Dec. 29, 1942. C. R. WARD 2,306,677

MAGNETIC DRAFTSMAN DEVICE

Filed Aug. 20, 1940

Fig. 1.

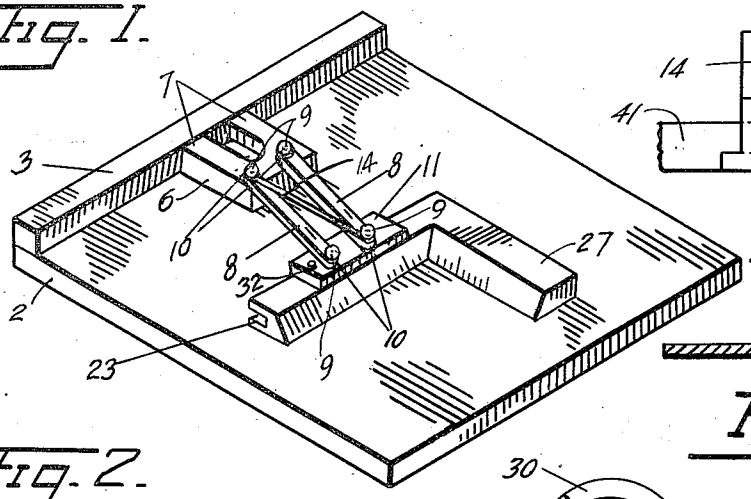
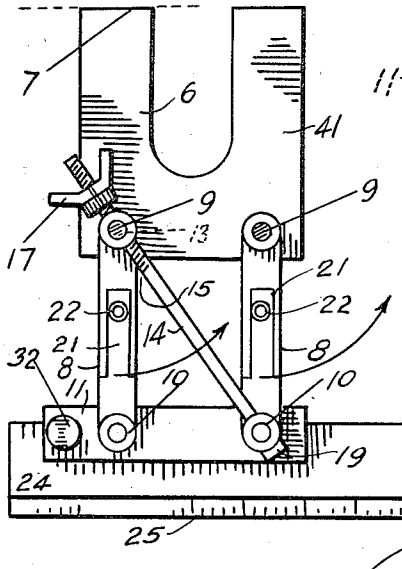


Fig. 2.



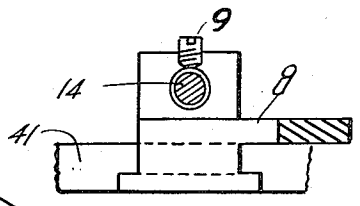


Fig. 7.



Fig. 3.

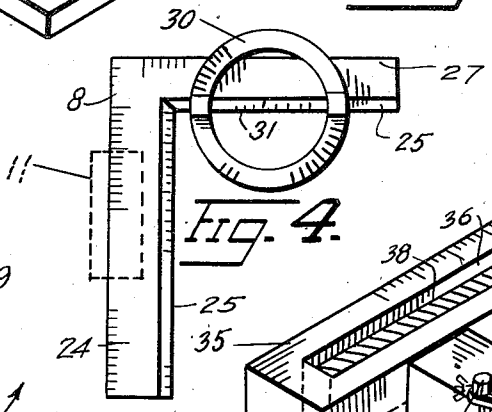


Fig. 4.

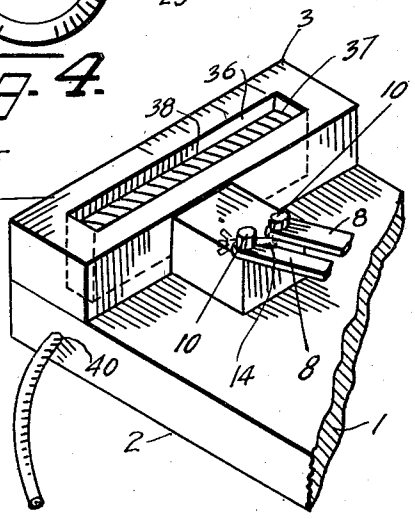


Fig. 5.

