



Hackworth Valve-Gear Part Number HVG

This kit contains parts to construct a set of Hackworth type valve-gear and is intended for use with the **Roundhouse** Hackworth Cylinder set.

NOTE:- Frames, Coupling Rods, Connecting Rods and Outside Cranks are not included with this set of parts.



Roundhouse Engineering Co. Ltd

Units 6 to 9, Churchill Business Park,
Churchill Road, Wheatley,
Doncaster. DN1 2TF. England.

Tel 01302 328035 Fax 01302 761312

Email: mail@roundhouse-eng.com

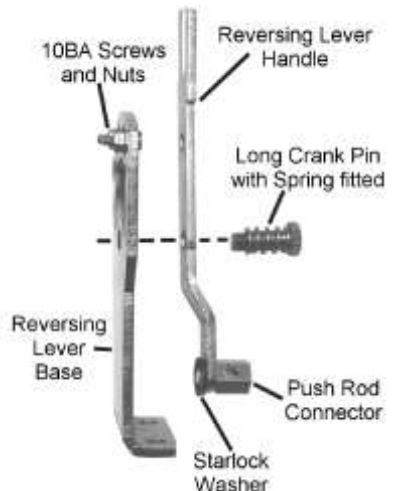
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This pack contains the following parts: -

- 2 Eccentric Rod (Valve Rod).
- 2 Vibrating Lever Assemblies.
- 2 Steel Short Valve Gear Pins.
- 2 Slide Block Assemblies with grub screws and Allen key.
- 1 Weigh shaft.
- 2 Return Cranks with M2 screws and nuts.
- 2 Plain crank pins.
- 12 5BA steel washers.
- 4 Short crank pins.

- 1 Reversing lever base.
- 1 Reversing lever handle.
- 1 Push rod connector, screw & starlock washer.
- 1 Long Crank Pin.
- 1 Stainless steel spring.
- 2 10BA brass screws & nuts..
- 2 M3 x 6 Brass screws.

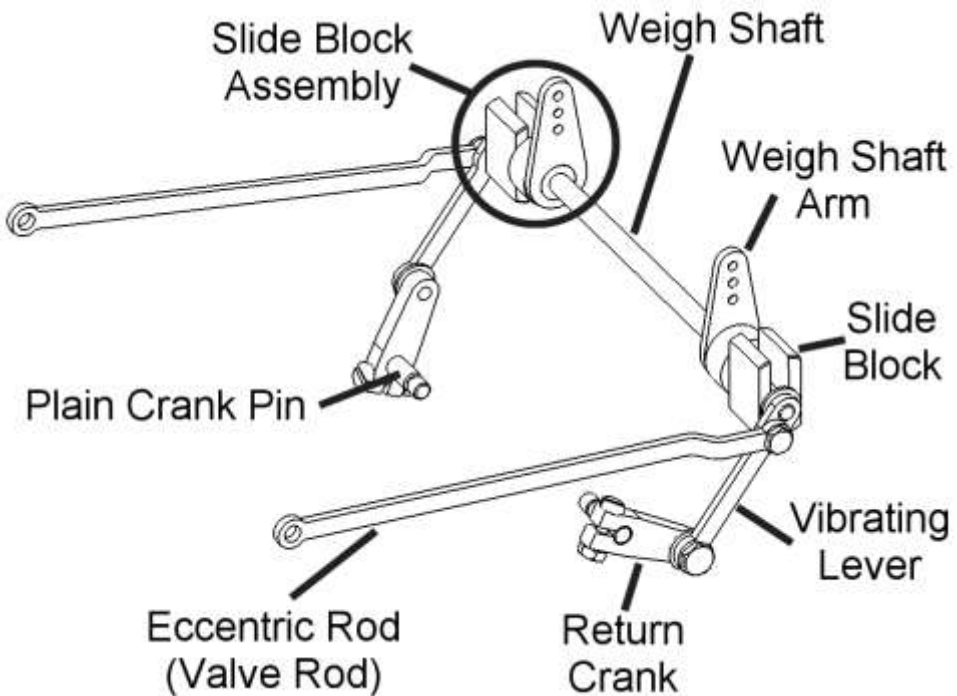
- 1 Steel push rod & Quicklink connector.



