

[54] CARPENTER'S TOOL

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[52] U.S. Cl. **33/75 R, 33/89, 33/91**

[51] Int. Cl. **B43I 7/06**

[58] Field of Search 33/88, 91, 94, 97, 33/117, 119, 191

[56] **References Cited**

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Primary Examiner—Louis R. Prince

Assistant Examiner—Charles E. Phillips

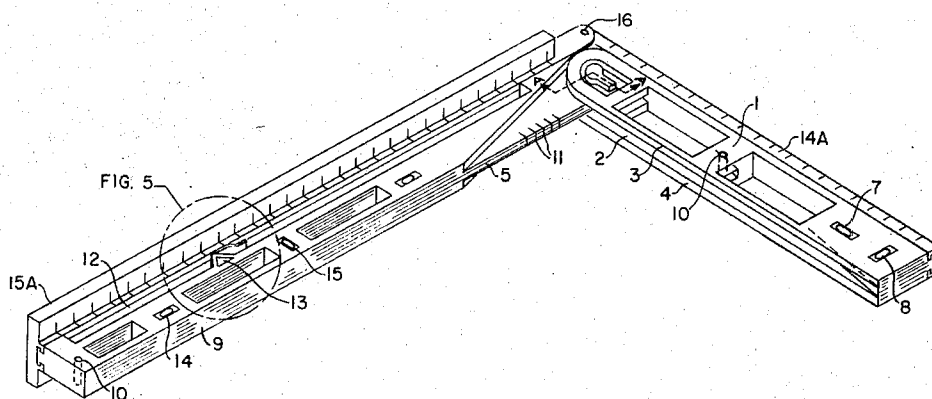
Attorney—Edward G. Atkins

[57] **ABSTRACT**

A new and improved carpenter's tool has been de-

signed which will measure pitches or angles in carpenter's work with speed and ease. This tool also contains a mechanism which will lock the tool in a rigid position simply and quickly. This tool comprises a first leg member having two elements at one end forming a slot; a second leg member pivotably mounted between the shoulders of the first leg member and having a blade element adapted for insertion into the slot of the first leg member; a locking sleeve joining the two leg members at the pivot point, said locking sleeve being right-hand threaded at one end and left-hand threaded at the other end; and a locking lever slidably mounted through the first and second leg member and through the locking sleeve such that a turn of the lever from either side of the tool will cause the shoulder elements of the first leg member to bind down against the blade element of the second leg member locking the leg members into a rigid position. The tool also can contain a first sliding member mounted perpendicular to and slidably connected to the side of the first leg member and a second slidably member slidably connected to the side of the second leg member said second sliding members being spring pivotably connected to the first sliding member. These slidably mounted members enable an angle measured by the two leg members to be extended beyond the pivot point connecting the first and second leg members.

