No. 815,035. PATENTED MAR. 13, 1906.

J. M. PERRIN & J. B. PERRAUD.

JACQUARD MACHINE.

APPLICATION FILED SEPT. 6, 1904.

FIG_1

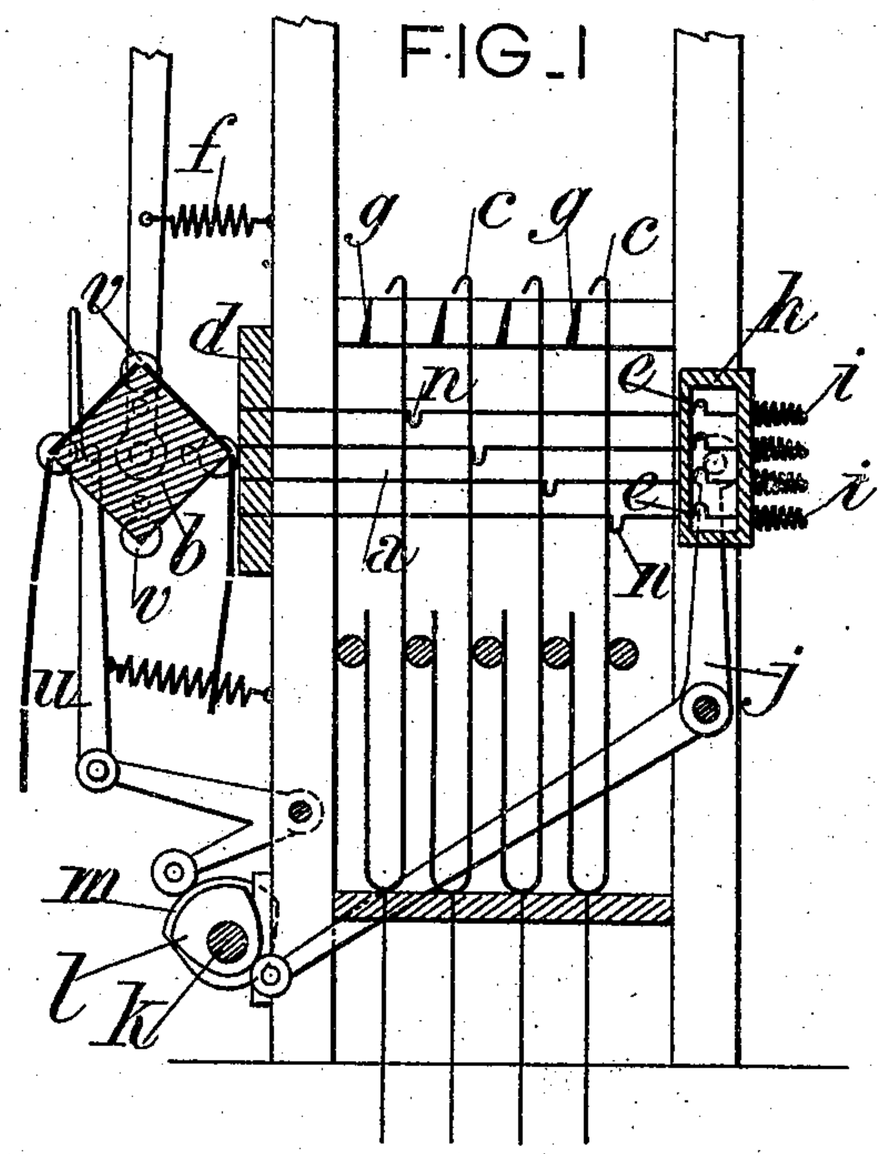


FIG_2

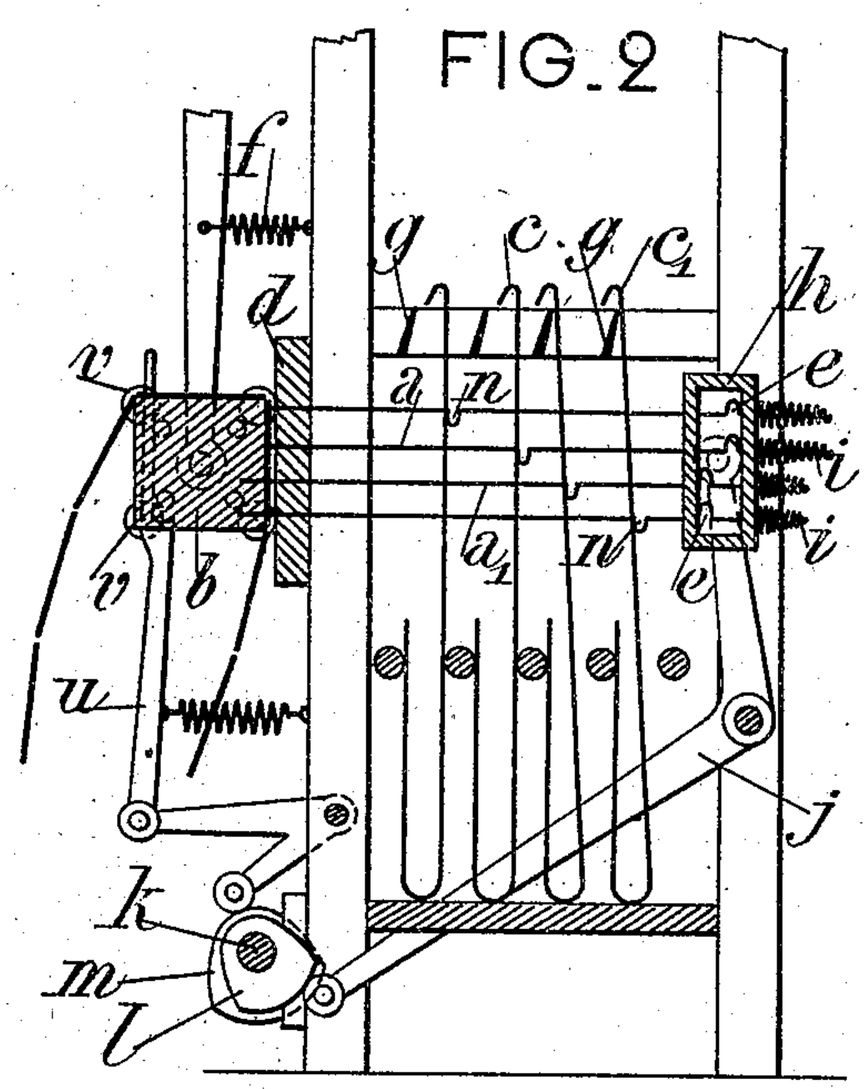
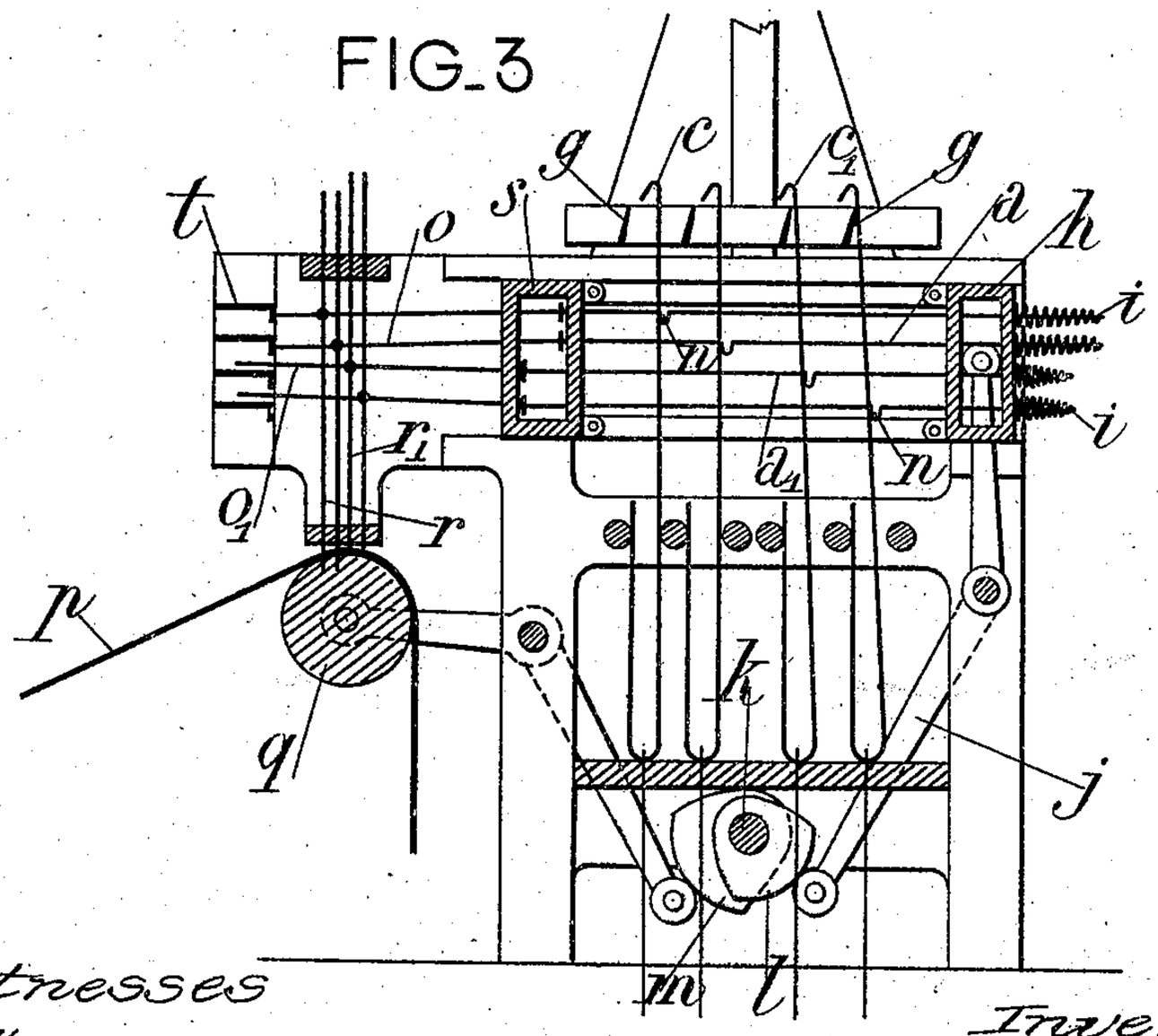


