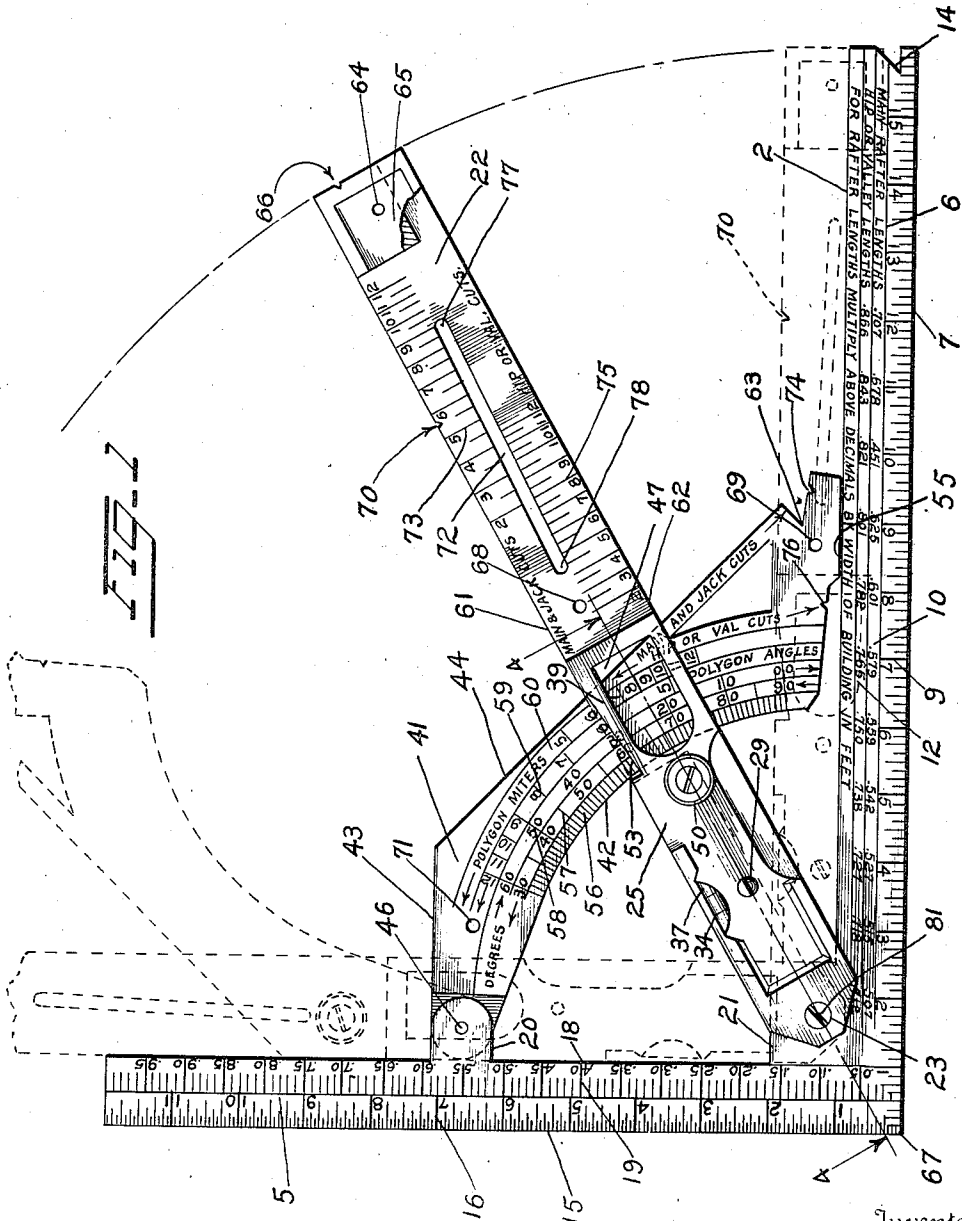


July 29, 1941.

