

INSTRUCTIONS

FOR THE CARE
AND OPERATION

of the

BROOKS STEAMER



BROOKS STEAM MOTORS
LIMITED

Factory: Stratford, Ontario

Head Office: Toronto, Ontario

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The lubrication of the engine is very simple. The crank and bearings are lubricated by an oil bath in the crank case. The cylinders are lubricated independently of the crank case oil by the cylinder lubricator.

The piston and valve stem packing boxes are packed with rings of metallic packing made to size. It is advisable to set the packing box nuts up after the first 500 miles; thereafter they will require little or no attention.

THE ENGINE HOOK-UP OR CUT-OFF.

The engine valves are provided with means for varying the cut-off from full forward position to one-third cut-off. The hook-up or cut-off permits taking advantage of the expansive force of steam to achieve greater economy under average to excellent driving conditions, than the same throttle opening would give with the valves in full forward position.

To hook up, press forward on the reverse pedal opening until you feel the catch drop into its notch on the quadrant, and it is held there. The hook-up button will then be seen to protrude farther through the reverse pedal.

To release, press the round end of the hook-up button, whereupon the catch will lift and the reverse pedal will come back to its original position.

THE THROTTLE VALVE

The throttle valve is located at the left of the boiler and is operated by the throttle lever on the steering post. A tension clamp is provided on the throttle quadrant, by which tension on the lever may be adjusted to suit the operator's preference.

The throttle requires little or no attention, but in case of adjustment see that the three punch marks on the throttle valve stem are in line with the outlet to the superheater, and then lock the locknut on the throttle stem tight.

LUBRICATION

The engine crank shaft and bearings run in an oil bath, and as the engine is in union with the rear axle the differential and inside rear axle bearings are lubricated from this same source.

During the warmer time of the year use 2 gallons of Vacuum Oil Company's Mobiloil "C" in the engine crankcase and rear axle. If the temperature falls below 40 degrees Fahr. drain the oil and use a mixture of 6 quarts of Vacuum Mobiloil "C" and 2 quarts of Mobiloil "E."

