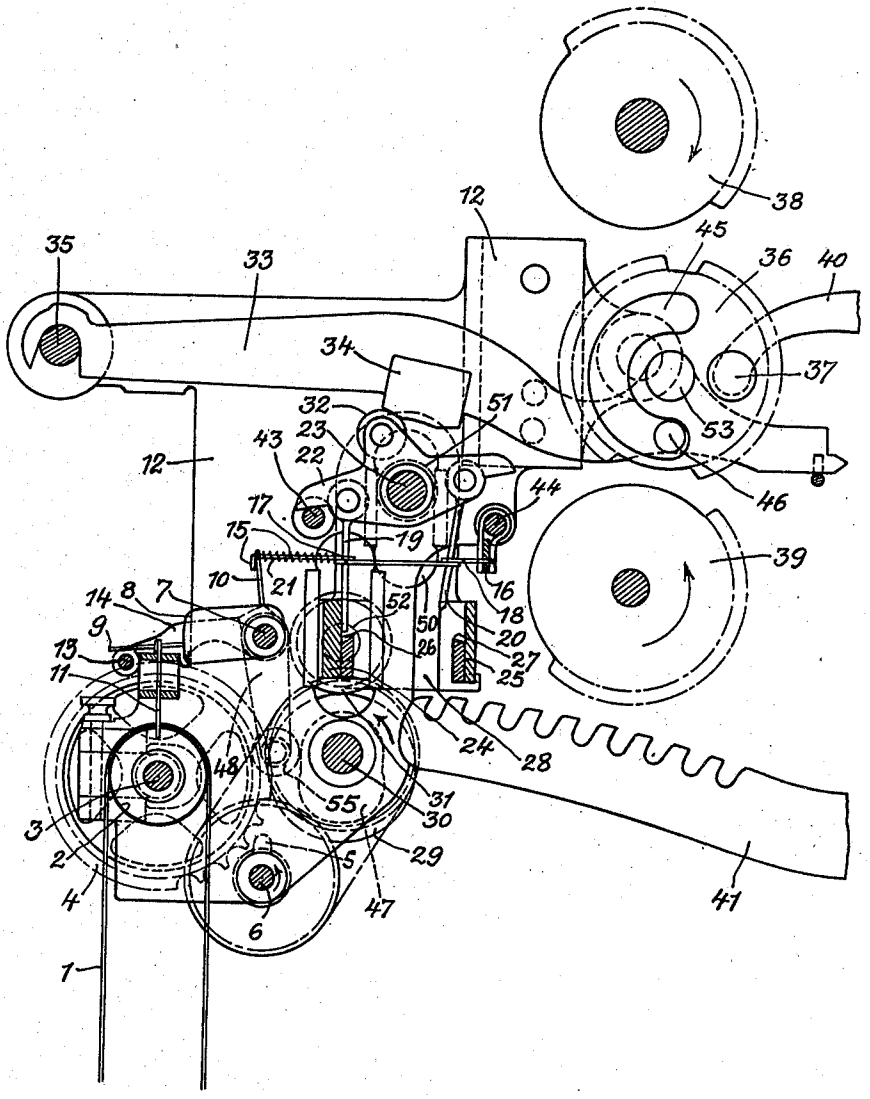
Nov. 15, 1938. O. STÄUBLI 2,136,765

SHEDDING MECHANISM FOR LOOMS

Filed Dec. 20, 1937



O. Stäubli
INVENTOR

By: Glascock Downing & Seibold
Attys.

