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(54) Envelope filling machine

Gerät zum Füllen von Umschlägen

Machine de remplissage d'enveloppes

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EP 2 000 324 B1

Description

[0001] The present invention relates to an envelope filling machine, aimed in particular at introducing sheets into envelopes. Documents WO06/1103.465 EP1.473.173 and EP1.226.980 are example of known envelope filling machine. In particular document EP 1.275.523 describes an envelope filling machine according to the preamble of claim 1.

[0002] The development of the so-called "mailing" field, that includes sending sheet printed materials, such as letters, advertisement prints, brochures, magazines, and the like (in the following referred to as sheets) to a large number of different addressees, often entrusted to utility firms, creates the need of envelope filling machines, which can stuff envelopes at very high speeds.

[0003] Some envelope filling machines form the envelopes from a paper sheet folded around the material to be mailed. Other envelope filling machines introduce the sheets into already formed envelopes. The empty envelopes are stacked within a storage area, such as a vertical magazine, from which they are taken and supplied one by one to an envelope filling station.

[0004] The envelope magazine and the means used to supply the envelopes to the filling station form a unit better known as envelope feeder.

[0005] Other means, commonly designated as sheet feeders, place the materials (sheets, prints, brochures, magazines and so on) to fill the envelopes, onto a sliding surface below. Transferring means act along the sliding surface and, in step relation with the envelope feeding, transfer the sheets to the envelope filling station.

[0006] The envelope filling machine of the present invention belongs to this last mentioned type of machine, i.e. it inserts materials (sheets, prints, brochures, magazines and so on) into already formed envelopes.

[0007] The envelope feeder delivers the envelopes to the filling station where suitable means open the apertures of the envelopes, e.g. with jets of air.

[0008] According to a known solution, the envelopes feeder is situated above the sliding surface, just upstream of the envelope filling station.

[0009] The position of the envelope feeder above the sheet sliding surface is advantageous, because it does not cause any change in the direction of the path run by the envelopes to the filling station and beyond it.

[0010] The envelopes are transferred in sequence to the envelope filling station, in suitable time relation with the feeding of the sheets along the sliding surface.

[0011] In particular, each individual envelope is transferred to the envelope filling station after the envelope filled before has been moved away.

[0012] Obviously, this causes reduction of the machine operation speed and consequently, the production rate is lower than the one which the current high speed sheet and envelope feeding devices would allow.

[0013] According to a solution disclosed in the patent publication EP 1473173 an envelope filling machine includes a sheet conveying line and a sheet transferring line, situated downstream of the conveying line and leading to an envelope filling station.

[0014] The envelopes are transferred to the envelope filling station along a direction transversal to the transferring line the sheets.

[0015] The envelope filling station includes a pair of side-by-side vertical extending screws supported rotating on a vertical axis.

[0016] The screws are operated to rotate in opposite directions at a speed, suitably controlled according to envelope and sheet transferring steps.

[0017] The envelopes are placed in the filling station with the bottom edge inserted into the space between the two lowermost turns of each screw and the facing with the closing tab down. The side of the envelope opposite to the arriving direction rests against a side wall.

[0018] When the screws rotate, the envelope is moved upwards and a second envelope can be placed therebelow, in the space between the two lowermost threads just become free.

[0019] When the envelope reaches the space between the two uppermost turns, the sheets are pushed by the transferring line to insert into the envelope, whose aperture edges are kept wide apart by an air jet. Meanwhile, the shafts of the screws act as a stop for the envelope.

[0020] Further rotation of the screws move the filled envelope clear of the shafts, so that it can go ahead, further moved by the transferring line, to closing, stacking and so on.

[0021] There is the need of a very accurate time relation between the raise of the envelope above the screw shafts and the arrival of the leading edges of the sheets at the bottom of the envelope. In case the leading edges of the sheets contact the bottom of the envelope before the envelope is moved clear of the screw shafts, envelope and sheets can get folded and compressed, possibly causing jams.

[0022] Conversely, in the leading edges of the sheets contact the bottom of the envelope too late, after that the envelope is moved clear of the screw shafts, insertion of the sheets can be uncompleted.

[0023] Such accurate time relation limit the operation speed of the machine.

[0024] Because the closing flap of the envelope is connected to the lower facing, the sheets must handled by the transferring line, which act on them from above. However, the sheets are released by sheet feeders which place them on the sliding surface.

[0025] Therefore, before reaching the filling station, the driving action on the sheets is transferred from the sliding surface, where lugs move the sheets, to a transferring conveyor acting on the sheets from above.

[0026] This transfer require accurate time relation between operation of the lugs of the sliding surface and the transferring conveyor. Also this accurate time relation need limit the operation speed of the machine.

[0027] This machine disclosed by publication EP

1473173 is effective in its operation. Raising of the envelope allows to place a new empty envelope without waiting for the one being filled to leave the filling station.

[0028] Moreover, the screw design allow a reliable handling of the envelopes, which are uniquely held between the pairs of turns.

[0029] However, further improvements in the operation speed are sought by means of the present invention.

[0030] Accordingly, the object of the present invention is to propose an envelope filling machine which introduces sheets into envelopes with a higher operation speed.

[0031] Another object of the present invention is to propose an envelope filling machine, which has a simple and functional structure, and which is highly reliable and versatile in its use.

[0032] Another object of the invention is to propose an envelope filling machine in which swelling of the envelope, due to opening by the air jet, does not shrink the envelope in width as much as to hinder insertion of the sheets.

[0033] The above mentioned objects are obtained in accordance with the content of the claims.

[0034] The characteristic features of the invention will be pointed out in the following description, with reference to the enclosed drawings, in which:

- Figure 1 is a top view of the proposed envelope filling machine;
- Figure 2 is a perspective elevation view of the envelope filling station of the machine;
- Figures 3 to 7 show lateral views of the filling station, as seen along section line III-III of Figure 1, in a sequence of operation steps.

[0035] With reference to the above figures, reference numeral 1 indicates the envelope filling station of the proposed envelope filling machine, which introduces sheets 2 into envelopes 3.

[0036] The sheets 2 are moved along a sliding surface 5. With the word "sheets" not only sheets are in fact meant, but also other items to introduce in the envelopes, such as magazines, booklets, pamphlets, letters, advertisement prints and like items.

[0037] Pushing means 7, e.g. pairs of lugs or prongs, move along the sliding surface 5 in the direction indicated with the arrow A, as they are moved by a driving line 6, situated therebelow, including e.g. endless chains.

[0038] The lugs of the pushing means 7 protrude from longitudinal slots 8 made along the sliding surface 5, and rest with the bottom on suitable support means 9, aimed at keeping the pushing means 7 in a raised position.

[0039] The envelope filling station 1 is located just downstream of the sliding surface 5. The bottom of the filling station is defined by a conveyor belt 25 that is placed after the sliding surface 5 at a slightly lower level (see Figure 3 to 7). The conveyor belt 25, which is narrower than the sliding surface 5, is operated in the same direction A and extends beyond the filling station 1, opposite to the sliding surface 5.

[0040] A pressure roller or a pair o pressure rollers 26, as shown in Figure 1, are located downstream of the station 1, in contact with the upper run of the conveyor belt 25.

[0041] Between the sliding surface 5 and the conveyor belt 25, there are situated a pair of nozzles 19, which result to be in the envelope filling station 1, The task of the nozzles 19 is that of sending jets of air toward the aperture of the envelopes 3 to make them open.

