

July 7, 1953

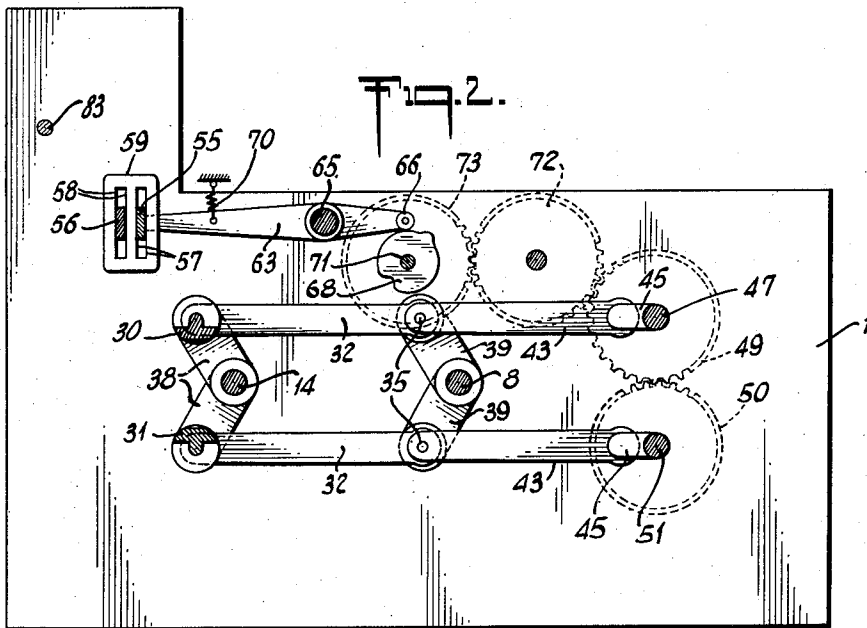
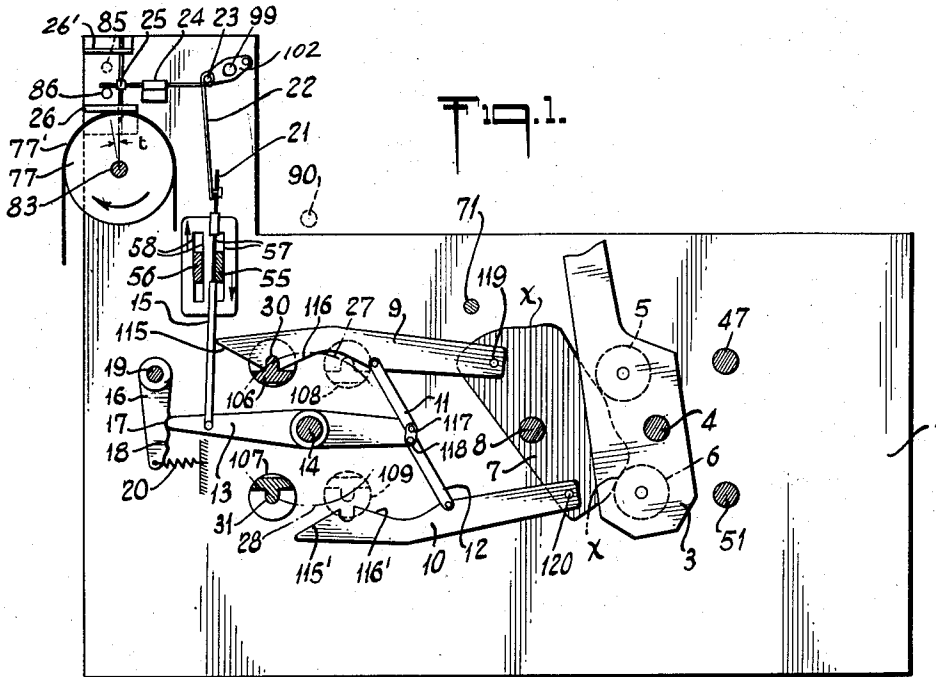
E. PFARRWALLER

