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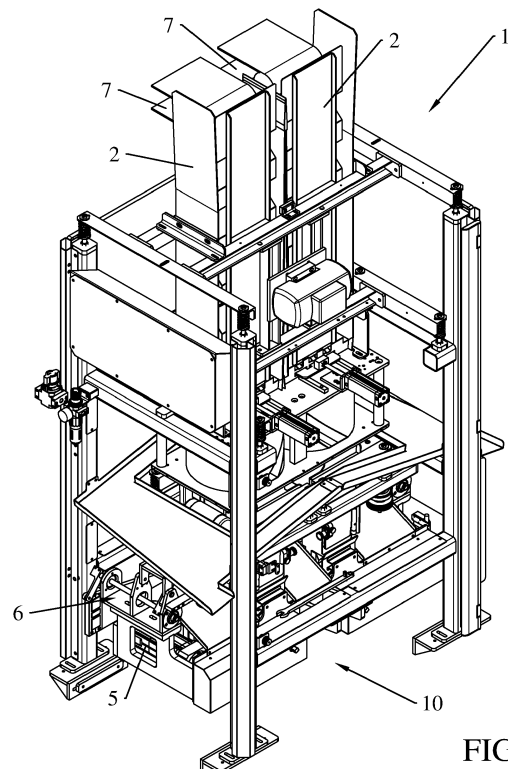
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KH MA MD TN(71) Applicant: **CYBORGLINE SA****6902 Paradiso - Lugano (CH)**(72) Inventor: **PIAZZAROLI, Massimo****55033 Castelnuovo di Garfagnana (LU) (IT)**(74) Representative: **Mittler, Andrea et al****MITTLER & C. s.r.l.****Viale Lombardia, 20****20131 Milano (IT)**(30) Priority: **23.06.2020 IT 202000014962**(54) **DUAL ROTOR LONG PASTA LOADER ASSEMBLY**

(57) A loader assembly (1) for dosing long pasta, comprising at least one descender (2) and a dosing unit (10) which provides dosing means, is described. The loader assembly (1) comprises two descenders (2). The dosing unit (10) comprises two rotors (3) each provided with a cavity (31), and two motors (5) able to independently control the rotation of the respective rotors (3). The dosing means of the dosing unit (10) comprise two paddles (4) and lever means (6) able to connect a paddle (4) to a respective rotor (3). Each descender (2) exclusively feeds a respective rotor (3), and control means of the loader assembly (1) are able to synchronize the position of the rotors (3) and the position of the respective paddles (4).

**FIG.1****EP 3 929 092 A1**

Description

[0001] The present invention relates to a dual rotor long pasta loader assembly.

[0002] Long pasta loader assemblies which are placed between a long pasta production line and a conveyor able to direct the dosed pasta towards a packaging machine, are known.

[0003] Conventionally, the loader assembly comprises a hopper closed at the bottom by a door with controlled opening and closing, said door comprising for example two openable and closeable doors so as to unload one dose of pasta at a time. The conveyor is of the bucket type, each of the buckets being able to receive from the loader assembly a dose of pasta unloaded from the hopper.

[0004] The drawbacks of the known loader assemblies are that part of the dose of pasta unloaded into the buckets comes out of the bucket itself and also that the sudden fall of the pasta from the hopper results in an uneven distribution of the pasta in the bucket.

[0005] Such drawbacks result in a slowness of the movement of the conveyor and therefore, of the loading process in general. Moreover, there are also other problems relating to the packaging downstream, as the packaging machine processes doses of pasta which are not evenly distributed in the buckets.

[0006] Granted European Patent EP-3326922 of the present applicant describes an apparatus for transferring long pasta from a production line towards a packaging machine, comprising a long pasta loader assembly.

[0007] Said loader assembly comprises a descender, dosing means and a rotor provided with a cavity.

[0008] The descender is able to vertically slide the long pasta towards the rotor.

[0009] The dosing means are movable between an opening position, in which the long pasta is free to slide along the descender, and a closing position, in which the sliding of the long pasta is blocked.

[0010] The dosing means consist of a paddle moved horizontally between said two positions by pneumatic means.

[0011] The rotor is placed below the dosing means, an accumulation space for a dose of long pasta being provided between the dosing means and the rotor.

[0012] The rotor is able to take on at least one filling position for receiving the dose of pasta therein, with the cavity facing upwards and the dosing means in closing position, and an emptying position for unloading the dose of long pasta along a wall of the cavity by rotation and sliding, with the cavity facing downwards and the dosing means in closing position.

[0013] The apparatus further comprises a bucket conveyor placed below the rotor able to transport, by means of each of the buckets therein comprised, a dose of pasta unloaded by the rotor to be transported towards the packaging machine. Said conveyor is configured so that a bucket is positioned below the rotor each time the rotor

is in emptying position.

[0014] The loader assembly further comprises guides able to be coupled to respective grooves of each bucket of the conveyor in order to accurately position each bucket below the rotor.

[0015] The above-described loader assembly is suitable for an apparatus in which the long pasta arrives from the long pasta production line by a single conveyor belt which empties the long pasta into the hopper.

[0016] Said loader assembly may be adapted to also serve two conveyor belts by providing two descenders which converge into a same dosing area above a same dosing paddle below which there is a single rotor.

[0017] The use of two parallel conveyor belts running from the production line towards the loader assembly is highly appreciated when long pasta is to be dosed, which conventionally is produced in double length and is cut in half by cutting means positioned between the two conveyor belts during the running on the two side-by-side conveyor belts.

[0018] The long pasta conventionally is produced in double length, lying on the two conveyor belts transversely to the direction of the motion, cut between the two conveyor belts during the running towards the loader assembly and emptied into two separate descenders which converge into a single dosing area.

[0019] Disadvantageously, the converging step of the two rows of long pasta in the loader assembly generates breaks in the long pasta and/or unpleasant weaves, for example if the long pasta consists of fettuccine, i.e. non-threadlike and soft long pasta. A long pasta shape such as spaghetti or linguine is also negatively affected by this converging step.

[0020] It is the object of the present invention to provide a loader assembly for dosing long pasta able to receive the long pasta from two conveyor belts originating from one production line.

[0021] It is a further object of the present invention that the loader assembly allows a dosage which is synchronized with the movement of an underlying bucket conveyor.

[0022] It is a yet further object of the present invention that the loader assembly allows an increase in the production speed without reducing the quality of the packaged long pasta.

[0023] According to the present invention, said and further objects are achieved by a loader assembly for dosing long pasta, comprising at least one descender and a dosing unit which provides dosing means,

characterized in that

the loader assembly comprises two descenders, the dosing unit comprises two rotors each provided with a cavity, and two motors able to independently control the rotation of the respective rotors, the dosing means of the dosing unit comprise two paddles and lever means able to connect a paddle to a respective rotor,

wherein each descender feeds exclusively a respective rotor,
 wherein control means of the loader assembly are able to synchronize the position of the rotors and the position of the respective paddles which are able to move horizontally between a first position in which the respective descender is obstructed and a second position in which the long pasta is free to access an accumulation space of each descender comprised between the paddle and the rotor.

[0024] Advantageously, the paddles open horizontal sections of the descenders for gradually unloading the long pasta so that the long pasta progressively occupies the accumulation space, thus limiting breaks in the long pasta.

[0025] The use of lever means allows a simultaneous filling step of the accumulation space, and unloading in the buckets of the long pasta loaded in the rotors in the preceding step.

[0026] Advantageously, the filling and emptying of the rotors is continuous.

[0027] The presence of separate descenders for respective paddles, respective lever means and respective rotors allows the production to be speeded up while limiting the breaks in the long pasta because there are no dangerous crossings of long pasta in the step of filling the space above a single paddle which served two series of incoming long pasta in the prior art.

