

No. 630,257.

Patented Aug. 1, 1899.

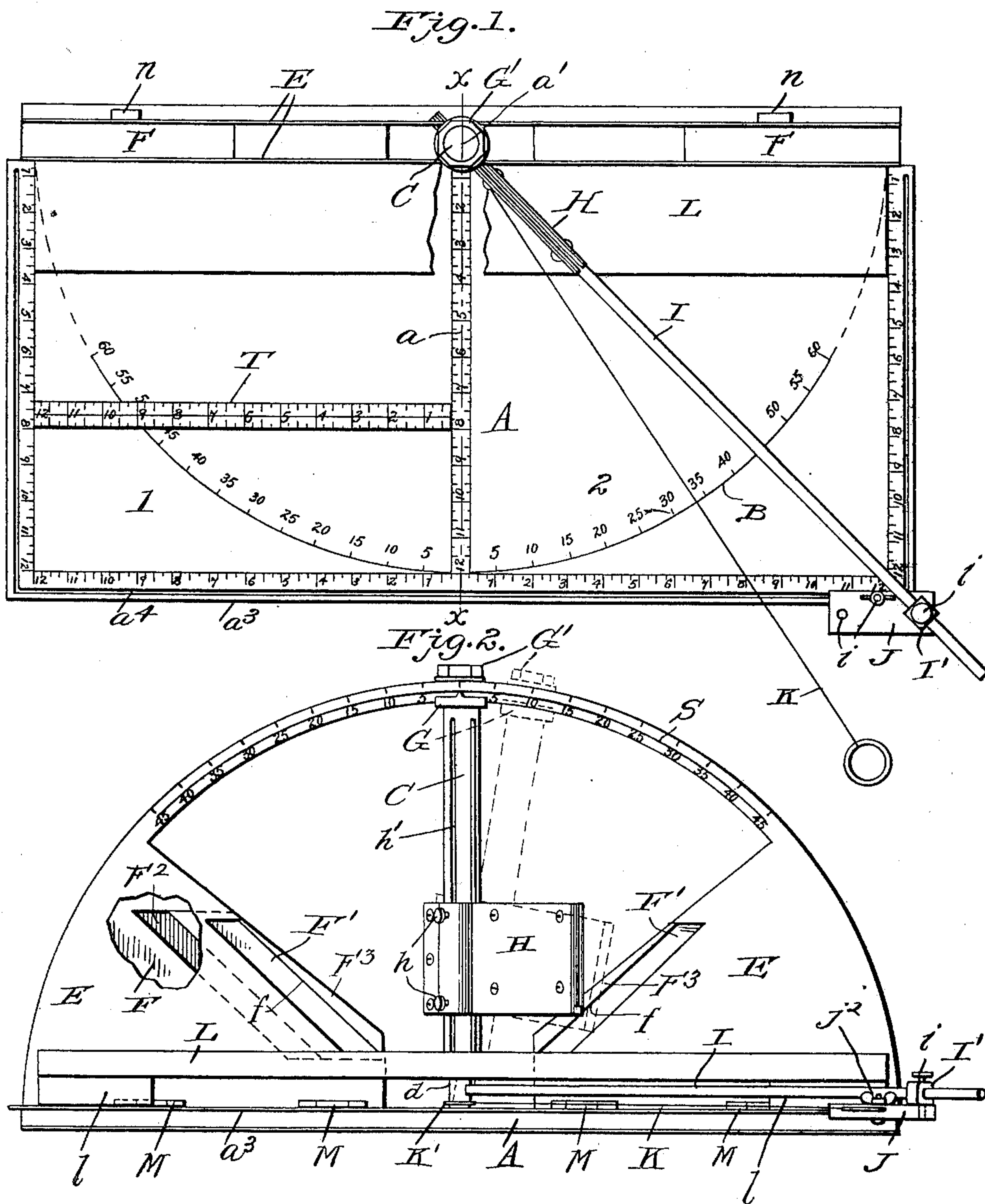
P. F. McDONALD.

