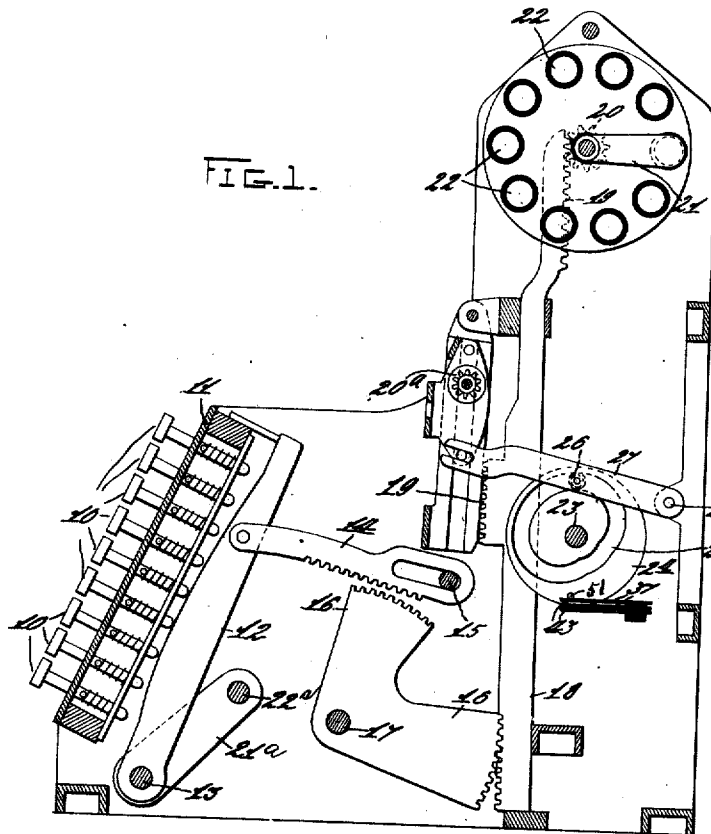


C. F. KETTERING.
CASH REGISTER.
APPLICATION FILED JUNE 9, 1906.

1,004,881.

Patented Oct. 3, 1911.
3 SHEETS—SHEET 1.



Witnesses
[Signature]
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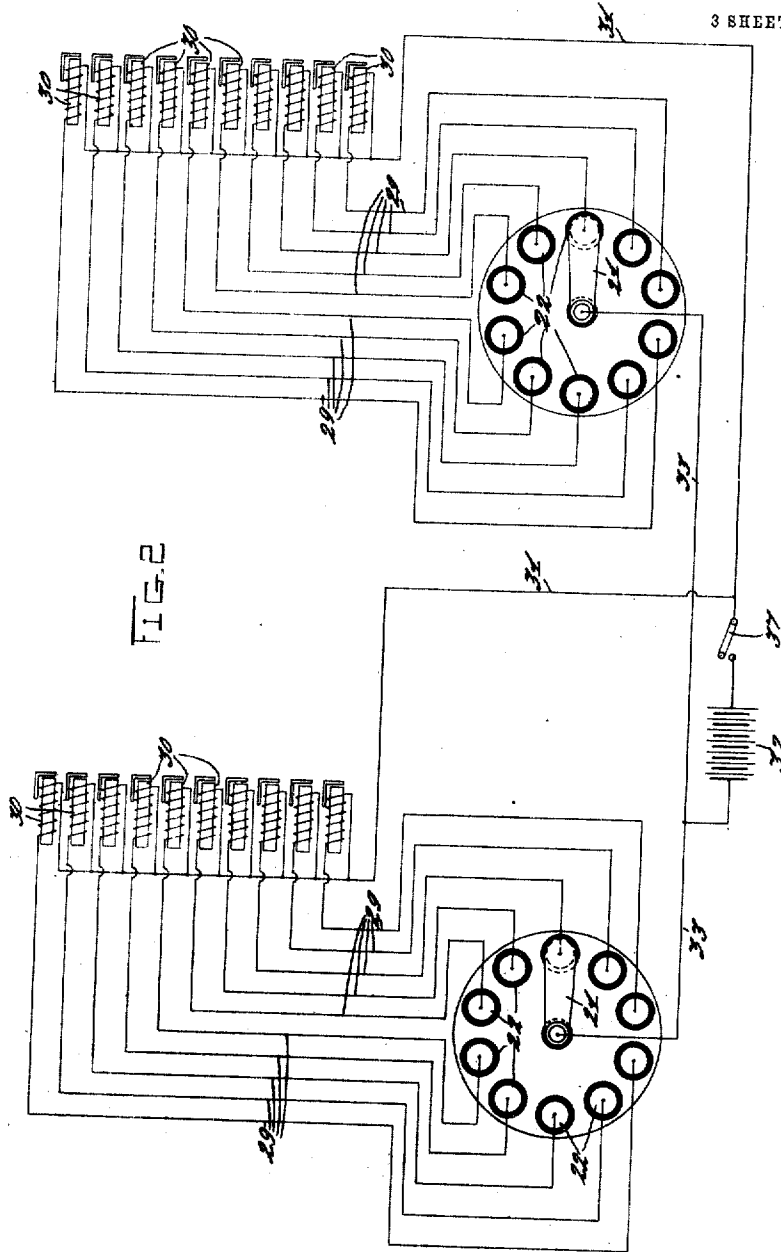


