

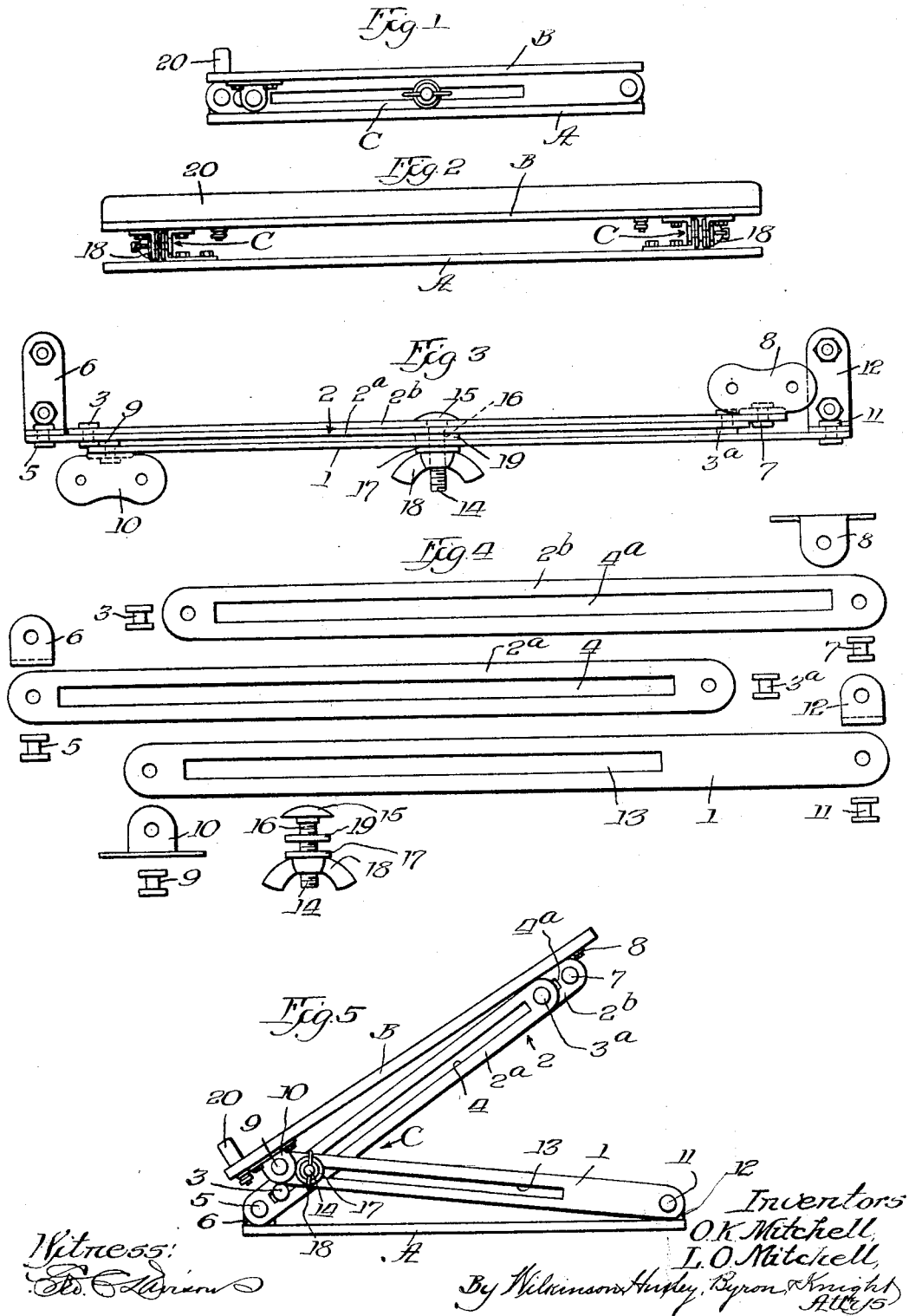
Feb. 14, 1933.

