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Patented Nov. 25, 1902.

A. & J. B. BASTIE.  
EMBROIDERING MACHINE.

(Application filed Oct. 29, 1897.)

-(No Model.)

4 Sheets—Sheet 1.

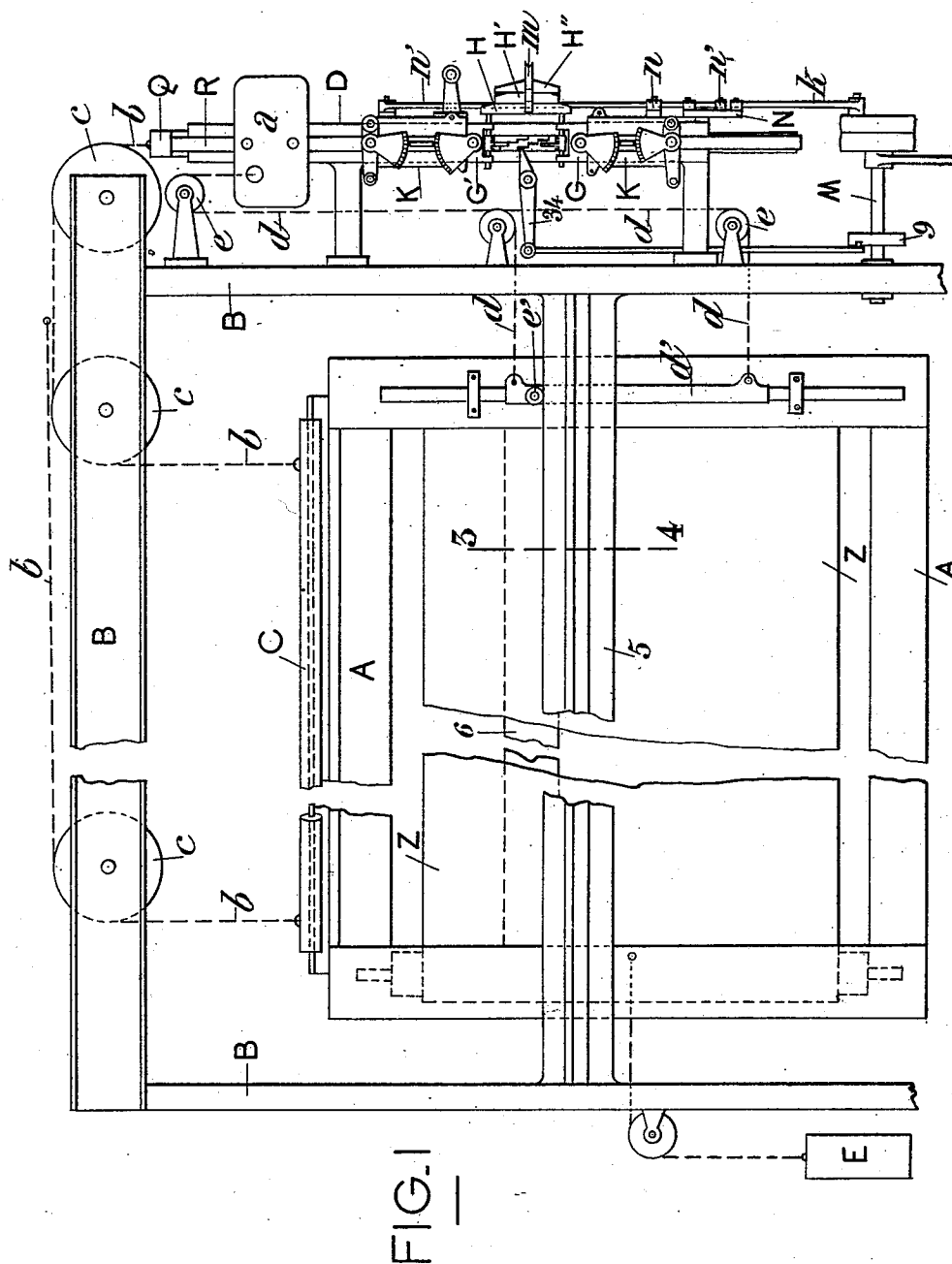


FIG. 1

WITNESSES:  
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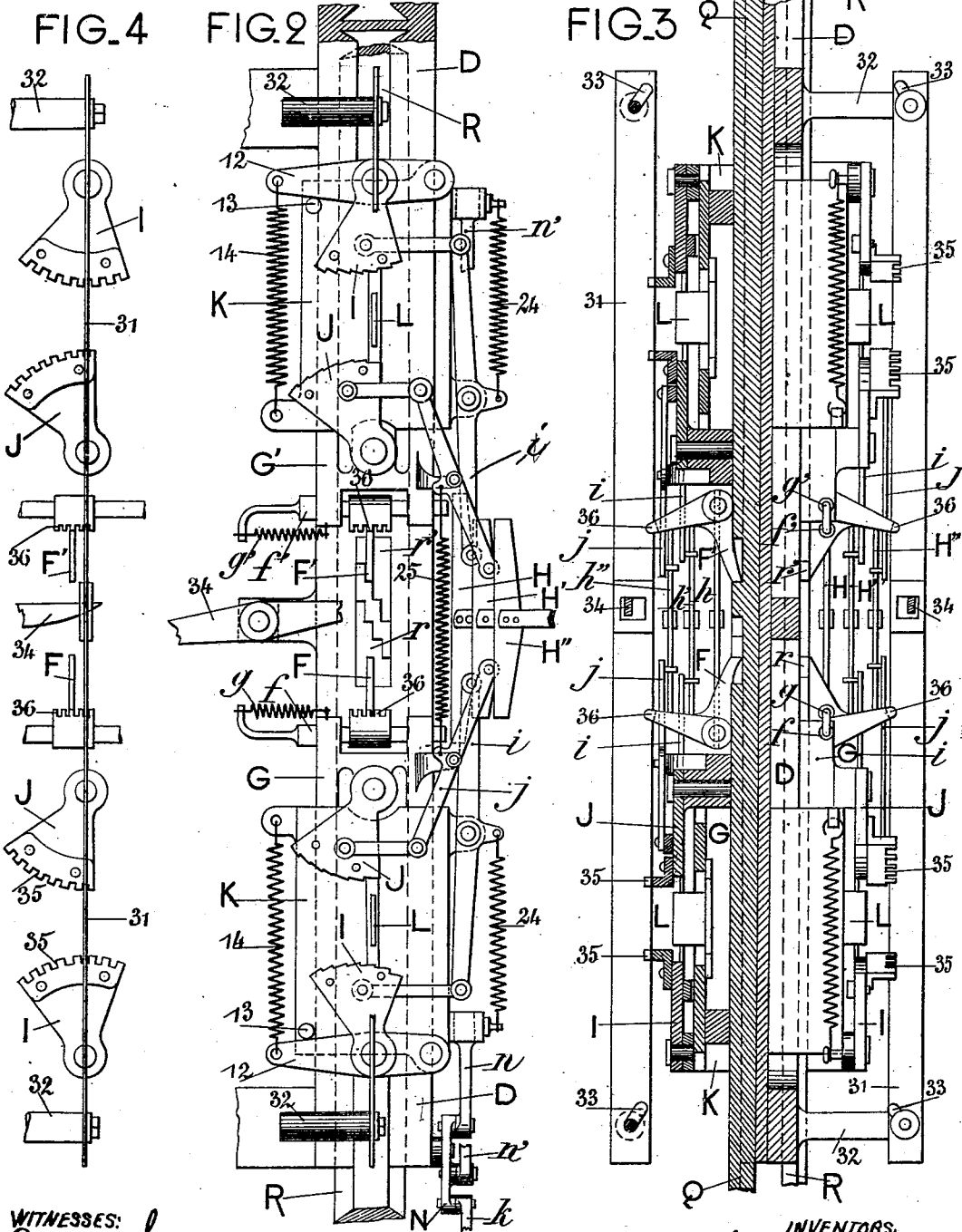
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EMBROIDERING MACHINE.

(Application filed Oct. 29, 1897.)

(No Model.)

4 Sheets—Sheet 2.



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EMBROIDERING MACHINE.

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(No Model.)

