

CASTELLANOS & CO LTDA
ABOGADOS
Calle 94 A No. 7 A-09
Bogotá, D.C. - COLOMBIA

70/ 20
SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 05-116684- -00004-0000

Fecha: 2007-11-14 14:13:24 Dep. 2020 NULCREACION
Tra. 2 PATENTES Eve: 1 REGDEPOSITO
Act. 538 PETICION Folios: 2

Señor

Jefe de la División de Nuevas Creaciones

Superintendencia de Industria y Comercio

Ministerio de Comercio, Desarrollo, Industria y Turismo

E. S. D.

Re.: Expediente No. **05.116.684**

Solicitud del examen de patentabilidad correspondiente a la Patente de Invención, para:

"APARATO DE SEPARACION DE MAQUINA DE TEJER CIRCULAR"

Solicitante: **PAI LUNG MACHINERY MILL CO. LTD.**

SOLICITUD EXAMEN DE PATENTABILIDAD

Yo, **MARGARITA CASTELLANOS ABONDANO**, mayor de edad, identificada y domiciliada como aparece al pié de mi firma, obrando en mi calidad de apoderada de la sociedad solicitante, atentamente me permito solicitar a Ud. que se realice el examen de patentabilidad de la invención arriba citada, para lo cual anexo el comprobante de pago No. **07- 91.995** de **Noviembre 13** de **2007**, correspondiente a la tasa establecida para dicha solicitud.

En consecuencia, atentamente solicito a Ud. se anexe este memorial junto con el comprobante de pago al expediente correspondiente a esta solicitud de Patente de Invención, y se continúe con su tramitación.

Señor Jefe,


Margarita Castellanos Abondano
C.C. No. **39.779.654** de Usaquén
T.P.A. No. **70.819** del C. S. J.
Calle 94 A No. 7 A-09 - Bogotá, D.C.
Teléfono (PBX): 610 7420

Bogotá,
MCA/gcb/P1264 (6024)

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

NIT : 800176089-2

RECIBO OFICIAL DE CAJA : 07 - 91,995
FECHA : NOVIEMBRE 13 DE 2007

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 05-116684- -00004-0000

Fecha: 2007-11-14 14:13:24 Dep. 2020 NULCREACION:
Tipo: PATENTES Eje: 1 REGDEPOSITO
Al: 0000000000 Folios: 2

***** CONSIGNACION *****

DEPOSITANTE	TIPO PAGO	BANCO	CUENTA	No. PAGO	FECHA PAGO	Vr. PAGO
ALVARO CASTELLANOS	CONSIGNACION	BANCO POPULAR	050-00110-6	72392175	13/11/2007	2,755,000.00

***** CONCEPTO *****

CANT.	RENTISTICO	CONCEPTO	TOTAL CONCEPTO
1	50005-01-01	SOLICITUDES	
		85 EXAMEN DE PATENTABILIDAD DE INVEN	404,000.00
		TOTAL :	\$ 404,000.00

SON: CUATROCIENTOS CUATRO MIL PESOS

RESPONSABLE : _____

RECIBO DE CAJA APLICADO AL EXPEDIENTE No. _____

DIVISIÓN DE NUEVAS CREACIONES

RADICACIÓN EXPEDIENTE No. 05-116684

EL EXTRACTO DE LA PRESENTE SOLICITUD DE **PATENTE DE INVENCION**

FUE PUBLICADO EN LA GACETA DE PROPIEDAD INDUSTRIAL No **576** DE

FECHA **31 DE MAYO DE 2007** EL TÉRMINO HÁBIL SEÑALADO POR LA LEY

EXPIRA EL **31 DE AGOSTO DE 2007**

NOTA: Dentro del plazo de los seis (6) meses siguientes a partir de la fecha de publicación en la gaceta de Propiedad Industrial, deberá solicitar y cancelar el examen de patentabilidad so pena de que la solicitud caiga en abandono, de acuerdo con lo establecido en el Artículo 44 de la Decisión 486/2000.

SE PRESENTARON OPOSICIONES POR PARTE DE TERCEROS.

SI _____

NO X

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SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
DIVISIÓN DE NUEVAS CREACIONES

2020
Bogotá, D.C.,

Abogada
Margarita Castellanos A.
(Apoderada)

ASUNTO	Radicación	05 – 116 684
	Trámite	002
	Evento	001
	Actuación	430
	Oficio	2106
	Folios	021
Patente de Invención	☒	Patente de Modelo de Utilidad ☐
Vía Nacional	☐	
Vía PCT (fase nacional)	☐	Cap. I ☐ Cap. II ☐
Solicitud Internacional n.º	_____	
Fecha de Presentación Intrnl.	_____	

Como resultado del examen de fondo, realizado con fundamento en el artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le comunica:

1. Documentos estudiados

- | | |
|--------------------------|--|
| <u>Descripción:</u> | Folios 4 a 19 como se radicó inicialmente |
| <u>Reivindicaciones:</u> | Folios 20 a 23 como se radicó inicialmente |
| <u>Dibujos:</u> | Folios 25 a 37 como se radicó inicialmente |

2. Objeto de la invención

- Título de la solicitud: *Aparato de separación de máquina de tejer circular*, folio 1.
- El objeto de la presente solicitud de patente de invención consiste en suministrar un aparato de separación de los hilos temporalmente insertados en una máquina de tejer circular, con el fin de evitar la aparición de los residuos de hilo en el tejido y mejorar la calidad general de la tela.

El problema planteado en esta solicitud es satisfacer la necesidad de evitar que se desgarran los hilos que se emplean temporalmente en un tejido cuando

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los hilos son retirados para cambiar el color. Esto produce unos residuos que quedan atrapados en el tejido y bajan la calidad del mismo.

Para solucionar este problema técnico la solicitud en estudio proporciona un aparato que tiene múltiples piezas que colaboran entre sí para realizar el cambio y el corte del hilo mediante unas levas que tienen desplazamientos coordinados a ese fin.

- Clasificación Internacional de Patentes (IPC) asignada: D04B 15/58, 15/80,

3. De la solicitud de Patente

Descripción (artículo 28 D. 486)

- Durante el análisis del texto de la descripción y de las ilustraciones anexadas, se observaron los siguientes defectos:
 - 1) En la página 4, folio 7, aparece la expresión *la cantidad de la tela es degradada* que carece de sentido, según el contexto.
 - 2) En las páginas 5 y 11 a 13, folios 8 y 14 a 17, respectivamente, se hace alusión explícita o implícitamente a la figura 5D que el solicitante omitió presentar. Esto afecta gravemente la completitud de la descripción.
 - 3) En la página 10, folio 13, aparecen las expresiones *primer elemento elástico 43, (...) primer vástago de conexión 43* en las cuales se emplea el mismo número de referencia para señalar a dos elementos diferentes. Esto no es admisible. El solicitante debe emplear una misma terminología para designar cada uno de los elementos, piezas, aspectos o detalles a los que haga referencia en el texto de la descripción y las reivindicaciones.
 - 4) En la página 13, folio 16, aparece la expresión *la posición de habilitación, habilitación y luego, (...)* que carece de sentido
 - 5) En la página 16, folio 19, aparece dos veces la expresión *510a* que no corresponde a ninguno de los números de referencia empleados en las figuras. El solicitante debe hacer la correspondiente aclaración.
 - 6) En las figuras 4A y 5C, folios 29 y 32, aparecen textos en inglés, que deben ser sustituidos por sus traducciones al español.
- La descripción no cumple con los requisitos de claridad y divulgación completa, lo que dificulta o impide su comprensión y ejecución de acuerdo al art. 28 de la Decisión 486

Reivindicaciones (artículo 30 D 486)

- Durante el análisis del texto de las reivindicaciones no se observaron defectos dignos de mención.

Se deben presentar, entonces, un nuevo capítulo descriptivo, junto con un nuevo juego de dibujos, donde se hayan corregido todas las objeciones que se han hecho arriba. Esto con el fin de evitar -cuando solo se presentan algunas páginas sueltas corregidas- que el lector tenga que desplazarse desde un sitio a otro de la solicitud y luego regresar a donde estaba antes sin perder la ilación de la lectura, porque esto produce confusión y afecta negativamente la claridad de dichos capítulos.

