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FIGARSKI et al.(10) **Pub. No.: US 2016/0143350 A1**(43) **Pub. Date: May 26, 2016**(54) **METHOD AND MEMBER FOR GUIDING A
STRAND OF FILTER FIBERS AND FILTER
ROD MAKING MACHINE****Publication Classification**(51) **Int. Cl.**
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(2013.01); **A24D 3/0229** (2013.01)(71) Applicant: **International Tobacco Machinery
Poland Sp. z o. o., Radom (PL)**(72) Inventors: **Radoslaw FIGARSKI, Radom (PL);
Robert SKIERCZYNSKI, Radom (PL)**(21) Appl. No.: **14/903,051**(22) PCT Filed: **Jul. 18, 2014**(86) PCT No.: **PCT/IB2014/063211**

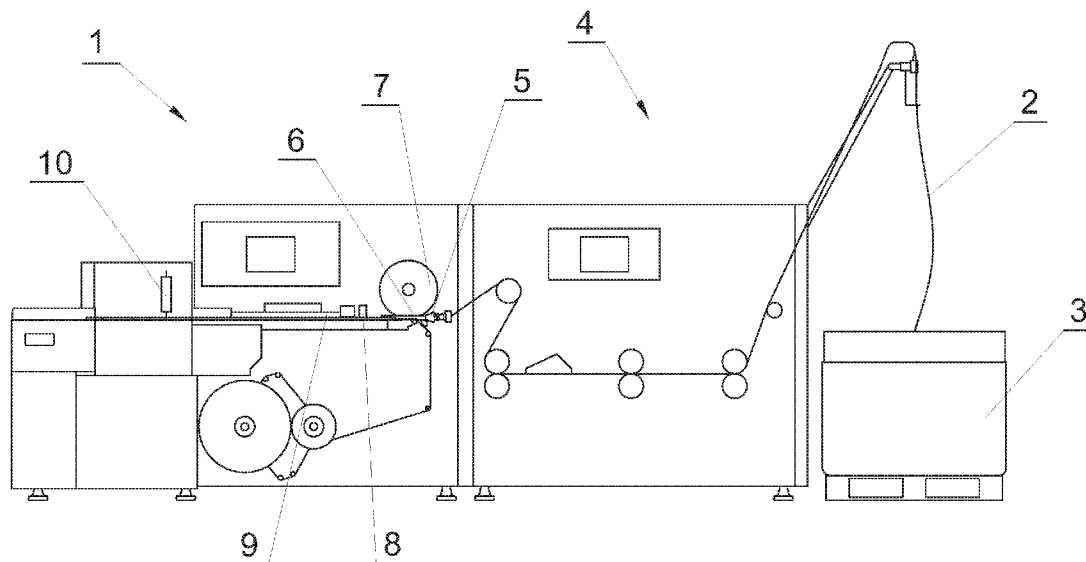
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(57) **ABSTRACT**

The object of the invention is a member for guiding a strand of filter fibers in an area of placing objects into the strand of filter fibers in a tobacco industry machine, adapted to work together with an apparatus for feeding the objects to the strand of filter fibers, having a slot in which the feeding members of the object feeder move, an inlet opening for a strand of filter fibers, an outlet opening for a strand of filter fibers, a guiding channel connecting an inlet opening and an outlet opening. The member is characterized by comprising vent holes for stabilizing a strand of filter fibers being converted and increasing the accuracy of object placing.



