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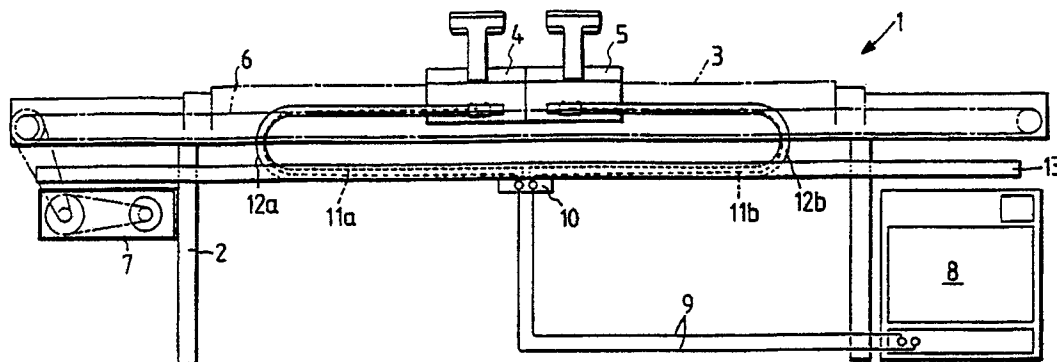
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54 **Flat knitting machine.**

57 In a flat knitting machine (1) comprising a needle bed (3), a frame (2) supporting the needle bed, a carriage (4,5), and a guide member supporting and guiding the carriage for reciprocation along the needle bed, a terminal unit (10) is provided on the frame at a position corresponding to the middle of the stroke of the carriage (4,5), one end of a cable

(11a,11b) for supplying power and electrical signals to the carriage (4,5) is connected to the terminals of the terminal unit, and the cable is supported by a flexible cable support structure (12a,12b). Preferably, two reciprocating carriages (4,5) are provided, each with a supported connection cable.

FIG. 1



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The present invention relates to a flat knitting machine having cable support means for supporting a cable or cables for supplying power and electrical signals to the carriage or carriages.

In one known flat knitting machine, a fixed cable connecting a controller for controlling the flat knitting machine to a terminal unit provided on the flat knitting machine to supply power and/or electrical signals to the carriage is arranged fixedly, while a movable cable connecting the carriage to the terminal unit is supported for free movement to allow the movable cable free movement according to the reciprocating motion of the carriage. The movable cable is suspended on a cable suspension device in a zigzag direction. The cable expands or contracts according to the movement of the carriage. No problem arises with such cable support means as long as the carriage reciprocates at a comparatively low speed. However, it is possible for the movable cable to become damaged due to its inertial movement in reversing the carriage when the carriage moves at a comparatively high speed or due to vibrations caused by frequent application of loads to the movable cable when the carriage reciprocates through a short stroke.

A weft knitting machine provided with two carriages on a single needle bed has problems attributable to the interference between movable cables connected to the carriages and the carriages themselves.

It is an object of the present invention to provide cable support means capable of supporting a movable cable or cables for supplying power and electrical signals to one or a plurality of carriages mounted on a single needle bed so that the movable cables, if there is more than one, do not interfere with each other and do not obstruct the individual movements of the carriages even when the carriages reciprocate rapidly.

In accordance with the invention, in a flat knitting machine comprising a needle bed, a frame supporting the needle bed, a carriage, and a guide member supporting and guiding the carriage for reciprocation along the needle bed, a terminal unit is provided on the frame at a position corresponding to the middle of the stroke of the carriage, one end of a cable for supplying power and electrical signals to the carriage is connected to the terminals of the terminal unit, and the cable is supported by a flexible cable support structure.

Also in accordance with the invention, in a flat knitting machine comprising a needle bed, a frame supporting the needle bed, two carriages, and a guide member supporting and guiding the two carriages for reciprocation along the needle bed, a terminal unit is provided on the frame, one end of each of two cables for supplying power and electrical signals to the two respective carriages is

connected to the terminals of the terminal unit, the two cables are supported respectively by flexible cable support structures, and the flexible cable support structures are bent respectively at the opposite outer sides of the frame.

When the terminal unit is disposed at a position corresponding to the middle of the stroke of the carriage and one end of the cable connected to the carriage is connected at the other end to the terminal unit, the cable is required to move through the minimum distance and to have the minimum length.

With a two carriage machine, since the cables connected to the two carriages are supported respectively on the cable support structures bending respectively at the opposite outer sides of the frame of the flat knitting machine, the cables do not interfere with each other and are able to move independently.

