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

(11) Publication number: **0 185 264**
A1

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: **85115495.5**

(51) Int. Cl.⁴: **D 04 B 35/14**

(22) Date of filing: **05.12.85**

(30) Priority: **10.12.84 IT 2397184**

(43) Date of publication of application:
25.06.86 Bulletin 86/26

(84) Designated Contracting States:
DE FR GB

(71) Applicant: **LONATI S.p.A.**
Via S. Polo, 11
I-25123 Brescia(IT)

(72) Inventor: **Lonati, Francesco**
Via Valsorda 28
I-25100 Brescia(IT)

(74) Representative: **Modiano, Guido et al,**
MODIANO & ASSOCIATI S.A.S. Via Meravigli, 16
I-20123 Milan(IT)

(54) **Knitting machine, in particular for hose knitting, incorporating a device for holding the needle latches open and blocking the rotation of the machine in case of yarn breakage.**

(57) The present invention relates to a knitting machine, in particular for hose knitting, incorporating a device for holding the needle latches open and blocking the rotation of the machine in case of yarn breakage, which comprises a small plate (1) associated with the machine load-bearing structure (2) and located upwardly of the needle cylinder (3) in the proximity of the needle tips (6); on the plate (1) there bear the yarn feeding fingers (4), and the plate (1) has a shaped profile for holding the needle (6) latches (5) open during the yarn feeding phase. The device is characterized in that the plate (1) comprises, upstream of the yarn feeding fingers (4), with reference to the direction of rotation of the needle cylinder (3), a first part (7) which is electrically insulated from a second part (8) associated with said first part (7) and carrying the yarn feeding fingers (4). The cited first part (7) is of an electrically conductive material and is engageable by contact with the needle (6) latches (5) on the yarn breaking to close an electric control circuit (11) including the cited first part (7), the needles (6), and interruption members (12,13) for discontinuing the needle cylinder rotation (3).

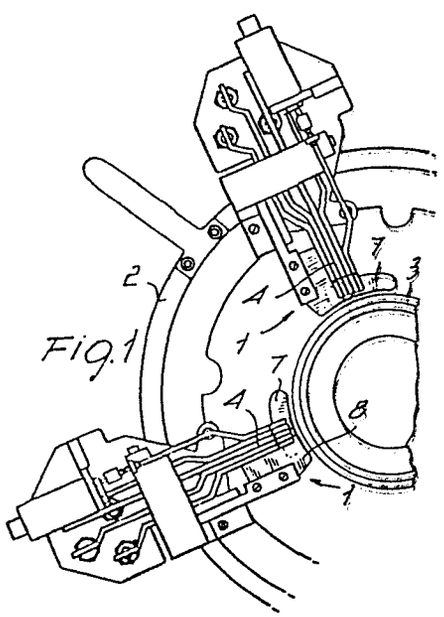

Fig.1

EP 0 185 264 A1

"KNITTING MACHINE, IN PARTICULAR FOR HOSE KNITTING, INCORPORATING A DEVICE FOR HOLDING THE NEEDLE LATCHES OPEN AND BLOCKING THE ROTATION OF THE MACHINE IN CASE OF YARN BREAKAGE"

This invention relates to a knitting machine, in particular for hose knitting, incorporating a device for holding the needle latches open and blocking the rotation of the machine in case of yarn breakage.

Known are devices for holding the needle latches open in circular knitting machines which consist generally of a small plate located upwardly of the needle cylinder at the outlet of the yarn feeding fingers, in the proximity of the needle tips.

These plates have a shaped profile for holding the needle latches open during the yarn feeding phase and to enable the needle tip to hook up the yarn being supplied from the yarn feeding finger.

The plate portion upstream of the yarn feeding fingers, with reference to the direction of rotation of the needle cylinder, only engages with the needle latches at the outset of the knitting cycle, that is before the first knitting course is formed, since during the following courses it is the already formed stitch which, being dropped along the needle stems, holds the latches open up to proximately the yarn feeding fingers.

Also known are devices for blocking the needle cylinder rotation on the yarn breaking, and consists generally of one or more small blocks which are positioned upwardly of the needle cylinder by association with the machine load-bearing structure.

