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(54) **Apparatus and method for forming a cigar from a bunch and a wrapper.**

(57) The invention relates to an apparatus for forming a cigar from a bunch and a wrapper. The apparatus comprises feed means for feeding a bunch to a rolling location; wrapper supply means for supplying a wrapper to a wrapper supply location; transport means for transporting the wrapper from the wrapper supply location to the rolling location. The transport means comprises a carrier arm that is movable in a transport direction from an up-take position for taking up the wrapper at the wrapper

supply location to a release position for releasing the wrapper at the rolling location. The carrier arm is provided with a suction means for holding the wrapper. The device further comprises a rolling device at the rolling location for rolling the wrapper around the bunch. The transport means are arranged such that, in at least the release position, at least a substantial part of the carrier arm extends from the suction means to behind the longitudinal axis of the suction means, as seen in the reverse transport direction.

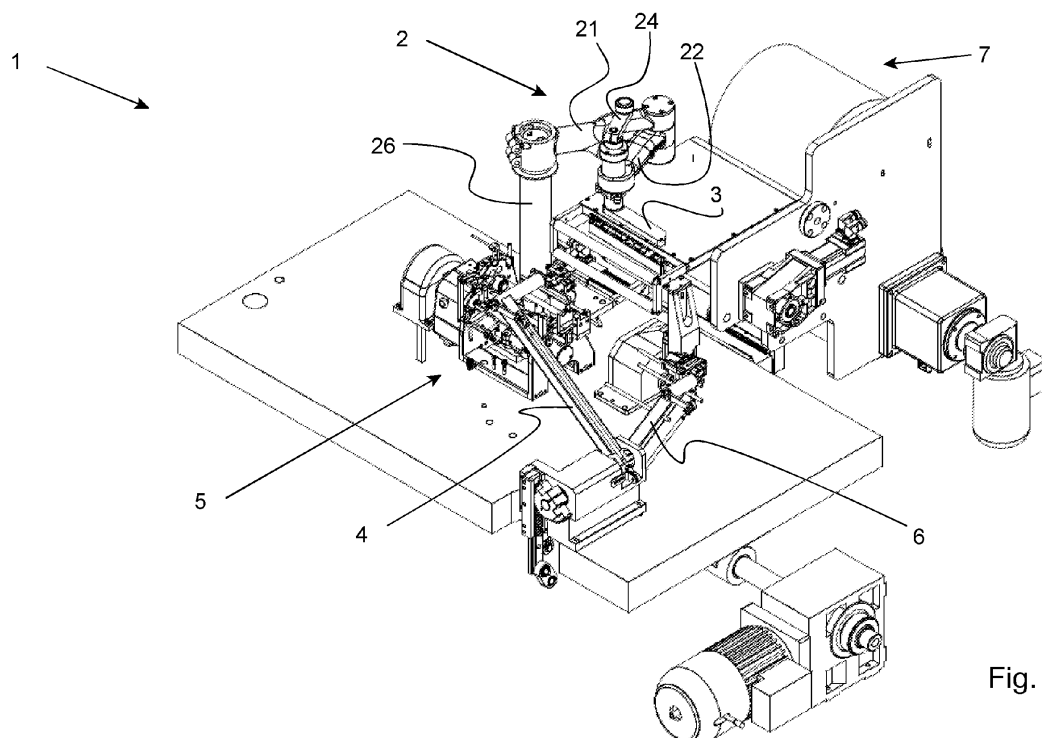


Fig. 1

## Description

**[0001]** The invention relates to an apparatus for forming a cigar from a bunch and a wrapper, as defined in the pre-amble of claim 1. The invention further relates to a method for forming a cigar from a bunch and a wrapper, as defined in the pre-amble of claim 12.

**[0002]** An apparatus of this kind is generally known. The known apparatus comprises a rolling device where a wrapper is rolled around a bunch, for forming a cigar. Feed means are provided for feeding a bunch to the rolling location. A conveyor belt-like structure supplies wrappers that were previously cut into shape to a wrapper supply location, where they are taken up by a suction device for holding the wrapper under the influence of suction force during transport, and transported to the rolling location by means of a carrier arm connected to the suction device. The carrier arm transports the wrapper to the rolling location, where it is formed, together with the bunch, into a cigar.

**[0003]** The feed means comprises a reciprocally moving arm, that moves back and forth between the rolling location and a bunch supply location. The carrier arm is also reciprocally moved back and forth, between an uptake position for taking up the wrapper at the wrapper supply location, to a release position for releasing the wrapper at the rolling location.

**[0004]** Both the bunch feed arm and the carrier arm require space at the rolling location. The carrier arm is able to release a wrapper at the rolling location, once the bunch feed arm has left the rolling location. Vice versa, the bunch can only be fed to the rolling location once the carrier arm has left the rolling location.

