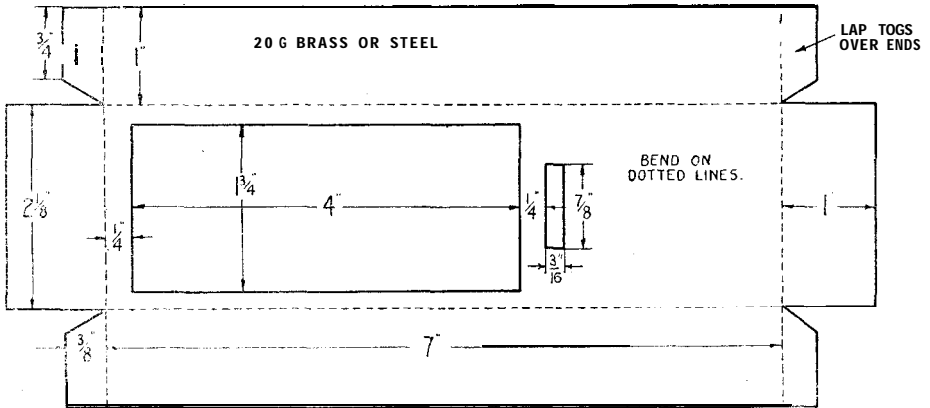
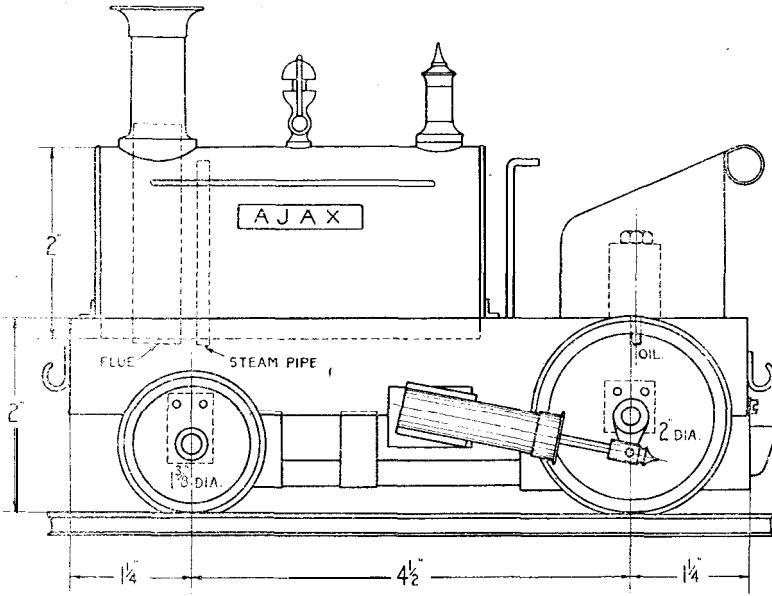


A Bit of Ancient History

by "L.B.S.C."

NOW for another "request item." As mentioned some little time ago, certain followers of these notes who were interested in my reminiscences of childhood days, expressed a desire to build one of the toy locomotives of the type that delighted the heart of young Curly ;

improve its steaming and pulling powers to an extent that would just about have sent me crazy, had I known at the time how to do it. Incidentally, as I am just scheming out the general arrangement and first details of the promised five-inch jobs, and they say " a change of work



The frames " in the flat "

partly for its historical interest, and partly from a combination of sentiment and curiosity. Well, here is a short account of how to build a replica of my " very first." My engine wasn't exactly up to present-day standards of efficiency, so I have added a few refinements, which will

is the best rest," this forms an acceptable interlude. I have one of the little engines here now, and it is intensely amusing to stand it between " Tugboat Annë " and " Jeanie Deans," and let my mind wander back for sixty years or so |

Frame and Wheels

The frame is like the lid of a cardboard box, and is made from a piece of sheet brass or steel about 20-gauge ; or a piece of stout tin will do just as well. The overall size of the piece needed is 9-in. long and 4-1/8in. wide. Mark out as shown, then cut away the ends to form the riveting tags. Cut out the opening for the boiler before bending, either with a metal-piercing saw, or by drilling holes all around, breaking out the piece, and filing to outline. Then bend on the dotted lines, turn the tags around at front and back, and put a couple of 1/16 in. rivets in each. All bending can be done by aid of an ordinary bench-vice.

