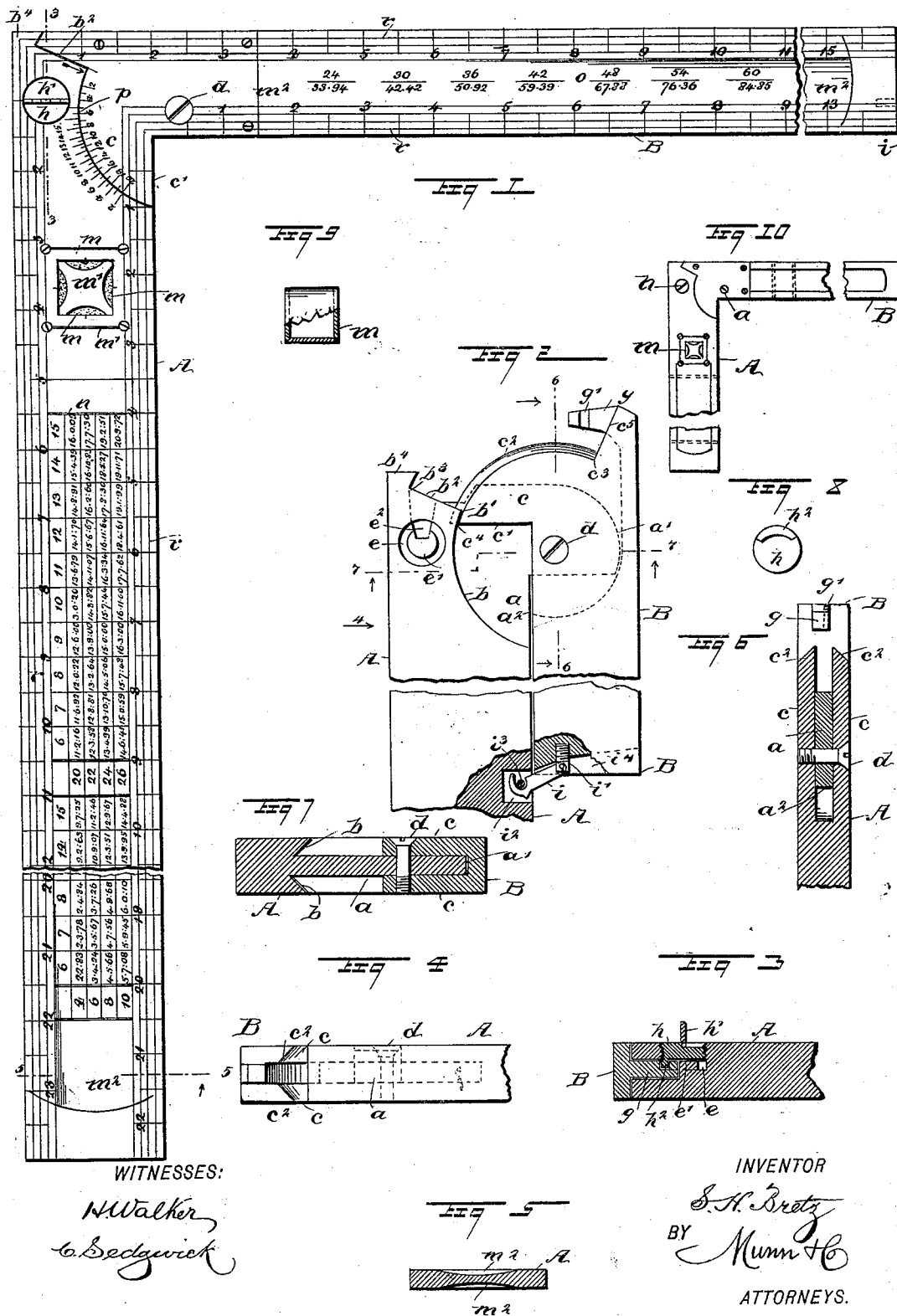


(No Model.)

S. H. BRETZ.
SQUARE.

No. 509,292.

Patented Nov. 21, 1893.



UNITED STATES PATENT OFFICE.

SOLOMON H. BRETZ, OF BATTLE CREEK, MICHIGAN.

SQUARE.

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To all whom it may concern:

Be it known that I, SOLOMON H. BRETZ, of Battle Creek, in the county of Calhoun and State of Michigan, have invented a new and useful Improvement in Squares, of which the following is a full, clear, and exact description.

