March 31, 1931. W. W. LASKER 1,798,610

BACK SPACE AND COLUMN NORMALIZING MECHANISM FOR CARD PERFORATING MACHINES

Filed April 26, 1927 4 Sheets-Sheet 1

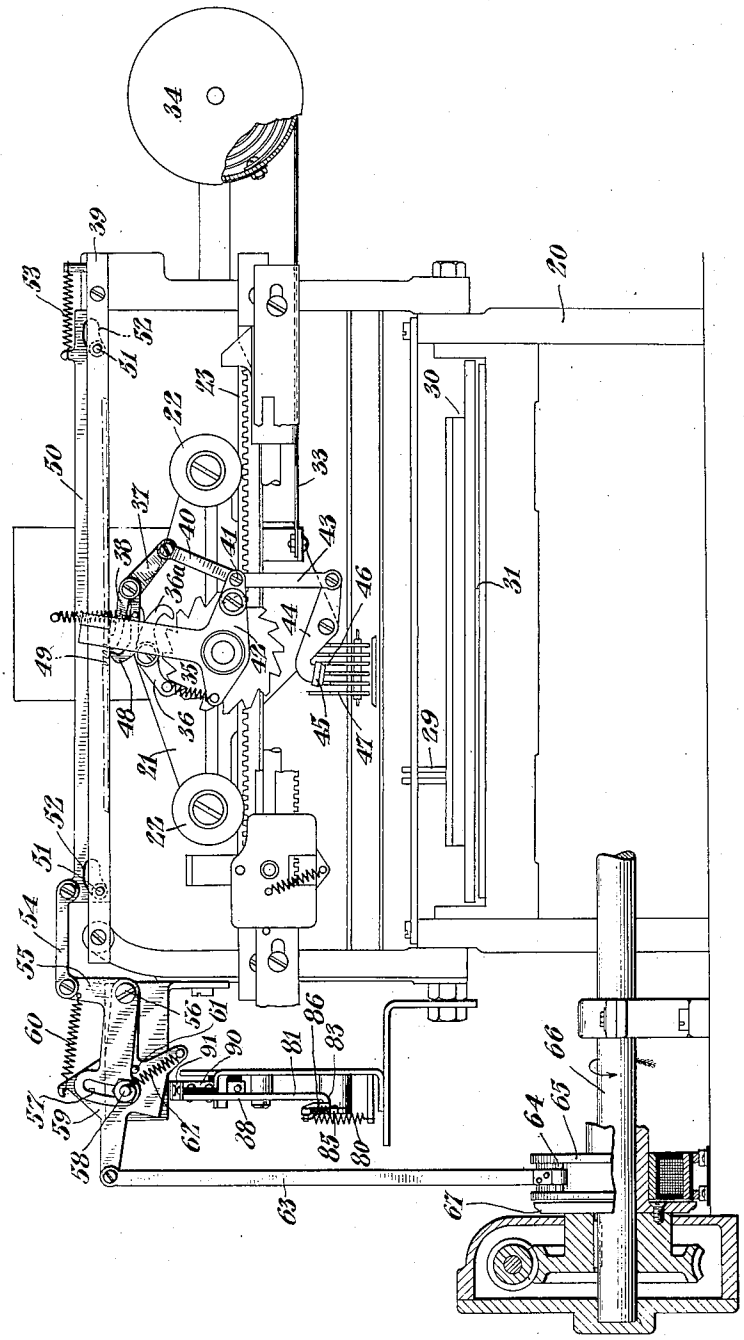


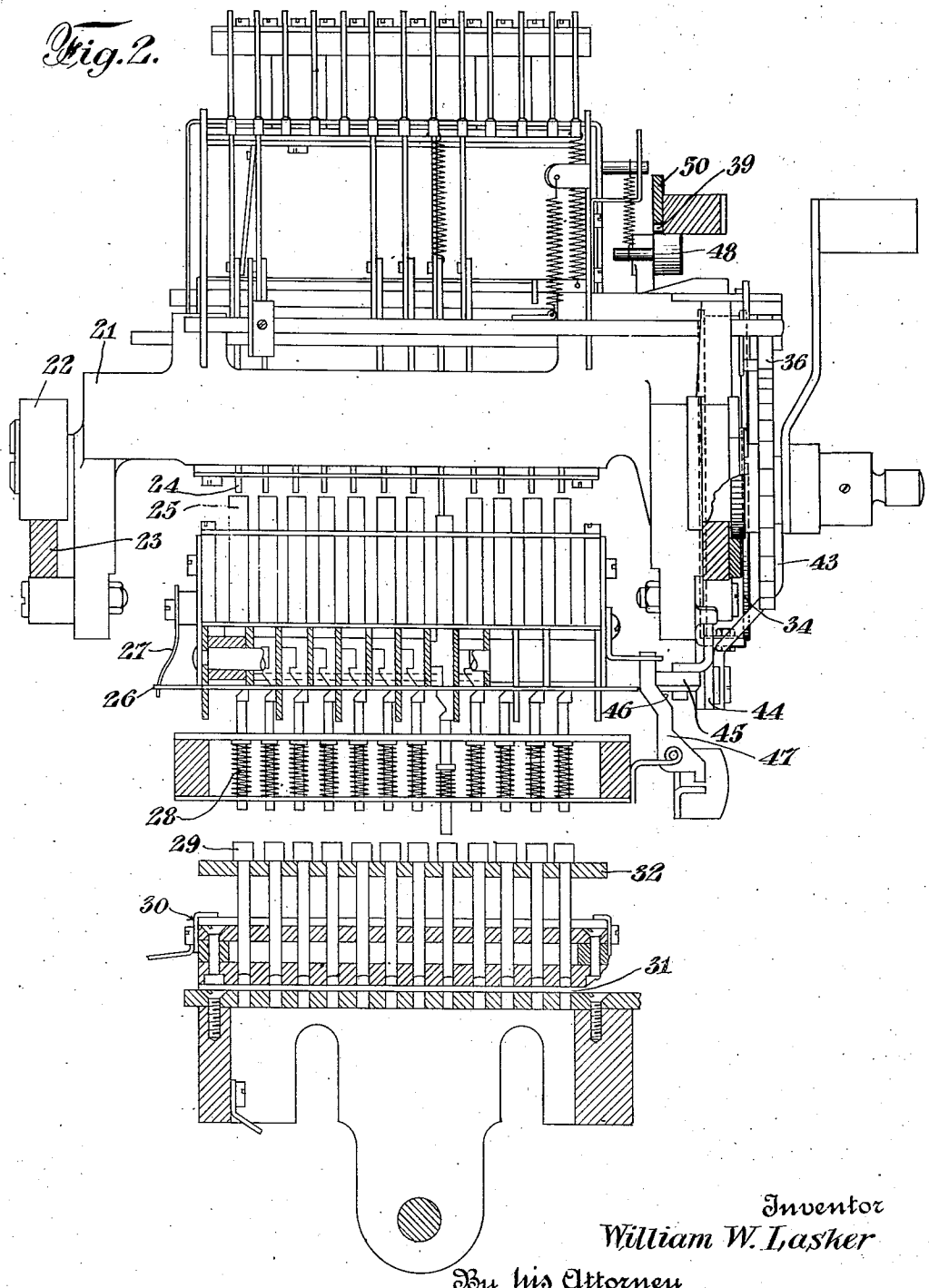
Fig. 1.

Inventor
William W. Lasker
By his Attorney
W. A. Sparks

March 31, 1931. W. W. LASKER 1,798,610

BACK SPACE AND COLUMN NORMALIZING MECHANISM
FOR CARD PERFORATING MACHINES
Filed April 26, 1927 4 Sheets-Sheet 2

Fig. 2.



Inventor
William W. Lasker
By his Attorney
H. A. Sparkes

March 31, 1931. W. W. LASKER 1,798,610

BACK SPACE AND COLUMN NORMALIZING MECHANISM FOR CARD PERFORATING MACHINES

Filed April 26, 1927 4 Sheets-Sheet 3

Fig. 10.

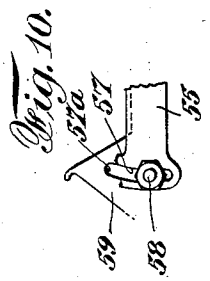


Fig. 3.

