

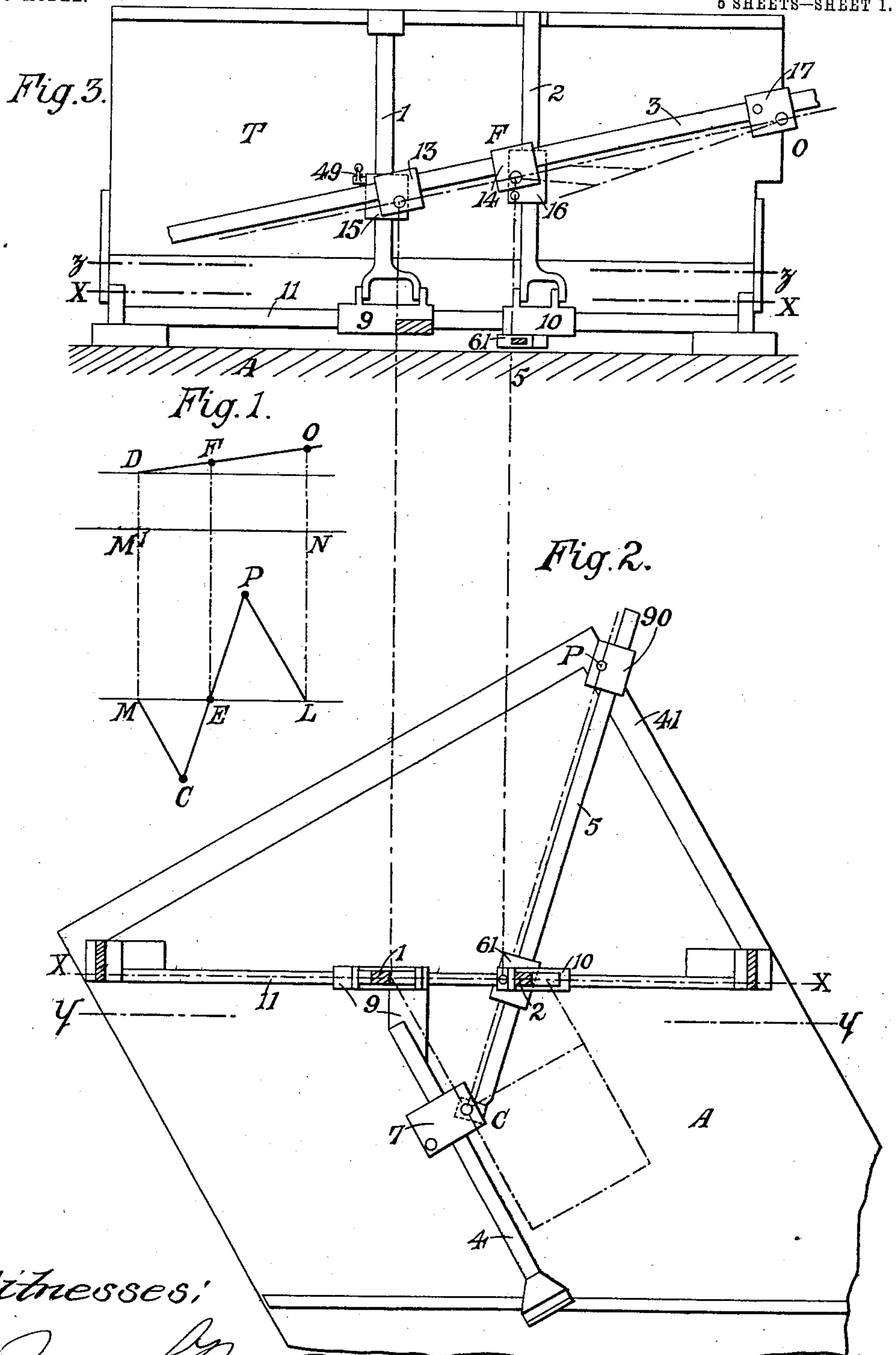
No. 771,667.

PATENTED OCT. 4, 1904.

H. C. ROBINSON.
DRAWING APPLIANCE.
APPLICATION FILED MAY 26, 1904.

NO MODEL.

5 SHEETS—SHEET 1.



Witnesses:

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No. 771,667.

