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(54) **Automatic, self-centering straightening machine for a continuous fabric, in particular suitable for being coupled in line with textile finishing machines, or with a printing machine.**

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Description

The present invention relates to an automatic, self-centering straightening machine for a continuous fabric, coupled in line with textile finishing machines, or with a printing machine as shown in US-A-4 384 686.

Coupling in line with a fabric finishing machine or printing machine, a weft straightener aligned according to the axis of the finishing or printing machine, wherein the fabric unrolled from a feed fabric roll is treated in order to have the picks positioned perpendicularly to the warp threads, or to verify the alignment of the loops, is known.

These correction actions determine the side shifting of the fabric inside the finishing or printing machine which cannot be easily controlled, and involve such an error of treatment or of printing, as to transversely invade, e.g., during the printing process, the selvages of the same fabric, in a direction, or in the other.

The presently feasible correction interventions allow an adjustment, or registering, of such errors to be achieved only after a certain time period, with a considerable waste of fabric, and not always do they reach the prefixed aim, because the corrections which can be carried out show a poor precision.

A purpose of the present invention is to provide an automatic, self-centering straightening machine for a continuous fabric coupled in line either with a textile finishing machine, or with a printing machine, and makes it possible both to rapidly carry out the correct positioning, controlled instant by instant, of the fabric, maintaining it in line with the finishing or with the printing, and a correct operating of the straightening unit.

A further purpose is to be able to operate on a wide range of fabric widths, without being obliged to replace the straightening machine, or to operate and carry out mechanical adjustments of the various components of the straightening unit before beginning the processing, also as a function of the fact that most times it is necessary to process the fabric on the finishing machines, and, above all, on the printing machines, in a out-of-centre position relatively to the axis of the same machines, e.g., to print a trade name on the selvages.

These and other purposes according to the present invention are achieved by providing an automatic, self-centering straightening machine for a continuous fabric, according to claim 1.

The structural and functional characteristics and the advantages of an automatic, self-centering straightening machine according to the present invention shall be better understood from the following exemplifying, non-limitative disclosure, referred to the hereto attached drawings, wherein:

Figure 1 is a schematic, longitudinal, sectional elevation view of an automatic machine according to the invention, positioned upstream the inlet of a partially shown printing machine;

Figure 2 is a side elevation view of the bottom portion of the machine of Figure 1; and

Figure 3 is a top plan view of the machine of Figure 1.

Referring to the figures, a self-centering straightening machine according to the present invention is generally indicated by the reference numeral 10, and is arranged to receive a continuous fabric 11, e.g., being unrolled from a roll 12, supported on a fabric roll holder car 47, and to feed it, through return rollers 13, to a printing machine 14, or to another textile finishing machine, such as a raising machine, and so forth, partially shown in Figures 1 and 3.

The continuous fabric 11, by unrolling from roll 12, comes to the true straightening machine, which comprises a frame 15, above which a first return roller 16 is located, said first return roller 16 being supported inside an entry gantry 24, which feeds the same fabric in a vertical direction, towards an underlying centering device or means 17.

The centering device 17 is constituted by three rollers 18 on board of swinging side support rods or shoulders 19, the one of which is hinged in 20 onto the frame 15, and the other one of which is rotatably constrained to the stem of a hydraulic cylinder 21, so to act on the lateral shift on the vertical plane, and to be used for aligning the fabric 11.

The fabric 11 enters then a straightening unit, generally indicated by the reference number 22, wherein, besides return rollers 9, provided are, e.g., three corrector rollers for the diagonal deformations 23, on board of a swinging frame 25 motor-driven in 26, and two further corrector rollers for the curved deformations 27, individually motor-driven in 28.

A plurality of optical reading heads 29, and of relevant projectors 30, as detector means for the position of the picks, and/or for the alignment of the loops, act on the fabric two by two, from opposite sides, detecting the deformations thereof relatively to the correct positions of the picks, or of the loops.

The fabric 11, then, by passing into an outlet calender 31, comes in correspondence of further detector means 32 and 33, detecting the opposite positions of the ends of the width of the straightened fabric 11 under processing which leaves said straightening unit, which opposite end positions indicate the relative position of the fabric relatively to a processing axis 35 corresponding to the axis of the framework 15.

