

(No Model.)

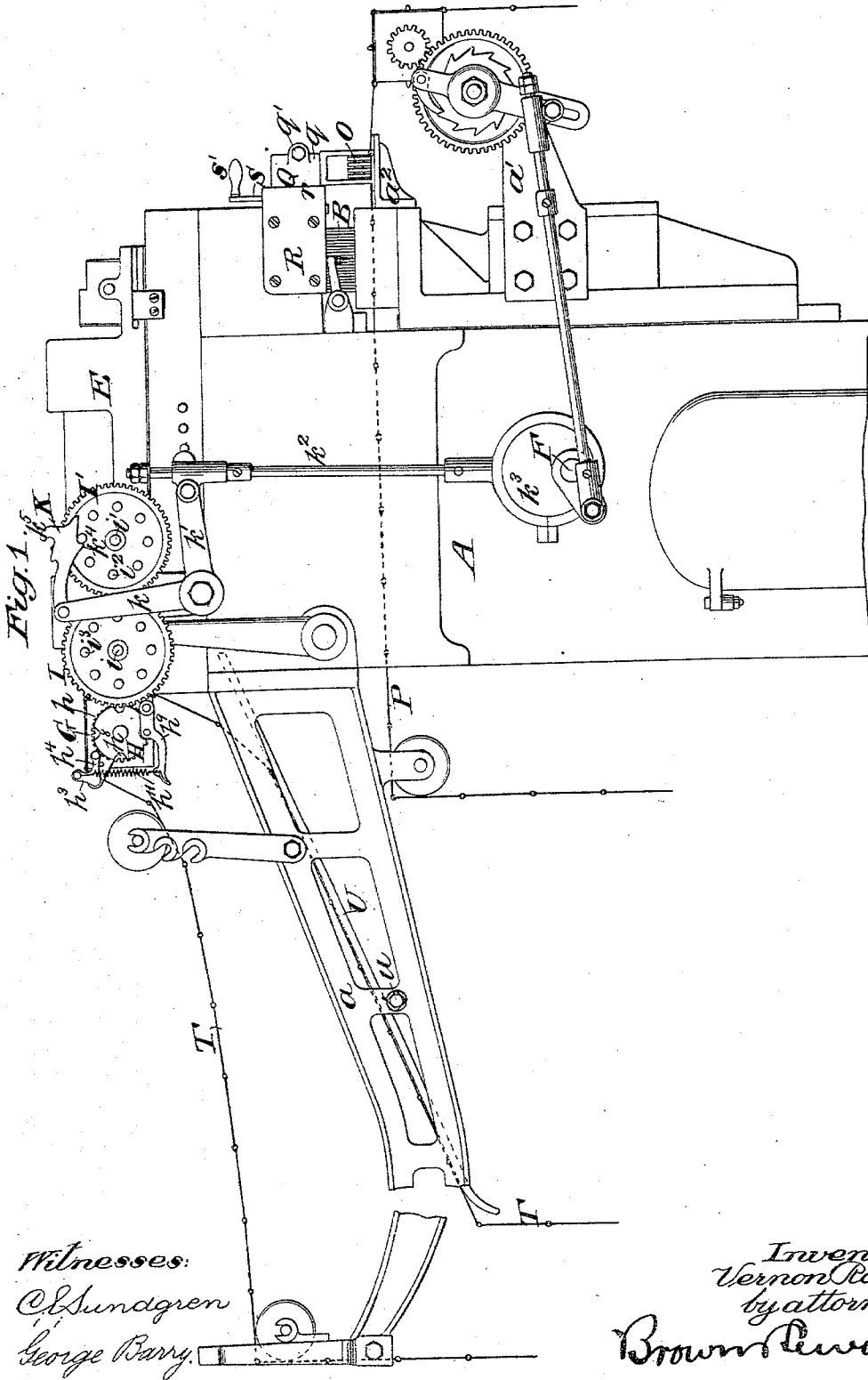
4 Sheets—Sheet 1.

V. ROYLE.

MACHINE FOR REPEATING PATTERN CARDS.

No. 556,775.

Patented Mar. 24, 1896.



Witnesses:  
*C. Sundgren*  
*George Barry*

Inventor:  
*Vernon Royle*  
 by attorneys  
*Brown & Leonard*

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Fig. 5.

