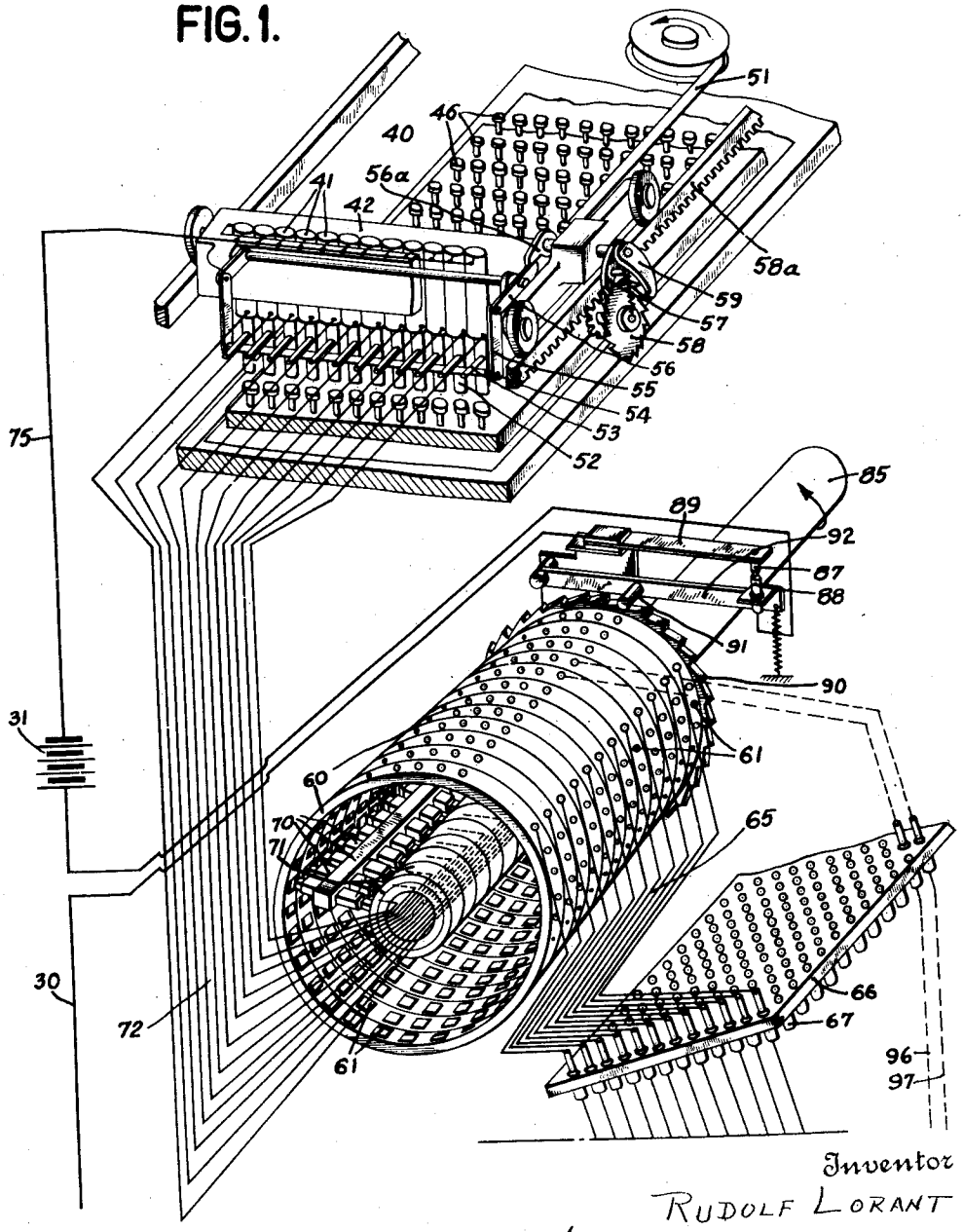
Jan. 5, 1932. R. LORANT 1,839,402

APPARATUS FOR TRANSFERRING DATA FROM PERFORATED RECORDS

Filed Dec. 18, 1929 3 Sheets-Sheet 1

FIG. 1.



