

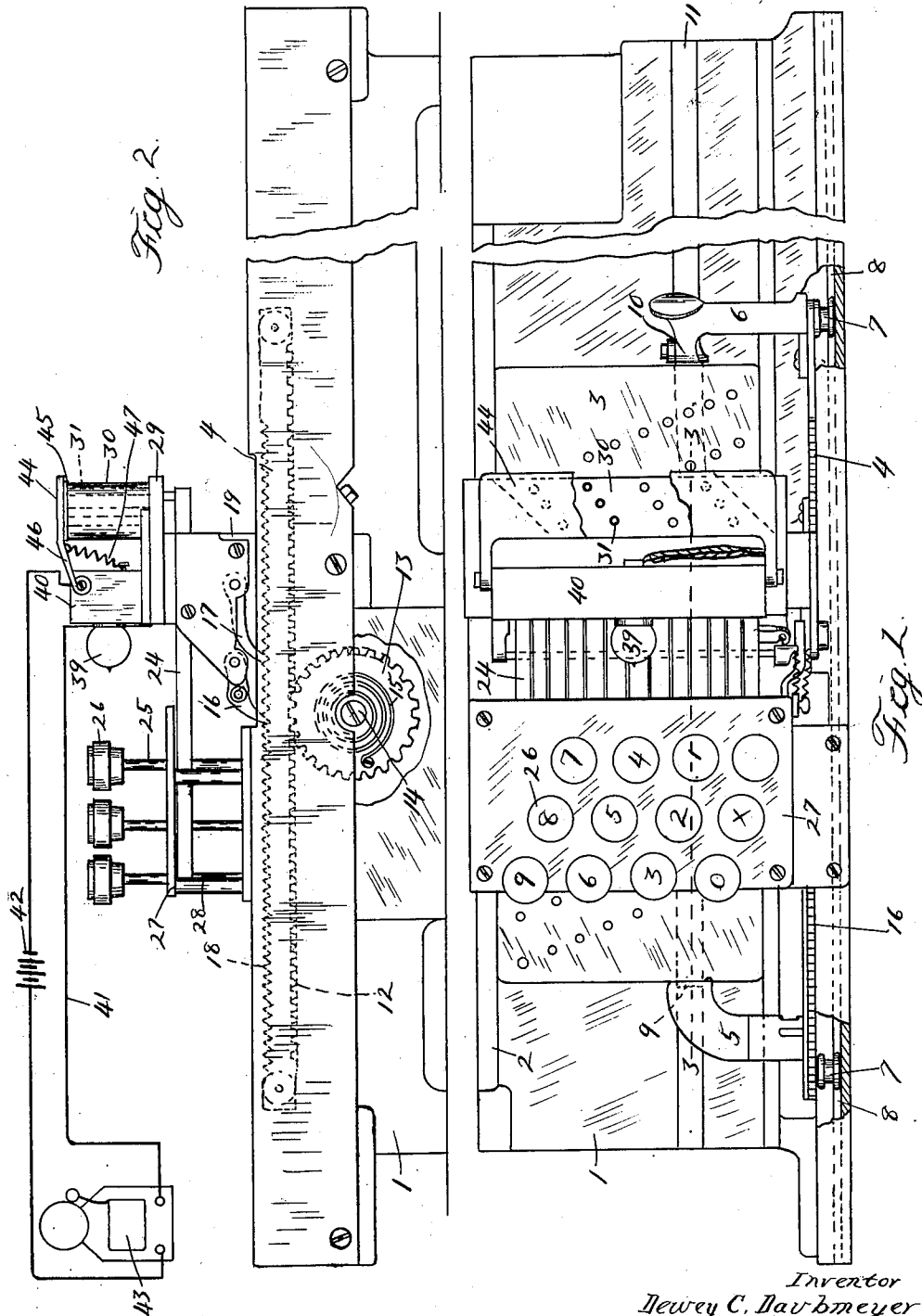
June 17, 1924.