Said processing axis 35 is independent from the fabric 11 being processed, and exactly as a

function of the height, or width, of the fabric, it is located in an out-of-centre position relatively to a central fixed axis 34 of the printing machine 14. For the purpose of varying the relative position of the processing axis 35, as referred to the fixed machine axis 34, the framework 15 is mounted on wheels 36 running along tracks 37, said tracks 37 being also located transversely relatively to the fabric feed direction 11, and being constrained to a baseplate, or to the floor, indicated by the reference numeral 38; the framework 15 interacts with, and is moved by a translational drive means 39, such as a hydraulic cylinder.

The straightening machine 10 can hence be shifted relatively to the printing machine 14, in relation to the width of the fabric 11 which is being processed.

A central computer 40 is equipped with a control keyboard 41, and is operatively connected with a related display screen 42. Said central computer 40 results furthermore to be operatively connected, through a set of connection leads, with said hydraulic translational drive means 39, which is provided with a shift control element 43, such as an encoder, interacting relatively to a starting stop 44, in correspondence of which the machine according to the invention processes a fabric having the maximum width.

In the hereto figures, a machine according to the invention is shown, during the automatic processing of an intermediate-width fabric.

Furthermore, with said central computer 40 a microprocessor 45 is connected, which is associated with the reading heads 29, and with the drive means 26 and 28 of the corrector rollers 23 and 27. Furthermore, third detection means 46, similar to those indicated by the reference numerals 32 and 33, are located in correspondence of the centering means 17, so to detect the alignment of the fabric 11 and transmit such information to the central computer 40, so that it can consequently actuate the hydraulic cylinder 21, determining the correction.

In this way, with a machine according to the invention, once that a roll 12 of fabric to be processed 11, having a determined width, is installed on the fabric roll holder 47, according to predetermined fixed positions 48 previously defined exactly as a function of the various fabric widths, through the keyboard 41, the computer 40 and the translational drive means 39, the shift is caused of the framework 15, so to position the processing axis 35, which is also the fabric axis 11, out-of-centre relatively to the stationary axis 34 of the printing machine 14.

The fabric 11 is thus located out-of-center inside the printing machine 14, and is positioned with an edge thereof nearly in correspondence with the

side edge of the same machine. In this position, the further third detection means 46 associated with the centering device 17 detect, and act according to commands coming from the computer 40 to line-up the fabric 11.

Advantageously, also the further detection means 32 and 33 detect the opposite transversal ends of the fabric 11 as said fabric is processed, and can act, always through the computer 40, to modify the position of the framework 15 by means of the hydraulic actuator 39.

Of course, coupled with said detection means 32, 33 and 46, the means act, which detect the position of the picks and/of the alignment of the loops 29-30, and the relevant microprocessor 45.

Thus, above all at the relatively low speeds at which the printing is carried out, an automatic, out-of-centre control is achieved of the alignment of the fabric inside the same printing machine.

Thus, it is possible to print, with an extremely high precision, on the selvedge located in correspondence of the side edge of the printing machine. Then, it is furthermore possible, e.g., on the display screen 42, to continuously identify all of the parameters relating to the fabric being processed, and act, through the control keyboard 41, to correct any possible faulty parameters.

According to a preferred, but not limitative, form of practical embodiment of the present invention, also the fabric roll holder 47 runs on further tracks, and is rigidly connected with the framework 15, so to be always perfectly aligned, eliminating any further initial adjustment and positioning of the fabric roll holder 47 relatively to the fixed positions 48.

