

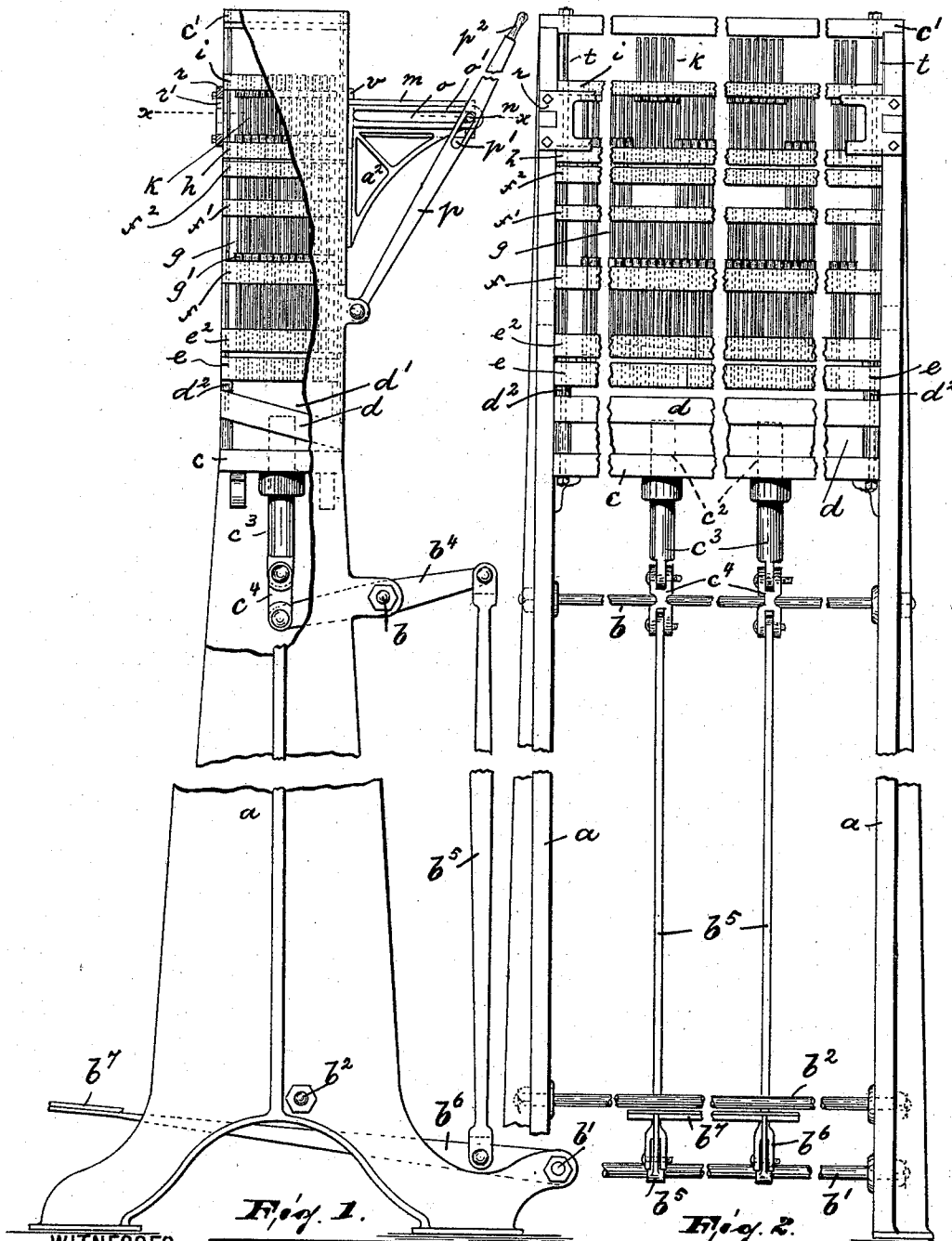
(No Model.)

2 Sheets—Sheet 1.

J. SHAW.
CARD PUNCHING MACHINE.

No. 585,634.

Patented June 29, 1897.



WITNESSES:

Wm. D. Bell.
Duncan W. Robertson

INVENTOR:

James Shaw

BY Partners & Co. ATTY'S.

