

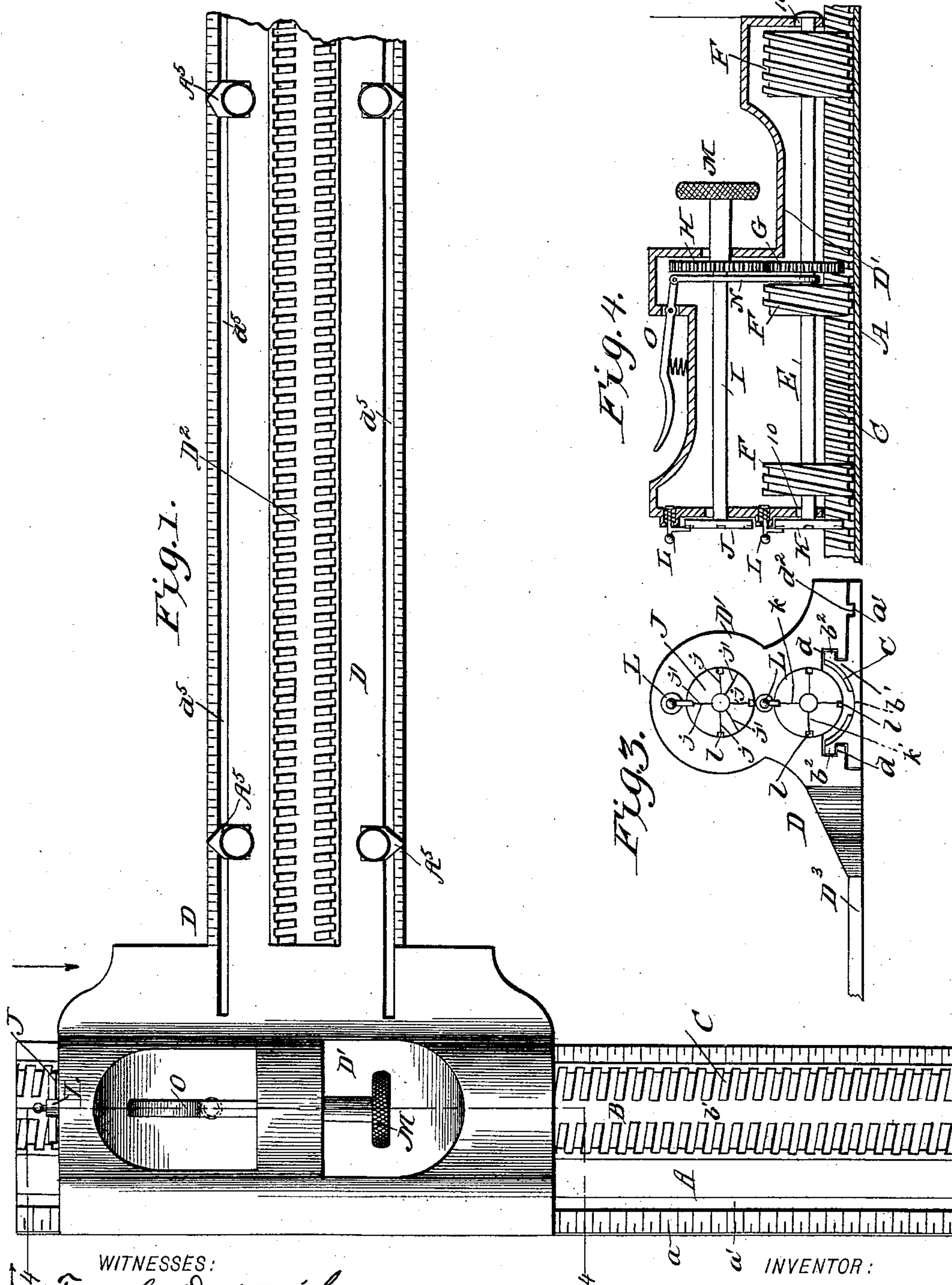
(No Model.)

