

FORM 1

599815

REGULATION 9

COMMONWEALTH OF AUSTRALIA

PATENTS ACT 1952

APPLICATION FOR A STANDARD PATENT

We, DANIELI & C. OFFICINE MECCANICHE SpA and ITI/CLM IMPIANTI TECNICI INDUSTRIALI SpA, of Via Nazionale, 33042 Buttrio (UD), Italy, and Via Nazionale 69, 33042 Buttrio (UD), Italy, respectively, hereby apply for the grant of a Standard Patent for an invention entitled:-

"SYSTEM TO FEED AND DISCHARGE MATERIALS CONTINUOUSLY IN OPERATIONS TO REHABILITATE RAILWAY ROAD BEDS AND THE LIKE"

which is described in the accompanying Complete Specification.

Details of basic application:-

Number: 83424 A/87

Country: Italy

Date: 4th August, 1987

AMENDMENTS ACCEPTED AND AMENDMENTS

16.5.90

Our address for service is:


SHELSTON WATERS

55 Clarence Street

SYDNEY, N.S.W. 2000.

DATED this 12th Day of July, 1988

DANIELI & C. OFFICINE MECCANICHE SpA and
ITI/CLM IMPIANTI TECNICI INDUSTRIALI SpA.

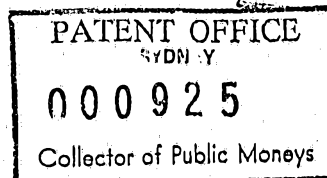
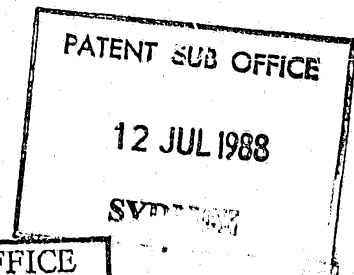
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COMMONWEALTH OF AUSTRALIA PATENTS ACT, 1952-1973
DECLARATION IN SUPPORT OF A CONVENTION APPLICATION FOR A PATENT

(a) Here Insert (In full) Name of Company.

In support of the Convention Application No. made by ^(a) DANIELI & C. OFFICINE MECCANICHE SpA and ITI/CLM IMPIANTI TECNICI INDUSTRIALI SpA

(b) Here Insert Title of Invention.

(hereinafter referred to as "Applicant") for a patent for an invention entitled: ^(b) "SYSTEM TO FEED AND DISCHARGE MATERIALS CONTINUOUSLY IN OPERATIONS TO REHABILITATE RAILWAY ROAD BEDS AND THE LIKE"

(c) and (d) Here Insert Full Name and Address of Company Official authorised to make declaration.

We ~~x~~ ^(c) GIOVANNI COASSIN, of Via Del Maglio 4, 33170 PORDENONE, Italy and ^(d) FLAVIO MANCINI, of Via Amba D'Oro 3 - 25100 BRESCIA, Italy

do solemnly and sincerely declare as follows:

(e) Here Insert Basic Country or Countries followed by date or dates of Basic Application(s).

1. We are ~~x~~ authorised by Applicant to make this declaration on its behalf.
2. The basic Application(s) as defined by section 141 of the Act was/were made in ^(e) ITALY on the 4th day of August, 1987.

(f) Here Insert Full Name(s) of Applicant(s) in Basic Country.

by ^(f) DANIELI & C. OFFICINE MECCANICHE SpA and ITI/CLM IMPIANTI TECNICI INDUSTRIALI SpA

(g) Here Insert (In full) Name and Address of actual Inventor or Inventors.

3. ^(g) FLAVIO MANCINI
Via Amba D'Oro 3 - 25100 BRESCIA, Italy

is/are the actual Inventor(s) of the invention and the facts upon which Applicant is entitled to make the Application are as follows:

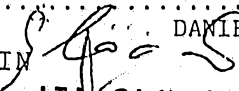
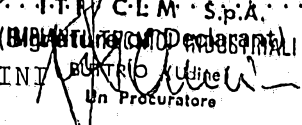
~~Applicant is the Assignee of the said Inventor(s).~~

Applicants are the Assignees of the said Inventor.

4. The basic Application(s) referred to in paragraph 2 of this Declaration was/were the first Application(s) made in a Convention country in respect of the invention, the subject of the Application.

DECLARED at Italy
this 23rd day of June 1988

(h) Personal Signature of Declarant (c) (no seal, witness or legalisation).

Giovanni COASSIN 
DANIELI & C./S.p.A.
ITI/CLM SpA
Flavio MANCINI 
Un Procuratore

To THE COMMISSIONER OF PATENTS.

(12) PATENT ABRIDGMENT (11) Document No. AU-B-18962/88
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 599815

(54) Title
SYSTEM TO FEED AND DISCHARGE MATERIALS CONTINUOUSLY IN OPERATIONS
TO REHABILITATE RAILWAY ROAD BEDS AND THE LIKE

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(56) Prior Art Documents
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(57) Claim

1. System to feed and discharge materials continuously for the rehabilitation of railway road beds and the like in cooperation with operational machines coupled to a plurality of waggons storing such materials, the system being characterized in that each storage waggon comprises:

- hoppers to contain materials, with lower movable shutters to open and close the hoppers,
- a lower conveyor cooperating with the hoppers and extending substantially along the whole length of the waggon in a horizontal plane,
- an upper conveyor extending substantially along the whole length of the waggon in a horizontal plane, and
- an almost vertical conveyor cooperating with the lower conveyor in the transfer of materials.

