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(54) **Mechanical device to be installed on textile machines for moving needles or punches.**

(57) This invention concerns a mechanical device to be installed on textile machines, which consists of a supporting box frame (1), within which a properly guided mobile carriage (3) can slide, driven by an electric step motor (5) by means of a helicoidal coupling. It will eventually be hooked to the needle or punch holder bar of the textile machine for carrying out complex knitting processes.

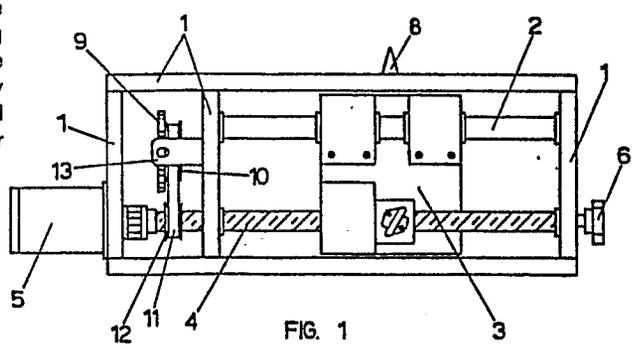


FIG. 1

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Mechanical device to be installed on textile machines, for moving needles and punches.

The subject of this patent application for an industrial invention is a mechanical device, to be installed on textile machines for the linear travel of needles or punches, so as to be able to carry out special knitting processes.

Textile knitting machines for carrying out "V" necks, punching, tufting, braids, or any other processes, which require linear travel of the needles in synchronisation with the other machine functions, are currently equipped by the manufacturers, with a special mechanism which consists of a crank mechanism, activated by the frame camshaft, intended to make a feed ratchet gear rotate, which in turn, sets off the rotation of a threaded bar, which is helicoidally coupled with a screw nut supporting the bar which sustains the textile machine combs, which must be set in motion to be able to carry out complex processes.

However, these mechanisms create problems, in as much as they are rather complicated and elaborate from a kinematical point of view, and are therefore costly and delicate. Moreover, they have the added disadvantage of being extremely limited as regards functionality, mainly due to the fact that the movement of the needles is obtained by means of a feed ratchet gear, activated by a crank mechanism with consequent feed angles, which cannot exceed the

value of 180° and, therefore, only allow the carrying out of a limited number of processes and designs.

Another considerable disadvantage of these mechanisms, is the fact that in order to return the needles, which are moved during working, to their original position, it is necessary to make the feed ratchet gear move backwards, as far as it has previously been made to move forwards. A considerable amount of time is wasted during these idle phases.

These problems have always made it unadvisable and in any case, rather complicated, to install the above-mentioned mechanisms for moving the punches on textile machines, which were not originally equipped to effect "V" necks, punching, tufting, braids, etc.

The above problems were taken into consideration in the mechanical device, as per the invention, which is able to rotate the bar on which the support screw nut of the needle bar holder is helicoidally coupled, with an autonomous movement without having to resort to coupling with the camshaft driving all the parts of the textile machine.

This feature of the device at reference, allows it to be installed in a simple, rapid and economical manner on existing machines without a device enabling them to carry out special processes.

The device, according to the invention, consists of a carriage to be coupled directly with the needle bar holder, which can be moved by a threaded bar with which it is helicoidally coupled. The threaded bar is set in rotation by a step motor, started by means of an electronically controlled device, on which any working programme for the knitting process can be established at will.

It becomes clear how this new device overcomes the limited functions of the previous mechanisms, by the fact that the rectilinear movement of the carriage and consequently of the comb holder bar, can be effected in any direction and for any length of stroke.

This is mainly due to the fact that the threaded bar, supporting the carriage itself, can freely effect any number of clockwise and anticlockwise turns, because it is autonomously activated by the step motor and not by a feed ratchet gear, controlled indirectly by the textile machine camshaft.