[0042] The envelope filling station 1 includes an envelope handling group 20 comprising two envelope handling means 21. The handling means 21 are formed by vertically extending screws 21.

[0043] The screws 21 are situated at both sides of the path followed by the sheets 2, so that their shafts 23 are set at a distance from one another corresponding to the width of the envelopes. The shafts are rotated by motor means, not shown in the figures, in opposite directions so that the spaces 22 between the turns, or threads, of the screws 21 "moves" downwards.

[0044] The motor means are operated continuously.

[0045] The envelopes 3 are supplied to the envelope filling station 10, in the direction indicated with the arrow B (see figure 3), extending longitudinally and concurrent with direction A of the conveying line along which the sheets 2 move.

[0046] The envelope feeder, which is not shown in its entirety in the figures 3 to 7, is located above the sliding surface 5. Only the terminal section of the envelope supplying conveyor 16 is illustrated, from which each envelope 3 exits.

[0047] The envelope feeder, as well known in this field, removes single envelopes 3 from the bottom of a stack and feeds them to the supplying conveyor 16 with horizontal arrangement. The upper facing is the one provided with the closing flap 13.

[0048] The envelope 3 exits from the conveyor 16 and is introduced between the shafts 23, above the turns of the screws 21. As mentioned before, the shafts 23 are set at a reciprocal distance corresponding to the width of the envelope. The width of the envelope is considered to be the distance between the sides of the envelope parallel to the envelope supplying direction B, in this case the shorter edges of the envelope.

[0049] To better guide the envelope toward the station 1, guiding means 14, formed e.g. by a sloping plate, are disposed above the screws 21 (see Figure 3). The front edge of the sloping plate 14 is bent upwards for facilitating guidance of the envelopes.

[0050] The leading edge 4 of the envelope, i.e. the closed edge or bottom edge of the envelope, goes in abutment against stationary stop means, constituted by stationary vertical stems 18 situated just after the shafts 23 of the screws 21, considering the forward direction A and between the screws 21. The stationary vertical stems

extend downwards up to a distance from the conveyor belt 25 equal or shorter than the space between two consecutive turns of the screws 21, i.e. sufficient to let an envelope pass thereunder (See Figure 3).

[0051] Two vertical stems give the best stability to the envelopes set against them, but it would be also possible providing only one vertical stems, for instance set in a position corresponding to a central line passing through the filling station 1.

[0052] Beside the stationary vertical stems 18, there are two movable stop means, constituted by vertical strips 17 supported by oscillating elements 15, swinging about a horizontal axis T extending crosswise to the advancement direction A. The horizontal axis T is situated just after the two stationary vertical stems 18.

[0053] Accordingly, also the vertical strips 17 can oscillate, swinging parallel to the forward direction A. The oscillating vertical strips 17 extends downwards to a level lower than the upper run of the conveyor belt 25. To allow such configuration, the strips 17 are situated bilaterally with respect to the conveyor belt 25, i.e. one at a respective side thereof.

[0054] Elastic means, not shown in the figures, are provided for keeping the hanging swinging elements 15 down.

[0055] Operation of the envelope filling machine is as follows.

[0056] The sheets 2, are fed along the sliding surface 5, being moved forward by the pushing means 7 of the driving line 6. The sheets 2 are fed to the filling station at regular intervals of time.

[0057] Meanwhile, the envelopes 3 are supplied by the feeding device via the envelope supplying conveyor 16 to the filling station 1. Each time, one envelope is positioned between the shafts 23 of the screws 21, resting above the turns thereof, and in abutments against the stationary vertical stems 18 (Figure 3).

[0058] Continuous operation of the shafts 23 make the initial edges 24 of the screws 21 go above the envelope 3 and then makes the envelope 3 be taken into the spaces 22 between the turns of the rotating screws 21 and moved downwards (Figure 4 to 6). The opposite rotation directions of the screws concur to keep the envelope pushed against the stationary vertical stems 18 and then against the movable vertical strips 17.

[0059] More than one envelope can be lodged between the turns of the screws, as it can be seen in Figure 4, which shows a moment just after the situation of Figure 3. This means that most of the time at least two envelopes 3 are present in the filling station 1, separated by the turns of the screws 21.

[0060] When the envelope 3 reaches the conveyor belt 25 below, further rotation of the screws 21 has no effect on it, since the turns of the screws slides over the facing of the envelope itself which is kept between the shafts 23 and pushed by the action of the conveyor belt 25 against the lower ends of the vertical strips 17. Figure 7 shows the situation just a moment before the envelope is completely laying on the conveyor belt 25. It can be seen that the turns of the screws keep the leading edge 4 of the envelope still raised and against the stationary stems 18.

[0061] This is the moment when the nozzles 19 are activated (again Figure 3) to open the envelope just before the sheets 2 arrive pushed by the lugs 7. The turns of the screws 21 keep opening of the envelope limited, so as to also limit swelling of the envelope, which would hinder insertion of the sheets.

[0062] Meanwhile, another envelope 3 is supplied to the station 1.

[0063] Then the lugs 7 push the sheets 2 into the open envelope 3 (See again Figure 4); the elastic force of the elastic means is strong enough to keep the envelope steady during insertion of the sheets.

[0064] When the sheets 2 go to contact the bottom of the envelope, the lugs 7 continue on their way along direction A, thus pushing forward also the filled envelope 33 (See Figure 5). This action forces now the vertical strips 17 to swing against the action of the elastic means, allowing the filled envelope 33 to pass under the stationary vertical stems 18.

[0065] When the filled envelope 33 reaches the pressure rollers 26, the lugs 7 leave the support means 9 and fall, due to gravity, tilting and bending rearward, not to push the trailing edge of the folding flap 13 downwards while turning down at the end of their forward stroke (Figure 6). The motion of the filled envelope 33 continues in exiting direction U under the action of the pressure rollers 26 and the conveyor belt 25.

[0066] This way, the filled envelope 33 leaves the envelope filling station 1 while the subsequent envelope 3 is moved downwards and a new sheet or pack of sheets 2 reaches the filling station 1 (See Figure 7).

[0067] When in normal operation, the number of envelopes 3 present in the envelope filling station 10 may substantially correspond to the number of turns of the screws 21.

[0068] The introduction of the sheet 2 through the aperture of the envelope 3 is facilitated by the opening of said aperture by the jets of air supplied by the nozzles 19 (see Figure 3).

[0069] However, the turns of the screws, as it can be seen in Figures 1 and 2, are also aimed at preventing an anomalous swelling of the envelopes 3.

[0070] Therefore, the above described envelope filling machine fulfills its object to introduce sheets into envelopes at high operation speed, considerably higher than the speed at which known machines work.

[0071] This is obtained in particular due to the substantial elimination of change of direction in the path of the envelopes and of dead times in the envelopes filling, deriving from the use of the handling group 20 equipped with the screws 21, which allow to prepare envelopes to be filled substantially in continuity with the filling and moving away of the previous envelopes.

[0072] This obviously allows to reach a very high pro-

duction rate, with very reduced costs.

[0073] It is to be pointed out that this result is obtained by a structure functional and simple, having reduced dimensions, and very reliable. The structure has been even simplified with respect to the one described in the European patent publication 1473173, and a driving conveyor has been eliminated. This eliminates also a transfer action and allows a higher operation speed

[0074] With the filling station of the present invention there is no need of setting a very accurate time relation between exiting of the envelopes from the spaces 22 and contact between the sheets 2 and the envelope bottom, because the movable stop means help to keep yieldingly the envelope during insertion. Also this allows a higher operation speed.

