ABSTRACT

A mobile petroleum supply station is provided with safety features to reduce the risk of fires and explosion when delivering petroleum products to customer's vehicles.

1 Claim, 4 Drawing Figures
MOBILE STATION FOR DELIVERY OF PETROLEUM PRODUCTS

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to mobile stations for delivery of petroleum products and associated filling station products and services directly to customer's vehicles, irrespective of the location of such vehicles.

2. Description of the Prior Art

In the prior art mobile petroleum supply stations such as those of U.S. Pat. Nos. 2,498,229 and 3,257,031, the containers in which the petroleum products were stored and the pumps and hoses which were used for carrying the petroleum products to a user's vehicle were unprotected from rain, snow, wind, dust and other adverse weather conditions, and also salt, road chemicals and other materials used on the roads in such weather.

Further, the dispensing apparatus of certain prior art stations, such as those of U.S. Pat. No. 3,257,031 were driven by the motor of the vehicle with a power take-off belt, requiring that the vehicle motor remain in operation during dispensing of the petroleum products, creating a risk of fire and other damage. Furthermore, if the power take-off belt was broken, the dispensing station could not accomplish its intended purpose. Also, as disclosed in this patent, a pick-up truck and two gasoline pumps were provided for services to customers.

Certain of the prior art stations, such as those of U.S. Pat. No. 2,498,229 were larger and cumbersome and thus unsatisfactory for use in urban and residential areas.

SUMMARY OF THE INVENTION

Briefly, the present invention provides a fully integrated mobile station for delivery of petroleum products and associated filling station supplies and services directly to customers without requiring the customer to come to a service station to obtain such products, supplies and services. The station is a vehicle which includes a motor for moving the vehicle to selected locations to deliver petroleum products to vehicles of customers, a plurality of storage tanks containing the products to be delivered, and pumping means to convey the petroleum products from the storage tanks to the customer's vehicle, all of which are mounted with a frame which supports the vehicle and such equipment of the vehicle, and a unitized vehicle body covering and enclosing such equipment, motor and storage tanks for protecting the equipment from rain, snow, dust and adverse weather conditions. The vehicle includes safety features to prevent the pumping equipment from operating while the vehicle's motor is running, and electrical energy means to drive the pumping equipment when the vehicle's motor has been stopped to reduce the risk of fire during delivery of the petroleum products.

It is an object of the present invention to provide a new and improved mobile station for delivery of petroleum products.

It is an object of the present invention to provide a new and improved mobile station for delivery of petroleum products which protects the petroleum storage and dispensing equipment on such vehicle for adverse weather conditions.

It is an object of the present invention to provide a new and improved mobile station for delivery of petroleum products directly to the vehicles of the customers without requiring the customer to come to a service or filling station to obtain such petroleum products.

It is an object of the present invention to provide a new and improved mobile station for supply of petroleum products which reduces the risk of fire during delivery and supply of such petroleum products.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an isometric view of the mobile petroleum supply station of the present invention;

FIG. 2 is a plan view of the mobile petroleum supply station of the present invention;

FIG. 3 is a side elevation view of the mobile petroleum supply station of the present invention; and

FIG. 4 is a schematic electrical circuit diagram of the electrical safety features of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In the drawings, the letter S designates generally the mobile petroleum supply station of the present invention which delivers petroleum products and associated filling station products and services directly to the vehicles of customers by moving to selected locations to deliver such petroleum products and services to the vehicles of the customers, rather than requiring that the customers travel to a service station or filling station to receive such petroleum products. The petroleum products include gasoline and other petroleum fuels for motor vehicles. The associated filling station products include motor oil, anti-freeze, battery water, motor additives and lubricants, and the filling station services include inspection of vehicle tires for air pressure, cleaning of windows, inspection of cooling systems of the vehicles and inspection of the battery water level in the vehicles.

The petroleum products are transported by the station S and contained within a storage tank T, and delivered from such tank T by a pump system P to the customer's vehicle. The associated filling station products are stored in a compartmentalized container S 40, and pressurized air is provided by an air compressor 44. An electrical energy source or storage battery B provides electrical energy to drive the pump P and air compressor 44, and an auxiliary electrical generator G re-charges the battery B when the battery is not in use.