2,644,488

SHEDDING MECHANISM FOR LOOMS

Filed Sept. 16, 1948

5 Sheets-Sheet 1



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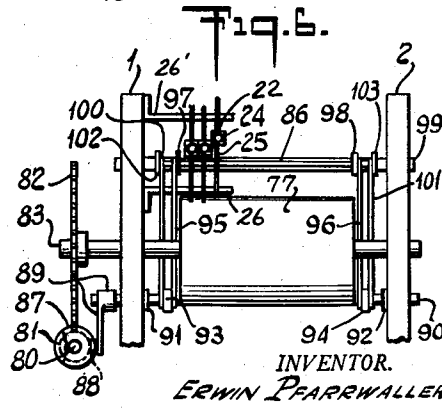
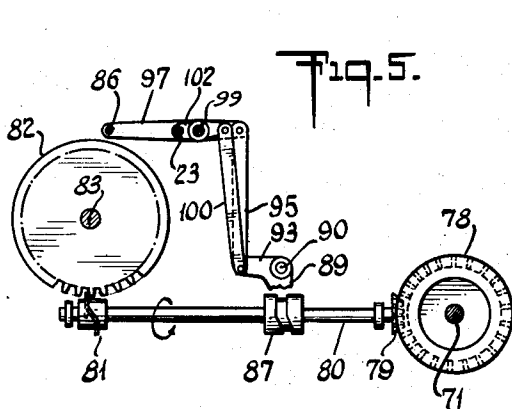
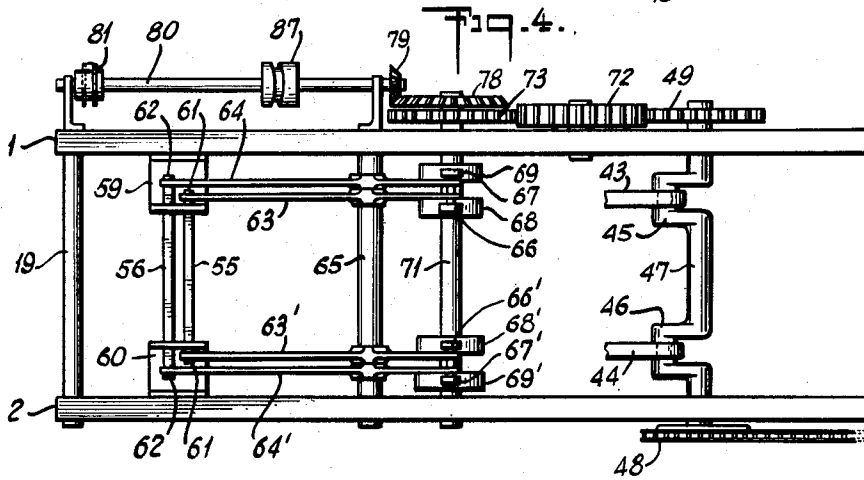
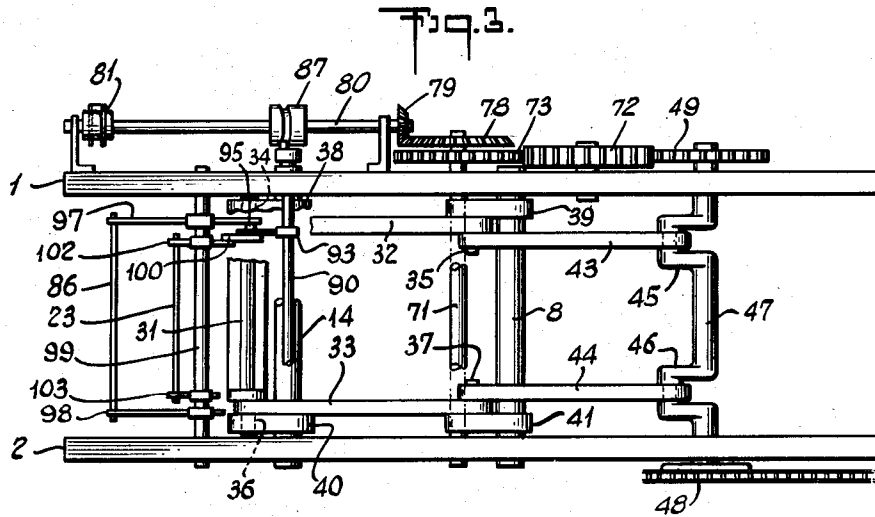
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5 Sheets-Sheet 2



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SHEDDING MECHANISM FOR LOOMS

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Fig. 7.

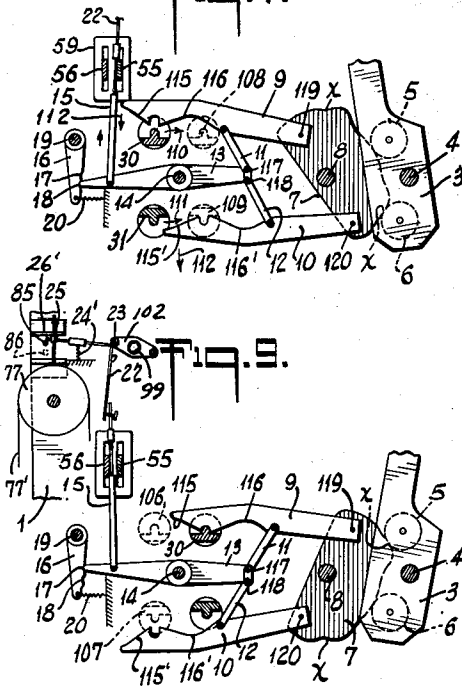


Fig. 8.

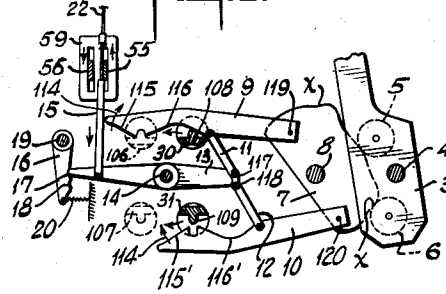
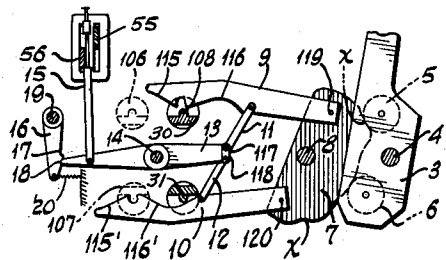


Fig. 10.



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Fig. 14.

