J. L. PATTERSON & L. A. GRISSOM.

PATTERN REVERSING JACQUARD.

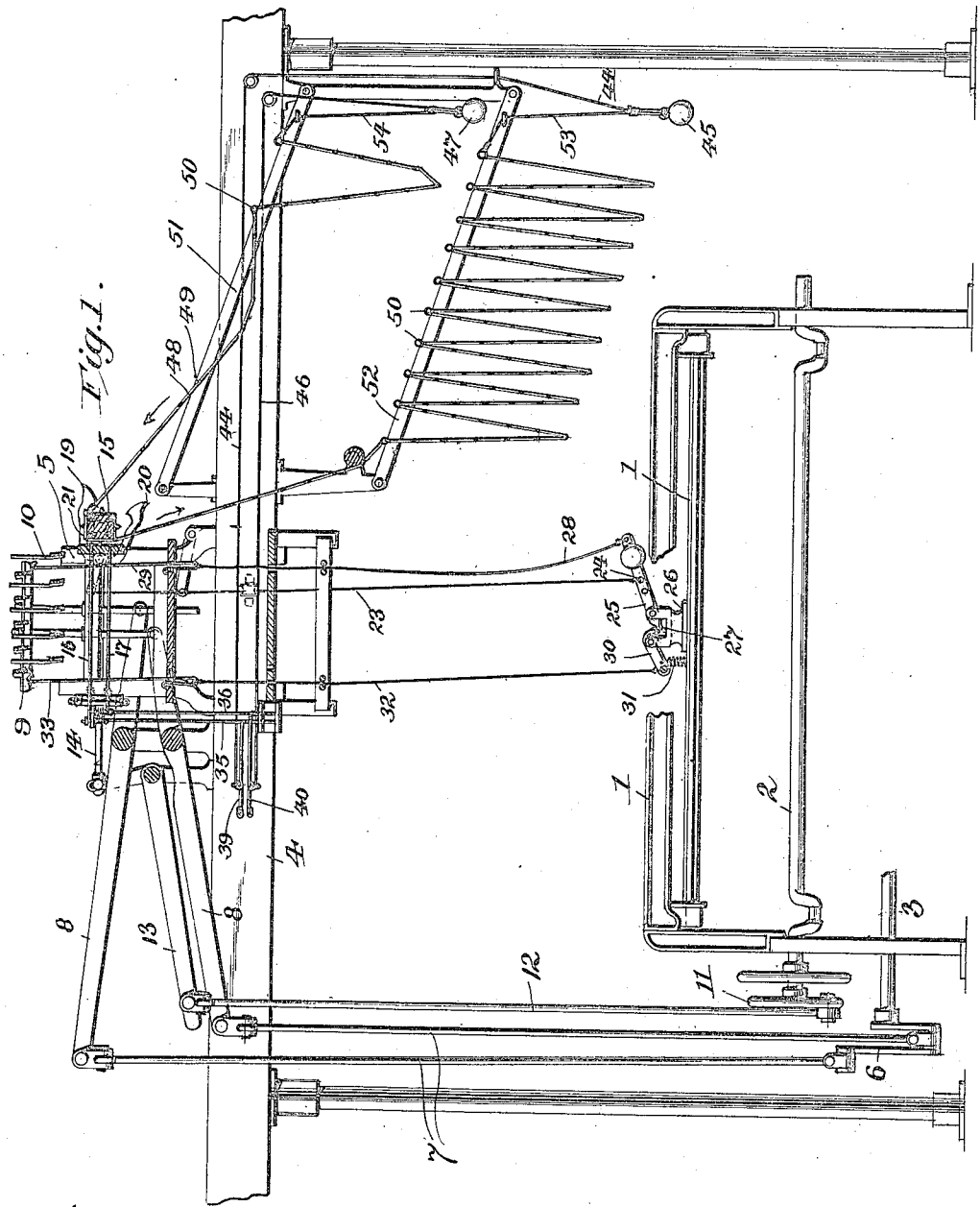
APPLICATION FILED DEC. 23, 1913.

