Feb. 1, 1938. H. A. WEINLICH ET AL 2,107,134

CARD PUNCH FEED MECHANISM

Original Filed Jan. 14, 1932

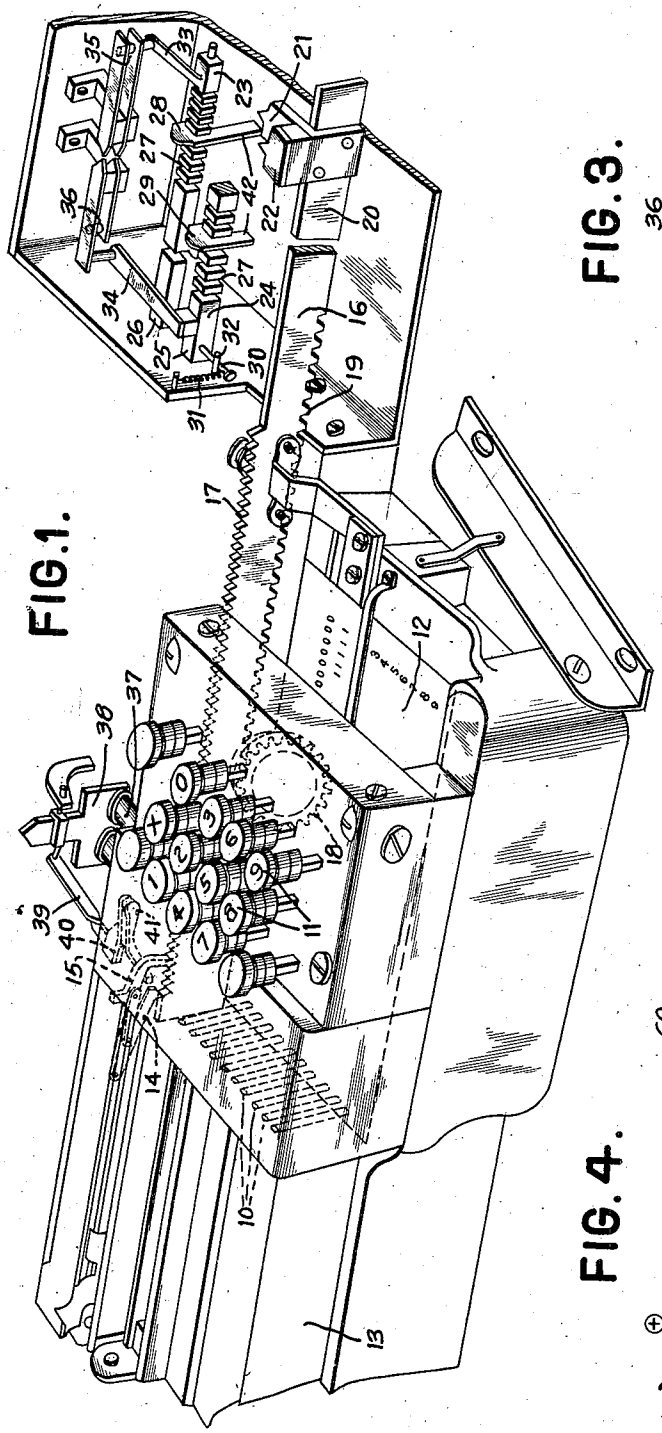


FIG. 1.

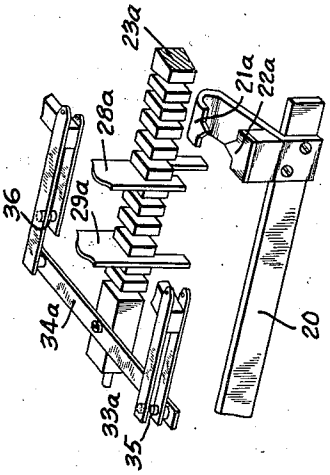


FIG. 3.

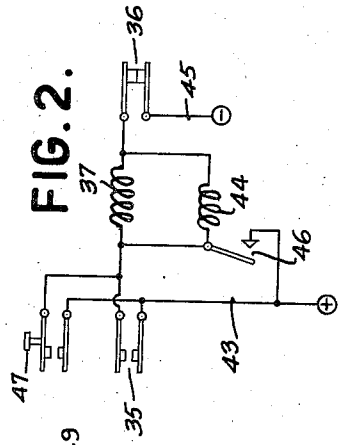


FIG. 2.

