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(54) Title: MACHINE AND METHOD FOR PACKAGING TOBACCO INDUSTRY ARTICLES

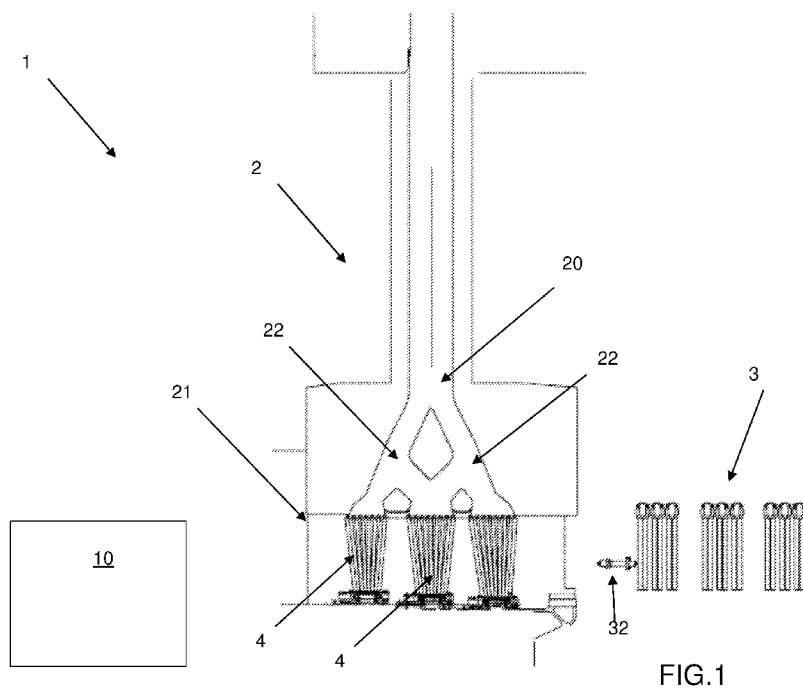


FIG. 1

(57) Abstract: A machine (1) for packaging tobacco industry articles, comprising: - a forming unit (2) for forming groups of articles (A) to be packaged and in turn comprising: an inlet section (20) that receives a plurality of articles (A) to be packaged; an outlet section (21) that feeds separate groups of articles (A) to be packaged; and a plurality of channels (22) each extending from the inlet section (20) to the outlet section (21); - a wrapping unit (10) that receives the groups of articles (A) to be packaged from the forming unit (2) to package them by means of at least one wrapping; - a sanitizing unit (3) designed to at least partially irradiate with UV radiation the forming unit (2) for forming groups of articles (A) during transit of the articles (A) in the forming unit (2).

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DESCRIPTION

MACHINE AND METHOD FOR PACKAGING TOBACCO INDUSTRY ARTICLES

Technical field

- 5 This invention relates to a machine and a method for packaging tobacco industry articles.

It should be noted that the expression “tobacco industry articles” is used to mean articles of any kind relating to the tobacco industry, for example, traditional cigarettes. filter tip cigarettes or articles of the “heat not burn”

- 10 (HNB) type, where the article is only heated and not burnt.

Background art

- A machine for packaging tobacco industry articles – for example, cigarettes – comprises a forming unit for forming groups of cigarettes. The forming unit receives a mass of cigarettes fed along a feed channel and feeds out a plurality of ordered groups of cigarettes which are then forwarded to the wrapping line after it.

- A forming unit for forming groups of cigarettes comprises a vertical hopper having an upper, infeed portion connected to the feed channel that feeds the mass of cigarettes and a lower portion that is provided with a plurality of outlet openings. Each outlet opening comprises a predetermined number of vertical conduits (or “veins”), down each of which a row of cigarettes is gravity fed and which is cyclically engaged by a respective extractor which extracts an ordered group of cigarettes from the bottom of the hopper and feeds the group of cigarettes to a wrapping unit.

The wrapping unit comprises a plurality of conveyors, provided with pockets in which the groups of cigarettes are disposed and wrapped in one or more wrapping / packaging sheets which are folded around each group of cigarettes.

- 30 To date, there is an ever growing need to obtain finished products (that is

to say, packages of tobacco industry products), whose contents are as free as possible of external contaminants such as germs, viruses and/or bacteria.

5 **Disclosure of the invention**

This invention has for an aim to overcome the disadvantage described above.

