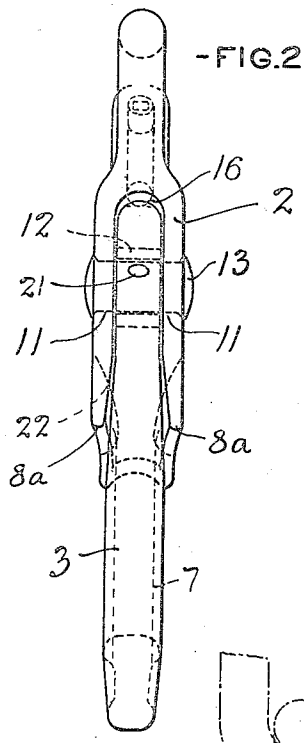
May 1, 1934. W. J. BEMIS 1,956,786

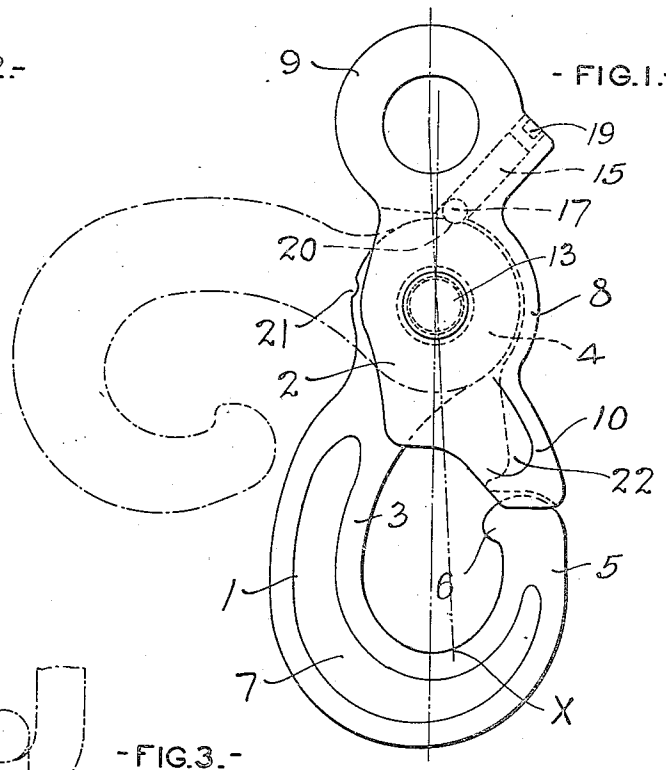
SAFETY HOOK

Filed May 12, 1933

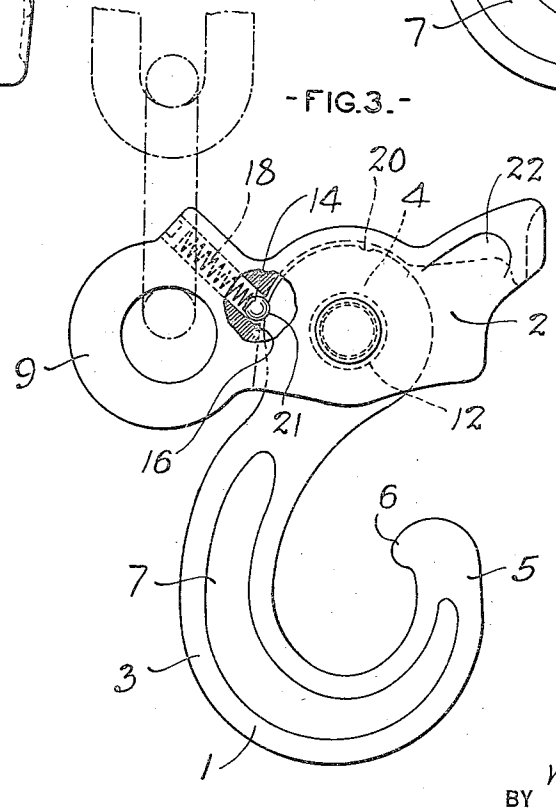
-FIG.2.-



-FIG.1.-



-FIG.3.-



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SAFETY HOOK

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8 Claims. (Cl. 24—230.5)

This invention relates to hooking devices for suspending loads, of the type used on the sling chains of cranes, and particularly to safety hooking devices provided with safe-guarding features for the prevention of accidental unhooking.

The main object of the present invention is to provide a hooking device comprising a hook and a closure member therefor adapted to be held in closed position while acted upon by the force of a load carried thereby.

A further object of the invention is to provide yielding means for holding the closure member in either closed, open or intermediate position when not under the action of a load.

Other and further objects of and advantages achieved by the present invention will be apparent from the following detailed description of an embodiment thereof and the appended claims.

