

March 2, 1943.

G. E. FROELICH
ADJUSTABLE STAND

2,312,636

Filed Aug. 4, 1940

3 Sheets-Sheet 1

Fig. 1

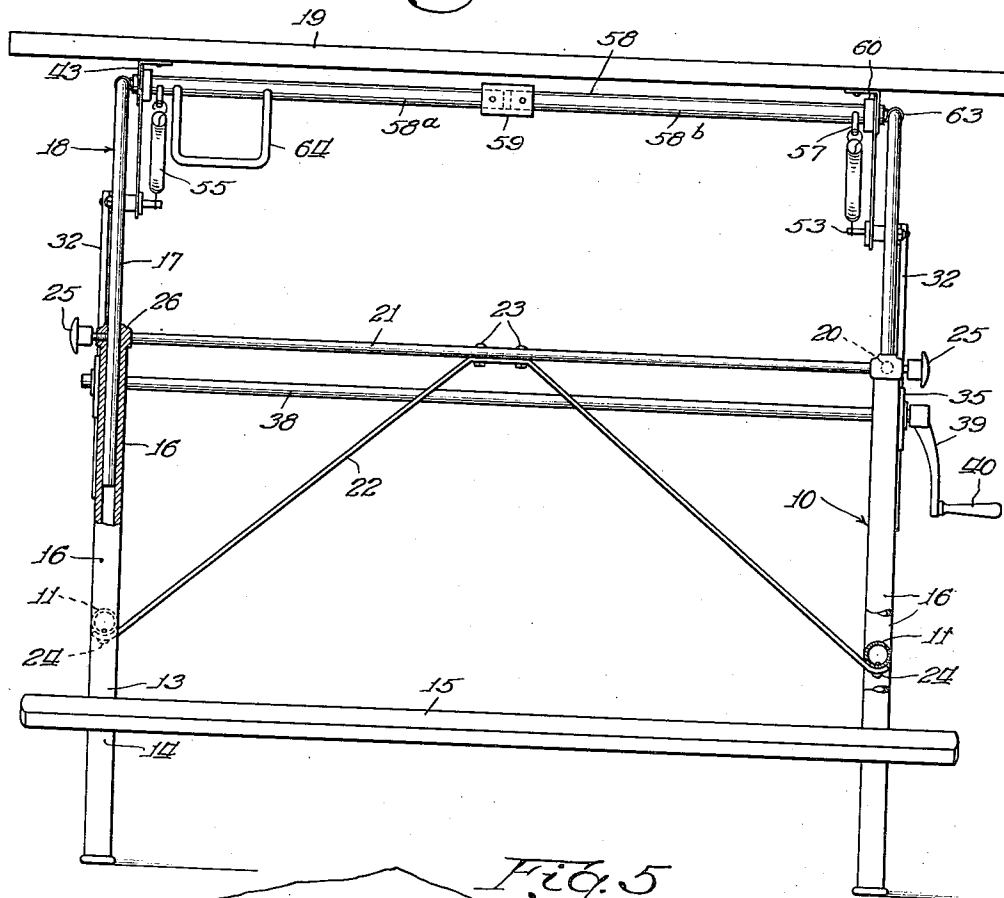
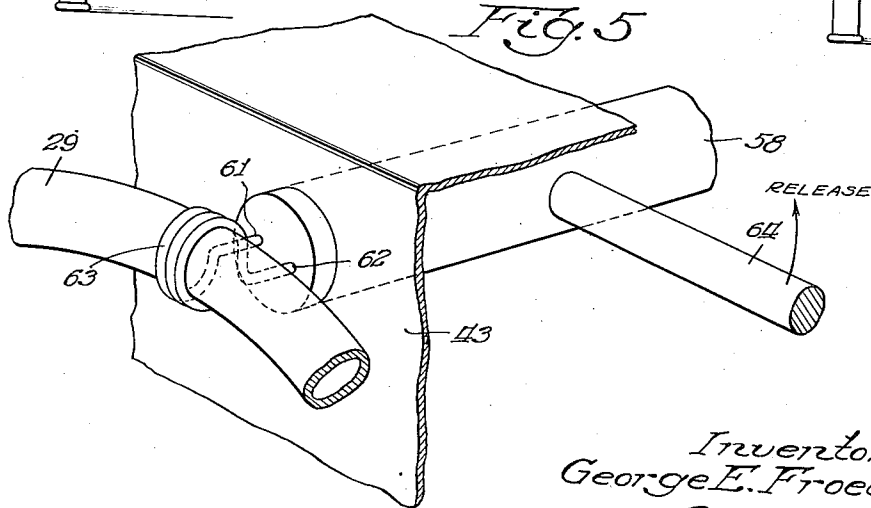