4 Sheets—Sheet 3.

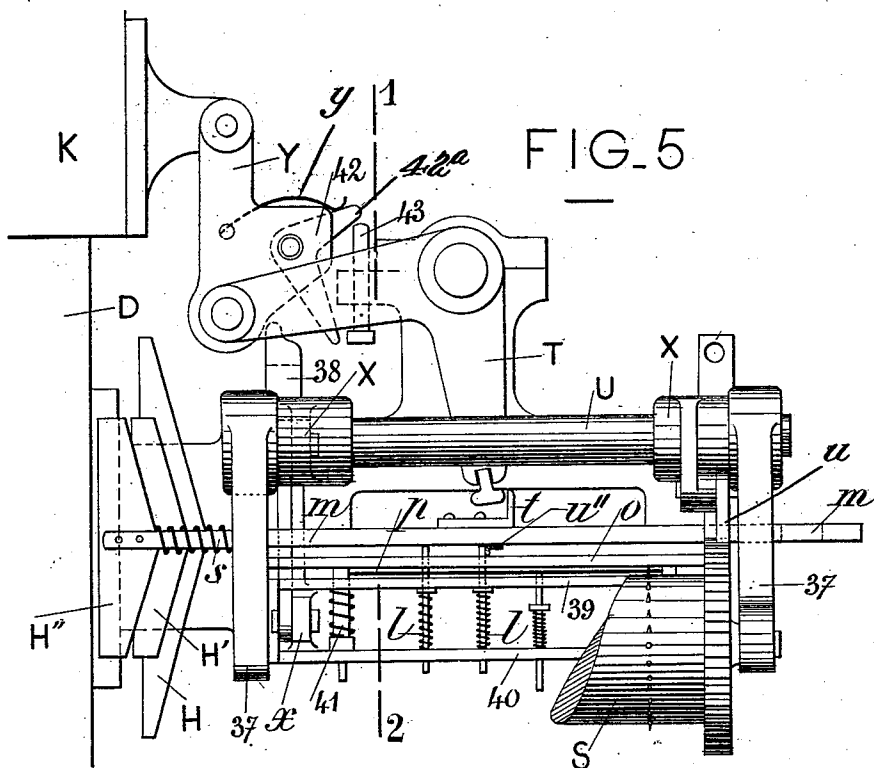
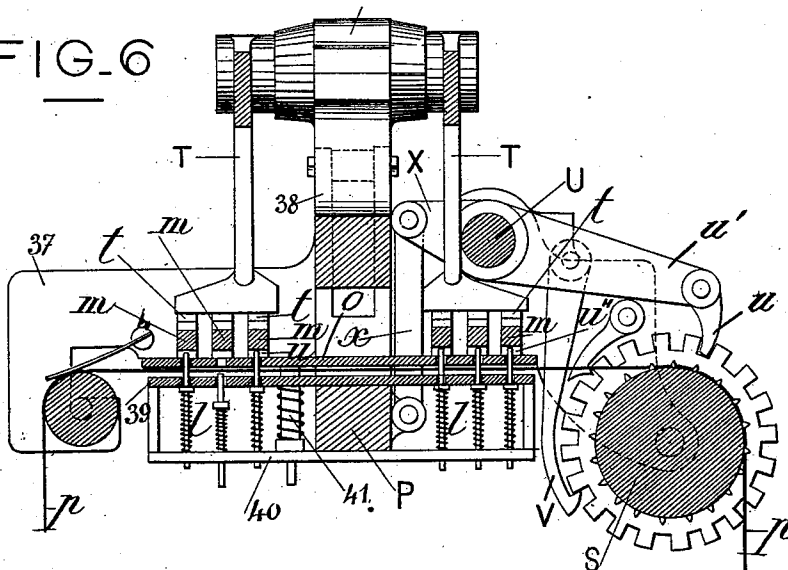


FIG. 6



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**EMBROIDERING MACHINE.**

(Application filed Oct. 29, 1897.)

(No Model.)

4 Sheets—Sheet 4.

FIG. 7

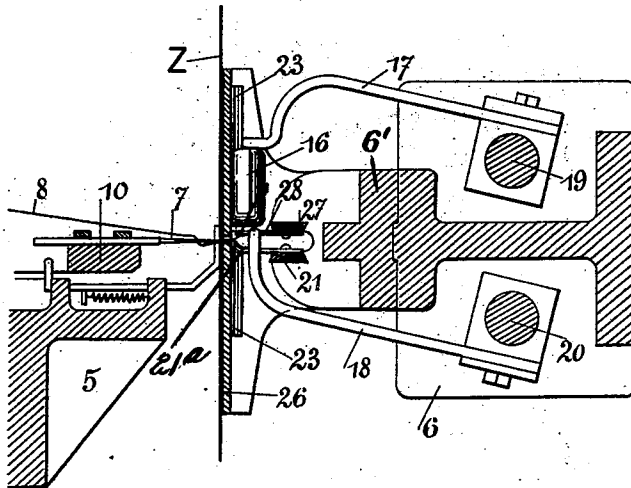
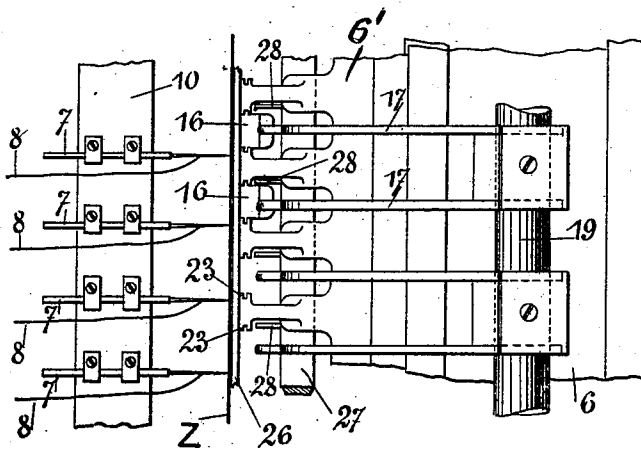


