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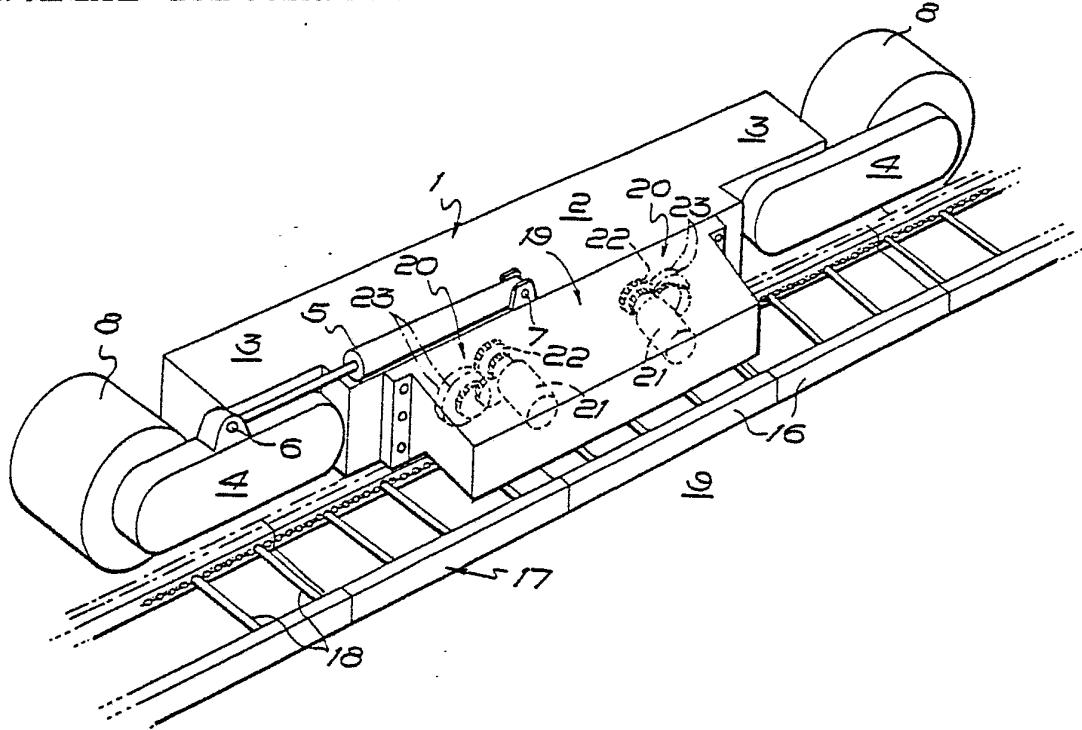
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(54) Title: MINERAL WINNING MACHINE AND SYSTEM



(57) Abstract

An "in-web" mineral winning machine (1) and mineral winning system, comprises an elongate machine body (2) adapted, in use, to be located beyond the face side sidewall (15) of an armoured conveyor (17) extending along the mineral face, at least one canopy (19) extending rearwardly from the machine body (2) and adapted, in use, to overlie the conveyor (17), and the or each canopy (19) housing a machine haulage unit (20).

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- 1 - Mineral Winning Machine And System.

This invention relates to an "in-web" mineral winning machine and to a mineral winning system incorporating such a machine.

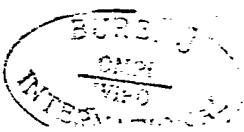
In the longwall mining of coal and other minerals, a mineral winning machine is reciprocated along a mineral face to extract mineral from the seam, the mineral being loaded onto an armoured, scraper chain conveyor extending along the mineral face, which conveyor serves to guide the machine along the face. Extraction is usually effected by a rotary, pick-carrying cutting head mounted at one end of a ranging arm pivotally attached to the machine body, which arm is displaceable under the control of a double-acting hydraulic ram. If, as is usually the case, the machine is designed as a double-ended machine, one cutting head and arm are mounted at each end of the machine. With relatively thick mineral seams, the machines are usually mounted on the conveyor in addition to being guided thereby, but the present invention is concerned with the winning of medium/thin seams, e.g. 6ft. or less where the main body of the machine is positioned beyond the face side sidewall of the conveyor and slidingly engages the conveyor at various locations on the face side of the conveyor and usually on a toe plate of the conveyor.



