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P. H. BURN

2,644,150

AUTOMATIC TRAFFIC DIRECTING DEVICE FOR GARAGES

Filed June 26, 1948

2 Sheets-Sheet 1

FIG. 1.

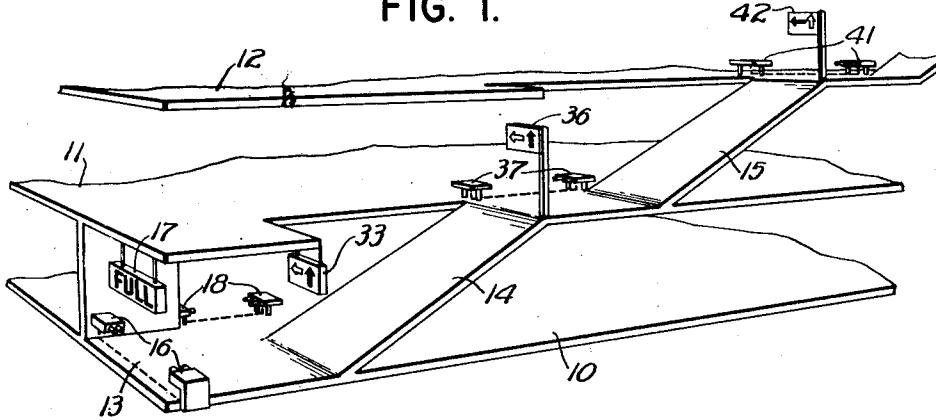
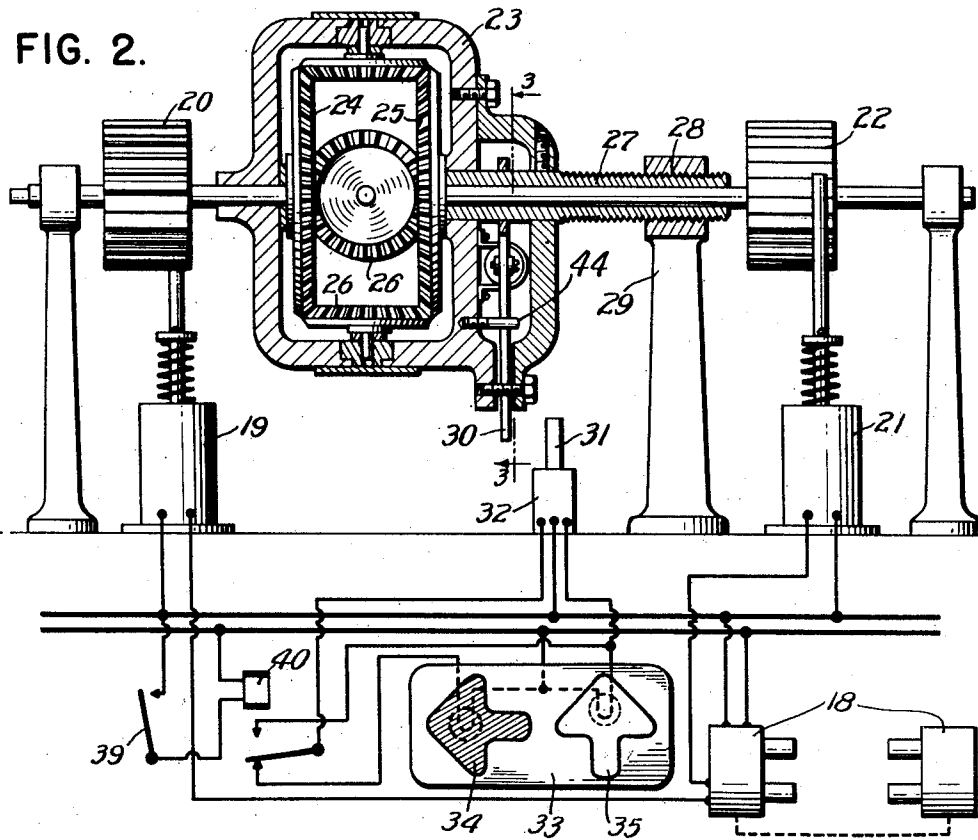


FIG. 2.



Inventor
PHILIP HAVILAND BURN

By *George H. Mitchell*

Attorney

June 30, 1953

P. H. BURN

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2 Sheets-Sheet 2

FIG. 3.

