

[72]	Inventor	Gabriel L. Guinot Le Plessis Belleville, France
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[73]	Assignee	Societe Anonyme Poclain Belleville, France
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[33]		France
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[56]

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Primary Examiner—Gerald M. Forlenza

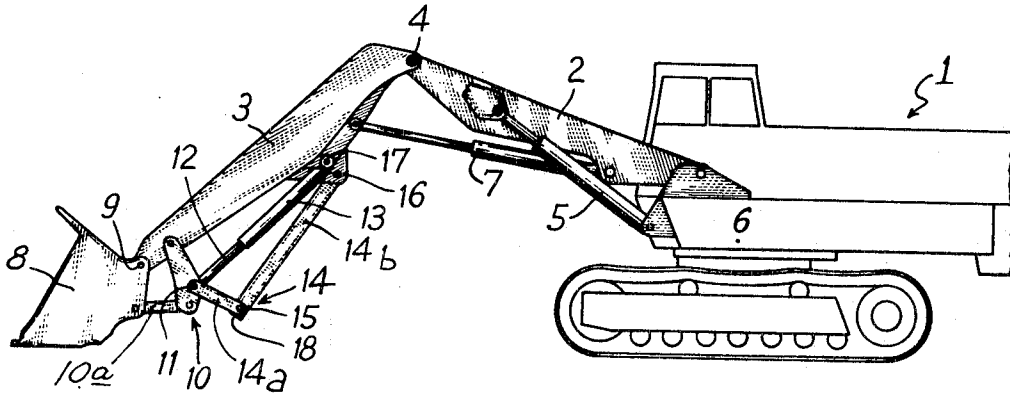
Assistant Examiner—Frank E. Werner

Attorney—Mason, Fenwick & Lawrence

[54] PROTECTION DEVICE FOR A CONTROL RAM
4 Claims, 2 Drawing Figs.

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ABSTRACT: The invention consist in providing on the jib of a mechanical earthworking vehicle pivoted bar means for protecting the ram for operating the jib, or a ram operating an implement such as a bucket or scoop mounted on the jib, the pivoted bar means being so arranged that said ram is located between said bar means and the jib.



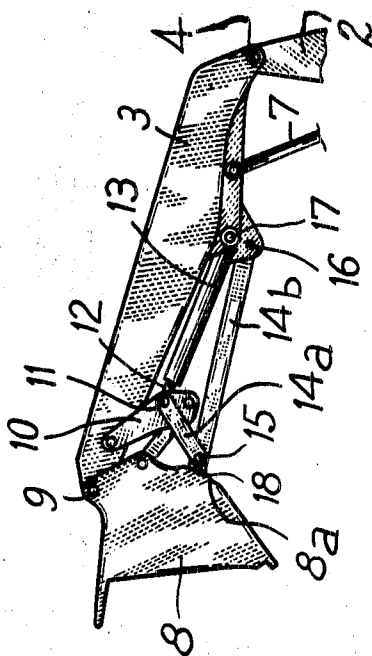


FIG. 2

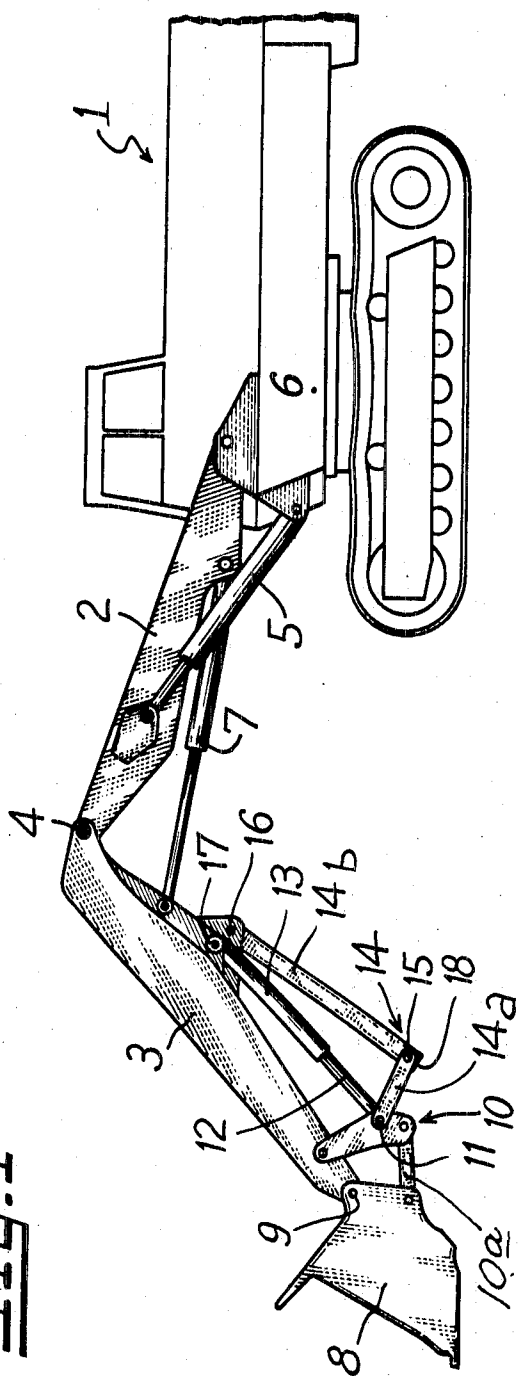


FIG. 1

Inventor
GABRIEL L. GUINOT
By *Mason, Fenwick & Laurence*
Attorneys

PROTECTION DEVICE FOR A CONTROL RAM

The present invention relates to a mechanical earthworking machine, such as a mechanical excavator, of the kind comprising a jib articulated to the turret of said machine and having articulated thereto an earthworking implement, such as a mechanical shovel, bucket or scoop, and power operated rams for operating said jib and said implement.

