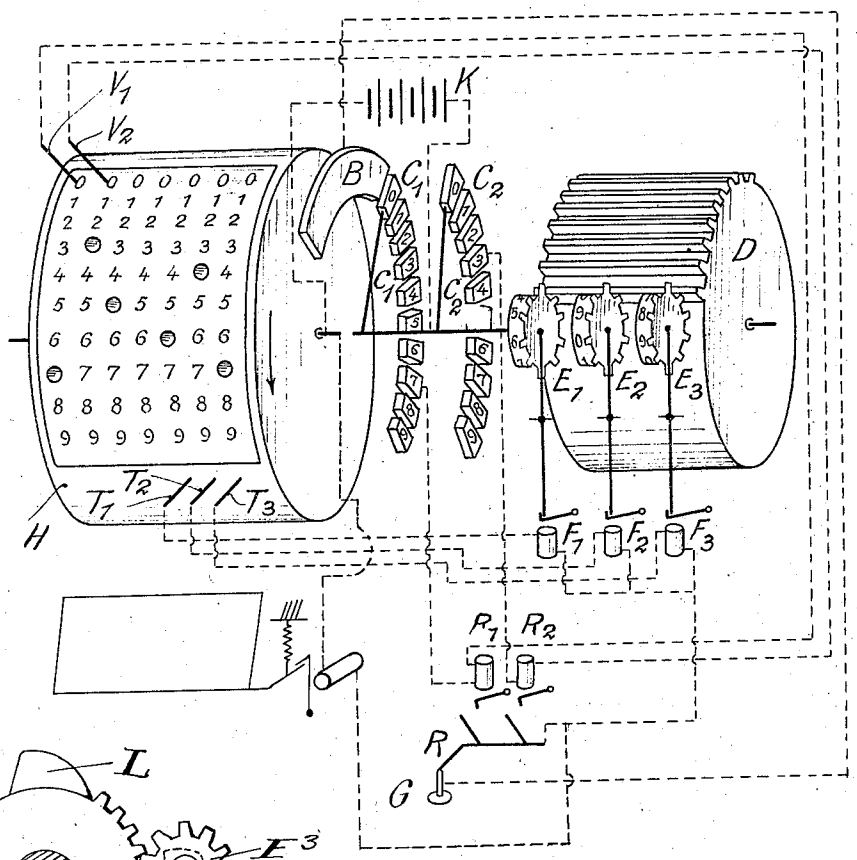
Nov. 4, 1924. 1,514,503

F. R. BULL

AUTOMATIC REGISTERING MACHINE FOR STATISTICAL AND SIMILAR PURPOSES

Filed Feb. 3, 1922

Fig. 1.



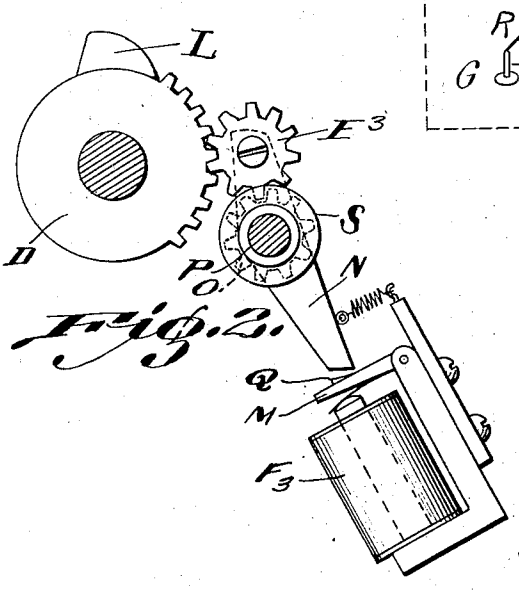


Fig. 2.

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UNITED STATES PATENT OFFICE.

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AUTOMATIC REGISTERING MACHINE FOR STATISTICAL AND SIMILAR PURPOSES.

Application filed February 3, 1922. Serial No. 533,996.

To all whom it may concern:

Be it known that I, FREDRIK ROSING BULL, a subject of the King of Norway, residing at Christiania, Norway, have invented certain new and useful Improvements in Automatic Registering Machines for Statistical and Similar Purposes, of which the following is a specification.