FIG. 8



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# UNITED STATES PATENT OFFICE.

ANTOINE BASTIE AND JEAN BAPTISTE BASTIE, OF TARARE, FRANCE.

## EMBROIDERING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 714,129, dated November 25, 1902.

Application filed October 29, 1897. Serial No. 656,850. (No model.)

*To all whom it may concern:*

Be it known that we, ANTOINE BASTIE and JEAN BAPTISTE BASTIE, citizens of the French Republic, residing at Place Victor Hugo 2, Tarare, Rhone, France, have invented certain new and useful Improvements in Embroidering-Machines, of which the following is a specification.

Our invention relates to embroidering-machines, and is designed to provide means controlled by jacquard mechanism for shifting the fabric-carrying frame in relation to the needles and to provide means for supporting and operating the shuttles which will permit of the ready changing of the same.

To this end the invention includes a fabric-supporting frame capable of vertical and lateral movement, corresponding slides connected thereto and controlling the position of the frame, reciprocating parts having uniform movement, means interposed between the same and the slides and operated thereby for shifting the slides, jacquard mechanism, and means operated thereby for regulating the interposed mechanism referred to, whereby the movement imparted to the slides may be varied notwithstanding the uniform movement of the reciprocating parts.

It further includes the particular arrangement and construction of this interposed mechanism, and it also includes the construction of the shuttle carrying and operating mechanism which permits of the rapid discharge of one shuttle and the substitution of another in place thereof.

In the accompanying drawings, comprising four sheets, we have illustrated one embodiment of our invention.

In the drawings, Figure 1 shows the machine in side elevation, parts being broken away. Fig. 2 is a fragmentary view showing on an enlarged scale, in front elevation, one of the slides with its shifting mechanism. Fig. 3 is a fragmentary view on the same scale as Fig. 2, showing in side elevation both sets of shifting mechanisms, parts being shown in section. Fig. 4 is a detail view of the locking-bar and the parts locked thereby. Fig. 5 is a fragmentary view showing in elevation the type of jacquard mechanism employed and its connection to its operating part. Fig. 6 is a sectional view of the same, taken on the

line 1 2. Fig. 7 is a cross-sectional view illustrating the shuttle-supporting mechanism, and Fig. 8 is a fragmentary plan view of the same.

In the embodiment of the invention illustrated in the annexed drawings the material to be embroidered is stretched between two rollers, which are carried in a frame capable of both vertical and lateral movement, this frame being suspended to bring the material between the needle-carrying bar, which is located on one side thereof, and the shuttle-support on the opposite side of the same. The frame is counterbalanced in both directions, weights being employed for this purpose, and the movement of the frame is secured by the shifting of these weights.

The material is shown at Z, carried by suitable rollers which are mounted in a frame A, slidably mounted on a bar C, which is supported within a main frame B by means of cords *b*, which pass over rollers *c* in said frame and are secured at their ends to a counterweight Q, which slides in a suitable guide. This weight will be hereinafter referred to as a "slide-bar." This bar counterbalances the weight of the frame A, and by shifting the same the said frame is raised and lowered. To counterbalance the frame as to its lateral position or movement, a weight E, secured to one side thereof by a cord which passes over a pulley secured to the frame B, exerts a pull in one direction thereon, which is counterbalanced by a weight R, similar to the weight Q and mounted to slide like the latter. This weight will also be hereinafter referred to as a "slide-bar," and by shifting the same the frame is shifted in a lateral direction. The weight R is connected to the frame A by means of cords *d*, guided around pulleys *e*, supported in brackets secured to frame B.

