Installation of Wedekind-Sicherung Sleeves as a Safety Device for L'Hotellier Fittings

Glaser-Dirks DG-101G ELAN
Airbrake Shafts
V2.7

See http://aviation.derosaweb.net/wedekind for the latest version of this document

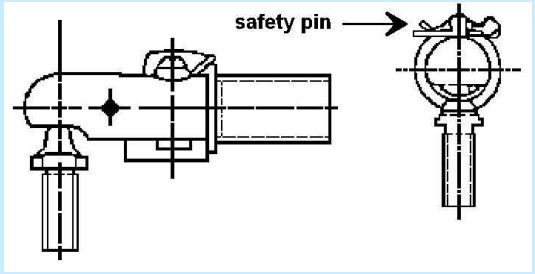
Background Information

In 1997 the Federal Aviation Administration (FAA) issued airworthiness directive (AD) 97-08-06 to address an issue of L'Hotellier fittings becoming uncoupled during flight. This can result in the loss of control of the aircraft.

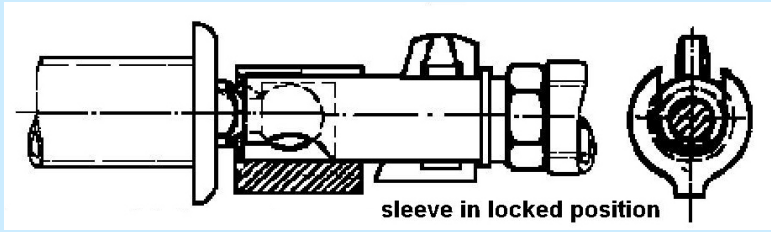
What would typically occurred is that the release mechanism was not fully engaged during assembly and/or worked loose during flight. There were three possible solutions to prevent this from happening:

Types of L'Hotellier Solutions

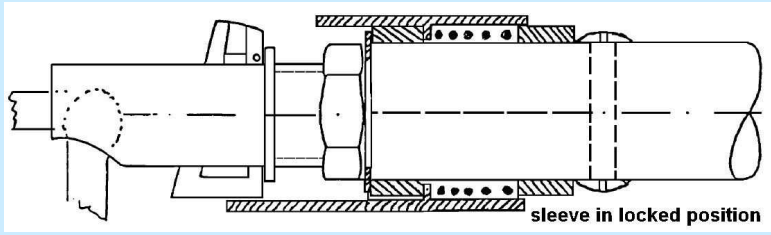
1) Drill a hole in the L'Hotellier fitting's release mechanism and insert a safety pin or wire.



2) Use a Uerling sleeve that rotates over the release mechanism. This will not work for 90° (right angle) L'Hotellier connections.



