

# United States Patent

[11] 3,575,458

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[54] **HOOK AND LATCH WITH LOCK**  
 14 Claims, 7 Drawing Figs.

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 24/241 (PP)

[51] Int. Cl..... **B66c 1/36**

[50] Field of Search..... 294/78, 82,  
 83; 24/241 (PP), 241 (PSP)

[56] **References Cited**

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**ABSTRACT:** A latch connected to a crane hook to prevent accidental disengagement of the load from the hook. The latch pivotally mounted on the hook shank has side portions which straddle the tip of the hook and the shank of the hook when the latch is in the closed position. A locking member pivotally mounted on the latch is operative to prevent movement of the latch to the open position.

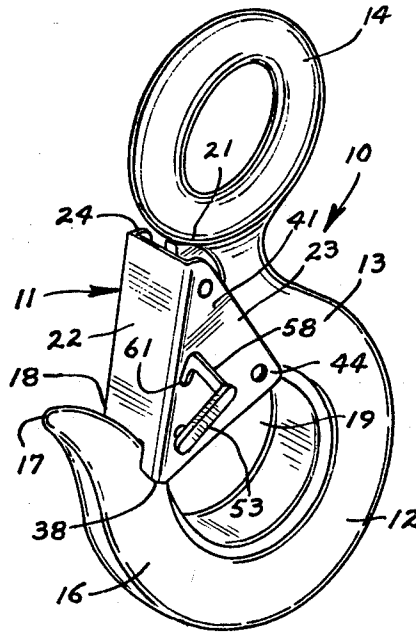


FIG. 1

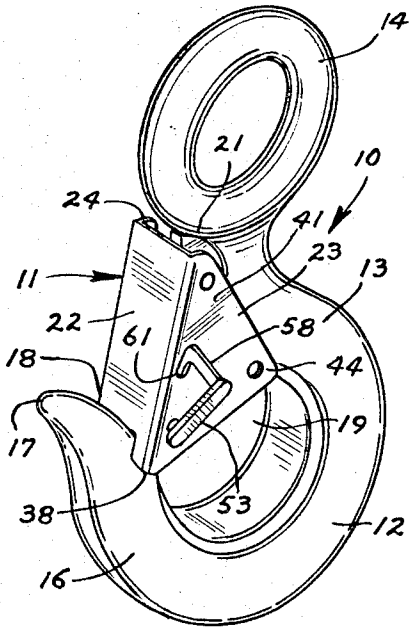


FIG. 2 FIG. 3

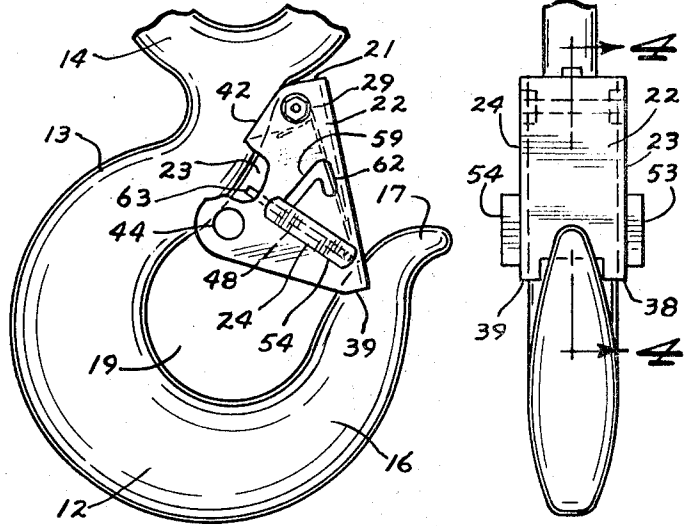


FIG. 5

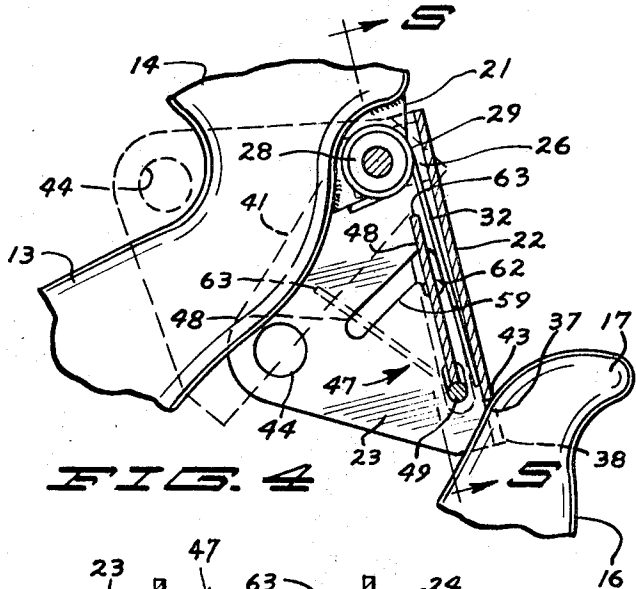
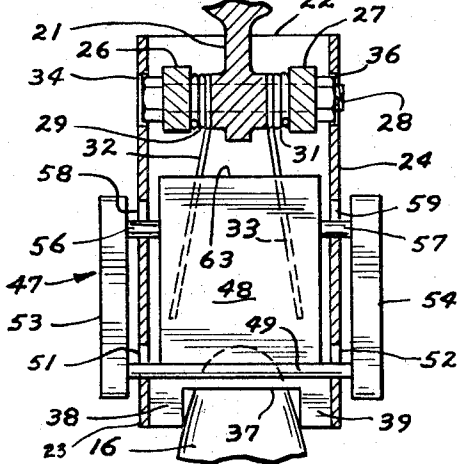