[0028] The loader assembly is very flexible in use, simple to assemble and maintain, given that the lever means are easily accessible to the operator.

[0029] The features and advantages of the present invention will be apparent from the following detailed description of a practical embodiment thereof, illustrated by way of non-limiting example in the accompanying drawings, in which:

Figure 1 shows a perspective view of a long pasta loader assembly according to the present invention;
 Figure 2 shows a side view of the loader assembly;
 Figure 3 shows a sectional view along line III-III of Figure 2;
 Figure 4 shows a perspective view of a dosing unit of the loader assembly, in a first position;
 Figure 5 shows a perspective view of the dosing unit, in a second position;
 Figure 6 shows a rear view of the dosing unit, in the first position;
 Figure 7 shows a rear view of the dosing unit, in the second position;
 Figure 8 shows a front view of the dosing unit without front covering elements, in the first position;
 Figure 9 shows a front view of the dosing unit without front covering elements, in the second position;
 Figure 10 shows a top plan view of the dosing unit, in the first position;
 Figure 11 shows a top plan view of the dosing unit,

in the second position;

Figure 12 shows a sectional view along line XII-XII of Figure 8;

Figure 13 shows a sectional view along line XIII-XIII of Figure 9;

Figure 14 shows a sectional view along line XIV-XIV of Figure 10;

Figure 15 shows a sectional view along line XV-XV of Figure 11.

[0030] An apparatus for transferring long pasta from a production line to a packaging machine comprises two conveyor belts, a loader assembly 1 for dosing long pasta (Figures 1 to 3) and a bucket conveyor below the loader assembly 1.

[0031] The conveyor belts (not shown in the drawings) run parallel and are placed side-by-side between the production line and the loader assembly 1. A space for using cutting means is provided between the conveyor belts, as will be clarified in greater detail below.

[0032] The loader assembly 1 comprises two descenders 2 and a dosing unit 10 (Figures 4 to 15) which provides dosing means and two rotors 3, each provided with a cavity 31. The cavity 31 is open so as to be filled or emptied according to the position of rotor 3.

[0033] The rotors 3 are controlled by respective motors 5, which are independent of each other.

[0034] The dosing means comprise two paddles 4 and respective lever means 6, wherein the lever means 6 are able to connect each paddle 4 to a respective rotor 3.

[0035] Each descender 2 is able to receive the long pasta from a respective conveyor belt by a respective mouth 7, and to vertically unload it towards a respective rotor 3.

[0036] Each paddle 4 is able to move horizontally between a first position, in which it obstructs the respective descender 2, and a second position, in which the long pasta is free to access a space 8 of descender 2 comprised between the paddle 4 and the rotor 3.

[0037] The lever means 6 comprise, for each rotor 3 and respective paddle 4, a first crank 61 controlled in rotation by the respective rotor 3 activated by the respective motor 5 by respective belt transmissions 15, a first rod 62 whose ends are rotatably associated with one end of said first crank 61 and with a first end of a second crank 63.

[0038] A second end of the second crank 63 is integral with a rotating bar 66 able to rotate a third crank 64. The rotating bar 66 is horizontal and rotatably associated with the frame of the dosing unit 10, wherein said frame is integral with the load-bearing frame of the loader assembly 1.

[0039] A second rod 65 provides ends rotatably associated with one end of the third crank 64 and with the paddle 4 which is able to move along a horizontal guide integral with the frame of the dosing unit 10.

[0040] The loader assembly 1 also comprises control means able to synchronize the rotation of the rotors 3

with the position of the respective paddles 4, as will be clarified in greater detail below.

[0041] The dosing unit 10 further comprises means 11 able to change the height of each paddle 4. Said means comprise a ring nut 12.

[0042] The bucket conveyor (not shown in the drawings) is able to place buckets below the rotors 3 and to transport the buckets loaded with doses of long pasta towards a packaging machine.

[0043] The loader assembly 1 further comprises guides 13 able to be coupled with respective grooves of each bucket of the conveyor in order to accurately place each bucket below the respective rotor 3.

[0044] Operatively, the long pasta, e.g. spaghetti, extends from the production line over two conveyor belts transversely to the direction of motion of the conveyor belts. In particular, each single unit of long pasta, for example a single strand of spaghetti, rests on both conveyor belts.

[0045] During the motion of the conveyor belts towards the loader assembly 1, cutting means placed between the two conveyor belts, e.g. a simple blade, cut each single unit of long pasta in the middle zone, between the two conveyor belts, thus obtaining two long pasta units of half-length with respect to the single unit of long pasta previously loaded at the production line.

[0046] After the cutting, two series of long pasta units of half-length continue moving towards the loader assembly 1, still lying transversely on the respective conveyor belts with respect to the direction of motion thereof.

[0047] The two series of long pasta enter respective descenders 2 by the mouths 7, thus filling the spaces above the respective paddles 4 which are stopped in the first position of descending block of the long pasta, as shown in Figures 6, 8, 10, 12, 14.

[0048] As shown in Figures 7, 9, 11, 13, 15, the movement of the paddles 4 into the second position of opening to the passage of the long pasta gradually occurs in a synchronized manner according to the position of the rotors 3, i.e. the presence of buckets below the rotors 3.

[0049] Advantageously, the paddles 4 open horizontal sections of the descenders 2 to gradually unload the long pasta so that the long pasta progressively occupies space 8, thus limiting breaks in the long pasta, which is known to be very delicate due to the elongated shape thereof.

[0050] The long pasta accumulates in space 8 by sliding over the outer surface of the rotors 3 in synchronized rotation with the movement of the paddles 4 by the lever means 6. In this step of opening the descenders 2, the cavities 31 of the rotors 3 are directed towards the buckets, i.e. space 8 is closed at the bottom by the outer surface of the moving rotors 3.

[0051] The use of lever means 6 allows a simultaneous filling step of the space 8 as described above, and unloading of the long pasta, loaded in the rotors 3 in the preceding step, into the buckets, for example simultaneously into two buckets.

[0052] Once unloading the long pasta into the buckets and the accumulation of new doses of long pasta in spaces 8 is complete, the paddles 4 are brought back to the first block position and the rotors 3 continue rotating, thus making the cavities 31 available for new filling with long pasta accumulated in the spaces 8.

[0053] Advantageously, the filling and emptying of the rotors 3 is continuous.

[0054] The presence of separate descenders 2 for respective paddles 4, respective lever means 6 and respective rotors 3 allows the production to be speeded up, while limiting the breaks in the long pasta because there are no dangerous crossings of long pasta in the filling step of space 8 above a single paddle which served two series of incoming long pasta in the prior art.

[0055] The lever means 6 are particularly important because they allow the use of the pair of rotors 3 to be optimized.

[0056] The activation of the rotors 3, and therefore of the lever means 6 and the paddles 6, is independent by means of the motors 5: the mutual position of the two rotors 3 and the paddles 4 advantageously may be differentiated.

[0057] This allows, for example an improved adaptation to the translational motion of the underlying bucket conveyor: for example, first one bucket may be started to be filled with respect to the other, or the two buckets may be filled with different quantities of long pasta by varying the height of the paddles 4 by the ring nut 12.

[0058] Advantageously, the loader assembly 1 is very flexible in use, simple to assemble and maintain, given that the lever means 6 are easily accessible to the operator.