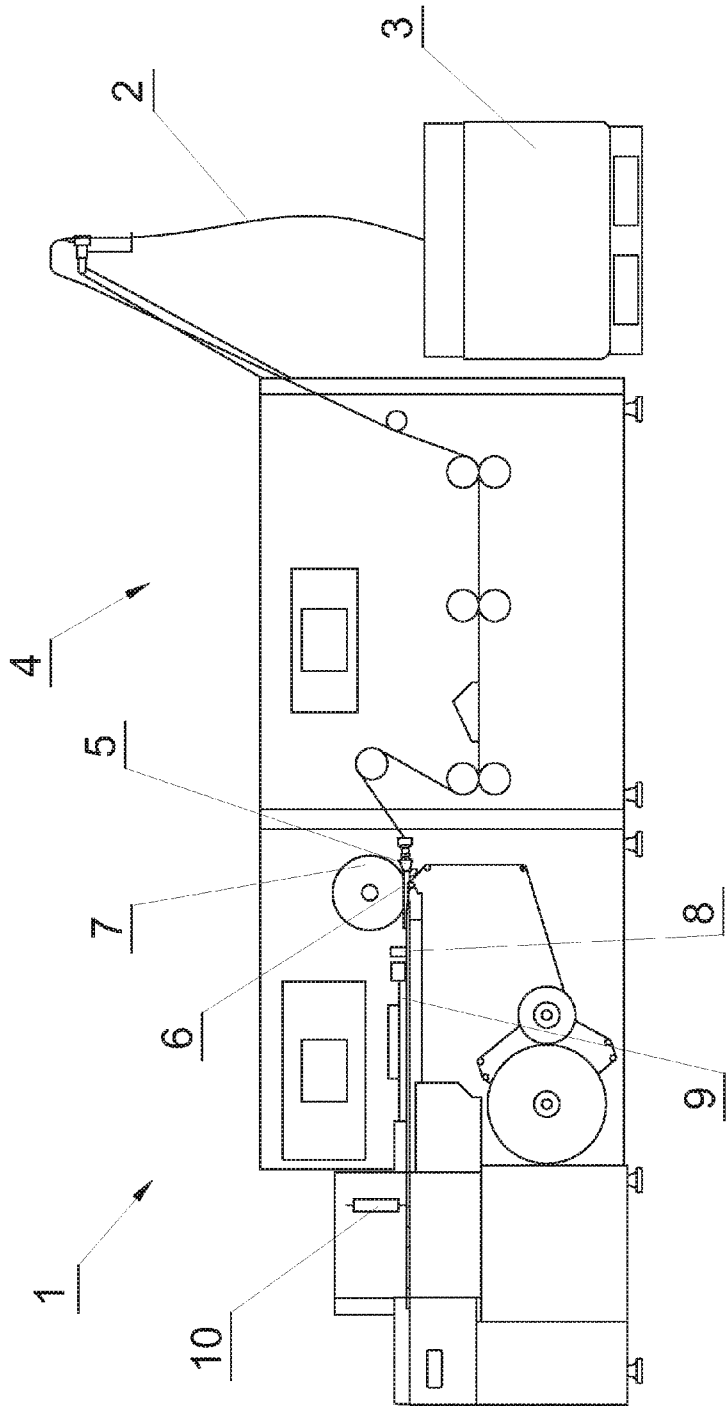


Fig. 1

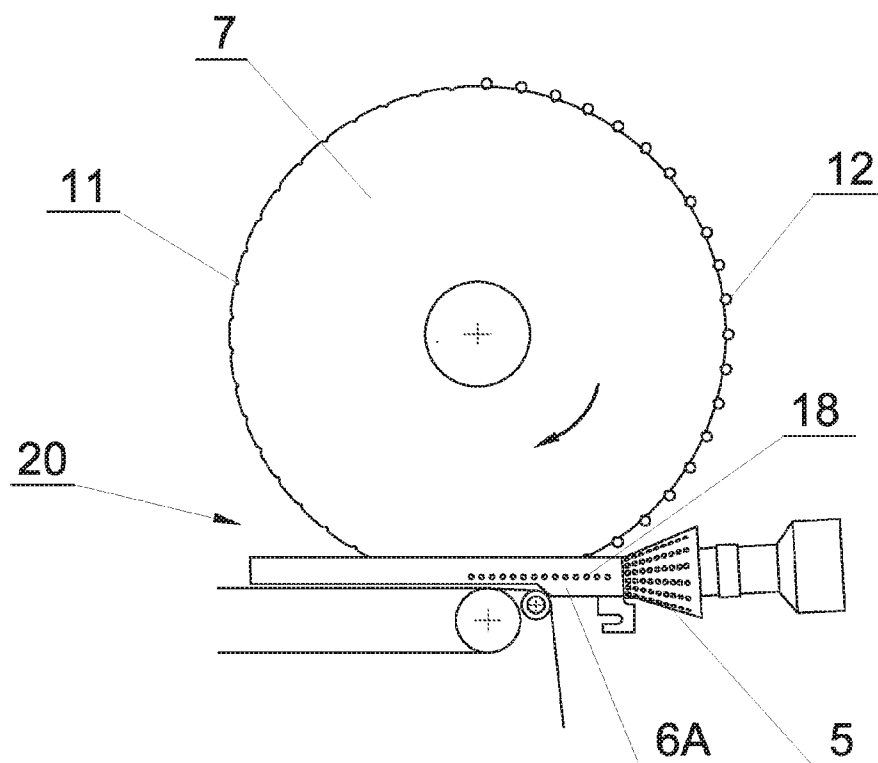


Fig. 2

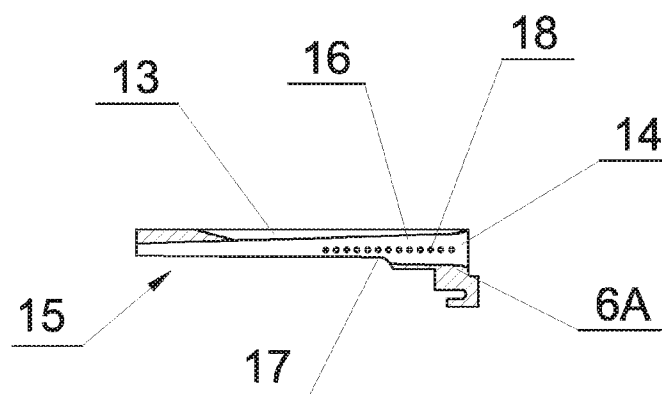


Fig. 3

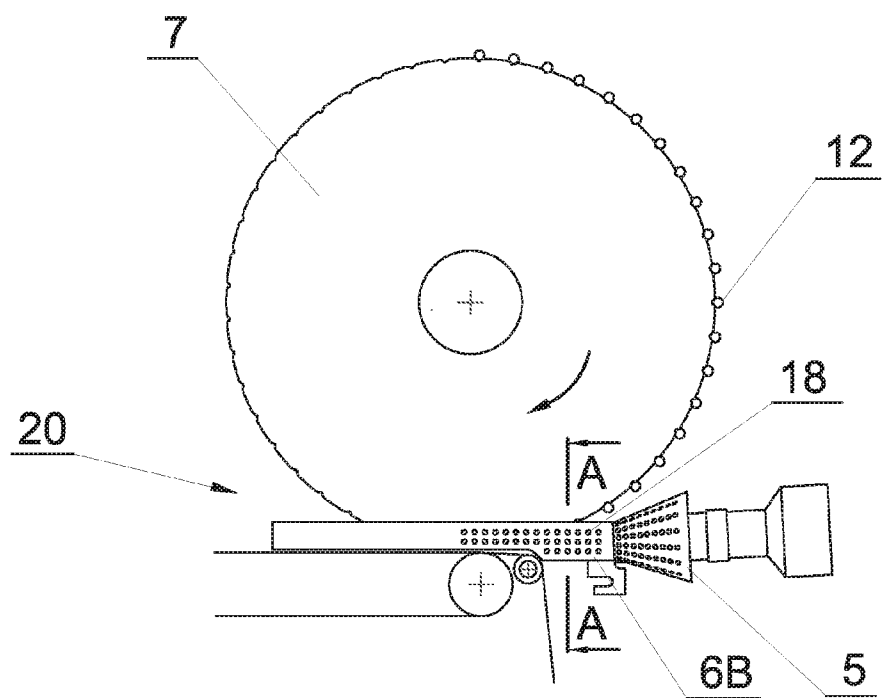


Fig. 4

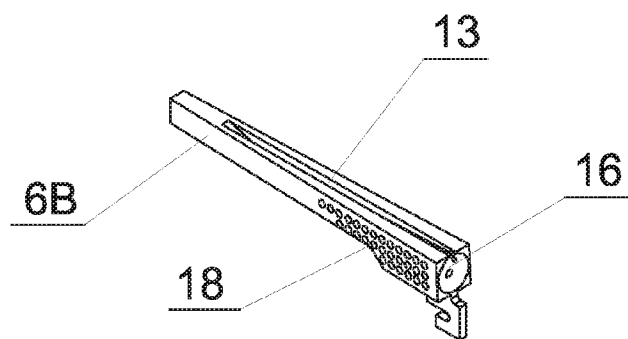


Fig. 5

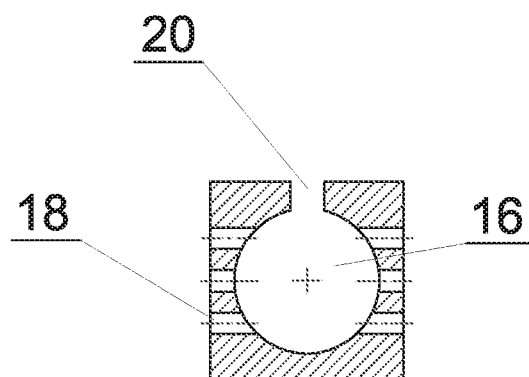


Fig. 6

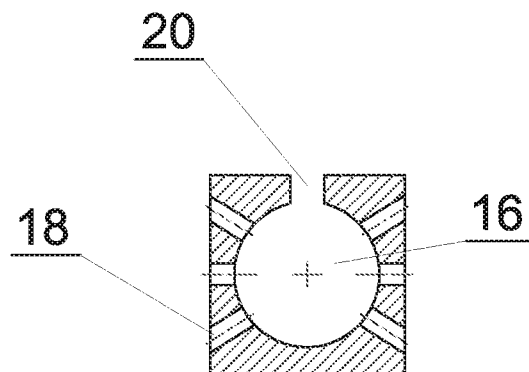


Fig. 7

METHOD AND MEMBER FOR GUIDING A STRAND OF FILTER FIBERS AND FILTER ROD MAKING MACHINE

[0001] The object of the invention is a method and a member for guiding a strand of filter fibers, and a filter rod making machine.

[0002] In the tobacco processing industry, filter rod making machines used to manufacture filter cigarettes are used whereas the filter rods are formed by cutting a continuous filter rod containing multiple filter fibers. A continuous filter rod is manufactured by a gradual compression of an acetate strand in narrowing channels; the rod usually has a circular section. A continuous filter rod is wrapped into a wrapper, and then divided into rods with a specific length by a cutting mechanism. The cutting is carried out by means of a rotating cutting head with knives situated on its circumference whereas the axis of rotation of a cutting head is put at an angle to the horizontal plane. If during the formation of a continuous filter rod beads with flavour substances or other objects with special characteristics are placed, it is expected that the beads or objects will take specific set positions relative to the rod tips. An axial position of the beads in the rods outside the allowable field of tolerance causes that the rods are rejected as defective, which results in production wastes.

