H. HOLLERITH.

CARD TESTING DEVICE.

APPLICATION FILED JAN. 19, 1914.

1,132,345.

Patented Mar. 16, 1915

3 SHEETS—SHEET 1.

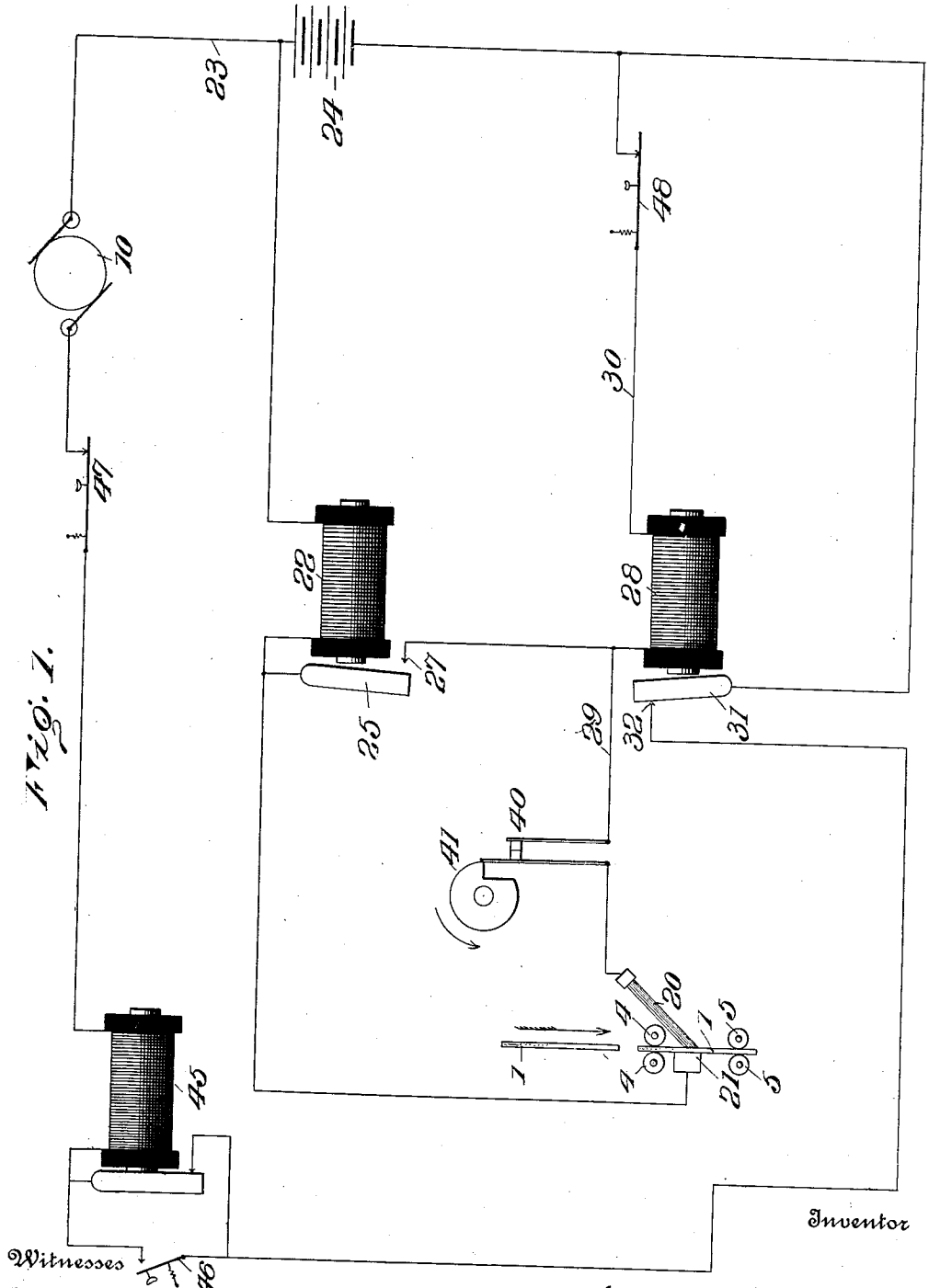


Fig. 1.

