

Oct. 2, 1934.

A. KNOTZ

1,975,694

CIRCUIT CLOSER FOR ADDING MACHINES

Filed June 22, 1932

3 Sheets-Sheet 1

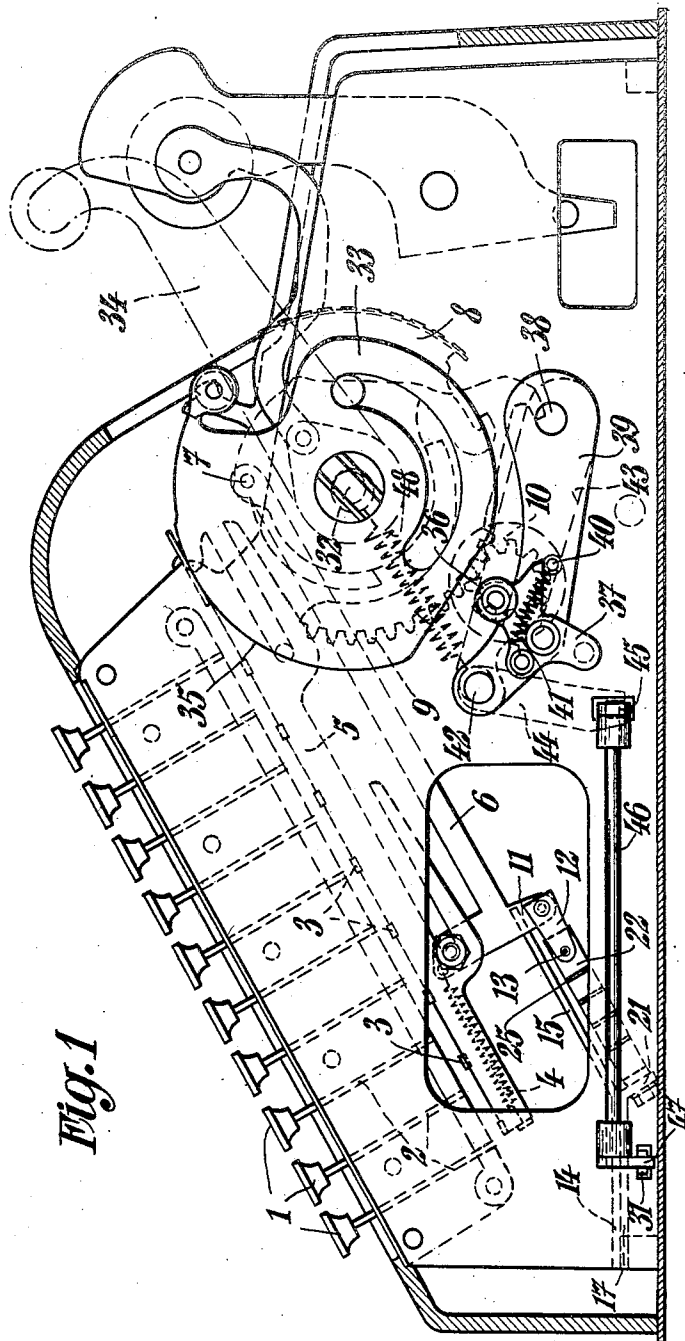


Fig. 1

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