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(54) **Machine for printing images on articles**

Maschine zum Drucken von Bildern auf Artikeln

Machine pour imprimer des images sur des articles

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Description

[0001] The present invention relates to a machine for printing images on articles by means of selective heat transfer of thermofusible ink present on an ink ribbon.

[0002] JP 03 083682 A discloses an ink ribbon cassette comprising a support structure on which a reel for unwinding the ink ribbon and a reel for rewinding the used ribbon are rotatably mounted, between said reels there being defined a path for the ribbon, including a first and a second pair of transmission rollers which are arranged at the corners of two opposite sides of a quadrilateral, downstream of the unwinding reel and upstream of the rewinding reel, respectively; a portion of the ink ribbon which operationally passes between said pairs of rollers being intended to be acted upon by a thermal print head of a printing machine wherein the ink ribbon cassette is used; the ribbon cassette also comprising a first and second diverting device including respective diverting rollers each movable, when the cassette is opened for replacing the ink ribbon, along a trajectory which intersects the path of the ribbon between the two transmission rollers of each pair; the diverting devices having a first condition, when the cassette is opened, where the diverting rollers are arranged in a disengaged position where they extend externally and at a distance from the path of the ribbon, between the corresponding pair of transmission rollers, and a second condition where said diverting rollers assume a fixed operative position where the ribbon is engaged between a corresponding pair of transmission rollers, forming between the rollers of these pairs a loop of ribbon.

[0003] One object of the present invention is to provide an improbe printing machine in which the operation of positioning and/or replacing the ink ribbon is particularly easy.

[0004] This object, together with other objects, is achieved according to the invention by a machine having the features defined in claim 1.

[0005] In a preferred embodiment the tensioning rollers of the tensioning devices are supported by respective arms mounted pivotably on the support structure about respective fixed axes perpendicular to the path of the ink ribbon.

[0006] Conveniently the resilient means associated with the tensioning devices may comprise a first and a second recall spring which are associated with each tensioning roller and are preferably connected to the associated pivoting arms.

[0007] Alternatively, the resilient means associated with the tensioning devices may comprise a single spring tending to recall towards each other said tensioning rollers or the associated pivoting arms.

[0008] Further characteristic features and advantages of the invention will emerge from the detailed description below, provided purely by way of a non-limiting example, with reference to the accompanying drawings, in which:

Figure 1 is a front view of a machine according to the present invention;

Figure 2 is a front view similar to that shown in Figure 1, where some front covering parts have been removed;

Figure 3 is a partial perspective view of the machine according to the preceding figures;

Figure 4 is a rear view of the machine according to the preceding figures; and

Figure 5 is a view similar to that shown in Figure 2 and shows the devices for tensioning the ink ribbon in an operative condition.

[0009] In the drawings, 1 denotes overall a machine according to the present invention for printing images on articles (not shown) by means of selective heat transfer of thermo fusible ink from an ink ribbon R (Figures 1, 2 and 5).

[0010] The machine 1 comprises a support structure 2 which houses, rotatably mounted in a manner known per se, a reel or spool 3 for unwinding the ink ribbon R and a reel or spool 4 for rewinding the used ribbon R.

[0011] The rewinding reel 4 is motor-driven so as to impart to the ribbon R, during operation, a movement in the direction indicated by the arrows F in Figure 5.

[0012] An operative path shown in Figure 5 is defined for the ribbon R between the reels or spools 3 and 4. Starting from the unwinding reel 3, the ribbon R passes around a first transmission roller 5 and then passes around a tensioning roller 7 mounted on a first pivoting arm 9 which is hinged with the support structure 2 about a shaft 10 which is essentially perpendicular to the path of the ribbon R.

[0013] One end of a helical spring 11 is connected to the pivoting arm 10, while the other end thereof is connected to the support structure 2. With reference to Figure 5, the spring 11 tends to recall the pivoting arm 9 away from the transmission roller 5, which is instead rotatable about a fixed shaft.

[0014] Still with reference to Figure 5, after forming a loop around the tensioning roller 7, the ribbon R passes around a further transmission roller 6 which is also rotatable about a shaft which is stationary and, preferably, motor-driven.

[0015] Downstream of the roller 6 the ribbon R passes into the bottom area of the support structure 2 to which a frame 12 is fixed, said frame having, extending therein, two idle rollers 13 and 14 which are parallel and spaced from each other and which define between them an opening indicated by 15 (see Figures 3 and 5).

[0016] In the operative condition shown in Figure 2, the ink ribbon R passes onto the roller 13 and then around the active bottom edge of a thermal print head 16, which is of the type known per se. Downstream of this print head, the ribbon R travels back up towards the transmission roller 18, passing over the roller 14 mounted on the bottom frame 12.

[0017] After travelling around the roller 18, the ribbon

R passes around a tensioning roller 19 mounted on a pivoting arm 20 which is similar to the arm 9 described above.

[0018] The arm 20 is mounted pivotably about a fixed shaft 21 which is parallel to the shaft 10 of the other pivoting arm 9.

[0019] Downstream of the tensioning roller 19, the ribbon R passes around a further transmission roller 22 rotatable about a fixed shaft and finally reaches the rewinding reel or spool 4.

