

[54] **ROTARY COAL CUTTERS WITH WATER JET ORIFICES**

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[58] Field of Search 299/81, 87; 175/393

[56]

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Primary Examiner—Ernest R. Purser

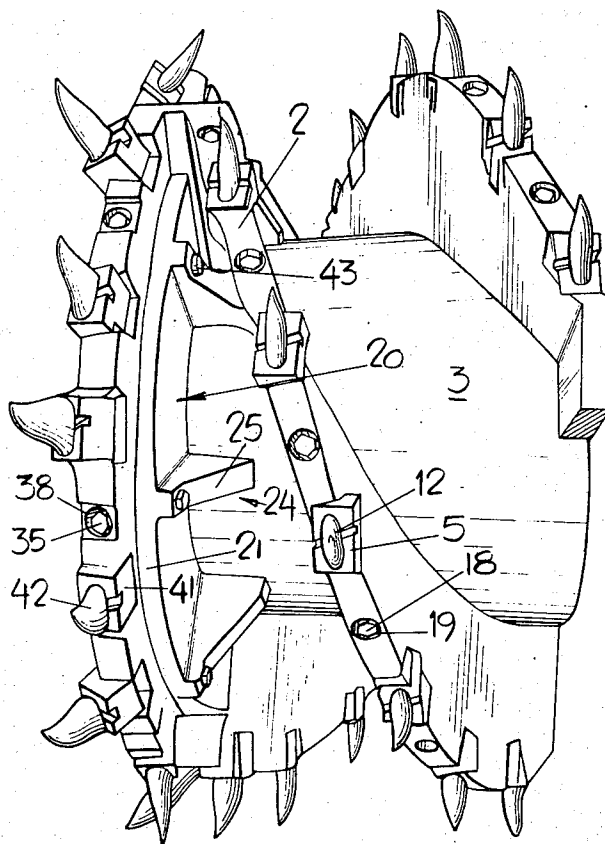
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[57]

ABSTRACT

A rotary coal cutter of the type having a drum mounting a ring cutting implement and a helical cutting implement or a helical guide for coal, wherein channels lead from the interior of the drum through the ring cutting implement to orifices from which water can be fitted to reduce dust.

