

No. 632,799.

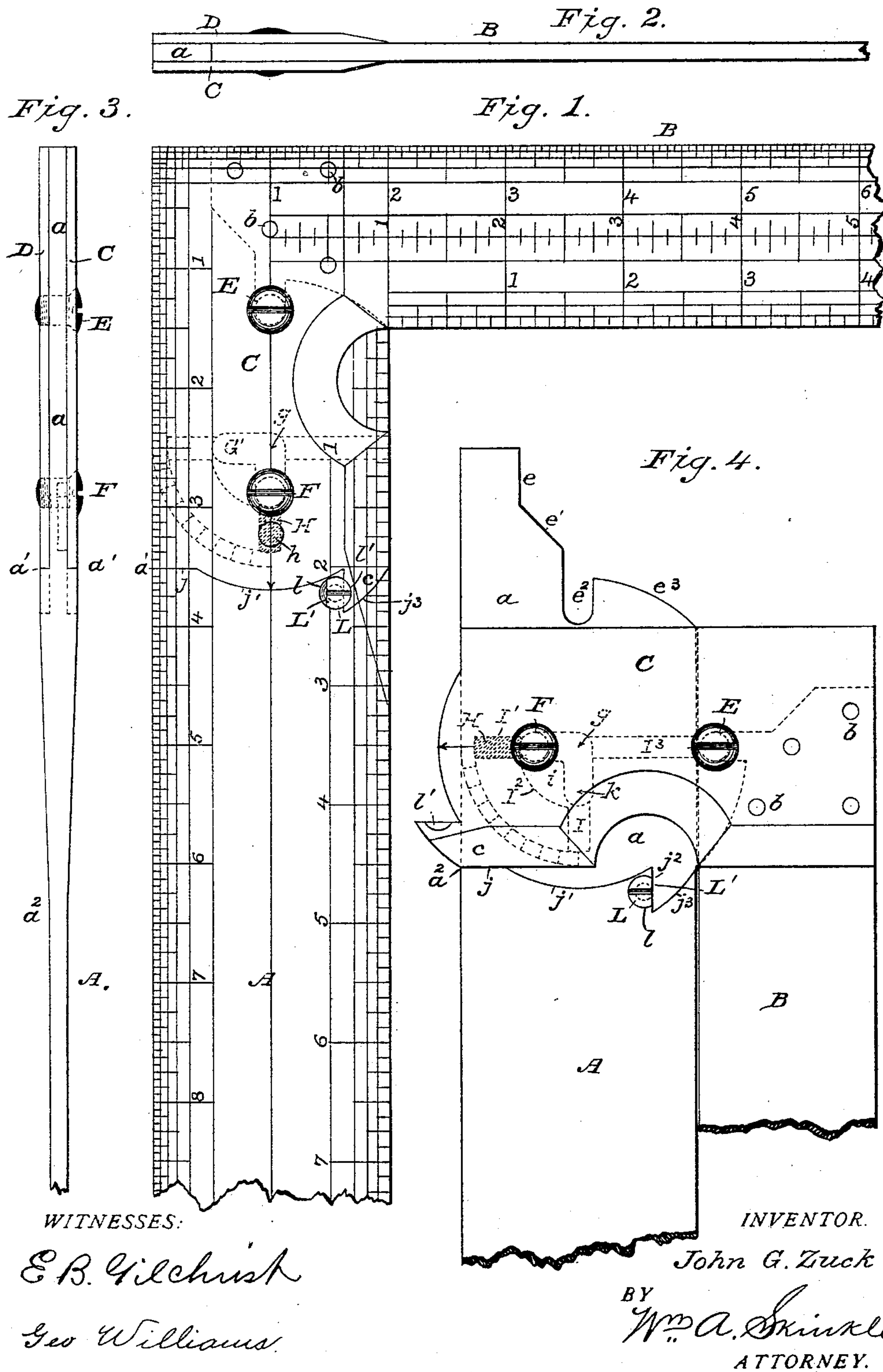
Patented Sept. 12, 1899.

J. G. ZUCK.
FOLDING SQUARE.

(Application filed Nov. 18, 1897.)

(No Model.)

4 Sheets—Sheet 1.



No. 632,799.

Patented Sept. 12, 1899.

