

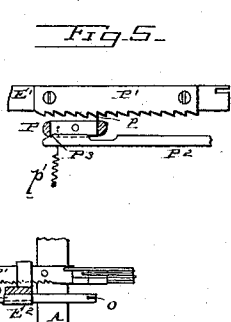
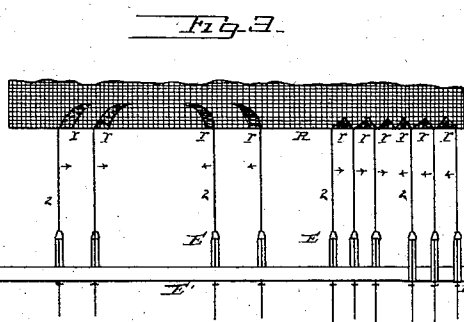
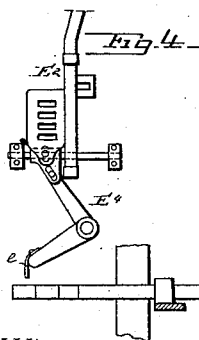
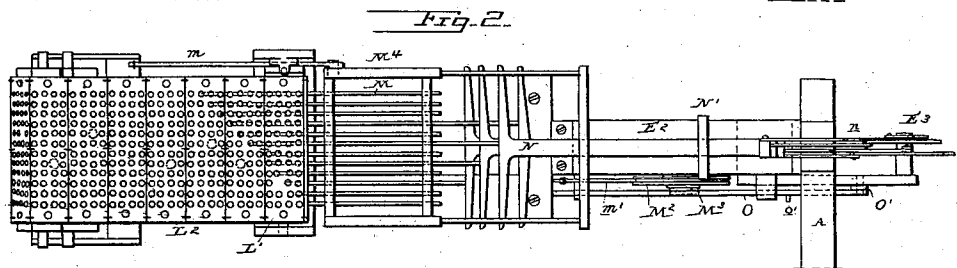
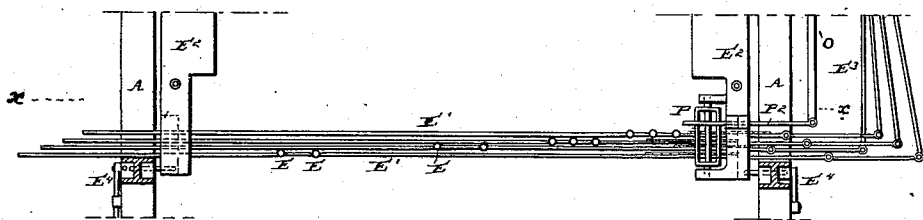
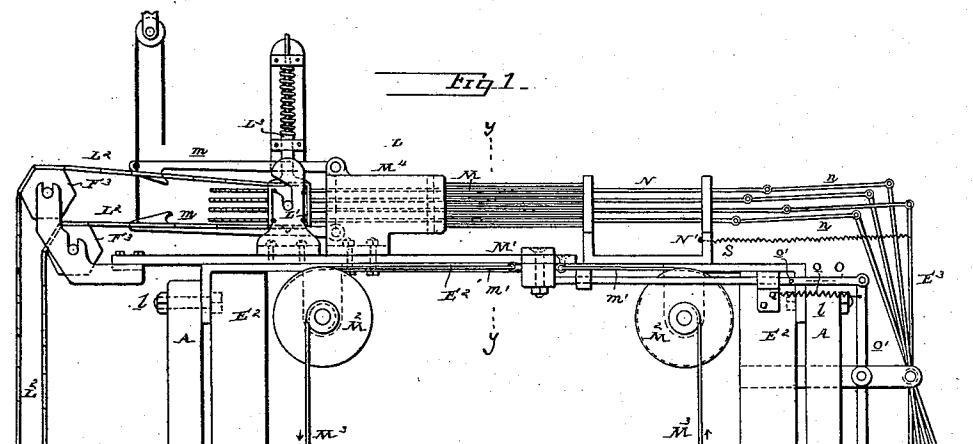
(No Model.)

2 Sheets—Sheet 1.

W. G. CONNELL.
JACQUARD MECHANISM FOR LOOMS.

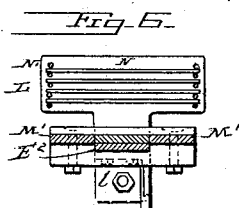
No. 567,453.