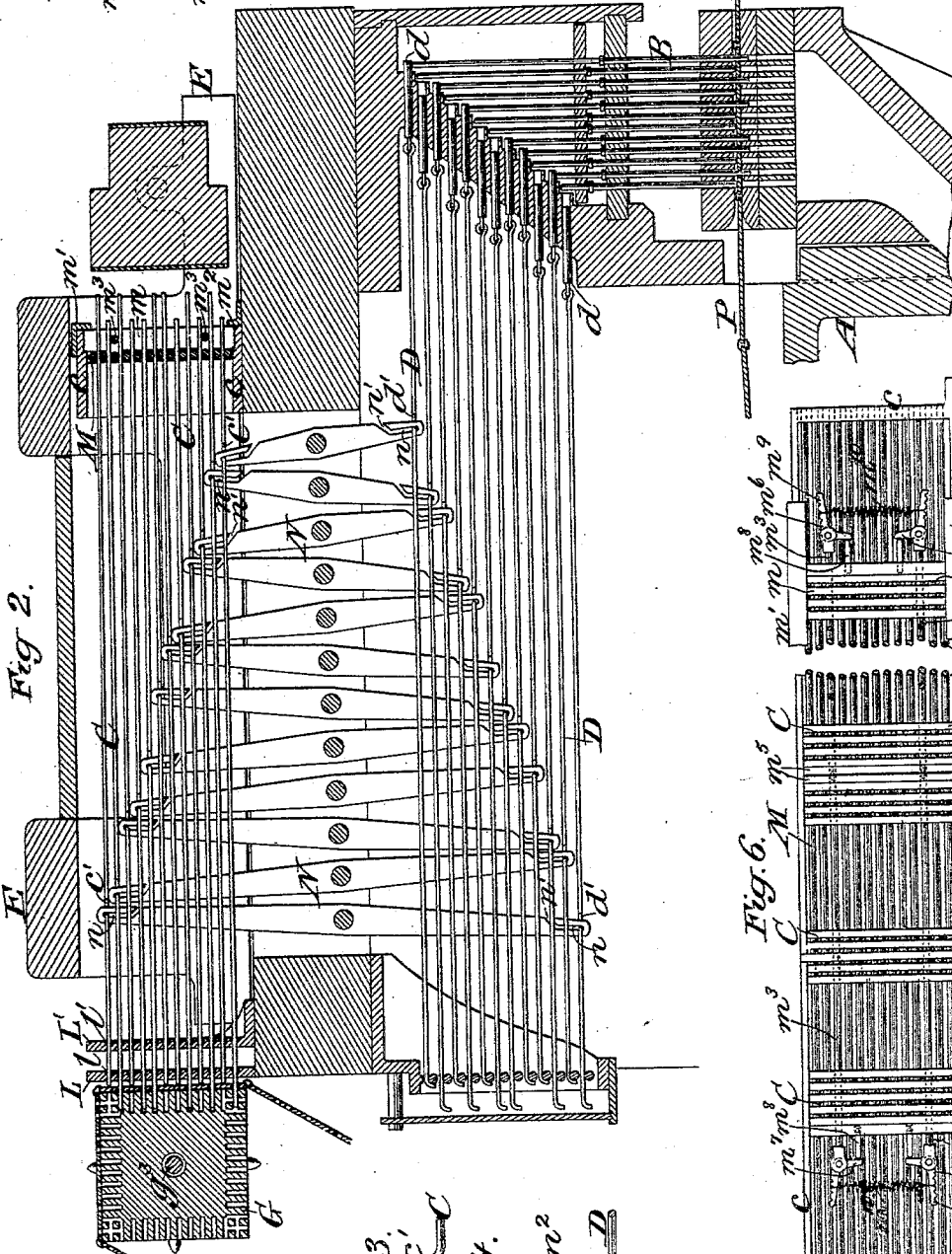
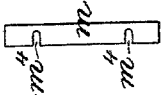


Fig. 2.

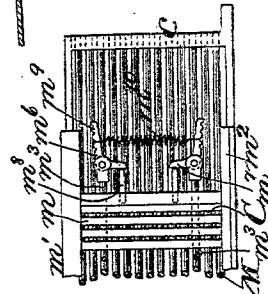


Fig. 6.