FIG_3



Witnesses

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JEAN MARIE PERRIN AND JEAN BENOIT PERRAUD, OF LYON, FRANCE.

JACQUARD-MACHINE.

No. 815,035. Specification of Letters Patent. Patented March 13, 1906.

Application filed September 6, 1904. Serial No. 223,504.

To all whom it may concern:

Be it known that we, JEAN MARIE PERRIN and JEAN BENOIT PERRAUD, citizens of France, residing at Lyon, France, have invented new and useful Improvements in Jacquard-Machines, of which the following is a specification.

The invention has for its object a new arrangement of jacquard-machine in which the needles in lieu of being pushed backward by the pressure of the card are, on the contrary, moved forward against an immovable card. The result is that the needles have no longer the function of pushing back the hooks which are not to be raised, but, on the contrary, have the function of placing in position the hooks which are to be raised. This arrangement enables the speed to be increased by reducing to the minimum the movements of the cylinder. It is applicable to all kinds of jacquard-machines employing either cards or perforated paper and is applicable with advantage to double-lift jacquards, in which two griff-frames work alternately, one for the even strokes, the other for the odd strokes.

The accompanying drawings represent at Figures 1 and 2 the application of the invention to an ordinary jacquard employing cards and at Fig. 3 to a jacquard arranged for the employment of paper.

The cylinder or prism *b*, Figs. 1 and 2, carrying the cards is suspended as usual and tends by the action of a spring *f* to press against the needle-board *d*. It receives at each stroke only the necessary rotary motion for producing the change of card. The pulleys *v v*, mounted at the four angles of the cylinder and pressing against the needle-board, push back the cylinder sufficiently to enable this movement to be accomplished, (see Fig. 1,) and, when the movement is finished, as shown at Fig. 2, to fix the exact position of the card by pressing against the needle-board *d*. The hooks *c* by their small spring-arm are naturally moved out of the path of the knives or blades *g*. The needles *a* can act on them by projections *n* to place them in the path of these knives or blades. At the rear these needles are connected to a movable frame *h*, between the sides of which they are provided with projections *e*, limiting their motion. They are also pushed forward by helical springs *i*, fixed to the rear of the frame *h*. The frame *h*, carried by levers *j*, receives a to-and-fro motion by two similar cams *l*, fixed on the shaft *k*, which makes one revolution for each stroke of the batten. The same shaft *k*, by means of another cam *m*, acting on the pawl-lever *u*, gives rotary motion at the required time to the cylinder *b*. Frame *h* is made to return to the position shown in Fig. 1 by means of springs attached to the bent lever *j*. These springs are not represented in the drawings. When at rest, (see Fig. 1,) the griff knives or blades *g* being at their lower position and the frame *h* being at its rear position, all the hooks *c* are separated from the knives or blades *g*. When the rotation of the cylinder is completed and the card is in place, (see Fig. 2,) the frame *h* advances and pushes the needles by means of the springs *i*. The needles which, like *a'*, encounter holes in the card complete their movement and bring their hooks *c'* in the path of the knives or blades *g*, the needles which, like *a*, encounter the solid parts of the card remain behind, stretching their springs *i*, and the corresponding hooks remain out of the path of the knives or blades *g*. These latter will then raise, as in other jacquard-machines, the hooks corresponding with the holes in the card. During the descent the frame *h* returns to the rear and brings back all the needles to the position shown at Fig. 1. The raised hooks remain hooked until the knives or blades *g* shall have descended below their curved part. Then they return to the rear by their own elasticity. It is to be understood that the springs *i* should be sufficiently strong to overcome the very weak resistance of the hooks to their approach toward the knives or blades *g*. Nothing is changed in the final result; but the new mode of operating obtains the following advantages: First, the cards are not submitted to any shock from the needles, but only to a very weak pressure, resulting from the excess of power of the spring *i* over the spring formed by the arms of the hook, thereby enabling the thickness of the cards to be reduced and even to substitute for it perforated paper; second, the cylinder or prism *b* has a much smaller movement—that is, only sufficient to enable it to rotate. This movement, can, however, be reduced by employing prisms having a greater number of faces and even be completely avoided by the employment of a round cylinder and perforated paper. These combined advantages enable a very great speed to be attained, consequent on the suppression of shocks and vibration.

