United States Patent [19]

Kleiner

[11] **3,730,232**

[45] **May 1, 1973**

[54] **DOBBY WITH A DEVICE FOR MOVING ALL HEALD FRAME INTO THE SAME POSITION**

[75] Inventor: **Walter Kleiner**, Wadenswil, Switzerland

[73] Assignee: **Staubli Ltd.**, Horgen-Zurich, Switzerland

[22] Filed: **May 26, 1971**

[21] Appl. No.: **146,867**

[30] **Foreign Application Priority Data**

May 29, 1970 Switzerland 8035/70

[52] **U.S. Cl.** **139/66,** 139/331

[51] **Int. Cl.** **D03c 1/00,** D03c 15/00

[58] **Field of Search** 139/66, 68, 71, 74, 139/329, 331

[56] **References Cited**

UNITED STATES PATENTS

1,256,644	2/1918	Barlow	139/66 R
3,554,238	1/1971	Hoenig	139/68
3,180,366	4/1965	Hoenig	139/66 R
3,207,186	9/1965	Hoenig	139/66 R
3,468,347	9/1969	Fumat	139/66 R

FOREIGN PATENTS OR APPLICATIONS

1,405,184	5/1965	France	139/66 R
1,089,821	11/1967	Great Britain	139/66 R

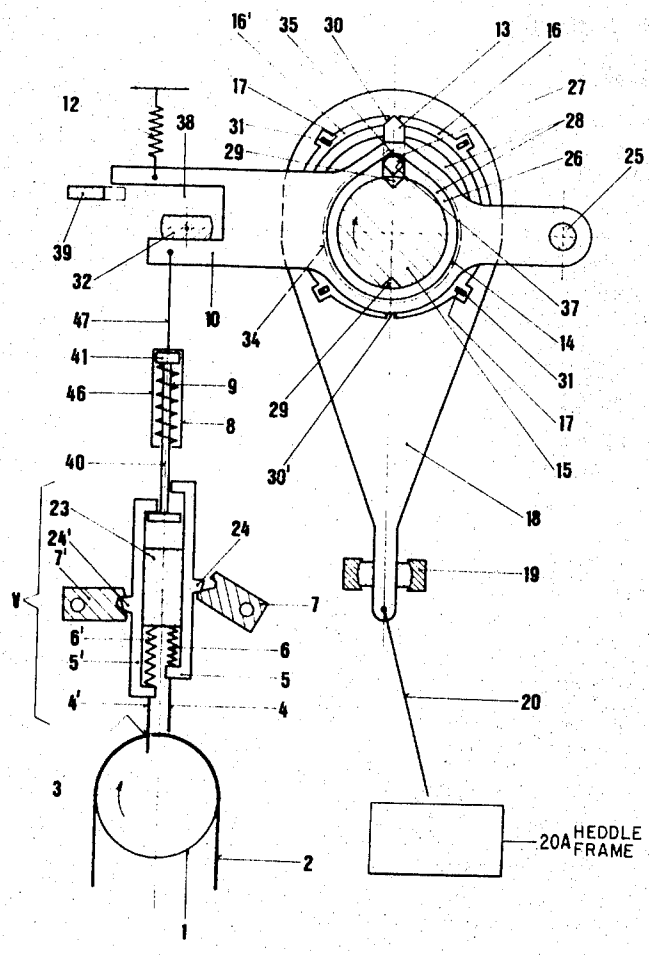
Primary Examiner—James Kee Chi

Attorney—Woodhams, Blanchard and Flynn

[57] **ABSTRACT**

Dobby with a device for moving all heddle frame of a Jacquard loom to the same height, for example the central position or the upper shed position, which machine has a wedge type coupling wherein the wedge is to be controlled according to a preselected pattern. An adjusting cam **32,39** is arranged in the control mechanism for the wedge **13**, which adjusting cam limits movement of the control arm **10**. In order that this does not result in an overloading of any part of the machine, a compensating spring **9** is also arranged in the control mechanism.

