

Description

This invention relates to methods and apparatus for determining the mileage of a vehicle and, more particularly, to such a method and apparatus which minimizes the calculations required and permits the determination to be made without any special equipment installed or attached to the vehicle.

In recent years, consumers have become aware of the need to conserve fuel so that we will be able to meet our future energy needs. Consumers have also become increasingly aware of the cost savings that can be achieved by increasing the fuel efficiency of vehicles. Both of these concerns have led to an increased interest in determining the mileage that vehicles actually obtain. The conventional method for determining mileage is to divide the number of miles travelled between two occasions of filling the gas tank of the vehicle, by the number of gallons required to fill the tank on the second occasion. This method has the disadvantages of requiring that the tank be filled to capacity on two separate occasions and of involving tedious computations. These disadvantages deter many people from attempting to keep track of the mileage performance of their vehicles.

One approach to solving the problem of the need for an easy way to determine mileage is to provide special meters and/or indicators that are installed in the vehicle. This approach has the obvious disadvantages of relatively high expense and requiring modification of the vehicle.

U.S. Patent No. 4,346,665, granted August 31, 1982, to the present applicant, discloses a method and apparatus for determining vehicular mileage. This patent discloses a device for facilitating calculation of units of distance travelled per unit of fuel consumed by a vehicle of the type having an odometer, a fuel tank, and a fuel gauge for indicating the level of fuel in the fuel tank, the device comprising indicator means for recording the reading of the fuel gauge when the initial odometer reading is taken. This patent also discloses a method for determining units of distance travelled per unit of fuel consumed by a vehicle of the type having an odometer, a fuel tank, and a fuel gauge for indicating the level of fuel in the fuel tank, comprising the steps of taking an initial odometer reading, and recording the corresponding fuel gauge reading (the "base" fuel gauge reading) by positioning indicator means; consuming fuel in the tank by operating the vehicle, and adding a number of units of fuel to the fuel tank to bring the fuel gauge reading above the base reading; continuing to consume fuel by operating the vehicle, and while so continuing, monitoring the fuel gauge; and when the fuel gauge again reaches the base reading, taking a second odometer reading, and subtracting the initial odometer reading from the second odometer reading.

The apparatus disclosed in the U.S. patent in-

cludes a sight device which is attached to the existing dashboard of a vehicle. The sight device has a portion which aligns with the pointer on the existing fuel gauge and which acts as a reference mark. The method disclosed includes aligning the sight device with the pointer, adding fuel to the tank, and then driving the vehicle until the fuel gauge again aligns with the reference mark. The fuel may be added at the same time as the alignment is accomplished before driving the vehicle, or after the vehicle has been driven some distance following the alignment. The odometer is noted at the initial alignment and at the time when the pointer again moves into alignment with the reference mark. The distance travelled between these two occasions and the amount of fuel added provide the data for the calculation of the mileage. In the patent, I disclosed that any quantity of fuel may be added, but the addition of ten units of fuel is preferred since this makes the calculation easier. I also disclosed that a table having one side with distance travelled and the other side with fuel units consumed may be used to determine distance travelled per unit of fuel while avoiding mathematical calculations.

The patent cited above and the prior art that is discussed and/or cited therein should be studied for the purpose of putting the present invention into proper perspective relative to the prior art.

The present invention provides a device for facilitating calculation of units of distance travelled per unit of fuel consumed by a vehicle of the type having an odometer, a fuel tank, and a fuel gauge for indicating the level of fuel in the fuel tank. The device comprises a recording surface. The surface includes first, second, and third horizontal rows of boxes. The first row is for receiving a notation of an initial odometer reading. The second row is positioned above and aligned with the first row and is for receiving a notation of a subsequent odometer reading taken following consumption of a predetermined number of units of fuel substantially equal to 10^n , with n being a whole number greater than zero. The third row is positioned below and aligned with the first and second rows for receiving a notation of the result of subtracting the notation in the first row from the notation in the second row. A decimal point is positioned relative to the third row to automatically convert the result of the subtraction into, and provide a visual display of, units of distance per unit of fuel.

The device further includes a graduated scale, the graduations of which correspond to different levels of fuel in the fuel tank, and indicator means. The indicator means is associated with the scale and allows selective recording of the reading of the fuel gauge when the initial odometer reading is taken. The scale and indicator means may take various forms. In the disclosed embodiment, the scale is arcuate, and the indicator means comprises a pivotable pointer. The scale may have fractional graduations between

zero and one.

In its preferred form, the device of the invention comprises a member having a display surface, and a stack of paper mounted on the display surface. The stack includes a plurality of removable sheets of paper. Each sheet has an outer surface with the characteristics of the recording surface described above. The scale and the indicator means are positioned on the display surface adjacent to the stack of paper. This preferred form of the device has the advantages of being relatively simple in structure, inexpensive to manufacture, and easy and fun to use. In addition, the stack of papers allows the device to be used on a number of occasions while automatically providing a permanent record of each mileage determination.

