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(54) **MACHINE FOR THE PRODUCTION OF STACKS OF TAGS**

MASCHINE ZUR HERSTELLUNG VON ETIKETTENSTAPELN

MACHINE DE FABRICATION D'EMPILEMENTS D'ÉTIQUETTES

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## Description

**[0001]** The present invention relates to a machine for producing stacks of tags starting from at least one sheet in which said tags are printed in regular manner on one or both its surfaces.

**[0002]** Currently, a sheet (or a length of web) is transformed into a stack of tags by several separate independent machines, each of which carries out a single specific operation. In particular, card cutters, rotary bitted drills, column stackers, rotary and cylindrical plane punches are usually used.

**[0003]** The main drawbacks related to the use of these are control difficulty, operating slowness, the large number of operators (generally at least one for each machine) and low precision. In greater detail, the card cutter makes its cut on packs consisting of a plurality of sheets, consequently the result obtained is not particularly accurate; column stackers, during intercalation, are subjected to constraints linked to the number of cards to be stacked and their format. Finally, the fact that, to define the final shape and dimensions of the tags, the punch cutting tools require dies which have to be purposely created for each specific tag type; moreover the punch cutting tools usually make the cut without separating the cut part.

**[0004]** Again, said traditional machines involve highly repetitive operations, causing stress and lack of attention for the operators, which means that the machines are not always safe.

**[0005]** Moreover, if the tags have to be stacked in accordance with variable codes (consisting for example of progressive or imaginary numbers) printed on the starting sheet, the complexity and slowness of the operations increase.

**[0006]** The drawbacks increase substantially if the overall number of tags to be handled is high and variable, obliging the operators to carry out counting, checking and laborious operations.

**[0007]** US 4405121 describes a machine for producing stacks of card pieces from a sheet on which said pieces are printed in ordered manner. This machine comprises a sheet feed and advancement station, a station for longitudinally cutting the sheet and a station for transversely cutting the sheet, and a stacking station. In particular, the longitudinal cutting station divides the sheet into strips, but leaving non-usable portions at the ends. The sheet advancement station uses rollers positioned such as to be in contact with a part of the sheet at the moment in which this enters the subsequent longitudinal cutting station.

**[0008]** The object of the present invention is to propose a machine producing one or more stacks of tags with elimination of the drawbacks of traditional machines, and with high productivity.

**[0009]** Another object of the invention is to provide a machine which is completely automatic and safe and requires at most a single operator with essentially supervisory functions.

**[0010]** Another object of the invention is to provide a machine in which the tags can be stacked in predefined order on the entering sheet.

**[0011]** Another object of the invention is to provide a machine in which the final tag dimensions can be varied easily and quickly.

**[0012]** Another object of the invention is to provide a machine of limited production cost and which is easy and comfortable to use.

**[0013]** All these objects and others which will be apparent from the ensuing description are attained, according to the invention, by a machine suitable for producing stacks of tags, having the characteristics indicated in claim 1.

**[0014]** The present invention is further clarified hereinafter by way of a preferred embodiment, with reference to the accompanying drawings, in which:

Figure 1 is a block scheme showing the entry elements and exit elements for a machine according to the invention,

Figure 2 is a plan view of the machine according to the invention,

Figure 3 is a view thereof on the line III-III of Figure 2, and

Figure 4 is a block scheme showing certain steps carried out by the machine according to the invention.

**[0015]** As can be seen from the figures, the machine 2 according to the invention receives at its inlet at least one sheet 4, on which the tags 6 are regularly printed, and provides at its outlet one or more stacks 8 of said tags 6.

**[0016]** In particular, the entering sheet 4 is of rectangular shape and is preferably of paper, but could also be a printable support in plastic material, for example PVC. In greater detail, the tags 6 printed on the sheet 4 (on one or both sides) are of equal dimensions and are disposed in ordered manner to form rows and columns.

**[0017]** The machine 2 according to the invention comprises a feed station 10 for the sheets 4. Preferably, one or more packs of sheets 4 are positioned in the feed station 10 in a "stepped" arrangement, i.e. such that the individual sheets 4 of the pack or packs are superimposed with a slight longitudinal slippage (see Figures 2 and 3). In greater detail, the sheets 4 can be positioned on the feed station 10 manually by the operator or, advantageously, by robotized means suitably arranged for positioning the packs of sheets 4 and/or for their "stepping".

**[0018]** Means, not shown, can also be conveniently provided at the inlet to the feed station 10 to receive said sheets 4 from a roll. For example, these means comprise blades disposed such as to cut the web unwinding from said roll into pieces.

**[0019]** In greater detail, the feed station 10 comprises an advancement surface in the form of belts 12 on which

the sheets 4 are positioned. In particular, the belts of the surface 12 are controlled such as to advance in constant steps corresponding to the stepping of the sheets 4.

**[0020]** Conveniently, the advancement pitch of the belts of the surface 12 is set by a control unit 16 (for example a PLC) for the entire machine.

**[0021]** Preferably, the advancement surface 12 is bounded on one side by a longitudinal edge 18 against which the sheets 4 rest, while on the opposite side, a striker wall, not shown, is provided which ensures correct longitudinal consolidation of the sheets 4.

**[0022]** Downstream of the feed station 10 an individualizing station 20 is provided, i.e. a station in which the upper sheet 4 of the pack is separated, i.e. "individualized" with respect of the other sheets of the pack, to facilitate its subsequent withdrawal. In particular, in the individualizing station 20, rollers 22 are provided which vertically press the advancing pack of sheets 4, at said rollers a toothed wheel 24 is provided, the individual teeth of which are made to engage the rear edge of the individual sheets to vertically space them apart. The purpose of this spacing is to facilitate the lateral entrance of puffs of air between the sheets to separate each sheet from the adjacent sheets. In greater detail, these puffs of air are generated by lateral nozzles, not shown, of adjustable position.