Fig. 5



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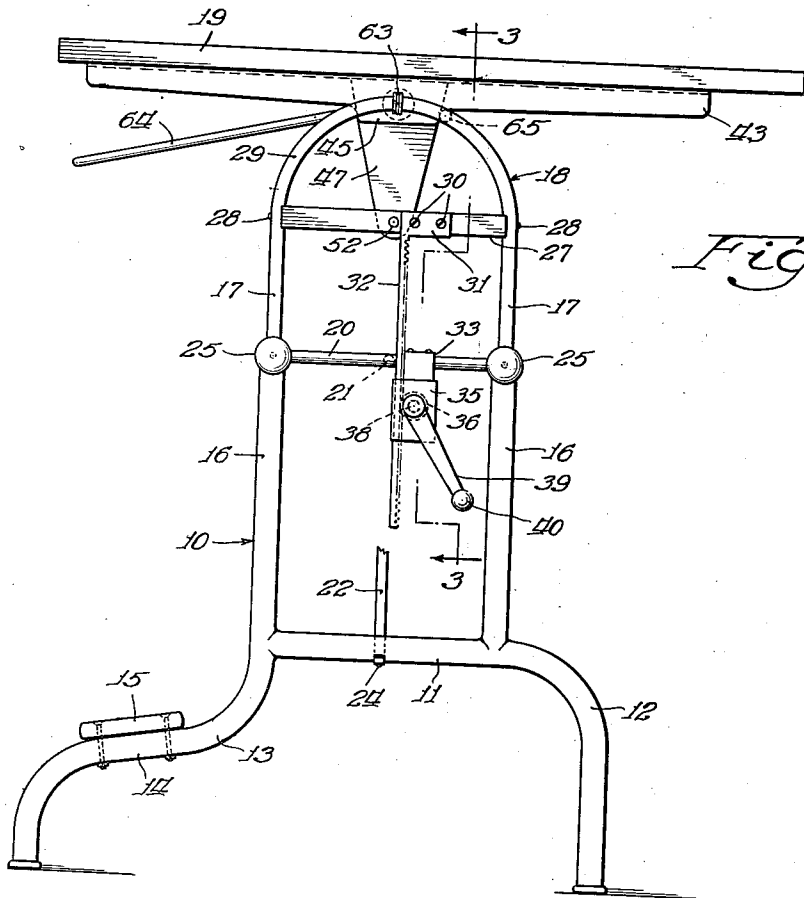


