

P. WEISSENBORN.
ELECTRICAL PATTERN FOR THE MANUFACTURE OF JACQUARD CARDS.
APPLICATION FILED JAN. 9, 1908.

933,805.

Patented Sept. 14, 1909.

2 SHEETS—SHEET 1.

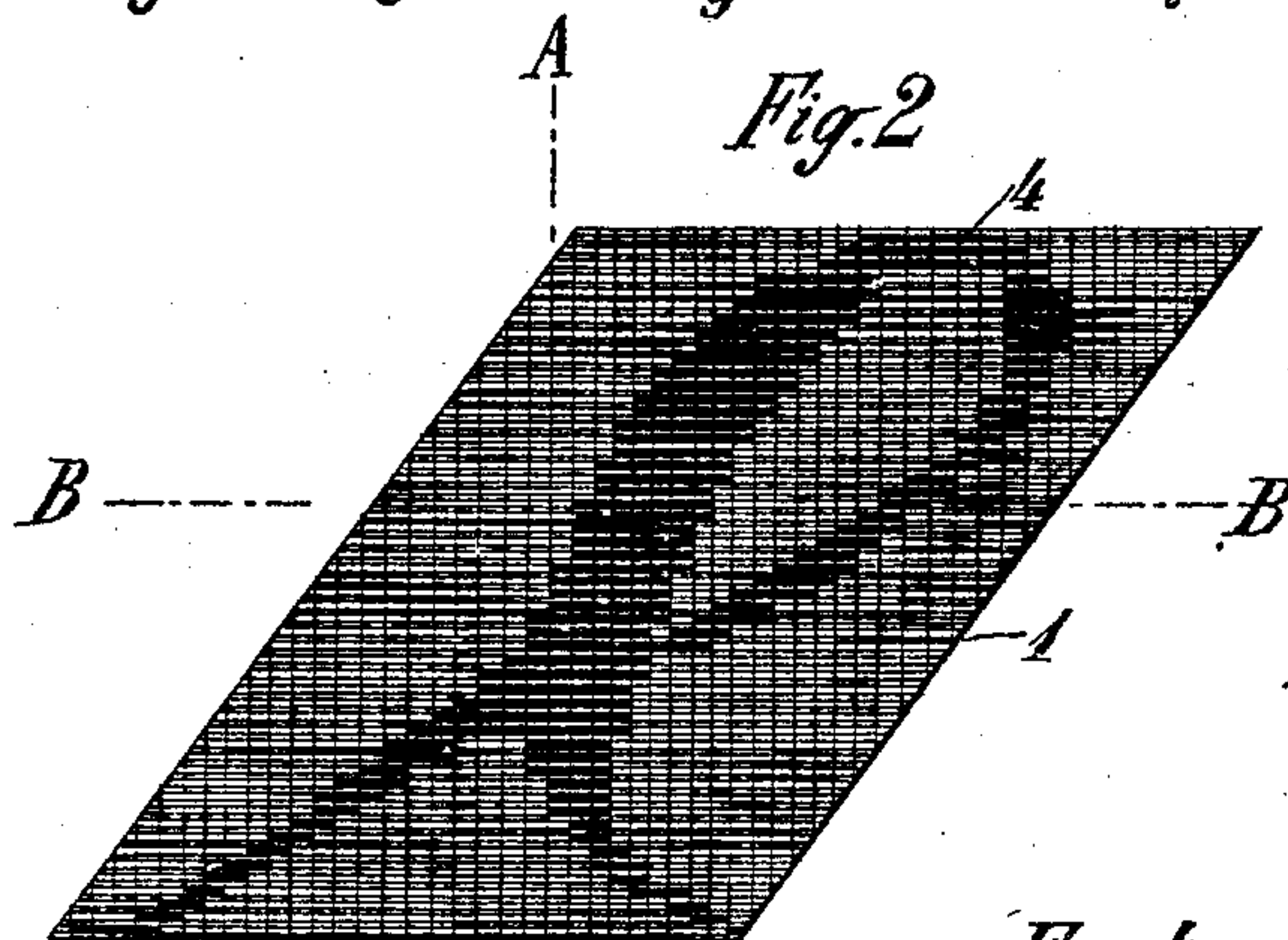
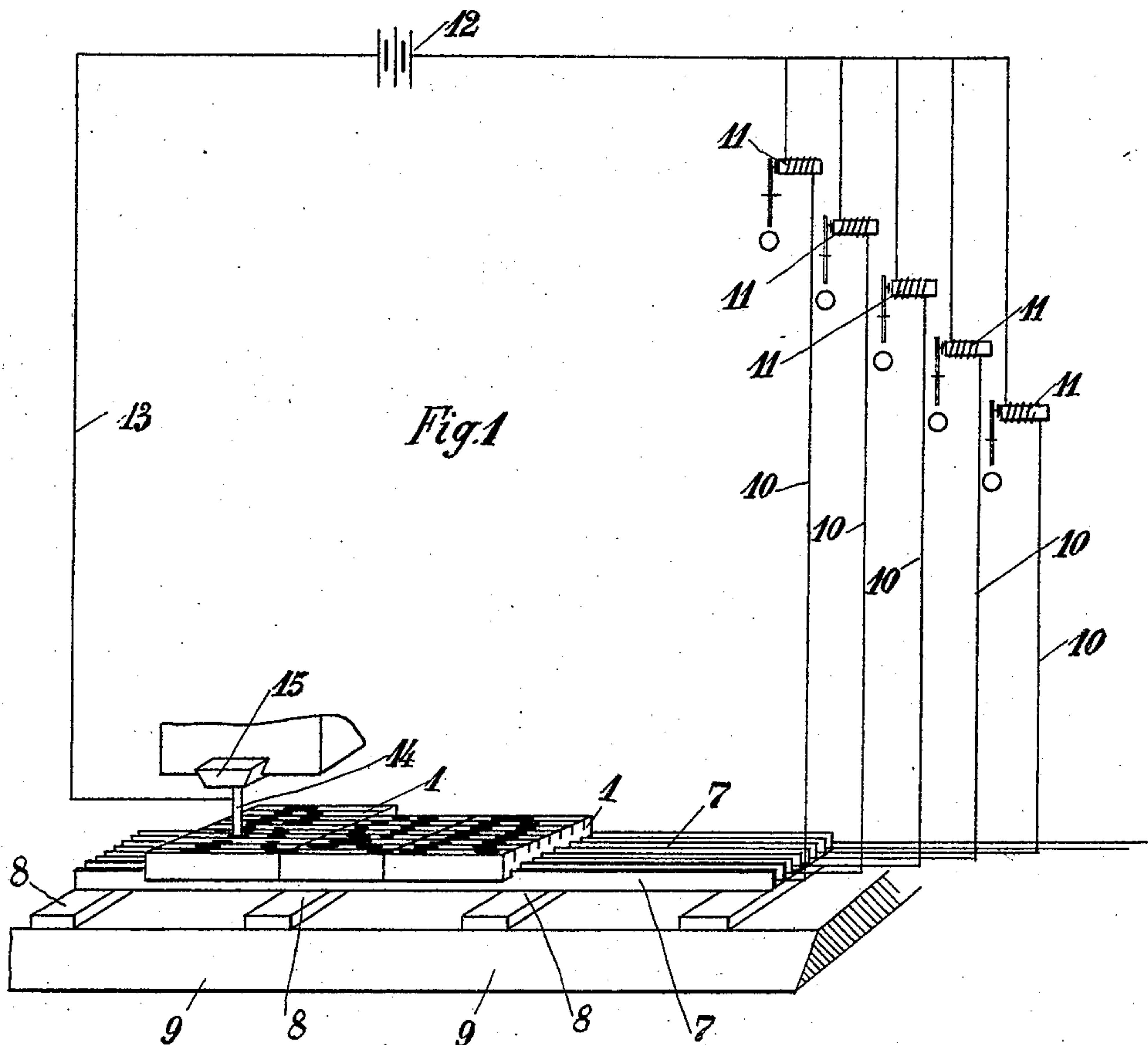
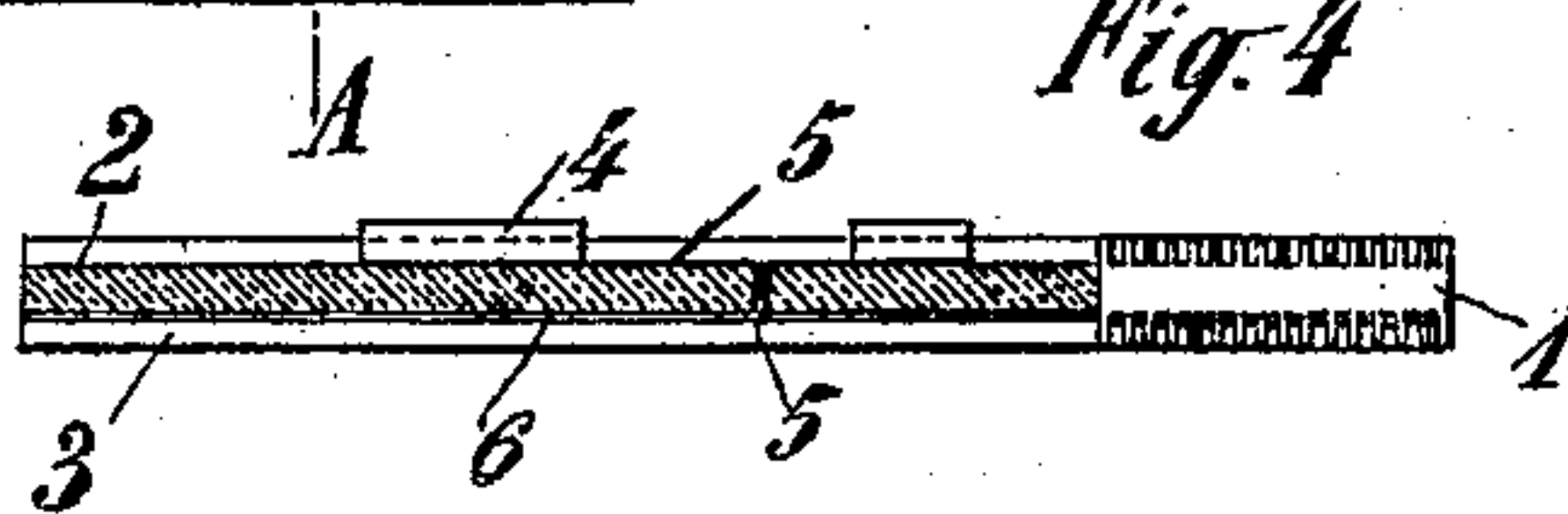