The station S is a motor vehicle modified in a manner to be set forth below which is, mounted with a motor vehicle frame F (FIG. 3), with which a suitable set of wheels W (FIGS. 1 and 3) are mounted, in order that the station S is a mobile, self-propelled vehicle. A suitable motor M (FIGS. 2 and 3), which may be an internal combustion engine, is mounted with the frame F and provides power to move the station S to selected locations to deliver the petroleum products to the vehicles of the customers. Since such motor M is conventional, and of the well-known type, details thereof have been omitted from the drawings in order to preserve clarity in the drawings.

A transmission, which may be automatic or standard, a steering system, a braking system, an ignition system, a lubrication system, a lighting system, a cooling system, and a suspension system are provided for the station S (not shown).
A unitized vehicle body 30 encloses and covers the containers and equipment of the station S when such equipment is not in use to protect the equipment from adverse weather conditions and from corrosive and harmful road chemicals.

A cab C (FIGS. 1 and 3) is provided in the unitized body 30 in which the operator of the station S may sit when driving the station S to a selected location to deliver the petroleum products to customers. A scut 10 is provided for the operator of the station while driving the station S to such selected location. The operator controls the steering system of the vehicular station S as he drives it by a conventional steering wheel 11 of the well-known type in order to control the steering system of the vehicular station S.

A storage tank T (FIGS. 2 and 3) is mounted with the rear portion of the frame F and contains the petroleum products to be delivered to the customers by the mobile vehicular service station S. A plurality of storage receptacle containers 20a and 20b are formed in the storage tanks T, with each of the storage receptacle containers 20a and 20b containing a different petroleum product, for example, gasoline of different octave ratings, in order that the customer may select a gasoline of the desired octave rating for his vehicle when being served by the station S. The exterior of each of the storage receptacles 20a and 20b in the storage tanks T is coated with a shock-absorbing foam or other suitable material which will protect the storage tank T in the event the supply station S is involved in a collision.

A plurality of inlet conduits 21a and 21b are formed on the upper surface of the storage tank T and communicate with the storage receptacle containers 20a and 20b, respectively, in order that the storage receptacle containers 21a and 21b may be filled with the desired gasoline products at a central storage or bulk storage station before the service station S begins delivery of petroleum products to the consumers at their respective vehicles.

A plurality of sealing caps 22a and 22b are threadedly engaged or otherwise suitably engaged with the upper ends of the respective inlet conduits 21a and 21b to seal such conduits when it is desired to close the upper ends of such conduits to prevent escape and vaporization of the gasoline products contained in the storage tank T. A movable closure or door 22c (FIG. 1) is formed in the unitized body cover 30 to permit access to the inlet conduits 21a and 21b.

It should be understood that the relative dimensions and volume of the storage containers 20a and 20b with respect to each other may be selected and chosen in accordance with the consumer demands for the different ratings of gasoline contained therein.

A first outlet conduit 23a is connected between the storage compartment 20a and the pump P and provides fluid communication therebetween, and a second outlet conduit 23b is connected between the storage container 20b of the tank T and the pump P and provides fluid communication therebetween.

Each of the outlet conduits 23a and 23b extend downwardly into the storage containers 20a and 20b, respectively, and have an inlet strainer 123a and 123b (FIG. 3), respectively, mounted at the lower end thereof to receive the gasoline from the storage container 20a and 20b, and strain such gasoline and prevent undesirable particulate matter from passing into the conduits 23a and 23b and the pump P.

The pump P is of the type which selectively mixes and varies the mix ratio of the gasolines drawn thereto through the conduits 23a and 23b to form a blend of gasolines in accordance with the blend ratio selected by the customer. A suitable pump for this purpose might be for example the Wayne Pump Model No. 760 made by the Wayne Pump Division, Dresser Industries, Inc.

A plurality of indicators I (FIGS. 2 and 3) are mounted with the pump P to indicate through a first plurality of indicator windows 31a and 131a (FIG. 2), the price per gallon of the various blends of gasoline which the pump P dispenses and through a second plurality of windows 31b and 131b (FIG. 2) the quantity and price of the gasoline delivered to a customer. Suitable controls are provided with the pump P to adjust the mixing performed by the pump P in accordance with the blend of gasoline selected by the customer.

A set of indicators I, including the indicators visible through the windows 131a and 131b, is mounted within the cab C of the vehicle, and a second set of the indicators I, including the indicators 31a and 31b, is visible through a window 31 formed in the body of the vehicle, in order that the customer may determine the particular blend of gasoline he wishes to be delivered to his car, as well as determine the gallon amount and cost of the gasoline delivered to his car.

