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MACHINE FOR AUTOMATICALLY SORTING, EVALUATING  
OR ACCOUNTING OF PERFORATED CARDS  
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2,012,135

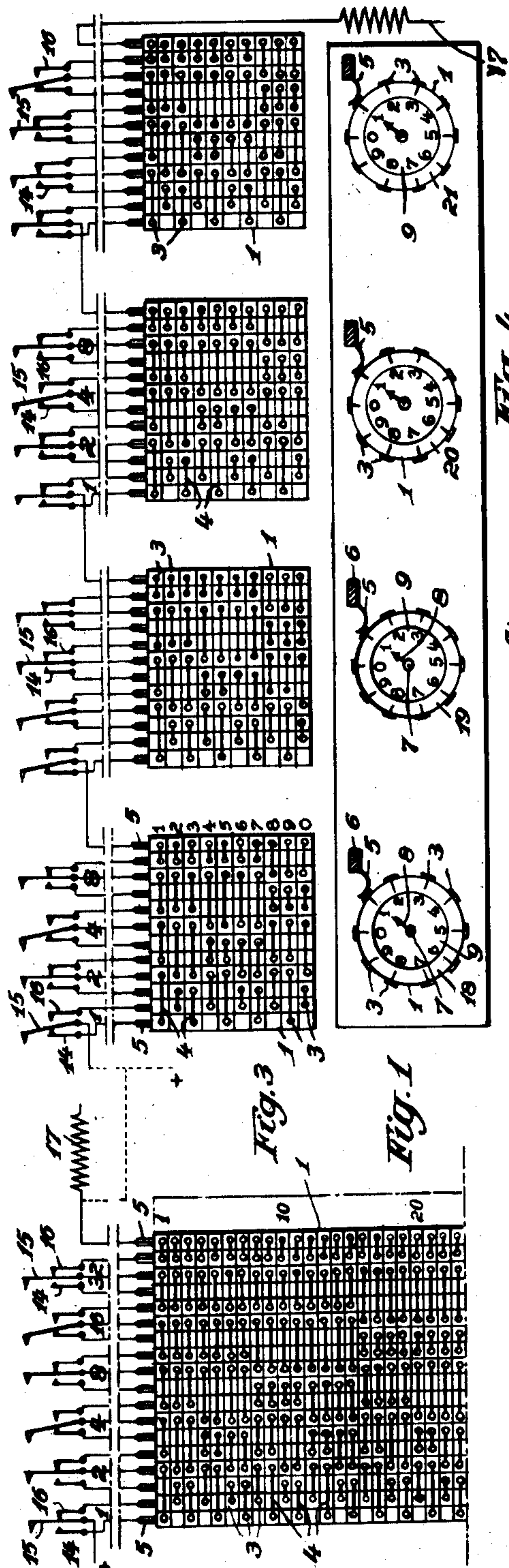


