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(54) **An apparatus for transporting a web through stations of a working plant**

Vorrichtung zum Transport einer Bahn durch Stationen einer Arbeitsanlage

Dispositif pour le transport d'une bande à travers des stations d'une ligne de traitement

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Description

[0001] The present invention relates to an apparatus for transporting a web through a plurality of stations of a working plant according to the preamble of claim 1.

[0002] In the fabrication of plastic cards, as credit cards, cheque cards, telephone cards and the like, the material web is transported through a plurality of working stations, for example printing stations, milling stations for milling a recess into which a chip is to be embedded, punching stations and the like. In the prior art, the web has a width exceeding that used for the cards, and the excess margins are provided series of holes, the series extending parallel to the transportation direction, and the holes being spaced from one another by accurately repeated distances. In each of the working stations, pins engage into the holes so as to hold the web portion between the pins in a tensioned state. The web is stepwisely transported from station to station by means of clamps which do not engage the holes but hold the web in a pinching operation.

[0003] Such systems of the prior art have a number of drawbacks.

[0004] The material consumption is higher than necessary because of the margins to be provided for the series of holes thereby increasing the costs of manufacture, in particular if expensive materials as e.g. poly carbonate are used.

[0005] While the regular hole spacing results in very accurate alignment but only for one given size of card. For each different size, another punching tool must be provided. When the plant is set up, the number of rejects is relatively high as the web may be transported in one direction only. This again increases the manufacturing costs.

[0006] The tensioning systems provided at each station for the web render the plant complex, susceptible to trouble, and the distance between stations must be larger than necessary for the very working.

[0007] For a temporary fixing of a material web on a carrier material US-A-4 810 006 discloses an adhesive coating to the secondary layer of the carrier material. Such an adhesive coating on the carrier material is a part of the carrier material.

[0008] It is an object of the present invention to provide an apparatus for transporting a solid or laminated web through a plurality of stations in a working plant permitting transportation without wear, through steps of selectable size, and in both directions whereby the working stations may be simplified and disposed closer to one another.

[0009] The apparatus of the present invention is defined in the characterizing part of claim 1.

[0010] It will be understood that the width of the web from which cards are to be produced need not exceed that necessary for the cards themselves as the lateral perforated margin is provided on the tape. Further, the tape may be tensioned over all stations by one single tensioning means so that the stations need not have such means.

[0011] The tape may be made of a material which resists the working environment. Steel is preferred but plastic, e.g. polyester, may be suited as well. Perforation of a steel tape may be performed with extreme precision before the tape is closed to form the loop by, e.g. plasma welding.

[0012] The displacement means preferably comprises drums having circumferentially disposed sprockets in engagement with the carrier tape holes. The carrier tape preferably is looped around a first driving drum and a second driven drum, and the distance spacing the drum axes defines the tension of the tape. In a preferred embodiment, the axis of the driving drum is stationary while the axis of the driven drum is displaceable so that the distance between the axes may be varied in order to adjust the tape tension. Such tension adjustment may be advisable in response to temperature variations. However, various other reasons may cause variation of the tape tension so that it is preferred to control the tension in response to the measured distance between adjacent holes.

[0013] Preferably, stepping motors drive the sprocket drum in order to displace the carrier tape by a predetermined stroke. The engagement between the sprockets and the holes provides for an unambigous relation between the number of pulses supplied to the stepping motor and the stroke through which the carrier tape is displaced.

[0014] It is to be understood that the "web" may consist of a series of cards already stamped from a substrate or laminate. The invention is applicable to webs of plastic as well as webs made of cardboard.

[0015] The attached drawings illustrate the present invention.

Fig. 1 is a schematic sideview of a card making plant,

Fig. 2 is a partial section view of drum 26 in Fig. 1.

[0016] In Fig. 1, the working stations 10, 12, 14, 16 are only schematically indicated. They may be four printing stations, one for each of the colors red, blue, yellow and one for black. The substrate web 18 to be printed on passes over a guiding drum 20 towards carrier tape 22 which surrounds a driving drum 24 and a driven drum 26. The drums rotate in accordance with arrow 28, driven by a stepping motor (not shown). Driven drum 26 is displaceable in direction of arrow 30 in response to ambien temperature variations.

[0017] A strip 32 of plastic is coated on both of its faces with an adhesive or bonding material. The strip is wound on bobbin 34 and fed between web 18 and carrier tape 22. Downstream of station 10, the strip is released from both carrier tape 22 and web 18 and is discarded. Instead of the single broad strip 32 a plurality of narrow ribbons may be used.

