June 13, 1939. C. L. HUNSICKER 2,161,962

INSTRUMENT SUPPORTING DEVICE

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FIG. 1.

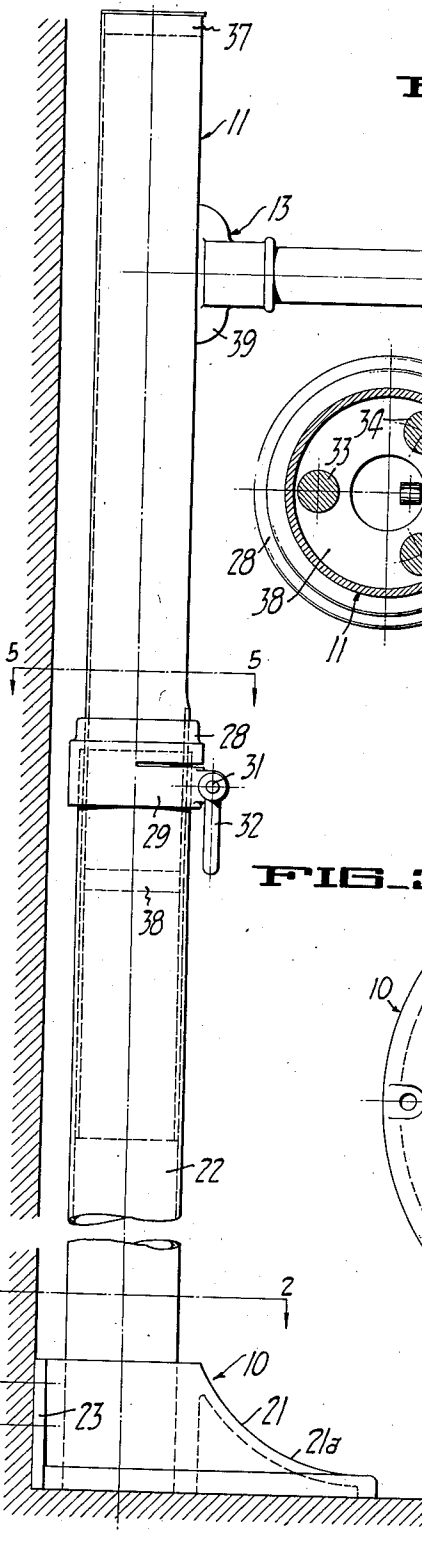
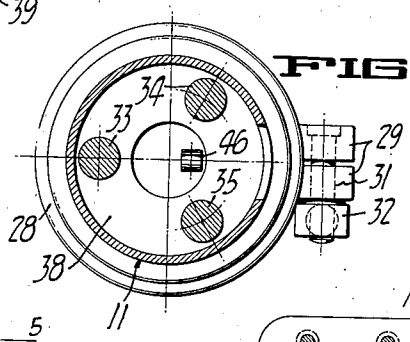


FIG. 5.



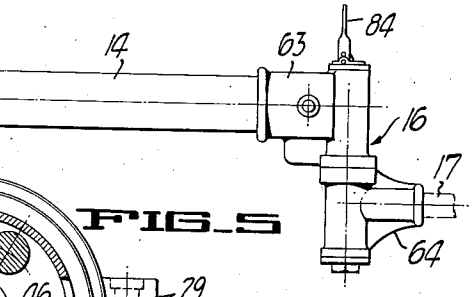


FIG. 4.

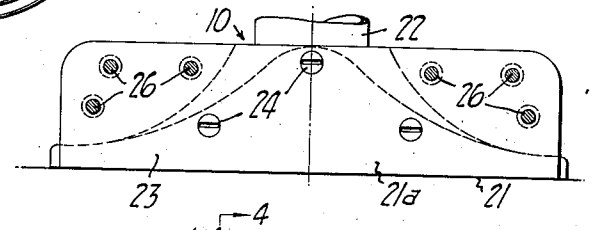


FIG. 3.

