(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 484 177 B1**

(12) # EUROPEAN PATENT SPECIFICATION

(45) Date of publication of patent specification: **09.08.95**

(51) Int. Cl.[6]: **B65H 29/58**, B07C 1/18

(21) Application number: **91310129.1**

(22) Date of filing: **01.11.91**

(54) **Method and apparatus for changing the direction of motion of flat articles.**

(30) Priority: **02.11.90 US 608512**

(43) Date of publication of application:
06.05.92 Bulletin 92/19

(45) Publication of the grant of the patent:
09.08.95 Bulletin 95/32

(84) Designated Contracting States:
DE FR GB

(56) References cited:
GB-A- 1 474 595
GB-A- 2 000 748
US-A- 3 215 428
US-A- 4 527 792
US-A- 4 909 374

PATENT ABSTRACTS OF JAPAN vol. 10, no. 134 (M-479)(2191) 17 May 1986 & JP-A-60 258 041 (FUJI XEROX K.K.) 19 December 1985

*** abstract ***

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Description

The present invention relates generally to a method and apparatus for changing the direction of motion of flat articles, and in particular to method and apparatus for changing the direction of motion of mailpieces in an inserter machine.

Devices are known which turn flat articles, such as letter envelopes, within a plane. These devices are required where envelopes are discharged from an inserter and are not properly oriented to be fed to a downstream device such as a franking machine. An inserter is a machine that places selected items in an envelope for further processing. The filled and sealed envelope is then conveyed to a franking machine to have postage imprinted thereon. Generally, turner devices have the disadvantage of not only having to turn the envelope to have it properly oriented but are also an integral part of the inserting machine.

Examples of devices which turn flat articles are shown in U.S. Patent No. 4,726,461 issued February 23, 1988 to J. Pokrinchak and U.S. Patent No. 4,928,807 issued May 29, 1990 to D. Auerbach, both of which patents are assigned to the Assignee of the present invention.

In Japanese Patent Application Publication No. 60-258041-A (Fuji Xerox) there is disclosed a device for turning paper sheets through 90° when they are being forwarded. The device has a rotating paddle which engages the sheets and is arranged at approximately 90° to the incoming direction (x) of the sheets. A series of stoppers are arranged at the edge of a square or rectangular tray, opposite to the incoming edge. A series of retractable stoppers are arranged at another edge (the exiting edge). The paddle wheel in use drives the sheets generally towards the exiting edge. The retractable stoppers are moved down to let the sheet leave the tray, the sheet having been turned through 90°

It is known to change the direction of travel for flat articles without changing the orientation of the articles, i.e., without rotating or turning the articles. It is also known that for a one stage right angle change in direction the articles must be stopped in one direction before being conveyed in the right angled direction. Such a device is described in U.S. Patent No. 4,909,374 issued March 20, 1990 to M. Skrypalle and assigned to the Assignee of the present invention.

It is also known that a right angle change of direction for flat articles can be achieved in two or more stages by the use of deflection rollers which change the direction of travel by forty-five degrees (45°) or less at each stage. Such an apparatus and method used in a sorting machine is disclosed in U.S. Patent No. 4,527,792 issued July 9, 1985 to G. Burkhardt. The Burkhardt apparatus has several limitations which prevent it from being useable in an inserter machine. The apparatus is limited to changing the direction of travel from a path parallel to a long edge of the mailpiece to a path of travel parallel to the short edge thereof. Furthermore, for all sized mailpieces, the Burkhardt apparatus requires a side-justified line of travel along the first direction of travel so that the deflection rollers can engage the article at the right moment to achieve an accurate change in direction. Typically, in an inserter, the center line of travel of the mailpiece is fixed with the side guides being adjustable for handling various sized mailpieces.

Several improvements in the throughput of various upstream modules (such as feeders, accumulators and insert stations) have raised the expectation that the output of the inserter machine will keep up with such improvements. However, when the output is increased on inserters including conventional turner devices, the turner devices are not maintaining the increased output rate. The turner devices are experiencing various problems when they are operated at higher speeds. For example, inserts are flying out of envelopes before the flap can be closed and turner components are malfunctioning.

