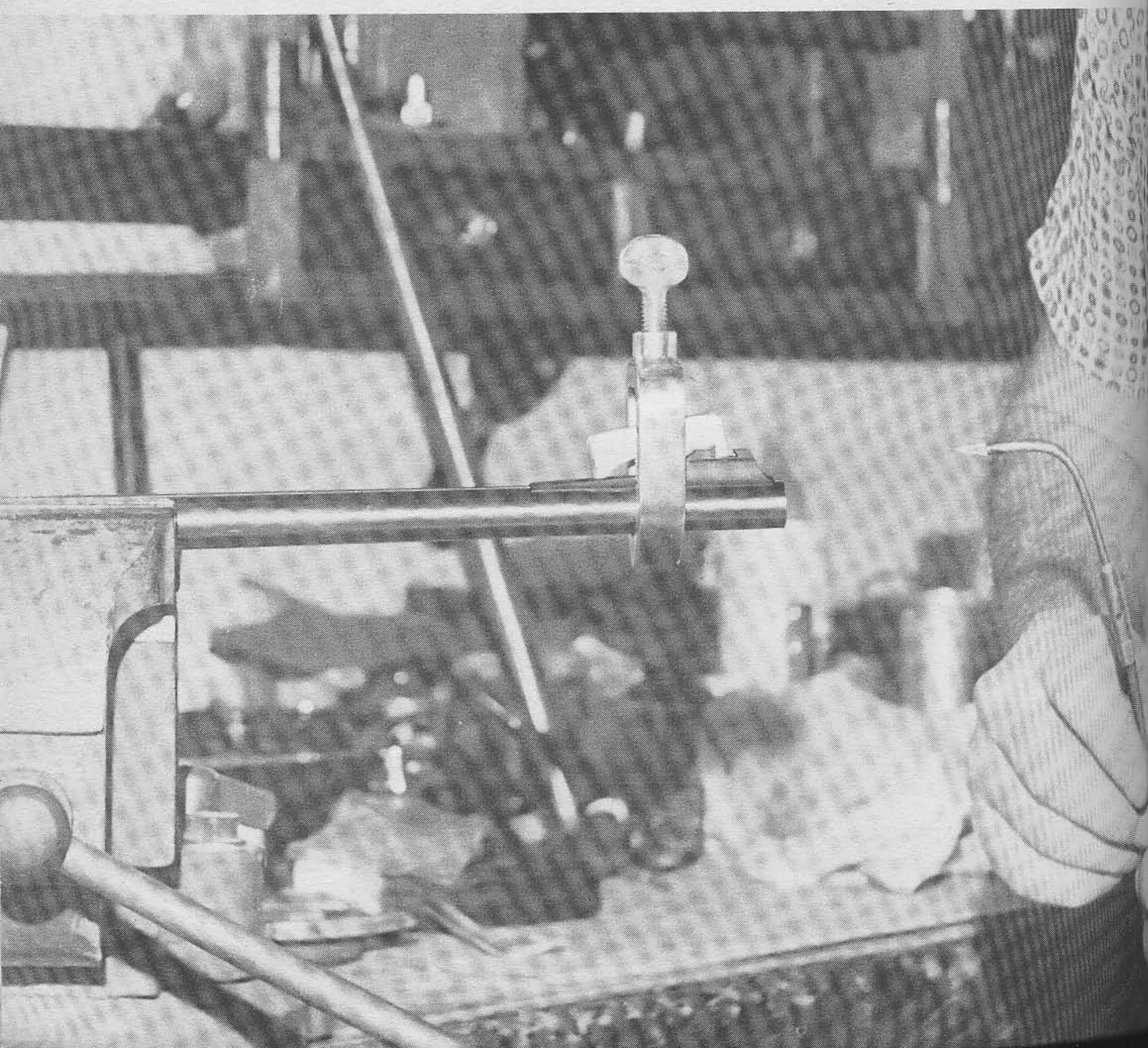