Patented Nov. 15, 1938 2,136,765

UNITED STATES PATENT OFFICE

2,136,765

SHEDDING MECHANISM FOR LOOMS

Othmar Stäubli, Horgen, Switzerland, assignor to Gebr. Staubli & Co., Horgen, Zurich, Switzerland

Application December 20, 1937, Serial No. 180,901

10 Claims. (Cl. 139—77)

The invention relates to shedding mechanisms for looms, especially shedding mechanisms of the so called gem head type as represented for instance in the United States Letters Patent No. 1,886,133 dated August 23, 1932. While however in said mechanism the so-called vibrator lever changes its position after each pick-reading action of the pick-reading needles, according to the present invention provision is made that the position of said vibrator lever is not altered as the associated pick-reading needle comes to the same position in two subsequent pick-reading actions. In this way a greater working speed is obtained and the loom becomes better adapted for the weaving of heavy pieces.

The accompanying drawing represents in a side view a shedding mechanism according to my present invention, this view being taken from the inside of the machine frame and the various parts disposed between the pattern card and the harness-controlling device shown for one shaft only.

1 represents the pattern card preferably consisting of Verdol-paper or like thin light material, 2 is the cylinder supporting this pattern-card which may be continuous or endless. On the shaft 3 of this cylinder is fixed a toothed wheel 4 which is intermittently driven from a shaft 6 by means of a cam 5 temporarily engaging with the notches provided on the periphery of the wheel 4.

On a shaft 7 mounted in the machine frame 12, like the shafts 3 and 6, there are loosely mounted directly side by side bell-crank levers, one for each shaft. Each of these levers consists of a little plate 8 having fixed thereto an approximately horizontal wire 9 disposed above the cylinder 2 and of an upstanding wire 10 also fixed on said plate 8. From each wire 9 there hangs loosely a pick-reading needle 11 by means of an eye vertically above the cylinder shaft 3. Below all wires 9 there extends a rod 13 which is supported by two arms 14 fixed on the shaft 7, this rod 13 serving, in a known manner, to hold the pick-reading needles 11 far off the cylinder during the movement thereof. By means of a hand lever or the like (not shown) mounted on the shaft 7 the rod 13 may be swung upwardly at any convenient time, for instance, when the cylinder shall be rotated forwardly or back by hand for a greater number of picks.

The upstanding arm 10 of the bell-crank lever 8 forms a ring wherein the bent end of a wire 15 rests, the rear end of which is slidably guided in a fixed bar 16. Between its two bearings this wire 15 forms two eyes 17, 18 to guide a pushing-pin 19 or 20 respectively. Between the wire 10 and the eye 17 the wire 15 is surrounded by a light spring 21. This spring is of such length as not to increase the pressure of the reading needle on the paper card when the reading needle rests upon it.

The pushing-pins 19, 20 are pendulously suspended on opposite arms of a rocking-lever 22 loosely mounted on a shaft 23. Said pushing-pins 19, 20 are suspended above two lifting-bars 24 and 25 respectively which have a slightly inwardly inclined abutment 26 or 27 respectively. The lifting-bars 24 and 25 are fixed on two lifting slides 28 mounted outside the machine frames 12 and provided each with a guiding slot 50 along which said lifting slide 28 is guided by means of a roller 51 mounted on the shaft 23. The slides 28 and therewith also the lifting-bars 24 and 25 receive an upward and downward movement by means of two lifting-cams 29 mounted upon a shaft 30 one on each side of the machine. Above the lifting-cams 29 rollers 31 are located which are mounted on the lifting-slide 28 by means of a stud 52. The position of the lifting-cams 29 relatively to the cam 5 is such that the lifting-bars 24 and 25 are lifted only after the cam 5 has driven the cylinder 2 for a tooth of the wheel 4 and the pick-reading needles 11 have read the next pick on the cylinder which at this time is at rest. This applies for the forward as well as for the backward movement of the pick-reading mechanism.

Each rocking-lever 22 is mounted below a vibrator-lever 33 and supports on its third arm, which is directed towards said vibrator lever, a roller 32 disposed beneath a cam piece 34 attached to the vibrator lever 33. The vibrator levers 33 are fulcrumed on a common rod 35.

