

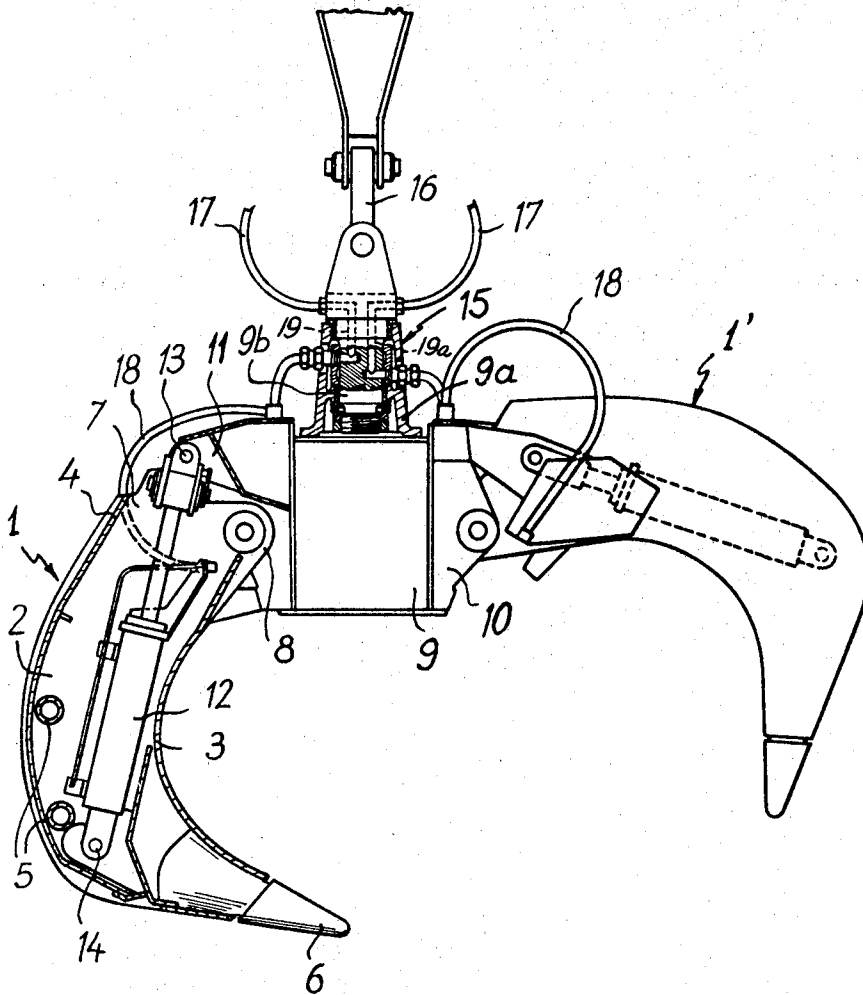
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G. L. GUINOT

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MECHANICAL GRAB

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INVENTOR
GABRIEL L. GUINOT
BY
Mason, Fenwick & Lawrence
ATTORNEYS

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MECHANICAL GRAB

Gabriel L. Guinot, Le Plessis-Belleville, France, assignor to Societe Anonyme Poclair, Le Plessis-Belleville, France

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ABSTRACT OF THE DISCLOSURE

A mechanical grab comprising a central unitary lifting frame, grab claws articulated to the frame, fluid cylinders for operating the claws, means for supplying fluid under pressure to the fluid cylinders, each claw comprising a hollow casing having closed sides and an opening in the upper end thereof, each fluid cylinder being housed within one of the casings having one end thereof connected to the lower part of the claw and the other end thereof extending through the opening in the casing and being articulated to the central unitary lifting frame.

The invention relates to mechanical grabs of the kind comprising a central lifting frame on which are articulated grab claws and rams for operating said claws.

In known grabs of this kind, the ram associated with a claw is situated above the claw and is connected to the upper side of the claw and to the central lifting frame. This means that the rams are not protected in any way against shocks and that the overall height of the grab from the tips of the claws to the point of articulation on the claws to the central frame, is considerable.

The object of the present invention is to overcome these two disadvantages thus, it aims at substantially reducing the total height of the grab and effectively protecting the rams without creating maintenance difficulties.

With this object in view each claw of a grab according to the invention comprises a casing with an opening in its upper part, and a claw operating ram situated within the said casing. One free end of the ram is connected internally to the lower part of the claw, at a relatively short distance from the tip of said claw, and the other free end of the ram extends from the upper end of the casing, through said opening and is articulated about a pivot carried by the central lifting frame of the grab.

At least a part of the wall of the casing, preferably the outer wall, is provided with an easily removable inspection door, providing access to the ram mounted within the casing.

A rotary coupling for pressure fluid is located between the upper part of the central frame and the hooking member of the grab assembly.

In order that the invention may be more clearly understood one particular embodiment thereof will now be described, by way of example, with reference to the accompanying drawing which is a part elevational and part sectional view of the grab; one half of the drawing showing a claw of the grab in section and in its closed position while the other half shows a claw of the grab in elevation and in open position.

