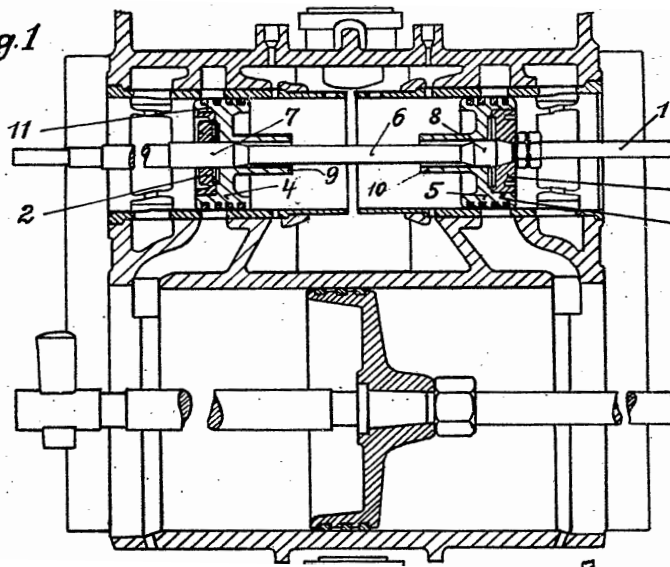


3025 Operating Procedures

Understanding the Trofimoff Valve. Trofimoff valves are designed to reduce the amount of wear and friction in the valves (piston rings and valve cages). Understanding the principal of operation and basic concepts will ensure efficiency of operation.

Trofimoff is an *inside admission* valve--steam from the throttle enters *between* the valves, which in turn pushes the valves to their corresponding stops at each end of the valve rod (see fig. 1). Maintaining pressure in the valve cages (indicated by the *steam chest pressure* gauge), keeps the valves extended. When there is no steam chest pressure, the valves naturally seek their central position in which both exhaust ports are permanently open (see fig. 2), which allows the gases in the cylinders to be transferred back and forth until the throttle is opened and steam admitted to the cylinders.

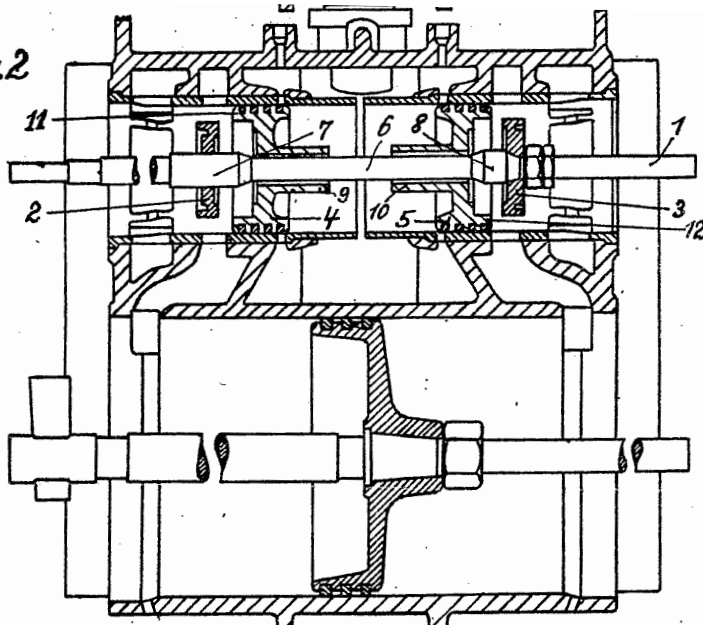
Fig.1



Keys to figures 1 and 2

- 1 valve rod
- 2 & 3 stop plate
- 4 & 5 piston valve
- 6 smaller middle part of piston rod
- 7 & 8 larger ends of piston rod
- 9 & 10 guiding hubs
- 11 & 12 collar rims (stops)

Fig.2



Using the throttle valve with pilot valve. The ease with which the throttle opens is caused by the pilot valve—a small valve located in the main throttle valve body. The pilot valve is easily opened because of its diminutive size in relation to the throttle leverage. Once opened, the pilot valve allows steam to flow into and pressurize the dry pipe with steam so that there is almost equal pressure on *both* sides of the main throttle valve. With minimized pressure differential the larger throttle valve is now easily opened with the throttle leverage.

