(No Model.)

W. S. BURROUGHS.

PATTERN MAKER'S TRAM.

No. 370,313. Patented Sept. 20, 1887.

Fig. 1.

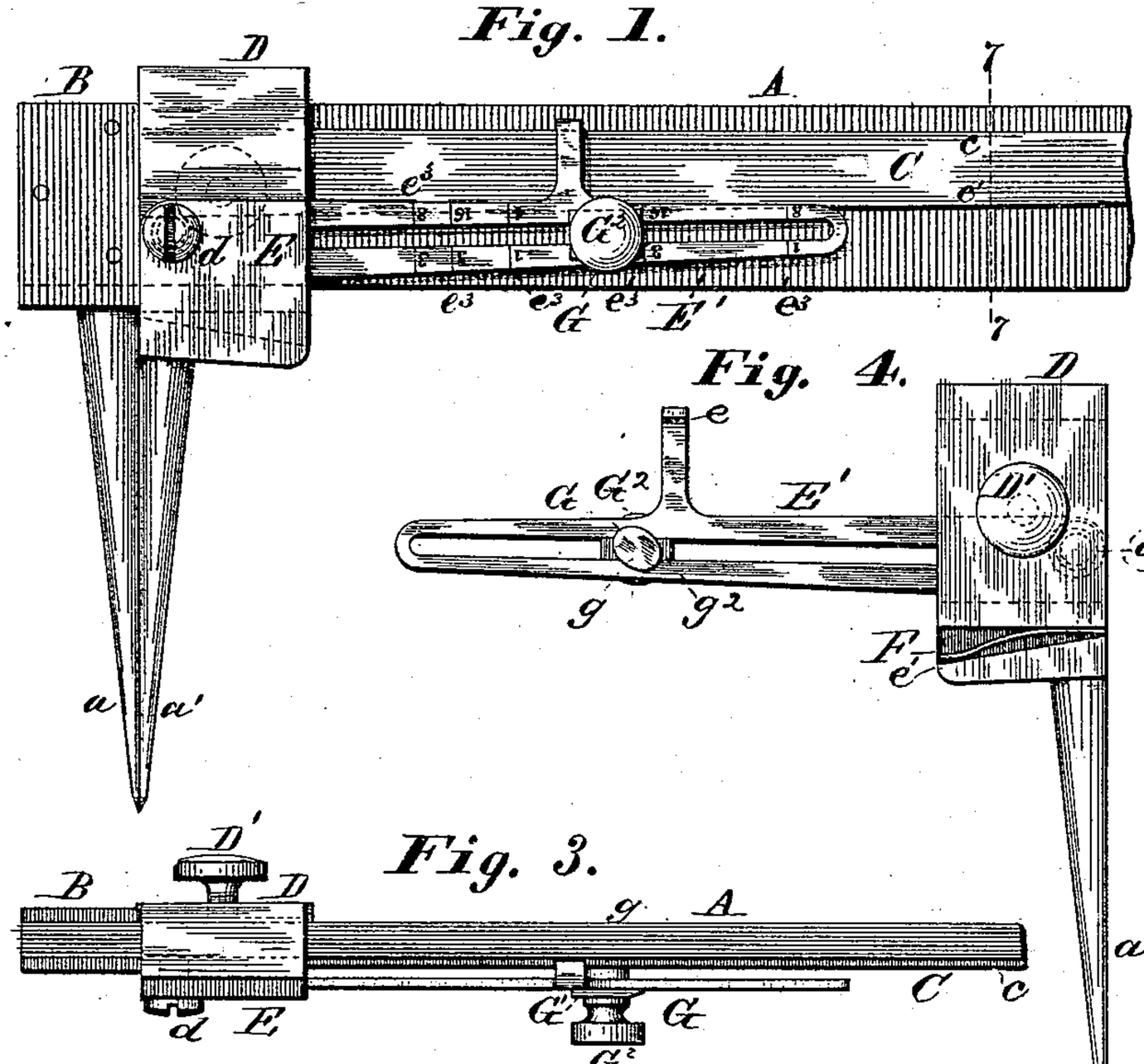

Fig. 2.

