

[54] **DEVICE FOR CONTROLLING A WEDGE COUPLING, PARTICULARLY IN A DOBBY**

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[56] **References Cited**

UNITED STATES PATENTS

3,468,347	9/1969	Fumat.....	139/66 R
1,256,644	2/1918	Barlow.....	139/66 R
2,926,703	3/1960	Scheibel et al.	139/68 X

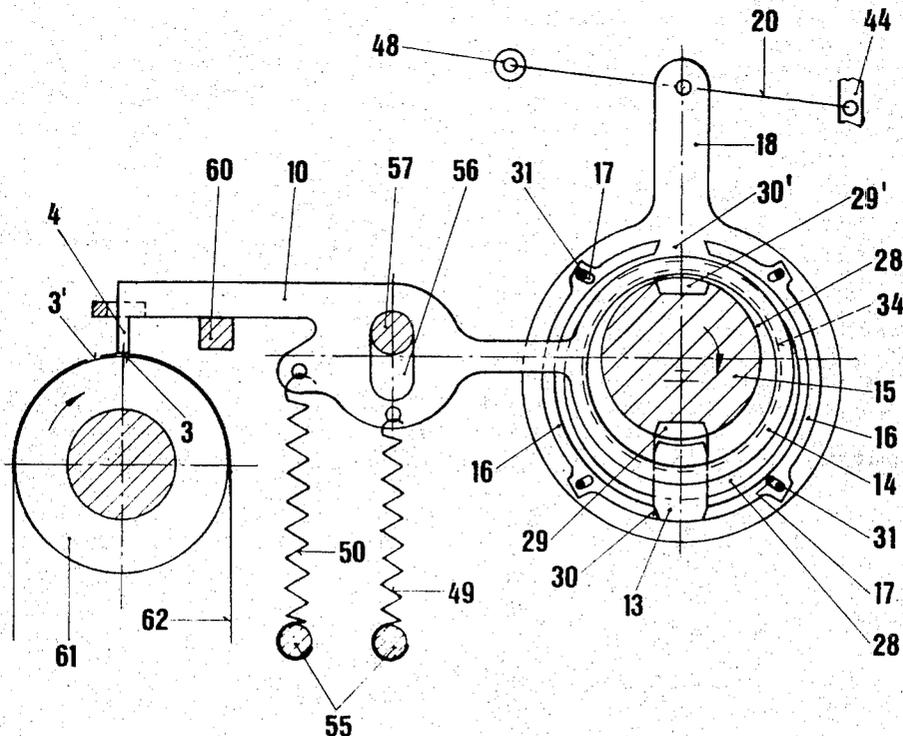
3,554,238 1/1971 Hoenig139/331 X

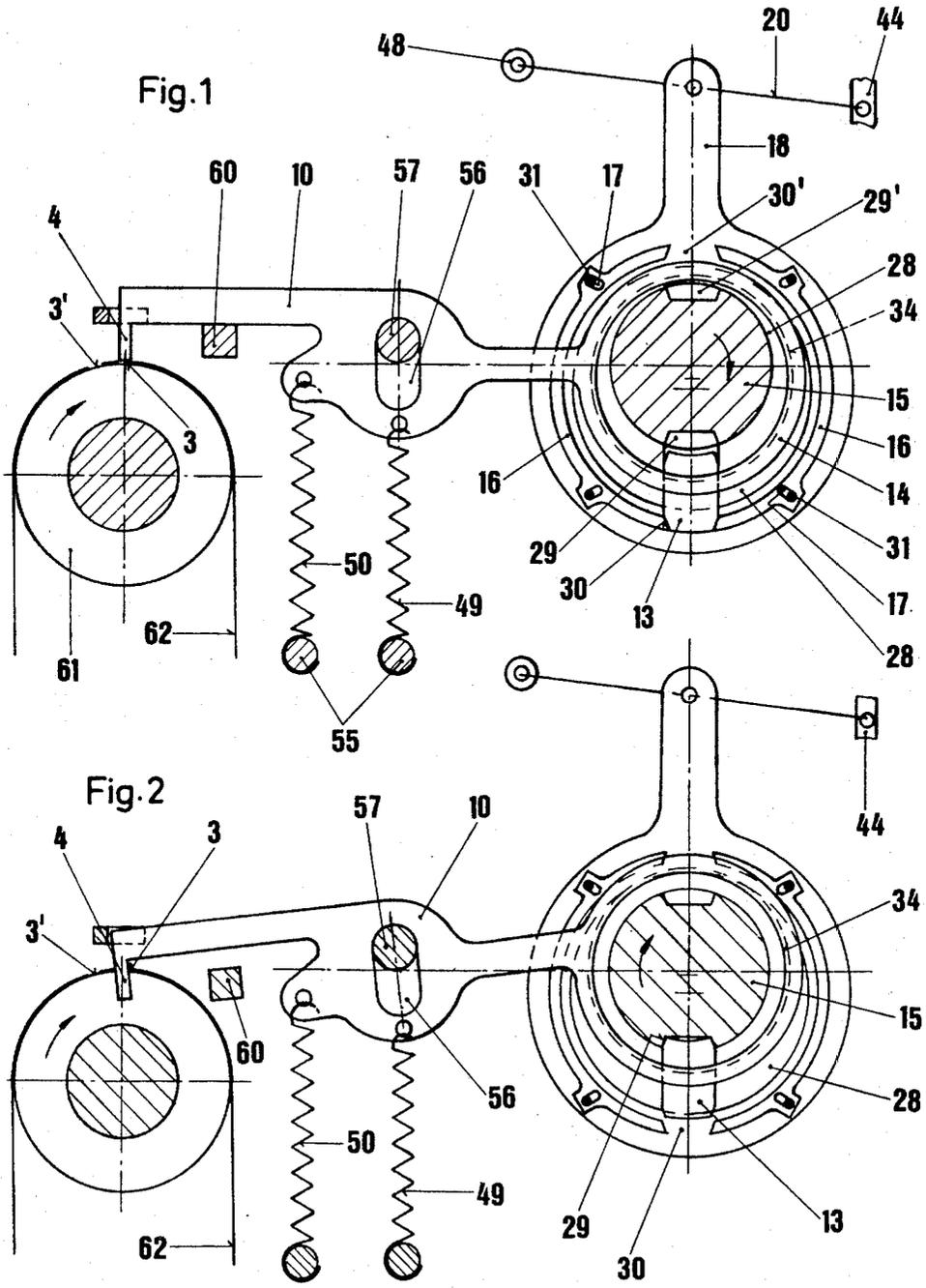
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[57] **ABSTRACT**

Dobby, in which the movement of the heddle frames is effected by a connecting rod (18), which connecting rod is mounted through an eccentric ring (28) on the driving shaft (15). The control of such movement is accomplished by a coupling wedge (13) which is supported in the eccentric ring and is connected in control relationship alternatively to the driving shaft or to the connecting rod. The control of the wedge is effected by means of a ring (14) movably arranged around the driving shaft, on which ring the wedges slides. One end of an arm (10) is secured to the ring, which arm carries on its other end the reading needle (4). The arm is supported through a slot (56) on a stationary member (57). The springs (49,50) acting onto the arm (10) and the supporting of the arm in the slot cause and permit the arm to tilt and yield in response to the position of the wedge and the needle.

