

No. 725,021.

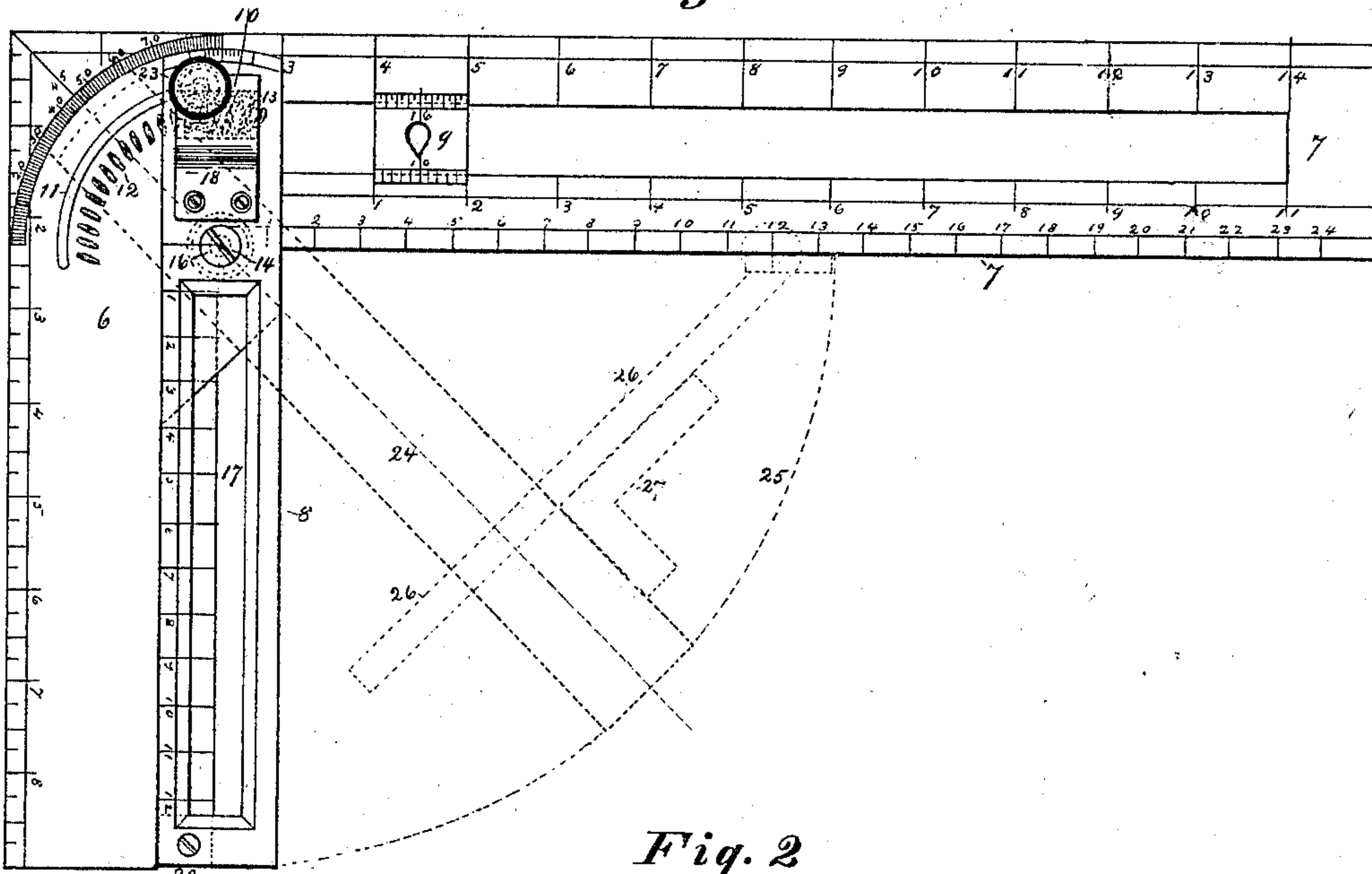
PATENTED APR. 14, 1903.