4. Determinación del Estado de la Técnica

- La fecha que se ha tenido en cuenta para determinar el Estado de la Técnica es la

Fecha de presentación de la solicitud nacional 2005-11-17

- Se realizó la búsqueda en el estado de la técnica de documentos relacionados con la solicitud teniendo en cuenta la fecha indicada; y durante la búsqueda de anterioridades se encontraron los siguientes documentos, que forman parte de la familia de patentes de la presente solicitud: Patente US 7 036 343 B1 del 2006-05-02 y publicación *Abstract* KR 100666653 B1 del 2007-01-03. Se anexa la copia de las primeras páginas de estos documentos junto con la copia del capítulo reivindicatorio admitido por la USPTO.
- También se encontraron los siguientes documentos que forman parte del estado de la técnica más cercano al objeto de la solicitud:

n.º	Documento	Título	Fecha de publicación
D1	Patente US 4 656 842, cuyos inventores son Masatoshi Sawazaki y Hidetoshi So, quienes le cedieron sus derechos a la Precision Fukuhara Works, Ltd.	«Yarn feeding and changing apparatus for circular knitting machine»(Un aparato para alimentar y cambiar hilos en una máquina de tejer circular)	1987-04-14
D2	Patente US 5 070 709, cuyo inventor es José María Dalmau Güell, quien le cedió sus derechos a la Jumberca, SA	«Striping system for circular knitting machine»(Un sistema de rascadora para una máquina de tejer circular)	1991-12-10
D3	Patente US 5 218 845, cuyo inventor es Ping-Shin Wang	«Circular knitting machine striper control system»(Un sistema de control para una rascadora de una máquina de tejer circular)	1993-06-15
D4	Patente US 6 000 245, cuyos inventores son Ernst-Dieter Plath y Harald Rehmann, quienes le cedieron sus derechos a la SIPRA Patententwicklungs und Beteiligungsgesellschaft	«Circular knitting machine with a yarn changer»(Una máquina de tejer circular con un cambiador de hilo)	1999-12-14
D5	Patente US 6 058 742, cuyo inventor es José María Dalmau Güell, quien le cedió sus derechos a la Jumberca SA	«Circular knitting machine for knitted fabrics»(Una máquina de tejer circular para fabricar tejidos)	2000-05-09
D6	Patente US 6 408 655 B1, cuyos inventores son Severino Ossensi y Dionigi Fantini, quienes le cedieron sus derechos a la Mec-Mor S.r.l.	«Device for selectively feeding threads in knitting machines or the like»(Un dispositivo para alimentar selectivamente hilos a las máquinas de tejer o lo similar)	2002-06-25
D7	Patente US 6 655 176, cuyo inventor es Ping-Shin Wang, quien le cedió sus derechos a la Pai Lung Machinery Mill Co. Ltd.	«Striping apparatus for circular knitting machines»(Un aparato rascador para máquinas de tejer circulares)	2003-12-02

Se anexa la copia de las páginas pertinentes de estos documentos

NOTAS: No se realizaron las evaluaciones de los demás requisitos de patentabilidad, porque se estableció que el solicitante omitió incluir la Figura 5D.

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Como esta omisión afecta la integridad de la solicitud, no se pueden adelantar los análisis pertinentes por ausencia de materia.

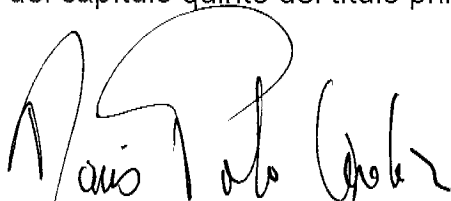
A pesar de lo anterior, con base en la patente US 7 036 343 y en las enseñanzas de los documentos encontrados hasta ahora, no se prevén objeciones respecto a la novedad ni respecto al nivel inventivo del objeto de la solicitud.

5. Conclusión:

Los requisitos de patentabilidad de la presente solicitud se encuentran afectados negativamente por la falta de claridad y completitud de la descripción y de la solicitud en general.

En cumplimiento del artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le indica que debe dar respuesta dentro del término de sesenta días contados a partir de la fecha de notificación de la presente comunicación. En caso de no dar respuesta al presente requerimiento, o si a pesar de la respuesta subsistieran los impedimentos para la concesión, se denegará la patente.

Notifíquese el presente oficio conforme a lo dispuesto en el número 5.2, letra e), del capítulo quinto del título primero de la Circular Única n.º 10 de 2001.



Doris Elena Polo Córdoba

Jefe de División de Nuevas Creaciones (E)

El anterior requerimiento fue notificado por fijación en lista, de fecha

CONCEPTO TÉCNICO n.º 0404

EXAMINADOR TÉCNICO

Código n.º 202009



US007036343B1

(12) **United States Patent**
Wei

(10) **Patent No.:** **US 7,036,343 B1**
(45) **Date of Patent:** **May 2, 2006**

(54) **STRIPING APPARATUS OF A CIRCULAR KNITTING MACHINE**

(75) **Inventor:** Chih-Liang Wei, Taipei Hsien (TW)

(73) **Assignee:** Pai Lung Machinery Co., Ltd., Taipei Hsien (TW)

(*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) **Appl. No.:** 11/267,167

(22) **Filed:** Nov. 7, 2005

(51) **Int. Cl.**
D04B 15/58 (2006.01)

(52) **U.S. Cl.** 66/140 R; 66/134

(58) **Field of Classification Search** 66/133-135, 66/138, 139, 140 R, 140 S, 141-144, 145 R
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,656,342 A * 4/1987 Sawazaki et al. 66/139
5,070,709 A 12/1991 Guell
5,218,845 A 6/1993 Wang

6,000,245 A * 12/1999 Plath et al. 66/139
6,058,742 A * 5/2000 Dalman Guell 66/140 R
6,408,655 B1 * 6/2002 Ossensi et al. 66/140 R
6,655,176 B1 12/2003 Wang

* cited by examiner

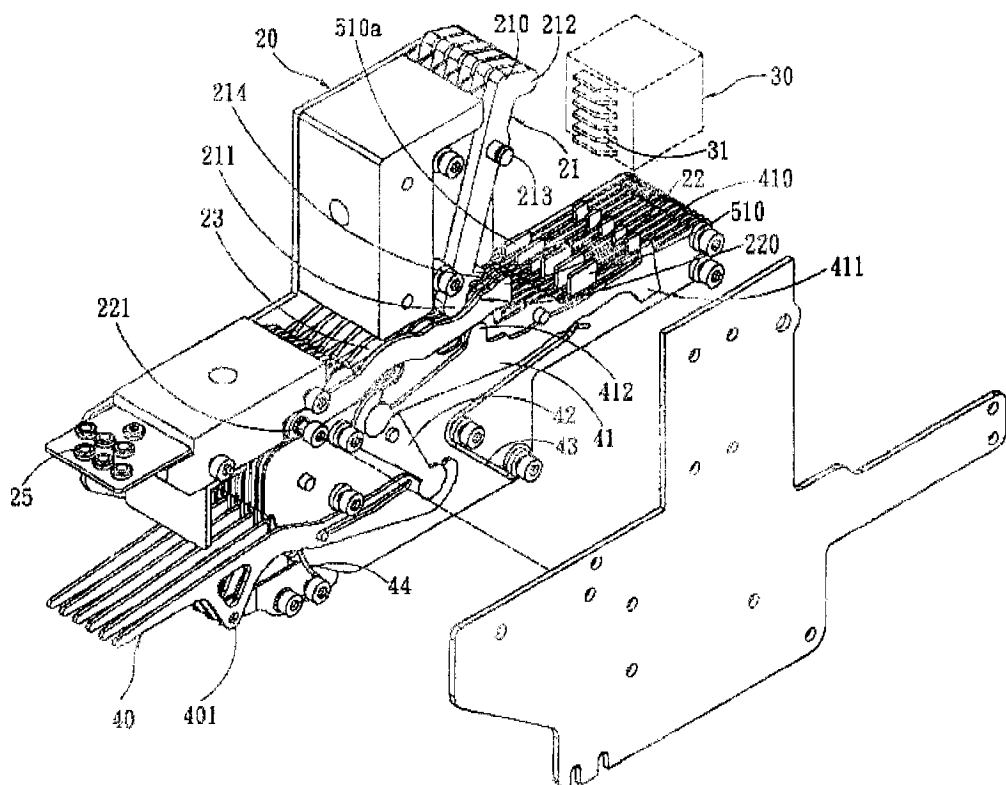
Primary Examiner—Danny Worrell

(74) **Attorney, Agent, or Firm**—Birch, Stewart, Kolasch & Birch, LLP

(57) **ABSTRACT**

The present invention relates to a striping apparatus of a circular knitting machine, comprising: a selector, a controller, a yarn-feed unit, and a drive unit. The yarn-feed unit has two portions; the first portion includes a yarn-changing plate, which feeds a yarn into a yarn-entering position, and the second portion includes a movable blade, which clips the tail of the yarn when standby and cuts off an old yarn so that the old yarn can depart from fabric when changing yarns and the operation can back to the standby state. In the preferred embodiments of the present invention, different cams respectively drive the yarn-changing plate and the movable blade, and even though a new yarn and an old yarn are farther spaced, the timings of the cams can be adjusted to release the tail of new the yarn from the movable blade before it is torn off.

5 Claims, 14 Drawing Sheets



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Firstly, as shown in FIG. 5A, the control circuit or the central computer controls a movable element 31 of the selector 30 to move to a triggering position. When the selector 30 passes the nearby of the controller 20, the movable element 31, which has reached the triggering position, will trigger the second nose 214 of the corresponding trigger 21. The second noses 214 of the triggers 21 are respectively at different heights; therefore, different movable elements 31 of the selector 30 can be used to trigger different second noses 214 of the corresponding triggers 21 separately, so that the corresponding triggers 21 move to the enable positions, and then, the first safety levers 22 move to the unlock positions, so that the forward-stroke protuberance 410 of the first connecting rod 41 rises above the sideboard 24 to the standby position ready for being pushed out. Simultaneously, as shown in FIG. 5B, the forward-stroke protuberance 510 also rises above the sideboard 24 to the standby position ready for being pushed out.