Metallic sound associated with Trofimoff. This sound, often referred to as a “pop,” is the sound made when the valves are charged with steam and move to the “collars” (stops) at each end of the valve rod.

Clearing and heating cylinders. With the reverser in center and engine brake applied, quickly open and close the throttle until you hear the familiar “pop” sound. Maintaining about 20 psi on the steam chest pressure gauge, move the reverser forward and backward until you are sure the cylinders are clear of water. Move the locomotive forward or backward as necessary to ensure both ends of each cylinder are cleared. The Trofimoff valves and gear are just as susceptible to water damage as any other type of valve gear. For at least the first 500 feet, run the locomotive with cylinder cocks open.

Starting the locomotive and/or train. With the reverser in center and engine brake applied, open and close the throttle until you hear the “pop” of the valves extending in their cages. Move the reverser to full gear in the direction of travel and release the independent brake. Open the throttle and adjust the throttle as necessary. Observe the steam chest pressure gauge and adjust throttle position to suit the required speed/power.

Setting cutoff. Once the locomotive is started you may immediately begin to adjust the cutoff. Full power is only needed when starting the train. Once the train is rolling, the cutoff should be adjusted to the working conditions. Under no circumstance should the cutoff be adjusted to less than 40%. In most cases the cutoff should be no less than 40-50%. Most work at VRR can be accomplished easily with 40-50% cutoff.

Drifting the locomotive. Simultaneously (with one hand on throttle and one hand on reverser) close the throttle and move the reverser to full gear (85% cutoff) in the direction of travel. The purpose of this maneuver is three fold:

1. The valve travel is greatest in full gear, and thus, as the valve rod travels back and forth, the valves will be pulled as close together in the center as possible, and
2. *It leaves exhaust ports open so that gases can transfer back and forth from one side of the piston to the other, and*
3. It will more quickly reduce the backpressure to zero.

After the backpressure drops to zero (2-3 seconds), center the reverser. This will minimize the “back and forth” motion of the valve rod in the valves, and thus reduce wear. The locomotive is now in drifting mode and can drift indefinitely. Additional mechanical lubricator points have been provided to insure sufficient lubrication for the valves and cylinders.

Transition from drifting to power. With the reverser on center, open the throttle until the valves are charged with steam and the valves “pop.” Gently transition to power by slowly moving the reverser to the desired cutoff. Do not merely open the throttle and pull the reverser to the full gear (85% cutoff) as this is liable to overpower the locomotive and cause it to jerk the train. It is important that the throttle be open slightly to maintain some pressure in the steam chest so the valves will remain extended, or the valves will return to center and the process must be repeated.

Avoid starting or transitioning to power by putting the locomotive into full gear and “popping” the valves open. This causes the valves to be *unbalanced* because they travel unequal distances to the collars (stops) on the valve rods, which can possibly cause one to strike the stop harder and damage it. It can also overpower the locomotive, which is liable to cause rough train handling or wheel slip (with excessive throttle). During light engine moves you should also avoid pulling the reverser into gear and “popping” the valves open because you can overpower the locomotive’s brakes and not have complete control. The better practice is to always “power up” the locomotive with the reverser centered.

Short moves. With the locomotive on center and engine brake applied, open the throttle and charge the valves with steam and close the throttle. Move the reverser to the direction of travel and release the engine brake. In many instances there will be sufficient steam to move the locomotive gently. Additional “shots” of steam may be required, but allow the locomotive sufficient time to respond. Remember that superheated locomotives respond slower than saturated engines. The valves will remain “set” as long as there is pressure in the steam chest.