

Ferrules

History, Design and Fitting

Chris Bogart

Acknowledgements

- JED Dempsey
 - Worked at Payne 75/76
 - Owns the Gillum Rod shop and equipment
 - Owns the Halstead Rod shop equipment
- Lawson Upchurch
 - Worked at Leonard for 7 years
 - Learned ferrule making from Hank Reynolds
 - Last ferrule maker at Payne from when Walt Carpenter took over until they closed
- Hal Bacon – Owned Payne 1978 - 1988

My Journey

- Buy commercial ferrules – good, bad and indifferent
- Original “Zimny” NS tube buy – marked improvement in shop made ferrules – smoother inside of tubing
- My first draw bench – a major step forward
- Discovering JED who introduced me to the lost genius of Halstead ferrules
- Obtaining with JED our first custom Carbide Dies – Wow
- Discovering from JED the Payne method of push drawing NS tubing
- Understanding the part that tapered mandrels play
- Exploring new frontiers in ferrule making – replicating Leonard, Payne, Divine, Varney and F.E. Thomas ferrules

NS Ferrules

- Most likely, the most expensive component you put on your rods.
- They are the most important component you put on your fly rods
- More or less taken for granted as “status quo” by today’s rodmakers
- There are more to ferrules than first meets the eye
- A look back in the past reveals just how little we know or understand today

Ferrule Questions

- Do you design your rods to fit the ferrule?
- Do you select a ferrule after you have made a rod?
- Or do you do as Lawson Upchurch says Payne / Halstead did
 - They designed the ferrule to fit the taper to make the rod a “Complete Package”?
- George Varney integrated ferrules and guides into his taper designs.

Importance of Ferrules

- Improvements in Ferrules were considered so important that they warranted a Patent:
 - 169,181 – Oct 26, 1875 – H. L. Leonard
 - 207,665 – Sep 3, 1878 – H. L. Leonard
 - 264243 – Sep 12, 1882 – T. H. Chubb
 - 322,750 – Jul 21, 1885 – W. H. Reed
 - 330,572 – Nov 17, 1885 – E. W. Edwards
 - 422,470 – Mar 4, 1890 – G. I. Varney
 - 428,755 – May 27, 1890 – L. N. Hawes
 - 537,088 – Apr 9, 1895 – G. I. Varney
 - 2600629 – Jun 17, 1952 – L. B. Feierabend

First “Modern” Ferrule

- Reed’s Patent Serrated Ferrules in 1885
 - William H. Reed and Spalding Rods (pre Kosmic)



Kosmic

- Formed 1890 by A. G.
- Marked a milestone in U.S. Rodmaking and spawned Rodmakers who became the backbone of various Rod Companies:
 - Ed Payne
 - Loman Hawes (H. L. Leonard's Nephew)
 - Eustice William "Billy" Edwards
 - Fred E. Thomas
- Drew their own NS ferrules – dies went with Fred Thomas.

Gold Standards

- For NS ferrules – Halstead Ferrules (Payne and pre-fire Leonards) are the Gold Standard
- They provide an unique insight into total rod design when you have control of the NS tubing.
- There is more to Halstead ferrules than meets the eye
- Allowing people to understand the sophistication of Halstead ferrules can hopefully motivate some of today's rodmakers to start thinking about what we can do with ferrules.

Dickerson

- If Halstead was the Gold Standard, then Dickerson stood right behind him
- Tool and Die man and who made his own draw bench and steel drawing dies.
- Drew all tubing down from 3/8th mother tube
- Never annealed but used sinking.
- Used a Sunnen hone for females and males
- Unique proportions
- Bluing was done with Kodak Developer

Divine

- The Gold standard for deep drawn NS ferrules
- Drew from flat stock
- Were never pinned – used a pine pitch glue
- Never saw a cracked one
- Still fit perfect after almost 100 years
- Bluing was achieved by first copper plating the outside and then simple brass black.

Feireabend

- The Gold Standard for Super-Z style
- His Super-Z's are a step above anything made today
- Originally conceived and made for Fiberglass Rods

Enter George Halstead

- One of the great metal men in rodmaking history:
 - Tool and Die man
 - Worked at Leonard 1920 – 1925 with Reben Leonard – made ferrules, drawing dies and mandrels
 - Taught Hank Reynolds how to draw and make Leonard style ferrules
 - Worked at Payne 1925 – 1937
 - Designed the now classic Payne reel seat hardware
 - Redesigned the Payne ferrules to what we know today
 - Made the dies and mandrels to draw NS tubing

What is Different about Halsted Ferrules?

