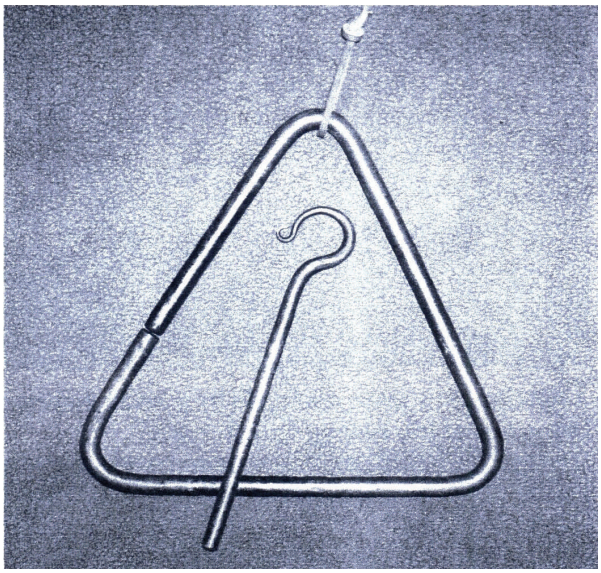
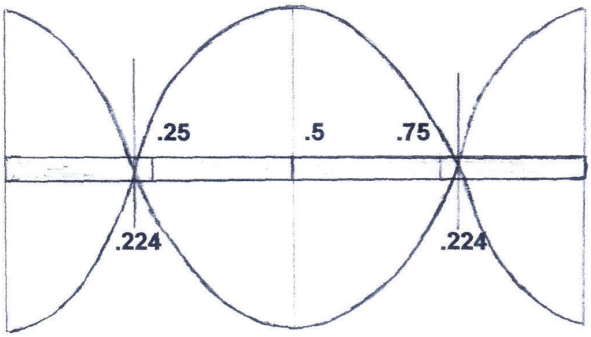
Bells

By Bill Clemens

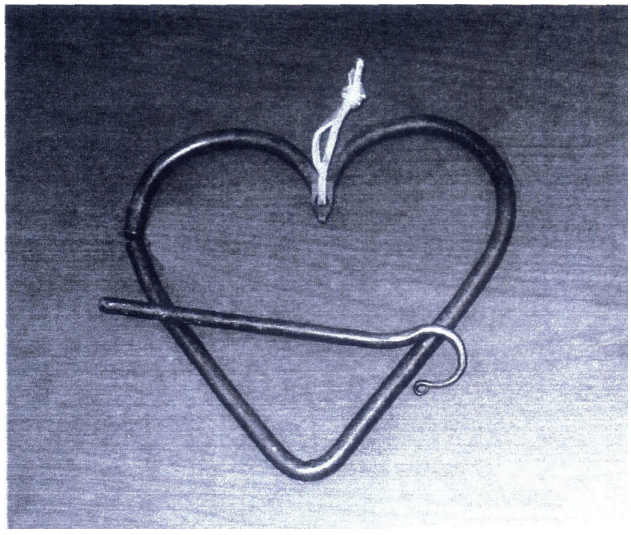
Here's a picture of the normal triangle shaped dinner bells that I make. Take note of the gap that is not in the corner but along one side. Making a dinner bell this way requires making three bends instead of just two but the results are worth it. When



I set out to make a dinner bell I went looking for some information on what length and size of stock to use to make a good sounding bell. While I found much discussion about others trying to do the same thing, I didn't find a definite answer on what to use but several that did suggest lengths around 30 inches and using 1/2" round bar. In searching the web I did find some info on Wind Chimes and the fact that the best tone could be achieved by hanging them at the node of their vibrations. The fundamental vibration of a rod or tube has nodes at .224 of their length as shown here:



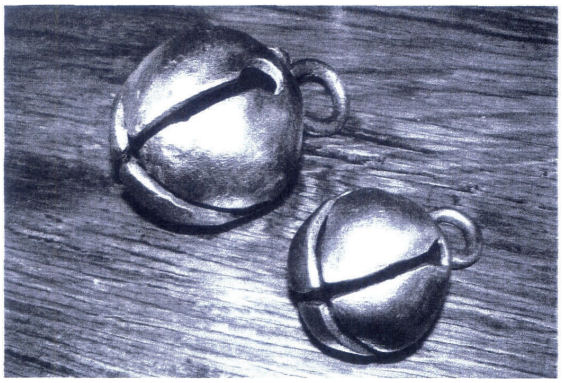
A triangle made from 30 inches would be 10 inches on a side but applying the .224 node distance for the suspension point yields a first bend at .224 x 30 or 6.72 inches (I used 6 3/4") with the other 2 bends at 16 3/4" and 26 3/4 " (3 1/4 " from the other end) The triangle I made had a much deeper and richer tone than one made with bends at 10 and 20 inches.



As for the Heart Dinner Bell pictured here, I made it from the same length (30 inches) and made the first bend at 6 3/4 inches. The bell was made by making the bottom bend at (30 - 2 x 6 3/4)/2 or 8.25 inches. Two things that are important are first, the leather through the hole to hang it can't be tight (don't turn the knot down against the hole) and second the bend at the bottom which is not at a node of the vibration should not be a tight bend.

In my research on what others had done to make triangles, there was some discussion about the tightness of bends with many leaning towards making the bend sharp but I've discovered that unless the bends are at a node (at .224 from either end of the overall length) that a loose bend is better.

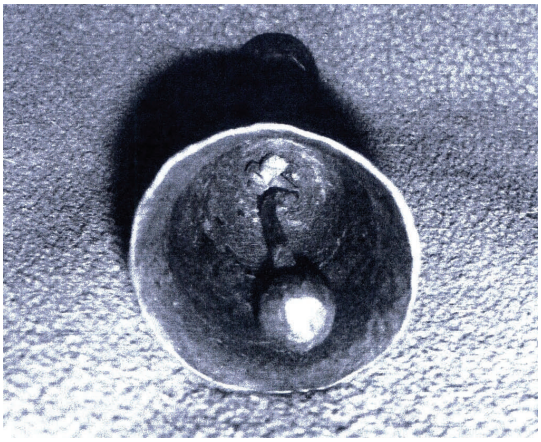
Other Bells I have made are the Jingle bells that were featured in an article in the Jan/Feb 2007 Issue of the Hammer and tong and can be found online at:
http://wiki.bgcmonline.org/bin/view.cgi/BlacksmithInfo/JingleBell
in BGCM's Blacksmith Wiki, an online encyclopedia that you can use and contribute to, check it out at: http://wiki.bgcmonline.org



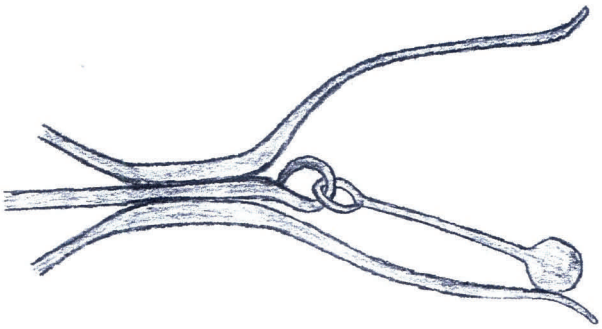
I also made a school bell from a 2 inch piece of pipe and a smaller version of it from a piece of

one inch pipe. In both cases, the handle was formed by fullering the pipe down to form it and using a short section of the pipe on the top to form the ball.