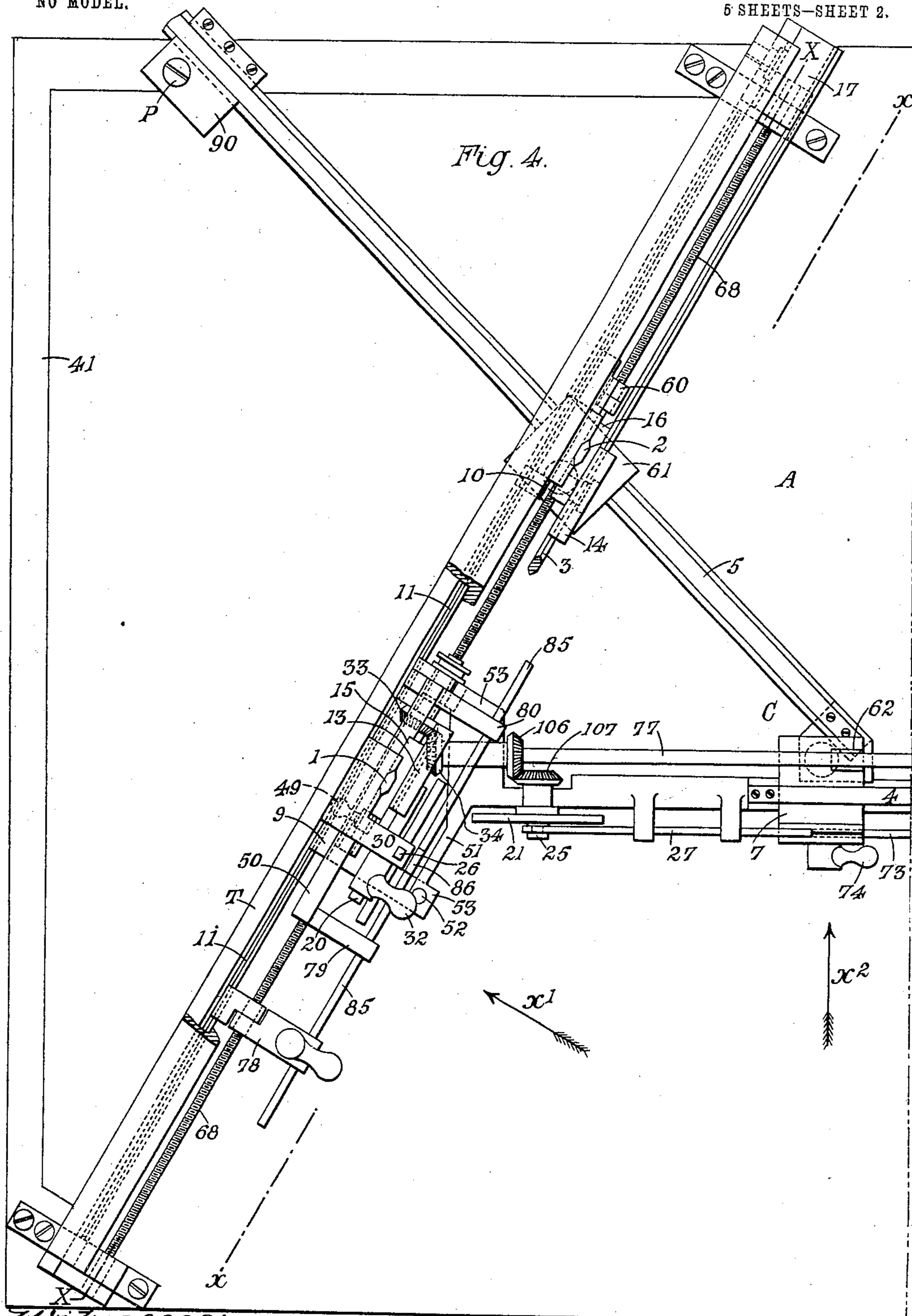
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NO MODEL.

5 SHEETS—SHEET 2.



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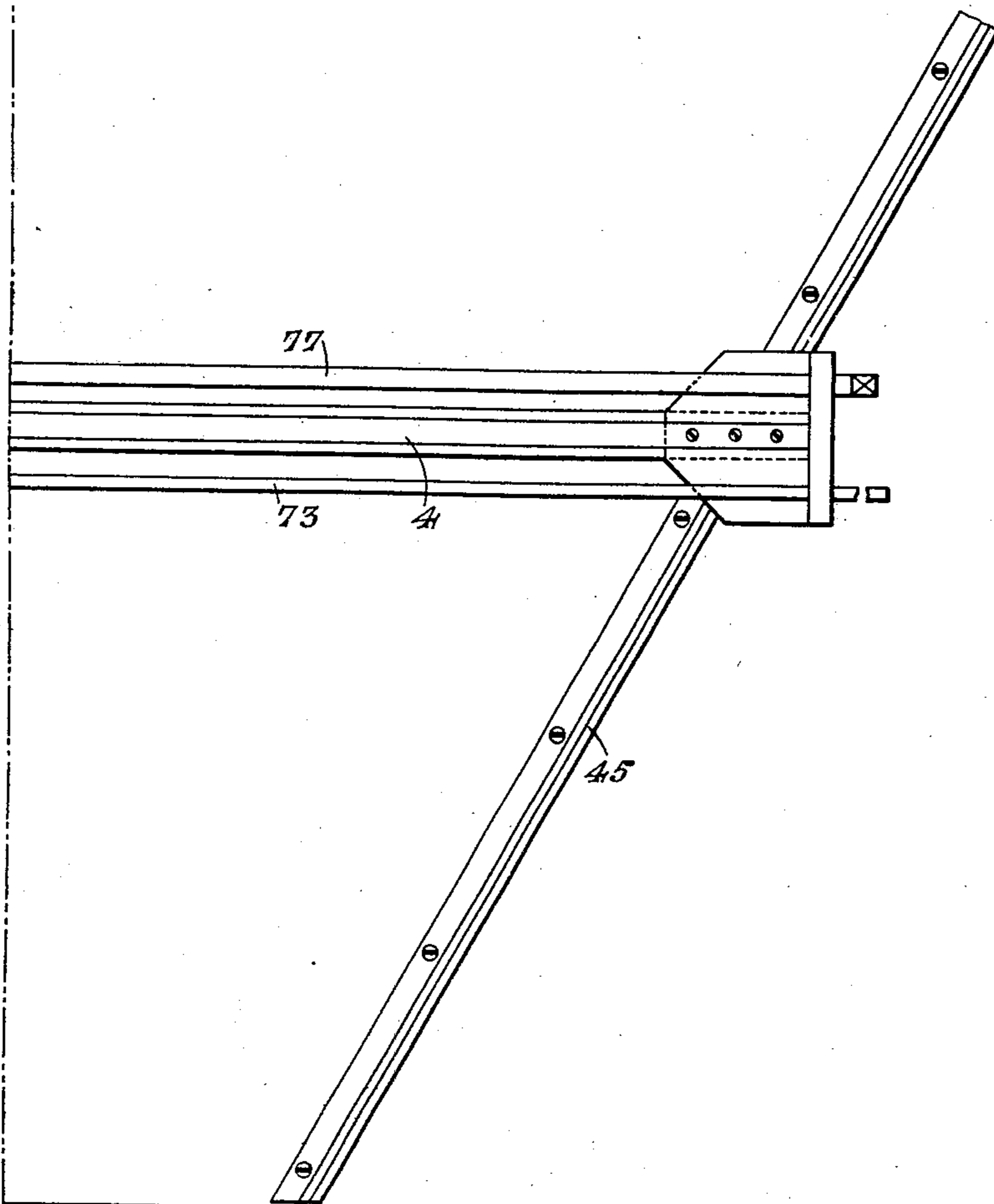
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NO MODEL.

