A floor mounted mining machine in which a tool such as a hydraulic hammer is so mounted that it can be subjected to a series of actions. The hammer can be rotated about its own axis, inclined upwardly and downwardly, oscillated transversely, moved bodily forwards relative to the base of the machine, moved bodily forwards relative to a boom supported on the base of the machine and disposed at an attitude relative to the boom between horizontal and vertical.
1. ADJUSTABLE TOOL SUPPORT ON VEHICLE FOR MINING

This invention relates to a machine for working on a rock, earth or other mineral face to form a tunnel or remove material. It can be used in coal or other mines. For the sake of convenience only the machine is hereinafter and in the claims referred to as a mining machine.

It is an object of the present invention to provide a mining machine which has a greater versatility in earth working capacity than existing mining machines.

According to the present invention there is provided a mining machine comprising a base, a first carriage slidably along the base, a cradle mounted on the first carriage for rotation about a vertical axis, a boom parallel with the longitudinal axis of the base, rotatable about its own longitudinal axis, and pivoted on the platform for movement about a horizontal axis, a platform mounted on the boom and pivotal about a horizontal axis at or adjacent the leading end of the boom, and a second carriage for mounting an earth-working tool and slidable relative to the platform.

As a result of the present invention the earth-working tool can be operated as follows:

i. it can be advanced forwardly of the base in a horizontal attitude or an upwardly or downwardly inclined attitude,

ii. it can be oscillated transversely to each side of the longitudinal axis of the base, the total transverse swing being, for example 45°,

iii. it can be disposed normally to the boom and rotated while in this attitude through 360°,

iv. it can be subjected to a combination of the actions defined in (i) to (iii) above.

The mining machine preferably has a material removal facility and for this purpose there is disposed rearwardly of the machine and preferably on or connected to the base a winch operatively connected by cable or wire rope and sheave means to a slush bucket in advance of the mining machine and movable transversely thereof to move cut material laterally of the machine.

An embodiment of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

FIG. 1 is a side elevation of a mining machine according to the invention;

FIG. 2 is a corresponding plan view showing the machine in a different attitude;

FIG. 3 is a sectional view of the boom of the machine;

FIG. 4 is a part-sectional detail of the boom;

FIG. 5 is a plan view on the line V—V of FIG. 3;

FIGS. 6 to 9 show different earth working attitudes which can be adopted by the machine; and,

FIGS. 10 and 11 are views showing the material removal facility of the machine.

Referring to the drawings, the mining machine comprises a sledge-like base 20 and can be advanced along a roadway in a mine in the conventional manner.

A carriage 21 is slidably mounted on the base 20 and is movable to-and-fro therealong by a double-acting hydraulic ram 22. A cradle 23 is supported on the carriage 21 for oscillation about a vertical axis 24 under the action of a pair of double-acting hydraulic rams 25 connected between the cradle 23 and the carriage 21 and with the vertical axis 24 therebetween. The cradle 23 can be oscillated 45° to each side of a central plane (see FIG. 8).

The cradle 23 supports a boom 26 and under the action of a pair of double-acting hydraulic rams 27 mounted at one end at locations 28 on the cradle 23 and secured as indicated at 29 to the boom 26, the latter can be pivoted about a horizontal axis 30 upwards through an angle of 35° and downwards through an angle of 10° (see FIG. 7).

The boom 26 can also be rotated through 360° (see FIG. 9) about its own longitudinal axis. The means for doing this can be seen in FIG. 4 and includes a pinion 31 fast with the boom 26 and meshing with a rack 32. This rack 32 is acted on by two hydraulic rams 33, 34, the ram 33 being in its collapsed position and the ram 34 in its extended position. It will be manifest that linear movement of the rack 32 under the action of the rams 33, 34 will rotate the pinion 31 and consequently the boom 26.

The boom 26 has pivoted thereto at its front as indicated at 35 a platform 36 which can be pivoted relative to the boom 26 from a substantially horizontal position to a substantially vertical position by a double acting hydraulic ram 37.