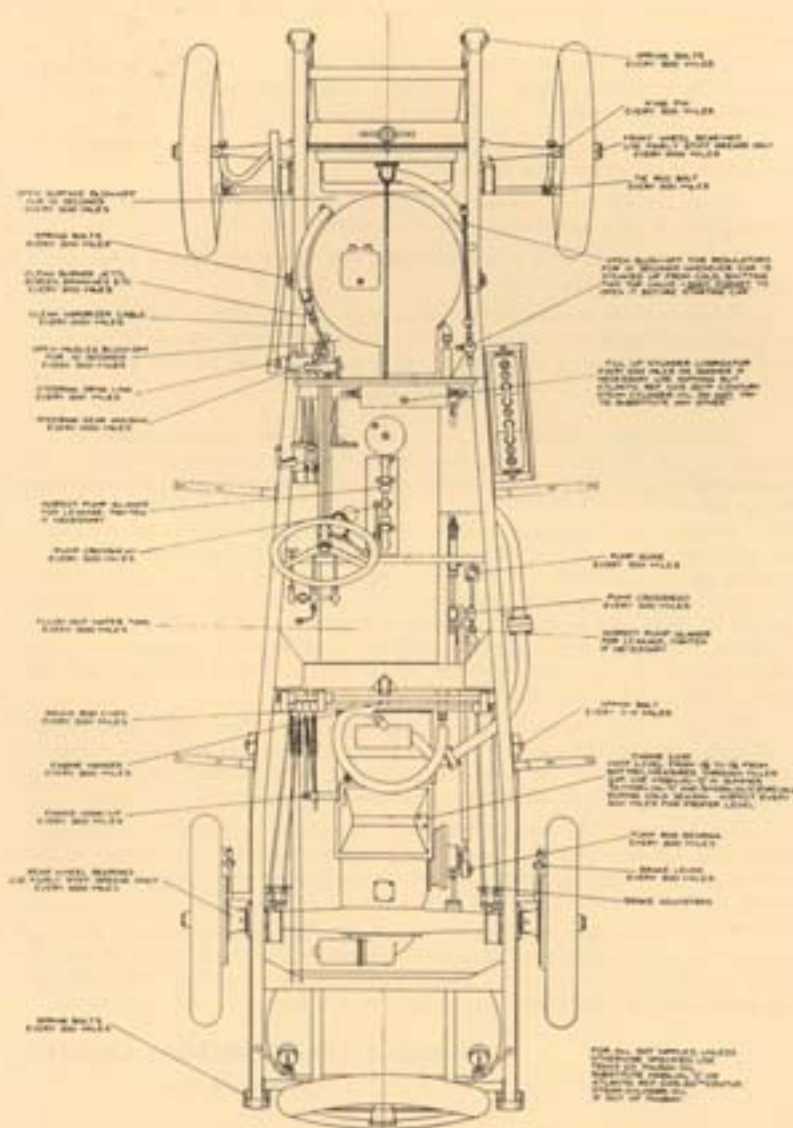
WINTER USE

A full half-day stop unprotected out-of-doors can be practiced with assurance with the Brooks, right up to the extreme cold weather, without any other precaution than maintaining a strong pilot, which is desirable at any time. For added protection in cold climates, we offer the following suggestions:

First—Keep a good pilot.

Second—The water pumps while well protected are the most remote from the boiler, which is the source of stored heat. Place heavy felt 1-inch thick over the pump box. Let this protection extend over the small air spaces between

LUBRICATION CHART



Foreword



IN appearance the Brooks Steamer is like other high grade cars. Its condenser (radiator), body, wheels, axles, chassis frame, steering gear, brakes, storage battery and generator are similar to other cars. Only its power plant and power control are different, and they are much simpler than those of internal combustion automobiles. The power plant consists principally of:

A simple, two-cylinder double acting steam engine, suspended from the chassis but geared directly into the rear axle so that the engine and rear axle form a single unit:

A boiler which supplies steam to the engine:

A burner which supplies heat to the boiler:

A set of tanks and pumps which automatically supply water to the boiler, fuel to the burner and lubricating oil to the engine cylinders:

A set of regulators which control the supply of water to the boiler and fuel to the burner:

A condenser which condenses the exhaust steam and returns the water to the water tank:

A storage battery which supplies current for lights and horn:

A generator which automatically charges the storage battery:

The power control consists of a throttle lever and a reverse pedal.

Wide mechanical knowledge is not necessary in order to drive an automobile successfully, but the greater the knowledge of the operator the more successful performance will be get from his car. The operation of a steam car is so simple and obvious that this knowledge can be more easily acquired than is the case with an internal combustion automobile.

ARTICLE 1.

TO STEAM UP

We are assuming in this article that the car is in the condition it would be in, if it had been run previously. That is, it has water in the boiler and water tank, fuel in the main and pilot fuel tanks, oil in the cylinder lubricator, and pressure on the main pressure tank and pilot tank.

The main fuel compartment of the fuel tank at the rear of the car has a quantity gauge on top at the right end. See that this tank contains kerosene.

The pilot fuel compartment of the fuel tank at the rear of the car has also a quantity gauge on top at the left end. See that compartment contains gasoline.

If it does not, read paragraph 2 of Article 3.

The air storage tank under the front seat has a pressure gauge extending through the front seat board on the left. See that it contains 100 lbs. pressure.

If it does not, read paragraph 6 of Article 3.

See that there is 20 to 30 lbs. pressure on the pilot fuel tank as shown by the small hand and small figures on the duplex fuel pressure gauge on the dash.

If there is not, read paragraph 4 of Article 3.

See that there is 100 lbs. or more pressure on the main pressure tank as shown by the large hand and black figures on the duplex fuel pressure gauge.

If there is not, read paragraph 5 of Article 3.

Set the emergency hand brake.

Lift the left side of the hood and open the small door in the top of the flue over the boiler.

Open both try cocks on the boiler level indicator column (on the left). See that water runs out of the lower one.

If it does it indicates that the water in the boiler is above this point and that is sufficient for steaming up. More does no harm but will take more time to raise steam.

TO START PILOT.

Open the door in the left running board shield near the front.

Pull out the pilot needle to see that it is clear of carbon. Then, by means of a match light the presto-lite tank which is supplied with each car. Open the presto valve half a turn only.

Open peek-hole in side of burner, then heat the pilot branch thoroughly until the branch shows red, then open the pilot valve on the left side of car near the pilot door about half a turn. Ignite pilot through peek-hole by means of presto tank. If pilot does not catch at first trial on account of cold gasoline, repeat.

