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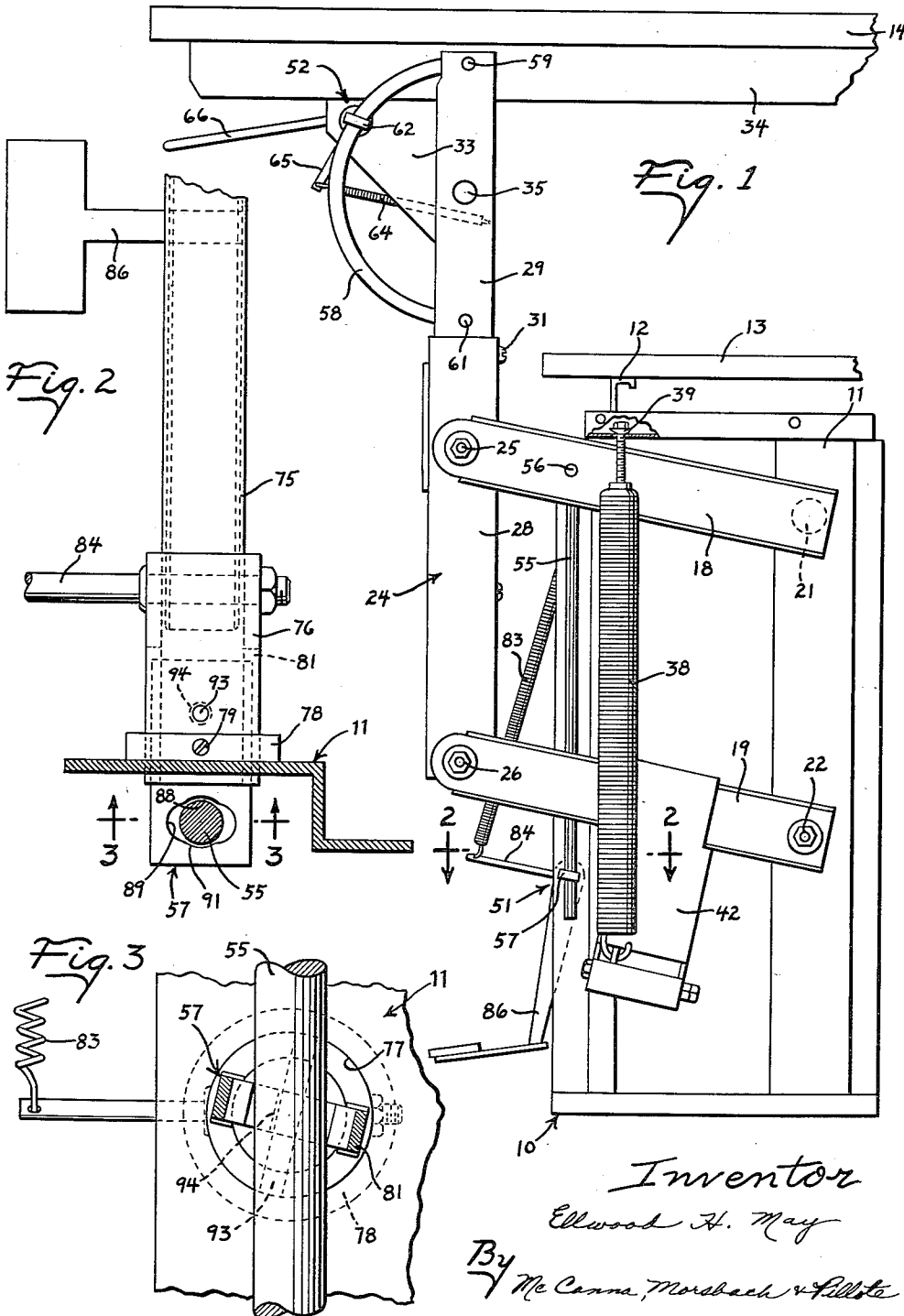
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3,079,726

