

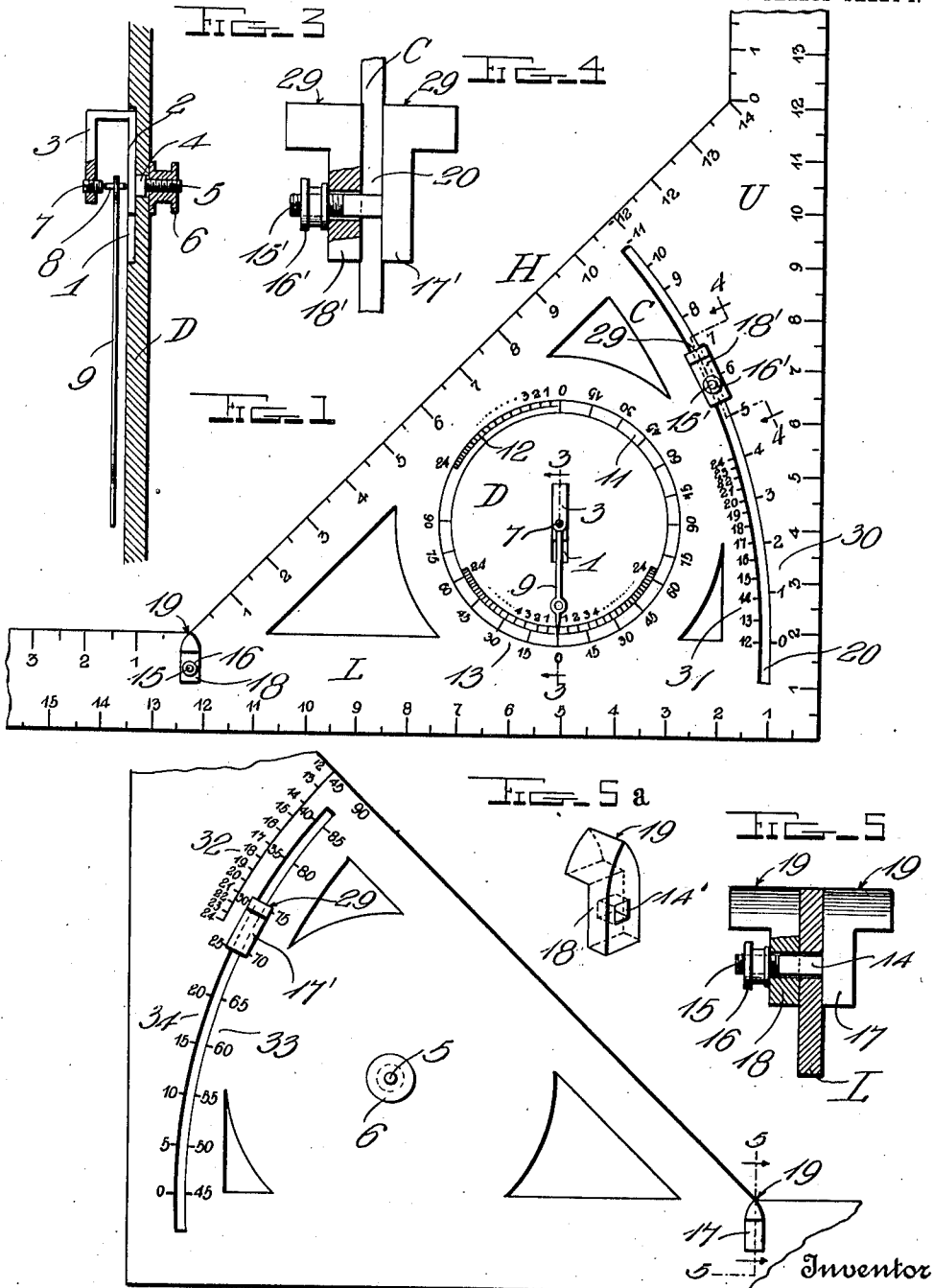
C. M. MILLER.
PITCH BOARD.

APPLICATION FILED AUG. 21, 1911.

1,035,379.

Patented Aug. 13, 1912.

