

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets

(11)

Publication number:

0 164 160
A2

(12)

EUROPEAN PATENT APPLICATION

(21)

Application number: **85200750.9**

(51)

Int. Cl.⁴: **E 01 B 27/02**

(22)

Date of filing: **13.05.85**

(30)

Priority: **07.06.84 IT 8336484**

(71)

Applicant: **DANIELI & C. OFFICINE MECCANICHE S.p.A., Via Nazionale, 19, I-33042 Buttrio (UD) (IT)**
Applicant: **ITI/CLM IMPIANTI TECNICI INDUSTRIALI SpA, Via Nazionale, 69, I-33042 Buttrio (UD) (IT)**

(43)

Date of publication of application: **11.12.85**
Bulletin 85/50

(72)

Inventor: **Ciclin-Sain, Ivo, Rue de Lausanne, 24, CH-1030 Bussigny-Laus (CH)**

(84)

Designated Contracting States: **AT BE CH DE FR GB LI LU NL SE**

(74)

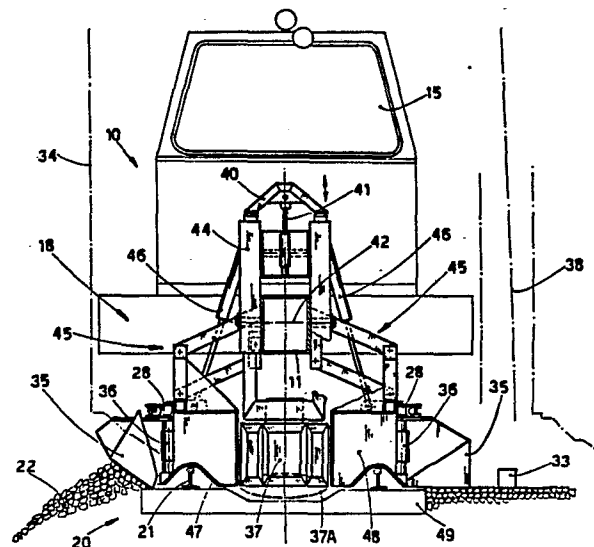
Representative: **Petraz, Gilberto Luigi, G.L.P. S.a.s. di Gilberto Petraz P.le Cavedalis 6/2, I-33100 Udine (IT)**

(54)

Unit to re-distribute ballast for machines which dress and re-distribute railway road bed ballast.

(57)

Unit (18) to re-distribute ballast for machines (10) which dress and re-distribute railway road bed ballast, such unit (18) comprising orientable ploughs (35) which can be positioned at the sides of a railway line (20), and also including rotary transfer drum means (37) cooperating with such orientable ploughs (35).

**EP 0 164 160 A2**

1 "UNIT TO RE-DISTRIBUTE BALLAST FOR MACHINES WHICH DRESS AND
2 RE-DISTRIBUTE RAILWAY ROAD BED BALLAST"

3 *****

4 This invention concerns a unit to re-distribute ballast for
5 machines which dress and re-distribute railway road bed
6 ballast. To be more exact, the invention concerns a ballast
7 re-distribution unit for employment on self-propelled machines
8 suitable for flattening and shaping operations on railway
9 ballast.

10 As is known, upkeep of the road bed ballast entails flat-
11 tening and/or shaping work, particularly at the portions of
12 the ballast at the sides of the rails. It also involves trans-
13 fer of metalling from one side of the line to the other and to
14 and from the middle of the line.

15 Various machines are known in the art which are intended to
16 perform operations of dressing and adjusting the ballast. For
17 instance, machines are known which comprise lateral ploughs to
18 form the edges of the ballast. Such machines also have a sy-
19 stem of orientable frontal ploughs through which the metalling
20 can be transferred from one side of the line to the other.
21 This operation, however, requires at least two passes so as to
22 be carried out properly.

23 In fact, it is necessary firstly to move the metalling from
24 one side of the railway line to the middle and then to trans-
25 fer the metalling thus collected at the middle of the line to

1/2 1901

1 the other side of the line.

2 A machine is known which is the subject of EP-A-0061227 and
3 comprises on its lower side a system of ploughs to dress the
4 ballast, and also an elevator belt in a central position to
5 lift the metalling.

6 EP-A-0092886 discloses dressing equipment for ballast with
7 rotary dressing drums. These rotary drums are fitted to arms
8 which can be retracted within the maximum overall bulk permit-
9 ted for travelling purposes. The drums serve only to dress the
10 outer flat portion of the ballast, whereas the sloped portion
11 of the ballast is shaped by means of ploughs positioned at the
12 lower part of the arms. Brushes are also included to clean the
13 zone of the rails. This machine does not re-distribute the
14 metalling and only performs the shaping work.