If your car has the latest electric pilot heater push the spring terminal of the cable on to the button of the pilot vaporizer branch, then push the starting switch making contact for approximately 20 seconds. This is sufficient time to heat the pilot if the battery is in properly charged condition. At the end of these

20 seconds release the starter switch and light the pilot with a gas lighter or match.

If the pilot does not appear strong, turn the pilot screw back and forth quickly a few times with a screw driver, or shut the pilot fuel valve, take out the screw and clean the wire.

The pilot should burn with a vigorous, blue audible flame for four or five minutes so as to heat thoroughly the main vaporizer before admitting fuel to the main burner. *Do not forget to close the peek-hole.*

TO START MAIN BURNER.

The starting valve has a handle at the extreme left of the dash under the instrument board. This valve permits the admission of gasoline into the main vaporizer, which will accelerate starting the main burner.

Open the starting valve until fuel comes out of the nozzle. If the fuel is liquid, close the starting valve at once (to prevent flooding), and allow the fuel thus admitted to assist the pilot in heating the main vaporizer. Leave starting valve open for one half to one minute, close it tight and quickly open main burner valve on dash.

Open the main burner valve slightly at first, being sure that the kerosene is well vaporized, then gradually turn it on more. Best results are obtained if the valve is opened just enough to avoid whistling.

As the pressure falls on the main burner fuel (as indicated by the large hand on the duplex pressure gauge) it may be restored by operating the hand fuel pump stick through the floor.

The main pressure tank contains an air cushion to stabilize the pressure. Lack of sufficient air cushion is indicated by the main fuel pressure receding rapidly when the main burner valve is opened.

It is most desirable to have the correct air cushion on the main pressure tank. The best time to supply the air is when the fuel pressure has been allowed to recede to a low point, as when steaming up.

Then, open both the control valve on the air storage tank and the main pressure tank air valve to admit air to the pressure tank. Admit enough air in this way so that the pressure does not recede rapidly with the main burner valve open.

The car is ready to start as soon as sufficient steam pressure has been generated to move it, which will vary with road conditions, approximately 100 to 200 lbs. on the gauge.

Thereafter the burner valve may be closed at will, or the steam pressure regulator will shut off the fuel at 550 lbs. pressure. The main burner valve need not be closed except when leaving the car, and then it should be shut tight. Close the throttle by moving back the throttle lever, and lock it.

ARTICLE 2.

TO DRIVE THE CAR

Unhook the valve gear by stepping on reverse pedal button. Open the throttle by moving forward the throttle lever.

THE REVERSE.

To back the car, press forward the reverse pedal and button (at the left, at the driver's feet) together as far as they will go and hold them there.

On releasing the reverse pedal be sure that it comes back to the full forward position, not stopping in the hook-up position.

The reverse pedal has a small round pedal protruding through it for varying the cut-off of the engine valves, which gives greater economy.

The hook-up or cut-off pedal may be ignored when learning to drive, and later when its function becomes more apparent you may begin hooking-up the engine as desired.

ARTICLE 3.

TO PREPARE CAR FOR STEAMING UP

PAR. 1.

TO FILL THE BOILER.

(a) If a pressure water system is available, use the hose connection furnished for the purpose to fill the boiler through the front bottom blow-off valve at the front of the boiler on the right. Open both try cocks on the Water Level Indicator Column.

(b) Fill the boiler until the water runs out of the lower try cock on the Water Level Indicator Column.

(c) If no pressure water system is available, the boiler may be filled by means of the hand water pump from the water tank.

To fill the boiler with the hand water pump, open the hand water pump valve and shut the hand by-pass, as well as the fuel suction valve under the right side of the main fuel tank. Then actuate the hand pump handle placed on the hand pump lever.

PAR. 2.

TO FILL THE PILOT TANK.

(a) This is at the left end of the fuel tank at the rear with a quantity gauge on top. Fill with gasoline only. Always screw large, knurled cap against shoulder before tightening wing screw in centre of cap.

PAR. 3.

TO FILL THE MAIN FUEL TANK.

This is at the right end of the fuel tank at the rear, with a quantity gauge on top. Fill the tank with kerosene. If kerosene is not available gasoline may be used.

PAR. 4.

TO PUT AIR INTO THE PILOT TANK.

