(No Model.)

2 Sheets—Sheet 1.

J. HOUGH.

JACQUARD CARD PUNCH SELECTING MACHINE.

No. 537,609. Patented Apr. 16, 1895.

Fig. 1.

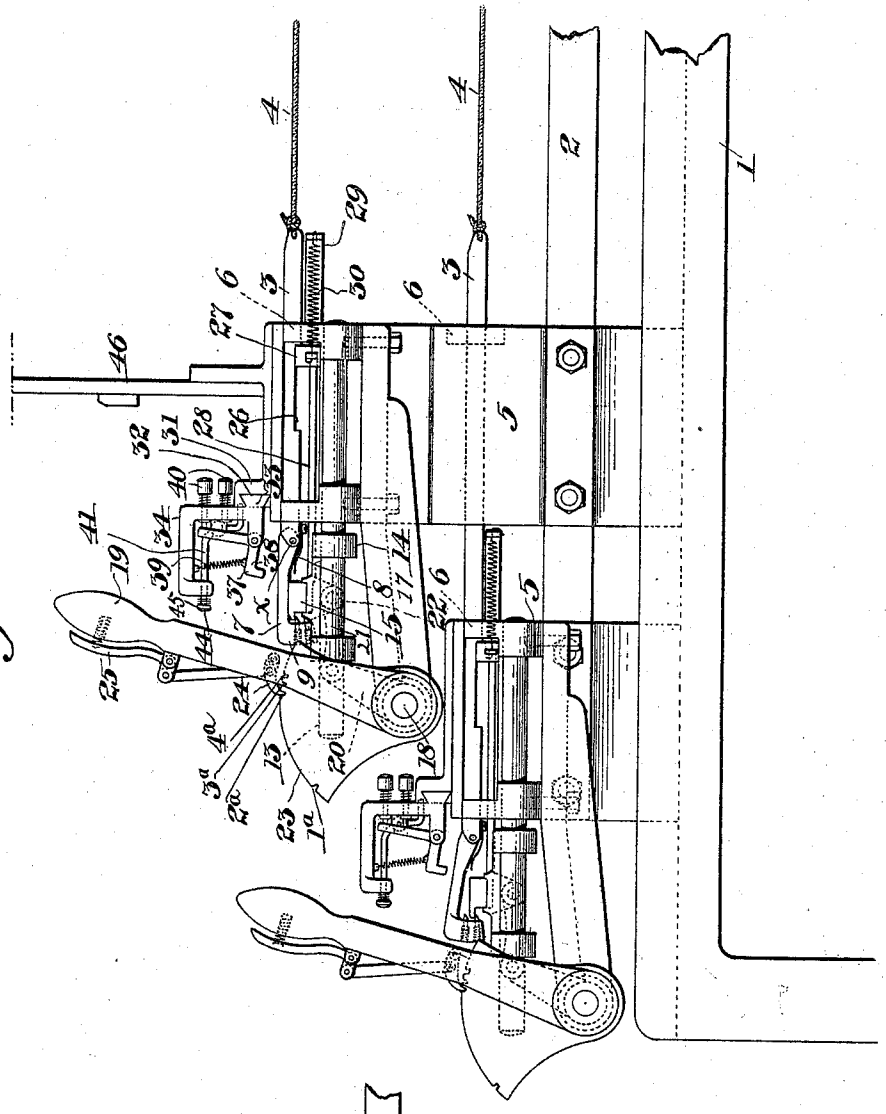
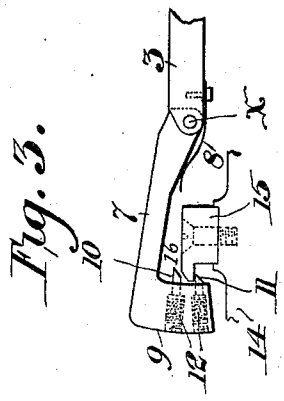


Fig. 3.



Witnesses.

Frank S. Bussey

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(No Model.)

2 Sheets—Sheet 2.

J. HOUGH.

JACQUARD CARD PUNCH SELECTING MACHINE.

