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(54) Platelayer waggon for rails.

(57) Platelayer waggon (10) for rails (18) which positions and fixes, in work, bolts (44), clips (50), washers and nuts (45) on sole plates (29) so as to anchor rails (18) to sleepers (19), and which includes:

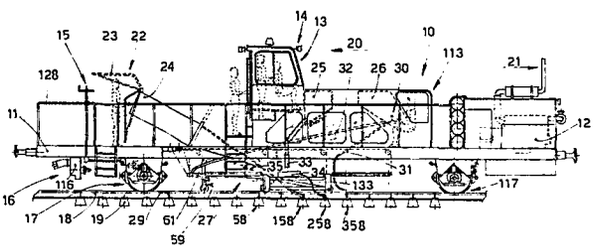
– a support frame (11) with at least one pair of drive wheels (17),

– at least one driver's cab (13–113),

– at least one store (24–25–26) for anchorage materials (44–45–50),

– delivery guide means (31–33–35), and

– installation units for specific installation stations (58–158–258–358), such installations units being differentiated as between respective installation stations (58–158–258–358) and being respectively able to lay bolts (44), clips (50), washers and nuts (45), the last installation unit (63) comprising means to screw and tighten nuts (45).



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"PLATELAYER WAGGON FOR RAILS"

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This invention concerns a platelayer waggon for rails. To be more exact, the invention concerns a self-propelled waggon able to position the elements for anchorage of a rail to a sleeper and to bolt them to the sleeper itself.

The problems linked to the mechanization of the laying or replacement of railway lines are known. For the purposes of this invention the replacement of railway lines and the laying of new lines are substantially the same.

It is known that the prior art has been able to mechanize the renewal of the rail track or the laying of a new line up to the moment when the line is placed in a suitable position on the sleepers.

With the present mechanized system, however, the subsequent work of fitting the anchorage means and bolting them is still carried out by gangs of workers acting appropriately.

In particular the part of such work linked to the positioning of the bolts, nuts, clips and washers and thereafter to the tightening of the bolts to the required value of torque is still performed by hand.

One purpose of the present invention is precisely to be able to mechanize these operations.

It is also a purpose of the invention to embody a device suitable for carrying out such operations independently with

Gilberto Petraz

the help of one or two workers, such device being able to move itself and to work independently on railways.

The present work of mechanization of the railway line deals only with the replacement of the sleepers and rails as regards their removal and also their laying and positioning, whereas the present invention concerns specifically the work downstream from the laying and positioning, namely the work connected with the distribution and fixture of the attachments, that is, the fixture of the rails to the sleepers.

Attempts to automate this step in the laying of railway lines at least partially are known.

For instance, FR-A-2.118.601 is known and discloses a waggon supporting a set of containers holding separated parts (bolts, plates, washers and nuts). Vibrating guides deliver these parts to laying stations below the waggon. In this case workmen sit on appropriate seats and take the various parts from the ends of the guides and fit them to the rails.

This invention does not solve the problem of how to place and screw the various parts automatically to the rails since it provides only a solution for conveying the parts from their containers to the laying stations. Moreover, a great number of persons is required for these operations.

US-A-3,841,221 discloses a self-propelled machine to apply anchorage plates to the rails. This machine has an automatic laying cycle,but a driver is needed to position the machine itself at each sleeper;the operation,therefore, has to be continually supervised, sleeper by sleeper. Moreover, this machine does not arrange to place bolts, washers and nuts or to tighten the nuts.

GB-A-2,092,647 discloses a machine to position clip elements automatically so as to fix the rails to the sleepers. It provides stores for the clips and guides to convey and lay the clips on the rails;it also includes means able to perform

automatic alignment in relation to the rails and sleepers. However, it does not provide means for the coordinated depositing of clips, nuts and washers nor tightening means; it is therefore not able to carry out bolted attachments.

FR-A-2.118.602 discloses a machine which serves to collect, from railway lines which are to be renewed, the fixture components employed such as clips, bolts, washers and nuts. These components are collected by means of conveyors which cooperate with collection receptacles. lt is envisaged that the machine will be employed in conjunction with an unscrewing machine, which unscrews the nuts before they are collected.

FR-A-2.410.088 discloses a machine to deposit studs for the fixture of the rails by means of a riveter mechanism. This machine is therefore not suited to the placing of bolted attachments.

US-A-3,257,962 discloses a machine analogous to the preceding FR machine for the placing of studs to anchor rails.

At the present time the work of distributing and fixing the attachments, namely the final anchorage of the rails to the sleepers, requires a gang of many workers who have to overcome many problems so as to be able to end the work of anchorage of the tracts to be renewed within the time allowed by the general standards.

To such difficulties at the worksite are added all the problems linked to the preparatory organization of the assembly of the attachment elements at the storage points of the materials to be used.

lt is necessary to bear in mind that, for instance, to renew 900 metres of line in which the distance between sleepers is 60 cms. it is necessary to work on 1500 sleepers, which entail 6000 attachments that require the assembly of 24,000 parts.

This mass of handlings and assemblings is carried out in-

dependently by the device of the invention, which enables the whole of such operations to be controlled by one operator.

This invention enables the great number of persons at the worksite to be eliminated and the length of the worksite itself to be shortened. It also enables the group of persons preparing the attachments at the usage stations to be eliminated.

It also makes it possible to employ one single person, or at the most two persons when it is desired to perform a further quality control on each attachment, and also to travel to the worksite independently or connected to the renewal train.

The platelayer waggon of the invention is also able to have access independently to storage points located at any position, thus obviating obstructions or overloading at small stations.

Moreover, the invention makes maintenance easy to carry out and is highly reliable owing to its own simplicity. Furthermore, work can be carried on even in unsatisfactory climates or weathers since the operators are sheltered in their cab.

Instead, at the present time in given climates or weather conditions the work has to be slowed down, if indeed it is not actually stopped, since the personnel are directly on the line without any shelter.

These and other advantages will become clearer in the description later on.

The platelayer waggon of the invention consists substantially of a vehicle which advantageously has two groups of wheels, at least two wheels being drive wheels.

A power group, lighting equipment and drive means are installed on this vehicle. Moreover, specific stores for the various components and a driver's cab are fitted to the vehicle.

Furthermore, appropriate conveyor and delivery guides are

provided between the stores and the installation zone, while in the installation zone a device is arranged to set to rest and to set to work the various components which perform the operations of delivery, positioning and retention of the various parts.

The device of the invention also enables work to be carried out on straight or curved rails and also on rails laid on flat ground or on a slope.

Moreover, the device enables work to be performed on single lengths of rail or on rails welded together (long sections).

The invention also envisages that the loading of the various components to be laid in position, within the means able to put them in position can take place with the withdrawal of such components from appropriate stores. According to the invention such withdrawal can be performed by hand or semi-automatically or fully automatically.