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COMMONWEALTH OF AUSTRALIA

FORM 10

PATENTS ACT 1952

C O M P L E T E S P E C I F I C A T I O N

FOR OFFICE USE:

Applicatca Number:
Lodged:

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Complete Specification Lodged:
Accepted:
Published:

This document contains the
amendments made under
Section 49 and is correct for
printing.

Priority:

Related Art:

Name of Applicant:

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Complete Specification for the Invention entitled:

"SYSTEM TO FEED AND DISCHARGE MATERIALS CONTINUOUSLY IN OPERATIONS TO
REHABILITATE RAILWAY ROAD BEDS AND THE LIKE"

The following statement is a full description of this invention,
including the best method of performing it known to us:-

1 "SYSTEM TO FEED AND DISCHARGE MATERIALS CONTINUOUSLY IN
2 OPERATIONS TO REHABILITATE RAILWAY ROAD BEDS AND THE LIKE"

3 *****

4 This invention concerns a system to feed and discharge
5 materials continuously in operations to rehabilitate railway
6 road beds or like operations.

7 To be more exact, the invention concerns a system suitable
8 to take materials from stores coupled to operational machines
9 and to transfer and feed such materials to the operational
10 machines.

11 The system is also suitable to transport and discharge
12 continuously materials coming from the operational machines in
13 cooperation with stores coupled to the operational machines or
14 with other discharge means or systems.

15 In operations to form railway ballast or road beds, as also
16 in operations to rehabilitate railway road beds, it is
17 necessary to deliver to the operational machine either new
18 ballast or, separately, new ballast and a mixture of aggregate
19 materials, normally sand and gravel, depending on the type of
20 operations to be performed.

21 In the same way the materials taken from the ballast or
22 road bed and no longer usable in the condition in which they
23 leave the operational machine have to be discharged somehow.

24 The productivity of the operational machines employed in
25 the above work is very great and therefore the flow of

1 materials being fed to and removed from such machines is very
2 heavy.

3 In the prior art the feed of materials to the operational
4 machines is carried out with storage containers borne on
5 waggons coupled to the operational machines.

6 The storage containers are moved from their respective
7 waggons to the feed zone of the operational machine,
8 discharged there and then moved back to their respective
9 positions on the waggons, where they remain until they have
10 been re-filled in a loading station or with other means.

11 The movement of the storage containers is normally carried out
12 with portals which can be passed lengthwise between the
13 support waggons and the operational machine.

14 This system to feed the operational machines is not
15 continuous and therefore entails an unavoidable slow-down in
16 the flow of feed and resulting limitations in the working
17 capacity of the machines.

18 Moreover, these difficulties increase with an increase in
19 the quantity of the feed materials which have to be kept as a
20 stock for the operational machine.

21 In the prior art the materials which cannot be re-used and
22 are discharged from the operational machines are normally
23 placed in one or more appropriate waggons coupled to the
24 machines or towed alongside the machines.

25 The known systems for such unusable materials discharged
26 from the operational machines provide for the inclusion of
27 storage units for this purpose.

28 The present applicants have studied, tested and embodied a
29 system for the continuous feed and discharge of materials
30 which can overcome the problems of the art.

31 According to the invention a plurality of identical storage
32 waggons bearing hoppers loaded with the materials required for
33 the operations to be performed is coupled to the operational

1 machine.

2 At least one conveyor to collect and carry the materials
3 discharged from the hoppers is located below the hoppers and
4 extends substantially along the whole length of each waggon in
5 a horizontal plane.

6 A second conveyor to transfer materials is located above
7 the hoppers and extends substantially along the whole length
8 of each waggon in a horizontal plane.

9 The upper conveyors of each storage waggon are able to
10 cooperate reciprocally and directly in the movement of
11 materials from one waggon to another.

12 The lower conveyors cooperate terminally, in the common
13 direction of feed of the upper and lower conveyors, with an
14 almost vertical conveyor that transfers materials.

15 This almost vertical conveyor located at one end of each
16 waggon cooperates with the upper conveyor of the successive
17 waggon in the feed of materials towards the operational
18 machine.

19 The method of working of the system is very simple. At the
20 beginning of feeding, for instance starting from the waggon
21 farthest from the operational machine, the required material
22 is released from the corresponding hoppers onto the lower
23 conveyor, is fed therealong until it is transferred onto the
24 almost vertical conveyor of the same waggon and is carried by
25 the latter conveyor onto the upper conveyor of the successive
26 waggon.

27 Thence the material is passed in succession along the upper
28 conveyors of each intervening waggon until it reaches the
29 operational machine, where it is collected with suitable
30 means.

31 Meanwhile, it is possible to release some of the material
32 of the second waggon onto the lower conveyor of the same and,
33 when the feed of material from the first waggon has ended or

1 almost ended, that lower conveyor is actuated so as to
2 continue the cycle in the same way.

3 The same storage waggons according to the invention can be
4 employed to store the material discharged from the operational
5 machine.