LOCK MECHANISM FOR DRAFTING TABLE

Filed Feb. 17, 1961

2 Sheets-Sheet 1



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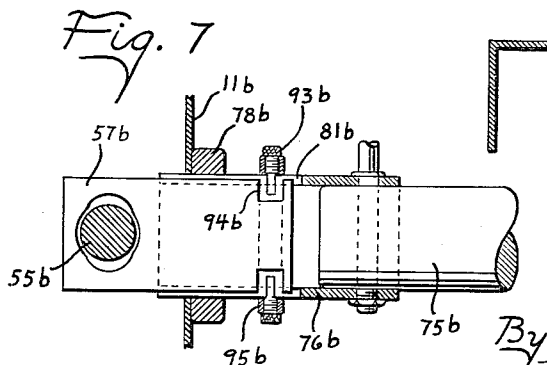
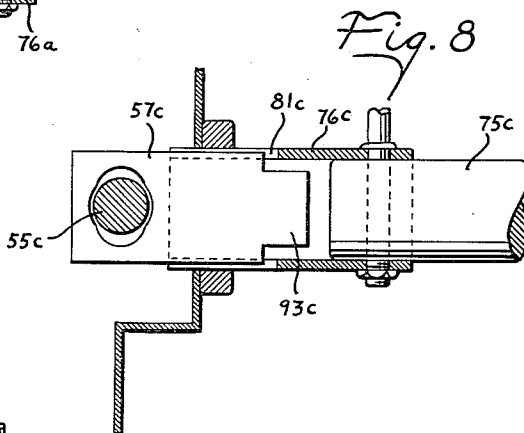
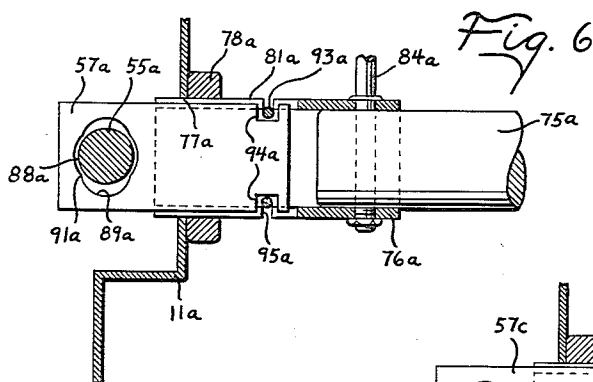
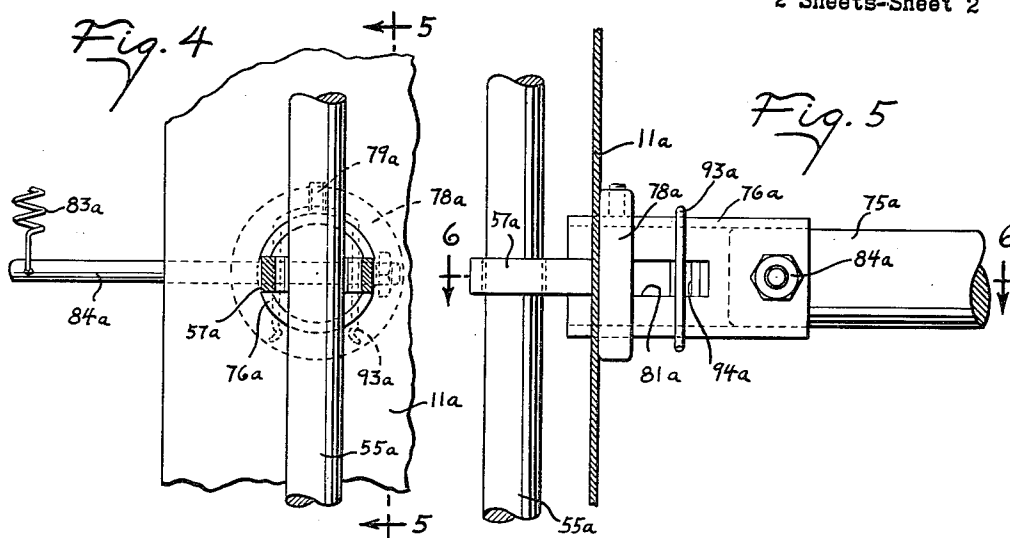
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LOCK MECHANISM FOR DRAFTING TABLE

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2 Sheets-Sheet 2



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3,079,726

LOCK MECHANISM FOR DRAFTING TABLE
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 11 Claims. (Cl. 45—131)

This invention relates to novel and useful improvements in adjustable drafting tables and particularly to a drafting table having an improved apparatus for locking the same in different adjusted positions.

An important object of this invention is to provide an adjustable drafting table having an improved apparatus for locking the table in any selected position and which permits smooth and substantially noiseless adjustment of the table between different positions.

Another object of this invention is to provide an adjustable drafting table including a locking bar and a locking block slidable on the bar and tiltable about its axis relative to the bar to lock the table in adjusted position, and which locking block is mounted in a manner to minimize wear and abrasion on the bar and block as they slide relative to each other during adjustment of the table.

