

United States Patent

Bateman

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[54] GASOLINE STATION ACCOUNTING SYSTEM

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[51] Int. Cl. B67d 5/24

[58] Field of Search 346/43, 60, 98; 222/30, 25, 222/26; 235/94, 92 FL

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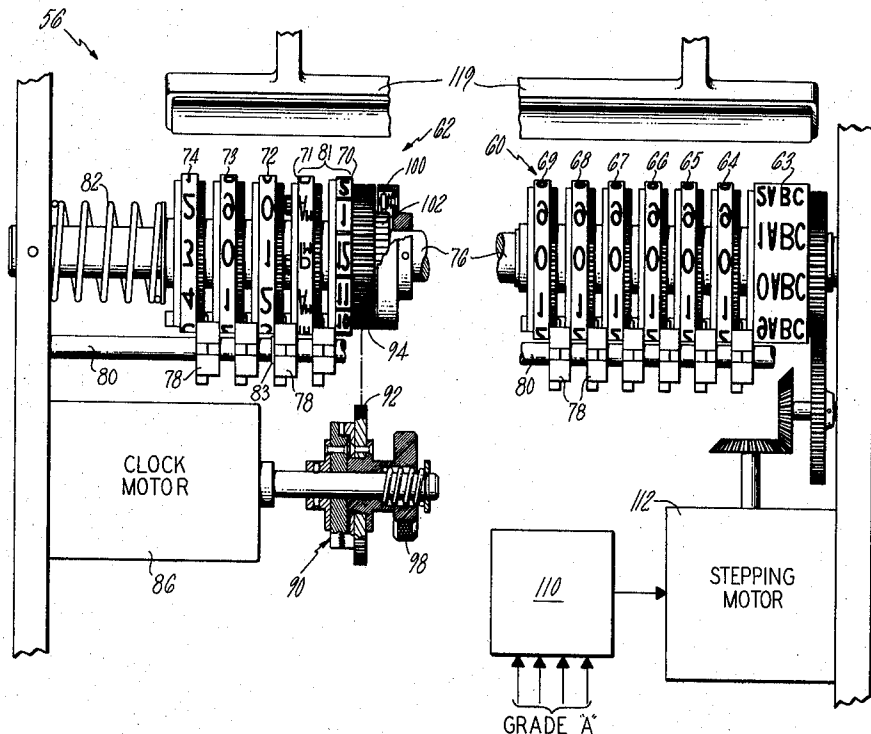
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[57] ABSTRACT

A gasoline station accounting system for a multiple grade gasoline station comprising a manually operable printing recorder for each grade having coaxial totalizer and clock printing counters and manually operable to provide a single line printout of the total volume of the grade of gasoline dispensed and the day and time of the printout.

