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DRAFTING INSTRUMENT

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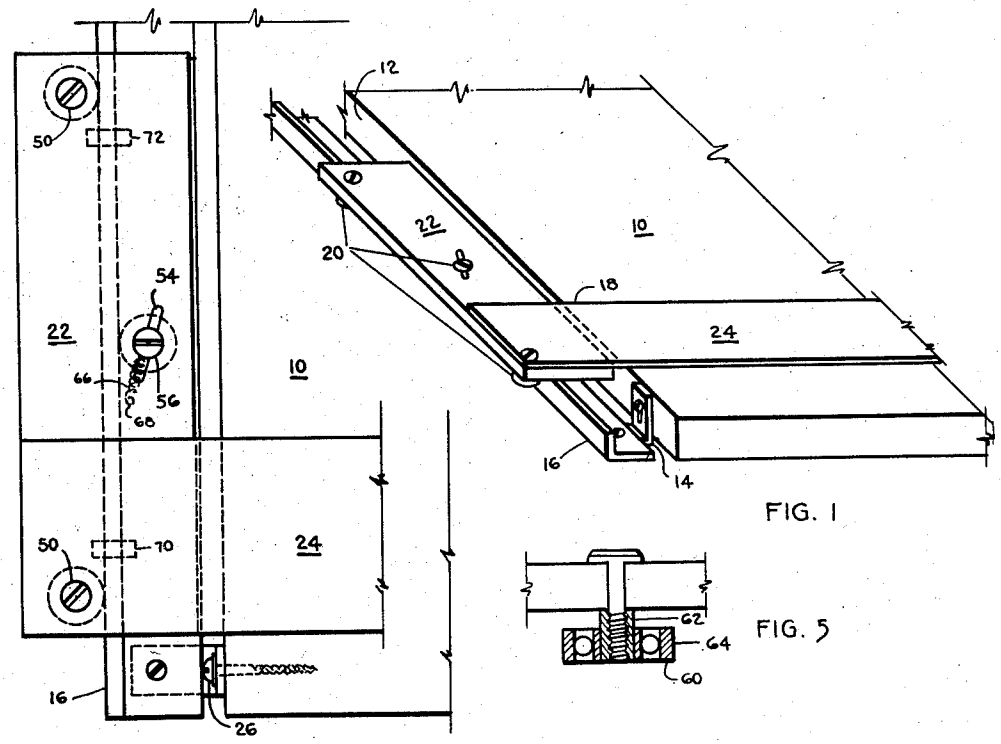


FIG. 1

FIG. 2

FIG. 5

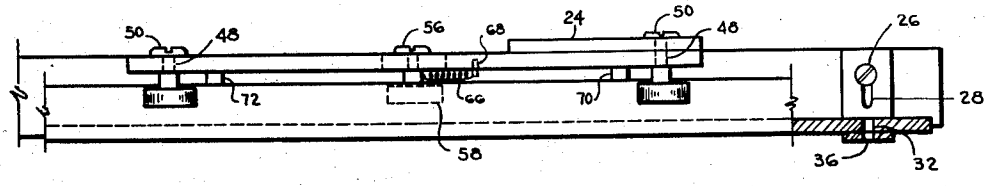


FIG. 3

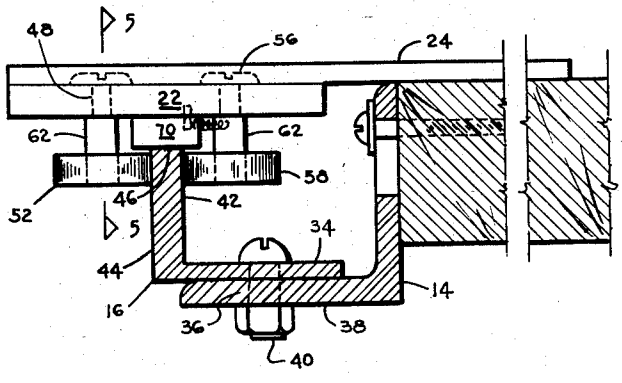


FIG. 4

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DRAFTING INSTRUMENT

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13 Claims. (Cl. 33—76)

The present invention relates to drafting devices and more particularly to a drafting instrument that incorporates a higher pairing means positioned on a mounting head which will be used in combination with a guide rail affixed to a drafting board to facilitate accurate parallel movement of a straight edge blade extending normally from the mounting head.

One of the objects of the present invention is to provide a drafting instrument, commonly referred to as a T-square, with a freely movable and guided straight edge blade when in normal use on a drafting board.

Another object of the present invention is to provide a mounting head of a drafting instrument with a bearing mechanism that will be freely movable along a guide rail during normal use and also one which may be readily removed from the guide rail.

Still another object of the present invention is to provide a drafting instrument which will be capable of free but guided movement between drafting board extremities.