A more particular object of this invention is to provide an adjustable drafting table in accordance with the foregoing object in which the locking block is mounted for free floating movement in a direction transverse to the direction of relative movement between the bar and the block to accommodate irregularities in the bar and to prevent rubbing or binding of the block on the bar during adjustment of the table.

Another object of this invention is to provide a locking mechanism for locking a drafting table in an adjusted position, and which locking mechanism is of simple and economical construction and which is reliable in operation.

These, together with various ancillary objects and advantages of this invention will be more readily appreciated as the same becomes better understood by reference to the following detailed description when taken in connection with the accompanying drawings wherein:

FIGURE 1 is a fragmentary side elevational view of a drafting table with the side panel removed and illustrating the adjustable support for the table;

FIG. 2 is an enlarged fragmentary horizontal sectional view taken on the plane 2—2 of FIG. 1 and illustrating the locking mechanism in its released position;

FIG. 3 is a fragmentary transverse sectional view taken on the plane 3—3 of FIG. 2;

FIG. 4 is a fragmentary vertical sectional view illustrating a modified form of locking apparatus;

FIG. 5 is a fragmentary vertical sectional view taken on the plane 5—5 of FIG. 4;

FIG. 6 is a horizontal sectional view taken on the plane 6—6 of FIG. 5;

FIG. 7 is a horizontal sectional view illustrating a further modified form of locking apparatus; and

FIG. 8 is a fragmentary horizontal sectional view illustrating still another form of locking apparatus.

The present application is a continuation-in-part of my copending application for "Adjustable Support for Drafting Table," Serial No. 767,713, filed October 16, 1958, now Patent No. 2,982,050. As disclosed in the aforementioned application, the drafting table includes a sup-

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port base 10 having side frame members 11 adjacent opposite sides thereof and crosspieces 12 extending between the side frame members to interconnect the same. In the drafting table illustrated, a fixed table top 13 is mounted to extend between the side members. A drafting board 14 is mounted on the base for vertical adjustment with respect thereto and also for limited lateral tilting movement. As shown, the drafting board is mounted for vertical adjustment by means of a pair of link members 18 and 19 which are pivotally attached at 21 and 22 to a respective one of the side members 11. The links are supported for swinging movement in a vertical plane and an upright member or post 24 is pivotally connected to the other side of the links 18 and 19, as by pivot pins 25 and 26, to form a parallelogram-type linkage. The post advantageously comprises two relatively adjustable sections 28 and 29 which are adjustably secured together by fasteners 31 to enable stepped adjustment of the elevation of the drafting board.

The drafting board 14 is mounted on the upright member or post 24 for swinging movement about a horizontal axis and, as shown, the drafting board has bracket members 33 secured to rails 34 on the underside of the drafting board, and which bracket members are pivotally mounted by pins 35 to the post 24 to support the drafting board for lateral tilting movement. As more fully disclosed and claimed in the aforementioned application, a spring type counterbalance is provided to facilitate elevating and lowering of the board. In general, the spring 38 is adjustably connected at its upper end 39 to the respective side member 11. The lower end of the spring 38 is connected to an arm 42 which extends laterally of the link 19. The point of attachment of the spring 38 to the arm 42 is spaced an appreciable distance below the longitudinal axis of the link 19 whereby the point at which the spring crosses the lower link can shift away from the pivot axis 22 of the lower link as the link swings upwardly to thereby increase the effective distance between the spring and the pivot point of the lower link. Thus, while the force or tension exerted by the spring 38 increases as the link 19 swings upwardly, the effective distance between the spring 38 and the pivot point of the lower link is increased so as to thereby compensate for the decrease in spring tension and to maintain a substantially uniform lift on the drafting board.

In accordance with the present invention, an improved locking apparatus 51 is provided for adjustably locking the drafting board in a preselected elevated position and a similar locking apparatus designated generally by the numeral 52 is provided for locking the drafting board in a preselected inclined position. In the embodiment illustrated, the locking mechanism 51 includes a locking bar 55 which is pivotally mounted at 56 to the upper link member 18. A locking block 57 is mounted on the side frame member 11 and is tiltable relative to the rod to lock the rod and the drafting board 14 in a preselected vertically adjusted position. The locking mechanism 52 also includes a locking bar designated 58 and, as shown, the locking bar 58 is in the form of a semi-circle and has end portions thereof attached at 59 and 61 to the upright member or post 24. A locking block 62 is mounted for turning movement in the bracket member 33 about an axis transverse to the locking bar. A spring 64 is attached to the bracket 33 and to an arm 65 for yieldably

turning the locking block 62 into its locked position, and a manually operable release lever 66 is provided for selectively moving the locking block 62 to its released position.