15 DE-A-1938890 discloses a machine which has on each side an
16 orientable lateral plough cooperating with a chute that passes
17 over the rails, and with a bladed transfer device located
18 above the chute. This text deals essentially with a device to
19 transfer metalling from the sides towards the middle of the
20 line.

21 US-A-3579873 discloses a machine able to work on rails and
22 also able to move on roads, this machine having frontal
23 ploughs and lateral disk ploughs for the upkeep of the road
24 bed. It has at its rear end a brush for the final cleaning.
25 This machine does not comprise scarifiers nor bladed rotary
26 drums and is based wholly on the principle of a plough.

27 CH-A-600043 discloses a re-distributing and dressing
28 machine with frontal ploughs and with lateral ploughs which
29 can be adjusted for height, inclination and lateral opening. A
30 finishing brush is also comprised.

31 CH-A-550282 discloses a machine with frontal ploughs and
32 lateral tracked scarifiers which can be adjusted for height
33 and inclination. It also includes a rear brush.

1 DE-A-1243227 discloses a machine with transverse and
2 lengthwise brushes and with means (5) able to compact the
3 ballast.

4 US-A-3007264 discloses a machine with brushes arranged
5 between and outside the rails. This machine serves essentially
6 to take excess metalling by means of chains with buckets
7 cooperating with the brushes.

8 Patent AT-A-359112 concerns a machine to transfer ballast,
9 the machine being equipped with a system of movable ploughs
10 which can be displaced so as to form suitable channels to
11 convey metalling below the machine itself. Lateral ploughs are
12 positioned behind the central ploughs, so that it is impos-
13 sible to transfer metalling and flatten the ballast in one
14 single pass.

15 These and other machines do not make possible an efficient
16 removal of the metalling in the central portion of recessed
17 and two-piece sleepers. Moreover, such machines do not enable
18 all the upkeep work to be performed in one single pass.

19 It is a purpose of our present invention to provide a
20 ballast re-distribution unit on machines which dress and re-
21 distribute railway ballast, the unit being intended to over-
22 come the drawbacks of the known machines.

23 In particular, this invention has the purpose of performing
24 the re-distribution and dressing operations in one single pass
25 with great efficiency and operating simplicity.

26 It is also a purpose of the invention to enable perfect
27 shaping of the ballast and re-positioning of the metalling to
28 be obtained even with recessed concrete sleepers.

29 The ballast dressing machine to which the invention is
30 applied comprises three separate work units. The first work
31 unit of the machine is a dressing unit; in a preferred embodi-
32 ment this unit comprises two rotary lateral dressing drums
33 instead of the traditional shaping ploughs but it could also

1 comprise shaped ploughs of a traditional type. In any event
2 this unit does not form part of the present invention.

3 A second work unit is included in a position substantially
4 at the centre of the machine and is constituted according to
5 the present invention. This unit is a central unit to re-
6 distribute the ballast.

7 In a preferred embodiment this second unit consists of two
8 ploughs, each of them located on a side of the machine. These
9 ploughs have the task of delivering metalling to the centre of
10 the line from one side and the other of the line respectively...
11 according to the orientation imparted to them by the driver of
12 the machine.

13 For this purpose the machine comprises two chutes or bridge
14 elements which cover the rails partially at the segment of
15 line where work is being carried out, so that the metalling
16 can pass over the rails. According to the invention a rotary
17 transfer drum is located in a central position between the
18 above two ploughs and comprises a suitable blade system or
19 equipment able to move the metalling. By rotating in one
20 direction or the other this drum causes the transfer of the
21 ballast from one side or the other of the railway line.

22 Such central drum can be oriented advantageously by tilting
23 its axis towards the front or rear of the machine; the purpose
24 of this is to form a substantially concave surface to engage
25 the metalling, with a profile corresponding to the projection
26 of the circular base of the drum on a vertical plane. This
27 capability of orientation, as we shall see, enables work to be
28 carried out in the central recessed portion of recessed con-
29 crete sleepers or two-piece sleepers or the like.

30 A cleaning unit equipped with a large brush to dress the
31 ballast and clean the sleepers and attachments is located at
32 the rear of the machine.

33 This invention is therefore embodied in a unit to re-

1 distribute ballast for machines which dress and re-distribute
2 railway road bed ballast, such unit comprising orientable
3 ploughs which can be positioned at the sides of a railway
4 line, and being characterized in that it includes rotary
5 transfer drum means cooperating with such orientable ploughs.

6 We shall now describe a preferred embodiment of the invent-
7 ion as a non-restrictive example with the help of the attached
8 figures, in which:-

9 Fig.1 is a side view of a dressing machine which employs
10 this invention;

11 Fig.2 is a plan view of such machine;

12 Fig.3 is a view of a cross section along B-B of Fig.1;

13 Fig.4 shows a detail of the central drum.

14 In Figs.1 and 2 a ballast dressing machine 10 comprises a
15 frame 11 that consists advantageously of a single beam,
16 preferably of a box type.

