

Dec. 13, 1960

J. H. MITCHELL

2,964,347

UNIVERSAL HOOK

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2 Sheets-Sheet 1

Fig. 1

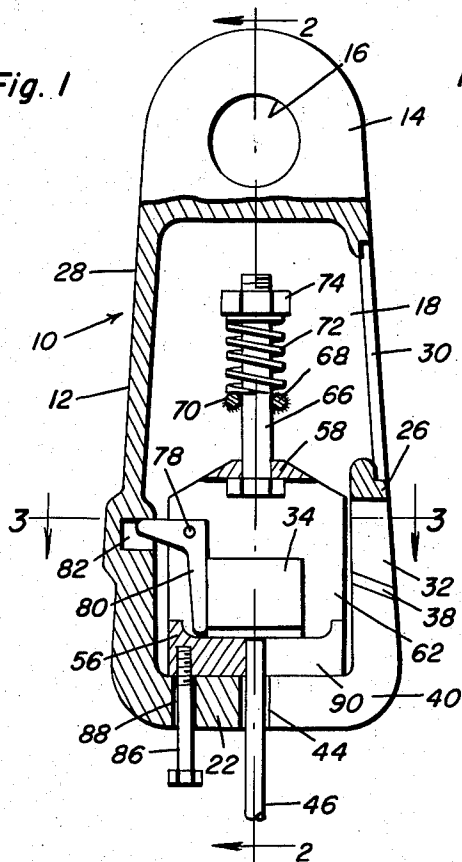


Fig. 2

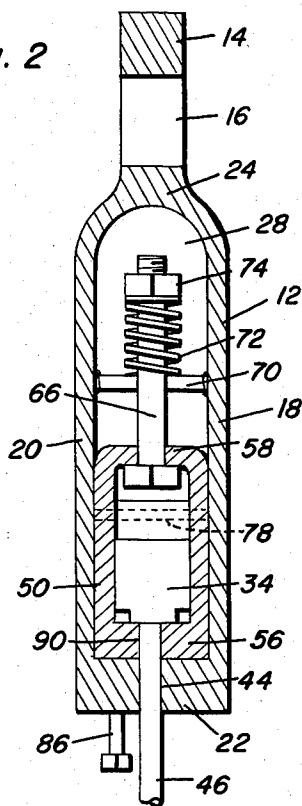


Fig. 4

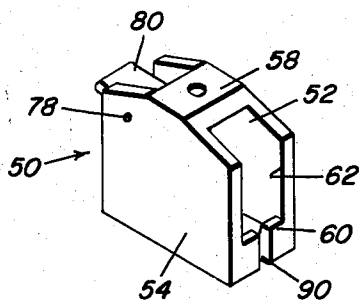
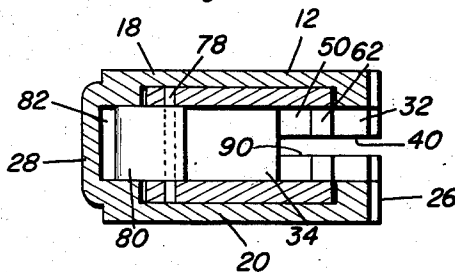


Fig. 3



John H. Mitchell
INVENTOR.

BY *Alonso A. O'Brien*
and *Harvey B. Jackson*
Attorneys

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J. H. MITCHELL
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Fig. 5