Claims

1. Loader assembly (1) for dosing long pasta, comprising at least one descender (2) and a dosing unit (10) which provides dosing means,

characterized in that

the loader assembly (1) comprises two descenders (2),

the dosing unit (10) comprises two rotors (3) each provided with a cavity (31), and two motors (5) able to independently control the rotation of the respective rotors (3),

the dosing means of the dosing unit (10) comprise two paddles (4) and lever means (6) able to connect a paddle (4) to a respective rotor (3), wherein each descender (2) feeds exclusively a respective rotor (3), wherein control means of the loader assembly (1) are able to synchronize the position of the rotors (3) and the position of the respective paddles (4) which are able to move horizontally between a first position in which the respective descender (2) is obstructed

and a second position in which the long pasta is free to access an accumulation space (8) of each descender (2) comprised between the paddle (4) and the rotor (3).

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2. Loader assembly (1) according to claim 1, **characterized in that** for each rotor (3) and respective paddle (4), the lever means (6) comprise:

a first crank (61) actuated to rotation by the respective rotor (3),
 a first rod (62) whose ends are rotatably associated with one end of said first crank (61) and with a first end of a second crank (63),
 wherein a second end of the second crank (63) is integral with a rotating bar (66) able to rotate a third crank (64),
 wherein the rotating bar (66) is horizontal and rotatably associated with the frame of the dosing unit (10),
 wherein a second rod (65) provides ends rotatably associated with one end of the third crank (64) and with the paddle (4) which is able to move along a horizontal guide integral with the frame of the dosing unit (10).

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3. Loader assembly (1) according to claim 1 or 2, **characterized in that** the dosing unit (10) comprises means (11) able to vary the height of each paddle (4).

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4. Apparatus for transferring long pasta from a production line to a packaging machine, comprising two conveyor belts, a loader assembly (1) and a bucket conveyor below the loading group (1), **characterized in that** the loader assembly (1) is according to any one of the preceding claims.

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5. Apparatus according to claim 4, **characterized in that** the conveyor belts run parallel and side by side between the production line and the loader assembly (1), wherein each long pasta unit is placed on both two conveyor belts transversely to the motion direction of the conveyor belts, wherein cutting means placed between the two conveyor belts are able to cut each single unit of long pasta in the middle zone, between the two conveyor belts, obtaining two long pasta units of half-length with respect to the single unit of long pasta previously loaded at the production line.

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6. Apparatus according to claim 5, **characterized in that** each descender (2) is able to receive the long pasta from a respective conveyor belt by means of a respective mouth (7).

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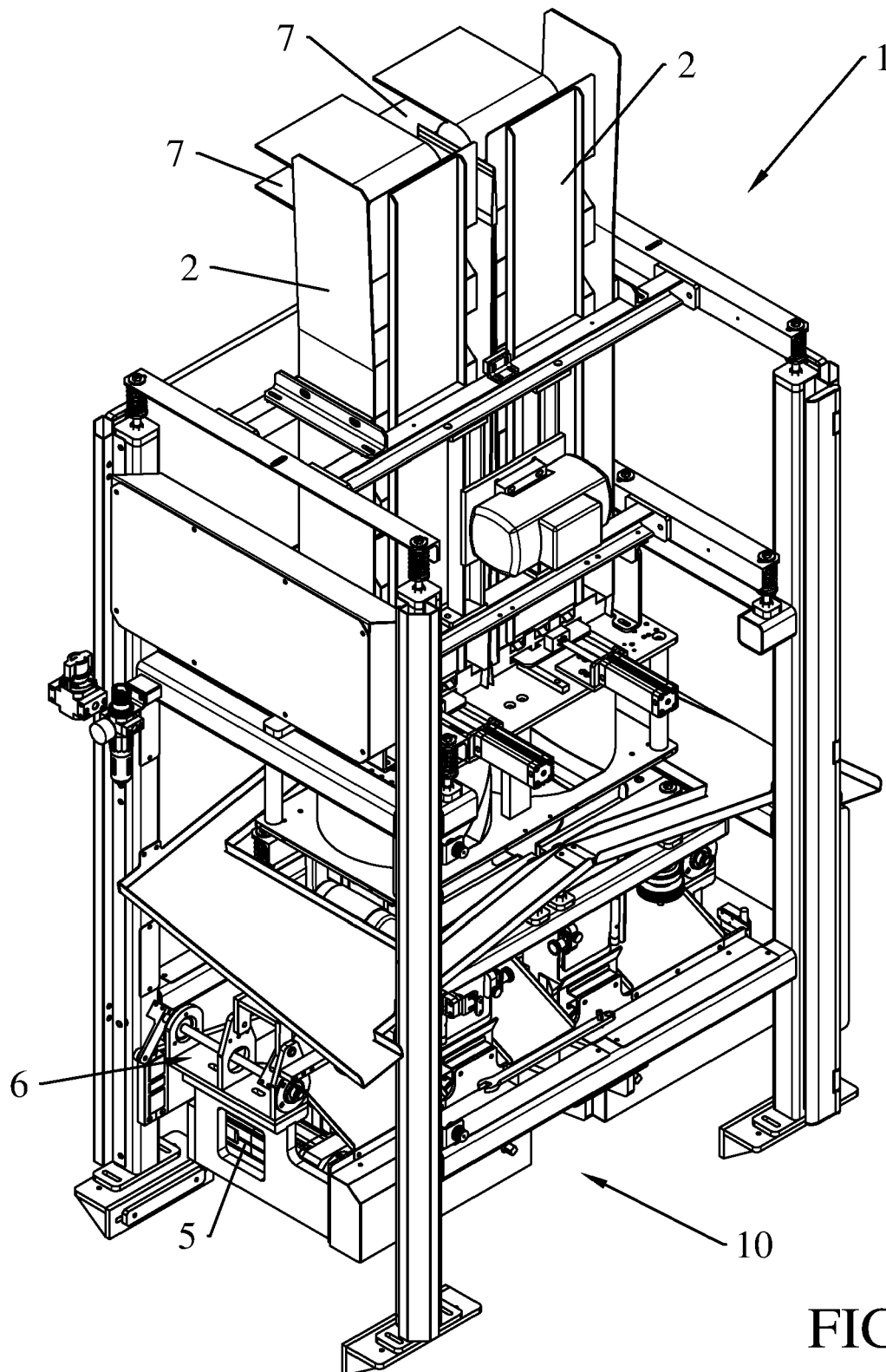