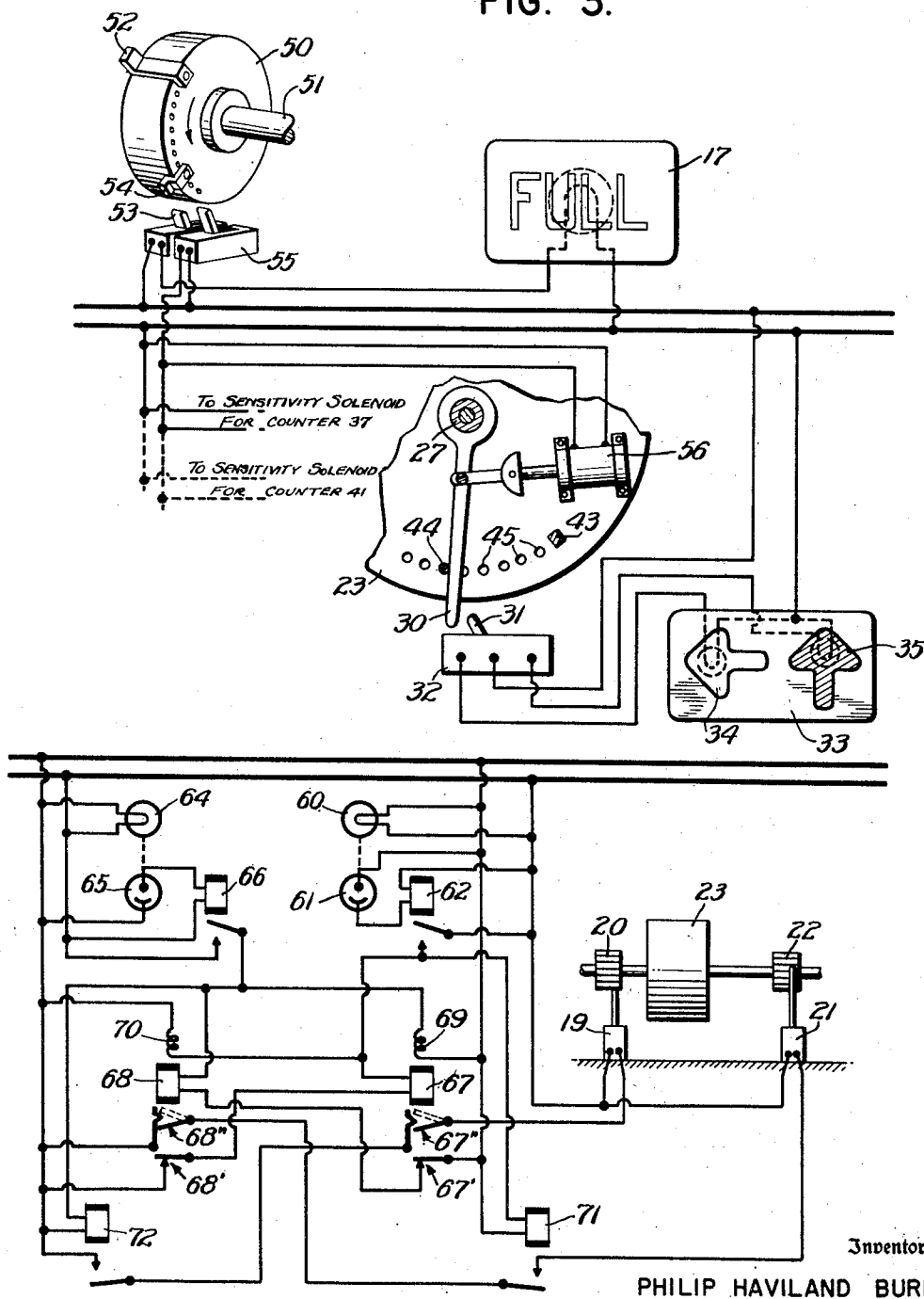


FIG. 4.

UNITED STATES PATENT OFFICE

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AUTOMATIC TRAFFIC DIRECTING DEVICE
FOR GARAGES

Philip H. Burn, Forest Hills, N. Y.

Application June 26, 1948, Serial No. 35,350

13 Claims. (Cl. 340-213)

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My invention relates to garages and in particular to novel means for the more efficient handling of traffic in garages. The present invention provides certain improvements over the automatic traffic-handling means disclosed in my copending patent application Serial No. 709,769, filed November 14, 1946, now Patent No. 2,482,610, issued September 20, 1949.

