

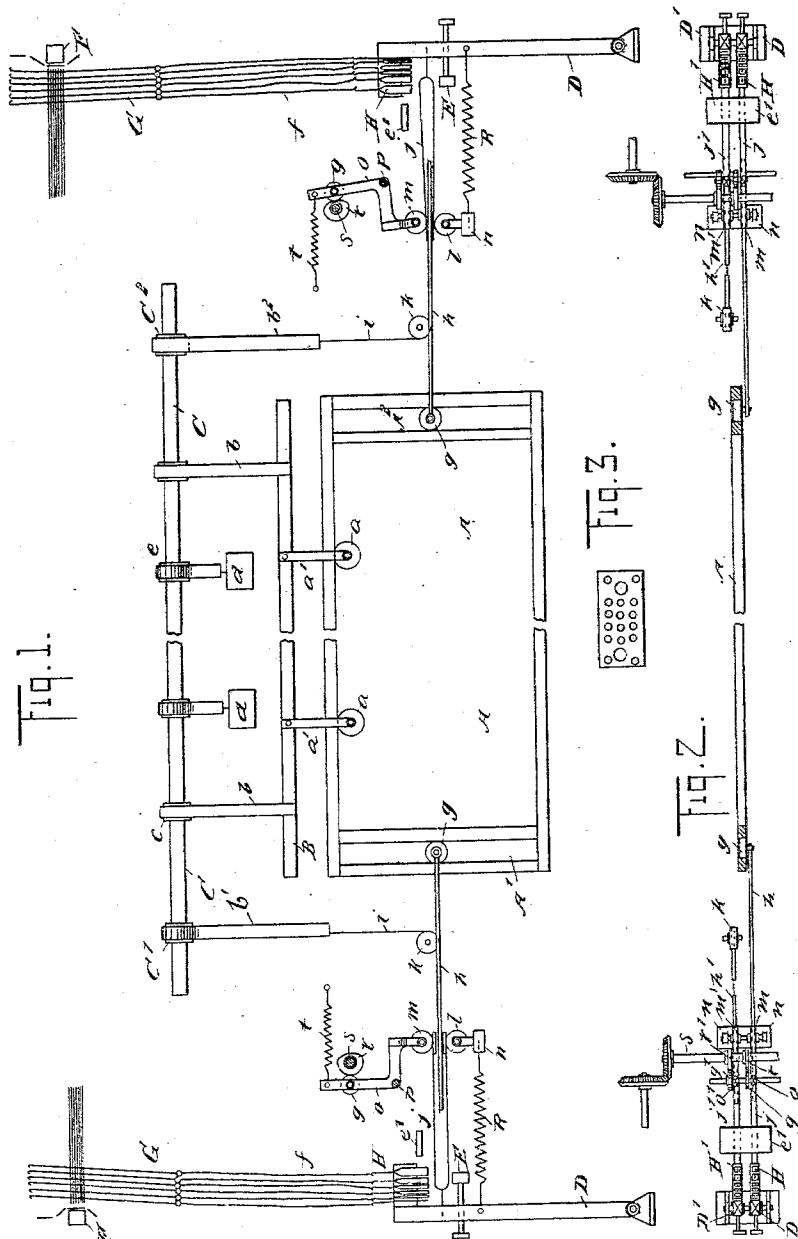
(No Model.)

3 Sheets—Sheet 1.

A. CARPENTIER.
EMBROIDERING MACHINE.

No. 566,656.

Patented Aug. 25, 1896.



WITNESSES:

Pro. C. Cheney
John Lottka

INVENTOR

A. Carpentier

BY

Munn & Co

ATTORNEYS.