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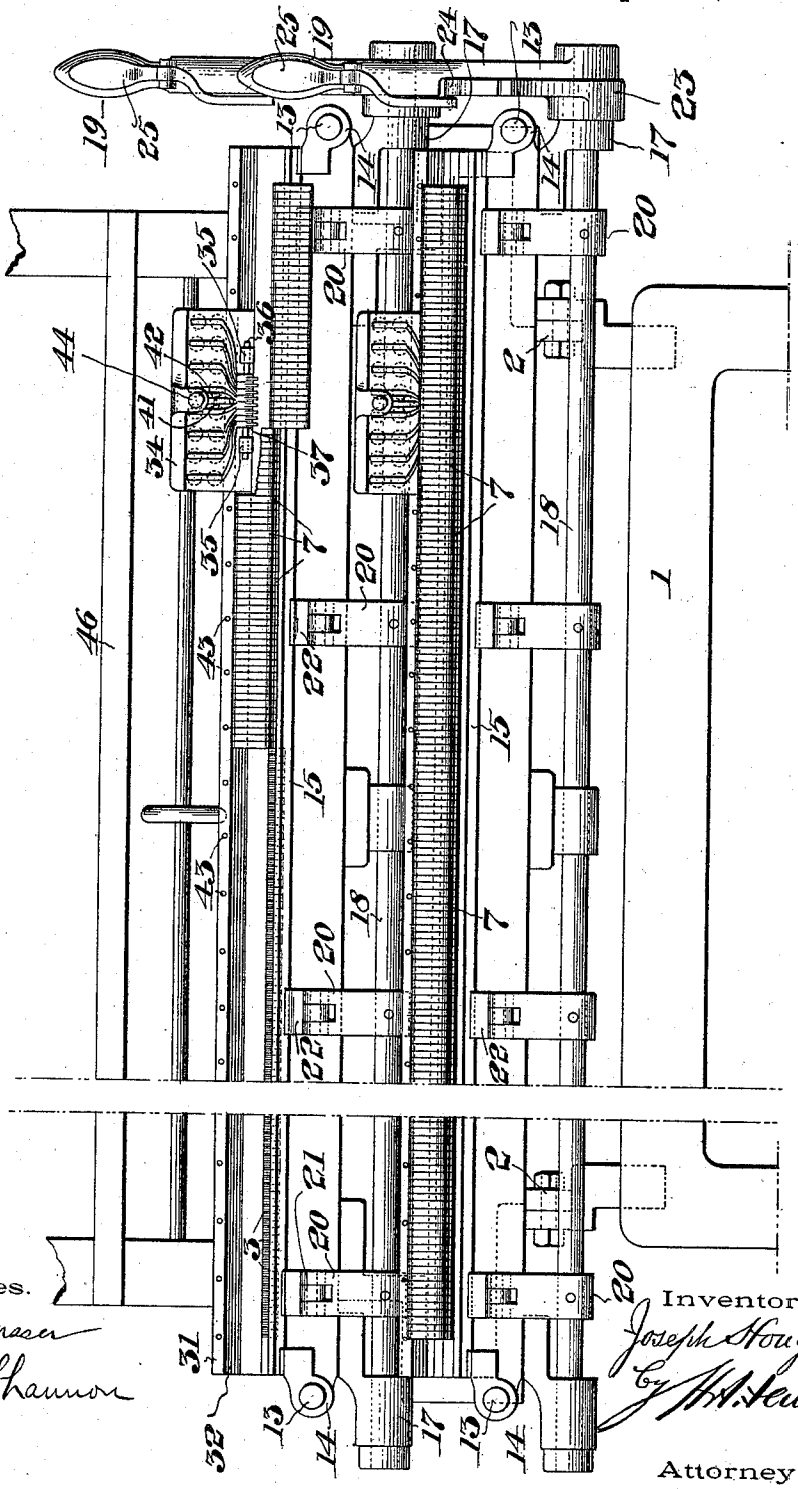

Fig. 2.

Witnesses.
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UNITED STATES PATENT OFFICE.

JOSEPH HOUGH, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO JOHN BROMLEY & SONS, OF SAME PLACE.

JACQUARD-CARD PUNCH-SELECTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 537,609, dated April 16, 1895.

Application filed July 11, 1894. Serial No. 517,186. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH HOUGH, a subject of the Queen of Great Britain, residing in the city of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Jacquard-Card Punch-Selecting Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

That class of lace known as "Nottingham lace" is woven on looms equipped with single-acting and double-acting Jacquard mechanism; the former being used where the interwoven design is a plain or unshaded figure, and the latter mechanism being employed where the design is shaded or densified in parts. In the single-acting mechanism a single set of cards is used, while in the double-acting construction a double set of cards is employed. The single set of cards is perforated to prescribe the operation of the usual devices which are connected with the weaving mechanism to effect the production of a plain or flat design. The double set of cards comprises one set that is perforated similarly to the single set just mentioned, and also a second set that is perforated to control, in conjunction with the first set, only those parts of the mechanism that are operated to produce the shaded parts of the design.