The construction and mounting of the locking block 57 for locking the drafting board in a vertically adjusted position is the same as that employed in constructing and mounting the locking block 62 which locks the drafting table in an inclined position and accordingly the construction and mounting of only one of the locking blocks designated 57 is herein illustrated and described in detail. As shown in FIGS. 2 and 3, the locking block 57 is mounted for rotation on a shaft 75 which extends crosswise between the side frame members 11 and has sleeves 76 at the ends thereof. Each sleeve 76 is rotatably supported in an opening or bearing 77 in the side frame member 11 and is constrained against axial movement by a collar 78 secured to the sleeve by a set screw 79. The sleeve has a diametrically extending slot 81 which opens at the end of the sleeve opposite the shaft 75 and which slidably receives the elongated generally flat locking block 57. The locking block is thus supported for rotation with the shaft 75, with the axis of the block substantially aligned with the axis of the shaft, and a spring 83 is attached to the outer end of a rod 84 connected to the shaft to yieldably turn the shaft in one direction into a locked position. A manual release lever, herein shown in the form of a foot treadle 86, is attached to the shaft for selectively turning the same in a relatively opposite direction to its released position.

As best shown in FIG. 2, the block 57 has an enlarged opening 88 therein having a diameter larger than the rod 55 and which slidably receives the same. Recesses 89 are advantageously formed at diametrically opposed sides of the opening 88 and have a width less than the diameter of the opening to form opposed pairs of cusps or points 91 which are arranged to engage the rod 55 when the block is tilted to lock the rod against relative movement.

In order to accommodate irregularities in the locking bar 55 and in the relative spacing between the bar and the sleeve as the link members are raised and lowered relative to the side frame members, provision is made for mounting the locking block 57 for free floating movement in a direction axially and crosswise of the sleeve. In the form shown in FIGS. 2 and 3, a pin 93 is attached to the sleeve 76 and extends crosswise of the slot 81 therein and through a relatively enlarged opening 94 in the locking block. The pin retains the locking block against accidental dislodgement from the slot and sufficient clearance is provided between the pin and the opening 94 in the block to permit limited axial and crosswise floating movement of the locking block relative to the sleeve and shaft. The block 57, at least in that portion which extends through the ring 78 and through bearing or opening 77 in the side frame member 11 is dimensioned narrower than the outer diameter of the sleeve 76 so that the collar and side frame members do not inhibit crosswise shifting of the lock. The locking block is therefore free to align itself with the bar 55 as the block and bar are moved relative to each other so as to minimize wear and abrasion as well as noise during adjustment of the drafting table. In addition, when the shaft 75 is turned about its axis and thereby tilts the locking block 57, the locking block can also shift sufficient to allow all four of the cusps 91 to substantially uniformly engage the bar 55 to lock the parts against relative movement. This floating movement of the locking block therefore allows the block to align itself with the bar to avoid wear during adjustment and to also provide more reliable locking of the relatively movable parts.

A somewhat modified form of locking mechanism is illustrated in FIGS. 4-6. This locking mechanism is generally similar to that shown in FIGS. 2 and 3 and like numerals followed by the sub-script *a* are utilized to designate corresponding parts. The embodiment of FIGS.

4-6 also includes a shaft 75_a having a sleeve 76_a at one end rotatably supported in the side frame member 11_a. The shaft is yieldably turned in one direction by means of a spring 83_a and rod 84_a and the sleeve has a slot 81_a therein which opens at the end of the sleeve and which slidably supports the locking block 57_a. A collar 78_a is secured to the sleeve and abuts against the side member 11_a to limit axial movement of the shaft relative to the side member. The locking block has an enlarged opening 88_a which loosely receives the bar 55_a and which opening has diametrically opposed recesses 89_a defining opposed pairs of cusps 91_a.

