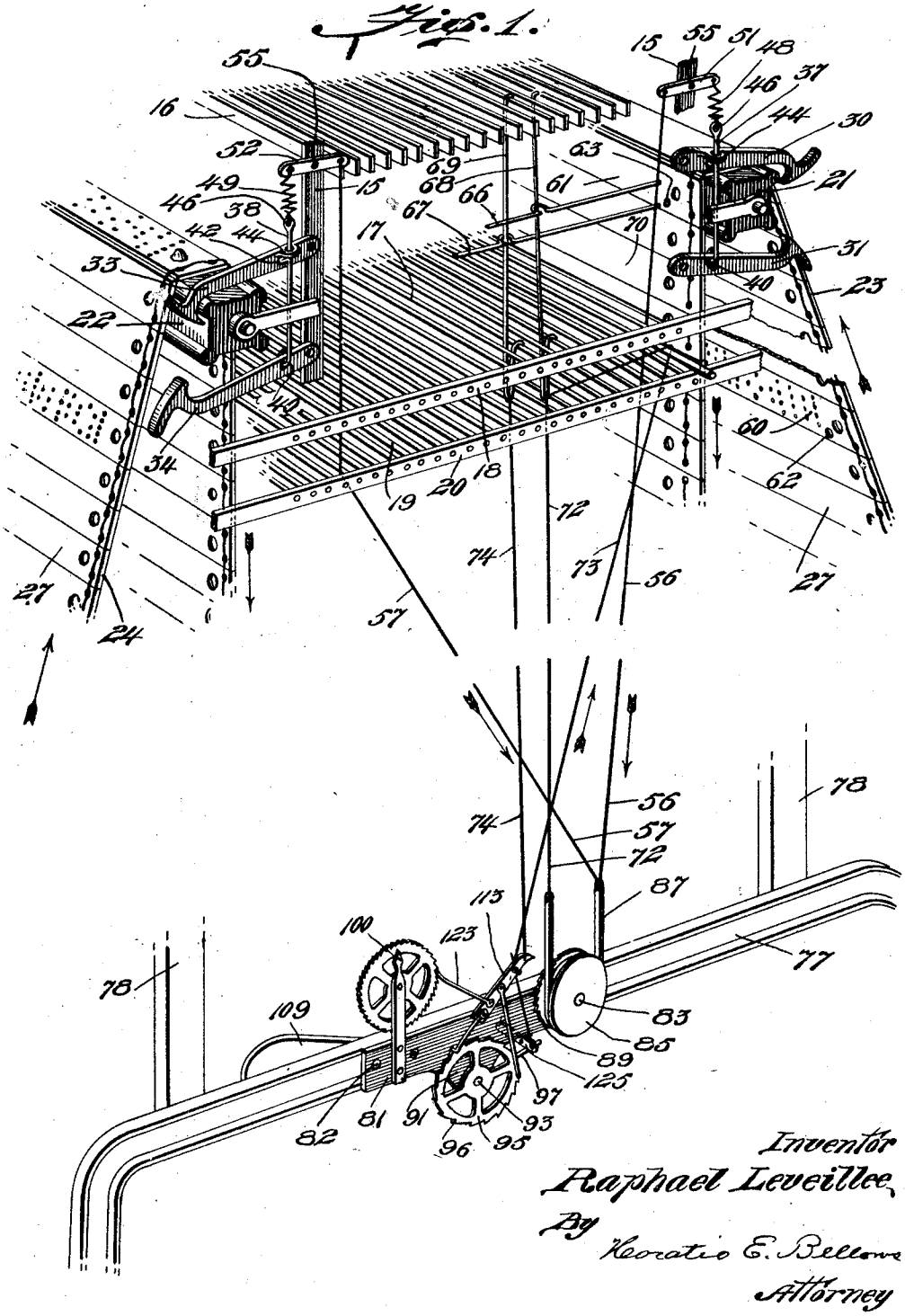
July 24, 1928. 1,678,121

R. LEVEILLEE

PATTERN REVERSING MECHANISM

Filed Aug. 29, 1927 3 Sheets-Sheet 1

Fig. 1.