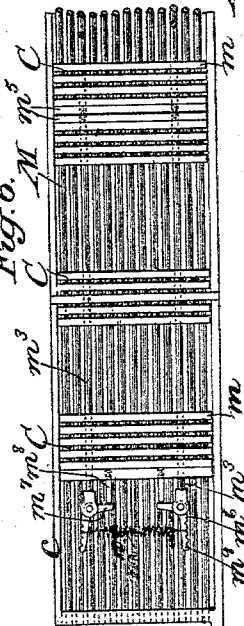


Fig. 3.

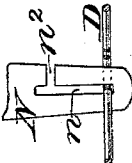


Fig. 4.

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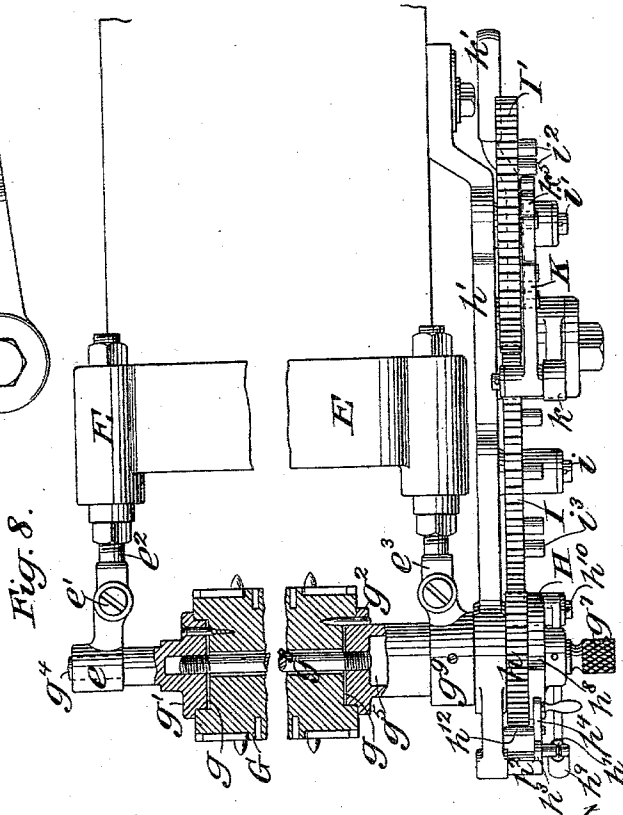
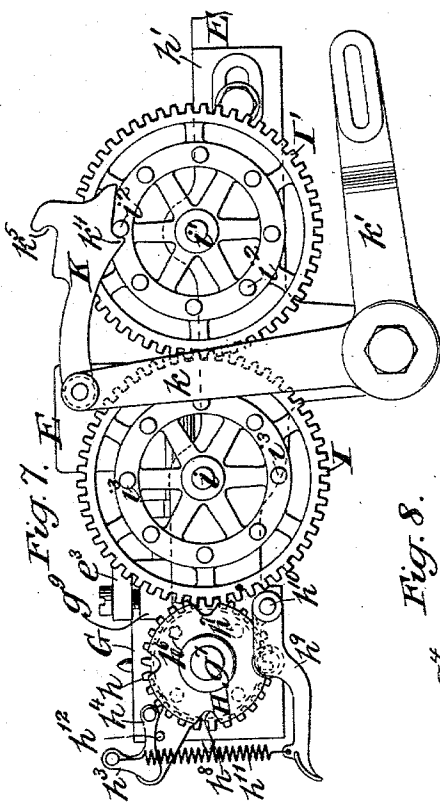
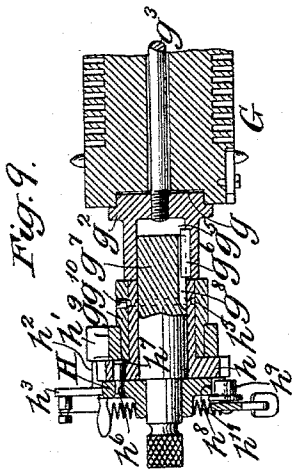
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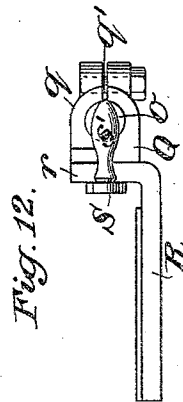
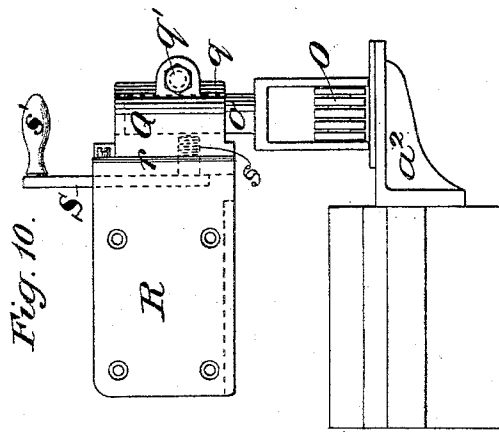
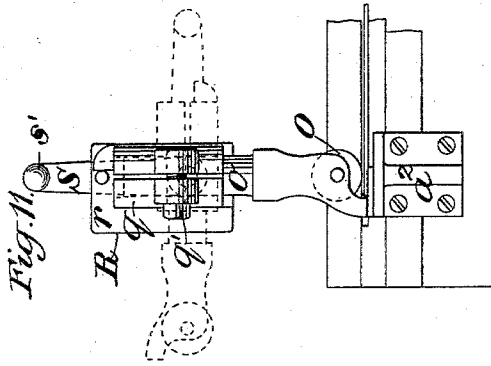
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# UNITED STATES PATENT OFFICE.