Fig. 1

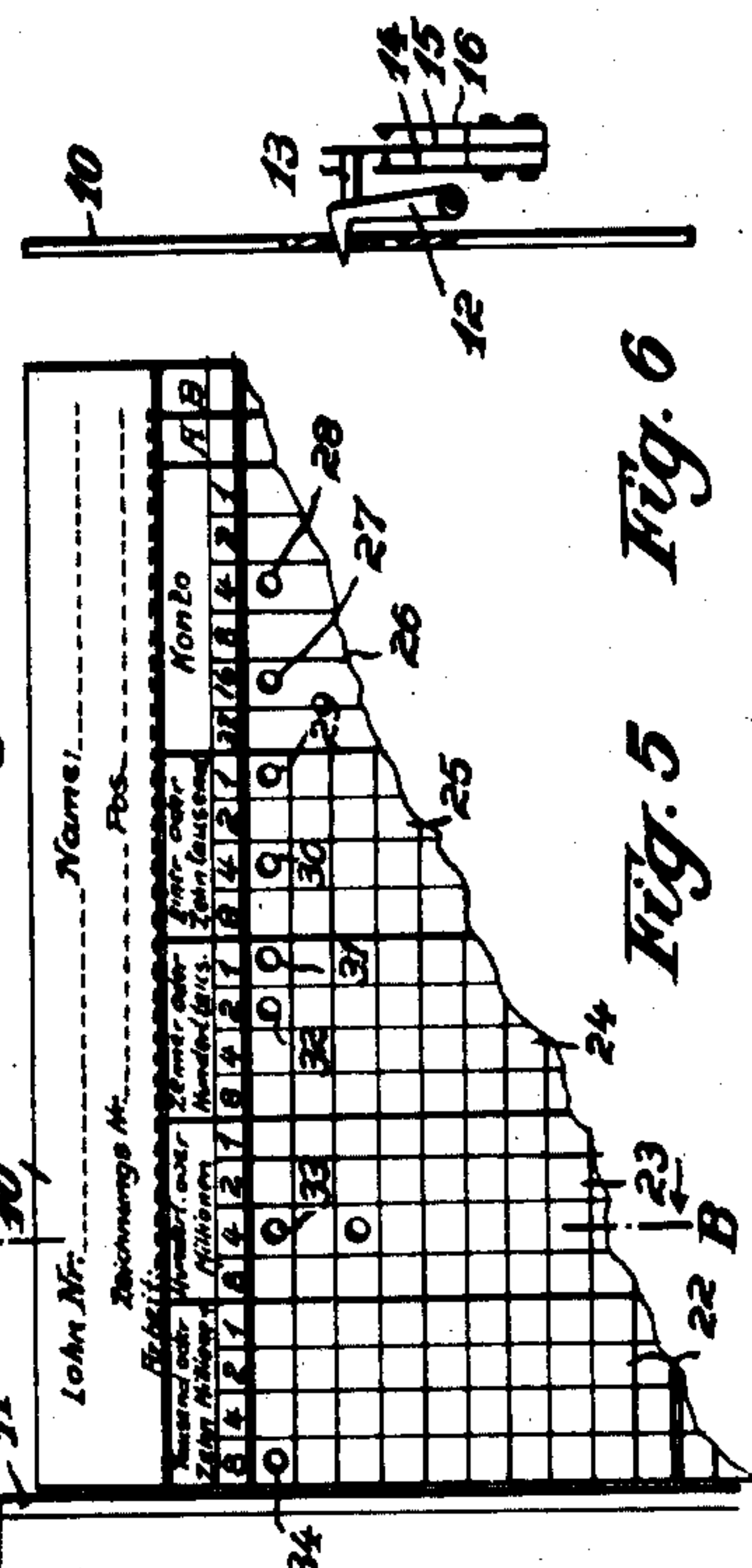


Fig. 2

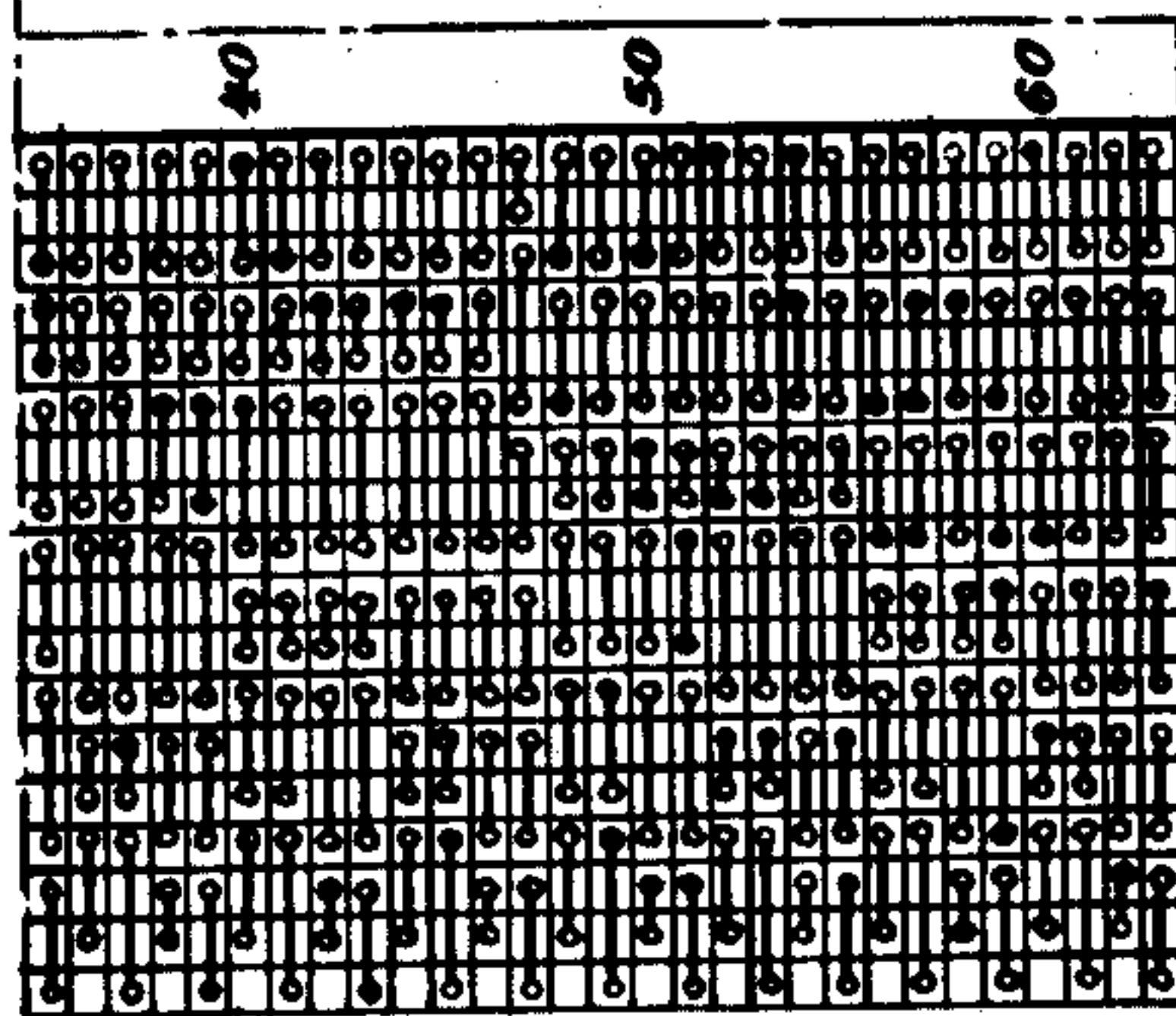


Fig. 3

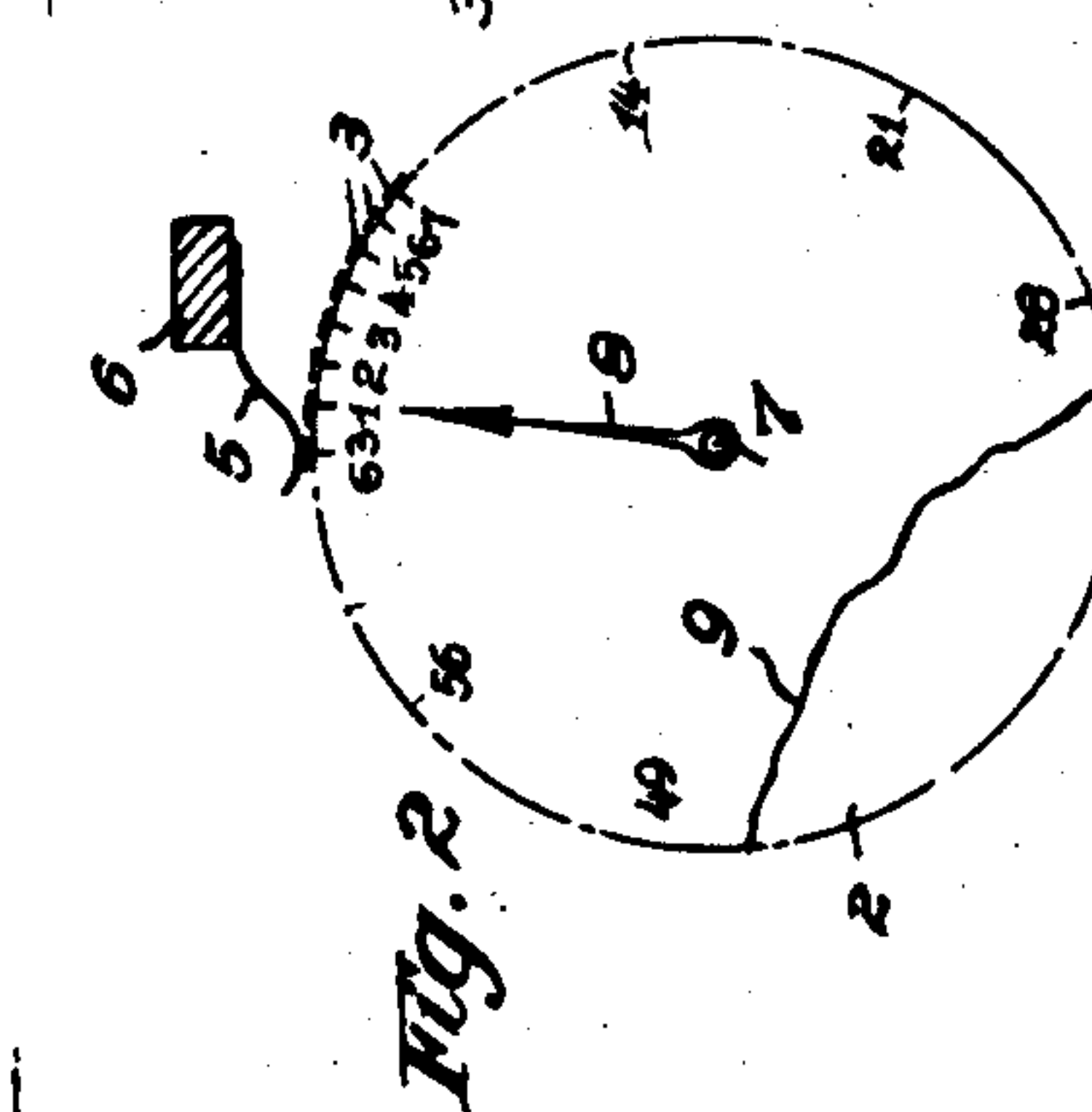


Fig. 4

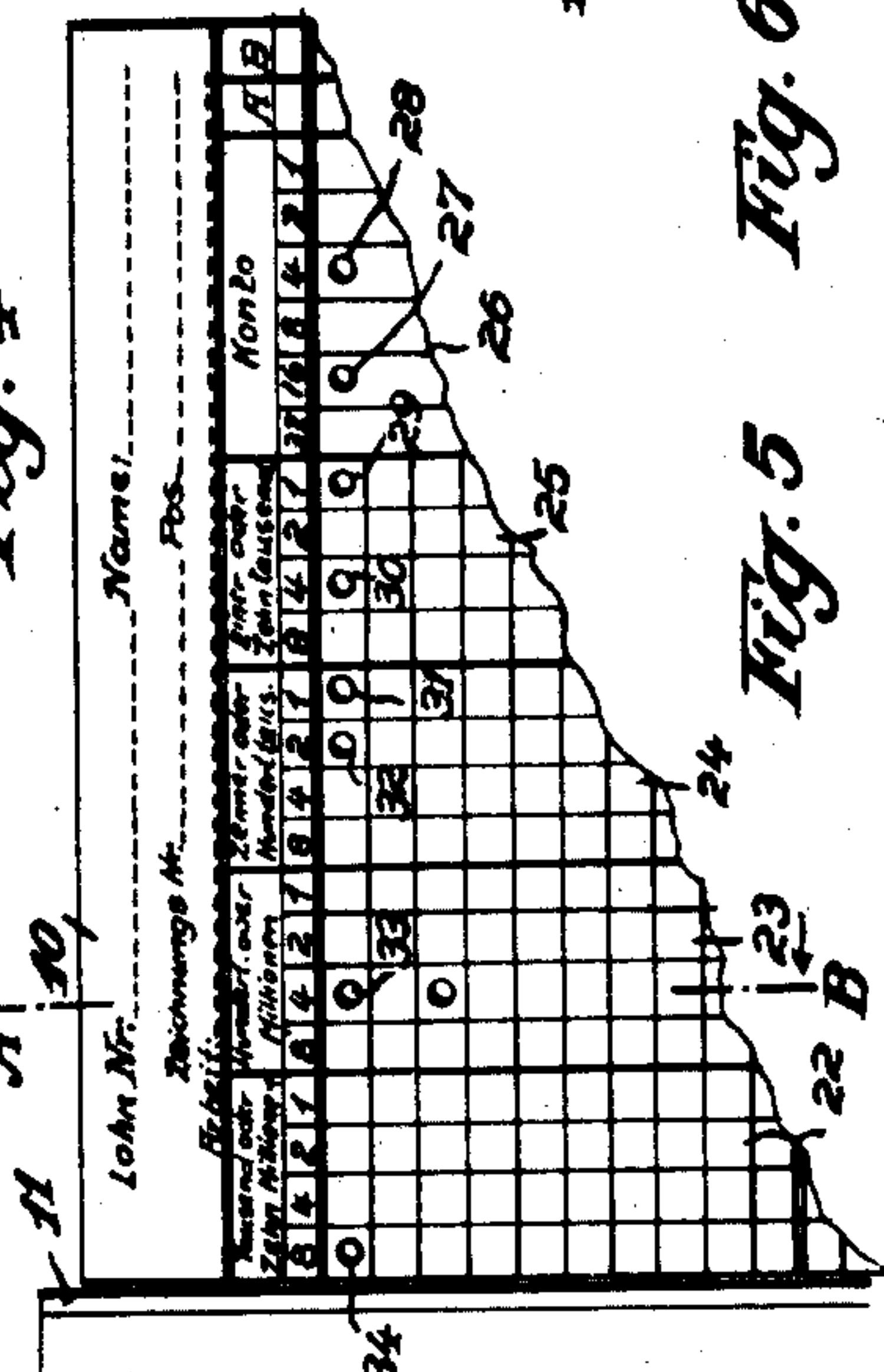


Fig. 5

