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54 Mineral breakers.

57 A mineral breaker having a pair of side by side breaker drums (14) which are spaced laterally from one another and arranged to rotate in opposite directions, each drum (14) having a plurality of breaker teeth (17) arranged in circumferentially extending groups of teeth spaced along each drum with the groups of teeth on one drum being positioned so as to extend between the groups of teeth on the other drum.

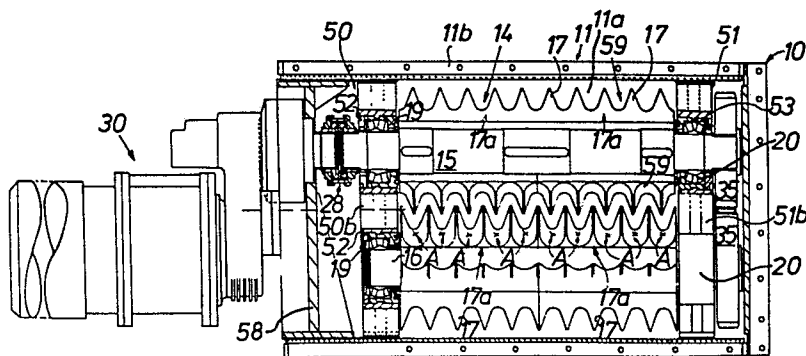


Fig. 1

MINERAL BREAKERS

The present invention relates to mineral breakers in particularlv, to mineral breakers for use in coal mining for ensuring maximum sizing of coal.

5 According to the present invention there is provided a mineral breaker having a pair of side by side breaker drums which are spaced laterally from one another and arranged to rotate in opposite directions, each drum having a plurality of breaker teeth arranged in circumferentially
10 extending groups of teeth spaced along each drum with the groups of teeth on one drum being positioned so as to extend between the groups of teeth on the other drum.

Reference is now made to the accompanying drawings, in which:

15 Figure 1 is a plan view, partly in section, of a mineral breaker according to the present invention;

Figure 2 is a side view of the mineral breaker shown in Figure 1;

20 Figure 3 is a sectional view taken along line III-III in Figure 2;

Figure 4 is a similar view to that of Figure 3 of a different embodiment according to the present invention;

Referring initially to Figures 1 to 3, a mineral breaker 10 includes a main frame 11, which in use is
25 capable of being sited over a conveyor for depositing sized material onto the conveyor which then transports the sized mineral away. The frame 11 houses a pair of breaker drums 14 which are located within a chamber 11a defined by side walls 11b of the housing and end support walls
30 50,51. Each of the drums 14 is fixedly mounted on shafts 15 and 16 respectively. Each drum is provided with a plurality of breaker teeth 17 which are arranged in circumferentially extending groups of teeth, with the groups on one drum being positioned so as to extend between the
35 groups on the other drum.

Both shafts 15,16 are rotatably supported at each end in bearing assemblies 19,20 respectively. Each pair of bearing assemblies 19,20 are respectively mounted within bearing seats 52,53 formed in end support walls 50,51 respectively. The end support walls 50,51 are each composed of two separate halves 50a, 50b and 51a,51b respectively, each half being secured to the side walls of the housing by bolts 54. Thus by separating adjoined halves it is possible to remove the respective bearing assemblies from the end support walls.

Shaft 15 is drivingly connected via a drive coupling 28 to an electric motor and reduction gear box assembly 30 which is bolted to an end plate 58 of the housing 11. Preferably the drive coupling 28 is of similar construction to that disclosed in U.K. Patent application 40511/78.

Shafts 15 and 16 are drivingly connected to one another by means of a pair of meshing gears 35 so that the drums 14 rotate in opposite directions. As shown in Figure 3 the angular position of the teeth on one drum in relation to those on the other drum is preferably arranged so that teeth on one drum extend between the circumferential spacing between teeth on the other drum. This relative angular position is maintained during operation by the meshing gears 35. It will be appreciated that the relative angular position between teeth on the drums may be adjusted as desired by changing the relative angular position of meshing gears 35. By changing the relative angular positions of the teeth on the drums 14 it is possible to adjust the breaker so as to produce sized material of a predetermined size.