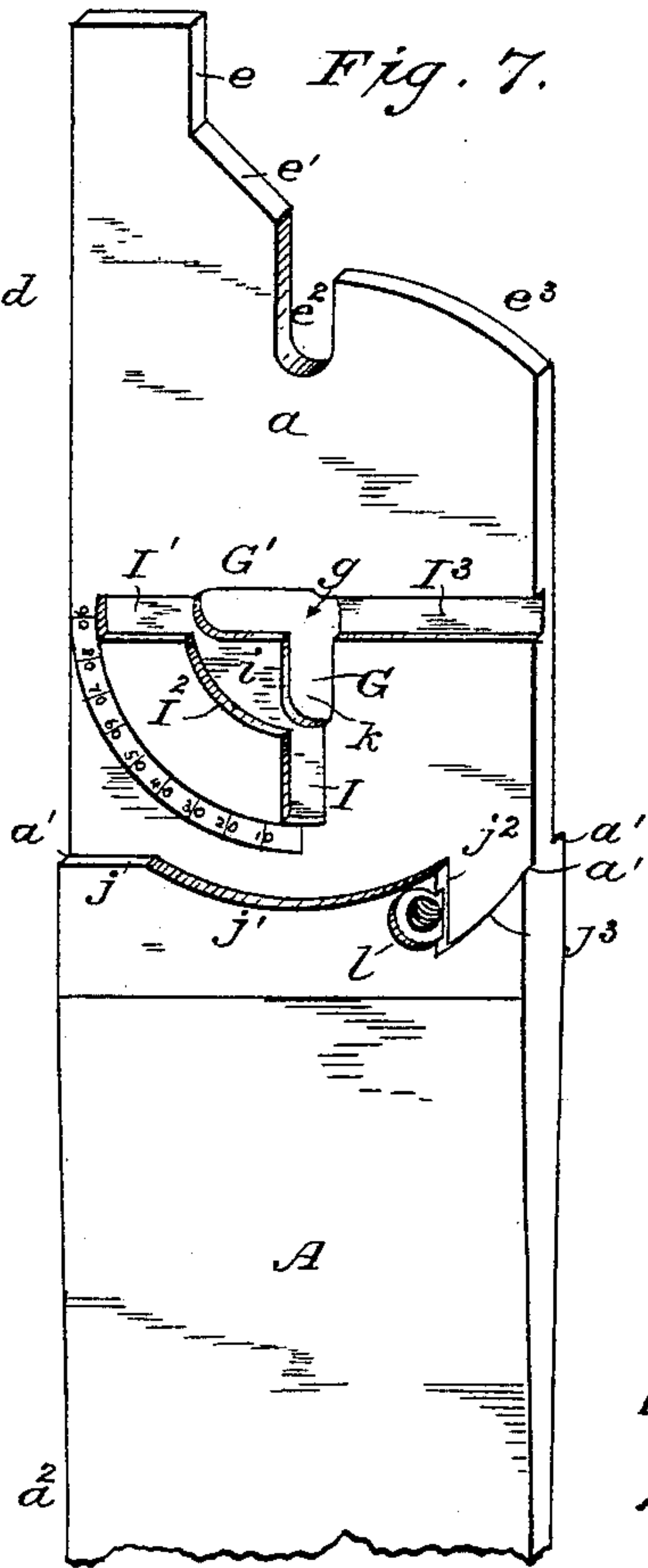
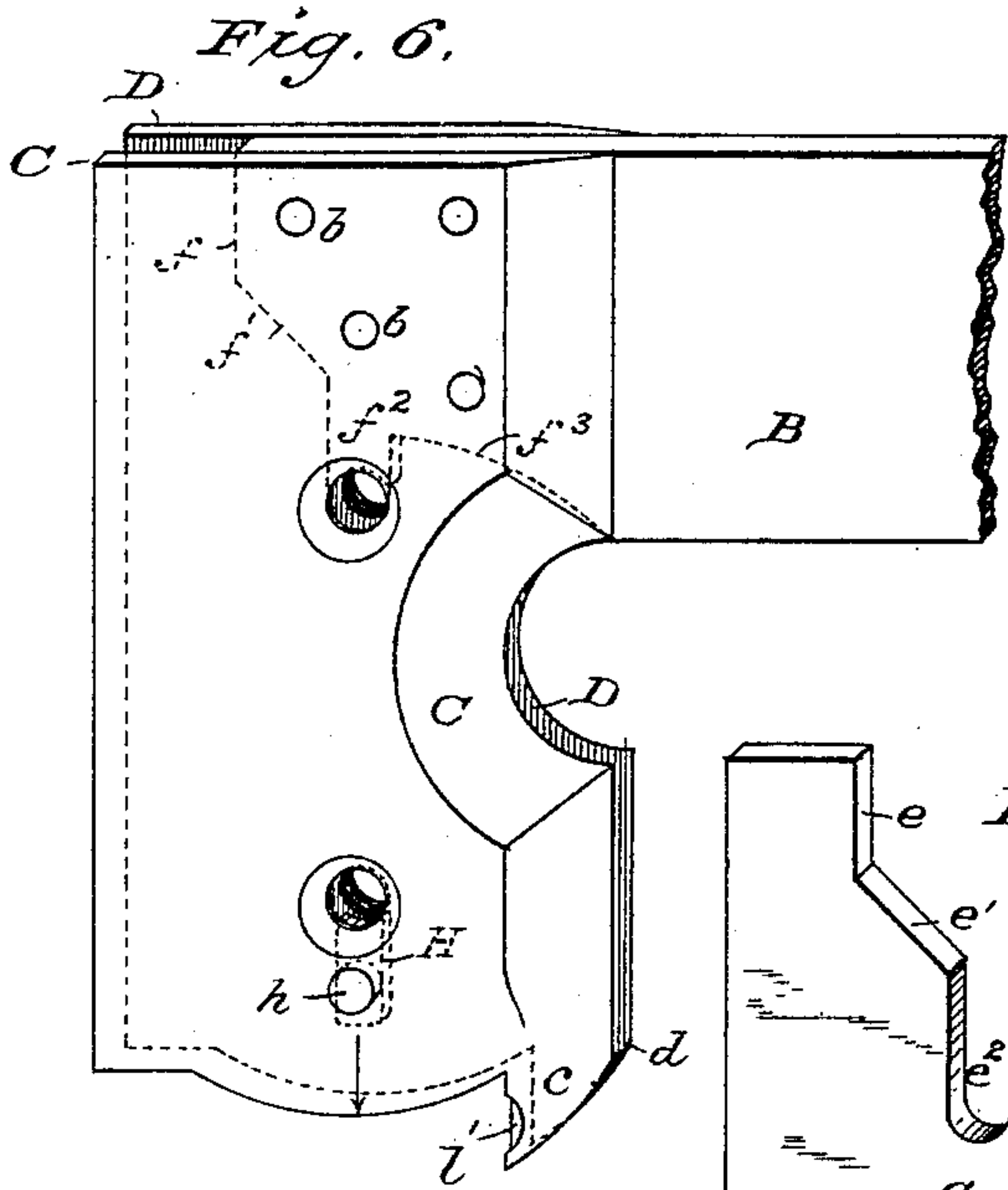