Slidably mounted on the platform 36 under the control of a double-acting ram 38 is a carriage 39 which mounts an earth-working tool, for example, a hydraulically-operated hammer 40. The carriage 39 and hammer 40 can therefore be advanced relative to the carriage 36 and consequently the boom 26.

The hydraulic control circuit for the above described machine is of conventional construction known to those skilled in the art of hydraulic control and includes an oil supply, pump means, piping, various control and safety valve, and pressure indicators. The circuit is manually controlled by a bank 41 of seven control valve disposed with a seat for the operator on the cradle 23.

From the above it will be seen that the earth working tool, i.e., the hammer 40 can

i. be advanced with the boom 26 relative to the machine base 20;

ii. be advanced relative to the boom 26;

iii. be pivoted to a vertical position relative to the boom 26;

iv. be rotated through 360° (boom rotation);

v. be upwardly and downwardly inclined (boom inclination);

vi. be directed to either side of a central plane (boom oscillation);

vii. be subjected to combinations of movements (i) to (vi).

The hammer 40 itself is also, of course, hydraulically operated.

There is, therefore, provided an extremely versatile earth-working machine.

The machine is provided at its front with flood lights 41, an impulse water spray (not shown) which when the hammer 40 is being operated and which serves to restrict dust, and a dozer blade 42 or other fixed or adjustable protective shield.

Outriggers are preferably provided at the sides of the machine, which outriggers are adjustable and/or removable.

The rear of the base 20 is provided with two coupling devices 43 to allow attachment to the machine of a debris removal facility.
The debris removal means is a slushing arrangement consisting of a hydraulically-operated winch 44 fastened to the machine via the devices 43 and a slush bucket 45 in advance of the machine. The winch 44 and bucket 45 are connected by cables passing round sheaves. The cables 46 pass from the winch 44 round sheaves 47 at the side of the base 20 and at the front of the dozer blade 42 and around further sheaves 47 in advance of and laterally of the machine, which sheaves 47 are suitably anchored in the ground.

With this arrangement, as is conventional, the winch 44 causes the slush bucket 45 to be moved transversely of and in advance of the machine to remove cut material directly out of the path of the machine.

The winch controls are indicated at 48.

What is claimed is:

1. A mining machine comprising: a base; a first carriage slideable along the base; a cradle mounted on the first carriage for rotation with respect to said carriage about a vertical axis; a fixed length boom parallel with the longitudinal axis of the base, rotatable about its own longitudinal axis, and pivoted on the cradle for movement about a horizontal axis; a platform mounted on the boom and pivotal about a horizontal axis or adjacent the leading end of the boom; and, a second carriage for mounting an earth-working tool and slideable relative to the platform.

2. A mining machine as claimed in claim 1, in which the sliding and pivotal movements are effected by hydraulic rams.

3. A mining machine as claimed in claim 2, in which the boom rotation is effected by rack-and-pinion means controlled by hydraulic rams.

4. A mining machine as claimed in claim 2 in which the cradle is oscillatable by hydraulic rams up to 45° to each side of a central plane.

5. A mining machine as claimed in claim 2 in which an operator's station including controls for the hydraulic rams is located on said first carriage.

6. A mining machine as claimed in claim 2, in which the boom is pivotal about the horizontal axis upwardly to 35° and downwardly to 10°.

7. A mining machine as claimed in claim 2, in which the platform is pivoted by a hydraulic ram between horizontal and vertical attitudes.

8. A mining machine as claimed in claim 1 in which the earth-working tool is a hydraulically-operated hammer.

9. A mining machine as claimed in claim 1 further comprising a dozer blade attached to the forward end of said base.

10. A mining machine as claimed in claim 1 further comprising front flood lights attached to said first carriage.

11. A mining machine as claimed in claim 1 further comprising an impulse water spray operable with the earth-working tool.

12. A mining machine as claimed in claim 1 further comprising material-removing means located rearwardly of and coupled to the machine base, said means having a winch operatively connected by cable and sheave means to a slush bucket in advance of the mining machine and movable transversely thereof to move cut material laterally of the machine.

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