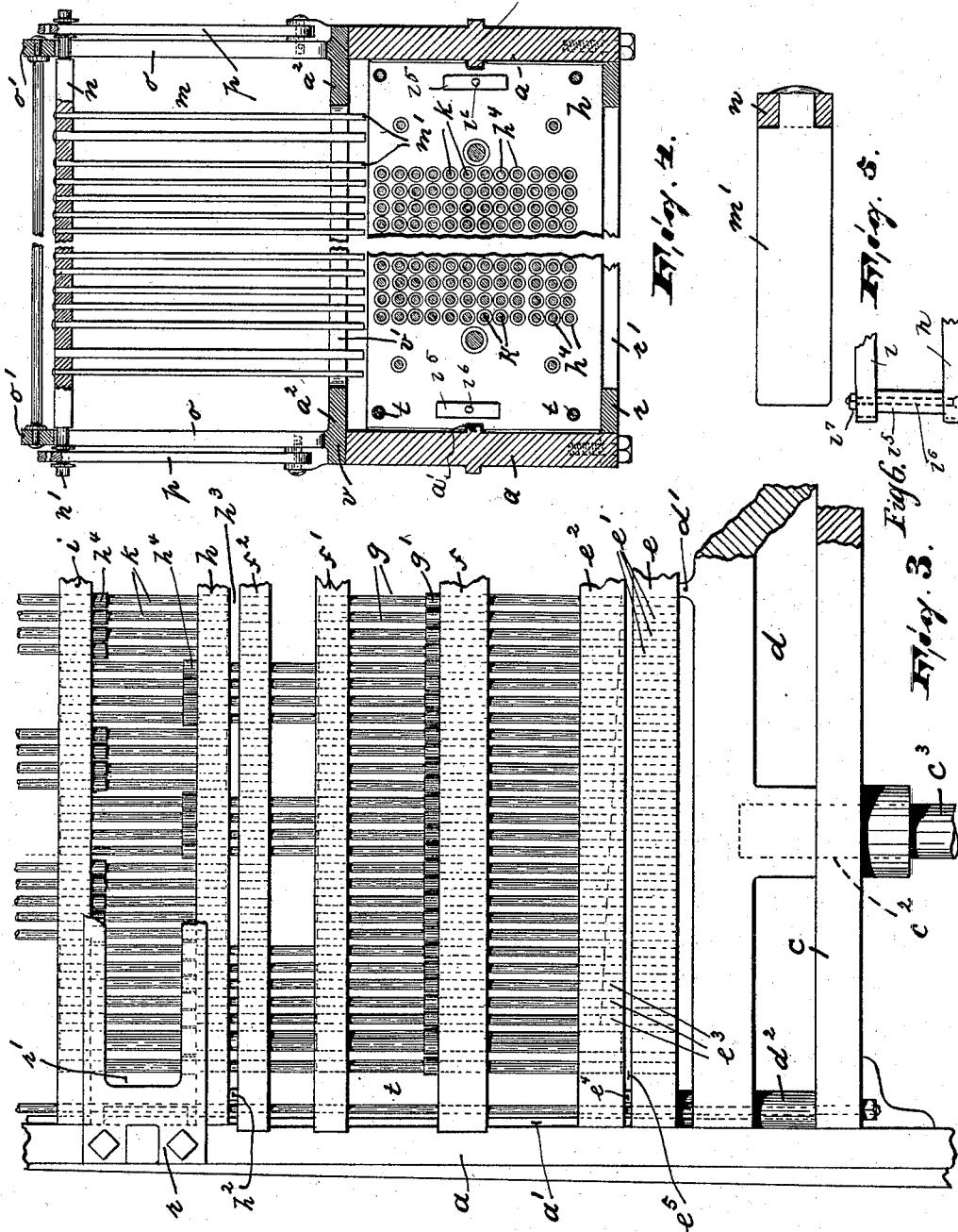
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UNITED STATES PATENT OFFICE.

JAMES SHAW, OF PATERSON, NEW JERSEY, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE TAYLOR, SHAW & COCKER, OF SAME PLACE.

CARD-PUNCHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 585,634, dated June 29, 1897.

Application filed December 31, 1896. Serial No. 617,545. (No model.)

