Oct. 13, 1931. L. D. JANNELL 1,827,014

BEVEL PROTRACTOR FOR RAFTERS

Filed April 27, 1928

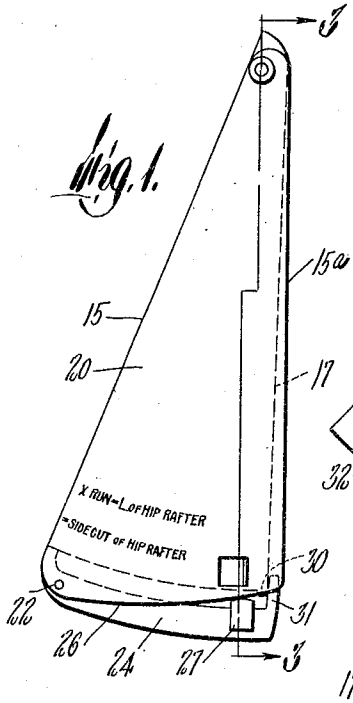


Fig. 1.

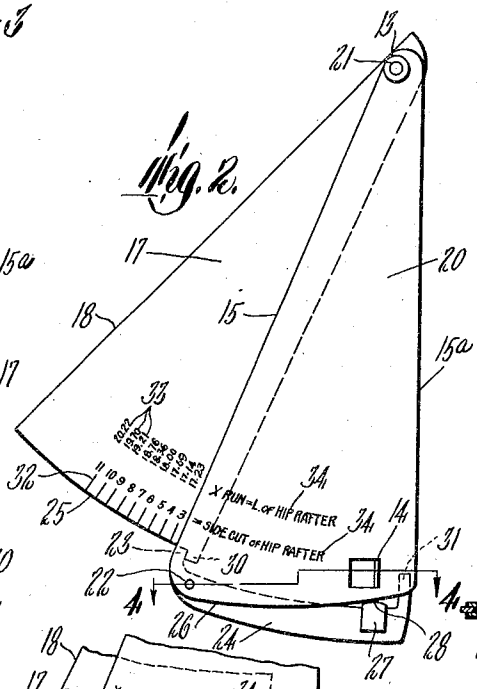


Fig. 2.

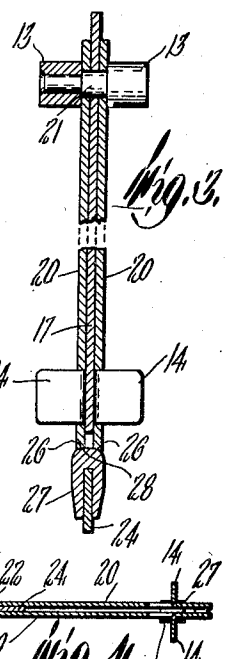


Fig. 3.



Fig. 4.

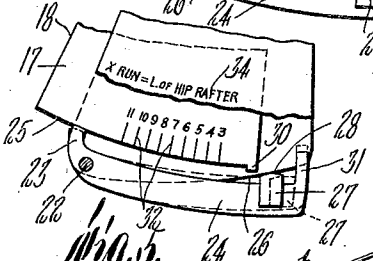


Fig. 5.

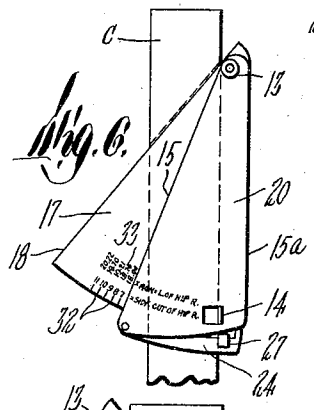


Fig. 6.

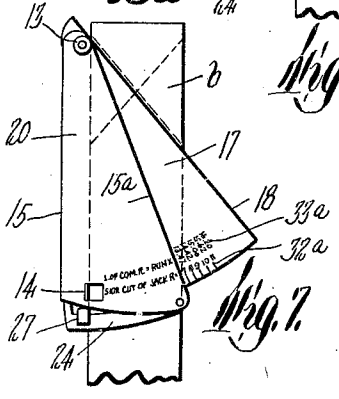


Fig. 7.

