



US 20170174375A1

(19) **United States**

(12) **Patent Application Publication**
EK

(10) **Pub. No.: US 2017/0174375 A1**

(43) **Pub. Date: Jun. 22, 2017**

(54) **DEVICE AND METHOD FOR PRODUCING PORTION PACKETS OF A SMOKELESS TOBACCO PRODUCT OR NON-TOBACCO SNUFF PRODUCT**

(52) **U.S. Cl.**
CPC *B65B 19/30* (2013.01); *B65B 9/06* (2013.01); *B65B 57/00* (2013.01); *B65B 61/06* (2013.01); *B65B 7/02* (2013.01); *A24F 23/02* (2013.01)

(71) Applicant: **Swedish Match North Europe AB,**
Stockholm (SE)

(57) **ABSTRACT**

(72) Inventor: **Kenneth EK,** Lerum (SE)

The invention concerns a device (1) for producing portion packets (2) of a smokeless tobacco product or non-tobacco snuff product, comprising a forming arrangement (3) configured to form portion packets of the product from a supply of product material, a packaging arrangement (4) configured to fold and seal a packaging material (5) around the portion packets and comprising a unit for transversal sealing (11), a sensor member (12, 13) configured to generate information useful for identifying defect portion packets during operation of the device, a rejection system (7) configured to reject selected portion packets during operation of the device, and a control system (8) configured to receive the information generated by the sensor member and to control the rejection system. The sensor member is capable of generating data of at least a part of an individual portion packet during operation of the device, and the control system is configured to i) carry out a comparison between a) the data received from the sensor member and b) reference data and to ii) control the rejection system depending on a result of the comparison. The sensor member is arranged in association with the unit for transversal sealing, such as to be capable of generating data of portion packets that have been folded into the longitudinally folded strip of packaging material. The control system is provided with information on where on the strip of packaging material transversal seals (9) generated by the transversal sealing unit will be or have been placed. The invention also concerns a method for producing portion packets of a smokeless tobacco product or non-tobacco snuff product.

(21) Appl. No.: **15/116,171**

(22) PCT Filed: **Feb. 5, 2015**

(86) PCT No.: **PCT/EP2015/000237**

§ 371 (c)(1),

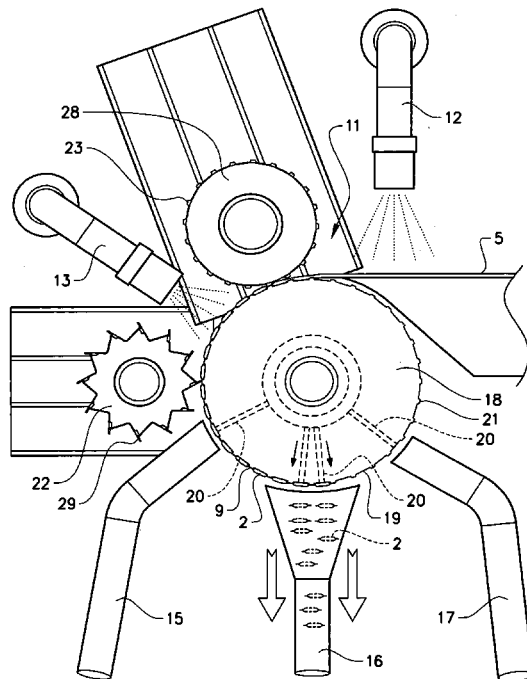
(2) Date: **Aug. 2, 2016**

(30) **Foreign Application Priority Data**

Feb. 6, 2014 (EP) 14154188.8

Publication Classification

(51) **Int. Cl.**
B65B 19/30 (2006.01)
A24F 23/02 (2006.01)
B65B 61/06 (2006.01)
B65B 7/02 (2006.01)
B65B 9/06 (2006.01)
B65B 57/00 (2006.01)