To all whom it may concern:

Be it known that I, JAMES SHAW, a citizen of the United States, residing in Paterson, county of Passaic, and State of New Jersey, have invented certain new and useful Improvements in Card-Punching Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The object of this invention is to provide a card-punching machine strong and durable in construction, reliable in operation, and which will greatly facilitate the duplicating of pattern-cards, especially such as are used in Jacquard machines.

The invention consists in the improved card-punching machine, in the punch operating and controlling mechanism, and in the combination and arrangement of the various parts thereof, substantially as will be hereinafter more fully described, and finally embodied in the clauses of the claim.

Referring to the accompanying drawings, in which like letters of reference indicate corresponding parts in each of the several views, Figure 1 is a side elevation of my improved card-punching machine, certain portions of the frame being removed to better illustrate the nature of this invention; Fig. 2, a front elevation of Fig. 1, with certain portions broken away; Fig. 3, an enlarged detail view of the left-hand top portion of Fig. 2, more clearly illustrating the relative position of certain punches, needles, guides, and plates, all necessary for the perfect and uniform operation of the machine; Fig. 4, an enlarged horizontal sectional view on line $x x$ of Fig. 1; Fig. 5, a detail view of one of a series of bars or blades of a grid or knife shown in Figs. 1 and 4; and Fig. 6, a detail view illustrating the means for connecting certain movable guide-plates, as hereinafter described.

In said drawings, $a a$ represent the vertical sides of the frame of my improved card-punching machine, securely held in position by the horizontally-arranged rods and plates $b b' b^2$

and $c c'$, respectively. The plate c is perforated by the openings c^2 , through which pass the vertically-arranged rods c^3 , having their upper ends securely embedded in a thrust-block d , resting, when in normal position, upon the upper surface of plate c .

Pivotally connected to the lower ends of rods c^3 , through the intermediate links c^4 , are the substantially horizontal levers b^4 , fulcrumed at or near their centers on the rod b , while depending from their outer ends and pivotally attached thereto are the connecting-rods b^5 , secured at their lower extremities to the treadle-levers b^6 , each having one end fulcrumed on the rod b' , while their other ends project forward and carry the foot-board b^7 , all as clearly shown in Figs. 1 and 2 of the drawings.

From the corners of the sloping upper surface of the thrust-block d project the studs d^2 , while a transverse rib d' rises from the center thereof. Said studs d^2 and rib d' are of such a height that their surfaces are in the same horizontal plane and support the horizontal die-plate e , vertically traversed by numerous perforations e' . (See Fig. 3.) Said plate e is arranged loosely between the sides $a a$ of the machine and is provided in its ends with suitable notches adapted to engage vertical guide-rails $a' a'$, arranged upon the inner surfaces of sides $a a$ and at or near the centers of the same. Parallel with and over said plate e is arranged a guide-plate e^2 , similar to the plate e and provided with perforations e^3 , corresponding with those (e') of plate e . Said plates $e e^2$ are held a certain distance apart by suitable blocks e^4 , thus forming a space e^5 between said plates adapted to receive the cards to be punched, as hereinafter described.

Securely mounted in suitable recesses in the sides $a a$ are the stationary horizontal plates $f f' f^2$, provided with perforations, which perforations are in vertical alinement with those of the plates $e e^2$. In the perforations of the stationary plates f and f' are slidably arranged the punches g , provided with collars g' , which latter are adapted to rest upon the upper surface of the plate f and to thus retain the said punches in their normal position. The lower ends of said punches

penetrate the perforations e^3 of the guide-plate e^2 , which prevents the punches from "spreading" when brought into operation during the working of the machine. It will be noticed that said punches g are of various lengths, causing the planes formed by their lower extremities to slope slightly upward from the center line of punches. By this arrangement a shearing cut is imparted to the punches, and by thus avoiding a sudden thrust from all of the punches at precisely the same time the strain on the machine and the power required to make a "cut" are greatly reduced. The top portions of the punches penetrate the perforations of the plate f^1 and almost reach the upper surface of the same.