[0003] A machine for making bead-containing filter rods was presented in the document WO 2012/042343. The beads are placed into a continuous filter rod by means of a delivery wheel with a vertical axis of rotation. In the abovementioned application, a member working together with a delivery wheel has a monolithic structure which allows discharging the air along the filter fiber axis.

[0004] The document US2013/102445A1 also discloses a machine for making filter rods containing beads with flavour or aromatic substances. The beads are placed into a continuous acetate rod by means of a delivery wheel with a horizontal axis of rotation. This solution also includes a member working together with a wheel having a monolithic structure similar to WO 2012/042343.

[0005] The solutions presented above do not guarantee a suitable repeatability of placing the beads into a strand of filter fibers. With the increasing speed of delivery of filter fibers, the accuracy of placing objects, e.g. beads, is decreasing. The present invention solves the abovementioned problem.

[0006] It was unexpectedly noticed during the operation of the machines for making bead-containing filter rods that an extremely significant factor for the repeatability of position of the beads in a rod is an effective discharge of the air from the spaces between the filter fibers outside of the continuous rod. In addition, the significance of the efficiency of air discharge increases with increasing speed of rod manufacturing. In the absence of an efficient air discharge the fibers move with a temporarily variable speed and are unequally distributed along the axis of the rods and around the beads, and the beads themselves take improper positions in finished rods.

[0007] The object of the invention is a member for guiding a strand of filter fibers in the area of placing objects into the strand of filter fibers in a tobacco industry machine, adapted to work together with an apparatus for feeding the objects to the strand of filter fibers, having a slot in which the feeding member or members of an object feeder move(s), an inlet opening for a strand of filter fibers, an outlet opening for a strand of filter fibers, a guiding channel connecting an inlet opening and an outlet opening. The member is characterized

by comprising vent holes stabilizing the converted strand of filter fibers and increasing the accuracy of object placing.

[0008] A member according to the invention comprises holes whose axes are situated radially.

[0009] A member according to the invention is characterized in that the axes of the holes are situated substantially perpendicular to the plane of the slot.

[0010] A member according to the invention has holes situated substantially along at least one line.

[0011] A member according to the invention has holes situated on both sides of the slot.

[0012] The object of the invention is a tobacco industry machine for making filter rods containing objects, comprising a treating unit for a strand of filter fibers, a continuous filter rod converting unit, an object feeding unit, a unit for cutting a continuous rod into individual rods. The machine is characterized by having a member according to the invention.

[0013] A machine according to the invention comprises an apparatus for feeding the objects to the strand of filter fibers comprising a delivery wheel.