Witnesses

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3 SHEETS—SHEET 2.

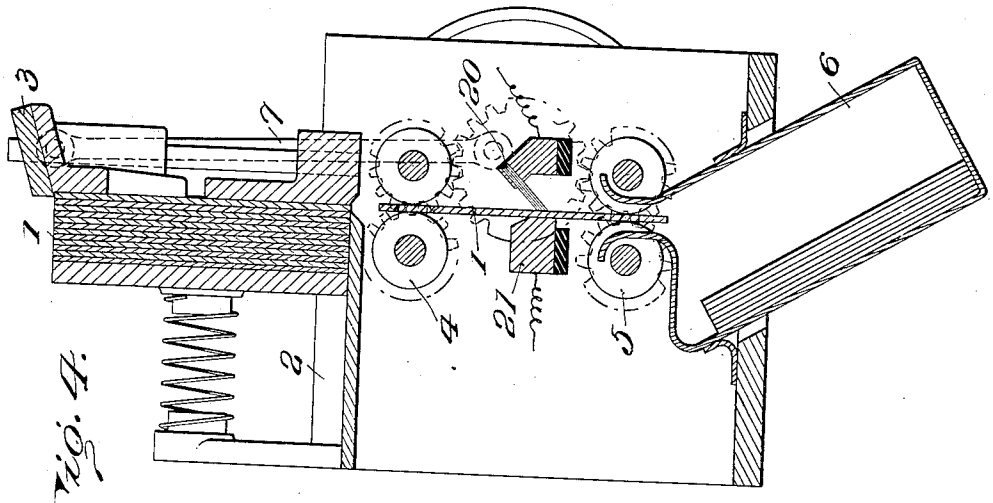


Fig. 4.

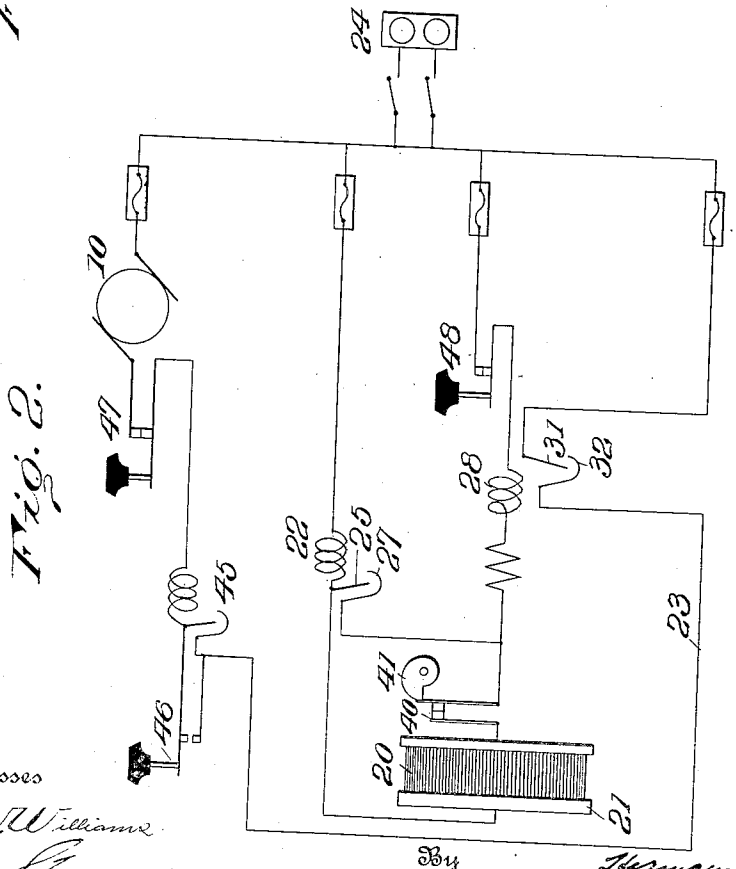


Fig. 2.