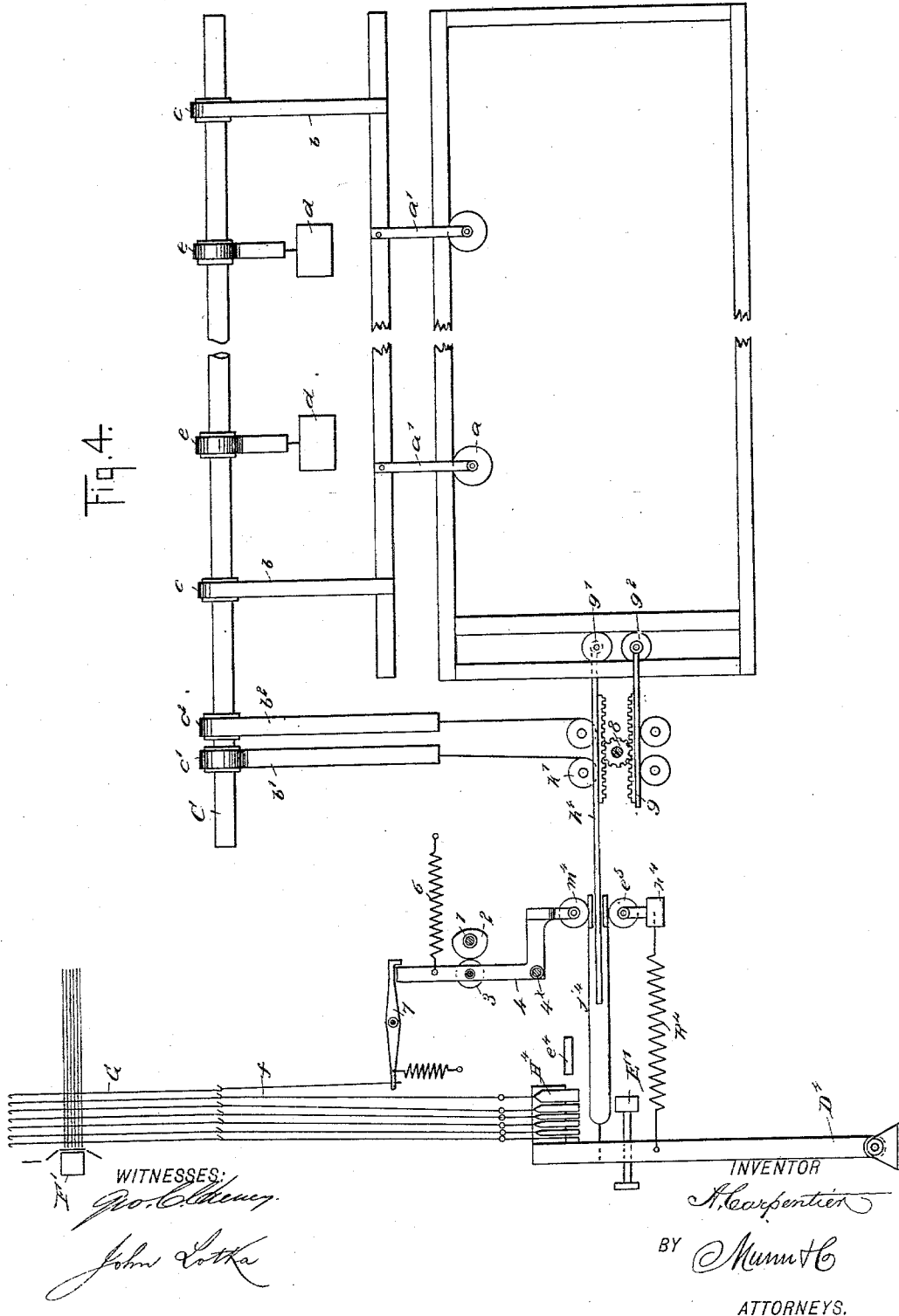
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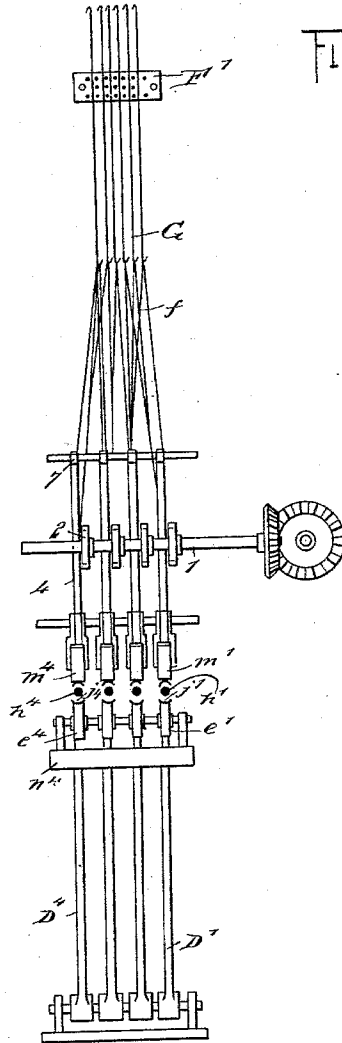


Fig. 6.

