United States Patent [19]
Servillat

[11] **3,741,468**
[45] **June 26, 1973**

[54] PREPARATION OF PERFORATED JACQUARD CARDS OR PAPERS

[75] Inventor: **Gabriel Servillat,** Saint-Cyr-Au-Mont-D Or, France

[73] Assignee: **Verdol S.A.,** Lyon (Rhone), France

[22] Filed: **June 22, 1971**

[21] Appl. No.: **155,525**

[30] **Foreign Application Priority Data**

July 10, 1970 France 7026737

[52] **U.S. Cl.** **264/65,** 35/16, 35/27, 66/1, 66/156, 139/333, 234/89

[51] **Int. Cl.** **F27b 9/04**

[58] **Field of Search** 234/54, 65, 89; 66/1, 156; 139/333; 35/15, 26, 27

[56] **References Cited**

UNITED STATES PATENTS

2,845,096	7/1958	Pasquet	234/65 X
3,059,843	10/1962	Corbaz	234/89 X

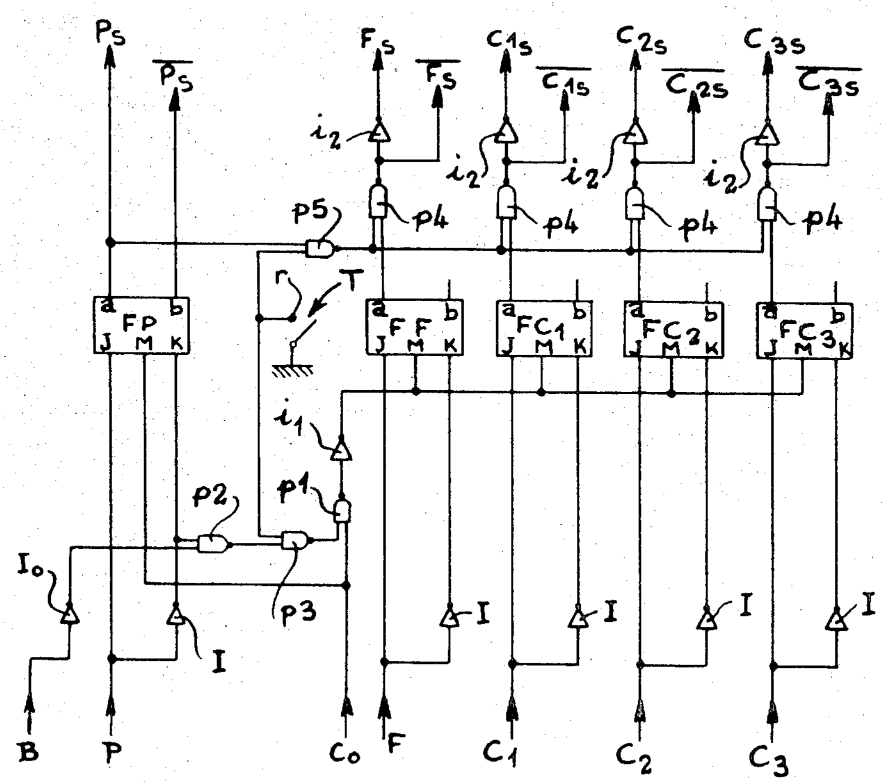
Primary Examiner—J. M. Meister
Attorney—Arthur E. Dowell and Arthur E. Dowell III

