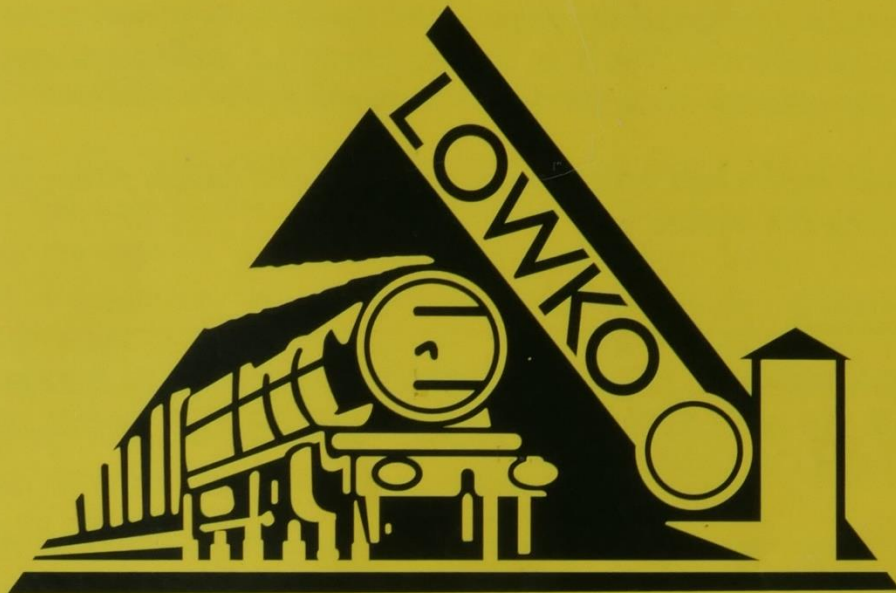


BASSETT-LOWKE



GAUGE O

SCALE MODEL

STEAM LOCOMOTIVE

OPERATING AND MAINTENANCE

INSTRUCTIONS

WITH PISTON VALVES
EXTERNALLY FIRED BOILER
VAPOURISING SPIRIT LAMP
& AUTOMATIC LUBRICATION
OF CYLINDER VALVES

1. INTRODUCTION

- 1.1 Bassett-Lowke Steam Locomotives are hand built to high engineering standards and have been subjected to many tests at all stages of manufacture. No model leaves the factory until it has passed the strictest performance tests, including running in under pressure. Independent laboratories also test important parts.
- 1.2 Every effort has been made to follow the Bassett-Lowke tradition and reproduce a model of superior engineering quality. Where possible modifications have been introduced to improve the original build standard, performance and accessibility for all types of collectors. This is an ongoing process. Careful treatment of this model will give the collector many years of pleasure and good service.
- 1.3 *Please read these instructions carefully and follow them step by step when running the model.*

2. WARNING

- 2.1 **THIS MODEL IS NOT SUITABLE FOR CHILDREN UNDER THE AGE OF 14 YEARS. ADULT COLLECTABLE ONLY. KEEP OUT OF REACH OF CHILDREN.**
- 2.2 During operation an open flame methylated spirit burner heats the boiler, boils the water to produce steam under pressure which in turn generates the power to turn the wheels.
DANGER. ADHERE TO RECOMMENDED PROPORTIONS OF FUEL AND WATER.
- 2.3 Burning methylated spirit gives off fumes. **DO NOT INHALE.**
- 2.4 Hot steam and water mixed with lubricating oil escapes from the chimney and whistle during operation and particularly when the model is first started or after a period of being stationary.
KEEP HANDS AND FACE AWAY FROM THE CHIMNEY AND STEAM EXHAUST.
- 2.5 The model becomes hot to handle during operation.
DO NOT PICK UP OR TOUCH WITHOUT PROTECTIVE WEAR ON THE HANDS.
- 2.6 Certain parts and fittings have functional sharp edges or corners. Springs, where fitted, are under compression.
PLEASE HANDLE WITH CARE.
- 2.7 The model should only be used on a suitable track laid on a non-combustible surface. **THE MODEL SHOULD BE ATTENDED AT ALL TIMES DURING OPERATION.**
- 2.8 **DO NOT DESTROY THIS INFORMATION.**