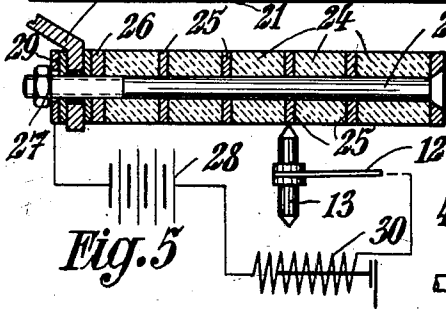
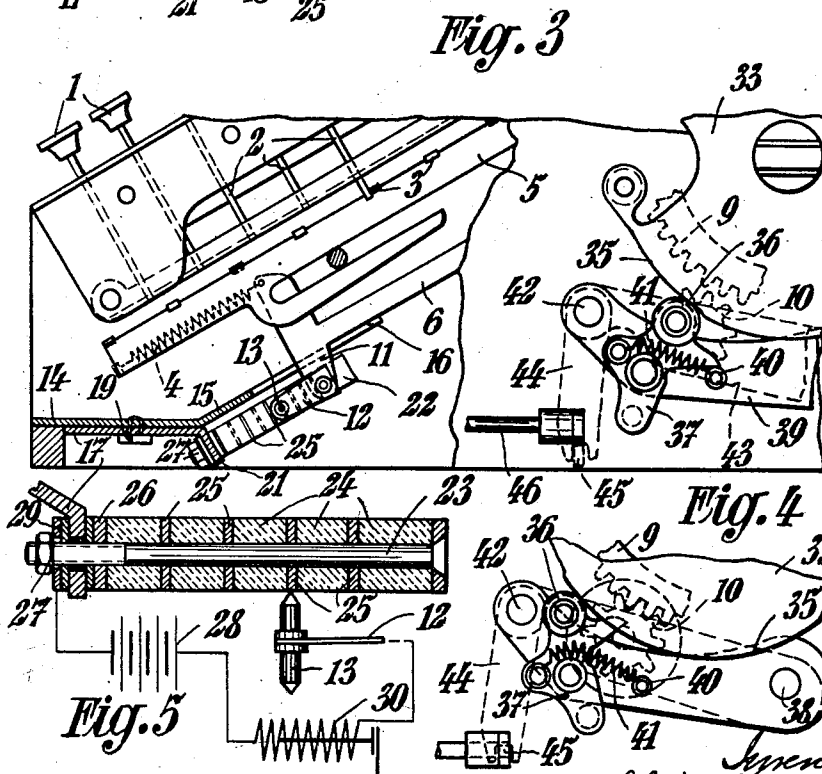
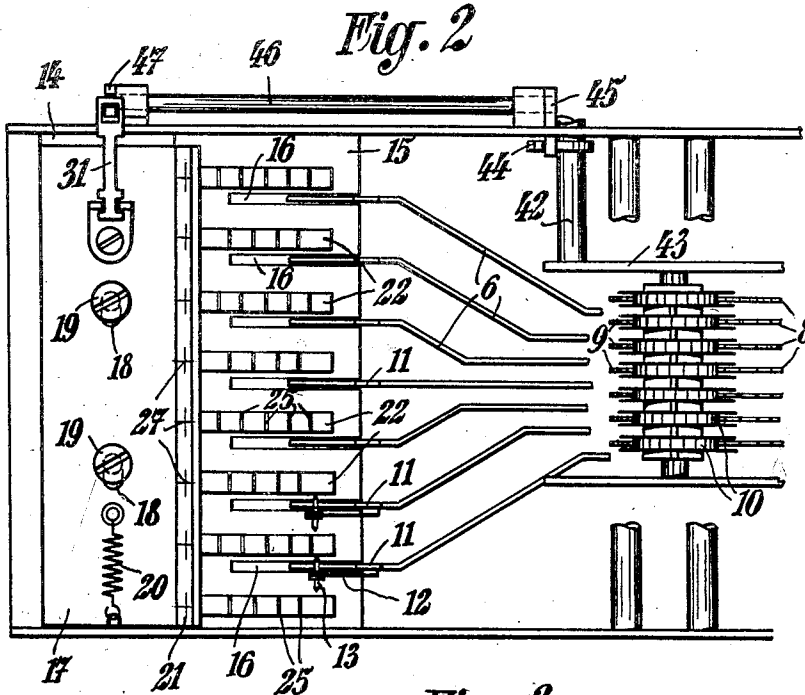
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3 Sheets-Sheet 2



