(No Model.) 3 Sheets—Sheet 1.

L. DIETMANN.

INSTRUMENT FOR MAKING PERSPECTIVES, &c.

No. 511,687. Patented Dec. 26, 1893.

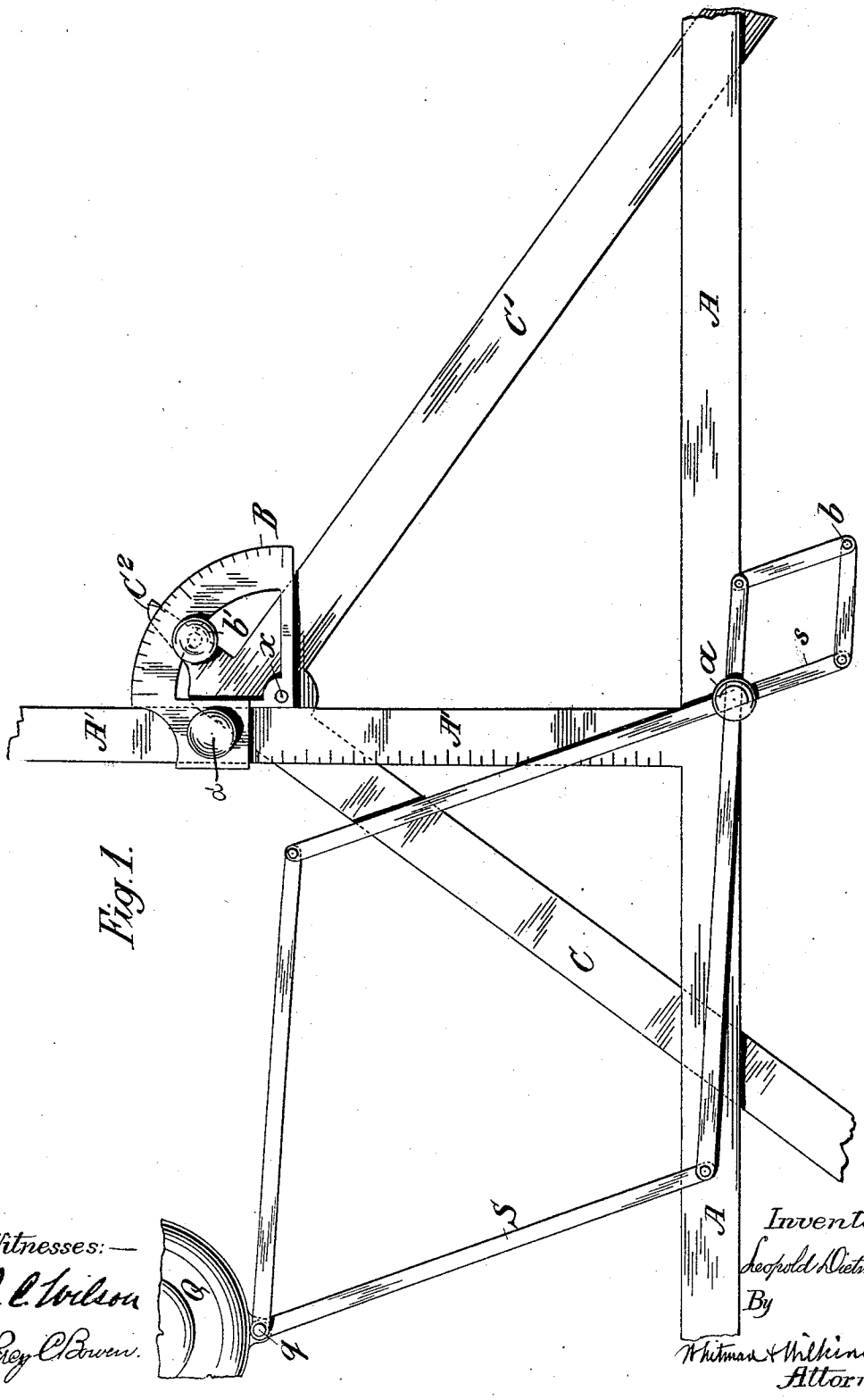

Fig. 1.

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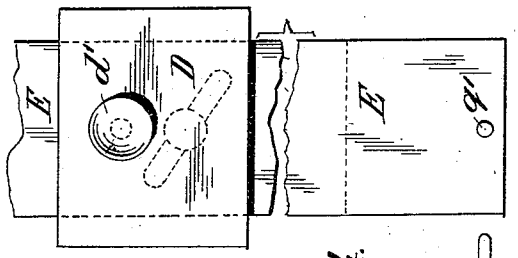

Fig. 4.