Patented Sept. 8, 1896.



Witnesses:

Jesse B. Heller.
Edw. A. Dutton.



Inventor.
Walter G. Connell
By *[Signature]*
Attorney.

(No Model.)

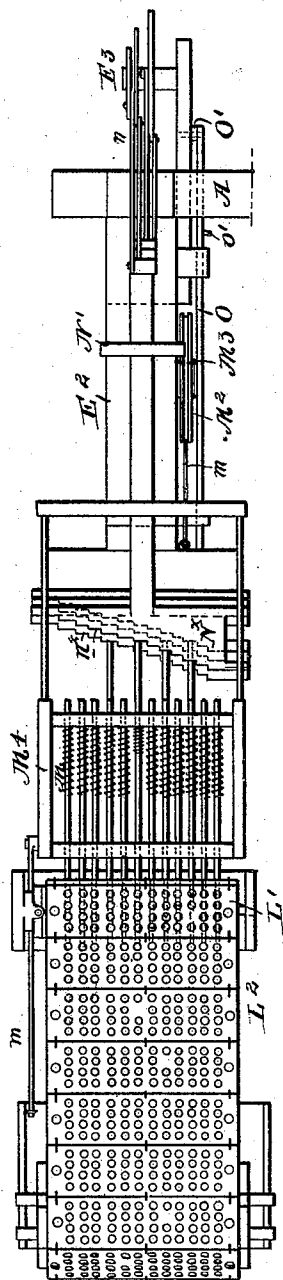
2 Sheets—Sheet 2.

W. G. CONNELL.
JACQUARD MECHANISM FOR LOOMS.

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Patented Sept. 8, 1896.

Fig. B.



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Walter G. Connell

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UNITED STATES PATENT OFFICE.

WALTER G. CONNELL, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO
JOHN H. LORIMER, OF SAME PLACE.

JACQUARD MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 567,453, dated September 8, 1896.

Application filed May 3, 1893. Serial No. 472,864. (No model.)

To all whom it may concern:

Be it known that I, WALTER G. CONNELL, of the city and county of Philadelphia and State of Pennsylvania, have invented an Improvement in Jacquard Mechanisms for Looms, of which the following is a specification.

My invention has reference to jacquards for textile machinery; and it consists of certain improvements which are fully set forth in the following specification and shown in the accompanying drawings, which form a part thereof.

This improvement comprehends certain improved features in a jacquard which is especially adapted to looms for weaving figured fabrics, and is shown in connection with a special make of loom in Letters Patent No. 522,554, dated July 3, 1894.

The Jacquard mechanism is provided with a series of needles to operate each individual thread-guide or series of thread-guides adapted to move in unison, and the cylinder and cards are so designed in connection with these series of needles for each guide or series of guides that they so operate upon any one of the needles of the series for the purpose of moving the thread guide or guides of a series to a variable distance, such as would be necessary in a loom of the character above referred to in laying in sectional shots of weft or filling between the warps in every other shed.

It is immaterial to my invention what particular mechanism is employed in connection with the jacquard, as my invention comprehends, broadly, that construction in which there is a series of needles combined with a thread-guide, a series of cards, and means to move the cards, whereby they are adapted to select any particular needle for the purpose of moving the thread-guide to the required variable distance.

My improvements will be better understood by reference to the accompanying drawings, in which—

Figure 1 is a side elevation of my improved Jacquard mechanism and a portion of a loom to which it is attached. Fig. 2 is a plan view of same. Fig. 3 is a sectional plan view taken on line *x x* of Fig. 1. Figs. 4 and 5 are views

of details. Fig. 6 is a cross-section of my improved jacquard on line *y y*. Fig. 7 is a perspective view of a card-plate. Fig. 8 is a plan view, similar to Fig. 2, of a modification of the Jacquard mechanism.

A is the frame of the loom, and may be of any suitable construction.