Witnesses

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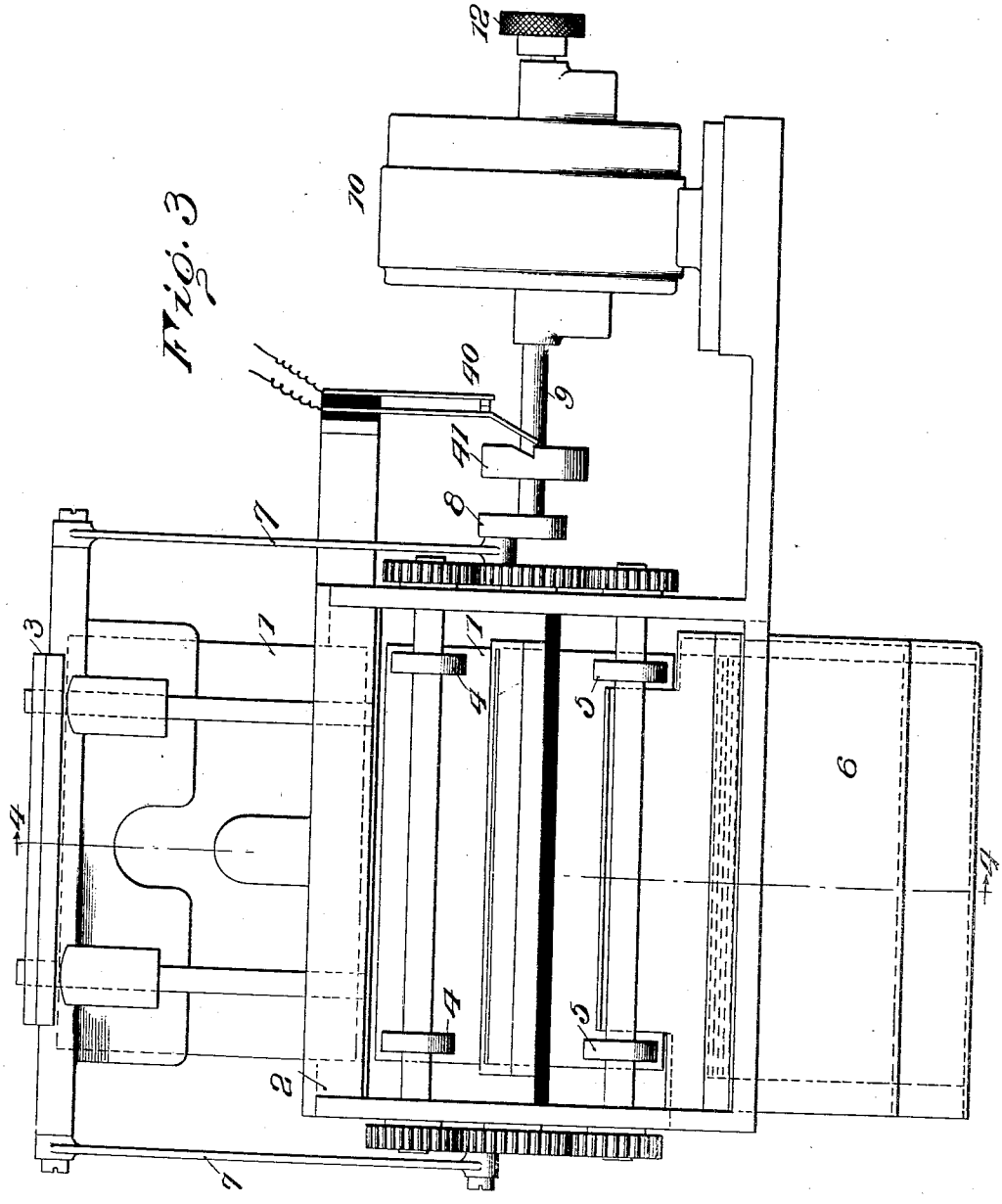
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3 SHEETS—SHEET 3.