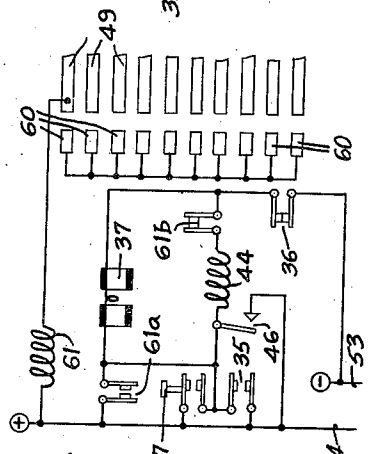


FIG. 4.

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CARD PUNCH FEED MECHANISM

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Original application January 14, 1932, Serial No. 586,496, now Patent No. 1,954,232. Divided and this application November 15, 1933, Serial No. 698,098. In Germany February 13, 1931

10 Claims. (Cl. 164—113)

This invention relates to mechanism for controlling the feeding of a carriage such as may be used in perforating machines, reproducing and verifying machines, and the like.

The present application is a division of copending application Serial No. 586,496 filed January 14, 1932, now Patent 1,954,232 granted April 10th, 1934.

The broad objects of the invention are to generally improve machines of the above types by making them simpler in construction, more convenient to operate, more reliable in operation, and cheaper to construct.

The primary object of the invention is to provide novel and improved mechanism for controlling the feeding of a carriage such as might be used in machines of the above types.

A general object is to provide a novel automatic column skipping mechanism.

A specific object is to provide an electrically controlled automatic column skipping mechanism.

Various other objects, advantages, and features of the invention will be particularly pointed out in the following description and claims or will be apparent after a study thereof and of the accompanying drawing.

In the drawing:

Fig. 1 is a view in perspective of a perforating machine embodying the present invention;

Fig. 2 is a diagram of the electrical connections of mechanism illustrated in Fig. 1;

Fig. 3 is a detail view of a modification of certain parts of the mechanism illustrated in Fig. 1;

Fig. 4 is a view showing how the invention may be coordinated with an automatic decimal tabulator of the type described in the above application.

The construction and operation of the invention may be understood by showing how it may be embodied in a well known perforating machine, for instance, the one described in Letters Patent No. 1,803,979 granted May 5, 1931 to John T. Schaaff. Since the machine described in said patent has now become well known in the art only brief mention will be made herein of its construction and operation. It will suffice to say that the machine has a series of punches 10 selectively controlled by keys 11 corresponding to the twelve index-point positions in the columns of the card. The machine shown is of the electrically operated type wherein operation of any key 11 selects one of the punches 10 for subsequent actuation by a magnet which forces the punch through a blank card 12 on the card table 13.

The magnet also operates escapement mechanism comprising a holding dog 14 and a release dog 15 to cause the card carriage 16 to move one column space to the left (Fig. 1) after the punching operation has been completed and the selected punch withdrawn from the card.

The dog 15 normally engages rack teeth 17 in the carriage and prevents movement to the left (Fig. 1) while the dog 14 is normally disengaged from the rack. A carriage feeding spring drum 18 is geared to teeth 19 in the carriage and normally has a tendency to feed the carriage 16 to the left (Fig. 1). It will be seen that it is merely necessary to lift dog 15 without disturbing dog 14 whenever it is desired to release the carriage for feeding movement greater than is permitted by a single operation of the escapement mechanism alone.

The mechanism for causing automatic skipping of a field in the blank card 12 when it is not desired that any perforations be made in said field comprises mechanism operatively connected with the carriage and is shown in the right hand portion of Fig. 1. As shown, the right end of carriage 16 has an extension 20 carrying two rearwardly extending cam members 21, 22 of different lengths. Two stop bars 23, 24, respectively are pivotally mounted as at 25, 26 to a frame fixed to the base of the machine and said bars extend parallel with the extension 20 of carriage 16. The stop bar 23 overlies the cam member 21 while the stop bar 24 overlies the cam member 22 and both bars are suitably notched as at 27 to removably retain suitable carriage control stops 28, 29 respectively.

