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(54) SUPPORTING ELEMENT FOR TOBACCO MACHINE

(57) The object of the application is a supporting element (3, 3', 33) for a tobacco industry machine designed to support a continuous rod, moving axially (2) during cutting by a rotationally mounted knife (4), whereas the supporting element (3, 3', 33) comprises an at least partially cylindrical supporting surface (10) for the continuous rod (2), having a longitudinal axis (11), moreover the supporting element (3, 3', 33) has a front surface (8) constituting a cutting surface, characterised in that the front surface (8) has a depression (12, 12', 42).

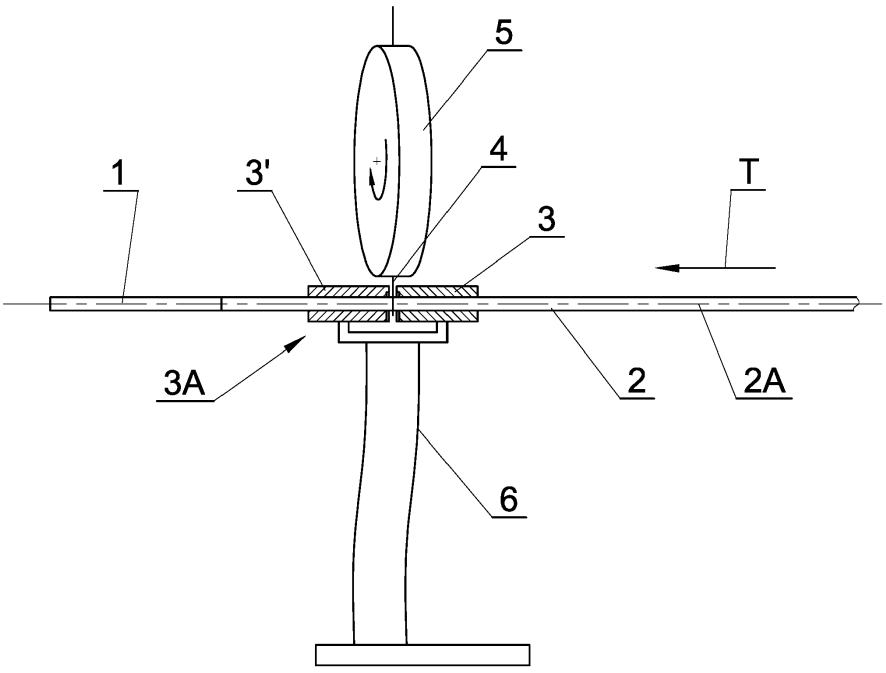

Fig. 1

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Description

[0001] The object of the invention is a supporting element for a tobacco industry machine used in a production machine for manufacturing tobacco, filter or multi-segment rods.

[0002] In the machines for manufacturing tobacco or filter rods of a defined length, first a continuous rod is manufactured which is cut during its movement into individual rods cut off from the continuous rod. Originally, reciprocating mounted knives situated perpendicular to the axis of the manufactured continuous rod were used. Presently, rotating knives which cut the continuous rod during the movement of the rod are commonly used. The rotating knives are mounted to a rotating knife head whose axis is not parallel to the axis of the continuous rod. The inclination of the knife head and the special mounting of the knives make it possible to cut the continuous rod during movement. An element for supporting the continuous rod during the cutting is required in order to cut of the continuous rod, usually the supporting element is made in the form of two sleeves having cutting surfaces directed opposite to each other, whereas the sleeves are situated coaxially and their cutting surfaces are spaced from each other at a distance equal to the thickness of the knife increased by a clearance.

[0003] Stationary cutting sleeves are known from the patent US1,418,437. Slidable sleeves mounted to a four-bar linkage and actuated by a crank mechanism are known from the patent GB328125. The patents US1,888,774, GB1207254 disclose cutting mechanisms wherein a knife head with an axis situated non-parallel to the axis of the continuous rod were used. From the patents GB652561, EP0163813 the sleeves having inclined cutting surfaces are known. The patent GB1462355 discloses sleeves having guiding surfaces which are narrowed by means of rings by the cutting surface. The patents US3,850,065, US3,956,955 and the publication WO2005/089574 disclose supporting elements having guiding surfaces which are partially cylindrical.

[0004] On a cigarette machine, a filter machine as well as a machine for manufacturing multi-segment rods the continuous rod is formed by wrapping the tobacco or filter material into a continuous wrapping material and gluing by means of an adhesive placed along the overlapping edges of the wrapping material. During cutting of such a continuous rod, it may happen that the adhesive has not fully set i.e. dried in the case of the PVA adhesive or cooled in the case of "hot melt" adhesive. Thus the adhesive may deposit on the knife, and further the dirt from the knife may be transferred onto the supporting element, both onto the element in the form of closed cutting sleeves and open supporting elements.