6 According to a variant the system will comprise only the
7 lower conveyors cooperating on each waggon with the almost
8 vertical conveyor.

9 Each almost vertical conveyor is associated with stationary
10 means, chutes or the like for instance, which transfer the
11 material onto the lower conveyor of the successive waggon.

12 In this case too the method of working is very simple.

13 At the beginning of feeding, starting from the storage
14 waggon next to the operational machine for instance, the
15 required material is released from the corresponding hoppers
16 onto the lower conveyor, on which it is fed to the almost
17 vertical conveyor, which delivers it to the operational
18 machine.

19 At the same time the material is released onto the lower
20 conveyor of the storage waggon next to the foregoing waggon
21 and is fed therealong towards the relative almost vertical
22 conveyor, which delivers the material through the stationary
23 transfer means onto the lower conveyor of the first waggon,
24 which has been gradually emptied of the material it contained.

25 The system proceeds in the same way up to the last storage
26 waggon.

27 The storage waggons employed for discharge of unusable
28 materials are equipped with upper conveyors in this embodiment
29 too.

30 Each upper conveyor cooperates momentarily with associated
31 means which discharge material from the upper conveyor into
32 the hoppers of the corresponding storage waggon.

33 According to a variant, if the operational machine is a

1 road bed rehabilitation machine, the same storage waggon will
2 perform the feeding, discharge and storage of materials.

3 Each waggon will comprise an upper conveyor, lower
4 conveyor, almost vertical conveyor and stationary means for
5 transfer of materials. The almost vertical conveyor and
6 stationary transfer means will be positioned at the opposite
7 ends of each waggon.

8 The lower and almost vertical conveyors in cooperation with
9 the stationary transfer means will feed the materials to the
10 collection zone of the rehabilitation machine.

11 The upper conveyors move in the opposite direction to that
12 of the feed and receive materials from the discharge zone of
13 the rehabilitation machine, thereafter loading them into the
14 waggons which are emptied of the feed materials.

15 The method of working may be as follows. Starting from the
16 storage waggon farthest from the rehabilitation machine, the
17 required material is released from the corresponding hoppers
18 onto the lower conveyor and is fed therealong until it is
19 transferred onto the almost vertical conveyor of the same
20 waggon.

21 Thence the material is fed through the stationary transfer
22 means of the next waggon onto the lower conveyor of that
23 waggon, and so on in succession until it reaches the
24 collection zone of the materials fed to the rehabilitation
25 machine.

26 According to desired sequences the materials to be removed
27 from the rehabilitation machine are transferred onto the upper
28 conveyor of the waggon next to the machine and are despatched
29 thence in the opposite direction to that of the feed materials
30 by means of the upper conveyors of each waggon until they
31 reach the storage waggon farthest from the machine.

32 The materials thus removed are unloaded into the hoppers of
33 such farthest waggon, which have been previously emptied of

1 the feed materials held in them.

2 The process continues until the storage waggon next to the
3 rehabilitation machine has been filled.

4 In this variant all the storage waggons are coupled to one
5 end of the rehabilitation machine and thus the other free end
6 can be used to couple the machine to other operational
7 machines, such as reinforcing, forming and other machines, so
8 as to enable the condition of the line to be restored, even in
9 short intervals between the passage of one train and another.

10 The almost vertical conveyors are fitted in such a way that
11 they can be swung at an angle to the usual plane of feed of
12 the material about a vertical axis.

13 In this way the materials can be discharged sideways from
14 the storage waggon onto suitable transport means located
15 alongside the waggon or in a place suitable for the purpose.

16 The invention is therefore obtained according to the
17 content of Claim 1 and of the dependent claims.

18 The attached figures, which are given as a non-restrictive
19 example, show the following:-

20 Fig.1 gives a diagrammatic side view of an embodiment of the
21 invention;

22 Fig.2 gives a diagram of a cross section of a storage waggon
23 according to the invention;

24 Fig.3 gives a diagrammatic side view of a variant of the
25 embodiment of Fig.1;

26 Fig.4 shows a diagrammatic side view of another variant of
27 the embodiment of Fig.1, as applied to a rehabilit-
28 ation machine;

29 Fig.5 gives a diagram of a cycle of feed and discharge of
30 the operational machine according to the invention;

31 Fig.6 gives a diagram of a cycle of feed and discharge of
32 the operational machine according to a variant of the
33 invention;

1 Fig.7 shows diagrammatically a cycle of feed and discharge
2 of a rehabilitation machine according to a variant.

3 The diagram of Fig.1 shows two identical, neighbouring
4 storage waggons 10. Each waggon 10 holds hoppers 11 to store
5 materials.

6 The hoppers 11 cooperate on their lower side with movable
7 shutters 12 which open and close the hoppers 11.

8 Lower 13 and upper 14 conveyors are comprised below and
9 above the hoppers 11 respectively. If the storage waggons 10
10 feed metalling and aggregate to the operational machine, then
11 the conveyors 13 and 14 are divided in two or consist of one
12 single conveyor having central partition means, as required or
13 convenient.