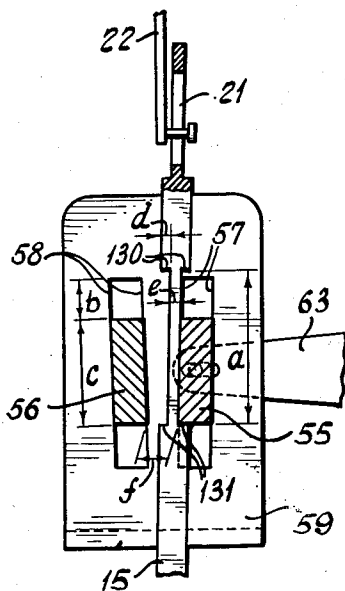
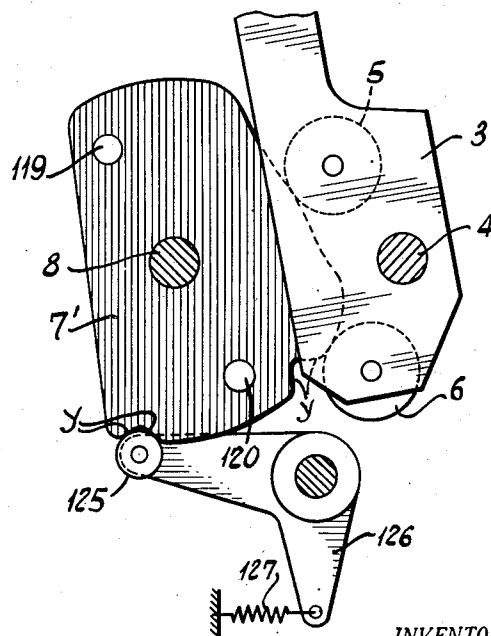


Fig. 15.



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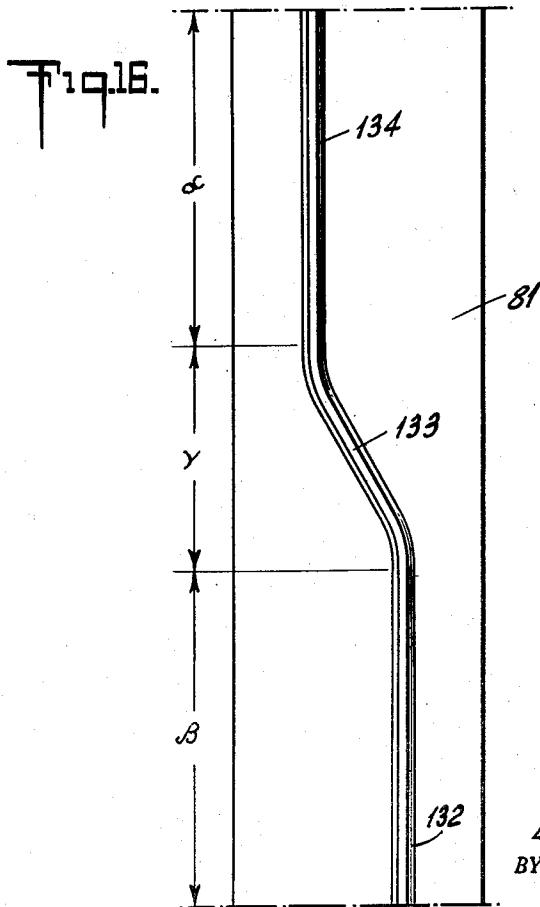
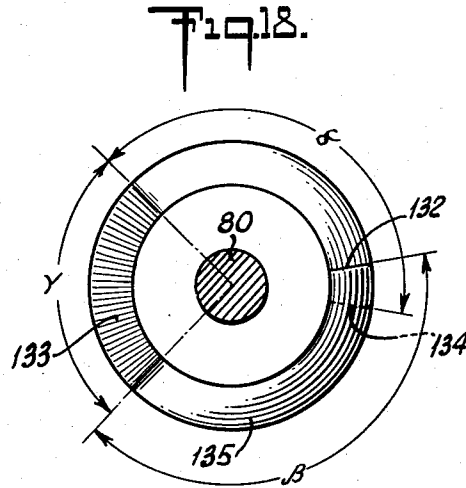
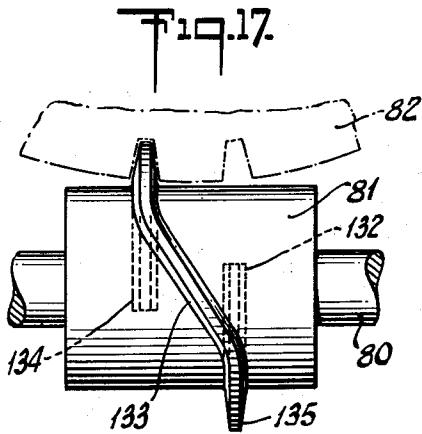
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2,644,488

SHEDDING MECHANISM FOR LOOMS

Filed Sept. 16, 1948

5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE

2,644,488

SHEDDING MECHANISM FOR LOOMS

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Application September 16, 1948, Serial No. 49,469
In Switzerland September 20, 1947

22 Claims. (Cl. 139-68)

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The present invention relates to a shedding mechanism or dobby which positively operates the heddles or harnesses in looms for weaving, i. e. raises them as well as depresses them.

An object of the invention is the provision of a shedding mechanism in which the heald frames are actuated by an operating lever which is positively oscillated in two opposite directions, one for raising and one for depressing the heald frames, by an oscillating cam. The latter is oscillated by a reciprocating movement of two actuating members pivoted thereto. The reciprocating movement is imparted to said members by actuating bars which are continuously reciprocated and temporarily individually connected to said members when actuation thereof is desired.

An object of the invention is the provision of a mechanism for bringing about engagement and disengagement of the actuating bars with the actuating members at predetermined operating conditions of the loom and in dependence on a pattern card. The mechanism comprises a two-arm switching lever and link members individually pivoted to one arm of said lever and to always one of the actuating members. The switching lever has two predetermined operating positions and is switched from one position to the other and vice versa by a control rod which is reciprocatingly moved by continuously reciprocatingly moving draw bars which engage and actuate said rod at desired periods of loom operation. The rod is swung to and out of engagement with always one of said draw bars by a lever means the position of which is controlled by a pattern card feeler depending from the lever means.

