

RIVETING

Billie J. Theide

Riveting is a process of joining two or more materials (metal, wood, plastic) together in a surface-to-surface relationship without the use of solder. A rivet, a cylindrical malleable metal pin, passes through holes drilled in the materials to be joined. The ends of the pin are compressed to form heads that prevent the materials from separating.

Rivets may be "fixed" permanently immobilizing the materials joined or "pivotal" permitting movement. Additionally, rivets may be purely functional or used as decorative elements.

MATERIALS and EQUIPMENT

Materials to be riveted--metal, wood, plastic
Wire--aluminum, bronze, copper, fine silver,
nickel silver, nu-gold, sterling silver,
yellow brass
Round tubing--aluminum, copper, sterling silver,
yellow brass
Polished steel surface plate or anvil
Drill and drill bit index
Drill gauge
Rawhide mallet
Chasing hammer
Rivet hammer or planishing hammer
Tube setting stake--tapered stake
Centerpunch
Tube cutting jig
Saw frame and jeweler's saw blades
Files
Masking tape or super glue
Silicon carbide abrasive sanding papers--320, 400, and
600 grit

RAISED WIRE RIVET

- 1) Select and cut materials to be riveted.
- 2) Determine rivet placement. Centerpunch.
- 3) Select rivet wire. Using a drill gauge, determine corresponding drill bit (16 gauge wire = #55 drill bit). Anneal wire.
- 4) Drill one hole through all materials to be riveted. Materials may be temporarily secured together with masking tape or super glue.
- 5) Remove burrs from drilling and finish materials to desired finish.

- 6) Saw rivets to equal the combined thickness of the materials to be riveted plus the diameter of the rivet wire to 2mm. File and sand ends.
- 7) Place rivet through drilled holes. A rawhide mallet may be used to gently tap the pin into the hole. Position the rivet wire so that an equal amount extends to both sides. Protect surfaces of materials with masking tape.
- 8) Position the materials to be joined over a polished steel surface plate or anvil. The rivet wire will be the only material in contact with the surface plate. Using a rivet hammer or planishing hammer "tap" the end of the rivet wire squarely. Turn the piece over frequently working both ends of the rivet. Check to see that the rivet is compressed evenly on each side.
- 9) Dress the heads of the rivet by sanding.

FLUSH WIRE
RIVET

- 1) Prepare as above steps #1-4.
- 2) Using a slightly larger drill bit, countersink drilled holes on outer surfaces.
- 3) Remove burrs from drilling and finish materials to desired finish.
- 4) Saw rivets to equal the combined thickness of the materials to be riveted plus the diameter of the rivet wire to 2mm. File and sand ends.
- 5) Place rivet through drilled holes. A rawhide mallet may be used to gently tap the pin into the hole. Position the rivet wire so that an equal amount extends to both sides. Protect surfaces of materials with masking tape.
- 6) Position the materials to be joined over a polished steel surface plate or anvil. The rivet wire will be the only material in contact with the surface plate. Using a rivet hammer or planishing hammer "tap" the end of the rivet wire squarely. Turn the piece over frequently working both ends of the rivet. Check to see that the rivet is compressed evenly on each side. Continue to hammer until the rivet wire fills the countersunk hole uniformly and completely.
- 7) File and sand to remove excess rivet material.
- 8) When flush rivets are properly made, the rivet will appear as a small dot (decorative) on the surface of the materials joined. If the material and rivet are the same metal, the rivet will be invisible (purely functional).

RAISED TUBE
RIVET

- 1) Prepare as above steps #1 and #2.
- 2) Select tubing. Using a drill gauge, determine corresponding drill bit. Anneal tubing.
- 3) Drill one hole through all materials to be riveted. Materials may be temporarily secured together with masking tape or super glue.
- 4) Remove burrs from drilling and finish materials to desired finish.
- 5) Using a tube cutting jig, saw rivets to equal the combined thickness of the materials to be riveted plus the diameter of the tube to 2mm. File and sand ends.
- 6) Place the tube rivet through the drilled hole. A rawhide mallet may be used to gently tap the pin into the hole. Position the tube rivet so that an equal amount extends to both sides. Protect surfaces of materials with masking tape.
- 7) Position the materials to be joined over a polished steel surface plate or anvil. The tube rivet will be the only material in contact with the surface plate. Using a rivet hammer or planishing hammer gently "tap" the tube rivet squarely. Turn the piece over to work the opposite end of the tube rivet. The tapping should be gentle to prevent collapsing the tube.
- 8) The tube rivet is flared using a tube setting stake--a tapered stake. The tubing may be flared by either using pressure while rotating the stake in your hand or by resting the stake on a bench and gently hammering the top of the piece while the tube rests on it. Reverse the piece so that the tube is flared evenly.
- 9) Alternate planishing and flaring to set the tube rivet.
- 10) Dress the heads of the rivet by sanding.