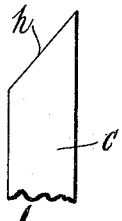


Fig. 8.

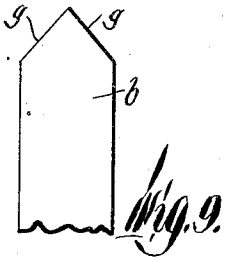


Fig. 9.

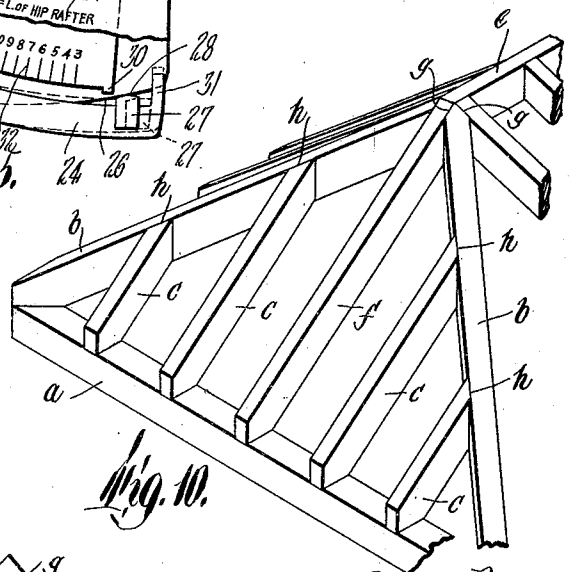


Fig. 10.

Inventor:
Leslie D. Jannell,
by Wright Brown Quinby & May
Attys.

Patented Oct. 13, 1931 1,827,014

UNITED STATES PATENT OFFICE

LESLIE D. JANNELL, OF SHERBORN, MASSACHUSETTS

BEVEL PROTRACTOR FOR RAFTERS

Application filed April 27, 1928. Serial No. 273,230.

The object of this invention is to provide a protractor whereby a carpenter may quickly and accurately mark a hip rafter and a jack rafter to guide a saw in forming a one-faced or single beveled end on a jack rafter, and a two-faced or double beveled V-shaped end on a hip rafter.

I attain this and other related objects, by the improved construction hereinafter described and claimed.

Of the accompanying drawings forming a part of this specification,

Figure 1 is a side view, showing a protractor embodying the invention, in a folded inoperative condition.

Figure 2 is a side view, showing the protractor in an operative condititon, the protractor arm being partially projected from the holder.

Figure 3 is an enlarged fragmentary sectional view, on line 3—3 of Figure 1, portions of the holder and arm being broken away.

Figure 4 is a section on line 4—4 of Figure 2.

Figure 5 is a fragmentary side view similar to a portion of Figure 2, showing a different position of the protractor arm, a portion of the holder being broken away.

Figure 6 shows a portion of a jack rafter and the protractor applied thereto.

Figure 7 shows a portion of a hip rafter and the protractor applied thereto.

Figure 8 shows a portion of the jack rafter; and

Figure 9 a portion of the hip rafter after the ends of said rafters have been beveled.

Figure 10 shows in perspective, a portion of the framing of a hip roof, which includes hip rafters and jack rafters.

The same reference characters indicate the same parts in all of the figures.

a designates the plate, *b* hip rafters, *c* jack rafters, and *e* the ridge pole of a hip roof, *f* designates a central rafter extending from the plate *a* to the ridge pole, between two groups of jack rafters *c*. The upper end of each hip rafter *b* is provided with two beveled faces *g*, forming a V-shaped end. The upper end of each jack rafter is provided with a single beveled face *h*, all in accordance with common practice.

My improved protractor is intended and adapted only to enable a carpenter to form suitable marks on the edge face of the rafters *b* and *c*, to guide the saw which forms the faces *g g* on a hip rafter, and the face *h* on a jack rafter, the transverse bevel of said faces crosswise of the rafter being determined by said marks. The vertical bevel from the upper to the lower edge of the rafter may be determined by marks formed, as usual, by the aid of another instrument, such as a carpenter's square.

