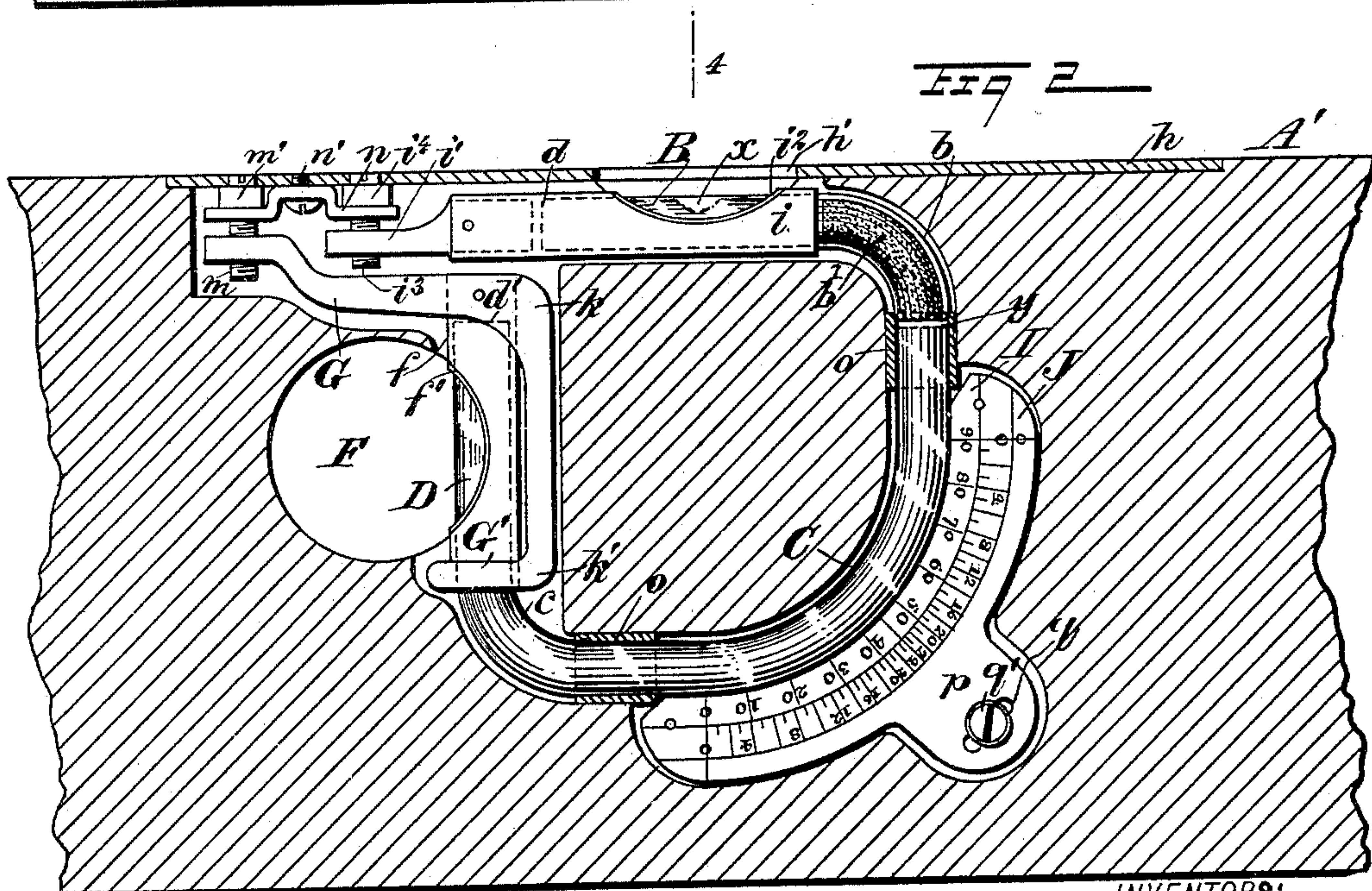


2 Sheets—Sheet 1.

CARPENTER'S COMBINATION LEVEL.

Patented Jan. 26, 1892.



INVENTORS:

H. R. Winkelmann
BY *A. C. Perkins*
Munn & Co
ATTORNEYS

ATTORNEYS

(No Model.)

2 Sheets—Sheet 2.

H. R. WINKELMANN & A. C. PERKINS.
CARPENTER'S COMBINATION LEVEL.

No. 467,844.