A preferred embodiment of flat knitting machine according to the present invention will now be described with reference to the accompanying drawings.

In the drawings:

Figures 1 to 4 are front views of a flat knitting machine in accordance with the present invention, showing the carriages at different positions; and

Figure 5 is a bottom view of a cable support structure.

A flat knitting machine 1 has a needle bed 3 supported on a frame 2, and carriages 4 and 5 supported on a guide rail (not shown). The carriages 4 and 5 are moved in a reciprocating manner by a driving belt 6. The rotary force of a driving unit 7 is transmitted to the driving belt 6. Power and/or electrical signals provided by a control unit 8 are transmitted through a fixed cable 9 connected to a terminal block 10 provided on the frame of the weft knitting machine 1. The carriages 4 and 5 are connected to the terminal block 10 by cables 11a and 11b respectively. The cables 11a and 11b are supported on flexible cable support structures 12a and 12b respectively. The flexible cable support structures 12a and 12b are supported on a support member 13. Fig. 5 shows the construction of the flexible cable support structures 12a and 12b, each of the flexible cable support structures 12a and 12b being formed by fitting a projection 15 formed on each of a plurality of small webs 14 in a small bore 16 formed in the adjacent small web 14 to connect the adjacent small webs 14 together. A terminal member 17 connected to one end of the series of small webs 14 is fastened to the driving belt 6, so that the flexible cable support structure 12a (12b) is unrolled, rolled up or bent according to the turning motion of the driving belt 6, hence according to the reciprocation of the

carriage 4 (5). The cables 11a and 11b are supported by the small webs 14.

The flexible cable support structures 12a and 12b connected respectively to the carriages 4 and 5 are bent respectively on the opposite outer sides of the frame, and both of the flexible cable support structures 12a and 12b are supported on the support member 13 for free bending.

The carriages 4 and 5 of the flat knitting machine thus constructed are able to move individually as shown in Figs. 2 to 4. In any of the modes of movement, the flexible cable support structures 12a and 12b, supporting the cables 11a and 11b connected to the carriages 4 and 5 respectively, are able to move individually without interfering with each other.

As is apparent from the foregoing description, in the flat knitting machine according to the present invention, the cable for supplying power and/or electrical signals to a single carriage supported on and guided by the guide member for movement along the needle bed is provided at a position corresponding to the middle of the stroke of the carriage and the cable is then supported by the flexible cable support structure. Accordingly, the length of the cable need only be about half the stroke of the carriage even if the carriage reciprocates over the entire width of the needle bed and the bend in the cable moves within the narrowest range. When the flat knitting machine is provided with two carriages, the cables connected to the carriages are bent respectively at the opposite outer ends of the needle bed, so that the cables and the cable support structures are able to move individually without interfering with each other.

Claims

1. A flat knitting machine (1) comprising a needle bed (3), a frame (2) supporting the needle bed, a carriage (4,5), and a guide member supporting and guiding the carriage for reciprocation along the needle bed, characterised in that a terminal unit (10) is provided on the frame (2) at a position corresponding to the middle of the stroke of the carriage, one end of a cable (11a, 11b) for supplying power and electrical signals to the carriage is connected to the terminals of the terminal unit (10) and the cable is supported by a flexible cable support structure (12a, 12b).

2. A flat knitting machine (1) comprising a needle bed (3), a frame (2) supporting the needle bed, two carriages (4,5), and a guide member supporting and guiding the two carriages for reciprocation along the needle bed, characterised in that a terminal unit (10) is provided on the frame (2), one end of each of two cables (11a, 11b) for supplying

power and electrical signals to the two respective carriages is connected to the terminals of the terminal unit (10), the two cables are supported respectively by flexible cable support structures (12a, 12b), and the flexible cable support structures (12a, 12b) are bent respectively at the opposite outer sides of the frame (2).

3. A flat knitting machine as claimed in claim 1 or 2, wherein the or each said flexible cable support structure (12a, 12b) comprises a plurality of small webs (14), each said small web having a projection and a small bore so that the webs can be connected to each other by fitting each projection into the bore of an adjacent web.

4. A flat knitting machine as claimed in any preceding claim, wherein a support member for supporting the flexible cable support structures (12,12b) is provided extending under the needle bed (3).