Fig. 3



Witnesses

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UNITED STATES PATENT OFFICE.

HERMAN HOLLERITH, OF WASHINGTON, DISTRICT OF COLUMBIA.

CARD-TESTING DEVICE.

1,132,345. Specification of Letters Patent. Patented Mar. 16, 1915.

Application filed January 19, 1914. Serial No. 813,072.

To all whom it may concern:

Be it known that I, HERMAN HOLLERITH, of Washington, in the District of Columbia, have invented certain new and useful Improvements in Card-Testing Devices; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

In the class of record-cards employed in the Hollerith tabulating system index-point positions are indicated by punched holes located on each card in accordance with the data which that card represents. Such record-cards are passed between a series of circuit controllers which are allowed to come together only as the several index-points are successively presented thereto so that as a punched hole in a column registers with the circuit-closing member of that column the desired operation will be effected as the result of the momentarily-established electrical contact.

If, owing to imperfections, a record-card contains holes or openings other than those representing index-point positions, or, as infrequently happens, has pieces of carbon embedded therein, the circuit will unintentionally be closed, thus occasioning the unintended operation of the machine and destroying the accuracy of the tabulation. By means of my present invention any imperfection of the character stated may be automatically detected so that such imperfect cards may be discarded before being used for tabulating purposes. The cards before being converted into records are severally fed between a brush and a contact plate constituting circuit-closing means in a secondary circuit. If such circuit is closed through a card, by reason of an opening or thin spot, or a piece of carbon in the card, the main or operating circuit is opened and the machine is automatically stopped, enabling the imperfect card to be removed.

In the accompanying drawings, Figure 1 is a diagrammatic view. Fig. 2 is a more detailed diagram. Fig. 3 is an elevation of the machine. Fig. 4 is a section on line 4—4, Fig. 3.

The cards 1 are preferably placed on edge upon a platform 2, and are fed therefrom, one by one, by a reciprocating cross-head 3 and feed-rollers 4 in gear with each other. Operating with feed-rollers 4 are supplemental feed-rollers 5, and beneath the latter I have shown a receptacle 6 into which the perfect cards may be discharged after passing through the machine. The cross-head is reciprocated by connecting rods 7 actuated by a crank-disk 8 with which the feed-rollers act in synchronism, the gearing of said feed-rollers being driven by said crank-disk which is shown as mounted on the shaft 9 of a motor 10. This shaft has a milled head 12 at one end to permit it to be manually turned to properly position a card in starting the machine. In the passage of the cards through the machine they are presented to circuit-closing means which is designed to engage substantially every point of each card. The circuit closing means shown in the drawings embodies a brush 20 composed of innumerable small wires, having a common support, and a contact plate 21, both arranged transversely of the machine and in proximity to the feed-rollers. The brush and contact plate are separated when a card is fed between them, but if a card be not imperforate, or contain any foreign substance constituting a conductor, the circuit will be closed through the brush and its contact plate, and the machine stopped.

Referring now to the diagram, Fig. 1, of the electric circuits, the contact plate 21 is connected with a relay magnet 22 in a secondary circuit, which magnet is connected with the main circuit 23 which includes a generator 24 and the motor 10. The armature 25 of relay magnet 22 is normally out of engagement with a contact 27 of a second relay magnet 28 which is connected by conductor 29 to the brush and by conductor 30 to the main circuit 23. While relay magnet 28 remains deënergized its armature 31 closes the main circuit by engagement with

