uses of SOFT SOLDER

By GEOMETER

SOFT solder melts with an iron or with a low-temperature flame, and has little strength in tension, so that it cannot be used where there is great heat or mechanical stress on parts. As a result, many engineers in this age of brazing and welding tend to look upon solder as an outmoded alloy which had its uses in grandfather's time and should now be in honoured retirement. Yet it still has many uses, particularly for the amateur worker.

A small, low-pressure boiler which is close-riveted for strength can be made steam-and-water-tight with solder at the joints. Components can be built up, by tinning the faces of abutting parts with solder and then sweating them together with heat. Holes can be filled and patches fixed to all sorts of sheet metal components in mild steel, brass and copper-to all of which solder adheres firmly.

A solder for general purposes consists of equal parts of lead and tin, though the proportions can vary widely. One solder can have as much as 85 per cent lead. Another is almost entirely of tin and is much more expensive. Some solders include a proportion of antimony not exceeding 6 per cent.

Given a good solder, sound joints depend on cleanliness, flux and heat. Machined parts are clean and can be soldered straightaway. Others must be cleaned by abrasion-by filing and scraping, or with wire brushes and emerycloth. If parts have been soldered previously, and the solder is old and rotten, it should all be melted off first. During the resoldering, further cleaning may be necessary, with repeated applications of flux.

Killed spirit or zinc chloride is the flux used for most jobs, and is best for the difficult ones. Pewter and lead are soldered with tallow for flux. Paste fluxes are used for electrical work and clean tinned surfaces. With these fluxes, there is no subsequent corrosion as sometimes happens with killed spirit. When this is used, parts should be swilled, or preferably scrubbed, in clean warm water, to get rid of all traces of the flux.

Heat for soldering can be provided by irons of various types and sizes, heated by various methods: in a domestic fire.; over a gas-ring; by a built-in gas Jet; or electrically from the mains. Blow-pipes may be operated from spirit lamps, bottled gas or oxy-acetylene cylinders. Like blow-pipes, continuously-heated irons of moderate size enable work to go on without interruption even on large jobs. Ordinary irons must be reheated from time to time, and their size must be suitable for the work. The bigger the job, the larger the iron.

All irons must be clean and properly tinned at their working ends. They can be ground or filed, heated carefully, dipped in flux, and then rubbed with solder.

Small parts can be held by pliers for heating in a flame ready to tin them. If an old pair of pliers can be spared, one jaw can be ground or filed (after softening), as at Al, to squeeze tinned parts together. Alternatively, clamps can be used. The simple one shown at A2 consists of two flat strips riveted to a hinge with the jaws pushed together by a spring at the handle end. A small C-clamp, as at B, can be made from a piece of rectangular bar with a tapped hole for a screw and a plain one for a hollow anvil. A toolmaker's clamp, as at C, can have a pin and a hollow anvil. The anvil provides broad-based support for parts gripped in each clamp. With two screws or two pins, parts could tilt or slip.

A solder chuck is a convenient means for setting up many small parts on the lathe. It can be in brass or mild steel. An example is at D, which shows a collar set up for thinning with a facing cut.

Solder sealing of a boiler end is as at El, and solder tilling of seams and dents as at E2 and 3. Diagram *F* illustrates the way in which a small fork can be built up, with a plate each side of the rod, each held by a pin and tinning. ❑