G. HANDWERCK.
CARD PUNCHING DEVICE FOR THE MANUFACTURE OF PATTERN CARDS.
APPLICATION FILED MAR. 3, 1903.
8 SHEETS—SHEET 8.

FIG. 10.

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ATTORNEYS
To all whom it may concern:  

Be it known that I, Curt Handwerck, a subject of the King of Saxony, residing at 22 Carolinestrasse, Leipsic, in the Kingdom of Saxony and Empire of Germany, have invented and useful Improvements in Lashing Devices for Card-Punching Machines Designed for the Manufacture of Pattern-Cards, of which the following is a specification.

My invention relates to a lashing device for card-punching machines designed for the manufacture of pattern-cards according to drawings of the design which have no bindings.

This device enables pattern-cards to be punched for fabrics which in the ground and the figure or in the several parts of the latter have different bindings which are independent of each other and for broché and lance fabrics and generally fabric having one or more warps and one or more wefts.

By means of the device each separate point of design of the respective weft-line in the drawing of the design may be transferred by itself, say, according to its position in the design and with the corresponding binding, the introduction of which takes place by special binding devices to the respective stamp or punch of the card-punching machine.

In the card-punching machine a stamp or punch corresponds to each point of the design of the weft-line in the drawing of the design, as is well known.

The essential feature of the invention lies in the fact that for each stamp or punch of the card-punching machine I provide a movable intermediate element which serves for releasing the same and for the movement of which, the agency of elements which is continually moved to and fro, there are provided as many transferring elements as the design contains differently-binding or differently-colored parts and that these transferring elements, by a locking device adapted to be adjusted in accordance with the design with the aid of an adjusting device and also by the respective binding device, are prevented or released to follow the action of the element which is continually moved to and fro in order to transfer the movement of the same to the movable intermediate element by which the respective stamp or punch of the card-punching machine is released. For the punching of the cards themselves use may be made of any of the known mechanical card-punching devices or machines.

The improved lashing device enables not only all the points of design of a weft-line to be punched simultaneously, and thus the working to take place rapidly, but also any desired mode of binding to be introduced into the several parts of the design, the sphere of action of each of the binding devices, which serve for the introduction of the binding and are quite independent of each other, being defined at will within the respective part of the design.

In the accompanying drawings I have represented, by way of example, a constructional form of the improved lashing device.

Figure 1 is a diagram showing the general arrangement of the device in combination with a known card-punching machine. Fig. 2 is a vertical transverse section of the device, which shows the device for adjusting the mechanism designated for locking the transferring elements. Fig. 3 is a like section through the mechanism for releasing a stamp or punch of the card-punching machine. Fig. 4 is a front view of the same. Fig. 5 is a detail pertaining to the mechanism shown in Fig. 8. Fig. 6 is a vertical section, and Fig. 7 is a section, on the line A B of Fig. 6, showing a detail of the device for adjusting the mechanism designed for locking the transferring elements. Fig. 8 is a partial front view of the adjusting device, and Fig. 9 is a detail pertaining to the device shown in Fig. 2. Figs. 10 and 11 are detail sectional elevations with parts in different positions. Fig. 12 is a front view of the punching-bands with the apparatus for moving them longitudinally, while Fig 13 represents a side view. The known card-punching machine, represented in the drawings consists of the punches 95, furnished with collars p, and a casing or receptacle having two perforated plates 63 64 for taking up the card-blank M to be punched with holes. The perforated plates 63 64 are fixed to a pressing-plate f, arranged to be...
moved periodically to and fro, so as to connect with each other, and by means of arms 69, 70 with another perforated plate 68, designed for guiding the rear ends of the punches. Between the perforated plates 63, 64 and the perforated plate 68 is provided a fixed perforated plate 71, the arrangement being such that the collars \( p' \) of the punches are between this perforated plate 71 and the perforated plate 68. The card \( M_0 \) to be perforated will after the adjustment of the punch \( p \) be pressed against the latter. This takes place by a corresponding movement of the pressing-plate \( i \) through the agency of an eccentric 65 from the shaft 62 of the machine, which is driven by spur-wheel 81.82 from the main shaft 83. Those punches which are to make a hole in the card \( M_0 \) are prevented from yielding to the card \( M_0 \) moved against them. For this purpose use is made of the slides \( q \), these slides being adjusted by the improved lashing device according to the design and according to the bindings. This device is illustrated in Figs. 1, 3, 4, and 5.

