

[54] **POWER SHOVEL WITH SCRAPER BLADE
RELEASABLY ATTACHED TO THE
SHOVEL BUCKET**

[75] Inventor: **Hubert Stark**, Fontanella, Austria
[73] Assignee: **Terramot-Beteiligungs-GmbH**,
Ravensburg, Germany
[22] Filed: **July 14, 1972**
[21] Appl. No.: **271,706**

[30] **Foreign Application Priority Data**
July 20, 1971 Austria A 6319/71
[52] U.S. Cl..... **214/145, 37/117.5, 172/438**
[51] Int. Cl..... **E02f 3/76**
[58] Field of Search..... **37/117.5; 172/666,**
172/667, 438; 214/1 E, 145, 138

[56] **References Cited**
UNITED STATES PATENTS
3,658,384 4/1972 Gluszek 37/117.5 X

3,044,196 7/1962 Kinney..... 214/138 X
3,039,210 6/1962 Slaughter..... 37/117.5

Primary Examiner—Robert E. Pulfrey
Assistant Examiner—Clifford D. Crowder
Attorney—Kurt Kelman and Hans Berman

[57] **ABSTRACT**

An arm releasably pivoted to the underside of the bucket in a power shovel projects beyond the shovel in the normal direction of movement of the vehicular base of the shovel, and its free end carries a tiltable scraper blade. The arm may be secured on the bucket, and the blade may be secured on the arm in several fixed angular positions so that the blade may be employed for scraping and shaping embankments of a road on which the power shovel moves, such embankments not being accessible to the bucket unless the power shovel moves at right angles to the direction of the road.