Above the stationary plate f^2 are the movable guide-plates h and i , provided with perforations similar in number and position to those of the other plates e e^2 , &c. Said plates h and i are held a certain distance apart by blocks i^5 , arranged at or near each end of and between the said plates and firmly secured thereto by means of the bolts i^6 and nuts i^7 , as clearly shown in Fig. 6. The plates h and i are adapted to slide upon the vertical guide-rails $a' a'$, their downward movement being limited by stops h^2 , arranged upon the upper surface of the stationary plate f^2 , thus forming a space h^3 between the lower surface of plate h and the upper surface of plate f^2 , as will be manifest.

Loosely arranged in the perforations of the plates h and i are the needles k , corresponding in number to the punches g and of such length that their lower extremities will rest upon and bear against the upper extremities of the punches g when in operative position. Said needles are provided at or near their centers with collars h^4 for the purpose of limiting them in their downward or upward movements and holding them in their operative and inoperative positions, as required.

Securely attached to the rear edges of the sides $a a$ is a bracket a^2 , consisting of a transverse plate v , horizontally slotted, as at v' , and adapted to receive and sustain the free ends of the bars or blades m' of a grid or knife m . The other ends of said bars or blade m' penetrate and are securely riveted in a movable transverse bar n , arranged parallel with the plate v and having its ends n' cylindrical shaped, so that they may reciprocate freely in the elongated slots o , arranged in the horizontally-projecting arms o' of bracket a^2 . The cylindrical portions n' of bar n , after passing through the elongated slots o of arms o' , penetrate the elongated slots p' of levers p , fulcrumed at their lower ends to the sides a of the frame, while their upper ends are fashioned into suitable handles p^2 , as clearly shown in Fig. 1.

To the front edges of the sides $a a$ and directly opposite the plate v of bracket a^2 is arranged a horizontal plate r , provided with a horizontal elongated slot r' , similar to the slot v , and adapted to engage the free ends

of the bars or blades m' , when they have been pushed forward by the action of lever p upon bar n in the operation of the machine. In being pushed forward said bars or blades m' pass between the needles k , and their upper and lower edges engage the collars of the raised and lowered needles, respectively, and hold said needles securely in position during the process of punching. The vertical rods $t t$ securely brace the plates c and c' together and pass through the thrust-block and intermediate plates, as clearly shown in the drawings.

In operation, when a card is to be punched from a given design the design-card, after the plates h and i , carrying the needles k , have been raised (by hand) and the space h^3 thus being widened and cleared from the said needles, is placed on the top surface of the stationary plate f^2 . The plates h and i are allowed to return to their normal position, whereby certain needles will pass through the openings in the design-card and rest on the upper ends of their respective punches, the collars of said needles resting on the upper surface of the plate h . The remaining needles will rest on the unperforated spaces of the design-card, and their collars will bear against the under side of the plate i . The grid m is then slid forward by means of the lever p until the forward ends of the bars m' of said grid engage the elongated slot r' of the front plate r . The upper and lower edges of said bars m' will respectively bear against the under and upper surfaces of the raised and lowered collars h^4 of the needles k . After the card to be punched is placed in the space e^5 , formed between the plates e and e^2 , the foot-board b^7 is depressed whereby the thrust-block d is forced upward. The said thrust-block carries with it the die-plate e , supporting the card to be punched, and forces said card against and over the lower ends of those punches g which are engaged and held in normal position by the needles k —that is to say, those needles which have penetrated the perforation of the design-card. The remaining punches, during the said upward movement of the die-plate e , rest upon the surface of the card, and as they are not in engagement with their respective needles are moved upward and do not penetrate the card. When the card is punched, the foot-board is released, allowing the die-plate to return to its normal position, and the machine is again ready for a renewed operation.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a card-punching machine, the combination with the frame, of a vertically-movable die-plate in said frame, a series of stationary plates above said die-plate and parallel thereto, a series of vertically-movable punches carried by said series of plates, two plates—connected together—arranged above the said series of plates and parallel thereto and verti-

cally movable in the frame, a series of independently-movable needles penetrating said two plates and in alinement with the series of punches, means for retaining said needles in their raised and lowered position respectively, and means for operating the die-plate, all said parts, substantially as and for the purposes described.

