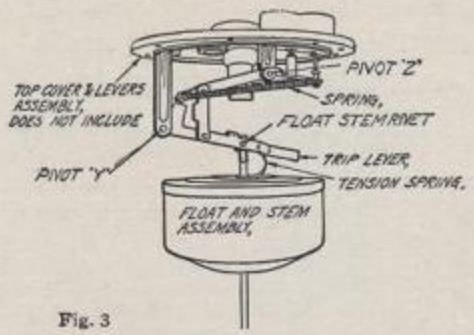

Fig. 3

Fig. 3. Top cover and lever assembly and float and stem assembly.

Filling the Tank on First Starting

Close the throttle to establish the greatest vacuum in the manifold, and turn over the engine with the starting motor for about ten seconds, or while counting ten slowly. Wait a few seconds to allow the fuel to flow to the carburetor, then start the engine as usual.

Some tanks have a hole in the top with a pipe plug in it to provide a more direct means of priming the carburetor. A pint will be ample.

Care of the Stewart Vacuum Tank

No care whatever is required of the tank and it is quite unlikely that you will ever have to touch it because of any imperfect functioning of the tank.

Instructions for Disassembling

It is not necessary to remove the tank from the car to repair it. When the cover is removed the float and operating mechanism is found attached. The inner shell (**M**) may be lifted out, exposing the flapper valve.

1. Disconnect the fuel line (**U**) and vacuum line (**J**) connections.
2. Remove the eight screws from the top.
3. Loosen the cork gasket by running a knife under it. In the new tanks only one gasket is used. The inner shell has a narrow flange so that the gasket covers both the flange and the screw holes in the outer shell. This gasket is wider than the old one formerly used.
4. Lift the cover with the mechanism and float attached.
5. Lift out the inner shell, if required.

To Reassemble

1. Replace the inner shell.
2. Replace gasket in position, with the large hole in edge over the vent tube (**H**) in the outer shell.

   Before replacing the gasket be sure there are no broken or damaged places. Be sure there are no pieces of gasket or other foreign matter on the cover or shell. The gasket is soft enough to take up small irregularities in the surface if they are clean.
3. Replace the cover with the mechanism attached. In doing this, be sure that it is placed so that the short vent tube in the outer shell is directly under the corresponding vent opening in the cover. Also be sure, as the cover is lowered, that the float stem enters the guide, as shown in Fig. 1. If it enters as it should the mechanism will not trip unless the tank is half full of fuel. **The tank cannot operate unless the stem is properly entered.**
4. Insert the eight cover screws and tighten them.
5. Connect the fuel and vacuum lines.

Possible Troubles; Their Causes and Remedies

General: It is very seldom that there is any trouble with the mechanism of the tank. Practically all reported failures of the fuel supply are found, on careful investigation, to be really failures of some part foreign to the tank itself, such as the carburetor, clogging or leaking of connecting lines, etc., as described below.

Failure to Draw Fuel

1. **Air leak in vacuum line or fittings. Air leak in supply line or fittings from supply tank to vacuum tank.**

This may be caused by loose or broken fittings at the vacuum tank, supply tank or manifold or by split, broken or worn tube. It will be most likely to prevent operation on open throttle, but will not cause total failure unless the leak is very bad.

To repair, replace broken tube or fittings or tighten loose fittings.

2. **Plugging of supply tank vent** (usually in the filler cap). This may also cause some gasoline to be forced out of the vacuum tank vent, due to expansion of the gas in the supply tank creating a pressure.

3. **Restriction in supply tube** (**U**) (Fig. 2). Any restriction will limit the flow of fuel. Restriction may **be caused by** dirt clogging the screen (**S**) (Fig. 1) at the vacuum tank or the entrance to the tube at the supply tank, especially when a valve or screen of any kind is used.

It may also **be caused by** a sharp bend in the tube or dirt clogged in the tube at bends, etc.

Over-Rich Mixture or Flooding Engine

Float leak: A leak in the float will cause it to fill partly, fail to open promptly, or at all, the atmospheric valve and close the vacuum valve. This will cause gasoline to fill the inner chamber and be drawn through the vacuum valve into the manifold, resulting in an over-rich mixture or flooding the engine, especially on idling.

