May 28, 1940. W. S. CRAWFORD 2,202,190

BOOK SUPPORT AND LINE GAUGE

Filed Aug. 9, 1938 2 Sheets-Sheet 1

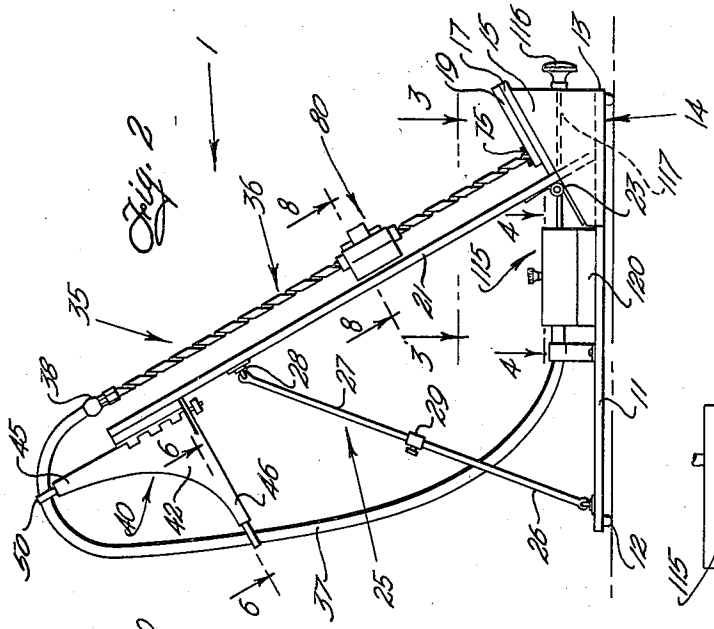


Fig. 2

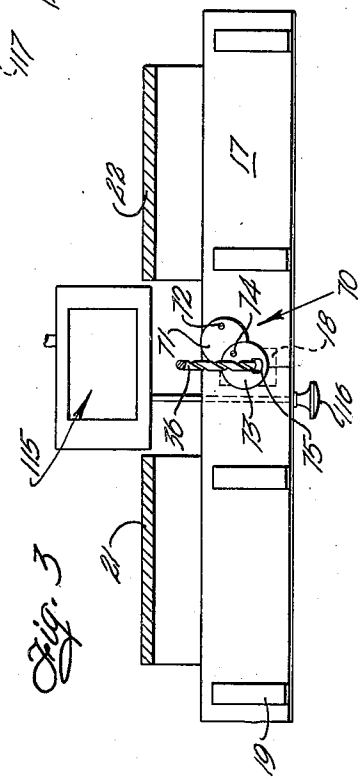


Fig. 3

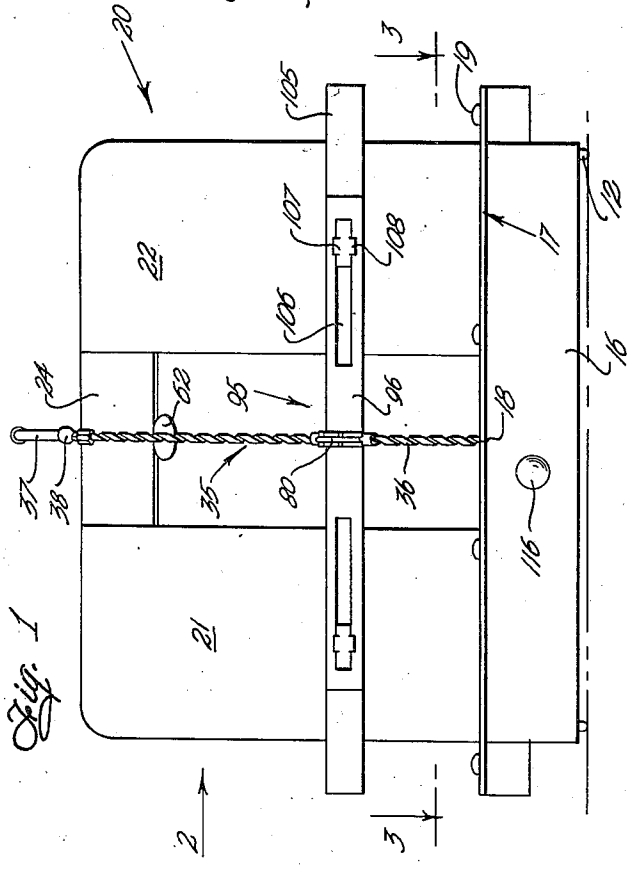


Fig. 1

