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2,552,942

MACHINE FOR THE PREPARATION OF CARDS FOR JACQUARDS

Filed April 11, 1949

5 Sheets-Sheet 1

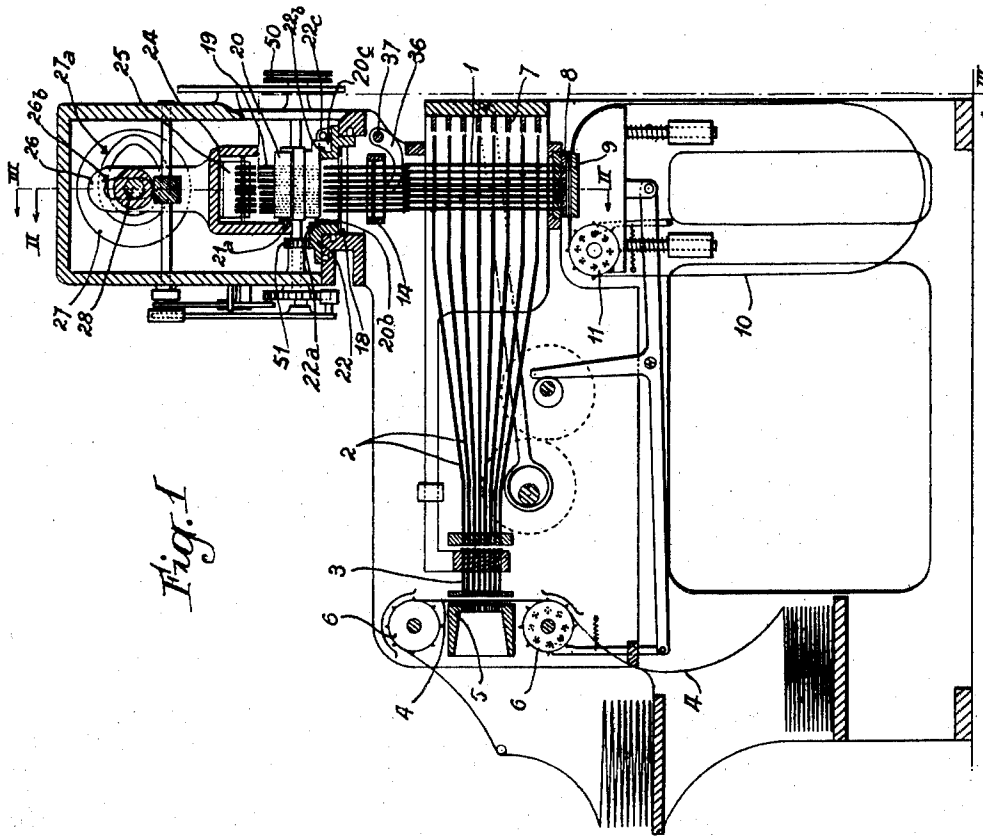


Fig. 1

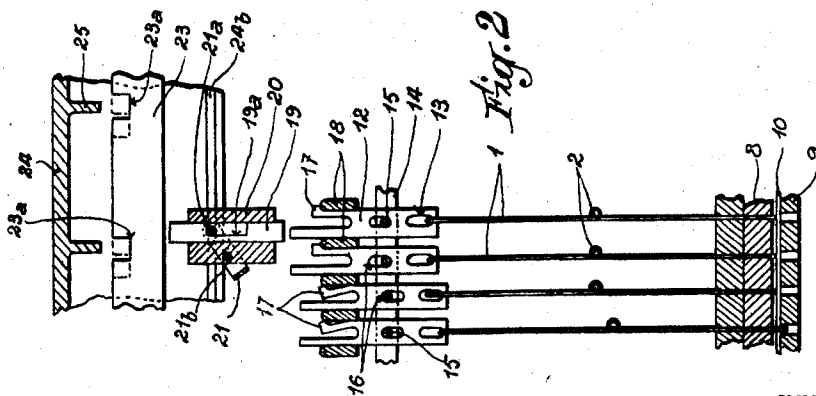


Fig. 2

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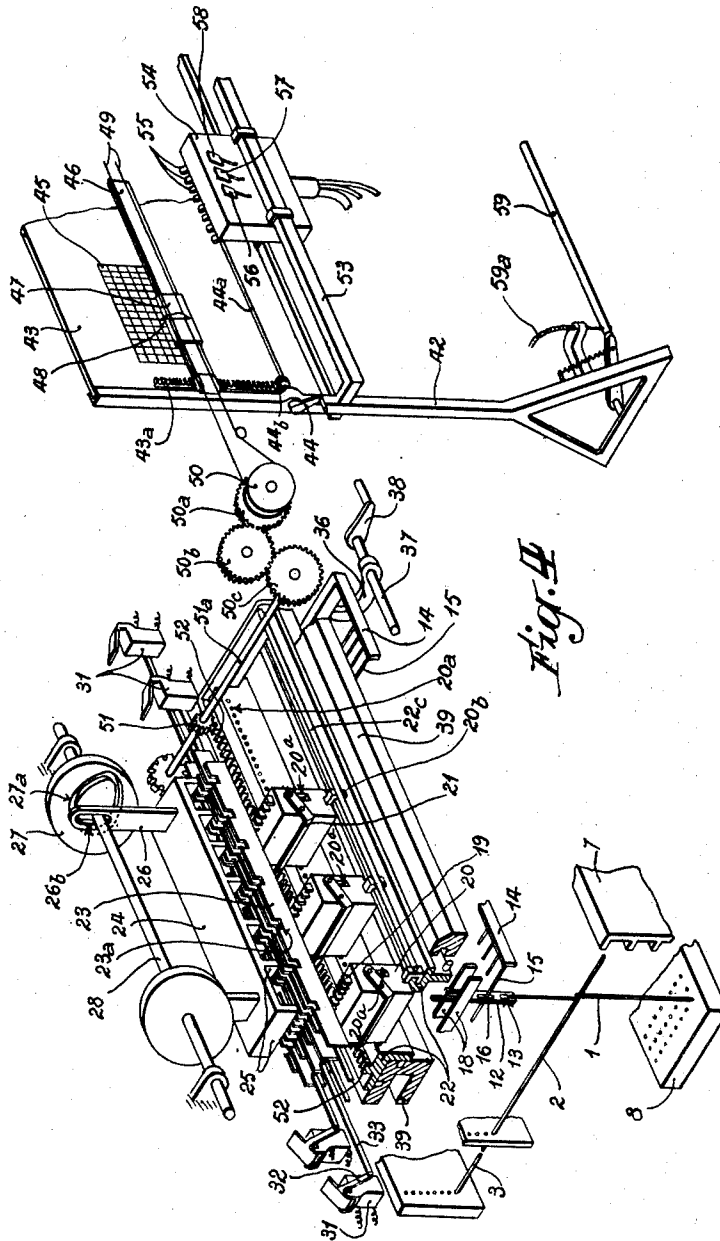
