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2,957,538

LADDER BOLT OR THE LIKE

Filed Nov. 18, 1957

2 Sheets-Sheet 1

Fig. 1.

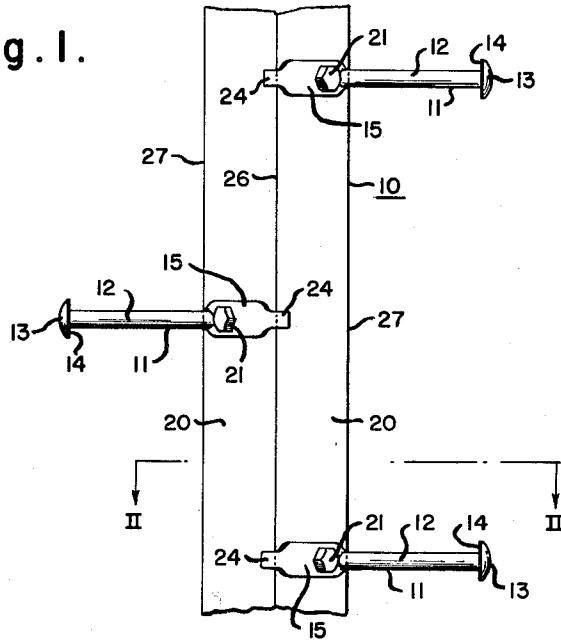


Fig. 2.

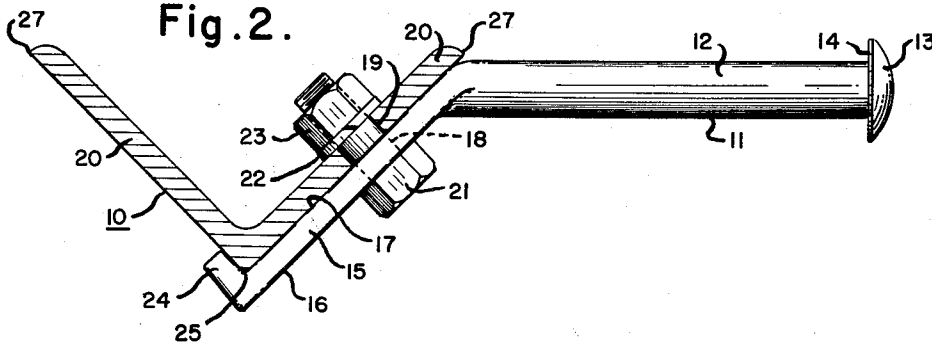
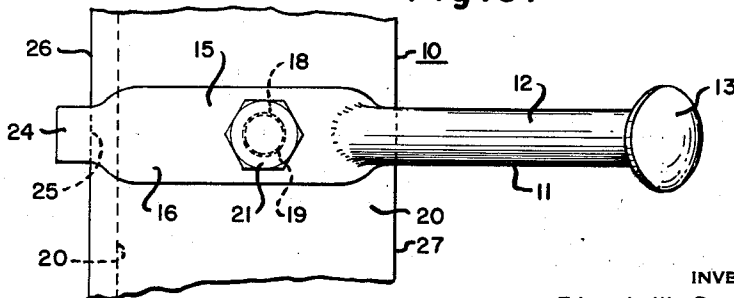


Fig. 3.