- 2 -

for guidance purposes. Such machines are double-ended and are known as "in-web" machines, and roll steering of these machines is effected by a pair of vertical rams, one located towards each end of the machine and each carrying a shoe to bear on, and slide along, the mine floor located beyond the face side sidewall and just cut by the leading drum.

In recent years there has been a requirement for the adoption of so called "chainless" machine haulage systems which operate on the rack and pinion principle. The racks are attached to the conveyor, normally at the goaf side thereof. However, for "in-web" machines, this location is too distant from the machine body for satisfactory haulage and face side location of the racks is known. The racks are engaged by at least one drive sprocket or endless drive chain carried by the machine and trapped into rack engagement. However, to enable the roll steering functions of the machine to be attained, a greater degree of play than would normally be provided is required in the trapping of the drive sprocket(s) or endless drive chain(s) in the rack, so that the machine can articulate with respect to the conveyor, but the increased play to achieve roll steering adversely affects satisfactory engagement of the drive



- 3 -

sprocket(s) or drive chain(s) with the rack. It is also the case that a canopy extending from the machine body to overlie the conveyor and serving usually to house only electric/electronic/hydraulic controls for the various functions of the machine presents a largely unused area and the overall length of the machine, which advantageously should be the minimum possible for the limited confines available underground, remains of generally conventional dimensions.

According to a first aspect of the present invention, an "in-web" mineral winning machine for reciprocation along a mineral face, comprises an elongate machine body adapted, in use, to be located beyond the face side sidewall of an armoured conveyor extending along the mineral face, at least one canopy extending rearwardly from the machine body and adapted, in use, to overlie the conveyor and the or each canopy housing a machine haulage unit.

According to a second aspect of the present invention, a mineral winning system comprises at least one mineral winning machine as defined above, an armoured scraper chain conveyor extending along a mineral face and a rack extending along the conveyor and attached to the face side sidewall



- 4 -

thereof, the rack being engaged by the or each machine haulage unit.

Thus, by adopting the machine and system in accordance with the invention, the location of at least one haulage unit within the canopy means that a haulage module can be eliminated from the machine body, as a result of which the overall length of the machine body can be correspondingly reduced and the attendant advantages obtained, while servicing/repair of the haulage unit(s) is rendered easier by being positioned in a more accessible location.

Preferably, the machine is double-ended comprising a ranging arm pivotally attached to each end of the machine, each arm being under the control of a double-acting hydraulic ram, and each arm carrying a rotary, pick-carrying cutting head. Preferably, the canopy houses two individual and longitudinally spaced apart haulage units. The latter may each comprise a drive sprocket drivable e.g. by a hydraulic motor and gearbox, or by an electric, variable speed motor. With a hydraulic drive, the machine body may house a hydraulic pump. The canopy may additionally be employed to carry and/or house electric/electronic/hydraulic control means for the various functions of the machine.



- 5 -

The invention will now be described in greater detail, by way of examples, with reference to the accompanying drawings in which:-

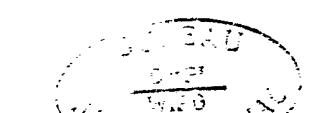
Figure 1 is a perspective view, looking from goaf to face, of a first embodiment of "in-web" mineral winning machine and system in accordance with the present invention;

Figure 2 is a part-sectional end elevation view of Figure 1; and

Figure 3 corresponds to Figure 1 but shows a second embodiment.

In both embodiments, like reference numerals are employed for like components.

