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WEAVING IN LOOMS COMPRISING A PATTERN DEVICE

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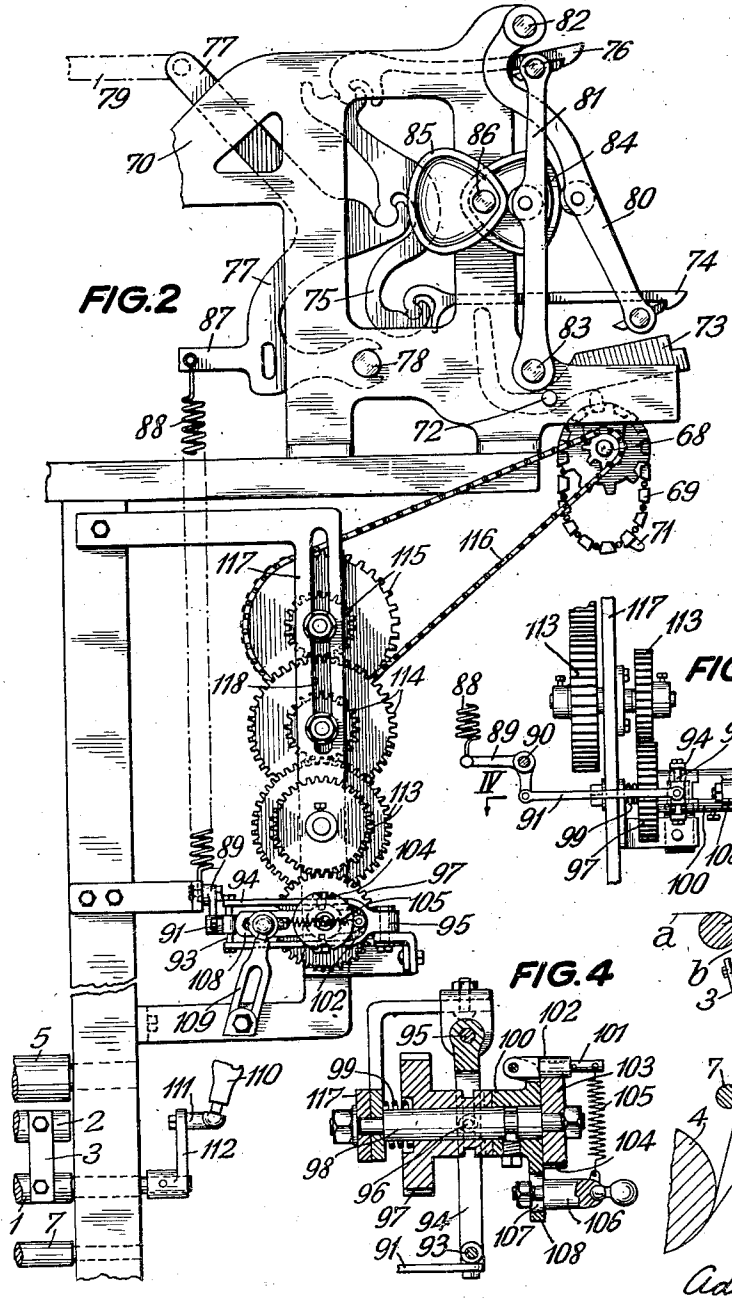

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WEAVING IN LOOMS COMPRISING A PATTERN DEVICE

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The invention relates to an arrangement for use with looms for producing woven effects as by conducting threads separated out from the warp over a guide member preferably constituted as an oscillatory member and which, during the weaving, is moved to and fro, so as to subject the threads to an alternating tension so that effects corresponding thereto will be produced in the fabric, the suitable selection of threads deflected out of the normal web of the remaining warp serving to effect a more or less pronounced wavy incorporation of the weft wherein the wavy portions may be of uniform or non-uniform configuration.

The oscillating lever is preferably disposed between the back rest that carries all of the warp threads and a lower back roller which serves solely for guiding the threads that are deflected out of the warp, and which therefore run per se to the normal upper back rest, so that the operating conditions necessary for producing the warp effect remain unchanged from full warp to empty warp conditions, whereas the warp remains unencumbered by the auxiliary means thus provided, besides which the supplementary arrangement can be subsequently applied without difficulty to modern looms, e. g. those provided with automatic warp-thread shut-down devices.

In accordance with the invention, the movement of the reciprocating guide member is effected by means of a shifting endless operating member which is associated with a pattern device already present on the loom.