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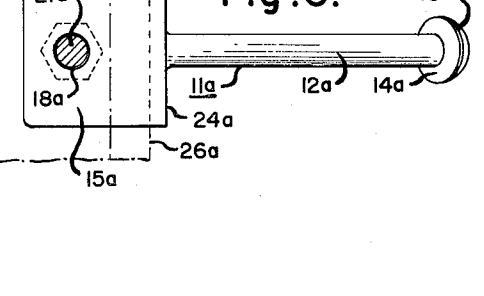
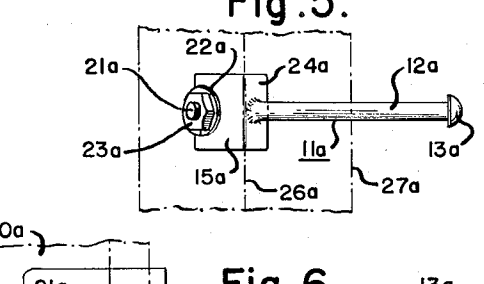
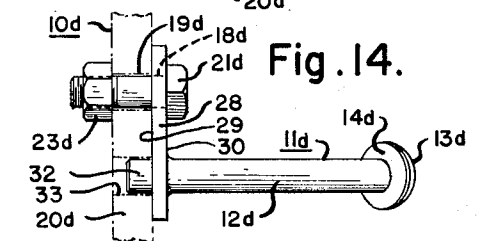
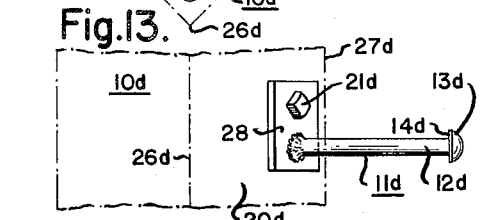
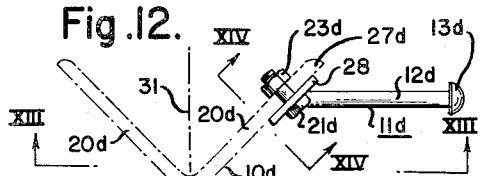
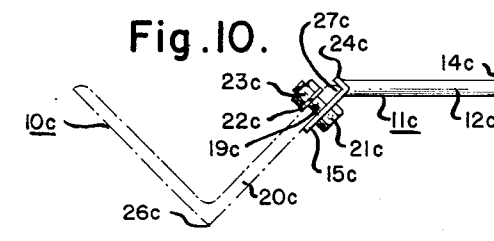
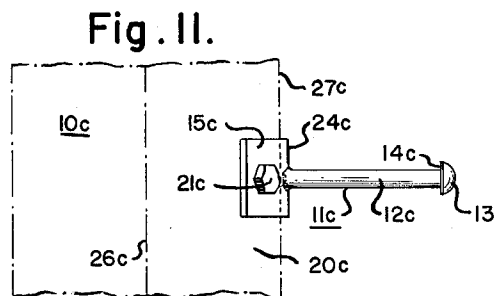
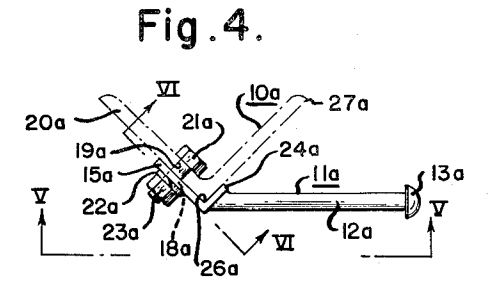
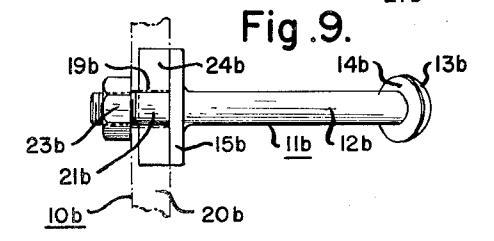
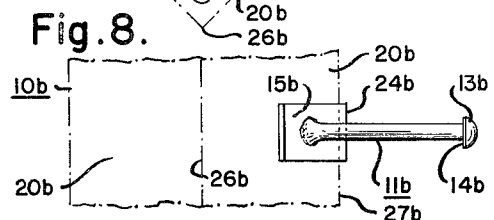
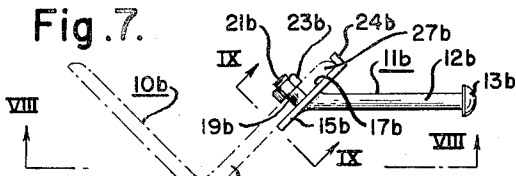
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LADDER BOLT OR THE LIKE

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2 Sheets-Sheet 2



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LADDER BOLT OR THE LIKE

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5 Claims. (Cl. 182-90)

This invention relates to new ladder bolts or the like. More particularly, this invention pertains to such bolts adapted to be attached to structures like towers by standard fasteners to provide a ladder which will have the rungs positioned relatively squarely across the foot of the user and be incapable of turning.

In the construction of transmission and other kinds of structural steel towers, for example, ladder means normally have to be provided to enable the structure to be climbed. A common expedient has been to affix straight bolts to a part of the tower such as a generally vertically extending corner angle to provide a ladder, such bolts having a narrower diameter threaded inner end passing through openings to be engaged by a locking nut arrangement. Such expedient, however, positioned the successive rungs alternately on the flanges of the corner angle, at right angles to one another, which meant that the climber had to climb with his feet forming a like angle which was not only awkward but also hazardous under many conditions.

By the use of the invention disclosed herein, a climber can climb naturally with his feet generally parallel. Further, ladder bolts made in accordance with this invention can be fastened by standard means to the structure they are to serve and will engage a portion thereof to make it impossible for such ladder bolts to shift out of position. Hence, they will not turn despite any offset between the rungs of such new ladder bolts and the position of such fastening means. Thereby, the comfort and safety of workmen on such structures are significantly advanced. Moreover, such new ladder bolts or the like can be fabricated at relatively low cost and by quantity production methods from standard stock pieces and shapes.

