A. E. MAGNUSON.

DRAFTING INSTRUMENT.

APPLICATION FILED JUNE 30, 1919.

1,349,550. Patented Aug. 10, 1920.

Fig. I

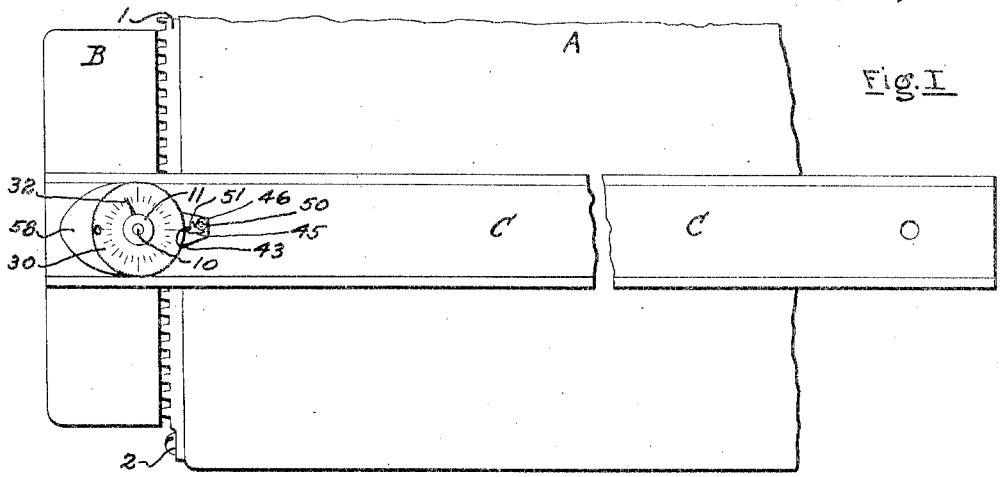


Fig. II

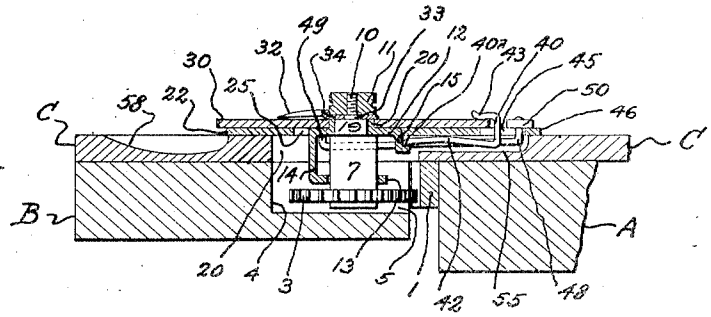


Fig. III

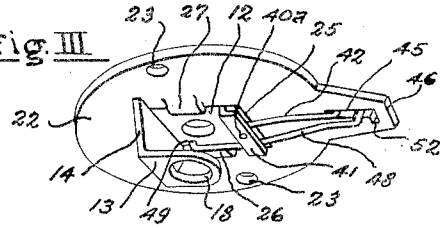


Fig. IV

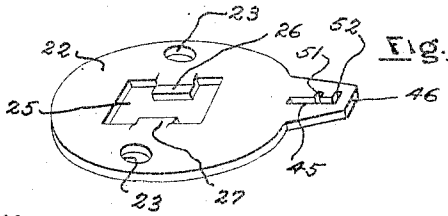


Fig. V

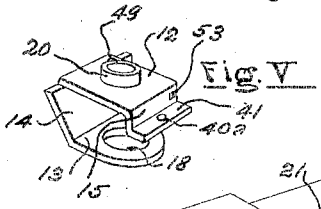


Fig. VI

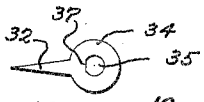


Fig. VII

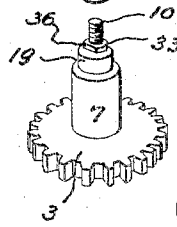
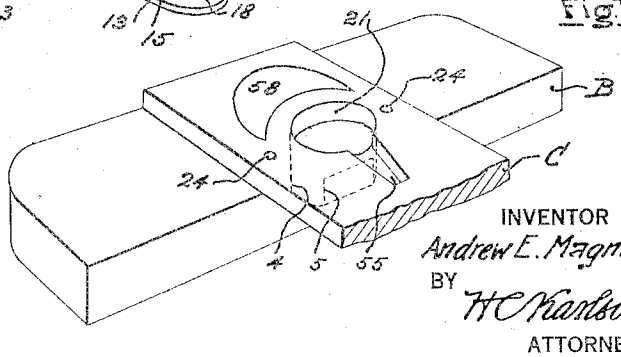


Fig. VIII



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DRAFTING INSTRUMENT.

