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3,033,446

CHARACTER DISPLAY SYSTEM

Filed July 2, 1956

2 Sheets-Sheet 1

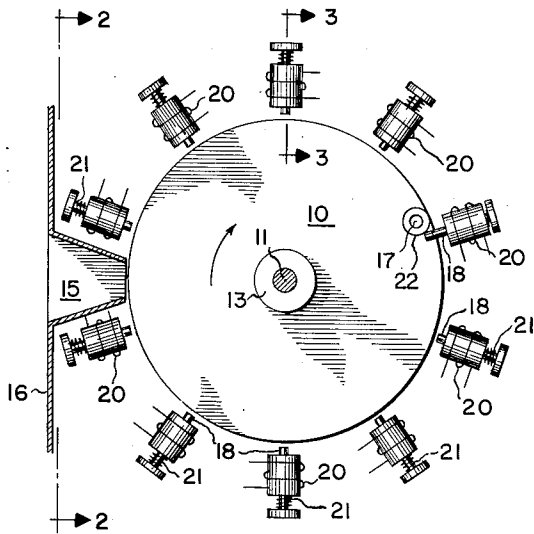


Fig. 1

Fig. 3

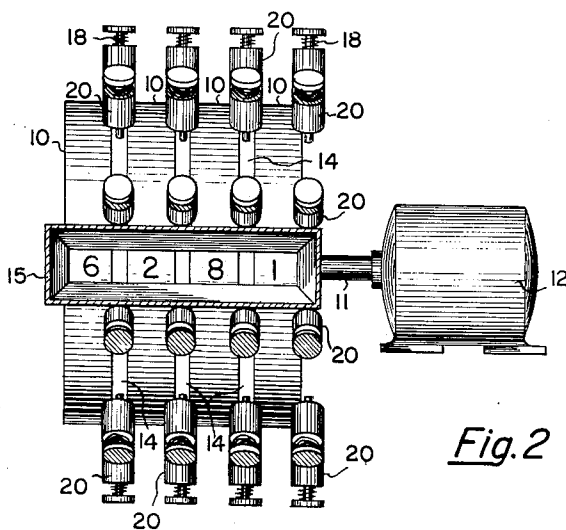
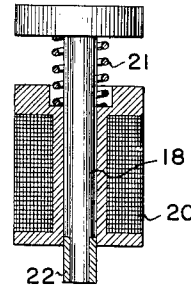
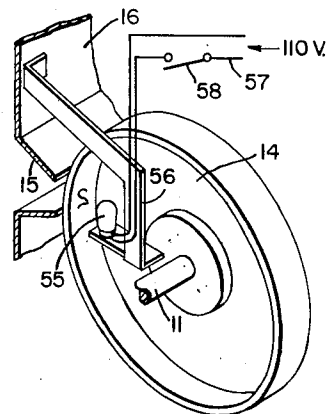