The positioning of the decimal point relative to the third row of boxes is an essential feature of the invention. The desired relative positioning may be achieved by positioning the decimal point on the recording surface between two boxes in the third row. In an alternative embodiment, the device comprises a foldable member and the decimal point is positioned on the cover of the device. The foldable member has an inner portion that includes the recording surface, and a cover. The cover folds into a closed position in which it substantially covers the recording surface. The cover defines a window through which the result of the subtraction in the third row is visible when the cover is in its closed position. The decimal point is positioned on the outside of the cover adjacent to the window to position it between two boxes in the third row when the cover is closed.

The invention also provides a method for determining units of distance travelled per unit of fuel consumed by a vehicle of the type having an odometer, a fuel tank, and a fuel gauge associated with the tank for indicating the level of fuel in the tank. The method comprises providing a recording surface, such surface including first, second, and third horizontal rows of boxes. The second row is positioned above and aligned with the first row, and the third row is positioned below and aligned with the first and second rows. A decimal point positioned between two boxes in the third row is also provided, as are a graduated scale, the graduations of which correspond to different levels of fuel in the fuel tank, and indicator means associated with the scale. The method also comprises taking an initial odometer reading, and substantially simultaneously taking a base fuel gauge reading. The initial odometer reading is recorded in the boxes of the first row, and the base fuel gauge reading is recorded by positioning the indicator means. Fuel in the tank is consumed by operating the vehicle. A number of units of fuel are added to the fuel tank, such number being substantially equal to 10^n , n being a whole number greater than zero, to bring the fuel gauge reading above the base reading. The consumption of fuel is continued, and the fuel gauge is monitored.

When the fuel gauge again reaches the base reading, a second odometer reading is taken. The second odometer reading is recorded in the boxes of the second row, and then the initial reading is subtracted from the second reading, and the result is recorded in the boxes of the third row. The decimal point is positioned automatically to convert the result of the subtraction into units of distance per unit of fuel. The scale may have fractional graduations between zero and one.

In some circumstances, it may be inconvenient or impractical to add as much as ten gallons or other fuel units to the tank. This is particularly likely in the case of a small automobile with a small fuel tank. Therefore, it is a feature of the invention that the step of adding fuel may comprise adding at different times a plurality of quantities of fuel, the sum of the quantities equalling the number of units described above, for example ten units. This optional feature of the invention greatly facilitates the use of the method and apparatus of the invention by drivers of small cars who can easily and conveniently add, for example, five gallons on two separate occasions, but for whom the need to add ten gallons on one occasion would often be impractical.

The method and apparatus of the invention provide a means for greatly simplifying the determination of a vehicle's fuel efficiency. The method and apparatus do not require any special installations in or attachments to the vehicle and reduce the calculations to one simple subtraction. The preferred embodiments of the method and apparatus provide in one simple device and one simple procedure a complete means for recording the necessary data and carrying out the required calculation. The preferred embodiment of the device of the invention provides in one compact simple structure a means for easily recording the fuel gauge level and the odometer readings. This frees the operator from any necessity for remembering any of the readings and helps prevent loss of notations of the readings. Since the method and apparatus do not require physical installations or attachments to the vehicle, they may readily be used in conjunction with any type of vehicle having any type of fuel gauge. The invention is versatile and completely compatible with both conventional dial-type fuel gauges and other newer types of gauges, such as bar-type and digital gauges.

These and other advantages and features will be apparent from the detailed description of the best modes for carrying out the invention.

In the drawings, like element designations refer to like parts throughout and:

FIG. 1 is an elevational view of a portion of a dashboard of a conventional type, showing conventional dials and gauges.

FIG. 2 is a pictorial view of the preferred embodiment of the invention.

FIG. 3 is a pictorial view of the device shown in

FIG. 2 opened and ready for use.

FIG. 4 is an elevational view of the top sheet of paper shown in FIG. 3 with an initial odometer reading recorded thereon.

FIG. 5 is like FIG. 4 except that it also shows a subsequent odometer reading and subtraction results recorded.

FIG. 6 is a fragmentary elevational view of the lower right-hand portion of the cover of a modified form of the device.

The drawings show devices 20, 20', that are constructed according to the invention and that also constitute the best modes of the apparatus of the invention currently known to the applicant. The drawings also illustrate the best mode for carrying out the method of the invention currently known to the applicant. FIG. 1 shows a typical passenger vehicle dashboard configuration. This configuration is shown and described herein for the purposes of illustration. It is of course to be understood that the method and apparatus of the invention may also be used to advantage in connection with passenger vehicles with other types of dashboard configurations and in connection with other types of vehicles.