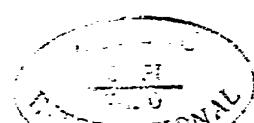
In the drawings, an "in-web" mineral winning machine 1, of the shearer type, comprises an elongate machine body 2 housing a main electric motor to supply power to gearheads 3 located at each end of the body 2, each gearhead supporting a ranging arm 4, which is pivotable with respect to its gearhead 3 in the known manner, under the control of a double-acting hydraulic ram 5 (one only indicated in Figure 4) pivotally attached at 6 to the arm and at 7 to the machine body 2. Each ranging arm 4 houses gearing to transmit drive to a rotary, pick-carrying cutting head 8 carried at the free end of the arm. As can be seen from Figure 2,



- 6 -

the machine seats on mine floor 9 via steering jacks 10, one of which is located towards each end of the machine body 2 and the machine incorporates a guiding and trapping arm 11 engaging a guiding and trapping recess 12 in a guide beam 13 which is also provided, along an upper edge thereof, with two laterally spaced rows of teeth 14, so that the guide beam 13 also constitutes a rack bar. The guide beam is attached to a face side sidewall 15 of a pan 16 which is secured end-to-end to similar pans to make up an armoured, scraper chain conveyor 17 of the desired length, flight bars 18 of the conveyor being indicated in Figure 1. In the embodiment of Figures 1 and 2, a single canopy 19 extends rearwardly from the machine body 2 to overlie the conveyor 17, the canopy housing two longitudinally spaced apart machine haulage units 20, each unit comprising a variable speed electric motor 21, a speed reduction transmission 22, and twin, co-axial haulage sprockets 23 in mesh with the teeth 14, each sprocket 23 being rotatable about a laterally extending axis 24. Preferably, the beams 30 correspond in length to the pans 16 with articulated joints provided at their adjacent ends.

In the embodiment of Figure 3, two



- 7 -

individual canopies 19A are provided, each housing a haulage unit 20.



CLAIMS

1. An "in-web" mineral winning machine for reciprocation along a mineral face comprising an elongate machine body adapted, in use, to be located beyond the face side sidewall of an armoured conveyor extending along the mineral face, at least one canopy extending rearwardly from the machine body and adapted, in use, to overlie the conveyor and the or each canopy housing a machine haulage unit.

2. A machine as claimed in Claim 1, comprising a ranging arm pivotally attached to each end of the machine, each arm being under the control of a double-acting hydraulic ram, and each arm carrying a rotary, pick-carrying cutting head.

3. A machine as claimed in Claim 1 or Claim 2, wherein the canopy houses two individual and longitudinally spaced apart haulage units.

4. A machine as claimed in any preceding Claim, wherein the or each haulage unit comprises a drive sprocket drivable by a hydraulic motor and gearbox.

5. A machine as claimed in any preceding Claim, wherein the or each haulage unit comprises a drive sprocket drivable by an electric, variable speed motor.



- 9 -

6. A machine as claimed in Claim 4, wherein the machine body houses a hydraulic pump.

7. A machine as claimed in any preceding Claim, wherein the canopy is employed to carry and/or house electric/electronic/hydraulic control means for the various functions of the machine.

8. An "in-web" mineral winning machine for reciprocation along a mineral face substantially as hereinbefore described with reference to Figures 1 and 2 of the accompanying drawings.

9. An "in-web" mineral winning machine for reciprocation along a mineral face substantially as hereinbefore described with reference to Figure 3 of the accompanying drawings.

10. A mineral winning system comprising at least one mineral winning machine as defined in any preceding Claim, an armoured scraper chain conveyor extending along a mineral face and a rack extending along the conveyor and attached to the face side sidewall thereof, the rack being engaged by the or each machine haulage unit.

11. A mineral winning system substantially as hereinbefore described with reference to Figures 1 and 2 of the accompanying drawings.