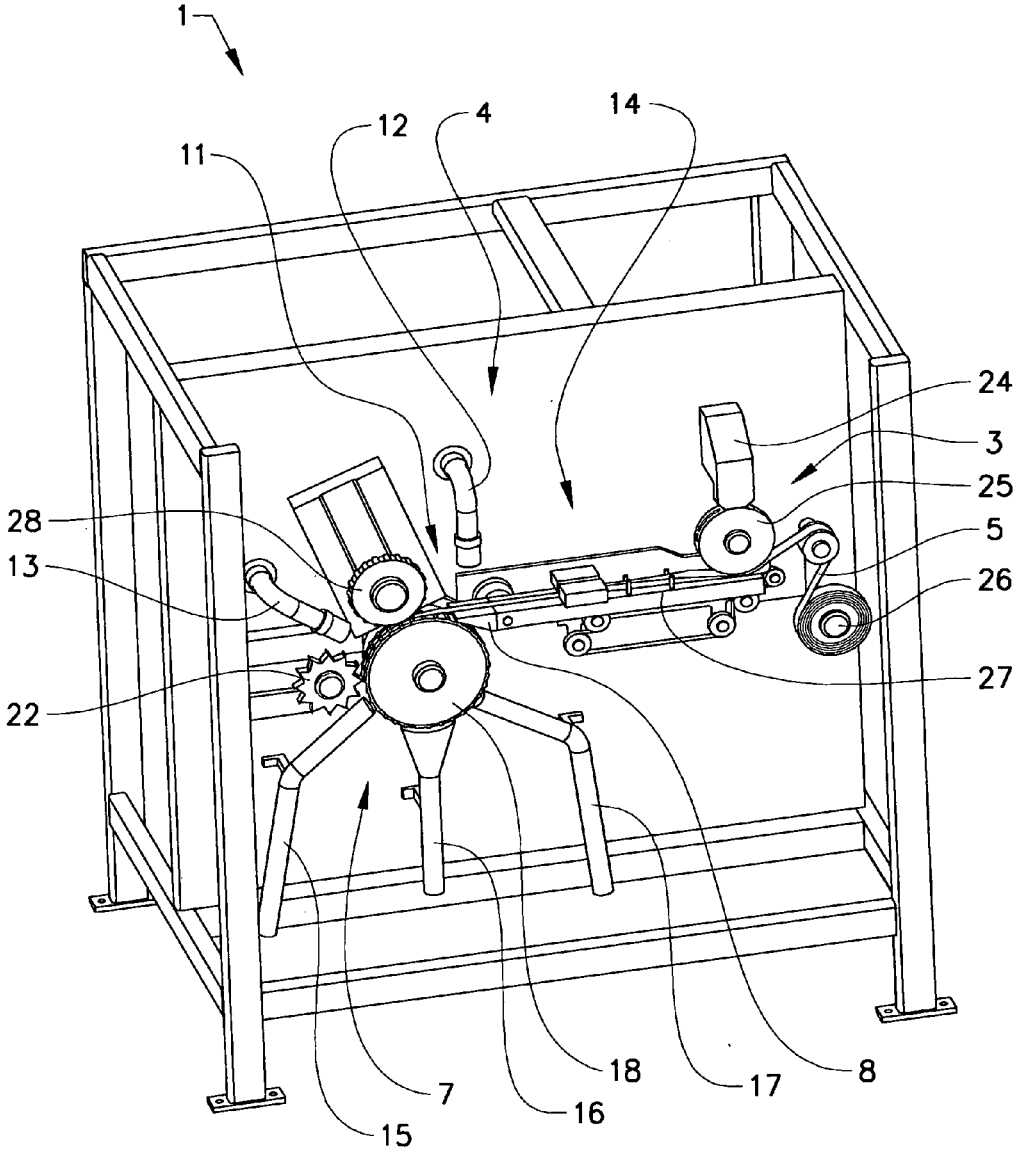


FIG. 1

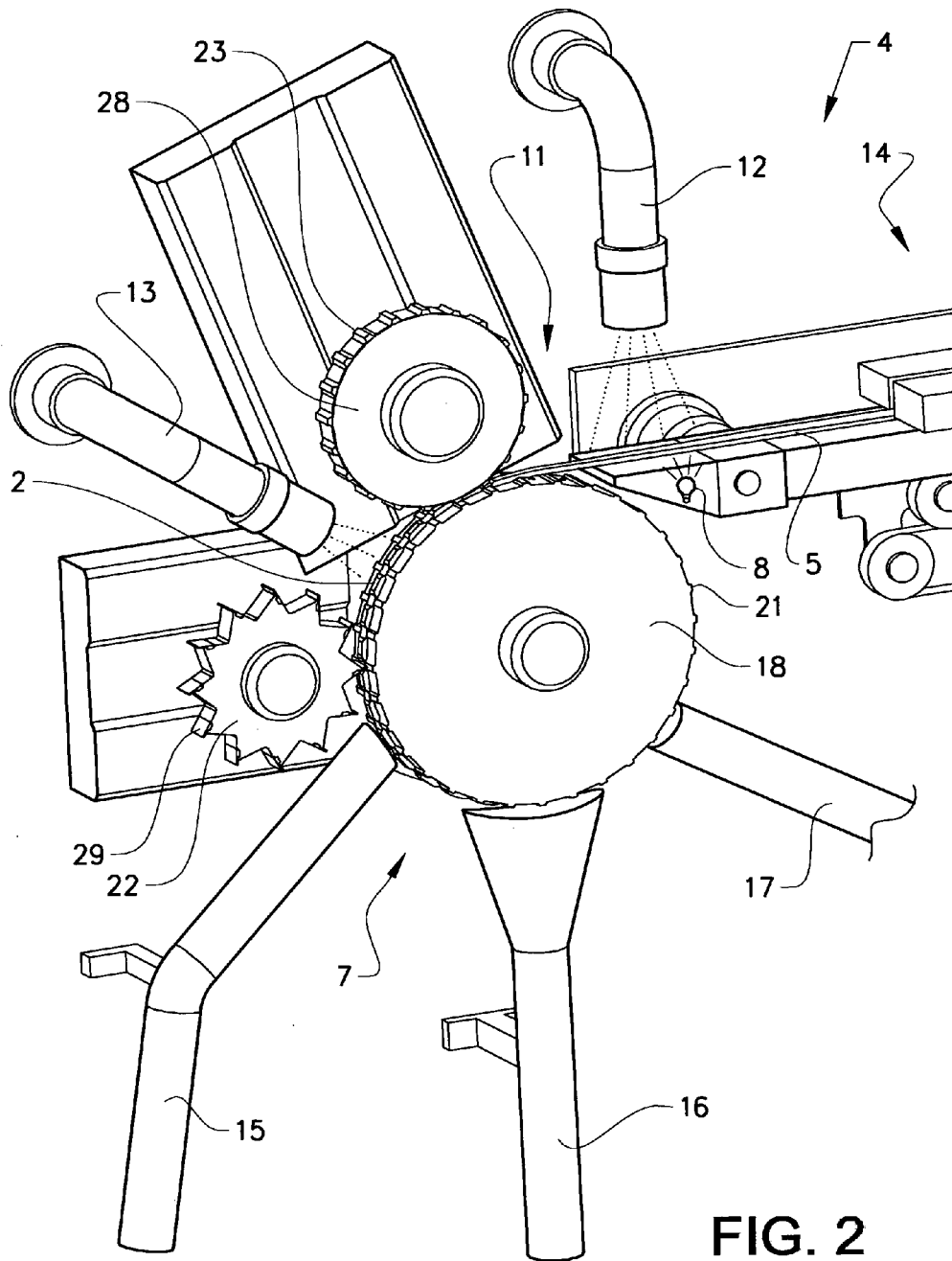


FIG. 2

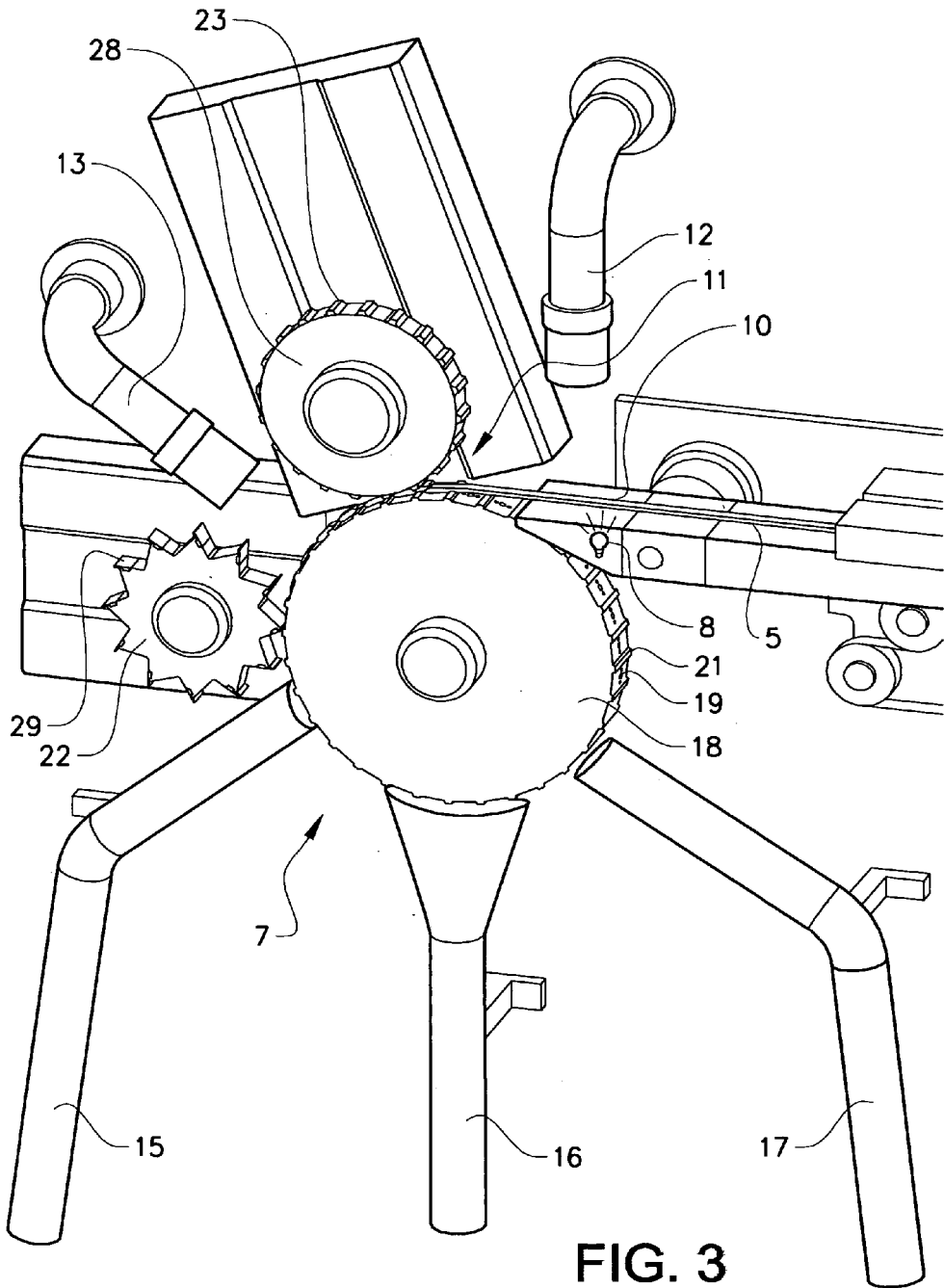


FIG. 3

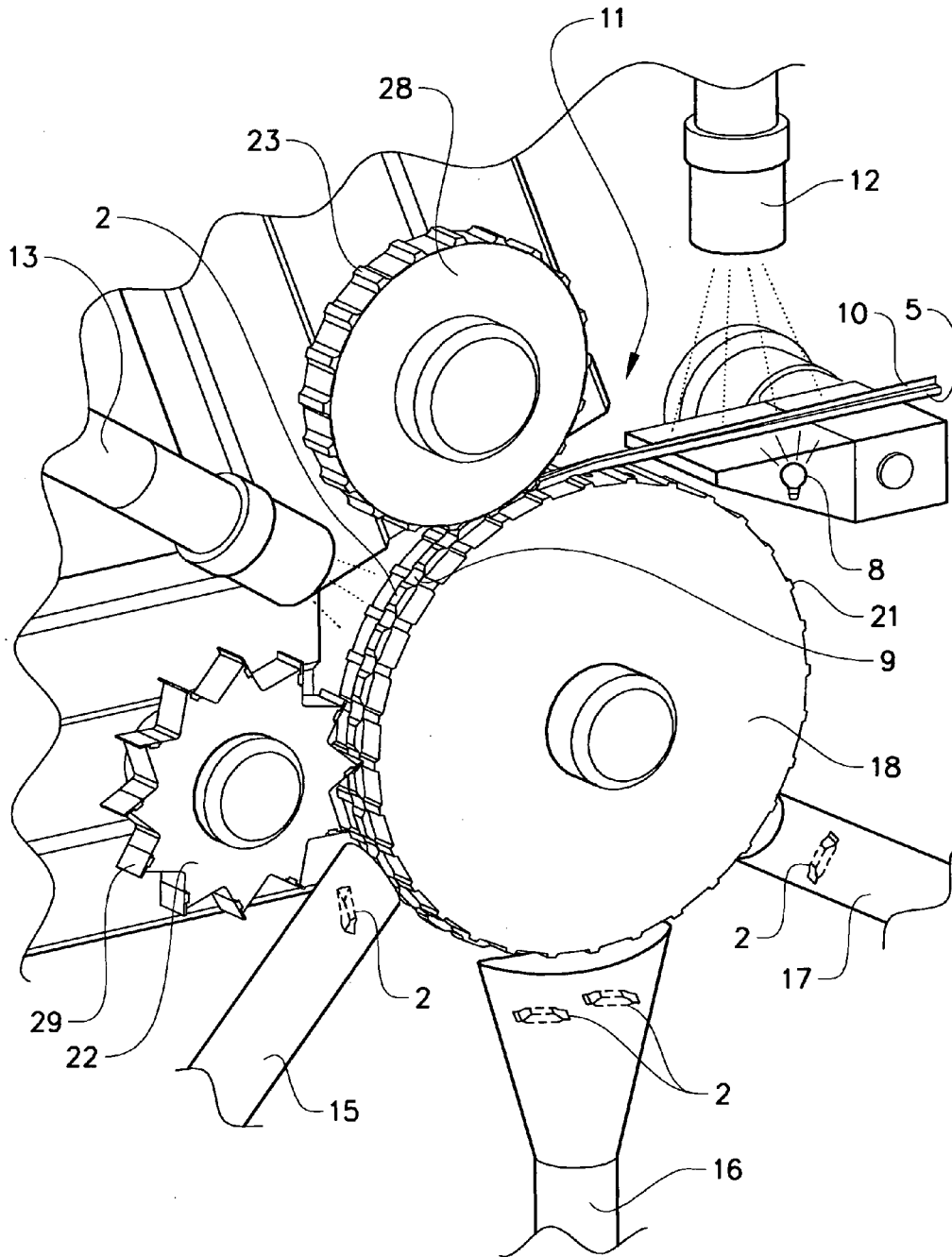


FIG. 4

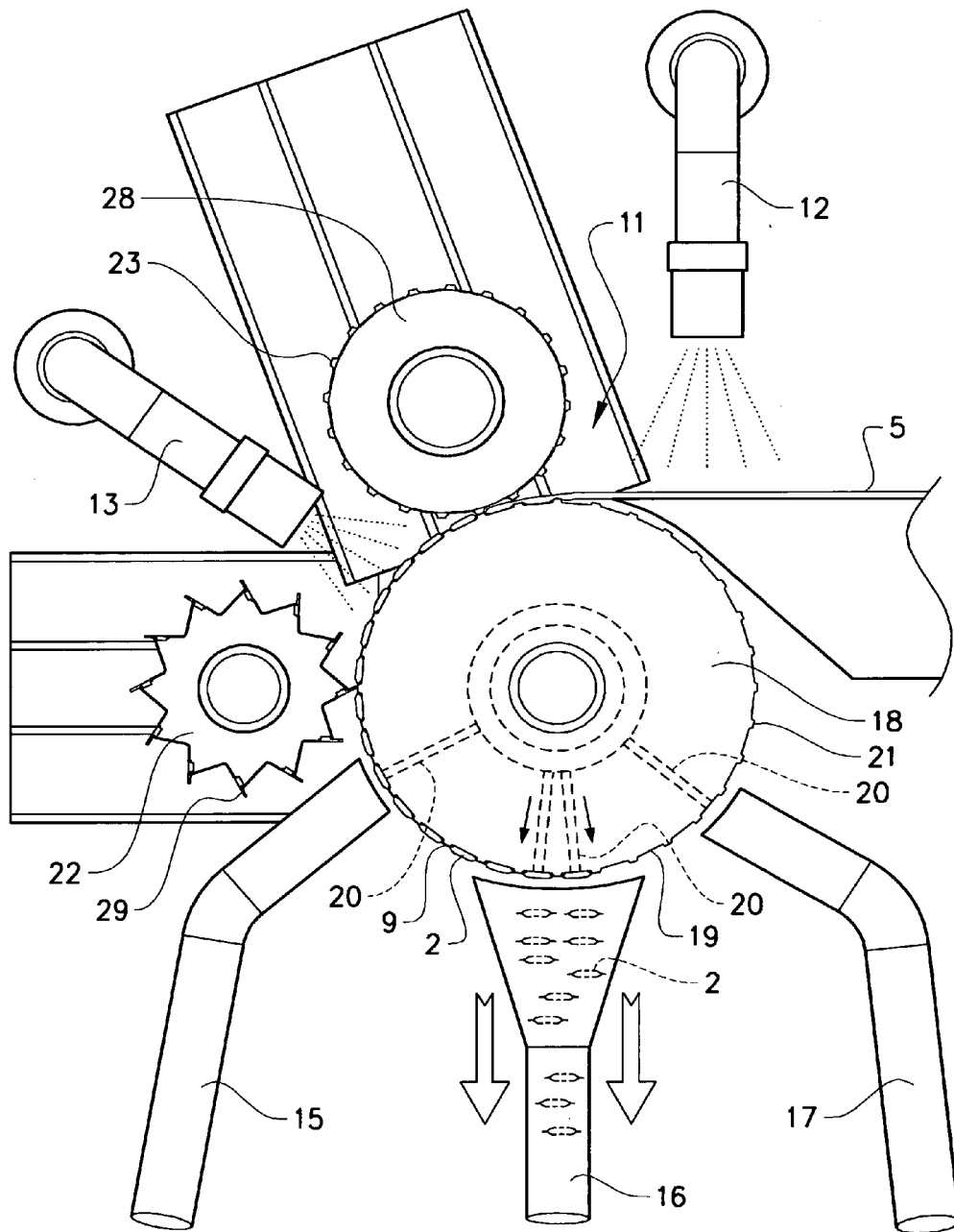


FIG. 5

**DEVICE AND METHOD FOR PRODUCING
PORTION PACKETS OF A SMOKELESS
TOBACCO PRODUCT OR NON-TOBACCO
SNUFF PRODUCT**

TECHNICAL FIELD

[0001] This invention relates to a device for producing portion packets of a smokeless tobacco product or non-tobacco snuff product, comprising a forming arrangement configured to form portion packets of the product from a supply of product material, a packaging arrangement configured to fold and seal a packaging material around the portion packets, a sensor member configured to generate information useful for identifying defect portion packets during operation of the device, a rejection system configured to reject selected portion packets during operation of the device, and a control system configured to receive the information generated by the sensor member and to control the rejection system.