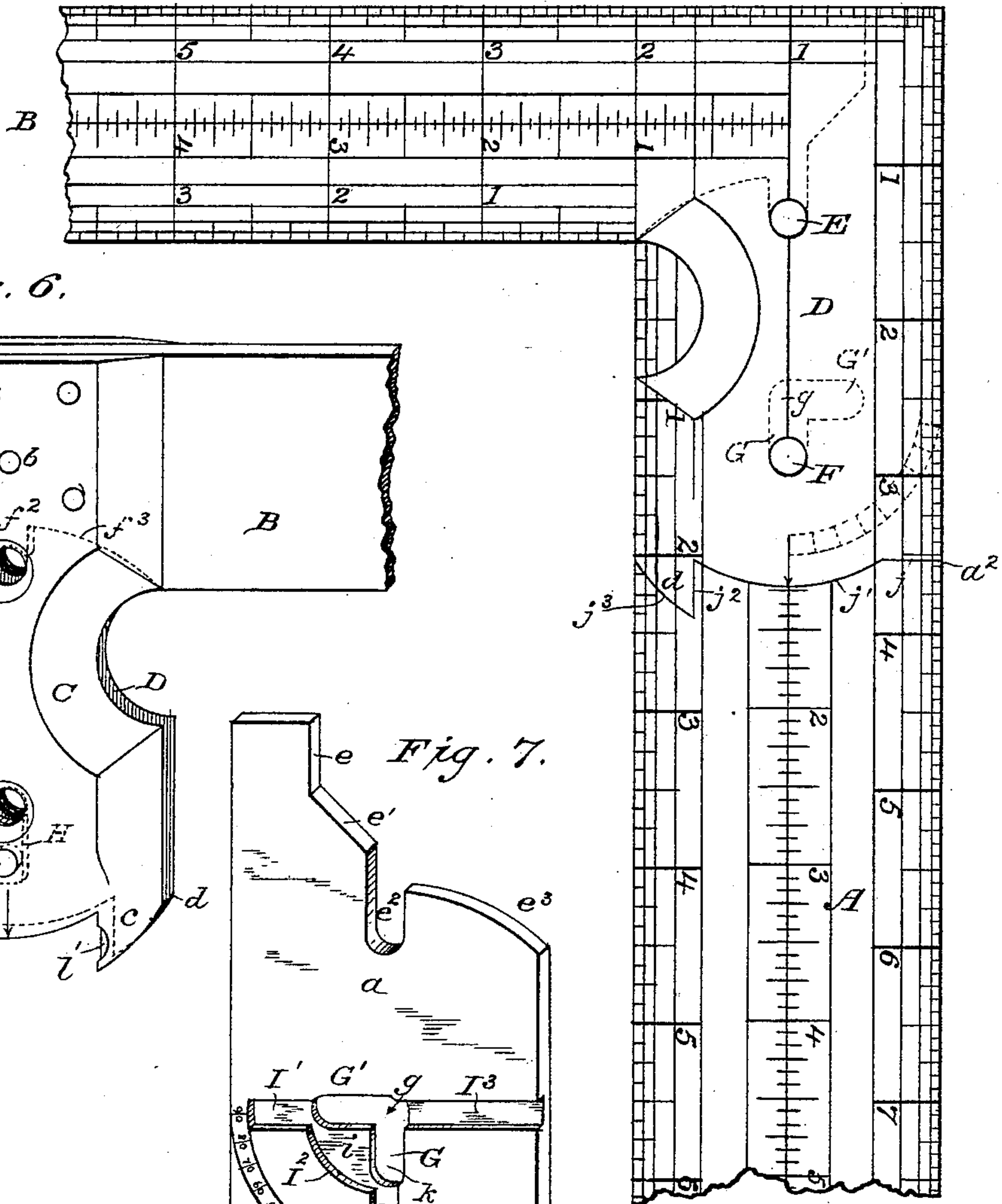
J. G. ZUCK.
FOLDING SQUARE.