2 SHEETS-SHEET 1.



Witnesses
C. C. Campbell

N. L. Hollamer

by

H. B. Wilson & Co.
Attorneys

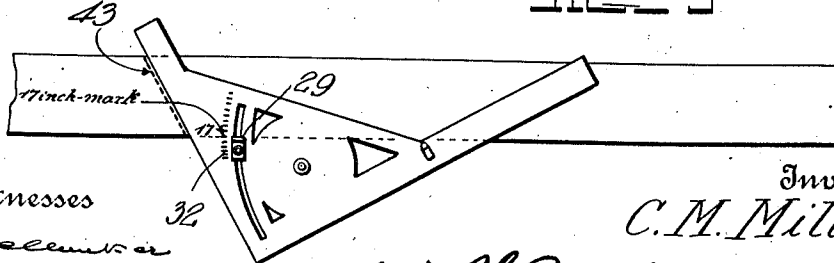
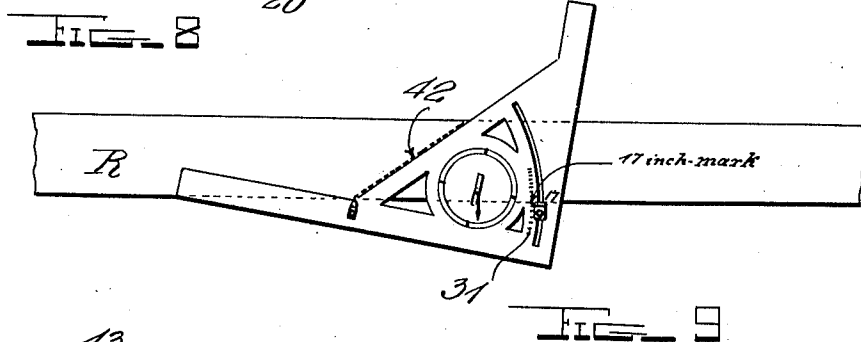
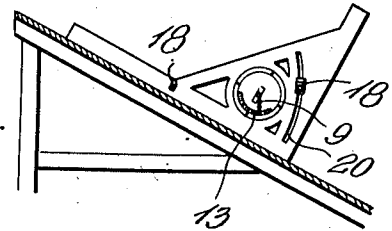
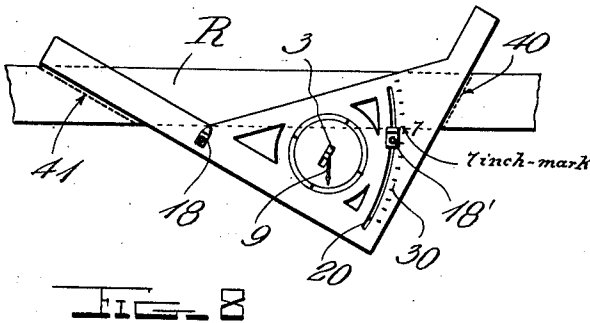
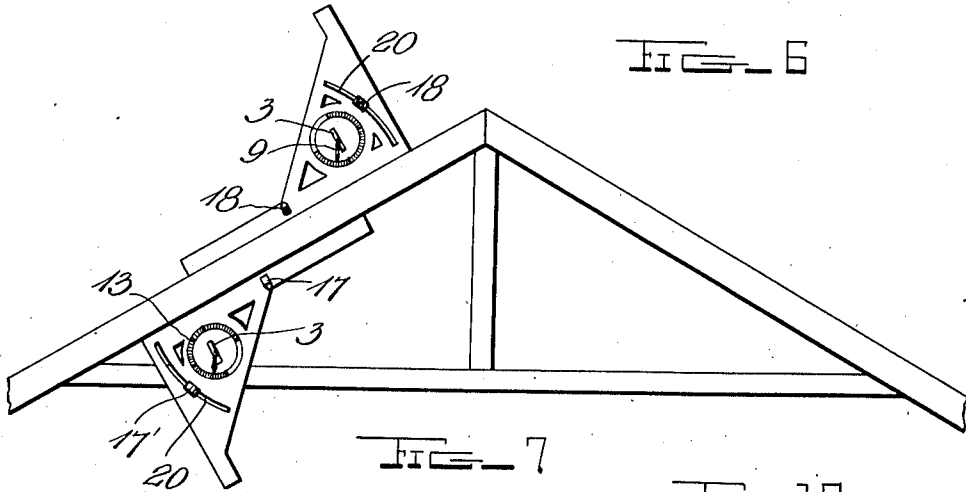
C. M. Miller

Inventor

C. M. MILLER.
PITCH BOARD.
APPLICATION FILED AUG. 21, 1911.

1,035,379.

Patented Aug. 13, 1912.
2 SHEETS—SHEET 2.



