Feb. 25, 1964 L. A. WILKINSON 3,122,348

ADJUSTABLE SUPPORT FOR INSTRUMENTS

Filed Nov. 20, 1961 4 Sheets-Sheet 1

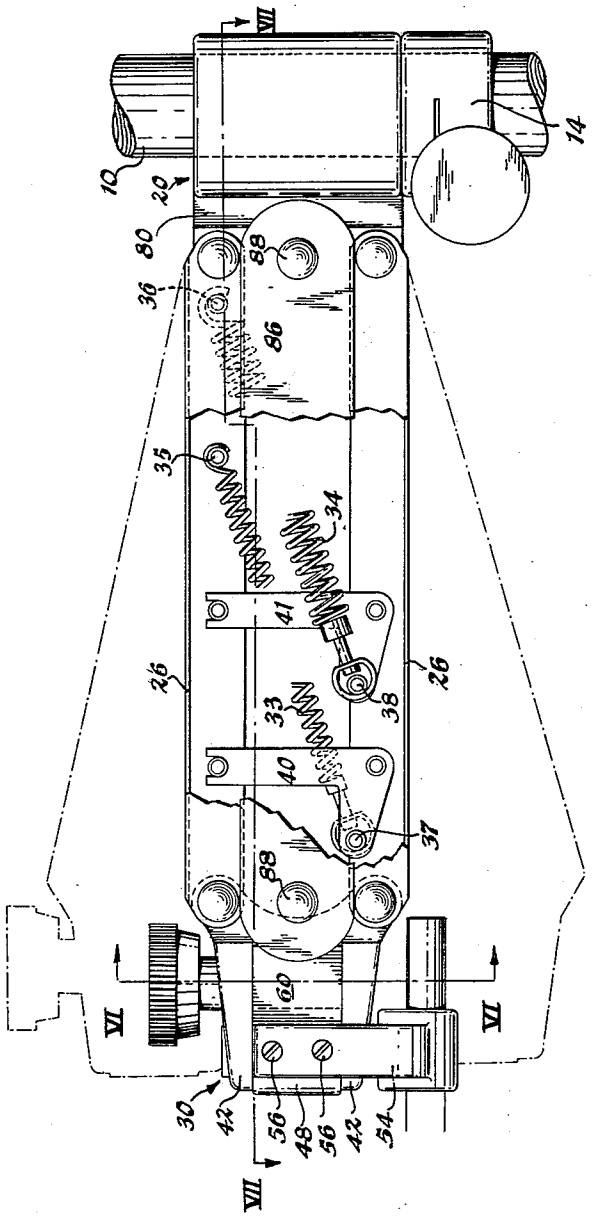


Fig. 1.

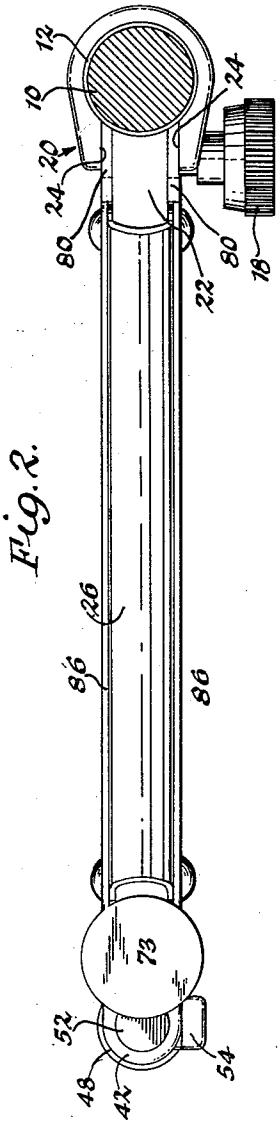


Fig. 2.

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Filed Nov. 20, 1961 4 Sheets-Sheet 2

Fig. 3.