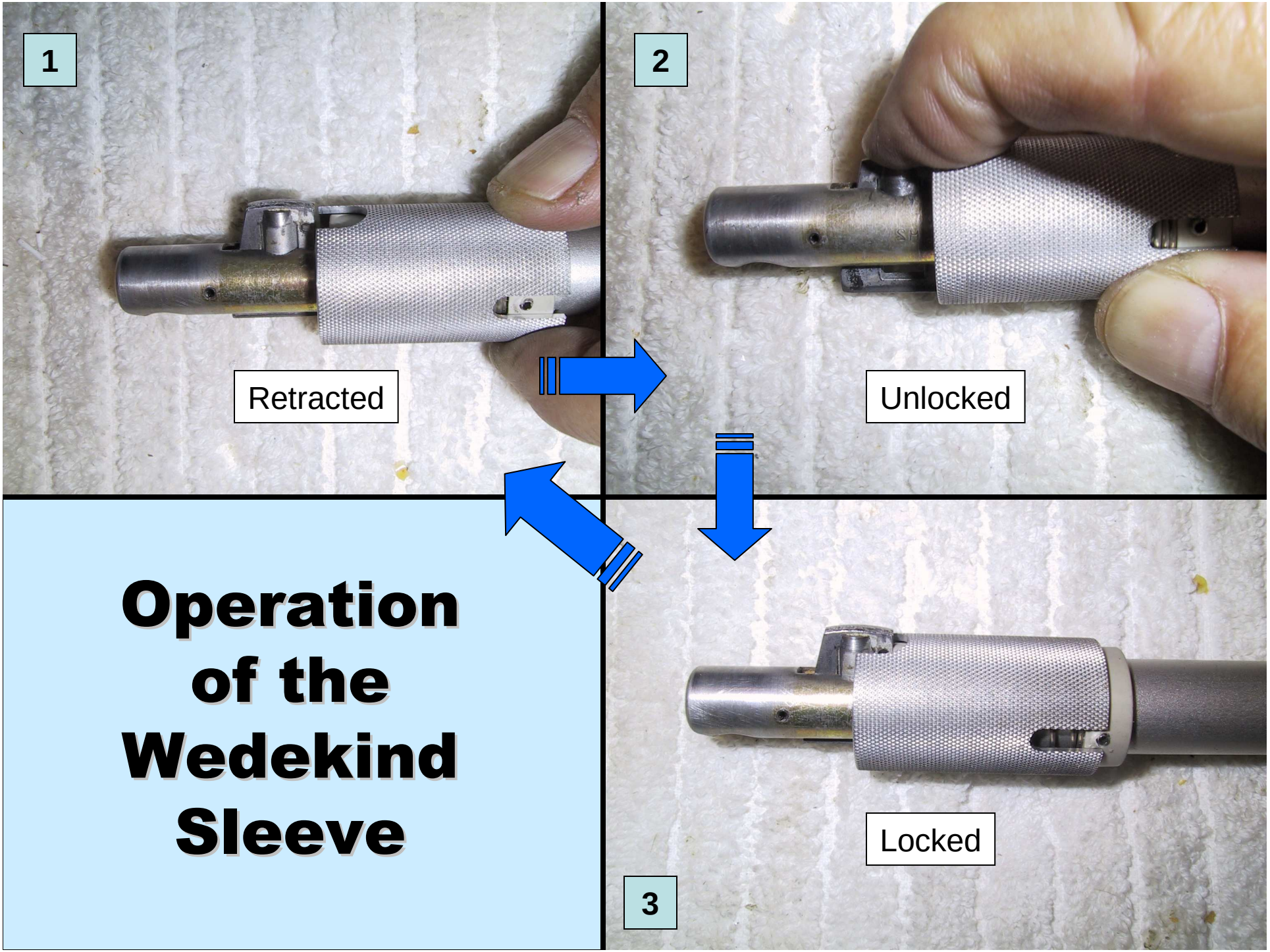
3) Use a Wedekind-Sicherung ("LS Safety") sleeve which captures the release mechanism.



See http://aviation.derosaweb.net/wedekind for more details on the different types of solutions.

This document deals with the installation of Wedekind-Sicherung sleeves on a DG-101G ELAN.

Operation of the Wedekind Sleeve



Disclaimer

Much care was taken to document the assembly process for future use.

Assembly on your glider may differ from what is shown in these slides. The documentation which was provided with the Wedekind sleeves, and from other sources, may not be perfectly identical to the situation found on your glider.

All work performed must be properly documented and approved by a FAA licensed technician.

DG-101 Airbrake Shaft Procedure

180°(straight)
L'Hotellier Fitting
(Type S)

Initial Steps

1) Remove the airbrake torque tube from the glider by removing the nut/bolt from the bell crank
2) Measure the total length of the torque tube between the fitting and the end of the aileron shaft. Accurate measurement is important. I clamped two blocks onto a work bench with the assembled shaft in between. After completion of the Wedekind fitting assembly, adjust the shaft length per the measurement taken earlier.

