An excavator attachment (1) for an excavator, comprising (i) a bucket portion (3) for receiving excavated material or a scoop portion for collecting excavated material and (ii) a cutter device (4) capable of cutting and excavating rock, wherein the cutter device comprises a rotary cutter (5) of elongate configuration having a proximal end (6) associated with the bucket portion (or the scoop portion) and a distal end (7) remote from the bucket portion (or the scoop portion) and is so arranged that, in use, the orientation of the elongate rotary cutter relative to the bucket portion (or scoop portion) is fixed.
ATTACHMENT FOR EXCAVATOR

[0001] The present invention relates to an attachment for an excavator.

[0002] Many excavator arrangements are known which use both a bucket and a cutter, such as those described in JP2000/336689, JP2002/73896, JP90/8554 and JP12/07507.

[0003] The attachment of the present invention provides an alternative in some respects an improved cutter to those of the prior art.

[0004] In accordance with a first aspect of the present invention, there is provided an excavator attachment for an excavator, the attachment comprising (i) a bucket portion for receiving excavated material or a scoop portion for collecting excavated material, and (ii) a cutter device capable of cutting and excavating rock, wherein the cutter device comprises a rotary cutter of elongate configuration having a proximal end associated with the bucket portion or scoop portion, and a distal end remote from the bucket portion or scoop portion and is so arranged that, in use, the orientation of the elongate rotary cutter relative to the bucket portion or scoop portion is fixed.

[0005] The terms “cutter” and “cutting” include within their meaning boring, scraping and other means of removing rock or the like from a substrate.

[0006] The term “rock” is taken to include non-mineral substrates of a relatively hard nature, such as coal, and relatively hard man-made substrates, such as tarmac and concrete.

[0007] In use, the orientation of the elongate rotary cutter relative to the bucket portion or scoop portion is fixed. Certain parts of the elongate rotary cutter may move (such as any cutting teeth or the like). The rotary cutter may be removed, for example, from the rest of the attachment in order to replace, service, repair or remount the rotary cutter. The orientation of the elongate rotary cutter relative to the bucket portion or scoop portion may not be changed in use, for example, as shown in JP2000/336689. The attachment itself may, of course, be moved during use.

[0008] It will therefore be appreciated that, in use, the position (and not merely the orientation) of the elongate rotary cutter relative to the bucket portion or scoop portion is preferably fixed.

[0009] The attachment may comprise a connecting portion for pivotal connection to an excavator. The connecting portion may be located between the bucket or scoop portion and the elongate rotary cutter. The connecting portion may be provided with an aperture for receipt of a pin.

[0010] Where a scoop portion is used, the scoop portion may be formed with a rear wall and two side walls, the two side walls projecting from the rear wall. This forms a scoop that is capable of moving excavated material, but not capable of picking it up. The side walls assist in the gathering of excavated material.

[0011] Where a scoop portion is used, the scoop portion may act like a shovel for moving excavated material along the ground.

[0012] It is preferred that the elongate rotary cutter comprises a multiplicity of cutting elements. It is further preferred that the cutter elements are rotatable about the longitudinal axis of the elongate rotary cutter. The elongate rotary cutter may comprise one or more outer members which is rotatable with respect to an inner member. The elongate rotary cutter may comprise a plurality of outer members. Each cutter element may be associated with one of the one or more outer members. The outer members may have an annular shape. Alternatively, the cutter elements may be associated with a rotatable, substantially rigid cylindrical cutter body. The cutter elements may be attached to, or integral with, the cutter body. It is preferred that cutter elements project substantially laterally or radially. The cutter elements are typically in the form of picks suitable for rock cutting. Such picks may have a steel body with a tungsten carbide or other ceramic cutting tip. Such picks may have a steel cutting tip if being used to cut coal, for example.

[0013] It is preferred that the attachment is a substantially linear arrangement.

[0014] The cutter device may be provided with a motor or the like for driving elongate rotary cutter. The motor may be hydraulic.

[0015] The attachment may comprise a body providing the bucket (or scoop) portion and a receiving portion for the receipt of the cutter device, wherein the cutter device is received by the receiving portion of the body.

[0016] The body may be integrally formed i.e. it may be provided in substantially one piece. The body is preferably formed, however, by welding together several pre-cast pieces.