Witnesses

E. C. Cramer

A. L. Cramer

Inventor

C. M. Miller

by H. B. Wilson & Co

Attorneys

UNITED STATES PATENT OFFICE.

CLARENCE M. MILLER, OF MOUNT PLEASANT, IOWA.

PITCH-BOARD.

1,035,379.

Specification of Letters Patent.

Patented Aug. 13, 1912.

Application filed August 21, 1911. Serial No. 645,225.

To all whom it may concern:

Be it known that I, CLARENCE M. MILLER, citizen of the United States; residing at Mount Pleasant, in the county of Henry and State of Iowa, have invented certain new and useful Improvements in Pitch-Boards; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to measuring instruments, and more especially to pitch boards; and the object of the same is to produce an instrument more particularly adapted for indicating the angle on which both the upper and lower ends of a rafter must be cut, whatever the pitch of the roof, this instrument indicating the latter both in degrees and in inches per foot and being capable of doing so whether it is applied to the upper or lower side of the rafter. This and other objects are accomplished by the construction hereinafter more fully described and claimed, and as shown in the accompanying drawings wherein—

Figure 1 is a side elevation of this instrument with its pendulum indicating that one arm is horizontal and the other arm is vertical; Fig. 2 is a rear elevation or reverse view of the parts standing the same as in Fig. 1; Figs. 3 and 4 are sections on the lines 3—3 and 4—4 respectively of Fig. 1; Fig. 5 is a section on the line 5—5 of Fig. 2; Figs. 6 to 10 inclusive are diagrammatic plan views showing the uses of this instrument and which will be referred to hereinafter. Fig. 5* is a perspective detail of one of the centering members.

The body of this improved instrument is by preference made of metal, properly treated to prevent rust and shaped like an ordinary square, and it includes the lower or horizontal arm L, the upright or vertical arm U, and the oblique arm or hypotenuse H standing at 45° to the other arms. Within the triangle formed by these three arms is by preference disposed a curved arm C and a disk D forming part of the dial hereinafter referred to, and by preference the entire square and all these parts thereof are formed of one piece of material although it could be made in members if desired. I might here state that the outer edges of the two arms L and U, and even

the edges of the hypotenuse H, may be provided with graduations on the plan of feet and inches, the metric system, or otherwise, so that the instrument may be used for measuring purposes if desired. The size, material, and details of construction of this character form no essential feature of the present invention which will be described below.

I utilize the disk D for supporting a pendulum specially mounted and moving over a special dial so that I may employ this instrument for instantaneously finding the pitch or inclination of any member, such as a roof, and this portion of my invention indicates said pitch in degrees and in inches per foot. Referring now more especially to Fig. 3, the disk D is shown as provided with an upright groove 1 in its face, in which rests the inner arm 2 of a U-shaped bracket 3 having a squared lug 4 from which a threaded stud 5 projects to the rear through the disk and receives a nut 6, and the front arm of said bracket 3 has a threaded opening for the reception of a set screw 7. The inner end of this screw and the outer face of said arm 2 are provided with conical sockets in which are pivotally mounted the conical extremities of a stub shaft 8 which is fixed through the upper end of a pendulum 9. The latter is therefore and thereby suspended by means of this bracket in such manner that it hangs by gravity in a plane parallel with the face of the disk D and can swing around the axis of said shaft 8 for almost a complete revolution. Ordinarily this device is used as shown at the top of Fig. 6 to ascertain the pitch of a roof or the slope of any inclined member, but occasionally it may be necessary to use it as shown at the bottom of Fig. 6 where access is only to be had to the under side of the roof or the like. When this occurs the nut 6 is removed from the threaded stud 5, at least part way, and the entire bracket 3 is inverted so that its arm 2 stands within what would be the lower end of the groove 1 in Fig. 3 instead of the upper end; and thereafter the pendulum 9 may swing around the axis of the stub shaft 8 to the other side of the center as indicated at the top and bottom of Fig. 6. Obviously the set screw 7 will be set up from time to time so as to prevent looseness of the conical tips of the stub shaft 8 within the sockets in which they turn.