D. L. SIGMON
COMBINATION SQUARE
Filed June 30, 1939

2,251,208

3 Sheets-Sheet 1



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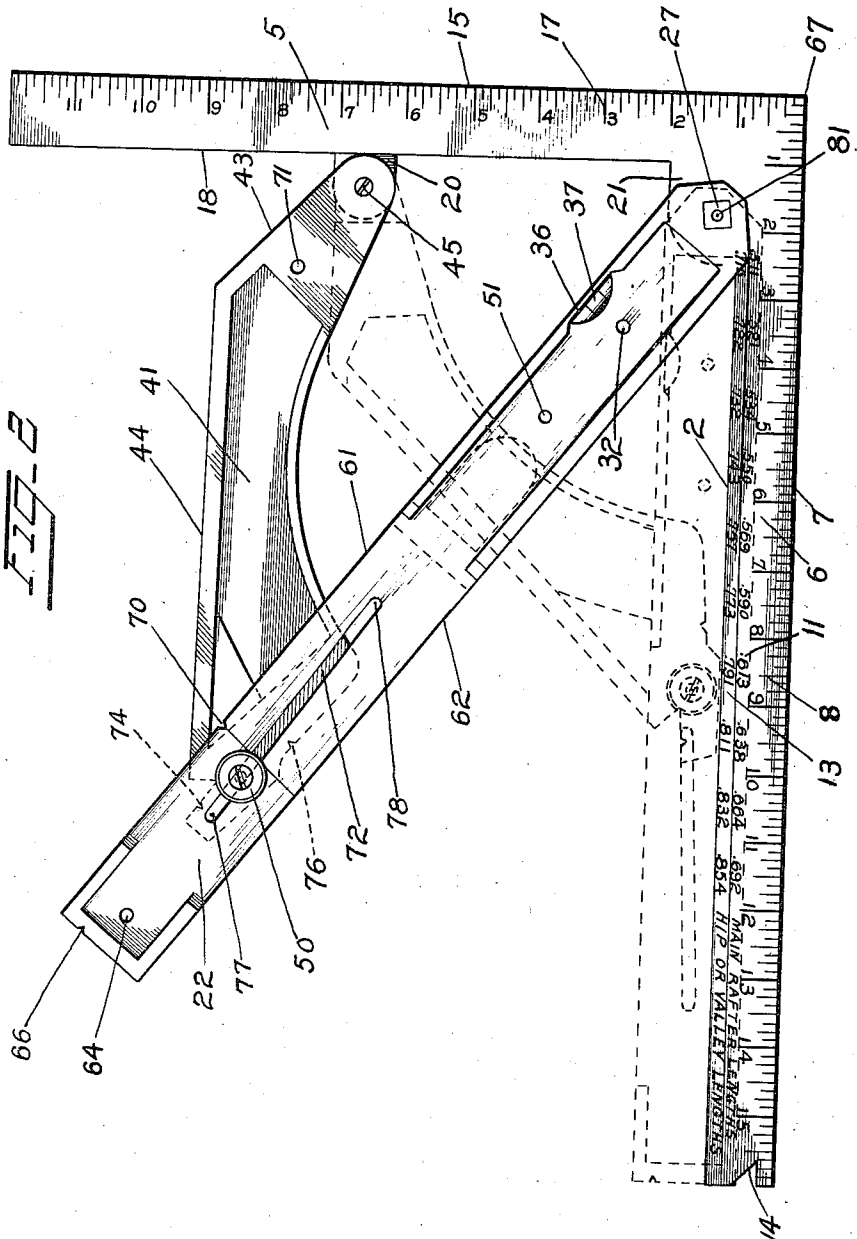
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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

