Nov. 7, 1933. T. SHIMP 1,934,096

COMBINED LEVELING AND FRAMING TOOL AND PROTRACTOR

Filed Aug. 29, 1929 3 Sheets-Sheet 1

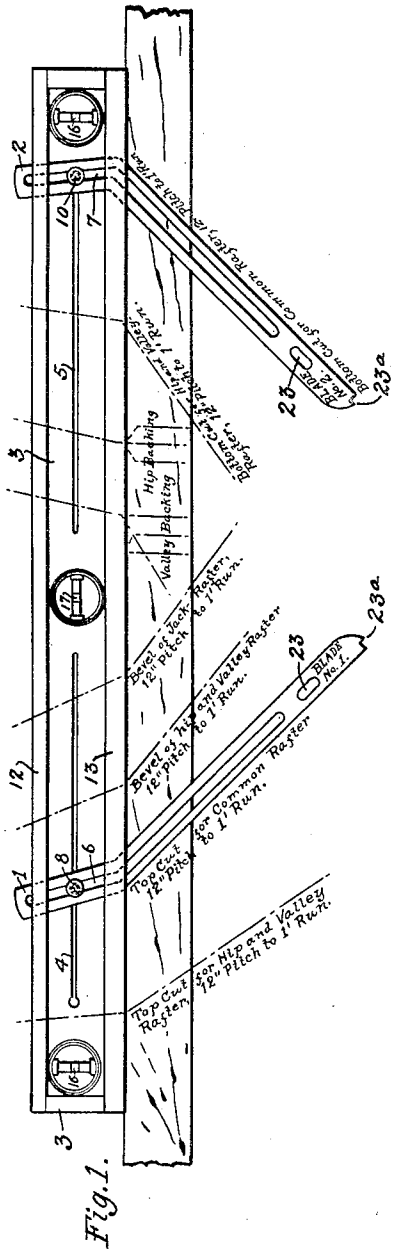


Fig. 1.

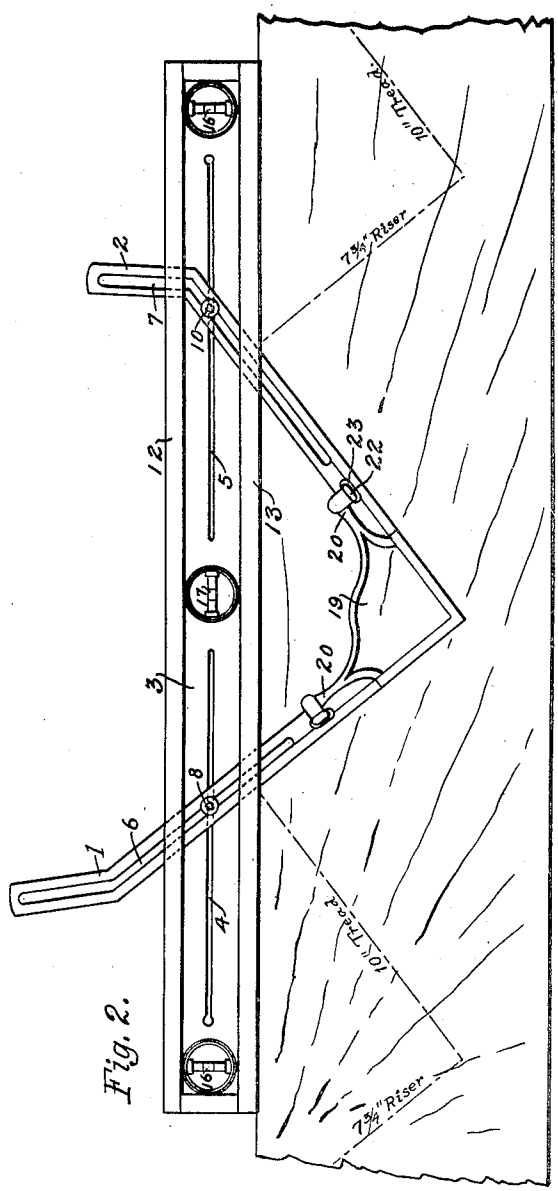


Fig. 2.

