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(54) **Machine for packaging stacks of articles in wrapping sheets**

Maschine zum Verpacken von Stapeln von Produkten in Umhüllungszuschnitten

Machine pour emballer des piles de produits dans des feuilles d'enveloppement

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**EP-A- 0 443 787 EP-A- 1 216 922
EP-A- 1 219 538 US-A- 5 535 573**

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Description

[0001] The Patent Application no. EP 1 216 922 (BO2000A 000733) of the same Applicant, describes a machine for packaging piles of multiply paper articles, or other articles, into relative wrappings obtained from heat-weldable wrapping sheets.

[0002] Basically, the machine includes: a first line for conveying and separating the piles; a second line for intermittent feeding heat-weldable wrapping sheets to a working station, where each sheet is positioned vertically and kept in this position; a third line, fed intermittently with piles coming from the first line and passing cross-wise the above mentioned working station, aimed at moving each pile toward the above mentioned sheet arranged in wait position in said working station. The pile goes to strike against the sheet and then the sheet is folded around the longitudinal outline of the pile to allow the wrapping sheet parallel edges to be overlapped in order to be heat-welded.

[0003] Figure 1 shows a schematic view of technical-functional aspects protected by the above mentioned Patent Application.

[0004] The above mentioned second line 2 includes a reel (not shown), from which a heat-weldable film K, for example polyethylene, is unwound continuously.

[0005] The film K passes through a so-called slow branch 16, more precisely between opposite runs of pairs of endless conveyors 16A, 16B, only one pair of which is shown in Figure. The runs are moved with a constant speed V_0 .

[0006] A cutting group 15 is situated upstream of the slow branch and makes, stepwise, transversal cut lines (defining as many pre-broken sections) spaced apart by a predetermined step in accordance with the pile size.

[0007] It is to be pointed out that the mutual contact between the opposite runs 16A, 16B allows on one hand to pull the film K, but on the other hand, it allows slipping of a sheet F, obtained by tearing the pre-broken section, between the facing runs.

[0008] A working group 70, situated downstream of the slow branch 16, takes over the leading edge of the film K going out of the slow branch, detaches the sheet F from the film K, pulls the detached sheet F up to the above mentioned working station So and keeps it still therein.

[0009] The group 70 includes first means and second means.

[0010] The first means include a pair of first endless belts 18, only one of which is shown in Figure 1, mounted around idler wheels 19 and a driving wheel 20, to define a vertical straight section in the region of the station So, and engaging the edges of a face of the sheet F.

[0011] The second means include a pair of second endless belts 22 (only one of which shown in Figure 1), mounted around idler wheels 23 and a driving wheel 24 to engage the edges of the other face of the sheet F and to define a short vertical straight section in the region of

the station So.

[0012] The mutual spatial arrangement of the first and second endless belts 18, 22 defines two facing runs 18A, 22A, having one side situated in cascade to the runs 16A, 16B of the slow branch and the other side leading to the station So.

[0013] The height of the lower idler wheel 23A is adjustable vertically during size change over operation (see position M indicated with broken line) by acting on tensioning means 25: consequently, also the vertical straight section of contact between the facing runs 18A, 22A of the first and second belts 18, 22 changes.

[0014] At the station So, the inner runs of the first belts are connected to means 30, which can be connected to a vacuum source: for this purpose, the first belts feature through holes set into communication with these means.

[0015] Upstream of the working station So, more precisely in a receiving station SR, which is integral part of the above mentioned third line, there is a slide 32 moving longitudinally according to to-and-from strokes, along the track defined by the direction W3.

[0016] The lower part of the slide carries a base plate 8, while the upper part of the slide carries a presser plate 33, parallel to the base plate 8, and the side part of the slides supports a pusher 34, perpendicular to the base plate.

[0017] Two endless conveyors 35, 36, arranged one over the other, are situated downstream of the working station So; the upper run 35A of the lower conveyor 35 is coplanar with the support base plate 8.

[0018] Obtaining the sheet F, its transferring to the station So, its keeping therein and finally, its extrusion by the pile P, are deducible from the Figure 1, as well as from the enclosed Figure 2.

[0019] The first and second endless belts 18, 22 are operated with the same speed, whose progress in function of time is shown in Figure 2.

[0020] In the time interval T1, the speed V_A is equal to the speed V_0 of the slow branch 16; in this interval, the leading edge of the film K enters between the initial parts of the facing runs 18A, 22A.

[0021] The same speed facilitates and optimizes the entrance action.

[0022] Afterwards, the speed of the belts reaches suddenly the maximum value V_B and maintains it for the time interval T2*; the quick acceleration imposed to the film makes the sheet F detach from the film due to breaking of the precut section made by the cutting group 15.

[0023] The sheet F, not hindered by the slow branch 16, is conveyed to the station So and passes through it because its edges are kept adherent to the inner run 18C due to the operation of the means 30.

[0024] When the time interval T2, practically equal to T2*, is finished, the speed is set to zero and the means 30 are still operated: in this situation, which is maintained for a time interval T3, the sheet F is stabilized in vertical position, normal to the direction W3, because its upper part is clamped between the facing runs 18A, 22A

of the first and second belts 18, 22 and kept adherent to the first belts due to the suction action of the means 30.

[0025] In step relation with the steps just mentioned, the presser plate 33 compresses the pile P and reaches the level of the lower run 36A of the upper conveyor 36, and the slide 32 translates in the direction W3, which brings the ends of the base plate 8 and the presser plate to strike the sheet F.

[0026] In step relation with the above mentioned striking action, the speed of the first and second belts 18, 22 reaches a speed VC, equal to the so-called "extrusion" speed.

[0027] In step relation with the slide stop, the pusher 34 is operated to "extrude" the pile P, compressed between the opposite surfaces of the base plate 8 and the presser plate 33, and to introduce it between the runs 35A, 36A of the conveyors 35, 36.

[0028] The speed VC, with which the belts 18, 22 feed the upper portion of the sheet is equal to the extrusion speed of the pile.

[0029] After the pile P had been introduced between the above mentioned runs, the slide 32 moves back, the pusher 34 moves back with respect to the slide and the presser plate 33 rises: the initial conditions are restored.

