(No Model.)

R. McCHESNEY.

ADJUSTABLE T-SQUARE.

No. 483,499. Patented Sept. 27, 1892.

Fig: 1

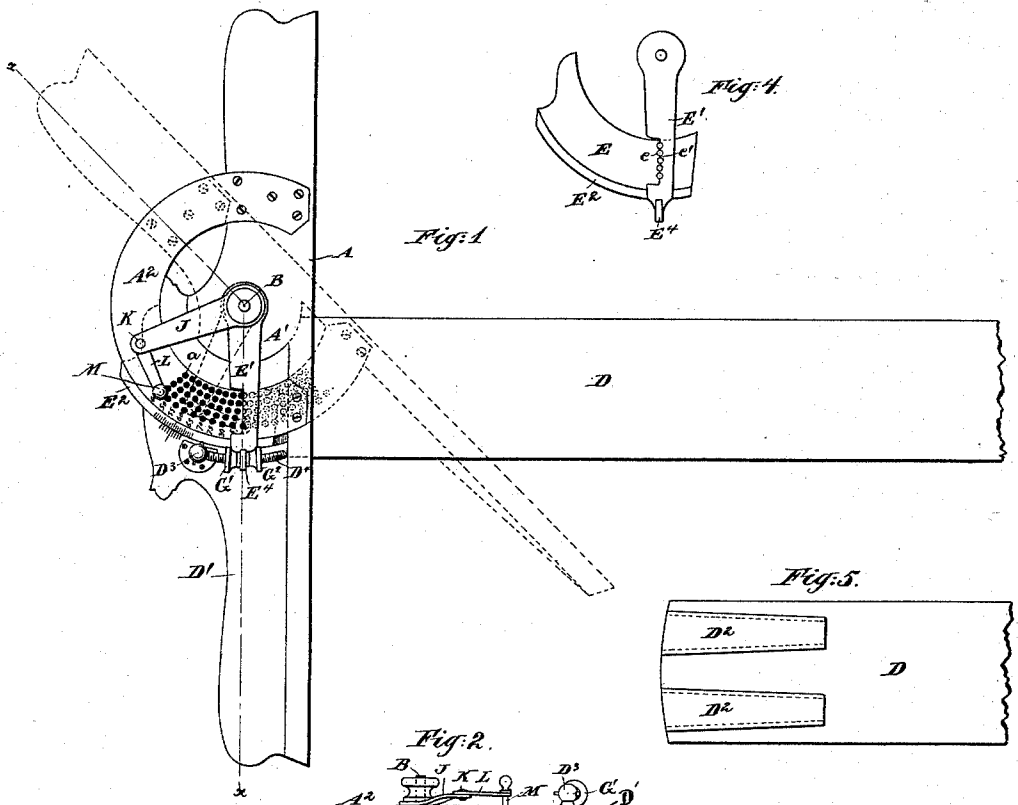


Fig: 4.

Fig: 5.

Fig: 2.

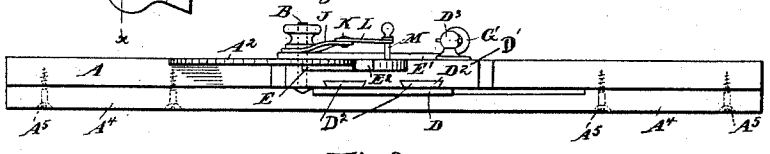


Fig: 3.

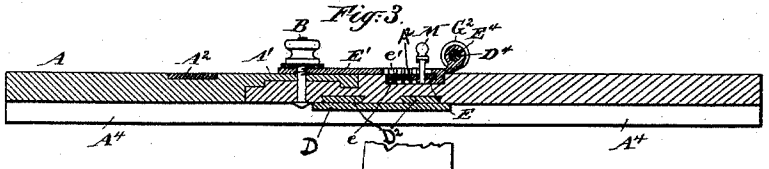
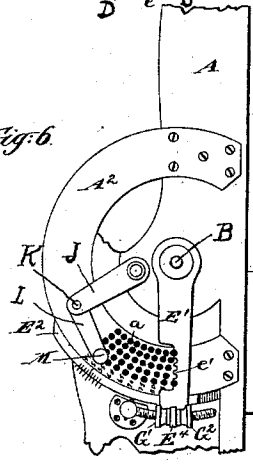


Fig: 6.



