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(71) Applicant:
G.D SOCIETA' PER AZIONI
I-40100 Bologna (IT)

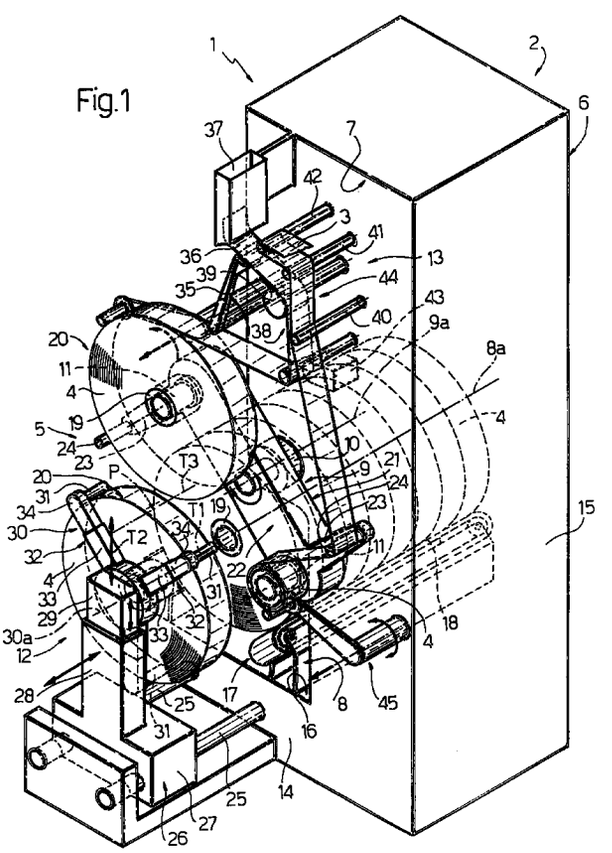
(72) Inventors:
- **Belvederi, Bruno**
  40050 S. Martino Di Monte S. Pietro (IT)
- **Tacchi, Alver**
  40100 Bologna (IT)
- **Draghetti, Fiorenzo**
  40059 Medicina (IT)

(74) Representative:
Jorio, Paolo et al
STUDIO TORTA S.r.l.,
Via Viotti, 9
10121 Torino (IT)

(54) Wrapping material supply unit

(57) A wrapping material supply unit (5) wherein a transfer device (12) successively withdraws reels (4) from one end of a store (8) and feeds them to one or other of two unwinding pins (11) on a rotary platform (9) fitted to a drive shaft (10) integral with a first surface (21) of the platform (9) facing the store (8); the unwinding pins (11) extending from a second surface (22) of the platform (9) opposite the first surface (21); and the transfer device (12) being movable between a loading position facing the first surface (21), and an unloading position facing the second surface (22).

Fig.1



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Description

The present invention relates to a wrapping material supply unit.

More specifically, the present invention relates to a wrapping material supply unit of the type comprising a store having a longitudinal first axis and supporting a number of reels positioned on edge and coaxial with the first axis; a platform rotating about a second axis and having a first and opposite second surface, the first of which faces the store; a drive shaft fitted to the platform and projecting from said first surface coaxially with said second axis; two reel unwinding pins fitted to the platform on either side of said second axis; and transfer means for successively withdrawing the reels from the store and feeding them selectively to said unwinding pins.

Supply units of the above type are normally used for supplying wrapping material to wrapping or packing machines, or constitute a portion of the machines.

In the following description, reference is made to the latter case purely by way of example.

On known wrapping or packing machines featuring a unit of the above type, the store normally extends laterally with respect to the machine, and is located behind a front surface of the machine - hereinafter referred to as the "machine side" - normally facing the machine operator; whereas the platform is mounted with the first surface facing the machine side, through which the drive shaft powering the platform extends.

Finally, on known wrapping or packing machines featuring a unit of the above type, the two unwinding pins project from the first surface of the platform towards the machine side, and are located on either side of the drive shaft.

On such machines, the arrangement of the unwinding pins and the drive shaft involves several drawbacks, in that, being located between the two unwinding pins, the drive shaft only enables each pin to be loaded with a relatively small-diameter reel.