The clappers were attached to a hook inserted in the top of the bell as shown here:



Before closing the pipe to form the handle insert a hook with the clapper attached into hole as shown here. Make a bell and help ring in the new year!
Blacksmith Guild of Central Maryland HAMMER & TONG January / February 2009



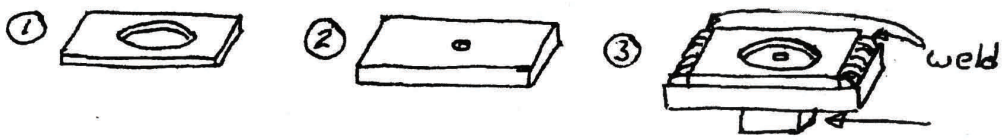
Tool for Decorative Rivets

By Joel Clark

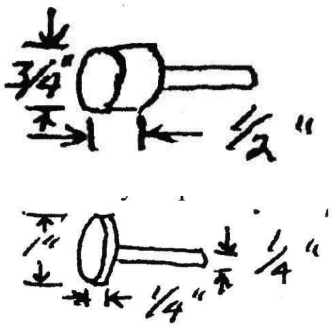
I recently made a number of large headed decorative rivets and experienced difficulty in centering the heads on the shafts and in making the heads uniform in size and shape. The tool described here allowed me to make rivets rapidly and accurately.

To make tool:
For rivets with heads 1" diameter 1/4" thick and with 1/4" diameter shafts, construct a tool as follows. The same principle can be used for rivets with different dimensions.

1) Drill a 1" diameter hole in a 1/4" x 2" x 2-1/2" flat bar (center the hole)
2) Drill a 1/4" diameter hole in a 1/2" x 2" x 3" flat bar (center the hole)
3) Weld the bars as shown with the holes concentric



A short piece of square tubing is welded to the bottom to fit the hardie hole of your anvil or treadle hammer.



To make rivets:

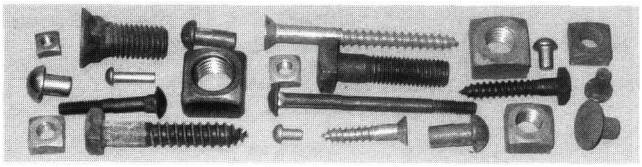
1) Form a 1/4" diameter tenon on the end of a 3/4" round bar and saw off bar 1/2" from tenon.

2) Insert the tenon of the orange hot rivet in the 1/4" hole of the tool and hit several times with a heavy hammer or treadle hammer. Quench and tap out rivet. The head will be 1" diameter, 1/4" thick and will be centered and properly shaped.

3) Place the rivet in a heading tool to hold it while decorating the head with chisels and punches.

Reprinted from the May 2008 The Anvil's Horn a publication of the Arizona Artist Blacksmith Association Dan Jennings editor. Here is a website I ran into. I haven't purchased from them yet, but their site looks like just what we need.

