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Guinot

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[54] **BACK-ACTING SHOVEL HAVING COOPERATING TURRET MOUNTED BLADE**

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[51] **Int. Cl.²** **E02F 3/32**

[58] **Field of Search** ..... 37/118 R, 117.5, DIG. 3; 214/DIG. 5, 1 E, 138 R, 138 C; 172/801

[56] **References Cited**

UNITED STATES PATENTS

3,466,770 9/1969 Morrison et al. 37/117.5

FOREIGN PATENTS OR APPLICATIONS

1,450,809 7/1966 France 172/801

141,497 11/1960 U.S.S.R. 172/801

Primary Examiner—Clifford D. Crowder

[57] **ABSTRACT**

An earth moving appliance comprises a frame equipped with caterpillar tracks so that it can be moved. A turret is mounted on the frame for rotation and has a working attachment mounted thereon, the working attachment including a working tool such as, for example, a bucket. An arm is mounted by one end on the turret and carries on its other end a blade. The position of the arm may be altered so that in one position the blade will bear against the ground. The blade extends transversely to a plane of movement of the working attachment and is disposed between the working tool and the frame.

6 Claims, 2 Drawing Figures

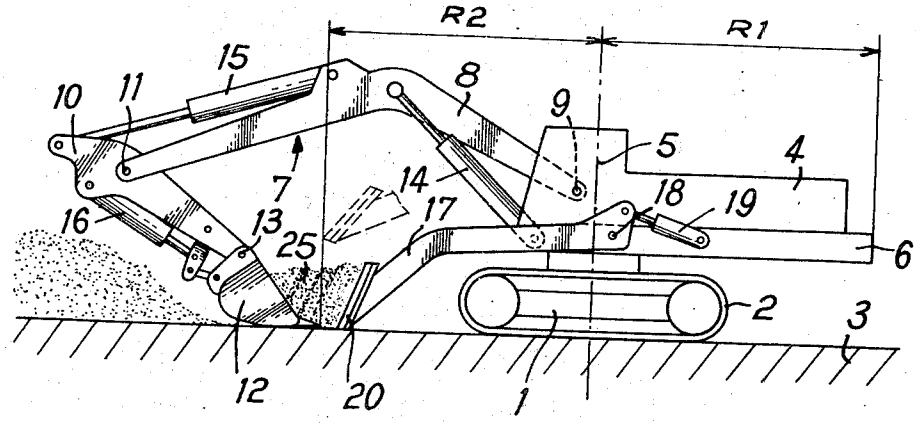
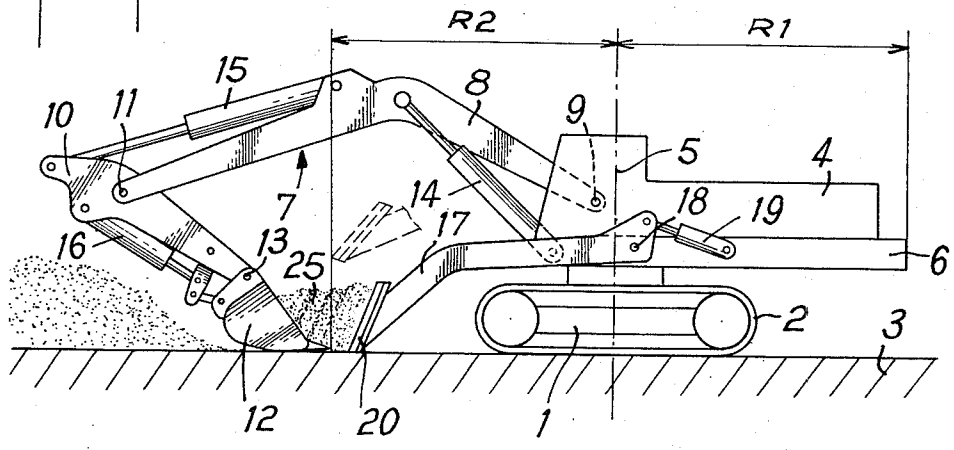