[0030] According to an interesting variant, the speed of the first and second endless belts 18, 22 is not set to zero; in other words, the speed VB passes directly to the speed VC (see the portion GX indicated with broken line in Figure 2): this allows reducing the stresses caused to the sheet F by the speed variations and has the positive effect, when necessary, to it possible reduce the time needed to place the sheet F in waiting position in the working station So.

[0031] The Patent Application num. BO2001A 000297 of the same Applicant proposes interesting variants of the just described technical solution.

[0032] Actually, the functions of the presser plate 33 and of the base plate 8 are fulfilled by as many endless conveyors, operated in a suitable moment to fulfill also the function of the pusher, which therefore, is not necessary any more.

[0033] Consequently, only one sheet F is present between the facing runs of the first and second belts 18, 22, in the interval TO, as considered from the entrance moment of the film K leading edge between the belts to the end moment of the extrusion step; obviously, the extension of the first belts 18 allows to pull the sheet F relative to the maximum size of the pile P, and place it in the station So.

[0034] Sheets of smaller length are used for piles, whose size is smaller than the maximum one.

[0035] The technical solutions proposed by the two above mentioned Patent Applications do not allow to increase the production rate when the length of used sheets is smaller than the maximum one, because the distance that the sheet must cover is always the same.

[0036] Consequently, with the sheet F placed in the

working station So, a distance is defined between the terminal part of the sheet F and the inlet of the facing runs of the first and second belts 18, 22, which must be covered by the sheet anyway and cannot be occupied by the next sheet, due to the above reasons.

[0037] In other words, the distance is the same independently from the size of the sheet; when the size gets smaller, the machine speed, expressed in the number of packages per minute, increases, and consequently, also the sheet speed increases.

[0038] The machines produced in accordance with the technical solutions proposed by the above mentioned Patent Applications, allow to obtain an acceptable speed for the sheets of maximum size, with reference to the feeding of the sheet F to the working station, since the number of packages per minute is minimal. These machines, however, reaches an excessive speed with reference to the sheets of smaller size, since the speed increase results from the increase of the number of packages which the machine can produce per minute.

[0039] The object of the present invention is to propose a machine for packaging piles of articles into relative wrappings obtained from wrapping sheets, which allows an adjustment of the sheet feeding frequency to a working station, in relation to the length of the sheets, i. e. to the size of piles.

[0040] Another object of the present invention is to propose a machine which allows to increase the feeding frequency when the sheets length diminishes, all obtained in a rapid and automatic way, and without downtime for the machine.

[0041] A further object of the present invention is to propose a machine which achieves the above mentioned objects by a technical solution, which is simple, in comparison to the obtained results, and reliable.

[0042] The above mentioned objects are obtained in accordance with the contents of the claims.

[0043] The characteristic features of the present invention will be pointed out in the following description of a preferred, but not unique embodiment, with reference to the enclosed drawings, in which:

- Figures 1, 2 show some technical-functional aspects of the technical solution described in the introduction;
- Figure 3 shows a schematic view of the technical-functional aspects characterizing the proposed machine;
- Figures 4, 5 are schematic views of two working steps obtained by the machine proposed by the invention.

[0044] In the Figures 3, 4, 5 the same reference numbers have been used for the elements and/or devices common with the solution shown in Figure 1, more precisely for what concerns the slow branch 16, the station

So, the station SR and the conveyors 35, 36.

[0045] Two working groups G1, G2, first and second respectively, are positioned one the other and in cascade to the slow branch 16.

[0046] The second working group G2 is situated at the above mentioned working station So.

[0047] The first group includes a pair of first endless conveying belts 118, only one of which is shown, mounted around idler wheels 119 and a driving wheel 120.

[0048] The inner runs 118A of the first belts face opposite inner runs 122A of corresponding second endless conveying belts 122 mounted around idler wheels 123 and a driving wheel 124.

[0049] The facing runs 118A, 122A of the belts engage, on opposite sides, the edges of the sheet F.

[0050] The driving wheels 120, 124 are operated synchronously by suitable motor means, not shown, controlled by a control unit C.

[0051] The second group G2 includes a pair of first endless working belts 78, only one of which is shown, trained around idler pulleys 79 and a driving pulley 80.

[0052] The inner run 78A of the belts passes through the station So and is acted on by suction means 30, which perform their action through holes made in the belts.

[0053] The initial portions of said inner runs 78A face the inner runs 88A of corresponding second endless working belts 88, trained around idler pulleys 89 and a driving pulley 90; the height of the lower idler wheel 89A is adjustable by tensioning means 95.

[0054] It is to be specified that the inner runs 78A of the first belts 78 engage the edges of one face of the sheet F, while the inner runs 88A of the second belts, facing the inner runs of the first belts, engage the edges of the other face of the sheet in the upper part up to the working station So.

[0055] The driving wheels 80, 90 are operated synchronously by suitable motor means, not shown, controlled by a control unit C.

[0056] Consequently, the two groups G1, G2 are operated independently one from the other, which is extremely advantageous for the reasons explained below.

[0057] Figure 3 refers to the maximum size of the pile P, as the example.

[0058] Figures 4, 5 refer to the size P* smaller than the maximum one.

[0059] With reference to Figure 4, the reference F* indicates the sheet corresponding to the above mentioned size P*; this sheet is placed vertically and held in this position by the action of the facing runs 78A, 88A of the first and second working belts 78, 88, and by the adherence action performed on the inner runs 78A of the first belts 78 by the suction means 30.

[0060] It is to be specified that the sheet F* placed in the station So does not engages the belts of the first group G1 (Figure 4).

[0061] As mentioned in the introduction, the translation (in direction W3) of the slide 32 causes the ends of

the base plate 8 and of the presser plate 33 to strike against the sheet F*; in step relation with this striking action, the first and second working belts 78, 88 are operated synchronously with the speed which is equal to the extrusion speed and which is maintained until the pile P* and the relative sheet F*, wrapping progressively three sides of the pile, are wholly introduced between the opposite runs 35A, 36A of the conveyors 35, 36.

[0062] After the above introduction, the slide 32 moves back and the pusher 34 moves back with respect to the slide.

[0063] During the just described operations, the leading edge KA of the film K is introduced between the facing runs 118A, 122A of the belts of the first group G1, which pull the film K with a speed equal to the speed Vo of the slow branch 16: this is possible, because the first group G1 is not engaged by the previous sheet F*.