6 Claims, 6 Drawing Figures



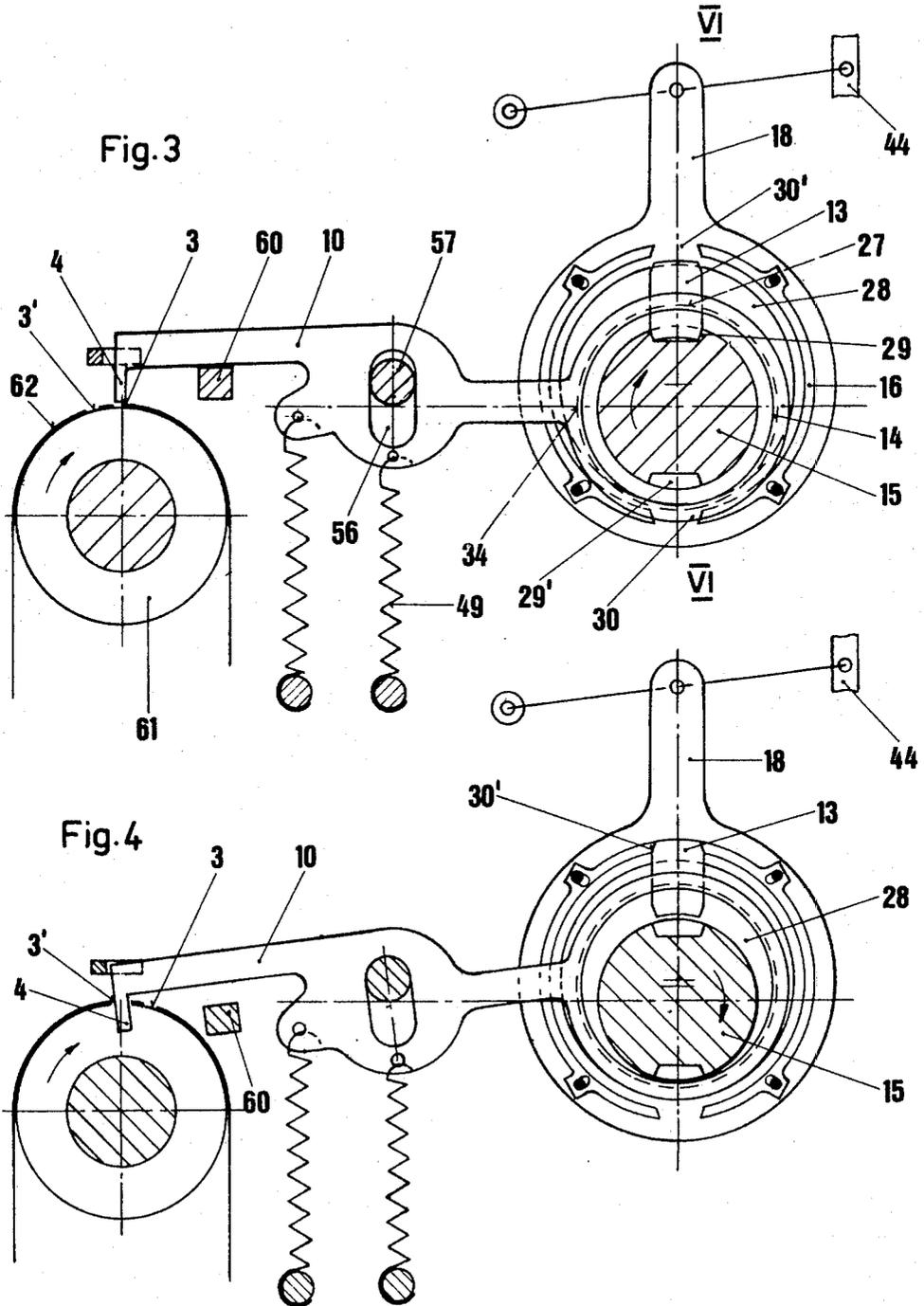


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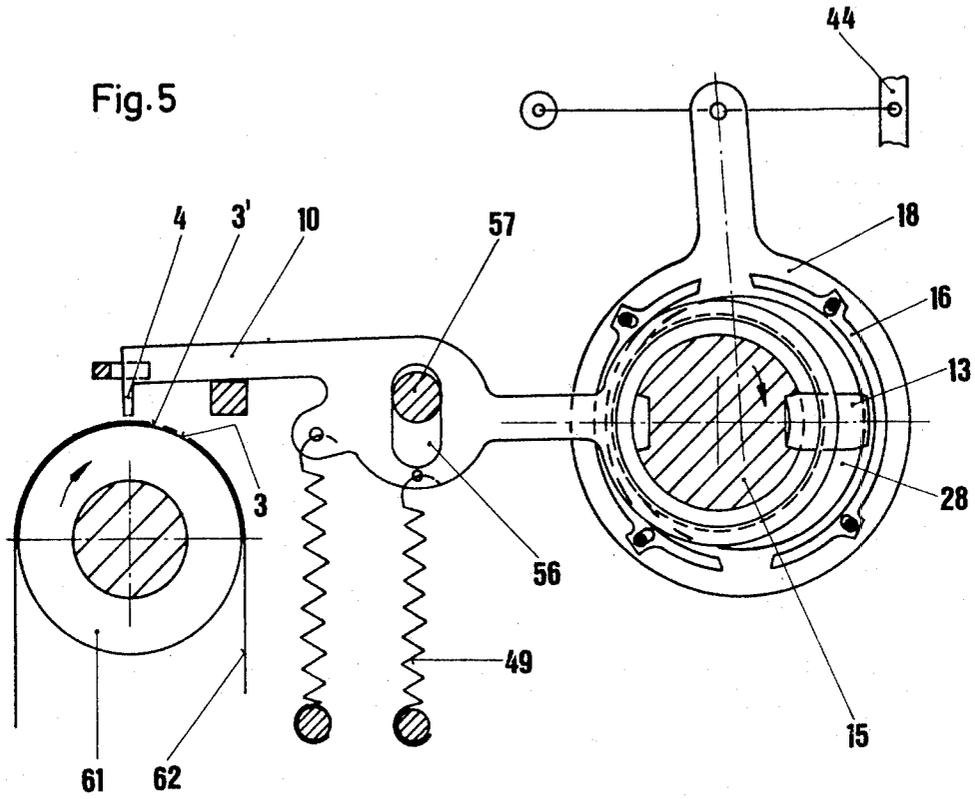


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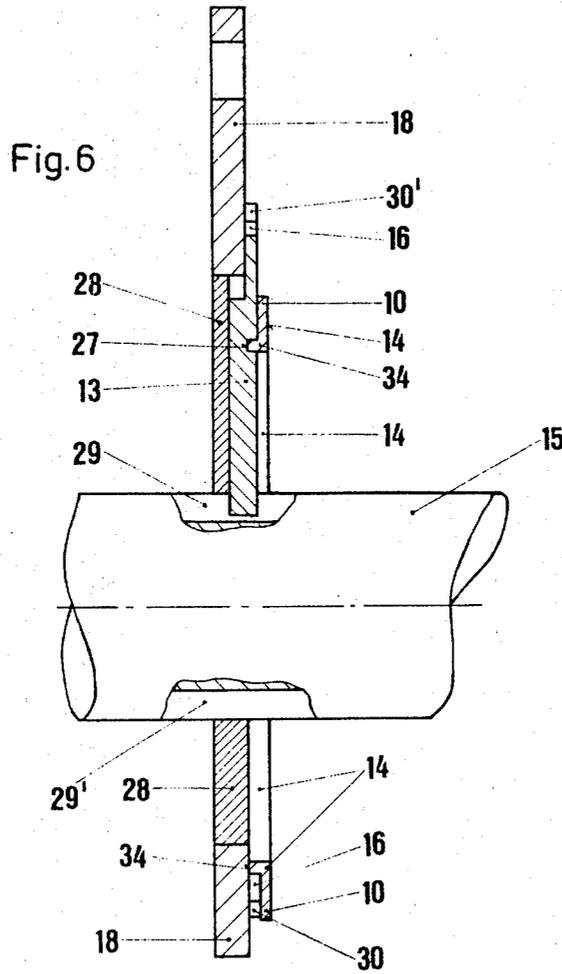
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DEVICE FOR CONTROLLING A WEDGE COUPLING, PARTICULARLY IN A DOBBY

The invention relates to a device for controlling a wedge coupling, particularly in a dobbie, which coupling is positioned in a continuously or discontinuously rotating driving shaft. Said coupling consists of an eccentric ring arranged on the shaft and provided with a radially slideable wedge and a connecting rod encircling the ring. The wedge responds to a pattern card and engages a recess of the driving shaft or the connecting rod. Movement of the wedge is caused by a ring of a control arm, which ring encircles the driving shaft, whereby the wedge, during the rotation of the driving shaft, slides along the ring. The invention also consists in a method for operating this device.