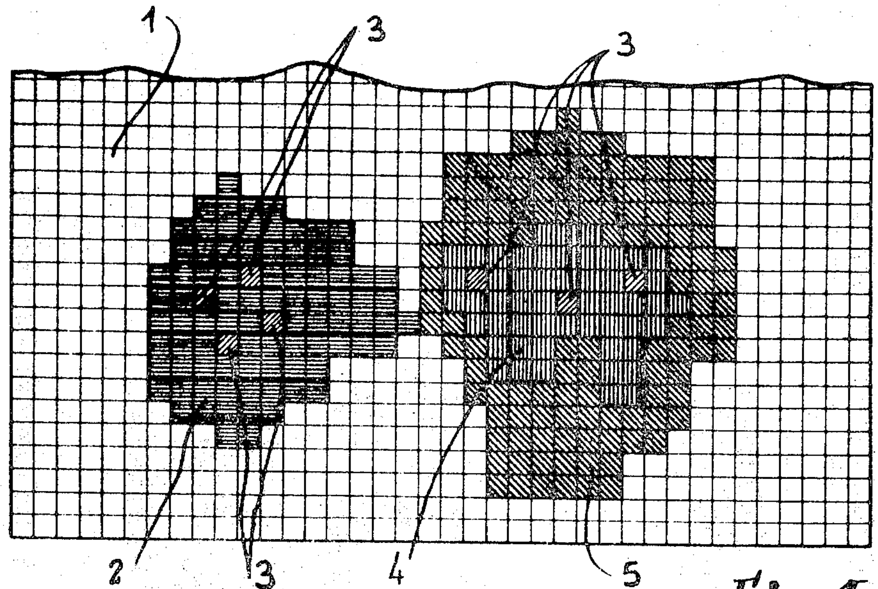
[57] **ABSTRACT**

In the preparation of designs on squared paper for the perforation of Jacquard cards or papers, such designs comprising a background (conventionally uncolored) and color zones each corresponding to a given color, the background is considered as an additional color zone corresponding to a particular color (different from those of the other color zones) and in each color zone (including the background) and in each row the designer only colors the first square which is met during the reading-in operation either at the beginning of the row or when passing from a color zone to the next one, the reader having to consider any uncolored square (white square) as if it were of the same color as the last colored square met in the row. This simplifies considerably the work of the designer and reduces the cost of the design. If the design comprises some few squares or "points" situated within a given color zone (including the background) and corresponding to a particular color (different from all the other colors of the design) they are wholly colored and the color of the said given zone is not repeated after them, the reader considering the color of such points as having priority to momentarily prevail on the color of the zone which remains, so to speak, in the reader's memory.

When the design is read-in by photo-electric means emitting color signals and also coincidence signals whenever they are centered on a square, there is inserted between these means and the perforating means a logic circuit having for each color (including background) a registering device (flip-flop) conditioned by the color signal and set or reset by the coincidence signal. The white signal (uncolored square) blocks the passage of the coincidence signal to the devices (excepting that of the priority color) thus causing repetition of the previous color. As to the priority color signal, it acts as the white signal and furthermore it momentarily inhibits the outlets of the other registering devices.