FIG. 2

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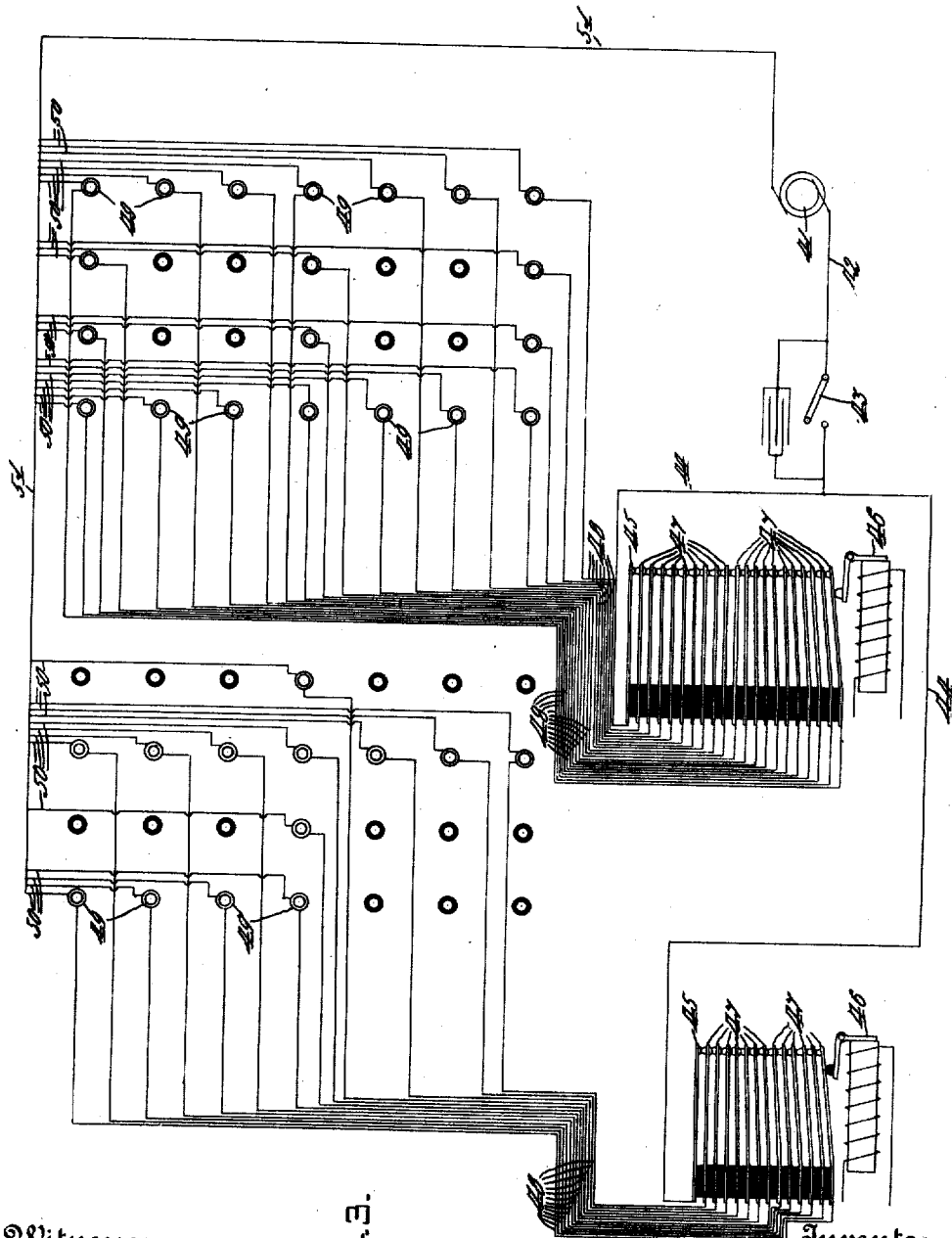


FIG. 3.