To repair, see "Instructions for Disassembling."

Punch a very small pin hole in the float and empty it of fuel. Solder the leak and the pin hole, then test by immersing it in a pan of **hot** water. If no bubbles are seen, the float is air tight.

2. **The vent tube (K) or passage (H) may become clogged** with dirt, which will cause a failure of fuel to flow from the outer chamber to the carburetor. **Clean out** the affected part.

3. **The atmospheric valve (C) may not seat properly,** due to dirt, corrosion, etc. This will prevent building up of vacuum in inner chamber, and if it will not seat tight by cleaning, a new valve or seat may be necessary. (Examine this valve from above by removing sleeve **SA.**)

If the vacuum valve (B) does not seat properly, there will be a continuous flow of air coming in through the atmospheric valve and out the vacuum valve while the tank is dumping. This will not interfere with the operation of the tank or engine.

4. **The atmospheric valve (C) may fail to open** under extreme conditions of high vacuum in inner chamber and weak springs.

As the vacuum valve does not close till after the atmospheric valve opens, fuel will be drawn through the vacuum valve into the manifold and cause a too rich mixture. This condition is prevented on all tanks of 1924 and later make, by the float lever striking the valve lever and opening valve (C).

A sufficiently high vacuum in the inner chamber to cause failure of some earlier model tanks may **be caused by** plugging the supply tank vent, too small a delivery pipe from the supply tank, kinks in it or clogging of screen (S).

5. **On a car that has been idle for some time with gas left in vacuum tank, the flapper valve may leak,** permitting air to flow in sufficient quantities to prevent the vacuum building up in the inner chamber.

This is usually **due to dirt** under the valve or corrosion. Dirt can generally be washed out by pouring a small amount of fuel in the plug opening at the top. In rare cases the bakelite valves that were first used failed to seat because of capillarity between the upper end of the flapper and the valve body. This is cured by installing a new valve which has a small boss on the upper end.

Test the valve by holding up to the light. If it appears very slightly bent, press the valve down moderately with the finger, if this closes the valve it is O. K. If not, a new valve must be installed.

6. **Corrosion of the flapper valve seat** may cause the flapper to stick and prevent the fuel from flowing to the outer chamber.

7. **Noise,** in some of the older tanks which used brass flappers, a rattle was produced at certain speeds. This has been eliminated by the use of bakelite flappers and by a bakelite washer in the float stem guide. Replace the inner shell and valve assembly with a new one.

Vent Tube Overflow

The air vent allows an atmospheric pressure to be maintained in the lower chamber, and also serves to prevent an overflow of gasoline in descending steep grades. If once in a long while a small amount of gasoline escapes, no harm will be done and no adjustment is needed.

However, **if the vent tube regularly overflows, one of the following conditions may be responsible:**

a) **Air hole in main gasoline tank filler cap may be too small or may be stopped up.** The expansion of the gasoline vapor causes a pressure which forces the fuel into the vacuum tank and out the vent. If the hole is too small, or if there is no hole at all, the system will not work. Enlarge hole to one-eighth-inch diameter, or clean it out.

b) **If pressure system was displaced by vacuum feed, the pressure system may not have been disconnected:** if so, disconnect same. There must be no pressure in the main gasoline tank.

c) **The vacuum tank may be too close to the hot engine,** in which case place it farther from this source of heat.

You can also remedy the overflow by attaching a length of tubing to the vent connection and carrying it to the highest point under the hood.

d) **The vacuum tank may not be installed quite high enough above the carburetor.** If the bottom of the tank is not three inches above the carburetor, raise the tank.

Replacing Pressure Fuel System with the Stewart Vacuum Fuel Feed System

When the Stewart vacuum fuel system is sold direct to a car owner, the following parts and fittings are supplied:

One Stewart vacuum tank, with bracket.

One solderless coupling.

Three solderless elbows.