O. K. MITCHELL ET AL  
ADJUSTABLE LINK SYSTEM TABLE

1,897,321

Filed April 11, 1928

2 Sheets-Sheet 1



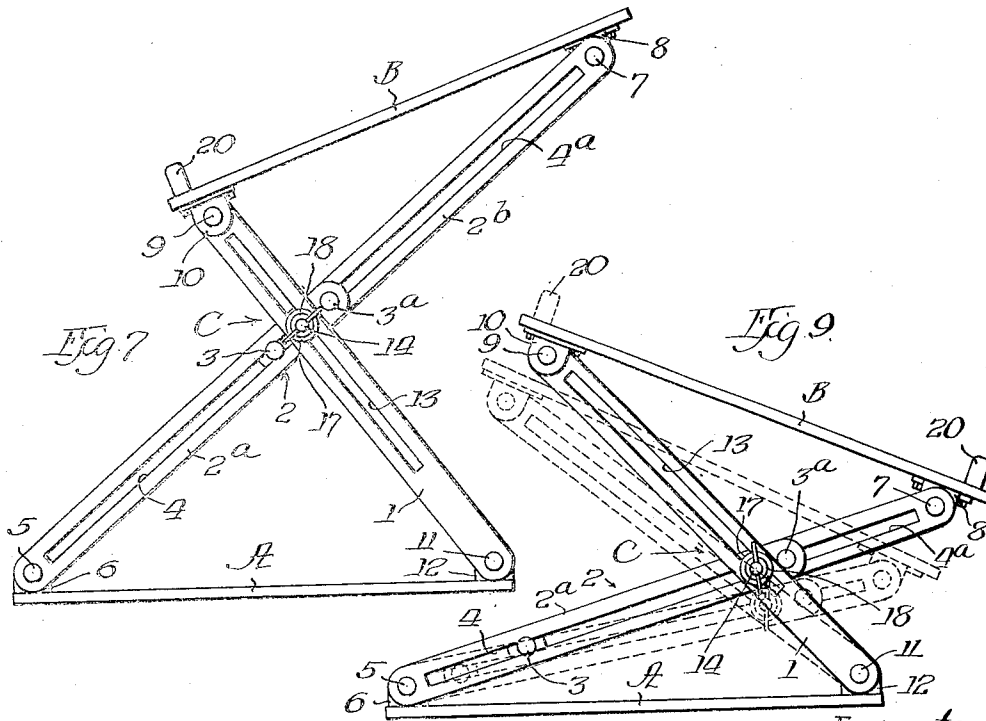
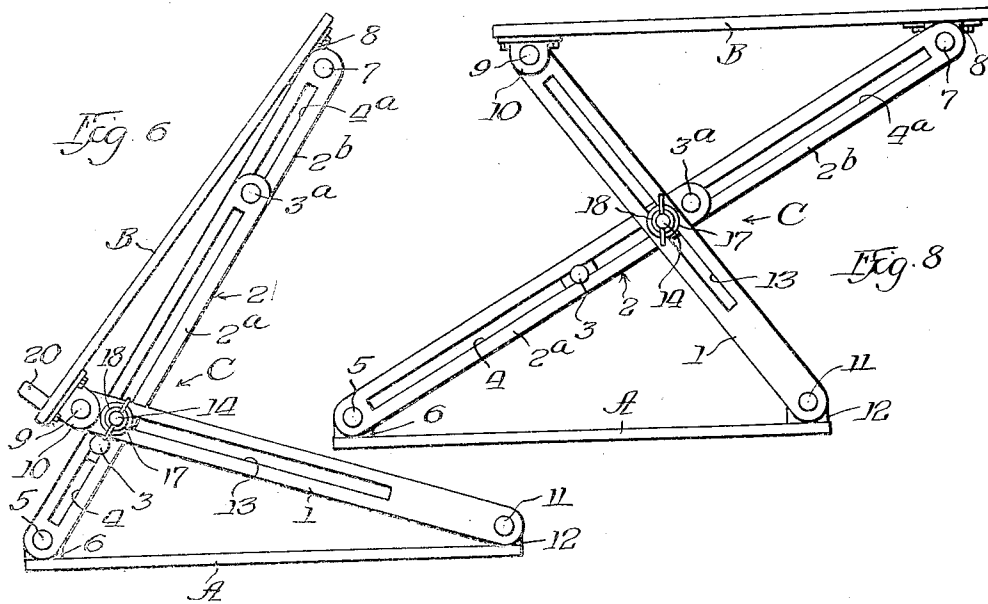
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Witness:

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## UNITED STATES PATENT OFFICE

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## ADJUSTABLE LINK-SYSTEM TABLE

