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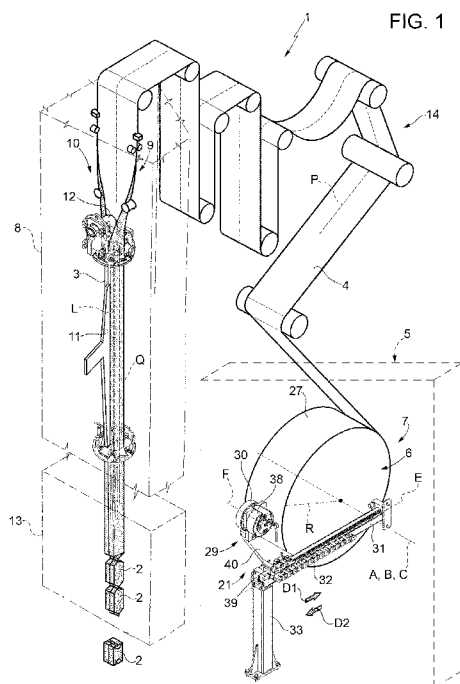
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(54) Title: MAGAZINE UNIT FOR A PACKAGING MACHINE, PACKAGING MACHINE HAVING A MAGAZINE UNIT AND METHOD FOR OPERATING A PACKAGING MACHINE



(57) Abstract: There is described a magazine unit (5) for a packaging machine (1). The magazine unit (5) comprises a support device (20) configured to rotatably carry a reel (6) of a web (4) of packaging material and a reel brake device (21) configured to decelerate a rotation of the reel (6) around a central axis (A). The reel brake device (21) comprises a brake assembly (29) adapted to interact with an outer lateral surface (27) of the reel (6) of the web (4) of packaging material and being configured to selectively exert a deceleration force on the reel (6) of the web (4) of packaging material for decelerating the rotation of the reel (6) around the central axis (A). The reel brake device (21) comprises a support rail (31) moveably carrying the brake assembly (21) and an actuator device (32) configured to actuate, in use, movement of the brake assembly (29) along the support rail (31) at least towards the outer lateral surface (27) so as to establish contact of at least an interaction element (30) of the brake assembly (29) with the outer lateral surface (27) of the reel (6) of the web (4) of packaging material.

**MAGAZINE UNIT FOR A PACKAGING MACHINE, PACKAGING
MACHINE HAVING A MAGAZINE UNIT AND METHOD FOR OPERATING
A PACKAGING MACHINE**

5 TECHNICAL FIELD

The present invention relates to a magazine unit for a packaging machine, in particular a packaging machine for producing sealed packages of a pourable product, even more particular of a pourable food
10 product. In particular, the present invention is related to a magazine unit comprising a reel brake device configured to decelerate a rotating reel of a web of packaging material.

The present invention also relates to a packaging
15 machine, in particular a packaging machine for producing sealed packages of a pourable product, even more particular of a pourable food product, having a magazine unit comprising a reel brake device.

The present invention also relates to a method for
20 operating a packaging machine, in particular a packaging machine for producing sealed packages of a pourable product, even more particular of a pourable food product.

BACKGROUND ART

25 As is known, many liquid or pourable food products, such as fruit juice, UHT (ultra-high-temperature treated) milk, wine, tomato sauce, etc., are sold in packages made of sterilized packaging material.

A typical example is the parallelepiped-shaped
30 package for liquid or pourable food products known as Tetra Brik Aseptic (registered trademark), which is made by sealing and folding laminated strip packaging material. The packaging material has a multilayer

structure comprising a base layer, e.g. of paper, covered on both sides with layers of heat-seal plastic material, e.g. polyethylene. In the case of aseptic packages for long-storage products, such as UHT milk, the packaging material also comprises a layer of oxygen-barrier material, e.g. an aluminum foil, which is superimposed on a layer of heat-seal plastic material, and is in turn covered with another layer of heat-seal plastic material forming the inner face of the package eventually contacting the food product.

Packages of this sort are normally produced on fully automatic packaging machines, which advance a web of packaging material from a magazine unit through a sterilization unit for sterilizing the web of packaging material, e.g. by means of chemical sterilization (e.g. by applying a chemical sterilizing agent, such as a hydrogen peroxide solution) or physical sterilization (e.g. by means of an electron beam) and to an isolation chamber (a closed and sterile environment) in which the sterilized web of packaging material is maintained and advanced. During advancement of the web of packaging material through the isolation chamber, the web of packaging material is folded and sealed longitudinally to form a tube having a longitudinal seam portion, which is further fed along a vertical advancing direction.

In order to complete the forming operations, the tube is filled with a sterilized or sterile-processed pourable food product, and is transversally sealed and subsequently cut along equally spaced transversal cross sections within a packaging unit of the packaging machine during advancement along the vertical advancing direction.

Pillow packages are so obtained within the

packaging machine, each pillow package having a longitudinal sealing band, a top transversal sealing band and a bottom transversal sealing band.

In more detail, a typical packaging machine
5 comprises:

- a magazine unit adapted to host at a host station at least one reel of a web of packaging material;
- conveying means for advancing the web of packaging material along a web advancement path from the
10 host station to a forming station, at which, in use, the web of packaging material is formed into a tube;
- a sterilizing unit for sterilizing the web of packaging material;
- a tube forming device arranged within an
15 isolation chamber and being adapted to form the tube from the advancing web of packaging material;
- a sealing device for longitudinally sealing the tube;
- a filling device for filling the tube with the
20 pourable product; and
- a package forming unit adapted to produce the single packages from the tube by shaping, transversally sealing and transversally cutting the packages.

A typical magazine unit comprises at least one
25 support device adapted to rotatably carry the reel of web of packaging material so that the reel is rotatable around a central axis for allowing for the unwinding of the web of packaging material.

The magazine unit also comprises a reel brake
30 device configured to decelerate, in use, the rotation of the reel around the central axis, e.g. in the case of a programmed or emergency stop of the packaging machine.

A typical reel brake device comprises:

- a support arm pivoted at a first end portion on a horizontal support plate of the magazine unit and being pivotal around a pivot axis parallel to the central axis of the reel with the reel being carried by the support device; and

- a brake assembly being coupled to the support arm at a second end portion of the support arm opposite to the first end portion.

The brake assembly comprises a brake wheel being adapted to contact an outer lateral surface of the reel of the web of packaging material and being adapted to rotate around a rotation axis parallel to the central axis of the reel upon contact with the outer lateral surface of the reel of web of packaging material and rotation of the reel around the central axis.