This aim is achieved by a machine and a method for packaging tobacco industry articles according to the appended claims.

- 10 Advantageously, the machine and the method according to this invention allow eliminating the contaminants that might otherwise be present in the finished product, that is to say, in the package of tobacco industry articles.

Brief description of the drawings

- 15 These and other advantages are more apparent in the specification which follows, with reference to the accompanying drawings, in which:
- Figure 1 is a partial front view of a machine according to the invention, with some parts exploded for clarity;
 - Figure 2 is a view like that of Figure 1 but without exploded parts;
 - 20 - Figure 3 is a side view of a machine according to this invention;
 - Figure 4 is a partial top view of a possible embodiment of a forming unit for forming groups of cigarettes according to this invention;
 - Figure 5 is a partial side view of a possible embodiment of a forming unit for forming groups of cigarettes according to this invention.

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Detailed description of preferred embodiments of the invention

With reference to the accompanying drawings, the reference numeral 1 denotes a machine for packaging tobacco industry articles A.

- It should be noted that the expression “tobacco industry articles” is used to
- 30 mean articles of any kind relating to the tobacco industry, for example, traditional cigarettes. filter tip cigarettes or articles of the “heat not burn”

(HNB) type, where the article is only heated and not burnt.

A machine 1 for packaging tobacco industry articles A according to the invention comprises: a forming unit 2 for forming groups of articles A to be packaged and in turn comprising: an inlet section 20 that receives in a mass a plurality of articles A to be packaged; an outlet section 21 that feeds separate groups of articles A to be packaged; and a plurality of channels 22 each extending from the inlet section 20 to the outlet section 21 and receiving therewithin the articles A to be packaged from the inlet section 20 and feeding them to the outlet section 21.

10 The machine 1 also comprises a wrapping unit 10 (illustrated schematically only in Figure 1) that receives the groups of articles A to be packaged from the forming unit 2 to package them by means of at least one wrapping.

In particular, the machine 1 according to the invention comprises a sanitizing unit 3 designed to at least partially irradiate with UV radiation the forming unit 2 for forming groups of articles A during transit of the articles A in the forming unit 2.

Advantageously, the sanitizing unit 3 allows destroying any contaminating agents (viruses, bacteria, etc.) just before the articles A are packaged. That way, the articles A inside the respective packets (packages) obtained with the machine 1 reach their end users in optimum conditions insofar as concerns the sanitization of the articles A themselves.

In the preferred embodiment of the invention, the sanitizing unit 3 is configured to irradiate each article A in transit inside the forming unit 2 for a period of time between 1 and 3 seconds. This time interval is long enough to allow sanitizing each article A and does not negatively affect the productivity of the machine 1 because it does not increase the length of time each article A needs to be inside the forming unit 2.

The sanitizing unit 3 might, however, irradiate each article A in transit inside the forming unit 2 for a time interval greater than 3 seconds, without damaging the articles A. For example, this might be the case when the

machine 1 is working at reduced speeds.

In an embodiment, irradiation by the sanitizing unit 3 may, as a precautionary measure, be stopped a certain length of time after the machine 1 has come to a stop. This avoids unnecessary heating, saves
5 energy and reduces related costs.

As is known, a tobacco industry article A (shown in Figures 4 and 5) extends mainly longitudinally along an axis H and comprises a first end P which, in use (that is, when the article is used, that is to say, when it is “smoked” by a user), is proximal to the user’s mouth (for example, the end
10 where the filter, if any is located) and a second end S, opposite the first end which, in use, is distal to the user’s mouth (for example, the lit end in traditional cigarettes).

Preferably, the sanitizing unit 3 is configured to irradiate each article A at least at its first end P.

15 Alternatively, as shown in Figures 3 and 5, the sanitizing unit 3 is configured to also irradiate the second end S of each tobacco industry article A.

In the preferred embodiment, the forming unit 2, at its outlet section 21, comprises a plurality of ducts 4 (“veins” in the jargon of the trade),
20 adjacent to each other and extending longitudinally, which receive the articles A from the channels 22 disposed in a row one on the other, where the adjacent ducts 4 are separated from each other by a partition wall 5 (see details shown in Figure 4 and Figure 5) which allows singulating the articles A in each duct 4.

25 In the preferred embodiment, the partition wall 5 comprises a transparent material and/or one or more openings 50 (the latter being shown, for example, in Figure 5).

