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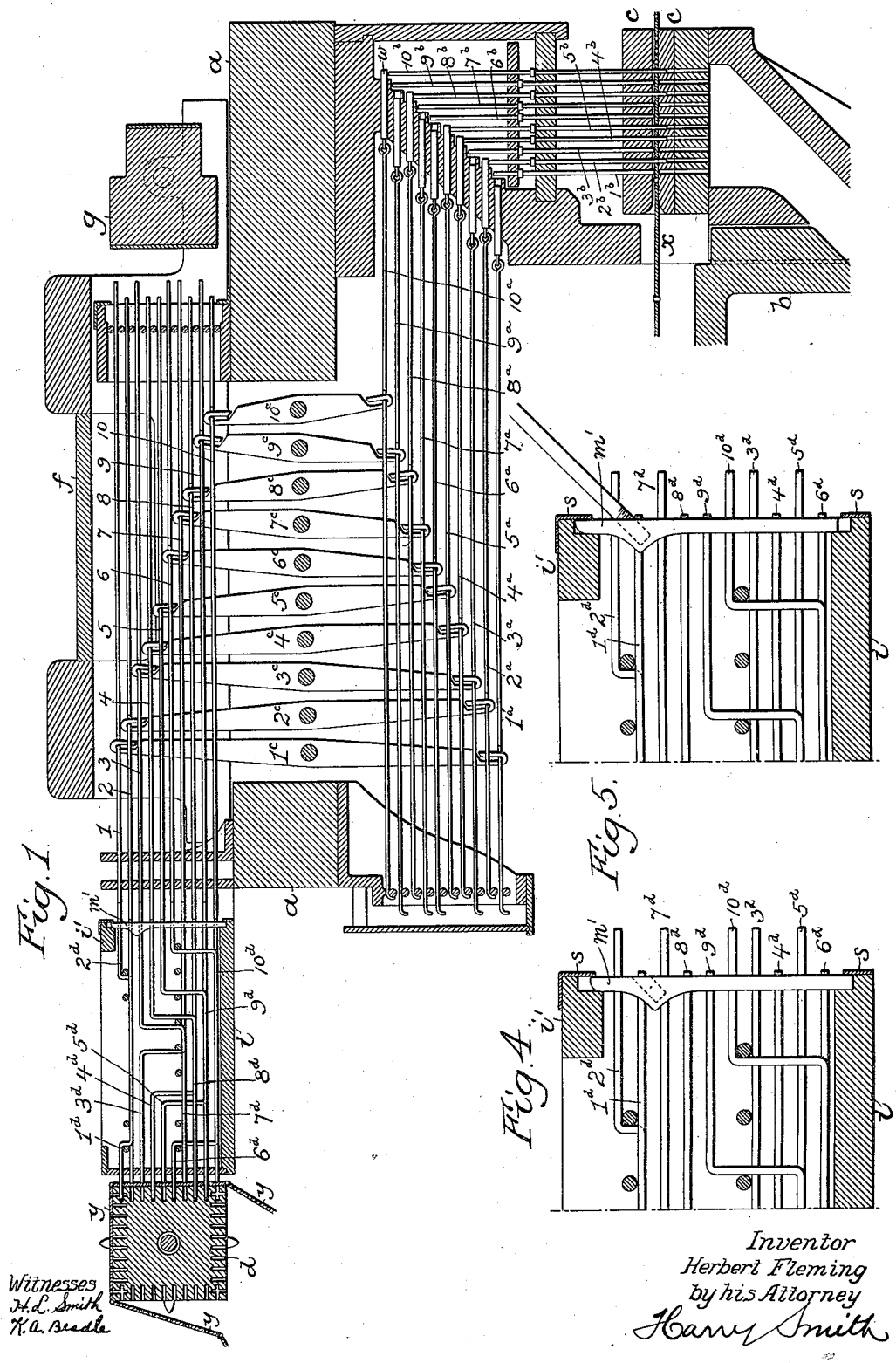
CARD PUNCHING MACHINE.

APPLICATION FILED AUG. 20, 1910.

1,015,619.

Patented Jan. 23, 1912.