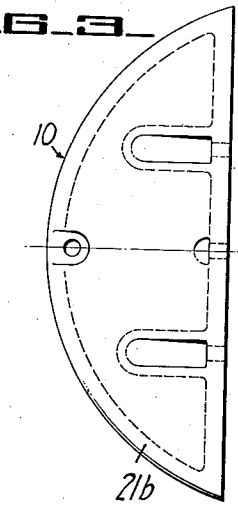
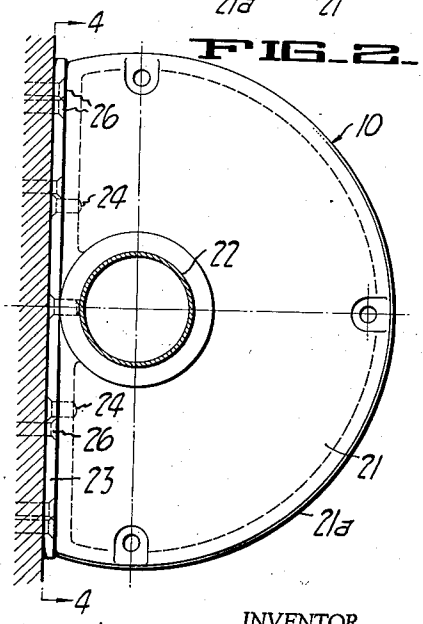


FIG. 2.



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INSTRUMENT SUPPORTING DEVICE

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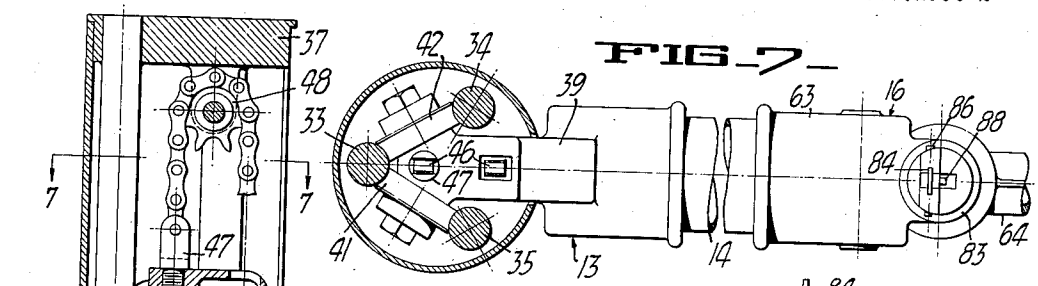


FIG. 7.

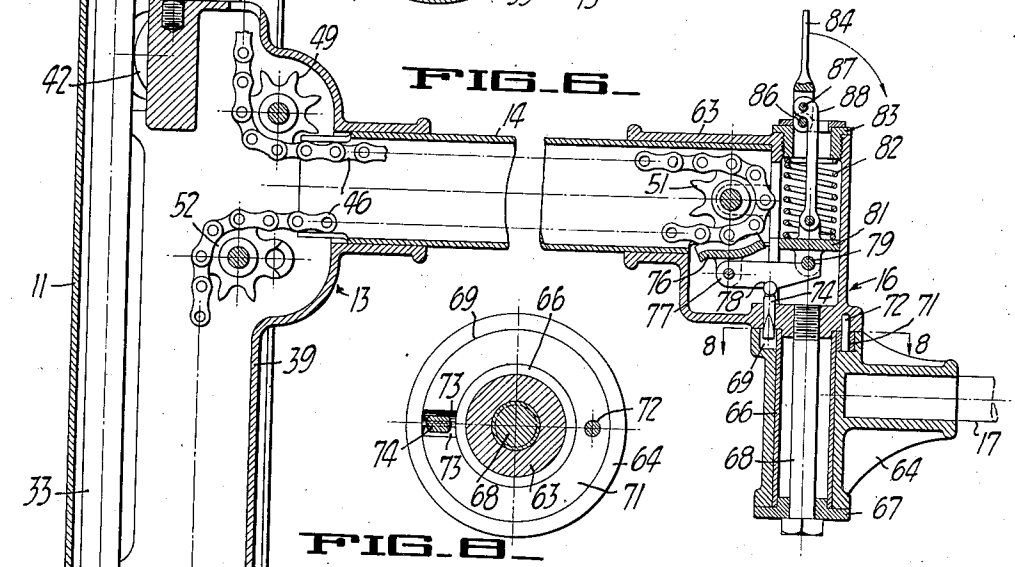


FIG. 6.

FIG. 8.