[0005] The object of the invention is a supporting element for a tobacco industry machine designed to support a continuous rod moving axially during cutting by a rotationally mounted knife, whereas the supporting element comprises an at least partially cylindrical supporting surface for the continuous rod, having a longitudinal axis, moreover the supporting element has a front surface constituting a cutting surface, characterised in that the front surface has a depression.

[0006] The supporting element according to the invention is further characterised in that the depressed surface is parallel to the front surface.

[0007] The supporting element according to the invention is further characterised in that the depressed surface is situated at an angle to the front surface.

[0008] The supporting element according to the invention is further characterised in that the width of the depression is equal to or greater than the diameter of the cylindrical supporting surface.

[0009] The supporting element according to the invention is further characterised in that the outer part of the front surface is conical.

[0010] The supporting element according to the invention is further characterised in that the front surface is perpendicular to the longitudinal axis of the supporting surface.

[0011] The object of the invention is further a machine for manufacturing of rods in the tobacco industry provided with a feeding unit arranged to feed a filling material, a unit adapted to feed a wrapping material, a continuous rod forming unit, and a cutting unit provided with a rotating cutting head. The machine according to the invention is characterised in that the cutting unit is provided with a supporting element according to the invention situated so that the axis of depression is directed convergently with the direction of movement of the knife mounted on the rotating head.

[0012] An advantage of the solution according to the invention is an increased quality of the tobacco, filter or multi-segment rods, in particular an improved cutting quality. The application of depression according to the invention forms a removing channel which allows removing adhesive or other dirt generated in the course of production of the continuous rod or in the process of knife sharpening. As a result, such dirt does not get into a receiving sleeve and does not cause product degradation.

[0013] The object of the invention was shown in detail in a preferred embodiment in a drawing in which:

Fig. 1 shows a fragment of a rod manufacturing machine,

Fig. 2 shows a cutting sleeve in a first embodiment,

Fig. 3 shows the cutting sleeve in a second embodiment,

Fig. 4 shows cutting of a continuous rod, whereas the supporting element as in the first embodiment is used,

Fig. 5 shows a cross-section through two supporting elements of Fig. 4,

Fig. 6 shows the supporting element in a third embodiment,

Fig. 7 shows cutting of the continuous rod, whereas the supporting element as in the third embodiment is used,

Fig. 8 shows cutting of the continuous rod, a supporting element for a double-track machine is used, and

Fig. 9 shows a multi-segment rod manufacturing machine.

[0014] Fig. 1 shows a fragment of a machine for manufacturing rods 1 of a continuous rod 2 moving axially and lengthwise. The continuous rod 2 is conveyed in the direction T shown with the arrow and moves through cutting sleeves 3, 3' which are mechanically connected with each other and constitute a supporting unit 3A designed to support the continuous rod 2 during cutting. The cutting sleeves 3, 3' may be identical. The sleeves 3, 3' may be mounted to flexible springy elements 6 or in any other way typical for rod manufacturing machines of the tobacco industry. A drive mechanism designed to put the sleeves 3, 3' into reciprocating motion in the direction of movement of the continuous rod 2 is not shown in the drawing. The cutting sleeves and other elements fulfilling the same function will be hereinafter referred to as supporting elements.

[0015] The supporting element 3 shown in Fig. 2 has a cylindrical outer surface 7 and two front surfaces 8 and 9. The supporting element 3 has a substantially cylindrical guiding surface 10 situated coaxially to the outer surface 7, whereas the guiding surface 10 may be situated eccentrically to the outer surface 7. The supporting element 3 may have a freely shaped outer surface 7. The guiding surface 10 has a longitudinal axis 11 being the geometrical axis of the cylindrical surface. In the front surface 8, there is a depression 12 having a depressed surface 13 being substantially parallel to the front surface 8, lateral surfaces 14 and 15 and a cylindrical surface 16 which may be situated coaxially with the guiding surface 10. In the embodiment shown, the diameter of the cylindrical surface 16 is greater than the diameter of the guiding surface 10. The lateral surfaces 14 and 15 and the depressed surface 13 form a channel having an outlet 18 for the dirt produced during the cutting. The depression 12 has an axis 19 directed from the axis 10 to the outlet 18. The front surface 8 constitutes the cutting surface and is the surface over which the knife 4 moves when cutting the continuous rod 2. The depression 12 may be shaped in another way so that the front surface 8 may constitute the guiding surface for the knife 4. The depression 12 may be rectangular or have the shape of a truncated pyramid. The front surface 8 is chamfered, around the front surface 8 extends a conically shaped surface 17 which facilitates inserting the knife 4 into the gap between the supporting elements.

[0016] In the embodiment shown in Fig. 3, the supporting element 3' is similar to the supporting element 3 of the first embodiment. In the front surface 8, there is a depression 12' having a depressed surface 13' being substantially parallel to the front surface 8, lateral surfaces 14' and 15' and a cylindrical surface 16'. In the embodiment shown, the diameter of the cylindrical surface 16' of the depression 12' is equal to the diameter of the guiding surface 10.