[0017] The receiving portion is preferably arranged so that the distal end is remote from the bucket portion or scoop portion. The receiving portion may be in the form of an aperture or recess in the body.

[0018] If the attachment is provided with a connecting portion for pivotal connection to an arm of an excavator, the connection between the excavator and the connecting portion, in use, providing a first axis of rotation of the elongate rotary cutter and the bucket portion (or scoop portion), the attachment may be provided with one or more components that, in use, facilitates rotation of the elongate rotary cutter and the bucket portion (or scoop portion) about a second rotational axis, the second rotational axis being angled with respect to the first axis of rotation. “Angled” means that the said axes are not parallel to one another. It is preferred that the angle between the first axis of rotation and the second rotational axis is from 45 to 135 degrees (more preferably from 60 to 120 degrees and further more preferably from 80 to 110 degrees).

[0019] It is further preferred that the angle between the second rotational axis and the longitudinal axis of the elongate rotary cutter is from 45 to 135 degrees (more preferably from 60 to 120 degrees and further more preferably from 80 to 100 degrees).

[0020] It has been found that the presence of such an axis of rotation enables the top (as opposed to the side) of the elongate rotary cutter to be presented to a substrate. This provides better performance; it was found that if the side of a cutter was presented to the substrate to be cut then the cutter and associated excavator tended to bounce. Furthermore, the size of the pieces of rock and coal removed from the substrate was lower than desired. Such an arrangement allows the cutter to be moved into many operating (i.e. cutting) positions by rotation about the second rotational axis.

[0021] It is preferred that said one or more components facilitates rotation of the elongate rotary cutter and the bucket portion (or scoop portion) through at least 300 degrees (preferably through at least 340 degrees and more preferably through at least 360 degrees) about said second rotational axis.
[0022] The one or more components may comprise a motor for rotating the elongate rotary cutter and the bucket or scoop portion about said second rotational axis. The attachment may not be provided with a motor for rotating the elongate rotary cutter and the bucket or scoop portion about said second rotational axis, instead being provided with a bearing (such as a roller bearing) and/or an attachment means for attachment to a motor facilitating the rotation of the elongate rotary cutter and the bucket or scoop portion about said second rotational axis.

[0023] It is preferred that said one or more components facilitates the fixing of the rotational position of the elongate rotary cutter and the bucket or scoop portion about said second rotational axis.

[0024] The attachment may be provided with one or more mountings for the placement of water cannon. The attachment may be provided with one or more water cannon. The water cannon may facilitate the suppression of dust around the cutter. Furthermore, the spray of water droplets often produced by such water cannon also comprises high pressure air which helps remove potentially dangerous gases (such as methane) from the region around the cutter. It is preferred that the one or more water cannon is operable to provide water onto the distal end of the cutter.

[0025] In accordance with a second aspect of the present invention there is provided an excavator attachment for an excavator, the attachment comprising (i) a bucket portion for receiving excavated material or a scoop portion for collecting excavated material and (ii) a cutter device capable of cutting and excavating rock, wherein the cutter device comprises a rotary cutter of elongate configuration having a multiplicity of cutter elements, the elongate rotary cutter having a proximal end associated with the bucket portion (or scoop portion) and a distal end remote from the bucket portion (or scoop portion).

[0026] It is preferred that the orientation of the elongate cutter device relative to the bucket portion or scoop portion is, in use, fixed.

[0027] The elongate rotary cutter may comprise one or more outer members which is rotatable with respect to an inner member. The elongate rotary cutter may comprise a plurality of outer members. Each cutter element may be associated with one of the one or more outer members. The outer members may have an annular shape. Alternatively, the cutter elements may be associated with a rotatable, substantially rigid cylindrical cutter body. The outer elements may be attached to, or integral with, the cutter body. It is preferred that cutter elements project substantially laterally or radially.

[0028] The attachment may comprise a body providing the bucket portion (or scoop portion) and a receiving portion for the receipt of the cutter device, wherein the cutter device is received by the receiving portion of the body.

[0029] The receiving portion may be in the form of an aperture or recess in the body.

[0030] The receiving portion is preferably arranged so that the distal end of the elongate rotary cutter is remote from the bucket portion or scoop portion.