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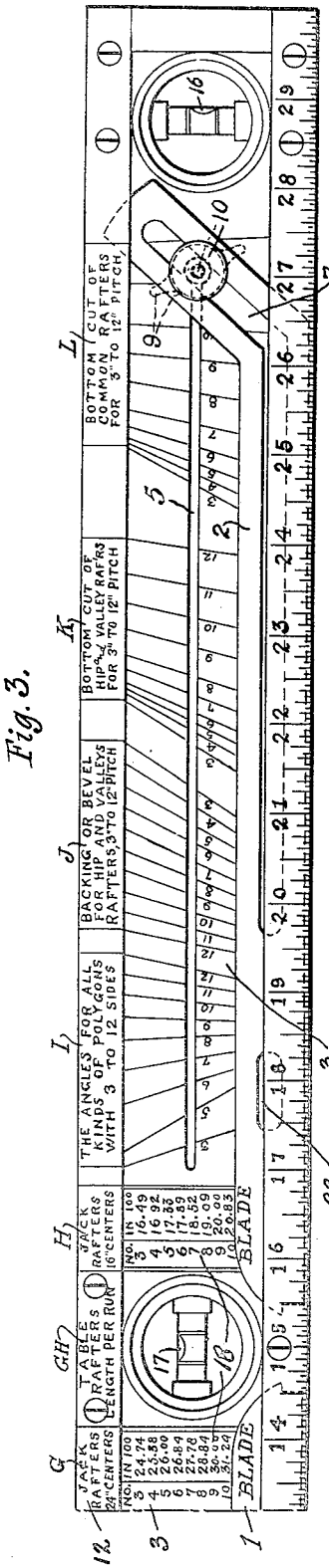


Fig. 3.

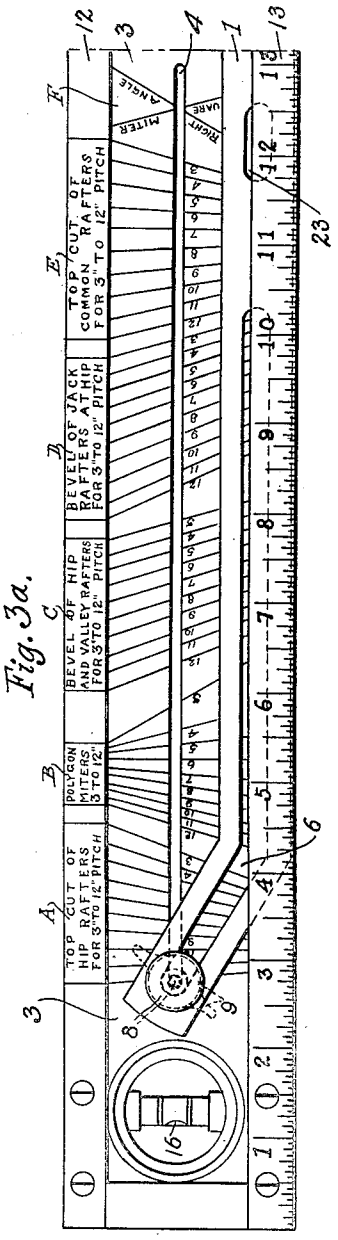


Fig. 3a.

