Oct. 23, 1951 C. W. REED 2,572,197

DRAFTING MACHINE

Filed Sept. 21, 1948

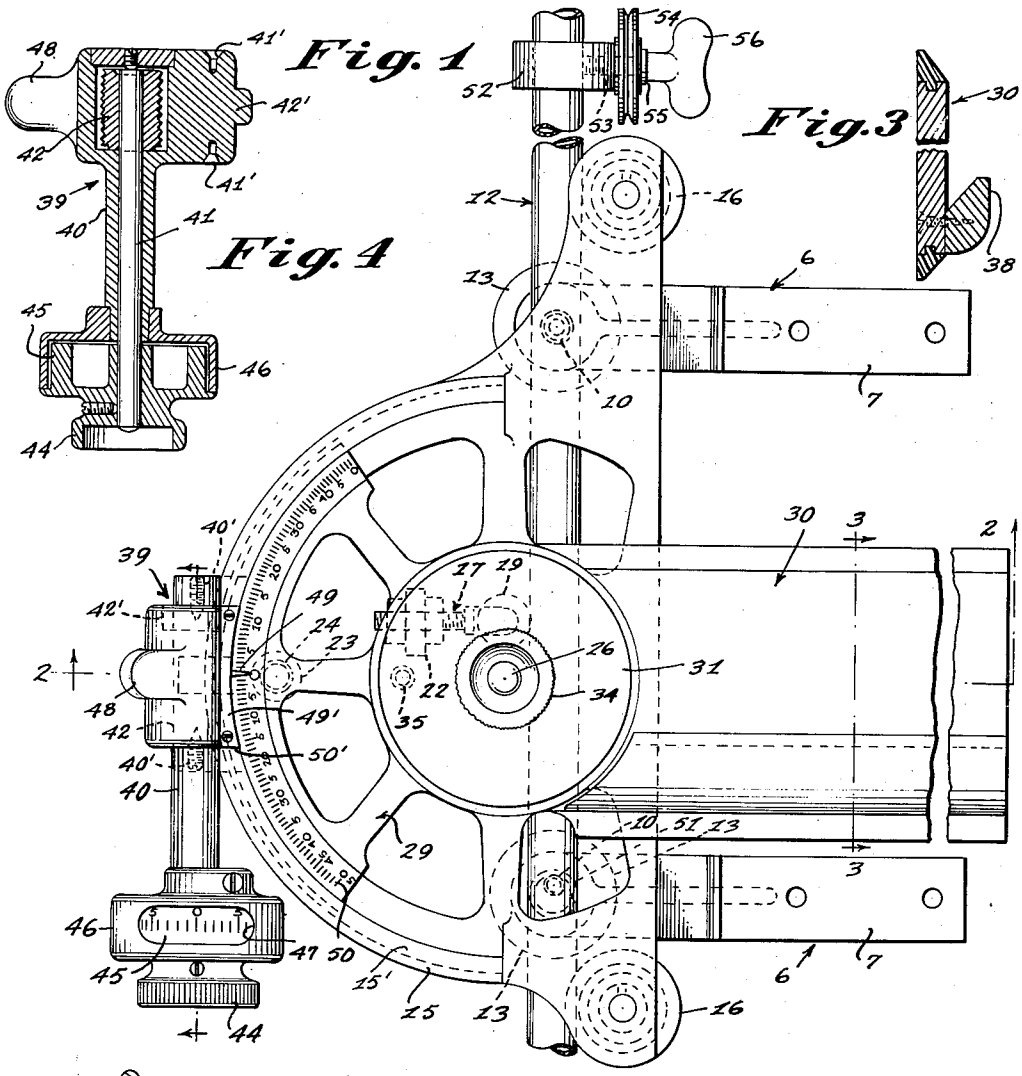


Fig. 1

Fig. 3

Fig. 4

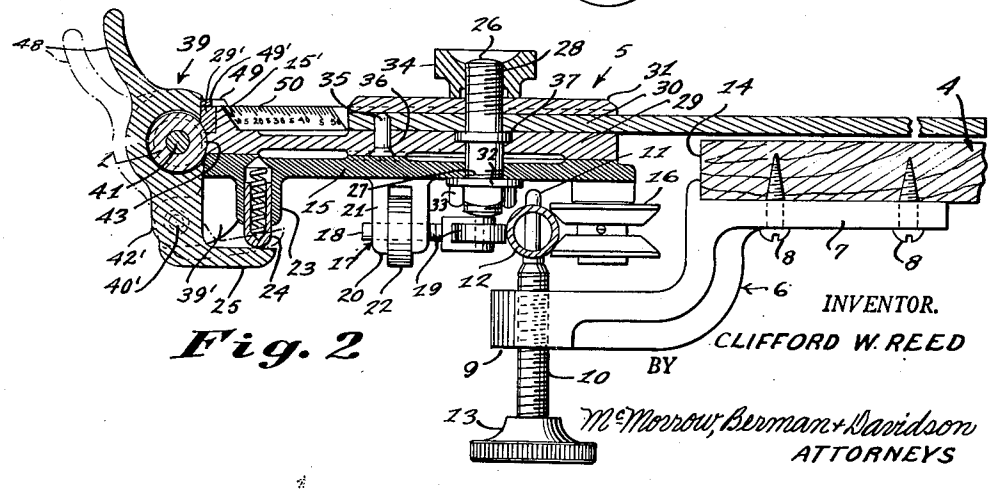


Fig. 2

INVENTOR.
CLIFFORD W. REED
BY
McMorrow, Berman & Davidson
ATTORNEYS

Patented Oct. 23, 1951

2,572,197

UNITED STATES PATENT OFFICE

2,572,197

DRAFTING MACHINE

Clifford W. Reed, Lakeland, Fla.

Application September 21, 1948, Serial No. 50,286

4 Claims. (Cl. 33—76)

1

This invention relates to improvements in drafting or drawing machines for use on drawing boards, tables, layout machines and the like, and the primary object of the invention is to provide a more flexible, adaptable and versatile device of this kind which can be more easily and efficiently operated by a draftsman.

Another important object of the invention is to provide an improved drafting machine of the character above indicated in which the protractor element is operable by worm vernier means, which is readily disengageable to permit the draftsman to manually move the protractor to a selected position when desired, and which is reengageable to permit vernier adjustment of the protractor relative to such position.

Another important object of the invention is to provide a drafting machine of the character indicated above featuring a guide rail and supporting means therefor, permitting easier and more exact mounting of the machine on the drafting table or board, and permitting the movable assembly of the machine to be shifted the full length of the rail or width of the table or board carrying with it a transparent edge straight edge; and said supporting means involving means enabling said movable assembly to be adjusted easily and accurately to the desired height so that the straight edge will have proper board clearance; and said supporting means further including eccentric compensating means facilitating alignments when replacing tracings or drawings and eliminating repeated re-pinning of such drawings and tracings.

Another important object of the invention is the provision in supporting means of the character indicated above of an adjustable tension keeper roller arrangement for holding the roller means engaged with the opposite side of the rail.

Another important object of the invention is to provide a drafting machine of the character indicated above in which the rail is round or cylindrical, whereby the movable assembly of the machine can be rotated on the axis of the rail into a vertical position relative to a horizontal table or board, thereby freeing the table or board of any obstruction otherwise resulting from the presence of the drafting machine.

Other important objects and advantages of the invention will be apparent from the following description and accompanying drawings, wherein, merely for purposes of illustration, a presently-preferred embodiment of the invention is set forth in detail.

2

In the drawings:

Figure 1 is a contracted top plan view of said embodiment.

Figure 2 is a fragmentary vertical longitudinal section taken on the line 2—2 of Figure 1.

Figure 3 is a transverse section taken on the line 3—3 of Figure 1, and,

Figure 4 is a longitudinal section through the vernier device.