12 Claims, 4 Drawing Figures



Patented May 1, 1973 3,730,232

4 Sheets-Sheet 1

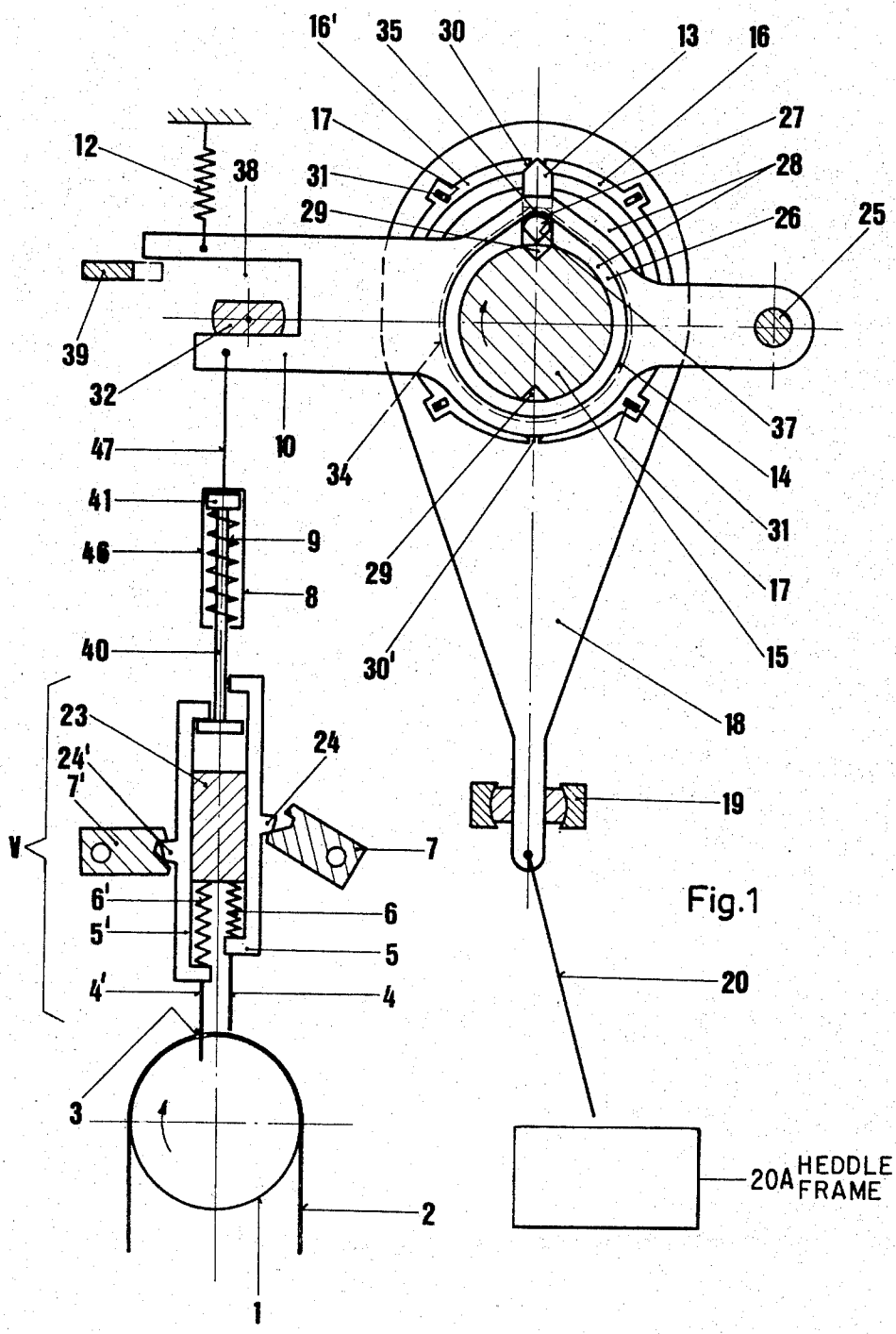


Fig.1

INVENTOR.
WALTER KLEINER
BY
Wadhams, Blanchard & Flynn
ATTORNEYS