Referring to this drawing each claw 1 or 1' comprises a hollow casing, formed by two side walls 2 integral with an inner wall 3 and an outer wall 4 and connected together by cross stays such as 5. The casing terminates at its lower end in a tip 6 formed by an expendable tooth. At its upper end the casing is provided with an opening 7.

The claw is provided at its upper part with two perforated ears 8 situated above the upper edge of the inner plate 3.

Each claw is articulated by said ears 8 to the periphery of a central unitary frame 9 provided with regularly spaced radial connecting flanges 10. Above the connecting flanges 10 the central unitary frame 9 carries the same number of extensions such as 11 which extend radially outwards beyond the connecting flanges 10.

10 An hydraulic ram 12 is housed within the casing of each claw. Each of these rams passes through the opening 7 and extends from a pivoted axis 13 carried by each extension 11, to another axis 14 within the casing at a relatively short distance from the tip 6. Preferably, the free end of the cylinder of the ram 12 is connected to the axis 14 while the free end of its piston rod is articulated about the axis 13.

20 The central unitary frame 9 to which the connecting flanges 10 and the extensions 11 are fixed, is surmounted by a pivot constituting a rotary coupling, designated generally by the reference 15, comprising essentially a sleeve 9a connected with the frame 9 and on the inside of which pivots a swivel pin 9b fixed to the supporting hook member 16 of the grab.

25 Fluid for operating the rams is supplied to the rotary coupling 15 through a flexible pipe 17 and is discharged by a set of other flexible pipes 18 each feeding a cylinder of each ram. One set of fluid lines 17 and 18 intercommunicate through a fluid passageway 19 in the rotary coupling 15 and the second set of fluid lines 17 and 18 intercommunicate through a second fluid passageway 19a in the rotary coupling.

30 The operation is as follows: first, due to the rotary coupling 15, the grab can execute a complete rotation about its axis of symmetry. When the rams are in the extended position, the claws are in the closed position as shown by the reference 1.

35 When the rams are in the retracted position, each claw is pulled upwards by a force exerted in the direction from the axis 14 to the axis 13 which forces it to pivot about its own axis of articulation. The ram also pivots about its axis 13 and the claw-ram assembly finally attains the open position shown by the reference 1'.

40 The outer wall 4 is formed as an easily removable inspection door providing access to the interior of the claw for inspection and maintenance of the rams which in service are protected against shocks.

45 It will be understood that this arrangement in accordance with the invention provides a grab of reduced overall height in comparison to that of known grabs. In effect, the axis of articulation 13 is removed vertically very little from the axis of articulation of the claws. In this respect it will be noted that the relative disposition of said two axes does not in any way have to be as shown in the figure. These axes may, for example, be positioned in the same horizontal plane or the axis of articulation of the rams may even be positioned below the axis of articulation of the claws. The latter arrangement is particularly suitable if it is desired to reverse the mode of action of the rams by interchanging the articulation axes in question. The extension of the rams will correspond to the opening of the claws and their retraction to the closing thereof.

50 It will thus be understood, the invention is capable of numerous practical variations and modifications, without departing from the scope of the invention as defined in the appended claims.

I claim:

70 1. A mechanical grab comprising a central unitary lifting frame, grab claws articulated to said frame, rams for operating said claws, means for supplying operating

fluid to said rams, each claw comprising a hollow casing having closed sides almost totally shielding an operating ram and an opening in the upper end thereof, each claw operating ram being housed within one of said casings having one end of said ram connected to the lower part of the claw and the other end of said ram extending through said opening in said casing and being articulated about a pivot carried by said central lifting frame.

2. A mechanical grab according to claim 1, wherein means for supplying fluid under pressure to the operating rams comprises a rotary coupling disposed between said central frame and a supporting hook member for the grab.

3. A mechanical grab comprising a central unitary lifting frame, grab claws articulated to said frame, rams for operating said claws, means for supplying operating fluid to said rams, each claw comprising a hollow casing having closed sides almost totally shielding an operating ram and an opening in the upper end thereof, each claw operating ram being housed within one of said casings having one end of said ram connected to the lower part of the claw and the other end of said ram extending through said opening in said casing and being articulated about a pivot carried by a radial extension of said central lifting frame and located above and at a greater radial distance from the axis of said central frame than the axis about which the claw is articulated to said frame.

4. A mechanical grab according to claim 3, wherein means for supplying fluid under pressure to the operating rams comprises a rotary coupling disposed between said central frame and a supporting hook member for the grab.

5. A mechanical grab according to claim 3, wherein said

casing is provided with a removable door providing access to the ram within said casing.

6. A mechanical grab according to claim 4, wherein said casing is provided with a door providing access to the interior of said casing.

7. A mechanical grab comprising a central unitary lifting frame, grab claws articulated to said frame, rams for operating said claws means for supplying operating fluid to said rams, each claw comprising a hollow casing having closed sides almost totally shielding an operating ram and an opening in the upper end thereof, each claw operating ram being housed within said casing with one end of said ram connected to the lower part of one of said claws and the other end of said ram extending through said opening in said casing and being articulated about a pivot carried by said central lifting frame, said casing having an easily removable door providing access to the interior of said casing.

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ROBERT G. SHERIDAN, *Primary Examiner.*

GERALD M. FORLENZA, *Examiner.*

F. E. WERNER, *Assistant Examiner.*