[0064] In step relation with the disengaging of the slide 32 from the working station So, the leading edge KA of the film K is situated near the final part of the opposite runs 118A, 122A; therefore, the leading edge KA can be introduced between the opposite runs 78A, 88A of the first and second working belts 78, 88.

[0065] After the leading edge KA of the film K had been introduced between the opposite runs of the belts of the second group G2, the latter are suddenly accelerated, synchronously with the belts of the first group, so as to detach the sheet F* from the film K in the region of the pre-broken line (Figure 5).

[0066] After the above sheet F* had been disengaged from the belts of the first group, the latter are brought back to the speed Vo of the slow branch.

[0067] The working belts of the second group are aimed at transferring the sheet F* to the station So, where it is placed and held in the already described way.

[0068] Consequently, due to the proposed solution, the leading edge KA is moved as close as possible to the beginning of the opposite runs 78A, 88A of the working belts of the second group, and then to the working station So.

[0069] This feature allows to adapt the time needed to place the sheet F* in the station So, since the leading edge KA of the sheet can be placed as close as possible to the beginning of the opposite runs 78A, 88A of the working belts when the length of the sheet reduces: consequently, the distance to cover, and therefore, the speed, reduces together with the same "machine duty cycle".

[0070] This advantageous feature results from the fact that the sheet F* placed in the station So engages only the belts 78, 88 of the second group G2, so the opposite runs 118A, 122A of the belts of the first group allow the leading edge KA of the film to be moved close to the beginning of the opposite runs of the second group, and then to the working station So, although the latter are still engaged by the extrusion step.

[0071] Consequently, it is possible to increase the frequency, with which the sheets F* can be placed in the

station So together with the reduction of the size: therefore, it is possible to increase the machine production rate, i.e. the number of packages produced per minute.

[0072] The groups G1, G2 are structurally independent, therefore they can be operated in different ways.

[0073] Nothing prevents from operating them synchronously in any working step, so as to re-propose the conditions of the technical solutions mentioned in the introduction.

[0074] This is extremely advantageous for the maximum possible size of the pile, or for sizes beyond a predetermined value, which need such dimensions of a sheet F that, when placed in the working station So, it engages the opposite runs 78A, 88A of the working belts as well as the opposite belts 118A, 122A of the conveying belts.

[0075] The advantages of the technical solution proposed by the present invention do not depend on the conformation of the station SR, which can be of the type shown in the enclosed Figures or of the type protected by the mentioned Application no. BO2001A000297.

[0076] Consequently, the proposed machine, with reference to feeding sheets F, F* in the working station So, can increase the production rate by passing from the maximum size P of the pile to the smaller sizes P*.

Claims

1. Machine for packaging piles of articles into relative wrappings obtained by wrapping sheets, of the type including:

- a first line for conveying and separating said piles (P,P*);
- a second line (2), for feeding intermittently heat-weldable wrapping sheets (F,F*) to a working station (So) in which each sheet (F,F*) is positioned vertically and kept in this position, comprising conveying means (16) for receiving and transferring a heat-weldable film (K) and a cutting group (15) situated upstream of said conveying means (16) for making, stepwise, transversal cut pre-broken lines in the film (K) spaced apart by a predetermined step in accordance with the pile (P,P*) size for defining successive wrapping sheets (F,F*);
- a third line (32,33,34,35,36), fed intermittently upstream with piles (P,P*) coming from said first line and passing crosswise said working station (So), for moving at least one pile (P,P*) to strike the above mentioned sheet (F,F*) placed in waiting position in said working station (So), with progressive folding of the sheet (F,F*) around a longitudinal outline of the pile (P,P*), and overlapping the relative parallel edges, which are heat-welded;

characterized in that said second line (2) includes:

a first working group (G1), situated downstream of said conveying means (16),
a second working group (G2) situated in cascade of said first working group (G1) in the region of said working station (So),
a control unit (C) for operating and verifying said first and second groups (G1,G2), whereby said first working group (G1) is aimed at receiving a wrapping sheet (F,F*) connected to said film (K) by a pre-broken line from said conveying means (16) and at feeding the leading edge of said film (K) to said second working group (G2), and said second group (G2) is aimed at receiving the leading edge of said film (K) and at cooperating with said first working group (G1) to first detach said sheet (F,F*) from the film (K) in the region of the correspondent pre-broken line, and then to feed and place the detached sheet (F,F*) in correspondence to said working station (So).

2. Machine, according to claim 1, **characterized in that** the extension of said second group (G2) allows receiving the entire said sheet (F,F*), which is included in a predetermined range of sizes (P,P*) of said pile.

3. Machine, according to claim 1, **characterized in that** said two groups (G1,G2) are operated with the same speed when both engage the sheet (F, F*).

4. Machine, according to claim 1, **characterized in that** the total extension of the two groups (G1,G2) allows receiving said sheet, which is included in a predetermined range of sizes (P,P*) of said pile.

5. Machine, according to claim 1 or 3 or 4, **characterized in that** said first group (G1) includes:

at least one pair of first endless conveying belts (118), operated synchronously and mounted around relative wheels (119), one of which (120) is a driving pulley;
at least one pair of second endless conveying belts (122) operated synchronously and mounted around relative wheels (123), one of which (124) is a driving pulley;
said first and second conveying belts being arranged spatially with the relative facing runs (118A,122A) engaging, on opposite sides, the edges of said sheet (F,F*);
motor means, controlled by said control unit (C) to drive said driving wheels (120,124) to rotate synchronously.

6. Machine, according to claim 1 or 2 or 3 or 4, **char-**

acterized in that said second group (G2) includes:

at least one pair of first endless working belts (78), mounted around relative pulleys (79), one of which (80) being a driving pulley, operated synchronously and arranged spatially in such a way as to engage the relative edges of a face of said sheet (F,F*) and to define a vertical section passing through said working station (So);

at least one pair of second endless working belts (88), mounted around relative pulleys (89), one of which (90) being a driving pulley, arranged spatially in such a way that the runs (88A), which face runs (78A) of said first belts (78), engage the relative edges of the other face of said sheet upstream, up to said working station (So);

suction means (30), connected to the vertical section of said first belts (78) at least in the region of the working station, aimed at making the edges of the sheet face related to said belts to adhere to said belts;

motor means, controlled by said control unit (C) for driving said control unit into synchronous rotation.