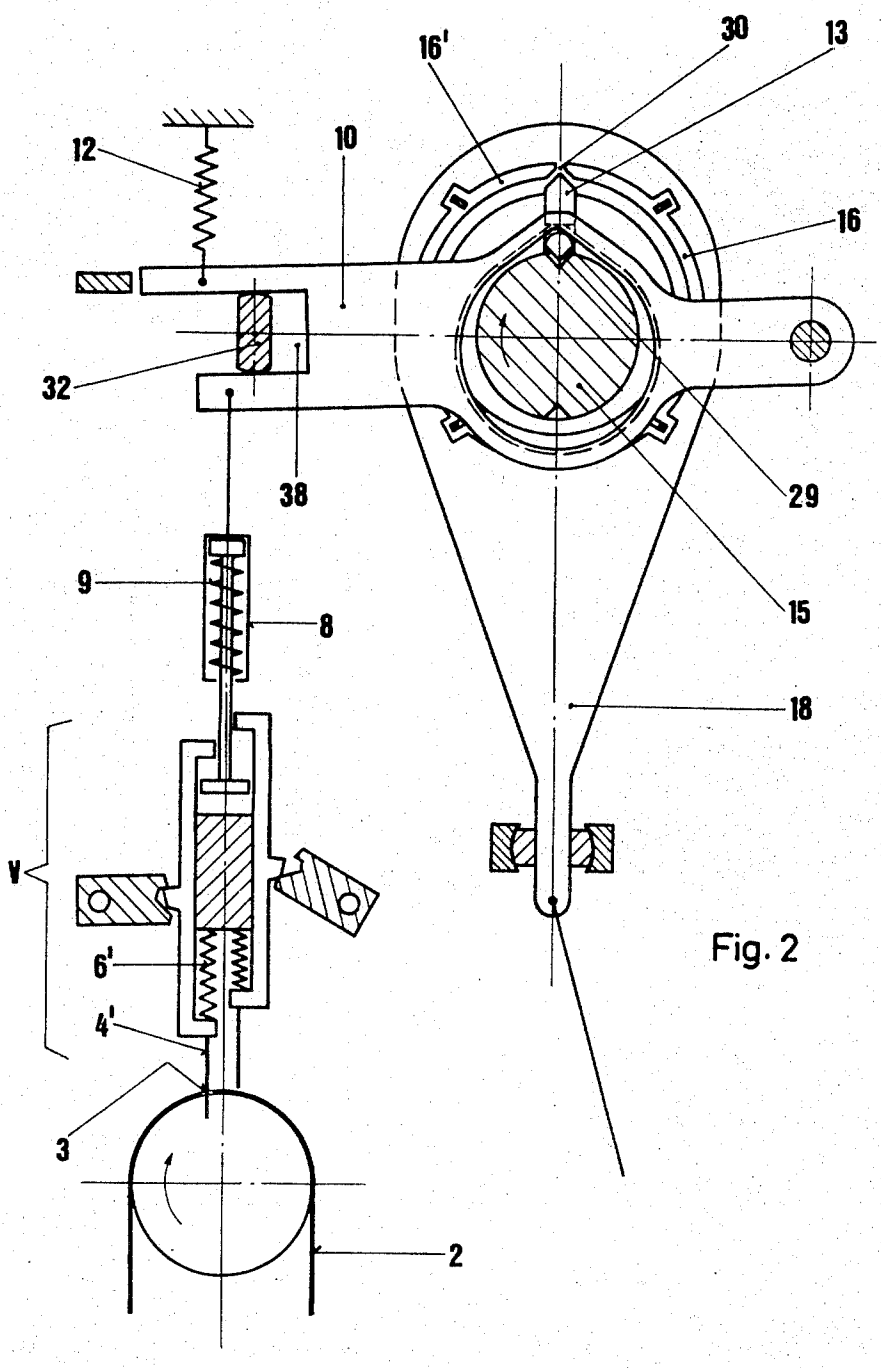


Fig. 2

INVENTOR.
WALTER KLEINER
BY
Woodhams, Blanchard & Flynn
ATTORNEYS

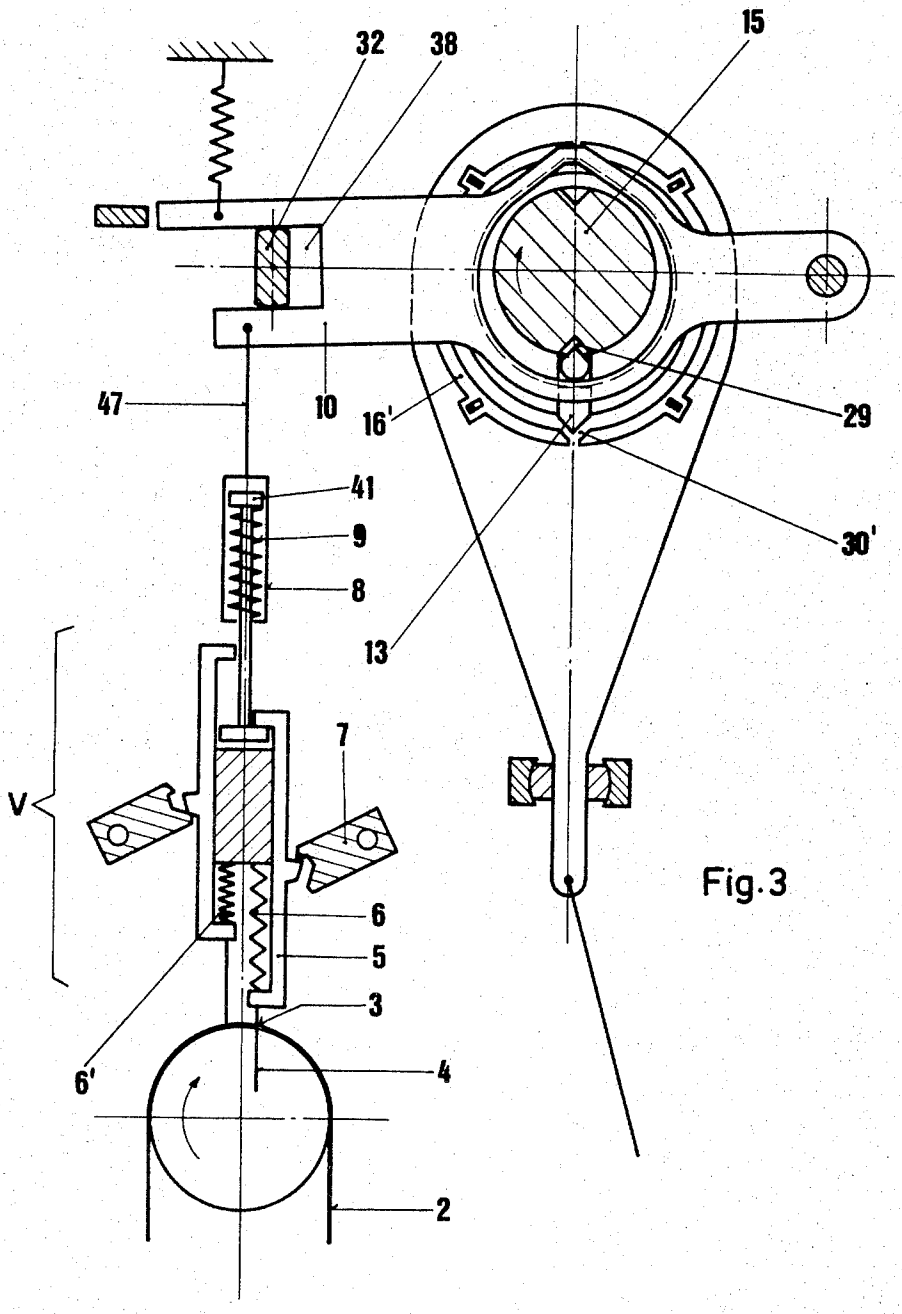


Fig.3

INVENTOR.
WALTER KLEINER
BY