Fig. 2

Fig. 6



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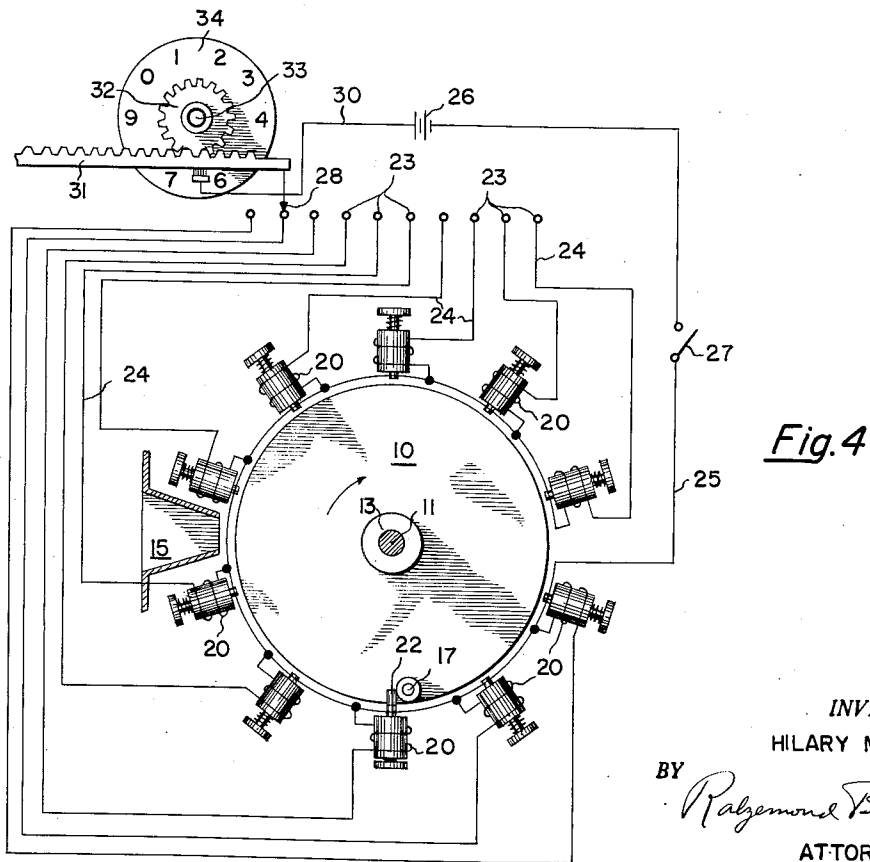
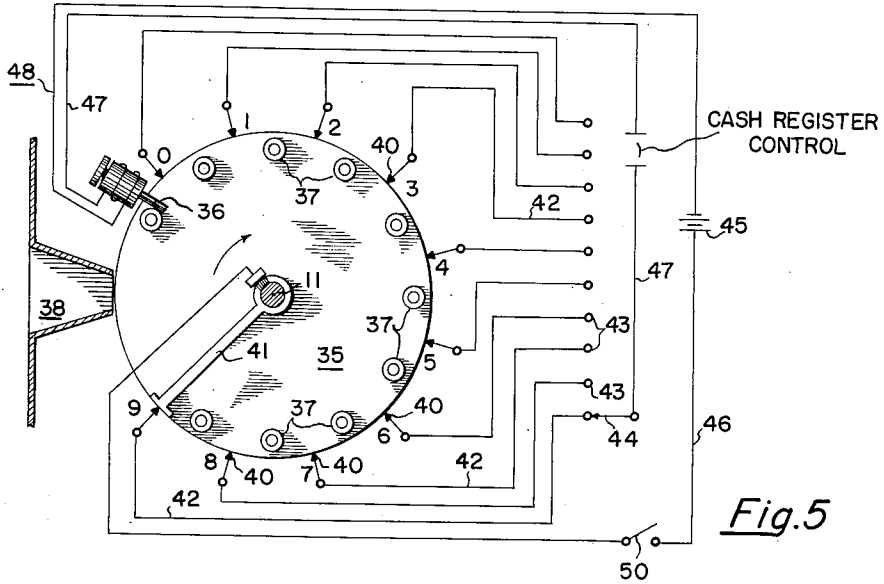
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2 Sheets-Sheet 2



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CHARACTER DISPLAY SYSTEM

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 2 Claims. (Cl. 235-23)

The present invention relates to the display of characters of any form, such as digits, letters and the like, and more particularly to the remote duplicate display of digits on cash registers and similar machines.

The display of numbers, or other characters, is an art seemingly without undue difficulties. Like many other apparently simple arts, however, this one also has its problems, and particularly in the display of changing numbers such as those in cash registers or similar apparatus. The numbers must be displayed in a manner making them clearly visible to a viewer, and they must not be changed at a rate inconsistent with the ability of the human eye and mind to see and comprehend, yet without waste of time during the actual changing from one number to another. Various methods, such as mechanical, electrical, electronic systems or combinations thereof, displaying self-luminous or reflective characters, have been used in the past but of those known, none has fully met the above mentioned requirements.

It is, therefore an object of the present invention to provide a novel character display system including the advantageous features mentioned above.

Another object is to provide such a system wherein the characters are displayed clearly and distinctly regardless of ambient light intensity.

A further object is to provide a display system for use with a cash register or other machine wherein operation of the machine causes simultaneous duplication of its reading at a remote location.

A still further object is to provide a unit having a plurality of digits corresponding respectively to like digits in a cash register wherein means is responsive to operation of the cash register to select digits in the unit and reproduce a register reading.

Other objects will appear hereinafter.

In the accompanying drawings:

FIGURE 1 represents a schematic end elevation of a number register embodying one form of the present invention;

FIGURE 2 is a sectional view taken along the line 2-2 of FIGURE 1;

FIGURE 3 represents on a larger scale an axial section of any one of like selector electromagnets;

FIGURE 4 is a diagram of one form of control circuit;

FIGURE 5 is a schematic showing of a modified form of the invention; and

FIGURE 6 represents the manner in which the individual drums are illuminated.

