(No Model.) 4 Sheets—Sheet 1.

J. VERDOL.

JACQUARD MACHINE.

No. 346,877. Patented Aug. 3, 1886.

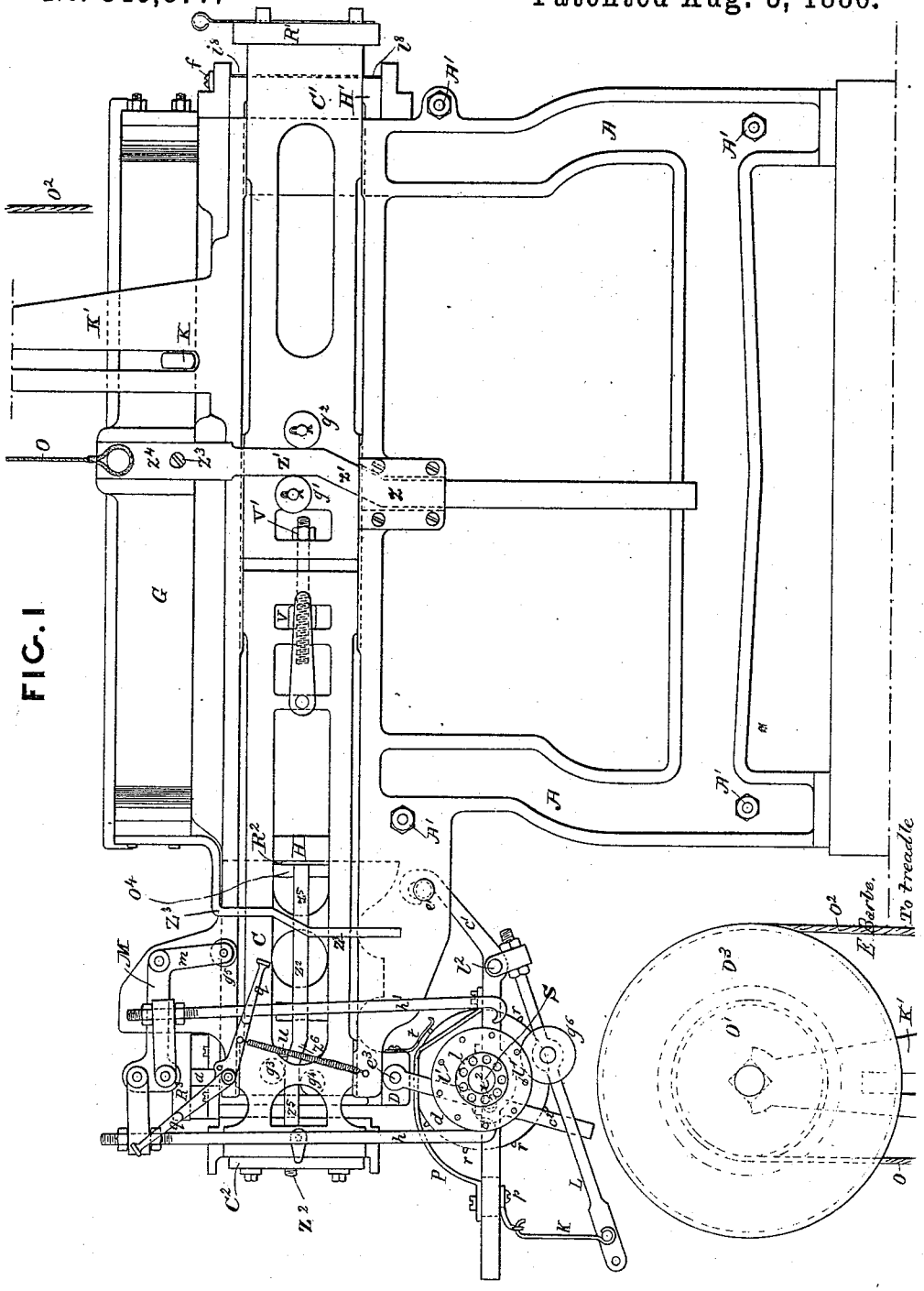

FIG. 1

WITNESSES

INVENTOR;

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J. VERDOL.

