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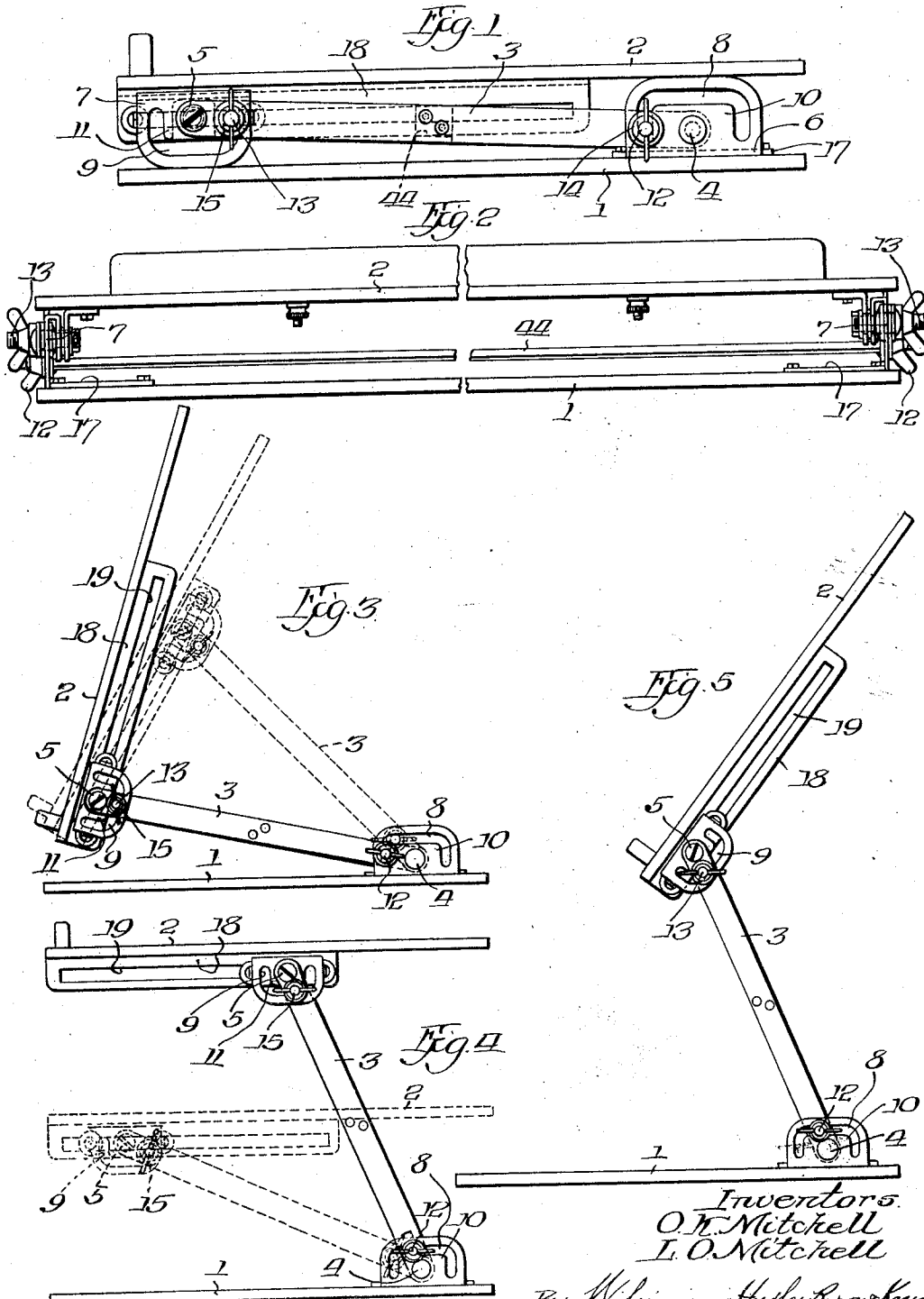
O. K. MITCHELL ET AL