[0002] The invention also relates to a method for producing portion packets of a smokeless tobacco product or non-tobacco snuff product comprising the steps of forming portion packets, folding and sealing a packaging material around the portion packets, generating information useful for identifying defect portion packets, and rejecting selected portion packets.

BACKGROUND OF THE INVENTION

[0003] Devices for packaging of individual portion packets of a smokeless tobacco product or non-tobacco snuff product, such as finely divided moistened tobacco material, in Swedish “snus”, are known from, for instance, EP0921978 and US2010/0101189.

[0004] It is important that the customer product, typically a can filled with a certain number of tobacco pouches, is of high quality which, for instance, means that cans that contain one or several individual pouches that are too large/heavy or too small/light should not be sent out to customers. To avoid that such faulty/defect individual pouches are placed in the can they must be identified and rejected during production before being placed in the can.

[0005] US2010/0101189 discloses a machine capable of detecting and removing from the production line pouches that have a weight out of a preselected range. The machine comprises a microwave emitter device interposed between paired transport belts and cutting means that senses the mass density of the tobacco particles contained in each of the pouches. A control unit connected to the emitter calculates the weight of each pouch and compares with reference values. If out of range, the pouch is removed by means of a mechanical expulsion device activated by the control unit.

[0006] US2012/0023874 discloses a device comprising an inspection and feed control system for identifying and rejecting pouches that have a content that deviates from a certain specification. Sensors are used to determine the content of individual pouches. The function of these sensors is not explained, so it is therefore unclear how to apply the disclosed inspection and feed control system.

[0007] In the device disclosed in EP0921978 the portion packets are formed by a rotary portioning wheel and placed onto an “endless” strip/tape of heat-sealable packaging material that is fed under the wheel and that transports the portion packets towards a folding and sealing unit where the

packaging material is folded, cut and transversely sealed around the individual portion packets. The problem of identifying and rejecting faulty pouches is not addressed in EP0921978.

SUMMARY OF THE INVENTION

[0008] The machine disclosed in US2010/0101189 may work well for rejecting packaged portion packets, also called pouches, that contain too little or too much smokeless tobacco product material or non-tobacco snuff product material, at least in the type of machine described. However, no indication is given on how to detect pouches with other defects than a faulty size or weight. Further, US2010/0101189 gives no indication on how to remove defect pouches from the production line in other types of machines, such as the one disclosed in EP0921978.

[0009] There is thus a need for improvements with regard to identification and rejection of faulty individual pouches in devices for packaging of individual portion packets of a smokeless tobacco product or a non-tobacco snuff product.

[0010] The invention concerns a device for producing portion packets of a smokeless tobacco product or non-tobacco snuff product, said device comprising

[0011] a forming arrangement configured to form portion packets of the product from a supply of product material,

[0012] a packaging arrangement configured to fold and seal a packaging material around the portion packets,

[0013] a sensor member configured to generate information useful for identifying defect portion packets during operation of the device,

[0014] a rejection system configured to reject selected portion packets during operation of the device, and

[0015] a control system configured to receive the information generated by the sensor member and to control the rejection system.

[0016] The sensor member is capable of generating data of at least a part of an individual portion packet during operation of the device, and the control system is configured to i) carry out a comparison between a) the data received from the sensor member and b) reference data, and to ii) control the rejection system depending on a result of said comparison.

[0017] Such a device can be used to identify a variety of defects of individual portion packets, such as an incomplete sealing of the packaging material, an inappropriate positioning of a portion packet before packaging, the presence of product material on an outside of the packaging material, etc., which makes it possible to reject such portion packets and avoid placing them in the can, i.e. in the customer product. This improves the quality of the customer product.

[0018] The reference data relate to data for portion packets deemed to be acceptable and/or correct.

[0019] The packaging material may comprise, or be constituted by, a material that is permeable to saliva and/or is heat sealable, such as viscose fibres bonded by a thermoplastic bonding agent. The packaging material may be a non-woven material, which is a fibrous material comprising relatively disordered fibres in comparison to a woven material. Examples of suitable materials for a non-woven intended for a smokeless tobacco product or non-tobacco snuff product are given in patent document EP 2 692 254 A1.

[0020] Also the weight/size of an individual portion packet can be determined or at least estimated by the inventive device, for instance by comparing length, width

and height from the data with an appropriate set of reference data. Thus also portion packets that are too small, too large or have a deviating shape can be identified and sorted out by the inventive device.

[0021] The individual portion packet subject to the generation of data may be fully packaged, partly packaged or non-packaged.

[0022] The reference data are preferably adapted to a particular product type, product size, type and size of strip packaging material, etc.

[0023] The data comparison comprises a comparison of one or several portion packet properties, wherein said property/properties is/are one or several of the following: length of portion packet; width of portion packet; position of portion packet in relation to an existing or intended position of a transversal seal of the packaging material; appearance, such as length, of the transversal seal; appearance of a longitudinal seal of the packaging material; and/or whether there is product material placed on an outside of the packaging material.

[0024] The sensor member may work with reflected and/or transmitted radiation, e.g. light, UV, IR, microwaves, x-ray, ultrasound, beta-radiation or gamma-radiation. The sensor member may be one-dimensional, i.e. sensing line-wise, e.g. a line camera, or two-dimensional, i.e. sensing in a measurement field, such as a normal camera.

[0025] The sensor member may be a vision sensor, such as a camera. Cameras may be used in pairs to obtain a stereo image. The camera may utilize light of the visible spectrum or invisible light such as UV light or IR light. Two-dimensional data, from e.g. a camera, form image data. The term image data as used herein may also be used for two-dimensional data from the non-visible part of the spectrum. Such data may however be presented as a visible image, e.g. by using colour coding.

[0026] Different ways are possible for carrying out the detailed data comparison procedure. If utilizing image data, the procedure can follow at least part of the following general principle: digitalizing the image into pixels, selecting a region of interest of the image, e.g. a region where an edge of a sealing or a portion packet is expected to be positioned, identifying a starting point such as an edge, e.g. by involving a comparison of image data with reference data, determining a portion packet property, e.g. length of transversal seal or presence of product material on outside of the packaging material, wherein the latter may include comparison of pixel contrast and/or brightness using e.g. a light/white packaging material and a dark/black/brown product, and comparing the determined portion packet property data with reference data.

[0027] The result of the final data comparison comprises preferably a classification of a first individual portion packet as defect if the data of said first individual portion packet received from the sensor member differs from the reference data with at least a certain threshold value. For instance, if the length of the transversal sealing of a particular portion packet is shorter than a certain threshold value, this particular portion packet is classified as defect, and the control system controls the rejection system so that the particular portion packet is rejected from the production line.

[0028] The packaging arrangement comprises a unit for transversal sealing of a strip of packaging material that has been longitudinally folded around a row of portion packets, wherein the sensor member is arranged in association with

said unit for transversal sealing such as to be capable of generating data of portion packets that have been folded into the longitudinally folded strip of packaging material. The control system is adapted to be provided with information on where on the strip of packaging material transversal seals generated by the transversal sealing unit will be or have been placed.

[0029] The information from the sensor member can thereby be used by the control system to identify whether there is product material properly positioned in relation to the intended position, if the sensor member is positioned upstream of the transversal sealing unit or existing position, if the sensor member is positioned downstream of the transversal sealing unit of the transversal seal.

[0030] The device may comprise a radiation emitting member located on an opposite side of an intended feeding path for the strip of packaging material compared to the sensor member. As mentioned above, the radiation may be visible light, IR, UV, microwaves, x-ray, ultrasound, beta-radiation or gamma-radiation. The sensor member hence utilizes transmitted light.