4 Claims, 2 Drawing Figures



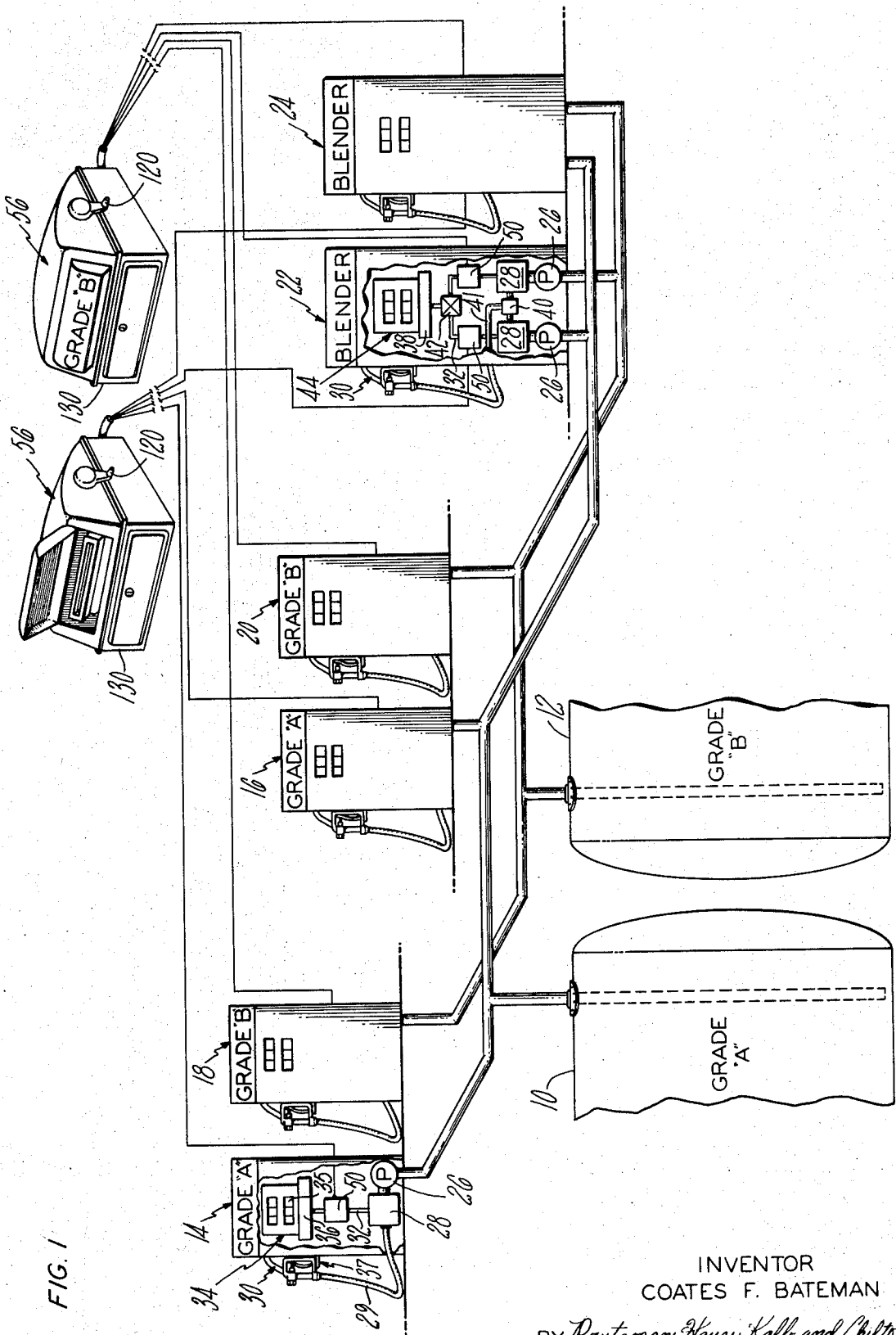
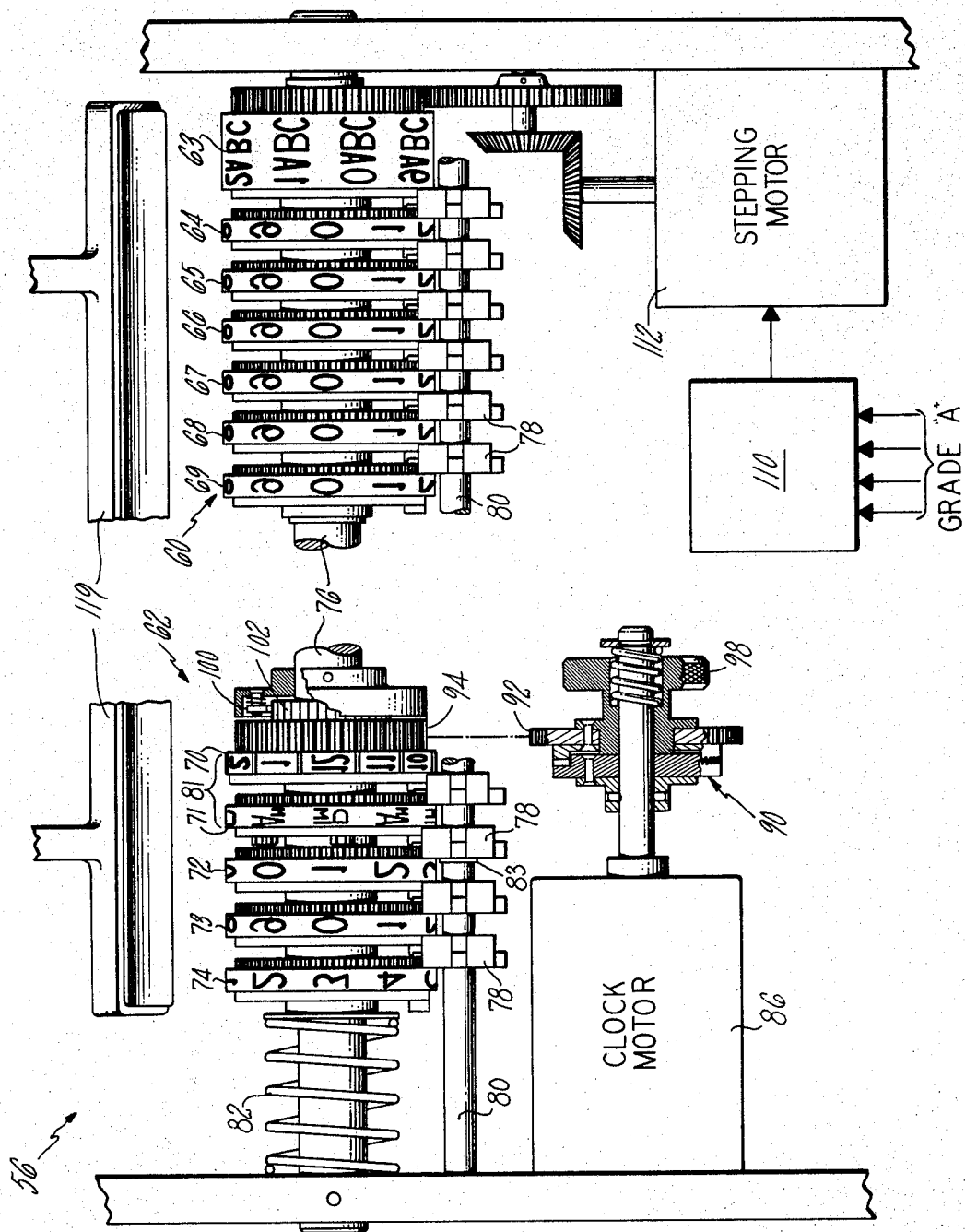


