GASOLINE GAUGES...

GASOLINE gauges can be divided into three classes, hydrostatic, electric with balanced coils in the dash unit and electric with bi-metal elements in the dash and tank units.

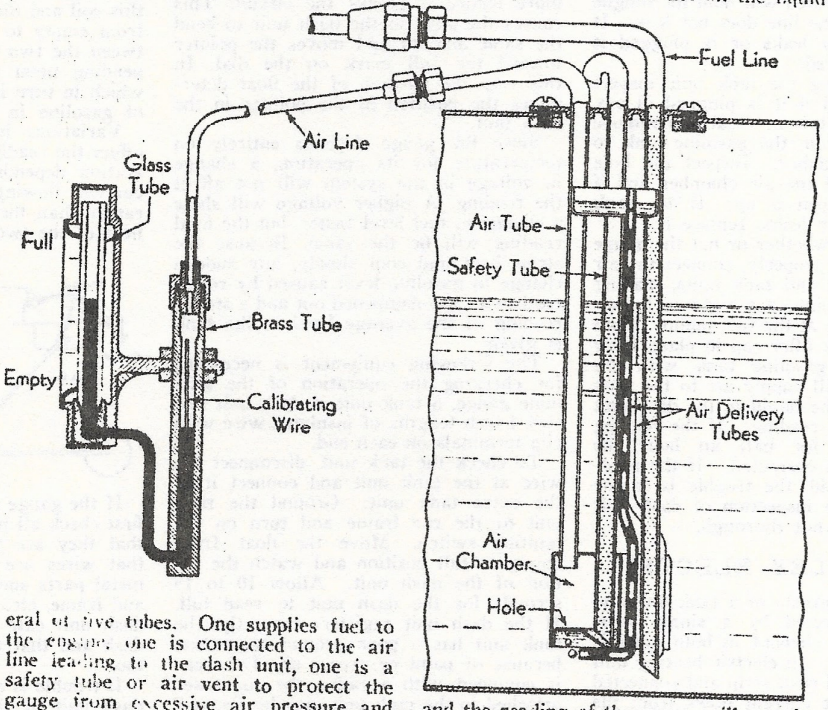
KING-SEELEY HYDROSTATIC

This gauge consists of a dash unit and tank unit connected by an air line. The dash unit is a U-tube containing a heavy red liquid. The front half of the U-tube is glass and gives the tank reading while the back half is brass and is connected to the air line. With the air line disconnected, liquid in both sides of the U-tube balance and the liquid in the glass side registers with the lowest line on the dash unit scale. The tank unit consists in general of five tubes. One supplies fuel to the engine, one is connected to the air line leading to the dash unit, one is a safety tube or air vent to protect the gauge from excessive air pressure and the other two are air tubes which supply air to the air chamber and keep it filled with air. When the cup on an air supply tube is above the level of the gasoline it is constantly being filled as the gasoline splashes around while the car is in motion. The gasoline runs down the air supply tube and in so doing draws with it a few bubbles of air. At the bottom of the tube this air bubbles out and rises under the air chamber. The air, being lighter than gasoline, rises and enters the air chamber through the hole at the bottom and pushes out any gasoline which may be there. When the air chamber is filled with air, these bubbles pass off and are not used.

In operating condition, the air line, air tube and air chamber are filled with air. Gasoline tries to rise to the same level in the air tube as it is in the tank. This is not possible because of the air trapped between the air chamber and the liquid in the U-tube. However, the effort of the gasoline to get into the air chamber presses on the trapped air and this pressure transmitted to the liquid in the U-tube forces the liquid down in the brass tube and up in the glass tube, where it registers on the scale.

From this it is apparent that if there are any leaks or obstructions in the lines the air pressure cannot act on the liquid and the reading of the gauge will remain stationary. It is also important that the correct liquid is used for if it is too light the reading will be too high and if it is too heavy the reading will be too low. Incorrect liquid may also evaporate or freeze.