Next, as shown in FIG. 5C, the drive unit moves to the yarn-feed unit, and a first inclined plane 610 of the forward cam 61 of the first cam set 60 touches the forward-stroke protuberance 410 of the first connecting rod 41 to actuate the first connecting rod 41 and the second connecting rod 42 to push the yarn-changing plate 40 to the external position. Further, as shown in FIG. 5D, a first inclined plane 710 of the forward cam 71 of the second cam set 70 touches the forward-stroke protuberance 510 of the driving link 51 to actuate the movable blade 50 to the external release position.

As shown in FIG. 5E, the return cam 80 moves to the controller 20 again, and the front inclined plane 801 of the return cam 80 gradually closes to the return nose 212 of the trigger 21, and the rear plane 802 of the return cam 80 pushes the trigger 21 to the normal lock position to actuate the backward-stroke protuberance 411 of the first connecting rod 41 to emerge from below the sideboard 24. Simultaneously, as shown in FIG. 5F, the backward-stroke protuberance 511 of the driving link 51 also emerges from below the sideboard 24.

Lastly, as shown in FIG. 5G, the drive unit moves to the yarn-feed unit again, and the first inclined plane 620 of the backward cam 62 of the first cam set 60 touches the backward-stroke protuberance 411 of the first connecting rod 41 to actuate the first connecting rod 41 and the second connecting rod 42 to pull the yarn-changing plate 40 back to the normal non-enable position. Further, as shown in FIG. 5H, the first inclined plane 720 of the backward cam 72 of the second cam set 70 also touches the backward-stroke protuberance 511 of the driving link 51 to actuate the driving link 51 to pull the movable blade 50 back to the normal holding position; at this time, the hook 502 at the front end of the movable blade 50 for clipping/cutting yarns will not only clip the tail of the yarn Y to position it at between the hook 502 and the sideboard 24 but also will cut off the yarn Y.

The time difference between the action of the backward cam 62 of the first cam set 60 and the action of the backward cam 72 of the second cam set 70, i.e., the time difference between that the first inclined plane 620 touches the backward-stroke protuberance 411 and that the first inclined plane 720 touches the backward-stroke protuberance 511, can be adjusted according to demand. A practical method is installing the backward cams 62, 72 separately at cam seats 63, 64; such a design can make an old yarn be quickly withdrawn and cut off when striping (changing a yarn) and make the tail of a new yarn be released from the movable

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blade 50 before the new yarn is torn off lest the yarn be torn off and yarnlets appear; thereby, fabric quality can be improved.

A preferred embodiment of the forward cam 71 of the second cam set 70 shown in FIG. 3 is a two-stage cam, which further comprises: a static cam 73 and a movable cam 74, wherein the first inclined plane 710 is positioned at the front end of the static cam 73, and the movable cam 74 further has a second inclined plane 730. The static cam 73 and the movable cam 74 are separately positioned at different heights. The movable cam 74 is fixed to the forward cam 71 with a screw 741, and after the screw 741 is loosened, the relative position of the movable cam 74 and the static cam 73 can be adjusted. The abovementioned forward-stroke protuberances of the multiple driving links of the yarn-feed unit are also divided into two kinds of forward-stroke protuberances 510, 510a, and the forward-stroke protuberance 510 can be pushed by the first inclined plane 710 of the static cam 73, and the forward-stroke protuberance 510a can be pushed by the second inclined plane 730 of the movable cam 74.

Refer to FIG. 6, wherein the present invention is exemplified by a six-color striping apparatus. Suppose that the old yarn is the yarn 6 and the new yarn is the yarn 1 herein; when the knitting needle moves to the yarn-entering point shown in FIG. 6, the movable cam 74 can be moved forward to advance the timing that the second inclined plane 730 touches the backward protuberance 511 from time t1 to time t2 shown in FIG. 7 lest the old yarn be released by the movable blade 50 too late and the old yarn be torn off.

What is claimed is:

1. A striping apparatus of a circular knitting machine, comprising:

a controller, a yarn-feed unit, and a drive unit, wherein said controller is driven by a selector that rotates around the knitting portion of said circular knitting machine, and characterized in:

that said yarn-feed unit has two portions; the first portion further comprises: a yarn-changing plate, a first connecting rod and a second connecting rod, and is used to feed a yarn Y to a yarn-entering position; the second portion further comprises: a movable blade and a driving link, and is used to clip the tail end of the yarn Y in standby state and to cut off an old yarn when changing a yarn in order to release said old yarn from fabric and restore said standby state; and

that said drive unit and said selector rotate around the knitting portion of said circular knitting machine; said drive unit further comprises: a first cam set, a second cam set; said yarn-changing plate and said movable blade are separately actuated by said first cam set and said second cam set; said first cam set and said second cam set further respectively comprise forward cams and backward cams; said forward cam of said first cam set is responsible for pushing said yarn-changing plate to an external position; said forward cam of said second cam set is responsible for pushing said movable blade to an external release position; said backward cam of said first cam set is responsible for pulling said yarn-changing plate back to a normal position; said backward cam of said second cam set is responsible for pulling said movable blade back to a normal holding position.

2. The striping apparatus of a circular knitting machine according to claim 1, wherein both sides of the head end of said first connecting rod respectively have an upward forward-stroke protuberance and a downward backward-stroke

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protuberance; said forward-stroke protuberance is actuated by said forward cam of said first cam set, and said backward-stroke protuberance is actuated by said backward cam of said first cam set; the tail end of said second connecting rod is coupled to the tail end of said yarn-changing plate in order to actuate said yarn-changing plate to reciprocate between said normal position and said external position.

3. The striping apparatus of a circular knitting machine according to claim 1, wherein the tail end of said movable blade of said second portion is coupled to the tail end of said driving link; both sides of the head end of said driving link respectively have an upward forward-stroke protuberance and a downward backward-stroke protuberance; said forward-stroke protuberance is actuated by said forward cam of said second cam set, and said backward-stroke protuberance is actuated by said backward cam of said second cam set; thereby, said movable blade is actuated to reciprocate between said normal holding position and said external release position.

4. The striping apparatus of a circular knitting machine according to claim 1, wherein said forward cam of said

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second cam set further comprises: a static cam and a movable cam; a first inclined plane is positioned at the front end of said static cam, and said movable cam further has a second inclined plane; said static cam and said movable cam are separately positioned at different heights; said forward-stroke protuberances of multiple said driving links of said yarn-feed unit have two kinds of forward-stroke protuberances at different heights; the higher one of said forward-stroke protuberances is pushed by said first inclined plane of said static cam, and the lower one of said forward-stroke protuberances is pushed by said second inclined plane of said movable cam.

5. The striping apparatus of a circular knitting machine according to claim 4, wherein said movable cam is fixed to said forward cam with a screw, and after said screw is released, the relative position of said movable cam and said static cam can be adjusted.

* * * * *

(19)



KOREAN INTELLECTUAL PROPERTY OFFICE

KOREAN PATENT ABSTRACTS

(11)Publication number: **100666653 B1**

(44)Date of publication of specification: **03.01.2007**

(21)Application number: **1020050110059**

(71)Applicant: **PAI LUNG MACHINERY MILL
CO., LTD.**

(22)Date of filing: **17.11.2005**

(72)Inventor: **CHIH LIANG WEI**

(51)Int. Cl. **D04B 9/26 20060101AFI20051220BHKR**

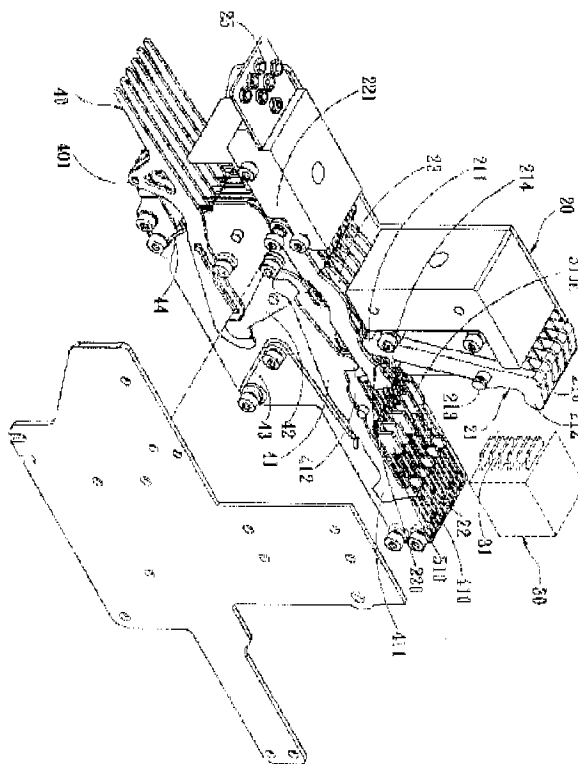
(54) **STRIPPING APPARATUS OF A CIRCULAR
KNITTING MACHINE BY MEANS OF DIFFERENT
CAMS**

(57) Abstract:

PURPOSE: A stripping apparatus of a circular knitting machine is provided to prevent the generation of the yarnlet, thereby enhancing the quality of the cloth.