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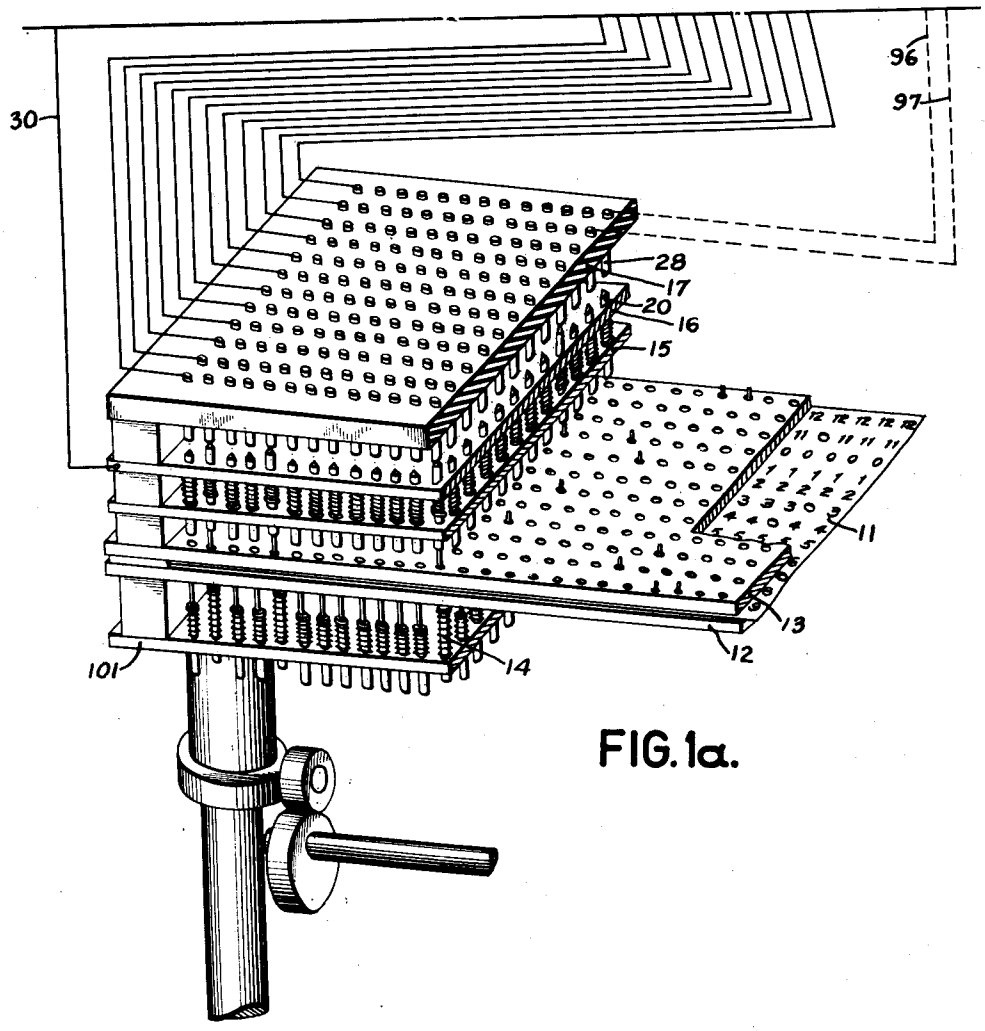


FIG. 1a.

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APPARATUS FOR TRANSFERRING DATA FROM PERFORATED RECORDS

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FIG. 3.

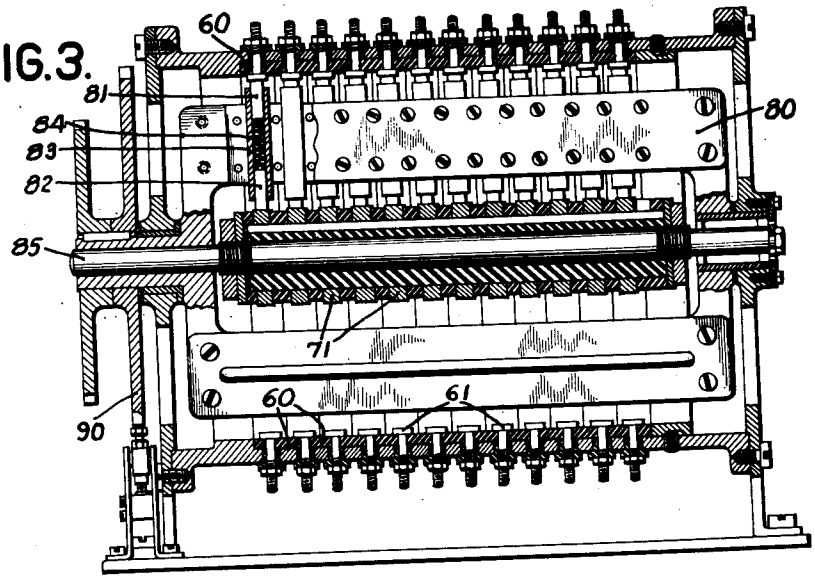


FIG. 2.

