(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 648 622 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
04.08.2021 Bulletin 2021/31

(21) Application number: **18735212.5**

(22) Date of filing: **20.06.2018**

(51) Int Cl.:
A24C 5/31 *(2006.01)* ***A24D 3/02*** *(2006.01)*

(86) International application number:
PCT/EP2018/066328

(87) International publication number:
WO 2019/007682 (10.01.2019 Gazette 2019/02)

(54) **A MACHINE FOR PRODUCING MULTI-SEGMENT RODS AND A METHOD FOR CLEANING A MACHINE FOR PRODUCING MULTI-SEGMENT RODS**

MASCHINE ZUR HERSTELLUNG VON MEHRSEGMENTSTÄBEN UND VERFAHREN ZUR REINIGUNG EINER MASCHINE ZUR HERSTELLUNG VON MEHRSEGMENTSTÄBEN

MACHINE DE PRODUCTION DE BÂTONNETS À SEGMENTS MULTIPLES ET PROCÉDÉ DE NETTOYAGE D'UNE MACHINE DE PRODUCTION DE BÂTONNETS À SEGMENTS MULTIPLES

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(30) Priority: **07.07.2017 PL 42215117**

(43) Date of publication of application:
13.05.2020 Bulletin 2020/20

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EP 3 648 622 B1

Description

TECHNICAL FIELD

[0001] The present disclosure relates to a machine for producing multi-segment rods, used in tobacco industry, comprising a system for automatic removal of segments from a collecting belt, and to a method for cleaning a collecting belt of a machine for producing multi-segment rods.

BACKGROUND

[0002] Tobacco industry products, such as cigarettes, may comprise segment filters (for example in a form of segments) with various filtering materials. The segments may have a form of rod-like elements having filtering properties or rod-like elements having non-filtering properties, for example comprising aromatic capsules or paper tubes. The segments are fed from containers, by transferring devices, onto a collecting transporter, and subsequently are transferred by a transferring module onto a garniture transporter, on which the segments are wrapped into a wrapper. When producing of such multi-segment rods, it is often needed to stop the operation of the machine for producing the multi-segment rods, or the machine may stop its operation automatically due to an error caused by a segment which is blocked on the transferring device, like a drum, a disc, a belt or a transferring chain. After each interruption of operation of the machine, the transferring devices need to be cleaned of the remaining segments therein, and also the segments located below the transferring devices (on the collecting transporter) need to be removed.

[0003] A British patent application GB1253617 presents a device for removing rod-like elements, in particular tobacco rods, which remained on a feeding path between a cutting head and a collecting drum after the machine was stopped. Before each subsequent restarting of the machine, the tobacco rods are removed from the path by converting their movement into transverse direction with respect to their longitudinal axis, by downwardly deflecting one side of a bar on which they are transported. It relates to tobacco rods, which are cut from a continuous rod into rods having a specified length. However, it does not solve the problem of removing segments from a collecting transporter, which is located at the opposite side of the cutting head, and removing the segments from transferring devices.

[0004] A European patent application EP1883318 presents a method for operating a machine for manufacturing tobacco articles. The method presents a method for cleaning the machine or a unit comprised in the machine, when an error has been detected by a control system. After detecting the error, a sensor sends an information to the control unit, which activates a process of cleaning the machine or the unit on which the error occurred. A disadvantage of this solution is that it does not solve the problem of cleaning the collecting transporter from the remaining segments after each interruption of operation of the machine, regardless of whether the error occurred or not. Moreover, the presented method relates only to a situation in which only a device on which the error was detected by the sensors is cleaned.

[0005] A European patent application EP3050441 discloses an apparatus for the manufacturing of multi-segment rods comprising a feeder delivering rod-like elements in the form of a rod-like elements train; a wrapping device situated downstream of the feeder in the direction of movement of the elements train, for wrapping a rod-like elements train into the wrapping material thereby forming a continuous rod; a conveying unit disposed between the feeder and the wrapping unit for the formation of the train of axially positioned rod-like elements and for transferring rod-like elements by means of a number of conveying wheels to the wrapping unit, whereas the rod-like elements are moved along guides, as well as cutting means used for cutting the continuous rod into rods, each containing a set of rod-like elements, characterised in that at least the last of the wheels in the unit conveying the rod-like elements to the wrapping device is a wheel whose circumferential surface is smooth.

[0006] In the prior art solutions, it is necessary to manually remove segments from the transferring devices and the collecting transporter, which is time-consuming and may cause irregularities during subsequent operation of the machine, if not all segments are removed.

[0007] There is a need to provide a method and a device which would allow more effective production of multi-segment rods, by allowing easier and faster cleaning of the collecting transporter, from the remaining segments after each interruption of operation of the machine. It would be desirable to provide a device that does not require additional sensors, nor controlling units, which is cheap to produce, easy to operate and is highly reliable.

SUMMARY

[0008] There is disclosed a machine for producing multi-segment rods for use in tobacco industry, the machine comprising: at least one feeding module for placing segments in a train, one after the other, on a collecting transporter for transporting the segments along a predefined transporting path in a direction towards a garniture transporter; a transferring module for transferring the segments from the collecting transporter onto the garniture transporter; the garniture transporter for transporting segments on a wrapper; a garniture device for wrapping the wrapper around the train of the segments to form a continuous rod; a cutting head for cutting the continuous rod into multi-segment rods; and a shifting mechanism for dislocating the collecting transporter with respect to the predefined transporting path to a cleaning position, wherein the segments while being transported on the collecting transporter are not in contact with any of the feeding modules.

[0009] When the collecting transporter is in the cleaning position, the segments, while being transported on the collecting transporter, may be not in contact with the transferring module.

[0010] The collecting transporter may be arranged along all the feeding modules.

[0011] The collecting transporter may be configured to be dislocated by changing its position with respect to the predefined transporting path by a distance in a range from 4 to 200mm, preferably from 4 to 50mm.

[0012] The collecting transporter may be configured to be dislocated by changing its position with respect to the predefined transporting path in a downward direction.

[0013] The collecting transporter may be mounted on at least one articulated arm.

[0014] The shifting mechanism may comprise at least two guides arranged angularly with respect to each other and a supporting element cooperating with the guides, wherein the supporting element is linearly movable.

[0015] The supporting element may be movable by means of a cylinder.

[0016] The machine may comprise a removing device for removing the segments from transferring devices.

[0017] The removing device may be configured to blow compressed air.

[0018] The machine may further comprise a controller for activating the shifting mechanism after interruption of operation of the machine that results from predefined types of interruption.

[0019] There is also disclosed a method for cleaning a machine for producing multi-segment rods for use in tobacco industry, the machine comprising: at least one feeding module for placing segments in a train, one after the other, on a collecting transporter for transporting the segments along a predefined transporting path in a direction towards a garniture transporter; a transferring module for transferring the segments from the collecting transporter onto the garniture transporter; the garniture transporter for transporting segments on a wrapper; a garniture device for wrapping the wrapper around the train of the segments to form a continuous rod; a cutting head for cutting the continuous rod into multi-segment rods; wherein the method comprises the steps of: dislocating the collecting transporter with respect to the predefined transporting path to a cleaning position, wherein the segments while being transported on the collecting transporter are not in contact with any of the feeding modules; and removing the segments from the collecting transporter while the collecting transporter is in the cleaning position.

[0020] The method may further comprise activating movement of the collecting transporter after it is dislocated to the cleaning position.

[0021] When the collecting transporter is in the cleaning position, the segments, while being transported on the collecting transporter, may be not in contact with the transferring module.

[0022] The method may comprise dislocating the collecting transporter by changing its position with respect to the predefined transporting path by a distance in a range from 4 to 200mm, preferably from 4 to 50mm.

[0023] The method may comprise dislocating the collecting transporter by changing its position with respect to the predefined transporting path in a downward direction.

[0024] The method may further comprise removing the segments from transferring devices.

[0025] The method may comprise removing the segments from the transferring devices before removing the segments from the collecting transporter.

[0026] The method may comprise removing the segments from the transferring devices by means of compressed air.

[0027] The method may comprise activating the shifting mechanism after interruption of operation of the machine resulting from predefined types of interruption.

[0028] The solution presented herein allows producing filter rods in a more effective way by eliminating the need for manual cleaning of the collecting transporter from the remaining segments or removing blocked segments from the transferring devices, which would be time-consuming and require involvement of an operator. Moreover, implementation of such solution on the machine is cheaper and does not require installation of additional sensors nor controlling units, therefore the presented solution is easier to operate and more reliable with respect to other cleaning systems known in the prior art.

BRIEF DESCRIPTION OF FIGURES

[0029] The present disclosure is shown by means of example embodiments in a drawing, in which:

Fig. 1 shows a machine for producing multi-segment rods;

Fig. 2 shows schematically a fragment of the machine during producing the multi-segment rods;

Fig. 3 shows schematically a fragment of a machine for producing multi-segment rods, with a shifting mechanism, during stoppage and during changing of a position of a collecting transporter;

Fig. 4a shows the collecting transporter in a working position, in a side cross-sectional view;

Fig. 4b shows the collecting transporter in a cleaning position, after shifting;

Fig. 5a shows the shifting mechanism in a working position;

Fig. 5b shows the shifting mechanism in a cleaning position;

Fig. 5c shows a second embodiment of the shifting mechanism;

Fig. 5d shows a third embodiment of the shifting mechanism;

Fig. 6 shows schematically a fragment of the machine for producing multi-segment rods during removal of the segments from the collecting transport-

er;

Fig. 7 shows schematically a fragment of the machine for producing multi-segment rods after removal of the segments from the collecting transporter;

Fig. 8 shows schematically a fragment of the machine for producing multi-segment rods in position ready for restarting;

Fig. 9 shows an arrangement of a train of segments on the collecting transporter in a position before restarting;

Fig. 10 shows a process of removing of the segments from the transferring devices;

Fig. 11 shows the process of removing of the segments from the transferring devices with an inclined transferring disc.

[0030] Fig. 1 shows a machine 1 for producing multi-segment rods R for tobacco industry, comprising a part A for preparing a train 20 of segments and a part B for producing multi-segment rods. The train 20 of segments with defined sequence is formed on a collecting transporter 6, wherein segments 5a, 5b, 5c are fed on the collecting transporter from feeding modules 2, 3, 4. The formed train 20 of segments is transferred onto a garniture transporter 9 by a transferring module 8. On the garniture transporter, the train 20 of segments is wrapped into a wrapper 10 and next the formed multi-segment rod 12 is cut into single multi-segment rods R.