Fig. 3



Fig. 4



Witnesses,

Wm. König
Emil Thümpner

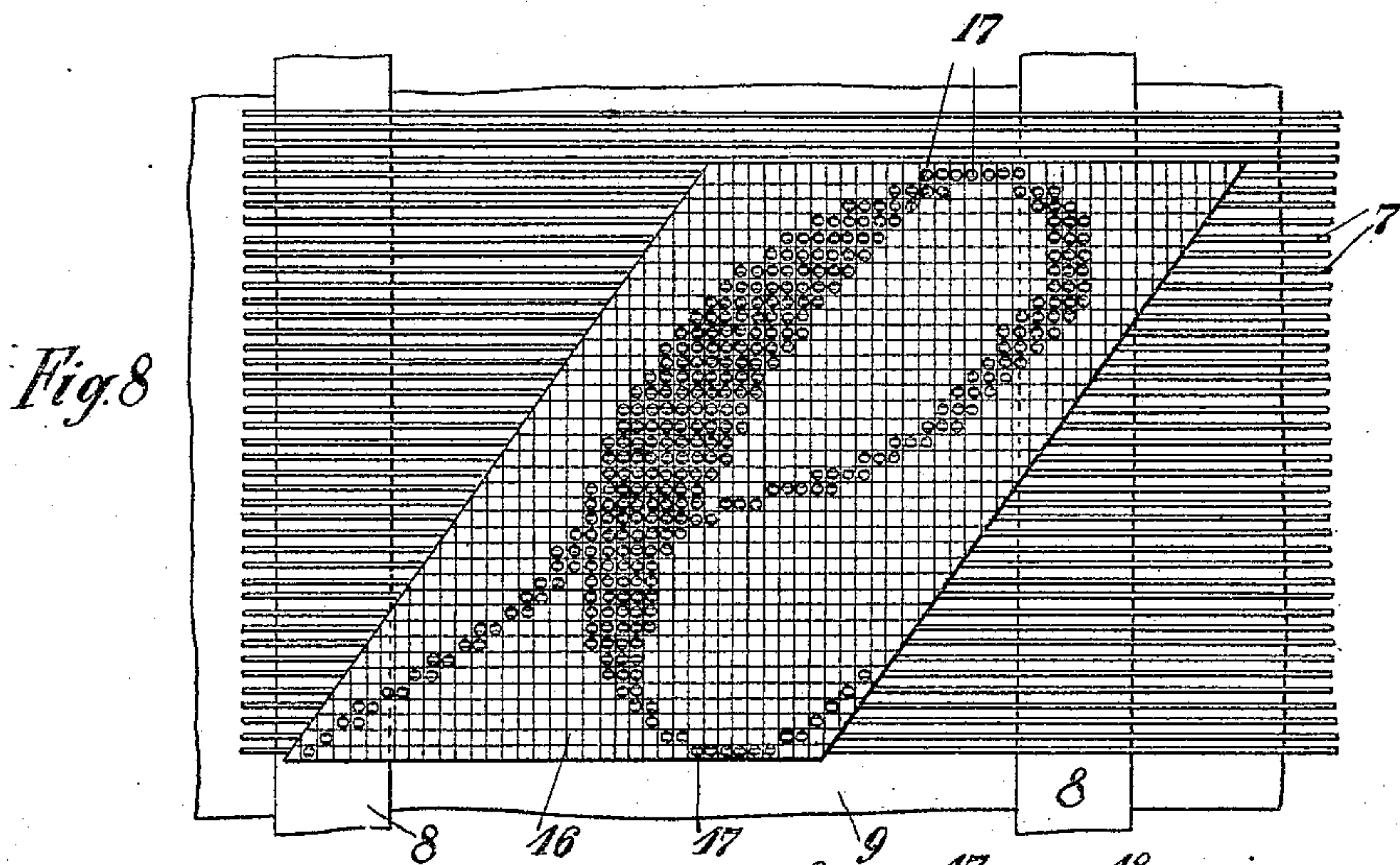