4 Claims, 8 Drawing Figures



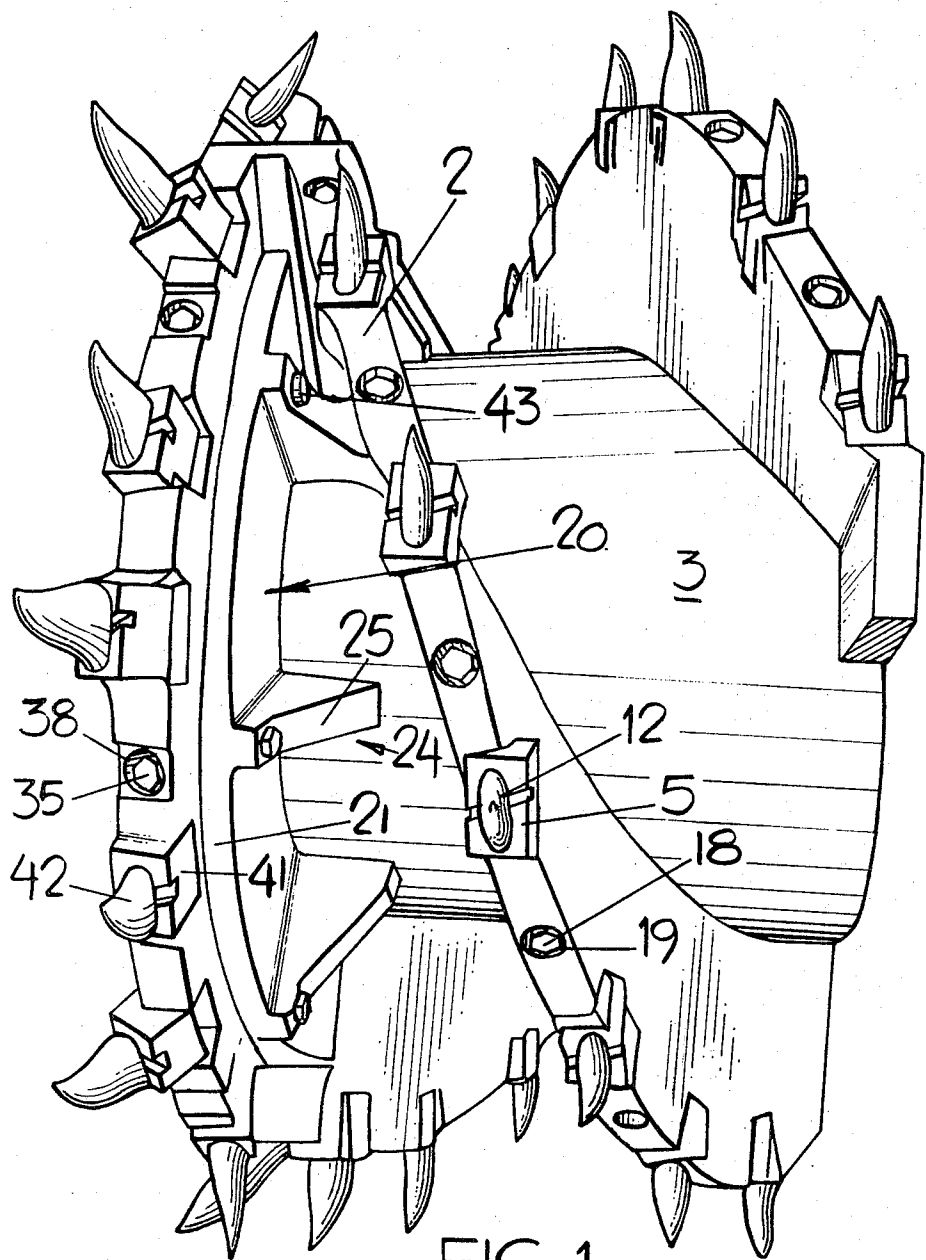


FIG 1

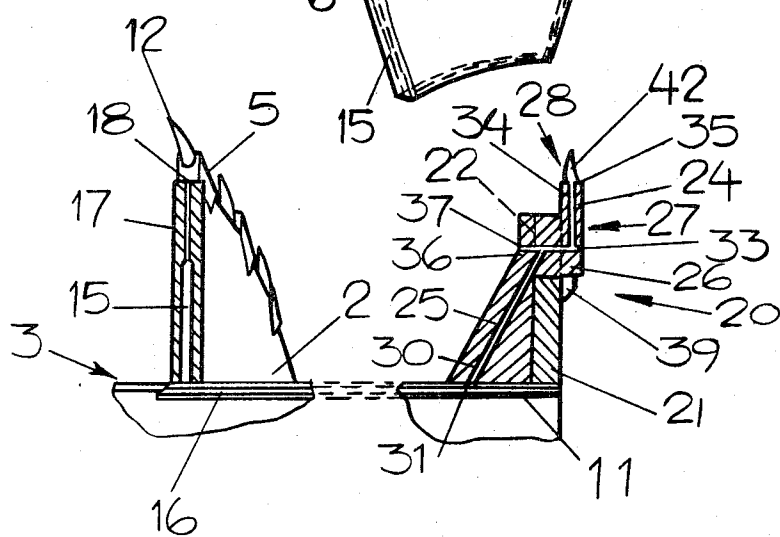
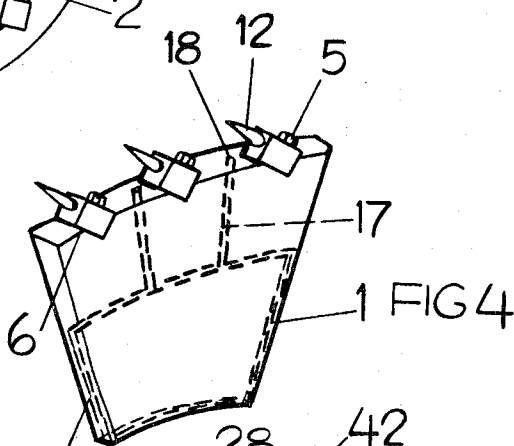
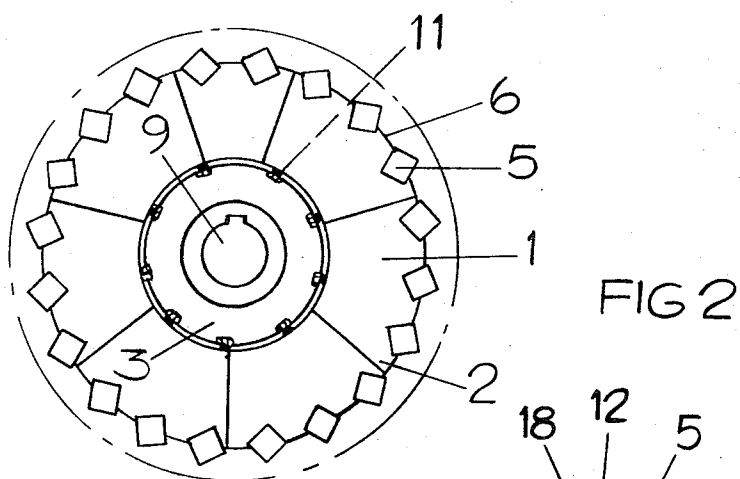