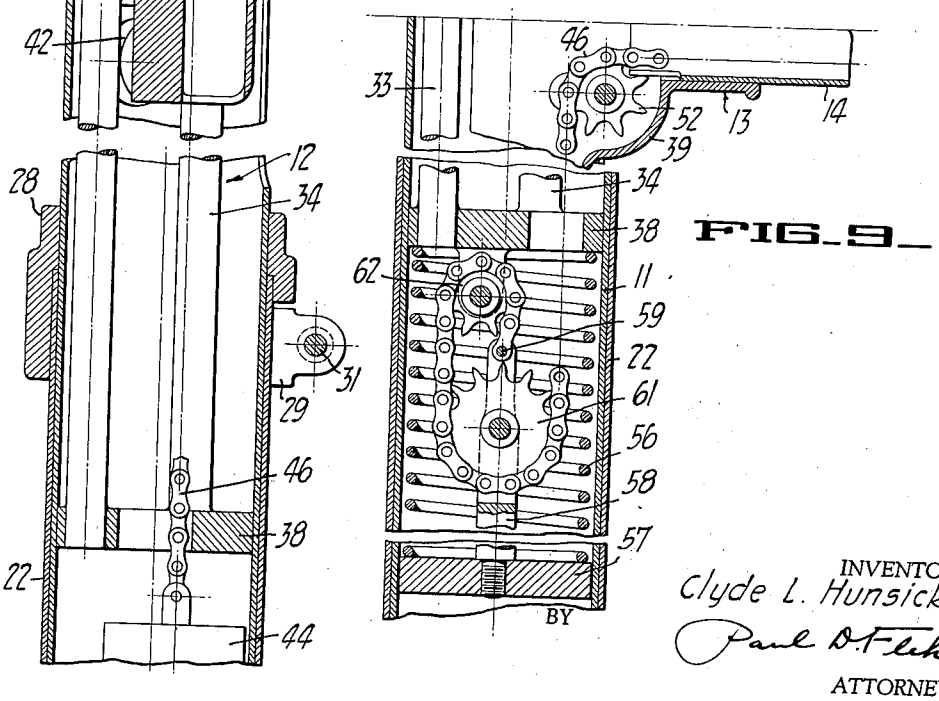


FIG. 9.

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Patented June 13, 1939

2,161,962

UNITED STATES PATENT OFFICE

2,161,962

INSTRUMENT SUPPORTING DEVICE

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Application March 29, 1937, Serial No. 133,585

9 Claims. (Cl. 248—123)

This invention relates generally to equipment for adjustably supporting various instruments, as for example ophthalmological instruments used in the testing of eyes and the fitting of glasses.

It is an object of the invention to generally improve upon apparatus of the above character whereby the instrument or device being supported, can be conveniently adjusted to a desired position, and can be held in such position while the instrument is in use. In the past such apparatus has been constructed in such a manner as to be difficult to manipulate, both with respect to adjusting the instrument to a desired position, and with respect to retaining the instrument in the desired location after adjustments are made. One type of apparatus which constitutes an improvement over the prior art, is disclosed in my co-pending application Serial No. 91,464, filed July 20, 1936. The subject matter of the present case can be deemed a further improvement, particularly with respect to the means employed for counter-balancing certain parts, and the means for retaining a particular adjustment.

Further objects of the invention will appear from the following description in which the preferred embodiment of the invention has been set forth in detail in conjunction with the accompanying drawings.

Referring to the drawings:

Fig. 1 is a side elevational view, illustrating apparatus in accordance with the present invention.

Fig. 2 is a cross-sectional detail, taken along the line 2—2 of Fig. 1.

Fig. 3 is a plan view showing a part which can be utilized in conjunction with the base illustrated in Fig. 2, to form a modified type of supporting means.

Fig. 4 is a cross-sectional view taken along the line 4—4 of Fig. 2.

Fig. 5 is a cross-sectional detail taken along the line 5—5 of Fig. 1.

Fig. 6 is an enlarged side elevational view, in cross-section.

Fig. 7 is a cross-sectional view taken along the line 7—7 of Fig. 6.

Fig. 8 is a cross-sectional detail taken along the line 8—8 of Fig. 6, and on an enlarged scale.

Fig. 9 is a cross-sectional detail, illustrating a modified form of counter-balancing means connected to the chain.

The apparatus illustrated in the drawings consists generally of a pedestal 10, which carries a tubular casing 11. Within the casing 11 there is a tracking means designated generally at 12, which is engaged by a carriage 13. A horizontal arm 14 is mounted upon the carriage 13, and the free end of this arm has a pivotal connection 16, with the member 17. It is upon the member 17 that the ophthalmological instrument or like device is mounted, and the features of the apparatus to be presently described enable substantially universal adjustment of the instrument within a prescribed space, with retention of the instrument in a desired adjusted position.