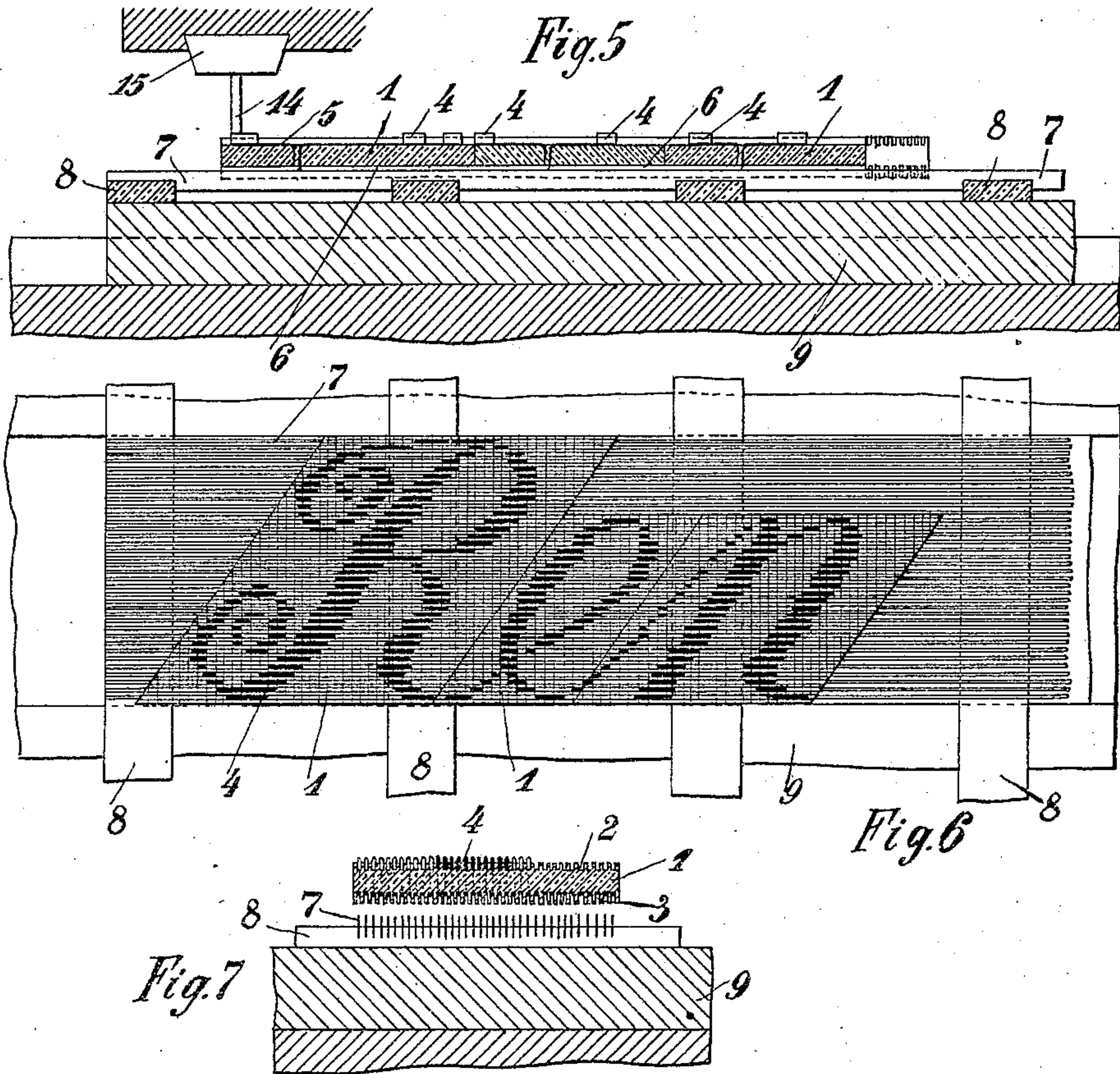
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