(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
07 September 2018 (07.09.2018)

(10) International Publication Number
WO 2018/158075 A1

(51) International Patent Classification:
B07B 1/14 (2006.01)

(21) International Application Number:
PCT/EP2018/053550

(22) International Filing Date:
13 February 2018 (13.02.2018)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10 2017 104 394.2 02 March 2017 (02.03.2017) DE

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(81) **Designated States** *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) **Designated States** *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,

(54) Title: DEVICE AND PROCESS FOR FEEDING A CONTINUOUS CONVEYOR

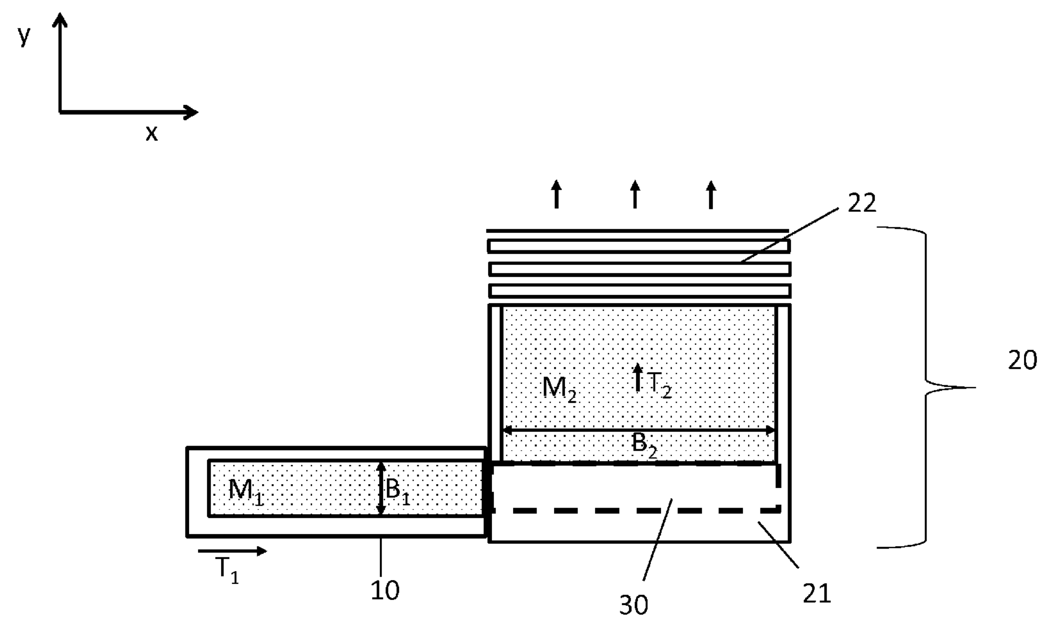

Fig. 1

(57) Abstract: The present invention relates to a device for feeding a continuous conveyor (20) with granular material. It comprises a first and a second continuous conveyor (10, 20) as well as a roller grate (50). The first continuous conveyor (10) is designed for the transport of material as a material bed having a mean width. With respect to both continuous conveyors (10, 20) the roller grate (50) is arranged such that the material is applied from the first continuous conveyor (10) directly onto the roller grate (50) and from the roller grate (50) directly or indirectly onto the second continuous conveyor (20). Here, the deviation between the transport directions T_1, T_2 and R_1 of both continuous conveyors (10, 20) and the roller grate (50) is less than 10°.

WO 2018/158075 A1

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EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:
— *of inventorship (Rule 4.17(iv))*

Published:
— *with international search report (Art. 21(3))*

Device and process for feeding a continuous conveyor

The invention relates to a device and the process for operating the same for feeding a continuous conveyor with granular material, comprising a first and a second continuous conveyor as well as a roller grate, wherein the first continuous conveyor is designed for transporting material as a material bed having a mean width.

Continuous conveyors or also elevators are transport systems generating a continuous transport stream. In particularly, they are suitable for the transport of large material mass streams or continuously required materials on defined routes. Furthermore, they are particularly suitable for the transport of bulk material. They are steadily or continuously in motion and thus they are different from the discontinuous conveyors which move transport material in single cycles.

Continuous conveyors are available as floor-bound or floor-free systems. Continuous floor-bound conveyors are capable of transporting the material to be transported in a horizontal, inclined and/or vertical manner. They have the disadvantage that they need a lot of room and that the way of transport is defined. In most application fields floor-free systems are rail-borne.

Continuous conveyors are automatized systems and are constructed for continuous operation and therefore, often, they are characterized by a simple construction type as well as low energy consumption. I. a. they are used for the delivery and removal of materials and products of the chemical industry, in the mining industry, in surface mining industry, of the metal-producing and -processing industry, in power plants, in the manufacturing sequence, in the storage field and anywhere else, where single production steps are connected.

In the sense of the present invention continuous conveyors, in particularly, mean mechanical conveyors and gravity conveyors. The mechanical conveyors are roller conveyors with driving facility, oscillating conveyors, circular conveyors, fixed tray conveyors, wall conveyors, cellular wheel sluices, belt bucket elevators, chain conveyors, screw conveyors and endless-rope haulage systems as well as carriage chains or plate conveyors. The gravity conveyors are in particularly the spiral chute and each kind of conveying facilities such as roller conveyors, ball transfer tables and track railways without driving facility.

All these continuous conveyors have in common that the continuous material transport being achieved with them also depends on their feed. For applying the material from a first continuous conveyor onto a second continuous conveyor it is important that this material transfer is conducted in a continuous manner, so that the material lane on the second continuous conveyor is influenced by the transfer profile of the first continuous conveyor. Thus, the feed of a continuous conveyor has a direct influence to what extent downstream processes, in general, can be conducted in a stationary manner. So the feed is also directly connected with the turnover and output and the product quality. This is in particularly true in the case, when a continuous conveyor is fed from different sources at the same time, thus when it has the function of a collector, in addition to the transport function.

