PATENT SPECIFICATION (11) 1585447

1585447

(21) Application No. 10724/78 (22) Filed 17 March 1978 (19)
(31) Convention Application No. 1998/77 (32) Filed 22 March 1977 in
(33) Austria (AT)
(44) Complete Specification published 4 March 1981
(51) INT. CL.³ E01B 27/10
(52) Index at acceptance
E1G 426 428 GD

(54) A CONVEYOR CHAIN ARRANGEMENT, MORE PARTICULARLY FOR BALLAST BED CLEANING MACHINES

(71) We, FRANZ PLASSER BAHNBAU-MASCHINEN-INDUSTRIEGESELLSCHAFT MBH, of 3 Johannesgasse, Vienna 1, Austria, an Austrian Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a conveyor chain arrangement, particularly for ballast cleaning machines, comprising a unit for taking up and, optionally, distributing and reintroducing bedding materials in the region of tracks, track branches, switches or the like, which includes a polygonal linkage formed by two longitudinal chain guide paths and at least one transverse flight arranged in the region where the bedding ballast is taken up and an endless conveyor or clearing chain guided in said polygonal linkage.

In known conveyor chain arrangements for taking up, distributing and reintroducing and, in some cases, even for separating bedding materials (as described in British Patent Specifications Nos. 1,494,034 and 1,520,796), the endless conveyor or clearing chain which is guided over several guide rollers in the polygonal linkage spans the region where the bedding ballast is taken up at its lower end extending transversely of the longitudinal axis of the machine and, at its two sides, extends in longitudinal chain guide paths pivotally arranged on either side of the machine. In this known arrangement, the so-called empty longitudinal chain guide path, i.e. the longitudinal chain guide path in which the chain travels from the point at which the ballast is discharged onto the cleaning sieve back to the transverse flight and in which therefore no bedding ballast is transported, can be pivoted transversely of the longitudinal axis of the machine by means of hydraulic cylinder-and-piston assemblies arranged substantially in the upper third of this empty longitudinal chain guide path to such an extent that about 8 to 9 transverse chain guide flight sections can be added to lengthen the transverse flight. On the side of the empty longitudinal chain guide path, the transverse flight can now be lengthened to such an extent that the ballast in a laterally adjacent longitudinal section of the ballast bed, for example in a switch in the region of the branching rail, can also be simultaneously taken up and cleaned in one operation. This machine has proved to be extremely successful in practice so that ballast in the region of switches can now also be taken up and cleaned by machine. However, in stations or at junctions, where successive switches with rails branching off to the right or left have to be worked on, difficulties are often encountered as a result of the fact that the clearing width can only be extended to one side. For this reason, it is also necessary to turn the machine through 180° in order to be able to carry out the necessary work on the track, giving rise to disadvantages in terms of organisation and progress of work, particularly in view of the relatively short intervals between trains in which work can be carried out.

The object of the present invention is to provide a conveyor chain arrangement of the kind referred to above which whenever necessary can be adapted quickly and without significant outlay to any regions of ballast or parallel tracks of the type encountered in practice and, in particular, to widening regions of ballast or parallel track.

According to the invention, this object is achieved surprisingly easily in that, for selectively taking up ballast from the ballast bed extending to the left or to the right or widening from the working track, at least the lower ends of the two longitudinal chain guide paths, where they are connected to the transverse flight, are so mounted as to be laterally pivotable and displaceable transversely of the longitudinal axis of the machine by means of associated lateral adjustment drives, additional chain members and/or transverse flight sections being provided for use as and when required for varying the clearing width.

By means of the conveyor chain arrangement according to the invention, it is possible for the first time to take up ballast from beneath a rail or from a region of track and,

at the same time, from a section of bedding or track branching off to the left or right therefrom or extending adjacent thereto. In the case of successive right-hand or left-hand switches, it is now possible, without turning the machine through 180°, to work on the switches, particularly while the machine is in use on the straight main track, the ballast simultaneously being taken up from below the track branching off in a curve to the left or right with the transverse flight optionally being lengthened towards one or other of the longitudinal chain guide paths. The conveyor chain arrangement, which overhangs fairly considerably to the right or left, can be guided relatively easily from the structural point of view because the machine is able in either case to travel along the straight main track.

