April 22, 1941. I. W. HICKS 2,239,323

DRAFTING INSTRUMENT

Filed June 22, 1939

FIG. 1.

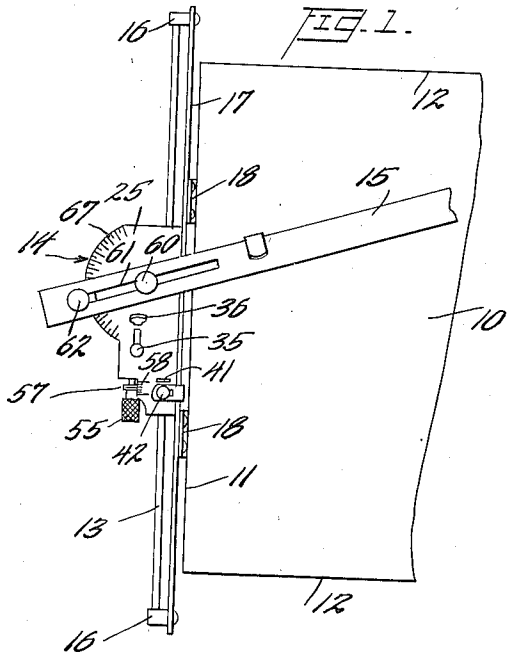


FIG. 2.

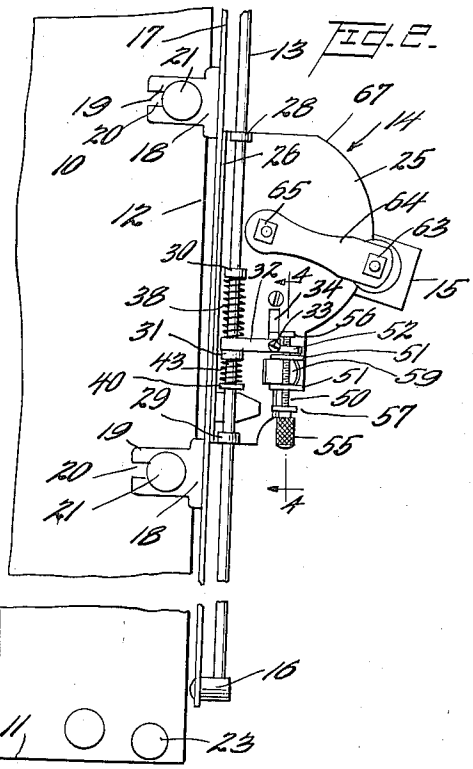


FIG. 3.

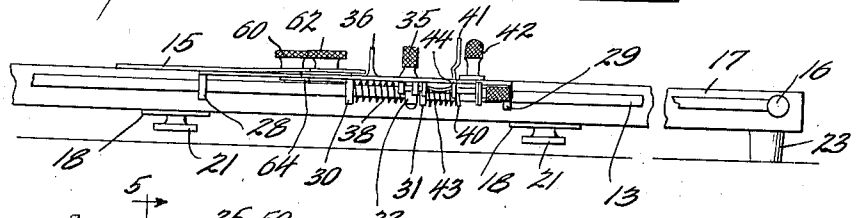


FIG. 4.

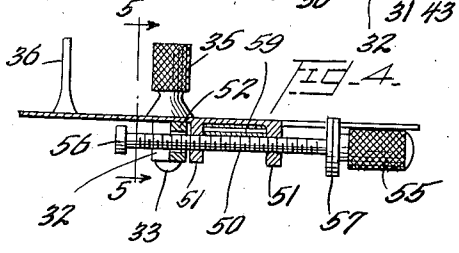
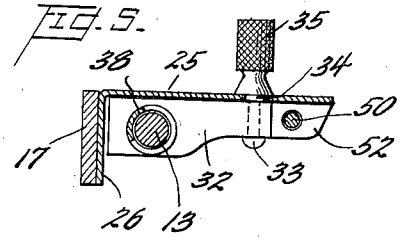


FIG. 5.



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DRAFTING INSTRUMENT

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8 Claims. (Cl. 33—81)

This invention relates to drafting instruments and more particularly to such instruments provided with means for giving a ruling straightedge a step-by-step movement whereby accurate cross-hatching, section-lining, ruling, and the like may be effectively, quickly, and simply carried out.

The invention is illustrated in use on a more or less conventional drawing board, but it will be understood that an equally as important use will be in connection with mimeoscopes, those under-lighted devices used in the preparation of drawings, charts and the like on stencils for mimeograph and like machines.

