

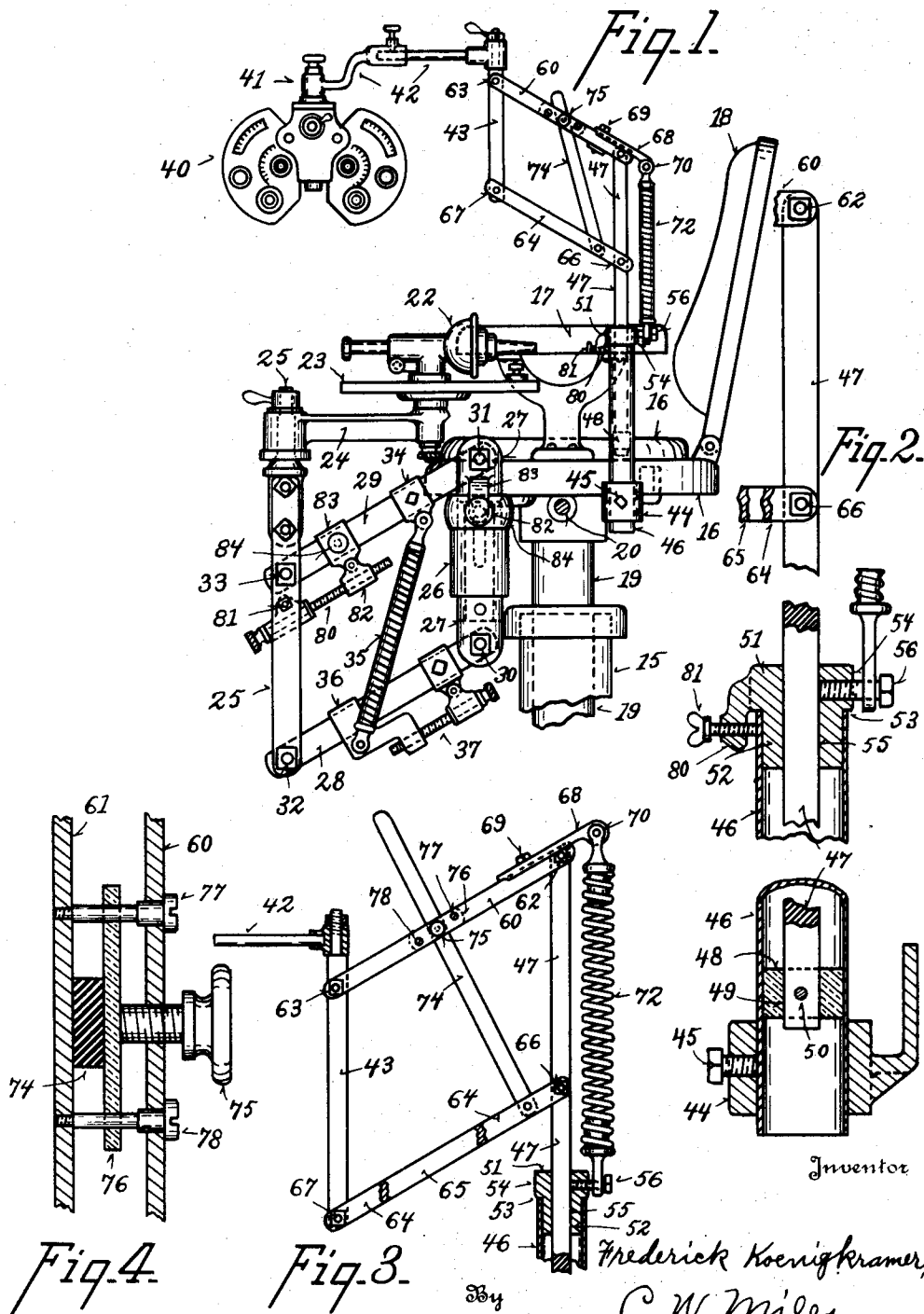
Aug. 16, 1927.