The bearings for the wheels are 3/4in. lengths of 1/2in. by 3/32-in. brass strip, or they can be cut from 3/32-in. brass sheet. Drill with No. 12 drill for 3/16in. axles, and rivet them to the inside of the frame, with a couple of 1/16in. rivets in each. As the centre of the driving axle lines up with the bottom of the frame, file a half-round nick in it to clear. The centres of front bearing holes are 5/16 in. below bottom edge of frame, if the given size of wheel is used ; but any other sized wheel

as shown. Two holes are drilled on the centre-line of this, for steam port and trunnion, like the pumps in my mechanical lubricators. The port is drilled 3/32 in., at 1/8in. from the end, right into the cylinder. The trunnion hole is drilled 3/8 in. farther along, using No. 40 drill, and tapping 1/8in. or 5-B.A. ; and take care not to make any indentation on the cylinder barrel. True up the rubbing-face of the block on a bit of emery-cloth laid on something flat, same as slide-valves, and screw in a trunnion-pin made from g-in. silver-steel, screwed at both ends and furnished with a nut.

The piston is 1/2 in. long, turned and fitted exactly as I have described for pistons of all engines in this series of notes. The piston-rod is made from 3/32-in. round steel (rustless for preference), 1 1/2in. long, screwed both ends. The big-end is turned from 3/16in. brass rod, screwed on to the end of the piston-rod, and cross-drilled No. 40 for the crankpins. Why on earth the original makers of the " Ajax " engines fitted big-ends of this fancy pattern, goodness only knows ; I don't know of anything

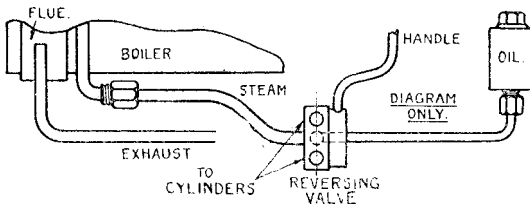
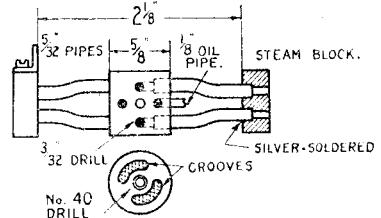


Diagram of pipe connections



How to connect reversing valve

available can be worked in if the axle holes are arranged so that the frame is level. The wheels are light brass castings, leading 1-3/8in. diameter, driving 2-in. diameter, and maybe they are screwed or pressed on to the 3/16in. axles, just as you prefer. Mine were screwed ; but unless the threads are tight, the driving wheels may shift and upset the 180-deg. setting of the crankpins. These are made from 3/32-in. round steel, and are screwed into the wheel bosses, at 3/8in. from centre, exactly opposite each other.

Cylinders and Steam Blocks

The cylinders are made from two pieces of 7/16in. brass treble tube, 1-5/8 in. long. One end is plugged with a disc of brass 3/32 in. thick, squeezed in and soldered. The other end has a press-on cap, made from a piece of brass tube 1/47 in. long and &-in. bore, silver-soldered to a disc 9/16in. diameter, with a No. 40 hole in the middle, and a 1/16in. air vent near the side. The caps can, of course, be turned from the solid, using 9/16in. brass rod ; or they may press into the bore instead of over the outside, if you prefer it. Their only function is to guide the piston-rods.

A block of brass, 9/16 in. wide, 3/4 in. long and 3/16 in. thick, is soldered to the side of each cylinder at the closed end. This is recessed out with a round file, to the radius of the cylinder barrel, and to a depth of 1/16 in., so that the flat face is 1/8 in. from the barrel. Bevel off each side

like it in full-size practice. Plain round bushes, with the piston-rod screwed in edgewise, or ordinary rectangular blocks, would have done quite as well and been more realistic. The pistons are packed with graphited yarn, and should not be mechanically tight ; they should work with as little friction as possible.

