

July 19, 1966

L. R. BLAKE

3,261,099

DRAWING AID

Filed May 7, 1964

3 Sheets-Sheet 1

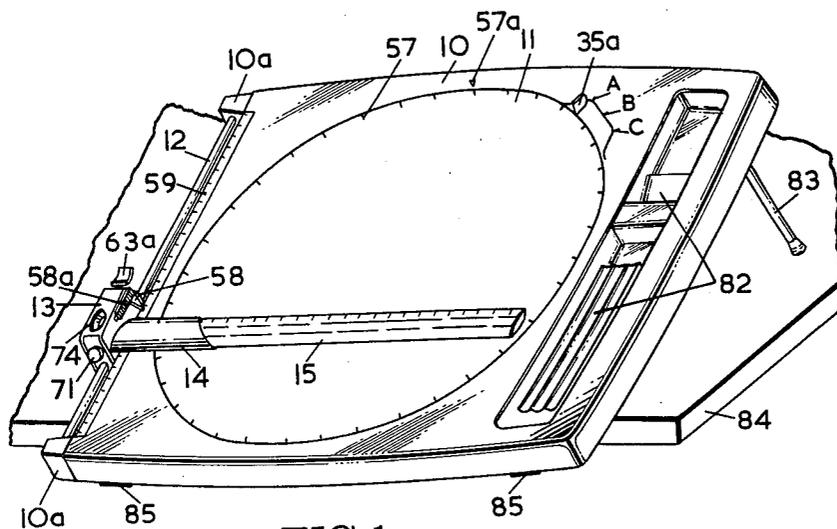


FIG. 1.

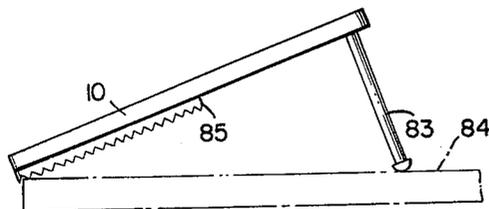


FIG. 7

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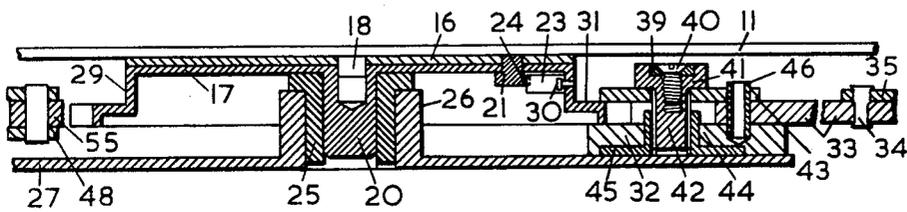


