H. WYMAN.

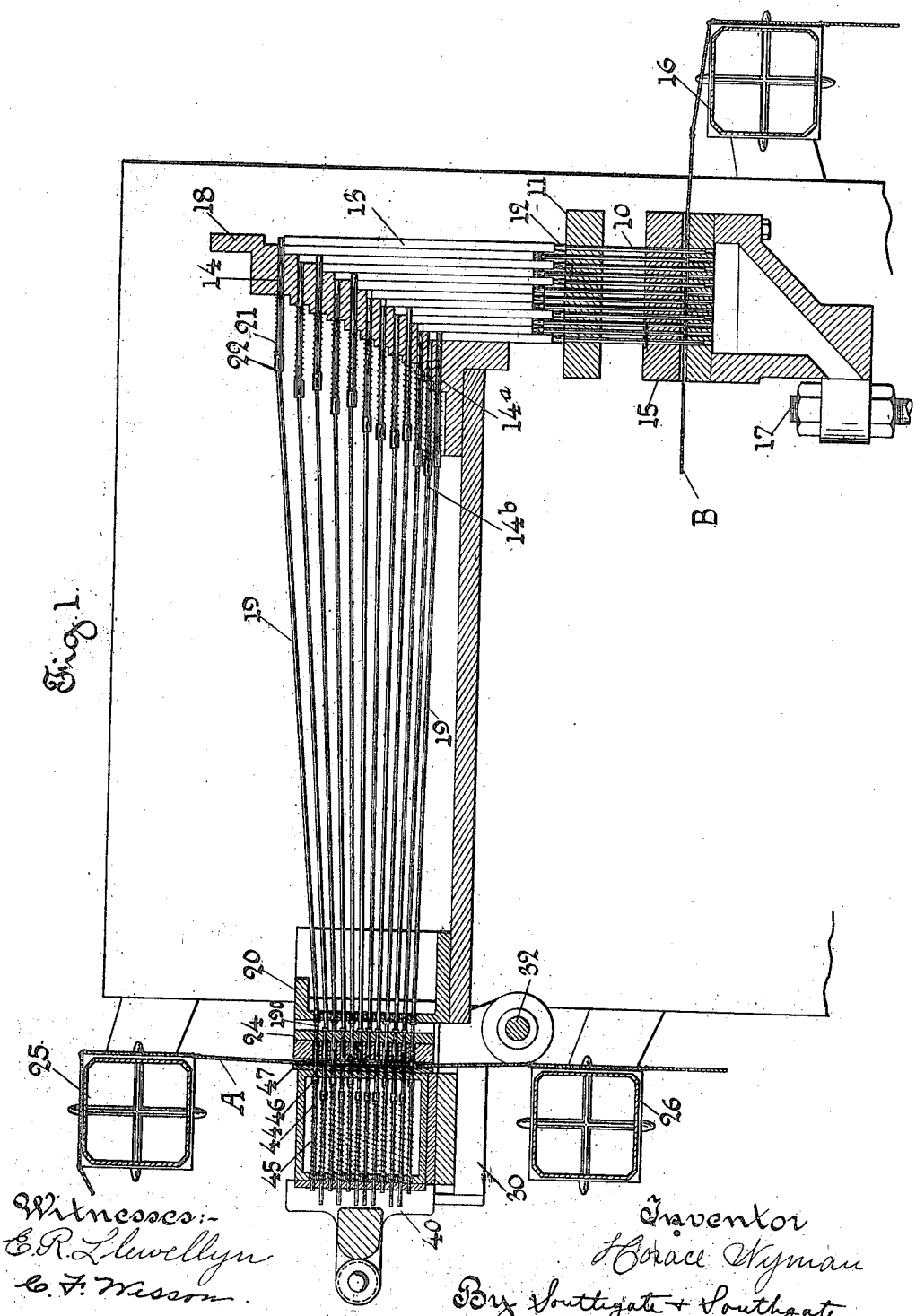
PATTERN CARD REPEATING MACHINE.

APPLICATION FILED JAN. 20, 1915.

1,161,368.

Patented Nov. 23, 1915.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 2.

