Nov. 3, 1964 J. R. BONDE 3,154,828

CRATE FASTENER

Filed July 13, 1961

FIG. 3

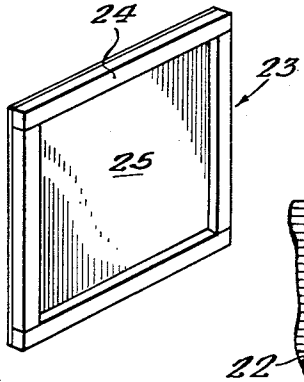


FIG. 4

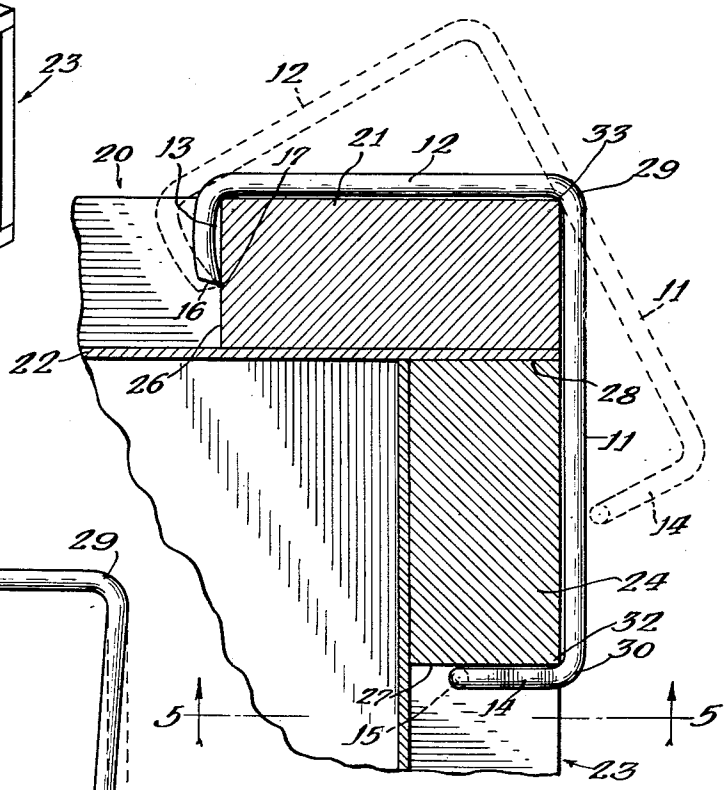


FIG. 1

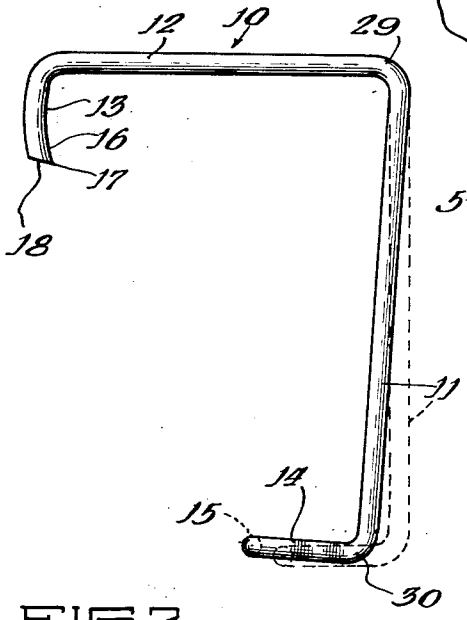


FIG. 5

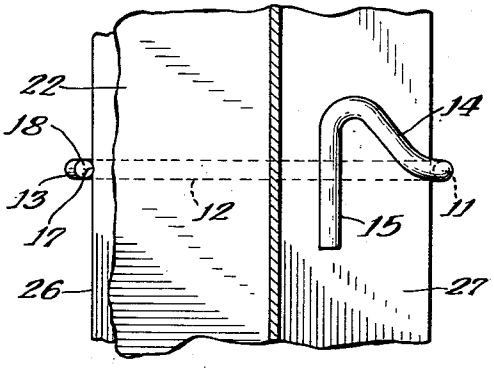
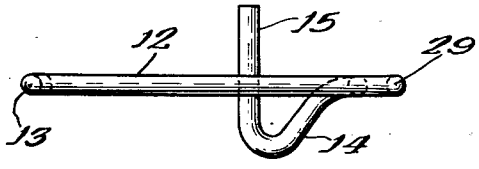


FIG. 2



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CRATE FASTENER

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This invention relates to an improved crate fastener.