The objects of my invention are, to provide a carpenter's and joiner's square of a novel construction, which will be adapted for a folding adjustment of one limb of the square upon the other, and furnish means to detachably lock the folding limb in closed adjustment, or in an extended position at a right angle to the other limb; also to provide a plumb and level attachment for the square, and furnish the square with rafter and brace tables to indicate lengths for such parts of a building, which tables are impressed upon a sunken portion of each limb and are thereby protected from obliteration by wear.

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

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

Figure 1 is a broken plan view of the improved square adjusted for use. Fig. 2 is an enlarged side view, in part, of the improved square in folded adjustment. Fig. 3 is a longitudinal sectional view of the improvement, on the line 3—3 in Fig. 1. Fig. 4 is an edge view of the square in a folded condition, opposite the arrow 4 in Fig. 2. Fig. 5 is a transverse sectional view of one limb of the square, on the line 5—5 in Fig. 1. Fig. 6 is a longitudinal sectional view of the jointed ends of the square, on the line 6—6 in Fig. 2. Fig. 7 is a transverse sectional view of the joint between the limbs of the square, on the line 7—7 in Fig. 2. Fig. 8 is an inner face view of a locking block which is a part of the invention. Fig. 9 is a detached partly sectional view of a novel level tube forming a part of the device; and Fig. 10 is a reduced and broken side view of the improved square, showing the connection of its limbs at their joint.

The square is composed of a main limb A, and a shorter limb B, of the usual dimensions for members of the tool upon which it is an improvement.

For lightness and economy in manufacture, the principal parts of the limbs A, B, are constructed of hard wood, not liable to warp, shrink, or expand when subjected to dampness and extremes of temperature when the square is in use. Near the junctional ends of the limbs A and B, these parts are reinforced by any suitable metal, joined to wooden portions by any preferred means, but preferably as indicated in Fig. 10, thereby affording the proper strength to the joint effected between the members of the square. A greater breadth is given to the limb A than to the limb B, as is usual in this class of carpenters' tools, and from the side edge of the limb A, at the end which is to be hinge-jointed to the limb B, a tongue *a* is laterally projected. A correct length is afforded to the tongue *a*, which is formed at the center of thickness of the limb A, by an equal reduction of material at each side, and an under-cut curved shoulder *b*, formed on each side of the limb, provides suitable abutments of a like shape for the sliding contact therewith of joint flanges on the limb B, as will be further explained. The member B, is slotted at the center of thickness of a proper depth and width to permit the introduction of the tongue *a* between the parallel flanges *c*, formed by the slot, and as the limbs A, B, are of an equal thickness, it will be evident that when the parts are slid together, the corresponding sides of the limbs will be level. The limbs A, B, are oppositely perforated to receive a pivot-screw *d*, said perforations being produced at a point which represents the radial center of the similarly under-cut and curved shoulders *b*. The outer edge *a'* of the tongue *a*, is curved to conform with the curved wall of the slot made in the limb B to receive said tongue, these mating curvatures having the pivot screw *d*, for a radial center.

At a proper distance from the center of the perforation formed in the flanges *c*, and toward the end of the limb B whereon said flanges are formed, a lateral projection is produced on each of these flanges, which extends from the inner edge of the limb B that may have contact when folded with one edge of the limb A, of a proper length, the edges *c'* of said flange extensions being cut at a right angle to the inner edge of the part they pro-

ject from, as represented in Figs. 1 and 2. The flanges *c*, have their edges *c*², curved and given the same radius as the under-cut shoulders *b*, said edges being beveled correctly to adapt them to slide below and have close contact with said shoulders. The curvature of the edges *c*² on the flanges *c*, extends between the points *c*³ and *c*⁴, the latter point being the apex of an acute angle of which the edge *c*¹ on each flange is a side.

On the limb A, from the corners *b*¹ of the under-cut shoulders *b*, said limb is cut on its end to produce a straight edge *b*² thereon, said edge being radial from the center of the pivot screw *d*, and terminating at *b*³ a proper distance from the outer edge of the limb A, where a square shoulder is formed which constitutes the side wall of an integral projection *b*⁴, which forms the corner of the limb and also of the square, when the limbs are relatively adjusted, as indicated in Fig. 1.

