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## **OPERATING INSTRUCTIONS**

### **A1 "TORNADO"**

#### **SAFETY FIRST**

**All our locomotives are safe to run, and will give many hours of pleasure, providing the following safety procedures are followed: -**

- 1. Please read the instructions thoroughly before running for the first time.**
- 2. Never let the engine run out of water.**
- 3. When refilling the gas, do not have any naked flame present, and NO SMOKING!**
- 4. Do not pick up the engine by the bodywork, chimney or boiler, especially when hot.**
- 5. Only pick up the engine by the buffer beams and, when hot, use old gloves or a cloth.**
- 6. Do not stand over the chimney. Ejected boiling water or steam may cause serious injury.**
- 7. Do not open the smoke box door while the engine is alight.**

## **General Hints**

As with all operating machinery, whether model or full size, wear will occur. In the model steam locomotive much can be done to help prolong its life and decrease the amount of time required in the workshop for servicing.

Keep the engine as clean as possible, and the motion free from dirt and garden debris. The valve gear, axles and crank pins should be oiled sparingly with light oil, e.g. "3-in -1 Oil". Over-oiling attracts dirt and grit, which will increase wear.

Regularly check that all screws and motion bolts are firm. Do not over-tighten, as this strips threads and shears bolts. **When filling the lubricator, always use a high temperature steam oil; this is available from other retailers. FAILURE TO USE THE CORRECT GRADE OF OIL CAN LEAD TO BLOCKED STEAM PIPES, AND WILL INVALIDATE THE GUARANTEE.**

When running your engine avoid excessive speed and acceleration, both will cause premature wear in the valve gear.

## **Positions of Fillers, Controls, and Drains etc.**

*The gas inlet valve* is in the small turret situated on the top of the gas tank which is in the tender. To access it lift out the coal load, this can be a little tricky but can be achieved by lifting out on a slight angle.

The gas control valve is on the front footplate of the tender.

*The lubricator* is in the front footplate just in front of the smoke box. To drain out the condensed water from the previous run use the small syringe provided, with the short length of tube supplied, attached.

*The boiler water* is contained in the tender in the tank that surrounds the gas tank. On the first fill use '*hand hot water*' **only**. This is to keep the gas tank warm so the gas will vaporise freely. **DO NOT USE BOILING WATER. This could over stress the gas tank and will invalidate the warranty.**

***The axle pump by-pass valve*** is in the cab on the right hand side. See photo. To open the valve turn anti-clockwise.

***The direction control*** is the lever in the nearside of the cab. To operate pull gently outwards and move to the desired direction. The control is “gated”, and will therefore hold itself in the full forward or reverse position.

***The steam throttle*** is the valve on the back of the boiler. Although it looks prototypical, ***BEWARE, it gets hot!***

The cab roof lifts up to give access to the cab interior and the controls.

### **Preparation for Running**

Connect the tender to the locomotive by pulling out the copper water feed and return pipes and pushing them into the connectors under the fall plate of the cab. Check they are fully in by giving them a little pull backwards. Then connect the loco to the tender using the draw bar. Place the gas jet holder into the burner on the back of the boiler. To remove the water pipes hold the pipe and press the ring on the fitting, the pipe can then be withdrawn. They can be a little tight!

Always service the engine in the following order; first gas, oil then water.

***To fill the gas tank:*** Invert the gas can and apply the nipple to the gas inlet valve on the top of the tank turret. You will know when the tank is full; gas will blow back from the inlet valve in a strong jet. A small amount of gas and air will escape during filling, but the difference between this and when the tank is full is always clear. Always keep the gas can vertical when filling the gas tank. We recommend that Butane gas is used whenever possible, but the gas tank is manufactured to accept the extra pressures generated by Butane/Propane mix gases, and the burner system will also perform using this gas. When you have gassed up the tank then fill the water bath with ***hand hot water only***. Fill to about  $\frac{3}{4}$  of the way up the gas tank.

***Filling the lubricator:*** as you will read in the instructions for the end of the run, the lubricator should be empty of oil and water. Remove the screw cap just in front of the smoke box door. Fill up the lubricator with

steam oil to about  $\frac{1}{4}$  of an inch below the top. Leave the filler cap off for the present, so that any trapped air can escape. It can be refitted after you have filled up the boiler.

***To fill the boiler:*** Using the long brass lever supplied, fit it onto the hand pump in the tender and fill up the boiler to about  $\frac{3}{4}$  full; this will allow a good space for a 'head of steam'. Ideally use filtered rainwater or distilled water. Check that the lubricator does not need topping up, and then replace its filler cap. The filler cap should be firm finger tight. It is sealed with a trapped 'O' ring and, therefore should not be over-tightened.

