Oct. 21, 1941. C. C. OBERLY 2,259,771

DISPENSING PUMP

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FIG. 1

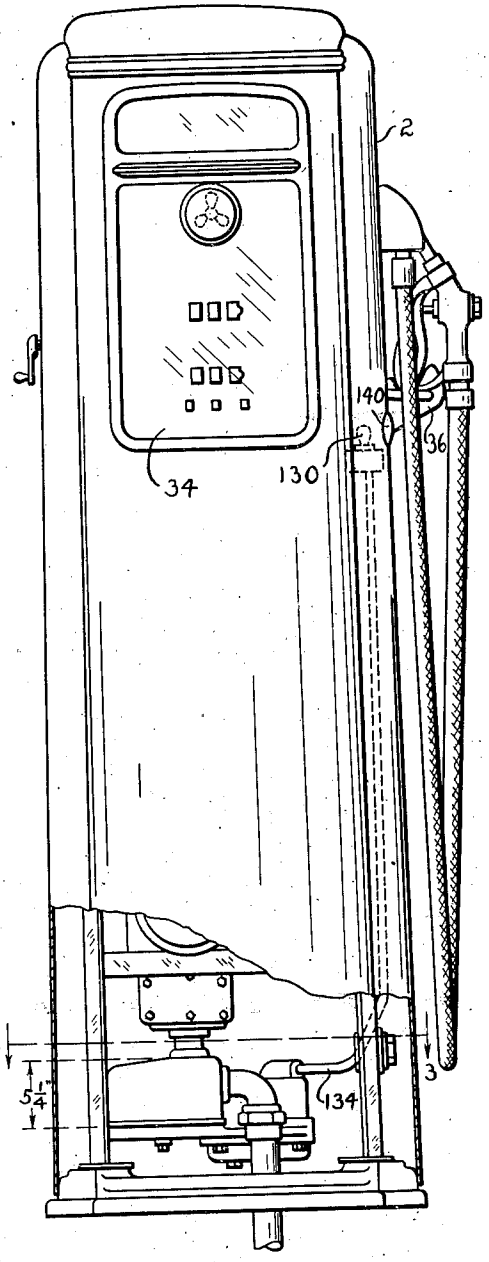
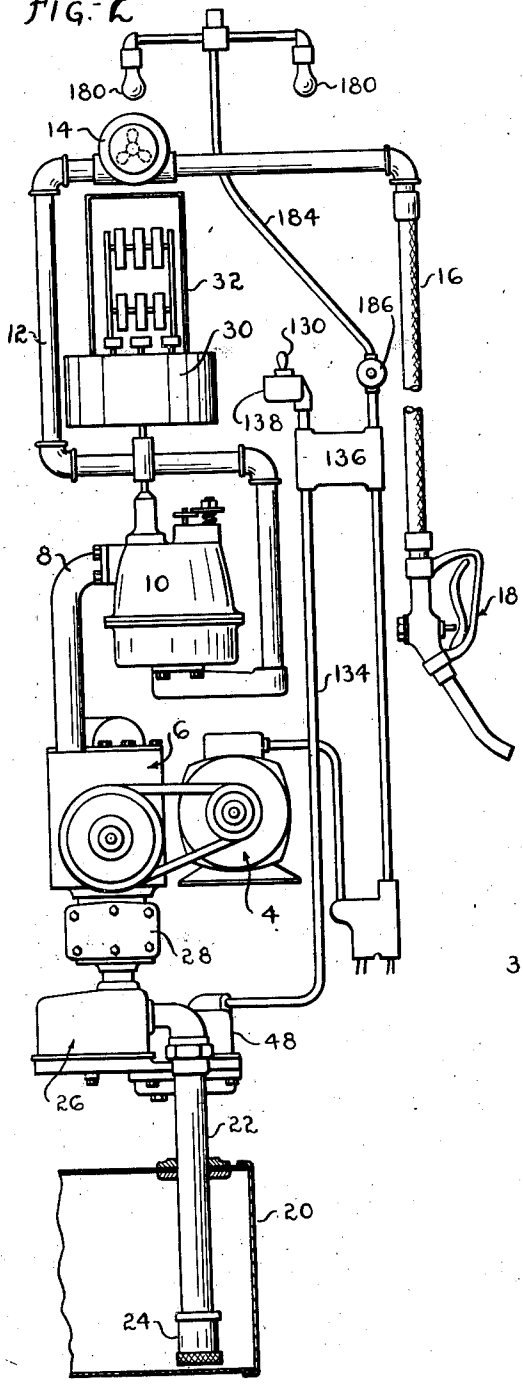


FIG. 2



INVENTOR.
Chester C. Oberly
BY:- Cox & Moore
ATTORNEYS.

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FIG. 3

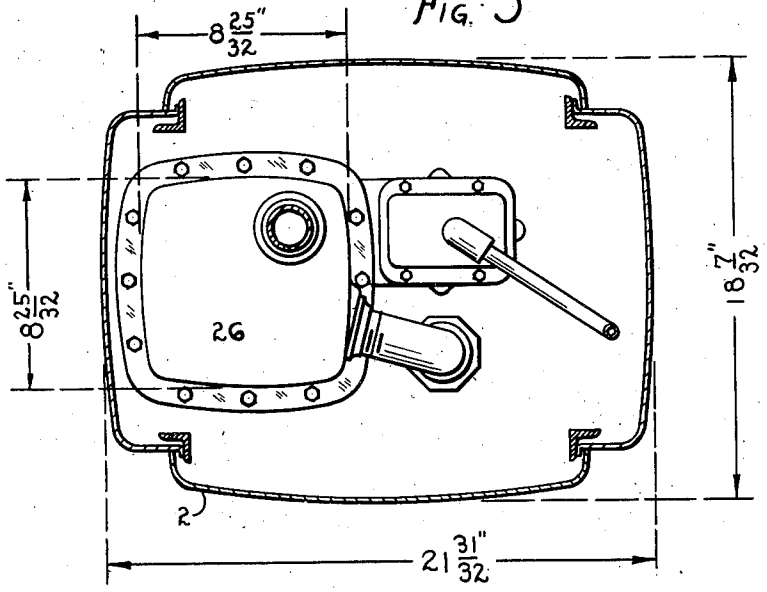
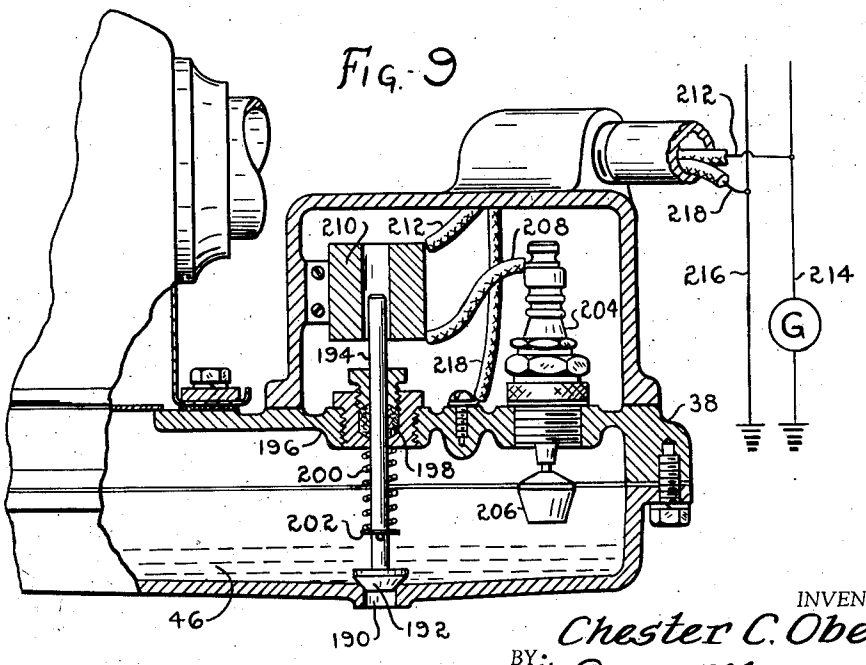


FIG. 9



INVENTOR.
Chester C. Oberly
BY: Cox & Moore
ATTORNEYS.

