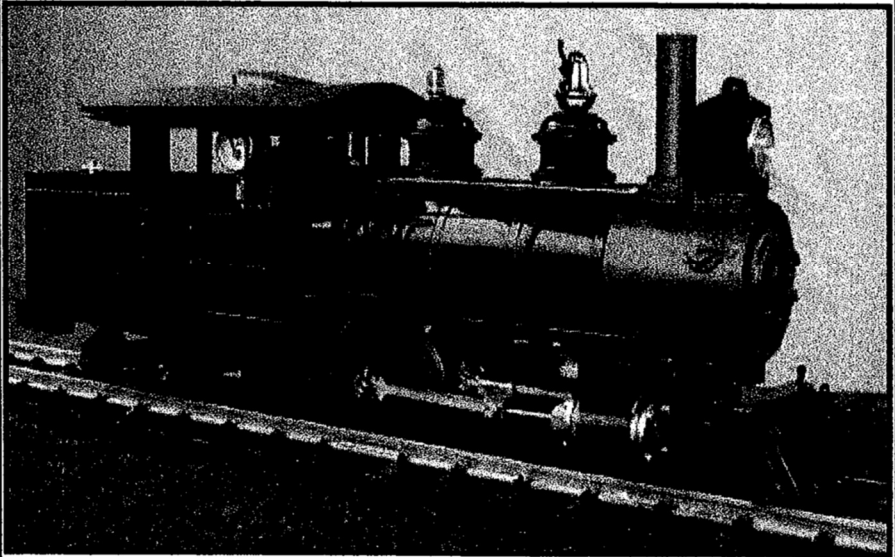


ROUNDHOUSE



Owners Handbook
For the Forney Locomotive

Operating Instructions

IMPORTANT: Read these instructions carefully before operating the locomotive

The following items are required for running this engine and are not included with the model.

Fuel Butane gas. See 'Filling the gas tank'

Water See 'Filling the boiler'

Lubricating oil See 'Lubrication'

SAFETY PRECAUTIONS

This is a working model locomotive using steam under pressure and highly flammable fuel. Provided it is operated with reasonable care and attention, no problems should arise.

It is intended for use out of doors and must only be operated in a well-ventilated area.

Whilst the locomotive is in use, hot gasses are exhausted up the chimney and excess steam frequently blows off through the safety valve even when stationary, so operator and spectators should not bend over the model.

As you will appreciate, this is not a toy and is therefore unsuitable for young unsupervised children.

Follow manufacturers recommendations regarding the safe storage of Butane gas canisters.

Some areas of the model will get quite hot whilst it is operating, so a pair of gloves are provided in the tool kit for your protection.

Always have to hand either a fire extinguisher or wet cloth when operating the model.

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TOOL KIT

The following items are included with your locomotive.

One 60ml bottle of special steam oil for use in the cylinder lubricator.

One 60ml syringe with plastic tube for filling the boiler with water.

One set of spare washers and 'O' rings.

One length of spare flexible steam hose.

One spare gas jet and gas filler valve.

One pair of protective gloves.

One cleaning duster.

One gas filling adaptor

RUNNING IN

All locomotives are extensively test run before leaving the factory, but they will still require a certain amount of running in when new, to overcome initial tightness and allow valves etc. to 'bed in'.

ACCESS TO THE CONTROLS

For normal operation, all controls are accessible without the need to remove any part of the locomotive, however, for ease of servicing, the cab roof hinges up. Lift the front of the roof vertically approximately 10mm then it will hinge forward if lifted from the rear.

The gas regulator and filler valve are located on top of the rear bunker. The roof must be hinged up to allow filling of the gas tank. Also on manual control engines, the steam regulator and reversing lever are accessible through the right hand cab doorway.

The displacement lubricator is positioned in the front left hand side of the cab and accessed by hinging up the roof as detailed above.

The switch for the locomotive r/c equipment is next to the regulator servo in the rear, right hand side of the cab.

The radio control batteries and receiver, are housed in the bunker. They are accessed by removing the bunker as follows.