The reel brake device also comprises a biasing device coupled to the support arm and being configured to continuously actuate an angular movement of the support arm around the pivot axis so as to continuously bias the wheel brake against the outer lateral surface of the reel. In this way, as in use the diameter of the reel decreases, a continuous contact between the wheel brake and the outer lateral surface of the reel is guaranteed. However, a drawback resides in that the constantly applied pressure of the brake wheel may cause an incorrect unwinding of the web of packaging material.

DISCLOSURE OF INVENTION

It is therefore an object of the present invention to provide a magazine unit for a packaging machine to overcome, in a straightforward and low-cost manner, at least one of the aforementioned drawbacks.

In particular, it is an object of the present invention to provide a magazine unit for a packaging

machine having a reel brake device allowing to reduce the risk of an incorrect unwinding of the web of packaging material.

It is a further object of the present invention to
5 provide a packaging machine having a magazine unit to overcome, in a straightforward and low-cost manner, at least one of the aforementioned drawbacks.

It is a further object of the present invention to provide a method for operating a packaging machine to
10 overcome, in a straightforward and low-cost manner, at least one of the aforementioned drawbacks.

According to the present invention, there is provided a magazine unit as claimed in claim 1.

According to the present invention, there is also
15 provided a packaging machine according to claim 7.

According to the present invention, there is also provided a method for operating a packaging machine according to claim 8.

Preferred embodiments are claimed in the dependent
20 claims.

BRIEF DESCRIPTION OF THE DRAWINGS

A non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

25 Figure 1 is a schematic view of a packaging machine for packaging a pourable product, with parts removed for clarity;

Figure 2 is a perspective view of a detail of the packaging machine of Figure 1, with parts removed for
30 clarity;

Figure 3 is an enlarged view of a portion of the detail of Figure 2, with parts removed for clarity; and

Figures 4 to 6 are side views of the portion of

Figure 3 during different operational conditions, with parts removed for clarity.

BEST MODES FOR CARRYING OUT THE INVENTION

Number 1 indicates as a whole a packaging machine
5 for producing sealed packages 2 of a pourable product,
in particular a pourable food product such as
pasteurized milk, fruit juice, wine, tomato sauce, etc.,
from a tube 3 of a web 4 of packaging material. In
particular, in use, tube 3 extends along a longitudinal
10 axis L, in particular, axis L having a vertical
orientation.

Web 4 of packaging material has a multilayer
structure (not shown). Web 4 comprises a respective
layer of fibrous material, normally paper, covered on
15 both sides with respective layers of heat-seal plastic
material, e.g. polyethylene.

Preferably, web 4 also comprises a respective layer
of gas- and light-barrier material, e.g. aluminum foil
or ethylene vinyl alcohol (EVOH) film, and at least a
20 respective first layer and a respective second layer of
heat-seal plastic material. The respective layer of gas-
and light-barrier material is superimposed on the
respective first layer of heat-seal plastic material,
and is in turn covered with the second layer of heat-
25 seal plastic material. The second layer of heat-seal
plastic material forms the inner face of package 2
eventually contacting the filled food product.

A typical package 2 obtained by packaging machine 1
comprises a longitudinal seam portion and a pair of
30 transversal sealing bands, in particular a transversal
top sealing band and a transversal bottom sealing band.

With particular reference to Figure 1, packaging
machine 1 comprises:

- a magazine unit 5 adapted to host at least one reel 6 of web of packaging material 4 at a host station 7;

- an isolation chamber 8 separating an inner environment, in particular an inner sterile environment, from an outer environment;

- a tube forming device 9 extending along a longitudinal axis, in particular having a vertical orientation, and being arranged, in particular at a forming station 10, at least partially, preferably fully, within chamber 8 and being adapted to form tube 3 from the, in use, advancing web 4;

- a sealing device 11 at least partially arranged within chamber 8 and being adapted to longitudinally seal tube 3 formed by tube forming device 9 so as to form a longitudinal seam portion of tube 3;

- filling means 12 for filling tube 3 with the pourable product;

- a package forming unit 13 adapted to at least form and transversally seal tube 3, in particular the, in use, advancing tube 3, for forming packages 2; and

- conveying means 14 for advancing in a known manner web 4 along a respective web advancement path P from host station 7 to forming station 10, at which, in use, web 4 is formed into tube 3 and to advance tube 3 along a tube advancement path Q towards and through package forming unit 13.

In particular, isolation chamber 8 is arranged downstream of magazine unit 5 along path P.

In particular, package forming unit 13 is arranged downstream of isolation chamber 8 and tube forming device 9 along path Q.

Preferably, packaging machine 1 also comprises a

sterilizing unit (not shown and known as such) adapted to sterilize the, in use, advancing web 4 at a sterilization station, in particular the sterilization station being arranged upstream of forming station 10 along path P.

Preferentially, conveying means 14 are adapted to advance tube 3 and any intermediate of tube 3 in a manner known as such along path Q, in particular from forming station 10 towards and at least partially through package forming unit 13. In particular, under intermediates of tube 3 any configuration of web 4 is meant prior to obtaining the tube structure and after folding of web 4 by tube forming device 9 has started. In other words, the intermediates of tube 3 are a result of the gradual folding of web 4 so as to obtain tube 3, in particular by overlapping the lateral respective edges of web 4 with one another.

With particular reference to Figure 2, magazine unit 5 comprises at least:

- a support device 20 configured to rotatably carry at least one reel 6 of web 4; and
- a reel brake device 21 configured to decelerate, in particular to stop, rotation of reel 6 around a central axis A of reel 6.

Preferentially, magazine unit 5 also comprises a support structure 22 carrying at least support device 20. Even more preferentially, magazine unit 5, in particular support structure 22, also comprises a cover 23 delimiting an inner space 24 of magazine unit 5 from an outside space. In particular, support device 20 is arranged within inner space 24 so as to host reel 6, in use, within inner space 24.

Preferably, magazine unit 5 also comprises

elevation adjustment means, in particular moveable feet elements 25, connected to support structure 22, and being configured to locally control elevation of support structure 22.

5 In more detail, reel 6 comprises a through-hole adapted to receive a spindle 26, spindle 26 extending along a longitudinal axis B so that spindle 26 carries reel 6. In particular, axis A and axis B being coaxial with spindle 26 being placed through the through-hole.

10 Preferentially, support device 20 is configured to indirectly carry reel 6 by supporting spindle 26, which in turn carries reel 6.

In particular, reel 6 being indirectly supported by support device 20 is rotatable around central axis A;
15 and, accordingly, spindle 26 carrying reel 6 and being carried by support device 20 is rotatable around longitudinal axis B.