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MACHINE FOR THE PREPARATION OF CARDS FOR JACQUARDS

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5 Sheets-Sheet 3



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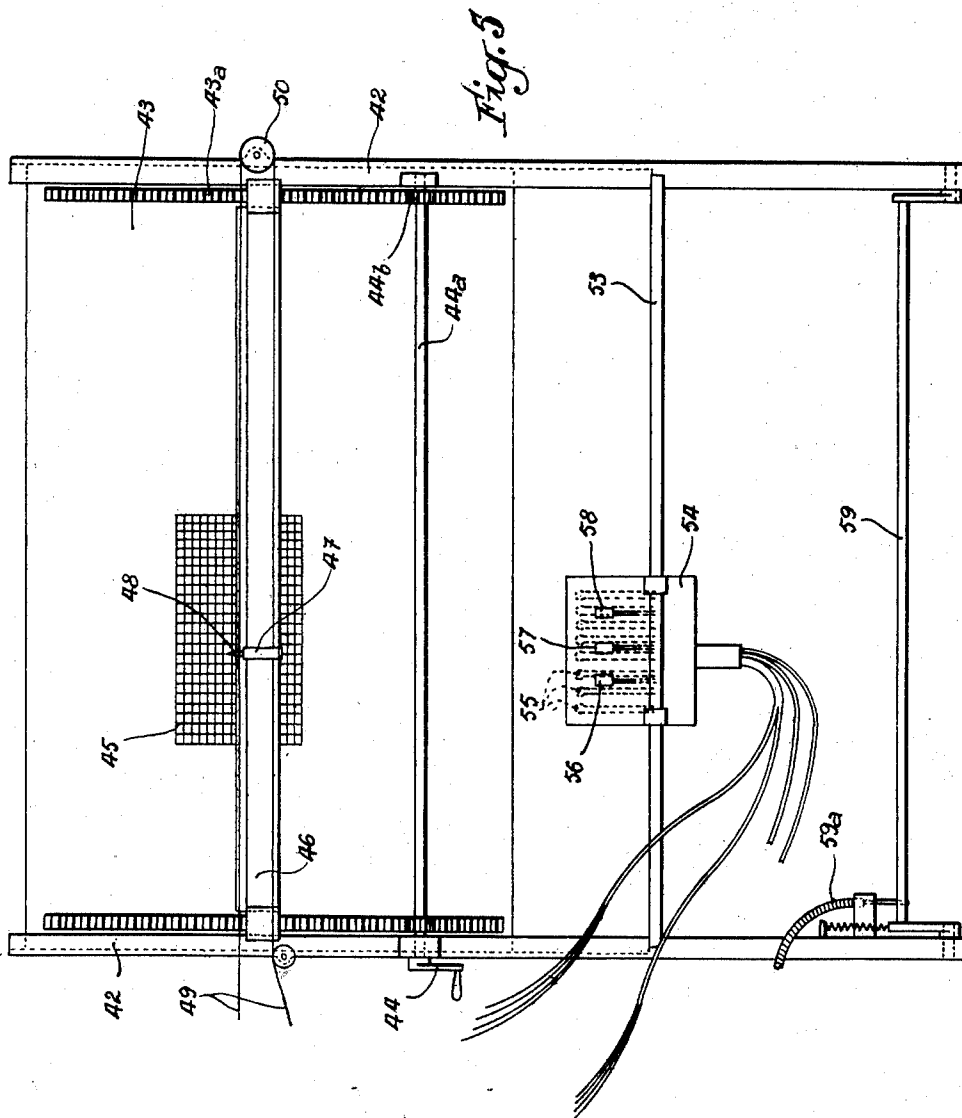
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MACHINE FOR THE PREPARATION OF CARDS FOR JACQUARDS