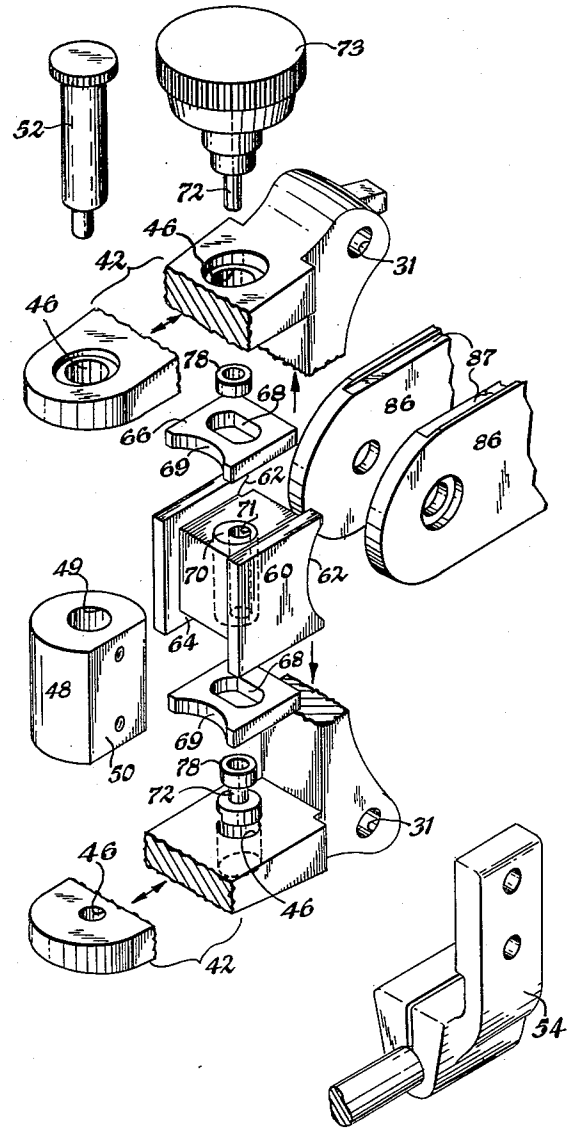
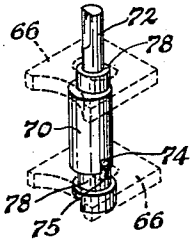


Fig. 4.



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Filed Nov. 20, 1961 4 Sheets-Sheet 3

