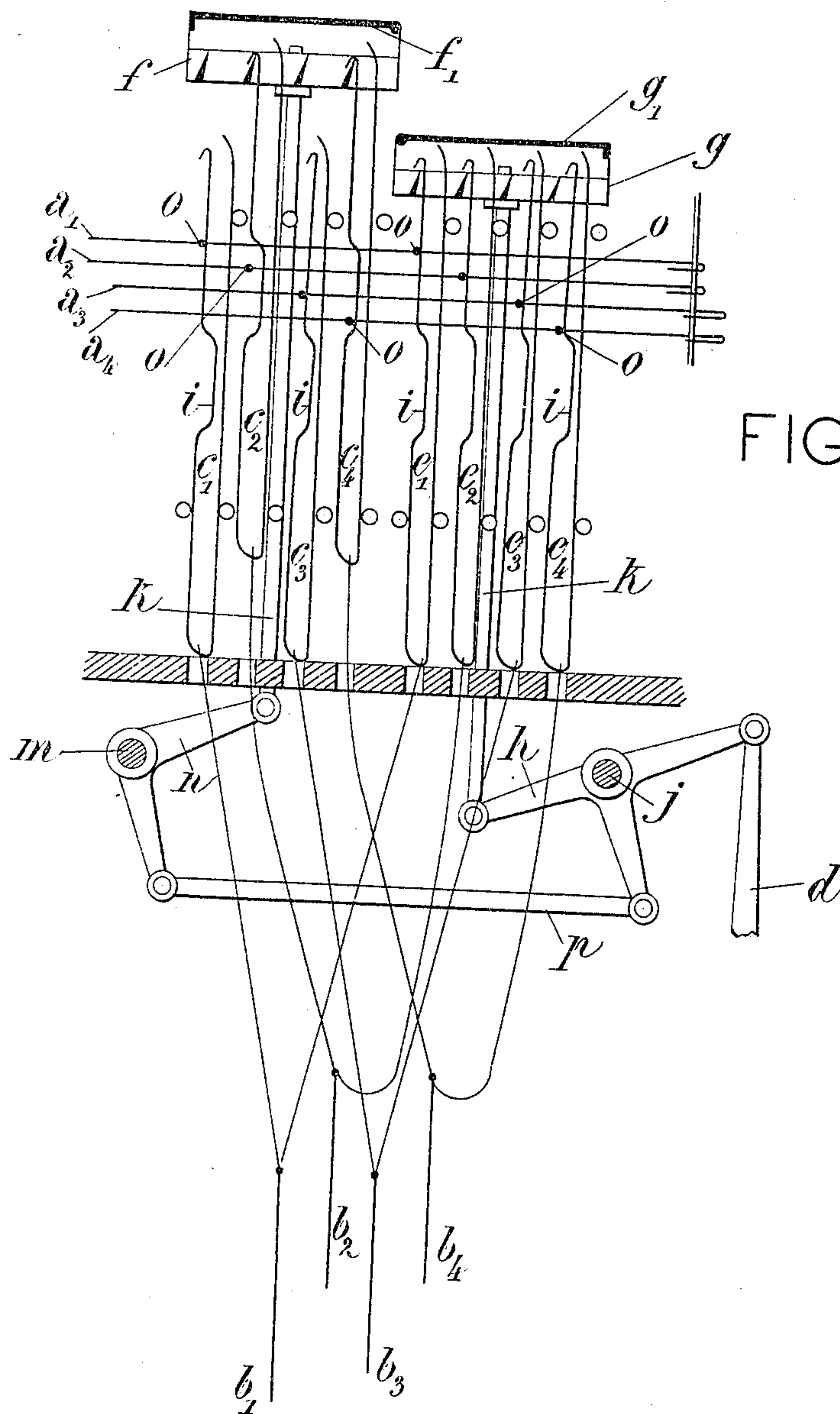


No. 812,246.

