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Patented June 3, 1902.

J. SZCZEPANIK.
JACQUARD CARD AND METHOD OF MAKING SAME.

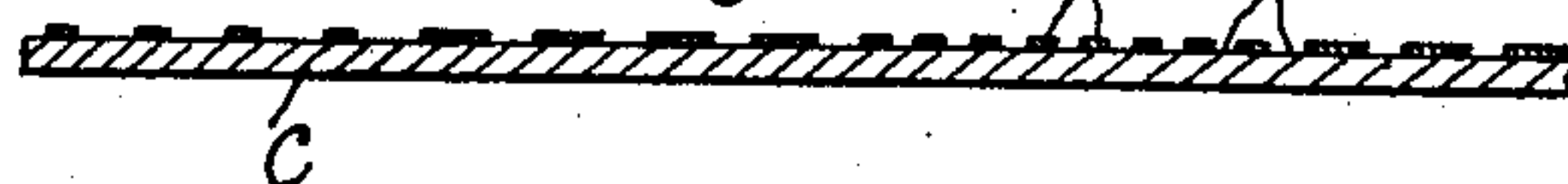
(Application filed Mar. 19, 1900.)

(Specimens.)

Fig. 1.



Fig. 2



Witness:
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SOCIÉTÉ DES INVENTIONS JAN SZCZEPANIK & CIE., OF VIENNA,
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JACQUARD-CARD AND METHOD OF MAKING SAME.

SPECIFICATION forming part of Letters Patent No. 701,775, dated June 3, 1902.

Application filed March 19, 1900. Serial No. 9,329. (Specimens.)

To all whom it may concern:

Be it known that I, JAN SZCZEPANIK, a subject of the Emperor of Austria-Hungary, residing at Vienna, in the Province of Lower Austria, in the Empire of Austria-Hungary, have invented certain new and useful Improvements in Jacquard-Cards and Methods of Making Same; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a process for photographically producing from objects, patterns, or reproductions of objects metallic templets or diagrams, (hereinafter called "templets,") each composed of conducting and non-conducting portions for electrically-driven weaving-machines, as jacquard machines and dobbies, and also for electrically-driven card-punching machines.

The several steps of the process are modified, as will be hereinafter more particularly explained, in order that the current-interrupting parts, which are formed by an insulating layer, may, as required, be thick or thin, as it may be for card-punching machines and for machines in general that take little current.

Referring to the drawings, in which like parts are similarly designated, Figure 1 represents a portion of a card made in accordance with my invention, and Fig. 2 is a section on an enlarged scale.

The metal plate *c* is provided with a coating made by photography and which exposes certain portions of the plate, as shown at *a*, and which are therefore conductive portions and covers up certain other portions, as shown at *b*, which are non-conductive, the whole being divided into squares, each of which represents a weaving-stitch and corresponding to the blanks and perforations in ordinary jacquard-cards.

In carrying out the process a reduced negative of the design is obtained photographically, and from that, after development, another photograph is taken through a screen, whereby a positive diagram is obtained. This diagram can either be taken on sensitive paper and transferred to a metal plate or be produced directly on the metal plate by photo-

tography. In the former case the photographic positive to be taken through the screen is produced on a translucent material, preferably silver bromid paper, which after development is rendered translucent, (capable of being copied by oil of turpentine or vaseline-oil,) and then either a copy of this positive is made on pigment-paper and transferred to the metal plate or the positive produced in this manner is transferred direct to the metal plate, which must in this case have been previously covered with a layer of a suitable pigment, for which a suitable vehicle is gelatin, fish-glue, india-rubber, or asphaltum. In the second case, with a view to the direct production of the positive diagram on the metal plate, a highly light sensitive emulsion, such as is used in photography, is after laying on one or more insulating layers of lac, for instance, applied to the layer of pigment placed on the metal plate, the object being to overcome the difficulty caused by the low light sensitivity of the layer of pigment. A photograph is taken through the screen on this sensitive layer, and the picture is developed and fixed as usual. Then the plate is exposed again and for a longer time to the light, whereby the picture on the first surface is copied through the insulating layer on the layer of pigment. During the development of the pigment picture, which takes place in the known way in lukewarm water, the light sensitive and insulating layers and also the undeveloped portions of the pigment layer dissolve away and the positive pigment picture remains on the metal plate. In this way places of current interruption are produced on the metal plate by portions of the insulating layer sufficiently thick even for high-tension currents, and therefore for large electrical weaving-machines.