This invention is therefore embodied with a platelayer waggon for rails which positions and fixes, in work, bolts, clips, washers and nuts on sole plates so as to anchor rails to sleepers, and which includes in cooperation:

- a support frame with at least one pair of drive wheels,
- at least one driver's cab,
- at least one store for anchorage materials,
- delivery guide means, and
- installation units for specific installation stations, the waggon being characterized by the fact that such installation units are differentiated as between respective installation stations and are respectively able to lay bolts, clips, washers and nuts, the last installation unit comprising means to screw and tighten nuts.

Let us now see, with the help of the attached figures, which are given as non-restrictive examples, a preferred embodiment of the invention so as to make clear the character-

izing aspects of the invention and to clarify further their purposes and advantages.

In the figures we have the following:

Fig.1 gives a side view of the platelayer waggon of the invention;

Fig.2a gives a view from above of the platelayer waggon of Fig.1;

Fig.2b gives a front view of the platelayer waggon of Fig.1;

Fig.3 gives a side view of a feeder device;

Fig.4 gives a view from above of the feeder device of Fig.3;

Figs.5, 6 and 7 give the three traditional views of a control and actuator cab for the operations;

Fig.8 shows a preferred section of a unit which unscrews nuts and bolts and delivers them to delivery and positioning guides;

Fig.9 shows a store of clips;

Fig.10 gives a side view of a means that feeds clips.

In the figures a platelayer waggon 10 has a support frame 11 to which is fitted a motor unit 12. A driver's cab 13 is located in an intermediate position, while a cab 113 for control of work is advantageously placed in a position away from the centre of the waggon.

Both the work-control cab 113 and the driver's cab 13 can be equipped with lights or headlights 14 able to light the work zone and the zone of travel of the waggon 10.

Like headlights can be envisaged as being positioned also, or only, at the ends of the waggon. The driver's cab 13 can also comprise other signal means, whether luminous or able to emit sounds, which may be necessary for the purpose.

Next, the platelayer waggon 10 can be equipped with a hand-brake 15 either for emergency use or for parking.

In the example shown the platelayer waggon 10 has two groups of wheels 17-117 respectively. In this case each group

has only one axle, but the invention envisages the possibility of employing groups of wheels 17 and/or 117 with more than one axle, such as bogies or other means, such embodiments with more than one axle being common in railway art.

Hydraulic motors 16 are anchored in this example to the frame 11 and serve to drive drive wheels 17 through a reduction gear unit 116, idler wheels 117 being present in cooperation. According to a variant the wheels 117 can also be envisaged as being drive wheels.

By means of the wheels 17-117 the platelayer waggon 10 is able to run on rails 18, whether the latter 18 are already anchored to sleepers 19 or still have to be anchored.

The wheels 17-117 or groups of wheels are designed in such a way as to enable the platelayer waggon 10 to be moved on straight rails or curved rails, depending on the planimetry of the railway track.

Moreover, the gauge of the wheels 17-117 can be suited to the gauge of the rails 18 within about a given value.

The sleepers 19 can be of any required type, whether of wood, metal, concrete, resin or another type.

Sole plates 29 are supported on the sleepers 19 and are suitably anchored at an appropriate position, vibration-damper material being possibly interposed as is usually arranged in railway installations.

The platelayer waggon 10 can move in either direction 20-21 when it has to travel over long distances but will move in the direction 20 when carrying out its platelayer duties. When it is travelling to its place of work and is returning, it is driven by the driver in the cab 13.

Instead, when it moves in the direction of performing its platelayer duties 20, it is driven by an operator in the cab 113, who may be also the person who drives it during long journeys.

Gilberto Petraz

Gangways 28 are fitted to the frame 11 and comprise guard rails 128.

On the frame 11 is positioned a series of stores, namely stores 24 for clips, stores 25 for washers which consist advantageously of two stores positioned at the sides of the waggon 10, and stores 26 for nuts and bolts located at the sides of the cab 113 and cooperating with that cab 113 by means of a container outlet 37 for nuts and bolts (see Figs.6 and 7).

The positions shown for the stores are preferred but not absolute positions and may be varied to suit specific requirements.

A loading point 22 for the loading of clips is envisaged in cooperation with the stores 24 for clips; at that point 22 the operator can load the clips into the stores 24.

The point 22 to load clips is equipped with a two-positional protective hood 23 which is suitable for sheltering the operator in bad weather and, at the same time, for sheltering the clip stores 24 during work.

The platelayer waggon 10 is also equipped with a two-positional positioner device 27 able to take up a lowered working position and a high position for long journeys.

The positioner device 27 has positioner wheels 59 (see Fig.3). Each of these wheels 59 is able to position one or more respective work units, which are shown from left to right in Figs.3 and 4 and are respectively the ends of guides 32 for the bolts, the ends of outer guides 35 for the clips, the ends of guides 133 for the washers and guides 31 for the nuts. The wheels 59 are envisaged as being independent so as to be adaptable to curved tracts of rail.

In the example shown the wheels 59 are shaped with a double tapered, or flared, edge for their alignment on the rail.

In their lowered position the wheels 59 cooperate with the

rails and always follow the centre line of the rail, whatever the gauge of the rails may be.

The two positions which the device 27 can take up are determined by the action of a positioner jack 60 which acts on appropriate positioner means 61, such as cables or connecting rods that are anchored at one end to the device 27. Fig.1 shows the lowered work position as an example.

The positioner device 27 cooperates with the stores 24,25 and 26 so as to convey the various components to stations 58-158-258-358 where the various components are positioned and fitted together.

A means 30 for delivering the nuts and bolts cooperates with the stores 26 of the nuts and bolts and serves to feed the guide 31 of the nuts and the guide 32 of the bolts.

A guide 33 of the washers cooperates with the stores 25 of the washers and feeds one or more shakers 34, which distribute washers and serve to feed the guides 133 of the washers.

The outer guides 35 of the clips cooperate with the stores 24 of the clips and serve to feed the clips when work is in progress.

The various guides, therefore, serve to feed four sets of materials at the same time, and for each rail 18 there are two sets of anchorage points on the right of the rail and two sets of anchorage points on the left of the rail; thus the platelayer waggon 10 is able to feed four anchorage elements at one and the same time.

This enables anchorage to be performed on one sleeper at a time in every phase and each sleeper is served in succession until anchorage has been completed.

According to the device 27 the guides 32 of the bolts convey bolts 44 (see Fig.8) to a positioner means 62, which at an installation station 58 carries out the positioning and fitting of the bolts 44 in the appropiate seatings comprised in

sole plates 29.

In a next installation station 158 clips 50 are fitted to the bolts 44 by means of the outer guide 35 of the clips 50.

The fitting of the clips 50 can take place advantageously by mutual cooperation of the momentary position of the clip 50, which is slightly inclined, with the position of contact which the head of the bolt 44 takes up.

So as to be correctly positioned, the clips 50 cooperate with the end portion of the outer guides 35, which is inclined and has a fork-wise conformation, within which the head of the bolts 44 can pass until it enters into cooperation with the central hole of the clip 50 and becomes engaged therein, removing the clip 50 from its position so that the clip 50 can be positioned by gravity.