Using the example of the transport of green pellets of iron ore to the pellet kiln it should be delineated again what this means: green pellets are produced on so-called pelletizing discs and from these pelletizing discs they are applied onto a first continuous conveyor for collecting the material, either via further continuous conveyors or directly. In prior art this first continuous conveyor feeds a discharge device which is moved over the width of the material bed on a second continuous conveyor. In such a case the second continuous conveyor typically is arranged in a right angle with respect to the first continuous conveyor and both continuous conveyors are arranged in a horizontal manner. Then, the second continuous conveyor transfers the material onto the grate carriages, either directly or via a sieving device, e. g. by means of a roller grate, and on the grate carriages, then, in a travelling grate chain the pellets are transported through the thermal treatment.

However, when the grate carriages are not uniformly fed, then this results either in material losses due to a load which is too high or the plant does not reach its theoretical maximum throughput, since the load of single grate carriages is too low. When the load of single grate carriages is a normal load and when the load of other great carriages is lower, then the flow of the reaction gasses through this load, during the thermal treatment, is a non-uniform one, since the gas preferably chooses the path of least resistance, in this case flow resistance, i. e. preferably through the bed on the grate carriage with the low load. On the one hand, this compromises the homogeneity of the product quality, since the pellets in the grate carriages are subjected to different process conditions due to the different load of the grate carriages, and on the other hand, the grate carriages either loose material due to overload and/or the plant capacity is only partially utilized due to a load which is too low. When then the pellet kiln is operated such that also the green pellets on the grate carriages with normal load still achieve the required product quality, then the energy demand of the kiln per mass unit of the burned pellets increases, since the pellets on the grate carriages with a low load are overburned.

Normally, a moving or slewing belt distributes the pellets from the first continuous conveyor on the second continuous conveyor. Based on the transport of green pellets, in particularly after the second continuous conveyor a roller grate for sieving out the oversize- or undersize-particle material is used whereby smaller non-uniformities with respect to the distribution are eliminated. Then, from this roller grate the material is applied onto the travelling grate chain.

The moving belt which throws material from one continuous conveyor onto another continuous conveyor can also be found in other application fields, in particularly in the case, when the first continuous conveyor serves as a collector for material of different sources and when, typically, the second continuous conveyor is arranged on a lower plane than the first one, so that it is possible that the material can fall from the first onto the second continuous conveyor by gravitation. Often, the second continuous conveyor is arranged crossways with respect to the first continuous conveyor, i. e. the transport directions of both continuous conveyors are arranged in an angle of 90° to each other. For moving belts different variants are available. On the one hand, a hydraulically moveable head of the collecting belt can be used; wherein in this case the head of the collecting belt is mounted such that it can be linearly shifted and it can be hydraulically shifted to and fro in the conveying direction of the collecting belt, so that the discharge point is shifted. The oscillating head applies the material onto the second continuous conveyor which is arranged in an angle of 90° with respect to the first continuous conveyor, and so it distributes in this manner the material over the whole width of the second continuous conveyor. Through the relative movement between the second continuous conveyor and the moving head of the first continuous conveyor, here, the material is applied onto the second continuous conveyor in a lane-form, wherein the lanes are arranged transversal with respect to the transport direction of the second continuous conveyor and are arranged parallel to each other. In an alternative, the head of the first continuous conveyor can also be shifted mechanically via racks and pinions or in an electromotive manner via a linear motor. In the case of this embodiment of the moving belt the length of the section of the conveyor belt which transports material changes. Most commonly, a compensation of this change of the length is achieved by a belt loop in which a weighted drum is arranged which is moving up and down.

When the angle of 90° between the first and the second continuous conveyors should be avoided and when both continuous conveyors should operate in the same transport direction, then a so-called slewing belt which is arranged between the first and the second continuous conveyors is used. The slewing belt in the zone of the material discharge of the first continuous conveyor is mounted in such a manner that it can be twisted with respect to a vertical axis, and it conducts a slewing movement so that its head is moved over the whole width of the second continuous conveyor. The slewing movement of the slewing belt can be achieved by a hydraulic, mechanic or electromotive drive. Through the slewing movement the material is distributed on the second continuous conveyor. Here, by the relative movement between the head of the slewing belt and the conveying velocity of the second continuous conveyor meandering material lanes are formed on the second continuous conveyor.

In an alternative to the slewing belt, a preferably hydraulically shiftable moving belt or a similar discharge device can be used which again is arranged between the first and the second continuous conveyors. Also in this case the first and the second continuous conveyors are characterized by the same transport direction and are arranged parallel to each other, but with offset, while the moving belt is arranged in a right angle with respect to both conveyors. In this case the length of the moving belt is constant. For a distribution of the material the whole moving belt together with the bend pulleys is moved in an oscillating manner by means of a linear mounting in an orthogonal direction with respect to the conveying direction of the second continuous conveyor. In this case, the length of the distance covered here corresponds to the width of the desired material bed on the second continuous conveyor. Through the conveying movement of the second continuous conveyor and the oscillating movement of the moving belt the material is applied onto the second continuous conveyor in a meandering form.

However, all these methods have in common that so on the second continuous conveyor no material bed is achieved which in a cross-section orthogonal to the transport direction of the second continuous conveyor, at least integrally or even in its course is constant.