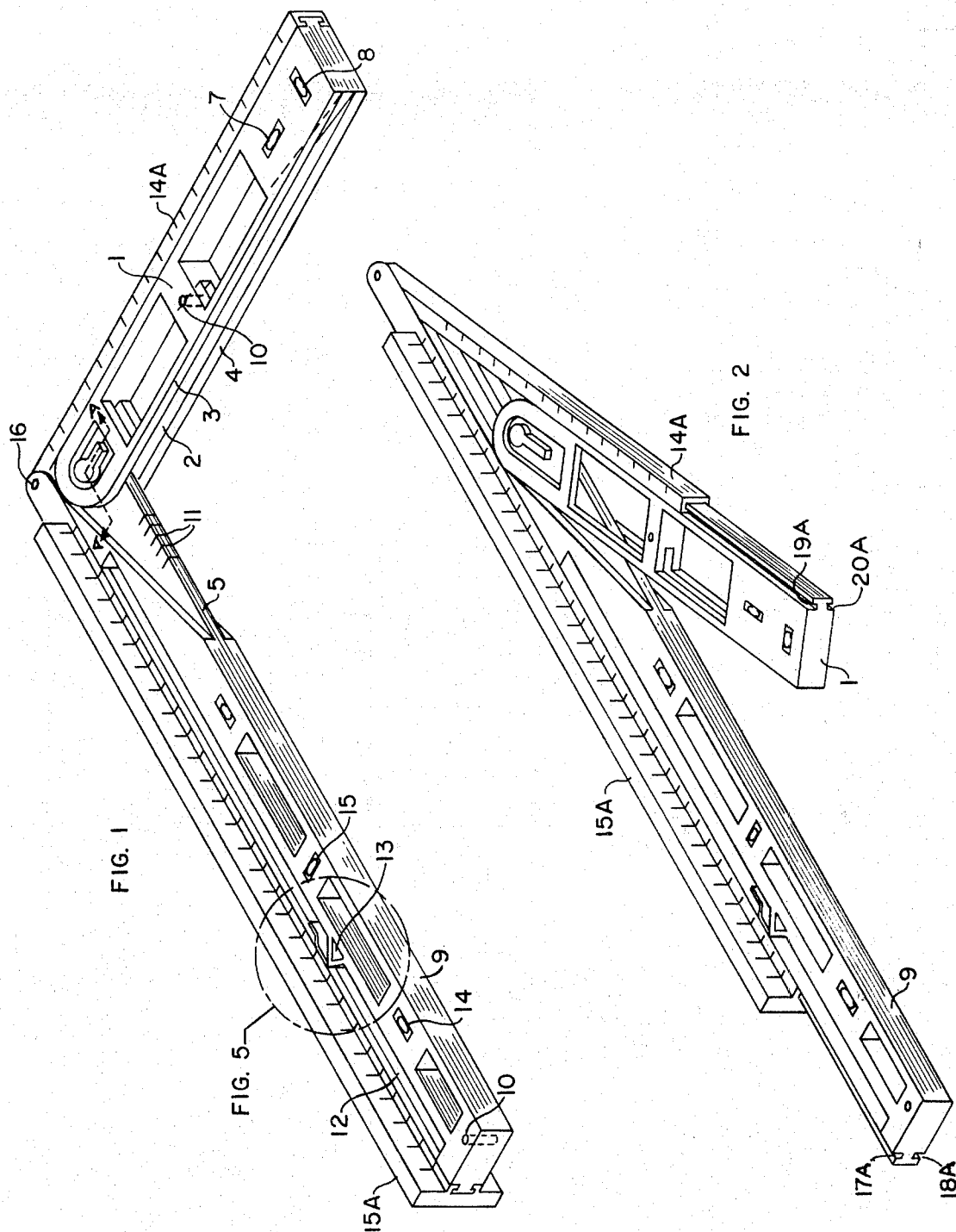
10 Claims, 10 Drawing Figures



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SHEET 1 OF 3



SHEET 2 OF 3

FIG. 3

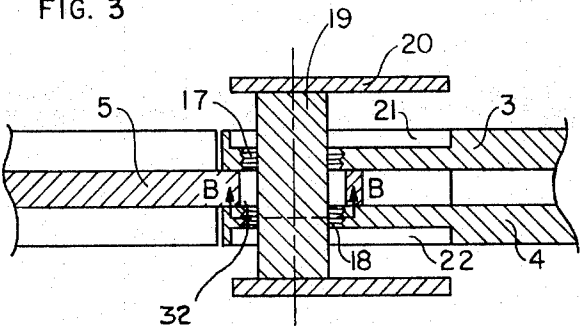


FIG. 4

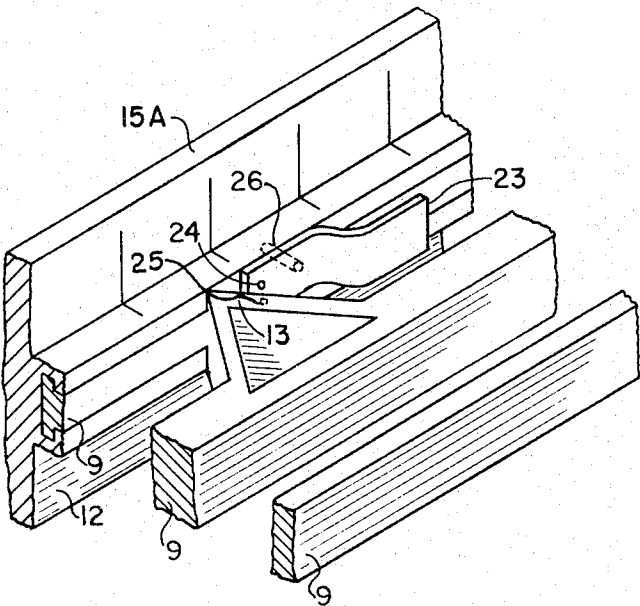
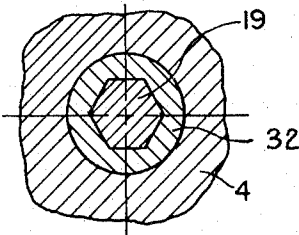


