

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 747 572 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:

08.01.2003 Bulletin 2003/02

(21) Application number: **95926810.3**

(22) Date of filing: **03.08.1995**

(51) Int Cl.7: **E21C 27/02**

(86) International application number:
PCT/BY95/00004

(87) International publication number:
WO 96/021086 (11.07.1996 Gazette 1996/31)

(54) **FACE-WORKING MACHINE**

SCHRÄMLAGEMASCHINE

MACHINE DE TAILLE DE FRONT

(84) Designated Contracting States:
DE FR GB

(30) Priority: **03.01.1995 BY 95000895**

(43) Date of publication of application:
11.12.1996 Bulletin 1996/50

(73) Proprietor: **PRODUCTION AMALGAMATION
"BELARUSKALI"
Soligorsk, 223710 (BY)**

(72) Inventors:
• **ZHIBURTOVICH, Sergey Sergeevich
Soligorsk, 223710 (BY)**
• **TOMCHIN, Lazar Ilich
Soligorsk, 223710 (BY)**
• **SYCHEVSKI, Vladimir Alekseevich
Soligorsk, 223710 (BY)**

- **CHUZHOV, Vasili Nikolaevich
Soligorsk, 223710 (BY)**
- **VOLCHOK, Yuri Petrovich
Soligorsk, 223710 (BY)**
- **TODOROV, Vladimir Ivanovich
Soligorsk, 223710 (BY)**

(74) Representative: **Abbie, Andrew Kenneth et al
R.G.C. Jenkins & Co.
26 Caxton Street
London SW1H 0RJ (GB)**

(56) References cited:
DE-A- 2 731 586 DE-C- 3 527 253
SU-A- 727 848 SU-A- 798 291
SU-A- 1 104 260 SU-A- 1 213 188
SU-A- 1 504 335

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 0 747 572 B1

Description

Field of Technology

[0001] The invention relates to mining and can be used for extracting ore from strata with complex deposition structures.

[0002] The claimed invention is directed to solving the problem of providing bulk and selective ore extraction with one and the same machine.

Prior Art

[0003] Known in the art is a face-working machine comprising a housing and two actuating elements disposed at the ends of the housing, the actuating elements being in the form of arms rotatable in the vertical plane and provided with a built-in drive and a cutting screw conveyor ("Glukauf", No.8, 1992, p.7).

[0004] The deficiency of this construction is a low efficiency of the machine when working seams of a mineral interlayered with barren rock because it is impossible to provide frontal control of the position of the cutting screw conveyors relative to the beam of the face.

[0005] The most pertinent technical solution adopted as the prototype is a machine (U.S.S.R. Patent 1553670) comprising a housing and two actuating elements hinged thereon, the actuating elements being in the form of screw conveyors with drives for extracting the mineral, and a cutting drum having a vertical axis of rotation for extracting rocky interstratification. The cutting drum with the drive is disposed on an additional support frame hinged to the machine. When turning relative to the support frame, the cutting drum occupies a position of being ahead of the screw conveyors in the direction of the face, and gets positioned behind them in the course of work.

[0006] The deficiency of this construction is its complication due to the presence of a third cutting member for extracting rocky interstratification, since for bulk extraction the machine can be used without the presence of a cutting drum; this lowers the effectiveness of utilization of the machine in various methods of working a mineral, including such minerals that have complex deposition structures. Moreover an additional cutting member increases the dimension of the machine lengthwise, making it more difficult to carry out end operations at conjugations of rock with vent and conveyor drifts.

Disclosure of the Invention

[0007] It is the object of the present invention to broaden the sphere of application and increase the effectiveness of working seams by a selective method, and also to enhance the technical potential of the machine in bulk and selective methods of extracting minerals.

[0008] To achieve the object that has been set, the

claimed invention, a face-working machine, comprises the following set of substantial features : a housing and two actuating elements disposed at the ends of the housing, the actuating elements being in the form of arms rotatable in the vertical plane, provided with a built-in drive and a cutting screw conveyor; each arm is connected to the housing of the machine by means of a bracket at one end of which the arm is hinged, while the other is movably mounted in the guides of the housing of the machine, enabling frontal movement of the arm against the face with the help of a hydraulic cylinder by an amount equivalent to the intake capacity of the screw conveyor.

