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(72) Inventor: **Michelotti, Riccardo**
51017 Pistoia (IT)

(74) Representative: **Celestino, Marco**
ABM, Agenzia Brevetti & Marchi,
Viale Giovanni Pisano, 31
56123 Pisa (IT)

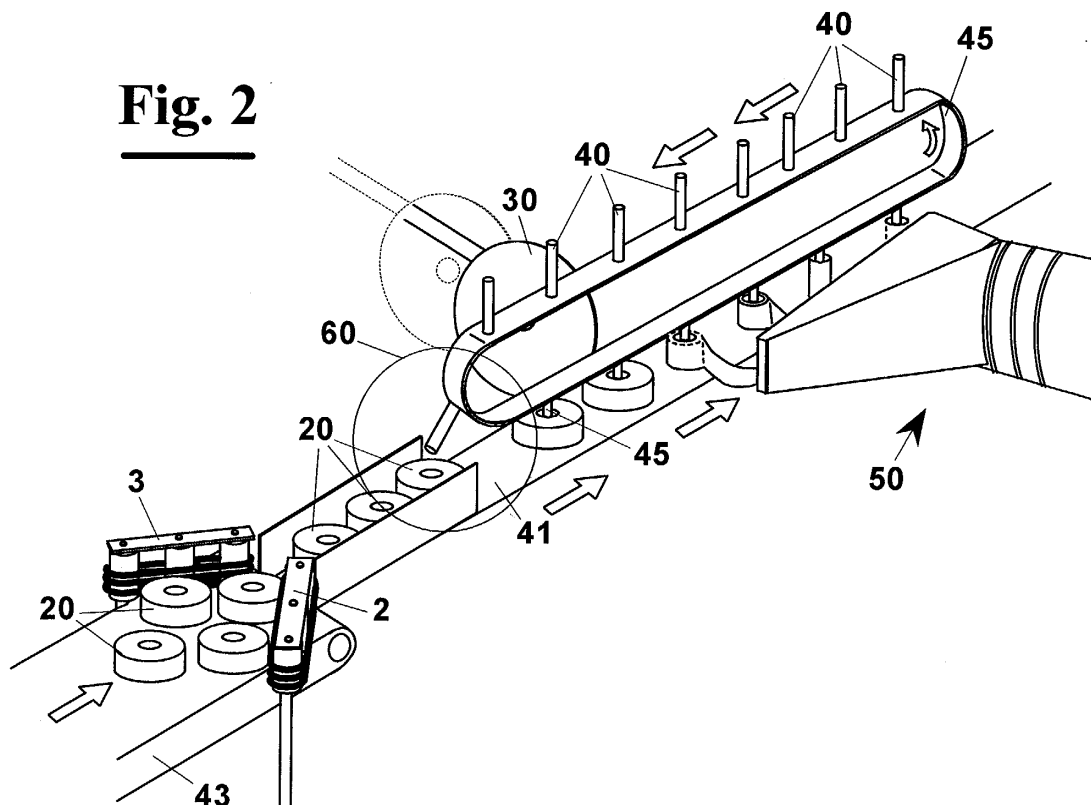
(71) Applicant: **SCA HYGIENE PRODUCTS S.p.A.**
55061 Carraia Lu (IT)

(54) **Machine for separating a scrap paper portion from a core on which it is wound**

(57) A machine (1) for separating a scrap portion (20) from a core (21) on which it is wound, such as by machines for the production of rolls of paper, comprises means (40) for engaging the core (21) of the scrap (20) in order to cause a blade (30), for example of circular shape, to partially cut the scrap (20) in a precise way. In particular, the blade (30) partially cuts the scrap (20) in a plane substantially parallel to the axis (25) of the scrap

(20), up to a determined depth. In particular, the blade (30) partially cuts the scrap (20) up to achieve a generatrix of the core. After having partially cut the scrap (20) by the blade (30) for a measured depth, the partially cut portion of the scrap (20) is withdrawn from core (21), on which it was wound. This step can be executed by an air flow generated by a blower or a fan (50) that separates the partially cut portion of the scrap (20) from the core (21) in one or several steps.

Fig. 2



Description

Field of the invention

[0001] The present invention relates to the field of paper converting machines and precisely it relates to a machine for processing the head and tail cut portions, i.e. the scraps, produced by a transversal cutting machine of logs of paper and similar material.

Background of the invention

[0002] In the production of rolls of paper, for example absorbent for wipers or toilet paper, machines are known that work starting from large reels of a web having a large transversal width. From these machines logs of paper are delivered, having length equal to said transversal width of the web, and which are to be cut off into smaller portions, for example rolls of toilet paper, industrial rolls of wiping paper, etc.

[0003] The transversal cutting machines have the object of cutting off rolls from the logs of paper and comprise normally a bench with one or more slides onto which the logs to cut are placed in turn.