2 SHEETS—SHEET 1.



COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

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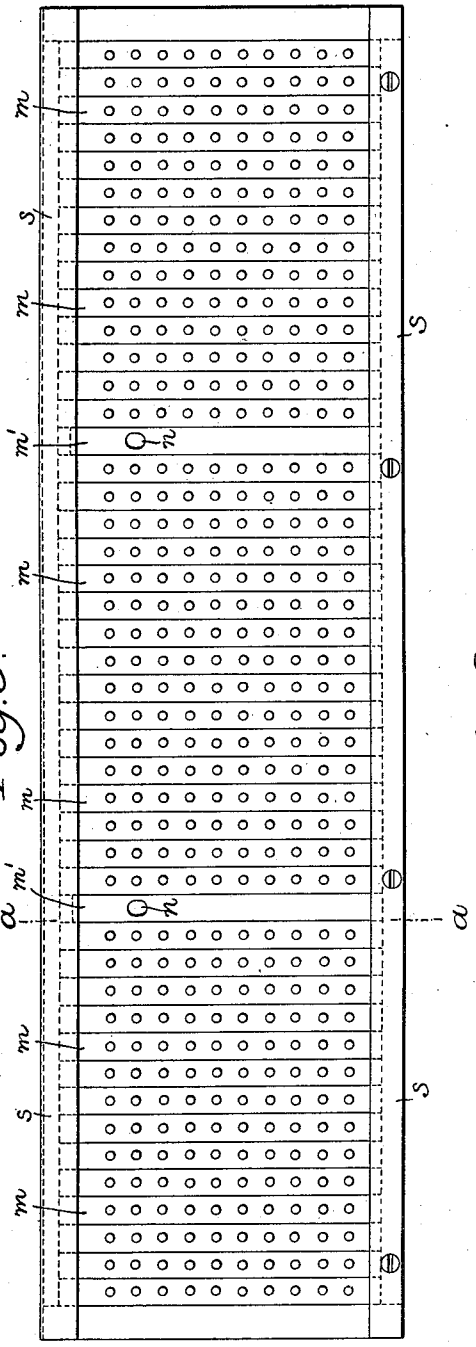

Fig. 3.

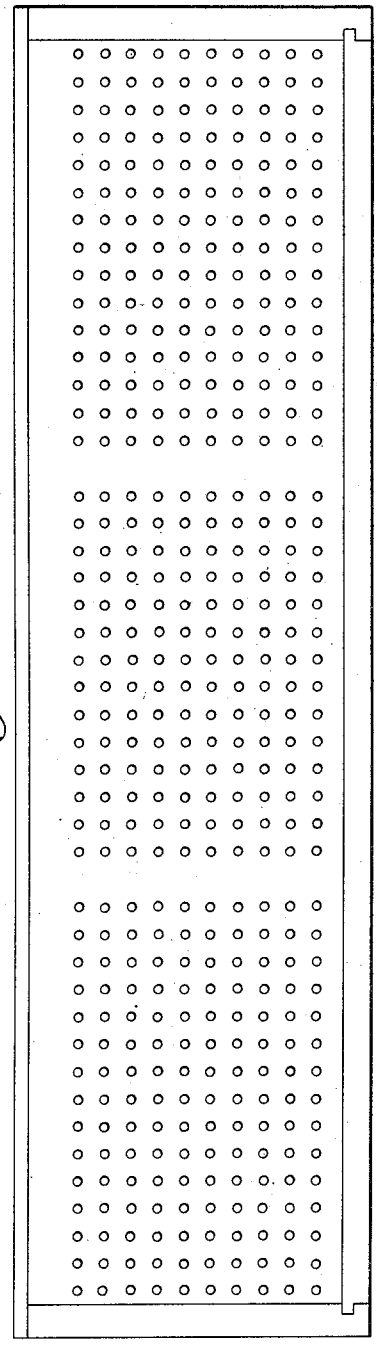

Fig. 2.

Witnesses
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Inventor
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UNITED STATES PATENT OFFICE.

HERBERT FLEMING, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO HARDWICK & MAGEE COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

CARD-PUNCHING MACHINE.

1,015,619. Specification of Letters Patent. Patented Jan. 23, 1912.

Application filed August 20, 1910. Serial No. 578,132.

To all whom it may concern:

Be it known that I, HERBERT FLEMING, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Card-Punching Machines, of which the following is a specification.

The object of my invention is to provide that type of machine for punching jacquard cards known as a "repeater" with an attachment whereby the disposition of the openings and blanks in the newly punched or "repeat" cards can be changed in respect to the disposition of the openings and blanks in the "primary" cards which dictate the punching of said repeat cards.