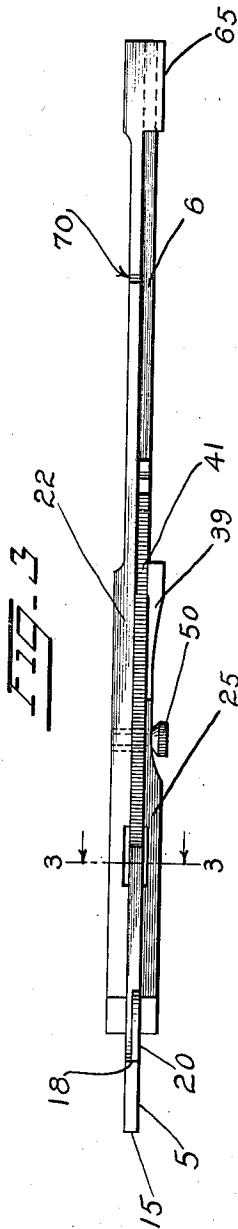


FIG-4

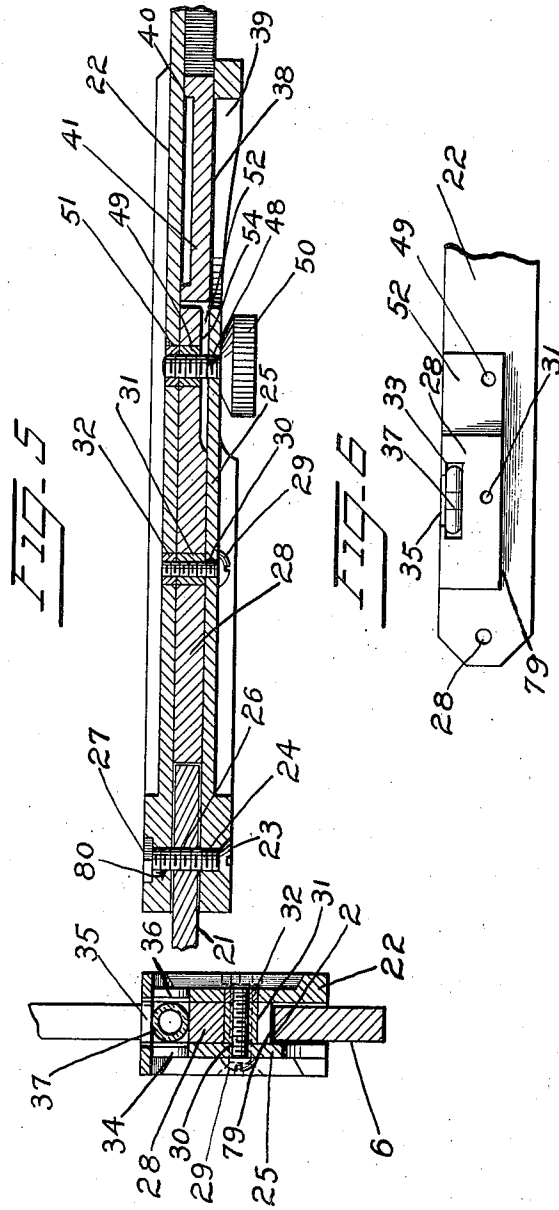
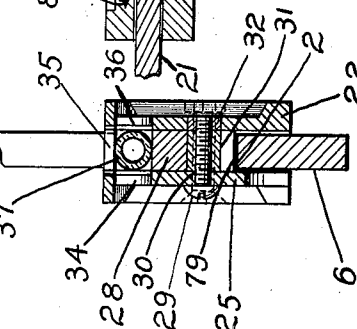


FIG-5

FIG-6



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UNITED STATES PATENT OFFICE

2,251,208

COMBINATION SQUARE

Dallas L. Sigmon, Hickory, N. C.

Application June 30, 1939, Serial No. 282,231

9 Claims. (Cl. 33-93)

This invention relates to improvements in the measuring tools of carpenters, builders and other mechanics, and it consists in the combination, construction and arrangements herein described and claimed.

The objects of my invention are, first, to provide an improved carpenter square or a combination square having a minimum number of adjustable parts so arranged as to provide all the ordinary uses to which a square may be put and also providing a level, protractor, plumb rule, miter square and an instrument conveniently constructed for scribing and gauging purposes.

Second, it is the object of my invention to provide a device of the character described which is readily adapted for use in the framing of a gable or hipped roof, whereby the various miter cuts for the main and jack rafters or for the hip and valley rafters may be conveniently determined by a single setting of my instrument.

Other objects and advantages will be apparent from the following description when taken in connection with the accompanying drawings.

Figure 1 is a plan view of the obverse side of an embodiment of my invention with the quadrant in two and the stock in three different adjusted positions.

Figure 2 is a plan view of the reverse side of the invention with the quadrant and stock in two different adjusted positions.

Figure 3 is an edge elevation of the invention in closed position.

Figure 4 is an enlarged transverse sectional view, on the line 3-3 of Figure 3 passing through the spirit level.

Figure 5 is an enlarged longitudinal sectional view of the clamping member on the line 4-4 of Figure 1.

Figure 6 is a plan view of the center plate attached to the stock with the top plate removed.

