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Kunz

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[54] **DRIVE ARRANGEMENT FOR THE TERRY WARPS ON A TERRY LOOM**

[75] Inventor: **Max Kunz**, Ruti/Zurich, Switzerland

[73] Assignee: **Ruti Machinery Works Ltd., Formerly Caspar Honegger, Ruti/** Zurich, Switzerland

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[52] **U.S. Cl.** **139/25**, 74/353, 139/102

[51] **Int. Cl.** **D03d 39/22**

[58] **Field of Search** 74/353; 139/24, 25, 139/26, 99, 102

[56] **References Cited**

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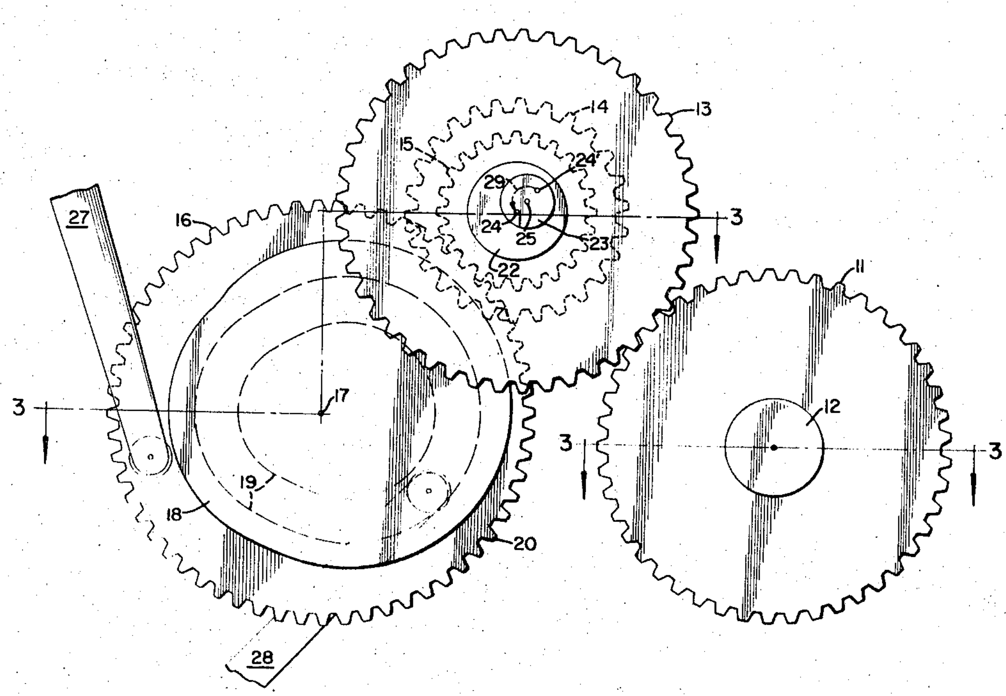
Primary Examiner—Henry S. Jaudon

Attorney—Donald D. Denton

[57] **ABSTRACT**

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.