Each slide \( q \), to which a stamp or punch \( p \) of the card-punching machine corresponds, is connected with a lever \( n \) by a cord \( r \), conducted over suitably arranged guide-rolls \( r' \), Figs. 1 and 3. The levers \( n \), Figs. 3 and 4, are furnished with hooks \( m \) at their upper ends and are suspended by these hooks between collars \( l \) of a round rod or spindle \( l \), which is stationary. Opposite the lower end of each lever \( n \) there is a row of bolts \( o \) or stamps \( k_0, 2, 3, 4, 5, 6 \), arranged one above the other and parallel to each other and for supporting and guiding which I use perforated plates 147 and 148, which are firmly connected with each other by U-shaped bars 84. The perforated plate 147 is fixed in a frame 85, which is adapted to be moved upon the guide-rods 169 in opposition to the action of springs 86. For imparting movement to the frames 85 I employ bell-crane lever 90, 91, which are adapted to turn about fixed journals or bolts 92, their arm 90 being connected with the respective frame 85 through the medium of a link 93 and their other arm 91 being jointed to a push-rod 94, arranged to be periodically moved up and down in bearings or guides 95, Fig. 1. The said push-rod receives its movement from the shaft 80 in opposition to the action of a spring 79, for which purpose the latter shaft carries a cam disk 113, which is arranged to act upon one end of a push-rod 114, the other end of which is jointed to one arm of a bell-crane lever 115, whose other arm is connected to the said push-rod 94. Through the medium of springs 146, which bear, on the one hand, against the perforated plate 147 and, on the other hand, against collars \( k' \) of the stamps \( k_0-6 \), these stamps \( k_0-6 \) are yieldingly connected with the perforated plate 147, adapted to force them against the levers \( n \). The collars \( k' \) limit the movement of the stamps by striking against the perforated plate 148. Between the lever \( n \) and the stamps \( k_0-6 \) I provide the device for locking these stamps. This device is adjusted in accordance with the design through the agency of the adjusting device and is shown in the drawings to consist, for instance, of a locking-slide \( E \), having an aperture 151. (Clearly shown in Figs. 3 and 4.) When the aperture 151 of the locking-slide \( E \) is adjusted to one or the other of the stamps \( k_0-6 \), it allows such stamp to act upon the lever \( n \), while the other stamps, \( k \), in the movement of the frame 85, with the perforated plate 147, in the direction of the arrow I, Fig. 3, are limited in their movement by the slide \( E \), so that the movement of the plate 147 will occasion merely a tension of its springs 146.

The locking-slides \( E \), Figs. 3 and 4, are guided side by side above and below between pairs of fixed guide-bars 170 89 and 170 89' and are suspended from cords 155, conducted over guide-rolls 73. The adjustment of the locking-slides \( E \) takes place by hand directly, according to the drawing of the design, with the aid of an appropriate adjusting device.

In the constructional form shown this device consists of groups of adjusting-slides \( a, b, c \), arranged to slide in a common casing 154 in the longitudinal direction thereof and connected by the cords 155 with the locking-slides \( E \). The device shown is designed for punching cards for fabrics having up to three different bindings, special devices hereinafter to be described being provided for introducing also any desired bindings for threads not forming the design below the threads which are forming the design at the moment.

In accordance with the three colors or main bindings which the design may have, for which the cards may be manufactured most rapidly with the machine, the adjusting-slides \( a, b, c \) may be placed in three different positions, which they transmit to the locking-slide \( E \) pertaining to them. The said adjusting-slides \( a, b, c \) are held in their several positions by a suitable locking device—for instance, by a stop-spring \( d \)—which is adapted to engage with the rests \( d' \) of the adjusting-slides \( a, b, c \), Figs. 2, 6, and 7.

Above the casing 154 for the adjusting-slides \( a, b, c \) is arranged the drawing \( M \) of the design, which serves as a pattern. In Figs. 1, 2, and 8 this drawing of the design is shown, by way of example, to have been painted upon an endless strip or band, which is conducted over three immovably-supported rollers \( R, R, R \), and over a tension-roller \( R \), supported so as to be movable parallel to them, and thus adapted to be adjusted. For this purpose the tension-roller has sliding bearings \( R',\) which are adapted to be adjusted in their guide \( R_1 \) by means of adjusting-screws \( R' \).

In front of the drawing of the design is ar-
ranged an indicating-rule J, placed parallel to the axes of the said rollers. At its front edge this indicating-rule has teeth, the pitch of which corresponds to the closeness of the warp. Thus the tooth at the front edge indicate upon the drawing of the design the warp-lines, and the weft-lines are determined by the corresponding movement of the drawing M of the design before the front edge of the rule. A clearer arrangement is obtained by providing the teeth at the front edge of the rule J with a division corresponding to the groups a b c of adjusting-slides, as shown partially in Fig. 8.

