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(54) SAFETY HOOK

(71) We, A/S KJAETTINGFABRIKEN, a Norwegian joint-stock company, of 3790 Helle, Norway, do hereby declare the invention for which we pray that a patent may be granted to us and the method by which it is to be performed to be particularly described in and by the following statement:-

The present invention relates to a safety hook particularly adapted for lifting and lowering goods, pulling anchoring or the like, by means of straps, chains or the like which may be hooked onto the hook, the hook comprising a spring actuated mousing piece of channel-shape adapted to close the mouth or gap of the hook, to prevent unintentional slipping of the strap, a chain link or the like from the hook.

In connection with such hooks a large number of spring actuated mousing pieces have previously been proposed, with various constructions of the connection between the spring and the mousing piece and giving widely varying degrees of safety. From U.S.-Patent Specification No. 3,575,458 a safety hook is known, wherein a spring-biased mousing piece is pivotally mounted externally of the hook shank. The mousing piece opens the hook mouth by pivoting inwardly, and in the closed position it is pressed against the inside of the free end of the hook. The mousing piece may be locked in the closed position manually by inserting a pin through aligned holes in the mousing piece. Such a pin may also be provided with a manually operated stop element. Thus, this prior art mousing piece is partly manually operated and has no defined open position unless the pin is placed so as also to bear against the outside of the hook shank.

An object of the present invention is to provide a safety hook wherein the mousing piece has well defined open and closed positions and in which the hook and mousing piece are simple to manufacture and easy to use, provide improved safety and cannot readily be rendered inoperative.

According to the invention, there is provided a safety hook having a coupling eye in its shank and a mousing piece for closing the mouth of the hook, said mousing piece being channel-shaped and being pivotally mounted on a bolt extending through the eye, and a compression spring located within the channel-shaped mousing piece and having one end bearing against the shank of the hook and its opposite end bearing against a transverse wall of the mousing piece, said one end of the spring, in the closed position of the mousing piece, being offset, with respect to an imaginary straight line joining the pivot axis of the mousing piece to said opposite end of the spring, on the side of said line remote from the mouth of the hook.

Due to such a location of the spring, the mousing piece has two well defined positions, namely a hook open position and a hook closed position to which the mousing piece will be urged by the spring. During the pivotal movement of the mousing piece between these two positions the spring will pass through a position of maximum compression. The spring, which may be a coil spring, is preferably protected, for example, against a chain link in the hook mouth.

Preferably, the mousing piece is adapted to cooperate with a shackle or an eye which connects the hook to a strap, chain or the like. By providing a pivotal connection between the mousing piece and the shackle, the mousing piece may be arranged to follow the pivotal movements of the shackle relative to the hook, and thus automatically be moved into the closed position when the hook and the shackle are subjected to load forces. Further, the mousing piece will automatically be moved into the open position when the hook in an unloaded condition is rotated relative to the shackle, in which open position a strap or chain may be hooked on or off the hook.

The invention will now be further described, by way of example, with reference to the accompanying drawings, in which:-

Fig. 1 is a side view of one embodiment of safety hook according to the invention, and

Fig. 2 shows the hook as viewed from the right in Fig. 1.

Referring to the drawings, a safety hook comprises a main body 1 with a neck portion or shank 2 having a coupling eye 3 which is adapted to receive a bolt 4 of a shackle 5. This shackle may preferably, but not necessarily be of the type shown in Norwegian Patent Specification No.122,214 (or the corresponding British Patent Specification No. 1,262,418). The hook and the shackle should not however be easily disconnectable from each other.

A channel-shaped mousing piece 6 of generally U cross-section has side walls 7, 8 which substantially cover the flanks of the eye 3 of the hook and is provided with holes adapted to receive the bolt 4. The free end of the mousing piece between the side walls 7, 8 is adapted to engage and cover the tip or free end 9 of the hook body 1 from the outside. The mousing piece is provided with a wall 11 extending across the channel of the U-shape mousing piece between the side walls 7 and 8 adjacent the free end of the mousing piece. The wall 11 provides a portion 10 which closes the opening between the side walls 7, 8 in an area which substantially corresponds to the hook mouth between the shank 2 and the hook tip 9. The remainder of wall 11 closes the free end of the mousing piece. The free edge of the wall portion 10 is also adapted to engage the inside of the hook shank 2 when the mousing piece is in the closed position. Further the shank 2 is provided with a radially projecting portion 12 which forms a bearing for one end of a coil spring 13. The opposite end of the spring bears against the transverse wall 11 of the mousing piece.

As can be seen from Fig. 1, when the mousing piece is in the closed position the end of the spring bearing against the shank portion 12 is offset with respect to an imaginary straight line joining the axis of the bolt 4 to the opposite end of the spring, on the side of this line remote from the mouth of the hook.

Consequently, when the mousing piece 6 is pivoted about the axis of the bolt 4 between the two positions shown in Fig. 1, the distance between the bearing portion 12 and the wall 11 is initially reduced and thus a strong force is required to compress the spring.