Referring to the drawings numeral 5 represents the tongue member and numeral 6 the body member which members are connected and are disposed at a right angle with respect to each other and comprise a supporting member. Body 6 having inner edge 2 and outer edge 7, is divided longitudinally on both sides thereof into three sections. Graduations or legends having predetermined values are disposed in each of the sections so formed. There are provided on both sides of body 6 along the outer edge 7, inch graduations. The said graduations are indicated by numeral 8 in Figure 1 and by numeral 8 in Figure 2.

Each decimal shown in the second section in-

dicated by numerals 10 and 11, Figures 1 and 2, is the equivalent of the percent expressed in the thousandths that the length of the main rafters of a gable roof bears to the width of the building, when the main rafters of the said building are set at a pitch or rise per foot of run corresponding to the figure in inches or half inches shown in the first section directly above such decimal.

Each decimal shown in the third section indicated by numerals 12 and 13, Figures 1 and 2, is the equivalent of the percent that the length of the hip or valley rafter of a gable or hipped roof bears to the width of the building, when the main rafters of the said building are set at a pitch or rise per foot of run corresponding to the figure in inches or half inches shown in the first section directly above such decimal.

On both sides of the tongue 5 along the outer edge 15, there are provided inch graduations for a one-foot measure indicated by numerals 16 and 17, Figures 1 and 2. Tongue 5 is further provided on the obverse side along the inner edge 18 with a one-foot measure divided into one hundred graduations, indicated in Figure 1 by numeral 19. Each graduation represents the decimal part of a foot measure expressed in hundredths. The corresponding equivalent in inches is shown on the graduation 16 directly opposite the markings on graduation 19.

On the inner edge 18 of the tongue 5 there is provided a pivot lug 20 the purpose of which will be explained later. Further, at the junction of tongue 5 and body 6 on the inner edges 18 and 2 there is provided a pivot lug 21. A radial arm, stock 22, is pivotally connected, Figures 1, 2 and 5, to the supporting member formed by the tongue 5 and body 6 by means of the pivot lug 21 and the pivot screw 23. The said pivot screw 23 is disposed in hole 24 of top plate 25, hole 26 of pivot lug 21 and hole 27 of stock 22. The said pivot screw 23 is fastened on the reverse side of the stock 22 by nut 27. The said radial arm, stock 22, has attached thereon in any suitable manner a center plate 28. The said center plate 28 has attached thereto, Figures 1, 4 and 5 by means of a screw 29 a top plate 25. The said screw 29 is disposed in screw hole 30 of top plate 25 being engaged in screw threaded hole 31 of center plate 28 and screw threaded hole 32 of stock 22.

Carried by one side of the center plate 28, Figures 4 and 6, is a spirit level 37 attached in any suitable manner in recess 33 and visible through slots 34, 35 and 36. There is further provided

in center plate 23, Figure 5, a recess indicated by numeral 52, the purpose of which will hereinafter appear.

Referring to Figures 1, 2 and 5, the reverse side 30 of the part 39 of the top plate 25 and the obverse side 49 of the stock 22 traverse the opposite faces of a quadrant 41.

The part 39 of the top plate 25 is provided with a slot 47 through which the figures appearing on the obverse side of the quadrant 41 may be easily seen. As shown in Figures 1, 3 and 5, there is disposed in screw hole 43 of top plate 25 a thumb screw 50. The said screw 50 is engaged in screw threaded hole 49 of center plate 23 and in screw threaded hole 51 of stock 22. As thumb screw 50 is tightened, the free end of the top plate 25 is forced downward causing the edge 33 to approach edge 54 of the recess 52. The top plate 25 is thereby caused to clamp quadrant 41 between the edge 33 of top plate 25 and edge 49 of the stock 22. In this manner the radial arm, stock 22, may be clamped at any desired position on the quadrant 41, and the pivoted quadrant 41 and the stock 22 fastened in adjusted position.

Referring to Figures 1 and 2, the auxiliary arm or quadrant 41 is pivotally connected to the tongue 5 by means of the pivot lug 29 and the pivot screw 45. The pivot screw 45 is disposed in a screw hole formed at the end of the quadrant 41, the said screw 45 being engaged in screw threaded hole 46 in pivot lug 29. The quadrant 41 may be detached from the instrument by unscrewing the pivot screw 45 from the screw threaded hole 45.

The said quadrant 41 is curved at the inner edge 42 on the arc of a circle. Positioned concentric with the said arcuate inner edge 42 is the point 31 which also represents the center point of screw 23. The quadrant 41 further has the straight edges 43 and 44 which form at the intersection thereof an angle of 135 degrees.