### **Lighting Up**

Open the smoke box door; just pull it open by the door handle. Light your lighter/match etc. and gently open the gas control valve until a gentle hiss is heard in the burner. Apply your light into the smoke box and the flame should 'pop' down the fire tube and ignite the burner inside the fire tube.

If the gas valve is opened too much the flame will not pop back; it will either fail to ignite, will roar in flame out of the smoke box, or there will be a ball of flame around the front of the engine, which will then blow the whole fire out (after giving the driver a fright)!

When the fire sound has stabilised, after about 30 seconds the gas can be turned up gently. Do not turn the gas up high as the flame could damage the paint on the smoke box door. The smoke box door may be shut after about two minutes. Now leave the locomotive to raise steam.

### **Running**

When the engine has raised about 60 psi, you are ready to start running. The locomotive cylinders are fitted with drain valves, these are the rods underneath the cylinders. To operate turn the little lever at the front through 90 degrees. Before commencing your first run of the day, it is advisable to put a cloth loosely over the chimney for a few minutes, as condensed water can be ejected from the chimney. This is quite normal; the motion of the engine will be jerky until all condensate has been ejected. **DO NOT stand over the chimney as ejected boiling water/steam could cause serious scalding.**

Place the direction lever into the reverse position, and then open the main steam throttle valve. The engine should start to move off in the

reverse direction. When starting from cold it will be jerky, this is normal, as it has to clear the condensate from the system. The more the main steam valve is opened, the faster the engine will go; our advice is to start slowly and learn the road with your engine

After a minute or so, remove the cloth and continue running. In running it is correct practice to balance the boiler pressure against the load being pulled and the track conditions. With a light load and level track the pressure may need to be only 40-50 p.s.i. therefore, turn the gas control down to keep this pressure. When running a heavy train with steep gradients, increase the pressure by turning up the gas.

The ideal running pressure can be learnt by experience and is one of the pleasures of running a live steam engine. There is no need to have the safety valve constantly blowing off (it is what its name implies – a safety vent for excess steam pressure).

This locomotive is equipped with an axle pump and bypass valve. The pump moves water from the tender to a check valve on the locomotive. The bypass valve is located on the back right hand side of the cab. When the bypass valve is completely shut, water is pumped into the locomotive. When the bypass valve is open, the pump will re-circulate water back into the tender. With careful adjustments of this valve, the engine will always have enough water to keep running for long periods of time until the tender water tank needs to be refilled. The tender is also equipped with the hand pump, which needs to be used to prime the axle pump and initially fill the boiler. Only two or three strokes are necessary to prime the pump.

When the gas runs out a complete gas and oil service must be done, remember to shut the gas regulator before refilling the gas tank, and **DO NOT** refill with gas near any other live steam loco).

### **End of Run**

When the last run has finished the locomotive should be allowed to cool. When cool, clean the engine, check the motion and oil if necessary. The locomotive should always be put away in a clean condition as it attracts less dust and is always ready for the next run (or to be shown to an admiring friend). It is advisable to store the locomotive where any residual drips of oil or water do not matter.

## **Blocked Gas Jets**

If the gas jet becomes blocked with particles of dirt within the gas, the jet will have to be removed and cleaned. With a spanner or pliers carefully undo the pipe union on the gas control valve. Remove the pipe and jet holder assembly from the burner.

Holding the jet holder gently in a vice, unscrew the jet. To clear, place the jet nozzle against the inverted gas can nozzle and clear the jet with a blast of gas. Under no circumstances use a pricker wire, this will damage the jet hole. Replace the jet in the holder, ideally using a thread sealant sparingly on the threads. Ensure it is tightened up firmly. Replace the assembly into the burner and re-connect the pipe to the control valve. Ensure this is done up tightly, test **CAREFULLY** for gas leaks, first with a 50/50 mixture of washing up liquid and water, and then if no bubbles are showing, with a flame and the gas “just on”. Tighten if required.