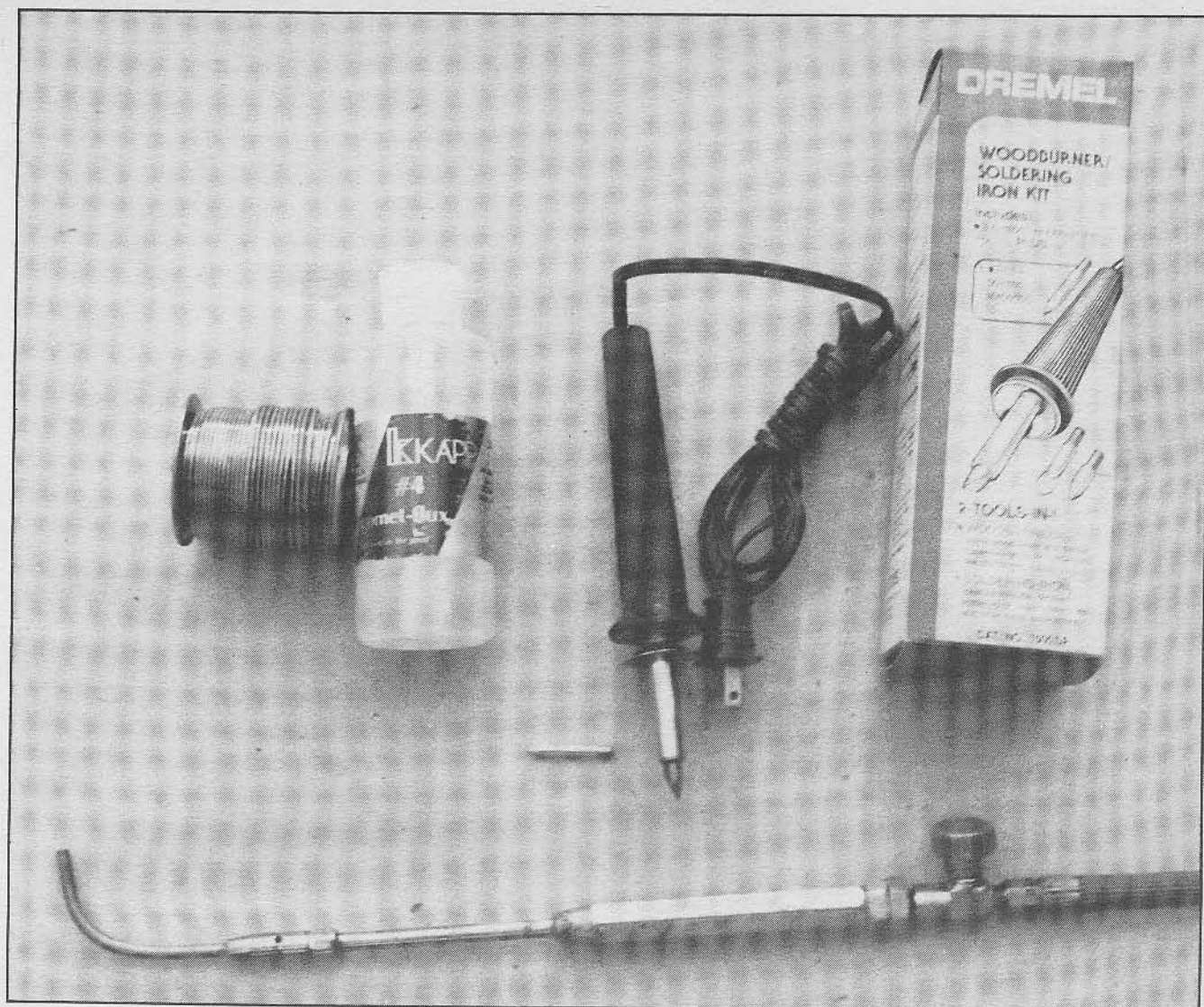