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5 Sheets-Sheet 4



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MACHINE FOR THE PREPARATION OF CARDS FOR JACQUARDS

Filed April 11, 1949

5 Sheets-Sheet 5

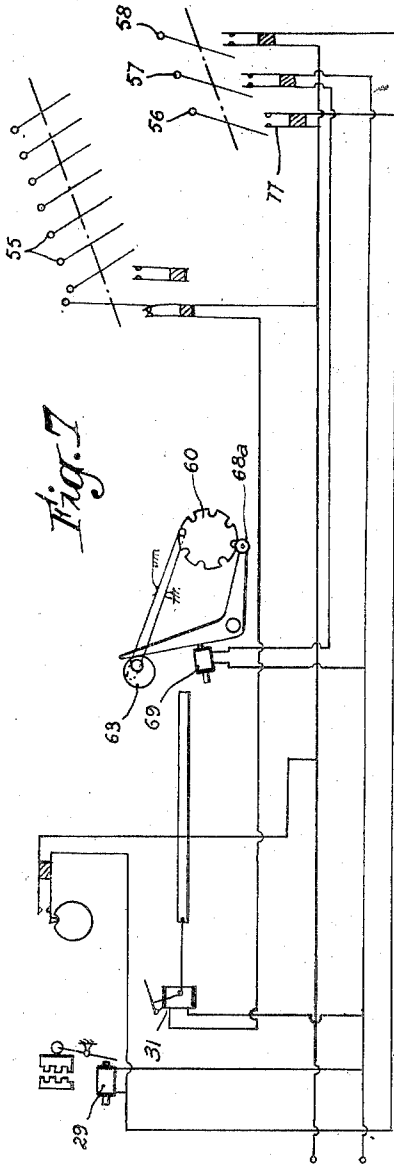


Fig. 7

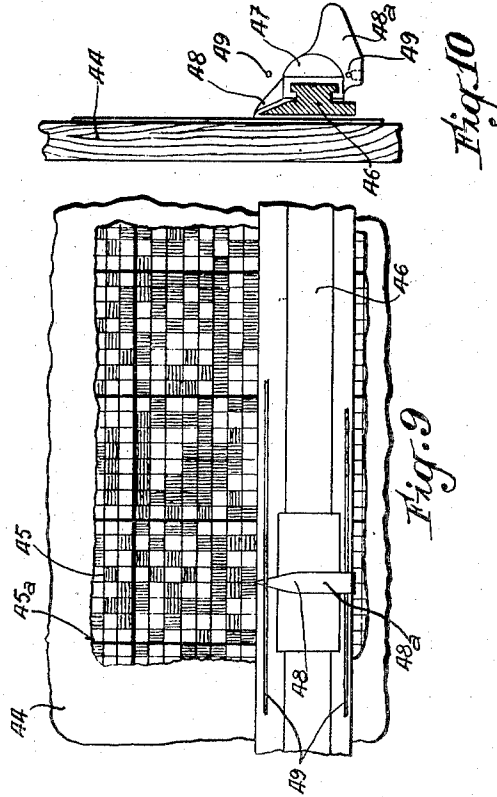


Fig. 10

Fig. 9

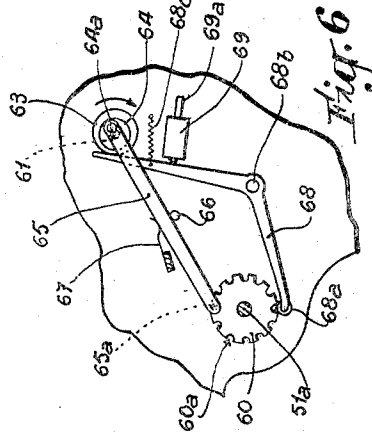


Fig. 6

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UNITED STATES PATENT OFFICE

2,552,942

MACHINE FOR THE PREPARATION OF
CARDS FOR JACQUARDS

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Application April 11, 1949, Serial No. 86,683
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7 Claims. (Cl. 164—113)

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My invention relates to machines used to prepare pattern cards and more particularly papers for Jacquards of the Verdol type.

A first object of my invention is to provide a machine which enables the operator to follow the design without having to take into account the details of the weave of the different parts of the pattern.

Another object of my invention is to provide a machine which may, without any modification, be manipulated to operate to reproduce pre-punched existing pattern cards or papers.

A further object of my invention is a machine for preparing pattern cards or papers which will permit automatic reproduction of a card (the term card comprising here the individual Jacquard card or the part of a Verdol paper corresponding to a weft) or of a given portion of a card in such a manner that the operator's work may be reduced to a minimum.

Still a further object of my invention is a machine comprising a paper repeating device of the Verdol type wherein the feeler needles are suspended with play to hooks adapted to be set either at a high position, for which the feeler needles are raised, or at a low position, for which the said needles are lowered on a master paper (which paper bears the different weaves of the part of the pattern read by the operator) and are selected in accordance with the said master paper, while means are provided to enable the operator to lower the said hooks for each point of the card where he desires reproduction of the weave of the master paper; and to raise all the lowered hooks when he has read in the appropriate portion of the design and perforated the corresponding part of the card.