The breaker teeth 17 are of a robust construction, as seen in Figures 3 and 4, and are constructed so as to be capable of breaking mineral which the breaker is intended to size. According, due to the interrelationship of the breaker teeth 17 all oversized mineral passing between the

breaker drums 14 is broken to provide sized mineral which is of a predetermined maximum size.

The shape of the breaker teeth 17 facilitates breaking of the oversized mineral in that a recess 59 is provided between adjacent rear faces 60 of teeth 17, the rear face of each tooth 17 being defined by a ridge 61 which in cross-section is arcuate as shown in Figures 3 and 4.

The width of ridge 61 is chosen bearing in mind the working conditions of the breaker. Accordingly oversized material will initially be seated across the ridges 61 of one or more adjacent teeth 17 on one drum and then on rotation of the drums, the front face 62 of teeth 17 on the other drum will engage the oversized material seated on the ridges 61. The oversized mineral will therefore be subjected to opposed loadings along its length thus causing it to fracture.

As seen in Figures 3 and 4, the front face 62 of each tooth 17 is inclined so as to define with an acute enclosed angle α with the tangent to the circumference of the drum at the point of intersection of the face 62 with the periphery of the drum. It will be appreciated that angle α may be varied as desired to suit working conditions of the mineral breaker.

In the embodiment of Figures 1 to 3, the teeth 17 on each drum 14 are formed separately to the drum 14. Thus sets of teeth 17 are cast together to form an elongate toothed strip 17a which includes a body portion 17b and teeth 17 projecting therefrom. The body portion 17b is provided with a rib 17c which extends longitudinally along same side of the body portion 17b as that from which the front faces 62 of teeth 17 are located.

Each drum 14 is provided with longitudinally extending channels 70 spaced circumferentially from one another. Each channel 70 has a bottom wall 70a against which the bottom face 17d of the body portion 17b abuts in use. Each channel also has a groove 71 for housing rib 17c as seen in Figure 3. Each drum 14 is provided

with bolt studs 75 which are anchored in the drum and project outwards into channel 70. The strips 17a are provided with apertures 80 and nut accommodating recesses 81 for securing each strip to the drum. For the sake of
5 simplicity, apertures 80 and recesses 81 have been omitted from Figure 2, their location being identified by crosses A. As seen in Figure 2, two strips 17a are provided in each channel 70. It will be appreciated that toothed drums of varying lengths may easily be constructed
10 using one or more strips 17a per channel 70.

The method of securing the strip 17a to the drums 14 described above is particularly advantageous since removal of the strips is relatively simple by removal of nuts 76 whilst, in use, loadings applied to the front faces 62 of
15 the teeth are transmitted to the drum via ribs 17c and co-operating grooves 71 and the bottom face 17d of the body portion 17b and the bottom wall 70a of channel 70. Thus in use, bolt studs 75 and nuts 76 are not loaded by the breaking operation of the drums.

20 It is to be noted that in Figure 3 all teeth 17 are formed on strips 17a and that for the sake of simplicity only one strip 17a is shown.

In the embodiment of Figure 4, all parts of the breaker are the same as those described in respect of the
25 embodiment of Figures 1 to 3 apart from the drum construction. Thus, in Figure 4, teeth 17 are formed integrally with drums 14 instead of being formed on strips 17a.