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COMBINED LEVELING AND FRAMING TOOL AND PROTRACTOR

Filed Aug. 29, 1929 3 Sheets-Sheet 3

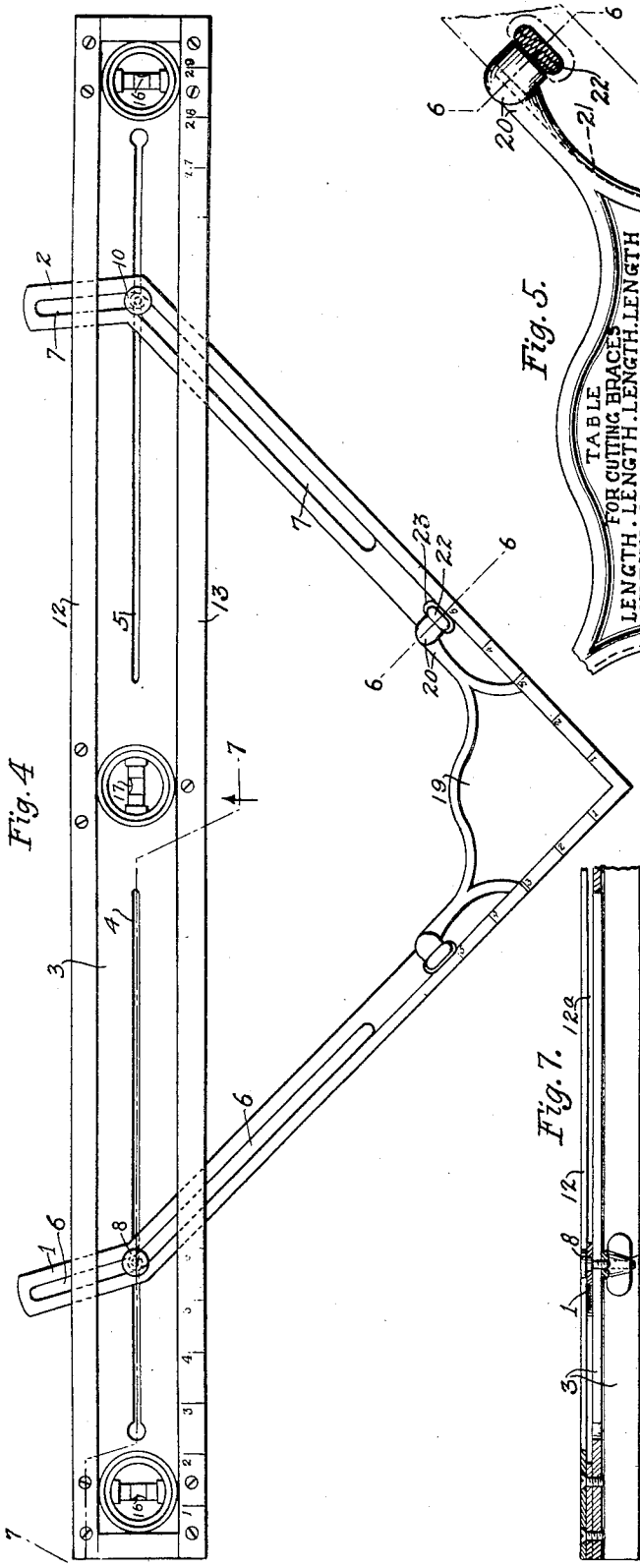


Fig. 4

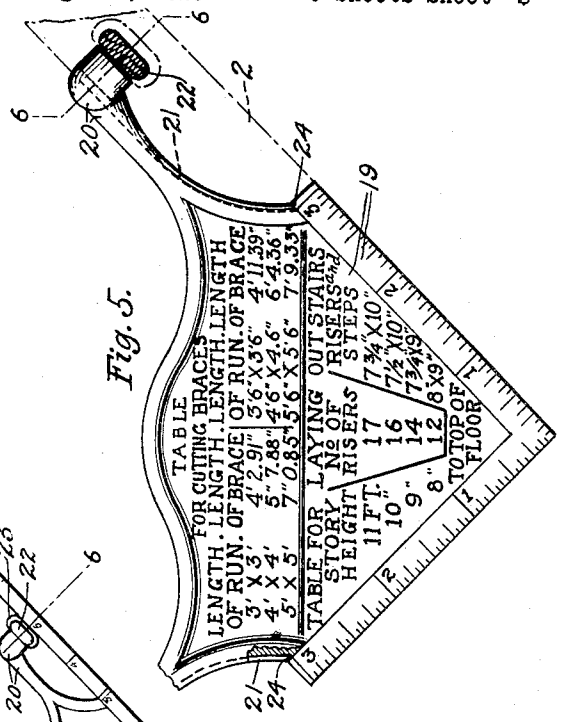


Fig. 5.

Fig. 7.

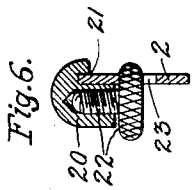


Fig. 6.

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UNITED STATES PATENT OFFICE

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COMBINED LEVELING AND FRAMING TOOL AND PROTRACTOR

Thomas Shimp, Moundsville, W. Va.

Application August 29, 1929. Serial No. 389,184

7 Claims. (Cl. 33—92)

This invention relates to measuring and gaging devices, and more specifically, to a combined leveling and framing tool and protractor.

One object of this invention is to provide an exceedingly convenient and comparatively inexpensive combination tool adaptable for use by carpenters, pattern makers, machinists and other mechanics, for serving various purposes such as leveling, roof framing, stair building, brace framing, laying out angles and mitres for polygons, and other purposes not necessary to specify.