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Fig. 2.

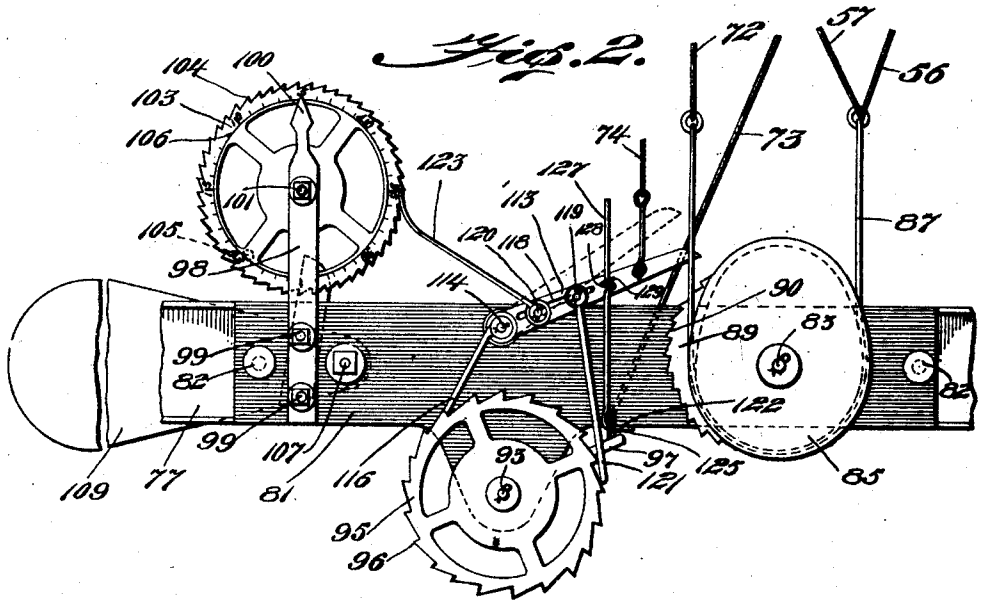
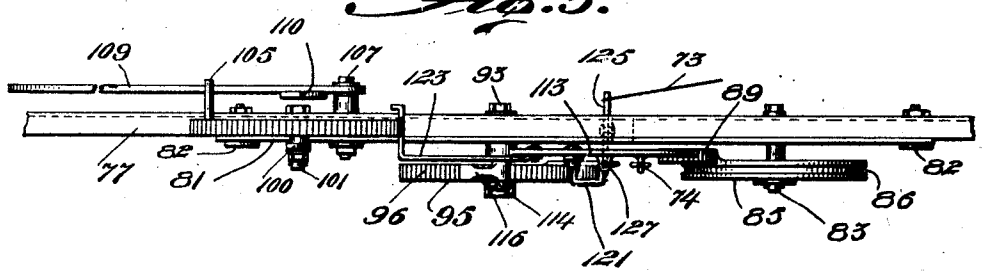


Fig. 3.



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Fig. 4.