[0031] By directing at least a part of the emitted radiation towards the sensor member it is possible to generate two-dimensional data, e.g. images, which show how the product material is positioned in the packaging material, in particular when using a thin, perforated white packaging material and a dark tobacco product. Preferably, the sensor member is placed above the intended feeding path and the radiation emitting member below the intended feeding path, with the radiation directed upwards. Such a radiation emitting member may be used in combination also with sensor members arranged in other positions of the device, and regardless of transversal seals etc.

[0032] The first sensor member is positioned upstream of the transversal sealing unit, wherein the device comprises a second sensor member positioned downstream of the transversal sealing unit.

[0033] Information from a sensor member positioned downstream of the transversal sealing unit can be used by the control system to identify whether the transversal sealing is proper e.g. by checking length of transversal sealing and/or whether there is any or too much product material placed on an outside of the strip of material, at least if strip material is considerably lighter or darker than product material. If a radiation emitting member as described above is arranged in connection with such a sensor member, i.e. a sensor member positioned downstream of the transversal sealing unit, all interesting data may be generated by this single sensor member. No further sensor member, upstream of the transversal sealing unit, would then be needed.

[0034] However, if it for instance is difficult to arrange a radiation emitting member downstream of the transversal sealing unit, for instance because it would require installation in a heated wheel used for welding the transverse seal, it is a preferable solution to make use of two sensor members, one upstream of the transversal sealing unit, e.g. combined with a radiation emitting member, and one downstream of the transversal sealing unit.

[0035] The first and/or the second sensor member may work with transmitted radiation. As an alternative, or as a complement, the first and/or the second sensor member may work with reflected radiation. The first and/or the second sensor member may be a vision sensor. Purely as an

example, the first sensor member may work with transmitted light and the second sensor member may work with reflected light.

[0036] The packaging arrangement may comprise a unit for longitudinal sealing of a strip of said packaging material and the unit for transversal sealing said strip, the unit for longitudinal sealing being positioned upstream of the unit for transversal sealing.

[0037] The sensor member is preferably arranged downstream of the unit for longitudinal sealing such that the sensor member is capable of capturing data related to the appearance of a longitudinal seal. The control system can thereby classify and subsequently reject portion packets based on the appearance of the longitudinal seal.

[0038] Control systems, i.e. one or several computers, electronic connections, computer programs, screens, actuators etc., are known as such. Based on the information disclosed in this document, a person skilled in the art can adapt known control systems to the inventive concept.

[0039] As mentioned above, the control system may be adapted to identify whether there is product material properly positioned in relation to an intended position and/or existing position of the transversal seal. The control system may be adapted to use this information to adjust the forming arrangement as regards how and/or where a portion packet is placed on the packaging material in relation to an intended position of a transverse seal. Thereby the transverse seals may be located in a suitable way in relation to the product material.

[0040] The device may comprise a cutting member for transversally cutting a strip of said packaging material, the transversal cutting member being positioned downstream of the packaging arrangement.

[0041] The cutting member is provided with transversally arranged cutting blades such that the strip of said packaging material travelling along the feeding path is cut by a rotation of the cutting member. The cutting blades are positioned such that their point of contact with the strip of packaging material corresponds to the transversal seals of the strip of packaging material i.e. the rotational speed of the cutting member and the supporting wheel, feeding the strip of packaging material, are the same.

[0042] The device may comprise at least one product outlet intended for non-rejected portion packets, wherein the rejection system is configured to direct selected portion packets to at least one other outlet that is separate from the product outlet.

[0043] It is preferred that the rejection system comprises at least one channel for leading pressurized gas towards an intended feeding path of the portion packets in a position corresponding to at least one of the outlets.

[0044] Pressurized air can thereby be applied to the gas channel in order to remove the portion packets from the intended feeding path. A channel leading towards the product outlet is useful for rejecting from the feeding path product portion packets and make them end up in the product outlet, and a channel leading towards an outlet separated from the product outlet is useful for rejecting from the feeding path product portions classified as defect and make them end up in the outlet separated from the product outlet.

[0045] The rejection system is arranged downstream of the cutting member, allowing individual separated portion packets, also called pouches, to be removed from the feeding path using the rejection system.

[0046] The at least one channel may be integrated in a supporting member comprising a perforated periphery and being capable of holding a vacuum or low pressure applied inside of the supporting member for holding a strip of the packaging material and the portion packets in place when transported in the feeding path along the supporting member. The supporting member may be a rotatable wheel or a linear structure.

[0047] The supporting member or wheel may be provided with heatable transversally arranged flanges at its periphery for transversal sealing of the packaging material around the portion packets. The supporting member or wheel thereby forms part of the transversal sealing unit, which preferably further comprises a rotary welding wheel also provided with heated transversally arranged flanges intended to interact with the flanges of the supporting wheel such as to form the transversal seal on the material strip.

[0048] The packaging arrangement may comprise a ramp member that extends in a direction along a feeding direction of the material strip, wherein the ramp member is provided with walls that, along the feeding direction of the material strip, exhibit a gradually increasing effective angle to a bottom of the ramp member such as to, during operation of the device, gradually lift a first and second longitudinal side of the strip of packaging material and fold the strip of packaging material in a longitudinal manner around the sides of the portion packets so that an upper/inner side of the first longitudinal side of the material strip faces an upper/inner side of the second longitudinal side of the material strip, said packaging arrangement further comprising first and second clamping surfaces arranged at the end of or downstream of the ramp member on each side of an intended feeding path of the packaging material strip, wherein the clamping surfaces are configured to press onto the lower/outer sides of the lifted longitudinal sides of the material strip so as to clamp the upper/inner sides of the first and second longitudinal sides of the material together and thereby provide a longitudinal seal.

[0049] This way a longitudinal seal can be provided in an efficient manner of a material strip onto which portion packs are placed in a row. The strip of packaging material will thus enclose the row of portion packets in a tube-like structure. Further, a transversal sealing and cutting of the packaged portion packets executed downstream of the longitudinal sealing is now easier to carry out compared to the device disclosed in EP0921978 where the strip of packaging material seems to be only folded but not sealed in the longitudinal direction. A longitudinal seal prevents that the product leaks out from the package.

[0050] The sealing is preferably effectuated by using a heat sealable packaging material in combination with at least one heated clamping surface. Sealing may alternatively be effectuated by applying an adhesive to at least one of the upper/inner sides of the material strip.

[0051] Above it is described that the longitudinal seal is provided above the portion packet. As an alternative, the longitudinal seal may be provided at the side of the portion packet or even below the portion packet. In that case, the packaging arrangement should be arranged accordingly,

such that the ramp members help to provide the intended position of the longitudinal seal.

[0052] The term effective angle is used to indicate that the walls of the ramp may have a bent or partly bent form that may not exhibit a distinct angle to the bottom of the ramp, but that still force the first and second longitudinal sides of the strip of packaging material in a direction away from the bottom of the ramp as the strip of material advances along the ramp. That the angle is said to be gradually increasing covers also variants where the angle increases in a plurality of small steps along the feeding direction.

[0053] The term bottom of the ramp member refers to the area that connects the lower parts of the ramp walls. Typically, this is a part of the device that supports the lower/outer side of the strip of packaging material as it passes along the ramp member. It may be a part of the ramp member, and/or constituted by e.g. a conveyor/suction belt.

[0054] The first and second clamping surfaces may form part of first and second rotatable wheel members, respectively, arranged on each side of the intended feeding path of the strip of packaging material. The turning wheel members ensure a constant pressure between the clamping surfaces, thus ensuring consistent clamping and forming of the longitudinal seal along the folded longitudinal sides of the packaging material. Preferably, the rotatable wheel members are arranged such as to, when the wheels turn, allow the clamping surfaces to move along the strip of packaging material with a speed corresponding to that of the strip of packaging material. Thereby, wear and tear of the packaging material is avoided. At least one of the clamping surfaces may be capable of being heated such as to allow heat sealing of the strip of packaging material.