Further, the mousing piece comprises two flanges 14, 15 each of which is adapted to be interlocked with a leg of the shackle 5, thus causing the mousing piece 6 to follow any pivotal movement of the shackle 5 relative to the hook.

Fig. 1 shows, in full lines, the relative positions of the hook, the shackle and the mous-

ing piece when the hook is loaded, the direction of the shackle being then coincident with a straight line through the axis of the bolt 4 and the bottom of the hook, while the mousing piece 6 closes the mouth in firm engagement with the tip 9 of the hook. In these relative positions it is not possible to open the mousing piece and unhook a strap, as the load effectively causes the shackle and the hook to be locked in the shown relative alignment, and the flanges 14, 15, by engaging the shackle 5, lock the mousing piece 6 relative to the shackle.

Fig. 1 shows, in dotted lines, the relative positions of the shackle 5 and the mousing piece 6, when the hook is in the unloaded condition. The hook may then be turned relative to the shackle and, as the mousing piece 6 and the shackle 5 are interlocked by means of the flanges 14, 15, the mousing piece will adopt a position outside of the hook mouth, as shown, thus permitting one or more strap eyes, shackles or the like to be hooked on or off the hook, the relative positions of the hook and the shackle being secured by the spring 13.

Due to the location of the bearing portion 12 of the spring 13, a force must be applied between the shackle and the hook or the mousing piece to compress the spring which, during the pivotal movement of the mousing piece relative to the hook, moves over a centre position, where the spring 13 is under maximum compression, with the result that the mousing piece moves to a well defined open or closed position relative to the hook, with no possibility of accidental swaying between these positions. The centre position is represented when the spring 13 is at a position where the axis of bolt 4, the bearing portion 12 and the spring 13 all lie on a common imaginary straight line.

In this embodiment, under all circumstances, the spring 13 is well protected and inaccessible within the channel-shaped mousing piece 6, and behind the wall portion 10 of the same and can only be removed when the shackle 5 has been disconnected from the hook, which means a complete dismantling of the hook unit.

#### WHAT WE CLAIM IS:-

1. A safety hook having a coupling eye in its shank and a mousing piece for closing the mouth of the hook, said mousing piece being channel-shaped and being pivotally mounted on a bolt extending through the eye, and a compression spring located within the channel-shaped mousing piece and having one end bearing against the shank of the hook and its opposite end bearing against the shank of the hook and its opposite end bearing against a transverse wall of the mousing piece, said one end of the spring, in the closed position of the mousing piece, being offset, with respect to an imaginary straight line

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joining the pivot axis of the mousing piece to said opposite end of the spring, on the side of said line remote from the mouth of the hook.

5 2. A safety hook as claimed in claim 1, in which the mousing piece comprises two flanges engagable with the legs of a shackle mounted on the hook bolt, whereby to cause the mousing piece to follow the pivotal movements of the shackle relative to the hook, and being automatically movable into the closed position when the hook and the shackle are subjected to load forces, and movable into an open position when the hook, in an unloaded condition, is rotated relative to the shackle.

15 3. A safety hook as claimed in claim 1 or 2, in which the mousing piece covers the tip of the hook when in the closed position.

20 4. A safety hook as claimed in claim 1, 2 or 3, in which the transverse wall of the mousing piece includes a portion which closes the open side of the channel shape of the mousing piece between the shank and the hook tip when the mousing piece is in the closed position.

25 5. A safety hook as claimed in claim 4, in which an edge of the wall portion is adapted to engage the inside of the hook shank when the mousing piece is in the closed position.

30 6. A safety hook constructed and adapted to operate substantially as hereinbefore described with reference to the accompanying drawings.

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FIG. 1.

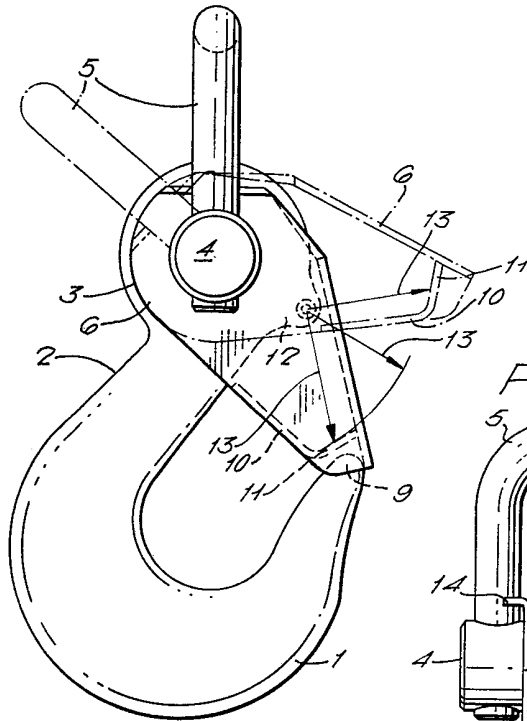


FIG. 2.