1,151,817.

Patented Aug. 31, 1915.

4 SHEETS—SHEET 1.

Fig. 1.



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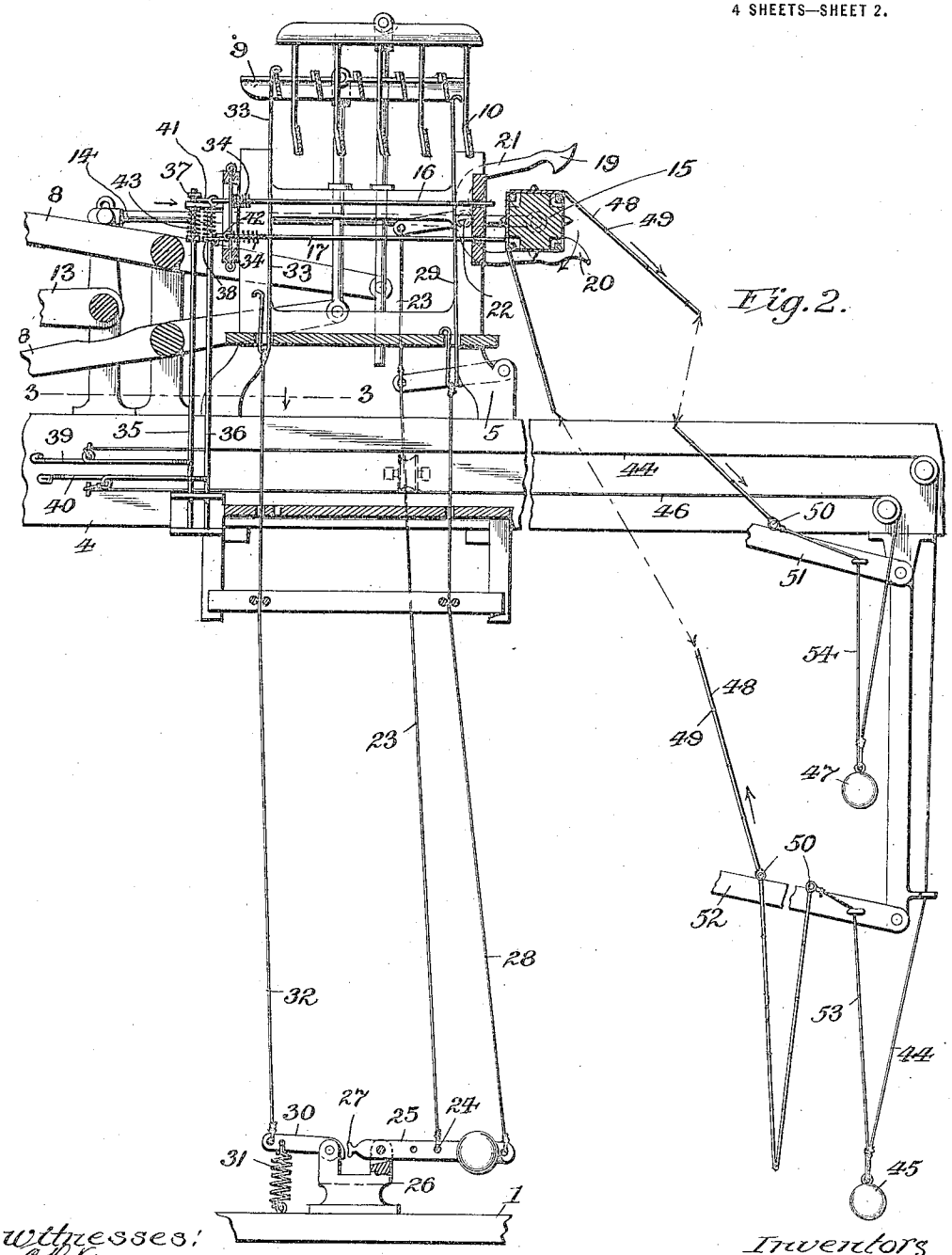


Fig. 2.