[0075] Naturally, all the above described means of the machine are suitably adjustable as a function of the envelopes size.

Claims

1. Envelope filling machine for introducing sheets (2) into envelopes (3), including:

a sliding surface (5) for transferring said sheets (2) in a forward direction (A) to an envelope filling station (1) due to the action of pushing means (7);

envelope supplying means (16) for supplying single envelopes (3) to said envelope filling station (1), each envelope having a leading edge (4) consisting of a closed, bottom edge of said envelope, a closing flap (13) connected to an opening of said envelope opposite to said closed, bottom edge (4), and two sides, with said envelope filling station (1) including:

at least two handling elements (21) between which said envelopes are placed one after another, said handling elements being capable of moving said envelopes (3) downwards while keeping them separated from one another;

a conveyor belt (25) situated below said handling elements (21) and extending in an exiting direction (U) opposite to said sliding surface (5);

stationary stop means (18) for stopping said envelopes (3) when they are between said handling elements (21) but still raised from said conveyor belt (25);

movable stop means (17) for yieldingly stopping said envelopes (3) when they are between said handling elements (21) and resting on said conveyor belt (25), during insertion of said sheets (2) into said envelope (3), and for allowing a filled envelope (33) to move in said exiting direction (U) under continued action of said pushing means (7) on the sheets (2) already inserted into the envelope (33), so that the filled envelope (33) leaves the filling station (1),

wherein said handling means include two screws (21), rotatingly supported on respective vertical shafts (23) and operated to move each of said envelopes (3) from an upper position above said screws, to a lower position resting on said conveyor belt (25), for the introduction of the sheets (2), said machine being **characterized in that** said screws (21) are arranged at both sides of said conveyor belt (25) and are rotated in opposite directions concurring to keep the envelopes pushed against said stationary and movable stop means (17, 18).

2. Machine as claimed in claim 1 wherein the shaft of said screws (21) are rotated in opposite directions by motor means which are operated continuously at a speed suitably controlled as a function of the transferring steps of said envelope supplying means (16) for supplying said envelopes (3) to the envelope filling station (1) and of the introduction of said sheets (2) into the envelopes (3).

3. Machine as claimed in claim 2 , wherein said shafts (23) are set a distance from one another equal to, or slightly greater than the width of said envelopes, i.e. the distance between said sides.

4. Machine as claimed in claim 2, wherein said screws (21) have turns delimiting spaces (22) into which said sides of said envelopes (3) enter due to rotation of the screws.

5. Machine as claimed in claim 1, wherein said supplying means (16) include at least an envelope supplying conveyor (16) situated above said sliding surface (5), so as to supply envelopes (3) to said envelope filling station (1) in a direction (B) concurrent with said forward direction (A) and said exiting direction (U).

6. Machine as claimed in claim1, wherein said stationary stop means (18) include at least one stationary vertical stem (18) situated just after said handling elements (21), considering said forward direction (A), and between said handling elements (21), said stationary vertical stem extending downwards up to a distance from said conveyor belt (25) equal or shorter than the space between two consecutive turns of said screws (21), sufficient to let an envelope pass under said stationary vertical stem.

7. Machine as claimed in claim 1, wherein said movable

stop means (17) include two vertical strips (17) supported by oscillating elements (15), swinging about a horizontal axis (T) extending crosswise to the forward direction (A), said horizontal axis (T) being situated just after the two stationary vertical stems (18).

8. Machine as claimed in claim 7, wherein said vertical strips (17) are situated bilaterally with respect to the conveyor belt (25) and extend downwards to a level lower than said conveyor belt (25).

9. Machine as claimed in claim 7 or 8, wherein said oscillating elements (15) include elastic means for keeping said vertical strips (17) down and yieldingly keep stopped said envelope (3) during filling with the sheets (2).

10. Machine as claimed in claim 1, wherein said pushing means (7) includes a plurality of lugs (7), regularly spaced apart along a driving line (6) for acting on a trailing edge of said sheets (2).

11. Machine as claimed in claim 10, wherein said lugs (7) run within corresponding longitudinal slots (8) made along said sliding surface (5).

12. Machine as claimed in claim 10 or 11, wherein said lugs (7) are kept in a raised position by support means (9) until the sheets (2) are fully inserted into an envelope (33) and said filled envelope (33) leaving said filling station (1) is gripped between said conveyor belt (25) operated in an exiting direction (U), and at least one pressure roller (26) situated downstream of said envelope filling station (1) in contact with said conveyor belt (25).

13. Machine as claimed in claim 12, wherein said pressure roller (26) is disposed above and in contact with said conveyor belt (25) to grip and move a filled envelope (33) while leaving said envelope filling station (1).

14. Machine as claimed in claim 1, wherein said envelope filling station (1) includes one or a pair of nozzles (19) disposed between said sliding surface (5) and said conveyor belt (25) for delivering jets of air to open an envelope (3) situated on said conveyor belt (5).

Patentansprüche

1. Umschlagfüllmaschine zum Einführen von Papierbögen (2) in Umschläge (3), mit:

Einer Gleitfläche (5), über die die Papierbögen (2) mit Hilfe von Schiebemitteln (7) in Vorwärtsrichtung (A) an eine Umschlagfüllstation (1) überführt werden;
Umschlagzuführmitteln (16) zum Zuführen einzelner Umschläge (3) an die Umschlagfüllstation (1), wobei jeder Umschlag eine von einer geschlossenen Unterkante des Umschlags gebildete Vorderkante (4), eine Verschlussklappe (13), die mit einer der geschlossenen Unterkante (4) gegenüberliegenden Öffnung des Umschlags verbunden ist, und zwei Seiten hat, wobei die Umschlagfüllstation (1) folgendes beinhaltet:

Mindestens zwei Förderelemente (21), zwischen die die Umschläge nacheinander platziert werden, wobei die Förderelemente in der Lage sind, die Umschläge (3) nach unten zu bewegen und sie dabei gleichzeitig getrennt voneinander zu halten;
ein Förderband (25), das unter den Förderelementen (21) und in einer Austrittsrichtung (U) entgegengesetzt zur Gleitfläche (5) verläuft;
feste Anschlagmittel (18) zum Anhalten der Umschläge (3), wenn diese sich zwischen den Förderelementen (21) befinden, jedoch noch immer vom Förderband (25) abgehoben sind;
bewegliche Anschlagmittel (17), die die Umschläge (3) während der Einführung der Papierbögen (2) in die Umschläge (3) nachgiebig anhalten, wenn diese sich zwischen den Förderelementen (21) befinden und auf dem Förderband (25) aufliegen, und ermöglichen, dass sich ein gefüllter Umschlag (33) unter kontinuierlicher Einwirkung der Schiebemittel (7) auf die bereits in den Umschlag (33) eingeführten Papierbögen (2) in Austrittsrichtung (U) bewegt, so dass der gefüllte Umschlag (33) dann die Füllstation (1) verlässt,
wobei die Fördermittel zwei Schrauben (21) aufweisen, die auf jeweiligen senkrechten Wellen (23) drehbar gelagert sind und in ihrem Betrieb jeden der Umschläge (3) aus einer oberen Stellung über den Schrauben in eine untere Stellung in Auflage auf dem Förderband (25) bewegen, um die Einführung der Papierbögen (2) zu ermöglichen, wobei die Maschine **dadurch gekennzeichnet ist, dass** die Schrauben (21) auf beiden Seiten des Förderbandes (25) vorgesehen sind und in entgegengesetzte Richtungen gedreht werden, um dadurch dahingehend zusammenzuwirken, dass die Umschläge gegen die festen und beweglichen Anschlagmittel (17, 18) gedrückt gehalten bleiben.