To describe the pedestal 10 in detail, it consists of a base 21, carrying a vertically extending tube 22. It is preferable to construct the base 21 so that the pedestal can either be mounted in close juxtaposition with a wall, or secured to the floor at a point remote from the wall. Thus as shown in Figs. 2 and 3 the base is formed of two parts 21*a* and 21*b*, which when secured together form a base which is circular in contour. The plane of division between the two parts 21*a* and 21*b* is vertical, and offset from the center of the tube 22, so that the base part 21*a* forms of itself a complete supporting part. With the two base parts 21*a* and 21*b* secured together, by screws or like attaching means, the base is suitable for attachment to the floor at any point remote from a wall. If it is desired to mount the base close to a wall surface, then the base part 21*b* is removed, and a supplemental plate 23 attached to the base part 21*a*, as by means of screws 24. The base part 21*a* can now be placed in close proximity with a wall surface, as shown in Fig. 1, and plate 23 can be secured to the wall by means of screws 26 (Fig. 4).

The casing 11 is journalled with respect to tube 22, whereby the casing may rotate about its vertical axis. Thus the lower end of casing 11 is shown having a telescopical fit within the tube 22, and the upper end of tube 22 is engaged by a collar 28, which is secured to the casing 11. This collar is split to afford the resilient portions 29, which are shown engaged by a clamping screw 31 and nut 32. By tightening nut 32, sleeve 28 is caused to grip the tube 22, thus retaining the casing 11 in a fixed angular position with respect to the base supporting pedestal.

The tracking means 12 can be best understood by reference to Figs. 5, 6 and 7. It consists of three vertically extending rods 33, 34 and 35, which are spaced equal distances apart. The ends of these rods are secured to upper and lower members 37 and 38, with both of these members being secured to the casing 11.

The carriage 13, which engages the tracking means 12, consists of a metal body 39. Two sets of tracking wheels or rollers 41 and 42 are mounted upon the body 39, with the rollers of the two sets being disposed in planes which are at an acute angle with respect to each other. These rollers engage the tracking rods 33, 34 and 35 in the manner illustrated particularly in Fig. 7. Arm 14 is in the form of a metal tube, having its one end fitted into and secured to the body 39 of the carriage.

The counter-balancing means for the carriage and arm, and also for the parts carried by the arm, is preferably constructed as follows: Below the tracking means and within the tube 22 of the pedestal, there is a counter-balancing weight 44. Attached to this weight there is a flexible cable or chain 46, which has been referred to in the appended claims as a flexible retention element. The other end of chain 46 has an attachment 47, to the carriage body 39. The intermediate portions of the chain are looped over a number of sprocket wheels, including a sprocket wheel 48, which is journalled to member 37, sprocket wheel 49, journalled to the carriage body 39, sprocket wheel 51 journalled within the arm 14, and wheel 52 journalled to the carriage body 39. Thus downward pull exerted upon the chain by the weight 44 pulls upwardly upon the carriage, through the attachment 47, and tensions the loop of the chain which extends laterally within the arm 14. When the carriage is moved manually upwardly or downwardly, the chain rides over the sprockets 49, 51 and 52, and relative movement takes place between the laterally looped portion of the chain and the arm. As will be presently explained such lateral movement is utilized in connection with means for restraining the carriage and arm against vertical movements.

The alternative use of a spring in place of the counter-balancing weight 44, is shown in Fig. 9. In this instance a compression spring 56 is provided, which has its upper end seated upon member 38, and its lower end seated upon a thrust member 57. Thrust member 57 is attached to a pull rod 58, which has an attachment 59 to the end of the chain, and which also carries a sprocket wheel 61. Another sprocket wheel 62 is mounted upon the under side of member 38, and the chain is engaged over these sprockets in the manner shown in Fig. 9. Thus downward pull of spring 56 upon the rod 58, is transmitted to the chain 46, and the motion multiplied.

The pivotal connection 16 between arm 14 and member 17, preferably has its axis arranged vertically, and is formed between the cooperating castings or like members 63 and 64 (Fig. 6). Casting 63 is secured to the outer end of the arm 14, while casting 64 serves as a mounting for the member 17. Casting 64 is provided with a cylindrical bore to loosely fit the sleeve 66. One end of this sleeve is seated upon casting 63, and the other end seated upon an end cap 67, which in turn is clamped to the casting 64, by screw 68. The upper end face of casting 64 is provided with an annular recess 69, which accommodates a split ring 71. A pin 72 serves to anchor ring 71 to the casting 63. The ends of the split ring are bevelled as indicated at 73, to cooperate with an expanding pin 74. This pin is slidably mounted in the lower end portion of casting 63, and when it is forced downwardly to expand ring 71, the ring grips the outer peripheral surface of recess 69, to frictionally retain the casting 64 fast with respect to casting 63.