Chapter 25

SOLDERING SAVVY

*Knowing What You Can — And Can't Do — With
The Various Solders Is The Key To Success*





Left: Sweat soldering a ramp on a rifle barrel is fairly simple, if one has the right equipment. Author uses his Presto-Lite torch to install a ramp held in position with Brownell's ramp soldering jig. (Above) Force 44, a silver-bearing solder, is preferred by Bish for most soldering work on firearms. It can be worked successfully with an electric soldering iron such as the Dremel model shown here or one can use a small torch to melt the solder.

ONE OF the most misunderstood yet fundamental phases of gun work is the chore of soldering two pieces of metal into a lasting union.

Such components as custom bolt handles, hammers, triggers and other working parts of the gun's mechanism made of steel cannot be joined satisfactorily with soft solder. To be bonded properly, these parts must be welded using an oxy-acetylene torch and the proper welding rod, preferably one with $3\frac{1}{2}$ percent nickel steel.

Yet over the years, I have seen at least a jillion gun parts that had been soft-soldered together by some neophyte to the gun fixin' business. These same parts held together, if at all, only until the first time the joint was placed under stress. In gunsmithing, both soft solder and the harder silver solder have definite uses, but one must know where and how it may be used with satisfactory results.

The gun craftsman is faced quite often with such chores as repairing sight beads, resoldering ribs that have come loose on shotguns, installing new barrel liners in shot-out barrels, repairing broken brass and silver patchboxes and inlays on Kentucky-type rifles; there are countless similar repairs for firearms, both modern and antique.

The common solders such as rosin core and others used in other trades are not necessarily adapted to gun work. Among working professional gunsmiths, the most extensively used soft solder is Force 44, which is available from Brownell's. This solder is used in conjunction with #4 Comet Flux to produce a soldered joint that is durable and strong, even after being immersed in a hot bluing tank. The advantage of Force 44, when properly used, is that it flows smoothly at 475 degrees Fahrenheit. A mixture of four percent silver and ninety-six percent pure tin, it successfully joins such metals as steel, stainless steel, copper,



The metal that is to be soldered must be cleaned, then polished. Bish favors the Dremel Moto-Tool with either a wire brush, emery disc or a buffing head. He has found this combination ideal for small, intricate solder jobs.

brass, silver and nickel-silver into a lasting unit. However, it should not be used on steel gun parts that will see extensive stress or wear. There are limitations. It even sounds foolish, but I have seen heavy mainsprings that had been broken with attempts at repair done with Force 44. It cannot be done! Springs cannot be welded or soldered together and be expected to retain their tension. The welded or soldered joint will always rebreak when the spring is bent.

The secret of soldering, whether with soft solder or the harder, more durable silver solder, is to make certain the two components are absolutely clean and the metal bright. To attempt to solder together two pieces of metal that are dirty with oxidation, rust, dirt, grease or any other foreign substance is a waste of time. The joint will not accept the solder in a smooth flowing manner as it should. The result is a sloppy-looking job and one that is weak.