VERNON ROYLE, OF PATERSON, NEW JERSEY.

## MACHINE FOR REPEATING PATTERN-CARDS.

SPECIFICATION forming part of Letters Patent No. 556,775, dated March 24, 1896.

Application filed March 25, 1893. Serial No. 467,596. (No model.)

*To all whom it may concern:*

Be it known that I, VERNON ROYLE, of Paterson, in the county of Passaic and State of New Jersey, have invented a new and useful Improvement in Machines for Repeating Pattern-Cards, of which the following is a specification.

My invention relates to an improvement in machines for repeating pattern-cards in which punches for perforating blank cards are controlled in their operation by the action of pattern-cards upon intervening communicating mechanism.

My present invention more particularly contemplates certain improvements in repeating-machines of the type shown, described and claimed in Letters Patent No. 304,864, granted to V. Royle and J. Royle, Jr., September 9, 1884, with the object in view of improving the levers for communicating the movement of the selecting-needles to the punch-retaining keys, means for mounting the selecting-needles and applying tension thereto, the pattern-cylinder, the means for imparting motion thereto, means for handling unwired pattern-cards and for supporting a numbering-machine.

In the accompanying drawings, Figure 1 is a view in side elevation of so much of a repeating-machine as is essential for showing the location and operation of the subject-matter of this present invention. Fig. 2 is an enlarged vertical section of a portion of the machine, showing the selecting-needles, pattern-cylinder, punch-controlling keys, punches, and the levers for connecting the selecting-needles with the punch-controlling keys. Figs. 3, 4, and 5 represent details of certain portions of the parts shown in Fig. 2. Fig. 6 represents the tension mechanism in side elevation, showing several groups of selecting-needles in connection therewith. Fig. 7 is an enlarged view, in side elevation, of the means for imparting an interrupted rotary movement to the pattern-cylinder. Fig. 8 is a top plan view, partly in section, of the parts represented in Fig. 7. Fig. 9 is a sectional view in detail of one end of the pattern-cylinder and the means for connecting it with its supporting and operating mechanism. Fig. 10 is a view in detail of the bracket for supporting the numbering-machine, the

numbering-machine being indicated in its position relative thereto. Fig. 11 is a view of the same, taken in elevation at right angles to the view shown in Fig. 10 and showing in dotted lines the position of the numbering-machine and its support when swung off to one side out of the operative position; and Fig. 12 is a top plan view of the bracket for supporting the said numbering-machine.

The main supporting-frame A with its brackets *a a'*, the former for supporting the chain of pattern-cards on their passage to and from the pattern-cylinder, and the latter for supporting the feed mechanism by which a chain of blank cards is fed at the proper intervals to a set of punches, the punches B, the selecting-needles C, the keys *d* and their operating-rods D, the mechanism for forcing the blank cards into engagement with the punches, and the reciprocating carriage E for moving the pattern-cylinder toward and away from the selecting-needles and returning the needles to their normal positions, and the main drive-shaft F for transmitting motion from a suitable source of power (not shown) to the several operative parts of the machine are quite similar in their structure and arrangement to the corresponding parts shown and described in Letters Patent No. 304,864, hereinabove referred to, and a more extended description of them is omitted herein, except so far as may be necessary to a clear understanding of the arrangement and operation of the subject-matter of my present improvements.

