

June 8, 1965

R. E. DAVIS

3,188,646

DATA RECORDER

Filed June 30, 1961

4 Sheets-Sheet 1

FIG. 1

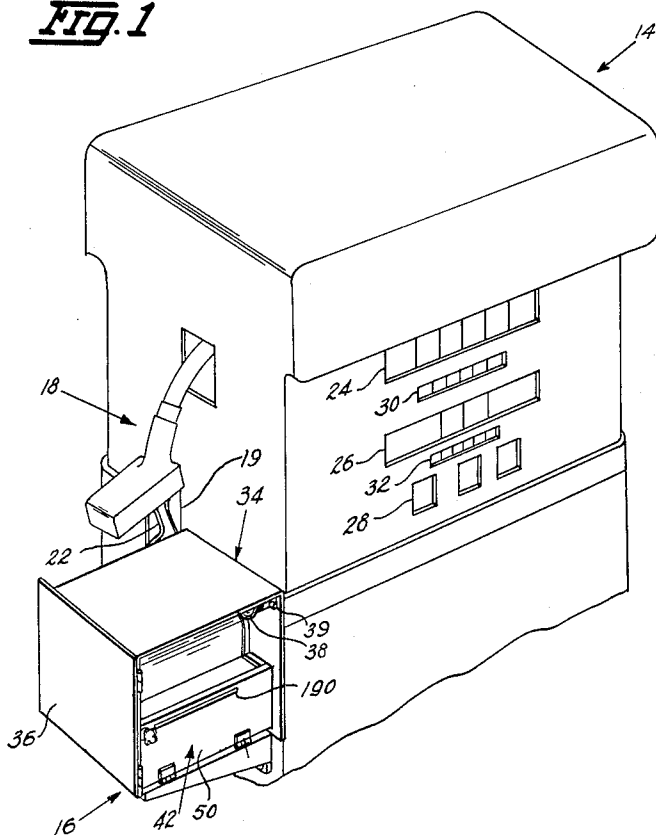


FIG. 2

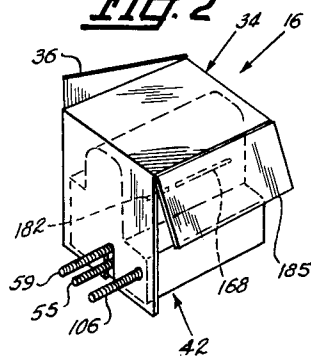


FIG. 3

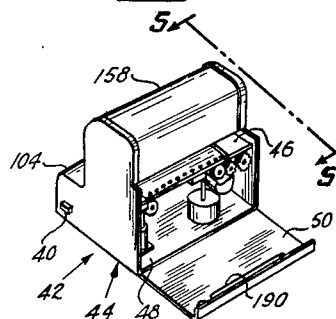


FIG. 6

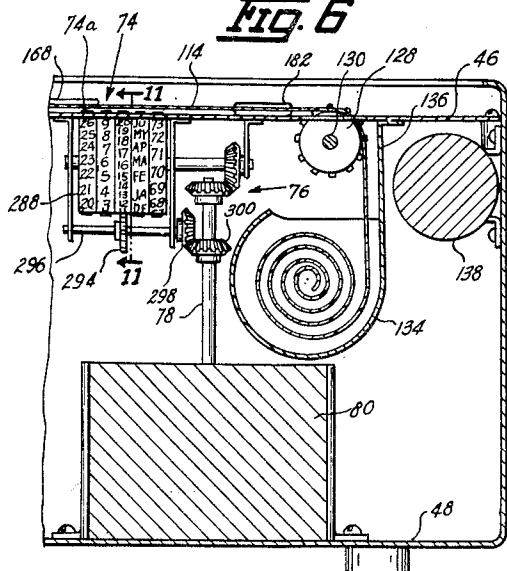
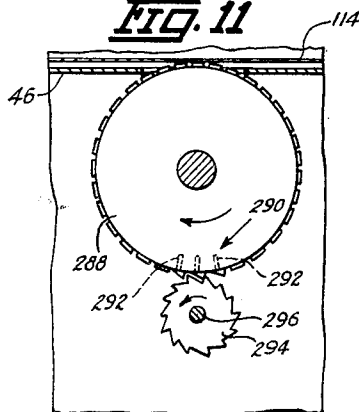


FIG. 11



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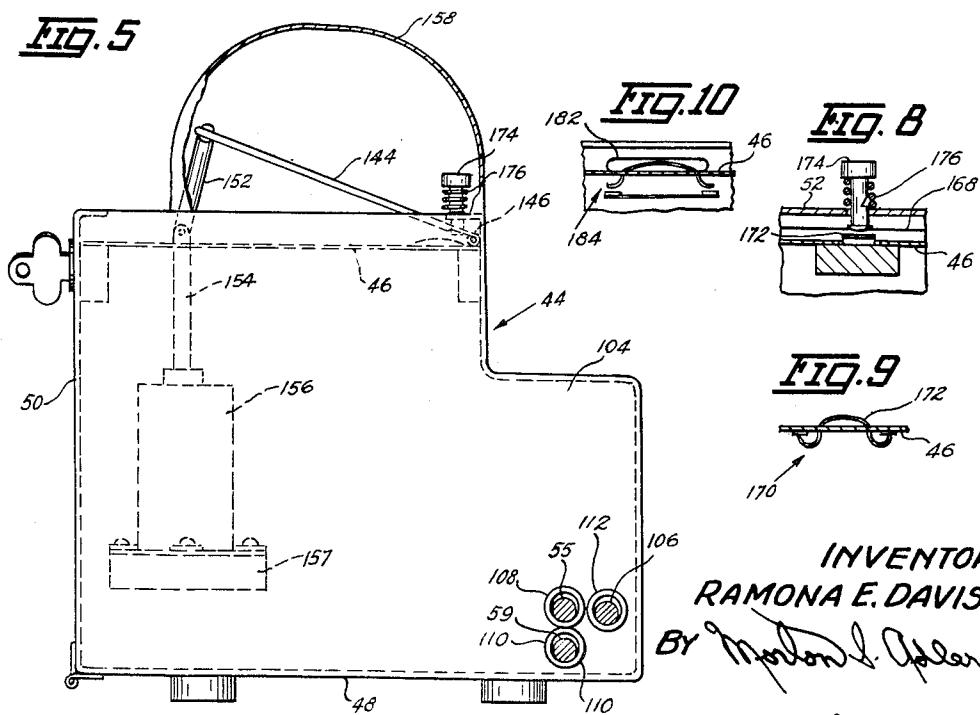
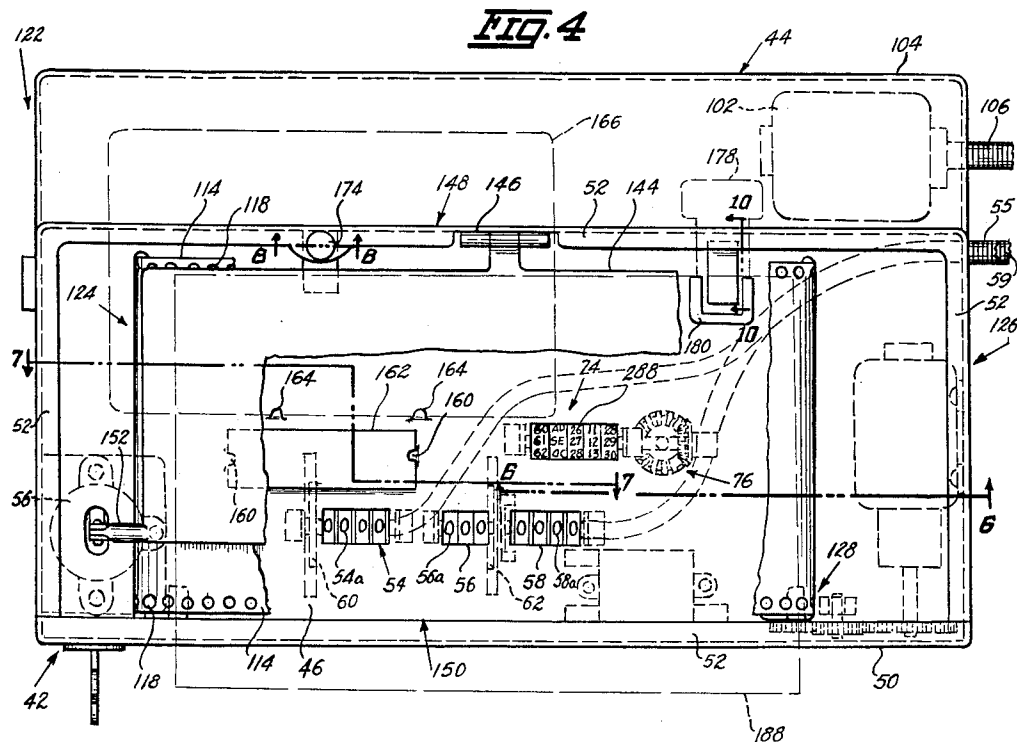
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FIG. 7