17 As can be seen in particular in the plan view of Fig.2,
18 this embodiment enables a driver 16, lodged in a cab 15 with
19 windows, to supervise visually the operations of dressing and
20 re-distributing the metalling in the best possible manner.

21 The front portion of the frame 11 bears a motor 14, which
22 supplies motion to front wheels 12, which in this example are
23 drive wheels. The frame 11 comprises also a rear axle 13,
24 which also can be powered or can possibly be an idler axle.

25 The machine 10 comprises in its lower part three separate
26 work units. Passing from the front of the machine 10 to its
27 rear, it is possible to distinguish a dressing unit 17, a
28 central re-distribution unit 18 and lastly a brush unit 19.

29 The dressing unit 17 has the task of shaping the portions
30 of ballast at the sides of a railway line 20 according to the
31 required geometric conformation. In this example the dressing
32 unit 17 comprises a rotary drum 23 and rotary drum 24 respect-
33 ively at the two sides of the machine 10.

0164160

1 These drums 23-24 have independent drives and the driver 16
2 can therefore work with only one or both of them as required.
3 Both drums 23-24 will be working advantageously during normal
4 operations.

5 The drums 23-24 can be equipped with suitable frontal or
6 peripheral means, such as blades, teeth or other means, which
7 can engage the metalling of which the ballast 22 consists. As
8 can be seen, the drum 23 or 24 is supported by a support plate
9 65, which in turn is supported rotatably at 27 by a telescopic
10 arm 25, which can be extended by an actuator 29, which in this
11 example is a jack.

12 The arm 25 in turn is pivoted at 26 and can be rotated by
13 an actuator 31, which also is a jack in this case.

14 The drum 23 or 24 can be adjusted for inclination by being
15 rotated about 27 by an actuator 30, which also in this example
16 consists of a jack.

17 Fig.3 shows the central re-distribution unit 18 according
18 to the invention in greater detail. In Fig.3 the unit 18
19 comprises two orientable ploughs 35, which are shown here in
20 their working position (see also Fig.2). Such ploughs 35 can
21 rotate about a shaft 36, and each of them is supported by a
22 support element 48, which in this example is a box-type
23 element. Actuators 28, which in this example are jacks, enable
24 each plough 35 to rotate about its shaft 36, so that the
25 ploughs 35 can be oriented forwards or backwards as required
26 (see also Fig.2).

27 The ploughs 35 can be the same as each other or have
28 different shapes, depending on the profile to be imparted to
29 the ballast and on the specific requirements. Several inter-
30 changeable ploughs 35 having different shapes can be provided
31 in the kit issued with the machine 10.

32 Vertical adjustment of the ploughs 35 is carried out by
33 raising or lowering the support elements 48, each of which 48

1 is connected to the frame 11 of the machine 10 by arms 45
2 arranged in a parallelogram. An actuator 46, which is a jack
3 in this example, serves to adjust the height of the support
4 element 48.

5 Bridge elements 47, shown also in Figs.1 and 2, as we said
6 in the first part of the description, enable the metalling
7 lifted by the ploughs 35 to be transferred to or from the
8 inner part of the railway line 20 by passing over the rails
9 21.

10 Adjustment of the inclination and height of the central
11 ploughs 35 is performed directly by the driver 16, who watches
12 the operations of re-distribution of the metalling from his
13 cab 15 with windows.

14 A transfer drum 37 is comprised in the centre of the
15 machine 10 between the two support elements 48. This transfer
16 drum 37 is arranged to be able to rotate and is supported by a
17 support structure 40, which can slide vertically within guides
18 44. Adjustment of the height of the structure 40 and therefore
19 of the transfer drum 37 is performed by an actuator 41, which
20 also is a jack in this example. The guides 44 in turn can
21 rotate about an axis 42 in relation to the frame 11. In this
22 way the guides 44 and therewith the slidable structure 40 can
23 be oriented so as to tilt the transfer drum 37 at an angle to
24 the vertical when so required. Such orientation is carried out
25 by means of an actuator 43, which in this example is a jack
26 (see Figs.1 and 2).

27 In an alternative embodiment, which is not shown here, it
28 is possible to arrange that the guides 44 cannot move. In such
29 a case a portion 50 of the support structure 40 to which a
30 motor 39/gearbox 51 assemblage is connected will be arranged
31 to be orientable. For instance, the portion 50 can be oriented
32 by a jack.