[0020] In Figures 1 to 3 and 5, 23 denotes a helical spring having one end fastened to the support structure 2 and the other end connected to the pivoting arm 20. This spring tends to recall the pivoting arm 20 in the direction of the other pivoting arm 9.

[0021] The two pairs of transmission rollers 5, 6 and 18, 22 are arranged at the corners of two opposite sides of a quadrilateral and the thermal print head 16 is arranged close to the portion of the ink ribbon R which operationally passes between these pairs of rollers.

[0022] The pivoting arms 9 e 20, with the associated tensioning rollers 7 and 19, and with the springs 11 and 23, form two tensioning devices, where the tensioning rollers 7 and 19 are movable along a trajectory which intersects the path of the ribbon R between the two transmission rollers 5, 6 and 18, 22, respectively, of each pair, tending to cause the formation of corresponding loops of ribbon R.

[0023] With reference to Figures 3 to 5, a shaft 24 is mounted in the middle region of the support structure 2 (Figure 3) and has, integral therewith, a cam member 25 (Figures 3 and 5) which extends on the front side of the machine and to which an operating handle 26 is connected at the front.

[0024] On the rear of the support structure 2 (Figure 4) the shaft 24 has an eccentric lug 27 acting as a transmission for an unextendable belt 28, the opposite ends of which are fastened to the periphery of corresponding rollers 29 and 30 which are rotationally integral with the pivoting arms 9 and 20 about the corresponding shafts 10 and 21.

[0025] The arrangement is such that the handle 26 is able to be arranged in a first position, shown in Figures 1 to 3 and, in broken lines, in Figure 5. When the handle 26 is in this position, the shaft 24 is arranged in the angular position which is visible in Figure 4 and where it tensions the belt 28 downwards, keeping consequently the pivoting arms 9 and 20 in the splayed position which is shown in Figures 1 to 4 and, in broken lines, in Figure 5. In this condition, as can be seen more clearly in Figure 2, the tensioning rollers 7 and 19 are arranged in a disengaged position where they extend externally and at a distance from the path of the ribbon R, between the pair of transmission rollers 5, 6 and the pair of transmission rollers 18, 22, respectively.

[0026] In this condition, it is extremely easy to arrange the ribbon R in the machine and/or replace this ribbon. In fact, as can be seen from viewing Figure 2, starting from the unwinding reel 3, the ribbon R must essentially be made to pass around the four rollers 5, 6 and 8, 22, so as to then be applied onto the rewinding roller 4.

[0027] Conveniently, in order to be able to facilitate further the positioning and/or the replacement of the ribbon R, the thermal print head 16 is mounted so as to be vertically movable in the support structure 2, between a lowered or working position (Figure 5), where it engages with the section of the ribbon R which passes close to the frame 12, and a raised or disengaged position (Figures 2 and 3), where it extends above the section of ribbon R which extends between the transmission rollers 6 and 18. In particular, in the example of embodiment shown, the head 16 is mounted on a unit denoted overall by 32 which is vertically displaceable and provided at the top with a shaped appendage 33 cooperating with the cam formation 25 which is integral with the shaft 24 and the handle 26 (Figures 3 and 5).

[0028] A pair of helical springs 34 (Figures 3 and 5) tends to recall the unit 32 upwards and keep the shaped appendage 33 of this unit engaged with the surface of the cam formation 25 integral with the shaft 24 and the handle 26.

[0029] The arrangement is such that when the handle 26 passes from the position shown in Figures 1 to 3 into the position shown in solid lines in Figure 5, the assembly 32 is forced to move downwards against the recall action exerted by the springs 34 until the print head 16 engages with the portion of the ribbon R which extends between the rollers 13 and 14 of the frame 12.

[0030] The downwards displacement of the print head 16, into its operative position shown in Figure 5, occurs simultaneously with the movement of the pivoting arms 8 and 20 and the associated rollers 7 and 19 into the operative position shown in Figure 5, where said rollers engage with the sections of the ribbon R situated between the pairs of transmission rollers 5, 6 and 18, 22. This displacement of the arms is caused by the recall springs 11 and 23, owing to the fact that rotation of the handle 26 has caused the movement of the eccentric lug 27 from the lowered position shown in Figure 4 into a raised position, where the belt 28 allows the rotation of the rollers 29 and 30 and therefore the pivoting arms 9 and 20.

[0031] When the handle 26 is arranged in the position shown in Figure 5, the printing machine 1 is ready in the operative working configuration.

[0032] In an alternative embodiment, instead of the separate springs 11 and 23 which are associated with the pivoting arms 9 and 20, it is possible to use a single spring such as the spring shown in broken lines and indicated by 40 in Figure 2, said spring interconnecting directly together these pivoting arms. This solution, in addition to simplifying construction and assembly, results in a beneficial mutual reaction between the two pivoting arms.

[0033] Obviously, without modifying the principle of the invention, the embodiments and constructional details may be widely varied with respect to that described and

illustrated purely by way of a non-limiting example, without thereby departing from the scope of the invention as defined in the accompanying claims.