An important feature of the invention resides in the combination of a guide rod or track removably mounted along any edge of a drawing board or the like and a carriage arranged to travel on and above this rod and to have its upper surface substantially clear and flush with that of the drawing board whereby it may carry a pivoted straight edge adapted to move over the surface of the carriage in its angular adjustments.

Another important feature of the invention resides in the carriage structure, the upper portion of which is a sheet metal plate supporting, housing and obscuring the working parts of the apparatus except for two operating knobs or levers which extend through the plate to permit ready manipulation of the same for stepping along the guide rod or track.

Another feature of the invention consists in the use of a threaded and headed rod mounted parallel to the guide rod and beneath the carriage, the head forming an adjustable stop to determine the advance of the carriage at each step and the opposite end of the rod being provided with a knurled knob, exposed at the edge of the carriage, for cooperation with a graduated scale on the carriage for indicating the extent of each step.

Other and further features and objects of the invention will be more apparent to those skilled in the art on a consideration of the accompanying drawing and following specification wherein is disclosed a single exemplary embodiment of the invention with the understanding that such modifications and variations may be made therein as fall within the scope of the appended claims without departing from the spirit of the invention.

In said drawing:

Figure 1 is a plan view of the drafting instrument constructed according to the present invention shown as applied to the end of a fragment of a conventional drawing board;

Figure 2 is a bottom plan view of the same on a somewhat larger scale mounted on the long side of the same board and illustrating the stepping mechanism as well as the devices for attaching the whole instrument to the board;

Figure 3 is a side elevation looking from the left in Figure 1;

Figure 4 is a sectional view on an enlarged scale taken on line 4—4 of Figure 2 looking in the direction of the arrows; and

Figure 5 is a section at right angles to that of Figure 4 taken on line 5—5 of that figure.

The usual procedure in drafting is to make use of a rectangular board to which the paper is attached, to provide a T-square having a head which slides along one edge of the board, and a blade at right angles thereto whereby horizontal lines may be drawn and to use, along the upper edge of this blade one or more angles for drawing vertical lines or lines at various angles to the horizontal. No accurate provision is made for spacing lines uniformly as when cross-hatching, making ruled forms, drawing music scores, and the like. To overcome this difficulty to some extent there have been provided so-called cross-hatching devices which usually take the place of the triangle and have a base adapted to be held against the upper edge of the T-square. On a rod mounted on this base a carriage is moved by a stepping mechanism to move a straight edge pivoted thereto. Such devices are effective but clumsy to use and still do not provide for direct movement of the T-square blade so that horizontal lines can be accurately spaced.

The present invention contemplates the provision of mechanism permitting the drawing of accurately spaced lines horizontally or any angle to the horizontal without the use of any additional devices such as triangles or the like. All drawing is done from a single straight edge which is the equivalent of the blade of a T-square and which is directly mounted on a carriage which travels on a rod or track interchangeably fixed to the side or end of the drawing board.

Referring now to the drawing for a simple embodiment of the invention, there is shown at 10 a conventional drawing board having the short end edges 11 and the long side edges 12. The instrument of the present invention is adapted to be attached thereto in a simple manner which will be later described. Such instrument comprises in general a track or guide rod 13 over and along which is adapted to travel a

carriage 14 to which is pivotally mounted for angular adjustment thereon the straight edge 15. The carriage is provided with stepping mechanism as will be later described whereby it can be given accurate advances in uniform steps of adjustable size.

The track rod 13 is preferably circular in cross section and may be somewhat longer than the edge of the board on which it is to be applied so that the carriage will have sufficient movement to permit the straight edge to cover the whole area of the board. This track rod is equipped at each end with a stud 16 suitably secured, as by the screws shown, to the ends of a flat bar or supporting member 17 preferably of rectangular cross section. This bar is of a width approximately equal to the usual thickness of a drawing board and has suitably secured thereto, as by welding, the two metal straps 18 which are bent beneath its lower edge and extended into the bifurcated clips 19, the slots 20 of which are adapted to be received over the shanks of screws having large knurled heads 21. Each screw is received in a threaded opening in the under-surface of the board whereby the clips may be securely attached to the board by being clamped between its lower surface of the screw heads. A similar pair of screws or openings for the same pair on a board edge at right angles to the one shown permits the device to be applied either to the end or the side of the board whereby horizontal or vertical lines may be drawn without resort to a triangle. To provide suitable clearance for the screw heads and clips between the under-surface of the board and the supporting table or the like, it is preferred to provide at each corner of the under-surface of the board a suitable button or supporting stud 23 which may have a rubber or felt tip.

