Feb. 5, 1952 B. FRAZIER 2,584,568

COMBINATION TOOL

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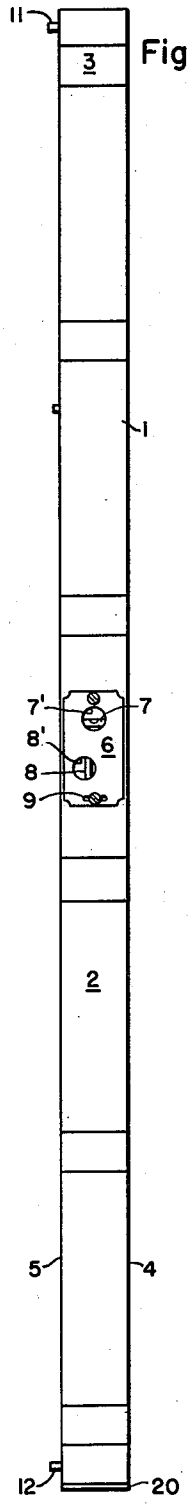


Fig. 1.

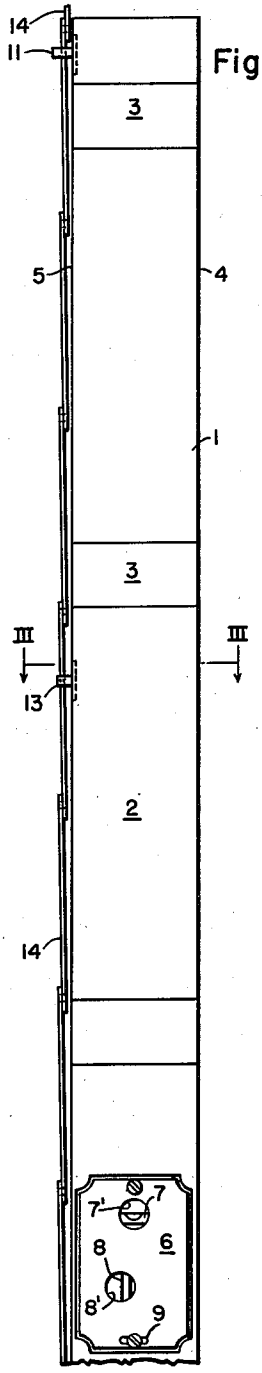


Fig. 2.

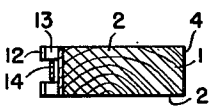


Fig. 3.

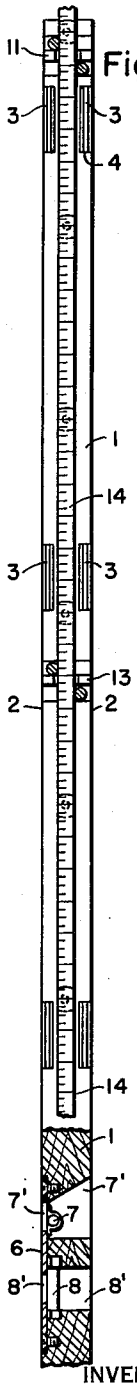


Fig. 4.

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COMBINATION TOOL

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10 Claims. (Cl. 33—74)

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My invention relates to a 4-in-1 tool, which may be used as a straight edge, a plumb rule, a level, and an engineer's (or surveyor's) rod, or any part or parts thereof.

More particularly, my invention relates to such a tool, made of an impregnated softwood, such as ponderosa, redwood or cypress, the impregnating material being linseed oil or other wood-preservative or toxic-treatment material. A softwood is preferred, because hardwoods twist or warp in outdoor moisture-conditions; while metal, in a tool of this sort, is likely to break in cold weather in ordinary use, and is almost certain to break when dropped off of a building, in any weather. My impregnating material makes my softwood tool moisture-resistant, and I have devised a system of inserts for resisting lateral twisting or warping, as will be described.

I prefer to make my combined tool 6 feet, 6 inches long, or not much shorter than that. This length is chosen so that the tool will stand up, as a plumb rule, underneath doorjambs, which are 6 feet, 6½ inches or 6 feet, 8½ inches in height. Such a tool is long enough to plumb up buildings, and short enough to carry in an automobile.