The means for actuating the pin 74, is correlated with means for restraining the chain 46 against movements relative to the arm 14. This means is preferably in the form of a brake shoe 76, which is disposed immediately below the sprocket wheel 51, and which is pivotally connected to one end of a lever 77. The intermediate portion of lever 77 has a fulcrum connection 78, with the upper end of pin 74. The outer end of lever 77 has a pivotal connection 79, with a plunger 81. A compression spring 82, has its lower end seated upon plunger 81, and its upper end seated upon a ferrule 83, which is attached to the casting 63.

In order to raise the plunger 81, and thus simultaneously release shoe 76 and also the expanding pin 74, means are employed including a single operating member 84. This operating member has a pivotal connection 86 with the ferrule 83. It also has a pivotal connection 87 with the upper end of a link 88, the lower end of this link having a pivotal connection to the plunger 81. When member 84 is swung to the vertical position illustrated in Fig. 6, link 88 raises plunger 81, thus causing retraction of pin 74 and shoe 76. However, when member 84 is swung to the right as viewed in Fig. 6, spring 82 presses plunger 81 downwardly, and thus force is applied downwardly upon the expanding pin 74, to expand ring 71, and likewise force is applied upwardly upon shoe 76, to press this shoe into braking engagement with the adjacent portion of chain 46. Therefore when member 84 is in the released position, illustrated in Fig. 6, carriage 13 can be freely raised or lowered with respect to the tracking means, and member 17 can be swung about to different angles with respect to the arm 14. To retain the instrument attached to arm 17 in a desired position, member 84 is moved to the braking position previously described, to restrain pivotal movement between member 17 and arm 14, and vertical movements of this arm relative to the supporting means.

Operation of the complete apparatus will be apparent from the above description. With the nut 32 in clamped position, arm 14 will be held against movements about a vertical axis. However, when nut 32 is released the angular position of arm 14 can be changed, as desired. With the member 84 in released position, arm 14 and carriage 13 can be readily moved to different vertical positions, by a relatively slight amount of manual effort. An operator may apply such forces to the instrument mounting member 17 or to the instrument itself, while the instrument is being shifted to the location desired. Thereafter only one operation is required, namely movement of member 84 to braking position, to retain the instrument in relatively fixed position.

I claim:

1. In an adjustable support for instruments, a relatively fixed mounting, vertically extending tracking means, means for journalling said tracking means with respect to said mounting, whereby the tracking means is rotatable about a vertical axis, a carriage engaging said tracking means and capable of vertical movement with respect to the same, a laterally extending arm having one end of the same secured to said carriage, a flexible retention element having one end of the same attached to the carriage, a wheel mounted near the upper end of the tracking means and over which the retention element is looped, means adjacent the lower end of said tracking means and serving to apply downward pull to the other

end of said retention element, said element having a laterally extending loop of the same positioned within said arm, and means carried by said arm and serving to releasably restrain the element against movement with respect to the arm.

2. In an adjustable support for instruments, a mounting, tracking means carried by the mounting, a carriage engaging the tracking means, an arm fixed to the carriage and extending laterally from the tracking means, a flexible retention element having a laterally extending loop disposed within said arm, wheels mounted upon the carriage and upon said arm, upon which said element is engaged, whereby when the carriage is moved with respect to the track, said element is caused to enter and leave said arm, and releasable means for retaining said element in a relatively fixed position with respect to said arm, whereby said arm is releasably restrained against movement with respect to the tracking means.

3. In an adjustable support for instruments, a relatively fixed mounting, vertically extending tracking means journalled upon said mounting, whereby said tracking means can swing about a vertical axis, a carriage engaging said tracking means, an arm fixed to the carriage and extending laterally from the tracking means, a flexible retention element, means connected to one end of said element for applying force in one direction, an attachment between the other end of said retention element and said carriage whereby the weight of the carriage and the arm is counterbalanced, a portion of said element extending along the carriage and having movement relative to the carriage when the carriage is raised or lowered, and means for releasably gripping and restraining said portion of the flexible element against movement with respect to said carriage, whereby the carriage is releasably restrained with respect to movements along the tracking means.