In order to change the rotational movement of the driving shaft of a dobbie into a linear movement of the heddle frame, wedge couplings of the mentioned type are known, through which the heddle frame of the weaving machine reach the upper shed or lower shed position. The time of the reversal is desired to be as short as possible since it means lost time in the weaving process. A pattern card is used as a release member for the control movement, which pattern card is provided with openings, cams or lugs and is read by a control mechanism, preferably a reading mechanism. In the case of machines running at extremely high speeds, the reading member, in this case the needle reading the openings, should be connected as directly as possible to the part moving the wedge.

It is the purpose of the present invention in which the reading needles form one unit with the control arm to provide an arrangement which permits the start of the control process for the next pick before the movement of the heddle frame for the preceding pick has been concluded. This minimizes the period of standstill for indexing to the next position of the pattern card on the pattern card cylinder.

This objective is achieved with a device of the above mentioned type which is characterized in that the arm is provided on the end remote from the ring with a needle for the reading of a pattern card or is in effective connection with a pattern card reading mechanism and that the arm has a slot approximately centrally arranged therein through which slot said arm is supported on a stationary member. Further, in the direction of the long axis of the slot a first tension spring and between slot and reading needle parallel thereto a second tension spring, both engage the arm. A lifting rod is arranged between the reading needle and the second tension spring, so that the reading needle can be lifted against the pull of the second spring from the pattern card for the purpose of indexing to the next position of same.

The operation of this device is characterized in that in the lower shed position of the eccentric ring the arm is supported on the stationary member under the effect of the first spring when the needle stands on the pattern card or sinks into an opening, that the arm in the slot is lifted from the stationary member when the lifting rod lifts the needle from the pattern card, and that in the upper shed position of the eccentric ring the arm is supported on the stationary member under the effect of the first spring when the needle falls into an opening of the pattern card and that the arm is lifted from the sta-

tionary member when the needle stands on the pattern card or is lifted off from same by the lifting rod. Further, in the lower shed position of the eccentric ring, by means of a suitable opening in the pattern card the arm causes the wedge to engage the shaft and in the upper shed position of the eccentric ring by means of a suitable opening in the pattern card the arm causes the wedge to engage the connecting rod.

One exemplary embodiment of a device according to the invention is illustrated in the drawings. FIGS. 1 to 5 each illustrate a schematic front view of the wedge coupling with the control members in various positions, namely

FIG. 1 illustrates the coupling in lower shed position of the heddle frame and a partially lifted reading needle,

FIG. 2 illustrates the coupling with a read-in needle and a wedge positioned for changing the heddle frame from the lower shed position to the upper shed position,

FIG. 3 illustrates the coupling in the upper shed position of the heddle frame and a lifted reading needle,

FIG. 4 illustrates the coupling with read-in needle and a wedge positioned for keeping the heddle frame in the upper shed position and

FIG. 5 illustrates the coupling in the moment of change of the heddle frame from the upper shed into the lower shed, whereby the reading needle is already lifted and the pattern card indexed for the next pick reading.

FIG. 6 is in an enlarged scale a cross-sectional view along the line VI—VI of FIG. 3.

The pattern card 62 provided with the openings 3,3' is moved together with the card cylinder 61. A needle 4 is provided on one end of the control arm 10 and serves for reading the pattern-like control openings 3,3'. The control arm has on the other end thereof an annular ring 14 through which the driving shaft 15 extends. The eccentric ring 28 is positioned on and rotatable with respect to the driving shaft and the connecting rod 18 is positioned on said eccentric ring 28. The connecting rod actuates about the pivot point 48 the motion member 20 for the heddle frame 44 (which is only schematically indicated in the drawing). The wedge 13 is supported radially slidingly on the eccentric ring 28, which wedge in its two extreme positions engages either the recess 29,29' of the driving shaft 15 or the zone 30,30' which is formed by the ends of the semicircular guide rails 16. These guide rails consist of spring steel and have approximately radially directed slots 17 which serve for guiding the rail on the pins 31 secured to the connecting rod. The ring 14 is offset and has a collar 34 which extends axially beyond the plane of the control arm 10 as best illustrated in FIG. 6 and which slides in a groove 27 of the wedge and thus controls same relative to its position on the eccentric ring 28.