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Application filed June 30, 1919. Serial No. 307,711.

To all whom it may concern:

Be it known that I, ANDREW E. MAGNUSON, a citizen of the United States, and a resident of the borough of Manhattan, in the county, city, and State of New York, have invented certain new and useful Improvements in Drafting Instruments, of which the following is a specification.

This invention generally relates to the art of mechanical drafting, and more especially it appertains to instruments or implements whereby distances between lines can be accurately measured, and the latter may be drawn uniformly at the desired intervals apart. For the furtherance of conciseness and precision, it will be described and shown herein particularly with reference to T-squares and drawing boards combined.

The primary object of the invention is to design an improved implement for the purpose contemplated, which shall be capable of accurately measuring spaces between lines that have been or are to be drawn, without using a separate scale or similar means to ascertain the distances at which the lines were or will be laid relatively to one another.

A secondary object is to supply an implement of the genus alluded to, including coacting measuring elements, one of which is normally movable over the other, while the latter may remain stationary or admit also of being moved to advance or retract the points at which the measurements will commence, so as to suit various requirements.

A third object of the invention is to produce an improved T-square of the character set forth affording an accurate means of spacing the lines to be drawn, according to any chosen standard of measurement, and which spacing can be maintained throughout the work, or varied instantly at the option of the draftsman using the implement, as may be required.

Another object is the production of an implement of the nature described so simple in construction and operation that the proper use thereof will be understood at once by the draftsman, even though a beginner, and his work will be performed without fear or hesitation, but intelligently as well as expeditiously.

A further object is to provide an implement of the class mentioned permitting the T-square to be quickly applied to or removed from the drawing-board, and also to be rendered inoperative to the end that it may be used in the ordinary manner, if and whenever desired.

Still another object is the provision of an implement of the type referred to, the actuating mechanism whereof shall be of small compass and for the most part shielded from exposure, so that it will be fully protected and may not cause the least interference or inconvenience while the work of drafting is being carried out.

A still further object is to devise an implement of the kind specified composed of but few parts, that can be produced from readily available material mostly anywhere, and easily assembled with the aid of common tools, by plain mechanics, at a slight expense.

Other objects and advantages of the invention will become apparent as the specification proceeds.

With the aforesaid objects in view, the invention consists of the novel combinations and arrangements of parts hereinafter described in their preferred embodiments, pointed out in the subjoined claims, and illustrated on the annexed drawing, wherein like parts are designated by the same reference characters throughout the several views.

In the said drawing,—

Figure I is a top plan view, showing one corner of a drawing-board, with this improved T-square in operative position thereon, the latter being shown on a reduced scale and with its blade broken transversely intermediate the ends;

Fig. II is an enlarged sectional elevation, including a fragment of the drawing-board and a broken view of the T-square, the section running across the head of the latter and lengthwise of its blade in a substantially central plane;

Fig. III is the perspective view of the carrier and bearing plate pertaining to the implement, looking at the under side of the same;

Fig. IV is a similar view of the said bearing plate alone, as seen from the upper side thereof;

Fig. V is a detached perspective view of the said carrier;

Fig. VI is a top plan view of a revoluble index, included in the implement.

Fig. VII is a perspective view of the operating pinion, including its spindle and parts thereto appertaining; and

Fig. VIII is a perspective view, on a slightly larger scale, showing the head of the T-square and a fragmentary part of its blade, with a recess, perforation, and incisions therein made.

In these views the letter A represents a well-known form of drawing-board, to which the invention is readily applied. On the face of this board appears a T-square of customary outline, the same comprising a head B; and a blade C. It is understood that the parts here named are not new in themselves, and therefore pertain to the present invention only in so far as the structural details and accessories herein disclosed are concerned.

The inner side of the head B aforesaid is adapted to be moved close to and in parallelism with the adjacent edge of the board A, the blade C meanwhile sliding over the surface of the board, in the usual manner. The head, however, is not intended to touch the board, but merely follows the edge thereof, going past the teeth of a rack-bar 1, attached to the latter. The rack-bar may be held to the edge of the board by any suitable means, for instance, by screws, as 2, as indicated in Fig. I.