The further movement of the drawing M of the design weft-line by weft-line takes place in the conventional form illustrated by a worm G, which gears with a worm-wheel G', secured to the shaft 158 of the lower roller R, Figs. 1, 2, and 8, and which is fixed upon a vertical shaft 95, arranged to be driven by a shaft 96 through the intervention of change-gear, Fig. 8. The change-gear consists of two spur-wheels G' and G'', made of different diameters and fixed upon the shaft 96. Two other spur-wheels, G' and G'' corresponding to them, are firmly connected with each other and arranged upon the shaft 95. These are fastened by a feather and groove, so that they may be displaced axially upon the shaft 95, and may be adjusted by a disengaging-lever, the fork of which takes into the groove G'' in the hub of the wheels G', and G'' so that either one or the other of these wheels is in engagement with the wheel corresponding thereto. The shaft 96 receives its turning movement by hand with the aid of a friction ratchet device 97 and the hand-roller 98. The turning movement of this lever may be limited in conformity with the desired closeness of the weft, this being effected through the medium of a suitably-arranged adjustable stop. (Not represented in the drawings.)

As the drawing M of the design is not very broad in proportion to the total length of the adjusting slide mechanism, such drawing for the purpose of rapidly gaining a better view is arranged to slide above the casing 154 of the adjusting-slides E in the conventional form illustrated. To this end the shafts of the rollers R are held by their extremities in the frame of the device, whereas the rollers are arranged between two side walls 99, which are rigidly connected with each other and adapted to be displaced upon the shafts of the rollers R. The shaft 158 for driving the lower roller R in order to transmit the turning movement has a groove extending all along, while a feather R or the like is placed in the bore of the roller R. The displacement of the drawing M of the design along the casing of the adjusting-slides may take place by hand by means of the following arrangement, (shown in Figs. 2 and 8.) Pin L of spur-wheel L carries belt-pulley L, being firmly secured to said spur-wheel, while on the side of the frame, Fig. 8, crank-shaft L is arranged, which carries, besides hand-crank L, belt-pulley L, whence transmission is effected, by means of belt L, to belt-pulley L, and therefore also to spur-wheel L.

To avoid mistakes on the part of the operator in effecting the adjustment of the slides a b c, the constructional form shown has a device whereby stops for the rows of slides are adjusted for each color or binding which, as above set forth, corresponds to a definite position of the adjusting-slide a or b or c. The said stops N, 3, 4, 5, 6 are represented in Figs. 1, 2, 6, 7, and 8, and the device is clearly shown in Figs. 6 and 7. Of the stops N those designated by N3, 3, 4, 5, 6 are movable and N1 is fixed. The stops N3, 3, 4, 5, 6 are secured to push-rods O3, 3, 4, 6, 6 which by their lower ends bear upon a cam-disk O, which has upon its face an elevation O', adapted to lift the ends of the push-rods O3, 3, 4, 6, 6 at the same time and, besides, an elevation O'', with the aid of which in the turning movement of the disk O only one of the push-rods O3, 3, 4, 5, 6 can be raised at a time. The turning movement of the disk O for adjusting the stops N3, 3, 4, 5, 6 takes place in the constructional form represented by hand through the agency of a hand-lever S, pivoted upon a fixed pin or journal 100 and adapted to move a rack S', which gears with a spur-wheel S'', fixed upon the shaft O'' of the disk O. According as the lever S is moved to the right or to the left the disk O will be turned in proportion in one or the other direction.

In order that it may not be necessary for the operator to look down upon the adjusting-lever S in each adjustment of the disk O, I have arranged on a level with the eyes a device which indicates to the operator the position occupied by the hand-lever S at any time. In the constructional form illustrated I have provided for this purpose a disk 159, painted with colored sectors, Figs. 2 and 9, and arranged to move below an aperture formed in a cover-plate 101 and corresponding to a sector on the disk. The transmission of the movement from the shaft O'' of the disk O to the shaft 160 of the color-disk 159 is effected in the constructional form represented, by way of example, through the agency of a cord of variable length. For this purpose the endless cord 102, besides being conducted over a pulley 103 on the shaft O'' and a similar cord-pulley 161 on the shaft 160 of the color-disk 159, passes over two loose pulleys 104, 105, adapted to turn upon journals 106 on a lever 107, which can swing freely and is weighted at its free end. Fig. 9 shows a front elevation of the color-disk 159 in its casing.

In the constructional form shown provision has, moreover, been made for the stops N3, 3, 4, 5, 6 to be moved as perpendicularly as feasible to the adjusting-slides a b c in the adjust.
ment of such stops. The push-rods $O$, 3, 4, 5, 6 are appropriately guided by means of pins 163, provided on them and adapted to be moved in guide-slots 108, arranged at a suitable inclination in the side walls of the casing 154 for the adjusting-slides. According as one of the stops is adjusted in conformity with the respective color or binding it limits the outward movement of all the adjusting-slides, and each of the slides which now require to be adjusted can only be adjusted in accordance with the definite color or binding that has been rendered visible by the color-disk 159.

The stamps $k$ are hindered from following

the operative movement of the perforated plate 147 or released in order to follow the same, not only by the slides $E$, in accordance with the design, but also by the binding devices, in accordance with the bindings.