CONSTITUTION: A controller(20) is driven by a selector(30). The selector is rotated toward the circumference of a knitting member of the circular knitting machine. The selector includes plural movable elements(31) normally driven and performs a function similar to a cam. The movable elements are moved to a trigger position under the control of a control circuit or a central computer. When the selector is passed through in the neighborhood of the controller, the movable element drives a trigger device(21) corresponding to the controller. The controller includes the trigger device and the first and second safety levers(22,23).

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United States Patent [19]

Sawazaki et al.

[11] Patent Number: 4,656,842

[45] Date of Patent: Apr. 14, 1987

[54] YARN FEEDING AND CHANGING APPARATUS FOR CIRCULAR KNITTING MACHINE

[75] Inventors: Masatoshi Sawazaki, Kobe;
Hidetoshi So, Ashiya, both of Japan

[73] Assignee: Precision Fukuhara Works, Ltd.,
Japan

[21] Appl. No.: 831,640

[22] Filed: Feb. 21, 1986

[30] Foreign Application Priority Data

Mar. 2, 1985 [JP] Japan 60-41496

[51] Int. Cl.⁴ D04B 15/60

[52] U.S. Cl. 66/139; 66/140 R;
66/146

[58] Field of Search 66/134, 139, 140 R,
66/146

[56] References Cited

U.S. PATENT DOCUMENTS

1,129,261 2/1915 Wilcomb 66/140 R X
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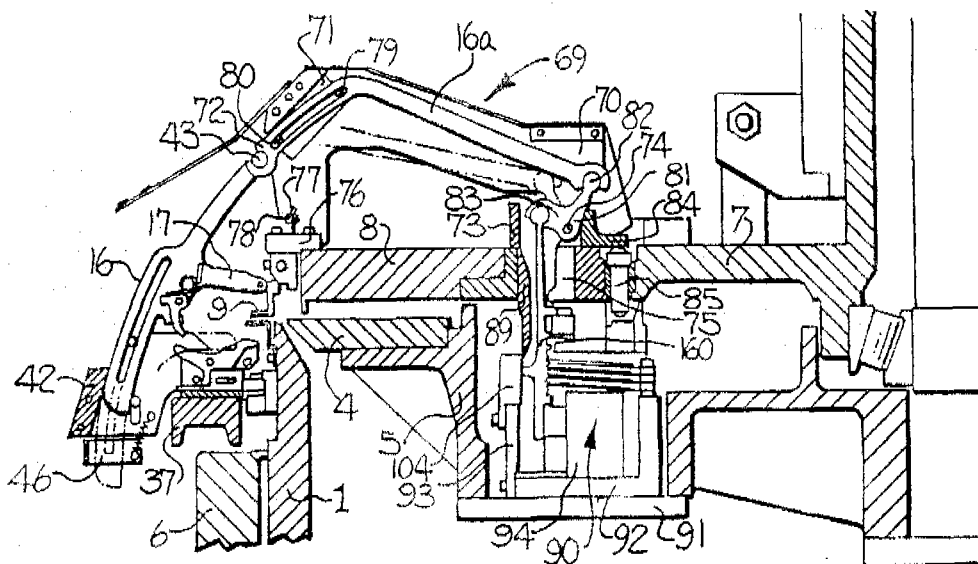
2507815 9/1975 Fed. Rep. of Germany 66/140 R
2710044 9/1977 Fed. Rep. of Germany 66/139
512170 8/1939 United Kingdom 66/140 R
1020710 2/1966 United Kingdom 66/140 R

Primary Examiner—Wm. Carter Reynolds
Attorney, Agent, or Firm—Bell, Seltzer, Park & Gibson

[57] ABSTRACT

An individual yarn clamping and cutting device is provided for each yarn guide and is moved to an open position in response to movement of the yarn guide from active to inactive position. The yarn clamping and cutting devices are moved to a closed position by cam means carried by the rotating needle cylinder. A yarn guide shifting cam is provided for imparting a slight amount of downward movement to the yarn guides to shift the same from a first upper active position to a second slightly lower active yarn feeding position during introduction of the yarn to reduce the tension in the yarn as the needles begin to knit and to aid in preventing yarn breakage. The yarn guides are mounted to facilitate individual threading of the yarn guides and are mounted for outward tilting movement of their upper ends to a readily accessible threading position while the remaining yarn guides remain in the normal operating position.

13 Claims, 14 Drawing Figures



82 82
cited p. 1 f. 2

United States Patent [19]
Güell

[11] **Patent Number:** **5,070,709**
[45] **Date of Patent:** **Dec. 10, 1991**

[54] **STRIPING SYSTEM FOR CIRCULAR
KNITTING MACHINE**

[75] **Inventor:** Jose M. D. Güell, Barcelona, Spain
[73] **Assignee:** Jumberca, S. A., Barcelona, Spain
[21] **Appl. No.:** 614,024
[22] **Filed:** Nov. 16, 1990

Related U.S. Application Data

[63] Continuation of Ser. No. 279,070, Dec. 2, 1988, abandoned.

[30] **Foreign Application Priority Data**

Dec. 4, 1987 [ES] Spain 8703484

[51] **Int. Cl.⁵** D04B 15/60

[52] **U.S. Cl.** 60/140 R

[58] **Field of Search** 66/138, 139, 140 R

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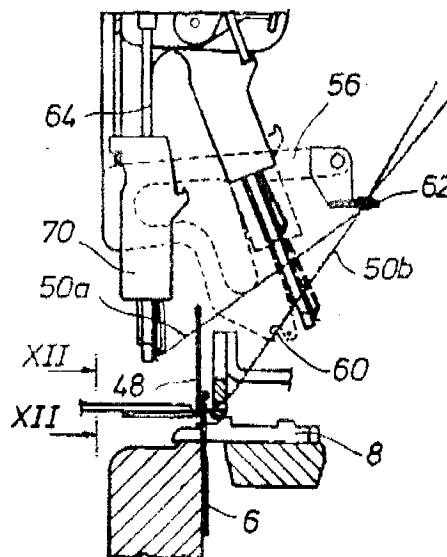
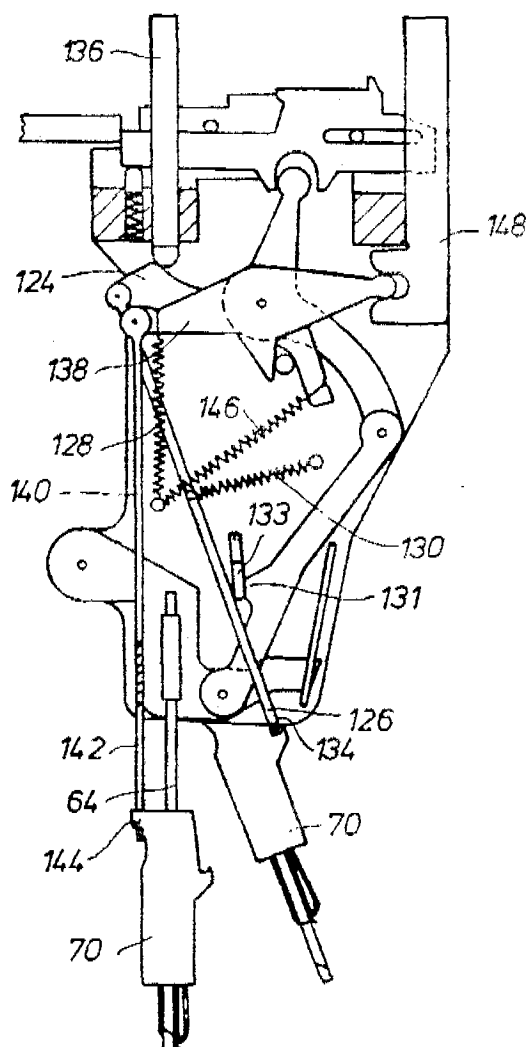
Primary Examiner—Wm. Carter Reynolds

Attorney, Agent, or Firm—Staas & Halsey

[57] **ABSTRACT**

The striper of the system is provided with yarnguide rods which are pivotable to a position conducive to delivery of yarn to the needle. The rod to be pivoted is selected by a selector which imposes a small movement on a slide member and this small movement causes the slide member to be moved by a first radial cam such that its movement causes pivoting of the rod. Independently of said pivoting, a closing lever and an opening lever respectively adapted to retain and cut the yarn or release it are always moved. The movement of said levers, is only effective when at least one yarnguide rod has pivoted. There is a striper for each cam section and all of them are controlled by a single selection box containing the selectors.