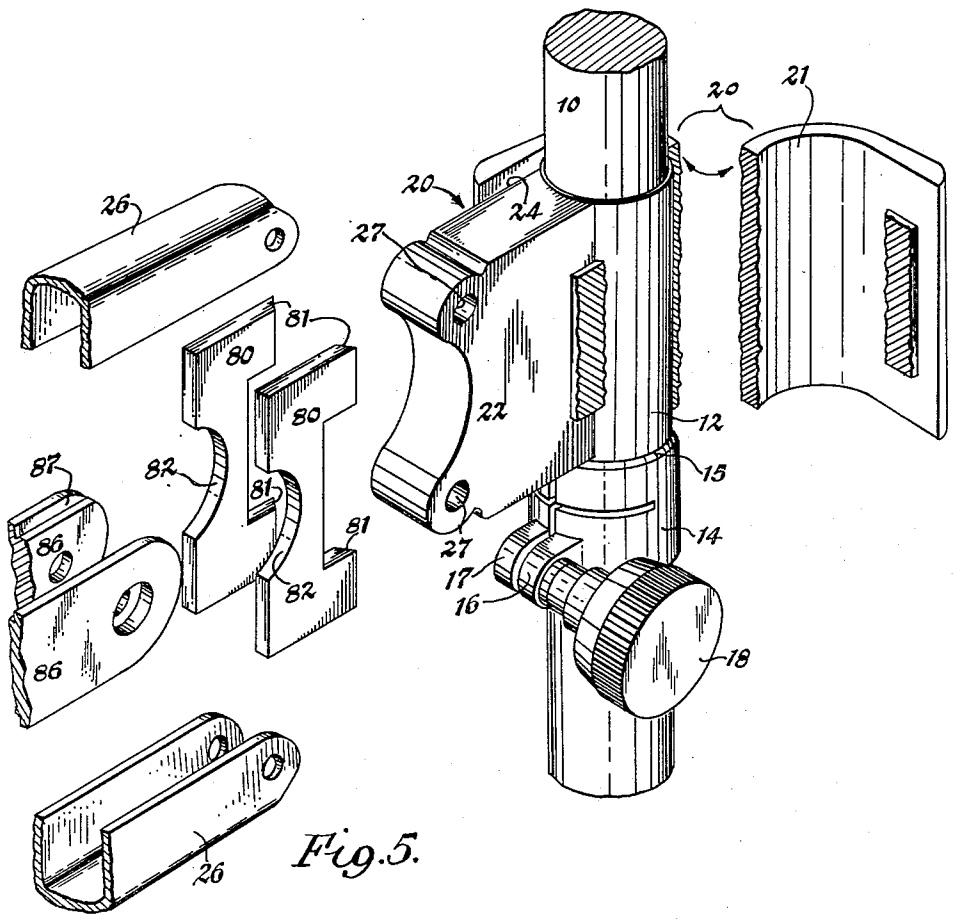


Fig. 5.

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ADJUSTABLE SUPPORT FOR INSTRUMENTS

Filed Nov. 20, 1961 4 Sheets-Sheet 4

Fig.6.

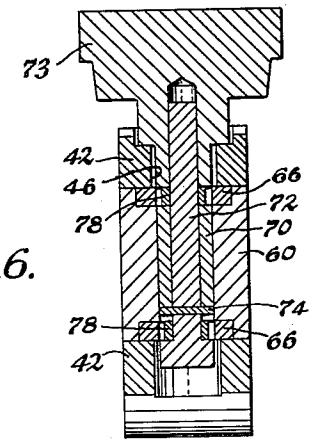


Fig.7.

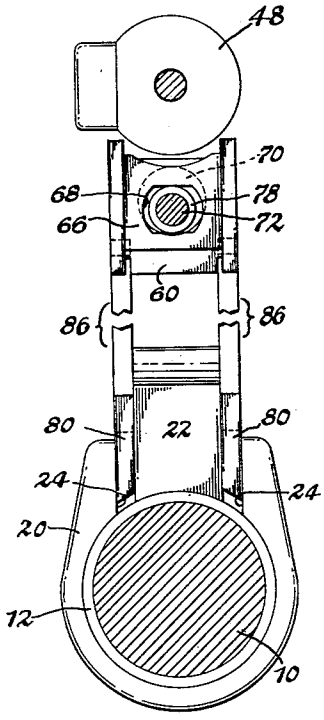


Fig.8.

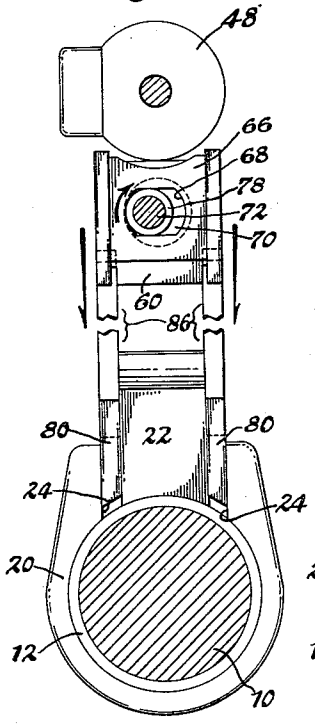
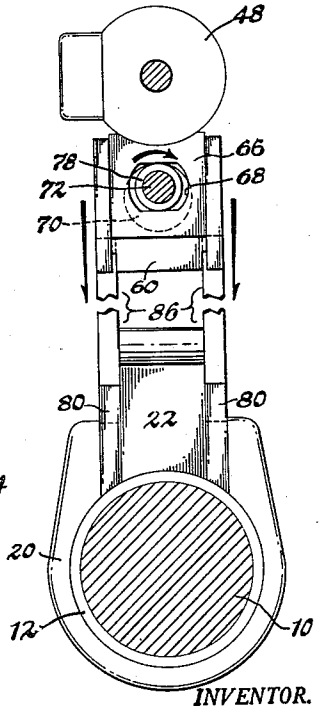


Fig.9.