The binding devices used in the constructional form shown by way of example are three Jacquard devices, Fig. 1. These consist of stationary blades 152', 152'', or 152''' and lifting-wires $g_1$, 2, 3, arranged to be released by a card-prism 205' or 206'' or 205'' and needles $h$, 2, 3. The board $o_1$ or $o_2$ or $o_3$ under the lifting-wires is movable and serves for the purpose of raising again such lifting-wires as have been released on the prism 205' or 206'' or 205'' and have dropped down in conformity with the binding-cards $A$ or $B$ or $C$ and hanging such lifting-wires upon the said blades 152. From the lifting-wires are suspended cords $i$ 140, $i$ 141, $i$ 142, or $i$ 140, $i$ 141, $i$ 142, which are guided each through a cord-plate $o_1$, $o_2$, or $o_3$ and over suitably-arranged guide-rolls $h$ or $h'$ or $h''$ to which they are attached.

When the lifting-wires $g_1$, 2, 3 are suspended from their blades 152' 152'' 152'', the stamps $h$, $h'', h'''$ will therefore be debarked from taking part in the movement of the perforated plate 147. As a consequence of the movement of the perforated plate 147 only the springs 146 are compressed. The boards $o_1$ to 3 under the lifting-wires are lowered simultaneously with the operative movement of the perforated plates 147. In like manner the return movement of the two takes place at the same time.

When the adjustment of the locking-slides $E$, with the aid of the adjusting-slides $a$, $b$, $c$, has been accomplished in conformity with the drawing of the design for one weft-shed, the binding-devices are set in operation—that is to say, the action of the card-cylinders 205', 205'', and 205'' of the three Jacquards takes place.

Then, as in all Jacquard devices, those needles $h$, $h'$, or $h''$ are pushed back for which there is no hole in the corresponding binding-card $A$ or $B$ or $C$. The needles pushed back force the lifting-wires $g_1$, $g_2$, or $g_3$, appertaining to them, from their blades 152', 152'', or 152''', and the corresponding lifting-wires $g$ are released. The boards $k$ under the lifting-wires are then lowered and the perforated plates 147 for the stamps $k$ are moved forward at the same time.

All those stamps $h$, $h'$, $h''$ to which an aperture 151 in the locking-slide $E$ is presented and the lifting-wires $g$ of which are released by the binding-cards $A$, $B$, $C$ are forced to the front, causing the lever $n$, which corresponds to them, to swing outward, thus drawing the cord $a$, from which the slide $g$ of the respective punch $p$ of the card-punching machine is suspended. The slide $g$ is lifted, and thus no longer prevents the corresponding punch $p$ to move out of the way by axial displacement in the following operation of the pressing-plate $f$ of the card-punching machine. The slides $g$ which are not raised retain the corresponding punches $p$ in the operative position, and these punches all perforate the card 85 when the pressing-plate $t$ moves forward in order to punch the card $M$. This having taken place, the pressing-plate $t$ passes back to its position of rest, and the punches $g$ are likewise moved back to their position of rest by the perforated plate 68. After this the finished card is removed and a fresh card $M$ is placed between the perforated plates 63 64 in front of the punches. At the same time the boards $o_1$, $o_2$, $o_3$ under the lifting-wires $g_1$, $g_2$, $g_3$ are raised, together with such lifting-wires, so that the latter will again hook into their blades 152' 152'' 152'''. In like manner the perforated plates 147 of the stamps $k$ are moved back, the latter themselves passing again to their position of rest. Such of the levers $n$ as may have swung out fall back, together with the slides $g$, suspended therewith, to the position of rest, everything being thus ready for the next adjustment.

Most of the adjusting-slides $a$, $b$, $c$, in conformity with the design, retain the position given them for the fresh weft-shed, only the positions of those adjusting-slides being changed whose points of design form the outline or are adjacent to the same. The adjustment of this small number of the adjusting-slides $a$, $b$, $c$ may be effected very rapidly, so that in by far the most cases the time requisite for the punching of the cards of a weft-shed will be sufficient for this work.

In order that during the period of an operative movement of the card-punching machine the fresh adjustment of the respective adjusting-slides $a$, $b$, $c$ for the next weft-shed may be accomplished, it is necessary to maintain the locking-slides $E$ in the position they have previously occupied until all the cards of the adjusted weft-shed have been punched.

In case this takes place directly the adjusting-slides $a$, $b$, $c$ can be pushed backward, but not drawn out, because this is prevented by the stretched cords 155. To enable the adjusting-slides $a$, $b$, $c$ to be drawn out when the locking-slides $E$ are fixed, it is needful to re-
lax the cords 155 for the fresh adjustment. This may be effected either by suitably adjusting the cord plates or rolls serving to guide them or, as in the constructional form shown, by displacing the adjusting device to the rear.