Each of said vibrator levers 33 supports on a pivot 53 extending from the side thereof, a vibrator-gear 36 having a crank-pin 37 adapted to be turned in one and then in an opposite direction by one or the other of the continuously-rotating cylinder-gears 38, 39 having teeth on the half of their circumference as shown and described in the cited Patent No. 1,886,133. Each crank-pin 37 has pivoted to it one end of a connector 40 the opposite end of which is connected with the harness controlling lever 41 as shown in said prior patent.

The drawing shows the parts in that position which they occupy immediately after the represented pick-reading needle 11 has dropped into a pick-hole of the pattern-card 1. That bell-crank lever 8, 9, 10 which supports this reading

needle 11 holds, by means of the wire or draw-needle 15, the pushing-pin 19 in contact with the upwardly extending web of the lifting-bar 24 directly above the slightly inwardly inclined abutment 26. The pushing-pin 20 is in its foremost position and therewith outside the reach of the rear lifting-bar 25. The rocking lever 22 rests with its forward arm on a supporting rod 43.

Starting from this position the lifting cams 29 begin to lift the lifting slides 28 and therewith also the lifting bars 24 and 25. The pushing pin 19 hanging above the abutment 26 of the lifting bar 24 is pushed upwardly and therefore rocks the rocking lever 22 on its shaft 23 until it comes to rest upon the abutting rod 44. During this movement the roller 32 comes below the cam piece 34 on the vibrator lever 33 and swings this lever upward so that the gear 36 comes into the reach of the upper tooth roller 38, is rotated and draws with it in known manner the harness controlling-lever 41 by means of the connector 40 and thus lifts the weaving shaft depending from said lever 41.

Shortly after starting of the upward movebent of the lifting bars 24, 25 viz after the pushing pin 19 has been engaged by the lifting bar and cannot slide off from the slightly inwardly inclined abutment 26 thereof the shaft 7 receives an angular movement from a cam disc 47 fixed on the shaft 30 by means of a lever 48 fixed on the shaft 7. Therefore also the rod 13, which is connected with the shaft 7 by means of the levers 14, makes an upward movement and lifts all pick-reading needles 11 off from the pattern-card cylinder 2. Thus the bell crank levers 8, 9, 10 swing upwardly but without altering the position of the draw-needles 15 and the pushing-pins 19 and 20 because the inclined abutment 26 against the little pressure exerted by the compressed springs 21 retains those pushing pins 19 which belong to pickreading needles dropped into holes of the pattern-card and the pushing-pins 20 which belong to pickreading needles not dropped into holes of the pattern-card, are already touching the upstanding web of the lifting bar 25.

As soon as all pick-reading needles 11 are lifted off from the pattern-card, the cam 5 engages with the toothed wheel 4 and rotates it for a tooth. Now the rod 13 is lowered again as the cam 47 leaves the roller 55 of the lever 48 and the pick-reading needles read off the next pick on the pattern-card. The lifting bars 24, 25 are lowered again and such pushing-pins 19 which had previously been engaged become now free from the abutment 26.

If now a pick-reading needle 11 which at the previous pick-reading had dropped into a hole of the pattern-card does not find a hole in the latter, the associated spring 21 displaces its pushing-pins 19, 20 backwardly so that the pin 19 with its lower end is swung out of the path of the abutment 26 and the pin 20 touches the upstanding web of the lifting-bar 25. The rear arm of the rocking lever 22 rests on the abutting bar 44. As now the lifting-bars move upwardly again the pushing-pin 20 is lifted by the bar 25 and the rocking lever 22 is thus swung backwardly to its initial position shown in the drawing, thus the roller 32 moves forwardly below the cam piece 34 on the vibrator lever 33 whereby this latter is lowered, the gear 36 comes into the reach of the toothed roller 39, is turned backwardly by this roller and, by means of the connector 40 lowers the harness-controlling lever 41.