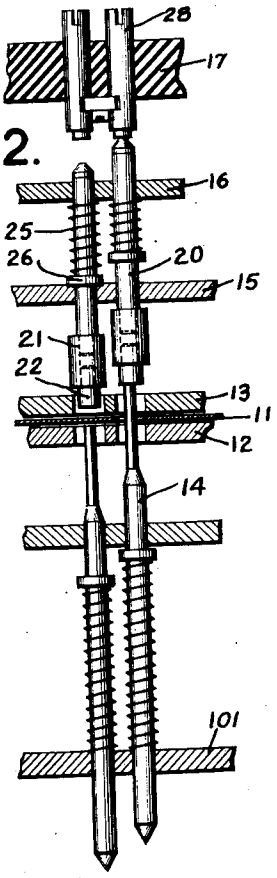
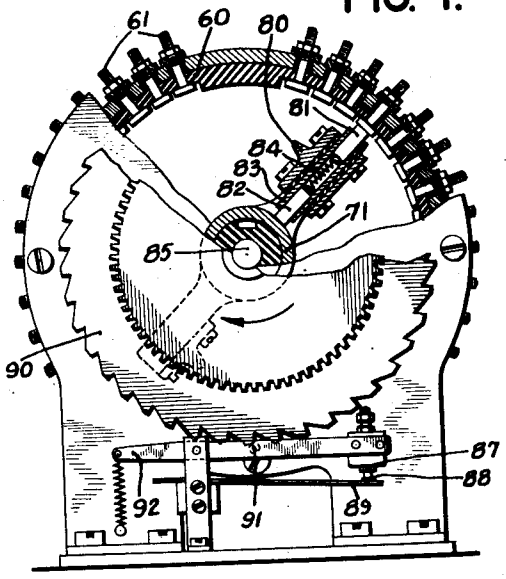


FIG. 4.



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UNITED STATES PATENT OFFICE

RUDOLF LORANT, OF VIENNA, AUSTRIA, ASSIGNOR TO THE TABULATING MACHINE COMPANY, OF ENDICOTT, NEW YORK, A CORPORATION OF NEW JERSEY

APPARATUS FOR TRANSFERRING DATA FROM PERFORATED RECORDS

Application filed December 18, 1929, Serial No. 415,089, and in Germany December 22, 1928.

The invention relates to an apparatus for transferring the perforated index points of statistical or tabulating cards or strips, and more particularly the invention permits the transfer of the said perforated index points to any desired reproduction device and further permits of the reproduction of the transferred index points either without changing the same or changing the sequence of the grouping or the values of the individual index points.

This is effected, according to the invention, by sensing or analyzing the cards or portions thereof or a plurality thereof as a whole, preparing for the transmission of all index points to be transmitted, but transmitting the sensed perforations in timed succession either individually or in small groups to any desired reproducing machine such as a typewriter, perforating machine, adding machine, composing machine or the like or if desired to a plurality of those machines simultaneously. The entire index card or portions thereof comprising several lines or columns, or portions of lines or columns are thereby simultaneously sensed and the actuation of the transmitting elements prepared.

With the apparatus according to the invention it is possible to sense the index points of several cards simultaneously, and to transmit the same onto a separate card or to write the same by means of a typewriter onto a common sheet or to compose the same by means of a composing machine by which they may be printed, or to transmit them to any other suitable machine. Furthermore, it is possible to actuate by means of a single sensing device several reproducing machines simultaneously e. g. a typewriter and perforating machine or the like. Furthermore, it is also possible to actuate simultaneously one or several machines of the same type such as for instance two or more typewriters, each serving a different purpose, for example, actuating one machine so as to write receipts on individual forms while the other machine composes different items on a common sheet.

In a preferred form of the invention a controlling mechanism is provided between the sensing device and the reproducing device, the controlling device having one member connected to timed progressing actuating members of the reproducing device while the other member thereof is operatively connected with the sensing elements of the sensing device.