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UNITED STATES PATENT OFFICE.

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ADJUSTABLE T-SQUARE.

SPECIFICATION forming part of Letters Patent No. 483,499, dated September 27, 1892.

Application filed July 28, 1891. Serial No. 400,964. (No model.)

To all whom it may concern:

Be it known that I, REUBEN McCHESNEY, a citizen of the United States, residing in the city and county of Philadelphia, and State of Pennsylvania, have invented a certain new and useful Improvement in Adjustable T-Squares, of which the following is a specification.

My improved square-like other adjustable T-squares, can be so set as to produce lines exactly at right angles to the edge of the board. In other words, it can be used as an ordinary T-square, or it can be set at various angles ranging from the right angle to a little beyond forty-five degrees. A pinching-screw, with a sufficiently-large milled head, allows the blade to be set firmly in any position and used thus set for any length of time required. I provide a circular or annular plate serving as a "protractor," and which I will call by that name, carried on the T-piece and working adjacent to a rim supported in an arm extending from the blade. I will term this arm the "L-piece." Graduations, preferably of the kind known as "vernier," may be engraved on this arm and on the adjacent surface of the rim to aid in setting the blade at any given angle relatively to the T-piece. The swiveling part or T of my square presents the proper offset on each face, so that the square may be used either side up, the lines presenting the required angle to the edge of the board inclining in either one direction or the other. A series of holes of equal size are arranged in a radial line on the L-piece, or on a plate fitted thereon, under or behind the protractor. I drill or otherwise produce a number of series of holes in the protractor, all exactly alike and equally spaced and all standing at a slight inclination relatively to the radial line. A cylindrical pin is provided which will exactly fill a hole. When the blade is set in one position relatively to the T-piece, the pin will fit in one of the holes in the protractor, and extending through this will fit in the hole in the plate behind. I provide an arm extending across the front face of the protractor, with one edge adapted to receive such pin in position exactly coinciding with the several holes in the plate beneath. So long as the parts are thus engaged the blade is locked firmly thereby, and the device may be used either side up for any period, making the lines with the corresponding uniform inclination to the T-piece, and consequently to the edge of the drawing-board. When it is desired to greatly change the inclination, the pin must be removed. Now by turning the blade a certain amount the next hole in the series will be brought into coincidence with the corresponding hole in the plate behind it and with the adjacent edge of the bar in front. Now the pin being inserted will again lock the blade in the new position. To change it still further, the pin must be removed, and after turning the blade again to the same extent the pin can be again inserted in another hole in the series, and so on. Care is taken to so determine the inclination of the lines of holes in the protractor relatively to the single line of holes in the plate behind it and to the bar in front that when the pin has been traversed through the whole series of one line of holes and is again detached and the blade again shifted the same amount in the same direction as before the pin will match in the first hole of the next series, and so on. This makes the several series of holes available to determine finely-spaced positions of the blade relatively to the T-piece. The amount of angular difference in the position thus determined by the insertion of the pin in the several holes may vary according to the fineness of the instrument and the expense to be involved in its manufacture. I have in my experiments provided nine series of holes with five in each series, and the changes of position of the blade to insert the pin in the next hole indicate always just one degree. I scallop the edge of the bar. This affords a better bearing against the cylindrical surface of the pin; but this is not absolutely essential. I mount the locking-pin on a swiveling arm carried on a lever adapted to turn freely on the center. The elasticity of the parts urges this pin firmly into the holes and allows it to be lifted out by a gentle force when it is desired to transfer it from one hole into another. In practice the series of holes in the protractor being properly marked to distinguish them

one from another the pin may be rapidly and instantly set in the desired hole with the blade out of position. The blade is turned either slowly or rapidly, and on arriving at the proper position the holes will coincide and the pin will snap into its place by the elasticity of its connections and the locking is complete. It remains to be shown how the blade may, when required, be set in any intermediate position. The back plate and the front arm are not immovably attached to the L-piece. They are capable of being turned slightly on the center. This is effected by a screw with two nuts. The position may by this means be determined with any degree of fineness.

