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[54] **PARKING CHARGE DISPLAY DEVICE**
 9 Claims, 6 Drawing Figs.

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 58/141, 340/51

[51] Int. Cl. G07c 1/30

[50] Field of Search 340/334,
 378, 309.1, 309.4, 309.5, 51; 235/92, 29, 30, 61 R;
 58/141; 346/15, 17; 194/DIG. 23

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ABSTRACT: A parking charge display device has a rotating disk carrying circumferentially spaced switches. The disk is located in front of a clock dial. Spacing of the switches corresponds to time intervals for which parking charges are to be made. Pressing any switch lights one of a row of lamps located behind prices posted on a display panel. Inside the device is a distributor drum with conductive rings wiped by brushes and connected in circuit with the switches and lamps.

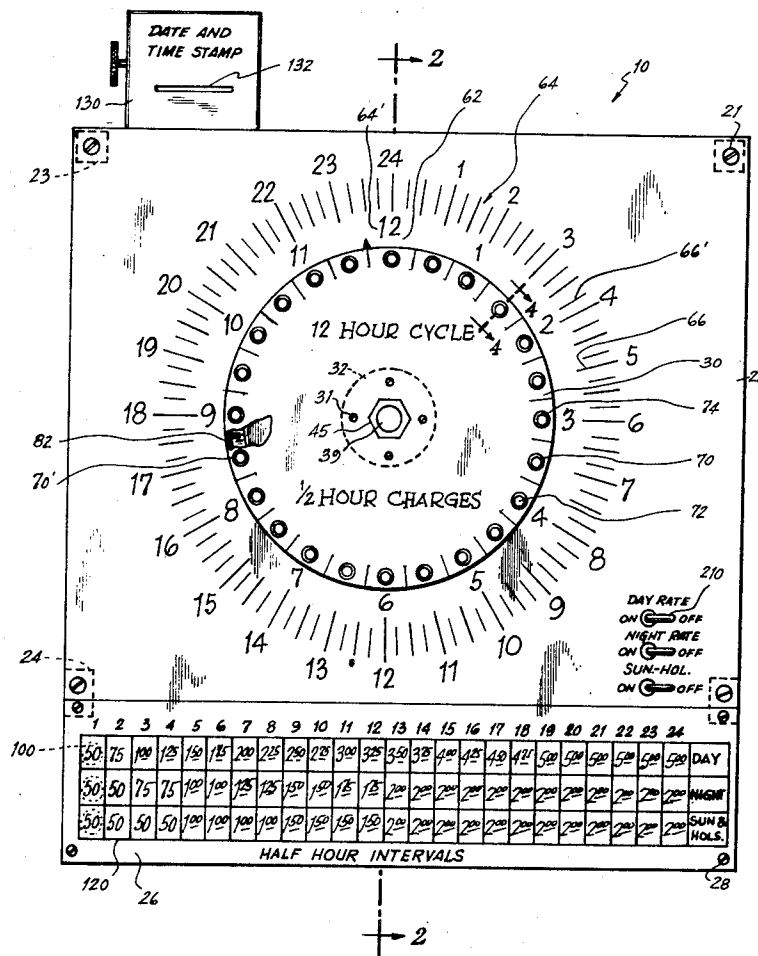
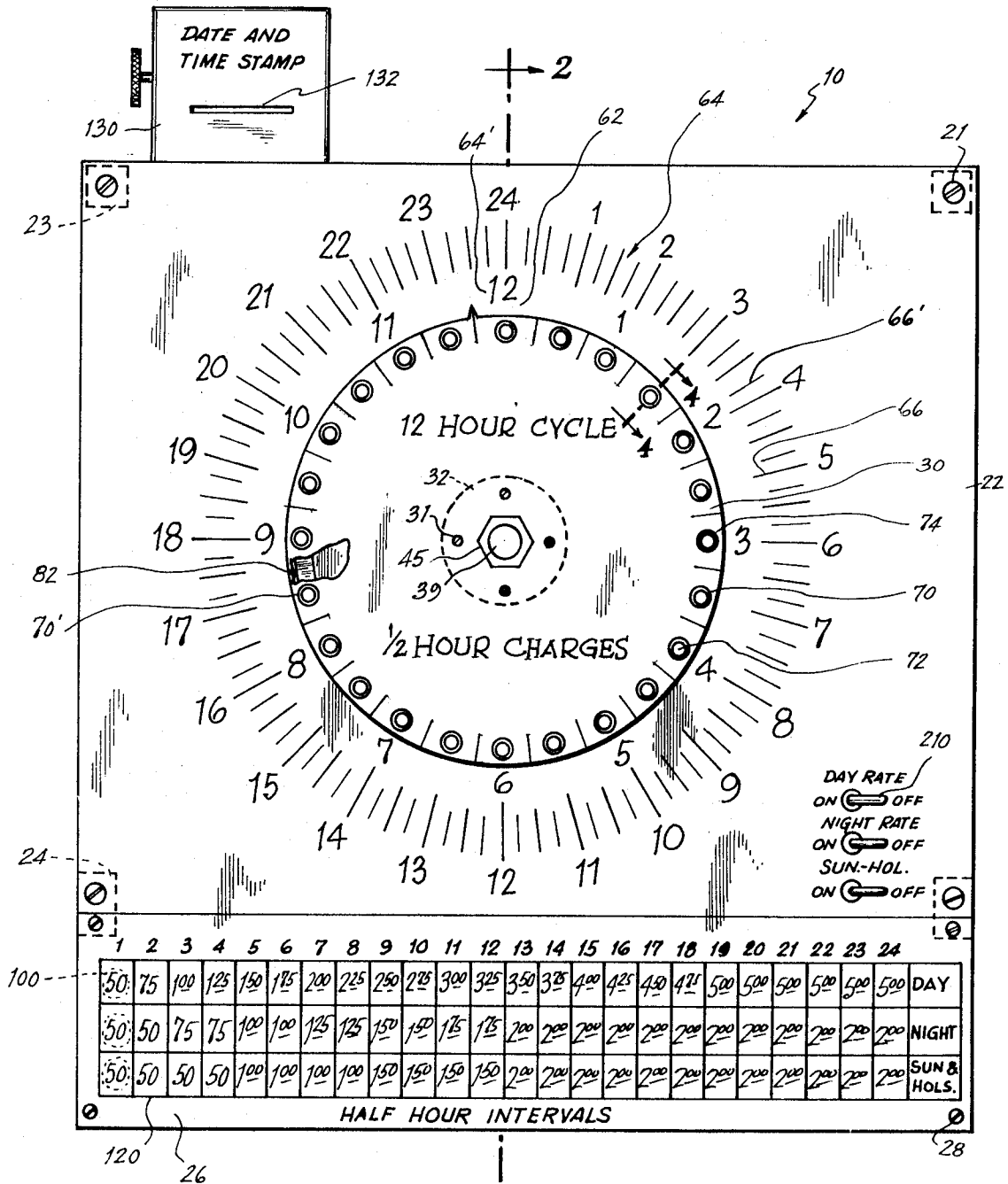