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4 SHEETS—SHEET 3.

Fig. 3.

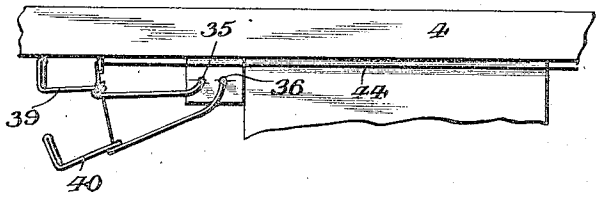


Fig. 4.

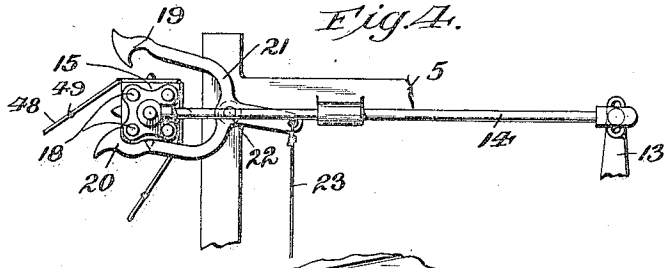


Fig. 6.

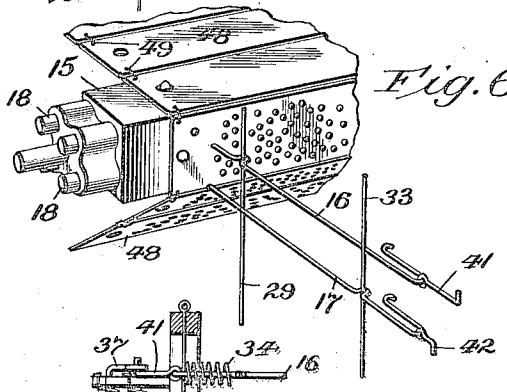


Fig. 7.

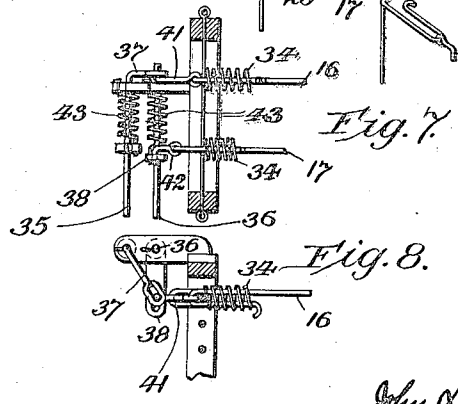


Fig. 8.

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PATTERN REVERSING JACQUARD.