Oct. 21, 1941. C. C. OBERLY 2,259,771

DISPENSING PUMP

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FIG. 5

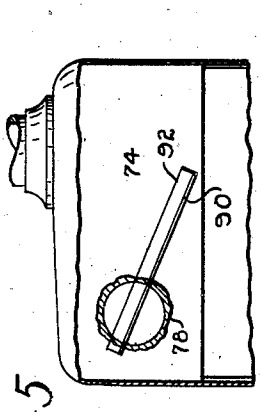


FIG. 4

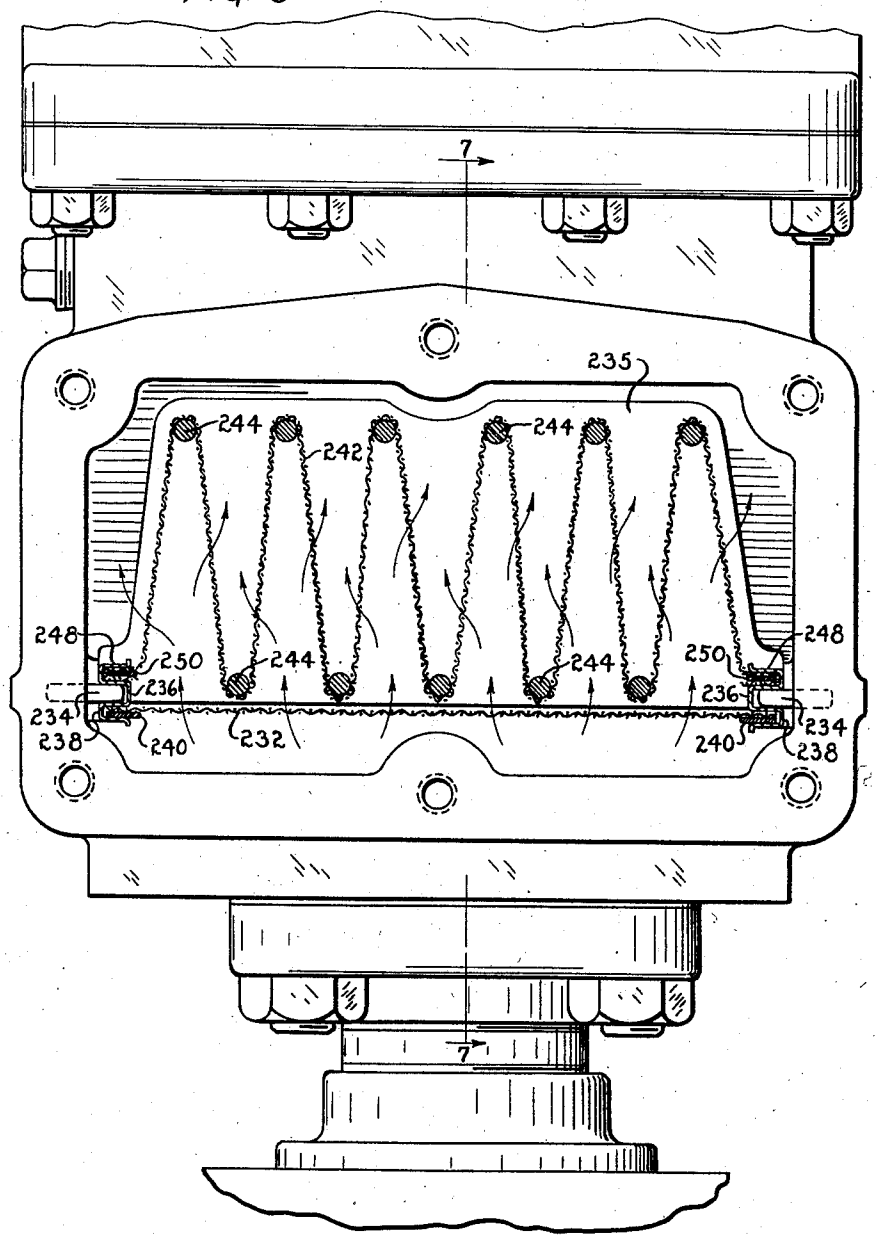
INVENTOR.
Chester C. Oberly
BY:- Cox & Moore
ATTORNEYS.

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DISPENSING PUMP

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Fig. 6



INVENTOR.
Chester C. Oberly
BY:- Cox & Moore
ATTORNEYS.

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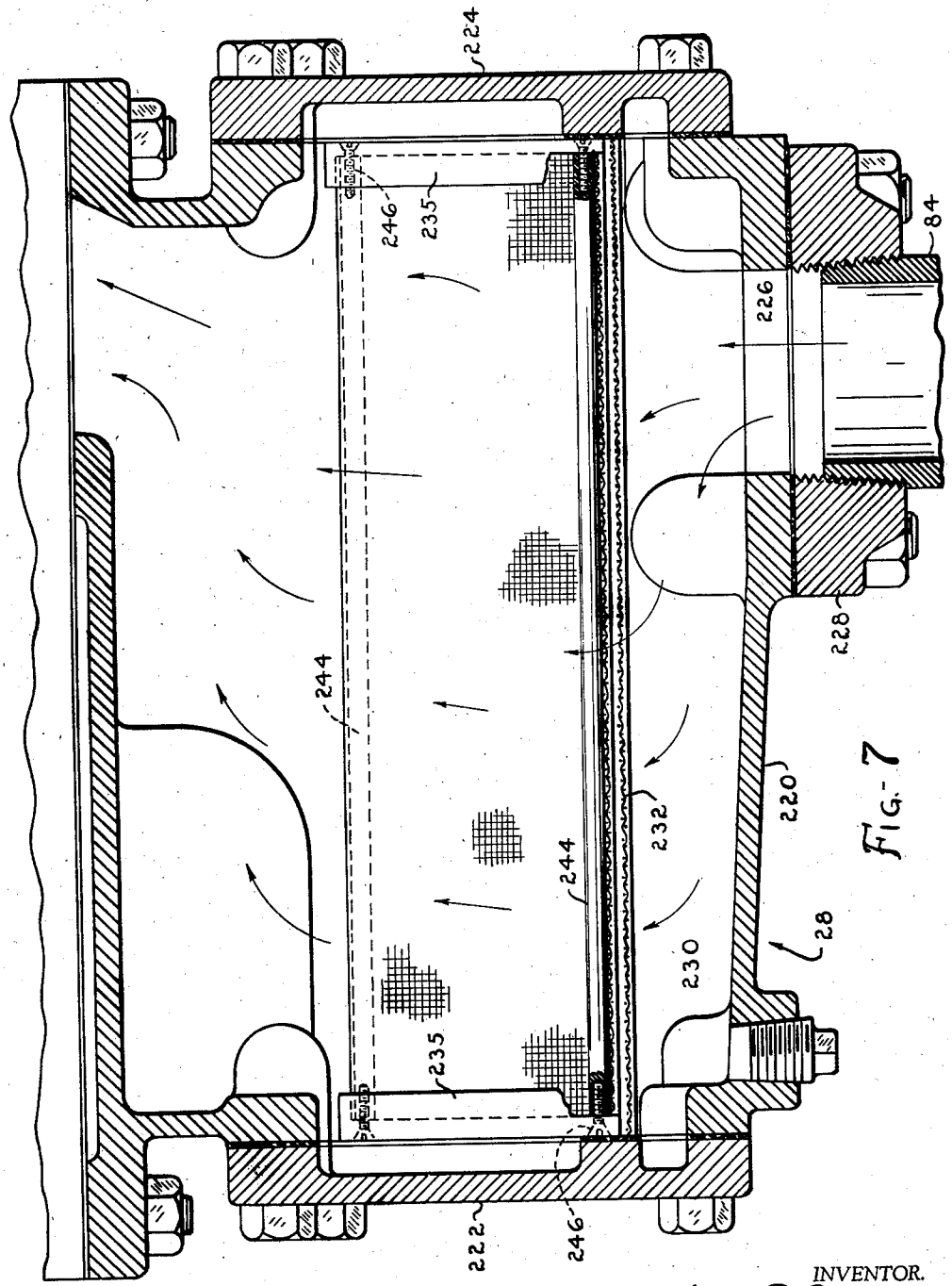