Another object of this invention is to provide a tool of this character which can be collapsed or folded so as to occupy a comparatively small space in a tool kit.

Another object is to provide a tool of this character by which measuring and gaging can be accomplished simultaneously in the operation of laying off rafters and the like.

Another object is to provide a tool of this character which embodies plain and universally well known and easily understood markings or indicia that can be readily understood and used by any ordinary mechanic, even if such mechanic cannot understood the use of indicia of trigonometry, etc.

Another object is to provide a tool of this character including a beam which is divided into sections, each section including index lines representing various angles, and each section adjoining a complementary section which contains informative matter as to the purpose and use thereof.

Another object is to provide, in a tool of this character, a right-angle or square section having means for attaching it to two blades or extensions, such blades or extensions being provided with means for adjustably securing them to the main beam, so that the tool can be used for laying out stair rails, rafters and the like, and so that the tool can be folded when the right angle section is detached.

Another object is to provide a tool of this character having its main beam formed of a channel beam, so the flanges of the channel beam protect the wing-nuts against being struck and displaced while the device is in use, that is, the wing-nuts which hold the gaging blades in their various adjustments.

Other objects and important features are pointed out or implied in the following details of description, in connection with the accompanying drawings in which:

Figure 1 is an elevation of the device applied on a piece of timber or lumber, and showing numerous angles and markings laid out by the device.

Figure 2 is a front view of the device made complete by a removable right-angle section secured to the adjustable gaging blades.

Figures 3 and 3*a*, when taken together, constitute an enlarged view of the device, showing the details which could not be shown on the smaller views.

Figure 4 is a view somewhat similar to Figure 2, but showing the details more clearly.

Figure 5 is an enlarged view of the right angle member or attachment, one end being broken off, and the main body containing indicia or tables for guiding the users of the device, a part of one of the blades being indicated in broken lines.

Figure 6 is an enlarged sectional view along the line 6—6 of Figures 4 and 5.

Figure 7 is a longitudinal sectional view along the line 7—7 of Figure 4.

Referring to these drawings in detail, in which similar reference characters correspond to similar parts in the several views, the invention will now be described in detail as follows:

Referring to Fig. 1, it will be seen that the invention includes two gaging blades, bearing the indicia "Blade No. 1" and "Blade No. 2." These blades include, respectively, two arms at an angle to one another. It will be seen that the angle of the arms of "Blade No. 1" is different from the angle of the arms of "Blade No. 2." To these blades are applied the reference characters 1 and 2.

A beam 3 is preferably formed of channel iron or other metal, and has longitudinal slots 4 and 5, each of the slots extending from a point near the middle of the beam to a point near the end of the beam, but not extending to the middle, nor to the end of the beam. Each of the blades 1 and 2 is provided with a slot which extends from one end portion to the opposite end portion as shown at 6 and 7. A screw 8 extends through the slots 4 and 6. A screw 10 extends through the slots 5 and 7. Each screw 8 and 10 has thereon a wing-nut 9, so the blades 1 and 2 can be held in an infinite number of adjustments as to location and angular relation with respect to the beam 3, the screws 8 and 10 constituting pivots as well as clamping elements. Referring to Figures 3 and 3*a*, it is seen that the beam 3 is provided with twelve distinctly separate groups of indicia, as referred to by the reference-letters A to L, inclusive. Groups A to F, inclusive contain laterally extending lines which constitute gaging lines or indexing lines for registering with either longitudinal edge of the short arm of the blade 1. Each of these sets of indicia also

includes Arabic numerals which correlate them with the respective angles which are to be laid out by the device. It should be clearly understood that these numerals have no reference to degrees of angularity, and to make this fact entirely clear, each group of indicia, referring to section A, it is seen that it contains the words "Top cut of hip rafters for 3 to 12 pitch." In the present example, it is seen that the Arabic numeral 3 of this section indicates that the adjacent line, when in registration with an edge of the short arm of the blade 1, shows that the long arm of blade 1 is adjusted for marking or gaging a hip rafter for a three-inch pitch. As another example, assume that the short arm of blade 1 is registering with the line having the numeral 8 thereon, in section or group E (Fig. 3*a*); such portion of blade 1, in connection with the note of this section or group, showing that the blade 1 is set for gaging and marking the "top cut of common rafters" for eight-inch pitch. Likewise, the short arm of blade No. 2, when set so one of its edges registers with line 8 of group or section I, shows that it is set for gaging and marking the angles, but the numeral 8 corresponds to the number of sides of the polygon, while the printed note of this group or section shows that this is the proper group for use in laying out polygons. As another example, with respect to blade No. 2, we may assume that one of the edges of its short arm registers with the index-line 7 of section or group L; this will indicate that the blade is set for gaging and marking the bottom cuts of common rafters which are to have a pitch of seven inches. The top slide or metal strip 12 is ⅛ inch by ½ inch by 30 inches long, put on the face of the level frame with six screws, and stands out from the face of the level frame ⅛ inch so that a slot 12*a* is provided in which the gaging blades can slide. The face of the beam 3 is provided with lines and correlated numerals that indicate the positions for cuts and angles to be obtained by setting the gaging blades parallel with the diagonal lines on the face of the level.