6 Claims, 13 Drawing Sheets



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circular p. 1 of 83



US005218845A

United States Patent [19]
Wang

[11] **Patent Number:** 5,218,845
[45] **Date of Patent:** Jun. 15, 1993

[54] **CIRCULAR KNITTING MACHINE STRIPER CONTROL SYSTEM**

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[21] **Appl. No.:** 986,500

[22] **Filed:** Dec. 7, 1992

[51] **Int. Cl.⁵** D04B 15/58

[52] **U.S. Cl.** 66/139; 66/133;
66/138

[58] **Field of Search** 66/111, 125 R, 127,
66/131, 133, 134, 135, 138, 139, 140 R

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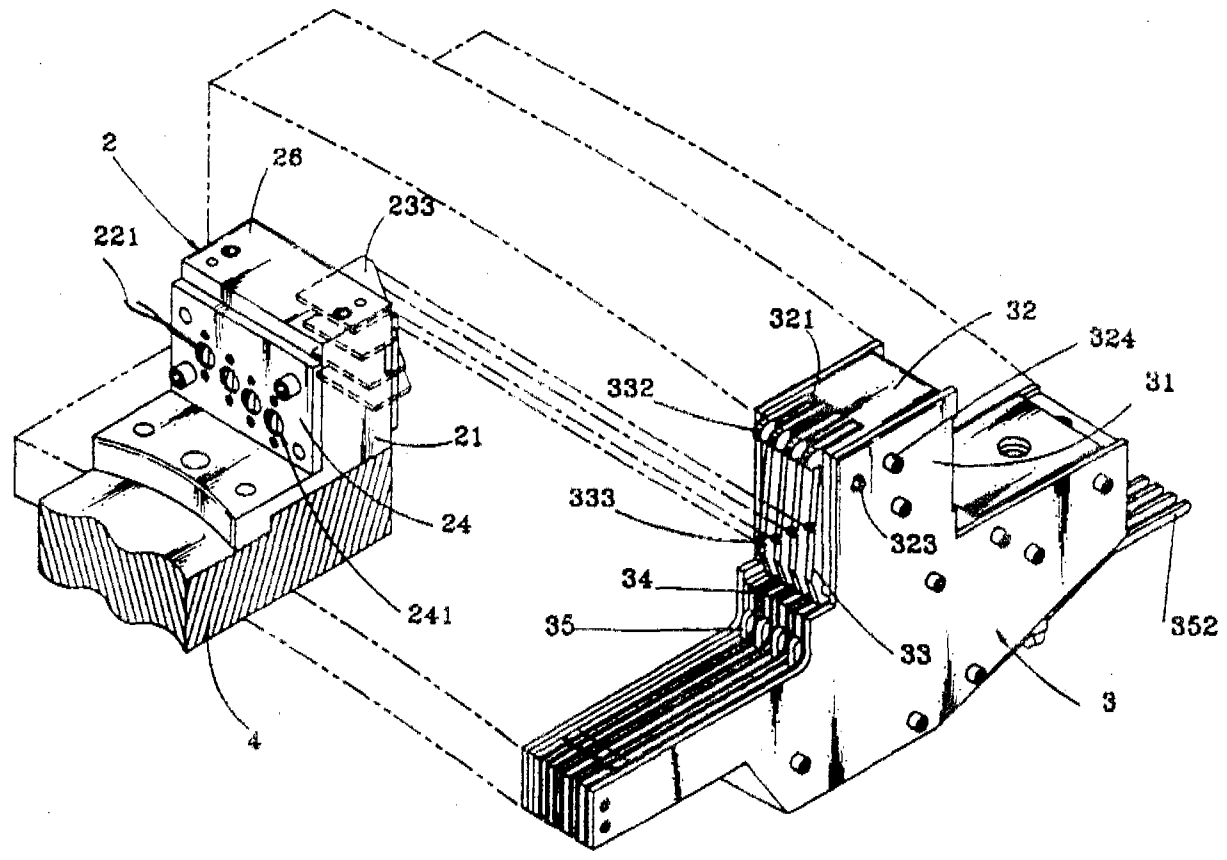
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Primary Examiner—Clifford D. Crowder
Assistant Examiner—John J. Calvert
Attorney, Agent, or Firm—Bacon & Thomas

[57] **ABSTRACT**

A circular knitting machine striper control system for controlling the operation of the stripers of a circular knitting machine in changing yarns for patterns automatically. The control system includes a controller carried on a rotary table, having a plurality of swinging plates respectively controlled by solenoids to drive striping fingers of either fixed striper in moving respective striping feeders to change yarns for patterns. A striping finger is not triggered by the respective swinging plate during the rotary motion of the rotary table as the respective solenoid does no work, when yarn changing operation is not needed.

5 Claims, 7 Drawing Sheets



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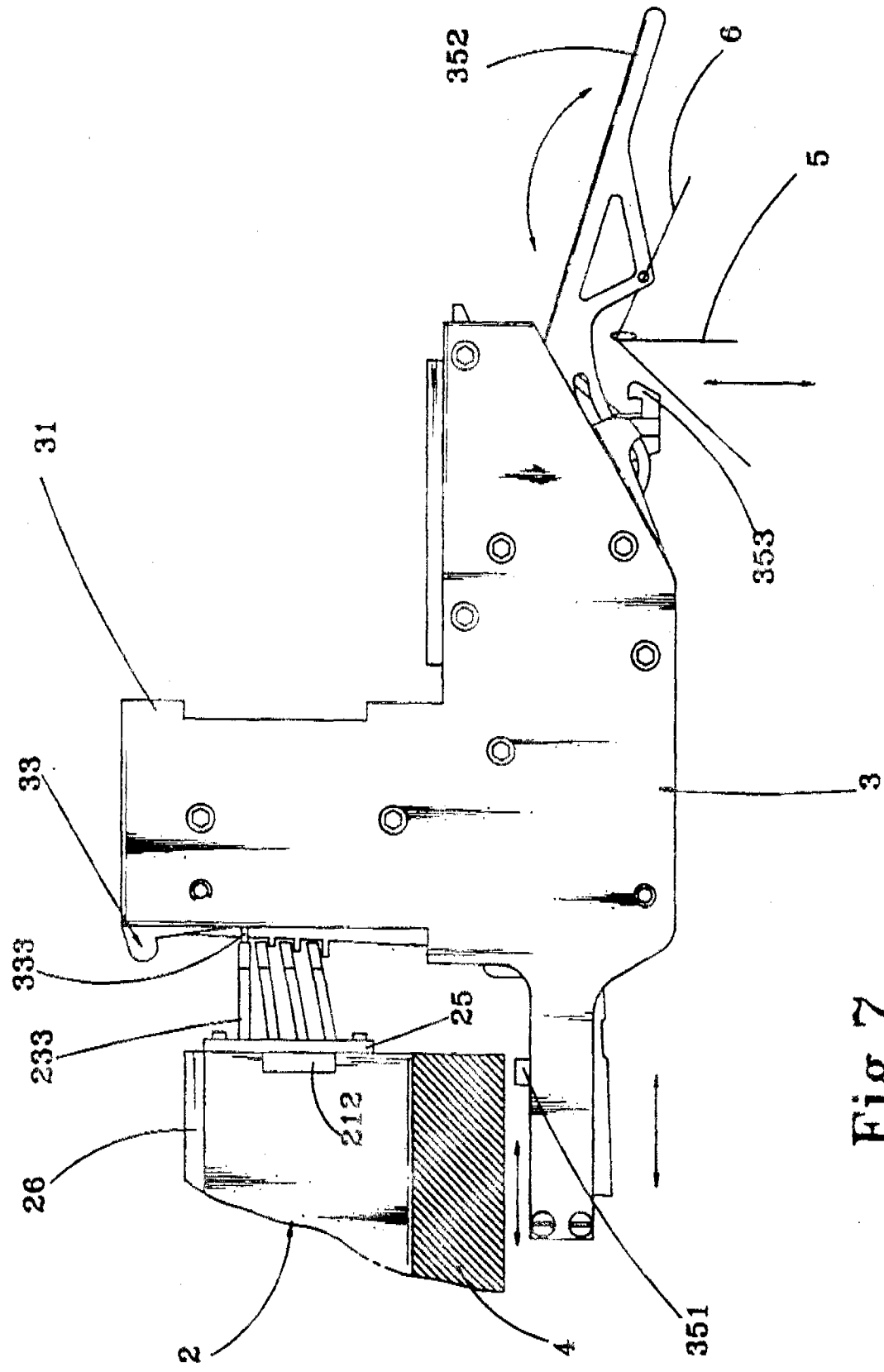


Fig. 7

CIRCULAR KNITTING MACHINE STRIPER CONTROL SYSTEM

BACKGROUND OF THE INVENTION

The present invention relates to control systems and relates more particularly to a control system controlling the operation of the stripers of a circular knitting machine in changing yarns for patterns automatically.