These blocks are provided with a sensing wire, usually a spring steel wire, which extends from the block as far as the needle tips so as to be stricken by the latches as these, on the yarn breaking, tend by centrifugal force to rotate and close against the needle.

In practice the needle latches and sensing wire are the contacts of an electric control circuit which when closed even for a short time acts on the machine motor to stop it.

These devices for blocking the rotation of the needle cylinder are not, however, devoid of shortcomings, in fact the blocks require accurate adjustment in order to be contacted by the needle latches without becoming damaged.

Furthermore, at the start of the knitting cycle and at the end of the hose formation, that is when the needles carry no stitch, the needle latches would strike the spring steel wire and therefore a device must be provided, under control by a machine control member, which arranges for the removal of the sensing wire so as not to damage the needle latches.

The same device, under control by the programming member, arranges for restoring the sensing wire to its position after the first knitting course is formed.

Over some time, the impacts of the needle latches against the sensing wire results in deterioration of the latches and consequent damage to the stitch.

It is the primary aim of this invention to provide a device which can act to block the needle

cylinder on the yarn breaking without the need for blocks with sensing wire.

Within the above aim it is an object of the invention to provide a device which involves reduced bulk in the area overlying the needle cylinder.

Another object of the invention is to provide a device which causes no damage of the needle latches.

This aim, and these and other objects to become apparent hereinafter, are achieved by a knitting machine, in particular for hose knitting, incorporating a device for holding the needle latches open and blocking the machine rotation in case of yarn breakage, comprising a small plate associated with the machine load-bearing structure and being positioned upwardly of the needle cylinder in the proximity of the needle tips, on said plate there bearing the yarn feeding fingers, said plate having a shaped profile for holding the needle latches open during the yarn feeding phase, characterized in that said plate comprises upstream of said yarn feeding fingers, with reference to the direction of rotation of the needle cylinder, a first part electrically insulated from a second part associated with said first part and supporting said yarn feeding fingers, said first part being made of an electrically conductive material and engageable by contact with said latches upon the yarn breaking to close an electric control circuit including said first part of said plate, said needles and means of interrupting the rotation of said needle cylinder.

Further features and advantages of the invention will be apparent from the description of a preferred but not exclusive embodiment of the device according to the invention, as illustrated by way of example and not of limitation in the accompanying drawings, where:

Figure 1 is a top plan view of two small plates according to the invention as applied to a circular hose knitting machine;

Figure 2 is a perspective view of the plate of this invention with a needle during the formed stitch dropping phase;

Figure 3 is a perspective view of the plate according to the invention on the yarn breaking;

Figure 4 is a perspective view of the plate according to the invention during the yarn feeding phase;

Figure 5 is an example of the electric control circuit of this invention.

With reference to the drawing figures, the device of this invention comprises a small plate, generally designated with the reference numeral 1, which is associated with the load-bearing structure 2 of the machine and positioned upwardly of the needle cylinder 3 and of the sinkers 20. The plate 1, on which the yarn feeding fingers 4 bear, has on its side facing the needles a shaped profile against which there engage the latches 5 of the needles 6 when they are not held back by the formed stitch. In

practice the shaped profile allows the needles in that they are open to engage with the yarn exiting the feeding fingers.

This plate, according to the invention, comprises two parts of which a first part 7 is located upstream of the yarn feeding fingers and a second part 8 on which the yarn feeding fingers bear which is insulated electrically from said first part.

The two parts are rigidly associated together with the interposition of electrically insulating material 18.

The first part is engageable by contact with the needle latches only when the latter are not held back by the stitch 9 already formed that is on starting the knitting cycle and, during the knitting process, on the yarn being incidentally broken, since in the normal knitting conditions the latch 5 is held back, with the needle located facing to this first part, by the already formed stitch which is being dropped onto the stem 10 of the needle.

The second part 8 comes instead, in the normal knitting conditions, always in contact with the latch 5 because the stitch has now left the latch 5, to allow the needle to pick up the yarn being carried on the yarn feeding fingers.

The first part 7 is of an electrically conductive material and in combination with the needles forms a part of an electric control circuit, generally designated with the reference numeral 11, which allows obtainment of the discontinuance of the motion of

the needle cylinder upon the yarn breaking.