A delivery ticket printer 32 is provided, and prints in the gallon amount of gasoline delivered to each customer on a standard printing meter delivery ticket. A door or closure 32a with an associated handle 32b is formed in the body cover 30 of the station S, and when opened such door provides access to the delivery ticket printer 32 in order that the operator may remove the delivery ticket and present such ticket to the customer.

An outlet conduit 23c is connected with the pump P and transports the mixed and blended gasoline from the pump P, after such gasoline has been conveyed from the storage containers 20a and 20b and mixed and blended in the pump P, to a dispensing hose 34 which is stored within a storage reel 35. A coiled spring retractor, or other suitable retractor means, is provided with the storage reel 35 in order that the reel 35 retracts the delivery hose 34 for storage when delivery of gasoline to the customer has been completed.

A nozzle 36 is mounted with an outlet end 34a of the delivery hose 34 and dispenses the petroleum products from the delivery hose 34 into the gasoline tank of the vehicle of the customer. A storage receptacle 36a is mounted with the top of the storage tank T and receives the dispensing nozzle 36 therein when such nozzle is not in use. A resilient clamp 36b or other suitable means is provided in the storage receptacle 36a to hold such nozzle 36 firmly in place when the nozzle is not in use and prevent undue movement which might damage the nozzle 36 when the vehicle S is being moved to a new location.

The nozzle 36 is of the well-known type which automatically shuts itself off when the gasoline tank of the customer has been filled. A door or closure 36c with an associated handle 36d (FIG. 1) is formed in the body cover 30 of the station S when opened provides access to the nozzle 36 in order that the nozzle 36 and delivery hose 34 may be extracted and pulled to the customer's vehicle, and the nozzle 36 inserted in the gasoline tank inlet of the customer's vehicle in order that the pump P may draw gasoline from the storage tanks T and pump such through the conduits 23c, the dispensing
hose 34 and the nozzle 36 into the gasoline tank of the customer's vehicle.

A compartmentalized container tray 40, made of expanded synthetic resinous material or other suitable material, has a plurality of pockets or compartments 40a (FIG. 2) formed therein to receive the containers of associated filling station products such as motor oil, lubricants, motor additives and cleansers, anti-freeze and the like. The tray 40 is housed within a closure or door 40d similar to doors 36c and 32a formed in the body 30 of the station S which is closed when the vehicle is moving to a location to provide gasoline products and associated filling station products and service. The door 40b is opened and the container tray 40 is pulled outwardly to allow access to the desired products held in the pockets 40a of the container 40 when such products are desired. The pockets 40a are cast, or otherwise formed, in a configuration conforming to that of the containers to be held therein, whether such containers be circular, rectangular, or square in cross section or of other configuration, as is evident from the drawings.

The air compressor 44, which is driven by the fan belt of the motor M, (FIG. 2), is mounted with the top of the storage tanks T and furnishes compressed air to a storage tank while the motor M is running. An outlet of the storage tank is provided through an outlet connection 44a to an air delivery hose 45 which is mounted with a storage reel 46. An outlet connection 45a is mounted with the end of the air delivery hose 45 and permits compressed air to be furnished to the tires and other associated equipment needing compressed air on the vehicle of the customer.

The reel 46 is provided with a retractor such as a compressed spring or the like which will retract the air delivery hose 45 and socket 45a when use of such has been completed. A door or closure 45b similar to the doors 36c and 32a, with an associated handle 45c, is formed in the unitized body 30 of the station S and permits access to the hose 45 and socket 45a when use of such is desired. When not in use, the hose 45 and body of the station S, and prevents weather and other adverse conditions from damaging the compressor 44, the retractor and reel 46, the hose 45 and the nozzle 45a.

The battery B is an electrical storage battery which furnishes direct current to drive the pump P during the operation of the Station S. The battery B is a separate battery from the battery used in the electrical system of the motor M, as will be more evident below, and is mounted in a suitable compartment behind the seat 10 in the cab C of the station S, above the storage tank T. Use of the battery B distinct from the battery of the motor M permits operation of the pump P while the motor M is not running, increasing the safety of dispensing petroleum products and precluding a fan-belt failure from halting pumping operations.

An auxiliary battery direct current generator G (FIGS. 2 and 3) is mounted in operative relationship with the motor M and a fan belt mounted with the motor M drives a drive pulley 50 of the generator G in order that a portion of the energy from the motor M is converted into direct electrical current by the generator G. The direct current from the generator G is furnished by suitable conductors to the battery B and is used to charge the battery B when the motor M is running, in order that the service life and effective power generated by the battery B may be increased.