A pinion 3, adapted for engagement with the teeth of the rack-bar 1, is placed in a recess 4, cut into the head B, directly under that part of the blade C which is fastened to the same. The recess 4 may be circular or of any other approved shape, but in any case is open laterally, as at 5, to enable the dented perimeter of the pinion to approach and engage with the corresponding dentate face of the rack-bar.

Preferably and as shown, the pinion 3 is held in suspension from above by a spindle 7, to which it is fastened. As seen in Fig. II, the spindle passes upwardly through a carrier presently to be described, and is journaled at opposite points therein. It is also reduced in diameter at its upper end, and terminates in a threaded shank 10, engaged by a binding-nut 11.

The carrier, above referred to, is conveniently formed of a single strip of metal bent upon itself to constitute an open-sided structure, the component parts of which all appear in Fig. V, and most of them also in Figs. II and III. In the exemplification given herein, the carrier includes two substantially parallel, top and bottom portions 12 and 13, a forward wall 14 joining the same, and a flanged pendant 15, at the rear.

Referring particularly to Fig. II, it will be observed that the larger part of the spindle 7, immediately above the pinion 3, finds a bearing within an opening 18, formed in the bottom portion 13 of the carrier. Similarly, the top portion 12 of the latter is provided with a corresponding aperture through which passes a reduced part 19, of the spindle. This aperture is surrounded by a collar 20, formed integral with the top 12 of the carrier and wherein is fitted the said reduced part 19.

That portion of the blade C, which was previously referred to as fastened to the head B, is apertured, as at 21, to permit the passage therethrough of the upper part of the before described carrier, with its connected parts. The top 12 of the said carrier just projects above the aperture 21, and is held at that elevation by means of a supporting plate 22, adapted to be secured as by screws entering holes 23 in the plate 22 and corresponding holes 24 in the blade C. As shown in Figs. III and IV, the carrier is made to project upwardly through a substantially rectanguler opening 25, in the plate 22, and its top 12 is arranged to bear slidably upon oppositely-located lugs 26, 27, projecting inwardly from the side edges of the latter-named opening.

Upon the top portion 12 of the carrier and overlying the supporting plate 22, is placed a disk or dial 30, which is centrally apertured, to embrace the said collar 20 of the carrier. The upper face of this disk bears an annular series of markings occurring at regular intervals apart from one another, and denoting, for instance, in fractions of an inch or of a meter, or other unit of linear measure, any distance traversed by the T-square as it is caused to travel over the surface of the drawing-board. The distance is pointed out by an index 32, rigidly connected with a receiving portion 33, of the spindle 7, situated intermediate of the aforesaid reduced portion 19 and the threaded shank 10. As detailed in Fig. VI, the index 32 has an integral hub 34, perforated centrally, as at 35, to fit around the receiving portion 33, and both the latter and the perforation 35 are provided with co-acting straight edges 36, 37, at one side, to prevent independent rotation. The indicator disk or dial 30 and the index 32 revoluble thereover are held in place against the carrier top and the pinion spindle respectively, through the action of the binding-nut 11, engaging the threaded shank 10, aforementioned.

A resilient retainer or clamp 40 is provided to hold the disk 30 both rotatably and slidably with relation to the supporting plate 22, while the said dial has only a circular motion relatively to the top portion of the carrier and its collar. This retainer may consist of a single spring wire anchored at 40^a to one end of a ledge or outwardly extended flange 41, of the pendant 15 of the carrier, and thence reaching rearwardly so as to grasp the superimposed disk

30 and plate 22. The wire may be bent upwardly, as at 42, to bear against the under side of this plate, and downwardly, as at 43, upon the upper margin of the disk.

The recess 4, perforation 21 and opening 25 are all made sufficiently large to admit of sliding the carrier forward and back therein, either to disengage the pinion from the rack, or to re-instate the same in their meshing relation. The indicator disk held by the clamp or retainer 40, it will be seen partakes of the same movement, the portion of the clamp which grasps the disk and plate thereunder being arranged to slide in a slot 45, made in a rearward extension 46, of the plate.

