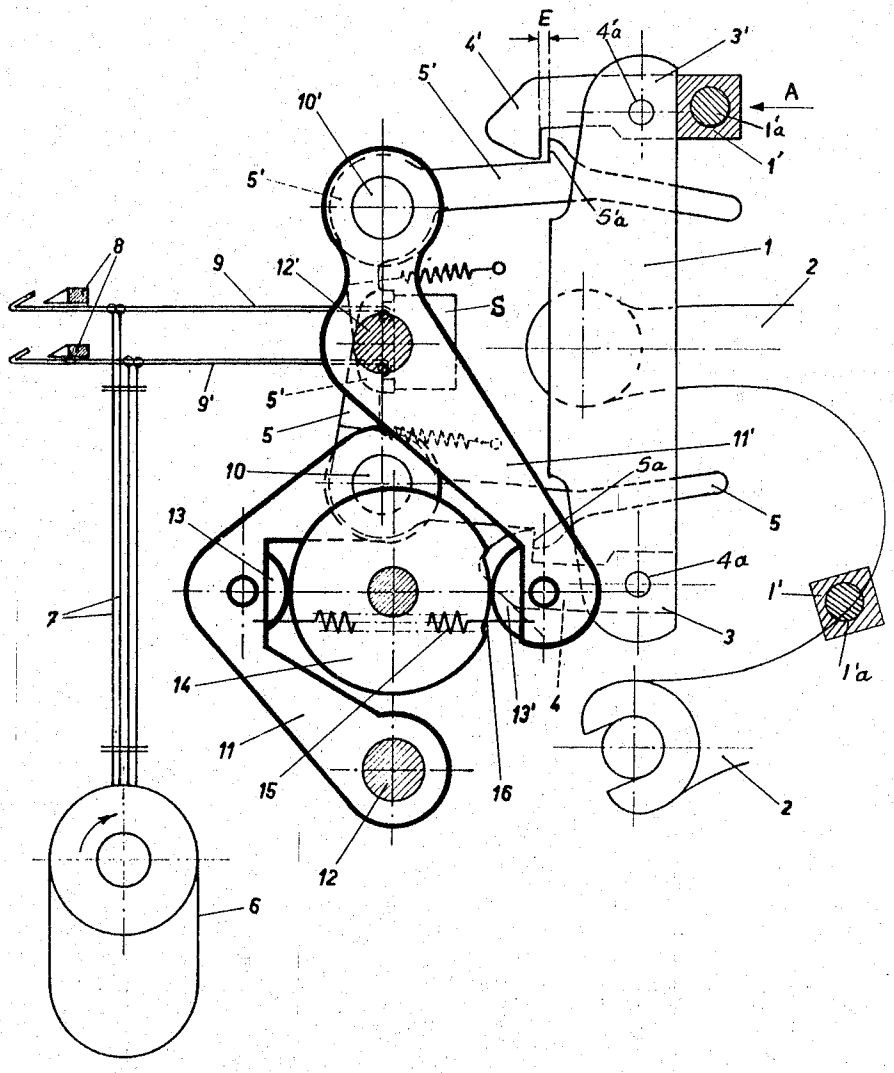
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DOUBLE-LIFT DOBBIES

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DOUBLE-LIFT DOBBIES

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This invention relates generally to loom dobbies and more particularly to a double-lift dobby.

Double-lift dobbies in which a baulk for actuating a respective jack lever which in turn actuates a respective heald for carrying out shedding operations are known. In these known dobbies the baulk or swing lever that actuates the individual jack lever is actuated or oscillated to a first and second operative position corresponding to positions for effecting control of a top shed position and a bottom shed position. The baulk for the individual jack levers may, for example have two opposite end portions operable to two operative positions by rail means or operating bars of some type. When a heald in a loom is to be retained in given operative position, for example a top shed position, the proper baulk is arrested in its proper operative position by commanding paired arrester hooks under control of a pattern reading means comprising instructions corresponding to instructions to control a top shed position and a bottom shed position.