FIG. 7

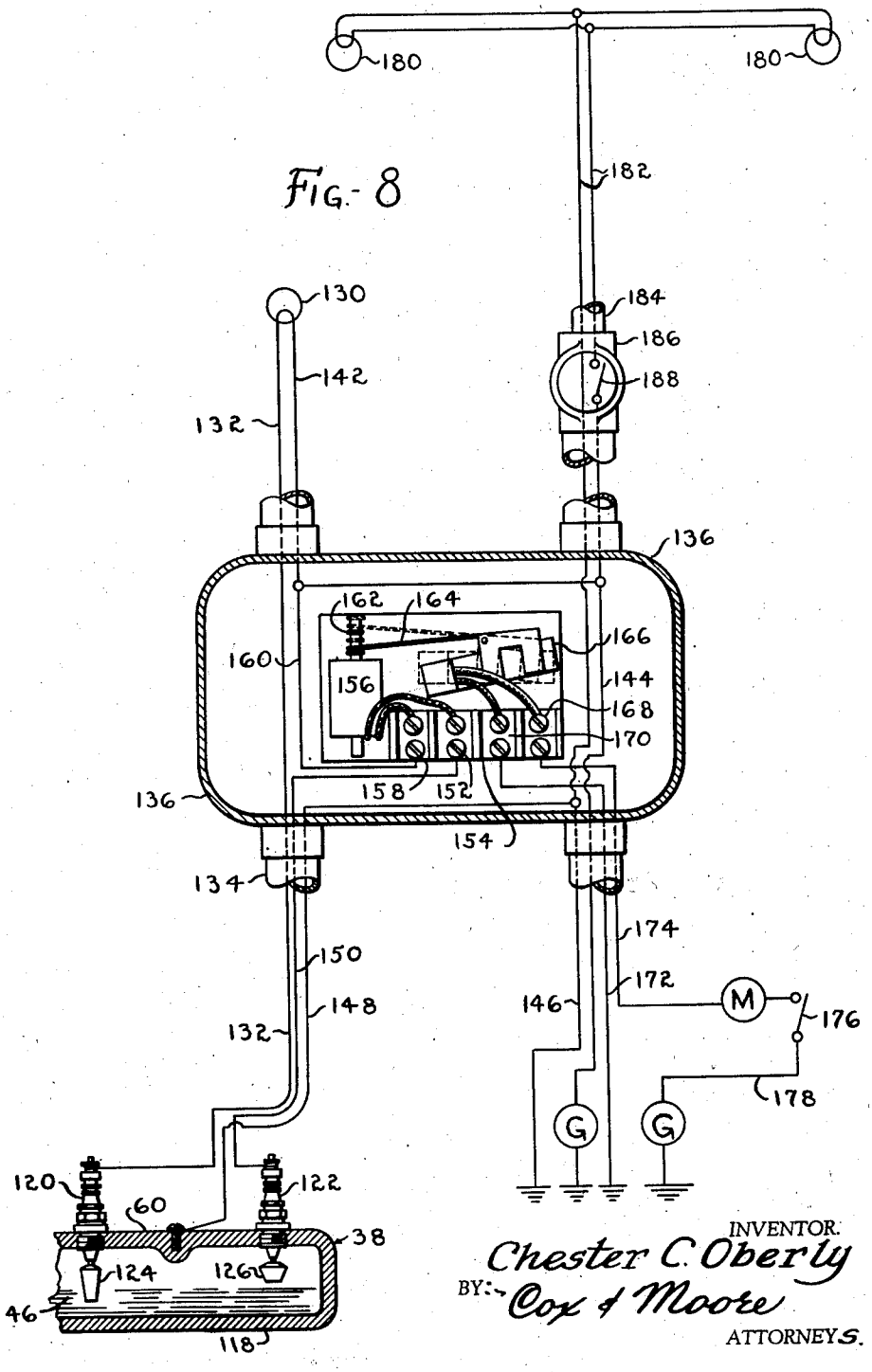
INVENTOR.
Chester C. Oberly
BY: Cox & Moore
ATTORNEYS.

Oct. 21, 1941. C. C. OBERLY 2,259,771

DISPENSING PUMP

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FIG. 8



INVENTOR.
Chester C. Oberly
BY: Cox & Moore
ATTORNEYS.

Patented Oct. 21, 1941

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UNITED STATES PATENT OFFICE

2,259,771

DISPENSING PUMP

Chester C. Oberly, Fort Wayne, Ind., assignor to Tokheim Oil Tank and Pump Company, Fort Wayne, Ind., a corporation of Indiana

Application January 30, 1939, Serial No. 253,486

23 Claims. (Cl. 221—95)

This invention relates to a gasoline dispensing pump and more particularly to a method and apparatus for separating water and a corrosion product from the gasoline during the flow of the gasoline through the dispensing line. It is a known fact that water of condensation accumulates in the underground supply tank from which gasoline is dispensed at a service station. This water accumulates at the bottom of the tank and becomes entrained in the gasoline as the same is withdrawn from a point adjacent the bottom of the tank. This entrained water is dispensed along with the gasoline and therefore the purchaser not only receives a less amount of gasoline than he pays for, but he also receives the entrained water which, more particularly in the winter time, interferes with the proper operation of the dispensing pump and also the purchaser's automobile.

The accumulated water in the presence of the gasoline in the metal gasoline tank also causes the formation of a certain corrosion product which appears as a gray-green slime and which analysis has shown to be principally iron oxide 78.52% and water combined with organic matter 14.11%. Particles of this corrosion product also become entrained in the gasoline drawn through the dispensing line with the result that the registering accuracy of the dispensing pump is detrimentally affected and also the accumulation of such matter in a user's automobile interferes with the proper operation thereof.

It is accordingly an object of applicant's invention to provide a method and apparatus for dispensing gasoline whereby the entrained water and/or this corrosion product may be separated from the gasoline during the continuous flow of the gasoline through the dispensing line.

More particularly it is an object of applicant's invention to provide means for separating the entrained water and/or this corrosion product from the gasoline during passage of the gasoline from the underground supply tank to the suction side of the power operated pump of the gasoline dispensing pump.

An ancillary object of applicant's invention is to provide separating means of remarkably small cubical capacity disposed between the suction inlet of the pumping element and the underground tank for separating all water from the gasoline, as the gasoline is continuously forced through the dispensing line, thereby to improve the efficiency and extend the life of said pumping element.

Another object of applicant's invention is to provide, in a gasoline dispensing pump, means cooperating with a water separator for indicating the existence of a predetermined amount of water in such water separator and for disabling the dispensing pump if a greater predetermined amount of water is allowed to accumulate in the separator.

A further object of the invention is to provide in a dispensing pump means of effecting a true and complete separation of water from gasoline during dispensing of the gasoline, such means being of a size capable of mounting within the usual or "standard" size of dispensing pump housing.

Still another object resides in the provision of improved means actuated by the rise or fall of the level of the accumulating separated water for electrically operating devices associated with the service station pump for apprising the operator of the existence of accumulated water and/or for stopping the gasoline pumping mechanism of the pump.

Other and further objects and advantages of the invention will be apparent from the following description when taken in connection with the accompanying drawings, wherein:

Fig. 1 is a view in elevation of a dispensing pump with the lower portion of the housing broken away for purposes of illustration.

Fig. 2 is a view in elevation showing the internal mechanism of the dispensing pump, the housing being entirely removed.

Fig. 3 is a horizontal section taken on the lines 3—3 of Fig. 1.

Fig. 4 is a view in longitudinal section through a separator constructed in accordance with the invention

Fig. 5 is a fragmentary vertical section taken along the lines 5—5 of Fig. 4.

Fig. 6 is a view in elevation of a gasoline filter forming part of the invention, a cover plate of the filter being removed for purposes of illustration.

Fig. 7 is a fragmentary view in vertical section taken substantially along the lines 7—7 of Fig. 6.

Fig. 8 is a schematic diagram of an electrical indicating and control circuit forming part of the invention.

Fig. 9 is a schematic diagram of an electrical circuit for controlling the automatic discharge of water from the liquid separator.