Both stop bars 23, 24 normally occupy the position shown in Fig. 1 and are so held yieldingly by means comprising a pin 30 fixed to each stop bar and held by a spring 31 against a second pin 32 carried by the frame. The stop bars 23, 24 have rearwardly extending arms 33, 34 adapted to operate contacts 35, 36, respectively, when one of said bars is rocked in a manner to cause its arm 33 or 34 to become raised. The contacts 35 are closed whenever the arm 33 is raised by rocking of stop bar 23 while contacts 36 are opened by similar movement of stop bar 24.

Associated with the dog 15 is a column skipping magnet 37 the armature 38 of which is arranged to rock an arm 39 upwardly whenever the magnet is energized. The arm 39 extends forwardly and horizontally (Fig. 1) and its free end underlies one arm of a bell crank 40 pivoted at 41 in the framework, the other arm of said bell crank being bent at an angle and un-

derlying the end of dog 15. It will be obvious that energization of magnet 37 will raise the arm 39, rock bell crank 40 upwardly and lift dog 15 out of engagement with rack teeth 17 thereby permitting the carriage 16 to move to the left under the influence of the carriage feeding spring drum 18.

The stops 28, 29 each have a downwardly extending portion 42 extending in the path of cam surfaces in cam members 21, 22 respectively so that engagement of one of the portions 42 with a cam member 21 or 22 will cause the associated stop bar 23 or 24 to be rocked as described and operate one of the pairs of contacts 35, 36.

When it is desired to set up the machine to automatically skip one or more fields in the card, each field comprising several columns, without perforating in such field, a stop 28 is placed in the notches on stop bar 23 corresponding to the first column of each field to be skipped and a stop 29 is likewise placed on the portion of stop bar 24, corresponding to the first column of the next field in which punching operations are to be effected. As the carriage 16 moves to the left (Fig. 1) in response to successive perforating operations, the stop 28 will strike the cam surface of cam element 21 and cause the stop bar 23 to be rocked to close contacts 35 thereby energizing the magnet 37.

The circuit for said magnet extends from the left current supply wire 43 (Fig. 2), contacts 35 (closed by operation of stop bar 23), magnet 37 and a holding relay 44, contacts 36 (normally closed), to right current supply wire 45. Energization of relay 44 causes contacts 46 to close thereby holding the circuit through said relay and magnet 37 until the stop 29 engages the cam surface of cam element 22 thereby opening contacts 36 and deenergizing magnet 37 and relay 44. The energization of magnet 37 will effect release of the carriage as described before and the latter will move to the left until contacts 36 are opened by the action of stop 29 whereupon said magnet will release its armature and the dog 15 will arrest the carriage in the first column of the field in which perforating operations are to be resumed.

Figure 3 illustrates a modification in which a single stop bar 23*a* is provided on which may be set stops 28*a*, 29*a*. The latter cooperate with corresponding cam elements 21*a*, 22*a* which cause the bar 23*a* to be rocked in one direction or the other to close contacts 35 or open contacts 36 through arms 33*a*, 34*a*, respectively. The operation of the parts will be obvious from the drawing and needs no further description herein.

A suitable key 47 is provided by means of which the carriage may be released at any point for movement until a stop 29 or 29*a* causes the carriage to be arrested as described. The manner in which the key 47 controls the carriage will be readily understood from the drawing without further explanation.

The blank card to be punched is placed on the card table 13 while the carriage is in its left hand position and the latter is then pushed to the right to the position shown in Fig. 1. Such movement of carriage 16 will cause the contacts 35, 36 to be actuated alternately owing to the engagement of cam elements 21, 22 with stops 28, 29 thereby causing stop bars 23, 24 to be rocked alternately. Since the first stop 28 on the right (Fig. 1) controls closure of contacts 35, the latter stop will be the last to be affected by such preliminary movement of carriage to the right and the magnet 37 would be energized at the time the carriage 16 reaches the end of its path of movement to the right. If the operator releases his hold on the carriage under such circumstances the dog 15 will not hold the carriage and the latter will immediately move to the left again until a stop 29 strikes the cam element 22 to operate contacts 36 and deenergizes the magnet 37 thereby releasing the dog and arresting the carriage. It is necessary, therefore, in order to ensure that the magnet 37 will be de-energized when the carriage is returned to starting position as described, to place a stop 29 on stop bar 24 in any one of the notches to the right of the first stop 28 on the right (Fig. 1) so that contacts 36 will be the last to be operated. It will be obvious that a stop 29*a* should also be placed to the right of the first stop 28 on the right in Fig. 3.