With the growing problems of traffic congestion in large cities and of rising labor costs in the staffing of garages located in such cities, it is becoming desirable, if not necessary, to devise improved means for handling the maximum number of vehicles in off-the-street parking with a minimum of personnel.

It is, accordingly, an object of my invention to provide improved means for the handling of vehicular traffic in a garage.

It is another object to provide an improved traffic-control system for garages that will reduce the required number of operating personnel, that is, to provide a garage which will be virtually "self-parking."

It is a more specific object to provide novel computing and indicator means for routing traffic into a given parking area until that area becomes saturated and for then rerouting the traffic into another area; the indicator means being operative to redirect traffic into the first area after a desired number of parking spaces have again become available in the first parking area.

It is a further object to meet the above specific object with means whereby the rerouting indicator may reroute traffic to the first area sooner (that is, after fewer free parking spaces have become available in the first area) when the garage is almost loaded to capacity, than when the garage is more lightly loaded.

It is also an object to provide manually operative means in an automatically self-routing garage of the character indicated for selectively disabling certain elements of the routing system in order selectively to load the garage in a particular desired order.

It is a further specific object to provide an improved vehicular counting device adaptable simultaneously to the in-counting and to the out-counting of vehicles.

Other objects and various further features of the invention will be pointed out or will occur to those skilled in the art from a reading of the following specification in conjunction with the accompanying drawings. In said drawings, which show, for illustrative purposes only, a preferred form of the invention:

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Fig. 1 schematically indicates in perspective a more or less conventional garage to which my traffic-control system is shown adapted;

Fig. 2 is a partially sectionalized side view of a computing device shown associated with suitable counters and indicators according to the invention;

Fig. 3 further schematically shows certain details of the computing device of Fig. 2; and

Fig. 4 is a simplified wiring diagram schematically illustrating a novel counting means according to the invention.

Broadly speaking, my invention contemplates a system of computers and indicators applied to a garage having a plurality of independently accessible parking areas. In general, counting means monitors vehicles entering and leaving a first area until the counting means determines that said area is saturated or substantially loaded, whereupon indicator means may become operative to route the traffic to a second area. In order that the counting means shall not become operative to reroute the traffic to the first area merely upon the subsequent exit therefrom of one or two vehicles, the counting means may include further means responsive to a counted loading which may represent any desired number of vacancies in the first area, and the indicator means may be responsive to this second determination to reroute traffic into the first parking area until the vacancies have been filled. Manually operated means may be employed effectively to override automatic or computer-control of the indicator, so that particular areas of the garage may be separately loaded in any desired unusual order. The invention is applicable to garages of the type disclosed in the above-mentioned copending patent application, wherein separate entrance and exit facilities are available for each parking area, but in the form to be described, each parking area is accessible through a way having novel counting means for both the in-counting and the out-counting of vehicles through said way.

Referring to the drawings, my invention is shown in application to a more or less conventional garage having a plurality of floor levels 10-11-12, and each of these floor levels may be said to be a separate parking area. Each of the parking areas 10-11-12 may be independently accessible, that is, from the entrance way 13 direct access may be had as by a left turn to the parking area 10, or by a ramp 14 and a left turn to the parking area 11, or by a ramp 15 and a left turn to the parking area 12. In the present illustrative case, the independent entrances to

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the various parking areas and the entrance 13 to the garage may all accommodate two-way traffic. It will be assumed that it is desired normally first to load the parking area 10, then to load the parking area 11, and finally to load the parking area 12, and then to load such other areas as may be located on other floor levels.

In accordance with the invention, I provide novel automatic means for handling traffic in the order indicated. This novel automatic means may employ a first counting system 16 which may guard or monitor the entrance and exit of all vehicles. The counting means 16 may be of a novel construction to be described in detail below, but it will suffice to say that the counting means 16 may produce an in-counting impulse or signal or other function for each entering vehicle, and a similar out-counting function for each leaving vehicle. Computer means may be responsive to the differential of the in-and-out counting functions, and in the case of the counting means 16 attainment of a given differential (representing a capacity loading of the garage) may operate a "Full" sign 17 or the like to indicate that the garage is loaded fully. Counting devices generally similar to the device 16 at the entrance to the garage may also be employed at the entrance to each of the parking areas 10—11—12.