www.blacksmithbolt.com

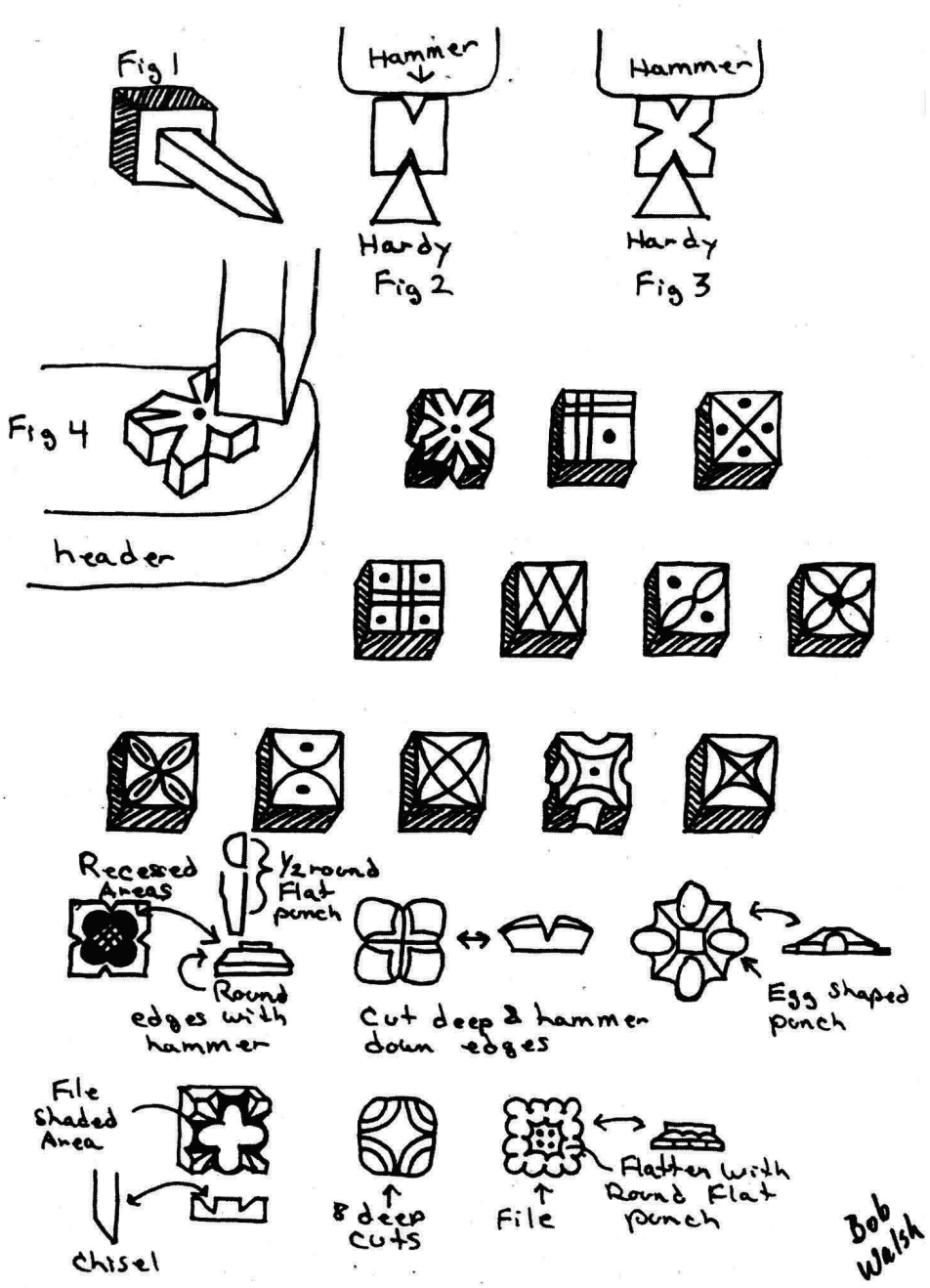


"In the image, you will find the cornerstones of our inventory: Square Head Lag Bolts, Square Head Machine Bolts, with square nuts, of course, Slotted Head Wood Screws, and Solid Iron Rivets.
We also have a few Iron Tire Bolts, Plow Bolts, Step Bolts and Carriage Bolts in stock. For these and the machine bolts, in addition to the square nuts, we also have flat washers and split lockwashers.
Nothing ruins the appearance of a nice piece of metalwork faster than a hex-head bolt or a Phillips head screw. Accordingly, you will not find any of either one of those items here. Recognizing that the majority of blacksmiths and other metalworkers may wish to make their fasteners more than simply functional, we have chosen not to carry zinc-plated or hot-dipgalvanized fasteners. The material finish will be either plain, plain & oiled, or black oxide, in almost all instances. No one really wants to have to burn the zinc off their fasteners before re-working them."

Bolt Heads

By Bob Walsh Minneapolis, MN Fellow Ironworkers,

I'd like to share with you some ideas and procedures that work well for me concerning decorative bolts. If you want a totally hand forged lag bolt, forge yourself a square tenon with a square point. (Fig I.). Heat, holding the point in a vice and turn counter-clockwise. The square point will twist first because it has the smallest cross sectional area, when it has the thread pitch you want, pour a little water on it, freezing your pitch, and continue to twist.