In order to use the certain figures scales and graduations provided on the obverse side of the quadrant 41, the said quadrant is set as shown in Figure 1. The said quadrant 41 in the latter position has the straight edge 43 set at an angle of 90 degrees to the edge 13 of tongue 5, together with the edge 44 set at an angle of 45 degrees to edge 2 of body 6. With the edges 43 and 44 set as aforesaid, the edge 55 of the quadrant 41 will be positioned parallel to and touching the edge 2 of body 6.

The quadrant 41, Figure 1, has the obverse side provided with scale 53 indicating the usual degree graduations. Further, there is provided the scale 57 indicating the degrees between stock 22 and body 6. The aforesaid scale markings may be easily read by bringing the edge 53 of top plate 25 into registration with the respective graduations 56, 57 and 58.

Further, there is provided on the quadrant 41 the scale 59 to facilitate the laying off of polygon sides. In operation the edge 53 of stock 22 is adjusted coincident with the line on scale 59 having the numeral indicative of the number of sides desired for the said polygon. In the adjusted position aforesaid there will be formed by the tongue 5 and stock 22 an angle equal to the outside angle formed by the base line extended and the succeeding side of a polygon having the number of sides indicated by the numeral registered on scale 59. With the said angle thus determined the sides of the polygon may be easily and quickly laid off.

There is also provided on the quadrant 41 the scale 60 which is similarly adapted for use in determining the angle of the miter cuts for the polygon side.

Extending through the stock 22, Figures 1 and 2, is a straight longitudinal slot 72 having the center thereof indicated by the center points 77 and 78. There is provided a screw 59, Figure 2, adapted to be inserted in the slot 72 from the reverse side of the stock 22. The said thumb screw 59 is engaged on the opposite side of the stock 22 in the screw threaded hole 69 of the quadrant 41. As the said thumb screw 59 moves longitudinally in the slot 72, the quadrant 41 is pivoted on the thumb screw 59 and the pivot screw 45, while the stock 22 is pivoted at 23.

The slot 72 is so positioned in the stock 22 that as the thumb screw 59 moves longitudinally therein pivoting the quadrant 41, the edge 44 will form with the edge 61 the proper angle for the side cuts of the timbers of a gable or hipped roof having the main rafters set at a rise per foot of run as registered on the graduations 73 and 75.

The quadrant 41 carries indicator notch 74 through the medium of which the graduations 73 may be easily read by bringing the indicator notch 74 into registration with the respective graduations 73.

Upon the indicator notch 74 registering on the graduations 73 the pitch for the main or jack rafters of a gable or hipped roof, the quadrant 41 and stock 22 may be readily clamped in position by tightening the thumb screw 50. Then with edge 61 or edge 62 of stock 22 used as a guide or runner along the timber or base line, the edge 7 of the body 6 will indicate the plate, bottom or level cut and edge 15 of tongue 5 will indicate the plumb, top and ridge cut for the main or jack rafters having the registered pitch aforesaid and edge 44 of quadrant 41 will indicate the side, bevel or cheek cut for the said jack rafters.

The stock 22 has further provided along the edge 62 the graduations 75. The quadrant 41 carries the indicator notch 76 through the medium of which the graduations 75 may be easily read. Upon the indicator notch 76 registering on the graduations 75 the pitch of the main or jack rafters to which the hip or valley rafters will be set, the quadrant 41 and stock 22 may be readily clamped in position by tightening thumb screw 50. Then with edge 61 or edge 62 of stock 22 used as a guide or runner along the timber or base line, edge 7 of body 6 will indicate the plate, bottom or level cut; edge 15 of tongue 5 will indicate the plumb, top or ridge cut; and edge 44 of quadrant 41 will indicate the side, bevel or cheek cut for the hip or valley rafters for framing a roof having main or jack rafters set at the pitch or rise per foot of run registered by indicator notch 76 on graduations 75.