In further detail, reel 6 comprises an outer lateral surface 27, in particular corresponding to the
20 face of web 4, which once the respective packages 2 are formed defines the outer surface of package 2.

Furthermore, reel 6 radially has a with radius R (e.g. reel 6 has a radius R). In use, during the unwinding of web 4 radius R decreases.

25 In particular, in use, reel 6 rotates around central axis A through a pulling action exercised by conveying means 13 on web 4.

In more detail, support device 20 is configured to retain reel 6, in particular spindle 26 such that
30 central axis A, in particular also longitudinal axis B, is/are parallel, in particular coaxial, to an alignment axis C of support device 20, in particular alignment axis C having a horizontal orientation.

Preferentially, support device 20 comprises at least two housing seats 28 (only one shown) arranged side-by-side and facing one another and being adapted to rotatably carry spindle 26. In particular, housing seats
5 28 define alignment axis C.

Even more preferentially, each housing seat 28 is configured to receive one respective engagement portion of spindle 26, in particular each engagement portion corresponds to one respective end portion of spindle 26.

10 More specifically, each housing seat 28 is mounted to one respective portion of support structure 22.

With particular reference to Figures 1 to 6, reel brake device 21 comprises:

- a brake assembly 29 having an interaction
15 element, in particular a brake wheel 30, adapted to interact with outer lateral surface 27, in particular through brake wheel 30, and being configured to selectively exert a deceleration force, in particular through brake wheel 30, on the, in use, rotating reel 6
20 for decelerating, in particular for stopping, rotation of reel 6 around central axis A;

- a support rail 31 extending along a longitudinal axis E, in particular being transversal, even more particular perpendicular to alignment axis C, moveably
25 carrying brake assembly 29; and

- an actuator device 32, in particular of the pneumatic type, configured to actuate, in use, movement of brake assembly 29 along support rail 31 (in particular between a first extreme position and a second
30 extreme position) and along a direction D1 parallel to support rail 31 (i.e. parallel to longitudinal axis E) at least towards outer lateral surface 27 so as to bring brake wheel 30 in contact with outer lateral surface 27.

Preferentially, reel brake device 21 also comprises a support bar 33, in particular having a vertical extension, carrying support rail 31.

More specifically, support bar 33 and support rail
5 31 are transversally, in particular orthogonally, oriented with respect to one another.

In the embodiment shown, support bar 33 is mounted to a horizontal bottom plate 34 (defining a portion of cover 23) of support structure 22.

10 In an alternative embodiment not shown, support bar 33 could be mounted to the floor of a production plant.

In more detail, brake wheel 30 of brake assembly 29 is adapted to rotate around a rotation axis F, in particular parallel to alignment axis C, upon contact
15 with outer lateral surface 27 and rotation of reel 6 around axis A. In particular, in use, with brake wheel 30 contacting outer lateral surface 27, the rotation of reel 6 is transferred onto brake wheel 30.

Preferentially, brake wheel 30 comprises an outer
20 lateral contact surface for contacting, in particular being of a rubber or rubber-like material.

Preferably, reel brake device 29 also comprises a brake actuator device 38, in particular of the electrical type, coupled to brake wheel 30 and being
25 adapted to selectively exert a force on brake wheel 30 so as to act against rotation of brake wheel 30 around rotation axis F, in particular as actuated by contact of brake wheel 30 with outer lateral surface 27 and rotation of reel 6 around central axis A.

30 Preferentially, brake assembly 29 also comprises a sensor device, in particular a rotation detection sensor, adapted to determine and/or detect a contact between brake wheel 30 and outer lateral surface 27, in

particular by means of detecting rotation of brake wheel 30 around rotation axis F.

In a preferred embodiment, brake assembly 29 also comprises:

5 - a slide 39 moveably mounted to support rail 31, coupled to actuator device 32 and being adapted to move along support rail 31 by actuation of actuator device 32; and

10 - a support plate 40 mounted to slide 39 and carrying at least brake wheel 30, preferentially also brake actuator device 38, and protruding sideways from support rail 31.

In particular, in this way, upon movement of slide 39 also brake wheel 30 moves.

15 Preferentially, magazine unit 5 also comprises a control unit 41 adapted to control reel brake device 21, in particular such that brake wheel 30 is kept, in use, in the proximity of outer lateral surface 27.

20 Preferentially, control unit 41 is connected to actuation device 32 and is configured to repeatedly activate actuation device 32 according to a predefined time interval, e.g. after every 10 seconds or every 5 seconds, so as to establish, in use and from time to time, a temporary contact between brake wheel 30 and
25 outer lateral surface 27 of reel 6. Even more preferentially, control unit 41 is also configured to repeatedly deactivate actuation device 32, in particular after brake wheel 30 getting, in use, in contact with outer lateral surface 27, in particular so that further
30 movement of brake wheel 30 is interrupted.

In other words, control unit 41 is configured to activate and deactivate actuation device 32 such that brake wheel 30 remains in the proximity of reel 6, in

particular outer lateral surface 27, and contacts outer lateral surface 27 only for a limited time. This allows to minimize the contact time of brake wheel 30 with outer lateral surface 27 and to guarantee that the distance between brake wheel 30 and reel 6, in particular outer lateral surface 27, remains within a certain range, such that the reel brake device 21 is able to decelerate, in particular to stop, rotation of reel 6 in case of need with the required reactivity.

It must be noted that the predefined time interval is a function of the advancement speed of web 4 along path P.

Preferably, control unit 41 is also connected to brake actuator device 38 and is configured to activate brake actuator device 38, in particular such that the force exerted by brake actuator device 38 still permits rotation of brake wheel 30 around rotation axis 30 as a result of the interaction with outer lateral surface 27 and rotation of reel 6 around central axis A. In other words, preferentially control unit 41 is configured such to control brake actuator device 38 such that rotation of brake wheel 30 around rotation axis F is decelerated with respect to the rotation of brake wheel 30 around rotation axis F as actuated through the rotation of reel 6.

Preferentially, control unit 41 is also configured to activate contemporaneously actuator device 32 and brake actuator device 38 so as to decelerate, in particular to stop, rotation of reel 6 around central axis A.

Preferentially, control unit 41 is also connected to the sensor device and is configured to receive data signals about a possible rotation of brake wheel 30

around rotation axis F.

Even more preferentially, control unit 41 is configured to activate actuator device 32 also in dependence of the possible rotation of brake wheel 30.