Patented Jan. 26, 1892.

Fig 3

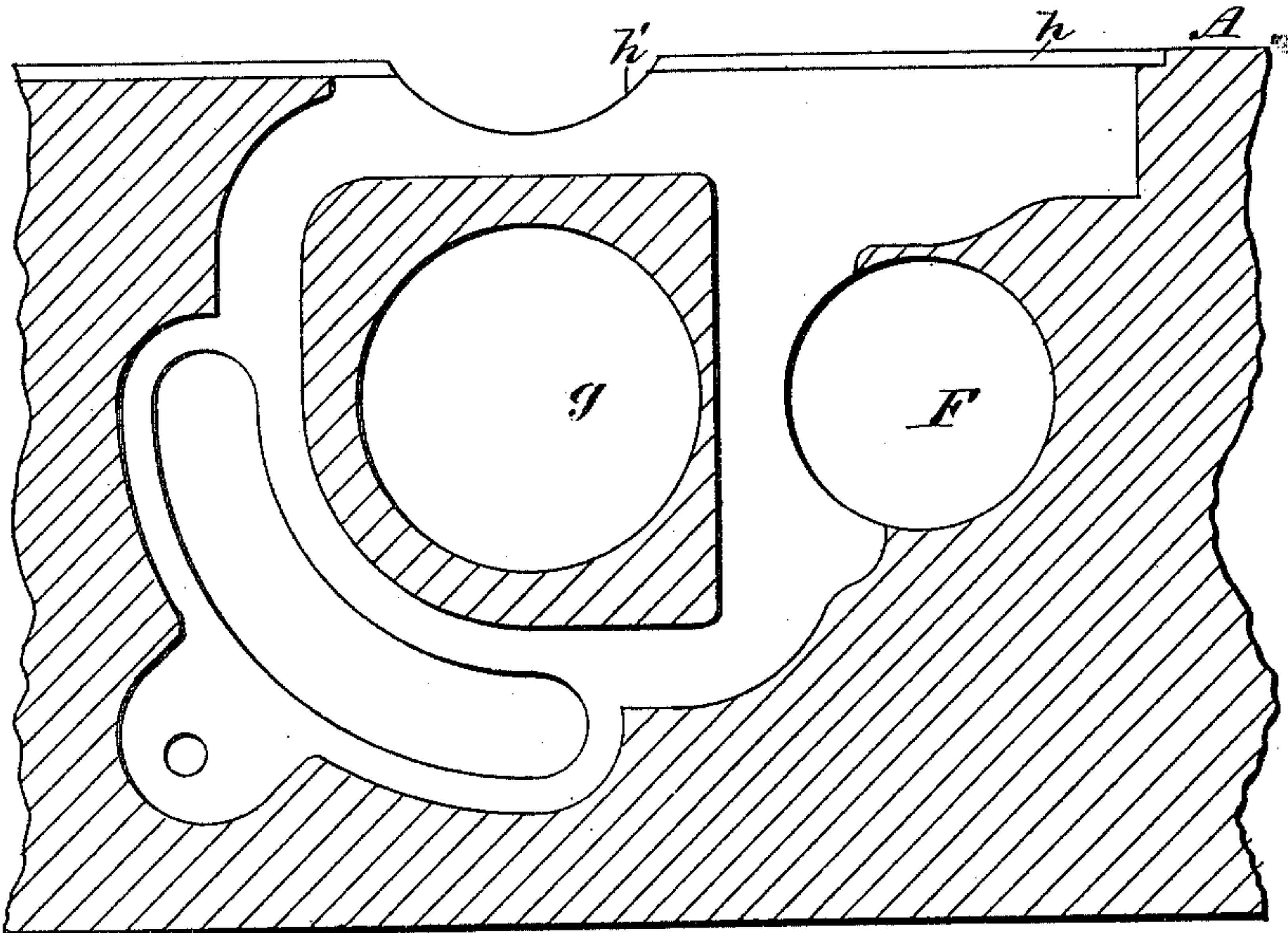