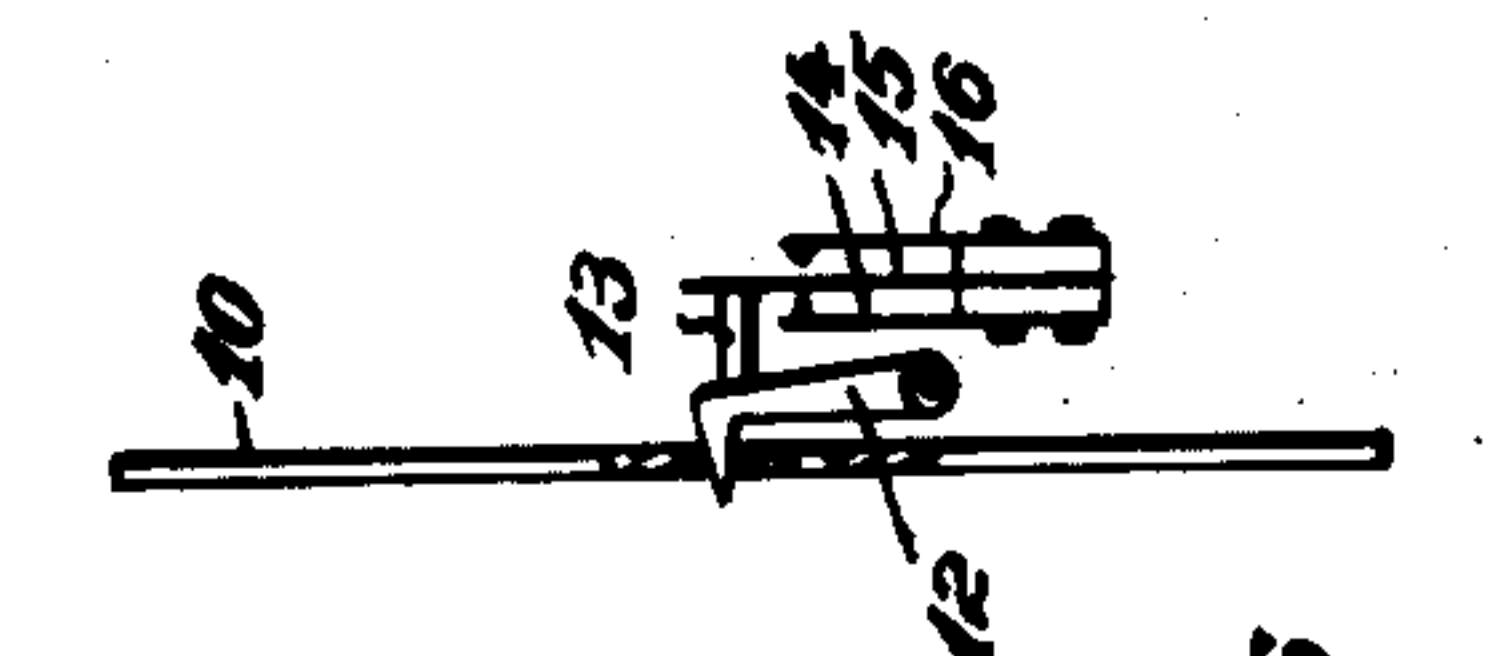


Fig. 6

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## UNITED STATES PATENT OFFICE

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MACHINE FOR AUTOMATICALLY SORTING,  
EVALUATING, OR ACCOUNTING OF PER-  
FORATED CARDSPaul Mansel, Berlin-Charlottenburg, Germany,  
assignor, by mesne assignments, to Remington  
Rand Inc., a corporation of DelawareApplication June 22, 1928, Serial No. 287,588  
In Germany June 28, 1927

7 Claims. (Cl. 209—110)

My invention relates to improvements in machines or apparatus for automatically sorting, evaluating or accounting of records such as cards or strips of paper, and more specifically to control mechanisms for such machines.