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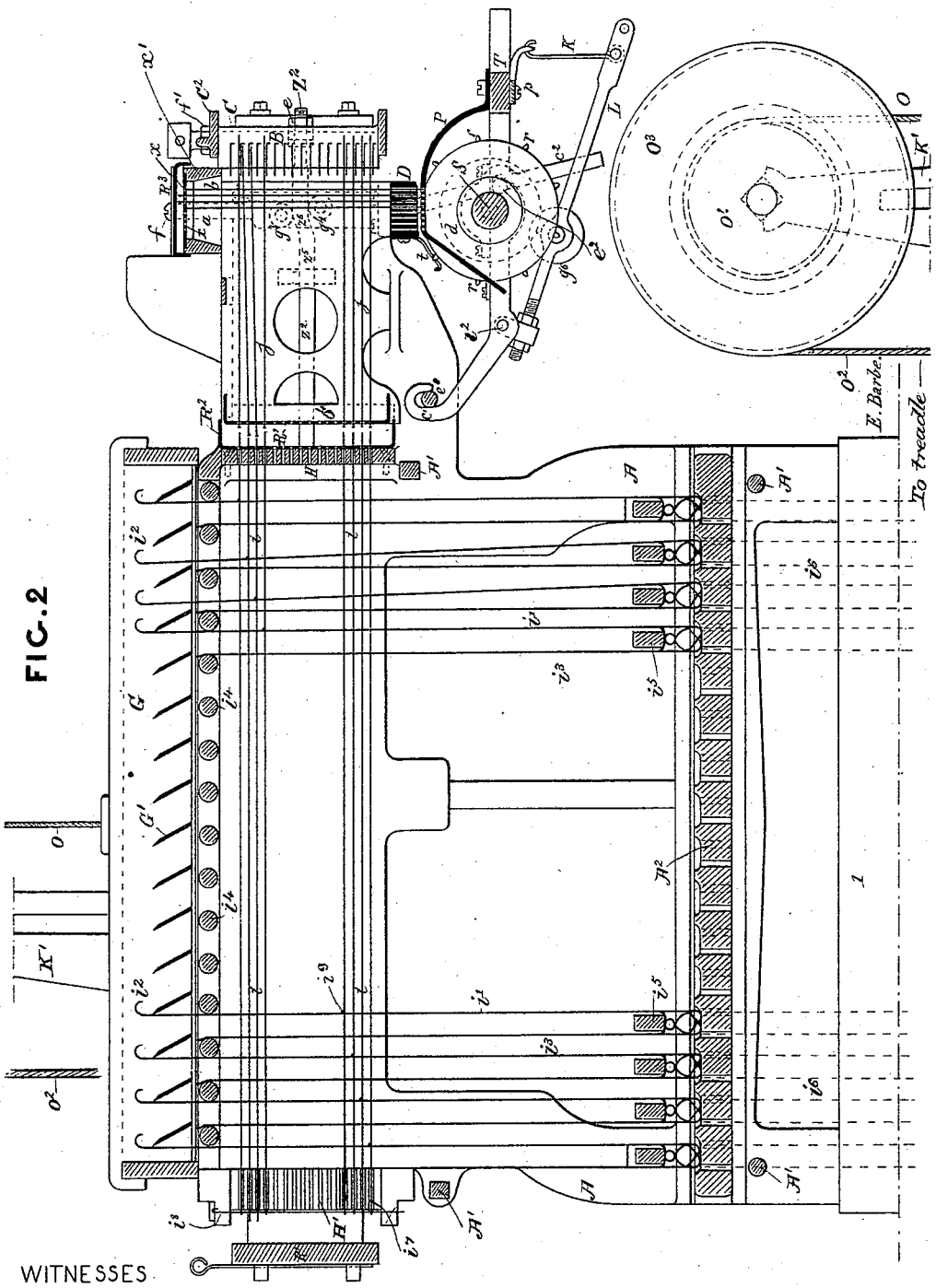

FIG. 2

WITNESSES

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(No Model.) 4 Sheets—Sheet 3.

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JACQUARD MACHINE.

