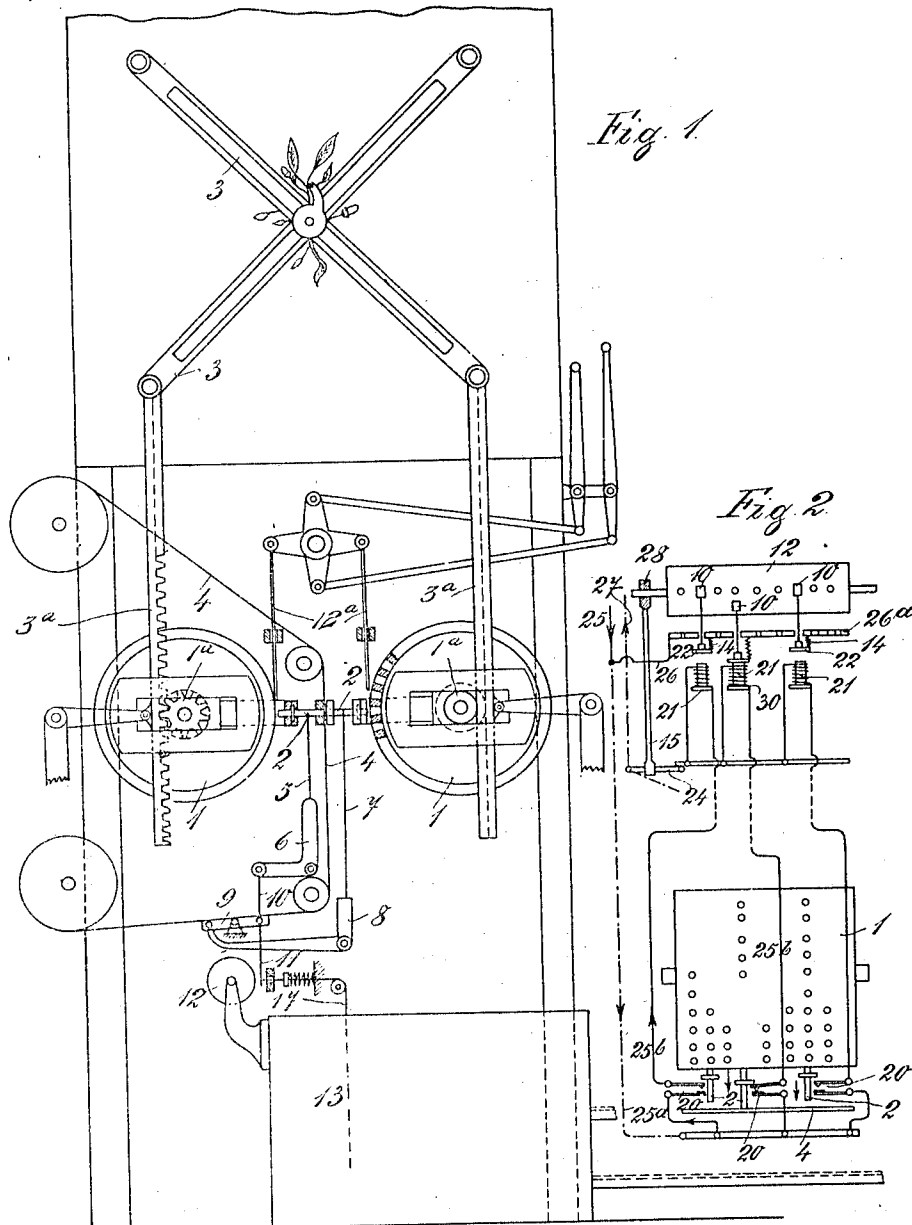


J. J. KNECHT.
 CARD PUNCHING DEVICE FOR AUTOMATIC EMBROIDERY MACHINES.
 APPLICATION FILED MAY 1, 1912.

1,048,416.

Patented Dec. 24, 1912.



Witnesses:

G. O. Kramer
 C. S. Brown

Inventor:
 Johann Jacob Knecht
 by
 Fisher, Freeman, Watson & Co.,
 Attorneys.

UNITED STATES PATENT OFFICE.

JOHANN JACOB KNECHT, OF KAPPEL, NEAR CHEMNITZ, GERMANY, ASSIGNOR TO
MASCHINENFABRIK KAPPEL AKTIENGESSELLSCHAFT, OF KAPPEL, NEAR CHEM-
NITZ, GERMANY.

CARD-PUNCHING DEVICE FOR AUTOMATIC EMBROIDERY-MACHINES.

1,048,416.

Specification of Letters Patent.

Patented Dec. 24, 1912.

Application filed May 1, 1912. Serial No. 694,455.

To all whom it may concern.

Be it known that I, JOHANN JACOB KNECHT, a citizen of the Confederation of Switzerland, and resident of Kappel, near Chemnitz, in the Kingdom of Saxony, Germany, have invented a new and useful Card-Punching Device for Automatic Embroidery-Machines, of which the following is a specification.