The protractor includes an oblong holder and a protractor arm pivoted to one end of the holder, the latter being flat-sided and adapted to be laid on an edge face of a rafter, as indicated by Figures 6 and 7. The holder is provided with spaced apart laterally projecting stops 13 and 14, arranged to bear on a side face of the rafter and with a longitudinal edge face 15, obliquely arranged relative to the stops, the arrangement being such that when the stops bear on the side face of the rafter, the edge face 15 extends diagonally entirely across the edge face of the rafter, as shown by Figures 6 and 7.

17 designates the protractor arm, which is oblong, and is pivoted at one end to one end of the holder, and adapted to swing in a plane parallel with the holder. The arm is provided with a marker-guiding longitudinal straight edge 18, adapted to extend diagonally entirely across the edge face of the rafter, at an angle determined by a swinging adjustment of the arm relative to the holder.

The protractor includes means for locking the arm 17 to the holder in any position to which the arm is adjustable, so that the straight edge 18 may be adjusted at various angles, as indicated by Figures 2 and 5.

I will now describe in detail the preferred construction of the holder, the protractor arm, and the arm-locking means.

The holder comprises a pair of flat oblong plates 20, and studs 21 and 22 (shown respectively by Figures 3 and 4), rigidly connecting said plates at their opposite ends, and spacing them apart. The stud 21 is a

pivot on which the protractor arm 17 is adapted to swing between the holder plates, and is provided with extensions projecting from opposite sides of the holder, each extension constituting a lateral stop 13, above described, there being two stops 13, as shown by Figure 3.

The stud 22 is a locking lever pivot or fulcrum on which is fulcrumed a locking lever of bell-crank form, including a shorter arm 23, and a longer arm 24.

The protractor arm 17 is provided at its free end with an arcuate transverse edge 25, concentric with the pivot stud 21. The holder plates 20 project from the edge 25, and are provided with arcuate edges 26, eccentric to the pivot stud 21. The longer arm 24 of the locking lever extends lengthwise of the eccentric edges 26, and is provided with a forked slide 27, having a gripping face 28, bearing on the edges 26, as shown by Figure 3.

The arrangement is such that when the slide 27 is in the dotted line position, shown by Figure 5, the locking lever is loose and inoperative, and when the slide is moved to the full line position, its gripping face 28 cooperates with the eccentric edges 26 in pressing the shorter arm 23 of the locking lever against the arcuate edge 25 of the protractor arm, and thereby locking the protractor arm to the holder.

The above described lateral stops 14 are ears integral with the holder plates 20 and bent outwardly therefrom, as shown by Figures 3 and 4.

It will now be seen that the protractor is adapted to be applied to a rafter with either side outward. The straight edge 18 of the protractor arm may face to the left, as shown by Figure 6, and guide a marker in forming a mark indicating the cut which forms the beveled end face *h* (Figure 8).

In marking a hip rafter the protractor is first applied with one side outward, while the straight edge is guiding a marker in forming a mark indicating the cut which forms one of the beveled end faces *g* (Figure 9), and with the other side outward while the straight edge is guiding a marker in forming a mark indicating the cut which forms the other beveled end face *g*.

The arcuate edge 25 of the protractor arm is provided with a projection 30, constituting a stop member adapted to limit the swinging movements of the arm, said member abutting the shorter arm 23 of the lever, when the protractor arm is swung to the position shown by Figure 2, and a stop member 31 on the longer lever arm when the protractor arm is swung to the position shown by Figure 1.

The sides of the protractor arm 17 may be inscribed in any suitable way, to enable a carpenter to adjust the straight edge 18 to the angle required by the length and rise of the rafter.

In this instance, the swinging end portion of the protractor arm is provided on each side with a row of serially numbered graduations 32, which are numbered as 3, 4, 5, 6, 7, etc., each number denoting the rise in inches of the rafters *b*, *c* and *f* to each foot of run of the plate *a*, the run being half the length of the plate, and the graduations being so spaced that when any one of them is brought into registry with the edge face 15 of the holder, the edge 18 of the protractor arm will be in the proper relation to the stops 13 and 14 to give the proper angle for the side-cuts of the jack, hip, and valley rafters associated with the particular graduation brought into registry. One side of the protractor arm is further provided with a row of graduations 33, in cooperative relation to the graduations 32, any particular graduation 33 in line with the edge face 15 of the holder in a given setting for angle of side cut corresponding to the length of hip rafters *b* per foot of run.