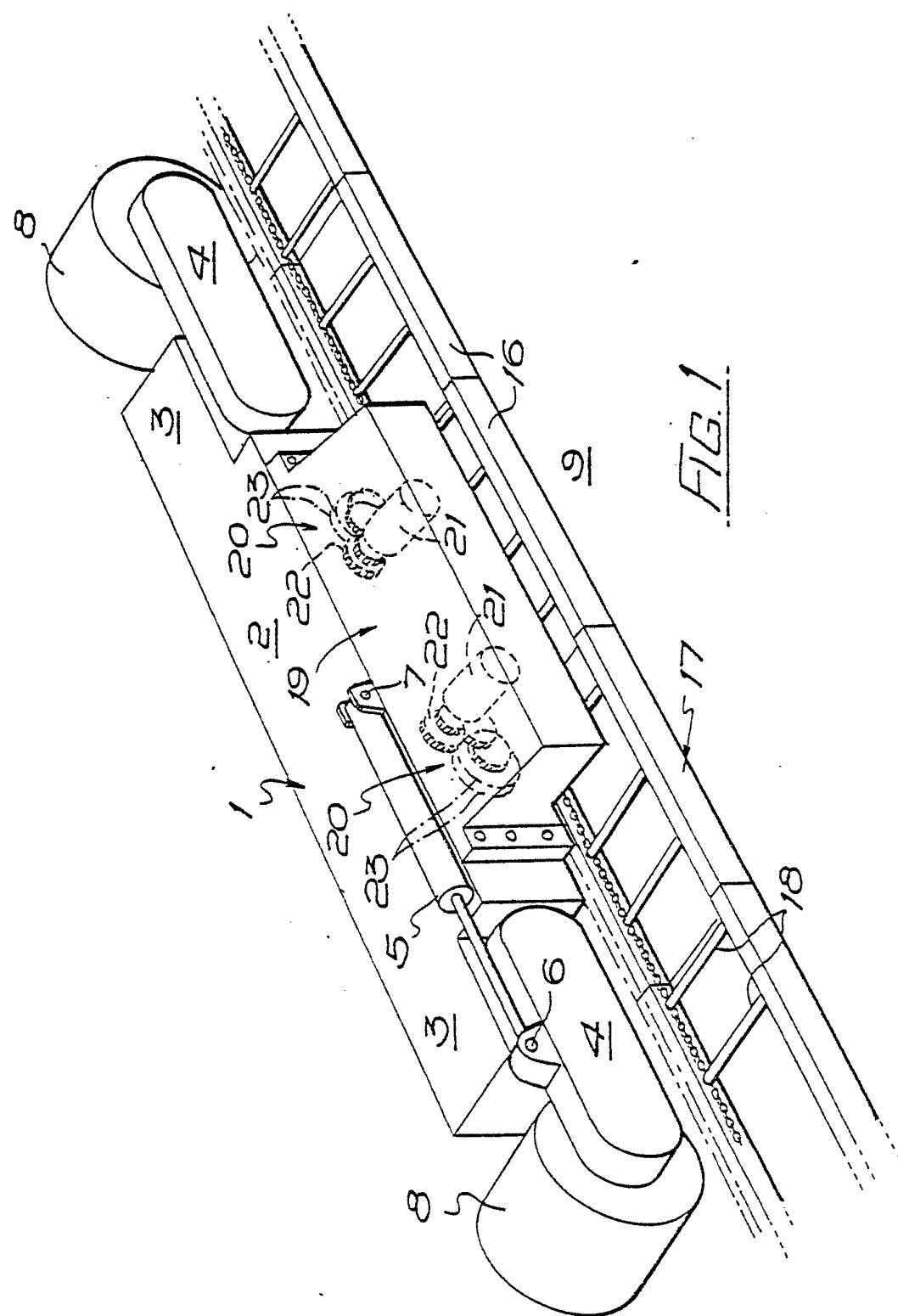
12. A mineral winning system substantially as hereinbefore described with reference to Figure