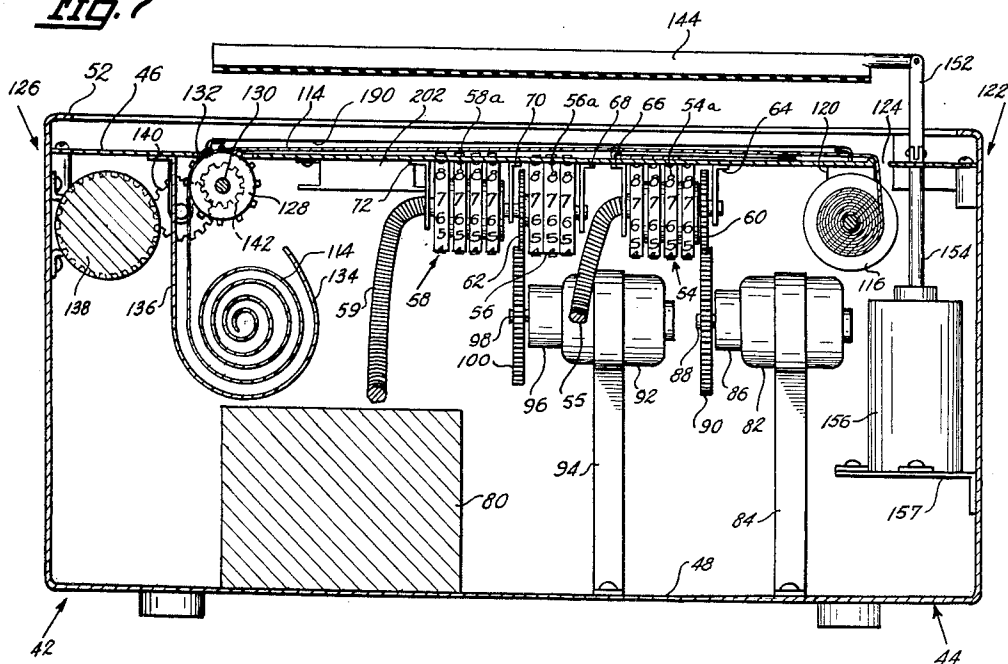
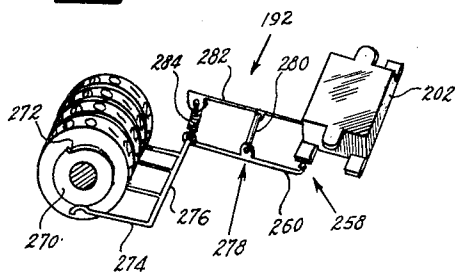


FIG. 12



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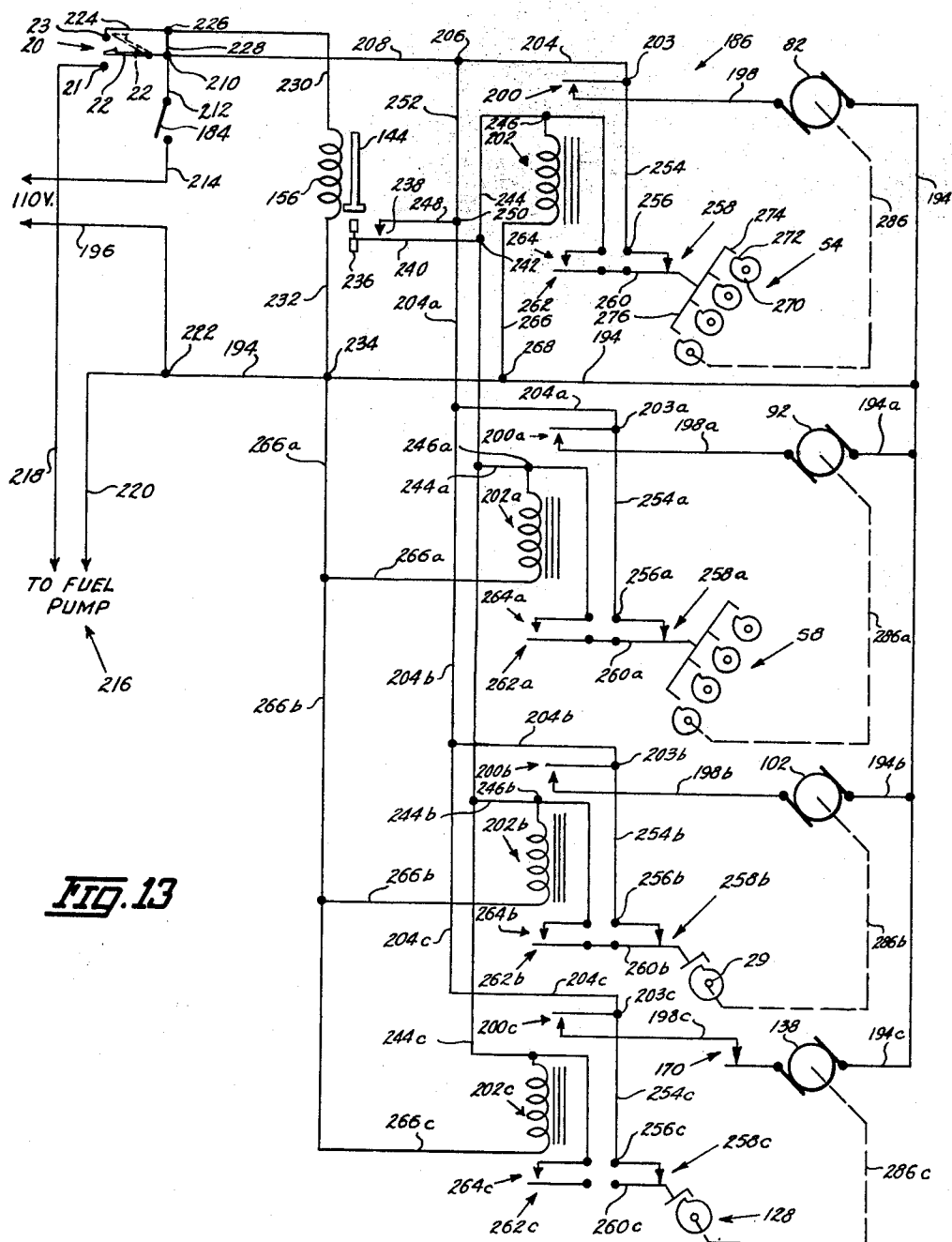
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4 Sheets-Sheet 4