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UNITED STATES PATENT OFFICE.

CHARLES F. KETTERING, OF DAYTON, OHIO, ASSIGNOR TO THE NATIONAL CASH REGISTER COMPANY, OF DAYTON, OHIO, A CORPORATION OF OHIO, (INCORPORATED IN 1906.)

CASH-REGISTER.

1,004,881.

Specification of Letters Patent.

Patented Oct. 3, 1911.

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To all whom it may concern:

Be it known that I, CHARLES F. KETTERING, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Cash-Registers, of which I declare the following to be a full, clear, and exact description.

This invention relates to cash registers, and more particularly to the indicating device thereof.

It has for its object to provide a system adapted to many known types of registers for procuring a distant indication, and preferably an indication comprising electric lights.

More particularly the invention comprises an arrangement in which the usual indicators of a cash register are adapted to control circuits and relays therein, which relays when energized close a plurality of local circuits, including electric lights. I have shown the invention as applied to a particular type of machine having rotating indicators, each of which bear a plurality of indicia, but it will be evident that many of the novel features of the invention are adapted for use with other types of register, such, for example, as the well-known variety of machine having separate reciprocating tablets for each amount.

With these and incidental objects in view, the invention consists in certain novel features of construction and combinations of parts, the essential elements of which are set forth in appended claims and a preferred form of embodiment of which is hereinafter specifically described with reference to the drawings which accompany and form part of this specification.

Of said drawings: Figure 1 is a transverse section through a machine to which my invention may be adapted, showing the indicating device and switch controlled thereby. Fig. 2 is a diagram of the circuits from the main indicators to the relay coils. Fig. 3 is a diagram of the circuits at the auxiliary indicator, which are controlled by the relays.

Described in general terms, the invention in its present embodiment is adapted for use in what is termed in the art "a two motion machine;" that is, one in which manipulative setting devices, such as keys, are

operated in correspondence with a transaction desired to be entered in the machine, and a main operating device, such, for instance, as a crank or lever, or a cash drawer is then moved to complete the operation of the machine. The machine includes a plurality of rotating cylinder indicators, each having numerals from zero to 9, inclusive, on their peripheries, and a circuit-controlling switch is also movable with each indicator. A plurality of stationary contacts are adapted to be moved over by the switch, said contacts each controlling a relay. The relays and contacts are arranged in multiple arc, in order that they may be energized from a common source of current, such as a battery. The relays when energized attract their armatures, and these armatures control a plurality of contacts for local circuits through incandescent lights, thereby causing an illumination of certain combinations of lights, depending on the relay energized. The invention as shown is adapted to give what may be termed "a monogram indication;" that is, one in which a plurality of numerals may be exhibited in the same area.

I have shown main switches controlling the relay circuits and the light circuits. The switch for the light circuits is adapted to be closed only after the relay switch is closed, and both switches are only closed after the indicator switches are closed. This sequence of operation prevents sparking at the indicator contacts, and also at the relay contacts, inasmuch as when these contacts are made there is no current in the wire, owing to the break at the main switch.

Referring now more particularly to the drawings, it will be seen that Fig. 1 shows a series of keys 10, carried by a frame 11, and adapted to move differentially a lever 12, journaled on a bar 13. This lever 12 has pivoted thereto a rack-bar 14, which is also supported by a bar 15, the said bar being adapted to be raised and lowered by means not a part of my invention, and not shown herein. The rack on bar 14 is adapted to gear when depressed with a rack on a segment 16, journaled on a bar 17. The rear end of the segment 16 carries a rack constantly in gear with the indicator operating bar 18. This bar at the top thereof, as shown in this figure, has a rack 19 gear-

