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PATENTED JULY 2, 1907.

F. G. LENTZ.
MACHINE FOR PUNCHING A JACQUARD CARD.
APPLICATION FILED JAN. 2, 1907.

3 SHEETS—SHEET 1.

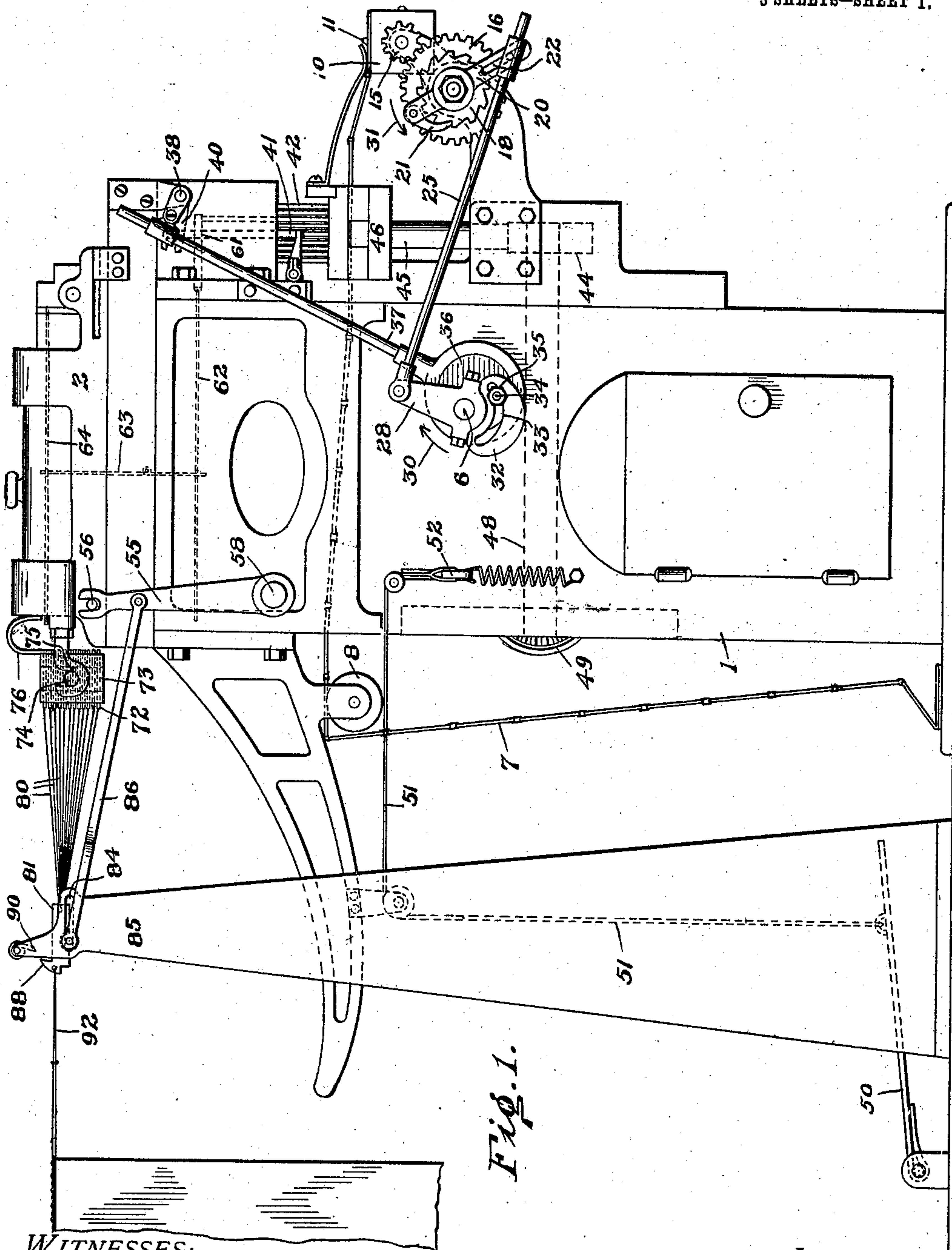


Fig. 1.