The accompanying drawings form a part of this specification and represent what I consider the best means of carrying out the invention.

Figure 1 is a face view of the square, the strong lines showing the blade at right angles to the T-piece and the dotted lines showing it set at a considerable angle thereto. Fig. 2 is an end view from the left in Fig. 1. Fig. 3 is a section on the angular line $x\,x$ in Fig. 1. Fig. 4 is a plan view of certain portions in the position corresponding to Fig. 1. Fig. 5 is a plan view of a portion of the blade alone. Fig. 6 is a plan view showing a modification.

Similar letters of reference indicate corresponding parts in all the figures where they appear.

A is the T-piece which applies against the edge of the drawing-board, certain portions being designated, when necessary, by supernumerals, as A′. One part is wide and a certain portion A′ near the center is finished with an exactly-circular contour to aid the central pivot B in holding the blade D and its arm or L-piece steadily pivoted. A protractor or annular plate A^2, extending around something more than a semicircle, is fixed on and forms a part of the T-piece. It is graduated near its periphery, and also is provided with a number of holes a, arranged in equal series, as shown. The L-piece D′ on the blade D has a circular recess receiving the boss A′ of the T-piece and matching accurately thereto, and also has an annular recess receiving the annular plate A^2 and matching thereto by the aid of a back plate E, underlying or behind a portion of rim E^2 on the outer edge thereof, and an arm E′, extending inward from such rim across the face of the annular plate and taking hold of the center pivot B. The piece E E′, &c., is slightly movable relatively to the blade and performs important functions in determining fine adjustments. An eye E^4 extends upward from the outer extremity of the arm E′ and supports a curved rod D^4, one end of which is pinned or otherwise held in a post D^3. This curved rod D^4 is screw-threaded.

G′ G^2 are milled nuts mounted loosely thereon and capable of being turned by the fingers of the operator. These nuts control the adjustment of the part E E′ E^2 relatively to the blade D and its L-piece D′.

A series of holes e are drilled or otherwise produced in the back plate E and the corresponding adjacent edge of the bar E′ is correspondingly scalloped, as indicated by e'. There is the same number of holes e as in a single series of the holes a, and they are correspondingly spaced with reference to their distance from the center B. On turning the blade D and its attached arm or L-piece D′ the series of holes e and corresponding scallops e' may be traversed partially around on the annular plate A^2, and any given hole in any one series may be brought to exactly match with the corresponding hole in the back plate; but the holes are so arranged that only one will coincide in any given position.

M is a pin adapted to match in any one of the equal holes a and also to engage in the corresponding hole e and extend through and engage a scallop e' when the parts are adjusted in the right position. This pin M is carried on a swiveling piece or link L, connected by a pivot K to an arm J, which is adapted to turn freely on the pivot-pin B. Both the arm J and the link L are elastic and exert a force tending to snap the pin M into the holes, but yield to allow the pin to be withdrawn by a gentle force of the fingers to allow the instrument to be set in a new position. There are five holes a in each of the nearly-radial series and five holes in the single series e, arranged slightly obliquely thereto. This gives a capacity for adjustment for each degree of angular movement of the blade D relatively to the T-piece A.

To shift the blade any desired number of degrees, the operator may draw the pin M out of its engagement in its hole a, then set the blade in the required new position and turning the link L to allow the pin to be shifted outward or inward from the center, and turning the arm J slightly, if necessary, to accommodate the new position, inserting the pin in the different holes which are now brought into line; but an easier and more expeditious mode is available, simply to turn the blade to or near a right angle with the T-piece. This will expose all the holes. Then insert the pin M in the required hole and turn the blade rapidly to carry the bar E′ against the pin, the latter serving as a stop. The proper hole e will thus be certainly brought into position and the pin M will by the elastic force of its holding means snap into engagement with such hole e.