To inspect the dash unit, disconnect the air line. The liquid in the glass part of the U-tube should register with zero on the gauge. Inspect the glass tube, brass tube and small connecting tube for damage and if broken, the complete dash unit must be replaced. If it is too high,



GASOLINE GAUGES . . .

remove excess liquid from the top of the brass tube with a pipe cleaner, toothpick or match. Do not remove any wires that may be in the brass tube as it will destroy the accuracy of the gauge. If the liquid level in the glass tube is too low, add the correct liquid at the top of the brass tube with a medicine dropper. To test the dash unit, move the thumb or finger rapidly up and down against the top of the brass tube. This action will supply air pressure to the liquid causing it to rise in the glass tube. Entrap the air by holding the thumb tightly over the top of the brass tube. If the liquid holds its reading the unit is okeh.

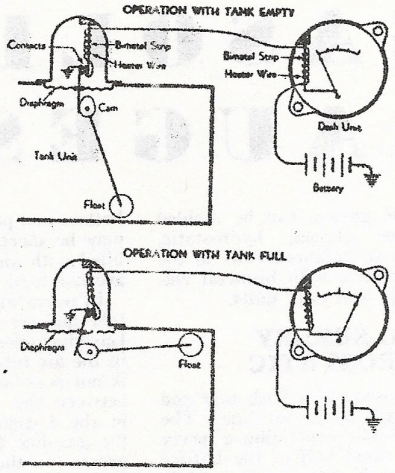
When inspecting the air line, make sure that it is dry first. To do this remove the gasoline tank filler cap. Attach a hand tire pump to the end of the air line at the dash unit end and give at least 50 continuous, full strokes. When pumping, make sure that air is going through the line and that it is not clogged. Now disconnect the air line at the tank unit and inspect the connections for roughness, dirt and flaws. If necessary smooth up the cones with fine emery cloth. Plug one end of the air line and suck with the mouth on the other end. If the suction created will hold the tongue for one minute the line does not leak. If the air line now leaks or is plugged it should be replaced.

Before checking the tank unit inspect the air vent and if it is plugged in any way, clear it. It is necessary to remove the tank unit from the gasoline tank to check it any further. Inspect the hole at the bottom of the air chamber and if it is clogged, open it up. If the tank unit is broken or leaks, replace it.

To determine whether or not the gauge is now working properly, connect the air line to the dash and tank units, making sure that the joints are tight. Disconnect the fuel line at the fuel pump. With the gasoline tank filler cap in place, blow back into the gasoline tank with the mouth. This will supply air to the tank unit and bring the liquid in the dash unit up to its proper reading. If the reading obtained holds for half an hour the trouble has been corrected. If the reading does not hold, the trouble is in the tank unit or the inspection of dash unit or air line was not thorough.

KING-SEELEY ELECTRIC

This gauge consists of a tank unit and dash unit connected by a single wire. The controlling element in both units is a bi-metal strip. An electric heating unit is wound around each strip and connected in series so that current flows from the battery, to the dash unit, and to the grounded contact in the tank unit to complete the circuit. When the strip is heated it bends and this movement operates the gauge. Both strips are similar and as the same current passes through each heating unit both strips are heated the same amount and therefore bend the same amount. The top of each strip is anchored. In the dash unit the bottom of the strip is connected to the pointer of the gauge and heating the strip causes it to bend to the right which also moves the pointer to the right. When the strip in the tank unit is heated it also moves to the right until it breaks the circuit at the grounded contact when it cools and straightens enough to return to the contact again. The movement of the needle



caused by the make and brake of the circuit is so small that the pointer seems to stand still. As the gasoline tank is filled, the cam on the float rod causes the contact to move to the right and therefore the strip in the tank unit must bend more before it breaks the circuit. This causes the strip in the dash unit to bend the same amount and moves the pointer toward the full mark on the dial. In this way the position of the float determines the position of the pointer in the dash unit.

