

Oct. 3, 1939.

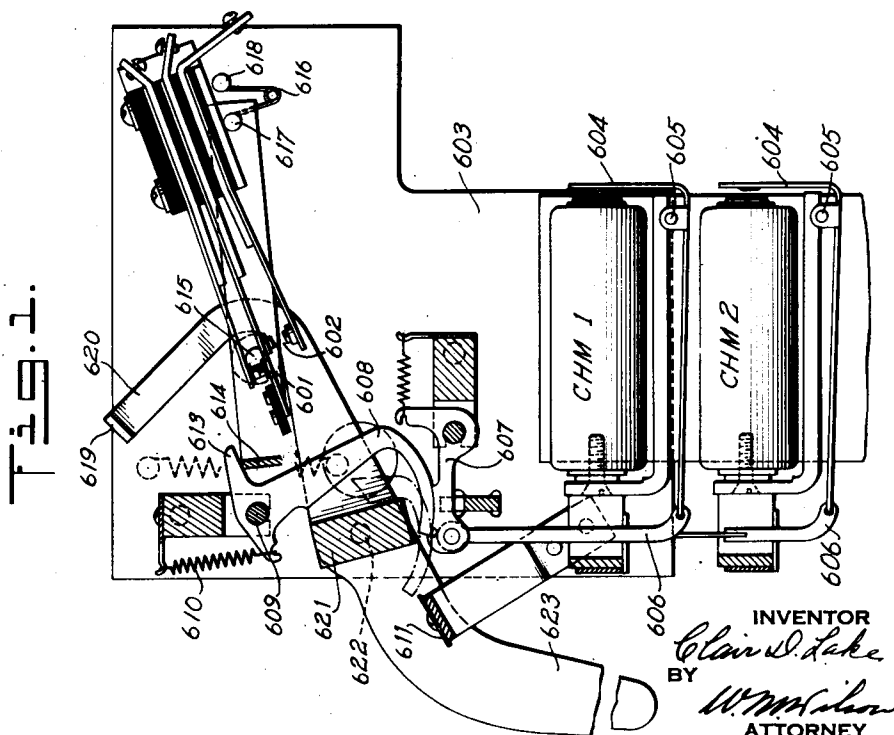
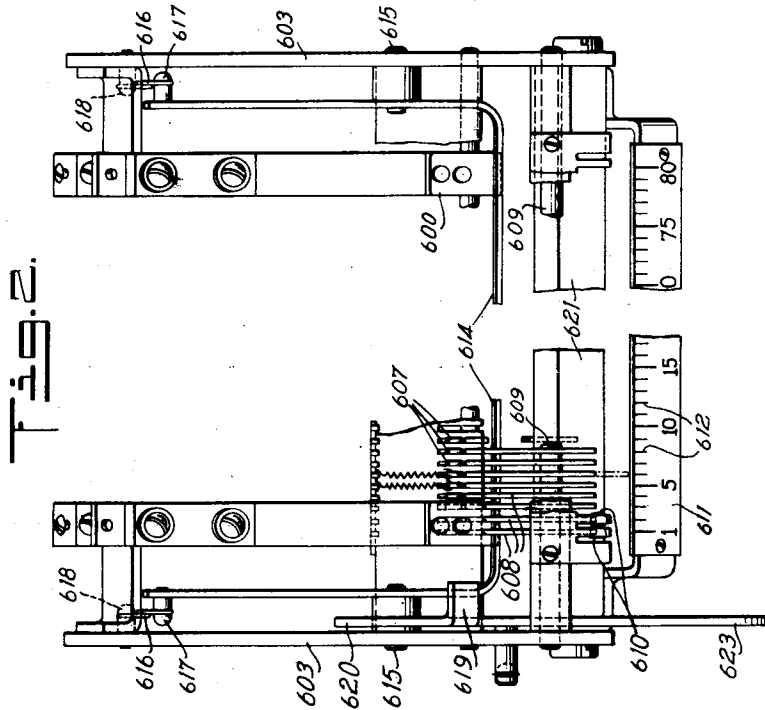
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INDICATOR FOR PERFORATING MACHINES