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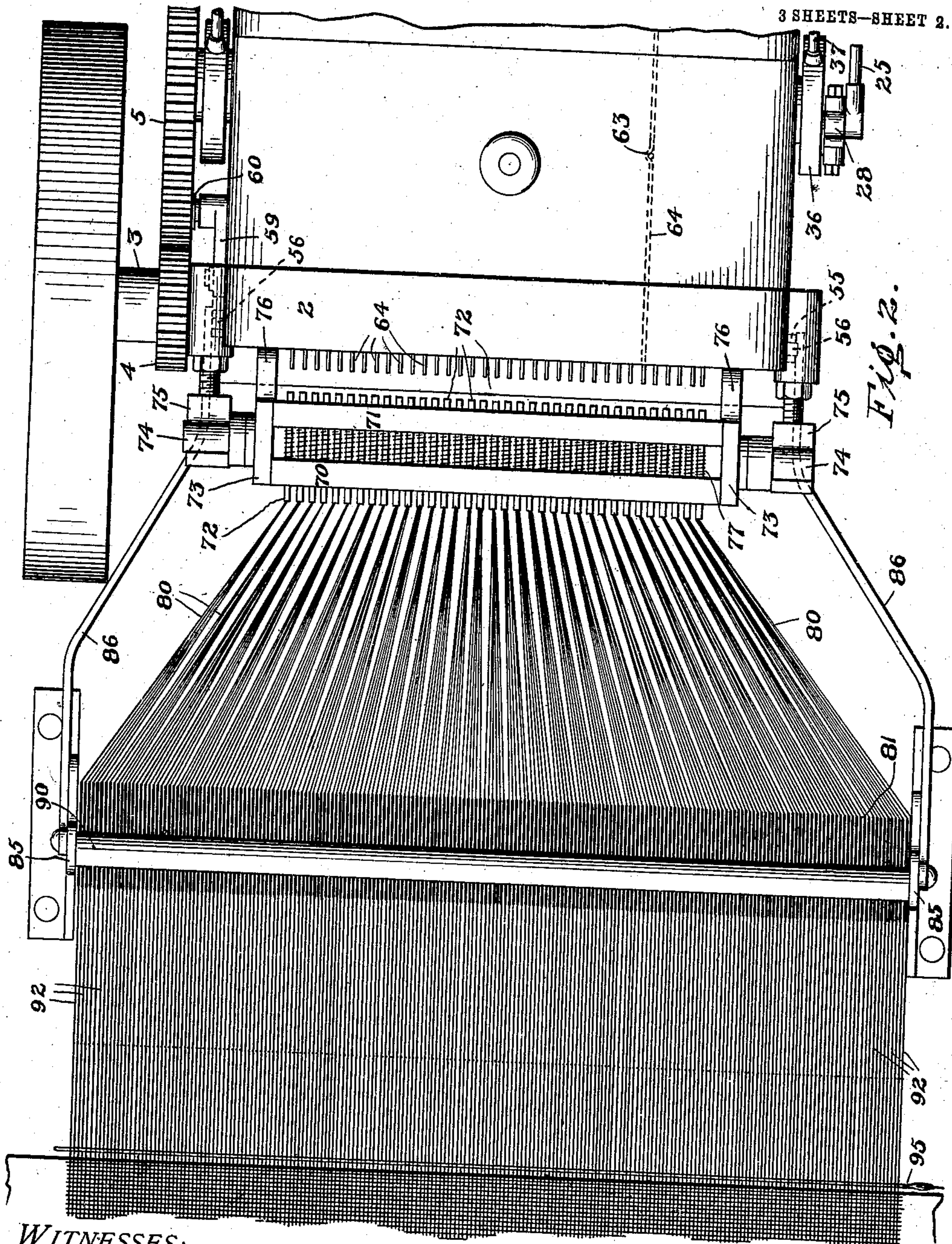
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