In one advantageous embodiment of the invention, the two longitudinal chain guide paths are each so mounted that they can be pivoted and/or displaced at least by an amount corresponding to the length of a sleeper and are separated by a transverse interval at least corresponding to the length of a sleeper, preferably at least up to about the middle of the longitudinal chain guide paths. By virtue of the considerable displacement and/or pivoting range of the longitudinal chain guide paths, it is now advantageously possible for the first time simultaneously to take up ballast from beneath two adjacent tracks, i.e. the working track along which the machine advances, and a track running alongside the working track on the right or left. In addition, it is possible, where the longitudinal chain guide paths are separated by a transverse interval substantially corresponding to the length of a sleeper up to about their midway point, to use the conveyor chain arrangement in conjunction with machinery for taking up and laying tracks where parts of the track are conveyed through the cross-sectional zone defined by the chain.

According to another feature of the invention, the longitudinal chain guide paths formed by so-called conveying troughs are arranged for displacement transversely of the longitudinal axis of the machine in the base plane of the conveying troughs and are connected at the ends to the preferably hydraulically operable lateral adjustment drive. The transverse displacement of the longitudinal chain guide paths affords the advantage that the transverse chain guide path or flight can be extended in a line because, when the clearing width is enlarged, the ends of the longitudinal chain guide paths remain in substantially the same position looking across the machine. In addition, it is possible in this way to keep the longitudinal chain guide paths at the distance corresponding to the increased clearing width, even in the region of the upper transverse chain guide path so that it is possible, for example when the conveyor chain arrangement according to the invention is used in conjunction with a switch relaying machine, for the parts of track taken up to be conveyed through the cross-sectional zone defined by the conveyor or clearing chain. In particular, it is also best to arrange the lateral adjustment drives at the ends of the longitudinal chain guide paths because, in this way, the flexural stresses to which the longitudinal chain guide paths are subjected during the adjusting operations for varying the clearing width are fairly minimal.

In another variant of the invention, the upper ends of the longitudinal chain guide paths remote from the transverse flight are connected to a transverse chain guide path which incorporates the ballast discharge point and which may optionally be arranged in front of a cleaning sieve and are also displaceable along guide paths or rods in the base plane of the conveying trough transversely of the longitudinal axis of the machine by means of the lateral adjustment drives. The use of a transverse chain guide path connecting the upper ends of the longitudinal chain guide paths promotes the distribution over the width of the machine of discharge points for the ballast taken up onto the cleaning sieve following the transverse chain guide path. In addition, the use of guide paths or rods is of advantage, particularly in regard to maintenance and service life, in view of the extremely rough conditions and severe forces which are encountered in the use of a cleaning machine.

It is also possible in accordance with the invention for the two longitudinal chain guide paths to be mounted to pivot transversely of the longitudinal axis of the machine about axes extending substantially perpendicularly of the base of the conveying trough at their upper ends facing the transverse chain guide path, the arrangement being in particular such that each longitudinal chain guide path has its own lateral adjustment drive connected to the machine frame. This embodiment of the conveyor chain arrangement provides for a relatively narrow, space-saving construction in the region of the upper ends of the longitudinal chain guide path and has the advantage that the clearing width can be varied simply by lengthening the transverse flight. In particular, the provision of separate lateral adjustment drives for each longitudinal chain guide path is also of advantage because these drives can be used both for pivoting the longitudinal chain guide paths in order to vary the clearing width and also for positioning and laterally adjusting the longitudinal chain guide paths when the machine is in

operation.

According to the invention, it is also possible with advantage for the longitudinal chain guide paths to consist of two pivotally interconnected main sections, these two main sections, joined by a shaft extending substantially perpendicularly of the base of the conveying trough, being designed to pivot relative to one another transversely of the longitudinal axis of the machine under the action of a pivoting drive, particularly a hydraulically operated pivoting drive. This enables the clearing width to be effectively adapted to the particular conditions prevailing, in addition to which relatively short adjustment paths are sufficient for the pivoting drives. In addition, it is possible in conjunction with an additional lateral displacement or pivoting movement of the entire longitudinal chain guide path transversely of the longitudinal axis of the machine to obtain an advantageous distribution of the individual adjusting paths of the lateral adjustment drives and pivoting drives.

One particularly advantageous embodiment of the invention is characterised in that both longitudinal chain guide paths are pivotal about axes extending substantially perpendicularly of the base of the conveying trough in the plane thereof and are also displaceable transversely of the longitudinal axis of the machine. In this way, it is possible, even in the event of major variations, particularly enlargements to the clearing width, for the ballast to be taken up for example even from two parallel tracks, such as in stations or the like, without adversely affecting the position of the transverse flight. Even with considerable clearing widths, it is advantageously possible in this way for the ballast taken up and cleaned to be reintroduced without interference.