**[0023]** Downstream of the individualizing station 20 a withdrawal station 28 is provided. In greater detail, this latter comprises a suction unit 30, provided for example with suckers and movable longitudinally along lateral guides 31.

**[0024]** Downstream of the withdrawal station 28 an advancement station 32 is provided. This comprises two belts 34, 36, advancing at the same speed, at least one of which is perforated and is connected to a vacuum source, not shown. Conveniently, the suction function for the perforated belt or belts 34, 36 is set on the basis of the quality, weight and thickness of the sheet 4 being worked, with suitable adjustment of the vacuum source connected to it. The presence of the perforated suction belt or belts 34, 36 ensures precision of sheet positioning during the subsequent cutting steps.

**[0025]** The advancement station comprises at its inlet a first contact stop 37, and in its central region a second stop 38. In greater detail, at the second stop 38 traditional optical sensors, not shown, are installed to read identification images (for example numeric or bar codes) printed on the sheet 4.

**[0026]** Downstream of the advancement station 32 a longitudinal cutting station 40 is provided, in which the sheet 4 is subjected to longitudinal cutting which divides it into a plurality of strips 41 of width 43 corresponding to the width of the tags 6 to be obtained (see Figure 4). In particular, the longitudinal cutting station 40 comprises a plurality of equidistant parallel rotating knives 42.

**[0027]** Preferably, the cutting station 40 comprises two synchronous pairs of rollers 46, 48 positioned respectively upstream and downstream of the rotating knives

42. In greater detail, each pair of rollers 46, 48 consists of an upper roller and a lower roller which are disposed such as to firmly retain the sheet passing between them and prevent any movements during the cutting step.

5 **[0028]** Conveniently, downstream of the longitudinal cutting station 40 a perforation station 50 can be provided, comprising perforators 52 preferably disposed along a transverse bar, and arranged to make one or more holes in each tag, in accordance with the programme set in the control unit 16.

10 **[0029]** Downstream of the longitudinal cutting station 40, and of the possible perforation station 50, a transverse cutting station 54 is provided. This comprises a vertically movable cutter 56 which transversely cuts the strips 41 of the sheet 4 to form a plurality of rows 57 of tags 6. In particular, each action of the transverse cutter 56 is controlled such as to obtain rows 57 of tags 6 of length 59 corresponding to the length of the tags 6 to be obtained.

20 **[0030]** Downstream of the transverse cutting station 54 a station 58 is provided for transferring each row 57 of tags 6 to the subsequent stacking station 60. This transfer station 58 comprises first belts 62, which transfer one row 57 of tags 6 at a time to a transverse perforated suction belt 64 connected for this purpose to a vacuum source. Preferably the number of first transfer belts 62 corresponds to the number of strips 41 into which the sheet 4 has been divided in the longitudinal cutting station 40.

25 **[0031]** Advantageously, the transverse perforated suction belt 64 is connected to a belt 66 made of a high friction material (for example rubber) in order to further separate the individual tags of each row 57 from each other.

30 **[0032]** Downstream of the transfer station 58 the stacking station 60 is provided, comprising a cyclic phase stacker 68 into which the tags of each individual row 57 are discharged one on the other such as to hence obtain a stack 8 of tags. This stacker 68 has movable bottom vanes such that, when a certain number of tags 6 has been reached, the vanes are opened to cause the hence formed stacks to fall onto a subsequent stack division station 70.

35 **[0033]** This stack division station 70 is positioned at a lower level than the stacking station 60 and comprises a rotating carousel 72 provided with compartments 74, each of which is able to receive a predetermined number of stacked tags 6. Suitable sensors are provided at the stacker 68 and/or the station 70 to measure the number of tags.

40 **[0034]** As already stated, the machine 2 comprises a control unit 16 which commands, controls and coordinates the operations carried out in all said stations.

45 **[0035]** The operation of the machine 2 according to the invention clearly derives from the foregoing description.

50 **[0036]** Initially, a pack of sheets 4 is positioned on the advancement surface 12 of the feed station 10 such that the sheets 4, preferably mutually "stepped", arrives in

proximity to the individualizing station 20. Here, the rollers 22 vertically press the advancing pack of sheets 4, while the toothed wheel 24 engages with its individual teeth the rear edge of the individual sheets to an extent sufficient to facilitate lateral entry of air puffs between them to hence separate each sheet from the adjacent sheets.

**[0037]** The suction unit 30 of the withdrawal station 28 grips the individual sheet 4 and, during its translation along the guide 31, retains this sheet until it brings it to the advancement station 32. In particular, the gripped sheet 4 is released onto the advancement station 32 such that its rear edge contacts the first stop 37, which defines the zero reference for this station.

**[0038]** The front edge of the sheet 4 moved by the advancement station 32 is then blocked by the second stop 38, at which any identification codes printed on the sheet 4 are suitably read.

**[0039]** When the control unit 16, in synchronism with the other operations, releases the sheet 4 from the second stop 38, it is able to advance towards the longitudinal cutting station 40 where, as a result of passage through the blades of the rotating knives 42, it is divided into strips 41 of width 43 corresponding to the width of the tags 6 to be obtained. During the longitudinal cutting, the sheet 4 is suitably retained by both the pairs of rollers 46 and 48 positioned respectively upstream and downstream of the rotating knives 42.

**[0040]** After possible perforation by the perforators 52 of the station 50, the longitudinal strips 41 of the sheet 4 enter the transverse cutting station 54 where they are cut transversely such as to obtain, in sequence, a series of rows 57, each of which consists of tags 6', 6", 6'''.