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Patented June 8, 1965

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3,188,646

DATA RECORDER

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Filed June 30, 1961, Ser. No. 121,245

20 Claims. (Cl. 346-43)

This invention relates to a novel apparatus for recording and making a permanent record of credit or cash sales, and in its preferred embodiment, as will be described in detail, it is particularly designed for adaptation to presently used fuel or gas pumps as used by filling stations, garages, docks and the like. It is also contemplated that it may be employed on fuel tank trucks and in other comparable situations where a permanent and accurate record of fuel dispensed or received is required or desired. This invention is also a continuation-in-part of my copending application under the same title, filed April 6, 1961, Serial No. 101,228.

The term "fuel pump" as used herein refers to the usual pump apparatus from which fuel tanks of vehicles are filled at a filling station, which are known in the trade as gas pumps, and to pumping apparatus for delivering fuel from a tank truck to a storage tank in a filling station, or elsewhere as the nature of the fuel and the situation may indicate.

Fuel pumps as presently used are provided with certain odometer-like devices for registering the monetary value of fuel pumped and the quantity thereof, and one set of such devices provides the designated information for each sale while another set maintains a permanent continuing and cumulative total of such information. The devices for registering the per sale data are synchronized with a reset mechanism manually operated by the attendant prior to each new sale so that such devices will be at zero readings for successive sales. In this respect most fuel pumps in use have an automatic locking apparatus preventing further dispensing of fuel once the nozzle has been replaced on its cradle until the reset mechanism is operated, although it is possible and has happened, that such automatic locking apparatus is at times ineffective if not in proper working order.

The registering devices indicated above provide only a visual record and all data on the individual sale resettable registering devices is of course lost once the reset mechanism has been operated, except as it may have been written on a credit sales slip. From the standpoint of a filling station owner, it might appear that the continuous registering device would furnish an accurate check of fuel dispensed relative to total fuel on hand and received during a given period, but experience has demonstrated quite clearly that too frequently such records do not balance and that sizeable quantities of fuel paid for are unaccountably missing from what should have been available for sale.

Whatever the reasons for this situation may be, it can be pointed out that such fuel pumps also contain adjustable visible indicia to indicate the unit sale price of the fuel, as per gallon, for example, and in the case of price changes, access to such indicia is available to attendants for making proper corrections. It is also possible to manually manipulate the registering devices referred to so that an accidental or intentional realignment of the same could have a material effect upon computations made later from figures then visible.

Such fuel pumps as referred to may be operated for successive sales without resetting the individual sale registering device to zero if the automatic locking apparatus is not functioning or if there is no such apparatus and if this does happen, the registered gallonage and dollar value of the succeeding sale would reflect on obvious overcharge and excess gallonage by the amount of the prior

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readings which were not reset. For example with a prior paid for sale of \$6.00 and no reset to zero, an additional \$10.00 worth of fuel would show \$16.00 on the pump. Thus it is possible for a \$16.00 receipt to be given when only a \$10.00 payment is required and for some who are obligated to pay for traveling expenses of others upon the basis of proffered paid receipts, what has appeared as excessive fuel expenditures in relation to calculated miles traveled indicates that an accurate fuel recording device would have many advantages.

In the use of credit card sales which is increasing continually, a filling station attendant is expected to manually record on the multicopy sales ticket the gallonage per sale and total amount, and while a cumulative total of such individual slips should aid the station owner in reconciling his figures, the disadvantages of present pumps as outlined above are still present together with the fact that the only amounts appearing on the sales slip are those manually written in by someone.

With the above observations in mind, it is an important object of this invention to provide a data recording device for association with a fuel pump that will automatically make a permanent printed record of each individual sale of fuel passing through the pump.

Another object herein is to provide with such a data recorder in addition to information as to gallonage and total price therefor, additional data for imprinting which includes the month, date, hour and year, station designation, attendant identification, and means for manually inscribing data relative to the sale of items other than fuel.

A further object contemplated is the provision of means to render the pump inoperable unless the attendant identification indicia is in place.

More particularly this invention contemplates the use of separate registering devices for indicating gallons of fuel pumped, together with the total price therefor which are synchronized with the respective corresponding devices on a fuel pump, and from which separate devices a printed impression is made by an electrically operated printing plate that is automatically actuated when the fuel pump nozzle is replaced on its supporting cradle.

This invention also contemplates means for the automatic resetting to zero readings, after each printing, of the registering devices for gallonage and cash total from which the printed impressions are made together with the automatic resetting to zero readings of the corresponding registering devices on the fuel pump, all of such reset mechanisms being electrically operated and actuated by the printing plate after the printing impression is made.

Another feature herein resides in the provision of a roll of paper in a lockable housing on which the permanent printed record of each sale is preserved, together with the fact that in the case of credit sales, credit cards and credit sales slips may also be used with this invention for recording the sale data thereon and providing the customer with a copy according to current practices.

Still another important object is to provide means whereby after the completion of each credit sale and the removal of the usual credit card, the roll of paper for preserving the permanent record of sales data is automatically moved to place on unprinted portion of the paper in position for the next printing. Included also herein is a means for manually actuating the paper moving mechanism in the event of a cash sale where no credit card is used together with the feature that a credit sale following a cash sale cannot be properly made unless manual actuation of the paper moving mechanism has been accomplished.

A further feature of this invention resides in its

adaptability to accommodate on the permanent record a manually written addition to or correction of a recorded sale before or after the record of a succeeding sale has been imprinted.

Other objects and advantages of this invention reside in the details of construction and correlation of the various parts and will be apparent as the description proceeds.