Moreover, the location of the two unwinding pins between the platform and the machine side impedes maintenance and prevents the reels from being loaded manually in the event the transfer means break down.

It is an object of the present invention to provide a straightforward, low-cost wrapping material supply unit designed to overcome the aforementioned drawbacks.

According to the present invention, there is provided a wrapping material supply unit of the type comprising a store having a longitudinal first axis and supporting a number of reels positioned on edge and coaxial with the first axis; a platform rotating about a second axis, the platform having a first and second surface opposite each other, and the first of which is positioned facing the store; a drive shaft fitted to the platform and projecting from said first surface coaxially with said second axis; two reel unwinding pins fitted to the platform and located on either side of said second axis; and transfer means for successively withdrawing the reels from the store and feeding the reels selectively to said unwinding pins; characterized in that said unwinding pins project, parallel to the second axis, from said second surface; said transfer means being movable between a loading position facing the first surface and an unloading position facing the second surface.

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

Figure 1 shows a view in perspective of a preferred embodiment of a supply unit in accordance with the present invention;

Figures 2, 3, 4 and 5 show smaller-scale side views, with parts in section and parts removed for clarity, of the Figure 1 unit in respective operating conditions.

Number 1 in Figure 1 indicates an input portion of a wrapping machine indicated as a whole by 2 and for wrapping products (not shown) by means of a strip 3 of wrapping material wound into reels 4 and supplied to machine 2 by a wrapping material supply unit 5 located at portion 1.

Unit 5 comprises a frame 6 forming part of a frame of machine 2, and having a front surface 7 defining the machine side of unit 5; and a store 8 located behind surface 7 and supporting a number of reels 4 positioned on edge.

Unit 5 also comprises a reel-change platform 9 in front of surface 7; a drive shaft 10 extending through surface 7 to support platform 9, and for rotating platform 9 about an axis 9a perpendicular to surface 7; and two reel unwinding pins 11 fitted to platform 9 and located on either side of axis 9a.

Finally, unit 5 comprises a cartesian transfer device 12 for successively withdrawing reels 4 from store 8 and feeding them selectively to pins 11 to replace an empty reel 4 on one of pins 11 with a new reel 4; and a known starting device 13 cooperating with platform 9 to feed strips 3 automatically to machine 2.

As shown in Figure 1, frame 6 comprises a horizontal base 14, and a vertical upright 15 connected integrally to base 14 and defining, with base 14, a lateral passage 16 of frame 6.

Store 8 is housed inside passage 16, has a longitudinal axis 8a perpendicular to surface 7 and parallel to axis 9a, and comprises two parallel conveyor belts 17 located over base 14 and having respective conveying branches 18 inclined towards each other.

Belts 17 support reels 4 positioned side by side on edge with respective cores 19 coaxial with axis 8a; and branches 18 cooperate with two points along the outer peripheral surface 20 of each reel 4 to support reel 4.

Platform 9 is fitted to upright 15, and comprises a first surface 21 and a second surface 22, which are positioned crosswise to axis 9a, are parallel to each

other, are located on either side of platform 9, and of which surface 21 is positioned facing store 8 and facing and parallel to surface 7. Drive shaft 10 is angularly integral with platform 9, extends coaxially with axis 9a, and projects from surface 21 towards surface 7; while pins 11 project, parallel to axis 9a, from surface 22, and are therefore located on the opposite side of platform 9 to shaft 10.

Platform 9 also comprises two arms 23, which are located at respective opposite ends of platform 9 substantially close to pins 11, and extend between surfaces 21 and 22, crosswise to a line joining pins 11, and on either side of platform 9.

Each arm 23 comprises a respective guide pin 24 projecting with respect to surface 22 and extending parallel to axis 9a.

Transfer device 12 is fitted to base 14, in front of surface 7 and lateral passage 16 of frame 6, and comprises two tubular guides 25 projecting, parallel to axis 9a, from base 14; and a slide 26 mounted to slide along guides 25, and in turn comprising a bottom box portion 27 connected to guides 25 and housing a known drive motor (not shown) and a known transmission (not shown) for driving slide 26, and a tubular, substantially rectangular-section top portion 28 extending crosswise to guides 25 from portion 27.