On each flange *c* of the limb B of the square, a radial shoulder *c*⁵, is formed, which shoulders will exactly fit upon the edge *b*² of the limb A, when the limbs are adjusted to produce a square, and when they are so arranged the edges *c*¹ of the flanges *c*, are aligned with a part of the tongue *a*, that conforms with the inner edge of the limb A, and gives a correct thickness to the latter at the inner corner of the square when the limbs A, B, are adjusted at a right angle to each other. The straight edge portion *a*² of the tongue *a*, that is at a right angle to the inner edge of the limb A, beyond which it projects, then coincides with the straight edges *c*¹ of the flanges *c*, which are then below the pivot screw *d*.

A circular cavity *e* is produced in the side of the limb A, which cavity is annularly grooved in its bottom, so as to increase its depth at the side wall, and permit a circular boss *e*¹ to project centrally from said bottom surface. The depth of the cavity *e*, where it is annularly grooved, is about equal to half of the thickness of the limb A, and it is intersected by a slot that extends inwardly from the wall *b*², which slot is tapered edgewise, as represented by dotted lines in Fig. 2, the inner end portion of the slot forming a shallow recess *e*² in the cavity *e*, as shown by full lines in said figure.

A locking toe *g* is formed on the limb B of the square, and projects inwardly from the edges *c*⁵, of the flanges *c*, the toe being shaped to cause it to fit neatly in the inwardly-converging slot in the limb A, that terminates in the cavity *e*, the length of the toe permitting its free end to slide in the recess *e*², and occupy it when the limbs A, B, are adjusted to form a square, a transverse groove *g*¹, therein, completing the annular groove of the cavity *e*. The wall of the cavity *e* is threaded for the reception of a cylindrical block *h*, that is peripherally threaded to screw therein, said block having a folding thumb piece *h*¹ hinged by one edge at the center of the top surface of the block *h*, so as to lie on one half of the

block which is reduced in height, and thus permit the thumb piece to lie flush with the higher part of the block when in folded adjustment thereon.

It will be seen, that if the limb B, is folded so as to lie close to and parallel with the limb A, a hook piece *i*, which is hinged on a screw plug *i*¹, screwed into the end of the limb B, may be swung so as to introduce its hook shaped free end into a recess *i*², formed in the edge of the limb A, and interlock with a cross-bar *i*³, secured transversely in said recess, and when so engaged secure the limbs A, B, together at or near their free ends. When the hook *i*, is released from the cross bar *i*³, it may be placed in the groove *i*⁴, formed for its reception in the end of the limb B, by partly rotating the hook and the screw plug to which it is hinged, so as to locate it above said groove, into which it can be pressed and by its frictional contact be retained therein, until purposely removed to be used as has been explained.

If the device is to be used as a square, the limbs A, B, are readily locked in position to form such a tool, by the partial rotation of the locking block *h*, after the limb B, has been extended as shown in Fig. 1, which will cause the cam projection *h*², formed on the lower side of the block, to engage with the groove *g*¹ in the toe *g*, said projection being curved so as to adapt it to rotate in the annular groove of the cavity *e* and in the groove *g*¹, thereby interlocking the toe with the block *h*, when the latter is manipulated as above explained.

On the side of the limb A, near its hinged end a level tube *m*, is secured by a clamping plate *m*¹. Said tube is a rectangular flat vessel adapted for sealing at one end when nearly filled with spirits or other suitable liquid, the tube being secured within a square aperture in the limb A so that its side edges will be parallel with the corresponding edges of said limb, and the usual air bubble in the tube will show at four points on the clamping plate *m*¹, and thus be adapted to indicate plumb and level positions of the implement when used for such a purpose.

There is a longitudinally extending curved depression *m*² formed on opposite sides in the body of the limb A, which depressions extend from a point near the level tubes *m*, to a point near the free extremity of the said limb, the depressions being indicated in Fig. 5, and a similar curved depression is also produced in each side of the limb B. The depressions *m*², are designed to permit the impression therein of the small figures of a rafter scale *n*, on the limb A, so as to protect said scales from wear, and in like manner the brace scale *o*, is indented in the depression in the limb B, these scales being respectively adapted to show the proper lengths for rafters of various pitches and elevations, and likewise the lengths of diagonal braces for buildings.