[0017] Fig. 4 shows location of the supporting element 3 relative to the knife 4 on the rotating head 5, on a manufacturing machine, rotating in the direction shown with the arrow. The supporting element 3 is positioned so that the depression 12 enables the dirt generated during the cutting to get out through the outlet 18. The axis 19 of the depression 12 is substantially convergent with the direction of movement K of the knife K 4.

[0018] Fig. 5 shows two supporting elements 3 in a cross-section A-A through the axis 2A of the continuous rod 2 (the cross-section is denoted in Fig. 4). The depressed surface 13 of the supporting element 3 is parallel to the front surface 8, whereas inclination of the depressed surface 13A shown with a broken line at the angle α in the range between 0° and 10° is possible. Together the depressions 12 of both supporting elements 3 form a channel for the dirt produced during the cutting having a constant cross-section or widening in the direction of movement of the knife 4.

[0019] Fig. 6 shows the supporting element 33 which has the rectangular shape which is open on one side and having two front surfaces 38 and 39. The supporting element 3 has a partially cylindrical guiding surface 40 and two flat surfaces 51, 52. The guiding surface 40 has a longitudinal axis 41 being the geometrical axis of the cylindrical surface. In the front surface 38, there is a depression 42 having a depressed surface 43 being substantially parallel to the front surface 38, and lateral surfaces 44 and 45. The lateral surfaces 44 and 45 and the depressed surface 43 form a channel for the dirt produced during the cutting having an outlet 48. The depression 42 has an axis 49 directed from the axis 40 to the outlet 48. The front surface 38 constitutes the cutting surface and is the surface over which the knife 4 moves during the cutting of the continuous rod 2. The depressed surface 43 may be parallel to the front surface 38, it may be inclined relative to the front surface 38 similar to the previous embodiment. The supporting element may have the form of two supporting elements 33 connected with each other so that the depressed surfaces 43 are situated opposite to each other as shown in Fig. 5 for supporting elements in the first embodiment.

[0020] Fig. 7 shows location of the supporting element 33 relative to the knife 4 on the rotating head 5 which rotates in the direction shown with the arrow. The sup-

porting element 33 is situated so that the depression 42 enables the dirt produced during the cutting to get out through the outlet 48. The axis 49 of the depression 42 is substantially convergent with the direction of movement K of the knife 4.

[0021] Fig. 8 shows the supporting element 63 in an embodiment for a double-rod making machine. The supporting element has the form of a double supporting element 33.

[0022] The supporting elements presented above are intended for the use in tobacco and filter rod manufacturing machines as well as in multi-segment filter rod manufacturing machines. Fig. 9 shows a machine 100 for manufacturing multi-segment filter rods. The machine 100 comprises a feeding unit 200 adapted to feed a filling material (in this case the filling material are segments made of various filter materials), a wrapping material feeding unit 300, a continuous rod forming unit 400 and a cutting unit 500. The filling material on the cigarette machine is tobacco, and on the filter machine a filtering material.

Claims

1. A supporting element (3, 3', 33) for a tobacco industry machine designed to support a continuous rod, moving axially (2) during cutting by a rotationally mounted knife (4), whereas the supporting element (3, 3', 33) comprises an at least partially cylindrical supporting surface (10) for the continuous rod (2), having a longitudinal axis (11), moreover the supporting element (3, 3', 33) has a front surface (8) constituting a cutting surface, **characterised in that** the front surface (8) has a depression (12, 12', 42).

2. The supporting element as in claim 1 **characterised in that** the depressed surface (13,13') is parallel to the front surface (8).

3. The supporting element as in claim 1 **characterised in that** the depressed surface (13A) is situated at an angle to the front surface (8).

4. The supporting element as in any of claims 1 to 3 **characterised in that** the width of the depression (12, 12', 42) is equal to or greater than the diameter of the cylindrical supporting surface (10).

5. The supporting element as in any of claims 1 to 4 **characterised in that** the outer part (17) of the front surface (8) is conical.

6. The supporting element as in any of claims 1 to 5 **characterised in that** the front surface (8) is perpendicular to the longitudinal axis (11) of the supporting surface (10).

7. A machine (100) for manufacturing of rods in the tobacco industry provided with a feeding unit (200) arranged to feed a filling material, a unit (300) arranged to feed a wrapping material, a continuous rod forming unit (400), and a cutting unit (500) provided with a rotating cutting head (5), **characterised in that** the cutting unit (500) is provided with a supporting element (3, 3', 33) according to any of claims 1 to 6, situated so that the axis (19) of the depression (12, 12', 42) is directed convergently with the direction of movement (K) of the knife (4) mounted on the rotating head (5).