It will be understood that as many stops 28, 29 or 28*a*, 29*a* may be used as desired according to the number of fields which are to be skipped automatically.

One of the features of the mechanism described herein is its adaptability for use in conjunction with a decimal tabulating mechanism described in the application named hereinbefore. The manner in which this is accomplished will be readily perceived by reference to Fig. 4 which is a fragmentary view illustrating the changes in the circuits necessary to combine the two mechanisms. It will be observed from Fig. 4 that the magnet 37 and its associated circuits are arranged substantially as illustrated in Fig. 2 and a relay magnet 61 is placed in series with the top bar 49 of the circuit described in the above application. The relay magnet 61 replaces and is operated the same as the magnet 37 in Fig. 3 of said application, closing contacts 61*a* in series with the magnet 37 and opening contacts 61*b* in series with the holding relay 44.

It will be noted in Fig. 4 that the magnet 37 and the holding relay 44 are in series parallel relation with the contacts 35, 36 across the line wires 53, 54 and that the contacts 35 are in shunt with the key contacts 47 and the holding contacts 46 of relay 44. When manual operation of the automatic column skipping mechanism is desired the operator will depress the key 47 which will establish a circuit through said key and magnets 37, 44 to the right side of line 53 through the contacts 36 thereby causing the dog 15 to be raised allowing the carriage to move to the left.

As soon as one of the stops 29 strikes the cam element 22, the contacts 36 will be opened as described and break the circuit through the magnets 37, 44 which circuit is maintained through the contacts 46 of the relay magnet 44 while the carriage is in motion.

When automatic operation of the column skipping mechanism takes place contacts 35 will be closed by a stop 28 in the proper position thereby causing the mechanism to operate as if the key 47 had been depressed, the opening of contacts 36 bringing the carriage to rest in exactly the same manner as previously described.

When the decimal tabulating mechanism is being used a circuit will be set up by brushes 60 through bars 49 and the relay magnet 61 in exactly the same fashion as the magnet 37 is controlled in the above application thereby causing the contacts 61*a* to close slightly after the opening of contacts 61*b* and causing a circuit

to be set up through the magnet 37 without, however, establishing a circuit through the relay magnet 44 owing to the fact that the contacts 61b are open. This circuit through the magnet 37 will hold as long as the relay magnet 61 is energized. As soon as the circuit through relay 61 is broken, as described with reference to magnet 37 in the above application, contacts 61a will open before the contacts 61b close, breaking the circuit through the magnet 37 in Fig. 4 without establishing a circuit through the magnet 44 so that the dog 15 will be released and the carriage will come to rest with the punches registering with the proper column of the field in which punching is to commence.

The forms of embodiment of the invention described herein and shown in the drawing have been used solely for the purpose of explaining the principle of the invention and the manner in which it may be applied to a well known type of machine, and it will be obvious that the invention may be varied as the occasion demands or embodied in other types of machine without deviating from the basic principles described herein.

We claim:

1. In recording apparatus, a carriage movable during recording operations, means for feeding said carriage; electrical means for rendering the feeding means operative, including a control circuit, and means for automatically controlling said circuit to feed the carriage predetermined extents, said automatic means including a support and two column stops each variably positionable along said support, one of the stops having the function of initiating carriage movement and the second stop of terminating carriage movement, and means engaged by first the initiating stop and subsequently engaged by the terminating stop for controlling said circuit whereby the first stop causes the electrical means to initiate carriage movement and the second stop causes the electric means to terminate such movement.

2. In recording apparatus, a carriage movable during recording operations, means for feeding said carriage step-by-step during the course of the recording operations including escapement mechanism having a holding dog normally preventing the carriage feeding means from feeding the carriage, electrical means for rendering the dog ineffective to permit unrestrained movement of the carriage under the influence of the feeding means, a control circuit for said electrical means, adjustable means operable to close said circuit, a second adjustable means operable to interrupt said circuit, and means operative in response to movement of the carriage for operating said adjustable means in succession, both said adjustable means being manually spaceable apart a distance proportional to a predetermined feed of the carriage.