- OK – what makes Halstead ferrules the gold standard and why?
 - He had control of the medium – NS tube
 - Could make his own dies and mandrels
 - Understood the properties of NS
 - A classic sense of proportions
 - He considered the rod taper and built the ferrules to fit the taper
 - 90 years later his ferrules are still going strong

Drawing NS Tubing

- Leonard and Payne used the “push” method
- Steel dies and draw and strip plates
- Tapered mandrels
 - Males all tapered
 - Females flat where male was then rear was tapered
- Tapered mandrels made for easier stripping
- Tapered ID made for easier fitting
- NS tube was drawn to be “Hard”

Lawson Upchurch drawing at Payne



Halstead Dies



My Drawbench



Carbide Die



NS Tube Hardness

- When you draw NS tube you align the grain.
- When you anneal NS tube you randomize the grain
- Hard NS tube is stronger and wears better than soft
 - You never see Payne or Leonard ferrules fit that wears out except from damage
- Hard NS tube feels smoother – less
- Shinier – polishes out better
- Classic “ring” to the tube

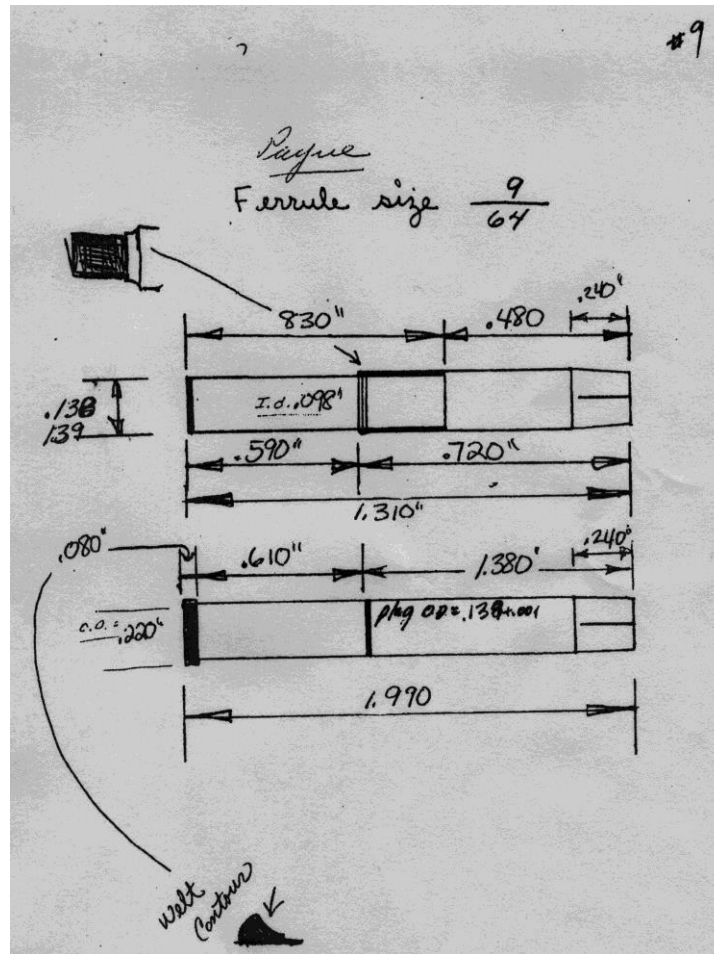
Payne Draw Schedule

- Original document made by Dave Decker and copy provided by Hal Bacon
- Gave precise Draw Schedule for each size using
 - Dies
 - Draw Plates
 - Centers aka mandrels
- Thus achieved the desired hardness and sizes

Classic Proportions

- Linear progression in sizing
- Logic behind the lengths of each ferrule size
- Male Caps are .005” smaller than the female OD – providing a visual “step” that makes the ferrules conform to the taper to appear much slimmer

Payne Workshop Ferrule Sheet



Leonard Ferrule Boards

- Laid out all the pieces for every size ferrules
- Original boards were destroyed in the fire this board made by Hank Reynolds and currently in the possession of Mike Canazon
- Gave a system to making their ferrules both Standard and Truncated
- Leonard and Payne dimensions are closer than people realize – the Halstead influence.
- Note – Leonard only went to precision drawn NS Tube after the fire which destroyed the original dies, plates and mandrels which could not be replaced.