[0031] In accordance with a third aspect of the present invention there is provided an excavator attachment for an excavator, the attachment comprising

[0032] (i) a cutter device capable of cutting and excavating rock, wherein the cutter device comprises a rotary cutter of elongate configuration capable of cutting and excavating rock, and

[0033] (ii) a body providing a bucket or scoop portion for the collection of excavated material, and a receiving portion for the receipt of the cutter device

[0034] wherein the cutter device is received by the receiving portion of the body.

[0035] The receiving portion may be in the form of an aperture or recess in the body.

[0036] The body may be integrally formed i.e. it is provided in substantially one piece. Alternatively, the body may be formed by welding together several pre-formed or cast pieces.

[0037] The receiving portion is preferably arranged so that the distal end of the elongate rotary cutter is remote from the bucket or scoop portion and the proximal end is associated with the bucket or scoop portion.

[0038] It is preferred that the orientation of the elongate cutter device relative to the bucket or scoop portion is, in use, fixed.

[0039] It is preferred that the elongate rotary cutter has a multiplicity of cutter elements.

[0040] In accordance with a fourth aspect of the present invention, there is provided an excavator attachment for an excavator, the attachment comprising a first functional tool and a second functional tool, the first functional tool having a proximal portion associated with the second functional tool and a distal portion forming a first end of the attachment,

[0041] the second functional tool having a proximal portion associated with the first functional tool and a distal portion forming a second end of the attachment,

[0042] the attachment being provided with a connecting portion for pivotal connection to an elongate arm of an excavator, the connection between the excavator and the connecting portion, in use, providing a first axis of rotation of the first and second functional tools, the attachment being further provided with one or more components that facilitate rotation of the first and second tools about a second rotational axis, the first axis of rotation being angled with respect to the second rotational axis. “Angled” means that the said axes are not parallel to one another.

[0043] The angle between the first axis of rotation and the second rotational axis may be from 45 to 135 degrees, preferably from 60 to 120 degrees and more preferably from 90 to 100 degrees.

[0044] The angle between the second rotational axis and the longitudinal axis of the attachment may be from 45 to 135 degrees, preferably from 60 to 120 degrees and more preferably from 80 to 100 degrees.

[0045] Such an arrangement is effective in producing an attachment that may be moved to many orientations.

[0046] It is preferred that said component facilitates rotation of the first and second functional attachment parts through at least 300 degrees (preferably through at least 340 degrees and more preferably through at least 360 degrees) about said second rotational axis.

[0047] The one or more components may comprise a motor for rotating the first and second functional attachment parts about said second rotational axis. The attachment may not be provided with a motor for rotating the first and second functional attachment parts about said second rotational axis, instead being provided with a bearing (such as a roller bearing) and/or an attachment means for attachment to a motor facilitating the rotation of the first and second functional attachment parts.
It is preferred that the said one or more components facilitates the fixing of the rotational position of the first and second functional attachment parts about said second rotational axis.

It is preferred that one of the first and second functional tools comprises an excavating tool, such as a cutter (preferably an elongate rotary cutter), but may be a hammer or the like.

The second functional attachment part may be in the form of another excavating head, a bucket portion, a scoop for the collection of excavated material, a grab, a ripper, a stump splitter or a thumb.

It is preferred that the attachment is arranged so that, in use, the orientation of the first functional attachment part rotates 120 degrees and the second functional attachment part is fixed.

The attachments of the second, third and fourth aspects of the present invention may comprise those features described above in relation to the attachment of the first aspect of the present invention.

For example, the cutter device may comprise a motor for powering the cutter portion. It is preferred that such a motor is located within a recess which is provided as part of the receiving portion of the body.

For the cutters of the first, second, third and fourth aspects of the present invention, it is preferred that the orientation of the elongate rotary cutter relative to the bucket portion (or scoop portion) is such that the excavator attachment can, in use, be positioned selectively in first and second operational positions, the first operational position permitting the cutting and excavation of rock by the elongate rotary cutter whilst the bucket or scoop portion is in a non-operational orientation and the second operational position permitting the collection of excavated material by the bucket or scoop portion whilst the elongate rotary cutter is in a non-operational orientation. This may be achieved, for example, by rotation about a pivotally provided connection of the attachment to an arm of an excavator.

In accordance with a fifth aspect of the present invention, there is provided an excavator comprising an attachment in accordance with the first, second, third or fourth aspects of the present invention, the attachment being pivotally connected to an arm of the excavator. The connection between the excavator and the attachment may, in use, provide a first axis of rotation of the attachment, the attachment further being provided with a component that facilitates rotation of the attachment about a second rotational axis, the angle between the first axis of rotation and the second rotational axis being from 45 to 135 degrees (preferably from 60 to 120 degrees and more preferably from 80 to 110 degrees).