In sorting machines for cards with perforation symbols control mechanisms are known, which in a definite, continuously repeating sequence prepare the control of guide members for the cards and only initiate the necessary motion of the guide members by the aid of electro-magnets after the closure of contacts controlled directly by the perforations of the cards. These mechanisms are very complicated in construction and their range of application is very limited. Even when applied to sorting machines they have the drawback, that the number of kinds of cards sortable in this manner to comply with practical requirements cannot be increased beyond a certain limit without endangering the reliability of operation and without making the individual parts of the mechanism excessively large.

The object of my invention is to provide an electrical control device for sorting, evaluating or accounting machines and apparatus of simple construction and great reliability, which is applicable to all machines and apparatus equipped with feeler or selector lever contact devices or similar arrangements and which need not be directly controlled by the perforations or other symbols of the card.

This object is according to my invention attained by means of a contact drum or cylinder provided with rows of contacts distributed over its circumference, each row forming part of one of a plurality of normally open circuits which include contact brushes or other contact closing means, preferably arranged in a row, in conjunction with contacting devices or switches controlled by the cards, each of such circuits being adapted to control the electrical driving or switch gear of the machines or apparatus, and arranged to be closed upon actuation of certain of the contacting devices when a card perforated in a predetermined manner is fed to the machine. Preferably a separate contact drum with brushes or contact closing means is provided for each set of feeler levers coordinated to the combination values of a decade number, an identification value or the like, all the contact drums being connected in series through their end contacts. The contacts in the rows located axially to the drum are thus combined into combinations with the card-controlled feeler lever contacting or switch devices belonging to them, each of which combina-

tions is associated with a certain numerical value. In the drawing affixed hereto an embodiment of my invention is illustrated diagrammatically by way of example, as applied to a sorting machine.

In the drawing

Fig. 1, a development of a contact drum or cylinder with connection diagram, the drum being connected with six feeler or selector levers by sliding brushes and adapted for the setting of 63 numerical values.

Fig. 2, a side-elevation of this drum,

Fig. 3, a development with connection diagram of an arrangement with four contact drums for setting tens values formed by combination values,

Fig. 4, the side elevation of the contact drums shown in Fig. 3,

Fig. 5, a perforated card in its position on the guide plate of a sorting or evaluating machine in plan, and

Fig. 6, a section along line A—B of Fig. 5 with the feeler lever contact arrangement.

Referring to Fig. 1, 1 is the shell or cover of the contact drum 2, upon which are located, in rows and differently spaced, contact faces 3 in the form of salient plates. A number of these contacts are connected by leads 4 in the interior of the drum 2. Within reach of the circumference of the drum 2 there are located a row of contact brushes 5 parallel to the spindle 7 in such a manner, that they slide upon the contact faces 3 of the drum. The contact brushes 5 are preferably rigidly mounted at the machine framing or any other stationary part 6, while the drum is adapted to revolve around its spindle 7. By means of a pointer 8 attached to the drum 2 and a stationary graduated disc 9 any desired row of contacts may be brought in contact with the brushes 5. It will be understood, however, that the arrangement may be such, that the contact drum 2 is stationary and the brush carrier 6 revolves around the drum 2, the pointer 8 being then preferably mounted upon the brush carrier 6 and adapted to move over the scale of a stationary disc 9. From the contact brushes 5 conductors lead to the contact springs of the feeler lever contact arrangement. In the arrangement illustrated each of the feeler levers 12 located in a row below the guide 11 for the perforated cards 10 controls the central one of the three contact springs 14, 15, 16 by means of an insulated pin 13.

The central contact spring or switch 15 is according to the position of the feeler lever 12 forced against the nose of the upper spring 14 or that of the lower spring 16. The central spring 15



of the feeler lever contact arrangement located at the extreme left in Fig. 1 is connected to the positive pole and the contact brush 5 of the same drum at the extreme right to the winding 17 of any driving or control member of the sorting or evaluating machine. From here a conductor leads directly or through other driving or control members to the negative terminal of a source of current.

10 In the construction illustrated in the Figures 3 and 4 of the drawing there are provided in series four contact drums 18, 19, 20, 21 with brushes 5 and feeler lever contact arrangements 12, 14, 15, 16, each of which permits the setting of the values from 0 to 9. In these contact drums 18 to 21 the insulating shell is again indicated by the reference letter 1, the individual contact faces placed in rows with 3, their connecting leads with 4, the contact brushes with 5, the brush carriers with 6, the spindles of the drums with 7, the pointers with 8 and the graduated discs with 9. 17 is again the winding of a driving or control member of the machine to be controlled.