ing with an indicator pinion 20. The bar 18 has also a rack 19, over which a counter 20^a is adapted to be moved to operate same. Also journaled on bar 13 is a frame comprising arms 21^a, and a cross-bar 22^a, which is adapted to restore the lever 12 to the position shown in this figure. The operation of the machine, as described, will include a depression of some one of the keys 10, thereby rocking lever 12 around its pivot 13 to a distance depending on the key depressed. When the main handle, which is mounted on shaft 23, is operated the frame 21 will be rocked and will restore lever 12 to the position shown in this figure, but meanwhile bar 15 has been lowered to carry the rack on bar 14 into gear with the segment 16, so that such return of lever 12 will cause movement of segment 16, and thereby move rack-bar 18. This will cause a number corresponding to the key to be exhibited on the indicator, and will set rack 19 to operate the counter. Also carried by shaft 23, on which the crank handle is mounted, is a disk 24, having a cam groove 25 therein, and in this cam groove is adapted to ride an anti-friction roller 26 on a lever 27, pivoted on a pin 28, and connected at its forward end by a pin-and-slot connection to the frame carrying counter 20^a. It will be evident that the rotation of shaft 23 will cause a reciprocation of counter 20^a over the racks 19, and thereby cause an addition to take place on the counter.

Mounted to move rigidly with indicator pinion 20 is a switch 21, adapted to move over a series of contacts 22, said contacts being ten in number, as shown. It will be evident that the operation as previously described will cause switch 21 to be rotated more or less, and to finally stop in a position to touch one of the contacts 22.

The indicator contacts, as shown on Fig. 2, have connected to each of them a wire 29, the wires leading through a series of ten relays 30, and then returning by a common wire 31 to the battery or other generator 32, from the opposite side of which a wire 33 leads back to the switch 21. I have shown in this figure two indicators and two sets of relays controlled thereby, and a common battery for furnishing current to both. It will be understood that a separate battery might be used for each indicator, or that, as would probably be the case in practice, more than two indicators and sets of relays would be connected to one battery. The switch for the indicator circuits is indicated at 37 on this figure, and will be fully described hereafter.

The local circuits through the lights which are controlled by the relays are shown in Fig. 3. These circuits derive their energy from a generator 41, from which a wire 42 leads through a main switch 43 and wires 44

to relay contacts 45. The relays, as shown in this figure, have each an armature 46, and when said armatures are attracted a plurality of contacts 47, the number of which depends on the indication to be made thereby, are operated into electrical contact with the common contacts 45. From contacts 47 wires 48 lead to lamps 49, from which wires 50 run to a common return wire 51, leading to the other side of the generator 41. I have shown an example of two indicators adapted to exhibit the number 48, the indicator to the left of the figure exhibiting 4, as will be evident from the lighted lamps, and the indicator to the right exhibiting 8, as will also be evident. It will be clearly understood that there will be ten relays for each set of 28 lamps, so connected as to cause an illumination of the number represented by the particular relay. I have shown, however, for the sake of clearness, only one relay in connection with each set of lights.

The main switches 37 and 43 are also shown on Fig. 1, and are controlled by a pin 51, carried by a cam disk 24 on the main rotation shaft 23 of the machine. In Fig. 1 the machine is shown in normal position, and the pin 51 will in this position maintain both switches 37 and 43 closed. When the shaft 23 begins to rotate, pin 51 will allow switches 37 and 43 to open, but such opening will take place successively, switch 43 opening before 37. It evidently follows from this that when switch 37 finally opens, de-energizing relays 30, that the connection between relay contact 45 and contacts 47 will then be broken, but inasmuch as the main switch 43 has been previously opened, no current is passing through the local circuits at the time of breaking same at contacts 45, and no spark will therefore occur at that time. The same general sequence is true of the circuits shown in Fig. 2. The switch 21 does not start to move until after the main switch 37 has been opened and finishes its movement before the main switch 37 is again closed. No sparking, therefore, will occur at contacts 22. It is evidently an easy matter to keep contacts 37 and 43 in good condition, and no attention needs to be paid to contacts 22 of the indicator or contacts 47 of the relays.

