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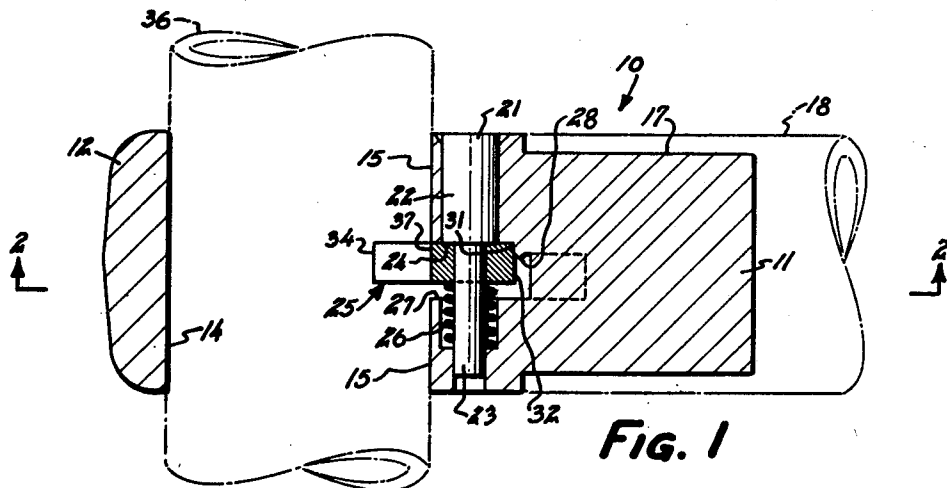
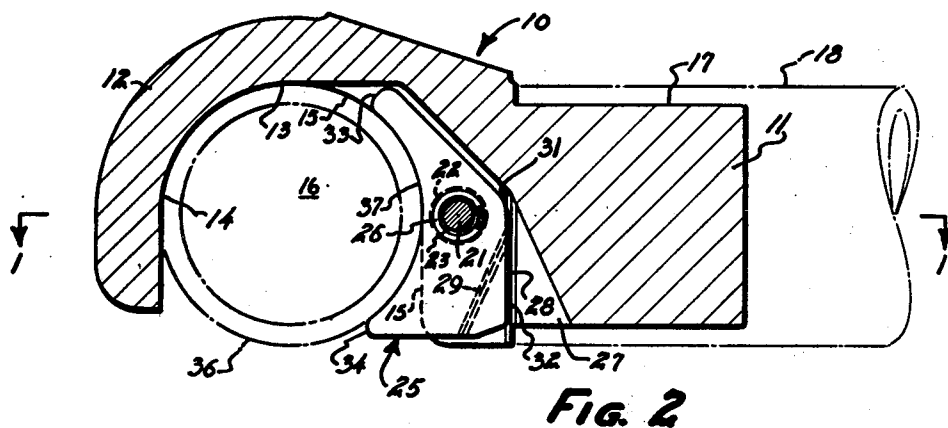
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LOCKING HOOK

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2 Sheets-Sheet 1



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LOCKING HOOK

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This invention relates to hooks for connecting structural members and more specifically to hooks that automatically lock when connected.

In general, the locking hook disclosed in this application is designed to be fixed to the end of a first tubular member, and is used to connect that first member to a second tubular member disposed at right angles to the end of the first member.

The primary object of this invention is to provide a locking hook adapted to lock automatically upon a structural member moved into the hook, in which the hook has a locking member that is rotationally mounted on the hook and is pivotally moved to locking position upon engagement thereof by the member moved into the hook and is pivotally moved to unlocking position when the member is moved out of the hook. In addition, the locking member is also movable on the hook between two positions transverse to the axis of rotation thereof, the locking member being positively locked in its closed position when in one transverse position and being movable to its other transverse position. The locking member is manually movable from its locked transverse position to the other transverse position, to allow the locking member to be rotated to its open position by the removal of the structural member from the hook, the locking member being held open after rotation to its open position until such time as the locking member is moved to its closed rotational position upon the insertion of a structural member into the hook, at which time the locking member moves automatically to its locked transverse position.

Other objects and advantages will become apparent in the course of the following detailed description.

In the drawings forming a part of this application, and in which like parts are designated by like reference numerals throughout the same,

FIG. 1 is a sectional view of an embodiment of the invention, showing the locked position thereof, and taken on line 1-1 of FIG. 2;

FIG. 2 is a sectional view of the locking hook taken on line 2-2 of FIG. 1;

FIG. 3 is a sectional view of the locking hook, showing the unlocked position thereof, taken on line 3-3 of FIG. 4;

FIG. 4 is a sectional view of the locking hook taken on line 4-4 of FIG. 3;

FIG. 5 is an end view of the locking hook of FIG. 1.

Referring now to the drawings, wherein is illustrated a preferred embodiment of the invention, the locking hook 10 comprises a body member 11 having an open hook 12. The hook has a root 13 and opposed walls 14 and 15 extending from the root to the open end of the hook, which walls and root form a hook opening 16.

The body member 11 has a portion 17 adapted to fit within a tubular member 18 and to be secured therein by any suitable means.

A shaft 21 extends through the body member 11 transversely to the hook 12 and has enlarged and reduced diameter portions 22 and 23 joined by a shoulder 24. Mounted on shaft 21 is a crescent-shaped locking member 25, which is biased towards the shaft shoulder 24 by compression spring 26.