[0018] Fig. 2 is a partial section view of the driven drum 26 having sprockets 36 in engagement with holes 38 of tape 22. In addition to strip 32, the web 18 is held on carrier tape 22 by small upstanding stampings 39 cut from tape 22 and angled upwards.

Claims

1. An apparatus for transporting a web (18) through a plurality of stations (10, 12, 14, 16) of a working plant, comprising:

   - a carrier tape (22) extending across said stations (10, 12, 14, 16) and forming a closed loop,
   - at least one series of holes (38) spaced by regular distances in longitudinal direction of said tape (22),
   - means (24, 26, 36) for stepwisely displacing said carrier tape (22) by cooperation with said holes (38),
   - means for holding said web (18) on one face of said carrier tape (22),

   characterized in that

   - said means for holding include a strip (32) having two main faces, each face being provided with an adhesive bonding agent, and
   - means (34) to feed said strip (32) between said carrier tape (22) and said web (18) upstream of said stations (10, 12, 14, 16),
   - said bonding agent being selected to be released from said carrier tape (22) and said web (18) downstream of said stations (10, 12, 14, 16).

2. The apparatus of claim 1 wherein said tape (22) is made of a material selected from the group comprising steel and plastic.

3. The apparatus of claim 1 wherein said means (24, 26, 36) for displacing comprise drums (24, 26), at least one of said drums (24, 26) having circumferentially disposed sprockets (36) in engagement with said tape holes (38).

4. The apparatus of claim 3 wherein said carrier tape (22) is held under tension between two drums (24, 26).

5. The apparatus of claim 4 wherein said tension is adjustable.

6. The apparatus of claim 5 wherein said tension is adjustable in response to temperature variations.

Patentansprüche

1. Vorrichtung zum Transportieren einer Bahn (18) durch mehrere Stationen (10, 12, 14, 16) einer Bearbeitungsanlage, umfassend:

   - ein Trägerband (22), das durch die Stationen (10, 12, 14, 16) verläuft und eine geschlossene Schleife bildet,
   - mindestens eine Reihe von Löchern (38), die in Längsrichtung des Bandes (22) um gleichmäßige Strecken beabstandet sind,
   - Einrichtungen (24, 26, 36) zum schrittweisen Vorschieben des Trägerbandes (22) durch Zusammenwirkung mit den Löchern (38),
   - Einrichtungen zum Halten der Bahn (18) auf einer Seite des Trägerbandes (22),

   dadurch gekennzeichnet, daß

   - die Einrichtungen zum Halten einen Streifen (32) mit zwei Hauptseiten, wovon jede mit einem Klebe-Haftmittel versehen ist, umfassen,
   - Einrichtungen (34) vorgesehen sind, die den Streifen (32) vor den Stationen (10, 12, 14, 16) zwischen das Trägerband (22) und die Bahn (18) befördern, und
   - das Haftmittel so gewählt ist, daß es hinter den Stationen (10, 12, 14, 16) vom Trägerband (22) und von der Bahn (18) lösbar ist.

2. Vorrichtung nach Anspruch 1, wobei das Band (22) aus einem Material hergestellt ist, das aus der Stahl und Kunststoff umfassenden Gruppe gewählt ist.

3. Vorrichtung nach Anspruch 1, wobei die Einrichtungen (24, 26, 36) zum Verschieben Trommeln (24, 26) umfassen, wovon wenigstens eine in Umfangsrichtung angeordnete Kettenrad-Zähne (36), die mit den Bandlöchern (38) in Eingriff sind, enthält.

4. Vorrichtung nach Anspruch 3, wobei das Trägerband (22) zwischen zwei Trommeln (24, 26) unter Zug gehalten wird.

5. Vorrichtung nach Anspruch 4, wobei der Zug einstellbar ist.

6. Vorrichtung nach Anspruch 5, wobei der Zug in Abhängigkeit von den Temperaturänderungen einstellbar ist.

Revendications

1. Dispositif pour le transport d'une bande (18) à travers une pluralité de stations (10, 12, 14, 16) d'une installation de traitement, comprenant :

- une courroie de transport (22) s'étendant à travers lesdites stations (10, 12, 14, 16) et formant une boucle fermée,
- au moins une série de trous (38) espacés à distance régulière selon la direction longitudinale de ladite courroie (22),
- des moyens (24, 26, 36) pour entraîner pas à pas ladite courroie de transport (22) en coopération avec lesdits trous (38);
- des moyens pour maintenir ladite bande (18) sur une face de ladite courroie de transport (22),

caractérisé en ce que

- lesdits moyens de maintien comprennent un ruban (32) ayant deux faces principales, chaque face étant munie d'un agent liant adhésif, et
- des moyens (34) pour fournir ledit ruban (32) entre ladite courroie de transport (22) et ladite bande (18) en amont desdites stations (10, 12, 14, 16),
- ledit agent liant étant sélectionné pour être détaché de ladite courroie de transport (22) et de ladite bande (18) en aval desdites stations (10, 12, 14, 16).