C. R. BANNIHR.  
COMBINED TRY-SQUARE AND BEVEL.

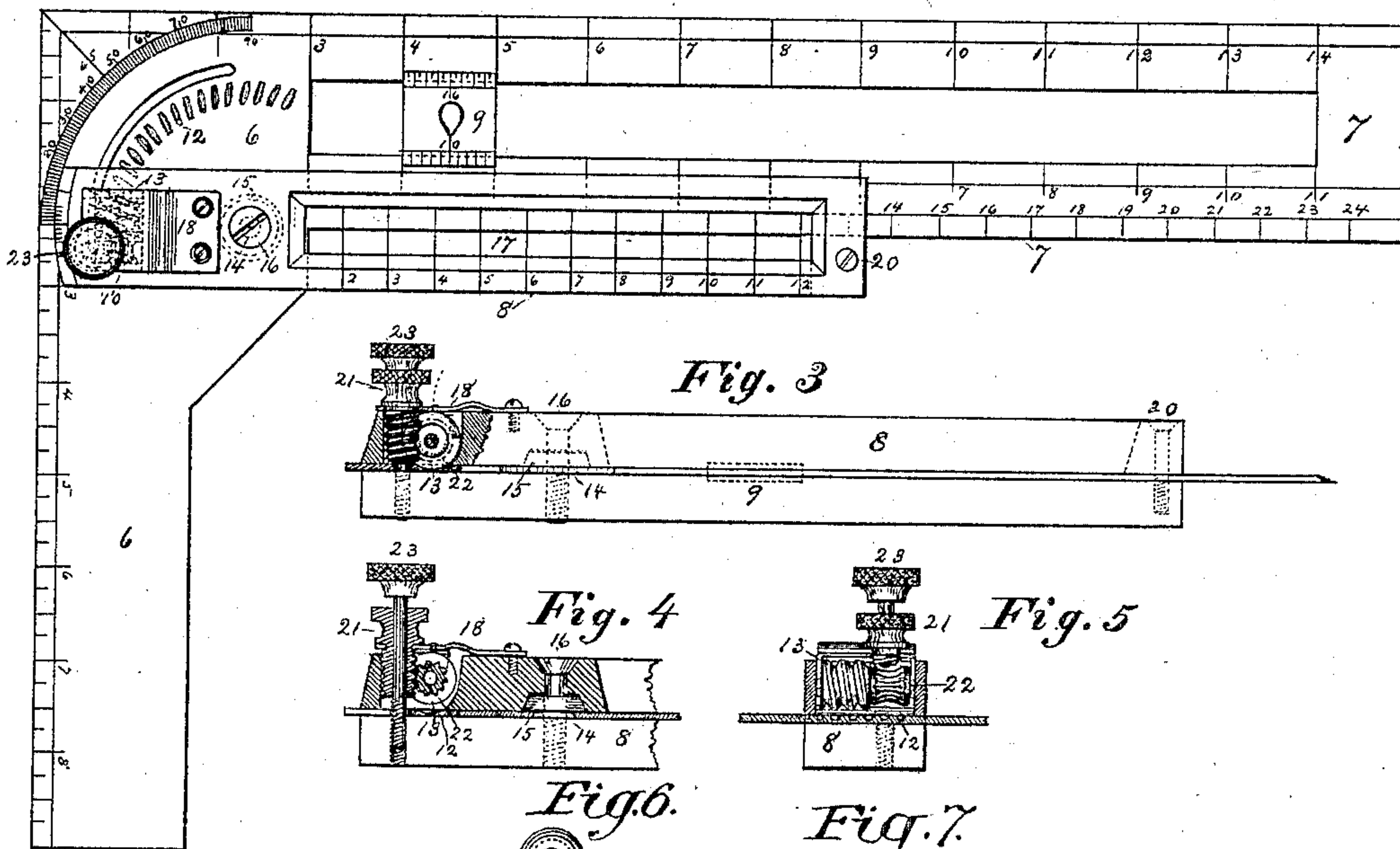
APPLICATION FILED APR. 29, 1901.