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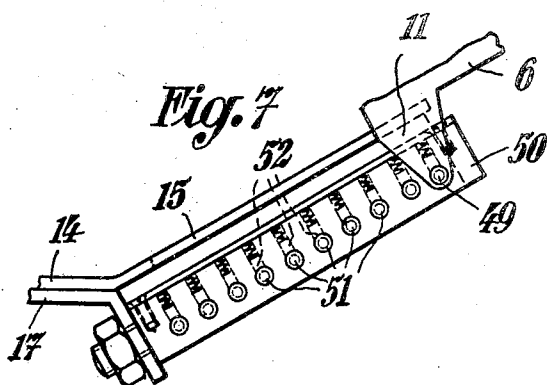
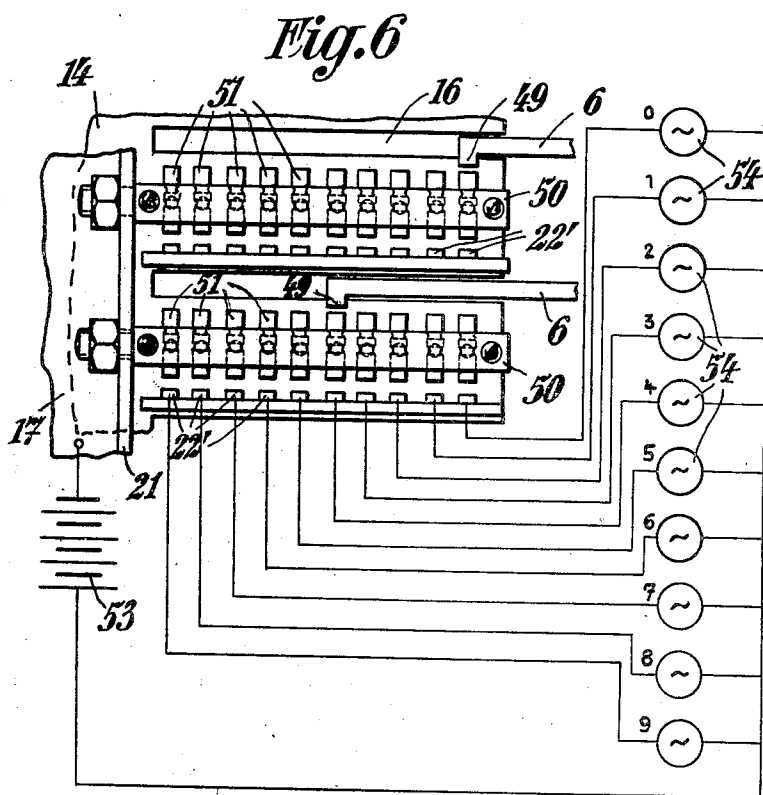
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CIRCUIT CLOSER FOR ADDING MACHINES

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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CIRCUIT CLOSER FOR ADDING MACHINES

Alois Knotz, Graz, Austria

Application June 22, 1932, Serial No. 618,733
In Austria June 23, 1931

3 Claims. (Cl. 235—92)

This invention relates to a device for enabling the amounts registered in the setting mechanism of an adding machine to be transmitted to indicating or notifying means. It has already been proposed to provide in conjunction with registering tills indicators adapted to be operated at a distance electrically, with a view to making the indicator independent as to location of the setting mechanism of the adding machine. For this purpose it has hitherto been necessary to modify the construction of the setting mechanism by the addition of accessory means for the operation of the necessary electric contacts.

The present invention relates to means for the transmission of the amounts registered in the setting mechanism of an adding machine to an indicating device which is independent of the machine, and consists essentially in the arrangement wherein there is associated with each of the differential actuators or similarly acting pivoted parts adapted to be displaced to an extent varying according to the numbers set at any one time a group of contacts which are influenced by the movable part, and which serve to close the current circuits of an electrically-operated indicating device. One preferred way is to arrange that, for each digit denomination, the movable part of the mechanism travels over the row of contacts, touching each of the contacts lying in its path, so that as many current impulses are set up in the current circuit common to all the contacts of the group concerned as correspond to the number set. The number of contacts in each group is equal to the number of digits in the corresponding digit denomination exclusive of zero.

In the accompanying drawings the invention is illustrated by way of example, in conjunction with a recording adding machine. In these drawings:

Fig. 1 shows a side elevation of the machine partly in section.