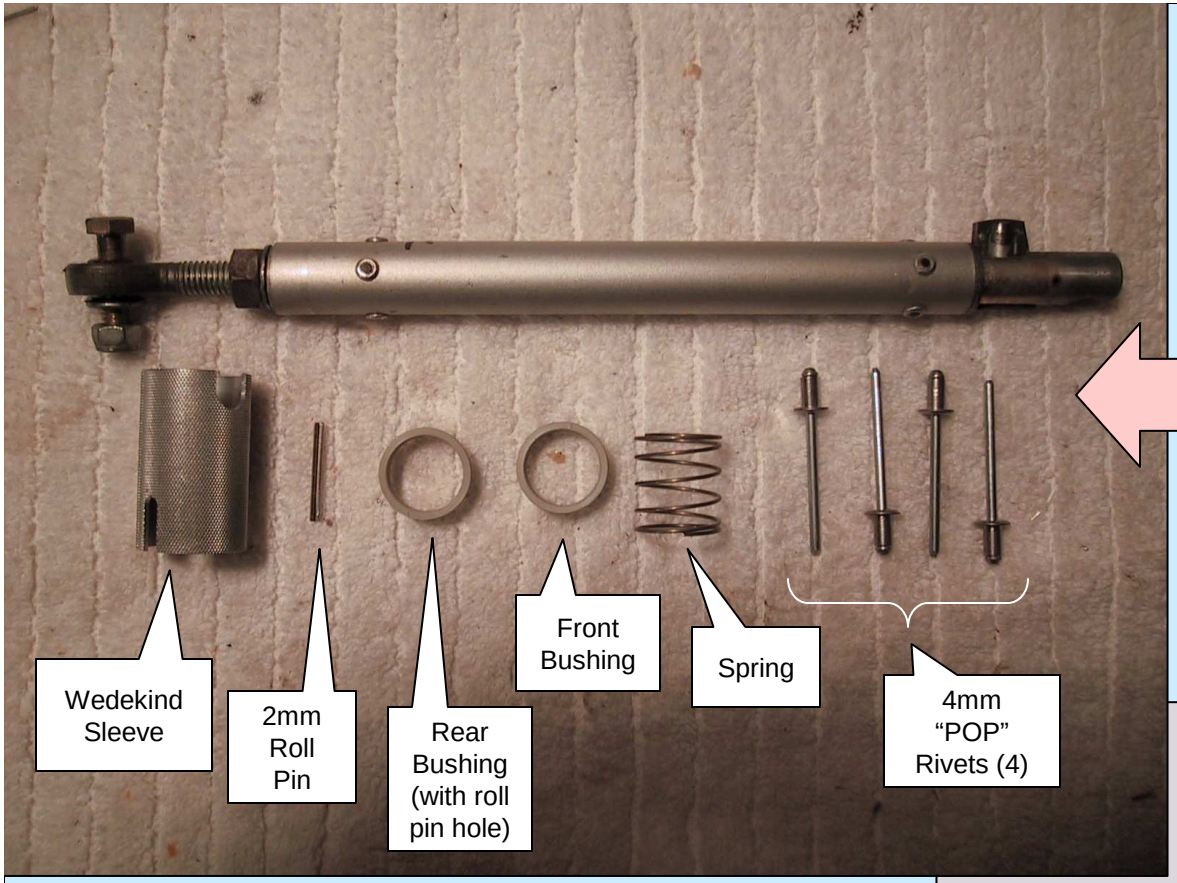
General Comments

1) All drilling performed is specified using metric drill bits. While metric bits can be purchased in the US via internet sources, I was successful in using a numbered drill index to find very close matches.

2.0mm (0.078740”) = #47 drill bit (0.00785”)