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CLAIMS

1. A mineral breaker having a pair of side by side breaker drums which are spaced laterally from one another and arranged to rotate in opposite directions, each drum
5 having a plurality of breaker teeth arranged in circumferentially extending groups of teeth spaced along each drum with the groups of teeth on one drum being positioned so as to extend between the groups of teeth on the other drum.
- 10 2. A mineral breaker according to Claim 1, wherein the angular position of teeth on one drum in relation to those on the other drum is arranged so that teeth on one drum extend between the circumferential spacing between the groups on the other drum.
- 15 3. A mineral breaker according to Claim 1 or 2, wherein each tooth on each drum is provided with a ridge projecting rearwardly, in the direction of rotation.
4. A mineral breaker according to Claim 3, wherein the ridge of each tooth is arcuate in cross-section.
- 20 5. A mineral breaker according to any of Claims 1 to 4, wherein the leading face of each tooth on each drum is substantially planar.
6. A mineral breaker according to any preceding Claim, wherein the teeth on each drum are integrally formed
25 therewith.
7. A mineral breaker according to any of Claims 1 to 6, wherein the teeth on each drum are releasably connected to the drum.
8. A mineral breaker according to Claim 7, wherein the
30 teeth are formed as part of elongate toothed strips, the strips being releasably connected to a respective drum so as to extend along the length of the drum.
9. A mineral breaker according to Claim 8, wherein each strip has a body portion from which said teeth
35 project and a rib projecting from the leading side of the

body portion, the drum having longitudinally extending channels for receiving the body portion and a recess formed in the leading side wall of each channel for accommodating said rib.