[0055] A guiding member may be arranged upstream of the first and second clamping surfaces in connection to a downstream side of the ramp member, the guiding member being positioned at a distance from the bottom of the ramp member to allow passage of the portion packets and positioned centrally between the walls of the ramp member such as to fit between the lifted sides of the first and second longitudinal sides of the strip of packaging material and thereby guide the folded material strip on its way towards the clamping surfaces during operation of the device.

[0056] The guiding member thus guides the folded material strip so as to keep the lifted and folded longitudinal sides in position and retain the shape of the folded strip until it reaches the clamping surfaces. The guiding member may be placed between the walls in the ramp member or downstream of the ramp member in which case the guiding member still is positioned centrally between the ramp member walls but downstream thereof. The guiding member may extend longitudinally, e.g. so as to guide the material strip over a longer distance, and thereby be positioned both in the ramp member and downstream thereof. The guiding member may, however, be of any suitable shape, which in some applications may be just a pin-like structure.

[0057] The guiding member provides an inner support for the inner/upper longitudinal sides of the packaging material such that it prevents the lifted/folded longitudinal sides of the strip of the packaging material from collapsing inwards.

[0058] The packaging arrangement may comprise at least one sensor member capable of detecting to which extent at least one of the first and second longitudinal sides of the strip of packaging material has been lifted during at least a part of its path along the ramp member, e.g. the sensor member

as described above. This sensor member is preferably arranged at the end of or downstream of the ramp member. Incorrect or asymmetric lifting of the sides of the material strip, for instance caused by an incorrect alignment of the strip, may be detected and determined by means of the sensor member. An incorrect lifting is likely to result in an inappropriate sealing process. A quick indication/detection of an incorrect lifting can be used to quickly interrupt the production process so as to save material, reduce waste and make it easier to fix the problem and resume the production.

[0059] The sensor member may be arranged in association with the guiding member, wherein the guiding member has an optical property that differs significantly from that of the strip of packaging material intended to be used. For instance, if white/light packaging material is to be used the guiding member is black/dark, and vice versa, to provide a contrast. By directing light towards the guide member in a position close to where an edge of a lifted side of the material strip will be positioned during operation of the device, either towards the guiding member close to the edge of the material strip or towards the material strip close to the edge, the reflection of light will be significantly changed if the edge of the material strip is moved, e.g. by incorrect lifting of that particular side of the strip or by incorrect alignment of the strip, so that the light spot is moved from the light material strip to the dark guiding member, or vice versa. In such a case the sensor member can detect a significant change in the intensity of the reflected light and thus indicate an incorrect lifting and/or positioning/alignment of the strip of material.

[0060] The guiding member guides the material strip and retains its angle in relation to the direction of the light emitted by the light emitting member.

[0061] The invention also concerns a method for producing portion packets of a smokeless tobacco product or non-tobacco snuff product, comprising the steps of forming portion packets of said product, folding and sealing a packaging material around the portion packets, generating information useful for identifying defect portion packets, and rejecting selected portion packets.

[0062] The inventive method comprises the steps of generating data of at least a part of an individual portion packet using a sensor member, comparing the data generated by the sensor member with reference data, and controlling the rejection of portions packets depending on a result of said data comparison.

[0063] The sensor member is arranged in association with a unit for transversal sealing, such as to be capable of generating data of portion packets that have been folded into the longitudinally folded strip of packaging material.

[0064] The data comprise information on where on the strip of packaging material transversal seals generated by the transversal sealing unit will be or have been placed.

[0065] Such a method can be used to identify a variety of defects of individual portion packets, such as an incomplete sealing of the packaging material, an inappropriate positioning of a portion packet before packaging, the presence of product material on an outside of the packaging material, etc. By being able to sort out faulty portion packets from the production line the method facilitates avoiding these selected portion packets to be placed in the container at the end, i.e. in the customer product. The invention thus makes the quality control of the portion packets fast and easy i.e.

improving the overall quality control of the portion packets. No manual inspection of the portion packets is in theory needed.

[0066] The step of comparing data may comprise a comparison of one or several portion packet properties, wherein said property/properties is/are one or several of the following: length of portion packet; width of portion packet; position of portion packet in relation to an existing or intended position of a transversal seal of the packaging material; appearance, such as length, of the transversal seal; appearance of a longitudinal seal of the packaging material; and/or whether there is product material placed on an outside of the packaging material.

[0067] The method further comprises the step of placing the portion packets in a row in/on a strip of the packaging material. This step is executed after forming of the portion packets and before folding and sealing a packaging material around the portion packets. The portion packets are placed with space in between each portion packet along the row.

[0068] The method further comprises the step of folding and sealing the strip of packaging material longitudinally around the row of portion packets. The step of folding and sealing the strip of packaging material longitudinally is preferably executed before generating information useful for identifying defect portion packets such that the information generated may be related to the appearance of the longitudinal seal.

[0069] The method also comprises the step of sealing transversally the strip of packaging material between the portion packets, thereby forming individual portion packet pouches. This step may be executed before or after the step of generating information useful for identifying defect portion packets. Alternatively the step of generating information useful for identifying defect portion packets is executed more than once, e.g. before and after step of sealing transversally the strip of packaging material. The step of sealing transversally the strip of packaging material is preferably executed after the folding and sealing the strip of packaging material longitudinally.

[0070] The method may further comprise the step of providing individual portion packets packaged in the packaging material.

[0071] The step of rejecting selected portion packets may comprise the step of guiding pressurized gas towards a feeding path of the portion packets in a position corresponding to an outlet that is separated from a product outlet intended for non-rejected portion packets i.e. removing the selected portion packets from the feeding path. The method may also, as a complement or alternative, comprise the step of selecting non-rejected portion packets by guiding pressurized gas towards a feeding path of the portion packets in a position corresponding to the product outlet i.e. removing the non-rejected portion packets from the feeding path and into a product outlet.

[0072] The method may further comprise that information about whether there is product material properly positioned in relation to an intended position and/or existing position of the transversal seal is used to adjust how and/or where a portion packet is placed on the packaging material in relation to an intended position of a transverse seal.

[0073] A control system is preferably configured to perform the steps of storing the reference data as well as accessing the reference data and receiving the data from the sensor member. Further, the step of comparing the data

received from the sensor member and the reference data is done using the control system.

[0074] The term longitudinal used herein refer to the direction of the feeding path of the packaging material. The term transversal refers to the transverse direction of the feeding path.

[0075] The inventive method may further comprise the steps of: lifting gradually, using a ramp member that extends in a direction along a feeding direction of the material strip, a first and second longitudinal side of the strip of packaging material and folding the strip of packaging material in a longitudinal manner around the sides of the portion packets so that an upper/inner side of the first longitudinal side of the material strip faces an upper/inner side of the second longitudinal side of the material strip; and pressing onto the lower/outer sides of the lifted longitudinal sides of the material strip by clamping the upper/inner sides of the first and second longitudinal sides of the material together and thereby providing a longitudinal seal.

[0076] The method may further comprise the step of heating at least one of two clamping surfaces used for clamping the upper/inner sides of the first and second longitudinal sides together such as to allow heat sealing of the strip of packaging material.

[0077] The method may further comprise the steps of detecting; using a sensor member, to which extent at least one of the first and second longitudinal sides of the strip of packaging material has been lifted during at least a part of its path along the ramp member. Detection may be effectuated by means of a light emitting member and a light detecting member, directing the emitting light towards the intended feeding path of the strip of packaging material.

BRIEF DESCRIPTION OF DRAWINGS

[0078] In the description of the invention given below reference is made to the following figure, in which:

[0079] FIG. 1 shows, in a perspective view, an embodiment of the inventive device;

[0080] FIG. 2 shows, in a perspective view, a part of the embodiment according to FIG. 1;

[0081] FIG. 3 shows, in another perspective view, the part according to FIG. 2;

[0082] FIG. 4 shows the part of FIGS. 2 and 3 during operation of the device; and

[0083] FIG. 5 shows, in a side view, the part of FIG. 4.

