A terry loom drive control arrangement for varying a predetermined number of weft insertions in relationship to the advance of the terry warp threads by controlling the advance of the terry warp threads in dependence on the revolutions of the terry loom drive shaft.
DRIVE ARRANGEMENT FOR THE TERRY WARPS ON A TERRY LOOM

The present invention relates to a drive arrangement for terry warp threads on a terry loom, by which arrangement the terry warp threads are periodically advanced after a predetermined number of weft insertions, a driving shaft of the loom driving a control member which controls the advance of the terry warp threads in dependence upon the number of revolutions of the drive shaft.

A terry fabric is produced by alternately beating up a certain number of weft threads inserted in the shed, so that they do not quite reach the fabric beat-up line, and, following this number of weft threads, fully beating up the next weft thread. In this process the incompletely beaten-up weft threads are also carried along and thus completely beaten up. Furthermore, in this process a certain length of terry warp thread is supplied, so that the weft threads which strike the beat-up stop carry along the terry warp threads, and the terry loops are formed by these.

In practice, it is desirable that full beat-up should take place at each third or fourth weft thread, i.e., that beat-up extending to the beat-up line should occur. A terry loom should therefore be optionally adjustable to produce three- and four-weft goods. In order to feed the terry warp threads in a suitable manner after each third or fourth weft beat-up, it has hitherto been necessary to change the gears through which the drive is transmitted from the drive shaft to the warp beam or feed roller. This procedure carries the disadvantage of being time-consuming and complicated. A change-over system that requires little time and is operated in a simple manner would be extremely valuable in weaving practice. This object is particularly difficult to achieve since in the present-day looms there is not sufficient space at the zone where the means for controlling the feed of the terry warp threads is located. If it were required to use a conventional arrangement, this would involve uneconomical re-designing of a considerable part of the loom.

According to the present invention, these disadvantages are avoided by providing a coupling wheel which is connected to a plurality of reduction gears or means of differing circumference, so as to form a transmission path for the drive of a rotatable control member or means for advancing the terry warp threads along which path the rotations of the control member are optionally reduced as compared with rotation of the main drive shaft of the loom, there being provided an eccentrically mounted bearing or means which has different angular positions in which each one of these reduction gears can be selectively located in a position for engagement with the control member, and coupling means being provided for effecting said selection and the transmission path completed when in the coupled condition.

The invention will now be described in more detail by reference to an embodiment thereof and to the accompanying drawings, in which:

FIG. 1 is a side view of a drive arrangement in a first operative coupled condition in accordance with the invention,

FIG. 2 is a side view of the drive arrangement similar to FIG. 1 but showing the reduction gearing in a second operative coupled condition when the bushing is rotated from its position in FIG. 1.

FIG. 3 is a plan view of this arrangement, partly in section, taken along lines 3-3 of FIG. 1, and

FIG. 4 is a schematic side view of the arrangement showing the relative positions of the gearing and eccentric means when in the coupled conditions of FIGS. 1 and 2.

In the Figures, like reference numerals designate like parts.

The number 11 designates a drive gear wheel which is continuously driven by the main drive shaft 12 of the loom by a prime mover not shown. The teeth of this gear wheel 11 mesh with teeth of a driven wheel 13. The latter is operatively connected to first and second reduction gear wheels 14 and 15. In the operating position shown in the drawing, the teeth of the gear wheel 15 mesh with the teeth of a gear wheel 16 which rotates about axis 17 to form a control member 20. This gear wheel 16 has a guide cam 18 and a guide groove 19 positioned therein. A first and second lever 27 and 28, controlled by the guide cam 18 and the guide groove 19, respectively, are operated by the movements imparted by the turning of wheel 16 to advance the terry warp threads in a loom producing terry cloth. When the reduction gear wheel 15 is in engagement with the gear wheel 16, the control member 20 revolves once during each four revolutions of the drive shaft 12. In other words, one advance of the terry warp threads takes place during four revolutions of the drive shaft 12 (See FIG. 1).

The driven wheel 13 and the reduction gear wheels 14 and 15 operatively connected thereto are a geared transmission unit rotatably mounted on an eccentric means or bushing 22 and concentric therewith with the help of the roller-bearing 21. The bushing 22 is rotatably displaced along and carried by a shaft 23. Displacement is achieved by means of handle 34. The bushing 22 has an eccentric bore therein with its outer cylindrical surface rotationally symmetrical in relation to the axis 24, in the position illustrated (See FIG. 1). The axis of the shaft 23 is indicated by the numeral 25. When the bushing 22 is passed through a half-revolution about the shaft 23, that is turned through an angle of 180°, the axis 24 moves into the position indicated by the numeral 24’. When this revolution is completed, the gear wheel 15 has been moved out of engagement with the gear wheel 16, and the gear wheel 14 is then coupled with the gear wheel 16 (see dash lines with primed numbers thereon in FIG. 4).