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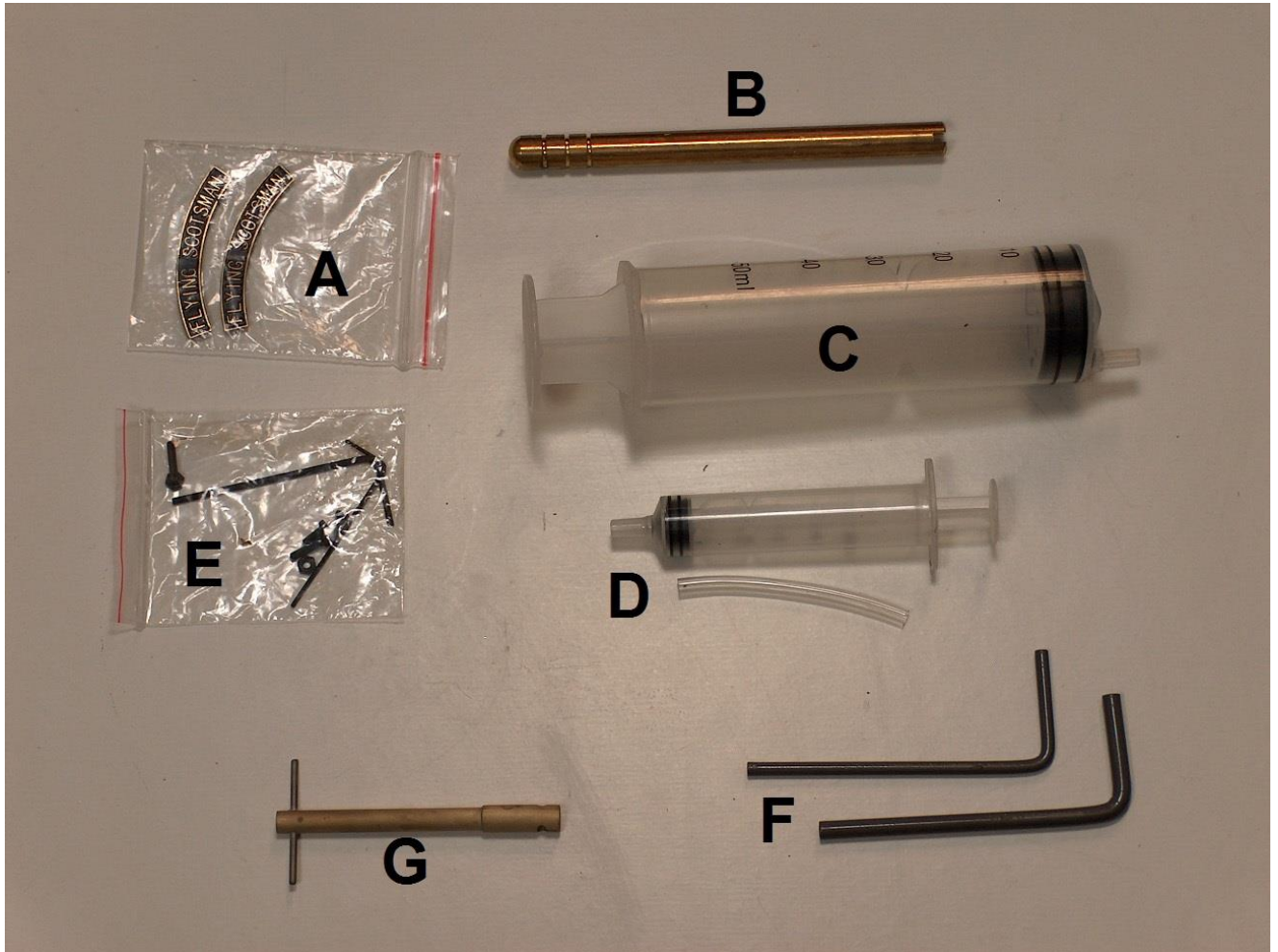
As with all our models, we strongly recommend a full demonstration (by our agents) before purchase, enabling you to get the best out of your model right from the start.

## ***HAPPY STEAMING***

### **Radio Control**

Although we do not offer the locomotive radio control fitted it has been designed with facility in mind. There is a dry compartment at the back of the tender which is accessed by un-doing the bolts in the corners of the tank filler platform. This should be big enough for a receiver and battery pack and wiring can then be run through the tender to the footplate to servos mounted on the locomotive.

Your warranty will not be invalidated if radio control is fitted by one of our approved repair agents – their details can be found on our website.