1,900,250

VERTICALLY AND HORIZONTALLY ADJUSTABLE TABLE

Filed April 28, 1928

3 Sheets-Sheet 1



Witness
Ed. Adams

Inventors
O. K. Mitchell
L. O. Mitchell
By *Wilkinson, Hupley & Grou, Knight*
Attys

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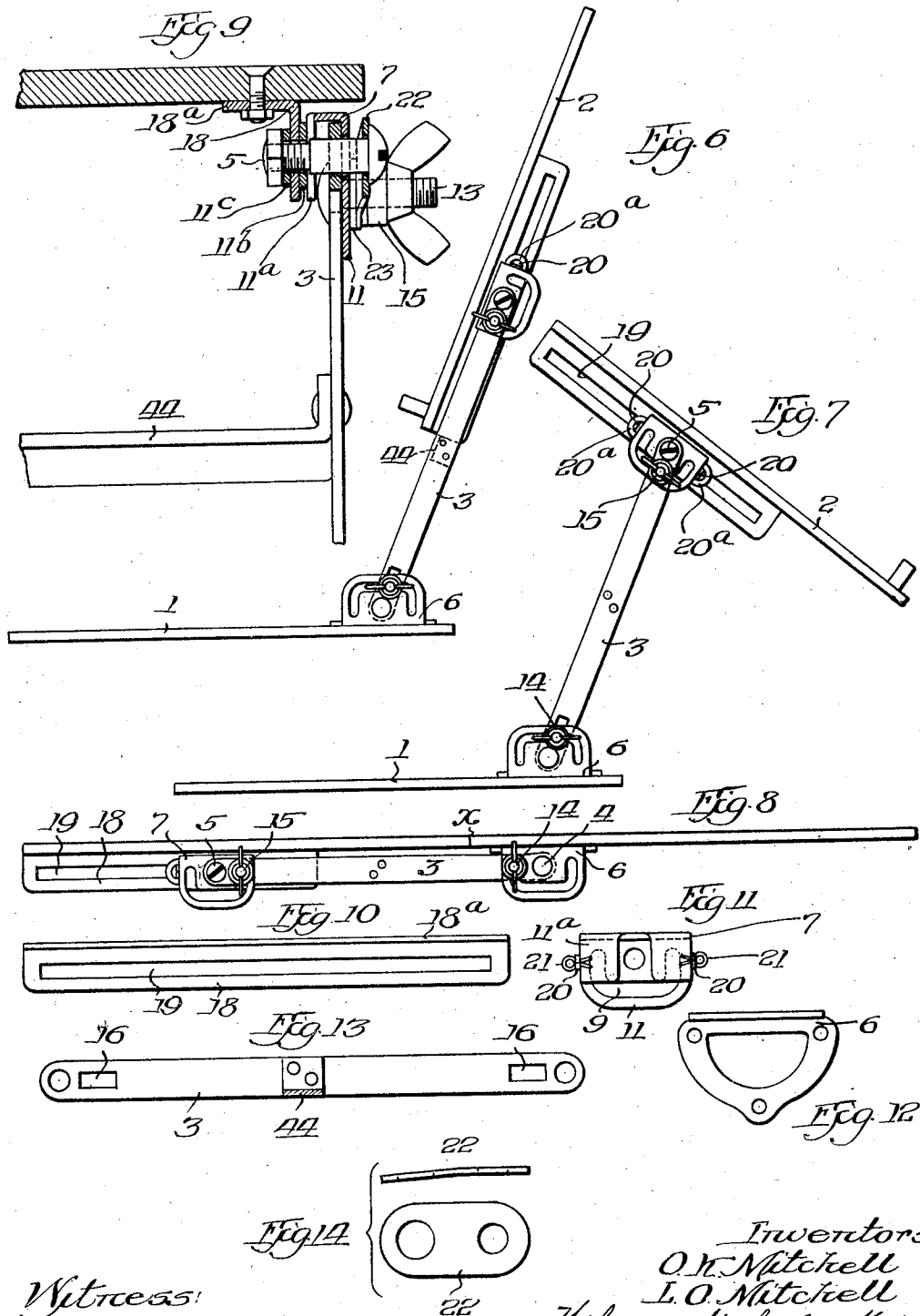
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VERTICALLY AND HORIZONTALLY ADJUSTABLE TABLE