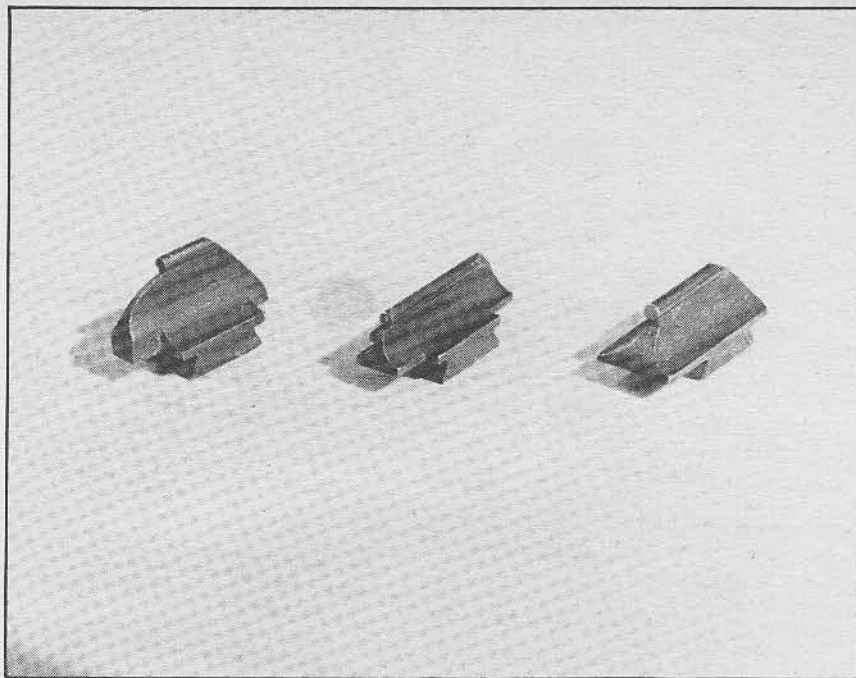
While there are several methods for applying heat in soldering, I prefer either a small acetylene torch, or for small jobs such as installing new beads on gun sights, a soldering iron.

The soldering iron I have used for some years with great success is the Dremel electric soldering iron which doubles as a woodburning tool. It is great for soldering and, by merely changing the tip, it is ideal for antiquing gunstocks and striping ramrods on muzzleloading rifles using the woodburning tip that comes with the kit.

Force 44 solder is available in rolls of one ounce, one-quarter- or one-pound spools. It also is available in fluxed form, having its own flux right in the core of the wire. A solder known as Swif 50-50 is a tin/lead alloy and comes in a paste form. I have used this solder to some extent with good results for tinning a new barrel liner or installing ramp front sights.

With careful workmanship, such components as front sight ramps, shotgun ribs, sights and sweat-on type European sling swivels can be installed on a perfect blue job without marring the finish in the least. Minor touch-up with cold blue may be necessary along the hairline soldered joint. However, jobs such as this do require that the craftsman have a good working knowledge of the process.

For the most part, soldering jobs involve only small areas, as with the installation of new beads on front sights



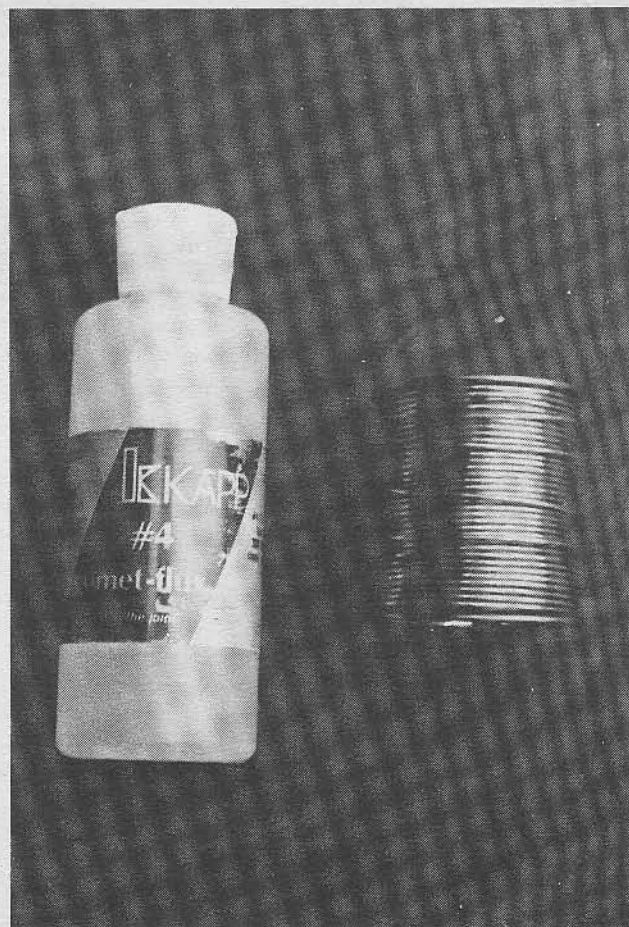
Left: Small front sights that have had their beads knocked off can be repaired easily with the soldering methods outlined in this chapter. (Below) The Force 44 silver-bearing solder, when used with #4 Comet Flux, produces as fine a soldered joining as possible. It flows smoothly at 475F degrees and proves strength up to 25,000 pounds per square-inch. It can be blued with cold gun blue.