The carriage proper, 14, for travelling on the rod 13 is a sheet metal stamping having the substantially flat top portion 25 and the vertical flange 26 serving to reinforce and strengthen the same. This flange passes down between the rod 13 and the bar 17. The under-surface of the carriage supports a plurality of aligned circular eyes, the apertures of which are just of sufficient size to slide smoothly on the rod 13 which is passed through them. The uppermost and lowermost of these eyes 28 and 29 respectively are purely for guiding the carriage on the rod, whereas the second one from the top 30, as well as the third one 31 have important functions in connection with the operation of the stepping mechanism.

Such mechanism includes a lever 32 having an opening to loosely fit over the rod. This lever lies along the undersurface of the carriage plate and has a vertical screw 33 extending therethrough, passing through a slot 34 in the carriage and mounting at its upper end the operating knob 35. The length of the slot 34 is equivalent to the maximum stepping distance desired. Adjacent the knob 35 is the fixed abutment 36 attached to the carriage. The operation to step the carriage downwardly comprises pinching the abutment 36 and knob 35 between the forefinger and thumb of the left hand. The slight canting thereby imparted to the lever 32 causes it to instantly grasp the stationary rod 13, and the forefinger then acting on the abutment 36 draws the carriage down to the extent permitted by the step length adjusting mechanism which will be later described.

Upon release of the knob 35 the now compressed helical spring 38 surrounding the rod 13, abutting one side of the eye 30 and the facing surface of the lever 32 immediately releases the lever from its locked condition on the rod and moves it downwardly to its starting position against the eye 31.

Retrograde movement of the carriage is normally prevented by the locking lever 40 of sheet metal, provided with an opening to permit it to slide over the rod 13 and having the thumb portion 41 which passes up through a close slot in the carriage to terminate adjacent a knob 42 fixed to the surface of the carriage. The helical spring 43 surrounding the rod 13 between the lower face of the eye 31 and the lever 40 tilts the lever about its fulcrum 44 at the edge of the slot until it locks onto the rod 13 in a manner to prevent the carriage from moving upwardly. When it is desired to move the carriage upwardly the end 41 of the lever is pressed against the knob 42 which tilts it about the fulcrum 44 until its lower portion is at right angles to the rod, releasing the locking action and permitting the carriage to be slid upwardly by pressure of the thumb on the knob 42.

For controlling the length of the step imparted to the carriage by squeezing the knobs 35 and 36, a rod 50 threadedly engages a pair of eyes 51 depending from the carriage and the rod passes loosely through an aperture in the extension 52 of the lever 32. A head 56 on the rod limits the movement of the lever relative to the carriage in the stepping direction. This head 56 may be positioned variously to permit changes in the length of the steps by rotation of the threaded rod 50 by means of its knurled head 55 which extends out from under the carriage plate near the lower edge thereof. Adjacent the knob is fixed the index disc 57 having a circumferential line thereon movable with the rod 50 along the graduated scale 58 on the edge of the carriage plate. The graduations indicate accurately the length of step imparted to the carriage in accordance with the position of the index wheel with respect thereto. A folded spring clip 59 snapped under the screw 50 and between the eyes 51 provides frictional resistance to hold the screw in adjusted position.

The upper surface of the carriage is positioned to be substantially flush with the upper surface of the drawing board and a large portion of it is clear of any obstructions so that it is convenient to provide either a pivot or a suitable clamp screw 60 as the fulcrum for the straight edge 15, operating either in a hole therein or in the slot 61 as shown. A second or clamping screw 62 passing through the straight edge threads into the nut 63 fixed on the arm 64 which also holds the nut 65 for the center screw 60. The edge of the carriage is arcuate as at 67 and may be graduated in degrees to indicate the angularity of the straight edge in respect to the track 13. The slot 61 may be of any suitable length to permit the straight edge to be adjusted to overhang to the left and be out of the way when used in the short direction of the board. The straight edge can be suitably shifted for use when turned in the long direction on the board as will be obvious.

The method of use needs no explanation for the ruling instrument, pencil, pen or the like is moved along the upper edge of the straight edge when it is set at the desired angle and for subsequent lines the carriage is stepped down the desired distance. Successive steps, without intervening setting of the knurled nut 56 will be identical so that accurate spacing of the lines

may be accomplished. It is obvious that various uses for the instrument will suggest themselves to those having need for such a time-saving device and it is not the intent of the following claims to limit the device to any particular use.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In a drafting instrument of the type described, in combination, a single rod-like track adapted to be mounted adjacent the end of a drawing board with all parts thereof below the level of the top of the board, a carriage mounted for rectilinear travel on and above said track and having a surface substantially flush with that of the board, a straight edge extending over the board and pivoted to said carriage for angular adjustment over said surface, means concealed beneath said carriage for cooperation with the track for stepping the carriage therealong in uniform steps, means exposed below an edge of said carriage to adjust the length of said steps, and means extending through the said carriage surface for manual operation to actuate said stepping mechanism.