For a clearer explanation, the description of the invention continues with reference to the attached drawing, for illustrative and not restrictive purposes, where:
- Fig. 1 is the front view of the mechanical device, according to the invention;
- Fig. 2 is the rear view.

With reference to the attached drawing, the mechanical device at reference, consists of a support box frame (1), within which a carriage (3) can slide, guided by a bar (2). The carriage (3) is helicoidally coupled with a threaded bar (4), which is parallel to and underneath the above-mentioned guide bar (2).

The threaded bar (4) is rotated by an electric step motor (5), externally flanged to the frame (1). It is also possible to rotate the threaded bar (4) manually, by means of a knob (6), connected to it and positioned on the outside of the frame (1), opposite the step motor (5).

The carriage (3) has a suitably shaped bracket (7) in front, to which part of the comb holder bar is to be hooked, and a small rod (8), which acts as a reference point for the po-

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sition assumed by the carriage (3) during movement.

Number (9) indicates a crown wheel, which is integral with a loose pulley (10), which is rotated by a drawing pulley (12) integral with the threaded bar (4), by means of a thooted belt (11).

During rotation, the crown wheel (9) activates a magnetic sensor, fixed to the small bracket (13). When the sensor detects the teeth, it informs the electronic control of the electric step motor (5) of the movement effected by the carriage (3), and therefore, indirectly, of the movement effected by the needle or punch holder bar.

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Claims

1) Mechanical device to be installed on textile machines for moving needles or punches, characterized by the fact that it consists of a support box frame, within which a carriage guided by a horizontal bar can move. The carriage is helicoidally coupled to a horizontal threaded bar rotated by an electric step motor, externally flanged to the frame. To this bar, a drawing pulley is connected, which makes a loose pulley rotate, by means of a toothed belt. A crown wheel is fitted to this loose pulley, and during rotation sets off a magnetic sensor, which informs the electronic panel controlling the electric motor, of the movement effected by the above-mentioned carriage, which has a front bracket for the hooking up of the needle or punch holder bar of the textile machine.

2) Mechanical device to be installed on textile machines for moving needles or punches, characterized by the fact that rotation of the above-mentioned threaded bar, can also be obtained manually, by means of a knob connected to said threaded bar, placed on the outside of the device frame, opposite the electric step motor.

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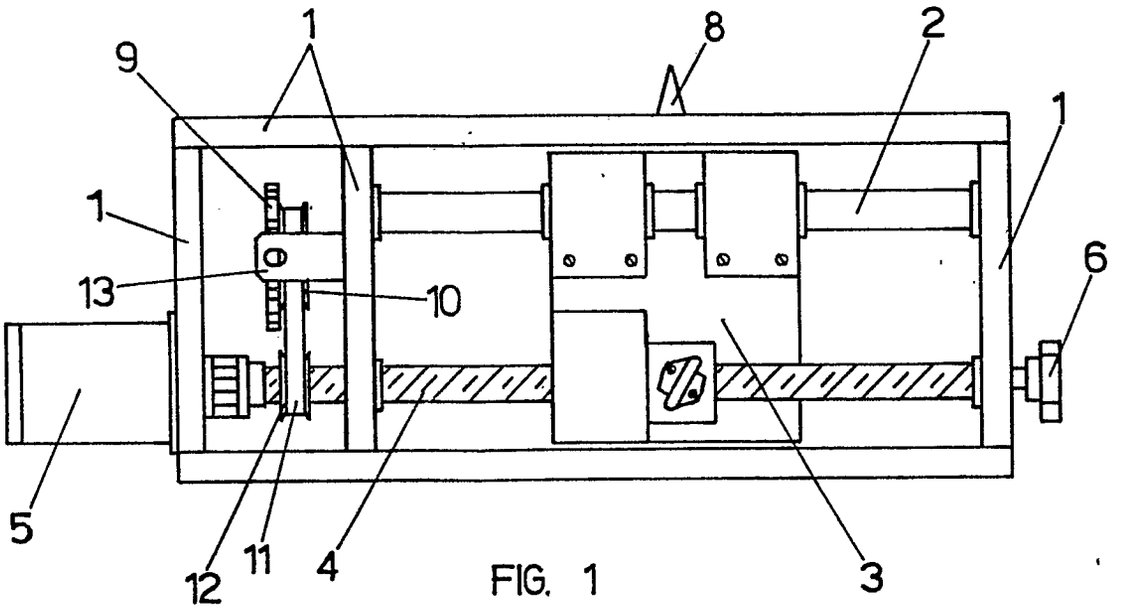