FIG.1

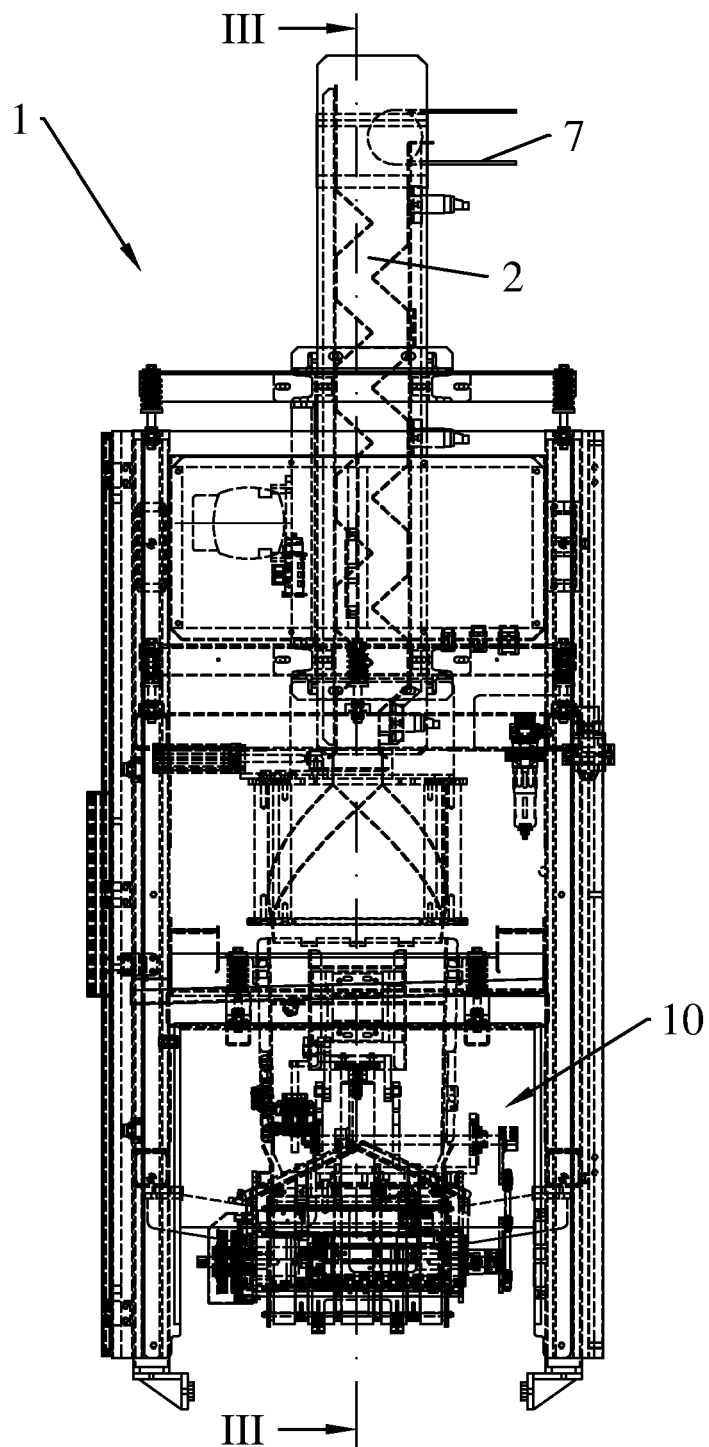
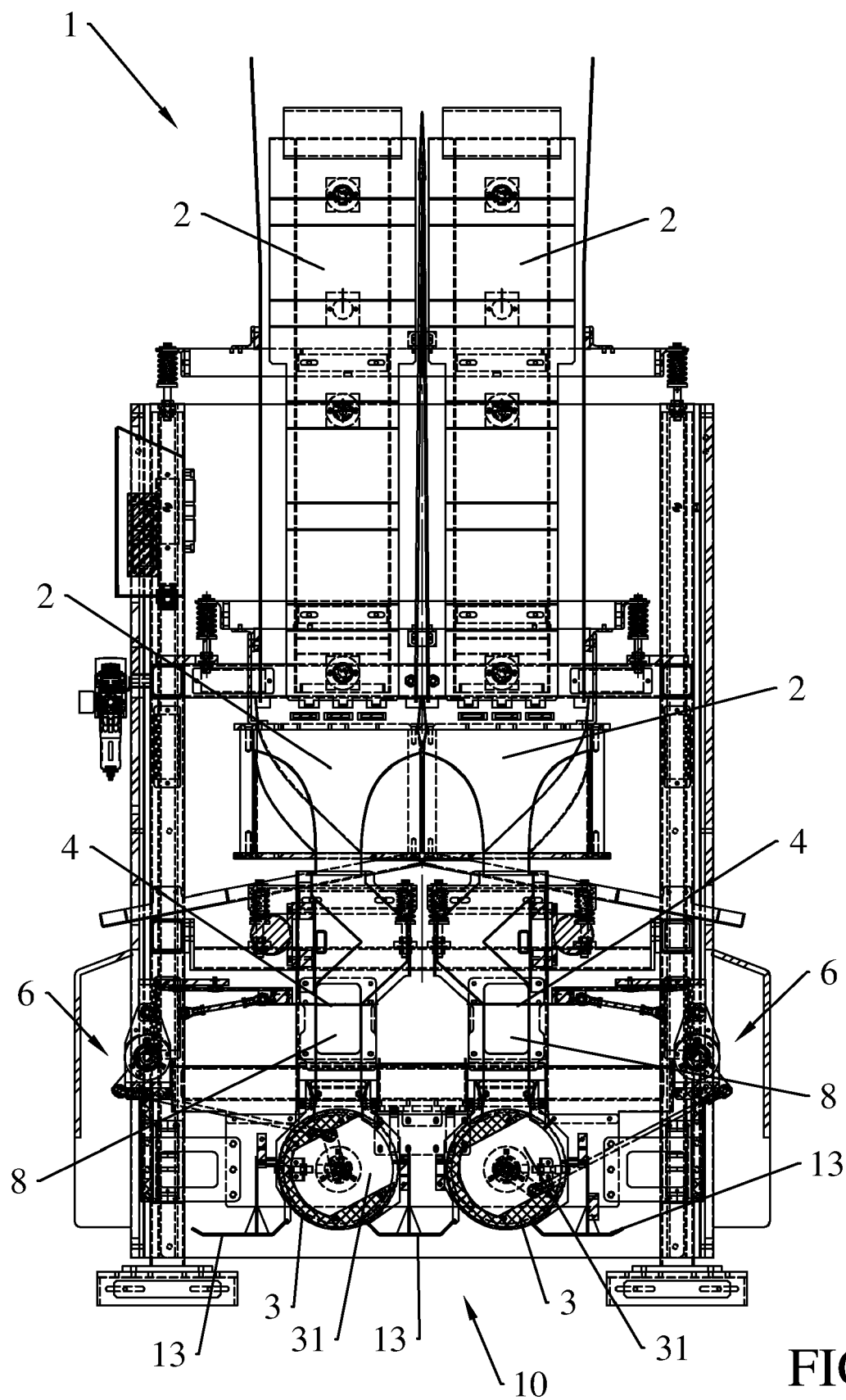