**[0041]** In sequence, each row 57 of tags is then transferred by the belts 62, 64 and 66 of the transfer station 58 to the stacking station 60. On reaching in proximity to this, the tags 6', 6", 6''' of each row 57 are discharged, one after another, into the stacker 68 to hence form the stack 8 of tags 6, as a result of their superimposing.

**[0042]** The stacks 8 formed within the stacker 68 preferably consist of only a small number of tags 6, to prevent these from being able to be impeded by other tags, due for example to inevitable burrs due to the cutting.

**[0043]** Then when the stack 8 of tags has reached the required number inside the stacker 68 (measured by a suitable sensor), the lower vanes of the stacker open to cause the stacked tags to fall into one of the compartments 74 of the underlying rotating carousel 72. In particular, each compartment 74 of the carousel 72 is filled with a sequence of stacks 8 formed in the stacker 68 until a stack of tags 6 of the desired number is obtained. In this manner, once this number has been reached, the carousel 72 is made to advance through one step to enable the next compartment 74 to be filled.

**[0044]** Advantageously, the width 43 of the strips 41, and hence of the tags 6 to be stacked, can be varied by simply adjusting the distance between the rotating knives 42 of the longitudinal cutting station 40, while the length

59 of the tags 6 to be stacked can be varied by suitably setting the rate of intervention of the transverse cutter 56 of the station 54.

**[0045]** Moreover, the distance between the upper rollers and lower rollers of the pairs of rollers 46, 48 of the cutting station 40 can be suitably adjusted on the basis of the thickness of the sheet 4 being worked.

**[0046]** Preferably, the stacks 8 of tags 6 formed inside each compartment 74 of the carousel 72 are arranged on the basis of a determined sequence 80 defined/printed on the starting sheet 4 (see Figure 1). Essentially, on the basis of the reading by the optical sensor, the control unit 16 is able to command, control and suitably vary the division of the stacks 8 between the various compartments 74 of the carousel 72, such as to obtain stacks 8 of tags divided in accordance with the required criteria and hence ready for subsequent use.

**[0047]** Advantageously, a specific verification test is implemented in the interior of the control unit 16 or in the interior of a different control unit suitably arranged for this purpose; in particular, a check is made on whether the number of tags 6 obtained from each sheet 4, and/or in the stacks 8 of tags 6, as counted at the stacker 68 and/or at the compartments 74, are consistent with that measured by the optical sensor on the starting sheet 4; if this is not the case (for example, if the number of tags obtained is less than that read by the sensor on the starting sheet), one of the control units activates means, not shown, which feed a preferably acoustic or light warning signal to the operator.

**[0048]** From the foregoing it is apparent that the machine according to the invention is particularly advantageous in that:

- it is of particularly high productivity, on average about 33000 tags per hour, and in any event substantially within the range of 25000 - 50000 tags/hour,
- it enables high precision to be achieved, given that it cuts one sheet at a time,
- it is completely automatic and at most requires a single supervisor,
- it does not use any hollow punches,
- it enables high personalization to be achieved, both in the shape and dimensions of the tags to be stacked,
- it enables stacks to be formed with the required number of tags, which can be set by the operator, and/or be established automatically on the basis of the readings carried out by the optical sensor,
- it enables stacks of tags to be obtained which are arranged and/or divided in accordance with a defined sequence printed on the starting sheet.

#### Claims

1. A machine (2) for producing stacks (8) of tags (6) starting from at least one sheet (4) on which said

tags (6) are printed in ordered manner on one or both its surfaces, comprising in sequence:

- a station (10) for feeding at least one sheet (4),
- a station (32) for advancing one sheet (4) at a time,
- a station (40) for longitudinally cutting said advanced sheet (4) into strips (41),
- a station (54) for transversely cutting said strips (41) into rows (57) of tags (6) of length (59) corresponding to the length of said tags (6) to be stacked,
- a stacking station (60) provided with a stacker (68), into which the tags (6) of each of said rows (57) are discharged one on another, in sequence, to form stacks (8) of tags (6), and
- a unit (16) for controlling and coordinating the operations performed in said stations (10, 32, 40, 54, 60),

**characterised in that:**

- said advancement station (32) comprises at least one perforated suction belt (36) for the purpose of stably retaining said sheet (4),
  - said longitudinal cutting station (40) divides said advanced sheet (4) into strips (41) of width (43) corresponding to the width of said tags (6) to be stacked.
2. A machine as claimed in claim 1, **characterised in that** said feed station (10) is arranged to receive at least one pack of superimposed sheets (4) which are slightly stepped in the advancement direction of said feed station (10).
  3. A machine as claimed in one or more of the preceding claims, **characterised in that** means are provided at the entry to said feed station (10) to receive said at least one sheet (4) from a web unwound from a roll.
  4. A machine as claimed in one or more of the preceding claims, **characterised by** comprising downstream of said feed station (10) an individualizing station (20) to separate, in sequence, each sheet (4) from the other sheets disposed in the feed station (10) and/or by comprising, downstream of said feed station (10) or of said individualizing station (20), a withdrawal station (28) for transferring one sheet at a time to said advancement station (32).
  5. A machine as claimed in one or more of the preceding claims, **characterised by** comprising a perforation station (50) interposed between said longitudinal cutting station (40) and said transverse cutting station (54).

