INSTRUCTIONS
(a) If Convention application insert "Convention"

(a) CONVENTION

AUSTRALIA

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(b) Delete one

APPLICATION FOR A (b) STANDARD ~~PETTY~~ PATENT

63 : 311

(c) Insert FULL name(s) of applicant(s)

I/ We (c) MAI. Gutehoffnungshütte Aktiengesellschaft

(d) Insert FULL address(es) of applicant(s)

of (d) Bahnhofstr. 66
4200 Oberhausen 11

(e) Delete one

hereby apply for the grant of a (e) Standard ~~Petty~~ Patent for an invention entitled

(f) Insert TITLE of invention

(f) A MINING MACHINE

(g) Insert "complete" or "provisional" or "petty patent"

which is described in the accompanying (g) complete specification.

(Note: The following applies only to Convention applications)

Details of basic application(s)

(h) Insert number, country and filing date for the or each basic application

	Application No.	Country	Filing Date
(h)	P 40 15 126.3-24	FRG Federal Republic of Germany	11.05.90

Address for Service: PHILLIPS ORMONDE AND FITZPATRICK
Patent and Trade Mark Attorneys
367 Collins Street
Melbourne, Australia 3000

(i) Insert date of signing

Dated (i) 24th April, 1991

(j) Signature of applicant(s) (For body corporate see headnote*)

(k) Corporate seal if any

(k)

(j) MAN Gutehoffnungshütte Aktiengesellschaft

(Jürgen Singelmann)
Proxy

(Hans König)
Authorized Officer

Note: No legalization or other witness required

PHILLIPS ORMONDE AND FITZPATRICK
Patent and Trade Mark Attorneys
367 Collins Street
Melbourne, Australia

PTP 2/83

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DECLARATION FOR A PATENT APPLICATION

▼ **INSTRUCTIONS**

(a) Insert "Convention" if applicable

(b) Insert FULL name(s) of applicant(s)

(c) Insert "and/or" if applicable

(d) Insert TITLE of invention

(e) Insert FULL name(s) AND address(es) of declarant(s) (See Headnote ★)

(f) Insert FULL name(s) AND address(es) of actual inventor(s)

(g) Recite facts upon which applicant is entitled to make the application if not actual inventor(s) (See Headnote ★★)

(h) Insert country, filing date and basic applicant(s) for EACH basic application

In support of the (a) Convention application made by (b)

MAN Gutehoffnungshütte
Aktiengesellschaft

(hereinafter called "applicant(s)") for a patent (c) for an invention entitled (d)

A MINING MACHINE

I/~~We~~ (e) 1. Dipl.-Ing. Jürgen Singelmann (Proxy)
Mülheimer Str. 109, 4200 Oberhausen 11
2. Hans König (Authorized Officer)
Fasanenstr. 13, 4300 Essen

do solemnly and sincerely declare as follows:

~~1. I am/We are the applicant(s).~~

(or, in the case of an application by a body corporate)

1. ~~I am~~ We are authorized to make this declaration on behalf of the applicant~~(s)~~.

~~2. I am/We are the actual inventor(s) of the invention.~~

(or, where the applicant(s) is/are not the actual inventor(s))

2. (f) 1. Dipl.-Ing. Hartmut Grathoff
Am Wiesengrund 14, 8508 Wendelstein
Germany

2. Peter Kurz
Hermannstädter Str. 14, 8500 Nürnberg
Germany

~~is~~ are the actual inventor(s) of the invention and the facts upon which the applicant~~(s)~~ is~~are~~ entitled to make the application are as follows:

(g)

Applicant is the assignee of the invention from the actual inventors

*(**Note:** Paragraphs 3 and 4 apply **only** to Convention applications)*

3. The basic application~~(s)~~ for patent or similar protection on which the application is based is/~~are~~ identified by ***country, filing date, and basic applicant~~(s)~~*** as follows:

(h)