Claims

1. Machine (1) for printing images on articles by means of selective heat transfer of thermofusible ink from an ink ribbon (R), comprising a support structure (2) on which a reel (3) for unwinding the ink ribbon (R) and a reel (4) for rewinding the used ribbon (R) are rotatably mounted; between said reels (3, 4) there being defined a path for the ribbon (R), including a first and a second pair of transmission rollers (5, 6; 18, 22) which are arranged at the corners of two opposite sides of a quadrilateral, downstream of the unwinding reel (3) and upstream of the rewinding reel (4), respectively; a thermal print head (16) being mounted in said structure and being able to act on a portion of the ink ribbon (R) which operationally passes between said pairs of rollers (5, 6; 18, 22);
the machine (1) also comprising a first and second tensioning device (7, 9, 11; 19, 20, 23) including respective tensioning rollers (7, 19) each movable in the operation along a trajectory which intersects the path of the ribbon (R) between the two transmission rollers (5, 6; 18, 22) of each pair;
the machine also comprising switching means (24-26) connected to the tensioning rollers (7, 19) of the tensioning devices (7, 9, 11; 19, 20, 23) and able to be set selectively to
a first condition where the tensioning rollers (7, 19) are arranged in a disengaged position where they extend externally and at a distance from the path of the ribbon (R), between the corresponding pair of transmission rollers (5, 6; 18, 22), and
a second condition where said tensioning rollers (7, 19) are free to assume, under the action of associated resilient means (11, 23; 40), an operative position where the ribbon (R) is engaged between the corresponding pair of transmission rollers (5, 26; 18, 22), tending to form between the rollers of these pairs a loop of ribbon (R);
the print head (16) being mounted movably in the support structure (2) between a position where it is engaged with the ribbon and a position where it is situated at a distance and disengaged from the ribbon (R); the switching means (24-26) being connected to the print head (16) so that when said switching means (24-26) assume the abovementioned first and second condition, respectively, the print head (16) is arranged in the position where it is disengaged from the ink ribbon (R) and in the position where it is engaged therewith, respectively.

2. Machine according to Claim 1, in which the tensioning rollers (7, 19) are supported by respective arms (9, 20) mounted pivotably on the support structure (2) about respective axes (10, 21) perpendicular to the path of the ribbon (R).

3. Machine according to Claim 1 or 2, in which the resilient means associated with the +-first and second tensioning devices (7, 9, 11; 19, 20, 23) comprise respective separate springs (11, 23).

4. Machine according to Claim 1 or 2, in which the resilient means associated with said tensioning devices (7, 9, 11; 19, 20, 23) comprise a single spring (40) which interconnects together said tensioning devices.

5. Machine according to any one of the preceding claims, in which the switching means (24-26) are connected to the tensioning devices (7, 9, 11; 19, 20, 23) by means of a cam mechanism (24, 27-30).

6. Machine according to Claim 4, in which the switching means (24-26) are connected to the print head (16) by means of a (further) cam mechanism (25, 33).

Patentansprüche

1. Maschine (1) zum Drucken von Bildern auf Artikel mittels selektivem Wärmetransfer von durch Wärme verflüssigbarer Tinte von einem Farbband (R), umfassend eine Unterstützungsstruktur (2), an welcher eine Spule (3) zum Abwickeln des Farbbands (R) und eine Spule (4) zum Rückwickeln des verwendeten Bands (R) drehbar angebracht sind, wobei zwischen den Spulen (3, 4) ein Pfad für das Band (R) definiert ist, umfassend ein erstes und ein zweites Paar von Übertragungsrollen (5, 6; 18, 22), welche an den Ecken von zwei gegenüberliegenden Seiten eines Vierecks, der Abwickelspule (3) nachgeordnet bzw. der Rückwickelspule (4) vorgeordnet, angeordnet sind, wobei ein Thermodruckkopf (16) in der Struktur angebracht ist und in der Lage ist, auf einen Abschnitt des Farbbandes (R) zu wirken, welcher im Betrieb zwischen den Paaren von Rollen (5, 6; 18, 22) hindurch passiert,
wobei die Maschine (1) auch eine erste und eine zweite Spannvorrichtung (7, 9, 11; 19, 20, 23) umfasst, welche jeweilige Spannrollen (7, 19) umfassen, von denen jede im Betrieb entlang einer Bahn beweglich ist, die den Pfad des Bandes (R) zwischen den zwei Übertragungsrollen (5, 6; 18, 22) von jedem Paar schneidet,
wobei die Maschine auch Schaltmittel (24-26) umfasst, welche mit den Spannungsrollen (7, 19) der Spannungsvorrichtungen (7, 9, 11; 19, 20, 23) verbunden sind und in der Lage sind, selektiv eingestellt zu werden, auf:

- einen ersten Zustand, in welchem die Spannungsrollen (7, 19) in einer Nichteingriffposition angeordnet sind, in der sie sich nach außen erstrecken, und mit einem Abstand von dem Pfad des Bandes (R), zwischen dem entsprechenden Paar von Übertragungsrollen (5, 6; 18, 22) und
- einen zweiten Zustand, in welchem die Spannungsrollen (7, 19) frei sind, unter der Wirkung von zugeordneten Federmitteln (11, 23; 40) eine Betriebsposition einzunehmen, in welcher das Band (R) zwischen dem entsprechenden Paar von Übertragungsrollen (5, 26; 18, 22) in Eingriff steht, dazu neigend, zwischen den Rollen dieses Paars eine Schleife des Bands (R) zu bilden,

wobei der Druckkopf (16) beweglich in der Unterstützungsstruktur (2) zwischen einer Position, in der er mit dem Band in Eingriff steht, und einer Position, in der er mit einem Abstand angeordnet ist und nicht mit dem Band (R) in Eingriff steht, angebracht ist, wobei die Schaltmittel (24-26) mit dem Druckkopf (16) verbunden sind, so dass, wenn die Schaltmittel (24-26) den oben erwähnten ersten bzw. zweiten Zustand einnehmen, der Druckkopf (16) in der Position angeordnet ist, in der er nicht mit dem Farbband (R) in Eingriff steht, bzw. in der Position, in der er damit in Eingriff steht.