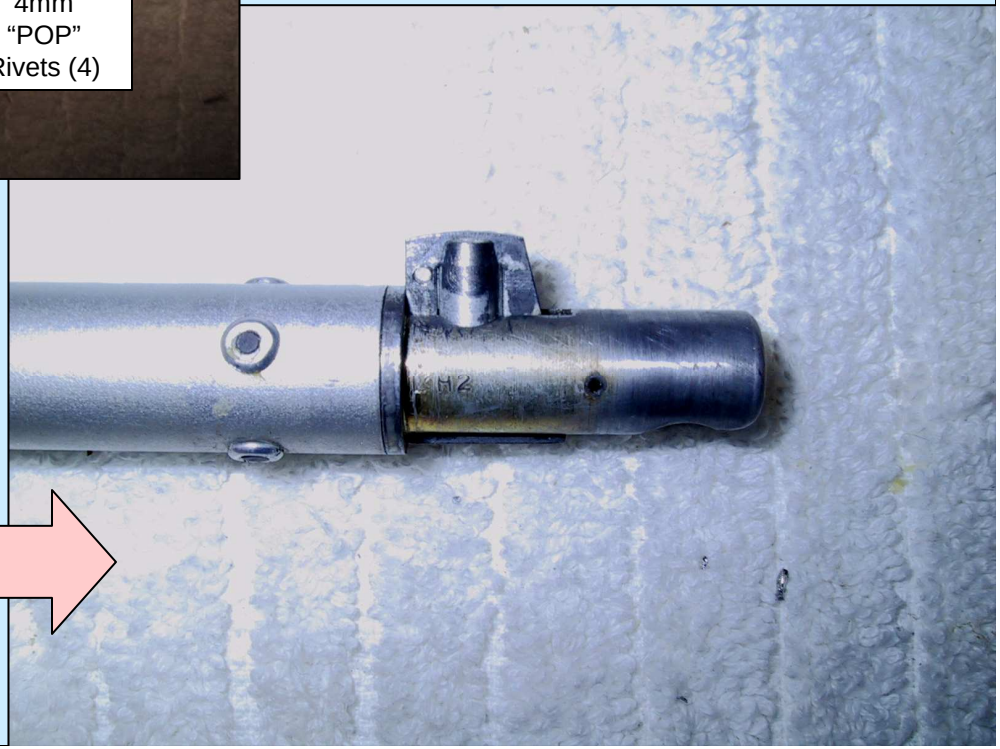
4.1mm (0.161417”) = #20 drill bit

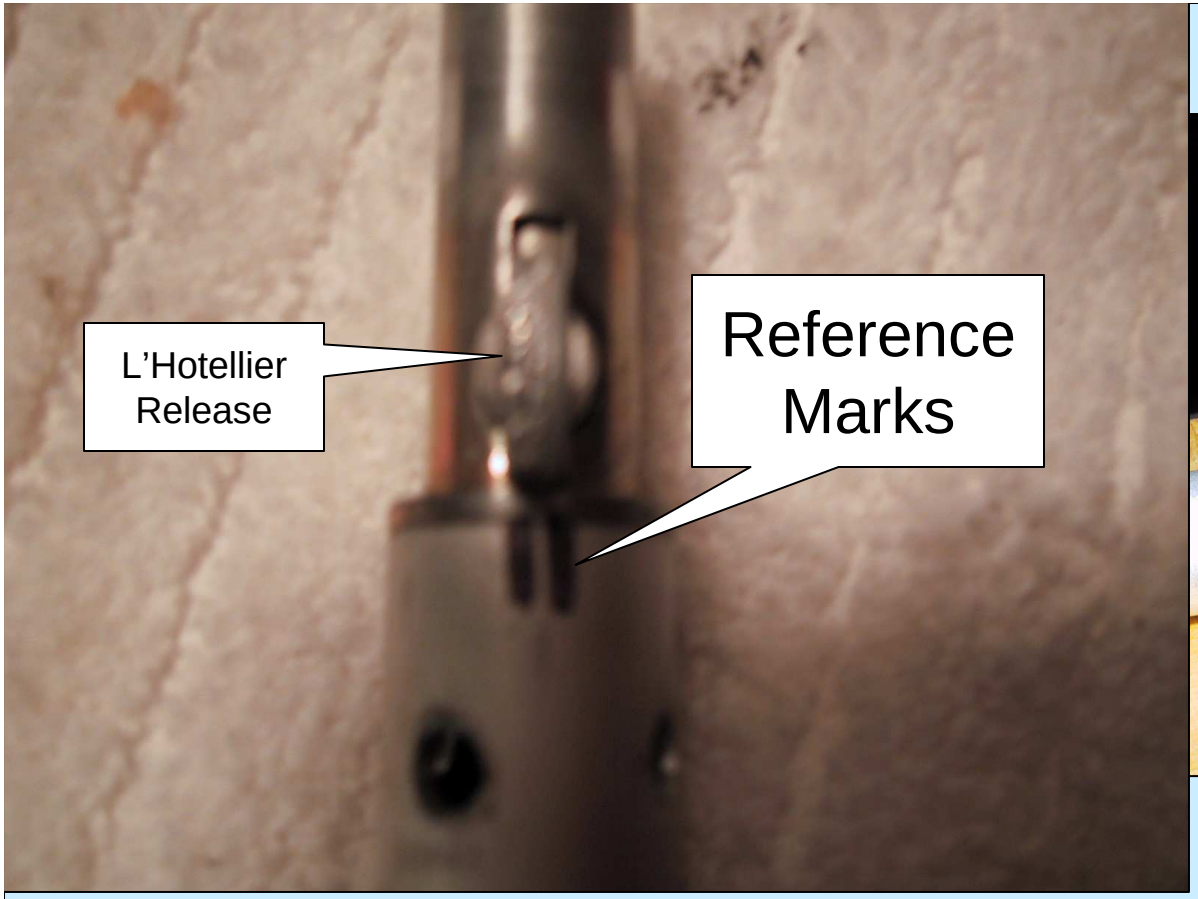
Unaltered Airbrake Shaft
and
Wedekind Sleeve Kit