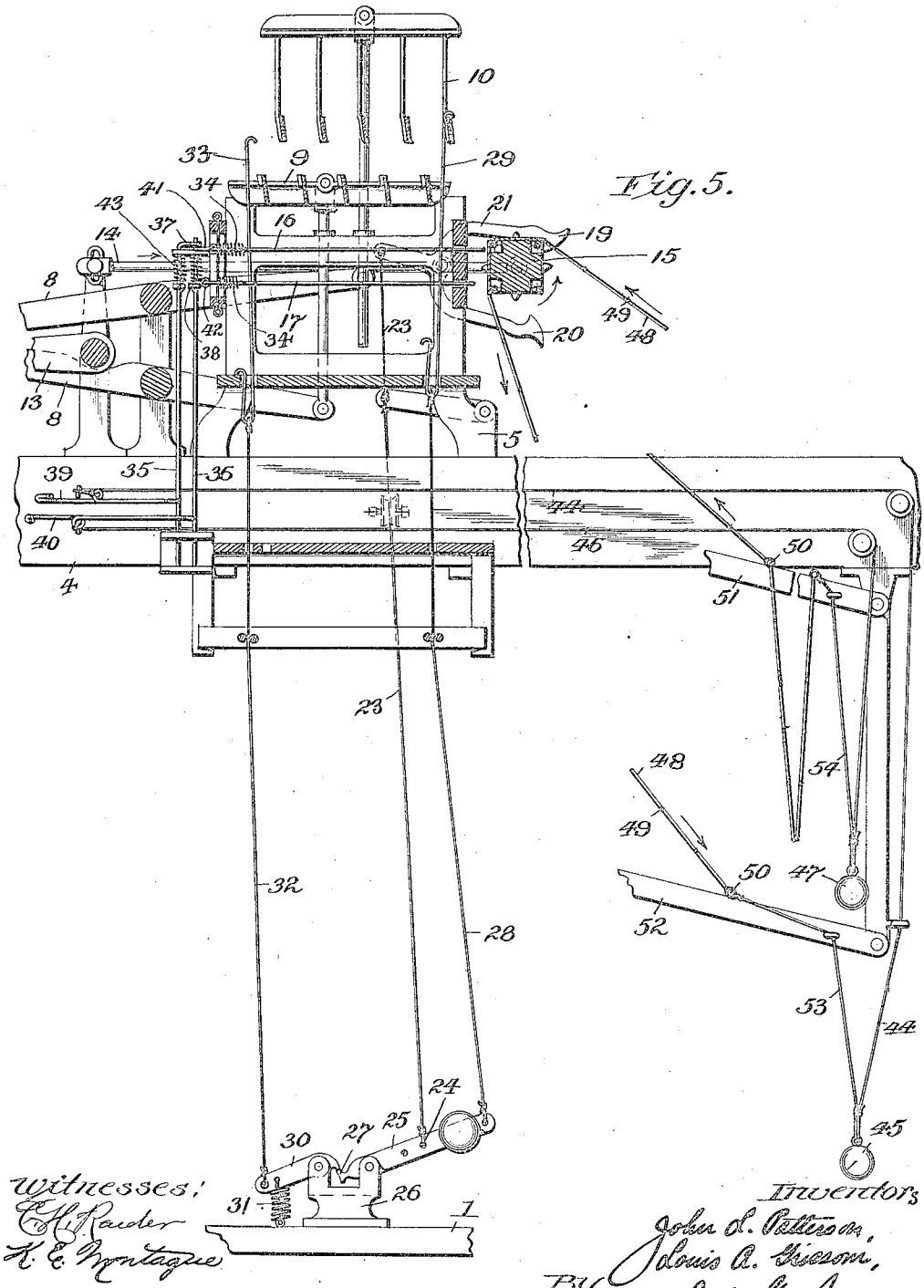
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4 SHEETS—SHEET 4.

Fig. 5.



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UNITED STATES PATENT OFFICE.

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PATTERN-REVERSING JACQUARD.

1,151,817. Specification of Letters Patent. Patented Aug. 31, 1915.

Application filed December 23, 1913. Serial No. 808,488.

To all whom it may concern:

Be it known that we, JOHN L. PATTERSON and LOUIS A. GRISSOM, citizens of the United States, residing at Roanoke Rapids and Rosemary, respectively, in the county of Halifax and State of North Carolina, have invented certain new and useful Improvements in Pattern-Reversing Jacquards, of which the following is a specification.

This invention pertains to jacquard mechanisms for looms, and particularly to means for reversing the direction of travel of the cards past the jacquard cylinder, a result usually attained by reversing the feed pawls or hooks of said cylinder. This type of mechanism has heretofore been used to some extent in weaving patterns which are symmetrical with reference to a line, and possesses the advantage of reducing by one half the number of cards necessary to weave the complete pattern, as compared with weaving without reversing the travel of the cards.