2. Maschine nach Anspruch 1, wobei die Spannungsrollen (7, 19) von jeweiligen Armen (9, 20) unterstützt werden, die an der Unterstützungsstruktur (2) um jeweilige Achsen (10, 21) orthogonal zu der Bahn des Bandes (R) schwenkbar angebracht sind.

3. Maschine nach Anspruch 1 oder 2, wobei die Federmittel, die der ersten und der zweiten Spannvorrichtung (7, 9, 11; 19, 20, 23) zugeordneten sind, jeweilige separate Federn (11, 23) umfassen.

4. Maschine nach Anspruch 1 oder 2, wobei die Federmittel, die den Spannvorrichtungen (7, 9, 11; 19, 20, 23) zugeordneten sind, eine einzige Feder (40) umfassen, welche die Spannvorrichtungen miteinander verbindet.

5. Maschine nach einem der vorhergehenden Ansprüche, wobei die Schaltmittel (24-26) mit den Spannvorrichtungen (7, 9, 11; 19, 20, 23) mittels eines Nokkenmechanismus (24, 27-30) verbunden sind.

6. Maschine nach Anspruch 4, wobei die Schaltmittel (24-26) mit dem Druckkopf (16) mittels eines (weiteren) Nockenmechanismus (25, 33) verbunden sind.

Revendications

1. Machine (1) destinée à l'impression d'images sur des articles à l'aide du transfert de chaleur sélectif d'une encre thermofusible provenant d'un ruban d'encre (R), comprenant une structure de support (2) sur laquelle une bobine (3) destinée au déroulage du ruban d'encre (R) et une bobine (4) destinée au rembobinage du ruban usagé (R) sont posées de manière à pouvoir tourner ; un espace étant défini entre lesdites bobines (3, 4) pour le passage du ruban (R), comprenant une première et une seconde paire de rouleaux de transmission (5, 6 ; 18, 22) qui sont situés aux coins de deux côtés opposés d'un quadrilatère, en aval de la bobine de déroulage (3) et en amont de la bobine de rembobinage (4), respectivement ; une tête d'impression thermique (16) étant installée dans ladite structure et étant capable d'agir sur une partie du ruban d'encre (R) qui passe entre lesdites paires de rouleaux (5, 6 ; 18, 22) lors du fonctionnement ;
la machine (1) comprenant également un premier et un second dispositif tendeur (7, 9, 11 ; 19, 20, 23) comprenant des rouleaux tendeurs respectifs (7, 19) pouvant chacun se déplacer lors du fonctionnement suivant une trajectoire qui intersecte le trajet du ruban (R) entre les deux rouleaux de transmission (5, 6 ; 18, 22) de chaque paire ;
la machine comprenant également des moyens de commutation (24-26) raccordés aux rouleaux tendeurs (7, 19) des dispositifs tendeurs (7, 9, 11 ; 19, 20, 23) et capables d'être mis de manière sélective dans
un premier état dans lequel les rouleaux tendeurs (7, 19) sont agencés en une position désengagée où ils s'étendent vers l'extérieur à une certaine distance du passage du ruban (R), entre la paire correspondante de rouleaux de transmission (5, 6 ; 18, 22), et
un second état dans lequel lesdits rouleaux tendeurs (7, 19) peuvent prendre, sous l'action de moyens élastiques associés (11, 23 ; 40), une position opérationnelle dans laquelle le ruban (R) est tendu entre la paire correspondante de rouleaux de transmission (5, 26 ; 18, 22), tendant à former une boucle de ruban (R) entre les rouleaux de ces paires ;
la tête d'impression (16) étant posée de façon à pouvoir se déplacer dans la structure de support (2) entre une position dans laquelle elle est en prise avec le ruban et une position dans laquelle elle est située à une certaine distance et désengagée du ruban (R) ;
les moyens de commutation (24-26) étant raccordés à la tête d'impression (16) de telle façon que lorsque lesdits moyens de commutation (24-26) se trouvent dans le premier et le second état susmentionné, respectivement, la tête d'impression (16) est agencée dans la position dans laquelle elle est désengagée du ruban d'encre (R) et dans la position dans laquelle

elle est en prise avec celui-ci, respectivement.

2. Machine selon la revendication 1, dans laquelle les rouleaux tendeurs (7, 19) sont supportés par des bras respectifs (9, 20) montés sur la structure de support (2) de façon à pouvoir pivoter autour des axes respectifs (10, 21) perpendiculaires au trajet du ruban (R).