The invention is shown by way of example in the accompanying drawings, in which:

Fig. 1 shows diagrammatically an arrangement for transmitting or transferring perforated data from a punched record to a punch for reproducing the data thereon.

Fig. 1*a* is a continuation of the diagram of Fig. 1.

Fig. 2 is a detail of the record analyzing or sensing mechanism.

Fig. 3 is a sectional view of the transmitter, and

Fig. 4 is an end view partially in section of the transmitter.

In the drawings 11 designates a perforated card which is inserted between plates 12 and 13 of a sensing device. Beneath the plate 12 and guided thereby are sensing pins 14 which are adapted to be moved against the card by any suitable means. As shown the pins are guided at their lower ends by a plate 101 and springs hold them elevated. When the plate 101 is raised the springs cause the pins to rise with it but if any pin encounters an obstruction its spring will compress and permit relative movement between the pin and the plate 101. Any perforation in the card 12 will therefore be pierced by a pin 14 while the imperforate portions of the card hold down their pins 14.

In the form of the apparatus shown in the drawings an electro or electromagnetic transmission system is shown, but it is of course also possible to transmit the index points of the card by means of a mechanical arrangement or liquid or fluid pressure such as for instance by means of an oil pressure or pneumatic control device.

The transmission device, of which several elements are shown in Figure 2 on an enlarged scale consists, in the example shown, of a plate system 15, 16, 17 carrying switch elements or pins 20. The switch pins are provided at their lower end with insulators

21 which are adapted to insulate the control stop 22 from the switch pin 20. The switch pins are pressed downwardly by springs 25 coacting with collars 26 until they are raised by a sensing pin 14. The plate 16 is connected to a source of current 31 by means of wire 30 (Fig. 1). Electric current is conducted to the switch pins by way of the springs 25, which preferably consist of highly conducting material, and the collar 26, so that the whole switch pin system carried by the plates 15 and 16 is electrically energized.

If a card 11 is inserted into the sensing device and a sensing pin 14 passes through a perforation in the card the corresponding switch pin 20 is lifted and the circuit flows to the contact 28 carried by the insulating plate 17. From the contacts 28, the current is conducted to a switch board 66 interposed between the sensing device and the reproducing device. This switch board permits selective plugging so that data on the card 11 may be transposed to different positions on the receiving machine. From the switch board the circuit proceeds to the controlling device which is connected to the receiving device which in the present case is represented as a punch.

While a punching machine is illustrated as the receiving device, it is to be understood that instead of a punching machine any other suitable machine may be used such as for instance a typewriter, an adding machine or a composing machine or several of the machines of the same type or several machines of different types.

As shown in the drawings the punchers 46 of the punching machine are adapted to be actuated individually or several of them simultaneously by means of electromagnets 41 whose cores are lowered when the magnet coils are energized to depress the punch. The electromagnets are arranged on a common carrier but may also be arranged on the side of the machine, the stroke of the magnet being transmitted to the punch rod by means of mechanical devices such as for instance Bowden cables or air pressure to the setting members. The carrier 42 is adapted to be moved over the punches column by column by means of a suitable driving mechanism for instance by a flexible band 51 having one end attached to the carrier and the other end wound on a spring actuated drum. The movement of the carrier is preferably controlled by the operation of the magnets by poviding lugs 53 on the magnet core 52 which lugs act upon a common bail 54 when one of the magnets is actuated. When the bail 54 is lowered, owing to the actuation of a punch, it rocks a lever 56 which in turn rocks an arm 56*a* fast to a shaft on which the pawl 59 is fast. Pawl 59 and pawl 57 cooperate with ratchet 58 to form an escapement of well known type. The ratchet wheel is fixed to a shaft which also carries a pinion which meshes with the stationary rack 58*a*. This mechanism, as will be understood, causes the carriage 42 to advance one step on each actuation of a punch.

As shown in the drawings a set of collectors is provided comprising the rings 60 which carry spaced segments 61. These segments may each be connected to a contact 28, as illustrated, a vertical row of contacts 28 being individually connected to a longitudinal row of segments 61. The individual elements of the collectors are connected to the sensing device by means of the contacts 61 either directly over the conduit 65 or, as shown in the drawings, over the switch board 66, the contacts 67 of which are in connection with the sensing device.