To attain these objects and such further objects as may appear herein, or be hereinafter pointed out, I make reference to the accompanying drawings forming a part hereof, in which:

FIG. 1 is a fragmentary front perspective view of the upper portion of a fuel pump showing my data recorder mounted thereto and ready for use,

FIG. 2 is a rear perspective view of this invention,

FIG. 3 is a front perspective view thereof with the outer cover removed,

FIG. 4 is a top view with both the outer and inner covers removed and with portions of the printing plate broken away to more clearly illustrate the printable indicia,

FIG. 5 is an enlarged side view, partly in section taken from the line 5—5 of FIG. 3,

FIG. 6 is a cross sectional view taken on the line 6—6 of FIG. 4,

FIG. 7 is a cross sectional view taken on the line 7—7 of FIG. 4,

FIG. 8 is a cross sectional view taken on the line 8—8 of FIG. 4 to show the paper drive switching assembly,

FIG. 9 is a schematic illustration of the switch element in FIG. 8,

FIG. 10 is a schematic illustration of the master switch operated by the key of the attendant on duty taken from the line 10—10 in FIG. 4,

FIG. 11 is a cross section view of certain of the clock mechanism taken on the line 11—11 of FIG. 6,

FIG. 12 is an enlarged perspective view illustrating one of the like automatic deactuating mechanisms used in the resetting of the various registering devices, and

FIG. 13 is a wiring diagram used with the printing, reset and paper moving parts of this invention.

Referring to the drawings the upper portion of a fuel pump is designated by the numeral 14 to illustrate one environment in which my data recorder 16 is used. The term fuel pump as used herein and which has been defined earlier will be understood as connected to a fuel supply tank (not shown) and to include electrically operated pump mechanism (not shown) for dispensing the fuel through nozzle assembly 18. According to conventional fuel pump construction, a cradle 19 on pump 14 supports the nozzle assembly 18 when it is not in use and a switch element 20 (FIG. 13) is associated with the pumping mechanism for pump 14 so that removal of the nozzle assembly 18 from the cradle 19 closes the circuit to the pumping mechanism at contact 21 and fuel can be dispensed by pressing a finger actuated lever or trip 22 on the nozzle assembly 18. Switch element 20 opens contact 21 to the pumping mechanism when the nozzle assembly 18 is replaced on the cradle 19 and momentarily closes contact 23 of switch 20 for setting in motion certain other electrically actuated equipment which will be referred to later in more detail. In addition to the fuel pump structure indicated, such pump 14 includes several registering devices which are rotating cylinders of an odometer type arrangement. One such device 24 indicates the monetary value of fuel dispensed, device 26 registers the amount of fuel dispensed as in gallons, for example, and member 28 is an indicator for showing the unit price per gallon or the like of the fuel. Member 28 is manually adjustable so as to be changeable to reflect the current price and members 24 and 26 are connected in a well known manner to the pumping mechanism of pump 14. Both members 24 and 26 have reset apparatus of well known construction which are simultaneously operated by a manual crank. Such crank per

se is not shown since in this invention it is not used but the crank shaft is identified by the numeral 29 in the wiring diagram of FIG. 13 and my recorder 16 automatically performs the function of the crank as will later appear in detail.

In addition to members 24, 26 and 28, pump 14 generally contains a permanent cumulative total registering device 30 for the monetary values registered on member 24 and a similar cumulative total device 32 for the readings on member 26. No invention is claimed in pump 14 so far described as such construction and the operation thereof is quite generally standardized and well understood.

With reference now to the principal aspect of this invention represented by recorder 16, an outer box-like cover or rain shield 34 is attached to the side of pump 14 near nozzle assembly 18 in any suitable manner and includes a hinged door 36 and light 38, such light being of the type which is illuminated when door 36 is open, and is off when door 36 is closed by action of the door against switch 39. Magnet means 40 on one side of cover 34 may be used to hold door 36 in open position.

Within cover 34 is mounted the actual recording device indicated generally by the numeral 42 and contained within a suitable housing 44 which includes a top plate 46, bottom 48 and a lockable door 50 at the front. The sides and ends of plate 46 are enclosed or framed by the relatively narrow inwardly extending lip 52 spaced slightly above the plate uniformly as shown in FIGS. 4 and 7. Contained within housing 44 are several odometer type recording devices of standard construction and which include member 54 for indicating the amount of fuel pumped as in gallons, for example and corresponding to member 26 of FIG. 1 and connected by the flexible cable 55 to member 26 for synchronized operation therewith; member 56 indicating the unit price and manually adjustable and corresponding to member 28 of FIG. 1, and member 58 for recording the monetary value and corresponding to member 24 of FIG. 1 and connected by the flexible cable 59 to member 24 for synchronized operation therewith. Members 54 and 58 both have the usual reset mechanisms (normally manually operated) represented here by the respective reset gears 60 and 62 thus far described there is no invention claimed in members 54, 56, 58, 60 and 62 as they are of well known construction and in commercial use.

All members 54, 56 and 58 are provided with raised characters or numbers projecting slightly above plate 46 and designated respectively by the numerals 54a, 56a and 58a. Such numbers function to make a printed impression as will later appear. Suitable bracketing or bracing 64, 66, 68, 70 and 72 is used for supporting members 54, 56, and 58 from plate 46 in the relative positions shown in FIG. 7.

An electric clock and date indicator 74 is connected by the bevel gear arrangement 76 through shaft 78 to a clock mechanism 80 that is of a well known construction having a pressure actuated solenoid (not shown) whereby the clock spring (not shown) at a given point of unwinding actuates the solenoid to wind the spring, and deactuates the solenoid at a given wound position. Since such clock mechanism is old and no invention is claimed therefore per se, it is not shown in detail.

An electric motor 82 (FIG. 7) attached by a bracket 84 to the bottom 48 of housing 44 includes a gear reduction box 86 and shaft 88 on which there is a gear wheel 90 for meshing engagement with the reset gear 60 on member 54. A similar arrangement for member 58 includes the electric motor 92 on support 94, the gear reduction box 96, shaft 98, and gear wheel 100 in meshing relationship with the reset gear 62 of member 58. A third motor 102 is disposed within compartment 104 projecting from the rearward side of housing 44 and connects by the flexible shaft 106 to shaft 29 of the pump unit 14. Cables 55, 59 and 106 all pass through respective open-

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ings 108, 110 and 112 in the sidewall of compartment 104 as shown in FIGS. 2 and 5. The wiring connections for these motors and other parts to be indicated will be fully described later after the various elements involved and their relative positions and purpose have been set forth.

It will be understood that the raised characters or numerals 54a, 56a and 58a on members 54, 56 and 58 respectively together with similarly raised indicia 74a on member 74 are all on the same plane as one of the objects herein is to obtain a printed impression of the respective readings at selected times. For describing the printing mechanism used with this invention reference is made more particularly to FIGS. 4, 5 and 7 where plate 46 is shown mounted in housing 44 in spaced above relationship to bottom 48. Plate 46 does not extend into compartment 104 and is provided with suitable openings for registering with the indicia on members 54, 56, 58 and 74. Extending across plate 46 and closely adjacent to indicia 54a, 56a, 58a and 74a is strip of a suitably treated paper 114 capable of producing an impression upon contact and which is commercially supplied in roll form 116 with spaced edge perforations 118 as in movie film. Roll 116 is rotatably arranged in a bracket 120 located just under plate 46 near side 122 of housing 44. Paper 114 from roll 116 is threaded through a slot 124 in plate 46, across plate 46 as described to a point near the opposite side 126 of housing 44 where the perforations 118 are engaged by a pair of spaced sprockets 128 on spindle 130 before passing downwardly through a slot 132 in plate 46 and into the arcuate collector 134 supported by bracket 136 from plate 46 just below sprockets 128. Collector 134 is open at the side or end toward the front end of this recorder so that paper therein can be removed by opening door 50. Such sprockets are driven by a geared down electric motor 138 operatively connected through the intermediate gear wheel 140 to the gear wheel 142 on spindle 130.