In order to carry out the arresting function the baulks usually comprise catches or attachment members arranged at opposite ends of the baulk and, as the baulk is driven oscillatably by reciprocating transverse rail means, the attachment or catch members are driven back and forth with the opposite ends of the respective baulks. When a baulk is to be arrested the arresting hooks are commanded to a position in the path of the attachment members on the baulks so that as a rail means on a given end portion of a baulk advances a respective attachment member into an operative position and then is retracted the arresting hook for that end portion is commanded by pattern reading means to a position in the path of the attachment member. A certain clearance is established between an engaging surface on the engagement member on the baulk and a second engaging surface on the respective arresting hook. This clearance, referred to herein as "resting in" or "reading in" clearance, is established by the travel of the rail means driving or advancing a respective end portion of a baulk to its most forward position so that upon return of the given rail means and the arresting of the baulk a certain amount of jolting takes place by virtue of the clearance that must be established between the two engaging surfaces of the members carrying out the arresting function.

As a consequence of the jolting movement, the heald attached to the baulk is also jolted into its operative shed position which increases the stresses applied to the warp threads thus causing wear thereon and sometimes even parting these warp threads.

A principal object of the present invention is to eliminate this undersired jolting.

A feature of the dobby according to the invention is the provision of means, in addition to the known arresting hook actuation means, for removing or cancelling the "resting-in" or "reading-in" clearance between the individual arresting hooks and attachment member contact surfaces. According to the present invention, mechanism is provided for varying or variably positioning the pivotal axes of the individual arresting hooks thereby to shift the arresting hooks longitudinally, while in the path in which the arresting will take place, to eliminate all

clearance between the arresting hook contact surface and the contact surface of the attachment surface on the baulk to be arrested.

Other features and advantages of the double-lift dobby in accordance with the present invention will be better understood as described in the following specification and appended claims, in conjunction with the drawing in which a diagrammatic elevation view of a portion of the dobby embodying the invention is illustrated.

Although the present invention will be illustrated and described as applied to a single baulk of a dobby, it will be understood that a plurality of baulks and arrester hooks and jack levers are used in dobbies, to which the invention is applied, for controlling a plurality of healds for carrying out shed operations in known manner.

According to the drawing, a baulk **1** is illustrated to which is connected a jack lever **2** illustrated fragmentarily for operating a respective heald, not shown, to its operative position. The baulk **1** is provided with opposite end portions **3**, **3'** to which are pivotally connected attachment or catch members **4**, **4'** through pivots **4***a* and **4'***a*. The baulk **1** is oscillated by transverse rail means **1'**, only one of which is shown engaging the baulk **1** and the other is in a retracted position. The rail means apply pressure to the opposite end portions alternately to oscillate the baulk **1**.

In the dobby illustrated, to which the invention is applied, the baulk **1** has a flat surface on the right hand thereof, as illustrated in the drawing, and each of the rail means **1'** has a cube cross section. Each cube is able to pivot on a respective axis **1'***a* to compensate for change of position as the transverse rail means are actuated back and forth for oscillating the baulk **1**. In the drawing the transverse rail means which advanced the end portion **3** has been retracted. These rails operate in timed relationship with their directions of movement or positions always being relatively opposite.

In order to arrest the baulk **1**, for example to carry out a top shed control position of a heald, paired arrester hooks **5**, **5'** are provided. The arrester hooks each have a pair of arms, one of which comprises a hook surface **5***a*, **5'***a* for engaging the respective attachment member surface of the attachment members **4**, **4'** and the other arm engages a stationary or fixed abutment or stop S.

In order to control the positioning of the hooks for arresting the opposite end portions of the baulk **1**, pattern control means are provided comprising a pattern tape **6** having control perforations therein and driven by a drum as illustrated. The perforations are sensed by reading needles **9**, lift off the lever arms of the individual arrester and which, in conjunction with elements **8** and control needles **9**, litf off the lever arms of the individual arrester hooks from the abutment S against the action of a respective biasing spring to dispose the arresting hooks in the path of the attachment means **4**, **4'** for carrying out an arresting function.

In the drawing, the arresting hook **5** is illustrated as having arrested the attachment member **4** thereby arresting the end portion **3** of the baulk **1**. The arresting hook **5'** is illustrated as having been positioned in the path of the attachment member **4'** after the baulk **1** has been advanced to its most forward position by the transverse rail means **1'** which applied its force in the direction of an arrow A, and a "resting in" or "reading in" clearance E has been established between the two engaging surfaces due to the advancement of the baulk. In the known dobbies, when a transverse rail means is retracted, the engagement of the arresting members takes place with a jolt as the clearance E is eliminated. In the present invention, provision is made for elimination of the clearance E by a mechanism variably positioning the pivotal axis of the arrester hooks individually to move the hooks

longitudinally, after they have assumed their "resting in" position. In the usual case, the pivotal axes of the arrester hooks are stationary. Provision is made according to the invention for movable, pivotal axes for the arresting hooks.