The Stewart vacuum tank is installed on the engine side of the dash. If the tank cannot be installed under the hood it may be placed on the driver's side of the dash.

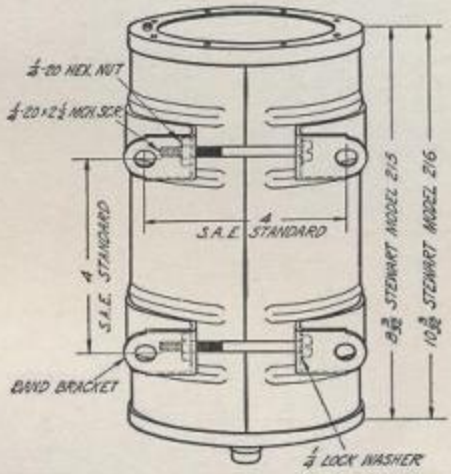

Fig. 4. Outside shell assembly, showing brackets. Bolts or screws to fit the holes in brackets can be $\frac{1}{4}$" or $\frac{5}{16}$"; $\frac{1}{4}$" preferable.

Bear in mind these four points in placing and attaching the vacuum tank:

1. **The top of the Stewart vacuum tank** must be above the level of gasoline in the main supply reservoir when full, even when the car is going down steep grades.

2. **The bottom of vacuum tank** must be not less than three inches above carburetor.

3. **Do not install Stewart vacuum tank directly over generator,** nor over any terminals on which gasoline could possibly leak.

4. **It is usually necessary to ream the carburetor float valve hole** to about double its present area to permit a sufficient flow of fuel by gravity from the vacuum tank for open throttle operation.

Where necessary to bend tubing, do so with a round bend, so that the diameter of the tubing is not made smaller at the bend and so that there are no sharp curves. Never cut the tube with shears, use a hacksaw or file, and square the end.

Attach the vent tube as shown in Fig. 1. See that the **compression collar** 17741 is in place, with flat side down, and that the tube goes in as far as possible before the sleeve is screwed down.

Screw into the bottom of the vacuum tank the **coupling elbow** like the one marked (E), Fig. 1, and two of these into the top at (U) and (J).

Drill and tap the intake manifold for connecting the vacuum line, as shown in Fig. 2. Be very careful to avoid tapping at a point in the manifold which is protected by a water jacket.

Into the hole which you have tapped, screw a **coupling elbow.** Turn this elbow down hard so as to make an air tight joint.

Be sure you connect this to the proper opening which is marked "vacuum line" on the top of the tank.

Join the tubing with the coupling elbow, as shown in Fig. 1.

Unscrew the nut (L) and remove the wedge ring (O).

Slip the end of the tubing through the nut (L), then through the wedge ring (O).—*(Continued on page 1307)*