(a) Attach a hand or power air pump to the air inlet valve of the air storage tank and open the pilot air valve and admit air into the pilot tank until the

pressure of 20 to 30 lbs. is indicated by the red figures and small hand on the duplex pressure gauge on the dash.

(b) Air may be admitted to the pilot tank from the air storage tank by opening the control valve on the air storage tank and also the pilot air valve.

PAR. 5. TO PUT FUEL AND AIR INTO THE MAIN PRESSURE TANK.

Put 80 lbs. of air pressure into the main pressure tank, as indicated by the large hand and large figures on the duplex pressure gauge on the dash. Then work pump stick until gauge shows 140 lbs. fuel pressure.

PAR. 6. TO PUT AIR INTO THE AIR STORAGE TANK.

Attach an air hose to the air inlet valve and open the control valve admitting the pressure up to 150 lbs. if available.

TO FILL THE CYLINDER LUBRICATOR.

Fill the cylinder lubricator with ATLANTIC 20th CENTURY CYLINDER OIL, made by the Atlantic Refining Co., Philadelphia, Pa. Use no substitute.

This oil is available at the Brooks factory and at all Brooks dealers.

We believe all automobile manufacturers are justified in their insistence that owners of cars use only the oil they recommend. It is a costly practice to experiment with cylinder oils, costly not only in money for repairs but also in loss of power and increased fuel consumption.

THE BURNER

The burner consists of two parts—the main burner and the pilot, the latter contained within the main burner and incorporated with it.

THE PILOT.

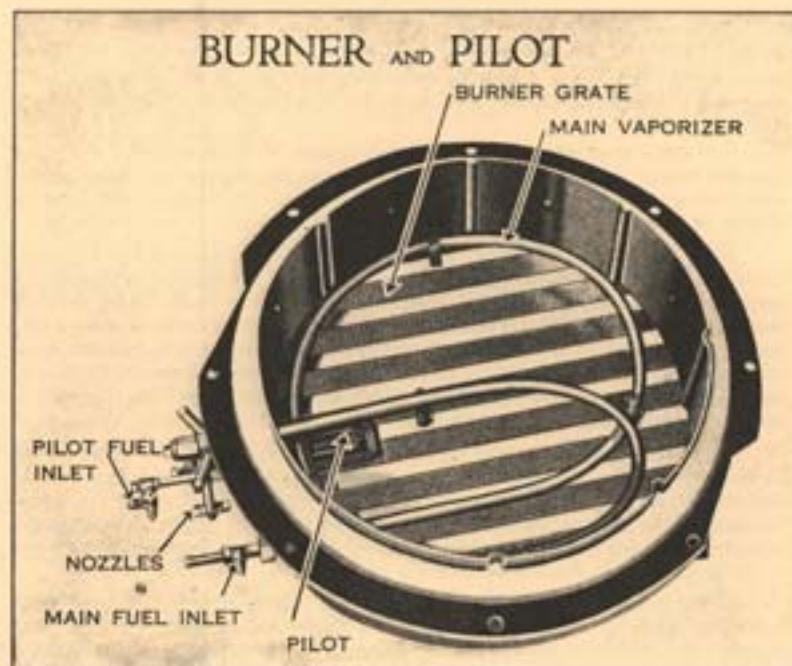
The pilot burns continuously; its functions are:

To ignite the main burner fuel when turned on; to keep the main vaporizer hot for vaporizing this fuel; to supply sufficient heat to the boiler, when standing, to maintain the steam pressure.

The pilot should burn with a clean, blue, audible flame. Its intensity can be varied by varying the pressure on the pilot fuel but should be burned continuously at a strength which will maintain steam pressure when standing. The fuel burned in the pilot is not wasted, it is storing and maintaining heat and energy.

The pilot screw fills the hole of the pilot nozzle except where it is filed off on the upper side, thus giving sufficient opening so that the proper amount of gas may be admitted.

The fuel passage must be kept clear to insure a clean, blue flame. Any carbon restriction in the vaporizer may be blown out by removing the pilot screw and blowing vigorously with its own pressure. Otherwise carbon may be readily removed by running through the vaporizer arms the drill which is supplied for that purpose.



This may be done with the pilot assembly in position, or it may be easily removed by disconnecting the fuel pipe and taking out the two screws in the burner face plate.

THE MAIN BURNER.