2. Maschine nach Anspruch 1, bei der die Wellen der Schrauben (21) von Motormitteln in entgegengesetzte Richtungen gedreht werden, welche kontinuierlich mit einer Drehzahl betrieben werden, die in Abhängigkeit von den Überführungsschritten des Umschlagzuführmittels (16) zum Zuführen der Umschläge (3) an die Umschlagfüllstation (1) und von der Einführung der Papierbögen (2) in die Umschläge (3) entsprechend geregelt ist.

3. Maschine nach Anspruch 2, bei der die Wellen (23) in einem Abstand voneinander angeordnet sind, der der Breite der Umschläge, d.h. dem Abstand zwischen den Seiten, entspricht bzw. geringfügig größer bemessen ist.

4. Maschine nach Anspruch 2, bei der die Schrauben (21) Windungen haben, die Räume (22) abgrenzen, in die infolge der Drehung der Schrauben die Seiten der Umschläge (3) eintreten.

5. Maschine nach Anspruch 1, bei der die Zuführmittel (16) mindestens einen Umschlagzuführförderer (16) beinhalten, der über der Gleitfläche (5) angeordnet ist, so dass Umschläge (3) der Umschlagfüllstation (1) in einer zur Vorwärtsrichtung (A) und zur Austrittsrichtung (U) gleich verlaufenden Richtung (B) zugeführt werden.

6. Maschine nach Anspruch 1, bei der die festen Anschlagmittel (18) mindestens einen festen senkrechten Schaft (18) aufweisen, der sich, bezogen auf die Vorwärtsrichtung (A), unmittelbar hinter den Förderelementen (21) und zwischen diesen befindet, wobei der feste senkrechte Schaft bis zu einem Abstand vom Förderband (25) nach unten verläuft, der dem Raum zwischen zwei aufeinander folgenden Windungen der Schrauben entspricht oder geringer als dieser bemessen ist und ausreicht, um den Verlauf eines Umschlags unter dem festen senkrechten Schaft hindurch zu ermöglichen.

7. Maschine nach Anspruch 1, bei der die beweglichen Anschlagmittel (17) zwei senkrechte Streifen (17) beinhalten, die von sich hin- und herbewegenden Elementen (15) getragen werden, welche um eine quer zur Vorwärtsrichtung (A) verlaufende horizontale Achse (T) herum schwingen, wobei sich die horizontale Achse (T) unmittelbar hinter den beiden festen senkrechten Schäften (18) befindet.

8. Maschine nach Anspruch 7, bei der die senkrechten Streifen (17) auf das Förderband (25) bezogen bilateral angeordnet sind und weiter nach unten verlaufen als das Förderband (25).

9. Maschine nach Anspruch 7 oder 8, bei der die sich hin- und herbewegenden Elemente (15) elastische Mittel zum Untenhalten der senkrechten Streifen (17) und zum nachgiebigen Anhalten des Umschlags (3) während dessen Befüllung mit den Papierbögen (2) aufweisen.

10. Maschine nach Anspruch 1, bei der die Schiebemittel (7) mehrere Zapfen (7) beinhalten, die in regelmäßigen Abständen voneinander an einem Antriebsband (6) entlang angeordnet sind, um auf eine Hinterkante der Papierbögen (2) einzuwirken.

11. Maschine nach Anspruch 10, bei der die Zapfen (7) in entsprechenden Längsschlitzen (8) verlaufen, die entlang der Gleitfläche (5) vorgesehen sind.

12. Maschine nach Anspruch 10 oder 11, bei der die Zapfen (7) von Trägermitteln (9) in einer aufgestellten Position gehalten werden, bis die Papierbögen (2) vollständig in einen Umschlag (33) eingeführt sind und der aus der Füllstation (1) austretende gefüllte Umschlag (33) zwischen dem in einer Austrittsrichtung (U) betriebenen Förderband (25) und mindestens einer Andruckrolle (26), die sich hinter der Umschlagfüllstation (1) befindet und mit dem Förderband (25) Kontakt hat, erfasst wird.

13. Maschine nach Anspruch 12, bei der die Andruckrolle (26) über dem Förderband (25) und in Kontakt mit diesem angeordnet ist, so dass ein gefüllter Umschlag (33) bei dessen Austritt aus der Umschlagfüllstation von ihr erfasst und weiter bewegt wird.

14. Maschine nach Anspruch 1, bei der die Umschlagfüllstation (1) ein oder mehrere Paar(e) Düsen (19) aufweist, die zur Zufuhr von Luftstrahlen zum Öffnen eines auf dem Förderband (5) liegenden Umschlags (3) zwischen der Gleitfläche (5) und dem Förderband (25) angeordnet sind.

Revendications

1. Machine à remplir des enveloppes pour introduire des feuilles (2) dans des enveloppes (3), comprenant:

   une surface de glissement (5) pour transférer lesdites feuilles (2) vers l'avant (A) à un poste de remplissage d'enveloppes (1) sous l'effet de moyens de poussée (7);
   des moyens d'alimentation en enveloppes (16) pour acheminer des enveloppes individuelles (3) audit poste de remplissage d'enveloppes (1), chaque enveloppe ayant un bord d'attaque (4) constitué d'un bord inférieur fermé de ladite enveloppe, d'un volet de fermeture (13) relié à une ouverture de ladite enveloppe opposée audit bord inférieur fermé (4) et de deux côtés, ledit

poste de remplissage d'enveloppes (1) comprenant:

au moins deux éléments de manipulation (21) entre lesquels lesdites enveloppes sont placées l'une après l'autre, lesdits éléments de manipulation étant capables de déplacer lesdites enveloppes (3) vers le bas tout en les maintenant séparées l'une de l'autre;
une bande transporteuse (25) située en dessous desdits éléments de manipulation (21) et s'étendant dans une direction de sortie (U) opposée à ladite surface de glissement (5);
des moyens d'arrêt stationnaires (18) pour arrêter lesdites enveloppes (3) lorsqu'elles se trouvent entre lesdits éléments de manipulation (21), mais toujours soulevées de ladite bande transporteuse (25);
des moyens d'arrêt mobiles (17) pour arrêter de manière souple lesdites enveloppes (3) lorsqu'elles se trouvent entre lesdits éléments de manipulation (21) et reposent sur ladite bande transporteuse (25), pendant l'insertion desdites feuilles (2) dans ladite enveloppe (3), et pour permettre à une enveloppe remplie (33) de se déplacer dans ladite direction de sortie (U) sous l'action prolongée desdits moyens de poussée (7) sur les feuilles (2) déjà insérées dans l'enveloppe (33), de sorte que l'enveloppe remplie (33) quitte le poste de remplissage (1), dans laquelle lesdits moyens de manipulation comprennent deux vis (21) supportées à rotation sur des arbres verticaux respectifs (23) et actionnées pour déplacer chacune desdites enveloppes (3) d'une position supérieure au-dessus desdites vis à une position inférieure reposant sur ladite bande transporteuse (25), pour l'introduction des feuilles (2), ladite machine étant **caractérisée en ce que** lesdites vis (21) sont aménagées des deux côtés de ladite bande transporteuse (25) et sont mises en rotation dans des sens opposés contribuant à maintenir les enveloppes poussées contre lesdits moyens d'arrêt mobiles et stationnaires (17, 18).