FIG. 1


R2
R1
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8
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25
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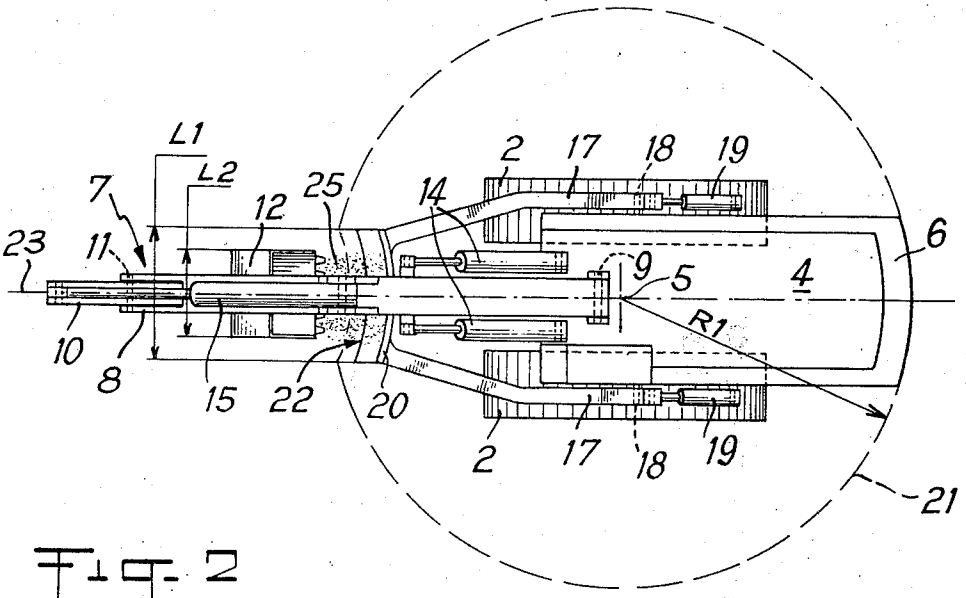
20
1


L1
L2
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17
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14
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R1
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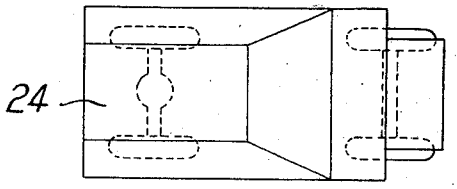
FIG. 2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BACK-ACTING SHOVEL HAVING COOPERATING TURRET MOUNTED BLADE

This invention relates to earth moving appliances.

In a known hydraulic shovel equipped with a back-acting bucket, a blade is interposed between a bucket and a frame of the shovel in such a manner as to retain the material brought close to the frame by the bucket at the level of the blade, and thus to load the bucket more easily. In the known shovel the blade is pivotally mounted on the frame, which does not permit the blade to operate to advantage in all positions of the turret relative to the frame. To avoid this disadvantage the blade may consist of a sort of shield which completely surrounds the frame but this makes the shovel heavy, expensive, and cumbersome.

According to the present invention there is provided an earth moving appliance comprising a frame; displacement means for moving the frame; turret means mounted on the frame for rotation relative thereto; a working attachment mounted on said turret means and including a working tool; an arm mounted on the turret means; a blade means mounted on said arm; and means for altering the position of said arm, so that in one position the blade means will bear against the ground, the blade means extending transversely to a plane of movement of the working attachment and being disposed between the working tool and the frame.

Preferably the working attachment is mounted on the turret means for pivotal movement about a first axis, the arm is mounted by one end on the turret means for pivotal movement about the second axis parallel to said first axis, the arm is disposed substantially parallel to the plane of movement of the said working attachment, a jack is operatively connected between the turret means and said arm, and the blade means is mounted on the other end of the arm.

Preferably the distance between the blade means and the axis of rotation of the turret means is substantially equal to the distance between the radially outer extremity of the turret means and the said axis of rotation.

The blade means may be concave in a direction facing the working tool.

Preferably the width of the blade means in a direction transverse to the plane of movement of the working attachment is between 1.5 times and 2 times the corresponding width of the working tool.

The working attachment may comprise a jib pivotally mounted on the turret means, a rocking lever pivotally mounted on the jib, and a bucket pivotally mounted on the rocking lever.

The invention is illustrated, merely by way of example, in the accompanying drawings, in which:

FIG. 1 is a side elevation of an earth moving appliance according to the present invention; and

FIG. 2 is a top plan view of the appliance shown in FIG. 1.

Referring to the drawings there is illustrated an earth moving appliance according to the present invention. The appliance comprises a frame 1 provided with caterpillar tracks 2 which rest upon the ground indicated by the reference numeral 3. A turret 4 is mounted for rotation about an axis 5 relative to the frame 1. A counterweight 6 is fixed to the rear (as seen in FIG. 1) of the turret 4 and its radially outer extremity is at a mean distance R1 from the axis 5, the locus of movement of the radially outer extremity of the counterweight 6 being indicated by the circle 21.

A working attachment 7 comprises a jib 8 which is mounted on the turret 4 for pivotal movement about a transverse horizontal axis 9, a rocking lever 10 mounted on the jib 8 for pivotal movement about an axis 11 which is parallel to the axis 9, and a bucket 12 mounted on the rocking lever 10 for pivotal movement about an axis 13 which is also parallel to the axis 9. A plurality of jacks 14, 15, 16 are coupled respectively between the turret 4 and the jib 8, the jib 8 and the rocking lever 10, and the rocking lever 10 and the bucket 12.

A double arm 17 is mounted by one end on the turret 4 for pivotal movement about an axis 18 parallel to the axis 9, two jacks 19 being coupled between the arm 17 and the turret 4. A blade 20 is fastened to the other end of the arm 17. The blade 20 shows in FIG. 1 in solid lines is in the position in which it bears on the ground 3. In the raised position, shown in broken lines, the maximum distance R2 between the blade 20 and the axis 5 is at most equal to the distance R1.

