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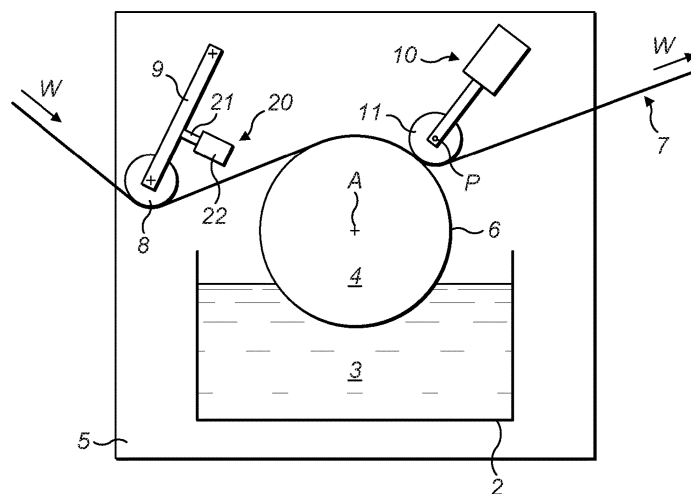
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(54) Title of the Invention: **Adhesive applicator**
 Abstract Title: **Applicator with transfer roller for applying glue to tipping paper from a reservoir, and pressure roller configured to pinch the paper between the two rollers**

(57) An adhesive applicator 1 for applying adhesive to a tensioned web 7 of tipping paper moving (w) through a smoking article filter assembly unit comprising a transfer roller 4 to transfer adhesive from a reservoir 3 onto a surface of a moving web of tipping paper and a pressure roller 11, configured to pinch the moving web of tipping paper between the pressure roller and the transfer roller. Preferably there is a pressure roller deployment mechanism 10 operable to move the pressure roller between a position where the web of tipping paper is pinched between the pressure roller and the transfer roller, and a position where the pressure roller is spaced apart from the transfer roller, thus altering the path of the moving web. Also claimed is a method of applying adhesive to a tensioned web of tipping paper moving through a smoking article filter assembly unit is also disclosed.