In the constructional form illustrated the casing 154 of the adjusting device for the adjusting-sildes a b c is adapted to be moved backward, Figs. 1, 2, and 8. It has for this purpose pins 164 on the side walls, the said pins being guided in a horizontal slot 109 in the frame of the machine. On the side walls of the casing 154 are also furnished the pins 110, to which arms 165 are attached, such arms being fixed upon a common shaft 111. This shaft has a partial turn imparted to it by a cam-disk 112 on the shaft 80 of the machine, which shaft is driven from the shaft 82 of the card-punching machine through the intervention of sprocket-wheels 59 and an endless chain 60. The cam-disk 112 acts upon an arm 165 on the shaft 111 in such a manner that in the upward movement of the same the backward movement of the casing 154 of the adjusting device will take place. The cords 155 must, however, not be relaxed before the slides are secured in the position they have previously occupied. For this purpose, as shown in Figs. 3 and 4, the cords 155, connecting the locking-slides E with the adjusting-slides a b c, are passed between two clamping-jaws 74 and 75, one of which, 74, is fixed, while the other, 75, is adapted to move parallel to the former. The clamping-jaw 75 is fixed to rods 76, upon which eyes 78 can be displaced, this displacement in the forward direction being limited by adjusting-rings 136 or the like. Between the eyes 78 and the clamping-jaws 75 there are pressing-springs 133, arranged on the rods 76.

The eyes 78 receive their movement through bell-crank levers 77, Fig. 1, connected to a common push-rod 121, which is adapted to move in guides 122. The push-rod 121 is moved by a bell-crank lever 120, to the other arm of which is connected a push-rod 118, furnished at its free extremity with a roll which is continually pressed against the periphery of a cam-disk 117 by means of the spring 119 acting upon the push-rod 118. Upon the shaft 116 of the cam-disk 117 is arranged a sprocket-wheel 98, which is driven from the shaft 80 of the machine through the agency of an endless chain and a sprocket-wheel 96 on the said shaft 80. The movement of the eyes 78 is distinct from that of the pressing-frame 85, because the clamping-jaws 75 must remain in their operative position during the punching of all the cards of a weft-shed, whereas the pressing-frame 85 for the stamps k has to make an operative movement for each card of the weft-shed.

During the punching of the cards the slides E are thus suspended from the cords 155, which are held, these cards being relaxed by their part situated behind the clamping-jaws 74 75 to such an extent by pushing back the adjusting device or adjusting the perforated plates that perfect freedom of movement is given to the adjusting-slides a b c for the fresh adjustment. When this adjustment has been effected and the card has been punched, the adjusting device is moved forward again after the clamping-jaws 74 75 have been opened again. In this manner the fresh adjustment for the next card is transmitted to the locking-slides, which are then fixed again by the clamping-jaws 74 75.

Of the six rows of stamps k, l k n k l k shown in the drawings there are only three—to say, k, l, k—which are connected by cords 140 141 142 with binding devices. In front of the other rows of stamps, k, l, k, there are perforated bands 179, having holes placed at distances corresponding to those of the stamps, the said bands being arranged to be moved in a longitudinal direction, so that by the suitable displacement of a perforated band 179 all the respective stamps k or l or k will be locked at the same time. To move the bands 179 in the longitudinal direction, I provide the following arrangement of parts: To each end of each punching-band 179 one guide-rod j, respectively, j, which is secured, said guide-rod being guided in a corresponding aperture of the frame. One of the rods, j, has at its free end a head j, spring j being arranged between said head and the frame. The other rod, j, has an eye j, being jointed by bolt j with an eccentric-lever j. Said eccentric-lever has the purpose to move band 179 longitudinally, countering thereby the effect of spring j. These stamps may be employed for binding the outlines, owing to the arrangement of further intermediate positions for the locking-slides E, which are indicated in the drawings by dotted lines x y z. These intermediate positions x y z are between the rows of stamps k, l, k, l, k, respectively, and k, k. Thus, for instance, the adjustment of the locking-slides E to x and k enables the points of the outline of two adjacent rows of points of design to be lashed into the upper shed and lower shed, and consequently the binding of the outline to be effected. The perforated band for the row of 115 stamps k is then placed in the position corresponding to open.