Fig. 1.



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Fig. 2.

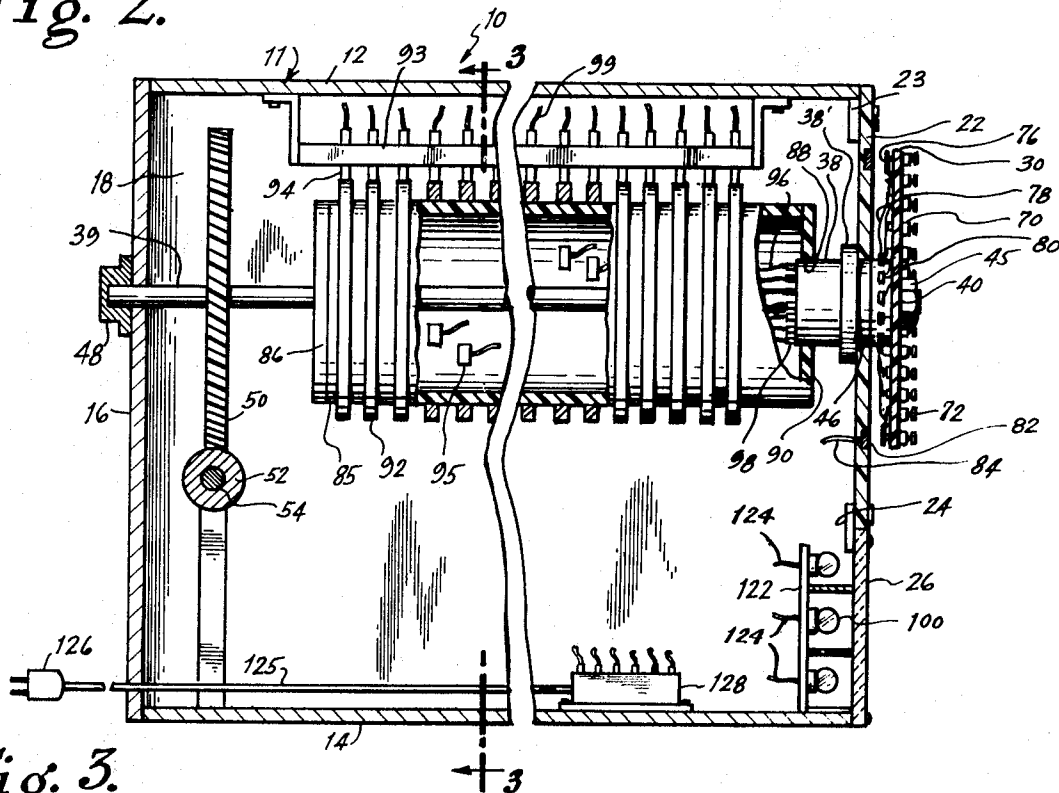
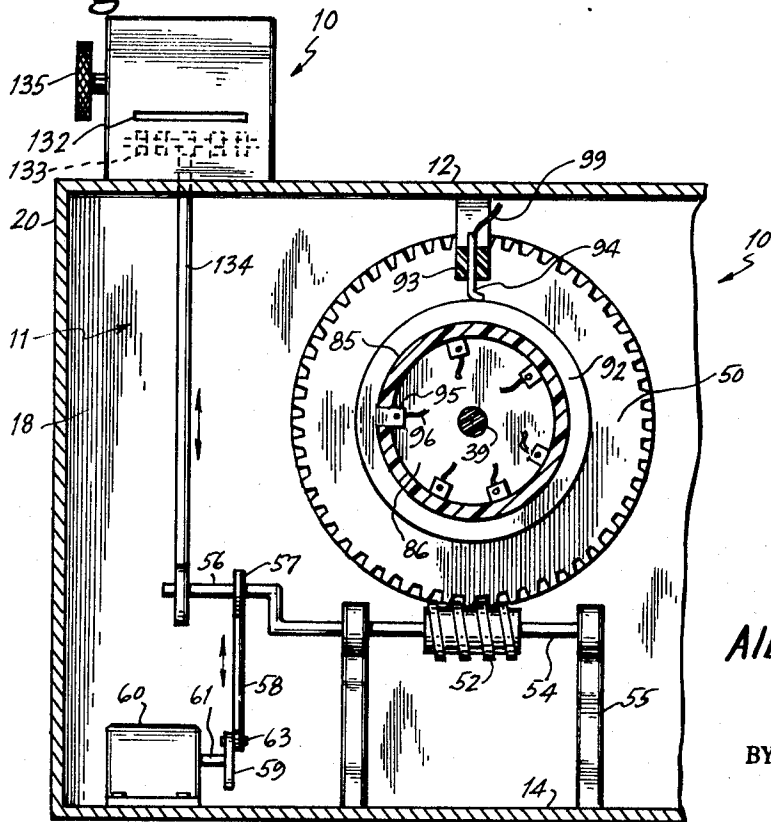


Fig. 3.



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Fig. 6.