FIG. 4



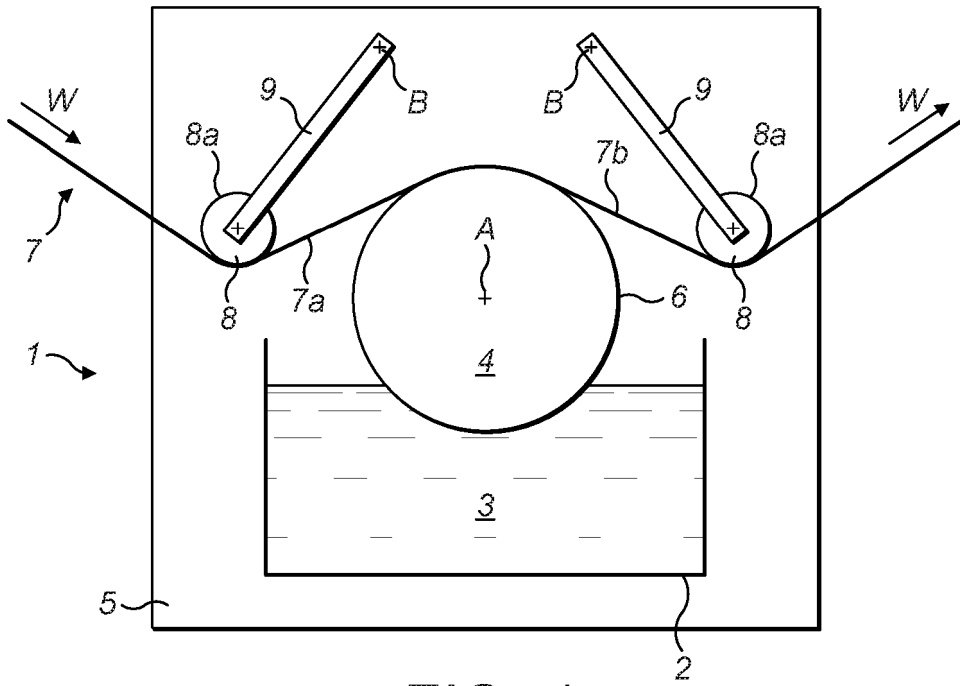


FIG. 1

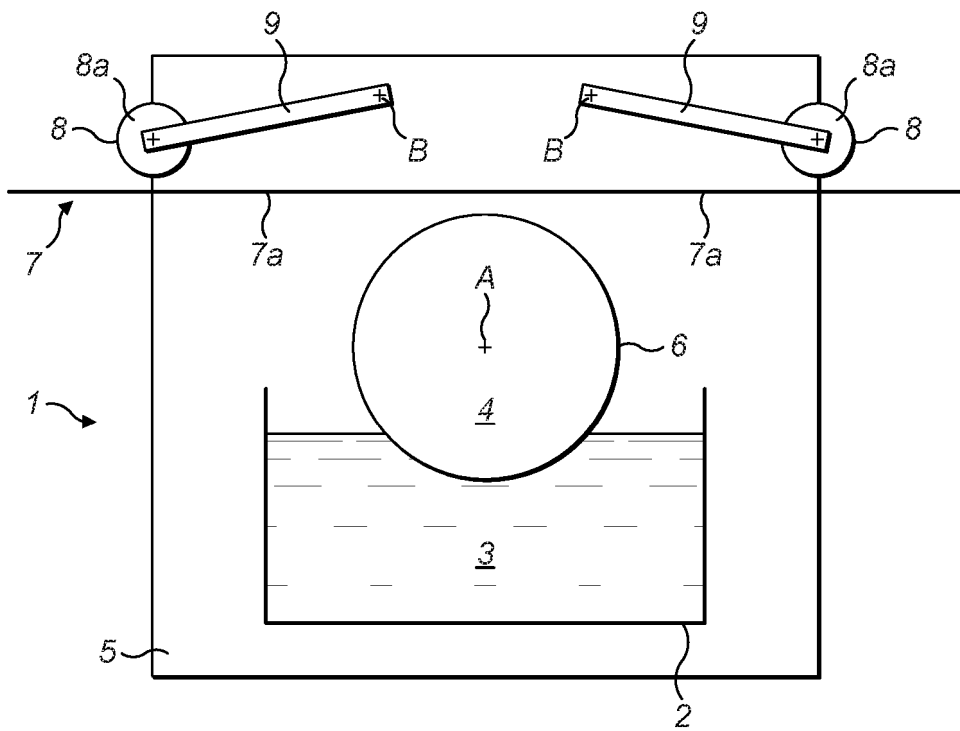


FIG. 2

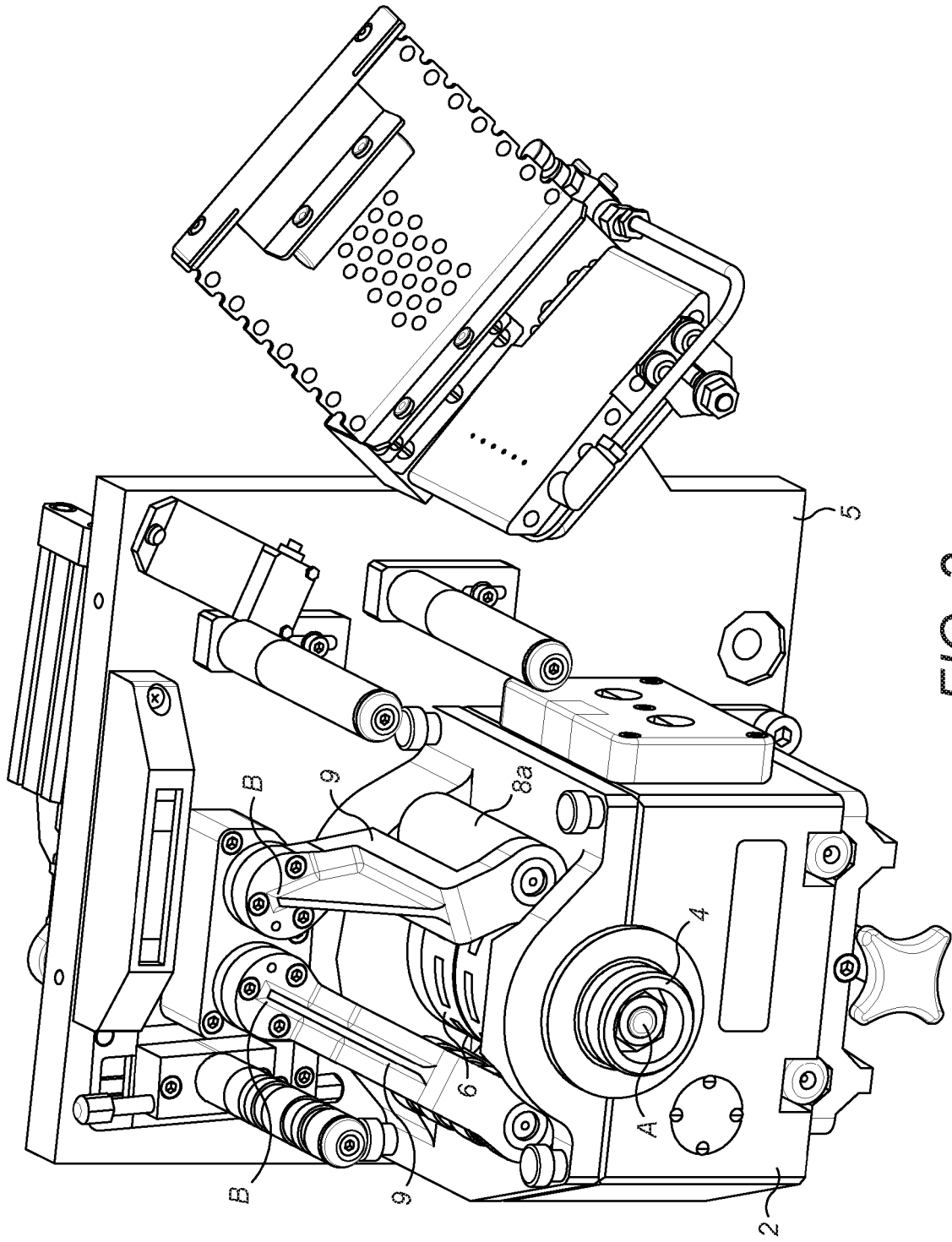


FIG. 3

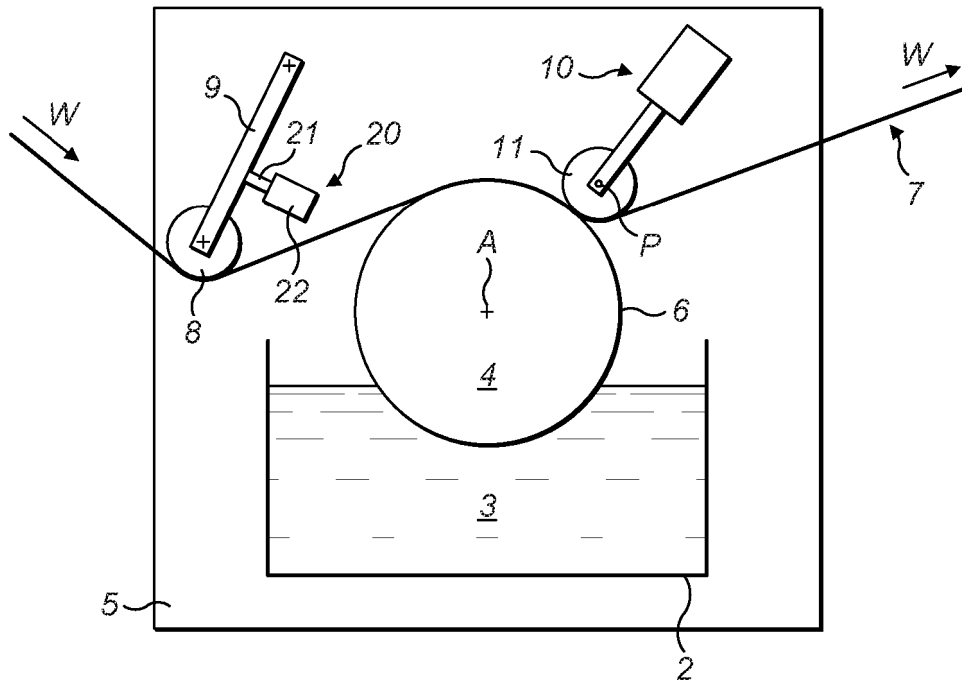


FIG. 4

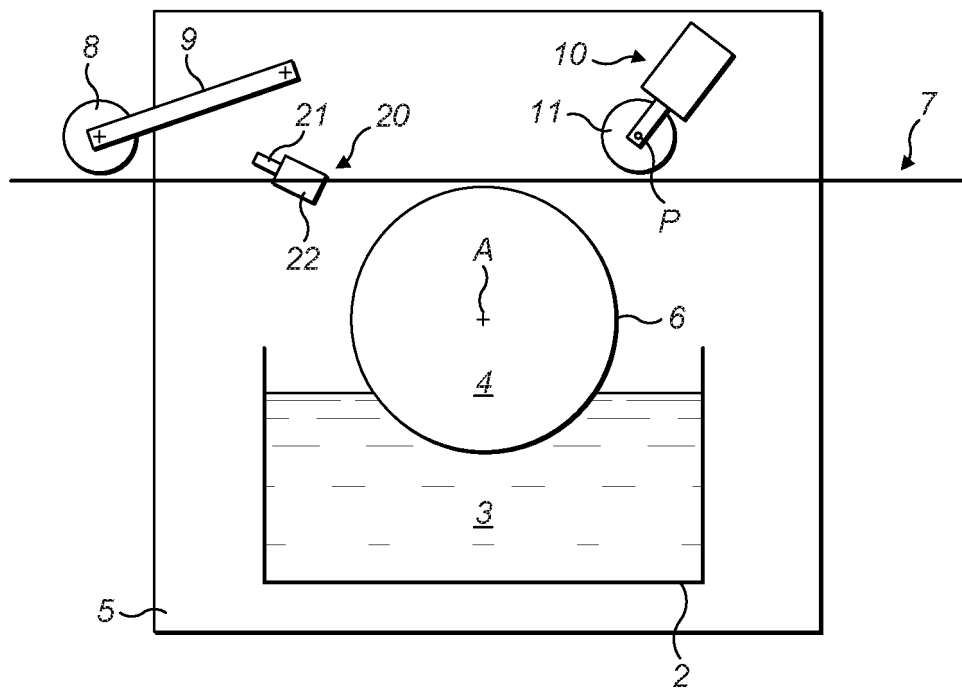


FIG. 5

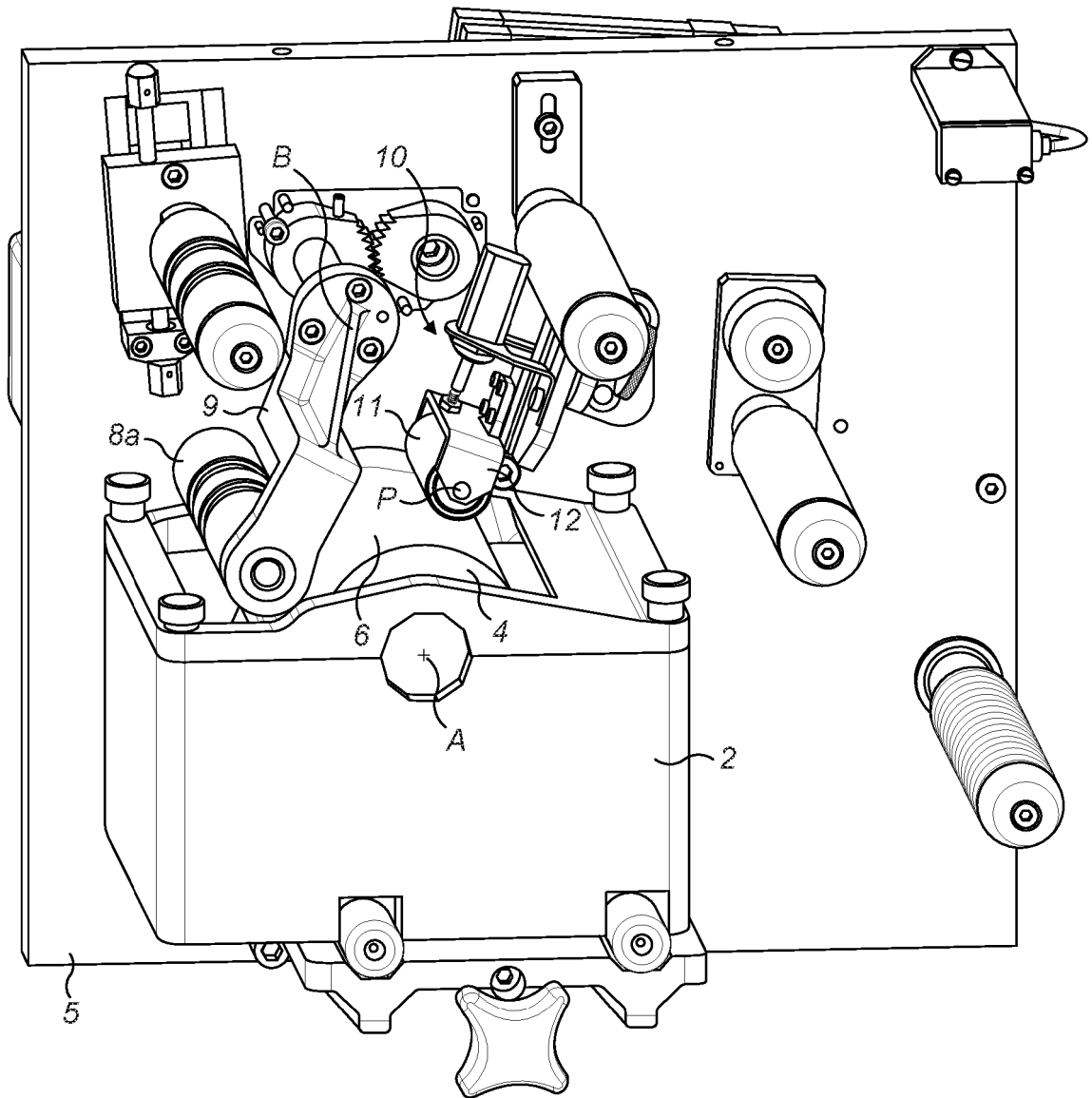


FIG. 6

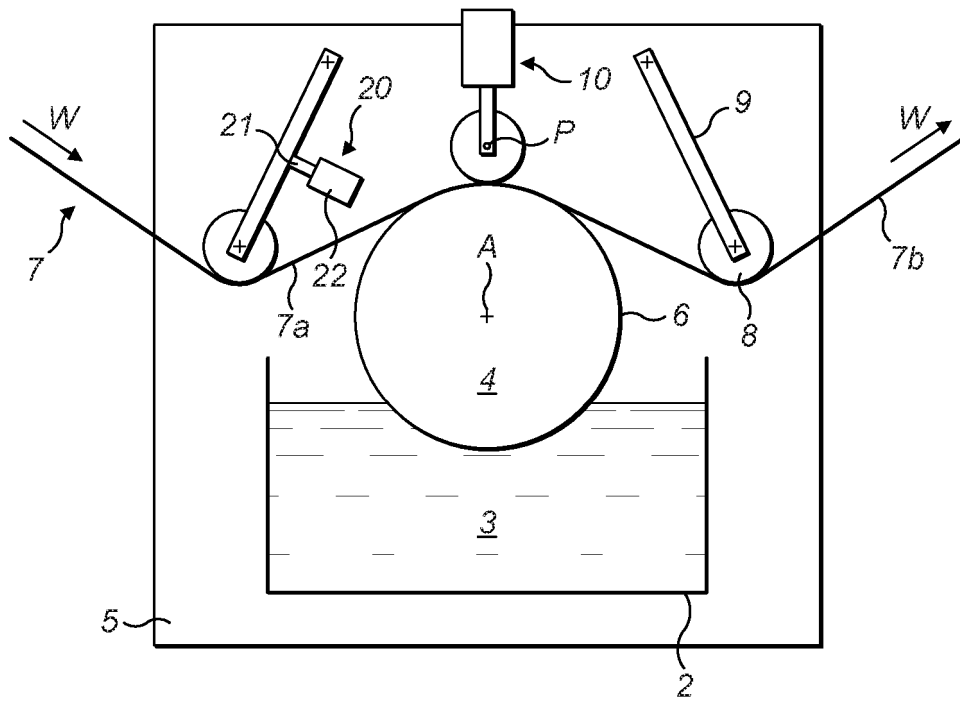


FIG. 7

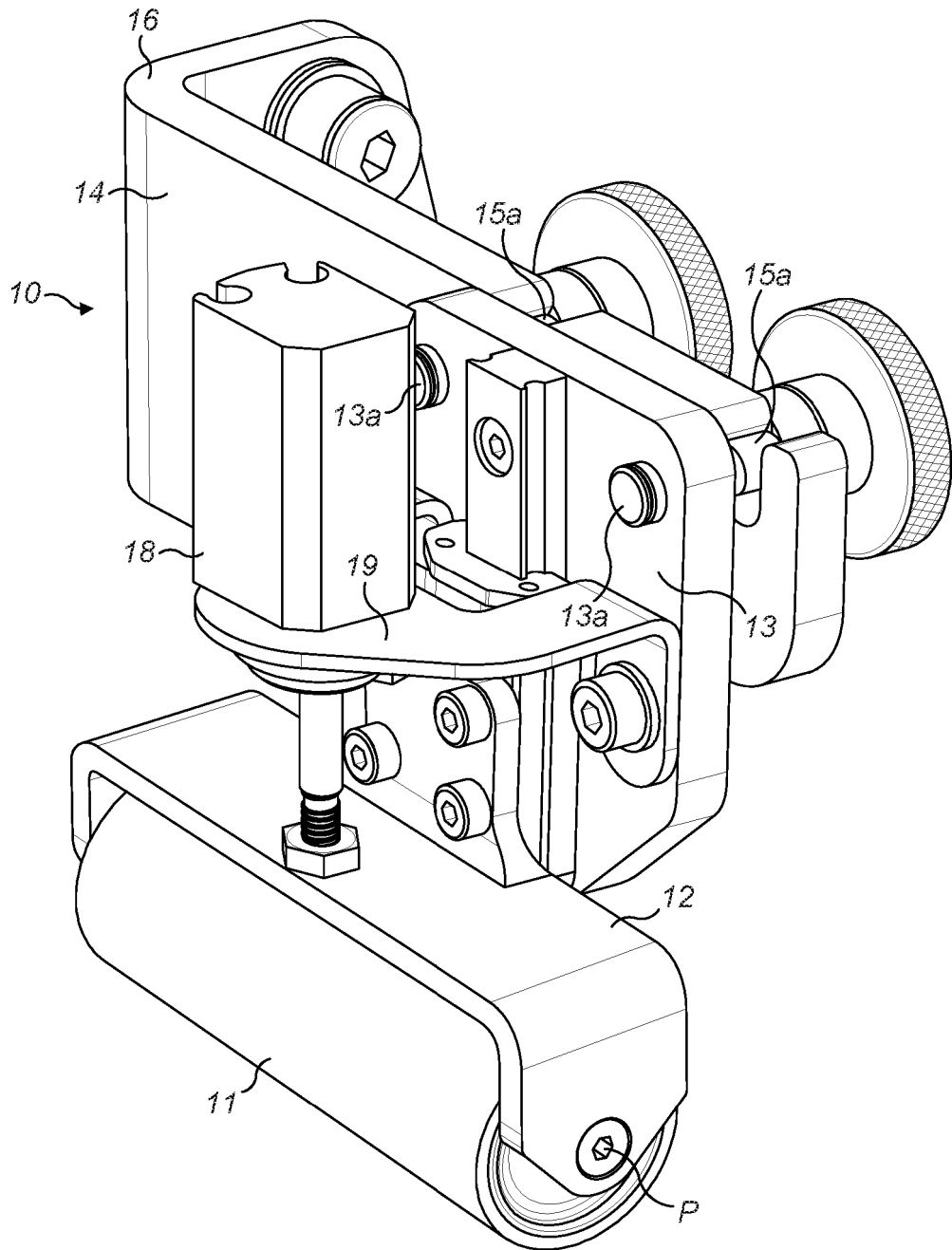


FIG. 8

Adhesive Applicator

Technical Field

This invention relates to an applicator for applying adhesive to a moving web of tipping paper in an apparatus used to form smoking articles such as filter cigarettes. The
5 invention also relates to a smoking article filter assembly apparatus incorporating the adhesive applicator of the invention and to a method of applying adhesive to a tensioned web of tipping paper moving through a smoking article filter assembly unit using the adhesive applicator of the invention.

10

Background

Apparatus used in the assembly of smoking articles, such as filter cigarettes, includes a filter attachment unit for attaching a filter and a tobacco rod to each other to form a
15 filter cigarette. A double length filter rod may be aligned with two tobacco rods, one at either end of the filter rod, and the three rods are wrapped with a patch of wrapping material known as a 'tipping paper' to join them together. The centrally positioned double length filter rod is then cut into two to form two filter cigarettes. The patch is attached to the filter and tobacco rod using adhesive applied to sections, or to the entire surface, of a web of tipping paper by an adhesive applicator prior to the web being cut