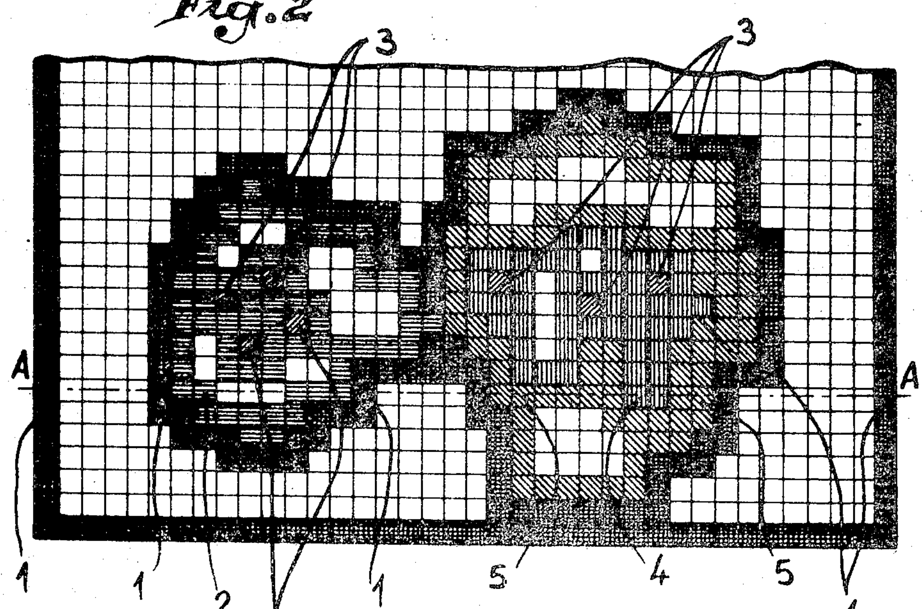
6 Claims, 4 Drawing Figures





PRIOR ART Fig.1

Fig.2



INVENTOR
Gabriel Sevillat
BY Alexander Sorell
Attorney

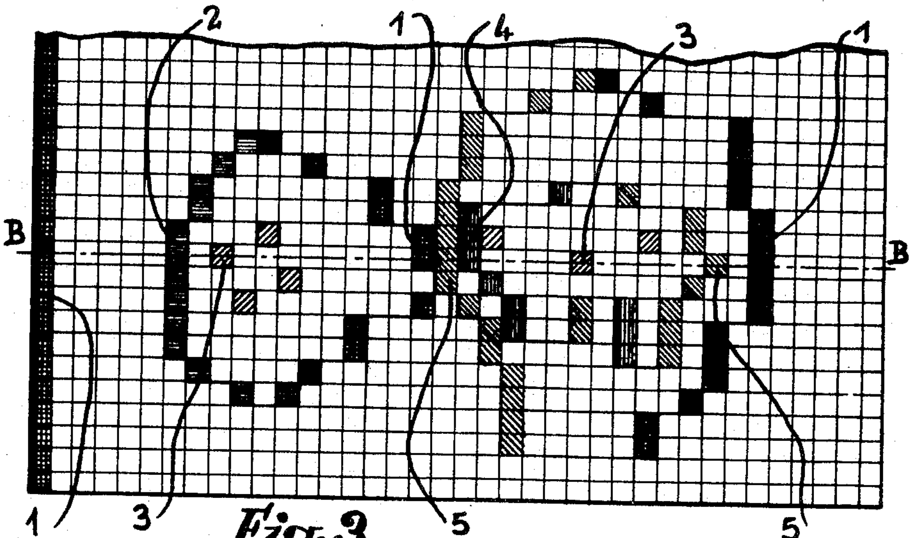


Fig. 3

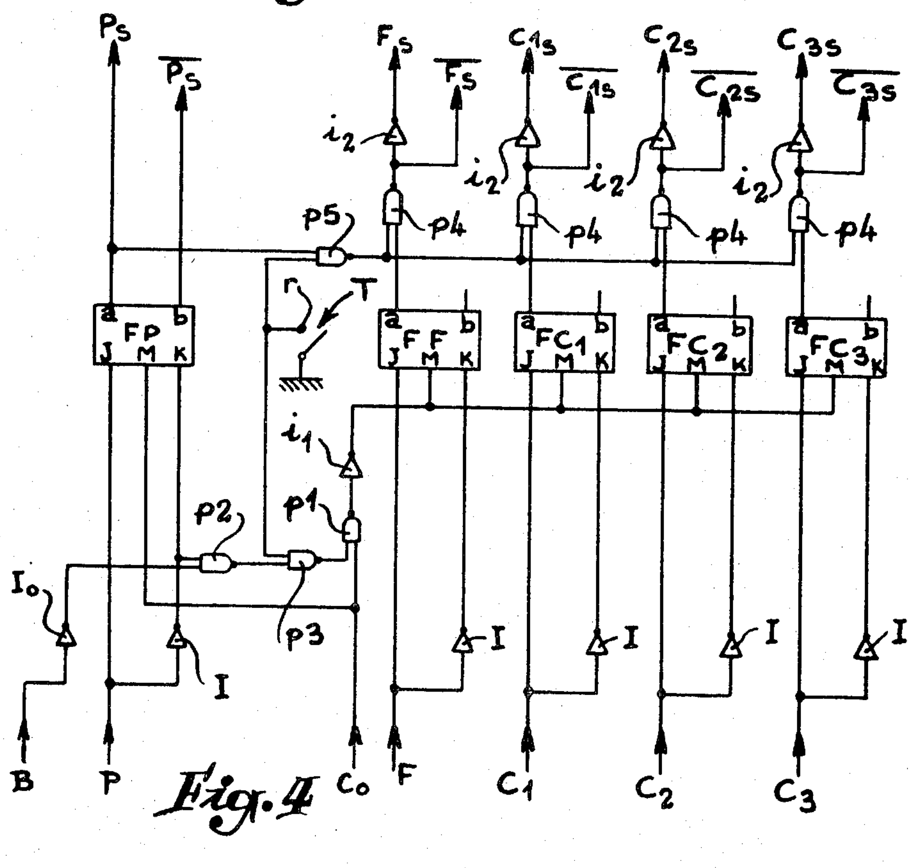


Fig. 4

INVENTOR
Gabriel Servillat
BY Alexander ... attorney

PREPARATION OF PERFORATED JACQUARD CARDS OR PAPERS

The perforated cards used in Jacquards for looms (the term "card" including the Verdol paper band) are prepared from a colored design drawn on squared paper. In order to read-in the design the operator or reader follows the successive horizontal rows of squares and he actuates a perforating machine in accordance with the colors of the successive squares. In actual practice each color corresponds to a particular weave adapted to expose or to conceal determined weft or warp threads in order to obtain on the finished fabric the design or pattern desired.

The draughtsman or designer who prepares the design on squared paper should theoritically color the different colored zones in a quite uniform manner, as if he were painting the fabric itself. But in order to save time he usually only indicates the various colors in a somewhat approximative manner leaving to the reader to correct the obvious deficiencies. Considering for instance a zone of squares which should be blue, it may happen that some squares of this zone are only very lightly colored, or even sometimes quite uncolored more particularly in the central portion of the zone, being understood that the reader will obviously consider these squares as blue.

In order to dispense with the tedious and time-consuming work of the design reader it has been proposed to effect the reading-in operation by photo-electric means, the different colors being read-in either successively or simultaneously. The machines which have been realized for this purpose operate quite satisfactorily. Their drawback is however that they require carefully prepared designs since a photo-electric reading-in device and the machine with which it is associated cannot have the intelligence of a design reader and are therefore quite unable to correct the coloring deficiencies whatever obvious they may be. If for instance the designer has left a square uncolored or only very lightly colored in a blue zone of the design, the machine will not read "blue" but presumably "white" which will cause a defect on the fabric. This requirement of uniform coloring of all the squares in the respective zones of the design increases considerably the time required from the designer and therefore reduces in a substantial manner the financial advantage which might otherwise result from the automatic reading-in.

It is an object of the present invention to eliminate this inconvenience and to provide a weaving design of quite simplified coloring, and therefore relatively inexpensive.

In accordance with the present invention the background of the design is considered as a colored zone, and in each colored zone of the design and in each horizontal row thereof the designer only colors the first square which will be met when reading in the row. The work to be effected by the designer is thus reduced to a minimum and he may take care to uniformly color these few squares without this entailing a noticeable loss of time.

According to another aspect of the present invention, in order to effect the automatic reading-in of such a design there is interposed between the photo-electric means which scan the said design and the punching means which perforate the paper or card a logic circuit which registers each signal from the photo-electric means and corresponding to a color other than that of the support of the design (generally white), and which transmits this same signal to the punching means for each successive square of the row being read-in as long as the said logic circuit does not receive from the photo-electric means another signal corresponding to another color different from that of the design support. Supposing for instance that the photo-electric means have detected a red square and emitted a corresponding "red" signal, the latter is transmitted to the punching means and if the said square is followed by uncolored squares (practically speaking white squares) this same red signal is again transmitted to the punching means for each of these squares.