[0004] The head and tail ends of the log are then trimmed and the trimmed portions are taken away as scraps along an outlet conveyor.

[0005] Since the trimmed scraps, at the head and tail of the log, once cut often lose their compact shape and become loose, they have to be withdrawn from the working area for avoiding that they jam and block the passage of the cut off rolls.

[0006] In order to avoid this drawback, in some types of cut-off machines pushing devices are provided that, after that sensors distinguish the trimmed portions from the rolls, the trimmed portions are pushed selectively sideways. Alternatively, zones of fall are provided of the trimmed portions obtained by distancing some belts so that they allow the passage of the rolls, which have larger size, causing only the trimmed portions to fall.

[0007] The scraps withdrawn are then recycled usually within the same plant of production to obtain however a poorer product, owing to the contemporaneous presence of paper of high quality, for the part of roll made of "tissue" paper, and of poorer paper or cardboard of the core. This causes a considerable waste of material that previously was of high quality and potentially was still recyclable upstream in the same production process.

Summary of the invention

[0008] It is therefore a feature of the present invention to provide a machine for separating a scrap portion from a core on which it is wound, which provides a considerable saving by recycling separately the portion of high quality paper present in the scrap.

[0009] It is another feature of the present invention to

provide such a machine that carries out the separation of the two parts in an easy and quick way.

[0010] It is a further feature of the invention to provide a machine for separating a scrap portion from a core that can align previously the scraps coming randomly from the transversal cutting machines.

[0011] It is still a feature of the invention to provide a method, which can be applied to paper converting machines, for separating a scrap portion from a core on which it is wound and that reaches the same objects.

[0012] These and other features are accomplished with one exemplary machine for separating a scrap portion from a core on which it is wound, said scrap coming from machines for the production of rolls of paper, comprising:

- means for engaging with the core of the scrap;
- cutting means suitable for partially cutting the scrap in a plane substantially parallel to the axis of the scrap same for a measured depth, the above described cutting means being arranged at a cutting station;
- means for removing a partially cut scrap portion from a core on which it is wound.

[0013] Advantageously, the means for removing a partially cut scrap portion from a core on which it is wound comprises at least an element to provide an air flow.

[0014] In particular, the means to provide an air flow can be means to provide a suction of a partially cut scrap portion, said means being arranged opposite to the cutting means with respect to the scrap.

[0015] Alternatively, the means to provide an air flow can provide blowing means.

[0016] Advantageously, the means for engaging with the core of the scrap to allow the action of the cutting means comprise a plurality of elongated elements suitable for capturing the scraps and to engage with them at the core when these reach an introduction area.

[0017] In an exemplary embodiment of the invention the above described elongated elements are arranged at a predetermined distance on a conveyor operated by motor means.

[0018] In particular, the means for engaging with the core of the scraps can engage the core capturing the scrap below or above with respect to a trajectory of the scraps. More in detail, in the first case the engagement step of the core of the scraps consists of putting the scrap on the elongated element, whereas in the latter case the scrap is constrained between the elongated element oriented towards below and the conveyor on which it proceeds.

[0019] In an exemplary embodiment of the invention the cutting means that partially cuts the scrap can reciprocate along a direction substantially orthogonal to the conveying direction of the scraps. For example, the reciprocation of the cutting means is effected by at least

one actuator.

[0020] Advantageously, upstream from the sawing station means are provided for aligning the scraps before bringing them to the cutting means.

[0021] In an exemplary embodiment of the invention, the means for aligning the scraps provide a first and a second belt arranged converging in a conveying direction of the scraps up to an outlet having the same diameter of the scraps and suitable for transmitting a rotation to the scraps towards the outlet. More in detail, the scraps at the end of the cutting step, executed for example by a transversal cutting machine, are located on a conveyor belt that carries the scraps at the means for aligning them.

[0022] According to another aspect of the invention, a method for separating a scrap portion from a core on which it is wound provides the following steps:

- engaging the scraps at the core;
- partially cutting the scrap along a cutting line substantially parallel to the axis of the scrap;
- separating and moving away a partially cut scrap portion from a relative core.

Brief description of the drawings

[0023] Further characteristics and the advantages of the machine for separating a scrap portion from a core on which it is wound, according to the present invention, will be made clearer with the following description of an exemplary embodiment thereof exemplifying but not limitative, with reference to the attached drawings wherein:

- figure 1 shows in an elevational front view a machine for separating a scrap portion from a core on which it is wound, according to the present invention;
- figure 2 shows a perspective view of the machine of figure 1 from the side where a partially cut scrap portion is withdrawn;
- figure 3 shows a perspective view of the machine of figure 1 from the side where the scrap is partially cut;
- figures from 4 to 6 show some possible exemplary embodiments of the means for introducing the scraps onto the means for engaging;
- figure 7 shows a possible exemplary embodiment of the means for removing the partially cut scrap portions by the respective cores, alternative to that of figure 1;
- figure 8 shows a further exemplary embodiment of the machine of figure 1.