However if the angle of inclination of a hip, valley or jack rafter is known, the plate, plumb and side cuts thereof may be conveniently determined by first placing the quadrant 41 in the position shown in Figure 1. The radial arm 22 may then be adjusted with respect to the scale markings 59 of quadrant 41 until the indicator edge 53 is placed in registration with the scale marking thereon denoting the angle of the said rafter. The auxiliary arm or quadrant 41 should then be pivoted so that the screw threaded hole 69 thereof is placed in engaging relationship with

the releasable fastening means thumb screw 50 positioned in the slot 72 of the adjusted radial arm 22, as shown in Figure 2. The auxiliary arm 41 and the adjusted radial arm 22 may then be clamped in position by tightening thumb screw 50. The plate, plumb and side cuts of the rafter in question will be indicated respectively by edge 7 of body 6, edge 15 of tongue 5 and edge 44 of quadrant 41 as previously explained.

In order to frame the rafters for a gable or hipped roof so as to have the same pitch as a given roof previously erected, or upon placing an addition to a building, the roof of the addition to have a like pitch to that of the roof of the prior building, it is necessary that the plumb and plate cuts for the main rafters; the plumb, plate and side cuts of the jack rafters; and the plumb, plate and side cuts of the hip or valley rafters for the new roof be determined. The foregoing may be easily, quickly and accurately determined by means of the last noted arrangement of my invention, by placing edge 7 of the body 6 on top of and extending along the incline of the given roof previously constructed. The said edge 7 should be placed parallel to the main rafters and should extend along the said incline upward from the end thereof to the heel or point 67 of the body 6.

The stock 22 is then pivoted at 23 to a horizontal position, which may be readily determined by the spirit level 37. The stock 22, in the level position, is then clamped to the auxiliary arm or quadrant 41 by tightening the thumb screw 50 disposed in the slot 72 and engaged in the screw threaded hole 69. Then upon placing the instrument along a timber using edge 61 or edge 62 of the stock 22 as a guide or runner; edge 7 of body 6 will indicate the plate cut and edge 15 of tongue 5 will indicate the plumb cut for the main or jack rafters for such roof and edge 44 of the auxiliary arm or quadrant 41 will indicate the side cut for the jack rafters of the said roof. Moreover, it will be readily apparent that indicator notch 74 will register on graduations 73 the rise per foot of run of the jack or main rafters.

Moreover, if the edge 7 is placed along the incline of the hip or valley rafters rather than along the incline of the main rafters of the said roof as previously described, then after fastening the instrument along a timber using edge 61 or edge 62 of the stock 22 as a guide or runner edge 7 of body 6 will indicate the plate cut and edge 15 of tongue 5 will indicate the plumb cut and edge 44 of quadrant 41 will indicate the side cut for the hip or valley rafters. Furthermore, notch 76 will register on the graduations 75 the rise per foot of run of the main rafters for such roof. And as previously explained with the rise per foot of run of the main rafters determined the several cuts for the jack rafters, main rafters or hip or valley rafters may be quickly determined.

Further, it is readily apparent that with the rise per foot of run of the main rafters thus determined, the length of the main rafters and the hip or valley rafters for such roof may be easily computed by multiplying the width of the building by the proper factors for such rise per foot of run as indicated on body 6 and previously explained.

Formed at the end of the stock 22 on the obverse side thereof as shown by Figures 1, 2 and 3, is a raised part 65 having provided in the edge

thereof a slot adapted to seat a part of the end of the body 6 upon the closing or bringing together of body 6 and stock 22 as shown in Figures 1 and 3. In such closed position edge 79 of the center plate 28 is positioned parallel to and touching edge 2 of body 6. Furthermore, top plate 25 and part 39 thereof both in part traverse a portion of the obverse side of the body 6, as shown by the broken lines in Figures 1 and 4.

Provided in the part 65 is a hole 64, Figures 1 and 2 which extends through the stock 22 and by means of which my invention is adapted for the scribing of circles. The same is accomplished by placing a nail, awl or other suitable device in and projecting through the hole 64 with the point of the device adapted for the center point of the circle. Then placing a pencil or other suitable marking device in the notch 63 of the quadrant 41, the stock 22 and quadrant 41 may be pivoted until the desired radius is obtained. The quadrant 41 and stock 22 may be secured in the adjusted position by tightening the thumb screw 50 in the hole 51 forcing the top plate 25 downward clamping quadrant 41 to stock 22 as previously explained. The notch 63 may then be swung about the point inserted in the hole 64, and the circumference of the circle formed by the marking device held in the notch 63. It is readily apparent that notch 14 in body 6 may be similarly used. Further, notches 14 and 63 are readily adaptable for scribing or gauging by using the edge 62 of the stock 22 as a guide or runner along a timber edge and placing a pencil or other suitable marking device in either or both notches.