(Application filed Nov. 18, 1897.)

(No Model.)

4 Sheets—Sheet 2.

Fig. 5.



WITNESSES:

E. B. Gilchrist

Geo Williams.

INVENTOR.

John G. Zuck

BY

Wm A. Siskle
ATTORNEY.

No. 632,799.

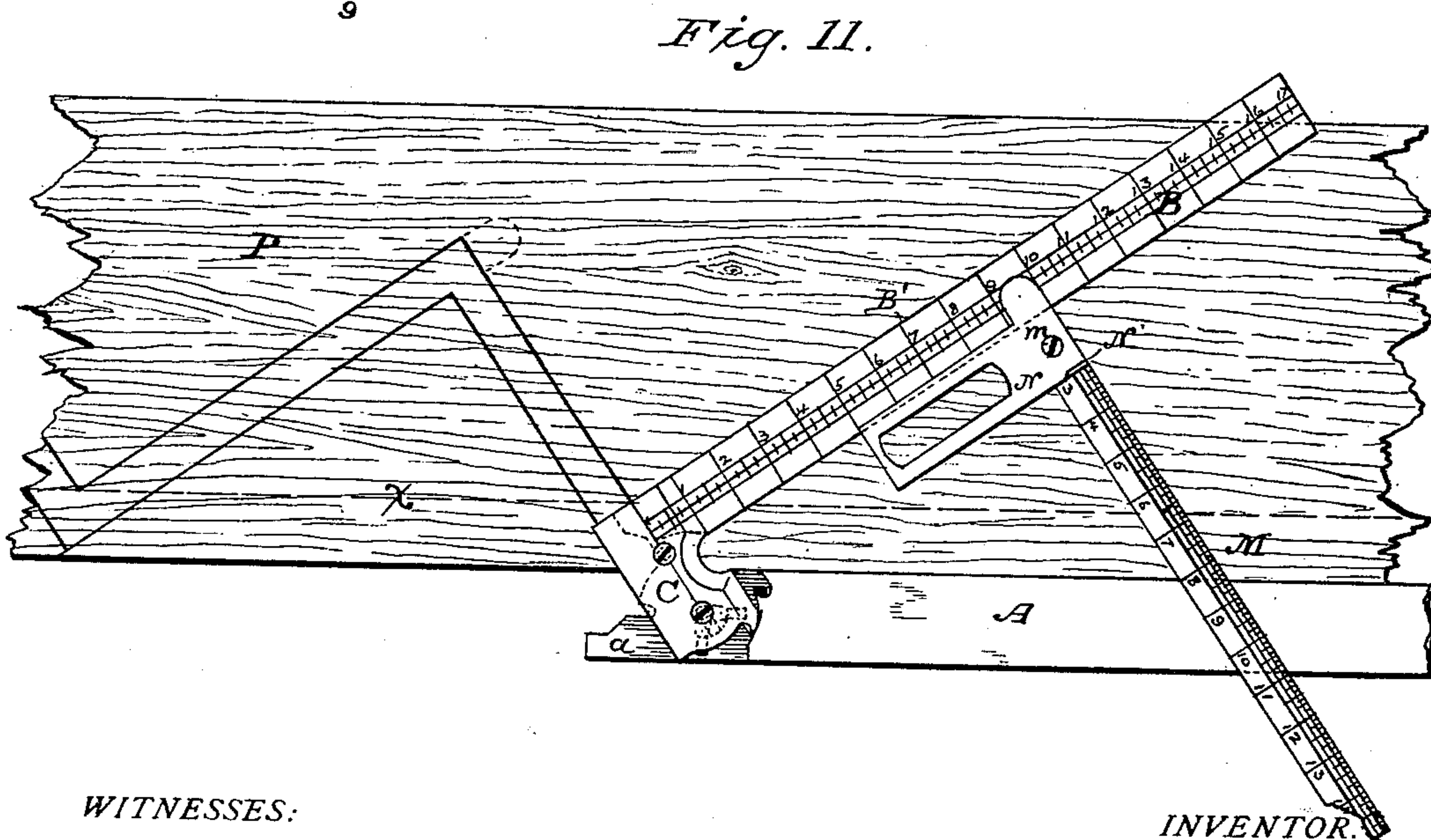
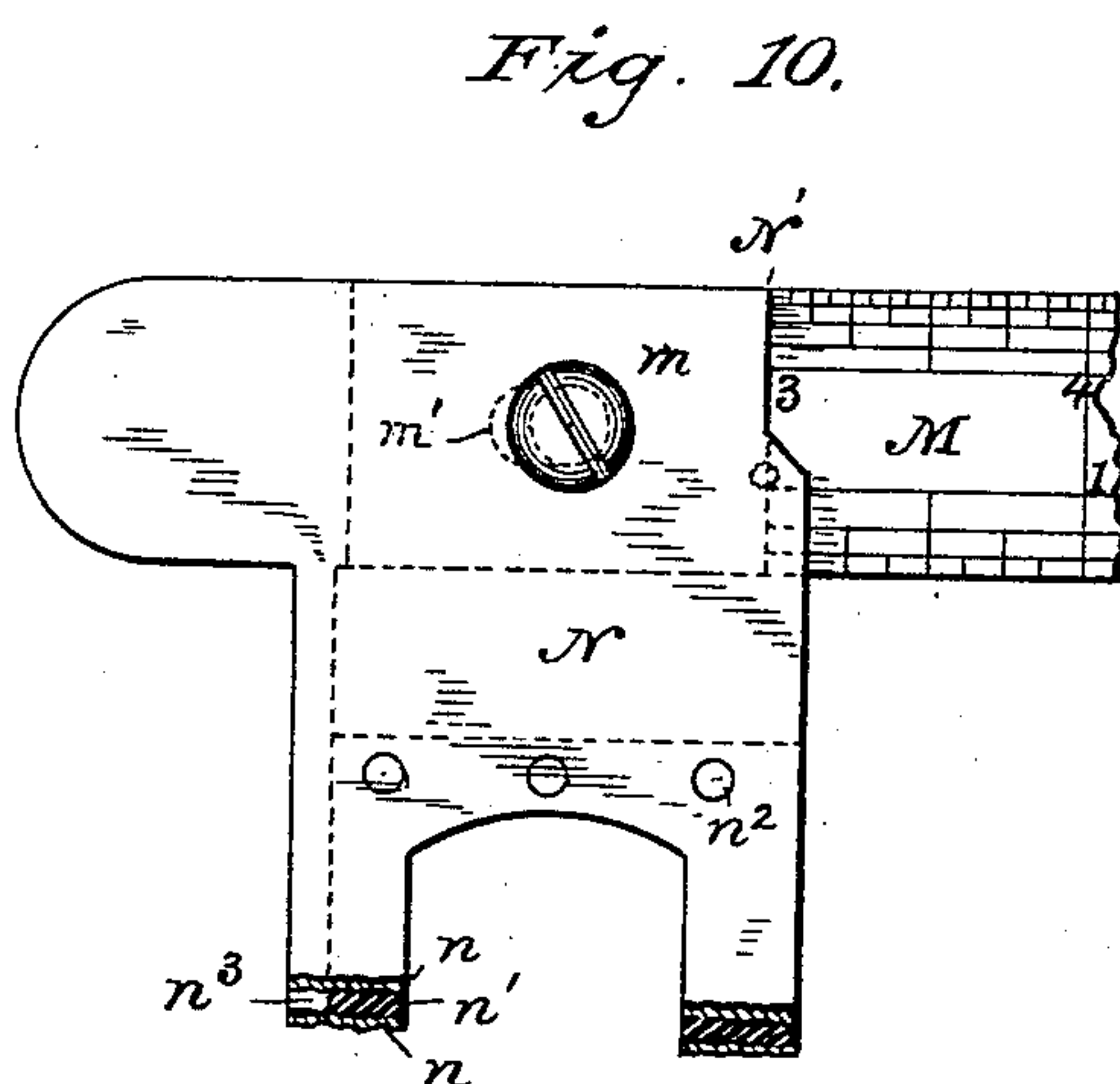
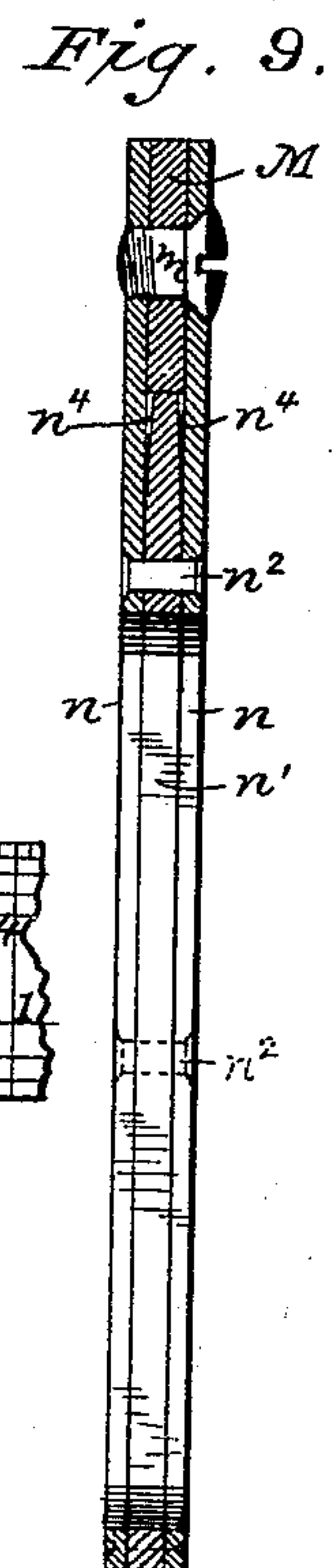
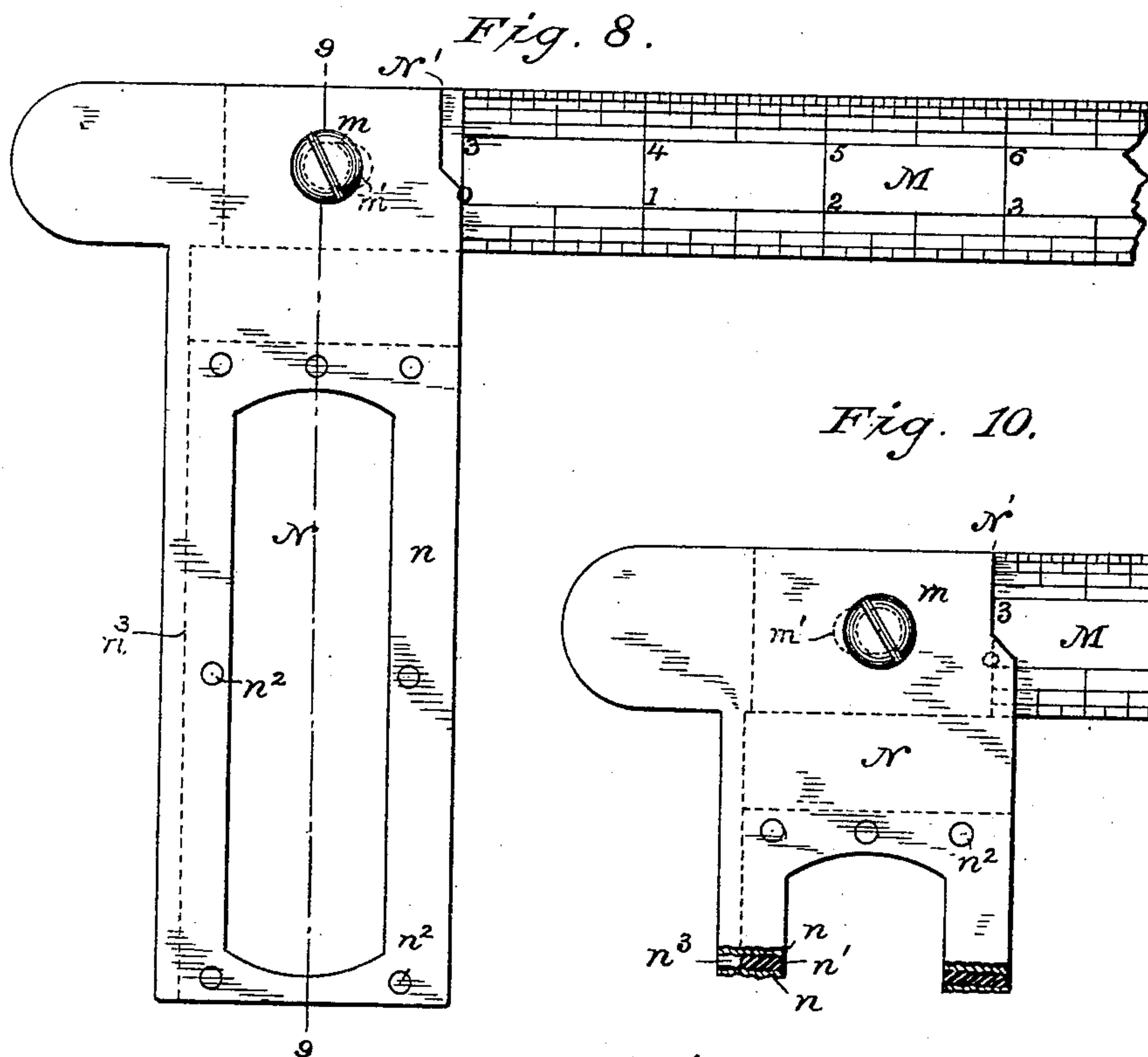
Patented Sept. 12, 1899.