A rectangular printing plate 144 (FIGS. 4 and 5), preferably of rubber or the like, is hinged 146 at a central point along one of its longitudinal edges to the rearward side 148 of plate 46 as viewed in FIG. 4, and near the forward end 150 of plate 46, one end of plate 144 is attached by an L shaped arm 152 to the operating arm 154 of a solenoid 156 which is mounted to bracket 157 within housing 44 at side 122 thereof. Plate 144 is arranged to extend over the major portion of paper 114 from the rear 148 to the front 150 of plate 46 sufficiently so as to be able to impress such paper against the various indicia 54, 56, 58 and 74 so far described and others above such members as will later appear. The area of paper 114 covered by the printing plate 144 and including such is enclosed in a transparent arcuate cover or dome 158 and as seen in FIG. 3 a portion of paper 114 projects beyond the front side of dome 158 on plate 46. This projecting paper portion is to accommodate handwritten information as may be required under situations which will be referred to later.

It is intended that certain other data be imprinted on paper 114 in addition to that represented by members 54, 56, 58 and 74 described above and for such purposes plate 46 carries suitably arranged clips 160 for retaining a thin plate 162 which will contain raised characters identifying the particular filling station and address concerned with the records kept by recorder 16. In addition other spaced clips 164 on plate 46 serve as stops for positioning a standard filling station credit card 166 as shown in FIG. 4, such card being insertable into housing 44 through a slot 168 at the rear as seen in FIG. 2. Within slot 168 (FIGS. 8 and 9) is a normally closed switch member 170 having the depressible spring element 172 extending above plate 46. Switch 170 is in series with motor 138 (FIG. 13), is opened by the weight of card 166 when inserted into slot 168 and closes automatically when card 166 is withdrawn. Separate manual means for opening and

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closing switch 170 are provided for situations where no credit card 166 is used and this comprises a spring loaded plunger 174 (FIG. 8) mounted through lip 52 so as to be capable of depressing spring 172. The shank of plunger 174 is notched 176 for engagement at times with lip 52 for holding it in depressed position and while it is in depressed position, it will block entry of card 166. Consequently, to use card 166 on a successive sale, plunger 174 must be released and this closes the circuit to switch 170 whereby motor 138 is actuated to move paper 114. I also provide for an identification key 178 (FIG. 4) which will carry initials or other information identifying the station operator on duty and which is removably placed on plate 46 in guides 180 through slot 182 (FIG. 2) at the rear of housing 44. A normally open master switch 184 in slot 182 (FIG. 10) is closed only by the insertion of key 178 and automatically opens when such key is removed. Both slots 168 and 182 are shielded from the weather by the flap door member 185.

An electric circuit designated generally by the numeral 186 in FIG. 13 is employed in the operation of the several electrical components referred to as well as others to be yet described but it is believed that a better understanding of such circuitry will be had by first describing the general sequence of operation which this recorder is designed to accomplish.

With recorder 16 constructed as described an attached to a pump 14 as shown in FIG. 1 it will require the insertion of key 178 before pump 14 can be used since the master switch 184 controls the current to the entire circuit of recorder 16 and pump 14. Key 178 will be in position under paper 114 so that information on such key is recorded each time the printing plate 144 operates. With key 178 thus in place, the circuit to the pumping mechanism of pump 14 is still open at switch 20 as long as long as the nozzle assembly 18 is hung in place as shown in FIG. 1. With a gas customer having a credit card 166, the attendant inserts card 166 through slot 168 where it too becomes positioned below paper 114 and on plate 46, and at the same time opening switch 170 to motor 138. Normally the customer will receive a copy of a sales slip 188 (FIG. 4) and these are quite generally of like form having prescribed places where under present practices the data from card 166 will be printed and also having portions where the attendant normally writes in the unit price of fuel, total amount of the sale and total gallons dispensed. Consequently I have provided an elongated slot 190 (FIG. 1) in door 50 through which a standard slip 188 can be inserted over paper 114 in such a position that the indicia on card 166, plate 162 and members 54, 56 and 58 will be impressed on slip 188 in substantially the area provided thereon. A portion of such slip 188 will protrude from dome 158 (FIG. 3) and such portion is normally that part of the slip on which the attendant would write information as to the sale of items or articles other than gas. Data from clock 74 and key 178 will also appear on slip 188 in areas that are normally blank spaces.

Sequence of operation

With the above accomplished, switch 20 is closed by removing the nozzle 18 from pump 14 and the desired amount of gas is dispensed into the customer's vehicle during which time members 54 and 58 operate in synchronization with members 26 and 24 respectively. When the nozzle 18 is replaced on pump cradle 19, contact 21 of switch 20 is opened and contact 23 is momentarily closed to set in motion the following sequence of operations: Printing plate 144 will impress the slip 188 and paper 114 against the various raised characters of information to be recorded which includes members 54, 56, 58, 74, 162, 166, and 178. As soon as the proper impressions are recorded on paper 114 and slip 188, the reset gears 60 and 62 for member 54 and 58 respectively are set in operation by the respective motors 82 and 92

to align all cylinders on members 54 and 58 in a well known manner and for stopping such cylinders at a zero reading after each printing, I have used apparatus described in my co-pending application referred to above to automatically deactuate motors 82 and 92. Such apparatus is indicated generally by the numeral 192 in FIG. 12, is duplicated in principle for motors 102 and 138 and will be referred to in more detail in the description of circuit 186.

Motor 102 will operate simultaneously with motors 82 and 92 to rotate shaft 29 and reset members 24 and 26 on pump 14 to zero readings. As indicated above, members 24 and 26 are of standard construction being so connected to shaft 29 that they are normally reset to zero by manual operation of a crank handle by the attendant as previously pointed out. It will thus be appreciated that this is now accomplished automatically and will not be overlooked as is possible now under some circumstances.

It will be noted that up to this point motor 138 has not operated since switch 170 is held open by the credit card 166. Since motor 138 rotates sprockets 128 to move paper 114, it is desired not to move the paper if other hand written entries are to be made for items other than gas. However, the immediate recording of information within the dome 158 upon replacing the nozzle 18 on pump 14 is highly desirable for a variety of reasons and is automatically accomplished as indicated. However, where sales are for items other than gas, the attendant can manually write them in on the protruding portion of paper 114 as shown in FIG. 3. In doing this, copies are made on slip 188 and paper 114 by carbon impression and the attendant can view through the transparent dome 158 the total printed amount from member 58 for the purpose of aiding him in writing in the grand total on the projecting slip portion. Having written in such additional data, or if none is required, the attendant withdraws the credit slip 188 and credit card 166 and when card 166 is withdrawn, switch 170 is closed to actuate motor 138 whereby the imprinted portion of paper 114 is moved by sprockets 128 into collector 134 and motor 138 is deactivated after a predetermined interval.