The function of the main burner is to supply the heat to drive the car. The intensity of the burner depends upon the fuel pressure and on the free passage of fuel from the pressure tanks to the nozzles. The normal maximum pressure is 140 lbs., at which it is set at the factory. If less than this it will merely reduce correspondingly the intensity of the burner.

With sufficient pressure on the fuel, with the main burner valve open, and with the boiler pressure not so high that the boiler pressure regulator is closed, the burner should burn freely. If not, it indicates either that the low water automatic fuel shut-off valve is closed, or that there is an obstruction in the fuel line between the pressure tank and the nozzles.

The low water automatic shut-off valve seldom has occasion to operate, except when the water tank has run dry. However, it is advisable to examine this first, and if for any reason it has functioned it will be sizzling hot from the steam which has been admitted to it.

The function of the low water automatic fuel shut-off valve is to shut off the fuel to the main burner if the water in the boiler should get extremely

low. The expansion tube is connected at the bottom with the boiler. So long as the water level is above this connection the valve remains open, but when steam enters the tube it expands the valve and closes it. If the valve does function, stop and restore the water level in the boiler before proceeding. See Article 3, Paragraph 1.

If there is an obstruction in the line it may be easily located. First, see that the nozzle holes are clean; if not, they can be cleaned by removing the vaporizer screws and using the small drills supplied for the purpose. It is inadvisable to use anything which might enlarge the holes.

Next, with the main burner and pilot extinguished, take out the vaporizer screws and see if there is a free flow of fuel. If not, it indicates an obstruction farther back. The arms of the vaporizer header should be cleared with the drill supplied for the purpose. This may be done in position or it may be easily removed by taking off the header nut. Remove the screen and its retainer from the main vaporizer and clean it. If the obstruction is thus shown to be farther back, proceed as above, disconnecting each union in turn until the stoppage is located, back to the pressure tank.

Inside the vaporizer, where the fuel enters it, is a wire cable. This should be removed and cleaned often enough to anticipate any stoppage, which would be indicated by lack of force in the burner. Before replacing it flush out the vaporizer with fuel, using its own pressure by opening the main burner valve with the vaporizer screws removed. Consistent use of clean fuel will greatly obviate the necessity of cleaning the fuel line.

If the pilot is permitted to burn weak or yellow it may cause the main burner to ignite in the mixing tubes with a pop. Should this occur, the main burner valve should be closed until the burning in the mixing tubes has ceased.

If unclean fuel is used, or if the cable is neglected, one of the main burner nozzles may become partially or wholly obstructed, causing an uneven flow of fuel and resulting also in igniting in the mixing tubes. This may occur, also, if the peek-hole cover is left open or if there is a leak around the burner casing or in the burner casting, or in the vaporizer.

MAIN PRESSURE TANK

Its function is to keep a small quantity of fuel under pressure for supplying the main burner, the supply being automatically maintained while running the power fuel pump. The fuel may be drained back to the main tank by opening the main pressure tank drain valve, located under the driver's seat.

THE MAIN FUEL PRESSURE REGULATOR

This is located under the rear floor boards on the right frame side member. It controls the pressure on the fuel in the main pressure tank by means of a spring which holds the valve on the seat until pressure on the tank, acting on the diaphragm, overcomes the spring and opens the valve.

THE STEAM PRESSURE REGULATOR

This is located in front of the dash on the left. It controls the steam pressure in the boiler by shutting off the fuel to the burner as soon as the steam pressure has reached 550 lbs. and opening again when the pressure is reduced.

LOW WATER REGULATOR

This is located in front of the dash on the right. Its function is to shut off the fuel to the main burner if the water in the boiler should get extremely low. This regulator rarely has occasion to function, but if it does, stop and restore the water level in the boiler by jacking up one rear wheel and running engine idle before proceeding.

THE POWER WATER PUMPS

The power water pumps are simple, positive plunger pumps located in the pump box, and are driven from the engine. An emergency hand by-pass valve is provided, which normally remains open. Closing it permits filling the boiler above the point where the automatic water regulator functions.

If for any reason the pumps become inoperative, see that there is water in the tank, then that there is no obstruction in the strainer, then that the pumps are not leaking from improper packing, and then see that the check valves and seats are clean. To confirm your inspection, with the wheels jacked up and engine running, loosen a union nut in the water line near the water level regulator. If they are working, water will spurt out.