Usually, devices of this character employ two extra needles in the jacquard mechanism, each controlling a corresponding upright or uprights connected with a reversing mechanism for the cylinder drive. In connection with such reverse mechanism the card at each end of the chain or series of cards serving to produce one half of the pattern, has been provided with a perforation positioned to receive one or the other of the extra needles, and thereby through the ordinary action of the jacquard mechanism itself, has served to effect a reversal of the direction of feed of the jacquard cylinder as one or the other end of the card chain approached the limit of its travel. In the operation of such devices, some difficulty has heretofore been experienced by reason of the premature actuation of the reversing mechanism, due to accidental needle indication. The causes of such accidental needle indication have been various, and the result has been heavy loss, imperfectly woven patterns being unsalable, or salable only at extremely low and unremunerative prices.

The purpose of the present invention is hence to provide means to hold back the two needles controlling the reverse mechanism, and maintain them in a neutral or inoperative position away from the cards and cylinder of the jacquard mechanism, until the last card of the pattern moves onto said cylinder and is about ready to come into operative relation with the needles. As the simplest and also one of the most effective means of accomplishing this purpose, weights are employed, which, through connection with the needles, normally hold them back or in inoperative position, but which are so connected with the pattern-cards as to be lifted to free said needles as the last operative card of the series, moving in a given direction, reaches the jacquard cylinder. In this way accidental or premature reversal is positively prevented.

It will be understood that by the terms "last card of the pattern" or "end card of the effective pattern series," etc., we mean the last card which is effective in weaving the pattern, *i. e.*, the card which is presented at the moment of reversal and therefore marks the extreme movement of the pattern series in one direction. This is not necessarily the last card of the chain of pattern cards, as we have found it desirable to attach a series of dummy cards at each end of the chain of cards and the preferred form of the device illustrated in the accompanying drawings is illustrated as equipped with a pattern card series of this character.

The accompanying drawings illustrate an embodiment of the invention applied to a double-lift jacquard, but it is equally applicable to the single-lift type, without change of construction or mode of operation. When applied to a double-lift jacquard, it is necessary either to make use of two uprights, each controlled by a single reversing needle and each connected to the reversing mechanism, or else to use a single upright for each reversing needle, and so time the passage of the cards that the reversing card will indicate the reversing needle at the proper time to bring the reversing upright into engagement with an upwardly moving griff-bar. The device using a single upright being simpler, is illustrated herein, but obviously the double upright arrangement, characteristic of all double-lift jacquards, might be substituted.

In these drawings: Figure 1 is a sectional elevation of a loom and its jacquard mech-

anism, sufficient to illustrate the construction and operation of the mechanism here involved, the parts being shown in the positions they occupy just prior to reversal of the travel of the pattern-cards; Fig. 2 is a similar view showing a portion of the apparatus on a larger scale, the parts being in the position they assume when the last card from the upper cradle is just leaving indicating position, or just after reversal of the pawls or hooks by which the jacquard cylinder is turned; Fig. 3 is a fragmentary sectional view taken on the line 3—3 of Fig. 2, looking downward or in the direction of the arrow; Fig. 4 is an elevation of the jacquard cylinder and the reversing feed pawl thereof; Fig. 5 is a view similar to Fig. 2, showing the last card from the lower cradle just leaving indicating position on the jacquard cylinder immediately after the reversal of the cylinder feed-pawl or hook; Fig. 6 is a perspective view showing the end of the jacquard cylinder, and a portion of several of the pattern-cards and the needles, illustrating their relation one to another; Fig. 7 is a fragmentary elevation of the hold-out mechanism for the needles, showing the upper needle released and in operative position, and the lower needle retracted and held out of operative position, this being the position of parts indicated also in Fig. 5; and Fig. 8 is a top plan view of the parts shown in Fig. 7.

In the drawings 1 represents the loom frame, 2 the crank-shaft of the loom, and 3 the bottom shaft or some other shaft running at half the speed of the crank-shaft.