J. G. ZUCK.
FOLDING SQUARE.

(Application filed Nov. 18, 1897.)

(No Model.)

4 Sheets—Sheet 3.



WITNESSES:

E. B. Gilchrist

Geo Williams.

INVENTOR.

John G. Zuck

BY

Wm A. Squire
ATTORNEY.

No. 632,799.

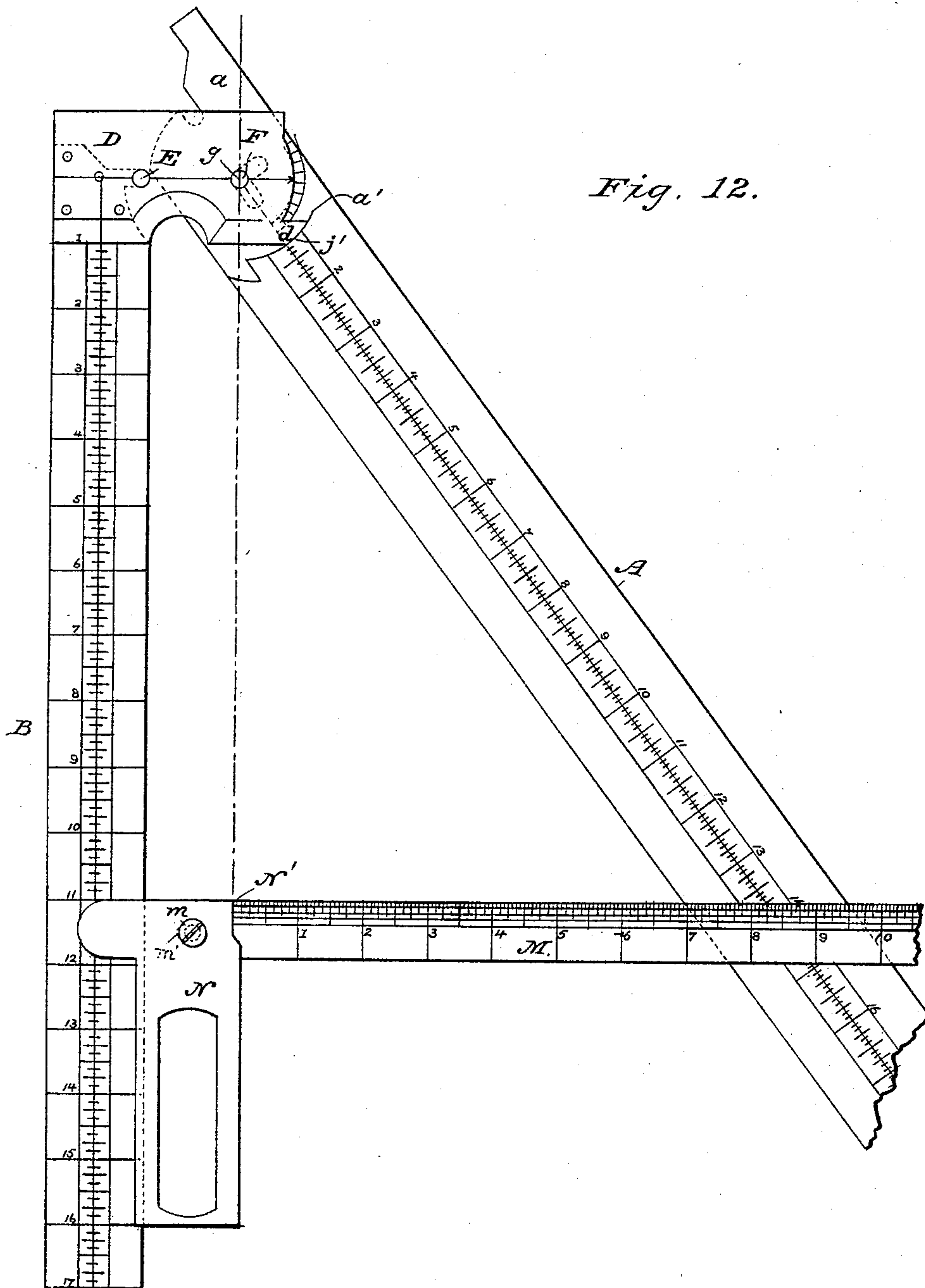
Patented Sept. 12, 1899.

J. G. ZUCK.
FOLDING SQUARE.

(Application filed Nov. 18, 1897.)

(No Model.)

4 Sheets—Sheet 4.



WITNESSES:

E. B. Gilchrist

Geo Williams

INVENTOR.

John G. Zuck

BY

Wm A. Skinkle
ATTORNEY.

UNITED STATES PATENT OFFICE.

JOHN GEORGE ZUCK, OF CLEVELAND, OHIO, ASSIGNOR OF ONE-HALF TO
WILLIAM LARK, OF SAME PLACE.

FOLDING SQUARE.

SPECIFICATION forming part of Letters Patent No. 632,799, dated September 12, 1899.

Application filed November 18, 1897. Serial No. 658,927. (No model.)

To all whom it may concern:

Be it known that I, JOHN GEORGE ZUCK, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Folding Steel Squares, of which the following is a specification that will enable those skilled in the art to which my invention pertains to make and use the same.

My invention relates to improvements in folding steel squares which may be used either as squares or bevels, as desired, and in combination with a supplementary square used to lay out stairwork, &c., and to find the lengths of framing-timbers and the angles at which their ends should be cut, either "level" or "plumb," when such horizontal and vertical dimensions as are generally given in carpentry are stated. In other words, when the base and altitude of a triangle are given any ordinary carpenter without scientific calculation can set his instrument so as to ascertain the length of the hypotenuse and the relative angles of all three sides to each other.

The objects of my invention, in addition to those above stated, are to provide improved means for interlocking and securing the two principal members of the square to each other at their point of connection and to provide scale-markings adapted to the square, which will enable the operator to easily work the triangulation of framing, as above stated, without formal or scientific computation.

The accompanying drawings show my invention in the best forms now known to me at this time; but some changes obvious to a skillful mechanic might be made in the details thereof and some of the parts used without others without departing from the spirit of my invention as set forth in the claims at the end of this specification.

Figure 1 is a side elevation of the ends of the two principal members of my square joined together at right angles and held in position by my improved locking devices. Fig. 2 is a top or plan view of the same. Fig. 3 is an edge view in elevation. Fig. 4 is a view similar to Fig. 1, except that it shows the two members of the square as folded together and locked in such position, so as to

occupy but little room in a carpenter's kit or tool-box either for storage or transportation. Fig. 5 is a view similar to Fig. 1, showing the opposite side of my square and some of the scale-markings particularly adapted to the purposes hereinbefore mentioned. Figs. 6 and 7 are detached perspective views of the interlocking ends of the two members to show more clearly the details of the clamping feature. Fig. 8 is a side elevation of the stock and a portion of the movable blade of a supplementary square used in connection with my principal square, the blade being set in the stock to adapt it for stairwork. Fig. 9 is a vertical section through the stock and blade on the line 9 9 of Fig. 8. Fig. 10 is a view of portions of the stock and blade similar to Fig. 8 except that the blade is set so that its scale is adapted to be used in the triangulation of framing or roofwork, as before mentioned. Fig. 11 is a view of a portion of a side board or housing for stairs with my main and supplementary squares applied thereto in such position that the grooves and channels to be cut in the side board for the reception of the treads and risers of the stairs may be readily marked out, the angles of the members of the square being easily ascertained by setting the squares to any given dimensions for treads and risers. Fig. 12 shows the opposite side of my principal square with the supplementary square applied thereto, the whole being adapted to the triangulation of roofing or framework, as before mentioned.