2. Machine selon la revendication 1, dans laquelle les arbres desdites vis (21) sont mis en rotation dans des sens opposés par des moyens moteurs, qui sont actionnés en continu à une vitesse régulée de manière appropriée en fonction des étapes de transfert desdits moyens d'alimentation en enveloppes (16) pour fournir lesdites enveloppes (3) au poste de remplissage d'enveloppes (1) et introduire lesdites feuilles (2) dans les enveloppes (3).

3. Machine selon la revendication 2, dans laquelle lesdits arbres (23) sont placés à une distance entre eux égale ou légèrement supérieure à la largeur desdites enveloppes, c'est-à-dire à la distance entre lesdits côtés.

4. Machine selon la revendication 2, dans laquelle lesdites vis (21) ont des spires délimitant des espaces (22) dans lesquels entrent lesdits côtés desdites enveloppes (3) en raison de la rotation des vis.

5. Machine selon la revendication 1, dans laquelle lesdits moyens d'alimentation (16) comprennent au moins un convoyeur d'alimentation en enveloppes (16) situé au-dessus de ladite surface de glissement (5), afin de fournir des enveloppes (3) audit poste de remplissage d'enveloppes (1) dans un sens (B) coïncidant avec ledit sens vers l'avant (A) et ledit sens de sortie (U).

6. Machine selon la revendication 1, dans laquelle lesdits moyens d'arrêt stationnaires (18) comprennent au moins une tige verticale stationnaire (18) située juste après lesdits éléments de manipulation (21), en se plaçant dans ledit sens vers l'avant (A), et entre lesdits éléments de manipulation (21), ladite tige verticale stationnaire s'étendant vers le bas jusqu'à une distance de ladite bande transporteuse (25) égale ou inférieure à l'espace entre deux spires consécutives desdites vis (21), suffisant pour faire passer une enveloppe sous ladite tige verticale stationnaire.

7. Machine selon la revendication 1, dans laquelle lesdits moyens d'arrêt mobiles (17) comprennent deux bandes verticales (17) supportées par des éléments oscillants (15), oscillant autour d'un axe horizontal (T) s'étendant transversalement à la direction l'avant (A), ledit axe horizontal (T) étant situé juste après les deux tiges verticales stationnaires (18).

8. Machine selon la revendication 7, dans laquelle lesdites bandes verticales (17) sont situées des deux côtés par rapport à la bande transporteuse (25) et s'étendent vers le bas jusqu'à un niveau inférieur à celui de ladite bande transporteuse (25).

9. Machine selon les revendications 7 ou 8, dans laquelle lesdits éléments oscillants (15) comprennent des moyens élastiques pour maintenir lesdites bandes verticales (17) en bas et maintenir de manière souple l'arrêt de ladite enveloppe (3) pendant le remplissage avec les feuilles (2).

10. Machine selon la revendication 1, dans laquelle lesdits moyens de poussée (7) comprennent une pluralité de mentonnets (7) régulièrement espacés le

long d'une ligne d'entraînement (6) pour agir sur un bord queue desdites feuilles (2).

11. Machine selon la revendication 10, dans laquelle lesdits mentonnets (7) s'étendent dans des fentes longitudinales correspondantes (8) ménagées le long de ladite surface de glissement (5).

12. Machine selon la revendication 10 ou 11, dans laquelle lesdits mentonnets (7) sont maintenus en position soulevée par des moyens de support (9) jusqu'à ce que les feuilles (2) soient complètement insérées dans une enveloppe (33) et que ladite enveloppe remplie (33) quittant ledit poste de remplissage (1) soit saisie entre ladite bande transporteuse (25) actionnée dans un sens de sortie (U) et au moins un rouleau presseur (26) situé en aval dudit poste de remplissage d'enveloppes (1) en contact avec ladite bande transporteuse (25).

13. Machine selon la revendication 12, dans lequel ledit rouleau presseur (26) est disposé au-dessus et en contact avec ladite bande transporteuse (25) pour saisir et déplacer une enveloppe remplie (33) tout en quittant ledit poste de remplissage d'enveloppes (1).

14. Machine selon la revendication 1, dans laquelle ledit poste de remplissage d'enveloppes (1) comprend une seule buse ou une paire de buses (19) disposées entre ladite surface de glissement (5) et ladite bande transporteuse (25) pour émettre des jets d'air afin d'ouvrir une enveloppe (3) située sur ladite bande transporteuse (5).