The electric control circuit comprises, according to this invention, interrupting means which may be, like in the example shown in Figure 5, a sensing device 12 capable of detecting the temporary closure of the electric circuit and acting on a relay 13 which is connected to the motor 14 which supplies the rotary motion to the needle cylinder.

To switch off the control circuit it is necessary to provide a driven switch 15 which is controlled directly by the machine control member 16.

For completeness of description it should be said that the first part of the plate is connected to the electric control circuit through a lead wire 17.

The operation of the device will be apparent from the foregoing description.

During the knitting process, on the yarn being broken accidentally, the latch 5 no longer held back by the stitch engages by contact with the first part of the plate closing for a moment the electric control circuit. This closure is sensed by the sensing device 12 which acts on the relay 13 to cause the motor 14 and hence the needle cylinder to stop, thus allowing the operator to act on the broken yarn to restore the knitting conditions and, accordingly, to restart the motor.

Of course, at the start and end of the knitting cycle, to prevent the undesired blocking of the machine, the control member will act on the driven

switch which prevents the circuit from being closed at least until the first knitting course is completed.

Where a microprocessor is used for a control member a more simplified circuit may be used wherein there is no sensing device 12, and it is the microprocessor itself which acts on the relay connected to the motor.

In this case the microprocessor is affected by the circuit closure and takes it into account by acting on the relay only where the knitting process is neither at the start nor at the end.

It has been found in practice that the device of this invention fully achieves its set aim in that to detect the yarn breakage it requires no additional members, but uses instead a part of the plate normally utilized to hold the needle latches open.

Another advantage of the device is that no damage is caused to the needle latches because these slide along the shaped profile of the cited plate.

A not least advantage, resulting from the elimination of the block with sensing wire, is that the number of the adjustments required with these machines is reduced, and that a number of plates can be simultaneously set to perform the same function as the block with sensing wire which is equal to the number of yarn feeds present on the machine, which is all beneficial to safety.

The device herein is susceptible to many variations and modifications without departing from the scope of the inventive concept; furthermore, all the details

are replaceable with technical equivalents thereof.

In practicing the invention, the materials used and the dimensions may be any ones contingent on requirements and the state of the art.

CLAIMS

1. A knitting machine, in particular for hose knitting, incorporating a device for holding the needle latches open and blocking the machine rotation in case of yarn breakage, comprising a small plate associated with the load-bearing structure of the machine and positioned upwardly of the needle cylinder in the proximity of the needle tips, on said small plate there bearing the yarn feeding fingers, said small plate having a shaped profile for holding the needle latches open during the yarn feeding phase, characterized in that said small plate comprises, upstream of said yarn feeding fingers with reference to the direction of rotation of the needle cylinder, a first part electrically insulated from a second part associated with said first part and supporting said yarn feeding fingers, said first part being made of an electrically conductive material and engageable by contact with said latches on the yarn breaking by closure of an electric control circuit comprising said first part of said small plate, said needles, and interruption means for discontinuing the rotation of said needle cylinder.

2. A machine according to Claim 1, characterized in that said first part (7) is rigidly associated with said second part (8) with the interposition of an electrically insulating material (18).

3. A machine according to the preceding claims, characterized in that said interruption means (12,13) are deactivatable by a control member (16) during the

formation of the first knitting course and at the end of the knitting process.

4. A machine according to one or more of the preceding claims, characterized in that said electric control circuit (11) comprises a sensing device (12) for controlling a relay (13) acting on the motor (14) of a machine.

5. A machine according to one or more of the preceding claims, characterized in that said electric control circuit (11) comprises a switch controlled by said control member (16) of the machine to deactivate said electric control circuit (11) during the formation of the first knitting course and at the end of the knitting process.

6. A machine according to one or more of the preceding claims, characterized in that said interruption means (12,13) comprise a relay (13) controlled by said control member (16).

