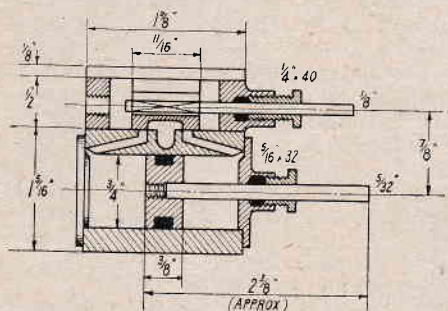


bother about a proper door with hinges on a child's toy. The chimney liner, of $\frac{3}{4}$ -in. tube, can be silver-soldered into a hole in the top of the smokebox, and a L.M.S. or any other kind of external chimney, turned up from rod, casting, or thick tube, and slipped over it. The dome is a dummy. If the Belpaire firebox casing of the L.M.S. "4F" is desired, bend it up from 1/32-in. sheet iron or steel, and fix over the round-back casing with a few small rivets. Snipped-off ends of domestic pins do fine for rivets.

The inside barrel should be either a thin copper tube 9 in. long and $1\frac{1}{4}$ in. diameter, or a piece of 24-gauge sheet rolled up and silver-soldered at the joint. Special to beginners: Thick tube or sheet won't do, under any circumstances. This is brazed or



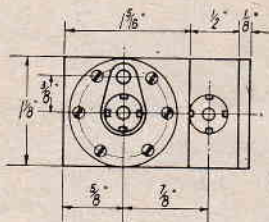
Section of cylinder.

silver-soldered to a backhead, knocked up like a locomotive-type backhead, from $\frac{1}{8}$ -in. or 16-gauge copper; and a disc of similar metal closes the front. I have shown it flanged, but it doesn't matter if it is merely a good fit, provided it is properly silver-soldered. Two $\frac{3}{8}$ -in. Averill type water tubes are provided; they also must be thin-walled. The boiler is fixed in the casing by a few screws running into tapped holes in the backhead flange at each side.

Fittings consist merely of safety-valve, regulator, test cock, and blower. Safety-valve is plain ball type, and screws into a bush silver-soldered to the boiler barrel. The regulator is a screw-down valve with a crank handle, see illustration; the steam pipe from the union underneath, goes along the bottom of the boiler barrel to the cylinder. Blower valve is a smaller screw-down valve fitted as high as possible, and the pipe from the union passes along inside the casing, terminating in a little nipple pointing up the chimney liner. The test cock may be either a plain plug cock of the commercial pattern, or a screw-down valve without gland, fixed on the backhead at the centre line of the inside barrel, so that it

opened, water runs out when the boiler is half full.

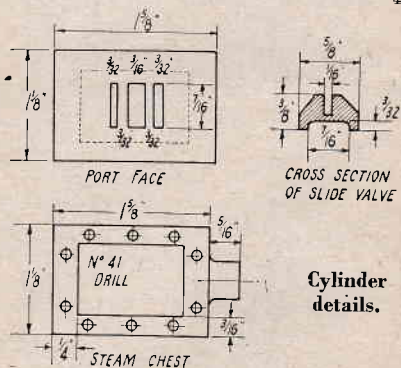
The boiler is fired by a four-burner spirit lamp, the wick tubes being $\frac{1}{2}$ in. diameter, $1\frac{1}{8}$ in. long, mounted on two $\frac{1}{4}$ -in. feed pipes. The lamp tank may be made of tin, and fits between frames behind the trailing axle. A short bit of $\frac{1}{2}$ -in. tube projects from top of



**Back end of
cylinder.**

tank, through a hole in the footplate, and spirit can be poured in through this until the tank is nearly full. A piece of $\frac{3}{16}$ -in. pipe may be soldered into the tank, to form an overflow, if desired. The tank is held in place by a pin passing through both frames and the tank, a piece of copper or brass tube being soldered into the tank to accommodate the pin. As the tops of the wick tubes are above the top of the tank, it is impossible for the burners to flood and set the whole issue alight; so there isn't any risk of the kiddy-driver having a flare-up.

All the pipe connections are shown in the illustration. The blast pipe is merely a short piece of $\frac{3}{8}$ -in. tube, with a 3/32-in. nozzle on it, screwed into the exhaust hole in the cylinder block, and bent as shown. The lubricator is a plain drum made from $\frac{3}{8}$ -in.



Cylinder details.

tube with $\frac{1}{8}$ -in. or $\frac{3}{32}$ -in. ends silver-soldered in. A screw each side through the frame holds it in place, and it is connected to the steam-chest by a $\frac{3}{32}$ -in. pipe and a small flange attached by a couple of $\frac{1}{8}$ -in. screws. Boiler and smokebox can be attached to the frames by a couple of countersunk screws through frames at each side of the bottom of the smokebox, and