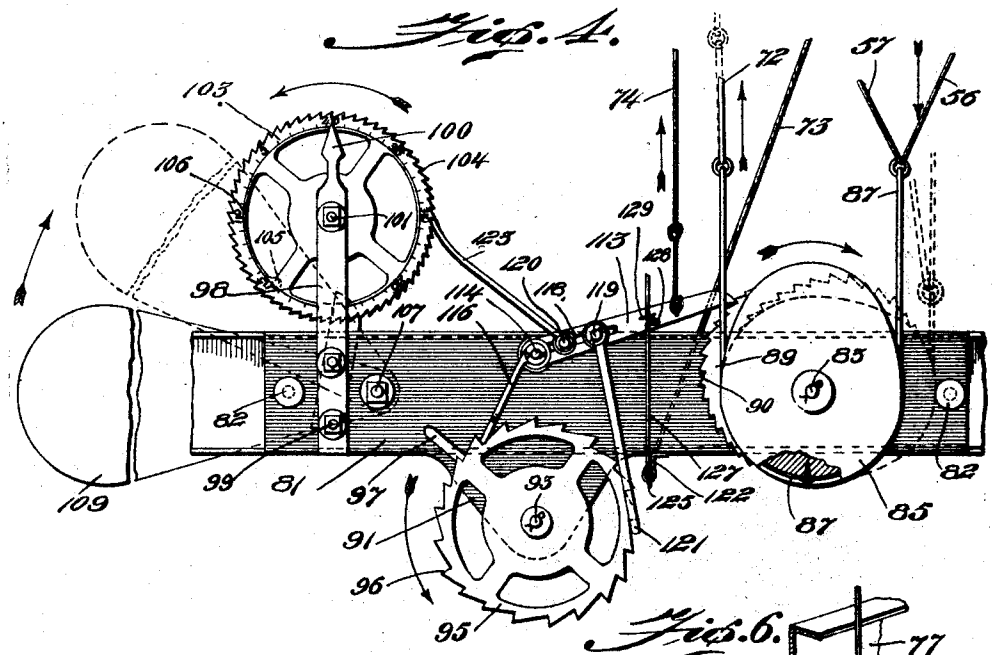


Fig. 6.

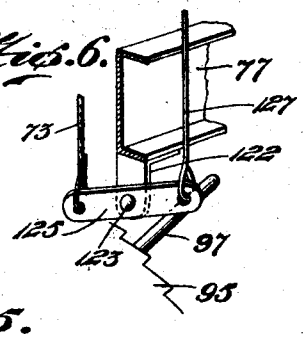
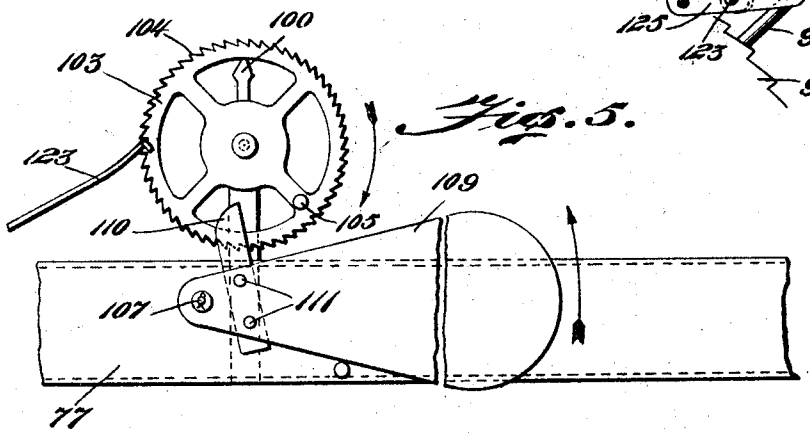


Fig. 5.



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UNITED STATES PATENT OFFICE.

RAPHAEL LEVEILLEE, OF ESMOND, RHODE ISLAND.

PATTERN-REVERSING MECHANISM.

Application filed August 29, 1927. Serial No. 216,009.

My invention relates to Jacquard or pattern loom mechanisms, and particularly to a supplemental mechanism adapted to cooperate with the usual jacquard mechanism to automatically control or vary the direction of movement of the pattern cards. My mechanism is especially effective in assisting correction of weaving errors and in facilitating the weaving of a series of designs separated at intervals by "headers" or by other transversely disposed non ornamental areas.

The essential objects of my invention are to automatically reverse the run of the pattern cards at any predetermined point; to automatically resume the original direction of run after such reversal; to effect a multiple of such reversals in succession; to prevent waste of the woven material; to save weaving time and reduce the labor of the attendant; and to insure these results without structural change of the jacquard portion or the weaving portion of the loom.

To the above ends essentially my invention consists in such parts and in such combinations of parts as fall within the scope of the appended claims.

In the accompanying drawings which form a part of this specification

Figure 1 is a fragmentary perspective view of a double cylinder Jacquard loom with my auxiliary or suplemental mechanism applied thereto or embodied therein, parts of the jacquard motion and loom mechanism unnecessary for an understanding of the invention being omitted,

Figures 2 and 3, a fragmentary front elevation and a plan view respectively of a portion of my auxiliary mechanism,

Figure 4, a front elevation of the same showing the parts in another operative position,

Figure 5, a rear elevation of the counting wheel and signal arm, and

Figure 6, a fragmentary perspective view of the tension lever and adjacent parts.