1,497,893

D. C. DAUBMEYER
VERIFIER ERROR SIGNAL

Filed July 9, 1921

3 Sheets-Sheet 1



Inventor
Dewey C. Daubmeyer
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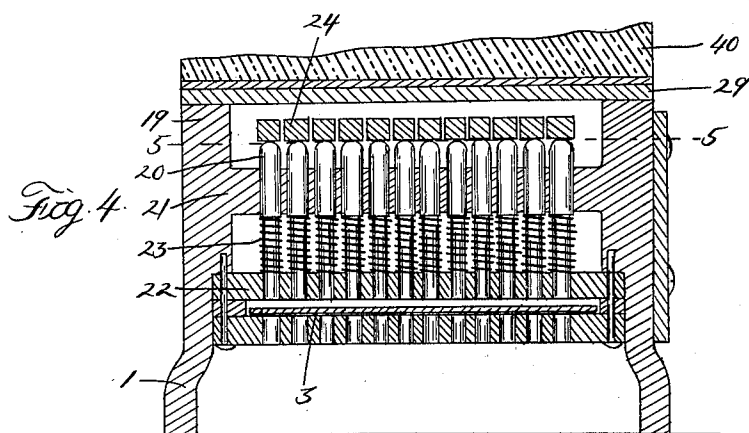
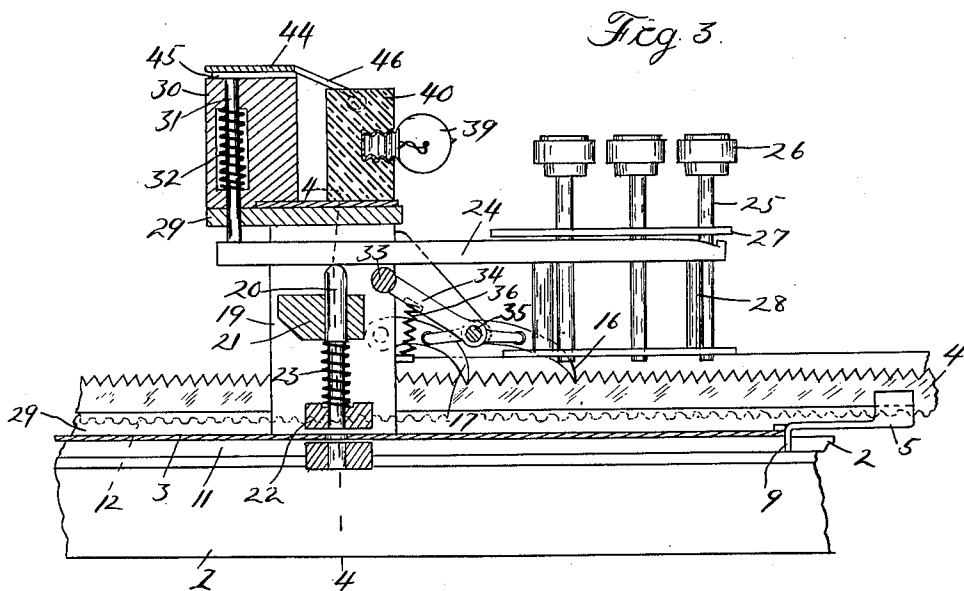
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3 Sheets-Sheet 2



Inventor

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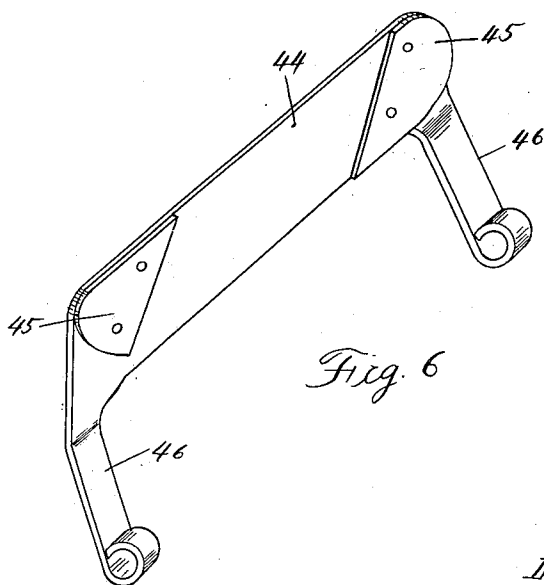
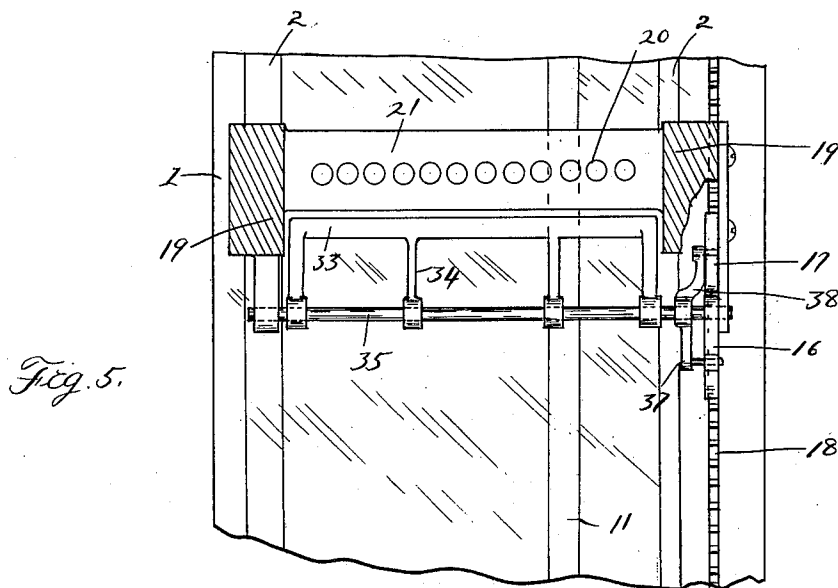
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE.