In the event that a customer is making a cash sale where no credit card 166 is used, it will be apparent that switch 170 would remain closed so that motor 138 would operate to move the paper immediately after the printing. This is not desired since items other than gas may be purchased for which a record on paper 114 should be made. Also the customer may request a cash receipt for the entire purchase in which case a slip 188 may be employed as described above. Consequently, where no card 166 is used, switch 170 is manually opened by plunger 174 (FIG. 8) so that motor 138 is not actuated until the attendant has written in information as to sales other than gas and plunger 174 is released. The general cycle of operation described is repeated each time the nozzle 18 is removed and replaced and thus if an attendant made an error or omission in his written entries, he can make a written correction and by merely removing and replacing nozzle 18, paper 114 with the correction will be moved as described to leave unprinted paper for the next sale.

With reference now to the circuitry 186 in FIG. 13 it is pointed out that motors 82, 92, 102 and 138 are on parallel like circuits so that the complete circuit to motor 82 will be first described and the circuits to the other motors then related thereto.

One side of motor 82 is connected by lead 194 to one side 196 of the 110 v. source. The other side of motor 82 is connected by lead 198 to a normally open contact point 200 on a holding relay 202, and contact 200 connects through terminal 203 to lead 204 through terminal 206 to lead 208 and through terminal 210 to line 212 running to one side of the master switch 184. The other side of switch 184 connects to the other side 214 of the 110 v. power so that switch 184 controls power to motor

82 and also to the fuel pump 216 since one lead 218 to pump 216 runs to contact 21 of switch 20, through terminal 210 and line 212 to one side of switch 184 and line 214, and the other line 220 to pump 216 runs through terminal 222 to line 196. Contact 23 of switch 20 connects by lead 224 through terminal 226, line 228, and terminal 210 to switch 184 and line 230 connects contact 23 to one side of solenoid 156 with line 232 running from the other side of the solenoid through terminal 234, line 194 and terminal 222 to line 196 of the 110 v. source. Thus the momentary closing of switch 20 at contact 23 actuates the solenoid 156 to move the printing plate 144 downwardly and upon the upward movement of plate 144 effected by the usual spring loaded plunger in the solenoid which is only momentarily actuated, a trip means 236 on plate 144 momentarily closes switch 238 to energize the holding relay 202. This is accomplished by lead 240 on switch 238 running to terminal 242 which is connected by lead 244 to terminal 246 at one side of relay 202. Lead 248 of switch 238 extends to terminal 250 and then through lead 252 to terminal 206 through lead 204 to terminal 203 and through lead 254 to terminal 256 at the other side of relay 202 where it is connected through the normally closed switch 258 to a switch breaker arm 260. Arm 260 at end 262 provides the normally open contact 264 at said other side of relay 202, and from such side, relay 202 connects by lead 266 to terminal 268 in lead 194. Thus the momentary closing of switch 238 energizes relay 202 by closing contacts 200 and 264 and motor 82 starts operation, being connected to line 214 through switch 184 through lead 208 terminal 206, lead 204, switch 200 and lead 198, and to line 196 of the 110 v. source through lead 194. Relay 202 remains energized after opening of switch 238, being connected from line 214 through switch 184 through lead 212, terminal 210, lead 208, terminal 206, lead 204, terminal 203, through lead 254 to terminal 256 contact 258, line 260, switch 264 and lead 266 to terminal 268 in lead 194. Deactuation of motor 82 is effected by the opening of contact 258 which breaks the circuit to relay 202 and opens contacts 200 and 264. Contact 258 is opened as follows with reference being made particularly to FIG. 12 and the circuit of motor 82 in FIG. 13.

On one side of each cylinder of member 54 I have provided a cam means 270 which includes a detent 272 to provide an abrupt drop or depression in the cam surface as shown. Cam 270 may be in the form of an integral shoulder-like projection or a separately attached member so long as it is designed to rotate with the respective cylinders of member 54. The detents 272 are arranged so that they are all in alignment when the corresponding numerals on the cylinders of member 54 are aligned. Each cam 270 is engaged by a respective finger 274 and all of said fingers are attached to a common support bar 276 which is secured to one end of the switch breaker arm 260. The other end 262 of arm 260, as described above, serves to maintain switch 258 in a normally closed position and this is accomplished as follows. Arm 260 is pivotally or rockably mounted intermediate its ends to a pivot point 278 on rod 280 supported by a bar or the like 282 secured to relay 202. As shown in FIG. 12, fingers 274 engage the cams 270 from the bottom side and thus I use a spring 284 extending from the outer end of member 282 to arm 260 intermediate support 276 and pivot point 278 to normally urge the fingers 274 into contact with the cams 270. By this arrangement it will be appreciated that as motor 82 operates it will eventually align all corresponding numerals on member 54 because of the nature of the conventional reset mechanism. This will also align all detents 272 which as shown are substantially diametrically opposite to the zero settings since fingers 274 are preferably at the bottom and accordingly when the aligned detents 272 reach fingers 274, such fingers are all urged into the depressions adjacent the detents. This causes arm 260 to rock

on pivot point 273 which opens switch 258 breaking the circuit to relay 202 and opens contact 260 (also 264) to stop motor 82. The dotted line 286 in the circuit for motor 82 (FIG. 13) merely designates the drive connection between motor 82 and member 54. As soon as member 54 starts operation, the movement of cam 270 on the one cylinder at the right end will act on one finger 274 to move it from its switch breaking position and since all fingers 274 are connected to the common support 276, all fingers are moved by arm 260 rocking on point 278 to close switch 258. It will be understood that fingers 274 may contact cams 270 at a different relative position than that described whereby detents 272 would be correspondingly relocated without in any way departing from the principle here disclosed. For example if fingers 274 were at the top of the cams they could drop by gravity into the cam depressions without requiring a spring 284, but I prefer the embodiment described for more accurate and position action.

Further referring to FIG. 13 it is pointed out that the circuitry relative to motors 92, 102 and 132 for starting and stopping such motors is a duplicate of the circuit described for motor 82 and by suitable leads are connected to corresponding sides of the 110 v. source and to corresponding sides of switch 238. Consequently to avoid unnecessary repetition of circuit description, the leads and contacts in the circuit for motor 92 are given the same numerals as for the motor 82 followed by the letter *a* and followed by the letters *b* and *c* for motors 102 and 132 respectively. It will be noted, however, that from line 214 of the 110 v. source lead 212 through terminal 210 through lead 208 to terminal 206 are common to the circuits for all motors.

Since one of the principal objects herein is to provide for the recording of important data, as described, under circumstances where the tampering with data indicia is not within the control of the attendant, it will be appreciated that at times the records will include data extending over the end of one month and beginning of the next. Consequently since all months do not have the same number of days, the printed date from clock 80 would not normally record the proper first day of a month following a thirty or twenty eight day month, for example. To avoid bookkeeping confusion which would result from such erroneous recording under circumstances indicated, I have provided an improvement to clock 80 which overcomes the problem.