Referring to FIG. 1, the dashboard 2 has displayed thereon a conventional dial-type fuel gauge 4, an odometer/speedometer 10, an oil pressure gauge 14, and an ammeter 16. The fuel gauge 4 has a scale 8 with the conventional graduations of empty (E), 1/4, 1/2, 3/4, and full (F). The gauge 4 also has a pivotable pointer 6 which indicates the fuel level in the vehicle fuel tank in a known manner. The odometer reading on the odometer/speedometer 10 is indicated by the reference numeral 12.

Referring to FIGS. 2 and 3, the preferred embodiment of the apparatus of the invention comprises a folding member or card 20. The card 20 may be made from various materials and is preferably made from lightweight cardboard. The card 20 has a cover 22 and an inner portion or back page 26. The cover 22 has a window 24 formed in its upper portion for the purpose described below. FIG. 2 shows the card 20 closed for storage or transportation. FIG. 3 shows the card 20 opened ready for use.

Referring to FIG. 3, the back page 26 of the card 20 has an inner face which forms a display surface 28. A stack 30 of sheets 34 of paper is attached to the lower portion of the display surface 28 by means of a fastener 32. The fastener 32 may take various forms, such as the large staple 32 shown in FIGS. 3-5. A scale 48 is printed on the display surface 28 above the stack of paper 30. The scale 48 has fractional graduations between zero and one. As shown in FIGS. 2 and 3, the preferred form of the scale 48 is arcuate and the fractional graduations are 1/4, 1/2, and 3/4 like the graduations on the conventional fuel gauge 4 shown in FIG. 1. The ends of the scale are preferably marked, "E" and "F" to correspond to the markings on

the scale 8 on the fuel gauge 4. A pointer 50 is pivotably mounted on the display surface 28 below the scale 48, as by a grommet. The pointer 50 is positioned to pivot relative to the scale 48 in the same manner that the pointer 6 of the fuel gauge 4 pivots relative to the fuel gauge scale 8. The attachment of the pointer 50 to the back page 26 is loose enough to allow the pointer 50 to be easily pivoted manually by a user but tight enough to hold its position once it has been pivoted. The scale 48 and pointer 50 are positioned on the display surface 28 to be visible through the window 24 in the cover 22 when the cover 22 is closed, as shown in FIG. 2.

Each of the sheets 34 of paper in the stack 30 has an outer recording surface 36. Each sheet 34 also has a line of perforations 38 so that it may be easily torn off the stack 30 following computation of mileage thereon. After being removed from the stack 30, the sheet 34 may be discarded or retained as a permanent record of the mileage. In order to facilitate the maintenance of a permanent record, a space for recording the date on which the mileage was calculated is provided at the bottom of each sheet 34.

The recording surface 36 of each sheet 34 has three horizontal rows 40, 42, 44 of boxes printed thereon. The first row 40 is in the middle and is labeled "A" to assist the user in recording the data in the proper places in the right order. The second row 42 is positioned above and aligned with the first row 40. Each of the first and second rows 40, 42 is provided for receiving a notation of an odometer reading. Preferably, each of the two rows 40, 42 has five boxes for recording the whole number portion of a standard odometer reading. Six, rather than five, boxes may also be provided to include the fractional portion of the odometer reading. The third row 44 is positioned below and aligned with the first and second rows 40, 42 and is provided for receiving a notation of the result of subtracting the notation in the first row 40 from the notation in the second row 42. Normally, only three boxes would be required in the third row 44, corresponding to the three rightmost boxes in the first and second rows 40, 42. However, in order to improve the appearance of the recording surface 36, the third row 44 has five boxes that are aligned with the five boxes of the first and second rows 40, 42. The second row is labeled "B", and the third row is labeled "C" again as an aid to the user in properly recording the data. The boxes in each of the three rows 40, 42, 44 would usually be square, as shown in the drawings. However, the boxes could also be other shape, such as rectangular, round, or elliptical.

The card 20 also has a decimal point 46 positioned relative to the third row 44 to automatically convert the result of the subtraction operation into units of distance per unit of fuel. The card 20 and the positioning of the decimal point 46 automatically provide a visual display of the units of distance per unit of fuel.

The automatic conversion is accomplished by means of the positioning of the decimal point 46 relative to the recorded difference between two odometer readings taken before and after, respectively, a predetermined number of units of fuel are consumed. The predetermined number of units is substantially equal to 10^n , with n being a whole number greater than zero. The embodiment of the recording surface 36 shown in FIGS. 3-5 is intended for use with passenger vehicles and light trucks. The decimal point 46 is positioned on the recording surface 36 between the rightmost and second to rightmost boxes in the third row 44 to correspond to the consumption of ten units of fuel.

An alternative positioning of the decimal point 46' is illustrated in FIG. 6, which shows a modified form 20' of the folding card 20. FIG. 6 shows the lower right hand portion of the cover 22' of the card 20' in a closed position. This portion of the cover 22' has a small window 52 formed therein through which the right three boxes of the third row 44' are visible when the cover 22' is closed. Rather than being positioned on the recording surface, the decimal 46' is printed on the outside of the cover 22' adjacent to the window 52. As seen in FIG. 6, the decimal point 46' is positioned between the two rightmost boxes of the third row 44' when the cover 22' is closed. The solid portions of the cover 22' around the window 52 cover the remainder of the recording surface.