Fig. 2 shows an inverted plan view of the mechanism directly actuated by the setting mechanism of the adding machine.

Fig. 3 is a partial view of the same mechanism.

Figs. 4 and 5 show details of the same form of construction.

Referring to the drawings, the adding machine of usual construction such as is shown in the patents to Barrett numbered 1,811,840 or 1,812,130 is provided, for each digit denomination, with ten keys 1 corresponding to the figures 0 to 9, the stems 2 of these keys being adapted to co-

operate in a known manner with stops 3 on the differential actuators. The differential actuators consist in the usual manner of two differential actuators 5, 6 connected together by means of springs 4. The differential actuator 6 is connected by one end at 7 to the appropriate type segment 8 the teeth 9 of which are adapted to mesh with the toothed wheels 10 of the calculating mechanism. The differential actuators 6 are provided with lugs 11 to which there are attached leaf springs 12 which carry a contact pin 13 which is pointed at both ends. A plate 14 attached to the machine is provided with a flange 15, which is bent up so as to lie parallel to the direction of the movement of the differential actuators, having slots 16 (see Fig. 2) in which the lugs 11 on the differential actuators engage, so that these differential actuators 6 are thus provided with lateral guiding means. On the under side of the plate 14 there is provided an angle plate 17 which is slidable at right angles to the direction of the movement of the differential actuators 6, for which purpose there are provided slots 18 in which screws 19 of the plate 14 engage. A spring 20 urges this angle plate to one end position (Fig. 2). Attached to and insulated from the projecting flange 21 of the angle plate there are contact bearers 22 (Fig. 3) each of which consists of a screw bolt 23 (Fig. 5) on which there are placed metallic discs 25 and blocks of insulating material 24, these bearers being arranged in a row alternately and pressed together by means of a tightening end nut 27. Between these nuts 27, for the attachment and clamping of the contact bearers 22 and the flange 21 there is clamped a strip of sheet metal 29 which is conductively connected to one pole of a source of current 28, and which is insulated from the flange 21. The other pole of the source of current is connected, through a relay 30 which acts upon the indicating device, to the conductive pin 13 and thus, when the pin 13 is in contact with a disc 25 and bolt 23 back to the strip 29. The metallic discs 25 which form the contacts are arranged, in the constructional example under consideration, on two adjacent contact bearers 22 (Fig. 2) for each digit denomination, the arrangement being such that one bearer has its contacts in the positions assumed by the pin 13 when the even numbers of this digit denomination are set on the key-board, while the other bearer has its contacts in the positions assumed by the pin when the keys for the odd numbers of the same digit denomination are depressed. In order to avoid the necessity of allotting two separate contact

bearers to each digit denomination, the arrangement is such that these contact bearers 22 carry alternately contacts pertaining to the even and the odd numbers, so that these contact bearers, 5 with the exception of the two outermost, are touched alternately by two pins 13 pertaining to two adjacent differential actuators 6. For this purpose the contact bearers 22 are displaced during the movement of the differential actuators 10 6, which displacement is effected by displacement of the angle plate 17 with which there is adapted to cooperate a rod 31 operated by the calculating mechanism of the machine. The disc 33 attached to the driving shaft 32 (Fig. 1) of the 15 machine is rotated together with this shaft 32 on the operation of the driving crank 34, and cooperates by its actuating cam surface 35 with the roller 36 of a controlling member 37 which is rockingly mounted upon a lever 39 pivoted at 20 38. In one direction (the clockwise direction in Fig. 1) the rocking movement of the controlling member 37 is limited by a stop 40 to which there is attached a spring 41 which tends to retain the controlling member in contact with this stop. A 25 bolt 42 on the lever 39 passes through an aperture in the side wall of the casing of the machine and is attached to the frame member 43 of the calculating mechanism. With the bolt 42 there is further associated an arm 44 which bears with 30 its forked end upon an arm 45 attached to a shaft 46 mounted on the side wall of the machine. At the other end of the shaft 46 there is provided an arm 47 which cooperates with the frame-shaped end of the rod 31.