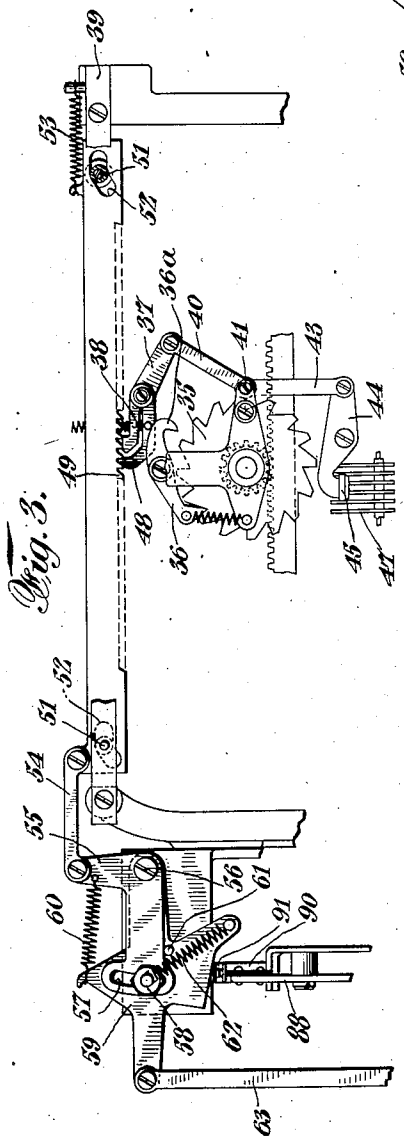
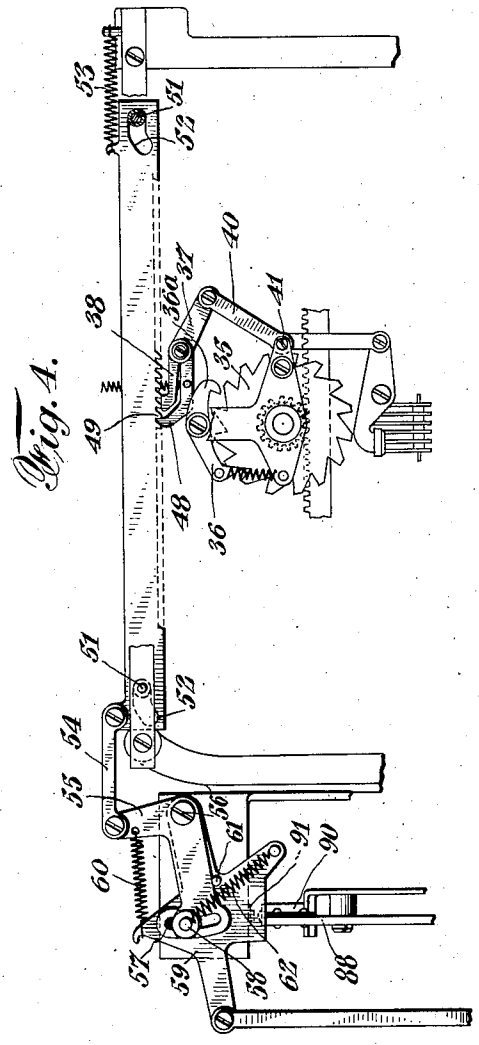


Fig. 4.



Inventor
William W. Lasker

By his Attorney
W. A. Sparks

March 31, 1931. W. W. LASKER 1,798,610

BACK SPACE AND COLUMN NORMALIZING MECHANISM FOR CARD PERFORATING MACHINES

Filed April 26, 1927 4 Sheets-Sheet 4

Fig. 5.

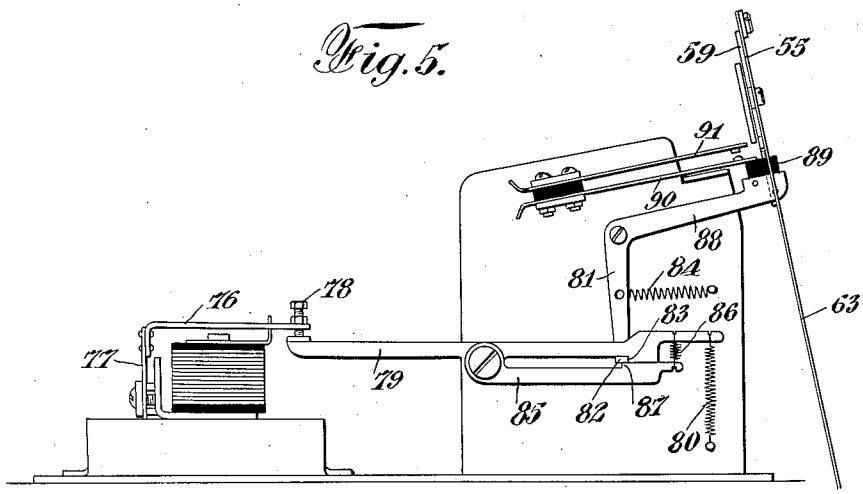


Fig. 6.