33 In this way it is possible to obtain an in-depth working

1 effect of the transfer drum 37, which will thus have a working
2 surface that is no longer flat but is convex towards a sleeper
3 49, thus fitting the recessed shape of such sleeper. Thus, as
4 shown with the lines of dashes of position 37A of Fig.3, the
5 transfer drum 37 can scrape and move any metalling held in the
6 central portion of the sleeper 49. This is particularly useful
7 for recessed concrete sleepers.

8 Such scraping of the metalling facilitates the brushing
9 work in the central zone of the line 20. The combined action
10 of the ploughs 35 and transfer drum 37 enables the metalling
11 to be transferred from one side of the line 20 to the other in
12 one single pass in cooperation with the bridge elements 47.

13 Fig.4 gives a better view of the transfer drum 37, which is
14 hollow; a support element 50, to which a motor 39/gearbox 51
15 assemblage is flanged, is lodged partially within the transfer
16 drum 37, which is fitted directly onto the output shaft of the
17 gearbox 51. The motor 39 is advantageously hydraulic.

18 The periphery of the transfer drum 37 is equipped with
19 blades 52, which have the purpose of assisting the transfer of
20 metalling from one side of the line to the other.

21 The direction of motion of the motor 39 and therefore of
22 the transfer drum 37 can, of course, be inverted.

23 In the example of Fig.4 the transfer drum 37 is shown in
24 its fully raised position in relation to the frame 11 of the
25 machine 10, being thus raised by the actuator 41 (see Fig.3).

26 As we said earlier, the machine 10 comprises also a cleaner
27 brush unit 19, which includes a rotary brush 53 driven by a
28 motor, which is not shown here and can be of any type.

29 Figs.1 and 2 show how the rotary brush 53 cooperates with a
30 central cleaner device 57, which in this example is a central
31 plough specially adapted for two-piece sleepers. The height of
32 the plough 57 can be adjusted by an actuator 58, which here
33 too is a jack.

1 The metalling thrown outwards and lifted by the plough 57
2 is collected thereafter by the rotary brush 53, whereas the
3 metalling lifted by the rotary brush 53 lands on a ramp 60 and
4 is discharged sideways by a conveyor or chute 59.

5 Instead of the plough 57 a rotary brush, which is of a
6 small size and is not shown here, may possibly be provided.
7 Such small brush will be capable of being adjusted advantage-
8 ously for height 58 independently of the cleaner brush 53.

9 A stationary brush 61 to clean the zone of the attachments
10 can also be seen (Fig.1) at the extreme end of the machine 10
11 and is kept in position by an actuator 62, which may be a jack
12 or an electromagnetic actuator. The cleaner brush 53 and
13 stationary brush 61 are raised when the machine 10 is moving
14 from one area to another.

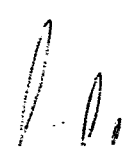
15 We have described here a preferred embodiment of this
16 invention but many variants are possible without departing
17 thereby from the scope of the invention.

18 Thus the shapes and sizes of the parts can be changed and
19 the actuators can be replaced with equivalent means of a
20 pneumatic, hydraulic, mechanical, electromagnetic, etc. type.

21 It is possible to give the ploughs 35 and transfer drum 37
22 conformations other than those shown and to provide several
23 transfer drums 37 working in series or parallel.

24 It is also possible to arrange auxiliary means, such as
25 blades or ridges on the transfer drum 37, which are different
26 from those shown.

27 These and other variants are all possible for a person
28 skilled in this field without departing thereby from the scope
29 of this invention.



1

INDEX

2

- | | | |
|----|-----|----------------------------------|
| 3 | 10 | - ballast dressing machine |
| 4 | 11 | - frame |
| 5 | 12 | - front wheels |
| 6 | 13 | - rear axle |
| 7 | 14 | - motor |
| 8 | 15 | - cab |
| 9 | 16 | - driver |
| 10 | 17 | - dressing unit |
| 11 | 18 | - central re-distribution unit |
| 12 | 19 | - brush unit |
| 13 | 20 | - railway line |
| 14 | 21 | - rails |
| 15 | 22 | - ballast |
| 16 | 23 | - rotary drum |
| 17 | 24 | - rotary drum |
| 18 | 25 | - telescopic arm |
| 19 | 26 | - pivot |
| 20 | 27 | - pivot |
| 21 | 28 | - actuator or jack |
| 22 | 29 | - actuator or jack |
| 23 | 30 | - actuator or jack |
| 24 | 31 | - actuator or jack |
| 25 | 32 | - motor |
| 26 | 33 | - pickets |
| 27 | 34 | - maximum permitted overall bulk |
| 28 | 35 | - ploughs |
| 29 | 36 | - shaft |
| 30 | 37 | - rotary transfer drum |
| 31 | 37A | - inclined position of drum |
| 32 | 38 | - maximum permitted working bulk |
| 33 | 39 | - motor |

0164160

- 1 40 - support structure
- 2 41 - actuator or jack
- 3 42 - axis of rotation
- 4 43 - actuator or jack
- 5 44 - guides
- 6 45 - parallelogram arms
- 7 46 - actuator or jack
- 8 47 - bridge elements
- 9 48 - support elements
- 10 49 - sleeper
- 11 50 - portion of support structure 40
- 12 51 - gear box
- 13 52 - blades
- 14 53 - rotary brush
- 15 57 - central cleaner device
- 16 58 - actuator or jack
- 17 59 - conveyor or chute
- 18 60 - ramp
- 19 61 - brush for zone of attachments
- 20 62 - actuator
- 21 65 - support plate.