A flange 26 is firmly secured to the bushing 22. It performs the function of rotating the latter about the shaft 23 and of locating the same in any of the two angular positions 180° apart.

When the loom is operating, the gear wheel 16 revolves once during four revolutions of the drive gear wheel 11 as a result of the reduction provided by the reduction gear arrangement represented by wheels 11, 13, 15 and 16. Movement is imparted to the lever 27 and to the lever 28 upon each revolution of the wheel 16, i.e., of the control member 20. Feed of the terry warp threads is reduced by this movement of the levers 27 and 28. As this occurs, the lever 28 actuates a brake and a coupling, and the lever 27 actually advances the terry threads. Since a weft thread is inserted during each revolution of the drive shaft 12, the terry warp threads are advanced at each fourth weft thread.
It often occurs in weaving operations that it is desired to make a change-over so that the terry warp threads are advanced after each third weft has been inserted. Such change-over can be made in the simplest possible manner by means of the arrangement illustrated. For this purpose, a flange 26 is released and the teeth of wheel 15 brought out of engagement with the teeth of wheel 16. The bushing 22 is then rotated through an angle of 180° by means of the flange. Thereby the bushing 22 is rotated about the axis 25 of shaft 23. The bushing 22 and the wheels 13, 14 and 15 move into the new positions 22', 13', 14' and 15' shown in dash lines in FIG. 4. When the bushing 22 is rotated about the axis 25, the axis 24, which forms the axis of rotation in relation to the outer cylindrical surface of the bushing 22, moves over the path indicated by the curve 29. The wheels 11 and 13 thereby more or less roll one on the other.

By pressing the handle 34 the teeth of the wheels 14 shown in the position 14' in FIG. 4 and of the wheel 16 are brought into engagement, and the flange 26 is screwed up tight again. If it is required to change back from three-weft terry fabric to four-weft material, the procedure takes place in the reverse sequence after flange 26 has been backed-off and the teeth of wheel 14 disengages from the teeth of wheel 16.

Because of the eccentric mounting of the wheels 13, 14 and 15, it is thus possible to provide coupling means which are extremely simple to actuate and occupy virtually no space.

In the apparatus illustrated, it is of particular advantage if, when changing from one type of fabric to the other, the teeth of the wheels 11 and 13 are never completely disengaged from each other. This results in the advance of the terry warp threads always coinciding precisely with the weaving process. These wheels are caused to remain in engagement by making the radius of the eccentric movement, i.e., the radius of the curve 29, smaller than the depth of engagement of the teeth on the wheels 11 and 13. A prerequisite to this is that the plane passing through the axes 24 and 24' is at least approximately parallel to the tangent to the wheels 11 and 13 at the zone where they are in mutual engagement, so that the wheel 13 more or less rolls on the wheel 11 during the changing from one reduction gear to the other.

It is obvious that an eccentrically mounted shaft can be provided instead of the shaft 23 and the eccentric bushing 22.

It will be further appreciated that more than two reduction wheels may be used depending on the number of ratios of welf thread insertions to the advancement of terry warp threads desired. Also, various changes and modifications may be made within the skill of the art without departing from the spirit and scope of the invention.

What is claimed is:

1. In a drive arrangement for a terry loom to periodically advance the terry warp threads in accordance with each revolution of the drive shaft of the loom so their advance always coincides precisely with the weaving process when changing the weaving between fabrics having different numbers of weft thread insertions, the combination comprising: a geared transmission unit having a driven gear wheel and a plurality of reduction gear wheels of differing circumference axially offset one from the other and operatively attached thereto, with all of said wheels rotatable in unison on a common axis, a drive gear wheel operatively connected to said geared transmission unit; a gear driven control means rotatable on an axis parallel to said common axis and operatively connected to one of said reduction gear wheels for controlling the advance of the terry warp threads; a coupling means having an eccentric means therein mounted concentrically in said transmission unit and eccentrically turnable about said common axis to selectively change the coupling from one of the said reduction gear wheels to another when said transmission unit is moved along said common axis and rotated with respect to said drive gear wheel to provide a change in gear ratio in the transmission path from said drive gear wheel to said gear driven control means for rotating the latter gear at a selectively different speed; said eccentric means being turnable through an arcuate path having a radius less than the depth of engagement of the teeth on said driven gear wheel with the teeth on said drive gear wheel, thereby providing for the teeth of the drive gear wheel and driven gear wheel to remain in operative engagement when shifting from one of said reduction gear wheels to the other so as to selectively control the speed of rotation of said control means when changing from one type of fabric to another.

2. The drive arrangement of claim 1 in which said eccentric means is a bushing eccentrically mounted on a shaft and concentric with said transmission unit.

3. The drive arrangement of claim 2 in which said bushing is slidable with respect to said shaft.

4. The drive arrangement of claim 2 in which said eccentrically mounted bushing has a flange means operatively connected thereto for selectively turning said bushing from one operative position to another to effect the driving of said rotatable gear driven control means by one or the other of said reduction gear wheels.

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