25 The feeler levers 12 are located in a row transverse to the travel direction of the card below the guide track 11 for the perforated card. For each vertical row of the card there is provided a feeler lever 12 with contact springs 14, 15, 16.

30 According to the division of the perforated card 10 four or more feeler levers 12 are always combined into a group and their contact springs 14, 15, 16 brought in connection with the slide brushes 5 of one of the contact drums 2, 18, 19, 20 or 21. Each of these contact drums 18 to 21 may according to Figs. 1 and 2 be used by itself or, according to Figs. 3 and 4 in connection with contact drums of like kind or, as indicated by the dotted lines between Figs. 1 and 3 in connection with contact drums which differ from one another in regard to the number of the adjustable values. Of the systems of contact drums illustrated the contact drums 18 to 21 of Figs. 3 and 4 may, for instance, be employed for the groups of columns 22 to 25 of the card 10 in Fig. 5 and the contact drum 2 in Figs. 1 and 2 for the groups of columns 26 of the card 10.

40 The mode of operation of my improved control apparatus is as follows: prior to the commencement of the sorting or evaluation of cards or strips of paper 10 punched with perforation symbols, one or more of the contact drums of the machine or apparatus are set for the values according to which the cards or strips of paper should be sorted or evaluated. If, for instance the cards are to be sorted out, according to the values punched only in the group of columns 26, which in the illustrated example contain the value 20 in perforation symbols, the contact drum 2, which is employed in the present case to control sorting, is set at 20 and the contact drums 18 to 21 at 0. When sorting cards according to the values contained in all of the columns 22 to 26, such as the cards 10, which in the groups of columns 22, 23, 24, 25 show the tens values 5, 3, 4, 8 and in the group of columns 26 the value 20 in perforation symbols, the contact drum 18 is set on the value 5, the drum 19 on the value 3, the drum 20 on the value 4 and the drum 21 on the value 8, as well as the drum 2 on the value 20.

70 If a card with the value 20 in the group of columns 26 of the card 10 passes through the machine, the third and fifth feeler levers 12 of the contact drum arrangement 2 according to Fig. 1 pass through the perforation symbols 27 and 28 of the card 10 in Fig. 5 and cause the central

5 springs 15 to move into contact with the upper contact springs 14. In the contact arrangements which correspond with the column values 4 and 16, the central springs 15 then make contact with the upper contact springs 14, while in the contact arrangements apportioned to the remaining column values 1, 2, 8 and 32 the central springs 15 are in contact with the lower springs 16. In the horizontal row of contacts 3 on the drum 2 coordinated to the value 20 (see horizontal row 20 in Fig. 1) 10 the contacts are so arranged and are so connected with each other directly or through the switch contacts 14, 15 and 16, that at the moment when the card 10 is searched by the feeler levers, a circuit is closed from the positive pole (see upper 15 left-hand corner of Fig. 1) across some of the feeler lever contact springs 14, 15, 16 as well as through some of the brushes 5 and across the contacts 3 of the row corresponding with the value 20 in predetermined sequence, to the winding 17 and 20 thence to the negative pole. Thus for every perforation value punched in the columns 26, the contacts 3 of the correspondingly numbered horizontal row of drum 2 are connected in series so as to close the circuit through the controlling element 25 17. This circuit will obviously be closed every time a card having the given value punched in columns 26 is fed to the machine.

In sorting cards with perforation symbols, which correspond with the number 5 3 4 8, the contact 30 sets corresponding with the values 1 and 4 are in similar manner set at the contact drum 18, at the drum 19 the contact sets belonging to the values 1 and 2, at the drum 20 the contact set apportioned to the value 4 and at the drum 21 the contact set coordinated to the value 8, in such a manner, that the central springs 15 are placed against the upper contact springs 14, while in the remaining sets of contacts abut against the lower contact springs 16.

40 The contact drums 18 to 21 previously set for the values 5, 3, 4, 8 then close a circuit passing from the positive pole across individual contact springs 14, 15, 16, as well as contact brushes 5 and across the contacts 3 of the horizontal rows of the drums 18—21 coordinated to the values 5, 3, 4 and 8, as well as across the winding 17 in the sequence shown in Fig. 3 to the negative pole. When, therefore, cards are to be sorted according to the perforation values in columns 22 to 26 inclusive, 50 the machine thus becomes operative then only, when cards 10 with the values set on the contact drums 2, 18, 19, 20, 21 in the individual groups of columns 22 to 26 are introduced through the card guide 11, since the contact drums are connected in series.