DOUBLE MITER BOX AND CALCULATOR.

(Application filed Apr. 1, 1899.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES:

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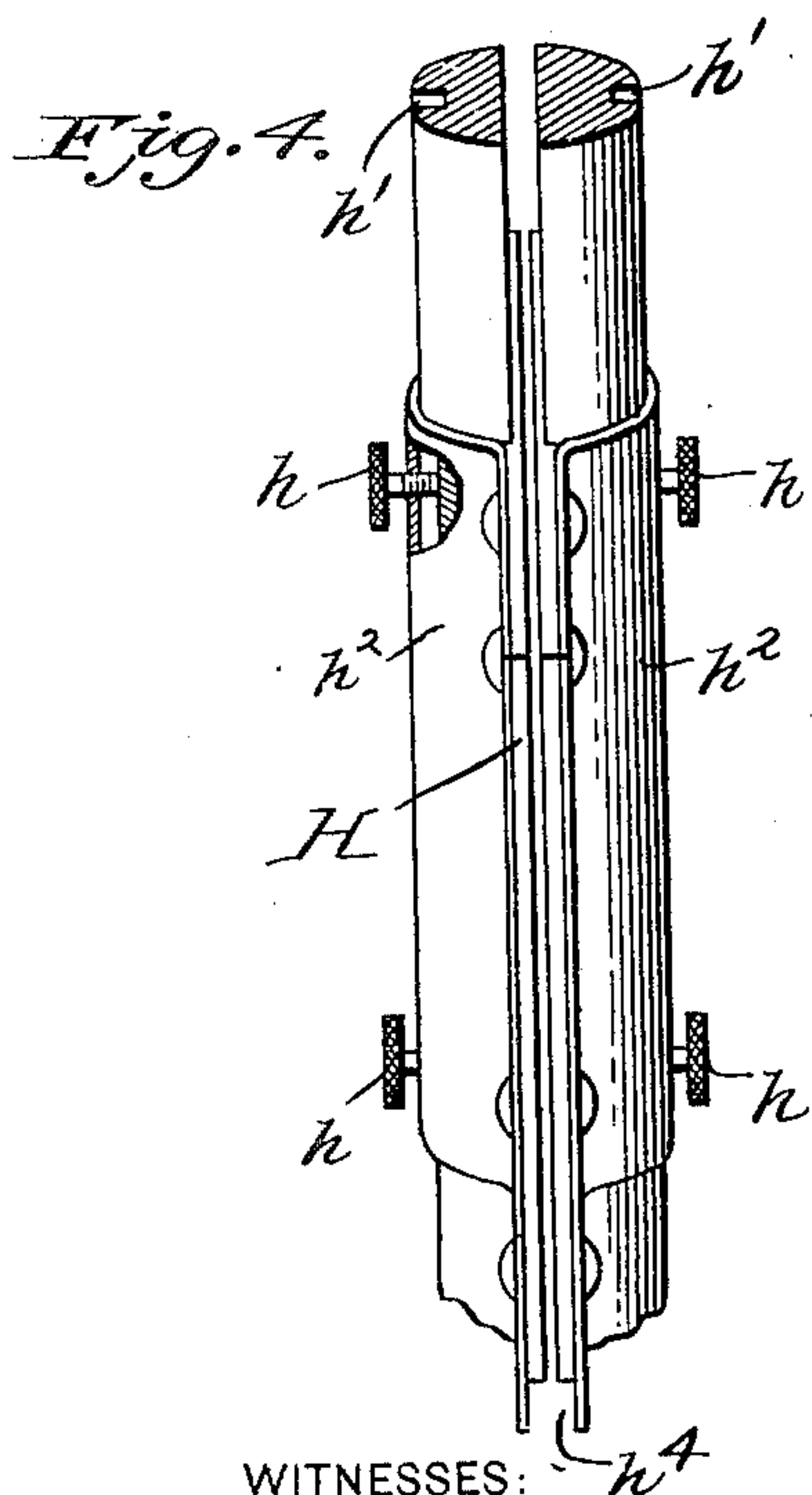