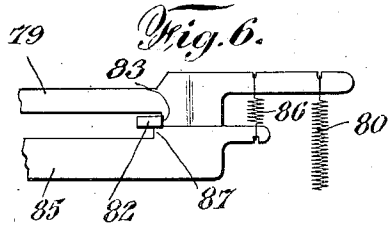


Fig. 7.

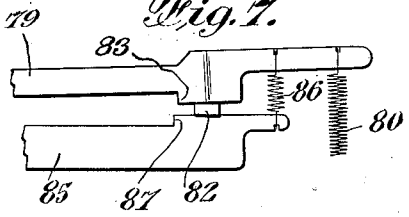


Fig. 8.

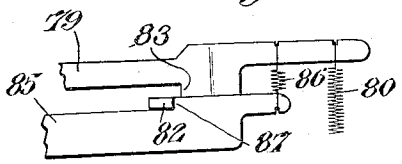
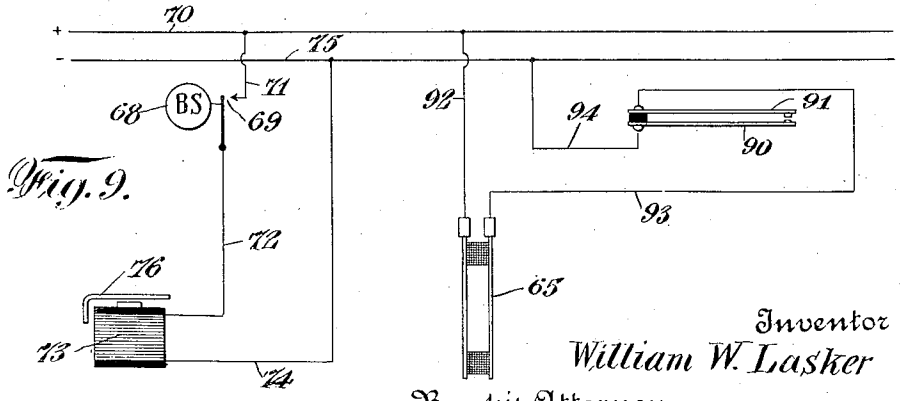


Fig. 9.



Inventor
William W. Lasker
By his Attorney
W. A. Sparks

Patented Mar. 31, 1931 1,798,610

UNITED STATES PATENT OFFICE

WILLIAM W. LASKER, OF BROOKLYN, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO REMINGTON RAND INC., OF NEW YORK, N. Y., A CORPORATION OF DELAWARE

BACK-SPACE AND COLUMN-NORMALIZING MECHANISM FOR CARD-PERFORATING MACHINES

Application filed April 26, 1927. Serial No. 186,718.

This invention relates to means for magnetically effecting back-space movement of the carriage of a card perforating machine and concomitantly normalizing the mechanism in the column to which the carriage is back-spaced.

One of the objects of the invention is to provide simple and efficient magnetic means for back-spacing the step-by-step moving carriage or card punching or perforating machine.

Another object of the invention is to normalize the setting mechanism of the punch machine in one column after another concomitantly with the back-spacing of the carriage.

Another object is to ensure the operation of the back-spacing and normalizing mechanism upon depression of the back-space key.

Another object is to prevent more than one back-spacing operation at each operation of the controlling or back-space key.

Other objects will appear from the following specification and appended claims. I attain all of these objects by means shown in the accompanying drawings, in which:—

Fig. 1 is a front elevation of a punch machine for perforating cards, provided with my invention, parts being broken away for the sake of clearness.

Fig. 2 is a vertical front to rear section of the machine shown in Fig. 1.

Fig. 3 is a detail of the back-spacing and normalizing mechanism in a partially operated condition.

Fig. 4 is a view similar to Fig. 3 but showing all the mechanism in a fully operated condition.

Fig. 5 is a view of the controlling devices in normal condition.

Figs. 6, 7, and 8 are fragmentary detail views of operations of the controlling mechanism in different conditions of operation.

Fig. 9 is a diagrammatic view indicating the electric circuits, contacts and magnets.

Fig. 10 is a fragmentary detail view of a pair of co-acting levers.

Like characters of reference refer to like parts in all views.