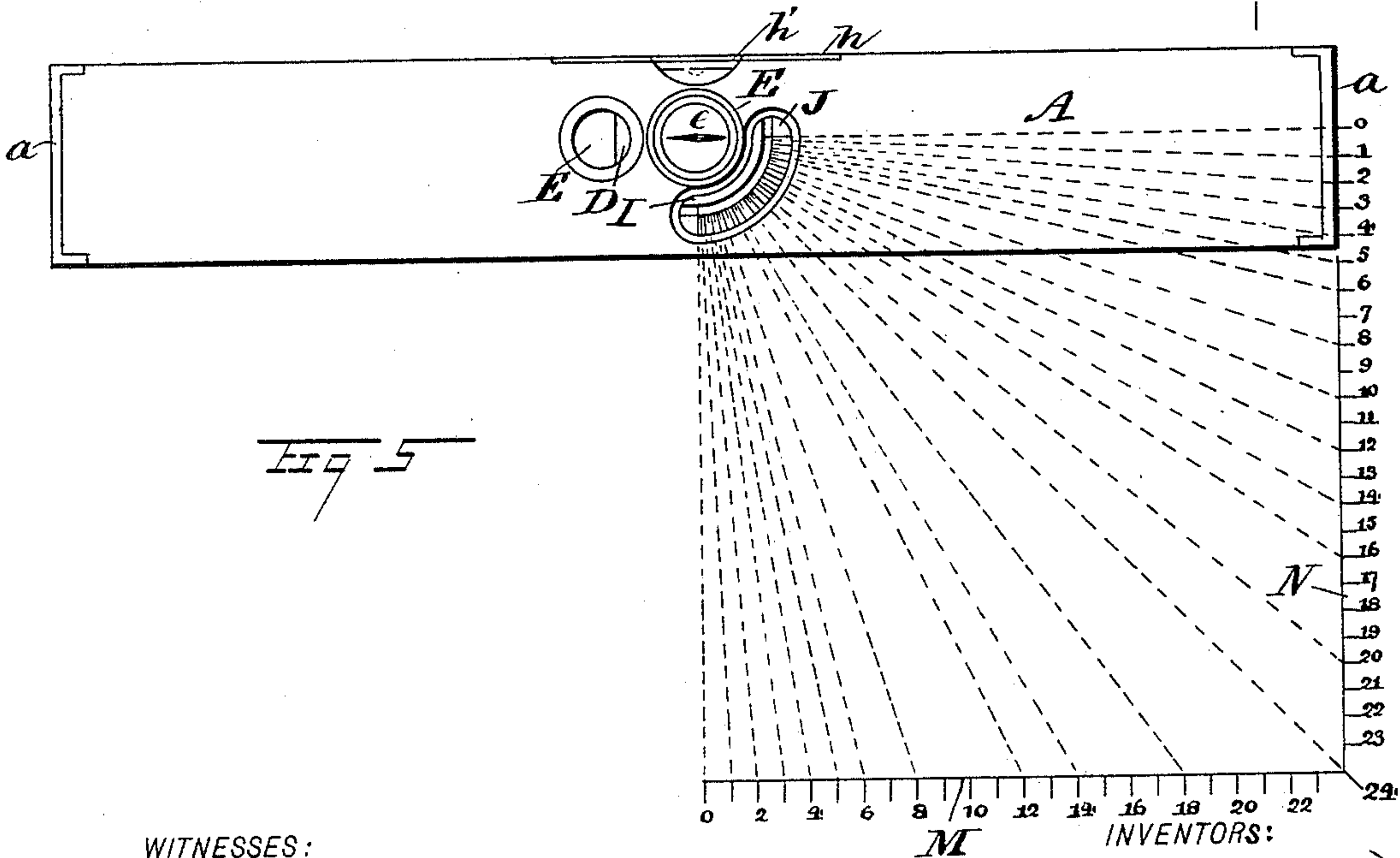
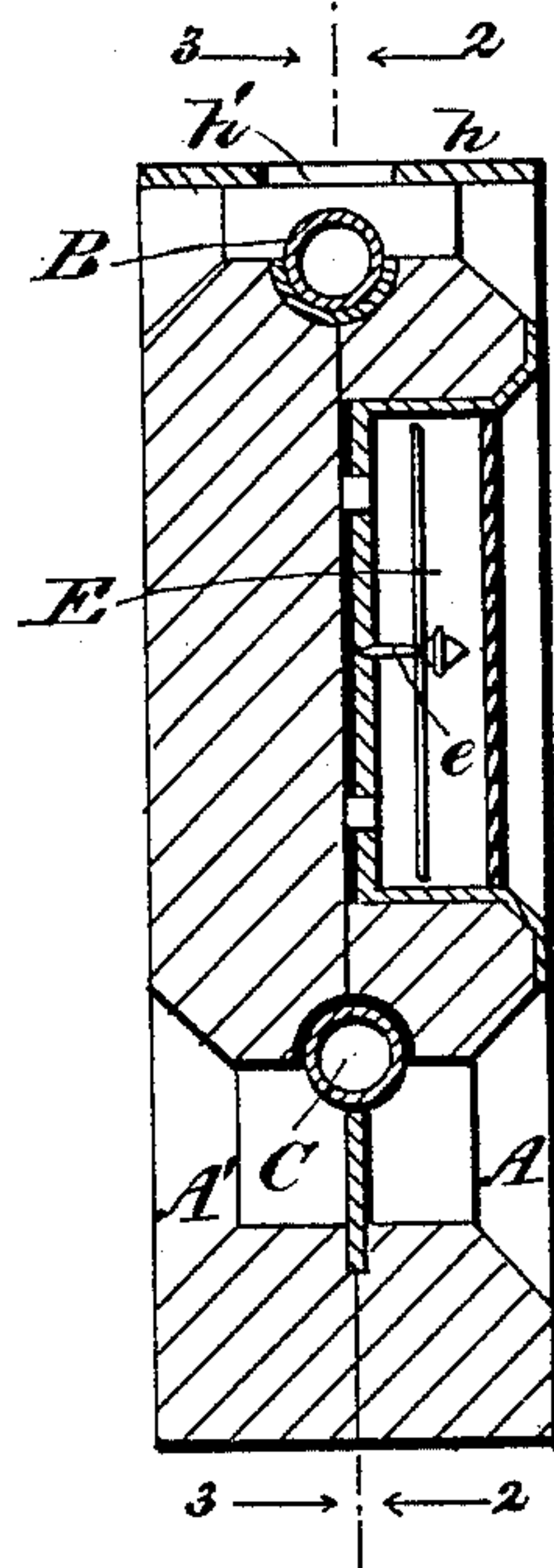