2 Sheets—Sheet 1.

G. A. BROWN.
PLOTTER.

No. 444,312.

Patented Jan. 6, 1891.



WITNESSES:

Fred G. Dietrich

W. D. Blondel.

INVENTOR:

George A. Brown.

BY *M. L.*

ATTORNEYS

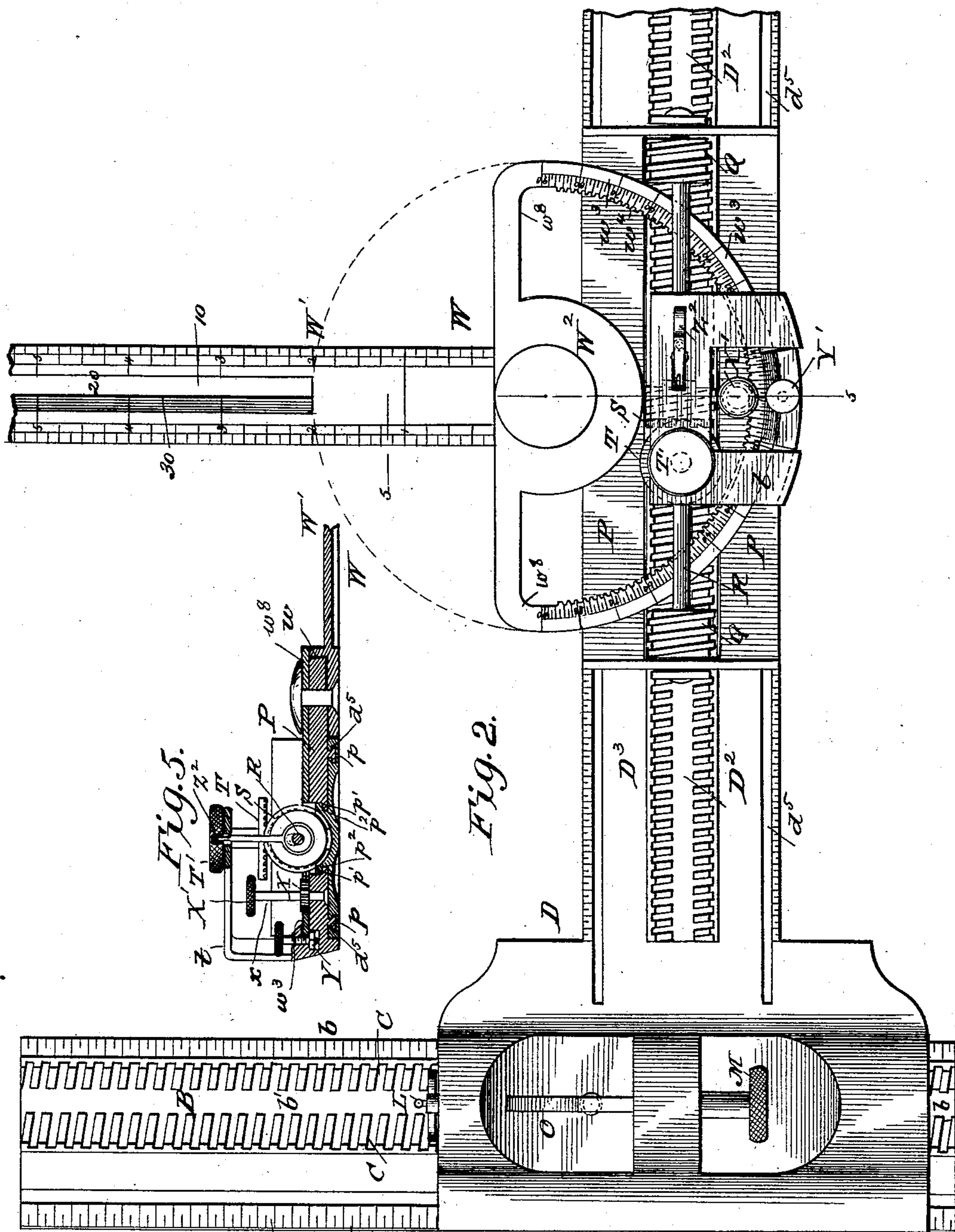
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UNITED STATES PATENT OFFICE.