In the accompanying drawings Figure 1 is a vertical longtiudinal section of sufficient of a well known Royle card punching machine of the repeater type to illustrate my invention; Fig. 2 is a view on an enlarged scale and looking at one end of the attachment which constitutes the subject of my invention; Fig. 3 is a like view looking at the other end of said attachment; Fig. 4 is a longitudinal section of part of the attachment taken on the line *a*—*a*, Fig. 3; and Fig. 5 is a similar view illustrating a different disposition of one of the parts shown therein.

Speaking in a general way, that type of jacquard card punching machine known as a "repeater" may be said to consist of a frame *a* having guides for an upper set of horizontally disposed needles 1, 2, 3, 4, etc., for a lower set of reversely arranged horizontal needles 1^a, 2^a, 3^a, 4^a, etc., and for a set of vertically disposed punches 1^b, 2^b, 3^b, etc., the corresponding needles of the upper and lower sets being connected by means of levers 1^c, 2^c, 3^c, etc., so that when a needle of the upper set is moved in one direction the corresponding needle of the lower set will be moved in the opposite direction.

Each of the needles of the lower set is connected to a bolt *w* which normally projects above the upper end of a corresponding punch, and below the fixed frame *a* is a vertically reciprocating frame *b* having jaws *c* with openings for the guidance of the lower ends of the punches. Between these jaws are fed the enchained cards *x* which are to constitute the repeat cards, the primary or dictating cards *y* being carried by an ordinary card cylinder *d* which is caused to reciprocate horizontally at one end of the machine and to partially rotate to the extent of a quarter turn between its successive forward or inward movements.

At the top of the machine is a reciprocating frame *f* carrying a leveling block *g* which acts upon the rear ends of the upper set of needles and restores to normal position such of said needles as may have been projected by the action of the primary card. In the usual repeater machine the primary cards act directly upon the forward ends of the needles of the upper set and wherever the card is blank the corresponding needle of the upper set will be projected and the corresponding needle of the lower set will be retracted, thus withdrawing its locking bolt *w* from above the top of the corresponding punch, thereby, when the frame *b* rises, permitting said punch to be lifted by the repeat card which is lying between the jaws *c*—*c*, consequently said punch will not perforate the card. Wherever there is an opening in the primary card, however, the corresponding needle of the upper set will fail to be projected and there will be a consequent failure of retraction of the corresponding needle of the lower set, whose bolt *w* will therefore remain in projected position so as to prevent rise of the corresponding punch, and the lower end of the latter will form an opening in the repeat card *x* corresponding to the opening in the primary card.

Owing to the arrangement of the warp thread in the loom, it frequently happens that the disposition of the blanks and openings in the repeat cards for producing one half of the pattern in the woven web, must be different from the disposition of the blanks and openings in the primary cards which produce the other half of the pattern. In order to effect such change, I interpose between the upper set of needles of the repeater and the reciprocating card cylinder *d* an attachment consisting of a frame *i* in which are horizontally guided needles 1^d, 2^d, 3^d, 4^d, etc., one for each of the needles in the upper set of the repeater, the needles in the attachment being bent or offset between their opposite ends so that the needles of the repeater will be acted upon in an

order different from that in which they would be acted upon directly by the primary card *y*.

In the present instance, as will be seen on reference to Fig. 1, the needles 1^d which are acted upon by the topmost row of blanks and openings in the card *y*, act upon the second row of needles 2 in the repeater, the needles 2^d corresponding to the second row of blanks and openings in the primary card act upon the first row of needles 1 in the repeater, the needles 3^d act upon the needles 7, the needles 4^d act upon the needles 8, the needles 5^d act upon the needles 9, the needles 6^d act upon the needles 10, the needles 7^d act upon the needles 3, the needles 8^d act upon the needles 4, the needles 9^d act upon the needles 5, and the needles 10^d act upon the needles 6, consequently, in the repeat card, the first row of blanks and openings will correspond to the second row in the primary card, the second row in the repeat card will correspond to the first row in the primary card, the third to the seventh, the fourth to the eighth, the fifth to the ninth, the sixth to the tenth, the seventh to the third, the eighth to the fourth, the ninth to the fifth, and the tenth to the sixth.

It will be observed on reference to Figs. 2 and 3 that the needles of the attachment are disposed in groups with intervening spaces wider than the distance between the needles themselves, these spaces corresponding to those portions of the card in which the lacing cords are placed.