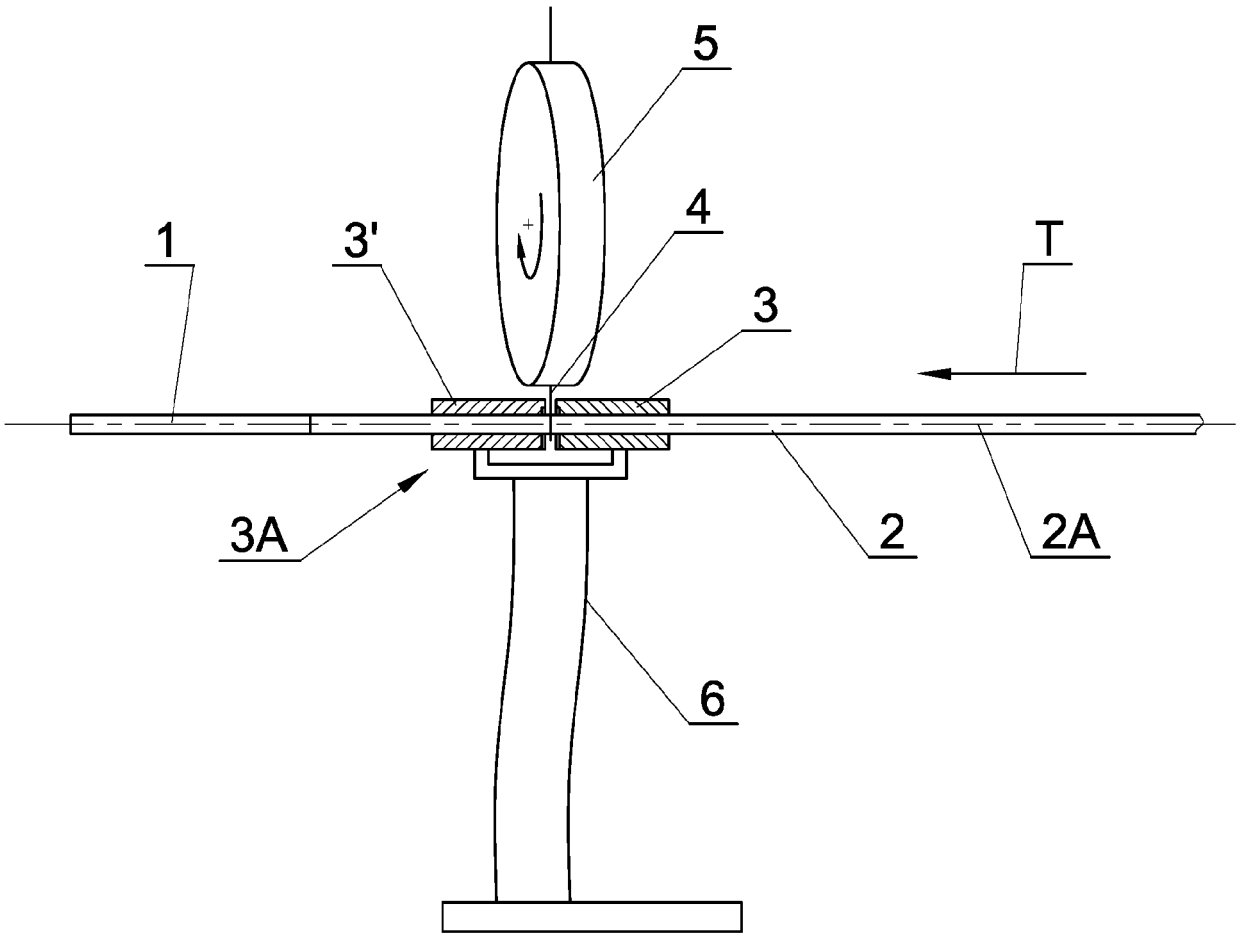

Fig. 1

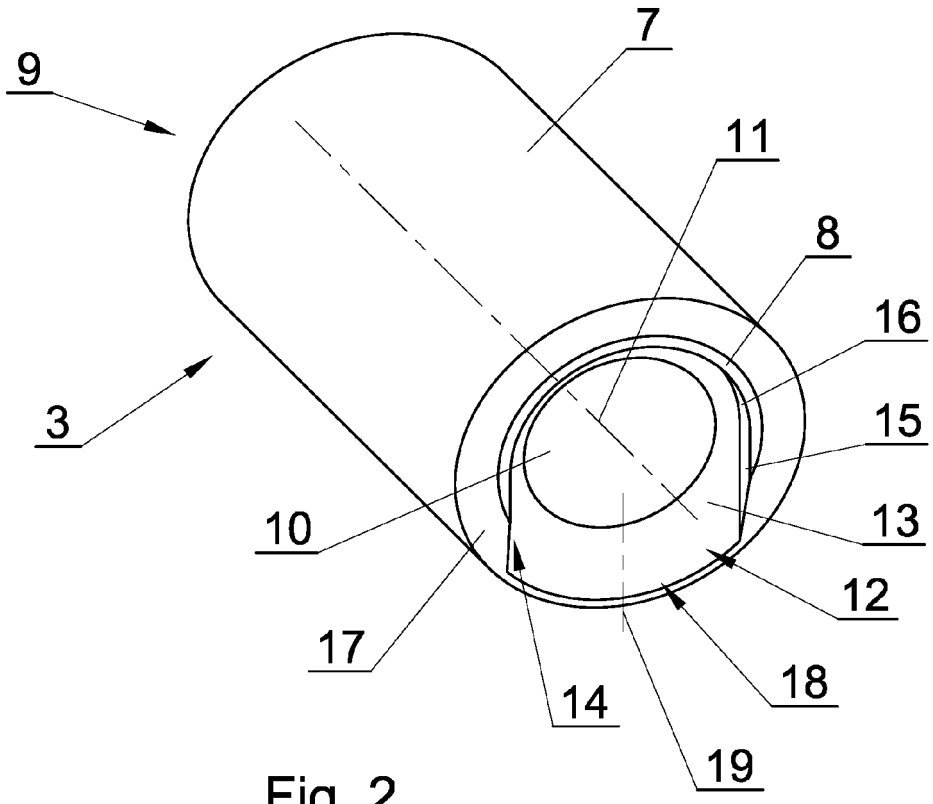

Fig. 2

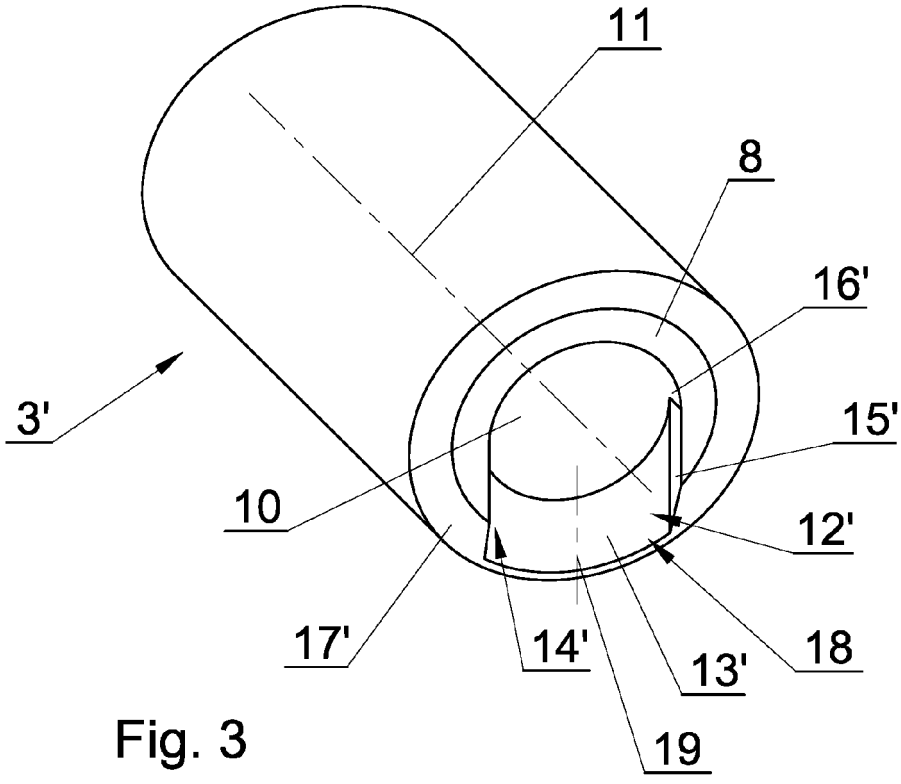

Fig. 3

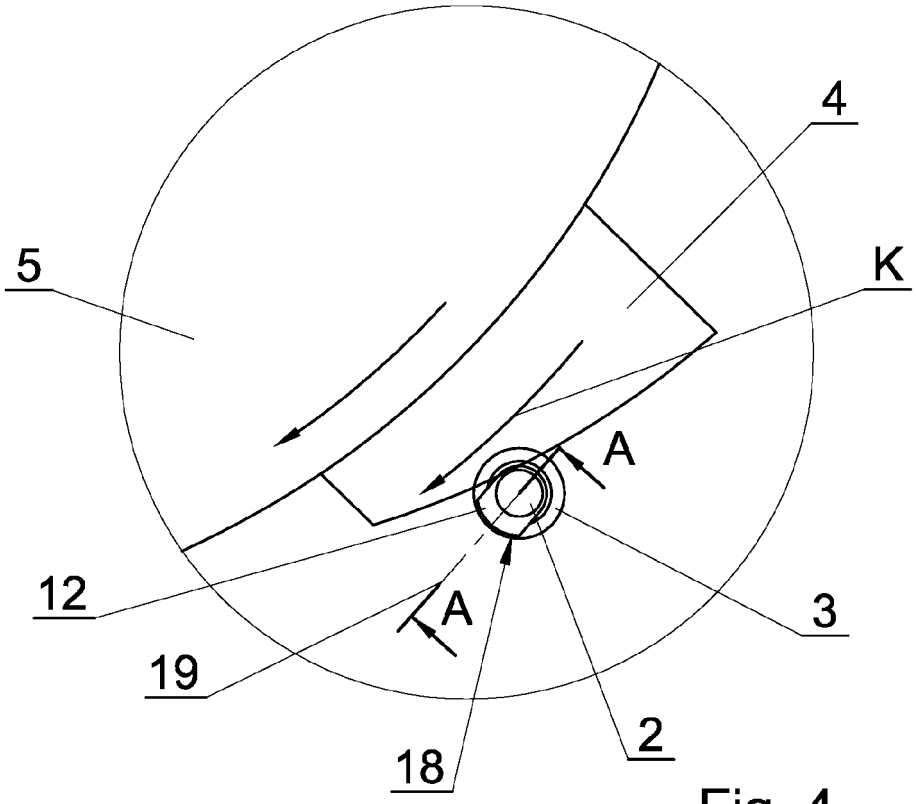