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FIG. 3

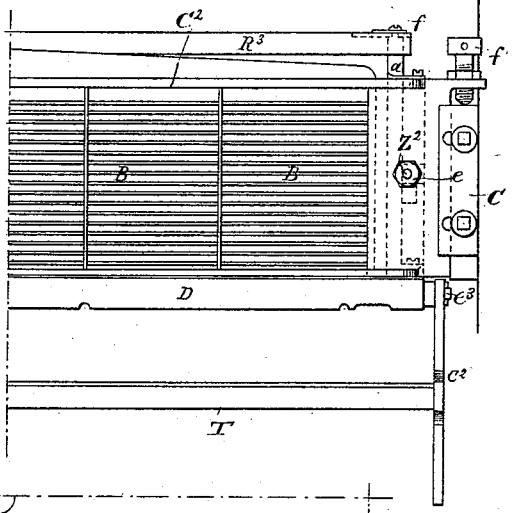


FIG. 4

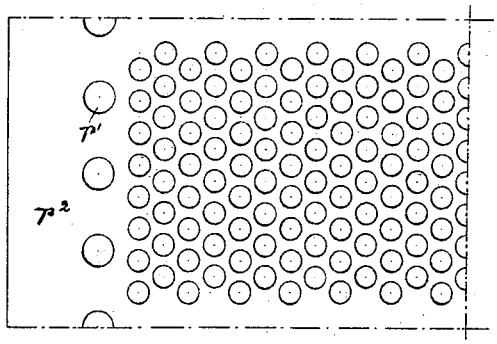


FIG. 5

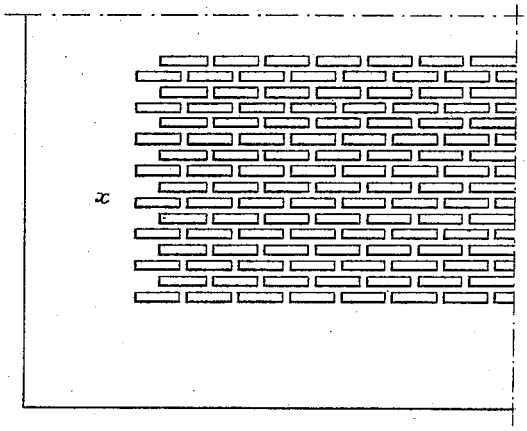


FIG. 6

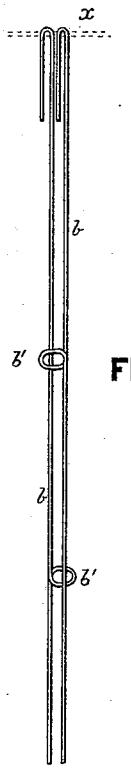
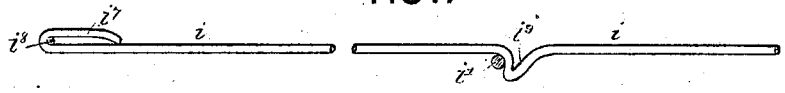


FIG. 7



WITNESSES

INVENTOR

(No Model.)

4 Sheets—Sheet 4.

J. VERDOL.

JACQUARD MACHINE.

No. 346,877. Patented Aug. 3, 1886.

FIG. 10.

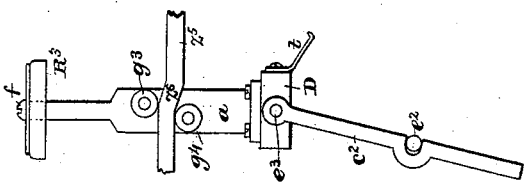


FIG. 8.

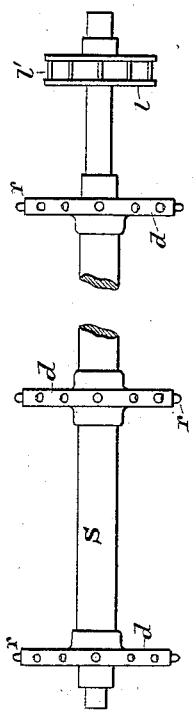


FIG. 9.