14 In the same way the hoppers 11 will have differentiated
15 storage compartments.

16 An almost vertical conveyor 16 is located at a terminal
17 part 15 of each waggon 10 and cooperates at its lower end with
18 the lower conveyor 13 and at its upper end with the upper
19 conveyor 14 of the neighbouring waggon 10, such upper conveyor
20 being located in a facing terminal part 115 of the neighbour-
21 ing waggon 10.

22 A transfer hopper 32 is included to transfer materials
23 directly from the upper conveyor 14 of each waggon 10 to the
24 upper conveyor 14 of the neighbouring waggon 10.

25 Fig.1 shows a service space 18 which has to be left free
26 for inspection and handling work.

27 The direction of feed of the work train is marked with an
28 arrow 33, whereas arrows 23, 24 and 25 show the direction of
29 feed of the materials being fed to the operational machine, as
30 shown later in Fig.5.

31 Fig.2 shows a diagrammatic cross section of the storage
32 waggon 10 with the lower 13 and upper 14 conveyors embodied as
33 being of a single type divided by partitions 19-119 so as to

1 carry different materials. The hopper 11 too comprises a
2 partition 20 for the same purpose.

3 Fig.3 shows a variant of Fig.1 in which means 17 to
4 transfer materials, such as a chute, hopper or the like,
5 cooperate with the almost vertical conveyor 16 and are able to
6 transfer materials from the lower conveyor 13 of each waggon
7 10 to the lower conveyor 13 of the neighbouring waggon 10.
8 Upper conveyors 14 are not comprised in this variant.

9 Fig.4 shows another variant of the invention for use in
10 cooperation with a road bed rehabilitation machine. Arrows
11 123,124 and 130 show that the direction of feed of materials
12 to the rehabilitation machine is opposite to the direction of
13 removal of materials 25 as shown later in Fig.7.

14 Fig.5 gives a diagram of a working train with storage
15 waggons 10 to feed materials to and remove materials from an
16 operational machine referenced generically with 21.

17 The working cycle is shown with flow lines drawn above the
18 working train. As an example, the cycle begins with discharge
19 of the hopper 11 onto the lower conveyor 13 of the storage
20 waggon 10 farthest from the operational machine 21, as
21 indicated by the arrow 22 on the continuous line.

22 The arrows 23 and 24 on the same line indicate the feed of
23 material on the lower conveyor 13 and the elevation and
24 transfer of the material on the almost vertical conveyor 16
25 respectively.

26 The arrows 25 indicate the feed of the same material on the
27 upper conveyors 14 of the neighbouring waggons 10 in
28 cooperation with transfer hoppers 32 on each waggon 10, as
29 shown by the arrow 35.

30 The arrow 26 indicates discharge of material in the feed
31 zone of the operational machine 21.

32 In the same way the lines of dashes show the flow of
33 material when the hopper 11 of the first waggon 10 has been

1 emptied.

2 The arrow 27 shows the removal of material from the
3 operational machine 21, the arrow 28 shows the movement of
4 such removed material on the upper conveyors 14 and the arrows
5 29 indicate the discharge of the material into the hopper 11,
6 for instance, of the waggon 10 farthest from the operational
7 machine 21.

8 The lines of dashes of the removal indicate the final
9 loading of the hopper 11 of the waggon 10 nearest to the
10 operational machine 21.

11 Fig.5 shows movable discharge means 31 cooperating
12 momentarily with the upper conveyors 14 of the waggons 10
13 receiving the removed materials so as to discharge such
14 materials into the hoppers 11.

15 Fig.6 shows, analogously to Fig.5, the working cycle
16 according to a variant of the invention in which the upper
17 conveyors 14 are not included in the waggons 10 feeding the
18 materials.

19 As an example, the cycle begins with the waggon 10 nearest
20 to the operational machine and passes on in succession to the
21 discharge of the hoppers 11 in the waggons 10 farthest from
22 the machine.

23 Arrows 30 indicate the transfer of material from the almost
24 vertical conveyors 16 to the lower conveyors 13 through the
25 transfer means 17.

26 Fig.7 shows, diagrammatically, according to a variant, a
27 working train connected to a rehabilitation machine.

28 The lower part of the diagram indicates the flow of
29 materials transferred by the lower conveyors 13, whereas the
30 upper part indicates the analogous flow for the upper
31 conveyors 14.

32 For the sake of simplicity we have indicated the flows for
33 the waggon 10 farthest from the rehabilitation machine 34 and

- 1 for the waggon 31 next to that waggon 10, the other flows
- 2 being wholly analogous.



THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. System to feed and discharge materials continuously for the rehabilitation of railway road beds and the like in cooperation with operational machines coupled to a plurality of waggons storing such materials, the system being characterized in that each storage waggon comprises:
 - hoppers to contain materials, with lower movable shutters to open and close the hoppers,
 - a lower conveyor cooperating with the hoppers and extending substantially along the whole length of the waggon in a horizontal plane,
 - an upper conveyor extending substantially along the whole length of the waggon in a horizontal plane, and
 - an almost vertical conveyor cooperating with the lower conveyor in the transfer of materials.
2. System as claimed in Claim 1, in which the almost vertical conveyor of each waggon is suitable to cooperate with the upper conveyor of the neighbouring waggon in the transfer of materials.
3. System as claimed in Claim 1 or 2, in which the upper conveyor of each waggon cooperates with upper conveyors of the neighbouring waggons in the transfer of materials.
4. System as claimed in any claim hereinbefore, in which the storage waggons can be employed equally well to feed materials to or remove materials from the operational machine.
5. System as claimed in any claim hereinbefore, in which the hoppers comprise partitions to separate different stored materials.
6. System as claimed in any claim hereinbefore, in which both the lower and upper conveyors consist of one single transport element.
7. System as claimed in any of Claims 1 to 5 inclusive, in which both the lower and upper conveyors consist of a transport element divided into two.
8. System as claimed in any claim hereinbefore, in which each waggon comprises means to transfer materials, such means cooperating with the almost vertical conveyor of one waggon and with the lower conveyor of the neighbouring waggon.