6. A machine as claimed in one or more of the preceding claims, **characterised by** comprising, downstream of said transverse cutting station (54), a station (58) for transferring each row (57) of tags (6) to said stacking station (60), in sequence.
7. A machine as claimed in one or more of the preceding claims, **characterised by** comprising, downstream of said stacking station (60), a station (70) in which the stacks formed in sequence in said stacker (68) are divided into a plurality of stacks (8) consisting of a desired and predefined number of tags (6).
8. A machine as claimed in one or more of the preceding claims, **characterised in that** said individualizing station (20) comprises a toothed wheel (24) provided with individual teeth intended to engage the edge of individual sheets to vertically space them apart, and means for generating lateral puffs of air to separate each sheet from the adjacent sheets.
9. A machine as claimed in one or more of the preceding claims, **characterised in that** said withdrawal station (28) comprises a longitudinally movable suction unit (30).
10. A machine as claimed in one or more of the preceding claims, **characterised in that** said advancement station (32) comprises optical sensors for reading identification codes printed on said at least one sheet.
11. A machine as claimed in one or more of the preceding claims, **characterised in that** said longitudinal cutting station (40) comprises a plurality of parallel rotating knives (42) at an adjustable distance apart and/or **in that** said transverse cutting station (54) comprises a transverse cutter (56), the cutting rate of which is adjustable by said control unit (16).
12. A machine as claimed in one or more of the preceding claims, **characterised by** comprising two synchronous pairs of rollers (44, 46) positioned in such a manner as to retain the sheet, both upstream and downstream, during its passage through said longitudinal cutting station (40).
13. A machine as claimed in one or more of the preceding claims, **characterised in that** said stacker (68) comprises movable bottom vanes controlled by the control unit (16) such as to open when a predetermined number of tags forming the stack has been reached, to cause it to fall into the subsequent stack division station (70).
14. A machine as claimed in one or more of the preceding claims, **characterised in that** said stack division station (70) is positioned at a level below the stacking

station (60) and comprises a rotating carousel (72) provided with compartments (74), each of which is able to receive a predetermined number of stacked tags (6) discharged by the stacker (68) and **in that** the stacks (8) of tags (6) are divided in said compartments (74) of the rotating carousel (72) on the basis of a predefined sequence (80) printed on the starting sheet (4).

15. A machine as claimed in one or more of the preceding claims, **characterised in that** a test is implemented in the interior of said control unit (16) or in the interior of a different control unit (84) which checks if the number of tags (6) and/or of said stacks (8) obtained from each sheet (4) are consistent with that measured by the optical sensor on the starting sheet (4), means being activated to send a warning signal to the operator if this check gives a negative result.

#### Patentansprüche

1. Maschine (2) zum Herstellen von Stapeln (8) von Etiketten (6), ausgehend von mindestens einem Blatt (4), auf das die Etiketten (6) in geordneter Art und Weise auf eine oder beide seiner Flächen gedruckt werden, die der Reihe nach umfasst:

- eine Station (10) zum Zuführen mindestens eines Blattes (4),
- eine Station (32) zum Vorrücken jeweils eines Blattes (4) nach dem anderen,
- eine Station (40) zum Längsschneiden des vorgerückten Blattes (4) in Streifen (41),
- eine Station (54) zum Querschneiden der Streifen (41) in Reihen (57) von Etiketten (6) mit einer Länge (59), die der Länge der zu stapelnden Etiketten (6) entspricht,
- eine Stapelstation (60), die mit einem Stapler (68) versehen ist, in den die Etiketten (6) jeder der Reihen (57) aufeinander folgend ausgegeben werden, um Stapel (8) von Etiketten (6) zu bilden; und
- eine Einheit (16) zum Steuern und Koordinieren der Vorgänge, die in diesen Stationen (10, 32, 40, 54, 60) ausgeführt werden,

#### **dadurch gekennzeichnet, dass:**

- die Vorrückungsstation (32) mindestens ein perforiertes Saugband (36) zum stabilen Festhalten des Blattes (4) umfasst,
- die Längsschneidestation (40) das vorgerückte Blatt (4) in Streifen (41) mit einer Breite (43) teilt, die der Breite der zu stapelnden Etiketten (6) entspricht.

2. Maschine nach Anspruch 1, **dadurch gekennzeichnet, dass** die Zuführstation (10) eingerichtet ist, um mindestens einen Packen übereinandergelegter Blätter (4) aufzunehmen, die geringfügig in der Vorrückrichtung zur Zuführstation (10) abgestuft sind.
3. Maschine nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** Mittel am Eingang zur Zuführstation (10) vorgesehen sind, um das mindestens eine Blatt (4) von einer von einer Rolle abgewickelten Bahn aufzunehmen.
4. Maschine nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** sie der Zuführstation (10) nachgelagert eine Vereinzelungsstation (20) umfasst, um nacheinander jedes Blatt (4) von den anderen Blättern, die in der Zuführstation (10) angeordnet sind, zu trennen und/oder dadurch, dass sie der Zuführstation (10) oder der Vereinzelungsstation (20) nachgelagert eine Entnahmestation (28) umfasst, um jeweils ein Blatt nach dem anderen zur Vorrückungsstation (32) überzuführen.
5. Maschine nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** sie eine Perforationsstation (50) umfasst, die zwischen der Längsschneidestation (40) und der Querschneidestation (54) angeordnet ist.
6. Maschine nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** sie der Querschneidestation (54) nachgelagert eine Station (58) zum Überführen jeder Reihe (57) von Etiketten (6) nacheinander zu der Stapelstation (60) umfasst.
7. Maschine nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** sie der Stapelstation (60) nachgelagert eine Station (70) umfasst, in der die in dem Stapler (68) nacheinander gebildeten Stapel in eine Vielzahl von Stapeln (8) aufgeteilt werden, die aus einer gewünschten und vordefinierten Anzahl von Etiketten (6) bestehen.
8. Maschine nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Vereinzelungsstation (20) ein Zahnrad (24), das mit einzelnen Zähnen versehen ist, die dazu bestimmt sind, mit dem Rand einzelner Blätter in Eingriff zu kommen, um sie vertikal voneinander zu beabstanden, und Mittel zum Erzeugen von seitlichen Luftstößen, um jedes Blatt von den benachbarten Blättern zu trennen, umfasst.
9. Maschine nach einem oder mehreren der vorherge-

henden Ansprüche, **dadurch gekennzeichnet, dass** die Entnahmestation (28) eine in Längsrichtung bewegliche Saugereinheit (30) umfasst.