In accordance with the invention therefore, the pattern device provided on the loom for controlling the weaving procedure has a supplementary function imparted to it which produces a corresponding simplification of the drive mechanism and its construction and supervision, but which nevertheless, in proportion to the length of the endless operating member (which may be constituted as a rod provided with cams or as a perforated paper card) permits the production of a large number of patterns in the form of less dense and more dense portion in the fabric. On the other hand, the shifting or adjusting of the pattern device already present on the loom serves at the same time to adjust the operating means provided by the present invention in correlation to the weaving as it proceeds on the loom.

An embodiment of the invention is illustrated in the drawing.

Fig. 1 serves for explaining the principle of the

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weaving method by showing parts that are necessary for this purpose in a vertical section;

Fig. 2 shows the control mechanism in elevation;

Fig. 3 is a partial side elevational view of Fig. 2, and

Fig. 4 shows a larger scale vertical section on the line IV—IV in Fig. 3.

In Figs. 1 and 2, the numeral 1 designates a shaft which is mounted at both ends in stationary bearings on the loom frame. A round rod 2 extends parallel with the shaft 1 at a certain distance apart from this shaft and has its ends fixed to the shaft 1 by means of connecting arms 3. By rocking the shaft 1 back and forth about its axis the round rod 2 is correspondingly swung about said axis, thereby to act as a rocking rod. The warp beam is designated by 4, the usual back rest or rail by 5, an additional back rest by 6 and a thread guiding roller or rail which is situated near to the warp beam 4, by 7.

From the warp *a* thread groups *b* are divided or leased off as indicated in chain dotted lines in Fig. 1, said thread groups passing away from the warp beam 4 across the roller 7 to the rocking rod 2 and the back rest 5. On the opposite side of the rocking rod 2 thread groups *c* which also had been leased off the warp *a* bear against said rod, as indicated in chain lines in Fig. 1, said thread groups passing away from the warp beam 4 across the roller 7, the rocking bar 2, and the back rest 5. The thread groups *b* and *c* are, therefore, diverted from the normal course of the warp threads *a* in different ways between the warp beam 4 and the weaving position, the warp threads passing away from the warp beam 4 across the additional back rest 6 and the usual back rest 5, as indicated in Fig. 1.

In Fig. 2, the numeral 68 denotes the shaft of a so-called card cylinder round which passes an endless pattern card or strip 69 from which a dobby 70 which is associated with the loom is controlled, if the pattern strip 69 is equipped with pegs 71 that are inserted therein in the required manner. These pegs 71 are capacitated pivotally to displace out of inoperative position weighting levers 73 constituting healds on a axle 72 which is arranged in the frame of the dobby. As the weighting lever 73 swings back into inoperative position it lifts a lower tie-hook 74, in a known manner, which is connected with an upper tie-hook 76 by means of a pivoting member 75. The member 75 is supported by a rocking member 77 which is mounted on an axle 78 and is operatively connected with two swing arms

(not shown) by means of a tension rod 79. From said two swing arms a shaft is suspended by two cords. The two tie-hooks 74 and 76 each serve for cooperating with one of two rocking arms 80 and 81 respectively which are mounted on corresponding axles 82 or 83 and are reciprocated in the operation of the loom, that is, the dobby, by cam discs 84 and 85 respectively. These cam discs are carried in common by a driving shaft 86.

The rearmost rocking member 77 of a row of rockers in the dobby is reserved for purposes of the present invention and is used exclusively for such purposes. In accordance therewith on the pattern strip 69 the corresponding path of travel is reserved for pegs for carrying the present invention into effect. With a projection 87 on the said rocking member 77 for which no tension-rod 78 is provided engages a tension spring 88 for connecting said rocking member with a bell crank lever 89.

The bell crank lever 89 which is mounted on a stationary axle 90 (Fig. 3) is in turn connected by means of a link 91 with a bolt 93 which interconnects two forked arms of a clutch control lever 94 which is mounted on a stationary bolt 95. The clutch control lever 94 is connected by means of two oppositely disposed pins 96 with a gear 97 which is loosely mounted on a stationary axle 98 (Fig. 4) and can be axially displaced against the influence of a compression spring 99. The hub of the gear 97 constitutes an element of a dog clutch for cooperation with a matingly constructed coupling element 100 which is arranged on said axle 96 for rotating thereabout but kept from axial displacement relative to this axle.

On the circumference of the clutch element 100 an auxiliary lever 101 is mounted which carries a roller 102 for cooperation with a locking disc 103 which is fixed to the axle 98. This disc is provided with two circumferential grooves 104 of rounded cross section for the reception of the auxiliary lever 101. The auxiliary lever 101 is maintained in bearing engagement with the circumference of the locking disc 103 or is occasionally in engagement with either one of said kerfs 104. The tension spring 105 is attached to a bolt 106 which extends through a longitudinal slot 107 in a side arm 108 on the clutch element 100.