It has been found that a turner device on an inserter machine can be replaced by a right angle transfer device which can operate at the higher throughput rate now required of the inserter machine. The problems experienced when operating a turner device at such higher rates have been eliminated by the use of this right angle transfer device.

According to the present invention, there is provided an apparatus for changing the direction of travel of a flat article without changing its orientation, comprising:

a deck mounted on a frame, said deck having a first or input side for receiving an article from a first direction;

means for conveying the article over said deck in a second direction which forms an angle equal to or less than forty-five degrees (45°) with the first direction, whereby the orientation of the article being conveyed in the first direction is maintained when said article is conveyed in the second direction;

a registration wall extending in a third direction which forms a right angle with the first direction;

means for conveying the article in said third direction after said article is in contact with said registration wall;

characterised in that said deck has a second side extending in said second direction;

said second direction conveying means is arranged to engage the leading edge of the flat article after said article has been fed to said deck

and has been disengaged by the means for conveying the flat article in the first direction; and

said registration wall is fixedly positioned downstream from said second direction conveying means and adjacent a third side of said deck extending in said third direction, whereby said leading edge of the flat article is driven by its own momentum against said registration wall after the flat article has been disengaged by said second direction conveying means.

A method for changing the direction of motion without changing the orientation of flat articles is also claimed herein.

An apparatus according to a preferred embodiment of the invention is disclosed for changing the direction of motion of flat articles being conveyed along a first path to a second path. The apparatus comprises a deck mounted on a frame. The deck has a first side for receiving an article from a first direction and a second side for conveying the article in a second direction which forms an acute angle equal to or less than forty-five degrees (45°) with the first direction. There is a structure for conveying the article over the deck in the second direction. The conveying structure engages a leading edge of the article only after the article has been disengaged by a conveying structure in the first direction. There is a registration wall positioned downstream from the second direction conveying structure adjacent a third side of the deck. The registration wall extends a third direction whereby the registration wall is at a right angle to the first direction, wherein the leading edge of the article is driven against the registration wall after the article has been disengaged by the second direction conveying structure. There is a structure for conveying the article in the third direction after the article is in contact with said registration wall.

The invention will be better understood from the following non-limiting description of an example thereof given with reference to the accompanying drawings in which:-

Figure 1 is a top plan view of a right angle transfer device in accordance with the present invention;

Figure 2 is a side elevational view of the transfer device seen in Figure 1 along the lines 2-2.

In the drawings, like reference numerals designate like or corresponding parts throughout the views.

Referring now to Figures 1 and 2, a flat article direction changing device 5 is shown which includes a plate 10 secured to a deck 12 being mounted on three leg members 13. Deck 12 has an input side 14 and an exit side 16. The deck is provided with eight rectangular slots 18, each of which has projected in part a continuously driven roller 20. In the preferred embodiment of the present invention, driven rollers 20 have a rubber surface, for example, a urethane surface.

Below deck 12 is a motor 30, preferably a variable speed motor, including shaft 32 on which pulley 34 is fixedly secured. Pulley 34 is operatively connected to drive shafts 40 by a staggered pulley/belt arrangement, generally designated 42, for driving rollers 20. The interior drive shafts 40 each drive two driven rollers 20 and the exterior drive shafts 40 each drive one roller 20. It will be appreciated by those skilled in the art that device 5 can include more than two rollers per shaft depending on the size of the article and the amount of control needed to achieve the right angle change in direction. It will be further appreciated that the orientation of the roller device 5 is not limited to 45 degrees (45°). Any angle less than 45 degrees (45°) can be used to deflect the envelope. When an alternate angle of deflection is employed, the length of the deck and the number of rollers may increase in achieving the right angle change in direction.

Above the deck are eight idler roller assemblies 48 positioned respectively above driven rollers 20. Each idler roller assembly 48 includes a supporting shaft 52 fixably mounted at one end to the plate 10 and at the other end to plate 11 for supporting idler roller assembly 48. This ensures fixed distance among shafts 52. Plate 11 is supported by shafts 52 and is suspended above deck 12. Each assembly 48 includes an idler roller 50 which is rotatably mounted on a pivotable lever arm 54. A torsion spring 56 is mounted on the shaft 52 and is attached at one end to arm 54 and at the other end to a retaining collar 58 also fixably secured to shaft 52. Another retaining collar 59 is used to secure arm 54 to shaft 52. A resultant counter clockwise movement, as viewed in Fig. 2, is therefore applied to each roller 50 and a normal force is applied to corresponding lower, driven roller 20 by the roller 50. In this manner, device 5 can handle envelopes of various thicknesses.