With reference to FIGS. 4, 6 and 11, I have identified the date or day cylinder of clock 80 more particularly by the numeral 288 and cylinder 288 will contain numerals 1-31 in sequence in the customary manner. However, for each numeral 29, 30 and 31 on cylinder 288 designated as group generally by 290 in FIG. 11 I have made a removal insertable boss, pawl or dog 292 which when inserted as shown will effect a meshing engagement with a continually rotating gear wheel 294 connected to shaft 296 on which a bevel gear 298 is in mesh with a second bevel gear 300 on clock shaft 78. Since shaft 78 is always in operation to run clock 80, gear wheel 294 will likewise be in continual rotation closely adjacent cylinder 288. In utilizing this arrangement, assume a given month has only thirty days, the person with access to housing 44 manually inserts a dog 292 for the thirty-first day which the given month does not have. With this done, as cylinder 288 moves past the thirtieth day, dog 292 is engaged by gear wheel 294 and cylinder 288 is rotated past the thirty-first reading into the correct number one for the first day of the next month. If a twenty-eight day month is involved, dogs 292 for the twenty-ninth, thirtieth and thirty-first would be used.

It will of course be necessary from time to time to replenish the supply of paper 114 or to remove the records accumulated in collector 134 and for this purpose it is only necessary to open door 50 as previously described

whereby access to the roll ends of paper 114 is readily accessible from below the upper or top edge of plate 46.

It will be understood that the phraseology employed herein is for the purpose of description and not for limitation and that modifications and changes in the construction and arrangement of this invention can be made within the scope of what is claimed, without departing from the spirit and purpose thereof. It is thus intended to cover by the claims, any modified forms of structure or mechanical equivalents which may be reasonably included within their scope.

I claim:

1. In a fuel pump having registering devices for indicating the amount of fuel pumped and the monetary value therefor and a reset mechanism for returning said registering devices to zero readings, the combination therewith of printing means for making a printed record duplicating the data on said registering devices, an electric circuit operatively connected to said fuel pump and including a solenoid connected to said printing means for operating the same, a momentarily acting switch connected to said solenoid for momentarily actuating the same, means associated with said fuel pump for actuating said momentarily acting switch, an electric motor in said circuit connected to said reset mechanism, a holding relay connecting to said motor, switch means connected to said holding relay, means on said printing means acting after the momentarily actuation of said solenoid on said switch means to energize said holding relay and actuate said motor, and switch breaker means associated with said reset mechanism to deactuate said motor at zero readings.

2. In a fuel pump having registering devices for indicating the amount of fuel pumped and the monetary value therefor and a reset mechanism for returning said registering devices to zero readings, the combination therewith of printing means for making a printed record duplicating the data on said registering devices, said printing means including a roll of paper capable of reproducing an impression, a printing plate, hinge means on said housing normally supporting said printing plate in spaced relationship above said roll of paper, means in said housing for supporting said roll of paper, electrically operable paper moving means connected to said roll of paper, an electric motor connected to said paper moving means, means in said housing for receiving a credit card in a position intermediate in said roll of paper and said printing plate so that indicia on said card will be imprinted on said paper by operation of said printing plate, a normally closed switch in said circuit connected to said motor, and said normally closed switch being so located that insertion into said housing of said credit card effects the opening of said switch and removal of the card effects the closing of said switch to actuate said motor.

3. A device as defined in claim 2 including a transparent dome on said housing constructed to enclose all of said roll of paper on which data is automatically printed and leaving a portion of said paper exposed for use by an attendant in manually writing data for items sold other than gas, and said dome affording means for the attendant to view the printed totals so they can be added to the written totals in computing the total sale.

4. A device as defined in claim 2 including a manually operable plunger for holding said normally closed switch in open position at times, and said plunger when in position to hold said normally closed switch in open position serving to prevent the entry of a credit card into said housing.

5. A device as defined in claim 2 including means to removably receive a sales slip in juxtaposition to said roll of paper to be simultaneously imprinted therewith.

6. In a data recorder for use with a fuel pump of the class having registering devices for indicating the amount of fuel pumped and the monetary value thereof and including a reset mechanism for returning said registering devices to zero readings, said data recorder comprising

separate registering devices corresponding to and synchronized with the registering devices on said fuel pump, a roll of paper trained over said separate registering devices, means for supporting and moving said paper, a hinged printing plate for impressing said paper against said separate registering devices, a solenoid connected to said printing plate for moving the same at times, separate reset mechanisms for said separate registering devices, individual electric motors connected respectively to said reset mechanisms and for moving said roll of paper, an electric circuit including all of said motors and said solenoid, switch means associated with said fuel pump to actuate said solenoid, a holding relay in said circuit for each respective motor, means on said printing plate to energize said holding relays, a normally closed switch in series with said paper-moving motor, means for receiving a credit card intermediate said roll of paper and printing plate and in a position to hold said switch open, the removal of said credit card effecting closure of said switch to actuate said paper-moving motor, and respective means on each reset mechanism and said roll of paper-moving means to act at a respective predetermined time to de-energize the respective holding relays and thereby deactuate said respective motors.

7. A device as defined in claim 6 including a manually operable plunger for holding said normally closed switch in open position at times, and said plunger when in position to hold said normally closed switch in open position serving to prevent the entry of a credit card into said housing.

8. In a fuel pump of the class having an electrically operated pump and dispensing nozzle, a pump switch, a cradle for said nozzle adapted to operate said pump switch, first and second odometer type devices for registering the amount of fuel pumped and the monetary valuation therefor respectively and including also a normally manually operable reset mechanism for returning such registering devices to zero readings, the combination therewith of a data recorder comprising a housing secured to said fuel pump, third and fourth odometer type registering devices for amount of fuel pumped and the monetary value thereof respectively mounted in said housing, said third and fourth registering devices corresponding to said first and second registering devices respectively in said fuel pump and respectively operably connected thereto for synchronized operation therewith, raised numerals on said third and fourth registering devices and each such registering device having a conventional reset mechanism associated therewith, a roll of paper capable of reproducing an impression trained over said raised numerals, means in said housing for supporting said roll of paper, a printing plate, hinge means on said housing normally supporting said printing plate in spaced relationship above said roll of paper, and an electric circuit including a solenoid connected to said printing plate for operating the same, a momentarily acting switch associated with said cradle so that placement of said nozzle on said cradle after a pumping operation automatically momentarily actuates said solenoid to operate said printing plate, paper-moving means connected to said roll of paper, respective electric motors in parallel connected to said respective reset mechanisms and said paper moving means, holding relays for each respective motor, switch means connected to said holding relays, means on said printing plate acting after the momentarily actuation of said solenoid on said switch means to energize said holding relays and actuate said motors, switch breaker means on each respective reset mechanism to deactuate their respective motors at zero readings, a normally spring loaded closed switch in series with said paper-moving means, means for receiving a credit card in said housing so as to hold said normally closed switch in open position and thus prevent movement of said roll of paper after a printing operation, the removal of said credit card automatically closing the circuit to said paper-moving motor

so as to actuate the same, and means on said paper-moving means to deactuate the motor connected thereto at a predetermined position.

9. A device as defined in claim 8 including a transparent dome on said housing constructed to enclose all of said roll of paper on which data is automatically printed and leaving a portion of said paper exposed for use by an attendant in manually writing data for items sold other than gas, and said dome affording means for the attendant to view the printed totals so they can be added to the written totals in computing the total sale.