7. Machine, according to claim 6, **characterized in that** at least one pair of pulleys (89A), around which said second belts (88) are mounted, and which are situated in the working station (So), moves vertically.

Patentansprüche

1. Maschine zum Verpacken von Stapeln aus Gegenständen in entsprechende Umhüllungen, die aus Umhüllungsbögen erhalten werden, welche umfasst:

- eine erste Linie zum Fördern und Trennen der Stapel (P, P*);
- eine zweite Linie (2) zum intermittierenden Zuführen wärmeschweißbarer Umhüllungsbögen (F, F*) zu einer Arbeitsstation (So), in der jeder Bogen (F, F*) vertikal angeordnet und in dieser Lage gehalten wird, mit Fördermitteln (16) zum Empfangen und Übertragen eines wärmeschweißbaren Films (K) und einer Schneidgruppe (15), die stromauf der Fördermittel (16) angeordnet ist, um quergeschnittene Schwächungslinien in dem Film (K) schrittweise herzustellen, welche um einen vorgegebenen Schritt entsprechend der Größe des Stapels (P, P*) beabstandet sind, um aufeinanderfolgende

- Umhüllungsbögen (F, F*) zu bilden, eine dritte Linie (32, 33, 34, 35, 36), die stromauf intermittierend mit Stapeln (P, P*) beaufschlagt wird, welche von der ersten Linie kommen und die Arbeitsstation (So) kreuzen, um zumindest einen Stapel (P, P*) so zu bewegen, dass er den erwähnten Bogen (F, F*) trifft, welcher in Wartestellung in der Arbeitsstation (So) angeordnet ist, wobei der Bogen (F, F*) fortschreitend um einen longitudinalen Umriss des Stapels (P, P*) gefaltet wird und die entsprechenden parallelen Ränder überlappt werden, welche wärmeverschweißt werden;

dadurch gekennzeichnet, dass die zweite Linie (2) umfasst:

eine erste Arbeitsgruppe (G1), die stromab der Fördermittel (16) angeordnet ist, eine zweite Arbeitsgruppe (G2), die kaskadenförmig zu der ersten Arbeitsgruppe (G1) im Bereich der Arbeitsstation (So) angeordnet ist, eine Steuereinheit (C) zum Betreiben und Verifizieren der ersten und zweiten Gruppe (G1, G2), wodurch, die erste Arbeitsgruppe (G1) dazu bestimmt wird, einen Umhüllungsbogen (F, F*), der mit dem Film (K) durch eine Schwächungslinie verbunden ist, von den Fördermitteln (16) zu empfangen und den vorderen Rand des Films (K) der zweiten Arbeitsgruppe (G2) zuzuführen, und die zweite Gruppe (G2) dazu bestimmt ist, den vorderen Rand des Films (K) zu empfangen und mit der ersten Arbeitsgruppe (G1) zusammenzuwirken, um den besagten Bogen (F, F*) von dem Film (K) im Bereich der entsprechenden Schwächungslinie zu lösen und dann den gelösten Bogen (F, F*) in Übereinstimmung mit der Arbeitsstation (So) zu fördern und anzuordnen.

2. Maschine nach Anspruch 1, **dadurch gekennzeichnet, dass** die Ausdehnung der zweiten Gruppe (G2) eine Aufnahme des gesamten Bogens (F, F*) ermöglicht, welcher innerhalb eines vorgegebenen Bereiches von Größen (P, P*) des Stapels liegt.
3. Maschine nach Anspruch 1, **dadurch gekennzeichnet, dass** die beiden Gruppen (G1, G2) beim Erfassen des Bogens (F, F*) mit derselben Geschwindigkeit betrieben werden.
4. Maschine nach Anspruch 1, **dadurch gekennzeichnet, dass** die gesamte Ausdehnung der beiden Gruppen (G1, G2) einen Empfang des Bogens ermöglicht, welcher innerhalb eines vorgegebenen Bereiches von Größen (P, P*) des Stapels liegt.
5. Maschine nach Anspruch 1 oder 3 oder 4, **dadurch**

gekennzeichnet, dass die erste Gruppe (G1) umfasst:

mindestens ein Paar erster endloser Förderbänder (118), die synchron betrieben werden und um entsprechende Räder (119) gelagert sind, von denen eines (120) eine treibende Rolle ist;

mindestens ein Paar zweiter endloser Förderbänder (122), die synchron betrieben werden und um entsprechende Räder (123) gelagert sind, von denen eines (124) eine treibende Rolle ist;

wobei das erste und zweite Förderband räumlich mit den entsprechenden zugewandten Trumen (118A, 122A) angeordnet sind, welche auf gegenüberliegenden Seiten an den Rändern des besagten Bogens (F, F*) angreifen; Motormittel, die von der Steuereinheit (C) gesteuert werden, um die treibenden Rollen (120, 124) so anzutreiben, dass sie synchron drehen.

6. Maschine nach Anspruch 1 oder 2 oder 3 oder 4, **dadurch gekennzeichnet, dass** die zweite Gruppe (G2) umfasst;

mindestens ein Paar endloser Arbeitsbänder (78), die um entsprechende Rollen (79) herum gelagert sind, von denen eine (80) eine treibende Rolle ist, welche synchron betrieben werden und räumlich so angeordnet sind, dass sie an den entsprechenden Rändern einer Seite des besagten Bogens (F, F*) angreifen und einen vertikalen Abschnitt definieren, der durch die Arbeitsstation (So) verläuft;

mindestens ein Paar zweiter endloser Arbeitsbänder (88), die um entsprechende Rollen (89) herum gelagert sind, von denen eine (90) eine treibende Rolle ist, welche räumlich so angeordnet sind, dass die Trume (88A), die Trumen (78A) der ersten Bänder (78) zugewandt sind, an den entsprechenden Rändern der anderen Seite des besagten Bogens stromauf bis zu der Arbeitsstation (So) angreifen;

Saugmittel (30), die mit dem vertikalen Abschnitt der ersten Bänder (78) zumindest im Bereich der Arbeitsstation verbunden sind, dazu bestimmt, die Ränder der den Bändern zugehörigen Bogenfläche an den Bändern haften zu lassen; Motormittel, die von der Steuereinheit (C) gesteuert werden, um die Steuereinheit mit synchroner Drehung anzutreiben.