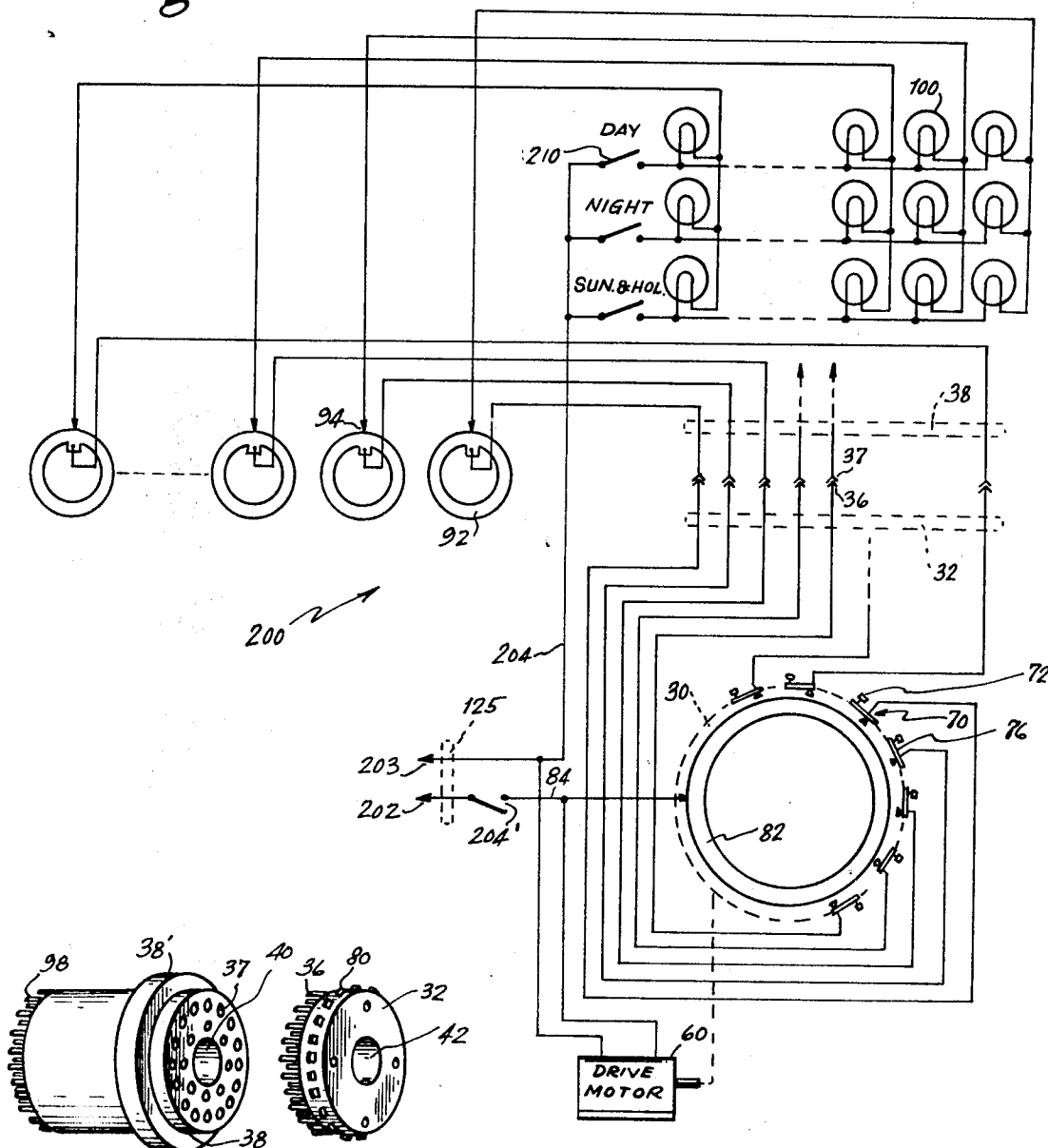
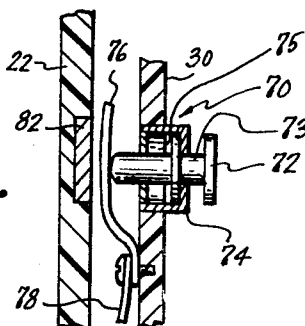


Fig. 5.