In each of the two embodiments shown in the drawings, the card 20, 20' would preferably also include complete printed instructions on how to use the card 20, 20'. In the embodiment of FIG. 6, a legend on the outside of the cover 22' would also preferably be provided to label the mileage showing through the window 52.

The method of the invention will be described in relation to the card 20 shown in FIGS. 2-5. The first step is to take an initial odometer reading when the vehicle is on a substantially level road surface, and to record the reading in the first row 40 of boxes. This is illustrated in FIG. 4. The odometer reading shown recorded in FIG. 4 is the reading that is shown on the odometer/speedometer 10 illustrated in FIG. 1. The fractional portion of the reading, in this case zero, has been deleted. Substantially simultaneously with the taking of the initial odometer reading, a base fuel gauge reading is taken. The fuel gauge reading is recorded on the card 20 by positioning the pivotable pointer 50 to correspond to the position of the pointer 6 of the fuel gauge 4.

After the initial odometer reading and the base fuel gauge reading have been recorded, the vehicle is operated to consume fuel in the tank. Fuel is added to the tank when the tank is sufficiently empty to accept it. As described above, the number of units of fuel added to the tank is substantially equal to 10^n , with n being a whole number greater than zero. The

fuel may be added immediately following the taking of the initial odometer reading and base fuel gauge reading, or after the vehicle has been driven some distance following the taking of these readings. The entire amount of fuel may be added on one occasion. However, if this is impractical because of the size of the tank or for some other reason is not desired, the fuel may also be added at a plurality of different times. The sum of the quantities added at the different times equals the desired number of units. The addition of the fuel brings the fuel gauge reading above the base reading.

After the fuel gauge reading has been brought above the base reading, operation of the vehicle and the consequent fuel consumption are continued. During the operation of the vehicle, the fuel gauge is monitored. When the fuel gauge again reaches the base reading, a second odometer reading is taken. The second odometer reading is recorded in the boxes of the second row 42, as shown in FIG. 5. Then the initial reading is subtracted from the second reading, and the result is recorded in the boxes of the third row 44, also as shown in FIG. 5. The user then merely has to read the third row 44 to determine his mileage.

As noted above, the date of the determination may be recorded at the bottom of the sheet 34 to provide a permanent record of the determination. The mileage determination may be made periodically to enable the vehicle operator to monitor the performance of the vehicle. The periodic determinations can serve to alert the operator when the vehicle is in need of a tune-up or other servicing. More frequent and/or better timed servicing can increase the overall energy savings of the vehicle and also help to prolong the life of the vehicle. In addition, the periodic determinations can alert the driver to poor driving habits that result in decreased mileage, and thereby encourage improvements in driving habits that reduce fuel consumption.

The device 20 shown in FIGS. 2-5 is designed for use in association with passenger vehicles and for computing miles per gallon. It is intended to be understood that the device of the invention may also be adapted for use with large vehicles, such as tractor/trailer trucks, which have large fuel tanks capable of holding in excess of a hundred gallons. For use with such large vehicles, the device would be modified to position the decimal point 46 between the second and third boxes from the right in the third row 44. The amount of fuel added in carrying out the method of the invention would be 100, rather than 10, gallons. The method of the invention is also suitable for use in areas where fuel quantities and distances are measured in the metric system. For example, 10 or 100 liters could be added to calculate kilometers per liter.

Since the method and apparatus of the invention are based on readings taken from the vehicle fuel gauge, which indicates fuel level, rather than quanti-

ty, there is no need to know what quantity of fuel is contained in the vehicle fuel tank. Therefore, there is no need to fill the tank completely. In personal tests, I have found my method to be very accurate if the fuel gauge and odometer readings are taken when the vehicle is on a substantially level surface. I have found a repeatable correspondence between the fuel level in the tank and the fuel gauge pointer position. Therefore, in the practice of the invention, the amount of fuel consumed between the two odometer readings is essentially equal to the amount of fuel added.

Some newer vehicles are equipped with a computer readout of mileage. The invention is also useful in connection with such vehicles since it provides a means for checking the accuracy of the computer readout and thereby determining whether or not the computer system needs repair. The invention also provides a means for establishing and maintaining a permanent record of the mileage obtained.

The preferred embodiments of the device of my invention and the preferred embodiment of the method of my invention have been described above. The description is in no way intended to limit me to the described embodiments. It is intended to be understood by those skilled in the art that various modifications and omissions in form and detail may be made without departing from the scope of the invention as defined by the following claims.