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3,122,348

ADJUSTABLE SUPPORT FOR INSTRUMENTS

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11 Claims. (Cl. 248—281)

This invention relates to adjustable supporting devices and more particularly to a new and improved adjustable supporting arm which provides for the proper and precise positioning of devices mounted thereon. The device of the invention has a large number of applications but the particular embodiment shown and described is specifically designed to function as a support for eye examining instruments such as phoropters.

A primary object of the invention is to provide a new and improved instrument support arm which is more quickly and easily adjusted to a desired position and locked therein than are devices heretofore known.

Another more specific object of the invention is to provide a support arm as described which has a plurality of points of pivotal adjustment at different positions thereon; all of which points of movement may be quickly and simultaneously locked in their instant positions by a simple movement of a single control member.

Still another object of the invention is to provide an adjustable support arm as described which gives the desired performance and at the same time is constructed of easily fabricated components providing a very rugged unit of compact form and clean design appearance.

Other objects and advantages will appear from the detailed description hereinafter and from the accompanying drawing wherein:

FIG. 1 is a side elevational view of a support arm of the present invention with components thereof partially broken away;

FIG. 2 is a top plan view of the device of FIG. 1;

FIG. 3 is an exploded perspective view of a portion of the device of FIG. 1 showing some of the components thereof and their relative positioning;

FIG. 4 is a perspective view showing the assembled position of some of the elements of FIG. 3;

FIG. 5 is an exploded perspective view of another portion of the device of FIG. 1;

FIG. 6 is a sectional view taken substantially along line VI—VI of FIG. 1; and

FIGS. 7, 8 and 9 are fragmentary sectional views taken substantially along line VII—VII of FIG. 1 showing different positions of movable locking parts of the device of the invention as the single control knob is actuated.

In the embodiment shown in the drawings, the support arm assembly of the invention is adapted to be carried by any suitable support such as a column as shown fragmentarily at 10. The column may be carried by a conventional pedestal arrangement or may be anchored to a floor or otherwise vertically fixed in any suitable manner. A support sleeve 12 is dimensioned to slide over the column 10 and is provided with a split-ring portion 14 at the lower end thereof having a pair of lugs 16, 17 extending therefrom in parallel relation. A clamping knob 18 is provided with a suitably threaded end portion (not visible) which extends through a suitable bore in lug 16 and threadedly engages a threaded bore in the lug 17, so that tightening motion of the knob 18 will clamp the collar to the column 10.

The support arm assembly includes support bracket, designated generally at 20, which is provided with a circular bore 21 (FIG. 5) and is thereby rotatably mounted on the sleeve 12 to seat and rotatably bear on shoulder portion 15 of the sleeve member. Thus, until clamped thereto by means to be described hereinbelow, the support bracket 20 is free to swing horizontally around the

vertical axis of the collar. The bracket 20 is formed with an extending nose portion 22 and is slotted at its upper and lower ends as indicated at 24 (see FIG. 2). A pair of channel shaped arm members 26, 26 are mounted on the support bracket 20 by means of pins inserted through bores formed in the arms and bracket as indicated at 27. At their other ends the channel members 26, 26 carry a supporting bracket member designated generally at 30 (FIG. 1) which is similarly provided with bore 31, 31 to facilitate connection with the arm members 26, 26. Thus it will be apparent that the brackets 20, 30 and channels 26, 26 form a parallelogram-type linkage and that the bracket 30 will maintain its orientation relative to the horizontal throughout the vertical field of travel of the arm assembly.

As an aid in vertically positioning the parallelogram assembly, tension springs 33, 34 are provided; the springs each having one of their ends mounted on pins 35, 36, respectively, and their other ends mounted on pins 37, 38, respectively. The pins 37, 38 are carried by crank arms 40, 41 which are in turn pivotally carried between the channel members 26, 26 as shown. By this means the distance between the respective mounting pins of the springs 33, 34 is maintained substantially constant whenever the parallelogram linkage is moved and therefore the springs exert a substantially constant counterweighting tension for the supporting arm.