It is often desirable or necessary to dispose the lacing cords in the repeat card differently from the disposition of said cords in the primary card, thus it will be noted that that end of the attachment at which the primary card cylinder is located, which end is illustrated in Fig. 2, the needles are disposed in three groups of which the outer groups comprise fifteen vertical rows each and the central group comprises fourteen vertical rows, whereas at that end of the attachment adjacent to the repeater, which end is illustrated in Fig. 2, the outer groups of needles are composed of fourteen vertical rows each and the central group of sixteen vertical rows.

In order that changes in the grouping of the needles at the repeater end of the attachment may be readily effected, the needle guiding means at that end of the attachment consist of vertical bars *m*—*m'*, there being one of the bars *m* for each vertical row of needles, each of which bars is provided with openings for the proper guidance of the needles, the bars *m'* however, being blank.

The lower ends of the bars *m* and *m'* are contained in a transverse groove in the base of the frame *i* and the upper ends of said bars are contained in a similar groove in a cross bar *i'* at the top of the frame. The bars *m* are of such length as to fill the grooves at top and bottom but the bars *m'* are shorter, so that when said bars *m'* are in their normal position, as illustrated in Fig. 4, there is a space between the base of the upper groove and the top of the bar, which is rounded, as shown, whereby, when it is lifted, as shown in Fig. 5, by means of a suitable implement inserted in an aperture *n* in the bar, its lower end will be freed from the lower groove and the bar can then be released by first swinging its lower end outward and then dropping it until its upper end is free from the upper groove. When the bars *m'* are thus removed any desired rearrangement of the bars *m* can be effected, and the bars *m'* can then be reinserted in the spaces provided by such rearrangement.

The needles of the attachment are of such length that the slight lateral deflection of the rear ends of some of them in respect to the forward ends which this necessitates will not interfere with their free horizontal movement under the action of the primary card. In order to permit of the ready assembling of the bars *m m'* in the first instance the grooves for the reception of the ends of said bars are preferably formed by rabbeting the base *i* and top cross bar *i'*, the groove being completed by the application of metal plates *s* to the ends of the base and cross bar, as shown in Figs. 4 and 5, the upper plate being, by preference, of angular form. Instead of having each of the vertical rows of needles at the rear end of the attachment guided in a separate bar only those needles may be thus guided which are adjacent to those portions of the card in which the lacing cords are likely to be placed, the needles of the other rows being fixedly guided at each end.

Although I have shown my invention as applied to a special type of repeater card punching machine, it should be understood that the latter has simply been selected for purposes of illustration and that my invention is not limited in this respect.

I claim:

1. The combination of a repeater card punching machine with an attachment interposed between the repeater and the primary card cylinder and having needles with their opposite ends in different planes, whereby the disposition of the openings and blanks in the repeat card will be different from their disposition in the primary card.

2. The combination of a repeater card punching machine with an attachment interposed between the repeater and the primary card cylinder and having needles acting upon those of the repeater and acted upon by the primary cards, said attachment

needles having their opposite ends in different planes, whereby the disposition of the openings and blanks in the repeat card will be different from their disposition in the primary card.

3. The combination of a repeater card punching machine with an attachment having needles disposed in vertical rows guided at one end in independent laterally adjustable bars, whereby different groupings of the vertical rows of needles can be effected.

4. The combination of a repeater card-punching machine with an attachment having needles disposed in vertical rows guided at one end in independent laterally adjustable bars, whereby different groupings of the vertical rows of needles can be effected, in combination with removable separator bars whereby the needle-guiding bars are retained in position after adjustment.

5. The combination of a repeater card-punching machine with an attachment having needles disposed in vertical rows guided at one end in independent laterally adjustable bars, whereby different groupings of the vertical rows of needles can be effected, in combination with removable separator bars whereby the needle-guiding bars are retained in position after adjustment, said separator bars being adapted at top and bottom to grooves in the attachment but being shorter than the distance between the bases of the grooves, whereby they can be removed from engagement therewith.

6. The combination of a repeater card-punching machine with an attachment having needles disposed in vertical rows guided in independent bars adapted at top and bottom to grooves in the attachment, each groove being formed by means of a rabbet in a bar of the frame and a face plate applied to said rabbeted portion of the bar.

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

HERBERT FLEMING.

Witnesses:
ALBERT N. GARRETT,
HARRY L. SMITH.