10. Maschine nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Vorrückungsstation (32) optische Sensoren zum Lesen von Identifikationscodes umfasst, die auf das mindestens eine Blatt gedruckt sind.
11. Maschine nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Längsschneidestation (40) eine Vielzahl von parallel rotierenden Messern (42) in einem einstellbaren Abstand umfasst und/oder dadurch, dass die Querschneidestation (54) einen Querschneider (56) umfasst, dessen Schnittgeschwindigkeit durch die Steuereinheit (16) einstellbar ist.
12. Maschine nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** sie zwei synchrone Rollenpaare (44, 46) umfasst, die derart positioniert sind, dass sie das Blatt sowohl vorgelagert als auch nachgelagert während seines Durchlaufs durch die Längsschneidestation (40) halten.
13. Maschine nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der Stapler (68) bewegliche untere Flügel umfasst, die von der Steuereinheit (16) so gesteuert werden, dass sie sich öffnen, wenn eine vorbestimmte Anzahl von den Stapel bildenden Etiketten erreicht wird, um zu bewirken, dass sie in die nachfolgende Stapelaufteilungsstation (70) fällt.
14. Maschine nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Stapelaufteilungsstation (70) auf einer Höhe unterhalb der Stapelstation (60) angeordnet ist und ein rotierendes Karussell (72) umfasst, das mit Fächern (74) versehen ist, von denen jedes in der Lage ist, eine vorbestimmte Anzahl von gestapelten Etiketten (6) aufzunehmen, die von dem Stapler (68) abgegeben werden, und dadurch, dass die Stapel (8) von Etiketten (6) auf der Basis einer vordefinierten Sequenz (80), die auf das Ausgangsblatt (4) gedruckt ist, in die Fächer (74) des rotierenden Karussells (72) aufgeteilt werden.
15. Maschine nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** eine Überprüfung im Inneren der Steuereinheit (16) oder im Inneren einer anderen Steuereinheit (84) implementiert wird, die prüft, ob die Anzahl der Etiketten (6) und/oder der Stapel (8), die von jedem Blatt (4) erhalten werden, mit der von dem optischen Sensor auf dem Ausgangsblatt (4) gemessenen An-

zahl übereinstimmt, wobei Mittel aktiviert werden, um ein Warnsignal an den Bediener zu senden, wenn diese Überprüfung ein negatives Ergebnis ergibt.

## Revendications

1. Une machine (2) de fabrication d'empilements (8) d'étiquettes (6) à partir d'au moins une feuille (4) sur laquelle lesdites étiquettes (6) sont imprimées d'une manière ordonnée sur l'une ou sur les deux de ses surfaces, comportant en séquence:

- une station (10) pour fournir au moins une feuille (4),
- une station (32) pour faire avancer une feuille (4) à la fois,
- une station (40) pour couper longitudinalement ladite feuille avancée (4) en bandes (41),
- une station (54) pour couper transversalement lesdites bandes (41) en rangées (57) d'étiquettes (6) de longueur (59) correspondant à la longueur desdites étiquettes (6) à empiler,
- une station d'empilement (60) pourvue d'un dispositif d'empilement (68), vers laquelle les étiquettes (6) de chacune desdites rangées (57) sont évacuées les unes sur les autres, en séquence, de façon à former des empilements (8) d'étiquettes (6), et
- une unité (16) pour commander et coordonner les opérations effectuées dans lesdites stations (10, 32, 40, 54, 60),

### caractérisée en ce que:

- ladite station d'avance (32) comprend au moins une courroie d'aspiration perforée (36) dans le but de retenir de façon stable ladite feuille (4),
- ladite station de coupe longitudinale (40) divise ladite feuille avancée (4) en bandes (41) de largeur (43) correspondant à la largeur desdites étiquettes (6) à empiler.

2. Une machine selon la revendication 1, **caractérisée en ce que** ladite station d'alimentation (10) est positionnée de manière à recevoir au moins un paquet de feuilles superposées (4) qui sont légèrement échelonnées dans la direction d'avancement de ladite station d'alimentation (10).

3. Une machine selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce que** des dispositifs sont positionnés à l'entrée de ladite station d'alimentation (10) pour recevoir au moins une desdites feuilles (4) provenant d'une toile déroulée par un rouleau.