FIG. 4

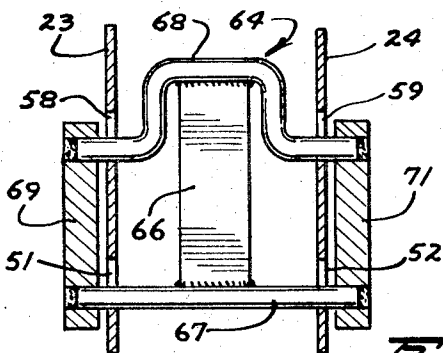


FIG. 6

FIG. 7

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## HOOK AND LATCH WITH LOCK

## BACKGROUND OF INVENTION

Hoist hooks have been provided with safety gate latches for closing the mouths of hoist hooks. In some structures dog pins have been used in combination with the latches to hold the latches in their closed positions across the mouths of the hooks. U.S. Pat. No. 2,927,358 shows an example of a hoist hook having this type of safety gate latching mechanism.

## SUMMARY OF INVENTION

The invention relates to a combined hook and latch for closing the mouth of the hook. The latch pivotally mounted on the hook is normally biased to its closed position. When in the closed position the latch has side portions on opposite sides of the hook shank and tip to increase the side strength of the latch. A lock member pivotally mounted on the latch is movable to a first lock position to prevent the opening of the latch and to a second open position to allow the latch to be pivoted to an open position. External handle means on the latch associated with the lock member are used to provide a visual indicator to determine the locked or unlocked attitude of the locking member.

An object of the invention is to provide a hook with a latch operable to prevent accidental disengagement of a load from the hook. A further object of the invention is to provide a latch which offers resistance to side blows and shields the pivoting structure for the latch. Another object of the invention is to provide the latch with a pivoted lock member operable to retain the latch in a closed position. Still another object of the invention is to provide a latch which protects and shields its pivoting and locking parts.

## IN THE DRAWINGS

FIG. 1 is a perspective view of the hook and latch showing the pivoting locking member in the closed position;

FIG. 2 is an enlarged fragmentary side view of the hook with a portion of the latch broken away to illustrate the locking member;

FIG. 3 is a front elevation view of FIG. 2;

FIG. 4 is an enlarged sectional view taken along the line 4-4 of FIG. 3;

FIG. 5 is a sectional view taken along the line 5-5 of FIG. 4;

FIG. 6 is an enlarged partly sectioned plan view of the locking member pivotally mounted on the latch; and

FIG. 7 is a view similar to FIG. 6 showing a modified locking member pivotally mounted on the latch.

Referring to the drawings, there is shown in FIG. 1, a crane hook indicated generally at 10 in assembled relation with a latch or gate indicated generally at 11. Hook 10 has a generally C-shaped body 12 with a curved shank or back portion 13 connected to a ring 14. The ring 14 is located in the longitudinal plane of the body 12. A shank hook can be joined to the shank 13 in lieu of the ring 14. Opposite shank 13, the body 12 has an upwardly directed bill 16 terminated in an outwardly turned tip or end 17. The bill 16 is spaced from the shank 13 to form a mouth 18 leading to the space or eye 19 of the hook.

The latch 11 located generally across the mouth 18 is pivotally attached to an outwardly directed rib 21 on the inside of the shank 13. Latch 11 is a generally U-shaped member having a flat outwardly facing base 22 and triangular-shaped sides 23 and 24. The base and sides can be formed from a single flat blank bent into a generally U-shape, cast or fabricated into its U-shape. As shown in FIG. 5, secured to the inside of the upper portion of base 22 are a pair of spaced legs 26 and 27 having transversely aligned holes for receiving a pivot member 28, as a nut and bolt, projected through a hole in the rib 21 to pivotally mount the latch on the rib. Located between the rib 21 and the legs 26 and 27 around the pivot member 28 are a pair of torsion coil springs 29 and 31 having legs 32 and 33 respectively which extend downwardly and engage the inside of the base 22. The springs 29 and 31

continuously bias the latch 11 to the closed position against the lip 16. A single coil spring with two legs and two coils can be used to bias the latch to the closed position. Latch sides 23 and 24 have holes 34 and 36 for accommodating the bolt head and nut of the pivot member 28. As shown in FIG. 5, the entire pivot member 28, and springs 29 and 31 are located within the U-shaped latch whereby the pivotal biased connection is shielded from damage and foreign material.