During the operation of earthworking machines of this kind there is a danger of the rams, and particularly the ram which operates the implement, coming into contact with rocks or other extraneous objects, especially when operating on uneven ground, and thus becoming damaged.

The object of the present invention is to provide means for protecting the rams of earthworking machine against such damage and with this object in view a mechanical earthworking machine is provided with means for protecting the operating rams, said means comprising a pair of bars pivotally connected together end to end and pivotally connected at their other ends respectively to members to which the two parts of the ram are connected, the arrangement being such that said ram is located between said jib and said pair of bars.

According to another aspect of the invention the ram protecting means comprises a pair of bars pivotally connected together end to end and pivotally connected at their opposite ends respectively to said jib and to a lever which is articulated to said jib and which effect pivotal movement of said implement under the action of said ram, said pair of bars, lever and jib together defining a polygon within which said ram is located.

In order that the invention may be more clearly understood one particular embodiment thereof will now be described, by way of an example, with reference to the accompanying drawings in which:

FIG. 1 is a side elevation of a mechanical earthworking machine provided with ram protecting means according to the invention, the ram being shown in its extended position; and

FIG. 2 is a similar view of the jib of the machine showing the ram in its retracted position.

Referring to these drawings the earthworking machine 1, in the form of a mechanical excavator, comprises a jib consisting of two arms 2 and 3 articulated to each other at 4. Arm 2 is articulated to the turret 6 of the machine and is operated by a first power operated ram 5, arranged between the turret 6 and the arm 2, and a second power operated ram 7 arranged between the two arms 2 and 3 of the jib.

Pivotally mounted at 9 on the outer free end of arm 3 is an earthworking implement in the form of a bucket 8. The implement is operated by a power operated ram 12, 13 through a lever 10 one end of which is pivotally connected with arm 3 of the jib and the other end is connected with the bucket 8 through a link 10a. The piston rod 12 of the ram is pivotally connected to lever 10 at its outer end at a point 11 intermediate the ends of said lever and the cylinder 13 of the ram is pivotally connected at 17 to the arm 3 of the jib.

In accordance with the invention the ram 12, 13 is protected by means 14 comprising a pair of bars 14a and 14b pivotally connected together end to end at 15 and pivotally connected at 11 and 16 by their other ends to the lever 10 and the arm 3 of the jib respectively. Thus the ram 12, 13 is located between the jib arm 3 and the pair of protecting bars 14a, 14b within a polygon defined by said pair of arms, the lever 10 and jib arm 3 and is thereby protected by said pair of bars 14a, 14b against

impact with obstacles or extraneous objects beneath ram 12, 13 when the jib 2, 3 is lowered.

As can be seen from the drawings the bar 14a is pivotally connected to lever 10 about the same axis 11 as the piston rod 12 of the ram is connected to said lever and the bar 14b is pivoted to a bracket integral with the arm 3 of the jib about an axis 16 which is parallel and closely adjacent to the axis 17 about which the cylinder 13 of the ram is pivoted to said jib arm 3.

The dimensions and arrangement of the protecting bars 14a and 14b are such that firstly the space between said pair of bars and the jib arm 3 is as small as possible whilst enabling operation of the ram between the two limits of its stroke without said ram fouling said pair of bars and secondly the end 18 of the bar 14b serves the additional purpose of forming an abutment or stop for the bucket 8 to limit the pivotal movement of said bucket when the ram 12, 13 is fully retracted as illustrated in FIG. 2. In the embodiment shown in FIG. 2 the base 8a of the bucket 8 abuts the end 18 of bar 14b but it is to be understood that the arrangement of bars 14a and 14b could be modified so that the end of bar 14a forms the abutment or stop against which the base 8a of the bucket abuts.

It must also be understood that the invention is not limited to the other details of construction illustrated in the drawing but various modification can be made without departing from the scope of the invention as defined in the appended claims. For example the invention is not limited to the provision of means for protecting ram 12, 13 but similar ram protecting means may be provided for protecting ram 7 also. Furthermore the invention can be applied to machines in which the jib and bucket operating rams are located in positions other than those illustrated in the accompanying drawings.

I claim:

1. Means for protecting a control ram having a rod and cylinder respectively pivotally connected to first and second articulated members comprising part of a jib of a mechanical earthworking machine for controlling the operation of said jib or an earthworking implement articulated to said jib, said means comprising a pair of bars pivotally connected together end to end and pivotally connected at their other ends respectively to said first and second articulated members to which said rod and cylinder of the ram are connected, the arrangement being such that said ram is located between said jib and said pair of bars.

2. Means for protecting a ram for controlling the operation of an earthworking implement articulated to the jib of a mechanical earthworking machine, wherein said means comprise a pair of bars pivotally connected together end to end and pivotally connected at their opposite ends respectively to said jib and to a lever which is articulated to said jib and which effect pivotal movement of said implement under the action of said ram, said pair of bars, lever and jib together defining a polygon within which said ram is located.

3. Means according to claim 2 wherein the dimensions and arrangement of said pair of bars are such that one of said bars forms a stop or abutment for said earthworking implement when the ram operating said implement is in its fully retracted position.

4. Means according to claim 3, wherein said stop or abutment is formed by the end of one of said pair of bars against which end the base of the implement abuts when the ram is in its fully retracted position.