9. System as claimed in any claim hereinbefore, in which the upper conveyors can cooperate momentarily with means which discharge materials into the hoppers.

10. System as claimed in any claim hereinbefore, in which the lower conveyor and upper conveyor of the same waggon move in opposite directions, namely for the feed of materials towards and for the removal and storage of material from the operational machine respectively.

11. System as claimed in Claim 10, in which the operational machine is a road bed rehabilitation machine.

12. System as claimed in Claim 10 or 11, in which the storage waggons to feed, remove and store materials are all coupled to one and the same end of the rehabilitation machine, thus leaving free the rehabilitated segment of the railway line.

13. System as claimed in any claim hereinbefore, in which the almost vertical conveyor can swing about a vertical axis at an angle to the plane of feed of said materials being moved toward or removed from said operational machine respectively.

14. A system substantially as herein described with reference to the accompanying drawings.

DATED this 7th Day of MAY, 1990

DANIELI & C. OFFICINE MECCANICHE SpA AND ITI/CLM IMPIANTI TECNICI INDUSTRIALI SpA.

Attorney: WILLIAM S. LLOYD

Fellow Institute of Patent Attorneys of Australia
of SHELSTON WATERS



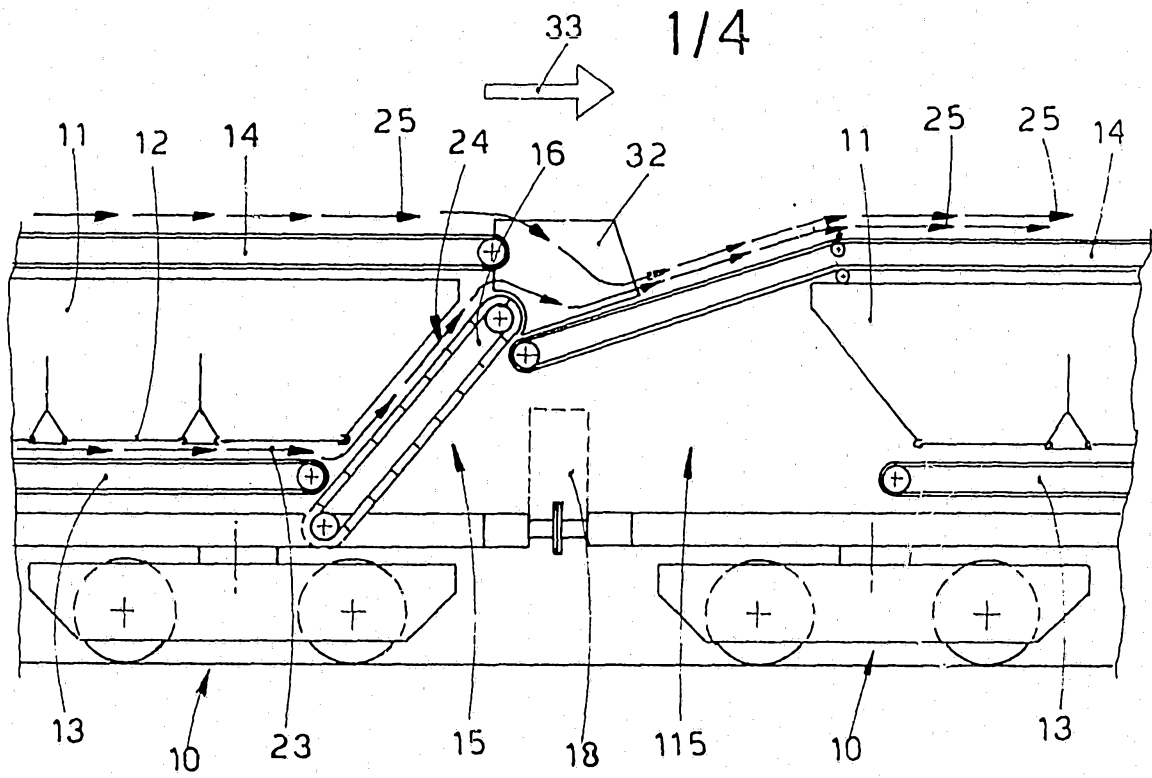


fig. 1

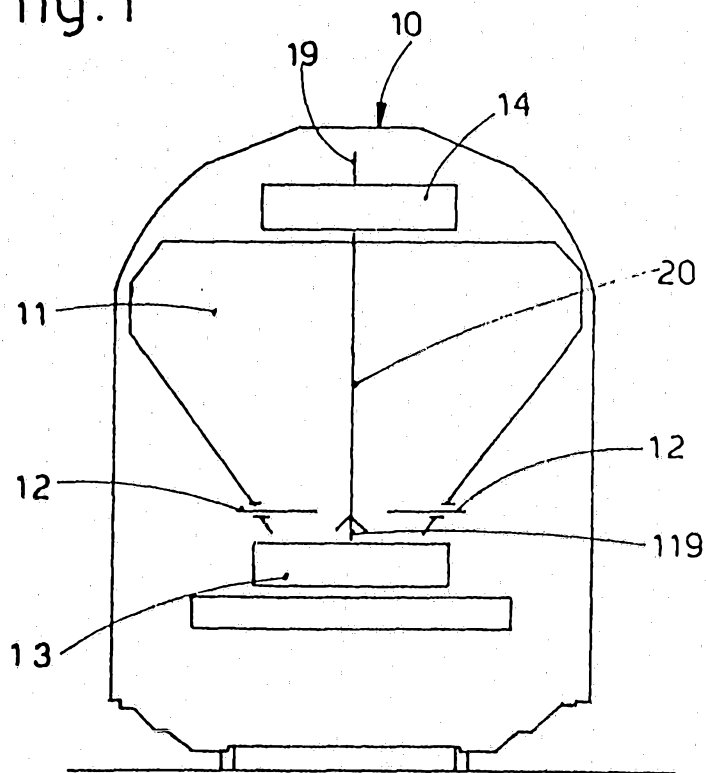


fig. 2

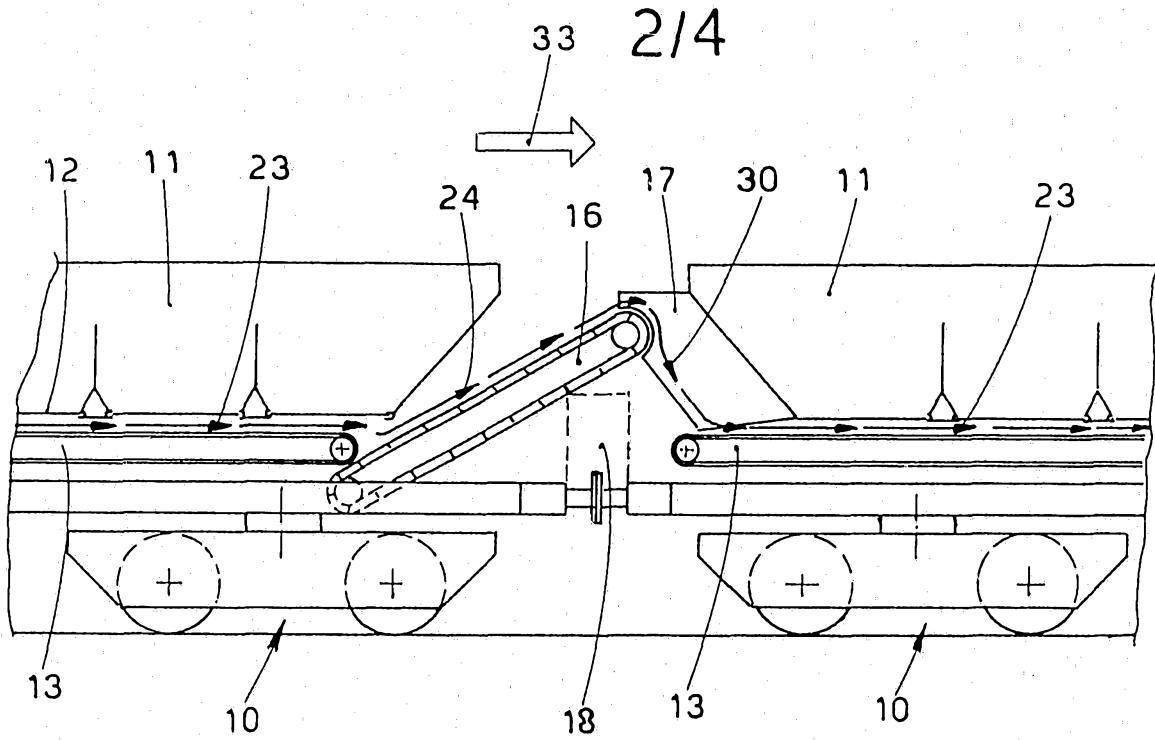


fig.3

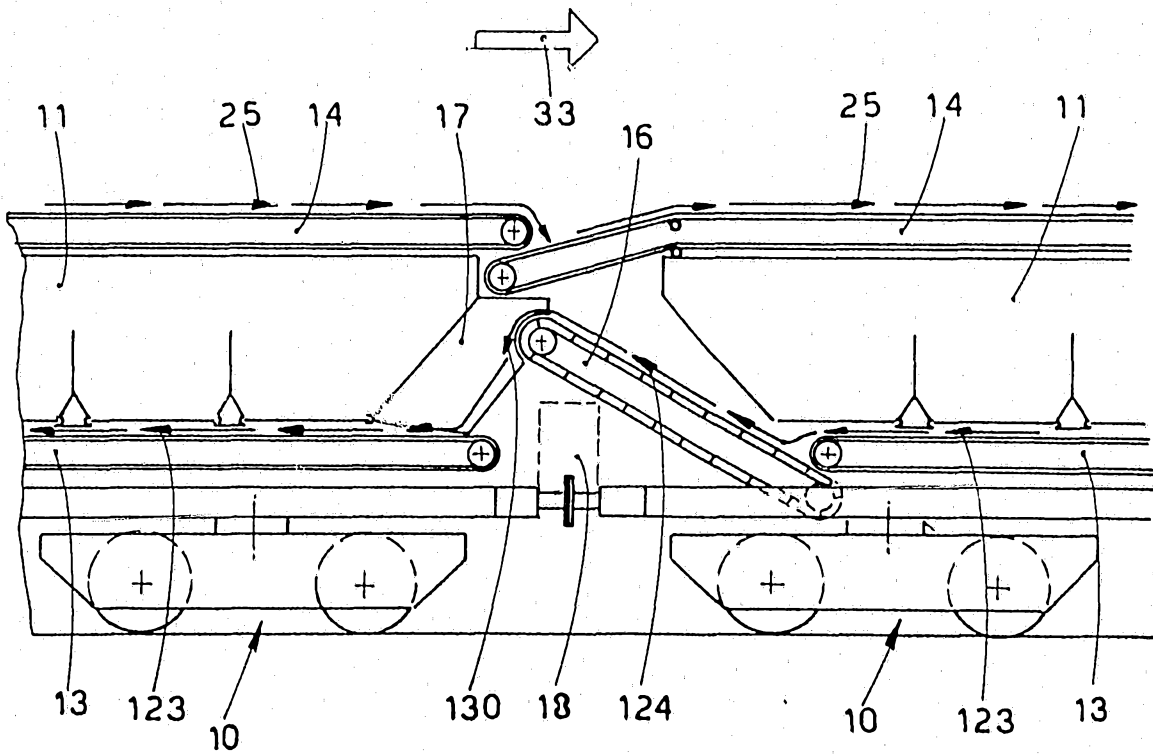


fig.4

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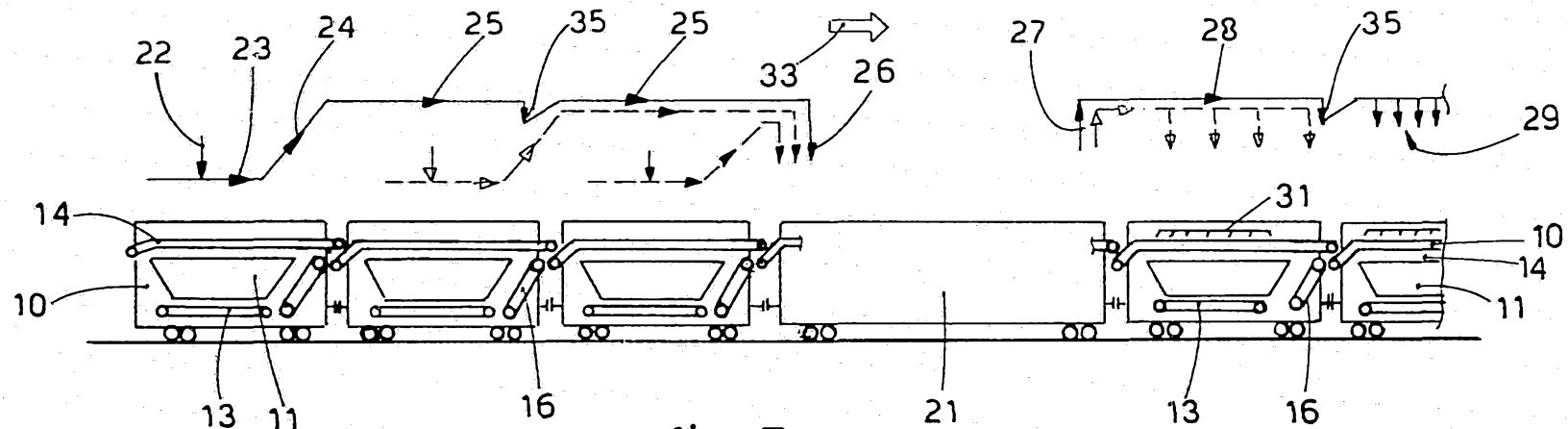