By a corresponding arrangement and connection of the individual contact drum 2, 18, 19, 20 and 21 and by increasing the number of contact drums and feeler lever contact sets 14, 15, 16 60 any desired number of sorts of cards may by means of the new control mechanism be picked out automatically from a large number of cards and sorted. In view of the fact that the feeding of the perforation values by the feeding levers 65 12 takes place in rows, it is possible to take up a plurality of values entered in different rows of the card of the same kind (for instance of the same account) in one operation, i. e. during a single passage of the respective card 10 through 70 the machine, in its counting and calculating mechanism and to evaluate them, by adding up the values or entering the balance.

Various modifications and changes may be made without departing from the spirit and the scope 75



of the invention, and I desire, therefore, that only such limitations shall be placed thereon as are imposed by the prior art.

I claim as my invention:

- 5 1. An electric control device for machines and apparatus of the class described used in connection with records, comprising movable contact cylinders adjustable to different positions but stationary during normal operation, con-  
10 tacts on said cylinders, brushes adapted to engage said contacts, contact members connected with said brushes, switch members each movable to engage a contact member connected with one brush or a contact member connected with  
15 a different brush, and feelers adapted for co-operation with the records and arranged to throw the respective switches into engagement with one or the other of two contact members according to the position of the respective feeler.
- 20 2. An electric control device for machines and apparatus of the class described used in connection with records, comprising movable contact cylinders adjustable to different positions but stationary during normal operation, rows of  
25 contacts on said cylinders, feelers adapted for co-operation with the records, and circuits associated with said contacts and including switches actuated by said feelers, each switch being adapted, according to its position, to connect one or  
30 the other of two contacts into circuit, the record-engaging portions of said feelers being located in one row in such a manner that the same feeler will be enabled to select from one record and analyze in one operation, a plurality of values  
35 of like character.
3. An electric control device for machines and apparatus of the class described used in connection with records, comprising movable contact cylinders adjustable to different positions  
40 but stationary during normal operation, contacts on said cylinders arranged to form predetermined combinations, and feeler mechanism adapted for co-operation with the records and including switch members which according to  
45 their position will establish an electrical connection between adjoining contacts of the respective cylinder or break such connection.
4. An electric control device for machines and apparatus of the class described used in connection with records, comprising movable contact  
50 cylinders adjustable to different positions but stationary during normal operation, contacts on said cylinders, feelers adapted for co-operation with the records, circuits associated with said contacts, and switches controlled by said feelers  
55 and arranged to effect different circuit connec-

tions according to the position of the respective feelers, said switches being arranged in groups each corresponding to the combination values of a denominational number or to an indicating value.

5. An electric control device for machines and apparatus of the class described used in connection with records, comprising movable contact cylinders adjustable to different positions but stationary during normal operation, contacts  
10 on said cylinders, feelers adapted for co-operation with the records, circuits associated with said contacts, and switches controlled by said feelers and arranged to effect different circuit connections according to the position of the re-  
15 spective feelers, said switches being arranged in groups each corresponding to the combination values of a denominational number or to an indicating value, the end contacts of said contact cylinders being connected in series, for the  
20 purpose of taking off simultaneously numerical values having a plurality of figures.

6. An electric control device for machines and apparatus of the class described used in connection with records, comprising a movable contact cylinder adjustable manually to different po-  
25 sitions but stationary during normal operation, rows of contacts on said cylinder, contact brushes adapted to engage said contacts, feelers adapted for co-operation with the records, pairs of  
30 contact members connected with said brushes, each member of a pair being connected with a different brush, a switch member for each of said pairs adapted to engage one or the other member of said pair, and circuit connections in-  
35 cluding said switch members, contact members, brushes, and contacts, whereby such switch members will be caused to close different circuits according as they are thrown into engagement with one or the other member of a pair of con-  
40 tact members.

7. An electric control device for machines and apparatus of the class described used in connection with records, comprising a movable contact cylinder adjustable to different positions but  
45 stationary during normal operation, longitudinal rows of contacts on said cylinder, means for adjusting said cylinder manually to different positions, feelers adapted for co-operation with the records, circuits associated with said contacts,  
50 and switches operated by said feelers and having two circuit-closing positions to close one circuit or another according to the position of the respective feeler.

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