Fig. 4.



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PARKING CHARGE DISPLAY DEVICE

The invention concerns a device which can be used at a vehicle parking lot, garage or station for automatically displaying the parking charge in accordance with a predetermined price-time schedule.

It is common at parking lots to set parking charges according to a schedule which varies at different times of the day and week, and which varies in different ways for successive parking times. For example, the charge for parking several hours may be at a lower rate per hour than the initial hour of parking, and the charge for parking an entire day or part of a day may be at a still lower rate. In a busy parking lot, when many customers are claiming their automobiles, it is very difficult for an attendant to compute accurately and quickly from the time stamped claim tickets presented, the charges which vary for each automobile according to the length of time it was parked and according to the time of day or night it was parked. This leads to customer dissatisfaction, financial losses to the parking lot operator, reduction in the rate of releasing parked vehicles to open parking spaces for others, etc.

The present invention is directed at overcoming the above and other difficulties and disadvantages by providing a device which a parking attendant can operate by pressing a switch on a disk at a position corresponding to the time when a customer started parking. The device will then automatically display the parking charge due and will present a lighted numerical display of the charge in dollars and cents.

According to the invention, a continuously rotating disk carries a multiplicity of switches circumferentially disposed. A graduated dial of a clock surrounds the rotating disk. Each switch is connected in circuit with a lamp on a transparent display chart of a particular scale of parking charges. When a switch is closed, one of the lamps lights up indicating numerically the parking charge or fee the customer must pay. The device also includes a mechanism which drives a time stamp in addition to driving the switch disk. The device is so arranged that the transparent display chart can be removed and replaced with another having a different scale of parking charges.

The invention will be explained in further detail in connection with the drawing, wherein:

FIG. 1 is a front elevational view of a device embodying the invention.

FIG. 2 is a reduced sectional view with a portion broken away taken on line 2—2 of FIG. 1.

FIG. 3 is a cross-sectional view taken on line 3—3 of FIG. 2.

FIG. 4 is an enlarged fragmentary sectional view taken on line 4—4 of FIG. 1.

FIG. 5 is an exploded perspective view of a plug and socket used in the device.

FIG. 6 is a diagram of the electrical circuit of the device.

Referring first to FIGS. 1, 2 and 3, the device 10 embodying the invention is housed in a rectangular cabinet 11 having a top 12, bottom 14, rear wall 16, and sidewalls 18, 20. A rectangular panel 22 is secured by screws 21 to brackets 23 and 24 at the open front of the panel. Below panel 22 is a removable vertical transparent plate 26 engaged by screws 28. Mounted in front of panel 22 is a rotatable circular disk 30. Secured to the center of the disk by screws 31 is a plug 32 having prongs 36 detachably engaged with female electrical contacts 37 in openings of a socket 38 (see FIGS. 2 and 5). A horizontal drive shaft 39 passes through central bore 40 in the socket, bore 42 in the plug and a hole 44 in disk 30. A nut 45 is removably engaged on the threaded front end of the shaft.

The front end of socket 38 is rotatably disposed in a hole 46 in panel 22. An annular radial flange 38' on the socket prevents forward axial movement of the shaft. The rear end of the shaft is journaled in a bearing 48 at rear wall 16. The shaft carries a worm gear 50 engaged by a worm 52 carried by crank shaft 54 on bearings 55. Crank end 56 engages an eye 57 of a link 58. The lower end of the link is engaged by a

turnable pin 63 eccentrically held by wheel 59 on shaft 61 of motor 60. When the motor is running it drives the worm which in turn rotates gear 50 and shaft 39 so that disk 30 turns continuously.

Disk 30 has a radially extending pointer 62 pointing to graduated lines of a clock dial 64 inscribed on panel 22. Dial 64 has an inner scale with numbers "1" through "12" representing hours with divisions 66' representing half hours and quarter hours. Panel 22 inscribed with universal dial 64 for both 12 hour and 24 hour cycles can be replaced by one inscribed only for a 12 hour cycle or a 24 hour cycle.