FLUSH TUBE
RIVET

- 1) Prepare as above steps #1-3.
- 2) Using a slightly larger drill bit, countersink drilled holes on outer surfaces.
- 3) Continue as above steps #4-8.
- 4) Alternate planishing and flaring to set the tube rivet. Continue this process until the tube rivet fills the countersunk hole uniformly and completely.
- 5) File and sand to remove excess rivet material.

RIVET SET

- 1) When a raised wire rivet is ready to set, domed rivet heads may be made with a rivet set--a small commercial punch with a tapered end in which a concave hemi-spherical indentation has been machined.
- 2) Set the punch over the rivet and rotate the punch as it is struck lightly with a hammer.

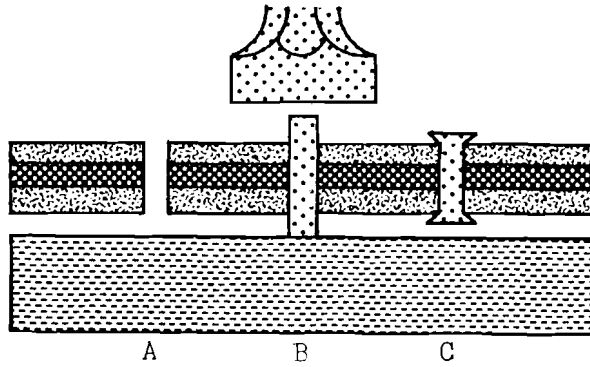
- PIVOTAL RIVET
- 1) To allow for movement in a riveted piece, a piece of bristol-weight board (index card) may be placed between the materials to be riveted prior to setting the rivet.
 - 2) The spacer may be removed by heating or soaking in water once the rivet has been set.

RIVET
COMBINATIONS

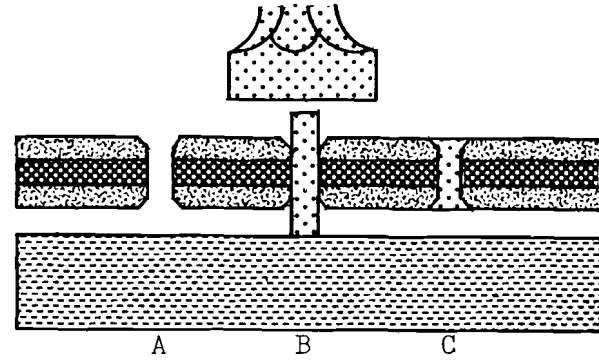
If flush and raised rivets are being used in combination in one piece, the flush rivets should be set first (excess rivet material filed and sanded) so that the raised rivets are not damaged in the finishing process.

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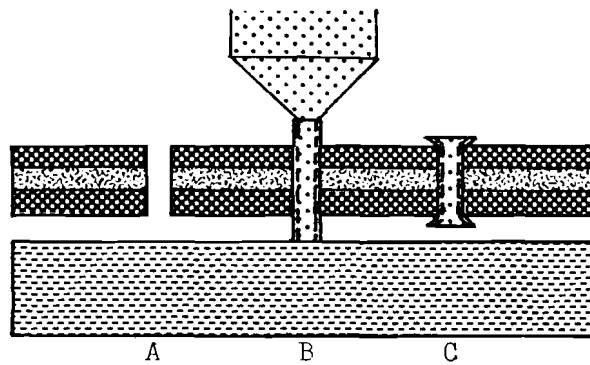
RAISED WIRE RIVET



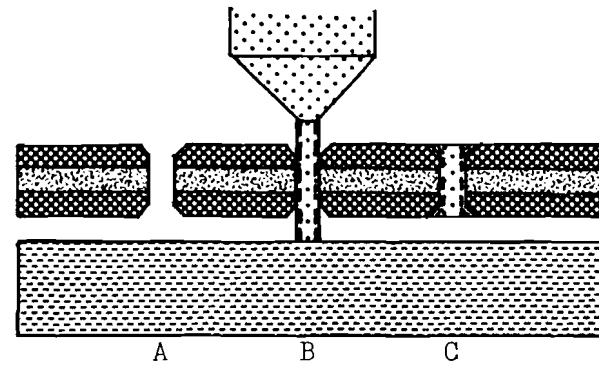
FLUSH WIRE RIVET



RAISED TUBE RIVET



FLUSH TUBE RIVET



A = DRILLING PREPARATION

B = PLANISHING or FLARING

C = FINISHED RIVET