Leonard Ferrule Boards



Tooling Marks

- Payne and Leonard had distinctive tooling
- All the tooling work on the ferrules was done using a Wood Lathe and HSS hand tools
 - Faster- remember they did not have quick change tool posts but the old “Lantern” ones
 - High speed steel tools similar to what a jeweler uses.
 - Used the Tool rest
 - Lots of practice equals proficiency and elegance

Varney Repro Ferrules sizes 13/7



Fitting Ferrules

More than just getting a good “POP”!

Fitting Today's Ferrules

- Understand the issues common with current commercial bought ferrules.
- Those made from precision drawn tube are the best
 - Drawn usually only $\frac{1}{2}$ - $\frac{3}{4}$ hard
 - Drawn using a floating button inside the tube that leaves minute chatter marks
- Those made from solid stock are marginal
 - Drilled from solid stock that is soft
 - Usually not 18% NS

Fitting Ferrules

- It is important to realize that the difference between a good fit and bad fit is only .0002”
- This underscores the importance of insuring that the female inside and male exteriors are perfectly round and parallel.
 - You cannot get a good fit with a lopsided ferrule and yet most ferrules you buy are.
- You need to first tune up the ferrules to make them consistent with your expectations
- The one thing you cannot change is the hardness of the NS.

Fitting Ferrules

- All ferrule fitting begins with the female – forget the male initially. Need to make sure the inside of the female is:
 - Perfectly round and uniform
 - Smooth
 - clean
- If you doubt this – look at the inside of your female ferrules using a bore scope