DEWEY C. DAUBMEYER, OF DETROIT, MICHIGAN.

VERIFIER ERROR SIGNAL.

Application filed July 9, 1921. Serial No. 483,426.

To all whom it may concern:

Be it known that I, DEWEY C. DAUBMEYER, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Verifier Error Signals, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to error indicators for tabulating machine verifiers and has an especial application to machines in which perforated cards are used.

It is the object of the invention to provide a machine which will positively indicate by either a visible or audible signal (or both) an erroneous provision of a perforation in a card undergoing verification, or the erroneous lack of such a perforation.

In the drawings:

Figure 1 is a plan view of the improved machine;

Figure 2 is a side view of the same together with the diagrammatic illustration of the electrical circuit for the error signal;

Figure 3 is a longitudinal sectional view taken on line 3—3 of Figure 1;

Figure 4 is a cross-section on line 4—4 of Figure 3;

Figure 5 is a horizontal sectional view taken on line 5—5 of Figure 4;

Figure 6 is a perspective view of a contact plate employed in controlling the circuit shown in Figure 2.

In these views, the reference character 1 designates the base of a tabulating machine verifier, and 2 indicates ribs between which a guideway is formed by the top surface of said base. Said guideway provides for the advance longitudinally on the machine of perforated tabulation cards, one of which is indicated at 3. The card advancing carriage comprises a bar 4 longitudinally extended at one side of the base 1, and card advancing and card retracting arms 5 and 6 respectively projecting above the guideway 2 from the rear and forward ends of the bar 4. The carriage is guided by engagement of rollers 7 at each end of bar 4 with a rib 8 upstanding upon the base, and by engagement of fingers 9 and 10 respectively carried upon the outer ends of the arms 5 and 6 in a groove 11 formed longitudinally in the guideway 2. The lower edge of the bar 4 is formed with a rack of teeth 12 en-

gaged by a gear 13 journaled upon a stub-shaft 14, and a spring 15 coiled upon said shaft exerts a rotative effort upon said gear tending to advance the carriage. 16 and 17 are escapement pawls alternatively engageable with a rack of pointed teeth 18 formed upon the upper edge of the bar 4 and controlled as hereinafter explained:

Substantially midway between the ends of the machine a pair of standards 19 is mounted upon the base 1 respectively at opposite sides of the guideway 2. Between said standards a row of vertical plungers 20 is arranged above the guideway engaging upper and lower spaced guide-bars 21 and 22 rigidly extending between the standards 19. Springs 23 coiled upon said plungers intermediate said guide-bars urge the plungers upwardly maintaining their lower ends normally substantially flush with the under-face of the lower bar 22. The plungers 20 are respectively actuable by a corresponding series of key bars 24 extending longitudinally of the machine and engaging above the plungers 20 at a relatively short distance from the rear ends of said bars. The forward ends of said key bars respectively engage the vertical stems 25 of a series of keys 26 suitably numbered. The stems 25 are mounted in a pair of horizontal guide-plates 27 terminally supported by pins 28 rising from the base 1 at each side of the guideway 2.

Upon the standards 19 is surmounted a plate 29 carrying a casing 30 elongated transversely of the machine. Within said casing there is mounted a second series of vertical plungers 31, the lower ends of which respectively engage the rear ends of the key bars 24. Within said casing the plungers 31 are respectively downwardly urged by coiled springs 32 to establish a normal position in which the upper ends of said plungers 31 are flush with the top face of the casing 30. For reasons hereinafter made clear, the springs 32 are relatively stiff as compared to the springs 23.