3. In recording apparatus, a carriage movable step-by-step during recording operations, carriage feeding means including escapement means for imparting a step-by-step movement to the carriage, electrical means including a control circuit for disengaging the escapement means from the carriage to permit the carriage to move an extent greater than a single step of movement under the influence of the feeding means, a stop bar operable in two directions to first close and then open said circuit, and devices variably positionable along said stop bar to correspond with alternate positions of the carriage and engageable by the carriage during its feeding movement for operating said stop bar in first one and then another direction to first close and then open said circuit.

4. In recording apparatus, a carriage movable during recording operations, feeding means for said carriage including an element normally holding the carriage against movement in response to the feeding means, an electrical device operative to release said element to permit the carriage to move freely in response to the feeding means, a circuit for operating said device, contacts operable to control said circuit to first render the electrical device operative on said element whereby to release the carriage for movement in response to the feeding mechanism and thereafter render said device inoperative to permit said element to arrest the carriage, and means for variably automatically controlling the operation of said contacts including a stop bar for operating said contacts and stops variably positionable along said stop bar, said stops being operated through the feeding movements of the carriage.

5. In recording apparatus, a carriage positionable during recording operations, means normally effective in any position of the carriage to hold the latter against movement, and means for automatically positioning the carriage variable extents during recording operations comprising power means normally tending to move the carriage, an electromechanical device for releasing the holding means, a control circuit for said device, and means manually variably positionable apart to correspond with two different predetermined positions of the carriage and operable by movement of the latter to control said circuit.

6. In recording apparatus, a carriage movable during recording operations, feeding means for said carriage, electromechanical means for calling the feeding means into operation to feed the carriage including a control circuit, selectively settable means for controlling said circuit to first automatically call into action the feeding means to feed the carriage and thereafter disable the feeding means to arrest the carriage, said selectively settable means including a stop bar and stops settable thereon to positions corresponding with alternate positions of the carriage, said stops being operated in response to movements of the carriage.

7. In recording apparatus a carriage, means to feed the carriage; and means for automatically variably controlling the feeding means comprising a magnet for causing the feeding means to feed the carriage, a control circuit for said magnet, a rotatable stop bar, column stops adjustable along said bar to predetermine the carriage feed, a member engageable with said stops to cause rotational movement of the stop bar, said member and bar being also movable relative to each other longitudinally of said bar in response to feeding movement of the carriage, and contacts in said control circuit and actuated by rotational movement of said bar when said member engages one of the stops whereby said magnet and hence the carriage feeding means is automatically controlled in accordance with the setting of the column stops.

8. In recording apparatus, a carriage, means to feed said carriage and means to automatically variably control the feeding means comprising a magnet for controlling the feeding means, a control circuit for said magnet; a pair of column

stops one for initiating carriage feed and the other for terminating feed, rotatable supporting means for said column stops along which supporting means said stops are adjustable, a member responsive to carriage movement and adapted to engage said stops in succession as the carriage moves and rotates the supporting means, said member rotating the supporting means in two different directions according to whether said member engages the initiating stop or the terminating stop, and contacts in said control circuit and actuated by the rotational movements of said supporting means.

9. In a recording apparatus, a carriage movable during recording operations, feeding means for said carriage including escapement mechanism connected to the carriage for causing step-by-step movement of the carriage in response to the feeding means, an electro-magnetic device for disconnecting the carriage and escapement mechanism whereby to free the carriage and permit its movement in response to the feeding means, a circuit for controlling said device, a stop bar, settable stops on said bar, and means associated with said stops for controlling said circuit to initiate and terminate movement of the carriage in accordance with predetermined settings of the stops.

10. In recording apparatus, a movable carriage, means to feed the carriage during recording operations, a control circuit for the feeding means, a pair of column stops, one for initiating operation of the feeding means and the other for terminating operation of the feeding means, means to support said column stops along which support the stops may be manually selectively positioned to control the extent of movement of the carriage, means engageable with the column stops, one of said engageable means and supporting means being moved by the carriage in the course of the carriage feed whereby the initiating stop and terminating stops are successively engaged by the engageable means, and means operated by the engagement of the stops with the engageable means for controlling said circuit.

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