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Fig. 4

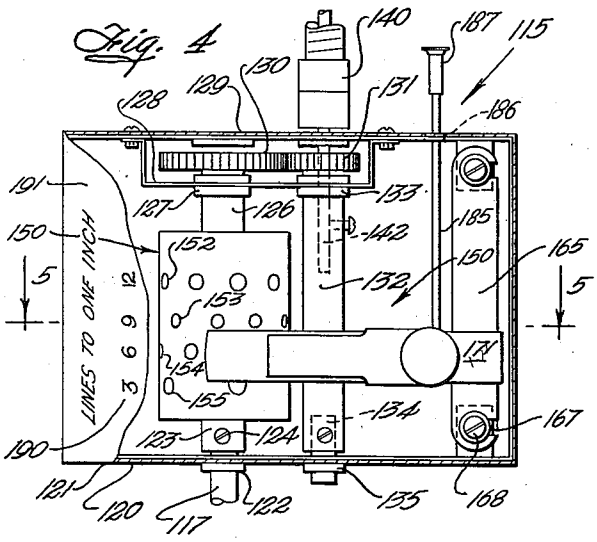


Fig. 6

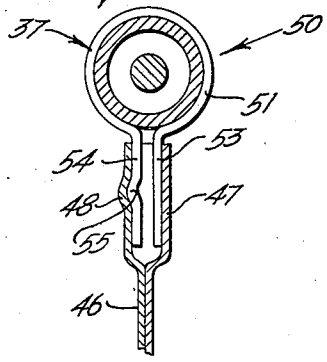


Fig. 5

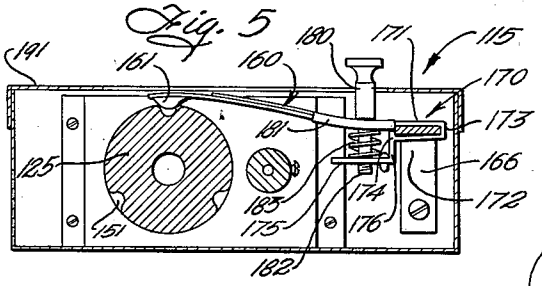


Fig. 7

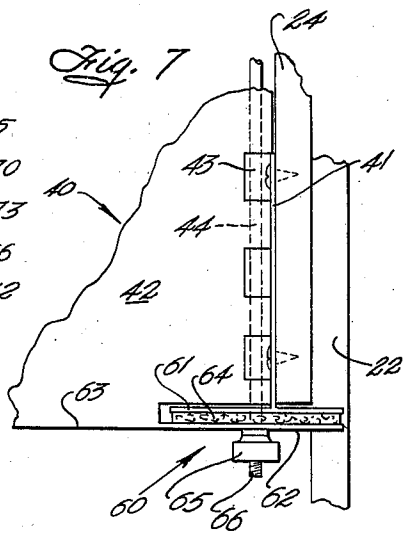
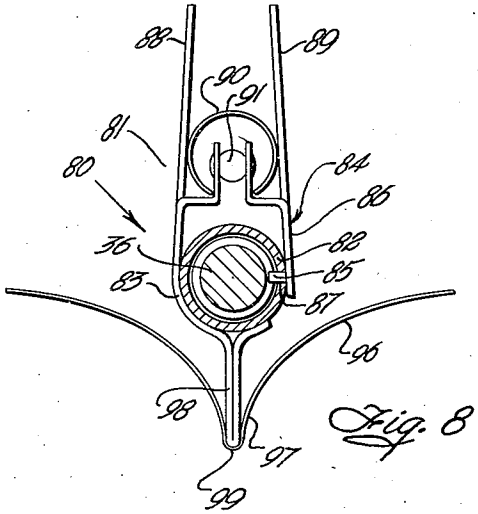