[0031] The amount of feeding modules present on the machine for producing multi-segment rods depends on a construction of the multi-segment rod, and specifically it depends on the amount and types of segments, from which it is formed. The presented solution may be applied on the machine for producing multi-segment filter rods as well as for producing multi-segment rods used in new generation cigarettes, for example "heat not burn". The segments utilized for producing of such rods may have filtering properties, for example the segment made of acetate fibers or comprising activated charcoal, taste properties, for example the segment comprising aromatic capsule, cooling properties, or properties for directing cigarette smoke, for example paper tubes. There are also utilized tobacco heating segments, which may comprise heating elements such as a sheet metal insert or spiral located inside tobacco segments, or which may be made of a flammable material such as extruded tobacco mixed with charcoal in a form of a rod. The collecting transporter 6 is located on a collecting bar 7, which may be installed as a single element or may be divided into several shorter interconnected bars. The collecting bar 7 is arranged along all of the feeding modules 2, 3, 4 up to the transferring module 8, transferring the segments onto the garniture transporter. The collecting transporter 6 may have a form of a band, a belt, or an elastic chain on which the segments 5a, 5b, 5c are placed sequentially, longitudinally, one after the other from each feeding module 2, 3, 4 in a specified configuration. The segments 5a, 5b, 5c arranged on the collecting transporter 6 are transported towards the transferring module 8, on which a change of distance between the segments or a group of the segments 5a, 5b, 5c may be performed, and next the segments are transferred onto the garniture transporter 9 on which the segments are wrapped into the wrapper 10 by the garniture device 11. The formed continuous multi-segment rod 12 is cut by a cutting head 13 into multi-segment rods R having specified length.

[0032] During producing of the multi-segment rods R it may be needed to stop the machine 1 which is equivalent to stopping of the segments 5a, 5b, 5c during transporting on the collecting transporter 6 and transferring devices 16a, 16b, 16c, as depicted in Fig. 2. The segments 5a, 5b, 5c remaining after interruption of operation of the machine 1 have to be removed before restarting the machine 1. If the remaining segments 5a, 5b, 5c are not removed from the collecting transporter 6, there is a risk of collision of the segments 5a, 5b, 5c with the transferring module 8, and specifically with teeth 17a-17f of a first transferring wheel 17 and teeth of transferring discs 18a, 18b, 18c. Depending on the cause of interruption of operation of the machine 1, several sequences of removal of the segments 5a, 5b, 5c from the transferring devices 16a, 16b, 16c and the collecting transporter 6, are possible.

[0033] Fig. 3 shows an automatic process of cleaning, which in the present case consists of changing the position of the collecting bar 7, on which is located the collecting transporter 6 with the segments 5a, 5b, 5c, with respect to a transporting path P, depicted as a dashed line, to a cleaning position in which it is possible to start the collecting transporter 6 and to remove the remaining segments 5a, 5b, 5c without collision.

[0034] The change of position of the collecting transporter 6 with respect to the transporting path P is performed by means of at least one shifting mechanism 19, for example a cylinder 19a or an electric motor, as depicted in Fig. 3 in a partial cross-sectional view of the machine 1. Alternatively, the transferring devices 16a, 16b, 16c and the transferring module 8 may be lifted to a height on which the collision with the transferring segments 5a, 5b, 5c, and specifically in this case with the transferring discs 18a, 18b, 18c and the transferring wheel 17 of the transferring module 8, will not occur.

[0035] Figs. 4a-4b show in a cross-section view, a preferable change of position, by lowering the collecting transporter 6 with respect to the transporting path P by a distance Y, where Y=Y1 - Y2 and preferably is equal from 4-50mm. The range of distance Y may be significantly wider, however it has to fulfill the condition of eliminating the collision of the segments 5a, 5b, 5c, located on a belt 14 of the collecting transporter 6, with the transferring discs 18a, 18b, 18c and the transferring wheel 17 of the transferring module 8. The minimal value of the range of dislocation should not be less than half of a diameter of the transported segment 5a, 5b, 5c. Other embodiments of this solution are also possible, for example moving the bar aside or askew with respect to the

transporting path P, which are not shown on the figure.

[0036] Figs. 5a and 5b show an embodiment of the shifting mechanism 19. An upper part 24, which is the collecting bar 7, on which the collecting transporter 6 is located, is a movable part which moves in an up-down direction. The movement may result from direction displacement components of the upper part 24. The rising and lowering of the upper part 24 is forced by a linear motion of the cylinder 19a. The upper part 24, of the shifting mechanism 19 is equipped with at least two guides 26a which cooperate with guides 26b located on a supporting element 27. The supporting element 27 is adapted to perform a linear motion in a direction depicted by an arrow. The linear motion may be forced by the cylinder 19a or by the electric motor. Fig. 5a shows the shifting mechanism 19 in a working position W. A distance between the collecting transporter 6 and a lower part 25 of the shifting mechanism 19 in this position is equal to L1. Actuating the cylinder 19a will cause linear dislocation of the supporting element 27 to the right, together with two guides 26b. Due to a mutually angular arrangement, the guides 26a of the upper part 24 of the shifting mechanism, move on the guides 26b, causing the lowering of the collecting transporter to the cleaning position R as shown in fig. 5b. A distance of the collecting transporter 6 from the lower part 25 of the shifting mechanism 19 in the cleaning position R is equal to L2. Whereas L1>L2 and L1 - L2 is equal to Y defining the lowering of the collecting transporter 6 with respect to the transporting path P.

[0037] Fig. 5c shows another embodiment of the shifting mechanism 19. The shifting mechanism 19 is equipped with two articulated arms 28 connecting the movable upper part 24 with the immovable lower part 25. The articulated arms 28 are connected with the supporting element 27. The cylinder 19a, connected to one of the articulated arms 28, making the linear motion causes a change of position of the articulated arms 28, and thereby causes lifting of the upper part 24, which is the collecting bar 7 and the collecting transporter 6 to the working position W depicted in a drawing by a dashed line, or causes lowering to the cleaning position R.

[0038] Other embodiments of the shifting mechanism 19 are also possible, for example with one articulated-sliding arm 28a located at a first end of the collecting transporter 6 and with hinged mounting 29 of at a second end of the collecting transporter 6, as presented in fig. 5d. In such embodiment, the collecting transporter 6 is raised or lowered angularly at the side of a first end of the collecting transporter 6, whereas its second end will only change its angular position, remaining on the same level.

[0039] In another embodiment, the shifting mechanism 19 may have a vertical guide, on which the collecting transporter 6 moves in the up-down direction.

[0040] Fig. 6 shows a process of removal of the segments 5a, 5b, 5c located only on the collecting transporter 6, in case when the machine 1 is stopped by an operator. The segments 5a, 5b, 5c remaining on the collecting transporter 6 are removed automatically. Automatically means that they are removed without intervention of the operator, by the machine itself, by temporary starting a drive of the collecting transporter 6 and transferring of the segments 5a, 5b, 5c remaining on the transporter, outside the machine or to a bin located at the end of the transporter. It is conducted owing to a program stored in a machine controller, which comprises all steps of the cleaning process depending on the type of interruption of operation of the machine 1. The transferring devices 16a, 16b, 16c, together with the segments located on them, remain stopped during the process of removal of the segments 5a, 5b, 5c from the collecting transporter 6.

[0041] After removal of the segments 5a, 5b, 5c from the collecting transporter 6 (Fig. 7), the transferring devices 16a, 16b, 16c and the transferring module 8 are set into working position, being such, that the segments 5a, 5b, 5c located on them will be in a specified location on the transferring discs 18a, 18b, 18c and will be ready to be fed onto the collecting transporter 6 in a specified time, to form a train of segments having specified configuration, transported one after the other towards the transferring module 8. The collecting bar 7 returns to its working position, the position in which a contact surface S of the collecting transporter 6 on which the segments 5a, 5b, 5c are placed, will be on the same level as the transporting path P.

[0042] The positioning of the transferring module 8 consists in setting the tooth 17a of the transferring wheel 17 to a working position, which is the position allowing contact of the tooth 17a with the first segment transferred in the train on the transporter. In this case, it is the positioning of one of the teeth of the transferring wheel 17, specifically the tooth 17a in a lowermost position.

[0043] Fig. 8 shows a restarting of the machine 1, in which a transferring disc 18a, which was in the working position feeds the segments 5a in a specified spaced manner onto the collecting transporter 6. The segments 5a placed on the collecting transporter 6 are transported in a direction of the transferring disc 18b which is feeding the segments 5b. The segments 5a, 5b are subsequently transported on the collecting transporter 6 towards the transferring disc 18c which feeds subsequent segments 5c in a predetermined spaced manner such, that the segments 5a, 5b, 5c with the transferring disc 18c form the train 20 of segments or the train of group of segments with required arrangement with respect to each other.

[0044] The arranged train 20 of segments is transported on the collecting transporter 6 until the first segment 20a, located at the front of the train 20 of segments, contacts the tooth 17a of the transferring wheel 17 of the transferring module 8, as depicted in an enlarged view in Fig. 9. At the moment of contact of the first segment 20a with the tooth 17a of the transferring wheel 17, the transferring module 8 which transfers the train 20 of segments from the collecting transporter 6 onto the garniture transporter 9 is started. Because, in order to set the tooth 17a in the lowest position, the transferring wheel 17 had

to perform a part of the revolution, which could cause that between the tooth 17a and a preceding tooth 17b a gap G is formed in the train 20 of segments, which in a later stage will be rejected after cutting the continuous rod on the cutting head 13.

[0045] In case when the machine 1 is stopped due to stoppage of one of the feeding modules 2, 3, 4, which may be caused for example by an error due to a blockage of the segments in the transferring device 16a, 16b, 16c or stoppage of the module by the operator, the cleaning process will be performed in a different configuration.

[0046] First, the segments remaining on the transferring devices 16a, 16b, 16c of the module which was stopped, will be removed and next the segments 5a, 5b, 5c remaining on the collecting transporter 6 will be removed as depicted in Fig. 10.