Transversely beneath the series of key bars 24 there is extended a carriage escapement release rock bar 33 mounted by a plurality of arms 34 upon a rock shaft 35, and upwardly urged by a coiled spring 36 to maintain it just below said key bars in the normal position of the latter. Upon normal actuation of any key bar 24 the escapement release bar 33 is rocked down-

wardly and an arm 37 projecting rigidly forward from the rock shaft 35 is rocked upwardly to release the pawl 16 from the rack 18 while the pawl 17 is at the same time engaged with said rack bar by a rearwardly projecting arm 38 rigidly mounted upon said rock shaft. The carriage undergoes a very slight advance as the result of the described adjustment of the escapement pawls, such advance being sufficient to carry the point of the rack tooth previously engaged by the pawl 16 clear of the point of said pawl. When the depressed key is released the actuated key bar 24 is returned to its normal raised position by the corresponding spring 23, and the bar 33 and shaft 35 are also rocked back to their normal positions by the spring 36, the pawl 17 being thus withdrawn from the rack 18, and the pawl 16 engaging with said rack. Since the point of the pawl 16 now clears the previously engaged tooth of the rack 18, the carriage is advanced by the spring 15 sufficiently to engage the next adjacent tooth of said rack with said pawl. No novelty is claimed for the described escapement mechanism.

In the operation of the machine as so far described, upon the actuation of any key 26 the forward end of the corresponding key bar is depressed, said bar normally pivoting upon the corresponding plunger 31 and functioning as a lever of the second class to depress the corresponding plunger 20. If the proper key has been actuated and a perforation in the card 3 is properly registered with said plunger 20, the latter will be free to descend and engage in the registered perforation of the card. Under these conditions no limitation is placed upon movement of the actuated key bar such as might prevent the release of the escapement pawls. If, however, there is an error either in striking the proper key 26, or in the location of a perforation in the card 3, the plunger 20 used with the actuated key bar 24 fails to register with a perforation in said card and the imperforated portion of the card encountered by said plunger resists depression of the latter and said plunger then becomes a fulcrum for the actuated key bar upon which the latter, functioning now as a lever of the first class, pivots to raise the corresponding plunger 31 in opposition to the restraining spring 32. Because of the shortening of the leverage occasioned by this change of fulcrum, the rock bar 33 is not depressed sufficiently to effect a release of the escapement, and the card 3 remains stationary. After actuation of any key bar 24 the same is returned to its normal horizontal position by the corresponding spring 23.

It devolves upon the operator, when the carriage fails to advance responsive to

actuation of any of the keys 26, to first ascertain that the correct key was struck, and if such was the case, to remove the card to remedy the same as regards the erroneous location of the perforation. It not infrequently occurs, however, that the operator fails to observe the failure of the carriage to advance, this being particularly liable to happen under certain conditions. One of these conditions is the occurrence of an error which appears just before the card is ready to be removed from the machine, so that the operator, if working carelessly, may remove the card without observing the inaction of the carriage responsive to the final depression of a key 26. Furthermore, after failure of the operator to note inaction of the carriage, it may happen that an aperture of the card will register with the plunger 20 depressed upon the succeeding actuation of a key 26, so that the carriage will properly respond to actuation of said succeeding key or possibly to a series of keys actuated following an error thus decreasing the opportunity of the operator to note the error.

The present invention eliminates this possibility of error by providing a signal energized by failure to release the carriage escapement and adapted to attract the attention of the operator without fail. Thus a small electric light bulb 39 is mounted upon the machine being carried preferably by an insulating bar 40 rigidly surmounting the plate 29 adjacent the casing 30. Said bulb is arranged in an electric circuit 41 energized by a battery 42 or other source of electrical current. It is preferred also to arrange in said circuit a bell or other audible signal device 43. For automatically controlling the circuit 41 a contact plate 44, formed of brass or some other material having good conductivity, is arranged in a slightly spaced relation above the plungers 31 so as to be engaged by any of said plungers upon a slight upward shifting of the latter from its normal position. To maintain the plate 44 properly spaced above the plungers 31 insulating spacer plates 45 may be attached to the under surface of the contact plate adjacent the ends thereof. Preferably, provision is made for upward yielding of said plate 44 when under pressure of any of the plungers 31 so that said plate may place no limitation upon the stroke of said plungers. Thus said plate is hinged by a pair of terminal arms 46 to the ends of the insulating bar 40, and is downwardly urged by a light coiled spring 47 to normally seat the insulated end portions of said contact plate upon the casing 30.

From the preceding description it will be evident that, upon upward actuation of any of the plungers 31 due to a failure of the escapement to properly function, the circuit

41 will be closed between the plate 44 and the raised plunger 31, and the operator will be very positively notified of the presence of an error in the card undergoing verification by lighting of the electric lamp 39 and by ringing of the bell 43. Thus the work of verification for which the machine is intended may be accomplished with a practical elimination of any error.