In another advantageous embodiment of the invention, the two longitudinal chain guide paths can be pivoted and/or displaced independently of one another. In this way, it is sufficient to use one cylinder per longitudinal chain guide path for laterally adjusting the longitudinal chain guide paths and for varying the clearing width.

According to the invention, it can also be of advantage for the two longitudinal chain guide paths to be pivotable and/or displaceable together with the transverse flight because in this way it is possible, once the clearing width has been fixed, for the entire clearing chain arrangement to be displaced transversely of the longitudinal axis of the machine during the clearing operation in order to prevent it from colliding with fixed obstacles, such as overhead contact line poles or railway platforms.

In another highly advantageous embodiment of the invention, the conveying troughs of the transverse chain guide path and/or the transverse flight sections are designed to telescope for varying the clearing width as fixed transversely of the longitudinal axis of the machine. In this way, there is no need to carry any additional transverse flight or transverse path sections, in addition to which the clearing width can also be infinitely and substantially continuously varied. Another advantage of this embodiment is that it eliminates the stoppages which would otherwise be required for installing additional transverse path or flight sections so that, in overall terms, the performance of the machine in widening regions of ballast can be increased.

Finally, for adaptation to different clearing widths, that part of at least one of the two preferably hydraulically operated lateral adjustment drives which is pivotally connected to the machine frame or to an intermediate support, for example the cylinder of a piston-and-cylinder drive, may with advantage be mounted for adjustment longitudinally of the machine and is preferably connected to a longitudinal displacement drive, particularly a hydraulically operated longitudinal displacement drive. In this way, it is possible for the lateral adjustment drive associated in particular with the longitudinal chain guide path in which the ballast taken up is carried upwards, to be pivotally connected to the lower end thereof so that the flexural stresses encountered during lateral adjustment while the machine is in operation are minimal. At the same time, the lateral adjustment drive remains within the permitted clearance profile of the machine when the longitudinal chain guide path is as it were tucked in, even despite this wide adjustment range, so that it is possible in particular to carry out adjustment work while the machine is in operation.

Several examples of embodiment of the invention are described in detail in the following with reference to the accompanying drawings, wherein:

Figure 1 is a side elevation of a conveyor chain arrangement according to the invention on a ballast cleaning machine.

Figure 2 is a plan view of the conveyor chain arrangement and the ballast cleaning machine shown in Figure 1 at work on a widening area of track, i.e. a switch.

Figure 3 is an elevation of part of the transverse flight in the base plane of the conveyor in the direction of arrow III in Fig. 2.

Figures 4 to 8 are diagrammatic perspective views of various other embodiments of conveyor chain arrangements according to the invention with one-part and multipart longitudinal chain guide paths or sections displaceable and/or pivotal in the base plane of the conveying trough.

Figures 1 and 2 show a ballast cleaning machine 1 on whose chassis 2 a conveyor

chain arrangement 3 is mounted. This conveyor chain arrangement 3 consists of two longitudinal chain guide paths 4,5 which are arranged on both sides of the cleaning machine and which form a polygonal linkage together with a transverse flight 7 connecting the lower ends 6 of these longitudinal paths 4,5 situated in the region where the ballast is taken up, and of a conveyor or clearing chain 8 which is guided in this polygonal linkage. Each of the longitudinal chain guide paths 4,5 is formed by a conveying trough which comprises a base 9 and two side walls 10. At their upper ends 13, which are situated opposite a discharge point 11 for the ballast taken up and a cleaning sieve 12, the two longitudinal chain guide paths 4,5 are mounted on universal bearings 14 on the chassis 2 so that they can be pivoted both vertically and laterally. In addition, for lateral displacement transversely of the longitudinal axis of the machine and for vertical displacement relative to the bedding ballast, the longitudinal chain guide path 5 is linked to the chassis 2 by lateral and vertical adjustment drives 15 and 16 formed by hydraulic piston-and-cylinder assemblies. The bearing 17 of the lateral adjustment drive 15 situated opposite the chassis 2 is mounted for displacement along a guide arrangement 18 formed by a longitudinal guide extending longitudinally of the machine by means of a longitudinal adjustment drive 19. Accordingly, even when the lateral adjustment drive 15 is pivotally connected to the lower end 6 of the longitudinal chain guide path 5, the longitudinal chain guide path 5 can be laterally swung out into the position shown in chain lines whilst the lateral adjustment drive 15 remains within the permitted clearance profile, even in the working position shown in solid lines and in the tucked-in in-transit position of the longitudinal chain guide path 5. By virtue of the fact that the lateral adjustment drive 15 is pivotally connected to the lower end 6 of the longitudinal chain guide path 5, the flexural stresses to which this longitudinal chain guide path is subjected during the lateral adjustment process, particularly during the lateral pivoting of the polygonal linkage when the machine is in operation, to avoid colliding with fixed obstacles situated alongside the ballast bed are kept fairly minimal. This is important above all because, in addition to the weight of the conveyor or clearing chain 8, the longitudinal chain guide path 5 also has to bear the weight of the bedding material being transported to the cleaning sieve 12.