FIG 5

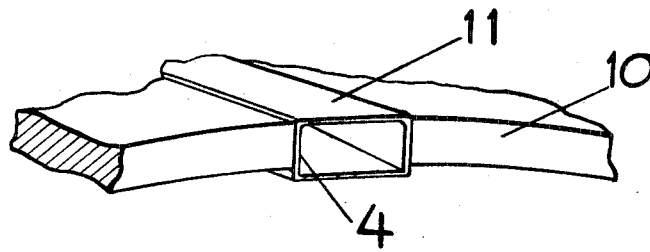


FIG 6

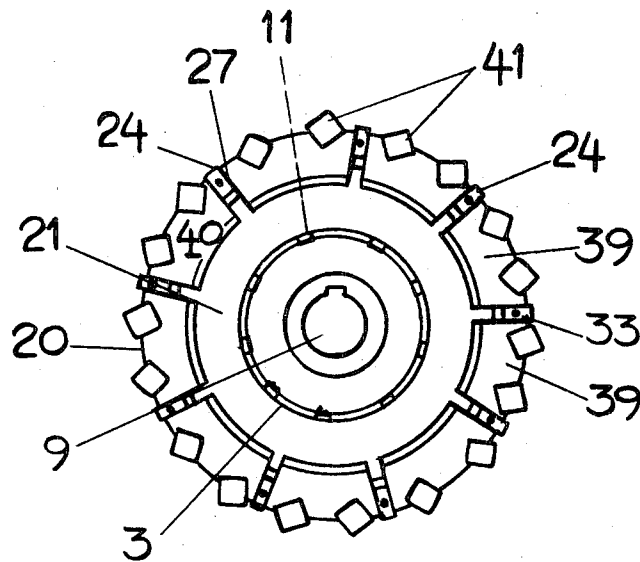
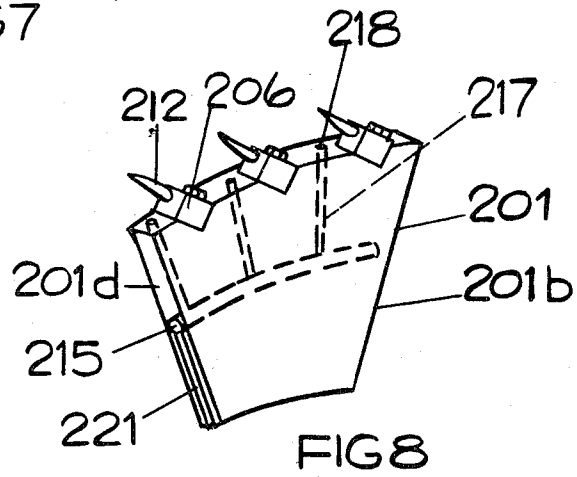
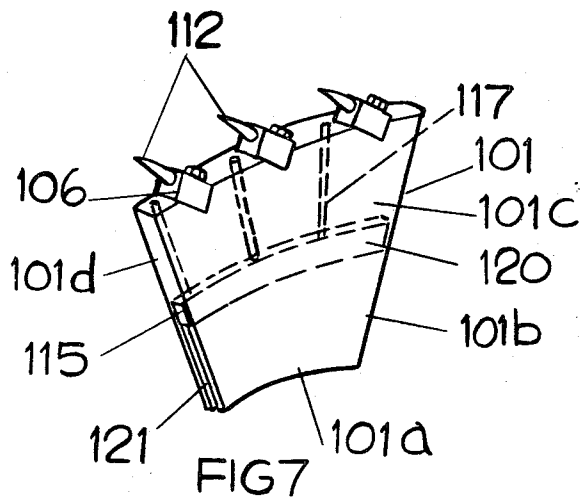


FIG 3



ROTARY COAL CUTTERS WITH WATER JET ORIFICES

This invention relates to a rotary coal cutter.