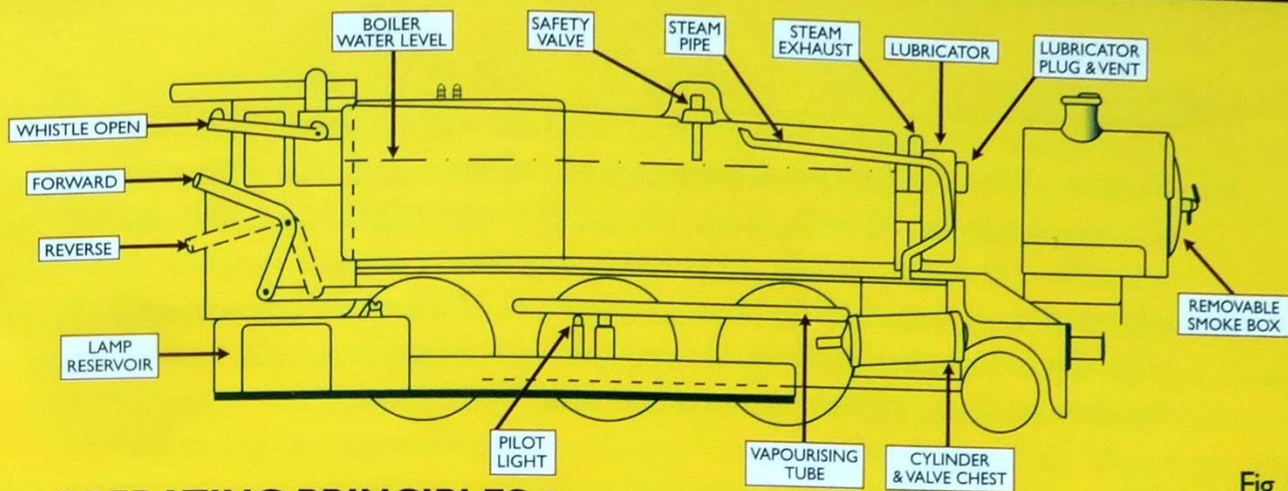


Fig. 1

3. OPERATING PRINCIPLES

3.1 **General. (Fig 1)** The working principles of this model are almost the same as that of a full scale locomotive. A methylated spirit burner mounted in the frame between the wheels boils the water in the boiler. Steam generated passes through a lubricator where it mixes with steam oil before entering the reversing valve. It is then directed into the cylinders where it provides power to move the pistons. This piston movement is converted by the connecting rods and cranks into rotation of the wheels. A system of rods and levers to separate cranks operates valves, which regulate the flow of steam in and out of the cylinders.

3.2 **Valve Gear.** The outside valve gear is of the Greenly-Walschaerts type. It is very similar in general appearance, construction and operation to a standard locomotive. Valves are of the "piston" type each consisting of a steel spindle with three grooves in it. As the valve moves backwards and forwards under the action of the valve-gear the grooves pass opposite holes in the valve-chest. These are known as "ports" and are passages controlling the steam flow during its power, exhaust and reverse operations. Thus steam from the boiler passes in at one port, flows round the valve spindle in the groove before entering the cylinder at another port. After completing its work of pushing the piston the expanded steam leaves the cylinder by the exhaust port and is guided by the valve groove to the exhaust (blast pipe). In this way the valves regulate the flow of steam in and out of the cylinders. The reversing valve simply diverts the steam the opposite way through the system.

3.3 **Unpacking.** When the locomotive is unpacked examine the running gear carefully and clean away the packing material being used for protection and oil absorbent after factory running in and during transit. Use a light **grade machine oil such as "3-in-1"** to oil all the moving parts. Read the instructions and operate all the moving parts until you are completely familiar with the model.