Like reference characters indicate like parts throughout the views.

In the construction illustrated 15 represents the frame, 16 the griff bars or knives, 17 the cross wires, 18 the grate, 19 and 20 the line separating rods and grate, 21 and 22 the main and auxiliary card cylinders, 23 and 24 the respective card chains, and 27 the pattern cards of a jacquard mechanism. The usual upper and lower pawls or catches 30 and 31 cooperate with the lantern portion of the cylinder 21 while the corresponding catches 33 and 34 cooperate with the cylinder 22. 37 and 38 represent the lifting pins or upright wires connecting catches 30, 31 and 33, 34 respectively. In conjunction with the above suggested jacquard operating parts the construction of my mechanism will be understood by one familiar with the art.

In this instance each lifting pin has a terminal loop or hook 40 engaging a lower catch, and an intermediate shoulder 42 supporting a lateral lug 44 upon the upper catch, the lug having a perforation through which loosely projects the upper portion of the pin terminating in an eye 46. Engaging the eyes of the lifting pins 37 and 38 are the lower ends of helical springs 48 and 49 respectively whose respective upper ends are attached to the outer ends of levers 51 and 52 pivoted intermediate their lengths upon studs or pins 55 fixed in the jacquard frame. To the inner ends of the levers 51 and 52 respectively are attached cords 56 and 57 to which reference will hereinafter be made. For the purposes of my invention two cards of the chain 23 indicated by the numerals 60 and 61, and which are separated from each other by a plurality of intervening cards, have in their corresponding end margins holes 62 and 63 respectively, independent of the pattern holes. Arranged to cooperate with these special or independent holes are two jacquard needles 66 and 67 engaging corresponding hooks or uprights 68 and 69 adapted to be engaged by two of the knives of the knife series, and operated in conjunction with the cylinder 21 by the same mechanism and in the same manner as are the pattern needles and uprights. The chain 23 includes the usual cutting line card 70 for its usual function. Instead of being connected with the harnesses the upright 68 has attached to its lower end cords 72 and 73, and the uprights 69, a cord 74, to which three cords reference will hereinafter be made.

77 represents the arch of the weaving portion of the Jacquard loom, and 78 the vertical extensions carried by the weaving portion for supporting the jacquard portion of the loom frame. It will be understood that the supports 78 may be omitted when the jacquard mechanism is, as is usual, mounted independently of the loom proper. Fixed to the arch 77 or to an attaching plate 81

in turn fixed by bolts 82 or otherwise to the arch, is a stud 83 upon which is loosely pivoted an eccentric cam shaped roller 85 provided with a peripheral groove 86 to receive a strap 87 to one end of which is attached the lower ends of the cords 56 and 57, and to whose other end is attached the cord 72. A portion 89 of the roller periphery has inclined teeth 90.