The two members A B of my principal square are connected together by means of side plates C D, secured to the member B by rivets *b* or in any other suitable manner. These plates have sufficient space between them to fit over and snugly embrace the upper end *a* of the member A, which is reduced in thickness, as shown, from the shoulders *a'* for this purpose. The thickness of the member A below these shoulders is the same as the distance from the outside of one plate to the outside of the other, so that when the parts are united, as shown in Fig. 1, a smooth and even surface is presented by the sides of the member A and the plates C D. Below these shoulders the sides of the member A incline

toward each other until at the point a^2 they merge into the normal thickness of the blade.

The end of the member A which abuts against the end of the member B is formed with an irregular outline consisting of a straight portion e , an inclined portion e' , a notch e^2 , and a curved portion e^3 . The member B has a correspondingly-shaped end consisting of a straight portion f , an inclined portion f' , a lug or projection f^2 , which fits into the recess e^2 , and a curved portion f^3 .

The side plates C D are drawn into frictional contact with the member A, embraced between them, by clamping-screws E and F, the first of which lies in the notch e^2 of the member A and the other in a right-angled slot G G' in the same member.

In Fig. 1 the instrument is shown as set for use as a square; but when it is to be used as a bevel or to be folded up, as in Fig. 4, the screws E and F are loosened, the member B, with its side plates, slipped up until the screw E passes out of the notch, and the screw F lies on the center g at the point of intersection of the two portions of the slots G G'. The member B and its side plates may then be swung around upon the screw F as a center to any angle desired, where it may be firmly locked by again tightening the clamping-screws.

In order that the square may not depend for its accuracy of set upon contact of the clamping-screws with the sides of the notch and slot in which they respectively lie, I provide the member B with a solid lug f^2 , which takes into the notch e^2 at the upper end of the member A.

In so far as described these details of construction resemble those set forth in my patent on steel squares, No. 523,500, granted July 24, 1894, and the objects sought to be accomplished by them are similar to those set forth in that patent and will be readily understood without further description here.

In addition to the notch e^2 and lug f^2 for holding the members of the square in position I provide on the inner face of the side plate C a solid lug H, which lies in shallow recesses I or I', formed in the face of the member A at the ends of the slots G G' and connected together by a depressed space i , bounded by a wall I^2 , curved about the center g . A straight groove I^3 , extending from g to the edge of the member A, provides for the passage of the lug H when the square is to be assembled or taken apart.

I prefer to have the lower side of the clamping-screw F bear against the end of the lug H, as shown in the drawings, for purpose of mutual support. When the instrument is set to be used as a square, the lug H lies in the recess I. When it is folded for transportation, as shown in Fig. 4, the lug lies in the recess I', and when it is used as a bevel the end of the lug bears against the wall I^2 , so that all movements of the member B shall be concentric about the center g . I prefer to fasten

the lug H to the inside of the plate C by means of a rivet-shank h ; but any other suitable means may be employed.

The walls or shoulders a' , which form a termination of the reduced portion of the member A, are formed with a straight portion j , a curved portion j' , concentric with the center g , a straight portion j^2 , extending lengthwise of the member, and another curved portion j^3 , curved about the center k , near the lower end of the slot G. The side plates C D have correspondingly-shaped ends which fit snugly against the walls a' when the instrument is set as a square, their ends c and d fitting into the corresponding depressions in the member A and aiding the lugs f^2 and H to hold the square in perfect position.

When the instrument is to be used as a bevel and the member B is raised so that the screw F lies on the center g , the curvature of the end portions c d of the side plates correspond with the curvature of the portions j of the shoulders on the member A and ride in contact therewith, assisting the lug H to hold the member B so that its movement shall be concentric with the center g .

In order to hold the members of the square against accidental displacement even though the clamping-screws E and F were to become loosened, I employ a locking-screw L, set into the blade A close to the straight portion j^2 of one of its shoulders, a recess l and l' being formed partly in the surface of the member A and partly in the surface of the side plate C, so that the head of the screw lies across the joint of the two members at this point, prohibiting the endwise movement necessary for disengaging the two members until the edge of the cut-away portion of the screw-head is turned into alinement with the joining edges, as shown in Fig. 4.

The supplementary square which is used in connection with my main square consists of a blade M, connected to a stock N, in one edge of which is a groove n^3 to embrace and slip along the edge of either member of the main square to which it may be applied. This stock I prefer to make of two side plates n with a spacing-block n' between them, the three parts being rigidly united by rivets n^2 or otherwise. Along one side of the stock the side plates n extend beyond the edge of the spacing-block to form a groove or channel n^3 . The blade M lies between the side plates at their upper end and is held in frictional contact therewith by a set-screw m , which pinches the plates upon it, the upper end of the spacing-block being beveled on each side, as at n^4 , (see Fig. 9,) to allow the side plates to yield for this purpose. The end of the spacing-block is squared off, and the edge of the blade lies thereagainst to insure guidance of said blade when being adjusted and its proper positioning when secured. As shown in Fig. 8, the blade has two scales drawn upon it. One of them, which is used in stairwork, beginning at Fig. 3, and when

the blade is set, as shown in Fig. 11, indicates the number of inches from the working side B' of the square member B. The other scale begins at zero, and when the instruments are used for framing it should be set to the point N' on the stock, as indicated in Figs. 10 and 12, to bring it in alinement with the center of the pivot-screw F of the main instrument. The blade M is slotted, as at m', for the passage of the clamping-screw, which slot allows of the adjustment of the blade in the stock just mentioned. In addition to the ordinary scales usually marked upon its edge the member B of the main square is provided along its central portion on each side with additional scales, the beginning points of which are in line with the center of the pivot clamping-screw F.

