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(54) **A document transfer mechanism.**

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Description

Field of the Invention

This invention relates to a document transfer mechanism for transporting a document along a transfer path, such as a plastic credit card, according to the preamble of claim 1 based on US-A-3001624.

State of the Prior Art

Embossing systems are in widespread use. Two such systems are shown in US-E-27,809 to Drillick and US -A- 4,088,216 to LaManna et al. Both of those systems are of substantially greater mechanical complexity and size in their embossing mechanism and may, therefore, require a relatively larger amount of maintenance and power to operate.

In the machine of US-E-27,809, a blank card is indexed along a card track past an array of punches and dies longitudinally arranged along the card track at a fixed height. Characters are embossed on one line of the card when the desired space is positioned adjacent a related die and punch pair on opposite sides of the card. A pair of bail arms driven in coordinated reciprocating or oscillatory movement by eccentric arms driven by an eccentric which is in turn driven by a motor-driven drive shaft provides the embossing pressure for the punch and die elements. Electromechanical interposers are utilized to couple movement of the bail arms to actuate a particular punch and die pair. A separate pair of interposers is required to be actuated and moved for each operation of a punch and die pair which results in a machine having a high degree of electromechanical complexity.

It is an object of the invention to provide a document transfer mechanism, in particular for a card for indexing cards along a card track by engaging an edge of the card with a projection on a continuous belt which includes a segment running parallel to the track and wherein the card can be transferred from one such belt drive to another without damaging projections on the indexing belt.

This object is attained by the features of the characterizing portion of claim 1.

The accelerator means prevent the spur means from being damaged by the engaged edge of a document.

Brief Description of the Drawing

Other advantages of this invention will become apparent from the following detailed description

thereof and the accompanying drawing wherein:

The single Figure is a top view of an embossing mechanism and card transport mechanism for a single module of a card embossing machine according to the present invention.

Description of the Preferred Embodiment

In the Figure, a frame of an embossing machine supports a pair of motors 12 and 14 which respectively drive printer embossing wheels 16 and 18. In the preferred embodiment shown the motors are DC servo motors which have modular position encoder devices mounted on one end of the motor shaft. The position encoders may be conventional optical position encoders or any other encoders which produce generally triangular output waveforms as a function of an angular shaft displacement.

Shafts 20 and 22 respectively of motors 12 or 14 are connected by an appropriate means to printer embossing wheels 16 and 18.

The printwheel 16 has a plurality of embossing elements 24 disposed in a plurality of slots distributed around its circumference. Typically, one of the printwheels carries die embossing elements, while the other carries the corresponding punch embossing elements in opposing positions.

The embossing operation is accomplished by forcing cooperative punch and die printing elements 24 together to engage both the front and back surfaces of a plastic card 34. The actuation mechanism for the embossing elements is also not shown. Card 34 is moved along a card track indicated by arrow 35. Card 34 is moved to various positions relative to printwheel 16 and 18 by a belt 62 which has a series of projections or spurs 64 projecting outwardly therefrom as belt 62 is moved by motor 66 around pulleys 68, 70 and 72. The control of motor 66 is accomplished by well known servo circuitry not specifically shown. It is necessary for motor 66 to move in steps having an angular displacement sufficient to move belt 62 one character position along the card path in the interval between each compression stroke of bail arms (not shown). The card indexing circuitry is synchronized with the operation of bail arms and utilizing a suitable position sensor on a bail shaft to sense the position of the shaft to initiate the indexing and printwheel positioning steps after the bail arms open and the print elements 24 are retracted into printwheels 16 and 18.

In prior art card indexing and transport mechanisms, such as the one shown in US-E-27,809 which utilize projections on a belt to move a card through a printing path, there is a problem encountered in the transfer of a card from the indexing

mechanism for one printing module to the indexing for another printing module. In such situations, the projection or spur 64 is often broken off as the belt turns the corner around the idler pulley because spur 64 catches the trailing edge of card 34 which is moving at the linear speed of the belt, a speed obviously insufficient to allow the spur to clear the projection without interference.

In the present machine, a considerable improvement is achieved over prior art systems by providing a set of drive rollers 80 and 82 which are driven at a speed such that a card 34 traveling through their nip will be accelerated to move at a slightly faster speed than the linear speed of belt 62. Thus, when the leading edge of card 34 enters the nip of drive rollers 80, 82, the card is accelerated to a slightly higher speed pulling it away from projection 64 and allowing projection 64 to follow the arcuate path of belt 62 around roller 70 while not in contact with the trailing edge of card 34. Rollers 80 and 82 then drive the card into a position on the next module where a projection on the drive belt for that module will engage the trailing edge of the card and index it through that module for embossing the next line of the card. Use of the accelerating drive roller combination in connection with the drive belts provides considerably longer life for the projections 64 and hence the drive belt. Although it is not specifically shown, the accelerating rollers can be conveniently driven by a belt drive from pulley 70 with the relative diameters of the rollers being selected to give a linear speed to a card in the nip of rollers 80 and 82 slightly higher than the speed of the card as belt 62 is advanced in the normal indexing mode sufficient to pull the trailing edge of card 34 away to clear projection 64 as belt 62 travels over roller 70.

