



Sparkie® II

Mini Fusion Welder

Millennium Edition



INSTRUCTION MANUAL®

Written and compiled
by
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2002

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WARRANTY

For two years from the date of purchase, Triad, Inc. will repair or replace The **SPARKIE® II Mini Welder** if defective in material or workmanship. This limited warranty does not include replacing collets, jigs or any damage caused by accident, neglect or misuse and ceases when you sell, rent, or dispose of this welder. The **SPARKIE II Mini Welder** must be delivered or shipped prepaid to the factory with your copy of the warranty or proof of purchase. Please save your shipping carton. Ship to: TRIAD, Inc. 301 West Main St. Chartley, MA 02712

Introduction

What is new in the Millinnum Edition

In a word it is simpler to operate. Fewer buttons and dials gives this new version a clean uncluttered look. Charging times have been reduced for faster production rates. The new foot pedal charging control frees both hands for accuracy and speed. The optional **Power Pack** simply pugs in and provides extra power for those big findings .

What is SPARKIE II?

SPARKIE II is a mini fusion welder. Fusion welding has been a mainstay in the jewelry industry for many years. Fusion provides a fast, clean bond between similar and dissimilar metals when using fusion findings. Low temperature (pot metal) and lead bearing alloys are not compatible with fusion welding.

SPARKIE II is a capacitive discharge welder. Capacitors are used to store an electrical charge, like a battery. That charge is released through a fusion finding as it touches the surface of the receiving metal. A small explosion occurs which blows all of the oxides and gases away from the weld. In that next millionth of a second a vacuum exists, allowing similar and dissimilar metals to bond in the residual heat.

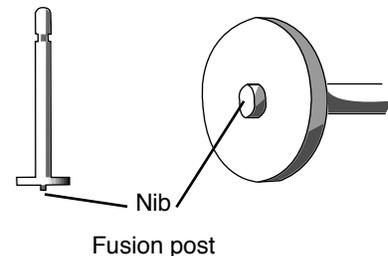
What are fusion findings?

When you look closely at the bottom of a fusion finding you will see a small (appx. .01 in. dia.) nib in the center of a flat plate. It is forged of the same metal as the finding, it is not solder or flux. This nib explodes when the capacitors discharge. The geometry of this contact area is the key to fusion welding.

Fusion findings have been standardized in the industry. They are available from your **SPARKIE II** distributor and other sources.

What about quality control?

The simplicity and speed of fusion welding can be misleading. Proper alignment of the machine and preparation of the pieces to be welded is very important and cannot be over emphasized. Test welds should be performed with some of the actual pieces and findings to be used. Occasional tests should be performed on the finished product.