The punches for effecting the perforations in the respective cards, as prescribed by the design, are selected by mechanism of well-known construction, which mechanism, briefly described, comprises a punch-containing block, a set of longitudinally-disposed spring-actuated selecting needles in rear of said block corresponding in number and position with the punches, and a series of back needles, as they are termed, which are connected with the selecting needles by means of wale strings, to the end that when any of the back needles are drawn rearward the connected selecting needle, or needles, will be retracted thereby, whereupon, if the entire set of selecting needles be moved forward, those of the set that have been retracted will not act upon the corresponding punches, but, on the other hand, the remaining needles of the set will act upon the opposed punches in the block and force them into an adjacent perforated plate or punch holder. This being done, said holder, with its punches, is transferred to the usual press wherein the cards are punched. It will be seen that in mechanism of the character described, the "reader" retracts the back needles which correspond with those punches that are not used in the operation of punching a card or cards.

Heretofore where a double-card design or pattern has been employed, a separate and independent reading operation has been required for each card; that is to say, the punches corresponding with the first or initial card have been selected by one reading, and then the punches corresponding with the second card have been selected by another or separate reading.

My object is to provide means whereby a single reading of the design will suffice for the selection of the punches for the two cards; and to this end the invention consists in various features of construction and organization of parts that will be hereinafter fully described and definitely claimed.

In the drawings,—Figure 1, is a side elevation of a machine embodying my invention. Fig. 2, is a rear view thereof. Fig. 3, is a detailed view.

As the present improvements relate solely to the means for controlling the back needles, and as the construction and arrangement of the other parts of the machine are well known, I have not deemed it necessary to illustrate and describe herein other than the novel features.

The numeral 1, represents a portion of the main frame of the machine; 2, the longitudinal side bars which are operatively connected with the usual needle-selecting frame at the forward end of the machine, and 3, the back needles which are connected with the set of selecting needles by means of the wale-strings 4.

The needles 3, and their operating devices are supported in a longitudinally movable carriage 5 at the rear of the machine, said carriage being bolted or otherwise connected with the lateral bars 2.

The needles are arranged in horizontal series in the carriage; there being a single or a plurality of series, as desired. In the present instance two series are shown, each being connected with a separate and independent set of controlling devices. As the construction and operation of each set are practically the same, a description of one set only will suffice.

The needles of each row are fitted to and guided in transversely disposed perforated plates 6 on the carriage, those ends of the needles to which the respective wale-strings are tied extending forwardly, and the opposite ends of the needles projecting rearwardly, of the carriage.

Pivoted to the rear end of each needle, as at *x*, is an arm 7 which is held normally elevated by the action of a flat spring 8 secured to the needle. The free end of the arm is provided with a depending portion or lug 9 to which are fitted two spring-controlled pins 10, 11. Suitably disposed springs 12 within the lug serve to project the points of the pins normally beyond the inner edge of the lug, for a purpose hereinafter described. On the sides of the carriage are fixed rearwardly-extending guide-rods 13 to which are applied guide brackets 14 on the respective ends of a transverse draw-bar 15, whereby the said bar may be reciprocated transversely and be guided in its movements. The bar is arranged immediately below the series of arms 7 and its outer edge is provided throughout its length with a projecting lip 16, with which the pins 10, 11, on said arms are adapted to be temporarily engaged at predetermined periods, as below explained.

Mounted in suitable bearings in rearwardly-extending arms 17, on the sides of the carriage, is a rock-shaft 18 on the right hand end of which is fixed a hand lever 19 whereby the shaft may be operated. On this shaft, at intervals apart, are fixed upwardly-extending crank arms 20, which are respectively connected by links 21, with brackets 22 depending from the bar 15, to the end that when the shaft is properly moved the bar and its connections will be correspondingly actuated.