Claims

1. Automatic, self-centering straightening machine for a continuous fabric (11), coupled in line either with textile finishing machines, or with a printing machine (14), comprising a framework (15), a first drive means (39) for the transversal translation of said framework (15) relatively to the direction of said fabric feed (11), which are operatively controlled by a control circuit connected with first detection means (32, 33) for the detection of opposite positions of the end of the width of said fabric (11), said first detection means (32, 33) being located on opposite sides relatively to an axis (34) of said framework (15) of the machine, essentially corresponding to a processing axis (35), characterized in that it further comprises a set of corrector rollers (23, 27) located on said framework (15) which correct the diagonal, curved or combined deformations of said continuous fabric (11), second drive means (26, 28) oper-

atively connected with a plurality of second detection means (29, 30), for the detection of the position of the picks and/or of the alignment of the loops, and in that said control circuit is a computer (40), said processing axis (35) being set and positioned on command by said computer (40), by means of said translation means (39), in a out-of-centre position relatively to the stationary axis (34) of the textile finishing or printing machine (14) as a function of the width continuously to keep the fabric (11) centered in this new out-of-centre position, and in that a centering means (17) is furthermore provided, which carries out the centering of said fabric (11) relatively to said processing axis (35), which is also connected with said computer (40), and is located on said framework (15) equipped with third detection means (46), which act to align and center said fabric (11) in said out-of-centre position, controlling at least a shift means (21), which carries out the shifting of said centering means (17).

2. Automatic machine according to claim 1, characterized in that said drive means (26, 28) operatively connected with said plurality of detection means (29, 30) detecting the position of the picks and/or the alignment of the loops are connected with a microprocessor (45).
3. Automatic machine according to claim 1, characterized in that said computer (40) is connected to a control keyboard (41) and is operatively connected with a relevant display screen (42).
4. Automatic machine according to claim 1, characterized in that said first drive means for the transversal translation of said framework (15) are respectively transversely constrained tracks (37) at the inlet of said textile finishing machines or of a printing machine (14), wheels (36) located on, and constrained to, the basis of said framework (15), and an actuator (39) operatively interacting between said tracks (37) and said framework (15), so to move the one relatively to the others, responding to a command given by said computer (40) as a function of said fabric (11).

Revendications

1. Machine à redresser automatique à autocentrage pour un tissu en continu (11), couplé en ligne soit à des machines de teinture et d'apprêt soit à une machine d'impression (14), comprenant un châssis (15), un premier

moyen d'entraînement (39) pour translation transversale dudit châssis (15) par rapport au sens d'avancée du tissu (11), qui sont fonctionnellement commandés par un circuit de commande connecté à des premiers moyens de détection (32, 33) pour la détection des positions opposées de l'extrémité de la largeur dudit tissu (11), lesdits premiers moyens de détection (32, 33) étant situés sur les côtés opposés par rapport à un axe (34) dudit châssis (15) de la machine, correspondant essentiellement à un axe de traitement (35), caractérisée en ce qu'elle comprend de plus un ensemble de rouleaux correcteurs (23, 27) situés sur ledit châssis (15) qui corrigent les déformations en diagonale, incurvées ou combinées dudit tissu en continu (11), des seconds moyens d'entraînement (26, 28) connectés fonctionnellement à une pluralité de seconds moyens de détection (29, 30) pour la détection de la position des duites et/ou de l'alignement des boucles et en ce que ledit circuit de commande est un ordinateur (40), ledit axe de traitement (35) étant établi et positionné sur ordre par ledit ordinateur (40) au moyen dudit moyen de translation (39) dans une position excentrique par rapport à l'axe fixe (34) de la machine de teinture et d'apprêt ou d'impression (14) comme une fonction de la largeur à conserver continuellement au tissu (11) centré dans cette nouvelle position excentrique et en ce qu'un moyen de centrage (17) est de plus prévu, qui réalise le centrage dudit tissu (11) par rapport audit axe de traitement (35), qui est également connecté audit ordinateur (40) et situé sur ledit châssis (15) équipé de troisièmes moyens de détection (46) qui agissent pour aligner et centrer ledit tissu (11) dans ladite position excentrique, commandant au moins un moyen de décalage (21) qui réalise le décalage dudit moyen de centrage (17).