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This invention relates to tables of the class in which a table member is supported upon a base member through the medium of connecting links pivoted at their ends to front and rear portions of the respective members and crossed between them in pairs in vertical planes extending from front to rear of the table, and spaced apart in the direction of the width of the table; in which said tables, for the sake of making the table member collapsible upon the base member, and adjustable to various heights above the base and to various angles of elevation and depression relatively thereto, the links are slidable longitudinally and transversely one upon the other at their crossings, and the restraint which two of the links (herein referred to as stay links) exercise over the table member is releasable to the extent of permitting the table to follow the radius action of the other two links (herein referred to as master links) as they swing about their pivots on the base; and particularly to tables in which, for the sake of permitting one of said adjustments without materially affecting the other, the adjustment of at least the stay links, longitudinally of the master links, in determining the angle of elevation, is of an amplitude sufficient to bring the table approximately parallel to the direction of yielding of the stay links, and then, by the yielding of said stay links, the table can while retaining its angle of elevation, move parallel to the stay-links in fixing its height.

Heretofore, the stay links, for instance, those links of the respective crossed pairs which extend from the front portion of the base member upwardly and rearwardly to the rear portion of the table member, had been made to yield the table to movements of the master links by rendering their pivotal connections with the rear portion of the table member releasable and slidable forwardly upon the table member. But this method is open to the objections that it renders the supporting system for the table member relatively complicated; it necessitates manual releasing and tightening of the two pivotal connecting means at each adjustment; in some adjustments it withdraws the supports for

the rear portion of the table member from positions where they are most needed; and the direction of movement of the releasable pivoting connections on the free rear portion of the table member is at such variance with the direction of manipulation of the table member itself that the sliding connections do not respond freely to the manipulation, and serious inconvenience results.

The object of the present invention is to provide a simplified system of crossed supporting links in a table having the character of adjustments referred to; a system in which the release of the rear swinging portion of the table member is accomplished by making its supporting links inherently yielding to the vertical swinging movements so that the pivotal connections between this vertically swinging rear portion of a table member and these links which support it will remain stationary on the table member and therefore require no releasable securing means or special manipulation during adjustment, besides leaving the table member better supported in all of its positions of adjustment; a system in which yielding of the supports for the vertically swinging portion of the table will be in a direction more nearly approaching that in which the table member is manipulated, and therefore less obstructive to such manipulation, and rendering the adjustments more convenient of accomplishment; and a system in which but a single securing means is required for each side of the table, to wit, a securing means serving to fix, simultaneously, both the crossing points of the links and the adjustment of the yielding links incident to each adjustment of the table member.

In realizing the foregoing object, the invention proceeds upon the principles of having those links which are pivotally connected to and afford support for the portion of the table member which is to swing vertically in maintaining its level or giving it angles of elevation or depression, constructed in duplex form so each of said links will consist of two aligned members slidable one upon the other in the direction of the length of the link in yielding to the movement of the table member

under the radius action of the master links, and releasable means for fixing the different lengths of link which they develop by their sliding movement; in other words, the yielding characteristic is made inherent in the links themselves instead of in the mounting of their pivotal connections on the table member; the sliding link members being preferably of such length that each will extend from its pivotal connection with the base member or table member, as the case may be, beyond the intersection of the extensible link with its crossing link; and the means for fixing the extensible link being made to serve also the purpose of binding the crossed links together at the point of intersection which results from that adjustment. An important identifying characteristic of the preferred embodiment of the invention is that by connecting the table member with the base member through means of one, two, or more pairs of substantially identical crossed links, of which each pair of crossed links has its respective ends connected to fixed points on said base member and table member, one link of said pair being of fixed length so that it definitely controls the collapsed relation of the table member to the base member and defines a definite path of movement of the table member to and from said base member, and of which pair the other link is composed of upper and lower sections lapped and relatively movable one upon the other and both slotted and receiving the crossing pivot of the pair through their slots, the table member is permitted to be moved bodily upward from the base member by pivotal action of all the link ends until such upward movement is arrested by the arrival of the crossing pivot at the upper end of the slot of the lower slotted link section, after which the table may execute a swinging movement about the upper end of the fixed length link and develop various angles of depression until the lower end of the upper slotted link section reaches the crossing pivot. By having means for clamping the fixed length link and the two overlapped slotted link sections together, the table can be fixed at various bodily elevations and at various angles of depression to suit the eyes of the reader. Furthermore, by having the fixed length link also slotted, the range of angular depression of the table is jointly determined by the lateral movement of the duplex link longitudinally of the fixed length link plus the longitudinal extension of the duplex link; and by permitting the extensible or duplex link to yield from its full length, a much greater angle of forward depression of the table member can be attained.