NO MODEL.

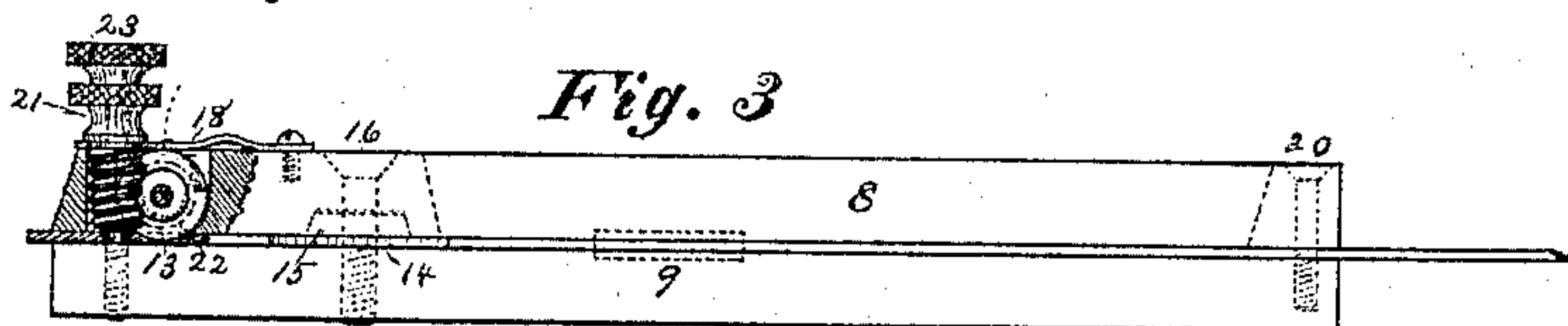
*Fig. 1*



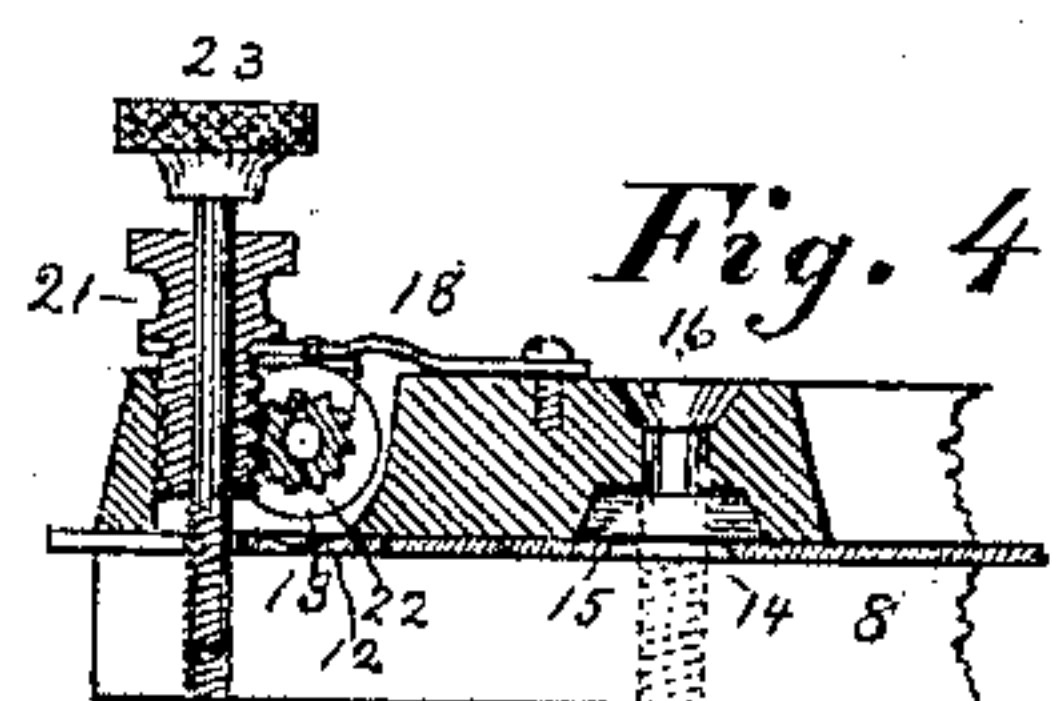
*Fig. 2*



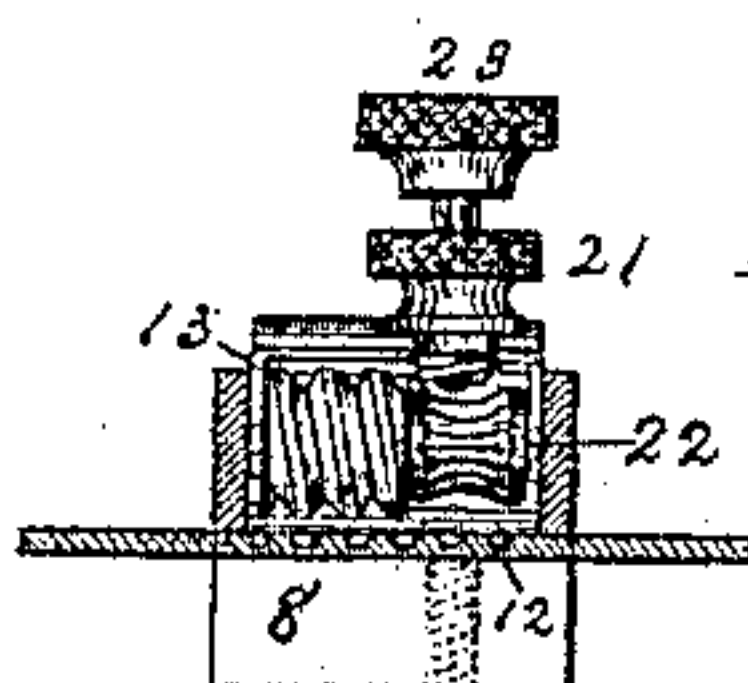
*Fig. 3*



*Fig. 4*



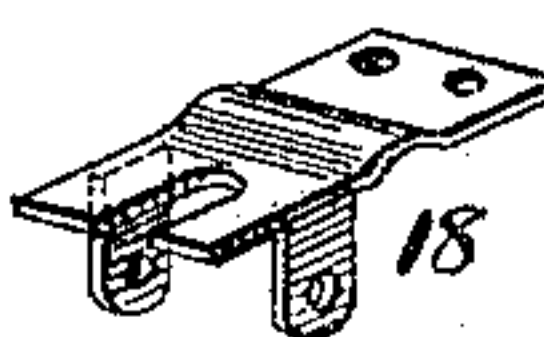
*Fig. 5*



*Fig. 6*



*Fig. 7*



Witnesses,  
William Haehnel  
Geo. W. Blakely

Inventor.  
Caesar R. Bannihir



# UNITED STATES PATENT OFFICE.

CAESAR R. BANNIHR, OF NEW YORK, N. Y.

## COMBINED TRY-SQUARE AND BEVEL.

SPECIFICATION forming part of Letters Patent No. 725,021, dated April 14, 1903.

Application filed April 29, 1901. Serial No. 58,008. (No model.)

*To all whom it may concern:*

Be it known that I, CAESAR R. BANNIHR, a citizen of the United States, residing at New York, in the county and State of New York, have invented a new and useful Device Forming a Square and Bevel in Combination with Sliding Scales and Bevel-Protractor, which when combined with certain features of the square for which I have obtained Letters Patent from the United States January 22, 1901, No. 666,455, will make a serviceable instrument for solving mathematical problems, as well as for carrying out the same in actual practice, of which the following is a specification.