The lower, driven rollers 20 are fixably mounted on drive shafts 40 which are suitably journaled to two plates under deck 12, one of which plates is designated 41, the other is not shown. Although the lower rollers 20 are the driven rollers, the top rollers 50 could be driven and the bottom rollers 20 could be the idler rollers.

In operation, the right angle transfer device 5 takes a stuffed envelope conveyed from the insert station 70 of an inserter machine and changes the direction of travel by ninety degrees (90°) without changing the orientation of the envelope.

In the preferred embodiment of the present invention, the speed of the rollers 20 is such that the linear speed of the envelope through the transfer device 5 is slightly less than the exit speed of

the envelope from the upstream insert station 70. It has been found that when the envelope is engaged by the first two roller pairs at 72, there is an abrupt jarring which encourages the enclosures to settle to the bottom edge of the envelope.

The exit speed of the envelope from the upstream insert station may vary from job to job and from inserter to inserter. It has been found that using variable speed motor 30, the speed of the rollers 20 on transfer unit 5 can be adjusted accordingly based on any exit speed of the envelope at the insert station 70.

Once the envelope is engaged by the rollers at 72, the envelope travels at a forty-five degree (45°) angle across transfer device 5 until the envelope is released by the last two roller pairs at 74. The envelope then hits the registration wall 80 and becomes engaged by takeaway roller assembly 82 at the same linear speed. As seen in Fig. 1, the orientation of the envelope is maintained as the envelope travels through the transfer device 5.

The position of registration wall 80 is adjustable for handling different sized envelopes. Wall 80 is positioned such that envelope 15 does not make contact with wall 80 until the envelope leaves the control of the last pair of rollers at 74. Roller assembly 82 is adjustably positioned along registration wall 80 to ensure that the envelope is not engaged until it leaves the control of the last pair of rollers at 74.

As previously stated, the present invention can be used at new inserter speeds, for example, 9600 cycles. It will be appreciated by those skilled in the art that the rollers provide a constant positive drive of the envelope, and eliminate the abrupt mechanical rotation typically associated with turners in this area of the inserter machine.

It has been found that engaging the envelope at all times by two or more rollers provides a steady positive drive through transfer device 5 and therefore, provides better control of the envelope travelling at such high speeds.

It has also been found that engaging the envelopes by only one directional drive at a time further provides better control at such high speeds. In the preferred embodiment of the present invention, envelope 15 is not engaged by the rollers in transfer device 5 until the envelope has been released by the drive means exiting insert station 70. Envelope 15 is not engaged by takeaway roller assembly 82 until envelope 15 has been released by the rollers in transfer device 5.

Fig. 2 shows the downstream idler roller 50 in a raised position in phantom to show that the idler rollers 50 can be raised to provide an alternative method for accommodating different sized envelopes. For example, the idler roller 50 of roller assembly 48a, may be raised to ensure that the envelope 15 is not engaged by any roller assembly when envelope 15 hits wall 80.

The transfer device 5 shown in Figs. 1 and 2 performs a change in direction to the right. It will be appreciated by those skilled in the art that a transfer device configured in the mirror image of device 5 will perform a change in direction to the left.

Because of the configuration of inserters, the center line 76 of envelope 15 is fixed leaving the insert station 70. It will be appreciated by those skilled in the art that, regardless of size of envelopes, the center line of any envelope conveyed from the insert station 70 will always be engaged at the same point 72 in transfer device 5.

In the preferred embodiment of the present invention, transfer device 5 is independently driven and controlled and is not an integral part of the inserter machine. Transfer device 5 includes its own drive motor 30. Once transfer device 5 is turned on, driven rollers 20 can be continuously driven independent of the starting, stopping and interruption in the operation of the inserter machine.

It will be appreciated by those skilled in the art that there as now been described an apparatus and method for performing a right angle change in the direction of motion of flat articles. Although this invention has been described in conjunction with a specific embodiment thereof, many alternatives, modifications and variations will be apparent to those skilled in the art.

