Oct. 21, 1958 G. F. SCHENK 2,857,226

ADJUSTABLE TABLE

Filed March 21, 1957 2 Sheets-Sheet 1

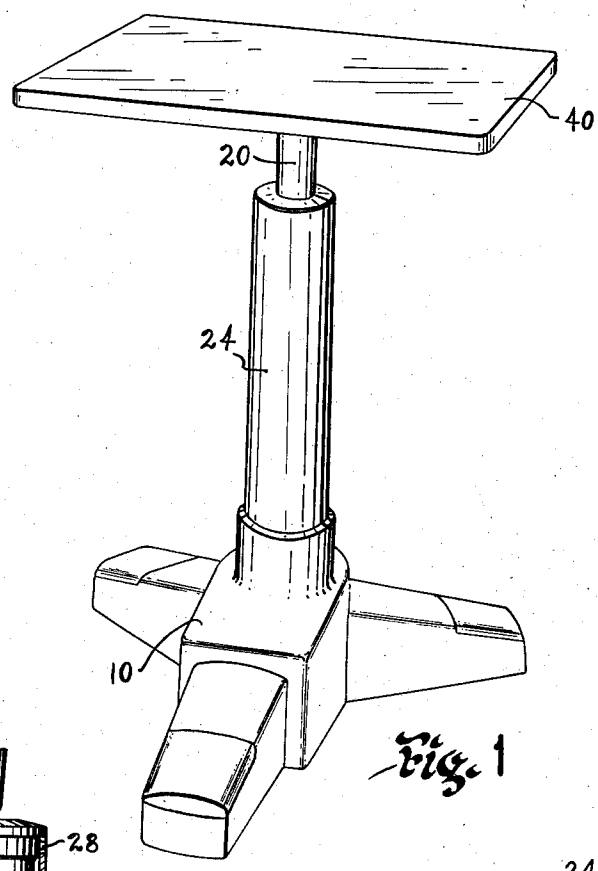

Fig. 1

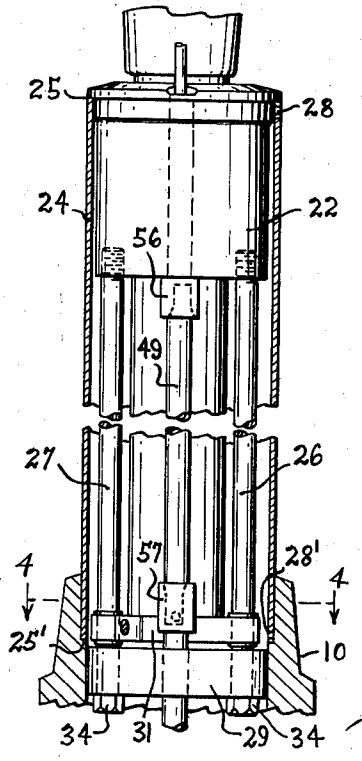

Fig. 3

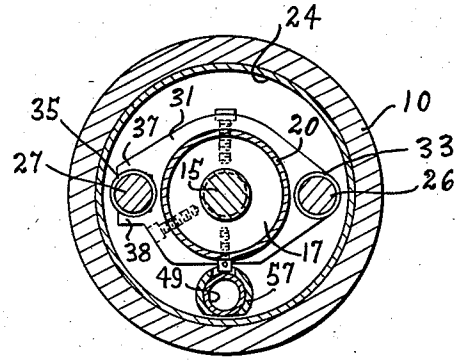

Fig. 4

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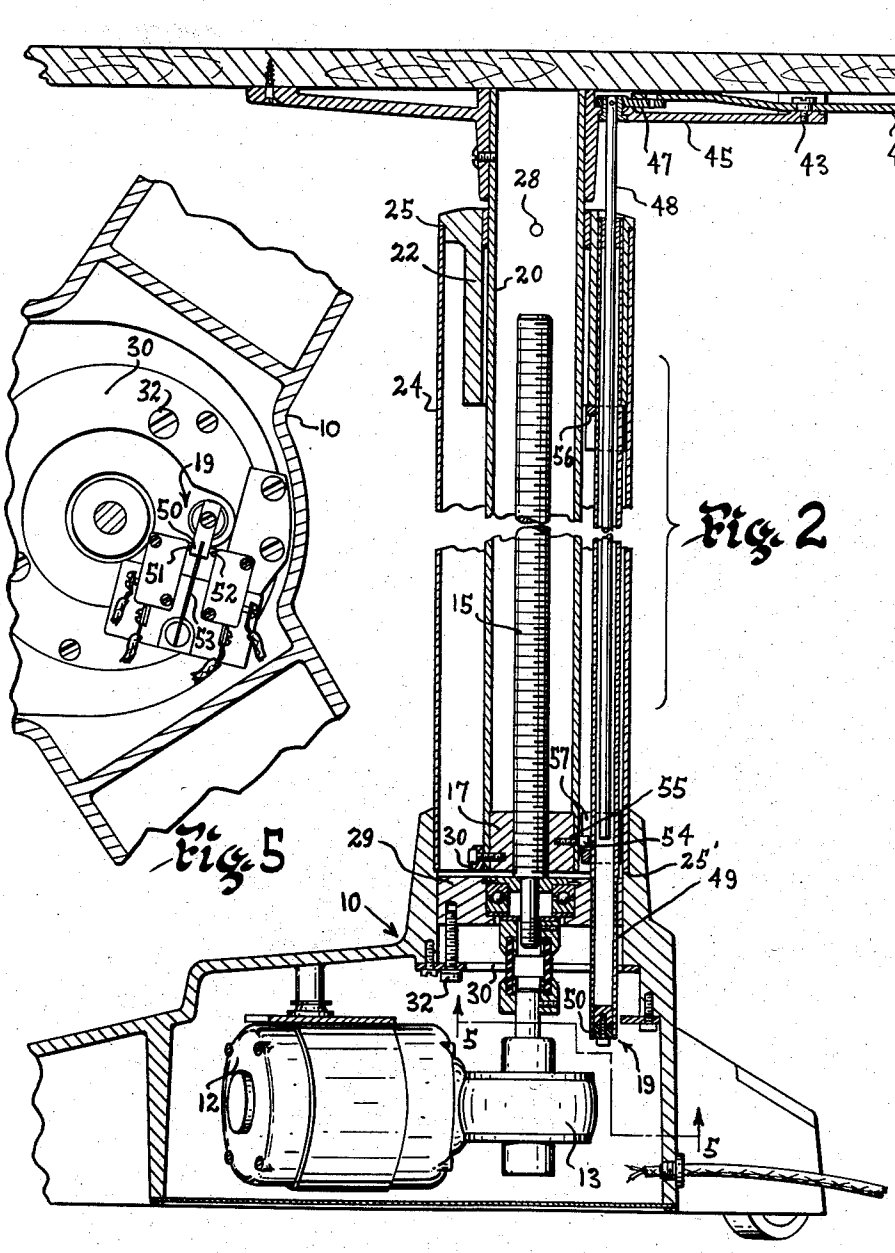

Fig. 2

Fig. 5

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ADJUSTABLE TABLE

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7 Claims. (Cl. 311—39)

This invention relates to adjustable supports such as adjustable instrument stands and tables.

An object of the present invention is to remove play from the raising and lowering mechanism so that more reliable operation is made possible.

A preferred embodiment of the invention is disclosed in the drawings in which:

Fig. 1 is a perspective view of the adjustable support;

Fig. 2 is a central vertical sectional view of the support, broken away to omit what is not instructive;

Fig. 3 is a detail view in side elevation and looking from the right side of Fig. 2, the outer cylindrical casing being broken away;

Fig. 4 is a sectional view on the line 4—4 of Fig. 3, and,

Fig. 5 is a sectional view, looking from the bottom, and taken on the line 5—5 of Fig. 2.

For convenience in use of the support, a motor is desirable for operating the raising and lowering mechanism so that the instrument can be brought to just the height desired. This calls for a two-way switch, so that if the raising or lowering goes past the precise height desired, the direction of the motor may be reversed to bring the support back to the selected height.

Because the support is raised and lowered by a central column, there is a necessity for overcoming the ability of the support to turn about the axis of the column; and this is taken care of in the present invention by utilizing a yoke which slides vertically on tie rods alongside the column to prevent such rotation of the support. This maintenance of correct alignment of the support as it is raised and lowered is of decided importance in affording close control of the actuating motor through the above mentioned reversing switch.