5 In particular, in use, control unit 41 is configured to activate actuator device 32 after the predetermined time interval so as to move brake wheel 30 into direction D1 and towards outer lateral surface 27 and to deactivate actuator device 32 when brake wheel 30 contacts, in use,

10 outer lateral surface 27 (which results, in use, in rotation of brake wheel 30 around rotation axis F, which again is, in use, detected and/or determined by the sensor device).

Preferentially, actuator device 32 is also adapted

15 to actuate movement of brake assembly 29, in particular brake wheel 30, into a direction D2 opposite to direction D1 for positioning brake assembly 29, in particular brake wheel 30, in an initial position, in particular in the proximity of the first extreme

20 position, in which brake wheel 30 is distanced from an unused reel 6 (a new reel 6) retained by support device 20.

In a preferred embodiment, actuator device 32 is a pneumatic cylinder.

25 In use, packaging machine 1 forms packages 2 filled with the pourable product.

In more detail, conveying means 14 advance web 4 from magazine unit 5 along advancement path P.

In further detail, conveying means 14 advance web 4

30 from host station 7 to forming station 10 at which web 4 is formed into tube 3. Then conveying means 14 further advance tube 3 along path Q to package forming unit 13. During the advancement of tube 3, filling means 12 fill

tube 3 with the pourable product.

Preferentially, during advancement of web 4 along advancement path P web 4 is sterilized at the sterilization station.

5 Package forming unit 13 forms and transversally seals tube 3 and, preferentially, also transversally cuts tube 3 so as to obtain packages 2.

Advantageously, operation of packaging machine 1 also comprises the steps of:

10 - rotating reel 6 of web 4 for unwinding web 4 of packaging material, in particular for advancing web 4 of packaging material along advancement path P;

- repeatedly activating actuator device 32 according to predefined time intervals so as to advance
15 at least brake wheel 30, preferentially brake assembly 29, towards and to outer lateral surface 27 and to temporarily establish (from time to time) contact between brake wheel 30 and outer lateral surface 27; and

- repeatedly deactivating actuator device 32 so as
20 to interrupt further advancement of brake wheel 30 after establishing contact between brake wheel 30 and outer lateral surface 27, in particular each step of deactivating is executed at the end of one respective step of activating actuator device 32.

25 Preferentially, the method for operating packaging machine 1 also comprises the step of decelerating the rotation of reel 6 around central axis A for decelerating, in particular stopping, the rotation of reel 6, preferentially in case of an interruption of
30 operation of packaging machine 1 or in case of an emergency stop of packaging machine 1.

In more detail, during the step of rotating reel 6, reel 6 rotates around central axis A through the

exertion of a traction force by conveying means 14 on web 4.

In particular, during rotation of reel 6 around central axis A, radius R decreases with time.

5 Preferentially, during rotation of reel 6 around central axis A also spindle 26 rotates around longitudinal axis B.

In more detail, repeatedly activating and deactivating actuator device 32 allows to keep brake
10 wheel 30 in the vicinity of outer lateral surface 27 and to minimize the contact time between brake wheel 30 and outer lateral surface 27.

In particular, this is shown in Figures 4 to 6. With particular reference to Figure 4, after bringing
15 brake wheel 30 into contact with outer lateral surface 27 movement of brake wheel 30 into direction D1 is suspended by deactivating, in particular by control unit 41, actuation device 32. As reel 6 further rotates around rotation axis F for further unwinding web 4, the
20 radius R of reel 6 reduces, so creating a gap between outer lateral surface 27 and brake wheel 30 (see Figure 5). As the actuation device 32 is activated, in particular by control unit 41, after a predetermined time interval, brake wheel 30 gets again into contact
25 with outer lateral surface 27 (see Figure 6). These steps are repeated during normal operation of packaging machine 1.

More specifically, during the step of repeatedly activating, control unit 41 controls activation of
30 actuation device 32 for controlling movement of at least brake wheel 30, in particular until establishing contact between brake wheel 30 with outer lateral surface 27.

Even more specifically, during the step of

repeatedly activating, actuator device 32 advances brake assembly 29 together with brake wheel 30 along direction D1 towards outer lateral surface 27.

In particular, during advancement of brake assembly
5 29, brake assembly 29, in particular slide 39, advances along support rail 31.

Preferentially, during each step of deactivating actuation device 32, the current position of brake wheel 30 remains unvaried.

10 Preferentially, operation of packaging machine 1 also comprises the step of detecting and/or determining contact between brake wheel 30 and outer lateral surface 27 and the step of deactivating actuator device 32 is executed if during the step of detecting and/or
15 determining, contact between brake wheel 30 and outer lateral surface 27 is detected and/or determined.

In particular, during the step of detecting and/or determining the sensor device detects and/or determines a rotation of brake wheel 30 around rotation axis F, the
20 latter being indicative of contact between brake wheel 30 and outer lateral surface 27 as the rotation of reel 6 is transferred to brake wheel 30.

In more detail, during the step of decelerating, at least actuator device 32 is activated so as to establish
25 and to keep contact between brake wheel 30 and outer lateral surface 27.

Preferentially, during the step of decelerating, the rotation of reel 6 around central axis A is decelerated, in particular stopped, through simultaneous
30 activation of actuation device 32 and brake actuator device 38 so that brake wheel 30 keeps contact with outer lateral surface 27 of reel 6 and acts against the rotation of brake wheel 30 around rotation axis F, in

particular as actuated through the contact between brake wheel 30 and outer lateral surface 27 and rotation of reel 6.

Preferably, the step of decelerating is activated
5 in case advancement of web 4 along advancement path P is to be interrupted, e.g. because of an interruption of the operation of packaging machine 1 or in case of the need of an emergency stop.

The advantages of magazine unit 5 according to the
10 present invention will be clear from the foregoing description.

In particular, by providing reel brake device 21 it is possible to keep braking wheel 30, in use, as close as possible to reel 6, in particular outer lateral
15 surface 27, minimizing the contact time of brake wheel 30 with outer lateral surface 27 (and therewith with web 4) and still maintaining the reactivity of reel brake device 21 in case rotation of reel 6 must be decelerated, in particular interrupted. This again,
20 allows to reduce the risk of a misalignment of web 4 during its advancement.

A further advantage resides in that the braking torque exerted by brake wheel 30 on reel 6 is provided by actuator device 32 and brake actuator device 38.
25 Actuator device 32 presses (forces) brake wheel 30 against outer lateral surface 27 and brake actuator device 38 exerts a force against rotation of brake wheel 30 around rotation axis F (or in other words, brake actuator device 38 acts against the rotation force
30 applied onto brake wheel 30 through rotation of reel 6 around central axis A and contact between brake wheel 30 and outer lateral surface 27).