The logic circuit above referred to may conveniently comprise for each color a flip-flop of the type known as J-K, i.e. having an auxiliary inlet which actuates the flip-flop when the latter is conditioned by the application of opposed voltages onto the main inlets thereof, this auxiliary inlet being adapted to receive the coincidence signals which are conventionally emitted by the reading-in photo-electric means in order that the color signal be only effective when the said means are centered with respect to the square being read-in. In accordance with the present invention gate circuits are inserted between the auxiliary inlets of the flip-flops and the outlet of the coincidence signal emitter so as to block this signal when the photo-electric means detect the color of the design support (white).

The invention further concerns an arrangement according to which when the design comprises in some colored zones (as for instance blue) small surfaces bearing a particular color (e.g. maroon points in a design having otherwise no maroon zone), the color of the zone in which these small surfaces appear need not be repeated in any row after the corresponding square or squares. For this purpose the particular color of the small surface is considered as having priority, which means that in the colored zone under consideration (blue for instance) when this particular color (maroon for instance) is detected, it automatically prevails momentarily on the color of the zone (blue) which however remains registered in the logic circuits of the reading machine and therefore re-appears as soon as the photoelectric means have passed the last square corresponding to the said particular color. The designer is thus dispensed from having to repeat the main color (blue) after each small surface or point.

In order to read-in a design comprising such a particular or "priority" color the signal of the photo-electric means which corresponds to this color is caused to act as the signal corresponding to the color of the support (white), i.e. to block the passage of the coincidence signal towards the flip-flops of the other or "normal" colors, but in addition the outlet of the flip-flop of the priority color momentarily blocks gate circuits interposed in the outlets of the flip-flops of the normal colors. Since the condition of these latter flip-flops remains unchanged, as soon as the signal corresponding to the priority colors ceases, the said gate circuits are reopened and the signal of the normal color of the zone being read-in is again effective to actuate the perforating means.

It will be understood that the preceding arrangement may be applied to any number of priority colors.

In the annexed drawings :

FIG. 1 shows a weave design as it has been hitherto established in the prior art.

FIG. 2 illustrates a first embodiment of a simplified design according to the invention.

FIG. 3 shows how such a design may further be simplified.

FIG. 4 illustrates the diagram of logic circuits adapted to read-in a design according to FIGS. 2 or 3.

Referring to FIG. 1 a conventional weave design on squared paper comprises a background 1 which is left uncolored (i.e. white in actual practice), being understood that in the reading-in operation any uncolored square exterior to the main colored zones of the design will correspond to the background weave. The design further comprises a blue zone 2 having three dark points 3, and a red zone 4 surrounded by a green zone 4, the red zone also having three dark points 3. As above explained if all the zones are colored in a quite correct manner, the design is easily read-in in a perfect manner by the known photo-electric reading machines provided the logic circuits of the machine are so arranged as to select the background weave whenever the white color of the support is detected. But the disadvantage of this solution is that the designer must carefully color all the squares in each zone, as if the design were a true painting, which is tedious and time-consuming, while when the design is to be read-in by a qualified reader, it is sufficient for the designer to color with some care the marginal portion of each zone, the central portions thereof being only very lightly and irregularly colored, or even in part incolored, since the reader will obviously read-in all the squares of each zone as if they had been properly and uniformly colored. It may thus be said that the designer and the reader have tacitly entered into the following agreement : The whole white space which surrounds the colored zones of the design corresponds to the background. On the other hand any white or only very slightly colored surface within a colored zone should be considered as a continuation of the obvious color of the zone. Such an agreement relies on the fact that the reader will distinguish between both kinds of white surfaces or will not hesitate when observing very slightly colored squares, which is always the case in actual practice. But of course an unintelligent automatic reading-in machine cannot be relied on to operate in this manner.

A first solution within the scope of the present invention consists in considering the background as a colored zone, i.e. in selecting for the background a given color (different from the other colors of the design). Furthermore in each zone only the marginal portions of the zone are colored, the central portions being deliberately left uncolored. FIG. 2 illustrates the design which is thus obtained. Such a design may be easily read-in by any competent reader and also by a photoelectric machine provided its logic circuits are so arranged as to consider a "white" signal as an order to repeat the preceding color signal. Referring for instance to the horizontal row A–A (FIG. 2) which is read from left to right, the photo-electric means will detect a first square having the color (different from white) of the background and they will send a corresponding signal to the logic circuits which will transmit same to the perforating means (or to an intermediate register). Then the photoelectric means will detect four white squares and, in accordance with the instructions which have been provided in the logic circuits, the latter will emit four successive background signals. The sixth square of the row is again colored as the first one and therefore the photo-electric means will again emit a background signal. The logic circuits will thus transmit a sixth background signal. The next two squares will be blue (colored zone 2) and will be read as such ; thereafter three white squares will cause three repetitions of the "blue" signal. Then the photo-electric mean will read three blue squares and thereafter a background square. Four white successive squares will cause four repetitions of the background signal. A colored background square will then be met and thereafter the photo-electric means will detect six successive green squares (zone 5), then two red squares (zone 4), then again two green squares before reaching a background square, then six white squares which will cause six repetitions of the background signal, and finally they will detect a last background square at the end of the row.