Yet another object of the present invention is to provide the combination of a T-square in which the straight edge blade is joined to the mounting head adjacent one end of each and a bearing mechanism is provided on the mounting head which will associate with a guide rail affixed to a drafting table or board to maintain parallelization of the straight edge blade during use.

A further object of the present invention is to provide a drafting instrument with a bearing mechanism mounted on the head portion of the instrument which will constantly urge contact with a guide rail affixed to a drafting board in order to assure continuous parallelization of a straight edge blade during movement.

Still another object of the present invention is to provide a drafting instrument which may be readily detachable from a restrained guided parallel movement and be made available for positioning at any angle on the drafting board.

Further objects and advantages of this invention will be apparent from the following description taken in conjunction with the accompanying drawing in which like characters of reference designate corresponding parts throughout the several views and wherein:

Fig. 1 is a perspective view of a drafting instrument embodying the present invention as attached to a drafting board;

Fig. 2 is an enlarged partial plan view of the present invention;

Fig. 3 is an enlarged end elevational view of the mounting head portion of the drafting instrument and the bearing mechanism associated therewith in combination with a guide rail;

Fig. 4 is a greatly enlarged side view illustrating the mounting head portion and the bearing mechanism in engagement with a guide rail;

Fig. 5 is an enlarged detail sectional view taken substantially along the line 5—5 of Fig. 4.

Referring to the drawings there is broadly illustrated in Fig. 1 a drafting board 10 to which side edge 12 an

adjustable angle bracket 14 is attached to support a guide rail or track member 16 on which a drafting instrument or T-square 18 is retained when engaged by a bearing mechanism 20 supported on the underside of the mounting head 22 so that parallel positions of the straight edge blade 24 may be maintained while the instrument is traversed along the drafting board.

For the purposes of this description reference to higher pairing is to be construed as straight line or point bearing contact as distinguishable from lower pairing which is plane or surface contact, and also where conventionally a T-square is referred to it shall be sufficiently broad to encompass an L-shaped construction or modification thereof.

The right angle guide rail 16 is laterally spaced from the side edge 12 of the drafting board by a suitable number of vertically adjustable rail supporting brackets 14 (only one shown), each of which is retained in position by the fastening screw 26 passing through an elongated hole 28. Longitudinally spaced holes 32 on the horizontal leg 34 of the guide rail 16 coincide with holes 36 in the projecting leg portion 38 of the bracket 14 to receive a fastening bolt 40 therein in order to maintain the rail 16 in parallel relation with and adjacent to the board edge 12. The vertical surfaces 42 and 44 of the guide rail 16 are sufficiently true to maintain parallelization of the straight edge blade 24 at any position of T-square movement. The top surface 46 of the rail is also sufficiently straight so that the straight edge blade will rest evenly on the top surface of the drafting board once the guide rail is fixed in position.

The drafting instrument or T-square, best illustrated in Figs. 2 and 3, comprises a mounting head portion 22 which is essentially a unitary planar surface, a straight edge blade portion 24, and higher pairing means 20 for facilitating movement of the drafting instrument along the board surface. In a preferred embodiment the end of the straight edge portion 24 is mounted adjacent to the end of the head portion 22 to form substantially an L-shaped instrument, thus facilitating use adjacent to the lower portion of the drafting board. In some instances it will be preferred that the guide rail 16 reach or extend beyond the top and bottom edges of the board in order to permit greater instrument traverse to the board extremities.

Preferably, but not necessarily, the blade or straight edge blade portion 24 and the mounting head portion 22 are to be made of a transparent plastic material and where the materials are suitable they may be fused or cemented together. However, other conventional fastening means may be employed to provide rigidity between the two members whether the members are of plastic material or other materials.

Spaced axially along the mounting head 22 and through one end of the blade 24 is a pair of bolt holes 48 through which bearing assembly bolts 50 are passed to receive on the underside of the mounting head the bearing assemblies 52. Laterally spaced from the line extending through the holes 48 and intermediate thereof is an angularly disposed slotted opening 54 for receiving the bearing assembly bolt 56 on which the bearing assembly 58 is retained. The lateral spacing between the pair of holes 48 and the slotted opening 54 is sufficient to accommodate the guide rail 16 therebetween.

Since the components in each of the bearing assemblies 52 and 58 are identical it will suffice to describe but one such unit in detail. As is illustrated in Fig. 5 the bearing assembly consists of a precision roller bearing 60 that is press fit onto the internally threaded bushing 62. Bushing 62 is of sufficient length to provide suitable clearance between the underside of the mounting head 22 and the bearings so as to permit free rotation of the

outer machined cylindrical raceway 64. In the embodiment shown, by providing the roller bearings with a smooth cylindrical outer raceway both the positioning and removal of the drafting instrument on the guide rail is greatly facilitated.