The unitized body cover 30 (FIG. 1) of the station S is made of fiberglass, other suitable synthetic resinous material, or any other type of desired material and encloses and contains the storage tank T therein in order to overcome the fear of bulk petroleum that delivery trucks often cause when travelling through residential and urban areas. The material of the body 30 is easily cleaned, and can be formed into numerous eye pleasing and acceptable designs in order to increase consumer acceptance of the service provided by the mobile service station S of the present invention. The material of the cover 30 also has a long service life and is resistant to rust and other harmful effects of the weather. A door is formed in the body 30 adjacent the cab C to allow the operator-driver to enter the cab C and drive the station S to specified locations to deliver gasoline and associated products to customers.

A front window 30a is formed in the cab C to allow the driver-operator to see ahead in the direction in which he is driving the station S, and two side windows 30b and 30c are formed in the sides of the cab C to enable the driver-operator to view the traffic on either side of the station S, and a rear window 30d is formed in the cab C to enable the driver to look rearwardly as he is backing or otherwise moving the station S rearwardly.

A set of headlights of the well-known type are mounted in the conventional manner to the front of the station S to provide night vision for the driver of the station S, and a set of tail lights 51 are mounted with the rear of the station S in the conventional manner (FIG. 3). A license plate mounting 52 of the conventional type is mounted with the rear of the station S and permits mounting of the registration plates for the station S, and a like constructed mounting plate is formed on the front of the station S for mounting of the front license plate. A front bumper 53 is mounted with the front of the station S in the conventional manner, and a pair of rear bumpers 54 are mounted with the rear of the station S (FIG. 1) the conventional manner to prevent the tail lights 51 and license plate mounting 52 of the station S should the driver inadvertently bump something while moving the station S into position for delivery of petroleum products to the vehicles of the customers.

As a safety feature, the pump P is de-energized, and will not operate while the motor M of the station S is running in order to reduce the risk of fire during delivery of petroleum products caused by an overheated motor or other like reason. A coil 60 (FIG. 4) of a safety relay is electrically connected in the ignition circuit of the motor M and receives electrical energy when the ignition system of the motor M is operating an ignition switch 61 of the motor M is closed. As has been previously set forth, the remainder of the ignition system is conventional and has been omitted from the drawings for clarity. When the motor M is operating, the coil 60 is energized, and a contact 60a thereof is held in a normally open position. The contact 60a of the safety relay 60 is connected in a series electrical circuit between the battery B and pump P so that so long as electrical current is flowing in the ignition system of the motor M, the pump P will not receive electrical current from the battery B due to the safety relay 60, holding the contact 60a of such safety relay in an open position. When it is desired to operate the pump, the ignition system of the motor M is de-energized by opening
the ignition switch 61 and the contact 60a of the safety relay 60 is thereupon permitted to close. Other equivalent suitable electrical circuitry may be used in place of the safety relay 60. A pump operating control switch 65 is connected in a series electrical circuit between the battery B and pump P and when closed allows current to flow from the battery B to the pump P and permit operation of such pump P.

A second safety feature of the station S of the present invention precludes operation of the pump P, until the service station S has been electrically grounded to the customer's vehicle to be serviced by the station S, by de-energizing the pump P until such station S has been electrically grounded to the customer's vehicle, thereby reducing the risk of electrical sparks which might produce a fire or explosion.

A second relay 62 is electrically connected in a series electrical circuit between a terminal of a suitable battery 63 and a safety cable 64. A contact 62a of the second relay 62 is electrically connected in a series electrical circuit between the battery B and pump P and is normally open unless the second relay is energized. When the safety cable 64 is electrically connected to the vehicle of the customer, the second relay 62 is energized by current from the battery 63 and the contact 62a thereof closes permitting a flow of electrical current from the battery B to the pump P energizing such pump. Should the safety cable be inadvertently dislodged from the customer's vehicle, the flow of current through the second relay 62 ceases and the contact 62a thereof opens, de-energizing the pump P by interrupting the electrical circuit between the battery B and the pump P until the station S is again electrically grounded with respect to the customer's vehicle, thereby reducing the risk of electrical sparks which might produce a fire or other undesirable consequences.

In the operation of the present invention, the operator fills the storage tank T with the desired petroleum products and then drives the station S to a suitable dispensing location which might be for example a parking lot adjacent an apartment complex, a shopping center, a hotel or motel, an industrial parking lot adjacent a factory or other industrial or commercial facility, or any other suitable location where a suitable number of vehicles requiring service are located.