A further object of the invention is the provision of means for displacing the fulcrum of the lever means for positioning the control rod simultaneously with the actuation of lifter means for lifting the card feeler depending from said lever means, from the pattern card.

An object of the invention is the provision of interdependent and suitably timed drive means for positively reciprocating the actuating bars for the cam actuating members, for positively reciprocating the draw bars for the control rod actuating the switching lever, for positively reciprocating the card feeler lifter, and the shaft supporting the lever means for positioning the control rod, and for advancing a drum supporting the pattern card.

Further and other objects of the present invention will be hereinafter set forth in the accompanying specification and claims and shown in the drawings, which by way of illustration show

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what I now consider to be preferred embodiments of the invention.

In the drawings:

Fig. 1 shows, diagrammatically and in side elevation, a section through a dobby according to the invention, with a side wall removed;

Fig. 2 is a diagrammatic sectional side view of a portion of the dobby according to the invention;

Figs. 3 and 4 are diagrammatic top views of the dobby according to the invention with the driving members for the individual harness levers and other parts of the mechanism omitted;

Fig. 5 is a diagrammatic side view of a mechanism according to the invention for actuating the pattern card drum and the lifters for the card feelers;

Fig. 6 is a front view of the mechanism shown in Fig. 5;

Figs. 7 to 13 are diagrammatic sectional side views of the mechanism for operating the harness levers, in different operating positions;

Fig. 14 is a large scale illustration of a detail of the mechanism according to the invention;

Fig. 15 illustrates, diagrammatically, an alternative arrangement for arresting the cam disc of the mechanism according to the invention;

Fig. 16 illustrates a detail of the mechanism according to the invention on larger scale;

Figs. 17 and 18 illustrate the worm gearing 81 and 82 on a larger scale.

Like parts are designated by like numerals in all figures of the drawings.

Referring more particularly to Figs. 1 to 4 of the drawings, numerals 1 and 2 designate the side walls of the container of the dobby which walls support the dobby mechanism. Harness operating lever 3 is supported by shaft 4 which forms the fulcrum for the lever, the latter being provided with two rollers or cam followers 5 and 6 running on cam 7. This portion of the mechanism as well as the means connecting lever 3 and the harness frames is as shown in the patent of Albert Moessinger, No. 2,592,820 of April 15, 1952.

Character of movement of the harness frames depends on the configuration of cam 7. The movement is positive, up as well as down, because of the provision of two cam followers 5 and 6, each being in engagement with its own portion of cam 7. Two recesses are provided on the cam for temporarily arresting the harness in its extreme positions. The recesses x are so positioned that when one roller, 6 in Fig. 1, is in a recess, the other roller, 5 in Fig. 1, is on a pro-

tubercance of cam 7 whereby any play of lever 3 is prevented.

Instead of providing recesses in cam 7 cooperating with followers 5 and 6, recesses *y* as shown in Fig. 15 may be arranged which cooperate with a follower roller 125 on an angle lever 126 whereby a spring 127 assures engagement of roller 125 with cam 7'. Lever 126 is swingably supported on the dobby frame.

Cam 7 is supported by shaft 8 forming a stationary fulcrum. Cam 7 has two actuating or hook members 9 and 10 swingably connected therewith. Link members 11 and 12 individually movably connect members 9 and 10 with the end of one arm of switching lever 13 which is swingable on shaft or swing axis 14, which forms a stationary fulcrum, a motion control rod 15 being pivoted to the other arm of lever 13. Members 11 and 12 and the switching lever 13 constitute what I call the switching mechanism. Lever 13 is held in its rest positions by a latch 16 mounted on shaft 19 and having two notches 17 and 18 adapted to engage one end of the lever against which the latch is pulled by a spring 20 connecting a stationary part of the dobby mechanism frame and the latch 16.

One arm of a positioning lever 22 which lever has the shape of a bell crank lever and swings about a shaft 23 is hooked in a slot 21 in the upper end of control rod 15. The upper, horizontal, arm of lever 22 carries a weight 24 as shown in Fig. 1, or is pulled counterclockwise by a spring 24' as shown in Fig. 9. A pattern card feeler 25 hangs on the horizontal arm of lever 22, which can be seen better in Fig. 6. The feelers 25 extend through and are guided by apertures in plates 26 and 26'. Control rod 15, lever 22, and the feeler 25 constitute what I term the control mechanism.

Each harness has its own switching and control mechanism, as described above, which mechanisms are placed between the side walls 1 and 2 of the casing containing the dobby.

Actuating bars 30 and 31 are disposed symmetrically with respect to an imaginary plane extending through the axes of shafts 8 and 14 forming the swing axes for the actuating means 9 and the second actuating means 13, respectively, and it is sufficient to explain the function of the upper bar 30 only. Its ends are rigidly connected with one end of horizontal rods 32 and 33 which extend at a right angle to bar 30. The rods 32 and 33 are provided at their other ends with pins 34, 35 and 36, 37, respectively, to which links 38, 39 and 40, 41 are pivoted, respectively. Links 38 and 40 swing about shaft 14 and links 39 and 41 about shaft 8. This limits movement of bar 30 parallel to its longitudinal axis on an imaginary cylinder surface or an arcuate path 27. Likewise, bar 31 moves on the surface 28 of an imaginary cylinder.

The pins 35 and 37 of rods 32 and 33, respectively, are connected by connecting rods 43 and 44 to cranks 45 and 46 of a shaft 47 and are reciprocatingly moved to and from their end positions 106, 108 and 107, 109 on the arcs 27 and 28. Shaft 47 is connected to and operated by the loom drive by means of a chain 48 and a sprocket wheel. Spur gear wheels 49 and 50 drive crank shaft 51 which operates the actuating bar 31, Fig. 2. The bars 30 and 31 perform what I call translatory movements whereby all points of the bars travel along parallel paths of equal length which are not necessarily straight. The axis of members 8, 14, 106, and 119, and 8,

14, 107, and 120 are at the corners of parallelograms in the device according to the invention. See Fig. 1.