Although the instrument will function properly by setting the intermediate bearing assembly 58 in a fixed position by clamping the bolt 56 permanently, it has been found in some applications to be desirable to provide a biasing spring 66 which will constantly urge all the bearing assemblies into engagement with the guide rail surfaces 42 and 44. The spring 66 is retained at one end by the stud 68 fastened to the underside of the head portion adjacent the slotted opening and the other spring end is hooked to the bushing 62.

It is intended that sufficient tension will be exerted by the spring 66 on the bearing assembly 58 to maintain all the bearing assemblies in contact with the rail surfaces 42 and 44. However, it will be readily appreciated that a camming device or other known mechanical expedients may be substituted in place of the spring biasing means in order to apply the requisite engaging contact between the rail surfaces and the bearing elements while still retaining the advantages of a quickly releasable unit.

Vertical pads 70 and 72 are longitudinally spaced and fastened to the underside of the mounting head so as to engage and rest on the top surface of the guide rail to maintain vertical alignment therebetween. Where required, it is contemplated that suitable felt wipers (not shown) may be supported from the mounting head to contact and clean the bearing engaging surfaces.

During normal operation the drafting instrument may be manipulated merely by moving the blade 24 transversely across the board without regard to the mounting head 22 being displaced from the rail 16. At such times when the long blade of the instrument is to be at an angular disposition the mounting head need only be raised vertically to remove the instrument from the guide rail. The straight edge blade may then be placed in the desired position with a minimum of effort. To replace the instrument on the rail it is only necessary to slip the guide rail between the bearing mechanism or to slide the bearing assembly bolt 56 sideways to provide sufficient space for receiving the guide rail between the bearing assemblies 52 and 58.

It will be obvious that many modifications and variations may be made in the construction and arrangements of the bearing means and the other phases of the present inventive concept in the light of the above teachings without departing from the real spirit and purpose of this invention. Such rearrangement of parts, and alternatives as well as the use of mechanical equivalents to those herein illustrated are reasonably included and modifications are contemplated.

What is claimed is:

1. In combination with a drafting board and a guide rail supported adjacent a side of the drafting board, said rail having vertical parallel bearing surfaces and a level top surface normal to the parallel surfaces, a transparent T-square comprising a mounting head portion and a straight edge blade portion, said straight edge blade portion being affixed normally to the head portion adjacent one end of each, said head portion having mounted thereon a plurality of cylindrical rotatable bearing elements on the underside of the head portion and mounted to rotate about a vertical axis and each of the elements lying in the same plane, two of said elements being linearly spaced axially from each other and so arranged to make rolling contact with one of the rail bearing surfaces, and a third element spaced intermediate the other two elements to engage the other vertical rail surface, biasing means to urge the bearing elements into rail contact, and pads mounted on the underside of the head portion to contact the level surface of the rail to position the bearing elements adjacent the top of the rail whereby the T-square may be removed vertically from rail engagement.

2. In combination with a stationary guide rail having straight vertical elongated parallel sides mounted to a side of a drafting board, a T-square having a planar mounting head portion and a straight edge blade, said straight edge blade being affixed normally to the head portion adjacent one end of each, said head portion having rotatable bearing elements spaced axially on the underside of the head portion, a pair of said spaced apart elements engaging one side of the guide rail and a third element of said elements intermediate the pair of elements engaging the other side of the rail, biasing means cooperatively engaging said third element to urge constant contact between the rail sides and the elements as the blade is manipulated along the board, and pads spaced apart on the underside of the planar head portion to position the bearing elements adjacent the top of the rail to facilitate vertical raising of the T-square for removal from the rail.

3. In combination with a stationary guide rail having vertical bearing surfaces affixed in spaced relation to a side of a drafting board, and L-shaped drafting instrument having a unitary planar head portion and a transparent straight edge blade portion, said head portion having a pair of cylindrical rotatable bearing elements directly mounted on the underside of the head portion to cooperatively engage the guide rail, two of said elements being axially spaced from each other to make rolling contact in higher pairing contact with one side of the rail and a third element directly mounted on the underside of the head portion and spaced intermediate and laterally from the other two elements to engage the other side of the rail, and means cooperatively engaged with said third element to urge constant contact between the rail bearing surfaces and the bearing elements.

4. In combination with a stationary guide rail mounted to a side of a drafting board, a T-square comprising a planar head portion and a straight edge blade portion mounted at one end of and normal to the head portion axis, said head portion having directly mounted thereon a plurality of higher pairing elements for releasably engaging the guide rail, one of said higher pairing elements having means associated therewith for urging constant contact of the pairing elements with the rail, and pads for spacing the head portion a suitable distance above the guide rail.