FIG. 5

FIG. 6

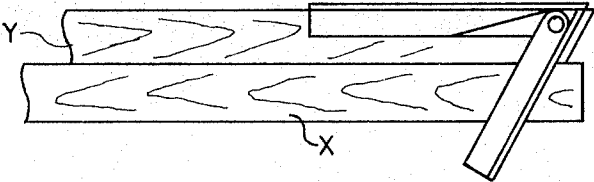


FIG. 7

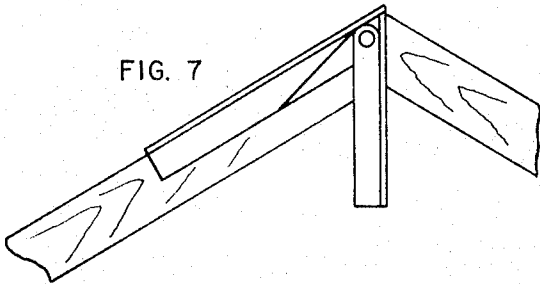


FIG. 8

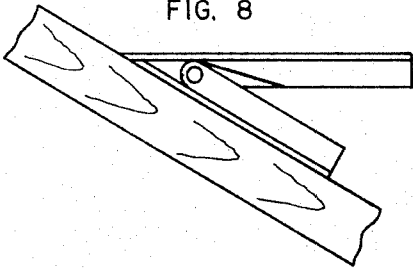


FIG. 9

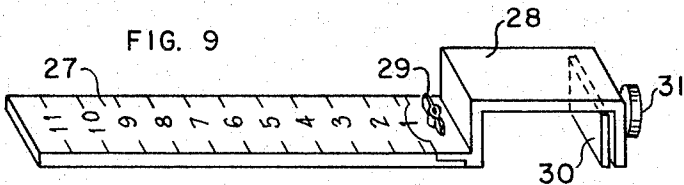
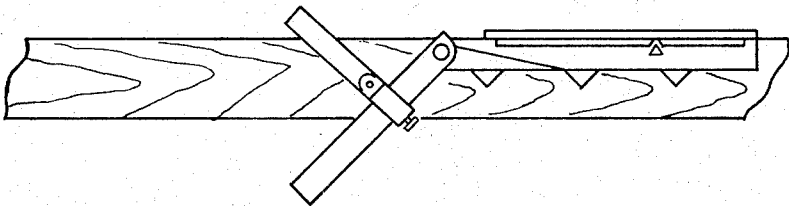


FIG. 10



CARPENTER'S TOOL

BACKGROUND OF THE INVENTION

A. Field of the Invention

This invention relates to a carpenter's tool having hinged or pivotably connected legs. More particularly, the invention relates to a carpenter's tool having sliding elements mounted on the legs of a carpenter's tool. This invention also relates to a carpenter's tool having a unique locking device enabling the user thereof to fix the tool at a desired angle easily and effectively.

B. Description of the Prior Art

Various carpenter's tools have been devised for measuring angles. Typical of these are found in the patents to Hill (U.S. Pat. No. 3,345,750) and Nelson (U.S. Pat. No. 3,154,857). These tools suffer from the disadvantages of having at least three elements required to measure a given angle and also suffered from the inability to extend an angle beyond the point joining elements of the tool. These tools also did not contain a simple locking device for fixing the legs of the device in a rigid position quickly and easily.