The two springs 49 and 50 are mounted on the frame of the dobbie at 55 and engage the control arm 10. The spring 49 acts in the direction of the slot 56 and is weaker than the spring 50 between the slot 56 and reading needle 4. The stationary member is identified with 57 on which member the control arm 10 can slide by its slot 56. The lifting of the control arm 10 and thereby of the needle 4 is accomplished through the lifting rod 60.

The operation of the device is set forth in connection with FIGS. 1 to 5, wherein only those reference numerals which serve the discussion are entered but where used the numerals correspond to those used in FIG. 1.

FIG. 1 illustrates the position of the wedge coupling in lower shed position of the heddle frame 44, namely the wider side of the eccentric ring 28 is positioned below the driving shaft 15. The lifting rod 60 has partially lifted the part of the arm 10 which carries the needle 4. The pattern card 62 has been indexed to the next pick reading (opening 3). The spring 49 has pulled the part of the arm 10 with the ring 34 downwardly in the slot 56 until the stationary member 57 abuts in the slot 56. This position is maintained even when the lifting rod 60 separates from the arm 10, namely is lowered, and no opening is provided in the pattern card 62. Thus, the wedge 13 is positioned in the zone 30 and does not engage the recess 29 of the driving shaft 15.

If now, as shown in FIG. 2, the needle 4 finds an opening in the pattern card 62 and the lifting rod 60 swings away from the arm 10, the arm will pivot about the stationary member 57 under the effect of the spring 50 and will, acting through the ring 34, cause the wedge 13 and the shaft 15 to engage, whereby the arm 10 with its slot 56 is held on the stationary member 57 by the effect of the spring 49. This produces the position according to FIG. 2.

From the position of the ring 14 in FIGS. 1 and 2 with reference to the driving shaft 15, the movement of the arm can be seen. This movement retracts the wedge 13 from the zone 30 and enters it into the recess 29 which causes the shaft 15 to carry the wedge 13 and thus also the eccentric ring 28 on its rotational movement for 180° until it reaches the position according to FIG. 3.

In the meantime the lifting rod 60 and thus the left part of the arm 10 are again lifted until the needle 4 is positioned above the pattern card 62. Since the wedge 13 can enter the recess only to the limit of the bottom thereof, the possibility that the rod 60 may lift higher than would correspond to this is permitted by the pivoting of the arm about the stationary member 57. The arm 10 can yield in its slot 56 against the force of the spring 49. Aside from the lifting of the rod 60, during the rotation of the shaft 15 the indexing to the next position of the pattern card 62 takes also place by means of the card cylinder 61 so that, as is illustrated in FIG. 4, the next pick can be read. Due to the rotation of the driving shaft 15 with the coupled eccentric ring 28, the wide side of this ring has been positioned above the shaft 15 and the connecting rod and with it the heddle frame 44 has been lifted into the upper shed position (FIGS. 3 and 4).

The lifting rod 60 is now lowered and the needle 4 reads the next opening 3' (FIG. 4). Since the needle is here shown as finding an opening, the arm 10 swings and lifts the wedge 13 into the space 30' where it is secured against rotation. The eccentric ring 28 is disengaged from the shaft 15. Thus, the heddle frame will during the next rotation of the shaft 15 for 180° remain in the upper shed.