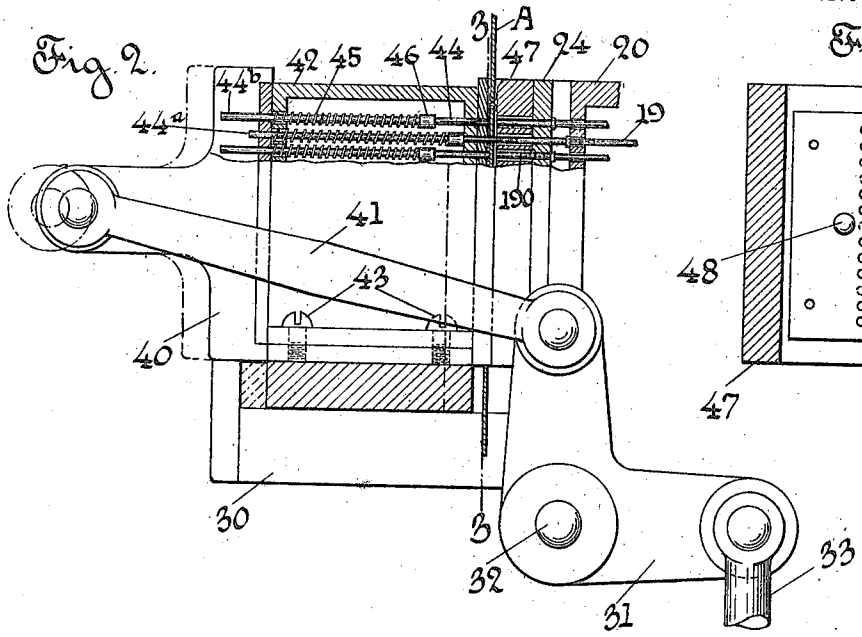


Fig. 3.

Fig. 4

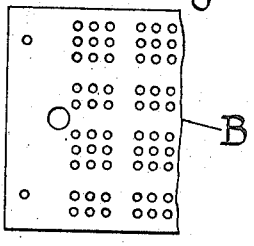


Fig. 5.

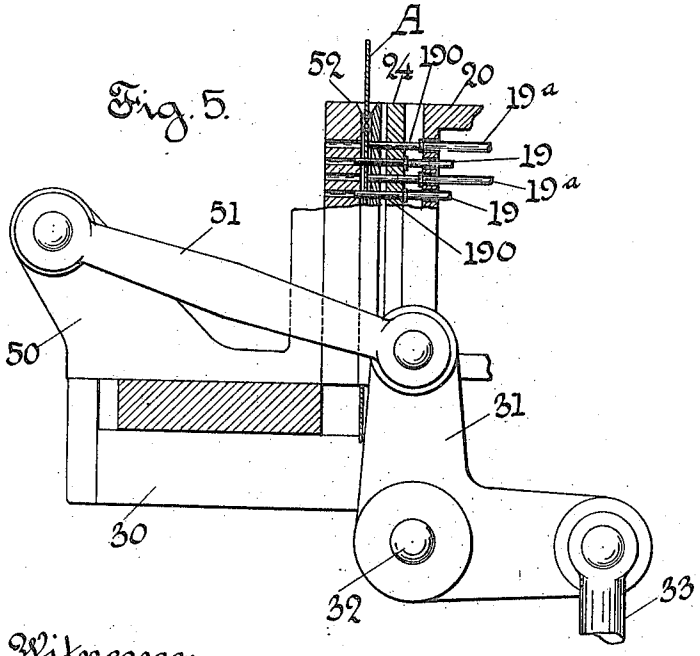
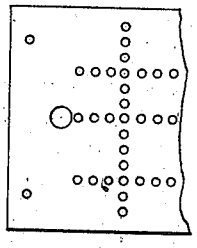


Fig. 6.



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UNITED STATES PATENT OFFICE.

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PATTERN-CARD-REPEATING MACHINE.

1,161,368. Specification of Letters Patent. Patented Nov. 23, 1915.

Application filed January 20, 1915. Serial No. 3,362.

To all whom it may concern:

Be it known that I, HORACE WYMAN, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Pattern-Card-Repeating Machine, of which the following is a specification.

This invention relates to a machine for duplicating or repeating the pattern cards used in large numbers in the operation of Jacquard and certain other types of looms.

A machine of this general type is shown in the patent to Royle No. 304,864, issued September 9, 1884. For the operation of such machines a set of original pattern cards must first be provided, which are used in the machine as master cards from which any desired number of duplicate sets may be reproduced.

My invention relates particularly to improved devices for selectively determining the punches to be rendered operative and to improved constructions in the punches themselves.