GEORGE A. BROWN, OF PARK CITY, UTAH TERRITORY.

PLOTTER.

SPECIFICATION forming part of Letters Patent No. 444,312, dated January 6, 1891.

Application filed April 5, 1890. Serial No. 346,768. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. BROWN, residing at Park City, in the county of Summit and Territory of Utah, have invented certain new and useful Improvements in Drawing-Instruments, of which the following is a specification.

My invention has for its object to provide a suitably-constructed drawing-instrument which will serve as a combined T-square and protractor, whereby the same can be readily adapted for architectural or surveyors' uses.

My invention consists in providing a suitable base-plate or ruler adapted to be held in any suitable manner upon a drawing board or table having a longitudinal rack-gear groove, a T-square provided with a base-plate adapted to be slid onto the said ruler for longitudinal movement thereon, providing such T-square base with a longitudinal shaft carrying worm gear or gears adapted to engage the groove in the ruler-base, and providing suitable operating thumb-screws whereby said T-square can be moved across the drawing-board in either direction to predetermined positions.

It also consists in forming the T-square blade with a suitably-arranged rack-gear groove adapted to receive suitably-constructed gearing devices held on the base of a protractor, and providing said protractor with a blade and with suitably-arranged thumb-operating knobs, whereby said protractor may be adjusted to the positions required in relation to the T-square blade.

My invention finally consists in the sundry novel arrangement and peculiar combination of parts, all of which will hereinafter be fully described in the annexed specification, and particularly pointed out in the claims, reference being had to the accompanying drawings, in which—

Figure 1 is a plan view of my improved drawing-instrument, showing same adapted for architectural uses. Fig. 2 is a similar view showing same as adapted for surveyors' uses. Fig. 3 is an end view looking in the direction indicated by the arrow. Fig. 4 is a cross-section on the line 4 4, Fig. 1; and Fig. 5 is a similar view taken on the line 5 5, Fig. 2.

In the accompanying drawings, A indicates

a metal plate formed with straight edges, provided with the usual inches and metric scales, as shown at *a* and *b*, respectively. The upper face of the plate A is formed with a semi-circular longitudinal groove B, the base of which is formed with a recess *b'* and the side walls thereof with obliquely-arranged rack-teeth C, as shown, the recess *b'* serving to take up the dirt or dust which might collect in the groove B, thereby admitting of the same being quickly brushed out. The upper face of the lower part of the plate A is also provided with a longitudinal groove *a'*, and the upper edge of the groove portion B of the plate is formed with tongues *b² b³*, which fit into grooves *d d*, formed in the head D' of the T-square D, said head being also provided with a rib *d³*, which fits the groove *a'*.

E denotes a shaft journaled in the head D' of the T-square in elongated bearings formed therein, whereby said shaft is adapted for slight vertical movement for a purpose presently explained. One or more worm-wheels E E are held on said shaft to turn therewith, the lower faces of which normally seat in the curved teeth C in the groove B, said shaft being also provided with a cog-wheel G, which meshes with a cog-wheel H on a shaft I, arranged parallel with and over the shaft E, said shaft being also journaled in the head D' for a slight vertical movement.

Upon the outer ends of the shafts E and I are secured indicator-wheels J and K, one of which J is provided with a series of graduations *j* and with a second series *j'*, the wheel K being also provided with a series of graduations *k k*, as shown. By reference to Fig. 3 of the drawings it will be seen that I arrange four marks *j*, forming the wheel into quarter-sections, and three marks *j'*, forming said wheel into three sections, the wheel K being divided into quarter-sections, as shown at *k*. The relation of the shaft E and its wheel K to the rack-groove B' is such that a complete revolution of the said shaft will cause the T-square to be moved one-fifth of an inch, and each quarter movement thereof one-twentieth of an inch.