The cylinder for receiving the chain of pattern-cards is denoted by G. In its ends are formed recesses *g* for the reception of heads *g'* and *g''*, which are held in position in the recesses in the opposite ends of the cylinder by means of a central rod *g'''* provided with screw-threaded ends adapted to screw into screw-threaded sockets in the heads *g'* *g''*. The end or head *g'* terminates in a journal *g<sup>4</sup>* adapted to fit and rotate freely within a bearing-piece *e* secured by a pivotal connection, preferably a screw *e'*, to the end of one of the adjustable arms *e<sup>2</sup>* carried by the carriage E. The opposite end or head *g''* is provided with a socket *g<sup>5</sup>* having an inwardly-projecting feather *g<sup>6</sup>*. A sliding spindle *g<sup>7</sup>* is provided on its inner end with a groove *g<sup>8</sup>*

adapted to receive the feather  $g^6$  within the socket, said spindle extending through the notched disk II and through the hub of a spur-wheel  $h$ . The hub of the spur-wheel  $h$  is adapted to rotate freely within the bearing  $g^9$  carried by the adjustable arm  $e^3$  on the carriage E. A sliding arm  $h'$ , connected at one end to the carriage, embraces near its opposite end the bearing  $g^9$ , and at its free end carries a rocking shaft  $h^2$  provided with diverging arms  $h^3$  and  $h^4$ . The hub of the spur-wheel  $h$  is locked against longitudinal displacement within the bearing  $g^9$  by means of a pin or screw  $g^{10}$  which extends through the bearing  $g^9$  into an annular groove  $h^5$  in the exterior of the hub. The notched wheel II is caused to rotate with the spur-wheel  $h$  by means of a pin  $h^6$  which projects from the inner side of the wheel or disk II into a perforation  $h^7$  in the spur-wheel.

The notches in the disk II are denoted by  $h^8$ , and are so spaced apart as to correspond to the four sides of the pattern-cylinder, and by the engagement of a yielding dog  $h^9$  therein serve to retain the pattern-cylinder with its face squarely toward the selecting-needles while it is being moved into engagement therewith to determine the work of the punches, as will hereinafter appear. The dog  $h^9$  is pivoted at  $h^{10}$ , and at its opposite end is connected by a spring  $h^{11}$  with the arm  $h^3$  on the rock-shaft  $h^2$ . When in normal position, the arm  $h^3$  is held by the spring a short distance past center, as shown in Fig. 7, with its arm  $h^4$  resting on a stop  $h^{12}$ , and when in such position holds the nose of the dog yieldingly in one of the notches  $h^8$  in the disk II, so as to hold the pattern-cylinder against unintentional displacement, but at the same time permit the said cylinder to be rotated when force for that purpose is applied thereto.

The dog  $h^9$  is so constructed that a portion of it at least shall rest, when the dog is in operative position, in front of the disk II and hold the latter, together with the spindle  $g^7$ , in position.

By the above construction and arrangement of parts I am enabled to remove the pattern-cylinder and exchange it for another at pleasure by first rocking the shaft  $h^2$  over away from its position shown in Fig. 7 until the tension of the spring  $h^{11}$  is exerted upon the other side of center, thereby permitting the dog  $h^9$  to drop out of its position in front of the disk II and then sliding the spindle  $g^7$ , together with the disk II, outwardly until the inner end of the spindle disengages the head  $g^2$  and then swinging the end of the cylinder with its head so released off to one side on  $e'$  as a pivot until the journal  $g^4$  may be slid out of the bearing  $e$ . The several parts may be reassembled in reverse order.