The outer end of base 22 has a rectangular-shaped recess or cutout 37 located between outwardly directed projections 38 and 39. The cutout 37 can have other shapes to accommodate the lip 16. When the latch is in the closed position, the projections 38 and 39 are positioned adjacent opposite sides of the lip 16 thereby providing a side anchor for the outer end of the latch. The side of the latch opposite projections 38 and 39 has elongated side portions 41 and 42 located closely adjacent opposite sides of the shank 13. The projections 38 and 39 and the side portions 41 and 42 are in a close or contiguous relation with the lip 16 and shank 13, so that when the latch 11 is in the closed position, the latch is laterally stabilized by both the lip 16 and the shank 13.

As shown in FIG. 4, springs 29 and 31 bias the latch 11 in an outward direction yieldably holding the outer end of base 22 against a stop point 43 adjacent the tip 17. When the latch 11 is in the closed position across mouth 18 the lower edges of the sides 23 and 24 project upwardly and outwardly toward tip 16. Latch 11 can be locked in the closed position by inserting a separate pin or removable member (not shown) through transversely aligned holes 44 in the outer apex portion of the triangular sides 23 and 24. The holes 44 are located closely adjacent the inside of the shank 13 so that a pin located through the holes would prevent the latch 11 from moving to the open position.

In a similar manner, when the latch 11 is moved to its open position, shown in broken lines in FIG. 4, the holes 44 are positioned adjacent the outside of the shank 13. A pin inserted through the holes 44 will engage the outside of the shank to hold the latch 11 in the open position.

Referring to FIGS. 2, 4 and 5, latch 11 has an additional lock member indicated generally at 47 holding the latch in the closed position across the hook mouth 18. The lock member 47 comprises an angularly movable plate 48 located within the latch below the pivot member 28. Plate 48 is selectively movable from an unlocked position shown in full lines in FIG. 4 to a locked position shown in broken lines. The lower end of the plate 48 is attached to a transverse rod 49 having opposite ends projected through elongated upright slots 51 and 52 in the latch sidewalls 23 and 24 respectively thereby pivotally mounting the plate 48 on the sidewalls.

Secured to the outer ends of the rod 49 are elongated handles 53 and 54 positioned in the general longitudinal plane of the plate 48. The handles 53 and 54 are located adjacent the outside of the sides 23 and 24 to provide a visual indication of the position of the plate 48 from both sides of the hook. The handles 53 and 54 also serve as arms or projections against which a force to open the latch can be exerted. Since the handles 53 and 54 are located adjacent the outside of the U-shaped member of the latch 11, the hands of the operator on the handles are not positioned in the area between the latch and the hook. This is an additional safety feature of the locking member.

Projected from opposite sides of the upper portion of plate 48 are short pins or rods 56 and 57 extended through the slots 58 and 59 in the sidewalls 23 and 24. The pins 56 and 57 cooperate with the slots 58 and 59 to function guide means for controlling the pivotal movement of the plate 48 between its open and closed positions. The slots 58 and 59 extend away from the base 22 in a generally circumferentially direction with respect to the rod 49 to allow the plate 48 to be pivoted to its closed position. The slots 58 and 59 are linear so that on pivotal movement of the plate 48 the rod 49 moves in the slots 51 and 52. On movement of the plate 48 to the open position the plate must be raised so that the weight of the plate is substantially on the stubs 56 and 57.

When the plate 48, shown in broken lines in FIG. 4, is in the closed position, the upper end 63 of the plate is in close proximity with the inside of the shank 13 thereby limiting the movement of the latch 11. The weight of plate 48 holds the plate in the locking position. In other words, the plate 48 is held by gravity in the closed or locking position. This position is visually observable by viewing the angular position of one of the handles 53 or 54.

The upper ends of slots 58 and 59 have downwardly extended recesses or seats 61 and 62 in general longitudinal alignment with the bottom slots 51 and 52. When the plate 48 is in the unlocked position, the upper rods or pins 56 and 57 are located in the recesses 61 and 62 thereby holding the plate 48 in the unlock position generally parallel to the base 22. The weight of the plate 48 retains the lock member in its unlock or open position. The plate 48 will remain in this position until it is manually raised so that the pins 56 and 57 can move down the inclined slots 58 and 59. The plate 48 is permanently movably attached by the rod 49 and pins 56 and 57 to the sides 23 and 24 so that it cannot be released.