Fig. 4

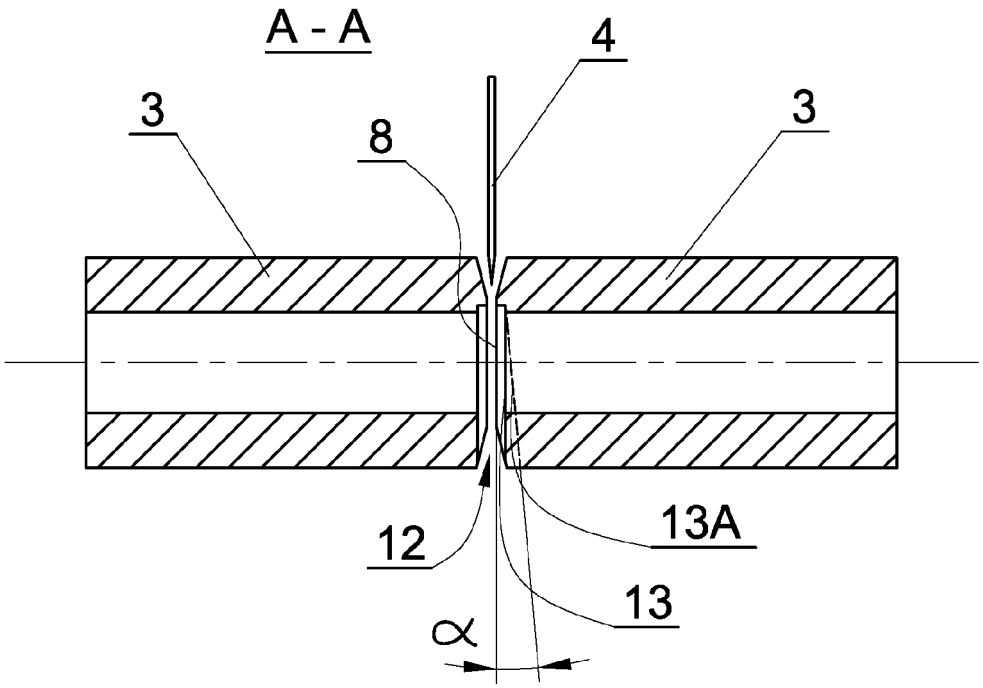

Fig. 5

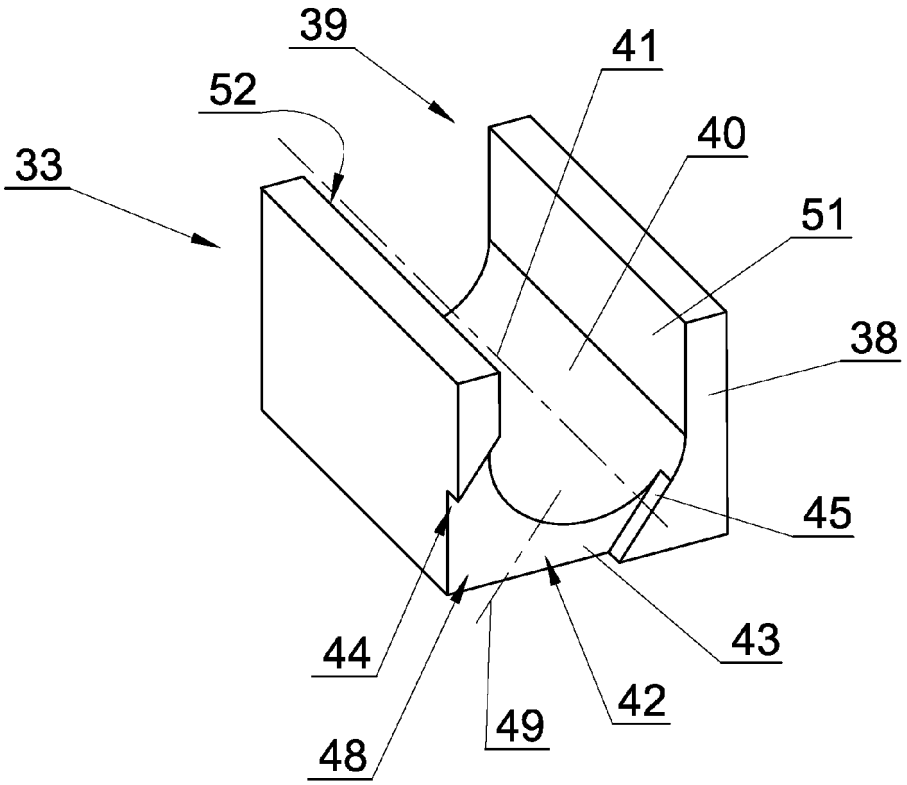

Fig. 6

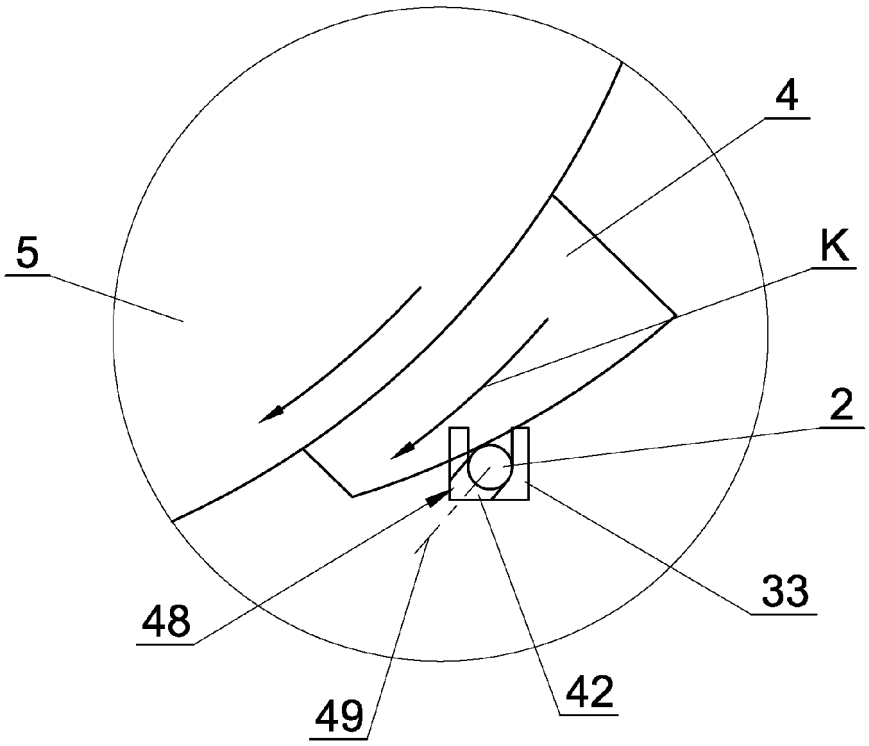

Fig. 7

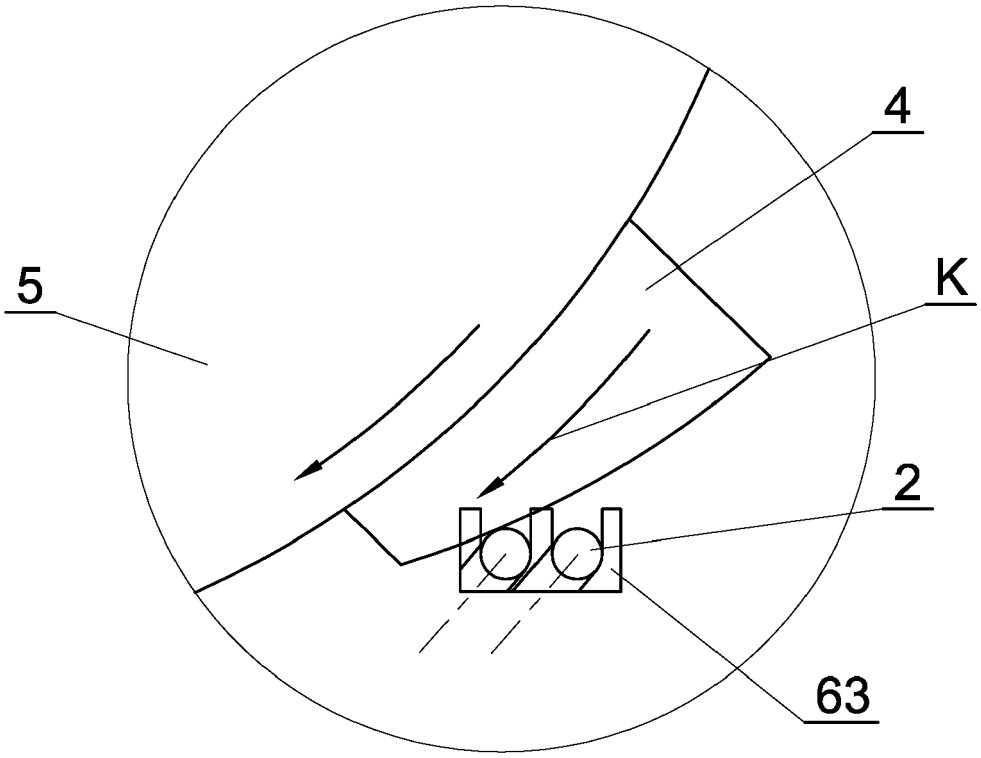