[0047] The process of removing the segments 5a, 5b, 5c from the transferring devices 16a, 16b, 16c is performed by rising or deflecting (turning aside) a drum 21, with a transferring spiral, from the segments transporting path P under the drum 21, removing the segments 5a, 5b, 5c located on the transporting path P by means of a removing device 22. The removing device 22 may remove the segments 5a, 5b, 5c utilizing a jet of compressed air, as depicted in Fig. 10, or may remove the segments 5a, 5b, 5c mechanically, for example by means of sweeping brushes. Next the segments located on a cam 23 are removed. The removal of the segments from the cam 23, is performed by deflecting the transferring disc 18a, 18b, 18c and rotating the cam 23 until all the segments 5a, 5b, 5c located on the cam 23 are removed. In case when the segments 5a, 5b, 5c are blocked on the cam, it is also possible to attempt removing the blocked segment by setting the cam 23 into cycle of short forward and backwards rotational motions. If the blocked segment is still not removed, then the cam 23 may be moved aside from the transferring disc 18a, 18b, 18c and the full revolution may be made after which the blocked segment is removed. Additionally, during the removal process of the segments 5a, 5b, 5c from the cam 23, a further pneumatic or mechanical removing device may be used (not shown in the figure).

[0048] Fig. 11 shows the process of removing of the segments 5a, 5b, 5c located on the transferring disc 18a, 18b, 18c by inclining the disc with respect of the collecting transporter 6 and performing the rotation until a moment, when all segments located on its circumference between the teeth are removed. The process is performed at the same time, or just after the segments are removed from the cam 23 and the drum 21.

[0049] When all the segments 5a, 5b, 5c are removed from the transferring devices 16a, 16b, 16c, then the segments 5a, 5b, 5c are removed from the collecting transporter 6 on which are located the segments 5a, 5b, 5c stopped during transportation and the segments, which could fall on the collecting transporter 6 during the cleaning process of the transferring devices 16a, 16b, 16c, located above. The process is performed in the same way as the process described in Figs 3-7. The collecting transporter 6 is lowered, the drive of the collecting transporter 6 is started until all the remaining segments are removed from it, after which the drive of the collecting transporter 6 is stopped and the collecting bar 7 together with the collecting transporter is lifted to the working position. The removal of the segments from the collecting transporter 6 may be enhanced, for example by pneumatic devices for removing remaining segments.

[0050] After such performed cleaning process, the machine 1 is ready for restarting, wherein sequentially from each feeding module 2, 3, 4 the segments 5a, 5b, 5c are transferred by means of the transferring devices 16a, 16b, 16c onto the collecting transporter 6, on which the segments set in a specified configuration are transported in a direction of the transferring module 8 until the first segment 20a of the train 20 of segments contacts the tooth 17a of the transferring wheel 17 and next are transferred further by the transferring module 8 onto the garniture transporter 9.

Claims

1. A machine for producing multi-segment rods for use in tobacco industry, the machine comprising:

   - at least one feeding module (2, 3, 4) for placing segments (5a, 5b, 5c) in a train, one after the other, on a collecting transporter (6) for transporting the segments along a predefined transporting path (P) in a direction towards a garniture transporter (9);
   - a transferring module (8) for transferring the segments from the collecting transporter (6) onto the garniture transporter (9);
   - the garniture transporter (9) for transporting segments on a wrapper (10);
   - a garniture device (11) for wrapping the wrapper (10) around the train of the segments to form a continuous rod;
   - a cutting head (13) for cutting the continuous rod into multi-segment rods;

   characterized in that it further comprises:

   - a shifting mechanism (19) for dislocating the collecting transporter (6) with respect to the predefined transporting path (P) to a cleaning position, wherein the segments while being transported on the collecting transporter (6) are not in contact with any of the feeding modules (2, 3, 4).

2. The machine according to claim 1, wherein when the collecting transporter (6) is in the cleaning position, the segments (5a, 5b, 5c), while being transported on the collecting transporter (6), are not in contact

with the transferring module (8).

3. The machine according to any of the previous claims, wherein the collecting transporter (6) is arranged along all the feeding modules (2, 3, 4).

4. The machine according to any of the previous claims, wherein the collecting transporter (6) is mounted on at least one articulated arm.

5. The machine according to claim 4, wherein the shifting mechanism (19) comprises at least two guides arranged angularly with respect to each other and a supporting element cooperating with the guides, wherein the supporting element is linearly movable.

6. The machine according to claim 5, wherein the supporting element is movable by means of a cylinder.

7. The machine according to any of the previous claims, comprising a removing device for removing the segments (5a, 5b, 5c) from transferring devices (16a, 16b, 16c).

8. A method for cleaning a machine for producing multi-segment rods for use in tobacco industry, the machine comprising:

- at least one feeding module (2, 3, 4) for placing segments (5a, 5b, 5c) in a train, one after the other, on a collecting transporter (6) for transporting the segments along a predefined transporting path (P) in a direction towards a garniture transporter (9);
- a transferring module (8) for transferring the segments from the collecting transporter (6) onto the garniture transporter (9);
- the garniture transporter (9) for transporting segments on a wrapper (10);
- a garniture device (11) for wrapping the wrapper (10) around the train of the segments to form a continuous rod;
- a cutting head (13) for cutting the continuous rod into multi-segment rods;

the method **characterized in that** it comprises the steps of:

- dislocating the collecting transporter (6) with respect to the predefined transporting path (P) to a cleaning position, wherein the segments while being transported on the collecting transporter (6) are not in contact with any of the feeding modules (2, 3, 4); and
- removing the segments from the collecting transporter (6) while the collecting transporter (6) is in the cleaning position.

9. The method according to claim 8, further comprising activating movement of the collecting transporter (6) after it is dislocated to the cleaning position.

10. The method according to any of claims 8 or 9, comprising dislocating the collecting transporter (6) by changing its position with respect to the predefined transporting path (P) by a distance in a range from 4 to 200mm, preferably from 4 to 50mm.

11. The method according to any of claims 8 or 9, comprising dislocating the collecting transporter (6) by changing its position with respect to the predefined transporting path (P) in a downward direction.

12. The method according to any of claims 8-11, further comprising removing the segments (5a, 5b, 5c) from transferring devices (16a, 16b, 16c).

13. The method according to claim 12, comprising removing the segments (5a, 5b, 5c) from the transferring devices (16a, 16b, 16c) before removing the segments from the collecting transporter (6).

14. The method according to any of claims 12-13, comprising removing the segments (5a, 5b, 5c) from the transferring devices (16a, 16b, 16c) by means of compressed air.

15. The method according to any of claims 12-14, comprising activating the shifting mechanism (19) after interruption of operation of the machine (1) resulting from predefined types of interruption.

Patentansprüche

1. Maschine zum Herstellen von Mehrsegment-Strängen zur Verwendung in der Tabakindustrie, wobei die Maschine umfasst:

- mindestens ein Zuführmodul (2, 3, 4) zum Einlegen von Segmenten (5a, 5b, 5c) in einer Reihe nacheinander auf einen Sammeltransporter (6) zum Transportieren der Segmente entlang einer vordefinierten Transportstrecke (P) in Richtung auf einen Garniturtransporter (9);
- ein Überführungsmodul (8) zum Überführen der Segmente vom Sammeltransporter (6) auf den Garniturtransporter (9);
- den Garniturtransporter (9) zum Transportieren von Segmenten auf einem Deckblatt (10);
- eine Garniturvorrichtung (11) zum Wickeln des Deckblatts (10) um die Reihe der Segmente, um einen kontinuierlichen Strang zu bilden;
- einen Schneidkopf (13) zum Schneiden des kontinuierlichen Strangs in Mehrsegment-Stränge;

dadurch gekennzeichnet, dass sie ferner umfasst:

- einen Verschiebemechanismus (19) zum Versetzen des Sammeltransporters (6) in Bezug auf die vordefinierte Transportstrecke (P) in eine Reinigungsposition, wobei die Segmente, während sie auf dem Sammeltransporter (6) transportiert werden, mit keinem der Zuführmodule (2, 3, 4) in Berührung sind.

2. Maschine nach Anspruch 1, wobei, wenn sich der Sammeltransporter (6) in der Reinigungsposition befindet, die Segmente (5a, 5b, 5c) nicht mit dem Überführungsmodul (8) in Berührung sind, während sie auf dem Sammeltransporter (6) transportiert werden.

3. Maschine nach einem der vorhergehenden Ansprüche, wobei der Sammeltransporter (6) entlang aller Zuführmodule (2, 3, 4) angeordnet ist.

4. Maschine nach einem der vorhergehenden Ansprüche, wobei der Sammeltransporter (6) an mindestens einem Gelenkarm montiert ist.

5. Maschine nach Anspruch 4, wobei der Verschiebemechanismus (19) mindestens zwei winklig zueinander angeordnete Führungen und ein mit den Führungen zusammenwirkendes Stützelement umfasst, wobei das Stützelement linear bewegbar ist.

6. Maschine nach Anspruch 5, wobei das Stützelement mittels eines Zylinders bewegbar ist.

7. Maschine nach einem der vorhergehenden Ansprüche, umfassend eine Entnahmevorrichtung zum Entnehmen der Segmente (5a, 5b, 5c) aus den Überführungsvorrichtungen (16a, 16b, 16c).

8. Verfahren zum Reinigen einer Maschine zum Herstellen von Mehrsegment-Strängen zur Verwendung in der Tabakindustrie, wobei die Maschine umfasst:

- mindestens ein Zuführmodul (2, 3, 4) zum Einlegen von Segmenten (5a, 5b, 5c) in einer Reihe nacheinander auf einen Sammeltransporter (6) zum Transportieren der Segmente entlang einer vordefinierten Transportstrecke (P) in Richtung auf einen Garniturtransporter (9);
- ein Überführungsmodul (8) zum Überführen der Segmente vom Sammeltransporter (6) auf den Garniturtransporter (9);
- den Garniturtransporter (9) zum Transportieren von Segmenten auf einem Deckblatt (10);
- eine Garniturvorrichtung (11) zum Wickeln des Deckblatts (10) um die Reihe der Segmente, um einen kontinuierlichen Strang zu bilden;
- einen Schneidkopf (13) zum Schneiden des kontinuierlichen Strangs in Mehrsegment-Stränge;

wobei das Verfahren **dadurch gekennzeichnet ist, dass** es die Schritte umfasst:

- Versetzen des Sammeltransporters (6) in Bezug auf die vordefinierte Transportstrecke (P) in eine Reinigungsposition, wobei die Segmente, während sie auf dem Sammeltransporter (6) transportiert werden, mit keinem der Zuführmodule (2, 3, 4) in Berührung sind; und
- Entnehmen der Segmente aus dem Sammeltransporter (6) während sich der Sammeltransporter (6) in der Reinigungsposition befindet.