Claims

1. An apparatus for changing the direction of travel of a flat article (15) without changing its orientation, comprising:

a deck (12) mounted on a frame, said deck having a first or input side (14) for receiving an article from a first direction;

means (20,48) for conveying the article (15) over said deck (12) in a second direction which forms an angle equal to or less than forty-five degrees (45°) with the first direction, whereby the orientation of the article being conveyed in the first direction is maintained when said article is conveyed in the second direction;

a registration wall (80) extending in a third direction which forms a right angle with the first direction;

means (82) for conveying the article (15) in said third direction after said article is in contact with said registration wall (80);

characterised in that

said deck (12) has a second side extending in said second direction;

said second direction conveying means (20,48) is arranged to engage the leading edge of the flat article (15) after said article has been fed to said deck (12) and has been disengaged by the means for conveying the flat article in the first direction; and

said registration wall (80) is fixedly positioned downstream from said second direction conveying means (20,48) and adjacent a third side of said deck (12) extending in said third direction, whereby said leading edge of the flat article is driven by its own momentum against said registration wall (80) after the flat article (15) has been disengaged by said second direction conveying means (20,48).

2. The apparatus according to claim 1, wherein said second direction conveying means (20,48) comprise a plurality of roller pairs, each of said roller pairs being positioned in line with said second direction.

3. The apparatus according to claim 1, wherein said second direction is forty-five degrees (45°) from said first direction.

4. The apparatus according to claim 1, wherein said third direction is ninety degrees (90°) from said first direction.

5. The apparatus according to claim 2, wherein each of said roller pairs (20,48) includes a spring biased idler roller assembly (48) and a driven roller (20).

6. The apparatus according to claim 5, wherein said driven rollers (20) are driven at an adjustable speed by a variable speed motor (32).

7. The apparatus according to claim 6, wherein said driven roller speed is less than a speed of said first direction conveying means.

8. The apparatus according to claim 6, wherein the control of said second direction conveying means (20,48) is independent of the control of an inserter in which the apparatus is configured.

9. The apparatus according to claim 5, wherein each of said idler rollers (48) is pivotable for disengaging any combination of roller pairs so that when the article is being conveyed by said second direction conveying means, said first and third direction conveying means are not engaging the article (15).

10. The apparatus according to claim 1, wherein said registration wall (80) is adjustably positioned to handle various sized articles.

11. A method for changing the direction of motion without changing the orientation of flat articles (15) being conveyed in a first direction to a third direction which is at a right angle to the first direction, the method comprising the steps of:

a) feeding a stream of articles in the first direction by a first drive means;

b) engaging the leading edge of each of said articles by at least two of a plurality of roller pairs (20,48) after said article has been disengaged by said first drive means, said roller pairs being configured in at least two parallel rows, each of said roller pairs being angled in a second direction which is equal or less than forty-five degrees (45°) from said first direction;

c) conveying each of the articles by the roller pairs across a deck (12) in the second direction;

d) driving under its own momentum said leading edge of each article against a registration wall (80) after each such article has been disengaged by the roller pairs in the second direction, said registration wall (80) being positioned at a right angle to the first direction and downstream of the roller pairs (20); and

e) conveying each of the articles along the registration wall by a third drive means (82).

12. The method according to claim 11, in which, in operation, the said roller pairs are driven and are controlled independently of the first and third drive means.

Patentansprüche

1. Vorrichtung zum Ändern der Bewegungsrichtung eines flachen Gegenstandes (15) ohne Ändern seiner Orientierung, mit:
einer an einem Rahmen angebrachten Tragplatte (12), wobei die Tragplatte eine erste oder Eingangsseite (14) zum Empfangen eines Gegenstandes aus einer ersten Richtung aufweist;
einer Einrichtung (20, 48) zum Befördern des Gegenstandes (15) über die Tragplatte (12) in einer zweiten Richtung, die einen Winkel kleiner oder gleich fünfundvierzig Grad (45°) mit der ersten Richtung bildet, wobei die Orientierung des in der ersten Richtung beförderten Gegenstandes beibehalten wird, wenn der Gegenstand in der zweiten Richtung befördert