[0009] The claimed invention has the following distinguishing features over the prototype: each arm is connected to the housing by means of a bracket at one end of which the arm is hinged, while the other is movably mounted in guides of the housing of the machine, enabling frontal movement of the arm against the face with the help of a hydraulic cylinder by an amount equivalent to the intake capacity of the screw conveyor.

[0010] According to the information available to the authors, the set of substantial features characterizing the substance of the claimed invention is not known from the prior art, thus permitting to come to the conclusion that the invention meets the criterion of "novelty".

[0011] A comparison of the claimed face-working machine with the prototype permits one to conclude that the prior art machine does not contain features similar to the substantial distinguishing features of the claimed machine.

[0012] The set of features of the claimed technical solution is distinguishable over the prototype and over known analogs, and is not obvious from the prior art. Therefore, the authors believe that the subject matter is novel and has inventive height.

[0013] The invention also has inventive height because a combination of features, which is the connection of each arm to the housing of the machine by means of a bracket at one end of which the arm is hinged, while the other is movably mounted in guides of the housing of the machine enabling frontal movement of the arm against the face with the help of a hydraulic cylinder by an amount equivalent to the intake capacity of the screw conveyor, solves the problem of the invention : to broaden the sphere of application and increase the efficiency when working seams by a selective method, and also to enhance the technical potential of the machine in bulk and selective methods of extracting minerals. These features are interconnected in such a way that one of them is removed, the technical result, which is provided with the invention, disappears.

[0014] The set of substantial features, characterizing the substance of the invention, can be used in mining by obtaining a technical result lying in efficiently working seams of a mineral by the bulk method and the selective method, leading to an achievement of the object set, thus permitting one to come to the conclusion that the

invention meets the criterion of "industrial applicability".

Short Description of the Figures in the Drawings

[0015] The substance of the claimed invention is explained graphically, the figures showing :

Fig. 1 is a face-working machine as seen from the face;

Fig. 2 is a top view of a face-working machine.

The Most Preferred Embodiment

[0016] The claimed face-working machine comprises a housing 1 with feed mechanisms 2 and 3, two actuating elements in the form of arms 4 and 5 having a built-in drive 6 and 7, and screw conveyors 8 and 9. Each arm is connected to housing 1 by means of brackets 10 and 11. Arms 4 and 5 are hinged at one end of each bracket, while the other is mounted in guides 12 and 13 of housing 1. Hydraulic cylinders 14 and 15 provide frontal movement of the brackets 10 and 11 together with arms 4 and 5 against the face by an amount equivalent to the intake capacity of the screw conveyor.

[0017] The machine operates as follows. For extracting seams of a mineral by the bulk method, both arms 4 and 5 are pushed back from the face into the machine with the help of hydraulic cylinders 14 and 15. At the same time brackets 10 and 11 move along guides 12 and 13, providing the necessary equal reach of screw conveyors 8 and 9 with respect to housing 1. In this state the machine is ready to work in the bulk method.

[0018] For working seams in the selective method, one or the other screw conveyor must periodically obtain frontal movement against the face. So, when working a seam which has a rocky interstratification in the middle section thereof, the order of working the machine is as follows : one of the screw conveyors occupies an upper position and, with the help of bracket 10 and cylinder 14, is pushed out frontally against the face along guides 12 by an amount equivalent to the intake capacity of the screw conveyor.

[0019] In this position the machine moves through the rock, extracting the upper productive batch of the seam. After passing through, the upper screw conveyor returns to its original position, i.e. it is pushed back into the machine. Having moved the whole machine on a trough-like foundation against the face, the following operation with both screw conveyors provides an extraction of the rocky interstratification.

[0020] For the following third operation, the upper screw conveyor is moved out against the face by an amount of its intake capacity and provides an extraction of the immediate upper productive batch of the seam, while the lower screw conveyor, which, with respect to the face, lags behind the upper screw conveyor by an amount of its intake capacity, works off the lower productive batch of the seam. Before the fourth operation,

the main conveyor together with the machine moves against the face by an amount of its intake capacity, while the upper screw conveyor is pushed back into the machine; as this takes place, both screw conveyors provide an extraction of the rocky interstratification. Further, the third and fourth operations alternate.

[0021] An analogous order of operation of the machine is possible when there are two or more rocky interlayers in the thickness of the seam.