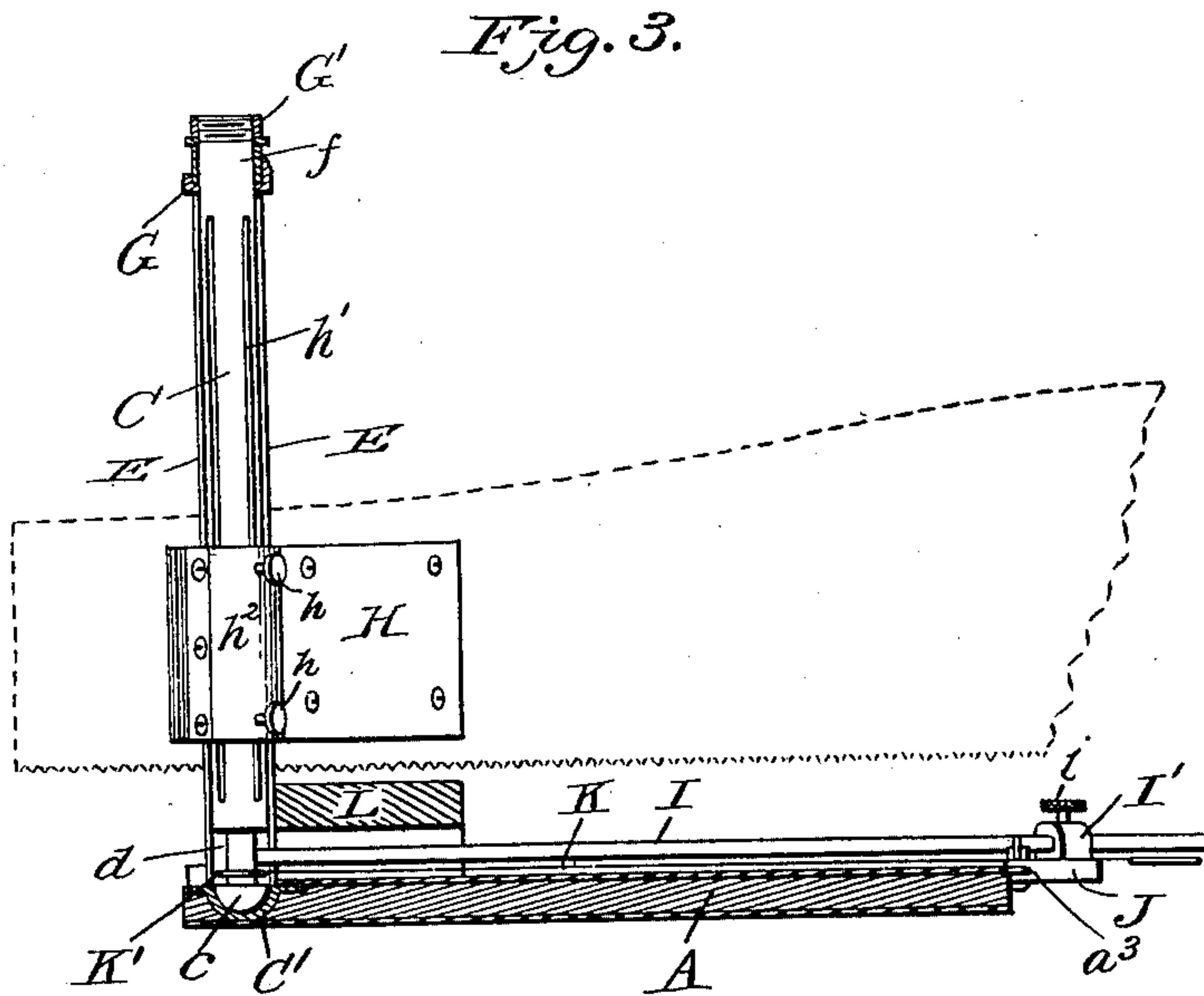
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