Woodhams, Blanchard & Flynn
ATTORNEYS

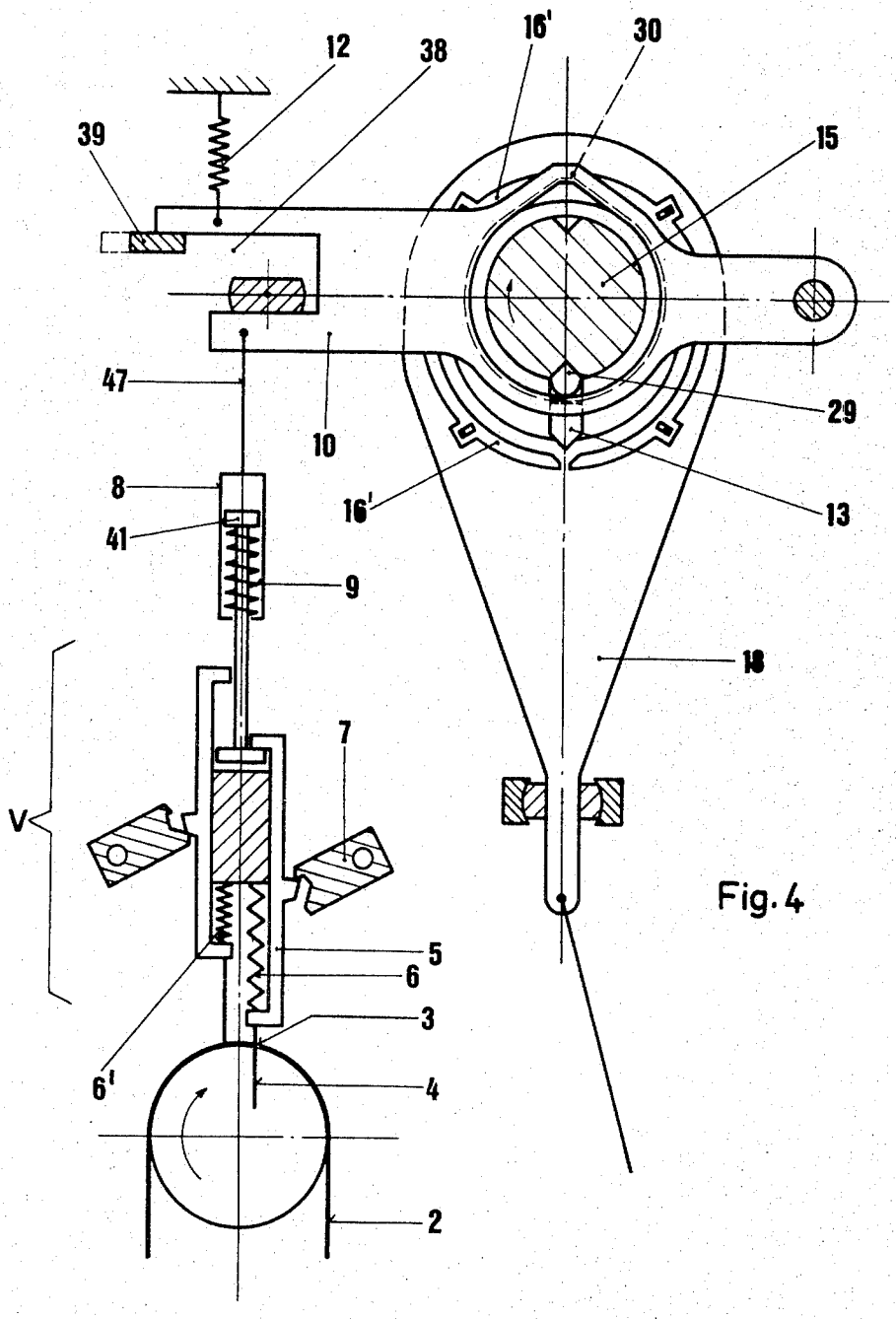


Fig. 4

INVENTOR.
WALTER KLEINER
BY
Woodhams, Blanchard & Flynn
ATTORNEYS

DOBBY WITH A DEVICE FOR MOVING ALL HEALD FRAME INTO THE SAME POSITION

CROSS REFERENCE

This application is related to my copending applications Ser. Nos. 146,875 and 146,878, filed concurrently herewith and reference is to be made to these applications.