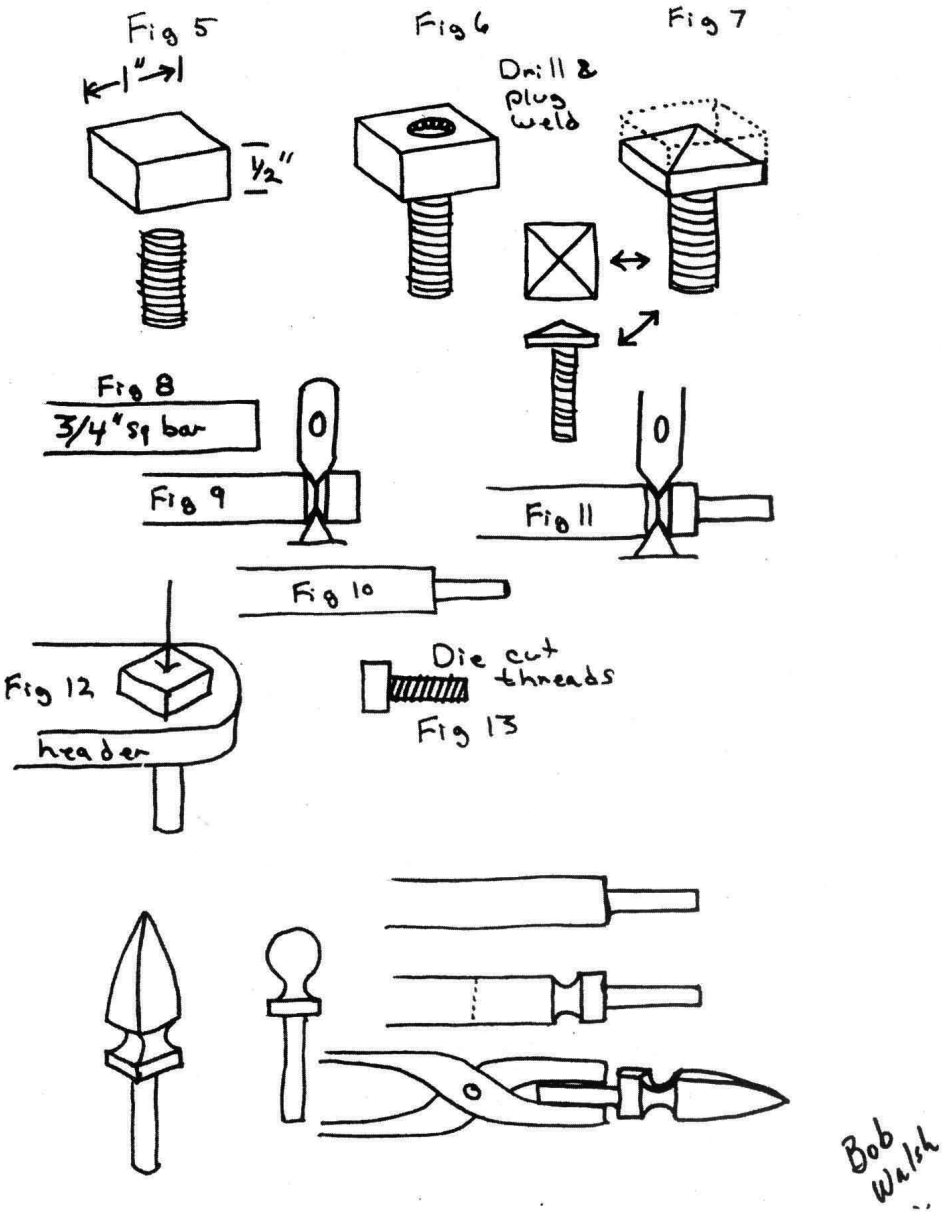


This process is quite easy, the part I usually forget is to twist counter-clockwise, and a clockwise twist will give you a left handed thread.

When making nails or bolts, I feel the desired shape has parallel sides with a point on the end. This is in comparison to a long taper. If you have ever pulled out a store-bought nail, you probably notice that the wood tries to grip the nail uniformly for the duration of the parallel sides. When pulling a tapered nail, after a 1/4" it pops right out.