A circular knitting machine, as shown in FIG. 1, may be equipped with stripers and controlled by a striper control system to change colored yarns for making color-patterned fabrics. This striper control system is complicated in structure. As illustrated in FIG. 2, each striper is controlled by a respective control device which has four reciprocating rods respectively controlled by a computer control through a respective solenoid, to trigger a respective pressure plate in moving a respective striping feeder, thereby causing the respective striping feeder in changing a yarn. Because a striper is controlled by a respective control device, various control devices should be used in a circular knitting machine. Therefore, the striper control system of a circular knitting machine according to the prior art is complicated and expensive to install.

SUMMARY OF THE INVENTION

The present invention eliminates the aforesaid disadvantages. The present invention uses a single controller to control all the stripers of a circular knitting machine. The controller is carried on a rotary table, and the stripers are spaced around the rotary table on a fixed bed-plate. The controller has a plurality of swinging plates respectively controlled by computer-controlled solenoids to drive striping fingers of either fixed striper in moving respective striping feeders to change yarns for patterns. A striping finger is not triggered by the respective swinging plate during the rotary motion of the rotary table as the respective solenoid does no work, when yarn changing operation is not needed. The aforesaid arrangement permits the stripers to be controlled by a single controller, and therefore the manufacturing cost of the striper control system is greatly reduced and its installation procedure is simplified.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view showing the arrangement of a conventional circular knitting machine;

FIG. 2 is a partly exploded view of the circular knitting machine of FIG. 1 showing the relative arrangement of a striper and a control switch;

FIG. 3 is a perspective view of a circular knitting machine striper control system embodying the present invention;

FIG. 4 is an exploded view of a striper of the circular knitting machine striper control system of FIG. 3;

FIG. 5 is an elevational view of the controller of the circular knitting machine striper control system of FIG. 3;

FIG. 6 is an exploded view of the controller of FIG. 5; and

FIG. 7 is a front plan view of the circular knitting machine striper control system of FIG. 3, showing a striper driven by the controller to change a yarn.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 3, a circular knitting machine striper control system according to the present invention is comprised of a controller 2 fastened to the rotary table 4 of a circular knitting machine, and a plurality of stripers 3 spaced around the rotary table 4 and respectively controlled by the controller 2. The number of the stripers 3 may vary with the model of the knitting machine. A knitting machine may have as much as 48 stripers and controlled by a single controller 2.

Referring to FIG. 4, a striper 3 comprises a base plate 32 fastened within two side walls 311 of a head 31 by bolts 324, having a series of vertical slots 321 facing toward the rotary table 4 and an axle hole 322 through the vertical slots 321. The vertical slots 321 receive each a F-shaped striping finger 33 respectively. The F-shaped striping finger 33 has an axle hole 331 swingingly connected to the axle hole 322 on the base plate 32 within either vertical slot 321 by a pin 323, a top flange 332 and a stub rod 333 respectively projecting toward the rotary table at different heights. The location of the stub rod 333 on each F-shaped striping finger 33 is quite different. When assembled, the top flanges 332 of the F-shaped striping fingers 33 of the base plate 32 are disposed at the same elevation while the stub rods 333 rise one above another in proper order like a flight, and each F-shaped striping finger 33 is supported above a respective pressure plate 34 and a respective striping feeder 35.

Referring to FIGS. 5 and 6, the controller 2 is generally comprised of a plurality of solenoids 22 fastened inside a casing 21 and covered by a front cover 24, a back cover 25 and a top cover 26, and a plurality of swinging plates 23 respectively controlled to swing by the solenoids 22. The front cover 24 has wire holes 241, through which conductors are inserted to electrically and respectively connect the solenoids 22 to an external computer system (not shown). Each solenoid 22 has a reciprocating rod 222 inserted in a locating groove 231 on either swinging plate 23 and controlled to alternatively move the respective swinging plate 23 back and forth. Each swinging plate 23 has two end rods 232 on two opposite ends thereof inserted in respective channels 211 on two opposite side walls of the casing 21 at the back side thereof and secured in place by locating plates 212, and a chamfered side wing 233 extended out of the back cover 25 through a respective slot 251. The side wing 233 of each swinging plate 23 may be disposed in contact with the stub rod 333 on the respective F-shaped striping finger 33 of either striper 3 or moved to pass horizontally through the gap between the two stub rods 333 of either two adjacent F-shaped striping fingers 33 of either striper 3 stopped (see FIG. 7), and therefore rotating the rotary table 4 causes the F-shaped striping fingers 33 of each striper 3 to be respectively driven by the swinging plates 23 to move the striping feeders 35 via the pressure plates 34 respectively, so as to further change yarns.

Referring to FIG. 7, during the operation of the circular knitting machine, the solenoids 22 of the controller 2 are controlled by a computer system through a pre-edited control program. When a solenoid 22 is turned on, the respective reciprocating rod 222 is driven to move the side wing 233 of the respective swinging plate 23 from the stub rod 333 of the respective F-shaped striping finger 33, and therefore the respective

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striping feeder 35 does no work. On the contrary, if a yarn is to be changed, the respective solenoid 22 of the controller 2 is off for permitting the side wing 233 of the respective swinging plate 23 to push the stub rod 333 of the respective F-shaped striping finger 33, hereby causing the respective pressure plate 34 to reciprocate the respective striping feeder 35 in changing a yarn. As the tail 352 of a striping feeder 35 is moved outwards, the selected yarn 6 is guided out for knitting by a respective needle 5 being reciprocated up and down or cutting by a cutter 353. Therefore, by means of the rotary motion of the rotary table 4 to carry the controller 2, the strippers 3 are driven by the controller 2 to proceed with yarn changing operation.

I claim:

1. A circular knitting machine striper control system comprising a plurality of stripers mounted on a bedplate spaced around a rotary table of a circular knitting machine, and a controller mounted on said rotary table and controlled by a computer control to drive said stripers in changing yarns for patterns, wherein each striper comprises a base plate fastened inside a head, having a plurality of F-shaped striping fingers respectively and swingingly fastened in a series of vertical slots thereof and controlled by said controller to drive a respective pressure plate in moving a striping feeder for yarn changing operation, said F-shaped striping fingers having a respective top flange projecting toward said rotary table and arranged at the same height and a respective stub rod projecting toward said rotary table and

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risen one above another; said controller comprises a plurality of solenoids, a plurality of swinging plates respectively driven by said solenoids to move the respective striping finger in driving the respective striping feeder for yarn changing operation, each swinging plate having a chamfered side wing carried to push the stub rod of the respective striping finger in driving the respective striping feeder for yarn changing operation.

2. The circular knitting machine striper control system of claim 1 wherein the number of the vertical slots and the striping fingers of each striper is equal to the number of colors of the yarns to be knitted by the circular knitting machine.

3. The circular knitting machine striper control system of claim 1 wherein a horizontal gap is respectively maintained between either two adjacent stub rods for passing the chamfered side wing of the respective swinging plate.

4. The circular knitting machine striper control system of claim 1 wherein the side wing of either swinging plate is carried by said rotary table to push the stub rod of the respective striping finger a the respective solenoid does no work.

5. The circular knitting machine striper control system of claim 1 wherein the side wing of either swinging plate is carried by said rotary table to pass through the respective horizontal gap between two adjacent stub rods as the respective solenoid does work when yarn changing operation is not needed.

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US006000245A

United States Patent [19]
Plath et al.

[11] Patent Number: 6,000,245
[45] Date of Patent: Dec. 14, 1999

[54] CIRCULAR KNITTING MACHINE WITH A
YARN CHANGER

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Primary Examiner—John J. Calvert
Attorney, Agent, or Firm—Michael J. Striker

[21] Appl. No.: 08/622,760

[22] Filed: Mar. 27, 1996

[30] Foreign Application Priority Data

Mar. 31, 1995 [DE] Germany 195 11 949

[51] Int. Cl.⁶ D04B 15/58

[52] U.S. Cl. 66/139; 66/140 R

[58] Field of Search 66/138, 139, 140 R

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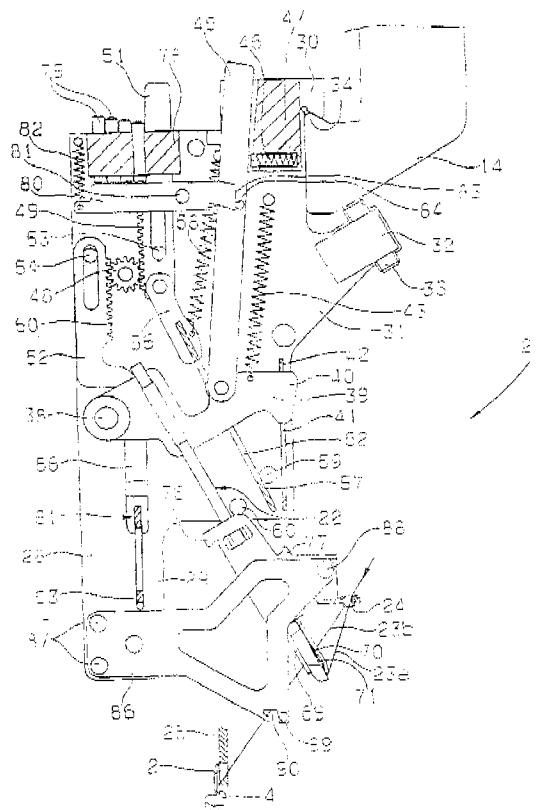
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[57] ABSTRACT

The invention relates to a yarn changer for knitting machines, with swinging yarn fingers (22c, 22d), which comprise finger bodies and guide bodies (66c, 66d) having cutting and clamping elements (69, 71) slidable on the finger bodies, and with an opener (121) and closer (122) both associated with all yarn fingers in common. In order to reduce the number of moving parts and the noise occurring in operation of the yarn changer, the opener (121) and closer (122) are in such operative connection through a reverse-coupling mechanism (114–120) that they can be actuated in common by an associated cam track (102) acting on a control member (114). The control member (114) is preferably only in the working range of the cam track (102) when a yarn change is to be effected. The invention moreover concerns a knitting machine equipped with the yarn changer, especially a rib circular knitting machine, in which a yarn catcher cooperating with the yarn changer is built into the dial.