The frame is intended to be shifted in relation to the needles, which are supported upon a bar *f*, extending between the vertical members of the frame B, in accordance with the particular pattern being worked, and it is my purpose to accomplish this operation automatically through the shifting of the slide-bars Q R. To shift said bars, reciprocating parts are employed which are of necessity given uniform movements; but as the movement of the frame in embroidering a particu-

lar pattern is by no means uniform mechanism must be interposed between the uniformly-moving parts and the slide-bars for imparting to the latter varying or irregular movements in accordance with the particular design being worked, so that such movements will be given said frame. To accomplish this result, jacquard mechanism is associated with the machine, and means controlled by said jacquard mechanism is interposed between the same and the slide-bars for converting the uniform movement of the reciprocating parts into varying or irregular movements of said bars. As similar mechanism is employed for controlling and moving each slide-bar, I will only describe that associated with the bar R, it being understood that the bars Q R slide in ways on opposite sides of the bar or standard D, supported from the front bar of frame B. The slide-bar R is raised by a pawl F and depressed by a pawl F', each of said pawls being mounted in a carriage G G', respectively, which is guided on the standard D. The ends of these pawls engage the opposite side of a projection on the face of the bar R, this projection being formed by recessing the bar on each side of said portion. This projection extends across the bar obliquely to the line of movement of the pawls and its engaging edges are regularly stepped, the steps on one edge being arranged in alinement with those on the opposite edge. At the end of the inward stroke of the reciprocatory movement of the carriages the ends of the pawl approach each other or are separated from each other approximately the distance of the width of the distance between the oppositely-arranged step, so that if said pawls are in alinement with the highest steps or those at the extreme left-hand side of Fig. 2 of the drawings the slide R will be depressed, while if the pawls engage the step at the opposite ends of the projection the slide will be raised. In these drawings four sets of steps are illustrated, so that four adjustments of the slide may be obtained by means of the pawls and carriages, assuming the latter have a uniform movement. The pawls are shifted laterally to bring them into alinement with the pair of steps necessary to give the slide R the proper movement through means controlled by the jacquard mechanism. This means includes pivot-pins *ff'*, to which the pawls are fixed, mounted in the adjacent ends of the carriages G G' in a manner to permit of the lateral shifting movement thereof. The pins are normally pressed in one direction by springs *g g'*, and they are pressed back and held in the desired position against the tension of said springs by a head H, carried by an arm *m*, controlled by the needles of the jacquard mechanism, to be described.

Each movement or adjustment which would be imparted to the slide R, and therethrough to the frame A, if the carriage G G' had regular uniform reciprocatory movement and the pawls F F', operating as described, were solely

depended upon to impart the movement of the carriages to the slide, would be too great and of little practical value. Therefore means must be employed to "back down" or reduce the individual impulses or single movements which would be imparted to the slide by the uniformly-reciprocating part while permitting of a wide range of adjustments. The particular mechanism employed in the present embodiment of the invention for effecting this purpose includes sliding carriages K, which are arranged to move both independently of and in unison with each carriage G G'. Each of said carriages G G' has a uniform reciprocatory movement imparted thereto through the medium of suitable rod connections *nn'*, the upper ends of said rods being connected to the carriages and their lower ends to a lever N on opposite sides of its pivot, said lever being rocked through the medium of a link *k*, connecting the same to a disk mounted on the end of shaft M. Each carriage K has a segment I, with a stepped periphery pivotally mounted thereon, the distance represented by the sum of the depths of said step being equal to the depth of a single step of the projection on slide-bar R. In alinement with these segments on the carriages G G' corresponding toothed segments J are pivoted, each provided with a stepped periphery presented toward the stepped periphery of the adjacent segment I. The sum of the depths of the teeth of each segment J equals the depth of a single tooth of each segment I.

In the extreme outward position of the carriages K the peripheries of each pair of segments are separated a distance greater than the width of a tongue L, projecting through a recess in the face of each carriage G G' into the path of travel by the segments I I during the inward reciprocatory movements of the carriages K. The tongues L project from base-pieces slidably mounted in the carriages G G'.

In the inward reciprocation of each carriage K it slides upon carriage G or G', and when it strikes the tongue L in its path it pushes said tongue along until the latter strikes the segment J, when the movement of carriage K is imparted to carriage G or G', and both move in unison until the inward movement of carriage K is reached.

The movement of carriages G or G' through the pawl F or F' shifts the slide R, as before premised.