wird;
einer sich in einer dritten Richtung, die einen rechten Winkel mit der ersten Richtung bildet, erstreckenden Bezugswand (80);
einer Einrichtung (82) zum Befördern des Gegenstandes (15) in der dritten Richtung, nachdem der Gegenstand die Bezugswand (80) berührt;
dadurch gekennzeichnet, daß
die Tragplatte (12) eine sich in der zweiten Richtung erstreckende zweite Seite aufweist;
die Beförderungseinrichtung (20, 48) der zweiten Richtung dazu ausgelegt ist, die Vorderkante des flachen Gegenstandes (15) zu greifen, nachdem der Gegenstand der Tragplatte (12) zugeführt und von der Einrichtung zum Befördern des flachen Gegenstandes in der ersten Richtung freigegeben worden ist; und
die Bezugswand (80) stromabwärts von der Beförderungseinrichtung (20, 48) der zweiten Richtung und einer sich in der dritten Richtung erstreckenden dritten Seite der Tragplatte (12) benachbart fest angeordnet ist, wodurch die Vorderkante des flachen Gegenstandes durch dessen eigenen Impuls gegen die Bezugswand (80) getrieben wird, nachdem der flache Gegenstand (15) von der Beförderungseinrichtung (20, 48) der zweiten Richtung freigegeben worden ist.

2. Vorrichtung nach Anspruch 1, bei der die Beförderungseinrichtung (20, 48) der zweiten Richtung eine Mehrzahl Walzenpaare aufweist, wobei jedes Walzenpaar entlang der zweiten Richtung angeordnet ist.

3. Vorrichtung nach Anspruch 1, bei der die zweite Richtung fünfundvierzig Grad (45°) von der ersten Richtung liegt.

4. Vorrichtung nach Anspruch 1, bei der die dritte Richtung neunzig Grad (90°) von der ersten Richtung liegt.

5. Vorrichtung nach Anspruch 2, bei der jedes Walzenpaar (20, 48) einen federvorgespannten Spannwalzenaufbau (48) und eine Antriebswalze (20) aufweist.

6. Vorrichtung nach Anspruch 5, bei der die Antriebswalzen (20) mit einer einstellbaren Geschwindigkeit von einem Motor (32) mit variabler Geschwindigkeit angetrieben werden.

7. Vorrichtung nach Anspruch 6, bei der die Antriebswalzengeschwindigkeit geringer als eine Geschwindigkeit der Beförderungseinrichtung der ersten Richtung ist.

8. Vorrichtung nach Anspruch 6, bei der die Steuerung der Beförderungseinrichtung (20, 48) der zweiten Richtung unabhängig von der Steuerung einer Einlegemaschine ist, in der die Vorrichtung angeordnet ist.

9. Vorrichtung nach Anspruch 5, bei der jede Spannwalze (48) zum Freigeben irgendeiner Kombination von Walzenpaaren schwenkbar ist, so daß die Beförderungseinrichtung der ersten Richtung und die der dritten Richtung den Gegenstand (15) nicht greifen, wenn der Gegenstand von der Beförderungseinrichtung der zweiten Richtung befördert wird.

10. Vorrichtung nach Anspruch 1, bei der die Bezugswand (80) zum Umgehen mit verschieden großen Gegenständen einstellbar angeordnet ist.

11. Verfahren zum Ändern der Bewegungsrichtung ohne Ändern der Orientierung in einer ersten Richtung beförderter flacher Gegenstände (15) in eine dritte Richtung, die zu der ersten Richtung in einem rechten Winkel liegt, wobei das Verfahren die Schritte aufweist:

a) Zuführen eines Stroms von Gegenständen in der ersten Richtung mit einer Antriebseinrichtung;

b) Greifen der Vorderkante jedes Gegenstandes mit zumindest zwei aus einer Mehrzahl Walzenpaare (20, 48), nachdem der Gegenstand von der ersten Antriebseinrichtung freigegeben worden ist, wobei die Walzenpaare in zumindest zwei parallelen Reihen angeordnet sind, wobei jedes Walzenpaar in einer zweiten Richtung, die fünfundvierzig Grad (45°) oder weniger von der ersten Richtung liegt, angewinkelt ist;

c) Befördern jedes Gegenstandes mit den Walzenpaaren über eine Tragplatte (12) in der zweiten Richtung;

d) die Vorderkante jedes Gegenstandes von ihrem eigenen Impuls gegen eine Bezugswand (80) Treibenlassen, nachdem jeder solche Gegenstand von den Walzenpaaren in der zweiten Richtung freigegeben worden ist, wobei die Bezugswand (80) in einem rechten Winkel zu der ersten Richtung und stromabwärts von den Walzenpaaren (20) angeordnet ist; und

e) Befördern jedes Gegenstandes entlang der Bezugswand mit einer dritten Antriebseinrichtung (82).