24 Claims, 16 Drawing Sheets



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US006058742A

United States Patent [19]
Dalmau Guell

[11] Patent Number: 6,058,742
[45] Date of Patent: May 9, 2000

[54] CIRCULAR KNITTING MACHINE FOR
KNITTED FABRICS

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Spain

[73] Assignee: Jumberca, S.A., Barcelona, Spain

[21] Appl. No.: 09/167,667

[22] Filed: Oct. 7, 1998

[30] Foreign Application Priority Data

Oct. 7, 1997 [ES] Spain 9/02082

[51] Int. Cl.⁷ D04B 15/54; D04B 9/30

[52] U.S. Cl. 66/140 R

[58] Field of Search 66/125 R, 133,
66/134, 145 R, 8, 13, 17, 19, 25, 26, 32,
33, 37, 140 R

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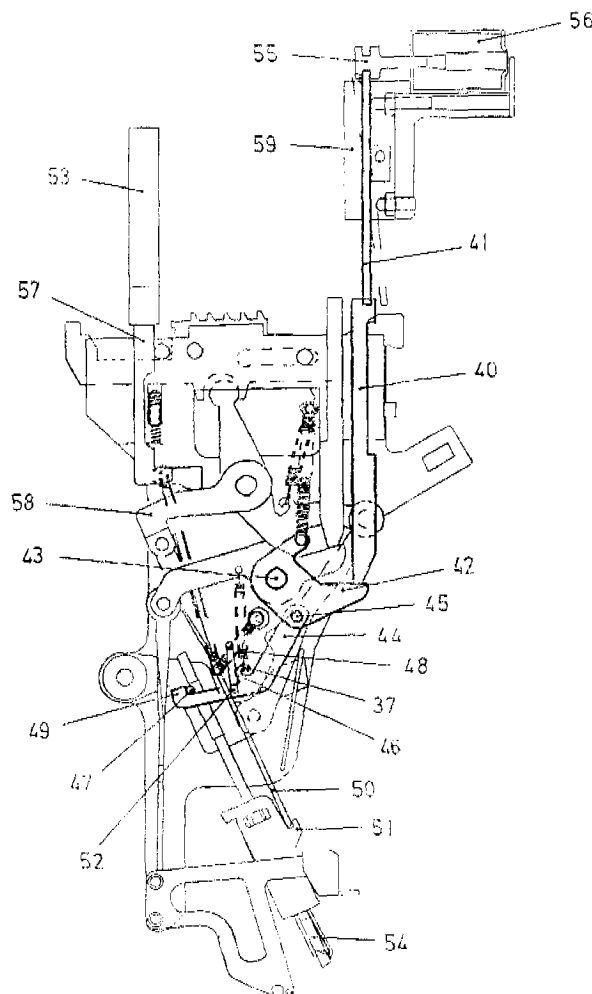
Primary Examiner—Danny Worrell

Attorney Agent or Firm—Nath & Associates; Gary M.
Nath; Gregory B. Kang

[57] ABSTRACT

Circular knitting machine for knitted fabrics, comprising an assembly of needles which are mounted in rotary needle beds provided with cam sections which act on the needles to conduct them selectively according to alternative trajectories, while the yarns to be knitted are delivered in each section in a selective manner by a programmable feed mechanism, which incorporates a complementary assembly which comprises a lever (40) which can be actuated in connection with a tiltable cam (42), which incorporates another associated lever (44) able to be positioned in order to effect the actuation of a rod (50) which actuates cutting and clamping of the yarn being fed, independently of the introduction of a new yarn substituting for the previous one.

7 Claims, 10 Drawing Sheets





US006408655B1

(12) **United States Patent**
Ossensi et al.

(10) **Patent No.:** **US 6,408,655 B1**
(45) **Date of Patent:** **Jun. 25, 2002**

(54) **DEVICE FOR SELECTIVELY FEEDING
THREADS IN KNITTING MACHINES OR
THE LIKE**

(75) Inventors: **Severino Ossensi, Viggini ; Dionigi
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(73) Assignee: **Mec-Mor S.r.l., Induno Olona (IT)**

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/959,685**

(22) PCT Filed: **May 17, 2000**

(86) PCT No.: **PCT/EP00/04456**

§ 371 (c)(1),
(2), (4) Date: **Nov. 5, 2001**

(87) PCT Pub. No.: **WO00/73564**

PCT Pub. Date: **Dec. 7, 2000**

(30) **Foreign Application Priority Data**

May 26, 1999 (IT) MI99A1168

(51) Int. Cl.⁷ **D04B 27/10**

(52) U.S. Cl. **66/140 R**

(58) Field of Search 66/125 R, 134,
66/135, 136, 137, 139, 140 R, 142

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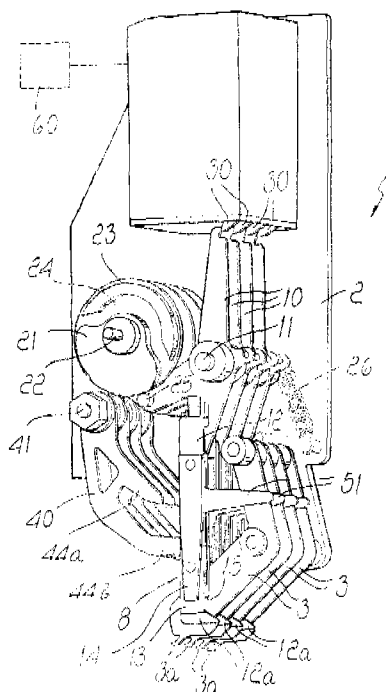
Primary Examiner—Danny Worrell

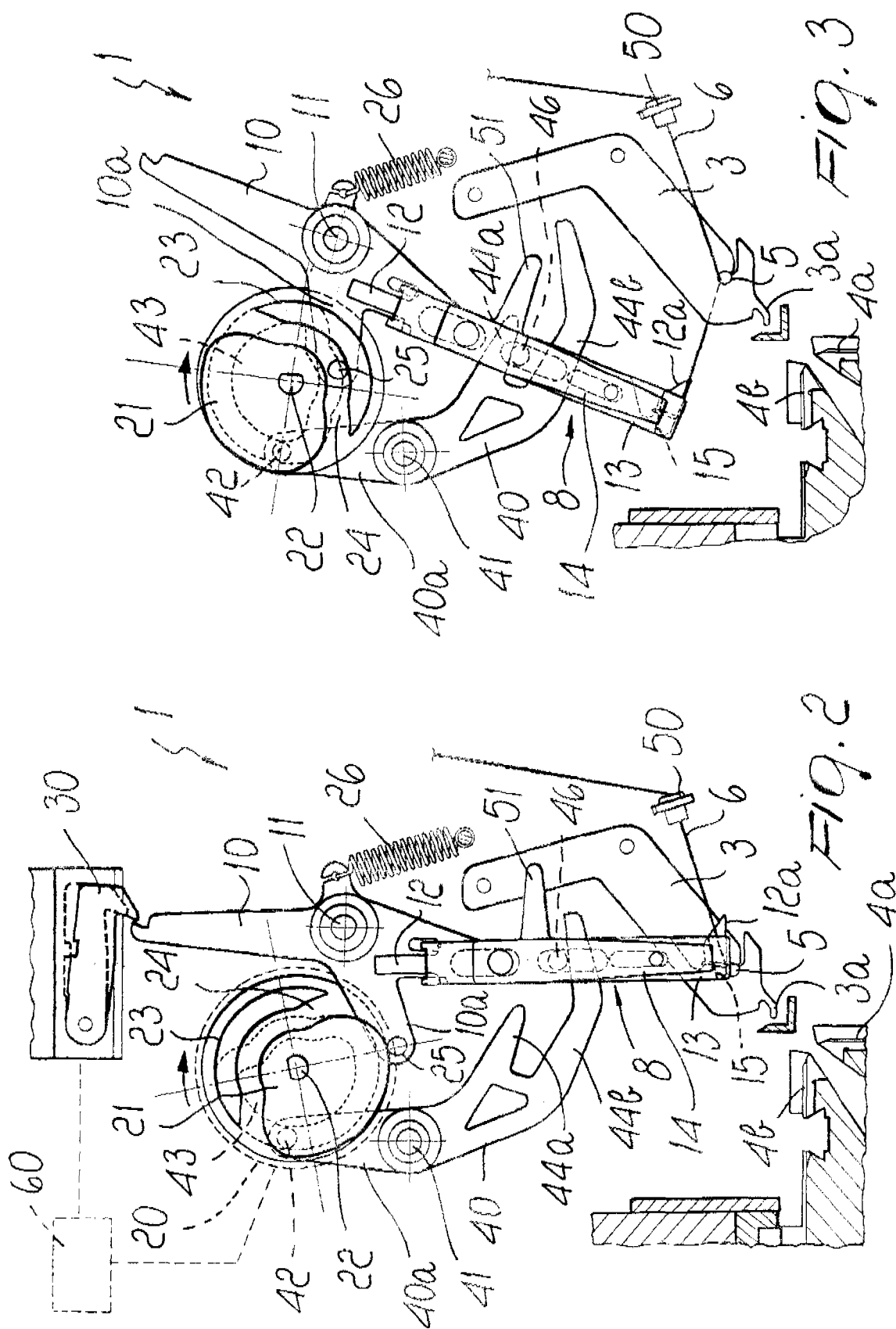
(74) *Attorney, Agent, or Firm*—Guido Modiano; Albert
Josif; Daniel O'Byrne