A notch 66 is further provided at the end of the stock 22. The said notch 66 is so positioned that with the stock 22 set at an angle of 45 degrees from the body and tongue members a line drawn through the point of the heel 67 and the notch 66 will also make an angle of 45 degrees with the said body and tongue members. Then upon placing tongue 5 and body 6 over the circumference line of a circle at equal distances from the heel 67 of the square, the line as aforesaid drawn between the points 67 and 66, will indicate the center line of the circle. The same therefore serves as a convenient means for determining the center of the circle.

It is readily apparent that a convenient plumb rule, try square and a miter square are formed by stock 22 and body 6 being closed together and thumb screw 50 being disposed in the screw hole 68 of the stock 22 and engaged in the screw threaded hole 69 of the quadrant 41. A further convenient arrangement is provided by placing the stock 22 and tongue 5 together, and pivoting the quadrant 41 so that edge 43 of quadrant 41 is parallel and touching edge 18 of tongue 5. The same being fastened in the said position by disposing thumb screw 50 in screw hole 68 of the stock 22 engaging screw threaded hole 71 of quadrant 41.

On edge 61 of the stock 22 is provided a notch 70 conveniently arranged so that upon the body 6 and stock 22 being closed, Figure 1, the said notch 70 is opposite the 12 inch graduations on the body 6. The said notch 70 is adapted for use in spacing joists or studding to 12 inches on centers.

There are further operations in connection with framing and carpentry work which may be facilitated by the use of the implement above described such as the laying off of stair carriages

or stringers and other operations. However, the examples above described are deemed sufficient without attempting to describe others which will be apparent to the skilled mechanic and carpenter.

It will be readily understood that minor changes in the size, form and construction of the various parts of my invention may be made and substituted for those herein shown and described without departing from the spirit of my invention the scope of which is set forth in the appended claims.

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

1. The combination with a square having body and tongue members, of a radial arm having scale markings thereon substantially as shown and described, a quadrant shaped arm pivotally attached to the tongue member aforesaid, and the said quadrant shaped arm having a pivotal and slidable connection with the said radial arm, the said quadrant shaped arm having provided a straight outer edge adapted to form with the radial arm the angle of the side cut for hip, valley and jack rafters of a gable roof when the body member and radial arm aforementioned are adjusted to the angle of inclination of the said rafters, and means provided on the said quadrant shaped arm for registering on the scale markings provided on the radial arm aforesaid.

2. The combination with a square having body and tongue members, of a radial arm pivotally attached to the said square, the said radial arm having scale markings and a spirit level provided thereon, an auxiliary arm pivotally attached to the tongue member aforesaid and the said auxiliary arm having a sliding connection with the said radial arm and having indicator means adapted to register on the scale markings provided on the radial arm aforesaid, the rise of the main rafters of a gable roof, when the body member is set along the incline of a valley rafter of a gable roof and the radial arm is pivoted to a level position as registered by the spirit level mounted on the said radial arm.

3. The combination with a square having a body and a tongue disposed at right angles to each other, of a quadrant shaped arm pivoted to the said tongue, the said quadrant shaped arm having straight outer edges forming at the juncture thereof a fixed angle, and having an inner edge formed on the arc of a circle, a radial arm pivoted at a point concentric with the said arcuate inner edge, the radial arm aforesaid having a longitudinal slot therein and scale markings at opposite sides of the said slot substantially as shown and described, a screw slidably positioned in the said slot, the said screw pivotally engaging the said quadrant shaped arm, the said quadrant having indicator notches adapted to register on the scale markings provided on the radial arm at opposite sides of the slot aforesaid.

4. The combination with a square having body and tongue members, of a radial arm pivotally attached to the said square, the said radial arm having scale markings and a spirit level provided thereon, a quadrant shaped arm pivotally attached at one end to the tongue member aforesaid and the opposite end of the said quadrant shaped arm having a pivotal and slidable connection with the said radial arm, and means provided on the said quadrant shaped arm adapted

to register on the scale markings of the radial arm aforesaid.