PATENTED FEB. 13, 1906.

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JACQUARD MACHINE FOR LOOMS.  
APPLICATION FILED DEC. 29, 1903.

2 SHEETS—SHEET 1.



WITNESSES

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*John A. Percival*

INVENTOR

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FIG-3

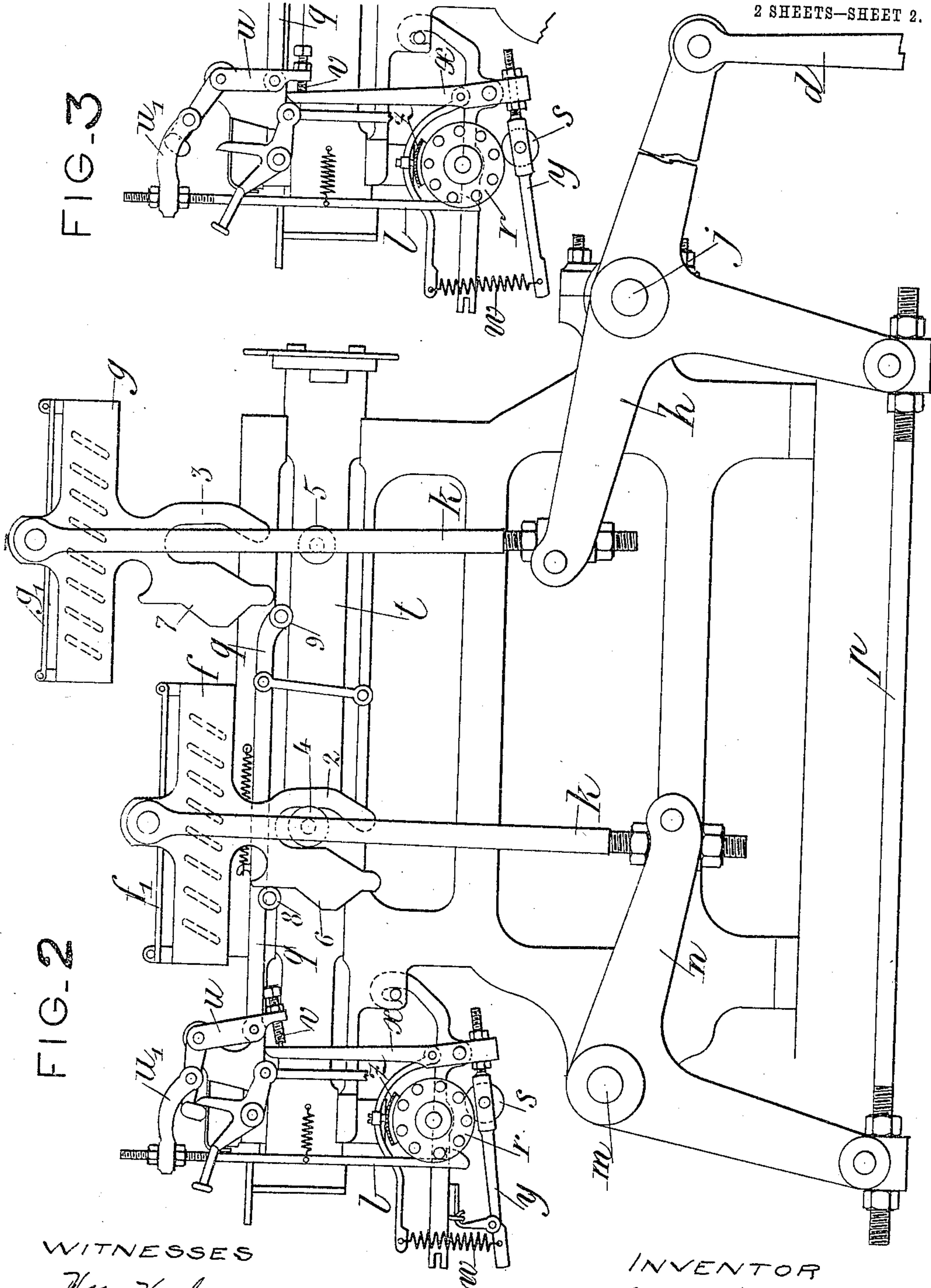


FIG-2

WITNESSES

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# UNITED STATES PATENT OFFICE.

