April 18, 1933. A. W. KEUFFEL 1,904,899

DRAWING BOARD

Filed Nov. 28, 1931

FIG.1.

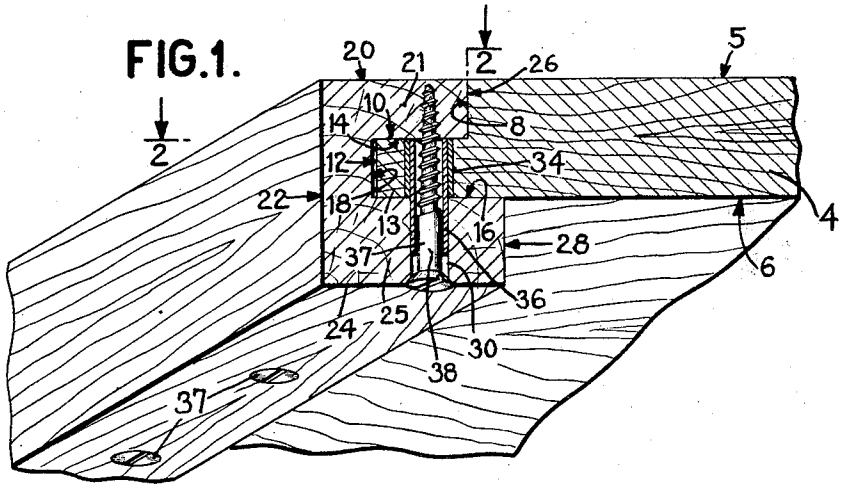


FIG.2.

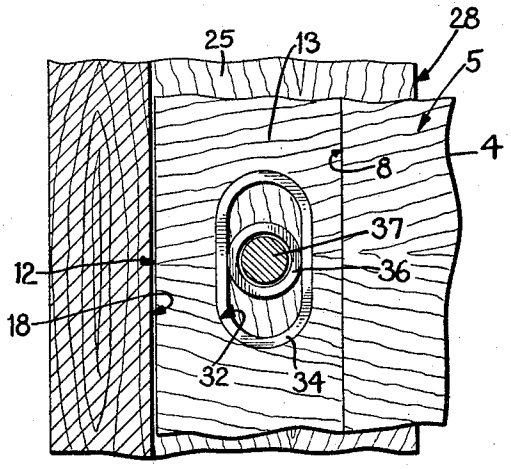
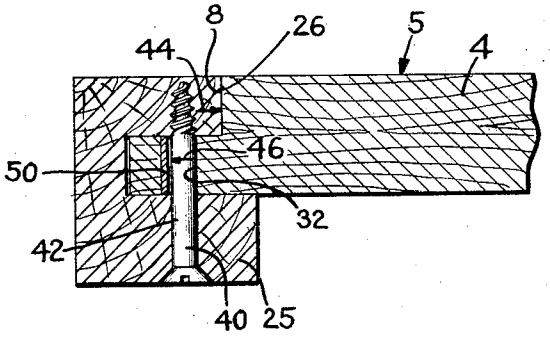


FIG.3.



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UNITED STATES PATENT OFFICE

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DRAWING BOARD

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This invention relates to furniture construction and more particularly to the construction of drawing boards, drafting tables and the like in which one or more edges or cleats are adapted to guide a T-square or other drawing instrument. These cleats also serve as means for keeping the board flat.

The edge of such a board must be durable, so that it will not be worn by the friction with the co-operating edge of the T-square and it must be hard so that its edge will always be straight and will not warp out of shape or become mutilated by objects knocking against it. On the other hand, the surface of the drawing board must be of a soft material so as to receive thumb tacks holding the drawing material in place and also so as to form a proper supporting surface for the paper over which the drawing pen travels.

It has heretofore been proposed to form the top of a drawing board of white pine or similar relatively soft wood, the grain of which, of course, generally runs in the long direction of the board. This top is bordered at one or both ends, transverse to the grain of the top, with an end cleat of maple or other relatively harder wood. Such cleats have been fastened to the top with screws. The top expands and contracts with respect to the cleat in a direction usually transversely to the direction of expansion and contraction of the cleat, and to a different degree. The screws are passed through elongated holes in the cleat to permit such relative movement.

