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(54) **FACE-WORKING MACHINE**

(57) The invention relates to mining and can be used for extracting ore from strata with complex deposition structures. The object of the invention is to make the selective method of working seams more widely applicable and more efficient, and to enhance the technical potential of the machine in bulk and selective methods of mineral extraction. The face-working machine comprises a housing with a feed mechanism, two actuating elements in the form of arms, each pro-

vided with a built-in drive and two screw conveyors. Each arm is connected to the housing by a bracket at one end of which the arm is attached so as to articulate, while the other is fitted in guide elements so as to be capable of moving. Hydraulic cylinders cause the brackets to move with the arms against the face by an amount equivalent to the intake capacity of the screw conveyor.

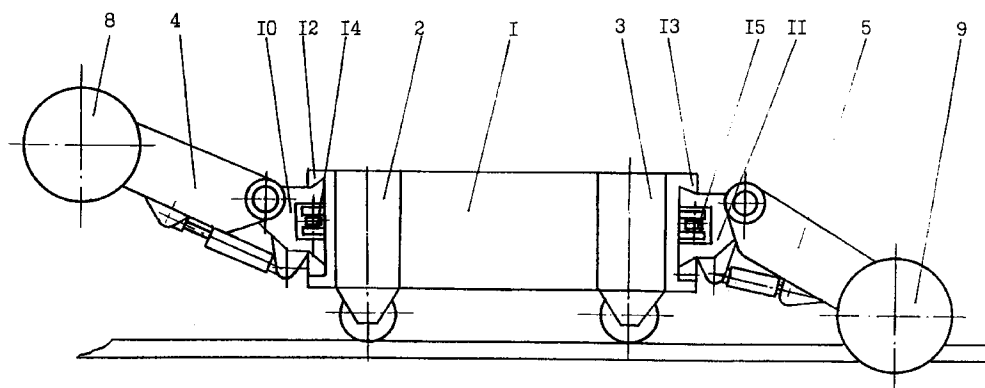


Fig. 1

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Description

Field of Technology

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

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

Prior Art

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).

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.

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.

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

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.

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.

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.

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".

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.

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.

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.

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

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

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.

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.

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.

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.

For the following third operation, the upper screw conveyor is moved out against the face by an amount if 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 forth 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.

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

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 :

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.