10 Claims, 7 Drawing Figures

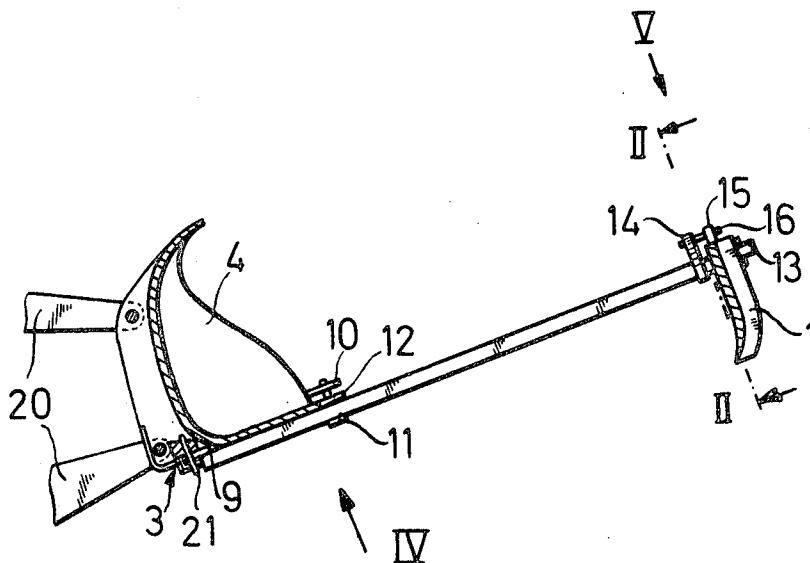


Fig. 1

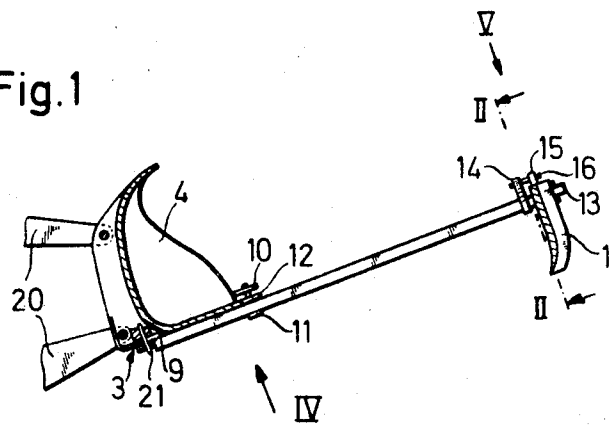


Fig. 2

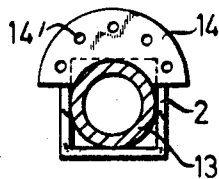


Fig. 3

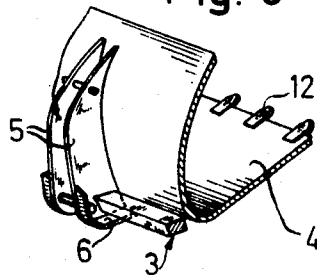


Fig. 4

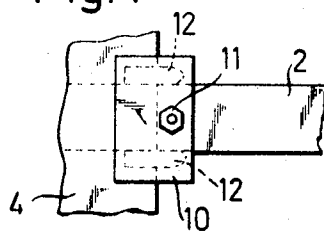


Fig. 5

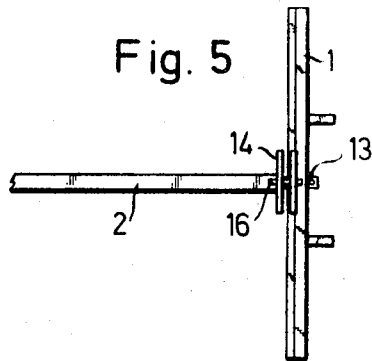
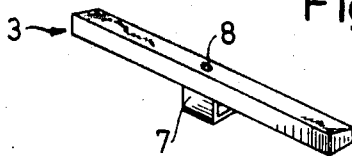


Fig. 6



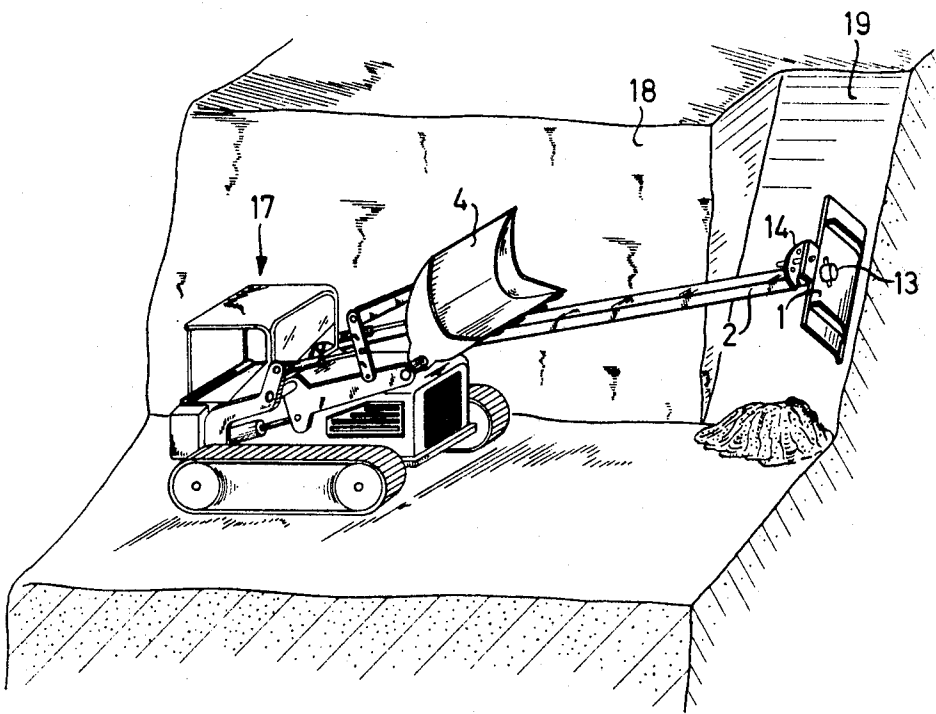


Fig. 7

POWER SHOVEL WITH SCRAPER BLADE RELEASABLY ATTACHED TO THE SHOVEL BUCKET

The invention relates to earth moving equipment, and particularly to an improvement in power shovels, more specifically overhead loaders and similar power shovels in which the bucket is driven into a load by movement of the vehicular base of the shovel.

Overhead loaders are commonly employed in road building. The known overhead loader has a vehicular body mounted on wheels, but more often on drive tracks which normally move the body in the direction of its elongation, and a bucket mounted on the body which can be swung only in a longitudinal plane toward and away from an operating position in which the bucket projects from the body in the direction of normal movement. When the body stands on a horizontal supporting surface, the plane of swinging bucket movement is vertical.

In operation of the overhead loader, the loader is driven toward the load with the bucket in the operative position. The bucket penetrates the load, and its cavity is filled. It may or may not be necessary thereafter to back the loader to release the bucket and its contents, and to permit the bucket to be swung overhead toward the rear of the body for unloading it into a truck or the like.

The overhead loader thus can attack a load only in its direction of normal movement. It is useful in excavating a roadbed through a hill and similar operations, but is less useful in grading an embankment and otherwise working on slopes laterally adjacent the roadbed. If the bucket is to engage the ascending slope of an embankment, for example, the conventional loader must be moved transversely to the direction of the road and can work only on a short length of embankment corresponding to the width of the bucket. Particularly in the construction of secondary roads, in which a small overhead loader may be the only required and available piece of earthmoving machinery, work on embankments had to be performed heretofore largely by manual labor.