Gear-wheels I and I' are mounted on studs  $i$  and  $i'$  respectively in the side of the arm  $h'$  in gear with each other and the wheel I in gear with the wheel  $h$  for driving the pattern-

cylinder. The wheels I I' are alike as to the number of teeth and are located in fixed relation to the wheel  $h$ , since their supporting-arm  $h'$ , by its connection with the bearing  $g^9$ , is subject to the same movement relative to the carriage that the pattern-cylinder supports are subject to. Motion is imparted to the wheel  $h$  from either the one or the other of the wheels I and I' at pleasure by means of a swinging pawl K pivoted to one arm,  $k$ , of a rocking angle-lever, the opposite arm,  $k'$ , of said lever being connected by a rod  $k^2$  (see Fig. 1) with the eccentric  $k^3$  on the main shaft F. The rocking angle-lever  $k k'$  is mounted to move with the carriage. The pawl K is provided on one face with a lip adapted to engage and push successively against a series of pins  $i^2$  on the face of the wheel I', while the opposite face of the said pawl K is provided with a hook  $k^5$  adapted to reach over and pull successively on a series of pins projecting from the face of the wheel I. When the pawl K is in the position shown in Figs. 1 and 7, the downward movement of the arm  $k'$  of the rocking lever will throw the pawl over toward the right and will thereby rotate the wheel I' to the right, and it in turn will rotate the wheel I to the left, and by its connection with the wheel  $h$  it will rotate the pattern-cylinder over to the right. The downward stroke of the arm  $k'$  will rotate the wheel I' a sufficient distance to rotate the pattern-cylinder a quarter of a revolution to bring a successive face of the pattern-cylinder squarely in position to act upon the selecting-needles.

If, as sometimes happens, it be desired to repeat one or more successive pattern-cards before continuing with the chain, this may be accomplished by simply throwing the pawl K over into engagement with the wheel I, when each downward stroke of the arm  $k'$  will rotate the wheel I to the right and thereby turn the wheel  $h$  and the pattern-cylinder over to the left or in a backward direction, so as to bring a pattern-card which has already been utilized again into position to act upon the selecting-needles.

It will be further observed that by operating the pattern-cylinder from the main shaft I am enabled to continue its motion throughout a considerable extent of the rotary movement of the main shaft, and while the movement of the main shaft is being completed and the pawl returning to make a successive engagement with the one or the other of the wheels I and I' the punches may be doing their work, so that there may be a presentation of the pattern-card and the punching of a blank card with each revolution of the main shaft and without any sudden movement either of the chain of pattern-cards or of blank cards.

The selecting-needles C are arranged in banks, as is common, and are supported to slide longitudinally. Their support near one end—the end toward the pattern cylinder—

consists of a pair of thin parallel plates L L' spaced a short distance apart and secured to the main frame. The plates L L' are provided with perforations therethrough for the passage of the needles, a perforation  $l$  in the plate L having its corresponding perforation  $l'$  in the plate L' and in alignment therewith. By forming the support of a plurality of thin plates, as distinguished from a single thick plate, I am enabled to make the perforations truer and may employ other material than wood—as, for example, metal or vegetable fiber—and at the same time by spacing the supporting-plates apart I secure the same effective extent of bearing. Near their opposite ends the needles are supported between the members of a series of supporting-bars M. The several banks of selecting-needles are further separated, bank from bank, by tension-bars  $m$ , held in position by overlapping lips  $m^1$  and  $m^2$  at the top and bottom of the fixed support  $c$ . The tension-bars  $m$  are drawn toward each other to press against the several banks of selecting-needles by means of draw-rods  $m^3$  spaced apart and extending through notches  $m^4$  in the several tension-bars and screwing at one end into centrally-located heads  $m^5$ . From the heads  $m^5$  the draw-rods extend in opposite directions to a point beyond the outside banks of selecting-needles and are there provided with pivoted angle-levers  $m^6$ . Each pair of angle-levers  $m^6$  has arms  $m^7$  extending toward each other and bearing against pins  $m^8$ , projecting from the outer face of the outside tension-bars, while the arms  $m^9$  of each pair of angle-levers are connected by a spring  $m^{10}$  tending to draw the said arms  $m^9$  toward each other and thereby exerting pressure through their arms  $m^7$  upon the pins  $m^8$  to force the tension-bars toward the central heads  $m^5$ . I find it convenient to notch the arms  $m^9$  of the angle-levers, so that the spring  $m^{10}$  may be attached thereto at points nearer to or farther from the pivotal points of the levers to diminish or increase the pressure upon the tension-bars at pleasure.

By exerting pressure upon the selecting-needles upon their opposite sides and at right angles to their separating and supporting bars M, I am enabled to regulate the tension with great exactness and to materially diminish the frictional contact of the needles with their separating-bars M, and thereby prevent the rapid cutting out of said bars, which has heretofore been objectionable. The tension-bars  $m$  may be renewed at pleasure or as fast as worn out at very slight expense.