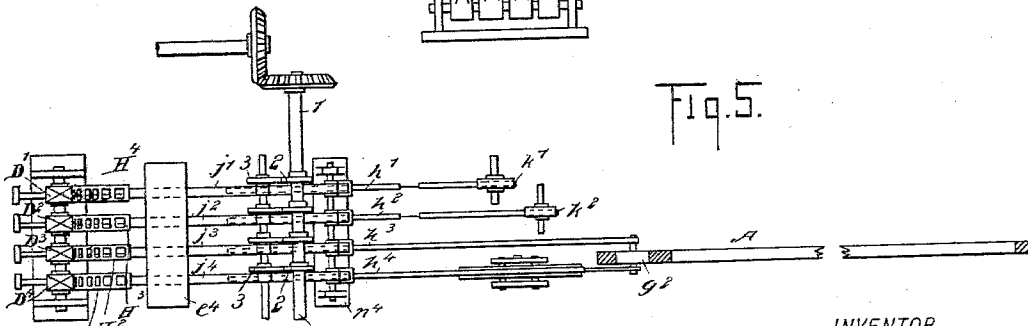


Fig. 5.

WITNESSES:

John C. Cherry
John L. Latta

INVENTOR

A. Carpentier

BY

Munn & Co.
ATTORNEYS.

UNITED STATES PATENT OFFICE.

ARSENE CARPENTIER, OF CAUDRY, FRANCE.

EMBROIDERING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 566,656, dated August 25, 1896.

Application filed April 3, 1895. Serial No. 544,312. (No model.) Patented in France July 11, 1894, No. 239,960.

To all whom it may concern:

Be it known that I, ARSENE CARPENTIER, a citizen of the Republic of France, residing in Caudry, (Nord,) France, have invented certain Improvements in and Relating to Embroidering-Machines, (for which I have obtained a French patent, No. 239,960, dated July 11, 1894,) of which the following is a specification.

My invention relates to embroidering-machines, and comprises devices permitting the application of the Jacquard mechanism with perforated cards to the automatic operation of the frame for carrying the fabric, and therefore dispensing with the special attendant charged with the guiding or the operation of the pantograph employed in the reading of the design. This device, moreover, enables the production to be augmented and to be rendered more economic.

According to my invention the Jacquard mechanism may be a so-called "Manchester" Jacquard mechanism with threads or strings and two sets of droppers corresponding to the heddles of an ordinary Jacquard loom. In any case the mechanism employed is divided into two parts, one, which operates in conjunction with the odd cards and is preferably placed to the left of the machine, being designed for effecting the upward movement of the work-holding frame and its movements from right to left, and the other, which operates in conjunction with the even cards and is placed to the right of the machine, being designed for effecting the downward movement of the work-holding frame and its movements from left to right. These two parts of the Jacquard mechanism operate by means of appropriate gear-wheels, shafts, and cams. By a special arrangement the work-holding frame, while being operated through the intermedium of its droppers for changes in its position, is independent of them after these movements are executed, which has the effect that, with a number of droppers having the respective thicknesses of one-half, one, two, four, eight, and sixteen millimeters in each set, I may gradually move the work-holding frame from one-half millimeter to fifty millimeters and more, as will be fully described hereinafter.

In order that my invention may be clearly

understood, I have represented the same in the accompanying drawings, in which—

Figure 1 of the drawings is a longitudinal elevation of the work-holding frame of an embroidering-machine with the aforesaid actuating apparatus at each extremity. Fig. 2 is a plan of the same. Fig. 3 represents, separately, a perforated card. Figs. 4, 5, and 6 show in longitudinal elevation, plan, and end elevation, respectively, a modification of the arrangement represented in Figs. 1 and 2.

In carrying my said invention into practice I support the work-holding frame A of the embroidering-machine, which is designed to carry the fabric and is made of varying length, by a series of rollers *a*, which leave it all freedom of motion in the longitudinal direction. These rollers are mounted in forks *a'*, fixed to a bar B, suspended by any desired number of straps, cords, or bands *b*, winding, respectively, upon pulleys *c*, keyed upon a shaft C, which is suitably supported by brackets (not shown) provided for this purpose. Counterweights *d* or other means tend constantly to pull back the said frame A upwardly. These counterweights are attached by straps, cords, or bands winding upon pulleys *e* in the inverse direction to the before-mentioned straps, cords, or bands *b*.