Other objects, features and advantages will be apparent from the following description and the accompanying drawings, in which

Figure 1 is a view in elevation of a portion of a corner of a structure such as a tower employing one embodiment of a device of this invention to provide a ladder for such structure;

Figure 2 is a plan view of one ladder bolt embodiment shown in Figure 1 taken along line II—II of Figure 1;

Figure 3 is a view in elevation looking at the outside of the ladder bolt shown in Figure 2;

Figure 4 is a plan view of a second embodiment of this invention in the form of a ladder bolt;

Figure 5 is a view in elevation of the device shown in Figure 4 taken along line V—V of Fig. 4;

Figure 6 is a further view in elevation taken from a different angle along line VI—VI of Figure 4;

Figure 7 is a plan view of a third embodiment of this invention in the form of a ladder bolt;

Figure 8 is a view in elevation of the device shown in Figure 7 taken along line VIII—VIII of Figure 7;

Figure 9 is a further view in elevation taken from a different angle along line IX—IX of Figure 7;

Figure 10 is a plan view of a fourth embodiment of this invention in the form of a ladder bolt;

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Figure 11 is a view in elevation of the embodiment shown in Figure 10;

Figure 12 is a plan view of a fifth embodiment of this invention in the form of a ladder bolt;

5 Figure 13 is a view in elevation of the device shown in Figure 12 taken along line XIII—XIII of Figure 12; and

Figure 14 is a view in elevation taken from a different angle along line XIV—XIV of Figure 12.

10 Referring to Figures 1 to 3 of the drawings, a structural steel tower which has to be climbed may be provided with a generally vertical corner angle 10 along which such climbing is performed. Although the illustrated embodiment is described in connection with such a structure, this invention may be applied to other structures such as, for example, tank frames, scaffolding and various edifices and poles.

The climbing of the tower of which angle 10 is a part is performed by affixing ladder bolts 11 of the new kind disclosed in those figures alternately to the right and left of the center of angle 10 and successively one above the other as illustrated in Figure 1. The ladder bolts 11 are generally symmetrical about a horizontal plane through the center thereof when they are in the position shown in Figure 1 and one such embodiment of ladder bolt can equally well be applied to the corner of angle 10 to extend to the right or to the left as shown.

Each ladder bolt 11 may be formed by forging the same out of a material like steel. Each has a projecting rung portion 12 at the outer end of which an integral round head 13 may be provided with the adjoining side 14 thereof being at an abrupt angle relative to the surface of rung 12 and extending radially outwardly of the surface of rung 12 around the entire such surface thereof so that the outside of a foot of a climber will encounter head 13 if he slides it outwardly that far along rung 12. The inner or base portion of bolt 11 may be formed into a plate 15 having an outer surface 16, a flat inner surface 17 and an angle projection 24. A hole 18 is preferably punched or drilled through plate portion 15 for registry with a drilled hole 19 in a flange 20 of angle 10. A fastening bolt 21 is passed through the respective holes 18 and 19 and fastened in place by a lock washer 22 and nut 23 when the ladder bolts 11 are assembled with a tower or other structure with a supporting member such as member 10 is. The ladder bolts 11 and the supporting members are preferably shop fabricated by quantity production methods.

50 Projection 24 at the inner end of plate portion 15 extends inwardly and at right angles to surface 17 with the inner angle 25 so formed being a right angle adapted to fit rather snugly against and along the outside central corner 26 of member 10, as distinguished from the flange edge corners 27. The projection 24 also is preferably integral with the remainder of ladder bolt 11. After assembling, the ladder bolts 11 extend to the right and left of the tower as shown in Figure 1 with the rung portions 12 projecting so as to be free and clear for a climber's booted feet and in climbing, each of his feet will be pointing forward in a convenient, comfortable and normal manner. At the same time, no ladder bolt 11 can move out of a rigid horizontal position due to the engagement fit provided by angle 25 against the outer angle 26 at the corner of angle member 10.

65 Further embodiments of our invention are respectively illustrated in Figures 4 to 6; 7 to 9; 10 and 11; and 12 to 14, inclusive. Therein, parts corresponding generally in construction and functioning are provided with the same reference numerals with the addition thereto of the respective suffix letters *a*, *b*, *c* and *d*.

70 In the embodiment of Figures 4 to 6, ladder bolt

11a is of a kind which has the rung portion 12a extending outwardly from the approximate center of member 10a where, for example, somewhat less width may be available in which to provide a ladder by means of ladder bolts of this invention. In bolt 11a, the rungs 12a may be made integral by welding to the outside of the projection 24a of the base or plate portion 15a.