The supporting bracket 30 is formed with parallel extending finger portions 42, 42 which are bored at their inner and outer ends as indicated at 46. A mounting block 48 is provided with a central bore 49 and a flatted side portion 50, and is mounted between the outer ends of the finger portions 42, 42 as by means of a headed pin 52. The block 48 has an instrument attachment bracket 54 fixed thereto as by machine screws 56, 56 (FIG. 1). Thus it will be apparent that the support arm assembly is arranged to swing about the collar 12 and to swing vertically through its parallelogram assembly; while the instrument carrying bracket 54 is rotatable upon the outer end of the arm.

Means for locking the support arm in any desired position of adjustment which is provided by the assembly as described hereinabove is furnished by means of a single control, as follows. A locking block and slide assembly is mounted between the leg portions 42, 42 of the bracket 30 adjacent the mounting block 48. The locking assembly, the details of which are best seen in FIG. 3, includes a lock block 60 which is formed with arcuately shaped wall portions 62, 62 at each outer side of the rear wall thereof. The upper and lower walls of the block are cut out, as by milling, to form channels 64, 64, and a vertical bore is provided therethrough as shown. A pair of locking slides 66, 66 are dimensioned in width and height to fit snugly within the channels 64, 64 and to be slidable therein. Each of the locking slides 66, 66 has a slot-shaped opening 68 therethrough, and the forward vertical face thereof is arcuately recessed as indicated at 69 to conform to the radiused portion of the block 48. A cylindrical sleeve 70 is eccentrically bored as indicated at 71 and is fitted within the bore provided in the lock block 60; and an actuating rod 72 having a suitable control knob portion 73 at its upper end, extends through the entire assembly by passing through the continuous opening provided by the bores 46, 46 slots 68, 68, and bore 71. The rod 72 is keyed to the sleeve 70 by means of a pin 74 which extends through the rod and into a slot 75 provided in the sleeve 70 (FIG. 4). Collar members 78, 78 slide-fit over the pin 72 and lie one within each of the slots 68, 68 in the slides 66, 66. The diameter of the collars 78, 78 is substantially the same as the narrow dimension of the slots 68, 68 so that lateral movement of the pin 72 and

collars 78, 78 relative to the slides 66, 66 is permitted, but relative longitudinal movement is not permitted.

A pair of brake plates 80, 80 (FIG. 5) are slidably mounted in the slots 24, 24 in the end bracket 20. The brake plates are provided with contoured braking contact faces 81 to match the radius of the sleeve 12 to assure good contact therewith, and are also each provided with a radiused cut-out 82 in their opposite end faces. The support arm assembly and linkage system are completed by the provision of a pair of cover plates 86, 86 which serve to cover the sides of the parallelogram assembly and to act as thrust transmitting means between the actuating brake block 60 and the brake plates 80, 80. The ends of the cover plates 86, 86 are radiused as shown to conform to the radiused surfaces 62, 62 and 82, 82 of the lock block 60 and brake plates 80, 80 respectively. The inner sides of the top and bottom edges of the cover plates 86, 86 are relieved as indicated at 87 so that when the plates are joined as by bolts 88, 88, which pass between the channel members 26, 26 and connect only with the plates 86, 86, the relieved portions 87, 87 engage the corners of the channel members 26, 26 and thereby hold the plates in their vertical positions while allowing them to slide longitudinally of the support arm assembly to the extent permitted by the locking block 60 and brake plates 80, 80.

Thus, the entire assembly may be locked in any adjusted position by simply rotating the single control knob 73. As shown in FIG. 7 the parts are so arranged that with the rod 72—collar 70 assembly in the unlocked position shown, the locking slides 66 are not forced into engagement with the mounting block 48, nor are the brake plates 80, 80 forced against the collar 12. However, as the rod 72 is rotated by turning the knob portion 73, the locking plates 66, 66 and lock block 60 are forced in opposite directions due to the eccentric relation of the rod 72 to the axis of the sleeve 70. Thus, the locking plates are moved into engagement with the mounting block 48 and the lock block 60 is thrust against the side plates 86, 86 which in turn force the brake plates 80, 80 against the collar 12. The support arm is thereby locked against movement at any point thereof, and any instrument mounted thereon is thereby held in firmly fixed position.