**Illustrations (from our A3 model but appropriate for our A1)*****Tools supplied:***

**A:** Name plates (already fitted to this model)

**B:** Tender hand pump extension lever.

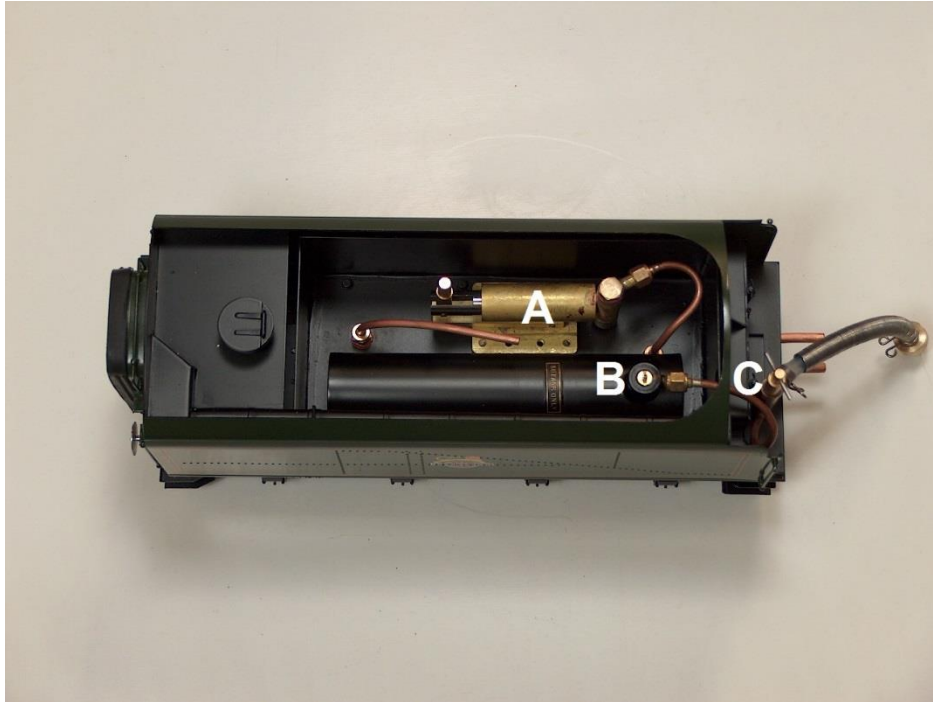
**C:** Large syringe, not really required for this model.

**D:** Small syringe and tube, for draining the lubricator.

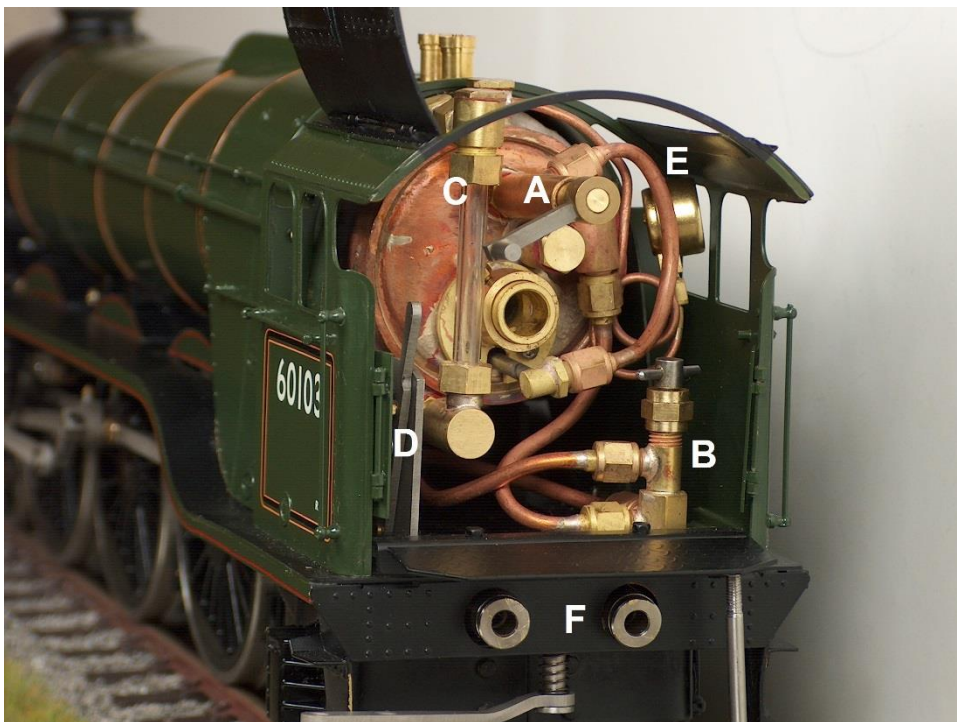
**E:** Bag of spare bolts and hex wrenches.

**F:** Nut spinners.

**G:** Extension tool to aid reaching the gas control valve.

***Tender Parts:***

**A:** Hand pump.      **B:** Gas tank filler valve.      **C:** Gas control valve.

***Cab Parts:***

**A:** Steam throttle valve.  
**C:** Water gauge.  
**E:** Pressure gauge.

**B:** Axle pump by-pass valve.  
**D:** Direction lever.  
**F:** Water pipe connectors.