20 into patches.

Summary of the Invention

In accordance with embodiments of the invention, there is provided an adhesive applicator for applying adhesive to a tensioned web of tipping paper moving through a
25 smoking article filter assembly unit, comprising a transfer roller configured to transfer adhesive from an adhesive reservoir onto a surface of a moving web of tipping paper in contact with said transfer roller as the transfer roller rotates, and a pressure roller configured to pinch said moving web of tipping paper between the pressure roller and the transfer roller.

30

Preferably, the adhesive applicator comprises a pressure roller deployment mechanism operable to move the pressure roller between an operational position, in which said moving web of tipping paper is pinched between the pressure roller and the transfer roller and, a non-operational position in which the pressure roller is spaced from the
35 transfer roller.

The pressure roller may be configured to alter the path of a tensioned web of tipping paper so that it only contacts the transfer roller when the pressure roller is in its operational position.

5 In some embodiments, the adhesive applicator may comprise a pair of pressure rollers positioned upstream and downstream, respectively, in the direction of travel of a tensioned web and with said transfer roller between said pressure rollers, each of said pressure rollers being configured to pinch said moving web of tipping paper between a respective pressure roller and the transfer roller.

10

The adhesive applicator may comprise a web guide roller movable into an operational position spaced from the transfer roller and in which it alters the path of a tensioned web of tipping paper so that it contacts the transfer roller.

15 Preferably, the pressure roller replaces one of a pair of web guide rollers positioned upstream and downstream of the transfer roller.

In another embodiment, the adhesive applicator may comprise a pair of web guide rollers positioned upstream and downstream, respectively, in the direction of travel of a tensioned web and so that the transfer roller is located between said web guide rollers, each of said web guide rollers being movable into an operational position spaced from the transfer roller and in which they alter the path of a tensioned web of tipping paper so that it contacts the transfer roller, the pressure roller being positioned between said pair of web guide rollers.

25

In preferred embodiments, the pressure roller deployment mechanism comprises a pressure roller control arm, the pressure roller system and pressure roller being mounted to said arm, the control arm being pivotable to move the pressure roller system from a non-operational position into an intermediary position between said non-operational and operational positions and prior to the pressure roller system moving said pressure roller into its operational position.

30 The pressure roller deployment mechanism may also comprise a yoke to which the pressure roller is rotatably mounted and a mounting plate, the yoke being slideably mounted to the mounting plate for movement of the pressure roller and yoke relative to the mounting plate between operational and non-operational positions.

35

The mounting plate may be releasably attachable to a mounting bracket.

5 A pneumatic cylinder is preferably mounted to the mounting plate and is operable to move the pressure roller between operational and non-operational positions.

Each web guide roller may be mounted to an arm, and a stop member can be positioned to stop movement of the arm beyond the operational position.

10 In a preferred embodiment, the adhesive applicator comprises a compensating roller operable to maintain a constant web path length irrespective of the location of the pressure roller between its operational and non-operational positions.

15 According to another aspect of the invention, there is provided a smoking article filter assembly apparatus comprising the adhesive applicator according to the invention.

According to the invention, there is also provided a method of applying adhesive to a tensioned web of tipping paper moving through a smoking article filter assembly unit using an adhesive applicator comprising a transfer roller configured to transfer
20 adhesive from an adhesive reservoir onto a surface of a moving web of tipping paper in contact with said transfer roller as the transfer roller rotates, the method including the step of pinching said moving web of tipping paper between a pressure roller and the transfer roller.