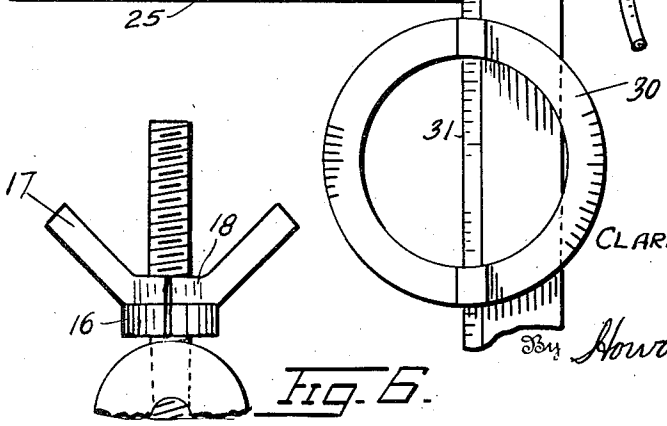


Fig. 6.

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MAGNETIC DRAFTSMAN'S DEVICE

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2 Claims. (Cl. 33—79)

This invention refers to drafting equipment and more particularly to those of the T-square or straight edge type usable for guiding lines to be drawn on a drawing board or the paper thereon. It has among its objects to provide a device that can be placed magnetically on the drawing table or any other selected part of same; to have the device adjustable in a number of ways and directions to increase its comparative utility and enable it to be used for special work; to have the device easily attachable and removable without necessarily requiring the use of mechanical contrivances to connect it up for the purpose. Another object is to have means provided for fine adjustments and locking the adjustments in predetermined positions and make the device relatively rigid for the purpose. A further object is to have a square that will tend to make its position accurate and stay rigidly located in this regard.

Still another object is to prevent the device from moving out of predetermined alignment when set for a particular purpose, and to have its structure designed to avoid unnecessary interference with the hands and drawing work of the user.

Other objects will become apparent as the invention is more fully set forth.

The usual T-square is held against the side of the drawing board and is relatively loose and subject to error. It is held in place by one hand of the draftsman and requires his continual attention to keep it placed properly. In this invention the square is connected with a suitable magnet that attaches itself to an armature bar placed at the side of the drawing board. The armature bar or straight edge is accurately trued so as to take the face of the magnet that is attracted to it, closely, rigidly and in proper alignment. The magnet may be removed without much trouble and replaced at another location against the bar or straight edge. This removal and replacement avoids the use of screws, bolts or catches of any kind that requires mechanical operation, and therefore avoids the incident trouble and effort that otherwise would be necessary. The square itself is capable of various adjustments that enable it to be positioned to suit many special requirements. The square and magnet are connected together with suitable parallel links which allow the square to be moved during use or be locked in a rigid position if preferred. The magnet may be pushed along the armature bar or straight edge to locate it in the proper place on the board, and when the magnet is set against it magnetically, it holds it securely and straight in position. The attraction causes the magnet to make straight and rigid contact with the armature bar or straight edge and align itself accurately with it. The use of a protractor in connection with the square affords many features which have not heretofore been anticipated on devices of this kind and will be outlined in the following specifications.

In the drawing which illustrates an example of this invention:

Figure 1 is a view in perspective of a drawing board with a magnetic T-square connected with it, embodying this invention;

Figure 2 is an enlarged detail in plan view of the magnetic connecting parts used in the device indicated in Figure 1, with parts being broken away;

Figure 3 is a detail of the protractor in side elevation used with the square employed in this embodiment;

Figure 4 is a detail of the square with protractor attached and fitted over it, the dotted outline indicating one of the positions to which the protractor could be moved to thereon; and

Figure 5 is a detail of a modified form of armature bar or straight edge adapted for external circuit energizing to form the magnetic attraction utilized for attaching and positioning the square in place on the drawing board.