Device 12 also comprises a further guide defined by portion 28; and a further slide 29 mounted to slide inside portion 28, and which is moved, crosswise to axis 9a, by a known linear actuator (not shown) housed inside portion 27.

Finally, device 12 comprises a gripping hand 30 connected to the top free end of slide 29 and facing store 8. Hand 30 has a centering axis 30a parallel to axes 8a and 9a, and comprises three gripping fingers 31, each fitted to a free end of a respective radial arm 32, and each parallel to axis 30a.

More specifically, the three arms 32 extend radially from axis 30a, are equally spaced angularly, and, in the example shown, each comprise a fixed portion 33 defined by a linear actuator, and a movable portion 34 movable in a radial direction with respect to axis 30a and defined by the output rod of the actuator.

Each finger 31 is fitted to the respective movable portion 34 at an adjustable distance from axis 30a, engages the peripheral surface 20 of reel 4, and cooperates with the other fingers 31 to maintain reel 4 coaxial with axis 30a.

As shown in Figures 2 to 4, transfer device 12 provides for moving hand 30 between a loading position (Figures 1 and 2) in which hand 30 is located behind platform 9 with axis 30a coaxial with axis 8a to engage and support a reel 4 housed inside store 8, and an unloading position (Figure 3) in which hand 30 faces surface 22 and is located in front of platform 9 with axis 30a coaxial with an empty pin 11 to load reel 4 on to pin 11. More specifically hand 30 of device 12 moves each reel 4 between the loading and unloading positions along a U-shaped transfer path P comprising a first portion T1 parallel to guides 25 and extending from the loading position to a first intermediate position in which hand 30, in use, is positioned facing surface 22 and reel 4 is coaxial with axis 8a; a second portion T2 crosswise to first portion T1 and extending, parallel to portion 28, from the first intermediate position to a second intermediate position in which hand 30, in use, is still positioned facing surface 22, but reel 4 is coaxial with an empty pin 11; and a third portion T3 parallel to first portion T1 and extending, parallel to guides 25, from the second intermediate position to the unloading position.

Finally, starting device 13 is fitted to the top of upright 15, substantially over platform 9, and comprises a known peel-off device 35, which rests on surface 20 of the new reel 4 to engage and feed a start portion 36 of strip 3 into a suction conduit 37 along an unwinding portion 38 extending tangent to a known starting drum 39, which, together with conduit 37, forms part of device 13.

Device 13 also comprises three rollers 40, 41 and 42 for guiding strip 3 unwound, in use, off a run-out reel 4; and a known gumming device 43 substantially located between rollers 40 and 41. More specifically, rollers 40, 41 and 42 define a further unwinding portion 44 comprising a portion in common with portion 38 and located between drum 39 and device 43, so that, in use, an end portion of the unwinding strip 3 may be connected by device 43 to portion 36 of strip 3 off the new reel 4.

In actual use, a known detecting device 45, fitted to upright 15 to the side of platform 9, determines when a reel 4 on one of pins 11 runs out, removes core 19 of the empty reel 4 off pin 11 (Figure 3), and unloads the core into a waste channel 46 beneath device 45.

At this point, drive shaft 10 rotates platform 9 (clockwise in the accompanying drawings) to set the empty pin 11 to a loading position corresponding to said unloading position of hand 30, which, as reel 4 was being unwound, has already withdrawn a new reel 4 from store 8 and moved successively along portions T1 and T2 into said second intermediate position. More specifically, when hand 30 is set by device 12 to the loading position, fingers 31 are moved away from axis 30a, and are positioned about the peripheral surface 20 of reel 4 in such a manner as not to interfere with conveyor belts 17 of store 8, and in such a manner as to grip and center reel 4 with respect to axis 30a when moved back towards one another.

Once reel 4 is gripped by hand 30, slide 26 is moved along guides 25 away from front surface 7 to enable platform 9 to rotate about axis 9a and set a pin 11 to said loading position; at which point, slide 29 is moved up along portion 28 to move hand 30 along portion T2 until axis 30a of hand 30 is aligned with an empty pin 11.