It has been proposed to make a crate out of six panels, each one of which comprises a web portion formed of plywood or the like, and a surrounding frame made up of four cleats, and then to fasten the six panels to each other by means of fasteners which span the joints between the cleats of adjacent panels and which lock in place by hooking over the remote edges of the cleats.

Although the cost of the fastener itself is comparatively low, it has been found that the ratio of the cost of packaging and shipping the fasteners to the cost of the fasteners themselves is relatively high due to packaging bulk and due also to high unit weight.

It is an object of my invention to provide an improved crate fastener having a low packing bulk in the sense that a greater number of pieces can be received in a carton of given volume than in the case of prior art fasteners.

It is another object of my invention to provide an improved fastener of small unit weight as compared with prior art fasteners.

A still further object is to provide a fastener having a greater ratio of strength to cost than in the case of prior art fasteners. According to this aspect of my invention, I provide a fastener which is made of wire stock and which comprises only a single span of wire for bridging the joint between the cleats of adjacent panels.

It is a further object of my invention to provide an improved fastener which does not entangle itself with other fasteners when packed in bulk. For instance, it has been proposed to provide a fastener in the form of a wire loop having abutting ends. This arrangement has the disadvantage of extreme tangling and also the disadvantage of bulkiness in packing.

Still another object is to provide an improved fastener which will remain in a given position, and not slide along the cleats. According to this aspect of my invention, it can be pointed out that, according to this system of crating, the cleats must be of standard dimensions in order to provide proper cooperation with the fastener. Nevertheless there is bound to be some tolerance in cleat dimensions which in some instances would permit a longitudinal sliding action of the fastener unless it is secured in some manner to one of the cleats. According to this aspect of my invention, I provide a fastener which includes a tang which penetrates the remote edge of one of the cleats to prevent this longitudinally sliding movement.

Other objects, features and advantages will become apparent as the description proceeds.

With reference now to the drawings in which like reference numerals designate like parts:

FIG. 1 shows a preferred embodiment of my invention in side elevation;

FIG. 2 is a top view of FIG. 1;

FIG. 3 is a perspective view of one of the six panels from which a crate is made;

FIG. 4 is a vertical section showing the application of the fastener to the cleats of two adjacent panels, and showing in dotted lines the position of the fastener as it is being applied; and

FIG. 5 is a bottom view taken along line 5—5 of FIG. 4.

As shown in FIG. 1, the fastener 10 is L-shaped to provide a span leg 11 and an anchor leg 12, the span leg being the longer of the two. The anchor leg terminates

in a bent end 13 which lies in the same plane as the legs 11 and 12. The span leg terminates in an anchor foot 14 which is in the form of an open loop, the wire stock being bent in such a manner that the loop is disposed in a plane which is perpendicular to the axis of the span leg 11. The anchor foot 14 includes a foot member 15, shown in FIG. 5, the axis of which is perpendicular to the axes of both legs 11 and 12.

The bent end 13 is preferably formed with a toe-in 16, and it terminates in a tang 17 which is formed by shearing off the end of the wire stock at an angle, as indicated at 18.

FIG. 4 is a vertical section shown the manner in which the fastener secures a top panel 20 to a side panel 23. The side panel 23 includes a web 25 formed of plywood, corrugated board, or the like, which is mounted on a frame formed of cleats, of which the top cleat 24 is shown in FIG. 4. FIG. 3 shows the complete panel.

The top panel 20 includes a web 22 and a side cleat 21.

When the fastener is in position, the bent end 13 engages the vertical surface 26 of the cleat 21, and the anchor foot 14 engages the bottom surface 27 of the cleat 24. The horizontal joint 28, between the cleats 21 and 24 is bridged by the span leg 11. Separation of the cleats is prevented by the fact that the anchor leg 12 engages the horizontal surface of the cleat 21, and the anchor foot 14 engages the horizontal surface or remote edge 27 of the cleat 24; thus spreading of the joint 28 is prevented. The bent end 13 prevents removal of the fastener in a horizontal direction and the tang 17 prevents longitudinal sliding movement.

In operation, the bent end 13 is first hooked over the top cleat so that the tang 17 engages the vertical surface 26. Then the fastener is moved into the dotted line position in FIG. 4 and the corner bend 29 is tapped with a mallet. This causes the foot member 15 to ride along the vertical outer surface of the cleat 24 until it snaps over the lower corner 32.