The sliding back and forth of the said carrier and parts thereto connected is effected by means of a detent 48. The latter also may consist of a single spring wire attached, as at 49, to the top 12 of the carrier, and extending thence to the said slot 45. A head 50, on the rear end of this detent, serves to hold it engaged with the upper face of the extension 46. Notches 51, 52, lateral to the slot 45 serve as keepers to retain the detent in a fixed position, after it is drawn forward or rearward as the case may be. In passing from the point of attachment 49 to the slot 45, the detent wire is made to run through a notch 53, in the pendant 15. Now, in order to disengage the wire from either of the notches 51 or 52, it is strained by being bent upon the corner of the carrier where the notch 53 is located, and therefore the tendency of the wire is to carry its outer or rear end into either of the notches first mentioned. Assuming that the outer end of the wire engages the notch 52, as represented in Fig. II, the carrier is then positioned so that the pinion 3 will be in mesh with the teeth of the rack-bar 1. When it is desired to disengage the pinion from the rack, then the head 50 of the detent is pushed sidewise to retract the wire from the notch 52, and the detent is pushed forward through the slot 45 to effect disengagement of the pinion and rack, whereafter the detent is released and that part of the wire thereof which adjoins the head 50 automatically enters the forward notch 51, due to the stress exerted upon the wire by its being bent around the said corner of the carrier. A channel or slideway 55 is cut into the blade C, at the end thereof intended to be placed upon the edge of the drawing-board A, so that the wires composing the said retainer and the said detent will have the requisite clearance for their effective manipulation. The slideway 55 is covered by the extension 46 of the supporting plate 22, hereinbefore mentioned.

As before intimated, the face of the dial or disk 30 bears a series of lines drawn so as to constitute some preferred scale of measurement. These lines may be impressed into the dial's surface, or otherwise produced. Whatever is the measuring system adopted, however, the series of lines is such that it will readily accommodate itself to the same. The lines, it is to be noted, are disposed in a circle, commencing and terminating, so to say, at the one point, namely, that indicated by zero (0) in Fig. I. The circle may be divided into sections representing, for instance, quarters of an inch, or five millimeters, and these sections can also be subdivided, into smaller intervals. In either case, the index 32 will point out the exact subdivision line or lines expressing distances which the draftsman wants the T-square to traverse in laying out or performing his work. The distances may be computed uninterruptedly, as the invention admits of it. But, in changing from one interval to another while making the computation, the operator will find it to his advantage to avail himself of that peculiarity of the invention which allows the rotation of the dial independently of the index. This will enable him to bring the zero point of the former to the latter at any time desired, and therefore will facilitate greatly the computation of intervals. The edge of the dial is knurled, in order that it may have a convenient grip for the fingers in making the desired adjustments.

A concavity 58, which may be of crescent shape, as shown in Figs. I, II and VIII, is provided in the end of the blade C that overlies the head B of the T-square. The knurled edge of the dial aforesaid advances over the inner margin of this concavity, and therefore can be reached easily by the operator placing the thumb or a finger into the depression. He is thus enabled, if he so chooses, to turn the dial with the same hand that guides or pushes the head of the instrument over the surface of the drawing-board, as the work progresses.

Although the operating mechanism herein described has been shown in the annexed drawing as being centrally located with relation to the head B of the T-square, it is understood that it could be attached thereto in any other required position. It is also obvious that notwithstanding the blade appears to be rigidly connected to the head of the T-square, these parts also can well be made inter-relatively movable. It is further conceivable that instead of relying on the sliding of the T-square upon the drawing-board to cause the pinion 3, actuated by the teeth of the rack-bar 1, to move the index 32 over the dial 30, the same result could be achieved by turning the nut 11. The latter, in that case, would immediately shift the index the exact distance wanted, and incidentally would serve to rotate the pinion positively in such a manner as to advance the

T-square a corresponding interval on the drawing board.

While a certain preferred embodiment of this device has been shown and described, it will be understood that changes in the form, arrangements, proportions, sizes and details thereof may be made, without departing from the scope of the invention as defined by the appended claims.

Having described my invention, what I desire to secure by Letters Patent and claim is:—

1. A drafting implement comprising a T-square combined with a drawing board and including a carrier supported from the head of said T-square, a revoluble element sustained by said carrier, a member attached to said drawing board so as to be engaged by said element in a manner to produce a step by step movement thereof along said board, an index operatively connected with the element, and a graduated dial rotatably mounted on the carrier under said index, the arrangement being such that the index coacts with the graduations on the dial and the latter is adjustable relatively to the former.