Filed July 14, 1938

2 Sheets-Sheet 1



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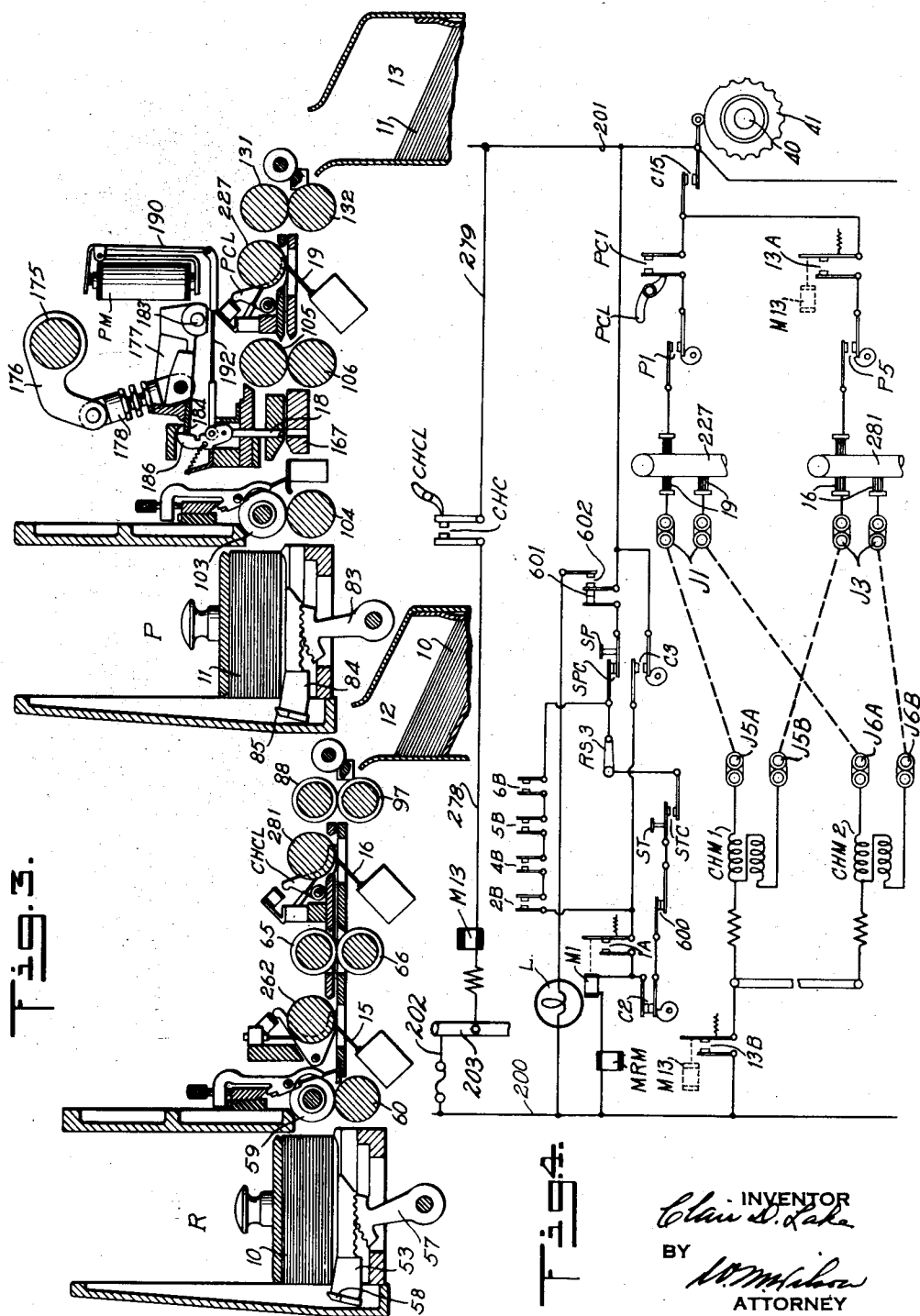
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UNITED STATES PATENT OFFICE

2,174,702

INDICATOR FOR PERFORATING MACHINES

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4 Claims. (Cl. 164—115)

This invention relates to a machine for perforating cards and, more particularly, to a perforating machine in which a perforated pattern card is sensed to control the punching of a blank card to reproduce therein the perforations sensed in the pattern cards.

The machine to which the improvements of the present invention are applied is that shown in Patent No. 2,032,805, granted March 3, 1936, to C. D. Lake. In such machine, there is provided checking mechanisms by means of which a comparison is made between the pattern card and the reproduced card, after the reproduction punching has been effected, to determine whether the two cards are alike. The machine is provided with mechanism for interrupting the operation of the machine and for lighting a lamp when any disagreement is found, so that cards may be removed from the machine to discover the source of error. The record cards are usually provided with 45 columns in each of which data may be represented, and time is consumed in inspecting the card to determine in which column or columns the error occurred.

It is, therefore, the main object of the present invention to provide, as an attachment for the machine of the above-mentioned patent, an indicating mechanism responsive to the comparing devices of the machine, said indicating mechanism interrupting the operation of the machine and lighting a lamp upon detection of an error, said mechanism also particularly identifying the column or columns of the cards in which disagreement occurred.

Further objects of the instant invention reside in any novel feature of construction or operation or novel combination of parts present in the embodiment of the invention described and shown in the accompanying drawings, whether within or without the scope of the appended claims and irrespective of other specific statements as to the scope of the invention contained herein.