If at the next pick-reading the reading-needle 11 does again not find a hole in the pattern-card, the position of the bell-crank-lever 8, 9, 10 and therefore also the position of the pushing-pins 19, 20 rests the same, this is: 19 is turned rearward, 20 depends vertically over the abutment 27 of the lifting-bar 25 but, because the rocking lever takes now the position shown, in such an elevation that at the next lifting movement of the lifting bar it is not reached by this bar. The vibrator-lever rests thus unaffected.

If however a pick-reading needle 11 which has dropped into a hole of the pattern-card at the first pick considered herebefore finds again a hole in the pattern-card 1, the wire or draw-needle 15 moves forwardly again and causes the pushing-pin 19 to touch again the upstanding web of the lifting bar 24. The lifting pin 20 is also drawn forwardly and thereby comes out of reach of the lifting-bar 25. As however the front arm of the rocking lever 22 is still in its raised position as in the preceding pick-reading, the lifting bar 24 in its upmost position can only touch the pushing-pin 19 but not lift it further. Thus the upward movement of the lifting-bars 24 and 25 does not effect an alteration in the position of the rocking lever 22. Therefore the vibrator-lever 33 also rests in its upper position. This position remains stationary as long as the pick-reading needle 11 finds a pick-hole in the pattern-card 1. When it does not find any hole, the rear pushing pin 20 turns the rocking lever 22 back to the initial position shown in the drawing whereby the vibrator-lever 33 is lowered, the gearing 36 is rotated backwardly in consequence of its interlocking with the toothed roller 39, the harness-controlling lever 41 is swung backwardly and thereby the harness shaft is lowered.

It is possible to rotate the pattern-card cylinder 2 forward or rearward by displacing on the shaft 30, by means of a knob (not shown), a key which connects the cam 5 either with a chain-wheel which is driven from the shaft 30 (the same direction of rotation as the shaft 30) or with a spur-wheel driven from the shaft 30 in reversed direction in a manner similar to that described in the prior specification.

The mechanism described can be used also, with certain modifications, in that case where the lifting of the harness-shafts shall be affected if the pick-reading needles do not fall into a hole when picking but meet solid parts of the pattern-card. For this case the abutments 26, 27 of the lifting-bars 24, 25 are disposed on the outer side.

What I claim is:

1. In a shedding-mechanism for looms, the combination of a pattern-card, with pick-reading needles hanging above said pattern-card and adapted to be lowered on to this pattern-card to read the picks therefrom, levers, on which said pick-reading needles are suspended, a harness-controlling mechanism comprising a vibrator lever the position of which depends on the position of the associated pick-reading needle relatively to the pattern-card, movable members inserted between each of the first mentioned levers and a vibrator lever for actuating this lever, said members being constructed and arranged in such a manner that said vibrator lever retains its position unaltered during a plurality of pick-reading actions giving the same position of the associated pick-reading needle relatively to the pattern-card.

2. In a shedding mechanism for looms, the

combination of a pattern-card with a series of levers loosely mounted on a common shaft, a pick-reading needle on each of these levers hanging above said pattern-card, a rocking lever for each of said pick-reading needles, two pushing-pins pendulously suspended on opposite directed arms of this rocking-lever, a lifting-bar below each of the two series of pushing-pins adapted to receive a reciprocating up and down movement, means adapted to alternately bring one or the other series of said pushing-pins over the associated lifting-bar according to the position of the associated pick-reading needle relatively to the pattern-card, a vibrator-lever in reach of each of said rocking-levers, a vibrator-gear pivoted on said vibrator-lever, a harness-controlling lever movably connected with said gear and two cylinder-gears continuously rotating in opposite directions with which said vibrator-gear is alternately brought in engagement according to the position of the associated pick-reading needle and the corresponding position of the vibrator-lever.