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1,638,939

INSTRUMENT SUPPORTING APPARATUS

Filed Aug. 20, 1923



Patented Aug. 16, 1927.

1,638,939

UNITED STATES PATENT OFFICE.

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INSTRUMENT-SUPPORTING APPARATUS.

Application filed August 20, 1923. Serial No. 658,375.

My invention relates to improvements in instrument supporting apparatus. One of its objects is to provide improved instrument supporting apparatus adapted for instance to support phorometers, refractors and similar instruments from chairs or tables. Another object is to provide improved means to support and readily adjust the instrument to various operative and inoperative position with reference to a chair or to a patient. Another object is to provide an improved instrument supporting apparatus having a substantially universal adjustment and capable of being quickly adjusted through wide ranges of adjustment. Another object is to provide improved means for the support and universal adjustment of a plurality of instruments interchangeably to operative and inoperative positions without liability of one instrument or its supporting apparatus interfering with the movements of the other. My invention also comprises certain details of form, and combination and arrangement of components, all of which will be fully set forth in the description of the accompanying drawings in which:

Fig. 1 is a side elevation of a portion of an operating chair showing two instruments supported thereon by supporting apparatus embodying my improvements.

Fig. 2, is a sectional detail of one of the supporting standards detached.

Fig. 3, is a side elevation of a portion of the upper supporting apparatus of Fig. 2, showing the same in another position from that shown in Fig. 1.

Fig. 4, is a sectional detail of a portion of the locking means employed to lock the supporting apparatus to its adjusted position.

The accompanying drawings illustrate the preferred embodiment of my invention, in which 15 represents a portion of the rigid base of an operating chair, 16 represents a chair seat, 17 chair arms, and 18 a chair back. The chair seat, arms, and back are preferably vertically adjustably mounted upon the chair base by means of a hydraulic plunger 19 adjustable vertically within a cylinder in the chair base by means of a hydraulic pump within the plunger operated by means of a pump shaft 20.

One object of the invention is to support two instruments upon or relative to the chair seat so as to be both vertically adjustable with the chair seat, and so as to be adjustable

one upwardly and rotatably, and the other downwardly and rotatably to bring the two instruments alternately or selectively into substantially a common horizontal plane when required for use, and so as to have independent idle positions in substantially different horizontal planes at one side of the chair, and each free from interference with the movements of the other.

An instrument 22 for instance an ophthalmometer is mounted upon a horizontal plate 23, which is pivotally mounted upon a horizontal arm 24. The arm 24 is pivotally mounted at its opposite end upon a vertical stud or standard 25, the lower portion of which is forked. The instrument is thereby adjustable in a circular path about the standard 25 as a center. A tubular bracket 26 is rigidly mounted relative to the chair seat, and has journaled therein a vertical shaft 27, which is enlarged at opposite ends and forked or slotted to receive the inner ends of link members 28 and 29 which are pivotally attached to opposite ends of the vertical shaft 27 by means of pivot bolts 30 and 31. At their opposite ends the link members 28 and 29 are pivotally attached to the forked portion of the standard 25 by means of pivot bolts 32 and 33. A pair of coiled springs 35 are attached at one end to a slide 34 adjustable along the link 29, and at their opposite ends said springs are attached pivotally to a slide 36 which is adjustable by means of a feed screw 37 along the link 28, whereby the weight of the instrument 22 and all of its supporting members except the bracket 26 and shaft 27 may be accurately compensated for and counterbalanced so that the substantially weightless instrument 22 may be freely adjusted through a considerable range of movement vertically, and can also be moved freely rotatably upon the shaft 27 or the standard 25 to bring the instrument readily into alignment with the face of a patient seated in the chair for active use, or to a substantially lower position at one side of the chair as shown in Fig. 1.