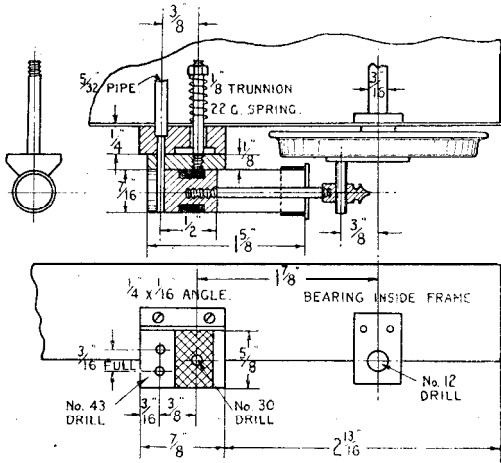
Two pieces of 5/8in. by 1/4in. brass bar, 7/8 in. long, are required for the steam distribution blocks. Each of these is drilled with three holes, as shown in the illustration ; and a recess about 1/16 in. deep is filed across the No. 30 hole. The backs of the No. 43 holes are slightly counter-bored to take 5/32-in. pipes. A small piece of 1/4in. by 1/16in. brass angle is attached to the upper end of each, for fixing to the engine frame. File a clearance in it to correspond with the recess in the block. Both blocks must be truly faced.

Reversing-valve

Young Curly's engine only went one way, chimney first, but there is more fun to be got out of the little toy if it goes both ways, so I am specifying a simple reversing-valve. Incidentally, in the old book on making simple steam engines, by " Steady Stoker," published in my childhood days, there was a description of a simple locomotive with four wheels and oscillating cylinders, and the steam-pipe connections were so arranged that the engine ran backwards only! Probably our friend the " stoker " had got a few cinders

in his eye when running chimney first, so had taken due precautions. Old "Tishy" presented me with a nice hot specimen the other evening, and it was pretty painful for quite an hour afterwards.

Another piece of 5/8 in. by 1/4 in. bar, 5/8 in. long, will make the reversing-valve distribution-block. Drill a No. 48 hole in the middle, and tap it 3/32 in. or 7-B.A. for a trunnion-pin, similar to those on the cylinders. On a circle 3/8 in. diameter, set out four holes as shown. Drill the top and bottom ones half through the block,

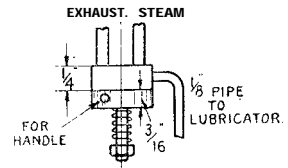


"The works"

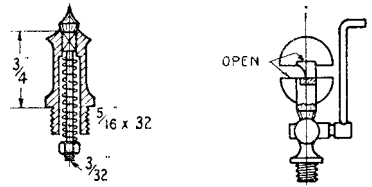
the centre of the driving-axle. Young Curly used to check his with a bit of tightly-stretched sewing cotton, which did the trick fine. Put the cylinders on, give the moving parts a drop of oil, and connect a tyre pump to the free end of the steam-pipe in the reversing-block. The wheels should spin freely in either direction, according to position of the reversing-valve.

Boiler

The boiler is merely a 4-in. length of 2-in. diameter brass or copper tubing, the lighter the



Plan of reversing valve



Safety valve "Squeaker" whistle

and the side ones right through ; counterbore the latter at the back, to take 5/32 in. pipes. Drill two 3/32-in. holes through the thickness of the block, level with the top and bottom holes in the face, and breaking into them. Counterbore these each side, to take 5/32-in. pipes (see dotted lines in illustration) ; then drill a 1/16 in. hole between them, into the steam port, and counterbore it 1/8 in. for the oil-pipe. Face the four-hole side truly, same method as used for cylinder port faces and so on ; then connect the valve-block to the steam-blocks with bits of 5/32-in. pipe as shown in the drawing. Put a piece of 1/8 in. pipe about 2 in. long in the oil-hole at side of block ; a piece of 5/32-in. pipe about 2-3/4 in. long in the steam hole, and another piece of 5/32-in. pipe about 4-1/2 in. long in the exhaust hole. Silver-solder them all in at one heat. Fit a 3/32-in. trunnion-pin as shown ; then make the valve from a 3/16 in. slice of 5/8 in. round rod. This has two sausage-shaped **grooves** in it, about 1/16 in. deep, and a No. 40 countersunk hole in the middle. It has also a 1/8 in. or 5-B.A. tapped hole in the edge for the "walking-stick" regulator-cum-reversing-handle. A fairly stiff spring and nut holds the valve to the block. The valve must, of course, be truly faced.