The longitudinal chain guide path 4 is connected to the chassis 2 through lateral and vertical adjustment drives 20 and 21 formed by hydraulic piston-and-cylinder assemblies, the lateral and vertical adjustment drives 20, 21 each being fixedly mounted to pivot on the chassis. In the case of the lateral adjustment drive 20, this is possible insofar as it is arranged at the upper end 13 of the longitudinal chain guide path 4, merely being required for pivoting the longitudinal chain guide path 4 during the installation or removal of transverse flight sections 22, 23 of which the transverse flight 7 is composed.

In addition, the longitudinal chain guide path 4 consists of two sections which are displaceable relative to one another in the longitudinal direction of the conveyor chain by means of a hydraulically operated tensioning cylinder 24 for tensioning and shortening or lengthening that part of the conveyor or clearing chain 8 which is guided in this longitudinal chain guide path 4.

The transverse flight section 22 has a length which is sufficient to enable it to take up the bedding ballast below the working track 25. By means of the additional transverse flight sections 23, the transverse flight 7 can be extended to the length illustrated so that the ballast in the widening region of track (switch) can also be taken up at the same time. As shown in particular in Fig. 2, the adjoining ends of the additional transverse flight sections 23 are inclined towards one another at a small angle of about 3° in the direction of the upper ends 13 of the conveyor chain arrangement 3. Thereby bridging the gap between the lower ends 6 of the longitudinal chain guide paths 4,5 in the longitudinal direction of the machine caused by the longitudinal chain guide path 4 being swung out laterally.

As indicated in chain lines, the transverse flight section 22 can be extended both in the direction of the longitudinal chain guide path 4 and in the direction of the longitudinal chain guide path 5 by virtue of the special construction of the lateral adjustment drive 15. In this way, it is possible simultaneously to work on regions of track branching off either to the right or to the left from a straight main track.

The cleaning sieve 12 provided with a vibrations drive is followed by conveyor belts 27 pivotal transversely of the longitudinal axis of the machine for distributing and reintroducing the cleaned bedding materials and by conveyor belts 28 for carrying off the waste spoil. Both the conveyor belts 27 can be swung out transversely of the longitudinal axis of the machine to such an extent that, even if the transverse flight is extended to its maximum length, the cleaned ballast can still be introduced in satisfactory distribution. In addition, the chassis 2 is provided both with ontrack undercarriages 29 and also with off-track crawler-type undercarriages 30 and with auxiliary undercarriages 31 arranged at the ends of the chassis so that the ballast cleaning machine 1 is able to travel and

operate both on the track and off the track.

Fig. 3 shows that the adjoining ends of the transverse flight sections 22, 23 of the transverse flight 7, as seen in the direction of the longitudinal chain guide paths, converge from the upper side facing the chassis 2 towards ground level, i.e. towards the ballast region 26 to be worked on, in other words they do not extend parallel to one another, but instead include an angle of preferably 3°. In this way, it is possible to produce a flat ballast bed despite the inclination of the base plane of the conveying trough relative to the plane of the track and the curvature of the transverse flight 7, as shown in Fig. 1. This slight inclination of the individual transverse flight sections 22, 23 towards one another does not in any way interfere with the guiding of the conveyor or clearing chain 28 made up of individual chain members 32. Since the conveyor chain 8 is designed both for loosening and for clearing and also for elevating the bedding materials to be taken up in the longitudinal chain guide path 5, every second chain member 32 is provided with a scraper blade 33 which may optionally be provided with hard-metal scraper fingers.

The transverse flight sections 22, 23 are joined by means of guide members 34 which engage with dove-tail-like projections in dove-tail guides arranged at the ends of the transverse flight sections. Fixing is by means of screw bolts 35.

