Nov. 1, 1932. H. STÄUBLI 1,886,133

SHEDDING MECHANISM FOR LOOMS

Filed May 12, 1931

Fig. 1.

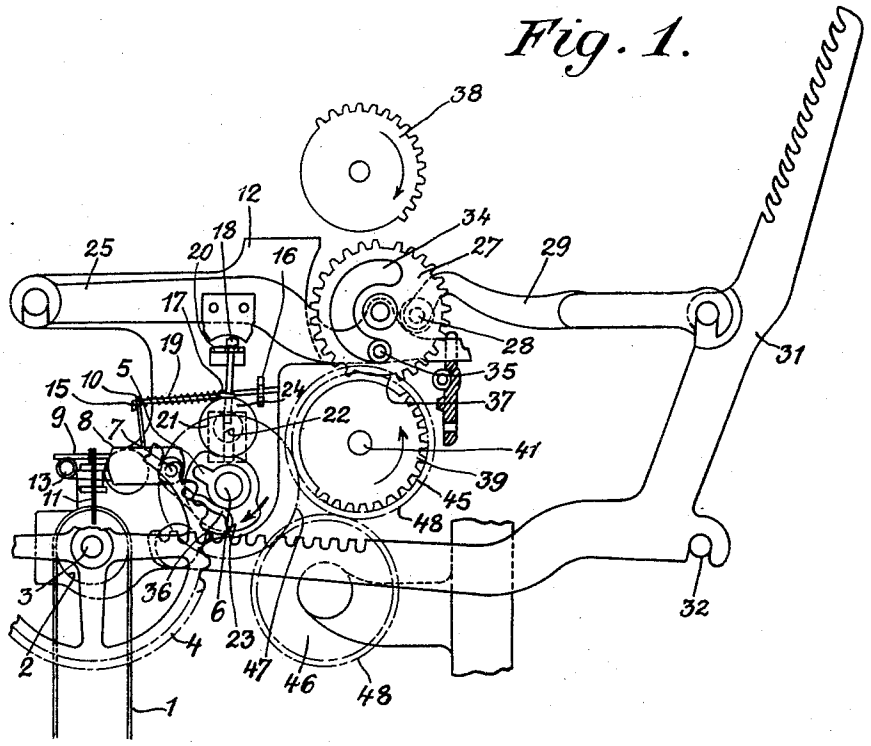


Fig. 2.

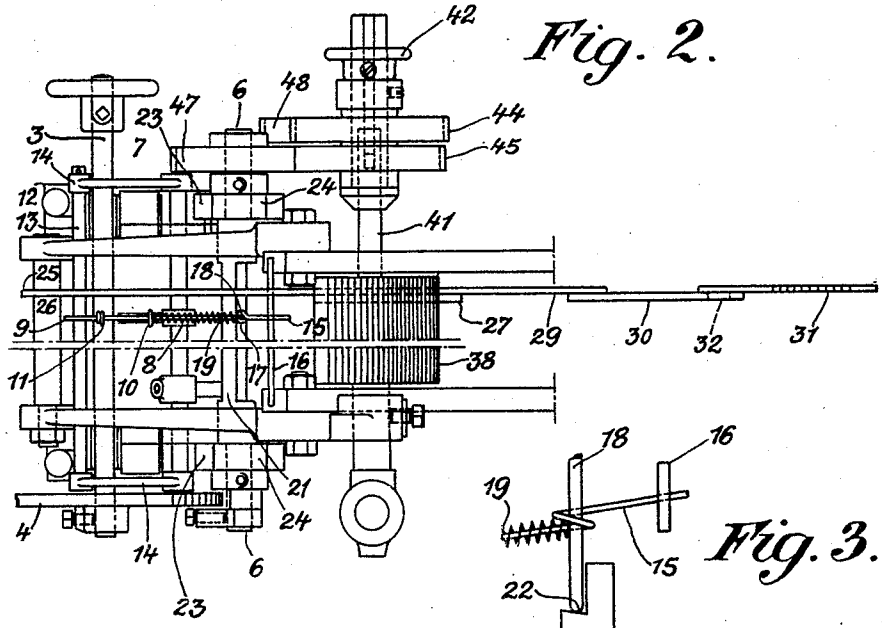


Fig. 3.