Hackworth Valve-Gear

Part Number HVG

Identification of parts



*Diagram showing general arrangement of Hackworth valve gear.
NOTE:- Frames, Coupling rods, connecting rods and outside cranks are not included with this set of parts.*

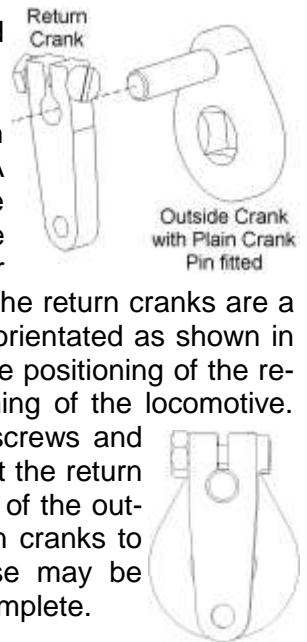
Construction

If constructing your own frames, ensure that the rear axle hole, weigh shaft mounting hole and cylinder mounting holes are positioned accurately as in the diagram on page 3. These instructions assume that a rolling chassis has been built, with cylinders, coupling, and connecting rods fitted and mounting holes drilled for the weigh shaft. Two plain crank pins are supplied for use in the rear driving axle outside cranks. These are threaded 6BA and are the correct length for mounting the return cranks on if using 1/16" thick connecting and coupling rods. They should be 'loctited' into the outside cranks and the end of the



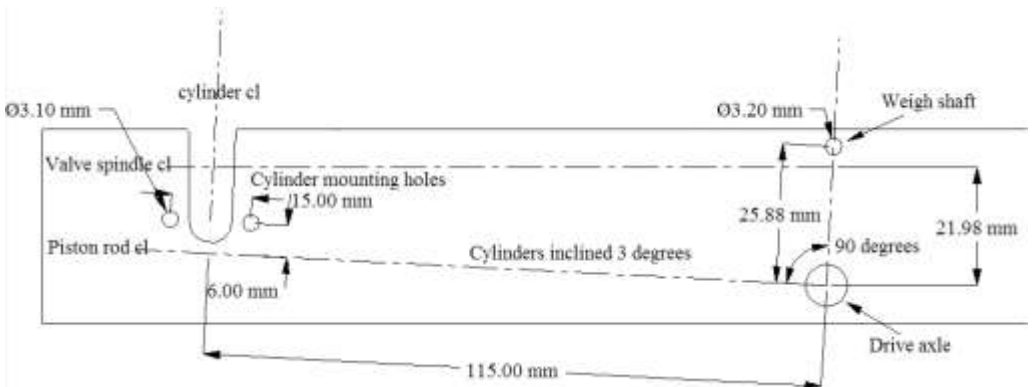
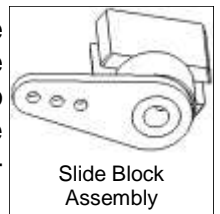
thread, which has a small counterbore, riveted over on the back to hold firmly in place.

Fit the return cranks first, as these will then retain the coupling and connecting rods. Place a 5BA steel washer between the outside crank and the coupling rod, then another washer between the coupling and connecting rod and a third washer between the coupling rod and the return crank. The return cranks are a tight fit onto the plain crank pins and should be orientated as shown in the diagram to the right hand side of this text. The positioning of the return cranks are critical to ensure the correct timing of the locomotive. Clamp the return cranks in position, using the screws and nuts provided. Refer to the diagram and note that the return cranks should point directly back over the centre of the outside cranks. For now it is sufficient for the return cranks to be placed as shown - fine adjustment of these may be needed during fine tuning, when the chassis is complete.



