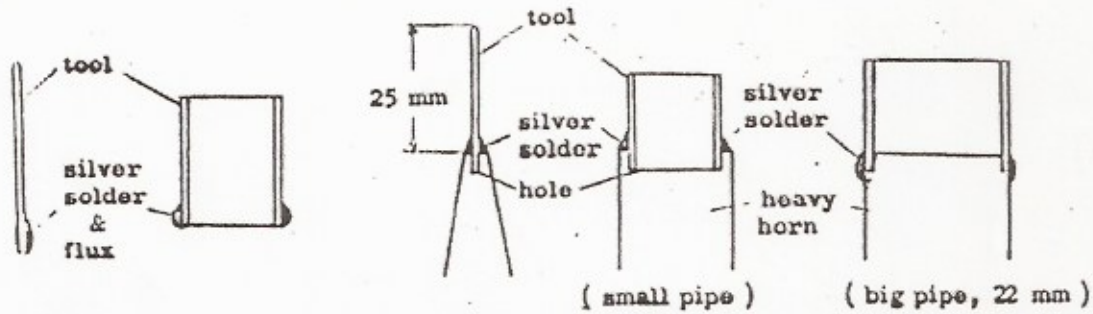


Silver Soldering of Tools



For silver soldering of a tool, the horn should be standing upright on a suitable stand. Before inserting a tool into the horn, apply a little flux and silver solder at the end of the tool as shown above figure.

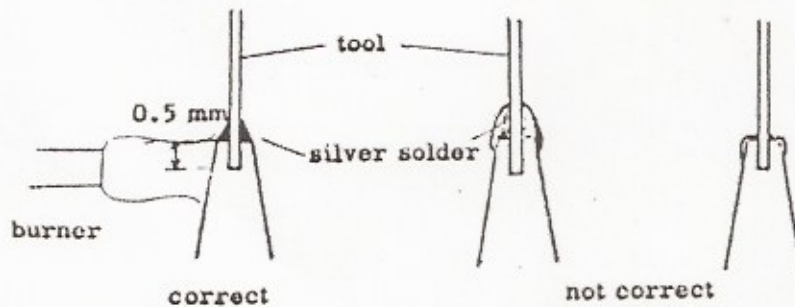
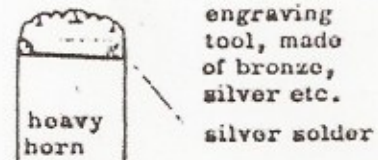
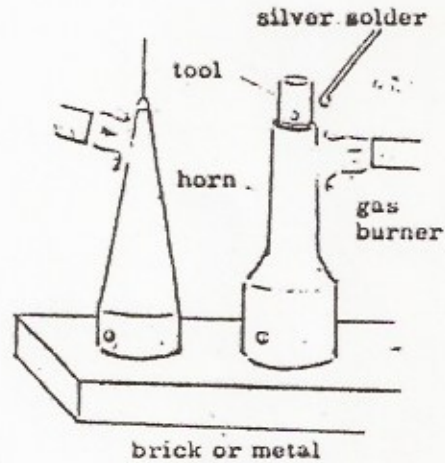
Heat the horn with a gas burner not only at its exact end position but over the length of 10 mm from end position of the horn. Do not flame the tool. After inserting a tool, apply silver solder on the top of the horn by heating, so that the silver solder will be melted and will support a tool securely into the horn.

* When the tool is worn out during the operation, the old broken tool should be removed by heating, then replace a new one as same as the above instructions.

Making one or two holes about 1.5 mm diameter at the upper side of the tool is very effective for core drilling large holes over 8 mm.

For engraving or stamping of stone, engraving tools which are made of lost wax casting also can be mounted on the heavy horn.

It is very important to silver sold a tool into the horn correctly. Please refer to the following figure;

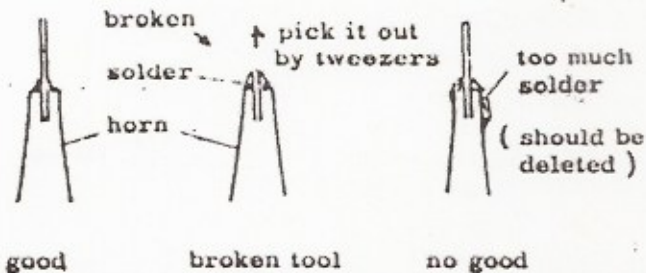


NOTE

DO NOT LET THE FLAME TOUCH THE TUBE (TOOL) THIS WILL RESULT IN AN INSTANT OVERHEAT AND WILL CAUSE THE TUBE TO BREAK INSTANTLY WHEN POWERED UP.