Referring particularly to the drawings, my invention is shown as applied to a form of key punch or card perforating machine in general use and commonly known as the Powers punch or card perforating machine, such for example as shown in Letters Patent of the United States No. 1,643,779 granted to W. W. Lasker, Sept. 27, 1927. The machine is used for perforating cards to indicate statistics and other data and such machines are constructed with punch mechanism which is set from keys and then operated to perforate cards in accordance with the setting. The purpose of the present invention is to provide such a machine with mechanism for wiping out a wrongly set punch control and at the same time returning the carriage so as to be able to correctly set the proper punch for the column. In the drawings only so much of the punch or perforating machine is shown as is necessary for an understanding of the operation of the mechanism embodying the present invention.

Generally speaking, 20, Fig. 1 represents the main framework of the machine and 21 represents the carriage frame which is mounted on rollers 22 running on rails 23 secured to the main frame of the machine. The carriage carries a plurality of depressible setting pins 24, Fig. 2, which are operable from keys (not shown) to effect depression of set-bars 25, as is well known in the art. When a set-bar 25 has been depressed, it is locked in depressed position by one of a plurality of locking slides or latches 26 normally moved to effective or latching position by respective springs 27. Each set-bar 25 is located directly over and in contact with a respective set-bar spring-pin 28. The springs of pins 28 tend constantly to return them and their respective set-bars 25 to normal or upper position. There are a plurality of rows or columns of set-bars 25 according to the number of columns to be perforated in the card, and each row or column of set-bars 25 includes a plurality of bars, one for each operating member 24 of the carriage. The carriage is provided with only a single row or column of operating members 24 which may be moved into register with successive rows or columns of set-bars 25.

There are a plurality of punches 29 mounted in a stripper-bar 32 and extending into a movable frame indicated generally at 30, one punch being provided for each pin 28 and arranged in alignment therewith.

When the pins 28 have been set to represent the desired amount, and with a card in the card passage 31, the frame 30 is moved upwardly carrying with it all of the punches 29 by reason of the record card contacting the bottom of the punches. As the frame moves upwardly such of the punches 29 as meet set pins 28 will be held against further upward movement and will effect perforating or punching of the card. The plate 32 acts as a guide for the punches in their upward movement and as a means for withdrawing or stripping the punches from the card upon downward movement of the frame 30. All of the above described mechanism is old and well-known in the art and a part of the ordinary punching mechanism of the Powers punch machine.

It frequently happens that in setting up data in the machine, the operator depresses the wrong set-bar 25 and cooperative pin 28. At the same time the carriage automatically steps to the next column of pins. In order to return the carriage positively and promptly to the row of pins in which the mistake has occurred and to permit re-setting in that row by wiping out what has already set therein, the present invention has been evolved.

Referring now particularly to Fig. 1 it will be seen that the carriage 21 is constantly urged toward the right of the machine by a tape 33 and spring drum 34. This movement of the carriage to the right is under control of an escapement wheel 35 and escapement pawls 36, 36[a], as is well-known in the art. Pivotally mounted on the carriage frame 21 is a rock lever 37, having an upwardly extending arm 38 with a broadened upwardly facing portion resting normally against the lower edge of a bar 39 secured to a stationary part of the machine. The lower arm of the rock lever 37 is pivoted to a link 40 the lower end of which link is pivotally connected to a pin 41 on a rock member 42. A link 43 has its upper end pivoted on pin 41 and is pivotally connected at its lower end to one arm of a lever 44. Lever 44 is pivoted to the frame 21 of the carriage and carries a beveled roller 45. The roller 45 normally stands over the inclined portion 46 of a release lever 47, Figs. 2, 3 and 4. There are a plurality of these release levers 47 one for each of the latch bars 26, and it is obvious that when a roller 45 is depressed so as to ride upon the face 46 of any one of the release levers 47 it will cause such release lever to move its respective latch bar 26 to release any of the set-bars 25 which may be in set position, whereupon such set-bar will be returned to normal position by the action of its respective set-bar spring-pin 28.

Pivoted on the same pivoted pin that the lever 37 is pivoted on, Fig. 1, is a carriage return pawl 48 the free end of which terminates in a tooth which points toward the right of the machine, as seen in Figs. 1, 3, and 4. The pawl 48 is quite broad and is normally pressed into contact with the lower face of the stationary bar 39 by a spring connected at one end to the pawl 48, and anchored at its other end to a pin extending from a part of the carriage framework. The pawl 48 and the broadened face of lever 38 extend rearwardly so as to both lie under the ratchet-bar 50. This ratchet-bar is slidably mounted on the stationary bar 39 by means of headed pins 51 which pass through slots 52 of the bar 50. These slots 52 are formed with a diagonally extending left-hand portion and a horizontal right-hand portion. The teeth 49 on the lower edge of bar 50 are undercut so that they point leftwardly, as shown in Figs. 3 and 4, and a spring 53 normally pulls the bar 50 to the right so that its teeth are raised out of engagement with the pawl 48 and arm 38, such raising of the bar being effected by the co-action of pins 51 and the diagonal portions of slots 52.