Industrial Applicability

[0022] According to constructional studies, the claimed invention can be utilized in the national economy, and in comparison to the prototype, it has the following advantages :

[0023] The sphere of application of such a machine is wider, i.e. it can be used without any structural change in both the bulk and selective methods. The efficiency of its utilization is increased due to the universal construction of its activating elements, which provide an extraction of productive batches and rocky interstratifications. The technological potential of the machine has been expanded because its actuating element can expeditiously regulate the breadth (range) of its intake capacity.

Claims

1. A face-working machine comprising a housing and two actuating elements disposed at the ends of the housing, the actuating elements being in the form of arms rotatable in the vertical plane and provided with a built-in drive and a cutting screw conveyor, **characterized in that** each arm is connected to said housing of the machine by means of a bracket at one end of which the arm is hinged, while the other is movably mounted in guides of said housing of the machine to enable frontal movement of the arm against the face, with the help of a hydraulic cylinder, by an amount equivalent to the intake capacity of the screw conveyor.

Patentansprüche

1. Maschine für den Ortsbetrieb, welche ein Gehäuse und zwei an den Enden des Gehäuses angeordneten Antriebselementen umfaßt, wobei die Antriebselemente die Form von in der vertikalen Ebene drehbaren Armen ausgestaltet sind und mit einem eingebauten Antrieb und einem Schneckenschräuförderer ausgestattet sind, **dadurch gekennzeichnet, daß** jeder Arm mit dem Maschinengehäuse mittels eines Trägers verbunden ist, an dessen einem Ende der Arm schwenkbar gelagert ist, während das andere Ende des Trägers beweglich in

Führungen des Maschinengehäuses angebracht ist, um mit Hilfe eines Hydrozylinders eine Vorwärtsbewegung des Arms gegen den Ort zu ermöglichen, in einem Ausmaß, welches zu der Aufnahmeleistung des Schneckenförderers äquivalent ist. 5

Revendications

1. Machine de travail sur une paroi frontale comprenant un châssis et deux éléments d'actionnement disposés aux extrémités du châssis, les éléments d'actionnement se présentant sous la forme de bras aptes à tourner dans le plan vertical et dotés d'un dispositif d'entraînement incorporé et d'un transporteur à vis de coupe, **caractérisée en ce que** chaque bras est relié audit châssis de la machine au moyen d'un support à une extrémité de laquelle le bras est articulé, tandis que l'autre extrémité est montée de façon mobile dans des guides dudit châssis de la machine pour permettre le déplacement frontal du bras contre la paroi frontale, à l'aide d'un vérin hydraulique, sur une distance équivalente à la capacité d'admission du transporteur à vis. 10
15
20
25