Fig. 2

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Fig. 3

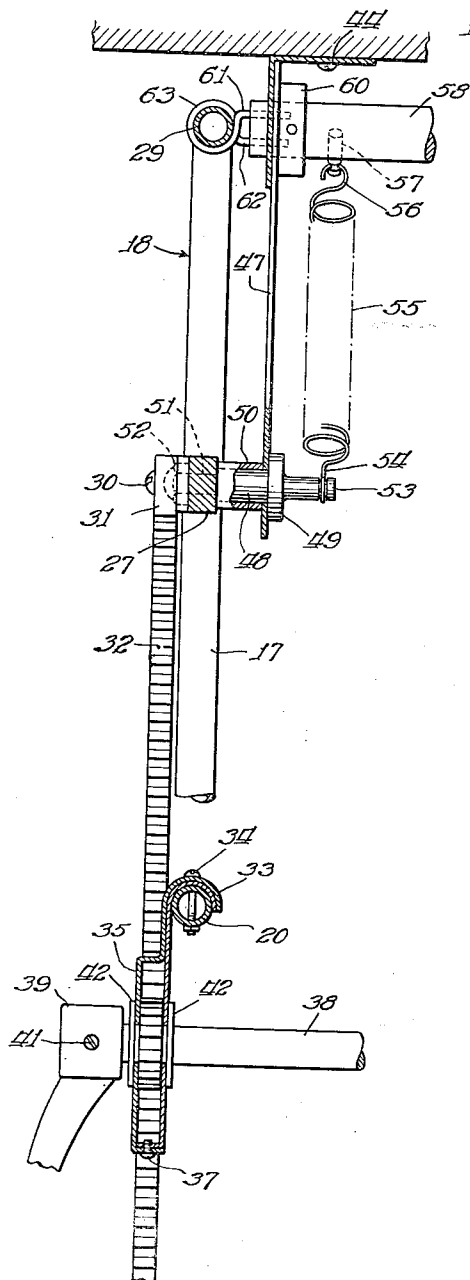
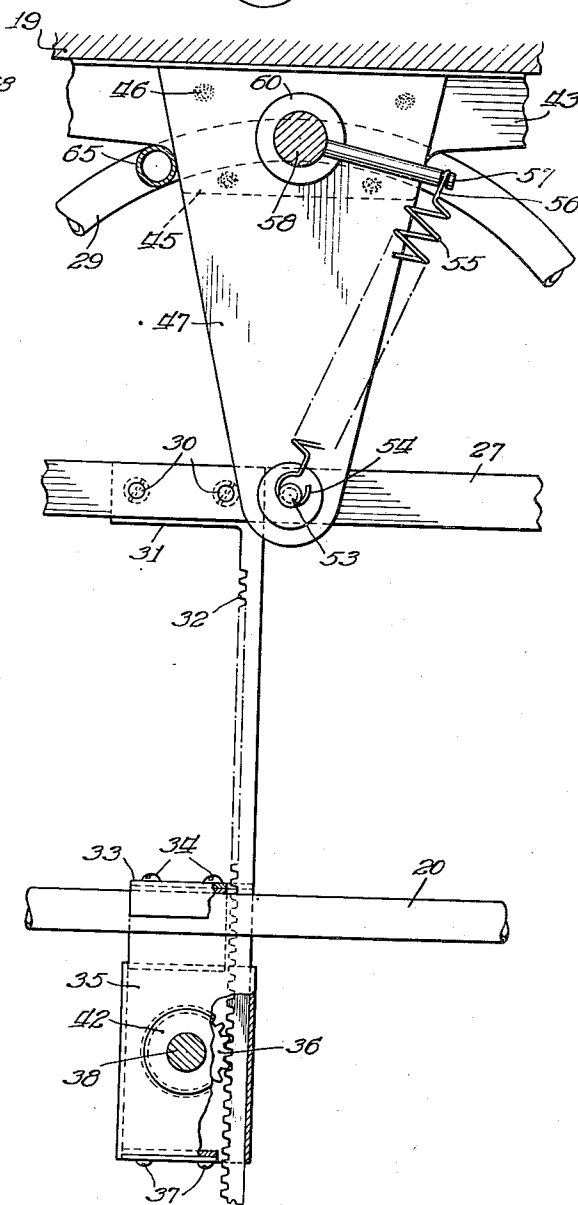


Fig. 4



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UNITED STATES PATENT OFFICE

2,312,636

ADJUSTABLE STAND

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Application August 4, 1940, Serial No. 351,381

14 Claims. (Cl. 311—36)

This invention relates to adjustable stands, more particularly drafting stands of the larger sizes used in professional drafting rooms, and, among other objects, aims to provide an improved device of this character of minimum weight and simplicity but at the same time capable of ready and easy adjustment for various heights and inclinations of the drawing board.