The ratchet-bar 50 is connected by a link 54 to the upright arm of a bell-crank lever 55 pivoted on pin 56 and formed with an arcuate slot 57, Figs. 1, 3, 4 and 10, embracing a pin 58 on a stationary part of the machine. A rock member 59 is also pivoted on pin 56 and formed with an arcuate slot 57[a] co-extensive with the slot 57 of the bell-crank. A spring 60 connects an upward projecting part of member 59 with the upright arm of the bell-crank 55, and a pin 61 on member 59 acts as a stop for 55 so that member 59 and bell-crank 55 normally move as a single piece. It may be stated at this point that the resilient connection is here provided so that if for any reason the carriage is prevented from making back-spacing movement, and the back-spacing device is operated, then member 59 can move independently and the mechanism will not be injured. A spring 62 tends constantly to hold members 55 and 59 in their upper position as determined by pin 58 and slots 57 and 57[a].

The free end of member 59 is connected by a link 63 and pin 64 with the shell of a magnet 65 mounted loosely on a constantly driven shaft 66 of the machine. Secured to shaft 66 and mounted in close proximity to the magnet 65 is a disk or flange 67.

Referring now to Figs. 5 to 9, a back-spacing key 68 when depressed closes a switch at 69 so that the current flows from line 70, over wires 71 and 72 to relay 73, then over wire 74 back to the return line 75. The relay armature 76 is supported at 77 and has its free end provided with an adjusting screw 78.

The bottom of said screw 78 rests upon the end of a stop lever 79. As shown in Fig. 5 the stop lever 79 has its right-hand arm drawn down by a spring 80, so as to keep the left-hand arm in contact with the screw 78. A lever 81 is pivoted to a stationary portion of the machine and has its lower arm terminating in a laterally extending finger 82 which passes under the right-hand arm of lever 79 and is drawn into contact with a stop shoulder 83 formed on the bottom of stop lever 79. The finger 82 is held in contact with shoulder 83 by the action of spring 84. Mounted on the same pivot as stop lever 79 is an auxiliary stop arm 85, the free end of which is supported by a spring 86 so that normally arm 85 engages with the stop lever 79 adjacent the stop shoulder 83. Arm 85 is formed with a stop shoulder 87 slightly to the left of stop shoulder 83 as is clearly shown in Figs. 5 and 6.

The horizontally extending arm 88 of the lever 81 has secured to its upper face at its free end an insulating piece 89 which lies under a contact member 90. Contact member 90 is adapted to be raised into contact with a second contact member 91 so as to close the circuit which is shown in Fig. 9 running from the line 70 through a wire 92 to the magnet 65 and from said magnet over a wire 93 to contact member 91 and from contact member 90 over the wire at 94 to the return line 75.

The operation of the mechanism described is as follows: When the operator depresses the back-space key 68, Fig. 9, the circuit is closed thru 70, 71, 69, 72, 73, 74 and 75. This energizes the relay magnet 73 which draws down its armature 76, Fig. 5 so that screw 78 effects rocking of stop lever 79 sufficiently to remove stop shoulder 83 from engagement with finger 82, and the latter is drawn from the position shown in Figs. 5 and 6 to the position shown in Fig. 7. The movement of lever 81 is limited by the contacts 90 and 91 which are together strong enough for this purpose. As finger 82 moves over, the lever 81 rocks so that the insulating element 89 raises contact 90 into engagement with contact 91 thereby closing the circuit shown in Fig. 9 as including elements 70, 92, 65, 93, 91, 90, 94, and 75. This effects energizing of magnet 65 which grips the disk 67, Fig. 1, and rotates therewith.

The rotation of the magnet 65 draws down link 63, Figs. 1, 3, and 4, and carries with it the rock member 59 and the bell-crank 55. This draws link 54 to the left carrying with it the bar 50. As bar 50 moves to the left, the inclined portions of slots 52 co-act with pins 51 to depress bar 50 until its teeth 49 engage the hook 48 and lock to it by reason of the respective rakes of the teeth. As the bar 50 is moved farther, the pins 51 travel in the horizontal portions of slots 52 and the engagement of the tooth 49 of bar 50 with the tooth of pawl 48 draws the carriage leftwardly slightly more than a column space so as to insure proper engagement of the escapement pawl and wheel. At the same time the teeth of bar 50 have depressed the arm 38 of the lever 37 thereby lifting links 40 and 43 and rocking member 44 so that the roller 45 is in position to engage the oblique faces 46 of the release levers 47, and as the carriage moves to the left, the roller 45 operates the release lever 46, of the column to which the carriage is returned, thereby releasing any members 25 and 28 which may be held depressed.