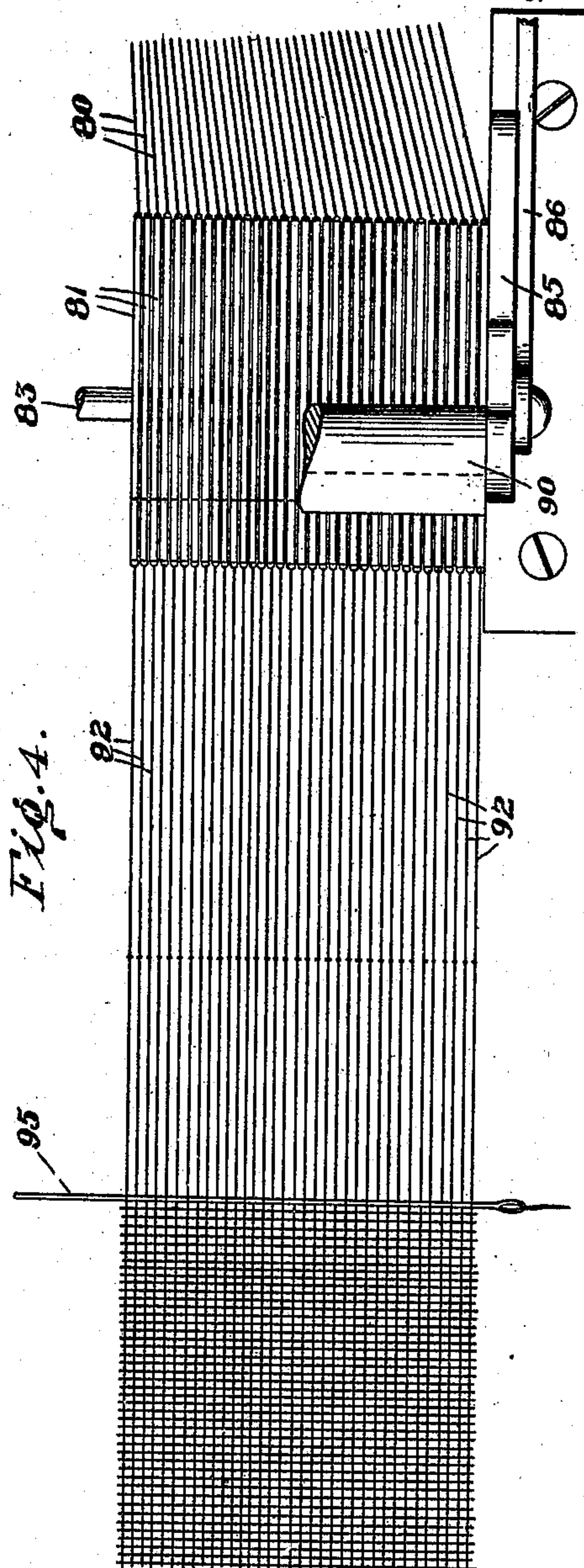
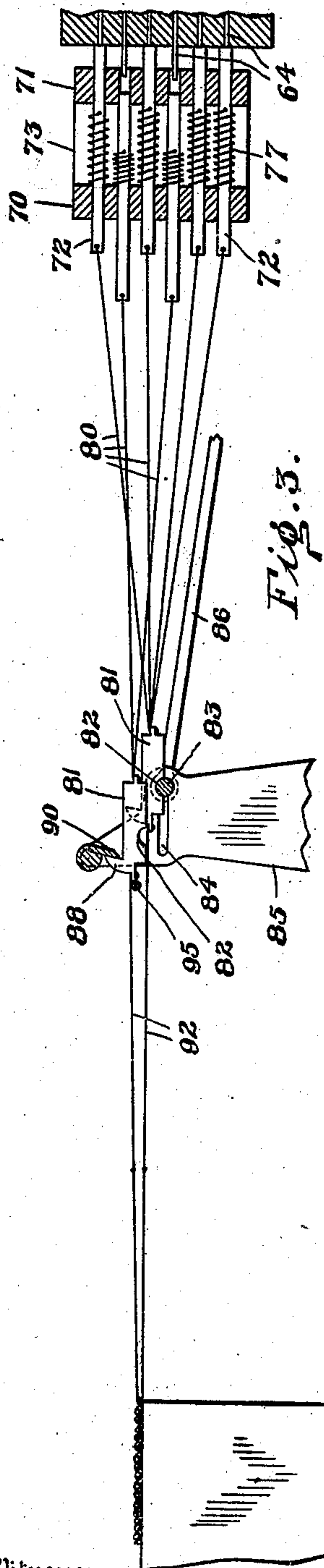
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