2. Machine automatique selon la revendication 1, caractérisée en ce que lesdits moyens d'entraînement (26, 28) fonctionnellement connectés à ladite pluralité de moyens de détection (29, 30) détectant la position des duites et/ou l'alignement des boucles sont connectés à un microprocesseur (45).
3. Machine automatique selon la revendication 1, caractérisée en ce que ledit ordinateur (40) est connecté à un clavier de commande (41) et est fonctionnellement connecté à un écran de visualisation approprié (42).
4. Machine automatique selon la revendication 1, caractérisée en ce que lesdits premiers

moyens d'entraînement pour la translation transversale dudit châssis (15) comportent des rails forcés transversalement respectivement (37) à l'entrée desdites machines de teinture et d'apprêt ou d'une machine d'impression (14), des roues (36) situées sur ceux-ci et forcées à la base dudit châssis (15) et un circuit de commande (39) interagissant fonctionnellement entre lesdits rails (37) et ledit châssis (15), de façon à déplacer l'un par rapport aux autres, répondant à un ordre donné par ledit ordinateur (40) comme une fonction dudit tissu (11).

Patentansprüche

1. Automatische, selbstzentrierende Maschine zum Ausrichten einer endlosen Stoffbahn (11), zum Kuppeln in Reihe mit Endbearbeitungsmaschinen für Textilien oder mit einer Druckmaschine (14), mit einem Rahmen (15) und ersten Antriebsmitteln (39) für die Transversalbewegung des Rahmens (15) relativ zur Richtung der zugeführten Stoffbahn (11), welche durch eine mit ersten Detektionsmitteln (32,33) für die Überwachung von gegenüberliegenden Positionen der Enden der Breite der Stoffbahn (11) verbundene Kontrollschaltung operativ gesteuert sind, wobei die ersten Detektionsmittel (32,33) an relativ zu einer Achse (34) des Rahmens (15) der Maschine, welche im wesentlichen einer Bearbeitungsachse (35) entspricht, gegenüberliegenden Seiten angeordnet sind, dadurch gekennzeichnet, daß sie weiters einen am Rahmen (15) angeordneten Satz von Korrekturrollen (23,27), welche diagonale, gekrümmte oder kombinierte Deformationen der kontinuierlichen Stoffbahn (11) korrigieren, und zweite Antriebsmittel (26,28) umfaßt, welche mit einer Vielzahl von zweiten Detektionsmitteln (29,30) zur Detektion der Position von Knoten und/oder der Ausrichtung der Schlaufen operativ verbunden sind, daß die Kontrollschaltung von einem Computer (40) gebildet ist, daß die Bearbeitungsachse (35) auf Steuerung durch den Computer (40) durch die Transversalbewegungsmittel (39) in einer relativ zur stationären Achse (34) der Endbearbeitungsmaschine für Textilien oder der Druckmaschine (14) außermittigen Position als Funktion der Breite gesetzt und positioniert ist, um die Stoffbahn (11) in der neuen außermittigen Position kontinuierlich zentriert zu halten, und daß weiters Zentriermittel (17) vorgesehen sind, welche die Zentrierung der Stoffbahn (11) relativ zur Bearbeitungsachse (35) durchführen, ebenfalls mit dem Computer (40) verbunden sind und am Rahmen (15) mit dritten Detek-

tionsmitteln (46) angeordnet sind, welche dazu dienen, die Stoffbahn (11) in der außermittigen Position auszurichten und zu zentrieren, und wenigstens ein Verschiebemittel (21) steuern, welches die Verschiebung der Zentriermittel (17) durchführt.

2. Automatische Maschine nach Anspruch 1, dadurch gekennzeichnet, daß die Antriebsmittel (26,28), welche mit der Vielzahl von Detektionsmitteln (29,30) zur Detektion der Position von Knoten und/oder der Ausrichtung der Schlaufen operativ verbunden sind, mit einem Mikroprozessor (45) verbunden sind.
3. Automatische Maschine nach Anspruch 1, dadurch gekennzeichnet, daß der Computer (40) mit einer Steuer-Tastatur (41) und operativ mit einem entsprechenden Ausgabe-Bildschirm (42) verbunden ist.
4. Automatische Maschine nach Anspruch 1, dadurch gekennzeichnet, daß die ersten Antriebsmittel für die Transversalbewegung des Rahmens (15) von jeweils quer verlaufenden Schienen (37) am Eingang der Endbearbeitungsmaschinen für Textilien oder einer Druckmaschine (14), auf der Basis des Rahmens (15) angeordneten und an dieser verlaufenden Rädern (36) und einer Bestätigungseinrichtung (39) gebildet sind, welche zwischen den Schienen (37) und dem Rahmen (15) wirksam ist, um diese entsprechend einem Steuerkommando des Computers (40) als Funktion der Stoffbahn (11) relativ zueinander zu bewegen.