According to the invention, arresting hook 5 is mounted on an axis 10 and the other hook 5' is pivotally mounted about an axis 10'. The pivot axis 10 is mounted on a rockable lever 11 pivotally mounted on a pivot 12 and provided with a radial cam roller or follower 13 for engaging a control profile cam 14 rotatably driven as hereinafter described. The pivotal axis 10' of the arresting hook 5 is mounted on a rockable lever 11' pivoted about axis 12' and carrying on a free end thereof a radial cam roller or follower 13'. The two rockable levers are biased toward each other by a spring 15 tending to maintain the cam followers in engagement with the control cam 14. The two radial cams are disposed diametrically opposite to each other.

As illustrated in the drawing, the cam 14 comprises a contoured profile surface having a peripheral recess 16 intended to allow the two cam followers 13, 13' to engage successively and sequently a minor diameter surface thereof and has a major diameter surface comprising most of the periphery of its profile surface. The position illustrated of the cam 14 shows the cam follower 13' engaging the portion or recess 16 of the profile or control cam 14 having a minor diameter so that the clearance E could be established. It can be seen that if the cam 14 is rotatably driven the major diameter surface of the control cam 14 will be engaged by the cam follower 13' and the rockable lever 11' will be rocked in a counterclockwise direction so that the arrester hook 5' will be moved longitudinally toward the left cancelling the clearance E and the engagement surface thereof is engaged with the engagement surface of the engagement member 4' in a smooth and jolt-free manner. The rockable lever 11 is illustrated as having been rocked in a counterclockwise direction since the cam follower 13 is illustrated as engaging the major diameter profile of the control cam so that the cancelling of the clearance during arresting of the end portion 3 has already taken place in a smooth manner.

The control cam 14 is rotatably driven in timed relationship with the oscillatory movement of the baulk 1 and more particularly timed with the transverse rail means so that the profile surface thereof is presented in the correct and timed sequence with the oscillatory movement thereof. Since the cam followers 13, 13' are diametrically opposed on the cam 14 the two rockable levers 11, 11' are alternately rocked and the opposite end portions 3, 3' of the baulk are alternately oscillated but selectively arrested so that the baulk is arrested according to the pattern of pattern tape 6 in a desired, operative position thereby the jack-lever 2 is arrested in its desired, operative position and the respective heald is held in the desired operative position, for example, a top shed position.

While the invention has been illustrated as described to the type baulk illustrated in the drawing, those skilled in the art will understand that the baulk can be of a different configuration and the attachment members thereon need not be in fixed position thereon but may be pivotally mounted on the baulk and pivotally controlled by the rail means. Moreover, those skilled in the art will understand that a plurality of rockable levers cooperative with respective control cams and cam surfaces thereon are used in the dobby according to the invention for cooperating and controlling the arresting of the respective baulks which control the respective healds in a loom, not shown. Only one baulk and its control and arresting thereof has been shown and illustrated to simplify the drawing.

While a preferred embodiment of the invention has been shown and described, it will be understood that

many modifications and changes may be made within the true spirit and scope of the invention.

What I claim and desire to secure by Letters Patent is:

1. For use in a loom having pattern means comprising instructions corresponding to instructions to control a top shed position and a bottom shed position, a double-lift dobby comprising a jack lever operable to a first and second operative position corresponding to positions for effecting control of a top shed position and a bottom shed position, a baulk for said jack lever for actuating said jack lever to said two operative positions and having two opposite end portions each operable to two operative positions, paired arresting hooks pivotally mounted for selectively arresting and holding a respective end portion of said baulk in one of said positions and for freeing said end portions to allow said baulk to move to said second operative position, catch means on said baulk engageable by said arresting hooks for arresting said baulk, and actuation means pivotally actuating said arresting hooks to positions for engaging said catch means of a respective baulk and for causing said arresting hooks to free said catch means as determined by said pattern means, the improvement which comprises means cooperative with said actuation means to impart to said arresting hooks an additional movement from positions in which said actuation means positions said arresting hooks to remove clearance between said catch means and said arresting hooks thereby to carry out a substantially jolt-free engagement between said hooks and said catch means.

