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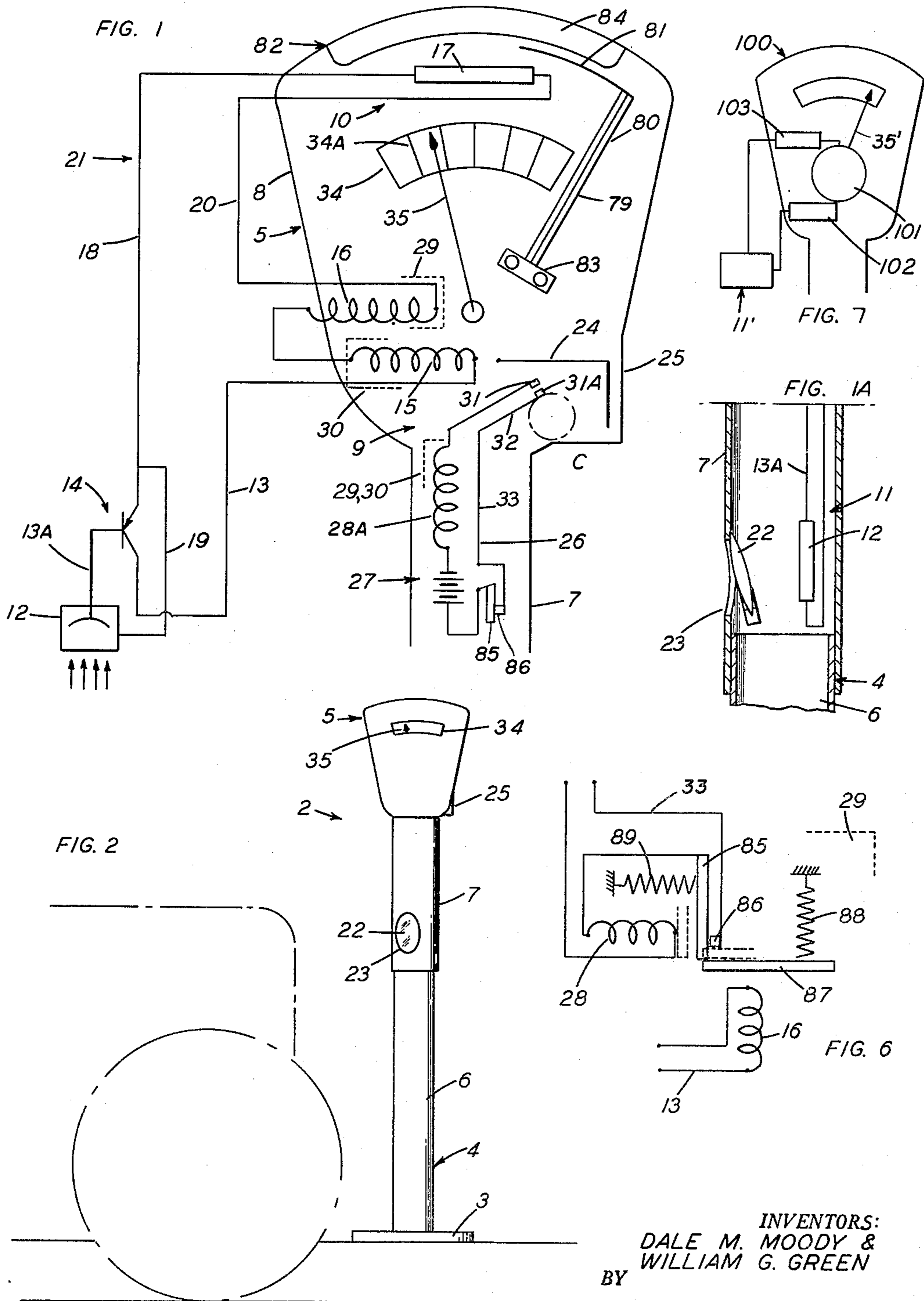
D. M. MOODY ET AL