5 SHEETS—SHEET 3.

Fig. 4.^a

A



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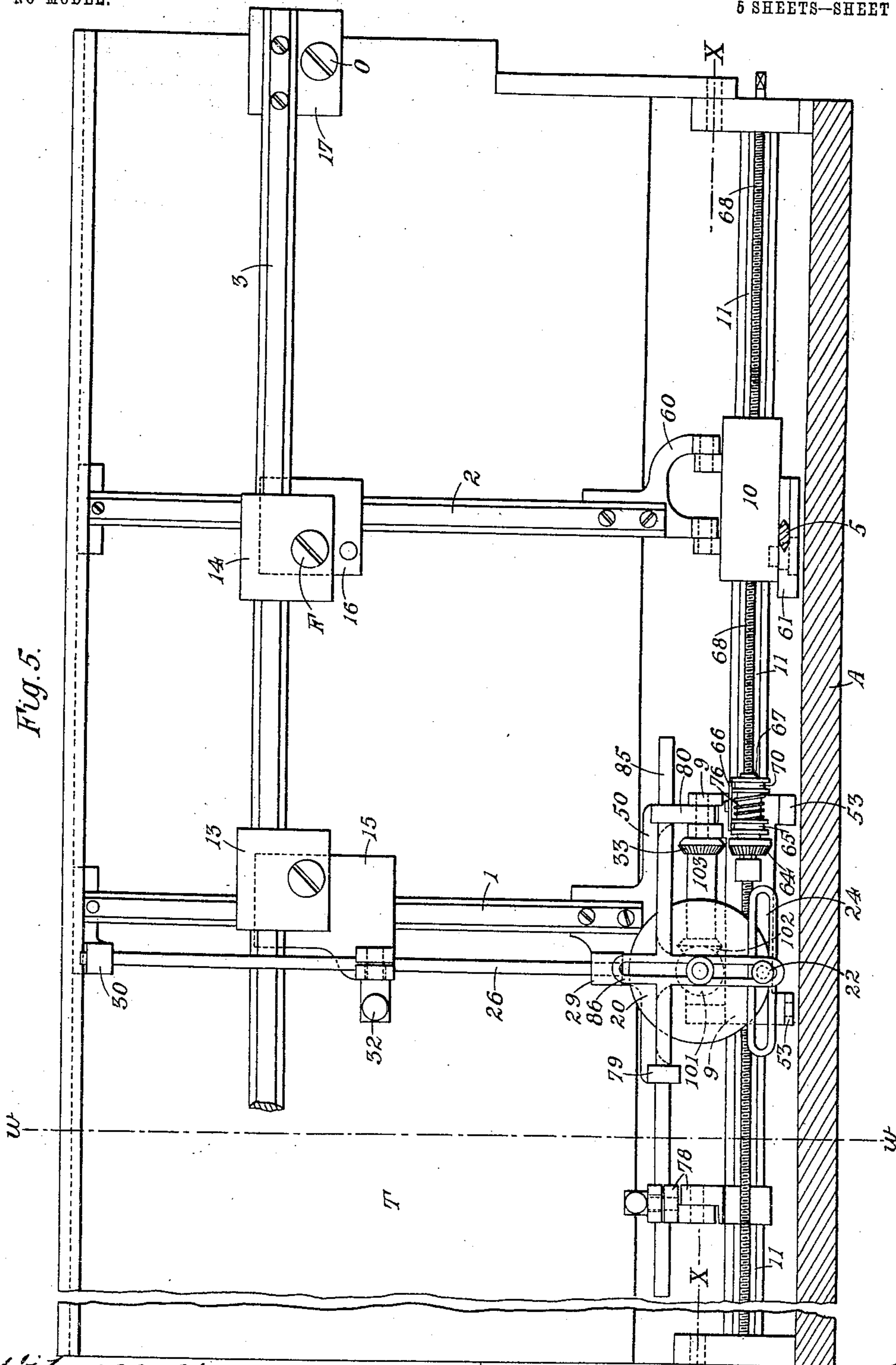
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NO MODEL.