0164160

CLAIMS

1 - Unit (18) to re-distribute ballast for machines (10) which dress and re-distribute railway road bed ballast, such unit (18) comprising orientable ploughs (35) which can be positioned at the sides of a railway line (20), and being characterized in that it includes rotary transfer drum means (37) cooperating with such orientable ploughs (35).

2 - Unit (18) to re-distribute ballast for machines (10) which dress and re-distribute railway road bed ballast as claimed in Claim 1, in which the rotary transfer drum means (37) are positioned substantially at the centre of the orientable ploughs (35).

3 - Unit (18) to re-distribute ballast for machines (10) which dress and re-distribute railway road bed ballast as claimed in Claims 1 and 2, in which the rotary transfer drum means (37) comprise at least one rotary drum.

4 - Unit (18) to re-distribute ballast for machines (10) which dress and re-distribute railway road bed ballast as claimed in any claim hereinbefore, in which the rotary transfer drum means (37) have an adjustable height (40-41).

5 - Unit (18) to re-distribute ballast for machines (10) which dress and re-distribute railway road bed ballast as claimed in any claim hereinbefore, in which the rotary transfer drum means (37) have an adjustable inclination.

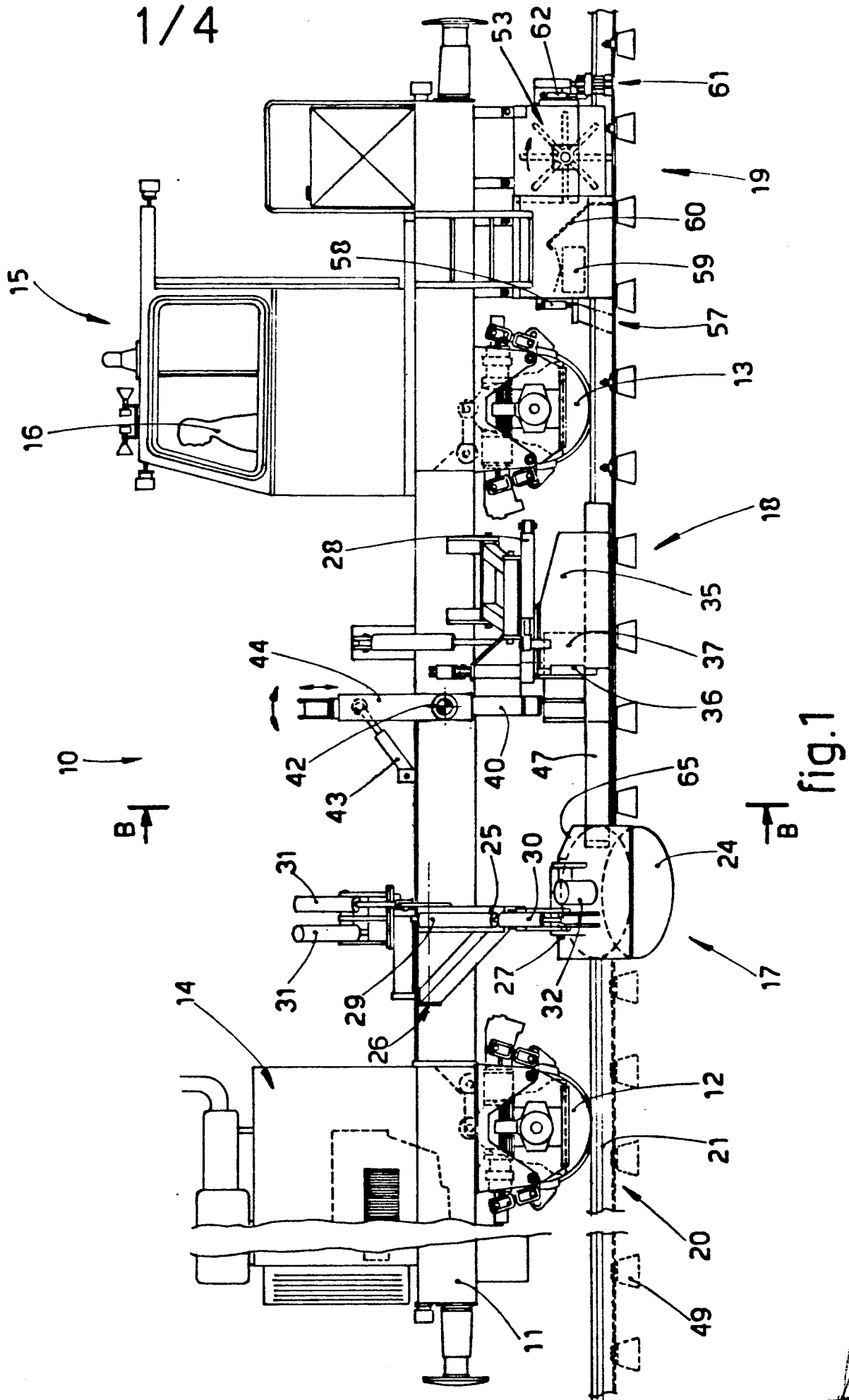
6 - Unit (18) to re-distribute ballast for machines (10) which dress and re-distribute railway road bed ballast as claimed in any claim hereinbefore, in which the rotary transfer drum means (37) are supported by a support structure (40), which cooperates with guides (44) and can be positioned by an actuator (41).