[0014] The object of the invention is also a method of guiding a strand of filter fibers in the area of placing objects into the strand of filter fibers in a tobacco industry machine, in a member for guiding a strand of filter fibers working together with an apparatus for feeding the objects to the strand of filter fibers, the member for guiding the fibers having a slot in which move(s) a feeding member or members of the object feeder, wherein the strand is guided in a guiding channel from an inlet opening for filter fibers to an outlet opening for the strand of filter fibers. A method according to the invention is characterized in that the excess air contained between the fibers of the filter strand is discharged through vent holes so that the converted strand of filter fibers is stabilized and the accuracy of object placing is increased.

[0015] Due to the use of venting in the area of object placing, a more stable operation of the rod making machine at higher speeds can be achieved. In addition, a further favorable effect in the form of an increase in accuracy and repeatability of object placing in the axial direction in a rod was observed. An advantage of the method and the member for guiding a strand of filter fibers and discharging the air is a more uniform distribution of acetate fibers around the beads in a cross section.

[0016] The object of the invention was shown in detail in a preferred embodiment in a drawing in which:

[0017] FIG. 1 diagrammatically shows a machine for making bead-containing rods;

[0018] FIG. 2 shows a fragment of a machine of FIG. 1 comprising a member for guiding a strand of fibers according to the invention in a first embodiment;

[0019] FIG. 3 shows a longitudinal section through a member of FIG. 2;

[0020] FIG. 4 shows a fragment of a machine of FIG. 1 comprising a member for guiding a strand of fibers according to the invention in a second embodiment;

[0021] FIG. 5 shows a perspective view of a member according to the invention of FIG. 4;

[0022] FIG. 6 shows a cross section through a member according to the invention;

[0023] FIG. 7 shows a cross section through a member according to the invention.

[0024] FIG. 1 diagrammatically shows a machine 1 for making bead-containing rods. Acetate fibers 2 are fed from a fiber dispenser usually in the form of a bale 3 of compressed

acetate fibers. The fibers 2 are stretched and loosened by means of compressed air and cylinders in a strand treating unit 4. As a result, the acetate fibers spread and can contain more air among them. Then the fibers are moistened with a softening liquid (e.g. triacetin). A machine 1 for making bead-containing rods is provided with an inserting member 5 in the form of a funnel through which a strand of fibers is conveyed and in which a preliminary compression of the fibers occurs. An inserting member 5 is usually provided with openings facilitating the discharge of excess air from among the fibers. Behind the inserting member 5, a member 6 for guiding a strand of acetate fibers is situated in which a preliminary strand conversion occurs, whereas the member 6 is adapted to work together with a member 7 for feeding beads which are placed into a strand of acetate fibers. A feeding member 7 operating in the bead placing area is a part of a not shown bead feeder. A feeding member 7 may be a rotary disc or drum with a plurality of bead feeding pockets disposed on the circumference. A bead feeding member can also be positioned by means of a feeder provided with feeding members feeding linearly arranged bead groups, with the feeding member having e.g. an elliptic path of movement. Generally, the feeder can be provided with multiple different members adapted to convey the objects from an object dispenser to the area of placing the objects into a strand of filter fibers. Further behind the area of placing the objects into a strand of acetate fibers in a direction of movement of the strand, an adhesive feeding unit 8 and the unit for wrapping a strand into a wrapper 9 are situated. A rotating cutting head 10 for cutting a continuous acetate rod into individual rods is provided in the machine.

[0025] FIG. 2 shows a fragment of a machine 1 containing a member 6A for guiding a fiber strand adapted to work together with a feeding member 7 in the form of a disc provided with a plurality of bead 12 feeding pockets 11. A feeding member 7 in the area 20 of placing objects in the strand of filter fibers is inserted in a slot 13 of a member 6A shown in FIG. 3 depicting a vertical longitudinal section through a member 6A. A member 6A for guiding a strand of filter fibers has an inlet opening 14 and an outlet opening 15 as well as a guiding channel 16 running from an inlet opening 14 to an outlet opening 15, whereas an outlet opening 15 can be enlarged by a recess 17. A guiding channel is shaped usually conically, however, a different shape of the channel as a composition of a conical, cylindrical or hyperboloid opening is also possible. A member 6a is provided with at least one row of vent holes 18 situated along a guiding channel 16. Vent holes 18 can be arranged on both sides of a slot 13. The holes 18 can be linearly or randomly arranged.

