(No Model.) 3 Sheets—Sheet 1.

A. R. PATTEN.

JACQUARD MECHANISM FOR LOOMS.

No. 578,068. Patented Mar. 2, 1897.

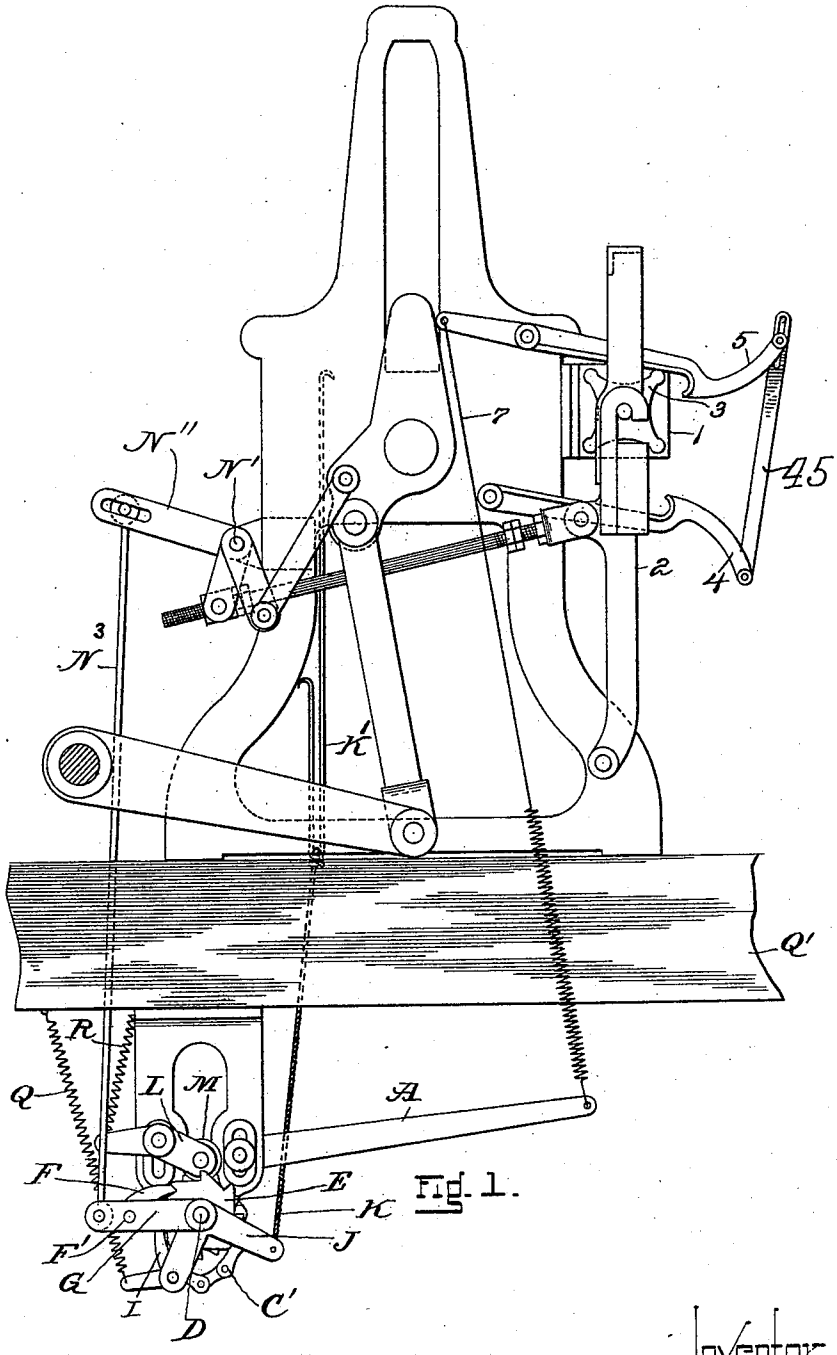

Fig. 1.