4. Une machine selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce qu'elle** comprend en aval de ladite station d'alimentation (10), une station d'individualisation (20) pour séparer, en séquence, chaque feuille (4) des autres feuilles disposées dans la station d'alimentation (10) et/ou **en ce qu'elle** comprend, en aval de ladite station d'alimentation (10) ou de ladite station d'individualisation (20), une station de retrait (28) pour transférer une feuille à la fois vers ladite station d'avance (32).
5. Une machine selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce qu'elle** comprend une station de perforation (50) interposée entre ladite station de coupe longitudinale (40) et ladite station de coupe transversale (54).
6. Une machine selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce qu'elle** comprend, en aval de ladite station de coupe transversale (54), une station (58) pour transférer chaque rangée (57) d'étiquettes (6) vers ladite station d'empilement (60), en séquence.
7. Une machine selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce qu'elle** comprend, en aval de ladite station d'empilement (60), une station (70) dans laquelle les empilements formés en séquence dans ledit dispositif d'empilement (68) sont divisés en plusieurs empilements (8) composés d'un nombre souhaité et prédéfini d'étiquettes (6).
8. Une machine selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce que** ladite station d'individualisation (20) comprend une roue dentée (24) pourvue de dents individuelles conçues pour s'engager dans le bord des feuilles individuelles afin de les espacer verticalement les unes par rapport aux autres, et de dispositifs prévus pour générer des souffles d'air latéraux afin de séparer chaque feuille des feuilles adjacentes.
9. Une machine selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce que** ladite station de retrait (28) comprend une unité d'aspiration qui se déplace de manière longitudinale (30).
10. Une machine selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce que** ladite station d'avance (32) comprend des capteurs optiques pour lire les codes d'identification imprimés sur au moins une desdites feuilles.
11. Une machine selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce que** ladite station de coupe longitudinale (40) comprend plusieurs couteaux rotatifs parallèles (42) disposés les uns par rapports aux autres à une distance réglable et/ou **en ce que** ladite station de coupe transversale (54) comprend un dispositif de coupe transversal (56), dont la fréquence de coupe est réglable avec ladite unité de commande (16).
12. Une machine selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce qu'elle** comprend deux paires de rouleaux synchronisés (44, 46) positionnés de manière à retenir la feuille, à la fois en amont et en aval, pendant son passage dans ladite station de coupe longitudinale (40).
13. Une machine selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce que** ledit dispositif d'empilement (68) comprend des clapets inférieurs amovibles contrôlés par l'unité de commande (16), qui s'ouvrent lorsqu'un nombre prédéfini d'étiquettes formant un empilement est atteint, de sorte à les faire tomber dans la station de division d'empilement (70) suivante.
14. Une machine selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce que** ladite station de division d'empilement (70) est positionnée à un niveau inférieur par rapport à la station d'empilement (60) et comprend un carrousel rotatif (72) pourvu de compartiments (74), chacun d'entre eux pouvant recevoir un nombre prédéfini d'étiquettes empilées (6) relâchées par le dispositif d'empilement (68), et **en ce que** les empilements (8) d'étiquettes (6) sont répartis dans lesdits compartiments (74) du carrousel rotatif (72) sur la base d'une séquence prédéfinie (80) imprimée sur la feuille de démarrage (4).
15. Une machine selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce qu'un** test est réalisé à l'intérieur de ladite unité de commande (16) ou à l'intérieur d'une unité de commande différente (84), pour vérifier que le nombre d'étiquettes (6) et/ou desdits empilements (8) obtenu à partir de chaque feuille (4) correspond aux mesures réalisées par le capteur optique sur la feuille de démarrage (4), des dispositifs étant actionnés pour envoyer un message d'avertissement à l'opérateur si cette vérification génère un résultat négatif.