7. Maschine nach Anspruch 6, **dadurch gekennzeichnet, dass** mindestens ein Paar Rollen (89A), um die die zweiten Bänder (88) herum gelagert und in der Arbeitsstation (So) angeordnet sind, sich vertikal bewegt.

Revendications

1. Machine pour emballer des piles d'articles, dans des emballages relatifs réalisés avec des feuilles d'emballage, du type comprenant:

- une première ligne pour le convoyage et la séparation desdites piles (P, P*);
- une seconde ligne (2) pour l'amenée intermittente de feuilles d'emballage (F, F*) thermosoudables à un poste de travail (So), dans lequel chaque feuille (F, F*) est positionnée verticalement et retenue dans cette position, comprenant des moyens de convoyage (16) pour recevoir et transférer un film thermosoudable (K) et une unité de coupe (15) située en amont desdits moyens de convoyage (16) pour former pas à pas des lignes de prédécoupage découpées transversalement dans le film (K) séparées par un pas prédéterminé conformément à la taille de la pile (P, P*) pour définir des feuilles d'emballage successives (F, F*),
- une troisième ligne (32, 33, 34, 35, 36), alimentée de façon intermittente en amont avec des piles (P, P*) arrivant de ladite première ligne et traversant ledit poste de travail (So) pour déplacer au moins une pile (P, P*) pour rencontrer la feuille (F, F*) mentionnée plus haut, placée dans une position d'attente dans ledit poste de travail (So), avec un pliage progressif de la feuille (F, F*) autour d'un contour longitudinal de la pile (P, P*) et avec chevauchement des bords relatifs parallèles, qui sont thermosoudés;

caractérisée en ce que ladite seconde ligne (2) inclut:

un premier groupe de travail (G1) situé en aval desdits moyens de convoyage (16),
un second groupe de travail (G2) situé en cascade avec ledit premier groupe de travail (G1) dans la région dudit poste de travail (So),
une unité de commande (C) pour faire fonctionner et vérifier lesdits premier et second groupes (G1, G2), ledit premier groupe de travail (G1) étant destiné à recevoir une feuille d'emballage (F, F*) raccordée audit film (K) par une ligne prédécoupée à partir desdits moyens de convoyage (16) et à amener le bord avant dudit film (K) audit second groupe de travail (G2), et ledit second groupe (G2) étant destiné à recevoir le bord avant dudit film (K) et, en coopération avec ledit premier groupe de travail (G1), à détacher tout d'abord ladite feuille (F, F*) du film (K) dans la région de la ligne prédécoupée correspondante, puis amener et placer la feuille détachée (F, F*) en correspondance avec ledit poste de

travail (So).

2. Machine selon la revendication 1, **caractérisée en ce que** l'extension dudit second groupé (G2) permet de recevoir l'ensemble de ladite feuille (F, F*), qui est incluse dans une gamme prédéterminée de tailles (P, P*) de ladite pile. 5
3. Machine selon la revendication 1, **caractérisée en ce que** lesdits deux groupes (G1, G2) fonctionnent à la même vitesse lorsque les deux groupes s'appliquent contre la feuille (F, F*). 10
4. Machine selon la revendication 1, **caractérisée en ce que** l'extension totale des deux groupes (G1, G2) permet de recevoir ladite feuille, qui est incluse dans une bande prédéterminée de tailles (P, P*) de ladite pile. 15
5. Machine selon la revendication 1 ou 3 ou 4, **caractérisée en ce que** ledit premier groupe (G1) inclut: 20

au moins une paire de premières bandes convoyeuses sans fin (118) actionnées d'une manière synchrone et montées autour de roues relatives (119), dont l'une (120) est une poulie motrice; 25

au moins une paire de secondes courroies de convoyage (122) fonctionnant de façon synchrone et montées autour de roues relatives (123), dont l'une (124) est une poulie motrice; 30
lesdites première et seconde bandes convoyeuses étant disposées spatialement avec leurs sections (118A, 122A) en vis-à-vis s'appliquant, sur des faces opposées, contre les bords de ladite feuille (F, F*); 35
des moyens en formant moteur commandés par ladite unité de commande (C) pour entraîner lesdites roues motrices (120, 124) pour qu'elles tournent d'une manière synchrone. 40

6. Machine selon la revendication 1 ou 2 ou 3 ou 4, **caractérisée en ce que** ledit second groupe (G2) inclut: 45
au moins une paire de premières courroies de travail sans fin (118) montées autour de poulies relatives (119), dont l'une (80) est une poulie motrice, fonctionnant de façon synchrone et agencée spatialement de manière à s'appliquer contre les bords relatifs d'une face de ladite feuille (F, F*) ou à définir une section verticale traversant ledit poste de travail (So); 50
au moins une paire de secondes courroies de travail sans fin (88) montées autour de poulies relatives (89), dont l'une (90) est une poulie motrice, disposée spatialement de telle sorte que les sections (88A) qui font face aux sections 55

(78A) desdites premières courroies (78) s'appliquent sur les bords relatifs de l'autre face de ladite feuille en amont, jusqu'audit poste de travail (So);

des moyens d'aspiration (30), raccordés à la section verticale desdites premières courroies (78) au moins dans la région du poste de travail, ayant pour but d'amener les bords de la face de la feuille associée auxdites courroies à adhérer auxdites courroies;

des moyens formant moteur, commandés par ladite unité de commande (C) pour entraîner ladite unité de commande selon une rotation synchrone.

7. Machine selon la revendication 6, **caractérisée en ce qu'**au moins une paire de poulies (89A), autour desquelles lesdites secondes courroies (88) sont montées et qui sont situées dans le poste de travail (So), se déplacent verticalement.