6 SHEETS—SHEET 4.



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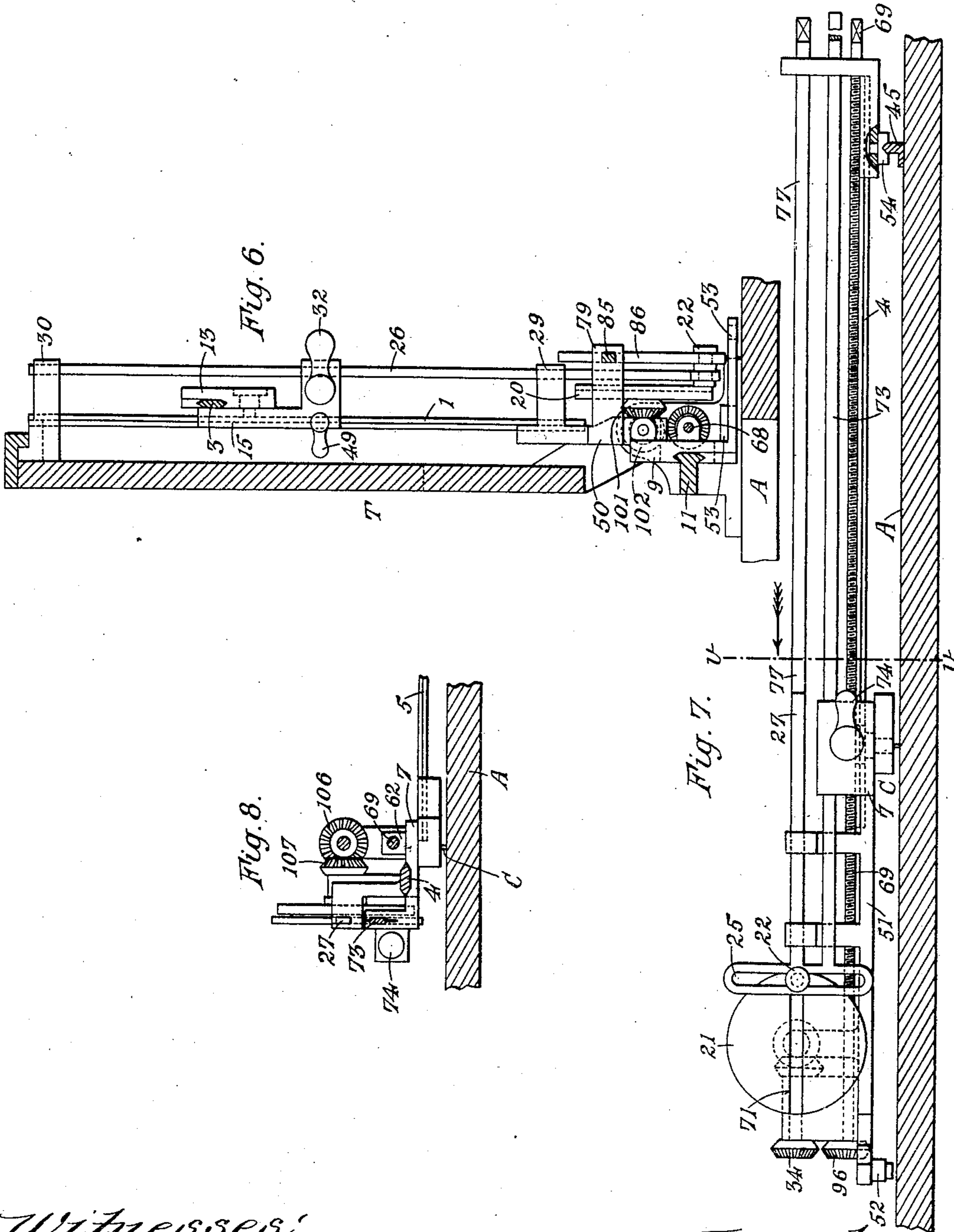
PATENTED OCT. 4, 1904.

H. C. ROBINSON.
DRAWING APPLIANCE.

APPLICATION FILED MAY 26, 1904.

NO MODEL.

5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

HUGH C. ROBINSON, OF LONDON, ENGLAND.

DRAWING APPLIANCE.

SPECIFICATION forming part of Letters Patent No. 771,667, dated October 4, 1904.

Application filed May 26, 1904. Serial No. 209,907. (No model.)

To all whom it may concern:

Be it known that I, HUGH CECIL ROBINSON, a subject of the King of Great Britain, residing at London, England, have invented certain new and useful Improvements in Drawing Appliances, of which the following is a specification.