It is preferred that the arm of the excavator is elongate. The excavator may be provided with a component or components (such as a bush and motor) for rotating the attachment about the second rotational axis.

The angle between the first axis of rotation and the second rotational axis may preferably be from 60 to 120 degrees and more preferably from 80 to 100 degrees.

The angle between the second rotational axis and the longitudinal axis of the elongate excavator arm may preferably be from 60 to 120 degrees and more preferably from 80 to 100 degrees.

In accordance with a sixth aspect of the present invention there is provided a method of excavation of material from a substrate, comprising

(i) providing an excavator having an excavating attachment comprising (a) a bucket portion for receiving excavated material or a scoop portion for collecting excavated material and (b) a cutter device comprising a rotary cutter of elongate configuration

(ii) using the elongate rotary cutter in a first operational position to cut material from a substrate

(iii) moving the attachment from the first operational position to a second operational position, and

(iv) collecting excavated material in the bucket portion or collecting excavated material using the scoop portion (if a scoop portion is present).

In the first operational position, it is preferred that the bucket portion or scoop portion is in a non-operational orientation. In the second operational position, it is preferred that the elongate rotary cutter is in a non-operational orientation.

The material is preferably rock, and it is therefore preferred that the cutter device is capable of cutting and excavating rock.

It is preferred that, in use, the orientation of the elongate rotary cutter relative to the bucket portion or scoop portion is fixed.

The attachment may be an attachment in accordance with the first, second, third or fourth aspects of the present invention.

The attachment and excavator of the present invention will now be described by way of example only with reference to the following Figures of which:

FIG. 1 shows a schematic side-on view of an embodiment of an attachment according to the first, second and third aspects of the present invention;

FIG. 2 shows the attachment of FIG. 1 in first and second operating positions when attached to the arm of an excavator;

FIG. 3 shows several alternative embodiments of attachments according to the present invention;

FIG. 4 shows a further alternative embodiment of an attachment according to the present invention;

FIG. 5 shows the attachment of FIG. 4 in different operating positions;

FIG. 6 shows an alternative embodiment of an attachment in accordance with the present invention, the attachment comprising four water cannons; and

FIG. 7 shows an alternative embodiment of an attachment in accordance with the present invention, the attachment comprising a scoop for the collection of excavated material.

FIG. 8 shows an embodiment of an excavator attachment (shown generally by reference numeral 1) in accordance with the first, second and third aspects of the present invention. The attachment comprises a bucket portion 3 for receiving excavated material and a cutter device 4 capable of cutting and excavating rock, wherein the cutter device 4 comprises a rotary cutter 5 of elongate configuration. The elongate rotary cutter 5 has a proximal end 6 associated with the bucket portion 3 and a distal end 7 remote from the bucket portion. The attachment is so arranged that, in use, the orientation of the elongate rotary cutter 5 relative to the bucket portion 3 is fixed.
[0076] The attachment 1 comprises an integrally-formed body 8 providing the bucket portion 3 and a receiving portion 9 for the receipt of the cutter device 4, wherein the cutter device 4 is received by the receiving portion 9 of the body 8.

[0077] The body 8 is formed by casting and provides a substantially cylindrical recess (shown as broken line 17) defined by receiving portion 9 for the receipt of the cutter device 4. The cutter device 4 is provided with a hydraulic motor 10 which drives the rotary cutter 5. Hydraulic fluid is provided to the motor 10 by a conduit (not shown).

[0078] The elongate rotary cutter 5 is generally cylindrical in shape and comprises a one-piece cylindrical body to which is attached a multiplicity of cutting members 12. The hydraulic motor 10 causes the cylindrical body to rotate about the longitudinal axis of the rotary cutter. These cutting members project radially from the body.

[0079] The attachment is provided with a connecting portion 13 for pivotal attachment to an arm of an excavator. The connecting portion is substantially between the elongate rotary cutter 5 and the bucket portion 3. Such a geometry is effective in facilitating the operation of both the bucket portion and the rotary cutter. Referring to FIGS. 1 and 2, the connecting portion 13 comprises an aperture 15 for pivotal connection to the arm 2 of the excavator by a pin or the like (not shown). The attachment 1 pivots about the rotational axis provided by the pin under the influence of a hydraulic piston 16 provided as part of the excavator. The connecting portion 13 of the attachment 1 also provides an aperture for connection to the hydraulic piston 16.