It is the principal object of my invention to provide a construction by which a single set of punches and the same operating devices may be utilized to produce either positive or negative pattern cards from a single set of master cards.

The terms "positive" and "negative" have a well understood meaning in this art and indicate respectively that the positive card is an exact reproduction of the master card and that the negative card has its perforated and unperforated portions interchanged and reversed relative to the master card.

In my improved construction I provide two different selective devices which may be interchangeably associated with the same actuating mechanism and which will operate in connection with the master card to produce positive and negative cards respectively.

A further object of my invention is to provide an improved and simplified mechanism for producing the positive duplicate cards.

A still further object of my invention is to provide an improved construction in the punches which perforate the duplicate cards.

With these and other objects in view my invention consists of certain devices, arrangements and combinations of parts which will be hereinafter described and more particularly pointed out in the appended claims.

A preferred form of my invention is shown in the drawings in which—

Figure 1 is a sectional elevation of the selective and perforating mechanism of the machine, showing a single series of punches and the devices for selectively controlling their operation; Fig. 2 is an enlarged side elevation of the carrier with the devices for producing positive duplicates mounted thereon; Fig. 3 is a partial sectional view taken along the line 3—3 in Fig. 2 and showing a portion of the master card; Fig. 4 is a partial face view of a positive duplicate of the master card shown in Fig. 3; Fig. 5 is an enlarged side elevation similar to Fig. 2 but showing the devices for producing negative duplicates of the master card, and Fig. 6 is a partial face view of a negative duplicate of the master card shown in Fig. 3.

In Fig. 1 I have shown a single transverse set of punches 10 such as would be utilized to produce a single vertical row of the perforations shown in the duplicate cards in Figs. 4 and 6. These punches are freely movable vertically in a fixed guide-plate 11. The punches 10 are all of substantially the same length and are provided with shoulders 12 upon their upper ends which limit the downward movement of the punches.

Positioned above each punch is an intermediate bar 13, these bars being of different lengths (as clearly shown in Fig. 1) and having their upper ends positioned adjacent a series of sliding keys 14. The bars 13 are in close sliding contact with each other and completely fill a rectangular space inclosed by the lower portion of a fixed frame member 18, side walls (not shown) integral with or carried by said frame member and a retaining bar or plate (not shown) detachably secured to the front edges of the side walls. When certain of these keys 14 are projected to the right in Fig. 1, as indicated at 14^a, the corresponding intermediate bars 13 and punches 10 are restrained from upward movement, but when the keys are withdrawn, as indicated at 14^b, the corresponding bars and punches are freely movable upwardly.

By the provision of the intermediate bars 13, I am enabled to use a single size and length of punch for the entire duplicating mechanism and by removing the front retaining plate and the bars 13 any punch may be readily removed and replaced in the guide plate 11.

The blank cards B from which the duplicates are produced are drawn through a card guide 15 by an intermittently actuated feeding cylinder 16. The card guide 15 is mounted upon vertically movable plungers 17 which may be intermittently actuated by any suitable mechanism.

The devices for vertically moving the card guide 15 and for intermittently feeding the cylinder 16 constitute no part of my invention and may be of the type shown in the Royle patent or of any other desired type.

The sliding keys 14 are supported in a fixed frame member 18 and are each connected at their rear ends with rods 19 having their opposite ends supported for sliding movement in a fixed frame member 20. A light coil spring 21 is provided for each sliding key, this spring being conveniently positioned between the frame member 18 and a collar 22 upon the key.

Each rod 19 at its rear end engages a short headed pin 190 mounted in a second fixed perforated frame member 24. The head upon the pin engages the frame member 24 and limits rearward movement of the rod 19 and attached key 14 under the influence of the spring 21.

Each rod 19 and its corresponding pin 190 operate together as a single element and might be formed integrally except for certain difficulties in manufacture and assembling.

As used in the claims, the term rod should be understood as including both the elements 19 and 190 unless otherwise defined.

The master pattern cards A are moved vertically downwardly adjacent the ends of the pins 190 by intermittently actuated feeding cylinders 25 and 26.

For the selective actuation of the pins 190, rods 19 and keys 14, I provide interchangeable sliding carriers 40 and 50 which are mounted to slide horizontally upon ways 30. For actuating the carriers I provide a bell crank 31 movable about a fixed pivot 32 and connected by a rod 33 to suitable actuating mechanism (not shown). The vertical arm of the bell crank 31 is adapted to be connected by a link 41 to the carrier 40 or by a link 51 to the carrier 50.