My improved machine is preferably used as follows: The operator reads in the design for each color of the latter in successive steps, while the perforating device is each time provided with a master paper bearing the weaves for the different shuttles in the portion which he is reading. The operator then lowers the hooks corresponding to the points where the color under consideration should appear and he leaves the other hooks at the raised position. It will be understood that for all these points the pattern cards (meaning, as above, the successive portions of the Verdol paper corresponding to a weft) will be perforated in accordance with the proper weaves, while they will remain unperforated for the other points. By reading in the design for all the colors in succession the operator thus ensures full perforation of all the cards.

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Actuation of the hooks is preferably effected by series of eight, which number has the advantage of simultaneously corresponding to the conventional number of holes in a transverse row of a Verdol-card (this term intended as above), and to the number of the operator's fingers apart from the thumbs. This actuation is ensured by a carriage bearing a striking device which covers a transverse row of eight hooks, the said carriage being movable from each row to the next one in succession under the operator's control. When the pattern drawing is formed of parts which are repeated on the width of the fabric, the machine is preferably provided with a plurality of striking devices disposed at equal distances on the above-mentioned carriage in such a manner that operation of one of them is automatically repeated by the others. The operator thus only reads in one part of the design and the cards are automatically perforated for all.

Actuation of the hooks is effected by means of eight keys which do not preferably ensure direct actuation, the latter being effected mechanically under control of an additional key actuated by one of the operator's thumbs. This arrangement permits the operator to verify the reading before perforation and also to repeat this reading for one or several rows of eight hooks, when this is rendered possible by the regularity of the weave for the color under consideration. For this latter purpose my improved machine preferably comprises a repeating key, also actuated by a thumb and adapted to ensure automatic repetition of the reading for a next row of eight hooks.

The keys are preferably disposed separately of the paper perforating mechanism proper and they are carried by a carriage adapted to be moved manually before a reading board on which the design is fixed. They are connected to the said mechanism by electric wires adapted for electromagnetic control of operation. The operator may thus follow the drawing by successive rows without having to pay attention to the setting device which acts automatically. He thus reads in eight points corresponding to the eight keys which he depresses (or not) by means of his eight fingers resting thereon. He then transfers the reading to the hooks, repeating if necessary. When all the hooks have thus been positioned he effects perforation of the card by setting into motion the driving gear of the perforating device.

In the annexed drawings:

Fig. 1 is a longitudinal vertical section of the

Verdol punching (or repeating) device forming part of my machine.

Fig. 2 is a fragmental enlarged transverse section thereof taken along line II—II of Fig. 1.

Fig. 3 is an elevation of this device with section taken along line III—III of Fig. 1.

Fig. 4 is a very diagrammatical perspective view of my machine showing some of the main parts thereof and illustrating their mutual relation and cooperation.

Fig. 5 is a front view showing the adjustable board whereon the design is fixed.

Fig. 6 is a diagrammatical view of the carriage advancing gear.

Fig. 7 is a general diagram of the electric circuits.

Fig. 8 diagrammatically shows the arrangement of the key controlling the striking of the intermediate members of the carriage and the advancing gear of the latter.

Fig. 9 is a large scale view illustrating the pattern drawing and the corresponding pointer.

Fig. 10 is a sectional view corresponding to Fig. 9.

As above explained my improved machine comprises a Verdol punching device the feeler needles of which are controlled in a particular manner. Fig. 1 diagrammatically illustrates this device which comprises in a known manner feeler needles 1 supporting pusher rods 2 which actuate punches 3 adapted to perforate the paper 4 resting against a punching matrix 5. Peg wheels 6 provided with pegs and rotated step by step ensure the feed between successive perforating operations. The pusher rods 2 are actuated by a row of bars 7 which move horizontally. The feeler needles 1 are guided in a perforated guide 8 above a perforated table 9 which supports the master paper 10 also fed step by step by peg wheels 11. Table 9 is vertically movable to lower the paper which clears the needles before the feeding step and thereafter is raised to effect selection of the needles.

In the conventional Verdol punching device, the master paper 10 is properly fed and a portion thereof corresponding to a stroke of the Jacquard is brought on table 9, such portion being commonly termed a card though the Verdol type of Jacquard uses a continuous band of paper instead of a succession of separate cards. The table is raised and the needles are freely selected by the paper, only those which meet a perforation in the latter remaining at the lower position, while the other are raised. The pusher rods 2 corresponding to the low needles are actuated by bars 7, while the raised ones escape the latter. The paper 4 is thus perforated in accordance with the master paper 10.

In my improved machine the feeler needles 1 are suspended with a considerable vertical play to vertically movable hooks 12 in such a manner that, when the said hooks are at their lowermost position, needles 1 may still be retained by a plain portion of paper 10 (Fig. 2, second needle from the left) or remain low by passing through a perforation thereof (Fig. 2, first needle from the left), while, when hooks 12 are at their highest position, needles 1 are raised even if paper 10 is perforated (Fig. 2, first and second needles from the right). Under such conditions paper 4 will be perforated in accordance with paper 10 where hooks 12 are lowered, and it will remain quite unperforated where the latter are raised. It follows that raising hooks 12 so to speak hinders the perforation reproducing oper-

ation for all the points of the card when the said hooks are raised.