[0080] The operation of the attachment is now discussed with reference to FIG. 2. The hydraulic piston is activated so as to move the attachment into a first operating position (FIG. 2a). In this position, the elongate rotary cutter 5 is presented in a generally forward position and may be urged onto a rock face or the like to cut and remove rock therefrom. In this first operating position, the bucket portion 3 is in a non-operating orientation. Once the desired cutting operations have been completed, the hydraulic piston 16 is activated to move the attachment into a second operating position (FIG. 2b). The attachment rotates about an axis provided by aperture 14, tilting the rotary cutter 5 generally in a rearward direction, and moving the bucket portion 3 in a generally forward direction. In this second operating position, the bucket portion 3 may be presented to the ground to collect rock that has been removed from the rock face. The hydraulic piston 16 is activated to rotate the attachment, the bucket portion 3 moving in a generally rearward direction towards the excavator to scoop up the rock 20.

[0081] FIG. 2 shows hydraulic piston 16 below arm 2. The piston may be, of course, above arm 2.

[0082] The attachment 1 is substantially linear i.e. substantially straight. Several alternative embodiments of attachments according to the present invention are shown in FIG. 3. The reference numerals used in FIG. 3 correspond to those used above in relation to FIGS. 1 and 2. FIGS. 3a and 3b show non-linear attachments. Such geometries may be desirable if, for example, the geometry of the bucket portion 3 restricts rotational movement of the attachment, or if a particular drilling or cutting angle is required that is not so easily obtained using a linear attachment. The attachment of FIG. 3c comprises a rotary cutter 5 that has several ring-shaped outer collars 21a, b, c, d, e that surround an inner member 22 (shown in broken lines). The outer collars are, in use, rotated relative to the inner member to produce a cutting action.

[0083] A further alternative embodiment of an attachment in accordance with the present invention is shown in FIG. 4. FIG. 4 shows an excavator attachment (shown generally by reference numeral 101) in accordance with the first, second, third and fourth aspects of the present invention. The attachment 101 comprises a bucket portion 103 for receiving excavated material and a cutter device 104 capable of cutting and excavating rock, wherein the cutter device 104 is a rotary cutter 105 of elongate configuration. The elongate rotary cutter 105 has a proximal end 106 associated with the bucket portion 103 and a distal end 107 remote from the bucket portion. The attachment is so arranged that, in use, the orientation of the elongate rotary cutter 105 is relative to the bucket portion 103 is fixed.

[0084] The attachment 101 comprises a body 108 providing the bucket portion 103 and a receiving portion 109 for the receipt of the cutter device 104, wherein the cutter device 104 is received by the receiving portion 109 of the body 108. The body is made by welding several sub-sections together.

[0085] The body 108 provides a substantially cylindrical recess (shown as broken line 117) defined by receiving portion 109 for the receipt of the cutter device 104. The cutter device 104 is provided with a hydraulic motor 10 which drives the rotary cutter 105. Hydraulic fluid is provided to the motor 110 by a conduit (not shown). Cutter device 104 is attached to the body 108 by a flange arrangement 111.

[0086] The elongate rotary cutter 105 is generally cylindrical in shape and comprises a one-piece cylindrical body to which is attached a multiplicity of cutting members 112. The hydraulic motor 110 causes the cylindrical body to rotate about the longitudinal axis of the rotary cutter. These cutting members project radially from the body.

[0087] The attachment is provided with a connecting portion 113 for pivotal attachment to an arm of an excavator. The connecting portion is substantially between the elongate rotary cutter 105 and the bucket portion 103. Such a geometry is effective in facilitating the operation of both the bucket portion and the rotary cutter. Referring to FIGS. 1 and 2, the connecting portion 113 comprises an aperture (not shown) for pivotal connection to the arm 102 of the excavator by a pin 130. The attachment 101 pivots about the rotational axis provided by the pin under the influence of a hydraulic piston 132 provided as part of the excavator. The connecting portion 113 of the attachment 101 is also pivotally connected via pin 131 to the hydraulic piston 132.