Fig. 8



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BOOK SUPPORT AND LINE GAUGE

William S. Crawford, Santa Barbara, Calif.

Application August 9, 1938, Serial No. 223,859

10 Claims. (Cl. 120—34)

My book support and line gauge is particularly designed and constructed for use with very large books such as tax records and other public record books from which it is desired at times for parties to make copies of various sheets. With this type of device the line gauge must therefore be adjustable to operate from different positions considered laterally of the device because due to the binding of the very large volumes when the books are opened, the center, that is, between two open leaves, shifts a considerable distance from side to side, that is, from left to right in viewing the book.

An object and feature therefore of my invention is the construction of a substantial book support to hold the book at a desired backward tilt from the vertical to facilitate easy reading. The book support feature has an adjustable rest board on which the lower edge of the book may rest, this being shiftable to accommodate the transference of weight no matter whether the book is opened near the front, the back or the intermediate leaves. A further feature of my invention relates to the line gauge which employs a screw threaded shaft along which a gauge carriage is operated by rotating the said screw or shaft. This shaft may be driven in any suitable manner preferably from the top and has its journals adjustable to shift the feed screw from side to side and from a position adjacent the supporting boards for the back of the book to a position a considerable distance therefrom. This is for the purpose of aligning the feed screw shaft with the inner edge of the sheets of the book adjacent the binder, no matter whether the book is opened necessitating the location of the feed screw considerably to the left or to the right of the center line of the book or whether it should be close to the back or spaced a considerable distance therefrom due to the thickness of the binding of the leaves.

Considered therefore in more detail, my invention comprehends a lower journal mounting for the feed screw shaft employing a plurality of disk-like links, one of which is pivoted to the supporting board of the stand and the other link pivoted to the first link in such a manner to permit a considerable swinging adjustment. The two disk-links have a friction contact retaining them in the adjusted position and the uppermost link has a bearing for the lower end of the feed screw shaft. Complementary to the lower bearing I employ an adjustable upper connection or bearing for the feed screw shaft preferably by using a flexible drive shaft which is guided through guides in a hinge. Such hinge may therefore be turned on its pintle and by means of a friction fastening, secured in any desired adjusted angular position. Thus the feed screw shaft may be positioned parallel to the back or supporting boards for the book and in a straight line with the inner crease or groove formed in the book when it is open by the binding of the leaves.

A further feature of my invention relates to the disengagement of the feed screw shaft from its lower bearing, it merely being inserted in the socket and on account of the flexible drive shaft together with the hinge at the top, this screw shaft may be shifted entirely out of the way for mounting a book on the stand or for turning the leaves. In this connection I have removable guides mounted on the movable leaf of the hinge so that when desired, the flexible drive shaft may be entirely disconnected from the hinge.

Another feature of my invention relates to a variable line gauge by which an indication is given as to the shift of the carriage having the line marker which is arranged to be adjusted for different spacing of the lines. For instance on some books the lines may be a considerable distance apart whereas in other books or in other sections of the same book the lines may be quite close together, however, most books have their lines on certain definite ratios of so many lines per inch, therefore the indicator may be adjusted to accurately indicate both by the sound and feel of the operator the step by step movement from one line to another. In this connection my invention includes a rotatable cylinder driven in connection with the flexible feed shaft, such cylinder having a plurality of circles with depressions or recesses, the different circles for different spacing of the lines and each circle indicating equal spacings. With this an adjustable pressure nub which drops in each recess in a circle indicates to the operator the step by step movement for aligning the line marker with the lines of the book. Another detail feature of improvement in my invention relates to the clamping nut for the screw feed shaft which engages with the threads of the shaft and also has the line marker positioned and shaped to follow the curve of the leaves of a book adjacent the binding and to have an accurate horizontal alignment with the lines on the leaves of the book. Each line marker is provided with a slide type of extension for wide leaves.