Description of the preferred exemplary embodiment.

[0024] In figure 1, a machine 1 is shown for separating a scrap portion 20 from a core 21 on which it is wound,

such as by machines for the production of rolls of paper. It comprises means 40 for engaging the core 21 of scrap 20 in order to cause a blade 30, for example of circular shape, to partially cut scrap 20 in a precise way. In particular, blade 30 partially cuts scrap 20, in a plane substantially parallel to the axis 25 of scrap 20, up to a determined depth. In other words, blade 30 partially cuts scrap 20 up to achieve a generatrix of the core.

[0025] After having partially cut scrap 20 by blade 30 for a measured depth, the partially cut portion of scrap 20 is withdrawn from core 21, on which it was wound. This step can be executed by an air flow generated by a blower or a fan 50 that separates the partially cut portion of scrap 20 from core 21 in one or more steps.

[0026] As shown in figures from 1 to 3 the successive steps can be carried out with a suction mouth that spans three or four elongated elements of the conveyor, in order to extend the suction for a certain distance. Alternatively, the successive steps can be carried out by distinct devices.

[0027] In particular, fan 50 can be arranged opposite to blade 30 with respect to the scraps 20 and cause the suction of the partially cut portion of scrap 20. Alternatively, the fan 50 can be arranged at the same side with respect to blade 30 for blowing air on partially cut portion of scrap 20.

[0028] More in detail, in the case of suction, in a first step the major part of partially cut portion of scrap 20 is withdrawn and in further steps also the coils of paper that remain constrained to core 21 are subject to suction, "unrolling" them from the core same. In a further exemplary embodiment of the invention and shown in figure 7, the separation of the partially cut portion of scrap 20 from core 21 is made through grasping means 55 that catch the scrap 20, for example radially, and withdraw it from the working area. The second steps, i. e. the removal of the coils still wound about core 21, can be executed in this case by a smaller fan 155.

[0029] As already said above, during the cutting step, scrap 20 is engaged at core 21 for allowing blade 30 to make precisely a partial cut and in particular for allowing to cut up to a measured depth without cutting also core 21. In particular, the elongated elements 40 can engage core 21 of scraps 20 capturing them from below (figures from 4 to the 6 and figure 8) or alternatively, from above (figures from 1 to the 3, figures 5 and 7), with respect to the trajectory of scraps 20. In other words, scrap 20 can be put on an elongated element 40 (figures from 4 to 6 and figure 8) or alternatively, can be constrained between the elongated element 40 and a support plane 41 on which scrap 20 moves during the whole process (figures from 1 to 3, figures 5 and 7). The engagement of scraps 20 by elements 40 can be made, as diagrammatically shown in figures 2 and 3, by arranging elongated elements 40 on a conveyor chain 45 moving towards the scraps 20. This way, when the scraps 20 reach an engagement area 60 they capture the scraps 20 same at the relative cores 21.

[0030] In figures from 4 to 6 some possible exemplary embodiments are shown of the machine 1 and in particular of the cross section depicted to the introduction of the scraps 20 on elongated elements 40. For example, in figures 4 and 5 the possibility is shown, according to the invention, to use chute elements 42 arranged orthogonally to the conveying direction of the scraps (figure 4) or inclined with respect to it (figure 5) that guide scraps 20 on a conveyor belt 43 towards the elongated element 40.

[0031] In figure 6, instead, the possibility is shown of using grasping means 70 for example in the shape of a mechanical arm to carry out the same step. In the figures above described the elongated elements 40, which are adapted to capture the scraps 20 at the respective cores 21 during the cutting step and the following separation of the two parts, are arranged at a determined distance from one another on a conveyor chain 45 operated by an motor not shown in the figure.

[0032] Furthermore, in figures from 1 to 3 and from 7 to 8 a preliminary step is provided of aligning the scraps 20 for optimising the process and in particular for speeding up the next operations of cutting and withdrawing the partially cut portion of scrap 20. The step of aligning can be carried out for example by a first belt 2 and a second opposite belt 3 that rotate in equal directions, so that the two segments of belt facing the scraps move in an opposite direction. In particular, the belts 2 and 3 are arranged converging in a conveying direction of the scraps 20 up to an outlet. This way, the access to the cutting station is allowed to a single scrap 20 at a time. Furthermore, blade 30 that partially cuts scrap 20 can reciprocate along a direction substantially orthogonal to the conveying direction of scraps 20. The reciprocation of blade 30 can be operated by at least one actuator 35, for example of pneumatic type. As shown in particular in figure 3 the reciprocation of blade 30 can be obtained arranging it on a carriage 37 sliding along guide 38.