2. In a card-punching machine, the combination with the frame, of a vertically-movable die-plate in said frame, a series of stationary plates above said die-plate and parallel thereto, a series of vertically-movable punches carried by said series of stationary plates, two plates—connected together—arranged above the said series of plates and parallel thereto and vertically movable in said frame, a series of independently-movable needles penetrating said two plates and in alinement with the series of punches, a collar at about the center of each of said needles and adapted to bear respectively against the upper or lower one of said two plates, a series of horizontally-movable blades carried by said frame and adapted to engage between said series of needles and its collars respectively, and means for operating the die-plates, all said parts, substantially as and for the purposes described.

3. In a card-punching machine, the combination with the frame, of a vertically-movable die-plate in said frame, a series of stationary plates above said die-plate and parallel thereto, a series of vertically-movable punches carried by said series of plates, two plates—connected together—arranged above the said series of plates and parallel thereto and vertically movable in the frame, a series of independently-movable needles penetrating said two plates and in alinement with the series of punches, means for retaining said needles in their raised and lowered position respectively, a thrust-block supporting the die-plate and vertically movable in the frame, a series of vertical rods connected with said thrust-block, a series of fulcrumed levers connected by intermediate links with the said rods, and means for operating said fulcrumed levers, all said parts, substantially as and for the purposes described.

4. In a card-punching machine, the combination with the frame, of a vertically-movable die-plate in said frame, a series of stationary plates above said die-plate and parallel thereto, a series of vertically-movable punches carried by said series of stationary plates, two plates—connected together—arranged above the said series of plates and parallel thereto and vertically movable in said frame, a series of independently-movable needles penetrating said two plates and in alinement with the series of punches, a collar at about the center of each of said needles and adapted to bear respectively against the upper or lower one of said two plates, a series of horizontally-movable blades carried by said frame and adapted to engage between said series of

needles and its collars respectively, a thrust-block supporting the die-plate and vertically movable in the frame, a series of vertical rods connected with said thrust-block, a series of fulcrumed levers connected by intermediate links with the said rods, and means for operating said fulcrumed levers, all said parts, substantially as and for the purposes described.

5. In a card-punching machine, the combination with the frame, of a series of punches carried by plates arranged in said frame, a series of needles in alinement with said punches and carried by a series of vertically-reciprocating guide-plates, said needles being adapted to engage the said punches, and means for locking said needles in and out of engagement with the said punches, substantially as and for the purposes described.

6. In a card-punching machine, the combination with the frame, of a horizontal thrust-block vertically movable in said frame and having its upper surface inclined and provided in its central portion with a transverse rib, a horizontally-arranged die-plate supported by said thrust-block and its rib respectively, a perforated guide-plate above said die-plate and separated therefrom, also arranged in said frame and adapted in connection with the said die-plate to be operated by the thrust-block, a series of stationary plates above said guide-plate and parallel thereto, a series of vertically-movable punches carried by said series of plates and engaging the perforations of the guide-plate, two plates—connected together—arranged above the said series of plates and parallel thereto and vertically movable in the frame, a series of independently-movable needles penetrating the said two plates and in alinement with the series of punches, means for retaining said needles in their raised and lowered position, and means for operating the thrust-block, all said parts, substantially as and for the purposes described.

7. In a card-punching machine, the combination with the frame, of a horizontal thrust-block vertically movable in said frame and having its upper surface inclined and provided in its central portion with a transverse rib, a horizontally-arranged die-plate supported by said thrust-block and its rib respectively, a perforated guide-plate above said die-plate and separated therefrom, also arranged in said frame and adapted in connection with the said die-plate—to be operated by the thrust-block, a series of stationary plates above said guide-plate and parallel thereto, a series of vertically-movable punches carried by said series of plates and engaging the perforations of the guide-plate, two plates—connected together—arranged above the said series of plates and parallel thereto and vertically movable in the frame, a series of independently-movable needles penetrating the said two plates and in alinement with the series of punches, a collar arranged at about

the center of each of said needles and adapted to bear against the upper or lower one of said two plates, a series of blades—carried by said frame and horizontally movable therein and adapted to engage between said needles and its collars respectively, and means for operating the thrust-block, all said parts, substantially as and for the purposes described.