Due to the geometry of the device, there will be interference between the upper cleat corner 33 and the span leg 11. However, by providing the sharp tang 17, the force involved in the tapping operation causes the tang to dig into the vertical surface 26 so that the span leg 11 will clear the upper corner 33 and permit the parts to interengage. Without some such digging in action, there would have to be a flexure of the bent end 13; if the fastener were made of stock which is sufficiently resilient to permit flexure of the bent end 13, it would also permit an equivalent degree of flexure in the corner bend 29 and at the lower bend 30, which would be undesirable.

Hence, by my arrangement, I am enabled to provide a fastener which is made of stiffer stock than in the case of the prior art devices. Furthermore, by making a fastener out of a single length of wire, rather than by providing two separate spans, I am enabled to get the desired stiffness with a minimum amount of weight.

The wire stock is preferably oil tempered steel wire, and for all normally encountered sizes, a wire diameter of .187 inch has been found to be adequate. The term "ordinary size" refers to a fastener of which the span leg is about 4½ inches and the anchor leg is about 3½ inches long, these being designed for cooperation with panels, the cleats of which are 1-inch by 4-inch boards. For smaller size crates, the dimensions of the fastener may be correspondingly reduced.

In the alternative, the fastener may be formed from hard drawn steel spring wire stock, and according to the present design, the fact that such wire may have a set or a cast due to the fact that it comes in coils, does not interfere with the fabrication of my fastener nor with its efficient operation.

A further advantage of my fastener is that it may be

easily fabricated by a single operation of a four-slide wire forming machine, since there are only four bends involved.

In removing the fastener, the claw of a hammer is inserted under the foot member 15, which permits one to snap the anchor foot 14 over the lower corner 32.

Although only a preferred embodiment of my invention has been shown and described herein, it will be understood that various modifications and changes may be made in the construction shown without departing from the spirit of my invention as pointed out in the appended claims.

I claim:

1. A crate fastener for the cleated panels of a panel type crate comprising an L-shaped member having two legs disposed substantially perpendicular to each other and formed of wire stock, each leg consisting of a single span of wire, one of said legs comprising an anchor leg and the other comprising a span leg, an anchor foot connected to said span leg so that said span leg is disposed between said anchor leg and said anchor foot for spanning the joint between the two cleats of two adjacent crate panels, the outer end of said anchor leg being bent to provide a bent end substantially parallel to said span leg so that it will hook over the remote edge of one of said panel cleats, and terminating in a sharp tang, said anchor foot being in the form of an open loop formed in a plane which is substantially perpendicular to the axis of said span leg, and including a straight foot portion which is adapted to ride along the surface of the other of said cleats in the course of application.

2. A crate fastener for the cleated panels of a panel type crate comprising an L-shaped member having two legs disposed substantially perpendicular to each other and formed of wire stock, each leg consisting of a single span of wire, an anchor foot connected to one of said legs, the outer end of the other one of said legs having a co-planar bend to provide a bent end which is substantially parallel to said first mentioned leg, said bent end terminating in a sharp tang, said anchor foot being in the form of an open loop formed in a plane which is substantially perpendicular to the axis of said first mentioned leg, and including a straight foot portion the axis of which is perpendicular to the axes of said two legs.

3. A crate fastener for the cleated panels of a panel type crate comprising an L-shaped member having two legs disposed substantially perpendicular to each other and formed of a single length of wire stock, each leg consisting of a single span of wire, one of said legs comprising an anchor leg and the other comprising a span leg for spanning the joint between the cleats of two adjacent crate panels, the outer ends of both legs being bent so that each one will hook over the remote edge of its respective cleat, the bent end of said anchor leg being substantially parallel to said span leg, and the bent end of said span leg being in the form of an open loop formed in a plane which is substantially perpendicular to the axis of said span leg, and including a straight foot portion which is adapted to ride along the surface of its respective cleat in the course of application.

4. A crate fastener as claimed in claim 3 in which said wire stock is oil tempered steel wire of a diameter of substantially .187 inch.

5. A crate fastener as claimed in claim 3 in which said wire stock is hard drawn steel spring wire.

6. A crate fastener as claimed in claim 3 in which said open loop is substantially as shown in FIG. 5, representing two sides of an isosceles triangle, said straight foot portion being the base side thereof.

7. A crate fastener as claimed in claim 1 in which said bent end of said anchor leg is formed with a toe-in.

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