My invention is illustrated in connection with the accompanying drawings, in which:

Fig. 1 is a front elevation taken in the direction of the arrow 1 of Fig. 2.

Fig. 2 is a side elevation taken in the direction of the arrow 2 of Fig. 1.

Fig. 3 is a horizontal section on the line 3—3 of Fig. 2 in the direction of the arrows.

Fig. 4 is a horizontal section on the line 4—4 of Fig. 2 in the direction of the arrows showing the variable line indicator.

Fig. 5 is a vertical section on the line 5—5 of Fig. 4 in the direction of the arrows.

Fig. 6 is a detail section on the line 6—6 of Fig. 2 showing one of the flexible cable clamps.

Fig. 7 is an enlarged elevation of part of the hinge for the flexible cable showing the friction clamp device.

Fig. 8 is a transverse section on the line 8—8 of Fig. 2 in the direction of the arrows through the clamp nut and part of the line markers.

Referring first to the general construction of the book support, I employ a base board 11, this having small legs or nubs 12 which may be of rubber to rest on a table. Adjacent the front edge 13 there is an inclined stand 14 which may be made up of somewhat triangular end and intermediate blocks 15, a front wall 16 and this is preferably open in the top. A removable rest board 17 is formed of two sections hinged at 18 and having cleats 19 on the top. This rests on the upper edge of the inclined stand 14 and when opened as shown in Fig. 1, preferably extends beyond the end 15 to support wide books. The back support for the books designated 20 includes two back boards 21 and 22, each hinged as at 23 to the support 14. There is a connecting upper board 24. This back board assembly is adjusted by telescopic legs 25 having a lower section 26 and an upper section 27, each being connected by eyes 28 to the base board 11 and to the boards 21 and 22 respectively. A screw clamp 29 is used for adjusting the length of the telescopic legs. By this construction the back boards 21 and 22 with the connecting board 24 may be at the desired angle in reference to the horizontal.

The assembly of the feed shaft and its shiftable support designated generally by the numeral 35 is as follows: the feed screw shaft 36 is driven through the medium of a flexible shaft 37 connected to the screw by a conventional coupling 38. The coupling may be shifted as to its position through the medium of a hinge connection 40, note Figs. 2 and 7, which employs a hinge leaf 41 secured to the back of the board 24. Complementary to this is the movable hinge leaf 42, these being connected through the medium of the knuckles 43 and the pintle 44. The hinge leaf has an upwardly projecting arm 45 and a laterally projecting arm 46, each of which is provided with a socket 47, note Fig. 6, which socket has an outwardly pressed nub 48 forming a slight recess. A guide eye 50 has a cylindrical section 51 and two projecting ends or prongs 53 and 54, one of which has a nub 55 to engage in the lateral recess inside of the nub 48. Thus the prongs may readily be removed to disconnect the flexible shaft 37 from the arm ends 45 and 46.

The clamp 60 for locking the hinge and hence the upper portion of the flexible shaft and the coupling 38 in the desired position employs an upper disk 61 which is secured to the leaf 41 of the hinge assembly 40. There is also a complementary disk 62 secured to the leaf 42 and in alignment with the lower edge, such leaf having a projecting fin 63 adding strength to the leaf. A friction disk 64 is located between the disks 61 and 62, therefore by tightening the nut 65 threaded on the threaded end 66 of the pintle 44, the disks 61 and 62 may be clamped together, thus rotating the upper coupling 38 of the screw shaft 35 in approximately the desired position.