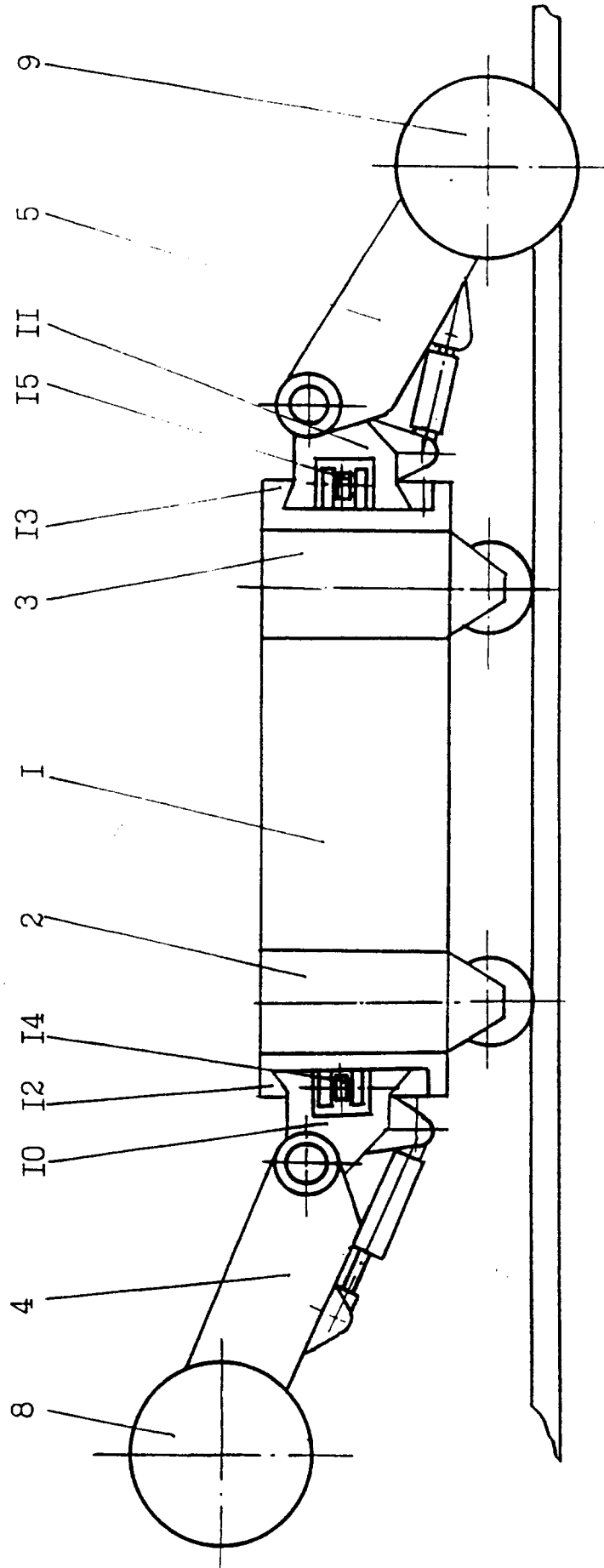


Fig. 1

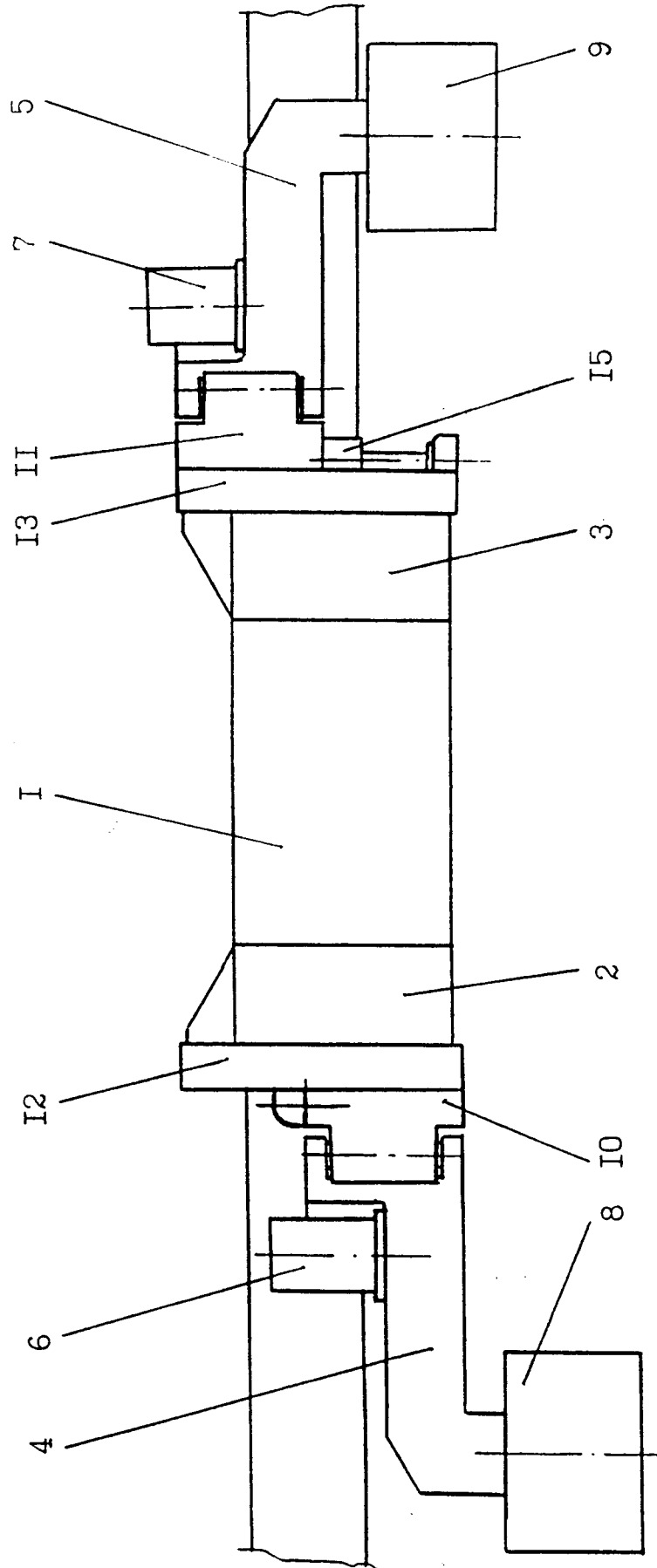


Fig. 2

INTERNATIONAL SEARCH REPORT

International application No.
PCT/BY 95/00004

A. CLASSIFICATION OF SUBJECT MATTER IPC-6: E21C 27/02 According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC-6: E21C 25/00-25/18, 27/00-27/16, E21D 23/00 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	SU, A, 727848 (GOSUDARSTVENNYJ PROEKTNO-KONSTRUKTORSKIJ I EHKSPERIMENTALNYJ INSTITUT UGOLNOGO MASHINOSTROENIYA GIPROUGLEMASH), 25 April 1980 (25.04.80)	1
A	SU, A, 798291 (DONETSKIJ NAUCHNO-ISSLEDOVATELSIJ UGOLNYJ INSTITUT MINISTERSTVA UGOLNYJ PROMYSHLENNOSTI UKRAINSKOJ SSR), 23 January 1981 (23.01.81)	1
A	SU, A, 1104260 (N. G. BOJKO et al.), 23 July 1984 (23.07.84)	1
A	SU, A, 1213188 (VSESOUZNYJ NAUCHNO-ISSLEDOVATELSKIJ I PROEKTOKONSTRUKTORSKIJ UGOLNYJ INSTITUT "KNIIUI"), 23 February 1986 (23.02.86)	1
A	SU, A1, 1504335 (VSESOUZNYJ NAUCHNO-ISSLEDOVATELSKIJ I PROEKTOKONSTRUKTORSKIJ UGOLNYJ INSTITUT "KNIIUI"), 30 August 1989 (30.08.89)	1
A	DE, A1, 2731586 (GEBR.EICKHOFF, MASCHINENFABRIK u. EISENGIE REI mbH), 25 January 1979 (25.01.79)	1
☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.		
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Date of the actual completion of the international search 28 December 1995 (28.12.95)		Date of mailing of the international search report 14 February 1996 (14.02.96)
Name and mailing address of the ISA/ RU		Authorized officer
Facsimile No.		Telephone No.

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/BY 95/00004

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE, C1, 3527253 (GEBR.EICKHOFF, MASCHINENFABRIK u. EISENGIE REI mbH), 6 November 1986 (06.11.86)	1

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