With a device such as the device 27, which is moved and positioned by a hydraulic or pneumatic jack 60, it is possible to carry out positioning even when the machine is moving.

In a next installation station 258 washers are then fitted above the clips 50 by a guide 133 for washers, the system employed being analogous to that used to fit the clips 50.

In a next installation station 358 a nut 45 is positioned last and is screwed tight, being fed by the guides 31 of nuts to the means 63 for positioning nuts.

The platelayer waggon 10 is also equipped with feeler means which sense the presence of sole plates 29 on the sleepers 19 or the presence of the sleepers 19 themselves and also with control means (not shown here) which serve to control the positioning and the operations to be performed.

Such control means sense the presence of a sleeper 19 or of a sole plate 29 already fixed to a sleeper 19 and condition the position of the positioner means 62 and 63 in relation to the rails 18 (but can also condition the means which serve to position the clips 50 and washers).

According to the invention the positioning of the various installation stations takes place by moving the platelayer waggon 10 step-by-step.

According to a variant the positioning of the various installation stations takes place by moving the waggon 10 by a series of steps and by then moving the various installation stations (or a part of such stations) step-by-step in relation to the waggon 10.

In the latter case, when the stations have completed their travel in relation to the waggon 10, the latter moves forward again by the above series of steps and the whole process is repeated.

Therefore, when the control means sense the presence of a sleeper 19, they halt either the waggon 10 or the frame which bears the installation stations, so that the various stations can work in correspondence with the series of sleepers 19 comprised in the installation stations 58-158-258-358.

According to a variant some operations can even be carried out while the machine is in motion or while the frame bearing the stations is moving.

When all the operations concerning the series of sleepers 19 corresponding to the installation stations 58-158-258-358 have been performed, the feeler means permits forward movement until it senses the next sleeper 19. In this way the new installation stations 158-258-358 can coincide with the previous installation stations 58-158-258.

The work-control cab 113 is equipped for efficient working in such a way that an operator 41 can control the work of each installation station 58-158-258-358 simultaneously and can carry out at the same time the unscrewing of the assemblages of nuts 45 and bolts 44 and the positioning of the same in their appropriate guides.

According to the invention the waggon 10 is loaded before-

hand at any service point so that the clips 50 are aligned and positioned on appropriate inner storage guides 52 in the store 24 for clips, as we shall see later, whereas the washers are loaded in bulk into their stores 25 and the nut-and-bolt assemblages 43 are loaded in bulk into their stores 26.

As can be seen in Figs.5, 6 and 7, in one embodiment of the invention the stores 26 have a discharge outlet container 37 to the right and to the left of the operator 41 from which, without taking his eyes away from the stations at work on the rails, he can simply stretch out his hands and take with each hand a nut-and-bolt assemblage 43 from each container 37 and fit it to a means 38 which unscrews and positions the nuts 45.

As can be seen in Fig.8, the means 38 to unscrew and position nuts 45 enables the nut 45 to be unscrewed and at the same time makes it 45 drop into a guide entry 42, which puts it into direct connection with the relative guide 31 for nuts 45.

When the nut 45 has been unscrewed, the operator 41 takes the bolt 44 already in his hand and positions it in an appropriate guide entry 39 for bolts 44.

In practice the operator 41 will feed two righthand nut guides and two lefthand nut guides and also two righthand bolt guides and two lefthand bolt guides with his right and left hands respectively so as to keep the respective guides supplied.

The operator 41, therefore, by operating the means 38 to unscrew and position nuts will feed the respective guides 31-32 continuously.

Such feed can also be linked to the preceding stores and be kept supplied by using the unscrewing means 38.

The operator 41 takes nut-and-bolt assemblages 43 from the outlet container 37 of the nuts and bolts with his right and left hands respectively and proceeds as detailed above.

The means 38 to unscrew and position nuts, as shown in Fig.8, comprises a motor 46 which sets in rotation, by means of an appropriate transmission such as a belt 48 or other means, a screw-slackener means 47 mounted on bearings and comprising appropriate friction means at its front. The operator 41 presses the head of a nut 45 screwed onto a bolt 44 against the friction means.

The pressure action causes the nut 45 to be unscrewed from the bolt 44 and, when unscrewing is completed, the nut 45 drops automatically into the nut guide entry 42 and is positioned in the nut guide 31.

The operator 41 then takes the bolt 44 and positions it in the bolt guide entry 39 (Figs.4 and 6).

According to a possible variant the feed of the various components (bolts, clips, washers and nuts) to their respective guides can be carried out in a manner at least partially automatic, means being provided to take and insert in the respective positioner guides the foregoing components (bolts, nuts, etc.) which have been withdrawn from their respective stores automatically.

The arrangement of such components in their respective stores can be such as to make possible their automatic withdrawal.

The four sets of installation stations, 58 for bolts, 158 for clips, 258 for washers and 358 for nuts respectively are each of them linked to a set of installation units, as we said earlier.

A preferred embodiment of the guides is shown in Figs.3 and 4, in which it is possible to see how the guide 32 takes bolts from the cab 113 and delivers them to a positioner means 62, which serves to feed the bolts 44 in the proper order of installation and to position them in the appropriate holes in the sole plates 29.

Gilberto Petraz

The outer guides 35 take clips 50 from the clip store 24 and deliver them to an installation unit which cooperates with the clip installation station 158.

The guides 133 take washers from the shakers 34 and deliver them to an installation unit which cooperates with the washer installation station 258, while the guide 31 takes nuts 45 from the means 38 which unscrews and positions nuts, and delivers them 45 to the means 63 which positions and screws the nuts 45 tight.

The various installation units which serve the installation stations 58-158-258-358 are secured, as we said earlier, to the positioner device 27 and thus can take up a position of rest and a work position, as detailed before.

The outer clip guides 35, as shown in Fig.10, are also capable of vertical and lateral movement which enables them to take clips 50 from the clip stores 24.

Such clip stores 24 are shown in Figs.9 and 10 and consist of a plurality of vertical 49 and horizontal 149 storage rows in which a series of clips is positioned and placed one behind another.

These clips 50 are positioned on inner clip storage guides 52, six horizontal rows and ten vertical rows being shown in the figure as an example and the whole being repeated four times, for four is the number of clips which have to be positioned at one and the same time.

A frame 51 to support outer clip guides 35 cooperates with the various inner clip storage guides 52 and can position the four outer clip guides 35 vertically and laterally.

The vertical position of the clip guide support frame 51 is obtained by means of a jack 54 which, by means of a towing cable 56 directed by transmission wheels 57, positions vertically a frame 53 which in its turn bears in a slidable manner the frame 51 that supports the outer clip guides 35.

The lengthwise positioning of the clip guide support frame 51 in relation to its carrying frame 53 is obtained by means of a jack 55.