FIG. 2

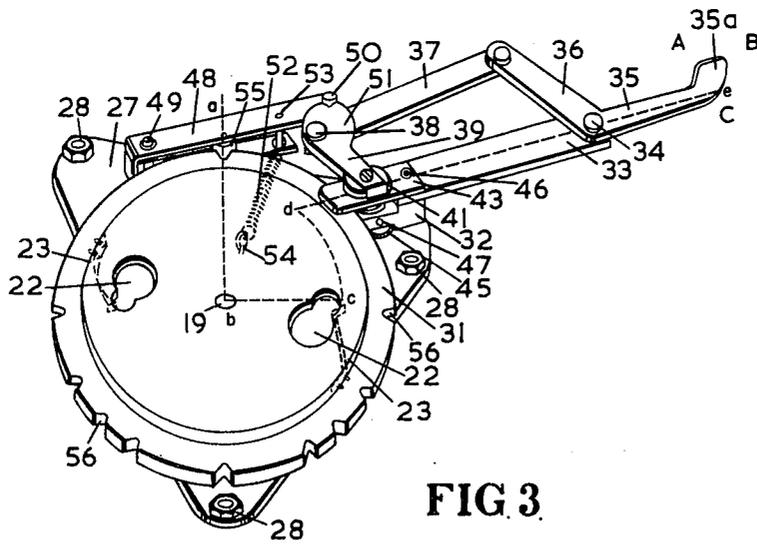


FIG. 3

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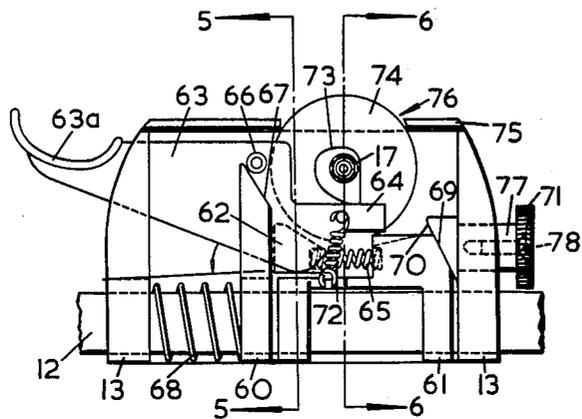


FIG. 4.

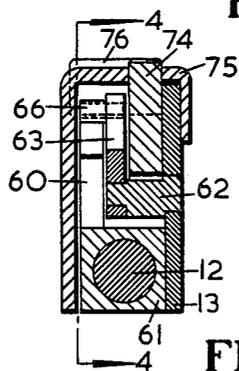


FIG. 5.

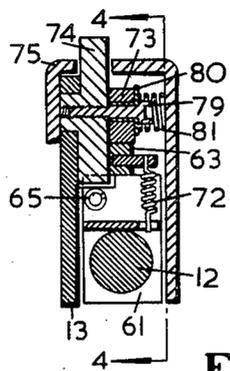


FIG. 6.

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DRAWING AID

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This invention relates to equipment used for preparing drawings or sketches.

The most common and simple method of draughting involves the use of drawing board, T square, set squares and a protractor. More complex draughting equipment is available whereby the T square is replaced by rules with mechanical linkage to maintain the rule parallel during movement across the board and which permits the rule to be rotated through a measurable angle in a convenient manner. Draughting equipment of this type suffers from a number of disadvantages in that the draughtsman has to change his position when drawing vertical lines or when lettering when this is other than horizontal, also at certain angles the rule causes shadows which partially obscure the work, also the rule brushes over the paper and tends to smudge, particularly with a soft pencil or India ink, also very small movements of the rule are difficult to make, for example in hatching or in precision drawing. It is the object of this present invention to mitigate these disadvantages.

According to the invention apparatus, for use in preparing a drawing, includes a table which is for supporting a sheet on which the drawing is to be made and is rotatively supported from a frame provided, in a position laterally clear of the table, with a rectilinear guide for a slide which pivotally supports, on an axis parallel to the guide, one end of a rule so that it extends, perpendicularly with respect to the guide, across and in contact with the sheet for the ruling of a line on the latter, but can be swung upwardly about its axis during an adjustment of the slide along the guide, or during a rotation of the table to avoid smudging the drawing.

According to a feature of the invention the frame pivotally supports a control lever connected by a link to the outer end of an arm adapted to operate a clamp for holding the table against rotation when the control lever has been operated to one side of a neutral position, and the frame pivotally supports one end of a bar which is biased for a cam-follower at its opposite end to engage a cam surface formed at the outer end of the said arm such that when the control lever has been operated to the opposite side of its neutral position the bias will cause a roller, supported from the bar in a position intermediate its ends, to run on the periphery of a circular flange fast with the table and to enter a notch in the flange for resiliently locating the table in a particular rotational position.

In such a case, and according to a further feature the circular flange fast with the table has a series of notches around its periphery for selective engagement by the roller for resiliently locating the table in any one of a plurality of commonly required rotational positions.

Also in such a case, and according to a still further feature the cam surface of the said arm is provided with a notch for engagement by the cam-follower when the said arm is in an angular position corresponding to the neutral position of the control lever whereby resiliently to maintain the latter in that position.