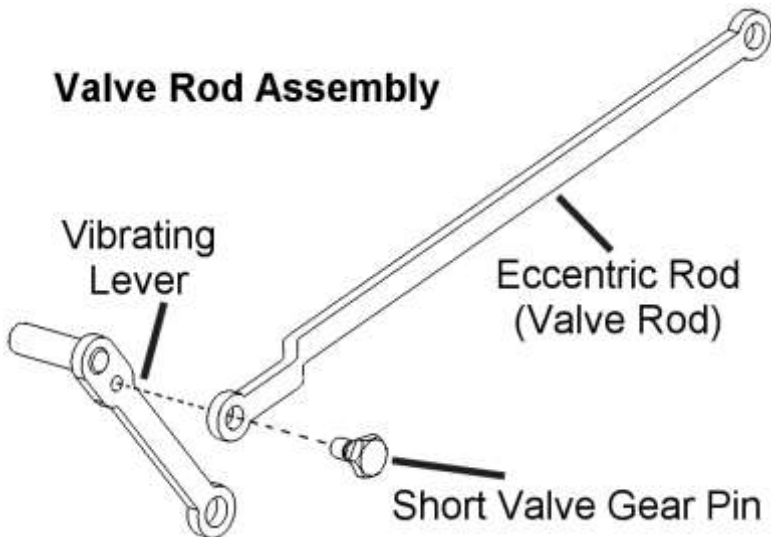
The weigh shaft can now be fitted. This is simply slotted through the 3.2mm holes in the frames as shown in the diagram at the bottom of this page.

The Slide Block Assemblies can now be fitted onto the protruding ends of the weigh shaft. Both of the Slide Block Assemblies are identical and so can be fitted to either side. Check that the Weigh shaft arms are in line with one another and then lock the Slide Block Assemblies in place using the Allen Key provided.



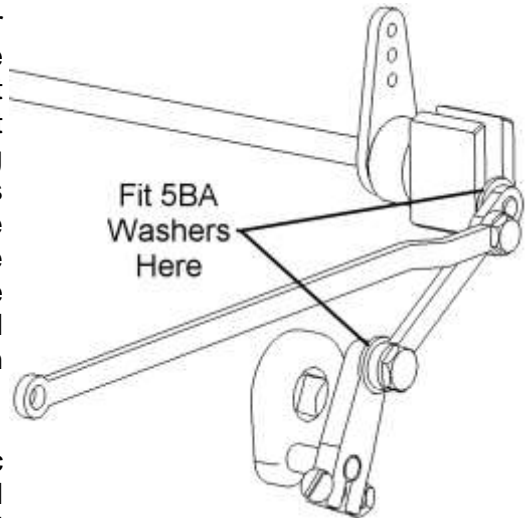
Valve Rod Assembly

The Valve Rod Assembly consists of a Vibrating Lever and an Eccentric Rod which need to be joined together with a Short Valve Gear Pin. Refer to the diagram below, which shows a Valve Rod Assembly for the *right hand* side of the locomotive. Ensure that the Eccentric Rod is orientated as shown below, so that cranked part of the rod is angled towards the inside and brings the long part of the eccentric rod in line with the vibrating lever. The left hand Valve Rod Assembly is the mirror image of the one shown below. Push a Short Valve Gear Pin through the eccentric rod and screw it into the threaded hole in the Vibrating Lever. Do not over tighten the Short Valve Gear Pin as the thread may be damaged. Use just enough force to secure the rods together. Check that the rods are free to move. If they don't move freely check that the Short Valve Gear Pin is correctly fitted. If the Short Valve Gear Pin is fitted correctly then the eccentric rod may need altering. Carefully file the inside face of the Eccentric Rod to allow free movement of the rods. When you are satisfied with the assembly, gently file the threads of the Short Valve Gear Pin where it protrudes through the inside edge of the Vibrating Lever. Now complete the left hand Valve Rod Assembly.



Fitting the Valve Rod Assembly to the chassis.