Witnesses.
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his Attorneys

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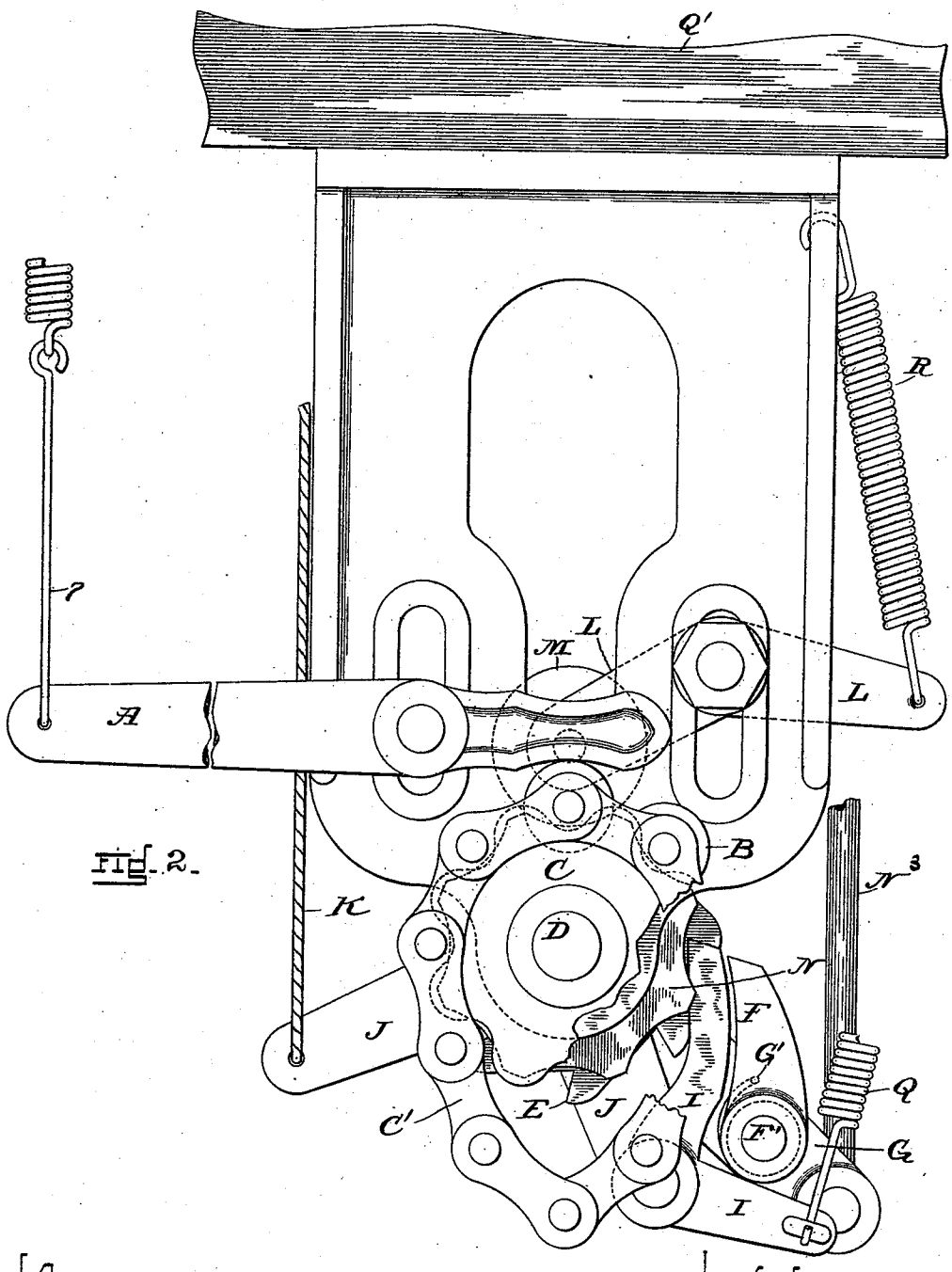

Fig. 2.

Witnesses.
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(No Model.) 3 Sheets—Sheet 3.