This invention relates to appliances or instruments for making perspective drawings, either from an ordinary plan drawing or by working by scales without a plan drawing and for making ordinary mechanical drawings.

The first part of the invention relates to apparatus for drawing the perspective of a point the position of which in plan and elevation is known. The second part of the invention relates to arrangements for moving a tracing point or pencil along straight lines in certain directions and simultaneously drawing the perspective of said lines, and the third part of the invention relates to means for drawing circles in plan and perspective.

My improved instrument for obtaining the perspective of a point comprises two frames, one of which is horizontal and carries the pivot corresponding to the point of sight and the plan drawing (where such is used) which is to be copied in perspective, and the other of which is hinged to the horizontal frame and can turn about a horizontal axis and be fixed in a vertical or horizontal or any desired inclined position. The hinged frame carries the paper on which the perspective drawing is made and a center corresponding to the vanishing point. Said hinged frame is also provided with two parallel sliding bars (hereinafter termed, respectively, the "scale-bar" and the "pencil-bar,") arranged perpendicularly to the axis about which the hinged frame turns, and a third bar, (hereinafter termed the "elevating-bar,") pivoted at the vanishing point and passing through slides adjustable on the aforesaid parallel sliding bars. The slide on the scale-bar is adjusted and fixed at the height corresponding to the height of the figure which is being drawn in perspective and remains stationary for all lines at the same elevation, but is adjusted vertically for figures at different elevations. The position of this slide determines the height of the slide on the

pencil-bar, which last-named slide moves along the elevating-bar as the perspective drawing is being made. The slide on the pencil-bar carries the pencil by which the perspective drawing is made. Attached to the horizontal frame, parallel to the axis about which the hinged frame turns, is a guide for guiding a slide to which the scale-bar is jointed. This horizontal slide carries one end of a horizontal bar (hereinafter termed the "tracing-point" bar,) which is inclined at a convenient angle—for example, sixty degrees—to the axis aforesaid and moves parallel to itself when its slide is moved along the guide aforesaid. The pencil-bar is also jointed to a slide movable along said guide. On the tracing-point bar is a slide movable thereon and carrying a tracing point or pencil. Said last-named slide is also hinged to a bar which is pivoted at the point of sight and which has a sliding connection with the horizontal slide of the pencil-bar. The point of sight is in a line making with the horizontal axis the same angle as the tracing-point bar and cutting said axis at the same point as a perpendicular from the vanishing point. By sliding the tracing-point bar along its guide and by moving the tracing-point slide on the tracing-point bar the tracer can be brought to any point on the drawing, and the perspective of this point is simultaneously indicated by the pencil on the pencil-bar.

In the accompanying drawings, Figure 1 is a diagrammatic view illustrating the principle of perspective drawing which is utilized in my improved instrument. Figs. 2 and 3 illustrate in general outline the essential elements of my instrument for drawing the perspective of a point, Fig. 2 being a plan of the horizontal frame and a section of the hinged frame on the line $z z$, Fig. 3, and Fig. 3 being an elevation of the hinged frame and a section of the horizontal frame on the line $y y$, Fig. 2. Figs. 4 to 8 illustrate a complete instrument drawn to larger scale, including the parts for drawing lines in certain directions and the perspective of circles. Fig. 4 is a plan of the complete instrument with the hinged frame in a vertical position. Fig. 5 is a sectional elevation taken on the line $x x$,

Fig. 4, looking in the direction of the arrow w' , the tracing-point bar being removed. Fig. 6 is a section on the line $w w$, Fig. 5, looking toward the right. Fig. 7 is a side view of the tracing-point bar looking in the direction of the arrow w' , Fig. 4; and Fig. 8 is a section on the line $v v$, Fig. 7, looking toward the left.

Like letters and numerals of reference denote corresponding parts in the several figures.

Referring to Fig. 1, P denotes the point of sight—*i. e.*, the plan of the station-point; O, the vanishing point, and M L the line of intersection of the picture plane with the horizontal plane. M' N denote the same line of intersection translated for convenience parallel to itself to separate the perspective drawing from the plan. To ascertain the perspective of a point C, draw the line O L perpendicular to the line M L and intersecting the line M L at L. Join P L. From C draw the line C M parallel to L P and cutting the line M L at M. Erect the perpendicular M M' and produce same to the point D, so that the distance M' D corresponds to the height of the point C above the horizontal plane. Join D O and C P. The latter line cuts the line M L at E. From E erect the perpendicular E F, cutting the line D O at F. Then F is the perspective of the point C. This method of drawing the perspective of a point is carried out by my instrument in such a way that by placing the tracer on any desired point of the plan the pencil is simultaneously brought by the instrument to indicate the position in perspective of said point.