This invention relates to machines for registering statistical and like particulars of the type in which cards provided with perforations corresponding to various numbers are used to close electrical circuits by means of brushes making contact through the said perforations, the closing of said electrical circuits actuating the registering mechanism.

This invention also relates to selecting apparatus for use in registering machines of the type in which insulated contact plates arranged in one or more arcs are provided and one or more selector arms are adapted to rotate synchronously with the card feeding mechanism so as to make rubbing contact with the said contact plates.

According to the present invention the adding mechanism in a machine of the above type consists of a mutilated toothed wheel having nine teeth only, rotating synchronously with the card feeding mechanism, and a plurality of toothed adding wheels each of which adding wheels is adapted to be released by an electromagnet so as to engage with a tooth on the mutilated wheel corresponding to the number indicated by the perforation on the card and to be rotated a corresponding number of teeth.

The invention also consists in a selecting apparatus for use with a registering machine of the type referred to above characterized by the feature that for each arc of contact plates there is provided a single electro-magnet which can be connected to one or more of the contacts in the said arc, the said electro-magnets actuating a switch to close a circuit ready for operating either the adding mechanism or a special flap for separating out the cards or for both, said switch closing the circuit only on all the electro-magnets being actuated.

Referring now to the accompanying drawings.

Fig. 1 is a diagrammatic view showing the operation of the registering and selector mechanisms and

Fig. 2 is a detailed view of the adding wheels.

In Fig. 1 of the drawings the cards are moved by means of a feed device H one by one passed the selector contacts V_1 V_2, and registering contacts T_1, T_2, T_3. On the same axis as the feed device there are provided rubbing contacts c_1 and c_2 which, during the rotational motion, rub over arc-shaped contacts C_1 C_2. These arc contacts consist of plates insulated from one another and correspond in number with the number of numerals in the vertical columns of the cards. One or more of the plates in the arc contacts C_1 C_2 are connected by means of a contact board with the locking magnets R_1, R_2 respectively. The whole arrangement is such and the parts are relative to one another in such a manner that the rubbing contacts c_1, c_2 come into contact with the plate which bears the same number as the perforation through which the brushes V_1 or V_2 is in meshing contact. On the same axis as the feed device there is arranged further, a broad toothed wheel D which serves to rotate the counting pinions E_1, E_2, E_3 in the adding operation. This toothed wheel D has nine teeth which are so arranged in relation to the counting wheels that immediately one of the contact brushes T_1, T_2 and T_3 comes exactly opposite one of the numbers on the card, the correspondingly numbered tooth of the wheel D will be situated exactly in front of the point of its engagement with the adding pinions.

The improved machine comprises further an electric battery K, locking magnets and clutches hereinafter described.

If, for instance, it is desired to select all the engineers in a certain town and at the same time add their respective incomes together and it is assumed that engineers in this town are represented by the numbers 7 and 3 in the first and second columns all the cards are perforated in the first two particulars as shown. The three columns on the right of the card may contain, for instance, the incomes stated in thousands, hundreds and tens of dollars. In this case, for instance, $6,470.

As the card is being fed in the direction of the arrow the contact brush V_1 will come through the hole 7 into contact with the drum and thus close a circuit extending from the battery K through the axle, the contact

c_1, the contact plate of the group C_1 which is designated 7, the locking magnet R_1, the contact brush V_1, the drum, and thus back to the battery. By this means the locking magnet R_1 releases partly the contact R in the electric circuit for the counter, but in such manner that the contacts R and G can be closed only after the locking magnet R_2 has been released. By a further feed of the card the brush V_2 in passing over the hole 3 in the card closes the circuit extending from the battery K through the axle, the contact c_2, the contact plate of the group C_2 which is designated 3, the locking magnet R_2 and again through the brush V_2 the drum, and thus back to the battery. By this means the magnet R_2 releases a locking hook and only now can the arm R drop and close the contact G.