THE CYLINDER LUBRICATOR

Cylinder lubrication is a simple and positive matter. The steam on its way to the engine becomes impregnated with the cylinder oil, which is fed to it by the lubricator. It delivers positively a definite amount of oil for each revolution of the engine. The lubricator is set when leaving the factory, to deliver the maximum amount of oil. This may be cut down after the car has run a few thousand miles.

The cylinder oil indicator on the dash is a dial with the hand following a semi-circular line, a part of which is marked "Off" and the remainder "On."

THE BOILER

The boiler is of the fire-tube type, shaped like a drum and standing on end.

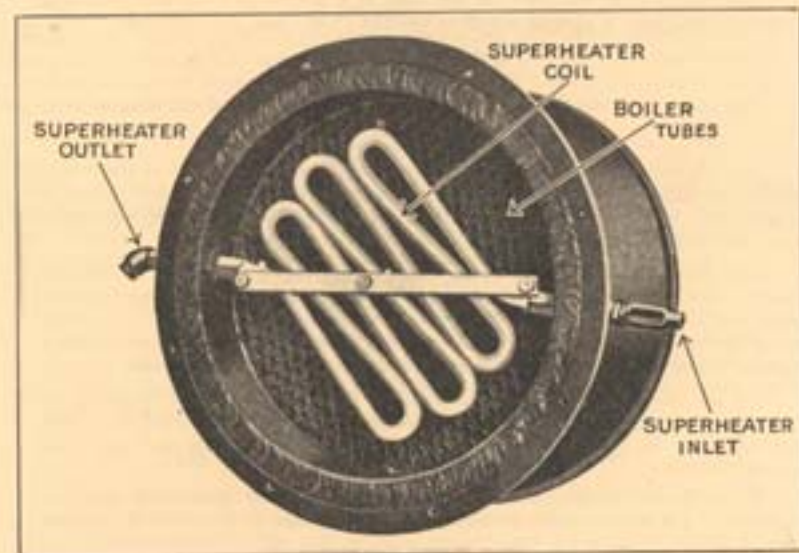
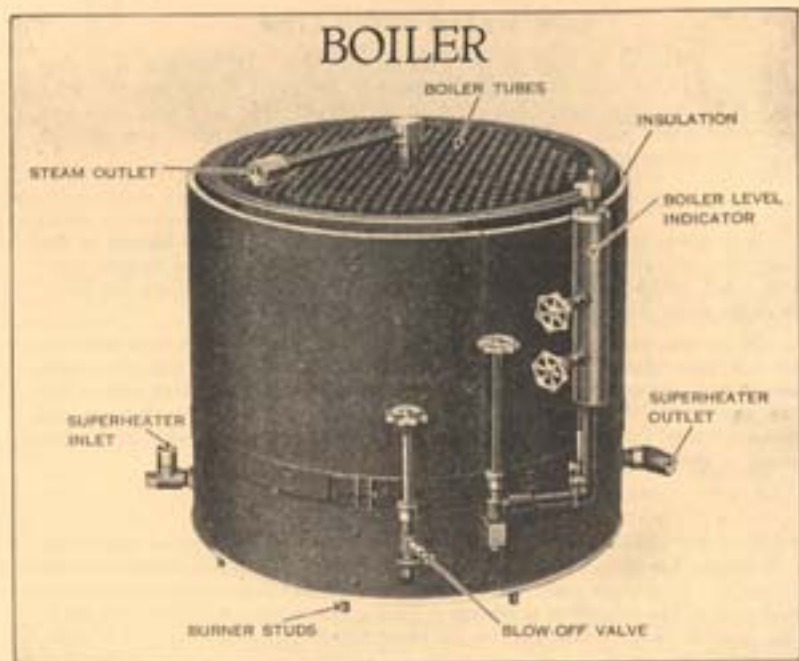
To Blow Off Boiler.

The surface blow-off valve is for removing from the surface of the water any accumulations of oil or other floating matter. It is a sleeve valve. Open it as wide as it will turn and allow to remain open until the water or wet steam ceases and dry steam appears. When closing, turn it until it seats.

This blow-off valve is not sufficient alone, however, to remove all foreign matter. To accomplish this the boiler should occasionally be blown entirely down and cleansed by flushing out with kerosene and hot water. The steam left in the boiler when it is blown completely down will condense and form a vacuum, which may draw sufficient water from the tank to fill the boiler.