Each collector ring 60 has a corresponding continuous conducting ring 71 each connected to a magnet 41. A set of brushes 70 is adapted to pass over the collectors and conduct the current of the collector segments or contacts 61 to the reproducing device over the collector ring 71 and the wire 72 to the magnets 41. The current is closed by a wire leading from the magnet 41 over the conduit 75, to the battery or source of current 31.

The construction of the controlling device can be seen more clearly from Figure 3 which shows a longitudinal section of this device, while Figure 4 represents an end section thereof. As will be seen from these figures, the collectors 60 surround the collector rings 71 concentrically. This arrangement can of course be reversed so that the collector ring or sliding ring sets surround the collectors or collector sets concentrically. Between the collectors and the collector ring an axially extending brush bridge 80 is arranged preferably in such a manner that the collector ring 71 and the collector 60 are stationary while the brush bridge 80 rotates.

According to the invention the brushes 81 of the collector 60 and the brushes 82 of the corresponding sliding ring 71 are arranged one behind the other by positioning them in a common brush holder 83. Between the two brushes 81, 82 a spring 84 is provided which tends to separate the brushes and establish contact between the brushes and the collector on the one side and between the brushes and the collector rings on the other side.

The brush bridge 80 may be driven by any suitable driving mechanism. Means, such as for instance current interruptors may be provided in the actuating circuit, preferably in the common return conductor 75 or 30 in order to prevent arcing when the brushes travel from one collector segment to the other. In the example shown a spring interruptor is provided comprising the spring 89 and the contacts 87 and 88. The interruptor is controlled by means of a dentated wheel 90 secured to the shaft 85 of the brush bridge,

which gear is adapted to engage a pin 91 arranged on a lever 92 controlling the spring-contact 89 and 87.

If the collector segments are so arranged as to correspond to the index points of a line, column, portions or groups of one card, for instance by means of a suitable switch arrangement or a switchboard as shown in the drawings or directly, and if the current transmitting elements such as brushes, collector rings or the like are arranged so as to correspond to the columns or lines or portions or groups of the same card, the operation will be effected as follows:

If a card 11 is inserted into the sensing device of Figure 1 and the sensing pins raised, all sensing pins which correspond to perforations in the card will pass through the corresponding perforation and contact with the corresponding switch pins 20. In the switch diagram shown, the switch pins 20 are connected in accordance with the column of the card to the collector segment arranged in axial alignment.

The collector rings lead to magnets which control the keys of the reproducing device in such a manner that to each sliding ring a key or, when the controlling device progresses, a row of keys is coordinated.

The brushes progress from one of the segment rows arranged in axial alignment to the other. Upon each step from one segment to the next the controlling bridge 42 moves correspondingly one step in the manner above described under the influence of the control lever 54 and the pawl and ratchet device 56, 57, 58. If a card is inserted into the reproducing device it will be punched or perforated column by column in accordance with the perforations provided on the original card, so that a copy of the original card is produced. By the provision of a switch board 66 it is possible to change the index points of an original card at will, during the transmission to the reproducing device by connecting the contacts of the switch board with a correspondingly chosen segment of the collector, as for instance indicated at 96, 97. It is thereby possible to change the succession of the index points of the original card at will, so as to bring them from one column or line into another desired column or line whereby the arrangement of the index points, or if the same are transferred into another line, also the value of the index point may be changed on other perforated cards according to any desired system.

It will thus for instance be possible to bring debit items into the credit column or if it should be desired to transmit the items secretly, the same may be changed by using a code and transmitted to another card from which latter they may be then deciphered accordingly.

If instead of a punching machine a typewriter or a composing machine is used, the actuating keys of the controlling bridge will be correspondingly arranged above the letter or figure keys and the stepping mechanism can then be actuated by the ordinary letter shifting device of the typewriter, so that the carriage together with the writing roller is moved from letter to letter in a direction reversed to the direction of writing.

If a text consisting of many words is to be transmitted, the size of the card or the number of perforations therein can be decreased by transmitting certain desired combinations of index points by columns whereby individual characters are indicated by hole combinations.

I claim:

1. A device for transferring data represented by perforations in a sheet to a receiving device comprising a sensing mechanism for simultaneously sensing a plurality of positions in one or more columns on the sheet for perforations, a receiving device and control means for controlling the latter successively in accordance with perforations in different columns on the sheet.