3. In a shedding-mechanism, a pattern-card, a series of levers loosely mounted on a common rod above said pattern-card, a pick-reading needle on each of these levers, a vibrator-lever for each pick-reading needle, a harness-controlling device adapted to be operated by said vibrator-lever, a rocking-lever beneath each of said vibrator-levers and supporting it in such a manner that according to the position of the rocking-lever the associated harness-shaft is in its upper or in its lower position, a connection of said rocking-lever with members for operating it on one side and with the pick-reading needle supporting lever on the other side in such a manner that said operating members only come to act upon the rocking-lever in consequence of a change of the position of the pick-reading needle relatively to the pattern-card at its pick-reading action.

4. In a shedding mechanism for looms, the combination of an endless pattern-card consisting of Verdol-paper or other thin light material with a series of levers loosely mounted on a common-shaft, pick-reading needles hanging on said levers above the pattern-card, a rocking-lever in connection with each of said levers, a pushing-pin pendulously suspended on each of two opposite directed arms of each rocking-lever, wire like members loosely connecting the two pushing-pins of the same rocking-lever with the lever supporting the associated pick-reading needle, a lifting bar underneath the pushing-pins adapted to perform a reciprocating up and down movement, a vibrator-lever the position of which is determined by said rocking-lever, a harness controlling lever loosely connected with said vibrator-lever, the connection between said wire like members with the first mentioned lever on one side and the two associated pushing-pins on the other side being such that in the moment where the associated pick-reading needle is reading a pick from the pattern-card, the position of the two pushing-pins is determined by the wire like member.

5. In a shedding-mechanism for looms the combination of a pattern-card with a series of bell-crank levers a pick reading needle hanging on one arm of each of said bell-crank levers and adapted to be lowered onto said pattern-card to read a pick there, a rod extending underneath all said needles and adapted to lift them from the pattern-card at predetermined intervals, a rocking-lever for each pick-reading needle, a pushing-pin pendulously suspended on each of two oppositely directed arms of said rocking-lever, a lifting-bar extending below each of the two series of pushing-pins and adapted to perform a reciprocating up and down movement at each pick-reading action of the pick-reading needles, a draw-needle connecting the two pushing-pins of each rocking-lever with the second arm of one of said bell-crank levers so as to bring the position of said pushing-pins relatively to the lifting-bars in relation with the position of the associated pick-reading needle relatively to the pattern-card, a vibrator-lever controlled by said rocking-lever and a harness-controlling-lever connected with this vibrator-lever.

6. In a shedding-mechanism for looms the combination of a pattern-card with a series of balanced levers, a pick-reading needle hanging on each of these balanced levers above said pattern card and adapted to periodically be lowered to the pattern-card and lifted therefrom, a rocking-lever for each pick-reading needle, a pushing-pin pendulously suspended on oppositely directed arms of this rocking-lever, a lifting-bar below each series of said pushing-pins, each of these lifting bars forming an abutment on opposite sides relatively one to another, this abutment having a lying and an upstanding web, a cam supporting said lifting bars to lift them together at each pick-reading action of said needles, a wire like member connecting the pushing-pins of each rocking-lever one with another and with one of said balanced-levers in such a manner that according to the position of the associated pick-reading needle relatively to the pattern-card one or the other of said pushing-pins is hanging over the lying web of the abutment of the associated lifting bar and touches the upstanding web thereof whilst the other pushing-pin is retained by said wire like member out of the path of the ascending lifting-bar, a vibrator-gear adapted to be brought into and out of action according to whether one or the other of said lifting bars and pushing-pins acts upon the rocking lever.

7. In a shedding mechanism for looms, the combination of a pattern-card with a series of bell-crank levers, a pick-reading needle hanging on an approximately horizontal arm of each of these bell-crank levers, a series of rocking levers, a pushing-pin pendulously hanging on each of two oppositely directed arms of each of said rocking-levers, a lifting-bar underneath each series of pushing pins, a wire like member connecting the two pushing pins of each of said rocking-levers with the upstanding arm of one of said bell-crank levers in such a manner that according to the position of the pick-reading needle hanging on the other arm of the bell-crank lever relatively to the pattern-card one or the other of said pushing pins is held in the path of the associated lifting-bar and the other out of said path in order to determine the direction of the next movement of the rocking lever, and a harness-controlling device controlled by said rocking-lever.