Advantageously, the radiation emitted by the sanitizing unit 3 thus irradiates a larger surface of each article A.

30 It is understood that the partition walls 5 may be structured differently from each other, that is to say, they may be provided with different openings 50

and/or be partially transparent at different points.

Preferably, the machine 1 further comprises at least a reflective surface 31 configured to reflect the radiation emitted by the sanitizing unit 3 (indicated by way of example by arrows in Figures 5 and 4). Advantageously, this aspect allows the radiation emitted by the sanitizing unit 3 to be deflected and to irradiate areas other than those directly facing the sanitizing unit 3 itself.

With reference to the accompanying drawings, a partition wall 5 may comprise the reflective surface 31 (see Figure 4, where the reflective surfaces 31 are represented schematically). The reflective surface 31 may be a mirror, for example, made from aluminium.

Preferably, the sanitizing unit 3 is configured to irradiate at least $2/3$ of the longitudinal dimension of each duct 4. This feature is sufficient to ensure that the articles A are optimally sanitized.

With reference to the preferred embodiment illustrated, the sanitizing unit 3 comprises at least a UV lamp 30 disposed opposite to the ducts 4 of the outlet section 21 of the forming unit 2.

Again with reference to the accompanying drawings, each UV lamp 30 has a longitudinal dimension (that is to say, a "height") that is at least equal to that of the ducts 4 that it faces. Obviously, the longitudinal dimension of each UV lamp 30 might also be less than that of each duct 4, preferably at least equal to $2/3$ of the longitudinal dimension of the ducts 4. In another variant, the UV lamps 30 might have a longitudinal dimension that is greater than that of the ducts 4 and might, for example, irradiate part of the channels 22.

The accompanying drawings show several groups of ducts 4 (three groups of ducts 4) at the outlet section 21 of the forming unit 2 and the same number of UV lamps 30 (three).

Preferably, each UV lamp 30 is configured to emit UVC radiation, with wavelengths between 100 and 280 nanometres: in effect, these wavelengths are capable of modifying the DNA or the RNA of the

microorganisms, thus preventing them from reproducing and/or causing damage.

Preferably, the main peak wavelength is between 240 and 260 nm and a second peak wavelength is between 175 and 190 nm. Advantageously, with these peak wavelengths, the UV radiation destroys the molecular bonds of the DNA, producing thymine dimers in their DNA and thus destroying them, making them harmless or preventing them from growing and reproducing.

This feature thus optimizes the sanitization of the articles A in transit in the forming unit 2.

In an embodiment, the machine 1 according to the invention further comprises at least one cover panel (not illustrated) which is used to cover the sanitizing unit 3 and which can be opened by the operator to allow access thereto; the panel is made of a material that is opaque, that is, absorbent, that is, non-transparent, to prevent the radiation emitted by the sanitizing unit 3 from escaping out of the machine 1. The machine 1 further comprises at least one sensor 32 (shown in Figures 1-3), which monitors the activated (emitting UV radiation) or deactivated status of the sanitizing unit 3 and sends a corresponding signal to a control and command unit that is configured to receive the signal from the sensor 32 and consequently inhibit or allow opening the cover panel. Advantageously, therefore, the cover panel can be opened only when the sanitizing unit 3 is not in operation (that is to say, in this specific case, when the UV lamps 30 are off).

Furthermore, a sensor 32 (the same one described above or another one) may detect the open or closed state of the panel. For example, if a fault in the control and command unit allows opening the panel while the sanitizing unit 3 is on, the sensor 32 can emit an alarm signal.

In addition, the alarm condition generated might also result in the sanitizing unit 3 being deactivated automatically. That way, advantageously, operator safety is further ensured.

In a preferred embodiment illustrated, the machine 1 further comprises at least one sensor 32 (which may be the same one described above or another one), configured to detect the correct functioning of the sanitizing unit 3 and to emit a signal as a result of a malfunction. In this case, the machine 1 might, for example, be brought to a stop if the sanitizing unit 3 develops a fault.

The invention also relates to a method for packaging tobacco industry articles A comprising the steps of:

- forming groups of articles A to be packaged starting from a mass of articles A;
- packaging each formed group of articles (A) with at least one sheet of wrapping material.

In particular, the method comprises a step of sanitizing the tobacco industry articles A, preferably by UV radiation, during the step of forming the groups of articles A.