[0033] The foregoing description of a specific embodiment will so fully reveal the invention according to the conceptual point of view, so that others, by applying current knowledge, will be able to modify and/or adapt for various applications such an embodiment without further research and without parting from the invention, and it is therefore to be understood that such adaptations and modifications will have to be considered as equivalent to the specific embodiment. The means and the materials to realise the different functions described herein could have a different nature without, for this reason, departing from the field of the invention. It is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

Claims

1. Machine for separating a scrap portion from a core

on which it is wound, said scraps coming from machines for the production of rolls of paper, **characterised in that** it comprises:

- means for engaging with the core of the scrap;
- cutting means suitable for partially cutting the scrap in a plane substantially parallel to the axis of the scrap same for a measured depth, said cutting means being arranged at a cutting station;
- means for removing a partially cut scrap portion from a core on which it is wound.

2. Machine, according to claim 1, wherein said means for removing a partially cut scrap portion cut from said core on which it is wound comprises at least an element to provide an air flow, wherein said air flow is selected from the group of a suction flow, a blowing flow.

3. Machine, according to claim 2, wherein said means to provide said air flow are arranged opposite to said cutting means with respect to said scrap.

4. Machine, according to claim 1, wherein said means for engaging with said core of said scrap comprise a plurality of elongated elements suitable for capturing said scraps and for engaging with them at the respective core when these reach an introduction area following a conveying trajectory.

5. Machine, according to claim 1, wherein said elongated elements are arranged at a predetermined distance on a conveyor operated by motor means and they capture said scraps at the end of said conveying trajectory.

6. Machine, according to claim 1, wherein said cutting means that partially cut said scrap are movable according to a reciprocation.

7. Machine, according to claim 1, wherein upstream from the sawing station means are provided for aligning said scraps before bringing them to said cutting means.

8. Machine, according to claim 8, wherein said means for aligning said scraps provide a first and a second belt arranged converging in a conveying direction up to an outlet having the same diameter of the scraps, said first and second belt being suitable for transmitting a rotation to said scraps towards said outlet.

9. Method for separating a scrap portion from a core on which it is wound, said scraps coming from machines for the production of rolls of paper, **characterised in that** it provides the following steps:

- engaging said scrap at said core;
- partially cutting said scrap along a cutting line substantially parallel to the axis of said scrap;
- separating and moving away the partially cut portion of said scrap from said core.

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- 10.** Method, according to claim 9, wherein said steps of engaging, partially cutting and separating occur as defined in any of claims from 2 to 10.