0185264

Fig. 2

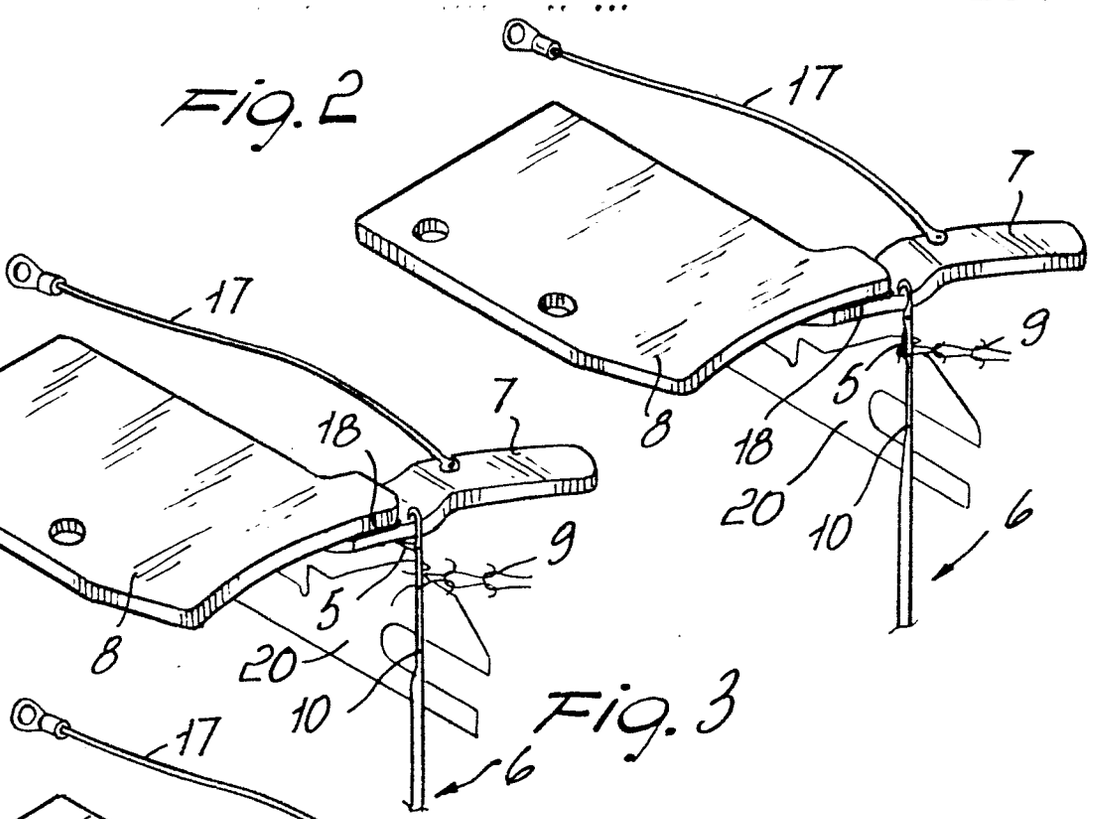

Fig. 3

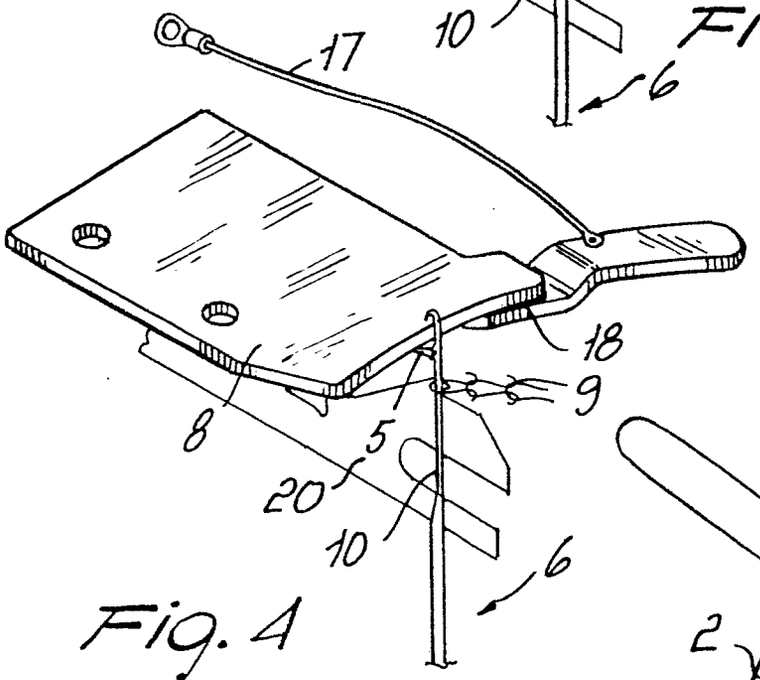

Fig. 4

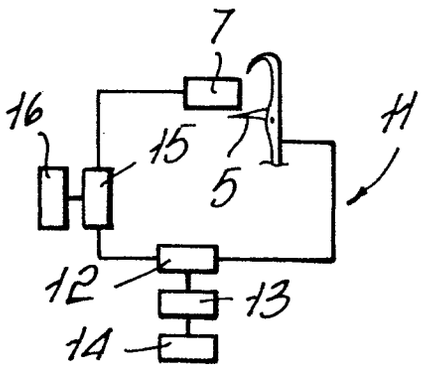

Fig. 5

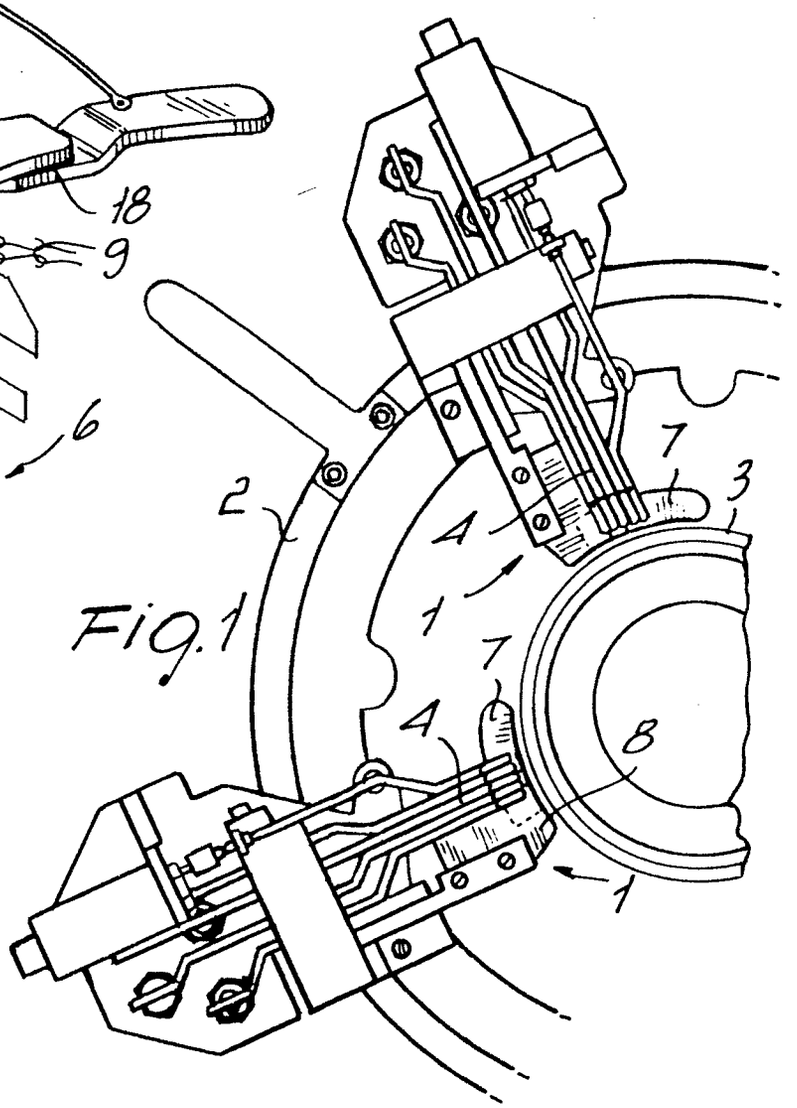

Fig. 1

European Patent Office

EUROPEAN SEARCH REPORT

0185264
Application number

EP 85 11 5495

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int Cl 4)
P,X	DE-A-3 432 315 (ELITEX) * Page 4, lines 2-26; figures 1,2 *	1,2	D 04 B 35/14
A	US-A-3 004 417 (LUNAK)		
A	FR-A-2 334 775 (UNIVERSAL TEXTILE MACHINE CORPORATION)		

TECHNICAL FIELDS SEARCHED (Int. Cl 4)

D 04 B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	25-03-1986	VAN GELDER P.A.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO Form 1503 03.82