In the drawings:

Fig. 1 is a central section through the indicating device.

Fig. 2 is a plan of Fig. 1.

Fig. 3 is a central section through the pattern card sensing and blank card punching mechanism of the machine to which the improvements are applied.

Fig. 4 is a view showing only so much of the electric circuits of the machine as is necessary for an understanding of the invention.

In Fig. 3 there is shown the essential elements

of the card reproducing machine disclosed in Patent No. 2,032,805 referred to hereinabove, and in briefly describing the operation of the mechanism the same reference characters will be employed as are used in the patent to facilitate ready reference thereto for any further detailed explanation. The reference numerals applied to the mechanism constituting the attachment to the machine will accordingly begin with number 600.

Referring to Fig. 3, pattern cards 10, in which perforations occur, are placed in hopper R. Arm 57 is oscillated to cause horizontal reciprocation of a slide 53, said slide carrying a picker 58 for advancing the lowermost card to a pair of feed rollers 59, 60 which convey the card to a sensing station comprising brushes 15 and contact roller 262 from which station the card passes to feed rollers 65, 66 and from there to a second sensing station comprising brushes 16 and contact roller 281 and from here, the card is conveyed by rollers 88, 97 to the discharge hopper 12.

Blank cards 11 which are to be punched are placed in hopper P from which hopper by means of arm 83 and slide 84, picker knife 85 will feed the lowermost card to rollers 103, 104 which convey the card to and past the punching station comprising a row of punches 18 and a die 167. Rollers 105, 106 then convey the card to a sensing station comprising brushes 19 and contact roller 227 and, by means of rollers 131, 132, the card is then conveyed to discharge hopper 13. The sets of rollers which convey the blank card through the punching section of the machine are intermittently driven so that the card is advanced in steps with each row of index point positions pausing momentarily in the punching position to receive a perforation, if, at such time, the magnet PM is energized.

Energization of the magnet PM will rock its armature structure 190, drawing a link 192 toward the right, to effect coupling between an interposer 186 and a plate 184. The plate 184 is carried by the member 177 pivoted at 183 and oscillated, by means of a link 178 connected to an arm 176 on shaft 175. Further detailed explanation of the construction and operation of the card feeding mechanisms, may be had by reference to the patent referred to and it will be sufficient for the purposes of the present invention to explain that, as the pattern card 10 passes brushes 15, circuits are completed through the perforations in the pattern card to energize punch magnets PM which magnets will couple the related punches to the oscillating plate 184 and effect

punching in the corresponding index point positions of the blank card. After the pattern card and the blank card have concurrently passed their respective sensing and punching stations, they concurrently pass the sets of checking brushes 16 and 19, respectively.

Checking control magnets designated CHM1, CHM2 (Fig. 4) are connected between related columns of brushes 16 and 19. These magnets are in the form of oppositely wound coils, of which one coil is connected to the sensing brush 19 and the other coil is connected to the brush 16, and there is one such magnet provided for each column to be checked. As a newly punched record card 11 is passing from the punching station through the sensing brushes 19, the associated pattern card passes from the reproducing sensing station 15 to the checking sensing station and the checking card lever designated CHCL in Fig. 3 and Fig. 10a, upper center, of 2,032,805 is operated to close a related set of contacts CHC (see Fig. 4) which, as explained in the patent, control a relay magnet designated M13 in Fig. 4 to close contacts 13B and 13A. If the perforations in a column of both cards agree, parallel circuits may be traced from line 201 to impulse distributor contacts C15 controlled by the cam 41, through card lever contacts PC1, cam contacts P1, common brush contact roller 227, brush 19, plug socket J1, thence through a plug connection to plug socket J5A through one coil of magnet CHM1, contacts 13B, to line 200.

The other parallel circuit is from line 201, contacts C15, contacts 13A, cam contacts P5, common contact roller 281, brush 16, to plug socket J3, thence through a plug connection to plug socket J5B, the other coil of magnet CHM1, contacts 13B, to line 200. Thus, the magnetizing effect of each coil is neutralized by the current flow from the other coil. If a perforation in one card does not appear simultaneous with a perforation in the other card, there is an error in punching and only one coil of relay magnet CHM1 is energized. This disturbs the balance of the magnet and, through a mechanism yet to be described, will cause the opening of pairs of contacts 600 and 601 and closure of a pair of contacts 602. Contacts 601 are wired in series in the circuit which keeps the machine in operation by maintaining a magnet MRM energized. This magnet is initially energized upon depression of start key ST, closing contacts STC and setting up a circuit from line 200 through MRM, relay magnet M1, contacts C2, 600, STC, switch RS3, stop key contacts SPC, contacts 601, to line 201. Magnet M1 closes its contacts 1A and a holding circuit is provided from line 200, through the magnet MRM, M1, contacts 1A, thence through series contacts 2B, 4B, 5B and 6B, contacts SPC, line 601 to line 201. Contacts 2B, 4B, 5B and 6B are closed by the various card lever contacts in the machine. Thus, upon opening of contacts 601, this holding circuit is interrupted. At the same time, closure of contacts 602 will complete a circuit through lamp L illuminating the same to indicate to the operator that an error has been detected.