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Fig. 1

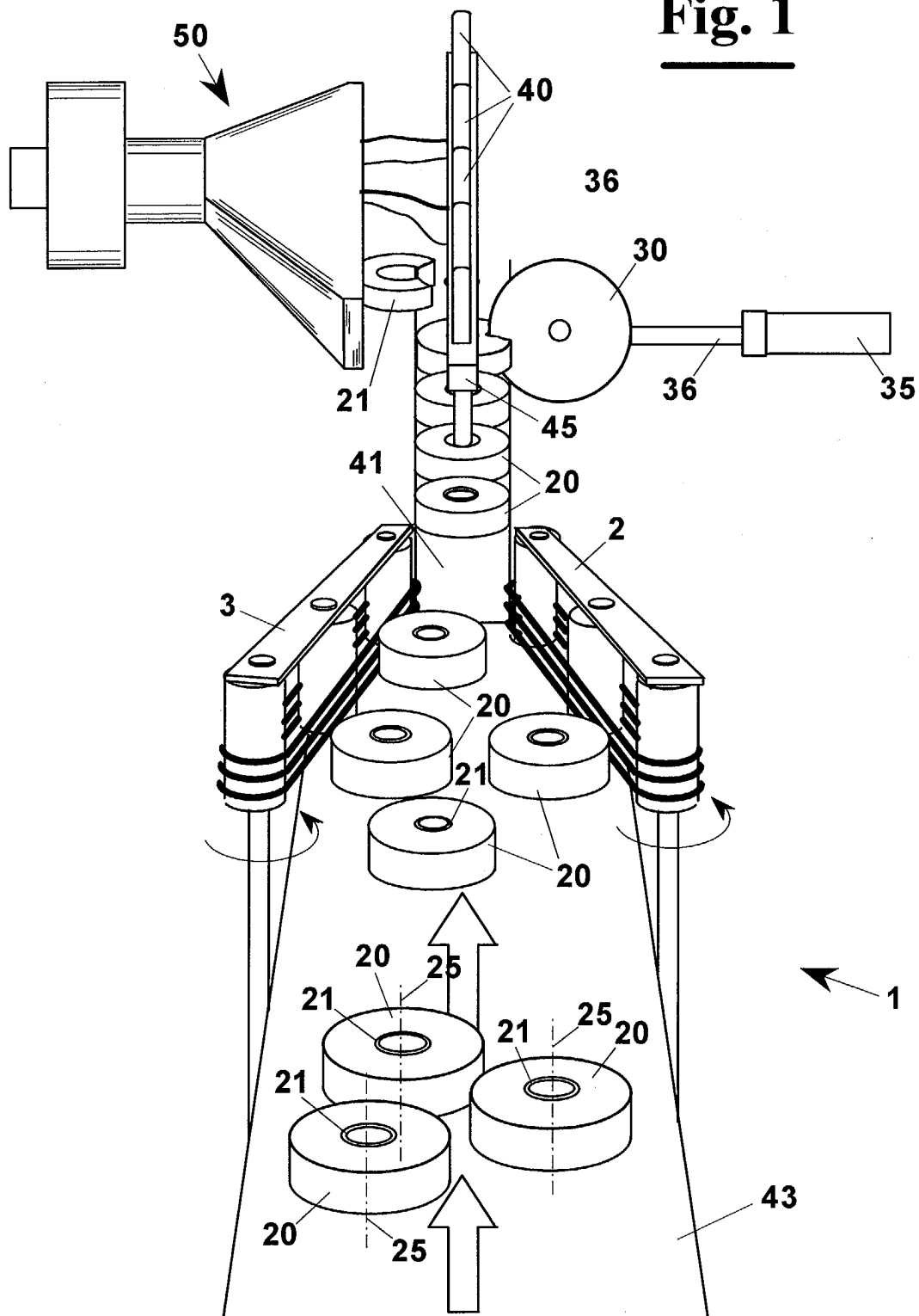


Fig. 2

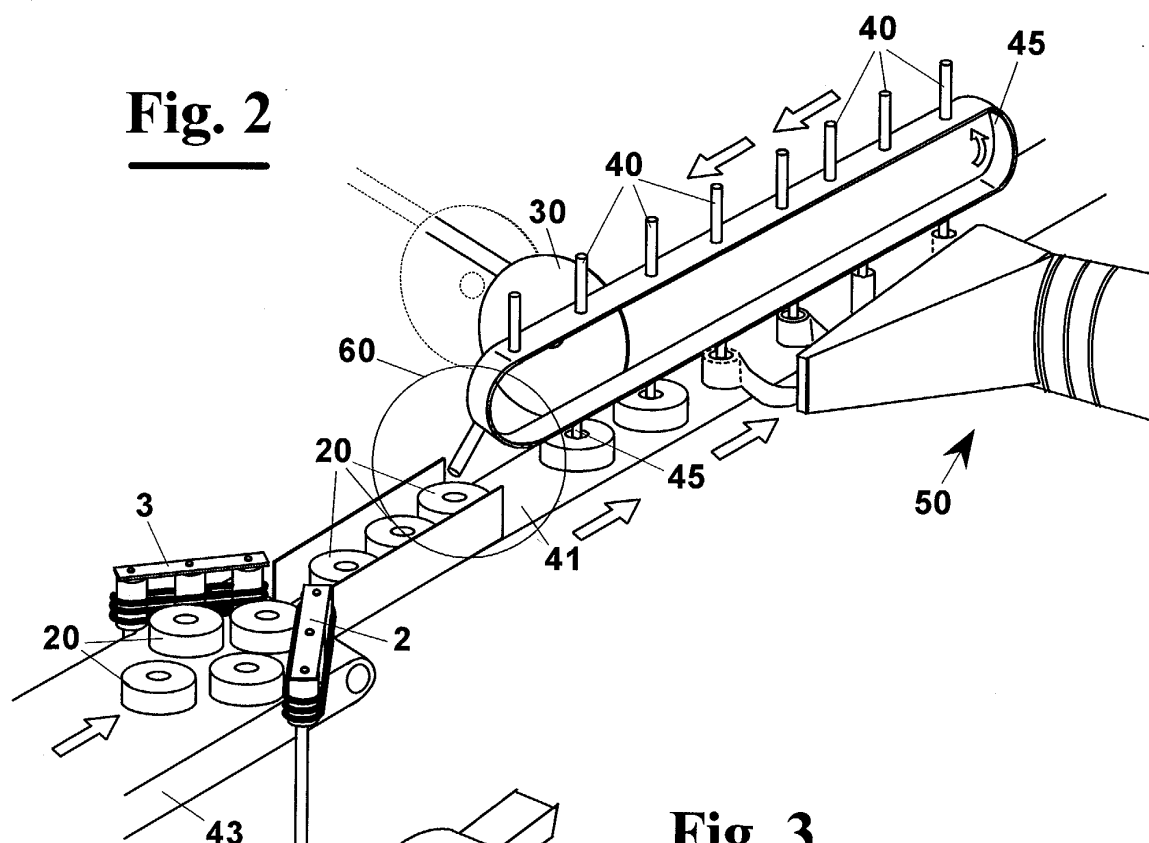