In some prior constructions, the screws have been passed through the end cleat into the end of the top in the direction of the end grain. Such construction was not durable because the soft end grain of the wood into which the screws were threaded, did not afford a secure base for the screw threads and readily became mutilated so that the screws sometimes pulled out of the top or became loosened therein.

The present invention has for an object a connection between the end cleat and the top of a drawing board which shall avoid mutilation of the softer material.

The invention also seeks a construction in which the means securing the parts together cannot readily work loose therefrom.

In accordance with the invention, in its broadest aspect, the securing means fastening the parts together are seated in the harder material of the end cleat and provision is made in the softer material for relative movement between the securing means and the softer material. More particularly, the softer material is formed with a passage for each securing means, which passage is elongated in the direction of the expansion of the softer material, so that no strain is placed thereon in its expansion and contraction.

The invention also seeks to prevent wear of the softer material where it comes in contact with the securing means. To this end, the passage in the softer material is preferably separated from the harder material of the securing means by wear resistant material, as by lining the passage, at least in part, with a metal plate or bushing.

It is also an object of the invention to prevent damage to the threads of the screw or other securing means. Accordingly, threaded securing means may be surrounded by a bushing which seats within the elongated opening, or bushing therein, in the softer material and prevents contact therewith.

The invention also seeks a construction which overcomes the strain on the softer material in a separation of the parts and to this end the softer material is clamped between portions of the harder material and the securing means is relied upon to clamp the parts together.

Another object of the invention is to prevent separation of the parts by a shearing action at the joint therebetween. Accordingly, a portion of one of the parts underlies a portion of the other part.

The invention also has to do with a construction which is practical from the standpoint of ease and cheapness of manufacture and convenience and durability in use.

In carrying the invention into effect, in its preferred embodiment, the top is formed along one edge with a tongue which is received in a groove in an end cleat and screws passing freely through holes in one wall of

the groove and through registering holes in the tongue are threaded into the other wall of the groove. The tongue may thus be clamped within the groove by drawing the walls of the groove together on the tongue by means of the screws. The holes in the tongue are preferably elongated to permit relative movement between the top and the screws, and to prevent wear of the material of the tongue, the holes may be lined, respectively, with elongated bushings. Similarly, to prevent wear of the screw threads, the screws may be surrounded with bushings which are within the first named bushings and enter the holes in the cleat.

These and other objects of the invention and the means for their attainment will be more apparent from the following detailed description, taken in connection with the accompanying drawing illustrating various embodiments by which the invention may be realized, and in which:—

Figure 1 is a fragmentary view, partly in vertical section and partly in perspective, through the end cleat and top of a drawing board, taken at one of the securing means.

Figure 2 is a horizontal sectional view taken in the planes indicated by the broken line 2—2 in Figure 1 and looking in the direction of the arrows.

Figure 3 is a view similar to Figure 1, but showing a modification of the invention in which the securing means is provided with a plane surface where it comes in contact with the softer material of the top to avoid mutilation.

Referring to the drawing, Figure 1 shows a fragmentary portion of a drawing board at one of its shorter edges. The top is indicated at 4. By the term "top" it is intended to denote the board or surface to which the drawing paper or the like is secured, as by thumb tacks. This top 4 is usually formed of some soft material, such as white pine, which will readily receive thumb tacks holding the drawing paper to its upper surface 5. The lower surface of the top is indicated at 6.

This top 4 is formed with a rebate along at least one edge, usually one of the shorter edges, as the board is generally oblong. This rebate is defined by a vertical edge 8 set inwardly from the outer marginal surface of the top and extends downwardly from the upper surface 5 for a material distance, for instance, approximately half the thickness of the top 4, and a surface 10 which lies in a plane parallel to and intermediate the top and bottom surfaces 5 and 6. The extreme outer edge portion of the top below the rebate is indicated by the numeral 12 and the material below the rebated part forms a tongue 13. Generally the grain of the top runs parallel to the longer dimension of the board, that is, the end surface 12 lies in a plane transverse to the grain.