Therefore, due to the described problems with respect to a non-uniform feed of downstream process steps by the second continuous conveyor it is the object of the invention to provide a process and the corresponding device with which material from a first continuous conveyor is transferred onto a second continuous conveyor in such a manner that on the second continuous conveyor a stationary material flow is achieved. In particular, with the invention highs and lows of the material bed M_2 in the transport direction T_2 of the second continuous conveyor or across thereto should be avoided.

This object is solved by a device being characterized by the features of patent claim 1.

Such a device comprises a first and a second continuous conveyor as well as a roller grate. The first continuous conveyor is designed for the transport of material as a material bed M_1 with a transport direction T_1. The first continuous conveyor transports the material with a mean width B_1. Width, in the sense of the invention, means the measure of the material bed in an orthogonal direction with respect to the transport direction T_1 of the first continuous conveyor. The operating velocity of the first continuous conveyor is v_1.

Then, the material should be transferred from the first continuous conveyor onto a second continuous conveyor with the transport direction T_2. According to the present invention, between both continuous conveyors a roller grate is arranged so that the material from the first continuous conveyor is applied directly onto the roller grate and from the roller grate directly or indirectly onto the second continuous conveyor. As an alternative to the roller grate, also a vibrating screen or any other screen-type can be used. Directly, in the sense of the invention, means that the material from the first roller grate is transferred onto the second continuous conveyor without passing further facility parts, whereas in the case of an indirect transport after the first roller grate further facility parts, in particularly further roller grates, are provided. The transport directions of both continuous conveyors T_1 and T_2 as well as the transport direction of the roller grate R_1 should only deviate from each other in an amount of less than 10°, preferably less than 5°, particularly preferably less than 2° and particularly preferably less than 1°, so that within the system no change in direction occurs.

A roller grate consists of a plurality of rollers which, starting from the charging position of the first continuous conveyor, are arranged in a sloped manner, preferably in parallel orientation to each other, namely such that between two rollers each a gap which corresponds to the desired minimum particle size is formed. Smaller material falls downwards through these gaps and thus is removed. The rollers itself can be rotated and/or are at least partially driven so that the material is further continuously conveyed.

The basis of the invention is that this roller grate at the same time also results in a distribution of the material and thus, in the case of a sufficient length, in a homogenization of the material flow. So a more uniform material flow and thus stationary conditions in downstream process steps can be guaranteed.

Furthermore, high-maintenance moving or slewing belts (hydraulic or electric movement design) or oscillating discharge drums as have normally been used till today can be omitted. So maintenance and spare parts costs can be reduced significantly.

A further advantage in the case of the use of green pellets is a reduction of the pellet fracture being a result of baking and crushing of the green pellets at the and/or through the transfer point between the first conveyor belt and the charging device, such as for example a slewing belt or a discharge drum. Thus, in further process steps this results in a reduction of the formation of dust and pellet fracture. Thus the space-time yield is increased which results in an increased cost efficiency of the facility.

The process is particularly advantageous, when the first and/or the second continuous conveyor is a conveyor belt. The design as a conveyor belt is preferable, because this is a particularly simple continuous conveyor.

Basically, it is also possible that at least one of both continuous conveyors is designed as a roller grate. This is connected with the advantage that the material itself is distributed more uniform on the continuous conveyor, since the movement of the rollers results in a distribution of the material, as is also the basic idea of the present invention. In addition, with the use of an additional roller grate the range of the particle-size distribution of the material to be transported is further limited.

Furthermore, it was shown to be advantageous, when the width of the roller grate is higher than the width of the first continuous conveyor. Particularly preferably, the width of the roller grate is at most 300 %, preferably at most 200 % of the width of the first continuous conveyor, wherein the width each relates to the bearing area being orthogonal to the transport direction. So a better distribution of the material can be achieved. In the case of the use of green pellets this concretely means that the collecting belt with a width of up to 2.2 m as the first continuous conveyor applies the green pellets onto a roller grate having a width of, for example, 3 m so that over the length of the roller grate the material stream achieves a more uniform distribution over the width of the roller grate.

The downstream belt having a high width as a second continuous conveyor transports the pellets to the downstream second roller grate having a width of 4 m. In an alternative it is also possible that after the roller grate having a width of 3 m also a roller grate having a width of 4 m which then serves as a second continuous conveyor follows. In each case it is important that after the second continuous conveyor the material stream is uniformly distributed over the width of 4 m and that so it is applied onto the travelling grate.

Furthermore, it was shown to be advantageous, when the roller grate applies the material onto the second continuous conveyor only in an indirect manner. This means, that after the roller grate as a first roller grate at least one further, second roller grate follows. Preferably, the deviation between the transport directions of both roller grates is less than 10°. So different fractions of the separated particles which are too small can be removed separately so that, for example, on the one hand dust accumulates which is completely removed from the process, while in the second roller grate smaller particles are removed which are fed into an upstream process step by being enlarged with respect to their diameter.

In addition, it was shown to be advantageous, when the width of the second roller grate is at most 150 % of the width of the first roller grate, because so a still better distribution and widening of the material feed can be achieved. In particularly, when the width of the roller grate is higher than that of the first continuous conveyor, a stepwise widening of the width seems to be of advantage for guaranteeing a uniform distribution on the roller grate.

It was also shown to be advantageous, when after the second continuous conveyor a further roller grate follows. In particularly then, for the roller grate being arranged between both continuous conveyors, it is possible to focus upon the uniform distribution of the material, whereas in this downstream roller grate particles which are too small and/or too large are separated.