A. Stäubli
INVENTOR

by: Marks & Clerk
Attys

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HUGO STÄUBLI, OF ZURICH, SWITZERLAND, ASSIGNOR TO GEBR. STAUBLI & CO., OF HORGEN, SWITZERLAND

SHEDDING MECHANISM FOR LOOMS

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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. 397,858, dated February 12th, 1889. In the shedding mechanisms of this class hitherto known endless chains of metal bars are used as pattern-cards, iron rollers of greater or smaller diameter being arranged on these bars in accordance with the pattern. The placing of these rollers on said bars needs much time, the chains require much material and become heavy accordingly.

The present invention has for its object to transform shedding mechanisms of the class described in such a manner that in place of said chains pattern-cards of Verdol-paper or like thin, light material can be used and the pick-reading may be effected by means of pick-reading needles. With this object in view care was taken to construct the pick-reading mechanism in such a manner that at the return-movement of the pattern-card cylinder picks already woven in are released in correct sequence as this is the case with the known shedding mechanism of the class described.

On the accompanying drawing

Fig. 1 illustrates an elevation and Fig. 2 a broken plan view of a shedding mechanism constructed according to the present invention.

Fig. 3 shows a modification.

For sake of clearness in Fig. 1 certain parts are omitted and in Fig. 2 the various parts disposed between the pattern card and the harness-controlling device are shown for one shaft only.

1 represents the endless pattern-card consisting of Verdol-paper or like thin light material. 2 is the cylinder supporting this pattern-card. On the shaft 3 of this cylinder is mounted 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 as 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 taken back by hand in case the releasing of a greater number of picks being required.

The upper end of the bell-crank lever arm 10 is eye-shaped to form a bearing for the bent end of a wire 15 the rear end of which is slidably guided in a fixed bar 16. Between its two bearings this wire 15 forms an eye 17 to guide a supporting needle 18. Between the wire 10 and the eye 17 the wire 15 is surrounded by a light spring 19 which does not increase the pressure exerted upon the pattern-card 1 by the reading-needle.

The supporting needle 18 guided in the eye 17 of the wire or draw-needle 15 is pendulously suspended in a rail 20 fixed on the machine frames 12 above a lifting bar 21 which is angle-shaped, thus forming a slightly inclined surface 22. This lifting bar 21 receives an up- and downward-movement by means of two lifting cam discs 23 fixed on the shaft 6 and upon which discs rest rollers 24 mounted on the lifting bar 21. The position of the cam discs 23 relatively to the cam 5 fixed on the shaft 6 rotating the cylinder 2 is such that the lifting of the lifting bar 21 is effected each time after the cam 5 has rotated the cylinder by a tooth of the wheel 4 and the pick-reading needles have been lowered again and have thus read the following pick, viz. during the time cylinder 2 is at rest.

The supporting needles 18 hang below a series of vibrator-levers 25 fulcrumed on a

rod 26 fixed in the machine frames. (For sake of better sight in Fig. 2 there is represented another vibrator-lever 25 than that belonging to the supporting-needle 18 shown.) Each of said vibrator levers 25 supports on a pivot extending from the side thereof, a vibrator-gear 27, having a crank-pin 28 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. Each crank-pin 28 has pivoted to it one end of a connector 29 the opposite end of which is connected with a connecting arm 30. The other end of this arm 31 is pivoted to the notched harness-controlling lever 31 mounted to be turned freely about a fulcrum 32. The vibrator levers 25 and the above mentioned parts connecting them with the levers 31, as well as the gears 38, 39 are in substance known from the above cited prior specification.

Fig. 1 shows the parts in that position which they occupy after a pick-reading needle has dropped into a hole of the pattern-card 1. That bell-crank lever 8, 9, 10 which supports this reading needle 11 holds, by means of the draw-needle 15, the supporting needle 18 in contact with the upwardly extending web of the lifting-bar 21 and thus above the horizontal or slightly inwardly inclined surface 22 of the angle shaped bar 21.

Starting from the position shown the cam-discs 23 begin to lift the lifting bar 21. Therefore the supporting needle 18 resting in the path of this bar is lifted also. Consequently this supporting needle 18 turns upwardly the corresponding vibrator-lever 25 whereby the harness-controlling lever 31 is turned substantially as described in the above cited prior specification and in the United States Letters Patent No. 770,168 of September 13th, 1904.