Fig. 4 shows a conveyor chain arrangement 3 in which the two longitudinal chain guide paths 4,5 are displaceable in the plane formed by the bases 9 of their conveying troughs transversely of the longitudinal axis of the machine. In this embodiment, the upper ends 13 of the longitudinal chain guide paths 4,5 are joined by means of a transverse chain guide path 38 formed by conveying troughs 36, 37 displaceable telescopically in one another. A ballast discharge point 39 is situated in the conveying trough 37 in the region of the cleaning sieve 12.

The transverse flight 7 also consists of several transverse flight sections 40, 41 telescopically displaceable relative to one another. Lateral adjustment drives 42 and 43 are provided between the two longitudinal chain guide paths and the conveying troughs 36 and 37. In addition, the lateral interval separating the longitudinal chain guide path 5 from the machine frame 45 can be fixed by means of additional lateral adjustment drives 44 which at one end are pivotally mounted on the machine frame 45. In order to increase the clearing width of the transverse flight 7 to such an extent that two parallel tracks, i.e. the working track 25 and an adjacent track 46 situated on the left thereof, can be worked on at the same time, the upper ends 13 of the longitudinal chain guide paths 4,5 are mounted to pivot about pins extending perpendicularly of the bases 9 of the conveying troughs. This pivotability is diagrammatically indicated by chain lines for the longitudinal chain guide path 4. If the length of the transverse flight sections 40, 41 displaceable telescopically in one another is not sufficient in the case of large clearing widths, additional transverse flight sections 23 may be added in this case, too, for lengthening the transverse flight 7.

As further indicated by means of the arrows 48, the ballast is taken up by the conveyor or clearing chain 8 in the region of the transverse flight 7, elevated in the longitudinal chain guide path 5 and delivered to the clearing sieve 12 at the ballast discharge point 39 in the region of the transverse chain guide path 38 during the continuous advance of the conveyor chain arrangement 3 in the working direction (arrow 49).

Figure 5 shows an embodiment of the conveyor chain arrangement 3 which encloses a substantially rectangular cross-sectional zone. For increasing or enlarging the clearing width in order for example to enable ballast to be taken up simultaneously from beneath two adjacent tracks 25 and 46, the longitudinal chain guide paths 4,5, as indicated in solid lines and chain lines, respectively, are arranged to be pivoted transversely of the longitudinal axis of the machine about shafts 51 extending substantially perpendicularly of the bases 9 of the conveying troughs by means of separate lateral adjustment drives 50 supported on the machine frame 45. The upper ends 13 of the longitudinal chain guide paths 4,5 are connected by means of a transverse chain guide path 38 in which ballast discharge points 39 are situated for situated for carrying the ballast taken up to a sieve or to distributing and reintroducing units.

Fig. 6 shows a conveyor chain arrangement 3 which encloses a substantially pentagonal cross-sectional area. The two longitudinal chain guide paths 4,5 may be pivoted independently of one another transversely of the longitudinal axis of the track by an amount corresponding to the length of a sleeper by means of separate lateral adjustment drives 50 which are mounted on the machine frame 45. When only the longitudinal chain guide path 5 is pivoted, the transverse flight 7 follows a curved path. If both the longitudinal chain guide paths 4 and 5 are laterally pivoted, for example for cleaning a three-way switch, it is possible to obtain a rectilinear trend of the transverse flight 7 (shown in chain lines). The ballast taken up by the clearing or conveyor chain (circulating in the direction of the arrow 48) is discharged at the upper end of the longitudinal chain guide paths 4 and 5. To this end, part of the side wall of the conveying trough is removed.

In this case, the conveyor or clearing chain is driven by a central drive positioned at the upper end of the longitudinal chain guide paths. By contrast, in the conveyor chain arrangement shown in Fig. 5, a drive is arranged for example in the region of each of the shafts 51.

The described conveyor chain arrangement 3 may be used with particular advantage in conjunction with a relaying train for dismantling and installing sections of track, providing the longitudinal chain guide paths 4, 5 are separated from one another in their central region 52 by a transverse interval which at least corresponds to the length of a sleeper because, in this way, track panels or sleepers for example can be transported in their installation position through the cross-sectional area enclosed by the conveyor chain arrangement 3.