Fig. 3 represents an ordinary jacquard with perforated paper, in which, as is known, the paper *p*, passing around a round cylinder *q*, acts on the vertical needles *r r'*. These latter raise pushers *o o'*, which are in contact at one end with the horizontal needles *a a'* in the interior of the cage *s* and at the other end with a vertical grille *t*, having a horizontal to-and-fro motion. The vertical needles, such as *r*, which encounter the solid parts of the paper, raise the corresponding pushers *o* and bring them opposite the bars of the grille *t*. The needles, such as *r'*, which encounter the holes in the paper, leave their pushers *o'* between the bars. To apply our invention to this kind of jacquard, the arrangement of the vertical needles and of the pushers is preserved; but the grille *t* is made a fixture. The horizontal needles *a*, the hooks *c*, and the knives or blades *g* are arranged as in Figs. 1 and 2. The frame *h*, furnished with springs *i*, receives a like to-and-fro motion by the cams *l*, mounted on the shaft *k*, the same shaft also carrying the cams *m*, which act on the cylinder. The frame *h* is connected to the cage *s*, within which the contact of the needles *a* with the pushers *o* takes place. The working is readily explained. The knives or blades *g* being at the bottom of their motion and the cylinder having placed in position the pushers *o o'*, the frame *h* pushes the horizontal needles by means of the springs *i*. Those of these needles, such as *a'*, the pusher *o'* of which is in front of the empty space between the bars of the grille *t*, complete their motion and place their hooks *c'* in the path of the knives or blades *g*. Those, such as *a*, the pusher *o* of which is opposite a bar, are stopped and leave their hooks *c* behind the knives or blades. After the motion the needles *a* and the pushers *o* are brought to the rear, and the hooks disengage themselves from the knives or blades *g*.

The advantages of the jacquard represented at Fig. 3 are the same as those described with reference to Figs. 1 and 2.

Having fully described our invention, what we claim, and desire to secure by Letters Patent, is—

1. The combination in a jacquard mechanism of a frame with griffs *g* moving vertically, of lifting-wires *c* having their lower ends bent upwardly to form spring portions, bearings for the spring portions, of needles *a* provided with projections *n* for pushing said lifting-wires forward so as to cause them to engage with the griffs, of a frame *h* in the rear of the needles, springs connecting the needles with the frame, said frame pushing said needles against the hooks by means of the springs, and pattern-controlled mechanism for selecting the needles to be made operative.

2. In jacquard-machines the combination of a card-cylinder which is fixed at the time of acting and has a rotary motion to bring a fresh card-section into use, horizontal needles having a forward motion imparted to them to push them against the cards, a frame at the rear end of said horizontal needles, springs connected to the rear of said frame and to the needles, means for giving to-and-fro motion to said frame, vertically-moving griff knives or blades, spring-actuated hooks normally out of the path of the knives or blades and projections on the horizontal needles to enable the selected needles to push the hooks into the path of the knives or blades.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JEAN MARIE PERRIN.
JEAN BENOIT PERRAUD

Witnesses:
GASTON JEAUNIAUX,
MARIN VACHON.