The jack 55, therefore, serves to position the outer guides 35 along the horizontal rows 149, whereas the jack 54 serves to position the outer guides 35 along the vertical rows 49.

As soon as a vertical row has been emptied, the device is lowered and starts again from the bottom and continues until all the clips 50 in the vertical row 49 have been withdrawn, the device repeating this process until all the clips 50 in the store 24 have been exhausted.

INDEX

10 - platelayer waggon
11 - support frame
12 - motor unit
13 - driver's cab
113 - work-control cab
14 - headlights
15 - handbrake
16 - hydraulic motors
116 - reduction gear unit
17 - drive wheels
117 - idler or drive wheels
18 - rails
19 - sleepers
20 - working or travelling direction
21 - travelling direction
22 - point for loading of clips
23 - protective hood
24 - stores for clips
25 - stores for washers
26 - stores for nuts and bolts
27 - positioner device
28 - gangways
128 - guard rails
29 - sole plates
30 - means to handle nuts and bolts
31 - guide for nuts
32 - guide for bolts
33 - guide for washers
133 - guide for washers
34 - shaker for washers
35 - outer guide for clips
36 - radius of curvature

37 - outlet container for nuts and bolts

38 - means to unscrew and position nuts

39 - guide entries for bolts

40 - guide entry for clips

41 - operator

42 - guide entry for nuts

43 - nuts and bolts or bolts

44 - bolts

45 - nuts

46 - motor

47 - screw-slackener means

48 - belt

49 - vertical storage rows

149 - horizontal storage rows

50 - clips

51 - clip guide support frame

52 - inner clip storage guides

53 - frame to bear the frame 51

54 - lifter jack

55 - jack for lateral movement

56 - towing cable

57 - transmission wheels

58 - station to instal bolts

158 - station to instal clips

258 - station to instal washers

358 - station to instal nuts

59 - positioner wheels

60 - positioner jack - high position

61 - positioner means

62 - means to position bolts

63 - means to position nuts.

CLAIMS

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1 - Platelayer waggon (10) for rails (18) which positions and fixes, in work, bolts (44), clips (50), washers and nuts (45) on sole plates (29) so as to anchor rails (18) to sleepers (19), and which includes:

- a support frame (11) with at least one pair of drive wheels (17),
- at least one driver's cab (13-113),
- at least one store (24-25-26) for anchorage materials (44-45-50),
- delivery guide means (31-32-33-35), and
- installation units for specific installation stations (58-158-258-358),

the waggon (10) being characterized by the fact that such installation units are differentiated as between the respective installation stations (58-158-258-358) and are respectively able to lay bolts (44), clips (50), washers and nuts (45), the last installation unit (63) comprising means to screw and tighten the nuts (45).

2 - Platelayer waggon (10) for rails (18) as claimed in Claim 1, of which the gauge of its wheels (17-117) is variable so as to position the installation units astride the centre line of the railway track.

3 - Platelayer waggon (10) for rails (18) as claimed in Claim 1 or 2, in which at least part of the installation units which constitute specific installation stations (58-158-258-358) are supported and positioned by a positioner device (27) (central bogie) at least during anchorage work.

4 - Platelayer waggon (10) for rails (18) as claimed in Claim 3, in which the positioner device (27) has positioner wheels (59) able to align the individual installation stations (58-158-258-358) at their required positions in relation to the

centre line of the rail (18) (lengthwise line).

5 - Platelayer waggon (10) for rails (18) as claimed in any claim hereinbefore, in which the store (24) for clips (50) has the clips (50) positioned in order in rows (49-149) which feed at least one outer clip guide (35).

6 - Platelayer waggon (10) for rails (18) as claimed in any claim hereinbefore,in which the initial tract of the outer clip guides (35) can be momentarily positioned at least laterally.

7 - Platelayer waggon (10) for rails (18) as claimed in any claim hereinbefore, in which the guides (32) for bolts deliver the bolts (44) to an installation unit (62) which serves the first installation station (58).

8 - Platelayer waggon (10) for rails (18) as claimed in any claim hereinbefore,in which the outer guides (35) for clips deliver clips (50) to an installation unit which serves the second installation station (158).

9 - Platelayer waggon (10) for rails (18) as claimed in any claim hereinbefore, in which the guides (33) for washers deliver washers to an installation unit which serves the third installation station (258).

10 - Platelayer waggon (10) for rails (18) as claimed in any claim hereinbefore, in which the guides (31) for nuts deliver nuts to an installation unit (63) which serves the fourth installation station (358).

11 - Platelayer waggon (10) for rails (18) as claimed in any claim hereinbefore, in which an operator (41) located in a work-control cab (113) has a field of view that covers at least part of the installation stations (58-158-258-358).

12 - Platelayer waggon (10) for rails (18) as claimed in any claim hereinbefore, in the work-control cab (113) of which there is at least one outlet container (37) for nut-and-bolt assemblages (43) which is fed from a store (26) for nut-and-

Gilberto Petraz

bolt assemblages.

13 - Platelayer waggon (10) for rails (18) as claimed in any claim hereinbefore, in the work-control cab (113) of which there is at least one means (38) to unscrew nuts (45) which cooperates with at least one nut guide entry (42).

14 - Platelayer waggon (10) for rails (18) as claimed in any claim hereinbefore, in which there is at least one guide entry (39) for bolts (44) in the neighbourhood of the means (38) to unscrew nuts.

15 - Platelayer waggon (10) for rails (18) as claimed in any claim hereinbefore, in which the guide entry (39) for bolts (44) feeds at least one guide (32) for bolts.

16 - Platelayer waggon (10) for rails (18) as claimed in any claim hereinbefore, in which the guide entry (42) for nuts (45) feeds at least one guide (31) for nuts.

17 - Platelayer waggon (10) for rails (18) as claimed in any claim hereinbefore, in which the guide (33) for washers feeds at least one means (34) to shake and orient washers which co-operates with at least one guide (133) for oriented washers.

18 - Platelayer waggon (10) for rails (18) as claimed in any claim hereinbefore, in which at least one installation unit (63) is halted momentarily so as to carry out at least part of the work phase.

19 - Platelayer waggon (10) for rails (18) as claimed in any claim hereinbefore, which waggon (10) moves forward by at least the distance between the centres of two sleepers (19) on each occasion.

20 - Platelayer waggon (10) for rails (18) as claimed in any claim hereinbefore, which waggon (10) moves forward by "n" times the distance between the centres of sleepers (19) on each occasion, "n" being a number other than one, and the installation units recover progressively the "n" times the number of such distance between centres.

21 - Platelayer waggon (10) for rails (18) as claimed in any claim hereinbefore, which waggon (10) is clamped to the rails (18) after each forward movement.

22 - Platelayer waggon (10) for rails (18) as claimed in any of Claims 1 to 18 inclusive, which waggon (10) moves forward continuously.