Although only one form of support device embodying the invention is shown and described hereinabove, it will be understood that various changes and modifications may be made therein without departing from the spirit of the invention or the scope of the appended claims.

What is claimed is:

1. A support assembly for instrumentalities, comprising
a supporting column,
support means pivotally received on said column,
supporting means,
parallelogram link means joining said support and supporting means,
a mounting member pivotally carried by said supporting means,
motion transmitting means movably carried by said parallelogram link means and extending between said support and supporting means,
expandable brake means disposed between said mounting member and said motion transmitting means,
brake means disposed between said support means and said motion transmitting means,
and means for actuating said expandable brake means to immobilize said assembly.

2. The assembly as defined in claim 1 wherein said motion transmitting means provides side closures for said parallelogram link means.

3. A support assembly for instrumentalities, comprising
a supporting column having a support member pivotally mounted thereon,
brake means movably carried by said support member for engagement with said supporting column to inhibit pivotal movement between the support member and the supporting column,
parallelogram link means pivotally mounted at one end thereof to said support member,
a supporting member pivotally mounted at the other end of said parallelogram link means,
a mounting member pivotally carried by said supporting member,
expandable brake means carried by said supporting member and having a portion for engagement with said mounting member to inhibit pivotal movement thereof relative to to said supporting member,
motion transmitting means carried by said parallelogram link means,
said expandable brake means having another portion engageable with said motion transmitting means to shift the latter against the first mentioned brake means to actuate the same.

4. The assembly as defined in claim 3 wherein that portion of the expandable brake means which is engageable with said motion transmitting means forms a brake surface interface therewith to inhibit pivotal motion of said parallelogram link means.

5. The assembly as defined in claim 4 wherein the engageable portions of said motion transmitting means and said first brake means form a brake surface interface to inhibit pivotal motion of said parallelogram link means.

6. The assembly as defined in claim 3 wherein the engageable portions of said motion transmitting means and said first brake means form a brake surface interface to inhibit pivotal motion of said parallelogram link means.

7. An adjustable support device for instruments or the like comprising, a base member, a support bracket mounted on said base member and having an arm carrying portion arranged to be swingable relative to said base about a first axis, arm means having one end thereof carried by said arm carrying portion of said support bracket so as to be pivotable thereon about a second axis, a carrying bracket mounted on the other end of said arm means, an instrument mount pivotally connected to said carrying bracket to pivot about a third axis, brake means having motion arrest bearing portions disposed adjacent each of said pivot axes, a single control member operable to render said brake means effective to lock said device against movement about all of said axes, said brake means comprising a first brake plate slidably mounted on said carrying bracket, a second brake plate slidably mounted on said support bracket, a thrust member slidably carried by said arm means, a cam member, said thrust member having braking surfaces engageable with said cam member and one of said brake members, said cam member being disposed between one of said brake plates and said thrust member and operable by said control means to displace said brake plate to lock said device against rotation about one of said axes while oppositely displacing said thrust member against the other of said brake plates to lock said device against rotation about the others of said axes.

8. An adjustable support device for instruments or the like comprising, a base member, a support bracket mounted on said base member and having an arm carrying portion arranged to be swingable relative to said base about a first axis, arm means having one end thereof carried by said arm carrying portion of said support bracket so as to be pivotable thereon about a second axis, a carrying bracket mounted on the other end of said arm means, said carrying bracket being arranged to be pivotable relative to said arm means about a third axis, an instrument mount pivotally connected to said carrying bracket to pivot about a fourth axis, brake means having motion arrest bearing portions disposed adjacent each of said pivot axes, a single control member operable to render said brake means effective to lock said device against movement about all of said axes, said brake means comprising a first brake plate slidably mounted on said carrying bracket, a second brake plate slidably mounted on said support bracket, a thrust

member slidably carried by said arm means, a cam member, said thrust member having braking surfaces engageable with said cam member and one of said brake members adjacent two of said axes, said cam member being disposed between one of said brake plates and said thrust member and operable by said control means to displace said brake plate to lock said device against rotation about one of said axes while oppositely displacing said thrust member against the other of said brake plates to lock said device against rotation about the others of said axes.