The locking block 57_a is supported for free floating movement in a direction axially and crosswise of the shaft within the slot 81_a and is constrained against axial detachment from the slot by means of a generally U-shaped pin 93_a. The pin 93_a straddles the sleeve 76_a and has leg portions thereof disposed in notches 95_a in the sleeve. The leg portions extend crosswise of the slot 81_a in the sleeve, adjacent opposite side edges thereof, and notches or openings 94_a are formed in opposite side edges of the locking block 57_a. As shown in FIG. 6, the notches 94_a loosely receive the legs of the pins 93_a so that the locking block can float axially as well as crosswise of the sleeve as required for alignment with the bar 55_a. The locking block, at least in the portion thereof extending through the opening 77_a and the collar 78_a, is dimensioned narrower than the opening so that the collar and side member 11 do not inhibit lateral floating movement of the locking block.

A further modified arrangement for retaining the locking block in the sleeve, while permitting free axial and crosswise floating thereof, is illustrated in FIG. 7. In this embodiment, the sleeve 76_b is attached to the shaft 75_b and has a collar 78_b thereon for limiting axial movement of the sleeve relative to the side frame member 11_b. The generally flat locking block 57_b is also slidably disposed in a slot designated 81_b in the sleeve and a second collar 95_b is disposed around the sleeve intermediate the ends of the slot. The collar has threaded pins 93_b thereon which project into the slot 81_b and into openings or notches 94_b in opposite side edges of the locking block. As in the previous embodiments, the locking block 57_b has a width less than the outer diameter of the sleeve to permit lateral floating movement of the locking block, and the notches 94_b loosely receive the pins 93_b to permit axial and crosswise shifting of the locking block relative to the locking bar 55_b.

In certain applications, the locking bar can be utilized to retain the locking block against dislodgement from the slot in the sleeve, so that it is not necessary to provide a separate means for preventing axial dislodgement of the locking block. Thus, the bar can be secured at opposite ends in the same manner as the arcuate bar 58, shown in FIG. 1. With this arrangement, there may be minor variations in the relative spacing between the locking bar and the shaft due to irregularities in the bar as the locking block slides along the bar. However, the variations are not sufficient to permit dislodgement of the block from the sleeve. Similarly, the straight bar such as 55 in FIG. 1 can be mounted so that it does not swing appreciably in a direction longitudinally of the locking shaft. In this event, the locking block designated need only be constrained against lateral movement out of the slot. As shown in embodiment of FIG. 8, a tongue 93_c is provided on the end of the locking block 57_c which tongue extends into the sleeve 76_c beyond the slot 81_c therein to limit lateral shifting movement. As will be noted, the tongue 93_c is smaller than the sleeve 76_c so as to permit limited lateral shifting of the block, as is necessary for alignment of the block with the bar 55_c. Thus, the block 57_c is also supported for limited axial and crosswise shifting relative to the sleeve 76_c and shaft 75_c.

From the foregoing, it is apparent that the locking blocks are mounted for turning movement with the re-

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spective shaft to thereby tilt relative to the respective locking bar and lock thereagainst. The locking blocks, however, are supported for free axial and lateral shifting movement relative to the respective shaft so as to accommodate variations in the spacing between the shaft and the bar, as the locking block and bar slide relative to each other, and to also facilitate shifting of the locking block during the locking operation so that the cusps on the locking block substantially uniformly engage the bar.

I claim:

1. In combination with a drafting table including a drawing board, first and second relatively movable members for adjustably supporting said board, means for locking said board in selectively adjusted positions comprising, a rod attached to said first member, bearing means on said second member, shaft means rotatably mounted in said bearing means on said second member for rotation about an axis transverse to said rod, a locking block having an opening loosely receiving said rod and operative when tilted relative to the rod to bind thereagainst and lock the rod and block against relative movement, means mounting said locking block on said shaft means in substantial alignment with the axis of the shaft means for turning movement therewith and for limited movement relative to the shaft means in a direction axially and crosswise of the shaft means to accommodate variations in the relative spacing between the rod and shaft means as said first and second members move relative to each other, means yieldably turning said shaft means in one direction about its axis to normally tilt the block relative to the rod and lock the members against relative movement, and manually operable means for selectively turning the shaft means in the opposite direction to release the rod.

2. In combination with a drafting table including a drawing board, first and second relatively movable members for adjustably supporting said board, means for locking said board in selectively adjusted positions comprising, a rod attached to said first member, bearing means on said second member, shaft means rotatably mounted in said bearing means on said second member for rotation about an axis transverse to said rod, said shaft means having a transverse slot at the end thereof adjacent said rod, a locking block having one end portion thereof slidably and non-rotatably disposed in said slot and having an opening therein loosely receiving said rod, means including said slot mounting said block on the shaft means for limited sliding movement relative to the shaft means in a direction axially and crosswise of the latter to accommodate variations in the relative spacing between said rod and shaft means as said first and second members move relative to each other, means yieldably turning said shaft means in one direction about its axis to normally tilt the block relative to the rod and lock said members against relative movement, and manually operable means for selectively turning said shaft means in the opposite direction to release said rod.