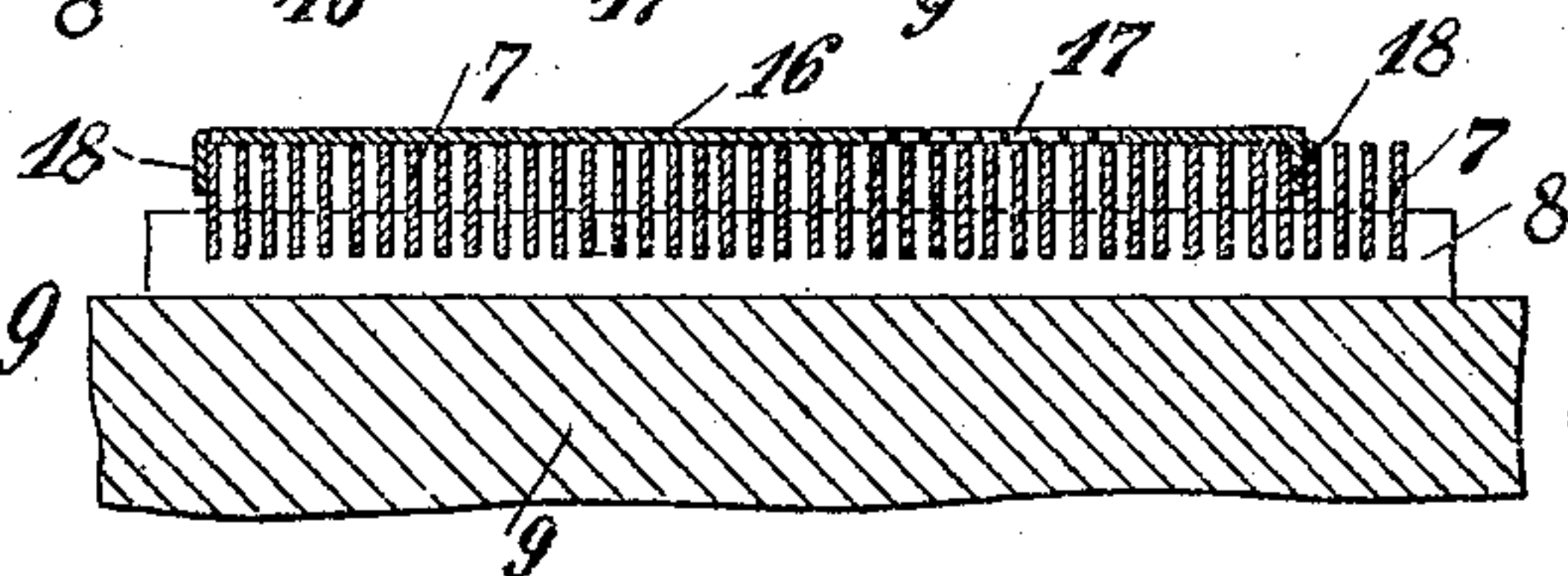
Patented Sept. 14, 1909.
2 SHEETS—SHEET 2.