Fig. 3

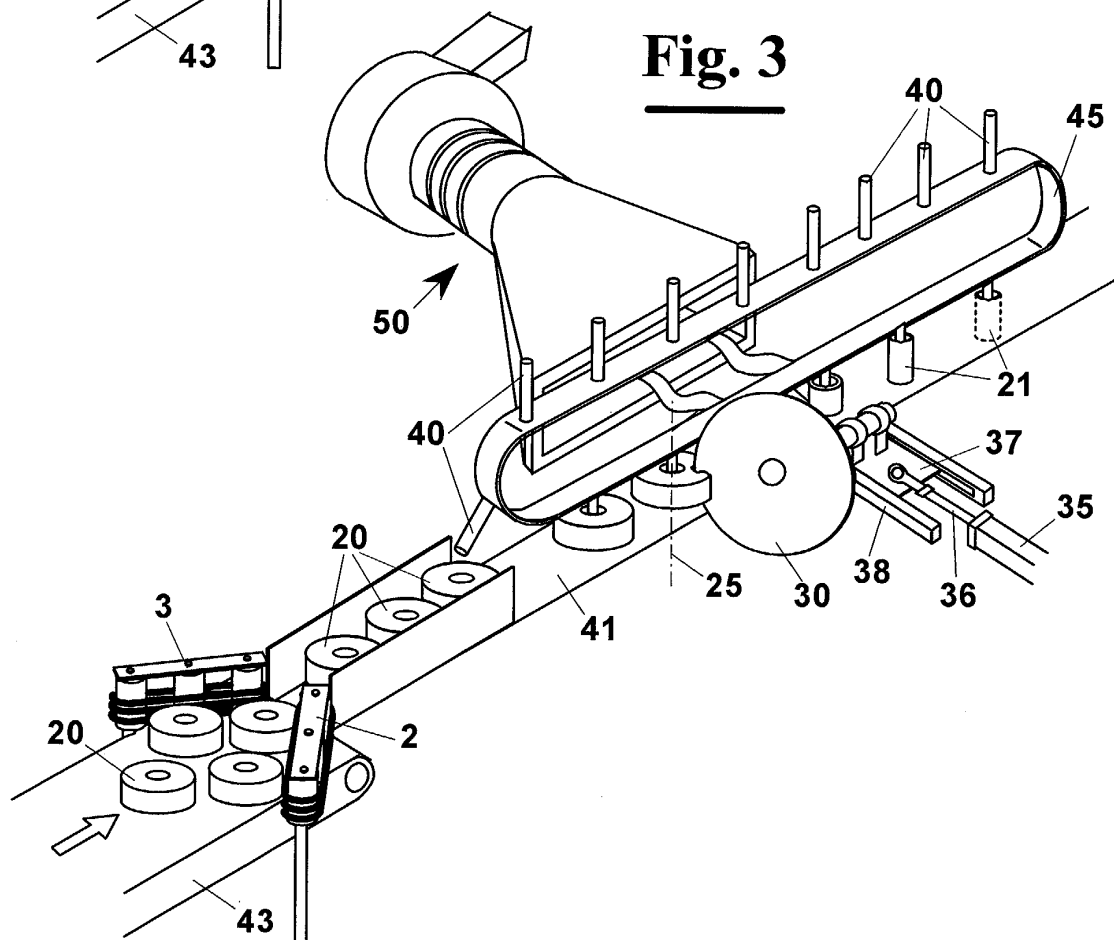


Fig. 4

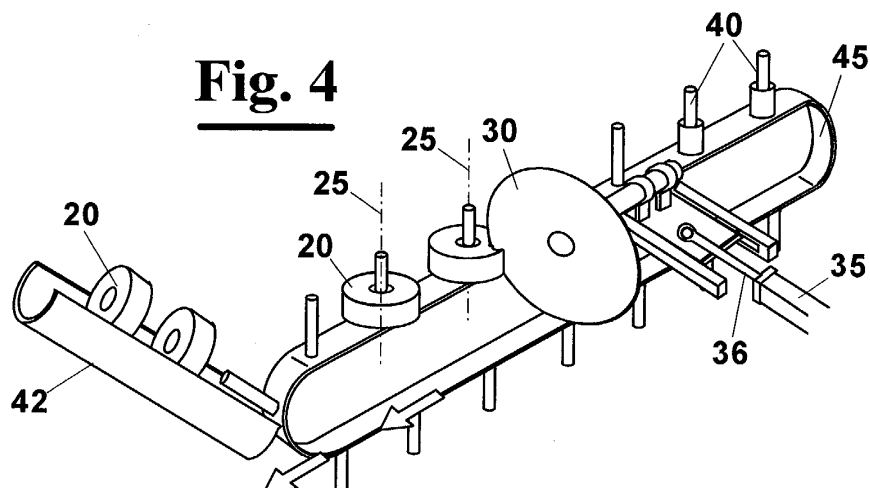


Fig. 5

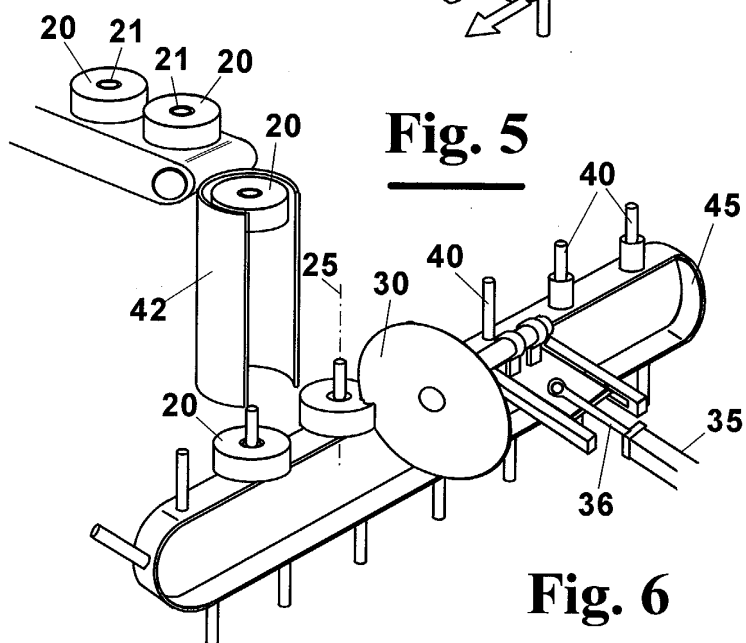