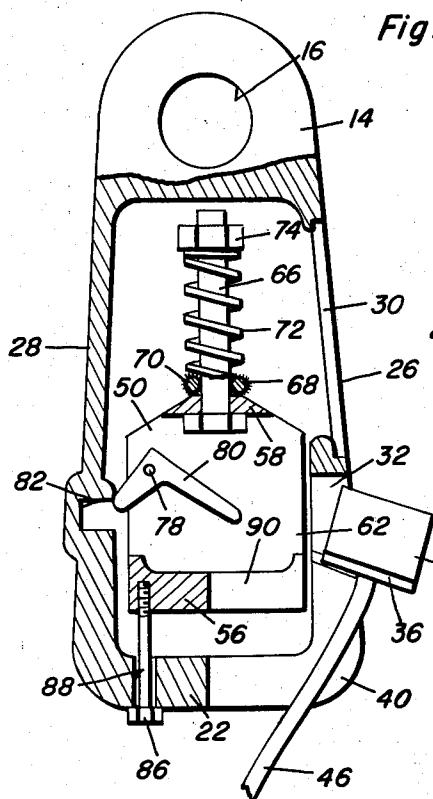


Fig. 6

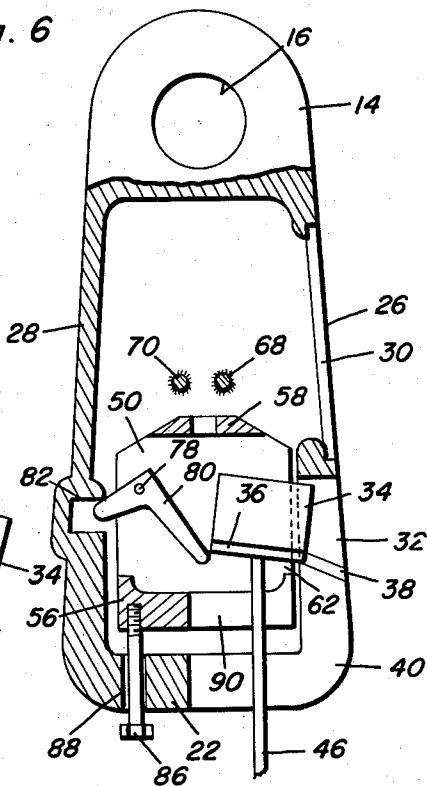
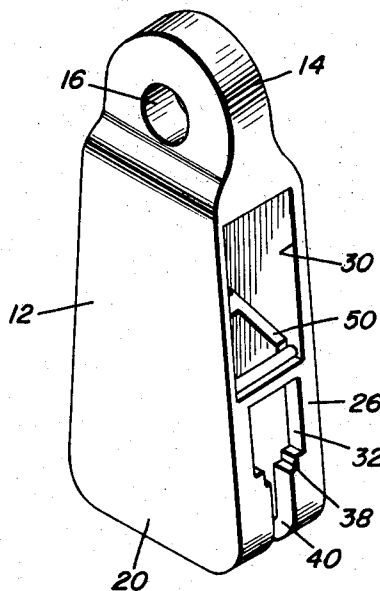


Fig. 7



John H. Mitchell
INVENTOR.

BY *Charles A. O'Brien*
and *Harvey B. Jackson*
Attorneys

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2,964,347

UNIVERSAL HOOK

John H. Mitchell, Montesano, Wash., assignor to Mar Hook Equipment, Inc., Aberdeen, Wash., a corporation of Washington

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21 Claims. (Cl. 294—83)

This invention relates to hoisting apparatus and particularly to improvements in hoisting hooks.

In handling loads by mechanical means it is common to use a sling having a knob or ferrule attached to the sling. It is difficult if not impossible to release ferrule slings from present hoisting hooks in a completely satisfactory manner. Accordingly, one of the primary objects of this invention is to provide a hoisting hook capable of automatically releasing a load with its sling having a ferrule attached to the end of it.

A further object of this invention is to provide a hoisting hook as aforesaid which permits three methods of the ferruled sling release that is, manually, by the operator allowing the hook to strike an object or the top of a load and finally, by automatically lifting or forcing the sling or rigging from the hook when the stress on the sling line is decreased to a predetermined amount.

A more specific object of the invention is to provide a hoisting hook for ferruled sling lines, which includes a cage mounted in a housing, the cage and housing having ferrule entrances which are adapted to be moved into registry by displacement of the cage during which time means for pushing the ferrule through the entrances are automatically set into operation.

Other objects and advantages of the invention such as the reduction of accidents, time, effort, labor and wire rope savings as well as increasing the life of hoisting equipment, will become apparent in following the description of this invention.

In the drawings:

Figure 1 is a vertical sectional view of one form of the invention showing particularly a ferrule in place therein;

Figure 2 is a vertical transverse sectional view taken substantially on the plane indicated by the section line 2—2 of Figure 1 and in the direction of the arrows;

Figure 3 is a horizontal transverse sectional view taken substantially on the plane indicated by the section line 3—3 of Figure 1 and in the direction of the arrows;

Figure 4 is a perspective view of the cage which operates as a hook in the invention;

Figure 5 is a vertical sectional view similar to Figure 1 but illustrating the ferrule as it is separated from the hoisting hook;

Figure 6 is a vertical sectional view similar to Figures 1 and 5 but of the hoisting hook with certain parts being removed and demonstrating manual removal of the ferrule from the hook; and

Figure 7 is a perspective view of the housing constituting a part of the illustrated embodiment of the invention.