FRG	11.05.90	MAN Gutehoffnungshütte Aktiengesellschaft

Federal Republic of Germany

4. The basic application~~(s)~~ referred to in paragraph 3 hereof was, ~~were~~ the first application~~(s)~~ made in a Convention country in

(12) PATENT ABRIDGMENT (11) Document No. AU-B-76279/91
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 631311

(54) Title
A MINING MACHINE

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(56) Prior Art Documents
AU 82662/91 E21C 47/04
AU 591283 72822/87 E21C 47/04
AU 137545 13625/47 85.7

(57) Claim

1. A self-propelled, endless transport track mounted, continuous mining machine, for use in open-cast pits, comprising, in combination:

a) a drum-shaped cutting head with cutting teeth arranged around the periphery of the drum, the periphery of the drum being provided with passage means to allow the passage of extracted material inside of the drum;

b) means for further directing the extracted material via a feed chute onto a first section of a discharge conveyor, said discharge conveyor further including a second section and a third section;

c) said first section being axially arranged inside the cutting drum and emerging at one end of the cutting drum;

d) a downstream end of said first section merging, outside the cutting drum, into said second section extending generally vertically up to about the level of the uppermost part of a frame of the mining machine;

e) a downstream end of said second section merging into

.../2

an overhead third section which is inclined, said third section ending at a discharge point where the excavated material is to be discharged onto a bridge conveyor located in a connecting bridge and operatively associated with the mining machine;

f) covering belt means operatively associated with a material supporting surface of said discharge conveyor along said second section and said third section up to said discharge point to retain excavated material on the material supporting surface of the discharge conveyor.

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COMPLETE SPECIFICATION
(ORIGINAL)

63 311

Class Int. Class

Application Number:
Lodged:

Complete Specification Lodged:
Accepted:
Published:

Priority

Related Art:

Applicant(s):

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Patent and Trade Mark Attorneys
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Complete Specification for the invention entitled:

A MINING MACHINE

Our Ref : 209410
POF Code: 1308/1308

The following statement is a full description of this invention, including the best method of performing it known to applicant(s):

6006

The present invention relates to a self-propelled, endless transport track mounted, continuous mining machine for use in open-cast operations, and having a drum-shaped cutting head with cutting teeth arranged around the periphery of the drum. The excavated material is conveyed via a feed chute onto a discharge belt axially arranged inside the cutting drum.

So-called surface-cutting machines are used to cut roadways or to remove the surfacing material from existing roads. Such machines operate with a small-diameter cutting drum, travel on endless transport tracks, and discharge the excavated material onto an intermediate belt having a feed hopper; this belt is arranged between the rear endless track units, seen relative to the direction of travel of the machine. This intermediate belt then discharges onto a swivellable belt which is used to load trucks.

A known type of open-cast mining machine exists which operates according to the "Satterwhite principle". In this machine, four bucket wheels are arranged and operate side by side, dumping the excavated material overhead and onto two transverse belts arranged behind the bucket wheels, and these belts in turn discharge onto an intermediate belt running opposite to the direction of travel of the machine. This belt feeds to a pivotable discharge belt used to load the excavated material into trucks.

An open-cast mining machine is described in German Patent Application DE P 39 20 011.6, which was not pre-published. In this mining machine the material excavated by the cutting drum is conveyed to the exterior at the side of the drum by a discharge belt arranged within the drum. The belt discharges the material onto a cardanically attached bridging belt. The discharge side of the bridging belt is cardanically attached to a hopper car. Then, via the hopper of the hopper car the excavated material is discharged onto a bench conveyor belt. The open-cast mining machine described in German Patent Application DE P 39 20 011.6 is highly versatile, insofar as the concept of the actual excavating element, namely the cutting drum, is concerned. However, in individual cases, the constellation of conveyors, such as bridging belt, bench conveyor belt, etc., cannot be used, for example when the local situation in the open-cast mine does not permit these items of conveying equipment to be set up in the manner described.