2. The combination with a T-square and a drawing-board, of a support applied to the head of said T-square near one end, a carrier slidable relatively to said support, a revoluble element journaled in said carrier, a dentate member positioned at one edge of said drawing board for engagement by said element, an index connected to revolve conjointly with the latter, and a coöperating dial independently movable with relation to said index.

3. The combination with a T-square and a drawing-board, of a carrier slidably mounted on the head of said T-square, a gear element revolubly suspended from said carrier, a member fixed to one edge of said drawing board arranged to receive the teeth of said element, a dial rotatable independently on the carrier, an index movable relatively to said dial concurrently with the revolving of the element, and means for sliding the carrier together with the dial from a point beyond said head so as to move the gear element into or out of engagement with said member.

4. The combination with a T-square and a drawing board of a rack member attached to one edge of said drawing board, a pinion arranged to mesh with said member so as to move longitudinally thereof, a carrier supporting said pinion, a dial rotatable independently of the latter on said carrier, an index to said dial conjointly rovoluble with the pinion, and means transverse to the member for sliding the carrier to or from the same along said edge of the board.

5. The combination with a T-square and a drawing board, a support overlying the head of said T-square, a carrier slidable on said support, a pinion suspended from said carrier, a rack fixed to one edge of said drawing board in position to be engaged by said pinion, a dial on the carrier above its said support, an index connected with the pinion so as to revolve over said dial, and means for sliding the carrier sustained by the same support.

6. The combination with a T-square and a drawing board, of a carrier mounted on the head of said T-square, a gear-element revolubly supported by said carrier, a rack member fixed to one edge of said drawing board in position to be engaged by said element, a dial rotatable on the carrier, an index arranged to be revolved over said dial from the gear element, and retaining means holding the dial against rotation while said index is revolved thereover.

7. The combination with a T-square and a drawing board, of a support overlying the head of said T-square, a carrier slidable on said support, a gear element suspended from said carrier, a rack member engageable by said element at one edge of said drawing board, a dial rotatably mounted on the carrier, an index revolved over said dial from the element, means for sliding the carrier, and other means coacting with the support and the dial to hold the latter against displacement while permitting its independent adjustment relatively to said index.

8. The combination with a drawing board, of a T-square the head whereof is provided with a recess and a passage offset therefrom, a rack member attached to one edge of said drawing board, a gear element engageable with said member through said recess adjacent to said edge, a slidable carrier supporting said element in the recess, a dial on said carrier, and means located in said passage serving to slide the carrier with the gear element either toward or away from the rack member.

9. The combination with a drawing board, of a T-square the head of which is provided with a recess and a cavity, a rack fixed to one edge of said drawing board, a pinion in said head capable of meshing with the teeth of said rack through said recess adjoining said edge, a carrier sustaining said pinion within the recess, a dial rotatable on said carrier adjacent to said cavity, and an index operatively connected with the pinion to revolve over said dial.

10. The combination with a drawing board and T-square, of a rack fixed to one edge of said drawing board, a pinion carried by the head of said T-square and positioned for engagement with said rack, a spindle to which said pinion is secured, said spindle having a neck, a shoulder and a threaded shank, a carrier wherein the part of the spindle adjoining the pinion is journaled, a portion of said carrier being adapted to re-

ceive said neck, a dial rotatable on the carrier around the neck, an index carried by said shoulder in position to be revolved over said dial from the pinion, and a binding element arranged to take over said threaded shank so as to bear upon said index.

11. The combination with a T-square and a drawing board, of a supporting plate overlying the head of said T-square and including an aperture, lugs extending from opposite sides of the latter, a carrier slidably mounted on said lugs within said aperture, a gear element having a spindle journaled in said carrier, a rack member attached to one edge of said drawing board in position to be engaged by said element, a dial rotatable around said spindle above the carrier, an index fixed to the spindle so as to be rotated thereby over said dial, and means for sliding the carrier on the lugs of said plate in order to place the gear element in or out of engagement with the rack member.

12. The combination with a T-square and a drawing board, of a supporting plate formed with a passage having lateral keepers, a carrier slidable on said plate, a gear element supported from said carrier, a rack member fixed to one edge of said drawing board so as to be engaged by said element, a dial rotatable on the carrier, an index revoluble over said dial through the action of the gear element, a retainer normally holding the dial from rotation and having one end slidable in said passage, and a detent for sliding the carrier and thereto connected parts, said detent being slidable also along the passage and adapted to enter either one of said keepers for locking the gear element either in or out of engagement with the rack member.

ANDREW E. MAGNUSON.