25 **Brief Description of the Drawings**

Embodiments of the invention will now be described, by way of example only, with reference to Figures 4 to 8 of the accompanying drawings, in which:

Figure 1 shows a schematic side elevation of a known adhesive applicator in an operational position with a web of tipping paper passing through it;

30 Figure 2 shows the same side elevational view of the adhesive applicator of Figure 1 but in a non-operational position;

Figure 3 shows a perspective view of an actual adhesive applicator without a tipping paper web passing through it;

35 Figure 4 shows a schematic side elevation of an adhesive applicator according to an embodiment of the invention in an operational position;

Figure 5 shows the same adhesive applicator as shown in Figure 4 but in a non-operational position;

Figure 6 shows a perspective view of an actual adhesive applicator according to an embodiment of the invention;

5 Figure 7 shows a schematic side elevation of another embodiment in an operational position; and

Figure 8 shows a perspective view of a pressure roller assembly for use in the adhesive applicator of Figures 4 to 7.

10 **Detailed Description**

As used herein, the term 'smoking article' includes smokeable products such as cigarettes, cigars and cigarillos whether based on tobacco, tobacco derivatives, expanded tobacco, reconstituted tobacco or tobacco substitutes and also heat-not-burn products and other nicotine delivery product such as aerosol generation devices
15 including e-cigarettes. The smoking article may be provided with a filter for the gaseous flow drawn by the smoker. Whilst not all smoking articles have a filter, embodiments of the present invention relate to smoking articles that are provided with a filter for the gaseous flow drawn by the smoker and which is attached to a tobacco rod in a cigarette filter assembly apparatus using tipping paper.

20

A known adhesive applicator 1 forming part of a cigarette filter assembly apparatus (not shown) is illustrated in Figures 1 to 3. The adhesive applicator 1 includes a trough 2 containing a reservoir 3 of adhesive and a transfer roller 4 which is mounted to a frame 5 for rotation about an axis 'A' above the trough 2 and has a circumferential surface 6
25 projecting into reservoir of adhesive 3 received in the trough 2. During operation, a layer of adhesive is received on the circumferential surface 6 of the transfer roller 4 and is deposited on the underside surface 7a of a tensioned web of tipping paper 7 which is moving across the transfer roller 4 as it rotates. The path of the tipping paper web 7 through the adhesive applicator 1 is indicated by arrow 'W' in Figure 1 and moves from
30 left to right, as shown on the drawing sheet, from an upstream position on the left hand side to a downstream position on the right hand side.

A web guide roller 8 is positioned to either side of the transfer roller 4. In other words, one web guide roller 8 is located in an upstream position and the other web guide roller
35 8 is located in a downstream position, with the transfer roller 4 located between each of the web guide rollers, and so that each web guide roller 8 lies on opposite sides of a

vertical plane extending through the axis A of the transfer roller 4. Each web guide roller 8 is rotatably mounted to a lower end of a respective arm 9 and each arm 9 is pivotally mounted to the frame 5 for rotation about an axis 'B', so that they can each pivot to move the web guide rollers 8 between an operational and a non-operational
5 position under pneumatic control and in response to a signal from a filter assembly apparatus control unit (not shown).

In an operational position, as shown in Figure 1, the web guide rollers 8 are pivoted about axis 'B' to alter the path of the tensioned web and force the underside surface 7a
10 of the tensioned tipping paper web 7 into contact with the surface 6 of the transfer roller 4, so that adhesive is transferred from the rotating transfer roller 4 to the underside surface 7a of the moving web 7 in the region of contact between the web 7 and the transfer roller 4. The web guide rollers 8 rotate freely relative to their arms 9 to minimise friction between the circumferential surface 8a of each web guide roller 9 and
15 the upper surface 7b of the web 7 as the web 7 passes beneath the web guide rollers 9 and over the transfer roller 4 situated between them. It will be appreciated that neither of the web guide rollers 8 come into contact with the transfer roller 4. However, they act on the tensioned tipping paper web 7 so as to alter its path and cause it to come into contact with the transfer roller 4 that is positioned between each of said web guide
20 rollers 8.

When the filter assembly unit is stopped and the web 7 is stationary, the arms 9 pivot in the opposite direction about axis 'B', as shown in Figure 2. Due to the tension in the web 7, the web 7 moves out of contact with the transfer roller 4. It is necessary for the
25 web 7 to come out of contact with the transfer roller 4 because, if the web 7 remained in contact with the transfer roller 4 when stationary, it would quickly become saturated with the adhesive present on the transfer roller 4 causing the web 7 to break during subsequent processing through the filter assembly unit.

30 According to one embodiment, one of the arms 9 and its respective web guide roller 8 is omitted from the adhesive applicator 1 and is replaced with a pressure roller assembly 10 (see Figure 4) that is positioned and configured to apply pressure to the tensioned web 7 and directly press it into contact with the circumferential surface 6 of the transfer roller 4. The pressure roller 11 forms a nip between itself and the transfer roller 4 to
35 pinch the web 7 as it passes therethrough. As shown in Figure 4, the pressure roller 11

is positioned so that the nip against the transfer roller 4 is downstream of a vertical plane extending through the axis A of the transfer roller 4.

More specifically, and with reference to Figures 4 to 8, there is provided a cylindrical
5 pressure roller 11 that is mounted for rotation about an axis 'P' parallel to the axis of
rotation 'A' of the transfer roller 4 and axis 'B' of the remaining arm 9. The pressure
roller 11 is shown in more detail in Figure 8, from which it can be seen that it is
mounted to a pressure roller deployment mechanism comprising a yoke 12 in which the
pressure roller 11 is free to rotate. The yoke 12 is slideably attached to a mounting plate
10 13 which is, in turn, removably attached to a bracket 14 bolted or otherwise attached to
the frame 5. Whilst it is envisaged that the mounting plate 13 may be attached directly
to the frame 5 or formed integrally with the bracket 14, it is preferable for the mounting
plate 13 and bracket 14 to be readily separable from each other so that the mounting
plate 13 can be removed easily from the adhesive applicator 1 together with the
15 pressure roller 11. This not only enables the pressure roller assembly 10 to be removed
and replaced quickly, but it also facilitates removal and replacement of the transfer
roller 4 and the adhesive trough 2, which would otherwise be difficult to detach from
the frame 5 in the presence of the pressure roller assembly 10. Furthermore, by making
the pressure roller 11 and mounting plate 13 removable, it need only have a short stroke
20 between its operational and non-operational positions, i.e. the distance of the pressure
roller 11 from the surface 6 of the transfer roller 4 may remain short. The mounting
plate 13 may be provided with fixing screws or bolts 13a that locate in recesses 15
formed in an upper edge 16 of the bracket 14. The mounting plate 13, together with the
pressure roller 11, may therefore be hung from the bracket 14 and the fixing screws 14
25 tightened by means of knurled end caps 17, to hold the pressure roller 11 in place.