The draw bars 55 and 56 are guided in slots 57 and 58 of the guide members 59 and 60 which are fixed to the walls 1 and 2. The ends of the draw bars 55 and 56 are provided with pins 61 and 62, respectively, which extend individually into slots of one end of two arm levers 63 and 64 and 63' and 64', Figs. 2 and 4. The two arm levers are supported by a shaft 65 and have at their ends cam followers 66 and 67, and 66' and 67', respectively, which engage the cams 68 and 69, and 68' and 69'. Tension springs 70, Fig. 2, assure engagement of the cam followers and cams.

The cams 68, 69, 68', 69' are so formed that the draw bars 55 and 56 are always moved in opposite directions in their guides 57 and 58. During one revolution of cam shaft 71 bars 55 and 56 move once up and once down. Shaft 71 is driven by crank shaft 47 through spur gear wheels 49, 72 and 73.

Control rod 15 extends between the draw bars 55 and 56 and has recesses at its sides which are adapted to receive the draw bars. The length of the recesses *a* between their end abutments 130 and 131, Fig. 14, is greater than the height of a draw bar 55 or 56 plus *b* of the stroke of said bars. This permits idling of the bars in slots 57, 58 for the purposes which will be explained later. The depth *d* of a recess plus the width *e* of rod 15 between the recesses is smaller than the distance *f* between the bars 55 and 56 to assure that always one only of the draw bars engages the control rod 15 for lifting or depressing it. The sum of the depth *d* of the recesses plus the width *e* of rod 15 between the recesses is greater than the distance *f* between the draw bars 55 and 56 to always assure engagement of a recess by a draw bar. For proper operation of the mechanism the following equations must be fulfilled:

$$a > c + b, d + e < f, \text{ and } e + 2d > f$$

Shaft 83 of the pattern card drum 77, Fig. 1, is driven by shaft 71 through the bevel gear wheels 78, 79, the shaft 80, Fig. 4, a worm 81 on the shaft 80 and the worm wheel 82 which is rigidly connected with shaft 83, Figs. 4 to 6. Whenever worm 81 makes one complete revolution, during a determined angle, Fig. 19, wheel 82 is rotated through an angle *t*, Fig. 1, the extent of which depends on the configuration of the cam 135 on member 81. The worm gearing 81 and 82 is shown in detail in Figs. 16 to 18. During the part of revolution of shaft 80 when worm 81 does not move wheel 82, the pattern card drum 77 stands still. During the period the drum is rotated through angle *t*, the feeler 25 is lifted out of pattern card 77' by a lifter 86.

As seen in Fig. 3, the lifter 86 is connected to one end of two-arm levers 97, 98 swinging about shaft 99. The other ends of said two-arm levers are pivoted to link members 95 and 96, Figs. 5 and 6, which are also pivoted to elbow levers 93 and 94, respectively, on shaft 90. The latter is revolvably borne in side walls 1 and 2 and has a crank 89 at one end which crank carries a cam follower 88 which follows a groove in drum 87 fixed to shaft 80. To levers 93 and 94 further link members 100 and 101 are pivoted which actuate the short two-arm levers 102 and 103 which also swing on shaft 99.

As shown in Fig. 3, the short two-arm levers

102, 103 carry the shaft 23 which supports the positioning levers 22. If shaft 23 would be immovable, lever 22 would be bent upon lifting of the feelers 25 because the device is so constructed that control rod 15 engages draw bar 56 when the respective feeler rests on card 77', Fig. 9. To prevent bending of member 22 its fulcrum is lifted by levers 102, 103 whenever lifter 86 is moved to position 85.

Lifter 86 and shaft 23, forming the fulcrum of lever 22, are simultaneously moved up and down by cam 87. When roller 88, which follows cam 87, is moved to the right in Fig. 5, bellcrank lever 89, 93 turns counter-clockwise, pulling links 100 and 95 down and turning levers 97 and 102 clockwise. This causes upward movement of lifter 86 as well as of fulcrum 23. Upward movement of lifter 86 causes lifting of feelers 25 out of their holes in the pattern card 77' and clockwise movement of levers 22 about fulcrum 23 and movement of control rod 15 from its right position (Fig. 1) to its left position (Fig. 9). Clockwise movement of bellcrank lever 89, 93 causes counter-clockwise movement of levers 97 and 102 and downward movement of lifter 86 and fulcrum 23. If a feeler 25 is above a hole in the pattern card at this moment, the horizontal arm of lever 22 supporting said feeler follows the downward movement of lifter 86, because of weight 24 or spring 24', and lever 22 turns counter-clockwise about fulcrum 23, moving rod 15 from its left to its right position. If there is no hole below feeler 25, the horizontal arm of its lever 22 cannot follow the downward movement of lifter 86 and the lever remains in the position in which rod 15 is in its left position.

The mechanism operates as follows:

The card drum 77 makes an angular movement t corresponding to one section of pattern card 77' while the feelers 25 are lifted by the feeler lifter which is then in position 85, Fig. 9. Upon consecutive lowering of lifter 86 the feelers 25 and lever 22 may follow or not depending whether there is a hole in the pattern card or not. Depending on the position of lever 22, the recessed portion of control rod 15 engages either draw bar 55 or 56 while they are in central position adjacent one another. Thereafter bars 55 and 56 move in opposite directions to their dead center positions and then back to central position. During this movement of draw bars 55, 56 the actuating bars 30, 31 are either in their dead center positions 106, 107 or 108, 109. Shaft 80, Fig. 3, revolves twice as fast as crank shaft 47.