12. Verfahren nach Anspruch 11, bei dem die Walzenpaare im Betrieb unabhängig von der ersten und der dritten Antriebseinrichtung ange-

trieben und gesteuert werden.

Revendications

1. Appareil pour changer la direction du parcours d'un article plat sans changer son orientation, comprenant:

   un plateau (12) monté sur un châssis, ledit plateau ayant un premier côté ou côté d'entrée (14) destiné à recevoir un article provenant d'une première direction;

   des moyens (20, 48) pour acheminer l'article (15) sur ledit plateau dans une seconde direction qui forme un angle égal ou inférieur à quarante-cinq degrés (45°) avec la première direction, de façon que l'orientation de l'article acheminé dans la première direction soit conservée lorsque ledit article est acheminé dans la seconde direction;

   une paroi d'enregistrement (80) s'étendant dans une troisième direction qui forme un angle droit avec la première direction;

   un moyen (82) pour acheminer l'article (15) dans ladite troisième direction après que ledit article soit en contact avec ladite paroi d'enregistrement (80);

   caractérisé en ce que

   ledit plateau (12) comporte un second côté s'étendant dans ladite seconde direction;

   ledit moyen d'acheminement dans la seconde direction (20, 48) est aménagé de façon à engager le bord avant de l'article plat (15) après que ledit article ait été chargé sur ledit plateau (12), et ait été désengagé par le moyen pour acheminer l'article plat dans la première direction; et

   ladite paroi d'enregistrement (80) est placée de façon fixe en aval dudit moyen d'acheminement dans la seconde direction (20, 48), et adjacente à un troisième côté dudit plateau (12) s'étendant dans ladite troisième direction, de façon que ledit bord avant de l'article plat soit entraîné par son propre élan contre ladite paroi d'enregistrement (80) après que l'article plat (15) ait été désengagé par ledit moyen d'acheminement dans la seconde direction (20, 48).

2. Appareil selon la revendication 1, dans lequel ledit moyen d'acheminement dans la seconde direction (20, 48) comprend plusieurs paires de rouleaux, chacune desdites paires de rouleaux étant placée en ligne avec ladite seconde direction.

3. Appareil selon la revendication 1, dans lequel ladite seconde direction est à quarante-cinq degrés (45°) par rapport à ladite première direction.

4. Appareil selon la revendication 1, dans lequel dans lequel ladite troisième direction est à quatre-vingt dix degrés (90°) par rapport à ladite première direction.

5. Appareil selon la revendication 2, dans lequel chacune desdites paires de rouleaux (20, 48) comporte un ensemble de rouleaux libres à ressort (48) et un rouleau entraîné (20).

6. Appareil selon la revendication 5, dans lequel lesdits rouleaux entraînés (20) sont entraînés à une vitesse réglable par un moteur à vitesse variable (32).

7. Appareil selon la revendication 6, dans lequel ladite vitesse du rouleau entraîné est inférieure à la vitesse dudit moyen d'acheminement dans la première direction.

8. Appareil selon la revendication 6, dans lequel la commande dudit moyen d'acheminement dans la première direction (20, 48) est indépendante de la commande d'un dispositif d'insertion dans lequel l'appareil est configuré.

9. Appareil selon la revendication 5, dans lequel chacun desdits rouleaux libres (48) peut pivoter pour désengager une association quelconque de paires de rouleaux, de façon que lorsque les articles sont acheminés par ledit moyen d'acheminement dans la seconde direction, lesdits moyens d'acheminement dans la première et dans la troisième directions n'engagent pas l'article (15).

10. Appareil selon la revendication 1, dans lequel ladite paroi d'enregistrement (80) est placée de façon réglable de façon à manipuler des articles de tailles variées.