The adjustable lower bar for the flexible shaft, designated 70, note Fig. 3, employs a lower friction disk 71 pivoted at 72 to the rest board 17. An upper disk 73 is hinged or pivoted to the lower disk at 74. This upper disk has a recess or bearing socket 75 within which the lower end of the feed screw 36 fits. Therefore by turning the two disks on their common pivot 74 and the assembly of disks on the pivot 72, the socket 75 may be moved a considerable range in distance both lengthwise of the rest board 17 and transversely thereto. Thus the lower end of the feed screw may be positioned quite close to the plane of the back boards 21 and 22 or shifted remote therefrom dependent on the space between the leaves from which copies are being made and the back or binding portion of the book.

The line marker attachment to the feed screw designated 80, note particularly Figs. 1, 2 and 8, employs a clamp 81 with a guide sleeve 82 which surrounds the feed shaft 36 and may be inserted over the lower end. This is attached to a jaw 83 extending from the spring clamp. The opposite jaw 84 has a pin 85 which projects from the movable jaw 86 through a perforation 87 in the sleeve 82 and engages the threads on the feed screw 36. This jaw is manipulated by finger grip handles 88 extending from the rigid or fixed jaw and 89 from the jaw 86. A spring 90 used in the conventional manner squeezes the jaws together, there being a resistance or pivot bar 91.

The line marking strips 95 include diverging strips 96 preferably of metal or other stiff material. These at the center are bent into a somewhat V-shape indicated at 97, Fig. 8, and are attached to a projecting reverse bent plate 98 from the jaw 83 and the sleeve 82. It is to be noted that these have a decided convex curve considered towards the front so that the apex 99 of the bend fits snugly between the leaves of an open book adjacent the binding. Therefore, this positions the strips 95 substantially in alignment with the opening of the leaves adjacent the book binding. An extension 105 is aligned with the strips 96, such latter strips being provided with a slot 106 and extensions 105 with a block or similar device 107 operating in the slot 106 and having tabs 108 to retain the alignment. The extensions 105 need only be used with books having unusually wide leaves.

The hand operated drive and control to operate the flexible shaft 37 and hence the feed screw 36 employs an intermediate variable line indicator designated by assembly numeral 115, note particularly Figs. 2, 3, 4, and 5. A hand operated knob 116 has shaft or stem 117 connected thereto and this is journaled in stand 14 and also the stem extends through a box-like housing 120 mounted on the baseboard 11 located behind the stand 14 and the book-supporting boards 21 and 22. This box or housing 120 has a side wall 121 with a bushing 122 secured at an opening, the stem or shaft 117 extending through this bushing and connected to a collar 123 by set screw 124 of a cylinder or drum 125. This cylinder has a continuing shaft 126 journaled in a

bushing 127 in an internal plate 128 of the box 120, this plate having a side wall 129 opposite the wall 121. A gear 130 is secured to the shaft extension 126 and meshes with a driven gear 131. This driven gear is mounted on the end of a driven stub shaft 132 which has a bearing and a bushing 133 of the plate 128. A shaft end piece 134 is fitted in socket and secured by a set screw or the like and is journaled in bushing 135 on the side 121. Thus, the shaft 132 operates as an idler. The flexible shaft 37 has a coupling element 140 with a shaft projecting prong 142 fitted in a socket in the shaft 132 and secured by a set screw. There is thus a drive from the shaft 117 through the collar 123, drum 125 and continuing shaft 126, the gears 130 and 131 to the flexible shaft 37.