First hinge up the cab roof as described above.

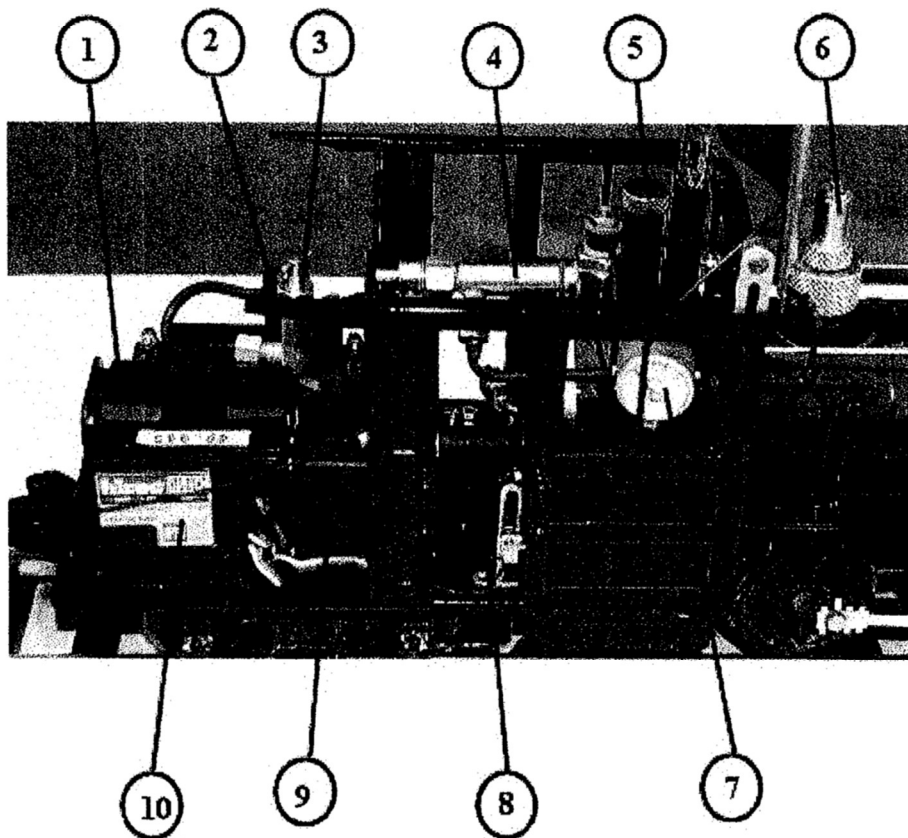
Next remove the two screws at the rear of the bunker which attach it to the footplate. Slide the bunker back a little so that the tabs on either side are clear of the slots on the cab rear, into which they fit. The bunker can now be lifted up and backwards, maneuvering over the gas regulator handle, to remove.

Fitting is the reverse procedure.

IDENTIFICATION OF PARTS OF THE LOCOMOTIVE

Radio controlled version illustrated

- 1/ Battery holder. 2/ Gas filler valve.
3/ Gas regulator
4/ Steam regulator. 5/ Lubricator filler cap. 6/ Safety valve.
7/ Pressure gauge. 8/ Gas burner.
9/ Steam regulator servo (not fitted on manual control engines).
10/ R/C receiver



PREPARING FOR OPERATION

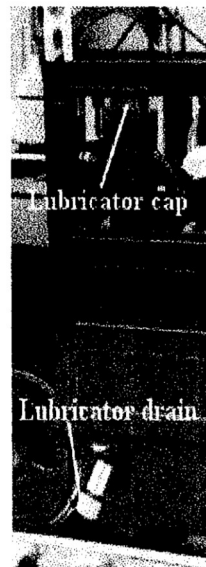
The locomotive must be serviced before being operated. It is important to perform all the following operations.