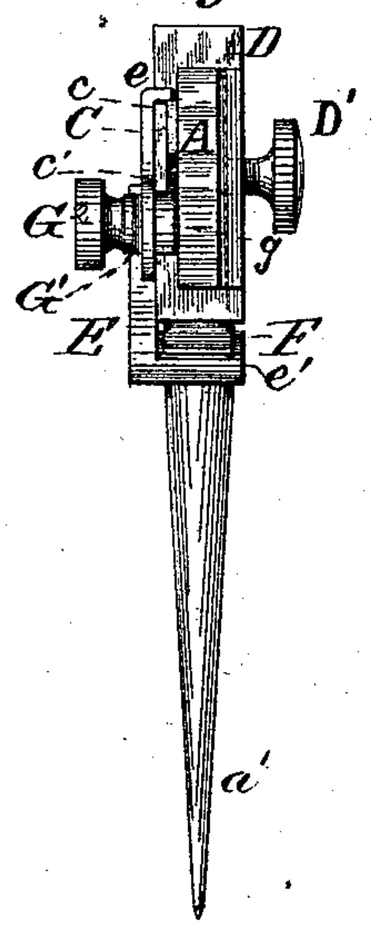

Fig. 4.

Fig. 3.

Fig. 5.

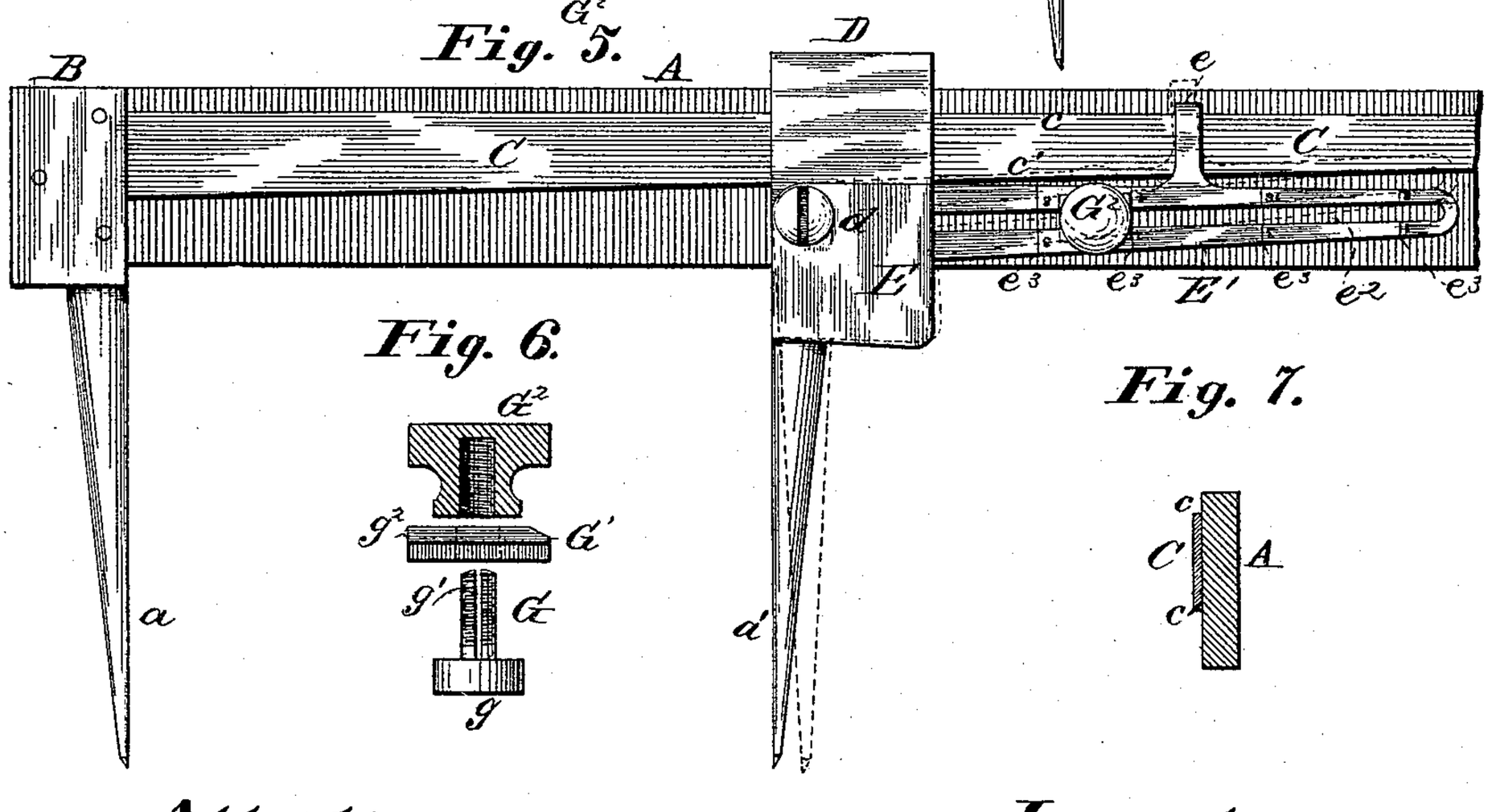

Fig. 6.

Fig. 7.

Attest:

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UNITED STATES PATENT OFFICE.

WILLIAM S. BURROUGHS, OF ST. LOUIS, MISSOURI, ASSIGNOR TO THE BOYER MANUFACTURING COMPANY, OF SAME PLACE.

PATTERN-MAKER'S TRAM.

SPECIFICATION forming part of Letters Patent No. 370,313, dated September 20, 1887.

Application filed September 29, 1886. Serial No. 214,871. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. BURROUGHS, a citizen of the United States, residing at the city of St. Louis, in the State of Missouri, have invented a certain new and useful instrument which I name a "Pattern-Maker's Tram," of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, and in which—

Figure 1 is a rear side view of a portion of the instrument with the points closed together. Fig. 2 is an end view. Fig. 3 is a top view of part shown in Fig. 1. Fig. 4 is a front side view of the sliding head and its appurtenances. Fig. 5 is a view similar to Fig. 1, except that the points are separated, and dotted lines are introduced indicating the position of the parts when shrinkage is being taken. Fig. 6 is an enlarged view of the parts forming the stop, the thumb-nut being in section. Fig. 7 is a transverse section at 7 7, Fig. 1.

My invention relates to a new instrument for determining the measurement of patterns to allow for shrinkage of the casting in cooling.