9. Verfahren nach Anspruch 8, ferner umfassend das Aktivieren der Bewegung des Sammeltransporters (6), nachdem er in die Reinigungsposition versetzt wurde.

10. Verfahren nach einem der Ansprüche 8 oder 9, umfassend das Versetzen des Sammeltransporters (6) durch Ändern seiner Position in Bezug auf die vordefinierte Transportstrecke (P) um einen Abstand in einem Bereich von 4 bis 200 mm, vorzugsweise von 4 bis 50 mm.

11. Verfahren nach einem der Ansprüche 8 oder 9, umfassend das Versetzen des Sammeltransporters (6) durch Ändern seiner Position in Bezug auf die vordefinierte Transportstrecke (P) in einer Richtung nach unten.

12. Verfahren nach einem der Ansprüche 8 bis 11, ferner umfassend das Entnehmen der Segmente (5a, 5b, 5c) aus den Überführungsvorrichtungen (16a, 16b, 16c).

13. Verfahren nach Anspruch 12, umfassend das Entnehmen der Segmente (5a, 5b, 5c) aus den Überführungsvorrichtungen (16a, 16b, 16c) vor dem Entnehmen der Segmente aus dem Sammeltransporter (6).

14. Verfahren nach einem der Ansprüche 12 bis 13, umfassend das Entnehmen der Segmente (5a, 5b, 5c) aus den Überführungsvorrichtungen (16a, 16b, 16c) mittels Druckluft.

15. Verfahren nach einem der Ansprüche 12 bis 14, umfassend das Aktivieren des Verschiebemechanismus (19) nach einer Betriebsunterbrechung der Maschine (1), die aus vordefinierten Unterbrechungsarten resultiert.

Revendications

1. Machine de production de boudins multi-segments destinée à être utilisée dans l'industrie du tabac, la machine comprenant :

   - au moins un module d'alimentation (2, 3, 4) pour placer des segments (5a, 5b, 5c) dans un train, les uns après les autres, sur un transporteur collecteur (6) pour transporter les segments le long d'un chemin de transport prédéfini (P) dans une direction vers un transporteur de garniture (9) ;
   - un module de transfert (8) pour transférer les segments en provenance du transporteur collecteur (6) sur le transporteur de garniture (9) ;
   - le transporteur de garniture (9) pour transporter les segments sur une enveloppe (10) ;
   - un dispositif de garniture (11) pour enrouler l'enveloppe (10) autour du train de segments pour former un boudin continu ;
   - une tête de coupe (13) pour couper le boudin continu en boudins multi-segments ;

   caractérisée en ce qu'elle comprend en outre :

   - un mécanisme de décalage (19) pour déplacer le transporteur collecteur (6) par rapport au chemin de transport prédéfini (P) vers une position de nettoyage, dans lequel les segments tandis qu'ils sont transportés sur le transporteur collecteur (6) ne sont en contact avec aucun des modules d'alimentation (2, 3, 4).

2. Machine selon la revendication 1, dans laquelle lorsque le transporteur collecteur (6) est en position de nettoyage, les segments (5a, 5b, 5c), tandis qu'ils sont transportés sur le transporteur collecteur (6), ne sont pas en contact avec le module de transfert (8).

3. Machine selon l'une quelconque des revendications précédentes, dans laquelle le transporteur collecteur (6) est disposé le long de tous les modules d'alimentation (2, 3, 4).

4. Machine selon l'une quelconque des revendications précédentes, dans laquelle le transporteur collecteur (6) est monté sur au moins un bras articulé.

5. Machine selon la revendication 4, dans laquelle le mécanisme de décalage (19) comprend au moins deux guides disposés angulairement l'un par rapport à l'autre et un élément de support coopérant avec les guides, dans laquelle l'élément de support est mobile linéairement.

6. Machine selon la revendication 5, dans laquelle l'élément de support est mobile au moyen d'un cylindre.

7. Machine selon l'une quelconque des revendications précédentes, comprenant un dispositif de retrait pour retirer les segments (5a, 5b, 5c) des dispositifs de transfert (16a, 16b, 16c).

8. Procédé de nettoyage d'une machine de production de boudins multi-segments destinée à être utilisée dans l'industrie du tabac, la machine comprenant :

   - au moins un module d'alimentation (2, 3, 4) pour placer des segments (5a, 5b, 5c) dans un train, les uns après les autres, sur un transporteur collecteur (6) pour transporter les segments le long d'un chemin de transport prédéfini (P) dans une direction vers un transporteur de garniture (9) ;
   - un module de transfert (8) pour transférer les segments en provenance du transporteur collecteur (6) sur le transporteur de garniture (9) ;
   - le transporteur de garniture (9) pour transporter les segments sur une enveloppe (10) ;
   - un dispositif de garniture (11) pour enrouler l'enveloppe (10) autour du train de segments pour former un boudin continu ;
   - une tête de coupe (13) pour couper le boudin continu en boudins multi-segments ;

   le procédé étant **caractérisé en ce qu'**il comprend en outre les étapes de :

   - déplacement du transporteur collecteur (6) par rapport au chemin de transport prédéfini (P) vers une position de nettoyage, dans lequel les segments tandis qu'ils sont transportés sur le transporteur collecteur (6) ne sont en contact avec aucun des modules d'alimentation (2, 3, 4); et
   - retrait des segments du transporteur collecteur (6) tandis que le transporteur collecteur (6) est en position de nettoyage.

9. Procédé selon la revendication 8, comprenant en outre l'activation du mouvement du transporteur collecteur (6) après qu'il a été déplacé vers la position de nettoyage.

10. Procédé selon l'une quelconque des revendications 8 ou 9, comprenant le déplacement du transporteur collecteur (6) en changeant sa position par rapport au chemin de transport prédéfini (P) d'une distance dans une plage de 4 à 200 mm, de préférence de 4 à 50 mm.

11. Procédé selon l'une quelconque des revendications 8 ou 9, comprenant le déplacement du transporteur collecteur (6) en changeant sa position par rapport au chemin de transport prédéfini (P) dans une direc-

tion descendante.

12. Procédé selon l'une quelconque des revendications 8 à 11, comprenant en outre le retrait des segments (5a, 5b, 5c) des dispositifs de transfert (16a, 16b, 16c).

13. Procédé selon la revendication 12, comprenant le retrait des segments (5a, 5b, 5c) des dispositifs de transfert (16a, 16b, 16c) avant le retrait des segments du transporteur collecteur (6).

14. Procédé selon l'une quelconque des revendications 12 à 13, comprenant le retrait des segments (5a, 5b, 5c) des dispositifs de transfert (16a, 16b, 16c) au moyen d'air comprimé.

15. Procédé selon l'une quelconque des revendications 12 à 14, comprenant l'activation du mécanisme de décalage (19) après une interruption du fonctionnement de la machine (1) résultant de types d'interruption prédéfinis.