This invention relates to an improved card punching device for use in combination with the jacquard or automatic mechanism for controlling and actuating embroidery machines of the ordinary size and type.

According to the present invention the jacquard mechanism is actuated simultaneously with the operation of the punching mechanism and is directly dependent thereon. By this means a proof or pattern of the embroidery is obtained with great rapidity during the punching operation and with perfect reliability, the proof obtained being dependent on the punching operation. Immediately after setting the punching mechanism in operation the corresponding actuation of the jacquard mechanism can be effected thus insuring that the proof of the embroidery shall truly correspond to the punched cards, so that on subsequent use of the cards in the usual manner in the embroidery machine the obtaining of the same embroidery as that of the proof obtained by punching the cards is insured.

In carrying out the present invention the card punches are connected in such a manner with cover plates that, when actuated, the cover plates are moved to free that hole in the card cylinder of the jacquard mechanism corresponding to the punch actuated and to the hole punched thereby in the card. The punching device can also be used if desired to control and actuate the jacquard mechanism without punching a card in which case the punches will likewise actuate the jacquard mechanism. The jacquard mechanism may also be actuated from the card punches if desired by electrical means which has the advantage that the punching machine can be arranged at any suitable distance from the jacquard mechanism or mounted on the embroidery machine which is to be momentarily used for producing a proof of the embroidery from the cards. By this means the operator is more readily en-

abled to supervise the operation of the machine inasmuch as the punching machine can be mounted in a position on the embroidery machine where the embroidery produced will be constantly visible to the operator. Moreover the machine when constructed according to the present invention can be used with embroidery machines producing any desired repeats spaced the desired distance apart. It is therefore no longer necessary to keep a special embroidery machine ready for testing new cards as they are punched which in smaller factories would probably remain unused for considerable time and thus prove uneconomical while in larger factories it has the disadvantage that when it is necessary to use thread of different count to that already in the embroidery machine, the thread in the latter must be removed and the embroidery machine rethreaded, as well as giving rise to many other complications consequent thereon. According to the present invention the punching machine can on the contrary be employed with all embroidery machines and fitted up to that machine which has already been supplied with the yarn of the requisite count and which produces a design whose repeats are the desired distance apart. When however no card is to be punched, the embroidery machine used to produce the proof of embroidery, can be run as an ordinary automatic embroidery machine the jacquard mechanism being controlled by suitable cards.

In order that the invention may be more clearly understood, reference is made to the accompanying drawings, which illustrate more or less diagrammatically such parts of my invention as are necessary for the invention to be clearly understood.

Figure 1 is a diagrammatic view showing mechanical connections between the card punches and the jacquard mechanism; Fig. 2 is a detail view showing electro-mechanical connections.

Referring to Fig. 1 of the drawings the drums 1 of a card punching machine are adjusted in known manner from the cross members 3 which are operated according to the design to be reproduced. Any suitable means may be employed for rotating the drums and adjusting them to actuate the punches 2, as for example that illustrated in

my prior Patent No. 1,027,286, of May 21, 1912. A portion only of said means, namely the racks 3^a, drum pinions 1^a and the manually adjustable cover plates 12^a, of the punch actuating and controlling means of said patent are herein shown, as illustration of the other parts is not essential to an understanding of the present invention. The drums 1 actuate punches 2 which punch the requisite holes in the cards 4. Connected to the punches 2 by means of connections 5 and 7 are bell crank levers 6 and 8 respectively, the bell crank 6 supporting a cover-plate of metal or other suitable material 10 and the bell crank 8 being connected to one end of a pivoted lever 9 carrying at its other end a similar cover plate 11. At each punching operation of one of the punches 2 the movement is transmitted through the corresponding members to either the cover plate 10 or 11 as the case may be, raising the cover plate so that the corresponding hole in the card cylinder 12 of the jacquard mechanism 13 is uncovered to enable it to contact with the corresponding lifting wire 17 which actuates the jacquard mechanism to produce the necessary embroidery.

In Fig. 2 of the drawings the transmission mechanism 5, 6, 7, 8 and 9 is replaced by an electro-mechanical system, the punches 2 being adapted to close suitable spring contacts 20 connected to a suitable electrical source by way of a wire 25^a and electro-magnet 21 through a wire 25^b, the winding of the electro-magnet 21 being connected through a contact 24 to the return wire 27. When the electro-magnet 21 is energized, its armature 22 is attracted and the latter being connected to the cover plate 10 frees the corresponding hole in the card cylinder 12 of the jacquard mechanism. For practical reasons it has been found desirable to construct the device so that the contact 20 is not held closed by the punch 2, until the jacquard mechanism has completed the corresponding stitch, as in this case the machine would operate comparatively slowly inasmuch as the operator could not readjust the drum 1 of the punching machine for a new stitch until the last stitch had been effected. For this reason the contact 20 is preferably only employed to complete the electrical circuit so as to actuate the armature 22 while the current is maintained closed for the requisite period of time and the circuit broken when required by means not directly dependent on the contact 20. The punch 2 can therefore return to its normal position immediately after punching the card 4 and the contact 20 will then break the circuit without however preventing the proper operation of the jacquard mechanism so that the latter will effect the stitch while the operator can adjust the drum 1 ready for the next stitch thus considerably saving time.