Referring now to Figs. 2 and 3, P denotes the point of sight on the horizontal frame 41, O the vanishing point, arranged, preferably, at the right side of the hinged frame T, and X X the axis about which the frame T turns. A is a drawing-board, shown fitted to the horizontal frame 41. The tracer C is carried by a slide 7, which can slide freely on the tracing-point bar 4. Said bar 4 is attached to a block 9, which can slide on a guide-bar 11. Said guide-bar is fixed at its ends to the horizontal frame 41 and lies parallel to the axis X X. The tracing-point bar 4 is inclined to the bar 11 at a fixed angle, preferably, of sixty degrees, which angle is most suitable for the purposes of my invention, and it is parallel to a straight line drawn through the point of sight P and through the intersection with the axis X X of a perpendicular to said axis from the vanishing point O. The distance of the point P from the axis X X represents the distance of the eye from the plane of the picture. 1 and 2 are bars perpendicular to the axis X X and movable over the frame T. The lower end of the bar 1 is hinged to the block 9, before mentioned, and similarly the lower end of the bar 2 is hinged to a block 10, which can slide on the guide-bar 11. The bar 1 I term the "scale-bar" and 2 the "pencil-bar." 3 is a bar, termed

the "elevating-bar," adapted to be secured to a block 17, pivoted at O. Said bar 3 passes freely through slides 13 14, which are pivoted, respectively, to slides 15 16, movable on the bars 1 2. 49 is a handle by which the slide 15 can be clamped to the bar 1. The slide 16 carries the pencil which draws the perspective. 5 is a bar pivoted at one end to the slide 7 on the bar 4 and passing through a slide 90, pivoted about the point of sight. Said bar 5 also passes freely through a slide 61, pivoted to the block 10 at the foot of the pencil-bar 2. The construction-lines which determine the perspective F, corresponding to the position of the tracer C, are shown by chain-lines. Before commencing to draw the perspective the slide 15 is adjusted on the scale-bar 1 to the proper position thereon, according to the height of the plan above or below the vanishing point O.

By the above-described bars the pencil-point is so controlled that when the tracing-point is moved over the plan the pencil-point simultaneously moves and draws the perspective of the plan. The tracing-point may be guided by hand or by rulers or other convenient means.

Referring now to Figs. 4 to 8, the bars 1 2 are shown hinged to their respective sliding blocks 9 10 by forked pieces 50 60 and the outer end of the bar 4 is shown provided with a slide 54, pivoted to the bar about a vertical axis and resting on and guided by a guide-bar 45. Said bar 45 may be permanently fixed to the horizontal frame, or it may be connected by parallel links to the bar 11 and be clamped to the frame when using the instrument. By the above-described means the tracing-point bar 4 can be moved readily without binding, and said bar is maintained at the required angle—sixty degrees—to the axis X X. The inner end of the bar 4 is shown attached to a plate 51, which rests on ledges 53 on the slide 9 and is held in position by a pin 52. A clamp is provided for clamping the slide 9 to the bar 11 when desired.

The second part of my invention relates to mechanical means for moving the tracing-point on lines parallel and at right angles to the bar 4. For lines parallel to the bar 4 the slide 7 is actuated by means of a screw 69, mounted on said bar, a clip-nut 62, that can be engaged with and disengaged from said screw, as desired, being provided on the slide 7. For lines at right angles to the bar 4 the slide-block 9 must move at the same time as the slide 7, and this is effected by a screw 68, parallel to the guide-bar 11 and engaging with a nut 162 on the slide 9. Said screw 68 is capable of being geared to the screw 69 by bevel-gears and a friction-clutch. This arrangement comprises a sleeve 67, turning with the longitudinally-slotted screw 68, while capable of sliding on said screw, and a bevel-gear 64, running loose on said sleeve. 65 and

70 are two parts of a friction-clutch separated by a spring 76. 66 is a pivoted T-shaped lever, furnished with pins working in grooves in the parts 65 70. Said lever is pivoted to the slide 9 and is so arranged that by turning it the parts 65 70 of the clutch can be drawn toward each other to free the bevel-gear 64, and, on the other hand, by turning back the lever 66 the parts 65 70 are freed, whereupon the spring 76 causes the part 70 to bear against a flange at the end of the sleeve and the part 65 to frictionally engage with the gear 64 and turn the latter. In order that the screws 68 69 may be conveniently rotated, suitable handles may be provided to operate on said screws, either directly or through multiplying gears, as desired. The gears connecting the screws 68 69 are shown of the same size, and in that case the pitch of the screw 68 must be double that of the screw 69. The nut on the slide 9 for engaging with the screw 68 can be disengaged to allow of sliding the block 9 without the aid of the screw when desired.

The third part of my invention relates to mechanical means comprising a combination of slot-gears for drawing the perspective of circles. For those circles whose planes are vertical and parallel to the tracing-point bar the arrangement is as follows: 20 21 are radial arms or disks, one of which—viz., 20—is carried in a bearing in the hinge-piece 50 of the bar 1, and the other of which—viz., 21—is carried in a bearing in the piece 51 of the tracing-point bar 4. Said disks are geared together by miter-wheels 101 102, sleeve 103, miter-wheels 33 34, shaft 77, mounted in bearings on the bar 4, and the miter-wheels 106 107. The shaft 77 can be turned by a handle to rotate both disks 20 21 simultaneously. Each disk is furnished with a diametrical dovetailed slot 71, in which is placed an adjustable pin 22. The pin of the disk 20 engages with a horizontal slot 24 in the head of a T-piece 26, which can slide vertically in bearings 29 30 on the bar 1 and is adapted to be clamped to the slide 15 by the handle 32, so as to raise and lower the said slide 15 as the disk 20 rotates. The pin of the disk 21 engages with a vertical slot 25 in the head of a T-piece 27, sliding in bearings on the bar 4. 73 is a bar which is fixed to the T-piece 27 and which can slide through a part of the slide 7, or it can be attached to said slide 7 by means of a clamping-lever 74. It will be seen that by locking the slide 7 to the bar 73 and the slide 15 to the T-piece 26 and releasing the handle 49 and then rotating the shaft 77 the slide 7 will be moved to and fro on the bar 4 and the slide 15 will be moved up and down on the bar 1, and the union of the two movements causes the pencil carried by the slide 16 to trace the perspective of a circle. It should be observed that the disks 20 21 must be so arranged that their grooves are horizontal at the same instant.