The adjustment of the locking-slides to the intermediate positions is designed by the stamps k, l, k and the lines x y z, and which is temporarily required with many kinds of fabric, is rendered feasible by the following arrangement: Above the stamps k, l, 6, Figs. 3 and 4, the guide-bolts 124 are fixed between two plates 123 and 123·. The plates themselves are secured to the ends of lifting-bars 125, having an upward or downward movement imparted to them either by hand or by mechanical means, such movement corresponding to the distance of the intermediate rows x y z from 125·.
the rows of points of design of the main stamps \( k_1, k_2, k_3 \). Upon the guide-bolts 124 the sliding pieces 126 are adapted to move in opposition to the action of springs 122 and have bars 127 fixed to them. By rolls 129, the sliding pieces 126 are connected with a corresponding number of curved bars 130, guided at one of their ends at 131, the other ends, Fig. 5, carrying rolls 132, adapted to run upon the peripheries of as many cam-disks 133. These disks are mounted upon a common shaft 134 and have a turning movement imparted to them by hand or by mechanical means, the said shaft being firmly held in bearings. With the aid of the adjusting-slides \( a, b, c \) the locking-slides \( E \) may also be placed in the intermediate positions \( k_1, k_2, k_3, a, b, c \), and may be secured in these positions by the locking-springs of the adjusting-slides entering notches \( k_4 \), suitably arranged therein, Fig. 6. When the locking-slide \( E \) is in such an intermediate position and when on a turning movement of the shaft 134 one of the rolls 132 enters the notch in the respective disk, the corresponding bar 127 can follow the action of the springs 122, forcing their sliding pieces 126 forward. It passes below the upper hook-shaped ends of the locking-slides \( E \), situated immediately above it in the respective intermediate position. In the raising of the bars 127 by the lifting-bars 125 the locking-slides \( E \), taken hold of by the bar 127, which has been pushed forward, are again lifted to their main position and remain therein until the card has been punched for that part of the design to which the main position corresponds, so that the main stamps \( k_1, k_2, k_3 \), appertaining to the respective color or binding, will also be able to act upon the lovers \( a \) if permitted by the binding device acting upon the said stamps \( k_1, k_2, k_3 \) through the agency of the cords 140, 141, 142 in the manner hereinbefore set forth. After the fresh adjustment of the locking-slides \( E \) the adjusting device is again brought back to its normal position—that is to say, the position for the reading or lashing—which in the constructive form shown by way of example likewise takes place through the intervention of the cam-disk 112. Previously, however, the cam-disk 117 has moved the clamping-jaws 75 away from the jaws 74 for a short time, so that the locking-slides \( E \) have been suspended freely. These locking-slides \( E \) have passed directly to the positions corresponding to the fresh adjustment of the adjusting-slides \( a, b, c \), and now the jacquard devices \( A, B, C \) and the pressing-plates 147 of the stamps \( k \) may at once begin to act again, causing the adjustment of the slides \( g \), so that the next card of the weft-shed can be punched. It is by this means possible to obtain a great rapidity in the punching of the cards if the operator has acquired some little skill. Moreover, the adjusting device affords the advantage that the squaring of the design may be dispensed with.

The adjusting-slides \( a, b, c \), adjusted in conformity with the several differently-binding parts of the design, are no longer situated in one continuous row, but are drawn out more or less. In this case the slides of the same color or binding have all been drawn out to the same extent, and the first and last adjusting-slides of each color are therefore easily to be recognized. In order to confine the bindings at the outlines, nothing else is needed than to prevent or to allow the passage of the respective stamp \( k \) through the aperture 151 of the locking-slide \( E \), which, as already stated, is accomplished by placing the locking-slide \( E \) in such a position, with the aid of the corresponding adjusting-slide \( a, b, c \), that its aperture 151 passes between two neighboring stamps \( k_1, k_2, k_3 \) or upon the rows of stamps \( k_1, k_2, k_3 \). The selection of the row of stamps depends on the kind of the binding—for instance, warp-twill or weft-twill.

In the case of artistic fabrics it is advantageous to punch the design first as a chain of figure-cards—that is to say, without any binding—and to employ this chain of figure-cards to try the design for the most varying bindings with a view to finally making use of the most favorable effects. Thus the chain of figure-cards once produced is to obviate the frequent reading or lashing by the operator and to provide for weaving the design immediately on a sample loom in the most varying kinds of binding.

The several figure-cards are used in connection with the chains of binding-cards to be laid upon the prism of the jacquard device, the operation being such that at the commencement of a fresh weft-shed the figure-cards will act first and adjust the locking-slides \( E \), after which the card periods begin and the binding-cards commence their operation. Such an adjustment of the locking-slides \( E \) by means of the figure-cards may be effected at once by the device represented in Fig. 1 if immediately above the hole 151 of the locking-slide \( E \), Fig. 3, a small stop (not represented) is arranged to bear in the downward movement of the locking-slides \( E \) upon the stamps \( k \), released by the figure-cards, thereby locking the slide \( E \) until the clamp 74, 75, Fig. 113, effects the fixing for the respective weft-shed.

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

1. In a mechanical lashing device of the character described, the combination of a movable releasing member permanently connected with the corresponding member for releasing the stamp of the card-punching machine with a row of members adapted to be moved against the same and the number of which corresponds to that of the differently-binding or differently-colored parts of the design, a pressing-piece with which all the members of the row for the movement against the releasing mem-
ber are yieldably connected, means for moving the pressing-piece to and fro, a locking member between the releasing member and the members adapted to be moved against the same, adjusting devices connected with the locking member and the number of which corresponds to that of the differently-binding or differently-colored parts of the design, and a binding device for each of the stamps for acting upon the same in accordance with the respective binding, substantially as and for the purpose herein set forth.

