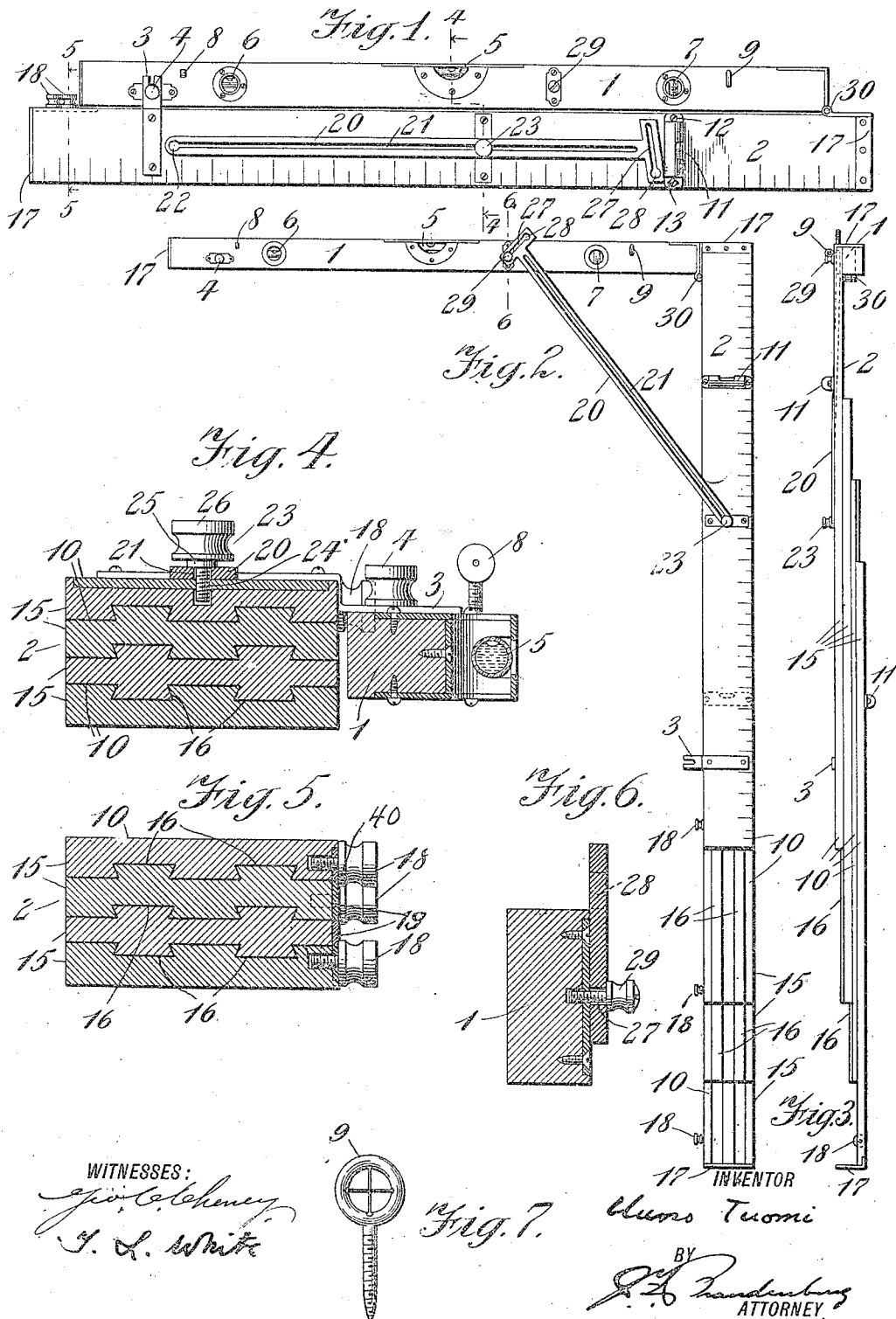


U. TUOMI.
 COMBINED CARPENTER'S TOOL,
 APPLICATION FILED APR. 28, 1909.

948,777.

Patented Feb. 8, 1910.



WITNESSES:
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Fig. 7.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, UUNO TUOMI, a subject of the Emperor of Russia, residing at Aberdeen, in the county of Brown and State of South Dakota, have invented a certain new and useful Improvement in Combined Carpenters' and Masons' Tools, of which the following is a specification.

My invention relates to a combined carpenter's and mason's tool that will possess many advantages for different purposes.