Fig. 7 shows a conveyor chain arrangement 3 in which the longitudinal chain guide paths 4,5 can be both displaced transversely of the longitudinal axis of the machine and also pivoted in the base plane of the conveying trough. To this end, the upper transverse chain guide path 38 consists of two telescoping conveying troughs 53, 54 which are displaceable transversely of the longitudinal axis of the machine by lateral adjustment drives 55 of which only one is shown and which are mounted on the machine frame 45. Between each of the conveying troughs 53, 54 and the longitudinal chain guide paths 5, 4 are provided lateral pivoting drives 56 by means of which, as shown for the longitudinal chain guide path 5, the longitudinal chain guide paths can be pivoted from the rest position shown in chain lines into the position indicated by a solid line about shafts 51 extending substantially perpendicularly of the base 9 of the conveying trough. The transverse flight 7 is lengthened by the introduction of additional transverse flight sections 23.

Finally, Fig. 8 shows a variant of a conveyor chain arrangement 3 in which the longitudinal chain guide paths 4,5 consist of pivotally interconnected main sections 57, 58 which, by means of a pivoting drive 60, can be moved from the normal position illustrated for the longitudinal chain guide path 5 into the extended position illustrated for the longitudinal chain guide path 4 about a shaft 59 extending substantially perpendicularly of the base 9 of the conveying trough. The upper ends 13 of the two longitudinal chain guide paths 4,5 can be moved in guide paths or on guide rods transversely of the longitudinal axis of the machine by means of lateral adjustment drives 61 which are each pivotally mounted on the machine frame 45, so that the transverse flight 7 can be extended by several additional transverse flight sections 23 for simultaneously taking up the bedding ballast from a region 26 widening from the working track 25.

The construction of, in particular, the lateral adjustment drives, the pivoting drives and the like is of course by no means confined to the use of hydraulic cylinder-and-piston arrangements, instead it is possible to use any other adjustment mechanisms, for example cables or spindle/travelling nut assemblies or the like. Likewise, the longitudinal chain guide paths 4,5 are pivotally connected at their lower ends 6 to the ends of the transverse flight 7 for adaptation to the various angular positions during pivoting of the longitudinal chain guide paths 4, 5, in other words the ends of the transverse flight 7 and the lower ends 6 of the longitudinal chain guide paths 4,5 are pivotal about shafts 62 extending substantially perpendicularly of the base 9 of the conveying trough (Figs. 1 to 8). In addition, the construction of the guide arrangement 18 (Figs. 1 and 2) may be modified as required. Instead of using a slide pin, it is also possible to use cables, roller guide assemblies or slides displaceable on guide posts. Instead of using the long-stroke lateral adjustment drive 15 illustrated, it is possible to use a lateral adjustment drive of shorter stroke. In that case, the lateral adjustment drive may either be fixedly arranged on a rigid lever arrangement, which is so mounted that it can be correspondingly displaced in the longitudinal direction of the machine and swung out laterally thereof, or may be so mounted as to be pivotable relative to the longitudinal axis of the machine by means of a drive.

As mentioned above, the machine frame in the illustrated embodiments is designed to travel along the working track 25 by means of the on-track undercarriages 29. In cases where the machine travels along the track on the crawler-type undercarriages 30, the working track 25 also includes the longitudinal section of bedding ballast which is exposed following the removal of a track and associated with that track. However, in either case, i.e. irrespective of whether the ballast cleaning machine 1 advances on or off the track, the fact that one or the other longitudinal chain guide paths 4 or 5 can be swung out means that ballast can be simultaneously taken up in a single operation both from the region of bedding situated below the machine and also from another section of bedding situated adjacent this region on the left or right thereof.

WHAT WE CLAIM IS:—

1. A conveyor chain arrangement, particularly for railway ballast cleaning machines, comprising a unit for taking up and, optionally, distributing and reintroducing bedding materials in the region of tracks, track branches, switches or the like, which includes

a polygonal linkage formed by two longitudinal chain guide paths and at least one transverse chain flight arranged in the region where the bedding ballast is to be taken up, and an endless conveyor or clearing chain guided in said polygonal linkage, characterised in that, for selectively taking up ballast from the ballast bed extending to the left or to the right or widening from the working track, at least the lower ends of the two longitudinal chain guide paths, where they are connected to the transverse flight, are so mounted as to be laterally pivotable and displaceable transversely of the longitudinal axis of the machine by means of associated lateral adjustment drives, additional chain members and/or transverse flight sections being provided for use as and when required for varying the ballast-clearing width.

2. A conveyor chain arrangement as claimed in Claim 1, characterised in that each longitudinal chain guide path is so mounted that it can be pivoted and/or displaced at least by an amount corresponding to the length of a sleeper, and the said longitudinal guide paths are separated, preferably up to at least about their central region, by a transverse interval at least corresponding to the length of a sleeper.