The hoisting hook 10 shown in the drawings demonstrates the principles of the invention and it is understood that various structural departures may be made. Hook 10 comprises a housing 12, shown especially in Figure 7, with an ear 14 at its upper end having an aperture 16 in it to accept a standard fastening device of hoisting equipment. The housing 12 has two side walls 18 and 20 respectively, a bottom wall 22, a top 24, a front and a back wall 26 and 28 respectively. There is an opening 30 in the upper portion of the front wall 26 to provide easy access to the interior of housing 12. Opening 32 in the wall 26 is below opening

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30, the opening 32 functioning as an entrance for a ferrule 34 or the equivalent. Inasmuch as the ferrule 34 selected for illustration has lower guideways 36, the opening 32 is fashioned with lower shoulders 38 which are engaged with the guideways 36 during insertion and removal of the ferrule 34 from the housing 12. The lower rope slot 40 is formed in the front wall 26 of the housing 12 and extends through part of the bottom wall 22, finally terminating in an aperture 44 into which the slot 40 opens and through which aperture the sling cable or rope 46 extends when the ferrule 34 is in place within the hoisting hook 10.

A cage 50 (Figure 4) functions as a hooking element for the ferrule 34. This cage is disposed within the housing 12 and is adapted to be moved toward or away from the bottom wall 22. The cage 50 has sides 52 and 54, a bottom 56, a top bridging member 58 and a short front wall 60. There is an opening 62 in the short front wall 60, the opening 62 being adapted to register with opening 32 in housing 12, when the bottom wall 56 of the cage 50 rests upon the bottom wall 22 of the housing, in order to form a through passageway for the ferrule. When openings 32 and 62 are in registry ferrule 34 may be separated from the housing, but when they are not the ferrule will remain in the hoisting hook 10 unless manually separated therefrom.

Cage 50 has a suspension bolt 66 connected to the top bridging member 58, the suspension bolt extending between the parallel stops 68 and 70 that are fixed to the opposite side walls 18 and 20 of the housing 12. The cage actuating means are operatively connected with the suspension bolt 66. Although an air cylinder or hydraulic cylinder for power actuation may be used, a simplified version is illustrated. Spring 72 seating upon spring stops 68 and 70 reacts upon the nut 74 which is threaded on suspension bolt 66. In view of this construction spring 72 yieldingly opposes movement of the cage 50 within the housing away from the spring stops 68 and 70 and assists movement in the opposite direction or upwardly in the housing 12. Adjustment of nut 74 on suspension bolts 66 will govern the stored energy within the spring under operating conditions.

Cage 50 has a means therein for pushing the ferrule 34 through the openings 62 and 32 when the latter are aligned. Such means consists of a lever 80 mounted pivotally between its ends on pin 78. One end of the lever is operable in an opening 82 formed in the back wall 28 of the housing 12, while the other end is disposed alongside of the ferrule. The lever 80 is actuated in response to movement of the cage 50 within the housing 12. One suggested way to move the cage 50 in the housing 12 is to apply a properly directed force on the push rod 86. This rod is secured to the lower wall of cage 50 and extends through a passage 88 in the bottom wall 22 for operation from the exterior of the housing 12.

The operation of the invention is as follows: The sling ferrule 34 is pushed through openings 32 and 62 by hand, the cable or rope 46 passing through the slot 40 in the housing 12 and the slot 90 in the cage 50 which is in communication with the opening 62. By the hoisting apparatus (not shown) cable 46 is drawn taut and the ferrule 34 pulls cage 50 downwardly against the spring opposition. The sling is then moved to its new location. Now, the ferrule 34 may be manually pulled from the hoisting hook or, when lowering the sling, the operator of the hoist may allow hoisting hook 10 to strike an object or the top of the load. In this event push rod 86 aided by spring 72 or in the absence of spring 72 (Figure 6) will push cage 50 upwardly in housing 12. Inasmuch as lever 80 has one end in the opening 82, the lever 80 must swing arcuately in a counter-

clockwise direction whereby an end thereof contacts and pushes the ferrule 34 through the opening 62 and into the opening 32. The lower wall of the opening 32 may be downwardly inclined as shown in the drawings so that the ferrule simply slips down it. Finally, the ferrule 34 may be separated from the hook by resting the sling and load so as to cause the cable 46 to become slack and allow spring 72 to pull the cage 50 upwardly in housing 12 whereby the lever 80 pushes the ferrule 34 through the aligned openings 62 and 32.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. In a hoisting hook for a sling ferrule, a housing provided with a lateral ferrule entrance opening, a ferrule receiving cage having a lateral opening through which the ferrule is adapted to pass, said cage being disposed within said housing, means on said housing mounting said cage for movement relative to said housing between an opening aligned position and an opening misaligned position, and means in said cage responsive to movement of said cage with respect to said housing for engaging and pushing the ferrule through said openings when said openings are in registry.