It is an object of the invention to further advance the art of open-cast mining machines which was not pre-published, in such a way that the machine can be used in a wide range of applications.

According to this invention there is provided a self-propelled, endless transport track mounted, continuous mining machine, for use in open-cast pits, comprising, in combination:

a) a drum-shaped cutting head with cutting teeth arranged around the periphery of the drum, the periphery of the drum being provided with passage means to allow the passage of extracted material inside of the drum;

b) means for further directing the extracted material via a feed chute onto a first section of a discharge conveyor, said discharge conveyor further including a second section and a third section;

c) said first section being axially arranged inside the cutting drum and emerging at one end of the cutting drum;

d) a downstream end of said first section merging, outside the cutting drum, into said second section extending generally vertically up to about the level of the uppermost part of a frame of the mining machine;

e) a downstream end of said second section merging into an overhead third section which is inclined, said third section ending at a discharge point where the excavated material is to be discharged onto a bridge conveyor located in a connecting bridge and operatively associated with the mining machine;

f) covering belt means operatively associated with a material supporting surface of said discharge conveyor along said second section and said third section up to said discharge point to retain excavated material on the material supporting surface of the discharge conveyor.

It is particularly advantageous when the discharge conveyor consists of a pan conveyor with transverse

partitions and corrugated side walls. In the second section and in the subsequent overhead third section at a point above the frame of the mining machine the material supporting face of the conveyor co-operates with a covering belt which assists in retaining the material on the discharge belt.

Instead of a pan conveyor with a covering belt, as mentioned, it is also possible to use a discharge conveyor consisting of a normal troughed conveyor belt which is provided with a covering belt in its second and third sections. The troughed conveyor belt and the covering belt are then pressed together by spring-loaded supporting rollers. The two belts may also be forced together in another known manner by applying compressed air to the back surfaces of the belts. In this case, the belts would encased in a housing.

Instead of the covering belt, it is also possible to use a so-called "foam belt" as described, for instance, in West German Patent 22 36 102 issued June 19, 1975 (Bechtloff et al.), operating with thick, resilient endless belts made from a foamed rubber or the like material, resiliently gripping the conveyed material between opposed surfaces of two conveyor belts.

In the mining machine according to the invention the bench conveyor and the loading car are positioned on the upper edge of the block being mined, both when the development trench is being cut and also when the blocks are being mined. The bench conveyor and the onward-conveying belts onto which it discharges are on the same level and therefore at no point do they have to be taken upwards over the sloping side of a bench.

It is especially advantageous that, at the side of the cutting drum where the discharge conveyor emerges from the contour of the drum and continues on upwards in the form of a vertical conveyor, cutting clearances are created which permit steep sides to be cut on the open-cast mine benches.

The invention will now be described by way of an exemplary embodiment, with reference to the accompanying simplified, diagrammatic drawing, wherein:

Fig. 1: is a cross-sectional view of the mining machine

Fig.2: is a side view of the mining machine with connecting bridge and loading car in the open-cast mine.

The open-cast mining machine is preferably mounted on individually driven endless track units (not shown here) which are arranged in pairs in front of and behind the cutting drum 1. The front and rear pairs of the endless track units can be raised and lowered independently of each other by means of hydraulically activated parallelogram links.

The structure of the mining machine and of the cutting drum 1 which is made up of cutting bars on which are arranged tiltable tooth holders containing the cutting teeth, is presented and described in detail in German Patent Application P 39 20 011.6.

As the cutting drum 1 rotates, the material excavated by the cutting teeth is discharged by the cutting bars and flights via a fixed feed chute **12** into the interior of the cutting drum and from there onto the discharge conveyor **2**, **3**, **4**.

The discharge conveyor is a continuous conveyor which is divided into three sections. The first section 2 is located inside the cutting drum 1 and emerges axially at the side of the drum. The second section 3 runs vertically up to approximately the height of the upper edge of the frame **5** of the mining machine.