FREDERICK G. LENTZ, OF LANGHORNE, PENNSYLVANIA.

MACHINE FOR PUNCHING A JACQUARD-CARD.

No. 858,521.

Specification of Letters Patent.

Patented July 2, 1907.

Application filed January 2, 1907. Serial No. 350,325.

To all whom it may concern:

Be it known that I, FREDERICK G. LENTZ, a citizen of the United States, residing at Langhorne, Bucks county, Pennsylvania, have invented certain new and useful Improvements in Machines for Punching Jacquard-Cards, of which the following is a specification.

My invention relates to an improvement in machines for punching a jacquard card, and its object is to provide a machine of this character with means whereby a card may be punched to reproduce the design of a fabric directly from a previously woven fabric and without the necessity of first producing or making a card by hand.

Heretofore, insofar as I am aware, if a textile manufacturer desired to produce a fabric having or showing the design of a certain fabric as a sample, it was necessary for him to prepare first a drawing or picture of the same, from which a master card or cards would be produced by hand or manually. After the manual production of such card or cards, they could be used in connection with a machine of known construction to occasion the rapid punching or reproduction of other cards.

By the use of my invention, which I propose to attach to machines now known and in use for producing cards for jacquard machines, I am enabled to produce cards without the necessity of first producing a drawing of the design which it is desired to reproduce and afterwards a master card, as stated.

My invention resides in the combination and arrangement of parts as hereinafter described in detail in the specification, set forth and claimed in the claims, and as illustrated in the accompanying drawings forming a part of this specification, and by reference to which my invention may be more readily understood.

Figure 1 is a side elevation of the jacquard punching machine having my invention attached thereto;

Figure 2 is a plan view of a portion of such machine, showing my invention attached thereto;

Figure 3 is a sectional elevation of the attachment embodying my invention; and

Figure 4 is a plan view of a portion of my said invention.

In the drawings,—

1 designates the main frame of my machine, and 2 designates a slidable frame secured upon the main frame 1. 3 designates the driving shaft upon which is mounted the gear wheel 4, which meshes with a gear wheel 5 mounted upon the shaft 6. 7 designates a series of jacquard cards which are adapted to travel through the machine. These cards travel over a roller 8, thence to what may be termed a sprocket bar 10 having lugs at its opposite ends, those at one end only being shown, and which are designated 11 in Figure 1 of the drawings. These projections 11 are adapted to register

with and enter holes at the opposite ends of the respective cards, so that each time that the sprocket bar 10 makes a one quarter revolution, the series of cards are fed forward a distance sufficient to bring a new card into position to be punched.

In order to occasion periodic or step by step revolution of the sprocket bar 10, I have provided a small pinion 15 upon one end of the sprocket bar which engages a gear 16 which is rigidly connected to a ratchet wheel 18, so that the gear wheel and the ratchet are adapted to revolve together.

20 designates a lever mounted upon the pivot or journal of the gear 16 and ratchet 18, which lever is adapted to move independently of the said gear and ratchet. Upon one end of the said lever a dog 21 is mounted, which is adapted to engage the teeth of the ratchet. The other end of the lever is provided with a slot 22 to movably receive a pin connected to one end of the link or rod 25, the other end of which is connected to one end of a lever arm 28 rigidly secured to one end of the shaft 6. The lever 28 rotates with the countershaft 6 in the direction indicated by the arrow 30 in Figure 1 and by reason of the pin and slot connection between the rod 25 and the lever 20, periodic movement of the ratchet 18 and gear 16 in the direction indicated by the arrow 31 is occasioned. Such movement of the gear 16 occasions step by step revolution of the gear 15 in the opposite direction, whereby the jacquard cards are fed through the machine step by step. 32 designates a fan-shaped projection or extension of the lever 28 which is provided with a concentric slot 33 through which a pin 34 projects. The lever 28 may be adjusted to different positions and clamped by means of a nut 35.

36 designates an eccentric upon the countershaft 6 and 37 designates an eccentric rod which is connected to the arm of a rock bar or shaft 38, on which are supported slotted arms, one of which is indicated by dotted lines at 40, which slotted arms are adapted to engage centering pins, one of which 41 is shown in Figure 1 of the drawings. The purpose of these pins is to engage the opposite ends of each of the jacquard cards, so as to hold the same in proper position while it is being punched by the punches 42, shown in Figure 1.

The operation of the machine is so timed that immediately after a quarter revolution of the sprocket bar 11, the high portion of the wheel cam 44 is located immediately underneath the standard 45, the top portion of which is connected to what may be termed a punch bar 46. The punch bar is thus raised so as to force or lift the same upwardly to bring the cards into contact with the lower ends of the punches 42, whereby holes corresponding to a certain pattern may be punched in the said cards. The cam wheel 44 is mounted upon a shaft 48 which is driven by a gear mechanism indicated at 49. The machine is started by the depression of a lever

50 which is connected by means of a cord 51 to a lever 52 which controls mechanism (not shown) by means of which the machine may be driven or operated. Movement of the slidable frame 2 is occasioned by means of 5 lever arms 55 which engage at their upper ends pins 56 upon the sides of the said frame. The lever arms 55 are connected to a rock shaft 58 which is rocked by means of a lever 59, one end of which is connected to the said rock shaft 58, and the other of which is provided 10 with a cam roll 60, which is adapted to engage a cam (not shown) in the side of the gear wheel 5 shown in Figure 2.