The line indicating mechanism designated by the assembly numeral 150, note particularly Figs. 4, 5, and 6, includes in the drum 125 a series of recesses 151. These are arranged in a plurality of circles indicated at 152, 153, 154, and 155. The recesses of each circle are spaced different distances longitudinally of the drum. Cooperating with these recesses is a spring or resilient arm 160 having a nub 161 on the end to engage in the recesses. The arm is longitudinally movable as to the drum 125 by providing a strap-like guide 165 mounted on brackets 166 in the gear box device housing 120. This plate has hook-like ends 167 and may be readily removed and clamped in place by set screws 168. The spring 160 is mounted on a slide carriage 170 which consists of an upper member 171, a lower cross piece 172, the outside edge element 173, and a slight upturned rim 174. A thrust plate 175 is connected by a vertical strip 176 to the carriage. A set screw 180 extends through a perforation in the spring 160 and this preferably having a metal binding 181 thereabove. The lower part of the set screw is threaded as indicated at 182 into the thrust plate 175. A coil spring 183 bears against the thrust plate 175 and the spring 160 or the wrapping 181 of said spring. The upper part of the set screw has a knob with a shoulder thrusting the spring downwardly. This, therefore, acts as a clamp for the carriage and also gives the desired pressure of the nub 161 on the drum 125 causing the nub to be pressed into any one of the recesses on any circle from 152 to 155 with which it is aligned. In order to shift the carriage on the nub a shifting rod 185 has its inner end secured to the carriage, extends through a perforation 186 in the wall 129, and has a finger grip end 187. This is in a convenient position to be shifted by the operator or user of the device so that the nub 161 may readily be aligned with any one or series of the circles of perforations. In order to clearly identify the spacing of the lines, a line gauge 190 is marked on the cover or lid 191 of the gear housing 120. The operator therefore, on turning the knob 116 readily determines by a slight sound and by the slight resistance when the nub 161 drops into recess 151 that the line marking strips have been shifted from one line to another. The gauge 190 indicates the usual spacing of the lines on books this being given in the number of lines to one inch. Therefore, my equipment is suitable for books in which the lines are quite close together, and these being usually of the printed type used in making copies of manuscript books such as tax records and the like in which the lines have a wide spacing.

In the use of my book support and line gauge as the lower end of the screw shaft 35 is loosely journaled in a cup-like bearing or socket 75, this may readily be removed and on account of the shaft 37 being flexible and also having the hinge support 40, the shaft may be swung completely to one side, that is shifted over or to one side of the boards 21 and 22 and may hang loosely back of these boards for placing a book in the desired position and opening at the pages to be copied. As above mentioned, on account of having the adjustable lower bearing assembly 70 the socket 75 may be located in the correct position in accordance with the line between two leaves. The hinge assembly 40 may also be turned at the correct angle so that the screw shaft 35 is properly aligned with the leaves adjacent the binding of the open book. It is manifest that the inclination of the back boards 21 and 22 to position the book at the correct angle for convenience is readily accomplished by the extension legs 25.

Various changes may be made in the details of the construction without departing from the spirit or scope of the invention as defined by the appended claims.

I claim:

1. In a device as described, a book support having a stand, a rest board for the lower edge of the book, back boards extending upwardly for the back of the book whereby a book may be opened with the front and back covers resting on the back board with the binding intermediate and the leaves opened and extending in opposite directions from the crease of the leaves at the binding, a hinge secured to the back boards on the back thereof and adjacent the top, such hinge having a pivoted leaf, a flexible shaft support and guide structures on the leaf for the flexible shaft, a screw threaded feed shaft connected by a coupling to the flexible shaft, a lower bearing on the rest board for the lower end of the screw shaft, a line marker having a feeding device engaging the feed screw and provided with marking strips extending laterally therefrom.

2. In a device as described and claimed in claim 1, the lower bearing having a first friction disk pivotally connected to the rest board, a second and upper friction disk pivoted to the lower disk, the upper disk being provided with a recess or bearing socket forming the lower bearing for the screw shaft.

3. In a device as described having a stand for an open book, a feed screw shaft, a socket forming a journal for one end of the shaft whereby such shaft may be inserted and removed as to the socket, means to shift the position of the socket in reference to the crease of the open leaves of a book adjacent the binding to align the shaft with the crease of the leaves of the book and a driving means connected to the other end of the shaft.