The invention relates to a dobby with a device for moving all heddle frames of a Jacquard loom to the same height, in which machine the heddle frame drive on one hand is controlled by needles which read a pattern card and on the other hand the heddle frames are moved by an eccentric ring which is arranged on a continuously or discontinuously rotating shaft. On such ring there is positioned a connecting rod connected to the heddle frame, whereby a wedge of the eccentric ring engages according to a preselected pattern either the shaft or the nonrotating connecting rod, and the movement and position of the wedge is controlled by a control arm, according to such pattern.

During the installation, particularly the adjusting of the heddle frame of a weaving machine, it is desirable that all heddle frames be moved into the same position independently of control by a pattern card. This is advantageously a central position between the upper shed and the lower shed position or directly the upper shed position.

The device for synchronizing the heddle frames in a dobby of the described type is characterized according to the invention by a device which brings an arm immovably into a central position, and a device which blocks the arm in its extreme position for the lifted heddle frames.

In order that all heddle frames reach a central position, the arm which transmits the control movement to the wedge of the coupling can, for example, have an opening which is engaged by a rotatable cam, whereby the width of the opening corresponds on one side to the largest expansion of the cam and on the other side to the smallest expansion of the cam plus the range of travel of the arm. Further, the axis of rotation of the cam is so arranged that, in case the first condition is met, the control arm directs the heddle frames into the central position. After the corresponding operation of the cam, the driving shaft of the dobby is rotated for 90° so that all heddle frames occupy the central position simultaneously. If all heddle frames, independent from the control by the pattern card, are moved into the upper shed position, the dobby has a rail which can be moved into and out of the sweep of the arm and which, in moved-in position, holds the arm in the control position for the heald shafts in lifted position.

In the case of all these controls, there exists the danger that the reading mechanism of the dobby may introduce certain control signals which are inconsistent with the desired control. A draw or push member with an interpositioned spring which gives way at an overloading of the control elements is arranged for this purpose in the draw or push path which is provided between the arm transmitting the control movement and the reading mechanism for the pattern card.

One exemplary embodiment of the subject matter of the invention is illustrated in the drawings. The figures illustrate the device in different operating positions, namely:

FIG. 1 is a schematic view of the coupling and the control mechanism of a dobby in upper shed position for the controlled heald shaft and disengaged wedge;

FIG. 2 is the same view with a controlled dobby and half engaging wedge in the driving shaft for achieving the central position of the heald shaft from the controlled upper shed position;

FIG. 3 is the same view with a controlled dobby and half engaging wedge in the driving shaft for achieving the central position of the heald shaft from the controlled lower shed position; and

FIG. 4 is the same view with a controlled dobby for the synchronization of all heald shafts into the upper shed position.

The pattern card 2 which serves for controlling the heddle frames 20A is moved by the cylinder 1. The control opening 3 is read by the reading needles 4, 4' by urging the supports 5, 5' of the needles by means of springs 6, 6' away from the stationary block 23 and toward the pattern card. If no control opening 3 appears in the pattern card, the needle 4, 4' rides on the card 2 and the rocking lever 7, 7' swings past the nose 24, 24' of the support 5, 5'. However, if an opening 3 appears in the control card 2, the needle moves a small distance into the opening under the pressure of the spring 6, 6',which causes the nose 24, 24' to reach the field of traverse of the lever 7, 7' and the rocking lever 7, 7' then moves the support 5, 5' through the nose 24, 24'. The support 5, 5' acts through the tension element 8 and the compensating spring 9 to pull the control arm 10 downwardly against the force of the spring 12. The force of the compensating spring 9 must be greater than the force of the spring 12 holding back the control arm. The reading needles 4, 4' with the supports 5, 5' and the members engaging thereon are called the reading-in mechanism V.