The general operation of this machine will, it is thought, be apparent from the above description, but it may be briefly indicated as follows: To register an amount the keys 10 corresponding thereto are depressed, and crank-shaft 23 then given one rotation. The depression of the keys will rock levers 12 around their pivot 13 and move rack-bars 14 distances corresponding to the depressed keys. When bar 15 is lowered and frame 21^a rocked, the lever 12 will be returned to normal position, and as bar 14 is at that time in gear with segment 16, the

segment will be rocked around its pivot 17, moving indicator bar 18 and setting the indicator to position. This movement also carries switch 21 to a position opposite some one of the contacts 22. Further rotation of shaft 23 causes the cam groove 25 to act on roller 26 and reciprocate the counter 20° over the adjusted racks 19. At the beginning of the operation, main switches 37 and 43 are released from pin 51 and allowed to open. At the conclusion of the operation, pin 51 again closes switches 37 and 43 in the order named. When switch 37 is closed, circuit will be made through wires 33, switches 21, contacts 22, wires 29, relays 30, and back through wires 31 to the battery. The energized relays will attract their armatures 46, causing all the contacts 47 to be brought into electrical connection with the common contacts 45, this occurring, as stated, before the switch 43 is closed. When switch 43 is then closed, circuit will be made from the generator 41 through wire 42, switch 43, wires 44, common contacts 45, contacts 47, wires 48, lamps 49, wires 50, and common wire 51 back to the generator 41. The proper lamps 49 will thereby be illuminated, and will remain lighted until a succeeding operation of the machine, as main switches 37 and 43 remain closed between operations. It will be evident that by using the relays and circuits of Fig. 2 a large saving of expense for wire is thereby made, inasmuch as there is only one wire from each indicator position to a relay, while if the indicator contacts were controlled directly, from five to fifteen wires would be needed, each wire controlling a separate lamp. It is also true that a much smaller current is needed with the construction shown, as from five to ten volts is ample to energize the relays, whereas the usual 110-volt lighting circuit is used for the lamps. This evidently saves a large amount of current which would be wasted in the wires if the lamps were directly controlled from the indicators.

I have shown the usual condenser as shunting the main switch 43 on Fig. 3, this being for the well-known purpose of minimizing the spark.

While the form of mechanism here shown and described is admirably adapted to fulfil the objects primarily stated, it is to be understood that it is not intended to confine the invention to the one form of embodiment herein disclosed, for it is susceptible of embodiment in various forms all coming within the scope of the claims which follow.

What is claimed is as follows:

1. In a machine of the class described, the combination with a plurality of keys, of indicators differentially controlled thereby, auxiliary indicators comprising electric lights for indicating a plurality of numer-

als in the same area, and contacts adapted to be separately controlled by the indicators, said contacts controlling circuits for the auxiliary indicators.

2. In a machine of the class described, the combination with a plurality of keys, of indicators differentially controlled thereby, contacts separately closed by the indicators, an auxiliary indicator comprising electric lights, and means controlled by the said contacts for lighting different combinations of lights.

3. In a machine of the class described, the combination with a plurality of keys, a differentially movable indicator having a switch, contacts separately made by said switch, an auxiliary indicator comprising electric lights, and means controlled by the contacts for lighting different combinations of lights.

4. In a machine of the class described, the combination with a plurality of keys, of a differentially movable indicator having a switch, contacts separately closed by said switch, relays controlled by said contacts, an auxiliary indicator comprising electric lights for exhibiting different indicia in the same area, and circuits for lighting different combinations of lights controlled by said relays.

5. In a machine of the class described, the combination with manipulative position determining devices, an indicator differentially controlled thereby, contacts separately closed by the indicator, relays energized according to the closed contacts, an auxiliary indicator, and means controlled by the relays for causing an indication corresponding to the energized relays.

6. In a machine of the class described, the combination with manipulative position determining devices, an indicator differentially controlled thereby, an auxiliary indicator comprising lights for exhibiting different indicia in the same area, and means for illuminating said auxiliary indicator controlled by the first-mentioned indicator.

7. In a machine of the class described, the combination with keys, a differentially movable indicator controlled thereby, a distant auxiliary indicator comprising electric lights, and means for illuminating different combinations thereof controlled by the first-mentioned indicator.

8. In a machine of the class described, the combination with manipulative position determining devices, an indicator having a switch differentially controlled by said devices, relays adapted to be energized by the switch, an auxiliary indicator including electric lights, and local circuits including said lights closed by the relays.

9. In a machine of the class described, the combination with manipulative posi-

tion determining devices, indicators controlled thereby, relays energized according to the position of said indicators, and circuits including electric lights controlled by said relays.

10. In a machine of the class described, the combination with keys, indicators set according to the operated keys, circuits including relays energized in agreement with the set indicators, and an auxiliary indicator controlled by said relays.