2. The combination of claim 1 including resilient means in said housing and engaging the latter and said cage and yieldingly urging the latter into a position with said openings in registry for passage of said ferrule therethrough.

3. The combination of claim 2 including means carried by said housing and accessible and actuatable from the exterior thereof for moving said cage in said housing to a position in which said openings are sufficiently out of registry to prevent passage of said ferrule therethrough.

4. The combination of claim 1 wherein the opening in said housing has lower walls inclined downwardly and outwardly to facilitate separation of the ferrule from said housing.

5. The combination of claim 1 including resilient means in said housing and engaging the latter and said cage and yieldingly urging the latter into a position with said openings in registry for passage of said ferrule therethrough, said housing having a further opening therein adjacent said resilient means for access to the latter for adjustment thereof.

6. The combination of claim 1 including means connected to said cage and housing for limiting said cage to guided movement whereby to bring said openings into registry.

7. The combination of claim 2 including means carried by said housing and accessible and actuatable from the exterior thereof for moving said cage in said housing to a position in which said openings are sufficiently out of registry to prevent passage of said ferrule therethrough, wherein said cage moving means comprises a rod secured to said cage and slidably extending through said housing and movable from the exterior of the latter.

8. The combination of claim 1 wherein said ferrule pushing means includes a lever pivotally mounted between its ends upon said cage, said lever having a portion thereof constituting a pusher for urging a ferrule through said openings when the latter are aligned.

9. The combination of claim 8 including means carried by said housing and accessible and actuatable from the exterior thereof for moving said cage in said housing to a position in which said openings are sufficiently out of registry to prevent passage of said ferrule therethrough.

10. The combination of claim 9 including resilient means in said housing and engaging the latter and said cage and yieldingly urging the latter into a position with said openings in registry for passage of said ferrule therethrough.

11. The combination of claim 10 including downwardly inclined rails on the bottom surface of said housing to guide the ferrule downwardly and outwardly as it is separated from said cage and housing.

12. The combination of claim 1 wherein at least one of said cage and housing has a bottom wall with an opening in said bottom wall and with the latter and the opening in the other of said cage and housing extending downwardly thereto whereby when a ferrule is disposed in said cage its sling will be suspended directly therefrom with its cable being disposed through both of said openings.

13. The combination of claim 12 wherein said ferrule pushing means includes a lever pivotally mounted between its ends upon said cage, said lever having a portion thereof constituting a pusher for urging a ferrule through said openings when the latter are aligned.

14. The combination of claim 13 wherein said housing has an abutment surface disposed for engagement by and actuation of another portion of said lever when said cage is positioned for registry of said openings whereby said first mentioned portion of said lever will be engaged by a ferrule to selectively cause ejection of said ferrule through said openings and movement of said cage whereby to cause misalignment of said openings.

15. The combination of claim 14 including downwardly inclined rails on the bottom surface of said housing to guide the ferrule downwardly and outwardly as it is separated from said cage and housing.

16. The combination of claim 1 wherein said housing has a pair of generally upright walls between which said cage is slidably and guidingly received, said ferrule pushing means including an abutment on one of said upright walls, a member movably carried by said cage and having a first portion engageable with a ferrule and a second portion engageable with said abutment for selectively urging the ferrule through said openings or urging said cage out of alignment with said openings.

17. The combination of claim 16 including means carried by said housing and accessible and actuatable from the exterior thereof for moving said cage in said housing to a position in which said openings are sufficiently out of registry to prevent passage of said ferrule therethrough.

18. The combination of claim 1 wherein said cage has a ferrule receiving and supporting seat therein, said housing and cage having bottom walls, said openings extending downwardly to constitute slots in said bottom walls whereby when a ferrule is rested on said seat, the ferrule sling may extend downwardly through said slots in said bottom walls.

19. The combination of claim 18 wherein said ferrule pushing means includes a lever pivoted to said cage and having a first portion engaging a ferrule when resting on said seat and a second portion engaging a portion of said housing comprising an abutment surface when said openings are aligned.

20. The combination of claim 19 wherein said lever is pivoted within said cage.

21. The combination of claim 20 including means carried by said housing and accessible and actuatable from the exterior thereof for moving said cage in said housing to a position in which said openings are sufficiently out of registry to prevent passage of said ferrule therethrough.

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