4. In a device as described and claimed in claim 3, the driving means for the shaft including a flexible shaft connected to the feed screw and means to shift the flexible shaft to correspond with the shift of the socket whereby the feed screw as to both ends may be positioned in the desired relationship to the crease of the leaves of a book adjacent the binding.

5. In a device as described in which a book support and a feed screw with a line marking device is operable relative to a book with open leaves resting on the book support combined with a flexible shaft positioned at the back of the support and having a coupling to the upper end of the feed screw, a hinge attached to the book support and having a swinging leaf with supporting guide means for the flexible shaft and a friction ele-

ment with means to loosen and tighten said element to retain such leaf in the desired position.

6. In a device as described, a book stand with back boards and a rest board for the lower edge of an open book, a feed screw and a line marker, the combination of a journal in the rest board for the lower end of the feed screw, a flexible support for the upper end of the feed screw, the feed screw being disconnectible from the lower journal for placing an open book on the stand or for turning the leaves of the book.

7. In a device as described, a book stand with back boards and a rest board for the lower edge of an open book, a feed screw and line marker, the combination of a flexible support for the upper end of the feed screw with means to shift such upper end laterally, a journal secured to the rest board for the lower end of the feed screw, said journal having a mounting on a first member adjustably connected to a second member and a second member being adjustably connected to the rest board whereby the lower journal and the flexible support likewise may be shifted in relation to the crease of a book between open leaves.

8. In a device as described, a book support having a stand, a rest board for the lower edge of the book and back boards for the back of the book whereby a book is adapted to be opened with the two covers resting on the back boards and the binding intermediate, the binding and the lower edge of the back of the book being adapted to rest on the rest board, a screw threaded feed shaft, a lower journal therefor mounted on the rest board, a journal structure with means connecting same to the back boards, a line marker having a feeding device engaging the feed screw with marking strips extending laterally therefrom whereby on rotating the feed screw the shaft may be rotated and the marking strips raised and lowered, the lower journal for the feed shaft including a pair of link-like elements pivoted together and one of said elements being pivoted to the rest board whereby the lower end of the shaft may be shifted laterally and outwardly from the back boards to align with the crease of an open book adjacent the binding.

9. In a device as described, a book support having a stand, a rest board for the lower edge of the book and back boards for the back of the book whereby a book is adapted to be opened with the two covers resting on the back boards and the binding intermediate, the binding and the lower edge of the back of the book being adapted to rest on the rest board, a screw threaded feed shaft, a lower journal therefor mounted on the rest board, a journal structure with means connecting same to the back boards, a line marker having a feeding device engaging the feed screw with marking strips extending laterally therefrom whereby on rotating the feed screw the shaft may be rotated and the marking strips raised and lowered, a flexible shaft coupled to the upper end of the feed screw, a hinge assembly mounted at the upper back portion of the back boards, the hinge having a movable leaf provided with guides for the flexible shaft whereby such shaft may be shifted and thereby shift the position of the upper end of the feed screw to align same with the crease of a book adjacent the binding.

10. In a device as described, a book support having a stand, a rest board for the lower edge of the book and back boards for the back of the book whereby a book is adapted to be opened with the two covers resting on the back boards and the binding intermediate, the binding and the lower edge of the back of the book being adapted to rest on the rest board, a screw threaded feed shaft, a lower journal therefor mounted on the rest board, a journal structure with means connecting same to the back boards, a line marker having a feeding device engaging the feed screw with marking strips extending laterally therefrom whereby on rotating the feed screw the shaft may be rotated and the marking strips raised and lowered, a flexible shaft connected to the feed screw, a coupling attaching such shaft and the screw threaded feed shaft, a support for the upper part of the flexible shaft connected to the back of the back boards and extending above the top of such boards whereby the flexible shaft with the line marker and marking strips as a unit may be lifted over the top of the back boards for placement of books on the book support and removal of books therefrom.

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