Other objects and advantages will be apparent from the following description, taken together with the accompanying drawings, in which—

Figure 1 is a front elevational view of a stand embodying the present invention;

Figure 2 is an end view looking at the structure of Figure 1 from the right-hand side, parts being broken away for clearness of description;

Figure 3 is an enlarged view, partly in section, of parts taken on the staggered line 3—3 of Figure 2;

Figure 4 is a view of parts shown in Figure 3, looking thereat from the right-hand side; and

Figure 5 is a still further enlarged view of details of the spring brake, somewhat diagrammatic.

In the illustrative construction shown in the drawings, the end pedestals 10 for my improved stand are desirably of tubular metal material for reduction of weight, ease of cleaning and modern appearance, and each pedestal is of somewhat H-formation with the horizontal component 11 substantially midway of its height and merging at one side into a foot 12 and at the other side into another foot 13, which feet are curved outwardly for greater stability, the foot 13 at the working side of the pedestal being advantageously of ogee curve formation, and thus providing an intermediate somewhat horizontal tangent 14 upon which may be mounted, across the pedestals, a foot rest 15 for the comfort of the draftsman when using the stand in either standing or sitting position.

Above the horizontal component 11, of the pedestal, the latter rises in a pair of hollow up-rights 16 for the telescopic reception of the free legs 17 of a drawing board support here shown as including an arch rail 18, upon which the drawing board 19 is mounted, as presently described.

For enhanced rigidity the upper ends of the pedestal up-rights 16 may be connected by a transverse strut 20, and the transverse struts 20 of each pedestal are connected by a longitudinal strut 21, a brace strap 22 being shown bolted to the longitudinal strut 21 medially at 23

and angling downwardly at each end to be bolted to the horizontal component 11 of each pedestal as at 24. The parts of the pedestal may be conveniently welded together. Hand wheels 25 at the top of each of the up-rights 16 and having screw co-action with the socket pieces 26 at the tops of the up-rights may serve to clamp the rail legs 17 in the up-rights for selectively fixing the height of the drawing board, but my invention contemplates also a unitary mechanism for accomplishing this without the use of the hand screws, particularly during a period when frequent adjustments may be desired, at which time the hand screws may be left loosened and only tightened when a given fixed adjustment is intended to be maintained for a relatively long period of time.

For purposes of such unitary vertical adjustment mechanism, each of the arch rails 18 may carry a chord bar 27 secured thereto as by screws 28 between the legs 17 and where the legs merge into the arch segment 29. Secured to the bar 27 as by screws 30 to one side of the center of the head is a block 31 from one end of which depends a rack 32. Suspended from the transverse strut 20, as by a hanger part 33 bolted at 34 to the strut, is gear box 35 in the path of the rack 32 and receiving the rack therethrough to engage within the gear box with a pinion 36. The gear box 35 may be formed of mating plates bent to form a flat box and the laminated hanger part 33, the laminations of which are matingly curved to suit the curvature of the tubular strut 20 and are held together and to the strut by the bolts 34, the box parts at their lower end being secured as by screw 37. The pinions 36 are carried within the gear boxes 35 by a common shaft 38, upon which the pinions are fixed, and which extends from one pedestal to the other and slightly therebeyond at each end to have slid thereon a crank 39 having a handle 40. A set-screw 41 on the crank which slides into a groove in the shaft end keys the crank to the shaft adjacent the gear box at either end of the stand as desired for convenience. Face plates 42 on the gear box 35, perforated for the passage of the shaft 38, reinforce the gear box at the point of rotation of the shaft.

Turning now to the means for fixing the inclination of the drawing board 19 with respect to the pedestals, the drawing board is shown supported by angular brackets 43 secured to its under face inwardly from its ends as by screws 44 passing through one angular part of the

bracket, the other angular part depending therefrom. These brackets 43 are desirably located transversely of the board, terminating a little short of the edges of the board, and progressively widening toward their centers where they are further flared downwardly as at 45 to have spot welded thereto as at 46 a pivot sector 47, the pivot sectors decreasingly tapering toward their lower ends where they are each pivotally mounted on one of the bars 27.