Witnesses.

Oh Kong
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Fig. 9



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UNITED STATES PATENT OFFICE.

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ELECTRICAL PATTERN FOR THE MANUFACTURE OF JACQUARD-CARDS.

933,805.

Specification of Letters Patent. Patented Sept. 14, 1909.

Application filed January 9, 1908. Serial No. 410,069.

To all whom it may concern:

Be it known that I, PAUL WEISSENBORN, a citizen of the German Empire, residing at Barmen, in the Province of Rhenish Prussia and Kingdom of Prussia, Germany, have invented certain new and useful Improvements in Electrical Patterns for the Manufacture of Jacquard-Cards, of which the following is a specification.

10 The subject-matter of this application is a new electrical pattern for card-punching machines, which is intended to be employed particularly for manufacturing jacquard cards for weaving name-ribbons, number-
15 ribbons and other patterned fabrics or fancy cloths. In the manufacture of said fabrics it has hitherto been necessary first of all for a pattern-drawing to be prepared for each design according to which drawing the jacquard cards have then been punched out on
20 a card-punching machine, an electrical pattern specially prepared therefor according to the drawing being used if desired.

The peculiarity of the new pattern consists in this, that in correspondence with the figure (name or the like) to be woven the pattern is composed of separate individual or unit patterns or letters, figures or other signs or portions of designs which are adapted to
30 be used over again, and in these unit patterns being united to form the complete pattern by being mounted side by side on a bed of electrically conductive rails or wires arranged side by side, their number corresponding with that of the warp threads in
35 the fabric to be manufactured, said rails or wires being connected each with a conductor controlling by means of an electromagnet the striking lifting-wire appertaining thereto. The unit patterns may thereby
40 themselves be formed as electrical patterns and be so shaped that the conductive surfaces on being mounted on the above-mentioned bed come into electrical connection
45 with the rail on the bed corresponding to the respective warp thread of the fabric to be manufactured. Instead of this, however, when unit patterns consisting of non-conductive material are used, these patterns may
50 be provided with perforations corresponding to the design, through which perforations the wires or rails of the above-mentioned bed are then accessible. Consequently in the case of this invention it is not
55 necessary to make a new pattern or a new

drawing for a new name nor a new electrical pattern corresponding to such new name or figure, but the electrical pattern is simply composed of unit patterns kept in stock. Consequently a very considerable amount of
60 time and wages is saved, particularly as the composition of the patterns does not require specially skilled workmen.

Two embodiments of the invention are illustrated by way of example in the accompanying drawing, in which:

Figure 1 illustrates in perspective the pattern composed of several parts according to the first method of carrying out the invention, said pattern being connected with the
65 electric conductors, Fig. 2 an individual or unit pattern in plan, Fig. 3 a section of the same on the line A—A of Fig. 2 and Fig. 4 a section on the line B—B of Fig. 2. Fig. 5 illustrates in longitudinal section a pattern
70 composed of three parts, said pattern being arranged on the rail-bed. Fig. 6 is a plan of the parts shown in Fig. 5, and Fig. 7 a cross section through said parts the unit patterns being shown raised above the rails. 80
Fig. 8 is a plan of the second embodiment. Fig. 9 is a cross section through the same.

In the case of the first embodiment the unit patterns having the various letters or signs are arranged like the well-known strip
85 patterns. They consist of a plate 1 of non-conductive material (hard-vulcanized india rubber (ebonite) or the like) which is shaped like a comb not only on its upper surface as in the case of previously known patterns but
90 also on its under surface, that is, it possesses at both sides longitudinal grooves 2 and 3 respectively, the grooves on its under surface being deeper than those on its upper surface as is particularly evident in Figs. 3 and 7. 95
The number of these grooves is equal to the number of the warp threads required for forming the design. The transverse divisions shown in Fig. 2 each correspond to one
100 of the jacquard cards which are to be made and which are requisite for forming the individual letter. In order to form the conductive surfaces the small strip-shaped contact pieces 4 are inserted in the upper
105 grooves 2 of the plate and are fastened by cement, for example, in such a manner that they project a little from the plate 1 but are insulated from one another by the ribs on said plate which are situated between them.
110 These small contact pieces 4 extend over one,

two, or even more of the transverse fields of the plate 1 according as to whether at the place in question a hole is to be punched in one or in more successive jacquard cards.

5 These contact pieces 4 might instead of being arranged as above extend over the whole length of the unit pattern and then according to the design be partially covered with insulating material as in the case of the

10 above mentioned strip-patterns. These contact pieces 4 are electrically connected, by means of a wire 5 embedded in the plate 1, with the wires 6 lying at the bottom of the under grooves 3 which coincide with the

15 upper grooves, said wires extending along the whole length of said grooves. The unit patterns thus arranged have in this case such an external shape that they can be arranged close together in rows in any desired order

20 so that thereby the pattern for a whole word, several words, or the like, can be formed. For this purpose the unit patterns are arranged close to one another on a bed in the requisite order, which bed is formed of thin

25 conductive rails or wires 7. These rails are arranged edgewise parallel and close to one another at a distance from one another corresponding exactly to the distance between the grooves 2 and 3 and are held in insulating supports 8 which in their turn are fastened on a foundation plate 9. The number