FIG. 1

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FIG. 2



GASOLINE STATION ACCOUNTING SYSTEM

BRIEF SUMMARY OF THE INVENTION

The present invention relates generally to gasoline station accounting systems and more particularly to a gasoline station accounting system adapted to provide a printout of the volume of gasoline dispensed.

It is a principal aim of the present invention to provide a new and improved gasoline station accounting system adapted to provide a separate printout of the total volume of each grade of gasoline dispensed from a multiple grade gasoline station.

It is another aim of the present invention to provide a new and improved gasoline station accounting system useful in accounting to the oil company supporting the station the volume of gasoline delivered at each wholesale unit volume price established by the oil company. In many instances the gasoline in the underground tanks of a gasoline station is owned by the supporting oil company and the station operator purchases the gasoline from the oil company as it is dispensed and at the current wholesale unit volume price established by the oil company. Thus, the gasoline station accounting system of the present invention is useful with such an arrangement for determining the amount owed to the oil company by the gasoline station operator for the fuel dispensed by the station and with regard to each wholesale unit volume price established by the oil company.

Other objects will be in part obvious and in part pointed out more in detail hereinafter.

A better understanding of the invention will be obtained from the following detailed description and the accompanying drawings of an illustrative application of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is a generally schematic view, partly broken away, of a multiple grade gasoline station incorporating an embodiment of a gasoline station accounting system in accordance with the present invention; and

FIG. 2 is a generally schematic view, partly broken away and partly in section, of a recorder of the gasoline station accounting system.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings in detail, a multiple grade gasoline station incorporating an embodiment of a gasoline station accounting system of the present invention is shown comprising two fuel storage tanks 10, 12 for two different grades of gasoline designated "A" and "B" for the purpose of this description. The gasoline station is shown comprising two grade "A" pumps 14, 16 connected to the grade "A" tank 10, two grade "B" pumps 18, 20 connected to the grade "B" tank 12, and two blender pumps 22, 24 connected to both tanks 10, 12. The single grade pumps 14, 16, 18, 20 may be substantially identical and in a conventional manner each includes a suitable motor driven pump 26 for delivering gasoline from the respective tank via a volume meter 28 to a fuel delivery hose 29 and nozzle 30. The volume meter 28 has a rotary output shaft 32 which is rotated in accordance with the volume of

gasoline dispensed (e.g., four revolutions per gallon of gasoline) and a computer 34 is driven by the meter shaft 32 to register (with its register 35) the volume of gasoline dispensed and the cost of the gasoline dispensed in accordance with the unit volume price established by the setting of its variator 36. The register 35 and a storage receptacle 37 for the nozzle 30 are preferably interlocked in a suitable manner (e.g., in a conventional manner by mounting the pump operating handle (not shown) adjacent the storage receptacle 37) such that the pump motor (not shown) is turned off when the nozzle 30 is returned to the storage receptacle 37 and the register 35 is reset to zero just prior to the beginning of each fuel delivery when the fuel nozzle 30 is removed from the storage receptacle 37.