My tool may be used as an engineer's or surveyor's rod, by turning it with its plumb-rule edge facing the surveyor's transit, so that its plumb vial will enable it to be plumbed fore and aft, while the transitman can give directions for plumbing it, with his instrument, in the sidewise direction. This is quite an advantage, as it avoids the disadvantage of having to tilt the engineer's rod back and forth to find the true vertical position, meanwhile working the bottom of the rod further in the ground, under most ground-conditions.

With the foregoing and other objects in view, my invention consists in the combinations, structures, parts, and methods of design and operation, hereinafter described and claimed, and illustrated in the accompanying drawing wherein,

Figure 1 is a vertical side-elevation of my tool, standing as a plumb rule,

Fig. 2 is a similar view, on a larger scale, showing the top portion of the tool, showing the use of the tool with a folding rule to make it an engineer's or surveyor's rod.

Fig. 3 is a cross-sectional view on the line III—III of Fig. 2, and

Fig. 4 is an edge-view of the parts shown in Fig. 2.

An illustrative embodiment of my invention is

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shown in the drawing, in the form which I now prefer. My combined tool is shown as being an elongated wooden board or beam 1, which is 6½ feet long, having any convenient cross-section such as 1¼ inches by 3⅝ inches. It is preferably made of ponderosa, redwood, cypress, or other softwood, treated with linseed oil or other wood-preservative or toxic-treatment material to fill the pores and make it water-repellant.

Extending across each of the flat sides 2 of the board, are a plurality of inserts 3 of warp-resistant material such as "Wildwood," which is a 3-ply plywood. These inserts 3 are placed in slots 4 which are cut straight across the flat sides 2 of the board. The inserts are firmly nailed and glued in place, so as to lie flush with the face of the board 1. The thickness of the inserts 3 is $\frac{3}{16}$ inch, or other small thickness which is considerably less than the thickness of the board, so as not to spoil the essential continuity of the longitudinally extending wood fibers of the board, which are necessary to give the board strength. The inserts are 2 inches wide, or other small width (measured longitudinally of the board 1), not wide enough to spoil the straight edge 4 or the plumb-rule edge 5 of the board 1. Thus the edges 4 and 5 are provided mainly by the longitudinally extending fibers of the wooden board 1, which provide much straighter and smoother edges than plywood, because of the cross-graining of a part or parts of the plywood-layers. The inserts 3 may be spaced 15 inches apart between centers (measured longitudinally of the board 1), or any other convenient spacing, say between 7 and 20 inches apart. They serve to prevent lateral twisting or warping of the board 1, thus preserving the straightness of the edges 4 and 5. The end-inserts 3 should be close to the ends of the board, to stop splitting.

At a convenient intermediate point in the board 1, there is inset a plate 6, flush with one of the flat sides 2, carrying a plumb vial 7 and a level vial 8, with observation-holes 7' and 8' for these vials, so that they can be seen from one or both of the flat sides 2 of the board. Preferably, provision is made for an adjustment or resetting of the vials 7 and 8, as by means of a screw-receiving slot 9, so that the vials may be reset in case the tool should be dropped from a considerable height.

The plumb-rule edge 5 of the board is preferably provided with two plumb-rule protuberances 11 and 12, which stand out equal distances

from this edge 5 of the board, one near each end of the board.

In order to adapt my tool for use as an engineer's or surveyor's rod, I provide, on the plumb-rule edge 5, an intermediately disposed guide-protuberance 13 which stands out a shorter distance from this edge 5 of the board, than the plumb-rule protuberances, so as not to interfere with the use of the device as a plumb rule. This guide-protuberance 13, and at least the top one (and preferably both) of the plumb-rule protuberances 11 and 12, are two-pronged, as shown, with the prongs separated by a space of ¾ inch, suitable for receiving an ordinary folding or zigzag rule 14, of the usual ⅝ inch width. The guide-protuberance 13 is disposed at a convenient eye-level, such as 57 inches from the bottom of the tool, so that the rule 14 may be set between the guiding prongs of the two top protuberances 13 and 11, with any preselected intermediate mark on the rule set on the eye-level protuberance 13, such as the 33 or 34-inch mark on the rule. The rule then extends up above the top of the board 1, and can be sighted in a surveyor's transit (not shown), for use in surveying or ground-leveling operations. The transitman, with his instrument (not shown), can give directions for keeping the engineer's rod vertical in the side-to-side direction, while the rodman, with his plumb vial 7, can keep the rod vertical in the fore-and-aft direction, as previously explained. The rule 14 can be held against the edge 5 of the board, at the proper height, by the hand of the rodman; or a rubber band (not shown) may be used for this purpose, or any more elaborate spring-clip means (not shown).