For illustrative purposes, Fig. 2 shows counting and computer means for the parking area 10. In this computer, in-counting means may be associated with twin-beam photoelectric stations 18. Upon traversal of the beams between stations 18 in a first direction or sequence, means to be later described may provide an impulse for energizing a solenoid 19 in one-way ratcheting engagement with a ratchet wheel 20. Upon traversal of the beams between stations 18 in the opposite order, as in the case of a vehicle leaving the parking area 10, a second type of impulse may be derived for operation of a second solenoid 21 in one-way ratcheting engagement with a ratchet wheel 22. The ratchet wheels 20—22 may be differentially associated within a cradle 23, as by means of a nest of bevel gears 24—25—26, the gears 26 being in constant mesh with the gears 24—25 and being positioned to carry the cradle 23. It will be understood that rotary displacement of the cradle 23 may be indicative of the difference between in- and out-counting impulses, and that its position may therefore represent the extent of loading on the floor or parking area 10.

As described in the above-mentioned copending application, the cradle 23 may be secured to a hollow shaft 27 in threaded engagement, as at 28, with a supporting member 29. Thus, differential actuation of the cradle 23 may not only result in angular displacement but also in axial displacement thereof. Upon attainment of sufficient angular and axial displacement a cradle position will be attained, representing a substantially full loading of the parking area 10 and at such time it will be understood that a lug or arm 30 carried with the cradle 23 may actuate an arm 31 of a double-throw switch 32 controlling a traffic-routing indicator 33. Normally, and preferably until the parking area 10 has been substantially loaded, the switch 31 and other associated electric connections complete a circuit for a lamp arrow or other indicating means 34 to route traffic into the parking area 10; and, upon attainment of the counting differential necessary for operation of switch 31, the indicator

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34 may be disabled and a similar arrow or other indicator 35 may be actuated so as to redirect the traffic up ramp 14 and into, say, the parking area 11. The latter flow of traffic will be understood to be directed by a further indicator means 36 which may operate in conjunction with further in-and-out counting means 37 similar to the counting means 18.

In certain instances, it may be desirable to change the order in which the various parking areas are normally loaded, and, in such event, I may employ manually operable means, such as a single-pole switch 39, for controlling a relay 40 to connect the indicator, arrow, or other device 35 for continuous operation, regardless of the position of switch 31, as long as the manual control means 39 is closed or otherwise operative. It will be understood that control means similar to the switch 39 may be associated with the counting and indicating means 37—36 for the parking area 11, with the counting and indicating means 41—42 for the parking area 12, and with further indicating means (not shown) for such other independently accessible areas as there may be in the garage. It will further be understood that the various switches or other control means 39 associated with the counters for the various parking areas may all be remotely located and mounted side by side for convenience, as in a master control room, office, pay booth, or the like.

With the system thus far described, as with the system of the above-mentioned patent application, the operation of the indicator switch 31 may be relatively sensitive, that is, the mere departure of one, two, or three vehicles from the parking area 10 may provide sufficient out-counting impulses to reposition the switch 31, so that the indicator 34 may then redirect traffic into the parking area 10. It will be appreciated that such highly sensitive operation may not be desirable as long as there is plenty of available parking space on the upper levels. For this reason, I prefer to employ means associated with the differential mechanism of the individual counting means, whereby the switch 31 and other similar switches for the particular parking area under consideration shall not be shifted to redirect traffic into such parking area until a desired and more substantial number of vehicles have left such (previously filled) parking area. For example, it may not be desired in the case of the parking area 10 (once the said parking area 10 has been fully loaded) to redirect traffic into the parking area 10 until, say, 10 or 15 vehicles have left, to make that many vacant spaces.

In order to effect such functioning of the counting means, a certain degree of lost motion may be permitted for the actuating arm 30 carried by the cradle 23. In the form shown, one of the limits of angular lost motion for the arm 30 is determined by a fixed abutment or stop 43, and the other limit of lost motion may be determined by an adjustable abutment 44. The abutment 44 may be a screw insertable in one of a number of suitably tapped holes 45 in the cradle 43, depending upon the desired degree of lost motion. Referring to Fig. 3, it will be appreciated that if the cradle 23 rotates clockwise with each incoming vehicle for the parking area 10 then the fixed abutment 43 will have to strike and carry the arm 30 (say to the position of arm 30 shown) before switch 31 will be actuated (to the position shown) for illumination of the arrow 35 directing traffic up ramp 14 to parking area 11. Later on,

as vehicles leave the parking area 10, they will be counted out by the mechanism 18 so as to index the differential cradle or housing 23 counterclockwise, while the arrow 35 continues to direct traffic up ramp 14 for the loading of upstairs parking areas. Sufficient vehicles will have to leave the parking area 10 to compel the adjustable stop 44 to carry arm 30 and operate switch 31 (to the right, in the sense of Fig. 3) before the indicator means 33 may again be operative to direct traffic into the parking area 10.