2. In a drafting instrument, in combination, a drawing board, a rod longer than said board, means for removably mounting the same spaced for its full length from an edge of the drawing board and below the level of the surface thereof, a sheet metal carriage mounted and guided on said rod for movement therealong, the top surface of the carriage being flush with the board surface, a straight edge pivoted to said carriage and extending over the board, stepping mechanism mounted beneath the under surface of said carriage and cooperating with said rod to move the carriage and straight edge in uniform steps, and an operating member extending through said carriage for manual manipulation of said mechanism.

3. In a drafting instrument, the combination with a drawing board, means elevating the under surface of said board above its support, a pair of thumb-screws entering the board from beneath adjacent each of two edges thereof, a flat bar for edgewise mounting adjacent either of said edges, a pair of bifurcated straps extending laterally from said bar and spaced for reception beneath the heads of a pair of said screws, a track rod spaced from and parallel to said bar and supported by its ends therefrom, a carriage of sheet metal adapted to travel on and above said rod with its upper surface substantially flush with that of the board, a reinforcing flange on said carriage extending between said bar and rod, a straight edge pivoted to said carriage and angularly adjustable thereon for cooperation with said board, stepping mechanism for the carriage completely housed beneath the same, and means for manual manipulation of said mechanism extending above the upper surface of the carriage.

4. In a drafting instrument for use with a board, in combination, a bar adapted to be positioned adjacent an edge of the board, means extending from said bar for attaching the same to the board, a track rod supported at its ends from and parallel to said bar, guides slidably mounted on said rod, a carriage plate attached to said guides and extending over said rod with its top surface substantially flush with that of the board, a straight edge extending over said surface and pivoted to the carriage, stepping mechanism cooperating with said rod and entirely housed beneath said plate, step length control means exposed at an edge of said plate, and means for manually manipulating said mechanism extending above the surface of said plate.

5. A carriage for step by step travel on a track rod comprising, in combination, a sheet metal plate, eyes extending beneath said plate to guide the same on said rod, an abutment depending from said plate and surrounding said rod, a helical spring surrounding said rod and engaging said abutment, a lever slidable on said rod and abutting the opposite end of said spring, an operating knob for said lever extending through a slot in said plate adjacent a knob fixed to the upper surface thereof, said lever locking to said rod when its knob is pressed toward the fixed knob whereby the carriage is moved by the pressure on the fixed knob, a stop screw extending through an opening in said lever, a lug on the underside of said plate threaded to receive said screw, a head on said screw to form an adjustable stop for said lever, a knurled knob on the other end of said screw extending beyond the edge of said plate, an index wheel on said screw cooperating with a scale on the plate edge and releasable means to prevent retrograde movement of said plate along said rod.

6. A drafting instrument comprising a track rod adapted to be mounted adjacent an edge of a drawing board, a carriage guided for movement on and above said rod entirely outside of the board, the upper surface of the carriage being flat and flush with the board surface, a straight edge adjustably secured to and for movement over the upper surface of said carriage for cooperation with the board, stepping mechanism entirely beneath said carriage to cooperate with the rod and move the carriage in uniform steps, operating means for said mechanism extending through said carriage in a position near the lower edge of the straight edge whereby the space beyond the working edge of said straight edge is entirely clear, and a step adjusting element having an operating part extending from beneath the edge of the carriage top near said other operating means.

7. A guide rod mounting for a step by step type of drafting instrument comprising, in combination, a cylindrical rod, a straight stiff bar, means supporting the rod ends from said bar, clips extending laterally from substantially the level of the lower edge of said bar, each clip being bifurcated for ready engagement beneath the head of a screw on the underside of a drawing board.

8. The combination of a supported track rod and a carriage plate guided for movement along and above the same, an abutment surrounding said rod and secured to said plate, a spring slidable on the rod and bearing on said abutment, a lever slidable on the rod and engaging the free end of said spring, an operating knob for the lever extending through said plate, a second lever and spring on the rod, cooperating with another abutment to lock the plate against retrograde motion, said second lever extending directly through an opening in the plate for manual manipulation to release the lock, an adjusting screw for limiting movement of the carriage in respect to the first lever, and a knob on said screw extending beyond the edge of said plate for adjusting the step size.

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