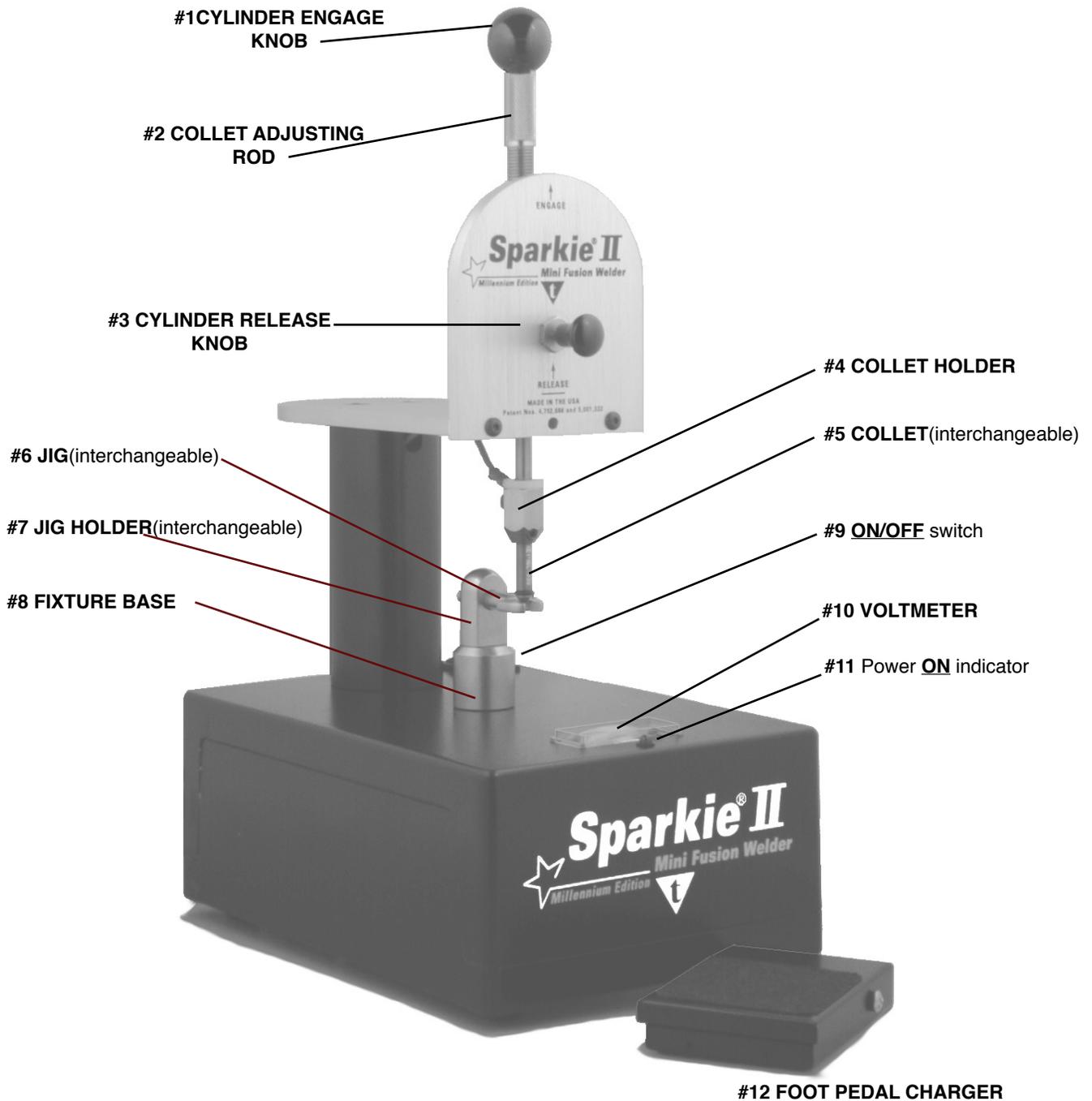


In the final analysis the precision of the operator is the key to success. The hand held operations must be performed with care and a realization that the quality of the finished product is in the balance during this final few seconds.

PLEASE READ ALL OF THE INSTRUCTIONS BEFORE ATTEMPTING TO OPERATE!

Note: For your personal safety and for the proper and efficient operation of **SPARKIE II** welders, TRIAD recommends that you read the instructions **before** operating the machine. Your familiarity with the machine and its operation will permit the continued safe use of **SPARKIE II** in your workplace and will allow for the efficient production of high quality work.

SPARKIE II working diagram.



Note: Banana plugs are provided on the back for installation of a Power Pack.

General Information

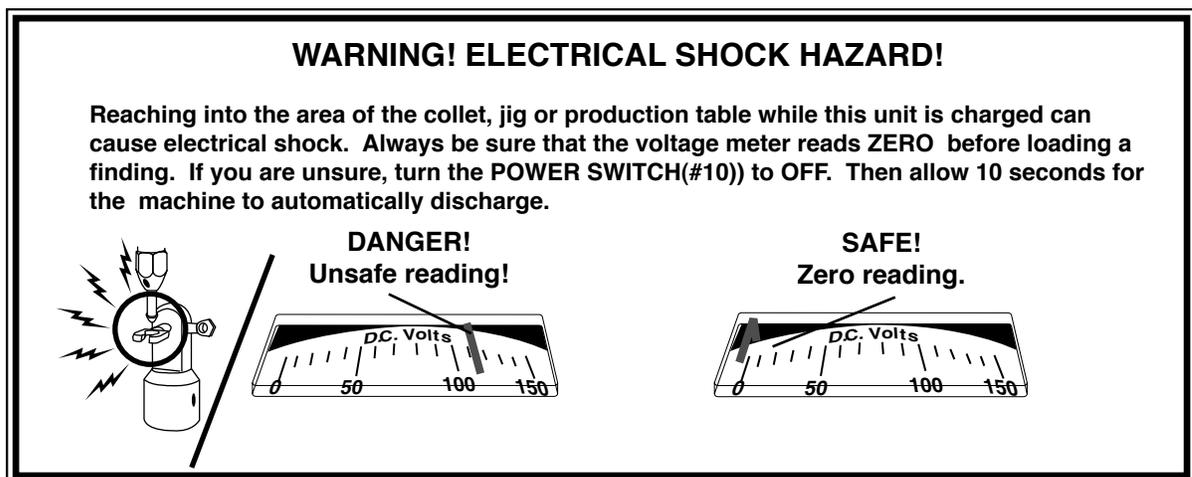
The following items were packed with your **SPARKIE II**: 1) Instruction manual with voltage chart, 2) Collets for ear posts (.030L, installed) and tie tacs (.045L), 3) Jigs SF-6 (ear post, installed) and SF-7 (tie tac), 4) Allen wrench, 5) Two extra 'O' rings and ball bearings, 6) Safety glasses, 7) Sample kit and test report. **Please save your shipping carton.**