In the accompanying drawings—

Figure 1 is an end view of the table in folded position;

Figure 2 is a front view of the same;

Figure 3 is a top plan view of one of the two identical link systems;

Figure 4 is a detail view showing the elements of Figure 3, segregated;

Figure 5 is an end view with the table member swung to a substantial angle of elevation, but without materially raising the front of the table;

Figure 6 is a similar view showing adjustment to a substantial angle of elevation with the table at an intermediate height;

Figure 7 is a similar view showing the table member at an angle of elevation and at extreme height;

Figure 8 is a view showing the table member at full height in level position; and

Figure 9 is a similar view showing the table member in full lines at an intermediate angle of depression and extreme rear overhang, and in dotted lines at its extreme position of depression with intermediate overhang.

The table comprises a base member A, a table member B, and two connecting link systems C, which, as shown in Figures 1 and 2, are located near the respective sides of the table in parallel vertical planes extending from front to rear of the table.

As shown in Figures 3 and 4, each link system comprises a unitary link 1 which, being non-extensible and pivoted at stationary points on the two members which it connects, becomes a master link in the sense that the portion of the table to which it is connected must partake of its radius action, and a duplex link 2 comprising two members 2a, 2b suitably connected, for instance, through studs 3, 3a and slots 4, 4a to enable them to slide one upon the other in the direction of the length of the duplex link, thereby adapting this duplex link to serve as a yielding stay link and avoid restraining the table member as the latter moved with the master link except in so far as the duplex link, by its adjustment may determine the vertical swinging of the table member about the upper end of the master link. Link member 2a is pivoted at 5 to a pivot bearing 6 which is fixed to the front portion of the base member A near one side thereof, and duplex member B has a similar pivot connection 7, 8 to the rear portion of the table member near one side thereof. Similarly, the unitary link 1 has pivotal connection 9, 10 with the front portion of the table member near one side thereof, and pivotal connection 11, 12 with the rear portion of the base member near one side thereof.

It is to be understood that all of the effects hereinafter referred to are accomplished with all of the pivoting members 6, 8, 10, and 12 stationary on the members A and B, to which they connect the respective link ends.

Unitary link 1 has a longitudinal slot 13 which is adapted to register with the slots 4, 4a at their places of intersection, and this

adapts the system to receive a single retaining means for locking the extensible duplex link 2 at any adjustment which may be imparted to it, as well as locking the two links 1 and 2 together at any point of intersection assumed in their use. A desirable means of simultaneously locking the extensible links and the intersection of both links is a bolt 14 provided with head 15 on one side of the system, a spacing washer 19 between links 1 and 2, a bearing washer 17 on the face of the link 1, and a wing nut 18.

Considering now the effect of two link systems, as disclosed in Figures 3 and 4, when applied as connecting means between the base member A and table member B, as suggested in Figures 1 and 2, it will be seen that without shifting any of the connections 5, 7, 9 and 11, and with the bolt 14 loose, table B, by manipulation of its rear end, may be shifted from the position of Figure 1 to the position of Figure 5, where it will remain by the simple expedient of tightening the bolt 14 on each side, and in which position it may be used as a convenient support for reading matter. In executing this movement, the duplex or yielding links 2 have swung upwardly about the pivot 5, raising the free ends of the master links 1 with them, and since the free ends of the master links 1 have moved through an arc with a substantial rearward factor, they have caused the table member B to increase its distance from the pivot 5, thereby bringing into play the extension feature of the duplex links, without which, so long as the pivot 11 is stationary on the table member, the adjustment could not have taken place. Having attained the position of Figure 5, with the table member B still in approximate parallelism with the extensible links 2, the height of the table while still maintaining its angle of elevation may be increased by merely releasing the bolts 14 and manipulating the table approximately in the plane of its inclination until the desired height is obtained, or the table reaches some such position as that shown in Figure 6, where the bolts 14 can be again tightened. From the position of Figure 6 with the point 9 unrestrained in its arcuate path, the point 11 may upon release of the bolts 14 be depressed to bring the table member to a still greater height from the base A but with a lesser angle of elevation, for instance, that shown in Figure 7; or by a still further depression of the point 11, brought to a horizontal position as shown in Figure 8. In the former of these last two adjustments the yielding or extensible links 2 are projected to their greatest length, while in the latter they are shortened somewhat, due to the limitation imposed upon the crossing point 14 by the end of the slot 4a in the link member 2b. Further depression of point 11 will bring the table member B into angles of depression, as sug-