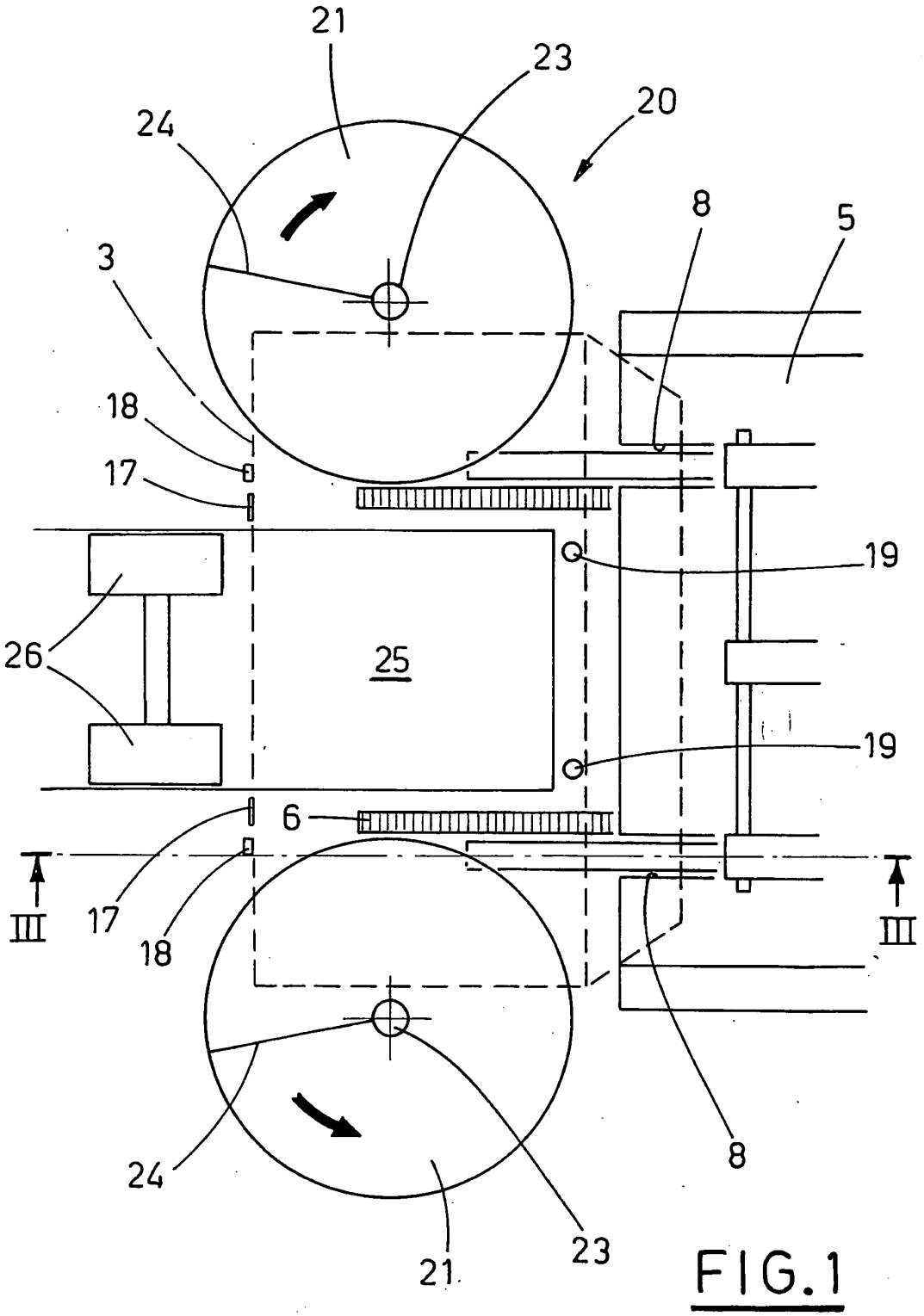

FIG.1

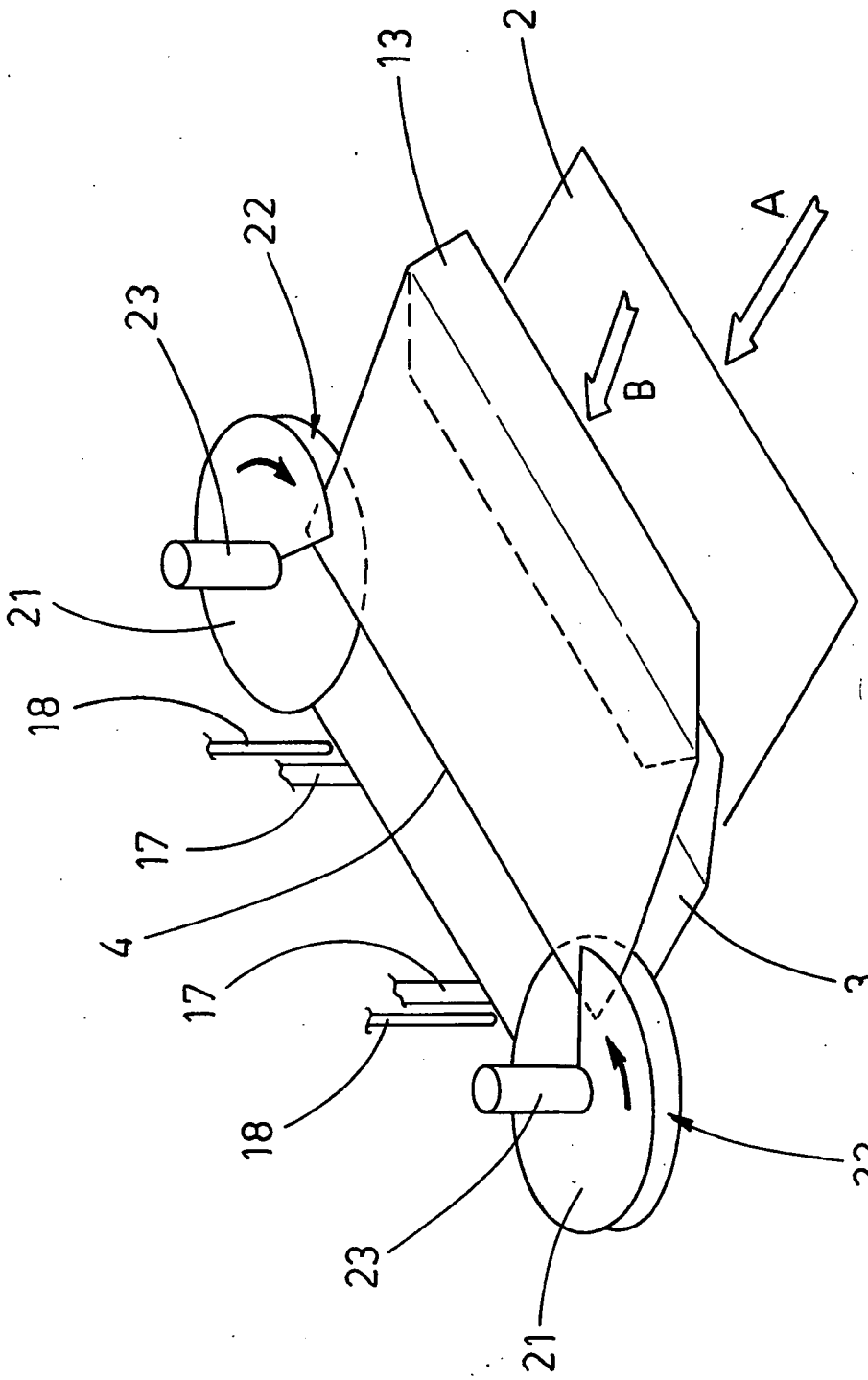

FIG.2

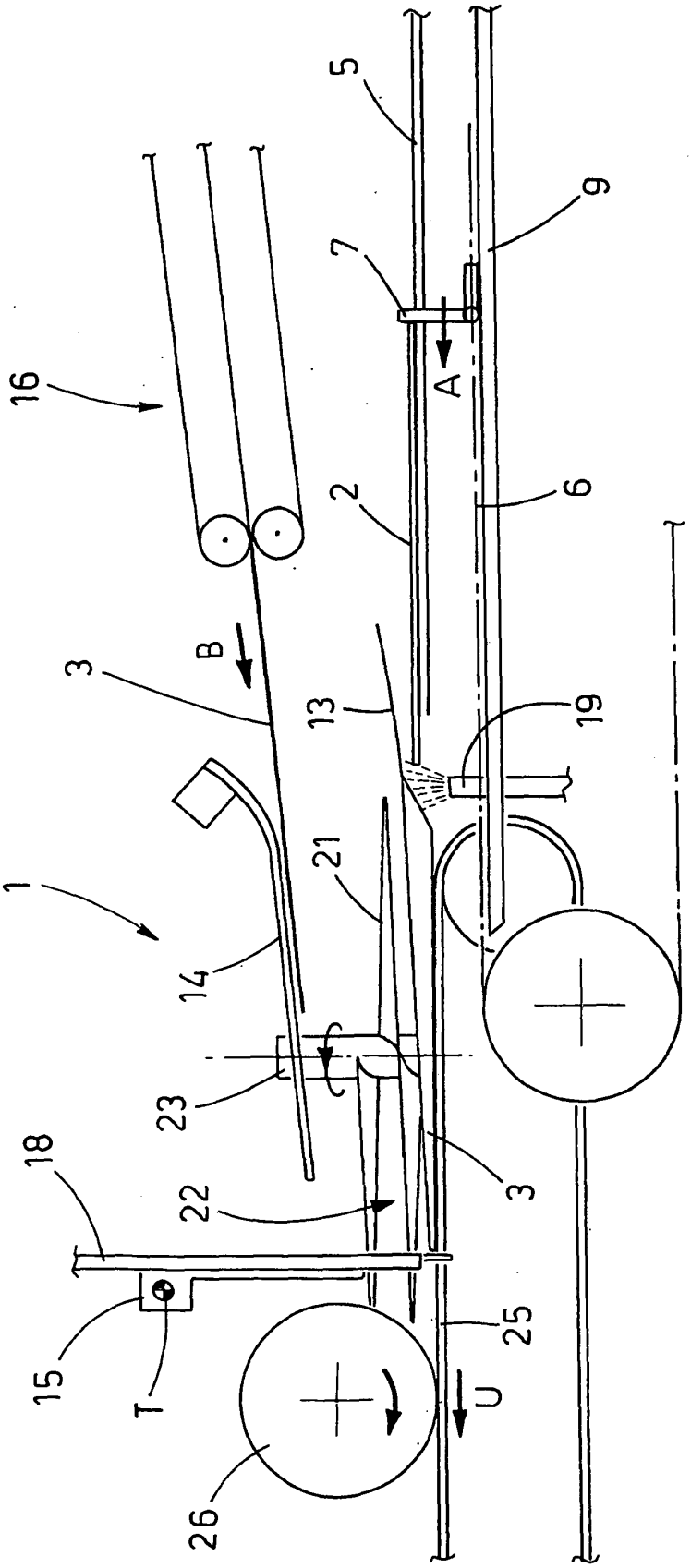

FIG.3