4. LUBRICATION

- 4.1 **Steam Oil.** The recommended steam oil for **Bassett-Lowke locomotives is Morris Lubricants Steam Cylinder Oil ALTO 460** available through Morris Lubricants agents. Steam engine lubrication information is enclosed by kind permission of **Morris Lubricants**. Packed with the locomotive is 40ml of synthetic oil sufficient for four initial firings of the loco until traditional steam oil has been purchased.
- 4.2 **Filling the Lubricator.** Cylinders and valves must be well lubricated. This involves filling the lubricator with **Morris 460 steam oil** before every operation. This is particularly important with a new engine during running in. The lubricator is located inside the smoke box. To obtain access pull the whole smoke box straight out from the front of the locomotive taking care to lift the front of the smoke box in order to clear the smoke box support from the centre lamp bracket above the front buffer beam. When filling both lubricators, remove the two plugs and hold the locomotive in a vertical position (**Fig. 2**) Using the funnel provided fill with steam oil. Air will escape from the other plug. After filling the plugs should be screwed firmly onto the fibre washers. The fibre washers are of the "captive" type and are threaded on the inside. Spare fibre washers are provided for the lubricator, safety valve, burner filler cap and whistle. To remove fibre washers unscrew from the thread, select the correct size and screw carefully back into position.

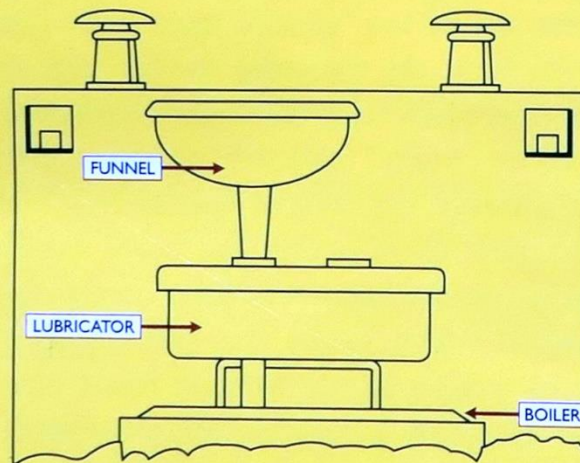


Fig. 2

- 4.3 **Lubrication Method.** An automatic displacement lubricator working on the "Roscoe" principle supplies oil for the lubrication of the cylinders. At the top of the steam feed pipe, where it passes through the lubricator, there is a small hole. This allows steam into the lubricator where it mixes with the oil and condenses into water. The oil thus displaced mixes with the steam, passes into the valves and cylinders lubricating and making them gas-tight. This is automatic in operation and only occurs when the locomotive is fired up, under pressure and in motion.

- 4.4 **Empty after each run.** The lubricator must be emptied of the waste oil/water mixture after each run. To do this remove the safety valve, hold the locomotive in a vertical position, lubricator facing down and shake gently. At the same time the boiler should also be emptied of unused water.
- 4.5 **Operating Volumes.** The volume of oil in the lubricator is proportional to that of the methylated spirit in the lamp and measured water in the boiler. When a full tank of spirit is consumed then there should be some steam oil remaining in the lubricator and also water in the boiler. This allows for one complete run and is a very important safety provision to make certain that no damage can be caused to the locomotive by running it dry or without adequate lubrication. **DO NOT PART FILL THE BOILER, LUBRICATOR OR BURNER.**

5. VAPOURISING SPIRIT LAMP

- 5.1 **Principles.** The vapourising spirit lamp is shown in **Fig. 3**. It is fitted with the correct wicks for optimum operation. Ensure that the holes in the vapouriser are always free of carbon deposit. They can be cleaned with a fine pricker. **Care must be taken not to enlarge these holes and disturb the designed burner operation.**
- 5.2 **Filling.** To fill the lamp, remove it from the locomotive and stand it on a flat level surface. Unscrew the lamp filler plug which is similar to the lubricator filler plug. Using the funnel fill the container with methylated spirits and screw the filler plug down firmly onto the fibre washer. Check that the pilot wick is one-eighth of an inch above the top of its tube. If not, adjust with tweezers. The pilot wick is designed to regulate the burner flame. If it is too high, the lamp will burn with a larger flame causing the boiler to generate too much steam which reduces running time. On the other hand, if the wick is too low, the lamp flame may go out during running or not be strong enough to generate sufficient steam to keep the locomotive running at its full power and speed. It will be necessary to trim this wick occasionally.