35 After the keys for the number to be indicated have been depressed, the crank 34 is pulled over. The cam surface 35 of the disc 33 is thereby brought in contact with the roller 36. Since the controlling member can not be rotated in a clock- 40 wise direction the lever 39 is rocked into the position shown in Fig. 3 whereby the calculating mechanism is put out of operation, and the type segments 8 together with the differential actuators are brought in a known manner into the 45 positions limited by the stems 2 of the keys. Simultaneously with the cutting-out of the calculating mechanism there is imparted to the shaft 46 through the arms 44 and 45 a rotary movement which is transmitted through the arm 47 50 to the rod 31, and which displaces the angle plate 17 against the action of the spring 20. On the movement of the differential actuators 6 into their operative position the pin thus slides, in the present example, first over the contacts 25 al- 55 lotted to the even numbers. If, for example, in a particular digit denomination the number "7" be set, the pin slides over the contacts allotted to the numbers 2, 4, and 6, a current impulse being transmitted to the relay 30 every time a contact 60 is passed, so that this relay for the present sets the number "3". On the return movement of the crank, the controlling member 37 is rocked against the action of the spring 41 by the cooperation of the cam surface 35 with the roller 36 65 (Fig. 4), so that the lever 39, under the action of a spring 48, (Fig. 1) brings the toothed wheels 10 into the position of engagement with the teeth 9 of the type segments. At the same time the arm 44 reascends, so that the angle plate 17 returns under the action of the spring 20, to its 70 initial position, in which position the pins 13

touch the contacts 25 allotted to the odd numbers. In the case of the above-mentioned numeral "7", on the return movement of the differential actuators 6 the pin 13 slides over the contacts for the numerals 7, 5, 3, and 1. The relay 30 thereby 80 receives four further current impulses, with the result that in the indicating device the number "7" for which the machine was set is displayed.

By virtue of the distribution of the contacts 25 over two contact bearers 22 both the forward 85 and the return movement of the differential actuators are utilized in the described manner, and the current impulses to the relay 30 occur at longer intervals. If the relay be suitably constructed it would be possible to make use of only 90 one of the movements of the differential actuators 6 for the consecutive touching of the contacts, in which case the contact bearer would require to be provided with nine contacts, and the described displacement of the contact bearers 95 could be dispensed with.

I claim:

1. In an adding machine having a slidably mounted differential actuator, a contact device for remotely indicating the setting of the differ- 100 ential actuator, a movable contact carried by the differential actuator, a plurality of series of fixed contacts adapted to be engaged by said movable contact in succession, the contacts of one series being staggered with respect to the 105 contacts of the other series and a normally open circuit having the movable contact at one terminal and the fixed contacts of both series connected in multiple to the other terminal.

2. In an adding machine having a slidably 110 mounted differential actuator, a contact device for remotely indicating the setting of the differential actuator, a movable contact carried by the differential actuator, a plurality of series of fixed 115 contacts adapted to be engaged by said movable contact in succession, the contacts of one series being staggered with respect to the contacts of the other series, a normally open circuit having the movable contact at one terminal and the 120 fixed contacts of both series connected in multiple to the other terminal, and means for successively moving said plurality of series of contacts into position for coaction with the movable contact.

3. In an adding machine having a slidably 125 mounted differential actuator, a contact device for remotely indicating the setting of the differential actuator, a movable contact carried by the differential actuator, a plurality of series of 130 fixed contacts adapted to be engaged by said movable contact in succession, the contacts of one series being staggered with respect to the contacts of the other series, a normally open circuit having the movable contact at one terminal 135 and the fixed contacts of both series connected in multiple to the other terminal, an angle plate supporting said series of contacts and mounted to slide laterally with the contacts, an oscillatory operating crank for said machine, and means 140 actuated by the operating crank and connected to said angle plate for shifting the plate alternately to one side and the other as the crank is oscillated forward and backward whereby to cause alternate engagement of the fixed contacts 145 with the movable contact.

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