Filed April 28, 1928

3 Sheets-Sheet 2



Witness:

Ed. C. Linn

Inventors

O. K. Mitchell

L. O. Mitchell

By Wilkinson, Huxley, Bynum, Knicker
Attys

UNITED STATES PATENT OFFICE

OSSIAN K. MITCHELL AND LEONARD O. MITCHELL, OF OAK PARK, ILLINOIS

VERTICALLY AND HORIZONTALLY ADJUSTABLE TABLE

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This invention relates to tables comprising in addition to the member which provides the working surface of the table (herein referred to as the table member), a base (herein referred to as the base member) from which said member is supported with freedom of adjustments that adapt the said member to be presented at different heights from the base and at different angles of elevation or depression relatively thereto.

The object of the invention is to provide a simplified means through which to support the table member from the base member, and a means which will afford a wider range of adjustments than has heretofore been attainable, as well as greater convenience in effecting the adjustments; and the invention, instead of employing the complicated systems of links crossed or otherwise arranged to conveniently define the positions of adjustment of a table member, as by crossing the links from the respective margins of one member to diagonally opposite margins of the other member, and with the incident multiplicity of staying devices at the crossing points and points of connection between the links and the members, proceeds upon the principle of employing, between the two members, connecting links which are essentially single links in principle, so that while as many of these links as desired may be employed for supporting the table member upon the base member so long as the links are arranged in parallel vertical planes extending from front to rear of the table and spaced apart in the direction of the length of the table (two, however, being ordinarily sufficient), and these links being connected to the respective members through means of suitable pivot mountings, all the pivot mountings on each member will be located with their pivots aligned in a single horizontal hinging axis extending perpendicularly to the planes of the links, and preferably on the rearward marginal portion of one member and forward marginal portion of the other member, and vertical swinging movement of the links upon the base member will have the effect of raising and lowering the axis of hinging motion of the table

member, and the table member with its axis of hinging motion at any elevation will be free to execute its vertical swinging motion to change its angle of presentation to the user because it is free from restraining connection with the base member otherwise than through the single links. The links are preferably connected through a cross bar at an appropriate point intermediate of their ends, and the pivot mountings are provided with stay devices for fixing the angular adjustments when selected. Preferably, the range of angular adjustment of the links upon the base member and of the table member upon the links will extend, in each instance, through an arc of 180° with the advantage of securing not only a number of new angular and height adjustments, but permitting the two members with their connecting links to change from a folded position in which the said members and links will be substantially parallel and superposed one above another to a position 180° removed therefrom, in which the two members abut edge to edge in the same plane, and are there held by the links which are again parallel with the members and tie them together in positions to produce a working surface equal to the sum of the areas of the two members. Finally, to facilitate bringing the members into edgewise abutment as well as to enlarge the range of adjustment one of the members, preferably the table member, has not only a vertical hinging movement upon the supporting links, but a sliding movement thereon in a direction defined by the plane of the table member and the planes of the links.

The preferred embodiment of the invention, as well as several modifications thereof through which the underlying principle of operation may be realized, also details of construction which facilitate such a realization in both the preferred and modified embodiments, are hereinafter fully described, reference being had to the accompanying drawings, in which—

Figures 1 and 2 are, respectively, an end elevation and a front elevation of the table

in folded position, and showing the preferred embodiment of the invention.