As shown in the drawings, a gasoline dispensing pump embodying the invention comprises a housing 2 in which there is mounted an electric motor 4 driving a pump 6 in a dispensing flow

line, the outlet side of the pump being connected by a pipe 8 to the inlet of a meter 10, and the outlet of the meter 10 being connected through a series of pipes 12 and a flow indicator 14 to a flexible dispensing hose 16 which carries at its outer end the usual manually operated nozzle valve assembly 18.

The inlet or suction side of the pump 6 is hydraulically connected to the underground tank 20 by a pipe 22 having at its lower end adjacent the bottom of the underground tank 20 the usual non-return foot valve 24. A separator 26 is connected to the upper end of the pipe 22, the outlet of the separator being in turn connected to the inlet of a filter 28 directly connected to the intake of the pump 6.

The meter 10, through a conventional computer mechanism 30, operates the usual register 32 which is visible through windows such as 34 in opposite sides of the housing 2. The master switch for the motor 4 may be controlled in the customary manner by the lever 36, upon which the nozzle 18 is hung when not in use.

The housing 2 is of standard size and the space therein which can be allotted to the water separator is necessarily restricted. Figs. 2 and 3 illustrate this fact and show graphically how a water separator made in accordance with the present invention makes it possible to provide means of such restricted overall dimensions to effect a true and complete separation of water and the accompanying corrosion product from the gasoline during its continuous flow from the underground reservoir through the dispensing line and out of the dispensing nozzle.

The separator 26 preferably comprises a base casting 38, a housing or casing 40 for a separating chamber 42, a pan or casing 44 for a collecting chamber 46, and a cover or casing 48 for a control chamber 50. The separating chamber 42 is of a capacity of substantially 264 cubic inches in an actual installation, and complete separation is effected in this chamber.

The base casting 38 is formed to provide an upper opening 52, defined by an annular rim or flange 54, and a lower opening 56 offset from the opening 52 and defined by an annular rim or flange 58. The flange 58 is connected to the flange 54 by an upper wall portion 60 forming a base for the control chamber 56 and a lower wall portion 62 which is inclined to facilitate the flow of water and sedimentary matter into the collecting chamber 46. The pan or casing 44 is detachably fastened to casting 38 for removal when desired, by means of bolts 63.

The housing 44 is substantially of rounded, ovate, box-like configuration to prevent damage thereto if the water therein becomes frozen, for as the ice forms the pitch of the walls raises the ice up to an area of larger horizontal cross section, permitting the necessary space required for the expansion of the water as it freezes.

The housing is provided at its open side with an outwardly turned flange 64 which is clamped to the annular rim 54 of the base casting 38 by a clamping ring 66 and bolts 68 passing through the clamping ring and threadedly received in the annular rim 54. The housing 40 encloses, in addition to the separating chamber 42, an inlet chamber 70 and an outlet chamber 72, the inlet chamber 70 being formed by a plate 74 secured to the top wall 76 of the housing, extending between the side walls and spaced inwardly of the end wall 78 a distance such that the mixture of gasoline, water and particles of corrosion product entering at the housing from the pipe 22 will not be churned nor will eddy currents be set up in the entering stream.

The outlet chamber 72 is formed by a plate 80 having a very small angle of inclination relative to the horizontal, the plate 80 extending between the side walls of the housing 40 and from the plate 74 to a point spaced from the end wall 82 a distance such that no churning of the gasoline thereby will occur as it enters this outlet chamber from the separating chamber 42. The plate 74 is sealed to the walls of the housing 40 above the plate 80, to prevent any liquid and sediment from passing to the outlet pipe 84 directly from the receiving chamber 70, by means of a sealing gasket or strip 86 secured in position by a clamping channel strip 88 welded or otherwise fastened to the outer face of the plate 74.

The plate 74 terminates at its lower end a predetermined distance from the open bottom side of the housing 40, the distance being predetermined by the rate of flow of the gasoline through the dispensing line so that the mixture of liquids and particles of corrosion product will be fed to the separating chamber 42 in a substantially horizontal sheet or stream at the proper velocity. On its outer face toward the supply pipe 22, the plate 74 is provided with a sharply inclined member or channel 90 secured thereto as by welding of its flange 92 to the plate 74, the member 90 directing the incoming mixture of liquids and corrosion product downwardly of the inlet chamber 70 without causing any churning or foaming of the liquids.

The open bottom side of the housing 40 is partially closed by a plate 94 which is thereby interposed between the separating chamber and the collecting chamber and maintains the liquid in the latter in a quiescent state. The plate 94 is securely fastened to the base 38 by means of screws 97 which are threaded into bosses extending upwardly from the floor of base 38. The plate 94 is provided with slots 96 extending transversely with respect to the direction of flow of the liquids in the separating chamber 42, the slots 96 being defined by downwardly pressed flanges 98 and 100. The flanges 98, which extend in the direction of the flowing liquids, are inclined from the horizontal at an angle which is smaller than the angle of inclination of the flanges 100, which extend oppositely to the direction of flow of the liquids. The flanges 98 and 100 cooperate to direct drops of water, which are heavier than the gasoline, and the particles of corrosion product held in or carried by the drops of water, into the collecting chamber 46 and prevent return of the same into the separating chamber. The inclinations of the flanges 98 and 100 are such that the drops of water and particles of corrosion product or slime associated with the drops are allowed to flow or drip into the collecting chamber without substantial agitation such as would cause an emulsification of the water and particles with the gasoline.

The plate 94 is additionally provided with a plurality of relatively short, upstanding strips which are preferably L-shaped and secured to the plate 94 between the slots 96, the strips 102 extending substantially parallel to these slots 96 and with their forward edges substantially in alinement with the inner, upper edges of the flanges 100. These strips have been found to facilitate the proper flowing or dripping of the water and slime particles onto the surfaces of the flanges 100 and to prevent an upward flow of the

water and particles directed onto the flanges 100 by the flanges 98.

Applicant has discovered that globules of water of the size that are normally drawn through the suction pipe of a dispensing pump will separate by force of gravity through gasoline at a rate of substantially eight feet per minute. The rate of flow of gasoline through a one-inch pipe at the usual maximum rate of delivery of fifteen gallons per minute is 330 feet per minute and through a one and one-half inch pipe at the same usual maximum rate of delivery the velocity of the gasoline is about 163.8 feet per minute.

Applicant has further discovered that in order to effect a true and complete separation of the water and sedimentary matter from the gasoline, it is essential that the flow of the mixed liquids be substantially uniform throughout the separator chamber and that this rate of flow be at all times less than the rate of downward separation of the water from the gasoline. If the rate of flow be not maintained uniform in all parts of the separating chamber, liquid "channels" will be formed in which the water will be carried along with the gasoline without separation therefrom. Also "eddy currents" will be produced resulting in a re-entraining or emulsification of the water with the gasoline. The maximum rate of flow of the gasoline is fifteen gallons per minute through the dispensing line; the maximum uniform rate of upward flow of liquid in the separating chamber should not exceed substantially five feet per minute, thereby allowing the water to separate out at the differential velocity rate of three feet per minute, which differential rate of flow applicant has discovered suffices to effect a true and complete separation of the water and the particles of slime from the gasoline during its continuous flow through the dispensing line.

Applicant therefore provides in the separating compartment 42 of the housing 40 a plurality of plates 104 to 112 spaced from each other, from the plates 74 and 80, from the end wall 82 of the housing 40, and from the plate 94 to form passages for directing the mixed gasoline and water upwardly and toward the outlet chamber 72 from the horizontally directed sheet or stream of mixed liquids flowing into the bottom of the separating chamber between the lower edge of the plate 74 and the surface of the plate 94.

The plates or baffles 104 to 112 must be so disposed within the separator chamber 42 as to insure at this zone this uniform rate of upward flow of the mixed gasoline and water therein. If this be done, the separator 26 may be made of the size shown in Fig. 3, which is such that it can be readily mounted in, and enclosed by, a pump housing 2 of normal, standard size and still effect a true and complete separation of the water and particles of iron oxide from the gasoline.

In order to accomplish this the plates or baffles 104 to 112 should be inclined to the vertical at angles which progressively increase in the direction of flow of the liquid from the inlet to the outlet of the separator. In the structure illustrated, the baffle 104 is preferably inclined to the vertical at an angle of 20 degrees; the baffle 106 at an angle of 28 degrees; the baffle 108 at an angle of 36 degrees; the baffle 110 at an angle of 47 degrees and the baffle 112 at an angle of 72 degrees.