When the member 59 was pulled down by the link 63 and after sufficient movement has been had to effect the back-spacing of the carriage and the wiping out of the column setting, the lower edge of the member 59 contacted with insulating member 89, Fig. 5, depressing the latter and releasing contact 90 so as to break the circuit through the magnet 65. The magnet now being deenergized, releases its grip on disk 67, and the magnet 65 links 63 and members 59, 55, 54, and 50 return to their normal positions under influence of springs 53 and 62. Depression of the member 89 rocked the lever 81 and positioned the finger 82 behind the auxiliary stop shoulder 87. Upon deenergizing of the magnet 73, the spring 80 returns the parts to the position shown in Fig. 6.

While I have described what I deem to be the most desirable embodiment of my invention, it is obvious that many changes in details could be made without departing from the spirit of my invention, and I, therefore, do not limit myself to the exact details of construction herein set forth, nor to anything less than the whole of my invention as hereinbefore described and as hereinafter claimed.

What I claim is:

1. In a device of the class described, the combination with set-up mechanism, a carriage having means for setting up said set-up mechanism, and automatic means for driving said carriage step by step in one direction during set-up of said setting mechanism, of means for back-spacing said carriage a single step at a time, and means brought into action by the back-spacing mechanism for erasing the corresponding setting in said set-up mechanism.

2. In a device of the class described, the combination with a carriage, and means for automatically moving said carriage in one direction, of a member for moving said carriage one step at a time in the opposite direction, a constantly running shaft, an electro-magnet mounted on said shaft and connected to said member, and means for energizing said magnet at will.

3. In a device of the class described, the combination with a carriage, and means for automatically moving said carriage in one

direction, of a member for moving said carriage one step at a time in the opposite direction, a constantly running shaft, an electro-magnet mounted on said shaft and connected to said member, means for energizing said magnet at will, and automatic means for effecting de-energizing of said magnet.

4. In a device of the class described, the combination with a carriage, and means for automatically moving said carriage in one direction, of a member for moving said carriage one step at a time in the opposite direction, a constantly running shaft, an electro-magnet mounted on said shaft and connected to said member, and means for energizing said magnet at will, the train of connections from said electro-magnet to said carriage including a resilient device for safety.

5. In a device of the class described, the combination with a carriage, set-up devices, and releasing means for said set-up devices, of a lever mounted on said carriage and operable to effect operation of said releasing means, an engaging element on said carriage, a member movable into engagement with said engaging element for effecting back-space movement of said carriage, said member being correlated with said lever for effecting operation of said releasing means, and electro-magnetic means for operating said member.

6. In a device of the class described, the combination with set-up mechanism, a carriage having means for setting up said set-up mechanism, and automatic means for driving said carriage step by step in one direction during setting of said set-up mechanism, of means for back-spacing said carriage a single step at a time, means effective during back-spacing for erasing the corresponding setting in said set-up mechanism and means requiring completion of the back space movement after it is initiated.

7. In a device of the class described, the combination with a setting-up carriage, set-up devices adapted to be set by means on said carriage and releasing means for said set-up devices, of a lever mounted on said carriage and operable to effect operation of said releasing means, an engaging element on said carriage, a member movable into engagement with said engaging element for effecting back-space movement of said carriage, said member being correlated with said lever for effecting operation of said releasing means, power means for actuating said member for back space movement and a key controlling actuation of said member by said power means.

8. In a device of the class described, the combination with a setting-up carriage, set-up devices adapted to be set by means on said carriage and releasing means for said set-up devices, of a lever mounted on said carriage and operable to effect operation of said releasing means, an engaging element on said carriage, a member movable into engagement with said engaging element for effecting back-space movement of said carriage, said member being correlated with said lever for effecting operation of said releasing means, power means for actuating said member for back space movement, resiliently extensible connecting means between said power means and said member and key controlled means for controlling actuation of said member by said power means.