The devices for actuating the rod 33 and the feeding cylinders 25 and 26 form no part of my invention and may be of any suitable or desired type.

The parts thus far described, with the exception of the carriers 40 and 50 and the links 41 and 51, are all utilized in the operation of the machine, whether positive or negative duplicates are to be produced. I will now describe the carrier 40 and the parts associated therewith which are adapted to the production of positive duplicates.

The carrier 40 is provided with a hollow rectangular casting 42 secured to the carrier 40 by any suitable means such as the screws 43 and having a plurality of auxiliary plungers 44 freely slidable horizontally in said casing. Each plunger is provided with a coil spring 45 encircling the plunger and engaging a collar 46 upon the plunger to force the plunger to the right as viewed in Fig. 2. This movement to the right is limited by the engagement of the collar 46 with the side wall of the casing 42, the normal position of the plungers being that of the plunger 44^a in Fig. 2. A card guide 47 is fixed to the frame member 24 and comprises two parallel perforated plates through which the auxiliary plungers 44 are freely movable. In the actual operation of the device, a master card A is positioned within the card guide 47 and an index pin 48 (Fig. 3) is projected through an enlarged perforation in the master card to accurately register it in the card guide. The carrier 40 is then moved to the right and those plungers 44^a (Fig. 2) which are alined with the perforations in the master card pass freely through said perforations and engage the ends of the corresponding pins 190. As the springs 45 are of greater strength than the springs 21, the plungers 44^a move the corresponding pins 190 and rods 19 to the right and slide the keys connected therewith into position to restrain upward movement of the corresponding punches 10. The plungers 44^b which are alined with unperforated portions of the master card slide rearwardly relatively to the casing and the corresponding rods 19 are undisturbed. It will thus appear that the punches corresponding to the perforations in the master card A are alone rendered operative and that the perforations in the duplicate card B (Fig. 4) will be identical with those in the master card.

Referring to Figs. 5 and 6, the special devices for producing negative cards will now be described. This mechanism is much simpler than the mechanism for producing positive cards and comprises simply a vertical card guide 52 mounted upon the carried 50 and having front and rear perforated plates through which the projecting ends of the pins 190 are freely movable. In the operation of this device, the card is positioned vertically as previously described and centering devices (not shown) may be provided for accurately registering the card. The card guide and card, supported on the carrier 50, are thereafter moved to the right (Fig. 5) and the unperforated portions of

the card engage the ends of the pins 190 corresponding to certain rods 19, moving them to the right to the position indicated at 19ª in Fig. 5. Such movement projects the corresponding keys 14 and prevents vertical movement of the corresponding punches 10. At the same time the perforations in the master card pass freely over the remaining pins 190 and the keys associated therewith remain in inoperative position. It will thus be seen that a blank space upon the master card produces a perforation in the negative card, while a perforation in the master card leaves a blank space in the negative card. The resulting card is thus a negative duplicate of the master card.

To adapt my improved card repeating machine to the production of either positive or negative cards, it is merely necessary to select the proper carrier 40 or 50 with its associated devices and operatively connect it to the bell crank 31.

Having thus described my invention, it will be evident that many changes and modifications can be made therein by those skilled in the art without departing from the spirit and scope thereof as set forth in the claims and I do not wish to be otherwise limited to the details herein disclosed, but—

What I do claim is:—

1. A pattern card repeating machine having, in combination, a plurality of normally freely-movable and inoperative punches, and pattern-controlled means for rendering said punches operative, said means comprising a plurality of members each yieldingly mounted in fixed supports and movable into position to prevent movement of one of said punches and a plurality of auxiliary devices yieldingly mounted upon a movable carrier and each effective in coöperation with a master card to selectively move one of said members to operative position.

2. A pattern card repeating machine having, in combination, a series of punches and a series of controlling devices for said punches, each controlling device comprising a sliding key yieldingly mounted in fixed supports, and an auxiliary plunger yieldingly mounted in a movable support and movable therewith to render said key operative.

3. A pattern card repeating machine having, in combination, a card guide adapted to support a master card, a series of punches, and a series of controlling devices for said punches, each controlling device comprising a sliding key yieldingly mounted in fixed supports, and an auxiliary plunger yieldingly mounted in a movable support and movable therewith to render said key operative, the effective operation of said auxiliary plungers being selectively determined by the master card.