Fig. 2 shows the detail of hooks 12. They are in the form of thin plates having at their lower end a vertically elongated hole 13 adapted to receive the curved end of the corresponding needle 1. These plates are guided between longitudinal bars 14 on which they are retained by pins 15 passing through a vertically elongated opening 16 which permit the vertical movement required for operation. The upper end of hooks 12 is fork-shaped, one of the fork arms, smaller in length than the other, being provided at its end with a lateral projection 17. The forked ends of hooks 12 are guided between transverse bars 18 with rounded upper edge. Hooks 12 are elastic and when they are pushed downwardly their lateral projection 17 is pressed inwardly by the rounded edge of the corresponding transverse bar 18, whereby the hooks may be lowered and elastically retained at their lower position (Fig. 2).

In accordance with the standard arrangement of the Verdol card each transverse row comprises eight hooks corresponding to the eight holes of a transverse row of the card, and one hundred and sixty eight hooks in a longitudinal row corresponding to the one hundred and sixty eight holes of a longitudinal row of the card.

Hooks 12 are actuated by hammers 19 (Figs. 2, 3 and 4) vertically slidable in blocks 20. Each hammer is formed as a rectangular rod having an elongated lateral notch 19a wherein there is passed a bar 21a transverse to the hammers and having its ends passed through vertically elongated apertures 20a (see Fig. 4) provided in the block 20, such bar being fixed to the ends of a flat U-shaped member 21 embracing block 20 and pivoted thereon at 21b. Bar 21a is retained at a raised position by means which will be described later and it retains hammers 19 at their higher position, while when this bar 21a is lowered hammers 19 are free to move downwardly or not owing to notches 19a. All the blocks 20 are carried by a single carriage 22 which may be displaced along the full length of the rows of hooks 12, as explained below, each block 20 being disposed transversely of carriage 22 and carrying a row of eight hammers 19 adapted to actuate the eight hooks of a transverse row.

Above hammers 19 there are arranged eight longitudinal bars 23 adapted to slide vertically to actuate hammers 19 at whatever longitudinal position the latter may be owing to longitudinal displacement of carriage 22. The upper edge of each bar 23 is notched as at 23a in Figs. 2, 3 and 4 and above the said bars there is disposed an inverted U-shaped movable frame 24 provided with downward transverse projections 25. Frame 24 is vertically guided in the machine frame and it is in one with upward extensions 26 each provided with a lateral finger 26a (Fig. 3) engaging a cam groove 27a formed in a disc 27 mounted on a common longitudinal shaft 28 passed through vertically elongated openings 26b (Fig. 1) of extensions 23 so that when the said shaft is rotated frame 24 is vertically reciprocated.

Bars 23 are slidably guided in the fixed frame or casing of the machine, as indicated in Fig. 3 and their lower edge is notched as shown at 23b. They are also formed with openings 23c through which are passed with considerable vertical and horizontal play transverse rods 24a fixed to frame 24 and movable therewith.

When frame 24 is at its higher position as in Fig. 3, bars 23 are supported by rods 24a and

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they are free to slide from an inactive position to an active position. At the inactive position notches 23a are under projections 25 of frame 24 while notches 23b are not in registration with the sides of the machine frame, as indicated in Fig. 3; under such conditions bars 23 are not struck by projections 25 during the downward stroke of frame 24 and they are retained at their higher position by the machine frame or casing. It will be noted that owing to the vertical play of rods 24a within openings 23c free movement of frame 24 is not hindered. At the active position of bars 23 notches 23a do not register longitudinally with projections 25 of frame 24 while on the contrary notches 23b register with the casing sides; bars 23 are therefore struck by projections 25 and they move downwardly therewith thus actuating hammers 19.

As shown in Figs. 1 and 2 one end of each bar 21a is engaged into a longitudinal groove 24b formed in a side of frame 24, so that as the said frame moves upwardly hammers 19 are returned to their higher position if they have been depressed by bars 23.

Shaft 28 is actuated by a step-by-step clutch of the kind used in presses wherein the crank-shaft only effects a single rotation for each actuation of the shaft, as described later.

Bars 23 are longitudinally controlled against the action of springs 29 by electromagnets 31 through cranked levers 32 and connecting rods 33.

The above described longitudinal bars 14 (Figs. 1 and 2) carrying the pins 15 passed through hooks 12 are not directly secured to the machine frame; these bars 14 are connected to one another to form a vertically movable frame which may be raised by curved fingers 36 (Figs. 1 and 4) carried by a longitudinal shaft 37 provided with a handle 38 by means of which those of hooks 12 which have been depressed by hammers 19 may be returned to their higher position by pins 15.

In Fig. 3 there is shown at the side of the frame 39 of the machine as hitherto described an electric driving motor 40, the drive being ensured through a belt 41 in the manner described later.

On the side of this frame 39 there is arranged another frame 42 (Figs. 4 and 5) carrying a vertically slidable board 43 actuated by means of a handle crank 44 through a horizontal shaft 44a carrying pinions 44b meshing with vertical racks 43a fixed to the said board 43, which latter is adapted to support the drawing 45 of the design or pattern to be drafted. Frame 42 has a horizontal transverse member 46 which slidably supports a carriage 47 carrying a pointer 48 adapted to follow the horizontal lines of the design (corresponding to the successive weft threads). To carriage 47 there is fixed an endless cable 49 passing on two end pulleys 50 one of which is carried by frame 39 where it is rigid with a gear wheel 50a in mesh with an intermediate gear 50b itself in mesh with another gear 50c mounted on a shaft 51a provided with a pinion 51 in engagement with a rack 52 (Fig. 3) fixed to the above-described carriage 22 in such a manner that by displacing pointer 48 along the drawing 45 the operator causes carriage 22 to move within frame 39. Of course this cable connection between frames 39 and 42 requires that they should be firmly positioned with respect to each other, for instance by means of appropriate stays or by being both anchored

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to the floor. It will besides be remarked that pulley 50 could be carried by frame 42 while gear 50a would be carried by frame 39 and connected with pulley 50 by a flexible transmission.