In the accompanying drawing, Figure 1 is a side elevation of an approved embodiment of the present invention showing the hook in closed position and indicating by broken lines the hook in open position; Fig. 2 is an end view looking from the left of Fig. 1; and Fig. 3 is a side elevation of the device with the hook in open position, a part being broken away to show a friction-retaining means, and a part of a lifting chain being indicated by broken lines.

Referring in detail to the drawing, the hooking device comprises two main parts, a hook 1 and a clevis 2.

The hook 1 is of the general crook-shape of ordinary practice having a long arm 3 provided with an eye 4 at its upper end, and a short arm 5. The arm 5 and the main portion of the arm 3 are of a slightly greater thickness than the eye 4 and that portion of the arm 3 immediately below the eye 4. An inwardly extending knob 6 is formed on the upper end or bill of the short arm 5 in the same manner as described in my United States Patent 1,459,816, issued June 26, 1923. A lateral finger gripping groove 7 is formed on each side of the hook 1, extending from a point spaced below the upper end of the arm 5 to a point near the upper end of the arm 3. These grooves together with finger gripping grooves in the clevis, hereinafter described, enable the device to be effectively and conveniently grasped and handled by the operator.

The clevis 2 comprises a body portion 8, U-shaped in cross section and open at its rear end and at its bottom. An eye 9 extends from the upper end of the body portion for engagement with a lifting sling or ring, and a leg 10 extends downwardly from the bottom of the body portion for closing the hook opening.

Aligned openings 11 are formed in the opposite walls of the body portion 8. A metal bushing 12 is provided in the eye 4, and a pin is passed through this bushing and the openings 11. The pin is headed over at its opposite ends on the outer sides of the body portion 8 of the clevis, the pin being free to turn in both the bushing and the openings 11 but having no side play. The sides of the body portion 8 are spaced so as to permit the eye 4 and the immediately adjacent portion of the arm 3, which as aforesaid is of the same thickness as the eye 4, to fit evenly within the body portion 8. The hook 1 is thus pivotally attached to the clevis. The open rear end and bottom of the body portion 8 of the clevis permits free swinging of the hook 1 on the pin 13 to open and closed positions, and the sides of the body portion at the lower parts of their rear margins are extended to increase the bearing surfaces and are slightly flared outwardly, as indicated at 8a, to fit the thicker portion of the arm 3, any tendency of wobbling of the clevis on the hook being prevented by the large bearing surface and the even fitting of the connected parts.

When the device is in closed position with the hook as shown in full lines in Fig. 1, the leg 10 extends across and closes the space between the knob 6 and the upper end of the arm 3, thus preventing the outward passage through the hook opening of a sling or ring of a load engaged by the hook, in this position. When the device is in open position, with the hook as indicated in broken lines in Fig. 1, or as clearly shown in Fig. 3, the space between the knob 6 and the upper end of the arm 3 is entirely open to permit engagement or removal of a sling or ring. It will of course be understood that in operation, with the device in open position prior to the attachment of a load, it will hang in a position between the open position shown in Fig. 1 and the position shown in Fig. 3.

Fig. 1 shows the eye of the clevis slightly off center to the rear of the device. The figure shows in full lines the intended relative positions of the hook and clevis in fully hook-closed position. Theoretically, the center of the clevis eye 9, the hook eye 4 and the point of application of the sling or ring to the hook 1 should be disposed in the same line. Ordinarily the sling or ring of a load tends to hang in a position in the center line of the hook and this condition is present when the device is closed by hand. But when the hook is left to close automatically, the hook in its open

position disposes the arm 5 more or less in a horizontal position and the sling or ring is placed on this arm. As the hook begins to close, when the strain is taking place, the sling or ring naturally drops or moves nearer to the center of the hook, but as a matter of fact it usually comes to rest at a point near the center but on the forward side of the hook, thereby tending to slightly open the hook under the force of the load. For this reason it is highly desirable to offset the clevis eye, as above stated, to the rear of the theoretical center line of the hook, to an extent which will compensate for the aforesaid opening movement of the hook. When the load is applied, the clevis eye 9 will swing toward the front, so to speak, as the actual point of application of the ring or sling swings toward the rear, thereby maintaining the leg 10 relative to the arm 5 in closed position as shown in Fig. 1.

In fixing the amount of displacement of the eye 9, the usual actual point of application of the ring or sling to the front of the theoretical center line of the hook is determined (indicated for illustrative purposes, in the present instance, at the point X in Fig. 1), and the center of the clevis eye 9 is placed approximately in the line passing through this point of application and the center of the eye of the hook 1, as shown in Fig. 1.