As will be noted, the amount of movement imparted to carriage G, for instance, depends upon the relative position of the segments I J. If the highest step of each segment is in alinement with tongue L, the maximum movement will be imparted to said carriage, while if the lowest steps are in alinement the minimum movement will be imparted thereto, and by bringing the intermediate steps into alinement with said tongue a graduated movement between these two extremes may be obtained.

To prevent the parts being unduly jarred, each segment I is carried by an arm 12, pivoted at one end to the carriage K and having its other end under tension of a spring 14, which normally holds the arm 12 against a pin 13.

The segments J and I are positioned automatically through the medium of the jacquard mechanism before referred to and the mechanism now to be described.

Each carriage K, near its inner end, has a centrally-pivoted three-armed lever *i* mounted thereon, one arm of the lever being linked to the segment I, a second arm having a spring 24 connected thereto which tends to throw the lever in such a position that the lowest step of the segment I will be in alinement with tongue L, while the third arm of the lever, which is in line with the first arm, carries at its end a roller or pin, against which a head H', carried by an arm *m*, controlled by the needles of the jacquard mechanism, bears. This head by pressing on the roller or pin positions the lever, and therethrough the segment J, against the tension of spring 24.

The means coacting with jacquard mechanism for positioning segments J is very similar to that employed for positioning segments I and comprises a three-armed lever *j*, pivoted to each carriage G G, each lever having one arm linked to a segment J, a second arm under spring tension—in this instance the spring extending between the second arms of the two levers *j*, said spring acting through the levers tending to force the segments J over, so that their lowest teeth will be in alinement with tongue L. The said arms of the levers are provided with rollers or pins, against which a head H'', mounted on the end of a sliding arm *m*, controlled by the needles of the jacquard mechanism, presses.

From the foregoing it will be apparent that the position of the heads H H' H'' controls the position of the pawls and segment and therethrough the movement imparted to the slide-bar R, and the position of said heads depends upon the slide-rods *m*, which are in turn controlled by the jacquard mechanism.

After the segments and pawls are properly positioned it is desirable that they be locked preparatory to and during the period they are operating to impart movement to the slide-bar R, and for this purpose locking-bar 31 is employed and the parts to be locked provided with means to coact therewith. This bar is vertically arranged directly in front of the segments and pawls and is carried by pins extending from the ends of brackets 32, projecting from frame B, said pins passing through oblique or inclined slots 33 in said bar near its ends. The bar is shiftable toward and from the pawls and segment, so as to engage and disengage the same, as will be explained, and the incline slots coacting with the pins impart to the bar this movement when the bar is shifted vertically. This latter movement is obtained by means of a

pivoted lever 34, having one end projecting through an aperture in said lever and its opposite end linked to a disk or arm 9, mounted on shaft M. As the link is drawn down the lever is tilted and the bar 31 raised and forced toward the segments and pawls into locking position. To interlock with this bar, each segment is provided on its outer face with a plate having an arcuate flange with a toothed edge into which the bar 31 engages. Each of the pawls F F' is provided with a broad tailpiece 36, which is also toothed to engage with said bar. Thus in whatever position the pawls and segment may be on the inward movement of the bar 31 it will engage and lock the same firmly against accidental movement. As soon as movement has been imparted to the bar R the operating-link for lever 34 is raised and the front end of said lever depressed, which will draw the bar 31 downwardly and outwardly and so release said pawls and segments.

The particular jacquard mechanism associated with the mechanism before described for controlling the bars *m* and therethrough the positions of the heads H, H', and H'' includes a bracket 37, secured to standard D, in which a bar P is mounted to have sliding movement. This bar carries an upper plate 39 and a lower plate 40, in which the needles 1 are guided, the latter being normally forced upwardly through apertures in the plate 39 by springs surrounding said needles and bearing at one of their ends on collars thereon and at their opposite ends on the plate 40. The perforated pattern-strip is fed step by step in a narrow path between the plate 39 and a fixed plate *o*, secured in bracket 37, having openings which register with the needles.

The heads H, H', and H'' are all normally pressed toward the levers *i j* and pivots *f f'* to push the latter toward the left, as viewed in the accompanying drawings, by springs S, and means are provided for drawing all of said heads to the extreme right against the tension of the springs at each downstroke of the upper carriage K and then permitting said heads to return under the influence of said springs. In this return movement the heads are arrested or positioned through the medium of the needles 1, as will be described.