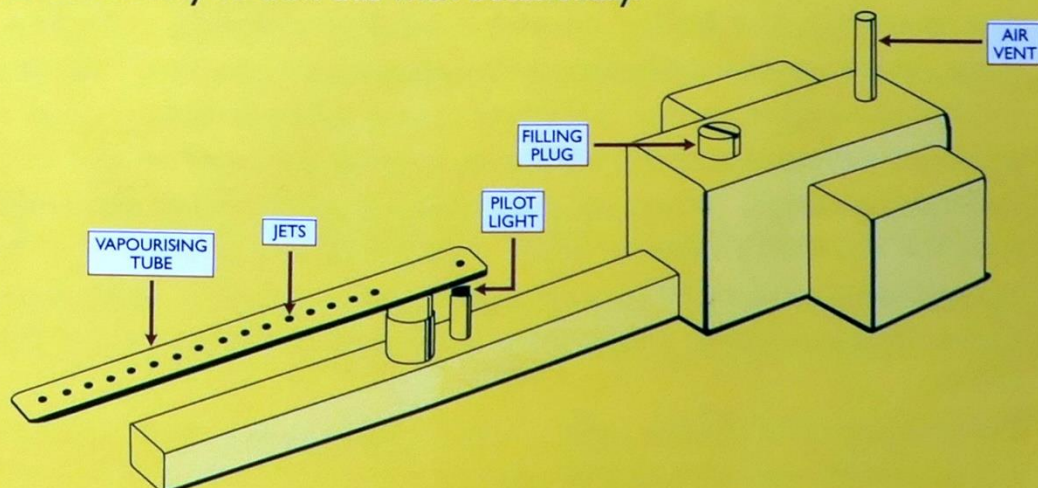


Fig. 3

5.3 **Testing.** The burner tube is a tapered push fit onto the spirit tank. It is designed for ease of access to the main wick for renewal. The main wick fit should be such that it reaches the bottom of the burner tank with its top just level with the underside of the vapourising tube. For those not familiar with this type of spirit burner a good practice is to test it independently first and observe its operation before using it on the locomotive. The flame should be about one inch high, pale blue and almost invisible. Use a dark background to view clearly. The spirit lamp is locked in position by the lever below the cab footplate. Tension on this lever is adjustable by gently bending the wire. A supply of spare wicks is provided with each locomotive.

6. **BOILER**

6.1 **Filling.** To fill the boiler remove the safety valve cover, unscrew the safety valve and open the whistle in order to allow air to vent. Fill with two and a half filler measures of water (100ml) or two thirds full. It is best to use **very hot distilled or boiled water**. This will reduce the risk of scaling and also the time taken for the burner to raise steam. Before replacing the safety valve, check that the valve and its spring operate freely. Screw down firmly onto the fibre washer and replace the dome. The safety valve is factory set for optimum performance of the loco when fully loaded.

7. **RAISING STEAM**

7.1 **Lighting Up.** With the locomotive on the track the pilot wick of the burner can be lit by passing a match or taper through one of the rear air holes in the main frame between the driving wheels. After a few seconds the spirit at the top of the main wick may be heard to be boiling. A lighted match can now be used to ignite the jets on the vapourising tube. Check that the methylated spirit is burning with a clear blue flame. The reversing lever should be set to its mid/neutral position. **At this stage the locomotive should not be pushed up or down the track because this may cause the water in the boiler to surge back and forth, entering the steam pipe, blocking the cylinders with water and causing priming.** Leave the whistle valve open so that the driver knows when steam is raised. As the steam pressure increases test the whistle by moving the lever to find its best working "whistle" position. When the water begins to boil close the whistle valve and wait for the safety valve to blow. This indicates a good head of steam and the control lever can now be moved to forward or reverse. If the loco is to be run under light loads then steam pressure will be sufficient before the safety valve blows.