Claims

1. A device for facilitating calculation of units of distance travelled per unit of fuel consumed by a vehicle of the type having an odometer, a fuel tank, and a fuel gauge for indicating the level of fuel in the fuel tank, the device comprising:
a recording surface, the surface including a first horizontal row of boxes for receiving a notation of an initial odometer reading, a second horizontal row of boxes positioned above and aligned with the first row for receiving a notation of a subsequent odometer reading taken following consumption of a predetermined number of units of fuel substantially equal to 10^n , with n being a whole number greater than zero, and a third horizontal row of boxes positioned below and aligned with the first and second rows for receiving a notation of the result of subtracting the notation in the first row from the notation in the second row; a decimal point positioned relative to the third row to convert the result automatically into, and to provide a visual display of, units of distance per unit of fuel;
a graduated scale the graduations of which correspond to different levels of fuel in the fuel tank; and
indicator means associated with the scale for re-

cording the reading of the fuel gauge when the initial odometer reading is taken.

2. A device as claimed in claim 1, wherein the graduations of the scale correspond to the fuel tank being empty, 1/4 full, 1/2 full, 3/4 full and full.
3. A device as claimed in claim 1 or claim 2, in which the scale is arcuate, and the indicator means comprises a pivotable pointer.
4. A device as claimed in any one of claims 1 to 3, which comprises a member having a display surface, and a stack of paper mounted on the display surface, the stack including a plurality of removable sheets of paper, each sheet having an outer surface with the recited characteristics of the recording surface; and in which the scale and the indicator means are positioned on the display surface adjacent to the stack.
5. A device as claimed in any one of claims 1 to 4, in which the decimal point is positioned on the recording surface between two boxes in the third row.
6. A device as claimed in any one of claims 1 to 4, which comprises a foldable member with an inner portion which includes the recording surface, and a cover which folds into a closed position in which it substantially covers the recording surface, the cover defining a window through which the result in the third row is visible when the cover is in the closed position, and the decimal point being positioned on the outside of the cover adjacent to the window to position it between two boxes in the third row when the cover is in the closed position.
7. A method for determining units of distance travelled per unit of fuel consumed by a vehicle of the type having an odometer, a fuel tank, and a fuel gauge for indicating the level of fuel in the fuel tank, comprising the steps of:
providing a recording surface, the surface including a first horizontal row of boxes, a second horizontal row of boxes positioned above and aligned with the first row, and a third horizontal row of boxes positioned below and aligned with the first and second rows, providing a decimal point positioned between two boxes in the third row, providing a graduated scale the graduations of which correspond to different levels of fuel in the fuel tank, and providing indicator means associated with the scale;
taking an initial odometer reading, and substantially simultaneously taking a base fuel gauge reading, recording the initial odometer reading in the boxes of the first row, and recording the base

ty, there is no need to know what quantity of fuel is contained in the vehicle fuel tank. Therefore, there is no need to fill the tank completely. In personal tests, I have found my method to be very accurate if the fuel gauge and odometer readings are taken when the vehicle is on a substantially level surface. I have found a repeatable correspondence between the fuel level in the tank and the fuel gauge pointer position. Therefore, in the practice of the invention, the amount of fuel consumed between the two odometer readings is essentially equal to the amount of fuel added.

Some newer vehicles are equipped with a computer readout of mileage. The invention is also useful in connection with such vehicles since it provides a means for checking the accuracy of the computer readout and thereby determining whether or not the computer system needs repair. The invention also provides a means for establishing and maintaining a permanent record of the mileage obtained.

The preferred embodiments of the device of my invention and the preferred embodiment of the method of my invention have been described above. The description is in no way intended to limit me to the described embodiments. It is intended to be understood by those skilled in the art that various modifications and omissions in form and detail may be made without departing from the scope of the invention as defined by the following claims.