It is preferable, when as at least one roller grate a so-called double-deck screening machine is used, wherein this one comprises two roller grates being at least partially arranged one upon the other, and preferably being arranged one upon the other over at least 80 % of their operating lengths. In this case, the roller grate being arranged above is characterized by a distance between the single rollers which is so high that only very large particles remain on this upper roller grate and can be transported away by an oversize-particle continuous conveyor, whereas particles which are too small and also particles with the target dimension with respect to the diameter fall through this upper roller grate. Then, the roller grate being arranged below is characterized by a distance between the single rollers which is such that particles with the target dimension with respect to the diameter remain on the roller grate, whereas particles having a still smaller diameter fall through the grate and are transported away by an undersize-particle continuous conveyor. In this manner, at the same time, particles which are too large and/or particles which are too small can be separated.

In addition, it is preferable to use a roller grate being characterized by different distances between the rollers. It is particularly preferable, when this roller grate in a first area is characterized by distances between the rollers through which particles having a diameter of smaller than a minimum threshold diameter fall, so that particles which are too small are removed. In a second downstream area the distance between the rollers is so high that only particles having a diameter of higher than a maximum threshold diameter remain on the roller grate. Thus, in this second area, particles having a diameter between the minimum and the maximum threshold diameters fall through between the rollers onto a further roller grate or directly onto the second continuous conveyor.

The different variants for the design of a roller grate are also conceivable for at least one roller grate between the first and the second continuous conveyors or also for a roller grate being arranged downstream of the second continuous conveyor.

Furthermore, the invention also relates to a process with the features according to patent claim 11. Such a process is preferably conducted with a device comprising at least parts of the features being described above, in particularly the features of patent claim 1 together with another arbitrary dependent patent claim.

In such a process for feeding a continuous conveyor with granular material by a first continuous conveyor material is transported as a material bed having a mean width. It is subject matter of the invention that this first continuous conveyor applies the material onto a roller grate and that the material is transferred, directly or indirectly, from this roller grate onto a second continuous conveyor. The deviation between the transport directions of both continuous conveyors and the at least one roller grate should be lower than 10°.

Here, the process is based on the finding that material which is transported on a roller grate in a transport direction is uniformly distributed on the roller grate over its width. This is a result of the movement of the single particles of the granular material on the rollers. In particularly in the case, when the width of the sandwiched roller grate is between the widths of the first and the second continuous conveyors, so a uniform distribution of the material stream on the width of the second continuous conveyor can be achieved.

In addition, configurations of technical equipment which normally require more maintenance work such as for example oscillating discharge drums, moving or slewing belts can be prevented, so that maintenance and spare parts costs can be reduced significantly.

In addition, such a transfer of the material which at the end of the continuous conveyor or the roller grate simply falls onto the device of the downstream process step is considerably gentler for the material. Furthermore, an additional screening area arises, which can be used for a better efficiency of the material screening. So a distribution function through the direct conveying process can be achieved, i. e. particles are distributed over the whole width through the movement on the roller grate.

The use of this process is particularly advantageous, when the granular material contains iron. In particularly in the case of the production of iron and steel large material amounts are handled so that in the example of conveying green pellets from the pelletizing discs producing them to the burning step in a travelling grate plant such a process is connected with decisive advantages, because only a uniform feeding of the grate carriages of the travelling grate can guarantee that at the prevailing conditions in the plant the used material is uniformly burned and that at the end of the process a homogenous product quality can be achieved.

Further features, advantages and possible applications of the invention follow from the description of the drawings below. Here, all described or depicted features form on its own or in arbitrary combination the subject matter of the invention, independently from their summary in the patent claims or their back references.

Shown are:

in fig. 1 a common transfer between two continuous conveyors according to prior art,

in fig. 2 a first embodiment according to the present invention,

in fig. 3 a second embodiment according to the present invention, and

in fig. 4 a third embodiment according to the present invention.

According to prior art, as shown in fig. 1, material is transported via a first continuous conveyor 10 comprising a shiftable discharge device which sweeps through the moving zone 30 on the second continuous conveyor 20. In this embodiment the material (M_1 with the width B_1) is applied onto a second continuous conveyor 20 via a first continuous conveyor 10. In the variant shown the first continuous conveyor 10 has the design of a conveyor belt comprising at least one drive and one oscillating discharge device. The continuous conveyor 20 consists of a conveyor belt 21 and a roller grate 22 which results in the advantage that it is possible to remove so particles which are too small and/or too large before further process steps. In this case it is preferable, when the conveyor belt 21 and the roller grate 22 have separate drives. However, also any design of the continuous conveyor according to the continuous conveyors being mentioned in the introduction of this description is conceivable.

The continuous conveyor 10 transfers material within the moving zone 30 of its discharge device onto the second continuous conveyor 20. In the simplest case, this can be achieved by the fact that the discharge device is designed as an oscillating discharge drum around which the belt of the conveyor belt is wrapped in a wrap-around angle of ca. 180°.

The discharge device of the first continuous conveyor 10 is moved in two operating directions, namely over the width of the material bed M_2 on the second continuous conveyor 20 (B_2), wherein the width means the direction being orthogonal to the direction of movement. Ideally, so the oscillating discharge device of the first continuous conveyor 10 moves from one side of the continuous conveyor 20 back to the other side. Here, in at least one operating direction it discharges material. Then, this material (M_2 with the width B_2) is further transported by the second continuous conveyor 20.

Fig.2 shows the simplest variant of the design according to the present invention. Here, the material from the first continuous conveyor 10 with the transport direction T_1 which, in this case, has the design of a conveyor belt is transferred onto a first roller grate 50 with the transport direction R_1 which is designed such that particles having a diameter of smaller than a lower threshold diameter fall through the distances between the single rollers and thus can be removed from the process or can be transported to another site in the process by means of the undersize-particle continuous conveyor 64.