Figure 6 is a detail in elevation showing the structure of the quick acting nut used in the device.

Figure 7 is a detail of the stud used in this invention.

Similar reference characters refer to similar parts throughout the drawing.

In the drawing, 1 represents a drawing board or table of conventional form with one of its sides 2, surmounted by an armature bar or straight edge 3 of iron, steel or composition bar having suitable magnetic permeability. This bar 3 may be laid on the drawing board or table or be attached with suitable means to this board. The general form of the bar is like that of a straight edge with its side 5 made accurately straight and polished for a horseshoe type slider magnet 6 to slide against. The faces 7 of the magnet that make contact with the side 5 are also made straight and accurate so that the slider magnet will position itself at right angles to the bar when placed in normal working position. This magnet is preferably of the permanent type and made of a composition that will afford considerable mag-

netic attractive force, and attach itself tightly and securely to the armature bar 3.

The magnet is preferably flat on its upper and lower surfaces to allow it to slide along the board evenly and for the parallel links 8 to move back and forth thereon without interference. These links are attached with studs 9 to the magnet's upper surfaces which do not prevent their movement. The studs 10 located in a holder 11 and on the other end portions of the links also hold the latter and permit their swivel movement to give a parallel travel to the holding piece 11 which is secured to a square 12 to move it on the board with its edges parallel on the board in all positions. Two of the studs at diagonal corners of the link connections have holes 13 therethrough for the passage of a lock bolt 14. This bolt 14 is screw-threaded at 15 and arranged to take a quick acting nut 16, whose wings 17 may be pressed together to open the body of the nut against the tension of a spring 18. When the wings are pressed the body opens to disengage from the threaded portion 15 and allow it to be moved on the bolt to any selected position.

The quick acting nut consists mainly of a body 16, with its end farthest from the wings screw-threaded internally like a nut and the balance of the body counterbored to a diameter slightly larger than the outside diameter of the bolt to which it is attached, it is split into two halves, which are attached to each other in a flexible manner. These halves are preferably kept closed and in contact with the bolt threads by spring 18, and are opened by pressing the wings 17 towards each other and the axis of the nut. The swing of the halves of the nut causes its central hole portion containing the threads to open and become large enough to pass freely over the bolt 14. When so open, the nut may be moved in either direction along the bolt without turning the nut in the conventional manner, and is held in the position selected when the wings are released to allow the spring to force the halves together and contact the bolt thread. Its structure in detail is shown in Figure 6. The quick action nut serves to hold the bolt 14 locked against the studs 9 and provides for micrometric adjustment of the scale 27 in one direction. The detail in Figure 7 shows the structure of the stud. The bolt has a head 19 that restrains it from being pulled through when the nut 16 is tightened on the bolt. When so tightened, the links become locked and hold the holder 11 rigid at the side of the magnet 6. The links are extensible or adjustable in length by means of a tongue and groove arrangement 21 and set screws 22. The holder 11 is preferably L-shaped and tongued to form a guide in the groove 23 provided in the blade of the square 24 for alignment. This square has bevelled edges 25 suitably divided into selected measurements or scales 26, on both its blades 24 and 27.

The blade 27 holds a special protractor circle element 30 provided on same. The protractor has the usual angular indicia to measure angles or directions. It is formed to fit closely over the blade 27 and may be moved along the blade 27 or removed entirely to suit the user.

This protractor is formed to fit over the scale 27 in the manner indicated in Figure 3, so that it may be laid over the scale with its center in line with the edge of the scale and its indicia in degrees on the flat portions 31 brought in alignment with the plane of the board or bottom of the scale. This allows the protractor to be used with the scale without requiring it to be laid underneath it, and interfere with the position of the scale thereon. This provides for accuracy in the use of the protractor to an extent not positively afforded in the use of the conventional form with it. It holds the protractor securely in place without interfering with the normal use of the scale. At the same time, it may be readily removed when not needed, and put out of the way. The protractor is used for the same purposes as the conventional types but as an adjunct to this equipment as a part of the scale.