Frame 42 also supports another transverse member 53 slidably carrying a box 54 (Figs. 4 and 5) having eight keys 55 on its rear face and three keys 56, 57, 58 on its front face, this box being connected with the controlling circuits of the machine, as hereinafter described, by means of flexible cables. Frame 42 is also provided with a foot bar 59 adapted to actuate the clutch of the card punching mechanism.

Fig. 6 diagrammatically indicates the indexing means for carriage 22. On the above-described shaft 51a there is disposed a wheel 60 provided with peripheral notches 60a, the position of this wheel being indicated in Fig. 4. Parallel to wheel 60 and at a distance therefrom is a shaft 61 (Fig. 6) which is driven from shaft 28 (Fig. 3) through a pair of helocoidal gears 62. Shaft 61 carries an eccentric 63 and a small plate 64 provided with a pivot 64a to which there is articulated a rod 65 slidably pressed against a stop 66 by a spring 67. Rod 65 has a terminal gudgeon 65a adapted to engage the successive notches of wheel 60. In this manner when shaft 61 rotates in the direction indicated in Fig. 6, gudgeon 65a first leaves the notch 60a in which it was engaged, then moves along an arcuate path over wheel 60 as indicated in dot line, re-engages another notch 60a and returns to its initial position while positively advancing wheel 60. Thus at each rotation of shaft 61 carriage 22 is itself advanced so that hammers 19 come in front of the next transverse row of hooks 12. Wheel 60 is retained in position between successive step-by-step motions by a roller 68a disposed at one end of a cranked lever 68 pivoted on the fixed frame at 68b and urged by a spring 68c. The other end of lever 68 cooperates with the above-described eccentric 63 in such a manner that roller 68a is caused to free wheel 60 during the successive indexing movements thereof and to elastically hold the latter between such movements. An electromagnet 69 with a movable core 69a is provided to swing lever 68 against the action of spring 68c when it is desired to move carriage 22 without being hindered by roller 68a.

At the normal position of shaft 28 (Figs. 3 and 4), i. e. when frame 24 is at its higher position, shaft 61, which rotates at the same speed (gears 62 forming a one to one transmission), is at such a position that gudgeon 65a is fully disengaged from notches 60a. The timing must besides be such that wheel 60 is not advanced until frame 24 has completed its operation, i. e. until hammers 19 are clear of bars 23. It is for this purpose that cam groove 27a (Fig. 3) has its portion nearer to shaft 28 concentric to same over a relatively great angle, in such a manner that the said shaft may rotate through the said angle while frame 24 remains "high" to ensure the indexing motion of carriage 22 and the subsequent disengagement of gudgeon 65a from wheel 60.

The above-described devices are controlled in the following manner:

Belt 41 (Fig. 5) drives a loose pulley 72 (Fig. 3) on the shaft of the paper punching mechanism and there is provided on the said shaft a step-by-step clutch of the kind used in metal cutting presses to connect the press shaft with the flywheel for only one rotation. The con-

struction of such a clutch is well-known in the art and it has not been illustrated in the annexed drawings for the sake of clearness. This clutch is controlled by foot bar 59 through a cable and sheath transmission 59a (see Figs. 3, 4 and 5). Pulley 72 is connected by means of a chain 74 (Fig. 3) with a clutch 75 mounted on the outer end of shaft 28. This clutch is also of the step-by-step type which automatically disengages after one rotation of the driven shaft and it is controlled by the above-mentioned electromagnet 29 which is energized through a switch operated by key 56 of box 54 (see Fig. 7). This switch is so arranged that when key 56 is depressed, it only gives a short emission of current. In the arrangement diagrammatically illustrated in Fig. 8 this is obtained by providing key 56 (which is pivoted at 56a) with a tail portion 56b articulated at 56c and acted upon by a light spring 56d which maintains in contact two abutments 56e and 56f respectively provided on key 56 and on tail portion 56a. The latter operates a wedge-shaped projection or cam 77a fixed to a flexible contact 77. When key 56 is depressed, portion 56b presses contact 77 against its cooperating contact 77b and it then escapes projection 77a. During the return stroke, portion 56b is swung about its pivot 56c against the action of spring 56d and contact 77 is not operated. With such an arrangement, or with any other equivalent device, depression of key 56 only causes one single rotation of shaft 28.

Electromagnet 29 is also energizable by means of key 58 (Fig. 7), but the latter holds its cooperating switch at the closed position, thus causing uninterrupted rotation of shaft 28. When this key is released, shaft 28 completes its last rotation and then stops.

The electromagnet 69 which actuates lever 68 (Fig. 6) is energized by a contact switch actuated by key 57.

The eight electromagnets 31 actuating bars 23 are energized by means of eight contact switches respectively actuated by the eight keys 55 (Fig. 7).

It must be noted that blocks 20 are easily adjustable in position longitudinally of carriage 22. For instance, as indicated in Figs. 1 and 4, they are provided with lateral pins 20b engaged into holes 22a provided in the longitudinal members of carriage 22; they are guided by U-shaped portions 20c engaging corresponding U-shaped portions 22b of carriage 22; and they are locked in transverse position by a longitudinal rod 22c, in such a manner, the said blocks may be quickly and easily disposed on carriage 22 at any appropriate position, as explained below.