10. A device as defined in claim 8 including a manually operable plunger for holding said normally closed switch in open position at times, and said plunger when in position to hold said normally closed switch in open position serving to prevent the entry of a credit card into said housing.

11. A device as defined in claim 10 including a normally open master switch in said circuit, a key having predetermined indicia thereon, said key being removably engageable with said master switch for selectively closing and opening the same, and said key when engaged with said master switch being so located that the indicia thereon is recorded with the recording of data from said separate registering devices.

12. In a fuel pump of the class having an electrically operated pump and dispensing nozzle, a pump switch, a cradle for said nozzle adapted to operate said pump switch, first and second odometer type devices for registering the amount of fuel pumped and the monetary valuation therefor respectively and including also a normally manually operable reset mechanism for returning such registering devices to zero readings, the combination therewith of a data recorder comprising a housing secured to said fuel pump, third and fourth odometer type registering devices for amount of fuel pumped and the monetary value thereof respectively mounted in said housing, said third and fourth registering devices corresponding to said first and second registering devices respectively in said fuel pump and respectively operably connected thereto for synchronized operation therewith, raised numerals on said third and fourth registering devices and each such registering device having a reset mechanism associated therewith, a roll of paper capable of reproducing an impression trained over said raised numerals, means in said housing for supporting said roll of paper, a printing plate, hinge means on said housing normally supporting said printing plate in spaced relationship above said roll of paper, and an electric circuit including a first electrically actuated means for momentarily moving said printing plate into contact with said paper for impressing said paper against said numerals, second and third respective electrically actuated means in parallel for operating said reset mechanisms on said respective third and fourth registering devices, a first switch means on each of said reset mechanisms to break the circuit thereto at a predetermined interval, a fourth electrically actuated means connected to the reset mechanism in said fuel pump for operating the same, a second switch means associated with said fourth electrically actuated means to break the circuit thereto at a predetermined interval, said first and second switch means being in parallel, a third switch means in series with said first electrically actuated means, said third switch means being operable by movement of said cradle upon engagement or release by said nozzle so that engagement of said cradle by said nozzle effects closing of said third switch means to actuate said first electrically actuated means, a fourth momentary switch momentarily closable by said printing plate in movement out of contact with said paper, and said fourth switch connected to said second, third and fourth electrically actuated means.

13. A device as defined in claim 12 including a normally open spring loaded master switch in said circuit disposed in said housing, a key carrying identifying indicia for

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an attendant responsible for said fuel pump operation, means in said housing for removably receiving said key in a position intermediate said roll of paper and said printing plate so that the indicia on said key will be printed upon said paper by operation of said printing plate, and said master switch being so located that insertion of said key into said housing effects the closing of said master switch and removal of said key effects the opening of said master switch.

14. A device as defined in claim 12 including a spindle at one side of said housing engageable with said roll of paper for moving the same across said numerals, a roll forming paper collector in said housing below said spindle, electrically operable drive means connected to said spindle for rotating the same, means on said spindle to break the circuit to said drive means at a predetermined interval, a normally spring loaded closed switch in said circuit in parallel with said first and second switch means and connected to said fourth momentary switch and to said drive means, means in said housing for receiving a standard filling station credit card in a position intermediate said roll of paper and said printing plate so that indicia on said card will be inprinted on said paper by operation of said printing plate, and said normally closed switch so located that insertion into said housing of a credit card effects the opening of such switch and removal of the card effects the closing of said switch to actuate said drive means.

15. A device as defined in claim 14 including a manually operable plunger for holding said normally closed switch in open position at times and said plunger when in position to hold said normally closed switch in open position serving to prevent the entry of a credit card into said housing.

16. In a fuel pump of the class having an electrically operated pump and dispensing nozzle connected thereto, a pump switch, a cradle for said nozzle adapted to operate said pump switch, first and second registering devices for indicating amount of fuel pumped and the monetary valuation therefor respectively and also including a reset mechanism for returning said registering devices to zero readings, the combination therewith of a data recorder comprising a housing secured to said fuel pump, third and fourth registering devices in said housing corresponding respectively to said first and second registering devices and respectively operably connected thereto for synchronized operation therewith, a reset mechanism in said housing associated with said third and fourth registering devices, means in said housing connected to the reset mechanism of said fuel pump for operating the same, means in said housing for effecting a printed record of the readings on said third and fourth registering devices and for actuating said immediate preceding means, means in said housing connected to the reset mechanisms of said third and fourth registering devices for operating the same, an electric circuit including said pump switch and said three last mentioned means, said pump switch being a double contact switch whereby removal of said nozzle from said cradle closes the circuit to said fuel pump and opens the circuit to said three last mentioned means and engagement of the cradle by said nozzle opens the circuit to said fuel pump and closes the circuit to said three last mentioned means to effect their actuation, and respective means associated with each of said reset mechanisms to effect their deactuation at a predetermined interval.

17. A device as defined in claim 16 including a normally open master switch in said circuit disposed in said housing, a key having predetermined indicia thereon, said key being removably engageable with said master switch for selectively closing and opening the same, and said key when positioned to close said master switch being so located that the indicia thereon is recorded with the recording of data from said third and fourth registering devices.

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18. In a data recorder for use with an electrically operated fuel pump having a dispensing nozzle, a pump switch, a cradle for said nozzle adapted to operate said pump switch, registering devices for indicating the amount of fuel pumped and the monetary value thereof and including a reset mechanism for returning said reset mechanism to zero readings, said data recorder comprising an electric circuit, said pump switch in said circuit and having a first and second contact, engagement of said cradle by said nozzle acting to close the circuit to the first contact and open the circuit to the second contact and disengagement of the nozzle from said cradle acting to reverse the relative closed and open circuit to said contacts, separate registering devices corresponding to and synchronized with the registering devices on said fuel pump, said second contact connected to said fuel pump, electrically operable printing means to effect a printed record of the readings on said separate registering devices, said printing means connected to said first contact, a separate switch operable by said printing means after completion of a printing operation, electrically operable means connected to said separate switch for operating said reset mechanism in said fuel pump, separate reset mechanisms for said separate registering devices, and separate electrically operable means connected to said separate switch to operate said separate reset mechanisms.

19. A device as defined in claim 18 including a normally open master switch in said circuit, a key having predetermined indicia thereon, said key being removably engageable with said master switch for selectively closing and opening the same, and said key when engaged with said master switch being so located that the indicia thereon is recorded with the recording of data from said separate registering devices.

20. A device as defined in claim 18 wherein said printing means comprises raised indicia on said separate registering devices, a roll of paper capable of producing an impression and disposed for movement over said separate registering devices, electrically operable means for moving said paper, an electrically operable printing plate for impressing said paper against said raised indicia, means associated with said fuel pump for actuating said printing plate, means to receive a sales slip in juxtaposition to said roll of paper for having imprinted thereon the data from said separate registering devices, a normally closed switch in said circuit connected to said means for moving said paper, said normally closed switch adapted to be held open by a standard credit card having indicia to be imprinted on said roll of paper and on said sales slip, and said normally closed switch adapted to automatically return to closed position when the credit card is removed therefrom to actuate said means for moving said paper, and means to deactuate said paper moving means at a predetermined interval.

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