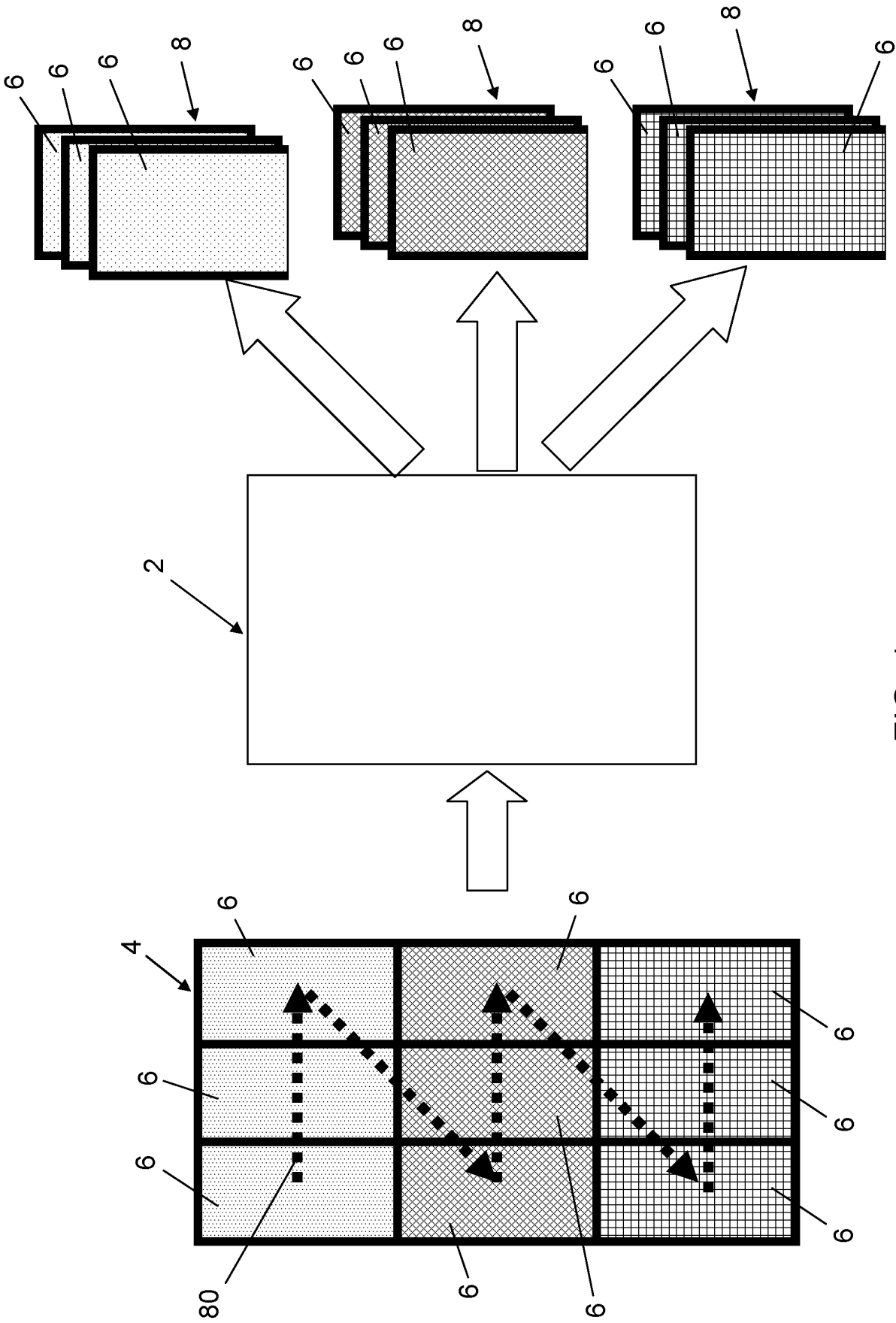


FIG. 1

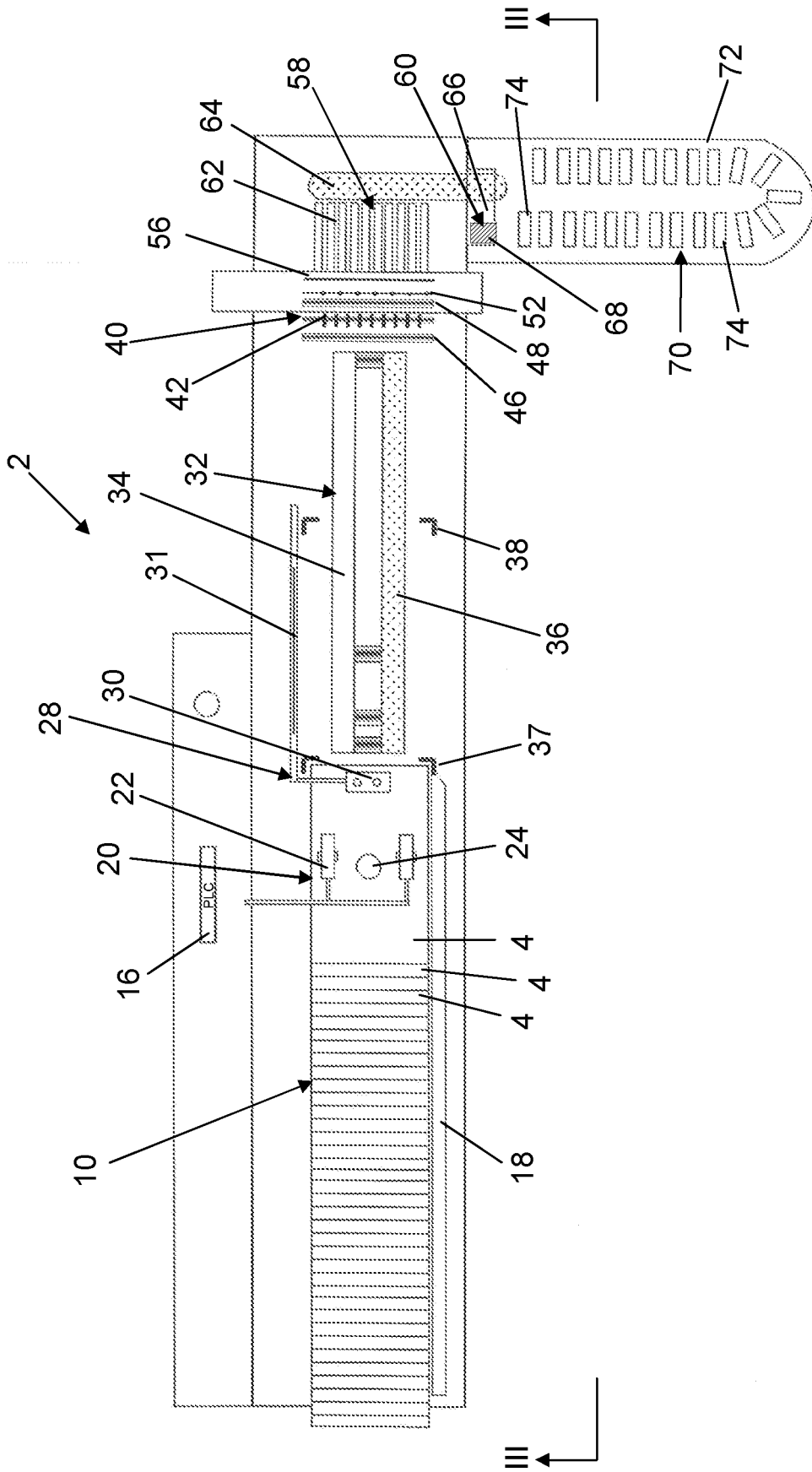


FIG. 2

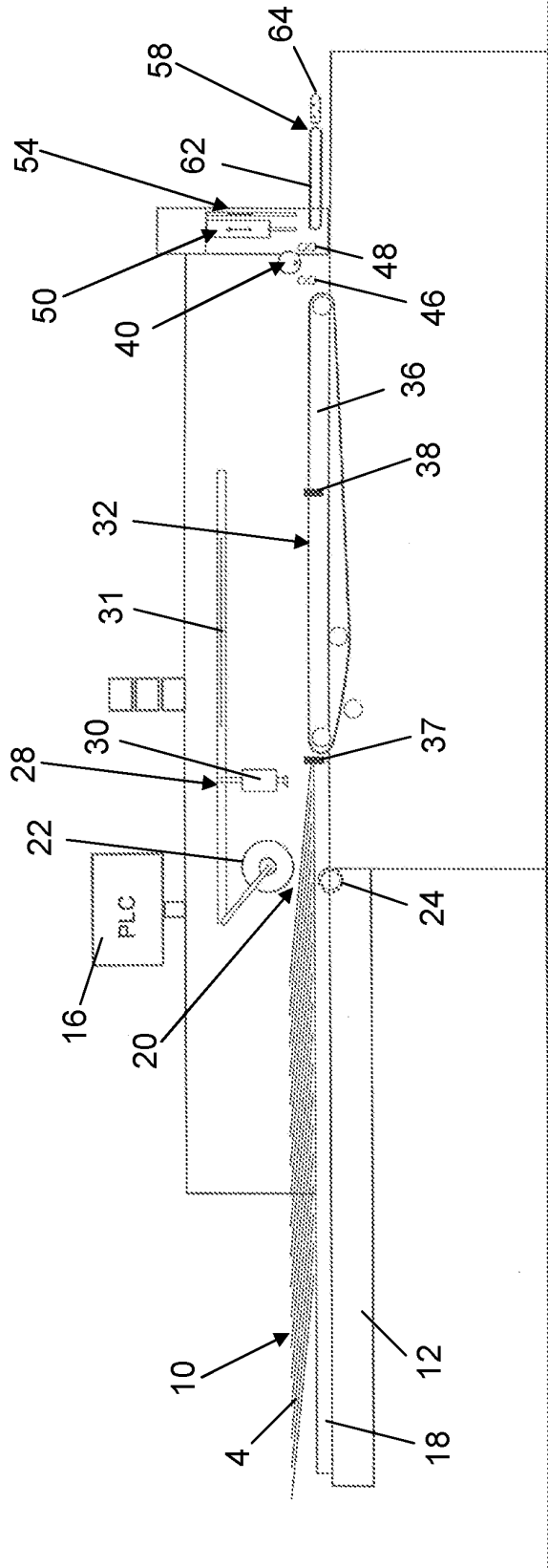


FIG. 3

