for a bound volume or book, the combination with a frame member, a pair of supports, and a plurality of links operatively connected between said frame member and said supports, of a cover member slidably mounted upon one of said supports, attaching means for fastening respectively one cover of said book to said cover member and the other cover of said book to the other support, resilient means between said cover member and its support, arranged to urge said cover member away from the other support and for normally spreading the halves of said book and tensioning the back thereof, a back rest member between said supports and for engaging the back of said book, and an elevating means between said frame member and said back rest member and for elevating the same to support the tensioned back of said book.

16. In a copy holder for a bound volume or book, the combination with a frame member, a pair of supports, and a plurality of links operatively connected between said frame member and said supports, of a cover member slidably mounted upon one of said supports, attaching means for fastening respectively one cover of said book to said cover member and the other cover of said book to the other support, resilient means between said cover member and its support and urging said cover member away from the other support, and a locking means between said cover member and its support for fixing said cover member with respect to its support.

17. In a copyholder for a copying camera having a photographic field, the combination with a base member, a frame member movably mounted upon said base member, and a pair of supports on said frame and for supporting respective halves of a document or book to be copied, of a back rest member between said supports and adjustable to engage the back of said book opposite the juncture of the open pages, and a shifting means including a reciprocating member operatively connected to said back rest member and for alternatively moving said respective halves of the document or book into said photographic field.

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