It is particularly useful in the setting of window and door casements, since it combines the capabilities of a square, a level and a plumb. It has been customary to employ the three separate tools in the operation of setting casements; performing the acts of squaring, leveling and plumbing at different times, and incurring the danger of deranging one while securing the other. With my tool the three acts may be performed practically simultaneously, lessening the possibility of error and the time and labor involved.

In the accompanying drawing, Figure 1 is a side elevation of the instrument in its most compact form, in which it is capable of being used as an ordinary carpenter's level; Fig. 2 is a side elevation showing the square opened up and the extensible vertical arm thereof partially extended; Fig. 3 is an edge or rear view corresponding to Fig. 2; Fig. 4 is a section on the line 4—4, Fig. 1, looking in the direction of the arrows; Fig. 5 is a section on the line 5—5, Fig. 1, looking in the direction of the arrows; Fig. 6 is a section on the line 6—6, Fig. 2; and Fig. 7 is a detail of the cross wires.

Describing the invention from the standpoint of a square, it may be said to consist primarily of a horizontal arm 1 and a vertical arm 2, the two being hinged at the corner of the square, as at 30, so as to be foldable together in parallelism, as shown in Fig. 1. When so folded in parallelism the arms may be secured together by a metal tongue 3 projecting from one over the surface of the other and a set screw 4 carried by such other arm and clamping the tongue thereagainst. Preferably the projecting end of the tongue 3 is bifurcated for the reception of the shank of the screw.

When folded as illustrated in Fig. 1 the whole tool constitutes a carpenter's or mason's level, by reason of small spirit levels

5, 6 and 7 mounted in the arm 1. Of these, 5 may be read from the upper and side faces of arm 1, and 6 and 7 are set at right angles to each other and may be read from the side faces of the arm when the tool is laid flat. A line of greater length than the tool may be leveled by means of two sights carried by the arm 1, a rear peep sight 8 and a forward sight 9 carrying cross-wires. The tool resting horizontally and the end of the line to be leveled being suitably marked, when this mark or point is caught through the peep sight on the junction of the cross-wires the user of the instrument knows that the line is both level and straight.

One of the important features of the invention is the extensibility of the vertical arm 2, which consists of a plurality of slidable sections 10. The importance of this construction is not only that, in the squaring operation, the vertical arm extends for substantially the full length of the door or window casement, but also that the arm may serve simultaneously as a plumb. To this end small levels 11 are attached to two of the more remote of the sections 10, preferably to the uppermost and the lowermost sections. These levels being disposed parallel to the arm 1, when the square is unfolded as shown in Fig. 2, it is obvious that they will indicate whether the side of the casement is plumb or not. The most desirable manner of mounting these levels 11 is transversely of the outer side faces of the uppermost and lowermost sections 10, as shown. If desirable, the levels may be rendered angularly adjustable, as by securing their metal casings pivotally at one end, as at 12, and by slotted connection at the other end, as at 13. While these levels, and the levels 5, 6 and 7 are shown for purposes of illustration as spirit levels, it will be obvious that they need not be of this type.

The several sections 10 are arranged with their side faces in slidable relation and their rear faces 15 in the same plane, these rear faces together constituting the rear face of the arm 2. Preferably the sections 10 are in the nature of comparatively thin strips, and their contiguous side faces are provided with interengaging dovetail slideways 16. However, other means of slidably connecting the sections might be utilized. While the sections are shown as only partly extended in the drawing, it will be understood that they may be extended until the arm 2 is of

a length substantially the sum of the lengths of the several sections.

It will be observed that the hinge 30 is secured to the uppermost section 10, leaving the other sections free to slide. Preferably, the uppermost and lowermost sections 10 are provided at their upper and lower ends, respectively, with oppositely laterally projecting cap plates 17, against which the upper and lower ends, respectively, of the several sections 10 abut when the arm 2 is shut. Various means may be employed for holding the sections 10 in closed or desired adjusted relation. Simple and desirable instrumentalities are set screws or set nuts 18 mounted on the front faces of the sections, each screw or nut being adapted to clamp down upon the face of a section adjacent to that upon which it is mounted. Regarding any one of the devices 18, it will be seen that the portion 40 of the enlarged head thereof overlaps the surface of a section 10 adjacent to that section into which the particular device 18 is screwed. This overlapping portion 40 bears forcibly upon the underlying surface, thus holding the two sections together in the desired relation by a frictional lock. As indicated, the head of a device 18 may overlap the two sections at opposite sides of the section into which the device is screwed. To release the sections all that is necessary is to loosen the devices 18. When they are screwed down again they bear frictionally upon the faces of adjacent sections 10. It will be seen that by loosening one or more of the devices 18 and leaving the remainder tight, certain of the sections 10 may be clamped together and other sections permitted to slide on each other. If the sections be made of wood, it is desirable to protect the portions of their front faces clamped by the members 18, when the sections are closed, with inserted metal plates 19.