4 Claims, 4 Drawing Figures



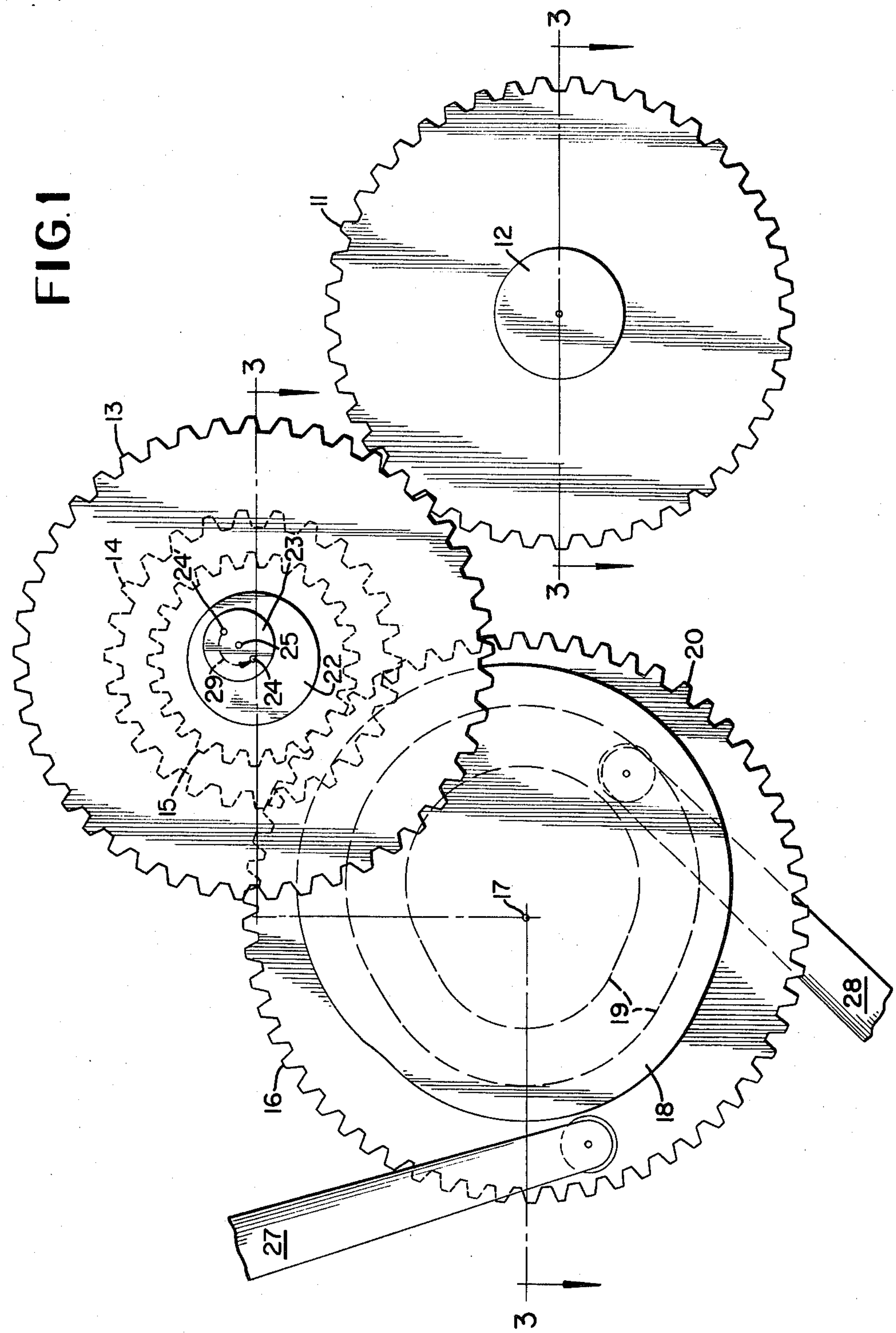


FIG. 1

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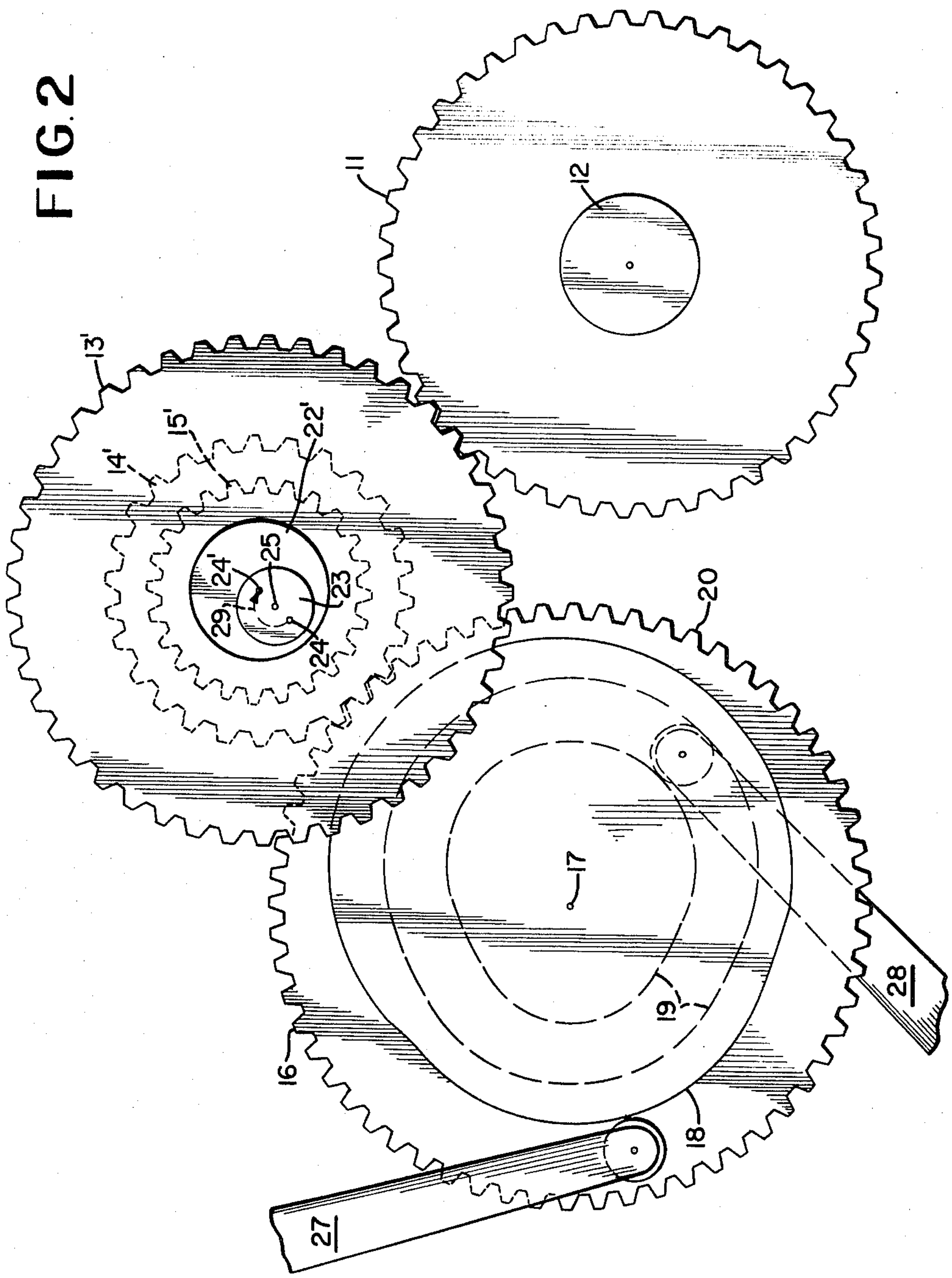
FIG. 2