Practice

Prior to plugging **SPARKIE II** into a power source, a dry run should be made to learn what to expect. **If you have already plugged the unit in, please unplug SPARKIE II now!**

- 1) Pull up on the cylinder **ENGAGE KNOB (#1)** until a slight "click" indicates that it is locked in the up position.
- 2) While the cylinder is up, note the position and alignment of the **JIG (#6)**. The **COLLET (#5)** must align with the center of the hole in the jig. A gentle pull on the **CYLINDER RELEASE KNOB (#3)** will drop the **COLLET HOLDER (#4)**. Try it. When in the down position the collet should fit perfectly into the hole in the jig. Try this a few times so you get used to the feel of this operation.
- 3) The alignment of the jig can be adjusted in two ways.
 - A, Loosening the thumb screw on the side of the **JIG HOLDER (#7)** will allow the removal of the jig and adjustments fore, aft and horizontally. Use the allen wrench through the hole in the thumb screw for leverage while tightening.
 - B, At the base of the **JIG HOLDER (#7)** an allen screw locks the holder in place and allows adjustments from left to right. The **JIG HOLDER (#7)** may also be removed and replaced with other fixtures._
- 4) The depth of the stroke can be adjusted with the **COLLET ADJUSTMENT ROD (#2)**. This is the threaded cylinder just below the **CYLINDER ENGAGE KNOB**. **SPARKIE II** is shipped with the adjustment set so that the collet rests slightly above the jig. This is normal for most post fusing operations. Other findings and fixtures may need this depth adjustment reset.

Operating Instructions



ALWAYS WEAR EYE PROTECTION WHEN OPERATING MACHINERY!

The safe operation of **SPARKIE II** requires the use of grounded 115 volt AC electrical receptacles. If you are not sure that your receptacles are properly grounded, have them checked by a qualified technician.

Set up and post welding

- 1) First plug **SPARKIE II** into a grounded 115 volt AC receptacle.
- 2) Pull the **CYLINDER ENGAGE KNOB (#1)** into the up, locked position.

3) Check the **VOLTMETER**(#10) for a **zero reading** then insert a stainless steel ear post part way into the **COLLET**(#5). It is important to leave the finding extended about 1/8th inch below the collet.

4) Place one of the brass samples that came with your welder **firmly** up against the **bottom** of the **JIG**(#7) with your finger (It's OK, you won't get shocked.) making sure the area to be welded is visible and centered through the hole in the jig. See the diagram below.

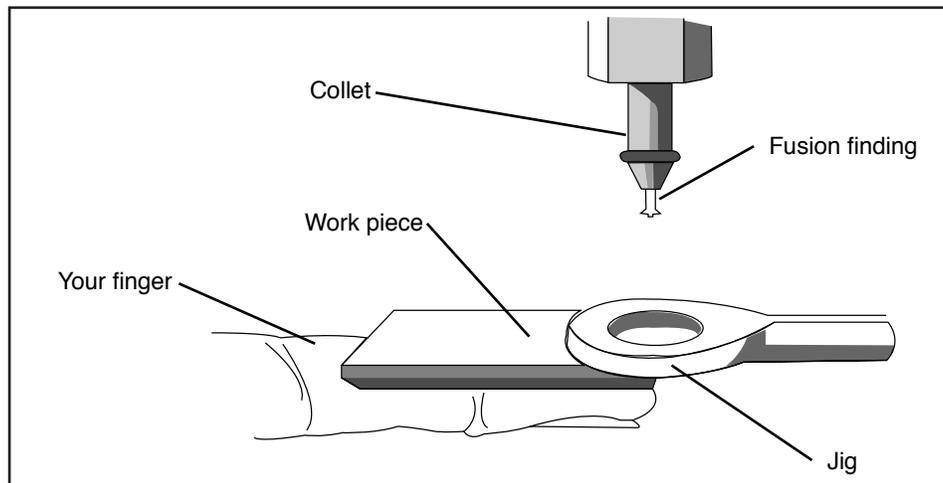
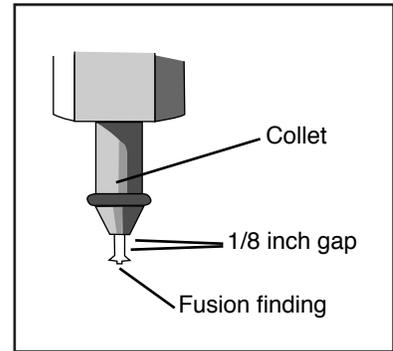
5) The **Voltage Chart** at the end of these instructions will guide you to the correct voltage for the type of metals you are fusing. The chart is only a guide and test pieces should be fused to find the level that best suits your needs. For now, use a voltage setting of 80.