7 - Unit (18) to re-distribute ballast for machines (10) which dress and re-distribute railway road bed ballast as claimed in

0164160

1 Claims 1 and 6, in which the guides (44) are rotatably (42)
2 anchored to a frame (11) of the machine (10).
3 8 - Unit (18) to re-distribute ballast for machines (10) which
4 dress and re-distribute railway road bed ballast as claimed in
5 Claims 1 and 6, in which the guides (44) are stationary.
6 9 - Unit (18) to re-distribute ballast for machines (10) which
7 dress and re-distribute railway road bed ballast as claimed in
8 Claims 1 and 8, in which the support structure (40) has an
9 orientable lower portion (50).
10 10 - Unit (18) to re-distribute ballast for machines (10)
11 which dress and re-distribute railway road bed ballast as
12 claimed in any claim hereinbefore, which comprises elements
13 (48) to support the orientable ploughs (35), such elements
14 (48) being adjustable at least as regards their height (45-
15 46).
16 11 - Unit (18) to re-distribute ballast for machines (10)
17 which dress and re-distribute railway road bed ballast as
18 claimed in Claims 1 and 10, in which the support elements (48)
19 are movably (42) anchored to the frame (11) by parallelogram-
20 wise arms (45), actuators (46) being included.
21 12 - Unit (18) to re-distribute ballast for machines (10)
22 which dress and re-distribute railway road bed ballast as
23 claimed in any claim hereinbefore, in which the rotary trans-
24 fer drum (37) comprises means (52) to engage the metalling.
25 13 - Unit (18) to re-distribute ballast for machines (10)
26 which dress and re-distribute railway road bed ballast as
27 claimed in Claims 1 and 12, in which the means (52) to engage
28 metalling comprise at least blades.
29 14 - Unit (18) to re-distribute ballast for machines (10)
30 which dress and re-distribute railway road bed ballast as
31 claimed in any claim hereinbefore, in which the rotary trans-
32 fer drum (37) is fitted directly to the shaft of the motor
33 (39)/gearbox (51) assemblage supported by the support struct-

1 ure (40).
2 15 - Unit (18) to re-distribute ballast for machines (10)
3 which dress and re-distribute railway road bed ballast as
4 claimed in Claims 1 and 14, in which the motor (39)/gearbox
5 (51) assemblage is lodged at least partially within the rotary
6 transfer drum (37).