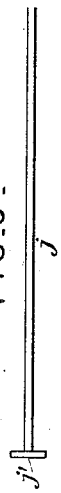
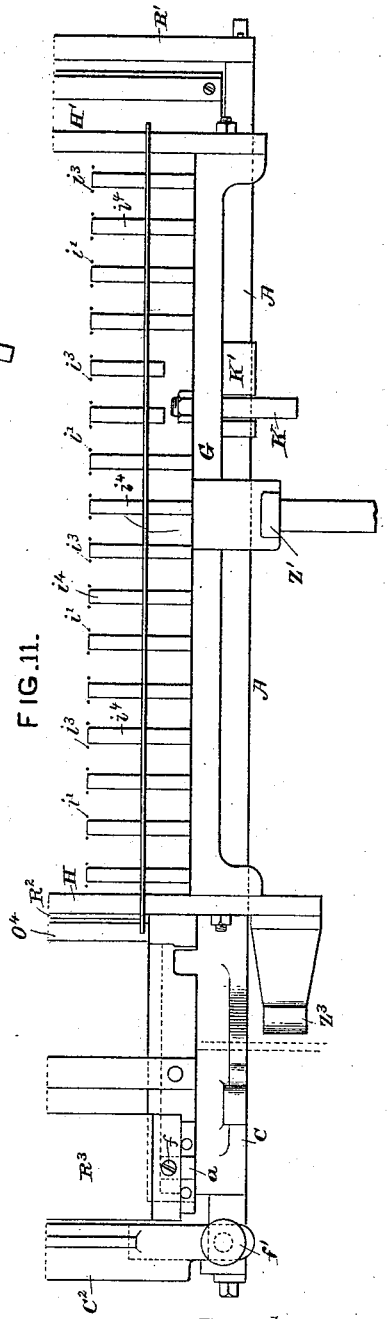


FIG. 11.



Witnesses;

Geo. T. Smallwood.

Walter Allen

Inventor

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By Knight Bros

attys

UNITED STATES PATENT OFFICE.

JULES VERDOL, OF PARIS, FRANCE.

JACQUARD MACHINE.

SPECIFICATION forming part of Letters Patent No. 346,877, dated August 3, 1886.

Application filed January 3, 1884. Serial No. 116,365. (No model.) Patented in France May 15, 1883, No. 155,454; in England January 19, 1884, No. 1,751, and in Belgium February 1, 1884, No. 64,020.

To all whom it may concern:

Be it known that I, JULES VERDOL, a citizen of the Republic of France, residing at Paris, in the Republic of France, mechanical engineer, have invented certain new and useful Improvements in Jacquard Machines, of which the following is a specification.

In order that my invention may be fully understood, I will proceed to describe it with reference to the accompanying drawings, in which—

Figure 1 is a side elevation of my improved machine, the carriage being in its rearward position. Fig. 2 is a vertical longitudinal section of the same, looking from the opposite side thereof. Fig. 3 is a front elevation showing a part of the carriage-frame. Fig. 4 shows a portion of a paper strip in plan view. Fig. 5 is a plan view of a portion of the grating which supports the vertical needles. Fig. 6 is an elevation of two vertical needles, the grating on which they are hooked being shown in dotted lines. Fig. 7 is a plan view of a horizontal needle. Fig. 8 is a side view of the roller and lantern-wheel. Fig. 9 is a side view of a pusher. Fig. 10 is a detail view of the vertical needle-frame, showing an end elevation thereof. Fig. 11 is a plan of one side of the machine, the blades of the grate being omitted.

My Jacquard machine is constructed with a main frame consisting of side plates, A, connected by tie-pieces A′, supporting the whole of the mechanism.

i' are the lifting-wires, formed of thick wire, bent at their upper ends to form hooks i^2, and bent on themselves at their lower part, and having their ends i^3 turned up vertically to provide springs. These wires are maintained between round parallel cross-bars i^4, which are fixed to the frame. The wires i' rest on a perforated board, A^2, provided with a hole beneath each wire. Small wooden bars i^5, extending across the machine in each row of wires i', serve to return them to their normal position after they have been lifted by the grate G. To these lifting-wires are attached the connections i^6, (shown by dotted lines,) which correspond to the neck-twines, and these latter with the weaving-threads. The horizontal needles i, the number of which correspond with that of the lifting-wires i', are supported at their ends by the plates H and H′, respectively, made of wood or metal, perforated with one thousand two hundred and forty-eight holes at least, (according to the size of the machine,) in which the needles slide freely. The rear ends of the needles i are bent forward, forming loops i^7, in which engage vertical pins i^8, serving to retain them without hindering their longitudinal movement. On each horizontal needle, at one point in its length opposite the lifting-wires i', Fig. 7, is a heel, i^9, designed to push back the hooked ends of the lifting-wires which are to remain stationary while the others are raised.