Thus far, the lost-motion feature of arm 30, with respect to the differential cradle 23, has been described as performing a useful function in the avoidance of too frequent routing and re-routing of the main flow of incoming traffic to and away from any particular parking area. In a normal course of operation, as when the garage does not approach a full loading, it may be desired to retain this lost-motion feature constantly operative. However, if this lost-motion feature were left in continuous operation for the counting devices for all parking areas, there might conceivably be a time when substantial numbers of vehicles had left each of several parking areas, and yet when the routing system would indicate no available parking space. To avoid this difficulty, in the event that it is desired at times to load the garage to its full capacity, I provide novel means for effectively changing the sensitivity of operation of switching means, such as the switch 31, in order that the rerouting controlled by switches 31 may take place sooner, say when only a few vehicles depart from a fully loaded parking area.

This change of sensitivity in the operation of switching means 31 may be controlled simultaneously for all counting devices, by appropriate connection to the counting mechanism 16 guarding the entrance and exit of all vehicles to the garage. In Fig. 3, such a mechanism is schematically illustrated by a cam drum 50 which may be carried with a shaft 51 having the rotary and the axial motion of the differential cradle or housing forming part of the counting mechanism 16. The cam drum 50 may carry a cam or lug 52 for performing the normal function (in cooperation with switching means 53) of turning on the "Full" sign 17 whenever the counter 16 determines that the garage has been fully loaded. It will be understood that the shaft 51 like the shaft 27 of counting means 18 may have both angular and axial motion, so that the switch 53 may be operated by cam 52 upon one and only one particular pass of the cam lug 52.

In accordance with the invention, additional timing means such as the cam lug 54 may be carried by the cam drum 50; the cam lug 54 may be so positioned as to operate further switching means 55 in advance of the operation of switch 53 by a lug 52. It will be understood that the cam lug 54 may be adjustably placed on the cam drum 50, so as to provide the desired timing advance with respect to the position of cam lug 52.

In the form shown operation of switching means 55 by the cam lug 54 may by itself increase the sensitivity of all counting devices 18—37—41 for the particular floors or parking areas, and this function may be accomplished by arranging the switch 55 to energize simultaneously a number of solenoids 56 carried by the differential cradles 23 of these counting devices 18—37—41. The armatures of solenoids, such as the solenoid 56 carried by cradle 23, may be

linked directly with the arm 30 so that upon solenoid energization the arm 30 may be drawn forcibly against the fixed abutment or stop 43. It will be appreciated then that as long as the solenoids (such as solenoid 56) remain energized, that is, as long as the garage is sufficiently loaded, the cam lug 54 will have operated the switch 55, and the control arms 30 for the various counting installations may be as fixed lugs on the differential cradles. The traffic will then be automatically routed so as to load first the parking area 10 and then the other parking areas in their normal sequence of loading, to full capacity. It will be understood that for certain relative positions of the stop 43, of the arm 30, and of the switch 31 (as in the case shown in Fig. 3), the energizing of solenoid 56 may result in an immediate operation of switch 31, thus immediately rerouting traffic into the area monitored by the equipment of Fig. 3.

It has been indicated above that my invention is applicable not only to a garage in which there may be separate entrance and exit facilities for each parking area but also to garages in which a common way may be employed both for entrance to and exit from a particular parking area. I have also indicated that in the latter-type garage a single novel counting mechanism may desirably be employed. A schematic illustration of such a counting system is indicated in Fig. 4, and is also described and claimed in my copending application, Ser. No. 264,105, filed December 29, 1951.

In Fig. 4, the counting system is shown to include a twin-beam photo-cell system employing a first electric lamp 60 constantly casting a beam across the entrance way to a first photoelectric cell 61; and, as long as this beam is uninterrupted, it will be understood that a relay 62 may be operative to maintain its contacts open. Upon interruption of the beam between lamp 60 and photo-cell 61, relay 62 will be deenergized so that its armature may drop to complete a circuit. In like manner, a second lamp 64 may be disposed to cast a continuous beam across the entrance-exit way and upon a second photo-cell 65; and, as long as this second beam is uninterrupted, a relay 66 may remain energized so as to keep its contacts open. The spacing between the two beams is preferably great enough so as not to be simultaneously interrupted by a person or by a small group of persons, but this spacing should of course not exceed the minimum vehicle length expected in the garage. It is thus expected that simultaneous operation of both beams will be necessary before a counting impulse may be derived, and the order of interruption of the beams may determine whether such counting impulses register the entrance or exit of a vehicle. In the form shown, the two types of counting impulses are available for the operation of one or the other of solenoids 19—21 and hence for the appropriate index-ratcheting of the differential mechanism within the housing 23.