E² is a bar-frame pivoted to the main frame at 1 and adapted to reciprocate or vibrate forward and backward. In practice this frame would be preferably arranged back of the heddles or harness and is provided with a series of guides whereby bars E' may be held with provision for both lateral and longitudinal motion. The bars E' may be constructed in any suitable manner and are each provided with one or more guides E for the figuring or filling threads 2. The guides E project from the guide-bars E' toward the fabric R being woven, and the figuring or filling threads 2 extend through the eyes of the guides toward the body of the fabric, as indicated in Fig. 3. The figuring or filling threads extend backward from the guides to any suitable thread-supports. The bar-frame E² may be reciprocated in any suitable manner, but its particular movements form no part of this invention.

The guide-bars E' are operated by means of the Jacquard mechanism proper. One end of the bars is connected to the lower end of the levers E³, which are pivoted to an extension of the bar-frame E². The upper ends of the levers E³ are connected by links *n* with the lifter-heads N of the jacquard, four of said lifter-heads, guided in suitable guides upon a frame N', being shown.

It is quite evident that there may be as many lifter-heads as desired. For illustration four only have been shown.

A spring S causes the levers E³ to be returned to their original positions when unacted upon by the Jacquard mechanism, so as to normally return the bars E' to the right when looking at Fig. 1.

The frame M⁴ carries four rows or sets of needles M, respectively adapted to act upon the four lifter-heads, which are located in the rear of the frame M⁴. There are as many rows of needles as there are bars E'. Each row of needles M is composed of a series of

needles of different lengths, as is clearly indicated in dotted lines in Fig. 2, and the cards L^2 , which operate the needles, have open perforations corresponding to their needles of the several sets, except where such perforations are omitted or closed by plates R for the purpose of moving certain of the needles and the corresponding lifter-heads.

It is quite evident that while I have stated the needles are of different lengths it would be possible to modify the apparatus in such a manner as to employ needles of the same length but arranged in connection with the lifter-heads to perform exactly the same functions as herein set out. In any event the needle will project in the path of the cards to different lengths, substantially as indicated in dotted lines in Fig. 2. Such a construction is illustrated in Fig. 8, in which the needles are shown all of the same length and the heads N^x provided with stepped faces n^x to be acted upon by the ends of the needles. In this case the needles are each provided with a spring to return them to normal position. In the construction shown in Fig. 2 it will be observed that the distance a head N will be moved under the action of any needle is equal to the length of the movement of the needle, and in the construction shown in Fig. 8 it is equal to the length of the movement of the needle less the normal distance of the end of the needle from the face of the head upon which it acts. Consequently the variation in the amount of movement for different needles may be produced either by varying the length of the movement of the needles by making them of different lengths or by varying the normal distances between the ends of different needles and the faces of the head upon which they act. In either case the distance from the front of the needles to the face of the head varies with different needles in the series.

The frame M' is adapted to reciprocate upon frame E^2 , and in doing so the cylinder L' and cards L^2 are also reciprocated. During this operation the needles M will be projected backward at places corresponding to the uncut or filled portions of the card.

In Fig. 2 four of the needles are shown as pushed back to different distances, and this is due to the fact that with a given movement of the cylinder the distance the needles will be pushed back will be the total distance the cylinder is moved after it reaches the longest needle less the difference between the projecting length of the needle moved and that of the longest needle.

The proper cutting or filling of the cards will cause the proper selection of any needle, and consequently the desired throw to either one of the lifter-heads N, with a corresponding lateral throw to the respective thread-guides E. The cards F^2 are guided upon cylinders F^3 , carried upon the frame M' , and may be supported in any of the usual manners beyond these cylinders, as is customary

in Jacquard mechanism where a large number of cards are employed. If the pattern is small, the cards may hang straight down in a loop. The cylinder L' is maintained in position by a spring-dog L^3 , which permits the cylinder to be turned under the action of the hooks m on each backward movement of the cylinder and its frame M' . Ordinarily the lower hook m will alone be in operative position to act upon the cylinder; but by lowering both hooks the upper hook may be alone in operation, and in that case the pattern-cards will be moved in a reverse direction. The movements of these hooks may be made automatic, if desired. By making the cards move in alternately-reversed directions only one-half the number of cards would be necessary in a geometric pattern.