Disk 30 has 24 pushbutton switches 70 arranged circumferentially around the disk. As best shown in FIG. 4, each switch includes a pushbutton 72 having a flanged shaft 73 slidably disposed in a casing 74 seated in an opening 75 in the disk. The rear end of the switch shank engages a spring contact 76 held by a screw 78 to the rear side of the disk. Wires 78 are connected to the spring contacts respectively at screws 78 and terminate at lugs 80 extending radially of plug 32. Each lug is connected to one prong 36 inside the plug. An annular conductive ring 82 is set in the front of panel 22 adjacent to the circular array of switches 70 and spring contacts 76 so that one of the spring contacts touches the ring when one of pushbuttons is pressed. Ring 82 is connected via wire 84 in the electrical circuit described below.

An insulated distributor drum 85 is carried by shaft 39. The shaft extends through end wall 86 and through bore 40 in socket 38. The socket is secured in central opening 88 in front wall 90 of the drum (see FIG. 2). A multiplicity of conductive rings 92 are secured on the drum in axially spaced array. Brushes 94 carried by insulated bar 93 on brackets 94, respectively, wipe the peripheries of the rings. Each ring has a radially inwardly extending lug 95 (see FIGS. 2 and 3). Wires 96 are connected between lugs 95 and lugs 98 at ends of female contacts 37 in socket. Wires 99 connect the brushes in the circuit of the device.

A plurality of rows of lamps 100 are disposed just behind plate 26 to illuminate numerals 120 representing parking charges or fees. The lamps are carried by bracket 122 and are connected by wires 124 in the circuit of the device.

Power is supplied to the electrical circuit via a cable 125 and plug 126. The cable is connected to a terminal block 128 to which wires are connected from electrical components in the device.

A date and time stamp assembly 130 of known type is mounted on the top of the cabinet. This assembly has a front opening or slot 132 into which tickets are inserted for time and date stamping. Time printing wheels 133 in the stamp assembly are advanced by reciprocating link 134 engaged on the end of shaft 54. The date stamp is changed by means of manually turnable wheel 135.

Circuit 200 of the device is shown in FIG. 6. In this circuit power supply cable 125 has one terminal wire 202 connected via switch 204' and wire 84 to conductive ring 82. The other terminal 203 is connected to common line 204 to pass current through all the lamps 100. The drive motor 60 is connected across terminals 202, 203 via switch 204. The spring contacts 76 of the switches 70 carried by disk 30 are connected respectively to prongs 36 of plug 32. These engage contacts 37 of socket 38 and in turn are connected to respective rings 92 carried by drum 85 as shown in FIGS. 2 and 3. Brushes 94 wipe the rings and are connected to the respective lamps 100. Switches 210 are connected in series with the respective rows of lamps. Lamps in each row are connected in common to the lamps below them in each vertical column.

In operation of the device, including circuit 200, power is applied to motor 60 via terminals 202, 203 after switch 204' is closed. This rotates the worm 52 at such a speed that the worm gear 50 and drum 85 turn once in either 12 hours or 24 hours. Suppose drum 85 and disk 30 turn once in twelve hours, pointer 62 rotating clockwise will indicate the true time on the inner scale of dial 64. One of the three switches 210 on panel 22 will be closed to select the particular scale of prices

such as daytime rates, nighttime rates, or Sunday-holiday rates. Suppose the uppermost switch 210 is closed, only the lamps 100 in the uppermost horizontal row will be capable of being illuminated. Suppose the hour is exactly 12 noon as indicated by the pointer 62 on disk 30 shown in FIG. 1, and further suppose a customer comes to claim his vehicle and presents a ticket showing that he parked at 8:30 a.m. The attendant will press the pushbutton 72 of switch 70'. This switch will be located 7 half hour intervals counterclockwise of pointer 62 at the 12 noon numeral 64'. The seventh lamp on the uppermost row of lamps 100 will light up to indicate the parking charge is \$2.00. If charges are to be based on an hourly rate, plate 26 can have an hourly charge schedule as indicated by the second row of prices on plate 26 or plate 26 will be removed and replaced by one showing hourly charges. In any case, the schedule of pricing will be fixed and automatically displayed.