The operation is as follows:

It will be hereinafter supposed that the design is in two colours, blue and red for the sake of simplicity. The first operation to be effected is to prepare the weave cards. These cards are arranged in the form of three paper sleeves, viz.:

A first sleeve which combines two weaves for the red.

A second sleeve combining two weaves for the blue, and

A third sleeve combining two weaves for the background.

Fig. 9 shows the drawing of the design as it appears on the board 43, each small square representing a point of the design respectively white for the background, blue and red for the coloured zones. To simplify matters it will be supposed that the drawing extends across the full width

of the fabric without any repetition. The usual case wherein the design is repeated will be explained afterwards.

The operator first depresses key 57 to free carriage 22 which he returns to its left position by operating pointer 48 connected therewith by cable 49, pulley 50, gears 50a, 50b, 50c, shaft 51a, pinion 51 and rack 52. For convenient actuation, the said pointer 48 is preferably arranged as indicated in Figs. 9 and 10 with an operating handle 48a. The design 45 is then fixed on board 43 raised at its highest position, in such a manner that pointer 48 is exactly midway of the first series of eight small squares in the lower horizontal row, as indicated in Fig. 9. In order to facilitate operation, the design is preferably divided by heavy lines 45a into larger squares having a side eight times the side of the small squares.

A single block 20 is then placed at the left end of carriage 22. The paper band to be punched is put on wheels 6 and on wheel 11 there is disposed a master sleeve 10 corresponding to the successive shuttles in the background.

The operator then places both hands on box 54, his thumbs resting on keys 56 and 58 while his eight other fingers are disposed on keys 55. He reads the background for the eight squares indicated by pointer 48, each key 55 corresponding to a square; for this purpose, he depresses a key when the square corresponds to the background and he leaves the key unactuated when the square corresponds to a blue or red point. It will be readily seen that in the case illustrated in Fig. 9 he will depress keys Nos. 2, 3, 6 and 8 corresponding to the white squares while keys Nos. 1, 4 and 5 which correspond to coloured squares will remain unactuated. For each key 55 thus depressed a bar 23 is displaced under the action of the corresponding electromagnet 31.

The operator then depresses key 56 which, as above explained, causes one rotation of shafts 28 and 61 (Fig. 3). Frame 24 strikes bars 23 and causes those of said bars which have been displaced by electromagnet 31 to sink, thus causing depression of the corresponding hooks 12 (Fig. 4) in the first transverse row of hooks. Shaft 64 thereafter causes wheel 60 to advance carriage 22 from the first row of hooks to the next one, pointer 48 being simultaneously advanced along transverse member 46 so that it comes midway of the next series of eight squares in the lower horizontal row of squares, as indicated in dotted lines in Fig. 9.

The operator then reads the next series of squares. In the example illustrated he will thus depress keys Nos. 2, 3, 4, 5, 6 and 7. Then he will again depress key 56 to actuate the corresponding hooks and to advance carriage 22 and pointer 48, and so on until the end of the lower horizontal row of the design.

When this is effected, hooks 12 will so to speak reproduce the design, all the hooks corresponding to a background point being lowered while those corresponding to blue or red points remain high. Referring now to Fig. 1 and to the explanations above given it will be understood that for all the background points feeler needles 1 may come into contact with the master card to be selected thereby, while for the other points they remain raised.

The operator now actuates foot bar 59 (Fig. 4) which operates the card punching mechanism for one single rotation or stroke. The corre-

sponding card or band 4 is thus punched in correspondence with the master card of sleeve 10, but only for the points corresponding to the background, the other points remaining unperforated. The rotation of pulley 72 also causes feed advance of band 4 and of sleeve 10 which are thus positioned for the next stroke.

The operator then lowers board 43 by actuating handle 44 (Figs. 4 and 5) so as to bring pointer 48 on the second horizontal row of squares; he returns carriage 22 to the left and reads this second row as already effected for the first one, and so on until the uppermost row of squares of the design. The background is thus wholly read in.

For reading the blue part of the design the operator proceeds in the same manner, but he uses as master sleeve the sleeve corresponding to the weaves for the blue shuttle. He thus perforates the cards of band 4 for all the blue points of the design. He proceeds in the same way for the red points. The band will thus be fully perforated. The perforating of band 4 is thus effected in successive stages.

When the design comprises repeated parts, this may occur in two ways.

The design proper may be fully repeated a certain number of times across the width of the fabric. If for instance the design is repeated twice, this means that out of the 168 transverse rows of the Verdol card the 84 first are identical with the 84 others. In such a case the operator disposes two blocks 20 on carriage 22, the first one towards the left and the other one in the middle (at the 85th row of the card). Bars 23 will then act simultaneously on two rows of hooks and the operator will only need to read one half of the width of the drawing.

It will be understood that it may be proceeded in a similar manner when the design is repeated three times or more.

It may also occur that in a given horizontal row two (or more) successive series of eight squares are identical. In such a case the operator only reads the first series and thereafter instead of depressing key 56 he depresses key 58 while holding keys 55. Clutch 75 then remains engaged so long as key 58 is retained at the depressed position and consequently bars 23 strike hammers 19 a number of times, carriage 22 being advanced between each two successive strokes together with pointer 48. When the latter reaches the last series of eight squares comprising the repetition, he leaves key 58 and the striking mechanism stops as soon as it has completed its last rotation.