With continued feed of the card it comes under the brushes T_1, T_2 and T_3 of the registering mechanism. First, the brush T_3 comes through the hole 7 into contact with the periphery of the drum thereby closing an electric circuit extending from the electric battery through the axle, the rubbing contact c_1, the arc B, the contacts G—R, the locking magnet F_3, the brush T_3, the periphery of the drum, the axle, back to the battery. Then the magnet F_3 attracts the armature M whereby the adding wheel E_3 which is rotatably mounted on the end of a spring-actuated lever, comes into mesh with tooth No. 7 of the mutilated toothed wheel D which consequently rotates the adding wheel E_3 in the forward direction to the extent of 7 teeth.

The lever N is pivoted about a shaft P. On this shaft is also rotatably mounted another adding wheel O similar to E_3 to which the number ring S is attached.

The toothed wheel D is provided with a cam L which resets the lever N behind the stop Q on the armature M since this is held against the lever N by means of a spring and thus takes the wheel E_3 out of mesh with the mutilated wheel D. The wheel E_3 is now ready to be engaged again with the teeth on D.

The wheels E_1 and E_2 are mounted and operated in the same manner as E_3.

Similarly the adding pinions E_1 and E_2 will be rotated forwards to the extent of 4 and 6 teeth respectively. At each revolution of the drum the adding wheels are brought out of mesh, whereupon the number being carried forward is added in the same way as in ordinary adding machines.

Below the feed drum there is provided a flap (not shown) which opens at the same time as the contact arm R which turns down to the screw terminal G. By the opening of this flap all the cards that have effected a release of the magnets R_1 and R_2 are separated out.

The flap is turned back after each revolution of the drum. Consequently it will be readily understood that all those cards that have their perforated selected particulars (both on the left-hand side) in the manner hereinabove described (at 7 and 3) are added together and collected in a separate receptacle, whereas all the other cards pass through the machine unsorted.

It will also be readily understood that the one selecting device illustrated by way of example for only two-figure numbers may be constructed without essential alteration for a plurality of selecting devices and that these may be employed for numbers containing more than two figures by simply providing a corresponding number of locking magnets and selecting arcs. The locking magnets must be so constructed that immediately all the magnets have been released, the machine will then only be able to register one or more statistical data for the card groups which have produced the release of the magnets. In the same manner a plurality of rows of counters may be provided for effecting the simultaneous addition of a plurality of particulars on the cards.

By connecting the locking magnets with a plurality of contact plates on the selector arcs C_1, C_2, it is possible by means of a series of selector brushes to separate out and register a plurality of groups of cards. For instance, if it is desired in addition to group 73 to separate out and register also groups 74, 75, and 76 the operator has merely to connect the contact plates 4, 5 and 6 of the arc C_2 with the magnet R_2 so that the locking pawls of this magnet will be released, also all cards whose numbers 4, 5 and 6 are perforated in the same column in addition to being released by the cards that are perforated at No. 3.

In the example here given the counter is employed in combination with the selector mechanism. It is however obvious that the counter can be used by itself.

What I claim is:—

1. A machine for registering statistical and like particulars comprising a movable carrier for cards perforated according to the particulars to be registered, a plurality of brushes resting on said carrier, electrical circuits including said carrier and brushes, an adding mechanism comprising a mutilated toothed wheel having nine teeth moving synchronously with the carrier, a plurality of toothed adding wheels, and an electro-magnet associated with each of said adding wheels and included in said circuits, said electro-magnets being adapted to be energized to bring their respective adding wheels into mesh with the mutilated toothed wheel so as to be rotated through numbers of teeth corresponding to the numbers represented by the perforations in the card

through which the carrier and brushes come into contact to complete the circuits of the respective magnets.

2. A machine as claimed in claim 1, having one or more series of insulated contact plates, a selector arm for each series moving synchronously with the card carrier and adapted to rub over said contacts an electromagnet for each series connected to one or more of the contacts thereof, and a switch adapted to be closed to complete the circuit of the adding wheel magnets only when all of said contact magnets have been energized by the contacts to which they are connected having been engaged by the selector arms at the moment when the card perforation corresponding to said contacts register with a brush.

In testimony whereof I have signed my name to this specification.

FREDRIK ROSING BULL.