4 is a gauntree supporting the jacquard frame 5. 6 is a double crank, which through the connecting rods 7 and the rock-levers 8, drives the griff frames 9 and 10, the jacquard illustrated being of what is known as the single-cylinder double-lift type, although as above stated, the improvements may obviously be applied to other types by minor changes which will readily suggest themselves to those familiar with such machinery.

The crank-shaft 2 is provided with a crank disk or wheel 11, which through the connecting-rod 12, bell-crank 13 and slide-rod 14, moves the jacquard cylinder 15 bodily toward and from the needles. These needles being well known and forming no part of the invention, have been omitted with the exception of the two extra needles 16 and 17, which serve to control the reversal of travel of the cards. The end of the cylinder 15 is provided with four lugs 18, which are successively engaged by one or the other of the hooks 19 and 20 rigidly mounted or formed on the yoke 21. This yoke 21, which is pivoted at 22 to the jacquard frame, falls by gravity to bring hook 19, or may be rocked by means of the cord 23, to bring hook 20 into operative relation with the lugs 18. Thus as the jacquard cylinder 15 moves away from the needles, the engagement of successive lugs 18 by either hook 19 or hook 20 serves to rotate said cylinder a quarter revolution in one or the other direction, at each such movement of the cylinder. Obviously, the cylinder 15 may be provided with a different number of faces and with a correspondingly different number of lugs, and obviously also, the feed mechanism may assume other forms, it being merely necessary to adopt some feed mechanism which is capable of giving the desired step-by-step motion for the requisite length of time, first in one and then in the other direction.

The cord 23 extends downward, and is connected at 24 to the weighted arm 25 pivoted in a bracket 26 on the loom frame 1. The arm 25 is provided at one end with a latching-nose 27 of substantially the form shown, and at the opposite end is connected by a cord 28 to an upright 29 which is controlled by the upper needle 16, and which when said needle 16 is retracted, is held back clear of the griff bars. Pivoted in the bracket 26 is a second latch arm 30 also having a latching-nose, said arm being normally drawn downward by a coil spring 31, but adapted to be lifted against the action of said spring by a cord 32 connected to an upright 33 which is controlled by the lower needle 17, and which in the retracted position of said needle is held clear of the griff frames.

The needles 16 and 17 are each urged forward or toward the card-cylinder by springs 34, and if allowed to remain in their normal positions would be moved back by each card presented by the cylinder and not provided with a corresponding hole, and would hence prevent lifting of their uprights by their respective griff bars, if the cards were always properly positioned and the parts functioned properly. To avoid accidental reversals, however, incident to a misplaced card or like cause, we find it desirable to hold the needles 16 and 17 in inoperative position in opposition to the action of the springs 34, except when the last cards of the pattern series or reversal cards are about to be presented on the cylinder. To effect this purpose we mount in suitable supports, two bell-crank levers 35 and 36, having horizontally-extending arms 37 and 38 at their upper ends, and longer horizontally-extending arms 39 and 40 at their lower ends, the arms 37 and 38 being connected by short links 41 and 42 to the needles 16 and 17 respectively. Each of the bell-crank levers 35 and 36 is provided with a coil spring 43 tending to rotate it in a direction to release the needles

16 and 17, and cause them to move forward aided by the springs 34. The arm 39 is connected by a cord 44 to a weight 45, while the arm 40 is connected by a cord 46 to a similar weight 47, and the arrangement of both these cords and weights is such as to rotate the bell-cranks 35 and 36 in opposition to the action of the springs 34 and 43, thus retracting the needles 16 and 17 and maintaining them normally in such position, out of contact with the pattern-cards presented by the cylinder 15.

