

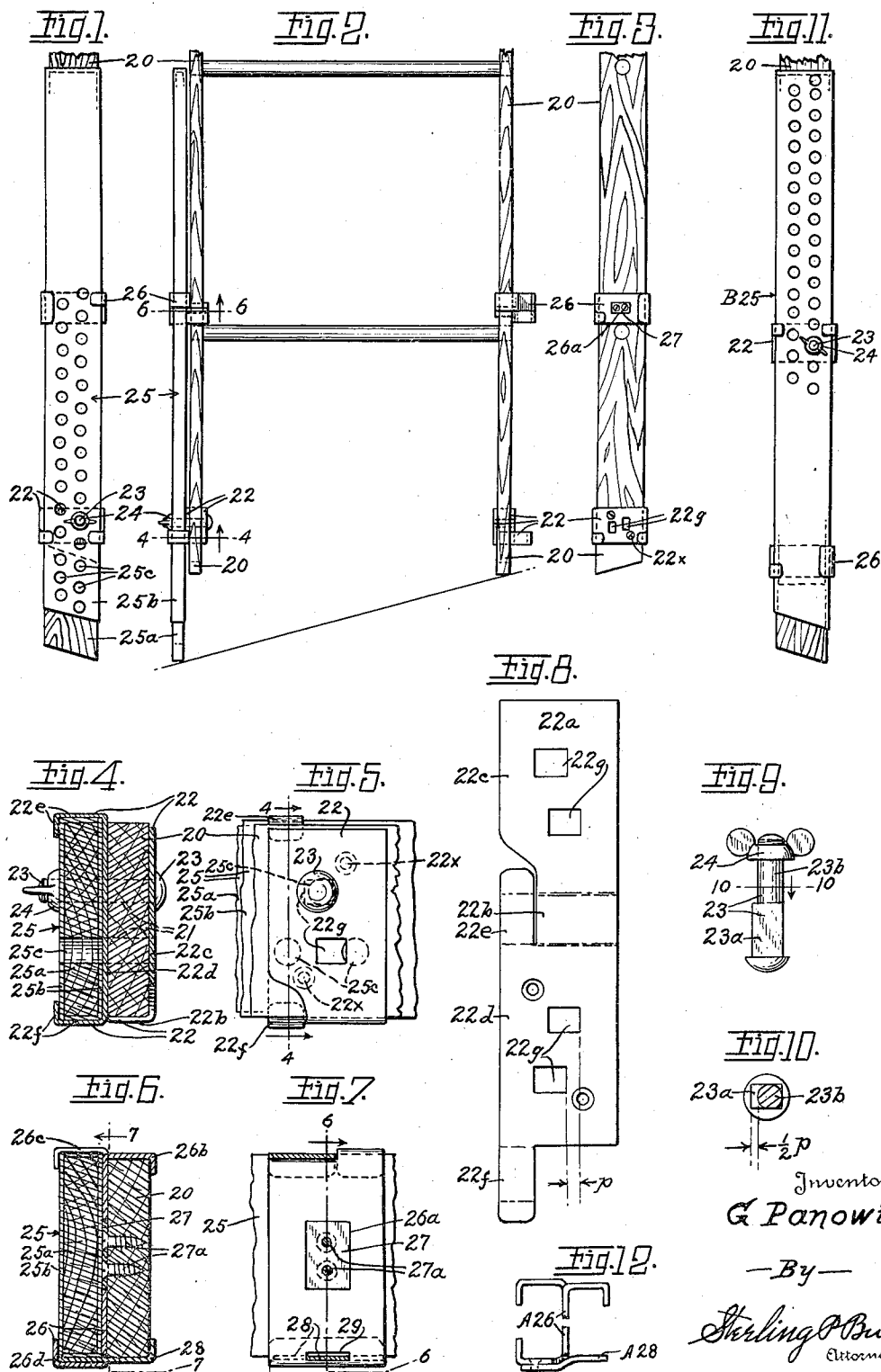
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LADDER FOOT LEVELING ATTACHMENT

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LADDER-FOOT LEVELING ATTACHMENT

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4 Claims. (Cl. 228—63)

This invention relates to ladder-foot leveling attachments.