To draw the perspective of a circle, set the pins on both disks 20 21 to the radius of the circle and place the groove in the disk 21 horizontal, with its pin toward the scale-bar. Set the tracing-point slide 7 so that the tracing-point is at the end of the plan of the circle nearest the scale-bar and attach the slide 7 to the slot-bar 27 by means of the clamping-lever 74. Place the slide 15 on the scale-bar to the height of the center of the circle, and having placed the groove in the disk 20 horizontal attach the slot-bar 26 to it. When both disks are revolved together the elevating-bar will be raised or lowered to the height of any point on the circle, while the tracing-point will be moved to the corresponding point on the plan. For circles in vertical planes at right angles to the tracing-point bar the arrangement described in part two must be used, and the radius of the pin on the disk 20 must be set to the radius of the circle, while the radius of the pin on the disk 21 must be set to the radius of the circle multiplied by the tangent of thirty degrees. A third slot-gear is provided to draw perspective of circles in a horizontal plane. Said gear comprises a bar 85, sliding horizontally in bearings 79 80 on the hinge-piece 50 of the scale-bar and furnished with a vertically-slotted part 86, engaging with an extension of the pin 22 of the disk 20. When this slot-gear is at work, the bar 26 is thrown out of action by releasing the clamping-handle 32. The bar 85 is locked to the guide-bar 11 by means of a bearing-bracket 78, and the action therefore of the disk 20 is to slide the scale-bar 1 to and fro. The piece 78 is hinged to turn about the axis X X. The pin in the disk 21 will be set to the radius of the circle to be drawn, and the pin in the disk 20 will be set to a radius of said circle multiplied by the secant of thirty degrees.

It will be understood that the tracer and the pencil may be placed in any desired positions on their respective slides 7 and 16. Moreover, if a pencil is used in lieu of a tracer on the slide 7 a plan can be drawn simultaneously with the making of the perspective of said plan.

What I claim is—

1. The combination of a tracing-point bar, a guide therefor, a slide on said bar carrying a tracing-point, a bar pivotally connected to said slide and sliding through a pivoted block corresponding to the point of sight, said pivoted block, a frame carrying said guide and pivoted block, a second frame hinged to the first-named frame and carrying a scale-bar, a pencil-bar and a pivot corresponding to the vanishing point, said scale-bar, said pencil-bar, and said pivot, slides connected to the scale-bar and pencil-bar and sliding on the aforesaid guide, the slide of the scale-bar being connected to the tracing-point bar, and the slide of the pencil-bar having a sliding

connection with the bar which turns about the point of sight, a slide on the scale-bar, a pencil-carrying slide on the pencil-bar and an elevating-bar pivoted about a pin corresponding to the vanishing point, slides pivotally
5 connected to the slides on the scale-bar and pencil-bar, and sliding on the elevating-bar, substantially as described for the purpose of drawing the perspective of a point.

10 2. The combination of a tracing-point bar, a guide therefor, a slide on said bar carrying a tracing-point, a bar pivotally connected to said slide and sliding through a pivoted block corresponding to the point of sight, said piv-
15 oted block, a frame carrying the aforesaid tracing-point bar, guide, and pivoted block, a second frame hinged to the first-named frame, a scale-bar, a pencil-bar and a pivot corresponding to the vanishing point carried by
20 the said second frame, a slide on the guide before mentioned to which slide the tracing-point bar is connected and the scale-bar is hinged, another slide on said guide to which
25 slide the bar turning about the point of sight has a sliding connection and the pencil-bar is hinged, an elevating-bar pivoted about the vanishing point and working in slides, said
30 slides, other slides pivoted to the last-named slides and mounted on the scale-bar and pencil-bar; and means for locking the slide on the scale-bar to said scale-bar, substantially as described.

3. The combination of a tracing-point bar, a guide therefor, a slide on said bar carrying
35 a tracing-point, a bar pivotally connected to said slide and sliding through a pivoted block corresponding to the point of sight, said pivoted block, a frame carrying said guide and pivoted block, a second frame hinged to the
40 first-named frame and carrying a scale-bar, a pencil-bar and a pivot corresponding to the vanishing point, said scale-bar, said pencil-bar, and said pivot, slides connected to the scale-bar and pencil-bar and sliding on the
45 aforesaid guide, the slide of the scale-bar being connected to the tracing-point bar, and the slide of the pencil-bar having a sliding connection with the bar which turns about the point of sight, a slide on the scale-bar, a
50 pencil-carrying slide on the pencil-bar, a pin corresponding to the vanishing point, an elevating-bar pivoted about said pin, and sliding through slides pivotally connected to the slides on the scale-bar and pencil-bar, said pivoted
55 slides, and means for moving the tracing-point slide along the tracing-point bar, substantially as described.

