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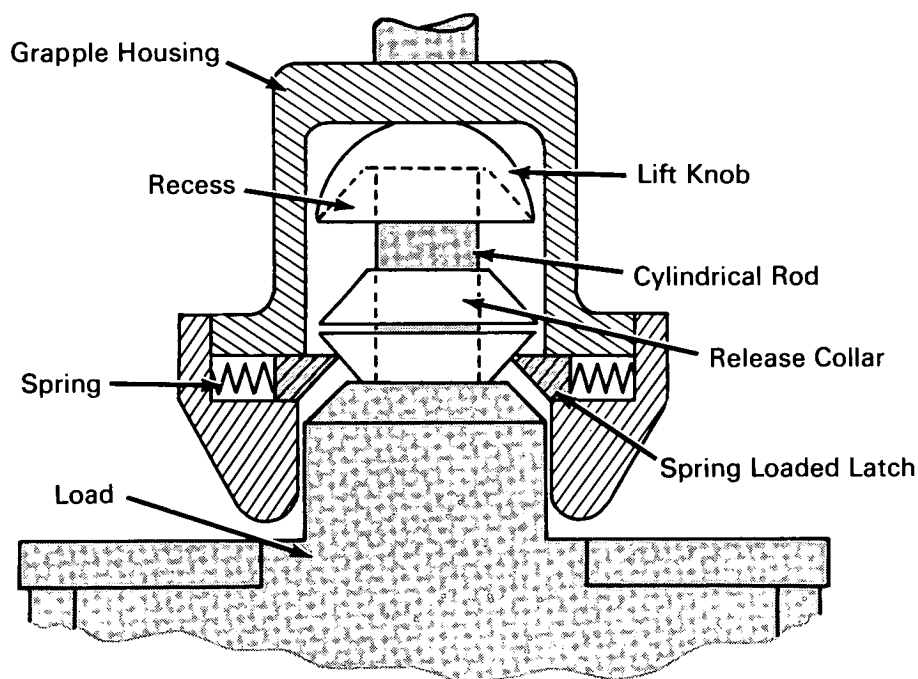


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Self-Actuating Grapple Automatically Engages and Releases Loads from Overhead Cranes



The problem:

To automatically disengage the load from a crane or other overhead lifting device when the load contacts the ground. The release mechanism should reside entirely within the hook or grapple member, and should require no extraneous cables or levers for actuation.

The solution:

A two-piece grapple mechanism consisting of a lift knob secured to the load and a grapple member connected to the crane or lift. The grapple automatically grips the lift knob when lowered over the

knob, and is released when it is lowered further to engage a latch-release collar and then raised. The key feature is the sliding collar under the lift knob which enables the grapple latch to be stripped off over the lift knob.

How it's done:

The grapple member features a cylindrical inner surface containing a circumferential slot of rectangular cross section. Inside the slot is a series of spring-loaded latches having the freedom to slide radially within the slot against the pressure of the springs.

(continued overleaf)

The lift knob is a steel hemisphere with its flat side downward, mounted on the end of a cylindrical rod. A latch-release collar, in the shape of two truncated cones joined end to end at their bases, slides freely along the cylindrical rod. A recess within the lift knob allows the top cone of the collar to fit inside the knob.

The lift knob is first secured to the load, and the grapple member is then lowered over the knob. The latches contact the upper hemispherical surface of the knob and are forced radially into the slot against the springs as the grapple descends. When the grapple is low enough to allow the latches to clear the knob, the springs behind the latches force them radially inward to catch the underside of the knob. The load may then be lifted.

To release the grapple, the load is lowered to the ground, and the grapple is then lowered further. As it lowers, the latches follow the contour of the tapered surfaces of the release collar, catching the surface of the lower cone. The grapple is then raised, and the collar is carried by the latches until its upper cone fits inside the recess in the lift knob. Further raising of the grapple causes the latches to slide along the lower cone and onto the outer surface of the knob without catching the knob lower surface.

Notes:

1. Since no mechanism within the grapple must be cocked or preset before lifting or release operations, the device may be used repeatedly by one lift operator. The only preparation necessary is to attach a lift knob to each load.
2. This grapple could find application in lowering and releasing loads from helicopters, for automatically releasing or lifting parts suspended from production line conveyors, or for moving and releasing loads within a warehouse.
3. Inquiries concerning this innovation may be directed to:

Office of Industrial Cooperation
Argonne National Laboratory
9700 S. Cass Avenue
Argonne, Illinois 60439
Reference: B66-10522

Patent status:

Inquiries about obtaining rights for commercial use of this innovation may be made to:

Mr. George H. Lee, Chief
Chicago Patent Group
U.S. Atomic Energy Commission
Chicago Operations Office
9800 S. Cass Avenue
Argonne, Illinois 60439

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(ARG-81)