4. In an adjustable support for instruments, a relatively fixed mounting, vertically extending tracking means journalled upon the mounting, whereby the tracking means may rotate about a vertical axis, a carriage engaging the tracking means, an arm mounted upon the carriage and extending laterally from the tracking means, a flexible retention element, means attached to one end of said element adjacent the lower end of said tracking means, and serving to apply downward force upon the same, a connection between the other end of said retention element and said carriage, a wheel mounted adjacent the upper end of said tracking means and over which the retention element is tracked, whereby that portion of the retention element between said wheel and said force applying means, moves relative to the carriage when the carriage is moved with respect to the tracking means, and means for releasably locking said portion of the flexible element with respect to the carriage.

5. In an adjustable support for instruments, a mounting, a vertically extending tracking means journalled to the mounting, whereby the tracking means can rotate about a vertical axis, a carriage engaging the tracking means, an arm fixed to the carriage and extending substantially horizontally from the same, a flexible retention element, means for applying counter-balancing force to the lower end of said retention element, said lower end being below the tracking means, a connection between the other end of the retention element and said carriage, a wheel mounted near the upper end of the tracking means and over which the retention element is looped, at least three wheels mounted upon the carriage and the arm, said wheels engaging and retaining a laterally extending loop formed in that portion of the flexible element extending between the first-mentioned wheel and the lower portion of the tracking means, and means mounted upon said arm at a point remote from said tracking means for releasably restraining said flexible element against movements with respect to the arm.

6. In an adjustable support for instruments, vertically extending tracking means, a carriage engaging the tracking means, a substantially horizontally extending arm secured to the carriage, a member pivotally connected to the free end of said arm and adapted to serve as a mounting for an instrument, the pivotal connection between said member and said arm being on a vertical axis, and clutching means associated with said pivotal connection and serving to releasably retain said member in a fixed angular position with respect to said arm, said clutching means including a split ring and means for expanding said ring to engaged position.

7. In an adjustable support for instruments, vertically extending tracking means, a carriage engaging said tracking means, an arm secured to said carriage and extending outwardly from the same in a general horizontal position, a member pivotally connected to the free end of said arm and adapted to serve as a mounting for an instrument, a flexible retention element associated with said tracking means, wheels mounted upon the carriage and upon the arm, said retention element being engaged with respect to said wheels whereby a loop of said retention element is disposed within said arm, said loop being movable with respect to the arm upon moving the carriage along the tracking means, and means for releasably restraining movements of the retention element with respect to said arm and for releasably restraining said member against pivotal movement with respect to the arm, said last means including a single manually operating member.

8. In an adjustable support for instruments, vertically extending tracking means, a carriage engaging the tracking means, an arm having one end of the same secured to the carriage and extending laterally from the tracking means, a flexible retention element, means engaging one end of said retention element and serving to exert downward pull upon the same, a connection between the other end of the retention element and the carriage, a wheel mounted near the upper end of the tracking means and over which the retention element is engaged, wheels mounted upon the carriage and upon the arm, said wheels serving to engage and retain a laterally extending loop formed in that portion of the retention element which lies between the first named wheel and the lower end of the tracking means, and disposed within the arm, whereby as the carriage is moved with respect to the tracking means said flexible element is caused to enter and leave the arm, a member pivotally connected to the free end of said arm and adapted to serve as a mounting for an instrument, the pivotal connection between said member and the arm being on a vertical axis, clutching means associated with said pivotal connection and serving to releasably retain said member in a substantially fixed angular position with respect to said arm, a member having releasable braking engagement with said flexible element, thereby serving to retain the car-

riage against movement relative to the tracking means, and means including a single operating member carried by the free end of the arm, for simultaneously actuating both said clutching means and said braking means.

9. In an adjustable support for instruments, a mounting, a vertically extending tracking means journalled to the mounting, whereby the tracking means can rotate about a vertical axis, a carriage engaging the tracking means, an arm fixed to the carriage and extending substantially horizontally from the same, a flexible retention element, means for applying counter-balancing force to the lower end of said retention element, said lower end being below the tracking means, a connection between the other end of the retention element and said carriage, a wheel mounted near the upper end of the tracking means and over which the retention element is looped, and at least three wheels mounted upon the carriage and the arm, said wheels engaging and retaining a laterally extending loop formed in that portion of the flexible element extending between the first-mentioned wheel and the lower portion of the tracking means.

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