Referring to FIGURES 1 to 4 of the drawings one form of the invention comprises a number or character display unit made up of one or more like drums or wheels 10 mounted upon a common shaft 11 which is preferably arranged to be driven continuously by a suitable motor 12 operating for example at a speed of the order of 500 r.p.m. Illustratively four drums 10 are shown, each mounted on a separate slip clutch 13 in side-by-side relation but spaced apart to provide circumferential slots 14 for a purpose to be described. One form of suitable slip clutch is shown in pending application Serial Number 492,247, filed March 4, 1955, now Patent No. 2,906,838. The periphery of each drum is inscribed with a sequential row of digits to be displayed for viewing individually through a window 15 in the casing 16 which houses the unit. These digits correspond to the digits to

be set up by the operation of associated apparatus, such as, for example, a cash register. That is, the row of digits on each drum is a replica of the cash register digit wheel, and may be arranged for viewing at a position remote from the cash register. The digit to be displayed on any drum is selected by an external switching circuit operating synchronously with the associated cash register so that the same digit shown on the register also appears in the window 15 on one of the drums.

For stopping any drum 10 for digit selection and viewing, a stop 17 projects laterally from one face of each drum in close proximity to the periphery of its drum, such stops 17 riding respectively in the slots 14 provided by the drum spacing. Circumferentially considered the stop 17 of each drum is located to match the number position of the digits so that in any stop position there is a known number in registered position in the window 15 corresponding to the set register number. The stop 17 of each drum 10 travels in a circular path to be stopped by the entrance of any one of a number of pistons 18 suitably supported and disposed circumferentially about the drum. In the ten digit system there are ten pistons 18 angularly spaced to respectively correspond to the peripheral digit numbers to be registered in the window 15. Each piston 18 is the armature of an electromagnet 20 and is held retracted by a coil spring 21 when the electromagnet 20 is de-energized to be out of the path of the stop 17. Any mounted electromagnet 20, when energized, projects its piston 18 into the path of a drum stop 17 which is provided with a slip collar 22 rotatively mounted thereon. This contact end of each piston 18 is preferably of nonmagnetic material.

For selectively energizing the electromagnets 20, a circuit control for one of the drums, as an example, is shown in FIGURE 4, and comprises a multi-contact single pole switch having a row of contacts 23 respectively connected by conductors 24 as terminals of the coils of the electromagnets, each such coil having a common return 25 leading to a source of voltage 26. A switch 27 is located in the return 25 for control purposes as will be understood. Selection of the contact 23 to energize a desired electromagnet takes place through the medium of a single pole contactor 28, as the terminal of a conductor 30 leading from the opposite pole of the source 26, such contactor 28 functioning as a selecting switch controlled by the operating of the cash register. Thus, for example, if the cash register sets up the digit "6," then this operation moves the contactor 28 to close the circuit for the electromagnet digit "6" to stop the drum 10 with the digit "6" registered in the window. Illustratively the selecting switch may comprise a slidable rack 31 of a machine such as a cash register, not shown, in mesh with a rack gear 32 keyed to the shaft 33 of the cash register number wheel 34, the arrangement being such that when the wheel has been rotated by rack 31 to show a digit number, the rack will also have moved the contactor 28 to close the selected circuit and energize its electromagnet to bring that digit number to centered position in the window. While contactor 28 successively contacts other terminals 23 in progressing to the selected digit, its contact therewith is only momentary and of insufficient time to cause the associated solenoids to be energized.

From the foregoing it will be seen that when the register is cleared all of the pistons 18 are retracted and all drums rotate in synchronism or near synchronism with the shaft 11. To read out, each selected electromagnet for each column is appropriately energized so each drum will then stop in a time interval not greater than one revolution of the drum, i.e., about one-tenth of a second. The numbers are locked in position during the read out by the constant torque exerted by the motor 12 and shaft 11 through the slipping clutches 13. The mass of each of

the drums is kept at a minimum so that its inertia is as small as possible.