JULES VERDOL, OF LYON, FRANCE.

## JACQUARD-MACHINE FOR LOOMS.

No. 812,246.

Specification of Letters Patent.

Patented Feb. 13, 1906.

Application filed December 29, 1903. Serial No. 187,034.

*To all whom it may concern:*

Be it known that I, JULES VERDOL, a citizen of France, residing at Lyon, France, have invented new and useful Improvements in Jacquard-Machines for Looms, of which the following is a specification.

The jacquard-machine forming the subject of the present invention is of the type known as "Verdol's system" or of similar types operating by means of perforated paper. It is characterized by arrangements enabling it to work at great speed by suppressing shocks and vibrations which wear out and tear the paper and rapidly deteriorate the parts in motion. With respect to the hooks their speed is reduced to a half by the employment of two similar sets working alternately according to a known principle. The only cylinder which moves the perforated paper operates all the strokes of the beater; but the suddenness of its movements is reduced by special arrangements hereinafter described.

The accompanying drawings represent a Verdol jacquard thus modified.

Figure 1 is a longitudinal section showing the arrangement of the two sets of hooks. The number of the hooks and needles has been reduced to render the drawings clearer. Fig. 2 is an elevation of the jacquard-machine, showing the mechanism which operates the cylinder. Fig. 3 shows the cylinder-operating mechanism in a different position.

The jacquard-machine comprises, Fig. 1, two sets of hooks  $c'$   $c^2$   $c^3$ ,  $e'$   $e^2$   $e^3$ , absolutely alike, placed one behind the other, and operated by the same needles  $a'$   $a^2$   $a^3$ .

The needle  $a'$  controls, by means of two projections  $o$   $o$ , the two symmetric hooks  $c'$  and  $e'$ , which are connected to the same portion of harness  $b'$ . The needle  $a^2$  controls in the same manner the two symmetric hooks  $c^2$  and  $e^2$ , connected to the portion  $b^2$  of the harness, and so on. There are therefore as many needles as portions of harness to be moved and a double number of hooks.

The left-hand ends of the needles are operated by the perforated paper or cards, according to the kind of jacquard, at every blow of the batten and in the manner usual to each description.

The hooks are raised by two griff-frames  $f$  and  $g$ , one for each set. These frames are moved alternately at half the speed of that of the batten by a crank or eccentric mounted on the driving-shaft of the loom. The connecting-rod  $d$ , worked by this crank or eccen-

tric, operates a first pair of levers  $h$ , mounted on the shaft  $j$  and connected to the rods  $k$ , carrying one of the griff-frames  $g$ . A connecting-rod  $p$  transmits the motion to the shaft  $m$ , which is parallel with the shaft  $j$ . This shaft  $m$  carries a second pair of levers  $n$ , working in contrary direction to the levers  $h$  and carrying the other griff-frame  $f$ .

It should be understood that each set of hooks represents an entire mechanism which alone is sufficient to produce the design; but by causing these two sets to work alternately the griffs and hooks will have a speed reduced by half.

Each hook has two arms. That on the left which receives the push of the needles and which carries at its upper end the "hook," properly so called, is bent or hollowed, so as to form a space  $i$ , which remains below the needles when the hook is at rest and which corresponds with the position of the needles when the hook is raised. This space has a depth equal to the stroke of the needles. The right-hand arm forms a spring and rises a little higher than the former. Above the hooks fixed to the griff-frames are arranged two sheet-iron plates  $f'$   $g'$ , which have for their object to cause the hooks to fall which might not fall by themselves with the corresponding griff. These plates are hinged to enable them to be raised to permit access to the hooks.