It will be apparent for anyone skilled in the art that my improved machine may be used in any other particular case, for instance when there is provided a background shuttle, when the shuttles must always return to the same side of the weaving loom (looms with but one multiple shuttle box), when a given shuttle operates with different weaves in the coloured points of the design, when the design is not a coloured design proper, but a pattern design with but one shuttle, etc.

It will also be observed that the machine described may be used for merely reproducing existing cards. In such a case hooks 12 are all brought to their lowered position and the perforating mechanism is operated without previously selecting the said hooks. All the feeler needles are then free to feel the master card and the perforated card is an exact and complete reproduction thereof.

I claim:

1. A machine for the preparation of cards for Jacquards comprising in combination card punching means; means engageable with said card punching means to actuate same; substantially vertical feeler needles adapted to be selected by a master card to cause selective engagement of said last-named means with said card punching means; vertically slidable feeler needle controlling members to which said feeler needles are individually suspended, said controlling members being selectively positionable either to retain said feeler needles spaced from the master card or to leave same free to rest on said card and to be selected thereby, and said feeler needle controlling members being disposed in transverse and in longitudinal rows above said feeler needles; means to elastically retain said feeler needle controlling members at their higher and at their lower position; means to bring all said feeler needle controlling members to their higher position; a carriage movable over said feeler needle controlling members longitudinally of same; vertically slidable intermediate members supported by said carriage, said intermediate members being disposed on said carriage in transverse rows and being adapted to actuate the feeler needle controlling members of corresponding transverse rows of said controlling members below said carriage; means to move said carriage step by step to cause said intermediate members to operatively register with successive transverse rows of said feeler needle controlling means; vertically movable bars extending longitudinally over said carriage, each adapted to actuate one of said vertically slidable intermediate members in each transverse row of said intermediate members on said carriage.

2. In a machine as claimed in claim 1, said vertically movable bars being also longitudinally movable and having notches along their upper edge, and said means to selectively actuate said bars comprising transverse members vertically movable over said bars to act against the unnotched portions of upper edge thereof, said transverse members being however inoperative when they register with the notches of said bars; and means to selectively position said bars longitudinally with respect to said transverse members.

3. In a machine as claimed in claim 1 a board to support a drawing of the design according to which the cards are to be prepared; a pointer transversely movable across the width of said board; and means to connect said pointer with said carriage to cause both to move in unison.

4. A machine for the preparation of cards for Jacquards and the like comprising in combination card punching means; means engageable with said card punching means to actuate same; substantially vertical feeler needles adapted to be selected by a master card to cause selective engagement of said last-named means with said card punching means; vertically slidable feeler needle controlling members to which said feeler needles are individually suspended, said controlling members being selectively positionable either to retain said feeler needles spaced from the master card or to leave same free to rest on said card and to be selected thereby, and said feeler needle controlling members being disposed in transverse and in longitudinal rows above said feeler needles; means to elastically retain said feeler needle controlling members at their higher and at their lower position; means to bring all said

feeler needle controlling members to their higher position; a carriage movable over said feeler needle controlling members longitudinally of same; vertically slidable intermediate members supported by said carriage, said intermediate members being disposed on said carriage in transverse rows and being adapted to actuate the feeler needle controlling members of corresponding transverse rows of said controlling members below said carriage; vertically movable bars extending longitudinally over said carriage, each adapted to actuate one of said vertically slidable members in each transverse row of said intermediate members on said carriage, said bars being also longitudinally movable and having notches along their upper edge; transverse members vertically movable over said bars to act against the unnotched portions of the upper edge thereof, said transverse members being however inoperative when they register with the notches of said bars; means to selectively position said bars longitudinally with respect to said transverse members; and means to actuate said transverse members and to advance said carriage in succession to cause said members to effect a full downward and upward stroke and thereafter to advance said carriage to cause each transverse row of said intermediate members on said carriage to operatively register with the next transverse row of said feeler needle controlling members.

5. In a machine as claimed in claim 4 a board to support a drawing of the design according to which the cards are to be prepared; a pointer transversely movable across the width of said board; and means to connect said pointer with said carriage to cause both to move in unison.

6. In a machine as claimed in claim 4 means

to automatically ensure repeated successive operation of said transverse members and carriage actuating means.

7. A machine for the preparation of cards for Jacquards comprising in combination card punching means; means engageable with said card punching means to actuate same; feeler needles adapted to be selected by a master card to cause selective engagement of said last-named means with said card punching means; feeler needle controlling means individually connected with said feeler needles and selectively positionable either to retain same spaced from the master card, or to leave same free to be selected thereby, said feeler needle controlling means being disposed in transverse and longitudinal rows; means to simultaneously bring all said feeler needle controlling means to the position at which said feeler needles are spaced from the master card; a plurality of vertically reciprocable actuating bars, each extending over a longitudinal row of said feeler needle controlling means, said bars at their lowermost position being vertically spaced from said feeler needle controlling means; and a plurality of intermediate slidable members selectively disposed over the transverse rows of said feeler needle controlling means which are to be actuated to selectively transmit to said controlling means the action of said reciprocable bars.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,732,982	Neville	Oct. 22, 1929