gested in Figure 9. Inasmuch as this develops an overhang of the rear portion of the table member relatively to the base A, it may be desirable to use the table in this position. The ledge 20, which is usually provided upon a table of this kind is made interchangeable between the portion of the table member which constitutes the front in Figures 1 to 8 and that which will be used as the front in Figure 9.

In all of the adjustments of the table it will be seen that the point 11 remains stationary with reference to the table member B and lends its supports where it is most needed. It will also be seen that in positions where there is the most transverse stress upon the extensible or yielding link, the splicing portions thereof will be sufficiently overlapped to space the two studs 3 and 3a a sufficient distance apart to stiffen the link. It will also be seen that to adjust the table to any of the positions which it is capable of assuming, it is merely necessary to release and tighten but two fixing bolts in permitting the adjustment and securing it when attained. Thus, the object of the invention is attained in all its details.

#### We claim:

1. In a collapsible table, a base member, a table member, and a pair of crossed links connecting said members together and having at their crossing point a crossing pivot movable lengthwise of both links; each link of said pair having its respective ends pivotally connected at fixed points to said base member and said table member; one link of said pair being of fixed length; the other link of said pair comprising an upper and a lower link section lapped and relatively movable one upon the other; said upper and lower link sections being both slotted and receiving a crossing pivot of the pair through their slots; said table member being bodily movable upwardly to various levels of elevation by the pivotal action of the link ends, and to a limit determined by the arrival of the crossing pivot at the upper end of the slot of the lower link section; and said table being angularly movable about the upper end of the fixed length link as a pivot to develop various angles of depression of the table member up to a limit determined by the arrival of the crossing pivot at the lower end of the slot of the upper link section; means being provided for securing the table member at its various adjustments.

2. In a collapsible table, a base member, a table member, and a pair of crossed links connecting said members together and having at their crossing point a crossing pivot movable lengthwise of both links; each link of said pair having its respective ends pivotally connected at fixed points to said base member and said table member; one link of said pair being of fixed length; the other

link of said pair comprising an upper and a lower link section lapped and relatively movable one upon the other; said upper and lower link sections being both slotted and receiving  
5 a crossing pivot of the pair through their slots; said table member being bodily movable upwardly to various levels of elevation by the pivotal action of the link ends and to a limit determined by the arrival of the crossing  
10 pivot at the upper end of the slot of the lower link section; and said table being angularly movable about the upper end of the fixed link as a pivot to develop various angles of depression of the table member up to a  
15 limit determined by the arrival of the crossing pivot at the lower end of the slot of the upper link section; means being provided for securing the table member at its various adjustments consisting of means coacting with  
20 the crossing pivot to clamp together the fixed link and the overlapped sections of the extensible link.

3. In a collapsible table, a base member, a table member, and a pair of crossed links connecting said members together and having at  
25 their crossing point a crossing pivot movable lengthwise of both links; each link of said pair having its respective ends pivotally connected at fixed points to said base member  
30 and said table member; one link of said pair being of fixed length; the other link of said pair comprising an upper and a lower link section lapped and relatively movable one  
35 upon the other; said upper and lower link sections being both slotted and receiving a crossing pivot of the pair through their slots; said table member being bodily movable upwardly to various levels of elevation by the  
40 pivotal action of the link ends, and to a limit determined by the arrival of the crossing pivot at the upper end of the slot of the lower link section; and said table being angularly  
45 movable about the upper end of the fixed length link as a pivot to develop various angles of depression of the table member up to a limit determined by the arrival of the  
50 crossing pivot at the lower end of the slot of the upper link section; means being provided for securing the table member at its various adjustments; the fixed length link being also  
55 slotted longitudinally, and the extensible link being laterally movable together with the crossing pivot on said fixed length link in varying the angle of depression of the table member.

Signed at Chicago, Illinois, this 9th day of April, 1928.

O. K. MITCHELL.  
LEONARD O. MITCHELL.