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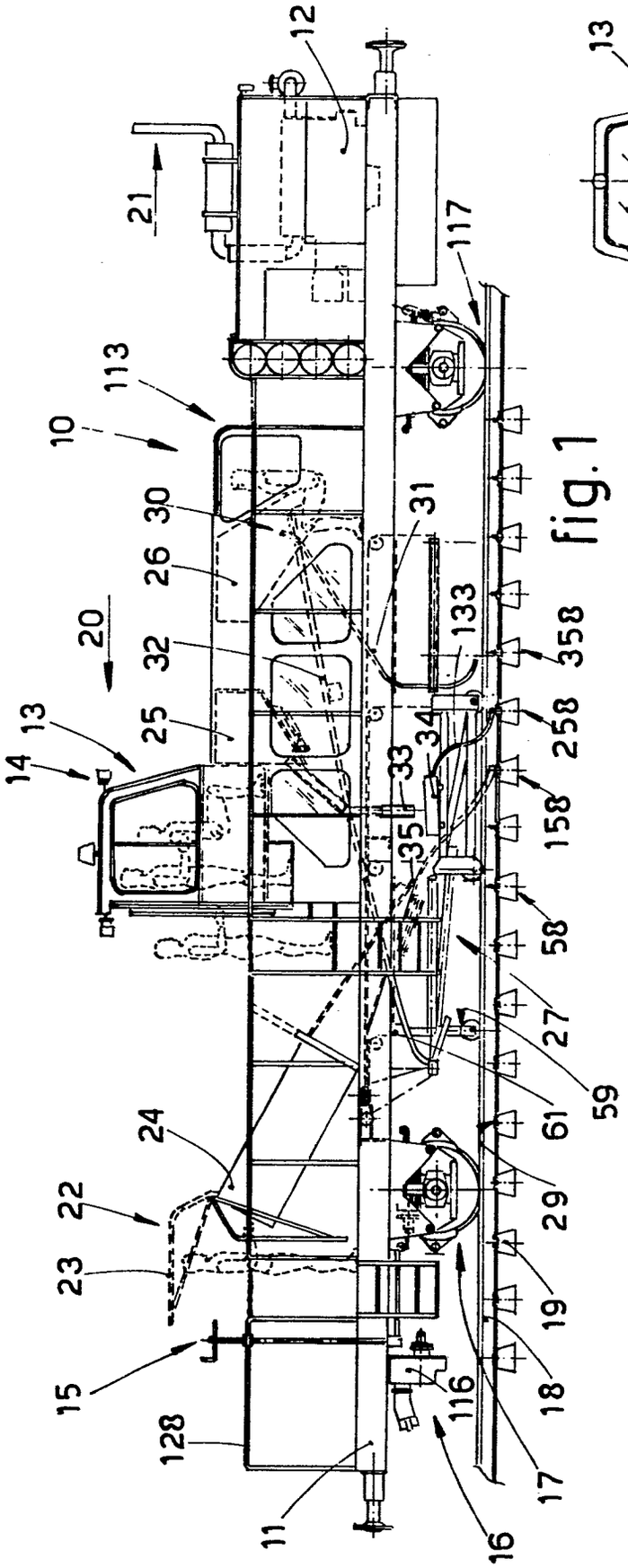


fig.1

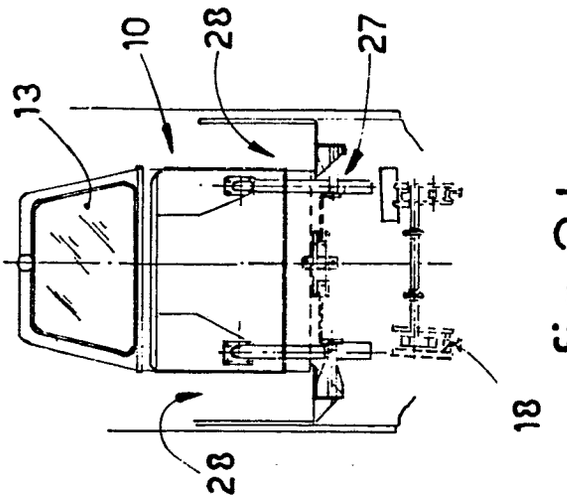


fig.2b

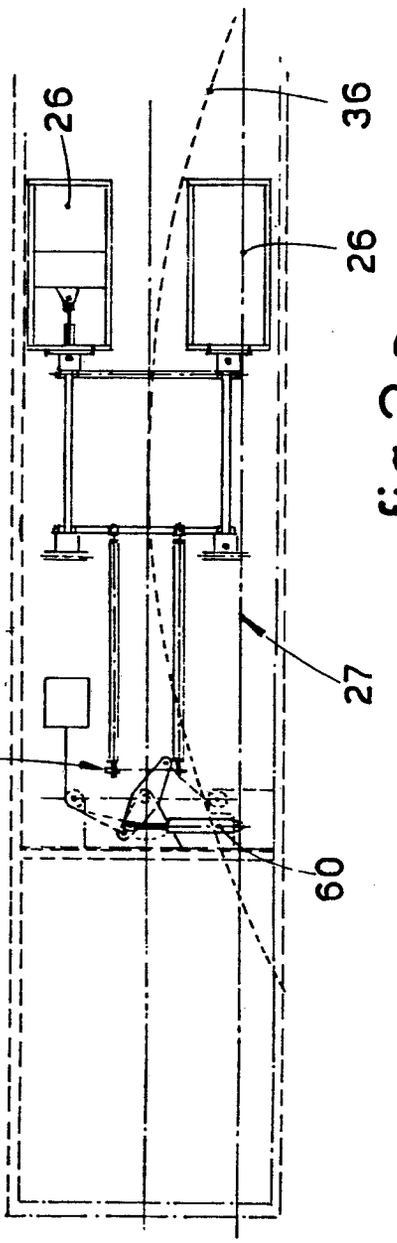
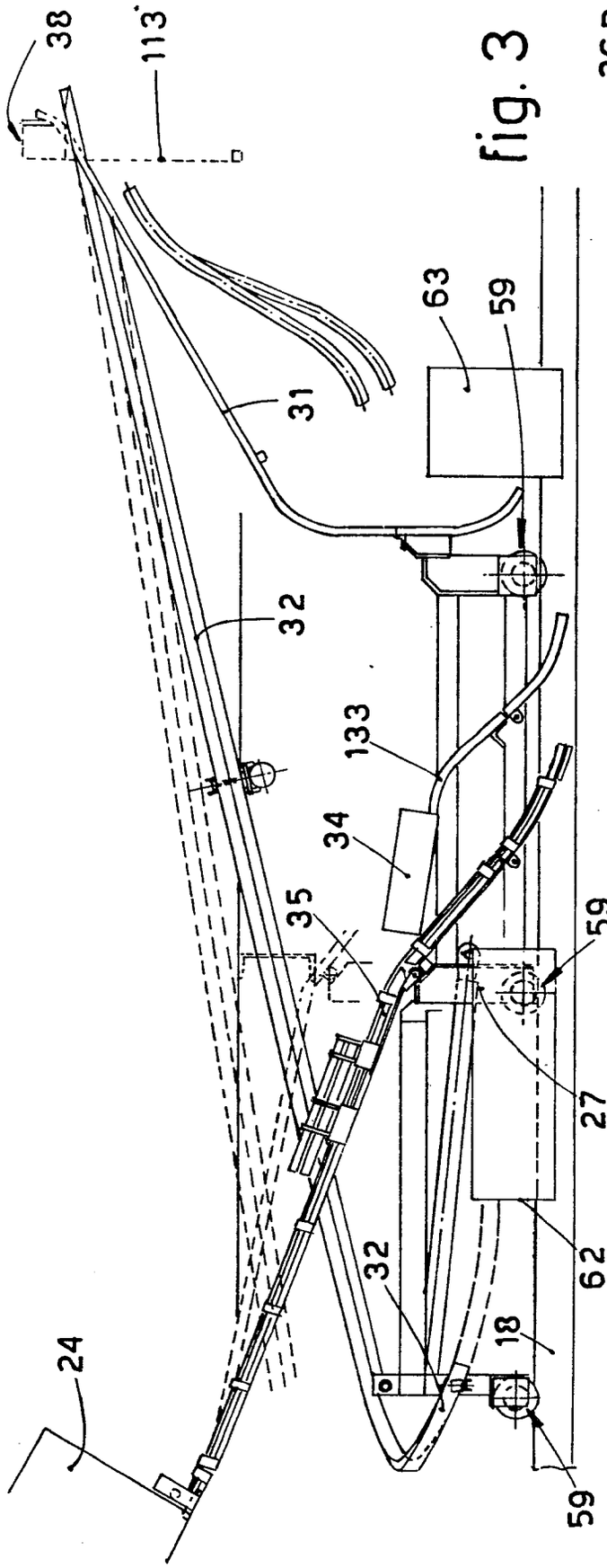