My invention relates to improvements in the instrument commonly known as a "try-square;" and the objects of my improvements are, first, to provide a square which is suitable for all the common purposes for which a square is used and at the same time is suitable to bring all the special features embodied in the square for which I have obtained a patent, as mentioned above, into use; second, to provide an instrument which will be rigid in the various forms, and, third, to provide one which shall be simple in form as a bevel-protractor and rigid in the different positions, making an accurate and reliable tool. I attain these objects by the device illustrated in the accompanying drawings, in which—

Figure 1 is a face view of the entire device, or "square and bevel," as I will hereinafter call it. Fig. 2 is a similar view with the stock or back in a parallel position with the long blade of the square. Fig. 3 is a side view of the stock, with a portion of the upper part in section to show the adjusting device. Fig. 4 is a section of the same, showing the structure of the adjusting device and set-screw. Fig. 5 is an end view of the same, partially in section, also showing the adjusting device, with the lower part of the adjusting and set screws and part of stock removed, showing the adjusting-worm. Fig. 6 is a face view of the bushing. Fig. 7 is a perspective view of the spring worm-carrier.

Similar numbers refer to similar parts throughout the several views.

The steel blade 6, the stock 8, and the adjusting and setting device 10 comprise the main parts of the square.

The steel blade 6 has the shape of an ordinary square with the exception of the inner corner, which is filled in with a diagonal portion the edge of which has an angle of forty-five degrees sloping toward the short arm of the square. The shape of the blade 6 is shown in Figs. 1 and 2.

The long arm 7 of the square has a slot running lengthwise through the middle for the slide 9 to move in. This slide is to be used as a gage or marker by placing a point or pencil in the V-shaped hole, and the graduations are to further divide the inch-graduations on the blade. It is made of three flat steel pieces, which are riveted together, the outer ones overlapping the square blade. The curved slot 11 is for the set-screw to play in. The notches 12 are for the worm 13 to travel in when adjusting the stock 8. The graduations on the outer edges are the common graduations of inches and fractions of the same in suitable divisions. The graduations on the outer edge of the inner side of the long arm are to represent feet on the scale of one-half of an inch to the foot. The graduations on the outer edge of the short arm are the same as on the outer edge of the long arm.

The pivot center about which the stock 8 swings is located at one-half the breadth of the stock away from where the right-angle lines of the inner edges of the square produced would meet. Here the square blade 6 has a hole 14 suitable to receive the bushing 15, which is of case-hardened steel and is secured in the hole 14 in the blade by riveting. This bushing 15 has a conical form and a hole through the center for the screw 16, which passes through the upper part of the stock 8 and screws into the lower part. The stock 8 consists of two parts made of steel, drop-forged and finished to suit. The upper part has a rectangular hole 17 through it, so the graduations on the under part may be seen. At the inner end is a square hole for the worm 13 and the spring and worm carrier 18 to fit into. The spring and worm-wheel carrier 18 is made of sheet-steel shaped as shown in the drawings, and it is screwed to the upper part of the stock with two screws at the end away from the worm-wheel. The worm 13 is hung on a central shaft, which hangs in the two ears which reach downward into the



square hole in the upper part of the stock 8. In the lower part of the stock there is a screw-hole for the screw 16 and on the end a screw-hole for the set-screw 23. At the other end is a screw 20, with a piece interposed between the upper and lower parts to hold them asunder a distance slightly greater than the thickness of the blade. Through the center of the inner face of the lower part of the stock and longitudinally thereof is a line at one side of which are graduations of the same divisions as the scale on the inner edge of the long blade of the square. The worm 13 is so arranged that it may be rotated on its center by the screw 21, which is held in the spring-carrier 18 and which engages with the worm-wheel 22 on one end of the worm 13, so the worm 13 may be turned by turning the screw 21 to the right or to the left, and the worm 13 will turn the stock 8 on the center 14 by traveling in the notches 12. The set-screw 23, which passes through the screw 21 and the curved slot 11 in the blade 6, screws into the lower part of the stock 8, and when the stock is adjusted it may be fastened in position by this screw. A segment graduated with a degree-scale for the purpose of adjusting the stock to any degree wanted is at the back end of the stock on the blade 6, and the lines on the stock constitute a vernier to further divide this by one-fourth degrees. The dotted line 24 in Fig. 1 is to show that the stock may be set at any angle on the dotted arc 25. The dotted lines 26 represent how a scale may be passed through the stock and placed against the blade 6 by squaring the same, as shown by the dotted lines 27 of a small square, to square the scale in ascertaining the distance between points on the blade and stock. This is to show how this square may be used for calculations for common purposes. For more accurate calculations the features embodied in the square patented by me, as mentioned above, may be introduced.