In the modification of the invention shown in FIGURE 5 a single slip clutch mounted drum 35, as one of several, is arranged to be selectively stopped by a single electromagnet operated piston 36, when projected into the path of a row of circumferential stops 37 which are positioned respectively to locate digits in register with the viewing window 38 when stopped by the selecting controls. Adjacent each stop 37 there is a pick-up contact 40 to be wiped by a ten pole switch 41 rotating with the drum 35 to successively wipe contacts 40 and close the circuit selected by the cash register control switch 41, as heretofore explained in connection with FIGURE 4. Thus the arm of the switch 41 makes contact in turn with the ten pick-up contacts 40 marked "0" to "9" in FIGURE 5. The external controlling circuitry determines which of these positions is "live" and thereby controls the instant at which the single electromagnet is energized to project its piston 36 into the path of the selected digit number stop. The angular disposition of the pick-up points "0" to "9" with reference to the electromagnet, is such as to allow time for the electromagnet to operate after the sensing mechanism has given its instruction.

Each contact 40 has a lead 42 to one fixed contact 43 of a row of such contacts to be selected by a contactor 44 shiftable in synchronism with the operation of the cash register as explained in connection with the circuit control of FIGURE 4. Thus as shown in FIGURE 5, the circuit is traced from the voltage source 45, conductor 46, rotatable contactor 41, conductor 42, selected contact 43, selector contactor 44, conductor 47, electromagnet for piston 36 and return conductor 48, to source 45. A circuit control switch 50 is included in the common return as will be understood.

In some instances and as illustrated in FIGURE 6, it will be found desirable to illuminate the displayed number and so it is preferred to face the periphery of the drums with translucent material and provide an internal illuminating means such as an electric lamp 55. Under conditions of relatively bright ambient light, a lamp is selected of greater intensity than such ambient light so that each number displayed is readily visible at all times. Each lamp may be supported upon a bracket 56 extending through slots 14, and be energized from a suitable source of electrical current 57 by closing switch 58. Of course, it is understood that when lights are used, the end of drums 10 opposite to the end carrying stop 17 would be open.

It is now apparent that the present invention proves a novel high speed number register which, while of broader applicability, is particularly useful in association with cash registers, whereby any number set, indicating a cash sale, may be simultaneously displayed on a register which may be remotely positioned for displaying the information, for example, to the customer or the manager of a store, or the like. Further where the ambient light in the store is of a high level, provision is made for illuminating the displayed number with light of greater intensity to ensure such number being visible under all adverse light conditions.

What is claimed is:

1. Apparatus for the remote display of characters corresponding to the characters on character wheels of a machine comprising, a plurality of such character wheels, means for indexing said wheels to character positions in response to characters indexed into the machine, and a

remotely positioned character display register, said register comprising a housing, a shaft journaled in said housing, means for continuously rotating said shaft, a plurality of slip clutches arranged on said shaft, a plurality of closely spaced drums mounted on said shaft to be driven by said clutches, each of said drums having a thin peripheral wall portion having translucent characters spaced therearound and corresponding respectively to those characters on the respective character wheels, a window in a wall of said housing, means for selectively stopping each drum to display a character in viewing position in said window, said means comprising abutments on said drums adjacent the periphery thereof, and electromechanical means fixed to said housing adjacent the periphery of each of said drums and responsive respectively to set character positions of said wheels for moving an element into engagement with said abutment means to stop each drum selectively with the character corresponding to that indexed into the corresponding number wheels of the machine displayed in said window, and a lamp fixed within each of said drums and positioned to transmit light through the translucent character displayed at said window.

2. In combination, a number indicating device, means for moving said number indicating device to differential positions representative of selected numbers, and a number register for the remote display of numbers corresponding to those on the number indicating device, said number register comprising a housing, a shaft journaled in said housing, a slip clutch, a hollow drum rotatably mounted on said shaft within said housing and drivably engageable with said shaft by means of said slip clutch, said drum having translucent numbers spaced about its periphery and corresponding respectively to the numbers on said number indicating device, a window in the wall of said housing, means for rotating said shaft thus to rotate said drum, means for selectively stopping said drum while said shaft continues to rotate thus to move said drum into position displaying a number in said window corresponding to the selected number on said number indicating device, said stopping means comprising abutment means on said drum adjacent the periphery thereof, and electro-mechanical means fixed to said housing adjacent the periphery of said drum and responsive to the selected number position of said number wheel for moving an element into engagement with said abutment means so to stop said drum, and a lamp fixed within said drum for illuminating said translucent number.

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