fig.2a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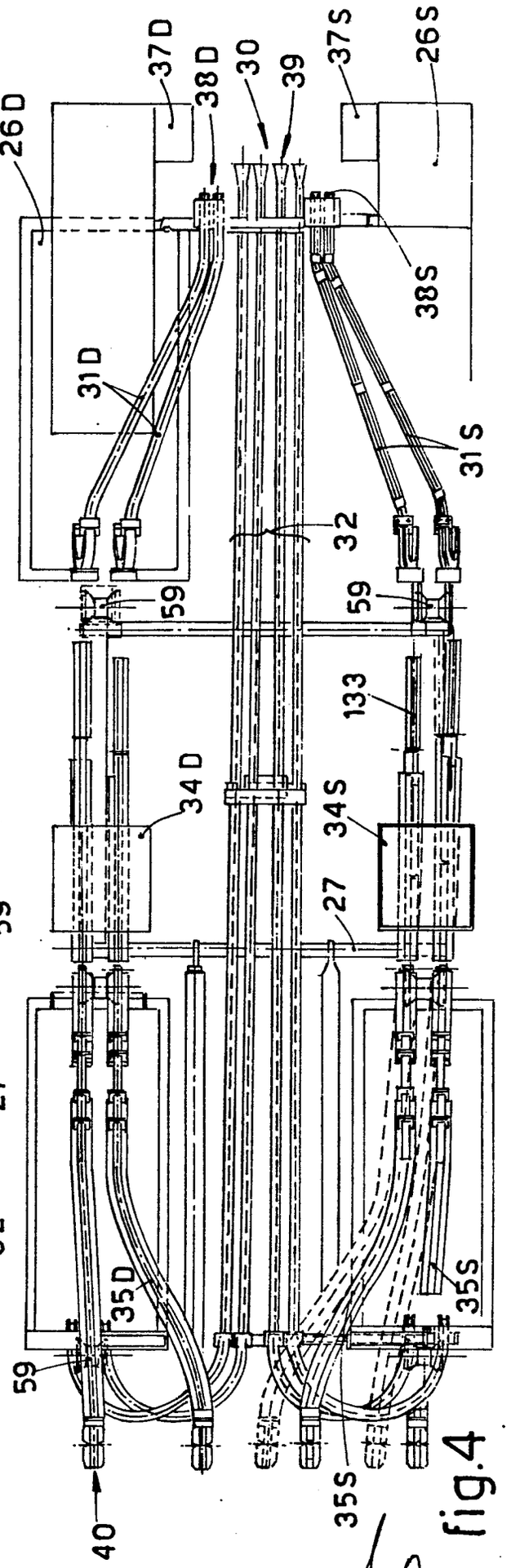
24

fig. 3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26D
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35S
59
35S
40

fig.4

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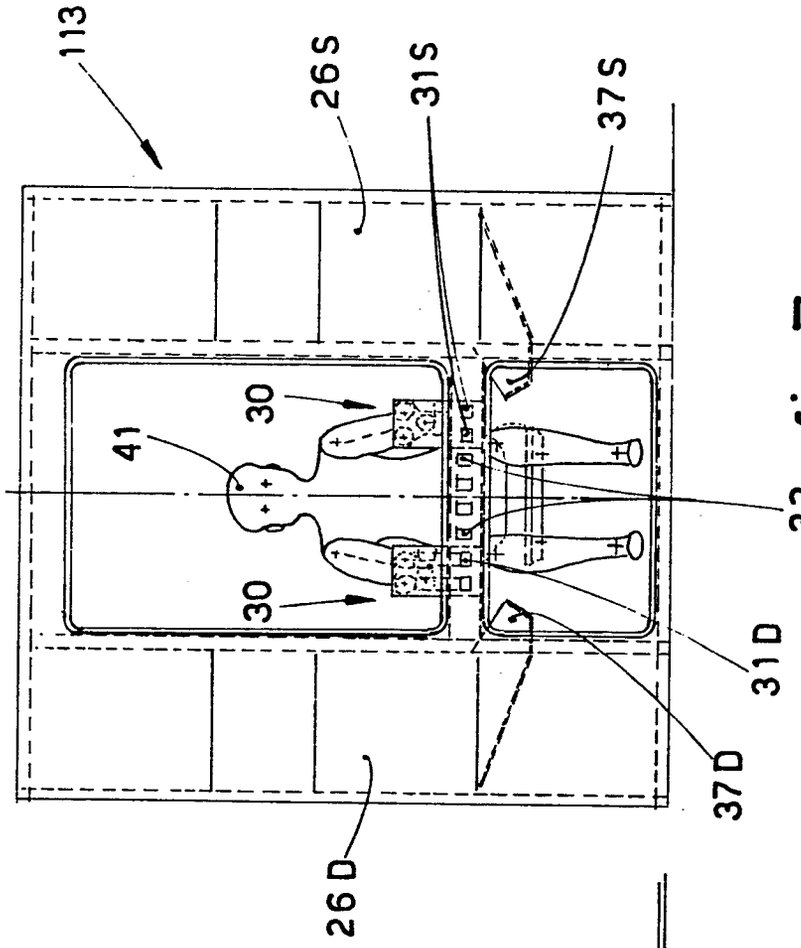