2,995,230

PARKING METERS

Filed Oct. 4, 1956

3 Sheets-Sheet 1



INVENTORS:
DALE M. MOODY &
WILLIAM G. GREEN
BY

F. A. Bopeland Jr.
AGENT

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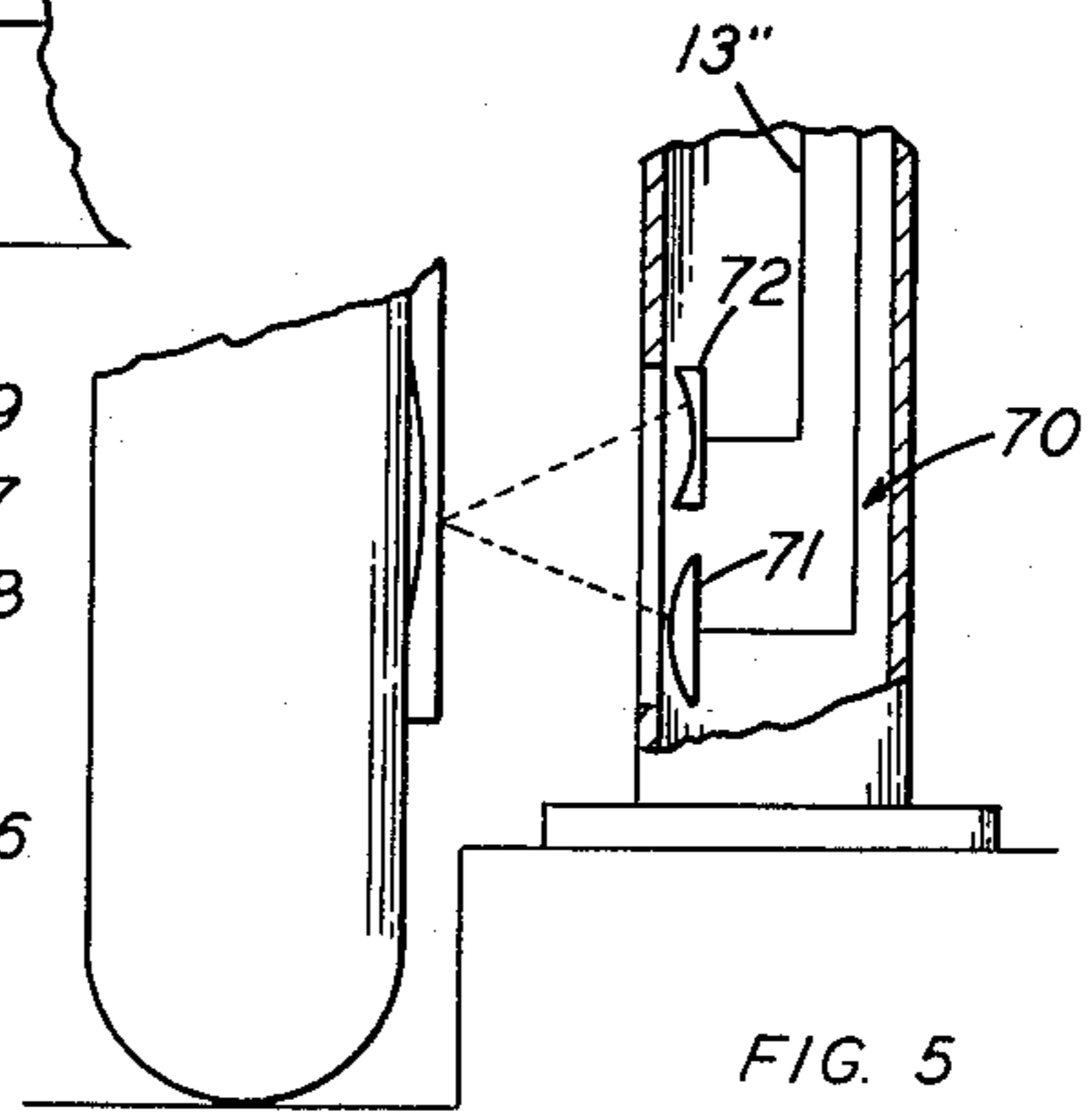
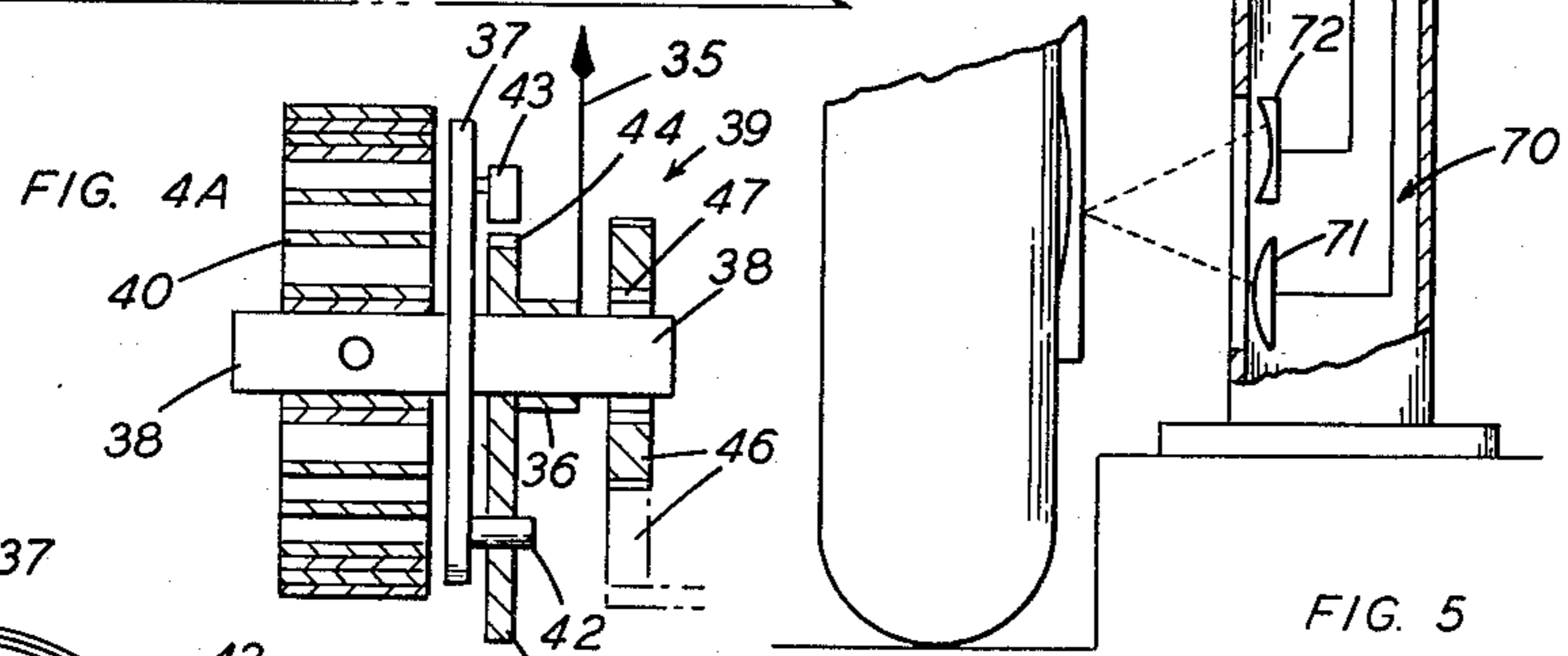
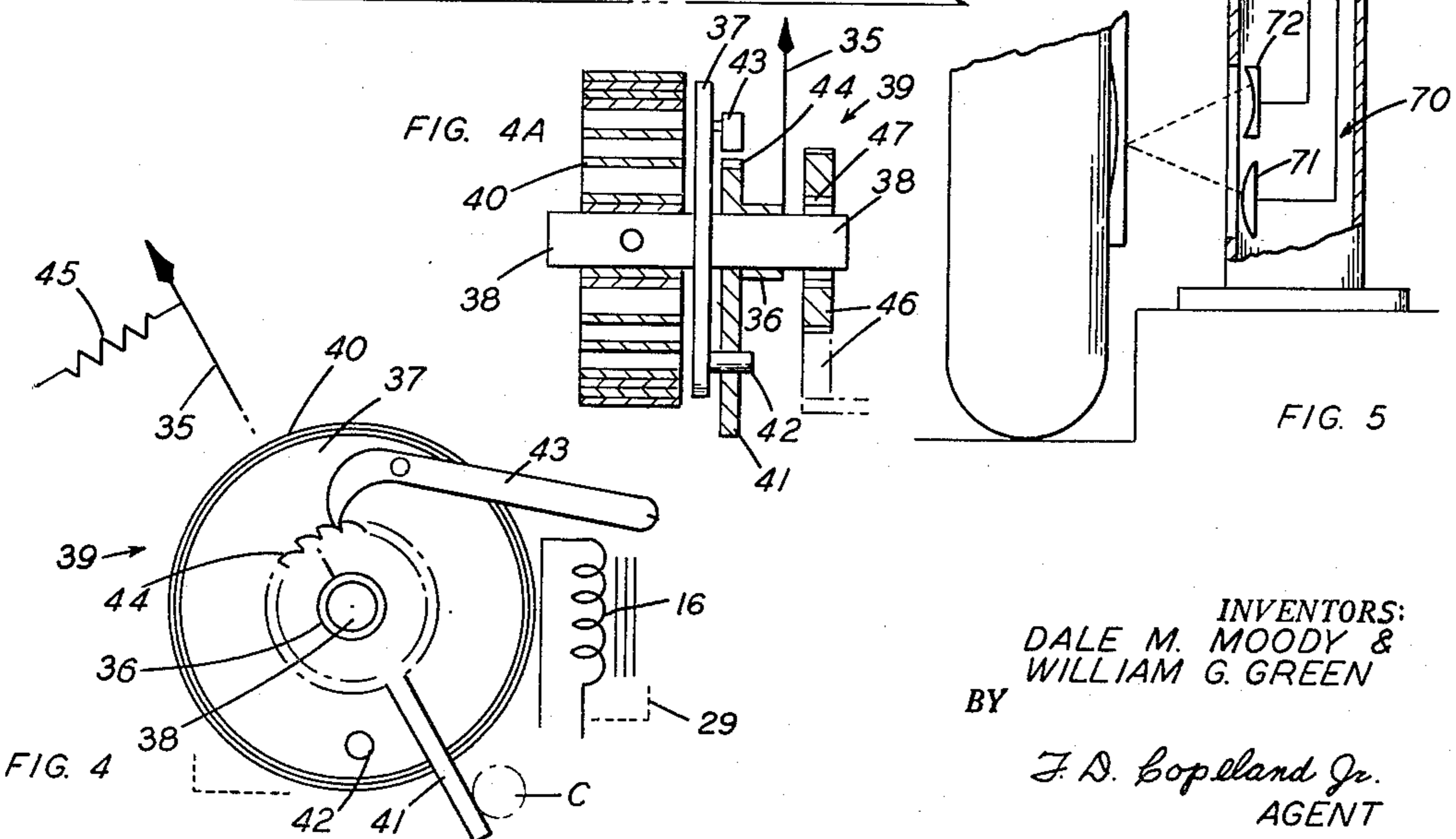