Upon the shaft C are secured two pulleys C' and C², upon which are wound straps *b'* and *b²*, attached to back rods *h' h'*, connected to the Jacquard mechanisms arranged one on the right and the other on the left of the work-holding frame.

At each of the extremities of the frame A are guides A' A², wherein can move the rollers *g g*, journaled, respectively, on the front rods *h h*, connected to the before-mentioned Jacquard mechanisms. The said two straps *b' b²* are wound inversely upon their respective pulleys C' and C². As shown, the work-holding frame A is free to move longitudinally and transversely, that is to say, horizontally and vertically, under the action of the Jacquard mechanisms. Each of these Jacquard mechanisms comprises two ordinary swinging frames or levers D D', independent of each other, placed one behind the other or side by side and which are constantly moved back to a stop E by powerful springs R, two Jacquard-operating bars receiving a

reciprocating movement by means of any approved mechanism in use, and a roller F, upon which the perforated cards pass, needles and hooks G in any suitable number causing the droppers H to operate through the medium of the threads or strings *f*, whereby the latter are connected to the said needles. These parts do not present any particular new feature in their construction and operation. It will be understood that these parts operate in the usual manner to give the frames or levers D D' a swinging movement. The operating-bars *e'* during their reciprocating movement come in contact with the droppers H, which partly fill the space between the said operating-bars and the adjacent upper portion of the levers D D'. As hereinbefore mentioned and also indicated in Figs. 2 and 5 of the drawings, the droppers of one set are of different thicknesses, and the stroke of the operating-bars *e'* being always the same it will be obvious that the extent of the movement of the levers D D' will be varied according to the aggregate width of the space filled out by the droppers left in their lower position. When employing a set of droppers of the relative thicknesses one-half, one, two, four, eight, and sixteen, as before mentioned, it will be obvious that by raising one or more of said droppers the aggregate width of all the droppers left in their lower position can be made equal to any thickness from one-half to thirty-one, (sixty-two different thicknesses,) while when all of the droppers are in the lower position their aggregate thickness will be equal to $\frac{1}{2}+1+2+4+8+16=31\frac{1}{2}$. Thus it will be seen that with six droppers of the above relative thicknesses the extent of the movement of the levers D D' can be varied sixty-three times, that is, the extent of said movement may be one-half, one, one and one-half, two, two and one-half, thirty and one-half, thirty-one, thirty-one and one-half. In order to temporarily connect the levers D D' with the frame A, so that the latter will receive a movement corresponding in extent to that of the levers, I provide the said levers in each of the Jacquard mechanisms with parts *j* and *j'*, having the form of pincers, between the branches of which are arranged rigid rods *h* and *h'*, of which the front rod *h* at its free end carries the roller *g*, hereinbefore referred to, and the back rod *h'* is connected to a cord *i*, which after passing around a guide-pulley *k* is attached to the corresponding strap, cord, or band *b'* or *b''* also hereinbefore mentioned.

The branches of the pincers *j* secured to one of the levers D are situated between two rollers *l* and *m*, one of which is journaled in a bearing *n*, fixed to the work-holding frame of the embroidering-machine and to which springs R are likewise attached, and the other in a lever *o*. This lever *o* oscillates upon a pivot *p* and carries a roller *q*, which, under the action of a spring *t*, bears upon a cam *r*, secured to a shaft *s* of the Jacquard mech-

anism. This device serves to depress the first or upper roller *m*. The pincers *j'* of the second lever D' are actuated by a similar device, the corresponding parts being designated by the same reference-letters with the index-numeral "1." From this it will be seen that the Jacquard mechanisms are connected with the work-holding frame A of the embroidering-machine by their first couple of levers D D in such a manner as to impart to it a horizontal or longitudinal movement, and by their second couple of levers D' D' in such a manner as to impart to it a transverse or vertical movement. The left-hand mechanism receives upon its cylinder F the odd cards, while the right-hand mechanism receives upon its cylinder F the even cards. Supposing with regard to the right-hand side that the front lever D is brought upon the stop E by its spring R, that the upper roller *m* is free, and that the droppers H are raised by the needles and threads or strings, the cylinder F, situated on the right-hand side, takes up the second card, which, by the combination of the holes pierced therein and the needles, allows the desired number of droppers H to fall. The upper roller *m*, set in movement by the aforesaid cam *r* and lever *o*, compresses the pincers *j* on the right-hand side, while the operating-bar *e'* of the jacquard, set in motion in the ordinary manner, carries away the front lever D to the right by the aggregate thickness made up by the droppers fallen, and as the rod *h*, between the said pincers, is securely clamped thereto, and consequently operatively connected to the front lever D, the latter will impart to the work-holding frame a corresponding horizontal movement to the right.