This is preferably obtained by providing a branch wire 26 from the main wire 25 to a bar 26^a, which is connected to the armatures 22 by means of springs 14, while the winding of the magnet 21 is in electrical contact at 30 with the core of the magnet. The contact 24 is moreover capable of being put into or out of circuit, by means of a rod 15 and an eccentric 28 mounted on the axle of the card cylinder 12 or by any other suitable mechanical means so as to make and break the circuit when required.

The operation of the foregoing device is as follows: If a punch 2 is operated by the drum 1 (as shown by the center punch in Fig. 2) the contact 20 will be closed and the current pass from the wires 25 and 25^a through the contact 20 and wire 25^b through the winding of the magnet 21 and thence by way of the contact 24 to the return wire 27. By this means the electro-magnet 21 will be energized and attract its corresponding armature 22 against the action of the spring 14. As the contact 24 is now in electrical connection with the wire 26 through the core of the magnet 21, the current will pass from the main wire 25 through the branch wire 26, bar 26^a, spring 14, armature 22 and the winding of the magnet 21 through the connection 30 to the contact 24 and thence to the return wire 27. The contact 20 can therefore be returned to normal position without releasing the armature 22 and the cover plate 10 connected thereto. When the stitch has been effected by the jacquard mechanism 13, the contact 24 will be broken by the eccentric 28 and connecting rod 15, thus releasing the armature 22 which will be withdrawn under the action of its spring 14 and return the cover plate 10 so as to cover the corresponding aperture in the card cylinder 12.

I claim:—

1. In combination with an automatic embroidery machine actuated by means of jacquard mechanism, means for punching the jacquard cards and for simultaneously producing a proof therefrom, comprising a series of card punches, mechanism for actuating said punches and mechanism for simultaneously controlling and actuating said jacquard mechanism from said card punches.
2. In combination with an automatic embroidery machine actuated by means of jacquard mechanism, means for punching the jacquard cards and for simultaneously producing a proof therefrom, comprising a series of card punches, mechanism for actuating said punches and electro-mechanical means for simultaneously controlling and actuating said jacquard mechanism from said card punches.

3. In an automatic embroidery machine, the combination with jacquard mechanism having a card cylinder and lifting wires co-

operating therewith, a series of card punches, mechanism for actuating said punches, cover plates for covering and uncovering the holes in said card cylinder and connections from
5 said cover plates to their respective punches.

4. In an automatic embroidery machine, the combination with jacquard mechanism having a card cylinder and lifting wires co-
10 operating therewith, a series of card punches, mechanism for actuating said punches, cover plates for covering and uncovering the holes in said card cylinder, and electro-mechanical connections from said cover plates to
15 their respective punches.

5. In an automatic embroidery machine, the combination with jacquard mechanism having a card cylinder and lifting wires co-
20 operating therewith, a series of card punches, mechanism for actuating said punches, an electrical circuit, electro-magnets in said circuit, make and break contacts in said circuit and actuated by said punches, movable
25 armatures controlled by said electro-magnets and cover plates connected to said armatures and adapted to cover and uncover the holes in said card cylinder.

6. In an automatic embroidery machine, the combination with jacquard mechanism having a card cylinder and lifting wires co-
30 operating therewith, a series of card punches, mechanism for actuating said punches, an electrical circuit, electro-magnets in said circuit, make and break contacts in said circuit and actuated by said punches, movable
35 armatures controlled by said electro-mag-

nets, cover plates connected to said armatures and adapted to cover and uncover the holes in said card cylinder, and means for attracting said armatures on the completion
40 of the circuit through said contact and after the circuit through said contact is broken by the return movement of the punch.

7. In an automatic embroidery machine, the combination with jacquard mechanism having a card cylinder and lifting wires co-
45 operating therewith, a series of card punches, mechanism for actuating said punches, an electrical circuit, make and break contacts in said circuit and actuated by said punches, electro-magnets in said circuit
50 and whose cores are in electrical contact with their windings, movable armatures controlled by said electro-magnets, springs for returning said armatures to normal position, an electrical connection from said armatures
55 through said springs to said electrical circuit, cover-plates connected to said armatures and adapted to cover and uncover the holes in said card cylinder, and a make and
60 break contact for making and breaking the electrical circuit through said armatures and electro-magnet cores, and mechanism operated from the jacquard mechanism for controlling said last mentioned contact.

In witness whereof I have hereunto set my
65 hand in the presence of two witnesses.

JOHANN JACOB KNECHT. [L. s.]

Witnesses:

LUDWIG FIEGLER,
SIDNEY RICH.