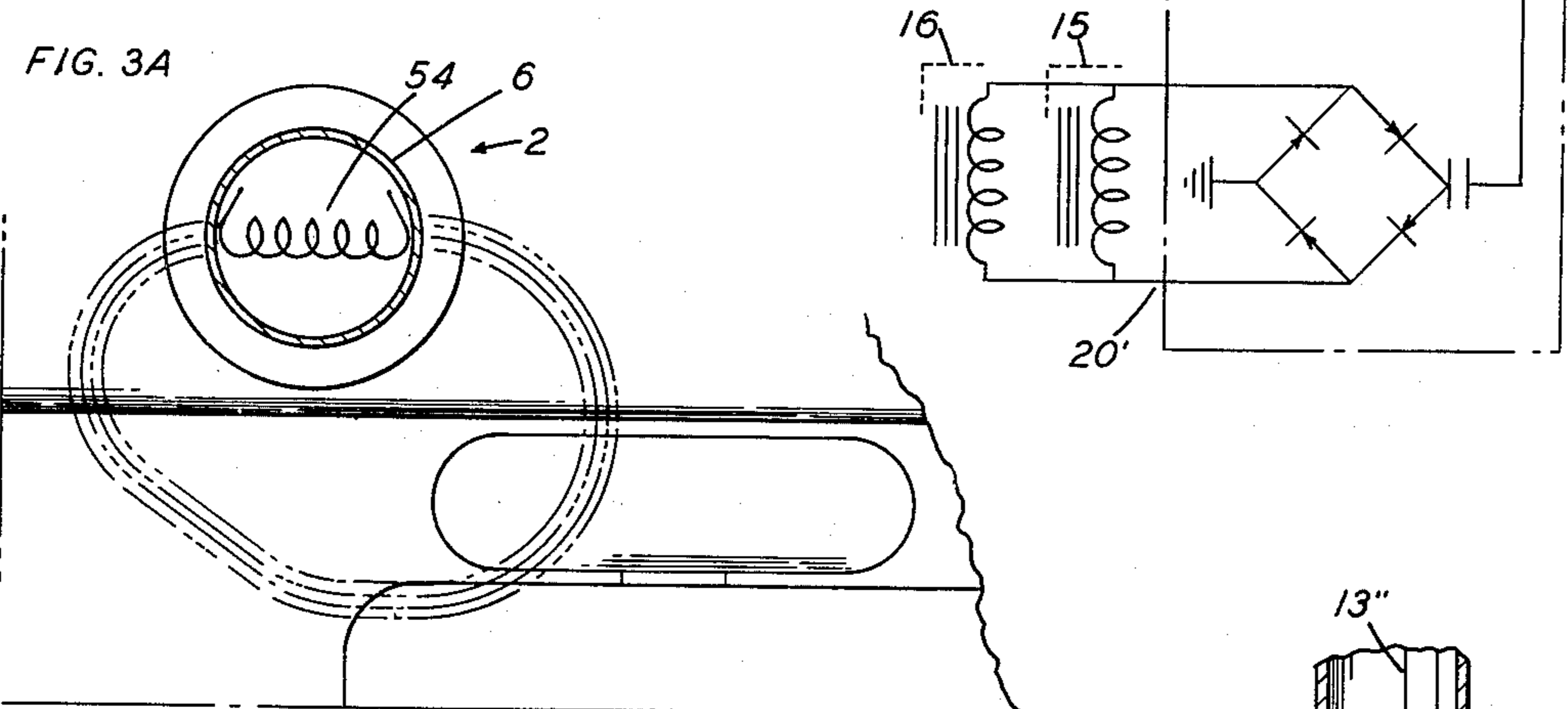
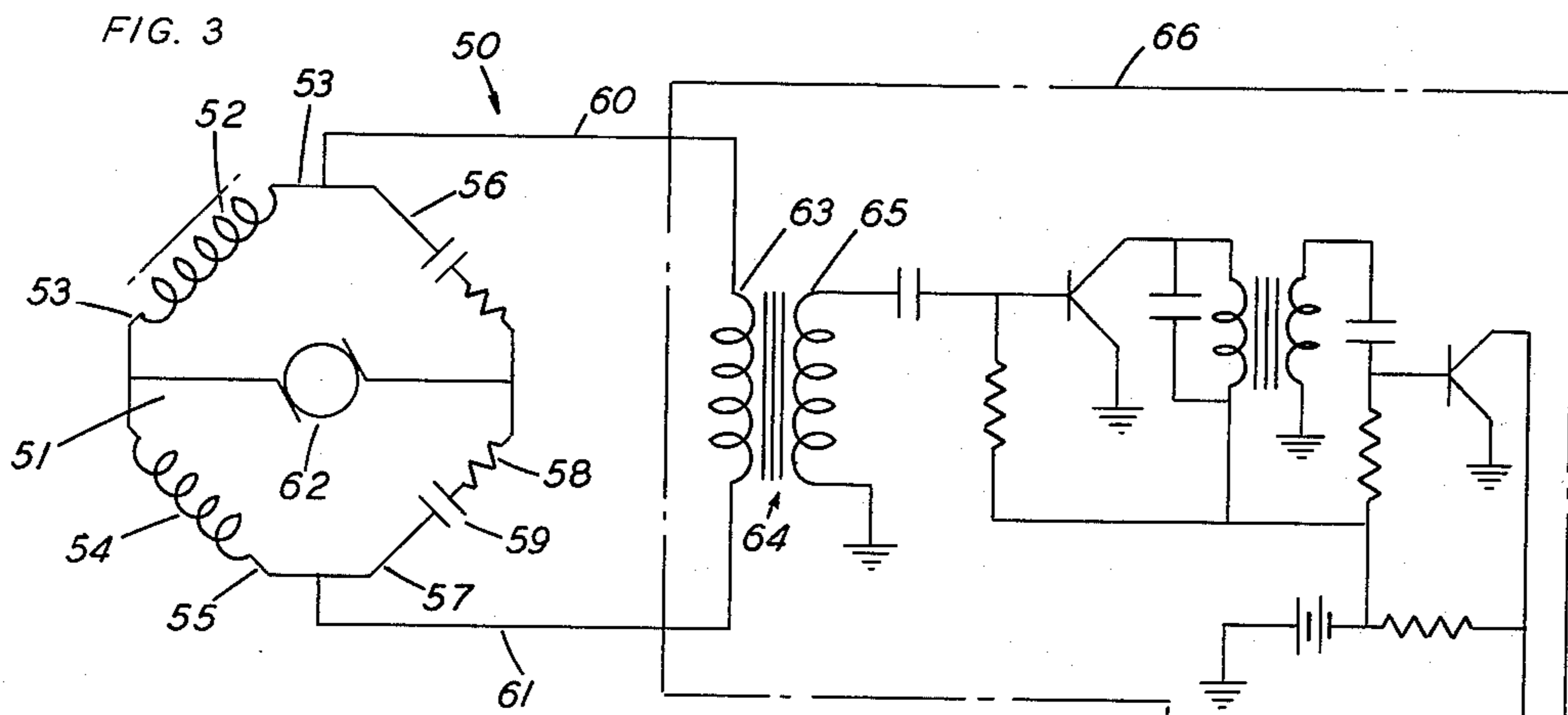
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3 Sheets-Sheet 2