DESCRIPTION OF EXAMPLE EMBODIMENTS OF THE INVENTION

[0084] The device 1 illustrated in FIG. 1 is intended for producing portion packets 2 of a smokeless tobacco product or non-tobacco snuff product, including producing individual portion packets 2 of a smokeless tobacco product or non-tobacco snuff product, enclosing the individual portion packets 2 in a packaging material 5, sealing the package material 5 and identifying and rejecting defect packaged portion packets 2.

[0085] FIG. 1 shows the device 1 comprising a forming arrangement 3 in the form of a funnel-shaped feeder container 24 to which prepared smokeless tobacco product or non-tobacco snuff product is supplied in any conventional manner, such as through vertically disposed tubes the upper ends of which communicate with a snuff preparatory reactor, not shown, and the lower ends of which are in communi-

cation with the feeder container **24**. The forming arrangement **3** further comprises a rotary portioning wheel **25** for portioning the product into portion packets **2**. Preparation of product portion packets **2** is known from e.g. EP0921978.

[0086] The portioning wheel **25** expels the portion packets **2** in a row onto a packaging material **5** in the form of a strip which may be made from a material that is permeable to saliva and heat sealable, e.g. from viscose fibres bonded by a thermoplastic bonding agent. The flat strip is being advanced in synchrony with the portions packets **2** from a reel **26** by means of an endless, perforated vacuum suction belt **27** which is rotated, by means of a motor, not shown, around a low pressure chamber.

[0087] The device **1** further comprises a packaging arrangement **4** at which the strip of packaging material **5**, being advanced along a feeding path by the suction belt **27**, is folded around the row of expelled portion packets **2**. The strip of packaging material **5** is further provided with a longitudinal seal **10** such that a tube of packaging material **5** enclosing portion packets **2** is formed.

[0088] The packaging arrangement **4** further comprises a unit for transversal sealing **11** that generates transversal seals **9** to the strip of packaging material in between the portion packets **2**. In the example described here the transversal sealing unit **11** comprises a rotary welding wheel **28** interacting with a rotary supporting wheel **18**. The rotary welding wheel **28** is at its periphery provided with heated transversally arranged protruding formations **23** that presses onto/towards similar transversally arranged flanges **21** at the periphery of the supporting wheel **18** such as to clamp and transversally seal the strip of packaging material when placed between the protruding formations **23** and flanges **21**.

[0089] A cutting member **22**, for transversally cutting the strip of packaging material **5**, is arranged downstream of the packaging arrangement **4**. The cutting member **22** is in this case a cutting wheel provided with transversally arranged cutting blades arranged to interact with the flanges **21** of the supporting wheel **18** and cut the strip of packaging material **5** in transversal direction along the transversal seal **9** such as to separate the packaged portion packets **2**.

[0090] As best seen in FIG. 2-5, the transversal seal **9** is formed by interaction of the protruding formations **23** provided to the rotary welding wheel **28** and the transversally arranged flanges **21** at the periphery of the supporting wheel **18**. During operation, the rotary welding wheel **28** and the supporting wheel **18** turn at the feeding speed such that the protruding formations **23** and the flanges **21** coincide at a position along the strip of packaging material **5** corresponding to that of the intended transversal seal **9**. A transversal seal **9** is thereby formed.

[0091] The supporting wheel **18** is also arranged to transport the packaging material **5** and its enclosed portion packets **2** along a portion of its feeding path. A perforated vacuum band **19** is applied at the periphery of the supporting wheel **18**. The supporting wheel **18** supports the folded and sealed strip of packaging material **5** enclosing portion packets such that it, during operation, is being advanced along its feeding path while sucked into close contact with the peripheral surface of the supporting wheel **18** retaining the portion packets **2** by suction. Thus, the portion packets **2** follow the periphery of the turning supporting wheel **18** until the individual packaged portion packets **2** are released from the perforated vacuum band **19** by a rejection system **7** integrated in the supporting wheel **18**.

[0092] The device **1** is further provided with a first sensor member in the form of a first vision sensor **12** arranged upstream of the unit for transversal sealing **11** and downstream of the packaging arrangement **4**, as illustrated in FIG. 1. The first vision sensor **12** is placed above, and directed towards, the feeding path of the folded and sealed strip of packaging material **5** such that it captures images and generates data relating to the tube of packaging material **5** and the row of portion packets **2**. A light emitting member **8**, symbolically indicated with a bulb, is located below the feeding path, i.e. on an opposite side thereof, and directed towards the first vision sensor **12** to provide contrast, such that the images captured by the first vision sensor **12** clearly show how the product material is positioned in the packaging material, in particular when using a thin, perforated white packaging material and a dark tobacco product. For example, the information generated may relate to the longitudinal alignment of each portion packet **2** in relation to the strip of packaging material **5**. If two adjacent portion packets **2** have been placed too close to each other onto the material strip this will likely lead to an incorrect transversal seal **9** in between the two and thus lead to defect portion packets **2**. Such too close positioned portion packets **2** can be identified by the first vision sensor **12** and thereby be sorted out and rejected by the rejection system **7** during operation of the device **1** before being placed in the can.

[0093] The sensor member forms part of, or is connected to, a control system, not shown comprising a computer, electronic connections, computer programs, actuators etc. Such a control system is known as such and is not described in detail here. In short, the sensor member sends image data to the control system that has access to the reference data and compares the image data with the reference data and provides a result. The control system also carries information relating to the operation of the downstream units, such as where the transversal seals **9** will be placed on the strip of packaging material **5** by the unit for transversal sealing **11**. The control system also controls the operation of, e.g. the downstream rejection system. Hence; if the first vision sensor **12** detects the presence of product material at the intended position of the transversal seal, which is likely to lead to two defect portion packets, the control system can classify the two adjacent portion packets **2** as defect already at this stage and instruct the rejection system to reject these two portion packets when they arrive at the rejection system.

[0094] As illustrated in FIG. 1, the device **1** also comprises a second vision sensor **13** arranged to capture image data of the transversally sealed portion packets **2** downstream of the unit for transversal sealing **11** and upstream of the cutting member **22**. The second vision sensor **13** is capable of detecting, for example, appearance of the longitudinal seal **10** and/or the transversal seal **9** and if there is product material present outside of the packaging material. The captured image data is compared by the control system against stored reference data as described above. Any defect packaged portion packets, also called pouches, are then removed by means of the rejection system **7**.

[0095] The control system is configured to control the rejection system **7** such that if, using the results of the comparison for classification, a portion pack **2** is deemed faulty the control system executes the rejection system **7** to eject the faulty portion packet **2** into a first outlet **15** other than a product outlet **16**, used for proper portion packets, during operation. In this example proper portion packets **2**,

classified as non-rejected, are, by means of control by the control system, ejected by the rejection system 7 into the product outlet 16 during operation of the device 1.

[0096] FIG. 5 shows that the rejection system in this example forms an integrated part of the supporting wheel 18, the rejection system comprising channels 20 arranged in directions towards entrance ends of the first outlet 15, the product outlet 16 and a further rejection outlet 17 respectively. The entrance ends, i.e. the inlets, of the outlets 15, 16, 17 mouth the perforated vacuum band 19 at different positions in relation to the feed direction so that portion packets 2 passes the first outlet 15 before reaching the product outlet 16 and only after that they reach the further rejection outlet 17. The channels are arranged to lead pressurized air, fed from an air source, not shown, towards the perforated vacuum band 19. In this example, one channel 20 leads towards the first outlet, two channels 20 lead to the product outlet 16 to allow for a higher flow of portion packets and one channel 20 leads towards the further rejection outlet 17.

[0097] During operation of the device 1 the portion packets 2 reach the rejection system and become blown away and removed from the perforated vacuum band 19, by supplying pressurized air into the respective channels 20, into their respective outlet 15 or 16 depending on their classification, i.e. defect or correct. Thus, selected portion packets 2 can be rejected.