Referring to the drawings, a hollow three-toed base 10 houses the motor 12 and reduction gearing 13 (see Fig. 2). The latter drives a vertical worm screw 15 for raising or lowering a worm nut 17 depending upon the direction in which the motor 12 is driven. A switch 19 (see Fig. 5) effects reversal of the motor 12 as it is shifted from one extreme position to the other, and has a central neutral position in which the motor is brought to an almost instantaneous stop. The span of movement of the switch 19 from one extreme position to the other can be so small as to give the highly desirable "finger-tip control" of the raising and lowering of the support, because the alignment of the support is held so true by the sliding of the yoke on the tie rods, as will now be described.

The central column is made up of a hollow tube 20 telescoping in a collar 22 spaced from the base 10 by a cylindrical casing 24. A shoulder 25 in the collar 22 is engaged by the upper rim of the casing, and a notch in this upper rim cooperates with a pin 28 on the collar to position the casing 24 and prevent twist. The lower rim of casing 24, which seats against a shoulder 25' in the base 10, likewise has a notch which cooperates with

a pin 28' in the base for this same purpose. A pair of tie rods 26 and 27 extend from the collar 22 to a block 29 housed in the base 10, and these tie rods unite the collar 22 to the block 29 and provide a rigid slide for a yoke later to be described. A cover plate 30 (see Fig. 2) within the base 10 has screws 32 for drawing the collar 22 and block 29 assembly downwardly to its accurately adjusted position after the nuts 34 on the lower ends of the tie rods 26 and 27 have been made secure.

The shoulder 25 of collar 22 is in this way drawn down to brace the casing 24 with the internal tie rods 26 and 27. The tie rods 26 and 27 together with the screws 32 unite the above assembly with the base 10 to form a rigid structure which is remarkably free of shake.

At the lower end of the tube 20 is fixed the nut 17, so that when the vertical screw 15 is rotated in one direction the tube 20 is pushed upwardly out of the collar 22, and when the screw 15 is rotated in the opposite direction the tube 20 is retracted within the collar 22. A yoke 31 (shown in Figs. 3 and 4) surrounds the lower end of the tube 20 and is fixed thereto. A round opening 33 in the yoke receives the tie rod 26 and an open ended recess 35 in the yoke receives the tie rod 27. In effect the recess 35 is defined by jaws 37 and 38 which can be slightly compressed toward each other or one can be bent toward the other to take up any play between the rod 27 and the yoke 31. In this way, as the nut 17 and the central column are moved up or down, the sliding of the yoke with a close fit on the tie rods 26 and 27 prevents any misalignment of the central column. Thus a raising and lowering mechanism from which play has been largely eliminated is provided by the invention.

Beneath the edge of the rear of the table top 40 (see Fig. 2) is the outer end of a lever 42 pivoted at 43 to the pallet 45 which is fixed to the top of the central column and carries the table top 40. The inner end of the lever 42 is linked to an arm 47 on a telescopic extension 48 of a control rod 49 which is journaled at its upper end in the collar 22 and adjacent its lower end in the block 29. A finger 50 (see Fig. 5) on the projecting lower end of the control rod 49 engages and actuates either micro contact 51 or 52 of switch 19 as the lever 42 is shifted to one side or the other. The finger 50 is biased by a spring 53 so as to return the switch 19 to neutral "off" position when the lever 42 is released.

Fixed to the control rod 49 are terminal controls 56 and 57 whose function is, through the control rod 49, to return the switch 19 to neutral "off" position. The projecting head 54 of a screw 55 fixed in the lower end of the tube 20 cooperates with the upper terminal control 56 to return the rod 49 and through it the switch 19 from "raising" position to neutral "off" position when this head enters the inverted U-shaped recess in the side of the control 56. The span of movement of the switch 19 is so small that only a small camming action against the head 54 is necessary to shift the control 56 and with it the control rod 49 to stop the motor 12. In this relation, the yoke 31 sliding on tie rods 26 and 27 prevents such deviation of the central column and with it the screw 55 as to make the action of the terminal control 56 unreliable.