Fig 4



WITNESSES:

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UNITED STATES PATENT OFFICE

HERMAN R. WINKELMANN, OF OAKLAND, FLORIDA, AND ADAM C. PERKINS,
OF MACON, GEORGIA.

CARPENTER'S COMBINATION-LEVEL.

SPECIFICATION forming part of Letters Patent No. 467,844, dated January 26, 1892.

Application filed June 30, 1891. Serial No. 398,058. (No model.)

To all whom it may concern:

Be it known that we, HERMAN R. WINKELMANN, of Oakland, in the county of Orange and State of Florida, and ADAM C. PERKINS, of Macon, in the county of Bibb and State of Georgia, have invented a new and useful Carpenter's Combination Implement, of which the following is a full, clear, and exact description.

10 The object of this invention is to provide a carpenter's plumb and level with an adjustable inclinometer and novel brace-scale therefor which will indicate the degree of bevel to be given to the ends of diagonal braces in
15 framed structures and the slope of cuts for the ends of rafters having different elevations from a horizontal plane, a further object being to provide a compass for the plumb and level which will facilitate the location of foundation-walls, side walls, &c.

20 To these ends our invention consists in the construction and combination of parts, as is hereinafter described and claimed.

25 Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters and numerals of reference indicate corresponding parts in all the figures.

30 Figure 1 is a side view of the combination implement shown with the ends of the level-stock broken away at each end. Fig. 2 is a longitudinal sectional view of parts shown in Fig. 1, taken on the center line in Fig. 4, viewed in the direction of the arrows 2. Fig.
35 3 is a longitudinal section taken on the same line as is Fig. 2, viewed in the direction of the arrows 3 in Fig. 4. Fig. 4 is a transverse section taken on the line 4 4 in Fig. 1. Fig. 5 represents the implement and a diagram in
40 connection with it illustrating the degree-indications of a brace-scale attachment prolonged to meet the equal graduations on the base and perpendicular of a square.

45 The level-stock is preferably made of hard wood two feet long, longitudinally divided into two pieces A A', of equal thickness, detachably secured together by any proper means, having a metal shoe a on each end to protect the same and assist in retaining the stock-
50 sections together.