Then the discharge conveyor runs through the gently rising third section 4 and ends at a discharge point **6** above the frame 5 of the mining machine.

In the embodiment described, the discharge conveyor 2, 3, 4 is a special type of a pan conveyor with transverse partitions **9** which are approximately as high as corrugated side walls **10**. The conveyor belt of this type is described, for instance in a publication entitled Flexowell™ Handbuch Manual (Technischer Auszug / Technical Extract 1988) published by Conrad Scholtz AG of P. O. Box 2228 D-4130 Moers 1, Germany. Briefly, the belt is made of a flexible rubber - like material and includes a base belt from the outer surface of which projects a number of transverse partitions. At each side of the belt, the partitions are integral with a continuous, corrugated side wall to provide a number of rectangular cells. Each side wall is inwardly spaced from the adjacent edge of the base belt to provide a guide roller engagement surface on the outer surface of the belt. The corrugated nature of the side walls allows the belt to

run over guide rollers which may engage a portion of the belt between the edge of the base belt and the adjacent corrugated wall.

Commencing in the direction of conveying, to the side of and below the discharge chute 12 of the cutting drum 1, and ending at the discharge point 6 above the frame 5 of the mining machine, the excavated material supporting surface of the discharge conveyor 2, 3, 4 is combined with a covering belt **11** on which the pan conveyor rests when it is loaded with excavated material.

The term "material supporting surface" of the conveyor belt is to be interprete broadly in that it relates to that surface of the belt on which the excavated material is deposited and conveyed, even though, in the third section of the conveyor, the "material supporting surface" in fact faces obliquely downwardly and thus does not "support" the material in the strict sense of the word, the strictly supporting function being effected by the part of the covering belt 11 extending along the third section.

The discharge point 6 consists of a housing enclosing the discharge head of the discharge conveyor 2, 3, 4 with a discharge hopper arranged beneath it.

A scraper **13** is arranged at the outlet of the feed chute 12 within the cutting drum 1. This scraper delimits the maximum filling height of the discharge conveyor 2, 3, 4 which is dictated by the height of the side walls 10 and of the transverse partitions 9 on the pan conveyor.

The material excavated by the cutting drum 1 is discharged at the head of the third section 4 of the discharge conveyor at the discharge point 6 onto a bridge conveyor **8** located in a conveyor bridge **7**. The bridge conveyor is as a rule a belt conveyor.

The connecting bridge 7 is mounted on the frame 5 of the mining machine and pivots freely around the vertical axis **14** as well as around the horizontal axis **15** oriented perpendicular to the longitudinal axis of the connecting bridge.

At the end opposite the discharge point 6, the connecting bridge 7 is mounted on a loading car **16** fitted for example with endless tracks. The connecting bridge 7 pivots freely around all three axes on the loading car 16 and it can slide relative to its longitudinal axis.

Below the loading car 16 a belt conveyor is arranged as a bench conveyor **17**.

Those skilled in the art will appreciate that the embodiment described may be modified to a greater or lesser degree, without departing from the scope of the present invention. Accordingly, we wish to protect by letters patent issued on this application all such embodiments as properly and fairly fall within the scope of our contribution to the art.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A self-propelled, endless transport track mounted, continuous mining machine, for use in open-cast pits, comprising, in combination:

a) a drum-shaped cutting head with cutting teeth arranged around the periphery of the drum, the periphery of the drum being provided with passage means to allow the passage of extracted material inside of the drum;

b) means for further directing the extracted material via a feed chute onto a first section of a discharge conveyor, said discharge conveyor further including a second section and a third section;

c) said first section being axially arranged inside the cutting drum and emerging at one end of the cutting drum;

d) a downstream end of said first section merging, outside the cutting drum, into said second section extending generally vertically up to about the level of the uppermost part of a frame of the mining machine;

e) a downstream end of said second section merging into an overhead third section which is inclined, said third section ending at a discharge point where the excavated material is to be discharged onto a bridge conveyor located in a connecting bridge and operatively associated with the mining machine;

f) covering belt means operatively associated with a material supporting surface of said discharge conveyor along said second section and said third section up to said discharge point to retain excavated material on the material supporting surface of the discharge conveyor.