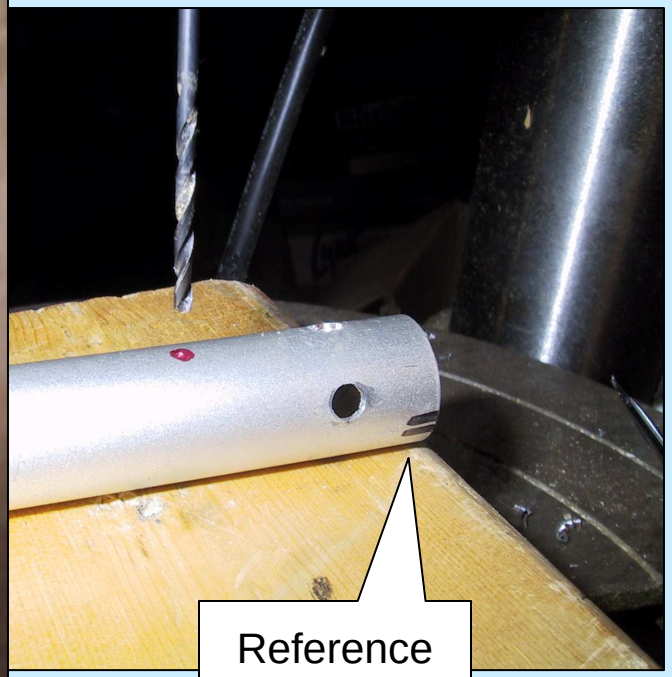


NOTE: On the DG airbrake shaft the L'Hotellier fitting is riveted in place. The aileron shafts L'Hotellier fittings are screwed onto the shaft end.

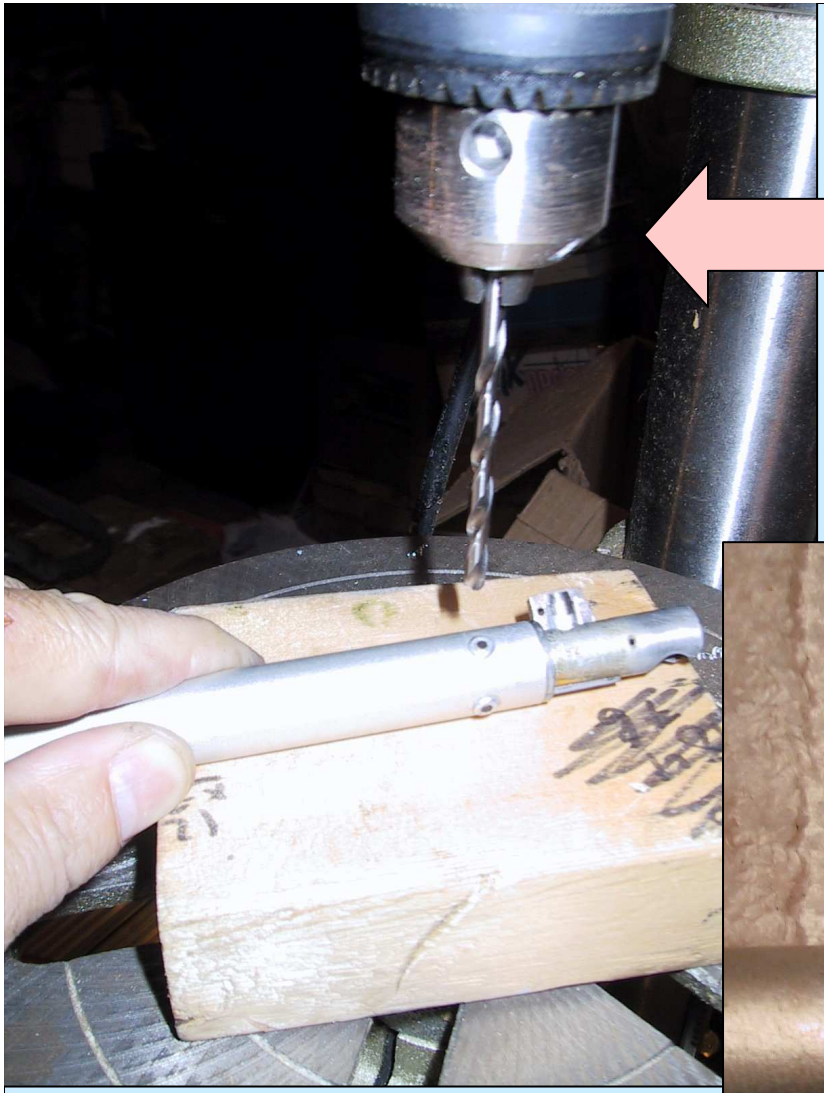
Close up of the unaltered L'Hotellier fitting with factory riveting.