Each of the baffles 104 to 108 in this illustrated structure is preferably of substantially three inches in face width in the vertical direction, while the baffles 110 and 112 each has preferably a face width of two and one-half inches.

In order further to insure uniformity in the rate of flow of liquid in the separating compartment, the baffle plates 104 to 110 are spaced at their lower edges from the surface of the plate 94 distances which progressively decrease in the direction of the horizontally flowing stream so that the channel or passage for this horizontal stream will uniformly decrease in width as more and more of the stream is diverted upwardly between the baffles. In the specific structure illustrated, the lower edge of the baffle 104 was spaced one and a quarter inches from the surfaces of the plate 94; the lower edge of the baffle 106 was spaced one and an eighth inches from said plate; the lower edge of the baffle 108 was spaced one inch from the plate 94 and the lower edge of the baffle 110 was spaced seven-eighths of an inch from the plate 94. The baffle plate 112 is so positioned as to further insure that the velocity of the liquid flowing upwardly between the baffles 108 and 110 is uniform with respect to the rate of liquid flowing upwardly between the baffles 104 and 106, and 106 and 108. The baffle 112 is so positioned as to cooperate with the plate 80 to allow the stream of separated gasoline to flow into the outlet chamber 72 without causing any churning or the production of any eddy currents.

The baffle plates 110 and 112 are so spaced at their lower edges from the end wall 82 of the housing 40 that the velocity of the liquid flowing upwardly at this end of the housing will be uniform with respect to the velocity of the upflowing liquid in all other parts of the separating compartment 42. Any water or particles of corrosion product carried from the gasoline by the water as it separates at this point will collect and gravitate downwardly along the end wall 82.

In operation, as the liquid is continuously sucked from the underground tank 20 through the separator 26 and the filter 28 and is then continuously forced through the meter and through the dispensing nozzle at a continuous rate greatly in excess of the rate at which water will separate from gasoline. As the sucked liquid passes from the pipe 22 into the receiving chamber 70 the flow is considerably decelerated and due to the baffles 74 and 90 the liquid is spread out laterally and caused to travel in a horizontal direction across the entire cross sectional area of the separating chamber; specifically, it is caused to travel in a horizontal stream across the bottom of the separating chamber coextensive with the cross sectional area thereof, and during this horizontal flow it is gradually decelerated to a rate at which globules of water separate from the flowing stream. The flow of liquid is then split into a multiplicity of streams flowing upwardly at a uniform rate of rise less than the rate at which water will separate from gasoline by gravity, and after separation of the water this multiplicity of streams is recombined into a single stream flowing through the outlet of the separator at the dispensing rate, which rate is substantially equal to the rate at which the gasoline and entrained water flowed into the water separator, thereby effecting a true and complete separation of the water as it flows continuously through the dispensing line and through the nozzle from the underground tank.

The globules of water as they separate from the gasoline carry with them small particles of the slimy matter which attach themselves to the

surfaces of the globules. As the globules form drops, the particles of slime accumulate thereon and are carried downwardly through the separating chamber and along the baffles.

The separated water and particles of slime, held in the water by the surface tension or attraction of the water drops, continue their flow downwardly and pass through the slotted plate 94 and into the offset collecting chamber 46 in which the slime of hydrated iron oxide stratifies upon the upper surface of the water. Of course in the normal operation of the device gasoline also flows through the plate 94 into the collecting chamber 46, filling this chamber and the base 38 as well as the housing 40. The drops of water with the oxide particles carried by or enveloping the drops of water flow downwardly through this gasoline in the collecting chamber and the base 38 and as they accumulate cause the lower level or line of separation of the water and gasoline to rise and the stratified layer of hydrated iron oxide or slime which floats upon the water separates the body of accumulated water from the gasoline.

The collecting chamber 46 is provided with a drain outlet 114 closed by a manually removable plug 116, the drain outlet 114 being located at the lowermost portion of the bottom wall 118 of the pan or casing 44. The bottom wall 118 for this purpose slopes from the side walls downwardly toward the drain outlet 114. When the plug 116 is removed, the water flows out of the collecting chamber and carries with it the collected slime of hydrated iron oxide.

Automatically operated means are provided for indicating the level of the water in the collecting chamber 46 and cooperating automatically operating means are provided for disabling the pump driving motor 4 when the water in this collecting chamber is above a predetermined level. These means preferably comprise a pair of electric control members or electrode devices 120 and 122 which are mounted within the control compartment 50 formed by the housing 48 and the upper wall portion 60 of the base casting 38.

The electrode devices 120 and 122 each preferably comprise a member received in a threaded opening in the upper wall portion 60 and carrying on its center electrode a downwardly extending frustoconical member 124 or 126, preferably formed of copper plated with silver. The member 124 is longer than the member 126 and therefore extends to a lower point in the collecting chamber 46. The member 126 is preferably provided with a frustoconical opening 128 extending inwardly from its lower face to increase the area of electrically active face of this member.

The electrode of the member 120, which electrode carries the water-contacting member 124, is connected to a signal device or lamp 130 by a wire 132 (Fig. 8) extending through a pipe 134 (Figs. 1 and 2) from the control housing 48 and through the explosion proof switch housing 136 to the lamp 130 carried upon the supporting bracket 138 so positioned within the housing that the lamp 130 may be viewed through a window 140 (Fig. 1) in the side of the housing 2. The window 140 is preferably located adjacent the nozzle support lever 36 so that the attendant can not help but see the lamp when he places or removes the nozzle. The lamp 130 is preferably of any well known type which increases in brilliance in accordance with the voltage impressed across its terminals. The wire 132 is connected to one terminal of the lamp 130; the other terminal is connected by a wire 142 which extends into the explosion proof switch housing 136 and is connected to the ungrounded power wire 144 of the lighting circuit. The other, and grounded side, wire 146 of the lighting circuit power supply is connected to the shell of the separator 26 as by a wire 148 extending from the switch housing 136 through the pipe 134 and into the control chamber 50 where it is connected to the upper wall portion 60 of the base casting 38.

It will be evident from this description that as the level of water rises in the collecting chamber 46 the voltage impressed across the signal device or lamp 130 will increase due to the shape of the electrode member 124 and due to the decrease in electrical resistance between this electrode member and the bottom 118 of the pan 44. The brilliance of the warning given by the signal lamp 130 will therefore vary proportionally to the level of the water in the collecting chamber 46.

The electrical control member 122 controls the de-energization of the pump driving motor. For this purpose the electrode of the member 122 is connected by a wire 150 to the terminal 152 of a terminal block 154 in the explosion proof switch housing 136. The terminal 152 is in turn connected to one side of a solenoid 156 in the housing 136, the other side of the solenoid being connected to a terminal 158 connected by the wire 160 to the ungrounded wire 144 of the power supply.

The solenoid 156, through its core 162 and a switch lever 164, controls a mercury switch 166. The contacts of the mercury switch 166 are connected to terminals 168 and 170, the terminal 170 being connected to the wire 172 of the motor supply power line and the terminal 168 being connected by a wire 174 in series with the master motor switch 176, which in turn is connected to the other wire 178 of the motor power supply. The master motor switch 176 is controlled in the usual manner by the nozzle supporting lever 36, as previously described. It will be evident that the master switch 176 and the mercury switch 166 being closed, the pump motor will be energized to drive the pump and effect a dispensing of the gasoline when the nozzle valve 18 is opened.

If the service station attendant ignore the warning signal given by the signal device or lamp 30 and if he permit the water to rise to such a level as to contact the electrode member 126, sufficient current will flow from the power wire 144, through the solenoid 156, the wire 150, and through the electrode member 126 to the grounded supply wire 146 by the wire 148. Energization of this solenoid will cause an upward movement of its core 162, which, through the switch lever 164, will rotate the mercury switch 166 in a clockwise direction, thereby breaking the motor circuit and preventing further dispensing of gasoline until the water has been drained from the collecting chamber 46.