It is desirable and now a requirement in United Kingdom coal mines, that water should be delivered to the coal face at the coal cutter to cut down the spread of coal dust. At present, water is usually delivered by apparatus independent of the coal cutter and such apparatus is expensive to install. It is an object of the present invention to overcome this disadvantage and provide an improved and more convenient manner of delivering water to the coal face.

In accordance with this invention, there is provided a rotary coal cutter comprising a drum, a cutting implement mounted on the drum and having a peripheral face adapted for mounting picks in a circle about the drum axis, and a helical guide wall for cut coal mounted co-axially on the drum adjacent the cutting implement, the cutting implement being provided with passages leading from an interior part of the drum to orifices formed in the implement.

The helical guide wall may be adapted at its periphery for mounting picks spaced along the helix.

In the preferred embodiment, the cutting implement includes a plurality of brackets and segments alternately positioned around the drum axis, the brackets serving to mount the implement on the drum and also being provided with the orifices and passages.

The invention is particularly described hereafter with reference to the accompanying drawings, wherein:

FIG. 1 is a perspective view of a rotary coal cutter according to the invention;

FIG. 2 is one end elevation of the rotary coal cutter of FIG. 1;

FIG. 3 is an elevation of the opposite end of the coal cutter;

FIG. 4 is a perspective view of one segment of a helical cutting implement of the cutter;

FIG. 5 is a longitudinal sectional view of part of the coal cutter;

FIG. 6 is a fragmentary sectional view showing how a water conveyance tube is mounted in a drum of the coal cutter;

FIG. 7 is a perspective view of a modified segment of the helical cutting implement; and

FIG. 8 is a perspective view of a further modification of the segment of the helical cutting implement.

Referring initially to FIGS. 1 to 6, the rotary cutter shown comprises a drum 3 keyed on a shaft 9 (FIG. 2) in conventional manner. A peripheral wall of the drum serves externally to support a first cutting implement 2 formed in a helix and co-axial with the drum, the implement extending generally radially outwardly of the axis of the drum. At one end of the drum there is mounted a second cutting implement 20 welded to the drum and extending, radially outwardly of the drum. Each of the cutting implements 2, 20 is provided with a plurality of recesses 6 each mounting a pick box 5, 41 respectively, the pick boxes being spaced around the periphery of the drum and mounted, remote from the drum, in the peripheral faces of the implements 2, 20. Each pick box 5, 41 mounts a replaceable pick 12, 42 respectively, in conventional manner.

The peripheral wall of the drum 3 is provided with elongate slots 4 (FIG. 6) extending parallel to the drum axis, nine such slots being provided in this example. Each slot 4 closely receives a rectangular section tube

11 which is welded into the slot. In the example illustrated, the drum has a diameter of 24 inches and each tube is 2 inches by 1 inch in section. The narrower sides of the tube project into the interior of the drum 3 and the outer face of each tube is substantially flush with the peripheral outer surface of the drum 3. Each tube 11 has an aperture 16 (FIG. 5) which communicates with the interior of the cutting implement 2, as described below, and is closed at each end. Each tube carries an inlet nozzle 8 for connection with a pressurised supply of water.

The first cutting implement 2 includes a plurality of segments 1, shaped so that when secured, each to a next adjacent segment, the segments complete a helix. The segments are metal castings, which are butt-welded to one another to define the helix and are also welded to the periphery of the drum.

Each segment 1 has a channel 15 extending from one side to the other of the segment and opening at both said sides and at the rear face of the segment which is welded to the drum. The channel of each segment registers with the channel of each next adjacent segment and the apertures 16 in the tubes 11 communicate the channels with the interiors of the tubes 11. From each channel, a plurality of passages are formed, each passage 17 leading to an orifice 18 of a nozzle 19 (FIG. 1) positioned in the peripheral outer face of the implement, one between each two adjacent picks.

The second cutting implement 20 comprises an end plate 21 welded to one end of the drum 3 and defining an outwardly extending radial flange on the drum. The end plate 21 is provided with nine radial slots 22, each of which receives a bracket 24. Each bracket has a gusset portion 25 (FIGS. 1 and 5) which seats on the drum periphery and against the end plate 21. The gusset portion 25 is welded both to the end plate 21 and to the drum 3. Each gusset portion overlies a corresponding tube 11.

Each bracket 24 also includes a water-jet portion 26 integral with the gusset portion and extending through the corresponding slot 22. Each water jet portion defines an end face 27, parallel to the end plate 21, and an outer peripheral face 28.