SUMMARY OF THE INVENTION

An adjustable carpenter's tool has now been designed having relatively few parts and having additional advantages of enabling the user to extend an angle measurement and of having a simple unique lock mechanism. The tool contains as one element a first leg member, said first leg member having two shoulders at one of its ends which form a triangular shaped slot along the longitudinal axis of this first leg member. The tool has a second leg member pivotably mounted between the two shoulders of the first leg member and is further distinguished by having a triangular shape blade element at one end attached for insertion into the slot formed by the shoulders of the first leg member. This second leg member also contains a mark observation slot running the length of the second leg member and a mark observation point placed at a convenient point along the mark observation slot. The two leg members are pivotably connected by a locking sleeve inserted through the leg members at the pivot point. This sleeve is threaded at both ends, the thread at one end being right-handed and the thread at the other end being left-handed. A spring mounted lock pin is located in the mark observation slot and runs through the side of the second leg member. A clamping screw is slidably mounted through the first and second leg members and through the locking sleeve, such that a turn of the clamping screw from either side of the tool will cause the locking sleeve to bind down on the second leg member locking the tool into a rigid position. The blade element is graduated in carpenter's measurements for determining pitches and other angle measurements. Thus, the two leg members are the only elements necessary to measure a given angle. The locking device is unique in character and requires less turning for securing the arms than art known nut and bolt binding mechanisms.

In order to extend an angle measurement beyond the joint connecting the two arms, a first sliding member is mounted perpendicular to and slidably connected to the side of the second leg member opposite from the blade element and a second sliding member is slidably connected to the side of the first leg member. These two sliding members are pivotably connected by means

of a spring pin mechanism. In this matter as will be described in more detail below, when the tool is in an acute angle position, the sliding elements will extend beyond the vertex connecting the two arms, thus enabling the user to extend the line of the angle beyond this vertex. In addition, the first sliding member described above contains an aperture to engage the lock pin spring mounted on the second leg member. The aperture is located so as to engage the spring pin at a point where both legs of the tool from a 90° angle.

The tool also contains an extension member designed to be slidably mounted on the first leg member. This extension element contains a measuring arm pivotably mounted on a bracket. The extension element may be secured against the slotted leg member by means of a screw-activated lock plate. This extension element is useful in measuring notches for steps at uniform distances and depths.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the adjustable carpenter's tool with legs in a 90° position.

FIG. 2 is a perspective view of the adjustable carpenter's tool with legs in a less than 90° position with sliding members extended.

FIG. 3 is a partial cross-sectional view of the pivot assembly. The cross-sectional view as depicted in this figure is that of A—A of FIG. 1 extended or rotated from 90° to 180°.

FIG. 4 is a cross-sectional view taken along the line B—B of FIG. 3.

FIG. 5 is an enlarged view of a position of FIG. 1 showing more detail.

FIGS. 6, 7, and 8 illustrate some of the uses of this device.

FIG. 9 is a perspective view of the extension member for this carpenter's tool.

FIG. 10 illustrates the use of the extension member in combination with the other elements of this carpenter's tool.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to FIG. 1, reference numeral 1 refers to a leg member having a slot 2 within the leg members formed by walls or shoulders 3 and 4. Slot 2, in the plane formed by leg member 1 and leg member 9 of this device, extends along the longitudinal axis of leg member 1. The slot 2 extends through leg member 1 at one end and gradually diminishes in depth as it runs along the longitudinal axis until it disappears. The extent of slot 2 is demonstrated by the dotted line shown on leg member 1. The slot is triangularly shaped as can be seen from FIG. 1 and adapted to accommodate blade 5 as will be described below.

Levelling bubbles 7 and 8 are located in leg member 1. Bubble 8 is employed when leg member 1 is used to determine whether a work piece is horizontally plumb whereas bubble 7 is used when leg member 1 is used to determine whether a work piece is vertically plumb. Temporary form nails may be driven through holes 10 which extends through leg members 1 and 9 for the purpose of affixing the carpenter's tool to a work piece.