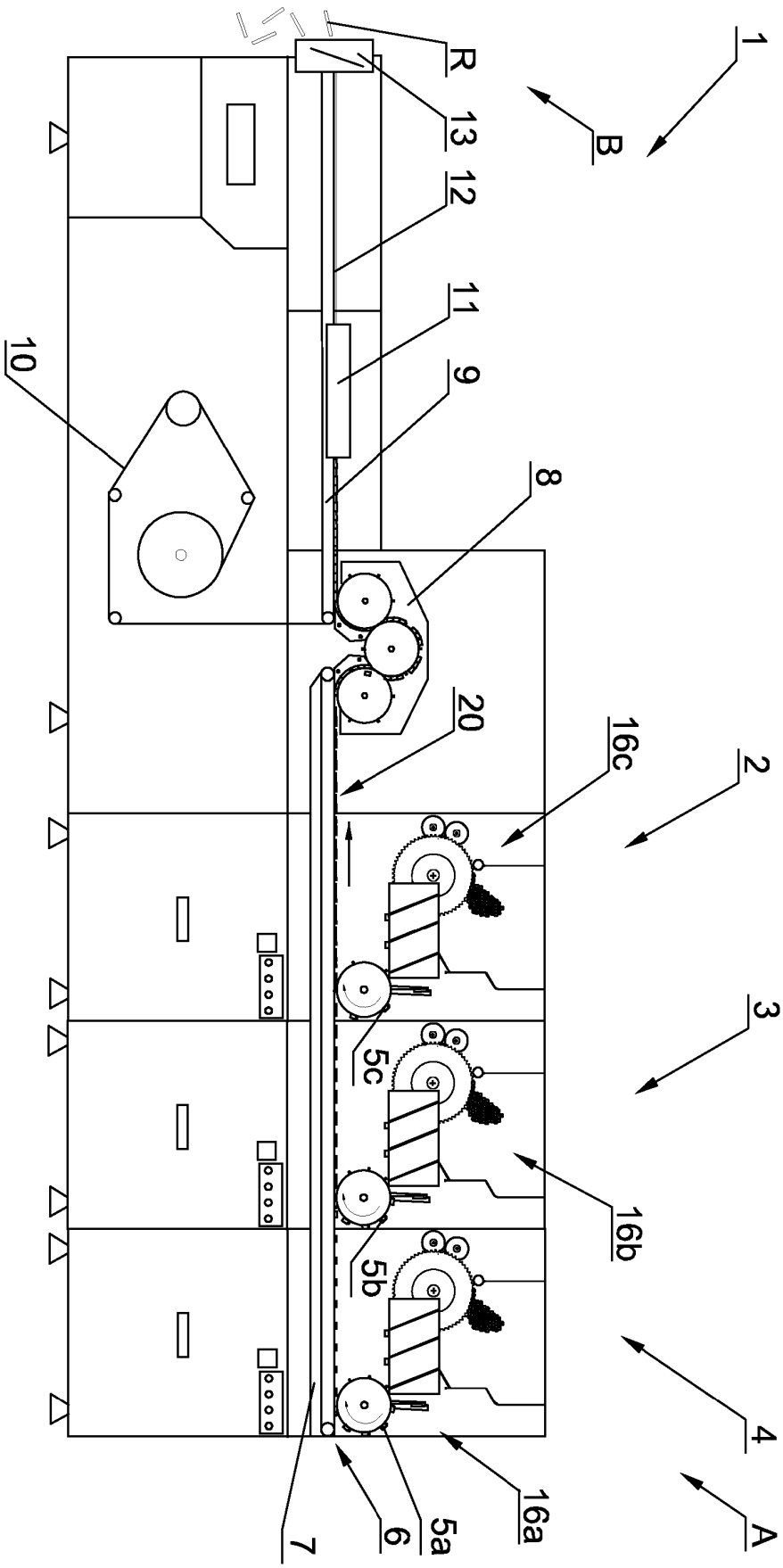

Fig. 1

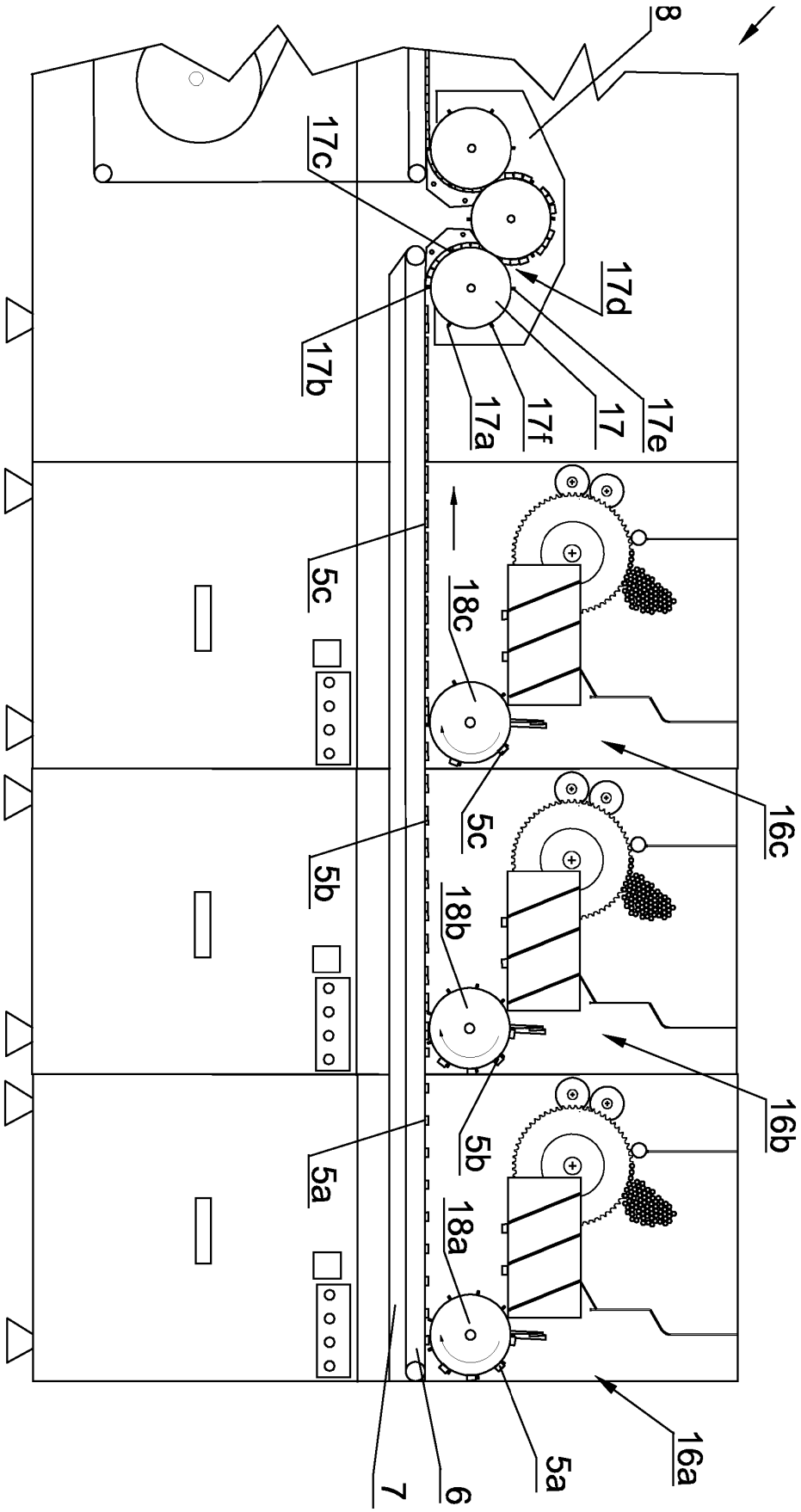
8
17c
17d
17b
17a
17f
17
17e
5c
18c
16c
5c
5b
18b
16b
5b
5a
18a
16a
5a
7
6