The primary object of this invention is the provision of a power shovel, such as an overhead loader which, in addition to its conventional functions, is capable of grading embankments and perform other work on embankments while traveling along the road.

With this object and others in view, as will hereinafter become apparent, the invention provides the aforedescribed conventional overhead loader with an elongated arm and a pivot arrangement which releasably mounts the arm on the bucket of the loader for movement about a pivot axis which extends in the normally vertical plane of bucket movement while a free longitudinal end portion of the arm projects beyond the bucket in the direction of normal loader movement and away from the loader body. A scraper blade is mounted on the end portion of the arm for movement about a tilting axis transverse to the pivot axis of the arm. The arm may be secured to the bucket in each of a plurality of angular positions relative to the pivot axis, and the scraper blade may be secured to the arm in each of a plurality of angular positions relative to the tilting axis.

Other features, additional objects, and many of the attendant advantages of this invention will become apparent as the invention is better understood by reference to the following detailed description of a pre-

ferred embodiment when considered in connection with the appended drawing in which:

FIG. 1 shows the bucket of an overhead loader and an attached scraper blade arrangement of the invention in side elevational section on the vertical median plane of the loader;

FIG. 2 illustrates elements of the device of FIG. 1 in enlarged section on the line II — II;

FIG. 3 is a perspective fragmentary view of the bucket of FIG. 1 and of associated elements;

FIG. 4 shows a portion of the device of FIG. 1 in enlarged top plan view;

FIG. 5 is a top plan view of another portion of the device of FIG. 1;

FIG. 6 is an enlarged perspective view of an element in the device of FIG. 1; and

FIG. 7 shows the overhead loader partly illustrated in FIG. 1 in a perspective view under working conditions.

Referring now to the drawing in detail, and initially to FIG. 1, there is seen the bucket 4 mounted on arms 20 of an overhead loader, not otherwise shown. The cavity of the bucket 4 is open in the normal direction of forward travel of the loader, and an arm 2 fastened to the downwardly directed outer wall of the bucket 4 projects far beyond the bucket in a forward direction. Its free front end carries a scraper blade 1.

As is better seen in FIGS. 2 and 5, the front end 13 of the arm 2 is a cylindrical tube which carries a fixed radial plate 14. Five apertures 14' are equiangularly distributed in the plate 14 in an arc of about 90° about the axis of the front end 13. The remainder of the arm 2 is a heavy square tube. The front end 13 is rotatably received in an opening of the blade 1, and a lug 15 on the blade 1 is formed with a single aperture, not itself seen in the drawing, which may be aligned with each of the apertures 14' by tilting the blade on the front end 13 of the arm 2. A pin 16 passing through the opening of the lug 15 and a selected, aligned opening 14' secures the blade 1 in a fixed angular position on the arm 2.

The outer back wall of the bucket 4, best seen in FIG. 3, carries two pairs of heavy, spacedly parallel flanges 5 which permit the bucket 4 to be attached to the arms 20 on the loader as is conventional. Reinforcing ribs 6 on the flanges project laterally from the lower ends of the same and thus bound a receptacle for the pivot arrangement of the arm 2.

The pivot arrangement includes a transverse bearing bar 3, best seen in FIG. 6. It is longitudinally retained between the two pairs of flanges 5, and its ends rest on respective ribs 6 while its center carries a depending L-shaped bracket 7. Bores 8 in the center of the bar and in the bracket 7 are aligned to receive a pivot pin 21, seen in FIG. 1. An eye 9 (FIG. 1) on the rear end of the arm 2 is normally received between opposite faces of the bar 3 and the bracket 7, and the pivot pin 21 passes through the opening in the eye 9.

The angular position of the arm 2 relative to its pivot axis defined by the pin 21 is secured by a clamping plate 10. The shaft of a bolt 11 freely passes through an opening in the plate 10 and engages threads in a bore of the arm 2 which, in the assembled condition of the apparatus, is located just ahead of the front edge of the bucket 4, but not as far from the edge as teeth 12 extend beyond the front edge. The teeth are spaced along the front edge, and the bolt 11 is thus loosely confined between two teeth 12 in a direction circumferential rel-

ative to the pivot axis of the arm 2. While the bolt 11 is shown in FIG. 4 centered between two teeth 12 for the convenience of pictorial representation, it normally abuts against one of the two confining teeth for transmitting to the bucket 4 circumferential stress exerted on the blade 1 by engaged work.

The clamping force of the plate 10 in cooperation with the bolt 11 need not and normally cannot transmit such stress. It is the primary function of the plate 10, jointly with the bar 3, to hold the arm 2 to the downward directed outer wall of the bucket 4 without any need for the bar 3 to be fixedly fastened to the bucket 4.