**[0005]** It is a drawback of the known apparatus and method, that the speed by which the cigars may be formed is limited. It is a further drawback of the known apparatus and method, that the wear on especially the fast moving components is relatively high.

**[0006]** It is therefore an object of the present invention, to provide an apparatus for forming a cigar from a bunch and a wrapper, which reduces or eliminates the aforementioned disadvantages of the prior art.

**[0007]** To this end, an apparatus of the aforementioned kind is provided, which is characterised according to the characterising part of claim 1. According to the invention, the transport means are arranged such that, in at least the release position, at least a substantial part of the carrier arm extends from the suction means to behind the longitudinal axis of the suction means, as seen in the reverse transport direction.

**[0008]** Compared to prior art arrangements, the carrier arm is now largely situated on the back side of the suction means, as seen in the transport direction, instead of partly or completely extending on the front side of the suction means. The arrangement according to the invention ensures that the carrier arm leaves the rolling location at a much earlier stage, giving a larger time-window for the feed means to feed a bunch to the rolling location. This

means that the speed of the apparatus as a whole may be increased, without actually increasing the speed of the individual components. Furthermore, according to the invention the chances of a collision between the carrier arm and the feeding means are reduced, such that an increase of the individual components is possible as well. Thus, the apparatus according to the invention may be run at a higher speed, enabling the formation of more cigars in a given time. Thus, the aim of the invention is achieved.

**[0009]** It is possible that over at least a length of the suction means, the carrier arm is mainly located behind the longitudinal axis of the suction means, as seen in the reverse transport direction. This way, the carrier arm does not unnecessarily occupy space near the rolling location.

**[0010]** Preferably, the carrier arm is located entirely behind the longitudinal axis of the suction means, as seen in the reverse transport direction.

**[0011]** In an embodiment, the transport means are arranged such that, during at least part of movement of the carrier arm to and from the release position, at least a substantial part of the carrier arm extends from the suction means to behind the longitudinal axis of the suction means, as seen in the reverse transport direction.

**[0012]** In a preferred embodiment, the carrier arm is pivotally movable around a first pivot axis, wherein the first pivot axis, as seen in the reverse transport direction, is located at a distance from the rolling location. By placing the first pivot axis at a distance, it is possible to use a shorter stroke, thus enabling the speed up of the apparatus.

**[0013]** It is possible that the carrier arm is an articulated carrier arm, comprising a first arm movably connected to the apparatus, and a second arm pivotally connected to the first arm, wherein the second arm is provided with the suction means. This way, the movement may be kept relatively compact.

**[0014]** In an embodiment, at least the first arm and/or at least the second arm is located behind the longitudinal axis of the suction means, as seen in the reverse transport direction.

**[0015]** Preferably, the second arm is directly connected to the first arm part. However, it is possible although not preferred that further arms are linked in between the first and second arm.

**[0016]** In an embodiment, the wrapper supply means are arranged such that the wrapper is suppleable to the wrapper supply location in a direction that is mainly parallel to the transport direction. This way, the stroke of the suction means may be minimized, thus enabling the speed up of the apparatus.

**[0017]** It is possible that the wrapper supply means are arranged such that the wrapper is suppleable to the wrapper supply location with the longitudinal axis of the wrapper being mainly perpendicular to the transport direction. This way, the stroke of the suction means may be minimized, thus enabling the speed up of the apparatus.

**[0018]** In an embodiment, the transport means are arranged such that the longitudinal axis of the suction means, during movement in the transport direction, stays mainly perpendicular to the transport direction. This way, movement of the suction means during transport may be minimized, thus enabling the speed of the apparatus to be increased.

**[0019]** In an embodiment, the transport means are arranged such that the suction means, during movement in the transport direction, is moved over a path that is substantially linear. This further minimizes the movement of the suction means, allowing the speed of the apparatus as a whole to be increased.

**[0020]** According to an aspect of the invention, a method according to claim 12 is provided. The method is characterised in that at least when the carrier arm is in the release position, at least a substantial part of the carrier arm that is located at or near the suction means is held behind the longitudinal axis of the suction means, as seen in the reverse transport direction. The arrangement according to the invention ensures that the carrier arm leaves the rolling location at a much earlier stage, giving a larger time-window for the feed means to feed a bunch to the rolling location. This means that the speed of the apparatus as a whole may be increased, without actually increasing the speed of the individual components. Further advantages of the method have already been described. Preferably, the method is carried out by an apparatus according to the invention.

**[0021]** In an embodiment of the method, the method further comprises the step of supplying the wrapper to the wrapper supply location in a direction that is mainly parallel to the transport direction. With a supply in the same direction, the speed of the method may be increased.

**[0022]** It is possible that the method comprises the step of supplying the wrapper to the wrapper supply location with the longitudinal axis of the wrapper being mainly perpendicular to the transport direction. This way, the wrapper is already in a position parallel to the rolling position, and the wrapper does not need to be turned before being rolled.