fig. 5

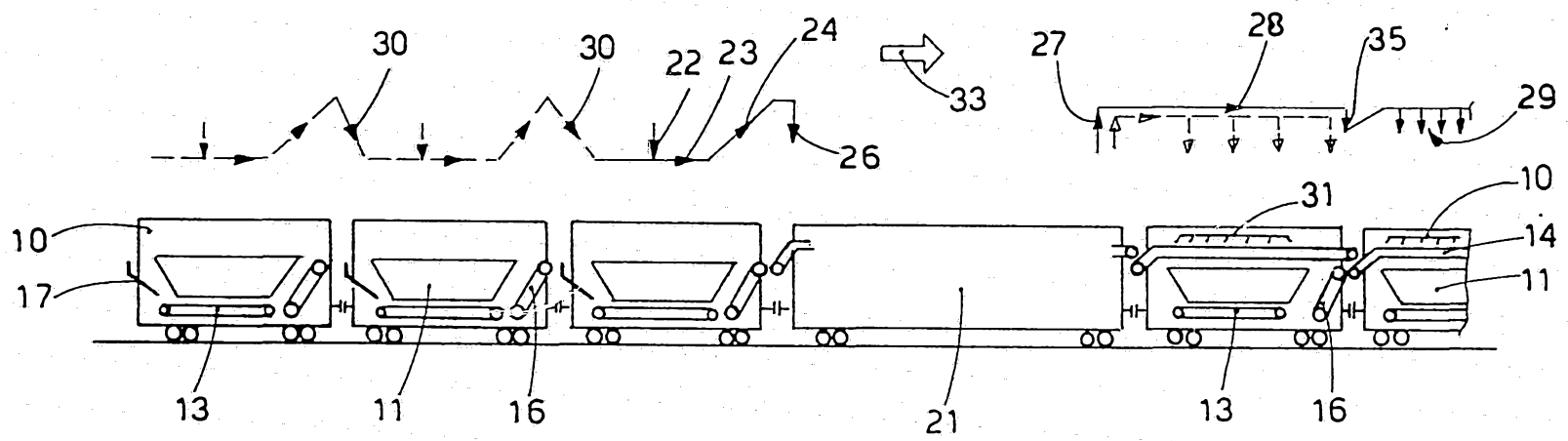
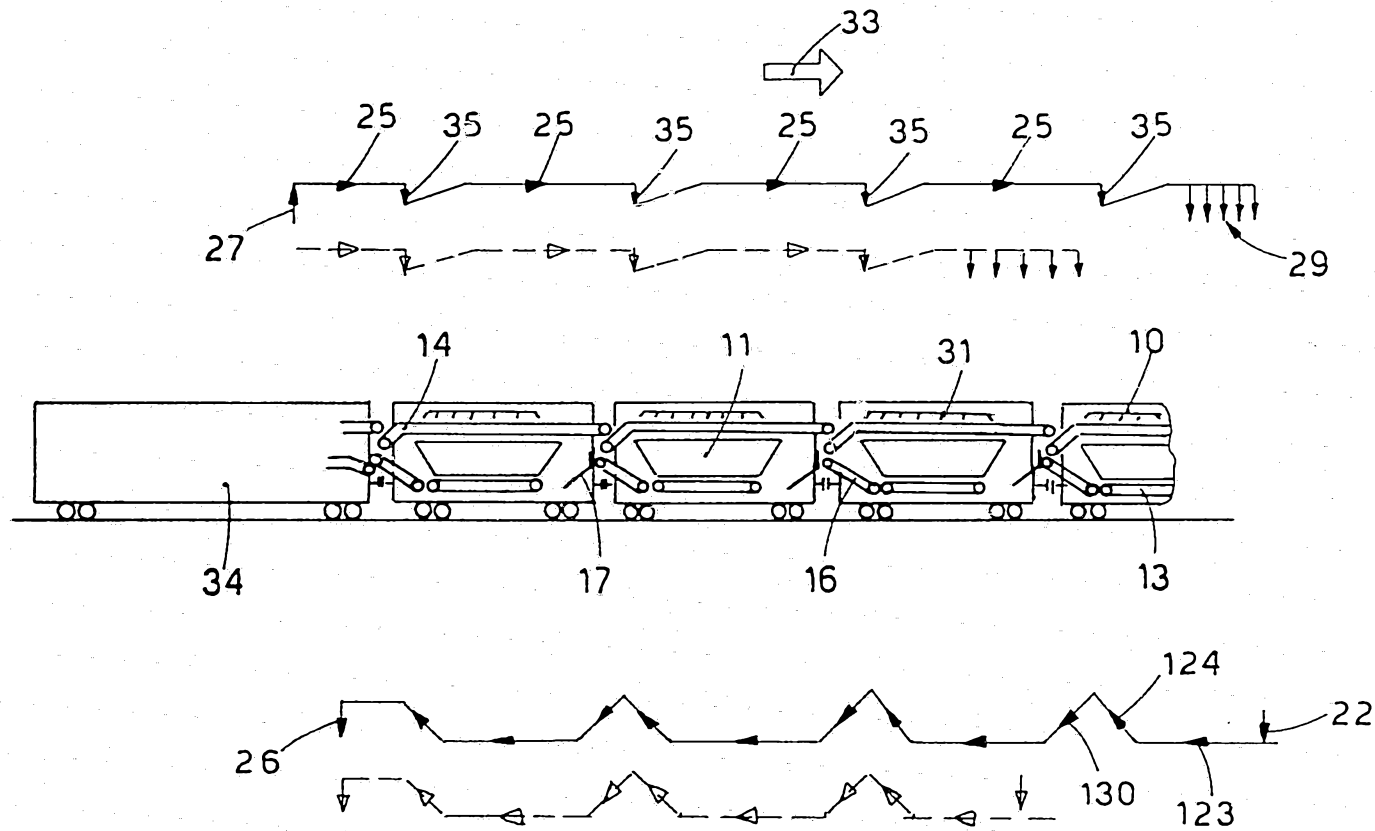


fig. 6

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1 2 3 4 5 6 7 8 9 10



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fig. 7