As it is intended that a complete revolution of the shaft I shall move the T-square one-fourth of an inch, I provide the cog-gear

G with twenty teeth and then make the gear H on the shaft I of a proportionately larger size and provide same with twenty-five teeth. By this construction it will be seen that one
5 complete revolution of the shaft I will cause the T-square to be moved one-fourth of an inch, and each quarter-revolution one-sixteenth of an inch.

As it sometimes is desirable to draw parallel lines but one-twelfth of an inch space apart, I therefore also provide the wheel J with the thirds divisions, as stated. Each one-third of a revolution of the wheel J will indicate a space of one-twelfth of an inch.

15 At the outer edges of the several graduation-marks j and k the wheels J and K are formed with notches l , with which engage suitably-arranged spring-latches L, which serve to automatically lock into the several
20 notches and hold the T-square from being accidentally moved too far.

It will be understood that the several quarter-sections on the wheels J and K can be subdivided to halves, quarters, &c., and the
25 T-square adjusted to draw parallel lines spaced to any degree desired.

Any suitable means for operating the shaft E may be employed; but I prefer the construction shown in the drawings, which consists in extending the shaft I and providing
30 the same with a thumb-knob M.

In operation, when used for architectural purposes, the operator gages the movement by the upper disk, the movement of the T-square being indicated thereon, and each space on
35 the disk being subdivided into halves and quarters admits of the T-square being moved to any extent desired without the necessity of the draftsman using dividers and the like
40 to indicate the proper points.

When it is desired to shift the T-square on the base-plate A to remove same therefrom or when detached to slip it in position, I provide a rod and link N, which is looped
45 under the shaft E, the upper end of which is connected to the inner end of a spring-actuated thumb-lever O, disposed on the upper face of the head D'. By depressing said thumb-lever the link N will lift the shaft E
50 in its bearings and hold the worm-gears F out of engagement with the groove B, thereby permitting of a free movement of said head. The straight edge of the T-square blade is also provided with a central groove D², which
55 is fitted with a longitudinal recess and curved rack-teeth similar to the groove B and with longitudinal grooves d^3 d^5 , in which tongues p p on a base-plate P fit, said plate being further held on the blade D³ by the tongue-
60 and-groove connection p' and p^2 . In elongated bearings formed on said base-plate is journaled a shaft R, which is provided with worm-gears Q, which normally mesh with the rack-teeth in the groove D², said shaft being
65 also provided with a cog-wheel S, with which meshes a cog-wheel T, held on the under face of a bracket t of the plate P, the upper end

of the shaft of such wheel being provided with a suitable thumb-nut T', as shown, by the adjustment of which the protractor can
70 be adjusted longitudinally on the T-square blade, as desired.

The protractor W consists of the blade W' and the head W², said head being formed, preferably, by bifurcating the rear end of the
75 blade, as at w , and extending the upper portion over the base-plate P and under the shaft, said extension w^8 being formed into a protractor-plate having the usual graduated scale thereon, said plate being cut away, as shown
80 in Fig. 2, whereby an annular ring portion w^3 is provided, the inner edge of which is formed with a series of teeth w^4 , with which meshes a pinion X, mounted on a short shaft x , journaled in the base-plate, the upper end
85 of which projects above the protractor-plate and is provided with a suitable thumb-piece X', as shown. The base-plate P is also provided with a short upward extension having graduations upon its face, which serve as a
90 guide for setting the protractor-plate to its normal position.

By the above-described construction it will be seen that by turning the thumb-nut T the plate P and the protractor can be adjusted
95 longitudinally on the T-square blade D³, and when set to its proper position on the blade D³ the protractor-blade can be swung to an acute or obtuse angle to the blade D³ by turning the shaft x and the pinion X, and when
100 adjusted to the angle desired the protractor can be held in such position by tightening the nut Y through the medium of the thumb-piece Y'. (See Fig. 5.) When it is desired
105 to remove or slide the protractor along the blade D³ rapidly, by pressing on the thumb-lever Z², which is constructed similar to the lever, the worm-wheels will be held from contact with the rack-groove gears.