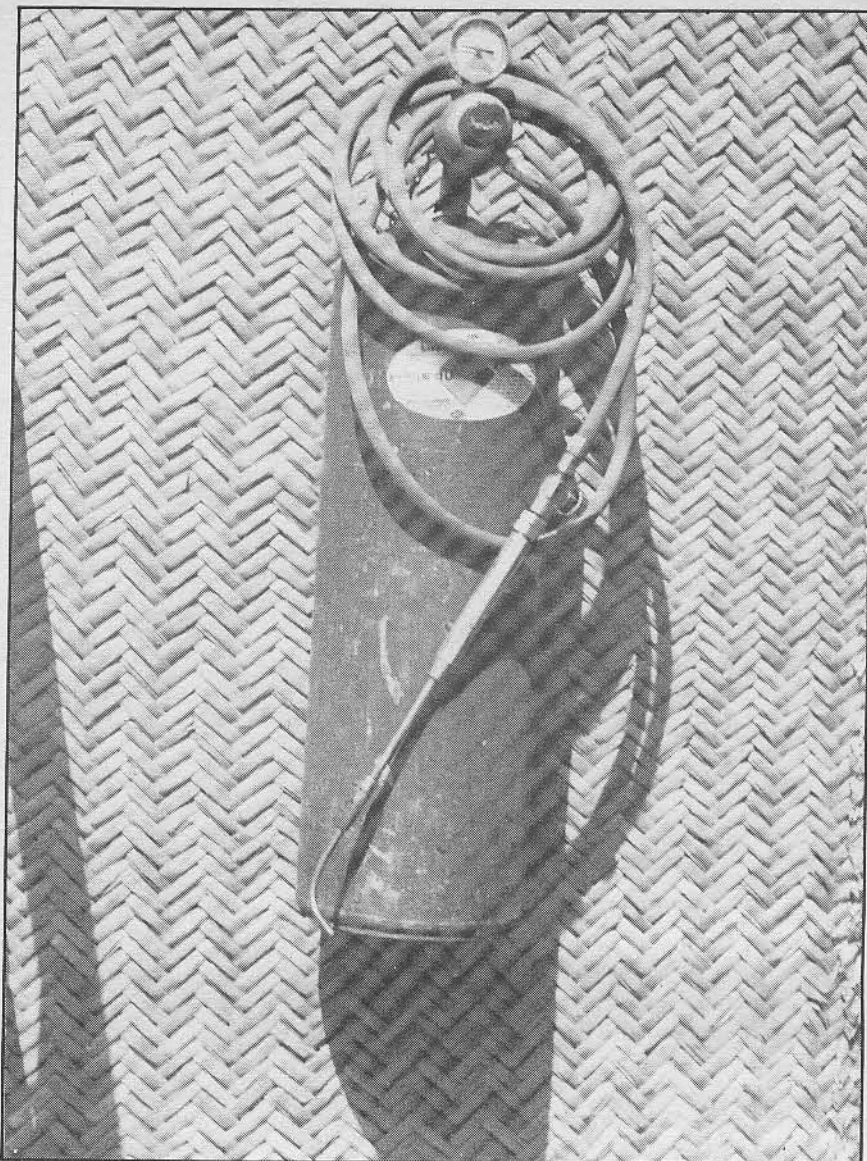
or sweating a ramp front sight onto a rifle barrel. I have found that my Dremel Moto-tool is ideal for getting these areas immaculately clean, using the appropriate sanding disc, wire brush or metal burr chucked into the tool. This is far faster than attempting to do it by hand and it does a better job.