Leg member 1 is pivotably connected to a longer second leg member 9 having a blade element 5 adapted to fit into slot 2. Blade element 5 has graduation marks 11. These graduation marks indicate pitch in carpenter's

ter's terms and are useful for example when the tool is used for measuring pitches in rafters. Leg member 9 has a mark observation slot 12 running along its longitudinal axis. Thus, when this leg member is placed against a work piece such as a piece of wood, the slot enables the user of the tool to properly determine the location of the mark where work is to be done without the necessity of lifting the tool from the wood.

Leg member 9 also has a mark observation point 13 located at a convenient distance along the leg member (usually 16 inches for stud markings) which gives the user of the tool a quick and convenient method by which to make marks a uniformly convenient distance. Also included on leg member 9 are levelling bubbles 14 and 15 which serve the same purpose as levelling bubbles 7 and 8 on leg member 1.

Attached to leg member 1 is a distance graduated sliding member 14A which is adapted to slide along grooves in leg member 1. Sliding member 14A is pivotably connected to a similar graduated sliding member 15A which is slidably connected to leg member 9. Sliding member 15A slides along grooves in leg member 9 similar to the grooves in leg member 1. Sliding members 14A and 15A are pivotably connected by a spring pin mechanism 16 for easy detachment of the two members.

Sliding member 15A differs from sliding member 14A in that it extends above and below the horizontal plane of leg member 9 and forms a perpendicular to leg member 9. Sliding member 15A is also distance graduated on the plane perpendicular to leg member 9 allowing measurement to be taken in that plane.

The primary functions of sliding members 14A and 15A are to provide a marking and measuring guide when the tool is being used to mark a work piece not in the same plane as the two legs or when the tool is being used to facilitate cutting of a work piece at a less than 90° angle as explained below. As stated above, sliding members 14A and 15A are pivotably connected by spring pin 16. When the sliding members are not needed, the spring pin is simply released disengaging its two sliding elements. These elements can then be removed completely from the tool.

FIG. 2 shows the tool with the two legs 1 and 9 at an angle of less than 90°. This position shows the grooves 17A, 18A, 19A, and 20A in which the members 14A and 15A slide.

Reference is now made to FIG. 3 for a more detailed explanation of the pivot assembly which joins legs 1 and 9. Shoulders or walls 3 and 4 of leg member 1 are adapted to overlap blade element 5 of leg member 9. Leg members 1 and 9 are pivotably connected by a locking sleeve 32 inserted through apertures in the ends of the leg members at the pivot point. Both ends of this locking sleeve are threaded. The sleeve is right-hand threaded at 17 and is interposed in shoulder 3 of leg member 1. The sleeve is left-hand threaded at 18 and is interposed in shoulder 4 of leg member 1. The remainder or middle of the sleeve which passes through blade element 5 of leg member 9 is unthreaded. The aperture in shoulder 3 of leg member 1 is right hand threaded to accommodate the right hand threaded part of the locking sleeve. The aperture in shoulder 4 of the leg number 1 is left hand threaded to accommodate the left hand threaded part of the locking sleeve. The locking sleeve is first inserted through the aperture in the end of leg 9. Shoulders 3 and 4 of leg number 1 which

have some flexibility are then fitted on the locking sleeve by spreading them and slipping the threaded aperture of the shoulders over the appropriately threaded ends of the locking sleeve. The locking sleeve is then turned in an appropriate manner to cause shoulders 3 and 4 to bind down on blade element 5 of leg number 9. An octagonal shaped lock lever 19 having a handle 20 is slidably mounted through the locking sleeve having an internal octagonal shape and the two leg members 1 and 9. Lock lever 19 moves up and down or vertically in relation to the plane of the tool and is adapted to fit into lock lever storage slots 21 and 22. In this manner, the tool may be laid flush against a work piece without interference from the lock lever. The handle 20 may be welded, screwed or otherwise attached to the lock lever.

In the operation of this pivot apparatus, the tool is placed at a desired angle as for example, the angle displayed in FIG. 2. The lock lever is then turned and the locking sleeve, because of its opposite threading, causes the shoulder elements of leg member 1 to bear down on the blade element 5 securing the legs in a rigid position. To release the tool from the locked position, the lock lever is simply turned in the opposite direction. As can be seen from FIG. 2, the lock lever can be operated from both sides of the tool.