An instrument 40, for instance a refractor or phorometer, is pivotally mounted at 41 upon an arm 42 which is pivotally mounted at its opposite end upon a vertical standard 43. A tubular bracket 44 is rigidly mounted relative to the chair seat, and has adjustably mounted therein by means of a set-screw 45 a metal tube 46. A vertical shaft 47 which

is preferably of rectangular cross-section is rotatably mounted relative to the tube 46 by means of two sleeves. A sleeve 48 has a vertical rectangular recess 49 to receive the lower end of shaft 47 which is secured there-
 5 to by a pin 50. The exterior of the sleeves 48 is cylindrical and fits the bore of tube 46. The sleeve 51 has a lower section 52 with a cylindrical exterior to fit the interior of
 10 the tube 46, and a shoulder 53 to ride upon the upper end of the tube 46 with an enlarged upper end 54. The sleeve 51 has a central vertical rectangular recess 55 through which the vertical shaft 47 passes. The distance between the sleeves 48 and 51 is ad-
 15 justable. A set-screw 56 serves to lock the sleeve 51 rigidly to its adjusted position upon the shaft 47.

A pair of links 60 and 61 are pivotally connected side by side to opposite sides of the upper end of shaft 47 by means of a pivot bolt 62. At their opposite ends the links 60 and 61 are pivotally connected to the upper end of standard 43, which stand-
 20 ard is preferably of rectangular cross section by means of a pivot bolt 63. A pair of links 64 and 65 are pivotally connected side by side to opposite sides of the shaft 47 by means of a pivot bolt 66. The op-
 25 posite ends of the links 64 and 65 are pivotally connected to opposite sides of the lower end of the standard 43 by means of a pivot bolt 67.

A bracket 68 is connected to the links 60 and 61 by means of a bolt 69, and is ad-
 35 justable endwise of said links, and provided with an eye 70 overhanging the ends of the links 60 and 61. A coiled spring 72 is pivotally attached at one end to the eye 70 of the bracket 68. At its opposite end the spring 72 is pivotally connected to the shank of the set screw 56. The tension of the spring 72 may be variably adjusted first by moving the sleeve 51 to different positions
 40 vertically along the shaft 47, and second through a wider range of tension by adjusting the bracket 68 and its eye 70 relative to the links 60 and 61. The spring serves to counterbalance the weight of the instrument 40 and its supporting members upon and
 45 relative to the shaft 47, whereby the instrument 40 becomes substantially weightless so far as adjusting said instrument to different positions vertically. The instrument
 50 40 is also adjustable rotatably upon the centers 41, 43, and 47 and is capable of a considerable range of adjustment vertically due to the vertical movement of the standard 43 relative to the shaft 47.

In order to lock the instrument 40 to its various positions of adjustment vertically I provide an arm 74 which is pivotally at-
 60 tached at one end to the link 65, the opposite end of the arm 74 enters between the links 60 and 61 and is adapted to be

clamped without liability to injury by means of a set-screw 75 between the inner face of the link 61 and a clamping plate 76 against which the end of the set screw 75 bears. The plate 76 is mounted upon the shanks of
 70 the screws 77 and 78, and is free to move endwise of said screws. The screws 77 and 78 resist the end thrust of the set-screw 75.

The instrument 22 may be accurately adjusted as to height by means of a feed screw
 75 80, which is pivotally mounted relative to the standard 25 upon a pivot bolt 81, and engages a nut 82 pivotally attached to a slide 83 adjustable endwise of the link member 29. A set-screw 84 serves to lock the slide 83
 80 rigidly to the link 29 when it is desired to adjust the height of the instrument by means of the feed screw 80. If desired the instrument 40 may be adjusted vertically by means of a feed screw in the same manner as de-
 85 scribed for operating the feed screw 80 to vertically adjust the instrument 22.

I preferably provide a projection 80 extending downwardly from the collar 51, through which extension is threaded a set-
 90 screw 81 which is adapted to be employed when desired to rigidly lock the shaft 47 to the tube 46 and thereby to the chair seat 16. Other means may be employed if de-
 95 sired in place of the set-screw 81 to lock the shaft 47 against rotation when desired.