FIG.2



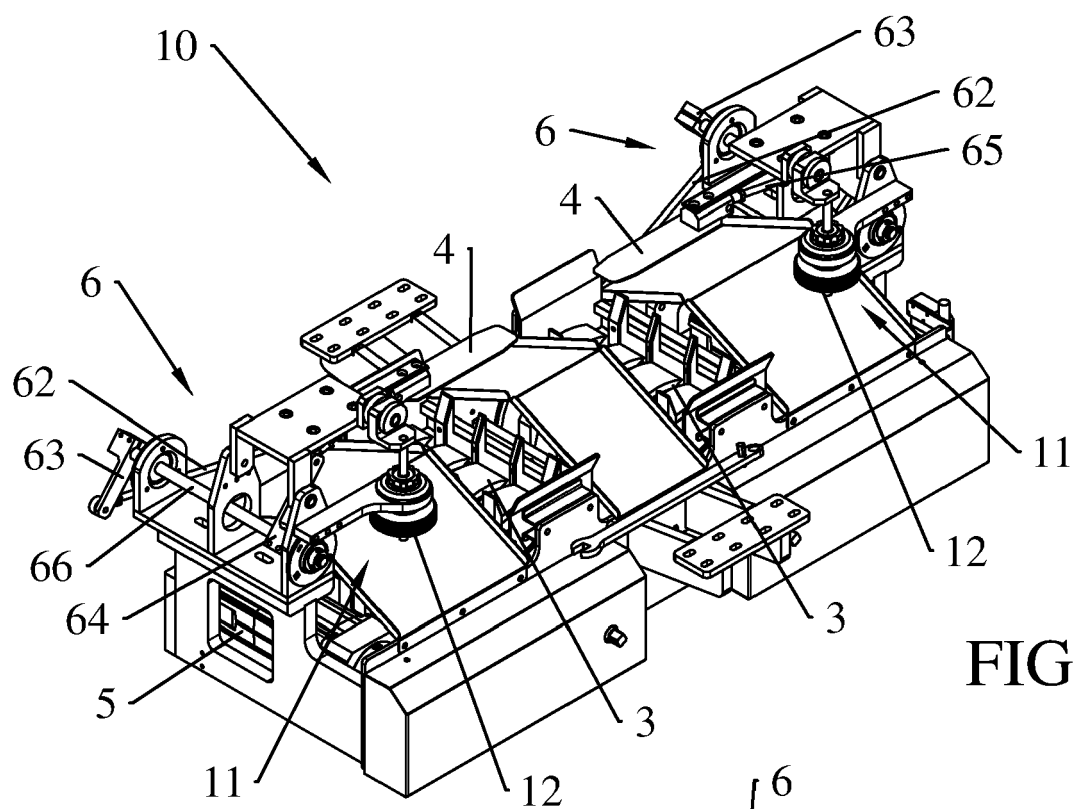


FIG.4

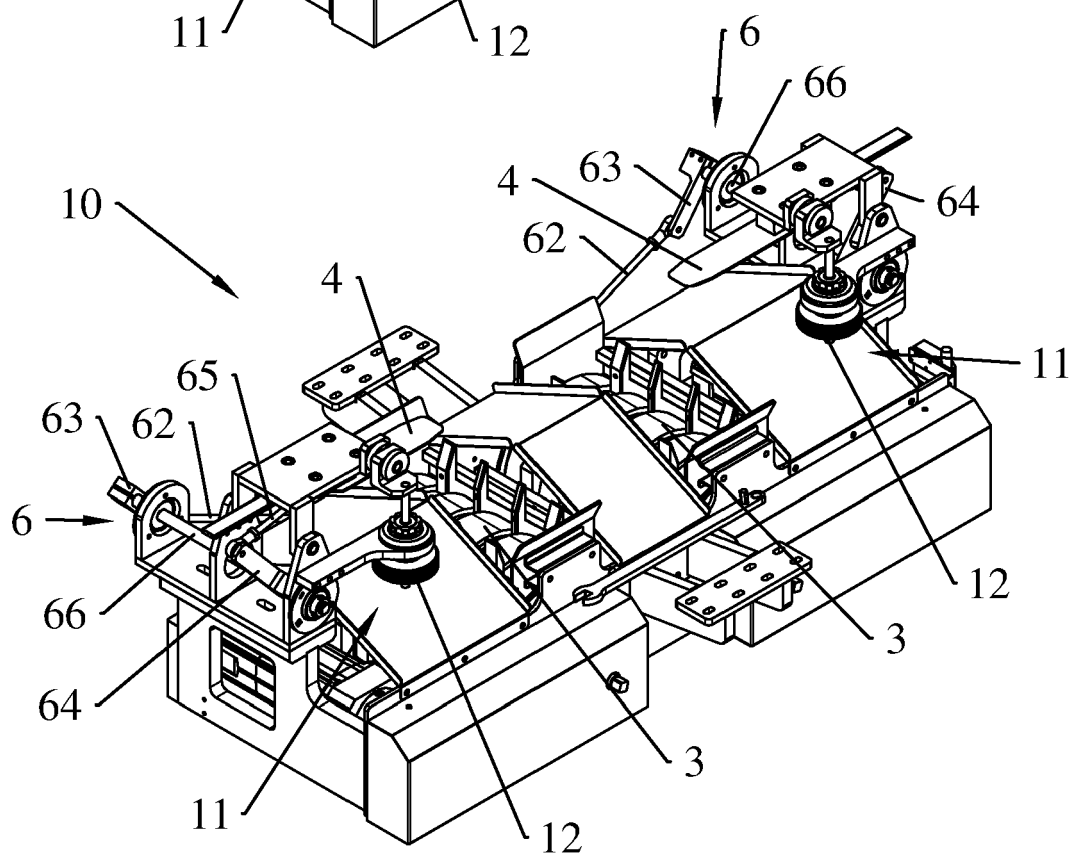


FIG.5

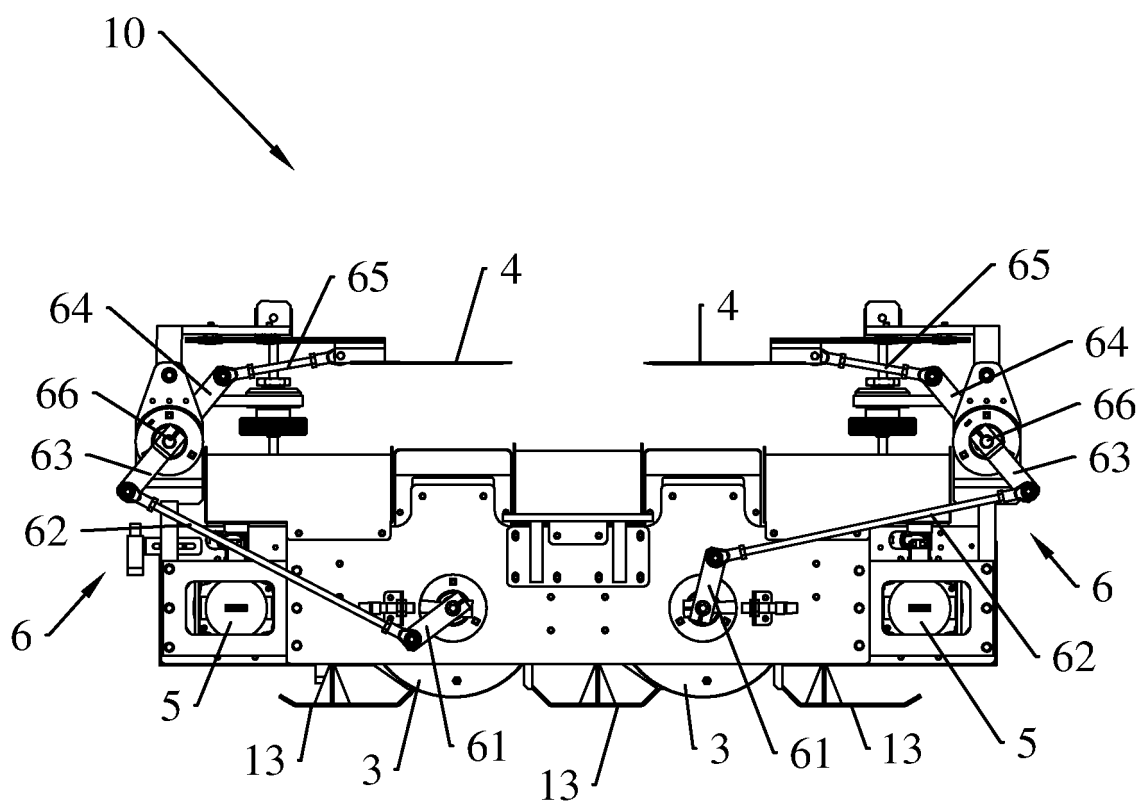


FIG. 6

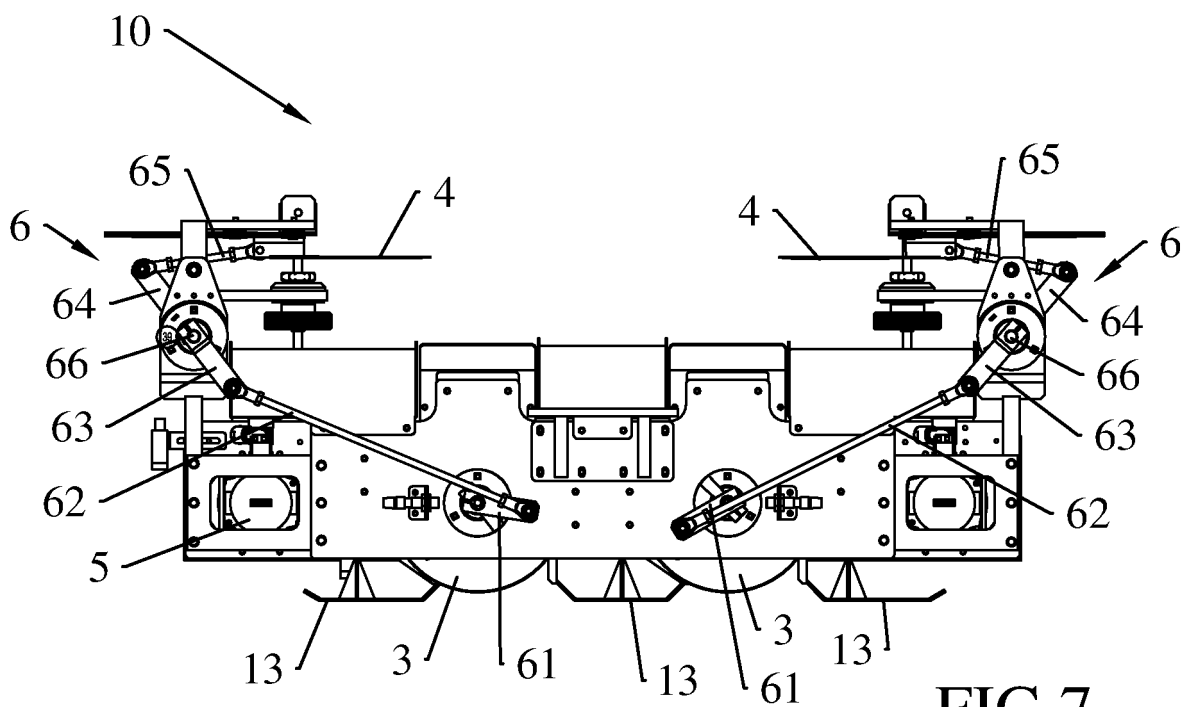