At the longitudinal center of the composite stock A A' a novel-shaped integral level, plumb, and inclinometer spirit-tube is embedded in the stock-sections, which are equally excavated on their inner surface to receive
55 the same. Said tube, which is a cylinder of glass, is bent at b, then curved at C, and again bent at c, (see Fig. 2,) thus producing a level tube B, a suitably-curved inclinometer-tube C, and a plumb spirit-tube D from one
60 continuous piece, having the terminal ends d d' projected toward each other and substantially at right angles, axially considered, the sides of the tube being disposed in parallel
65 planes, as the base is equal in diameter throughout its extent.

At the radial center of the curved portion C of the spirit-tube, which portion is a true arc of a circle, the center post e of a magnetic compass E is located, said compass being
70 seated in a circular aperture formed as at g in Fig. 3.

Upon the upper edge of the stock A A' the excavation formed for the level portion B of the spirit-tube is suitably shaped and cut
75 through to allow a bubble x in the spirit-tube to show when the stock is in a horizontal plane, as usual, there being a cap-plate h secured on the stock over the tube, having a longitudinal slot h' formed on it above the
80 tube to expose the bubble when the implement is used as a level.

The tube portion D is located in the stock-piece A at right angles to the parallel edges of the stock, having a sleeve f placed upon
85 it, which envelops said tube portion and has an aperture f' cut in its side wall at a proper point to expose the bubble y when the implement is in service as a plumb-indicator, there being a transverse hole F cut through
90 the level-stock, so that the tube portion D may be inspected.

A preferred means for correcting any slight error in the adjustment of the spirit-tube is shown in Fig. 2, and consists of a socket-piece
95 i, that envelops the level-tube B and has a prolongation or ear i' at the end of said tube portion, which socket is affixed by any proper means upon the tube and is also adapted to close it, the side wall of the tube having an
100

oval orifice i^2 formed on its upper side at a proper point to expose the bubble x , the ear i' being vertically perforated and threaded to permit the insertion of the threaded body of an adjusting-screw i^3 .

A regulating-arm G is provided for the other terminal end of the spirit-tube, which is surrounded by the sleeve f , said arm being bent to form a right angle at k and again at k' , thus affording a shorter arm G' therefor, parallel to the upper arm G and separated a proper distance therefrom, both extending in the same direction, or toward the oval slot f' of sleeve f .

The ends of the spirit-tube are sufficiently separated to allow the parts mentioned to be secured thereon, and the upper terminal of the plumb-tube portion D is hermetically sealed by any preferred means when the tube has been nearly filled with spirits, colored or clear, the small air-space left affording the air-bubble x .

It may here be explained that it is feasible to use the bubble x for the level, inclinometer, and plumb; but that preference is given to the employment of two bubbles and the division of the spirit-tube into two chambers by the insertion of a plug b' where the tube is curved at b , a slight air-space y in the lower chamber providing an air-bubble for the inclinometer-tube C and plumb-tube D .

The arm G is extended into a cavity formed in the upper portion of the stock-sections A A' for the accommodation of it and the ear i' , which parts lie substantially in the same plane, the end portion of the arm being perforated and threaded to receive a set-screw m .

Upon the lower surface of the cap-plate h a yoke-piece n is seated, and secured by the insertion of a binding-screw n' through it and into the cap-plate, the yoke having its end portions bent away and returned in a plane parallel to and sufficiently removed from the cap-plate to permit the collars i^4 m' on the screws i^3 m to occupy the intervening spaces when inserted through the perforated ends of the yoke-piece into the threaded ends of the ear i' and arm G , each screw having an integral head, which projects through an orifice in the cap-plate, made therefor, which perforations align with the perforations of the yoke-piece, ear, and arm named, so as to permit the kerfed heads of the screws to be adjusted with a screw-driver to alter the relative position of the end portions of the spirit-tube as may be necessary to secure a correct adjustment of the entire tube within the stock-pieces A A' .

In order to facilitate the adjustment of the spirit-tube as has been explained, there are slightly-elastic bands o placed around the tube and located, preferably, at the terminations of the arched tube portion C , which bands form a slightly-yielding packing between the tube and the rigid walls of the excavation in the stock-sections A A' , which channel is cut larger than the tube, so that

freedom for expansion and contraction of the tube-body due to alterations in temperature is permitted and danger of breakage due to such a cause or to percussion is obviated.