1) LUBRICATION

Regular lubrication of all working parts is important and should be carried out before each operating session. There are two types of lubrication required: The external moving linkages and bearings are lubricated with a medium oil such as motor engine oil, and the internal steam mechanisms such as cylinders, pistons and valves are lubricated with a special steam oil that is mixed with the steam. Infrequent external lubrication will allow parts to run dry, and over oiling can form pools around operating parts that attract dirt and grit. If too thin an oil is used it will evaporate very quickly as the loco gets hot – leading to dry running. We recommend the use of a 20-50 motor oil for external lubrication. When carrying out general lubrication, do not forget the reversing linkages under the footplate and chassis, cab roof hinge/slide and regulator spindles (see Trouble Shooting section for further details of oiling the regulators).

Internal lubrication is achieved by steam oil that is mixed with the steam in the displacement lubricator, housed in the left-hand side of the cab. Hinge up the cab roof and remove the knurled cap from the top and slacken the drain screw two or three turns at the bottom but do not remove it. Any water in the lubricator will run out through the drain screw. Tighten the drain screw and refill with the steam oil supplied, then replace the cap. Take time filling the lubricator, especially when cold, as the oil takes time to run down and may trap an air bubble. Both cap and drain screw are fitted with 'O' rings and need only be closed finger tight.

NOTE: Only special steam oil as supplied should be used in the lubricator and under no circumstances should ordinary oil be substituted, or damage may result.



2) FILLING THE BOILER

A syringe and plastic pipe are supplied for filling of the boiler. The boiler is filled with water through the safety valve bush, housed in the dummy steam dome on top of the boiler. The dome is a substantial and heavy item, being machined from solid brass. Care is needed when removing the dome, especially when the engine is hot, as the dome itself will be hot. Take care not to drop the dome onto the locomotive, as the weight of it may

damage the model. Lift off the dome then remove the safety valve/filler plug by unscrewing it with the large knurled ring around its base. Fill the boiler right to the top with clean water. Distilled water is recommended if available. As an alternative to distilled water if this is unavailable, clean tap water can be used in soft water areas. Also, rain water or water from a dehumidifier can be used provided that it is adequately filtered

Do not use deionised water as this type of water may cause long term damage to the boiler and fittings.

There has to be a space above the water to allow steam to be raised so, insert the end of the plastic pipe into the boiler and withdraw 30ml of water with the syringe. Replace the safety valve finger tight then place the dummy steam dome over it.

3) FILLING THE GAS TANK

The filling of the gas tank should only be carried out in a well-ventilated area, where there are no naked lights or other lighted locomotives close by. Ordinary Butane gas is used (as used in gas cigarette lighters), though for economy, the larger canisters as used for blowlamps or camping stoves etc. are better. The larger canisters have an EN417 threaded self sealing valve on top and require a special adapter to couple up to the filler valve on the locomotive and one is supplied in your toolkit.

Iso-butane and butane/propane mixed gasses (typically 20-80, 30-70 and 60-40 Butane/Propane) are also available, and these can be used on this model, see trouble Shooting section for further details.

Before attempting to fill the gas tank, make sure that the gas control valve is closed by turning it clockwise.

The filler valve for the gas tank is on top of the rear bunker next to the gas regulator and is accessed by hinging up the cab roof. Ensure that the gas canister is fitted with a correct adaptor then invert it and place its nozzle over the gas filler valve. Support the locomotive from underneath and press the canister down. The gas will be heard hissing as it enters the tank and a small amount will escape around the valve. This is quite normal and is the tank venting as the liquid enters. After about 20 to 30 seconds, liquid gas will emerge from the valve showing that the tank is full. Remove the canister immediately.

4) LIGHTING THE BURNER

WARNING: Before lighting read the section on gas system troubleshooting (page 13) and be aware of potential problems. If the gas system is not operating correctly, **shut it off immediately** or damage may result.

Move the locomotive to another location before lighting. Butane is heavier than air and small pockets of gas can collect around the locomotive during

filling.

To light the burner, hold a lighted match or cigarette lighter over the top of the chimney and **slowly** open the gas regulator by turning it anti-clockwise. The gas should ignite almost immediately with a pop as the flame travels down the chimney and into the boiler tube. The burner should be audible but not too loud.