Claims

1. A document transfer mechanism for transporting a document (34) along a document transfer path, in particular for a card for indexing cards along a card track, comprising belt means (62) passing over first and second wheel means (68, 70) mounted adjacent to said document transfer path (35) for aligning a segment of the belt means (62) with the document transfer path, at least one spur means (64) projecting from the belt means (62) for engaging the trailing edge of a document (34) positioned on the document transfer path between the first and second wheel means (68, 70), drive means (66) for moving the drive belt means (62) and pushing a document (34) from the first wheel means (68) to the second wheel

means (70), characterized by accelerator means (80, 82) driven in synchronism with the drive means (66) for engaging the leading edge of a document (34) approaching the second wheel means (70) and increasing the transport speed of the document relative to the belt means, thereby disengaging the spur means (64) from the trailing edge of the document means prior to the spur means (64) passing over the second wheel means (70).

2. The mechanism of claim 1, wherein the accelerator means comprises at least one pair of roller means (80, 82) on both sides of a document transfer path, the nip of the roller means being positioned for engaging the leading edge of the document (34), the roller means (80, 82) being driven by the drive means (66).
3. The mechanism of claim 2, wherein the accelerator roller means (80, 82) is connected by a belt to a third wheel mounted on a shaft upon which the second wheel means (70) is axially mounted.
4. The mechanism of claim 1, wherein the drive means (66) drives the belt means (62) and the accelerator means (80, 82) in incremental steps.

Revendications

1. Mécanisme de transfert de document pour transporter un document (34) le long d'une voie de déplacement de documents, en particulier une carte, pour indexer des cartes le long d'une voie de déplacement de cartes, comprenant une courroie (62) passant sur une première et une seconde roues (68, 70) montées au voisinage de la voie de transfert de document (35), pour aligner un segment de la courroie (62) avec la voie de transfert de document, au moins un ergot (64) faisant saillie sur la courroie (62), apte à venir en contact avec le bord arrière d'un document (34) positionné sur la voie de transfert de documents entre la première et la seconde roues (68, 70), un dispositif d'entraînement (66) pour déplacer la courroie (62) et pousser un document (34) de la première roue (68) vers la seconde roue (70), caractérisé en ce qu'il comprend un dispositif d'accélération (80, 82) entraîné en synchronisme avec le dispositif d'entraînement (66) pour engager le bord avant d'un document (34) approchant de la seconde roue (70) et augmenter la vitesse de transport de ce document par rapport à la courroie, dégageant

ainsi l'ergot (64) du bord arrière du document, avant que l'ergot (64) passe sur la seconde roue (70).

2. Mécanisme suivant la revendication 1, caractérisé en ce que le dispositif d'accélération comprend au moins deux rouleaux (80, 82), de part et d'autre d'une voie de transfert de document, l'intervalle des rouleaux étant disposé de façon à engager le bord avant du document (34), les rouleaux (80, 82) étant entraînés par le dispositif d'entraînement (66).
3. Mécanisme suivant la revendication 2, dans lequel le dispositif de rouleaux accélérateurs (80, 82) est relié au moyen d'une courroie à une troisième roue montée sur un arbre sur lequel la seconde roue (70) est montée axialement.
4. Mécanisme suivant la revendication 1, dans lequel le dispositif d'entraînement (66) entraîne la courroie (62) et le dispositif d'accélération (80, 82) par pas incrémentiels.

Ansprüche

1. Dokumententransportvorrichtung zum Transport eines Dokumentes (34) entlang eines Dokumentenförderweges, insbesondere für eine Karte zum Indexieren der Karte entlang einer Kartenführung, mit einem Band (62) welches ein erstes und ein zweites Rad (68, 70) passiert, die benachbart zu dem Dokumentenförderweg (35) angebracht sind, um einen Abschnitt des Bandes (62) mit dem Dokumentenförderweg auszurichten; wenigstens einem dem Band (62) vorgelagerten Vorsprung (64), der an der hinteren Kante des auf dem Dokumentenförderweg zwischen dem ersten und zweiten Rad (68, 70) angeordneten Dokument angreift; einem Antriebsmittels (66), um das angetriebene Band (62) zu bewegen, und um das Dokument (34) von dem ersten Rad (68) zu dem zweiten Rad (70) zu schieben, gekennzeichnet durch ein Beschleunigungsmittel (80, 82), das synchron mit dem Antriebsmittel (66) angetrieben wird, an der vorderen Kante des Dokumentes (34), wenn sich dieses dem zweiten Rad (70) nähert, angreift, und daß die Transportgeschwindigkeit des Dokumentes relativ zu dem Band erhöht, wodurch der Vorsprung (64) von der hinteren Kante des Dokumentes entfernt wird bevor dieser das zweite Rad (70) passiert.
2. Vorrichtung nach Anspruch 1, worin das Be-

schleunigungsmittel wenigstens ein Paar, auf beiden Seiten des Dokumentenförderweges angeordnete Führungsrollen (80, 82) umfaßt, eine Einlaufspalte an den Führungsrollen vorgesehen ist, die an der vorderen Kante des Dokumentes (34) angreift, und die Führungsrollen (80, 82) von dem Antriebsmittel (66) angetrieben werden.

3. Vorrichtung nach Anspruch 2, worin die Beschleunigungsrollen (80, 82) über ein Band mit einem dritten Rad verbunden sind, welches an einer Antriebswelle befestigt ist, an der das zweite Rad axial befestigt ist.
4. Vorrichtung nach Anspruch 1, worin das Antriebsmittel (66) das Band (62) und das Beschleunigungsmittel (80, 82) in Zuwachsstufen antreibt.