Fixed to one of the lateral arms 17, adjacent to the hand lever, is a peripherally notched sector 23 with the notches of which is adapted to be engaged at certain times, a pivoted dog 24 on the side of the hand lever, said dog linked with and operated by an ordinary spring-actuated thumb-lever 25 on the side of the hand lever. Hence if the latter lever be moved to a predetermined position and, the dog be engaged with the opposed notch, said lever and its connections will be held in place. In the present instance there are four notches in the edge of the sector, the same being marked 1^a, 2^a, 3^a, and 4^a respectively. When the dog is engaged with the notch 2^a, the lever is in normal position; that is to say, the lipped bar is held in a position to be engaged by the projecting pins on the arms 7, should the latter be depressed. If each arm be partially depressed, the lower pin 11 thereon will be engaged with the under side of the lipped edge of the bar, but if the arm be depressed still farther the upper pin will be engaged with said edge. Assuming that certain of the arms are partially and others fully depressed, if the lever be drawn backward until the dog engages the notch marked 1^a all the arms engaged with the bar, together with their respective needles, will be retracted, and in consequence the corresponding series of selecting-needles at the forward part of the machine will be thrown out of operation. This being done, if the lateral bars be drawn forward in the ordinary way, the operative selecting-needles will bear against the corresponding punches in the proximate punch frame and project them into engagement with the detachable perforated punch block in the usual manner; which block with the selected punches therein may be transferred by the operator to the punching machine for the purpose of perforating a card as formerly.

The punches for one card having been secured, if the handle lever be thrown forward until the dog is engaged with the notch marked 3^a, the bar will be moved forwardly sufficiently to release the lower pins engaged therewith, whereupon the arms to which said pins are fitted will be thrown upward by their individual springs and the parts connected with said arms will resume their normal position. In this operation those arms whose upper pins 10 are engaged with the lipped bars will not be freed, and, in consequence, the corresponding punches will be held out of action, thereby permitting the formation of the second card, in a manner similar to the card first described. Hence during each reading of the design, the selection of the punches for the two cards may be had. When the punches for the second card have been selected, the hand lever is thrown forward until the dog is engaged with the notch marked 4^a, thereby moving the bar sufficiently forward to free the engaged pins, and, in consequence, all the needles resume their normal position. The lever is then retracted to engage the dog with the notch marked 2^a, whereupon the parts occupy the normal or first described position in readiness for another reading and selecting operation.

In order positively to retract the needles when the hand lever is thrown to the extreme forward position, I offset the under edges of the needles as at 26, and arrange immediately beneath the needles in engagement with their offsets, a transverse bar 27 which is connected by means of rods 28 with the lipped bar. Hence when the latter bar is moved the other bar is correspondingly actuated.

The bar 27 is so arranged in respect to the offsets that during the forward movement of the bar, immediately after the arms have been freed, it takes against the opposed shoulder of the offsets and forces the needles forward;

but owing to the elongation of the offset the bar during its rearward movement does not act upon the needles. That the bar and its connections shall tend to assume the extreme forward position, I attach to said bar, near its respective ends, and to suitably disposed brackets 29 in the carriage, strong retracting springs 30, as seen.

As a simple and efficient means whereby the pivoted arms 7 may be conveniently depressed by the operator as and for the purpose above stated, I have designed a traveling key-board device which I shall now proceed to describe, as follows: Fixed to the top of the carriage, rearwardly of the arms 7, is a transverse bar 31 in which is a longitudinal guide way 32, preferably though not essentially of dovetail form in cross-section, to receive a correspondingly formed rib 33 on a frame 34, to the end that the latter with its connections may traverse the bar from end to end. This frame is provided on its forward face with a pair of lugs 35 between which is fitted a rod 36. On this rod, side by side, is arranged a series of independently movable bell-crank levers 37, the rearwardly projecting arms 38 of which are provided with tails that overhang the arms 7 respectively; that is to say, in this instance there are eight levers the tails of which extend directly above eight adjoining arms 7 respectively. The upwardly extending arms of the levers are spread outwardly, as seen, so as to occupy a larger compass than otherwise. The arms are held normally elevated by means of separate retracting springs 39 secured thereto and to the overhanging portion of the frame respectively. Fitted to perforations in the frame plate are two sets of key pins 40, each set corresponding in number with the levers. The sets are arranged one above the other as seen, and their pins are so disposed that one of each set takes against the opposed lever arm. Hence if a key of the upper set be pressed inwardly by the operator said key will bear against the opposed lever arm, move it rearwardly and, perforce, depress the other arm of the lever, the tail of which, striking the opposed pivoted arm 7, will depress the latter sufficiently to engage the upper pin 10 with the lipped bar; and again if a key of the lower set be operated the opposed lever will be moved to depress the corresponding pivoted arm sufficiently to engage the lower pin 11 with the lipped bar. Thus by the act of moving the frame from side to side of the machine, and by properly manipulating the keys at predetermined stages of the movements, the pivoted arms may be operated to meet the requirements of any pattern or design.