In accordance with another aspect of the present invention the design of FIG. 2 may still be further simplified by taking into account two remarks.

In the first place, referring to the preceding explanations concerning row A—A, the photo-electric means have first detected a square having the color of the background, four white squares which have caused four repetiitons of the background signal, and a sixth square having the color of the background as the first one, which corresponds to a total of six background signals. But this sixth square could as well have been left uncolored, i.e. white ; the photo-electric means would have detected five white squares, the background signal would have been repeated a fifth time, and here again six background signals would have been transmitted. After the sixth square the photo-electric means would have detected a blue square and emitted a blue signal in spite of the lack of color of the sixth square or last square of the first background zone. In the same manner in the first blue zone all the squares following the first one of this zone (seventh square of the row A-A) could also have been left uncolored (white) ; and so on. Finally, considering any row it is only necessary to color in each zone (including the background the first square which is met during the reading-in operation, i.e. the square corresponding to the left-hand edge of the zone if the row is read in from left to right, as usual.

Furthermore it may be seen in FIG. 2 that the dark points 3 (which may be comprised each of more than one square) are surrounded by squares having the color (blue for instance) of the zone in which such points are located. Of course with reference to the preceding paragraph this surrounding could be limited to the right-hand side of each point (i.e. to the first square of the blue zone after the point), but nevertheless this requires a particular care from the designer since such points, even if they correspond to more than one square, cannot be easily considered as "zones." But in general these points are of a color which is not to be found in the other parts of the design. Such a particular color may therefore be considered as having priority over the other or "normal" colors (including the color of the background) and the logic circuits of the reading-in machine may be so arranged as to act according to the following instructions : Each time a "priority" color is detected, the corresponding signal will be transmitted towards the perforating means, but the preceding color signal will remain registered and will therefore re-appear for the first white square following the square or squares of the priority color. Stated in other words, the priority color momentarily inhibits the repetition of the preceding normal color, such repetition re-appearing for the next white or differently colored square.

Taking into account the preceding remarks one is finally led to the design of FIG. 3 which is obviously simplified in a considerable manner with respect to that of FIG. 1. The work and time required from the designer are of course correspondingly reduced.

FIG. 4 illustrates a possible embodiment of logic circuits adapted to emit correct perforating signals when they receive the signals of photo-electric means reading-in the simplified design of FIG. 3 by successive horizontal rows. In the diagram of FIG. 3 each rectangular block corresponds to a flip-flop of the type known as J–K, i.e. to a bi-stable flip-flop having an auxiliary actuating inlet M in addition to its conventional or main inlets J and K. As in any flip-flop the outlets *a* and *b* are always at different levels, i.e. if a is at the higher level (level 1), *b* is at the lower level (level 0), and vice-versa. The main inlets J and K are connected with each other through an inverter I. The incoming color signal is applied to one of these inlets (inlet J in the example illustrated). As to the auxiliary inlet M it receives a particular signal which permits the flip-flop to operate and to register the color signal. In other words if a signal 1 is applied to inlet J (and therefore a signal 0 to inlet K) the flip-flop is merely conditioned, but it only sets when a signal or pulse of level 1 is applied to the auxiliary inlet M. When the flip-flop is set, its outlet *a* is at the higher level 1 and its outlet *b* at the lower level 0. If thereafter the incoming color signal disappears (logic level 0) the flip-flop only returns to the reset state (*a* at 0 and *b* at 1) when the actuating pulse is again applied to its auxiliary inlet M.

The diagram of FIG. 4 further uses conventional NAND gates, i.e. inverted AND gates. These NAND gates are electronic circuits which only emit an outlet of lower level (level 0) when all their inlets are at the higher level (level 1), any other combination of inlet levels (as for instance 1-0, 0-1, 0-0 in the case of a two-inlet gate) havinG for its result an outlet at the higher level (level 1).

The diagram of FIG. 4 is established in correspondence with the design of FIG. 3. It is therefore provided for one background color F, three normal colors C1, C2, C3, a priority color P and the white color B of the squared paper. For each color other than B there is provided a flip-flop of the type above referred to, which has been designated by the reference F followed by the indication of the color. The color signals from the photo-electric means have been referenced as the colors themselves. Apart from the white signal B, they are directly applied to the first main inlet J of the corresponding flip-flops and through the inverter I to the second main inlet K thereof.

The logic circuits of FIG. 4 further comprise a sixth inlet Co adapted to receive the coincidence signals or pulses emitted by the scanning device to which the photo-electric means are assOciated, each time the latter explore the center of a square. It is indeed a known fact that in order to obtain the correct reading-in of a design the photo-electric cells should only become effective when they are exactly centered with respect to a square. For this purpose there is generally provided an appropriate scale which is scanned at the same time as the design, each line of the scale generating a pulse each time the main cells are centered with respect to a square of the row being read in, and the logic circuits are so arranged that the color signals from the main cells are only transmitted to the perforating means when such a pulse appears. In FIG. 4 this pulse Co is directly transmitted to the auxiliary inlet M of the flip-flop FP which corresponds to the priority color and also to one of the two inlets of a NAND gate *p1* the outlet of which is connected through an inverter *i1* with the auxiliary inlets M of the four flip-flops FF, FC1, FC2 and FC3 of the normal colors (including the background).