Clearly, changes may be made to packaging machine

1, in particular magazine unit 5 as described herein without, however, departing from the scope of protection as defined in the accompanying claims.

CLAIMS

1.- A magazine unit (5) for a packaging machine (1), the magazine unit (5) comprising:

- one support device (20) configured to rotatably carry a reel (6) of a web (4) of packaging material; and
- a reel brake device (21) configured to at least decelerate a rotation of the reel (6) around a central axis (A);

wherein the reel brake device (21) comprises a brake assembly (29) adapted to interact with an outer lateral surface (27) of the reel (6) of the web (4) of packaging material and being configured to selectively exert a deceleration force on the reel (6) of the web (4) of packaging material for at least decelerating the rotation of the reel (6) around the central axis (A);

characterized in that the reel brake device (21) further comprises:

- a support rail (31) moveably carrying the brake assembly (21); and
- an actuator device (32) configured to actuate, in use, movement of the brake assembly (29) along the support rail (31) at least towards the outer lateral surface (27) so as to establish contact of at least an interaction element (30) of the brake assembly (29) with the outer lateral surface (27) of the reel (6) of the web (4) of packaging material.

2.- The magazine unit according to claim 1, wherein the support device (20) is configured to carry the reel (6) such that the reel (6) is adapted to rotate around the central axis (A) and the central axis (A) being parallel to an alignment axis (C) of the support device (20);

wherein the support rail (31) extends along a

longitudinal axis (E) being transversal to the alignment axis (C); and

wherein the actuator device (32) is configured to move the brake assembly (29) along a direction (D1) parallel to the longitudinal axis (E).

3.- The magazine unit according to claim 1 or 2, wherein the brake assembly (29) comprises:

- a brake wheel (30) defining the interaction element and being adapted to rotate around a rotation axis (F) upon contact with the outer lateral surface (27) of the reel (6) of web (4) of packaging material; and

- a brake actuator device (38) coupled to the brake wheel (30) and being adapted to selectively exert a force on the brake wheel (30) so as to act against rotation of the brake wheel (30) around the rotation axis (F).

4.- The magazine unit according to claim 3, wherein the brake assembly (29) comprises a sensor device adapted to detect contact between the brake wheel (30) and the outer lateral surface (27) of the reel (6) of web (4) of packaging material so as to detect a rotation of the brake wheel (30) around the rotation axis (F).

5.- The magazine unit according to any one of the preceding claims, wherein the actuator device (32) is a pneumatic cylinder.

6.- The magazine unit according to any one of the preceding claims further comprising a control unit (41) configured to repeatedly activate the actuation device (32) according to predefined time intervals so as to establish, in use, a temporary contact between the interaction element (30) and the outer lateral surface (27) of the reel (6) of web (4) of packaging material.

7.- A packaging machine (1) for producing sealed packages (2) of a pourable product comprising:

- an isolation chamber (8) separating an inner environment from an outer environment;

5 - a tube forming device (9) at least partially arranged within the isolation chamber (8) at a forming station (10) and being adapted to form a tube (3) from a web (4) of packaging material;

10 - a sealing device (11) at least partially arranged within the isolation chamber (8) and being adapted to longitudinally seal the tube (3) formed by the tube forming device (9);

- filling means (12) for filling the tube (3) with the pourable product;

15 - a package forming unit (13) adapted to form and to transversally seal the tube (3) for forming the packages (2);

20 - conveying means (14) for advancing the web (4) of packaging material along a web advancement path (P) from a host station (7) to the forming station (10) and for advancing the tube (3) along a tube advancement path (Q) to the package forming unit (13);

25 characterized by further comprising a magazine unit (5) according to any one of claims 1 to 6 and being adapted to host a reel (6) of a web (4) of packaging material at the host station (7).

8.- Method for operating a packaging machine (1) for producing packages (2) filled with a pourable product, the packaging machine (1) having a magazine unit (5) comprising:

- a support device (20) configured to rotatably carry a reel (6) of a web (4) of packaging material; and

- a reel brake device (21) configured to decelerate

a rotation of the reel (6) around a central axis (A);

wherein the reel brake device (21) comprises a brake assembly (29) adapted to interact with an outer lateral surface (27) of the reel (6) of the web (4) of packaging material and being configured to selectively
5 exert a deceleration force on the reel (6) of web (4) of packaging material for at least decelerating the rotation of the reel (6) around the central axis (A);

wherein the brake assembly (29) comprises an
10 interaction element (30) configured to at least temporarily engage with the outer lateral surface (27) of the reel (6) and an actuator device (32) adapted to advance at least the interaction element (30) towards the outer lateral surface (27) of the reel (6);

15 the method comprises at least the steps of:

- rotating the reel (6) of the web (4) of packaging material for unwinding the web (4) of packaging material;

- repeatedly activating the actuator device (32)
20 according to predefined time intervals so as to move the interaction element (30) towards and to the outer lateral surface (27) and to temporarily establish contact between the interaction element (30) and the outer lateral surface (27); and

25 - deactivating actuator device (32) so as to interrupt further advancement of brake wheel (30) after establishing contact between brake wheel (30) and outer lateral surface (27).

9.- The method according to claim 8, wherein during
30 the step of repeatedly activating, the actuator device (32) advances the brake assembly (29) together with the interaction element (30) along a direction (D1) towards the outer lateral surface (27) of the reel (6).

10.- The method according to claim 8 or 9, and further comprising a step of detecting and/or determining contact between the interaction element (30) and the outer lateral surface (27), the step of
5 deactivating the actuator device (32) being executed if contact between the interaction element (30) and the outer lateral surface (27) is detected and/or determined during the step of detecting and/or determining.

11.- The method according to any one of claims 8 to
10 10, wherein the interaction element is a brake wheel (30) being adapted to rotate around a rotation axis (F);

wherein the brake wheel (30) rotates around the rotation axis (F) upon contact with the outer lateral surface (27) of the reel (6);

15 wherein the reel brake device (21) further comprises a brake actuator device (38) configured to exert a force on the brake wheel (30) so as to act against rotation of the brake wheel (30) around the rotation axis (F) for decelerating the rotation of the
20 reel (6) around the central axis (A);

the method further comprising a step of decelerating the rotation of the reel (6) around the central axis (A) through simultaneous activation of the actuation device (32) and the brake actuator device (38)
25 so that the brake wheel (30) establishes and keeps contact between the outer lateral surface (27) of the reel (6) and a force acts against the rotation of the brake wheel (30) around the rotation axis (F).