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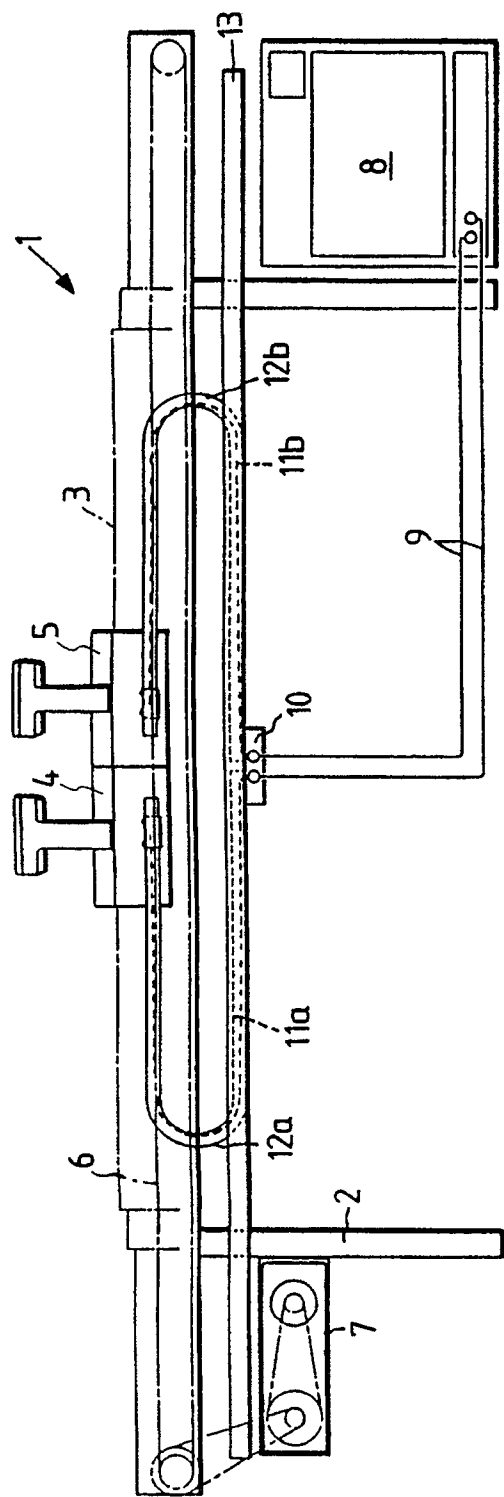