Experience will define the "steam up" times and relative pressures necessary for various types of operation.

Important. At this time the locomotive may require a small push to clear the condensed steam from the cylinders and valves. On the first few piston strokes this will cause the locomotive to throw up hot oil and water from the chimney. Either stand well clear or have a cotton cloth ready to absorb this as it comes out of the chimney. Once the hot oil water mixture has been cleared then the locomotive should run freely with a strong well timed beat from the exhaust. If the locomotive is reluctant to move forwards or backwards it is possible that there is too much water in the boiler over-flowing into the steam feed pipe. To rectify this blow out the burner, remove, release the boiler pressure by opening the whistle valve then pour out excess water.

Warning. NEVER REMOVE THE SAFETY VALVE WHEN THE BOILER IS UNDER PRESSURE.

7.2 **Forward/Reverse.** To stop the locomotive or change direction, hold the smoke box or cab with a cotton cloth or suitable hand protection. Pull the reversing lever into mid-position, forward or reverse, as necessary. Careful adjustment of the lever between full forward and full reverse will regulate speed.

7.3 **Warning** - if the locomotive is used without carriages then speed should be adjusted carefully because full power may cause derailment. In the interest of general safety it is always advisable to have a water mist spray available to extinguish the burner.

7.4 **Stopping.** When stopping at a station or in a siding steam pressure will rise until the safety valve releases. An alternative is to open the whistle valve. Short stops need no special attention. It is sound operating practice to be careful and aware when, other than for short periods of time, the locomotive is stationary with steam up.

7.5 **Running In.** In the factory pistons and valves have been individually lapped before the loco was tuned, tested and run in for a period of time. The machinery is still relatively "stiff". During the first few hours of operation the driver will notice that power and performance improve steadily as all the parts "bed in".

8. **SUMMARY OF IMPORTANT POINTS**

8.1 **Safety First.** Careful safe operating procedures and understanding of the fine adjustments of the locomotive will give maximum pleasure for many years to come.

8.2 Reminders and Routine Maintenance.

Check that all the fixtures are tight before each run. They are tight and tested before leaving the factory but it is possible that the heat and vibration of operation may eventually cause some to work loose.

- Hot water gives a longer run. Boiled or distilled water ensures a long engine life. Always use the correct measures which are:
 - Lubricator - full
 - Burner - full
 - Boiler - two and one half filler measures (100ml) or two thirds full.
- The wicks must be long enough to reach the bottom of the spirit channel.
- Lubricate all bearings frequently with **light machine oil**.
- Lubricate the pistons, valves and cylinder with **Morris steam cylinder oil 460**.
- Do not forget to oil the tender and rolling stock bearings.
- When the locomotive is at rest with the lamp lighted open the whistle to relieve the steam pressure.
- After the day's run, empty all water out of the boiler and waste oil/water from the lubricator. Oil the piston valves and cylinders freely, clean and wipe the locomotive dry and oil all bearings before putting the loco away.
- When filling up always examine the safety valve carefully for ease of operation and to ensure that the fibre washer is in good condition.
- Remember that the pilot flame regulates the spirit lamp. If more steam is required then raising the pilot wick will give a larger flame causing faster evaporation of the spirit which in turn gives a larger burner flame.
- For less steam, push the wick further down to reduce the pilot flame. A large flame increases steam and power but reduces running time by using the fuel more quickly.

READ THE INSTRUCTIONS AND OPERATE ALL THE MOVING PARTS UNTIL YOU ARE COMPLETELY FAMILIAR WITH THE MODEL.

9. **CONTENTS**

Packed with this locomotive are the following :

User instructions

7 Lamps

Measure

Oil bottle with 40ml of steam oil

Funnel

Spare fibre washers

Spare wicks

10. **SERVICE ENQUIRIES**

For service and general enquiries please contact **Bassett-Lowke Ltd, Leicester. LE3 2RL. United Kingdom. Tel ++ 44 (0) 116 282 6622. Fax ++ 44 (0) 116 282 6633.**