Referring in detail to the drawings, the numeral 4 generally designates a drawing or drafting table or board, here shown as horizontally arranged, with which the machine, generally designated 5, embodying the present invention is shown as associated.

The machine 5 comprises a pair of brackets 6, 6 spaced along the adjacent edge of the board 4, each comprising an upper horizontal part 7, engaging the under side of the drawing board 4 and traversed by mounting screws 8, 8, a depressed horizontal part 9, in which is vertically threaded a rail-supporting and adjusting screw 10 having a reduced stud 11 on its upper end slidably traversing the horizontal tubular cylindrical or round rail 12, and a knob or handhold 13 on its lower end. The brackets 6 support the round rail 12 below and generally parallel with the adjacent edge 14 of the board 4, as shown in Figure 2. The foregoing constitute the stationary assembly of the machine 5.

The movable assembly of the machine 5 comprises the horizontal semi-circular plate 15 from whose inner edge depend a number of grooved vertical axis rollers 16, in this case two such rollers, for rollably engaging the inner side of the round rail 12, which rollers 16 are opposed by one or more keeper roller assemblies 17, whereby the rollers 16 are kept engaged with the rail 12, and whereby the entire movable assembly can, from the point of view of Figure 2, be rotated on the axis of the rail 12 in a counterclockwise direction into a vertical position in which the top of the board 4 is free of obstruction.

Each keeper roller assembly 17 comprises a bifurcated shaft 18 carrying a plane surface roller 19 in engagement with the rail 12 and horizontally slidably traversing spaced ears 20, 20 on a bracket 21 in the form of a clevis depending from the bed plate 15, with a nut 22 threaded on shaft 18 between said ears for feeding the roller 19 with the desired tension against the rail 12. As indicated in dotted lines in Figure 1, a single keeper roller 17 may be used between two grooved rollers 16, 16.

Mounted upon the top of the bed plate 15 by a vertical clamping and pivot stud 26, having both

ends threaded as indicated at 27 and 28, respectively, and passing upwardly through an accommodating opening in the plate 15 above the keeper roller 19, are the substantially semi-circular protractor plate 29, the laterally rearwardly-extending straight edge 30, and the clamping disc 31, in the vertical order named from bottom to top. A washer 32 and nut 33 are provided on the lower threaded end 27 of the stud 26 for engaging the under side of the bed plate, and a knurled nut 34 is provided on the upper threaded end 28 of said stud for engaging the upper side of the clamping disc 31.

The bed plate 15 and protractor plate have conventional annular surfaces 15' and 29', respectively, by which they have free rotational bearing upon each other on the axis of the stud 26. The protractor plate 29 and the straight edge 30, instead of being locked against rotation relative to each other by the usual arrangement of a plurality of screws having slotted heads, are held against such rotation by a single dowell pin 35 arranged with its head 36 seated in a recess in the bottom of the protractor plate and its shank rising into an eccentric accommodating opening provided in the straight edge 30. This arrangement, in conjuction with the provision of the special stud 26 and the knurled nut 34 on its upper end, provides proper assembled relation of the associated parts, and provides also greater ease of manipulation thereof in the assembling and disassembling of these parts, and their manipulation in the use of the machine than are afforded by the usual slotted head stud and screws, which require a screw driver for loosening and tightening them. The stud 26 has a fixed shoulder or collar 37 which seats in an accommodating recess in the top of the protractor plate 29, so that when the straight edge 30 and clamping disc 31 are loosened or removed, the protractor plate 29 retains its initial or original assembled relation with the bed plate 15 determined by the adjustment of the lower nut 33.

The straight edge 30 is preferably of the transparent edge type and has a check rail 38 along the near or lower edge, as indicated in Figure 3.