The bucket 12 is shown in FIG. 1 in the position in which it rests on the gound 3. In this position the bucket 12 faces the blade 20, the latter being interposed between the frame 1 and the bucket 12. As will be seen in FIG. 2, the blade 20 has a slightly concave profile 22 facing the bucket 12. The blade 20 extends substantially perpendicularly or transversely to a plane 23 of movement of the working attachment 7, the two parts of the arm 17 extending substantially parallel to the plane 23 of movement of the working attachment. The blade 20 has a width L1 in a direction transverse to the plane 23 of movement of the working attachment 7 approximately equal to 1.5 times the width L2 of the bucket 12.

In FIG. 2 a lorry 24 is shown at the side of the appliance.

Since the above appliance has a working attachment 7 which is known per se and which is pivoted in a known manner to a turret 4 mounted for rotation on a frame 1, it can perform the functions of a conventional shovel. In addition, however, by providing the blade 20 mounted on the arm 17 which itself is pivotally mounted on the turret 4, it is possible to engage the blade 20 with the ground 3 thus to oppose movement towards the tracks 2 of the appliance of material 25 pushed by the bucket 12, and to enable this material 25 to enter the bucket. Thus the blade 20 makes it possible to load all the material 25 into the bucket 12. The width L1 of the blade 20, being greater than the width L2 of the bucket 12, ensures satisfactory retention of the material 25.

Furthermore, since distances R1 and R2 are equal, the blade 20 has a locus of movement the diameter of which is equal to the diameter of the locus of movement of the counterweight 6 on the turret. This being the case, the lorry 24, which is disposed outside the circle 21, is out of possible contact not only with the counterweight 6 but also with the blade 20, which is a desirable feature in connection with operational safety.

The concave profile 22 of the blade 20 collects the material at the centre of the blade and thus also facilitates loading of the material 25 into the bucket 12.

It will be appreciated that, in addition to its function as a stop, the blade 20 can also serve to anchor the working attachment 7 relative to the ground 3. The

force of collecting the material **25** by, and in the bucket **12** entails a reaction force against the bucket. In known shovels this reaction force is taken by a bucket ring which permits the rotation of the turret **4** relative to the frame **1.** In the appliance shown in the drawings, all or part of this reaction force can be taken by momentary anchoring of the blade **20** in the ground **3** and, therefore, independently of the frame **1.** The working attachment **7** combined with the blade **20** constitutes an assembly which is at least partially balanced at this point.

Finally, once the material **25** has been collected by the bucket **12,** the blade **20** can be used after the style of a blade of a bulldozer in order to remove debris from the surface of the ground.

It will be appreciated that the fact that the blade **20** is mounted on the turret **4** makes it possible, on the one hand, for the blade to accompany the bucket **12** whatever the orientation of the turret **4** and for the center of the blade to be located in the plane **23** of movement of the bucket **12,** and on the other hand the width L1 of the blade **20** can be limited, in this particular case, to **1.5** times the width L2 of the bucket. Consequently, although the blade **20** is relatively light and compact, it nevertheless effects satisfactory retention of the material **25.** It should be added that as a modification the axis **18** may be coaxial with the axis **9** and that a jack may be coupled between the jib **8** and the arm **17.** Combined movement of the bucket **12** and of the blade **20** can then be achieved, this operation being similar to that of a grab bucket comprising two shells.

Furthermore, it will be appreciated that in certain applications the bucket **12** can be replaced by another tool, such as, for example, a claw type tool.

What is claimed is:

1. An earth moving appliance comprising a frame; displacement means for moving the frame; turret means mounted on the frame for rotation relative thereto; a working attachment mounted on said turret means and including a working tool; an arm mounted on the turret means; a blade means mounted on said arm; and means for altering the position of said arm, so that in one position the blade means will bear against the ground, the blade means extending transversely to a plane of movement of the working attachment and being disposed between the working tool and the frame.

2. An appliance as claimed in claim **1** in which the working attachment is mounted on the turret means for pivotal movement about a first axis, the arm is mounted by one end on the turret means for pivotal movement about a second axis parallel to said first axis, the arm has at least a portion thereof disposed substantially parallel to the plane of movement of the said working attachment, a jack is operatively connected between the turret means and one end of said arm, and the blade means is mounted on the other end of the arm.

3. An appliance as claimed in claim **1** in which the distance between the blade means and the axis of rotation of the turret means is substantially equal to the distance between the radially outer extremity of the turret means and the said axis of rotation.

4. An appliance as claimed in claim **1** in which the blade means is concave in a direction facing the working tool.

5. An appliance as claimed in claim **1** in which the width of the blade means in a direction transverse to the plane of movement of the working attachment is between **1.5** times and **2** times the corresponding width of the working tool.

6. An appliance as claimed in claim **1** in which the working attachment comprises a jib pivotally mounted on the turret means, a rocking lever pivotally mounted on the jib, and a bucket pivotally mounted on the rocking lever.

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