5. The combination with a square having body and tongue members, of an auxiliary arm pivotally attached at one end to the tongue member aforesaid, a radial arm having a spirit level mounted thereon, the said radial arm having a pivotal connection with the auxiliary arm aforesaid, the said auxiliary arm having a straight outer edge, and means adapted to pivot the said auxiliary arm in such a manner as to cause the said outer edge to form with the radial arm the angle of the side cut for hip, valley and jack rafters when the body member is set along the incline of the said rafter for which the side cut is desired and the radial arm is pivoted to a level position as registered by the spirit level mounted on the said radial arm.

6. The combination with a square having body and tongue members, of a radial arm pivotally attached to the said square, the said radial arm having scale markings and a spirit level provided thereon, an auxiliary arm having the shape substantially of a quadrant and the said auxiliary arm having a straight edge, the said auxiliary arm pivotally attached to the tongue member aforesaid and the said auxiliary arm having a pivotal and slidable connection with the said radial arm and having indicator means adapted to register on the scale markings provided on the radial arm aforesaid the rise of the main rafters of a gable roof when the body member is set along the incline of a valley or hip rafter of a gable roof and the radial arm is pivoted to a level position as registered by the spirit level mounted on the said radial arm, the said radial arm and the said straight edge of the said auxiliary arm being thereby positioned in such a manner as to cause the said straight edge of the said auxiliary arm to form with the said radial arm an angle equal to the angle of the side cut of the said hip or valley rafter and the said radial arm to form with the said body member an angle equal to the angle of the plate cut of the said rafter, and the said radial arm to form with the said tongue member an angle equal to the angle of the plumb cut of the said rafter.

7. The combination with a square having a body and a tongue disposed at right angles to each other, of an auxiliary arm having the shape substantially of a quadrant, and the said auxiliary arm having a straight outer edge and an inner edge formed on the arc of a circle, the said auxiliary arm having one end thereof pivotally connected to the aforesaid tongue member, a radial arm pivotally connected to the said square at a point concentric with the said arcuate inner edge of the said auxiliary arm, releasable means slidably and pivotally connecting the other end of the said auxiliary arm to the said radial arm, and a spirit level mounted on the said radial arm in such a manner as to indicate when the said radial arm is positioned in a level position whereby when the body member is set along the incline of a hip, valley or jack rafter of a gable roof and the radial arm is pivoted to a level position as registered by the said spirit level, the straight edge of the auxiliary arm is thereby positioned in such a manner as to form with the radial arm an angle equal to the angle of the side cut of the said hip, valley or jack rafter, and the said radial arm is positioned in such a manner as to form with the said body member an angle equal to the angle of the plate cut of the said hip, valley or jack rafter,

and the said radial arm is positioned in such a manner as to form with the said tongue member an angle equal to the angle of the plumb cut of the said hip, valley or jack rafter, and including means adapted to indicate the rise of the said rafters.

8. The combination with a square having body and tongue members of a radial arm pivotally attached to the said square, an auxiliary arm having the shape substantially of a quadrant, a series of scale markings provided on the said auxiliary arm, and indicator means provided on the said radial arm adapted to register on the said scale markings, the said auxiliary arm pivotally attached to the tongue member aforesaid, and the said auxiliary arm having a straight edge, and releasable means for connecting the said auxiliary arm with the said radial arm, whereby the straight edge of the said auxiliary arm will be adapted to form with the radial arm the angle of the side cut, and the body member will be adapted to form with the said radial arm the angle of the plate cut, and the said tongue member will be adapted to form with the said radial arm the angle of the plumb cut for a hip, valley or jack rafter of a gable roof having a rafter rise

as registered on the scale markings aforesaid, upon the said radial arm being first adjusted in registering relationship with the said scale markings so as to indicate thereon the rise of the roof rafter and then the said auxiliary arm being so adjusted as to be connected with the said adjusted radial arm by the releasable connecting means aforesaid.

9. The combination comprising a supporting member, a radial arm member pivotally attached to the said supporting member, an auxiliary arm having a pivotal connection with one of the said members, and releasable means for connecting the said auxiliary arm to the other member, the said auxiliary arm having the shape substantially of a quadrant, a series of scale markings provided on the said auxiliary arm, and indicator means adapted to register on the said scale markings, and the said auxiliary arm having a straight edge adapted to form with the radial arm an angle equal to the angle of the side cut for a hip, valley or jack rafter of a gable roof having a rafter rise as registered by the said indicator means on the scale markings aforesaid.

DALLAS L. SIGMON.