FIG. 1

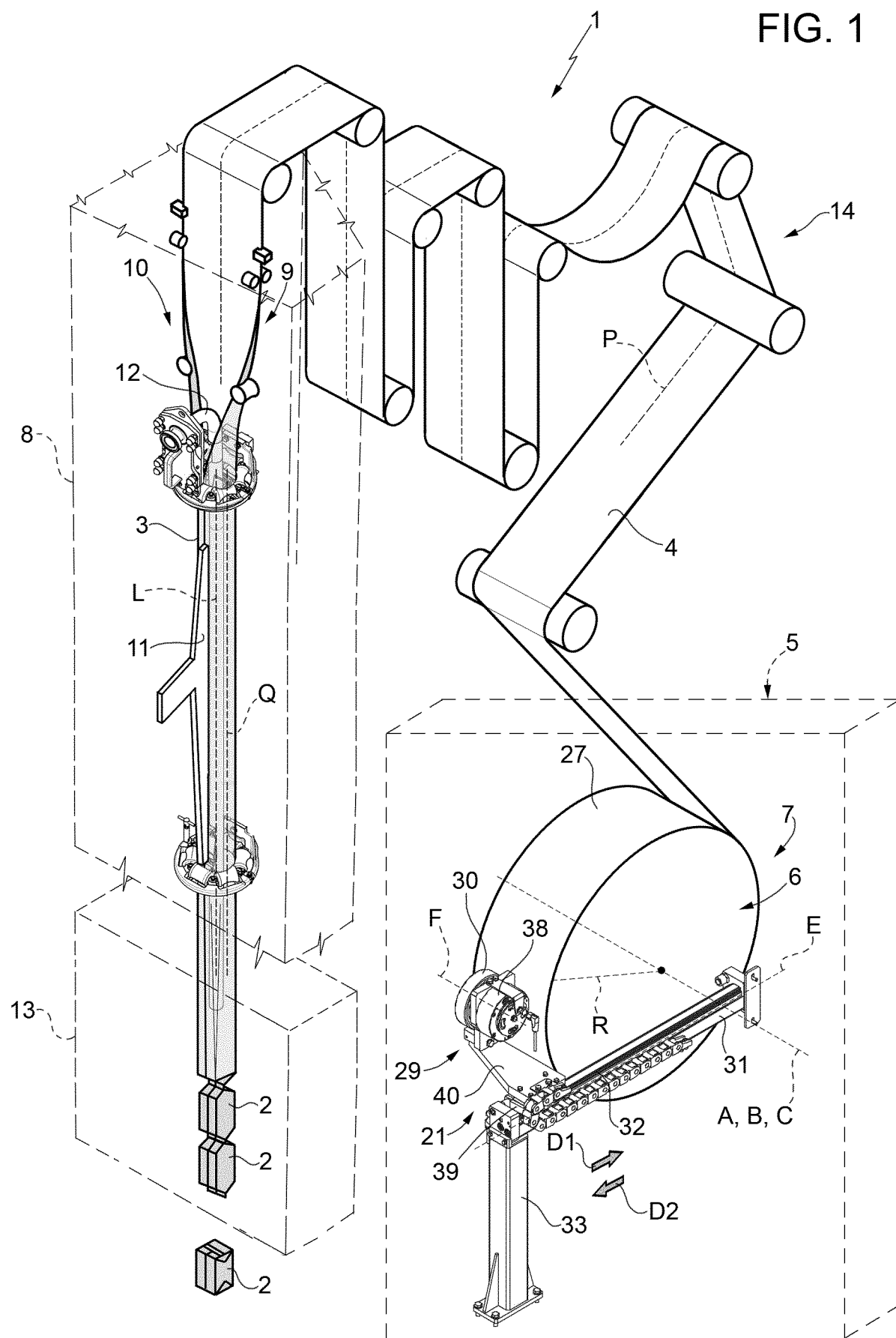


FIG. 2

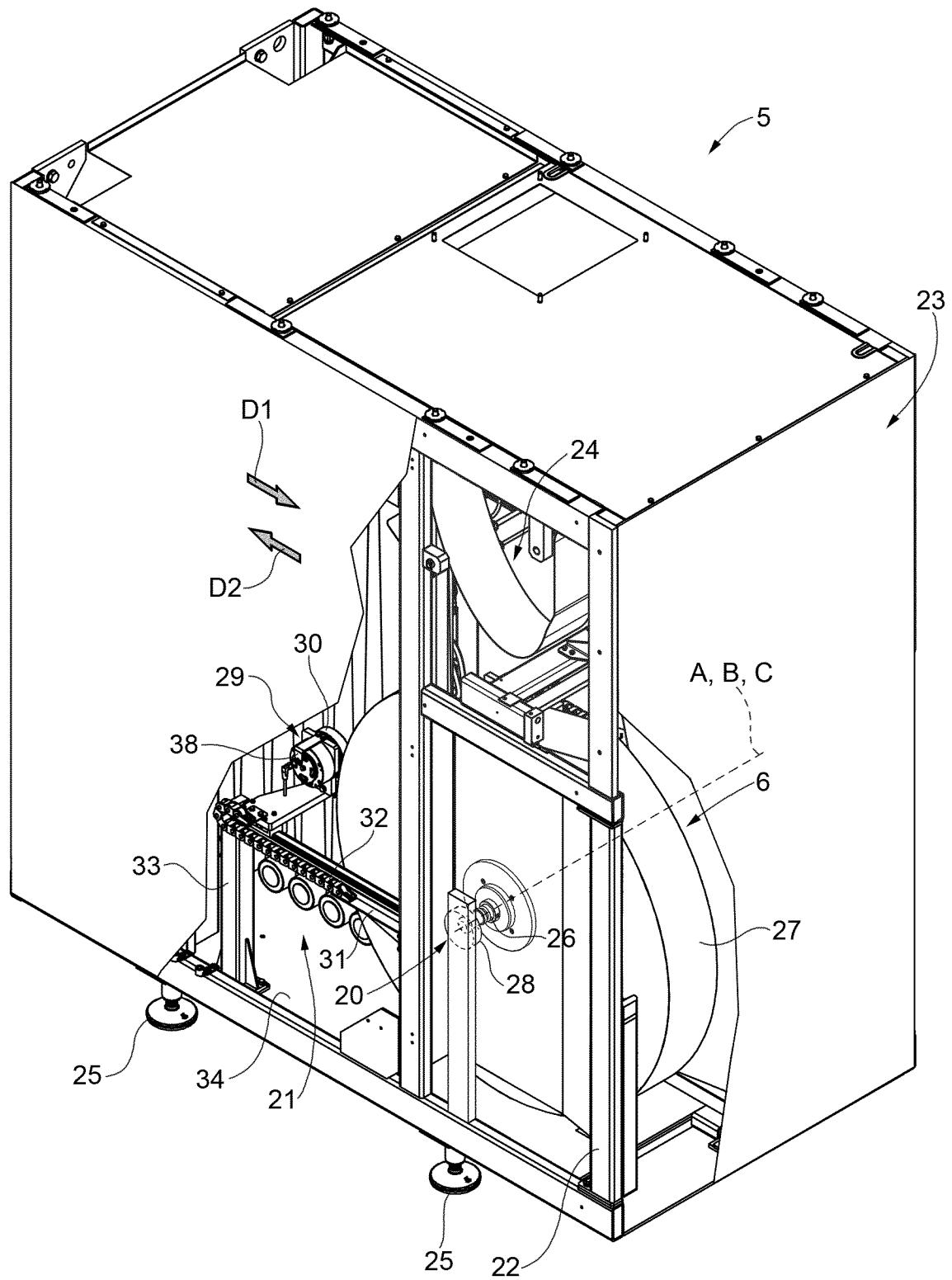