The circuit which permits a particular lamp 100 to light up when a particular switch 70 is closed can be traced through circuit 200. From terminal 202 the current flows through switch 204, ring 82, a spring contact 76, a prong 36, socket contact 37, a ring 92, a lamp 100, a switch 210, and line 204 to terminal 203.

Only 24 rings 92 will be required for a timed parking period of 24 intervals. This can be 6 hours at one quarter hour each or 12 hours at one-half hour each, or 24 hours at 1 hour intervals each. There will be as many rings as there are individually timed intervals in a parking period. There will be as many prices 120 posted as there are individual priced intervals set in a particular period. Disk 30 will be removed and replaced by another if, for example, quarter hour intervals are to be charged.

The date and time stamp 130 automatically driven by drive motor 60 is a convenience feature to facilitate issuing parking checks and tickets to customers, and to record time of return of the checks to verify amounts of charges made to customers.

The device can be made in various sizes and styles. The structure shown being only exemplary. Various modifications can be made in the circuitry and other components without departing from the invention.

What is claimed is:

1. A display device for parking time charges, comprising a cabinet; a stationary panel at one side of the cabinet displaying a graduated time clock dial; a disk rotatably disposed in front of said panel and having a pointer to indicate time on said time clock dial; motor means in the cabinet; an axially horizontal shaft rotationally mounted in the cabinet operatively arranged for rotation by said motor means, said disk being carried by said shaft for rotation by said motor means; a multiplicity of manually operable switches carried by said disk near its periphery adjacent to said time clock dial in a circumferentially spaced array on the disk corresponding to timing intervals on said clock dial; a transparent plate mounted on the cabinet and bearing a row of numerical indications of parking time charges; stationary lamps located behind said

plate at the respective numerical indications to illuminate the same; and circuit means electrically interconnecting said switches and lamps so that when any one switch on the disk adjacent a time indication on the clock dial is operated, one of the lamps lights up to indicate a particular parking time charge.

2. A display device as defined by claim 1, further comprising an insulative drum carried by said shaft, said drum having a multiplicity of conductive rings axially spaced apart thereon; a first electrical connector carried by said drum and rotating with the drum on said shaft, said connector having contacts connected to said rings respectively; a second electrical connector attached to said disk and having elements engaging said contacts respectively, said switches being connected to said elements, and said rings being connected to the lamps, whereby electric current flows through a particular ring, switch and lamp when the last-named switch is operated.

3. A display device as defined by claim 2, further comprising a support carrying a plurality of brushes respectively disposed to wipe the rings when the drum rotates, said brushes being connected in circuit with the lamps to conduct electric current therethrough.

4. A display device as defined by claim 3, further comprising an electrical power supply; a conductive annular member carried by said panel disposed to be contacted by each switch when closed, said power supply being connected to said annular member and to said lamps, whereby a selected lamp is energized and lights up when a selected switch in circuit therewith is operated.

5. A display device as defined by claim 1, further comprising means removably mounting said disk on said shaft so that the disk can be removed and replaced by another having other switches thereon spaced to correspond with other timing intervals on said clock dial.

6. A display device as defined by claim 1, further comprising means removably mounting said plate at the front of the cabinet for displaying said parking time charges thereat, and for replacing the plate with another to display other time charges.

7. A display device as defined by claim 1, further comprising a stamping means on said cabinet for stamping on the time indicated by said pointer at said dial; and link means operatively interconnecting said motor means and said stamping means to synchronize change of time stamped by the stamping means with the time indications of said pointer.

8. A display device as defined by claim 2, wherein the drum is hollow and wherein the first connector is a socket mounted in one end of the drum and having contact lugs open to the interior of the drum, said rings having other lugs also open to the interior of the drum and connected by wires respectively to the lugs of said socket.

9. A display device as defined by claim 8, wherein the second connector is a plug having prongs detachably engageable with the contacts of the first connector, whereby the disk is removable with said plug from said shaft.