To use this square as a bevel-protractor, it is only necessary to loosen the set-screw 23 and the spring 18 will force up the screw 21 and worm 13 and the stock may be moved to any line on the protractor and the worm 13 forced into any notch, the set-screw 23 turned down, not quite setting the stock, and the screw 21 turned to right or left until the desired line is met, and then the set-screw 23 set firmly, and the stock will be held in a rigid position, from which it cannot be stirred by accidental knocks.

Having described my invention and also pointed out how certain features embodied in a square for which Letters Patent were granted to me January 22, 1901, No. 666,455, may be applied and used in the square herein shown, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a try-square and bevel, a blade with a short and a long arm, and a corner-filling between the two, the long arm having a cen-

tral slot parallel therewith, a gage-slide 9 adjustable in said slot, and the stock pivotally supported on the corner-filling, the center of the pivot being located in line with the inner edge of the long arm and half the breadth of the stock outside of the line produced of the inner edge of the short arm, substantially as described.

2. In a try-square and bevel, a blade having a long and a short arm at right angles to each other with a corner-filling, a pivot-hole reinforced by a bushing at the intersection of the line of the inner edge of the long arm and a line central with and half the breadth of the stock away from the inner edge of the short arm when the stock is parallel with and resting on the inner edge of the short arm, a segmental slot the curvature of which is concentric with said pivot-hole, a row of notches laid out on an arc parallel with said slot, and a segmental scale, and a stock of two parts with the adjusting device comprising the worm and screw and spring worm-carrier, as herein shown and described.

3. In a try-square and bevel, having a blade with a long and a short arm at right angles to each other and a corner-filling with a pivot-hole at the intersection of the line of the inner edge of the long arm and a central line of the stock when the same is brought parallel with and resting on the inner edge of the short arm the blade being provided with a segmental row of notches and a segmental slot each concentric with said hole, a stock of two parts provided with the adjusting device, the latter consisting of the spring worm-carrier and worm having a worm-wheel, a screw to engage and adjust said worm-wheel and a set-screw entering the lower part of the stock through the worm-adjusting screw and said slot, the worm engaging with said row of notches, all as shown and described.

4. In a try-square and bevel, having a blade with a long and a short arm at right angles to each other, a corner-filling with a diagonal edge and a pivot-hole at the intersection of the inner line of the edge of the long arm of the square and a central line of the stock when the same is brought parallel with and resting on the inner edge of the short arm of the blade, the blade being provided with a segmental series of notches and a segmental slot each concentric with said hole, a two-part stock with a screw passing through the upper part and through the pivot-hole and bushing and screwed into the lower part of said stock, an adjusting device consisting of a worm to engage with said notches in the blade, a worm-wheel at one end of said worm to engage with an adjusting-screw and a screw passing through the latter and through said slot and screwing into the lower part of the stock as shown and described.

5. In a try-square and bevel, having a blade with arms at right angles to each other, a stock pivoted at the intersection of the line of the inner edge of the long arm and a line central



with and half the breadth of the stock away from the inner edge of the short arm when the stock is parallel with and resting on the inner edge of the short arm of said blade, the  
5 adjusting devices as herein shown to secure said stock at any position so that any accidental knock may not change or move the stock from its position all as herein shown and described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 26th day of April, 1901.

CAESAR R. BANNIHR.

Witnesses:

WILLIAM HAEHNEL,  
GEO. W. BLAKELY.