As will be noted on the drawings, the locking member 25 is movable in said body member 11 between a first transverse position relative to the body member, shown in

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FIG. 3, and a second transverse position shown in FIG. 1. The body member has a slot 27 therein to permit the locking member 25 to rotate between a first (unlocked) rotational position shown in FIG. 4 and a second (locked) rotational position shown in FIG. 2, when the locking member is in its first transverse position.

The body member is provided with a triangular detent rib 28 and the locking member is provided with a complementary shaped groove 29. When the locking member 25 is rotated to its first rotational position (FIG. 4), the rib 28 fits into groove 29 and the biasing action of spring 26 releasably holds the locking member against rotation back to its second rotational position. If sufficient force is applied to the locking member 25 to rotate it back to the position shown in FIG. 2, the rib 28 will cam out of groove 29, forcing the locking member to move slightly against the force of spring 26, and the locking member will then be free to rotate to its second, or locked, rotational position (FIG. 2).

When the locking member 25 is in its second transverse and rotational positions (FIG. 1), the interengagement of body member shoulder 31 and locking member surface 32 will positively restrain rotation of the locking member from its second, or locked, rotational position.

The locking member has end portions 33 and 34 which are alternately movable into the hook opening 16. The locking member portion 33 is movable into the hook opening in proximity to root 13 upon rotation of the locking member to its first rotational position (FIG. 4) and the other portion 34 is movable into the opening in proximity to the open end of the hook 12 upon rotation of the locking member to its second rotational position (FIG. 2). When either end 33 or 34 of the locking member is fully within the hook opening 16, the other end is out of the opening.

In operation, the body member is connected to a tubular member 18. With the locking member in its unlocked position (FIG. 4) a second tubular member 36 is moved relatively upwardly into the hook opening 16 to engage the end portion 33 of the locking member. Continued upward movement of the tubular member 36 forces the locking member to rotate in a clockwise direction about shaft 21, camming the detent rib 28 out of the locking member groove 29. The further movement of the tubular member 36 completely into the hook causes the locking member 25 to rotate to its second rotational position (FIG. 2). In this position of the locking member, its surface 32 will clear body member shoulder 31, thus allowing spring 26 to translate the locking member automatically to its second transverse position (FIG. 1).

The end portion 34 of the locking member engages the tubular member 36 and prevents it from moving out of the hook, since the locking member is restrained from rotation due to the interengagement of body member shoulder 31 and locking member surface 32.

To unlock the hook, the enlarged end of shaft 21 is manually pushed against the bias of spring 26 to move the locking member to its first transverse position (FIG. 3), so that the locking member clears the body member shoulder 31. Downward movement of the tubular member 36 rotates the locking member to its first position where it is automatically held in place by the engagement of detent rib 28 in groove 29.

Although the hook opening 16 is shown as being semi-circular in shape and the locking member surface 37 is shown as being shaped on the same arc, it is to be realized that these shapings are designed to accommodate the outer surface of tubular member 36 to prevent play of the tubular member 36 in the hook when hooked together. If it is desired to operate upon a different-shaped struc-

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tural member, then the shaping of the hook and locking member should be changed to conform thereto.

Although the particular form of the invention herein shown and described is a preferred embodiment thereof, it is to be realized that various changes in the shape, size and arrangement of parts may be made without departing from the spirit of the invention or the scope of the attached claims.

Having thus described my invention, what I claim is:

1. A locking hook, comprising:

a body member having a root and a side wall forming two sides of a hook opening;

a locking member;

means mounting said locking member on said body opposite to said side wall for limited rotational movement between first and second rotational positions relative to said body member about an axis parallel to the axis of said hook opening and for limited movement relative to said body member between first and second positions transverse to the axis of rotation of said locking member;

said locking member having first and second portions thereon, said first portion being disposed adjacent said root and movable theretowards upon rotation of said locking member to its first rotational position and said second portion being disposed adjacent said root opening and movable towards said side wall upon rotation of said locking member to its second rotational position;

means permitting said locking member to rotate between its first and second rotational positions when said locking member is in its first transverse position; means permitting said locking member to move between its first and second transverse positions when said locking member is in its second rotational position;

means positively preventing rotation of said locking member from its second to its first rotational position when said locking member is in its second transverse position;

means urging said locking member towards its second transverse position when said locking member is in its second rotational position;

manually operable means for moving said locking member from its second to its first transverse position; and

means for releasably holding said locking member in its first rotational position when said locking member has been rotated to its first rotational position.

2. A locking hook comprising:

a body member having an open hook, said hook having

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a root and opposed walls extending from said root to the open end of the hook to form a hook opening through said hook;

a locking member pivotally mounted on said body adjacent said hook opening for limited rotational movement between first and second rotational positions relative to said body member about an axis transverse to said hook;

said locking member having first and second portions thereon alternately movable into said hook opening, said first portion being movable into said hook opening in proximity to said root upon rotation of said locking member to its first rotational position and said second portion being movable into said opening in proximity to the open end of said hook upon rotation of said locking member to its second rotational position;

said locking member being movable transversely to said body member between first and second transverse positions relative to said body member;

interengageable means on said body member and said locking member for positively restraining rotation of said locking member from its second to its first rotational position when said locking member is in its second transverse position;

said locking member being rotatable between its first and second rotational positions when said locking member is in its first transverse position;

spring means resiliently biasing said locking member towards its second transverse position;

detent means on said body member and locking member for releasably holding said locking member in its first rotational position upon rotation of said locking member from its second to its first rotational position; and

manually operable means for translating said locking member from its second to its first transverse position against the bias of said spring means.

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