It is common during soldering jobs to have the solder run into areas where it isn't wanted. This necessitates cleaning that solder run from the forbidden area. Modern technology has taken care of this with an item known as Brownell's soldering talc. This metal workers' talc is packaged in a form resembling a crayon. Merely rub the area with the talc where solder is not wanted and it will prevent the solder from adhering.

If installing a front ramp sight on a rifle, first trace the outline of the ramp onto the barrel where it is to be installed. Then remove the ramp and rub the entire area outside these lines with the talc crayon. Presto, a perfect no-run solder job. Incidentally, great care is needed in using the #4 Comet Flux, a cleansing acid, to prevent blued surfaces of the gun from being streaked or bleached out. Use this flux sparingly; a drop at a time does wonders.

Another aid to good soldering is a product known as Heat Stop, which is a heat control paste. Applied properly, this paste acts as an anti-flux when soldering and prevents heat flow into previously soldered areas. Heat Stop will not damage blued surfaces and is cleaned from the work easily. This substance is even used by emergency crews to protect victims who must be cut from wreckage with acetylene torches. Just follow the directions on the container.





A compact tank setup such as this is ideal for both soft and hard solder work. With this Presto-Lite unit, the tank will last several months before refilling is required. This Tor-It torch has been used for 30-odd years.

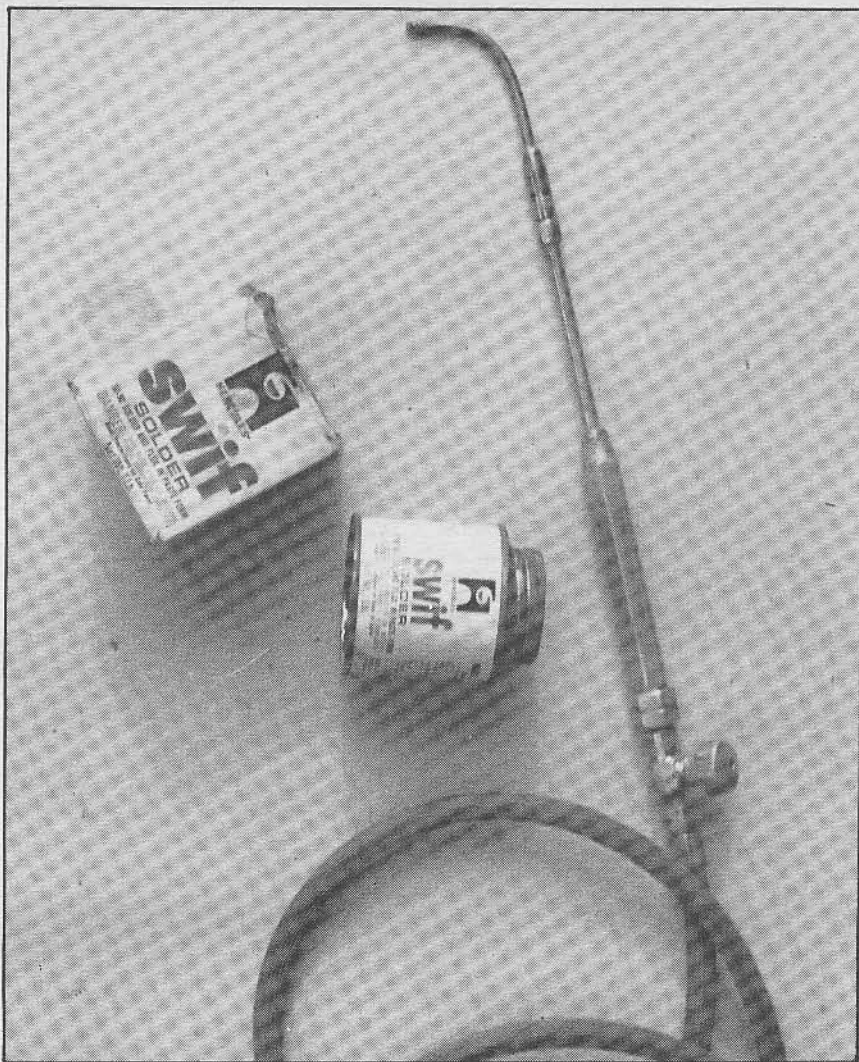
Soft solders are those containing various mixtures of tin, lead and in the case of Force 44, some pure silver for added strength. The harder silver solders are just that; an alloy of silver capable of brazing steel, stainless steel, copper, copper alloys, nickel and its alloys or any combination of these. The silver solder I've found best suited to gun work is Silvaloy Silver Solder or Silvaloy 45. This solder is available in ribbon form measuring .005-inch thickness by one-half-inch in width or in wire form 1/32-inch in diameter. Silvaloy has a melting temperature of 1125 degrees Fahrenheit, and the flow point is 1145 degrees. A standard silver soldering paste flux is used.