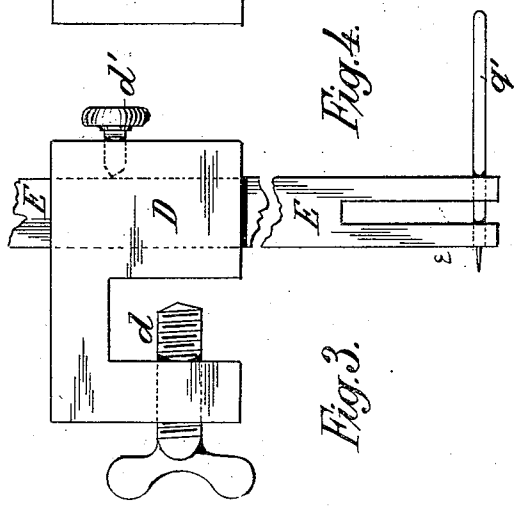

Fig. 3.

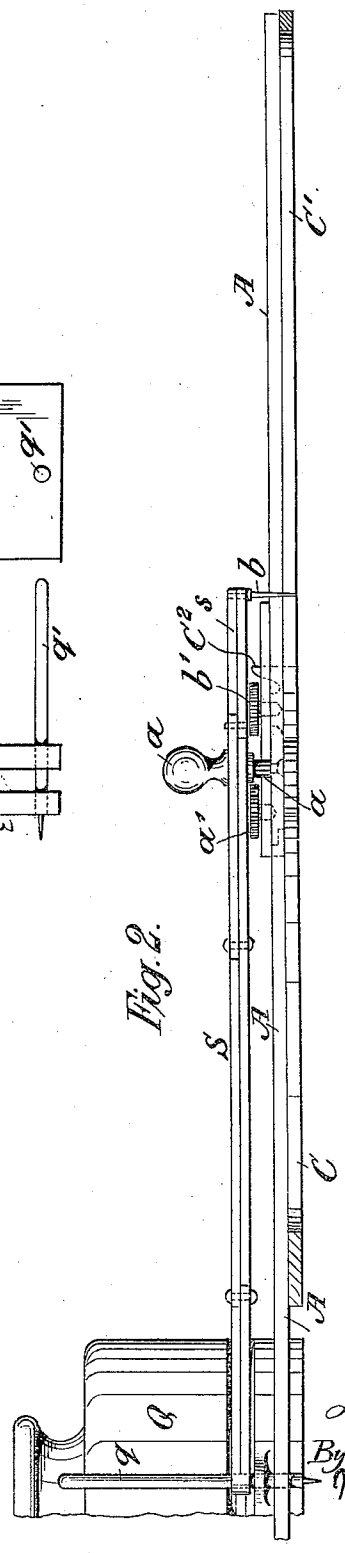

Fig. 2.

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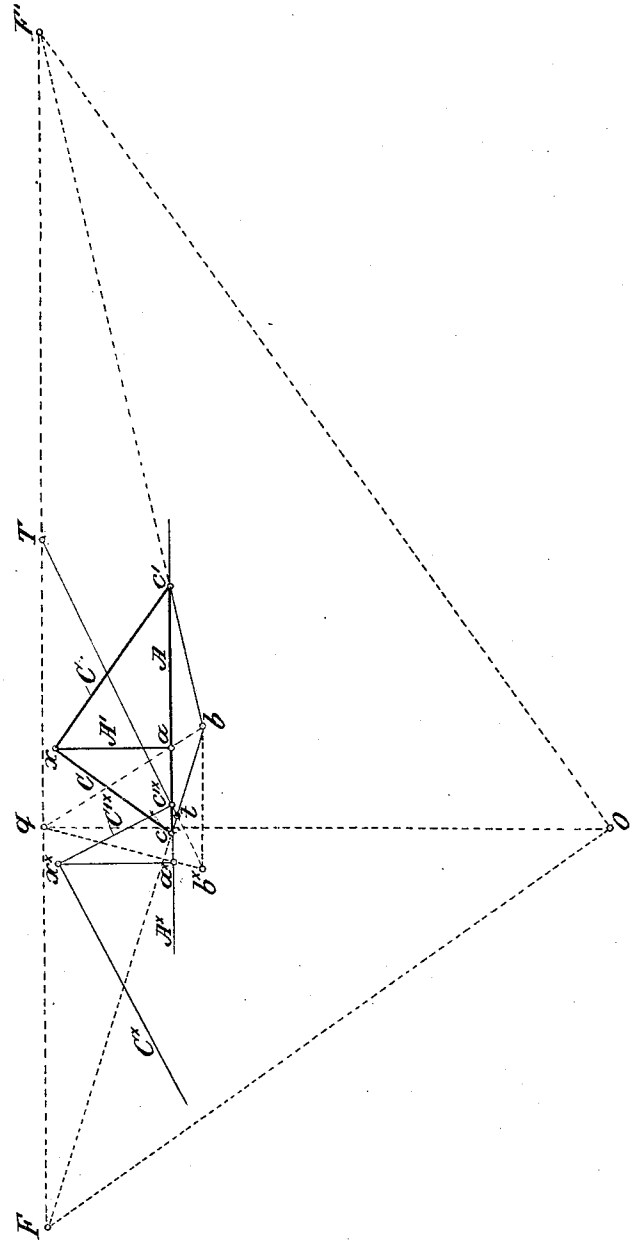
Fig. 5.