At the middle of the curved edge of the bed plate 15 is a pair of depending, outwardly directed lugs 39', 39' through which pointed screws 40', 40' are threaded, with their pointed ends engaging in tapered holes 41', 41' in opposite ends of a depending part 42' on a worm housing 39, including a tubular portion 40 tangential to the periphery of the protractor plate 29 and affording bearing for shaft 41 carrying a worm 42 in mesh with worm teeth 43 on the periphery of the protractor plate 29. The worm 42 is manually operable by a knurled vernier knob 44 having a cylindrical 60-graduation scale 45 within a head 46 on the tubular portion 40 formed with an opening 47 exposing the scale, as shown in Figure 1. The worm housing 39 includes a thumb lever 48 projecting outwardly therefrom by means of which the worm housing 39 can be swung outwardly on the pivot screws 40', 40', so as to disengage from the protractor plate teeth 43 at the will of the draftsman to permit manual rotation of the protractor free of the worm, enabling the draftsman to manually set the protractor in a desired position, and thereafter re-engage the worm 42 with the protractor teeth 43 and operate the vernier knob 44 and obtain a vernier adjustment of the protractor.

The depending portion 42' on the worm housing 39 has a laterally inwardly-projecting arm 25 which reaches under the bed plate 15, as shown in Figure 2, and is downwardly tensioned to hold the worm 42 engaged with the protractor teeth 43 by a downwardly spring-pressed plunger 24, mounted in a vertical tubular boss depending from the bed plate.

A rim portion 29' on the bed plate 15 has an inwardly-projecting pointer 49, bent to conform to the angulated scale portion 50 of the protractor plate 29, as shown in Figure 2, the pointer 49 being carried on a removable plate 49' secured by screws 50' to the rim portion 29'.

The stud 11 of one of the mounting screws 10 is eccentric with respect to the longitudinal axis of the screw, as indicated in dotted lines in Figure 1, whereby the rail 12 can be shifted toward and away from the adjacent edge 14 of the board 4 by turning the knob 13 in opposite directions.

On the remote end of the rail 12 is provided a grooved pulley arrangement comprising a collar 52 encircling the rail 12 including a locking thumb set screw 53 which acts as axle for the grooved pulley 54, a washer 55 being placed between the outer side of the pulley and the handhold 56, as shown in Figure 1.

It will be observed that the fact that the brackets 6 do not interfere at any stage with the freedom of movement of the movable assembly of the machine along the rail 12, the rail 12 may be made considerably longer than the drawing board 4 when desired, so that the movable assembly can in that case be moved along the rail to a position in which the straight edge 30 is carried off and clears either end of the drawing board.

I claim:

1. A drafting machine adapted to be mounted along an edge of a drawing board, comprising bracket means for attachment to spaced points along said edge of the drawing board, a rail supported on said bracket means, a bed plate having depending vertical axis stationary rollers engaging one side of said rail, at least one tensioning roller depending from said bed plate between said stationary rollers and engaging the opposite side of said rail whereby said bed plate is mounted on said rail to move therealong and swing upwardly with respect to the drawing board, a protractor cluding a straight edge to overlie the drawing board, vertical pivot means mounting said protractor on said bed plate, said bracket means comprising vertically adjustable screws engaging said rail and being operable to raise and lower said rail protractor and straight edge relative to said drawing board, one of said screws having a reduced eccentric stud on its upper end supportably journalled in said rail whereby rotation of said one screw in opposite directions adjusts said rail toward and away from the edge of the drawing board.

2. In a drafting machine adapted to be mounted along an edge of a drawing board, a pair of brackets adapted to be secured to the underside of the drawing board having terminals projecting beyond the drawing board edge and below the level of the drawing board, said terminals being spaced apart along the drawing board edge, vertical adjusting screws traversing said terminals having upper ends rising above said terminals, reduced studs on the upper ends of said screws, a rail supported on the upper ends of said screws on a level below the drawing board, said rail being formed with vertical journal holes journalling said studs, a bed plate having depending vertical axis stationary rollers engaging the side of

said rail adjacent to the drawing board edge, said bed plate having depending tensioning roller means engaging the opposite side of said rail and located between said stationary rollers whereby said bed plate is supported on said rail for movement in opposite directions along the drawing board edge, said stationary rollers and said tensioning roller means being arranged to support said bed plate at a level below the top of the drawing board, a protractor plate rotatably engaging the top of said bed plate and pivoted on a vertical axis thereon, the top of said protractor plate being on a level not substantially higher than the top of the drawing board, and a straight edge mounted upon said protractor plate to extend over the drawing board.