When the left hand extremity of the slot 34 in the gear 27 reaches the pin 35 on the vibrator-lever 25, the rotation of the gear 27 stops. At the same time the lifting-bar 21 is lowered so that the vibrator-lever 25 returns to the position shown. The shaft 7 now receives a partial rotation by means of the cam 5 on the shaft 6 said cam engaging a lever 36 fixed on the shaft 7. Thus the rod 13 turns the bell-crank levers 8, 9, 10 so that the reading-needles are lifted out of reach of the cylinder 2.

At the same time by this partial rotation the supporting needle 18 is swung backward (to the right in Fig. 1 and to the left in the modified form of Fig. 3) by means of the spring 19 surrounding the draw-needle 15 so as to bring the lower end of the needle 18 out of the path of the lifting bar 21.

Now the cylinder 2 receives a motion corresponding to a tooth of the wheel 4 by the engagement of cam 5 with said wheel. Then the next pick is read, as the rod 13 is lowered again and permits the bell-crank levers 8, 9, 10 to return to their prior position by the action of the over-weight of that arm which supports the wire 9.

If now a reading needle 11 does not find a hole in the pattern-card 1, the associated bell-crank-lever 8, 9, 10 is stopper by the pattern-card in such a position that the lower end of the associated supporting-needle 18 rests out of the path of the lifting-bar 21 which is now lifted again. Therefore the associated vibrator-lever 25 is not lifted and the gear 27 supported by it is rotated backward by the lower gear 39 in clock-wise direction and returns the harness-controlling lever 31 to its previous position by means of the connector 29 and the arm 30. Afterwards the operations described are repeated.

The cylinder 2 is adapted to be rotated backward in known manner in order, for instance, to release picks which have already been interwoven. For reversing the cylinder a knob 42 which rotates with the driving shaft 41 of the gear 39 is adapted to be deplaced on this shaft in axial direction and to couple therewith one or the other of two spur-wheels 44, 45. The spur-wheel 45 directly engages with a spur-wheel 47 fixed on the shaft 6, the spur-wheel 44 engaging with a transmission wheel 48 rigidly connected with a spur wheel 46 engaging with the spur-wheel 47. Thus according as the wheel 44 or the wheel 45 is coupled with the shaft 41 by the knob 42, the shaft 6 is rotated in one or the other direction. In an intermediate position of the knob 42 neither of the spur-wheels 44, 45 is coupled with the shaft 41 and the whole pick-reading mechanism is at rest.

When the cylinder 2 is to be rotated backwardly by hand, all reading-needles 11 must be removed therefrom. But in removing of reading-needles which have previously been dropped into the cylinder the position of the associated harness-controlling levers and shafts should not be altered. To obtain this the springs 19 which surround the draw-needles 15 are made such that the tension produced in said springs by the backward motion of the bell-crank levers 8, 9, 10 (in Fig. 1 in clockwise direction) is not sufficient to remove the supporting needles 18 from the surface 22 and to bring them out of the path of the lifting bar 21, when said supporting needles rest upon the surface 22 and are loaded by the vibrator-levers 25. In order to increase security in this respect, said face 22 which serves for supporting the supporting-needles is slightly inclined towards the upstanding web of the lifting bar 21.

The described connection between the reading-needles 11 and the lifting-bar 21 enables to remove the reading needles from the cylinder 2 at any convenient moment with-

out influencing other parts of the harness-controlling mechanism.

The mechanism shown and described for transmitting the movement of the pick-reading needles on the vibrator-levers 25 (pick-reading mechanism) may also be used in combination with pattern-cards 1 the full not perforated parts of which effect the lifting of the harnesses. It is only necessary to arrange the lifting bar 21 in the manner as shown in Fig. 3. In this case when a reading-needle 11 drops into a hole of the pattern-card, when therefore the corresponding shaft is not to be lifted, the associated supporting-needle 18 is swung to the left out of reach of the surface 22 of the lifting bar, the associated lever 25 is thus not lifted and the corresponding harness not operated. Supporting-needles 18 however, which belong to reading needles resting upon not perforated parts of the pattern-card remain above the horizontal or slightly inclined web of the surface 22 of the lifting bar 21, and consequently the associated shaft is lifted.