Do not assume that this will always be the case, but before steaming up again make certain that there is water in the boiler. If the burner is started with no water in the boiler, the boiler will become overheated and may leak around the tubes.

If the boiler has siphoned full, as indicated above, it is advisable to draw off some of the water before steaming up. Otherwise, if the throttle remains



closed a hydraulic pressure may be created which would do no harm but might cause the safety valve to blow.

Should the boiler prime while running, through the hand by-pass being left closed, wet steam would pass to the engine and make it knock. Make sure that the hand by-pass is open and proceed cautiously until the engine runs freely, or the excess water may be removed at once by blowing off a little.

THE WATER TANK

The water tank is suspended from the chassis just forward of the engine. It is good practice to overflow and flush the tank occasionally.

THE CONDENSER

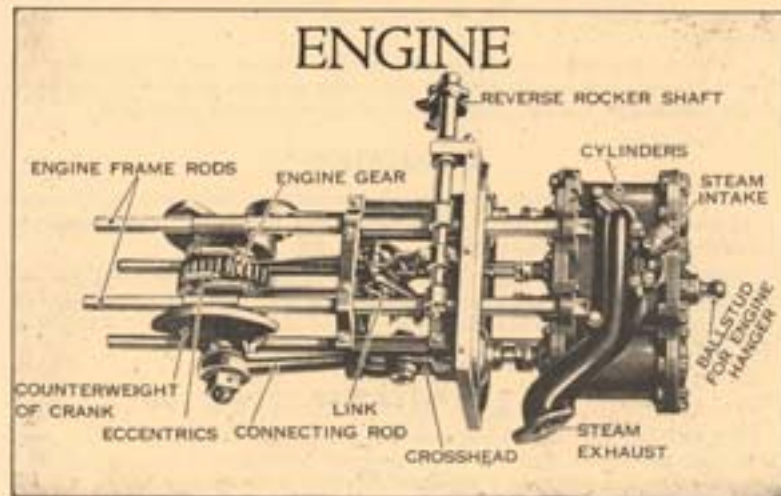
The condenser occupies the place of the radiator on an internal combustion car and is similar in appearance.

THE BOILER CHECK VALVE

The boiler check valve is located in the water line just in front of the dash.

THE SAFETY VALVE

An automatic safety valve is provided, which is of the spring type, the spring holding the valve closed until the pressure overcomes it.



THE ENGINE

The engine has two cylinders, is of the single expansion type, and is double acting.

pump box and water tank, as there is some heat given off from the tank when left well filled after the car has been run sufficiently to warm the water.

Third—The products of combustion from the boiler and burner when standing are delivered directly against the water tank, which assist it to retain its warmth.

Cover all but three or four of the front louvers of the hood by placing a piece of black cardboard inside. This helps in retaining heat and the added air circulation to the condenser is not needed in cold weather.

Fill the steam gauge with heavy oil. This is retained by a reducing bushing which is easily removed for filling.

Dilute the oil in the engine case with a thinner oil of the same quality, keeping the oil at a consistency that will splash easily.

There is no likelihood of the condenser freezing as it is empty when standing and heated when running.

To prepare for storage, drain the water tank and drive the car a few yards to expel water from the pumps, etc.; then blow off boiler; remove steam gauge and safety valve. Remove all check valve bonnets and loosen all unions.