6) Press and **hold** the **FOOT PEDAL CHARGER**(#12) until the voltmeter reads 80 volts.

7) Gently pull on the **CYLINDER RELEASE KNOB**(#3). **Bang!** The cylinder should have dropped to the down position, sparks should have flown and the weld is complete.

8) Pulling the cylinder into the up and locked position will release the finding.

9) Examine the weld closely for a true perpendicular (right angle) position. An uneven splash around the weld may also indicate a misalignment. Poor alignment may make the weld fail. Test the weld by bending the post back and forth. If the weld breaks easily or peels off, either the alignment or voltage will need to be adjusted. While a large amount of splash around the base of the post may indicate too high a charge, no sign of the weld indicates that the voltage is too low. Pitted burn marks will indicate poor contact between the work and jig.



Collet depth adjustments

Most post welding is performed with the setup just described and allows the collet to set slightly above the jig. Larger findings (joints, catches, ear clips and stick pins) pass through a jig without touching. The depth of the collet stroke must be adjusted so that the finding strikes your work, but does not drive into it and damage it. The stroke depth must also be adjusted when the **Production Table** is installed in place of the jig holder.

Stroke Adjustment

- 1) With the proper collet and jig installed, release and lower the cylinder so that the **ENGAGE KNOB** is in the down position.
- 2) The **COLLET ADJUSTING ROD**(the knurled collar) can then be rotated to adjust the stroke depth.
- 3) Rotate the collar counter clockwise until it comes in contact with the **ENGAGE KNOB**. Continuing to rotate will shorten the stroke.
- 4) Rotating the collar in a clock wise direction will lengthen the stroke.

Set up

- 1) Lower the collet mechanism carefully and check that it will clear the sides of the jig. Check that the jig is aligned and perfectly perpendicular with the collet.
- 2) Place a finding in the collet and hold a sample piece of metal tightly under the jig.
- 3) Rotate the **COLLET ADJUSTING ROD** until the finding touches the work piece and then add just a little more until the metal moves down just a hair.
- 4) Again check that the finding is hitting the metal squarely and clears past the jig. **It is extremely important that large findings hit squarely in order to produce consistent results.**

NOTE: Welding findings can cause dents in metals thinner than B&S 24ga(.020" or .5mm). Results can vary depending the type of metal and its condition (annealed or work hardened).

Maintenance

SPARKIE II requires very little in the way of special care. All that is necessary is a little cleaning.

Residue from the fusion process will build up on the bottom of the jig. This can be the cause of inconsistent welds and burns on the back of your piece.

- 1) Loosen the thumb screw that holds the jig in place and pull out the jig.
- 2) Clean the bottom of the jig with fine abrasive paper or steel wool. Be sure to check inside the hole.
- 3) Check the shaft of the jig for burn marks and clean. Indications of burns on this shaft mean that the thumb screw was not tight. This can be a source of inconsistent welds.
- 4) Slip the jig back into the jig holder. Lower the collet into position and align the jig hole with the collet. Align the jig and collet so they form a true right angle. **This is very important, findings must be perpendicular to the surface as they strike!** Tighten the thumb screw very firmly. Use the allen wrench through the hole in the thumb screw for leverage. Do not overtighten and break the bolt!