The bolt 106 carrying the locking disc 103 is engaged by means of a spherical head by a rod 109, along a longitudinal slot in said rod an extension 110 being adjustable the other end of which engages by means of a bolt 111 a lever 112 which is fixed to the shaft 1 carrying the rocker bar 2, the said bolt 111 being adjustable along a longitudinal slot in a lever 112.

The gear 97 being axially displaceably arranged on the fixed axle 98 is positively operatively connected via three pairs of gears 113, 114, 115 and a chain 116 with the card cylinder 68 of the pattern device. By means of the chain 116 and the pairs of gears 113, 114 and 115 the rotational movement of card cylinder 68 is transmitted to the gear 97 in accordance with the ratio of gearing provided. This ratio of gearing can if desired be varied by interchanging the pairs of gears 114 and 115 to which end these pairs of gears are detachably secured by means of a slot 118 on a common carrier 117 which is arranged on the loom frame.

In the operation of the loom the card cylinder 68 and thus the pattern strip 69 is advanced step by step from the drive of the loom, in a known manner. The card cylinder 68 positively transmits rotational movement via the chain 116 and the pairs of gears 115, 114, 113 to the gear 97 and thus, provided that this gear is connected for operation, to the clutch element 100. The clutch element 100 being thus set in rotational movement transmits this movement by means of the control arm 108, the linkage 109, 110 and the lever 112 to the shaft 1 whereby the rocker 2 is accordingly actuated for influencing the warp thread groups passing thereover.

As soon as, due to cooperation of this shaft with the pattern strip 69 the rocking member 77 is moved upwardly, the gear 97 is axially displaced in such fashion via the tension spring 88, the bell crank lever 89, the link 91 and the clutch control lever 94 as to be disengaged from the clutch element 100, in consequence whereof, actuation of the rocking rod 2 does not take place. At this time the clutch element 100 is in an angular position in which the auxiliary lever 101 being carried by said element has entered into engagement by means of the associated roller 102 with one of the kerfs in the locking disc 103, whereby the control arm 108 remains temporarily locked in position.

The gear 97 then rotates without taking along the clutch element 100 until after having performed half a turn the dogs on the hub of said gear 97 enter between the dogs of the clutch element 100, due to the gear 97 shifting axially to a corresponding extent by action of the compression spring 99, provided that the rocking member 77 allows of this shifting movement to take place. The clutch element 100 is then carried along with the gear 97 again and the control arm 108 is further pivotally displaced until by action of a peg 71 on the pattern strip 69 the disconnecting of the gear 97 from the clutch element 100 takes place in the described manner anew. By accordingly choosing the relative distance between the pegs on the endless pattern strip 69 one is enabled to provide for the disconnecting of the gear 97 from the coupling element 100 to be effected at variable time periods apart and thus to determine the corresponding movement of the rocking rod 2 dependent upon the patterning of the weave as required.

If for any purpose of manufacture, for example, if weft thread breakage arises or if faulty weaving must be eliminated from the weave, so that the person attending to the loom must turn a handwheel (not shown) on the shaft 68 the control device for the shaft 1, that is, for the rocking rod 2 is positively adjusted to the required extent at the same time. Therefore, the card cylinder and the control means for the rocking rod 2 remain coordinated with each other for cooperation.

Due to the provision of deriving the driving movement for the rocking rod 2 from the card cylinder 68, that is, from the pattern device of the dobby for the control of the rocking rod 2 relatively little power is required.

Instead of using a single rocker for cooperation with thread groups having been diverted from the normal course several such rockers may be employed.

The present invention can be applied to a Jacquard-device operated machine in an analogous manner as hereinbefore described for a dobby, as will be readily understood without any further comment.

I claim:

1. In a loom apparatus, an operating mechanism for producing woven effects, comprising a swinging member 2 over which threads *b, c*

diverted out of the warp *a* are passed, and a clutch having two portions **97**, **100**, one portion of which **97** is controlled by an auxiliary swinging member **77** of a dobby **70**, and the other portion **100** of which effects movement of the swinging member **2** through agency of a card cylinder **68** of the dobby **70**.

2. An operating mechanism for a loom apparatus according to claim 1, and in which a supplementary drive **113—116** is provided between the clutch portion **97** and said card cylinder **68** of said dobby **70** for the purpose of effecting a positively actuated driving connection.

3. An operating mechanism for a loom apparatus according to claim 2, and in which said clutch portion **100** is provided with a spring-loaded engaging member **101** for engaging with a locking disk **103**.

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