The operator then drives the station S to a position adjacent the vehicle requiring service, parks the station S and opens the ignition switch 61 of the motor M, causing the motor M to cease operation and allowing the contact 60a to close. The operator then electrically grounds the station S with respect to the customer's vehicle, whereupon the second relay 62 receives electrical current and closes its associated contact 62a whereupon the electrical circuit furnishing power from the battery B may furnish energy to the pump P upon closing of the control switch 65 of the pump P and allow such pump to operate. Until the motor M of the vehicle has been turned off, and the station S electrically grounded with respect to the customer's vehicle, the associated relays contacts 60a and 62a do not close, and thus prevent operation of the pump P even if the control switch 65 of the pump P is inadvertently closed, and thereby reduce the likelihood of fire from an overheated motor M or from an electrical spark from the motor M or the static electricity from the station S to the customer's vehicle.

The pump P is adjusted to extract the desired blend ratio of gasolines for the customer's vehicle from the storage containers 20a and 20b and mix and blend such gasolines in the pump P and convey such through the outlet conduit 23c to the dispensing hose 34. When the nozzle 36 is inserted in the gasoline tank of the customer's vehicle, the pump P then forces the mixed and blended gasoline through the dispensing hose 34 into the customer's gasoline tank.

While the customer's vehicle is receiving gasoline from the station S, the operator may check the tires of the customer's vehicle and if such tires need air, the air outlet connection socket 45a is removed from the storage compartment within the body 30 of the vehicle V through the door 45b, and the compressor 44 delivers compressed air through the hose 45 to the socket 45a to furnish compressed air for the tires of the customer.

Should the customer desire lubricating oil, motor additives, anti-freeze, or other associated filling station products, the door 45b in the body 30 of the vehicle V is opened and the compartmentalized container tray 40 is extracted and the containers having the desired products therein are removed from their pockets 40a in the container tray 40 and added to the customer's vehicle through the radiator, gasoline tank inlet, or motor oil inlet, as the case may be for such products.

The door 32a is opened to provide access to the ticket printer 32, and the delivery ticket printer 32 is then operated to provide the customer with an indication of the quantity of gasoline he has received.

Upon completion of providing petroleum products, filling station products and associated services to the customer's vehicle, the electrical ground cable is removed, de-energizing the second relay 62 and opening the electrical circuit between the battery B and the pump P, thereby preventing further operation of the pump P to prevent spillage of petroleum products, the retractor for the reel 35 retracts the dispensing hose 34, and the nozzle 36 is inserted into its container 36a and the clamp 36b positioned about the nozzle 36 to hold such nozzle firmly in place. The container tray 40 is inserted within its pocket 40b, and the air hose 45 returned to its receptacle 45b within the body 30 of the vehicle. The door 32a is also closed.

When the doors in the body 30 are closed, the equipment of the station S mounted behind such doors is enclosed within the body 30 of the station S, and is protected by the body 30 from adverse weather conditions, insuring long service life for such equipment and providing safe equipment for use in dispensing petroleum to vehicles of consumers at selected service locations without requiring that the customers drive to a service station to receive such products.

Upon completion of servicing the customer's vehicle, the operator of the station S may remain in a single location in a suitable parking lot or other facility and provide such services to other vehicles, or he may move the station S to a new desired location to provide petroleum products and associated services to customers in such new location. While the motor M is operating during such movement, the generator G is re-charging the battery B and renewing the charge in such battery for subsequent use thereof.

The foregoing disclosure and description of the invention are illustrative and explanatory thereof, and various changes in the size, shape, and materials as well as in the details of the illustrated construction may be
made without departing from the spirit of the invention.

We claim:

1. A mobile petroleum supply station for delivery of petroleum products and associated filling station products and services directly to vehicles of customers, comprising:
   a. motor means providing power to move the station to selected locations to deliver the petroleum products to the vehicles of the customers;
   b. storage means for containing the petroleum products to be delivered;
   c. pumping means for conveying the petroleum products to the vehicles of the customers;
   d. safety means for de-energizing said pumping means when said motor means is operating wherein the risk of injury or damage during delivery of the petroleum products is reduced; and
   e. said safety means further including means for de-energizing said pumping means until said supply station is electrically grounded to the customer's vehicle whereby the risk of electrical sparks producing a fire is reduced.

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