30 of these rails or wires 7 corresponds with the number of the warp threads of the fabric to be manufactured or of that of the lifting wires of the jacquard machine in question

35 for which the cards are to be made. The unit patterns as already mentioned are mounted on these rails 7 and in particular on those which correspond with the warp threads coöperating in the formation of the design and in such a manner that the rails 7 engage in the under grooves 3 of the plate 1 and consequently are in contact with the

40 pieces of wire 6 lying at the bottom of these grooves, the contact being as much as possible over the whole length of said pieces of wire, so that the contact pieces 4 of the patterns are electrically connected with the corresponding rails 7. Each of these rails 7

50 is connected by means of a wire 10, in the course of which an electromagnet 11 is connected, with the one terminal of a suitable source 12 of current, the other terminal of which is connected by means of a wire 13

55 with a contact finger 14. The latter in the example illustrated is so arranged on a slide 15, which is moved by suitable means not shown in the drawing transversely to the rail 7, it being adapted to come to a standstill

60 at the end position, that on each movement of the slide 15 its free end lightly passes over one of the transverse areas of the pattern. After each of these movements of the contact finger 14 the pattern is advanced through a

65 distance equal to one transverse division of

the pattern by the displacement of the foundation plate 9 which carries the rail 7, in order that the contact finger 14 when performing its next movement may slide over the next area of the pattern. Instead of the

70 above method however the same end may be attained by correspondingly moving the slide 15 together with the contact finger. As often as the contact finger 14 on moving over the pattern meets one of the contact

75 pieces 4 the circuit of the corresponding wire is closed and consequently the electromagnet 11 situated in the circuit in question is excited whereby the needle mechanism of a card-punching machine, well known *per se*,

80 is set.

The second embodiment which is illustrated in Figs. 8 and 9 is distinguished from the first embodiment merely by the nature of the unit patterns. Said patterns consist

85 in this case of a simple plate 16 of non-conductive material such as cardboard. They are provided on their upper surfaces with transverse and longitudinal divisions, the strips formed by the latter each corresponding

90 to a warp thread and each of the transverse divisions corresponding to a pick, that is, to one of the jacquard cards which is to be made and which is requisite for the formation of the individual figures. Instead

95 of the conductive surfaces on the unit patterns in the case of the first embodiment, in the case of this second embodiment the respective areas of the unit patterns are provided with a complete perforation 17 so that

100 when these patterns are mounted and arranged properly on the bed 7, 8, 9 the wires or rails 7 are accessible through these perforations 17 to the contact finger, while they are covered over at other places by the

105 pattern. The contact finger is in the case of this embodiment suitably guided by hand and formed like a style so that it can be conveniently brought into contact through the perforations 17 with the rails or wires.

110 Otherwise the mode of operation is the same as in the case of the first example.

In order to be able to keep the patterns 16 in a certain position on the bed 7, 8, 9 the patterns are suitably provided with ribs 18

115 so that they may be clamped firmly by means of the latter between the wires or rails 7 as can be seen in Fig. 9.

Having now described my invention I declare that what I desire to secure by Letters

120 Patent is:

1. In a jacquard card manufacturing machine having electrical means controlling the formation of the holes in the cards, an electrical pattern punching device comprising

125 the combination of a plurality of electric conductors arranged parallel to one another, electrical connections between said conductors and said electrical means controlling the formation of the holes, a plurality of

130

electric patterns detachably arranged on said conductors, a movable contact, and electrical connections between said contact and said electrical controlling means, each pattern comprising a non-conducting plate having contact pieces set into its opposite faces and electric connections between the contact-pieces in one face and those in the other face, for the purpose set forth.

10 2. In a jacquard card manufacturing machine having electrical means controlling the formation of the holes in the cards, an electrical pattern punching device comprising the combination of a plurality of electric
15 conductors arranged parallel to one another, electrical connections between said conductors and said electrical means controlling the formation of the holes, a plurality of electric patterns detachably arranged on said con-
20 ductors, a movable contact, and electrical connections between said contact and said electrical controlling means, each pattern comprising a non-conductive plate having a plurality of longitudinal parallel grooves in
25 its upper and under surfaces, said grooves being in the same relative positions to one another as the relative positions of said plurality of electric conductors and being of substantially the same width as the latter, a
30 plurality of contact pieces in the grooves in the upper surface, a plurality of contact pieces in the grooves in the under surface, and electrical connections between the contact pieces in the upper grooves and those in
35 the corresponding under grooves.