Slide 26 is then moved towards surface 7 to move hand 30 along portion T3 and fit core 19 on to the empty pin 11; hand 30 is then withdrawn from pin 11 and

released from reel 4 to enable platform 9 to rotate about axis 9a, which rotation is arrested upon the new reel 4 contacting a known locating device 47.

At this point, peel-off device 35 rests on the peripheral surface 20 of reel 4, which is rotated by respective pin 11 via a known motor (not shown) common to both pins 11.

On contacting start portion 36 of strip 3, peel-off device 35 detaches and feeds portion 36 around starting drum 39 into suction conduit 37.

When device 45 detects that the reel 4 on the other pin 11 is running out, a lever 48 (Figure 3), substantially located at drum 39, feeds strip 3 on the new reel 4 to gumming device 43, which gums strip 3 on the new reel 4 to strip 3 on the old reel 4.

During the above operation, portion 36 is detached from strip 3 and drawn by suction along conduit 37.

From this point on, the above operations are repeated cyclically and as described for all the other reels 4.

Claims

1. A wrapping material supply unit (5) of the type comprising a store (8) having a longitudinal first axis (8a) and supporting a number of reels (4) positioned on edge and coaxial with the first axis (8a); a platform (9) rotating about a second axis (9a), the platform (9) having a first and second surface (21, 22) opposite each other, and the first of which is positioned facing the store (8); a drive shaft (10) fitted to the platform (9) and projecting from said first surface (21) coaxially with said second axis (9a); two reel (4) unwinding pins (11) fitted to the platform (9) and located on either side of said second axis (9a); and transfer means (12) for successively withdrawing the reels (4) from the store (8) and feeding the reels (4) selectively to said unwinding pins (11); characterized in that said unwinding pins (11) project, parallel to the second axis (9a), from said second surface (22); said transfer means (12) being movable between a loading position facing the first surface (21) and an unloading position facing the second surface (22).

2. A unit as claimed in Claim 1, characterized in that said transfer means (12) are cartesian transfer means (12) for moving each said reel (4) between said loading and unloading positions along a path (P) comprising a succession of straight portions (T1, T2, T3).

3. A unit as claimed in Claim 2, characterized in that said straight portions (T1, T2, T3) comprise a first (T1) and a second (T2) portion respectively parallel and crosswise to the first axis (8a).

4. A unit as claimed in Claim 3, characterized in that said second portion (T2) is a vertical portion for feeding said reel (4) between a position coaxial with the first axis (8a), and a position coaxial with a said unwinding pin (11) in said unloading position.

5. A unit as claimed in one of the foregoing Claims from 2 to 4, characterized in that said first axis (8a), said second axis (9a) and said unwinding pins (11) are parallel; said path (P) being a U-shaped path comprising a first portion (T1) extending from said loading position to a first intermediate position facing said second surface (22), a second portion (T2) crosswise to the first portion (T1) and extending from said first intermediate position to a second intermediate position also facing said second surface (22), and a third portion (T3) parallel to the first portion (T1) and extending from said second intermediate position to said unloading position.

6. A unit as claimed in any one of the foregoing Claims, characterized in that said transfer means (12) comprise a first guide (25) parallel to said first axis (8a); a first slide (26) mounted to slide along the first guide (25); a second guide (28) mounted on the first slide (26) and extending crosswise to the first guide (25); a second slide (29) mounted to slide along the second guide (28); and gripping means (30) fitted to the second slide (29) to engage and support a said reel (4); said second guide (28) being movable, with the first slide (26), to and from said loading position; and said gripping means (30) facing the store (8) and being movable, with said second slide (29), between a position coaxial with the first axis (8a), and a position coaxial with a said unwinding pin (11) in said unloading position.