3. A conveyor chain arrangement as claimed in Claim 1, characterised in that the longitudinal chain guide paths are formed by conveying troughs and are arranged for displacement transversely of the longitudinal axis of the machine in the plane of the bases of the conveying troughs and are connected at their ends to the preferably hydraulically operable lateral adjustment drives.

4. A conveyor chain arrangement as claimed in Claim 3, characterised in that the upper ends of the longitudinal chain guide paths remote from the transverse flight are connected to an upper transverse chain guide path which incorporates a ballast discharge point and which may optionally be arranged in front of a cleaning sieve, and are also displaceable along guide paths or rods in the base plane of the conveying trough transversely of the longitudinal axis of the machine by means of the lateral adjustment drives.

5. A conveyor chain arrangement as claimed in Claim 1, characterised in that the two longitudinal chain guide paths are mounted to pivot transversely of the longitudinal axis of the machine about shafts extending substantially perpendicularly of the base of the conveying trough at their upper ends facing the upper transverse chain guide path, the arrangement being in particular such that each longitudinal chain guide path has its own lateral adjustment drive fixed to the machine frame.

6. A conveyor chain arrangement as claimed in any of Claims 1 to 5, characterised in that the longitudinal chain guide paths consist of two pivotally interconnected main sections, these two main sections, joined by a shaft extending substantially perpendicularly of the base of the conveying trough, being designed to pivot relative to one another transversely of the longitudinal axis of the machine under the action of a pivoting drive, particularly a hydraulically operated pivoting drive.

7. A conveyor chain arrangement as claimed in any of Claims 1 to 6, characterised in that both longitudinal chain guide paths are pivotable about shafts extending substantially perpendicularly of the base of the conveying trough in the plane thereof and are also displaceable transversely of the longitudinal axis of the machine.

8. A conveyor chain arranged as claimed in any of Claims 1 to 7, characterised in that the two longitudinal chain guide paths can be pivoted and/or displaced independently of one another.

9. A conveyor chain arrangement as claimed in any of Claims 1 to 7, characterised in that the two longitudinal chain guide paths can be pivoted and/or displaced together with the transverse flight.

10. A conveyor chain arrangement as claimed in any of Claims 1 to 9, characterised in that the conveying troughs of the upper transverse chain guide path and/or the transverse flight sections are designed to telescope for varying the clearing width setting transversely of the longitudinal axis of the machine.

11. A conveyor chain arrangement as claimed in any of Claims 1 to 10, characterised in that, for adaptation to different clearing widths, that part of at least one of the two preferably hydraulically operated lateral adjustment drives which is pivotally connected to the machine frame or to an intermediate support, for example the cylinder of a cylinder and piston drive, is mounted for adjustment longitudinally of the machine and is preferably connected to a longitudinal displacement drive, preferably a hydraulically operated longitudinal displacement drive.

12. A railway ballast-cleaning machine incorporating a conveyor chain arrangement as claimed in any of the preceding claims.

13. A railway ballast-cleaning machine substantially as herein described with reference to Figs. 1 to 3 or any of Figs. 4 to 8 of the accompanying drawings.

MARKS & CLERK,
Chartered Patent Agents
57–60 Lincolns Inn Fields,
London WC2A 3LS.
Agents for the Applicants.

Printed for Her Majesty's Stationery Office by Burgess & Son (Abingdon) Ltd.—1981. Published at The Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.