[0098] In an operative situation where no defect portion packets 2 are identified by the first and second vision sensor 12, 13, pressurized air is provided only to the two channels leading air in the direction towards the product outlet 16, as illustrated in FIG. 5. In case of the identification of a defect portion packet 2, the control system instructs the rejection system 7 to supply air into the channel 20 directed towards the first outlet 15 at the time the defect portion packet 2 arrives in front of the corresponding channel 20 during its feeding path at the periphery of the wheel 18.

[0099] The second outlet 17 is a spare outlet that, for instance, can be used if the product outlet 16 becomes clogged.

[0100] The invention is not limited by the embodiments described above but can be modified in various ways within the scope of the claims. For instance, the device may comprise only one or more than two sensor members. The embodiment described above comprises vision sensors. If the inventive device is provided with only one vision sensor it is preferably arranged downstream of the packaging arrangement such as to allow quality control of e.g. both the longitudinal seal and the transversal seals at the same time.

[0101] The order of the outlets may be varied, e.g. the product outlet may be arranged upstream of the outlet for faulty portion packets. The number of channels leading pressurized air towards each outlet may be different than in the shown embodiment. Also the shape, length, etc. of the channels may be varied as also the general position of the channels. They need not to be integrated in another structure, and in particular they need not to be integrated in a supporting wheel or suction wheel.

[0102] As an alternative to the supporting wheel a straight/flat/planar transportation structure can be used. Transversal sealing and cutting can be carried out also when the material strip moves along such a structure. To remove selected packaged portion packets from the feeding path of such a transportation structure, one may e.g. feed pressurized air

from underneath the feeding path, similar to the embodiment described above, or from a side of the feeding path.

[0103] Generally, the rejection system may be structured in different ways. A main function is to allow separation of proper products from defect products.

1. A device for producing portion packets of a smokeless tobacco product or non-tobacco snuff product, said device comprising:

- a forming arrangement configured to form portions of the product from a supply of product material on to a longitudinally extending strip of a packaging material;
- a packaging arrangement located downstream of the forming arrangement, the packaging arrangement configured to fold and seal the packaging material around the portions, the packaging arrangement comprising a transversal sealing unit configured to form a transverse seal in between the portions to form portion packets;
- a sensor located upstream or downstream of the unit for transversal sealing, the sensor configured to generate information useful for identifying defective portion packets during operation of the device, wherein the information comprises data indicative of a property of at least a part of a portion packet;
- a rejection system configured to reject selected portion packets during operation of the device; and
- a control system configured to receive the information generated by the sensor and to control the rejection system, the control system configured to compare the data received from the sensor to reference data and to control the rejection system depending on a result of said comparison.

2-20. (canceled)

21. The device according to claim 1, wherein the property of at least a part of a portion packet comprises one or more properties selected from the group consisting of: a length of the portion packet, a width of the portion packet, a position of the portion packet in relation to an existing or intended position of the transverse seal, a length of the transversal seal, an appearance of a longitudinal seal, an appearance of the packaging material, and an appearance of the product material placed on an outside of the packaging material.

22. The device according to claim 1, wherein the control system is configured to classify a first individual portion packet defective if the data received by the control system from the sensor differs from the reference data by at least a certain threshold value.

23. The device according to claim 1, wherein the sensor is a vision sensor and wherein the data indicative of a property of at least a part of an individual portion packet comprises image data.

24. The device according to claim 1, wherein the device further comprises a radiation emitter located on a side of an intended feeding path for said strip of packaging material that is opposite of the sensor.

25. The device according to claim 24, further comprising an additional sensor configured to detect reflected radiation.

26. The device according to claim 25, wherein one of the sensors is positioned upstream of the transversal sealing unit and the other one of the sensor is positioned downstream of the transversal sealing unit.

27. The device according to claim 1, wherein the packaging arrangement comprises a unit for longitudinal sealing

of said strip of said packaging material, said unit for longitudinal sealing being positioned upstream of the unit for transversal sealing.

28. The device according to claim **1**, wherein the device further comprises a cutter for transversally cutting a strip of said packaging material.

29. The device according to claim **1**, wherein the device further comprises at least one product outlet for non-rejected portion packets, wherein the rejection system is configured to direct selected portion packets to at least one other outlet that is separate from the product outlet.

30. The device according to claim **29**, wherein the rejection system comprises at least one channel configured to lead pressurized gas towards an intended feeding path of the portion packets in a position corresponding to at least one of said outlet(s).

31. The device according to claim **30**, wherein the at least one channel is integrated in a supporting member comprising a perforated periphery and capable of holding a vacuum or low pressure applied inside of the supporting member for holding a strip of the packaging material and the portion packets in place when transported in the feeding path along the supporting member.

32. The device according to claim **31**, wherein said supporting member is provided with transversally arranged flanges at its periphery for transversal sealing of said packaging material around the portion packets.

33. The device according to claim **1**, wherein the control system is configured to identify whether there is product material properly positioned in relation to an intended position or an existing position of the transversal seal.

34. The device according to claim **33**, wherein the control system is configured to use information about whether there is product material properly positioned in relation to an intended position or an existing position of the transversal seal to adjust said forming arrangement as regards to how or where a portion packet is placed on said packaging material in relation to an intended position of a transverse seal.

35. The device of claim **1**, wherein the sensor is located upstream of the unit for transversal sealing and the data indicative of a property of at least a part of an individual portion packet is data indicative of a location of product material in relation to an intended location of a transverse seal.

36. The device of claim **1**, wherein the sensor is located downstream of the unit for transversal sealing and the data indicative of a property of at least a part of an individual portion packet is data indicative of a location of a transverse seal.

37. The device of claim **1**, wherein a first sensor is located upstream of the unit for transversal sealing and a second sensor is located downstream of the unit for transversal sealing, wherein the first and second sensors are capable of generating data indicative of portion packets that have been folded into the longitudinally folded strip of packaging material and wherein said control system is adapted to be

provided with information on where on the strip of packaging material transversal seals generated by the transversal sealing unit will be or have been placed.

38. A method for producing portion packets of a smokeless tobacco product or non-tobacco snuff product, using the device of claim **1**, said method comprising:

forming portion packets of said product;

placing the portion packets in a row on a strip of packaging material;

folding and sealing the strip of packaging material longitudinally around the portion packets;

transversally sealing the strip of packaging material between the portion packets;

generating information useful for identifying defective portion packets; and

rejecting selected portion packets, wherein generating information includes generating data indicative of a physical property of at least a part of an individual portion packet using the sensor and comparing the data generated by the sensor to reference data, and the rejecting selected portions packets is based on a result of said comparison.

39. The method of claim **38**, wherein the sensor is arranged in association with the unit for transversal sealing such as to be capable of generating data of portion packets that have been folded into the longitudinally folded strip of packaging material, said data comprising information on where on the strip of packaging material transversal seals generated by the transversal sealing unit will be or have been placed.

40. The method according to claim **38**, wherein comparing comprises comparing data indicative of one or several portion packet properties, said properties selected from the group consisting of: a length of portion packet, a width of portion packet, a position of portion packet in relation to an existing or intended position of the transversal seal of the packaging material, a length of the transversal seal, an appearance of a longitudinal seal of the packaging material, and an appearance of product material placed on an outside of the packaging material.

41. The method according to claim **38**, further comprising providing individual portion packets packaged in the packaging material.

42. The method according to claim **38**, wherein rejecting selected portion packets comprises guiding pressurized gas towards a feeding path of the portion packets in a position corresponding to an outlet that is separated from a product outlet intended for non-rejected portion packets.

43. The method according to claim **38**, wherein data indicative of a physical property of at least a part of an individual portion packet includes data indicative of the position of a transverse seal, and the method further comprises using the data to adjust the placing of the product material on the packaging material.

* * * * *