3. A drafting machine adapted to be mounted along an edge of a drawing board, comprising a pair of brackets adapted to be secured to the underside of the drawing board having terminals projecting beyond the drawing board edge, said terminals being spaced apart along the drawing board edge and depressed below the level of the drawing board, vertical adjusting screws traversing said terminals, reduced studs on the upper ends of said screws, a rail supported on the upper ends of said screws, said rail being formed with vertical journal holes journalling said studs, a bed plate having depending vertical axis stationary rollers engaging the side of said rail adjacent to the drawing board edge. said bed plate having depending tensioning roller means engaging the opposite side of said rail and located between said stationary rollers whereby said bed plate is supported on said rail for movement in opposite directions along the drawing board edge, said stationary rollers and said tensioning roller means being arranged to support said bed plate at a level below the top of the drawing board, a protractor plate rotatably engaging the top of said bed plate and pivoted on a vertical axis thereon, the top of said protractor plate being on a level not substantially higher than the top of the drawing board, a straight edge mounted upon said protractor plate to extend over the drawing board, the stud on one of said adjusting screws being eccentrically arranged whereby rotation of said one adjusting screw in opposite directions swings said rail toward and away from the drawing board edge on the axis of the stud of the other adjusting screw.

4. A drafting machine adapted to be mounted along an edge of a drawing board, comprising a pair of brackets adapted to be secured to the underside of the drawing board having terminals projecting beyond the drawing board edge, said terminals being spaced apart along the drawing board edge and depressed below the level of the drawing board, vertical adjusting screws traversing said terminals, reduced studs on the upper ends of said screws, a rail supported on the upper ends of said screws, said rail being formed with vertical journal holes journalling said studs, a bed plate having depending vertical axis stationary rollers engaging the side of said rail adjacent to the drawing board edge, said bed plate having depending tensioning roller means engaging the opposite side of said rail and located between said stationary rollers whereby said bed plate is supported on said rail for movement in opposite directions along the drawing board edge, said stationary rollers and said tensioning roller means being arranged to support said bed plate at a level below the top of the drawing board, a protractor plate rotatably engaging the top of said bed plate and pivoted on a vertical axis thereon, the top of said protractor plate being on a level not substantially higher than the top of the drawing board, a straight edge mounted upon said protractor plate to extend over the drawing board, said tensioning roller means comprising a clevis depending from said bed plate having laterally spaced legs, a threaded shaft slidably traversing said legs, a vertical axis roller on said shaft at one side of said clevis and engaging the said opposite side of the rail, and a nut threaded on said shaft between said legs and adapted to be turned in opposite directions to extend and withdraw said roller relative to said rail.

CLIFFORD W. REED.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
502,112	Bramwell	July 25, 1893
658,262	Hester	Sept. 18, 1900
713,255	Traut	Dec. 16, 1902
1,031,665	Pocklington	July 2, 1912
1,042,743	Wuest	Oct. 29, 1912
1,050,605	Boland	Jan. 14, 1913
1,116,231	Bramwell	Nov. 3, 1914
1,147,105	Lederer	July 20, 1915
1,229,069	Hagman	June 5, 1917
1,351,527	Lopez	Aug. 31, 1920
1,382,460	Berglof	June 21, 1921
1,459,792	Nilant	June 26, 1923
2,077,677	Dawson et al.	Apr. 20, 1937
2,243,838	Cunningham	June 3, 1941
2,443,364	Vancura	June 15, 1948
2,471,099	Dethlefs	May 24, 1949

FOREIGN PATENTS

Number	Country	Date
241,384	Germany	Jan. 17, 1911
367,673	Germany	Jan. 26, 1923