If a pattern is to be made to be used in making iron castings, one-eighth of an inch to the foot must be added to all measurements to allow for the shrinkage of the casting, while for brass castings three-sixteenths of an inch to the foot must be allowed. It is often required that castings should be made from wood patterns, which castings are fitted up for patterns, and in such cases double shrinkage must be allowed for in the metal patterns. By the use of this instrument this can readily be done.

A is a straight bar, which may properly be made of metal or wood, wood being preferred to relieve the instrument of weight.

B is a metal block rigidly attached to one end of the bar A. *a* is a metal point firmly attached to the bar A.

Secured to the rear side of the bar A, and extending from the block B to the other end of bar A, is a strip, C, which tapers evenly in the direction of its width from end to end, the wider end being at the block. The upper edge, *c*, of the strip C is parallel with the edges of the bar A, and consequently the lower edge, *c'*, is inclined to the edges of the bar A.

D is a metal block sliding freely on the bar A, but held to any position thereon, as may be required, by a thumb-screw, D'. (See Fig. 2.)

Secured to the movable block D by means of the screw-stud *d* is a pendent block, E, carrying the point *a'*.

E' is a slotted strip or bar extending from the block E, to which it is rigidly attached, adjacent to and parallel with the strip C. The slotted strip E' is provided with a lip, *e*, which extends over the upper edge of the strip C, thus limiting the downward movement of the strip E'.

Attached to the under side of the sliding block D is a spring, F, which bears against a shoulder, *e'*, of the pendent block E in such a manner as to keep the lip *e* in contact with the upper edge of the strip C.