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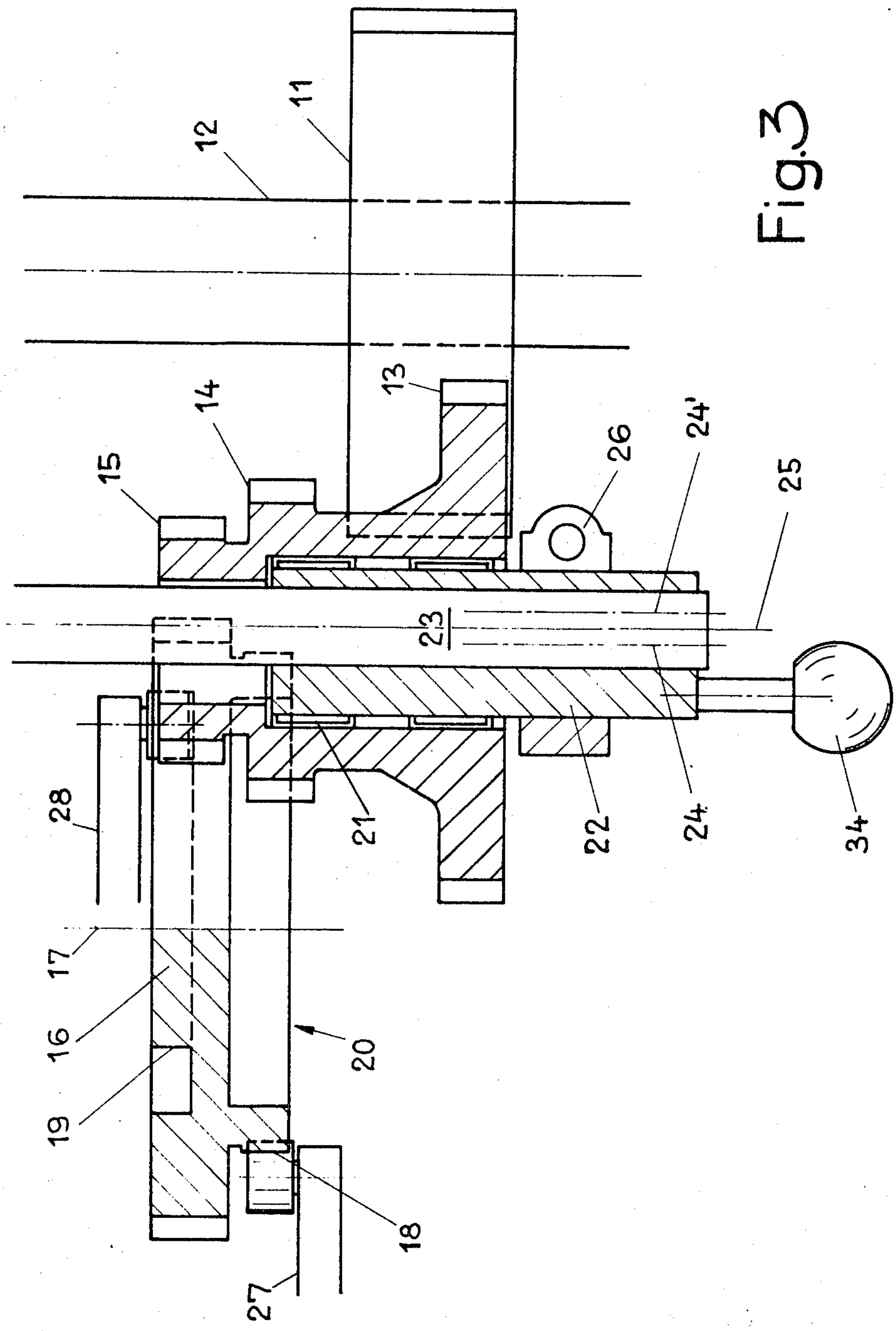