The dobby according to the invention operates according to the following rule: "No hole" in card 77' will be followed by a depressed heald frame; "hole" is followed by a raised heald frame, or vice versa, according to the type of connection of lever 3 with the heald frame. In the mechanism according to the invention illustrated in Figures 1 and 7 to 13 "no hole" in the pattern card causes clockwise movement of lever 3 and depressed heald, and "hole" causes counterclockwise movement of lever 3 and raised heald. When the shed is changed either member 9 or 10 is in engagement with bars 30 or 31.

What happens when the harness is and stays in the raised position will be described first. In the position shown in Fig. 1, finger or feeler 25 is inserted in a hole of the pattern card and lever 3 is in its left position during the following pick, i. e. lever 3 will stay in the position shown in Fig. 1. Rod 15 is pushed to the right by lever 22 and to engagement with bar 55. The latter

moves down and causes disengagement of member 9 from bar 30 through switch lever 13 and link 11, as seen in Fig. 7. During the movement of bar 31 to the right, arrow 111, bar 31 sliding on guide surface portion 115' of member 10 pushes said member down. This causes an up-stroke of rod 15 which is connected with member 10 by link 12 and lever 13, and the mechanism reaches the position shown in Fig. 8 at the end of the movement of bars 30, 31 to the right into positions 108, 109. Lever 3, which was already in the left position, for holding the harness connected therewith in raised position corresponding to "hole" on the pattern card, has not changed its position.

If the heald frame is to retain its "up" position, there must again be a hole in the pattern card so that rod 15 is again pressed to the right for engagement with bar 55 which will make an "up" stroke that does not move rod 15 which is already in the "up" position, Fig. 8, as the length of the recesses in rod 15 are greater than the height of bars 55, 56. If then bars 30 and 31 return to positions 106, 107, bar 30 glides along guide surface portion 116 of member 9 and swings it up in the direction of arrow 114 to the position shown in Fig. 7. If the harness must retain the raised position, the following stroke down of bar 55 does not affect the position of the harness, as rod 15 is in its lower position.

The following is a description of what happens when the heald frame is to be moved from the raised to the depressed position and stays therein.

From the position shown in Fig. 1, lever 3 must be moved clockwise for depressing the heald frame connected therewith, and there must be no hole in the pattern card when it is advanced for preparing this movement. Rod 15 is then moved to the left and bar 56 can move upwardly without affecting members 9 and 10 which are in the position illustrated in Fig. 1. Due to the movement of bars 30, 31 to the right the system changes to the position shown in Fig. 9 whereby lever 3 is swung clockwise, to the right, for depressing the heald frame connected therewith. If it is desired that the shed remain in this position, no hole in the pattern card must be available to feeler 25; then rod 15 remains in engagement with bar 56 and will be pressed down to the position shown in Fig. 10 whereby member 9 is swung up and out of engagement with bar 30 which is in the position 108. At the return of bars 30, 31 to positions 106, 107, bar 31 pushes member 10 down by sliding on its guide surface portion 116' whereby the system is switched to the position according to Fig. 11.

If, after the pattern card has made a further angular movement t , there is again no hole in card 77' members 9 and 10 will not alter their positions as bar 56 can make an idle stroke up. At the movement of bar 30 to the right it swings member 9 up by sliding along its guide surface portion 115 whereby the position shown in Fig. 10 is reproduced.

For a change from depressed harness position corresponding to Fig. 11 to raised position, i. e. for moving lever 3 over to the left, a hole in the pattern card must be presented to feeler 25 whereby rod 15 is moved to engagement with bar 55 and pushed down by it and the condition of the device shown in Fig. 12 is produced. Now, bar 31 will move member 10 to the right whereby cam 7 and with it lever 3 is moved counterclockwise to the position of Fig. 13.

If from the position shown in Fig. 13 the next

position of the harness shall be the depressed one, no hole must be in the pattern card so that lever 3 will be moved clockwise. Then rod 15 is swung to the left and bar 56 can make an idle stroke down whereby member 10 remains engaged with bar 31 and the apparatus is brought to the condition shown in Fig. 12 when bars 30, 31 have been moved to the left. The harness is thereby moved into the depressed position.

If, however, from the position of Fig. 12 no change of the heald frame must occur, there must again be no hole in the pattern card.

If there is a hole in the pattern card at the motion after the condition according to Fig. 13, no change of the shed will take place. Rod 15 is then in position where it engages bar 55 and will be lifted thereby whereafter the system is in the condition according to Fig. 8. Bars 30 and 31 can idle to the left and the system assumes the condition shown in Fig. 7.

The dobby can operate forward as well as backwards. This is of advantage if in case of a failure already inserted weft threads must be removed. In this case the dobby is operated in reverse, at first into the last previous picking position and then pick by pick till the faulty pick is reached.

Fig. 17 shows the worm 81 as in Fig. 3 but in a greater scale. The shaft 80 makes one revolution during one picking cycle and rotates the worm wheel stepwise by the pitch t of the pattern card drum 77 (Fig. 1) in the following manner. The drum 77 can only be rotated when the feelers 25 are lifted out of the pattern, therefore the ends 134 and 132 of the worm tooth 135 (Fig. 17) are lying within the centri-angles α and β (Fig. 18) in two parallel planes in a right angle to the shaft 80. Thus during the rotation of the shaft 80 within the angles α and β , there is no rotation of the worm wheel 82; rotation of the worm wheel is caused by the passover part 133 of the worm tooth 135 which extends within the angle γ , Fig. 16.