Then, the material which has been transported via the rollers of the first roller grate 50 is transferred onto the second continuous conveyor 20 with the transport direction T_2 which here also has the design of a conveyor belt. The second continuous conveyor 20 transfers the material onto a second roller grate 51 with the transport direction R_2. Also here again material having a diameter of smaller than a lower threshold value is removed which falls onto the undersize-particle continuous conveyor 65 and thus can be removed from the process or can be returned into the process at another site thereof.

Then, the material which has been transported via the rollers of the second roller grate 51, having a diameter of larger than the lower threshold diameter arrives at the schematically shown travelling grate facility 70.

Fig. 3 shows a second variant of the design according to the present invention. Via a first continuous conveyor 10 with the transport direction T_1 the material is transferred onto a first roller grate 50 with the transport direction $R_{1.}$ This one is divided into two subareas 50a and 50b. Instead of two subareas also two single roller grates 50a and 50b can be provided. In the subarea 50a the rollers are arranged such that particles or pellets having a diameter of smaller than the lower threshold diameter fall through the gap between the rollers and thus can be removed from the process via the undersize-particle continuous conveyor 64. In the subarea 50b the rollers are arranged such that only material having a diameter of larger than the upper threshold diameter is transported onwards. Material having a diameter which is between the lower and the upper threshold diameter falls onto the second continuous conveyor 20 with the transport direction T_2.

The material having the diameter which is too large arrives at the oversize-particle continuous conveyor 63 from which it can also be removed from the process or can be returned into the process at another site thereof. Then, from the second continuous conveyor 20 the material arrives at a so-called double-deck screening machine 60 with the transport direction R_2, which consists of two roller grates 61 and 62 being at least partially arranged one upon the other, which in this arrangement being also called double-deck roller grate. Material with a limit above the upper threshold diameter remains on the upper roller grate 62, from which it is transferred onto an oversize-particle continuous conveyor 67. With this oversize-particle continuous conveyor 67 the material can either be removed from the process or can be returned into the process at another site thereof.

Material having a diameter of less than the upper threshold diameter falls onto the lower roller grate 61 the rollers of which being arranged such that material having a diameter of less than the lower threshold diameter falls onto the so-called undersize-particle continuous conveyors 65 and 66 with which it can also be removed from the process or can be returned into the process at another site thereof. Then, material the single particles of which having a diameter of between the lower and the upper threshold diameters arrives at the travelling grate 70 which is only shown in schematic manner.

Fig. 4 shows a variant in which the material is transferred via a first continuous conveyor 10 with a transport direction T_1 onto a roller grate 50 with the transport direction R_1. Fine-grained material which falls through the gap between the rollers of this roller grate is transported away by means of the undersize-particle continuous conveyor 64. The material which has been transported by the rollers of the roller grate 50 is transferred onto the second continuous conveyor 20 with the transport direction T_2. Since, here, the second continuous conveyor 20 also has the design of a roller grate, material from it having a particle size of smaller than the lower threshold diameter arrives at the undersize-particle continuous conveyor 65 and thus can be removed or can be returned. Larger particles from this second continuous conveyor 20 are directly transferred onto the travelling grate chain 70.

List of reference signs

10	first continuous conveyor
20	second continuous conveyor
21	conveyor belt
22	roller grate
30	moving zone of the discharge device of the first continuous conveyor
50	first roller grate
50a	first subarea
50b	second subarea
51	second roller grate
60	double-deck screening machine
61	lower roller grate
62	upper roller grate
63, 67	oversize-particle continuous conveyor
64, 65, 66	undersize-particle continuous conveyor
70	travelling grate chain

B_1	width of the material stream on the first continuous conveyor
B_2	width of the material stream on the second continuous conveyor
M_1	material bed on the first continuous conveyor
M_2	material bed on the second continuous conveyor
R_1	transport direction of the first roller grate
R_2	transport direction of the second roller grate
T_1	transport direction of the first continuous conveyor
T_2	transport direction of the second continuous conveyor

Patent claims

1. A device for feeding a continuous conveyor (20) with granular material, comprising a first and a second continuous conveyor (10, 20) as well as a roller grate (50), wherein the first continuous conveyor (10) is designed for the transport of material as a material bed having a mean width, **characterized in** that the roller grate (50) with respect to both continuous conveyors (10, 20) is arranged such that the material is transferred from the first continuous conveyor (10) directly onto the roller grate (50) and from the roller grate (50) directly or indirectly onto the second continuous conveyor (20) and that the deviation between the transport directions T_1, T_2 and R_1 of both continuous conveyors (10, 20) and the roller grate (50) is less than 10°.

2. The device according to claim 1, **characterized in** that the deviation between the transport directions T_1, T_2 and R_1 of both continuous conveyors (10, 20) and the roller grate (50) is less than 2°.

3. The device according to one of the preceding claims, **characterized in** that the first and/or the second continuous conveyor (10, 20) are/is a conveyor belt.

4. The device according to one of the preceding claims, **characterized in** that the width of the second continuous conveyor (20) is higher than the width of the first continuous conveyor (10).

5. The device according to one of the preceding claims, **characterized in** that the width of the roller grate (50) is higher than the width of the first continuous conveyor (10).

6. The device according to one of the preceding claims, **characterized in** that the roller grate (50a) transfers the material onto at least one further, second roller grate (50b) and that the deviation between the transport directions of both roller grates (50a, 50b) is less than 10°.

7. The device according to claim 6, **characterized in** that the width of the second roller grate (50b) is higher than the width of the first roller grate (50a).

8. The device according to one of the preceding claims, **characterized in** that the second continuous conveyor (20) applies the material onto a down-stream roller grate (60).