Figures 3 to 8 inclusive are side elevations showing the table of Figures 1 and 2 in some of the numerous positions of adjustment which it is adapted to assume;

Figure 3 showing in full lines the elevation of the table member to approximately extreme angle of useful elevation but at minimum height, and with but slight swinging of the links upwardly; and by dotted lines a somewhat similar angle of elevation and height of the table member, but with a substantial upward swinging of the links, the sliding displacement of the table member on the links being resorted to in the dotted line position but not in the full line position;

Figure 4 illustrating by full and dotted lines the feature of horizontal presentation of the table member at different heights, and maintaining the table vertically above the base by the use of the sliding feature of the table together with the swinging function of the links and the pivoting of the table on the links;

Figure 5 showing adjustment of the table member at a substantial angle of inclination to approximately its extreme height;

Figure 6 illustrating the feature of securing the table member at an angle of elevation convenient for reading, with vertical adjustment without changing the angle and without obstructing the space above the base member, namely, by adjusting the links to an angle of rearward inclination and bringing the table member into parallelism with the links so that the base can be used as a writing surface while the table member is serving as a copy holder;

Figure 7 showing the links at an angle of rearward inclination and the table member at an angle of depression relatively thereto (the book retaining ledge being transferred from the front to the rear margin and being thereby brought closer to the body of the reader); and

Figure 8 showing the base and table members brought into abutment in the same plane and developing a working surface equal to the combined areas of the two said members, and the structure as a whole being held by the links rigidly in a condition which makes it convenient for supporting upon the laps of two persons sitting vis-à-vis.

Figure 9 is a detail view in vertical section of a portion of the table member, and one of its pivot mountings together with adjacent portion of a link connected thereby.

Figure 10 is a side elevation of one of the slide tracks through means of which the table member is slidably mounted on the links.

Figure 11 is an inner side elevation of one of the stay plates which provide pivotal mountings for the upper ends of the links,

and which are in turn slidably connected with the slide track.

Figure 12 is a top plan view of the combined stay plate and attaching bracket which provides pivotal mountings for the lower ends of the links and connects the links with the base member.

Figure 13 is a side elevation of one of the links together with its intermediate tie rod in section.

Figure 14 shows by edge and face views one of the rocker plates that engage beneath the slide bolts of the upper pivot mountings and beneath the wing nuts of the stay devices, simultaneously locking the table against sliding movement on the pivot mounting and against angular movement on the links.

Figures 15 and 16 represent by end elevation and plan view, partly in section of the supporting and articulating means, a modified construction of table adapted to receive most if not all of the adjustments attainable with the construction shown in Figures 1 to 14; and

Figures 17 and 18 represent by end elevation and by plan view partly in section of the supporting and articulating means, another construction of table adapted to afford adjustments of the kind herein described.

1 represents the base member, 2 the table member, and 3 supporting links which are pivoted at 4 to the base member and at 5 to the table member, there being, as shown in Figure 2, a plurality of these links in vertical planes extending from front to rear of the table and spaced apart endwise of the table. Ordinarily, two such links will suffice. Links 3 are connected to the respective members through means of pivot mountings 6 and 7 respectively located preferably upon the rearward portion of one member and the forward portion of the other member so that links of substantial length may be employed without projecting beyond the overall limits of the table when folded; and these pivot mountings are of such construction that while permitting the links to swing vertically to any desired angle relatively to the base 1, and the table member 2 to swing to any desired angle relatively to the links, each of said members preferably having a range of swinging movement approximately 180°, said pivot mountings are so constructed and equipped that they can lock the links and members at any angles of adjustment that may be selected, with such security that it is unnecessary to have any other means of support between the table member and the base member than a single link connection in each vertical plane.

In the form shown in Figures 1 and 2, the means for locking relative angular adjustment of the members and the links, comprises in addition to the pivots 4 and 5 on the pivot mountings, cam slots 8 and 9 in those portions