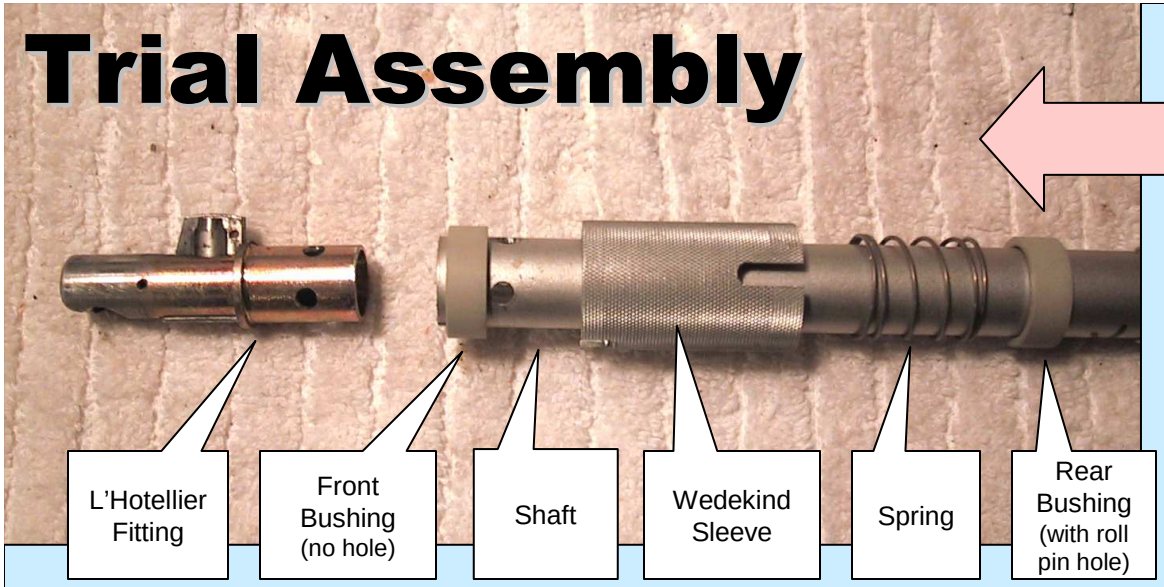
It is difficult to see in this picture but I marked the relative location of the L’Hotellier fitting on the shaft before drilling out the factory rivets to make sure that I riveted the fitting back into the original orientation. These reference marks do not need to be particularly accurate but simply indicate the orientation of the L’Hotellier fitting around the shaft’s diameter for later re-assembly. They can also be seen in the right hand picture above.



Drilling out the original “POP” rivets. When I attempted to center punch the rivets, I found that the center of the rivet pushed in, making accurate centering of the drill bit on the rivet a bit easier.