4. In a pattern card repeating machine, a plurality of punches, a movable guide for a pattern card, and a plurality of selective devices comprising members yieldingly held in fixed supports and auxiliary devices yieldingly held in a movable casing, said card guide and casing being simultaneously movable relative to said fixed supports, and said auxiliary devices, when so moved, being effective, under the control of the master card, to move selected members to render the corresponding punches operative.

5. A pattern card repeating machine having, in combination, a plurality of normally inoperative punches, sliding keys for said punches, each movable into position to render one of said punches operative, means to withdraw said keys and to maintain them normally in inoperative position, a series of rods each connected at one end to one of said keys, a fixed master card guide adjacent the other end of said rods, a carrier movable toward and away from said card guide and rods, and auxiliary plungers yieldingly mounted in said carrier and each effective when projected through a perforation in the master card to move the corresponding rod and key to operative position.

6. A pattern card repeating machine having, in combination, a plurality of normally inoperative punches, sliding keys for said punches, each movable into position to render one of said punches operative, means to yieldingly retain each key normally in inoperative position, a series of rods each connected at one end to one of said keys, a fixed master card guide adjacent the opposite ends of said rods, a carrier supporting a plurality of spring-pressed plungers, and means to move said carrier toward said card guide and rods, said plungers when projected through perforations in a master card held in the card guide being effective to render the corresponding keys and punches operative.

7. A pattern card repeating machine having, in combination, a plurality of normally inoperative punches, sliding keys for said punches, each movable into position to render one of said punches operative, a series of springs each effective to withdraw one of said keys and to maintain it normally in inoperative position, a series of rods each connected at one end to one of said keys, a fixed master card guide adjacent the opposite ends of said rods, a carrier movable toward and from said card guide and rods, and spring-pressed auxiliary plungers mounted in said carrier and each effective when projected through a perforation in the pattern card to move the corresponding rod and key to operative position, the spring on said auxiliary plunger being stronger than the spring which controls the key.

8. In a pattern card repeating machine, in combination, a fixed guide plate, a plurality

of punches of substantially equal length, each vertically slidable in said plate, independent means to limit downward movement of each punch, a plurality of intermediate bars of different and suitable lengths each positioned above one of said punches and normally freely movable upwardly with its respective punch, and pattern-controlled devices for preventing such movement of selected punches and bars, said punches and bars being readily and separately removable from said machine.

9. In a pattern card repeating machine, in combination, a plurality of punches of substantially equal length, each having a shoulder on its upper end, a fixed guide plate for said punches with which said shoulders engage, a plurality of intermediate bars of different lengths each overlying one of said punches, a series of horizontally movable keys each effective to render a bar and punch operative, and pattern-controlled means for moving said keys.

10. A pattern card repeating machine having, in combination, a plurality of normally inoperative punches, sliding keys for said punches each movable into position to render one of said punches operative, springs to normally retain said keys in inoperative position, a series of rods each connected at one end to one of said keys and movable in substantial alinement therewith, and interchangeable devices for supporting and moving a master card toward and away from the other end of said rods, said devices coöperating with said master card to directly control the operation of said punches for the production of a positive or negative duplicate of the master card.

11. A pattern card repeating machine having, in combination, a plurality of normally inoperative punches, sliding keys for said punches, each movable into position to render one of said punches operative, means to withdraw said keys and to maintain them normally in inoperative position, a series of rods each connected at one end to one of said keys, a fixed guide for the rear ends of said rods, a series of headed pins each alined with one of said rods and slidable in a fixed supporting plate, a fixed master card guide adjacent the rear ends of said pins, a carrier movable toward and away from said card guide and pins, and auxiliary plungers yieldingly mounted in said carrier and each effective when projected through a perforation in the master card to move the corresponding rod and key to operative position.

12. In a pattern card repeating machine, in combination, a fixed guide plate, a plurality of punches slidable in said plate, means to limit downward movement of each punch, a plurality of intermediate bars each positioned above one of said punches and normally freely movable upwardly with its respective punch, said bars being retained in vertical position over their respective punches by sliding contact with each other within a rectangular frame opening, and pattern controlled devices for preventing upward movement of selected punches and bars.

In testimony whereof I have hereunto set my hand, in the presence of two subscribing witnesses.

HORACE WYMAN.

Witnesses:
E. F. GREEN,
J. B. SYME.