The control arm 10 is pivotably supported on the axis 25 and has an opening 26 in which the driving shaft 15 of the dobby is positioned. The edge 14 of the opening projects axially in the manner of a collar and engages the groove 27 of and is received in a wedge 13 where it serves as a controlling cam. The wedge 13 is supported radially movably in the eccentric ring 28 and can engage either one of the recesses 29 of the driving shaft 15 or it may engage one of the zones 30, 30' between the ends of the resilient guide rails 16, 16'. The connecting rod 18 is also slidingly positioned on the eccentric ring 28 which in turn is supported on the driving shaft 15. Said connecting rod 18 converts during rotation of the coupled eccentric ring with the driving shaft the rotational movement of the shaft into a translatory movement for the heddle frame. The guide 19 holds the connecting rod 18 against a rotation. The tension member 20 extending to the heddle frame 20A engages the guided end of the connecting rod 18. Four pins 31 are arranged on the connecting rod 18 which pins are used through the slots 17 as guide and stops for the guide rails 16.

If all heald shafts — independent from the position controlled by the pattern card and the reading-in mechanism — are to take the central position between upper shed and lower shed — which is for example important for the adjustment of the elements engaging the heddle frame —, the cam 32 is then rotated for 90°. This brings the parts to the position according to FIG.

2. The entire reading-in mechanism V with the reference numerals 1 to 9 is turned off and can no longer actuate the heddle frame arm 10. As is illustrated in FIG. 2, the control arm 10 now moves the wedge 13 into a central position in which it engages both the zone 30 and the recess 29 where it is moved together with the shaft 15. If no suitable safety mechanism is provided on the coupling, this control can lead to overloading of any one of the parts. Since, however, the guide rails 16, 16' consist on the one hand of resilient material or on the other hand their mounting through the pins 31 and the slots 17 is flexible (as more fully set forth in Ser. No. 146,878, filed concurrently herewith), the corresponding guide rail 16 can yield upon the rotation of the driving shaft with the wedge. In order to bring all heald shafts 15 into the central position, the driving shaft with the thus controlled wedge 13 is rotated 90°.

The FIG. 3 illustrates the same control of the arm 10 with the cam 32 wherein the heddle frame is, however, can be brought from the lower shed position into the central position by rotating the driving shaft 15 for 90°. The wedge 13 will engage both the recess 29 and also the zone 30' and can thereafter follow the rotation of the shaft 15 for 90° without damage only if the guide rail 16' can yield.

The rotatable cam 32 is positioned in a notch 38 in the end of the arm 10. The largest longitudinal dimension of the cam corresponds to the width of the opening 38, and the latter corresponds at least to the sweep required for the control plus the thickness of the cam 32.

In order that through the rotation of the shaft 15 all heddle frames are controlled by the illustrated dobby, reach the upper shed position and remain there, the device has the blocking bar 39. Same is arranged in such a manner that it can be moved into the notch 38 of the control arm 10 when the control arm 10 is released by the reading-in mechanism V and pulled up by the spring 12 — illustrated position in FIG. 4 as illustrated by dashed lines in FIG. 1. In this manner the arm 10 is blocked. If, as this is illustrated in FIG. 4, the wedge coupling is in the control position for the lower shed position of the heddle frame then the wedge 13 is rotated along with the shaft 15 during its rotation whereby now, however, the wedge 13 is slowly pulled out of the recess 29. Again, the resiliently flexible guide rail 16' functions and yields until the wedge engages the zone 30, the shaft 15 in this case being rotated clockwise. Thus, one reaches the position of the actual wedge coupling according to FIG. 1. Any further rotation of the driving shaft 15 remains without any effect on the coupling and therewith also on the position of the heald shafts in the upper shed position.

Even though a movement of the control arm is blocked by the cam 32 or the bar 39 in all coupling positions according to FIGS. 1 to 4, the reading-in mechanism V continues to function in its normal manner. This is possible without any effect on or overloading of parts of the dobby since a safety means in form of a spring 9 is installed in the pull or push member 8 between the reading-in mechanism V and the control arm 10.