3. Machine selon la revendication 1 ou 2, dans laquelle les moyens élastiques associés au premier et au second dispositif tendeur (7, 9, 11 ; 19, 20, 23) comprennent des ressorts distincts respectifs (11, 23).

4. Machine selon la revendication 1 ou 2, dans laquelle les moyens élastiques associés auxdits dispositifs tendeurs (7, 9, 11 ; 19, 20, 23) comprennent un ressort (40) unique qui relie lesdits dispositifs tendeurs entre eux.

5. Machine selon l'une quelconque des revendications précédentes, dans laquelle les moyens de commutation (24-26) sont raccordés aux dispositifs tendeurs (7, 9, 11 ; 19, 20, 23) à l'aide d'un mécanisme à came (24, 27-30).

6. Machine selon la revendication 4, dans laquelle les moyens de commutation (24-26) sont raccordés à la tête d'impression (16) à l'aide d'un mécanisme à came (supplémentaire) (25, 33).

FIG. 1

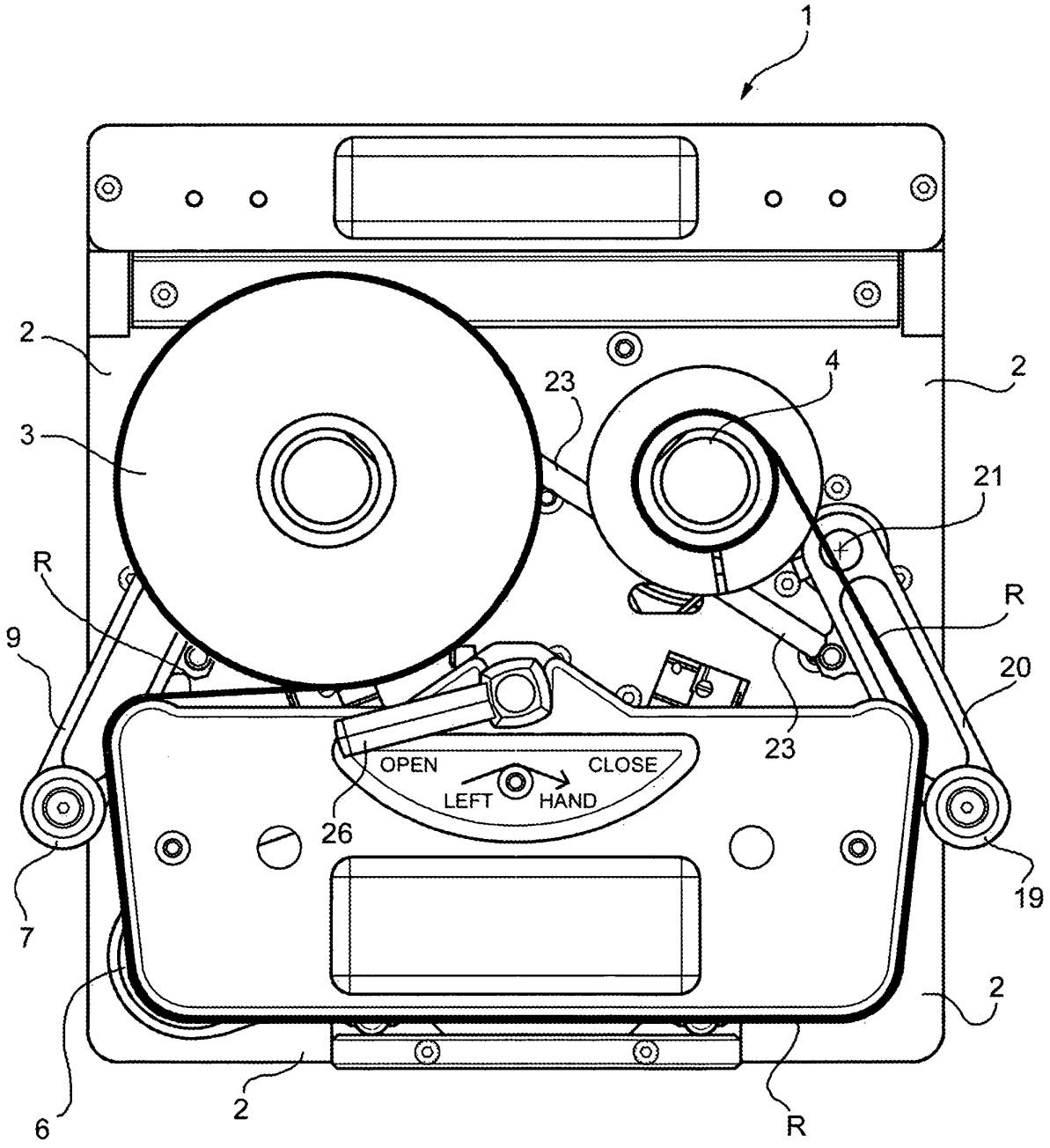


FIG. 2

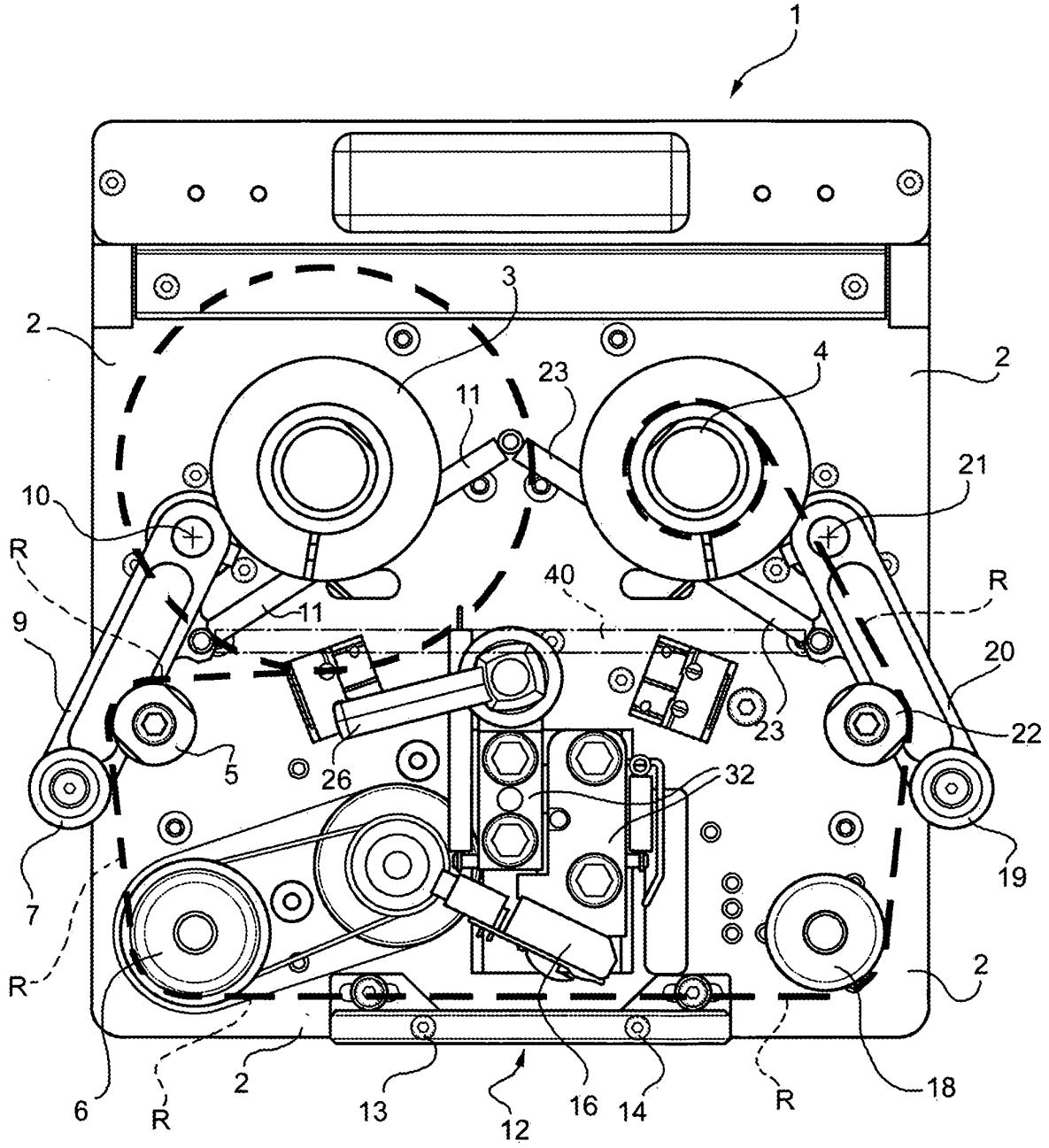

1
2
3
4
2
23
11
21
10
R
40
R
9
11
20
22
23
5
26
32
19
7
R
2
6
R
2
13
12
16
14
R
18

FIG. 3