The blender pumps 22, 24 may be substantially identical and of conventional construction. The blender pumps 22, 24 have a suitable product selector (not shown) for selecting each of the available gasoline products (e.g., a plurality of pre-established blends of the two grades plus each grade alone) and for setting a variator 38 in accordance with the preset unit volume price for the selected gasoline product. The blender pumps 22, 24 incorporate a motor driven pump 26 and fuel meter 28 for each of the two grades of gasoline. A proportioning valve 40 provides for proportioning the two grades of fuel in accordance with the setting of the product selector and the two grades of fuel are independently conveyed to the dispensing nozzle 30 via a pair of coaxial conduits 41. Also, the meter output shafts 32 are combined by a differential 42 to drive the pump computer 44 in accordance with the total volume dispensed of both grades of gasoline.

In accordance with the present invention a suitable pulse generator 50 is provided for each meter 28 and a separate printing recorder 56 is provided for each grade of gasoline and is connected for being operated by the respective pulse generators 50. In this regard it has been found that the employment of a separate printing recorder for each grade of gasoline simplifies the design and installation of the system and ensures the proper and accurate accounting of the total volume dispensed of each grade of gasoline.

Referring to FIG. 2, each printing recorder 56 comprises a totalizer printing counter 60 and a clock printing counter 62. The totalizer printing counter 60 comprises a bank of seven print wheels 63-69 and the clock printing counter 62 comprises a bank of five print wheels 70-74. All of the print wheels 63-69 and 70-74 are coaxially mounted on a single nonrotatable shaft 76 and coaxial transfer pinions 78 are rotatably mounted on a parallel shaft 80 to provide for generating transfers between adjacent lower order and higher order print wheels in a conventional manner.

The clock printing counter 62 comprises a time section 81 consisting of hour and meridian print wheels 70, 71 respectively and a day section consisting of three day print wheels 72, 73, 74. The hour print wheel 70 bears a sequence of type of 1 through 12 and the meridian print wheel 71 bears alternate A.M. and P.M. type. The transfer mechanism between wheels is such that the meridian print wheel 71 is indexed one count for every full revolution of the hour print wheel 70 (and therefore every 12 hours) and the day print wheel 72 is indexed one count for every two counts of the print

wheel 71 (and therefore every 24 hours). The remaining day print wheels 73, 74 are indexed one count for ever revolution of the adjacent lower order print wheels 72, 73 respectively in a conventional manner such that the three day print wheels 72-74 are adapted to provide a three place printout of the day of the year (i.e., 000 to 365).

The transfer pinion 78 between the print wheels 71, 72 is locked against axial displacement to the left as seen in FIG. 2 by a suitable retaining ring 83 whereas the remaining transfer pinions 78 between the wheels 72-74 are adapted to be axially shifted with the wheels to provide for setting the day wheels at the beginning of each year. Thus, the day wheels may be axially shifted against the bias of a return spring 82 to disengage the wheels and reset the wheels as desired.

The clock printing counter 62 is driven by a suitable constant speed (e.g., synchronous) electric motor 86 via a positive clutch 90, a gear 92 driven by the clutch 90, and a gear 94 secured to the hour print wheel 70. The clock motor 86 is maintained energized throughout the day such that the clock printing counter 62 continuously provides an accurate current reading of the time of day and day of year. However, if for example, the clock is behind as a result of a power failure, the clock may be advanced by shifting the gear 92 axially with a knob 98 to disengage the clutch 90 and manually rotate the print wheel 70 with the knob in the advancing direction. A one-way lock comprising an enclosed pivotal pawl 100 mounted on the shaft 76 and a ratchet 102 secured to the print wheel 70 are provided for preventing resetting the clock in the opposite direction.

The totalizer printing counter 60 is preferably non-resettable and the lowest order counter wheel 63 is provided with an identification symbol for identifying the particular recorder and therefore for identifying the gasoline station employing the recorder and the fuel grade for which the recorder is being used. In the shown embodiment the identification symbol is shown as "ABC" but, of course, numerals and/or other symbols could be used as well as letters in the identification symbol.

The totalizer printing counter 60 is driven by the respective pulse generators (i.e., the pulse generators driven by the meters for the corresponding grade of fuel) via a parallel-to-serial drive system which comprises an electronic parallel-to-serial converter 110 and a suitable electrical stepping motor 112. The outputs from the pulse generators are fed by parallel entry into the electronic converter 110 wherein the pulses are suitably shaped and temporarily stored and fed to the stepping motor 112 in nonoverlapping sequence. The stepping motor 112 is connected by suitable gearing to index the lowest order counter wheel 63 of the printing counter 60 such that the counter 60 (which preferably reads in gallons to provide a count to 9,999,999 gallons) continues to provide a current reading of the total volume dispensed of the particular grade of gasoline.