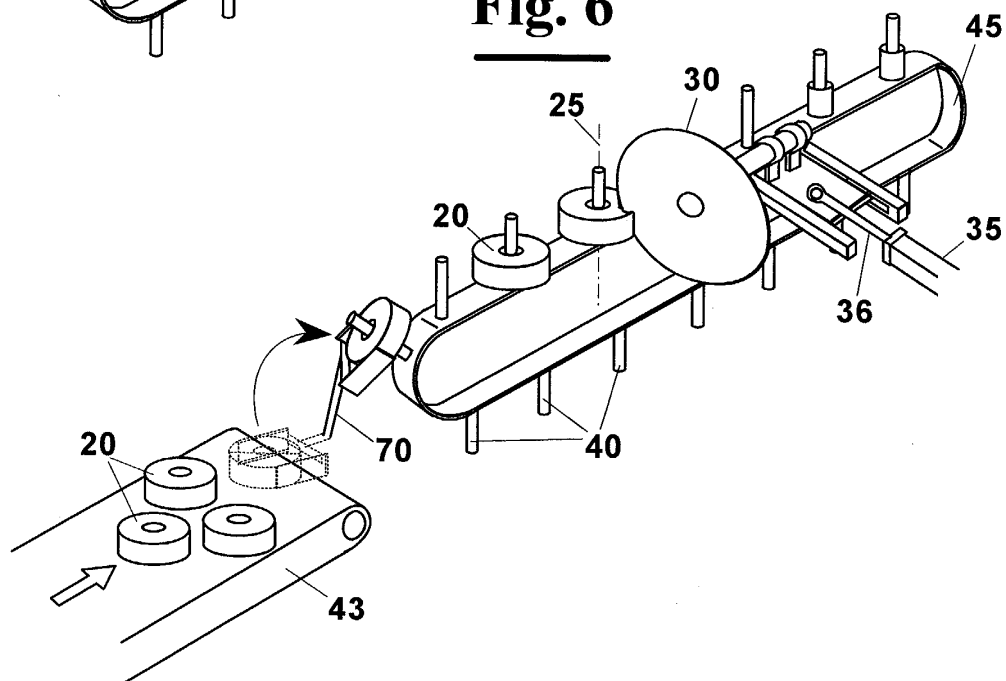
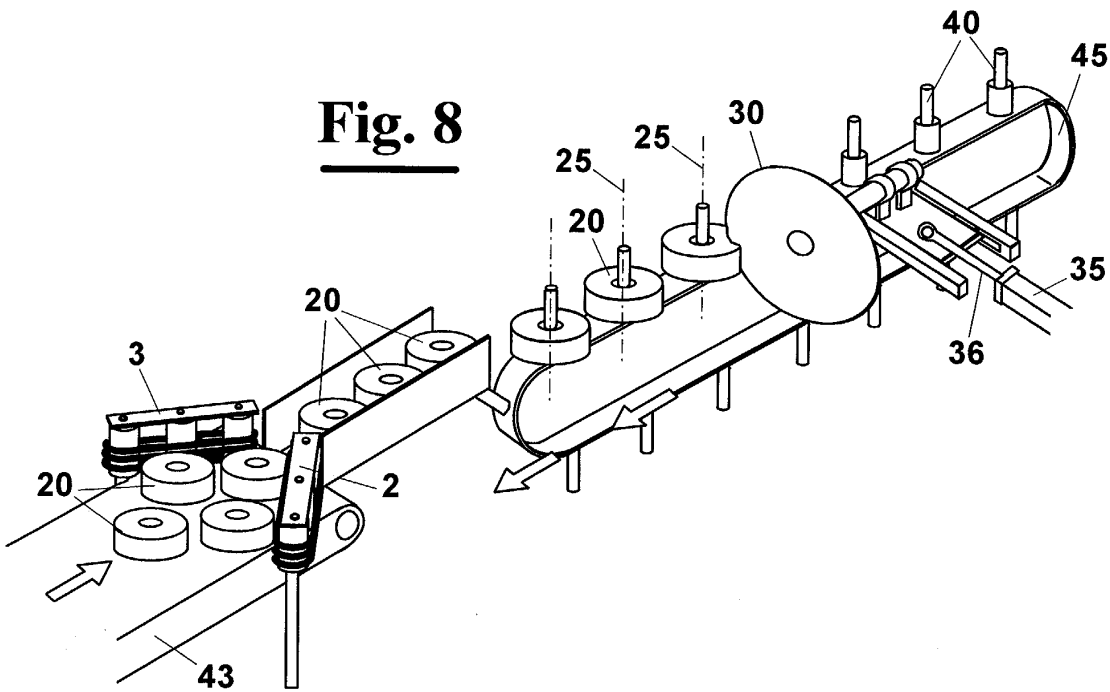
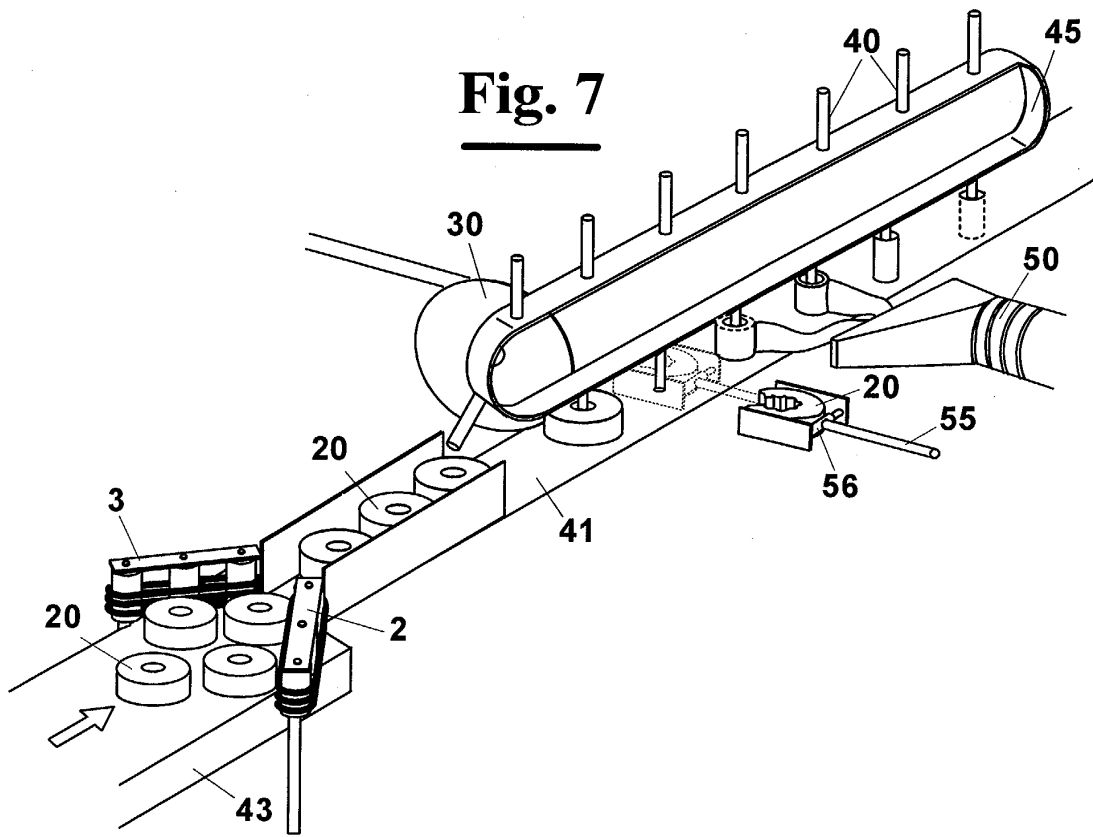


Fig. 6







European Patent
Office

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Application Number
EP 04 42 5238

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