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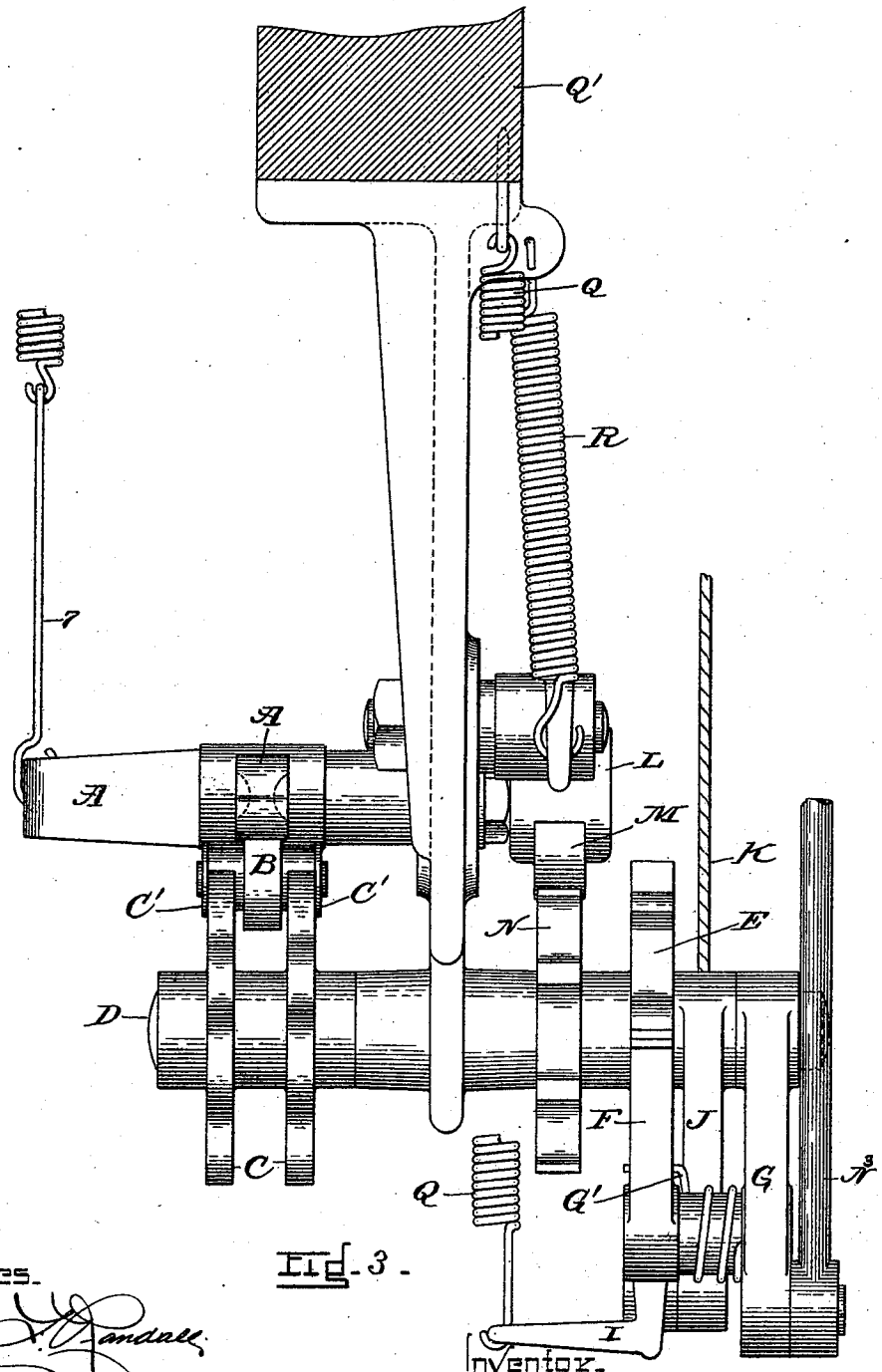

Fig. 3.

Witnesses.
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UNITED STATES PATENT OFFICE.

ALONZO R. PATTEN, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO THE KNOWLES LOOM WORKS, OF WORCESTER, MASSACHUSETTS.

JACQUARD MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 578,068, dated March 2, 1897.

Application filed December 14, 1896. Serial No. 615,665. (No model.)

To all whom it may concern:

Be it known that I, ALONZO R. PATTEN, a subject of the Queen of Great Britain, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Jacquard Mechanism for Looms, of which the following is a specification, reference being had therein to the accompanying drawings.

Certain classes of woven goods—such, for example, as table-covers and the like—are characterized by having cross-borders at the opposite ends thereof and an intermediate body portion having some suitable pattern, there being usually a number of repeats of the said pattern of the body between the two cross-borders pertaining to a table-cover or the like article. For the weaving of goods of such classes it is required that the jacquard mechanism of the loom in which the weaving is effected should be equipped with cards that are punched in accordance with the pattern in the body of the goods intermediate the cross-borders and also with cards that are punched in accordance with the pattern of the cross-borders. In the case of ordinary jacquard mechanisms it is necessary to employ a great number of cards, one card for every pick in the entire length of a table-cover. This renders the set of cards very expensive and adds very much to the cost of weaving the goods.

The object of the present invention is to reduce greatly the number of cards which it is necessary to employ, and thereby to lessen the expense, as well as to obviate the various disadvantages and inconveniences which are incident to the employment, handling, and storing of an extended series of cards.