In transmitting the movements of the selecting-needles C to the key-operating rods D it is desirable that there should be no considerable lost motion. To prevent such lost motion and at the same time provide for arranging the several banks of needles in close proximity to each other, I have formed the connecting-levers N wide in the direction in which their tension is to be exerted and thin in a di-

rection transverse thereto. I prefer to form them of flat thin strips of metal, gradually diminishing in width from their widest central portion toward their ends, as clearly indicated in Fig. 2. Their connection with the selecting-needles and key-operating rods is made as follows: The selecting-needles are provided with shallow U-shaped bends  $c'$  and the rods D with corresponding bends  $d'$ . The opposite ends of the levers N are provided with elongated eyes  $n$  communicating with the exterior of the lever, preferably through oblique slots  $n'$ , although the communicating slots may be made at right angles to the eye, as shown at  $n^2$ , Fig. 4. By passing the bends  $c'$  and  $d'$  through the slots and into the eyes of the lever and then turning the levers flatwise with respect to the bank of needles and rods, as shown in Fig. 2, the lever secures a firm grip upon the needle or rod and one which will not become loosened by any slight vibratory movement which the needle or rod may make.

The operation of the needles and their effect upon the keys and through the keys upon the punches are fully set forth in the Letters Patent hereinabove referred to and need not be repeated here at length.

For the purpose of numbering the several cards as they pass from the punches I have provided a numbering-machine O of any well-known or approved form—in the present instance one in which the article to be numbered is brought into contact with the numbering-disks and by such movement adjusts the numbering-disks so as to print the next successive number when the numbering-disks are again brought into contact with the article to be numbered. Numbering-machines of this character are well known in the art, and the particular type or structure of the numbering-machine forms no part of my present invention. I locate said numbering-machine on the main frame A at one edge of the path along which the chain of blank cards P is arranged to pass, and by attaching a bracket  $a^2$  to the movable die which carries the blank cards toward the punches I provide for lifting the punched card into contact with the numbering-disks simultaneously with the lifting of a blank card into contact with the punches.

To lock the numbering-machine to the main frame A, so that it may readily be released and swung out of the way, I provide a swinging bracket Q, having a split socket  $q$  for the reception of the stem  $o$  of the numbering-machine, and a clamp-screw  $q'$  for drawing the walls of the split socket together around the stem of the numbering-machine and attach the said bracket Q to a projecting portion  $r$  of a fixed plate R by means of a screw  $s$ , having attached thereto a lever S, with a handle  $s'$  for operating it.

The plate R may be screwed fast to the side of the main frame A near its corner, as shown in Fig. 1, and the projecting portion  $r$  of said

plate is intended to be spaced a short distance from the end of the frame A to permit the lever S to swing between it and the projecting portion *r* of the plate. When the lever is in its upright position, as shown in Figs. 1 and 10, the screw *s* will draw the bracket Q tightly against the plate *r* and thereby lock the numbering-machine in operative position. When it is desired to throw the numbering-machine off out of the way, as shown in dotted lines in Fig. 11, all that is required is to throw the lever S around a half-turn, more or less, thereby loosening the bracket Q from the plate and permitting it, together with the numbering-machine, to be turned on the screw as a pivot off to one side. When turned in its horizontal position, the numbering-machine may be locked in such position by throwing the lever S back far enough to tighten the screw.

In presenting chains of pattern-cards to the machine it is sometimes required to handle chains of cards which are not wired and which cannot therefore be supported upon the bracket *a* in the manner shown and described in the Letters Patents hereinabove referred to. Such a chain of unwired cards is represented in the present case in Fig. 1 by T. To adapt the machine to receive such a chain of cards, I provide a removable guide or race plate U, which may be secured in position within the bracket *a* by means of a binding-bolt *u* and may be removed at pleasure whenever it is required to use a chain of wired cards.

The terms "wired cards" and "unwired cards" are employed in the art to distinguish between a chain of cards provided at intervals of sixteen cards, more or less, with laterally-projecting wires for suspending the chain in loops between a pair of supporting-arms, and a chain of cards without such provision of suspension.

What I claim is—

1. The combination with the levers provided with eyes, of the selecting-needles provided with bends and extending crosswise through the levers with their bends engaged in the eyes of the levers, substantially as set forth.