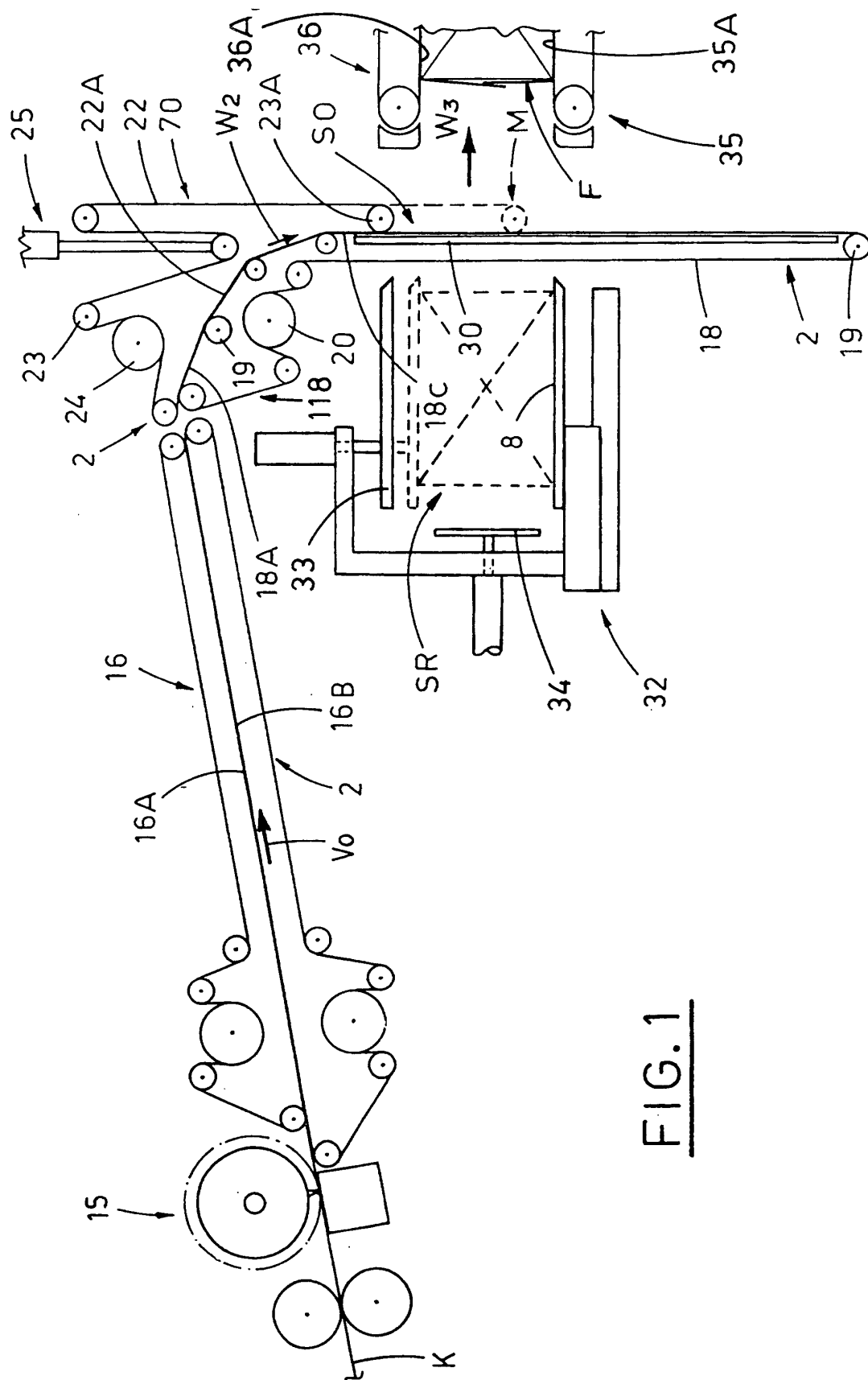
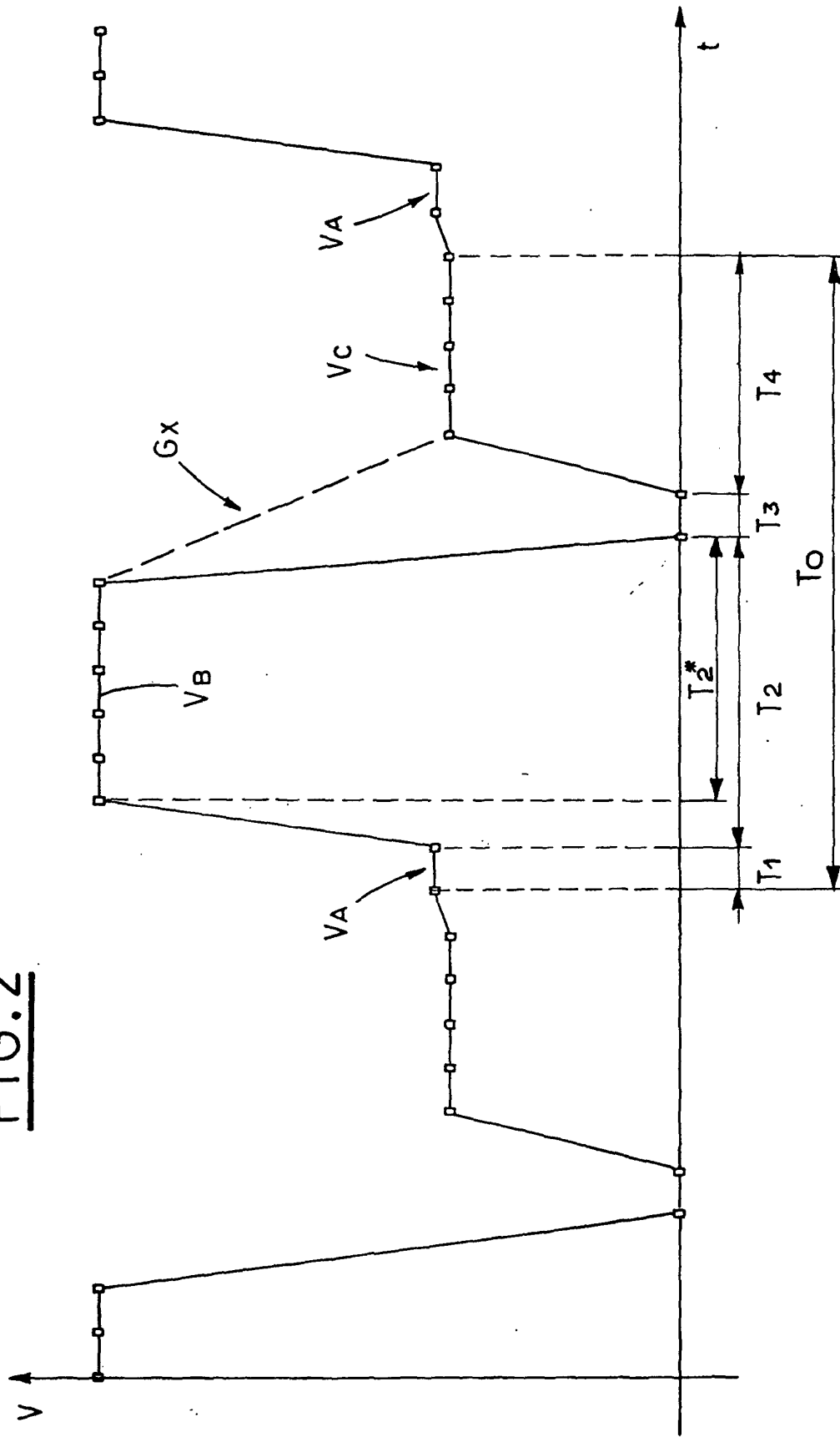