2. In a mechanical lashing device of the character described, the combination of a releasing member for each stamp of the card-punching machine, a horizontal spindle for carrying all the levers, means for preventing axial displacement upon the spindle, means for permanently connecting each lever with the releasing member of the respective stamp in card-punching machines with a row of members adapted to be moved against the same and the number of which corresponds to that of the differently-binding or differently-colored parts of the design, a pressing-piece with which all the members of the row for the movement against the releasing member are yieldingly connected, means for moving the pressing-piece to and fro, a locking member between the releasing members and the members adapted to be moved against the same, adjusting devices connected with the locking member and the number of which corresponds to that of the differently-binding or differently-colored parts of the design, and a binding device for each of the stamps for acting upon the same in accordance with the respective binding, substantially as and for the purpose herein set forth.

3. In a mechanical lashing device of the character described, the combination of a movable releasing member permanently connected with the respective releasing member for the stamp of the card-punching machine, with a row of stamps adapted to be moved against the same, the number of which corresponds to that of the differently-binding or differently-colored parts of the design, two perforated plates wherein the ends of the stamps are guided and which are connected to form a frame, collars on the stamps for limiting the movement of the same, springs on the stamps which bear on the one hand against the collars and on the other hand against one of the perforated plates, means for moving the frame formed of the perforated plates to and fro, a locking member between the releasing member and the members adapted to be moved against the same, adjusting devices connected with the locking device and the number of which correspond to that of the differently-binding or differently-colored parts of the design, and a binding device for each of the stamps for acting upon the same in accordance with the respective binding, substantially as and for the purpose herein set forth.

4. In a mechanical lashing device of the character described, the combination of a movable releasing member permanently connected with the respective releasing member for the stamp of the card-punching machine, with a row of members adapted to be moved against the same and the number of which corresponds to that of the differently-binding or differently-colored parts of the design, a pressing-piece with which all the members of the row for the movement against the releasing member are yieldingly connected, means for moving the pressing-piece to and fro, a locking slide between the releasing member and the row of members adapted to be moved against the same, the said slide being provided with an aperture which at any time allows only the passage of one of the members adapted to be moved against the releasing members, adjusting devices which are connected with the locking-slide and the number of which corresponds to that of the differently-binding or differently-colored parts of the design, and a binding device for each of the stamps for acting upon the same in accordance with the respective binding, substantially as and for the purpose herein set forth.

5. In a mechanical lashing device of the character described, the combination of a movable releasing member permanently connected with the respective releasing member for the stamp of the card-punching machine with a row of members adapted to be moved against the same and the number of which corresponds to that of the differently-binding or differently-colored parts of the design, a pressing-piece with which all the members of the row for the movement against the releasing member are yieldingly connected, means for moving the pressing-piece to and fro, a locking member between the releasing members and the members adapted to be moved against the same, adjusting-slides provided for the locking-slide and the number of which corresponds to that of the differently-binding or differently-colored parts of the design, and which are all connected with the latter, means for guiding the adjusting-slides, means for fixing the same in the several positions, and a binding device for each of the stamps for acting upon the same in accordance with the respective binding, substantially as and for the purpose herein set forth.

6. In a lashing device of the character described, a movable releasing member which is permanently connected with the means for releasing the respective stamp of the card-punching machine, a row of stamps, the number of which corresponds to that of the differently-binding or differently-colored parts of the design, two perforated plates united to form a frame and in which the front and rear ex-
tremities of the stamps are supported, rods arranged parallel to the latter for guiding the said frame of perforated plates, springs upon the guide-rods, rods for moving the frame of perforated plates in opposition to the action of the springs, and a cam-disk for acting upon the said rods, substantially as and for the purpose herein set forth.

7. In a lashing device of the character described, a releasing member which is permanently connected with the means for releasing the respective stamps of the card-punching machine, with a row of stamps, the number of which corresponds to that of the differently binding or differently-colored parts of the design, means for guiding the stamps, means for moving the latter against the releasing member, means for yieldingly connecting the stamps with the means for moving the same, a locking-slide between the stamps and the releasing member, two pairs of guide-bars arranged one over the other, for the locking-slide, adjusting-slides for the latter and means for permanently connecting the locking-slide with its adjusting-slides, substantially as and for the purpose herein set forth.

8. In a lashing device of the character described, the combination of the adjusting-slides, the locking-slides and means for fixing the same independently of the adjusting-slides, substantially as and for the purpose herein set forth.

9. In a lashing device of the character described, the combination of the locking-slides and cords for connecting the same with the respective adjusting-slides, with a clamping device for the cards and means for operating this clamping device during the fresh adjustment of the locking-slides, substantially as described and for the purpose herein set forth.