While I believe the above described embodiments of my invention to be preferred embodiments, I wish it to be understood that I do not desire to be limited to the exact details of method, design and construction shown and described, for obvious modifications will occur to a person skilled in the art.

I claim:

1. A dobby for positive actuation of the shedding mechanism in looms for weaving, comprising a harness operating member, a cam engaging said member, two actuating members individually pivoted to said cam for actuating it, and two positively driven actuating bars individually engageable with said actuating members and actuating same when in engagement therewith.

2. A dobby as defined in claim 1 in which said operating member is provided with two cam followers for engagement with said cam.

3. A dobby for positive actuation of the shedding mechanism in looms for weaving, comprising a harness operating member, a cam swingable about an axis disposed within and at a right angle to said cam, two actuating members individually pivoted to said cam for swinging it about its axis, two positively driven actuating bars individually engageable with said actuating members and actuating same when in engagement therewith, a switching lever swingable about an axis extending at right an-

gle thereto, two link members individually swingably connected with one end of said switching lever and pivoted, individually, to said actuating members and placing same for engagement or disengagement with said actuating bars depending on the position of said switching lever; the swing axes of said switching lever and of said cam, and the pivot on said switching lever of one of said link members when placing same for engagement of one of said actuating members with one of said actuating bars being in one plane.

4. A dobby as set forth in claim 3, comprising two more link members, each of said last mentioned link members having one end swingable about the axis of said switching lever and having another end swingably connected with one of said bars, the individual distances of the swing axes at one end of said link members from the respective swing and pivot centers of their other ends and the distances of the pivot centers of said actuating members on said cam from the swing axis of the latter being all alike.

5. A dobby for positive actuation of the shedding mechanism in looms for weaving, comprising a harness operating member, a cam engaging said member, two actuating members individually pivoted to said cam for actuating it and individually having guide surface portions, and two positively driven actuating bars individually engaging said guide surface portions for placing said members in desired operating positions.

6. A positively actuated shedding mechanism in looms for weaving, comprising a harness operating member swingable about a fulcrum and having two cam follower rollers connected therewith, a cam swingable about a fulcrum and having a surface portion engaging said rollers, said surface portion having two recesses individually accommodating said rollers when said operating member is in an extreme operating position for temporarily arresting the mechanism, two actuating members individually pivoted to said cam for actuating it, and two positively driven actuating bars individually engageable with said actuating members and actuating same when in engagement therewith.

7. A dobby for positive actuation of the shedding mechanism in looms for weaving, comprising a harness operating member, a cam swingable about a fulcrum, two actuating members individually pivoted to said cam for swinging it about its fulcrum, two positively driven actuating bars individually engageable with said actuating members for actuating same when in engagement therewith, a positively oscillated switching lever, two link members individually pivoted to one end of said switching lever and to said actuating members and placing same for engagement and disengagement with said actuating bars depending on the position of said switching lever, and latch means slideably engaged by said switching lever for temporarily holding it in its extreme operating positions.

8. A dobby as defined in claim 7, said switching lever having two arms, said link members being pivoted to one of said arms, said latch means having the form of a lever having two notches, the other arm of said switching lever having an end portion formed to be inserted in one of said notches at a time, and a spring pressing said latch lever to said end portion.

9. A dobby for positive actuation of the shedding mechanism in looms for weaving, compris-

ing a harness operating member, a cam swingable about a fulcrum, two actuating members individually pivoted to said cam for swinging it about its fulcrum, positively driven actuating bars individually engageable with said actuating members for actuating same when in engagement therewith, a switching lever, two link members individually pivoted to one end of said switching lever and to said actuating members and placing same for engagement and disengagement with said actuating bars depending on the position of said switching lever, and a control rod pivoted to said switching lever and having two oppositely positioned recesses, a draw bar disposed on either side of and at a right angle to said control rod adjacent said recesses and adapted to be temporarily engaged thereby, and a positively cam-actuated member pivoted to each of said draw bars and adapted to reciprocate said draw bars in opposite directions parallel to themselves.

10. A dobby as defined in claim 9, said recesses having each an abutment on each end thereof for engaging one or the other side of a draw bar, the distance between said abutments of one recess being greater than the height of a draw bar plus the extent of half of the stroke of said bar.

11. A dobby as defined in claim 9, the depth of one of said recesses plus the thickness of said control rod between said recesses being smaller than the distance between said draw bars.

12. A dobby as defined in claim 9, the combined depths of both of said recesses plus the thickness of said control rod between said recesses being greater than the distance between said draw bars.

13. A dobby as set forth in claim 9, comprising a positioning lever movably connected to said control rod and moving said rod to engagement with one or the other of said draw bars, depending on the position of said positioning lever, a pattern card feeler movably connected with said lever, a pattern card having apertures adapted to receive said feeler, a revolvable drum supporting and advancing said card, a lifter abutting said positioning lever and adapted to lift it for lifting said feeler out of an aperture in the pattern card, and drive means common to said drum and said lifter and advancing said drum after said lifter has removed said feeler from the aperture in which it was inserted.

14. A dobby as set forth in claim 9, comprising a positioning lever movably connected to said control rod and moving said rod to engagement with one or the other of said draw bars depending on the position of said positioning lever, a pattern card feeler depending from said lever, a pattern card having apertures adapted to receive said feeler, a revolvable drum supporting and advancing said card, a lifter abutting said positioning lever and adapted to lift it for lifting said feeler out of an aperture in the pattern card, a shaft supporting said positioning lever, displaceable support means supporting said shaft, and actuating means connected with and actuating said lifter and connected with and simultaneously displacing said support means.