The usual dial illuminating lamps 180 (Figs. 2 and 8) may be connected by wires 182 extending through pipes 184 and switch housing 186, to the lighting circuit supply wires 144 and 146. The housing 186 encloses the usual manually operated light control switch 188 interposed in one of the wires 182.

If it be desired to automatically drain the water and slime from the collecting chamber 46, when a predetermined amount of water accumulates therein, the circuit shown in Fig. 9 may be provided. In this form of the invention the

drain outlet 190 may be controlled by a valve 192 carried by a valve rod 194 slidably mounted in an upper wall portion 196 of the base casting 38, a suitable packing means 198 being provided for the valve rod 194. A spring 200, encircling the valve rod 194 and interposed between the upper wall portion 196 and a collar 202 carried on the rod 194, normally urges the valve 192 into closed position with respect to the drain outlet 190.

The electrical control member 204 has its electrode 206, which projects into the collecting chamber 46, connected by a wire 208 to a solenoid 210 which receives the upper end of the valve rod 194. The solenoid 210 is in turn connected by a wire 212 to the ungrounded wire 214 of a motor power supply line in parallel to the pump driving motor. The other wire 216 of the motor power supply line is grounded, as is also the shell of the separator, as by a wire 218.

It will be evident from this description that as the water level rises, the electrical control member 204 permits a sufficient current to pass through the solenoid to effect a lifting of the valve rod 194 and the valve 192, thereby allowing the accumulated water to drain by gravity from the separating chamber 46.

If desired the solenoid 210 may be of the conventional fast operating, slow releasing type, or it may be controlled by a conventional fast operating, slow releasing relay in the electrode circuit, and having its contacts in a separate solenoid circuit, thereby permitting the valve 192 to remain open a predetermined time after it has been raised by the solenoid 210. Alternatively, the solenoid may operate conventional timing contacts connected in parallel to the control member 204, and which retain the solenoid energized for a predetermined time to hold the drain valve open for such predetermined time. In addition a dash pot could be employed to prevent quick closing of the valve 192.

The filter 28, which is inserted between the separator 26 and the suction side of the pump 6, preferably comprises (as shown in Figs. 6 and 7) a central casting 220 and removable end walls or cover plates 222 and 224. The outlet pipe 64 of the separator 26 is directly connected to the intake 226 of the filter 28 as by the union or coupling 228. The filter 28 provides a longitudinally extending channel 230 for permitting the incoming stream of gasoline, with any fine particles or dirt which might be contained therein, to spread out over the surface of a substantially horizontal, flat screen 232 secured to bars 234 extending between end plates 235 and pinned, or otherwise fastened, to the opposite side walls of the central section 220 of the filter housing.

The screen 232 is preferably releasably clamped to these bars 234 as by resilient clips 236 frictionally bound to the bars 234 and provided with generally U-shaped portions 238 between the legs of which the screen 232 is clamped by means of a clamping strip 240. The screen 232 extends from side to side and from end to end of the filter housing and all gasoline which passes into the pump must pass through this screen, this screen preferably being of the order of sixteen mesh per inch.

Above the screen 232 the filter is provided with a screen 242 extending from side to side of the filter housing and from cover plate to cover plate and being arranged in a plurality of folds about spaced pins or bars 244. The spaced pins or bars 244 extend between the end plates 235 to which they are secured as by screws 246. The opposite free edges of the screen 242 are secured to the bars 234 by the clips 236 which, at their upper ends, are provided with substantially U-shaped channels or clamping portions 248 to receive the edges of the screen 242 and a clamping strip 250. The screen 242 is preferably a fine screen of the order of sixty mesh to the inch. The screen 242 being arranged in folds makes it possible to provide a very large screening area within a very small space and insures that the very fine particles of dust which are borne by the gasoline are separated out as the gasoline flows upwardly along the inclined surfaces thereof.

It will be apparent from the foregoing description that applicant has provided a method and apparatus for dispensing gasoline after having separated out water and sedimentary matter.

This application is a continuation-in-part of my prior application, Serial No. 226,752, filed August 25, 1938.

The invention is hereby claimed as follows:

1. In a gasoline dispensing device, means forming a source of gasoline supply, means forming a dispensing line connected to said source of supply, a pump for causing gasoline to flow from said source of supply through said dispensing line, means operative during such flow for slowing down the gasoline in a portion of said dispensing line to a rate of flow at which water in said gasoline will separate from the gasoline by gravity, whereby water separates from the gasoline as it flows through said portion of the dispensing line, means for collecting the separated water from said portion of the dispensing line, means including a first electrode operatively associated with said collecting means and controlled by the separated water for indicating the presence of water in said collecting means, an electric motor for actuating the pump, a second electrode operatively associated with the collecting means and the electric motor and controlled by the separated water for disabling said electric motor when a predetermined amount of water collects in said collecting means, the first electrode extending to a lower level in said collecting means than the second electrode whereby as the water accumulates in the collecting means and reaches the first electrode an indication thereof will first be given and thereafter the electric motor wil be subsequently disabled upon the water reaching the second electrode.

2. In a gasoline dispensing device, a source of gasoline supply, means forming a dispensing line connected to said source of supply, a pump in said line for drawing gasoline from said source of supply and forcing it through said dispensing line at a rate which is substantially in excess of the rate at which water entrained in the gasoline will separate from the gasoline, a separator in said line in advance of said pump and operative during such dispensing flow for slowing down the gasoline in said separator to a rate of flow at which water in said gasoline will separate from the gasoline by gravity, thereby allowing water to separate from the flowing gasoline in said separator, a water collector below said separator in which the water collects in a quiescent body, an electric motor for driving the pump, and electrically operable means operatively associated with said electric motor and controlled by the separated water for de-energizing said motor when a predetermined amount of water

accumulates in said collector, said electrically operable means comprising electrode means providing an electrode extending into the quiescent body of water in the collector for engaging the water when the same accumulates to a predetermined amount.

3. In a gasoline dispensing pump, a source of gasoline supply, means forming a dispensing line connected to said source of supply, means for drawing gasoline from said source of supply and for forcing it through said dispensing line, means forming a separating chamber in said line in advance of the forcing means and including baffle means operative during such flow for uniformly slowing down the rate of flow of the gasoline in said separating chamber to a rate of flow which is less than the rate at which water in said gasoline will separate from the gasoline by gravity, thereby allowing such water to separate from the flowing gasoline in said portion of the dispensing line, means forming a collecting chamber below said settling chamber in which gasoline and the separated water accumulate and stratify, and means between said collecting chamber and said separating chamber for preventing agitation of the body of gasoline and water in the collecting chamber by the gasoline flowing through said portion of the dispensing line.

4. A method for dispensing gasoline from a source of gasoline supply through a dispensing line, said method consisting in forcing the gasoline from said source through said line in a continuous stream at an original rate which is in excess of the rate at which water entrained in the gasoline will separate therefrom, retarding the flow of gasoline and entrained water in an unscreened portion of said dispensing line as the gasoline with entrained water flows therethrough to a second, lower rate at which the water entrained in said gasoline separates by gravity from the continuously flowing gasoline, accelerating the flow of the gasoline after the water is separated from the gasoline in such portion of the line to its original rate, and collecting the water as it separates in an area outside of the path of flow of the gasoline through said portion of the line.

5. In a gasoline dispensing pump, a source of gasoline supply, means forming a dispensing line connected to said source of supply, means for sucking the gasoline from said source of supply through a portion of said line, means forming a separating chamber interposed in a portion of said line through which the gasoline is sucked, a plurality of spaced baffles within said separating chamber and inclined to the horizontal at successively decreasing angles thereby to divert the stream of gasoline in said portion of the line into a multiplicity of streams flowing upwardly at a uniform rate or rise at which water entrained in the gasoline will separate from the gasoline thereby allowing such entrained water to separate from the flowing gasoline during the continuous flow of the gasoline through the dispensing line.

6. The herein described method of removing wax-like slimes present in gasoline and similar internal combustion engine liquid fuels, as such fuels are dispensed, comprising sucking the liquid fuel with water entrained therein in a continuous closed column at a rate of flow greatly in excess of the rate at which water separates by gravity from such fuel, while continuously and progressively decelerating the liquid fuel and entrained water during a portion of such flow to a rate at which the entrained water separates by gravity from such fuel and in a manner to cause the fuel to flow uniformly throughout the entire cross sectional area of such flow at such decelerated speed, whereby to form the entrained water into globules to cause the slimy wax-like matter in suspension in said fuel to adhere to said globules to cause said slime covered globules by gravity to move to the bottommost portion of such flowing column of fuel, and continuously removing the globules of water with adhering slimy material from the zone of the flowing fuel.