10 and 11 of the pivot mountings which lie parallel with the links, and which portions are herein referred to as stay plates, and stay bolts 12 and 13 are passed through the
 5 links and through the slots 8 and 9 so that said bolts must travel in said slots in angular adjustments of the links relatively to the base member, and of the table member relatively to the links, and by tightening said
 10 stay bolts, for instance, through means of wing nuts 14, 15, such angular adjustments can be maintained with sufficient security to sustain any load for which the table is intended without pivotal action between the
 15 links and the said members. To make the staying effect of the bolts 12 and 13 more effective, slots 8 and 9 are non-concentric with the pivots 4 and 5, for instance, by designing them with substantially straight portions as well as vertical portions, thereby necessitat-
 20 ing radial displacement of the stay bolts relatively to the bolts 4 and 5 in the angular adjustments (to permit which the links 3 are slotted to receive said bolts as shown at 16,
 25 in Figure 13) and so that said slots become camming slots and by producing a sliding movement of the wing nut and bolt head upon the stay plate and link respectively, build up the frictional resistance to swing-
 30 ing movement when the bolt is tightened, so that it will be ample for the purpose intended. For convenience in attaching the pivot mountings 6 to the base member 1, the stay plates 10 are constructed with attaching
 35 brackets 17, and a similar mode of attachment might be used between the pivot mountings 7 and the table member 2, except that the present invention contemplates the additional function of sliding the table member
 40 2 relatively to the pivot mountings 7; and, accordingly, the pivot mountings 7 are indirectly attached to the table member 2 through the medium of slide tracks 18 upon which pivot mountings 7 are mounted
 45 through the medium of back plates 11a and pivot bolts 5, the latter extending not only through stay plates 11 and links 3, but through said rear plate 11a and slots 19 in the slide tracks 18, suitable spacing washers
 50 11b and 11c being also employed; the pivot mountings 7 being held against rotation upon the pivot bolts 5 through means of guiding lugs 20 extending from back plates 11a which extend through washers 20a and slots
 55 19 and are there secured by any suitable means such, for instance, as cotter pins 21. In order to lock each pivot mounting 7 against sliding movement in the slide track 18, pivot bolt 5, normally loose enough to slide
 60 freely in the slot 19, is engaged by one end of a rocker plate 22, the other end of which is caught between the wing nut 15 and washer 23 on the stay bolt 13, thereby arresting sliding movement of the table member each time
 65 it is stayed in its angular adjustment.

In adjusting the table, it is simply necessary to release the wing nuts 14 and 15 and move the table member to any desired height and angle of elevation or depression, the height being regulated by the vertical swing-
 70 ing of the links 3, and the elevation or depression being determined by the swinging of the table member on the pivots 5. If the wing nuts are loosened only to the extent of permitting forcible shifting of the table and
 75 links, the adjustment becomes very convenient and the selected position will maintain itself until the wing nuts can be again tightened. When this is done, the adjustment
 80 will be maintained with all security and rigidity required for any use for which the table is intended. The range of adjustments permitted is greatly enlarged by the function of sliding the table upon the links.

One important advantage of a table con-
 85 structed as herein described, is that the two members 1 and 2 can be assembled in the relations shown in Figure 8, where they are in abutment edge to edge and in the same plane, and are there held by tightening the
 90 wing nuts 14, 15. While this disposal of the members could, of course, be obtained by having the pivots 4 and 5 appropriately located on the members 1 and 2, it is more conveniently obtained by reason of the sliding
 95 function of the table member afforded by the slide track 18, as it permits the two members to move more freely in assuming position of coincident planes if the members can be kept apart until they reach their ultimate
 100 plane of assembly and then forced together by sliding the pivot mountings 7 on the slide track. As shown in Figure 8, when this assembly is attained, links 3 constitute bridg-
 105 ing members across the line of division X between the two members, and these bridg- ing members being tightened against rotation relatively to the pivot mountings 6 and 7, develop a rigid structure that can be conveniently suspended between the knees of
 110 two persons who may wish to use the table as a surface upon which to play games.

According to Figures 15 and 16, pivot mountings 6a and 7a are adapted to serve
 115 as stay plates by providing them with secondary pivots 24, 25, of which the pivot 25 by passing it through the slot 19 can be made to serve the purpose of preventing tip-
 120 ping of the pivot mounting 7a upon the slide track 18; and from these secondary pivot mountings 24, 25 extend stay links 26, 27 having slots 28, 29 through which they receive a single stay bolt 30 fixedly mounted
 125 at about the middle point of the links 3a. By loosening the stay bolt 30 on each link 3a, the parts will be released to angular adjustment upon the pivots 4, 5, the stay links 26, 27 sliding on the stay bolt 30 in said adjust-
 130 ments and, when the desired adjustment is attained, retaining the single bolt 30 at each
 135

end of the table will simultaneously lock against angular movement both the links 3a relatively to the base 1, and the table member 2 relatively to the said links; and having secured said adjustment, loosening of wing nuts 15a will permit the table member 2 to slide upon the pivot mounting 7a.