Claims

1. A device for facilitating calculation of units of distance travelled per unit of fuel consumed by a vehicle of the type having an odometer, a fuel tank, and a fuel gauge for indicating the level of fuel in the fuel tank, the device comprising:
 - a recording surface, the surface including a first horizontal row of boxes for receiving a notation of an initial odometer reading, a second horizontal row of boxes positioned above and aligned with the first row for receiving a notation of a subsequent odometer reading taken following consumption of a predetermined number of units of fuel substantially equal to 10^n , with n being a whole number greater than zero, and a third horizontal row of boxes positioned below and aligned with the first and second rows for receiving a notation of the result of subtracting the notation in the first row from the notation in the second row;
 - a decimal point positioned relative to the third row to convert the result automatically into, and to provide a visual display of, units of distance per unit of fuel;
 - a graduated scale the graduations of which correspond to different levels of fuel in the fuel tank; and
 - indicator means associated with the scale for recording the reading of the fuel gauge when the initial odometer reading is taken.
2. A device as claimed in claim 1, wherein the graduations of the scale correspond to the fuel tank being empty, $1/4$ full, $1/2$ full, $3/4$ full and full.
3. A device as claimed in claim 1 or claim 2, in which the scale is arcuate, and the indicator means comprises a pivotable pointer.
4. A device as claimed in any one of claims 1 to 3, which comprises a member having a display surface, and a stack of paper mounted on the display surface, the stack including a plurality of removable sheets of paper, each sheet having an outer surface with the recited characteristics of the recording surface; and in which the scale and the indicator means are positioned on the display surface adjacent to the stack.
5. A device as claimed in any one of claims 1 to 4, in which the decimal point is positioned on the recording surface between two boxes in the third row.
6. A device as claimed in any one of claims 1 to 4, which comprises a foldable member with an inner portion which includes the recording surface, and a cover which folds into a closed position in which it substantially covers the recording surface, the cover defining a window through which the result in the third row is visible when the cover is in the closed position, and the decimal point being positioned on the outside of the cover adjacent to the window to position it between two boxes in the third row when the cover is in the closed position.
7. A method for determining units of distance travelled per unit of fuel consumed by a vehicle of the type having an odometer, a fuel tank, and a fuel gauge for indicating the level of fuel in the fuel tank, comprising the steps of:
 - providing a recording surface, the surface including a first horizontal row of boxes, a second horizontal row of boxes positioned above and aligned with the first row, and a third horizontal row of boxes positioned below and aligned with the first and second rows, providing a decimal point positioned between two boxes in the third row, providing a graduated scale the graduations of which correspond to different levels of fuel in the fuel tank, and providing indicator means associated with the scale;
 - taking an initial odometer reading, and substantially simultaneously taking a base fuel gauge reading, recording the initial odometer reading in the boxes of the first row, and recording the base



fuel gauge reading by positioning the indicator means;
 consuming fuel in the tank by operating the vehicle, and adding a number of units of fuel to the fuel tank substantially equal to 10^n , with n being a whole number greater than zero, to bring the fuel gauge reading above the base reading;
 continuing to consume fuel by operating the vehicle, and while so continuing, monitoring the fuel gauge;
 when the fuel gauge again reaches the base reading, taking a second odometer reading and recording the second odometer reading in the boxes of the second row, subtracting the initial odometer reading from the second odometer reading, and recording the result in the boxes of the third row;
 the decimal point being positioned so that, in the third row, a number of boxes equal to the number n are to the right of the decimal point, to convert the said result automatically into units of distance per unit of fuel.

8. A method as claimed in claim 7, in which the step of adding fuel comprises adding at different times a plurality of quantities of fuel, the sum of the quantities equalling the said number of units.

Patentansprüche

1. Vorrichtung zur Erleichterung der Berechnung von zurückgelegten Streckeneinheiten pro verbrauchter Kraftstoffeinheit eines Fahrzeugs, welches einen Wegstreckenzähler, einen Kraftstofftank und einen Kraftstoffvorratsanzeiger zur Angabe des Kraftstoffstandes im Kraftstofftank aufweist, enthaltend:
 eine Aufzeichnungsfläche, umfassend eine erste horizontale, aus Kästchen bestehende Reihe zur Aufnahme einer Aufzeichnung einer ersten Wegstreckenzählerablesung, eine zweite, darüber angeordnete und nach der ersten Reihe ausgerichtete horizontale Kästchenreihe zur Aufnahme einer Aufzeichnung einer nachfolgenden Wegstreckenzählerablesung, die vorgenommen wird nach Verbrauch einer vorbestimmten Anzahl von Kraftstoffeinheiten, die im wesentlichen 10^n entspricht, wobei n eine ganze Zahl größer Null ist, sowie eine dritte horizontale Kästchenreihe, die unterhalb der ersten und zweiten Reihen angeordnet und nach diesen ausgerichtet ist, zur Aufnahme einer Aufzeichnung des Ergebnisses aus der Subtraktion der Aufzeichnung in der ersten Reihe von der Aufzeichnung in der zweiten Reihe,
 einen Dezimalpunkt, der in bezug auf die dritte Reihe angeordnet ist, um das Ergebnis automa-

tisch in Streckeneinheiten pro Kraftstoffeinheit umzuwandeln und eine Sichtanzeige für diese bereitzustellen,
 eine mit Gradeinteilungen versehene Skala, deren Teilstriche verschiedenen Kraftstoffständen im Kraftstofftank entsprechen, sowie ein der Skala zugeordnetes Anzeigemittel zur Aufzeichnung des Standes der Kraftstoffvorratsanzeige bei der ersten Wegstreckenzählerablesung.