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According to yet another feature the slide includes a hollow main slide, with end walls between which are arranged a locking slide and a release slide, a manually-operable lever pivoted from the main slide and having between its fulcrum and the release slide means biasing the latter into engagement with the leading end wall of the main slide, and the lever provided with a follower for a cam surface on the locking slide such that when the lever is depressed against a bias into engagement with a stop the locking slide is caused to bind on the guide and the main slide and release slide are caused to advance along the guide a distance which is a function of the amplitude of movement of the lever and the angle of the cam surface, and that when the lever is released to be returned by its bias to its initial position, a spring reacting between the trailing end wall of the main slide and the locking slide causes the latter to move along the guide into its original relative position with respect to the release slide.

In such a case, and according to a further feature the release slide bears on a stop supported from the leading end wall of the main slide, the operative position of the stop being adjustable whereby to control the distance the main slide will be moved along the guide at each operation of the lever.

The above mentioned features enable a draughtsman to work on a drawing without having to change his position to any material extent because the drawing can be rotated into any desired position relatively to him. Moreover, he is enabled to draw uniformly-spaced hatching lines at any desired angle.

In the accompanying drawings:

FIGURE 1 is a top perspective view of one form of apparatus in accordance with the invention;

FIGURE 2 is a cross-section through the rotatable table, and its support shown in FIGURE 1, the section being on the line a-b-c-d-e in FIGURE 3;

FIGURE 3 is a perspective view of means for rotating the table shown in FIGURE 1;

FIGURE 4 is a longitudinal section through the guide and slide shown in FIGURE 1 for supporting and moving the rule but drawn to a larger scale, the plane of the section being indicated by the line 4-4 of FIGURE 6;

FIGURE 5 is a section on the line 5-5 of FIGURE 4;

FIGURE 6 is a section on the line 6-6 of FIGURE 4, and

FIGURE 7 is a side edge view of a board shown in FIGURE 1 illustrating how it can be supported in an inclined position on a table.

Referring firstly to FIGURE 1 the apparatus comprises a board 10 acting as a frame on which is rotatively supported a circular table 11, and at one side of the frame is a guide rod 12 along which can be positioned a slide 13 provided with a carrier 14 for a rule 15 such that the rule can either rest on a sheet of drawing paper secured to the table or be lifted angularly out of contact therewith as hereinafter described.

The table 11, which may be overlaid with graduated markings of any convenient spacings such as a square graduated grid or a triangular grid to facilitate isometric drawing, is detachable in the example illustrated so that it can be substituted by another with different markings. For this purpose, and as can best be seen from FIGURES 2 and 3, the table has a rigid disc 16 fast with its underside for attachment to a turn-table 17. The disc has a central dowel 18 which engages in a cylindrical recess

19 of a hub 20 of the turn-table, and it also has two studs 21, one only of which is shown in FIGURE 2, for locking engagement with respective key-hole openings 22 in the turn-table. To place the table in position the dowel and studs are respectively entered in the recess 19 and the wider portions of the key-hole openings, and then the table is rotated relatively to the turn-table to bring the studs into the narrower portions of the key-hole openings, in which position they are held by respective leaf springs 23 anchored to the turn-table so that their free ends snap into indentations 24 in the sides of the studs.

The hub 20 of the turn-table is journaled in a bush 25 which seats in a boss 26 of a triangular sub-frame member 27 secured to the main frame as by bolts 28. It will therefore be seen that the table and turn-table are locked together.

The turn-table has an integral depending annular skirt 29 (to which the springs 23 are anchored at 30) terminating in an annular flange 31. This flange coacts with the means shown in FIGURE 3 for holding the turn-table against rotation when in a desired rotational position, as will now be described.

Just beyond the periphery of flange 31 of the turn-table, sub-frame member 27 supports a block 32, and fast with this block is a radially-extending arm 33. A bell-crank lever is pivoted at 34 from the outer end of arm 33, one arm 35 of the bell-crank lever acting as a control lever with an up-turned end 35a extending above the board 10, and the other arm 36 being pivoted to one end of a link 37. The opposite end of the link is pivoted at 38 to the outer end of a cam-arm 39 having its inner end secured by a screw 40 in a diametral slot in the head 41 of a clamp-operating screw. The stem 42 of the latter extends through a clamping plate 43 and into an internally screw-threaded hub 44 of an adjustment wheel 45. The clamping plate is secured at one end to arm 33 by a screw 46 which secures the latter to block 32, and the opposite end portion of the clamping plate overlies turn-table flange 31.