Early door hardware nails were deliberately made to be longer than the door was thick. After installing, the point protruding through the back side was hammered over which acted as a locking device. Once the nail was hammered over, it was then considered "dead" (without movement), hence, the term "deader than a door nail".

I don't make a lot of nails or truly hand forged lag bolts as store-bought threads are sharper, deeper, and always uniform. I do, however, customize a lot of hardware store lag bolts which works well.
One style which has worked well for me is to start with a conventional lag bolt (6 sides), square off and head or start with a square headed lag bolt, set on your hardy, notch opposite sides, turn 90 degrees and notch the remaining sides (Fig. 2 and 3). Now reheat, place in your header and with a cold chisel put in the four accent lines and center punch (Fig. 4). With a straight and couple of arced chisels, the number of patterns you can come up with is endless.

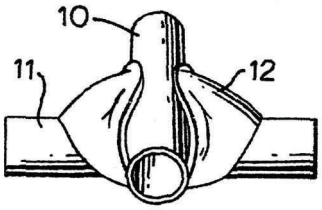


Recently I worked on some English gates that had some huge bolts that came to a blunt square point. (Fig. 7). After looking at them closely, it appears that the smith cut off about 1/2" from a piece of 1" bar and drilled a hole through the center. He then put a 3/8" machine bolt about half way through the hole, plug welding it from the top. In the case of the bolt, I saw they were then ground to a point (Fig. 5-7)
This process might be worth a try only as some alternatives to grinding to a point, try some decorative chisel work. This large headed bolt could also be achieved by using traditional methods (Figs. 8-13) which I feel would give you a better product as the one piece unit would be stronger than the plug welded unit.

Good luck and let's keep on swingin! Editor's note: Safety Warning- don't forget conventional bolts are coated (zinc, cadmium and chrome) and give off poisonous vapors when the coating is burned off in the forge. California Blacksmiths March 1985

The Stuart Hill Joint
by Paul Boulay
Campbell, California

Around 1980, designer and artist blacksmith Stuart Hill of Suffolk, England, invented a means for connecting two bars or tubes meeting at right angles. The Hill joint is strong and quick to produce and results in a distinctive. design at the joint location. Smart was granted British and US patents for his "Method of Forming Forged Joints" (U.S. Patent 4,631,797 issued Dec. 30, 1986.) 1 have heard some of our senior members mention that this joint was patented. What I had not heard in those conversations was that the patent was no longer in force. (Actually the patent lapsed in the US in 1998 due to non-payment of the year 12 maintenance fees. The patent has expired in Britain as well.)



The figure above, taken from the patent, shows the component parts of the completed joint. Items 10 and 11 are of course the bars to be joined. Item 12 is a stub of round or square tubing - roughly 2 times the diameter of the tubes in both length and diameter. I am going to call this short length of tubing a collar. This seems an apt description of what it does but it is clearly not the sort of collar that traditional blacksmithing would recognize. The joint is made with the bars being joined cold and the collar at red/orange heat. The joint is pressed together until the bars touch. Then the collar is immediately cooled. This cooling causes the collar to shrink and lock the assembly tight.

Figures 1 through 3 from the patent illustrate the sequence, as the tubular stub is progressively deformed in order to lock the 2 bars together.

The collar can be made of either square tubing or round. Also the proportions can be varied somewhat to change the aesthetic result.

Stuart's patent teaches a second design. This design makes a "T" joint between a bar and a larger diameter tube. This time there is no separate collar piece, but rather the larger diameter tube is plastically deformed to become a sort of self-collar wrapping around the crossbar.