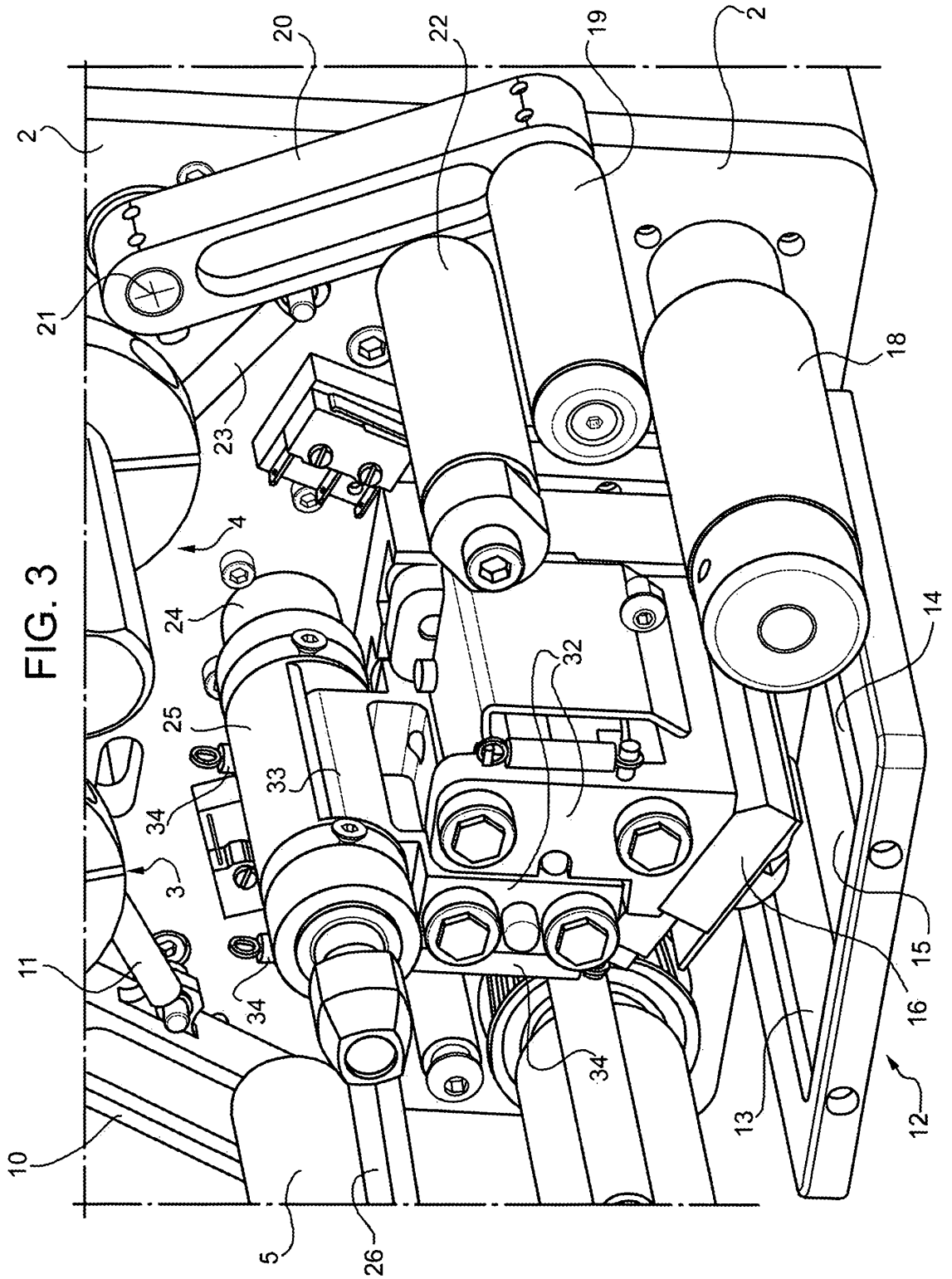


FIG. 4

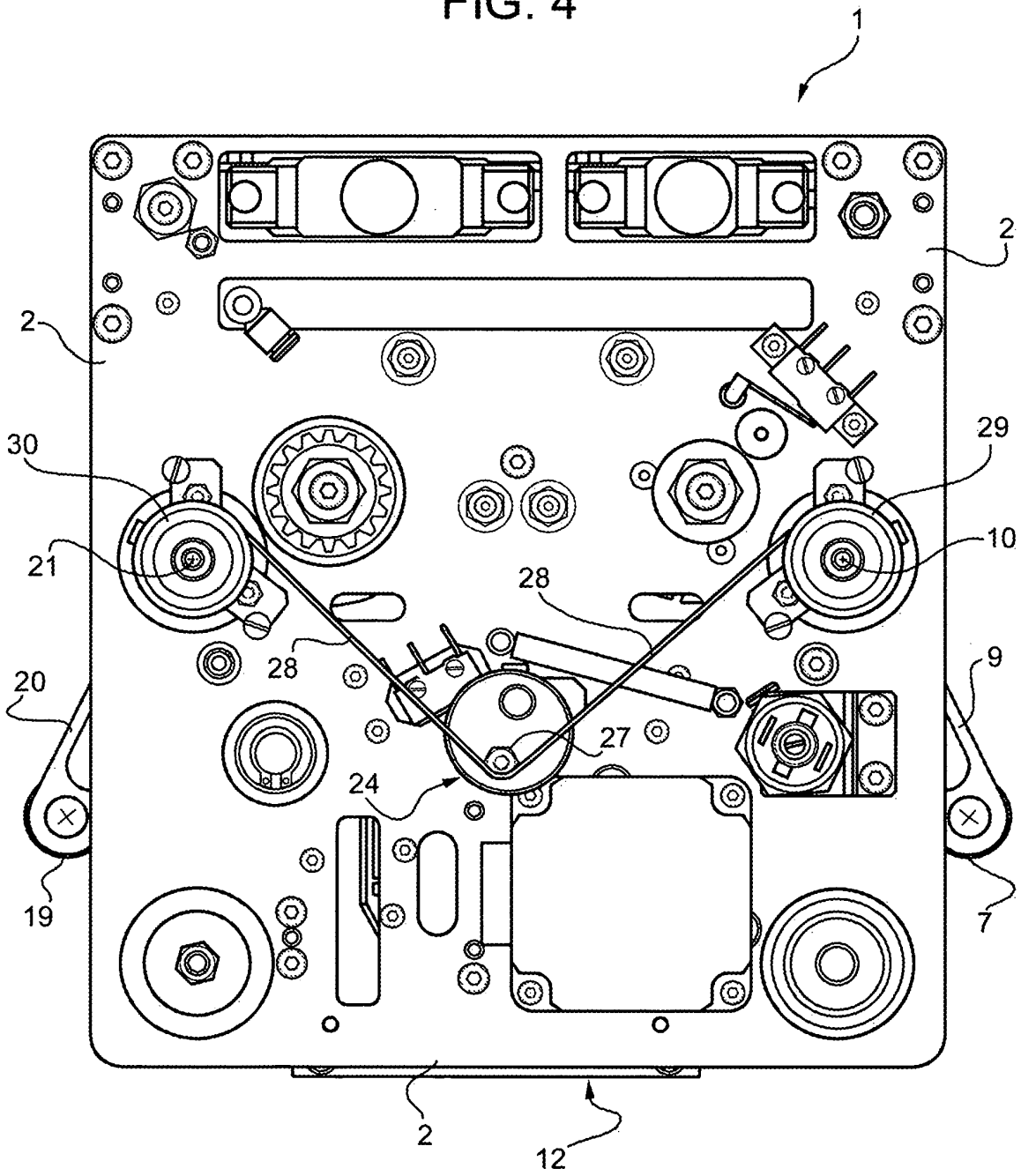
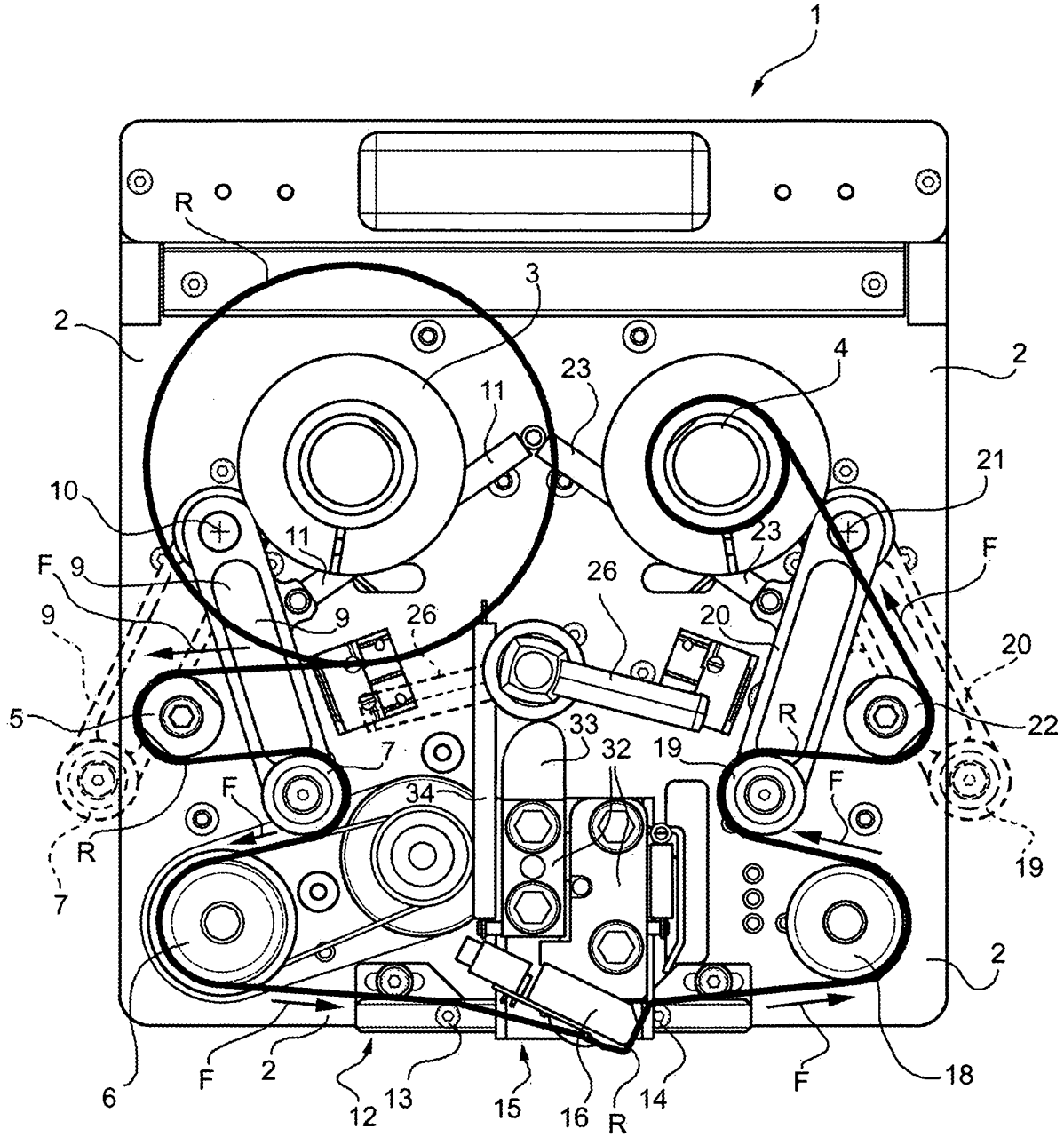


FIG. 5


1
R
3
2
4
2
23
11
21
10
11
23
F
9
F
26
9
9
26
20
20
5
33
R
22
32
19
7
F
34
F
19
R
7
2
F
2
18
6
12
13
15
16
R
14
F

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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