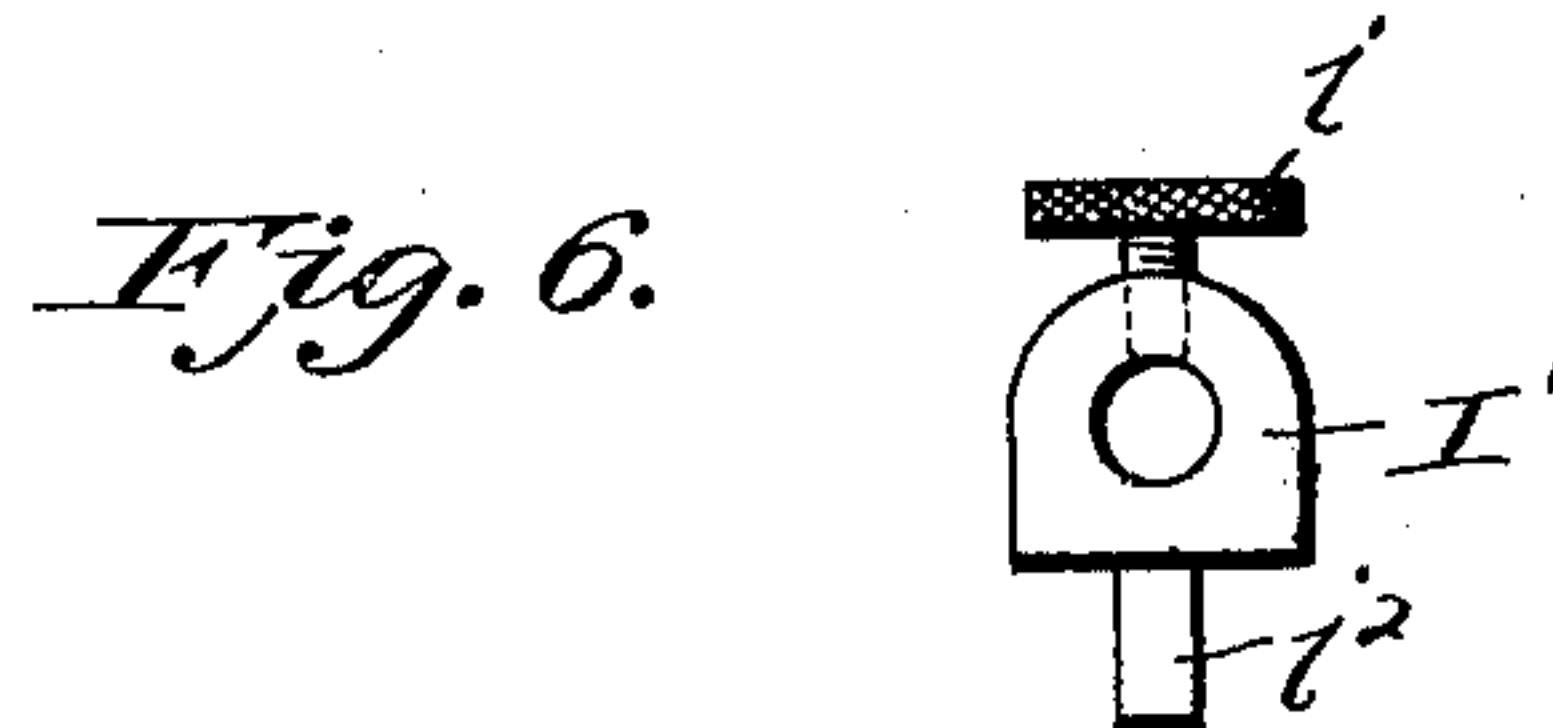
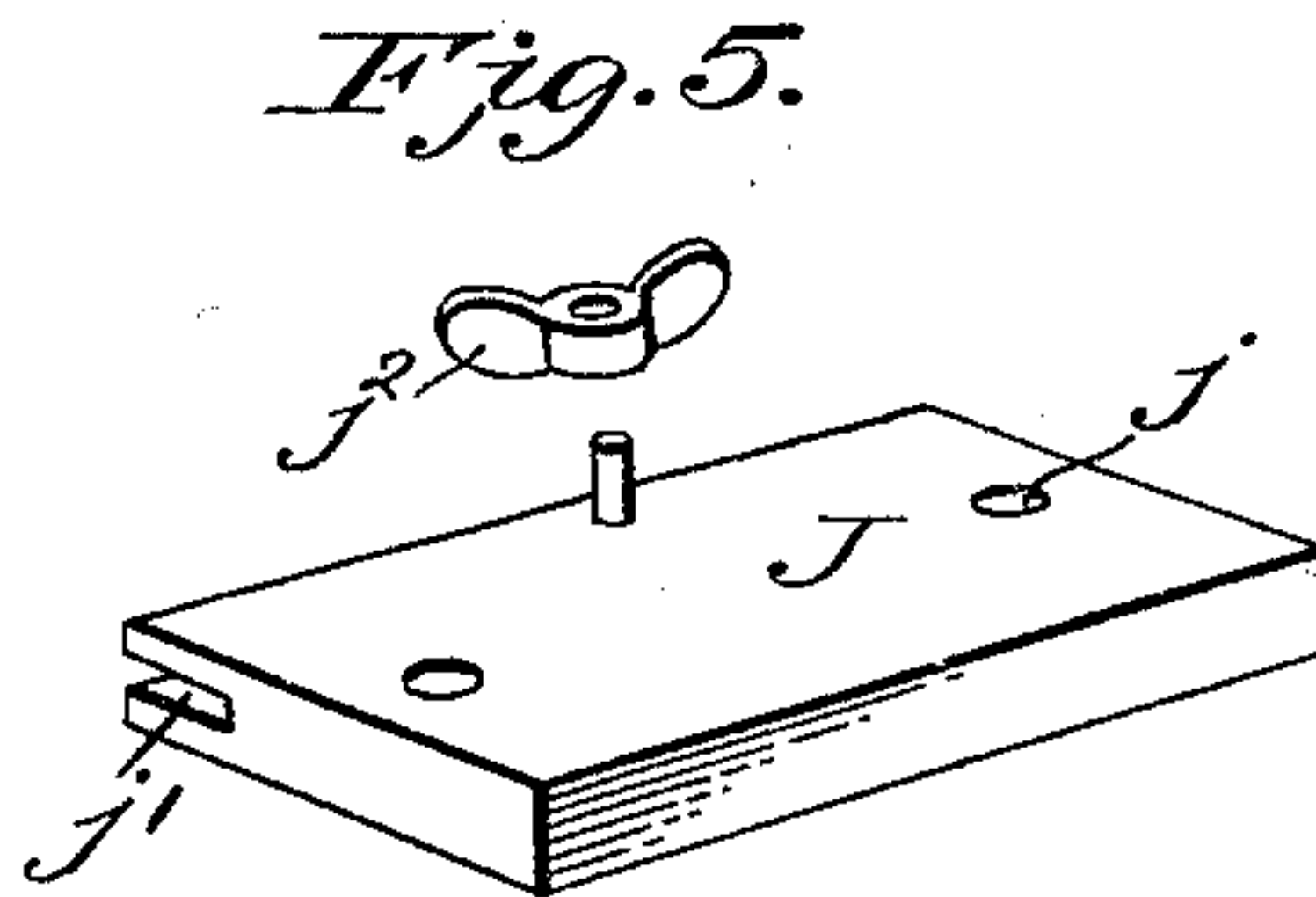
(No Model.)