One feature of my invention lies in the peculiar disposition of the graduation marks around the dial upon the disk D, as seen in Fig. 1. At the top of this view are shown at 11 graduations upon one quarter of the dial whose designations indicate degrees of a circle, and as shown at 12 another quarter of the circle is inscribed with graduations whose designations indicate inches fall or rise per foot; but at the bottom of this view at 13 is shown a half circle of both kinds of graduations which in the practical embodiment of my idea will be distinguished from each other in some manner as by printing one set of designations in one color and another in some other color or printing the reference characters for one set outside a circle around the axis 8 and for the other set inside the same. Any suitable means may be provided for permitting the user to distinguish between these two sets of designations. I have utilized Fig. 1 to show that these two scales, one in degrees and the other in inches per foot, may have their graduation marks separately inscribed upon the face of the dial or superimposed one over the other, but it is to be understood that in the finished article the manufacturer will adopt one plan and doubtless carry it all around the circle. The obvious use of the graduations at the lower side of the dial D is to ascertain the pitch of any inclined member when the instrument rests upon the top of the same as seen at the top of Fig. 6; but when an occasion does arise where the instrument must be applied to the bottom of the inclined member for the sake of finding its pitch, the bracket 3 is inverted as above described and the instrument is used as shown at the bottom of Fig. 6 and at this time the same pendulum 9 moves over the other set of graduations whether the latter have been disposed separately or superimposed upon each other as above described.

Having found the pitch of the roof or other inclined member, my instrument may be used when it becomes necessary to cut the extremities of beams such as rafters to be employed in building the same in its various parts, although I do not limit the invention to this use. At the angle of the hypotenuse H with the lower arm L two L-shaped members 17 and 18 are disposed with their shanks in parallelism and secured to opposite sides of the arm L while their feet have acute upper edges 19 standing in alinement with each other and exactly in the angle between these arms of the instrument. While these members may be attached in any suitable way, I preferably use a threaded stud 15 much like that employed in connection with the bracket 3, which stud extends from one member 17, has a squared shank 14 producing a lug which stands within an opening in the arm L and fits closely in a square

hole 14' in the other member 18, and has a threaded extremity receiving a thumb nut 16 so that the two members may be tightened up upon the arm L with their edges 19 always in alinement or may be disconnected therefrom for cleansing or repair. In the curved member or arm C of the instrument is formed a slot 20 struck on an arc of which the edge 19 of the part just described is the accurate center, and in this slot is movably mounted a clamp best seen in Fig. 4 and whose construction by preference follows that just described and which is best seen in Fig. 5. That is to say, the two members 17' and 18' are connected by a threaded stud 15' upon which is a nut 16' that can be tightened up to hold them and the clamp in any adjusted position within the slot 20. However, the active faces 29 of these members are by preference cut off flat as shown best in Fig. 1 rather than coming to a sharp or acute edge as at 19, although the feet of the members 17' and 18' project outwardly from the arm to which they are attached. Thus I produce what might be termed a "center" or fixed member and a "clamp" or movable member, both of which are to be brought up against the straight edge of some beam or article such as a rafter after the clamp has been suitably set, and thereafter the user draws a line alongside one arm of the instrument to indicate the angle at which said rafter shall be cut off.

To the right of the slot 20 on the face of the instrument as seen in Fig. 1 is inscribed a scale 30 whose graduations are numbered from zero up to 12 although the mark for the latter would be at the edge of the hypotenuse H, this scale being for the purpose of finding a pitch by inches in a foot up to an incline of 45° which would be twelve inches rise in a foot; and at the opposite side of said slot is another scale 31 whose graduations are numbered from 12 to 24, the latter mark occurring at a point exactly midway between a horizontal line and the hypotenuse as seen. On the reverse of the instrument (see Fig. 2) and at the left side of said slot 20 it is inscribed with a scale 32 whose graduations are marked from 12 to 24 reading from the hypotenuse downward toward the horizontal. This view also shows that the reverse of the instrument is inscribed with a scale 33 whose graduations are equally spaced from each other and extended along both sides of the slot, their designations beginning at zero on the left side thereof and reading upward (as seen at 34) to 45 which would occur at the hypotenuse, and then beginning again at 45 on the right side of the slot and reading upward to 90. I have purposely so illustrated the two sets of scales in order to avoid confusion on the drawings but I desire it to be understood that if preferred I