The whole assembly is attached to the frames by a couple of screws through each angle, nutted inside the frames. The hole for the cylinder trunnion should be 1-7/8 in. ahead of the centre-line of the driving-axle, and a line drawn midway between the ports, passing across the centre of the trunnion-hole, should cut across

better, within reason, as the pressure is very low, and thin-gauge metal gives better results with spirit firing. Alternatively, it can be rolled up from 22-gauge sheet copper. Two light flanged ends can be silver-soldered on, and a piece of 1/2 in. by 22-gauge tube goes through one end, to form an exhaust flue. Two small brackets, made from odd scraps of copper or brass, bent in the bench vice, are silver-soldered to the ends, at fin. from the bottom. When the boiler is in position on the frame, these brackets rest on the frame at the ends of the rectangular hole, and a couple of 1/16 in. screws through each, with nuts underneath, will keep the boiler central.

The mountings consist of a chimney, "peanut" squeaker whistle, and a safety-valve with internal spring, both the latter being screwed into bushes silver-soldered into the boiler. The chimney can be spun up from a bit of 9/16 in. brass tube, or turned from a casting. The whistle is just an "organ-pipe" whistle with the top cut short, and a hollow dome or inverted cup fixed on it, to give a little deeper note. It squeaks, anyway, as the dome is too small for a proper tone. The lower part is simply a cup, fitting on the stem of the whistle under the sound opening, and the whole doings is mounted on the end of a plug-cock, screwed into the bush on the boiler. The safety-valve is shown in section, and needs no comment ; the wire stem is screwed into the valve head, which has three flats filed on it to allow steam to pass.

Steam is collected by a 5/32-in. pipe silver-soldered into the bottom of the boiler and

ing almost to the top. A union screw is attached close to where it emerges, and a union nut and cone is fitted to the end of the steam-pipe coming from the reversing-block. When these are coupled up, the pipe should be bent so that it will be directly in the lamp flame. The end of the exhaust pipe is bent to go up the flue tube, the pipe being set to one side of the chassis, clear of the lamp flames. A small drum lubricator, made from a 3/4 in. length of 1/2 in. brass tube, is installed in the middle of the frame at the back end, and the oil-pipe coming from the reversing-block can either be soldered direct into it, or attached by a union. The "walking-stick" is bent so that it projects upwards through the slot in the frame behind the boiler.

The tank of the spirit lamp can be made of thin brass, or stout tin. It is 2-3/8 in. long, 3/4 in. deep, and about 2 in. wide, to clear the wheel bearings. The back is made a little higher than the sides and front, so that the tank can be attached to the back of the frame by two 3/32-in. screws. A strip of brass, about 3/32 in. thick, is soldered along the back, inside the frame, and the holes for the screws are drilled and tapped through this, as nuts cannot be got on with the lamp tank in place. The feed-pipe is 1/4 in. brass tube, and the wick tubes 3/8 in. diameter and 7/8 in. long. The lamp on Curly's toy slid between two runners soldered to the frame, but every time the tank was slid in or out, the wicks caught the steam-pipe and were pulled out. The lamp can be filled via a socket soldered to the back of the tank as shown, with a hole drilled in the tank for the spirit to enter; or you can fit a vertical pipe, and drill a hole beside the lubricator, through which the filler pipe can project into the "tender."

The "tender body" is bent up from sheet brass, steel or tin, and soldered to the top of the frame. The back is turned over as shown, so that the engine may easily be picked up by holding the back, the rolled-over part forming a convenient grip. Young Curly found this very handy, having tender fingers in those days. They are apparently made of asbestos now! The coupling-hooks are made of wire, bent to shape, the end being flattened, drilled, and attached to the engine frame by a single rivet. The handrails are tinned wire.