The instrument 40 when idle normally occupies substantially the position shown in Fig. 1, due to being slightly more than counterbalanced by spring 72 and may be
 100 swung into active position and lowered until opposite the face of a patient and then locked in position, and later elevated and swung to the idle position at the side of the chair seat, without liability to interfere
 105 with movements of the instrument 22, which moves downwardly and laterally to its idle position. The adjustment of either instrument from idle to active position is almost instantaneous, and both instruments follow
 110 the adjustments of the chair seat.

The apparatus herein shown and described is capable of considerable modification without departing from the spirit of my inven-
 115 tion.

What I claim is:

1. An instrument supporting apparatus comprising a base member, a substantially vertical shaft rotatably mounted upon said base, a plurality of substantially parallel
 120 link members spaced apart and pivotally attached one above the other to the upper end of said shaft above said base member, a substantially vertical standard at one side of said shaft and to which the opposite ends
 125 of said link members are pivotally attached one above the other, an instrument supporting arm rotatably supported upon said standard and adjustable therewith vertically, relative to said shaft and rotatably with said
 130

shaft, means to independently rigidly lock said supporting arm, standard, and link members relative to said shaft, and adjustable means to substantially counterbalance the weight of said instrument standard and link members upon and relative to said shaft.

2. An instrument supporting apparatus comprising a main stationary base member, a secondary base member vertically adjustable relative to said main base member, a substantially vertical shaft rotatably mounted at its lower end upon said secondary base member and with its upper end projecting above said base member, a plurality of substantially parallel link members spaced apart and pivotally attached one above the other to the upper end of said shaft above the secondary base member, a substantially vertical standard at one side of said shaft and to which opposite ends of said link members are pivotally attached one above the other near opposite ends of said standard, an instrument supporting member pivotally mounted upon said standard to move in a substantially horizontal plane relative to said standard and adjustable vertically with said standard, a locking bar pivotally attached to the first of said links intermediate of the ends of said link and extending across the second of said links intermediate of its ends, means to rigidly clamp said locking bar and said second link together at their intersection, and means acting upon one of said links to substantially counterbalance the weight of said links and the weight carried thereby upon and relative to said shaft.

3. An instrument supporting apparatus comprising a main stationary base member, a secondary base member vertically adjustable relative to said main base member, a substantially vertical shaft rotatably mounted at its lower end upon said secondary base member and with its upper end projecting above said base member, a plurality of substantially parallel link members spaced apart and pivotally attached one above the

other to the upper end of said shaft above the secondary base member, a substantially vertical standard at one side of said shaft and to which the opposite ends of said link members are pivotally attached one above the other near opposite ends of said standard, means to rigidly lock said links together to prevent relative movement thereof, an extension carried by one of said links and adjustable relative thereto, a spring attached at one end to the free end of said link extension and at its opposite end attached to said shaft and serving to substantially and adjustably counterbalance the weight of said links, standard, and members carried thereby.

4. An instrument supporting apparatus comprising a main stationary base member, a secondary tubular base member vertically adjustable relative to said main base member, a collar rotatably adjustable within said secondary base member and supported endwise by means of a flange resting upon the upper end of said secondary base member, means to rigidly clamp said collar to said secondary base member, a vertical shaft adjustable endwise and non-rotatably through the bore of said sleeve, a plurality of substantially parallel links spaced apart and pivotally attached one above the other to the upper end of said shaft above the secondary base member, a substantially vertical standard at one side of said shaft and to which opposite ends of said links are pivotally attached one above the other near opposite ends of said standard, an instrument supporting member pivotally mounted upon said standard to move in a substantially horizontal plane relative to said standard and adjustable vertically with said standard, means to rigidly clamp said links together to prevent relative movement thereof, and means adjustable to substantially counterbalance the weight of said links, standard and members carried thereby.

In testimony whereof I have hereunto affixed my signature.

FREDERICK KOENIGKRAMER.