Fig. 2

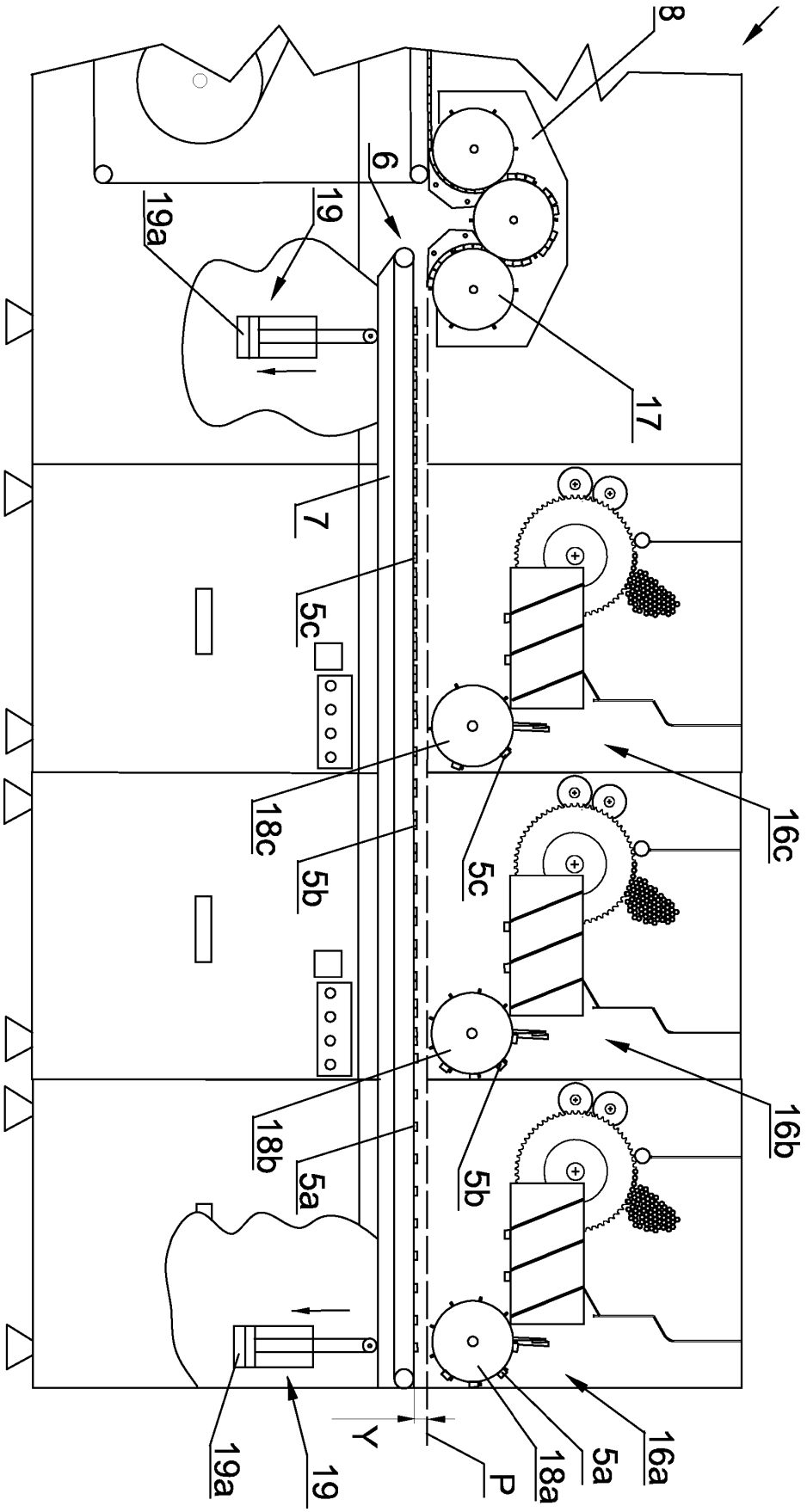

Fig.3

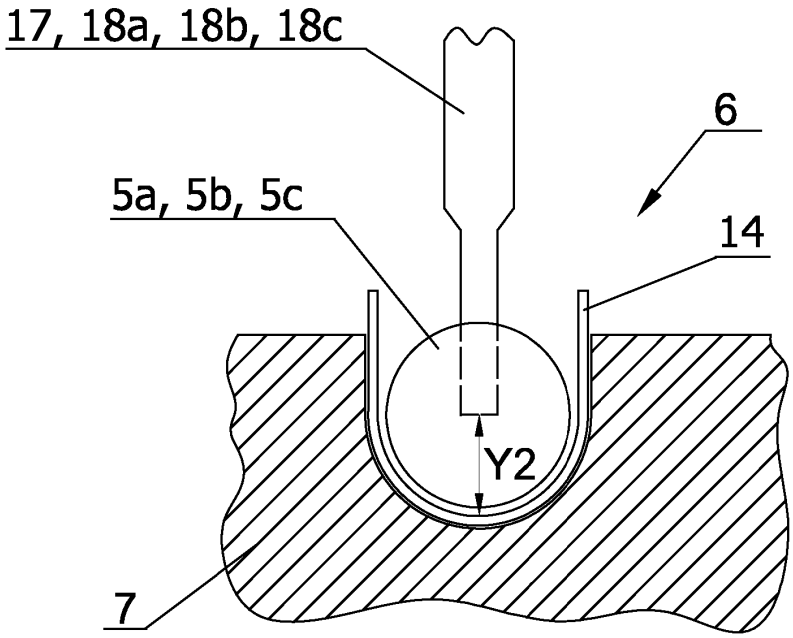

Fig.4a

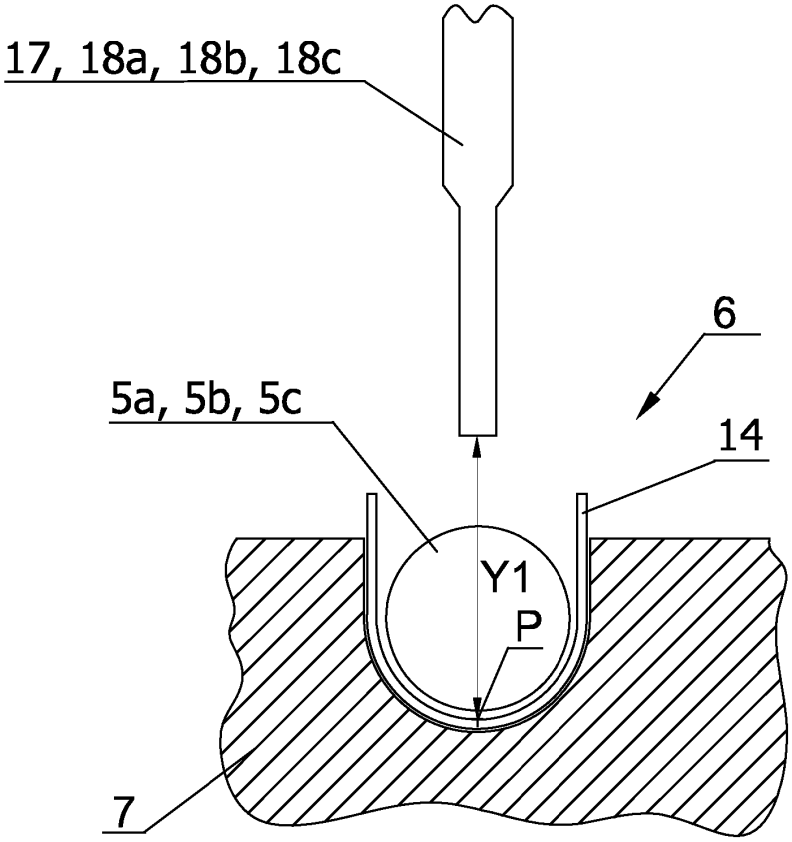

Fig.4b

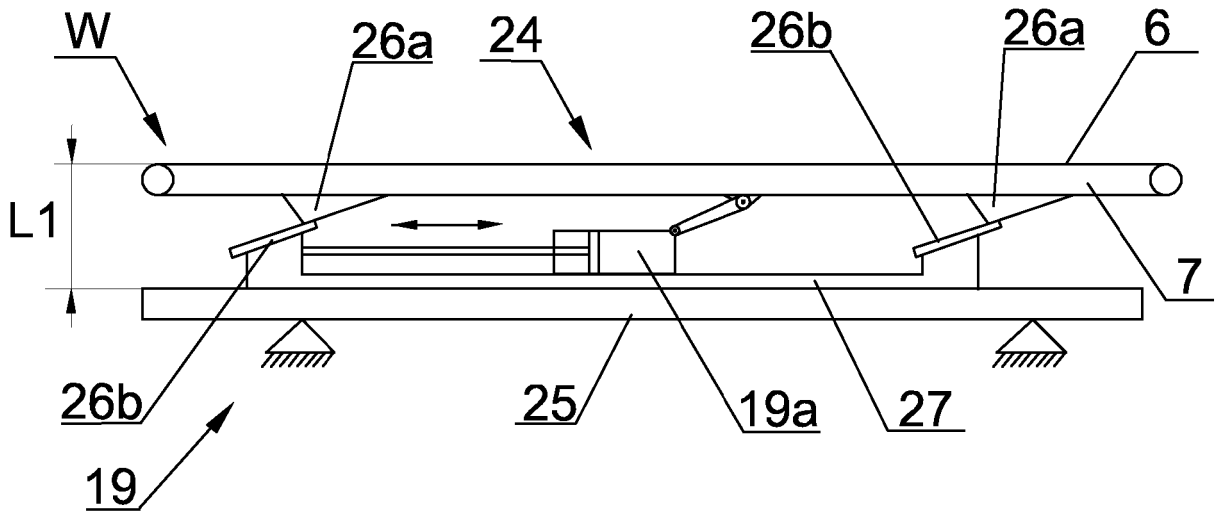
W
26a
24
26b
26a
6
L1
7
26b
25
19a
27
19

Fig.5a

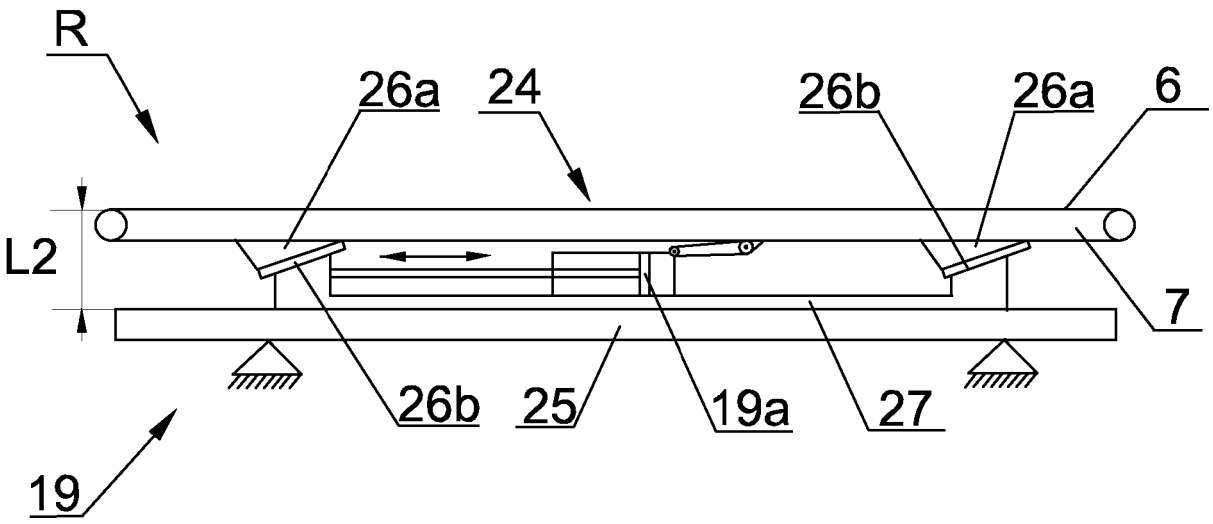
R
26a
24
26b
26a
6
L2
7
26b
25
19a
27
19