8. In a card-punching machine, the combination with the frame, of a horizontal thrust-block vertically movable in said frame and having its upper surface inclined and provided in its central portion with a transverse rib, a horizontally-arranged die-plate supported by said thrust-block and its rib respectively, a perforated guide-plate above said die-plate and separated therefrom, also arranged in said frame and adapted in connection with the said die-plate—to be operated by the thrust-block, a series of stationary plates above said guide-plate and parallel thereto, a series of vertically-movable punches carried by said series of plates and engaging the perforations of the guide-plate, two plates—connected together—arranged above the said series of plates and parallel thereto and vertically movable in the frame, a series of independently-movable needles penetrating the said two plates and in alinement with the series of punches, a collar arranged at about the center of each of said needles and adapted to bear against the upper or lower one of said two plates, a series of blades—carried by said frame and horizontally movable therein and adapted to engage between said needles and its collars respectively, a bar connecting the outer ends of said blades, a bracket-frame projecting from one side of the frame and provided at each of its sides with an elongated horizontal slot engaging the ends of said connecting-bar, a fulcrumed lever pivotally connected with said connecting-bar, and means for operating the thrust-block, all said parts, substantially as and for the purposes described.

9. In a card-punching machine, the combination with the frame, of a horizontal thrust-block vertically movable in said frame and having its upper surface inclined and provided in its central portion with a transverse rib, a horizontally-arranged die-plate supported by said thrust-block and its rib respectively, a perforated guide-plate above said die-plate and separated therefrom, also arranged in said frame and adapted in connection with the said die-plate—to be operated by the thrust-block, a series of stationary plates above said guide-plate and parallel thereto, a series of vertically-movable punches carried by said series of plates and engaging the perforations of the guide-plate, two plates—connected together—arranged above the said series of plates and parallel thereto and vertically movable in the frame, a series of independently-movable needles penetrating the said two plates and in alinement with the series of punches, a collar arranged at

about the center of each of said needles and adapted to bear against the upper or lower one of said two plates, a series of blades—carried by said frame and horizontally movable therein and adapted to engage between said needles and its collars respectively, a bar connecting the outer ends of said blades, a bracket-frame projecting from one side of the frame and provided at each of its sides with an elongated horizontal slot engaging the ends of said connecting-bar, a fulcrumed lever pivotally connected with said connecting-bar, a plate arranged at the opposite side of the frame and provided with an elongated horizontal slot, adapted to be engaged by the free ends of the blades, and means for operating the thrust-block, all said parts, substantially as and for the purposes described.

10. In a card-punching machine, the combination with the frame, of a vertically-movable die-plate in said frame, a series of stationary plates above said die-plate and parallel thereto, a series of vertically-movable punches carried by said series of stationary plates, two plates—connected together—arranged above the said series of plates and parallel thereto and vertically movable in said frame, a series of independently-movable needles penetrating said two plates and in alinement with the series of punches, a collar at about the center of each of said needles and adapted to bear respectively against the upper or lower one of said two plates, a series of horizontally-movable blades carried by said frame and adapted to engage between said series of needles and its collars respectively, a bar connecting the outer ends of said blades, a bracket-frame on one side of the frame and provided at each of its sides with an elongated slot engaging and guiding the ends of said connecting-bar, a fulcrumed lever connected with said bar, and means for operating the die-plate, all said parts, substantially as and for the purposes described.

11. In a card-punching machine, the combination with the frame, of a vertically-movable die-plate in said frame, a series of stationary plates above said die-plate and parallel thereto, a series of vertically-movable punches carried by said series of stationary plates, two plates—connected together—arranged above the said series of plates and parallel thereto and vertically movable in said frame, a series of independently-movable needles penetrating said two plates and in alinement with the series of punches, a collar at about the center of each of said needles and adapted to bear respectively against the upper or lower one of said two plates, a series of horizontally-movable blades carried by said frame and adapted to engage between said series of needles and its collars respectively, a bar connecting the outer ends of said blades, a bracket-frame on one side of the frame and provided at each of its sides with an elongated slot engaging and guiding the ends of said connecting-bar, a fulcrumed lever con-

nected with said bar, a plate at the opposite
side of the frame and provided with a hori-
zontal elongated slot adapted to be engaged
by the free ends of the blades, and means for
5 operating the die-plate, all said parts, sub-
stantially as and for the purposes described.

In testimony that I claim the foregoing I

have hereunto set my hand this 21st day of
September, 1896.

JAMES SHAW.

Witnesses:

ALFRED GARTNER,
THOMAS W. COCKER.