NOTE as stated above, the gas regulator should be opened slowly until the burner ignites. If opened too quickly, particularly when the engine is cold or if the gas tank has just been filled, it is possible that the flame may not travel back into the boiler flue but stay in the smokebox. If this should happen, the burner will sound quite different to normal and the blue flame will be visible in the smokebox if viewed down the chimney from a safe height. Should this happen, turn off the gas immediately or damage may result and then re-light it. If the problem persists and it is not possible to ignite the burner correctly, then a dirty jet should be suspected and cleaned as detailed on page 14.

For the first couple of minutes keep the burner on low. This is important, as until it warms up, the flame will be a little unstable and turning it up too much could cause it to go out. Also, with a completely full tank, liquid gas could be drawn off instead of vaporized gas, which can also extinguish the flame.

After a couple of minutes, the gas control valve can be opened more to speed up steam raising. Open the gas regulator slowly to about one full turn. The full range of adjustment (closed to fully open) is achieved within the **first full rotation** of the gas regulator knob any more is unnecessary.

RUNNING THE LOCOMOTIVE

When full working pressure has been reached (about 40psi), the safety valve will start to blow off steam. Steam generation can be controlled by the gas valve on the rear bunker. If the safety valve blows off frequently during running, then too much steam is being produced, which wastes water and gas. Turning down the burner will decrease the amount of steam created. Conversely, if steam pressure is not maintained during a run, then the burner should be turned up. After a few minutes of running it may be noticed that the gas pressure through the burner has increased. This is due to the gas tank becoming warmer and so increasing the gas pressure. Simply turn the gas down – this may need to be performed several times during a run. The art of balancing steam generation to the operational requirement by the adjustment of the gas control valve will quickly be learned.

The gas tank has a duration of about 25 minutes, though this will vary depending on gas valve setting. The boiler should not be allowed to run dry, and the gas tank capacity is such that the gas should run out before the water.

When the gas is fully used up, the steam pressure in the boiler will be seen to gradually drop until the loco comes to a halt. Should the water expire before the gas is fully used, the pressure will drop rapidly and the loco will stop. Check the pressure gauge – if this is zero turn off the gas. No damage will result if the gas is turned off immediately.

DRIVING THE LOCOMOTIVE MANUALLY

On manually controlled locomotives, there are three main controls, all of which are housed in the cab.

1) The gas regulator, which should be used to control steam generation as described earlier.

2) The reversing lever. This is in the right-hand side of the cab and is moved fully forward for running in a forward direction and full back to run in the reverse direction. To operate the lever, push it lightly inwards against spring pressure, and move it in the desired direction. There are three notches in the top of the quadrant to locate the screw head in the lever and hold it in the correct position. It should be parked in the centre (mid gear) when the locomotive is stationary for any length of time. When in mid gear position, the reversing valve is closed and the engine will not move under steam power.

3) The steam regulator. This is the main steam control valve and regulates the speed at which the engine will run. The regulator handle is situated in the left hand cab doorway and is moved anti-clockwise to open and clockwise to close.

Using the reversing lever, select the desired direction of travel and open the regulator a little. Initially, there will be a certain amount of water in the pipes and cylinders, which will exhaust through the chimney and, after a few moments, the engine will move jerkily, until this clears. Once the parts have warmed up, the engine will move off steadily and it's speed can be controlled with the regulator. Subsequent starts will be quite smooth once the cylinders etc. have reached their normal operating temperature.

To reverse the locomotive, close the regulator to bring it to a halt, move the reversing lever over and open the regulator again.

The art of fine control will soon be learnt with a little practice.

DRIVING BY RADIO CONTROL

On a radio controlled model, speed and direction are controlled by moving the two levers on the transmitter supplied. The left hand lever operates the steam regulator, down for stop, up for go and the right hand lever operates the steam reversing valve, left for forward, right for reverse and centre for mid

gear (neutral).