FIG. 1

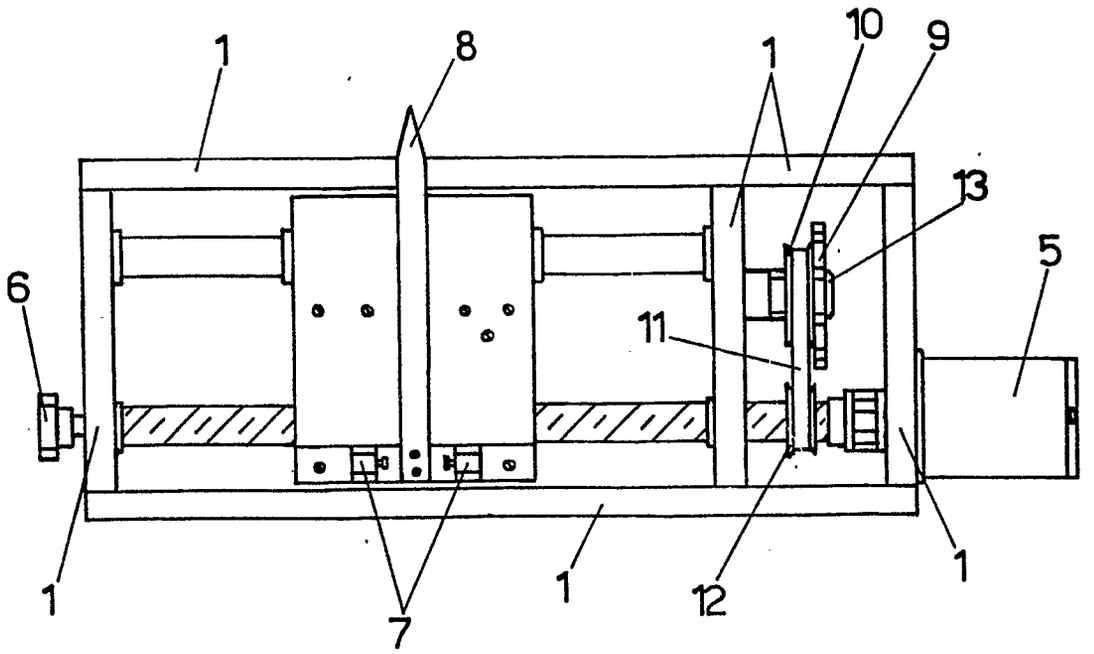


FIG. 2

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EUROPEAN SEARCH REPORT

Application number

EP 86 83 0096

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)
Y	GB-A-2 057 716 (SHIMA IDEA CENTER) * Page 1, lines 110-128; figures 1,2 *	1	D 04 B 15/12
Y	FR-A-1 253 233 (MORAT) * Page 2, right-hand column, line 51 - page 3, left-hand column, line 5; figure 3 *	1	
A	DE-A-2 938 388 (SCHAFFHAUSER STRICKMASCHINENFABRIK) * Page 5, line 13 - page 6, line 20; page 7, lines 11-21; figures 1,2 *	1,2	
A	US-A-3 762 184 (SCHUR)		TECHNICAL FIELDS SEARCHED (Int. Cl.4)
A	FR-A-2 384 048 (DUBIED)		D 04 B
A	US-A-3 783 643 (LADYMAN)		
A	DE-A-3 330 150 (SCHELLER)		

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	28-08-1986	VAN GELDER P.A.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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