11. Procédé pour changer la direction du mouvement sans changer l'orientation d'articles plats (15) acheminés dans une première direction vers une troisième direction qui fait un angle droit avec la première direction, le procédé comportant les étapes de:

    a) chargement d'un courant d'articles dans la première direction par un premier moyen d'entraînement;

    b) engagement du bord avant de chacun desdits articles par au moins deux parmi plusieurs paires de rouleaux (20, 48), après que ledit article ait été désengagé par ledit premier moyen d'entraînement, ladite paire de rouleaux étant configurée en deux ran-

gées parallèles au moins, chacune desdites paires de rouleaux faisant un angle dans une seconde direction, qui est égal ou inférieur à quarante-cinq degrés (45°), par rapport à ladite première direction;

c) acheminement de chacun des articles par les paires de rouleaux sur un plateau (12) dans la seconde direction;

d) entraînement par son propre élan dudit bord avant de chaque article contre une paroi d'enregistrement (80) après que chacun de ces articles ait été désengagé de la paire de rouleaux dans la seconde direction, ladite paroi d'enregistrement (80) étant placée à angle droit par rapport à la première direction, et en aval de la paire de rouleaux (20); et

e) acheminement de chacun des articles le long de la paroi d'enregistrement par un troisième moyen d'entraînement (82).

12. Procédé selon la revendication 11, dans lequel, en fonctionnement, lesdites paires de rouleaux sont entraînées et sont commandées indépendamment du premier et du troisième moyens d'entraînement.