The invention consists in the combination, with the feeding devices for the cards of a jacquard mechanism, of certain devices whereby the working of the said feeding devices is controlled automatically, with the result that the direction of rotation of the said devices is reversed from time to time as often as a repeat of either the pattern of the cross-border or that of the body should occur.

The invention will be described first with reference to the accompanying drawings, in which I have represented the best embodiment thereof which I have yet contrived, after which the distinguishing characteristics of the invention will be particularly pointed out and distinctly defined in the claims at the close of this specification.

In the drawings, Figure 1 shows in side elevation the said embodiment of the invention, sufficient of the working parts of the jacquard mechanism being illustrated to render clear the relations and working of the invention. Fig. 2 is a view looking from the left in Fig. 1 and showing the auxiliary pattern devices detached, but only a portion of the pattern-chain. Fig. 3 is a view from the rear in Fig. 2, only a small part of the pattern-chain being shown.

1 is a prism of the jacquard mechanism, around which passes the series of cards, (not shown,) and 2 is a support for the said prism, the said support being of any suitable or convenient character and being moved in known manner to carry the prism and the card resting against the inner face thereof inward into contact with the ends of the usual needles and then outward away from the ends of the needles.

3 is the wheel that is connected with the said prism to facilitate the turning of the latter, and 4 5 are the pawls which engage with the projections of the said wheel in the outward movements of the prism to occasion the turning of the prism while it is out of contact with the ends of the needles, 45 being the usual rod by which said pawls are connected so as to move in unison. The said pawls act to rotate the prism in opposite directions, and the direction of rotation of the prism at a given time is determined by whichever of the said pawls is permitted to come into engagement with the wheel 3.

The foregoing are all as usual, and the working thereof is well understood by those who are skilled the art.

In carrying my invention into effect I apply to the pawls 4 and 5 a connection, such as 7, which is joined to the outer end of the operating-lever A for the pawls. The inner end of the said lever is arranged to project over a cylinder C, around which latter is passed a pattern-chain C', having balls B ap-

plied thereto, the sequence of balls and empty spaces on the said pattern-chain being, as prearranged, in order to conform with the exigencies of the weaving. A ball on the pattern-chain coming under the inner end of lever A acts to move the said lever, with the effect of placing pawl 4 in position to engage wheel 3, so as to cause the prism to be rotated in one direction, while when an empty space on the pattern-chain presents itself beneath the inner end of lever A the pawl 5 comes into position to cause the prism to be rotated in the opposite direction. The cylinder C is fast upon the shaft D, which latter has fast thereupon also the ratchet E and the notched detent-wheel N. The ratchet E is engaged for the purpose of rotating the shaft D and parts fast thereon by pawl F, the latter being pivoted on a pin F′, projecting from an arm G, which is mounted loosely upon the shaft D, the said pawl being pressed toward the teeth of the ratchet E by a spring G′. The notches of the detent-wheel N are entered in customary manner to prevent overrunning of shaft D and the parts that are fast thereon by a detent consisting of a roll M, mounted on a lever L, that is acted upon by a spring R. For the purpose of actuating the arm G and pawl F carried thereby the said arm is connected by the rod N^3 to the arm N″ on the moving shaft N′ pertaining to the jacquard mechanism, or the rod N may transmit movement to the arm G from any other suitable moving part.

The operation of so much of the mechanism as has been described will be obvious, and is in substance as follows: Whenever a ball B upon the pattern-chain C′ is present under the inner arm of lever A, the pawl 4 is held thereby in position to operate the prism and feed the chain of cards in one direction, and when a space upon the said pattern-chain comes underneath the said inner arm of lever A the pawl 5 is caused to become operative to operate the prism and feed the chain of cards in the opposite direction. In order to enable the length of the pattern-chain to be reduced, I combine with the pawl F devices whereby to determine the times at which the same shall be permitted to engage with the ratchet C. Thus I mount loosely upon shaft D a bent lever or bell-crank J, one arm of which is connected by a cord or the like K with one of the hooked uprights K′ of the jacquard mechanism. To the other arm of lever J, I pivot the pawl-lifter I, the end of which is caused to bear against the face of ratchet E, below pawl F, by means of spring Q, one end of which latter is connected with the timber Q′, while the other end thereof is connected with the projecting tail of the pawl-lifter I. The spring Q causes the pawl-lifter I to occupy normally a position which keeps the actuating-pawl F raised from engagement with the adjacent tooth of ratchet E, so that ordinarily the pawl F in its movements fails to actuate the said ratchet, the shaft D, the cylinder C, and the pattern-chain C′. When, however, a forward shift of the said pattern-chain should take place, the hooked upright K′ is caused to be raised in the working of the jacquard mechanism, and thereby the bent lever J is moved so as to draw the pawl-lifter I out of the way and permit pawl F to engage with a tooth of ratchet E.