10. A mineral breaker substantially as described with reference to and as illustrated in the accompanying drawings.

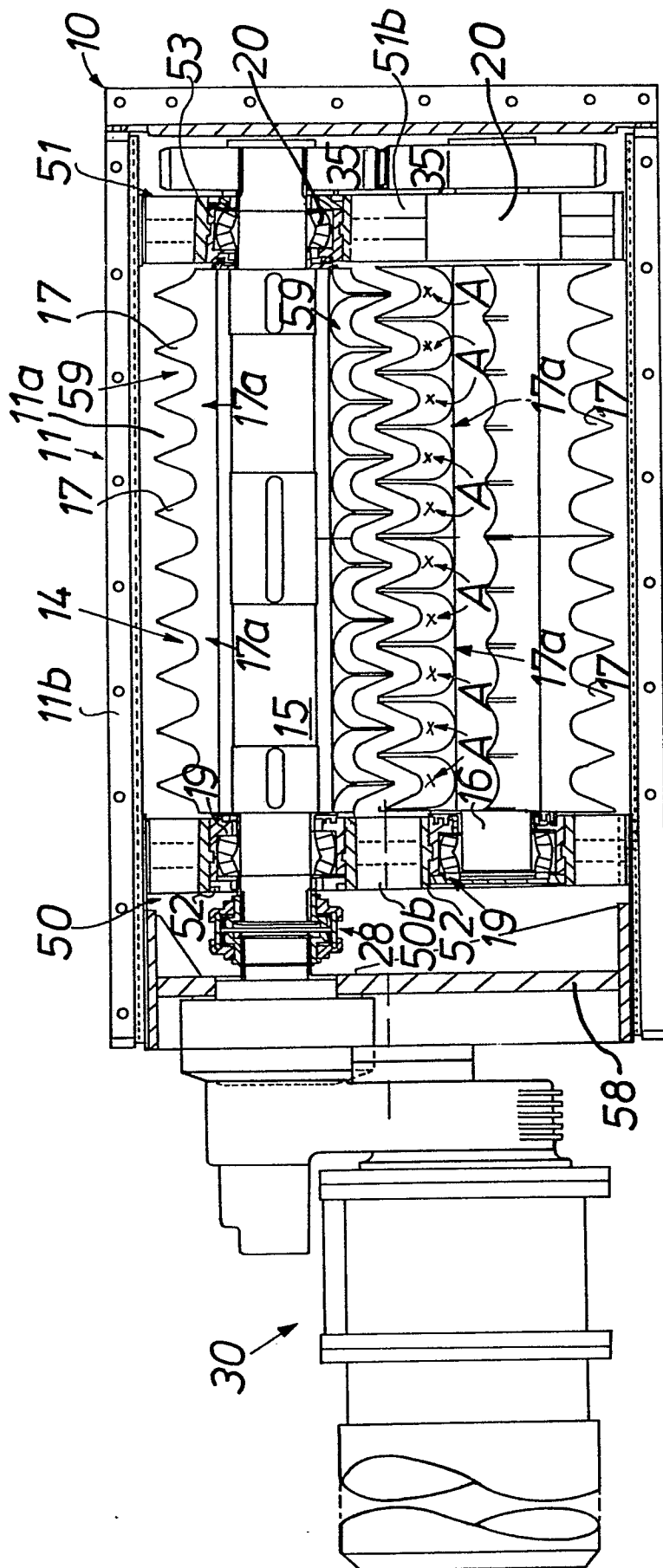
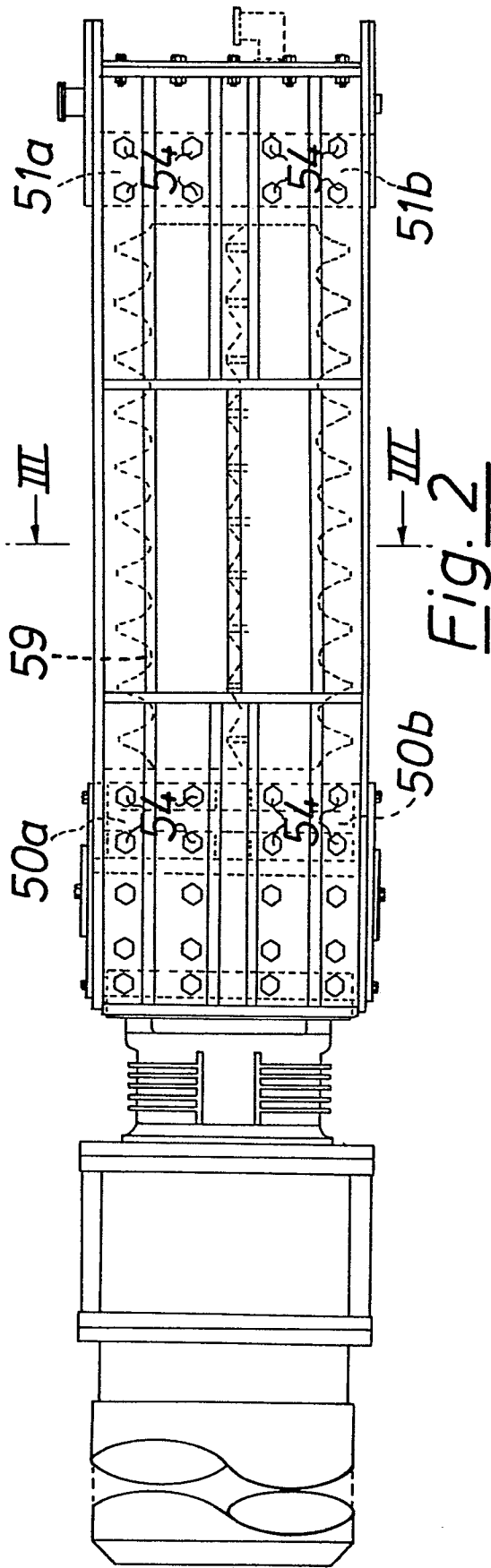
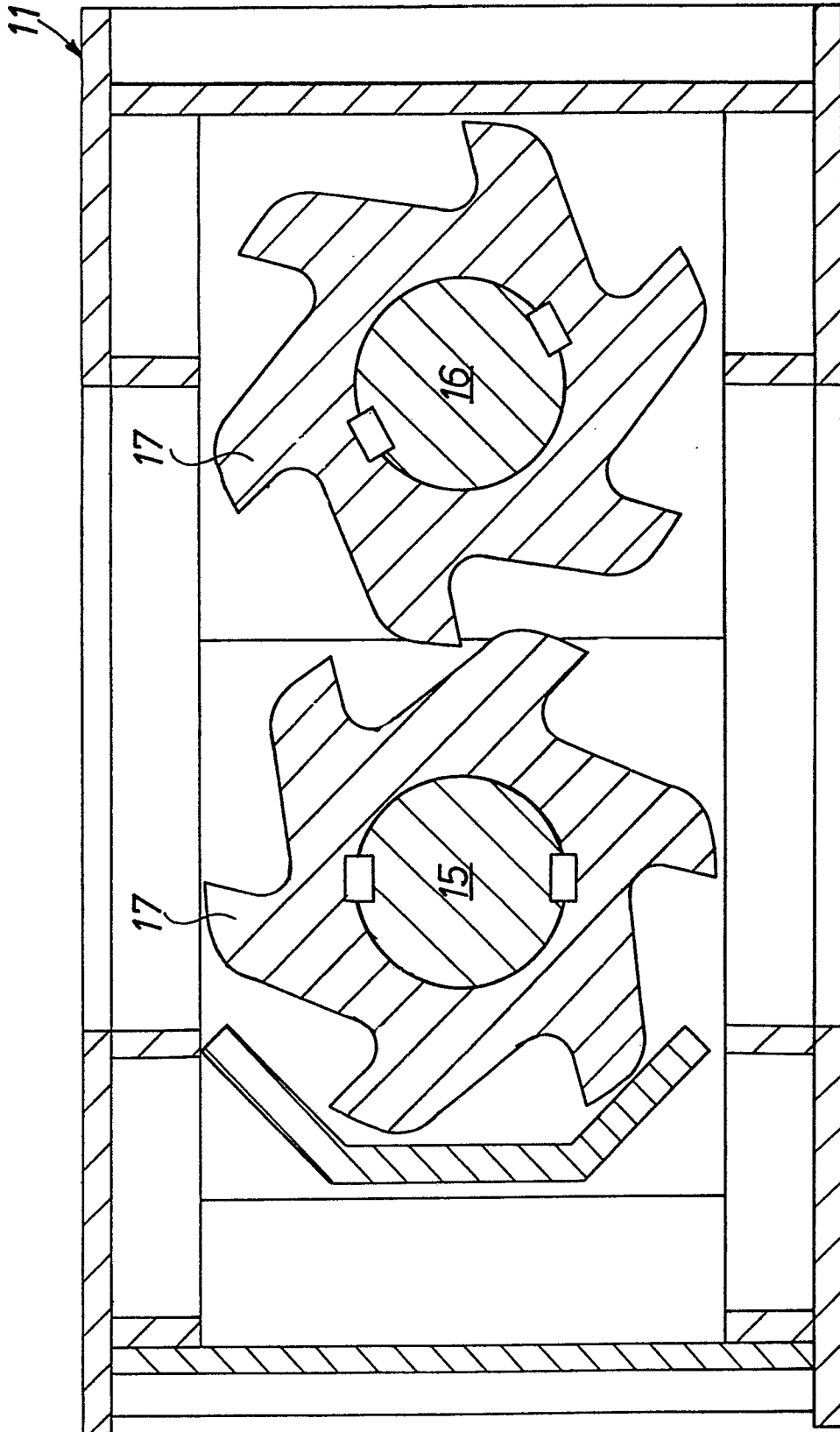