In order to secure the device in open or closed position, that is, to hold the hook in the desired position relative to the clevis until it is intentionally changed, friction means indicated generally by the numeral 14, are provided. These means 14 comprise a cylindrical chamber 15, formed in the upper part of the body portion 8 of the clevis and the eye 9. The lower end of the chamber 15 is open to the adjacent outer surface of the eye 4 and is peened over at 16. A ball 17 is disposed in the chamber 15 and extends in part outwardly from the chamber 15 but is limited by the peened over part at 16. A helical spring 18 is disposed in the chamber 15 and held in compression against the ball 17 by a plug 19 which is screwed into the outer end of the chamber. Depressions 20 and 21 are formed in the eye 4 at the upper and rear parts respectively of its outer surface so that, when the hook is in closed position, the ball 17 will rest in the depression 20, and when the hook is in fully open position, the ball 17 will rest in the depression 21. The spring 18 is strong enough to produce sufficient friction to hold the clevis and the hook in any desired fully or partly open or closed position, but the depressions 20 and 21, while not essential to the design, give additional holding power where the greatest security is needed. The plug 19 may be readily adjusted by screwing it inwardly or outwardly so as to effect the correct amount of compression of the spring 18 on the ball 17 and consequently effect the desired amount of friction. This adjustment also obviously enables the spring to be further compressed in order to compensate for wear.

While in the embodiment illustrated, the spring 18 and ball 17 are carried by the clevis, it will be readily apparent that these parts may be disposed within the eye 4, in which instance, of course, depressions corresponding to the depressions 20 and 21 would be formed at proper locations in the clevis. Likewise it is within the contemplation of the invention to form the upper end of the hook arm 3 as the body portion 8 of the embodiment illustrated is formed, and to replace the body portion 8 of the clevis by an eye like the eye 4, thus changing the construction so that the hook 1 provides a housing for the connected portion of the clevis.

A lateral finger gripping groove 22 is formed on each side of the leg 10, which grooves enable the clevis to be effectively and conveniently grasped by the operator, and which grooves, together with the grooves 7 of the hook, thus provide simple and effective means for operating the device.

To open the device for engaging or removing a sling or ring, it is only necessary to swing the hook rearwardly relative to the clevis to effect an opening or space between the knob 6 and the upper end of the arm 3, through which space the sling or ring may freely pass. The friction means will cause the device to remain in this position until it is intentionally brought back to closed position by the operator. Likewise when the device is in closed position, it is definitely held in such position by the friction means until intentionally opened. Also, the weight of a load holds the device closed. When the device is in open position and a sling or ring of a load has been inserted, the taking up of slack or raising the device will automatically move the parts to hook-closed position.

It will be apparent that such automatic closing of the device makes possible the attachment of a sling or ring of a load by merely guiding the hook on to the sling or ring and thereupon raising the device, thus affording a distinct advantage in safe loading, as it eliminates the necessity of an operator handling the hook during the application of a load and being subjected to the hazard of having his hands caught between the hook and the sling or ring of the load, and further affording an advantage in making possible rapid loading, as delay of waiting while the device is manually closed by a person at the load is eliminated. To unload, however, requires an intentional opening of the device by an operator, so that accidental opening is not possible. This feature of safety is of particular importance when a load is momentarily grounded or slackened, while being lowered, due to catching upon an obstruction in or adjacent to its path of movement and being immediately thereafter released. Under such circumstances many of the so-called "safety hooks" of the prior art would allow the load to become disengaged from the hook, and fall, endangering persons therebelow. While many persons have been injured and lives have been lost in this manner where hooks of the prior art have been used, the present device is particularly designed, as aforedescribed, to eliminate all danger of such accidental unhooking. It will further be apparent that the present improved device is free from projecting points or corners which would be liable to catch upon nearby objects and that the friction means is so designed as to be substantially foolproof and subject to a minimum amount of wear or damage.

While there has been hereinbefore described an approved embodiment of the present invention, it will be readily apparent that many and various changes and modifications in form, design, structure and arrangement of parts may be made without departing from the spirit of the invention and it will be understood that all such changes and modifications are contemplated as a part of the present invention as defined in the appended claims.

The invention claimed and desired to be secured by Letters Patent is:

1. A hooking device comprising a hook member

embodying a pair of upstanding arms open between their upper ends; a lifting member pivotally connected to the upper end of one of said arms and provided with an extension, said members being relatively movable amount the point of said pivotal connection to a closed position with said extension disposed across the opening between said upper ends and movable to an open position with said extension removed from said opening; and friction resistance means carried by one of said members and yieldingly engaging the other of said members for yieldingly resisting said relative pivotal movement of said members.