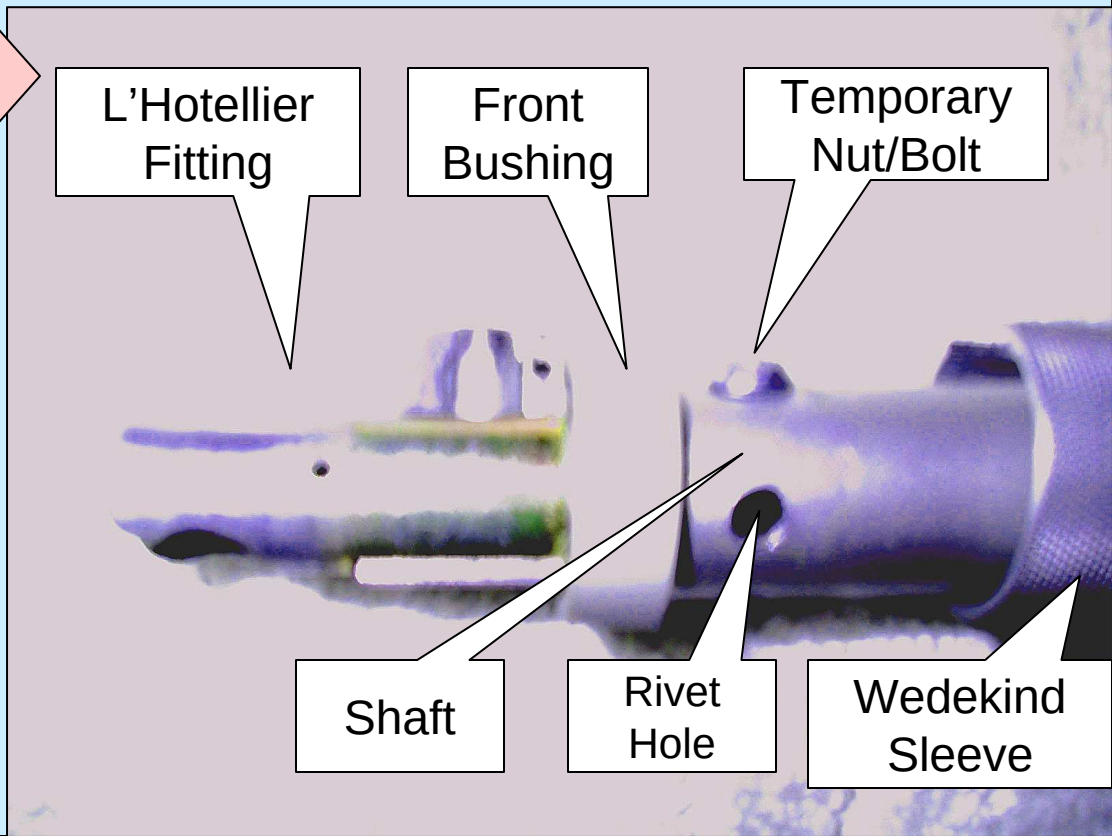
Disassembled L’Hotellier fitting and shaft.