4. The combination of a tracing-point bar, a guide therefor, a slide on said bar carrying
60 a tracing-point, a bar pivotally connected to said slide and sliding through a pivoted block corresponding to the point of sight, said pivoted block, a frame carrying said guide and pivoted block, a second frame hinged to the
65 first-named frame and carrying a scale-bar, a

pencil-bar and a pivot corresponding to the vanishing point, said scale-bar, said pencil-bar, and said pivot, slides connected to the scale-bar and pencil-bar and sliding on the
70 aforesaid guide, the slide of the scale-bar being connected to the tracing-point bar, and the slide of the pencil-bar having a sliding connection with the bar which turns about the point of sight, a slide on the scale-bar, a pen-
75 cil-carrying slide on the pencil-bar, a pin corresponding to the vanishing point, an elevating-bar pivoted about said pin and sliding through slides pivotally connected to the slides on the scale-bar and pencil-bar, said pivoted
80 slides, means for moving the tracing-point slide along the tracing-point bar, and means for moving the tracing-point bar along its guide, substantially as described.

5. The combination of a tracing-point bar, a guide therefor, a slide on said bar carrying
85 a tracing-point, a bar pivotally connected to said slide and sliding through a pivoted block corresponding to the point of sight, said pivoted block, a frame carrying said guide and pivoted block, a second frame hinged to the
90 first-named frame and carrying a scale-bar, a pencil-bar and a pivot corresponding to the vanishing point, said scale-bar, said pencil-bar, and said pivot, slides connected to the scale-bar and pencil-bar and the slide of the
95 scale-bar being connected to the tracing-point bar, and the slide of the pencil-bar having a sliding connection with the bar which turns about the point of sight, a slide on the scale-bar, a pencil-carrying slide on the pencil-bar,
100 a pin corresponding to the vanishing point, an elevating-bar pivoted about said pin and sliding through slides pivotally connected to the slides on the scale-bar and pencil-bar, said pivoted slides, means for moving the tracing-
105 point slide along the tracing-point bar, means for moving the tracing-point bar along its guide, and gearing connecting said means so that the one works the other, substantially as described.

6. The combination of a tracing-point bar, a guide therefor, a slide on said bar carrying
a tracing-point, a bar pivotally connected to said slide and sliding through a pivoted block
115 corresponding to the point of sight, said pivoted block, a frame carrying said guide and pivoted block, a second frame hinged to the first-named frame and carrying a scale-bar, a pencil-bar and a pivot corresponding to the
120 vanishing point, said scale-bar, said pencil-bar, and said pivot, slides connected to the scale-bar and pencil-bar and sliding on the aforesaid guide, the slide of the scale-bar being connected to the tracing-point bar, and
125 the slide of the pencil-bar having a sliding connection with the bar which turns about the point of sight, a slide on the scale-bar, a pencil-carrying slide on the pencil-bar, a pin corresponding to the vanishing point, an ele-
130 vating-bar pivoted about said pin and sliding

through slides pivotally connected to the slides on the scale-bar and pencil-bar, said pivoted slides, an adjustable crank 21 carried by the tracing-point bar and gearing with a slotted bar 25, 27 also mounted on the tracing-point bar, said slotted bar 25, 27 means for connecting said slotted bar to the tracing-point slide, an adjustable crank 20 mounted on the scale-bar and gearing with a slotted bar 24, 26 sliding in bearings on the scale-bar, said slotted bar 24, 26, means for connecting said bar 26 to the scale-bar slide, and gearing connecting said cranks 20, 21, substantially as described for the purpose of drawing the perspective of circles in vertical planes.

7. The combination of a tracing-point bar, a guide therefor, a slide on said bar carrying a tracing-point, a bar pivotally connected to said slide and sliding through a pivoted block corresponding to the point of sight, said pivoted block, a frame carrying said guide and pivoted block, a second frame hinged to the first-named frame and carrying a scale-bar, a pencil-bar and a pivot corresponding to the vanishing point, said scale-bar, said pencil-bar, and said pivot, slides connected to

the scale-bar and pencil-bar and sliding on the aforesaid guide, the slide of the scale-bar being connected to the tracing-point bar, and the slide of the pencil-bar having a sliding connection with the bar which turns about the point of sight, a slide on the scale-bar, a pencil-carrying slide on the pencil-bar, a pin corresponding to the vanishing point, an elevating-bar pivoted about said pin and sliding through slides pivotally connected to the slides on the scale-bar and pencil-bar, said pivoted slides, an adjustable crank 20 mounted on the scale-bar, a slotted bar 85, 86 engaging with the crank 20, a bracket 78 and means for locking said bracket to the guide of the tracing-point bar, substantially as described for the purpose of drawing the perspective of circles in horizontal planes.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

HUGH C. ROBINSON.

Witnesses:

GEORGE HARRISON,
ALEXANDER W. ALLEN.