The circuits utilizing the photo-cell operated solenoids 62—66 may be so interlocked as to prevent the unnecessary registration of a count should a vehicle inadvertently interrupt one beam, only to back out and fail to interrupt the other beam. Also, the circuits may provide a means for failing to register a count should both the beams be interrupted by a vehicle only to have the vehicle back out. In other words, I prefer that the circuits associated with the relays 62—66 be so arranged that the in-count or out-count be derived only after a vehicle has

interrupted a first beam, has then interrupted a second beam, and has passed both beams to the point of permitting reestablishment of the second beam.

Each of the relays 62—66 may interlockingly be associated with an interlocking relay 67—68, respectively. The relays 67—68 are each shown to include normally closed contacts 67'—68' and normally open contacts 67''—68''. The contacts 67'—68' are preferably of a type to make contact only during the movement of the contacts 67''—68'', that is, the contacts 67'—68' in the form shown may only close for an intermediate and transiently occupied position, and these contacts are not closed during the steady-state condition of an energized or of a deenergized relay 67—68, as the case may be. As a further feature, holding coils 69—70 may be associated with the relays 67—68. When energized, holding coils 69—70 may be sufficiently strong to hold the relay contacts in operated position, but the holding coils 69—70 are of themselves preferably insufficiently strong to raise or to operate the contacts of relays 67—68. To complete the circuits for relays 62—66, there may be a further normally open relay 71 to be operated directly by the relay 62, and there may be another further normally open relay 72 to be operated directly by the relay 66. The contacts of the normally open relays 71 may be in series relation with the ratchet solenoid 21 and with the transiently wiping contact 68'', and in like manner the contacts of normally open relay 72 may be in series with the ratchet solenoid 19 and with the transiently wiping contacts 67''. For a purpose which will be clear, the nature of relays 71—72 is preferably such that their contacts break relatively slowly or even with a slight delay, as compared with the break or drop-out action of relays 69—70.

In operation, let it be assumed that a vehicle is passing the two light beams from right to left in the sense of Fig. 4. The beam between lamp 60 and photo-cell 61 will then be the first to be interrupted, and upon such interruption relay 62 will be deenergized to close its contacts and thus simultaneously to close the contacts of relays 71, to energize the holding coil 70 for relay 68, to open the normally closed contacts 67' of relay 67, and to cause contacts 67'' transiently to wipe while raising the armature of contacts 67'' to an upper (dotted) position. This wiping action will be understood to have produced no function, inasmuch as the circuit of contacts 67'' will at the time have been open at the relay 72. Should the vehicle be backed up without breaking the beam of lamp 64, it will be understood that all relays will have been returned automatically to the positions shown, without registering or deriving a counting impulse or function.

As a next step in the operation of the counting device of Fig. 4, the beam of lamp 64 will be interrupted while the beam of the lamp 60 remains interrupted. When both beams thus become interrupted, relay 66 will be deenergized so as simultaneously to close the contacts of relay 72 and to energize the holding coil 69 of relay 67; relay 68 will not be operated at this time, inasmuch as the circuit therefor will have been open at the contacts 67'. Here again, it will be noted that if the vehicle should be backed up so as to reestablish both beams, all relays may return to the positions shown in Fig. 4 without registering a counting impulse.

As a third step in the operation, the rear end of the vehicle will pass the beam of lamp 60 so that this beam may again impinge upon photo-cell 61. Relay 62 may then be reenergized, but it will be noted that the holding coil 69 may still be operative to retain contacts 67' and 67'' in their raised positions. This operation of relay 62 will be understood to have the further functions of deenergizing the holding coil 70 of relay 68, and of opening the contacts of relay 71. Again it will be noted that should the vehicle be backed away from the counter at this third step in the operation thereof, no counting impulse will be derived.