One object of this invention is to generally and particularly improve on previously known attachments for leveling the feet of ladders when used on inclined or sloping surfaces such as sidewalks, roofs or any place where the feet of ordinary ladders need leveling so that the ladders will not dangerously lean to one side or the other.

A further object of this invention is to provide a ladder-foot-leveling attachment that can be made applicable to every kind and size of ladder that has rigid side-beams, legs or uprights, including the rear uprights as well as the front uprights of step ladders.

A further object is to provide, in an attachment of this kind, the features of simplicity and consequent low cost of manufacture, convenience in applying to and adjusting on either side of a ladder, a large range of fine adjustments so as to obtain the maximum exactness in plumbing a ladder on which it is attached, and the maximum security and consequent safety.

Another object is to provide an improved form of guiding and adjusting member which can be formed with comparatively slight expense from a single blank of sheet metal and which is very practical as to manufacture and use.

Another object is to provide an interchangeable guiding member which is formed of a single blank of sheet metal and can be transferred from one side-beam to the other side-beam of a ladder very quickly and easily when desirable to change the attachment from one side to the other side of the ladder.

Another object is to provide an improved form of extension-beam that consists of wood encased in metal so as to combine the features of strength, rigidity, comparative lightness, and the capability of being bent when desirable to fit it to a ladder which has its side-beams curved and flared at the bottom.

Another object is to provide an improved form of securing and adjusting bolt having a part of its shank eccentric to its other part and which can be inverted for obtaining different fine adjustments of the extension-beam with respect to the side-beam of the ladder.

Other objects and important features are pointed out or implied in the following details of description, in connection with the accompanying drawing in which:

Fig. 1 is a left-side view of the ladder-foot

leveling attachment applied on the lower end of a ladder of ordinary construction.

Fig. 2 is a front view of a ladder's lower end or foot having the complete attachment on its left side, and having the guide-members in place on its right side, the lower diagonal line indicating the inclined surface on which the ladder is leveled by the attachment.

Fig. 3 is a right-side view of the parts shown at the right in Fig. 2.

Fig. 4 is an enlarged sectional view taken on the lines 4—4, of Figs. 2 and 5.

Fig. 5 is a fragmental view disclosing details of the guiding and adjusting member and contiguous parts, that is, a right-side view of the parts shown in Fig. 4 and the adjoining parts.

Fig. 6 is a sectional view taken on the lines 6—6 of Figs. 2 and 7.

Fig. 7 is a fragmental view partly in section along the line 7—7 of Fig. 6.

Fig. 8 is a plan view of a sheet metal blank with broken lines thereacross to indicate where it is to be bent in forming one of the guiding and adjusting members.

Fig. 9 is a side elevation of the securing and adjusting bolt having a wing-nut thereon.

Fig. 10 is a sectional view along the line 10—10 of Fig. 9.

Fig. 11 is a side view similar to Fig. 1, but showing a modified construction and arrangement.

Fig. 12 is top plan view of one of the guiding members which is somewhat different from those shown in the middle parts of Figs. 1, 2 and 3, being a modification thereof.