In the use of my invention I employ as many cards as are necessary for a cross-border and one repeat of the pattern in the body of the goods. For instance, if one repeat of the pattern in the body of the goods should be eight inches long, and if the goods should contain fifty picks to the inch, there would need to be used four hundred cards for this repeat in addition to the number of cards which might be required for one cross-border. It may be assumed that the weaving has been proceeded with up to the completion of the body portion of a table-cover, also that at this stage the devices act to present No. 1 card of the cross-border and then continue presenting the cards of the cross-border in regular succession, the pawl-lifter I meanwhile holding pawl F out of action. The last of the said cards of the cross-border is perforated so as to cause upright K′ to be raised, whereby pawl-lifter I is retracted and pawl F is allowed to engage ratchet E and cause pattern-chain C′ to be advanced one step. On the descent of hooked upright K′ the pawl-lifter I is caused by spring Q to move again into position to hold pawl F from acting upon ratchet E. A new indicator upon the pattern-chain C′ having by the advance of the latter been presented to lever A, the pawls 4 5 are shifted in position, so as to cause the direction of rotation of the prism to be reversed, so as to feed in the reverse direction the cards of the cross-border. This provides for weaving a second cross-border, namely, the first one pertaining to the next table-cover or other article. On the completion of this second cross-border the last card pertaining to the cross-border is presented to the needles. This card is perforated to occasion retraction of the pawl-lifter I in the manner set forth hereinabove, but inasmuch as the indicator that is presented at this time to lever A is of the same character as that last presented thereto no change occurs in the action of the pawls. The continued feeding of the cards without change of direction causes those pertaining to the body-pattern to be presented successively to the needles until one repeat of the body-pattern has been woven. The last card which is used at this time in the production of the said repeat is perforated to occasion the withdrawal of pawl-lifter I. The action of pawl F now brings a different kind of indicator beneath lever A and causes the pawls to be shifted so as to feed the cards of the body-pattern in the reverse direction. The reversal of the direction of feed of the said cards is effected in the foregoing manner as many times as may be required for the production of the desired length of body, where-

upon the pattern-chain causes the cards of the cross-border to be presented to the needles, and so on, in the manner which has been described.

I have shown and described herein the two pawls 4 and 5 and their connection with lever A. The said pawls constitute a well-known contrivance by means of which to feed the cards intermittingly with capacity for reversal of the direction of feed, and the lever A and its actuating devices herein described serve to occasion the reversal in an automatic manner. Other known arrangements of devices have been proposed and employed by which to feed the cards intermittingly in either direction, and these last admit of being employed and combined in obvious manner with the lever A without departure from the spirit of the present invention. The pattern-chain C′ constitutes a convenient form of pattern-surface, and the balls and spaces thereof constitute indicators which operate in well-known manner to determine the working of the lever A and the parts which are controlled thereby. Any other suitable form of pattern-surface and indicators may be employed, if found desirable.

I claim as my invention—

1. The combination with reversible feeding devices for the cards of a jacquard mechanism, and a lever A by means of which the direction of feed may be reversed, of a pattern-surface having indicators to act upon lever A and determine its action, an actuating-pawl and ratchet for said pattern-surface, a device to control the engagement of said pawl with said ratchet, a hooked upright in the jacquard mechanism, and connections whereby the action of said pawl-controlling device is determined by the movement of the said upright, substantially as described.

2. The combination with reversible feeding devices for the cards of a jacquard mechanism, and the lever A whereby the directions of feed may be reversed, of a pattern-surface having indicators to act upon lever A and determine its action, an actuating-pawl and ratchet for said pattern-surface, a pawl-lifter I, a lever on which said pawl-lifter is mounted, a spring to move the pawl-lifter in one direction, and a hooked upright in the jacquard mechanism connected with said lever and serving to move the pawl-lifter in the other direction, the action of said pawl-lifter being determined by the movement of the said upright, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

ALONZO R. PATTEN.

Witnesses:

LEWIS A. WATERMAN,

THOMAS F. I. MCDONNELL.