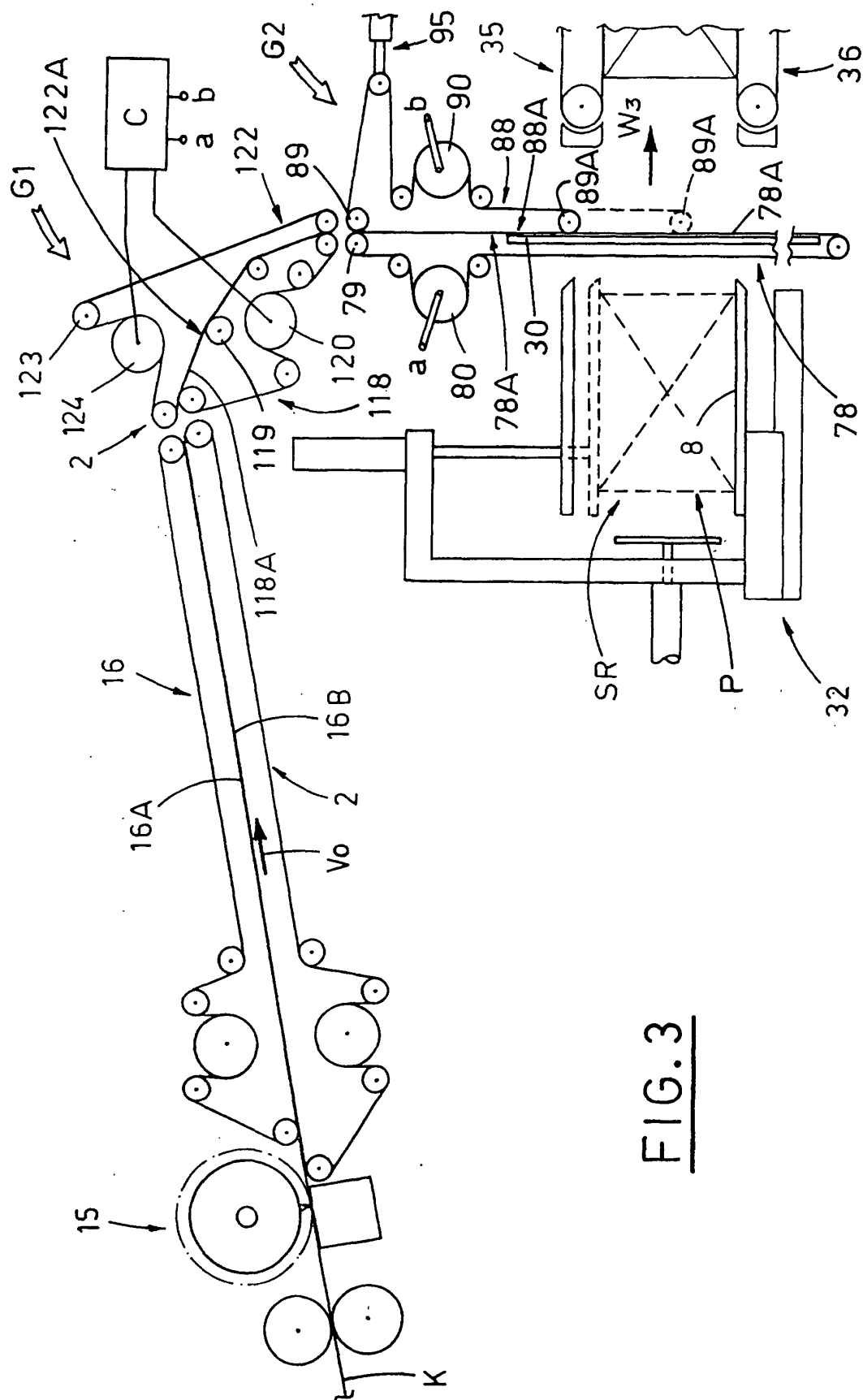
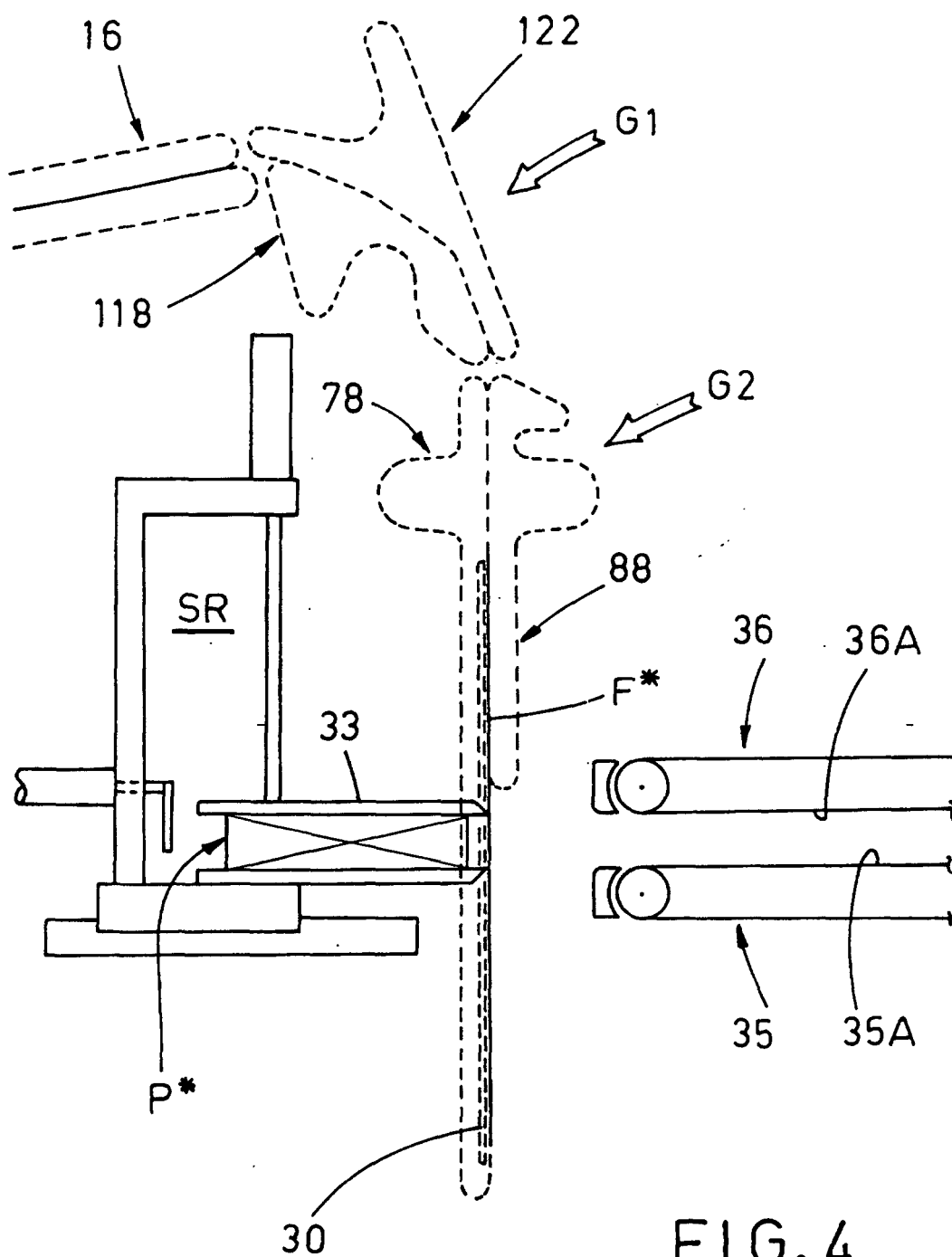