There remains to be described the preferred means for holding the arms 1 and 2 in their opened relation, that is, at right angles to each other. This preferred means constitutes a brace 20 adapted to be secured to the two arms extending diagonally therebetween. This brace 20 is provided longitudinally with a slot 21, one end of which, 22, is circularly enlarged. When the tool is in the compact form illustrated in Fig. 1, the brace 20 is held longitudinally against the outer side face of the uppermost section 10 by a set screw 23, whose threaded shank 24 is received in the slot 21 and which clamps down upon the brace by reason of a circular enlargement 25 the diameter of which is greater than the width of the slot. This enlargement 25 fits within the circular enlargement 22 at the end of the slot, when the square is opened as shown in Fig. 2, thus insuring that the brace will not slip endwise, irrespective of the clamping action

of the head 26 upon the brace. The advantage of rendering the slot 21 and the circular socket 22 continuous with each other is that the brace 20 may be shifted from the position shown in Fig. 1 to that shown in Fig. 2 without taking the screw 23 entirely out. First, the screw is loosened slightly, and the brace is then slid along the shank 24 until the enlargement 22 is under the enlargement 25, when the screw is tightened again, this time seating the enlargement 25 in the socket 22. The other end of the brace is provided with a transverse slot 27, provided toward one end with an enlargement 28. This enlargement is proportioned to take over the head of a set screw 29 mounted on the side face of the arm 1, the head of this screw being of greater diameter than the width of the slot 27 and its threaded shank being adapted to be received therein. Consequently, in connecting the brace 20 to the arm 1, the screw 29 is raised, the enlargement 28 is passed over the head thereof, the brace is then swung to position the head of the screw over the slot 27, and the screw is then tightened against the brace. Thus, it is not necessary to remove the screw 29 for the purposes of securing the brace to or disconnecting the same from the arm 1. Preferably, the slot 27 is formed slightly eccentric with reference to the screw 23 as a pivot, so that delicate adjustment of the angle between the arms may be secured by shifting the slot with reference to the screw 29. This feature is of value for the purpose of insuring that the square is true. It will be clear that the presence of the levels on the two arms will make it possible to determine whether the arms are truly perpendicular to each other or not. In this connection I wish to observe that I regard it as new broadly and irrespective of details to provide a square having its two arms hinged to fold together, levels carried by the two arms disposed parallel to the plane of the square, and adjustable brace connection between the arms. The tool may be used also as an angle finder, by the simple operation of setting the screw 23 in the slot 21, the screw 29 being in the slot 27, when the arms may be swung to any angle desired or to be measured and the screw 23 tightened. In this connection the face of the brace 20 might be graduated, as will be obvious. Besides the uses outlined, the tool will have many other capabilities.

What I claim as new is:—

1. A carpenter's or mason's tool, comprising a square the arms of which are hinged at the corner to fold together, one arm carrying a level disposed longitudinally thereof and also carrying aligned sights, and the other arm carrying a level disposed transversely thereof and parallel to the plane of the square, the last-mentioned arm being extensible consisting of a plurality of super-

posed sections slidable longitudinally upon each other and having their rear faces in the same plane.

5 2. A carpenter's or mason's tool comprising a square the arms of which are hinged to fold together, and a diagonal brace having a longitudinal slot provided with a socket enlargement adjacent one end of the
10 brace, a screw clamp mounted on one of the arms for connecting the brace thereto, said clamp having a shank adapted to be received in said slot, an enlarged head, and an intermediate enlargement of greater diameter
15 than the width of the slot but of smaller diameter than the head, said intermediate enlargement being proportioned to be received in said socket enlargement of the slot, together with means for removably securing
20 the brace to the other arm when the square is open.

3. A carpenter's or mason's tool, comprising a square the arms of which are hinged at the corner to fold together, one arm carrying a level disposed longitudinally and visible from the side thereof, and the other arm
25 being extensible, consisting of a plurality of superposed sections, having their rear faces in the same plane, slidable longitudinally upon each other by reason of interlocking guide ridges and grooves, the two
30 outer and remote sections carrying levels disposed transversely thereof and parallel to the plane of the square, and a brace adapted to sustain said arms in their opened position
35 and to effect fine angular adjustment thereof.

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