The method according to the invention ensures that the articles A are packaged in an optimally sanitized condition, that is to say, free of contaminating agents such as viruses and/or bacteria or the like.

The method proposed can be implemented by the machine 1 according to the invention described above.

The method preferably comprises irradiating the articles A with UV radiation for between 1 and 3 seconds while the groups of articles are being formed.

Radiation is preferably UVC radiation and, still more preferably, has a main peak wavelength between 240 and 260 nm and a second peak wavelength between 175 and 190 nm.

CLAIMS

1. A machine (1) for packaging tobacco industry articles, comprising:
 - a forming unit (2) for forming groups of articles (A) to be packaged, comprising in turn: an inlet section (20) that receives a plurality of articles (A) to be packaged; an outlet section (21) that feeds separate groups of articles (A) to be packaged; and a plurality of channels (22) each extending from the inlet section (20) to the outlet section (21) and receiving therewithin the articles (A) to be packaged from the inlet section (20) and feeding them to the outlet section (21);
 - a wrapping unit (10) that receives the groups of articles (A) to be packaged from the forming unit (2) to package them by means of at least one wrapping;characterized in that it comprises:
 - a sanitizing unit (3) designed to at least partially irradiate with UV radiation the forming unit (2) for forming groups of articles (A) during transit of the articles (A) in the forming unit (2).
2. The machine (1) according to claim 1, wherein each article (A) comprises a first end (P) that in use is proximal to the mouth of a user and a second end (S), opposite to the first end (P), that in use is distal to the mouth of a user; the sanitizing unit (3) being configured to irradiate each article (A) at least at its first end (P).
3. The machine (1) according to any one of the preceding claims, wherein the sanitizing unit (3) is configured to irradiate each article (A) in the forming unit (2) for a period of time between 1 and 3 seconds.
4. The machine (1) according to any one of the preceding claims, wherein the forming unit (2), at the outlet section (21), further comprises a plurality of ducts (4) adjacent each other and extending longitudinally, in order to

receive from the channels (22) the articles (A) disposed in a row one on the other, wherein adjacent ducts (4) are separated from each other by a partition wall (5).

5. The machine (1) according to the preceding claim, wherein the sanitizing unit (3) is configured to irradiate at least $\frac{2}{3}$ of the longitudinal dimension of each duct (4).

6. The machine (1) according to claim 4 or 5, wherein the partition wall (5) comprises a transparent material and/or one or more openings (50).

7. The machine (1) according to any one of the preceding claims, further comprising at least a reflective surface (31) configured to reflect the radiation emitted by the sanitizing unit (3).

8. The machine (1) according to claims 4 and 5 or 6, wherein at least one partition wall (5) comprises the reflective surface (31).

9. The machine (1) according to any one of the preceding claims from 4 to 8, wherein the sanitizing unit (3) comprises at least a UV lamp (30) disposed opposite to the ducts (4) of the outlet section (21) of the forming unit (2).

10. The machine (1) according to the preceding claim, wherein the UV lamp (30) is configured to emit UVC radiation, preferably having a main peak wavelength between 240 and 260 nm and a second peak wavelength between 175 and 190 nm.