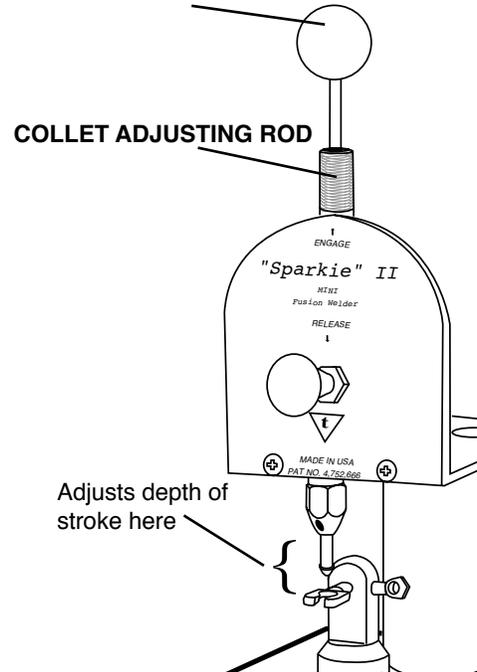
Residue can also build up on the bottom of the collet.

- 1) Loosen the front allen screw on the collet holder. (Not the one with the wire attached.) Pull the collet down and out.
- 2) Clean any built up metal deposits off the end with sand paper or a small file. Tighten the allen screw firmly when it is back in place.

The "O" ring and ball bearing that hold the post in place in the collet may occasionally need to be replaced.

- 1) Remove the collet from the holder.
- 2) Roll the rubber "O" ring off the tapered end of the collet. (Work on a clean surface so these small parts don't get away from you.) If the rubber appears to be cracked replace it with a new one.
- 3) If the ball bearing appears burnt and pockmarked, replace it with a new one.
- 4) Look down the inside of the collet for roughness and built up residue. An abrasive cord or small drill bit should be used to clean it out.
- 5) With the ball bearing in place, roll the "O" ring back over the tapered end of the collet.

CYLINDER ENGAGE KNOB

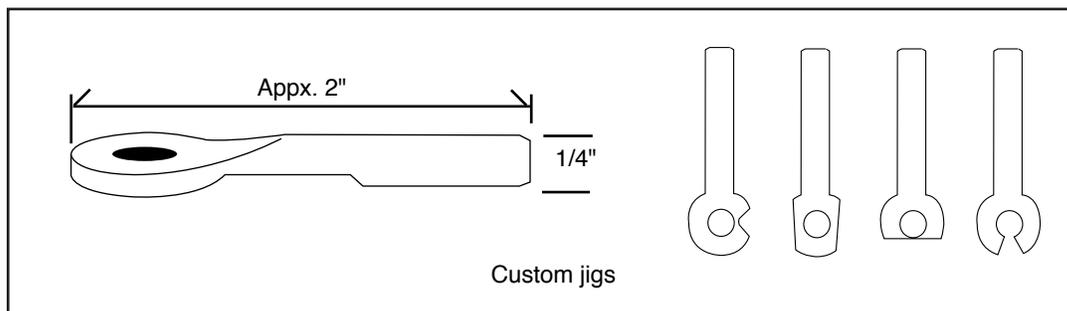
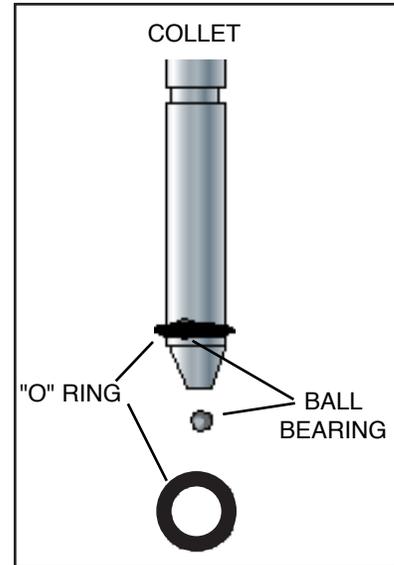


6) Replace the collet. Make sure the collet slides all the way back up into the holder before tightening the allen screw. Be sure the allen screw is tightened firmly.

Collets with clips will need the same basic kind of care. Light brushing with a toothbrush is all that is necessary. The clip should hold the findings tightly, preventing burn marks from appearing on the finding. Replace the clip when necessary by removing the two hold down screws. An extra clip was provided with each collet and replacements are available from your dealer.