This safety means has according to FIG. 1 the following structure:

The draw member consists of two parts. At the head of the rod 40 there is provided the plate 41 on which the coil spring 9 surrounding the rod 40 is supported. The whole unit is enclosed by the housing of the draw parts 46, 47 whereby the spring 9 is supported on the housing base.

If now, as illustrated in FIGS. 3 and 4, a slight insertion of the needle 4 into the opening 3 of the pattern card 2 occurs under the effect of the spring 6, the needle 4 is moved due to the effect of the rocking lever 7 engaging the support 5 all the way into the pattern card 2. The plate 41 compresses the spring 9 since the arm 10 and therewith the draw part 47 is blocked. Thus, overloading and damage cannot occur.

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 having means defining an opening therein and adapted to rotatably receive said eccentric ring therein and wedge means radially movable toward and away from said drive shaft under control of a pattern card reading mechanism for selectively connecting said eccentric ring to said drive shaft, the improvement comprising:

a cam device adapted to move between first and second positions and further adapted to engage said wedge means in said first position to maintain said wedge means in a central position and, when in said second position, preventing said radially outward movement while permitting a radially inward movement; and

blocking means adapted to move between third and fourth positions, said blocking means engaging said wedge means when in said third position to prevent a radially inward movement and, when in said fourth position, permitting a radially inward movement.

2. The improvement according to claim 1, wherein said wedge means comprises a wedge radially slidably mounted on said eccentric ring, a movably supported control arm having an opening therethrough larger in diameter than said drive shaft and receiving said drive shaft, the axis of said opening being perpendicular to the direction of movement of said control arm and connecting means for connecting said control arm to said wedge whereby a movement of said control arm effects a radially slidable movement of said wedge; and

wherein said cam device and said blocking means are adapted to engage said control arm.

3. The improvement according to claim 2, wherein said control arm includes pivot means for pivotally supporting said control arm.

4. The improvement according to claim 3, wherein said control arm has means defining an outwardly opening notch in the end thereof remote from said pivot means; and

wherein said cam device is adapted to be received in said notch.

5. The improvement according to claim 4, wherein said blocking means is adapted to be received in said notch when in said third position.

6. The improvement according to claim 4, wherein said movement of said cam device is rotatable;

wherein said cam device is larger in one dimension than in the other, said larger dimension being of a sufficient size to occupy the width of said notch when rotated to said first position to maintain said control arm in said control position, the smaller dimension occupying only a portion of said notch but preventing said radially outward movement while permitting said radially inward movement of said control arm.

7. The improvement according to claim 3, including a pattern card reading mechanism connected to said control arm and adapted to control the pivotal movement of said control arm when said cam device is in said second position and said blocking means is in said fourth position.

8. The improvement according to claim 7, including first resilient means for effectively biasing said control arm into the radially outermost position.

9. The improvement according to claim 8, wherein said pattern card reading mechanism includes second resilient means responsive to an overloading of said control arm to prevent damage to said control arm when said cam device is in said first position and, alternatively, said blocking means is in said third position.

10. The improvement according to claim 9, wherein said second resilient means comprises a housing member secured to said control arm, plate means movably mounted in said housing and connected at periodic intervals with the reading means of said pattern card reading mechanism and a spring connected between said movable plate means and said housing member.

11. The improvement according to claim 10, wherein said spring is stronger than said first resilient means.

12. In a dobby having a rotatable drive shaft, an eccentric ring mounted on said drive shaft and rotatable with respect thereto, a connecting rod having means defining an opening therein and adapted to rotatably receive said eccentric ring therein and wedge means radially movable toward and away from said drive shaft under control of a pattern card reading mechanism for selectively connecting said eccentric ring to said drive shaft, the improvement comprising;

a cam device adapted to move between first and second positions and further adapted to engage said wedge means in said first position to maintain said wedge means in a central position and, when in said second position, preventing said radially outward movement while permitting a radially inward movement.

* * * * *