A depending extension or bracket arm 91 upon the plate 81 has a stud or pin 93 upon which is rotatably mounted a locking and timing wheel 95 with ratchet teeth 96. The wheel has sufficient frictional engagement with its stud to resist accidental rotary movement. A radially projecting finger 97 is fixed to the rear face of the wheel. Adjacent the wheel 95 is a vertical bracket 98 fixed by bolts 99 to the plate 81, and provided upon its upper extremity with a pointer 100. Upon a pin or stud 101 in the bracket is rotatably mounted an indicator ratchet wheel 103 provided with the usual teeth 104. A pin or projection 105 extends from its rear face. The front face of this wheel has a marginal annular scale of graduations 106. A pivot pin 107 in the arch 77 and plate 81, is subjacent to the wheel 103, and has pivoted thereon a signal arm 109. A cam finger 110 is fixed by rivets 111 to the signal arm transversely thereof and projects therefrom into the path of the pin 105. A pawl 113 is loosely pivoted to the plate 81 by means of a stud 114 located intermediate the members 85, 95 and 103, and is adapted to engage the teeth upon the eccentric roll 85. A detent arm 116 is also loosely pivoted upon the stud 114 and is adapted to engage the teeth 96 of the ratchet wheel 95 to prevent accidental movement thereof. The pawl 113 is provided with a longitudinal slot 118 in which are adjustably fixed pivot pins 119 and 120. The former pin has pivotally mounted thereon a ratchet hook 121 engaging the teeth 96 of the wheel 95. On the pin 120 is pivoted a ratchet arm 123 angaging the teeth 104 of the wheel 103. The free end of the pawl is attached to the cord 74. The plate 81 or the loom arch 81 is provided with a depending bracket 122 in which is a pin 123 upon which is pivoted intermediate its length a tensioning lever 125 which extends transversely of the plate 81 and loom arch. The forward end of the lever has pivoted thereto the lower end of a link or rod 127 which passes loosely through a laterally extending eye or ring 129 upon the pawl 113. The link 127 has intermediate its length a shoulder 128 adapted to receive the weight of the pawl 113. The opposite end of the lever 125 has attached thereto the lower end of the cord 73.

In operation indicator wheel 103 is initially set to indicate the number or extent of designs desired to be advanced before a reversal of patterns is effected. When the pattern card chain 23 has completed the travel incident to the weaving of one individual design or unit and the cutting line card 70 has passed, the pattern card 61 becomes so positioned that a subsequent inward movement of the cylinder 21 will bring the opening 63 into registration with the needle 67, and the upright 69, is permitted to move into such position that the next upward and downward movement of its particular griff knife will effect a reciprocation thereof which movement is transmitted through the cord 74 to the pawl 113 whose ratchet arm 123 rotates, step by step, the indicator ratchet wheel 103 to indicate the number of designs completed. These movements are repeated after the completion of each design unit, and each repetition causes to advance the indicator wheel 103 one tooth towards its final count. After the beginning of the final design the cam finger 110 is progressively engaged by the pin 105, and the signal arm 109, is gradually elevated to attract the attention of the operator to notify him that the determined number of designs is nearly completed and that the automatic reversal mechanism may be set. This setting is effected by grasping the finger 97 and turning the wheel 95 clockwise until the finger assumes the position shown in Figure 4. The withdrawal of the finger 97 from the lever 125 permits the lever 125 to pivot to relax tension upon the cord 73, which normally holds the upright 68 out of the path of its griff knife, and to drop the link 127, permitting the pawl 113 to engage the teeth 89 of the eccentric reversing roll 85, as shown in Figure 4.

The wheel 95 is a timing and locking device by which the number of successive reversals necessary to weave a certain length of header is regulated. After setting, this wheel is returned, step by step, to its original position by the reciprocation of the pawl 113 and ratchet hook 121.

When tension on cord 73 was relaxed the upright 68, upon registration of its needle 66 with the hole 62 assumed a vertical position, and was thereupon adapted for engagement with its griff knife, and upon the first rise of the knife thereafter translated said movement into a pull of the cord 72, thereby rotating clockwise the reversing roll 85 about a quarter turn to the position shown in broken lines in Figure 4. The clockwise motion of the reversing roll 85 through the medium of its strap 87 pulls downwardly upon cords 56 and 57, thereby reversing both pairs of cylinder hooks 30, 31 and 33, 34, whereupon the next outward movement of the cylinders 21 and 22 results in the reversing of the cylinders, and upon the next inward movement of the cylinders the reversing hooks 31 and 34 through the resilien-

cy of the springs 48 and 49 are permitted to ride over and properly engage the corners of the cylinders. The reversal of the cylinders reverses the travel of the pattern chains, and this reverse travel continues until the pattern card 61 of the chain 23 is in such position that the next inward movement of the cylinder 21 will effect registration of the opening 63 with the needle 67, whereupon the upright 69 assumes a position adapted to be engaged and raised by its griff knife upon the next upward movement thereof. The raising of the upright 69, through the medium of the cord 74, lifts the pawl 113 from contact with the teeth 89 of the reversing roll 85. The roll 85 is now returned to the full line position shown in Figure 2 by reason of the tension exerted by the springs 48 and 49 distributed through the connecting cords 56 and 57 to the strap 87 of the reversing roll. This return causes the cylinder hooks 30, 31 and 33, 34 to return to their original positions and the loom now resumes direct weaving.