2 Sheets—Sheet 2.



WITNESSES:

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UNITED STATES PATENT OFFICE.

PATRICK F. McDONALD, OF SCRANTON, PENNSYLVANIA, ASSIGNOR OF
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DOUBLE MITER-BOX AND CALCULATOR.

SPECIFICATION forming part of Letters Patent No. 630,257, dated August 1, 1899.

Application filed April 1, 1899. Serial No. 711,340. (No model.)

To all whom it may concern:

Be it known that I, PATRICK F. McDONALD, a citizen of the United States, and a resident of Scranton, in the county of Lackawanna and State of Pennsylvania, have invented certain new and useful Improvements in Double Miter-Boxes and Calculators; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

Figure 1 of the drawings is a plan view of the invention. Fig. 2 is a front elevation of the invention. Fig. 3 is a section on the line xx , Fig. 1. Fig. 4 is an enlarged detail view of the saw-guide. Figs. 5 and 6 are detail views of the set-slide.

This invention has relation to miter boxes or machines, and is designed to provide a device of this character by means of which a double-miter cut, or a cut having a miter in two different planes of any desired angularity, may be accurately formed, also by means of which a single-miter cut only in either one of two planes and of any desired angularity may be accurately formed.

The invention also involves means for readily effecting calculations which are incident to the use of machines of this kind and to various branches of the carpenters' art which have reference to relative angular and circular values and measurements.

With these objects in view my invention consists in the novel construction and combination of parts, all as hereinafter described, and pointed out in the appended claims.

Referring to the accompanying drawings, the letter A indicates a suitable base whose upper surface is divided by scale-marks into two squares 1 and 2, the sides of which are twelve inches in length and which have the side a in common. These scales are suitably marked in feet and inches, as shown in the drawings. Inscribed in these squares from the point a' at the rear extremity of the side a as a center and with one quadrant in each of the squares 1 and 2 is a semicircular arc B, which is accurately divided and marked in

degrees, as shown. The radius of this arc is the length of a side of the squares.

C designates a vertically-slotted center post or standard formed with a half-ball c at its lower end, which bears neatly but loosely in a hemispherical cup C' in the base A, the center point of said cup and of the bearing of the ball c coinciding with the point a' , which, as before stated, is the center from which the arc B is struck. The material of the post adjacent to the ball is cut away, as indicated at d , to permit the post to be moved to an angle of or approaching forty-five degrees without contacting with the base. The upper end of the post is formed with a guide portion f , which projects through the space formed between parallel back plates E E, whose upper and outer edges are cut to form an arc of one hundred and eighty degrees of the same radius as the arc B and having the same center. These side plates are shown as being cut away at their central portion to permit the post or standard to assume an inclined position to forty-five degrees upon either side of center. These plates are preferably of thin character and are reinforced by intermediate pieces F, of wood, as shown, in order to provide a secure back bearing or rest for the work. These pieces F are provided with the sliding sections F' at their inner portions, which when extended, as shown, increase the extent of the bearing for the work, but which are moved back to the position indicated in dotted lines when the post or standard is moved to an inclined position approaching forty-five degrees.

The sliding sections F' are worked by hand and slide in recesses F^2 of the blocks F. Each section F' has secured to each side thereof triangular ribs or plate-sections F^3 in the same planes as the plates E E, and the rear edges f of which ribs abut against and are stopped by said plates when the sliding sections F' are pushed back.

The upper portion of the post or standard is provided with a guide G, which engages the under side of the arcuate rim portions of the plates E E, as shown. A nut G' engages the threaded upper end of the stud portion f and provides means for securing the post in any desired position of adjustment. Said rim

portion is marked with a scale S in degrees, as shown. Adjustably secured to the said post by a set-screw h , engaging a groove h' , or by any other suitable means, is a saw-guide H, consisting of two parallel plates, which pass through the slot of the post and are formed with the semicylindrical sleeve portions h^2 , which embrace the post. They are also provided with the separated lips h^4 at the bottom, which protect the set of the saw-teeth.