10 What I claim as my invention is:

1. In a machine of the character described, the combination with a step-by-step card advancing mechanism including a carriage, of a plurality of keys, means for controlling said mechanism from any of said keys, said means including members restraining release of the card advancing mechanism according as said members encounter a perforated or imperforate surface of the card, and a visual and audible signal and means for energizing said signal upon failure of the carriage to respond to actuation of a key.

2. In a machine of the character described, the combination with a step-by-step card advancing mechanism including a carriage, of a plurality of keys, means for controlling said mechanism from any of said keys, said means including members restraining release of the card advancing mechanism according as said members encounter a perforated or imperforate surface of the card, a signal adapted to be electrically energized and means for energizing said signal upon failure of the carriage to respond to actuation of a key.

3. In a machine of the character described, the combination with a step-by-step card advancing mechanism, of a plurality of keys, means for controlling said mechanism from any of said keys including a series of plungers respectively actuatable by said keys, release of the card advancing mechanism by any key being dependent upon registration with the plunger corresponding to said key of a perforation in the card advancing through the machine, a signal and means for energizing said signal upon failure of one of said plungers to encounter a perforation of the card upon actuation of the corresponding key.

4. In a machine of the character described, the combination in a step-by-step card advancing mechanism, of a plurality of keys, a series of key bars respectively engageable by said keys, a series of plungers terminally engaging said key bars and normally functioning as fulcrums for said bars, a second series of plungers intermediately engaging the key bars and actuatable by the latter upon actuation of the corresponding keys, perforations of the advancing card being required to register with the last mentioned plungers to permit actuation of the same, the last mentioned plungers functioning as fulcrums in the absence of registering per-

forations in the card and actuating the first mentioned plungers, a contact plate co-acting with the first mentioned series of plungers to close a signal circuit upon actuation of any of said plungers, and a signal device in said circuit.

5. In a machine of the character described, the combination with means for rectilinearly advancing a perforated card, of plungers engageable in the perforations of said card for verifying the accuracy of the same, a signal and means for automatically energizing said signal upon failure of any plungers to encounter a perforation of the card.

6. In a machine of the character described, the combination with means for rectilinearly advancing a perforated card, of means for verifying the accuracy of the perforations in said card, a signal and means for automatically energizing said signal contingent upon the inaccurate presence or absence of the perforations in said card.

7. In a machine of the character described, the combination with means for advancing a perforated card, of means for verifying the accuracy of the perforations in said card, an electric signal, a normally open circuit for said signal, and means for automatically closing said circuit upon failure of the verifying means to encounter a perforation of the card.

8. In a machine of the character described, the combination with a guideway for a perforated card, of a plurality of plungers independently movable transversely across the path of said card for entering the perforations of the card to verify said perforations as to accuracy of location, actuating elements for said plungers adapted for a normal movement in actuating the plungers and for an abnormal movement fulcruming upon the plungers upon failure of the latter to encounter perforations of the card, an electric signal and circuit for the same, and means for closing said circuit through abnormal movement of any of said actuating members.

9. In a machine of the character described, the combination with a guideway for a perforated card, of a series of plungers movable transversely across the path of said card for entering the perforations of the card to verify accuracy of location of said perforations, a series of levers engaged with said plungers for independently actuating the same, a series of normally fixed fulcrum elements for said levers yieldable under abnormal stress to permit fulcruming of said levers upon said plunger when the latter encounters an imperforate portion of a card, a contact member normally spaced from said fulcrum elements and engageable by the latter upon movement of said elements incident to functioning of the plungers as ful-

crum elements, a circuit closed through engagement of said contact by any fulcrum element, and an electric signal in said circuit.

10. In a machine of the character described, the combination with a guideway for a perforated card, of a plurality of plungers independently movable transversely across the path of said card for entering the perforations of the card to verify said perforations as to accuracy of location, actuating elements for said plungers adapted for normal movement in actuating the plungers and for an abnormal movement fulcruming upon the plungers on failure of the latter to encounter perforations of the card, and a signal energized through abnormal movement of any of said actuating members.

11. In a machine of the character described, the combination with a guideway for a perforated card, of a plurality of plungers independently movable transversely across the path of said card for entering the perforations of the card to verify said perforations as to accuracy of location, actuating elements for said plungers adapted for a normal actuating movement and for an abnormal movement upon failure of the plungers to encounter perforations of the card, and a signal energized through abnormal movement of any of said actuating members.

In testimony whereof I affix my signature.

DEWEY C. DAUBMEYER.