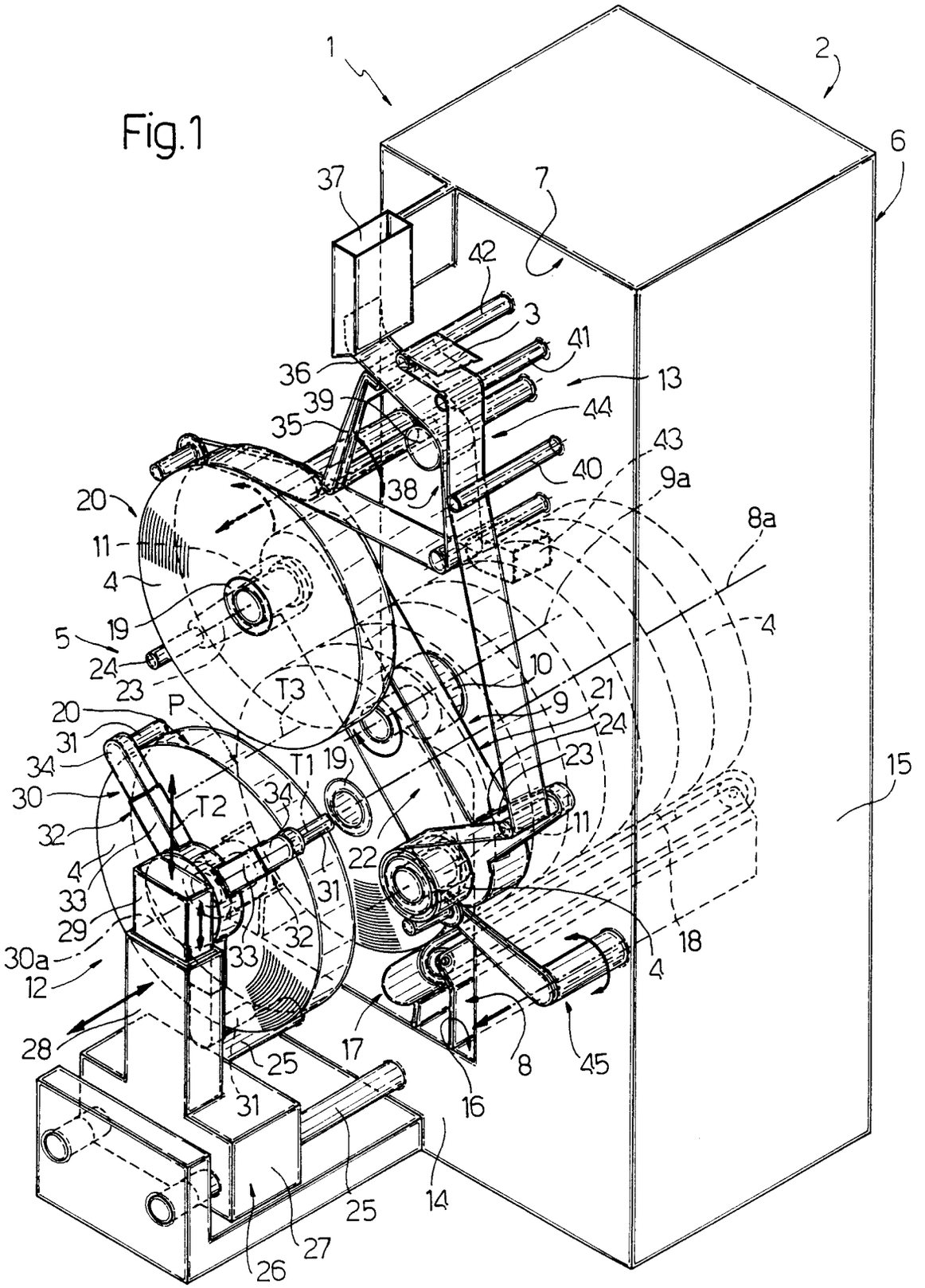
7. A unit as claimed in Claim 6, characterized in that said gripping means (30) comprise a gripping hand (30) having a number of fingers (31) and a third axis (30a) parallel to said first axis (8a) and said second axis (9a); each finger (31) being parallel to the third axis (30a), being located at an an adjustable distance from the third axis (30a), engaging an outer surface (20) of a said reel (4), and cooperating with the other said fingers (31) to keep the reel (4) coaxial with said third axis (30a).