Switch on the transmitter with the switch in the centre of the front panel. The battery meter above should indicate that the batteries are OK. Switch on the receiver on the locomotive with the switch in the right hand side cab. Select the desired direction of travel by holding the right hand lever fully over, and then open the regulator a little by moving the left-hand lever upwards slowly. The locomotive will now move off as described in the manual control section. The art of fine control will soon be learnt with a little practice.

NOTE:

Always hold the reversing lever fully over in the required direction when the engine is moving. The model is fitted with a steam reversing valve and is not capable for 'notching up' (altering the valve cut off).

Always bring the locomotive to a halt by closing the regulator before changing direction.

If an emergency stop is required, simply release the reversing lever, which will spring back into mid gear and halt the train. Then close the regulator.

Always ensure that the regulator is closed before switching off the transmitter.

Always switch off the receiver and transmitter when not in use to preserve battery life.

It is good practice to switch on the transmitter before the receiver and switch off the receiver before the transmitter. In this way, the radio receiver is never on when the transmitter is switched off and so should always be under your control.

When the batteries are getting low, a poor signal between transmitter and receiver will result and control of the engine will become erratic. The transmitter batteries are housed in the back of the unit under a clip off panel.

The receiver batteries are housed in the rear bunker as described on page 4.

WATER TOP UP SYSTEM

A water top up system is available for this model, either factory fitted or as an add-on accessory. This enables the water level in the boiler to be monitored and topped up to keep the engine in steam for longer periods.

Once the locomotive is in operation as detailed in the previous sections, water can be added to the boiler at any time during the run as follows.

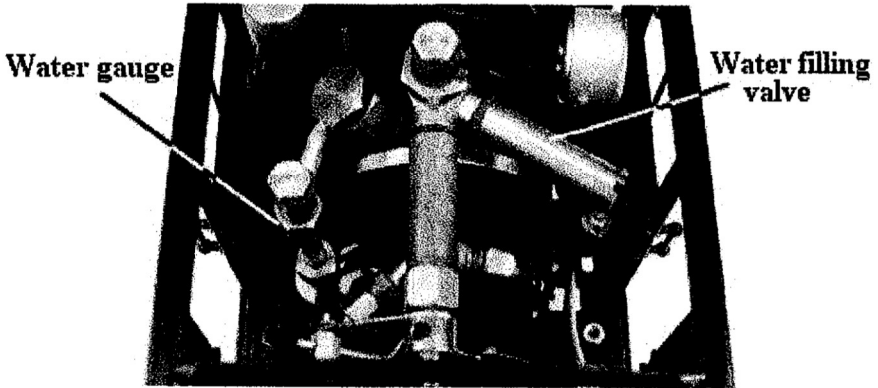
Fill the water pump bottle from your usual water supply.

Push the end of the plastic tube into the open end of the water filling valve on the right hand side of the turret whilst steadying the locomotive, but be careful what you touch if the engine is hot.

Pump the handle and this will inject water into the boiler.

You will usually see water and air bubbles passing through the sight glass as you pump so allow the level to settle after a few pumps.

Carefully pull the plastic pipe out of the water filling valve whilst still steadying the engine.



Sometimes, small particles of dirt will find there way in with the water and may cause the water filling valve to leak back a little when the pipe is removed. If this should happen, re-connect the pipe and give a further pump or two of water to clear it.

Once you start running your loco you will see the water level in the gauge slowly dropping. Note that air bubbles may sometimes form in the gauge giving a false reading but these can be pushed out by connecting the pipe from the water pump to the water filling connector – and injecting some water.

It is better to pump small amounts of water into the boiler at frequent intervals rather than large amounts as the pressure drop will be much less and you will be back up to working pressure much quicker.

Aim to keep the water level between $\frac{1}{2}$ and $\frac{3}{4}$ up the gauge and re-fill the gas tank as detailed in the locomotive operating instructions whenever it is empty. In this way, you can keep the loco in steam and at working pressure as long as you like.

Don't forget to re-fill the displacement lubricator about every 30 minutes.

TROUBLE SHOOTING & MAINTENANCE

On a working model of this nature, it is important to keep all working parts well lubricated.