15. A dobby for positive actuation of the shedding mechanism in looms for weaving, comprising a harness operating member, a cam swingable about a fulcrum, two actuating members individually pivoted to said cam for swinging it about its fulcrum, two positively driven actuating bars individually engageable with said actuating members for actuating same when in engagement therewith, a switching lever, two link members

individually pivoted to one end of said switching lever and to said actuating members and placing same for engagement and disengagement with said actuating bars depending on the position of said switching lever, and a control rod pivoted to said switching lever and having two oppositely positioned recesses, a draw bar disposed on either side of and at a right angle to said control rod adjacent said recesses and adapted to be temporarily engaged thereby, two levers pivoted individually to said draw bars and extending at a right angle thereto, each lever having a cam follower roller connected therewith, two rotating cams individually engaging said rollers and being so formed as to actuate said levers to move said draw bars parallel to themselves and simultaneously in opposite directions from and to a central position in which they are adjacent.

16. A dobby as set forth in claim 15, said rotating cams being so formed as to move said draw bars alternately.

17. A dobby for positive actuation of the shedding mechanism in looms for weaving, comprising a harness operating member, a cam swingable about a fulcrum and engaging said member, two actuating members individually pivoted to said cam for swinging it about its fulcrum, two actuating bars individually engageable with said actuating members for actuating same when in engagement therewith, a switching lever, two link members individually pivoted to one end of said switching lever and to said actuating members and placing same for engagement and disengagement with said actuating bars depending on the position of said switching lever, a control rod pivoted to said switching lever and having two oppositely positioned recesses, a draw bar disposed on either side of and at a right angle to said control rod adjacent said recesses and adapted to be temporarily engaged thereby, two levers pivoted individually to said draw bars at a right angle thereto, each lever having a cam follower roller connected therewith, two cams individually engaging said rollers and being so formed as to actuate said levers to move said draw bars in opposite directions from and to a central position, a rotating shaft supporting said cams, drive means common to said shaft and to said actuating bars and rotating the former and substantially reciprocatingly moving the latter parallel to themselves between two extreme operating positions, said cams being so fixed on said shaft that said draw bars begin to move after said actuating bars have reached an extreme operating position.

18. A dobby for positive actuation of the shedding mechanism in looms for weaving, comprising a harness operating member, a cam swingable about a fulcrum and engaging said member, two actuating members individually pivoted to said cam for swinging it about its fulcrum, two actuating bars individually engageable with said actuating members for actuating same when in engagement therewith, a switching lever, two link members individually pivoted to one end of said switching lever and to said actuating members and placing same for engagement and disengagement with said actuating bars depending on the position of said switching lever, a control rod pivoted to said switching lever and having two oppositely positioned recesses, a draw bar disposed on either side of and at a right angle to said control rod adjacent said recesses and adapted to be temporarily engaged thereby, two levers pivoted individually to said

draw bars at a right angle thereto, each lever having a cam follower roller connected therewith, two cams individually engaging said rollers and being so formed as to actuate said levers to move said draw bars in opposite directions from and to a central position, a positioning lever having one arm movably connected to said control rod for laterally swinging it into and out of engagement of one of its recesses with one of said draw bars, a pattern card feeler movably connected with the other arm of said positioning lever, a substantially reciprocatingly movable feeler lifter abutting said other arm for swinging said lever and its feeler out of card engaging position, a shaft displaceable parallel to itself in the direction of movement of said card feeler and swingably supporting said positioning lever, and drive means connected with said feeler lifter and said last shaft for simultaneously moving said feeler lifter and displacing said shaft.

19. A dobby for positively actuating the shedding mechanism in looms for weaving, comprising a harness operating member, actuating means engaging said member, a translatorily moving member, and a hook member having one end movably connected with said actuating means and having a hook substantially at its other end and adapted to be engaged by said translatorily moving member; both ends of said hook member performing a translatory movement conforming with that of said translatorily moving member, when the latter engages said hook member.

20. A dobby for positively actuating the shedding mechanism in looms for weaving, comprising a harness operating member, actuating means swingable about a stationary fulcrum and engaging said member, a translatorily moving member, a hook member having one end pivotally connected with said actuating means and having a hook substantially at its other end and adapted to be engaged by said translatorily moving member, and second actuating means swingable about a stationary fulcrum and movably connected with said hook member; said fulcrums, said hook and the pivot axis of the pivotal con-

nection of said hook member and said first actuating means being disposed at the corners of an imaginary parallelogram at all operating positions of said mechanism when said hook is engaged by the translatorily moving member.

21. A dobby for positively actuating the shedding mechanism in looms for weaving, comprising a harness operating member, actuating means swingable about a stationary fulcrum and engaging said member, a translatorily moving member, a hook member having one end pivotally connected with said actuating means and having a hook substantially at its other end and adapted to be engaged by said translatorily moving member, a lever swingable about a stationary fulcrum, and a link member swingably connected with one end of said lever and with said hook member for swinging the latter in and out of engagement with said translatorily moving member depending on the position of said lever; the axes of said fulcrums and the swing axis of the connection of said link member with said lever being disposed in an imaginary plane when said hook is engaged by said translatorily moving member.

22. A dobby for positively actuating the shedding mechanism in looms for weaving, comprising a harness operating member, actuating means engaging said member and swingable about a stationary fulcrum, a member reciprocating along an arcuate path, and a hook member having one end movably connected with said actuating means and having a hook substantially at its other end and adapted to be engaged by said reciprocating member; the radius of said arcuate path being equivalent to the distance between said stationary fulcrum and the point where said hook member is swingably connected with said actuating means.

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Number	Name	Date
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