7. The herein described method of continuously removing water from gasoline and similar liquid internal combustion engine fuel during dispensing, which comprises forcing gasoline or other liquid fuel with entrained water therein in a closed column for a predetermined length of travel at a rate of speed greatly in excess of the rate at which water separates by gravity from such fuel, while along a portion of the column progressively decelerating the flow of the feul and entrained water uniformly throughout the entire cross sectional area of such portion of the column to a rate at which water separates by gravity from said fuel, whereby to cause entrained water to take the form of globules in such decelerated body of fuel and to move by gravity therethrough to the bottom of said column, collecting such separated water and removing it from the zone of decelerated flow, and thereafter accelerating such liquid fuel, with the water separated therefrom, to its former rate of flow in such closed column, all in a continuous manner.

8. A dispensing device for dispensing internal combustion engine motor fuel comprising, in combination with a tank for holding a relatively large quantity of such fuel, means forming a dispensing line adapted for connection to said supply tank, a pump disposed in said line in said housing for sucking liquid fuel from the tank at a rate of flow greatly in excess of the rate at which water separates by gravity from such fuel, said pump forcing such fuel under pressure through that portion of the dispensing line connected to the discharge side of said pump, and water separating mechanism disposed in that portion of said line connected to the suction side of the pump, said mechanism including a chamber through which the fuel is sucked by said pump, said dispensing line from the tank to the pump being constructed and arranged to prevent the ingress of air thereto except such air as is entrained with the liquid sucked from the tank by the pump, said water separating chamber including angularly disposed baffle means for progressively decelerating the rate of flow of the fuel passing through said chamber to a rate at which the water separates by gravity from said fuel, and said baffle means being disposed in relation to the chamber for causing such deceleration of the fuel to take place uniformly in said chamber throughout the entire cross sectional area thereof, said chamber and said baffle means being free of screens whereby to provide a series of open, angularly disposed liquid fuel passages devoid of obstructing screens whereby such passages cannot become clogged with slime or other wax-like solids inherently present in the fuel passing therethrough, and whereby such deceleration of the fuel during

dispensing continuously separates by gravity all water from the liquid being dispensed.

9. In a gasoline dispensing device, the combination of means forming a source of gasoline supply, means forming a dispensing line connected to said source of supply, pumping means disposed in said line for drawing gasoline and entrained water from the source of supply and forcing gasoline with entrained water through the dispensing line at a rate greatly in excess of the rate at which water separates by gravity from such gasoline, means forming a water separating chamber disposed in the line on the suction side of the pumping means and means in said separating chamber operable during the dispensing flow for retarding the gasoline and entrained water and for causing the gasoline and entrained water to flow through said chamber at a rate uniform throughout the cross sectional area of said chamber and at which water separates by gravity from the gasoline, whereby to permit the water automatically and continuously to form into globules and to flow by gravity to the bottom of said chamber, and water collecting means providing a separating chamber disposed below said separating chamber and in communication with the water separating chamber to collect the separated water out of the path of flow of the gasoline and entrained water in said separating chamber.

10. In a liquid dispensing device for dispensing internal combustion engine motor fuel, in combination with a supply tank for holding a relatively large quantity of such motor fuel, a dispensing line having one end connected thereto and having a foot valve in said end, a pump in said line adapted to suck the fuel from said tank at a rate of flow greatly in excess of the rate at which water separates by gravity from such fuel and for forcing the fuel through that portion of the line connected to the discharge side of said pump, a relatively fine mesh screen filter in that portion of the line on the suction side of the pump for removing relatively larger solids from the fuel, means in the dispensing line in advance of the mesh filter comprising a chamber relatively large in cross sectional area in comparison with the cross sectional area of the dispensing line, said chamber having baffle means therein arranged to provide a series of tortuous channels disposed to decelerate the liquid flowing between said baffles in a uniform manner throughout the cross sectional area of said chamber to a rate less than the rate at which water separates by gravity from such fuel to cause entrained water in said fuel tio separate out by gravity in the form of water globules, and whereby the globules during their formation remove by capillary attraction the wax-like slimes in said fuel, and means associated with said chamber for collecting and isolating said globules of water and said wax-like slime whereby said fuel prior to reaching said filtering screen has had all water and said wax-like slimes removed therefrom.

11. In a dispensing device for dispensing internal combustion engine liquid motor fuel, in combination with a supply tank for holding a relatively large quantity of such motor fuel containing water and wax-like slime in suspension therein, a dispensing line adapted for connection to said tank, a pump disposed in said line for sucking liquid from the tank at a rate of flow greatly in excess of the rate at which water separates by gravity from such fuel and for forcing such fuel under pressure at such excess rate of flow through that portion of the dispensing line connected with the discharge side of the pump, slime separating means disposed in said line on the suction side of the pump for removing such wax-like slime from the fuel and including a chamber sealed against the entrance of air and through which the fuel is sucked by the pump, said separating chamber including walls forming unrestricted liquid flow channels therebetween and constructed and arranged to decelerate the rate of flow of the fuel and entrained water passing through the separating chamber to a rate substantially less than the rate at which water separates by gravity from such fuel, the walls of said channels providing downwardly inclined surfaces on which the water forms as globules entraining the slime suspended in said slowly flowing fuel, and means for collecting said separated water and slime out of the path of flow of the fuel and entrained water in said separating chamber, and means for maintaining the separated water and slime isolated from the fuel as the fuel flows through said channels.

12. In a dispensing device for gasoline and other internal combustion engine fuel, the combination of means forming a source of gasoline supply, means forming a dispensing line connected to said source of supply, pumping means disposed in said line for drawing gasoline from the source of supply and forcing it through the dispensing line at a rate of flow greatly in excess of the rate at which water separates by gravity from such gasoline, water separating means having a water separating chamber of larger cross sectional area than that of the dispensing line and disposed in the line on the suction side of the pumping means, said water separating means including means continuously operative during the dispensing flow for causing the gasoline to flow uniformly through said water separating chamber at a rate less than the rate at which water in said gasoline will separate by gravity therefrom, water collecting means disposed below said separating chamber and out of the path of flow of the gasoline as it flows through said separating chamber and into which the separated water is adapted to collect, and an apertured partition disposed between said separating chamber and said water collecting means, said partition permitting collected water to pass therethrough and having means for preventing agitation of the collected water by the gasoline flowing through said separating means, said partition including spaced apart upstanding baffles on its upper surface lying in the path of flow of the gasoline as it flows into said separating means, said partition having reversely disposed flanges depending from its opposite side into said collecting means.

13. In a device for dispensing gasoline and similar internal combustion engine fuel, the combination of means forming a supply tank adapted to contain a relatively large quantity of said fuel, a dispensing line connected to said tank through which the fuel is adapted to be dispensed, a pump in said line adapted to draw fuel from said tank at a rate greatly in excess of the rate at which water separates by gravity from said fuel, a water separator in said dispensing line in advance of said pump, said separator forming a more or less box-like chamber, with the inlet side of the line connected to one end of the upper portion of said chamber, said chamber having a vertically depending baffle disposed in spaced relation from

the bottom wall of said chamber and directly opposite and spaced from said inlet pipe, there being means associated with said baffle for spreading the incoming liquid uniformly laterally of said baffle whereby to cause the liquid to flow downwardly and thence forwardly along the entire bottom portion of said chamber, the upper portion of said chamber having along its length a plurality of diagonally disposed imperforate baffles inclined in a direction such that their uppermost ends are nearest to said first mentioned baffle, the upper ends of said baffles being spaced from the upper wall of said casing at progressively increasing distances in a direction away from said inlet end, and the lower ends of said baffles being spaced from the lower wall of said chamber at progressively decreasing distances from said inlet end, the spaces between said inclined baffles providing a plurality of liquid flow channels, the upper portion of said separator having a substantially horizontal partition terminating short of the end of the chamber opposite the inlet end, the portion of said chamber above said partition having a discharge outlet connecting with the suction side of said pump, there being an additional baffle disposed at a slightly downward inclination to a horizontal plane, the lower end of the baffle lying substantially between the last of the vertical series of baffles and the horizontally extending partition, said separating chamber being provided on its bottommost portion with a foraminated plate, and means forming a collecting chamber beneath said foraminated plate adapted to receive the collected water, said foraminated plate having a plurality of spaced apart, upstanding baffles projecting into the separating chamber, and said foraminated plate having on its under side a plurality of spaced apart, oppositely extending depending flanges, the free ends of which lie adjacent each other in overlapping relation.