Fig.1

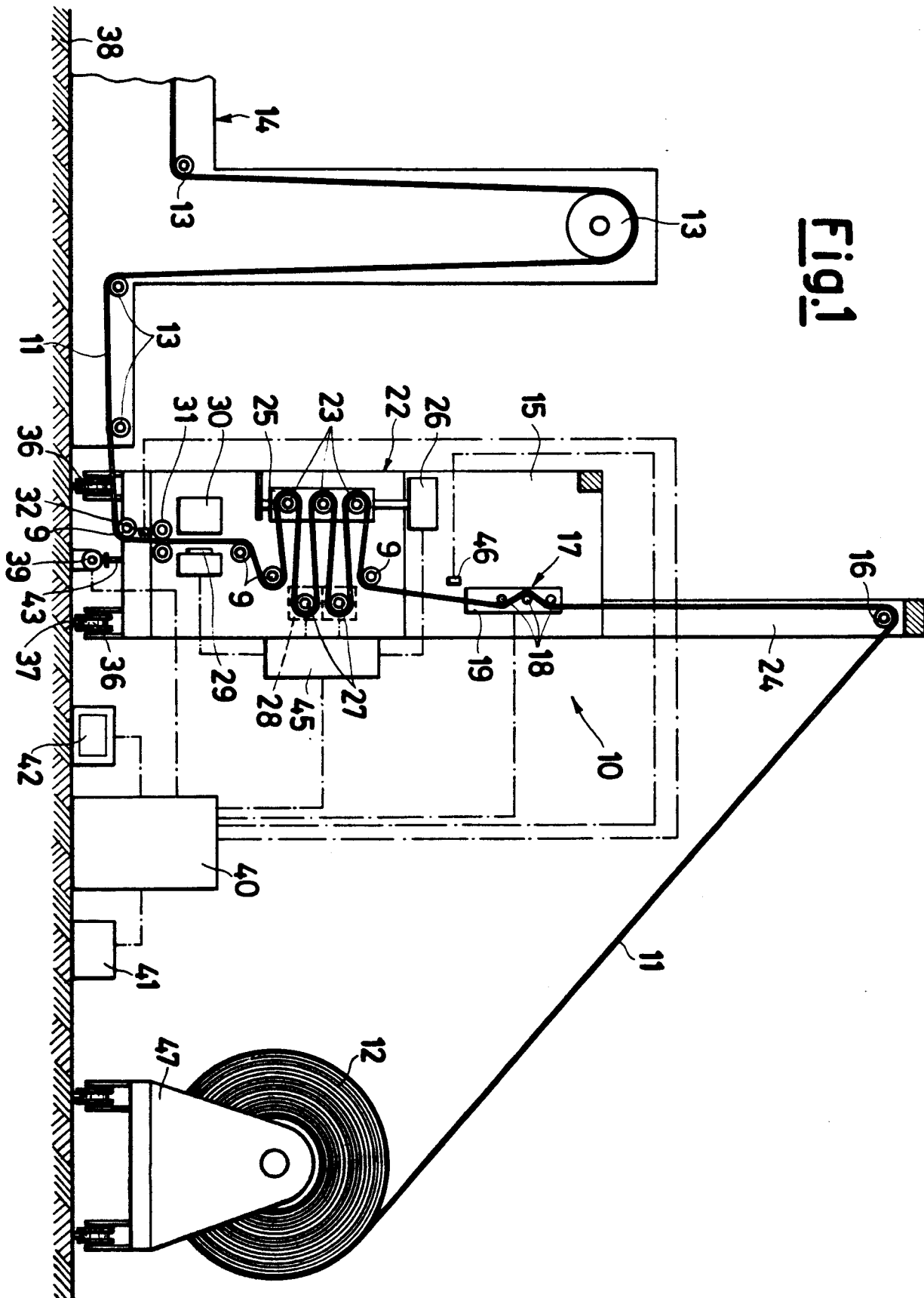


Fig.2