The scraper blade 2 and its supporting elements may thus be removed from the bucket 4, when not needed, by loosening the bolt 11 and withdrawing the pivot pin 21 from the openings 8 and the eye 9. The arm 2 together with the blade 1 and the plate 10 may then be pulled forward until the plate 10 clears the front edge of the bucket 4, and removed. Thereafter, the bar 3 may be lifted from the ribs 6 between the flanges 5 along the rear wall of the bucket. The reversed steps are performed in opposite sequence for installing the scraper blade 1 on the bucket 4.

The arm 2 may be secured on the bucket 4 in almost as many angular positions as there are teeth 12 so that the blade 1 may reach laterally beyond the roadbed for work on an embankment on the left or right while the loader travels on the roadbed. The position of the blade may be adjusted further by setting the pin 16 in an appropriate aperture, and ultimately also by moving the arms 20 and thereby tilting the bucket 4 in a conventional manner. The portion of the arm 2 projecting beyond the bracket must be of adequate length to permit proper operation of the blade 1, and should not be less than the corresponding dimension of the bucket 4.

As shown in FIG. 7, the loader 17 moves along a newly excavated shelf road. The scraper blade 1 attached to the bucket 4 of the loader 17 by its arm 2 scrapes the almost vertically ascending mountain side 18 on one side of the roadbed to form an embankment 19 of more gradual slope, thereby dropping displaced soil on the roadbed from which it may be removed by means of the bucket 4 after release of the arm 2 from the shovel 4.

It should be understood, of course, that the foregoing disclosure relates only to a preferred embodiment of the invention, and that it is intended to cover all changes and modifications of the embodiment of the invention herein chosen for the purpose of the disclosure which do not depart from the spirit and scope of the appended claims.

What is claimed is:

1. In a power shovel having an elongated body, drive means for moving said body in the direction of elongation, a bucket member mounted on said body, and swinging means for swinging said bucket member in a vertical longitudinal plane toward and away from a position in which said bucket member projects from said body in said direction when said body stands on a horizontal supporting surface, the improvement which comprises:

- a. an elongated arm;
- b. pivot means releasably mounting said arm on said bucket member for pivoting movement about a pivot axis extending in said plane while a free, longitudinal end portion of said arm projects beyond

said bucket member in said direction away from said body;

- c. a scraper blade mounted on said free end portion for tilting movement about a tilting axis;
- d. first securing means for securing said arm to said bucket member in each of a plurality of angular positions relative to said pivot axis; and
- e. second securing means for securing said scraper blade to said free end portion in each of a plurality of angular positions relative to said tilting axis.

2. In a power shovel as set forth in claim 1, said bucket member, when in said position thereof, having a downwardly directed outer wall, said pivot means securing said arm to said outer wall.

3. In a power shovel as set forth in claim 2, the portion of said arm projecting beyond said bucket member having a length at least equal to the dimension of said bucket in the direction of elongation of said arm.

4. In a power shovel as set forth in claim 2, retaining means on said bucket member bounding a receptacle adjacent said outer wall, said pivot means including a bearing member superposed on said retaining means and secured in said receptacle against movement transverse to said direction, and a pivot pin pivotally connecting the other longitudinal end portion of said arm to said bearing member.

5. In a power shovel as set forth in claim 4, a bracket depending from said bearing member, said bracket, said bearing member, and said other longitudinal portion being formed with respective, aligned bores, said pivot pin being received in said aligned bores.

6. In a power shovel as set forth in claim 1, wherein said bucket member has a free edge portion transverse to said direction and directed away from said body, said first securing means including means for clamping said arm to said edge portion.

7. In a power shovel as set forth in claim 6, said clamping means including a clamping plate and a threaded clamping member connecting said plate to said arm, said plate and said arm receiving said edge portion therebetween.

8. In a power shovel as set forth in claim 7, wherein said bucket member carries a plurality of teeth spaced along said edge portion and projecting from the same, said threaded clamping member being interposed between two of said teeth.

9. In a power shovel as set forth in claim 1, said free end portion having a face of circular cross section about said tilting axis, and said blade member being formed with an opening rotatably receiving said end portion, said tilting axis extending in the direction of elongation of said arm and being transverse to said pivot axis.

10. In a power shovel as set forth in claim 9, said second securing means including a first member formed with a plurality of openings extending therein in the direction of said tilting axis, a second member formed with an opening extending in the direction of said tilting axis, said first and second members being secured on said arm and on said blade member respectively against angular movement about said tilting axis, said openings being equidistant from said tilting axis, and a securing member simultaneously received in said opening of said second member and in one of the openings of said first member.

* * * * *