**[0023]** Furthermore it is possible that the wrapper is transported from the wrapper supply location to the rolling location over a path that is substantially linear, further minimizing the necessary movements of the suction means, and thus allowing the speed to be increased.

**[0024]** Further aspects and embodiments of the invention will become apparent from the appended figures, in which:

- Fig. 1 Shows an isometric view of the apparatus according to the invention;
- Fig. 2 Shows a detail of the carrier arm of the apparatus of Fig. 1;
- Fig. 3 Shows a top view of the apparatus of Fig. 1;
- Fig. 4 Shows a top view of a carrier arm and its movements during transport according to the Prior

Art;

Fig. 5 Shows a top view of the carrier arm and its movements during transport according to the invention;

**[0025]** Figure 1 shows an isometric view of an apparatus 1 for forming a cigar from a bunch and a wrapper. The apparatus 1 comprises a rolling device 5 where a wrapper is rolled around a bunch, for forming a cigar, in a manner which is known to those skilled in the art. Feed means 4 are provided for feeding a bunch to the rolling location at the rolling device 5. A conveyor belt-like structure 7 supplies wrappers that were previously cut into shape to a wrapper supply location, where they are taken up by a suction device 3 for holding the wrapper under the influence of suction force during transport. Then, the wrappers are transported to the rolling location by means of a carrier arm 2 connected to the suction device 3. The carrier arm 2 transports the wrapper to the rolling location at the rolling device 5, where it is formed, together with the bunch, into a cigar.

**[0026]** The feed means 4 comprises a reciprocatingly moving arm 4, that moves back and forth between the rolling location at the rolling device 5 and a bunch supply location (not shown). The carrier arm 2 is also reciprocatingly moved back and forth, between an uptake position for taking up the wrapper at the wrapper supply location, to a release position for releasing the wrapper at the rolling location, as will be described in more detail below with reference to Figure 4 and Figure 5.

**[0027]** Figure 2 shows a detail of the apparatus shown in Figure 1, and more specifically of the carrier arm 2. The carrier arm is pivotally connected to the apparatus 1 by means of a hinge 26. The carrier arm 2 is an articulated carrier arm, comprising a first arm 21 movably connected to the apparatus 1, and a second arm 22 pivotally connected to the first arm 21. The second arm is provided with the suction means 3, which are pivotally connected to the second arm, such that the orientation of the suction means during transport may be changed. The orientation may be changed via an arm 24.

**[0028]** The carrier arm 2 moves the suction means 3 during transport from the position shown in Figure 2, which is an uptake position for taking up a wrapper, in the transport direction T, to the rolling location at the rolling device 5. In that position, also referred to as release position, the wrapper is released, and the rolling device produces a cigar from a bunch supplied by the feeding arm 4 and the wrapper.

**[0029]** Then, the suction means 3 are moved back again to the take-up position, in the negative or reverse transport direction T. By moving back and forth between these two positions, the stroke can be kept small. In other words, the distance that the suction means need to travel is kept small, such that the speed of the apparatus 1 may be increased. It should be noted that the reverse transport direction T and the transport direction T are both referred to by letter T. However, with reverse transport direction

T, it is meant a movement in the direction opposite to the direction indicated by the arrow in the figures.

**[0030]** Fig. 3 shows a top view of the apparatus 1 according to the invention. The carrier arm 2 and the feed means 4 alternately occupy the same space at the rolling location R. The suction means 3 need to clear the space at the rolling location R of the rolling device 5, before the feed means 4 are able to place a new bunch, and vice versa. According to the invention, the space in front of the suction means 3, as seen in the transport direction T, is cleared as much as possible. To that end, the transport means 2 are arranged such that, in at least the release position (suction device 3 is at the rolling location R), at least a substantial part of the carrier arm 2 extends from the suction means 3 to behind the longitudinal axis L of the suction means 3, as seen in the reverse transport direction T. The carrier arm does not extend towards the rolling location R, and thus does not occupy the space at the rolling location R, either during movement to the rolling location, or during movement from the rolling location. Thus, the transport means 2, including the suction means, are able to reside a much shorter time at the rolling location, which enables the feed means 4 to feed a bunch to the rolling location R sooner. Thus, the speed of the apparatus may be increased, without actually increasing the speed of the different components.

**[0031]** Figure 4 shows an embodiment according to the prior art. More specifically, figure 4 shows the rolling device 5, and a wrapper supply device 107 at a distance thereof. A carrier arm, having two pivotally connected arms 121, 122, which are pivotally movable around a first pivot axis 126, transports the wrapper 171 from the wrapper supply location (right in the figure) to the rolling location (left in the figure), and then moves back again to the uptake position at the wrapper supply location. The position of the carrier arm in the uptake position is denoted by a solid line, whilst the position of the carrier arm in the release position is denoted by a dashed line.