5. In combination with a stationary guide rail mounted to a side of a drafting board, a T-square comprising a unitary planar head portion and a straight edge blade portion mounted at one end of and normal to the head portion axis, said head portion having higher pairing elements for releasably engaging the guide rail, a pair of said higher pairing elements engaging one side of the guide rail, a single higher pairing element on the other side of the guide rail and means for urging said single higher pairing element into engagement with the guide rail.

6. In combination with a drafting board having a guide rail with vertical bearing surfaces mounted in spaced relationship with an edge of the board, a T-square comprising a unitary planar mounting head portion and a straight edge portion, said head portion having directly mounted thereon a pair of linearly spaced apart cylindrical roller bearings mounted to rotate about a vertical axis on the underside of the head portion to engage tangentially one side of the guide rail and a single cylindrical roller bearing normally spaced from a line joining the pair of linearly spaced bearings and intermediate thereof to engage the other side of the guide rail, and pads for spacing the head portion a suitable distance above the guide rail and whereby the head portion may be disengaged from the rail directly by a vertical lifting action.

7. A drafting device substantially as described comprising a planar mounting head portion and a straight edge blade portion, said straight edge blade portion being affixed normally to the head portion adjacent one end of each, said head portion having cylindrical rotatable bearing elements directly mounted on the underside thereof and each of the elements being mounted to rotate about a vertical axis, two of said elements being axially spaced from each other and so constructed and arranged to making rolling contact with one side of a rail, and a third element spaced intermediate the other two elements on the underside of the head portion to engage an opposite side of a rail, biasing means cooperatively engaging one of the elements to urge the bearing elements into rail contact, and pads mounted on the underside of the head portion to position the drafting device suitably on the rail.

8. In a drafting device of the character described comprising a unitary planar mounting head portion and a straight edge portion, said straight edge portion being affixed normally to the head portion at one end of each, said mounting head portion having cylindrical roller bearing elements directly mounted on the underside thereof, each of said bearing elements being free to rotate about a vertical axis during movement of the drafting device by roller bearing element contact with a rail, two of said bearing elements being axially spaced from each other to contact one side of a rail and a third of said bearing elements positioned intermediate the other bearings and spaced laterally therefrom a suitable distance to accommodate a rail therebetween, and biasing means associated with said third bearing element to maintain bearing and rail contact.

9. In a drafting device of the character described comprising a planar mounting head portion and a transparent straight edge blade portion, said straight edge portion being affixed normally to the head portion, said head portion having a pair of cylindrical roller bearings spaced apart on the underside of the head portion to contact one side of a guide rail and a higher pairing element intermediate the bearings and laterally spaced therefrom to contact an opposite side of a guide rail from the bearings whereby the drafting device may be vertically raised for removal from the guide rail, and pads for spacing the head portion a suitable distance above a guide rail.

10. For use with a drafting straight edge blade, a mounting head consisting of a unitary elongated planar base having a pair of cylindrical rotatable bearing elements axially spaced apart and mounted on the underside of the mounting head on a line parallel to the longitudinal axis, a third cylindrical rotatable bearing element intermediate and laterally spaced from the pair of bearing elements on the underside of the head, the lateral spacing between the pair and third element being such as to accommodate a guide rail member therebetween, and biasing means for urging said third bearing element transversely toward the longitudinal axis of the head

11. For use with a drafting straight edge blade, a planar mounting head comprising an elongated planar base, a pair of cylindrical rotatable bearings axially spaced and mounted on the underside of the base on a line parallel to the longitudinal axis and a third cylindrical rotatable bearing intermediate and laterlly spaced from the pair of bearings to accommodate a guide rail therebetween, all of said bearings being mounted to rotate about a vertical axis, and pads to space the mounting head a suitable distance above the guide rail and whereby the head may be raised vertically for removal from a guide rail.

12. In combination with a stationary guide rail mounted to a side of a drafting table, an L-square drafting instrument comprising a planar head portion and a straight edge blade portion being mounted normally to the head portion adjacent one end of each, a plurality of cylindrical rotatable bearing elements in spaced relation to each other directly mounted on the underside of the planar head portion for rotation about a vertical axis, all of said bearing elements lying substantially in the same plane, two of said elements being spaced linearly from each other for bearing contact with one side of the guide rail, and a third bearing element mounted on the underside of the head portion and spaced intermediate the other two elements and laterally therefrom to engage an opposite side of the guide rail, means associated with said third bearing element for urging all bearing elements into rail contact, said head portion having a recess therein for guiding the third bearing element for sliding resilient movement between limits and whereby the head portion may be raised vertically for removal from the rail.

13. In combination with a stationary guide rail mounted to a side of a drafting table, a T-square comprising a unitary planar head portion and a straight edge blade portion mounted at one end of and normal to the head portion axis and a plurality of higher pairing elements directly mounted on the underside of the planar head portion for releasably engaging the guide rail, one of said higher pairing elements being adjustable relative to the other elements thereby facilitating direct vertical removal of the head portion from the rail.

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