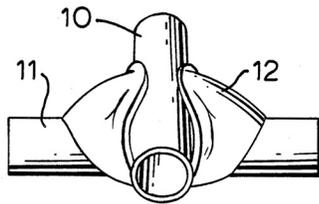


The Stuart Hill Joint

by Paul Boulay

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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. Stuart was granted British and US patents for his "Method of Forming Forged Joints" (U.S. Patent 4,631,797 issued Dec. 30, 1986.) I 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 What I had not heard in those conversations was that the patent was no longer in force.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.

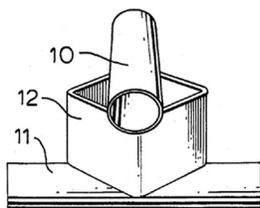


FIG. 1

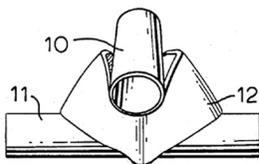


FIG. 2

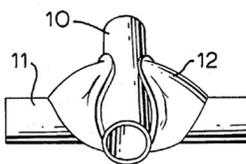


FIG. 3

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

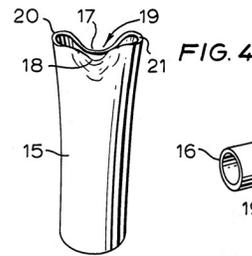


FIG. 4

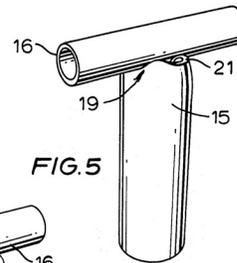


FIG. 5

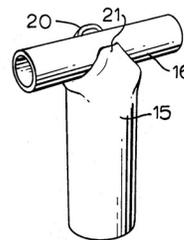


FIG. 6

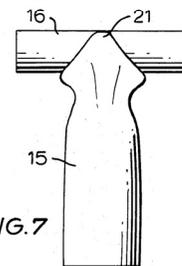


FIG. 7

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.

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 Tübingen, Berlin.