The device is employed by the user bringing the magnet 6 against the armature bar 3 at a suitable location. The magnet is attracted to the armature bar or straight edge as soon as it is brought close enough and adheres tightly and accurately against same. It may be shoved up or down the front of the bar or straight edge until its position is ascertained. The resistance to the moving of the magnet or magnetic block along the bar does not interfere with this adjustment. The links are then adjusted and their set screws tightened after the holder 11 and its square are brought to the proper location on the board. Any further adjustment is made by utilizing the provision made for the same. The protractor is placed to suit on the blade. It will be noted that the square or liner may be adjusted sidewise or longitudinally on the drawing board.

In the modified form shown in Figure 5, the armature bar or straight edge is of magnetic material 35 and slotted at 36 and a core rod 37 extended therein. This rod is wrapped with insulated wire coil 38 and its connections brought out at 39 so its circuit cord 40 may be connected electrically with it. The armature bar or straight edge 35 is magnetically energized when the current is turned on, and attracts the slider piece 41 when brought within its sphere of attraction, holding it in the same manner as the magnet holds in the other form indicated in the drawing. The slider piece is quickly released by turning off the current whenever it is desired to remove it from the magnetic bar 35, or deenergize it. The links, square and other parts are attached and operate in the manner already described in the previous form.

The indicia on the various parts serve to guide the user in various ways in doing his work on the drawing board. It is valuable in connection with lettering and work that has to be centered and placed in accordance with a predetermined arrangement, and for use on map work where the compass directions have to be followed or referred to. The use of the slider magnet eliminates the use of the uncertain head of a conventional T-square and its lack of steadiness, by providing a rigidly placed head or support for the square in any place along the side of the board. Strings and cables and long swinging levers are avoided and every function is substantiated by parts and connections that are solidly arranged, so as to make the work done with its use accurate. Yet the arrangement is such that it may be removed at any time without difficulty, and also replaced without mechanical connections or connections that require time and trouble. It is quick, effective and avoids parts that project in a manner to interfere with the use of the hands and drawing instruments, and its structure is relatively simple.

While only two forms of the invention are shown in the drawing and described in the specification, it is not desired to limit this applica-

tion for patent in any way, otherwise than limited by the principles employed and the scope of the appended claims.

Having thus described the invention, what is claimed is:

1. In combination with an iron bar adapted to be laid on and attached to a drawing surface, a magnet attachable to the said iron bar magnetically on one side thereof, a plurality of studs mounted on the magnet, links held by the studs to the magnet, a scale for the drawing surface have its arms rigidly connected with one another, and with a groove in one edge portion thereof, a holder adapted to be secured to the scale and having a predetermined portion to slide in said groove so as to be guided thereby, additional studs for attaching the links to the holder and for permitting the adjustment thereof to space the holder and magnet to and from each other predetermined amounts, means for setting the links to hold the magnet and holder in predetermined spaced relationship with each other and for placing the scale in predetermined drawing positions on the said surface.

2. In combination with an iron straight edge secured to a drawing board, a magnet with a plurality of poles with an open spacing in between for magnetic attachment to the straight edge over a relatively substantial length thereof to provide stability, the contact surfaces of the poles being straight and flat to permit facile movement and attachment to the straight edge, a scale for drawing purposes operable on the board and having a longitudinal groove therein, a holder with a portion slidable in the said groove and adapted to arrange for longitudinal adjustment of the scale, parallel links and studs for attaching the magnet and holder together and setting the latter rigidly in predetermined positions and an additional bolt member rigidly positioning the links and studs in relation to the holder and magnet in accordance with the spacing predetermined upon, and means for adjusting the links longitudinally to control the spacing of the holder from the magnet and thereby place the scale further away or closer to the magnet.

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