8. In a shedding mechanism for looms, the combination of a pattern-card with a series of bell-crank levers, a pick-reading needle hanging on each of these levers above the pattern-card, a series of two-armed rocking-levers, a pushing-pin pendulously hanging on each of the two arms, a lifting bar below each of the two series of pushing-pins, each of these lifting-bars forming an abutment having an upstanding and a lying web, this latter being slightly inclined towards the up-

standing web, a draw-needle slidably supported in the upstanding arm of one of said bell-crank levers and connecting this arm with the two pushing-pins of one of said rocking-levers in such a manner as to alternately hold one of these pins over the lying web of the associated lifting-bar in contact with the upstanding web whilst the other pushing-pin is held out of the path of its lifting-bar, a light spring surrounding said draw-needle and inserted between the bell-crank lever and the next of said pushing-pins and adapted to temporarily change the position of the two pushing-pins relatively to their lifting-bars when not engaged thereby, a vibrator-lever supported by each of said rocking levers so as to be altered in its position when this rocking-lever is operated by one or the other of said lifting bars, and a harness-controlling device connected with each of said vibrator-levers.

9. In a shedding mechanism for looms, the combination of a pattern-card of Verdol paper or other thin light material, with a series of bell-crank levers, a pick-reading needle hanging on an approximately horizontal arm of each of these bell-crank levers above said pattern-card, a series of rocking-levers having each two oppositely directed arms and an upward directed intermediate arm, a vibrator lever resting upon this intermediate arm, a harness-controlling device connected with this vibrator lever in such a manner that the position of the harness is determined by the position given to said vibrator lever by the associated rocking lever, a pushing-pin hanging on each of the opposite directed arms of said rocking-lever, a lifting-bar below each series of pushing-pins forming an abutment for these pins and adapted to temporarily lift them, a draw needle connecting the two pushing-pins of the same rocking lever one with another and with the upstanding arm of said bell-crank lever in such a manner as to alternately hold one or the other of said pushing-pins out of reach of the corresponding lifting bar according to the position of the associated pick-reading needle relatively to the pattern-card, a light spiral spring surrounding said draw-needle between the bell-crank lever and the first pushing-pin for transmitting the movement of the bell-crank lever to said pushing-pins when the associated pick-reading needle is lifted off from the pattern-card, the connection between said draw-needle and the lever arm supporting it being such as to allow a relative movement between the bell-crank lever and the draw-needle.

10. In a shedding mechanism for looms, the combination of a pattern-card, with a series of bell-crank levers, loosely mounted on a common shaft, a pick-reading needle hanging on one arm of each of these bell-crank levers above said pattern-card, a series of rocking-levers, a harness controlling device controlled by each of said rocking-levers, a pushing-pin pendulously hanging on each of two oppositely directed arms of said rocking-levers, a lifting-bar underneath each series of these levers adapted to perform a reciprocating up and down movement, a draw-needle connecting an upstanding arm of each of said bell-crank levers with the two pushing-pins of the associated rocking levers in such a manner that alternately one or the other of said pushing pins is held in the path of the associated lifting-bar at its upward movement whilst the other pushing-pin is turned off from the path of its lifting-bar, the connection between said draw-needle and the upstanding arm of the bell-crank lever being such as to allow a movement of one relatively to the other, a light spring surrounding the draw-needle between the bell-crank lever and the next of said pushing-pins and adapted to temporarily displace the draw-needle relatively to the bell-crank lever and to swing the pushing-pins to alter their position relatively to the associated lifting-bar.

OTHMAR STÄUBLI.