I designates a horizontal radial arm or rod which is secured to the lower portion of the post to sweep over the base A and its inscribed arc B. Said arm or rod carries a slide I', provided with a set-screw i , by means of which it may be secured in the desired angular or longitudinal adjustment on said rod or arm. Said slide is also provided with a stud i^2 , adapted to engage an aperture j , formed in a set-slide J. The latter is formed with an edge groove j' , which engages a lip a^3 on the edge of the base A, and also with a set-screw j^2 , which passes through a longitudinal slot a^4 in said lip a^3 . By these means the block I may be moved to any point on the edge of the base and secured at that point. The stud j^2 is then engaged with the aperture j and the slide I' secured by tightening its screw i . The slide J is preferably formed with two of the apertures j , one upon each side of the center, in order to receive the stud when the rod or arm I is moved to either side of the dividing-line between the two squares.

K designates an indicating wire or cord which is connected at one end to a ring K', loosely mounted on the reduced base portion d of the post, so that the wire may be moved to any radial position on the arc B over the scale around the squares.

L designates a work support or rest which is secured to supporting-block l at the rear side of the base, with its rear edge against the back plate. This bar is of wood and is designed to be secured to the block l in any manner suitable to permit its being removed and replaced whenever necessary.

I have shown the back plates as connected to the base by means of hinges M, which permit it to be folded over onto the base when the work-support L is removed. The latter normally holds the plates in upright position against movement in one direction, and suitable back stops n are provided to hold them against movement in the opposite direction.

The operation of the machine will be readily understood. The ball-bearing of the post permits its rotary movement to give the saw-guide an angular direction at any degree on the arc B and also an angular movement to incline said guide at any angle from ninety to forty-five degrees in each direction to the plane of the base. It will be readily seen, therefore, that I am able to make a compound or double-miter cut by reason of these two movements and that by a proper relative adjustment of such movement the angularity of this cut with respect to either one of two

planes may be controlled. It will at once be appreciated that by reason of this fact the machine is of very great value for use in a great variety of special work where angular joints of peculiar form are to be made as well as for ordinary work, both cuts being made at the same time, and inasmuch as by moving the post to the one side or the other of its vertical position and by rotating it to bring the guide to either side of the line dividing the two squares on the base the direction of angularity may be reversed. The number of possible combinations and the corresponding different cuts which may be made is almost unlimited.

The angular adjustment of the post can be readily determined by the scale S and its rotary adjustment by the scale on the arc B. For greater accuracy, however, I provide the indicator wire or cord above described. In setting the saw-guide this wire is carried to a radial position such that it exactly coincides with the mark on the scale B which denotes the desired angle. The set-slide J is then moved to a position where the said wire or cord crosses the center of the aperture j , in which the stud j^2 of the slide I' is to be engaged. The slide J is then secured in this position. The stud i is next engaged with the aperture j , and the slide I is secured by its screw. This insures the correct position of the saw-guide, the angular adjustment of the post being secured by its nut. The slide I' being both longitudinally and angularly adjustable on the rod or arm I, it follows that its adjustment will correspond perfectly with the two movements of the post.

The saw-guide can be adjusted vertically on the post to suit the particular work being done.

It will also be observed that the scales on the base of the board indicate in feet and inches or fractions thereof the value of the tangent of any given angle on the arc B between forty-five and ninety degrees. Therefore if either the angle or the value of its tangent be known the value of the other element is at once indicated without calculation. To illustrate: Supposing it to be required to fit a pair of rafters to give a particular roof a pitch of four inches to the foot, the set-slide J is moved to a position on the base where the center of its aperture j is directly over the four-inch mark of the scale. This at once gives the proper angle for cutting the rafters and sets the saw-guide at that angle. This, however, is but one instance of many similar calculations based on the relative mathematical relations existing between a given square and a circle whose radius is equal to the side of such square. The arrangement described, however, is not limited to calculations based on a circle whose radius is twelve inches, since by the use of a sliding scale T, placed on one of the squares 1 and 2 on the base, similar calculations may be made based on a circle of a less radius, and by ex-

tending the length of the indicating cord or wire to any point outside the base it will be readily seen that other calculations based upon circles of longer radii may be made.