The position of the pressure roller 11 can be pneumatically controlled by the filter unit
assembly apparatus in the same way that the web guide roller 8 that it replaces is
controlled. A pneumatic lifting cylinder 18 can be attached to the mounting plate 13
30 using a secondary bracket 19 to which the lifting cylinder 18 is attached. Operation of
the pneumatic lifting cylinder 18 will cause the pressure roller 11 and yoke 12 to slide
relative to the mounting plate 13 in a radial direction relative to the axis 'A' of the
transfer roller 4 between an operational position, in which it forms a nip with the
transfer roller 4, as shown in Figure 4, and a non-operational position, as shown in
35 Figure 5.

In the operational position, a web 7 of tipping paper passing through the nip between the pressure roller 11 and the transfer roller 4 is pinched and directly urged or biased into contact with the surface 6 of the transfer roller 4 by the pressure roller 11. As web 7 is forced against the transfer roller 4 by the pressure roller 11, the transfer of adhesive from the transfer roller 4 to the tipping paper web 7 is more even and consistent as the web 7 travels between them. It will be appreciated that, in the absence of the tipping paper web 7, the pressure roller 11 would make direct contact with, and press against, the circumferential surface 6 of the transfer roller 4 in its operational position. Therefore, when the web 7 is present, the pressure roller 11 squeezes or pinches the web 7 to press it against the transfer roller 4.

In the non-operational position of the pressure roller 11, as shown in Figure 5, the web 7 is no longer pinched or squeezed against the transfer roller 4 by the pressure roller 11 and so the web 7 moves out of contact with the transfer roller 4 to prevent the web 7 from becoming soaked with adhesive. When the pressure roller 11 moves into its non-operational position, the web moves away from the transfer roller 4 due to tension in the web 7 that causes it to flatten out and assume a more direct, undeflected path through the adhesive applicator 1.

In the above-described embodiment, the remaining web guide roller 8 is retained in order to deflect the web 7 so that it contacts the transfer roller 4 and prior to passing through the nip formed between the pressure roller 11 and the transfer roller 4. The web guide roller 8 may be located upstream so that the web 7 is deflected into contact with the transfer roller 4 prior to the web 7 passing through a vertical plane extending through the axis of rotation A of the transfer roller 4, whereas the pressure roller 11 may be located downstream so that the web 7 is nipped to the transfer roller 4 at a point on the transfer roller 4 that is located after the web 7 has passed through said vertical plane.

However, it is also envisaged that the remaining web guide roller 8 may be omitted so that only the pressure roller 11 is employed to urge the tensioned web 7 against the transfer roller 4. In order to increase the extent of contact between the web 7 and the transfer roller 4 other than at the nip, a second pressure roller 11 and second pressure roller deployment mechanism may be provided in place of the remaining web guide roller 8, so that the web 7 is nipped to the transfer roller 4 at two spaced locations around the circumference of the transfer roller 4. One pressure roller 11 may be located

upstream so that the first nip is located prior to the web 7 passing through a vertical plane extending through the axis of rotation A of the transfer roller 4, whereas the second pressure roller 11 may be located downstream so that the second nip is located after the web 7 has passed through said vertical plane extending through axis A of the transfer roller 4.

In an alternate embodiment, a pressure roller assembly 10 may be provided in addition to both the arms 9 and web guide rollers 8 shown in the adhesive applicator of Figures 1 to 3. For example, the pressure roller assembly 10 may be located between each of the arms 9, as shown in Figure 7. In this case, the axis 'P' of the pressure roller 11 could be located directly above the axis 'A' of the transfer roller 4 so that the pressure roller 11 will move in a vertical path between its operational and non-operational positions.

In another embodiment, the mounting plate 13 of the pressure roller assembly 10 may be attached to the end of one of the arms 9 so that it will only be necessary to omit the web guide roller 8 attached to that arm 9. In such an embodiment, the arm 9 would first pivot downwardly into its operational position and the pressure roller 11 would then slide relative to its mounting plate 13 so that it directly presses the web 7 against the transfer roller 4.

In any of the above described embodiments, a stop member 20 (see Figures 4 and 5) may be associated with each arm 9 and attached to the frame 5 in a fixed position. When the arm 9 moves into its operational position under pneumatic control, it stops at the same fixed and consistent position due to engagement with the stop member 20. This ensures that the arm 9, or arms 9, do not move or fluctuate in position due to slight variations in the compressed air pressure. The stop member 20 may be adjustable. For example, the stop member 20 may comprise a screw 21 threadingly received within a fixed block 22 with the arm 9 making contact with the head of the screw 21 when its operational position is reached. The position of the screw 21 may be adjusted by rotating it within the block 22 thereby altering the operational position of the arm 9.

It will be appreciated that movement of the pressure roller 11 between operational and non-operational positions will alter the web path resulting in a change in web length. However, a change in web length can be avoided if the web is passed over a further compensating roller (not shown) whose movement is synchronised with that of the

pressure roller 11 and which moves to compensate for any changes in web length caused by movement of the pressure roller 11. For example, the compensating roller may retract out of contact with the web as the pressure roller 11 is brought into contact with the web so that the web length remains unchanged irrespective of the position of the
5 pressure roller 11 between its operational and non-operational positions.

The adhesive applicator may be controlled by a controller linked to the filter unit assembly apparatus so that movement of the pressure roller between its operational and non-operational positions occurs automatically in response to other events. For
10 example, the pressure roller 11 may disengage and move into its non-operational position when the assembly unit stops and re-engage when the assembly unit starts.

