"Well connected water feed"

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Recently I was sorting out some last details of a 5"G model and in particular dealing with the pipework for feeding water from the tender to the engine. It seems like the umpteenth time I have carried out this kind of job so you will probably think that by now I have pretty well sorted out the best way to do it, and I certainly do have a tried and tested method, even so each new engine brings its own quirks. In this case the novel bit was due to the design of the prototype, harking well back into the Victorian era, that brought with it some features of the 19th century as well as being rather small and less forgiving with regard to available space.

I thought it might be worthwhile explaining my "standard" arrangements for tenders and feed equipment and the particular complications of this one. For feeding water my engines have just two injectors as per prototype, but with an addition in the form of a hand pump in the tender. There is a good case for not installing a pump as quite simply if I can't get water in the boiler the proper way a small hand pump will not keep the engine running so I may as well extinguish the fire and come off. Even so, following a lifelong habit I test the pump on the steaming bay each time, put the handle in my pocket and forget about it until the next steaming. So far I have continued to fit pumps so the connections between tender and engine consist of a pump pressure line plus two hoses for injector water supply

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Obviously, the pump needs to be accessible for maintenance and luckily tender tops usually have a separating fence to keep the coal from invading the water filler area so the rear plate can be left loose for getting inside the tank. This particular tender has a raised filler in the coal space, which is used for the same purpose on the model, and a small fence very close to the rear leaving the removable plate the full width of the tank, but very short. The pump was fitted “cross ways” as the longitudinal space was insufficient for the movement of the pump handle. Another item that has to be get-at-able is the filter for the injector supply: my standard is to fit a small circular sump about ¾” dia. beneath the floor with a slightly projecting lip over which fits a sort of brass top hat with gauze sides. Water passes through it into the sump from where a large copper pipe leads to the connectors at the front of the tender so as to reduce the drag on the water being sucked by the injector. The filter lifts off for cleaning after each run and it is shown loose in the photo. This space is also useful for putting in a drain plug in one corner so after running the tank can be emptied quickly and by slightly lifting the opposite corner small debris can be swirled out through it.

A particular complication of the current tender is its unusual wooden frame with a multitude of timbers that rather restrict the space for putting in fittings and the drain-down had to be run to a cross pipe with the plug accessed from one side between the wheels, the frame caused more difficulties at the front end. Some locomotives have the water valves for injector feed at the front of the tender and others have them under the floor of the cab, I like to follow the prototype which in this case had the valves in the tank with the operating spindles projecting through the tank top at the front. I thought I would adapt the arrangement from my other Crewe engine that has commercial valves below the tender floor with the spindles coming up through the floorboards and I purchased the same valves but then realised the wooden joists were in the way. As a result, the valves had to go inside the tank above the floor at the front with just the output pipe connection below, so I concocted a special design of valve.

The critical feature of water valves supplying injectors is avoidance of air leakage but here there is no problem as they are submerged. The body is reamed ⅜” with a $\frac{3}{16}$” hole in the side for the supply and the rotating cylindrical plug carries an O-ring and has a stainless spindle passing up through a hole in the top of the tank. Provision for access is a must and luckily it was easy to arrange removable plates at the front end of the tank each side. I did not want to feed unfiltered water directly from the tank but the wooden timbers obstructed the run of the usual pipe from the sump, so I had to route it back up through the floor and forwards to the valves through the tank. The output pipes from the valves are $\frac{3}{16}$” D curving downwards and soldered to brackets attached to the front beam to keep them rigidly supported.

The feed from the pump is quite normal, a $\frac{5}{32}$” pipe under the tank goes forwards below the frame timbers, as usual flexibility is achieved by putting a spiral loop into the run and the pipe finishes with a nipple and nut ready for connecting to the union below the drag beam of the engine.

The pump feed on the engine is very simple with a curved tube running from the ¼” union on a bracket below the drag beam to the check valve. All my engines belong to the pre-grouping era when it was not considered decent to display bits of engineering, so injectors are hidden away underneath, in fact on North Western engines they were attached to the rear of the ashpan so the feed pipes went straight up the doorplate to the check valves while the steam pipes

ran down alongside them, quite a neat arrangement if you don’t mind your injectors near the fire. Mine are positioned beneath the drag box between the trailing coupled wheels and are mounted

rigidly in a manner I have used previously. The pipes to take the rubber tubes from the tender are fitted on an inverted U-shaped bracket attached to the underside of the drag box and they are silver soldered to ¼" elbows with special elongated nipples pointing upwards (the nipples are actually flat face connectors for my particular injectors). This is a bit fiddly to make as of course the soldering has to be done with the union

nuts in place but without soldering them solid. While doing the job the nuts are held away by dummy unions of rusty steel and a band of permanent marker is applied to inhibit the flow of the solder. The injectors are held firmly in place by the water unions, facing forwards, and steam is supplied from the rear via elbows while the output water goes forwards through gently curving pipes to run up the doorplate as on the full-size engine. Connection to the tender is by stout rubber tube pushed on to the $^{3}/_{16}$" pipes on the bracket, the 90° easy curve provides good flexibility for movement when running. Finally, overflow tubes discharging under the footsteps are connected to the injectors by short rubber sleeves that can easily be slipped off when removing an injector. I have found this type of installation quite satisfactory on several engines, the only variation between them being the location and type of water valve to suit the prototype. It works well and the connections are easy to attach.