2. In combination, the selecting-needles provided with bends, means for operating the needles, and flat transmitting-levers provided with eyes in their ends and with a slot leading from the eye to the edge of the lever to receive the bend in the needle, substantially as set forth.

3. In combination, the selecting-needles provided with bends, means for operating the needles, and flat transmitting-levers provided with elongated eyes in their ends and with an oblique slot leading from the elongated eye to the edge of the lever to receive the bend in the needle, substantially as set forth.

4. In combination, the selecting-needles arranged in banks, separating-bars extending transversely to the several banks of needles, and a tension device comprising tension-bars located upon opposite sides of each of the sev-

eral banks, draw-rods extending transversely to the several tension-bars, and means for applying tension to the draw-rods to press the tension-rods against the needles, substantially as set forth.

5. In combination, the selecting-needles arranged in banks, tension-bars arranged upon opposite sides of each bank, draw-rods engaged at one end with a head-piece and at the opposite ends provided with angle-levers, bearings for one arm of each angle-lever upon the outside tension-bar, and a tension device engaged with the other arms of the angle-levers to force the tension-bars into engagement with the needles, substantially as set forth.

6. In combination, the bank of selecting-needles, the tension-bars, the draw-rods, the angle-levers pivoted to the draw-rods, and the tension device engaged with the levers, one arm of the angle-lever being provided with a series of seats for the attachment of the tension device to vary the tension upon the needles, substantially as set forth.

7. In combination, the pattern-cylinder mounted to rotate, a spur-wheel fixed to rotate therewith, a pair of spur-wheels arranged to intermesh with each other and one of them arranged to intermesh with the first-named spur-wheel, a vibrating lever, means for operating the lever and a pawl secured to the vibrating lever in position to be swung into engagement with the one or the other of the pair of spur-wheels to rotate the pattern-cylinder in one direction or the other, substantially as set forth.

8. The combination with the pattern-cylinder and its supports, of a longitudinally-sliding spindle keyed to rotate with the cylinder, a cylinder-operating wheel loosely mounted within the supporting-bearing about the spindle, means for locking the operating-wheel against displacement within the bearing, a cylinder-retaining disk fixed to the spindle, means for locking the disk to the cylinder-operating wheel, and means for holding the spindle in position in engagement with the cylinder, substantially as set forth.

9. In combination, the pattern-cylinder and its supports, the longitudinally-movable spindle for locking and releasing the cylinder, means for rotating the cylinder, a cylinder-retaining disk fixed to the longitudinally-movable spindle, a dog for engaging the disk and holding it in the desired rotary adjustment and also it and the spindle in working longitudinal adjustment, a swinging arm, a spring connecting the arm with the dog and a stop for holding the arm, under the tension of the spring in position to draw the dog into engagement with the disk, substantially as set forth.

10. In combination, the main supporting-frame, the carriage arranged to reciprocate thereon, the pattern-cylinder supported on the carriage, means for adjusting the pattern-cylinder toward and away from the carriage, a sliding arm connected at one end with the



5 cylinder-support and at the opposite end with the carriage, cylinder-operating mechanism carried by said sliding arm and means for transmitting motion to said cylinder-operating mechanism, substantially as set forth.

10 11. The combination with the main frame, the punches, means for passing a chain of blank cards beneath the punches and means for moving the cards toward the punches, of a numbering-machine, a swinging bracket forming a support for the numbering-machine and means for presenting an advanced card to the numbering-machine simultaneously with the presentation of a previous card to the punches, substantially as set forth.

15 12. The numbering-machine support comprising a bracket having a socket for the reception of the shank on the numbering-machine, a screw mounted in a fixed support on the main frame and having a screw-threaded engagement with the bracket and means for rotating the screw to draw the bracket into

contact with or release it from the screw-support, substantially as set forth.

25 13. The numbering-machine support comprising a bracket having a split socket for the reception of the shank of the numbering-machine, a plate fixed to the main frame and having an extended portion spaced from the main frame, a screw mounted in the extended portion of the plate and having a screw-threaded engagement with the bracket and the lever fixed to the screw and having a swinging movement within the space between the main frame and the extended portion of the bracket and operating-screw to lock the bracket to and release it from the extended portion of the plate, substantially as set forth.

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Witnesses:

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