FIG. 5 illustrates an intermediate position, namely after a 90° rotation of the driving shaft 15 with a wedge 13 engaging the shaft 15 as a result of the lack of an

opening in the pattern card 62. The heddle frame 44 now moves from the upper shed to the lower shed position. The wedge 13 which was moved with the shaft 15 slides during this rotation with its head along the rail 16 which prevents a disengagement of the wedge from the shaft. It can be clearly recognized from the figure that the part of the arm 10 with the needle 4 has already been lifted by the rod 60 and the pattern card 62 which at this point does not have an opening is just now being indexed to the next position. The arm 10 cannot be overloaded because its support by means of the slot 56 on the stop 57 permits yielding. The spring 49 always returns the arm 10 into its normal position on the stop 57.

In place of a needle 4, the arm 10 may be provided with any other known pattern card reading mechanism.

If the left part of the arm 10 is lifted by the lifting rod 60, at the same moment that the shaft 15 rotates and the then unengaged wedge is positioned above the shaft (wedge position according to FIG. 4), this will require the greatest yielding possibility in the slot of the arm. The slot must therefore be dimensioned corresponding to this maximum position change.

In the illustrated and described exemplary embodiment — contrary to the common pattern cards — an opening in the card does not always mean the same type of control of the heddle frame. In the case of the known pattern cards, the heddle frame is moved into the upper shed position for example with an opening, while if no opening was provided, the heddle frame remained in the lower shed position independent of the position of the heddle frame during the preceding pick insertion. In the present device, each pick must take into account the position of the eccentric ring from the preceding pick.

If the wide portion of the eccentric ring 28 and also the wedge 13 there mounted, is positioned below the shaft 15 (FIGS. 1 and 2) which corresponds to the lower shed position of the heald shaft 44, then an opening 3 in the pattern card 62 means that the wedge 13 engages the shaft 15 and is withdrawn from the recess 30 of the connecting rod 18. The heddle frame is lifted into the upper shed position during the next rotation of the shaft for 180°. If, however, the pattern card does not have an opening during the initial position according to FIG. 1, then the heddle frame remains in the lower shed position for the next pick insertion.

Conversely, when the wide portion of the eccentric ring 28, and also the wedge 13 there mounted, is positioned above the shaft 15 (FIGS. 3 and 4), which corresponds to the upper shed position of the heddle frame 44, then this time an opening 3 in the pattern card 62 means that the wedge 13 is disengaged from the shaft 15 and is engaged in the recess 30' of the connecting rod 18. The heddle frame remains in the upper shed position. If the pattern card does not have an opening, then during the next rotation of the shaft for 180°, the heddle frame moves to the lower shed position.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. In a dobby having a rotatable drive shaft, an eccentric ring mounted on said drive shaft and rotatable with respect thereto, a connecting rod mounted on said eccentric ring and movable in response to a rotational

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movement of said eccentric ring and a wedge slideably mounted on said eccentric ring and adapted to couple said eccentric ring to said drive shaft in response to a pattern card, the improvement comprising:

pattern card reading means for reading said pattern card and selectively controlling the movement of said wedge and thereby the coupling of said eccentric ring to said drive shaft, said pattern card reading means including:

a control arm having means defining a reading needle on one end thereof adapted to engage said pattern card;

a ring mounted on the end of said control arm remote from said reading needle and encircling said drive shaft;

connecting means for connecting said ring to said wedge;

pivot means for pivotally supporting said control arm, said pivot means being located between said reading needle and said ring; and

lifting rod means for drivingly pivoting said control arm to effect a coupling or uncoupling of said drive shaft and said eccentric ring.

2. The improvement according to claim 1, wherein

said pivot means comprises an elongated slot in said control arm and a pivot member received in said slot, said pivot member being smaller in size than said slot.

3. The improvement according to claim 2, including resilient means secured to said control arm for biasing said control arm and said reading needle into engagement with said pattern card.

4. The improvement according to claim 3, wherein said resilient means comprises a first tension spring connected to said control arm along an extended axis of said elongated slot and a second tension spring parallel to said first tension spring connected to said control arm between said pivot means and said reading needle; and

wherein said lifting rod means engages said control arm between said second tension spring and said reading needle.

5. The improvement according to claim 4, wherein said first spring is weaker than said second spring.

6. The improvement according to claim 5, wherein said slot is located generally at the central portion of said control arm.

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