2. A device for transferring perforations comprising a sensing mechanism for simultaneously sensing a plurality of columns of a record card, a punch, and controlling means for the punch controlled by the sensing mechanism to effect column by column operation of the punch in accordance with the simultaneous sensing of a plurality of columns by the sensing mechanism.

3. A device for transferring perforations from one card to another comprising a sensing mechanism including a plurality of sensing elements for simultaneously searching a plurality of columns of one card for perforations, a punch including a plurality of punches corresponding to perforation receiving positions in a plurality of columns of a second card, an element for operating the punches column by column and means controlled by the sensing mechanism and controlling the punch operating element for effecting column by column punching of the second card in accordance with the simultaneous sensing of the first card.

4. A device for transmitting data comprising a sensing mechanism for simutlaneously searching a plurality of positions in a plurality of columns on a sheet for perforations, a receiving device and a transmitter having a set of elements connected to the sensing mechanism, a second set of elements connected to the receiving device and means for coordinating the two sets of elements to transmit the several data according to the simultaneous sensing of the sheet successively to the receiving device.

5. A device for transmitting data comprising a sensing mechanism for simultaneously searching a plurality of columns of a record

sheet for perforations, a receiving device including mechanism for registering data successively column by column on the receiving device and a transmitter having a set of elements connected to the sensing mechanism, a second set of elements connected to the successively operating registering mechanism of the receiving device and means for coordinating the two sets of elements to bring the successively operating mechanism under control of the searching mechanism for column by column operation.

6. A device for transmitting data represented by perforations in a record comprising sensing means including a plurality of sensing elements each comprising a circuit maker for simultaneously sensing a record, a receiving device comprising a group of electromagnetically operated elements for selectively effecting representations of data and means for shifting said group of electromagnetic elements to different columnar positions to permit successive representations of data in successive columns and a transmitting device intermediate the sensing means and the electromagnetic elements and connecting the two comprising a commutator having collector rings and cooperating segments with a brush mechanism for successively shifting circuit connections between a given collector ring and its cooperating commutator segments.

7. A device for transferring data represented by perforations in a record sheet to a receiving device comprising a sensing means for simultaneously sensing all the data representing positions on the record sheet for perforations, a transmitter having a number of contacts equal to the number of positions on the record sheet, a switch board between the sensing means and the transmitter having a number of connections equal to the number of positions on the record sheet, the connections being adapted for use in rearranging data, a receiving device, and means between the transmitter and the receiving device for taking a reading of the data set upon the contacts of the transmitter and thereby controlling the receiving device.

In testimony whereof I hereto affix my signature.

RUDOLF LORANT.

DISCLAIMER

1,839,402.—*Rudolf Lorant*, Vienna, Austria. APPARATUS FOR TRANSFERRING DATA FROM PERFORATED RECORDS. Patent dated January 5, 1932. Disclaimer filed February 17, 1933, by the assignee, *The Tabulating Machine Company*.

Hereby enters this disclaimer to that part of the claims in said specification which is in the following words, to wit:

"1. A device for transferring data represented by perforations in a sheet to a receiving device comprising a sensing mechanism for simultaneously sensing a plurality of positions in one or more columns on the sheet for perforations, a receiving device and control means for controlling the latter successively in accordance with perforations in different columns on the sheet.

"2. A device for transferring perforations comprising a sensing mechanism for simultaneously sensing a plurality of columns of a record card, a punch, and controlling means for the punch controlled by the sensing mechanism to effect column by column operation of the punch in accordance with the simultaneous sensing of a plurality of columns by the sensing mechanism."

"4. A device for transmitting data comprising a sensing mechanism for simultaneously searching a plurality of positions in a plurality of columns on a sheet for perforations, a receiving device and a transmitter having a set of elements connected to the sensing mechanism, a second set of elements connected to the receiving device and means for coordinating the two sets of elements to transmit the several data according to the simultaneous sensing of the sheet successively to the receiving device.

"5. A device for transmitting data comprising a sensing mechanism for simultaneously searching a plurality of columns of a record sheet for perforations, a receiving device including mechanism for registering data successively column by column on the receiving device and a transmitter having a set of elements connected to the sensing mechanism, a second set of elements connected to the successively operating registering mechanism of the receiving device and means for coordinating the two sets of elements to bring the successively operating mechanism under control of the searching mechanism for column by column operation."

[*Official Gazette March 7, 1933.*]