With constant heating up, cooling down and the stresses of hard work, screws etc. can work loose so, it is good practice to check all fixings and cylinder screws regularly but remember, never over tighten.

STORAGE BETWEEN OPERATING SESSIONS

At the end of an operating session, it is good practice to clean the locomotive carefully with a clean soft cloth, and to oil all bright metal parts.

- * Do not leave fuel or water in the tank or boiler for long periods.
- * Do not store in places where the temperature may drop below freezing as water may still be present in the pipework.
- * Ensure all controls are closed and the valve gear in mid gear.
- * Ensure that radio control equipment is switched off and, if the engine is not to be used for some time, remove all batteries.

Periodically, wash off all traces of dirt and old oil from the moving parts with paraffin (not thinners) and apply fresh oil. This will stop the build up of dirt and grit.

STEAM LEAKS

The cylinders are fitted with 'O' rings in the glands sealing the piston rods. These can be adjusted with a spanner if steam leaks develop. They should only be tightened just enough to stop the leak, as over tightening will affect the running of the model.

REGULATOR NOT SHUTTING (R/C models)

The steam regulator seating and seal can, after a period of time become worn or compressed so that when the lever on the radio control is fully closed, the locomotive still moves. To overcome this, a trimmer is fitted to the transmitter. This is the small lever at the side of the main control lever and is set at the factory to the top of its slot. As wear takes place in the regulator, it can slowly be moved down the slot to compensate. When it reaches the bottom, it is time to reset it to the top and adjust the linkage between the servo and the regulator in the cab. If adjustment does not cure this problem, the internal 'O' ring is probably damaged and requires replacement. Contact the factory for further advice.

Periodic oiling of the gland will help keep the regulator working freely. Place a spot of motor oil between the gland nut and the regulator arm and work the regulator a few times.

RADIO CONTROL

If the radio control gives problems, always check the batteries first and replace if in doubt. AA size batteries are used, four in the locomotive and eight in the transmitter. If problems occur whilst running the locomotive near other r/c engines, check that yours is on a different frequency.

To allow a number of locomotives to operate at the same time in close proximity, a

range of crystals are available for different frequencies, which can be purchased from any good model shop. Crystals operate in pairs, one in the transmitter and one in the receiver. They are clearly marked with the frequency and either TX or RX. When fitting, ensure that the one marked TX is fitted to the transmitter and RX to the receiver. Two radio systems are currently in use, 40MHz FM and 75MHz FM. **ROUNDHOUSE** now only use 75MHz FM sets for USA and CANADA. Ensure that the replacement crystals are of the correct type.

It is common practice with radio controlled sets to attach a white marker or label to the aerial with the frequency or band number clearly marked in black.

For further details of the r/c equipment, refer to the manufacturers literature supplied.

GAS SYSTEM

Forney locomotives are fitted with our 'FG' type gas burner, which is set up and fully tested at the factory.

This system is designed for use with Butane or Iso-butanegas as stated earlier. Mixed gasses, i.e. Butane with a proportion of Propane mixed in, are available, and may be used in this model, but please note the following. As the pressure of the gas in the tank is much higher with propane, the temperature of the gas tank should not be allowed to exceed 60 degrees Celcius, though under normal running conditions, the working temperature of the tank will be far less than this. Propane also requires a slightly different fuel/air mixture to butane, even when the two are mixed so efficiency of the burner and steam generation may vary, depending on the gas used.

The tiny jet in these units can become blocked by small particles of dirt making the burner difficult to light, burn weakly at normal operating temperatures*, burn in the smokebox or fail completely. If any of these should happen, clean out the jet as follows.

(* On very cold days, a burner may start off burning weakly due to the temperature of the gas but should increase to its normal level as the engine warms up. This is quite normal)

Hinge up the cab roof and remove the rear bunker.