Fig. 1 shows the frame  $f$  raised and the frame  $g$  ready to rise, the needles which, like  $a'$  and  $a^2$ , have not been pushed, having left their hooks in position.

Among the needles which have been pushed those which, like  $a^3$ , correspond with two hooks at rest  $e^3$   $e^3$  push both of them, which is necessary, as either of the griffs may be called to raise them; but it would not be the same for the needles which, like  $a^4$ , correspond with a hook  $e^4$  at rest and with a raised hook  $c^4$ , which could not be pushed without becoming degriffed or bending. The space  $i$  has been arranged to enable the projection  $o$  to accomplish its stroke without pushing the raised hook.

It has been shown that the horizontal needles  $a'$   $a^2$  operate at every blow, as in known jacquard-machines. Motion is always given to them by a grill fixed in front of the horizontal carriage  $t$ , Fig. 3. This carriage is operated alternately by cam-shaped slots 2 and 3 in downwardly-extending arms of the griff-frames  $f$   $g$  and within which pulleys 4 and 5



engage when the corresponding griff is in the lower half of its stroke.

The paper advances as usual under the vertical needles; but the mechanism which conducts it will be modified, as shown at Figs. 3 and 4, to avoid shocks or vibrations which prevent it from attaining great speed. The cylinder, which in its motion draws forward the paper, has on its exterior the lantern *r*, keyed upon its axle and operated by a hook *l*, which is moved by the connecting-rod *q* by means of the combination of levers *u u'*. The connecting-rod *q* is operated by the inclined planes 6 7 on the exterior of the downwardly-extending arms of the griff-frames, in which the cam-shaped slots 2 3 are formed. These inclined planes 6 7 act alternately on the pulleys 8 9, mounted on this connecting-rod. Each time the connecting-rod *q* advances the hook *l* acts upon one of the teeth of the lantern, so as to cause the latter to advance a little more than the half of a division. A brake *z*, pressed on the circumference of the lantern by a spring *w*, prevents it passing beyond the precise point to which it is brought by the hook. At the same time the bent lever *x y*, carrying on its horizontal arm the stop-roller *s*, is pushed by a stud *v* on the lever *u*, which has the effect of liberating the lantern and allowing it to be moved exclusively by the hook *l*. The mechanism thus arrives to the position shown at Fig. 4, after which the pulley 9, returning to the rear, the hook *l* redescends without moving the lantern, which is held by the brake *z*, while the stop-pulley *s* returns to apply itself to the lantern and causes it to complete its motion between two studs. (See Fig. 3.) This latter part of the motion is accomplished with

the aid of the spring *w*, and, consequent on the relative length of the arm *y* of the lever *x*, with a sufficient slowness to produce no shock on the lantern and on the cylinder moved by it.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a double-lifting jacquard-machine of the Verdol system, the combination of two griff-frames, provided with depressing-plates *f', g'* to cause the lifting-wires to descend, a cylinder-driver and a mechanism for drawing along the perforated paper moved alternately by the griff-frames, said mechanism consisting of a latch *l* acting upon the cylinder-driver at reduced speed so as to cause it to advance each time by one division, of a brake *z* preventing the cylinder-driver from being drawn along too far by its acquired speed, of a pulley-jack *s*, a large lever *x* actuating said pulley-jack at slight speed so as to bring finally the cylinder-driver into its position and to maintain it there.

2. In a double-lifting jacquard-machine of the Verdol system, the combination of the two griff-frames, provided with depressing-plates, of a set of needles, lifting-wires, two of which are actuated by each needle, and of lifting-wires hollowed on one portion of their height so as to prevent them from being pushed back by the needles when they are lifted.

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

JULES VERDOL.

Witnesses:

JEAN BARRÊME,

MARC ANTOINE GUIGAL.