The question will arise, as to which to use for a specific job — soft or silver solder. Light jobs such as installation of new beads on front sights or ramps on barrels where minimum heat is desired call for soft solder with a melting and

flow point of only 475 degrees. For heavier metals, such as steel triggers, hammers and the like where more strength is desired, one should use the harder silver solders with its flow point of 1145 degrees.

While silver solder cannot replace a good oxy-acetylene or heli-arc weld on iron or steel parts, it is acceptable for repair of cracked or broken parts, such as triggers and hammer spurs. These repairs are hardly detectable once the silver union is colored with the Solder Black produced by Birchwood-Casey. Also, most cold gun blues can be used to darken the soldered seam to the point that it is undetectable.

In gun work, a solder often is needed that has an extremely low melting point, yet is capable of making a strong bond. Such a solder is Tix Soft Solder which has a melting point of only 275F — more than 100 degrees lower



Swift 50-50 solder, packaged in four-ounce jars and one-pound cans, is a favorite with many gunsmiths for sweating on ramps, ribs, sights, et al. In paste form, this solder is applied in a thin coat to one side of the surface to be soldered. Applied heat creates strength of about 2000 psi.

than lead/tin solders. Often called "The hardest soft solder on earth," its bond strength is 4000 pounds per square-inch (psi) and it can be used to solder gold, silver, stainless steel, alnico, pewter, most alloys and all of the other solderable metals.

Tix soft solder will not tarnish, so it can be left in the white if desired, or can be blued with Brownell's T-4 bluing solution. It contains no silver or bismuth and works beautifully for attaching ribs, ramps, precious metal inlays and overlays. For electronics and radio buffs, it is ideal for soldering solid state components without a heat sink and will not damage print boards.

It is common these days for some armsmakers to produce certain firearms components of aluminum or aluminum alloys. Included are such parts as trigger guards, butt plates, cartridge magazines and clips, scope rings and mounts. On occasion, these parts may be broken or badly cracked through abuse or accident and require repairs.

Most professional gunsmiths will recommend that such a damaged gun component be replaced, but the occasion

still arises when it is necessary to repair the original part due to factory shortages or a refusal to replace such parts on short notice.

A good gunsmith should be capable of repairing damaged gun parts made of aluminum with a product known as Multicore solder. This product consists of a tin/lead/silver alloy specifically formulated for soldering aluminum. It is highly corrosion resistant and no precleaning or sanding of the parts to be soldered is necessary. It includes an extra-active flux that prepares the surface for soldering.

The melting range is 354 to 518 degrees Fahrenheit and the actual soldering range is from 600 to 700 degrees. Multicore solder also may be used on brass, copper, tin plate, nickel and steel. Properly used, Multicore solder will produce repairs to aluminum gun components that are undetectable. Once the job is done, and the repaired section polished, it may be colored using Aluminum Black, a Birchwood-Casey product.

Any number of other solders are available, but those solders discussed should handle any firearms work.