5 I do not wish to limit myself to the particular construction and arrangement of parts which I have herein shown and described, as it is obvious that many changes may be made without departing from the spirit and scope
10 of my invention.

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

1. In a miter box or machine, the combination with a base, a support having a hemispherical socket, of a saw-guide-carrying post having a ball end bearing in said socket, and means for guiding and holding the upper end portion of said post, substantially as specified.
20

2. In a miter box or machine, a base or support having a bearing cup or socket, a saw-guide-carrying post, having a ball end bearing in said cup or socket, and means for securing said post in different positions of rotary and angular adjustments.
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3. In a miter box or machine, the combination with a supporting-base having a hemispherical socket, of a saw-guide-carrying post having a ball end bearing in said socket, means for guiding and holding the upper end portion of said post, a radial rod connected to said post, and means for securing said rod in different positions, substantially as specified.
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4. In a miter box or machine, the base having on its surface two equal squares having a common side, and whose sides are marked by scales, a subdivided arc inscribed in said squares, with an equal segment in each, and a hemispherical socket at one extremity of the said common side at the center of said arc, of the saw-guide-carrying post having a ball end fitted to said socket, guides for the upper end of said post, a radial arm attached to the lower end of said post, and a slide-block slidably engaging the free edge of said base and adjustably engaged by said radial arm, substantially as specified.
45

5. In a miter box or machine, the base having the hemispherical socket, the work-support, the back-stops, and the arched guides, of the saw-guide-carrying post having a ball end fitted to said socket, and engaging the said guides, and means for securing said post in different angular and rotary adjustments, substantially as specified.
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6. In a miter box or machine, the combination of a base or support, having the hemispherical socket, the work-support, the back strip, and the arched guide, of the saw-guide-carrying post having the ball end fitting said socket, and engaging said guides at its upper portion, means for securing said post in different angular positions in said guides, a radial arm connected to the lower portion of said post, and a slide on the opposite edge portion of the base adjustably engaged by said rod.
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7. The combination with a base having on its surface two equal squares having a common side, and whose sides are marked by scales, and also an arc inscribed in said squares, with a segment lying in each, a saw-guide-carrying post centered at one extremity of said common side and at the center of the said arc, means for securing said post in different positions of rotary and angular adjustments, and an indicating wire or cord connected to the said post, substantially as specified.
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8. The combination with the base having its upper surface divided into two squares having a common side and whose sides are marked by scales of a post or standard centered at one extremity of said common side, and capable of rotary and angular movement, and a saw-guide carried by said post or standard, said base also having inscribed therein an arc of one hundred and eighty degrees whose center is the center of movement of said post, and whose radius is the length of the common side, substantially as specified.
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9. In a machine of the character described, a base having its surface divided into two equal squares having a common side, and whose sides are marked by scales, said base also having inscribed therein a subdivided arc of one hundred and eighty degrees one quadrant of which lies in each of the squares and whose center is a point marking one extremity of the common side of the squares, and whose radius is equal to the length of such side, in combination with a saw-guide movable over said base, substantially as specified.
80

10. In a machine of the character described, a base having its surface divided into two equal squares having a common side, and whose sides are marked by scales, said base also having inscribed therein a subdivided arc of one hundred and eighty degrees one quadrant of which lies in each of the squares and whose center is a point marking one extremity of the common side of the squares, and whose radius is equal to the length of such side, together with a saw-guide-carrying post centered at the center of the said arc and rotatably and angularly adjustable upon said center, and an arcuate back portion secured to said base and forming a guide for said post, the arc of said back portion having the same center and radius as the arc inscribed on the base, substantially as specified.
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In testimony whereof I affix my signature in presence of two witnesses.
PATRICK F. McDONALD.
Witnesses:
GEO. H. PARMELEE,
GEO. M. ANDERSON.
90
95
100
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