Antonio P. Graz

2/4

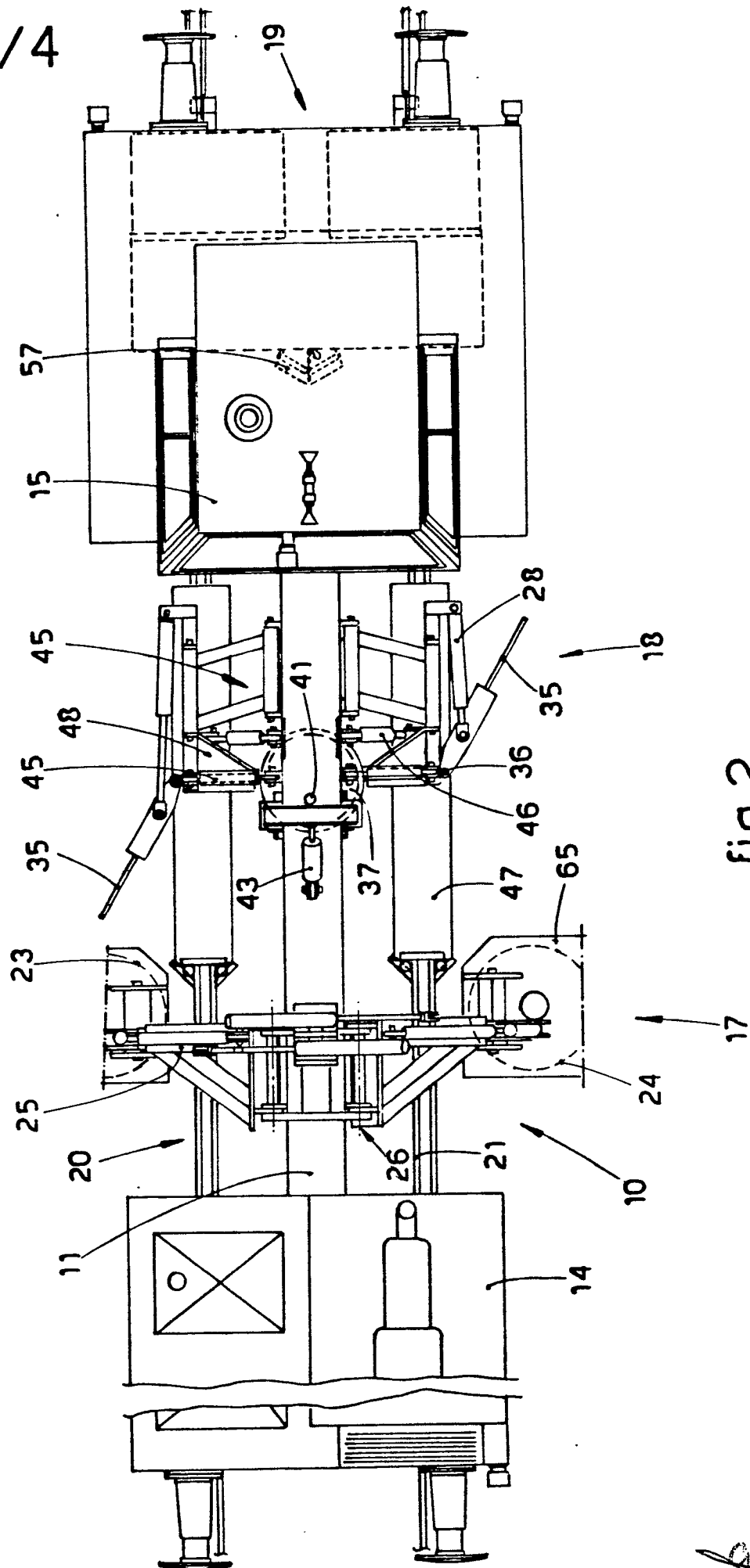


fig.2

Antonio Petrazz

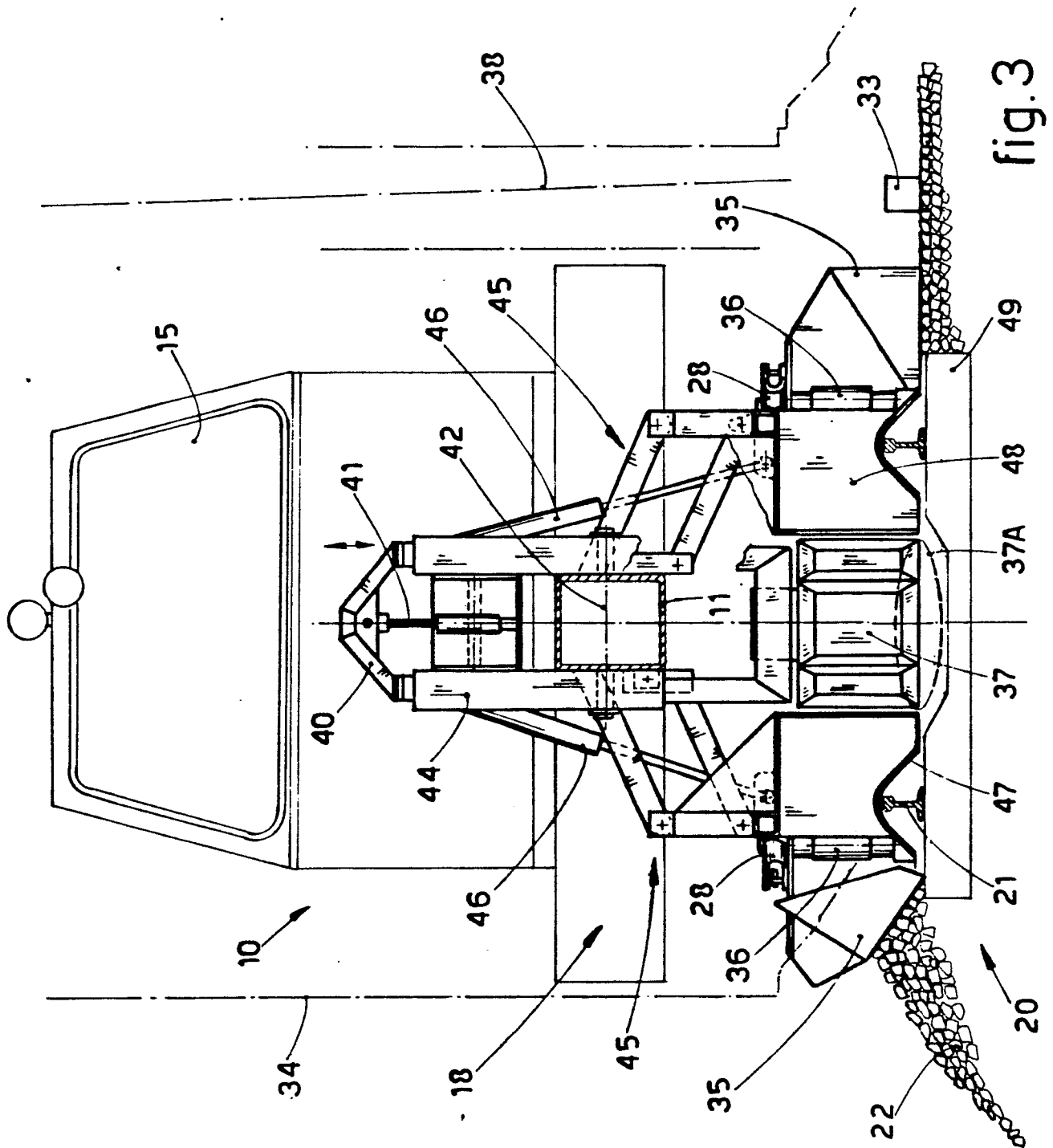


fig. 3

Carlo De Luca

4/4