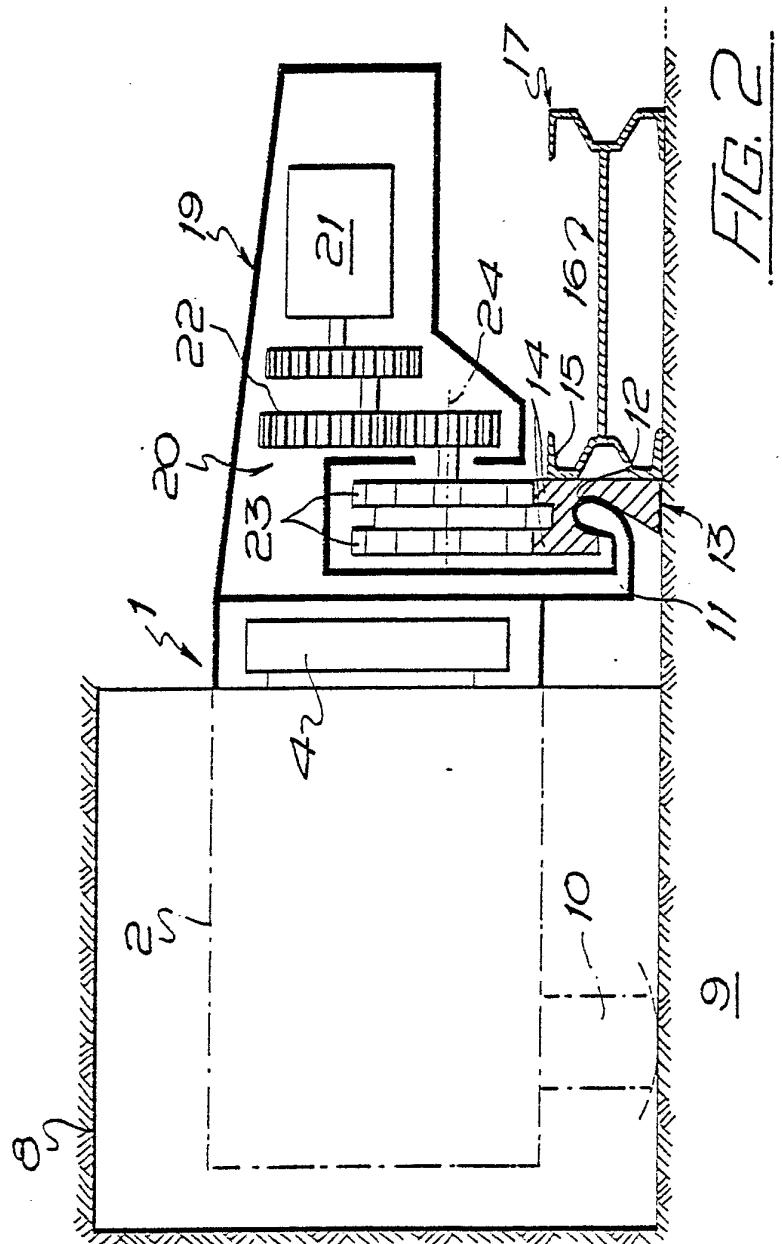
- 10 -

3 of the accompanying drawings.