FIG. 7

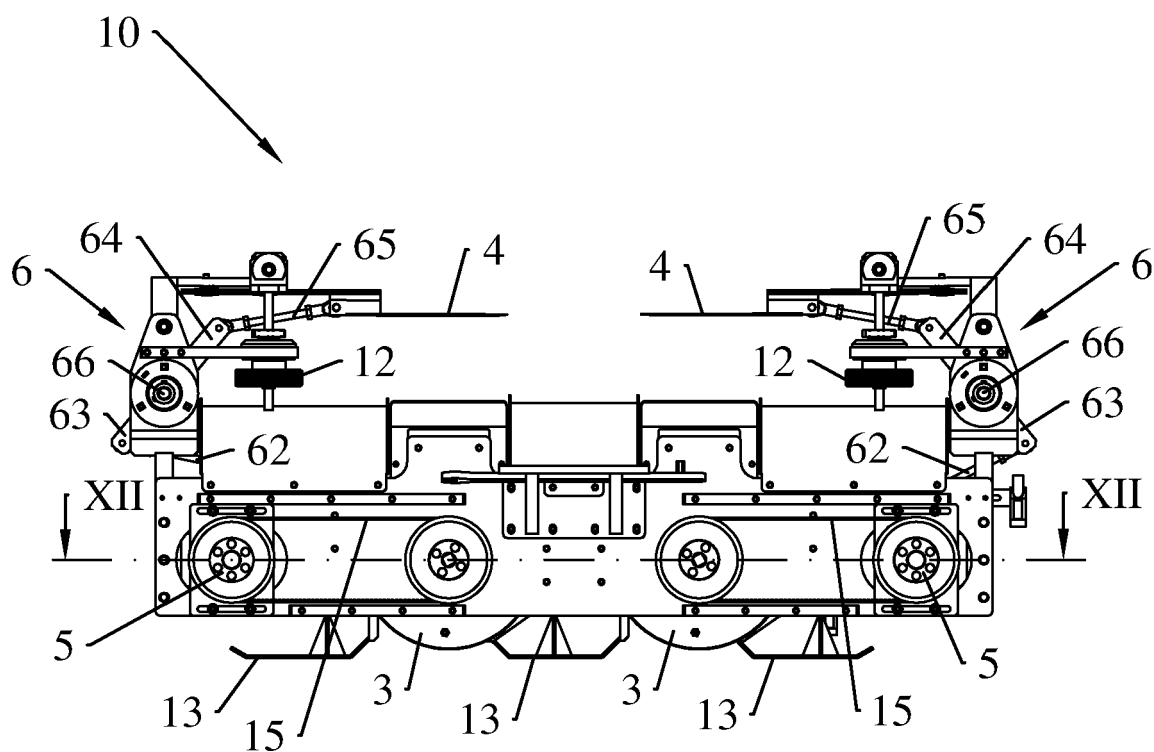


FIG. 8

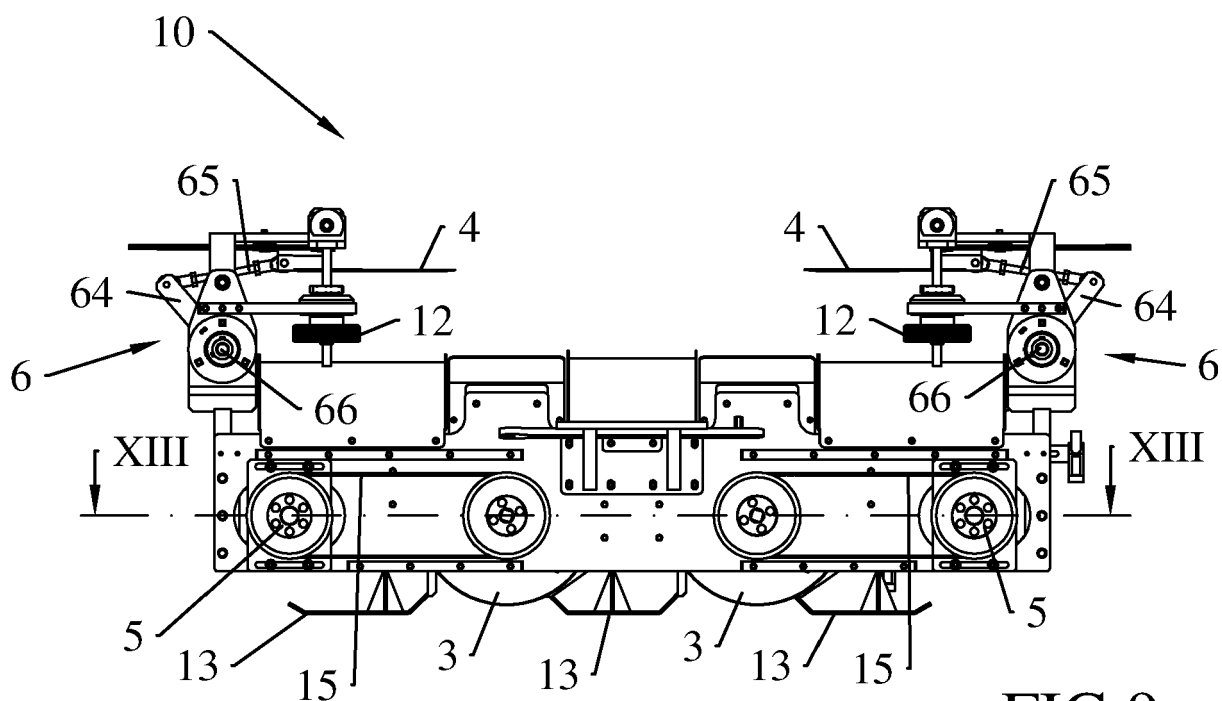


FIG. 9

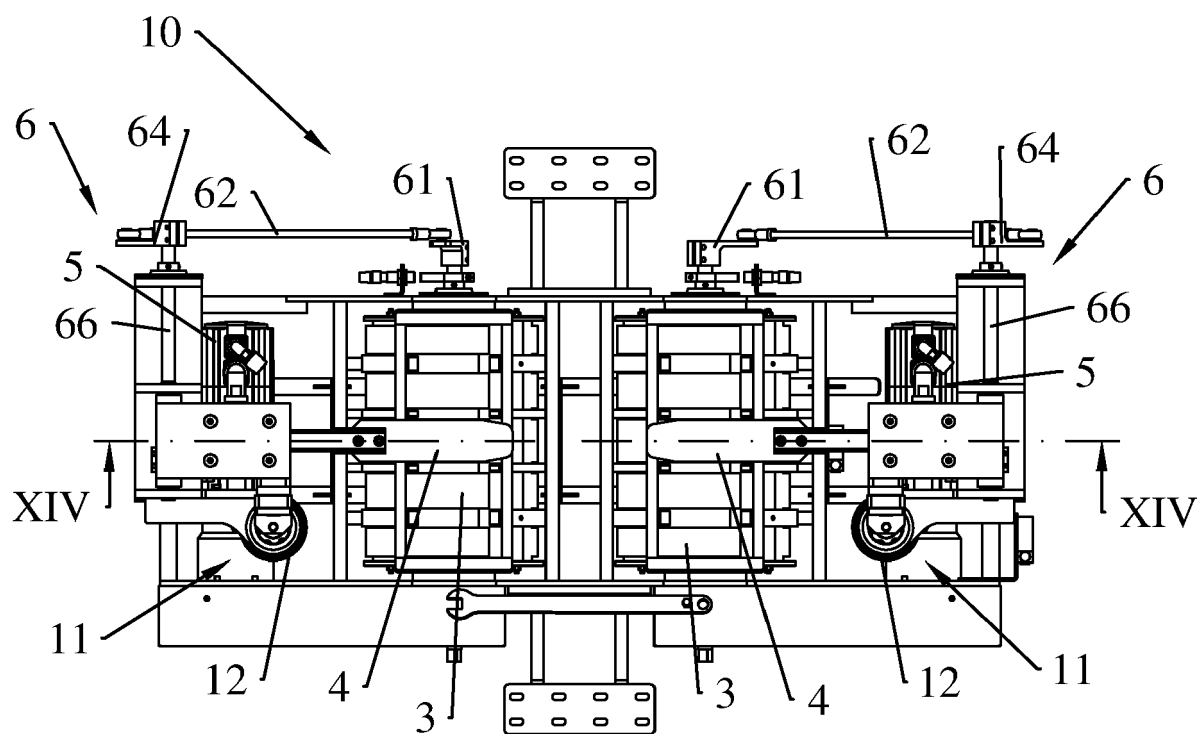


FIG.10