2. Vorrichtung nach Anspruch 1, bei der die Skaleneinteilungen dem Füllstand des Kraftstofftanks leer, viertelvoll, halbvoll, dreiviertelvoll und voll entsprechen.
3. Vorrichtung nach Anspruch 1 oder Anspruch 2, bei der die Skala bogenförmig ist und das Anzeigemittel einen drehbaren Zeiger enthält.
4. Vorrichtung nach einem der Ansprüche 1 bis 3, welche ein Element mit einer Anzeigefläche und einen auf der Anzeigefläche angeordneten Papierstapel enthält, wobei der Stapel eine Vielzahl abnehmbarer Blätter umfaßt, die jeweils eine Oberfläche mit den angeführten Kennzeichen der Aufzeichnungsfläche aufweisen, und bei welcher die Skala und das Anzeigemittel auf der Anzeigefläche in der Nähe des Stapels angeordnet sind.
5. Vorrichtung nach einem der Ansprüche 1 bis 4, wobei der Dezimalpunkt auf der Aufzeichnungsfläche zwischen zwei Kästchen in der dritten Reihe angeordnet ist.
6. Vorrichtung nach einem der Ansprüche 1 bis 4, enthaltend ein faltbares Element mit einem inneren Teil, der die Aufzeichnungsfläche umfaßt, und einem Deckel, der sich in eine geschlossene Position klappen läßt, in der er die Aufzeichnungsfläche im wesentlichen abdeckt, wobei der Deckel ein Fenster definiert, durch welches das Ergebnis in der dritten Reihe sichtbar ist, wenn sich der Deckel in der geschlossenen Stellung befindet, und sich der Dezimalpunkt auf der Außenseite des Deckels in der Nähe des Fensters befindet, so daß er bei geschlossenem Deckel zwischen zwei Kästchen in der dritten Reihe angeordnet ist.
7. Verfahren zur Bestimmung von zurückgelegten Streckeneinheiten pro verbrauchter Kraftstoffeinheit eines Fahrzeugs mit Wegstreckenzähler, Kraftstofftank und Kraftstoffvorratsanzeiger zur Angabe des Kraftstoffstandes im Kraftstofftank, enthaltend die Schritte:
 Bereitstellung einer Aufzeichnungsfläche, umfassend eine erste horizontale, aus Kästchen be-



- stehende Reihe, eine zweite, darüber angeordnete und nach der ersten Reihe ausgerichtete horizontale Kästchenreihe und eine dritte, unterhalb der ersten und zweiten Reihe angeordnete und nach diesen ausgerichtete horizontale Kästchenreihe, Bereitstellung eines zwischen zwei Kästchen in der dritten Reihe angeordneten Dezimalpunktes, Bereitstellung einer mit Gradeinteilungen versehenen Skala, deren Teilstriche verschiedenen Kraftstoffständen im Kraftstofftank entsprechen, sowie Bereitstellung eines der Skala zugeordneten Anzeigemittels,
- Ablesen eines ersten Wegstreckenzählerstandes und im wesentlichen gleichzeitiges Ablesen eines Ausgangsstandes der Kraftstoffvorratsanzeige,
- Aufzeichnen des ersten Wegstreckenzählerstandes in die Kästchen der ersten Reihe und Erfassen des Ausgangsstandes der Kraftstoffvorratsanzeige durch Einstellen des Anzeigemittels,
- Verbrauch von Kraftstoff im Tank durch Inbetriebnahme des Fahrzeugs und Zugabe einer Anzahl von Kraftstoffeinheiten in den Kraftstofftank, die im wesentlichen 10^n entspricht, wobei n eine ganze Zahl größer Null ist, um den Stand des Kraftstoffvorratsanzeigers über den Ausgangsstand zu bringen,
- Fortführen des Kraftstoffverbrauchs durch Fahren des Fahrzeugs und währenddessen Überwachen des Kraftstoffvorratsanzeigers, sobald der Kraftstoffvorratsanzeiger den Ausgangsstand wieder erreicht,
- Ablesen eines zweiten Wegstreckenzählerstandes und Aufzeichnen der zweiten Wegstreckenzählerablesung in die Kästchen der zweiten Reihe,
- Subtrahieren des ersten Wegstreckenzählerstandes von dem zweiten Wegstreckenzählerstand und Aufzeichnen des Ergebnisses in die Kästchen der dritten Reihe, wobei der Punkt vor der ersten Dezimalstelle derart angeordnet ist, daß eine Anzahl von der Zahl n entsprechenden Kästchen in der dritten Reihe rechts des Punktes liegt, so daß das Ergebnis automatisch in Streckeneinheiten pro Kraftstoffeinheit umgewandelt wird.
8. Verfahren nach Anspruch 7, bei dem der Schritt der Kraftstoffzugabe enthält, daß zu verschiedenen Zeiten eine Vielzahl von Kraftstoffmengen zugegeben wird, wobei die Summe der Mengen gleich der Zahl der Einheiten ist.