2-3



3-3

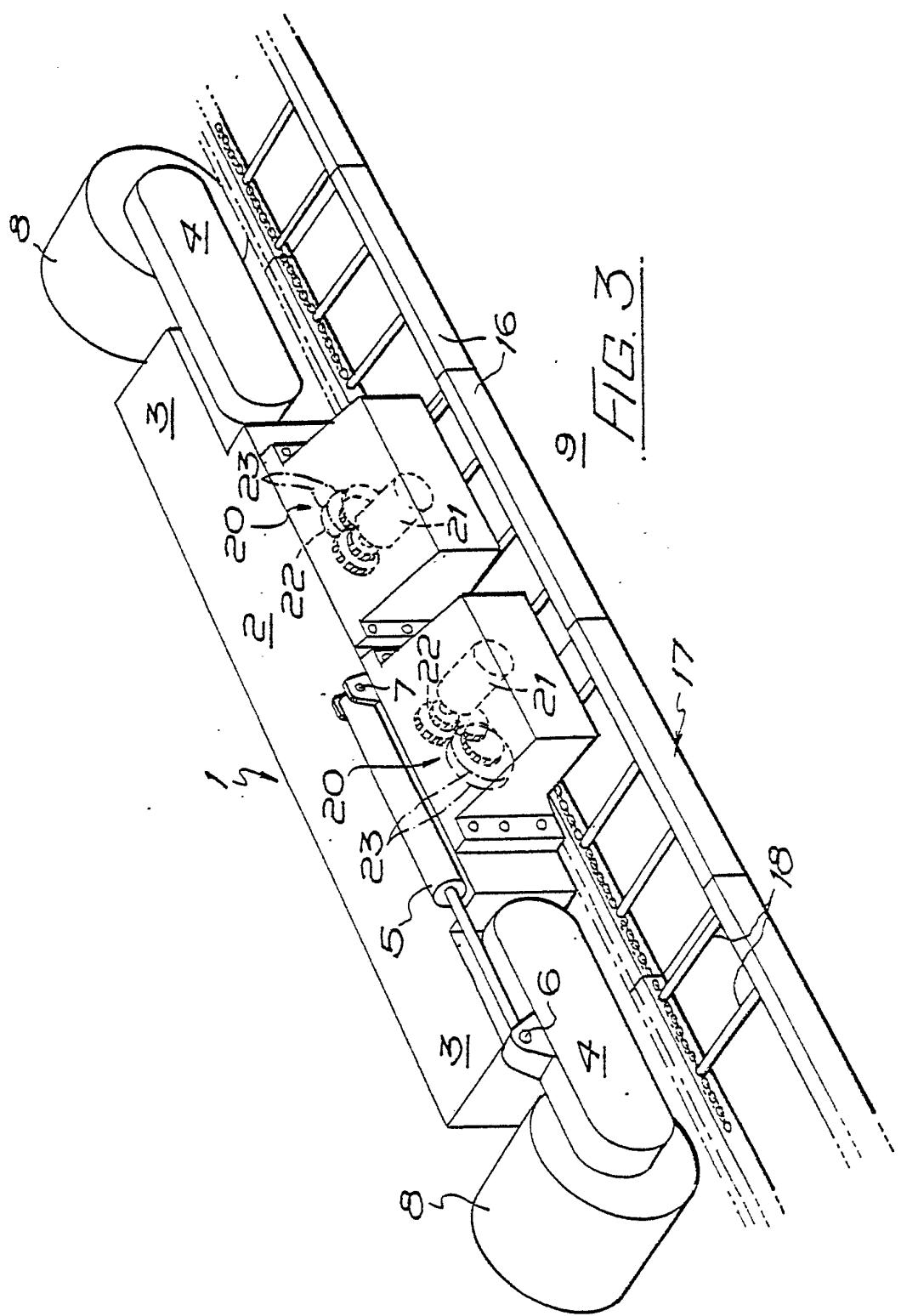


FIG. 3

INTERNATIONAL SEARCH REPORT

International Application No. PCT/GB 81/00161

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) ³

According to International Patent Classification (IPC) or to both National Classification and IPC

Int.Cl. ³: E 21 C 29/22; E 21 C 29/10; E 21 C 27/02

II. FIELDS SEARCHED

Minimum Documentation Searched ⁴

Classification System	Classification Symbols
Int.Cl. ³ :	E 21 C

Documentation Searched other than Minimum Documentation
to the Extent that such Documents are Included in the Fields Searched ⁵

III. DOCUMENTS CONSIDERED TO BE RELEVANT ¹⁴

Category ¹⁵	Citation of Document, ¹⁶ with indication, where appropriate, of the relevant passages ¹⁷	Relevant to Claim No. ¹⁸
X	GB, A, 2009819, published June 20, 1979 see page 2, lines 5-13, 63-91; figures 1-3, Eickhoff --	1, 2, 4, 5, 7-12
A	GB, A, 1545588, published May 10, 1979 Summit --	
A	DE, A, 2622218, published December 1, 1977 Eickhoff --	
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"X" document of particular relevance

IV. CERTIFICATION

Date of the Actual Completion of the International Search ²⁰

3rd November 1981

Date of Mailing of this International Search Report ²¹

17th November 1981

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