G is the grate, which consists of a frame having inclined plates or blades G′, beveled off at the upper edges. The grate is elevated in the usual manner. It is guided during its movement by an arm, K, sliding in the slot of a standard, K′.

The grate is the means by which the wires i' with their connections i^6 are raised and then permitted to drop.

The frames A are formed with V-shaped grooves, in which slide the side plates of a carriage moving lengthwise of the machine. Each side plate is formed in two parts, C C′, which are adjustably secured together by means of a screw-bolt, V, and nut V′.

The reciprocating motion is imparted to the carriage by a bar, Z′, formed with two vertical portions, zz, connected by an inclined portion, z', working between two friction-rollers, g' g^2, secured to or journaled on a side plate on horizontal axes. The bar is secured to the grate G by screw z^3 and stud z^4. The upward movement is imparted to the grate by means of a cord or strap, O, which is wound on a pulley, O′, governed by a belt, O^2, one end of which is fixed to a pulley, O^3, and the other end secured to a treadle or other power. (Not shown.)

The carriage is provided at its rear end with a readjusting-plate, R′, for returning the projected needles i, and at its front end with the frame C^2, provided with the bars B, (or series of seventeen lipped or flanged blades in transverse section,) which act on buffers or pushers j in rear thereof.

To the end frame, C^2, is fixed, by nuts and counter-nuts *e*, the end of a bar, Z^2, having horizontal portions z^3 z^5, connected by an inclined portion, z^6. This bar receives the horizontal movement imparted to the carriage, carrying with it a readjusting-plate, R^2, for the buffers *j*, said plate being fixed to the bar at the rear end of the latter. The inclined portion of the bar imparts a vertical movement to two vertical slides, *a*, by means of the friction-rollers g^3 g^4, journaled on the latter. A needle-guide, D, formed with holes arranged quincuncially like the perforations of a portion of the strip r^2 of paper material, (shown in Fig. 4,) having for length the width of the machine, receives the ends of the vertical needles *b*. This needle-guide is fixed to the lower ends of the slides *a*, so as to move therewith. To the upper ends of the slides is secured a readjusting-plate, R^3, by means of screws *f*. Thus the slides, needle-guide, and the readjusting-plate, supported on the slides, all move together, the inclined portion of the horizontal bar working between the rollers g^3 g^4, and imparting the vertical movements, the amplitude of which is one-sixteenth of an inch. The vertical needles *b* are supported by a fixed plate, *x*, seated on a stationary frame, *x'*, resting on the frame of the machine, and formed with rectangular openings or slots quincuncially arranged, (see Figs. 2, 5, and 6,) the vertical needles being formed with bent upper ends, providing hooks which engage the bars of the grating *x*, while their lower ends occupy the holes of the needle-guide D. The buffers *j* are mounted opposite the needles *i*. They are sustained at their rear ends by the fixed plate O^1, and their forward ends engage in the eyes *b'* of the needles *b*. These buffers are provided at their rear ends with washers *j'*, against which the readjusting-plate R^2 presses, to return the buffers to normal position after they have acted on the horizontal needles *i*. The end frame, C^2, is adjusted by set-screws *f'*, to regulate the position of the bars B to proper height.

S is a shaft provided with disks *d*, having pins or studs *r*, which work in the holes *r'* of the strip r^2, (formed of paper material,) and serving to guide the latter. The shaft is suspended on the hooks *c'*, secured to the frame of the machine by pins or studs *e'*, and by the hooks c^2, engaging studs or pins e^2 on the hooks *c'*, and secured to pins or studs e^3 on the needle-guide D, so that the shaft receives a vertical motion with and of the same amplitude as the guide D. In consequence of this vertical motion the imperforate portion of the paper acts to lift some of the needles *b*, while the perforated portion of the paper permits the other needles to remain at rest or in normal position.

T is a cross-bar, which unites the hooks *c'*.

A lever, L, hinged at the point l^2 to a hook, *c'*, at its inner end, and supported by a hook, K, and a spring, *p*, on the same hook, *c'*, at the outer end, supports a friction-roller, g^6, which bears on the pins *l'* of a lantern-wheel, *l*, on the end of the shaft S, to hold the shaft stationary while the strip r^2 acts on the needles *b*.