Section A provides indicia for laying out top cuts for hip and valley rafters, according to the following incomplete table:

Set Blade No. 1 on line No. 3 for 3 inch pitch to the foot
Set Blade No. 1 on line No. 4 for 4 inch pitch to the foot
Set Blade No. 1 on line No. 5 for 5 inch patch to the foot

Section C provides indicia for laying out bevels of hip and valley rafters at top to fit deck, as in the following incomplete table:

Set Blade No. 1 on line No. 3 for 3 inch pitch to the foot
Set Blade No. 1 on line No. 4 for 4 inch pitch to the foot
Set Blade No. 1 on line No. 5 for 5 inch pitch to the foot

Section D provides indicia for laying out bevels of jack rafters to fit hip and valley rafters, according to the following incomplete table:

Set Blade No. 1 on line No. 3 for 3 inch pitch to the foot
Set Blade No. 1 on line No. 4 for 4 inch pitch to the foot
Set Blade No. 1 on line No. 5 for 5 inch pitch to the foot

Section E provides indicia for laying out top cuts of common rafters, as in the following incomplete table:

Set Blade No. 1 on line No. 3 for 3 inch pitch to the foot
Set Blade No. 1 on line No. 4 for 4 inch pitch to the foot
Set Blade No. 1 on line No. 5 for 5 inch pitch to the foot

Section J provides indicia for laying out backing for hip and valley rafters as in the following incomplete table:

Set Blade No. 2 on line No. 3 for 3 inch pitch to the foot
Set Blade No. 2 on line No. 4 for 4 inch pitch to the foot
Set Blade No. 2 on line No. 5 for 5 inch pitch to the foot

Section K gives indicia for laying out bottom cuts for hip and valley rafters, as in the following incomplete table:

Set Blade No. 2 on line No. 3 for 3 inch pitch to the foot
Set Blade No. 2 on line No. 4 for 4 inch pitch to the foot
Set Blade No. 2 on line No. 5 for 5 inch pitch to the foot

Section L gives indicia for laying out bottom cuts for common rafters, as in the following incomplete table:

Set Blade No. 2 on line No. 3 for 3 inch pitch to the foot
Set Blade No. 2 on line No. 4 for 4 inch pitch to the foot
Set Blade No. 2 on line No. 5 for 5 inch pitch to the foot

Section B gives indicia for laying out cuts for polygon miters, as shown in the following incomplete table:

Set Blade No. 1 on line No. 3 for the triangle 3 sides.
Set Blade No. 1 on line No. 5 for the pentagon 5 sides.
Set Blade No. 1 on line No. 6 for the hexagon 6 sides.
Set Blade No. 1 on line No. 7 for the heptagon 7 sides.
Set Blade No. 1 on line No. 8 for the octagon 8 sides.
Set Blade No. 1 on line No. 9 for the nonagon 9 sides.
Set Blade No. 1 on line No. 10 for the decagon 10 sides.

Section I gives indicia for laying out angles for polygons, as shown in the following incomplete table:

Set Blade No. 2 on line No. 3 for the triangle 3 sides.
Set Blade No. 2 on line No. 5 for the pentagon 5 sides.
Set Blade No. 2 on line No. 6 for the hexagon 6 sides.

Section F shows indicia for laying out a square, set Blade No. 1 on line marked right angle.

To lay out a square miter, set Blade No. 1 on line marked square miter.

Sections G and H show indicia for determining a jack rafter's length per run when spaced on 24 inch centers and 16 inch centers, respectively, as in the following tables.