The cross-bar P referred to has at one end a vertical extension 38, with which one arm of a dog 42 engages as the carriage K descends. This dog is pivoted in a bracket Y, depending from an arm projecting laterally from said carriage, and it is normally in position to engage the extension by a leaf-spring *y*. The end of bracket Y is connected to an arm extending from a lever having two depending arms T, carrying at their end wipers which operate in the paths of projections *t*, extending upwardly from all of the slide-bars *m*, carrying the heads H, H', and H''. On each downward stroke of the upper carriage K the arms T are swung rearwardly through the connec-

tions described, and the wipers engaging the projections *t* carry all of the slide-bars *m* to the rear, and with them the heads *H*, *H'*, and *H''*, against the tensions of springs *S*. In the same movement of the carriage *K* the depending arms of dog 42 engage the extension 38 of the bar and depress the latter and there-through the cross-bar *P* against the tension of spring 41, coiled about a stud depending from the fixed plate *O*. The bar *P* carries the plate 39 with it in its downward movement, and the latter bearing upon the collars carried by the needles depresses the latter until their upper ends are all below the Jacquard card or pattern-strip. This strip passes over and is fed forward by a drum *S*, journaled in the frame 37 and provided at one end with a toothed wheel, which is engaged by a dog *u* and pawl *v*, both being carried by an arm *u'*, pivoted in frame 37 and provided with a tail *X*, connected by a link *x* to cross-bar *P*. The dog *v* holds the drum against accidental displacement, and the pawl rotates the same step by step as arm *u* is oscillated. As the bar *P* is depressed, as before described, the tailpiece of the arm is drawn down through link *x* and the arm *u'* thrown up, disengaging the detent *u* from the toothed wheel, the latter being rotated one step by the upward movement of pawl *V*. The drum is thus rotated one step and the pattern-strip or Jacquard card *p* given a forward impulse, bringing a new set of holes or pattern above the needles. When the bar *P* has been depressed the required distance, the horizontal arm 42<sup>a</sup> of dog 42 strikes against a stop and is thrown around, thus disengaging the same from the extension 38, when the bar *P* under the influence of the spring 41 will rise. As the plate 39 rises with said bar the needles 1 will also rise under the influence of their springs, and those which register with openings in the pattern-sheet will pass through the same and through alining openings in plate *O*, their ends projecting above the latter plate and into the path of depending lugs *u''*, which are carried by the bars *m*. As the upper carriages move upwardly the arms *T* are swung toward the left and the wipers carried thereby free of the projections *t*, so that the bars *m* may move forward under the impulse of springs *S*. As soon as the wipers release said arms they move forward until arrested by the lugs *u''* striking against the ends of the needles 1, which extend through the pattern-strip and project above plate *O*. The stop for engaging the arm 42<sup>a</sup> of dog 42 is shown in the accompanying drawings as an adjustable bolt or screw 43.

60 It will be understood that the Jacquard mechanism described serves to control the mechanism for actuating both the bar *Q* and *R*.

The needles and shuttle mechanism are illustrated in Figs. 7 and 8 of the accompanying drawings. The needles 7, which are operated in any well-known or improved manner, are

supported from the cross-bar 5 of frame *B*, hereinbefore described.

The cross-bar 6, which also forms a part of frame *B* and is located to the rear of the fabric *Z*, carries a plate 26, which forms a backing for the material and is provided with apertures registering with the needles. The bar 6 also carries a frame 6', having a series of arms projecting therefrom each provided in its opposite faces with grooves or guideways 23, arranged in alinement with the corresponding guideways in the adjacent arms. Between each pair of arms a shuttle is arranged, which runs in the guideways 23 and is actuated by fingers 17 18, a pair of which coacts with each shuttle. The fingers 17 are carried by an oscillating shaft 19, having axial adjustment, and the fingers 18 are carried by corresponding shafts 20. The frame *G'* also carries two longitudinally-sliding bars 21 27, the latter having a series of knives secured thereto, one for each needle, and the former a series of loop-distending hooks 21<sup>a</sup>, one for each needle. In the operation of this part of the machine the needles pass through the fabric 2 and the registering apertures in the plate 26, and their loops are engaged and distended by the hooks 21<sup>a</sup>, which engage said loops, and as the bar 21 is reciprocated toward the shuttle, which coacts with said loop, distends the latter. The shuttle on its downward reciprocation then passes through the loop and the needle retracts, drawing the binding-thread taut. To insert a new shuttle either when one of the shuttles become empty or it is desired to work a new color, the shuttle to be inserted is placed in the guideways 23 above the shuttle to be discharged and the machine is stopped, with the shuttles in their upper positions. The threads are then passed to the left of the cutting-blades 28 and the slide-bar 21 manually reciprocated, when the threads will be severed. The shaft 20 is then shifted axially to bring the fingers 18 out of the path of the shuttles, when the released shuttles fall into a suitable trough provided for their reception. The shafts 20 are then returned to place to bring the fingers 18 in position to support the new shuttles. When the new shuttle-threads have been tied by some embroidery-points, the extreme ends can be cut by manipulating the knife mechanism while the shuttles are in their lower positions.