3. The combination of claim 2 wherein said block mounting means includes a pin mounted on said shaft means extending transverse to said slot, said locking block having an opening in said one end portion dimensioned larger than said pin to loosely receive the pin whereby to retain the block in the slot while permitting limited axial and crosswise movement of the block relative to the shaft means.

4. The combination of claim 2 wherein said block mounting means includes spaced pins mounted on said shaft and extending into said slot adjacent opposite side edges thereof, said block having openings in said one end portion at opposite side edges thereof dimensioned larger than said pins to loosely receive the pins whereby to retain the block in the slot while permitting limited axial and crosswise movement of the block relative to the shaft means.

5. The combination of claim 2 wherein said shaft

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means has notches in opposite side edges thereof intersecting said slot, said shaft mounting means including a U-shaped clip having spaced leg portions defining pins extending through said notches and crosswise of said slot adjacent opposite side edges of the latter, said block having openings in said one end portion at opposite side edges thereof dimensioned larger than said pins to loosely receive the pins whereby to retain the block in the slot while permitting limited axial and crosswise movement of the block relative to the shaft means.

6. The combination of claim 2 wherein said shaft mounting means includes a ring extending around said shaft means intermediate the ends of said slot, said block having a width at adjacent said ring which is narrower than said ring.

7. The combination of claim 6 including a pin attached to said ring and extending into said slot, said block having an opening in the side edge thereof dimensioned larger than said pin to loosely receive the latter.

8. In combination with a drafting table including a drawing board, first and second relatively movable members for adjustably supporting said board, means for locking said board in adjusted position comprising, a rod attached to said first member, bearing means on said second member, shaft means rotatably mounted in said bearing means on said second member for rotation about an axis transverse to said rod, said shaft means including a sleeve portion on the end thereof, said sleeve portion having a transverse slot in the end thereof adjacent said rod, a locking block slidably and non-rotatably disposed in said slot and having an opening therein loosely receiving said rod, means including said slot loosely mounting said block on the shaft means for limited sliding movement relative to the sleeve portion in a direction axially and crosswise of the sleeve portion to accommodate variations in the relative positions of said rod and shaft means as said first and second members move relative to each other, means yieldably turning said shaft means in one direction about its axis to normally tilt the block relative to the rod and lock said members against relative movement, and manually operable means for selectively turning said shaft means, in the opposite direction to release the rod.

9. The combination of claim 8 wherein said block mounting means includes a tongue on the end of said block remote from said opening therein and projecting into said sleeve portion beyond the slot, said tongue to retain said block in the slot while permitting limited axial and crosswise shifting movement of the block relative to the sleeve portion.

10. In combination with a drafting table including a drawing board, first and second relatively movable members for adjustably supporting said board, means for locking said board in selectively adjusted positions comprising, a rod having a round cross-section attached to said first member, bearing means on said second member, shaft means rotatably mounted in said bearing means for rotation about an axis transverse to said rod, a locking block having an opening therein loosely receiving said rod, said opening including a generally circular hole dimensioned larger than said rod to loosely receive the same and a pair of diametrically opposed recesses having a width less than said hole and intersecting the same to define opposed pairs of cusps engageable with the rod, to bind thereagainst when the block is tilted relative to the rod, means mounting said locking block on said shaft means in substantial alignment with the axis of the shaft means for turning movement therewith and for limited movement relative to the shaft means in a direction axially and crosswise of the shaft means to accommodate variations in the relative spacing between the rod and shaft means as said first and second members move relative to each other, means yieldably turning said shaft means in one direction about its axis to normally tilt the block relative to the rod and lock the members against relative movement, and manually operable means for selectively

turning the shaft means in the opposite direction to release the rod.

11. The combination of claim 1 wherein said opening in said block is defined by an enlarged circular hole for loosely receiving said rod and a pair of diametrically opposed recesses intersecting said hole at opposite sides of the axis of the shaft means and having a width at the intersection with said hole which is less than the diameter of said hole to define cusps engageable with said rod to

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lock the same against movement when the block is tilted relative to the rod.

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