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DALE M. MOODY &
WILLIAM G. GREEN
BY
F. D. Lopeland Jr.
AGENT

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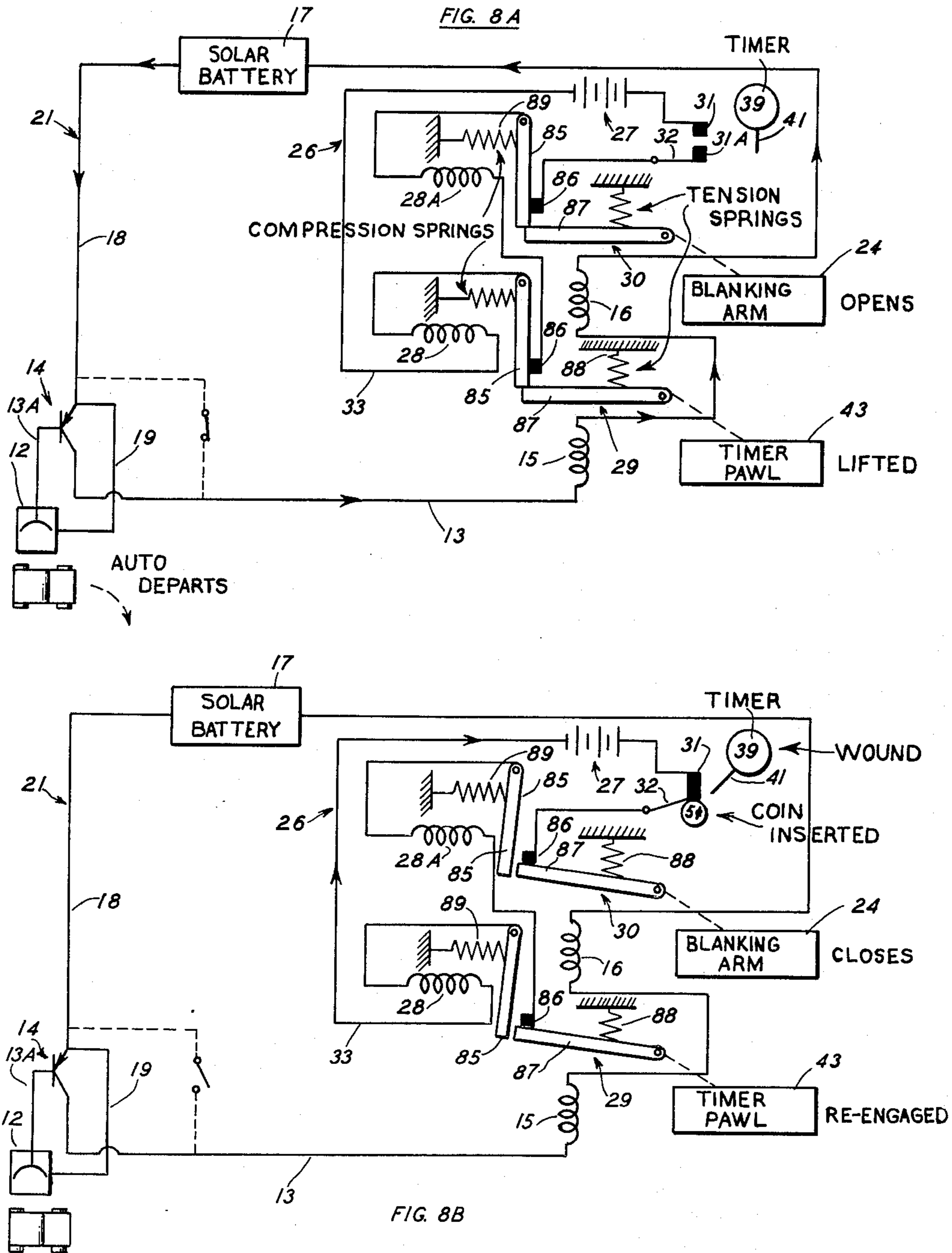
D. M. MOODY ET AL

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PARKING METERS

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3 Sheets-Sheet 3



INVENTORS
DALE M. MOODY
WILLIAM G. GREEN
BY
J. H. Copeland Jr.
AGENT

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2,995,230

PARKING METERS

Dale M. Moody, Box 3585, Tulsa, Okla., and William G. Green, Tulsa, Okla. (4925 Camellia Way, South St. Petersburg, Fla.)

Filed Oct. 4, 1956, Ser. No. 613,975

19 Claims. (Cl. 194—9)

This invention relates to motor vehicle parking meters and more particularly to meters of this type which automatically guard against unintended usage by the motoring public.

The primary object of this invention is to provide a new and unique structure for accomplishing the known objects of increasing the municipal government's revenue, and providing more parking turnover for a particular parking zone.

A secondary object is to provide a novel mechanism for a parking meter of this type which does not require underground cables or power source connections of any type.

An additional object is to provide a parking meter head having the novel mechanism for accomplishing the stated objectives which may be installed on existing meter posts without any expensive modification required.

Another object is to provide an electrically operated parking meter which is completely powered by a sun battery.

And yet another object is to provide an economical electric parking meter which has only a very few operating parts, a small quantity of wiring, and requires a minimum of maintenance as compared to prior devices for accomplishing the stated objectives.

And another object is to provide a compact, economical, and yet durable parking meter which is easy to install and virtually fool-proof in operation.

With the increase in the number of motor vehicles, and the size and population of cities, the problem of having sufficient space for parking automobiles in congested areas, especially for shoppers and business people, is commanding more and more attention. Cities and towns also are always looking for more revenue. In zones where parking is restricted to short periods of time; such as 10 minutes; 30 minutes; one hour; and two hours, traffic supervisors find that many citizens defeat the purposes of the zone restrictions, by parking for much longer periods—by returning periodically to insert additional coins. Thus, the limited number of spaces is still further reduced by one person utilizing them for longer periods than legally permitted. Traffic patrolmen attempt to correct this by marking the cars periodically, but this is expensive, and it is usually impossible to cover all the traffic zones often enough to correct the difficulty. Still another difficulty lies in the fact that many persons leave a parking zone with unexpired time on the parking meter. Other persons frequently occupy the space and transact their business on the remaining "time," without paying their proper fee, thus defrauding the city treasury. It is among the objects of this invention to correct the above difficulties.

The instant invention solves both of these problems by the use of a novel combination of structures and mechanisms and accomplishes an additional object of providing a meter wherein the motorist is protected against losing his coin if he inadvertently tries to deposit a second coin in the same meter after his original parking time is expired.

A further object is to provide a sun battery operated parking meter which includes means therein to control the battery output at a constant level in spite of the fact that there is a great variation in the amount of sunlight

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that radiates on the parking meter throughout the daylight hours.

Another object is to provide a parking meter which includes an auto detecting means which actuates a device for preventing the insertion of a second coin in the meter while the same auto remains parked in the meter zone.

And an additional object is to provide a parking meter of the type described which employs an auto detecting means to place certain events in operation which is based on the principle of a balanced impedance bridge circuit.

A still further object is to provide a parking meter as described which has an auto detecting means employing a supersonic signal.

An object of another embodiment of the device of this invention is to provide a parking meter which does not require a coin for its operation, but will include a timing mechanism which is activated by the presence of an automobile in the parking zone and will continue to show elapsed time until the automobile is moved out of the zone whereupon the timing mechanism will return to zero to await the entrance of another automobile into the parking zone.

This embodiment will be of special interest to suburban shopping centers where collection of revenue for parking is not desired, but it is highly desirable to limit the time of parking and parking space to customers of the shopping centers and not to permit a parking space to be usurped for the entire day by an employee parking for the day or by a down-town worker who might park his car at the shopping center and ride a bus to town.

By the use of this embodiment, local guards or suburban police may check the time elapsed and give tickets or warning to the offending motorist.