Put in Bold type

The remainder of broken tool is usually buried in the horn and is difficult to be removed unless it is drilled out or solder is melted. It will be the best method that the remainder of broken tool can be easily picked out with tweezers when the solder is melted.



The standard tool for drilling small holes is 1 - 1.2 mm in diameter and 25 mm in maximum length from the end of the horn. High carbon steel wire is generally used for this purpose.

As the diameter of the tool increases, machining efficiency will decrease. In this respect, pipe shaped tools of 0.1 to 0.5 mm in wall thickness are normally used to drill holes larger than 2 mm diameter. The stainless steel pipe is popular for this purpose.

The following care must be taken when the tool is soldered.

- (1) The horn should not be heated unnecessarily high.
- (2) The horn should not be cooled rapidly after soldering.
- (3) The tool should be inserted to the bottom of the hole and should be soldered upright to the center line of the horn.
- (4) The end of the horn should be protected from any harm by hammering, dropping and filing etc.

If too much silver solder is used, excessive solder may run down over the end of the horn. In such a case, the excessive solder should be removed by wiping off with a piece of cloth after heating into molt.

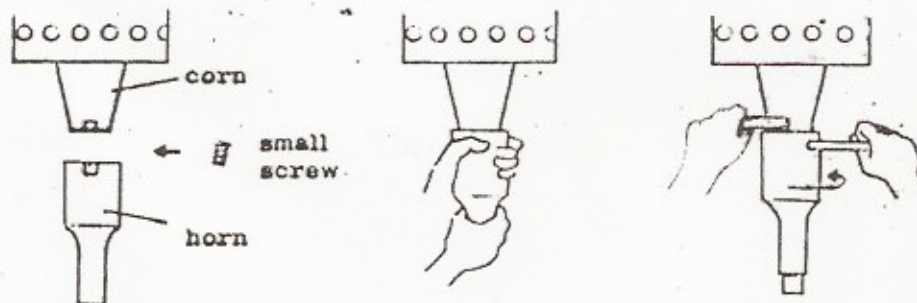
When the excessive solder is removed using a file, only excessive solder should be taken off with great care. Never harm the horn by filing. Even a small flaw will prevent the horn from correct ultrasonic vibration and eventually make the horn broken.

Mounting The Horn and Other Adjustments:

Clean up the contact surfaces of both horn and horn.
and apply a drop of machine oil on both sides.

Screw the horn onto the transducer horn firmly with a small screw as shown following fig. 1. If not tightly enough, vibration energy from the transducer is not transmitted correctly to the horn.

Fig. 1.

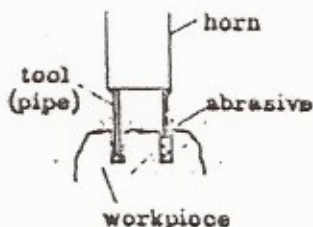


Machining Unit Operation

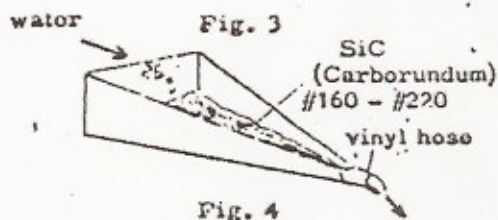
Drilling of small holes holding the workpiece by fingers

This method is very popular among the professional gem cutters especially for drilling round bead and small piece of gemstone, and is also effective for drilling of polished gemstones.

Mount the horn to the end of the corn after clean up the both contact surface by a cloth.
Check the alignment of the steel wire soldered to the horn against the center line.



Adjustment of abrasive and water should be done by positioning the abrasive hopper in good condition and by adjusting a water cock.
The best mixture is 50% abrasive and 50% water in weight.
A vinyl hose on the end of the hopper should be in contact to the horn so that abrasive and water are uniformly fed onto workpiece along the horn.



For ample supply of abrasive and water, the use of abrasive pump may be better than gravity feed method using the abrasive hopper. Especially the abrasive pump is useful for the machining in a horizontal posture of this drilling machine.
However, generally gravity feed method is very popular because of the simple and easy handling.
Water supply to the abrasive hopper can also be done by this gravity method as shown in figure.