10. In a lashing device of the character described, the combination of the adjusting-slides, means for guiding the same, means for fixing the same in the several positions, and means for limiting their outward movement by a casing adapted for the reception of the whole, means for displacing this casing parallel to itself, and means for guiding the casing in the displacement, substantially as and for the purpose herein set forth.

11. In a lashing device of the character described, the combination of the adjusting-slides with rests provided on them, locking-springs which engage with these rests, and means for guiding the adjusting-slides, substantially as and for the purpose herein set forth.

12. In a lashing device of the character described, the combination of the adjusting-slides with stops for limiting the outward movement of the same, means for adjusting these stops, and noses provided on the adjusting-slides and into the path of which the stops extend, substantially as and for the purpose herein set forth.

13. In a lashing device of the character described, the combination of the adjusting-slides with stops for limiting the outward movement of the same, noses provided on the adjusting-slides and into the path of which the stops extend, rods which are firmly connected with the stops, a cam-disk upon which these rods bear, elevators on the cam-disk for raising the rods severally and together, and means for turning the cam-disk about its axis, substantially as and for the purpose described.

14. In a lashing device of the character described, the combination of the adjusting-slides with stops for limiting the outward movement of the same, noses provided on the adjusting-slides and into the path of which the stops extend, rods which are firmly connected with the stops, a cam-disk upon which these rods bear, elevators on the cam-disk for raising the rods severally and together, and means for turning the cam-disk about its axis, and means for indicating the position of the cam-disk, substantially as and for the purpose herein set forth.

15. In a lashing device of the character described, the combination of the adjusting-slides with stops for limiting the outward movement of the same, noses provided on the adjusting-slides and into the path of which the stops extend, rods which are firmly connected with the stops, a cam-disk upon which these rods bear, elevators on the cam-disk for raising the rods severally or together, and means for turning the cam-disk about its axis, a vertical shaft upon which the cam-disk is arranged, a pulley upon the said shaft, a color-disk, a casing having an aperture for the said color-disk, a horizontal shaft for the color-disk, a cord-pulleys upon this shaft and a cord-gear between this pulley and the cord-pulley upon the shaft of the cam-disk, substantially as and for the purpose herein set forth.

16. In a lashing device of the character described, the combination of the adjusting-slides with rollers for guiding the drawing of the design, according to which the adjustment of the adjusting-slides takes place, means for moving the drawing of the design forward by a weft-line by a weft-line, and means for putting the drawing of the design in tension, substantially as and for the purpose herein set forth.

17. In a lashing device of the character described, the combination of the adjusting-slides with a frame for supporting the rollers for guiding the drawing of the design, means for displacing the frame in the direction of the axes of the rollers and means for guiding the frame in this displacement, substantially as and for the purpose herein set forth.

18. In a lashing device of the character described, the combination of the locking-slides with a hook provided at its upper end, a cas
ing adapted to be moved vertically up and down, guide-bolts arranged in the casing at right angles to the locking-slides, bars adapted to be guided upon the bolts and to be moved against the locking-slides, the said bars being arranged parallel one over the other, means for moving the bars to and fro, and means for moving the casing up and down, substantially as and for the purpose herein set forth.

19. In a lashing device of the character described, the combination of the locking-slides with a hook provided at its upper end, a casing adapted to be moved vertically up and down, guide-bolts arranged in the casing at right angles to the locking-slide, bars adapted to be moved against the locking-slides and to take below the hooks of the locking-slides, springs for moving the slides against the locking-slides, cam-disks for moving the bars in opposition to the action of the springs, and draw-rods for transmitting the movement from the cam-disks to the bars, substantially as and for the purpose set forth.

20. In a lashing device of the character described, the combination of the releasing member, which is permanently connected with the means for releasing the respective stamps of the card-punching machine, with a row of stamps adapted to be moved against the releasing member, means for moving the stamps, means for yieldably connecting the means for such movement with the stamps of each binding device for each stamp for acting upon the same in accordance with the binding, stamps which are independent of the binding devices and are placed between the aforesaid stamps and means for locking the independent stamps substantially as and for the purpose herein set forth.

21. In a lashing device of the character described, the combination of the releasing member, which is permanently connected with the means for releasing the respective stamps of the card-punching machine, with a row of stamps adapted to be moved against the releasing member, means for moving the stamps, means for yieldably connecting the means for such movement with the stamps of each binding device for each stamp for acting upon the same in accordance with the binding, stamps which are independent of the binding devices and placed between the aforesaid stamps, perforated bands adapted to be moved transversely to the independent stamps, and arranged between them and the releasing member, and means for adjusting the locking-slides or their apertures relatively to the independent stamps, substantially as and for the purpose herein set forth.

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

CURT HANDWERCK.

Witnesses:
R. V. T. DUNN,
RUDOLPH FRICKE.