As to the signal B corresponding to the white color (uncolored paper) it passes through an inverter Io and reaches one of the two inlets of a NAND gate *p2* the other inlet of which is connected with the second main inlet K of flip-flop FP. The outlet of gate *p2* is itself connected with one inlet of a third NAND gate *p3* the outlet of which is connected with the second inlet of the first NAND gate *p1*. The second inlet of gate p3 is connected with the fixed contact *r* of a grounding switch T.

The first outlet *a* of flip-flop FP is directly connected with the perforating means so as to transmit to same the signal P*s* which corresponds to the priority color. It may also be provided to use the inverted signal $\overline{Ps}$ which appears at the second outlet *b* of this same flip-flop, this solution being of interest in some cases.

The output *a* of each flip-flop FF, FC1, FC2, FC3 is applied to the first inlet of an individual NAND gate *p4* associated with this flip-flop. the secondinlets of t hese four gates *p4* are all connected with the outlet of a common NAND gate *p5* having one inlet connected with the above-mentieoned contact *r* and the other one connected with the first outlet *a* of flip-hop FP. The outlet of tach gate *p4* is applied to an individual inverter *i2* and the outlet Fs, C1*s*, C2*s*, C3*s* of this inverter forms the signal which is sent to the perforating circuits. Hwre again there may be provided for each color an inverted outlet $\overline{Fs}$, $\overline{C1s}$, $\overline{C2s}$, ; $\overline{C3s}$ which may conveniently be directly derived from the outlet of the corresponding NAND gate *p4* upstream of inverter *i2*, as shown.

It will be noted that the second outlets *b* of the four flip-flops FF, FC1, FC2, FC3 remain unused. The second inlets these above-mentioned flip-flop each Here

The logic circuits of FIG. 4 operate as follows :

When the device is at rest with switch T open, signals P and B are at level 0 (no signal from the photo-electric means) and therefore the outlets of the inverters Io and of the inverter I which is associated to flip-flop FP are at level 1. Gate *p2* thus receives two inlets 1 and it therefore emits an outlet 0. Both inlets of gate *p3* are thus at level 0 and this gate emits therefore an outlet at level 1 while is applied to the first inlet of gate *p1*. But since the second inlet of *p1* is at level 0 (no coincidence signal Co from the reading means), the outlet of *p1* remains at level 1 and consequently inverter *i1* applies level O to the auxilary inlets M of the four flip-flops FF, FC1, FC2, FC3 which remain in the state for which their outlets *a* are at level 0 (generally referred to as "reset" state). Gates *p4* therefore emit lever 1 and the corresponding inverters *i2* have their outlets at level 0. The four outlets F*s*, C1*s* C2*s*, C3*s* of the logic circuits are therefore at level 0, the inverted outlets being of course at level 1.

As to the flip-flop FP, in the absence of any signal CO or P (logic value of these signals equal to 0), it also remains in the reset state with its outlet *a* at level 0. The fifth outlet P*s* of the logic circuits is thus also at level 0.

If now the photo-electric means detects the first square of a given row B-B (FIG. 3) of the design, i.e. the colored background square along the left side of the first background zone, the signal F is received by the main inlet J of flip-flop FF which is thus conditioned. As soon as the photo-electric means are centered with respect to the square, the signal Co is generated. Gate *p***1** then receives two inlets at the lever **1** and it emits an outlet O which is inverted by inverter *i***1** to produce the level **1**, the latter being applied to the auxiliary inlets of the four flip-flops FF, FC**1**, FC**2**, FC**3**. Since only FF has been previously conditioned, it sets while the other three remain unchanged. Its gate *p***4** receives two inlets **1** and it therefore generates an outlet **0** which is inverted by the corresponding inverter *i***2**. The outlet F*s* of the logic circuits is thus brought to level **1**.

It should be noted that flip-flop FP has also remained unchanged since logic signal P has itself remained at level 0.

The next square is white (i.e. uncolored) and consequently the white signal B is brought to level 1, the outlet of Io becoming 0. Gate *p***2** therefore no more receives two inlets at level **1** and its outlet rises from 0 to 1. As to gate *p***3** its lower inlet is now at level **1**, while its upper inlet receives no voltage, which is equivalent for a conventional NAND gate to a signal at level 1. Gate *p***3** therefore generates on its outlet the logic level 0. Under such conditions, even when the coincidence signal Co appears, gate *p***1** emits an outlet at level 1 which is inverted by inverter *i***1** to produce the level 0 at all the auxiliary inlets M of the four flip-flops FF, FC**1**, FC**2**, FC**3** which therefore remain unchanged in state. The logic circuits still emit the outlet signal F*s* at level 1, as if the second square of the row had been colored with the beckground color F, in spite of the fact that FF is no more conditioned.