9. An adjustable support device for instruments or the like comprising, a base member, a support bracket mounted on said base member and having an arm carrying portion arranged to be swingable relative to said base about a first axis, arm means having one end thereof carried by said arm carrying portion of said support bracket so as to be pivotable thereon about a second axis, a carrying bracket mounted on the other end of said arm means, said carrying bracket being arranged to be pivotable relative to said arm means about a third axis, means interconnecting said support bracket and said arm means and said carrying bracket to maintain said carrying bracket in the same attitude relation to said base member throughout all adjustments of the device, an instrument mount pivotally connected to said carrying bracket to pivot about a fourth axis, brake means having motion arrest bearing portions disposed adjacent each of said pivot axes, a single control member operable to render said brake means effective to lock said device against movement about all of said axes, said brake means comprising a first brake plate slidably mounted on said carrying bracket, a second brake plate slidably mounted on said support bracket, a thrust member slidably carried by said arm means, a cam member, said thrust member having braking surfaces engageable with said cam member and one of said brake members adjacent two of said axes, said cam member being disposed between one of said brake plates and said thrust member and operable by said control means to displace said brake plate to lock said device against rotation about one of said axes while oppositely displacing said thrust member against the other of said brake plates to lock said device against rotation about the others of said axes.

10. An adjustable support device for instruments or the like comprising, a base member, a support bracket mounted on said base member and having an arm carrying portion arranged to be swingable relative to said base about a first axis, arm means having one end thereof carried by said carrying portion so as to be pivotable thereon about a second axis disposed in a plane substantially normal to said first axis, a carrying bracket mounted on the other end of said arm means, said carrying bracket being arranged to be pivotable relative to said arm means about a third axis substantially parallel to said second axis, an instrument mount pivotally connected to said carrying bracket to pivot about a fourth axis disposed substantially parallel to said first axis, brake means arranged to arrest relative motions about said pivot axes, a single control member operable to alternately render said

brake means effective to lock said device against movement about all of said axes, said brake means comprising a first brake plate slidably mounted on said carrying bracket, a second brake plate slidably mounted on said support bracket, a thrust member slidably carried by said arm means, a cam member, said thrust member having braking surfaces engageable with said cam member and one of said brake members adjacent two of said axes, said cam member being disposed between one of said brake plates and said thrust member and operable by said control means to displace said brake plate to lock said device against rotation about one of said axes while oppositely displacing said thrust member against the other of said brake plates to lock said device against rotation about the others of said axes.

11. An adjustable support device for instruments or the like comprising, a base member, a support bracket mounted on said base member and having an arm carrying portion arranged to be swingable relative to said base about a first axis, arm means having one end thereof carried by said carrying portion so as to be pivotable thereon about a second axis disposed in a plane substantially normal to said first axis, a carrying bracket mounted on the other end of said arm means, said carrying bracket being arranged to be pivotable relative to said arm means about a third axis substantially parallel to said second axis, means interconnecting said support bracket and said arm means and said carrying bracket to maintain said carrying bracket in the same attitude relation to said base member throughout all adjustments of the device, an instrument mount pivotally connected to said carrying bracket to pivot about a fourth axis disposed substantially parallel to said first axis, brake means arranged to arrest relative motions about said pivot axes, a single control member operable to alternately render said brake means effective to lock said device against movement about all of said axes, said brake means comprising a first brake plate slidably mounted on said carrying bracket, a second brake plate slidably mounted on said support bracket, a thrust member slidably carried by said arm means, a cam member, said thrust member having braking surfaces engageable with said cam member and one of said brake members adjacent two of said axes, said cam member being disposed between one of said brake plates and said thrust member and operable by said control means to displace said brake plate to lock said device against rotation about one of said axes while oppositely displacing said thrust member against the other of said brake plates to lock said device against rotation about the others of said axes.

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