(57) **ABSTRACT**

A device for selectively feeding threads in knitting machines or the like, which comprises a set of fixed strippers (3) arranged mutually side by side on the outer side of the needle bed or beds (4a,4b) of the machine. Each stripper (3) has a passage (5) for a thread (6) to be fed to the needles (7) of the machine, and an element (8) for clamping and cutting the thread (6) arriving from the corresponding stripper (3). Each clamping and cutting element (8) is movable from a standby position, in which it is laterally adjacent to the corresponding stripper (3) on the outer side of the needle bed (4a,4b) of the machine and clamps the thread (6) arriving from the corresponding stripper (3), to an active position, in which at least its region that engages the thread (6) is arranged on the inner side of the needle bed (4a,4b) of the machine in order to arrange the thread (6) transversely to the needle bed (4a,4b) of the machine and then release it, and vice versa, in order to clamp and cut the thread (6) arriving from the corresponding stripper (3). First actuators are provided which comprise a programmable electronic controller (60) for the individual actuation, according to a preset program, of each clamping and cutting element (8) for its transfer from the standby position to the active position and vice versa.

12 Claims, 5 Drawing Sheets





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DEVICE FOR SELECTIVELY FEEDING THREADS IN KNITTING MACHINES OR THE LIKE

BACKGROUND OF THE INVENTION

The present invention relates to a device for selectively feeding threads in knitting machines or the like.

Conventional devices for selectively feeding threads in knitting machines in order to form patterns or lines on the resulting knitted fabric generally comprise a set of elements known as "stripers" arranged side by side and facing the needle bed or beds of the machine with an end at which there is a passage for the thread to be fed to the needles of the machine. Each striper is provided with an element for clamping and cutting the thread fed by the corresponding striper.

In most of the conventional devices, the thread clamping and cutting elements are arranged on the inner side of the needle bed of the machine and each striper is movable on command from the inner side of the needle bed toward the outer side in order to engage the thread clamped by the corresponding clamping and cutting element and arrange it transversely to the needle bed.

The thread thus arranged is then captured, in some kinds of machine, by a hook rigidly coupled to the needle beds and lowers said thread until it is deposited in the selvage retention clamps located at the beginning of the needle bed. Then the clamping and cutting element releases the thread, which is knitted in by the needles of the machine. In other kinds of machine, the thread dispensed by the striper is knitted in directly by the needles.

After knitting said thread and usually at the end of the needle bed, the striper is moved again toward the inside of the needle bed, toward the corresponding clamping and cutting element, which clamps and cuts the thread.

GB-2 196 026 discloses a striping device in a circular knitting machine wherein the stripers are movable and the cutting device performs cutting with a rotating movement.

U.S. Pat. No. 4 656 842 discloses a striping device wherein the stripers are also movable.

In other kinds of device, the stripers are fixed and are arranged on the outer side of the needle bed of the machine, while the corresponding clamping and cutting means are movable from the outside of the needle bed toward the inside and vice versa in order to arrange the thread transversely to the needle bed.

The actuation of the stripers or of the thread clamping and cutting elements in order to arrange the thread transversely to the needle bed of the machine is generally performed by way of cams applied to the needle bed, which is usually movable with respect to the stripers; said cams act on the stripers or on the clamping and cutting elements by way of levers and transmissions.

Accordingly, the patterns that can be achieved with conventional stripers are rather limited, since it is of course not possible to vary, during knitting, the arrangement and configuration of said cams in order to vary the thread or threads that are fed to the needles and to vary their feeding sequence.

SUMMARY OF THE INVENTION

The aim of the present invention is to solve the above problem, by providing a device for selectively feeding threads in knitting machines or the like which allows to produce patterns which are more complex and varied with respect to those that can be obtained with conventional devices.

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Within the scope of this aim, an object of the invention is to provide a device which allows to vary, according to the requirements, the insertion and extraction points of the threads without requiring mechanical interventions on the machine.

Another object of the invention is to provide a device which allows to vary the insertion points of the threads row by row.

Another object of the invention is to provide a device which, besides providing greater operating flexibility, also allows to structurally simplify the machine on which it is installed.

This and other objects which will become better apparent hereinafter are achieved by a device for selectively feeding threads in knitting machines or the like, as claimed in claim 1.

BRIEF DESCRIPTION OF THE DRAWINGS

Further characteristics and advantages of the invention will become better apparent from the description of a preferred but not exclusive embodiment of the device according to the invention, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

FIG. 1 is a schematic perspective view of the device according to the invention;

FIGS. 2 to 9 are schematic views of an operating sequence of the device during the transition of a clamping and cutting element from the standby position to the active position and vice versa.

DESCRIPTION OF THE PREFERRED EMBODIMENT'S

With reference to the above figures, the device according to the invention, generally designated by the reference numeral 1, comprises a frame 2 which supports a set of fixed stripers 3 which are laterally adjacent one another and are arranged on the outer side of the needle bed or needle beds 4a and 4b of a knitting machine or the like.

Each one of said stripers 3 has a passage 5 for a thread 6 to be fed to the needles 7 arranged in the needle beds of the machine.

For each one of the stripers 3 there is a clamping and cutting element, generally designated by the reference numeral 8, for the thread 6 arriving from the corresponding striper 3.

Each clamping and cutting element 8 is movable from a standby position, in which it is laterally adjacent to the corresponding striper 3 on the outer side of the needle beds 4a and 4b of the machine and clamps the thread 6 arriving from the corresponding striper 3, to an active position, in which at least its region that engages the thread 6 is arranged on the inner side of the needle beds 4a and 4b of the machine so as to arrange the thread 6 transversely to the needle beds of the machine and then release it, and vice versa, in order to perform clamping and cutting of the thread 6 arriving from the corresponding striper 3, as will become apparent hereinafter.

In the device according to the invention there are first actuation means which comprise a programmable electronic controller 60 for the individual actuation, according to a preset program, of each clamping and cutting element 8 in order to actuate its transfer from the standby position to the active position and vice versa.

More particularly, the stripers 3 have a flat laminar body and have, at their end directed toward the needle beds 4a and



US006655176B1

(12) **United States Patent**
Wang

(10) **Patent No.:** **US 6,655,176 B1**
(45) **Date of Patent:** **Dec. 2, 2003**

(54) **STRIPING APPARATUS FOR CIRCULAR KNITTING MACHINES**

(75) **Inventor:** **Ping-Shih Wang, Taipei Hsien (TW)**

(73) **Assignee:** **Pai Lung Machinery Mill Co., Ltd., Taipei Hsien (TW)**

(*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) **Appl. No.:** **10/180,318**

(22) **Filed:** **Jun. 27, 2002**

(51) **Int. Cl.⁷** **D04B 15/58**

(52) **U.S. Cl.** **66/140 R; 66/139**

(58) **Field of Search** **66/139, 134, 135, 66/136, 137, 140 R, 142, 125 R**

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Primary Examiner—Danny Worrell

(74) **Attorney, Agent, or Firm—**Birch, Stewart, Kolasch & Birch, LLP

(57) **ABSTRACT**

A striping apparatus for a circular knitting machine includes a control mechanism, an operation mechanism driven by the control mechanism, an adjusting mechanism mounted onto the control mechanism and a release mechanism located in the operation mechanism. The striping apparatus is installed on the circular knitting machine and is controlled by the yarn releasing and receiving cam and the color selection device, and may feed different colored yarns to the knitting needles to produce striped jacquard knitting fabrics.

15 Claims, 12 Drawing Sheets