On the exterior edge surface of the curved tube portion C a curved aperture of proper size and form is made for the embedment of the graduated arcs of a degree and brace scale plate I J in the stock-pieces A A' , which graduated arcs are both preferably produced upon one piece of sheet metal having an integral lug p formed on the same, which lug is seated in a recess in the stock-pieces and has a sufficient movement allowed therein edge-wise to afford means for connection in regard to the relative position of the plate, tube C , and opposite parallel edges of the level-stock, a concentric slot being formed in the ear, as at q in Fig. 2, for the introduction of a binding-screw q' , that retains the plate wherever it is desired to hold it.

Upon the inner edge portion of the scale-plate degree-graduations from zero to ninety degrees, inclusive, are marked, which constitute the degree-scale I , and concentric with the degree-scale, nearer the lug p , another series of graduation-marks J are produced, which is termed a "brace-scale" from the fact that it is utilized to indicate the degree of slope or inclination to be given to the ends of diagonal braces, rafters for roofs, and other similar uses. The marks on the brace-scale J are not evenly spaced apart, as the degrees of a circle, and are ascertained by means of a chart, (shown in Fig. 5,) which will be explained.

The level-stock is parallel on its edges and two feet long, as before mentioned, and in the view is represented by A . From the compass-center e a perpendicular is dropped to a point zero, which is the left-hand terminal of a base-line M , which is parallel with the edges of the level-stock and removed from the center one foot or half the length of said stock.

From the right-hand terminal of the level-stock A another perpendicular to the base-line M is drawn, as at N in Fig. 5. The base-line M and perpendicular N are each laid off into twenty-four equal divisions, and radial lines (shown dotted) are drawn from the center e to each division-mark on the base-line and perpendicular, cutting through the arc of the brace-scale plate J .

The variation in degree of inclination from the zero point at the left of the base-line M to the vertex 24 of the right angle formed by the junction of the perpendicular N with the base-line causes the graduations to diminish in distance apart as the angle is approached, and as the angle is receded from on the perpendicular N the spaces between the scale-marks increase in width in the same ratio as that of the base-line graduations, so that the marks are more closely located near the center of the brace-scale J than toward its ends, as represented more clearly in Fig. 1.

It is apparent that any degree of diagonal inclination for braces, rafters, king-posts, and like frame-timbers may be quickly and accurately determined and laid off by the use of the combined degree and brace scales I J, conjunctively used with the novel form of inclinometer spirit-tube hereinbefore described. The scale-plate whereon the degree-scale I and brace-scale J are formed will, from its position in the level-stock, be displayed on each of its sides, which may be graduated alike, and thus permit these scales to be viewed from either side of the level-stock.

The compass E is frequently of service in conjunction with the other parts of the combined implement—as, for instance, to indicate the position of foundation-walls or building side walls which are to be placed to correspond with any particular point of the magnetic compass.

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

1. The combination, with the stock, of the level, plumb, and inclinometer formed of a single tube having a longitudinal section B, a vertical section D below one end of the section B, and the inclinometer-segment connecting the diverging ends of the sections B D, and adjusting devices connected with converging ends of the tube, substantially as set forth.

2. The combination, with the stock, of the tube having the longitudinal level-section B, the vertical plumb-section below one end of the section B, the segment C, connecting the diverging ends of the sections B D, arms projecting from the converging ends of sections

B D, and parallel swiveled set-screws engaging said arms, substantially as set forth.

3. The combination, with the stock, of the tube having level and plumb sections B D at right angles to each other and converging at one end, the segmental section C, connecting the diverging ends of the sections B D, the flexible bands o, surrounding the tube, the arms i G, projecting from the converging ends of the sections B D, and the parallel swiveled set-screws engaging the said arms, substantially as set forth.

4. In a combined implement for carpenters' use, a level-stock longitudinally divided into two equal sections, which are excavated on adjacent sides for the embedment therein of an integral level, plumb, and inclinometer spirit-tube, and a spirit-tube having a true arc bent intermediately of its end portions, which are bent toward each other at the ends of the arc of the inclinometer-tube portion in the same plane therewith and at a right angle to each other, the end portions having projections that are secured thereon and are adapted to each to receive the threaded body of a set-screw, which screws are held rotatably in perforations of a cap-plate of the level and kerfed to be rotated and effect the adjustment of the level, plumb, and inclinometer-tube when revolved, substantially as described.

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