The other side of the protractor arm is shown in Figure 7, with a row of graduations 33*a*, similar to the graduations 33, in cooperative relation to a row of graduations 32*a*, similar to the row 32, the graduations 33*a* in line with an opposite edge face 15*a* of the holder in a given setting for angle of side-cut, corresponding to the length of the central rafter *f* and of the jack rafters *c* per unit of run.

The holder plates 20 and protractor arm are preferably of the approximately triangular form shown by Figures 1, 2, 6 and 7, the longitudinal edges of each diverging from the end where the pivot stud 21 is located, and the length of the transverse arcuate edges being considerably shorter than the diverging edges. The instrument thus formed may be proportioned to be conveniently carried in a pocket.

I claim:

1. A bevel protractor for rafters, comprising a flat-sided oblong holder, having spaced apart laterally projecting stops arranged to bear on a side face of a rafter and locate the holder on an edge face thereof, with one of its longitudinal edges extending diagonally across said edge face, an oblong protractor arm pivoted at one end to the holder to swing in a plane parallel therewith, and having a marker-guiding longitudinal straight edge, adapted to extend diagonally across the edge face of the rafter at an angle determined by a swinging adjustment of the arm, and means for locking the protractor arm to the holder in any position to which said arm is adjustable, the arrangement being such that the edge face of a jack rafter may be provided with a mark to guide a saw in forming a one-faced beveled end thereon, and the edge face of a hip rafter may be pro-

vided with marks to guide a saw in forming a two-faced or V-shaped beveled end.

2. A bevel protractor as specified by claim 1, the holder comprising a pair of flat oblong plates, and studs rigidly connecting said plates at their opposite ends and spacing the plates apart, one of the studs being a pivot on which the protractor arm is adapted to swing between the plates, the stops projecting from opposite sides of the holder, so that the protractor may be applied to a rafter with either side outward.

3. A bevel protractor as specified by claim 1, the holder comprising a pair of flat oblong plates, and studs rigidly connecting said plates at their opposite ends and spacing the plates apart, one of the studs being a pivot on which the protractor arm is adapted to swing between the plates, and the other stud being a locking lever pivot, the holder plates having transverse arcuate edges which are eccentric to the protractor arm pivot, the protractor arm having a transverse arcuate edge concentic with said pivot, the protractor arm locking means comprising a locking lever fulcrumed on the lever pivot and including a shorter arm arranged to bear on the arcuate edge of the protractor arm, and a longer arm extending lengthwise of the eccentric edges of the holder plates, and a shoe slidable on the longer arm and having a gripping face adapted to cooperate with said eccentric edges in pressing the shorter arm against the concentric edge of the protractor arm, and thereby locking the latter to the holder in any position to which it is movable.

4. A bevel protractor for rafters, comprising a comparatively thin holder having a straight edge and internally recessed inwardly from said edge to receive and enclose a protractor arm, fixed stops on said holder arranged to bear on a side face of a rafter, a swingable protractor arm having a straight edge swingably secured to said holder and movable into and out of the recess of said holder, there being graduations on the protractor arm denoting the rise of the rafter to each foot of run, said graduations being so arranged that when any one of them is brought into registry with the straight edge of the holder, the straight edge of the protractor arm will be in proper relation to the stops to give the proper angle for the side-cuts of the rafters.

5. A bevel protractor for rafters, comprising a comparatively thin holder having a straight edge and internally recessed inwardly from said edge to receive and enclose a protractor arm, fixed stops on said holder arranged to bear on a side face of a rafter, a swingable protractor arm having a straight edge swingably secured to said holder and movable into and out of the recess of said holder, there being graduations on the protractor arm denoting the rise of the rafter to each foot of run, said graduations being so arranged that when any one of them is brought into registry with the straight edge of the holder, the edge of the protractor arm will be in proper relation to the stops to give the proper angle for the side-cuts of the rafters, and another row of graduations on said protractor arm in cooperative relation to the first-mentioned graduations, the particular graduation of said row in line with the straight edge of the holder in a given setting for angle of side-cut, corresponding to the length of rafter per unit of run.

In testimony whereof I have affixed my signature.

LESLIE D. JANNELL.