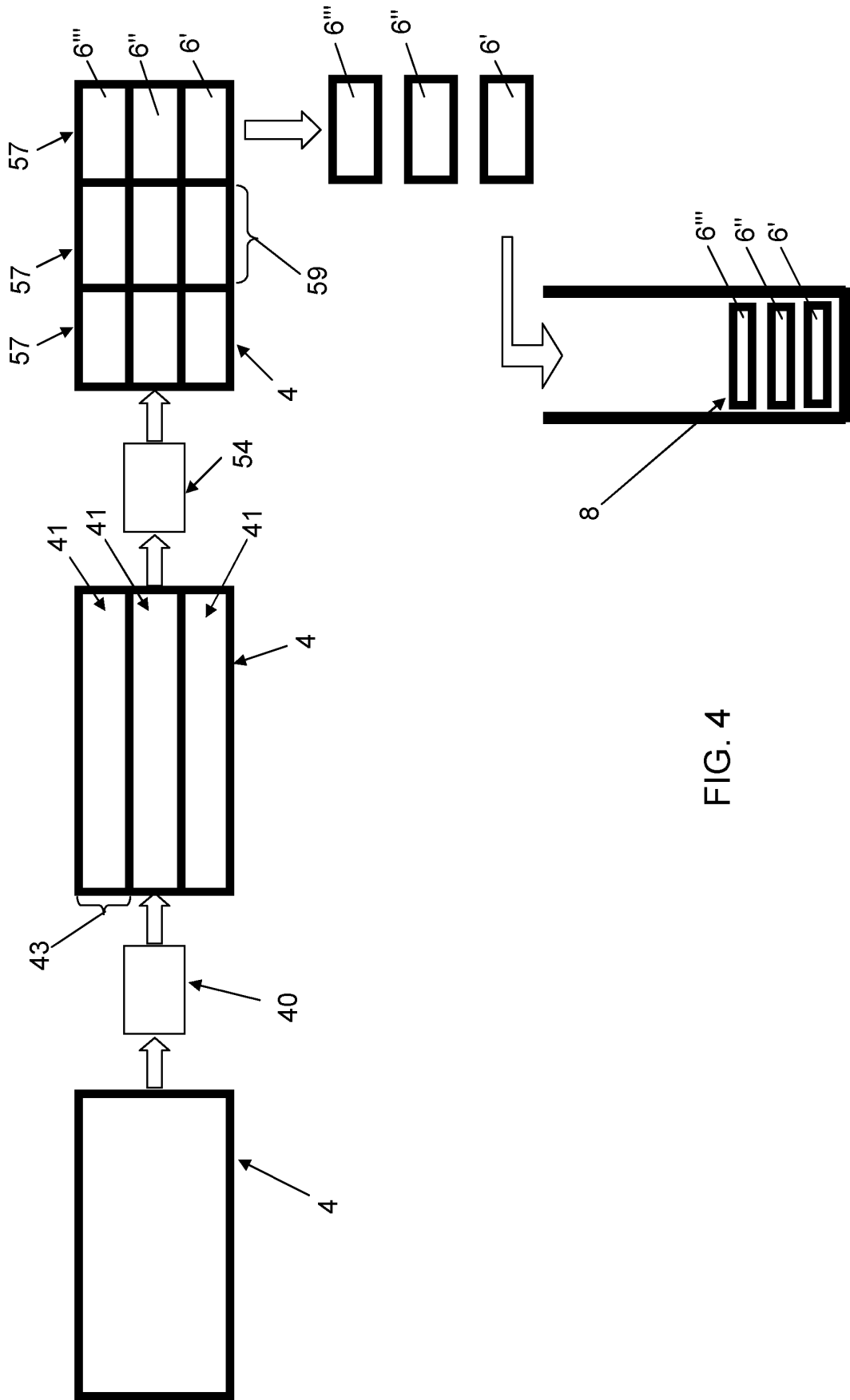


FIG. 4

**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

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