This pivotal mounting of the sectors on the bars may be through the intermediation of a cylindrical bearing pin 48, as best shown in Figure 3. The bearing pin 48 has a flange 49 against which the sector 47 rotatably abuts, the reduced end of the sector being perforated to snugly but rotatably receive the larger cylindrical part of the bearing pin 48 therethrough. The bearing 48 is located centrally of the bar 27 to be concentric with the segment 29. A sleeve 50 spaces the sector from the bar 27. The bearing pin has an outer reduced end 51 which passes through a suitable hole in the bar 27 and is screw-threaded to receive the cap screw 52 thereon to tightly clamp the bearing pin 48 to the bar. The other or inner end of the bearing pin 48 is in the form of a necked spindle 53 for anchoring there-to one end 54 of the coil expansion spring 55, the other end 56 of which is hooked to a finger 57 rigidly projecting radially from the brake rod 58 beneath the board.

The brake rod 58 may be conveniently formed as here shown, in two sections, 58a and 58b, joined centrally of the board by a coupling 59 to act as a unit, it being understood that as here shown there are desirably two of the springs 55, one at each end of the board. The brake rod 58, which functions somewhat as a rock shaft, passes rotatably through each of the pivot sectors 47 and brackets 43 where the pivot sectors and brackets are welded together, a collar 60 keyed to the brake rod at each end limiting longitudinal movement of the brake rod. The axis of the brake rod is at a distance from the axis of the bearing pin 48 equal to the radius of the segment 29. Into the ends of the brake rod which project from the brackets 43 are fixedly secured the terminations 61, 62 of a torsion spring 63, the helicals of which, in this instance preferably at least three, encircle the segments 29 of the arch rail 18. It will be understood that the arch rail 18 is passed through the torsion spring 63 when the torsional force of the spring is relaxed sufficiently for this purpose, the expansion springs 55, already referred to, thereafter effecting a normally enhanced torsional force of the torsion springs 63 for the purpose of causing the latter to frictionally grip the segments 29 to prevent movement thereon until the torsional force is again relaxed.

Parts at each end of the board, as just described, are similar and reciprocal.

A release lever 64, preferably in the form of a loop or ball as shown, is rigidly secured to the brake rod 58 to extend beneath the drawing board substantially to its proximate edge at the same side of the stand upon which the foot rest 15 is located, so as to be readily accessible to the draftsman at the working side of the board.

The bar 27 and rack 32 together form a T shape member which advantageously provides elements both for pivoting the board and for elevating the board.

It will be understood that operation of the device is as follows:

When the draftsman desires either to raise or lower the board 19, he manipulates the crank 38 by its handle 40 to rotate the common shaft 38, which by means of the pinions 36 moves the racks 32 either upwardly or downwardly as the case may be, and, with the racks, the arch rails 18, as a whole and in unison. During this operation it will be understood that the hand clamps 25 are released, but these may now be tightened manually if desired to fix the vertical adjustment just attained as described.

Having now attained the correct height adjustment for the drawing board, the desired inclination thereof is obtained by grasping the release lever 64 and urging this manually toward the board 19, as by squeezing these parts together, which rotates the brake rod 58 so as to slightly twist the ends of the torsion springs 63 in the direction to open these ends of the springs to relax slightly the torsional force of the springs and thus their grip upon the segments 29, whereupon while held in such released position the board may be swung on the sectors 47 which pivot on the pivot pins 48 to the desired angle of inclination from say either horizontal position as shown in Figure 2 to almost a vertical position in the direction toward the working side of the stand upon which is located the foot rest 15. Since such extreme inclination of the board from the horizontal in the opposite direction, away from the working side of the stand would probably not be desired, a stop 65 may be fixed on the segment 29 to limit movement in the latter direction. When the desired inclination is obtained as just described the draftsman lets go of the release lever 64 and brake rod 58 is permitted to return to its normal position as biased by the expansion springs 55 to again tighten the torsion springs 63 to grip the segments 29 and thus frictionally prevent accidental change of inclination of the board.