P is a plate perforated with holes corresponding with those of the guide D, and supporting the strip r^2, which is drawn rearward of the machine by the pins or studs *r*. The strip is held on the pins or studs by a latch or plate, *t*, extending from the guide D, to which it is secured.

The shaft S is moved by a bent bar, Z^3, secured to the grate G, and bearing on a friction-roller, g^5, turning in the arm *m* of a bell-crank lever, M, connected to clicks *h* and *h'* in the usual manner.

q q are jointed bars acted upon by a spring, *u*, for changing the feeding of the strip. The clicks *h h'* engage the pins *l'* of the lantern-wheel to shift the strip.

The machine is operated as follows: The cord or strap O^2 on the pulley O^3 being pulled down, turns the latter and the pulley O' and lifts the cord O, and the grate G, secured thereto, raises those lifting-wires *i'* whose hooked ends i^2 are over the plates or blades G'. The upward movement of the grate being continued, carries with it the vertical bar Z', whose inclined portion *z'*, working between the rollers *g' g²*, moves the carriage forward. The forward movement of the carriage causes the inclined portion z^6 of the horizontal bar Z^2 to slide between the rollers g^3 g^4, thus lowering the slides *a* and parts secured thereto, including the shaft S. The upward movement of the grate continuing still farther, the arm Z^3 is caused to bear on the roller g^5, and, pressing the arm *m* rearward, lifts the click *h*, which in turn engages a pin on the lantern-wheel and causes the latter to turn a ninth part of a revolution. The release of the cord or strap lowers the grate G, producing the contrary effect of all the above movements, except the feeding of the paper material or strip to the machine, which only takes place with the upward movement of the grate. In consequence of the lowering of the grate the carriage C receives a rearward movement, which imparts an upward movement to the slides *a* and to their attached parts, including the shaft S. In the upward movement the imperforate portion of the strip lifts the vertical needles thereover, while the needles over the perforations enter the latter, remaining stationary. The needles elevated raise their pushers and place them in a position to be struck by the hooked bars B of the end frame, C^2, when the carriage is moved sufficiently far rearward to push back the lifting-wires by pressing on the horizontal wires *i*. The frame in which is mounted the shaft S, being suspended on the one hand by the hooks *c'* to the frame of the machine, and on the other hand connected to the guide-bar D by hooks c^2, moves with the slides *a* and guide-bar. The space existing between the guide-bar and the plate P remains the same as they move together. Each vertical

needle *b* raised falls again by its own weight, aided by a part of the weight of the pusher *j* engaged in its eye; but if, by any cause whatever, as a resistance arising from friction, one of these needles should not fall and resume its normal position, it is nevertheless forcibly replaced in its first position by the readjusting-plate R^3, which prevents it remaining idle. There results from the provision of this readjusting-plate R^3 an absolute certainty in the regulation of the work of the needles, and consequently the obtainment of a perfectly-manufactured product.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. The combination of a main frame supporting the whole mechanism with a carriage mounted thereon comprising side plates, an end frame having lipped bars, a readjusting-plate for the horizontal needles or wires, and a readjusting-plate for the pushers, the horizontal needles or wires, perforated plates secured to the main frame for supporting the horizontal needles or wires, the pushers, a perforated plate for supporting the rear ends of the pushers, means for operating the carriage, the vertical needles, a stationary grating secured to the main frame for supporting the vertical needles, a vertically-sliding needle-guide, means for operating the vertical needle-guide, and means for presenting the pattern-strip to the vertical needles, substantially as described.

2. The combination of the main frame with the vertical needles, a stationary grating secured on the main frame for supporting the vertical needles, vertical slides *a*, provided with a needle-guide, D, and readjusting-plate R^3, and means for operating the slides, substantially as described.

3. The combination of the vertical needles, the vertical slides *a*, provided with vertical needle-guide D, and readjusting-plate R^3, means for operating the slides, and means for supporting the vertical needles beneath the plate, substantially as described.

4. The combination of the vertical needles, a stationary grating, *x*, for supporting the vertical needles, formed with rectangular slots arranged quincuncially, vertical slides *a*, provided with needle-guide D, formed with holes arranged quincuncially, means for raising and lowering said slides, and devices, substantially as described, connected with said slides for presenting a pattern-sheet to the vertical needles.

J. VERDOL.

Witnesses:
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EUG. BARBE.