The fourth and final step in the operation of my counter may occur when the vehicle completely passes the second light beam, so as to re-activate photo-cell 65 and thus to energize relay 66. This operation may result in an immediate deenergization of the holding coil 69 so that, as the contacts 67'' drop and brush, there may be a circuit completed to the counting or ratcheting solenoid 19. At the same time, energy to relay 72 will have been cut off but, due to the above-mentioned slow-action or delay features which may be incorporated in the relay 72, the contacts of relay 72 are preferably not opened until after the contacts 67'' of relay 67 have brushed to produce the described counting function.

By virtue of the complete electric symmetry of connections to the relays operated by both photo-cell circuits, it will be understood that a reverse order of interrupting the light beams may transiently complete a circuit through contacts 68'' and the contacts of relay 71 so as to produce a ratcheting or counting impulse for operation of solenoid 21. This reverse order of light-beam interruption may occur for a vehicle leaving the monitored parking area, and the generated impulse will be understood to produce an out-counting operation of solenoid 21.

It will be appreciated that I have described an ingenious automatic control system which may so regulate traffic flow in a garage that the garage may be virtually "self-parking." By providing a mechanism which may permit more than just a few vehicles to leave a previously filled parking area before the traffic is again routed to that area, it will be appreciated that the flow of traffic may be smooth and that the garage may be filled with a minimum of routing-signal changes; in order that maximum use may be obtained for the full capacity of the garage, however, I have described an automatically operated mechanism which may assure that all parking areas may be filled to the full capacity. It will further be appreciated that I have described an ingenious counting mechanism having particular usefulness in a garage in which an entrance way serves both in-going and out-going traffic.

While I have described my invention in detail for the preferred form shown, it will be understood that modifications may be made within the scope of the invention as defined in the appended claims.

I claim:

1. In a garage or the like, two parking areas, first counting means for counting vehicles entering the first of said areas, second counting means for counting vehicles leaving said first area, differential means for resolving the difference between operations of both said counting means, said differential means including means producing two functions, a first function upon at-

tainment of a given differential when said given differential is approached in an ascending order and when the second of the two said functions has been more recently produced and means producing a second function upon attainment of a second lesser differential when said second differential is approached in a descending order and when the first of said two functions has been the more recently produced, and indicating means connected to respond to said first function for directing traffic to said second parking area upon attainment of said first differential, said indicating means being connected for effective disablement in response to said second function, whereby said first area may contain a given number of vehicles before said indicating means will route traffic to said second area, and further whereby said first area may be emptied of a plurality of vehicles before said indicating means will stop routing traffic away from said first area and into said second area.

2. A garage according to claim 1, in which said differential means includes adjustable means for adjusting the relation of one of said differentials to the other of said differentials, whereby adjustment may be made as to the number of vehicles that must leave said first area before said indicating means ceases to route traffic away from said first area and into said second area.

3. In a garage or the like, two parking areas, in-counting means positioned to count traffic entering said garage, out-counting means for counting traffic leaving said garage, further in-counting means for counting traffic entering one of said areas, further out-counting means for counting traffic leaving said one area, computer means differentially responsive to both said further counting means and including an indicator for routing traffic away from said first area and into said second area upon attainment of a first differential from a second lesser differential, said computer further including means responsive to attainment of said second differential upon a decrease from said first differential and connected to change said indicator to route traffic to said first area upon such attainment of said second differential, further computer means differentially responsive to said first in-and-out-counter means and operatively connected to said first computer means upon attainment of a given differential in an ascending order in said further computer means, said connection including means for reducing the operative difference between said first differential and said second differential by changing said second differential, whereby for a lightly loaded garage a greater number of vehicles may leave said first area before said indicator ceases to route traffic away from said first area than will be the case when the full capacity of said garage is approached.

4. In mechanism for counting vehicles in a parking area, differential computer means including a member movable in one direction in response to incoming vehicles and in a reverse direction in response to outgoing vehicles, routing indicating means including switching means responsive to movement of said member in the first direction to direct traffic away from said area and responsive to movement of said member in the reverse direction to direct traffic into said area, a shiftable element for said movable member for operative engagement with said switching means to effect said response, and means for limiting the relative movement be-

tween said shiftable element and said movable member.

5. In mechanism for counting vehicles in a parking area, differential computer means including a member movable in one direction in response to incoming vehicles and in a reverse direction in response to outgoing vehicles, routing indicating means including switching means responsive to movement of said member in the first direction to direct traffic away from said area and responsive to movement of said member in the reverse direction to direct traffic into said area, a shiftable element for said movable member for operative engagement with said switching to effect said response, means for limiting the relative movement between said shiftable element and said movable member, and biasing means for preventing said relative movement.