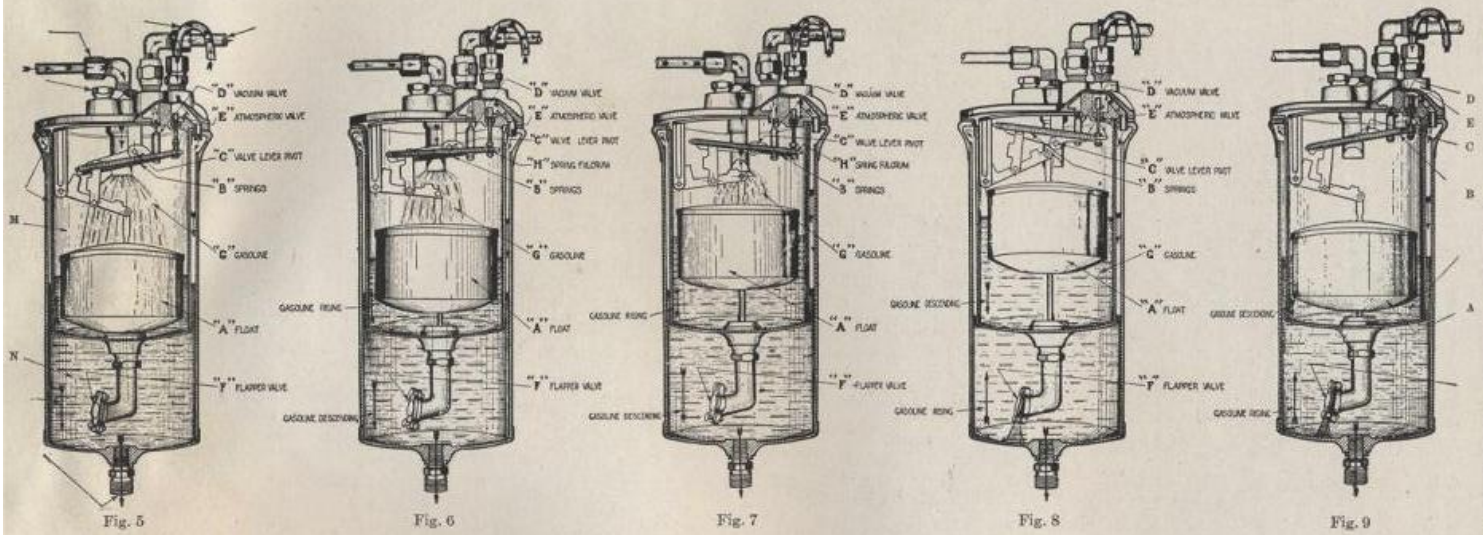

Fig. 5 Fig. 6 Fig. 7 Fig. 8 Fig. 9

Figs. 5 to 9. **The operation of the Stewart vacuum tank** is explained in the illustrations and text below as follows:

Fig. 5. **View showing interior of vacuum tank with mechanism in position at the start of the cycle of operation.** Float (**A**) is in its lowest position. Springs (**B**) are below valve lever pivot (**C**), producing a tension downward on the valve stem lever, holding the atmospheric valve (**E**) closed and the vacuum valve (**D**) open.

Air is being exhausted from inner vacuum, or operating chamber (M). Flapper valve (F) is closed, because pressure inside of outer reserve chamber (**N**) is greater than that inside of operating chamber (**M**).

Gasoline (G) is flowing into operating chamber (M).

Fig. 6. **View showing float (A) rising due to gasoline (G) flowing into operating chamber** which raises the level of the gasoline. Note that springs (**B**) are also moving upward with their fulcrum (**H**) at the extreme right end. Vacuum valve (**D**) still open, atmospheric valve (**E**) closed; flapper valve (**F**) still closed.

Fig. 7. **View showing float (A) still rising** and in a higher position. Springs (**B**) are now slightly above center of valve lever pivot (**C**), producing a slight tension in an upward direction. This will cause the lever to snap upward (see view in Fig. 8). Vacuum valve (**D**) still open, atmospheric valve (**E**) closed, flapper valve (**F**) still closed.

Gasoline (G) flowing into operating chamber.

Fig. 8. **View showing float (A) in highest position.** Springs (**B**) above valve lever pivot (**C**); lever having moved upward thus closing the vacuum valve (**D**) and opening the atmospheric valve (**E**) to the operating chamber.

Gasoline ceases to flow from the main tank as the suction is broken. Atmospheric pressure (see pages 1073, 113 for meaning) now exists in both operating and reserve chambers.

The level of the gasoline in the operating chamber (**M**) being higher than that in the reserve chamber (**N**), causes the **gasoline to flow into the reserve chamber** (**N**) through the flapper valve (**F**)

Fig. 9. **View showing float (A) descending,** with level of gasoline in operating chamber lowered to a point where the float (**A**) and springs (**B**) are in position, producing a tension below valve lever pivot (**C**), which will move the valve lever downward, opening the vacuum valve (**D**) and closing the atmospheric valve (**E**), at which time the operation shown in Fig. 5 will take place again.

Note: The **reference letters** on above illustrations differ from those in preceding illustrations (except **M** and **N** which correspond). The vacuum tank shown in Fig. 1 page 1303, is a later development and has the **improved float operating mechanism** (see **T**, Fig. 1, page 1303 and Fig. 3, page 1304). The principle of operation is the same however.