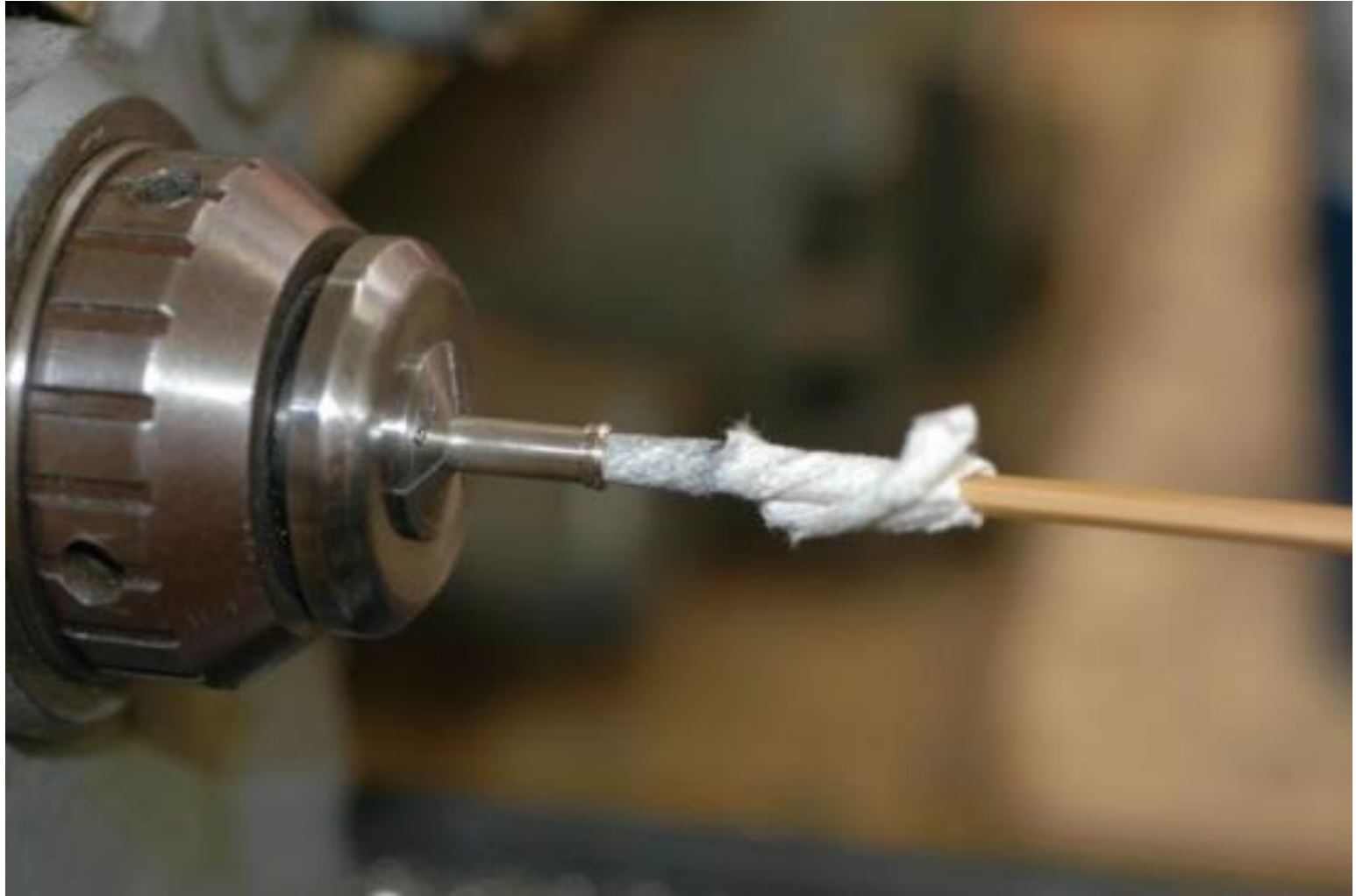
Lapping the Female

- Use a brass rod 1/64 smaller than the female
- Non-embedding (sorry no diamonds) Lapping compound
 - Clover Compound uses carbide (I use 500 grit)
 - Others may use aluminum oxide
- Spin in lathe
 - using tail stock to hold brass rod
 - If making ferrules & no moisture plug you should lap from rear to avoid “belling” of the mouth