[0088] The attachment 101 also comprises a component (in this case a motor and spindle arrangement shown by reference numeral 134) that facilitates rotation of the elongate rotary cutter and the bucket portion about a second rotational axis, the angle between the first axis of rotation (i.e. the axis of rotation provided by the connection between the arm of the excavator and the connecting portion of the attachment) and the second rotational axis being about 90 degrees, and the angle between the second rotational axis and the longitudinal axis of the elongate rotary cutter being about 90 degrees. Referring to FIG. 4, the longitudinal axis of the elongate rotary cutter is in the plane of the paper and is indicated by "1." The axis of rotation provided by the connection between the arm of the excavator and the connecting portion of the attachment is normal to the plane of the Figure. The second rotational axis for rotation of the elongate rotary cutter and the bucket portion is in the plane of the paper, and is indicated by "1'". Such an arrangement of first and second rotational axes is extremely effective in facilitating the movement of the
cutter and bucket into a large number of operating positions, and is now discussed with reference to FIG. 5.

[0089] FIGS. 5a to 5/ provide end-on views of the attachment of FIG. 4 in four operating positions in relation to a chamber having a left wall (G), a right wall (R) and a floor (B). Movement between the four positions may be achieved by rotation about the second rotational axis (labeled "P" in FIG. 4). In FIGS. 5a, bucket 103 is in position to remove rock that has been cut and fallen onto the floor (B). In FIGS. 5b and 5d, the elongate cutter 105 is brought into contact with the right wall (R) and left wall (G) respectively, thus cutting rock from that wall for subsequent collection by the bucket 103. In FIGS. 5b and 5d, the end of the elongate cutter is brought into cutting contact with the wall. This is extremely beneficial because it allows pieces of rock may be removed from the wall in this way. If the attachment cannot be rotated about the second rotational axis, then cutting of the wall may only be achieved by presenting the side of the cutter 105 against the wall. This results in the cutter bouncing off the wall during the cutting operation which produces small pieces of rock which is not desired. In FIG. 5c, the end of the elongate cutter is brought into cutting contact with the floor (B).

[0090] The attachment 101 may also be pivoted about the first axis of rotation (i.e. the axis of rotation provided by the connection between the arm of the excavator and the connecting portion of the attachment) much as described in relation to attachment 1 of FIGS. 1 and 2, for example. In order to present the end of the cutter to a wall directly in front of the excavator.

[0091] Those skilled in the art will realize that the bucket and cutter may be rotated into a large number of operating positions (far greater than four) about second rotational axis "P".

[0092] A further embodiment of an attachment in accordance with the present invention is shown in FIG. 6. The attachment (shown generally by reference numeral 201) comprises a bucket portion 3 for receiving excavated material and a cutter device capable of cutting and excavating rock, wherein the cutter device comprises a rotary cutter 5 of elongate configuration. The elongate rotary cutter 5 has a proximal end associated with the bucket portion 3 and a distal end 7 remote from the bucket portion. The bucket portion 3 and rotary cutter 5 are substantially as described above with reference to FIG. 1.

[0093] The attachment is provided with four water cannon (only three of which are shown by reference numerals 202a, 202b and 202c). The water cannon are commercially available from Minnovation Limited (Wakefield, UK). The water cannons are provided with water via hoses (not shown). In operation, a high pressure water spray is emitted by each water cannon. The central portion of the spray is aimed at the distal end 7 which is also the most frequently used cutting part of the cutter 5. The water spray comprises water droplets which help to suppress dust and air which helps to purge any methane or other potentially dangerous gas from the region around the cutter.

[0094] A further embodiment of an attachment in accordance with the present invention is shown in FIG. 7. The attachment (shown generally by reference numeral 301) comprises a scoop portion 303 for collecting excavated material and a cutter device capable of cutting and excavating rock, wherein the cutter device comprises a rotary cutter 5 of elongate configuration. The elongate rotary cutter 5 has a proximal end associated with the scoop portion 303 and a distal end 7 remote from the scoop portion. The rotary cutter 5 is substantially as described above with reference to FIG. 1. The scoop 303 is used to collect excavated material, for example, in order to move that material to a conveyor. The scoop portion 303 comprises a rear face 304 from which extends two side walls 305, 306. The side walls assist in retaining excavated material in a region to be scooped when the scoop is used. In the present case, the scoop portion acts like a shovel, moving excavated material along the ground. The attachment is further provided with a motor (not shown) located in drive compartment 307, the motor being for powering the rotary cutter.