FIG. 1

FIG.2







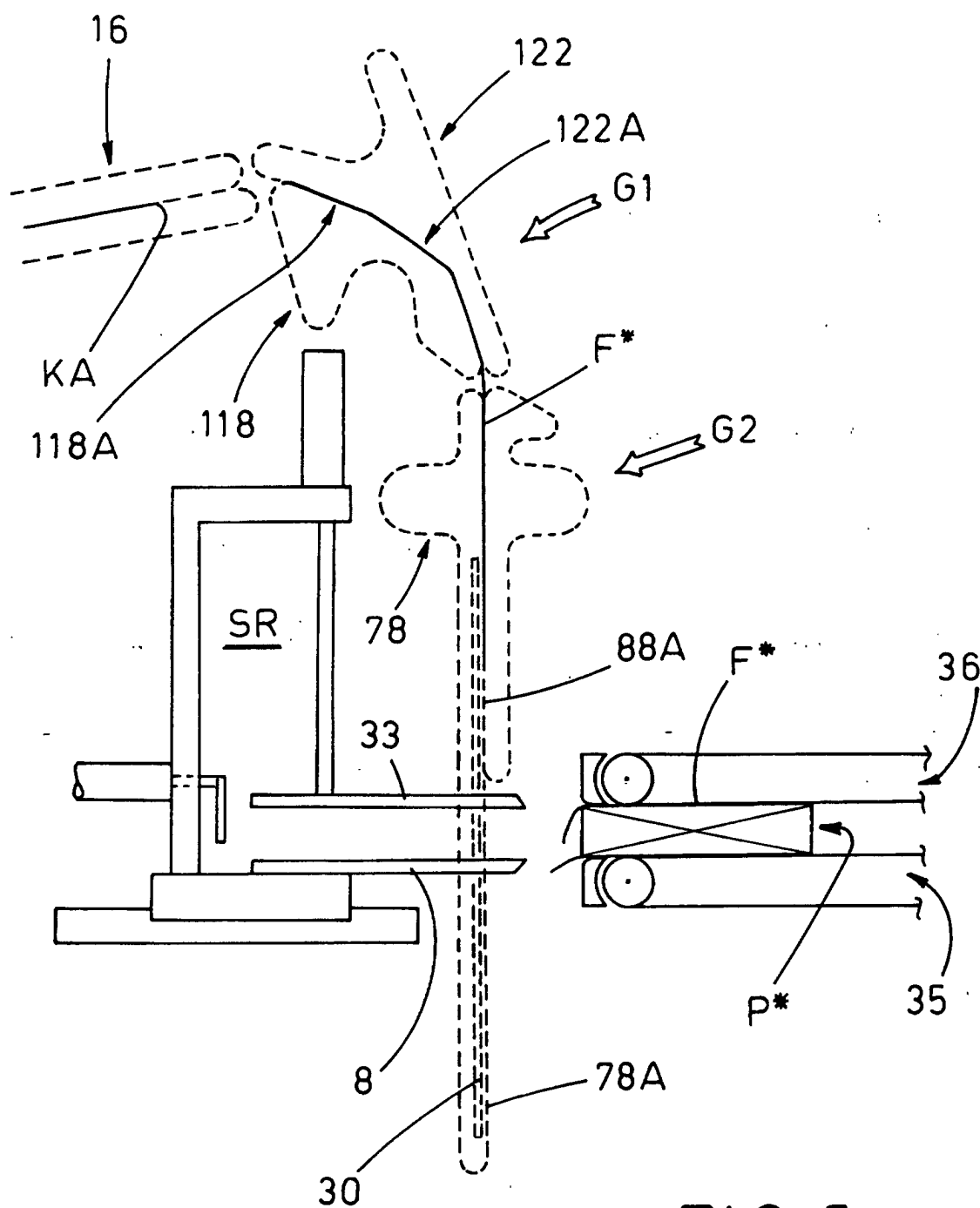


FIG. 5