Section G:

3 inches pitch to one ft. and 24 inches on centers 24''74/100 long
4 inches pitch to one ft. and 24 inches on centers 25''38/100 long
5 inches pitch to one ft. and 24 inches on centers 26''00/100 long
6 inches pitch to one ft. and 24 inches on centers 26''84/100 long
7 inches pitch to one ft. and 24 inches on centers 27''78/100 long
8 inches pitch to one ft. and 24 inches on centers 28''84/100 long
9 inches pitch to one ft. and 24 inches on centers 30''00/100 long
10 inches pitch to one ft. and 24 inches on centers 31''24/100 long
11 inches pitch to one ft. and 24 inches on centers 32''56/100 long
12 inches pitch to one ft. and 24 inches on centers 33''94/100 long

Section H:

3 inches pitch to one foot and 16 inches on centers 16''49/100 long
4 inches pitch to one foot and 16 inches on centers 16''92/100 long
5 inches pitch to one foot and 16 inches on centers 17''33/100 long
6 inches pitch to one foot and 16 inches on centers 17''89/100 long
7 inches pitch to one foot and 16 inches on centers 18''52/100 long
8 inches pitch to one foot and 16 inches on centers 19''09/100 long
9 inches pitch to one foot and 16 inches on centers 20''00/100 long
10 inches pitch to one foot and 16 inches on centers 20''83/100 long
11 inches pitch to one foot and 16 inches on centers 21''70/100 long
12 inches pitch to one foot and 16 inches on centers 22''62/100 long

Referring again to the longitudinal metal strips 12 and 13, the strip 12 is the one which carries the notes of the respective groups of indicia, and the strip 13 is the measuring strip, being graduated for inches and fractions thereof. These strips 12 and 13 are secured at their ends and middle parts by screws or other appropriate means, and have parts spaced from the body of the beam 3, to provide slots 14 and 15 through which the blades 1 and 2 extend. The slots 15 are long enough to permit the blades 1 and 2 to be slid from the middle part to the end parts of the beam 3, and to permit these blades to be folded into a substantially parallel relation to the beam 3, as shown in Figs. 3 and 3*a*.

For providing all possible convenience for the use of such tools, I provide this beam 3 with leveling and plumbing devices such as shown at 16 and 17, and I also provide the beam 3 with tables 18 at opposite sides of the leveling device 17.

A detachable square member or right angle member 19 is shown attached and secured to the ends of the blades 1 and 2, Fig. 4; and in Fig. 5, the same member is shown detached, this figure being enlarged for showing the tables or instruction-notes "for cutting braces", "for laying off risers" and so on. Each member 19 includes a plate having arms 20 which are grooved at 21 (as shown in Figs. 5 and 6), and which have internally screw-threaded ends having thumb-screws 22 screwed therein. Blades 1 and 2 have openings 23 into which the heads of the screws or thumb-screws 22 extend. By tightening these screws when the ends of the blades are in the grooves 21, the thinned edges being fitted in the grooves 21, and the notched and pointed ends 23*a* (Fig. 1) being under shoulders 24 (Fig. 5), the heads of the screws 22 engage with the edges of the openings 23 so as to hold the member 19 in rigid engagement with the blades 1 and 2. It will be seen that the member 19 and the blades 1 and 2 have measuring edges including graduations, preferably inches and fractions thereof. It will also be seen (Fig. 4) that the graduations on the member 19 are complementary to the graduations on the blades 1 and 2. When the members 1, 2 and 19 are secured together as shown in Fig. 4, they form a unitary member or tri-square which is bodily adjustable with respect to the beam 3. By adjusting this unitary member to the position shown in Fig. 2, this combination tool is made applicable for laying out stair braces having 10'' treads and 7¾'' risers.

Referring again to Figs. 3 and 3*a*, it is seen that the blades 1 and 2 are partly hidden, the lower part of blades 1 and 2 being in the slot between the body of beam 3 and the strip 13, and the upper corner of blade 2 being in the slot 14 between the beam 3 and the strip 12. These strips 12 and 13 protect the edges of the blades 1 and 2, so they will not become bent or battered when being carried in a tool kit. It should be noted that the slots 6 and 7 extend into both arms of each blade 1 and 2, so the screws 8 and 10 can be operated in either arm of the respective blades, thereby permitting a large range of adjustments of the blades with respect to one another and with respect to the beam 3.