9. The device according to one of the preceding claims, **characterized in** that at least one roller grate (20, 50, 60) is a double-deck screening machine.

10. The device according to one of the preceding claims, **characterized in** that at least one roller grate (20, 50, 60) comprises two areas (50a, 50b) which are characterized by different distances between single rollers.

11. A process for feeding a continuous conveyor with granular material, wherein at least one first continuous conveyor transports material as a material bed having a mean width, **characterized in** that the first continuous conveyor applies the material onto at least one roller grate, that the material is transferred from the roller grate directly or indirectly onto a second continuous conveyor and that the deviation between the transport directions of both continuous conveyors (10, 20) and the at least one roller grate (50) is less than 10°.

12. The process according to one of the preceding claims, **characterized in** that the granular material contains iron.

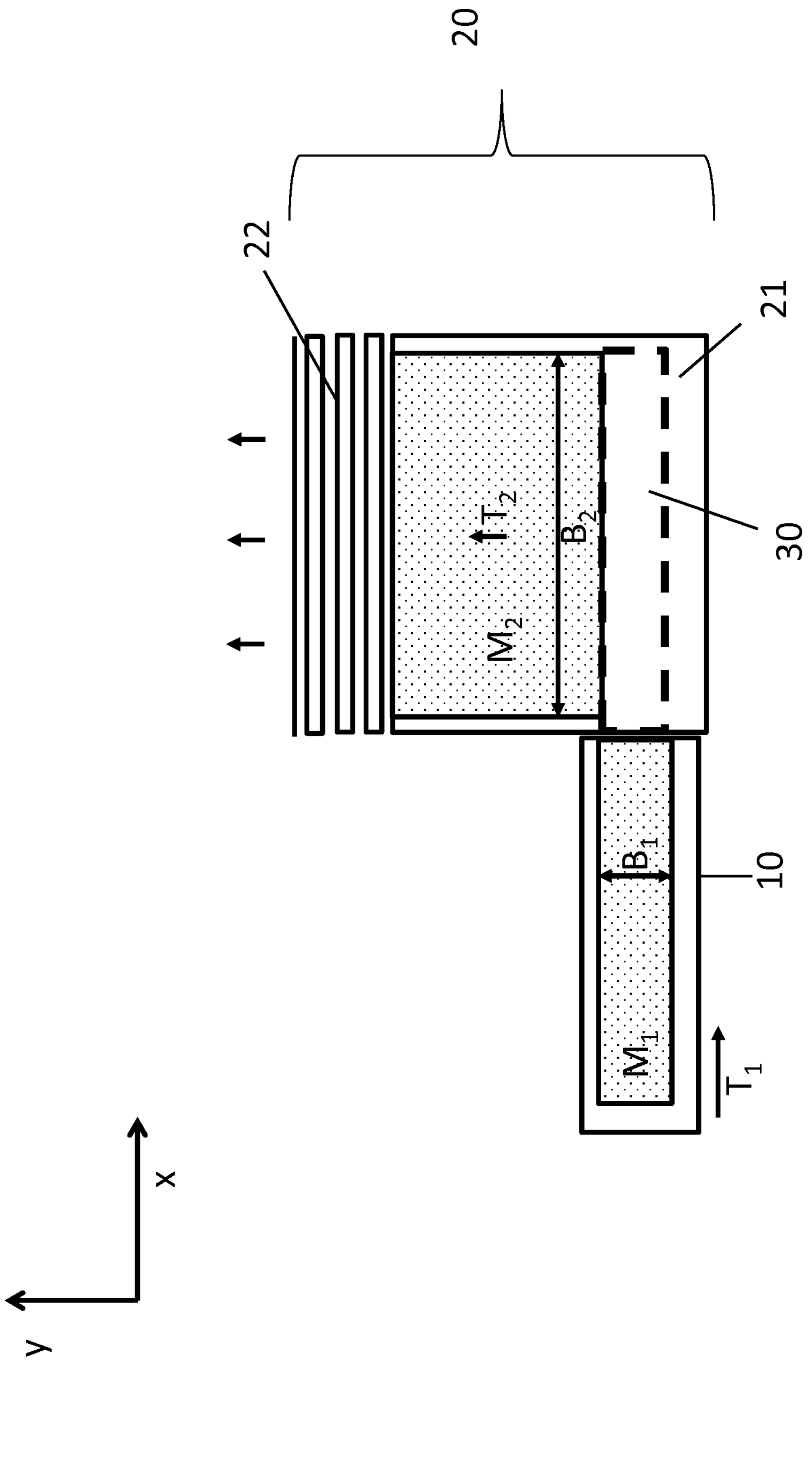

Fig. 1

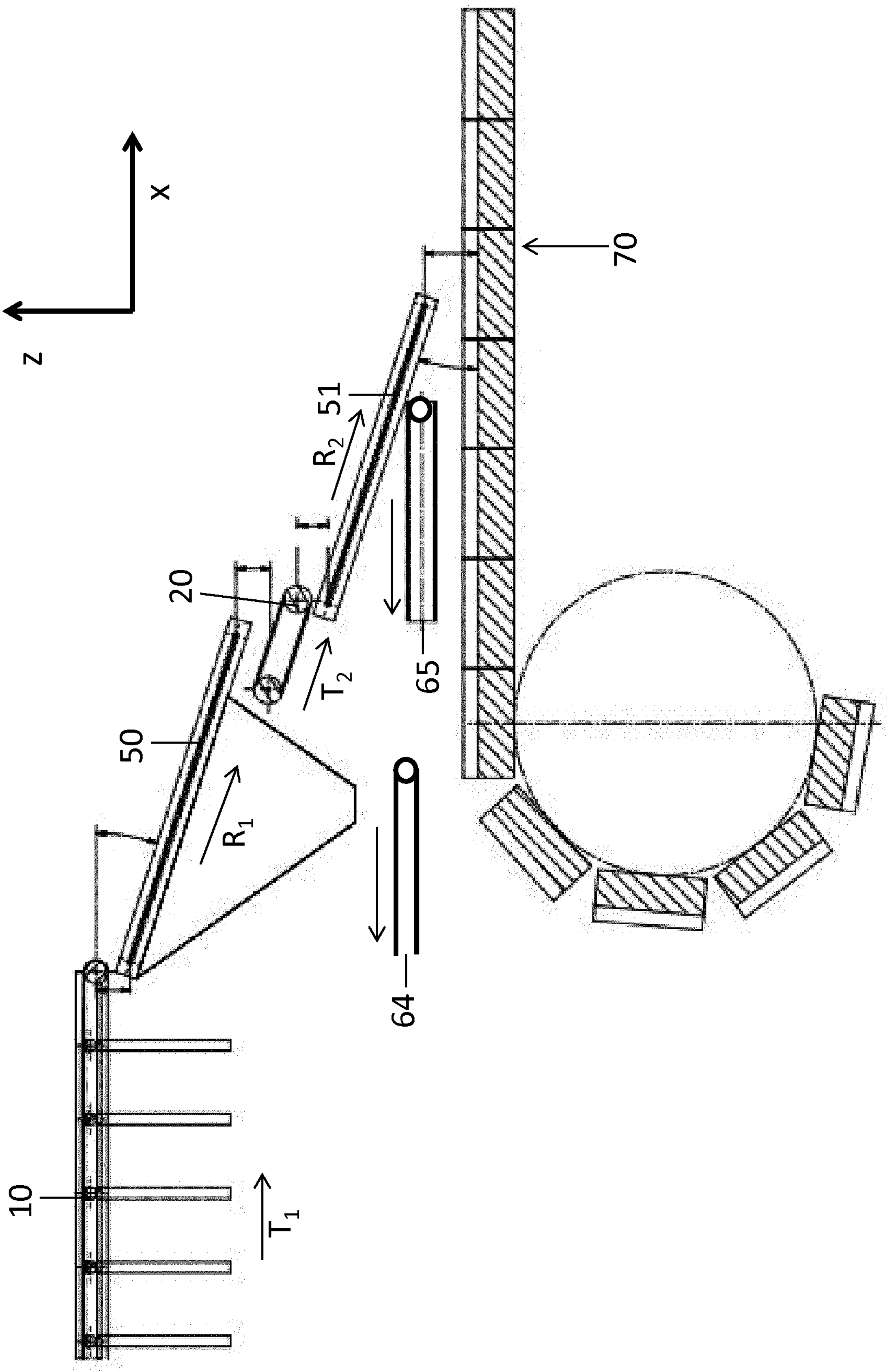

Fig. 2

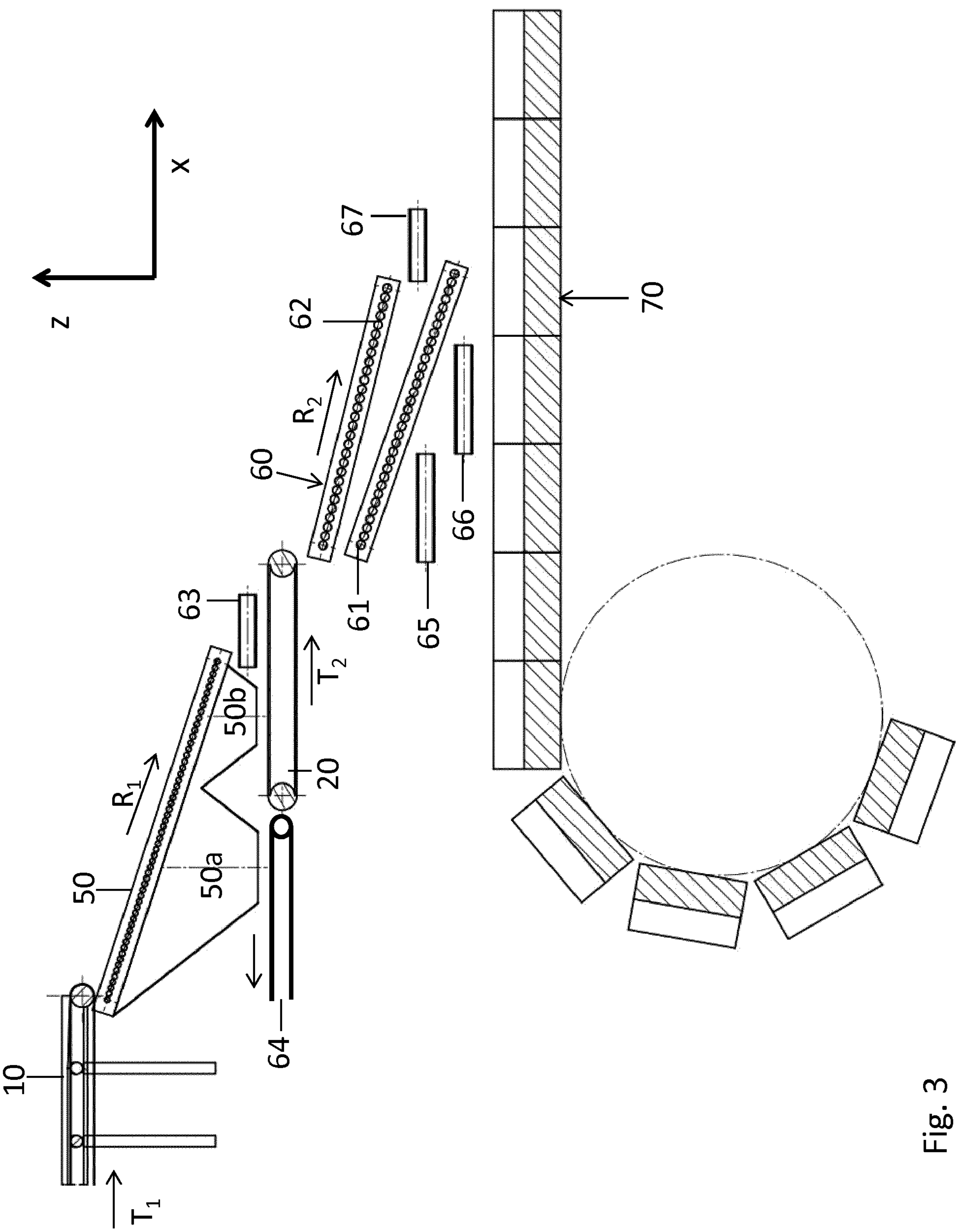

Fig. 3

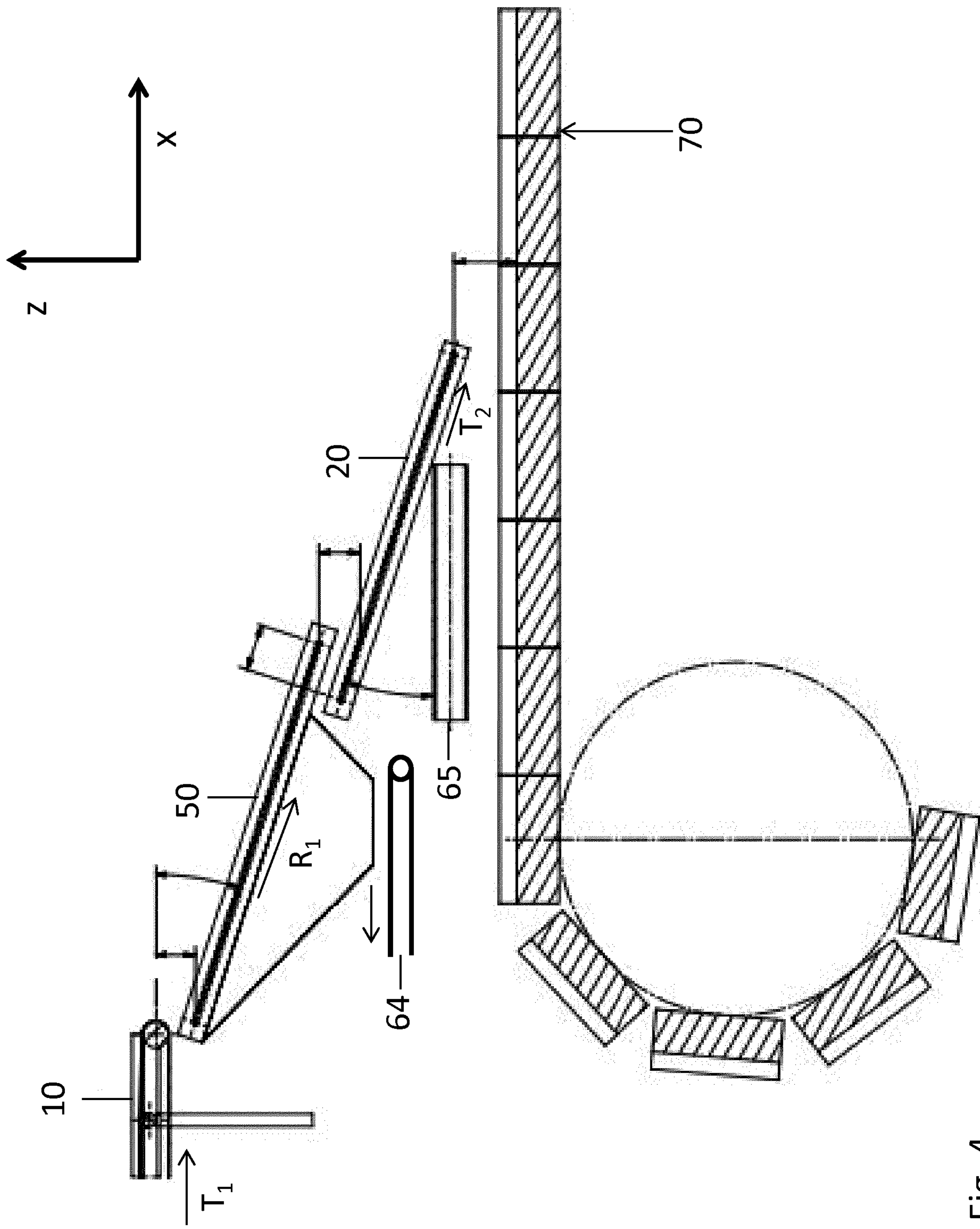

Fig. 4

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2018/053550

A. CLASSIFICATION OF SUBJECT MATTER
INV. B07B1/14
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B07B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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X	CA 1 074 260 A (OUTOKUMPU OY) 25 March 1980 (1980-03-25) page 1, paragraph 1 - page 4, paragraph 6 figures 1,2 -----	1-8, 10-12
X	EP 0 019 953 A1 (METALLGESELLSCHAFT AG [DE]) 10 December 1980 (1980-12-10) page 1, paragraph 1 page 4, paragraphs 1,2 figures 1,2 -----	1-12

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
19 April 2018	02/05/2018

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Thenert, Alexander

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
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