Referring to the drawing in detail, in which similar reference numerals refer to similar parts in the several views, the invention is described in detail as follows:

The side-beams of the ladder are shown at 20, and each of these has two openings 21 therethrough as indicated by the parallel broken lines in Fig. 4. A guiding and adjusting member 22 is formed with a U-shaped portion that embraces the opposite broad sides and the lower edge of the side-beam on which it is to be secured by screws 22a and reenforced by a bolt 23 and wing-nut 24. This guiding and adjusting member 22 is preferably bent into shape from a blank of sheet metal such as shown at 22a in Fig. 8 where the single broken lines indicate where the parts are to be turned upward from said lines, while the double broken lines indicate where the parts are to be turned downward; so, considering the part 22b as being held stationary while the parts

22c and 22d are bent down into vertical and parallel relation, the resultant structure is the U-shaped part that embraces either of the ladder's side-beams; and next, considering the tongues 22e and 22f as being bent at their bases so as to extend away from the U-shaped part, then bent at their free ends so as to bring these ends into the same plane, parallel to the parts 22c and 22d, the resultant structure is such as shown best in Figs. 4 and 5. The parallel walls 22c and 22d of the U-shaped part are provided with rectangular openings 22g which register with the openings 21 of the side-beams, each of said holes being oblong, the lengths of these holes extending in the direction of movements for adjusting the extension-beam which is presently to be described. The bolt 23 has a shank which includes a part 23a that is oblong in cross section, that is, of such shape and size as to snugly fit in either one of the openings 22g—21, and of such length as to extend entirely through the U-shaped portion of the member 22. The shank of said bolt also includes a part 23b that is cylindrical and has a screw-threaded end on which the nut 24 is screwed. One side of the part 23a is offset from the part 23b; so this bolt is properly hereinafter known as an eccentric securing and adjusting member.

Referring now to Figs. 1, 2, 4 and 5; it is seen that the extension-beam 25 is composed of a wooden part 25a and a metal casing or jacket 25b, and that both of these are provided with two rows of holes or bores 25c, which rows are parallel to one another, and in which the holes of one row are staggered with relation to the holes of the other row. These openings of the respective rows are guided into registering relation with the respective openings 22g by means of the angular retaining and guiding elements 22e and 22f of the member 22 as the extension-beam is slid along the side-beam 20 for adjustment according to the slope of the surface on which the ladder is next to be used.

In adjusting and securing adjustment, the ladder is first set in perpendicular position with respect to its lateral edges, and if the bolt 23 is then out of the openings 25c, the weight of the ladder or of the adjusting beam will cause automatic movement of the beams 20 and 25 to the proper adjusted position or within a small fraction of an inch of the proper adjustment, and if the adjustment is perfect, one of the holes 22g will be in registration with one of the holes 25c, so the bolt can then be passed through these registering openings, either by placing the offset or eccentric side of the shank-portion 23a at the upper end or the lower end of the opening 22g; but if the openings are slightly out of registration, the proper registration can be obtained either by a slight tilting of the ladder or by a slight twisting of the ladder's lower end and thus causing the beam 25 to slide slightly up or down until one of the holes 25c registers with either the upper end or lower end of one of the holes 22g, and then the bolt 23 is entered with its offset side disposed at the upper or lower side, according to the position of the hole 25c in relation to the hole 22g.

Now referring to Figs. 3 and 5, it will be seen that the arrows in Fig. 5 point to what is normally the upper end of the ladder, and that the openings 22g are disposed with their upper ends in slightly spaced parallel planes, as more clearly shown at p in Fig. 2; and in Fig. 10, it is seen at $\frac{1}{2}p$ that the offset or eccentricity of the part 23a

is about one-half the distance indicated at p; while in Figs. 1, 3 and 5, it is seen that the distance between the openings 25c of each row is considerably greater than the distance p; so, the following facts are quite evident:

The two rows of staggered holes 25c and two holes 22g provide much finer adjustments than if there were only one row of holes 25c; the fact that the distance p is less than the distance between the holes 25c provides still finer adjustment than if these distances were the same; and the fact that the distance $\frac{1}{2}p$ is less than the distance p, and that the bolt 23 is invertible to suit different adjustments and can be applied and inverted in any of the registering holes 22g and 25c provides for securing the beam 25 in any one of a large number of fine adjustments on the foot of the ladder.