1585447 COMPLETE SPECIFICATION
2 SHEETS This drawing is a reproduction of the Original on a reduced scale
Sheet 1

Fig. 1

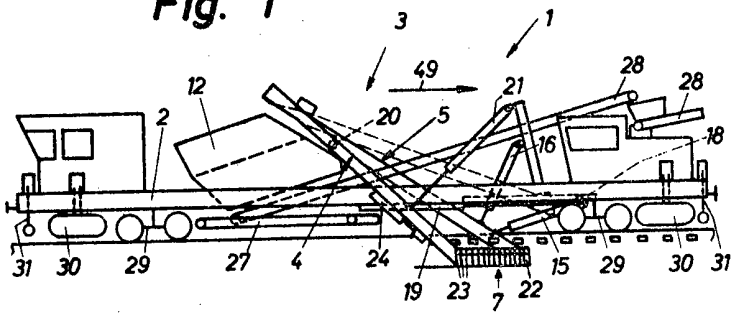


Fig. 2

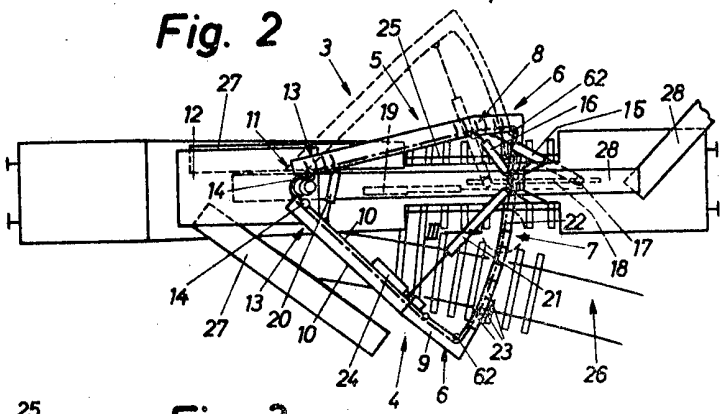
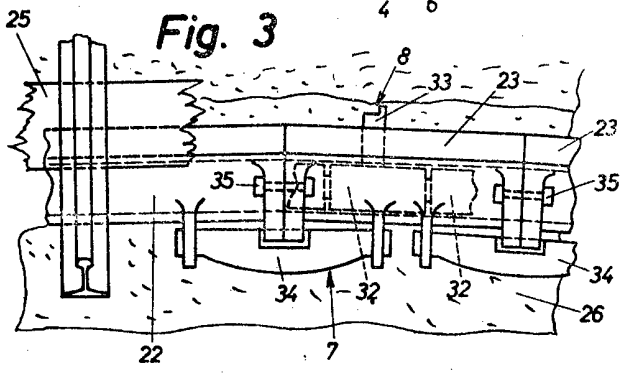


Fig. 3



1585447 COMPLETE SPECIFICATION
2 SHEETS This drawing is a reproduction of the Original on a reduced scale
Sheet 2

Fig. 4

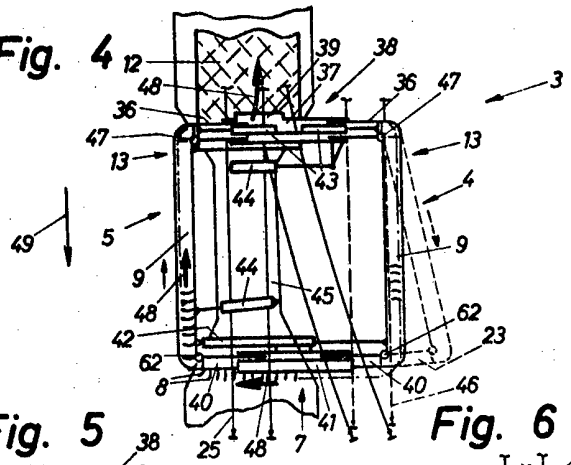


Fig. 5

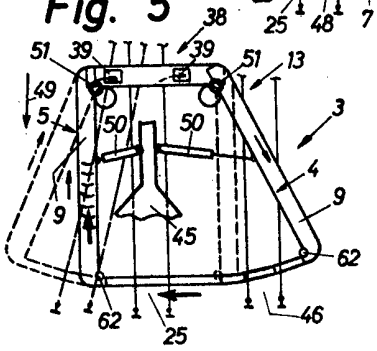


Fig. 6

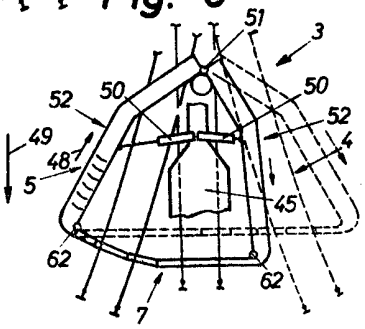


Fig. 7

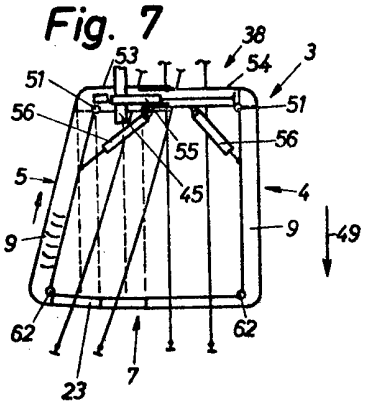


Fig. 8