As will be understood from the foregoing the shuttles work upon the right side of the fabric—that is, the side which receives the design—and the material forming the latter being laid thereon by the shuttles and sewed or fixed in place by the threads carried by the needles.

We claim as our invention—

1. In combination with the embroidering devices, a frame movable in relation to said devices and means for moving said frame comprising the two bars *Q* and *R*, pawls for reciprocating said bars, carriages *G* *G'* carrying

said pawls, carriages K with means for reciprocating the same toward and from each other, and sectors on the said carriages K and G G' with means for communicating the movement of the sector on the carriage K to that on the carriage G or G', and means for adjusting the sectors, substantially as described.

2. In combination, in embroidering devices, a frame, two bars Q and R connected with said frame, said bars having stepped notches, pawls for engaging said notches, said pawls being adjustable, carriages for said pawls, reciprocating carriages K, adjustable means for communicating the movement of the carriages K to the pawl-carriages and jacquard mechanism for adjusting said means and for also adjusting the pawls, substantially as described.

3. In combination, embroidering devices, a movable frame, a reciprocating bar connected with the frame and having stepped notches, an adjustable pawl for engaging said notches, carrier means for reciprocating said pawl, adjustable means for giving said carrier a variable stroke and jacquard mechanism for adjusting the pawls and said means, substantially as described.

4. In combination, the frame, a reciprocating bar for adjusting the frame, said bar having a series of stepped notches, an adjustable pawl for engaging said notches, a carriage for the pawl, a reciprocating carriage with means for operating the same, connections between the reciprocating carriage and the pawl-carriage comprising an adjustable stepped sector, and jacquard mechanism for adjusting the sector and the pawl, substantially as described.

5. In combination in an embroidering-machine, a shuttle, a runway in which said shuttle moves, a pair of fingers 17 and 18 for moving the shuttle, said fingers 17 and 18 being movable vertically and having lateral displacement to allow the empty shuttle to fall and cutting means for the shuttle-thread, substantially as described.

6. In combination in an embroidering-machine, a shuttle, a runway in which said shuttle moves, a pair of fingers 17 and 18 for moving the shuttle, said fingers 17 and 18 being movable vertically and having lateral displacement to allow the empty shuttle to fall and cutting means for the shuttle-thread, said

cutting means comprising the blade 28, and a shifting bar carrying the same, substantially as described.

7. In an embroidering-machine, the combination with the needles and shuttles, of a fabric-supporting frame having vertical and lateral movement, slide-bars forming counter-balance-weights therefor and means for shifting said bars including reciprocating carriages having uniform strokes, means interposed between the same and the slide-bars for imparting the movement of the carriages to the bars, said interposed means including back-down mechanism, substantially as described.

8. In an embroidering-machine, the combination with the needles and shuttles, of a suspended fabric-frame having vertical and lateral movement, slide-bars forming counter-balance-weights therefor, reciprocating carriages with means for imparting regular or uniform strokes thereto, pawls having variable engagement with the bars, means interposed between the carriages and the pawl-supports for imparting the movement of the carriages to said supports and through the pawl to the slide-bars and means for controlling the engagement of the pawls with said bars, substantially as described.

9. In an embroidering-machine, the combination of the needles and shuttles, of a suspended fabric-frame, having vertical and lateral movement, slide-bars forming counter-balance-weights therefor, reciprocating carriages with means for imparting regular or uniform strokes thereto, pawls having variable engagement with the bars, means interposed between the carriages and pawls for imparting the movement of the carriages to said supports and through the pawls to the slide-bars, said means including back-down mechanism, and means, for controlling both the engagement of the pawls with the slide-bars and the back-down mechanism, including Jacquard mechanism, substantially as described.

In witness whereof we have signed this specification in presence of two witnesses.

ANTOINE BASTIE.

JEAN BAPTISTE BASTIE.

Witnesses:

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THOS. N. BROWNE.