I preferably provide means whereby the key frame, upon its being advanced intermittently, from one series of needle arms to the next adjacent series, may be locked in place in order to prevent its displacement during the act of manipulating the keys. This means comprises, in this instance, a lever 41 pivoted to a lug 42 on the face of the frame plate, and adapted to register at the proper times with a series of sockets 43 formed at regular intervals apart in the face of the guide bar. The shorter arm of this lever, constitutes the bolt, said arm being bent horizontally and being fitted to a perforation in the frame-plate. The longer arm is extended rearwardly and is fitted to a lug on the overhanging portion of said plate. Its free end is provided with a head 44 between which and the lug is interposed a spring 45 the tendency of which is to maintain the shorter arm normally in contact with the socketed guide bar.

Extending upwardly from the carriage is a pattern-holding frame 46 of well-known construction.

Having thus described my invention, I claim as new—

1. In a Jacquard-card punch-selecting machine, the combination with the back needles and their supporting parts, of means whereby a predetermined number of said needles may be retracted, and means whereby one or a series of said latter needles may be released independently of the remaining retracted needles; substantially as described.

2. In a machine of the class recited, the combination with the back needles, and their supporting parts, of a retracting device, means whereby the needles, or a predetermined number thereof, may be connected with said device, and means whereby certain of said connected needles may be released from the retracting device at different periods; substantially as described.

3. In a machine of the class recited, the combination with the back needles and their supporting parts, of a retracting device, means for operating the same within prescribed limits, and arms on said needles provided each with a plurality of independent catches adapted to be engaged with said retracting device, at predetermined periods; substantially as described.

4. In a machine of the class recited, the combination with the back needles, and their supporting parts, of a reciprocative retracting device, means for reciprocating the same within prescribed limits, arms on said needles provided each with a plurality of independent catches adapted to be engaged with said retracting device at predetermined periods, and means for manipulating said arms to effect the engagement of the catches, substantially as described.

5. In a machine of the class recited, the combination with the back needles and their supporting parts, of a retracting device, means for operating the same, vibratory arms connected with said needles, catches on said arms adapted to be engaged with said device when the latter is in one position, and to be disengaged therefrom when the device is in another position; substantially as described.

6. In a machine of the class recited, the

combination with the back needles, and their supporting parts, of a reciprocative bar rearward of the needles, a rock-shaft, an operating device therefor, connections intermediate the said shaft and bar, and vibratory arms connected with said needles, and provided with catches adapted to be engaged with and disengaged from said bar at predetermined intervals, substantially as described.

7. In a machine of the class recited, the combination with the back needles, and their supporting parts, of a reciprocative bar, a rock-shaft, connections intermediate the said shaft and bar, a hand lever on said shaft, a locking dog on the lever, a notched sector adjacent to the latter, and vibratory arms connected with the needles and provided each with catches adapted to be engaged with and disengaged from said bar at predetermined intervals, substantially as described.

8. In a machine of the class recited the combination with the back needles and their supporting parts, of a needle retracting device, provisions whereby they may be engaged with said device, key operated levers to effect their engagement, and means whereby one or a series of said needles may be released from said retracting device independently of the others, substantially as described.

9. In a machine of the class recited the combination with the back needles, and their supporting parts, of a retracting device, means for operating the same within prescribed limits, and arms on said needles provided each with a plurality of independent catches adapted to be engaged with said retracting device at predetermined periods, and a traveling frame or carriage arranged above the said arms, and provided with a series of key-operated levers adapted to act upon predetermined arms in its path, substantially as described.

10. In a machine of the class recited, the combination with the back needles, and their supporting parts, of a retracting device, means for operating the same within prescribed limits, and arms on said needles provided each with a plurality of independent catches adapted to be engaged with said retracting device, at predetermined periods, and a traveling frame or carriage arranged above the said arms, and provided with a series of key-operated levers adapted to act upon predetermined arms in its path, and devices to lock the said frame or carriage at points throughout its traverse, substantially as described.

In testimony whereof I have hereunto affixed my signature this 2d day of July, A. D. 1894.

JOSEPH HOUGH.

Witnesses:
JOHN R. NOLAN,
H. T. FENTON.