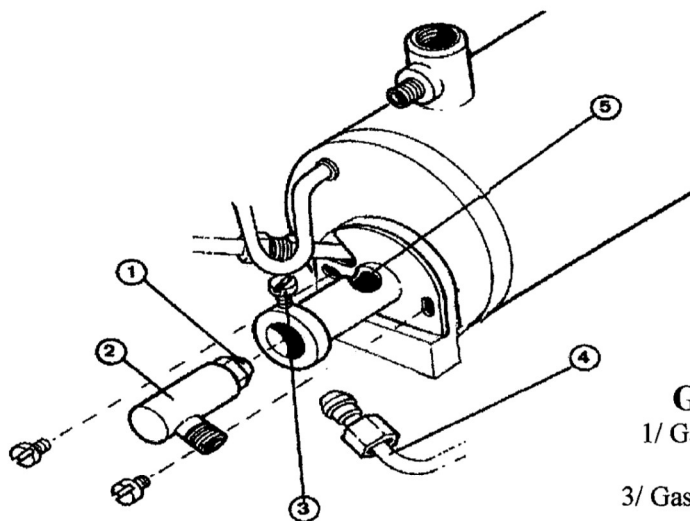
Carefully, disconnect the gas pipe from the jet block using a 2BA spanner.

Note when connecting or disconnecting the gas pipe and jet block, do not use excessive force. Always hold the end of the gas burner near the air holes to support it otherwise it is possible to cause damage by bending the body. Slacken the screw retaining the jet block and slide it out to the rear. Remove the jet from the jet block using a 4BA spanner. Wash out the jet in fast evaporating thinner (Cellulose or similar). Blow through the jet from the front, which should clear most blockages. Although the hole through the jet is tiny, if you hold it up to the light you should be able to see quite clearly if it is blocked or not. If in doubt, fit a new jet. A spare gas jet is included with the toolkit. Do not use wire to clean the jet as this can damage the precision hole and may upset the delicate balance of the gas system. Reassemble in the reverse order, putting a small amount of PTFE tape round the thread of the jet. Ensure all connections are tight. When re-positioning the jet block in the burner, ensure that it is pushed in as far as it will go.

The gas regulator has a removable spindle and sealing gland that will require oiling

from time to time if operation becomes either stiff or 'springy', causing difficulty in obtaining fine control over the burner. If you keep rotating the spindle in an anticlockwise direction, it will eventually screw right out and this must never be done when gas is present in the tank. As stated in the lighting instructions on page 8, the full range of adjustment for normal burner operation is achieved within the first full rotation of the regulator knob, and it should only be unscrewed more than this for maintenance purposes and when the tank is empty, and there are no naked lights nearby.

The spindle-sealing gland is an 'O' ring and is housed inside the hexagon gland nut, just below the gas control knob. To lubricate it, remove the knurled knob which is retained by a 4BA socket grub screw (.100" AF Allen key required) and run a drop of oil down the spindle. Replace the knob and screw the spindle in and out two or three turns to work the oil into the seal. This will usually have an immediate effect and the regulator should be smooth and free operation. If it is still a little stiff or 'springy', it may be necessary to repeat the operation or even remove the hexagon gland nut to gain full access to the 'O' ring. Silicone lubricant, obtainable from car accessory shops, is very good for this application. When replacing the gland nut apply a small spot of Loctite hydraulic seal to the thread (or if not available, a small spot of paint will suffice) - this will hold the gland nut in place. Tighten the gland nut up enough to compress the 'O' ring and form a gas tight seal, and then allow the hydraulic seal or paint to cure.



Gas Burner
1/ Gas jet. 2/ Gas jet block.
3/ Gas jet block retaining

FLEXIBLE STEAM PIPES

Because this locomotive has an articulated power bogie, the steam feed and exhaust pipes between the smoke box and reversing valve are flexible. If either of these fails in service, it will be necessary to replace it, and spare tube is included in the tool kit.

Remove the steam dome and place the locomotive upside down on some soft packing on your bench. The two flexible pipes will be seen between the chassis frames, connecting to two copper pipes which in turn connect to the steam reversing valve. The steam feed is the pipe with the stainless spring protecting it and the one without is the exhaust.