**[0032]** It can be seen that in the prior art, the second arm 122' in at least the release position occupies space in front of the suction means 103. Also, when moving back to the uptake position, the second arm 122' occupies said space.

**[0033]** According to the invention, as shown in Fig. 5, the carrier arm 21, 22, over at least a length of the suction means 3, is mainly located behind the longitudinal axis L of the suction means 3, as seen in the reverse transport direction T. In the release position, the carrier arm 2 is located entirely behind the longitudinal axis L, as seen in the reverse transport direction T. Also, during at least part of movement of the carrier arm 21, 22 to and from the release position, at least a substantial part of the carrier arm 21, 22 extends from the suction 3 means to behind the longitudinal axis L of the suction means, as seen in the reverse transport direction T. This way, the carrier arm 2 and the suction means 3 only occupy the space at the rolling location for a length of time that is needed to release the wrapper at the rolling location.

**[0034]** Further improvements in the speed by which the apparatus may function, will also become apparent from figures 4 and 5. As can be seen in Figure 4, the wrappers according to the prior art are supplied in the wrapper supply direction B, which is perpendicular to the wrapper transport direction T. According to the embodiment of Figure 4, however, the wrappers are supplied in the wrapper supply direction B which direction B is mainly parallel to the transport direction T. Furthermore, the wrapper is supplied to the wrapper supply location with the longitudinal axis of the wrapper being mainly perpendicular to the transport direction T. This allows the longitudinal axis of the suction means 3, during movement in the transport direction T, to stay perpendicular to the transport direction. Furthermore, this allows the suction means, during movement in the transport direction, to be moved a path that is substantially linear. The suction means need to be rotated less during transport, enabling faster movement of the suction means 3 and the carrier arm 2, and thus enabling a higher speed of the apparatus 1.

**[0035]** The invention is not limited to the embodiment as described in the foregoing, but it is to be understood primarily within the context of the appended claims.

## Claims

1. Apparatus (1) for forming a cigar from a bunch and a wrapper, the apparatus (1) comprising:

- feed means (4) for feeding a bunch to a rolling location (R);
- wrapper supply means (7) for supplying a wrapper to a wrapper supply location;
- transport means (2) for transporting the wrapper from the wrapper supply location to the rolling location, the transport means comprising a carrier arm (2) that is movable in a transport direction (T) from an uptake position for taking up the wrapper at the wrapper supply location to a release position for releasing the wrapper at the rolling location (R), and that is movable in a reverse transport direction (T) from the release position to the uptake position, wherein the carrier arm is provided with a suction means (3) for holding the wrapper under the influence of suction force during transport; and
- a rolling device (5) at the rolling location for rolling the wrapper around the bunch;

**characterised in that** the transport means are arranged such that, in at least the release position, at least a substantial part of the carrier arm (2) extends from the suction means to behind the longitudinal axis (L) of the suction means (3), as seen in the reverse transport direction (T).

2. Apparatus according to claim 1, wherein over at least a length of the suction means (3), the carrier arm (2) is mainly located behind the longitudinal axis (L) of the suction means (3), as seen in the reverse transport direction (T), and preferably wherein the carrier arm is located entirely behind the longitudinal axis, as seen in the reverse transport direction.
3. Apparatus according to claim 1 or 2, wherein the transport means (2) are arranged such that, during at least part of movement of the carrier arm (2) to and from the release position, at least a substantial part of the carrier arm extends from the suction means (3) to behind the longitudinal axis (L) of the suction means, as seen in the reverse transport direction.
4. Apparatus according to any one of the preceding claims 1 to 3, wherein the carrier arm is pivotally movable around a first pivot axis (26), wherein the first pivot axis, as seen in the reverse transport direction, is located at a distance from the rolling location.
5. Apparatus according to any one of the preceding claims 1 to 4, wherein the carrier arm is an articulated carrier arm, comprising a first arm (21) movably connected to the apparatus (1), and a second arm (22) pivotally connected to the first arm (21), wherein the second arm is provided with the suction means (3).
6. Apparatus according to claim 5, wherein at least the first arm (21) and/or at least the second arm (22) is located behind the longitudinal axis (L) of the suction means (3), as seen in the reverse transport direction.
7. Apparatus according to claim 5 or 6, wherein the second arm (22) is directly connected to the first arm (21).
8. Apparatus according to any one of the preceding claims 1 to 7, wherein the wrapper supply means (7) are arranged such that the wrapper is suppliable to the wrapper supply location in a direction (B) that is mainly parallel to the transport direction (T).
9. Apparatus according to any one of the preceding claims, wherein the wrapper supply means (7) are arranged such that the wrapper is suppliable to the wrapper supply location with the longitudinal axis of the wrapper (71) being mainly perpendicular to the transport direction (T).
10. Apparatus according to any one of the preceding claims, wherein the transport means are arranged such that the longitudinal axis (L) of the suction means (3), during movement in the transport direction (T), stays mainly perpendicular to the transport direction (T).
11. Apparatus according to any one of the preceding claims, wherein the transport means (2) are arranged such that the suction means (3), during movement in the transport direction (T), is moved over a path that is substantially linear.
12. Method for forming a cigar from a bunch and a wrapper, preferably using an apparatus (1) according to any one of the claims 1 to 11, the method comprising the steps of:
  - feeding a bunch to a rolling location (R);
  - transporting a wrapper (71) from a wrapper supply location to the rolling location (R) in a transport direction (T);
  - rolling the wrapper around the bunch at the rolling location (R); and
  - discharging a wrapped bunch;
 wherein for the purpose of transporting a wrapper to the rolling location, use is made of a carrier arm (2) that is movable in the transport direction (T) from an uptake position for taking up the wrapper at the wrapper supply location to a release position for releasing the wrapper at the rolling location, wherein the carrier arm (2) is provided with a suction means (3) for holding the wrapper under the influence of suction force during transport, wherein the method further comprises the step of moving the carrier arm in the reverse transport direction (T) to the wrapper supply location for taking up a subsequent wrapper, **characterized in that** at least when the carrier arm is in the release position, at least a substantial part of the carrier arm that is located at or near the suction means is held behind the longitudinal axis (L) of the suction means (3), as seen in the reverse transport direction.
13. Method according to claim 12, further comprising the step of supplying the wrapper (71) to the wrapper supply location in a direction (B) that is mainly parallel to the transport direction (T).
14. Method according to claim 12 or 13, comprising the step of supplying the wrapper (71) to the wrapper supply location with the longitudinal axis of the wrapper being mainly perpendicular to the transport direction (T).
15. Method according to any one of the claims 12 to 14, wherein the wrapper is transported from the wrapper supply location to the rolling location (R) over a path that is substantially linear.