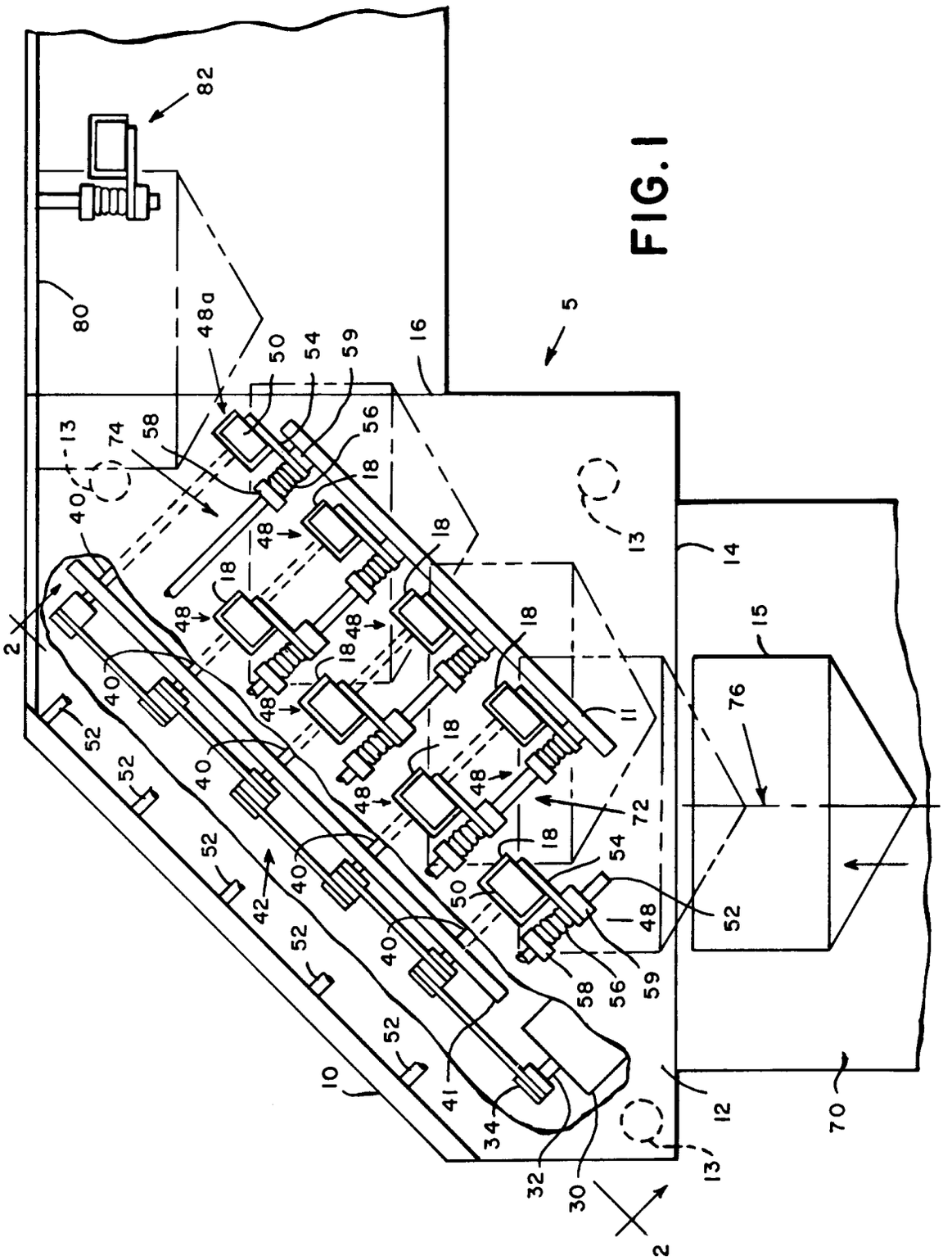

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2

FIG. 1

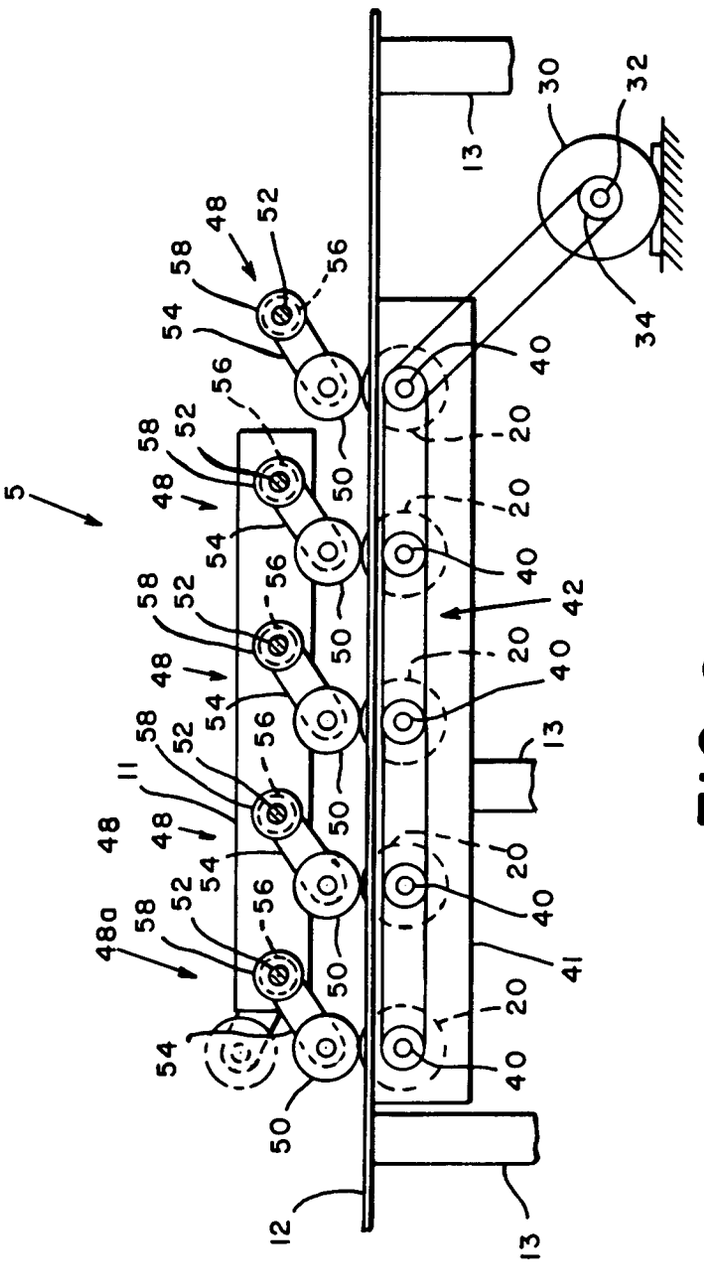


FIG.2