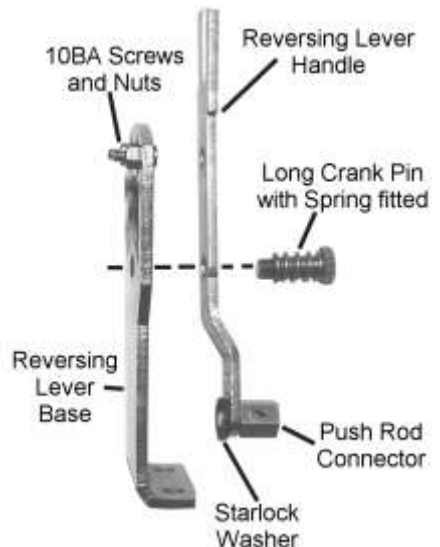
Slide a 5BA steel washer over the steel pin attached to the Vibrating Lever. Push a Short Crank Pin through the hole at the bottom of the Vibrating Lever (if the Short Crank Pin is tight then slightly open the hole with a round needle file). Place a 5BA steel washer over the end of the Short Crank Pin and then screw the short crank pin into the Return Crank.



Fit the end of the Eccentric Rod / Valve Rod into the forked end of the cylinder valve rod and screw the 6BA steel screw (supplied with the cylinders) through the hole to connect up. Repeat for the other side.

Reversing Lever

What is needed now is a means of moving the valve gear between forward and reverse, and the reversing lever should now be assembled. Take the reversing lever handle and fit the brass push rod connector through the bottom hole securing it into place by pushing the starlock washer over the spindle where it protrudes through the back of the handle. File the end of the brass push rod connector down so that it doesn't foul the reversing lever base.

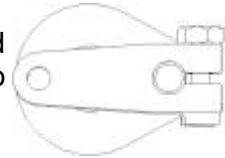


Slide the Spring over the Long Crank Pin then push the threaded end of the pin through the hole in the middle of the Reversing Lever Handle and screw into the tapped hole in the Reversing Lever Base. Refer to the picture on the right to ensure correct assembly.

The completed Reversing Lever should now be fixed to the cab floor or chassis. The steel push rod and 'Quicklink' can be used to hold things in position. Push the rod through the hole in the push rod connector that you have already fitted to the reversing lever handle. Attach the 'Quicklink' to one of the weigh shaft arms, by springing the ends of the Quicklink open, pushing the pin through the hole in the arm and then letting it close.

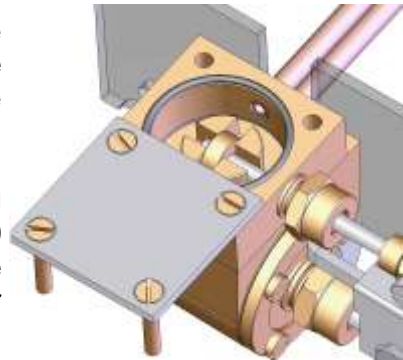
Setting the Valve Gear

First, check that the Return Cranks are positioned exactly central across the outside crank - this critical to ensure the correct timing is achieved.