NOTES:

- 1) A thin film of water containing a small amount of liquid detergent can be applied to the piece to be welded. It acts as a wetting agent. This will help clean away residue and splash from the weld. It is also very important when welding plated goods and repairs. The wetting agent also helps prevent surface burns.
- 2) The small black stain that appears around the weld is just carbon. It will wipe off with mild soap and water.
- 3) The jigs that came with **SPARKIE II** are of an all purpose design. Special jigs can be made by the owner to fit odd shapes and help align production pieces. Jigs can be machined from steel and aluminum as well as cast from wax patterns in brass or bronze.
- 4) Too small a contact area or holding the work loosely against the jig will cause burned spots on the surface due to poor contact. Developing a consistent technique when holding the work against the jig is very important. The contact must be firm!



- 5) If the piece to be welded is too small to hold on your finger, place it on a soft eraser or rubber pad. Use the pad to press the work up under the jig.
- 6) A small amount of silicon lubricant inside of the collet can help smooth the insertion of findings and assure good electrical contact.
- 7) Re-using findings is not recommended.
- 8) Remember, always look at the meter before inserting a finding. If you have started to charge, **DON'T REACH UNDER THE COLLET!** You will get a shock! **OUCH!** Turn the power switch **OFF** and wait a few seconds for all the charge to drain.
- 9) Objects that will fit in the collet other than fusion findings can often be adapted for welding. Use the base of a fusion finding as a model when experimenting with your own designs.
- 10) Warm **SPARKIE II** up before you start. Turn it **ON** and charge the welder, then turn it **OFF** and let it discharge internally (10 seconds). Do this at least twice to get the juices flowing in the capacitor.

11) Poor welds are most often caused by misalignment. It can really help to look at the weld under high magnification. Look at the base and see if it is sitting crooked and has uneven splash around the edges. This indicates the edge of the base hit first. The post will probably peel off.

12) Remember, **SPARKIE II** will continue to charge as long as you hold down the foot pedal! It will discharge slowly if allowed to sit and quickly if turned off.

Can SPARKIE II shock you? The answer is unquestionably, yes! Where and when and how bad is it?

The components of **SPARKIE II** represent two sides of a short circuit. **POSITIVE** and **NEGATIVE**. Almost all of **SPARKIE II** is **NEGATIVE**. The case, the upper frame, the jig holder and jig are **NEGATIVE**. (See the diagram.) All that is **POSITIVE** is the collet and the collet holder. The red wire that connects to the collet holder carries the **POSITIVE** charge from the internal components to the holder. So, where, is anywhere between the two sides of the circuit. Fusion welding is what happens when the **POSITIVE** and **NEGATIVE** sides touch and the energy stored inside **SPARKIE II** is released.

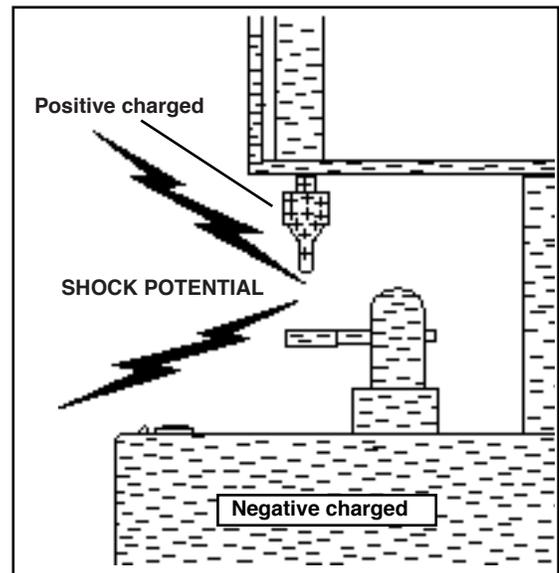
Which leads us to when. A shock can only happen when **SPARKIE II** is turned **ON**. Turning **SPARKIE II OFF** automatically drains any stored energy (allow 10 seconds). Let's set the scene for an accident.

The operator is happily shooting earposts, when a slight distraction interrupts the process. The operator looks away a moment while pressing down on the foot pedal and then turns back.

There is no finding loaded in the collet!

Noticing that the finding is missing, the charging is stopped. **SPARKIE II** is partially charged and waiting to discharge through something or someone. Check the volt meter!

If at this point the operator reaches in to load a finding the chances of a shock are very high. All that is necessary is to touch any **NEGATIVELY** charged metal part of **SPARKIE II** when contact is made with the collet. (See the diagram.)
OUCH!



A shock from **SPARKIE II** lasts only a millisecond. It can produce a nasty bite. It should be avoided at all costs. **SPARKIE II** automatically drains itself of all stored energy in about 10 seconds when it is turned off.

The rule is simple:

Check the volt meter!

If you are unsure, turn SPARKIE off!

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