It will be understood that when the torsion of the springs 63 is lessened manually by the operation of the release lever, these springs slide easily on the circular cross section of the segments 29.

Having described my invention, I claim:

1. In a drafting stand, the combination of a pair of end pedestals each comprising a pair of tubular uprights, an arch rail operatively associated with each pedestal and having its free legs snugly received in said tubular uprights for telescopic movement therein, a chord bar for similar segments of each of the rails, means including a member connected with each of said chord bars for securing various selective telescopic adjustments of the rails and uprights, common mechanism for actuating said means for both pedestals, a drawing board pivotally mounted on the chord bars, means cooperating with the rails for selectively fixing the inclination of the board with respect to the chord bar, and common mechanism for actuating said last mentioned means for both pedestals.

2. In a drafting stand, the combination of a pair of end pedestals each comprising a pair of tubular uprights, an arch rail operatively associated with each pedestal and having its free legs snugly received in said tubular uprights for telescopic movement therein, a chord bar connected transversely across each of the rails, means for securing various selective telescopic adjustments of the rails and uprights, a drawing board pivot-

ally mounted on the chord bars, and means cooperating with the rails for selectively fixing the inclination of the board with respect to the chord bar.

3. In a drafting stand, the combination of a pair of arch rail segments, a pair of sectors pivoted concentric therewith, a drawing board secured to the sectors, a brake rod rotatably carried by the sectors co-radial with the segments, a pair of torsion springs encircling the segments and riding thereon, the ends of the springs being secured in the ends of the brake rod whereby rotation of the brake rod in one direction increases the torsional force of both torsion springs and rotation in the opposite direction decreases the force and yieldable means for maintaining the brake rod in torsion increasing position.

4. In a drafting stand, the combination with a pivotal mounting for the drafting board, of an arch rail segment member of circular cross-section, a torsion spring carried by the board and encircling the segment member, yieldable means for biasing the spring to torsion increasing position to grip the segment member and manually operable means for decreasing the torsion to permit the spring to slide on the rail.

5. In a drafting stand, the combination with a pair of pedestals, of an arch rail carried by each pedestal and extendible vertically thereabove, a T-shape member having its head secured transversely between each rail to form a chord for intersecting a segment of the arch and having its leg vertically disposed between the legs of the arch, said leg of the T-shape member comprising a rack, a sector pivoted on each chord bar concentric with the segment, a drawing board secured to the sectors, friction clutches carried by the board and riding the segments in engagement therewith, a pair of pinions engaging the racks, a crank for rotating the pinions, and means for releasing the clutches.

6. In a drafting stand, the combination with a pedestal therefor, of an arch rail carried by the pedestal and extendible vertically thereabove, a T-shape member having its head secured transversely between each rail to form a chord for intersecting a segment of the arch and having its leg vertically disposed between the legs of the arch, said leg of the T-shape member comprising an element operatively associated with operator controllable mechanism for raising or lowering the arch rail, a sector pivoted on each chord bar concentric with the segment, a drawing board secured to the sector, a clutch carried by the board and riding the segment in engagement therewith, and operator controllable means for releasing the clutch.

7. In a drafting stand, the combination with a pedestal therefor, of an arch rail carried by the pedestal, a sector member pivotally carried by said pedestal concentric with said arch rail, a drawing board secured to the sector, a torsion spring encircling the arch rail and riding thereon with said drawing board and sector, and operator controllable means for selectively tightening or loosening the gripping effect of the spring on the arch rail.