In the position shown in FIGURE 3 clamping plate 43 is clear of flange 31 and the turn-table is therefore free to rotate, but if control lever 35 is moved from position "B" to position "C" in the figure clamping screw 41, 42 is turned clockwise to urge the plate into frictional engagement with the flange, as shown in FIGURE 2, so as to lock the turn-table against rotation. The reaction on the clamping screw is taken by the engagement of adjustment wheel 45 with the bottom of the recess in block 32 in which it is mainly accommodated, but as shown in FIGURE 3 a part of the wheel extends beyond the block so that it can be turned for adjusting the clamping pressure. A grub screw 47 engaged in the block locks the clamping screw in its adjusted position.

One end of a bar 48 is pivoted at 49 from sub-frame member 27, and at its other end it has a follower 50 which is biased into engagement with the edge of the cam 51 of cam-arm 39 by a tension spring 52 secured between an anchorage 53 on the bar and an anchorage 54 on the sub-frame member. Between its ends bar 48 rotatively supports a roller 55, and in the neutral position "B" of control lever 35 shown in FIGURE 3 the roller is held clear of the periphery of turn-table flange 31. However, on moving the control lever counter-clockwise to position "A" cam 51 is moved relatively to follower 50 and allows spring 52 to draw roller 55 on to the periphery of flange 31. The roller can then coact with notches 56 in the flange to locate the turn-table resiliently in a selected position. The notches are disposed for enabling the turn-table to be located quickly at such commonly used angles as 30 deg., 45 deg., 60 deg. and 90 deg. either side of a zero datum. These angular markings, and others at which the turn-table can be set by use of the clamp are preferably calibrated on table 11 as indicated at 57 for coaction with an index marking 57a as shown in FIGURE 1.

It will be seen that with control lever 35 in its central, neutral position "B" the turn-table can be turned freely in either direction to a desired position which can be set by index marking 57, and that a subsequent movement of the control lever to position "C" locks the turn-table in the adjusted position. If, on the other hand, the turn-table is to be set quickly at one of the commonly used angles for which the notches 56 cater, the control lever is moved to position "A" and the turn-table is rotated by hand until roller 55 "clicks" into the selected notch.

In order to set position "C" accurately, cam 51 is provided with a notch in which cam-follower 50 will engage under the action of spring 52.

The slide 13, carrier 14 and rule 15 shown in FIGURE 1, in conjunction with the guide rod 12 constitutes a hatching unit by the use of which parallel lines can be drawn on a sheet secured to the table 11. It is important that the slide can be indexed accurately for providing uniform spacing of the hatching lines, that the indexing mechanism can be adjusted to vary the spacing of the hatching lines, that the slide can be accurately positioned along the guide rod, that the slide can be moved freely in either direction along the guide rod, and that the rule can be raised from the sheet so as to avoid smudging the drawing when the position of the slide along the guide rod, or the rotational position of the table is adjusted. For these purposes the hatching unit preferably takes the form now described with reference to FIGURES 1, 4, 5 and 6.

The slide, which is indicated generally at 13 in FIGURE 1 is, as previously stated, movable along guide rod 12, and the latter has its ends supported in lugs 10a of the board 10. The guide rod is of circular cross-section so that the slide can also pivot on it for enabling the rule 15 to be raised from the sheet. The slide is provided with an index finger 58, adjustable relatively to a scale 58a on the slide, to coact with a scale 59 secured to the adjacent marginal portion of the board 10 so as to enable the rule to be moved along the guide, and the rule, which can be graduated at both edges on both sides, is slidably received in carrier 14 so as to enable a particular graduation marking on the rule to be aligned with a line on the drawing. A grub-screw, not shown, can be used for clamping the rule in a longitudinally adjusted position in carrier 14.