6. Apparatus as defined in claim 5, in which said biasing means includes electromagnetic actuating means and remote switching means for the actuating means.

7. In mechanism for counting vehicles in a garage or the like having at least two parking areas, first computing means for evaluating the capacity of one of said parking areas, second computing means for evaluating the capacity of the garage as a whole, indicating means responsive to said first computing means for routing traffic into or away from said one parking area, said first computing means being operative in one sense to cause said indicating means to route traffic into said one parking area and operative in a reverse sense to route traffic away from said one area, sensitivity means including switching means to alter the degree of responsiveness of said indicating means to reversal of the sense of said first computing means, said second computing means including a movable element for operative engagement with said switching means.

8. In mechanism for counting vehicles in a garage or the like having at least two parking areas, first computing means for evaluating the capacity of one of said parking areas, second computing means for evaluating the capacity of the garage as a whole, indicating means including switching means responsive to said first computing means for routing traffic into or away from said one parking area, both of said computing means including a member movable in one direction in response to incoming vehicles and in a reverse direction in response to outgoing vehicles, said first computing means including an element shiftable with respect to the movable member for operative engagement with said switching means, and biasing means responsive to movement of the movable element of said second computing means to prevent relative movement between the shiftable element and movable member of said first computing means.

9. In mechanism for counting vehicles in a parking area, differential computer means including a member rotatable in one direction in response to incoming vehicles and in a reverse direction in response to outgoing vehicles, an arm pivotally connected with said member, routing indicator means including switching means having two positions, said rotatable member being adapted to move said arm into engagement with said switching means for alternative disposition into one of said two positions, and lost-motion means to delay the responsiveness of said switching means to said pivoted arm when the direction of rotation of said member is reversed.

10. In mechanism for counting vehicles in a

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parking area, differential computer means including a member rotatable in one direction in response to incoming vehicles and in a reverse direction in response to outgoing vehicles, an arm pivotally connected with said member, routing indicator means including switching means responsive to movement of said arm in one direction to direct traffic into said area and in the reverse direction to direct traffic away from said area, means limiting the relative movement between said arm and said member to allow the response of said switching means to said arm to be delayed when the direction of rotation of said member is reversed, and means to prevent said relative movement when said delayed response is not desired.

11. In mechanism for counting vehicles in a parking area, differential computer means including a member rotatable in one direction in response to incoming vehicles and in a reverse direction in response to outgoing vehicles, an actuating element connected with said member for relative movement in the plane of movement of the member, routing indicator means including switching means responsive to movement of said actuating element in one direction to direct traffic into said area and in the reverse direction to direct traffic away from said area, adjustable stop means for limiting the relative movement between said actuating element and said rotatable member to allow the response of said switching means to be delayed when the direction of rotation of said member is reversed, and electromagnetic means for urging said actuating element against one of said stop means when said delayed response is not desired.

12. In a garage or the like, two parking areas, first counting means for counting vehicles entering the first of said areas, second counting means for counting vehicles leaving said first area, differential means for resolving the difference between operations of both said counting means, said differential means including means producing two functions a first function upon attainment of a given differential when said given differential is approached in an ascending order and when the second of the two said functions has been more recently produced said given differential being substantially the capacity of said first parking area and means producing a second function upon attainment of a second lesser differential when said second differential is ap-

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proached in a descending order and when the first of said two functions has been more recently produced, and indicating means connected to respond to said first function for directing traffic

5 to said second parking area upon attainment of said first differential, said indicating means being connected for effective disablement in response to said second function, whereby said first area may be substantially filled before said indicating means will direct traffic to said second area, and further whereby said first area may be emptied of a plurality of vehicles before said indicating means will stop directing traffic away from said first area and into said second area.

10 13. In a garage or the like having two independently accessible areas for vehicles, differential counting and computing means for continuously determining the number of vehicles present in one of said areas, indicator means for alternatively displaying two visual indications, switching means controlled by said differential counting and computing means for establishing a first circuit for one of said visual indications when less than a predetermined number of vehicles is present and for establishing a second circuit for the second of said visual indications when more than a predetermined number of vehicles is present, and manual switching means operable in one position to allow establishment of said first and second circuits by said first mentioned switching means and operable in a second position to overrule said first mentioned switching means to positively establish a circuit for said second visual indication irrespective of the

15 35 number of vehicles present in said one area.

PHILIP H. BURN.

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