A stud, G, is made to pass through the slot e^2 of the strip E and through a hole in the washer G', and upon it is fitted a thumb-nut, G^2, which may be made to bear upon the washer and draw the head *g* of the stud hard against the inner side of the strip E, so as to hold the stud firmly in position in the slot. The head *g* is made elliptical or non-circular, for a purpose to be hereinafter explained. The stem of the stud G is split or slotted diametrically at *g'*, the parts being made to spring outward to cause the studs to turn with the thumb-nut until the salient part of the head comes in contact with the lower edge of strip C. The washer G' is prevented from turning by a rib, g^2, which enters the slot e^2 of the strip E'. The strip or bar E' has marks upon it at e^3, with numbers indicating the position for the stop-stud G, which show the degree of oscillation permitted to the point *a'* for each twelve inches the points *a* and *a'* may be separated, the chamfered end of the washer being in line with the mark.

In using the instrument the stud G is first set for the amount of shrinkage required. This is accomplished by moving the head-block D until the two points *a a'* are in close contact. (See Fig. 1.) Then the thumb-nut G^2 is loosened and the stud G moved along the strip until the chamfered end of the washer

corresponds with the graduation required. The thumb-nut G^2 is then tightened.

It will be remembered that the head *g* is made non-circular and frictionally bound to the thumb-nut, so that they will turn together until the rotation of the head is arrested by contact with the under edge, *c'*, of the strip or rib C. After this the thumb-nut turns on the stud and fixes it firmly to the strip or bar E'. It will be seen that the lip *e* is now in contact with the upper edge of the strip C, and the stud *g* in contact with the lower edge of the strip, and thus there is no possibility of lost motion. The slotted strip or bar E' is shown graduated to represent one-eighth, three-sixteenths, one-fourth, five-sixteenths, and three-eighths of an inch to the foot; but it may be graduated to any extent desired. In Fig. 1 it is set to three-sixteenths, which represents brass shrinkage, as before mentioned.

It will be seen that when the block D is in the position shown in Fig. 1 there can be no play of the point *a'*; but if moved toward the other end of the bar until the points are one foot apart there will then be three-sixteenths of an inch play in the point *a'*, and if set any distance along the bar the amount of play will be exactly proportionate to the distance between the points *a* and *a'*. The points are first made to correspond with certain dimensions of the working drawing or draft. The head D is then locked by the thumb-screw D', and the instrument being held with the fixed point *a* to the right the forefinger is applied to the thumb-nut to throw up the bar E' and move the point *a'* the required distance from the point *a*, and the enlarged measurement is transferred to the pattern.

I claim as my invention—

1. The combination, in a pattern-maker's tram, of a support, a point permanently connected to said support, a pivoted point movably connected to said support, and a stop for checking the pivotal movement of the point proportionate to its distance from the permanent point, as and for the purpose set forth.

2. The combination of a trammel-bar with a movable point thereon, a lever provided with indications, and an adjustable slide on the lever, as and for the purpose set forth.

3. The combination of a trammel-bar having a longitudinal rib, a fixed point, a movable point, mechanism for adjusting the latter, and a stud having a non-circular head adapted to engage said rib, substantially as set forth.

4. The combination of a trammel-bar with two points thereon, one of which, attached to an oscillatory block, is movable endwise upon the bar, a bar, E', extending from the oscillatory block, carrying a stop-stud adjustable on the bar E', and a strip or rib, C, on the side of the trammel-bar, having an incline side, *c'*, to arrest the movement of oscillatory point by the impingement of the stop-stud against it, substantially as set forth.

5. The combination of a trammel-bar, A, with fixed point *a*, tapering strip or rib C, movable block D, with oscillating block E, connected thereto, with bar E', having point *a'* and lip *e*, and carrying adjustable stop-stud G, substantially as and for the purpose set forth.

6. The combination of trammel-bar A with fixed point *a* and tapering strip or rib C, movable block D, carrying oscillating block E, with point *a'*, bar E', and lip *e*, and stop-stud G, adjustable on the bar E', and having a non-circular head, *g*, for the purpose set forth.

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Witnesses:

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