The slide 13, as shown more particularly in FIGURES 4 to 6, contains two further slides. One of these, marked 60, is a locking slide, and the other, marked 61, is a release slide. The slide 13, hereinafter called the main slide, and slides 60 and 61 all have a sliding fit on rod 12. Main slide 13 has pivoted from it at 62 an operating lever 63 having a finger-operable portion 63a, and toe portion 64, and an abutment surface for one end of a compression spring 65 of which the other end acts on a surface of the release slide 61. The operating lever also carries a pin or roller 66 which is adapted to act on a ramp 67 of the locking slide 60 in an off-set position, as shown in FIGURE 5, when the portion 63 of the lever is depressed. The locking slide 60 is normally biased axially towards the release slide by a compression spring 68, and compression spring 65 normally biases an oblique end surface 69 of the release slide 61 into engagement with a correspondingly oblique surface 70 on a part fast with a hatch release disc 71. A tension spring 72 interconnects the operating lever and the release slide to bias the portion 63 of the lever to its upper position, and the main slide rotatively supports a shaft bearing a cam 73 and a graduated wheel 74. The main slide 13 has a cover 75 with a window opening 76 through which an upper arc of wheel 74 extends.

Release disc 71 is made fast with a plunger 77 working in a bore of the main slide by a screw 78, and the inner end of the plunger has an enlarged head on which the oblique surface 70 is formed. Spring 65 normally keeps the said enlarged head abutted to the adjacent surface of the main slide, with the plunger 77 fully extended.

In the position shown, cam 73 is holding lever 63 against depression of portion 63a, and spring 68 is urging locking slide 60 along rod 12 for its ramp 67 to engage roller 66 on lever 63. In these conditions the assembly of slides is free to be slid towards the left of FIGURE 4, or downwardly in FIGURE 1. However, an attempt to move the said assembly of slides towards the left of FIGURE 4, or upwardly in FIGURE 1, would result in roller 66 bearing laterally on ramp 67, and owing to the said roller and ramp being off-set with respect to the axis of rod 12 the locking slide would be caused to bind on the latter. If it is desired to move the assembly of slides freely to the left of FIGURE 4 axial pressure is applied to release disc 71 which then, through interengaging oblique surfaces 69 and 70, urges release slide to the left when it will abut locking slide 60 and move it to the left, against spring 68, for its ramp 67 to disengage from roller 66. By rotating release disc 71 to cause oblique surfaces 69 and 70 to rotate relatively, the release slide can be held in the releasing condition. This shows how the assembly of slides can be slid freely in either direction.

To index the rule 15 for the successive ruling of equispaced, parallel hatch lines, graduated wheel 74 is rotated counter-clockwise in FIGURE 4 until the appropriate graduation registers with a datum edge of window 76. This rotates cam 73 to provide clearance from toe portion 64 of the lever, and enables the lever to be depressed through a predetermined arc. Spring 72 biases lever portion 63a to its uppermost position with the toe portion 64 engaging the top of release slide 61 to act as a stop. If, now, lever portion 63a is depressed roller 66 will first press on ramp 67 to cause locking slide 60 to bind on rod 12, and further depression of the lever to the extent set by cam 73 will move the main slide positively to the right of FIGURE 4. During that movement compression spring 65 will cause release slide 61 also to move to the right with oblique surfaces 69 and 70 maintaining contact with each other. In this way rule 15 is fed laterally a predetermined distance. On releasing lever portion 63a spring 72 returns it to its uppermost position and in doing so removes the pressure of roller 66 on ramp 67. This withdraws the off-set binding force and permits compression spring 68 to act axially on the locking slide to cause it to follow up to the release slide and resume their original relative positions. A succeeding operation of the lever will move the rule laterally by the same amount so as to enable hatching lines to be drawn at equal intervals.

It will be seen that cam 73 is clamped to wheel 74 by the head of a screw 79 with a friction-promoting ferrule 80 between them. This enables the cam to be adjusted into agreement with a datum marking on the wheel. Alternatively to the screw 79, use could be made of a compression spring 81 to promote the frictional engagement.

Further features of the apparatus include the provision of the recesses 82 shown in FIGURE 1 for holding pens, pencils and other drawing instruments, and a pair of in-folding legs 83 for supporting the board from a bench 84 at a desired inclination. For this latter purpose the board, as shown in FIGURES 1 and 7, can also have a pair of parallel strips 85 of some resilient material on its underside, the strips being provided with spaced transverse notches or ribs to engage the front edge of the bench for allowing the angle of inclination to be increased.