While the front lever or frame D on the right-hand side works as before described, the upper roller *m* on the left-hand side is freed, and the cylinder F of the Jacquard mechanism on this side takes up the first card, which, by the combination of its holes, needles, and threads or strings, lets the desired number of droppers fall. From this it follows that when the right-hand part has finished its work and when the pincers *j'* on the right-hand side are freed the left-hand part, whose pincers *j* are tightened at the same moment, will move the work-holding frame A to the left to a definite extent, which, as above explained, corresponds to the aggregate thickness of the droppers which are in their lower position. It will thus be seen that the work-holding frame A is alternately connected to the mechanism on the right and to the mechanism on the left for the purpose of effecting horizontal movements to the right and to the left. If, therefore, with the second card on the right-hand side, I impart to the work-holding frame A a movement whose extent is in proportion to the droppers fallen, for example, a movement of twenty-five millimeters, and with the first card on the left-hand side no movement, it is clear that if the fourth card

on the right-hand side also makes a movement of twenty-five millimeters the work-holding frame will be displaced to the right a distance of fifty millimeters; or, if the second card makes a movement of one-half millimeter and the first card likewise a movement of one-half millimeter, the work-holding frame returns to its original place, embroidering to the extent of half a millimeter. It will be remembered that the odd-numbered cards control the lateral movement of the frame A in one direction and the even cards the lateral movement in the opposite direction. Similar or different effects may be produced on either side, according to the requirements of the design, and the total movement of the work-holding frame is limited only by the length of the pincers $j j'$.

The rear levers or frames D' and D' of the right-hand and left-hand sides operate alternately under the same conditions, but have for their object to produce, respectively, the upward and downward movements of the work-holding frame A, so that this frame is connected to the left hand Jacquard mechanism for the upward movements and to the right-hand Jacquard mechanism for the downward movements. Thus the work-holding frame A may be displaced to the left, to the right, downward or upward, alternately or successively, according to the nature of the design to be embroidered upon the fabric stretched on the said frame and reproduced by suitable perforations in the Jacquard cards, a specimen of which is represented in Fig. 3 of the drawings.

In Figs. 4, 5, and 6 of the drawings I have represented a modification of the apparatus hereinbefore described for the purpose of realizing a great saving in the construction and requiring less space for placing the machine. In this modification the Jacquard mechanism on the right-hand side is completely dispensed with.

The Jacquard mechanism on the left-hand side is exactly the same as before described for controlling the upward movements and the movements from the right to the left hand side of the work-holding frame. The levers, pincers, and other parts of the Jacquard mechanism which in the above-described construction were on the right-hand side are placed by the side of those of the Jacquard mechanism on the left-hand side, from which it results that this Jacquard mechanism possesses four levers or frames $D^1 D^2 D^3 D^4$, four sets of droppers $H^1 H^2 H^3 H^4$, four pincers $j^1 j^2 j^3 j^4$, and four rigid rods $h^1 h^2 h^3 h^4$. However, there are no additional needles G to actuate the Jacquard mechanism for the droppers, each needle operating two droppers of the same relative position in the two sets, effecting either the horizontal movements or the vertical movements.

The rollers $m^1 m^2 m^3 m^4$ are mounted each upon a lever 4, pivoted at 4^x and provided

with a roller 3, engaging a cam 2, keyed upon the shaft 1 of the Jacquard mechanism.

The lever 4 is subjected to the action of a spring 6, whose tension causes the branches of each of the corresponding pincers $j^1 j^2 j^3 j^4$ to be forcibly pressed together. Each lever is controlled by a balancing-hook 7, operated in turn by the Jacquard mechanism by means of a needle, of a hook, and a wire or string or thread, which, for example, has the effect that, the same movement being caused by the cards, the needles, and droppers at the two squares for the horizontal movements, this movement will be transformed into a movement from right to left if the lever for the movement from left to right is prevented from acting, and the movement from left to right will be effected if the lever controlling the movement from right to left is prevented from acting. The same is the case for the vertical movements.