Carefully slide the brass collar off the flexible tube and onto the copper pipe. If the steam feed is being replaced, push the stainless spring back along the flexible tube to access the collar.

The flexible tube can now be eased off the copper pipe.

To gain access to the other end, it is necessary to lift the power bogie away from the boiler cradle. To do this, remove the 6BA hexagon headed screw which holds the reversing link to the rear frame spacer and carefully rotate this 90 degrees so that the 6BA screw on the power bogie pivot can be removed with a nut spinner or box spanner. Once this nut has been removed, the power bogie will lift upwards enough to access the upper pipe connections. Disconnect as for the bottom end. Cut a new piece of tube and connect the top end first. Slide the brass collar onto the metal pipe first, making sure the flanged end is facing out. Slide the flexible tube over the metal pipe and push it on about 7mm. Slide the brass collar fully over the end of the flexible tube and gently pull the flexible tube back to seat it correctly against the ring on the end of the metal pipe.

Don't forget to slide the spring back over the tube if it is the steam feed that you are replacing. Position the flexible tube between the frames of the power bogie and fit the bogie back onto it's pivot before replacing the 6BA nut and washer that retain it.

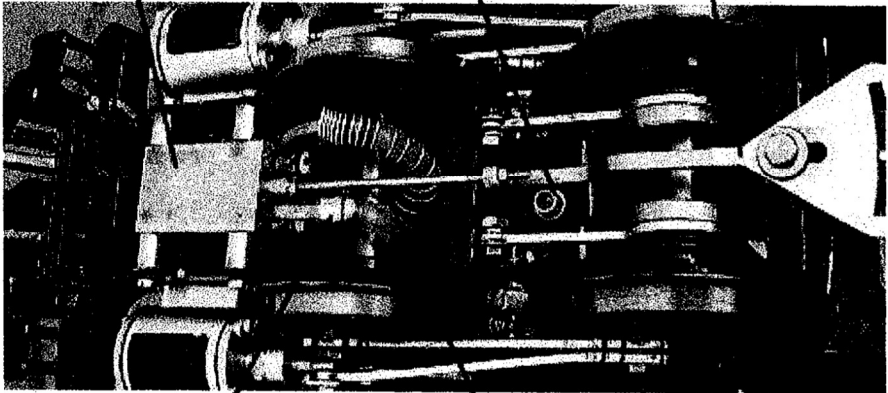
Connect the bottom end of the flexible tube as above.

Re-position the reversing rod making sure that the curved in the rear sits over the reversing slide under the footplate , and re-fit the 6BA hexagon screw and washer that retain it to the rear frame spacer.

Reversing valve

Reversing rod

Power bogie pivot

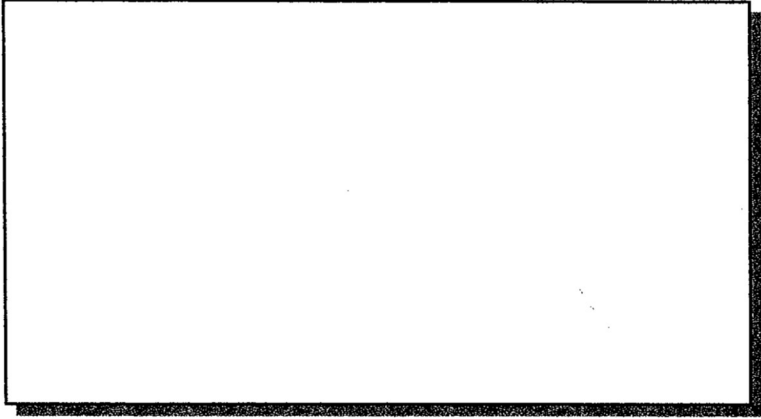


Brass collar

Flexible tube

SERVICE AND PARTS

If any problems arise with this model which are not covered in these operating instructions or, spare parts are required, owners should first contact their local dealer.



Your **ROUNDHOUSE** dealer is; If your dealer is unable to help you may contact the Factory directly:

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