What I claim as my invention and desire to secure by Letters Patent of the United States is:

1. Apparatus, for use in preparing a drawing, comprising a circular table for supporting a sheet on which the drawing is to be made, said table provided with notches in its periphery, a rectangular frame, means rotatively supporting said table at its centre from said frame, a control lever pivotally supported from said frame, a clamping member supported from said frame, screw-operated means for moving said clamping member into clamping relationship with said table, an arm extending radially from said screw-operated means, a link interconnecting said

arm and said control lever to move said clamping member into its clamping position when said control lever is actuated to one side of a neutral position, a bar pivotally supported at one end from said frame, a cam surface at the outer end of said arm, a cam-follower at the other end of said bar, a roller pivoted from said bar intermediate the ends of said bar, means biasing said cam-follower on to said cam, said cam when said control lever is at the other side of the neutral position permitting said roller to engage the periphery of said table and to enter a notch when brought into registration by a rotation of said table, a rectilinear guide of circular cross-section supported from said frame parallel to a side edge thereof in a position laterally clear of said table, a slide movable along said guide, and a rule supported from said slide to extend perpendicularly from said guide to over-lie said table, said slide rotatable on said guide so that said rule can be raised clear of the sheet.

2. Apparatus according to claim 1 in which the cam surface has a notch to be engaged by the follower for locating the control lever in the neutral position.

3. Apparatus, for use in preparing a drawing, comprising a circular table for supporting a sheet on which the drawing is to be made, a rectangular frame, means rotatively supporting said table at its centre from said frame, a rectilinear guide of circular cross-section supported from said frame parallel to a side edge thereof in a position laterally clear of said table, a slide movable along said guide, and a rule supported from said slide to extend perpendicularly from said guide to over-lie said table, said slide rotatable on said guide so that said rule can be raised clear of the sheet, said slide comprising a main slide, a locking slide and a release slide, said main slide being hollow and having end walls, a manually-operable lever pivoted from said main slide, an adjustable stop to limit depression of said lever, means situated between the lever pivot and said release slide to bias the latter into engagement with the inner face of one of the end walls of said main slide, means situated between the inner face of the other end wall and said locking slide to bias the latter towards said release slide, said locking slide provided with a ramp off-set from the axis of said guide, said lever provided with a roller to engage said ramp when said lever is depressed firstly to tilt said locking slide into binding engagement with said guide and then to feed said main slide and said release slide a distance along said guide determined by the position of said adjustable stop, said locking slide becoming unlocked by a subsequent return of said lever to its initial position and being moved by its bias into its original position relatively to said release slide.

4. Apparatus, for use in preparing a drawing, comprising a circular table for supporting a sheet on which the drawing is to be made, a rectangular frame, means rotatively supporting said table at its centre from said frame, a rectilinear guide supported from said frame parallel to a side edge thereof in a position laterally clear of said table, a slide movable along said guide, a rule supported from said slide to extend perpendicularly from said guide to over-lie said table, said rule supported to be movable about an axis parallel to said guide whereby it can be raised clear of the sheet, a pair of legs pivotally supported from the underside of said frame and adjacent a top edge thereof, said legs laterally spaced from each other and having their pivot axes at right-angles to the edge of the frame so that they can be swung from a position in which they lie flatly against the underside of said frame to a position in which they will support said frame in an inclined position, and a pair of rubber-like strips secured to the underside of the frame, said strips being laterally spaced and at right-angles to the top edge of the frame, and said strips formed with transverse corrugations for selective engagement with the front edge of a bench on which the frame is supported whereby to

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enable the angle at which the frame is held inclined by the legs to be increased.

References Cited by the Examiner

UNITED STATES PATENTS

Re. 24,927	1/1961	Shelly	-----	33-78	X
870,224	11/1907	Burbank et al.	-----	33-80	X
1,277,962	9/1918	Longvist	-----	33-81	

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1,843,824	2/1932	La France	-----	33-78	
2,627,323	2/1953	Larson	-----	33-76	X
3,163,939	1/1965	Heyer	-----	33-76	

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