Curly's engine was painted bright green, with black frame. The chimney, safety-valve, whistle and cylinders were polished brass, and the handrails left bright. The wheels had bronze-coloured spokes.

Well, there you are; the little toy is worth building, just for curiosity if nothing else, and actually takes a matter of hours only. Though only suitable for indoor working, or on a calm day outdoors, there is a peculiar fascination in seeing it at work. I built one for a friend in Liverpool, as a reminder of old times (her name was "Bjill," not "Bill" as misprinted in a recent issue) and one of the funniest sights I ever saw on my railway was "Bjill" piloting old "Ayesha." The energetic way the little toy tugged at the front drawbar hook of her'sedate coal-fired passenger-hauling sister, as though to say, "Come along, let's get on with the job," was really comical.

Early Passenger-hauling

Whilst on the subject of "ancient history," during the past few weeks some correspondence has come to hand on the subject of live passenger hauling on small gauges, asking for information on this subject; and as there is apparently some misapprehensions floating around, I'll tell you here what I know about it. The first living passenger to ride *in public* behind a 3-1/2 in. gauge locomotive was none other than Mr. Percival Marshall, the engine being a Caledonian 4-4-0 of the Dunalastair class. The information, as far as I recollect, came from Mr. A. P. Whatley, one of the earlier members of the London S.M.E., who was present at the Holborn Town Hall. I understand that the engine slipped very badly, but she did the job. About the same time (the opening years of the century) Mr. Jack Wood, of Winnipeg, built a 3-1/2 in. gauge Canadian Atlantic which managed to pull a passenger. Later, Carson's catalogue appeared, showing a 2-1/2 in. gauge "Cardean" hauling a small boy-ridiculed in "opposition" firms' catalogues—and Carson's guaranteed that their 2-1/2 in. gauge jobs would pull a load of 56 lb. continuously. The first 2-1/2 in. gauge engine to pull an *adult* passenger, of about 8 stone, was Mr. W. Briggs's 4-4-2 "Charles Rous-Marten," an inside cylinder job of his own design, for which I made the valve-gear; this was about 1921. The engine is still running; she has had one "heav shopping" only.

The pioneer of the "mighty haul" was the late Tom Averill, of Alcester; but he did it in "one-inch-scale." His engines were beautiful jobs, and followed full-size practice, for he knew all the drivers at the local G.W.R. sheds, and got them to come along and test his engines. I well recollect that one of them refused to believe that a "one-inch-scale" engine would haul his weight with the lever one notch off middle, until she actually did it. We can do that in 2-1/2 in. gauge now!

The era of popular passenger-hauling by coal-fired engines in the smaller sizes was started by "grand-nanny Ayesha" at the Caxton Hall, followed by these notes, which "spilled the beans" on how to do it. The first gauge "1" engines to haul living loads were the "Lizzie" (the first complete locomotive described in these notes), a similar engine rebuilt from a commercial job, and my 4-6-4 tank engine "Eileen." The "Lizzie" (Ford Pacific) was spirit-fired, with a water-tube boiler, cylinders 9/16 in. by 7/8 in., and 2-1/2 in. coupled wheels. The rebuild was of similar type, but with 3/4 in. stroke cylinders and 2-in. wheels. "Eileen" was a copy of the 4-6-4 Lancashire & Yorkshire tank engines designed by George Hughes. She had a coal-fired Belpaire boiler, with a grate 3 in. long and 1 in. wide; cylinders 1/2 in. by 7/8 in., and 2-1/4 in. coupled wheels.

The first gauge "0" locomotive to haul an *adult* passenger was my Southern Pacific "Sir Morris de Cowley," and she did it over 20 years

at the Model Railway Club Exhibition at the Kingsway Hall, the driver being the late Bill Irvin of the L.N.E.R., who weighed over 11 stone at the time. Small-gauge passenger hauling is such a commonplace at the present time, that it is difficult to believe that the idea was ridiculed less than 25 years ago.