Referring to FIG. 7, there is shown a modified lock member indicated generally at 64 usable with a latch to hold the latch in a closed position. The lock member 64 located between the latch sides 23 and 24 comprises an elongated plate 66 secured to a transverse rod 67. Opposite ends of the rod project through the elongated slots 51 and 52 in the sides 23 and 24. Secured to the outer end of plate 66 is a rod 68 having a forward offset central portion secured to the upper end of the plate 66. The opposite ends of rod 68 are pins which project through the slots 58 and 59 and function as guide members for the lock member 64. Handles 69 and 71 are attached to the ends of the rods 67 and 68 which project through the slots in the sides 23 and 24. Lock member 64 functions in the same manner as the lock member 47. The offset portion of rod 68 is located in close proximity to the shank of the hook to prevent the opening of the latch.

Both the locking members 47 and 64 are shielded within the latches and are pivotally mounted on the sides of the latch. The slots and guide rods function as guide means to control the pivotal movement of the locking members and are movable from locking positions to unlocking positions. The lock members are retained in the locked positions by locating of the upper guide rods in the recesses 61 and 62 at the upper slots 58 and 59.

We claim:

1. In combination: a hook having a shank and a lip spaced from the shank thereby forming a mouth opening, a latch for closing the mouth opening, means pivotally mounting the latch on the hook for selective movement of the latch to a closed position across the mouth opening and to an open position relative to the mouth opening, a locking member to prevent movement of the latch from the closed position to the open position, pivot means mounting the locking member on the latch for pivotal movement of the locking member to its locked position and to an unlocked position, guide means comprising pin means and a slot structure between the locking member and the latch coacting with the locking member and latch for directing the pivotal movement of the locking member, the upper ends of the slot structure having downwardly directed recesses for accommodating the pin means to hold the locking member in the unlocked position.

2. The combination of claim 1, wherein: the latch is a U-shaped member having sides positionable adjacent opposite sides of the shank and lip when the latch is in the closed position.

3. The combination of claim 2, wherein: the U-shaped member has a flat base with a recess in the outer end thereof to accommodate the lip.

4. The combination of claim 1, wherein: the latch is a U-shaped member and including biasing means located within the U-shaped member to yieldably hold the latch in the closed position.

5. The combination of claim 1, wherein: the latch is a U-shaped member and said means pivotally mounting the latch on the hook being located within the space between the sides of the U-shaped member.

6. The combination of claim 1, including: handle means located outside the latch and connected to the locking member to provide a visual indicator of the position of the locking member.

7. The combination of claim 1 wherein: the locking member includes a flat plate.

8. The combination of claim 1 wherein: one end portion of the latch is pivoted on the shank and the locking member is pivoted on the opposite end portion of the latch.

9. The combination of claim 1 wherein: the latch is a member having spaced sides located on opposite sides of the shank, said sides of the latch having holes to accommodate a pin to selectively hold the latch in an open position and a closed position.

10. In combination: a hook having a shank and a lip spaced from the shank thereby forming a mouth opening, a latch for closing the mouth opening, said latch comprising a generally U-shaped member having a base and sidewalls positionable adjacent opposite sides of the shank when the latch is in the closed position, means pivotally mounting the latch on a portion of the shank for selective movement of the latch to a closed position across the mouth opening and to an open position wherein the base is located adjacent the shank, a locking member located between the opposite sidewalls of the latch operable to prevent movement of the latch from the closed position to the open position, said locking member having an outer edge engageable with the portion of the shank when in the locked position to prevent pivotal movement of the latch to the open position, pivot means mounting the locking member on the outer portions of the sidewalls for selective pivotal movement of the locking member to a locked position and to an unlocked position, said sidewalls having upwardly directed slots spaced from the pivot axis of the locking member, pin means on the locking member positionable in said slots for directing the pivotal movement of the locking member from the locked position to the unlocked position to locate the locking member adjacent the base of the latch when it is in the unlocked position thereby allowing the latch to move away from the lip toward the shank.

11. The combination of claim 10 including: handle means connected to the pin means to provide a visual indication of the locked and unlocked positions of the locking member, said handle means being located adjacent the outside faces of the sidewalls of the latch.

12. The combination of claim 10 wherein: the sidewalls of the latch have holes to accommodate a pin to selectively hold the latch in an open position and in a closed position.

13. The combination of claim 10 wherein: the upper ends of the slots in the sides have downwardly directed recesses for accommodating the pin means to hold the locking member in the unlocked position.

14. The combination of claim 10 wherein: the base of the U-shaped latch has a recess at its outer end to accommodate opposite portions of the lip.