These and other objects and advantages will be apparent from an examination of the following specification and drawings in which:

FIG. 1 represents a side elevational view of the improved parking meter of this invention with the operating circuitry shown in schematic diagram.

FIG. 1A is a detail cross sectional view through the detecting element and lens of FIG. 2.

FIG. 2 is an outline drawing of the meter in use and showing its relation to a parked auto.

FIG. 3 is a schematic diagram of a second embodiment of the invention employing an impedance bridge in place of the photocell of FIG. 1.

FIG. 3A is a cross-sectional plan view of a meter employing the bridge circuit of FIG. 3.

FIG. 4 is a detail view of the ratchet arrangement employed to control the operation of the time indicating pointer driven by the clock mechanism of this invention.

FIG. 4A is a cross-sectional elevational view of the device of FIG. 4.

FIG. 5 is a fragmentary cross sectional view of the lower end of the meter post assembly showing the sonic detecting means of one embodiment of this invention.

FIG. 6 is a detail schematic diagram of one of the latching relays employed in this invention.

FIG. 7 is an outline side elevational view of the head assembly of the "free" parking meter embodiment of this invention with the operating circuitry shown in block diagram.

FIGS. 8A and 8B are electrical schematic drawings of the invention.

Referring now more particularly to the characters of reference on the drawing, it will be observed that the complete parking meter indicated at 2 of this invention consists basically of a base 3, a post assembly 4, and a meter head assembly 5.

The base 3 and post 6 of post assembly 4 may be conventional structure, and may in fact be the base and post of an existing parking meter which will be improved by the installation of the meter head assembly 5 and

other parts in accordance with the teachings of this invention.

The meter head assembly 5 is shown in FIG. 1 to include a downward extending tubular member 7 and an enlarged housing 8 to enclose the indicating and control mechanism 9 and the power supply system 10.

The detector element 11 is located remote from the indicating mechanism 9 but is in operative communication with it. Regarding its location, element 11 as shown in FIG. 1A may be enclosed in the lower section of tubular member 7 for convenience of change-over of existing meters or it may be considered a component of post assembly 4 if it is physically attached to post 6. However, regarding its operation, it is a necessary component of indicating mechanism 9. Element 11 includes a photoelectric cell 12 which is connected by output lead 13a to a transistor amplifier 14 and then to latching relay coils 15 and 16 respectively. Both amplifier 14, photocell 12 and coils 15, 16, are supplied with the small but essential electric power from sun battery 17 via power leads 18 and 19, and return lead 20 completes this electrical circuit 21.

A lens 22 is installed inboard of window 23 in the side-wall tubular member 7 whereby the light reflected from the adjacent parking area will enter window 23, be concentrated by lens 22 to impinge upon photocell 12 and therein produce an electric signal for transmission through lead 13a to activate transistor amplifier 14 and thence deliver a signal through lead 13 to the latching relay coils 15, 16, and thus actuate certain phases in sequence of the operation of the parking meter of this invention. Latching relay coil 15 operates when actuated to retract a blanking arm 24 which normally blocks coin slot 25 and prevents the insertion of a coin to start the parking meter time cycle except at periods which follow the happening of certain predetermined events to be hereinafter explained in detail. The coin slot 25 may be a part of a conventional coin mechanism similar to that shown in Patent 2,656,908 to J. A. T. Ellison (his FIG. 2) except employing a side opening slot 25 in lieu of his top slot (of chute 34), and the depending right angle portion of the blanking arm 24 is adapted to align with and block the entrance of this slot until the arm 24 is retracted by the solenoid action of coil 15.

A second electrical circuit 26 is made up of a power source 27 which may be the sun battery 17 or a separate miniature battery having an output lead directly connected to latching relay coil 28 of timer relay 29 and coil 28A of blanking relay 30 thence to one contact point 31; the second contact point 31A is attached to a pivoting spring contact arm 32 which is electrically connected to battery 27 by lead 33. Coil 15 and 28A cooperate to constitute a blanking relay 30 controlling blanking arm 24, and coil 16 and coil 28 cooperate to constitute a timer relay 29 controlling timer 39. Coils 16 and 28 thus have a dual function of operating pawl 43 and contacts 85 and 86. Contact arm 32 is directly in line with coin slot 25 so that a regulation size coin inserted through the slot will cause arm 32 to pivot and thus produce contact between points 31 and 31A to complete current flow through circuit 26.

Housing 8 includes an arcuate window 34 through which pointer 35 is visible against a background of a time increment scale 34A for indicating the elapsed time and the time remaining on the meter. Pointer 35 as seen in FIGS. 4 and 4A is directly attached to and operated by a hollow shaft 36 which is rotated in a counterclockwise direction by its ratchet engagement with disk 37 on solid shaft 38 of timer (or clock) mechanism 39 which is in turn operated by spring 40. This spring is wound by the insertion of a prescribed coin C against lever 41 which rotates pointer 35 clockwise back to the 60 minute (or designated maximum position). However, when lever 41 hits stop 42 on disk 37 at whatever position timer 39 has carried it, additional movement of lever 41 will carry

disk 37 with it and consequently wind spring 40 (shaft 36 and 38 may also be wound by a solenoid as shown at 102 in FIG. 7). Pawl 43 on disk 37 permits ratchet 44 of hollow shaft 36 and pointer 35 to turn independent of the timer mechanism 39 in a clockwise direction until lever 41 hits stop 42 and thereafter spring 40 begins to wind back to its initial position. The pawl 43 engaging ratchet 44 will not permit any independent movement in a counterclockwise direction and so pointer 35 moves at clock speed from its initial (60 minute) position as long as an auto remains in the parking zone. When the auto leaves and pawl 43 is released by the action of timer relay 29, small spring 45 will return pointer 35 to its zero indicating position. The timer mechanism 39 keeps on running until it runs down, but there is no indication on the parking meter face to this effect. Gear 46 of timing mechanism 39 is attached to shaft 38 by a second ratchet 47 so that winding the spring 40 will not involve any turning of clock gears 46. Timer 39 and lever 41 are of such dimensions that a coin inserted through slot 25 will complete the winding operation of the timer at the time contacts 31 and 31A are closed by the action of the coin against contact arm 32.