What I claim is:

1. In a shedding mechanism for looms, the combination of an endless pattern-card of Verdol-paper or like thin light material, with a pick-reading device comprising pick-reading needles hanging above said pattern-card and adapted to be lowered on to this pattern-card to read the picks therefrom in unloaded condition while it is at rest balanced levers on which said pick-reading needles are suspended, a harness-controlling mechanism comprising a vibrator-lever arranged in reach of said pick-reading device, the position of this lever depending on the position of the associated reading-needle relatively to the pattern-card, a vibrator-gear located between two cylinder-gears to alternately be brought in reach of one or the other thereof according to the position of said vibrator-lever, and a harness-controlling lever connected with said vibrator-gear.

2. In a shedding mechanism for looms, the combination of an endless pattern-card consisting of thin light material, 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 the pattern-card, a series of pendulously mounted supporting needles, a lifting means located below this series of supporting needles, a vibrator-lever mounted above each of these needles, a vibrator-gear pivoted on this lever, a harness-controlling lever movably connected with said vibrator gear, and two cylinder-gears adapted to alternately rotate the vibrator-gear in opposite directions according to the position of the associated pick-reading needle relatively to the pattern-card.

3. 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 bell-crank levers loosely mounted on a common rod, pick-reading needles hanging on these levers above the pattern-card, a series of pendulously mounted supporting needles, draw-needles each of which loosely connects one of said bell-crank levers with one of said supporting needles, a lifting bar extending underneath said series of supporting needles and adapted to perform a reciprocating up and down movement, a vibrator-lever located above each of said supporting-needles, a harness controlling-lever movably connected with said vibrator-lever, the connection between each of said draw-needles with the associated bell crank-lever on one side and the corresponding supporting-needle on the other side being such that at the moment where the corresponding reading-needle reads a pick on the pattern-card, the position of the associated supporting needle relatively to the lifting bar is controlled by said draw-needle in such a manner that according to said position the supporting needle is lifted or not in the following upward motion of the lifting bar and accordingly said vibrator lever and the harness-controlling-lever are operated or rest in their former position.

4. In a shedding-mechanism for looms according to claim 3, a spring surrounding the draw-needle between the upstanding arm of the associated balanced bell-crank lever and the corresponding supporting needle in such a manner that swinging of the unloaded supporting needle is effected in one direction by traction exerted by the bell-crank lever upon the draw-needle, in the other direction by pressure exerted by said bell-crank lever upon said spring.

5. In a shedding mechanism for looms according to claim 3, a spring surrounding each draw-needle between the upstanding arm of said balanced bell-crank lever and the associated supporting needle, said spring being made so as to not increase the pressure exerted by the reading needle upon unperforated parts of the pattern-card and that, when the associated supporting needle is loaded by the corresponding vibrator-lever of the harness-controlling device, in removing the reading-needle from the pattern card the tension of the now pressed spring is not sufficient to remove the supporting needle from its bearing on the lifting-bar.

6. In a shedding mechanism for looms, according to claim 3, a lifting-bar located on the opposite side of the axis of rotation of the bell-crank levers than the pick-reading needles and adapted to periodically perform a reciprocating up and down motion, this lifting bar, on the side opposite said bell-crank levers, forming a step having an upstanding and a lying web, a supporting needle being pendulously suspended between

said lifting-bar and a vibrator-lever of the harness-controlling device and connected with the associated balanced bell-crank lever in such a manner that when the associated reading-needle drops into a hole of the pattern-card the supporting-needle is brought into the path of the lying web of the lifting bar by said bell-crank lever and is thus adapted to lift the associated vibrator-lever in a position for operating the harness-controlling device.

7. In a shedding mechanism for looms according to claim 3, a series of balanced bell-crank levers each having one arm extending over the pattern-card, a pick-reading needle hanging down from this arm, the other arm being movably connected with a pendulously mounted supporting needle, a vibrator-lever mounted above said supporting needle, a harness controlling device connected with said lever to be brought in and out of operation thereby, a lifting bar extending underneath the series of said supporting-needles, means adapted to impart to this lifting bar periodically a reciprocating up and down movement, said lifting bar being provided on the side of the bell-crank lever with a step having an upstanding and a lying web in such position relatively to the supporting-needles that on dropping of the associated reading-needle into a hole of the pattern card the supporting needle is drawn out of the path of the lying web of said step by the bell-crank lever so that the upward movement of the lifting-bar does not influence upon the vibrator lever of the harness-controlling mechanism.

In testimony whereof I have affixed my signature.

HUGO STÄUBLI.