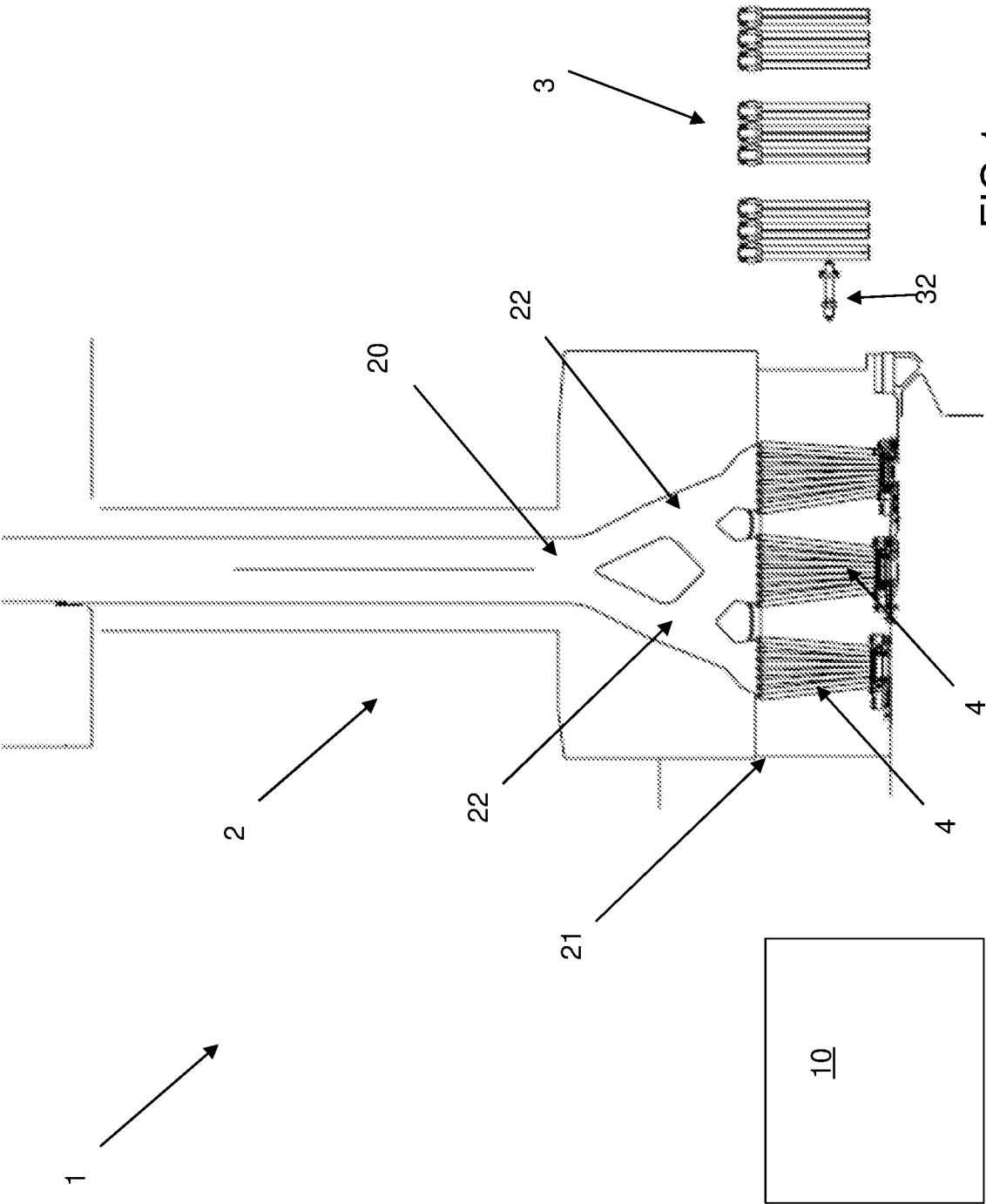
11. The machine (1) according to any one of the preceding claims, further comprising at least one sensor (32), configured to detect the correct functioning of the sanitizing unit (3) and to emit a signal as a result of a

malfunction.

12. The machine (1) according to any one of the preceding claims, further comprising a cover panel of the sanitizing unit (3), that an operator can open; a sensor (32) for monitoring the activated or deactivated status of the sanitizing unit (3) and sending a corresponding signal; and a control and command unit configured to receive the signal from the sensor (32) and consequently inhibit or allow opening the cover panel.

13. A method for packaging tobacco industry articles (A) comprising the steps of:

- forming groups of articles (A) to be packaged starting from a mass of articles (A);
- packaging each formed group of articles (A) with at least one wrapping; characterized in that it comprises, during the step of forming groups of articles (A), the step of:
 - sanitizing the articles (A), preferably with UV radiation.