FIG. 3

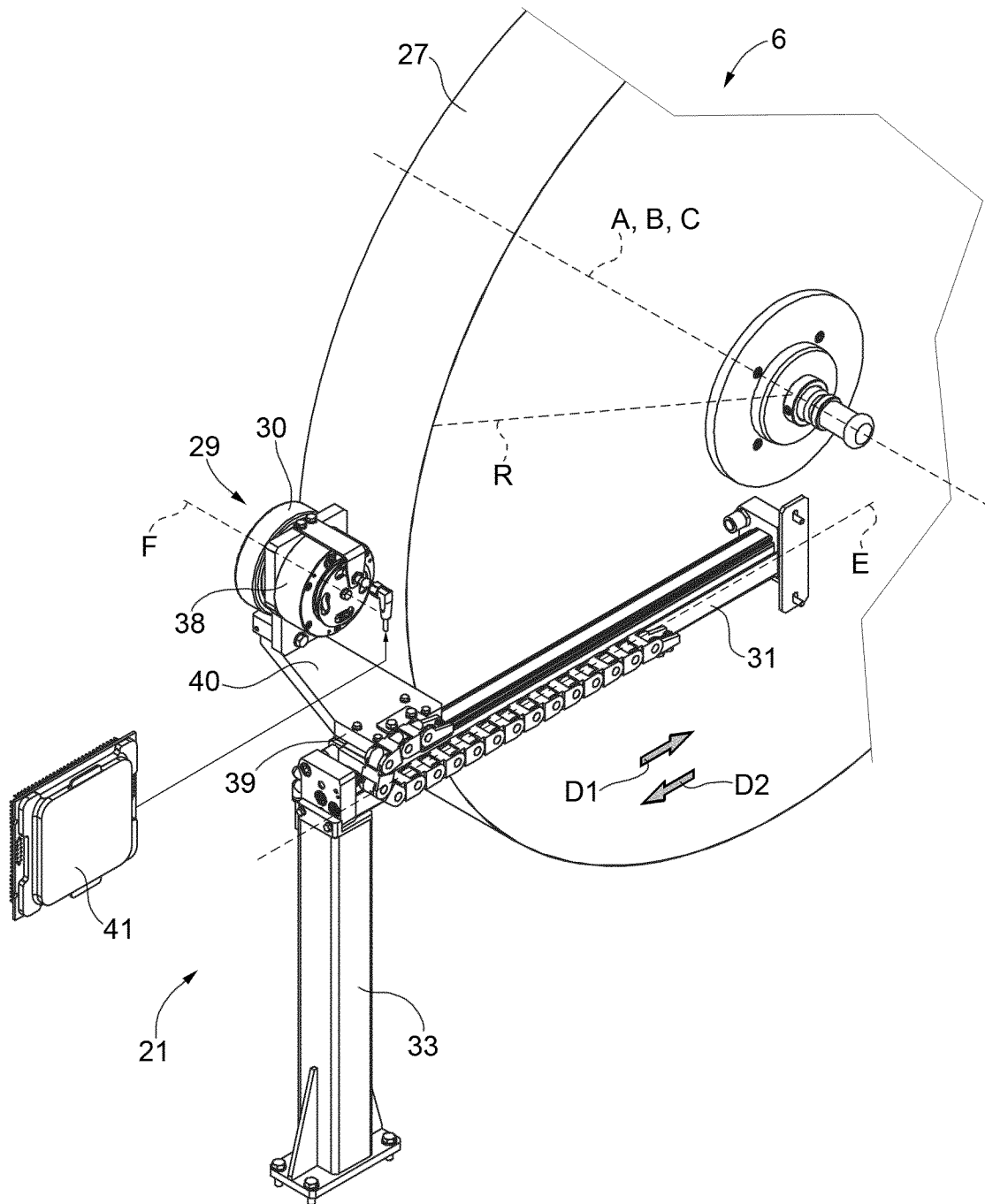


FIG. 4