14. In a device for dispensing gasoline and other internal combustion engine liquid fuels, the combination with a supply tank adapted to hold a relatively large quantity of such fuel, a dispensing line connected to said supply tank, a pump for drawing the liquid from said tank at a rate greatly in excess of the rate at which water separates by gravity from said liquid and for forcing such withdrawn liquid through a portion of the dispensing line, water separating means disposed in said dispensing line on the suction side of the pump, comprising a chamber having a cross sectional area of flow greatly in excess of the cross sectional area of the dispensing line, means associated with said chamber for directing the gasoline flowing thereinto so as to cause the same to flow in a horizontal direction across said cross sectional area, such flow gradually decelerating to a rate at which water separates by gravity from such gasoline, the bottom of said chamber comprising a perforated partition, the perforations in said partition permitting globules of water separated out during the decelerated flow to pass therethrough, and means forming a chamber below said partition for receiving such separated water in a quiescent pool out of the path of flow of the gasoline through the separating chamber.

15. In a gasoline dispensing device, a source of gasoline supply, a housing, means forming a dispensing flow line in said housing and connected to said source of supply, pumping means disposed in said housing and connected in said line for causing the gasoline to flow from said source of supply through said line, and screenless flow control separating means disposed on the suction side of the pumping means, said separating means providing an enlarged chamber forming a portion of said dispensing line, and means in said chamber operative during such flow for causing the gasoline and entrained water to flow upwardly through said chamber at a rate which is less than the rate at which water in said gasoline will separate by gravity from the gasoline thereby substantially completely separating the water from the flowing gasoline during dispensing flow of the gasoline through said dispensing line.

16. In a service station pump, a source of gasoline supply, means forming a dispensing line connected to said source of supply, means in said dispensing line for continuously drawing the gasoline from said source of supply and forcing it through said dispensing line at a rate of flow greatly in excess of the rate at which water separates from gasoline and screenless flow control separating means disposed in said line in advance of said liquid forcing means, said separating means providing an enlarged chamber forming a portion of said line and means in said chamber operative during such continuous dispensing flow for slowing down the flow of the gasoline and entrained water through said chamber to a uniform continuous rate of flow per cross sectional area of said chamber not exceeding substantially five feet per minute, thereby allowing water to separate by gravity from the continuously flowing gasoline.

17. In a gasoline dispensing device, a source of gasoline supply, means forming a dispensing flow line connected to said source of supply, a pump in said line for causing the gasoline to flow from said source of supply through said dispensing line, water separating means in said line between the pump and the source of supply, said water separating means including a housing, a baffle in said housing causing the gasoline to flow downwardly and spread out horizontally as it enters the housing, a baffle for causing the gasoline to flow substantially horizontally as it leaves the housing, said baffles forming a separating chamber and unscreened connections between said chamber and the inlet and outlet to the housing, said baffles extending between opposed side walls of the housing and terminating short of the bottom and end of the housing respectively to direct the gasoline horizontally across the chamber and then upwardly to flow out of the chamber, a collecting chamber beneath said separating chamber, and means between said collecting chamber and said separating chamber for preventing agitation of the water in the collecting chamber by the gasoline flowing through the separating chamber.

18. In a device for dispensing gasoline or other liquid internal combustion engine fuel, a source of liquid fuel supply, a dispensing line connected to said source, a pump for drawing the liquid fuel from said tank at a rate greatly in excess of the rate at which water separates by gravity from said liquid fuel, water separating means disposed in said dispensing line on the suction side of the pump, said water separating means comprising a chamber of cross-sectional area greatly in excess of the cross-sectional area of the dispensing line, means associated with said chamber for directing the liquid fuel flowing into the chamber in a horizontal direction, means in said chamber for gradually decelerating the fuel and entrained water to a rate at which water separates by grav-

ity from the liquid fuel, and means beneath said chamber for receiving from the chamber the separated water in a quiescent pool out of the path of flow of the liquid fuel through the separating chamber.

19. In a gasoline dispensing device, a source of gasoline supply, means forming a dispensing flow line connected to said source of supply, a pump connected in said line for causing the gasoline to flow from said source of supply through said line at a rate greatly in excess of the rate in which water will separate by gravity from gasoline, and water separating means including an enlarged chamber, means in said chamber for directing the gasoline and entrained water in a horizontal direction and screenless means in said chamber for retarding the flow of gasoline and water through said chamber to a rate at which water in said gasoline separates by gravity from the gasoline, thereby separating the water from the flowing gasoline during the dispensing flow of the gasoline through said dispensing line.

20. A method for dispensing gasoline from a source of gasoline supply through a dispensing line, said method consisting in drawing the gasoline with entrained water from said source through said line in a continuous stream at an original rate greatly in excess of the rate at which water entrained in the gasoline will separate therefrom, retarding the flow of gasoline and entrained water in an unscreened portion of said dispensing line as it flows therethrough to a second lower rate at which the water entrained in said gasoline separates as globules from the continuously flowing gasoline, utilizing the globules of water to hold by reason of their surface tension particles of slime contained in the gasoline thereby to separate such particles from the gasoline as it flows through said unscreened portion of said dispensing line, and accelerating the flow of the gasoline after the water and slime are separated from the gasoline to its original rate.

21. In a gasoline dispensing device, a source of gasoline supply, means forming a dispensing line connected to said source of supply, a pump in said line for sucking the gasoline from said source and forcing it through said line, a water separator in said dispensing line on the suction side of the pump, said separator having means forming an enlarged chamber, means for directing the gasoline and entrained water in a horizontal direction through the chamber, and means in said chamber for retarding the gasoline and water as they flow in the chamber to a rate at which water separates by gravity from the gasoline, means below said chamber and in constant communication therewith for receiving from the chamber the separated water in a pool out of the path of flow of the gasoline through said chamber and means for preventing agitation of the water in the receiving means by the gasoline flowing through the separator chamber.

22. In a gasoline dispensing device, a tank forming a source of gasoline supply, a dispensing line connected to said source of supply, pumping means in said line above said source for causing said gasoline to flow from said source of supply through said dispensing line at a rate which is greatly in excess of the rate at which water entrained in the gasoline will separate by gravity from the gasoline, means providing a water separating chamber in said line and having an outlet connected to the suction side of the pumping means above an inlet connected to the source, and baffle means in said chamber for uniformly dividing the gasoline and entrained water flowing through the chamber into a multiplicity of streams flowing upwardly at a uniform rate at which water in said gasoline separates from the gasoline by gravity, thereby to remove the water from the gasoline during its continuous flow through the chamber.

23. A method for dispensing gasoline or other internal combustion engine fuel from a source of supply through a dispensing line, said method consisting in sucking the gasoline with entrained water from said source through a portion of said line and forcing the gasoline through another portion of said line in a continuous stream and at a rate which is greatly in excess of the rate at which water entrained in the gasoline will separate therefrom by gravity while retarding the flow of the gasoline and entrained water in a part of that portion of the dispensing line through which the gasoline and entrained water is sucked and to a rate of flow at which water in said gasoline separates from the gasoline by gravity.

CHESTER C. OBERLY.

CERTIFICATE OF CORRECTION.

Patent No. 2,259,771. October 21, 1941.

CHESTER C. OBERLY.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 4, second column, line 51, for the reference numeral "30" read --130--; page 5, second column, line 53, claim 1, for "wil" read --will--; page 6, first column, line 61, claim 5, for the word "or" read --of--; page 7, first column, line 56, claim 10, for "tio" read --to--; page 9, first column, line 11, claim 19, for "in which" read --at which--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 2nd day of December, A. D. 1941.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.