In the embodiment shown in FIG. 3, an impedance bridge circuit 50 is employed in place of the photocell 12 as the detecting means for detecting an automobile parked in the parking zone. The bridge 51 of this complete circuit 50 includes a shielded impedance coil 52 of a known size in one leg 53 thereof and a similar size unshielded coil 54 in leg 55 to be used for detecting purposes. The other legs 56 and 57 each include an equal sized resistances 58 and capacitances 59. Output leads 60 and 61 are attached to bridge 51 at the junction of legs 53 and 56 and at the junction of legs 55 and 57 respectively, and a power source 62 which may be a small A.C. generator powered from sun battery 17 is connected across the bridge from the junction of legs 53, 55 to the junction of legs 56, 57. The output of leads 60 and 61 is fed to the primary coils 63 of a transformer 64 which produces a voltage in secondary coil 65 whenever there is an unbalanced condition in bridge 51. This unbalancing will of course occur as soon as an automobile appears in the parking zone adjacent the meter 2. It is therefore desirable to place the unshielded impedance coil 54 in remote position as in the lower portion of post 6 as shown in FIG. 3A. The balance of circuit 50 comprises a transistor amplifier 66 whose output leads 20' connect with latch relay coils 15 and 16 which function in the manner described. It should be observed that the relays 15 and 16 may be connected either in series as shown in the embodiment of FIGURE 1 or in parallel as shown in the embodiment of FIGURE 3. These connections may be interchanged without affecting the operation of the circuit, assuming the component values are properly selected (by a person skilled in this art).

In the embodiment shown in FIG. 5 a sonic detector means 70 is employed to detect the presence of an automobile in the parking zone. By employing a high frequency short range sonar type transmitting transducer 71, sonic waves may be projected into the parking space at such an angle that no reflection will be received by receiving transducer 72 unless a vehicle is occupying the parking zone, in which case the receiving transducer 72 sends an electric signal through lead 13" and amplifier 14 to operate relays 15 and 16 to place the parking meter cycle of this invention in operation.

In each of the embodiments above wherein the sun battery 17 has been employed as the power source it is desirable to regulate the amount of power generated to obtain a more uniform and stable operation of the electrical components. A regulating means 80 in the form of a shutter 81 moves across the opening 82 in the top of meter housing 8 to reduce the amount of sunlight striking battery 17 and consequently control the voltage output to the various components. Shutter 81 is arcuate in shape

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and preferably of a light reflecting phenolic material. One end of shutter 81 is fastened to the free end of a bi-metallic element 79 which is anchored to housing 8 by bracket 83. As the temperature within housing 8 increases, as it will do when exposed to direct sunlight, the element 82 which is in the form of a strip composed of two metals having a different coefficient of expansion due to heat, will begin to curve in a counterclockwise direction, and as it does so, shutter 81 will move across opening 82 to reduce the sunlight entering housing 8 through lens 84 and consequently reduce the output of battery 17. The same procedure occurs in reverse as the sun begins to set so that a reasonably consistent level of sun battery output voltage is maintained.

In FIG. 6 structural details of one form of latching relay (29 or 30) is seen to include an actuating coil 28 which when energized will attract lever 85 away from contact 86 to break the electrical circuit through lead 33; at this point lever 85 would tend to return to its former position and engage contact 86 except for the fact that pivoted lever 87 has already engaged contact 86 due to its spring 88 and lever 87 blocks the return of lever 85 until such time as its actuating coil 16 is energized through its lead 13 to return lever 87 to its original position and thus permit compression spring 89 to return lever 85 to engagement with contact 86 to await the next insertion of a coin to close contacts 31 and 31A and re-energize this circuit.

FIG. 7 is a block diagram illustration of the parking meter head assembly of the "free," non-coin operated embodiment of the invention. In head assembly 100 the timer mechanism 101 corresponds to the timer mechanism 39 of the FIG. 1 embodiment, except the timer is wound by a solenoid 102 in lieu of being coin operated as before. The time release 103 corresponds to the pointer release relay 16 to return pointer 35' to zero after the auto has departed from the parking zone. The detector 11' may be any of the auto sensing devices described herein or otherwise publicly known at the time of this writing which may be adapted to actuate an electric solenoid using a battery, sun-battery, or other known power source. By the use of this device "free" limited parking time may be given to bona-fide customers, but the use of the parking space by unauthorized personnel will be prevented. Overtime parking tickets could be redeemed at the merchant's establishment if presented by a customer immediately after receipt of the ticket, but all-day parkers or employees could not be excused in this manner.

From the foregoing description it will be readily seen that there has been produced a device which substantially fulfills the objects of this invention as set forth herein. The invention is not limited to the exemplary constructions herein shown and described, but may be made in many ways within the scope of the appended claims.

What is claimed is:

1. A coin operated parking meter for a vehicle parking zone comprising an indicating mechanism for displaying time increments, detector means to detect the presence of an automobile in said parking zone, and control means to permit insertion of a coin when said automobile has been detected and prevent the insertion of a second coin in said meter until said first detected automobile has been moved out of said parking zone.

2. A coin operated parking meter for a vehicle parking zone, comprising: an indicating mechanism for displaying unexpired parking time increments, detector means to detect the presence of an automobile in said parking zone, and control means to permit insertion of a coin when said automobile has been detected and to prevent the insertion of a second coin in said meter until said first detected automobile has been moved out of said parking zone and to cause said indicating mechanism to display a zero amount of unexpired time when said detected automobile has been moved out of said parking zone.

3. A coin operated parking meter for a vehicle parking

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zone, comprising: an indicating mechanism for displaying unexpired parking time increments, photoelectric cell detecting means to detect the presence of an automobile in said parking zone, and electrically operated control means activated by said photoelectric cell means to permit insertion of a coin when said automobile has been detected and to prevent the insertion of a second coin in said meter until said first detected automobile has been moved out of said parking zone.