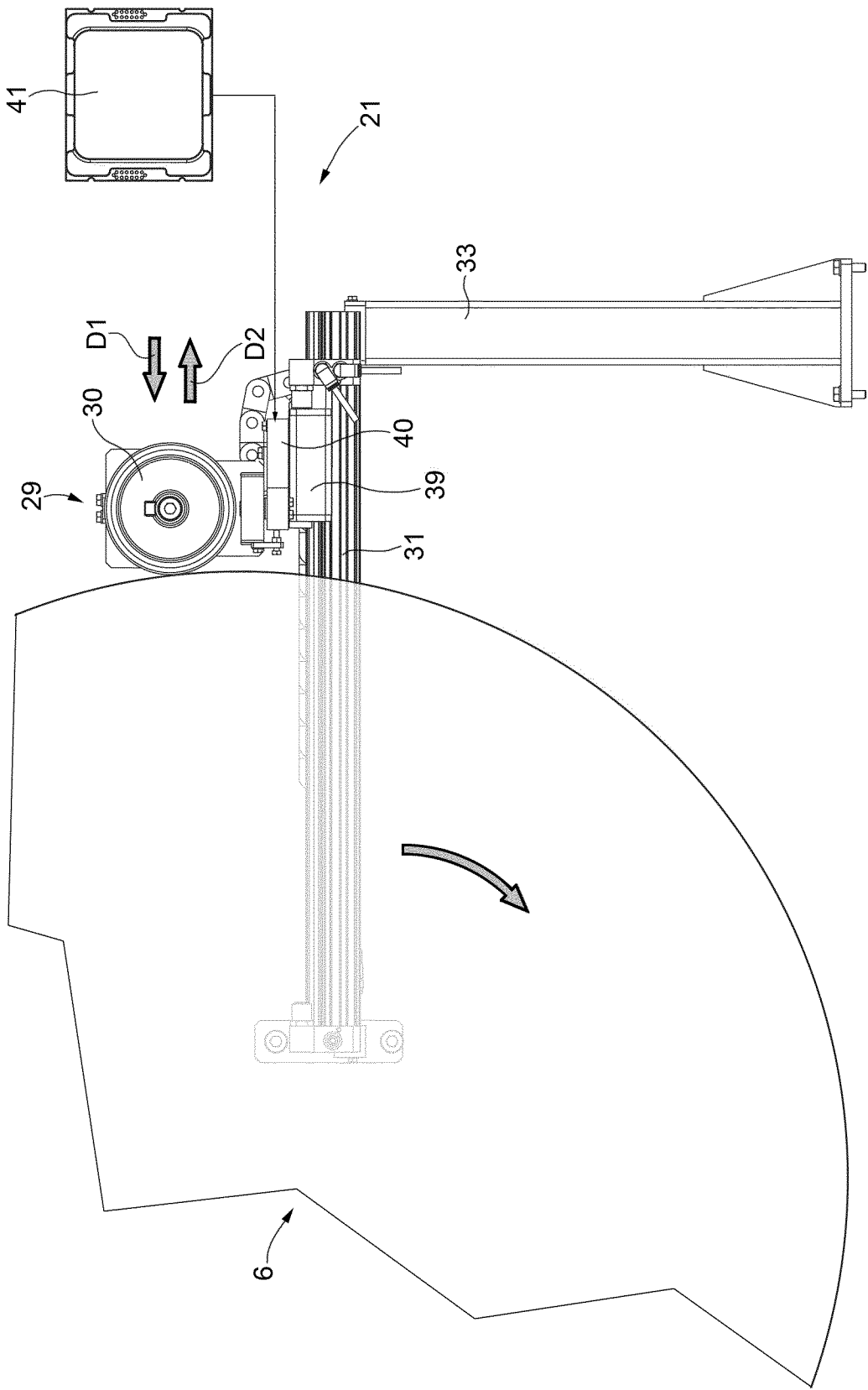


FIG. 5

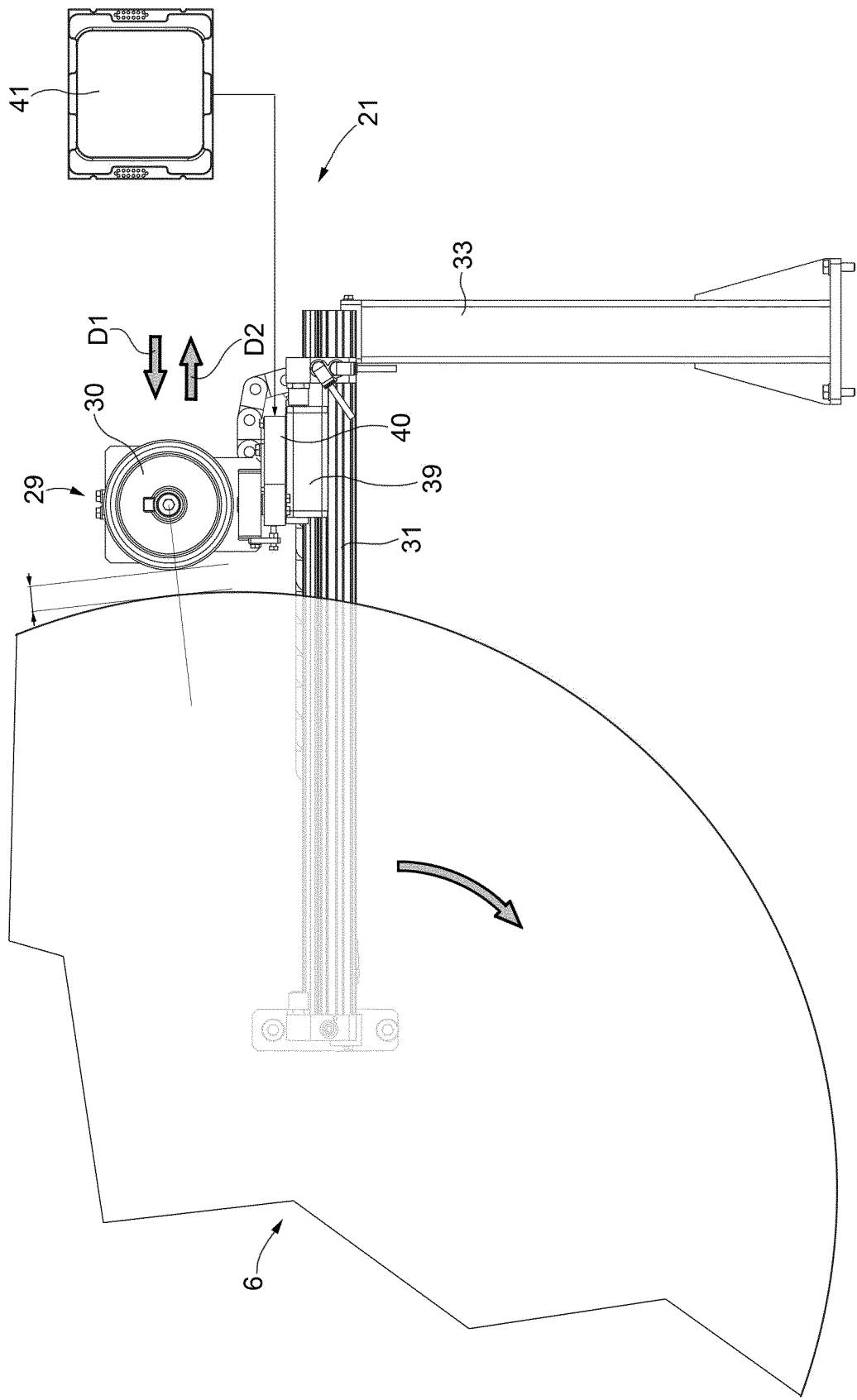


FIG. 6