30

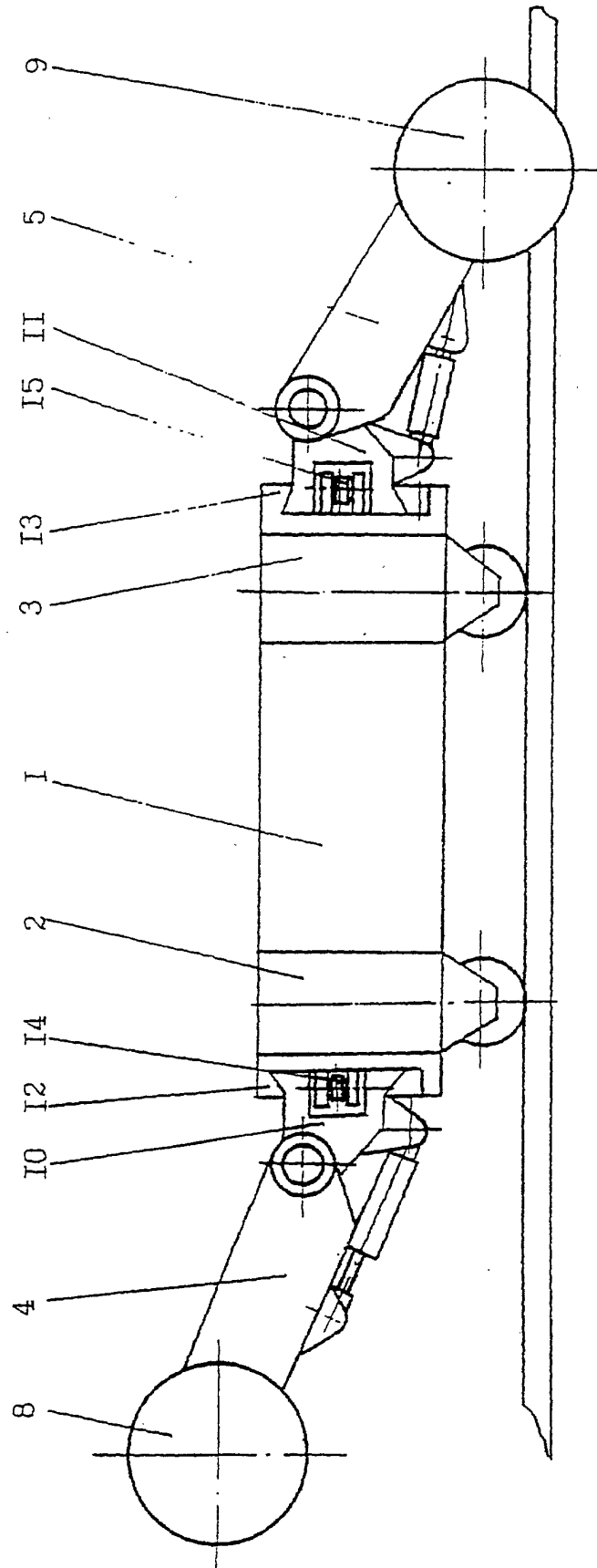
35

40

45

50

55



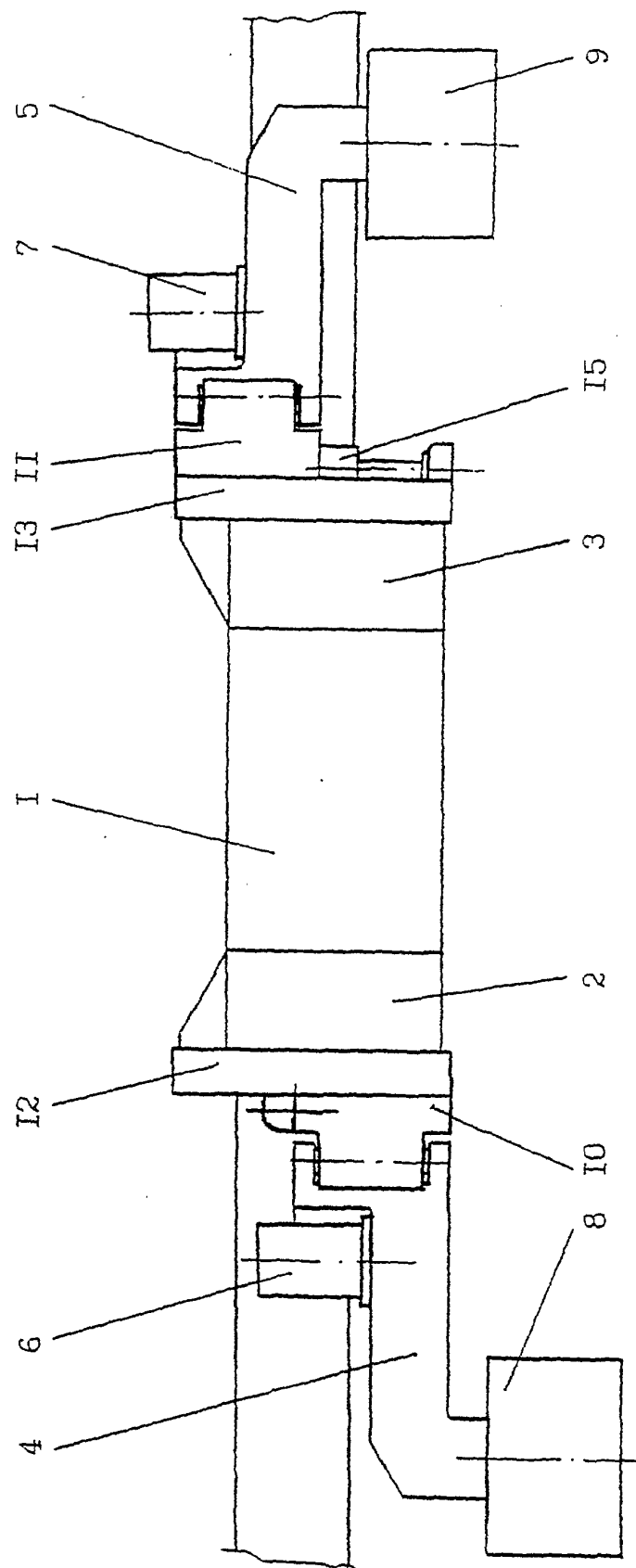


Fig. 2