2. An open-cast mining machine according to Claim 1, wherein the discharge conveyor comprises:

a) a pan conveyor having an endless conveyor belt which includes transverse partitions approximately as high as corrugated side walls of the conveyor belt, the partitions and the corrugated side walls combining to

form a plurality of compartments;

b) said covering belt means being a smooth, endless, flat covering belt beginning at a point where the first section of the discharge conveyor merges into the second section thereof, and ending just upstream of said discharge point;

c) said covering belt being operatively associated with engagement means for maintaining the belt in engagement with adjacent portions of the discharge conveyor such as to cover up said compartments of the portion of the pan conveyor at the second and third section thereof.

3. An open-cast mining machine according to Claim 1, wherein

a) the discharge conveyor consists of a troughed conveyor belt which, in the second section and in the third section of the discharge conveyor, is operatively associated with a covering belt;

b) the troughed conveyor belt and the covering belt being provided, at said second and third sections, with spring-loaded rollers, adapted to apply pressure to the back of the troughed conveyor belt and the covering belt to force them together.

4. An open-cast mining machine according to Claim 2, wherein a scraper is arranged at a downstream end of the feed chute, the scraper being adapted to limit the filling level of the belt compartments to that corresponding to the height of the side walls and the transverse partitions.

5. An open-cast mining machine according to Claim 1, wherein a first end of the connecting bridge is freely pivotable on the frame of the mining machine about a vertical axis and about a longitudinal axis of the connecting bridge, an opposed end of the connecting bridge being freely pivotably mounted on a loading car, about three axes disposed at right angles to each other, said opposed end of the bridge being also slidably mounted on the loading car along the longitudinal axis of the connecting bridge.

6. A self-propelled, endless transport track mounted, continuous mining machine, for use in open-cast pits substantially as herein described and illustrated.

DATED: 1 September 1992

PHILLIPS ORMONDE & FITZPATRICK
Attorneys for:
MAN GUTEHOFFNUNGSHUTTE AG

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Fig.2

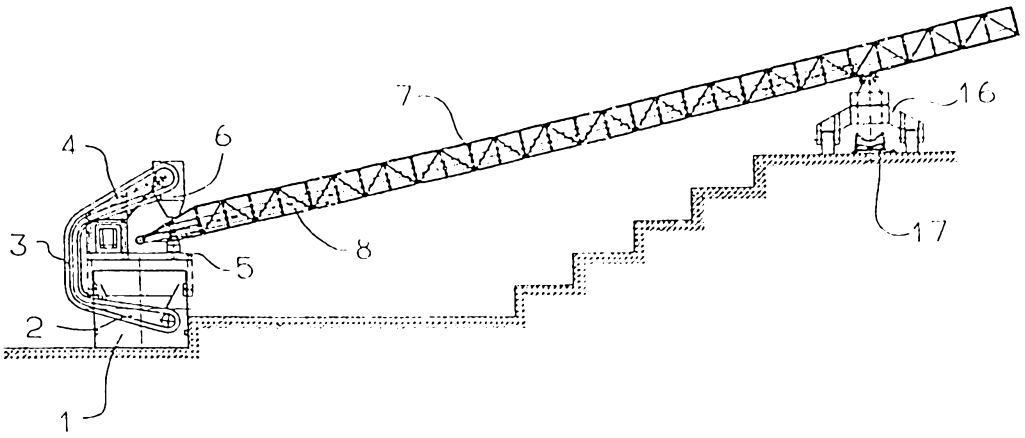

Fig.1