may superimpose one scale over the other and distinguish them in any suitable manner as by printing one in a different color than the other, and by this means it might be possible to put all of the scales on one face of the instrument. The uses of these scales will now be explained: To cut the upper end of a rafter on a pitch whose incline is seven inches to the foot, the clamp (best seen in Fig. 4) is set within the slot 20 opposite the figure 7 in the scale 30 as best seen in Fig. 7, and the rafter R is marked across at the point 40 while the clamp and the center are in contact with the edge of the rafter. At the same time the proper angle on which the lower end of the rafter may be cut off can be marked across at the line 41, and this is obviously true because the square has arms which are exactly at right angles to each other. If it should happen that the pitch of the roof is at an angle which is greater than twelve inches to the foot, as for instance seventeen inches to the foot, the clamp is adjusted opposite the figure 17 in the scale 31 at the left side of the slot as seen in Fig. 8, and then the rafter R can be marked across on the line 42 to indicate the proper cut for its upper extremity. To get at the proper cut for its lower extremity, however, as the instrument contains nothing which stands exactly at right angles to the hypotenuse H, it is necessary to invert or reverse the instrument as seen in Fig. 9. When this is done the clamp is moved so that its face 29 registers with the mark opposite 17 in the scale 32; and thereafter, the straight edge of the rafter resting upon the clamp and the center, the proper angle for the lower end of the rafter can be indicated by drawing a line across it on the line 43.

Fig. 2 of the drawings well shows how the degree scale 33 on the reverse of the instrument can be utilized to indicate the degree of any pitch which is indicated by the obverse or face of the instrument in inches to the foot by the scale 30 or 31. All that is necessary is for the operator to invert or reverse the instrument from its position as shown in Figs. 7 and 8 in order to ascertain the pitch in degrees at the upper end of the rafter. As above suggested, it is quite possible that the degree scale could be superimposed over the other scales on the face of the instrument and distinguished therefrom in any suitable manner as by different coloring, but I prefer the arrangement described because it is less complicated and because there really is not often the necessity for ascertaining the pitch in degrees as it is usually spoken of in inches to the foot.

Fig. 10 indicates how the dial and pendulum will be employed to designate a fall or rise in inches per foot when the scales are not superimposed, but for the reason given above

it may be desirable to superimpose the two scales upon the dial, especially on one face of the instrument.

What is claimed as new is:

1. In an instrument of the class described, the combination with the body having an opening; of two like L-shaped members whose shanks stand in parallelism against opposite faces of said body, one of them being pierced with a square hole, and whose feet project away from said body and stand in true alinement with each other, a stud fixed to the shank of the imperforate member and having a square shank projecting through said opening and fitting closely in said hole and having a threaded extremity, and a nut on the latter for the purpose set forth.

2. In an instrument of the class described, the combination with the body having at one point a fixed center consisting of members projecting from opposite sides of the body and in alinement with each other, the body having cut through it on an arc around said center a slot provided with parallel walls; of two L-shaped members whose shanks stand in parallelism against opposite faces of said body, one of them being pierced with a square hole, and whose feet project away from said body and stand in true alinement with each other, a stud fixed to the shank of the imperforate member and having a square shank projecting through and fitting slidably in said slot and fitting closely in said hole and having a threaded extremity, and a nut on the latter for the purpose set forth.

3. In an instrument for indicating pitch, the combination with a body consisting of a square including two arms at right angles to each other, and a hypotenuse whose extremities join said arms on oblique angles, the body having through it an opening adjacent one of said oblique angles; of two like L-shaped members whose shanks stand in parallelism on opposite faces of said body, one of them being pierced with a square hole, and whose feet project away from said body and have acute outer edges standing in alinement with each other and with the angle adjacent said opening, a stud fixed to the shank of the imperforate member and having a square shank projecting through said opening in the body and fitting closely in said hole in the other member and provided with a threaded extremity, and a nut on the latter for the purpose set forth.

4. In an instrument for indicating pitch, the combination with a body consisting of a square including two arms at right angles to each other, and a hypotenuse connecting said arms, said body having a fixed center and a slot on an arc around said center, and said body having graduations along both

sides of the slot, those at one side thereof being marked with designations reading up to a certain pitch which is formed along the right-angular arms of the body, while
5 the graduations at the other side of the slot are marked with designations indicating a higher pitch which is formed along the hypotenuse of the body; of a movable clamp, and means for setting it in said slot, both
10 the clamp and the center having feet projecting at right angles from the body.

5. In an instrument for indicating pitch, the combination with a body member having a fixed center and a slot through the body
15 on an arc around said center, one face of said body having graduations along said

slot marked with designations to indicate the pitch in inches per foot and the other face of said body having graduations marked with designations to indicate the
20 pitch in degrees; of a movable clamp, and means for setting it in said slot, both the clamp and the center having feet projecting at right angles from the body.

In testimony whereof I have hereunto set
25 my hand in presence of two subscribing witnesses.

CLARENCE M. MILLER.

Witnesses:

N. L. COLLAMER,
D. M. DIXON.