From another aspect, the form of device shown in Figures 15 and 16 will be seen to constitute a table member supported from a base member through means of a pair of crossed links, which obviously may be duplicated or multiplied in number to meet requirements; that the links of this pair have their respective ends pivotally connected at points which are fixed relatively one to the other upon both members; that one link of the pair, namely, the link 3a, is of fixed length; that the other link of the pair is a duplex link made up of the two stay members 26, 27, which constitute lower and upper link sections lapped one upon the other and relatively movable longitudinally of the said duplex link as well as angularly in the plane thereof, the said lower and upper link sections being both slotted and receiving, through their slots a crossing pivot which is provided by the stay-bolt 30 that also passes through the fixed length link 3a; that the fixed length link defines the relation of the table to the base when in collapsed position, as well as a definite path through which the table member moves away from the base member; that by the pivotal action of the crossed links the table can be moved bodily from the base to any elevated level within reach of the fixed length link 3a; that having attained a desired level of elevation, the table can then, by reason of the sliding movement of the link sections 26, 27, be moved to any desired angle of depression; that these adjustments of height and angle of depression can be secured by clamping means 30 in a single transverse line; and that by reason of the freedom of the overlapping link sections to move angularly in the plane of the duplex link, the crossing pivot and clamping means 30 can occupy a fixed intermediate position on the link of fixed length.

According to the form shown in Figures 17 and 18, the pivot mountings 6b and 7b, mounted respectively upon the base member 1 and upon the slide track 18 of the table member 2, are constructed with stay plates or the functional equivalent of stay plates in the form of ratchets or ratchet plates 31, 32, in position to enter into engagement with toothed ends 33, 34 of dogs 35, 36 sliding upon the supporting link 3b; dogs 35, 36 being simultaneously projected into engagement with or withdrawn from the ratchets 31, 32 by means of a cam 37 pivoted at an intermediate point 38 upon the link 3b adapted to be conveniently rocked upon its pivot through the medium of the finger piece 39,

and controlling the said dogs through the medium of lugs 40, 41 on the cam engaging slots 42, 43 in the dogs. Pivot mounting 7b is secured to the slide track 18 by means of pivot bolt 5b by loosening which the table member 2 is left free to slide on the said pivot mounting 7b; and in order that the pivot mounting 7b may not tip on the slide track 18, it is provided with an elongated base 7b' which travels upon the attaching flange 18a of the slide track. With this arrangement it is merely necessary to throw the cam 37 in the direction to withdraw the dogs 35, 36 from the ratchets 33, 34 and select the desired height and angular adjustment of the table member, and then rotate the cams 37 in the opposite direction, when the selected adjustment will be secured; and having secured the desired height and angular adjustment, the pivot bolts 5b may be loosened and the table member 2 slid to any desired position within the limits of the slide track 18.

From the foregoing description it will be seen that all of the forms of the invention herein described exemplify a table consisting of a base member, a table member above the base member, links for supporting the table member on the base member, said links being located in vertical planes extending from front to rear of the table and spaced apart endwise thereof, and articulating and staying devices through which the respective ends of the links are connected to said members in the form of pivot mountings located on the rearward portion of one member and the forward portion of the other member, the members being free from restraint one over the other otherwise than through means of the single link connections; also that in addition to adjustment as to height and angle of presentation, the table member is made slidable upon the links, but which sliding action is wholly independent of and without influence upon its other adjustments.

In order that the supporting links may be caused to execute identical angular movements relatively to the base 1 and at the same time materially stiffened against side swaying, a cross brace 44 will preferably be used with its ends rigidly united to the links, for instance, by deflecting the ends of the cross brace to positions of 90° to the length of the cross brace and riveting them to the links.