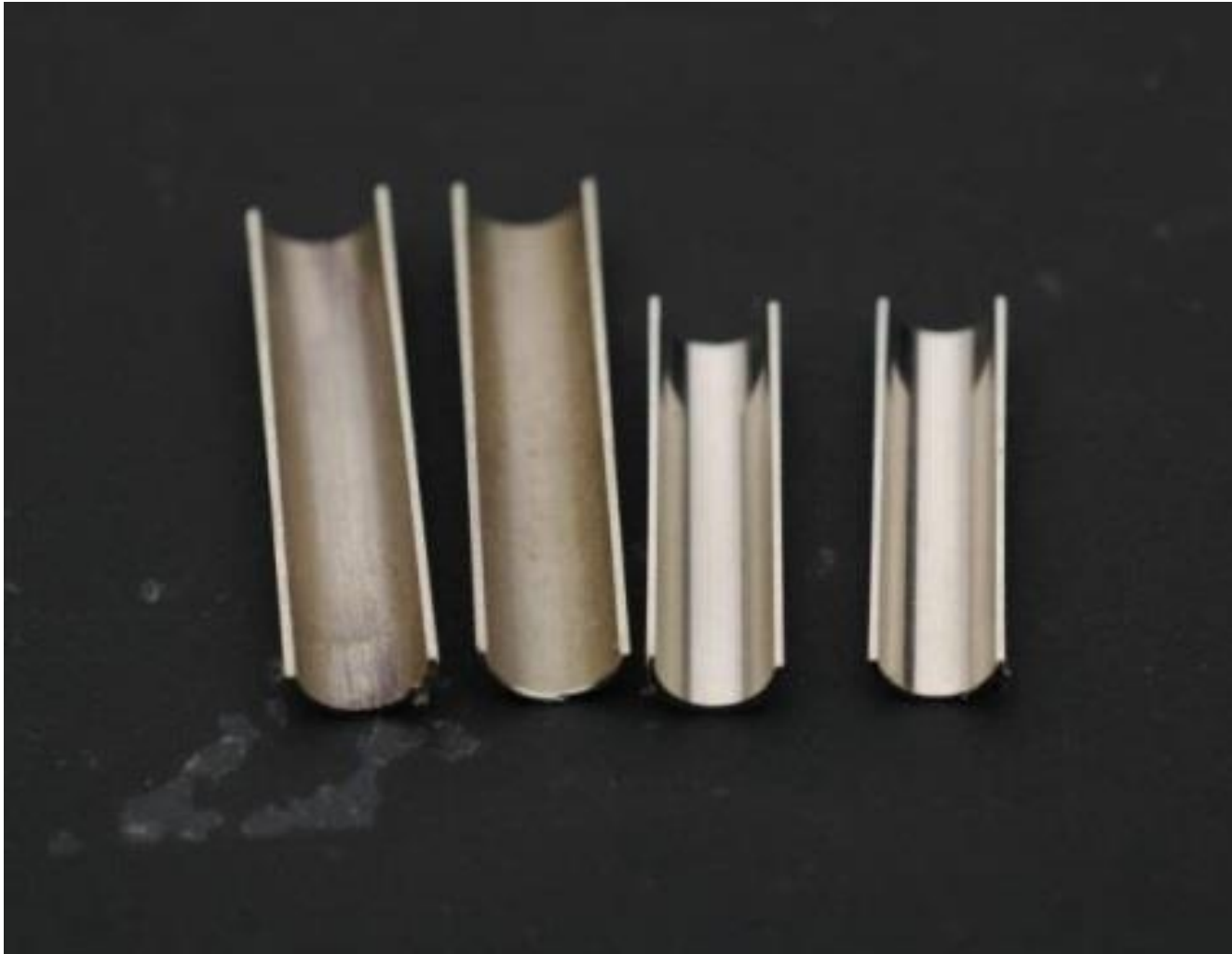
Clean and Polish Female

- Dawn Dishwashing Detergent
- Cotton or high in cotton cloths / material
- 0000 steel or bronze wool to polish on a cut off bamboo rod section.
- Clean again with DNA
- Final with Cotton material (I use WypAlls cut to size on a cut off bamboo rod section)

Cleaning Female



Before and After Lapping



Surrogate Males

- I use pin gages to find the ID of the female
 - They are straight and perfectly round
 - Eliminates any guessing as to size and fit



Fitting Males

- Use a good Micrometer for all measurements
- Also need to “True-up” the male to insure it is perfectly round (most ferrules aren’t)
 - Use external hone - Sunnen FAE
 - Clean off honing compound
- Spin the Ferrule and feel with fingers (before and after to feel the difference)
- Measure in three places:
 - Front, middle and rear to determine if parallel

Honing Male



Fitting the Male

- First measure the pin gage with the micrometer. Then measure your male to determine how far you have to go and where.
- Grobet Pilar Files
 - 4 cut – roughing (be careful)
 - 6 cut – standard fitting
 - 8 cut – final fitting and polishing
- Grey then Gold ScotchBrite then 0000 steel wool for polishing

Fitting the Male

- Fit the first 3rd of the male first, then middle and finally the last 3rd.
- With Super-Z's the first part of the male tends to be “fatter” due to deflection when cut on the lathe.
- Measure the entire slide each time you use the files or polish to determine exactly where you are at in fitting and exactly what is high and what isn't.

Fitting Males

- Yes you can use steel wool or emery cloth with your fingers and spin them to fit ferrules – however:
 - Very poor method
 - Female ID and male slide not be round - you follow the existing contours and may make them worse
 - Male slide will not be parallel
 - Overall poor fit

Things to Look For Afterwards

- If you see scratches on the male slide:
 - Soft NS produces scratches and will wear more
 - Hard NS tube doesn't – totally different feel – like buttery smooth versus gritty feel
 - Cleaning Female
 - Dirty inside of female
 - Cotton Swab with DNA

Things to Look For Afterwards

- Look for wear pattern on your male slides to see how well you have fitted them. They tell the story of the ferrule fit.
- Evenness of wear patterns
 - Length of contact
 - Where the contact is and isn't
 - Is it consistent contact as you rotate the male ferrule (roundness issue)
- Typical good fit is usually 30% - 50% , Very Good is 50% - 70%, Excellent is 70% to 90%

Clean Ferrules for Mounting

- Use Green or Maroon Scotchbrite and DNA only
- Only acceptable alternative is sandblasting with aluminum oxide and DNA
- Do not scratch inside – counter productive
- Do not use Mineral spirits – leaves residue

Adhesives

- Today we have many good adhesives
 - Pine pitch Glue – old school but great (Divine)
 - Ferr-L-tite – good for repairs
 - Pliobond – also good
 - Epoxies – need to make sure does not react with copper – common fault – Devcon 5 min does
 - Indian Head gasket sealer – Grainger / Phillipson
 - J.B. Weld – only if you never ever want the ferrule to be removed in one piece.

Pinning

- With good modern adhesives – no need to pin today
- Was only done by Leonard and Payne due to the fact they did not use an adhesive. They used white lead mixed with varnish and pressed the ferrules on. Were meant to be easily removed for repair. Yet the legacy of pinning ferrules lives on.

Ferrule Tabs

- More than cosmetic
- Require preparation before and after mounting
- Smooth transition from bamboo to NS
- Various styles
- Traditionally, double wrapped

Prepared Tabs



Heddon Replacement

- Swaged Tab area
 - still tapered to fine thin edge



Heddon Ferrule Mounted



Mounted and Wrapped



Summary

- That was a quick journey into a very complex but overlooked component of rodmaking.
- George Halstead influenced many rodmakers of his day and still felt today, yet is largely forgotten in history
- Knowing the issues and properties of Nickel Silver ferrules and how to fit them will help you advance your skills and the quality of your Rods.