The end edge of a drawing board must be hard and durable so that it will retain its straight shape and form a guide, say, for a T-square. Accordingly, an end cleat of relatively harder material, such as hard wood, for instance, maple, is secured to the edge of the top 4.

The end cleat is formed, preferably, with a horizontally extending preferably rectangular groove defined by the upper surface 14 and the lower surface 16 and a bottom 18. The vertical dimension of the groove between the surfaces 14, 16 is substantially equal to the vertical dimension of the tongue 13 between the surface 10 and the bottom surface 6 of the top but the depth of the groove from the surface 26 to the bottom 18 is preferably somewhat greater than the corresponding dimension of the tongue 13.

The groove may be considered to define ledges forming the sides of the groove, the upper ledge being indicated at 21 and the lower ledge at 25. The upper surface of the upper ledge 21 is indicated at 20 and lies substantially in the plane of the top surface 5, the end surface of the cleat is indicated at 22 and the bottom surface of the lower ledge 25 is indicated at 24. On the side of the cleat opposite the end surface 22, the inner surface of the upper ledge is indicated at 26. When the two parts, cleat and top, are assembled, the surface 26 of the upper ledge 21 abuts the surface 8 of the top. The lower ledge 25 extends inwardly beneath the top 4 further than the upper ledge 21 so as to underlie the top 4. It thus extends beyond the plane including the surfaces 8 and 26, which is the plane in which the tongue 13 might be broken off from the top 4 by shearing stresses and thus the lower ledge 25 resists such shearing stresses.

The bottom ledge 25 of the end cleat is formed at predetermined points with holes 30. The tongue 13 is formed with holes 32, in register with these holes 30. Securing means such as screws 37 pass through these holes 30 and 32 and are seated in the upper ledge 21. As has been pointed out, the top 4 is subject to expansion and contraction in a direction transverse to the grain of the top and parallel to the longitudinal axis of the cleat. The holes 32 in the tongue 13 are elongated in the direction transverse to the grain so that relative movement of the top 4 is permitted in that direction, with respect to the cleat.

To prevent the securing means from damaging the relatively softer material of the top 4, the holes 32 on their diameter on the longer dimension of the board are sufficiently greater than the diameter of the holes 30 so as to receive a bushing 34 of wear resistant material. This bushing 34 is preferably elongated in cross section to permit such rel-

ative movement and is conveniently made of metal.

Such bushings 34 may be found, in some situations, to damage the threads of the screws 37, they being preferably wood screws and therefore, as shown, after the parts are assembled, each hole 30 is provided with a sleeve or bushing 36, preferably circular in cross-section, which passes at least partly through the hole 30 and through the bushing 34 to abut against the lower surface 14 of the top ledge 21. Thus the bushing 36 bears on the shank 38, of the screw 37, and is guided or held against displacement into contact with the threads not only by its fit in hole 30 but also by bushing 34, if desired.

Preferably, the sleeve 36 is of a length such that when abutting the surface 14 of the upper ledge 21, it does not extend to the bottom surface 24 of the lower ledge 25 so that the hole 30 may receive in part, at least, the head of the wood screw 37 and the screw be thus substantially countersunk within the marginal surface 24.

When the parts are secured together, as illustrated in Figure 1, wood screws 37 are passed through the holes 30 within the bushing 36 and are seated or threaded into the ledge 21. When the head of the screw thus bears against the bottom surface 24 of the end cleat, the two ledges 25 and 21 are drawn together, clamping between them the tongue 13, thus securely holding the parts together while permitting expansion of the top 4 in the direction of its shorter dimension by reason of the elongated slots 32.