Fig. 1

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Fig. 4



European Patent
Office

EUROPEAN SEARCH REPORT

0052165

Application number
EP 80 30 4060

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
X	<u>GB - A - 294 798 (PERTWEE)</u> * Page 2, lines 84-117; page 3, lines 1-6 * --	1,2,7,8	B 02 C 4/08 4/30 13/20
X	<u>US - A - 1 356 291 (KENNEDY)</u> * Page 4, lines 83-101; page 1, lines 9-12; figures 16,17 * --	1-3,5,6	
X	<u>US - A - 3 240 436 (MYLTING)</u> * Column 3, lines 54-72; column 4, lines 1-4 * -- <u>FR - A - 871 657 (PAGET)</u> * Page 1, lines 55-61; figures 2,4 * ----	1,2 1-6	
			TECHNICAL FIELDS SEARCHED (Int. Cl. ³) B 02 C
			CATEGORY OF CITED DOCUMENTS X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
			&: member of the same patent family, corresponding document
<div style="display: flex; justify-content: space-between;"> <div> <p><input checked="" type="checkbox"/> The present search report has been drawn up for all claims</p> </div> <div> <p>Place of search The Hague</p> </div> <div> <p>Date of completion of the search 14-08-1981</p> </div> <div> <p>Examiner VERDONCK</p> </div> </div>			