The curved rod D^4 might be rigidly set in the post D^3. I prefer to allow a little play up and down; but there should be no liberty for end movement of the rod D^4. These parts determine the adjustment of the blade E and its attachments relatively to the L-piece D′. By slacking one of the nuts G′ G^2 and screwing up the other the entire piece E E′ E^2 E^4 may be shifted around to the extent of one degree or

more on the L-piece D′. This adjustment may be effected either before or after the pin M has been engaged in the proper hole.

I make the T-piece A with a front bar A^4, rigidly connected by screws A^5 or other suitable means. This attachment is finished with its working face coinciding exactly with the working face of the adjacent part A and allows the instrument to be used either side up. When used in the ordinary position, with the mechanism on the upper side, this piece A^4 applies against the edge of the drawing-board. When the instrument is inverted, so as to present the mechanism on the under side and this removable piece A^4 on the upper side, the edge of the part A matches against the board. This capacity for inverting the square allows the lines to be inclined either to the right or to the left with exactly the required inclination.

I make the blade D in a separate piece from the L-piece D′ and engage them by means of cheeks D^2 of dovetail section, rigidly fixed on the blade and matching in corresponding dovetail recesses in the back face of the L-piece. This allows the parts to be separated for transportation or repairs.

Modifications may be made without departing from the principle or sacrificing the advantages of the invention. It is not necessary that the center on which the arm J turns shall coincide with the center of the T-piece A. The two may turn on centers entirely independent. Fig. 6 shows such an arrangement.

Instead of the two nuts G′ G^2, I can effect the object by using either one alone and introducing a sufficiently-powerful spring in place of the other. I prefer the entire construction, as shown in Figs. 1 to 5.

I claim as my invention—

1. In a T-square, the blade D, provided with dovetail cheeks D^2, in combination with an L-piece D′, having corresponding dovetail grooves and with the swiveling T-piece A and the attached bar A^4, allowing the device to be used for right and left bevels by inverting, all substantially as herein specified.

2. In an adjustable T-square, the blade D, having the arm or L-piece D′, in combination with a swiveling T-piece A, turning on a center B and having an additional circular bearing A′ and an annular protractor A^2, arranged to serve as herein specified.

3. In an adjustable T-square, the blade D, having the arm or L-piece D′, in combination with a swiveling T-piece A, turning on a center B and having an additional circular bearing A′ and an annular protractor A^2, and back plate E, with a series of holes *e* in one part and a number of series of holes *a* in the other part, adapted to be secured in predetermined positions by the pin M, as herein specified.

4. In an adjustable T-square, the blade D, having the arm or L-piece D′, in combination with a swiveling T-piece A, turning on a center B and having an additional circular bearing A′ and an annular protractor A^2, and back plate E, with a series of holes *e* in one part and a number of series of holes *a* in the other part, adapted to be secured in predetermined positions by the pin M, and the front arm E′, adapted to form an additional bearing for the pin M, and a stop in rapidly setting the device, as herein specified.

5. In an adjustable T-square, the blade D, having the arm or L-piece D′, in combination with a swiveling T-piece A, turning on a center B and having an additional circular bearing A′ and an annular protractor A^2, the protractor having a number of series of equal holes *a*, and the plate E, having one series of corresponding holes *e*, and an arm J, joint K, link L, and pin M, arranged for joint operation as herein specified.

6. In an adjustable T-square, the blade D, having the arm or L-piece D′, in combination with a swiveling T-piece A, turning on a center B and having an additional circular bearing A′, and an annular protractor A^2, and back plate E, with a series of holes *e* in one part and a number of series of holes *a* in the other part, adapted to be secured in predetermined positions by the pin M, the front arm E′, adapted to form an additional bearing for the pin M, and provisions, as the threaded rod D^4 and nuts G′ G^2, for adjusting the plate E and bearing E′ relatively to the blade D, as herein specified.

In testimony that I claim the invention above set forth I affix my signature in presence of two witnesses.

REUBEN McCHESNEY.

Witnesses:
MARY F. BOYLE,
CHARLES R. SEARLE.