The printing recorder 56 is provided with a single elongated printing platen 119 and the platen is preferably adapted to be manually operated by an operating handle 120 such that a single one-line printout may be provided of the current readings of the clock and totalizer printing counters 60, 62. The

printer platen 119 is suitably rounded to provide for printing with the two adjacent type lines of the wheel where the wheel is half-way between two full count positions, thus permitting a complete printout during the transfer interval and when the lowest order print wheels 63, 70 of the printing counters are between full count positions. Any suitable mechanism may be provided for operating the platen 119 for effecting the printout as for example a printer operating mechanism of the type shown in U.S. Pat. No. 3,446,432 of Bruno S. Smilgys dated May 27, 1969 and entitled "Meter Duplicator."

The accounting system of the present invention has notable utility in gasoline stations for accounting for the volume of each grade of gasoline dispensed at each wholesale unit volume price established by the supporting oil company in those instances where the supporting oil company owns the gasoline in the underground tanks at the station and the station operator purchases the gasoline from the oil company as it is dispensed and at the current wholesale unit volume price established by the oil company. Thus, when the supporting oil company changes the wholesale unit volume price, the gasoline station operator will operate each printing recorder when the price change takes effect to provide a printout of the total volume of the grade of fuel delivered prior to the rate change. The clock printout provides for ensuring that the printout is made at the effective time of the price change. The printout can then be used to determine the number of gallons dispensed at the old price level. Also, such printouts may be used for weekly or monthly billing purposes. In either case each printing recorder being connected to a single grade will provide for accurately recording the amount of the particular grade dispensed at the printed time. To reduce the opportunity for cheating in such billing procedures, it is preferable that the clock motor 86 be connected such that it cannot be manually de-energized by unauthorized personnel. Also, to minimize cheating by incorrectly setting the clock, the locking pawl 100 is provided for requiring the clock counter 62 to be set in the advancing direction only. Finally, the entire recorder 56 is preferably enclosed in a suitable casing 130 which is adapted to be locked to prevent access to the clock and totalizer printing counters except by authorized personnel.

As will be apparent to persons skilled in the art, various modifications, adaptations and variations of the foregoing specific disclosure can be made without departing from the teachings of the present invention.

I claim:

1. A gasoline station accounting system for independently and selectively accounting for the total volume of each of a plurality of grades of gasoline dispensed from a multiple grade gasoline station having a storage tank for each grade of gasoline and a plurality of independently operable gasoline pumps connected to the storage tanks such that each grade of gasoline is adapted to be dispensed from each of a plurality of pumps and wherein each pump comprises a volume meter for each grade of gasoline dispensed thereby, comprising a separate grade deliver recorder for each of the plurality of grades of gasoline; each said separate grade delivery recorder comprising recorder identification print means, a clock printing counter, a constant

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speed electric motor connected for driving the clock printing counter to maintain a current clock reading therein, a totalizer printing counter adapted to be driven for providing a volume reading, manually operable printing means for selectively providing a collective printout of the readings of the totalizer and clock printing counters and the identification print means, and parallel-to-serial drive means for driving the totalizer printing counter; an electrical pulse generator for each volume meter connected to the volume meter to be driven by the meter for generating a train of electrical pulses in accordance with the volume of the respective grade of gasoline dispensed, and connecting means connecting each parallel-to-serial drive means to the pulse generators for the respective grade of gasoline for operating the parallel-to-serial drive means with the pulse trains generated thereby to drive the respective totalizer printing counter in accordance with the total number of generated pulses of such pulse trains to maintain a current total volume reading in the totalizer

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printing counter of the respective grade of gasoline delivered by the gasoline station.

2. A gasoline station accounting system according to claim 1 wherein at least one of the pumps is adapted to selectively deliver each of a plurality of blends of two grades of gasoline.

3. A gasoline station accounting system according to claim 1 wherein the clock printing counter comprises manual reset means connected for resetting the printing counter in the advancing direction only.

4. A gasoline station accounting system according to claim 1 wherein the parallel-to-serial drive means comprises an electrical stepping motor connected for driving the totalizer printing counter and an electronic parallel-to-serial converter connected to the respective pulse generators to be operated by the pulse trains generated thereby and adapted to generate a single train of nonoverlapping pulses for operating the stepping motor.

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