The pattern-cards 48 are of the usual form, being merely a series of suitably perforated cards, laced together at their edges as indicated at 49. At suitable intervals, say after every twelfth card, a supporting rod 50 is introduced, the ends of which project beyond the cards and rest upon cradles 51 and 52, permitting the intermediate cards to hang down between the bars of the cradles in V-shaped loops, as seen in Figs. 1, 2 and 5. The opposite ends of this chain of cards are connected by cards 53 and 54 to the weights 45 and 47 respectively, and the length of the cords 53 and 54 is such that just before the last effective card of the pattern series near either end of the chain of cards reaches indicating position on the cylinder 15, the corresponding weight 45 or 47 will be lifted by the pull of the cords, thus releasing the bell-crank 35 or 36, and consequently allowing the corresponding needle 16 or 17 to move forward into operative position.

Assuming, for example, that the last card to be indicated in the chain of cards from the upper cradle 51, has reached the position shown in Fig. 2, the needle 17 will remain in its extreme forward position, passing through the hole provided in the card to effect the desired reversal, and carrying the upright 33 into hooking engagement with a griff bar of the rising griff frame. The lifting of the upright 33 raises the latch-arm 30, which releases the latch-nose 27 and allows the weighted arm 25 to fall. The falling of said arm 25 shifts the yoke 21, thus reversing the direction of feed of the cylinder 15. The parts of the mechanism will now retain their new positions, with the exception of the needle, 17, which owing to the reverse movement of the cards and consequent lowering of weight 47, is again retracted. As the last card to be indicated in the chain of cards on cradle 52 approaches the indicating position on cylinder 15, the weight 45 is lifted, thus releasing the bell-crank 35 and its needle 16. When this card reaches the indicating position on the cylinder, as shown in Fig. 5, the needle 16 will pass through the perforation provided for it in said card, carrying the upright 29 into engagement with a griff bar of the rising griff frame, said frame, by lifting the weighted arm 25, permitting the yoke 21 to fall by gravity and again to shift or reverse the drive of the cylinder 15. When the weighted arm 25 is in its lifted position, the nose of latch-arm 30 engages over the latching-nose 27, and retains the arm 25 in its elevated position. The pattern cards are thus fed over the cylinder alternately in reverse order, reversal being effectually prevented until one or the other end of the pattern series has been reached.

In the claims the expression "terminal card" is used to designate the end cards of the pattern, or those intended to indicate the reversing needles. While such cards are the end cards of the effective pattern series, it is obvious that other inoperative cards may be connected beyond them, and serve as a convenient means for attaching the cords 53 and 54, as illustrated in the drawings. To guard against failure to reverse, more than one card adapted to indicate the reversing needle may be attached at each end of the pattern series, and the use of the expression "terminal card" is not intended to exclude such construction.

Having thus described our invention, what we claim is:—

1. The combination of a jacquard mechanism; a series of jacquard cards; means for feeding said cards in forward and reverse order to indicating position; a reversing mechanism controlled by the jacquard mechanism through the indication of the terminal cards of the series, and adapted to effect a reversal of feed of the card series; means adapted normally to maintain said reversing mechanism in inoperative condition; and mechanism adapted to be actuated by the approach of a terminal card to indicating position to render said reversing mechanism operative.

2. The combination of a jacquard mechanism; a series of jacquard cards; means for feeding said cards in forward and reverse order to indicating position; two reversing mechanisms controlled by the jacquard mechanism, one to change from forward to reverse feed and the other from reverse to forward feed and each adapted to be operated upon the indication of a corresponding terminal card of the series; means adapted to maintain both said reversing mechanisms normally in inoperative condition; and mechanism adapted to be actuated by the approach of each terminal card toward indicating position to render the corresponding reversing mechanism operative.

3. The combination of a jacquard mechanism; a series of jacquard cards; means for feeding said cards in forward and reverse order to indicating position; a reversing mechanism adapted to effect a reversal of

feed of the card series and including a reversing needle adapted to be indicated by a terminal card of the series; means adapted normally to maintain said reversing needle in an inoperative position; and mechanism adapted to be actuated by the approach of said terminal card to indicating position to cause said needle to move into operative position.