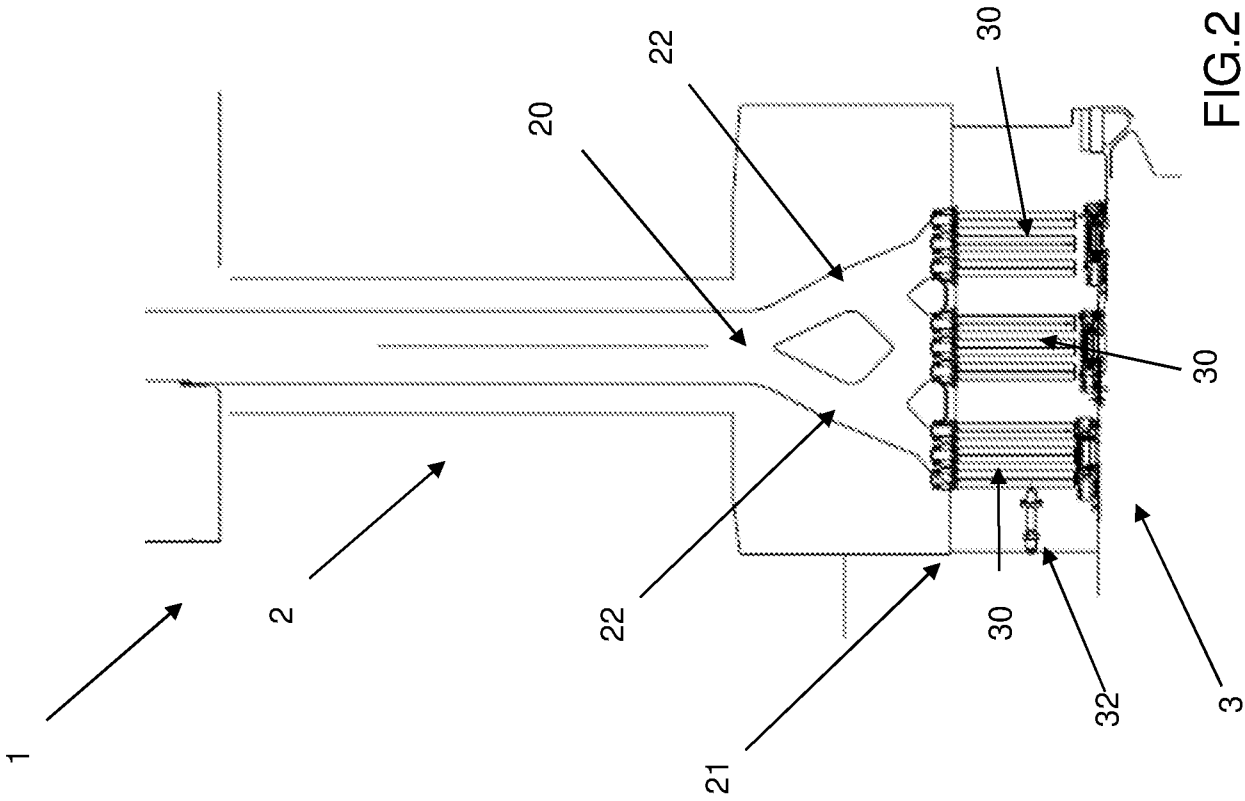


FIG. 2

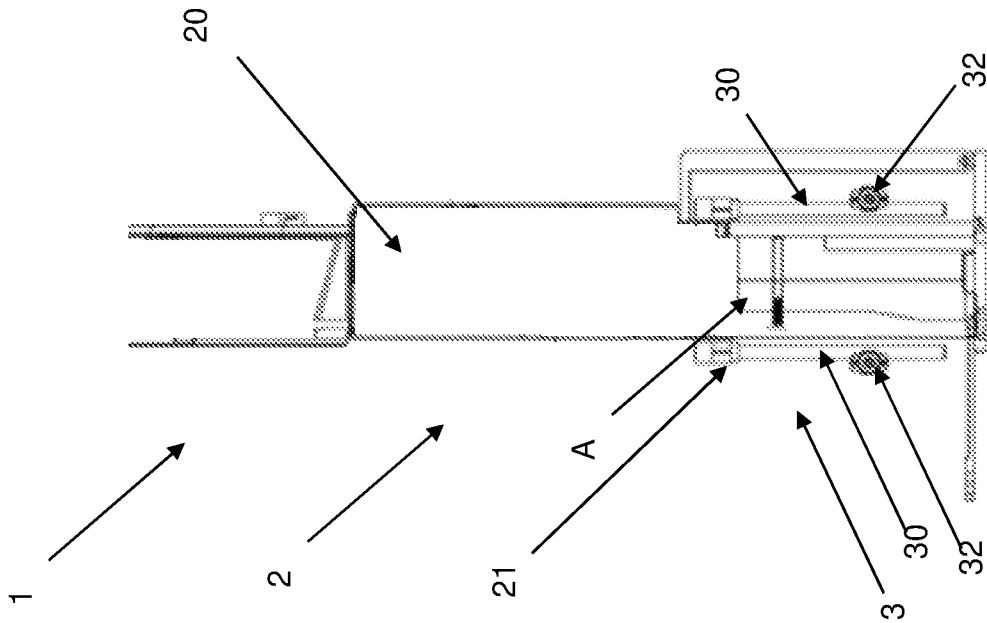
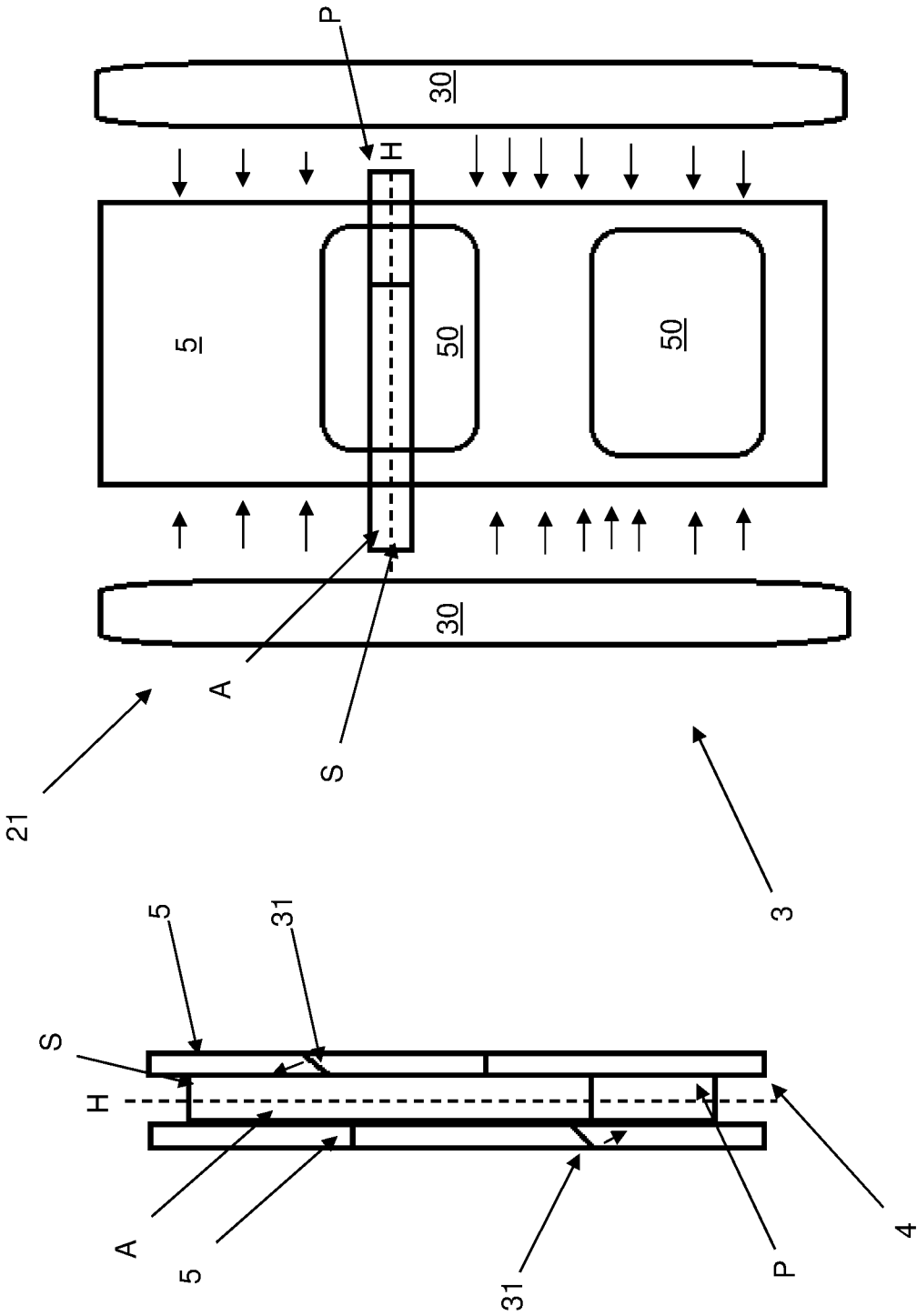


FIG. 3



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INTERNATIONAL SEARCH REPORT

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
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