2. A hooking device comprising a hook member embodying a pair of upstanding arms open between their upper ends; a lifting member pivotally connected to the upper end of one of said arms and provided with an extension, said members being relatively movable about the point of said pivotal connection to a closed position with said extension disposed across the opening between said upper ends and movable to an open position with said extension removed from said opening; and friction resistance means carried by one of said members and yieldingly engaging a surface of the other of said members for yieldingly resisting said relative pivotal movement of said members, said other member being provided with an irregularity in said surface adapted to be yieldingly engaged by said friction resistance means when said device is in said closed position, whereby an increased amount of yielding resistance will be offered to said relative pivotal movement of said members from said closed position.

3. A hooking device comprising a hook member embodying a pair of upstanding arms open between their upper ends; a lifting member pivotally connected to the upper end of one of said arms and provided with an extension, said members being relatively movable about the point of said pivotal connection to an open position with said extension disposed across the opening between said upper ends and movable to an open position with said extension removed from said opening; and friction resistance means carried by one of said members and yieldingly engaging a surface of the other of said members for yieldingly resisting said relative pivotal movement of said members, said other member being provided with an irregularity in said surface adapted to be yieldingly engaged by said friction resistance means when said device is in said open position, whereby an increased amount of yielding resistance will be offered to said relative pivotal movement of said members from said open position.

4. A hooking device comprising a hook member embodying a pair of upstanding arms open between their upper ends, said member having a finger gripping groove provided in one of its sides; and a lifting member pivotally connected to the upper end of one of said arms, and provided with an extension, said extension having a finger gripping groove formed in one of its sides, said members being relatively movable about the point of said pivotal connection to a closed position with said extension across and closing the opening between said upper ends of said arms and said members being relatively movable to a position with said extension away from said opening.

5. A hooking device comprising a hook member embodying a pair of upstanding arms open between their upper ends, said member having a finger gripping groove provided in one of its sides; a lifting member pivotally connected to the upper end of one of said arms, and provided with an extension, said extension having a finger gripping groove formed in one of its sides, said members being relatively movable about the point of said pivotal connection to a closed position with said extension across and closing the opening between said upper ends of said arms and said members being relatively movable to a position with said extension away from said opening; and yielding means carried by said members for resisting relative pivotal movement therebetween whereby accidental opening or closing movement will be prevented.

6. A hooking device comprising a hook member embodying a pair of upstanding arms open between their upper ends; a lifting member pivotally connected to the upper end of one of said arms and provided with an extension, said members being relatively movable about the point of said pivotal connection to a closed position with said extension disposed across the opening between said upper ends and movable to an open position with said extension removed from said opening, one of said members being provided with a chamber open adjacent the other said member; a ball in said chamber extending in part through said opening and bearing on an adjacent surface of said other member; a spring in said chamber bearing at one of its ends on said ball; and means at the other end of said chamber engaging the other end of said spring for holding said spring under compression against said ball to yieldingly force said ball against said adjacent surface, to effect resistance to relative pivotal movement of said members.

7. A hooking device comprising a hook member embodying a pair of upstanding arms open between their upper ends; a lifting member pivotally connected to the upper end of one of said arms and provided with an extension, said members being relatively movable about the point of said pivotal connection to a closed position with said extension disposed across the opening between said upper ends and movable to an open position with said extension removed from said opening, one of said members being provided with a chamber open adjacent the other said member; a ball in said chamber extending in part through said opening and bearing on an adjacent surface of said other member; a spring in said chamber bearing at one of its ends on said ball; and means at the other end of said chamber engaging the other end of said spring for holding said spring under compression against said ball to yieldingly force said ball against said adjacent surface, to effect resistance to relative pivotal movement of said members, said other member being provided with an indent in its said adjacent surface arranged for the reception of said extending part of said ball when said members are in closed position to provide an increased amount of resistance to opening movement from said closed position.

8. A hooking device comprising a hook member embodying a pair of upstanding arms open between their upper ends; a lifting member pivotally connected to the upper end of one of said arms and provided with an extension, said members being relatively movable about the point of said pivotal connection to a closed position with said extension disposed across the opening between said upper ends and movable to an open position with said extension removed from said opening, one of said members being provided with

a chamber open adjacent the other said member; a ball in said chamber extending in part through said opening and bearing on an adjacent surface of said other member; a spring in said chamber bearing at one of its ends on said ball; and means at the other end of said chamber engaging the other end of said spring for holding said spring under compression against said ball to yieldingly force said ball against said adjacent surface to effect resistance to relative pivotal movement of said members, said other member being provided with an indent in its said adjacent surface arranged for the reception of said extending part of said ball when said members are in open position to provide an increased amount of resistance to closing movement from said open position.

WILLIAM J. BEMIS.