In Fig. 2, it is noted that the members 22 are true counterparts or are oppositely constructed so as to fit the opposite sides of the ladder; but the guide-members 26 are true duplicates, so that when interchanged from one side-beam to the other side-beam of a ladder, they are inverted, as shown in Fig. 2. To provide for such interchange, so that only one of these parts is needed for a pair of side-beams, each part 26 has a central opening 26a to receive and fit around a positioning lug or small plate 27 which is secured to one of the side-beams 20 while a similar member 27 is secured to the other side-beam 20, screws 27a or other appropriate means being used as the securing means (see Fig. 6). However, it is within the scope of this invention to make the members 27 counterparts of one another and to permanently secure them in place as is done with the parts 22; but of course the use of one transferable member 27 minimizes the manufacturing cost; so, to make the member easily removable from the side-beam 20, it is provided with a keeper element 28 in a slot 29 whose length is less than the outer end of the keeper element; and the inner end of the keeper element is bent angularly to extend towards a similarly bent end of a retaining lip 26b of the member 26, and these retaining and keeper elements cooperate with the members 27 and 27a for removably securing the member 27 in position on either of the side-beams. Guiding elements 26c and 26d are component parts of the member 26, and the outer end of the keeper element 28 normally rests on the element 26d and is held there by the extension beam 25, but when the extension beam is removed from the member 26, the keeper element is then free to be swung about its middle part, at the slot 29, so its inner end disengages the side-beam and permits the removal of the members 26 and 28 from the side-beam, for being fitted on the member 27 of the other side-beam.

In the modified form of guide-member A26 shown in Fig. 12, the keeper element A28 is pivoted to the lower side of the member A26, so it can be turned on its pivot into a position at right angles to that which is shown, thus being moved out of engagement with the side-rail.

In the modified form shown in Fig. 11, the rows of holes 25c are at the upper end of the adjusting beam B25; so the positions of the members 22 and 26 are reversed with respect to Figs. 1 and 2, and the member 26 may be used in connection with or without the members 27 and 28 while being secured to the side-beam by any appropriate means.

The several modifications of the invention do not exhaust the various changes that may be

made without departure from the inventive ideas herein implied and claimed.

What I claim as my invention is:

1. In a ladder-foot leveling attachment, the combination of a guide-member provided with means for attaching it to the lower end-portion of an upright or side-beam of a ladder or other upright, a second guide-member having two openings therethrough at substantially different levels and approximately in the same horizontal plane, an extension-beam of proper size and shape to be slidably engaged with said guide-members in proper relation for keeping the extension beam substantially parallel with the side-beam of a ladder to which it is attachable, said extension-beam having two parallel rows of openings arranged in spaced relation therealong in complementary relation to the two openings of said second guide-member so as to register said two openings respectively with the openings of said extension-beam when the latter is adjusted to different positions along the ladder's side-beam, the openings of one of said rows being staggered with relation to the openings of the other one of said rows for the purpose of obtaining relatively fine adjustments by bringing the openings of either row into registration with one or the other of the said two openings of the second said guide-member, and a securing member normally fitted in an opening of said second guide-member and an opening of said extension-member for securing the latter in one of said adjustments.

2. The combination defined by claim 1, the two openings of said second guide-member being longer in the vertical direction than the openings of said extension-beam, and said securing member having a smaller part that fits in the openings of said extension-beam and a second part that fits in the respective longer openings of said guide-member, the said second part of the securing member having one side offset from the said smaller part so that when the securing member is removed from two of these registering openings and inverted and replaced therein it necessitates a change of adjustment between the said second guide-member and the extension beam.

3. The combination defined by claim 1, the openings of each of said rows being in horizontal planes that are spaced more widely than the horizontal planes that coincide with the upper ends of said openings of said guide-member, for the purpose specified.

4. The combination defined by claim 1 as an attachment on a side-beam of a ladder which has an apertured part through which the said securing member extends when in engagement with said second guide-member and said extension device, the first said guide-member being secured on said side-beam in spaced relation to the second said guide-member.

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