WARRANTY

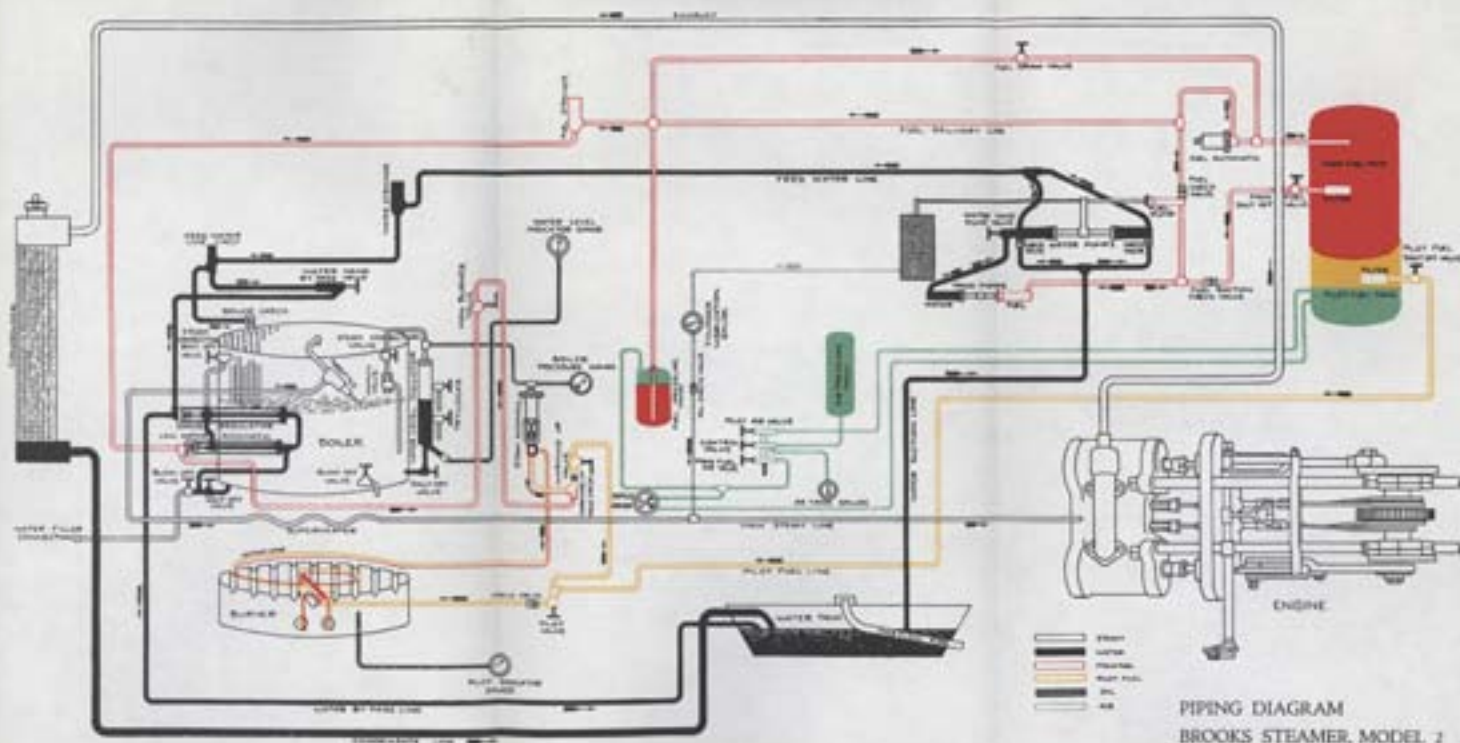
The passenger and commercial automobiles and chasses furnished by Brooks Steam Motors Limited, are warranted to be free from defects in material and workmanship under normal use and service, our obligation under this warranty being limited to making good at our factory any part or parts thereof, which shall within ninety days after delivery to the original purchaser, be returned to us with the transportation charges prepaid, and which our examination shall disclose to our satisfaction to have been thus defective this warranty expressly excludes and is in lieu of all other warranties or conditions, express or implied, and of all other obligations or liabilities on the part of the Brooks Steam Motors Limited, and we neither assume nor authorize any person to assume for us any other liability in connection with the sale of Brooks Steam Passenger or Commercial automobiles and chasses.

This warranty shall not apply to any Brooks steam passenger and commercial automobiles and chasses which shall have been repaired or altered outside of our factory in any way, so as in our judgment, to affect their stability or reliability, nor which have been subject to misuse, negligence or accident.

Brooks Steam Motors Limited, makes no warranty whatever in respect to tires, rims, ignition apparatus, horns or other signalling devices, batteries, speedometers or other trade accessories, inasmuch as they are usually guaranteed separately by their respective manufacturers.

Brooks Steam Motors Limited, reserves the right to make changes in design or add any improvements on Brooks Steam passenger and commercial automobiles and chasses at any time without incurring any obligation to install same on passenger and commercial automobiles and chasses previously purchased.

**BROOKS STEAM MOTORS LIMITED,
Stratford, Ont.**



PIPING DIAGRAM
 BROOKS STEAMER, MODEL 2
 WT. 4000 REPRINTS

INSTRUCTIONS

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AND OPERATION

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