FIG. 1

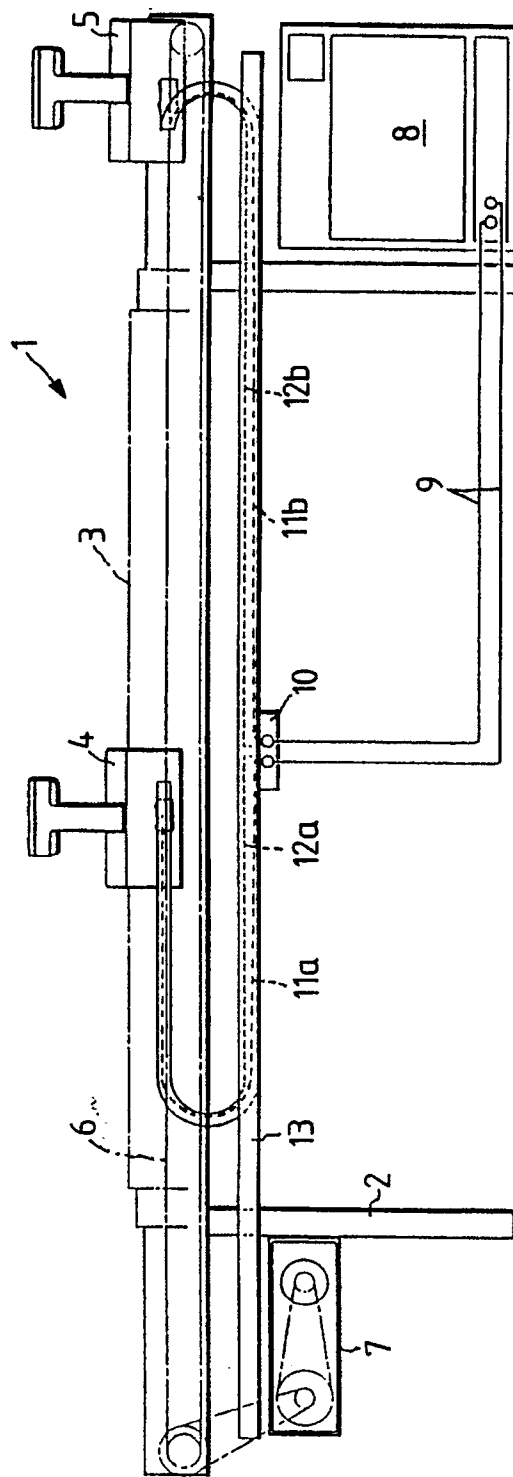


FIG. 2

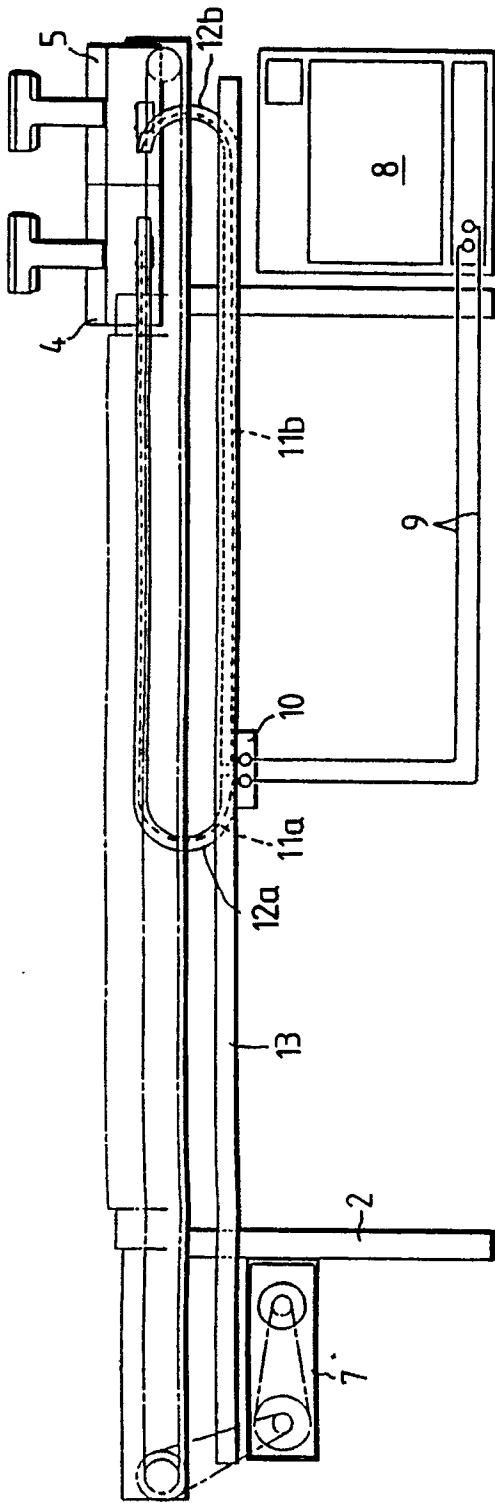


FIG. 3

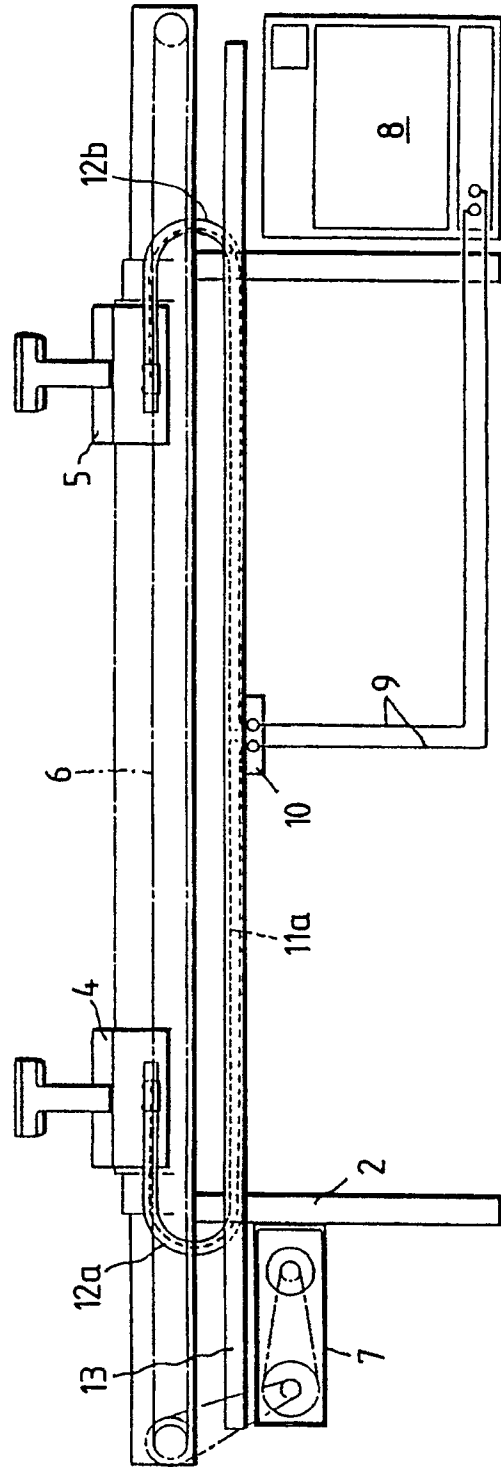
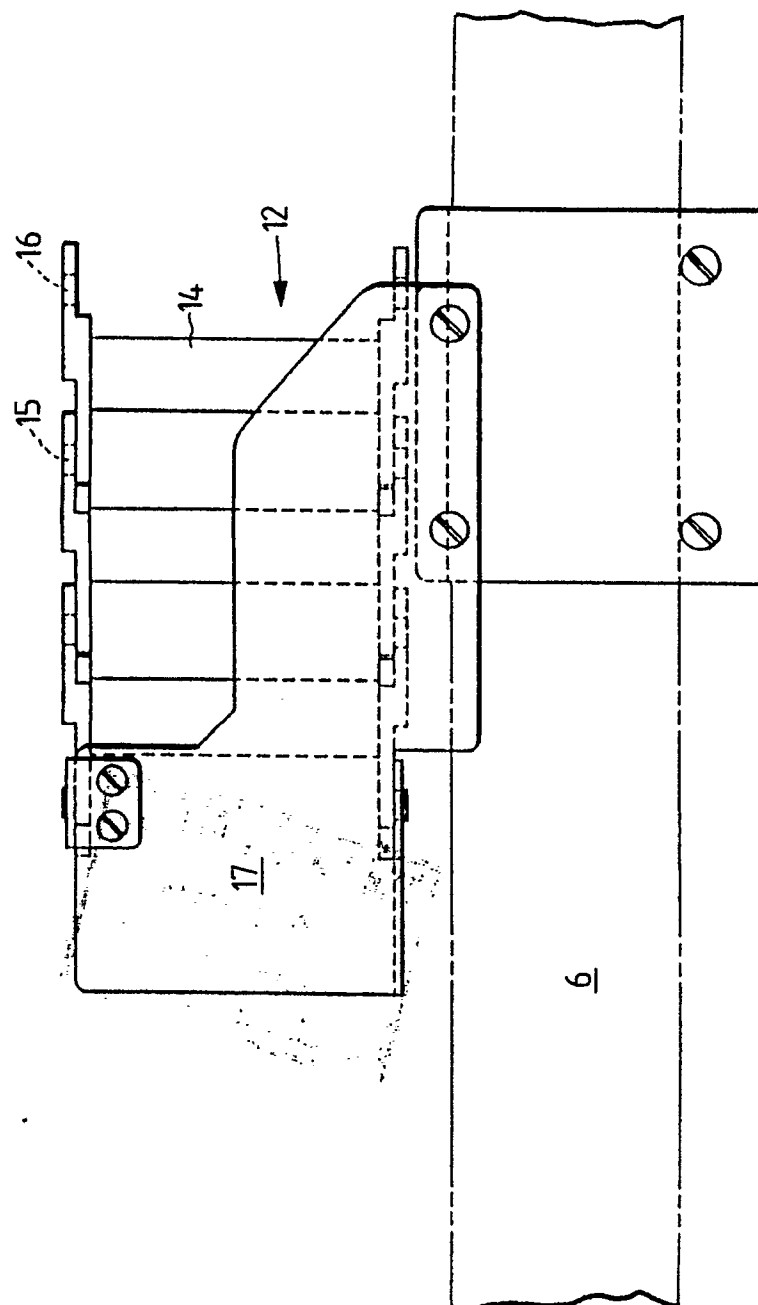


FIG. 4

FIG. 5





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EUROPEAN SEARCH REPORT

Application Number

EP 90 31 0253

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.5)
A	EP-A-0 277 351 (H. STOLL GMBH & CO.) * column 2, line 23 - column 3, line 39; figure 1 * - - -	1	D 04 B 7/00
A	GB-A-2 136 152 (VEB KOMBINAT TEXTIMA) - - -		
A	FR-A-2 227 362 (UNIVERSAL MASCHINENFABRIK DR. RUDOLF SCHIEBER KG.) - - - - -		
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			D 04 B
The present search report has been drawn up for all claims			
Place of search		Date of completion of search	Examiner
The Hague		10 January 91	VAN GELDER P.A.
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