1. An excavator attachment for an excavator, the attachment comprising (i) a bucket portion for receiving excavated material or a scoop portion for collecting excavated material, and (ii) a cutter device capable of cutting and excavating rock, wherein the cutter device comprises a rotary cutter of elongate configuration having a proximal end associated with the bucket portion or scoop portion, and a distal end remote from the bucket portion or scoop portion, and is so arranged that, in use, the orientation of the elongate rotary cutter relative to the bucket portion or scoop portion is fixed.

2. An attachment according to claim 1 wherein the orientation of the elongate rotary cutter relative to the bucket portion or scoop portion is such that the excavator attachment can, in use, be positioned selectively in first and second operational positions, the first operational position permitting the cutting and excavation of rock by the elongate rotary cutter whilst the bucket portion or scoop portion is in a non-operational orientation and the second operational position permitting the collection of excavated material by the bucket or scoop portion whilst the elongate rotary cutter is in a non-operational orientation.

3. An attachment according to claim 1 comprising a connecting portion for pivotal connection to an excavator.

4. An attachment according to claim 3 wherein the connection between the excavator and the connecting portion, in use, provides a first axis of rotation of the elongate rotary cutter and the bucket portion (or scoop portion), wherein the attachment is further provided with one or more components that, in use, facilitates rotation of the elongate rotary cutter and the bucket portion (or scoop portion) about a second rotational axis, the first axis of rotation being angled with respect to the second rotational axis.

5. An attachment according to claim 4 wherein the angle between the first axis of rotation and the second rotational axis being from 45 to 135 degrees and the angle between the second rotational axis and the longitudinal axis of the elongate rotary cutter being from 45 to 135 degrees.

6.-7. (canceled)

8. An attachment according to claim 4, wherein said one or more components facilitates rotation of the elongate rotary cutter and the bucket portion (or scoop portion) through at least 300 degrees about said second rotational axis.

9. (canceled)

10. An attachment according to claim 1, wherein, in use, the position of the elongate rotary cutter relative to the bucket portion (or scoop portion) is fixed.

11. An attachment according to claim 1, wherein the elongate rotary cutter comprises a multiplicity of cutting elements, wherein the cutter elements are rotatable about the longitudinal axis of the elongate rotary cutter.

12. An attachment according to claim 11 wherein the elongate rotary cutter comprises a plurality of outer members
which are rotatable with respect to an inner member, each cutter element being associated with one of the outer members.
13. (canceled)
14. An attachment according to claim 11 wherein the cutter elements are associated with a rotatable, substantially rigid cylindrical cutter body.
15-16. (canceled)
17. An attachment according to claim 1 wherein the attachment is a substantially linear arrangement.
18. (canceled)
19. An attachment according to claim 1 wherein the attachment comprises a body providing the bucket portion (or scoop portion) and a receiving portion for the receipt of the cutter device, wherein the cutter device is received by the receiving portion of the body.
20. (canceled)
21. An attachment according to claim 1, wherein the attachment is provided with one or more mountings for the placement of water cannon.
22-23. (canceled)
24. An excavator attachment for an excavator, the attachment comprising (i) a bucket portion for receiving excavated material or a scoop portion for collecting excavated material and (ii) a cutter device capable of cutting and excavating rock, wherein the cutter device comprises a rotary cutter of elongate configuration having a multiplicity of cutter elements, the elongate rotary cutter having a proximal end associated with the bucket portion (or scoop portion) and a distal end remote from the bucket portion (or scoop portion) wherein the orientation of the elongate rotary cutter relative to the bucket (or scoop) portion is, in use, fixed.
25-34. (canceled)
35. An attachment for an excavator, the attachment comprising a first functional tool and a second functional tool, the first functional tool having a proximal portion associated with the second functional tool and a distal portion forming a first end of the attachment, the second functional tool having a proximal portion associated with the first functional tool and a distal portion forming a second end of the attachment, the attachment being provided with a connecting portion for pivotal connection to an elongate arm of an excavator, the connection between the excavator and the connecting portion, in use, providing a first axis of rotation of the first and second functional tools, the attachment being further provided with one or more components that facilitate rotation of the first and second tools about a second rotational axis, the first axis of rotation being angled with respect to the second rotational axis.
36-39. (canceled)
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