The same operative steps will occur for the third, fourth, fifth and sixth squares of row B—B. When the photo-electric means reach the seventh square, which is colored with color C**1**, the corresponding signal C**1** conditions flip-flop FC**1**. Since signal B is no more received (which is tantamount to say that its logic value iS now 0), the first inlet of *p***1** rises to level **1** (outlet of Io at 1, outlet of *p***2** at 0, outlet of *p***3** at 1) and consequently the coincidence signal Co (at level 1) is transmitted to FF, FC**1**, FC**2**, FC**3** (outlet of *p***1** at O, outlet of *i***1** at **1**). Flip-flop FC**1** therefore sets and the outlet C**1***s* of the logic circuits become effective (i.e. rises to level **1**). As to flip-flop FF, since now its main inlets J and K are respectively at levels 0 and 1, it resets under the action of the coincidence signal, its outlet *a* returns to level O and the corresponding outlet signal Fs also passes from level 1 to level 0 (i.e. disappears).

Assumming for a time that row B-B comprises no square of priority color **3**, the photo-electric means would thereafter detect ten successive white squares and as above explained for the background color F, the outlet signal of the logic circuits, C**1***s* in the present case, would be maintained.

The photo-electric means would then reach in row B—B a square having the color F of the background. It will be easily understood that signal F would condition FF which would set when receiving coincidence signal Co, while FC**1** would reset. The logic circuits would emit the outlet signal Fs.

The next square being of color C**2**, the outlet signal of the logic circuits would become C**2***s*. The next square of color Cs would cause generation of outlet signal C**3***s* which would be maintained for the following white squares, and so on.

But actually in FIG. **3** the ninth square of row B—B corresponds to a point of the priority color P. When the photo-electric means detect such a square, they generate the corresponding signal P (or in logic terms this signal rises from **0** to **1**). This conditions the particular flip-flop FP which sets as soon as its auxiliary inlet M receives the coincidence signal Co. Its outlet *a* rises from level 0 to level 1 and therefore the logic circuits emit the corresponding outlet signal Ps. But at the same time the second main inlet K of flip-flop FB is at level 0, the outlet of *p***2** is at level 1 and therefore the outlet of *p***3** is at level 0 (since its higher inlet is to be considered as at level 1). The outlet of p**1** is thus at level 1, whatever may be the level of Co. The level applied to the auxiliary inlets M of FF, FC**1**, FC**2**, FC**3** is therefore O, whereby these four flip-flops are so to speak locked, the flip-flop FC**1** which had been previously set remaining in the set state. But the outlet signal Ps (at logic level 1) generated by flip-flop FP is transmitted to the first or upper inlet of NAND gate *p***5**. Since the second or lower inlet of *p* **5** is not connected to any voltage source, this gate behaves as if that inlet were at level 1 and it emits on its outlet the logic level 0 which is applied to the four gates *p***4** whose outlets are therefore blocked at level **1**. Although therefore the outlet *a* of FC**1** is at level **1**, the corresponding voltage or signal has no action on the outlet C1 s which drops to level 0.

But when the photo-electric means have passed color P (ninth square) and detect the next white square, this kind of inhibition of the outlet *a* of FC**1** ceases since the coincidence signal or pulse Co resets FP. The outlet C**1***s* of the logic circuits therefore returns to level **1**.

The above explanations may be summarized as follows :

1. All the flip-flops are conditioned by the signals of the colors to which they correspond.

2. The flip-flop FP corresponding to the priority color is the only one to which the coincidence signal or pulse Co is directly transmitted.

3. For the other flip-flops this signal or pulse Co is inhibited by either the white (signal B) or the priority color (signal P) in such manner that the flip-flops of the normal colors F, C**1**, C**2**, C**3** are then locked.

4. The white signal B has no influence whatever on the outlets of the flip-flops corresponding to the normal colors F, C**1**, C**2**, C**3**, but on the contrary the signal P of the priority color blocks these outlets and prevents the flip-flop which had been previously set from acting on the perforating circuits.

If for any reason it is desired to dispense with the particular operation of the logic circuits of FIG. **4** and to cause same to act as in the prior art, it is sufficient to close switch T. Gates *p***3** and *p***5** then receive logic signal level 0 on one of their inlets and they continuously generate on their outlets logic level 1. The coincidence signal Co is thus always transmitted to the normal color flip-flops the outlets of which are never inhibited by the priority color. In such a case the background would be wholly white and the "white" signal B would be applied to flip-flop FF in lieu of signal F (in other words signals B and F would become identical).

It has been hitherto supposed that the design only comprised a single "priority" color. But more than one could be provided, if desired. In such a case the second inlets K of their individual flip-flops would be connected with a common NAND gate such as *p*2, but having more than two inlets (one for the white signal B and one for each priority color), while the outlets of their individual gates *p*5 would be connected in parallel to act on gates *p*4.

It will also be noted that it would be possible to provide a particular flip-flop for the white color (signal B) if it were required to obtain a corresponding outlet signal from the logic circuits.