When the punch bar 46 is moved upwardly, the cards come into contact with the lower ends of the punches 15 42, as has been stated, with the result that all of the punches which are at such time held against upward movement perforate the cards, while those punches which are permitted to move upwardly, due to their contact with the cards, do not perforate such cards. 20 The operation of the punches is controlled by a series of plugs, one of which is indicated in dotted lines at 61 in Figure 1. It will be noted that this plug is located near the upper end of one of the punches so that upward movement of the punch is prevented, with the result 25 that if the card is moved upwardly against this punch, a hole will be forced through the same.

It will be understood that the punch bar 46 is provided with perforations into which the lower ends of the punches 42 project. Each of the plugs 61 is connected 30 to a bar or needle 62. Each of these bars or needles is connected to the lower end of a pivoted lever 63. The upper end of each of the levers 63 is connected to a bar or needle 64 similar to the bars or needles 62.

It will be understood that there are a large number of 35 these bars or needles 62 and 64 and that a movement of any one of the bars or needles 64 in one direction occasions a movement of a corresponding bar or needle 62 in the opposite direction. A movement, for instance, of the bar or needle indicated in dotted lines at 64 in 40 Figure 1 to the right would occasion a movement of the bar or needle indicated by dotted lines at 62 in the same figure, to the left, so as to withdraw the plug 61 from its position over the upper end of the punch shown in part in dotted lines in Figure 1, in which case such 45 punch would be permitted to move upwardly so as not to occasion the perforation of the cards. The bars or needles 64 are mounted in a stationary frame which, however, is not shown.

70 and 71 designate the side members of a frame in 50 which a series of plugs 72 is mounted, which plugs extend transversely of the members 70 and 71, as indicated. 73 designates end pieces connected to the side members 70 and 71 of the frame and 74 designates journals connected to the end pieces 73 and which rest in 55 bearings 75 at the opposite sides of the machine, such bearings being supported upon arms which extend forwardly from the frame 2.

76 designates U-shaped springs which are secured to the frame 2, and which bear against one side of the 60 frame which supports the plugs 72, so as to prevent the same from rotating in its bearings 75. Each of the plugs 72 is located or positioned in alinement with a bar or needle 64. 77 designates coiled springs which are connected respectively to plugs 72 and coil around the 65 same, as indicated very clearly in Figures 2 and 3.

The purpose of these springs is to hold the plugs normally in the position indicated in Figure 2 of the drawings, with both ends projecting beyond the sides of the frame.

The plugs 72 are connected by means of harness 70 threads 80 to what I term harness plates 81, which are arranged side by side and very close together, as indicated in Figure 2, of the drawings. These plates are provided upon their lower edges with semi-circular notches, as indicated at 82 in Figure 3 of the drawings, 75 and said plates rest upon a rod 83, which rod fits in the said notches. The rod 83 is supported at its opposite ends in horizontal slots 84 in supports 85. As illustrated, these supports extend up from the floor, but it will be understood that they may be supported in any 80 other suitable manner, as, for instance, upon the frame of the machine.

The rod 83 is adapted to be moved back and forth in the slots 84 by means of connecting links 86, which are connected to the rocking levers 55. 88 designates hooks upon the outer or front ends of the harness plates 81, which are adapted to engage with a stop plate or bar 90 supported at its opposite ends in any suitable manner and in proper relation to the harness plates 81 to be engaged thereby when such plates are elevated. As illus- 90 trated in the accompanying drawings, said stop plate or bar is supported upon the upper ends of the supports 85.

92 designates harness threads which are connected to the outer or front ends of the harness plates 81, which 95 harness threads are adapted to be connected to the inner ends of the warp threads of a fabric, the design of which it is desired to reproduce.

Broadly considered, the idea of my invention is that each of the weft threads or fillers shall be moved singly 100 bodily rearwardly to a point directly in front of the ends of the harness plates 81, after which, such weft thread as has been so moved is lifted up so as to raise or elevate all of the harness plates which are connected to warp threads which are located above such weft thread. 105