In the same way the head 54 cooperates with the lower terminal control 57 to return the rod 49 together with switch 19 from "lowering" position to neutral "off" position when head 54 enters the U-shaped recess in the side of the lower terminal control 57. Here too only a small camming action against the head 54 is necessary to shift the control 57 sufficiently to turn switch 19 to "off" position. It will be noted that the U-shaped recesses in both controls 56 and 57 are wide enough so that after the control rod 49 has moved to "off" position, there is still suf-

ficient width of space for the head **54** in the recess to permit the operator (through lever **42**) to turn the control rod **49** to "raising" position (in the case of control **57**) or to "lowering" position (in the case of control **56**).

The raising and lowering mechanism is thus promptly and reliably responsive to pressure one way or the other on the control lever **42**, and the mechanism is protected from over-running by automatic limit controls to prevent jamming the mechanism when either limit of the travel of the support is reached.

I claim:

1. An adjustable support comprising a base, a central column carrying a support and telescoping with a collar, motor driven mechanism for raising and lowering said column relative to said collar, a plurality of rods tying said collar to said base as a rigid guiding structure for said column, and a guide yoke fixed to the lower portion of said column and slidable on a plurality of said rods as the column is raised and lowered.

2. An adjustable support comprising a base, a collar spaced from said base, a plurality of rods tying said collar to said base as a rigid structure, a central column carrying a support and reciprocable within said collar, motor driven mechanism for raising and lowering said column relative to said structure, a guide yoke slidable on a plurality of said rods and fixed to the lower portion of said column to maintain its alignment during reciprocation, a reversing switch having a "raising" position for causing rotation of said motor in one direction, a "lowering" position for causing rotation of said motor in the other direction and an intermediate "off" position for stopping said motor, a rotatable control rod adjacent said column and operatively connected to said switch to move the same to each of said three positions, and upper and lower terminal controls on said rod actuated by an element on said column for shifting said switch through said control rod to "off" position as said column reaches the upper and lower limits of its travel.

3. An adjustable support comprising a base, a central column carrying a support and telescoping with a collar, a pair of rods tying said collar to said base as a rigid guiding structure for said column, mechanism driven by an electric motor for raising and lowering said column relative to said structure, a guide yoke slidable on said rods and fixed to the lower portion of said column to maintain its alignment during raising and lowering, a reversing switch for delivering current to actuate said motor in both directions and for stopping said motor, a rotatable control rod mounted in said guiding structure beside said column and operatively connected to said reversing switch, and upper and lower terminal controls on said rod actuated by an element on said column for shifting said switch through said rod to "off" position as said column reaches the upper and lower limits of its travel.

4. An adjustable support comprising a base, a central column carrying a support and telescoping with a collar, a plurality of tie rods surrounded by a casing, said casing spacing said collar from said base and said tie rods tying said collar casing and base together as a rigid guiding structure for said column, motor driven mechanism for raising and lowering said column relative to said structure, and a guide yoke slidable on a plurality of said rods and fixed to the lower portion of said column to maintain its alignment during raising and lowering.

5. An adjustable support comprising a base, a central column carrying a support and telescoping with a collar, motor driven mechanism for raising and lowering said column relative to said collar, a casing surrounding said raising and lowering mechanism and supporting said collar, a reversing switch having a "raising" position for causing rotation of said motor in one direction, a "lowering" position for causing rotation of said motor in the other direction and an intermediate "off" position for stopping said motor, a rotatable control rod extending vertically through said collar and operatively connected to said switch to move the same to each of said three positions, and upper and lower terminal controls on said rod cooperating with an element on said column to cam said rod and thereby rotate said rod and switch to "off" position.

6. An adjustable support as claimed in claim 5 in which each of said terminal controls affords sufficient clearance to permit manual operation of the control rod to reverse the switch and return the adjustable support from each of its terminal positions.

7. An adjustable table comprising a base, a single tubular column carrying a table top, a collar telescoping with said column, a plurality of rods outside said column tying said collar to said base as a rigid guiding structure for said column, a guide yoke surrounding the lower end of said column and slidable on at least one of said rods as the column is raised and lowered, and motor driven mechanism extending within said column for raising and lowering said column relative to said collar.

References Cited in the file of this patent

UNITED STATES PATENTS

1,945,047	Klausmeyer	Jan. 30, 1934
2,065,952	Trautmann	Dec. 29, 1936
2,677,517	Castello	May 4, 1954