11. In a machine of the class described, the combination with keys; of a differentially movable indicator set according to the operated key, a switch moved with said indicator, contacts closed by said switch, relays energized according to the said closed contacts, an auxiliary indicator comprising electric lights for exhibiting a plurality of indicia in the same area, and means for lighting different combinations of said lights controlled by said relays.

12. In a machine of the class described, the combination with keys, of an indicator controlled thereby, circuits including a main switch and relays, said circuits being closed according to the position of the indicator, an auxiliary indicator comprising electric lights controlled by said relays, a main switch for said lights, and means for closing said main light switch before said first main switch, whereby sparking at the relay coils is avoided.

13. In a machine of the class described, the combination with an indicator, of circuits controlled thereby, and including relays and a main switch, an auxiliary indicator, circuits therefor controlled by said relays, and including a second main switch, and means for closing said latter switch prior to closing the first-named switch.

14. In a machine of the class described, the combination with keys, of a movable indicator having a plurality of indicia separately exhibited thereby, an auxiliary indicator comprising a plurality of electric lights, and means for illuminating the lights in correspondence with the indication exhibited on the movable indicator.

15. In a machine of the class described, the combination with a plurality of keys, of an indicator differentially set thereby and carrying a switch, contacts controlled by the switch, relays energized by the contacts, an auxiliary indicator comprising electric lights and controlled by said relays, main switches for said relays and said auxiliary indicator, normally closed, and means for opening said switches during the operation of the machine.

16. In a machine of the class described, the combination with indicators positioned to exhibit a plurality of corresponding characters in different localities, an operating mechanism for one of said indicators, relays

for controlling another of said indicators, electrical circuits including said relays, contacts in said circuits controlled by said first mentioned indicator and other contacts in said circuit controlled by the operating mechanism.

17. In a machine of the class described, the combination with manipulative devices, of controlling mechanism constructed to be differentially positioned under control of said devices, an indicating mechanism comprising a plurality of lights for indicating any of a plurality of numerals in the same area, contacts and relays one for each contact for controlling the illumination of said lights, and means for closing said contacts separately in accordance with the position of said controlling mechanism.

18. In a machine of the class described, the combination with manipulative devices and controlling mechanism constructed to be differentially positioned under control of said devices, of indicating mechanism comprising devices constructed to have different parts thereof illuminated and thereby indicate any of a plurality of numerals in the same area, corresponding contact and relay circuits, circuits for causing the illumination of said different parts, and means for energizing said contact circuits separately in accordance with the position of said controlling mechanism and thereby energizing the corresponding relay circuits.

19. In a machine of the class described, the combination with manipulative devices, and differentially adjustable mechanism controlled by said devices, of indicating mechanism comprising devices constructed to have different desired parts thereof illuminated and to thereby display a plurality of numerals in the same area, independent groups of circuits controlling the illumination of the desired different parts, relays for closing said circuits, one for each group and means controlled by the differentially adjustable mechanism for energizing said relays.

20. In a machine of the class described, the combination with manipulative devices, and indicating mechanism differentially adjustable under control of said devices, of a distant indicating mechanism comprising devices constructed to have different desired parts thereof illuminated and thereby exhibit any of a plurality of indicia in the same area, circuits controlling the illumination of the desired parts, and means controlled by the first mentioned indicating mechanism for separately energizing said circuits.

21. In a machine of the class described, the combination with manipulative devices, and differentially adjustable mechanism controlled by said devices, of a distant indicating mechanism having parts constructed to be individually rendered visible and

thereby to exhibit any of a plurality of indicia in the same area, corresponding contact and relay circuits, circuits for controlling the visibility of the said parts, and means controlled by the differentially adjustable mechanism for energizing the contact circuits in accordance with the differential positioning of said mechanism and thereby energizing the corresponding relay circuits.

22. In a machine of the class described, the combination with indicators for exhibiting a plurality of corresponding characters in different localities, of an operating mechanism for differentially adjusting one of said indicators, and means comprising contacts and relays, one each for the different characters to be exhibited, controlled by the differentially adjusted indicator for ex-

hibiting a corresponding character upon the other indicator.

23. In a machine of the class described, the combination with an operating mechanism, of a differentially movable indicator controlled thereby, a distant indicator constructed so as to display a plurality of characters in the same area, a plurality of contacts and relays one each for the different characters to be exhibited, controlled by the differentially movable indicator, and means controlled by the operating mechanism for energizing the contacts and relays.

In testimony whereof I affix my signature in the presence of two witnesses.

CHARLES F. KETTERING.

Witnesses:

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