In Figure 3 there is illustrated a modification of the invention in which the elongated slot 32 receives a plain or unthreaded portion 40 of a screw 42. Thus there are no threads to injure the softer wood. By reason of the taper of the threaded portion of the screw, when the parts are in clamping engagement a force is exerted as indicated by the arrow 44 by the end 26 pressing against the face 8. The reaction of the shank of the screw to this force 44 is indicated by the arrow 46 and causes the shank 42 to bear only against the left hand side of elongated slot 32, as viewed in Figure 3. Hence it is only necessary, if desired, to provide that side of the elongated slot with wear resistant material, as indicated at 50. This material 50 may be a plate of metal.

It will thus be seen that means are provided, in a drawing board or the like, which prevents separation of the hard and soft materials at the joint while at the same time the securing means is seated solely in the hard material and wear of the soft material is in great measure avoided, particularly where a wear resistant means is interposed between the securing means and the softer material.

Various modifications will occur to those skilled in the art in the composition and configuration of the co-acting and component elements of this invention, and no limitation is intended by the phraseology of the foregoing specification or illustrations in the accompanying drawing except as indicated in the appended claims.

What is claimed is:—

1. In a device of the character described, in combination, a top having a tongue along at least one edge thereof, at least one end cleat formed with a groove to receive a tongue, and means seated in the respective sides of the groove and drawing the sides of the groove together to clamp the tongue therebetween.

2. In a device of the character described, in combination, a top having a tongue along at least one edge thereof, at least one end cleat formed with a groove to receive a tongue, and means passing freely through the wall on one side of the groove and seated in the other wall of the groove to draw the walls of the groove together to clamp the tongue therebetween.

3. In a device of the character described, in combination, a top having a tongue along at least one edge thereof, at least one end cleat formed with a groove to receive a tongue, and means passing freely through the wall on one side of the groove and passing freely through the tongue and seated in the other wall of the groove to draw the walls of the groove together to clamp the tongue therebetween.

4. In a device of the character described, in combination, a top formed with a tongue along at least one edge, at least one end cleat formed with a groove defining spaced ledges, said groove receiving the tongue, at least one hole in one of the ledges, at least one hole formed in the tongue in register with said hole, and securing means passing through the holes and secured in the other ledge, said hole in the tongue being greater in at least one dimension than the corresponding dimension of the securing means.

5. In a device of the character described, in combination, a top formed with a tongue along at least one edge, at least one end cleat formed with a groove defining an upper and a lower ledge, said groove receiving a tongue, at least one hole in the lower ledge, at least one hole formed in the tongue in register with said hole, and securing means passing through the holes and secured in the upper ledge, said hole in the tongue being greater in at least one dimension than the corresponding dimension of the securing means.

6. In a device of the character described, in combination, a top formed with a tongue along at least one edge, at least one end cleat formed with a groove defining spaced ledges, said groove receiving the tongue, at least one hole in one of the ledges, at least one

hole formed in the tongue in register with said hole, and securing means passing through the holes and secured in the other ledge, one of said holes being greater in at least one dimension than the corresponding dimension of said securing means.

7. In a device of the character described, in combination, a top formed with a tongue along at least one end, at least one end cleat formed with a groove to receive a tongue, said groove defining upper and lower ledges, one of said ledges being formed with a plurality of holes, said tongue being formed with elongated holes in register, respectively, with the holes in the ledge, the major axis of said holes being substantially parallel to the longitudinal axis of the cleat, and threaded securing means passing through the holes and seated in the other ledge.

8. In a device of the character described, in combination, a top formed with a tongue along at least one end, at least one end cleat formed with a groove to receive a tongue, said groove defining upper and lower ledges, one of said ledges being formed with a plurality of holes, said tongue being formed with elongated holes in register, respectively, with the holes in the ledge, the major axis of said holes being substantially parallel to the longitudinal axis of the cleat, a bushing passing through the holes, and threaded securing means passing through the holes and seated in the other ledge.

9. In a device of the character described, in combination, a top formed with a tongue along at least one end, at least one end cleat formed with a groove to receive a tongue, said groove defining upper and lower ledges, one of said ledges being formed with a plurality of holes, said tongue being formed with elongated holes in register, respectively, with the holes in the ledge, the major axis of said holes being substantially parallel to the longitudinal axis of the cleat, a bushing within the hole in the tongue, and threaded securing means passing through the holes and seated in the other ledge.