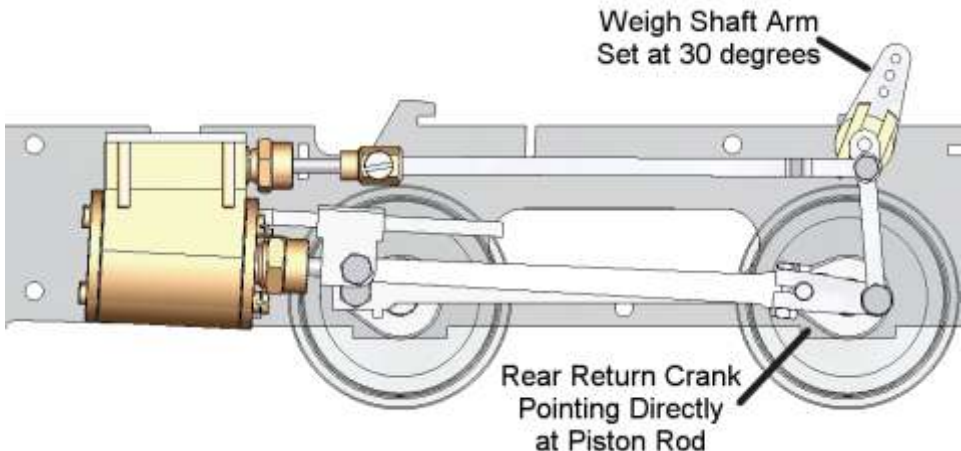


If you have not already done so, remove the steel valve chest covers so that the movement of the slide valves can be observed.

To set the Valve Gear for forward running pull the Weigh Shaft Arm back about 30 degrees then tighten the screw in the push rod connector to lock the valve gear in this position.

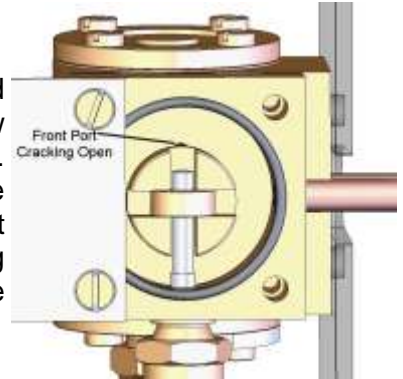


We will concentrate on the Left Hand side of the valve Gear initially. Rotate the driving wheels until the valve gear is at dead centre. This is when the rear outside crank is pointing directly at the piston rod. The



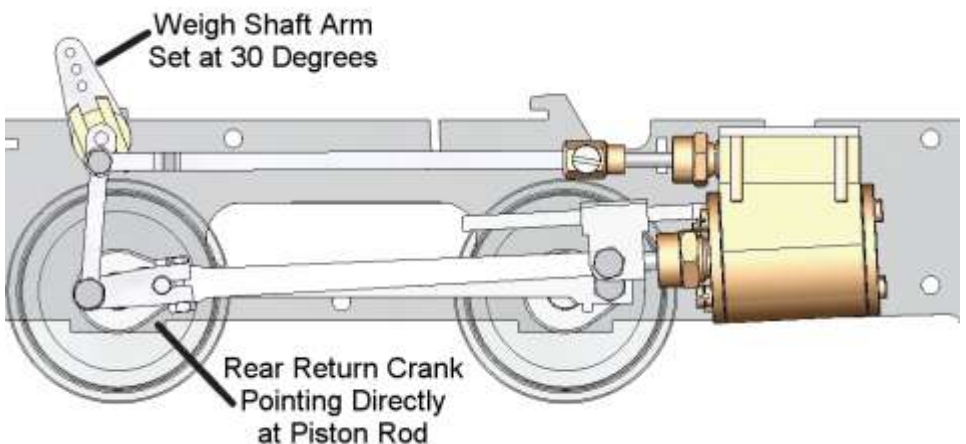
Left Hand slide valve should be covering both forward and rear ports of the cylinder block. If not, remove the steel screw in the valve rod that holds the eccentric rod in place. Rotate the valve rod to move the slide valve either forward or backwards to cover the ports. Replace the steel screw and check that both ports are now covered. If not, repeat the above procedure until the slide valve is in the correct position.

Rotate the driving wheels slightly forward so that the outside cranks are now pointing parallel with the frame (9 o'clock). The left hand slide valve should now have moved backwards to expose the front port very slightly. If so, then continue rotating the wheels until reaching rear dead centre is reached.



Again, the slide valve should be covering both forward and rear ports. If so, rotate the wheels until the outside cranks are parallel with the frame pointing backwards (3 o'clock). The slide valve should now have moved forward exposing the rear steam port very slightly. This completes the timing of the left hand side valve gear for forward running.

Now set the Right hand side valve gear for cranking Open. This is the mirror image of the Left Hand gear.





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