contact 32, but when the secondary circuit is closed through the brush and contact plate 21, the relay magnets are energized, causing the armature 25 to engage contact 27 and the armature 31 to disengage contact 32, thus opening the main circuit and causing the motor to stop. In the conductor 29 are contacts 40 which are arranged to be separated to break the circuit by a constantly-revolving cam 41 during the interval between the passage of one and the entrance of a succeeding card into controlling position between the brush and contact plate. In the main circuit is a relay magnet 45 which, in starting, is controlled by a starting key 46 in the main circuit, but through the armature of which the circuit is thereafter maintained while the key is opened. Also in the main circuit is a normally-closed switch-key 47 by operating which the circuit may be manually broken at any time. In the conductor 30 of the secondary circuit is a release key 48 which is operated only in starting the machine for the purpose of deënergizing the circuit-breaking relay magnet 28.

The operation of the apparatus is as follows: The cards being stacked on the platform, the operator manually turns the motor shaft to position the lower edge of a card between the brush and the contact plate, and while breaking the secondary circuit through the release key 48 the main circuit is closed through the starting key, thereby enabling the motor to start, the main circuit being closed and the secondary circuit open. When, however, owing to the presence of an imperfect card the brush is in electrical engagement with the contact plate, the secondary circuit is closed and the main circuit is open, the former remaining closed by the action of relay magnet 22 attracting armature 25. In the interval between cards the secondary circuit is broken through contacts 40.

By means of the present invention imperfect cards may readily be detected and while the machine is at rest may be thrown aside.

I do not restrict myself to the means shown and described for carrying out my invention, since other means may be employed without departing from my invention.

I claim as my invention:

1. In an apparatus of the character described, the combination with card feeding means, of an electric circuit, contacts therein controlled by the cards, and means for automatically stopping the feeding means in the event of the circuit being closed through a card.

2. In an apparatus of the character described, the combination with card feeding means, of an electric circuit, contacts therein controlled by the cards and designed to engage during its movement substantially the entire surface of each card, and means for automatically stopping the feeding means in the event of the circuit being closed through a card.

3. In an apparatus of the character described, the combination with card feeding means, of an electric circuit, contacts therein controlled by the cards, means for automatically stopping the feeding means in the event of the circuit being closed through a card, and means for breaking the circuit after each card has passed the contact.

4. In an apparatus of the character described, the combination with card feeding means, of an electric circuit, contacts therein controlled by the cards, means for automatically stopping the feeding means in the event of the circuit being closed through a card, and means actuated in synchronism with the feeding means for breaking the circuit after each card has passed the contact.

5. In an apparatus of the character described, the combination with card-feeding means and an operating motor, of an electric circuit, contacts therein controlled by the cards, and means for automatically stopping the motor in the event of the circuit being closed through a card.

6. In an apparatus of the character described, the combination with card-feeding means and an operating motor, of an electric circuit, contacts therein controlled by the cards, means for automatically stopping the motor in the event of the circuit being closed through a card, and means actuated by the motor for breaking the circuit after each card has passed the contacts.

7. In an apparatus of the character described, the combination with card-feeding means and an operating motor, of a main circuit including said motor, a secondary circuit, contacts in said secondary circuit controlled by the cards, and means for automatically opening said main circuit in the event of the secondary circuit being closed through a card.

8. In an apparatus of the character described, the combination with card-feeding means and an operating motor, of a main circuit including said motor, a secondary circuit, contacts in said secondary circuit designed to engage substantially the entire surface of each card, and means for automatically opening said main circuit in the event of the secondary circuit being closed through a card.

9. In an apparatus of the character described, the combination with card-feeding means, of a circuit-controlling device for engaging substantially the entire surface of each card, and means controlled by such device for arresting said feeding means in the event of the circuit being closed through a card.

10. In an apparatus of the character described, the combination with card-feeding

means, of a card-controlled electric circuit comprising normally closed contacts which are separated by the passage of a card between them, and means controlled by said contacts for stopping the feeding means when an imperfect card is presented to said contacts.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

HERMAN HOLLERITH.

Witnesses:

FRANCIS S. MAGUIRE,

MILDRED P. IMIRIE.