Referring again to the sections or groups of indicia A to L inclusive, it is seen that they are spaced from one another; that is, a clear space is provided between each group and the next adjacent group, so they are distinctly separate from one another, and there is no danger of an element of one group being confused with an element of any other of the group. The indicia designated GH refer to both tables G and H.

Although I have described this embodiment of my invention very specifically, I do not intend to limit my patent protection to these exact details of construction, arrangement and operation, for the invention is susceptible of numerous changes within the scope of the inventive ideas as implied and claimed.

What I claim as my invention is:

1. In a tool of the character described, the combination of a beam having alined slots spaced from one another at the middle part of the beam and extending towards the ends of the beam, two originally separate gaging blades, two adjusting screws extending through the respective slots of the beam and slidable therealong and engaged with the respective gaging blades so as to hold them in different and independent adjustments along said beam while one end of each blade is free, at least one of these blades having a slot extending therealong and adapted to permit one of said screws to slide therein, and means to secure the free ends of the gaging blades in a definite united and unchangeable angular relation to one another substantially as shown.

2. In a combination tool of the character described, the combination of a beam having a gaging edge and having a slot extending parallel to the gaging edge, a gaging blade, a screw extend-

ing through said slot and slidable therein and engaged with said gaging blade, a wing-nut combining with said screw for holding the blade in different adjustments along said slot and in angular relation to the gaging edge of said beam, said beam having a group of indexing lines extending crosswise thereof for registration with an edge of said gaging blade in its different adjustments, a metal strip having its end portions secured to said beam and having a portion spaced from the beam and thereby providing a slot through which said gaging blade can slide under said strip, said strip having thereon a printed note registering with said group of indexing lines for imparting information regarding the use of said indexing lines, and a measuring strip having indicia thereon and secured on said beam and extending parallel to its gaging edge and having a part spaced from the beam to provide a slot through which said gaging blade can slide under the measuring strip to avoid hiding any of said indicia.

3. In a combination tool of the character described, the combination of a beam having a gaging edge and having two alined slots extending parallel to the gaging edge, a gaging blade, a screw extending through one of said slots and slidable therein and engaged with said gaging blade, a wing-nut combining with said screw to hold the gaging blade in different angular relations to the gaging edge of said beam, said beam having a group of indexing lines extending crosswise thereof for registration with an edge of said gaging blade in its different adjustments, a metal strip having its end portions secured to said beam and having a portion spaced from the beam and thereby providing a slot through which said gaging blade can slide under said strip, said strip having a printed note thereon and registering with said group of indexing lines for imparting information regarding the use of said indexing lines, a second gaging blade, a screw extending through the second slot of said beam and engaging with said second gaging blade and operable for holding the same in different adjustments along said second slot, said beam having a second group of indexing lines, said second group being in indexing relation to said second gaging blade, and means for insertion between the gaging blades to secure them in a definite unchangeable angular relation to one another.

4. In a combination tool of the character described, the combination of a beam having slots extending therealong, two gaging blades each having a slot extending therealong and also having a gaging edge, a screw constituting a pivot and extending through the slot of one blade and through one slot of said beam and being slidable along these slots for effecting adjustments of this gaging blade and being operable to secure this blade in different adjustments in which it has one end free, a second screw constituting a pivot and extending through the other slot of said beam and through the slot of the other blade and slidable along these slots and operable to hold this blade in different adjustments in which it has one end free, whereby said blades can be adjusted to different angles to said beam and to one another, and an originally separate section having edges at an angle to one another and provided with means to removably secure it to the free ends of said blades in such relation that said edges are alined with the respective gaging edges of said blades and are held in an unchangeable angular relation to one another while in a changeable angular relation to said beam.

5. The structure defined by claim 4, each of said blades having two straight arms at an angle to one another, the amount of angularity of the arms of one blade being greater than the amount of angularity of the arms of the other blade, substantially as shown.

6. The structure defined by claim 4, each gaging blade having two straight arms at a definite angle to one another, the slot of each blade extending from one arm into the other arm and conforming to said definite angle, substantially as shown.

7. The structure defined by claim 4, each of the gaging blades having measuring graduations along its gaging edge, said originally separate section having graduations along its edges that are alined with said gaging edges, the graduations of said gaging edges being complemental to those of said originally separate section when the latter is secured to the blades as shown.

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