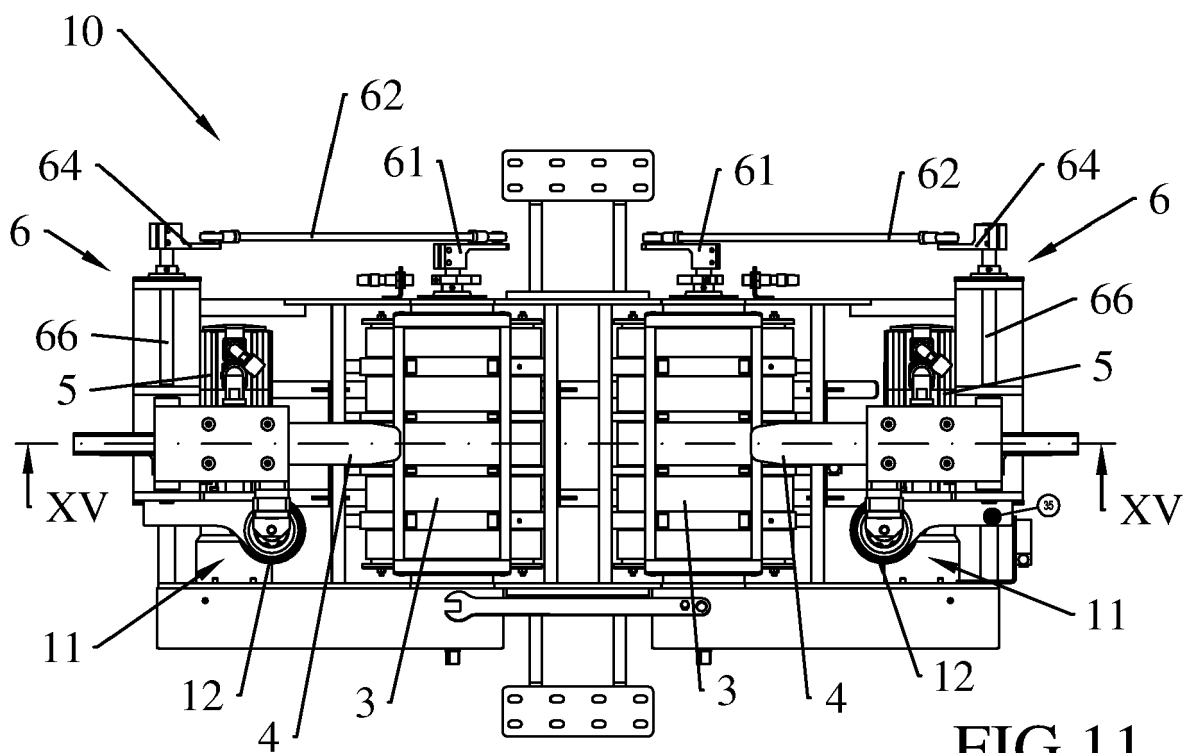


FIG.11

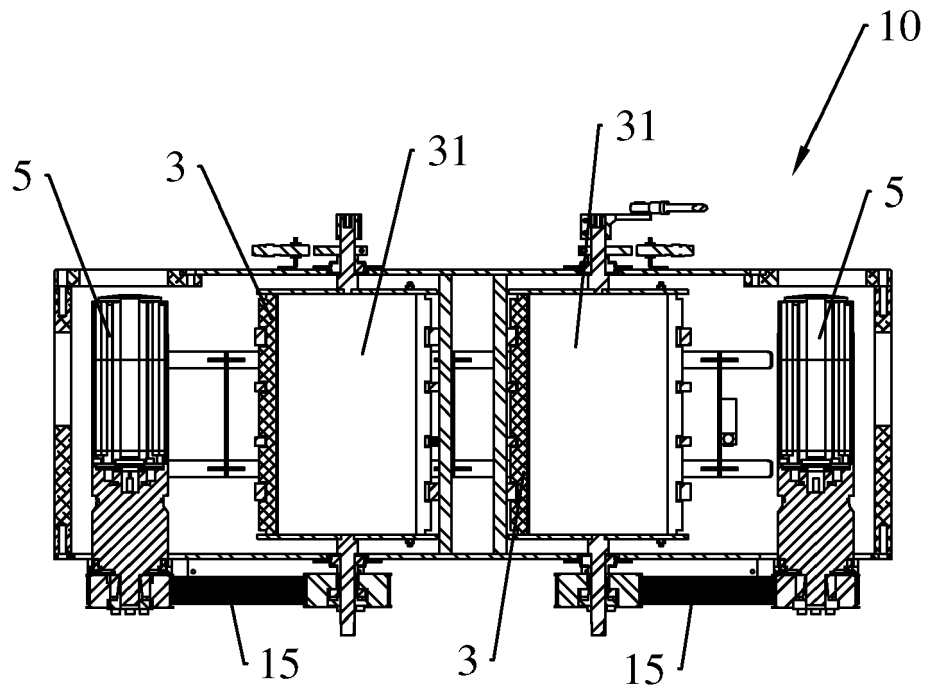


FIG.12

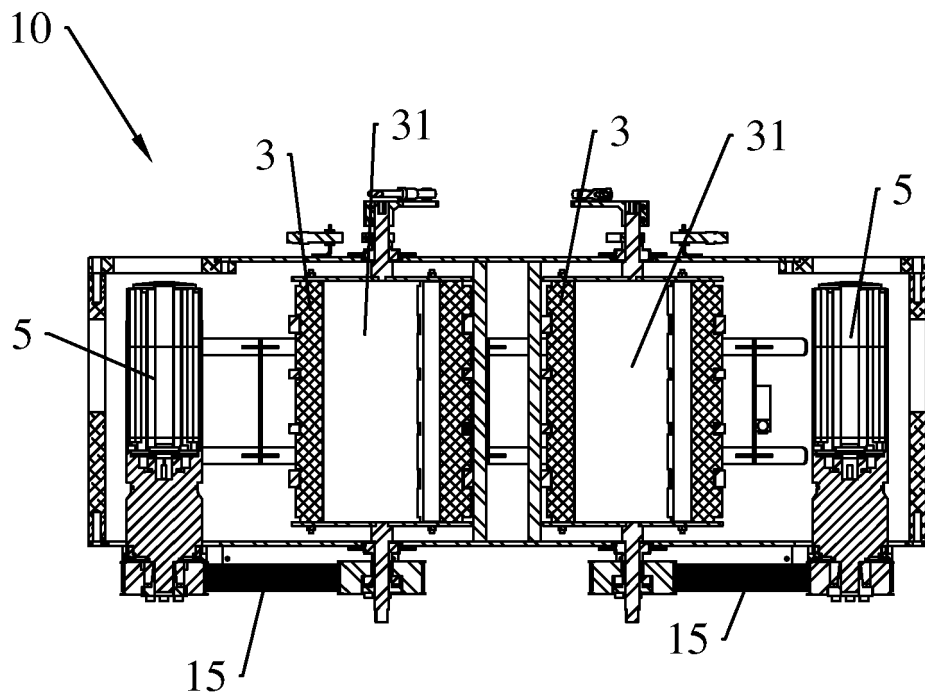


FIG.13

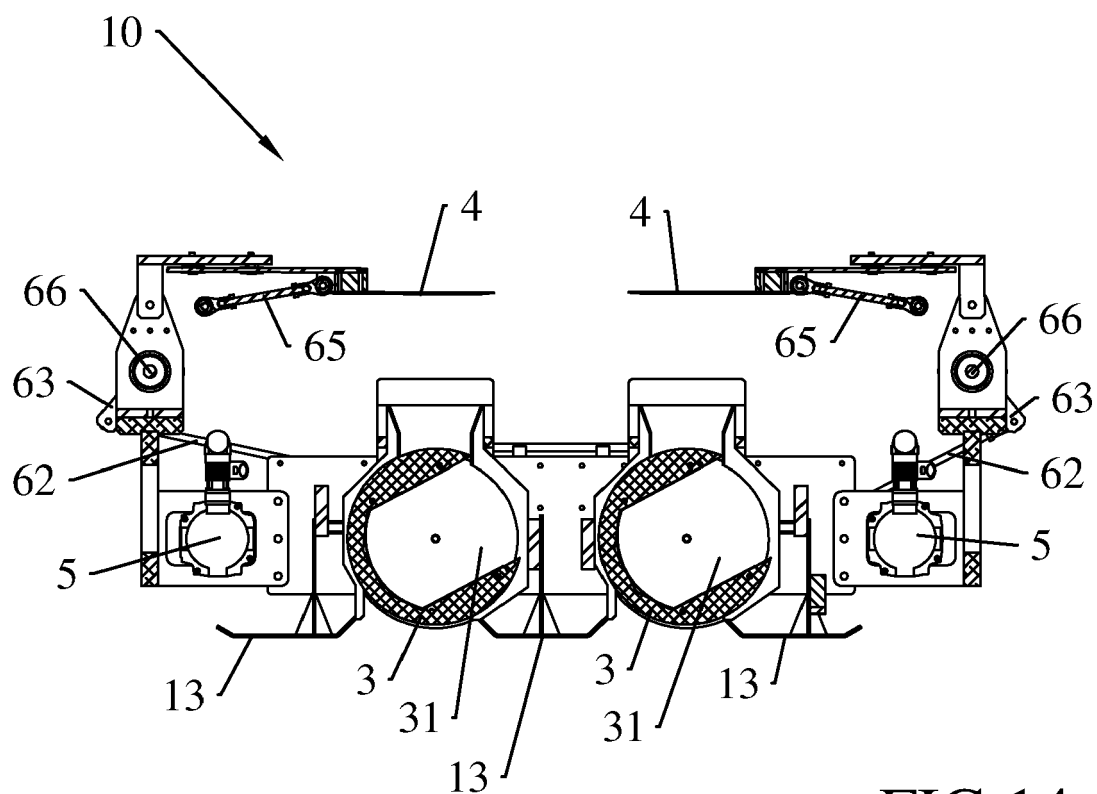