In practice, it is found desirable, however, to attach a needle or wire to the weft thread and draw such needle or wire through the fabric to take the place of the weft thread, for the reason that it may happen that the weft thread would not always be of sufficient 110 strength to insure the raising of the harness plates 81 connected to threads occupying a position above the weft thread. A portion of such wire or needle is shown at 95 in Figure 2 and in section or end view in Figure 3. When such wire or weft thread, as the case 115 may be, is lifted, as indicated in Figure 3, certain of the harness plates are elevated, so as to bring the hooks 88 into engagement with the stop bar or member 90. Immediately after these harness plates have been raised, as indicated, the starting lever 50 is depressed, 120 so that the operation of the machine may begin, the result being that the cards are moved forward a step in the machine for each cycle or revolution of the parts, and at the same time the shaft 58 is rocked so that a complete oscillation of the frame 2 is occasioned, the 125 oscillation of such frame being occasioned by the lever arms 55. All the harness plates 81 which are in engagement with the stop bar or member 90 are held stationary, while those which remain in engagement with the rod 83 are oscillated or moved in unison with 130

the frame 2, as also are the plugs to which they are connected.

These plugs, which are connected by means of harness threads to the harness plates which remain in engagement with the rod 83, move rearwardly, while those which are connected with the harness plates which have been moved into engagement with the stop plate or member 90 are held in their original position, the result being that there is relative movement between such plugs and the frame, so as to compress the coiled springs surrounding such plugs. This is indicated in Figure 3 of the drawings.

All of the plugs which move rearwardly with the frame 2 and the plug frame connected thereto engage the forward ends of the bars or needles 64 which are in alinement therewith, so as to push the same rearwardly, as indicated in Figure 3 of the drawings. The movement of these rods or needles rearwardly occasions pivotal movement of the levers 63 connected to them and a consequent forward movement of the corresponding bars or needles 62, and the punch controlling plugs 61, which are connected to the latter bars or needles.

It will thus be seen that those of the plugs 61 which are not moved forward to a position out of alinement with the punches 42 are those which correspond to the harness plates 81, which are in engagement with the stop bar or plate 90, and which plates have been raised into their position of engagement with such stop plate or member by means of those of the warp threads which occupy a position above the weft thread or wire which has been moved forward and elevated, as described.

In this manner, I am enabled to punch the cards so that when employed in the weaving of a fabric they will occasion the reproduction of the design of the fabric which it is sought to reproduce, it being only necessary to employ the different colored threads which are necessary to the production of such design.

Having thus described my invention, I claim:—

1. In a machine of the character described, the combination of means for perforating a card and means for controlling the operation of said perforating means, the said controlling means comprising a plurality of movable devices, a plurality of movable devices respectively connected to the first-named devices, the second named devices being also respectively connected to the warp threads of a fabric, means for holding any selected number of the second named devices against movement in one direction, whereby relative movement between the

first-named devices may be occasioned, and the said selected number of the said second-named devices being adapted to be moved into engagement with the said holding means by a weft thread.

2. In a machine of the character described, the combination of means for perforating a card, and means for controlling the said perforating means, the said means comprising a movable frame, a series of plugs supported upon said frame, a series of harness plates supported forwardly of the said plugs, each of which plates is connected to a plug, means for occasioning movement of the said movable frame and the said harness plates, and means for holding certain of the said plates and their connected plugs against movement.

3. In a machine of the character described, means for perforating a card for jacquard machines, and means for controlling the said perforating means, the said controlling means comprising a movable frame, a series of relatively movable devices supported upon the said movable frame, a series of devices connected respectively to the said movable devices, and means adapted to be engaged by the said second named devices to hold the same and their connected movable devices against movement when the movable frame is moved.

4. In a machine of the character described, the combination of means for perforating a card for jacquard machines with means for controlling the said perforating means, the controlling means comprising two series of movable needles, pivoted levers, each of which is connected at one end to a needle in one series and at its opposite end to a needle in the other series, plugs located above the perforating means and connected to the needles of one of the said series, a movable frame, a series of plugs supported upon the said frame, each plug being in alinement with a needle of the other series of needles, means for occasioning movement of the said frame and the said plugs to bring the latter into contact with the needles to occasion movement thereof, a series of devices connected respectively to the said last mentioned plugs, and means adapted to be engaged by the said devices to hold the same and their connected plugs against movement.

5. A machine for producing a card for jacquard machines directly from a fabric disclosing a certain design, comprising means for perforating said card, and means for controlling the operation of the said perforating means, said controlling means comprising devices, each of which is movable in a plurality of directions, the movement in one direction being occasioned by the lateral movement of a weft thread.

In testimony that I claim the foregoing as my invention, I have hereunto signed my name this 26th day of November A. D. 1906.

FREDERICK G. LENTZ.

In the presence of—

HARRY F. AMBLER,
LAURA KLEINFELDER.