The protractor-blade is provided with the
110 usual graduations on its straight edges, as shown. The lower face of the blade is concaved its entire length, except a portion 10, which extends inward to the center of the blade in line with the pivotal axis of the blade, a longitudinal slot 20 being formed. By this arrangement it will be seen that the draftsman
115 can obtain any angle he desires by adjusting the edge 30 in line with the axis, and after marking the desired angle on the paper he
120 can adjust the protractor on the blade D³ so as to make lines parallel on the same angle, if desired.

A⁵ A⁵ denote stop-plates secured upon the blade D³, which are adapted for adjustment
125 thereon, the edges thereof projecting over the edges of the blade D³. By spacing these stop-plates to the proper distances on the blade D³ the length of the lines to be drawn will be determined thereby.
130

From the foregoing description, taken in connection with the drawings, the advantages and operation of my invention will be readily understood by those skilled in the art to which

it appertains. The same is exceedingly simple in construction and its operation sure and positive, its supplying an instrument by the use of which the trouble, anxiety as to the proper dimensions, and loss of time in computing and making measurements in the usual manner incident to architectural or surveyors' work are reduced to a minimum.

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

1. An improved drawing-instrument comprising a fixed base-plate, a T-square held for longitudinal movement thereon, and a protractor adapted to be detachably connected to the blade of said T-square and have longitudinal movement thereon, substantially as shown and described.

2. An improved T-square consisting of a base-plate adapted to be held upon the drawing board or table, provided with a longitudinal rack in its upper face, a T-square formed with a head portion D', held to slide on said base, a shaft journaled in said head D', provided with worm-gears adapted to engage the longitudinal rack in the base-plate, an indicator-wheel held on said shaft, and means for operating said shaft, substantially as and for the purpose described.

3. An improved T-square comprising a base-plate having a longitudinal rack-groove, a T-square portion formed with a head D', held to slide on said base-plate, a shaft journaled in said head, provided with worm-gears engaging the longitudinal rack-groove in the base-plate, a second shaft mounted in said head, differential gear-connections between said shafts and indicator-wheels mounted on the ends of said shafts, and means for operating said shafts, as shown, said wheels adapted to indicate the degrees of movement of said T-square in relation to the base-plate, substantially as and for the purpose described.

4. An improved T-square comprising the base-plate A, having a longitudinal rack-groove in its upper face, the T-square portion D, formed with a head D', detachably held to slide on said plate A, a shaft journaled with

slight vertical movement in said head, having worm-gears adapted to engage said longitudinal rack-groove in the base-plate, means for rotating said shaft, whereby said head D' is moved gradually in longitudinal directions on said base-plate, and the lifting mechanism, substantially as shown, for raising said worm-gears from contact with the said rack-groove, whereby said head D' can be quickly moved on the base-plate, substantially as shown and described.

5. The combination, with the base-plate A and the T-square D, held for longitudinal movement thereon, of a protractor held for longitudinal movement on the T-square blade D³ and means for moving said protractor at angles to said blade, substantially as and for the purpose described.

6. The combination, with the T-square blade D³, formed with a longitudinal rack-groove, a head P, having worm-gearing mounted therein, adapted to engage said groove, and means for rotating such worm-gears, whereby said head is moved longitudinally on said blade, of a protractor held over said head and having a pivotal connection therewith and means for adjusting said protractor at angles to the blade D³, substantially as and for the purpose described.

7. The combination, with the T-square D, formed with a longitudinal rack-groove on its upper face, a head P, held to slide thereon, a shaft journaled therein having worm-gears adapted to engage the rack-groove in the blade D³, and means for rotating said shaft, as shown, of a protractor held over said plate P and pivotally connected therewith, said protractor formed with a blade having an elongated opening, one wall of which is in line with the pivotal axis of said protractor, and the gear mechanism for adjusting said protractor on its pivot, substantially as shown and described.

GEO. A. BROWN.

Witnesses:

SOLON C. KEMON,
CHAS. A. PETTIT.