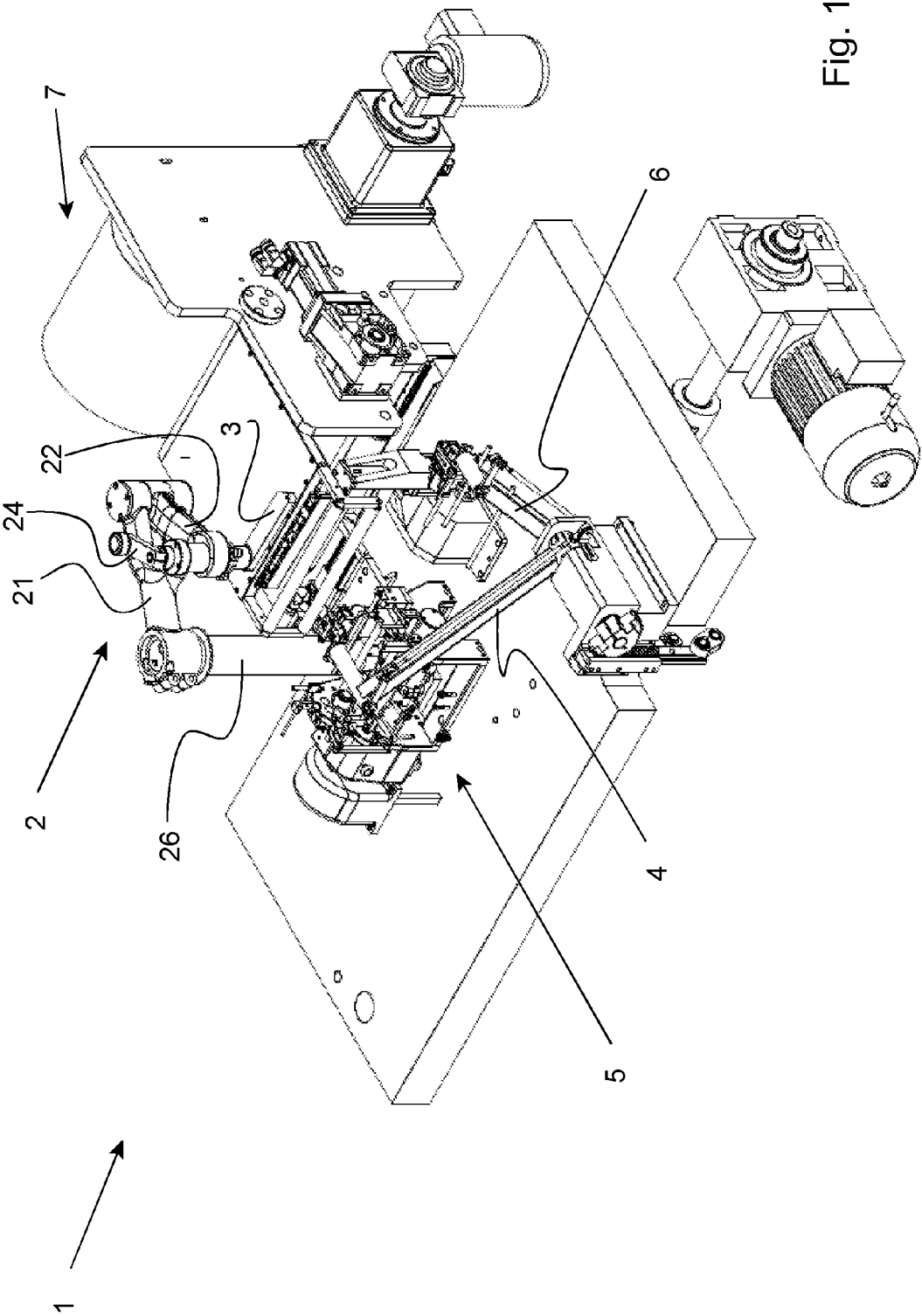


Fig. 1

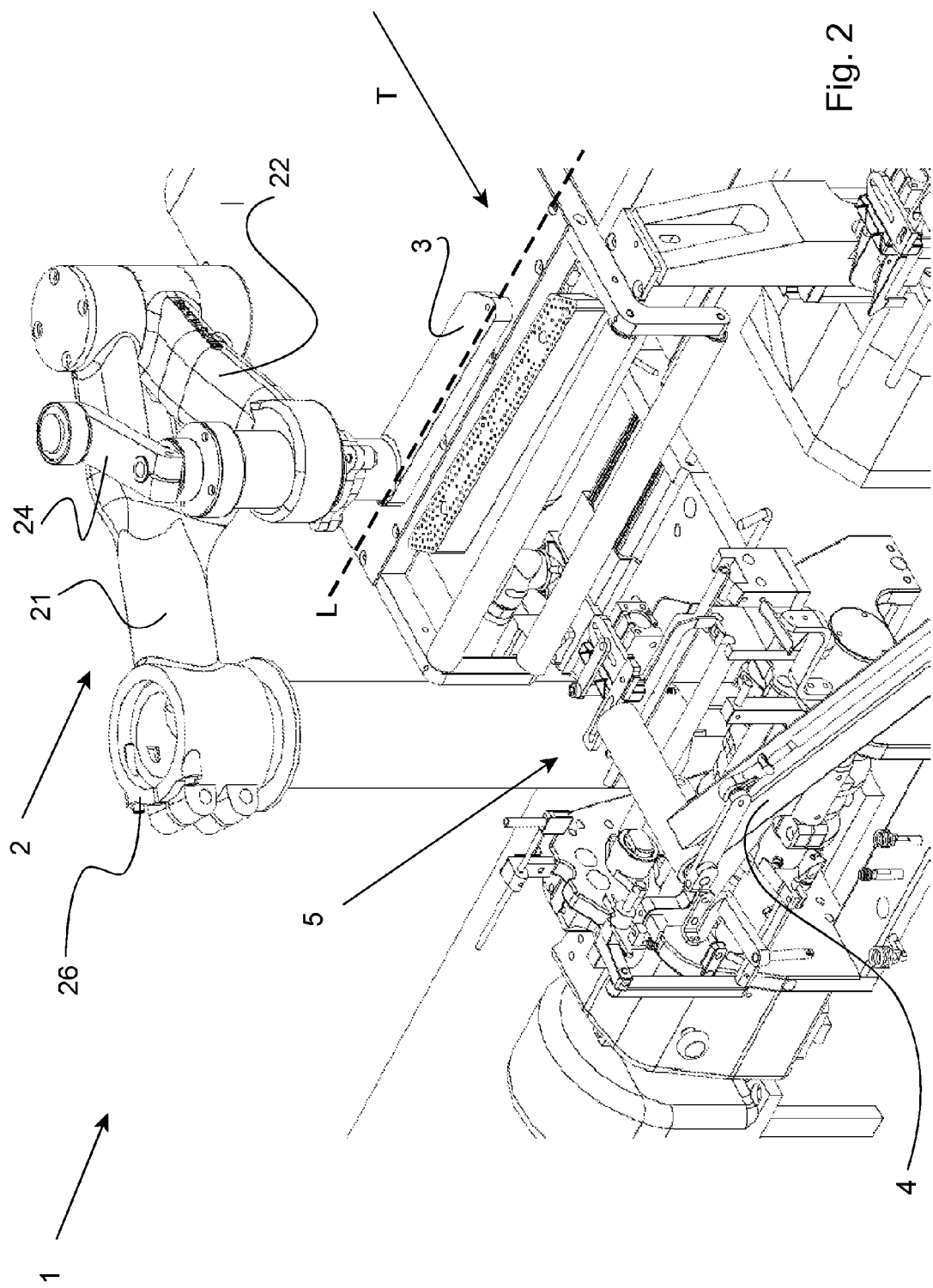
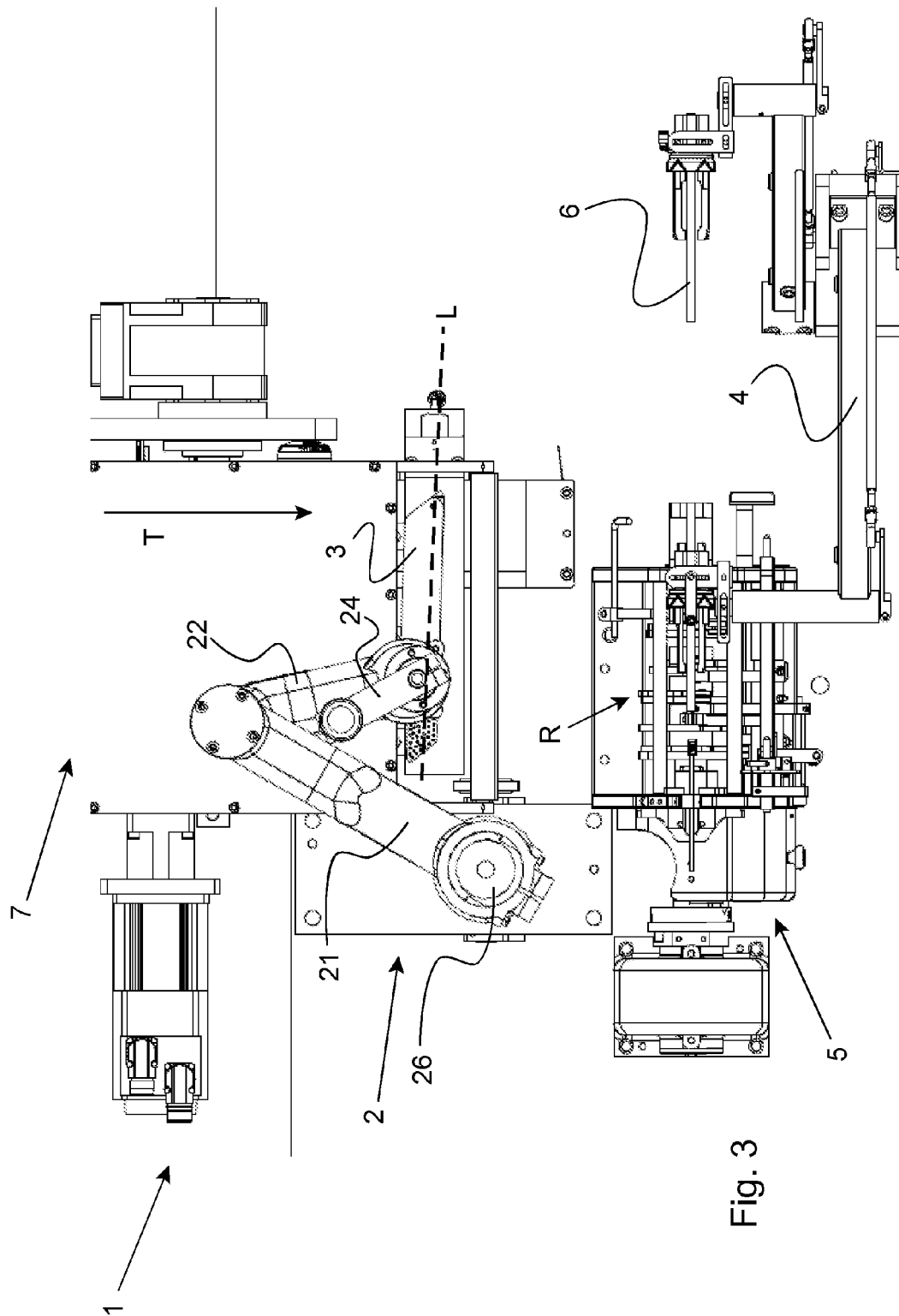
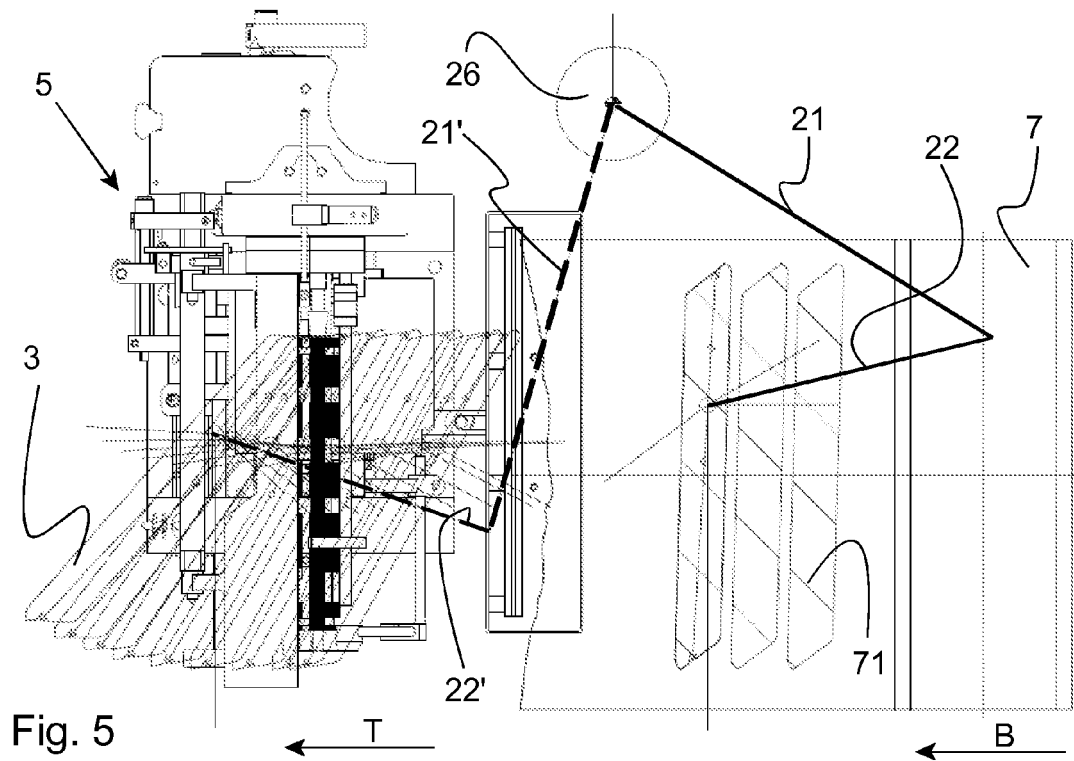
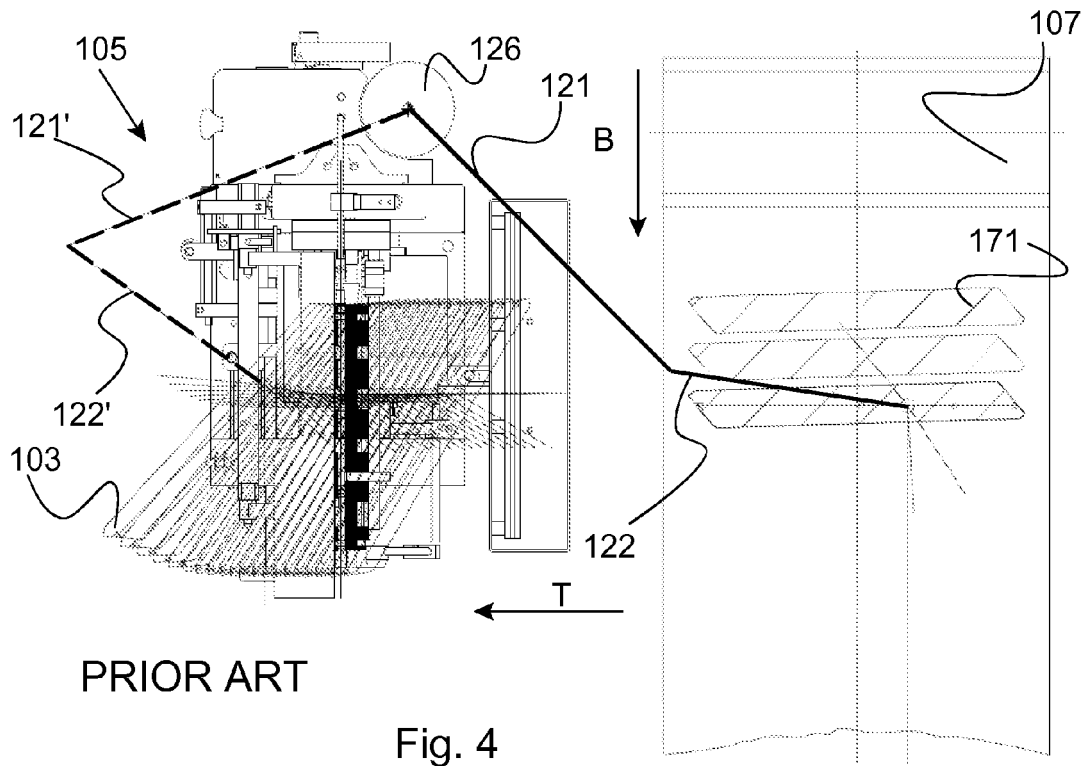


Fig. 2









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Application Number  
EP 11 16 9282

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A	DE 754 773 C (FORMATOR AB) 17 August 1953 (1953-08-17) * the whole document *	1-15	
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The present search report has been drawn up for all claims			
Place of search <b>Munich</b>		Date of completion of the search <b>22 November 2011</b>	Examiner <b>Kock, Søren</b>
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... &amp; : member of the same patent family, corresponding document</p>			

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EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 11 16 9282

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
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