FIG. 4 represents a cross-sectional view taken along Line B—B of FIG. 3. It shows its relationship of the left-hand threaded end of the locking sleeve with shoulder 4 and lever 19.

Referring now to FIG. 5 leaf spring 23 is attached to leg 9 by rivets 24 and 25. Attached to spring 23 is a lock pin 26 which passes through the side of leg 9. Sliding member 15A contains an aperture designed to engage lock pin 26 when the legs of the tool are at a 90° angle as depicted in FIG. 1. In this manner, the tool can be quickly opened to a 90° angle. When the tool is to be set in a position other than 90° the leaf spring is lifted disengaging lock pin 26 from the aperture in sliding member 15A.

FIGS. 6, 7, and 8 show various uses of this carpenter's tool. FIG. 6 shows the tool measuring an angle work piece which is to be cut at the same angle shown on piece Y. In this instance, a saw guide arm is run against the side of the tool cutting the desired piece of wood at the desired angle. FIGS. 7 and 8 show the carpenter's tool measuring the pitch of rafters from two different positions.

Referring now to FIG. 9 graduated extension member 27 is pivotably connected to bracket 28 by means of a wing nut 29. Screw 31 operates plate 30. This extension element is attached to leg member 1 and fastened rigidly by binding plate 30 against the leg member.

FIG. 10 indicates the use of this extension element in measuring notches at a uniform distance and size for steps. If steps of an unusual character are desired, the member 27 can be shifted to an angle other than 90° and fastened in place by the wing nut 29.

I claim:

1. An adjustable carpenter's tool comprising:

- a. a first leg member having two shoulder elements at one end forming a slot and further having a right hand threaded opening in one shoulder and a left hand threaded opening in the other shoulder, said openings adapted to receive a threaded locking sleeve;

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- b. a second leg member pivotably mounted between the shoulders of the first leg member and having a blade element adapted for insertion into the slot of the first leg member, said blade also having an unthreaded opening adapted to receive an unthreaded portion of a locking sleeve;
 - c. a locking sleeve joining the two leg members at the pivot point, said locking sleeve being right-hand threaded at one end corresponding to the right hand threaded opening in one shoulder of the first leg member and left-hand threaded at the other end corresponding to the left hand threaded opening in the other shoulder of the first leg member and unthreaded between said right-hand and left-hand threaded portions; and
 - d. a locking shaft having a lever on either end and slidably mounted through the first and second leg members and through the locking sleeve and in meshing engagement with the locking sleeve such that a turn of a lever from either side of the tool will cause the shoulder elements of the first leg member to bind against the blade element of the second leg member, locking the leg members into a rigid position.
2. An adjustable carpenter's tool as in claim 1 which contains in addition:
- a. a first sliding member slidably connected to the side of the first leg member; and
 - b. a second sliding member slidably connected to the side of the second leg member and pivotably connected to the first sliding member.

3. An adjustable carpenter's tool as in claim 2 wherein the second sliding member extends above and below the horizontal plane of the second leg member.

4. An adjustable carpenter's tool as in claim 1 wherein the second leg member contains a mark observation slot running along the longitudinal axis of said second leg member.

5. An adjustable carpenter's tool as in claim 4 wherein the second leg member contains mark observation point at a convenient point along its length.

6. An adjustable carpenter's tool as in claim 5 which contains in addition a spring-mounted lock pin located in the mark observation slot and running through the side of the second leg member and wherein the second sliding member contains an aperture to engage said spring mounted lock pin at a point where both legs of the tool form a 90° angle.

7. An adjustable carpenter's tool as in claim 6 which contains in addition levelling bubbles located in the first leg member.

8. An adjustable carpenter's tool as in claim 7 which contains in addition levelling bubbles located in the second leg member.

9. An adjustable carpenter's tool as in claim 8 wherein the two shoulders of its first leg member form a triangularly shaped slot and wherein the blade element of the second leg member is triangularly shaped.

10. An adjustable carpenter's tool as in claim 9 which contains in addition a pivotably mounted extension member slidably connected to the first leg member.

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