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UNITED STATES PATENT OFFICE.

LEOPOLD DIETMANN, OF VIENNA, AUSTRIA-HUNGARY.

INSTRUMENT FOR MAKING PERSPECTIVES, &c.

SPECIFICATION forming part of Letters Patent No. 511,687, dated December 26, 1893.

Application filed July 18, 1893. Serial No. 480,815. (No model.)

To all whom it may concern:

Be it known that I, LEOPOLD DIETMANN, commonly known as LEO DIET, a subject of the Emperor of Austria-Hungary, and a resident of the city of Vienna, in Austria-Hungary, have invented certain new and useful Improvements in Instruments for Use in Making Perspectives and other Drawings, of which the following is a specification.

The object of this invention is to provide an instrument termed a "perspective ruler" whereby a plan and elevation of any object may be converted into a perspective view without resorting to mathematical construction.

The said invention will be clearly understood by reference to the accompanying drawings, in which—

Figure 1 is a plan, and Fig. 2 a front view of the instrument arranged for use upon horizontal drawing boards. Fig. 3 and 4 are, respectively a side elevation and a plan showing a modified arrangement for determining the visual point or point of sight in cases where the drawing board is in a vertical position. Fig. 5 shows the theory of the operation.

The instrument consists of a ruler A movable both in the longitudinal direction and in a direction at right angles thereto, on parallel lines only; to this ruler A is rigidly attached a perpendicular ruler A′ provided with graduation or division lines. Against this second ruler A′ is placed a protractor B capable of being moved or adjusted along the said ruler, and of being fixed in any desired position by means of a set screw a'. To the center x of the protractor B are pivoted two rulers C C′ rigidly connected at right angles to each other, and adapted to be secured in any required position by means of a set screw b' which at the same time secures in place, against the protractor, an index or pointer C^2 which is an extension of the ruler C. The ruler A carries at a the fixed pivot of a pantograph S s the terminal points q and b of which are fitted with marking pencils or styles.

The style or marker q at the end of the larger parallelogram, which, as will presently be explained, is intended invariably to retain its position, may, in the case of a horizontal drawing board, be maintained in place by a weight Q. Where the drawing board is vertical, a bar E may be provided which is adjustable and which by means of a set screw d' may be fixed in any desired position in a block or clamp D capable of being tightly secured to the board by means of a screw d. In the forked end e of the said bar E is mounted a style or marker q'.

The theory of operation of the instrument and the manner in which it is to be employed are illustrated in Fig. 5.

The pencil or style q at the end of the larger parallelogram of the pantograph is brought to what is intended to be the visual point or point of sight of the perspective view to be drawn, while the ruler A is fixed so as to be parallel to the horizon F q F′. Assuming the problem to be, to draw a straight line from a given point of the perspective, which line should form a predetermined angle q F O with the plane of the picture and itself lie in a plane parallel to that determined by the eye of the observer and the horizon F F′. The ruler C is first so adjusted as to form an angle equal to q F O with the ruler A (for which purpose the protractor B is used.) The instrument is then moved until the style b at the end of the smaller parallelogram s of the pantograph coincides with the given point of the perspective image; the other style q, however, remaining stationary, and the ruler A remaining parallel to the horizon F F′. Now the straight line drawn from the point b to the vanishing point F will not pass through the point of intersection c of the two rulers C and A (*i. e.* supposing the position of the pivot points x and a on the inner edge of the ruler A′ to be as shown in Figs. 1 and 2) unless the following ratios are obtained:

$$qb : ab = Fq : ca$$

but since the angle qFO = the angle xca △ $qFO \sim xca$; the existing proportion consequently is:

$$Fq : ca = qO : ax.$$

The point c therefore lies in the straight line bF when

$$qb : ab = qO : ax.$$

The distance between the two points a and x

must therefore be so determined as to be in the same relation to the visual distance, as the diagonal of the small parallelogram of the pantograph to the sum of diagonals of the large and small parallelograms of the pantograph. When the distance has thus been adjusted, the point of intersection c will be situated on the straight line drawn from the point b to the vanishing point. It will therefore be sufficient to mark the said point c and draw the line $b\ c$ to solve the problem as stated above, and $b\ c'$ will, as a matter of course, be the perspective image of the perpendicular constructed on $b\ c$.

Should it be desired to cut the straight line $b\ c$ at a certain distance, the ruler C is so adjusted that in conjunction with the ruler A it forms an angle equal to $\frac{1}{2}q$FO.—A line $b\ b^*$ is then drawn parallel to the ruler A a given distance being measured off in the required direction (according to the amount of correction necessitated by the position of the point b relatively to the plane of the picture) whereby the point b^* is reached. The style b is next placed at b^*; the point of intersection c'^* of the ruler C'* with the ruler A* is marked off; and the straight line $b^*\ b'^*$ is drawn, which, as will be readily seen, passes through the point of intersection T. The intersection t of the line $b^*\ c'^*$ with the line $b\ c$ then gives the required perspective image of the terminal point b^*.

A* a^* x^* C* C'* here designate the same parts as do the corresponding letters without the asterisk in Fig. 1 when these parts occupy the positions conductive to the solution of the second problem.

From the foregoing description any person skilled in the art of perspective drawing will readily understand the manner in which the instrument should be handled in a given case. The same instrument will prove serviceable in working out the problem above stated inversely, that is to say, in constructing a plan and elevation from a given perspective view. For this purpose it is only necessary to find by construction or conjecture the visual point or point of sight and horizon for the two main lines of the image which lines extend at right angles to each other in the same plane.

Let the point be q and the horizon line, for he lines $b\ c$ and $b'\ c'$ as at F F' Fig. 5. The style q is placed at the visual point, and the style b at the point of intersection of the two lines $b\ c$ and $b'\ c'$; the ruler A is made parallel to the horizon, and the two rulers C C' are turned and shifted until they pass through the points of intersection $c\ c'$ of the ruler A with the lines $b\ c$ and $b'\ c'$ the styles q and b however, remaining at rest in the meantime. The distance between a and x will then be proportional to the visual disance while the angles $x\ c\ a$ and $x\ c'\ a$ give the degree of inclination of the two straight lines to the plane of the picture. The point x is determined on the ruler A by tightening the screw a'. If it be desired to determine the exact length of part of the line $b\ c$ say the distance $b\ t$, the ruler C is placed in such a position as to include between it and the ruler A an angle equal to one-half $x\ c\ a$ whereupon the style b is moved in a straight line parallel to the horizon (q remaining stationary and A parallel to the horizon) until a straight line ($b^*\ c'^*$, Fig. 5) passing through the intersection of C' and A and through the point b^* intersects the line $b\ c$ at t. It will be understood that the distance $b\ b^*$ Fig. 5, thus found, requires correcting, in accordance with the position of the point b in relation to the plane of the image. When the distance $a\ x$ is found for a given perspective view in the manner above stated it is only necessary in order to determine the angle of inclination of a line to the plane of the picture to place the style b at any point of such line, and then to turn the rulers C C' about x until one of them passes through the point of intersection of the said line with the ruler A. The angle which the ruler C or C', then forms with the ruler A gives the required angle of inclination.

I claim—

An instrument for converting a plan and elevation into a perspective view or for performing the reverse operation which instrument consists of two rulers (A A') arranged at right angles to each other, to one of which (A') are pivoted two other rulers (C C') also arranged at right angles to each other, both turning about, and intersecting at, an adjustable point (x) movable along the ruler A' and of a pantograph (S s) pivoted at the point of intersection (a) of the first mentioned rulers (A A') substantially as hereinbefore described.

In testimony whereof I have affixed my signature in presence of two witnesses.

LEOPOLD DIETMANN.

Witnesses:
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F. L. BELMONT.