4. A coin operated parking meter for a vehicle parking zone, comprising: an indicating mechanism for displaying unexpired parking time increments, photoelectric cell detecting means to detect the presence of an automobile in said parking zone, and electrically operated control means activated by said detecting means to cause said indicating mechanism to display a zero amount of unexpired parking time when said detected automobile has been moved from said parking zone.

5. A coin operated parking meter for a vehicle parking zone, comprising: an indicating mechanism for displaying unexpired parking time increments, impedance bridge means to detect the presence of an automobile in said parking zone, and electrically operated control means activated by said impedance bridge means to cause said indicating mechanism to display a zero amount of unexpired parking time when said detected automobile has been moved from said parking zone.

6. A parking meter for a vehicle parking zone, comprising: an indicating mechanism for displaying unexpired parking time increments, power driven detecting means to detect the presence of an automobile in said parking zone, and power operated control means activated by said detecting means to cause said indicating mechanism to display a zero amount of unexpired parking time when said detected automobile has been moved out of said parking zone; and a self contained power source within said meter to operate all mentioned power driven equipment.

7. A parking meter for a vehicle parking zone, comprising: an indicating mechanism for displaying unexpired parking time increments, power driven detecting means to detect the presence of an automobile in said parking zone, and power operated control means activated by said detecting means to cause said indicating mechanism to display a zero amount of unexpired parking time when said detected automobile has been moved out of said parking zone; and a self-contained automatically renewable power source within said meter to operate all mentioned power driven equipment, and a self-contained regulating means to regulate the renewing action of said power source.

8. A coin operated parking meter for a vehicle parking zone comprising: an indicating mechanism for displaying unexpired parking time increments, power driven detecting means to detect the presence of an automobile in said parking zone, and power driven control means to permit insertion of a coin in said meter when said automobile has been detected and to prevent the insertion of a second coin until said first detected automobile has been moved out of said parking zone.

9. A coin operated parking meter for a vehicle parking zone comprising: an indicating mechanism for displaying unexpired parking time increments, electric powered detecting means to detect the presence of an automobile in said parking zone, and electric powered control means to permit the insertion of a coin in said meter when said automobile has been detected and to prevent the insertion of a second coin until said first detected automobile has been moved out of said parking zone to cause said indicating mechanism to display zero unexpired parking time when said automobile has thus been moved.

10. A coin operated parking meter as in claim 9 comprising a sun battery electric power source for supplying electric power to all said electrically operated means.

11. A coin operated parking meter as in claim 10 comprising regulating means for said sun battery whereby the

amount of sunlight falling on said battery to generate power therein is controlled inversely with the intensity of said sunlight.

12. A single coin operated meter head assembly for installation on a conventional vehicle parking zone parking meter base and post assembly comprising: indicating means for displaying unexpired parking time increments, detector means to detect the presence of an automobile in said parking zone, and control means to cause said indicating means to display a zero amount of unexpired parking time when said detected automobile has been moved out of said parking zone and to prevent the insertion of a second coin in said meter head assembly until after said detected automobile has been so moved.

13. A single coin operated meter head assembly for installation on a conventional vehicle parking zone parking meter base and post assembly, comprising: an indicating mechanism for displaying unexpired parking time increments, detector means to detect the presence of an automobile in said parking zone, and control means to cause said indicating mechanism to display a zero amount of unexpired parking time when said detected automobile has been moved out of said parking zone and to prevent the insertion of a second coin in said meter head assembly until after said detected automobile has been so moved; a power source contained entirely within said head assembly, each said means being power operated from said source.

14. A single coin operated parking meter for a vehicle parking zone, comprising: an indicating mechanism for displaying unexpired parking time increments, sonic detecting means including a sending and receiving transducer for detecting the presence of an automobile in said parking zone, control means to cause said indicating mechanism to display a zero amount of unexpired parking time when said detected automobile has been moved out of said parking zone and to prevent the insertion of a second coin in said meter until after said detected automobile has been so moved; a self-contained self-energizing power source in said meter and supplying power to operate said detecting means and said control means.

15. A single coin operated parking meter for a vehicle parking zone, comprising: an indicating means for displaying unexpired parking time increments, a power drive in said mechanism, power driven detecting means to detect the presence of an automobile in said parking zone, power operated control means activated by said detecting means to cause said indicating means to display a zero amount of unexpired parking time when said detected automobile has been moved out of said parking zone and to prevent the insertion of a second coin in said meter until after said detected automobile has been moved out of said parking zone; and a self-contained automatically renewable power driven equipment.

16. A free, time displaying parking meter, comprising: a parking head assembly including a time indicator pointer, a timer mechanism, electric means to simultaneously wind said timer and move said pointer to the zero time position and start said timer and pointer in operation upon receiving a predetermined signal, and a detector element capable of sending said signal when an automobile is parked adjacent said parking meter.

17. A parking meter, comprising: a parking head assembly including a time indicating pointer, a timer, means to simultaneously wind said timer and move said pointer to the zero time position and start said timer and pointer in operation upon receiving a predetermined signal, a pointer release means operative to move said pointer to the fully expired time position when an automobile has departed from a parked position adjacent said parking meter.

18. A free parking meter, comprising: a totally sealed parking head assembly including a time indicating pointer, a timer slideably cooperating with said pointer, means to simultaneously wind said timer and move said pointer to the zero time position and start said timer and pointer in operation upon receipt of a predetermined electrical signal, an electric pointer release means operative to move said pointer to its fully expired time position upon receipt of a second electric signal; and a detector element capable of sending said second signal when an automobile has departed from a parked position adjacent said parking meter.

19. A free parking meter, comprising: a totally sealed parking head assembly including a timer having an operating shaft, a winding spring rigidly attached to said shaft, a time indicating pointer journaled to said shaft and adapted to freely rotate thereon in one direction, means on the timer cooperating with said pointer to cause combined rotation of the timer and pointer in the said other direction, electric means to simultaneously wind said timer and move said pointer to the zero time position and start said timer and pointer in operation upon receipt of a predetermined electrical signal, and pointer release means operative to move said pointer to its fully expired time position upon receipt of a second signal; and a detector element capable of sending said second signal when an automobile has departed from a parked position adjacent said parking meter.

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