The cycle of operations intervening between the setting of the wheel 95 and the returning to original position of the reversal roll 85 is alternately and automatically repeated until the wheel 95 resumes its original position with the finger 97 again locking the lever 125 in its original position. In such original position the lever 125 functions to maintain all the reversal mechanism inactive until a second setting of the wheel 95 is effected. During this inactive period the pawl 113 again reciprocates between the points indicated by the full lines and broken lines in Figure 2, and resumes its normal function operating the indicator wheel 103. During the above described cycles of operation the alternate periods thereof have resulted in weaving an intervening area of cloth commonly called the header comprising a series of repetitions of a portion only of the entire design.

I claim:—

1. The combination of a card cylinder, means for operating the cylinder, means for reversing the operation, a counter connected with the operating and reversing means, an indicator or signal, and means controlled by the counter for bringing said indicator or signal into display position preliminarily to the initiation of the reversing means.

2. The combination of a card cylinder, means for operating the cylinder, means for reversing the operation, a counting wheel operatively connected with the operating and reversing mechanism, a pin on a side of the wheel, a signal arm pivotally mounted adjacent the wheel, and a finger on the arm projecting into the path of the pin to be engaged thereby and bring the arm into display position.

3. The combination of a card cylinder, means for operating the cylinder including a pair of opposed pawls, a chain of cards driven by the cylinder, a pair of uprights engageable with the operating means and normally inactive, a pair of direction needles engageable with selected cards to set the uprights in active position, a reversing roll connected with one of the uprights and with the pawls, and a timing and locking device connected with the two uprights and engageable with the reversing roll.

4. The combination of a card cylinder normally rotating in one direction, means for operating the cylinder, a reversing roll, means connected with the operating mechanism for rocking the roll and reversing the direction of rotation of the cylinder, and a timing and locking device connected with the operating means and engageable with the reversing roll to maintain the rotation through a predetermined interval.

5. The combination of a card cylinder, means for operating the cylinder, a reversing roll actuated by the operating means to reverse the direction of rotation of the cylinder, a timing and locking wheel, means controlled by said wheel to restore normal direction of travel to the cylinder, and means actuated by the operating means to maintain the roll in the reverse position and drive the timing wheel to effect restoration of the normal direction of travel.

6. The combination with a card cylinder, and means for operating the same, of a tension lever connected with a part of the operating means, a reversing roll connected with the same part of the operating means whereby upon release of the tension lever the roll will be active, a timing and locking wheel, an element for setting said wheel, said element normally holding the tension lever against release, and means for actuating the timing and locking wheel through a predetermined interval to return the parts to normal, said means being normally held inactive by the tension lever.

7. The combination of a card cylinder, and means for operating the same, including a pair of opposed pawls, of a pair of card and needle controlled uprights actuated by the operating means, a reversing cam, a flexible connection between one of the uprights and the pawls, said connection being trained around the cam, a ratchet on the cam, a timing and locking wheel adjacent the cam, a pawl adapted to engage the ratchet on the cam, a connection between the pawl and the second upright, means on the pawl for actuating the timing and locking wheel, a tension lever below the pawl, a connection between one end of the lever and the first upright, a setting arm on the wheel normally abutting the tension lever to maintain the last-mentioned connection under tension, and a link carried by the tension

lever and normally holding the pawl raised in inoperative position.

8. The combination of a card cylinder, means for operating the cylinder, means for reversing the operation, an indicator or signal, and means for bringing said indicator or signal into display position preliminarily to the initiation of the reversing means.

9. The combination of a card cylinder, means for operating the cylinder, means for reversing the operation, a counter connected with the operating and reversing means, an indicator or signal, and means for bringing said indicator or signal into display position preliminarily to the initiation of the reversing means.

In testimony whereof I have affixed my signature.

RAPHAEL LEVEILLEE.