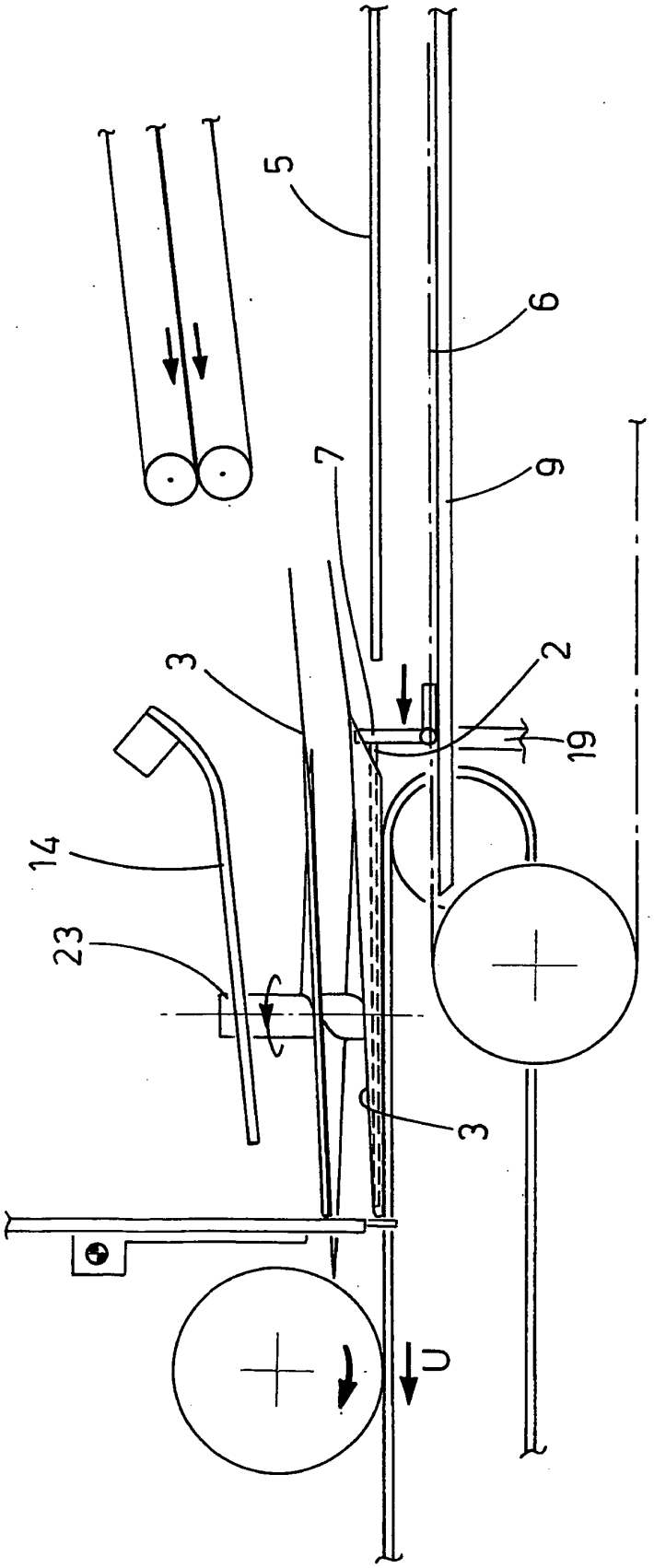

FIG.4

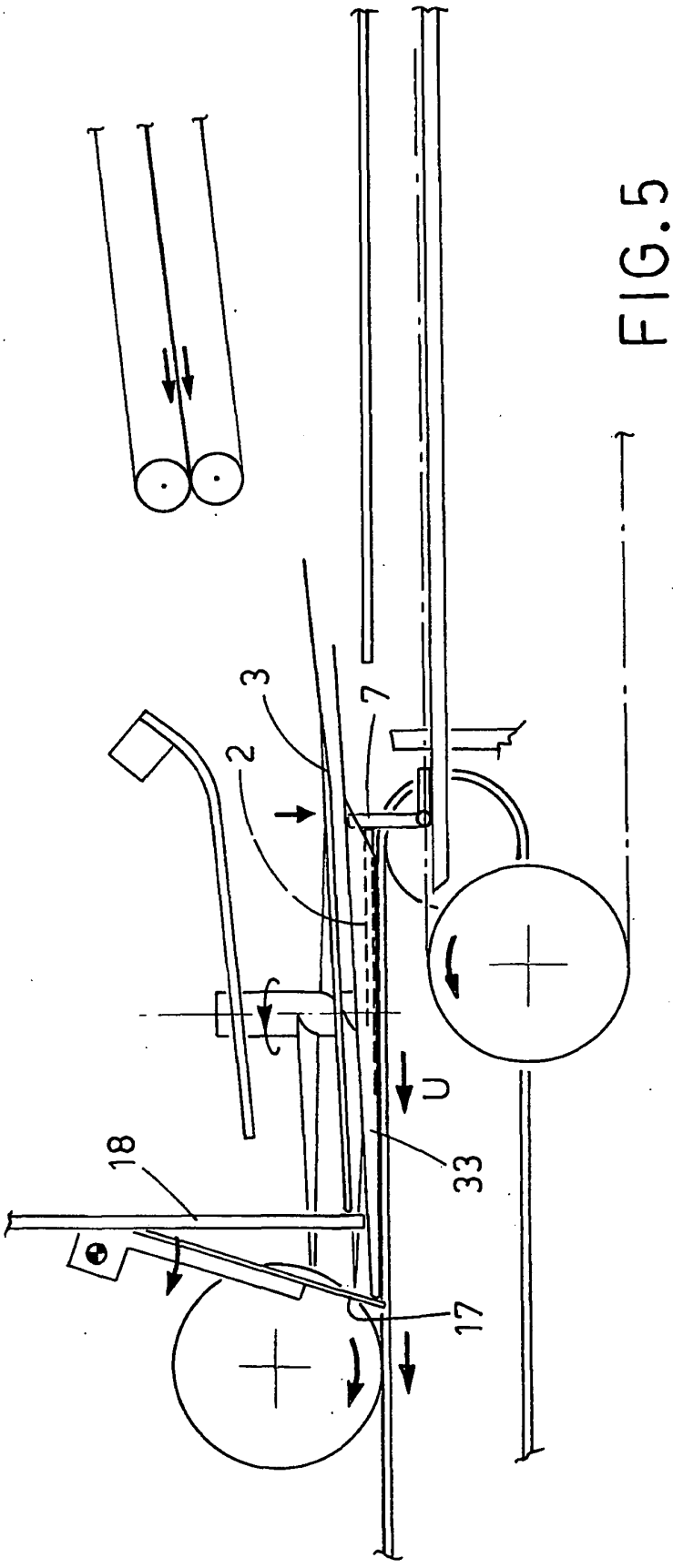

FIG.5

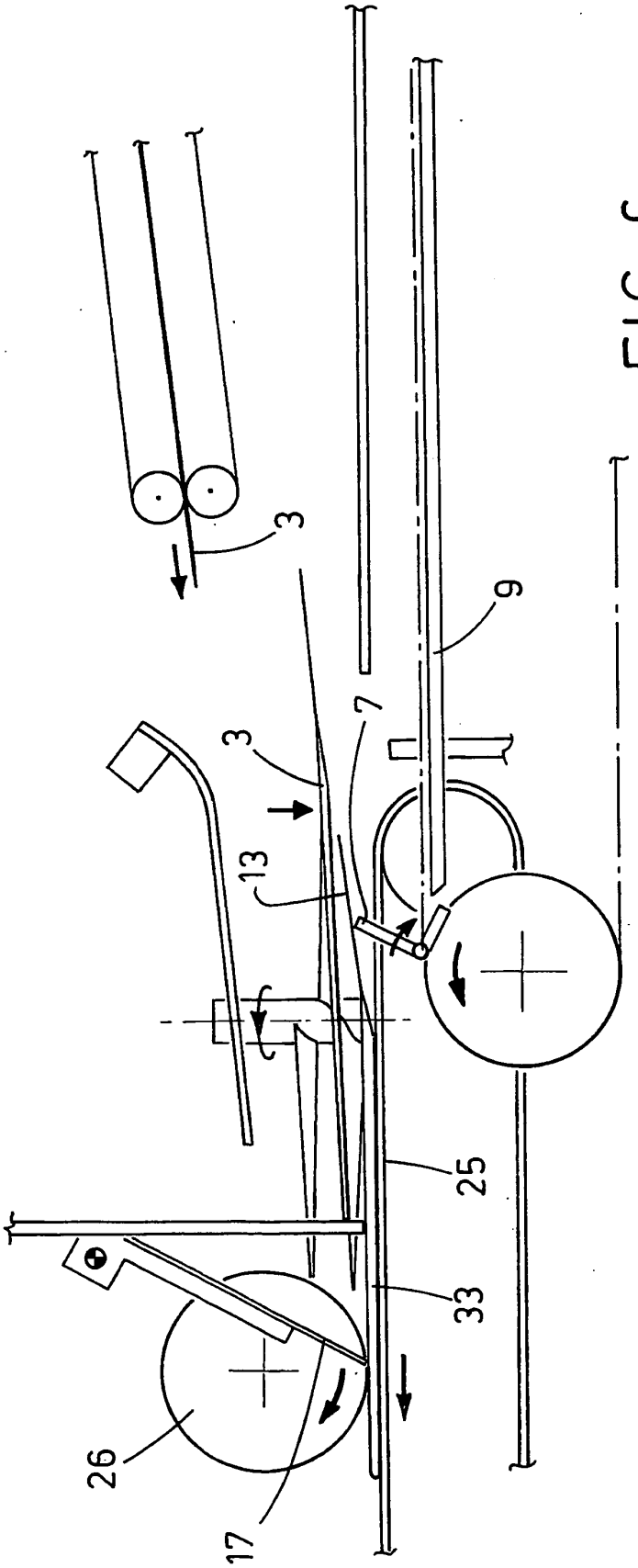