3. In a jacquard card manufacturing machine having electrical means controlling the formation of the holes in the cards, an electrical pattern punching device comprising
40 the combination of a plurality of electric conductors arranged parallel to one another, electrical connections between said conductors and said electrical means controlling the formation of the holes, a plurality of
45 electric patterns detachably arranged on said conductors, a movable contact, and electrical connections between said contact and said electrical controlling means, each pattern comprising a non-conductive plate having a
50 plurality of longitudinal parallel grooves in its upper and under surfaces, said grooves being in the same relative positions to one another as the relative positions of said plurality of electric conductors and being
55 of substantially the same width as the latter, a plurality of contact pieces in the grooves in the upper surface, a wire arranged at the bottom of each of the grooves in the under surface and extending from
60 one end to the other end of the groove, and electrical connections between the contact pieces in the upper grooves and the wires in the corresponding under grooves.

65 4. In a jacquard card manufacturing machine having electrical means controlling

the formation of the holes in the cards, an electrical pattern punching device comprising the combination of a plurality of electric conductors arranged parallel to one another, electrical connections between said
70 conductors and said electrical means controlling the formation of the holes, a plurality of electrical patterns detachably arranged on said conductors, a movable contact, and electrical connections between said
75 contact and said electrical controlling means, each pattern comprising a non-conductive plate having a plurality of longitudinal parallel grooves in its upper and under surfaces, said grooves being in the same rela-
80 tive positions to one another as the relative positions of said plurality of electric conductors and being of substantially the same width as the latter, a plurality of holes through said plate each of said holes inter-
85 connecting one upper groove with its corresponding under groove, a plurality of contact pieces in the grooves in the upper surface, a plurality of contact pieces in the grooves in the under surface, and a wire
90 running from each contact piece in each upper groove along the bottom of the latter and through the hole connecting said groove with the corresponding under groove and to the contact piece in the latter.
95

5. In a jacquard card manufacturing machine having electrical means controlling the formation of the holes in the cards, an electrical pattern punching device comprising
100 the combination of a plurality of electric conductors arranged parallel to one another, electrical connections between said conductors and said electrical means controlling the formation of the holes, a plurality
105 of electric patterns detachably arranged on said conductors, a movable contact, and electrical connections between said contact and said electrical controlling means, each pattern comprising a non-conductive plate
110 having a plurality of longitudinal parallel grooves in its upper and under surfaces, said grooves being in the same relative positions to one another as the relative positions of said plurality of electric conductors and
115 being of substantially the same width as the latter, and the under grooves being deeper than the upper grooves, a plurality of contact pieces in the grooves in the under surface, and electrical connections between
120 the contact pieces in the upper grooves and those in the corresponding under grooves.

6. In a jacquard card manufacturing machine having electrical means controlling the formation of the holes in the cards, an electrical pattern punching device comprising
125 the combination of a plurality of electric conductors arranged parallel to one another, electrical connections between said conductors and said electrical means controlling the formation of the holes, a plurality
130

of electric patterns detachably arranged on said conductors, a movable contact, and electrical connections between said contact and said electrical controlling means, each pattern comprising a non-conductive plate having a plurality of longitudinal parallel grooves in its upper and under surfaces, said grooves being in the same relative positions to one another as the relative positions of said plurality of electric conductors and being of substantially the same width as the latter, a plurality of strip-shaped contact pieces in the grooves in the upper surface said strip-shaped contact pieces having a height greater than the depth of said grooves and thereby projecting out of the same, a plurality of contact pieces in the grooves in the under surface, and electrical connections between the contact pieces in the upper grooves and those in the corresponding under grooves.

7. In a jacquard card manufacturing machine having electrical means controlling the formation of the holes in the cards, an electrical pattern punching device comprising the combination of a plurality of elec-

tric conductors arranged parallel to one another, electrical connections between said conductors and said electrical means controlling the formation of the holes, a plurality of electrical patterns detachably arranged on said conductors a movable contact, and electrical connections between said contact and said electrical controlling means, each pattern comprising a non-conductive plate having a plurality of rows of perforations said rows being in the same relative positions to one another as the relative positions of said plurality of electric conductors and said non conducting plate being also provided with contact pieces in its upper face and its lower face, and electric connections from said contact pieces of its upper face and its lower face and electric connections from said contact pieces of the upper face to those of the lower face, for the purpose set forth.

PAUL WEISSENBORN. [L. s.]

Witnesses:

OTTO KÖNIG,
ERNST THIRGEN.