10. In a device of the character described, in combination, a top formed with a tongue along at least one end, at least one end cleat formed with a groove to receive a tongue, said groove defining upper and lower ledges, one of said ledges being formed with a plurality of holes, said tongue being formed with elongated holes in register, respectively, with the holes in the ledge, the major axis of said holes being substantially parallel to the longitudinal axis of the cleat, a bushing within the hole in the tongue, a bushing within the hole in the cleat and entering the bushing in the tongue, and threaded securing means passing through the holes and seated in the other ledge.

11. In a device of the character described, in combination, a top formed with a tongue along at least one end, at least one end cleat formed with a groove to receive a tongue, said groove defining upper and lower ledges, one of said ledges being formed with a plurality of holes, said tongue being formed with elongated holes in register, respectively, with the holes in the ledge, the major axis of said holes being substantially parallel to the longitudinal axis of the cleat, a bushing within the hole in the tongue, a bushing within the hole in the cleat and entering the bushing in the tongue, and a screw passing through the last named bushing and threaded into the other ledge.

12. In a device of the character described, in combination, a top formed with a tongue along at least one edge, at least one end cleat formed with a groove defining spaced ledges, said groove receiving the tongue, at least one hole in one of the ledges, at least one hole formed in the tongue in register with said hole, securing means passing through the holes and secured in the other ledge, said hole in the tongue being greater in at least one dimension than the corresponding dimension of the means, and wear resisting means between the material of the tongue and at least one side of said means.

13. In a device of the character described, in combination, a top of relatively soft material formed along at least one edge with a rebate defining a tongue, at least one end cleat of relatively harder material formed with a groove to receive a tongue, said groove being of greater depth than the width of the tongue, defining an upper ledge to be received in the rebate and a lower ledge of greater width to underlie the top inwardly of the tongue, a plurality of holes formed in the lower ledge, a plurality of elongated holes formed in the tongue in register with the holes in the ledge, respectively, the major axis of said last named holes being substantially parallel to the longitudinal axis of the cleat, wear resistant material lining the hole in the tongue, a bushing of wear resistant material within the hole in the tongue and extending at least part way into the hole in the cleat, and a wood screw passing through the last named bushing and threaded into the upper ledge to clamp the tongue between the ledges.

14. In a device of the character described, in combination, a top of relatively soft wood formed along at least one edge, across the grain, with a rebate defining a tongue rectangular in cross-section, at least one end cleat of relatively harder wood formed with a groove, rectangular in cross-section, to receive a tongue, said groove being greater in depth than the corresponding dimension of the tongue and defining an upper ledge to be received in the rebate and a lower ledge, said lower ledge being wider than the upper ledge to underlie the top inwardly of

the tongue, a plurality of holes formed in the lower ledge, a plurality of elongated holes formed in the tongue, the major axis of the ledge being substantially transverse to the grain of the wood of the top, metal bushings, respectively, lining the holes in the tongue, metal bushings disposed, respectively, in the first named bushings and extending at least part way into the holes in the lower ledge and screws passing through the last named bushings and threaded into the upper ledge to clamp the tongue between the ledges.

15. In a device of the character described, in combination, a top formed with a tongue along at least one edge, at least one cleat formed with a groove to receive a tongue, said groove defining spaced ledges, one of said ledges being wider than the other to overlie the top inwardly of the groove, and means drawing the ledges together to clamp the tongue therebetween.

16. In a device of the character described, in combination, a top formed with a tongue along at least one edge, at least one cleat formed with a groove to receive a tongue, said groove being greater in depth than the corresponding dimension of the tongue, said groove defining spaced ledges, one of said ledges being wider than the other to overlie the top inwardly of the groove, and means drawing the ledges together to clamp the tongue therebetween.

In testimony whereof I affix my signature.

ADOLF W. KEUFFEL.