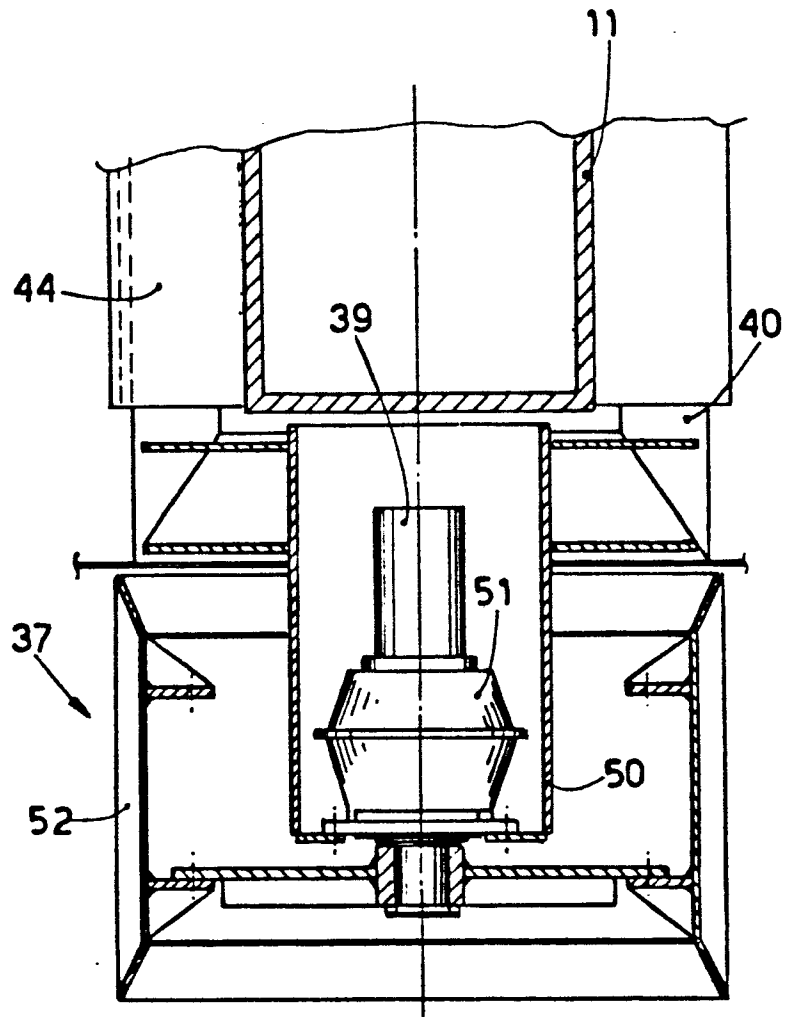


fig. 4

A handwritten signature or mark, possibly a stylized 'L' or 'K', located in the bottom right corner of the page.