8. A unit as claimed in any one of the foregoing Claims, characterized by comprising a frame (6) having a front surface (7) defining a machine side (7) of the unit (5); said drive shaft (10) extending through said machine side (7); said platform (9) being located to the front of said machine side (7); said store (8) extending rearwards of said machine side (7); and said loading and unloading positions being located respectively to the rear and to the front of said platform (9).

9. A unit as claimed in Claim 8, characterized in that said frame (6) comprises a lateral passage (16) housing said store (8); said first axis (8a) and said second axis (9a) being perpendicular to said machine side (7).

10. A unit as claimed in Claim 8 or 9, characterized in that said frame (6) forms part of a frame of a wrapping machine (2).

Fig.1


1
2
6
37
7
42
3
41
36
13
39
44
35
43
40
9a
38
20
8a
11
4
19
5
24
23
T3
P
10
9
21
24
20
31
34
T1
19
23
15
30
T2
34
32
22
11
4
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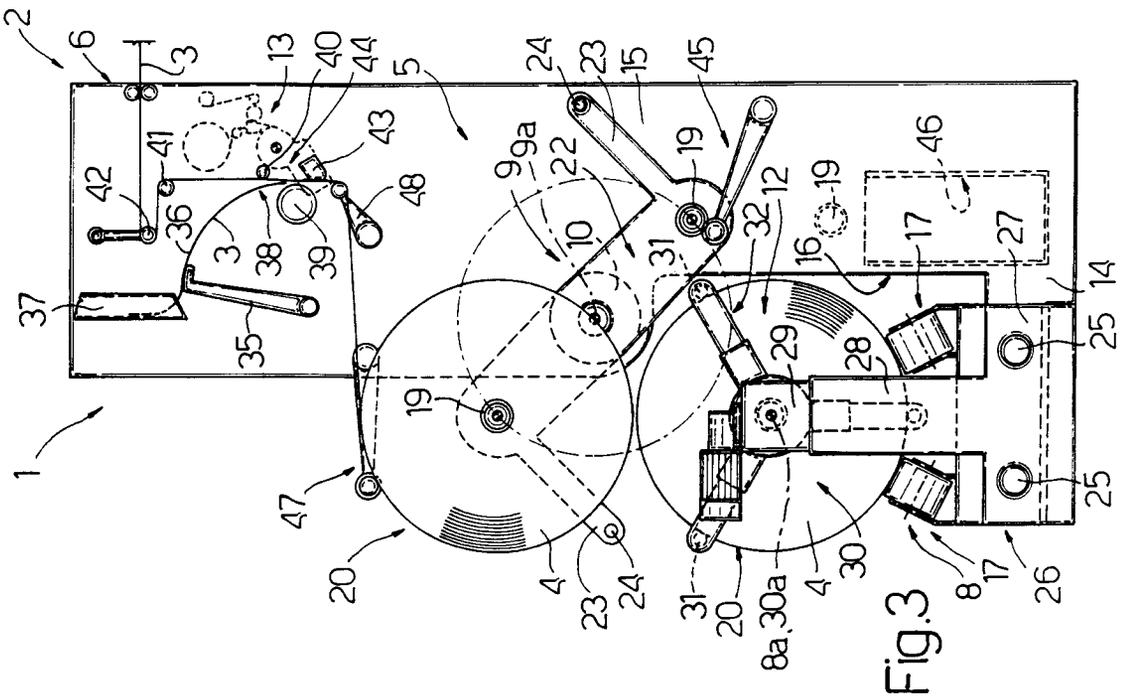