Bores are provided in each bracket to define a set of passages including a main passage 30 extending through the gusset portion 25 and leading from an aperture 31 in the wall of the underlying tube 11. A first branch passage 32 leads from the main passage 30 to an orifice 33 of a jet (not shown) at the end face 27 and a second branch passage 34 leads from the main passage to an orifice 35 in a jet 38 (FIG. 1) at the peripheral face 28. A third branch passage 36 leads to the opposite face to the end face 27 and opens at an orifice 37 of a jet 43 (FIG. 1).

Between each pair of brackets 24, there is mounted a part-annular plate 39 welded to the end plate 31. Each part-annular plate has a rear face 40 flush with the rear faces of the brackets 24. The outer peripheral face of each plate 39 carries the pick boxes 41.

In use, the drum 3 is rotated so as to rotate both the helical cutting implement 2 and the second cutting element 20 so that the picks 12, 42 effect cutting of coal from a coal face. The helical cutting implement also acts as a guide for guiding coal to a conveyor adjacent the coal face. During rotation, the tubes 11 are connected to a source of water under pressure and, preferably, a known valve arrangement is included between

the source and the tubes 11 and is operable in phase with rotation of the drum, so that the tubes are intermittently supplied with water. The arrangement is such that only the tubes in communication with the orifices transiently near the coal face are supplied with water through the tubes 11. Water is ejected through the orifices 18 in the first, helical implement and the orifices 33, 35, 36 in the second implement, water being directed at the coal face and at cut coal picked up by the helical implement. By this means, the spread of dust away from the face, as cutting proceeds, is reduced.

The above described rotary coal cutter incorporating the system of water jetting can be cheaply assembled and is particularly effective in use. Further there are no pipes on, in the vicinity of the coal cutter, during a cutting operation, so that risk of damage to the water jetting system is reduced and the system is particularly robust.

It is envisaged that water can be supplied only to the first helical implement, or only to the second implement, if desired.

The tubes provide a particularly effective, cheap and robust manner of conveying water through the drum without any substantial projection to the interior of the drum, whereby the risk of damage is reduced.

Referring to FIG. 7, a modified segment 101 is provided with pick boxes 106 having picks 112. The segment is a casting and is formed with a transverse channel 115 spaced from the inner peripheral face 101a and from one side wall 101b of the segment. In the example shown, the channel is of rectangular section, but any other section may be chosen. The channel is formed in one of the major faces 101c defining a part of a side of the helical implement and the open mouth at that face is closed by a plate 20 recessed into the face 101c. An inlet passage 121 is formed in the opposite side wall 101d and leads from the channel 115 to the inner peripheral face 101a for communication with one of the tubes 11. Outlet passages 117 lead to orifices 118 from the channel. Welding of one segment to the next segment will close the passage 121 and the channel 115 at the side wall 101d, but one end segment must have

these parts closed by other means such as a plate.

In a further modification, shown in FIG. 8, each channel 215 is a cast bore formed transversely in each segment 201 and 201d and a terminating short of one side wall 201b. The channel opens at the opposite side wall inlet passage 221 lead to the channel from the tubes 11. Outlet passages 217 lead to orifices 218 at the outer periphery of the helical implement. Each segment is again formed with pick boxes 205 having picks 212.

It is envisaged that the interior of the drum may be provided with a single annular chamber instead of the plurality of tubes for supply of water.

I claim:

1. A rotary coal cutter comprising a drum, a cutting implement mounted on the drum and having a peripheral face adapted for mounting picks in a circle about the drum axis, and a helical guide wall for cut coal mounted co-axially on the drum adjacent the cutting implement, wherein the improvement comprises the cutting implement defining orifices and passages leading from an interior part of the drum to the orifices and wherein the cutting implement includes a plurality of brackets spaced around the drum and serving to mount the implement on the drum, each bracket defining at least one of said passages leading to a corresponding orifice in the bracket.

2. A rotary coal cutter according to claim 1, wherein the peripheral outer face of the bracket defines an orifice and at least one other orifice is defined by one of the faces extending between the inner and outer peripheries of the cutting implement the bracket defining passages leading to all the orificies.

3. A rotary coal cutter according to claim 2, wherein each bracket defines a main passage leading from the interior of the drum and defines branch passages leading from the main passage to the respective orificies.

4. A rotary coal cutter according to claim 1, wherein the cutting implement includes a plurality of segments mounted alternately with the brackets about the drum axis, the segments being adapted for mounting picks.

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