2. For use in a loom having pattern means comprising instructions corresponding to instructions to control a top shed position and a bottom shed position, a double-lift dobby comprising a jack lever operable to a first and a second operative position corresponding to positions for effecting control of a top shed position and a bottom shed position, a baulk for said jack lever for actuating said jack lever to said two operative positions and having two opposite end portions each operable to two operative positions, paired arresting hooks pivotally mounted for arresting and holding a respective end portion of said baulk in one of said positions and for freeing said end portions to allow said baulk to move to said second operative position, engagement means on said baulk engageable by said arresting hooks for arresting said baulk, and actuation means pivotally actuating said arresting hooks between positions for selectively engaging said engaging means of a respective baulk and for disengaging said engaging means to free said end portions as determined by said pattern means, the improvement which comprises, means comprising a cam in addition to and cooperative with said actuation means to accurately position said arresting hooks individually subsequently to actuation and positioning thereof by said actuation means to allow smooth engagement between said hooks and said engagement means to avoid any jolting of said baulk when arrested by said arresting hooks.

3. For use in a loom having pattern means comprising instructions corresponding to instructions to control a top shed position and a bottom shed position, a double-lift dobby comprising a jack lever operable to a first and a second operative position corresponding to positions for effecting control of a top shed position and a bottom shed position, a baulk for said jack lever for actuating said jack lever to said two operative positions and having two opposite end portions each operable to two operative positions, paired arresting hooks pivotally mounted for arresting and holding a respective end portion of said baulk in one of said positions and for freeing said end portions to allow said baulk to move to said second operative position, engagement means on said baulk engageable by said arresting hooks for arresting said baulk, and actuation means pivotally actuating said arresting hooks to positions for engaging said engaging means of a respective baulk and for causing said arresting hooks to free said engagement means as determined by said pat-

tern means, the improvement which comprises pivotal means defining pivotal axes pivotally mounting said arresting hooks, means variably positioning said pivotal means to variably position said axes in timed sequence with the operation of said baulk to vary the position of said arresting hooks in addition to the motion of said actuation means individually to effect a jolt-free engagement between said engagement means on said baulk and a respective arresting hook.

4. For use in a loom having a pattern means comprising instructions corresponding to instructions to control a top shed position and a bottom shed position, a double-lift dobby comprising a jack lever operable to a first and a second operative position corresponding to positions for effecting control of a top shed position and a bottom shed position, a baulk for said jack lever for actuating said jack lever to said two operative positions and having two opposite end portions each operable to two operative positions, paired arresting hooks pivotally mounted for arresting and holding a respective end portion of said baulk in one of said positions, and for freeing an end portion to allow it to move to said second operative position, tive position, engagement means on said baulk engageable by said arresting hooks for arresting said baulk, and actuation means actuating said arresting hooks to positions for engaging said engagement means of a respective baulk and for causing said arresting hooks to free said engagement means as determined by said pattern means, the improvement which comprises pivoted lever means having means defining pivotal axes, means variably rocking and positioning said lever means to variably position said axes in timed sequence with operation of said baulk to vary the position of said arresting hooks in addition to said actuation means individually to effect a jolt-free engagement between said engagement means on said baulk and a respective arresting hook.

5. For use in a loom having pattern means comprising instructions corresponding to instructions to control a top shed position and a bottom shed position, a double-lift dobby comprising a jack lever operable to a first and a second operative position corresponding to positions

for effecting control of a top shed position and a bottom shed position, a baulk for said jack lever for actuating said jack lever to said two operative positions and having two opposite end portions each operable to two operative positions, paired arresting hooks pivotally mounted for arresting and holding a respective end portion of said baulk in one of said positions, and for freeing an end portion to allow it to move to said second operative position, engagement means on said baulk engageable by said arresting hooks for arresting said baulk, and actuation means actuating said arresting hooks to positions for engaging said engagement means of a respective baulk and for causing said arresting hooks to free said engagement means as determined by said pattern means, the improvement which comprises rockable lever means defining pivotal axes pivotally mounting said arresting hooks, cam means variably positioning said rockable lever means to variably position said axes in timed sequence with operation of said actuation means to vary the position of said arresting hooks to effect a jolt-free engagement between said engagement means and a respective arresting hook.

6. The improvement according to claim 5, in which said cam means comprises a rotatably driven control cam, radial cam followers on said rockable levers, said control cam comprising a contoured surface engaged by said cam followers.

7. The improvement according to claim 6, in which said control cam comprises a profile cam and said cam followers are disposed diametrically opposite each other relative to said profile cam.

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