We claim:

1. An angularly and vertically adjustable table, comprising a base member, a table member, supporting links extending from front to rear of the table in vertical planes spaced apart in the direction of the lateral dimension of the table, pivot mountings carried by the base member and table member to which the ends of the links are, respectively, pivoted, and stay means fixing the ends of the links against angular movement relatively to their pivot mountings; said stay

means connecting the links with their pivot mountings at points removed from the pivots and moving longitudinally of the links, and having fixing means for releasably arresting said longitudinal movement and thereby resisting the angular adjustment of the links.

2. A table as described in claim 1, in which the pivot mountings on one of said members has sliding movement upon the member in the plane of the member, and the stay means partakes of said sliding movement.

3. A table as described in claim 1, in which the pivot mountings on one of said members has sliding movement upon the member in the plane of the member, the stay means partakes of said sliding movement, and said pivot mountings have clamping means acting through their pivots to resist said sliding movement.

4. A table as described in claim 1, in which the connection between a stay member and the link includes a bolt passing through said parts, and one of said parts has a slot through which it receives said bolt.

5. A table as described in claim 1, in which a stay connection comprises an auxiliary link pivotally connected at one end to a pivot mounting at a point removed from the pivot of the supporting link on said mounting, and said auxiliary link has slot and bolt connection with said supporting link at a point remote from said pivot mounting.

6. A table as described in claim 1, in which the stay means of each supporting link comprises two auxiliary links pivotally connected to the respective pivot mountings of said supporting link at points removed from the supporting link pivots thereon; the two auxiliary links having each slot and bolt connection with the supporting link whereby they have longitudinal adjusting movements thereon.

7. A table as described in claim 1, in which the stay means of each supporting link comprises two auxiliary links pivotally connected to the respective pivot mountings of said supporting link at points removed from the supporting link pivots thereon; the two auxiliary links having each slot and bolt connection with the supporting link whereby they have longitudinal adjusting movements thereon; the two slot and bolt connections comprising a single clamping bolt carried by the supporting link, the slots of said connections being formed in the auxiliary links; and said auxiliary links being lapped one upon the other upon said supporting link.

8. A table as described in claim 1, in which the stay means of each supporting link comprises two auxiliary links pivotally connected to the respective pivot mountings of said supporting link at points removed from the supporting link pivots thereon; the two auxiliary links having each slot and bolt connection with the supporting link whereby

they have longitudinal adjusting movements thereon; and those pivot mountings which are carried by one member of the table, together with the pivots of the supporting links and auxiliary links mounted thereon, being slidably connected with said table member so that the latter can be adjusted bodily in the plane of its surface without changing its angular relation to the said links.

9. In an angularly adjustable table, a table member, a supporting member, a pivot mounting carried by one of said members and having pivotal connection with the other of said members, said pivot mounting including a sector plate having a portion radially remote from the pivot of said connection and extending in the plane of pivotal movement, and a bolt received by and binding together said supporting member and said radially remote portion of the sector plate; said radially remote portion having a slot extending in the direction of swinging movement but not concentric with said pivot and through which it receives and moves the bolt to and from the pivot as swinging takes place; and said supporting member having a slot through which it receives and forces the bolt to partake a swinging movement, extending in a direction that permits the said movement of the bolt to and from the pivot.

10. In an angularly adjustable table, a table member, a supporting member, a pivot mounting carried by one of said members and having pivotal connection with the other of said members, said pivot mounting including a sector plate having a portion radially remote from the pivot of said connection, overlying the supporting member and extending in the plane of pivotal movement, a pivoted clamping plate overlying the pivot mounting on the side opposite from the supporting member, and a bolt passing through and binding together said supporting member, said radially remote portion of said sector plate and said clamping plate; said radially remote portion having a slot extending in the direction of swinging movement but not concentric with said pivot and through which it receives and moves the bolt to and from the pivot as swinging takes place; and said supporting member having a slot through which it receives and forces the bolt to partake of swinging movement, extending in a direction that permits the said movement of the bolt to and from the pivot.

Signed at Chicago, Illinois, this 24th day of April, 1928.

OSSIAN K. MITCHELL.
LEONARD O. MITCHELL.