[0026] FIG. 4 shows a fragment of a machine 1 provided with a similar member 6B for guiding a strand of filter fibers having three rows of vent holes 18. A member 6B for guiding a strand is shown in a perspective view in FIG. 5. FIG. 6 shows a cross section through a member 6B for guiding a strand marked as A-A in FIG. 4. Vent holes 18 are situated perpendicular to a slot 13, with the slot 13 being substantially parallel to the plane of a feeding member 7. FIG. 7 shows a cross section through a member 6B for guiding a strand in another embodiment in which the vent holes 18 are arranged radially to a guiding channel 16.

[0027] A member 6A, 6B for guiding filter fibers according to the invention can be used in a situation when a feeding member 7 operates in both a vertical and a horizontal plane,

i.e. when a slot is situated vertically or horizontally. It can be also used in any other position.

[0028] A suitably treated strand of acetate fibers 2 passes through an inserting member and then moves through a channel 16 of a member 6A 6B for guiding a strand of filter fibers in an area 20 of placing the objects within a strand. A member 6A, 6B for guiding a strand has a plurality of holes so that the air accumulated among the fibers is effectively removed and discharged through the holes 18. This allows placing the objects axially centrally in a continuous filter rod with a high repeatability. An effective removal of the air in the object placing area improves the repeatability of longitudinal arrangement of the objects. In this area, a fiber strand is finally converted to a continuous rod with a specific diameter.

1. A member (6A, 6B) for guiding a strand of filter fibers in an area of placing objects into the strand of filter fibers in a tobacco industry machine (1), adapted to work together with an apparatus for feeding the objects to the strand of filter fibers, having a slot (13) in which a feeding member or members (7) of an object feeder move(s), an inlet opening (14) for the strand of filter fibers, an outlet opening (15) for the strand of filter fibers, a guiding channel (16) connecting the inlet opening (14) and the outlet opening (15), the guiding channel (16) comprising vent holes (18) for stabilizing a converted strand of filter fibers and increasing the accuracy of object placing.

2. The member as in claim 1 characterized in that the axes of the vent holes (18) are situated radially.

3. The member as in claim 1 characterized in that the axes of the vent holes (18) are situated substantially perpendicular to the plane of the slot (13).

4. The member as in claim 1 characterized in that the vent holes (18) are situated substantially along at least one line.

5. The member as in claim 1 characterized in that the vent holes (18) are situated on both sides of the slot (13).

6. A tobacco industry machine for making filter rods containing objects, comprising a treating unit for a strand of filter fibers, a continuous filter rod converting unit, an object feeding unit, a unit for cutting a continuous rod into individual rods, the tobacco industry machine being provided with a member according to claim 1.

7. The machine as in claim 6 characterized in that the object feeding unit comprises a delivery wheel.

8. A method of guiding a strand of filter fibers in an area of placing objects into the strand of filter fibers in a tobacco industry machine, in a member for guiding the strand of filter fibers working together with an apparatus for feeding the objects to the strand of filter fibers, the member for guiding the strand of filter fibers having a slot in which move(s) a feeding member or members of the object feeder, wherein the strand of filter fibers is guided in a guiding channel from an inlet opening for the strands of filter fibers to an outlet opening for the strand of filter fibers, wherein the excess air contained among the fibers of the filter strand is discharged through vent holes so that a converted strand of filter fibers is stabilized and the accuracy of object placing is increased.

9. A tobacco industry machine for making filter rods containing objects, comprising a treating unit for a strand of filter fibers, a continuous filter rod converting unit, an object feeding unit, a unit for cutting a continuous rod into individual rods, the tobacco industry machine being provided with a member according to claim 2.

10. A tobacco industry machine for making filter rods containing objects, comprising a treating unit for a strand of

filter fibers, a continuous filter rod converting unit, an object feeding unit, a unit for cutting a continuous rod into individual rods, the tobacco industry machine being provided with a member according to claim 3.

11. A tobacco industry machine for making filter rods containing objects, comprising a treating unit for a strand of filter fibers, a continuous filter rod converting unit, an object feeding unit, a unit for cutting a continuous rod into individual rods, the tobacco industry machine being provided with a member according to claim 4.

12. A tobacco industry machine for making filter rods containing objects, comprising a treating unit for a strand of filter fibers, a continuous filter rod converting unit, an object feeding unit, a unit for cutting a continuous rod into individual rods, the tobacco industry machine being provided with a member according to claim 5.

13. The machine as in claim 9 characterized in that the object feeding unit comprises a delivery wheel.

14. The machine as in claim 10 characterized in that the object feeding unit comprises a delivery wheel.

15. The machine as in claim 11 characterized in that the object feeding unit comprises a delivery wheel.

16. The machine as in claim 12 characterized in that the object feeding unit comprises a delivery wheel.

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