Since the gauge depends entirely on temperature for its operation, a change in voltage in the system will not affect the reading. A higher voltage will show a change in fuel level faster, but the final reading will be the same. Because the strips heat and cool slowly, any sudden change in gasoline level caused by rough roads, etc., are dampened out and a steady reading of the average level in the tank is given.

The following equipment is necessary for checking the operation of the gasoline gauge, a tank unit, a dash unit and two 4-inch lengths of insulated wire with clip terminals on each end.

To check the tank unit, disconnect the wire at the tank unit and connect it to the extra tank unit. Ground the tank unit to the car frame and turn on the ignition switch. Move the float from empty to full position and watch the action of the dash unit. Allow 10 to 15 seconds for the dash unit to read full. If the dash unit registers correctly, the tank unit has a poor ground connection because of paint or grease or, if the car is equipped with a radio, the condenser attached to the tank unit may be shorted. This will cause overreading when the ignition switch is on. The condenser can be checked by disconnecting the wire from the condenser to the tank unit. If the gauge operates correctly with the condenser disconnected replace the condenser. The original tank unit may be damaged and should be replaced. If the reading is the same with the extra tank unit the wiring should be checked. If the wire connecting the tank and dash units is broken or grounded it must be repaired or replaced. If the tank unit and the wiring are okeh then check the dash unit.

To check the dash unit disconnect the wires from the dash unit and attach them to the extra dash unit. If the extra dash unit reads correctly, then replace the dash unit. If the reading is the same as originally the previous checks were not correctly made or the installation was correct all the time.

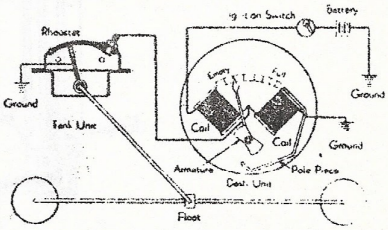
AC ELECTRIC

This gauge consists of a dash unit and a tank unit connected by a single wire. The dash unit consists principally of two coils spaced 90 degrees apart with an armature and pointer assembly mounted at the intersection of the coils axis. An inertia dampener is provided on the armature assembly to prevent vibration of the pointer on rough roads.

The tank unit is essentially a rheostat, the movable contact of which is actuated by a float that rests on the surface of the gasoline in the tank. Movement of the float is transmitted to the rheostat contact arm by a set of gears in larger tanks and through a lever in smaller tanks.

When the gasoline tank is empty the float assembly is at its lowest position where the rheostat in the tank unit is completely grounded. All current through the dash unit therefore flows through the coil at the empty side of the indicator and the pointer is pulled to the empty mark. As fuel is added in the gasoline tank the float assembly rises. This moves the contact brush in the rheostat, introducing resistance into the circuit that grounds the full coil in the dash unit so that part of the current flows through this coil and the pointer is attracted away from empty to a position of balance between the two coils, its point of rest depending upon the amount of resistance which in turn is governed by the amount of gasoline in the tank.

Variations in battery voltage do not affect the reading of the gauge as its operation depends upon the proportion of current flowing through the two coils rather than the strength of the magnetic field of the two coils.



If the gauge does not register properly, first check all wire connections to be sure that they are tight and also make sure that wires are not pinched between any metal parts such as between fender arms and frame, etc. Then make sure that the dash unit case is grounded to the metal dash and that the tank unit is grounded too.

If trouble is experienced with either the dash unit or the tank unit, replacement of the inoperative unit is the only remedy.

Work in locating trouble will be considerably simplified if an extra tank unit is available as it can be connected temporarily with the dash unit by a short piece of wire and grounding the body of the unit to the chassis. The float can then be moved to full and empty positions. If the dash unit indicates the correct position of the float, the trouble is confined to the tank unit and wiring.