Fig.5b

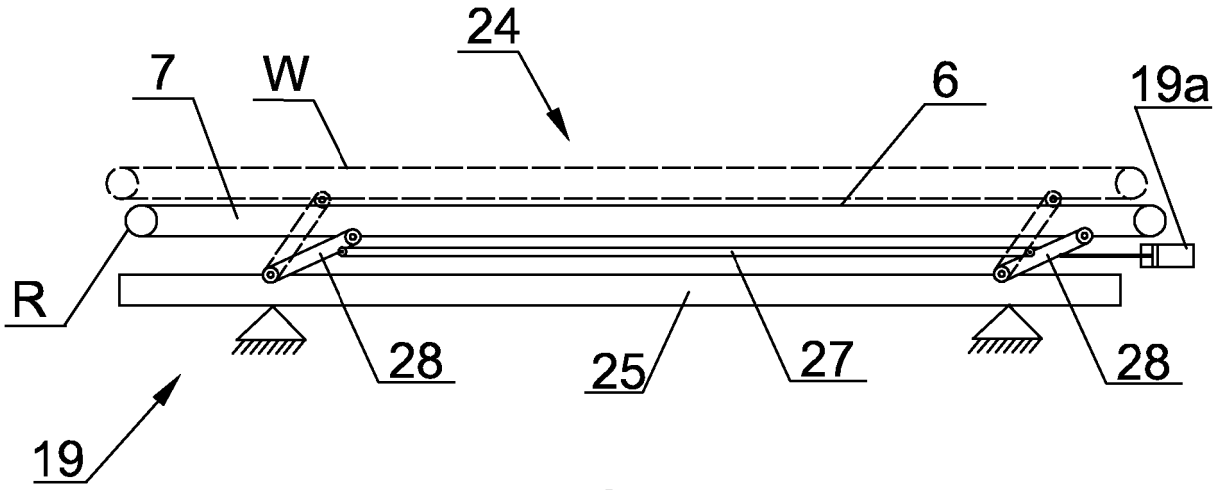

Fig.5c

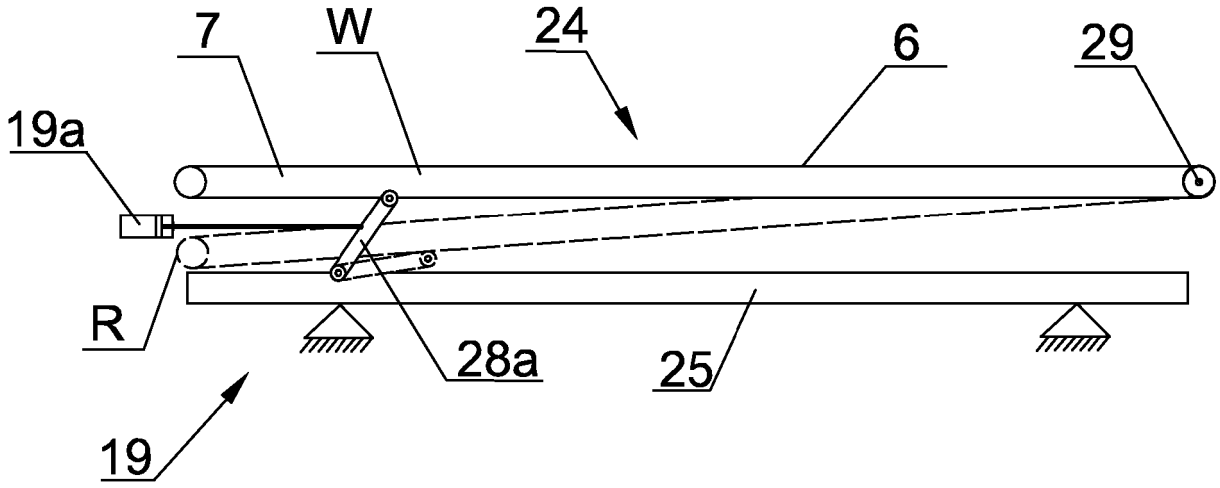

Fig.5d

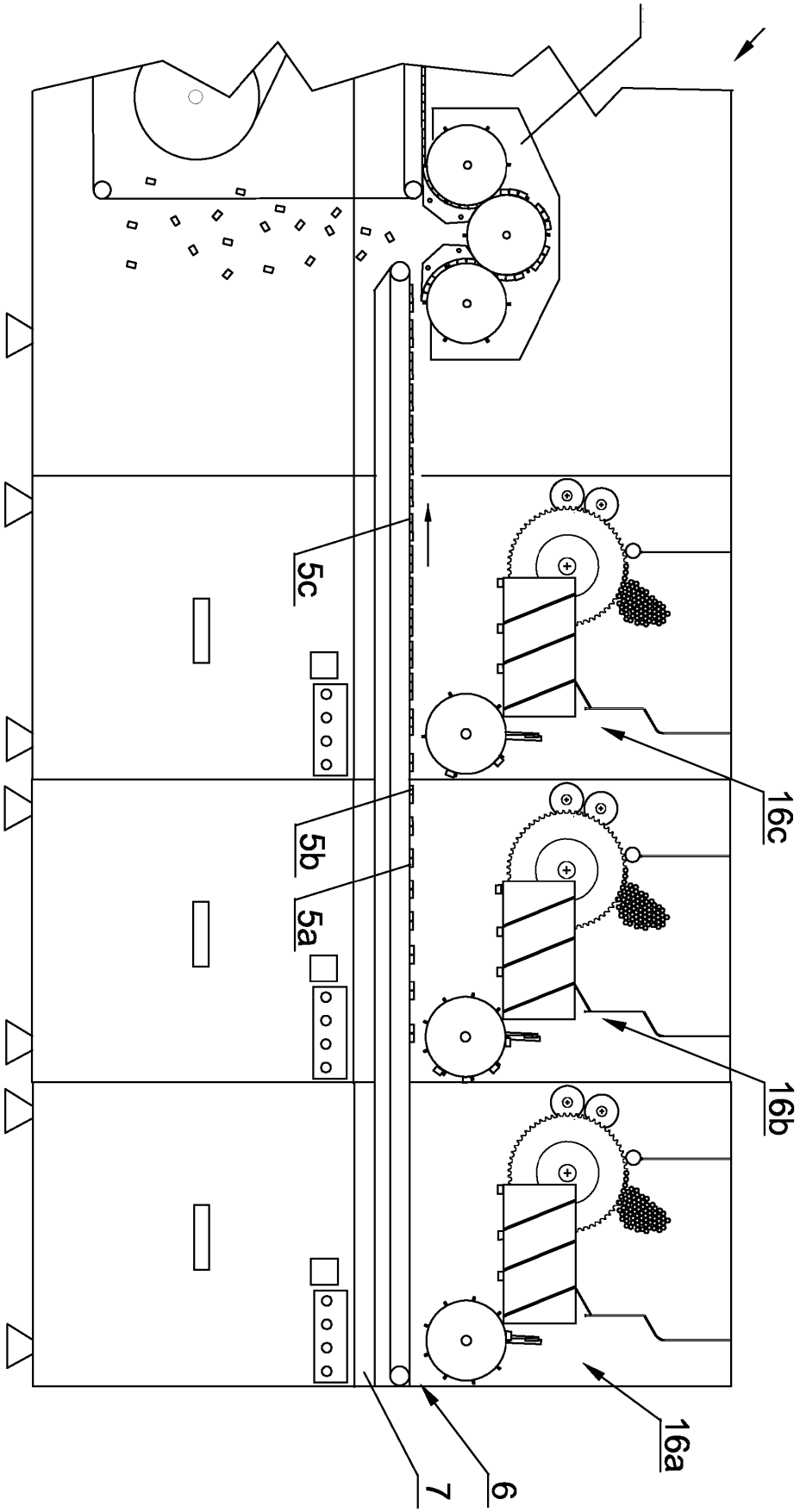

Fig. 6

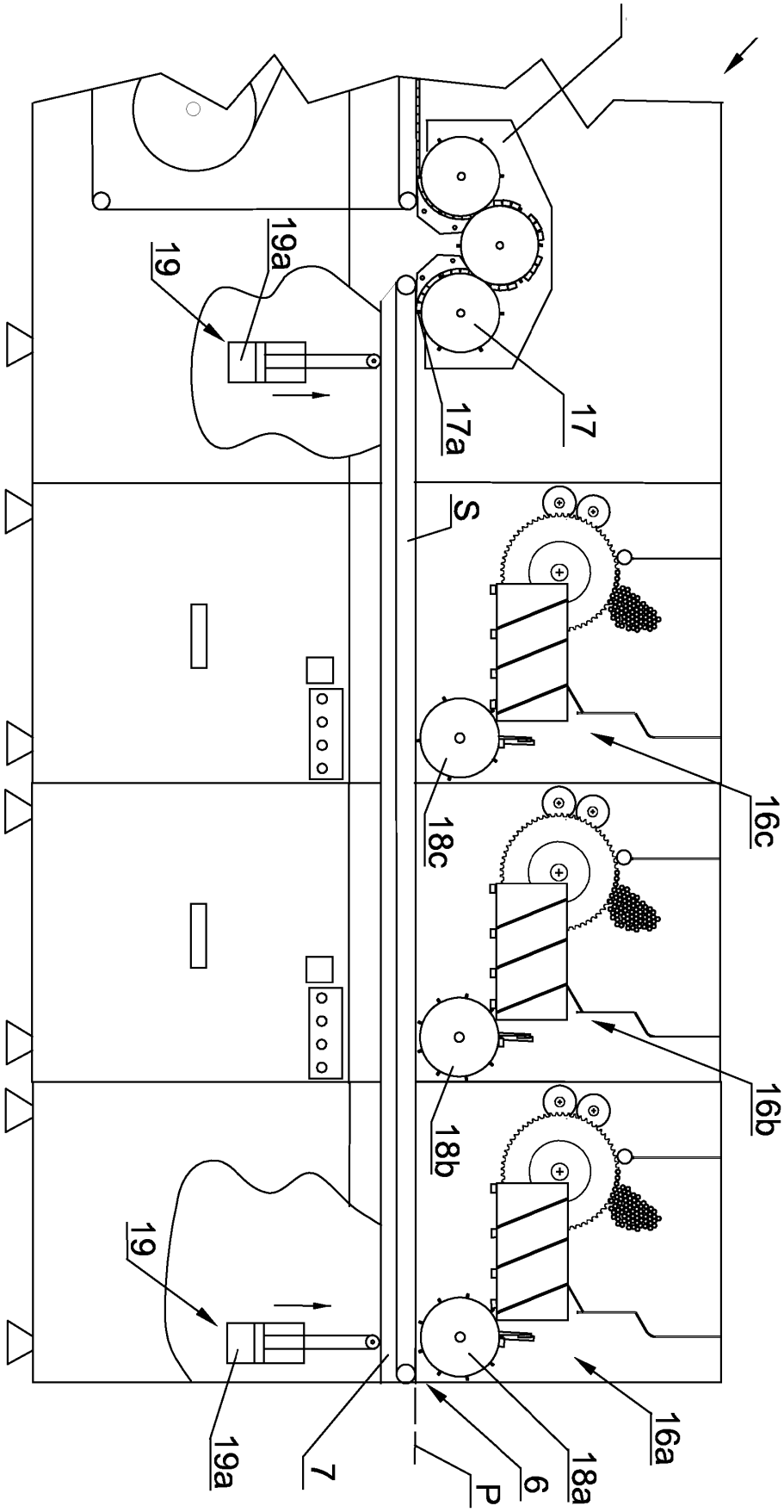

Fig. 7

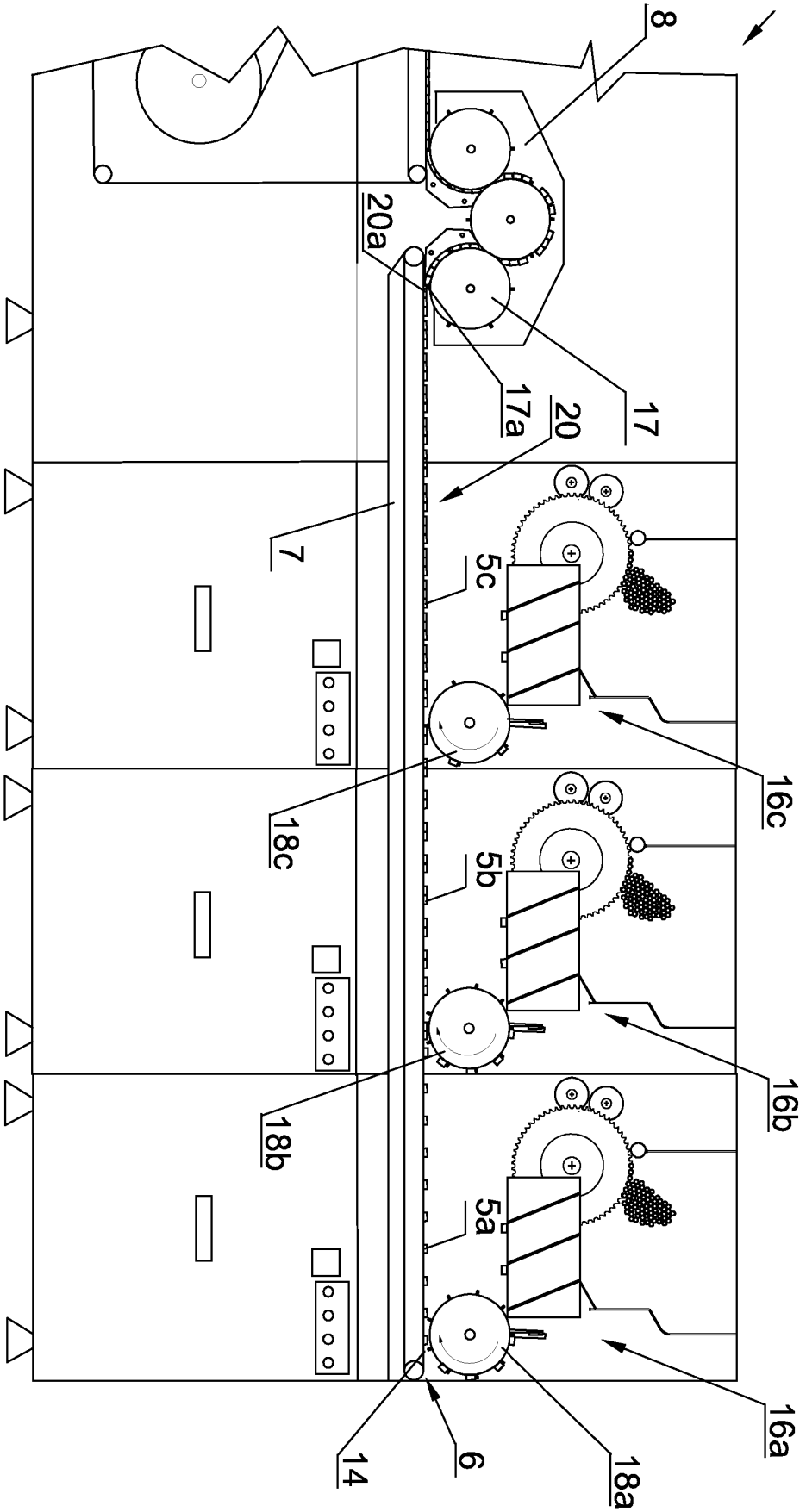

Fig. 8

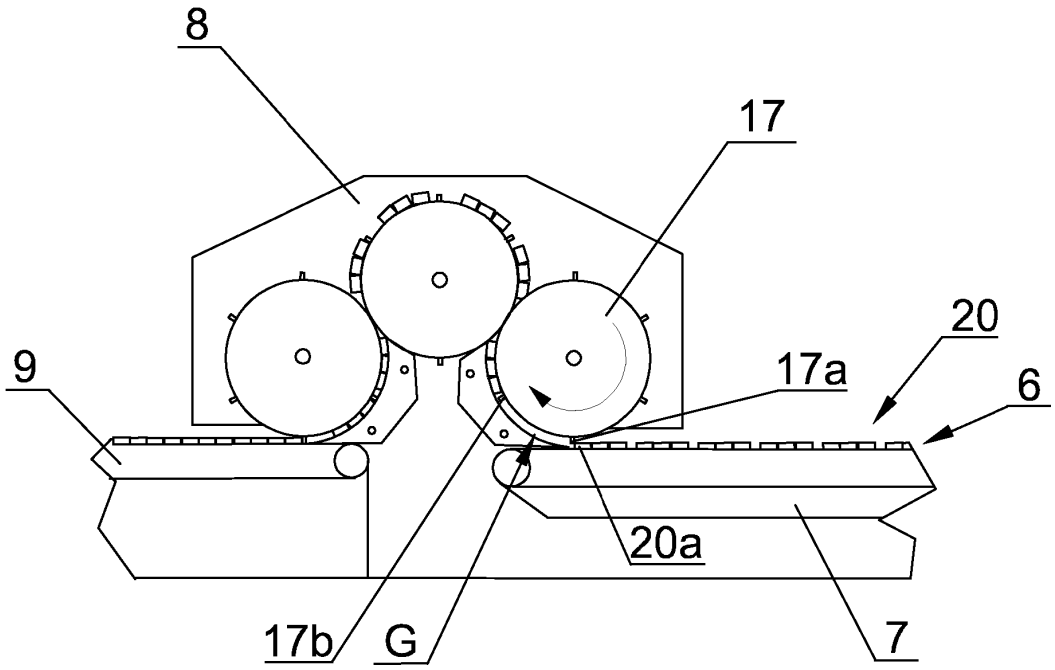