The frame M' is reciprocated in any suitable manner and may be timed to suit any particular style of loom or textile machine with which the jacquard may be combined. In the construction shown the frame M' is reciprocated by cables m' , extending in opposite directions and connected to two pulleys M^2 , having smaller diameters, to which are connected operating-straps M^3 , extending downwardly to any suitable treadles or other power devices. These straps M^3 are operated in reverse directions and by their action may cause the frame M' and its connecting parts to be reciprocated. Each reciprocation of the Jacquard mechanism sets a new position to the guides E, carried by the bars E' , to guide the thread in the fabric the requisite distance to form the pattern r . The bar-frame E^2 is shown as adapted to be reciprocated to and from the body of the fabric by a lever E^4 , (shown in Fig. 4,) having connection e with some suitable power device of the loom.

The several bars E' are provided each with a rack P' , corresponding to saw-teeth, and these are locked in position by a suitable locking-frame P, having a tooth p . A spring p' keeps the tooth p in contact with the teeth of the racks P' and locks the bars E' against the return movement when the card-cylinder is moving away from the needles to permit the next card to be turned into operative position. When the frame M' is moved to the right, as indicated in Fig. 1, it strikes a slide-bar O, arranged to operate a lever O' against the action of a spring o , and this lever operates a trip-cam P^2 , carried in the free end of the bar-frame E^2 .

The stop o' of the bar O limits the left-hand movement of the bar, so that the last portion of the right-hand movement of the frame M' alone acts upon the bar O. When the said frame M' moves to the right sufficiently, it causes the cam-bar P^2 to be projected to the left, so that its cam-surface P^3 trips the locking-frame P and liberates the rack P' . This tripping of the locking-frame P liberates the bars E' , so that the springs S come into play and move the bars to the right until the lifter-heads N are arrested by coming into contact

with any needle M which may be pushed back under the action of the cards. This locking mechanism, it will be seen, prevents the action of the springs S coming into play until after the cards have been reset and after operating upon the needles. Furthermore, it permits the bars E' to be locked in position while guiding the figuring or filling threads 2 during the operation of the loom without reference to further movements of the Jacquard mechanism, so that the manipulations of the jacquard for setting a new card may take place over the period required for the action of the lay or weaving portion of the loom and the oscillation or the vibration of the bar-frame E². It gives a longer period for the jacquard to reset itself than would be permitted in case the jacquard itself was required to hold the bars E' in their operative positions. The cards are preferably stamped in full rows of holes, and the number of cards to be used in the design are laced together in the ordinary way. Small flat steel tacks or card-plates R with preferably two projection-points are used. (See Fig. 7.) The designer in setting the design on the cards presses these tacks into the cards over the holes where the desired needles are to operate in forming of the design. The same cards and the same tacks can be used in any design and over and over again.

I have described my invention in connection with the guide E, adapted to lay in figuring wefts, as set out in my application previously referred to; but it is to be understood that I do not limit my invention to any particular devices between the lifter-heads and the threads to be operated by the Jacquard mechanism, as the improved jacquard may be adapted to a large variety of textile-machines. I therefore do not confine myself to the minor details of construction here shown.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a jacquard, a needle-frame, independ-

ent series of independently-movable needles carried by the needle-frame, a needle-actuated head for each series of needles arranged in the rear of the needle-frame, the distance from the front of the needles to the face of the needle-actuated head which is acted upon by said needles varying with different needles in the series, and card devices adapted to act upon the front ends of the needles and move any predetermined needles in any series, whereby variable movements may be imparted to the needle-actuated heads and the devices controlled thereby.

2. In a jacquard, a stationary needle-frame, independent series of independent needles carried by the needle-frame and movable therein, a reciprocating card-cylinder located in front of the needle-frame, and an independent movable needle-actuated head for each independent series of needles located in the rear of the needles and adapted to be actuated by those needles of the series which are moved by the card, whereby the head and devices controlled thereby may be moved a variable distance.

3. In a jacquard, the reciprocating frame M', a reciprocating card-cylinder carried by the frame M' and reciprocating therewith, a stationary needle-frame located in front of the card-cylinder, independent series of independent needles carried by the needle-frame and movable therein, and an independent movable needle-actuated head for each independent series of needles located in the rear of the needles and adapted to be actuated by those needles of the series which are moved by the card-cylinder, whereby the head and devices controlled thereby may be moved in a variable distance.

In testimony of which invention I have hereunto set my hand.

WALTER G. CONNELL.

Witnesses:

ERNEST HOWARD HUNTER,
R. M. HUNTER.