In Figs. 4, 5, and 6 the letters indexed "1" refer to the parts for the upward movement; those indexed "2" refer to the downward movement; those indexed "3" refer to the movement from right to left, and those indexed "4" refer to the movement from left to right. The transmission of the horizontal movements from right to left and vertical upward movements having remained the same, I describe here only the differences which exist for the other movements. The horizontal movement from left to right is obtained by the rod h^1 , which terminates in a rack gearing with a toothed wheel 8 and returning the movement by another rigid rod 9, terminating likewise in a rack gearing with the same toothed wheel. The vertical downward movement is the same except that it takes place on the left of the machine by the side of the inverse vertical movement.

It is understood that the dimensions and forms of the various parts hereinbefore mentioned may be modified without departing from the principle or scope of my invention. The materials employed may also be varied at will.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In an embroidering or like machine, a movable work-holding frame, a reciprocating actuating-frame movable independently of the work-holding frame, means for temporarily coupling the actuating-frame and the work-holding frame so as to move the latter, an operating device having a reciprocating motion, movable droppers of different width or thickness arranged between the actuating-frame and the operating device, and adapted to extend into the path of travel of the latter to control the extent of the reciprocating movement of the said actuating-frame, and mechanism for selecting the droppers, substantially as described.

2. In an embroidering or like machine, a movable work-holding frame, a rod connected to the said frame to move therewith, a reciprocating actuating-frame having a fork or clamp projecting adjacent to the said rod, means for compressing the fork or clamp to temporarily couple the actuating-frame and the rod so as to move the work-holding frame, an operating-bar having a reciprocating motion, movable droppers arranged between the actuating-frame and the operating-bar and adapted to extend into the path of travel of the latter to control the extent of the reciprocating movement of the said actuating-frame and mechanism for selecting the droppers, substantially as shown and described.

3. In an embroidering or like machine, a movable work-holding frame, a reciprocating actuating-frame movable independently of the work-holding frame, means for temporarily coupling the actuating-frame and the work-holding frame so as to move the latter, an operating device having a reciprocating motion, movable droppers arranged between the actuating-frame and the operating device, and adapted to extend into the path of travel of the latter to control the extent of the reciprocating movement of the said actuating-frame, the width or thickness of said droppers varying according to a geometrical progression whose ratio is two, and mechanism for selecting the droppers, substantially as described.

4. In an embroidering or like machine, a movable work-holding frame provided with a longitudinal and a transverse guideway, a movable rod engaging the transverse guideway of the said frame to permit of independent transverse movement of the latter, yet compel the rod and frame to move in unison upon longitudinal movement of the rod, another movable rod and operating parts connected thereto and engaging the longitudinal guideway of the work-holding frame to move the latter transversely, yet allow it to move longitudinally independently of the second-named rod, independent reciprocating actuating-frames having parts projecting adjacent to said rods, means for temporarily coupling either of the actuating-frames and

its rod so as to move the work-holding frame either longitudinally or transversely, an operating-bar having a reciprocating motion, movable droppers arranged between the actuating-frames and the operating-bar and adapted to extend into the path of travel of the latter to control the extent of the reciprocating movement of the said actuating-frames and mechanism for selecting the droppers, substantially as described.

5. In an embroidering or like machine, a movable work-holding frame provided with a longitudinal and a transverse guideway, a movable rod engaging the transverse guideway of the said frame to permit of independent transverse movement of the latter, yet compel the rod and frame to move in unison upon longitudinal movement of the rod, another movable rod, a shaft extending longitudinally of the work-holding frame, a band secured to the second-named rod and winding on said shaft to turn the same in one direction, means having a tendency to turn the shaft in the opposite direction, other bands winding on said shaft and operating parts secured to said bands and engaging the longitudinal guideway of the work-holding frame to move the latter transversely, yet allow it to move longitudinally independently of the second-named rod, independent reciprocating actuating-frames having parts projecting adjacent to said rods, means for temporarily coupling either of the actuating-frames and its rod so as to move the work-holding frame either longitudinally or transversely, an operating-bar having a reciprocating motion, movable droppers arranged between the actuating-frames and the operating-bar and adapted to extend into the path of travel of the latter to control the extent of the reciprocating movement of the said actuating-frames and mechanism for selecting the droppers, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ARSÈNE CARPENTIER.

Witnesses:

FLAMANT LÉON,
GODARD CHARLEMAGNE.