8. In a drafting stand, the combination of a pair of end pedestals each comprising a pair of tubular uprights, an arch rail operatively associated with each pedestal and having its free legs snugly received in said tubular uprights for telescopic movement therein, a chord bar connected transversely across each of the rails, means including a rotatable shaft carried by the pedestals,

a pinion at each end of the shaft, a vertical rack fixed to each chord bar and engaging the pinions for securing various selective telescopic adjustments of the rails and uprights, a drawing board pivotally mounted on the chord bars, and means cooperating with the rails for selectively fixing the inclination of the board with respect to the chord bar.

9. In a drafting stand, the combination of a pair of end pedestals each comprising a pair of tubular uprights, an arch rail operatively associated with each pedestal and having its free legs snugly received in said tubular uprights for telescopic movement therein, a chord bar connected transversely across each of the rails, means for securing various selective telescopic adjustments of the rails and uprights, a drawing board pivotally mounted on the chord bars, and means cooperating with the rails for selectively fixing the inclination of the board with respect to the chord bar, said last mentioned means including a torsion spring slidably encircling the arch rail, a rotatable brake rod carried by the drawing board and adapted by its rotation to tighten or loosen the torsion spring, an expansion spring normally maintaining the brake rod in torsion spring tightening position, and a release lever for rotating the brake rod slightly in the opposite direction against the pull of the expansion spring to loosen the torsion spring.

10. In a drafting stand, the combination with a pedestal therefor, of a drawing board support carried by the pedestal and extendible vertically thereabove, a rigid T-shape member having its head secured transversely to the support and having its leg vertically disposed, said leg of the T-shape member constituting a rack secured to the said head to one side of the center thereof, operator controllable mechanism carried by the pedestal and associated with the rack for raising or lowering the support, a drawing board pivotally secured to the said head centrally thereof, and operator controllable means for adjusting the angle of the drawing board with respect to the support.

11. In a drafting stand, the combination with a pedestal therefor comprising a pair of tubular uprights, of arch rails carried by the pedestal and extendible vertically thereabove by having their free legs received in said tubular uprights, a transverse strut connecting the upper ends of said tubular uprights respectively, a T-shape member having its head secured transversely between each rail to form a chord intersecting a segment of the arch and having its leg vertically disposed between the legs of the arch and between the uprights, said leg of the T-shape member comprising a rack, a pinion rotatably carried by each said transverse strut and engaging the rack operatively associated with operator controllable mechanism for simultaneously raising or lowering the arch rails, a pivot member carried on each chord bar concentric with the segment, a drawing board secured to the pivot members, a pair of clutches carried by the board and riding the segments in engagement therewith, and operator controllable means for releasing the clutches.

12. In adjustable devices of the class described embodying a fixed member and a movable member, that improvement therein which comprises a rail carried by one of said members, a torsion spring carried by the other of said members and encircling said rail, said spring being normally biased into position gripping said rail to

frictionally restrain relative movement of the members, and means for temporarily loosening the frictional grip of the torsion spring on the rail for relative movement of the fixed and movable members.

13. In adjustable devices of the class described embodying a fixed member and a movable member, that improvement therein which comprises a pair of rails carried by one of said members, a pair of torsion springs carried by the other of said members and each encircling one of said rails, said springs being normally biased into position gripping said rails to frictionally restrain relative movement of the members, means for releasing the frictional grip of the torsion springs on the rails for relative movement of the fixed and movable members, said means including a common rock shaft connected with the springs and resiliently rotatable therefor.

14. In adjustable devices of the class described

embodying a fixed member and a movable member pivoted thereon, that improvement therein which comprises a pair of arch rails carried by the fixed member, a pair of gripping elements carried by the movable member disposed for movement in an arc concentric with the arch rails respectively and adapted to have gripping engagement therewith, resilient means carried by the movable member normally maintaining the gripping elements in gripping engagement with said arch rails, and means carried by the movable member for temporarily releasing the gripping engagement of the said elements on the arch rails against the action of said resilient means for relative movement of the fixed and movable members, said last mentioned means including a common mechanism for simultaneously actuating both gripping elements.

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