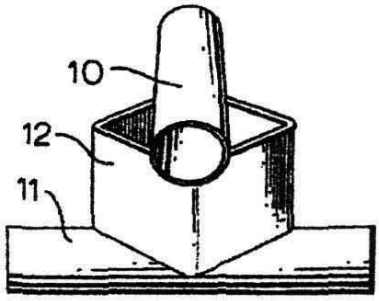


FIG. 1

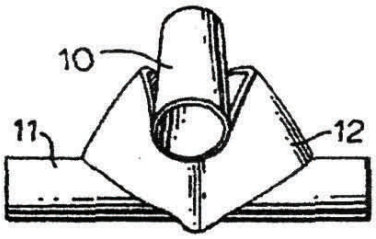


FIG. 2

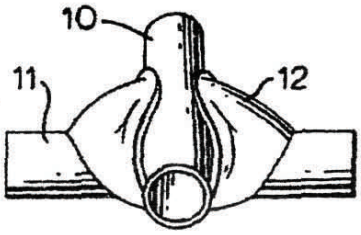


FIG. 3

Figures 4 through 7 show the steps in making the "T"joint. Here the end of the large tube is heated and a

saddle for the smaller tube to sit in is formed. While the end is still at red heat, the
crossbar is presented and quickly pushed down to cause the ears of the large tube to wrap themselves around and lock it in place.
As with the first design, as soon as possible the joint is cooled and the contraction locks the elements together.
These joints are obviously not traditional blacksmithing design patterns. But under the right circumstances they would be right at home in contemporary designs.
Well, that's all I have time for this time. Next issue I will report on my experiments. There will be some ideas about tooling with photos of trials with square and round collars, varying the length and diameter ratios, and some more about Stuart Hill.
References:
.US Patent 4,631,787 issued to Stuart Hill of Croydon, Suffolk, England on Dec 30, 1986.
Klaus Pracht, Metal Works: Stuart Hill. (c) 1999, Ernst Wasmuth Verlag Tubingen, Berlin.
A one page article from ABANA-Hammer's Blow, Spring 2010
THE UPSETTER
NEWSLETTER OF THE MICHIGAN ARTIST BLACKSMITH ASSOCIATION NOV DEC 2010

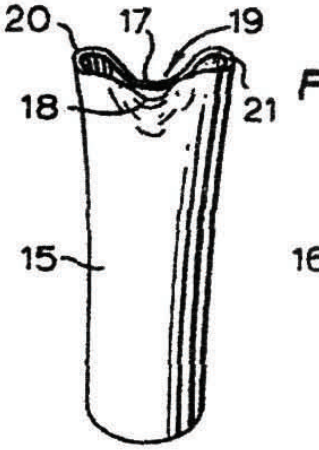


FIG. 4

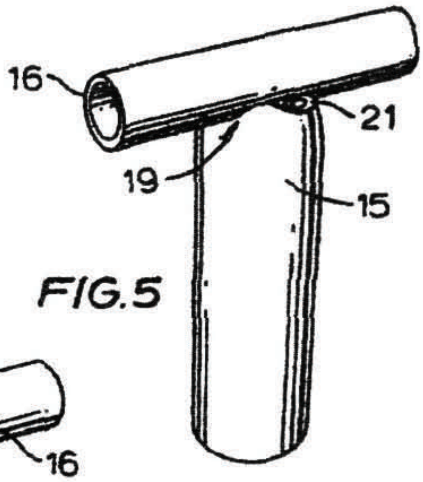


FIG. 5

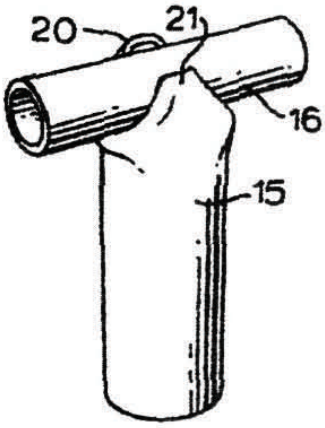


FIG. 6

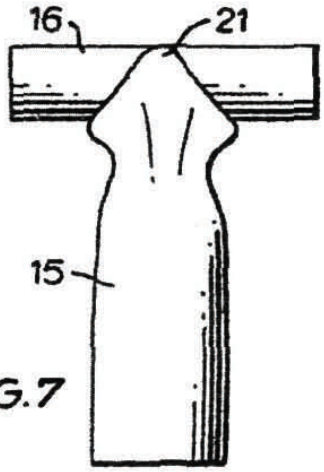


FIG. 7