2. Dispositif selon la revendication 1, dans lequel ladite courroie (22) est réalisée en un matériau sélectionné parmi le groupe comprenant l'acier et le plastique.

3. Dispositif selon la revendication 1, dans lequel lesdits moyens d'entraînement (24, 26, 36) comprennent des tambours (24, 26), au moins un desdits tambours (24, 26) comprenant des dents (36) disposées de façon circonférentielle en engagement avec lesdits trous de courroie (38).

4. Dispositif selon la revendication 3, dans lequel ladite courroie de transport (22) est maintenue sous tension entre deux tambours (24, 26).

5. Dispositif selon la revendication 4, dans lequel ladite tension est réglable.

6. Dispositif selon la revendication 5, dans lequel ladite tension est réglable en réponse à des variations de température.

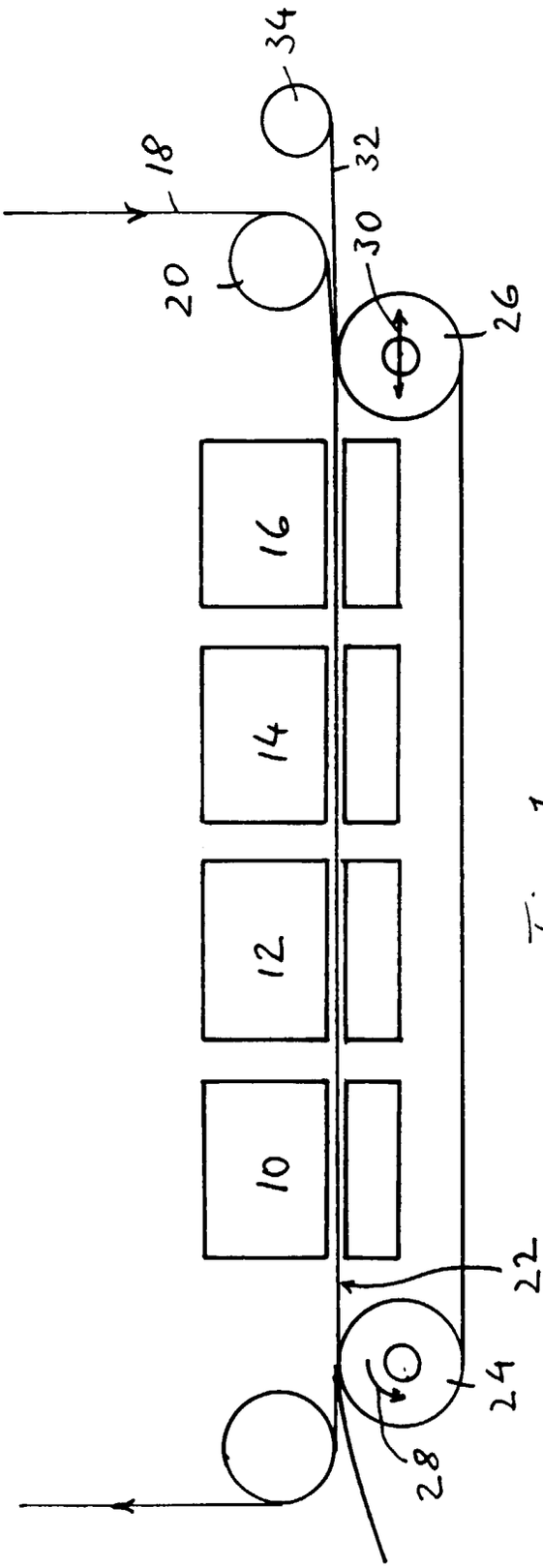

Fig. 1

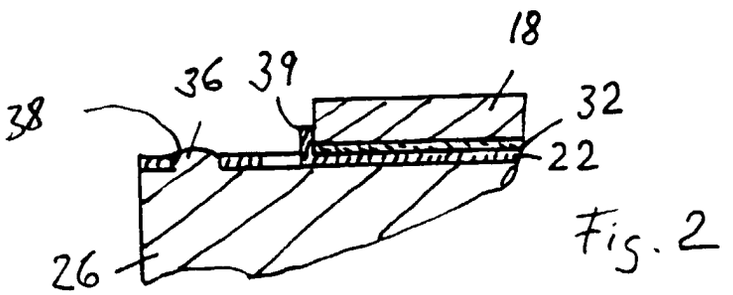

Fig. 2