Referring now to Fig. 1, the magnets CHM1, CHM2, etc. are mounted between side plates 603 of the attachment and, upon energization of any magnet, the magnet will rock its armature 604 pivoted at 605 to draw downwardly on a link 606, whose upper end is connected to a spring-pressed latch 607. Latch 607 normally engages the free end of a finger 608, pivoted at 609 and normally

biased to turn clockwise by a spring 610. There is provided a finger 608 for each column of the record cards and the fingers are arranged in alignment in a single row as indicated in Fig. 2. Extending across the ends of the fingers 608, is a scale 611 provided with markings 612 corresponding to the card columns. Energization of any magnet CHM, will release its related finger 608 for movement to the broken line position shown in Figs. 1 and 2, wherein the free end of the finger is shown moved up to a position immediately adjacent the scale 611 and in line with the marking 612 of the column to which the finger is related, thus providing an immediate indication to the operator that the error occurred in that particular column or columns.

Each finger 608 is provided with an extension 613 lying over the upper edge of the bail 614 which bail is pivoted at 615 and normally held in the position shown in Fig. 1 by a spring 616, whose point of connection 617 with the bail 614 lies below the line through the centers of pivot 615 and pin 618. The release of any finger 608, will cause its extension 613 to rock bail 614 counterclockwise, raising pin 617 above the line through the centers of 615 and 618, and spring 616 will hold the bail in this position. The lower edge of bail 614 lies over the common blade of contacts 601, 602 so that, upon rocking of the bail by finger 608, the contacts will be shifted. In the same manner, the bail 614 causes opening of the contacts 600 at another point along the length of the bail (see Fig. 2). The contacts 600 open to prevent restarting of the machine by depression of the start key ST (Fig. 4) until the bail has again been restored. Such restoration is effected by an extension 619 upon an arm 620, secured to a cross-bar 621 pivoted at 622. By means of a handle 623, the bar may be rocked clockwise so that the uppermost corner thereof will engage any tripped fingers 608 and return them concurrently to their latched position, at the same time, causing arm 620 to rock in the same direction to restore bail 614 to its initial position.

Accordingly, by means of the indicating attachment described, there is provided a device which will stop the machine and light a lamp and also prevent unintentional restarting of the machine as in the arrangement of the patent. In addition, however, there is provided a means of definitely identifying the column or columns in which disagreement between the two cards is found so that correction of the source of error may be more readily effected.

While there has been shown and described and pointed out the fundamental novel features of the invention as applied to a single modification, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation, may be made by those skilled in the art, without departing from the spirit of the invention. It is the intention, therefore, to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. In a reproducing punching machine having a pair of sensing devices, means for feeding a perforated pattern card past one sensing device, means for feeding a reproduced record card past the other sensing device concurrently, connections between said sensing devices for each pair of card columns and a magnet for each pair of card columns concurrently sensed, energized

when the columns of any pair of columns concurrently sensed do not agree, in combination with a row of aligned latches, one for each column on a card, a spring pressed finger for each latch, arranged in alignment in a single row, an indicating scale positioned adjacent to said row of fingers, energization of any magnet causing operation of its latch to release its related finger for movement out of alignment with the remaining fingers to a position immediately adjacent said scale for indicating the column of the cards in which disagreement occurred.

2. The invention set forth in claim 1 in which a bail is provided, and arranged for operation upon the release of any of said fingers, a pair of contacts opened by the bail when the latter is operated, and a single lever for restoring said released finger and operated bail.

3. The invention set forth in claim 1 in which a pivoted bail is provided with a spring toggle to hold it normally in one position, release of any of said fingers causing said bail to rock to another position wherein said spring toggle will hold the same, a pair of contacts opened by said bail when

operated to stop the machine, and a single lever for restoring said fingers and thereafter returning the bail to its normal position to release said contacts.

4. A separate indicating unit for a reproducing punching machine comprising a pair of side frames, a plurality of oppositely wound magnets, one for each column of a record card passing through the machine, supported between said side frames, an armature for each magnet, a latch for each armature, a connection between the latch and armature, said latches being aligned in a single row and each operated when the related magnet is energized in response to the disagreement in perforations in two cards sensed in the machine, a row of spring urged fingers, one for each latch normally held thereby and arranged in alignment in a single row, a plate extending across the row of fingers with numbered markings thereon to represent the columns of a card, each finger, upon release, moving to a position adjacent said plate to indicate the column of the card related thereto.

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