In the embodiment illustrated in Figures 7 to 9, the ladder rung 12b is welded to the outside face of plate portion 15b as shown. A stud bolt 21b is welded to the face 17b on the other side of plate portion 15b to pass through a punched or drilled opening 19b in flange 20b before being fastened thereto by nut 23b.

The ladder bolt embodiment 11c in Figures 10 and 11 has a rung portion 12c welded to the right angle formed by the outside faces of projection 24c and the remainder of plate portion 15c, the rung 12c having its end welded to the base 15c in that area of engagement. It will be noted that the embodiment shown in Figures 10 and 11, like that of Figures 7 to 9, is operative to prevent turning against an outermost edge 27c when the ladder bolts 11c are assembled with structural member 10c. Moreover, ladder bolts in respective forms shown in Figures 4 to 11, inclusive, may be made from stock angle and bolt or rivet blanks.

In the embodiment illustrated in Figures 12 to 14, a base portion 28 is flat and has its inner face 29 fitting against the planar outside of a flange 20d. A rung portion 12d is welded at its inner end to the outer face 30 of plate 28 at an angle such that a climber facing member 10d from either direction of a plane 31 bisecting the angle between the flanges 20d has the axes of such rungs 12d normal to that plane and squarely cross the normal forward position of his feet. A projection 32 is fixed to the inner face 29 and extends into a punched or drilled opening 33 in flange 20d. A fastening bolt 21d extends through the openings 18d and 19d to complete the assembling of ladder bolt 11d and the member 10d.

Although the illustrated embodiments are shown applied to an angle of a structural metal like steel, they may also be applied to other structural shapes including channels, beams and plates. Further, projections, such as projections 24b, may, if desired, be made so as to extend farther around the edge of a supporting structural member.

Various other embodiments of our invention may be devised and changes made in details of the embodiments illustrated without departing from the spirit of our invention or the scope of the appended claims.

We claim:

1. A ladder bolt comprising, in combination, a straight round rung, a head at the outer end of said rung projecting radially relative to the surface of said rung, the inner end of said rung being flattened to provide a plate portion having flat inner and outer faces at an angle to the axis of said rung, the longitudinal axes of said rung and said plate being in the same horizontal plane, the innermost end of said plate portion being bent at a right angle to the adjacent portion thereof to form a projection defining a vertically extending angle facing the inside of said plate portion, said plate having an opening therethrough for a fastening bolt spaced from said projection, whereby when the inner corner formed by projection is fitted against a generally vertically ex-

tending right-angled corner and fastened thereto by said fastener bolt, said rung will be incapable of movement and project horizontally away from said corner to serve a ladder purpose.

2. A ladder bolt comprising, in combination, a rung, a projecting head adjacent the outer end of said rung, a base for said rung in the form of an angle having flat inner faces, said rung and said base being symmetrical about a median horizontal plane, said rung being welded to the outside of said base and offset relative thereto, said base having an opening therethrough for a fastening bolt, whereby when the inner faces of said base are fitted against a generally vertically extending corresponding angle of a structure, it may be fastened thereto by said fastener bolt so said rung will project horizontally away from said last-named angle.

3. A ladder bolt comprising, in combination, a straight rung, a base having its outer side fixed to the inner end of said rung, said rung extending at an oblique angle from said outer side, a vertical flat face portion on the inner side of said base, an integral projection on said base having a projection surface on the inner side at right angles to said first-named face portion, single bolt fastener means for said base to extend inwardly of said face portion and normal thereto, said rung being offset from said means, said rung being oriented to an unchangeable horizontal position by said base when the face portion and projection surface are fitted and fastened to a supporting structure by said single bolt fastener means.

4. A ladder bolt comprising, in combination, a base having a lesser included right angle between the inner sides thereof, a ladder rung fixed to the outside of said base, the angle of said rung relative to said base being such that when said lesser included angle is fitted to a generally vertically extending corner of a structure, said rung will be substantially horizontal and extending away from said corner, said base having provision for a single fastening bolt to extend inwardly to hold said ladder bolt against movement when in place, and means in said base projecting inwardly of one inner face of said base in spaced relation to said rung to prevent rotation of said ladder bolt about the axis of said hole.

5. A ladder bolt or the like comprising, in combination, a base angle adapted to have the inside thereof fit a structural corner, a ladder rung extending horizontally at an oblique angle to the outside of said base angle, said rung being integral with said base angle, and means offset from said rung to fasten said base angle to said structural corner and cooperating with said base angle to lock said ladder bolt or the like in fixed, oriented position, the axis of said rung lying in a generally horizontal plane passing through said base angle substantially midway between the top and bottom thereof.

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