It is believed that the uses and advantages of my invention will be clear from the foregoing explanations of its construction and objects. It will be understood that the precise illustrative structures and measurements are subject to considerable variation. In general, I prefer that the board should be exactly 6½ feet long, so as to stand under a door-jamb, although a 6-foot length would also be serviceable, and probably also a 5½ foot length or even a 5-foot length. It should be long enough to be convenient for plumbing up buildings, and also long enough to keep a suitable spacing between the two rule-guiding protuberances 13 and 11 without getting the lower rule-guiding protuberance 13 too low for the rodman to be able to set the rule at its proper position or height, without having to stoop in order to read the rule at this point. The preferred length is also suitable for using the straight edge 4 as the bottom edge of a level, in building-construction.

The bottom edge of the board, when standing upright, is preferably provided with a buck-plate 20.

I claim as my invention:

1. A combination straight edge, plumb rule and engineer's rod of the order of 5½ to 6½ feet in length, comprising an elongated wooden board having a plurality of inserts of warp-resistant material extending across each flat side, with longitudinal spacings of the order of 7 to 20 inches between centers of the inserts, the thickness of each insert being considerably less than the thickness of the board, said board further having a plumb vial inset therein, with an observation hole for the vial in at least one of the flat sides, one of the edges being a straight edge, and the other edge having two plumb-rule protuberances thereon, one near each end, and an intermediate guide-protuberance at a convenient eye-level, the two plumb-rule protuberances standing out further from said plumb-rule edge than said guide-protuberance, and said guide-protuberance and the top plumb-rule protuberance being two-pronged, with the prongs separated by a space suitable for receiving a folding rule.

2. A board as defined in claim 1, characterized by the inserts being of plywood.

3. A board as defined in claim 1, characterized by the board being made of an impregnated softwood, the impregnating material being a wood-preservative.

4. A board as defined in claim 1, characterized by the board being made of an impregnated softwood, the impregnating material being a wood-preservative, and the inserts being of plywood.

5. A combination straight edge, plumb rule, level and engineer's rod of the order of 6 to 6½ feet in length, comprising an elongated wooden board having a plurality of inserts of warp-resistant material extending across each flat side, with longitudinal spacings of the order of 7 to 20 inches between centers of the inserts, the thickness of each insert being considerably less than the thickness of the board, said board further having plumb and level vials inset therein, with at least one observation hole for the vials in at least one of the flat sides, one of the edges being a straight edge, and the other edge having two plumb-rule protuberances thereon, one near each end, and an intermediate guide-protuberance at a convenient eye-level, the two plumb-rule protuberances standing out further from said plumb-rule edge than said guide-protuberance, and said guide-protuberance and the top plumb-rule protuberance being two-pronged, with the prongs separated by a space suitable for receiving a folding rule.

6. A board as defined in claim 5, characterized by the inserts being of plywood.

7. A board as defined in claim 5, characterized by the board being made of an impregnated softwood, the impregnating material being a wood-preservative.

8. A board as defined in claim 5, characterized by the board being made of an impregnated softwood, the impregnating material being a wood-preservative, and the inserts being of plywood.

9. A combination straight edge, plumb rule and engineer's rod of the order of 5½ to 6½ feet in length, having a plumb vial inset therein, with an observation hole for the vial in at least one of the flat sides, one of the edges being a straight edge, and the other edge having two plumb-rule protuberances thereon, one near each end, and an intermediate guide-protuberance at a convenient eye-level, the two plumb-rule protuberances standing out further from said plumb-rule edge than said guide-protuberance, and said guide-protuberance and the top plumb-rule protuberance being two-pronged, with the prongs separated by a space suitable for receiving a folding rule.

10. A combination straight edge, plumb rule, level and engineer's rod of the order of 6 to 6½ feet in length, having plumb and level vials inset therein, with at least one observation hole for the vials in at least one of the flat sides, one of the edges being a straight edge, and the other edge having two plumb-rule protuberances thereon, one near each end, and an intermediate guide-protuberance at a convenient eye-level, the two plumb-rule protuberances standing out further

from said plumb-rule edge than said guide-protuberance, and said guide-protuberance and the top plumb-rule protuberance being two-pronged, with the prongs separated by a space suitable for receiving a folding rule.

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