When the instrument is to be used for stair-work, as shown in Fig. 11, a working line X is drawn upon the board P to be marked off and the instrument set to this line for any given dimensions of treads and risers, as will be understood by an inspection of Fig. 11, in which the squares are set to give a ten-inch tread with a six-and-three-quarter-inch riser. When the squares are thus set, the board may be marked off accurately and rapidly by moving the instrument along the edge of the board until the top line of the tread for a new step intersects the junction of the line of the last riser with the working line X previously placed upon the board.

When the instrument is to be used for triangulation, the blade M of the supplementary square is moved into the stock until the zero-point of its scale is brought to the point N' on the stock, when it is in line with the center of the pivot-screw F, as indicated at Fig. 12. When the vertical and horizontal dimensions of a desired roof-span, for instance, are given, the squares are set in accordance therewith, and the length of a third side of the triangle is at once found, as well as the relative angles of the three sides thereof. The two members of the main square are provided with center scales for this purpose, the zero-points of each of which being on lines intersecting the pivot-screw F of that instrument. These scales may be of any desired graduation; but I prefer to mark the blade B and the blade of the supplementary squares in eighths, halves, quarters, &c., of inches, while the scale on the main member A is graduated to inches and twelfths thereof, so that it may be read to indicate a reduced scale of feet and inches. Should a carpenter desire to find out the length of the third side of a triangle the height of which is eleven feet and the base eight and a quarter feet, he would set the instrument as indicated in Fig. 12 and would ascertain by reading the scale on member A that the length of the third side would be approximately thirteen feet and nine inches, and at the same time he would ascertain all the angles for cutting the ends of the timber, the length of which he had just ascertained.

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

1. In a folding square, the combination of relatively foldable members one of which has a substantially right-angular slot and straight grooves or recesses forming continuations of the respective portions of the slot and a recess connecting the aforesaid recesses, and the other member having an elongated lug having straight sides and adapted to fit snugly in either of the straight slots to lock the members in spread or folded arrangement, said lug being incapable of turning in the straight slots, and to travel in the different recesses during manipulation of the members, and a pivot and clamping-screw movable in the right-angular slot.

2. In a folding square, the combination of two members, one of which has a longitudinally-disposed slot, and the other a clamping-screw which is movable in said slot whereby a shifting pivotal connection is provided, said slotted member having two transversely-disposed curved shoulders and a straight shoulder connecting them, and the other member having shoulders corresponding with those aforesaid and adapted to lie thereagainst when the square is spread, whereby its members are locked, said members being adapted for relative shifting to disengage the straight shoulders and so that they can be turned with the curved shoulder on one member bearing against and guided by the curved shoulder on the other member with which it was not previously engaged.

3. In a folding square, the combination of two members, one of which has a right-angular slot having its branches disposed longitudinally of the member and transversely thereof, respectively, and the other a clamping-screw which is movable in both arms of the slot, whereby a shifting pivotal connection is provided, said slotted member having a transversely-disposed straight shoulder, a transversely-disposed curved shoulder forming a continuation thereof, a longitudinal straight shoulder leading off abruptly from the curved shoulder, and a second transverse curved shoulder leading from the other end of the straight shoulder, and the other member having shoulders corresponding with those aforesaid and adapted to lie thereagainst when the square is spread whereby the members are locked, said members being adapted for relative longitudinal shifting to disengage the straight shoulders and permit turning and for relative transverse shifting for locking together in closed arrangement.

4. The combination of two members, a connecting-plate secured to one member substantially at right angles thereto and pivoted to the other member at one side of the first member, a scale on the pivoted member which has its zero-point lying at the pivotal connection and a scale on the other member which has its zero-point lying in a line intersecting

the pivotal connection and disposed at right angles to the member on which said scale is provided.

5 5. The combination of two members pivoted together and each provided with a graduated scale, one of said scales having its zero-point at the pivotal connection and the other having its zero-point lying in a right line intersecting said pivotal connection, and a supplementary square having an attaching device at one end connecting it to the member having the scale last named and said supplementary square having a scale whose zero-point lies in a line parallel to the edge of the member to which it is attached and intersecting the pivotal connection.

15 6. The combination of two members pivoted together and each provided with a graduated scale, one of said scales having its zero-point at the pivotal connection and the other having its zero-point lying in a right line intersecting said pivotal connection, and a supplementary square comprising a stock having an attaching device at one end connecting it to the member having the scale last named, a graduated blade, and an adjustable connection between the blade and stock whereby the blade can be set to bring its zero-point next an edge of the stock and in a line parallel to the edge of the member to which the stock is attached and intersecting the pivotal point of the members.

25 7. The combination of the two members A, and B, pivotally connected and provided with graduated scales on their faces the beginnings

or zero-points of which are at lines intersecting the pivotal center, with a supplementary square having a blade adjustably connected to its stock which is grooved to fit upon the edges of the members A, and B, the blade being provided with a graduated scale which may be set so that its beginning or zero-point lies at a line which intersects the pivotal point of the main instrument and is parallel to the edge of that one of the main members to which the stock of the supplementary square may be applied substantially as hereinbefore set forth.

30 8. A supplementary square comprising a graduated blade having a longitudinal slot, a stock composed of independently-constructed side plates and a separately-formed spacing member between and connected to them and of less length, thereby providing a groove or channel, said spacing member having the sides of one end beveled and having said end squared off and abutting the edge of the graduated blade, and a clamping-screw passing through the stock and slot of the blade and adapted for pinching or compressing the side plates into the spaces provided by the beveled portions of the spacing member.

60 In testimony whereof I affix my signature, in the presence of two witnesses, at Cleveland, Ohio, November 16, 1897.

JOHN GEORGE ZUCK.

Witnesses:

WM. A. SKINKLE,
E. B. GILCHRIST.