If the gauge shows full under all conditions check the wire and all connections between the dash unit and the tank unit. The tank unit may be burned out and should be replaced or the tank unit may be improperly grounded due to loose mounting screws or paint under the screw heads. If this is the case tighten the

screws holding the tank unit and ground the tank to the chassis. If this does not locate the trouble, remove the wire from the tank unit terminal and ground it to the frame of the car. Turn on the ignition switch. If the gauge shows full the wire from the dash unit to the tank unit is open circuited and must be replaced. If the gauge shows empty the wire is okeh but the tank unit is open circuited and must be replaced.

When the gauge shows empty under all conditions it may be caused by the wires being reversed on the dash unit. This can be corrected by simply attaching the wires to the proper terminals. The trouble may also be due to the fact that the dash unit is not grounded and should therefore be replaced. Remove the wire from the dash unit terminal leading to the tank unit and turn on the ignition switch. If the gauge now shows full the dash unit is okeh. If the gauge still shows empty the dash unit is at fault and must be replaced. Replace the wire at the dash unit and disconnect the wire at the tank unit. Turn on the ignition switch. If the gauge now shows full the wire from the dash unit to the tank unit is okeh but the tank unit is shorted and must be replaced. If the gauge shows empty the wire from the dash unit to the tank unit is shorted and must be replaced.

If it becomes necessary to remove the gauge from the dash, disconnect the battery terminal to prevent possible short circuits which may damage the tank unit or other electrical equipment. When connecting the battery wire to the dash unit, make certain that the wire which leads to the tank unit does not come in contact with the ammeter connection or the upper terminal on the dash unit marked "ignition" as this may result in damage to the tank unit rheostat.

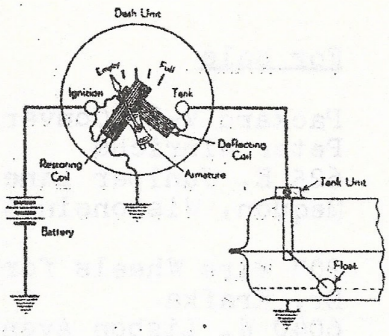
Do not install or remove the tank unit without making sure that the ignition switch is off to prevent danger of sparks near the gasoline supply.

MOTO-METER ELECTRIC

Moto-Meter Electric—This gauge is similar to the AC electric except for the arrangement of two coils in the dash unit. When the gasoline tank is filled the float assembly is at its highest position where the rheostat in the tank unit is completely grounded. All current through the dash unit is therefore equally divided between the two coils and the pointer is pulled to the full mark. As fuel is used from the tank the float sinks, moving the contact brush on the rheostat. This introduces resistance into the circuit that passes through the deflecting coil so that a greater portion of the current flows through the restoring coil and the pointer is attracted away from the full mark in accordance with the amount of gasoline in the tank.

Servicing is also the same as described for the AC electric but locating troubles by gauge readings is a different story.

If after checking all wires for proper installation the gauge still does not indicate properly, remove the wire from the tank unit terminal and ground it to the frame of the car. Turn on the ignition switch. The gauge should then read full. Remove the wire from the frame, with the ignition switch still on, and the gauge should read empty. If this is not the case, the dash unit should be replaced. If the gauge indicates as described, the trouble is probably in the tank unit, which should be replaced.



If the gauge shows full under all conditions one of the following is probably the source: leads are reversed at the dash unit, the wire from the tank unit is grounded or the ground at the dash is poor.

If the gauge shows empty under all conditions one of the following is probably the cause: the wire from the dash unit to the tank is open, the tank unit is burned out or the tank unit is poorly grounded due to loose screws or paint under the heads of the screws.

ATTENTION

The Get-To-Gether listed as a February activity has now been set for Sunday March 1,1970. The place is COUNTRY GARDEN RESTAURANT, 911 W. Layton Ave., Milwaukee. Cocktails at 5:30 P.M. Smorgasbord to follow with slides of last years activities. The price is $4.00 for dinner including tax & tip -- Cash Bar -- KEEP THIS DATE OPEN