In order to address various issues and advance the art, the entirety of this disclosure shows by way of illustration various embodiments in which the claimed invention(s)
15 may be practiced and provide for a superior adhesive applicator. The advantages and features of the disclosure are of a representative sample of embodiments only, and are not exhaustive and/or exclusive. They are presented only to assist in understanding and teach the claimed features. It is to be understood that advantages, embodiments, examples, functions, features, structures, and/or other aspects of the disclosure are not
20 to be considered limitations on the disclosure as defined by the claims or limitations on equivalents to the claims, and that other embodiments may be utilised and modifications may be made without departing from the scope and/or spirit of the disclosure. Various embodiments may suitably comprise, consist of, or consist essentially of, various combinations of the disclosed elements, components, features,
25 parts, steps, means, etc. In addition, the disclosure includes other inventions not presently claimed, but which may be claimed in future.

Claims

1. An adhesive applicator for applying adhesive to a tensioned web of tipping paper moving through a smoking article filter assembly unit, comprising a transfer roller configured to transfer adhesive from an adhesive reservoir onto a surface of a moving web of tipping paper in contact with said transfer roller as the transfer roller rotates, and a pressure roller configured to pinch said moving web of tipping paper between the pressure roller and the transfer roller.
2. An adhesive applicator according to claim 1, comprising a pressure roller deployment mechanism operable to move the pressure roller between an operational position, in which said moving web of tipping paper is pinched between the pressure roller and the transfer roller and, a non-operational position in which the pressure roller is spaced from the transfer roller.
3. An adhesive applicator according to claim 2, wherein said pressure roller is configured to alter the path of a tensioned web of tipping paper so that it only contacts the transfer roller when the pressure roller is in its operational position.
4. An adhesive applicator according to any preceding claim, comprising a pair of pressure rollers positioned upstream and downstream, respectively, in the direction of travel of a tensioned web and with said transfer roller between said pressure rollers, each of said pressure rollers being configured to pinch said moving web of tipping paper between a respective pressure roller and the transfer roller.
5. An adhesive applicator according to any of claims 1 to 3, comprising a web guide roller movable into an operational position spaced from the transfer roller and in which it alters the path of a tensioned web of tipping paper so that it contacts the transfer roller.
6. An adhesive applicator according to claim 5, wherein the pressure roller replaces one of a pair of web guide rollers positioned upstream and downstream of the transfer roller.
7. An adhesive applicator according to claim 5, comprising a pair of web guide rollers positioned upstream and downstream, respectively, in the direction of travel of a

tensioned web and so that the transfer roller is located between said web guide rollers, each of said web guide rollers being movable into an operational position spaced from the transfer roller and in which they alter the path of a tensioned web of tipping paper so that it contacts the transfer roller, the pressure roller being positioned between said
5 pair of web guide rollers.

8. An adhesive applicator according to any of claims 2 to 7, wherein the pressure roller deployment mechanism comprises a pressure roller control arm, the pressure roller system and pressure roller being mounted to said arm, the control arm being
10 pivotable to move the pressure roller system from a non-operational position into an intermediary position between said non-operational and operational positions and prior to the pressure roller system moving said pressure roller into its operational position.

15 9. An adhesive applicator according to any of claims 2 to 8, wherein the pressure roller deployment mechanism comprises a yoke to which the pressure roller is rotatably mounted and a mounting plate, the yoke being slideably mounted to the mounting plate for movement of the pressure roller and yoke relative to the mounting plate between operational and non-operational positions.

20 10. An adhesive applicator according to claim 9, wherein the mounting plate is releasably attachable to a mounting bracket.

11. An adhesive applicator according to claim 10, wherein a pneumatic cylinder is
25 mounted to the mounting plate and is operable to move the pressure roller between operational and non-operational positions.

12. An adhesive applicator according to claim 5 to 11, wherein each web guide roller is mounted to an arm, and a stop member is positioned to stop movement of the arm
30 beyond the operational position.

13. An adhesive applicator according to any preceding claim, comprising a compensating roller operable to maintain a constant web path length irrespective of the location of the pressure roller between its operational and non-operational positions.

35

14. A smoking article filter assembly apparatus comprising the adhesive applicator according to any preceding claim.

5 15. A method of applying adhesive to a tensioned web of tipping paper moving through a smoking article filter assembly unit using an adhesive applicator comprising a transfer roller configured to transfer adhesive from an adhesive reservoir onto a surface of a moving web of tipping paper in contact with said transfer roller as the transfer roller rotates, the method including the step of pinching said moving web of tipping paper between a pressure roller and the transfer roller.



Application No: GB1417761.2

Examiner: Mrs Katherine Russill

Claims searched: 1 - 15

Date of search: 20 January 2016

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1 - 15	EP1500438 A1 (HAUNI), see WPI abstract Accession number 2005-103789, and figure 1.
X	1, 4, 14 and 15	EP0846499 A2 (BOLDRINI), see last paragraph column 2 and figure 1.
X	1, 4, 14 and 15.	US4340074 A (BROWN & WILLIAMSON), see figure 1 and column 2, lines 35 onwards.
X	1, 4, 14 and 15	EP1097894 A1 (DRAGHETTI), see figure 1 and paragraph 21.
X	1, 4, 14 and 15.	US5623952 A (HAUNI), see figure 1, structure 22 and column 9, lines 55 - 65.
X	1, 4, 14 and 15	EP0017794 A1 (RJR ARCHER), see figure 4 and description
X	1, 4, 14 and 15.	GB275739 A (MOLINS), see figure 1 and page 3 lines 9 - 35.

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^X :

Worldwide search of patent documents classified in the following areas of the IPC

A24C

The following online and other databases have been used in the preparation of this search report



WPI, EPODOC

International Classification:

Subclass	Subgroup	Valid From
A24C	0005/47	01/01/2006
A24C	0005/58	01/01/2006
B05C	0001/08	01/01/2006
B05C	0001/16	01/01/2006