It is further to be remarked that any NAND gate combined woth an inverter could be replaced by a single conventional AND gate. This applies directly to the unit *p*1–*i*1. But if the inverted outlets $\overline{Fs}$, $\overline{C1s}$, $\overline{C2s}$, $\overline{C3s}$ are left aside, each pair *p*4–*i*2 may also be replaced by an AND gate. As to the flip-flops which have been supposed as of the J–K type, they could be formed each of a quite conventional flip-flop associated with an AND gate disposed upstream of its inlet and adapted to be conditioned by the Co signal.

I claim:

1. A method for the preparation on a support having a given color, of a design adapted to be read-in by scanning successive parallel rows thereof for the realization of perforated Jacquard pattern cards by means of which said design may be reproduced on a woven fabric, such design compriSing a background and at least one color zone corresponding to an individual color different from the color of said support, comprising the following steps:

selecting for the background a color different from the color of said support and from the color of said zone, in order that said background may be considered as an additional color zone of said design and read-in as such;

and in only coloring in each color zone, including the additional one formed by said background, and in each row the marginal portion of said each zone which is met first when beginning the scanning of said each row and when passing from one of said color zones to another one of same.

2. A method as claimed in claim **1** for the preparation of a design comprising at least one small surface corresponding to a particular color different from that of said color zones, including the one formed by said background, and different also from the color of said support, with said small surface being situated within one of said color zones, which consists in wholly coloring said small surface and in leaving of the color of said support the first portion of said last-named one of said color zones which is met after said small surface when scanning a row intersection said small surface, the color of said small surface being considered as having momentarily priority over the color of said one of said one until said small surface is passed.

3. In a design established on a squared support having a given color and adapted to be read-in by scanning successive parallel rows of squares for the realization of perforated Jacquard pattern cards by means of which said design may be reproduced on a woven fabric, with said design comprising a background and at least one color zone of squares corresponding to an individual color different from the color of said support, the improvements which consist :

in said background corresponding to a color different from the color of said support and from the color of said color zone, so as to form an additional color zone ;

and, in each row of said support, each of said color zones, including the additional one formed by said background, being only colored with the corresponding color in the first square of said last-named each of said zones which is met when leaving a preceding zone during the scanning operation.

4. A design as claimed in claim **3**, further comprising small surfaces formed of adjacent squares and situated within one of said color zones, including the additional one formed by said background, with the first square of said last-named one of said color zones which follows said small surface in each row intersecting same, being of the color of said support.

5. In an automatic apparatus for the preparation of perforated Jacquard pattern cards from a design established on a squared support of a given color, said design including cOlor zones corresponding to individual colors different from the color of said support and a background corresponding to a color different from the colors of said zones and of said support so as to form an additional color zone, with said apparatus comprising photo-electric means to scan said design by successive parallel rows to emit color signals indicating each color detected by said meanS in the successive squares of each row and coincidence signals each time said means are centered with respect to a square ; and perforating circuits operating under control of said photo-electric means ;

a logic circuit unit interposed between said photo-electric means and said perforating means, said unit comprising:

main bi-stable registering means, each corresponding to one of the colors of said color zones, including the additional one formed by said background, each of said main registering means having at least one outlet connected with said perforating means to selectively actuate same, conditioning inlets connected with said photo-electric means to receive therefrom the corresponding color signal, and an auxiliary setting and resetting inlet also connected with said photo-electric means to receive therefrom said coincidence signal, same causing said each of said main registering means to assume the state corresponding to the color signal applied to its conditioning inlets and further causing its outlet to assume a corresponding logic level to actuate said perforating means in accordance with said last-named color signal ;

blocking means connected with said photo-electric meanS to receive therefrom the color signal corresponding to the color of said support ;

and gate means interposed between said photoelectric means and the auxiliary inlets of said main registering means, said gate means being actuated by said blocking means to pass said coincidence signal in the absence of the color signal corresponding to the color of said support and on the contrary to block said coincidence signal when said color signal corresponding to the color of said support is received by said blocking means.

6. In a logic circuit unit as claimed in claim **5,** for the reading-in of a design including wholly colored small surfaces within at least one of said color zones, including the additional one formed by said background, with said small surfaces being each of a particular priority color different from the colors of said color zones, including said background, and of said support :

an additional registering means for each of said priority colors, each of said additional registering means also comprising an outlet connected with said perforating means to selectively actuate same, conditioning inlets connected with said photo-electric means to receive therefrom the corresponding priority color signal, and an auxiliary setting and resetting inlet also connected with said photo-electric means to receive therefrom said coincidence signal, same causing said each of said additional registering means to assume the state corresponding to the priority color signal applied to its conditioning inlets and further causing its outlet to assume a corresponding logic level to actuate said perforating means in accordance with said last-named priority color signal ;

additional blocking means connected with said photo-electric means to also receive therefrom the priority color signal corresponding to any of said priority colors, said additional blocking means also acting on said gate means to cause same to block said coincidence signal when said last-named color signal is received ;

and additional gate means interposed between the outlet of each of said main registering means and said perforating means, said additional gate means being actuated by the outlet of any of said additional registering means so as to permit the outlets of said main registering means to actuate said perforating means in the absence of any priority color signal from said photo-electric means and on the contrary to momentarily inhibit said last-named outlets when such a priority color signal is received by said unit from said photo-electric means.

* * * * *