Fig.3

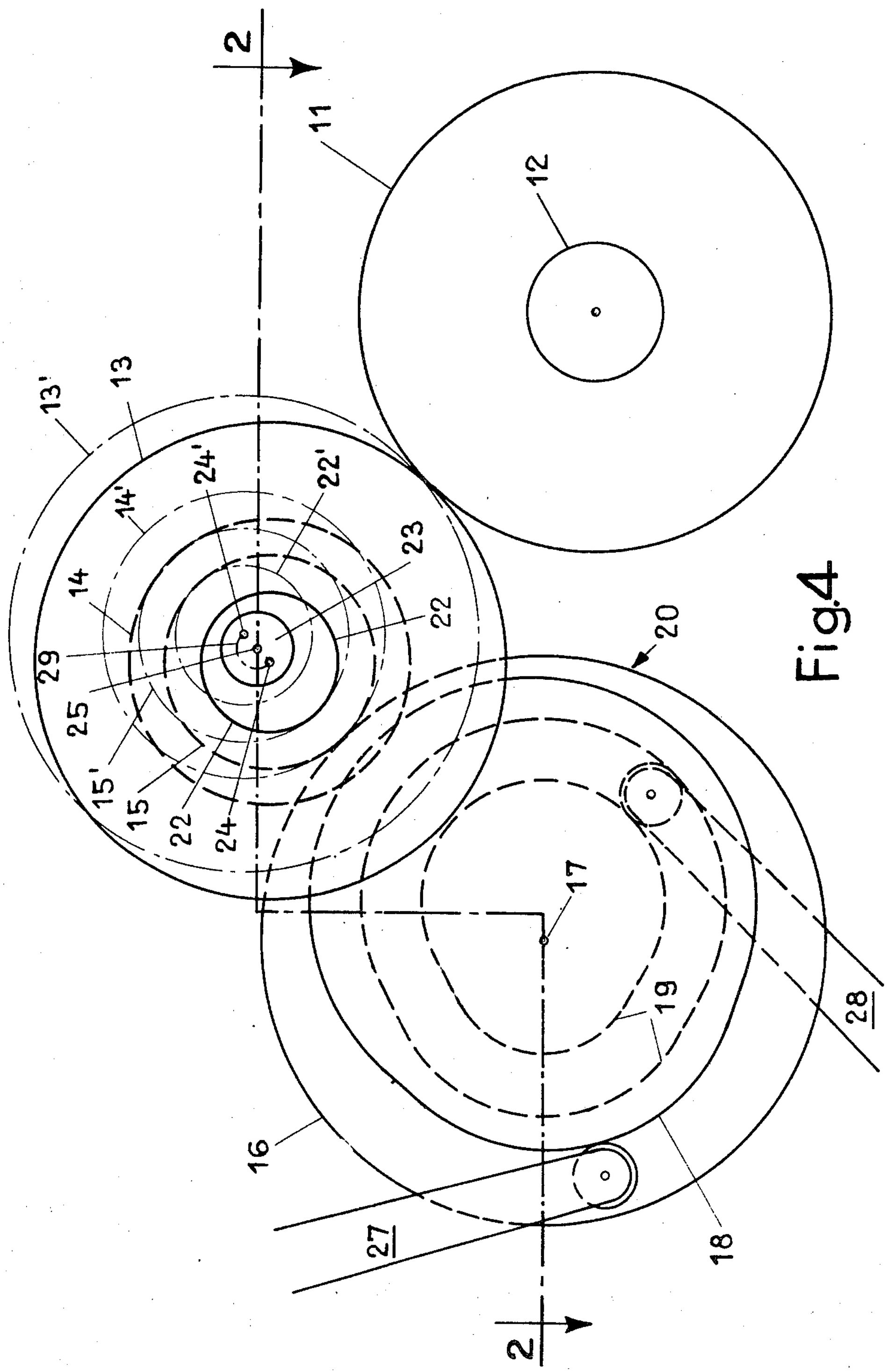

Fig.4

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 weft 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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