FIG.6

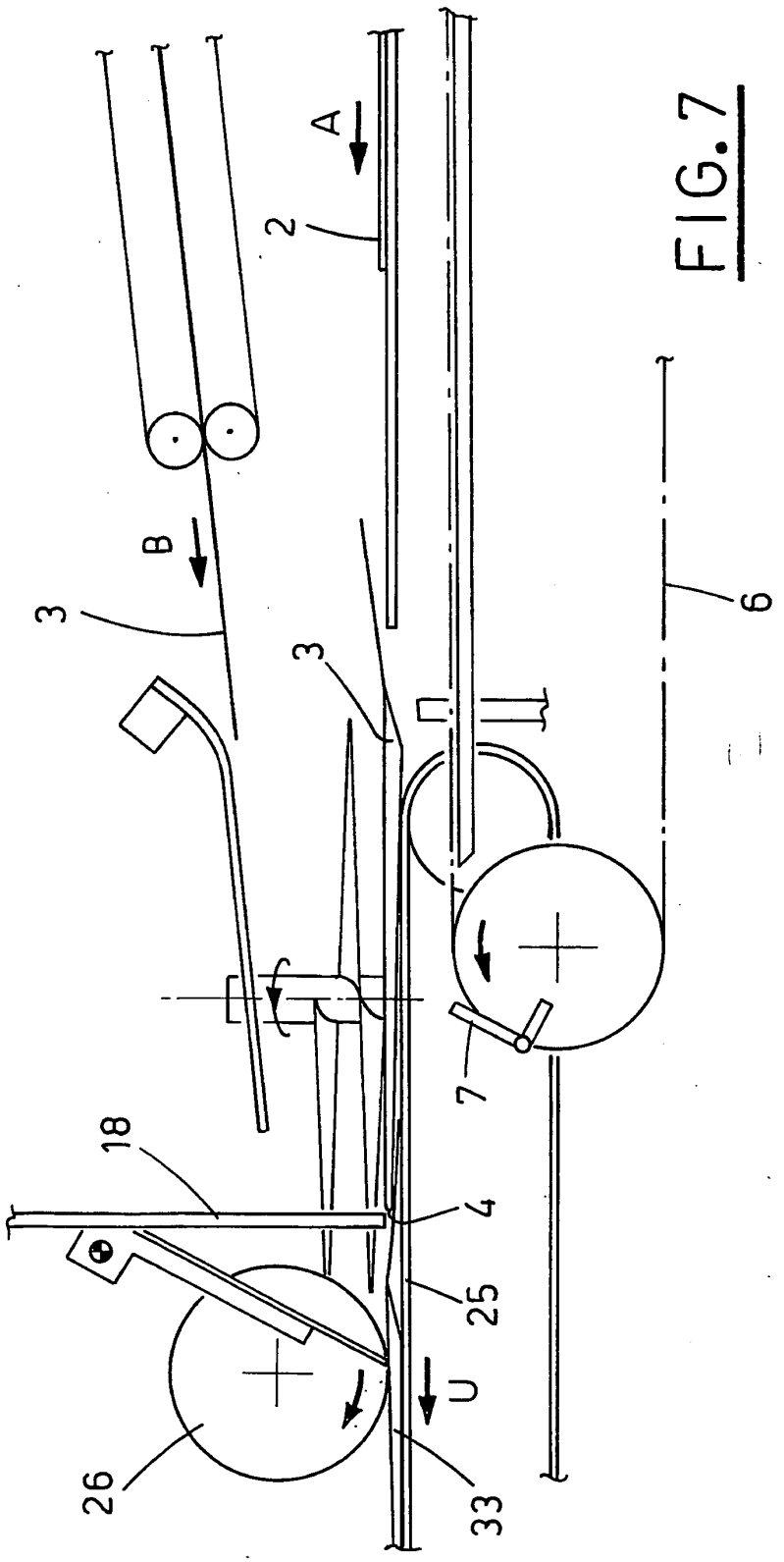

FIG.7

REFERENCES CITED IN THE DESCRIPTION

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