8
17
20
9
17a
6
20a
17b
G
7

Fig. 9

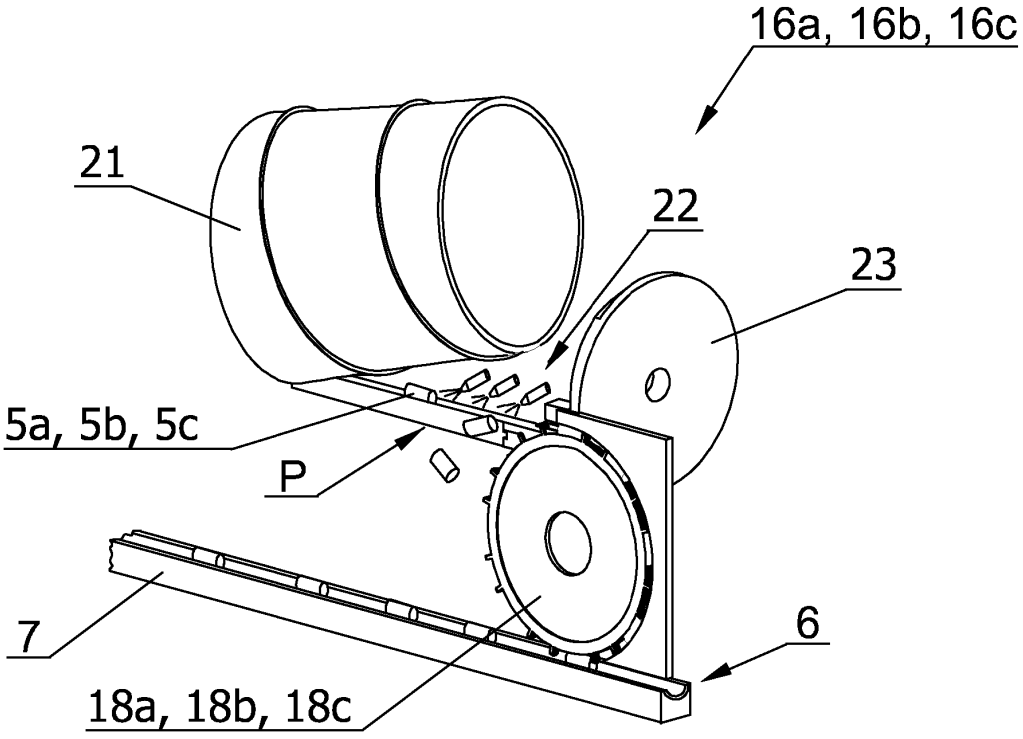
16a, 16b, 16c
21
22
23
5a, 5b, 5c
P
7
6
18a, 18b, 18c

Fig.10

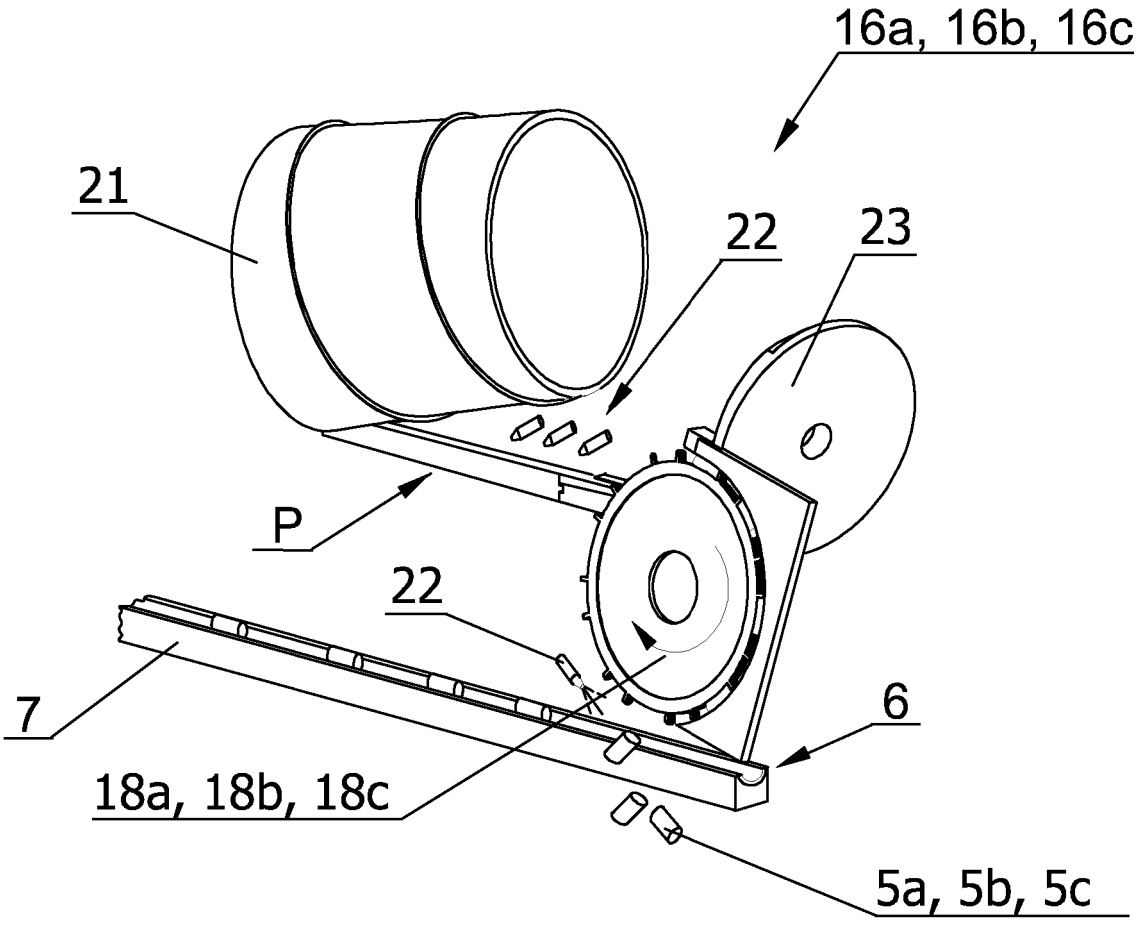

Fig.11

REFERENCES CITED IN THE DESCRIPTION

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