fig.7

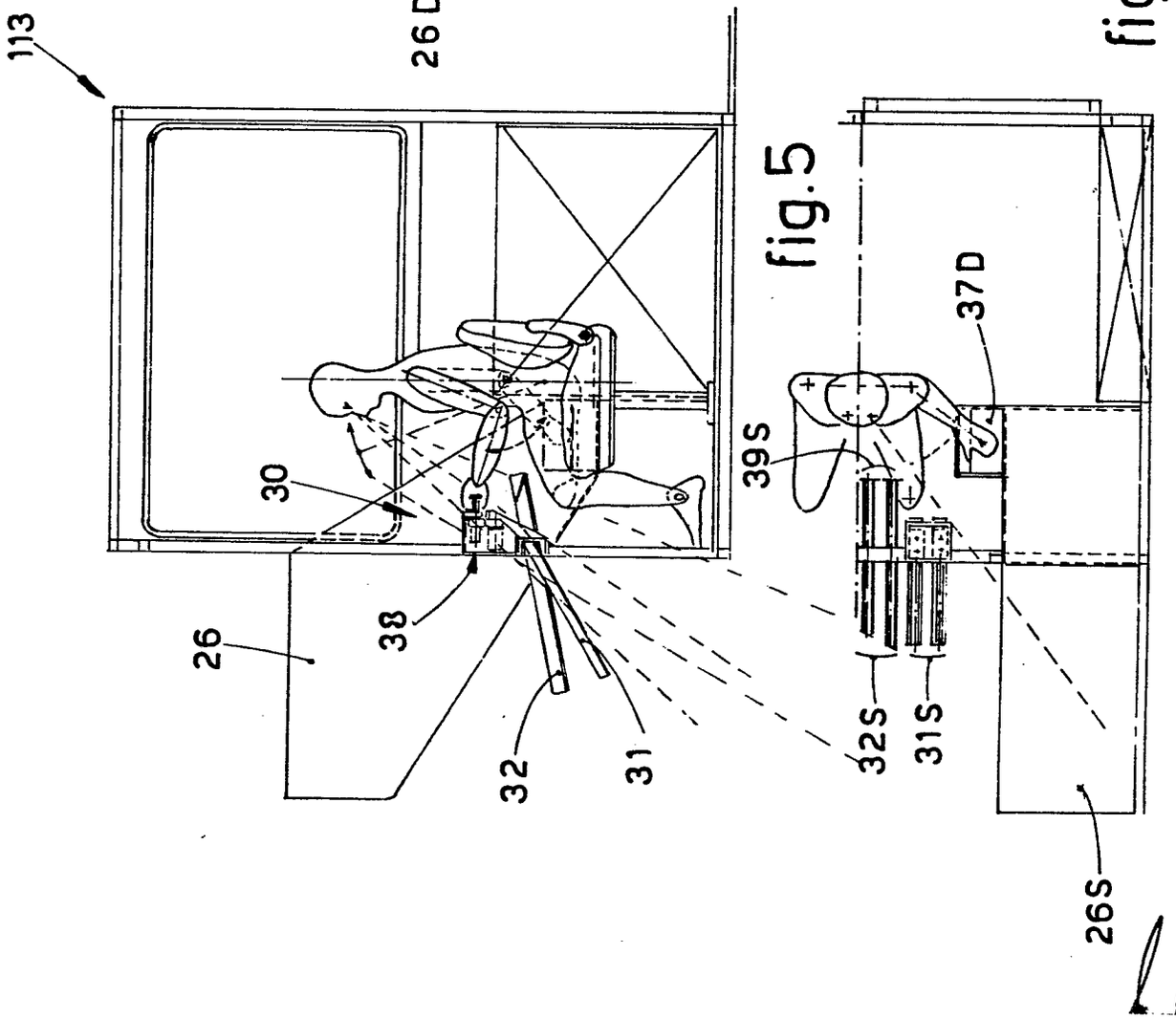

fig.5

fig.6

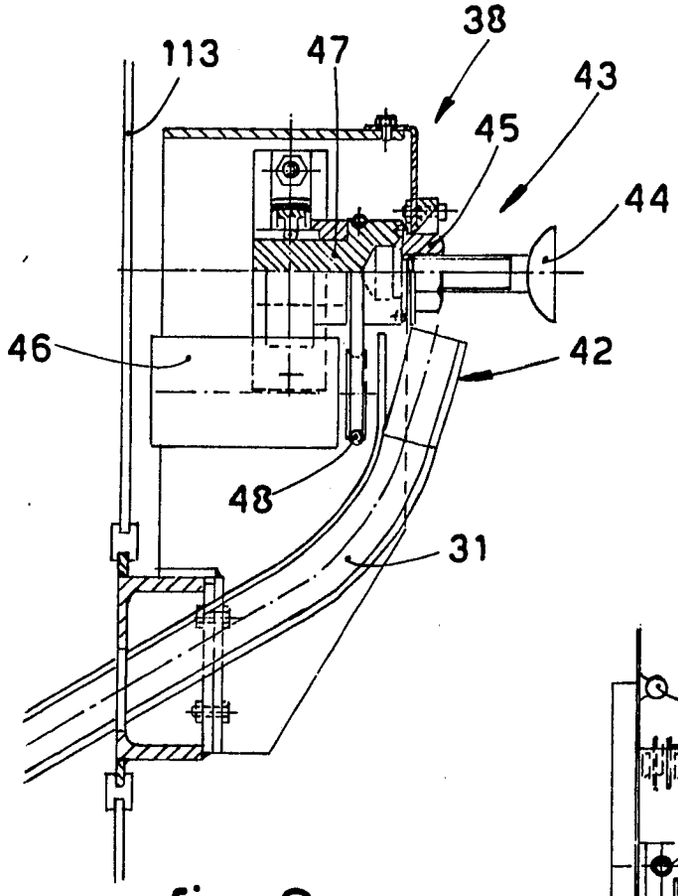

fig. 8

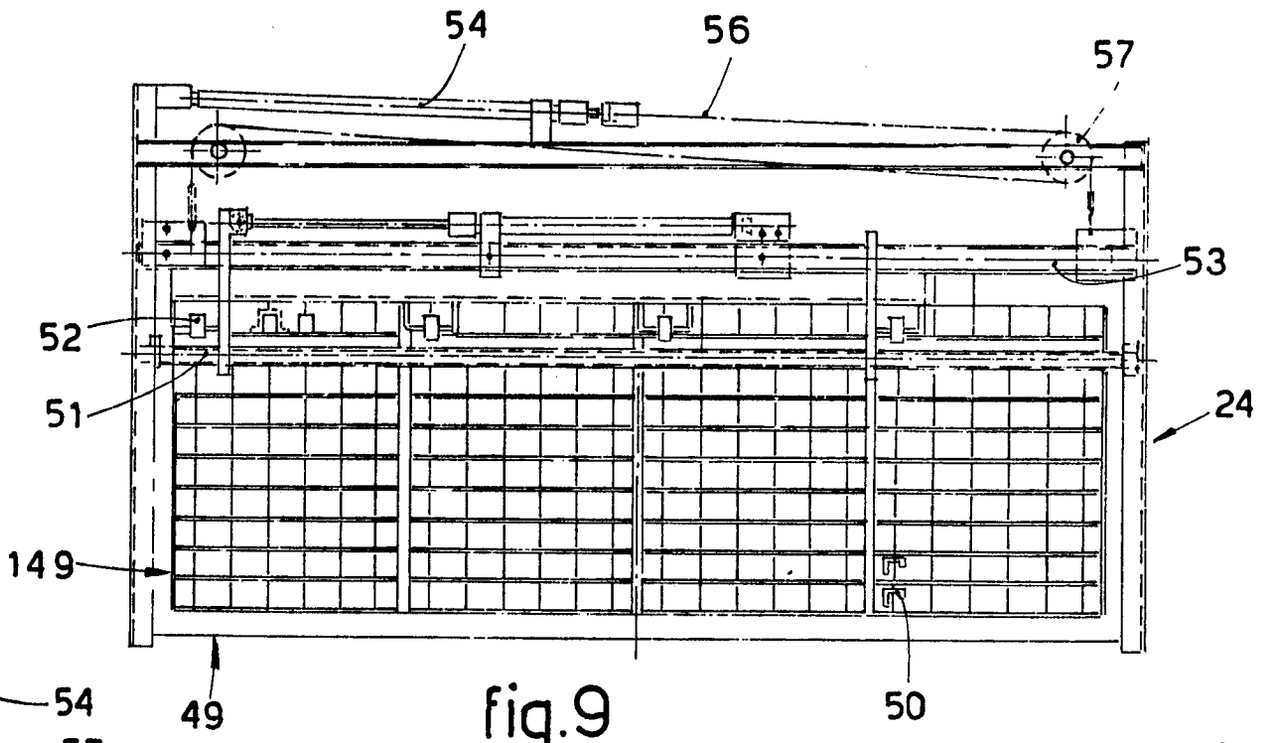

fig.9

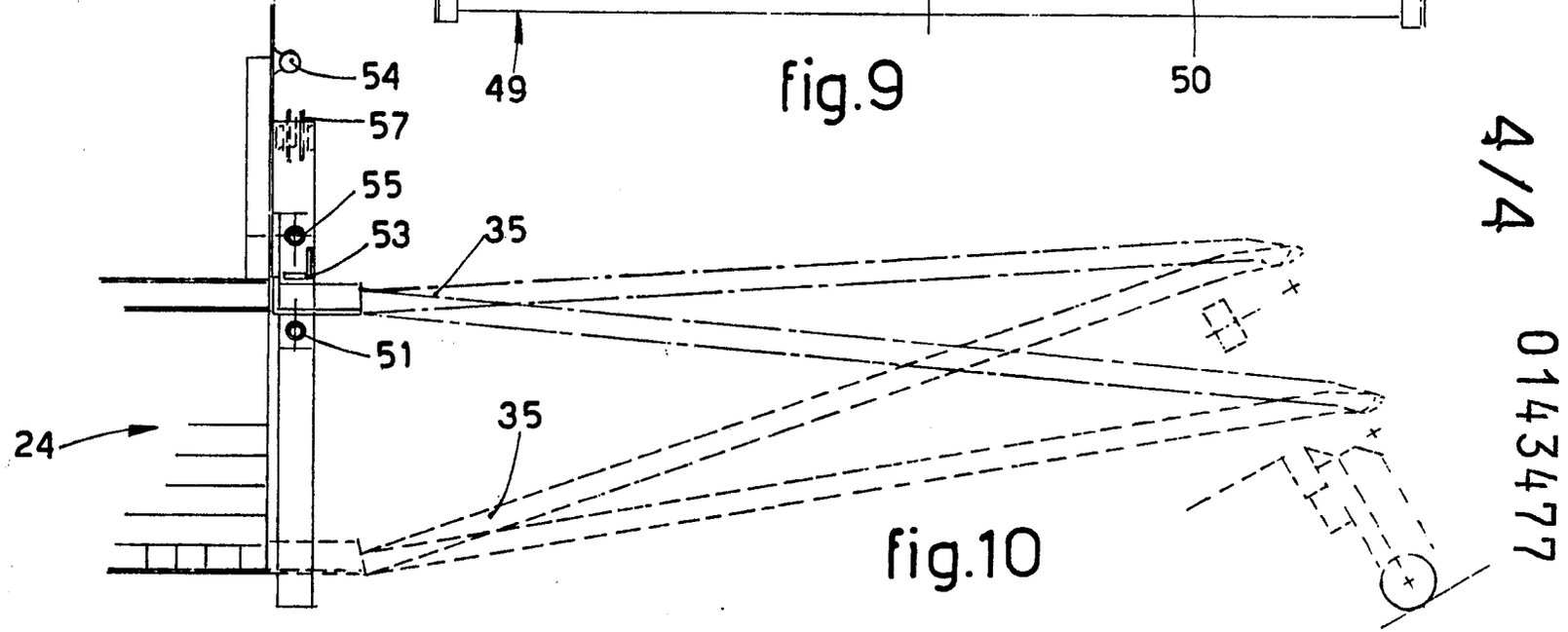

fig.10

4/4

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EUROPEAN SEARCH REPORT

EP 84 20 1392

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A,D	FR-A-2 118 601 (F. PLASSER) * Page 1, lines 1-16; page 2, lines 5-35; page 4, lines 17-37; page 5, lines 1-13; page 6, lines 34-37; page 7, line 1; figures 1-3 *	1	E 01 B 29/24
A,D	US-A-3 841 221 (A.M. DIERINGER et al.) * Column 1, lines 9-31, 68; column 2, lines 1-49, 57-64; column 3, lines 8-12; column 6, lines 19-39; figure 1 *	1,5-7, 11,19, 20	
A,D	GB-A-2 092 647 (PANDROL Ltd.) * Page 1, lines 3-9, 24-35, 82-127; page 3, lines 3-10, 119-126; page 4, lines 79-97; page 5, lines 56-74; figures 1,2,5,7,13,14 *	1-5, 11,19, 20	TECHNICAL FIELDS SEARCHED (Int. Cl.4) E 01 B
A,D	FR-A-2 118 602 (F. PLASSER) * Page 1, lines 1-11, 36-37; page 2, lines 1-23; page 5, lines 10-25; page 7, lines 20-37; figures 1-4 *	1,13	

-/-

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	11-02-1985	RUYMBEKE

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DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A,D	FR-A-2 410 088 (CANRON, INC.)		
A,D	US-A-3 257 962 (R.B. DOORLEY)		

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
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