Fig. 8

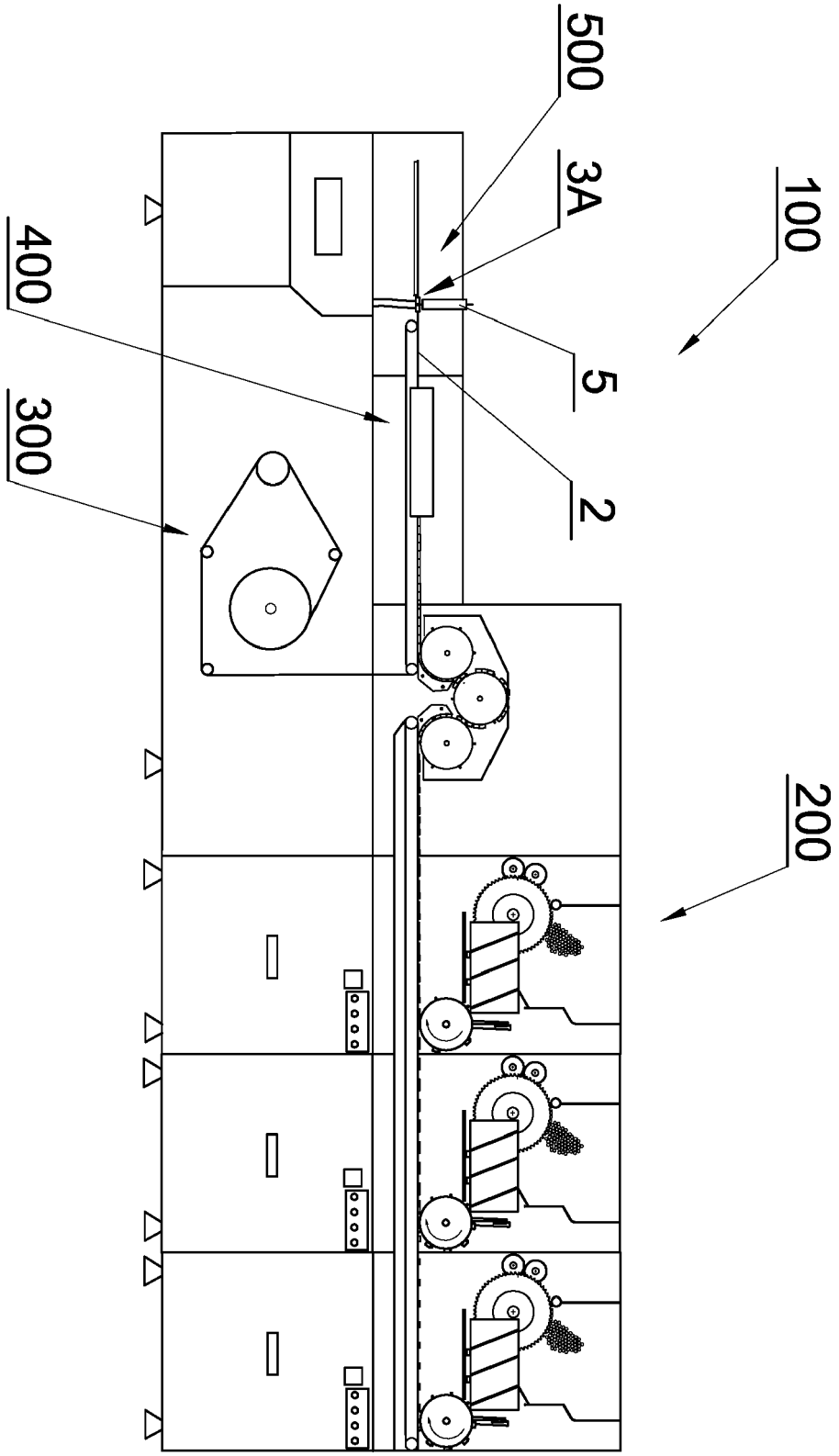

Fig. 9

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EUROPEAN SEARCH REPORT

Application Number
EP 18 21 1126

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TECHNICAL FIELDS SEARCHED (IPC)

A24C
B26D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	12 April 2019	Calabrese, Nunziante

CATEGORY OF CITED DOCUMENTS

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12-04-2019

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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