9. In a device of the class described, the combination with a setting-up carriage, set-up devices adapted to be set by means on said carriage and releasing means for said set-up devices, of a lever mounted on said carriage and operable to effect operation of said releasing means, an engaging element on said carriage, a member movable into engagement with said engaging element for effecting back-space movement of said carriage, said member being correlated with said lever for effecting operation of said releasing means, power means for actuating said member for back space movement, connections between said member and said power means, including a safety device, key controlled means for effecting operation of said member by said power means, and automatic means for rendering said power means ineffective when said member has completed a back space movement of said carriage, said safety device being brought into action if said back space movement is blocked.

10. The combination of a carriage having means for setting set-up devices, means for advancing the carriage step-by-step in setting said step-up devices, back space mechanism for moving the carriage back one space at a time, power means for operating said back space mechanism and means for automatically disabling said power means at the completion of the back space movement.

11. The combination of a carriage having means for setting set-up devices, means for advancing the carriage step-by-step in setting said set-up devices, back space mechanism for moving the carriage back one space at a time, power means for actuating said back space mechanism, a key for controlling operation of the back space mechanism by said power means and means actuated by the back space mechanism for disconnecting said power means independently of said key.

12. The combination of a carriage having means for setting set-up devices, means for advancing the carriage step-by-step in setting said set-up devices, back space mechanism for moving the carriage back one space at a time, a rotary power shaft, clutch mechanism for connecting said back space mechanism to said power shaft, a key for control-

ling operation of said clutch for effecting back space movement and means actuated by the back space mechanism for disconnecting said clutch.

13. The combination of a carriage having means for setting set-up devices, means for advancing the carriage step-by-step in setting said set-up devices, back space mechanism for moving the carriage back one space at a time, a power actuated shaft, a magnetic clutch adapted when energized to be rotated by said shaft, means connecting said magnetic clutch to the back space mechanism for operating the latter and a key for controlling energization of said magnetic clutch.

14. The combination of a carriage having means for setting set-up devices, means for advancing the carriage step-by-step in setting said set-up devices, back space mechanism for moving the carriage back one space at a time, a power actuated shaft, a magnetic clutch adapted when energized to be rotated by said shaft, means connecting said magnetic clutch to the back space mechanism for operating the latter, a key for controlling energization of said magnetic clutch, and means for maintaining said magnetic clutch energized until the back space movement is completed.

15. The combination of a carriage having means for setting set-up devices, means for advancing the carriage step-by-step in setting said set-up devices, back space mechanism for moving the carriage back one space at a time, magnetic means for actuating said back space mechanism, connections between said magnetic means and the back space mechanism, key actuated means for energizing said magnetic means to effect back spacing and means operated by the back space mechanism for deenergizing said magnetic means during back space movement.

16. The combination of a carriage having means for setting set-up devices, means for advancing the carriage step-by-step in setting said set-up devices, back space mechanism for moving the carriage back one space at a time, a continuously rotating power shaft, a magnetic clutch thereon, means for connecting said clutch to the back space mechanism for actuating the latter, a switch for closing the circuit of said magnetic clutch, a relay controlling the closing of said switch and a key for operating said relay for effecting back space movement.

17. The combination of a carriage having means for setting set-up devices, means for advancing the carriage step-by-step in setting said set-up devices, back space mechanism for moving the carriage back one space at a time, a continuously rotating power shaft, a magnetic clutch thereon, means for connecting said clutch to the back space mechanism for actuating the latter, a switch for closing the circuit of said magnetic clutch, a relay controlling the closing of said switch, a key for operating said relay for effecting back space movement, and means for opening the circuit of and deenergizing said magnetic clutch at the completion of the backspace movement whether or not said key is held down.

18. The combination of a carriage having means for setting set-up devices, means for advancing the carriage step-by-step in setting said set-up devices, back space mechanism for moving the carriage back one space at a time, magnetic means for actuating said back space mechanism, a switch for controlling the circuit of said magnetic means, means for urging said switch toward closing, means normally preventing the closing of said switch and a key for actuating the last named means for releasing said switch for closing.

19. The combination of a carriage having means for setting set-up devices, means for advancing the carriage step-by-step in setting said set-up devices, back space mechanism for moving the carriage back one space at a time, magnetic means for actuating said back space mechanism, a switch for controlling the circuit of said magnetic means, means for urging said switch toward closing, means normally preventing the closing of said switch and a key for actuating the last named means for releasing said switch for closing, said back space mechanism being adapted to open said switch and break the circuit of said magnetic means at the completion of the back space movement.

In testimony whereof I affix my signature.

WILLIAM W. LASKER.