FIG. 14

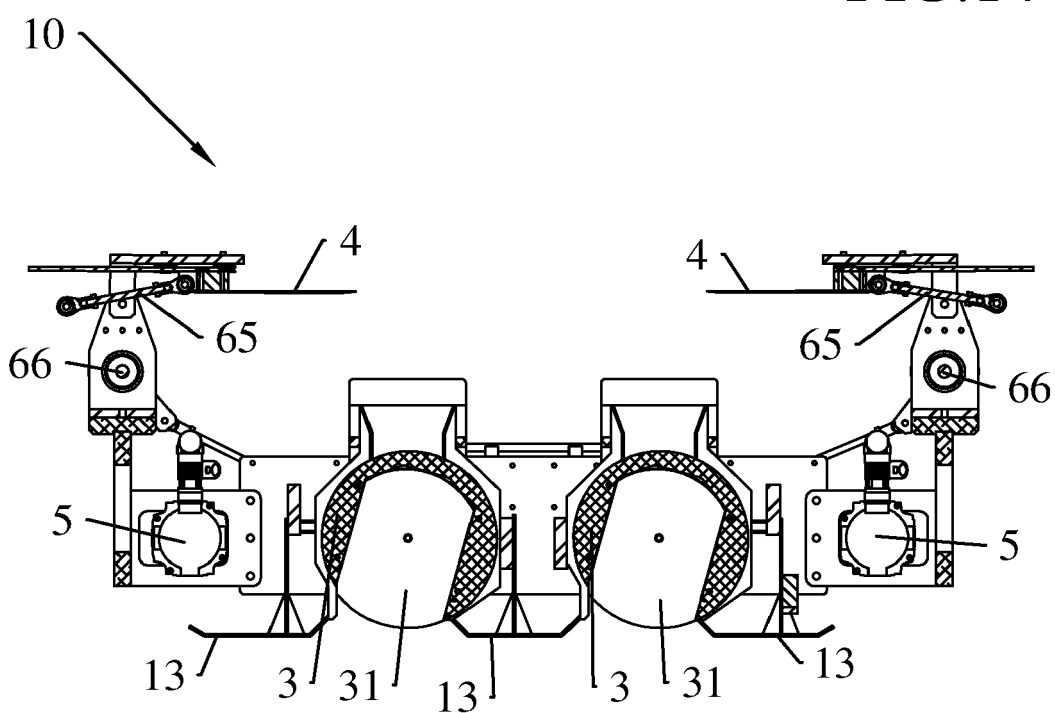


FIG. 15



EUROPEAN SEARCH REPORT

 Application Number
 EP 21 17 9734

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