4. The combination of a jacquard mechanism; a series of jacquard cards; means for feeding said cards in forward and reverse order to indicating position; two reversing mechanisms, each including a reversing needle adapted to be indicated by a corresponding terminal card of the series, one reversing mechanism being adapted to change from forward to reverse feed and the other from reverse to forward feed; means adapted normally to maintain both said reversing needles in an inoperative position; and mechanism adapted to be actuated by the approach of each terminal card toward indicating position to cause the corresponding reversing needle to move into operative position.

5. The combination of a jacquard mechanism; a series of jacquard cards; means for feeding said cards in forward and reverse order to indicating position; a reversing mechanism adapted to effect a reversal of feed of the card series and including a reversing needle adapted to be indicated by a terminal card of the series; a weight adapted normally to maintain said reversing needle in inoperative position; and operative connections between said terminal card and said weight, adapted to lift said weight and release said reversing needle, as the terminal card approaches indicating position.

6. The combination of a jacquard mechanism; a series of jacquard cards; means for feeding said cards in forward and reverse order to indicating position; two reversing mechanisms, each including a reversing needle adapted to be indicated by a corresponding terminal card of the series, one reversing mechanism being adapted to change from forward to reverse feed and the other from reverse to forward feed; weights, one connected with each of said reversing needles and adapted to maintain the same normally in inoperative position; and operative connections, one between each of said terminal cards and a corresponding one of said weights, adapted to lift said weights and release the corresponding needles as said terminal cards approach indicating position.

7. The combination with a pattern reversing jacquard of the type in which reversal of the card series is effected through the indication of a reversing needle by a reversing card included in the series; of means normally rendering said reversing needle inoperative; and a mechanism adapted to be actuated by the approach of a reversing card to indicating position to render said needle operative.

8. The combination with a pattern reversing jacquard of the type in which reversal of the card series is effected through the indication of either of two reversing needles by a corresponding one of two reversing cards included in the series; of means adapted normally to render both said reversing needles inoperative; and a mechanism adapted to be actuated by the approach of either of said reversing cards to indicating position to render the corresponding reversing needle operative.

9. The combination with a pattern reversing jacquard having reversing needles adapted to be actuated by reversing cards included in the card series; of supporting cradles for the card series; means normally maintaining said reversing needles inoperative; and mechanism adapted to be actuated by the exhaustion of the card series from either of said cradles, to render a corresponding reversing needle operative.

10. The combination with a pattern reversing jacquard mechanism provided with reversing needles adapted to be indicated by reversing cards included in the card series and when so indicated adapted to effect a reversal of feed of the series; of a secondary mechanism adapted to be actuated by the movement of said card series to prevent reversal of such movement except at predetermined limits of travel of the card series.

11. The combination of a jacquard mechanism having the usual needles; a card cylinder; a reversible ratchet feed for said cylinder; a latch mechanism operatively connected to said feed and adapted to effect reversals thereof; operative connection between the latch mechanism and two needles of the jacquard; a series of pattern cards adapted to be fed by said cylinder and having terminal cards each adapted to indicate a corresponding one of the above mentioned two needles; weights each adapted to hold a corresponding one of said two needles in inoperative position; and connections between each terminal card and a corresponding weight adapted to release the corresponding needle as either terminal card approaches indicating position.

12. The combination with a jacquard mechanism having means for feeding a series of pattern cards in forward and reverse directions, and having a control device operatively associated with said feeding means for controlling the direction of feed of said series of cards, of a control needle mounted in said jacquard and operatively connected with said control device for actuating the latter; a series of pattern cards,

including a control card for indicating said control needle; and secondary means adapted to be actuated by the movement of said control card to and from indicating position to prevent the actuation of said control device by said control needle except when said card is at indicating position.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."