The following is an explanation of the rafter

scale on the limb A: The columns of figures embraced between the transverse lines 4, 6, 8, 10, &c., indicate the width of buildings for rafters that are to be cut, and the upper row of figures 6, 7, 8, 9, &c., in the blocks defined by transverse lines, show the rise of roof to each twelve inches of width of the building. The small integers in the blocks below the figures 6, 7, 8, 9, &c., indicate the length of rafter required by the width and rise indications. The bevel of the lower end of the rafter may be found by adjusting the arrow on the limb A opposite the numeral indicating the degree of rise to run of rafter, and setting the limbs as a bevel to mark the same on the foot of the rafter; the upper end bevel in like manner is found by adjusting the point of the flange *c'*, opposite the figure indicating the degree of rise to the run or length of the rafter.

The brace scale shown is of the ordinary kind and will be understood by all skilled in the art to which it belongs.

On the sides of the limbs A, B, where the curved and beveled edges of the flanges *c*, engage with the undercut shoulders *b*, a bevel indicating scale *p*, is impressed or otherwise formed, these graduations which increase in numerical value in opposite directions, being adapted by their opposite adjustment, to accurately indicate the degree of slope or angular cut to be given to the heels or tops of rafters, or the bevel cuts to be formed on braces of different lengths.

The graduations *r*, on the higher parts of the opposite sides of the limbs A, B, are the usual measures of length, indicating feet, inches and fractions thereof, as are usually placed on this class of tools.

It is claimed for this device, that it is light, strong, convenient in service and compact when folded, and that it affords in one implement a square, a bevel gage, rafter and brace indicator, and plumb and level instrument, thus dispensing with the necessity for carrying these tools separately, as well as incurring the additional expense of their cost as separate articles that are all needed at times by a carpenter or joiner.

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

1. In a square, the combination of hinged limbs one limb being provided with a slot and a cavity at right angles to the slot, and the other with a tongue adapted to enter the said slot, and a block fitting in the said cavity and engaging the tongue, substantially as described.

2. In a square, the combination of hinged limbs, one limb being provided with a slot and a threaded cavity at right angles to the slot, and the other with a grooved tongue, and a threaded plug fitting in the cavity and provided with a cam projection adapted to engage the groove of the tongue, substantially as described.

3. In a square, the combination of hinged limbs, one limb being provided with a recess containing a cross bar, and the other with a groove, and a hook pivoted in the groove and adapted to engage the said cross bar, substantially as described.

4. In a square, the combination of hinged limbs, one limb being provided with a recess containing a cross bar, and the other with a groove, a plug adjustable in the groove, and a hook pivoted to the plug and adapted to engage the said cross bar, substantially as described.

5. A square having a rectangular spirit tube secured in a correspondingly shaped aperture in one limb thereof by a plate having four openings through which the air bubble will show, substantially as described.

6. An edgewise hinged and folding square, comprising two limbs both longitudinally channeled on both their sides, one limb having a rafter scale marked in its channeled surface, and the other limb being marked with a brace-scale in its channeled surface, substantially as described.

7. An edgewise hinged and folding square, the limbs of which are longitudinally channeled on both their sides, each limb having graduations for length measures on the surfaces above the channels, the channeled surfaces of one limb having a rafter scale impressed thereon, and the channeled surface of the other limb being impressed with a brace scale, substantially as described.

8. In a square, the limbs of which are jointed together near one end, and restricted from divergence beyond a right angle, a locking device adapted to retain the limbs fully diverged, comprising a circular peripherally threaded locking block, a folding thumb piece on the top of the block, a circular threaded cavity in one limb of the square, engaged by the threaded body of the block, an inwardly converged slot intersecting said cavity, an annular groove in the bottom of the cavity, a toe on the other limb of the square entering the converged slot and projecting into the cavity when the limbs of the square are adjusted to form a right angle, and a circular cam rib on the lower side of the locking block adapted to engage a transverse groove in the toe when said block is rotated, substantially as described.

9. In a composite tool for carpenters' and joiners' use, a square, the limbs of which are jointed together near one end, and graduated on arcs of circles defined by two curved undercut opposite shoulders on one limb, and bevel edged and mating curved flanges on the other limb, which flanges have a sliding contact with said shoulders and are radially coincident, said graduations providing a bevel indicating device, substantially as described.

SOLOMON H. BRETZ.

Witnesses:

L. E. CLAWSON,
C. W. SELLERS.