In the case of electrical card-punching machines, for which a very thin insulating layer is sufficient, since they work with low tension, it is not necessary before photographing through the screen to apply a layer of pigment to the metal plate, and the highly light sensitive material may be applied to the plate itself, which should be previously silvered. In this case development is carried out with a tanning developer—for example, a mixture of pyrogallol and an alkali—and it is

then washed, so as to remove the unilluminated parts.

The metal templet produced in any of the ways hereinbefore described is finally treated with alum solution or with formalin in order to harden the current-interrupting layer. When fish-glue is used as a vehicle for the pigment, the hardening may be effected by burning in the layer in enamel fashion. The templet produced in this way is in all cases a positive.

If, as is often the case, it is desired that the templet appear as a negative, an ordinary developer, such as hydroquinon, is used for developing the positive produced on the metal plate, as hereinbefore described. Then it is fixed and thoroughly washed, and the picture or diagram is wiped over with ammonium persulfate, $(\text{NH}_4)_2\text{SO}_4$, which causes the picture to fade out. Then it is washed again, and finally further developed in tepid water, whereby the black parts are washed away.

I claim—

1. The process of making weaving cards or designs, which consists in coating a suitable metallic plate with an actinic film, photographically copying a weaving-pattern on said film, developing the latter to expose parts of the metal plate, substantially as described.

2. The process of making weaving cards or designs, which consists in coating a suitable plate with an actinic film, coating this film with one or more coats of a transparent substance, then applying a second actinic film, providing said plate with a suitable photographic record developing the second actinic film, then exposing the plate to light and developing the first actinic film, substantially as described.

3. The process of making weaving cards or designs, which consists in copying a diapositive through a suitable screen on a silvered metallic plate coated with an actinic substance, developing and hardening said actinic coating, substantially as described.

4. The process of making weaving cards or designs, which consists in coating a suitable metallic plate with a slow actinic film, coating the latter with a transparent film, and then applying a second and more rapid actinic coating, providing said plate with a suitable photographic record, developing the second actinic film, exposing the plate to light and developing the first actinic film so as to expose parts of the metallic plate, substantially as described.

5. The process of making weaving cards or designs, which consists in coating a suitable plate with an actinic pigment film, coating the pigment film with one or more coats of a non-conductive transparent substance, then applying an actinic coating, exposing said plate to a photographic diapositive, developing the outer actinic film, then exposing the developed plate to light and developing the pigment layer, substantially as described.

6. The process of making weaving cards or designs, which consists in coating a suitable metallic plate with a slow actinic pigment film, coating the latter with a transparent non-conductive film, and then coating the latter with a more rapid actinic film, exposing the plate under a suitable photographic diapositive, developing the outer film, exposing the plate to light and then developing the second actinic film, substantially as described.

7. The process of making weaving cards or designs, which consists in coating a suitable metallic plate with a slow actinic pigment film, then with a suitable lac, and then with a more rapid actinic film exposing the plate to a photographic diapositive and a suitable screen, thereby dividing the photographic record so as to indicate the stitches of a weaver's pattern, developing the outer film, exposing the developed plate to light, removing the lac and developing the under film to expose parts of the metallic plate, substantially as described.

8. The process of making weaving cards or designs, which consists in copying a photographic diapositive through a suitable screen on sensitized paper, developing the print, rendering the paper transparent, copying the print on sensitized pigment-paper, developing this print, transferring the pigment film from the paper to a suitable metallic plate and hardening said pigment film, substantially as described.

9. The method of producing weaving pattern cards or designs, which consists in coating an electrically-conductive support with an actinic film, copying a photographic plate through a suitable screen on said film, developing and fixing the latter to produce a positive, treating the film with a suitable chemical to cause the picture to fade out and washing to remove the dark portions on said plate to produce a negative picture, substantially as described.

10. A card or design for jacquard-weaving, comprising a metallic plate provided with a finished photographic record to indicate a weaving-crossing, substantially as described.

11. A card or design for jacquard-weaving, comprising a silvered metallic plate provided with a finished photographic record to indicate a weaving-stitch, substantially as described.

12. A card or design for jacquard-weaving, consisting of a silvered metallic plate with a finished photographic record thereon having electrically conducting and non-conducting parts arranged to indicate a weaving-crossing, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

JAN SZCZEPANIK.

Witnesses:

ALVESTO S. HOGUE,
AUGUST FUGGER.