Revendications

1. Dispositif destiné à faciliter le calcul des unités de distance parcourues par unité de carburant

consommé par un véhicule du type comportant un compteur kilométrique, un réservoir de carburant, et une jauge à carburant destinée à indiquer le niveau de carburant dans le réservoir, le dispositif comprenant :

une surface d'enregistrement, la surface comprenant une première rangée horizontale de cases destinée à recevoir une notation d'une lecture initiale du compteur kilométrique, une deuxième rangée horizontale de cases placée au-dessus et dans l'alignement de la première rangée, destinée à recevoir une notation d'une lecture ultérieure du compteur kilométrique prise après la consommation d'un nombre prédéterminé d'unités de carburant sensiblement égal à 10^n , n étant un nombre entier supérieur à zéro, et une troisième rangée horizontale de cases placée en dessous et dans l'alignement des première et deuxième rangées, destinée à recevoir une notation du résultat de la soustraction de la notation dans la première rangée de la notation dans la deuxième rangée;

une virgule décimale placée relativement à la troisième rangée pour convertir automatiquement le résultat en unités de distance par unité de carburant et pour fournir une représentation visuelle de ces unités de distance par unité de carburant;

une échelle graduée dont les graduations correspondent à différents niveaux de carburant dans le réservoir, et

un moyen indicateur associé à l'échelle pour enregistrer la lecture de la jauge à carburant lorsque la lecture initiale du compteur kilométrique est prise.

2. Dispositif suivant la revendication 1, dans lequel les graduations de l'échelle correspondent à l'état du réservoir de carburant vide, rempli au 1/4, rempli à 1/2, rempli aux 3/4 et plein.
3. Dispositif suivant la revendication 1 ou la revendication 2, dans lequel l'échelle est courbe, et le moyen indicateur comprend une aiguille qui peut pivoter.
4. Dispositif suivant l'une quelconque des revendications 1 à 3, qui comprend un élément présentant une surface de présentation et une pile de papier montée sur la surface de présentation, la pile comportant une pluralité de feuilles de papier détachables, chaque feuille ayant une face extérieure qui présente les caractéristiques exposées de la surface d'enregistrement; et dans lequel l'échelle et le moyen indicateur sont placés sur la surface de présentation, près de la pile.
5. Dispositif suivant l'une quelconque des revendications 1 à 4, dans lequel la surface d'enregistrement est une surface plane, et le moyen indicateur est un moyen indicateur à aiguille.



cations 1 à 4, dans lequel la virgule décimale est placée sur la surface d'enregistrement entre deux cases de la troisième rangée.

6. Dispositif suivant l'une quelconque des revendications 1 à 4, qui comprend un élément repliable présentant une partie intérieure qui comprend la surface d'enregistrement, et une couverture qui se replie en position fermée dans laquelle elle recouvre sensiblement la surface d'enregistrement, la couverture définissant une fenêtre à travers laquelle le résultat dans la troisième rangée est visible lorsque la couverture est en position fermée, et la virgule décimale étant placée sur l'extérieur de la couverture près de la fenêtre afin de la positionner entre deux cases de la troisième rangée lorsque la couverture est en position fermée.

7. Procédé pour déterminer les unités de distance parcourues par unité de carburant consommé par un véhicule du type comportant un compteur kilométrique, un réservoir de carburant et une jauge à carburant destinée à indiquer le niveau de carburant dans le réservoir, comprenant les étapes consistant à :

prévoir une surface d'enregistrement, la surface comprenant une première rangée horizontale de cases, une deuxième rangée horizontale de cases placée au-dessus et dans l'alignement de la première rangée, et une troisième rangée horizontale de cases placée en dessous, et dans l'alignement des première et deuxième rangées, prévoir une virgule décimale placée entre deux cases dans la troisième rangée, prévoir une échelle graduée dont les graduations correspondent à différents niveaux de carburant dans le réservoir, et prévoir un moyen indicateur associé à l'échelle;

faire une lecture initiale du compteur kilométrique et, en substance simultanément, une lecture de base de la jauge à carburant, enregistrer la lecture initiale du compteur kilométrique dans les cases de la première rangée, et enregistrer la lecture de base de la jauge à carburant en plaçant le moyen indicateur;

consommer du carburant dans le réservoir durant la marche du véhicule et ajouter un nombre d'unités de carburant au réservoir sensiblement égal à 10^n , n étant un nombre entier supérieur à zéro, afin d'amener la lecture de la jauge à carburant au-dessus de la lecture de base;

continuer à consommer du carburant durant la marche du véhicule, et pendant ce temps, surveiller la jauge à carburant;

lorsque la jauge à carburant atteint à nouveau la lecture de base, faire une deuxième lecture du compteur kilométrique et enregistrer la

deuxième lecture de compteur kilométrique dans les cases de la deuxième rangée, soustraire la lecture initiale du compteur kilométrique de la deuxième lecture du compteur kilométrique et enregistrer le résultat dans les cases de la troisième rangée;

la virgule décimale étant placée de telle sorte que, dans la troisième rangée, un nombre de cases égal au nombre n soit à droite de la virgule décimale, afin de convertir automatiquement ledit résultat en unités de distance par unité de carburant.

8. Procédé suivant la revendication 7, dans lequel l'étape consistant à ajouter du carburant consiste à ajouter à différents moments une pluralité de quantités de carburant, la somme des quantités égalant ledit nombre d'unités.