Fig.3

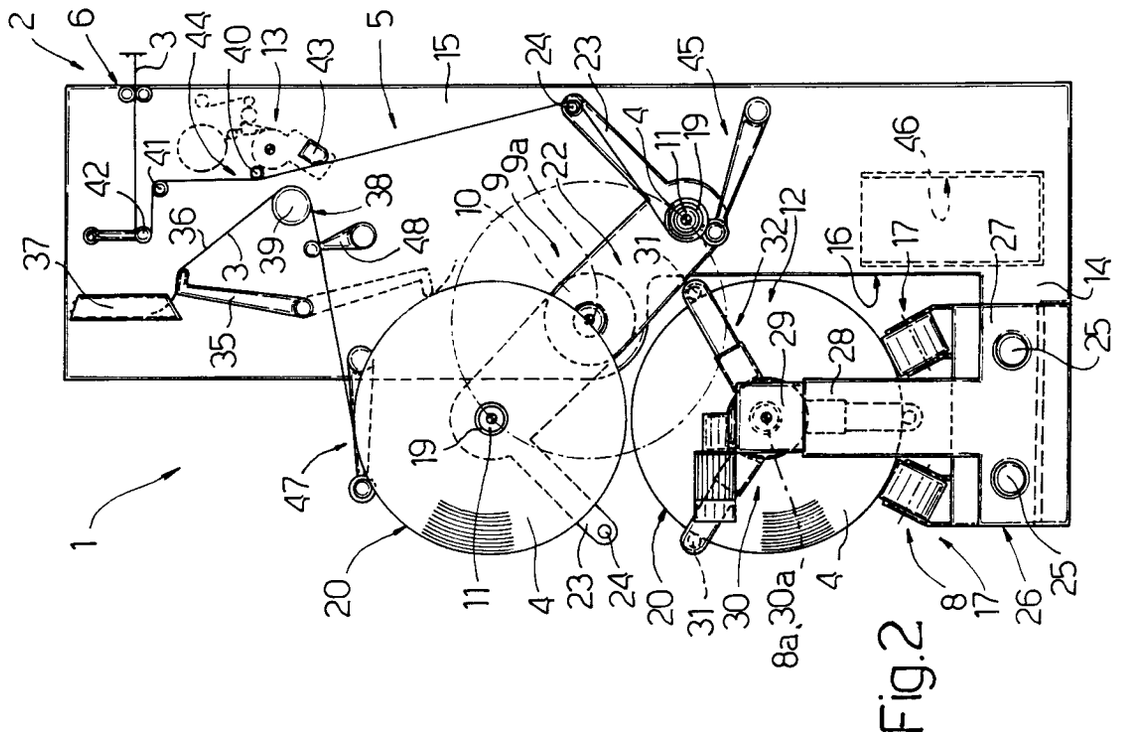


Fig.2

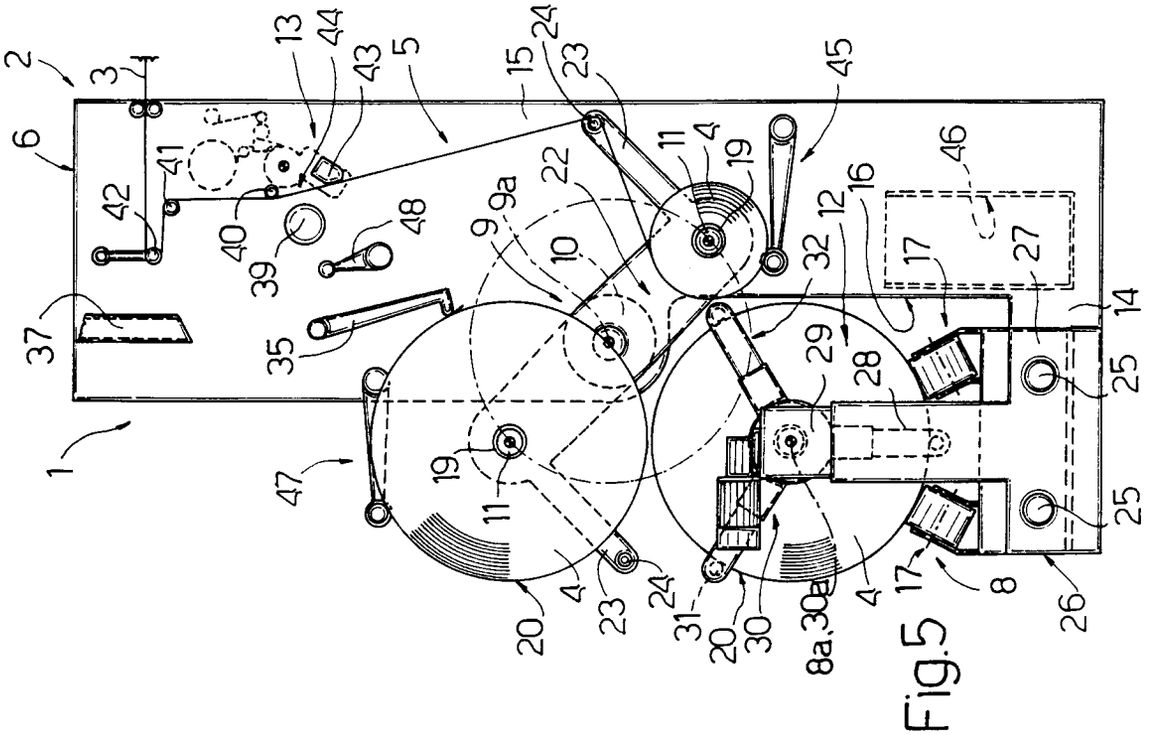


Fig.5

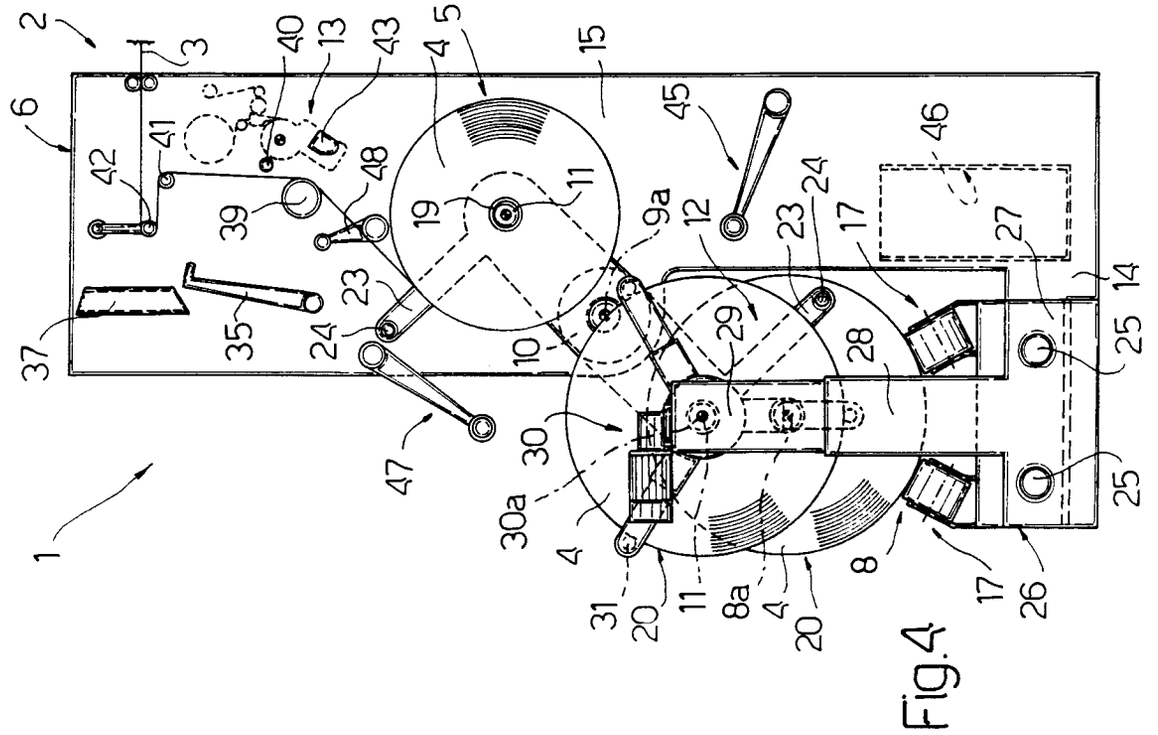


Fig.4

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EUROPEAN SEARCH REPORT

Application Number
EP 97 11 0829

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	22 October 1997	Häusler, F.U.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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