Trial Assembly

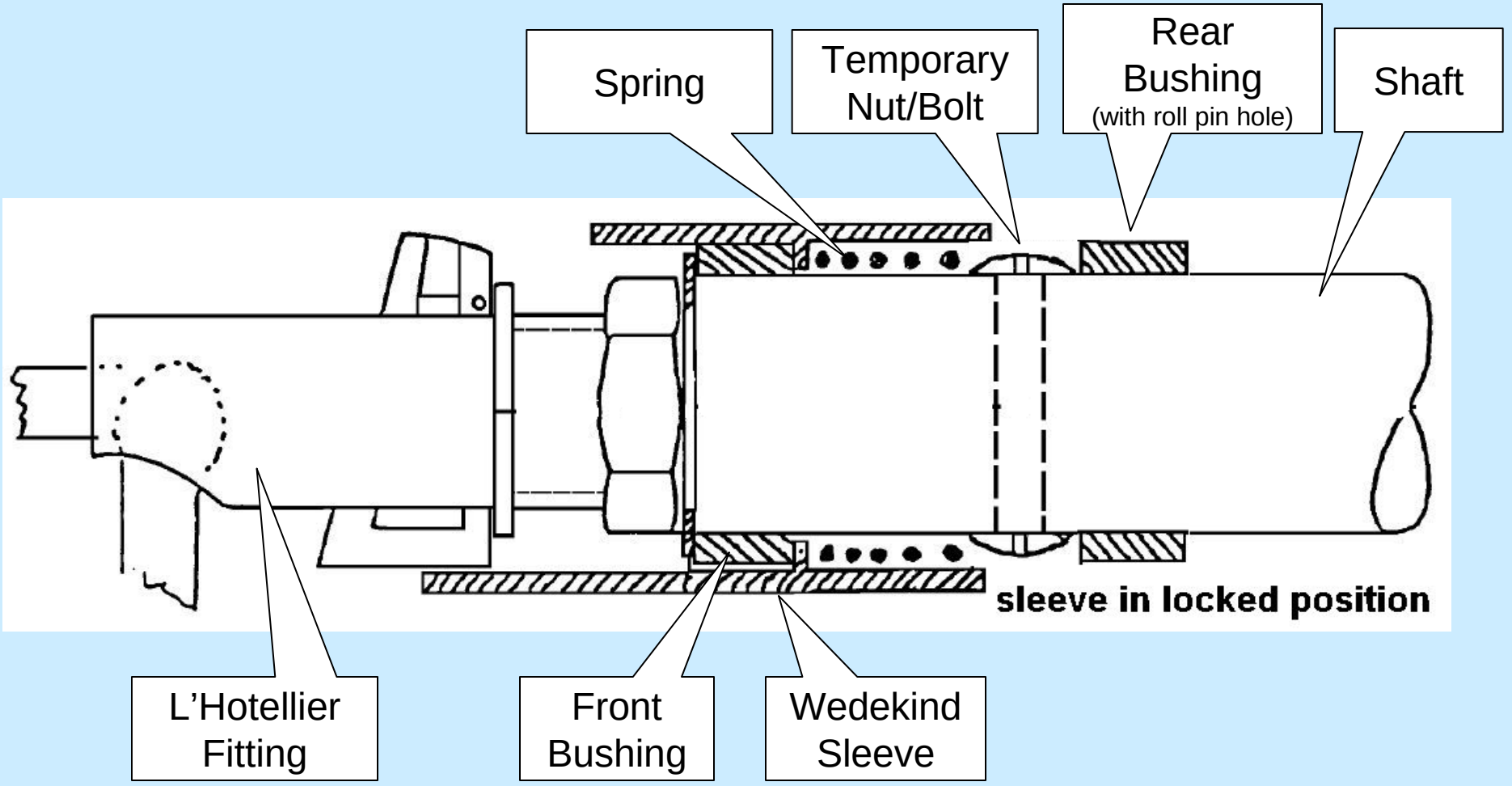


Here are the Wedekind parts lined up on the shaft in the correct order. The rear bushing has a hole in it for a roll pin.

Difficult to see clearly in this picture but I inserted a nut/bolt as a replacement "rivet" to temporarily hold the L'Hotellier fitting in place on the shaft during the trial assembly. The head/tail of the nut/bolt needed to be filed down to clear the sleeve. See the next slide for more details.

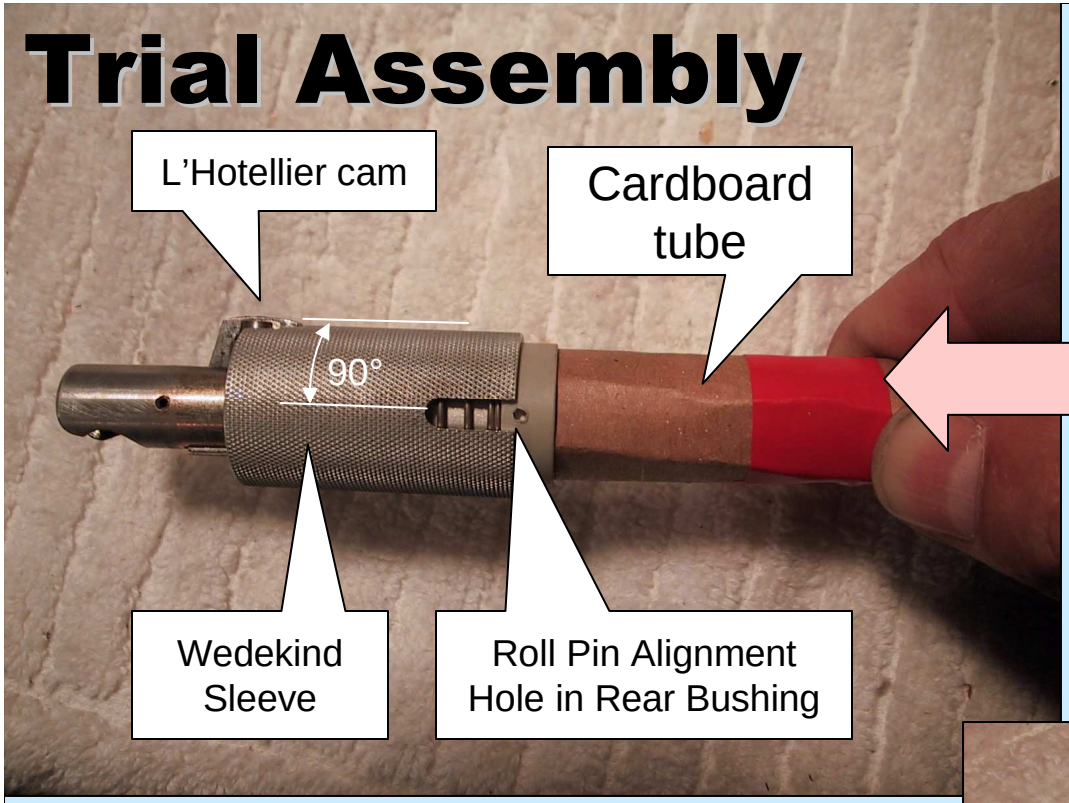


Trial Assembly



Note: This diagram is not completely accurate for DG-100 use and should be used for general reference purposes only.

Trial Assembly



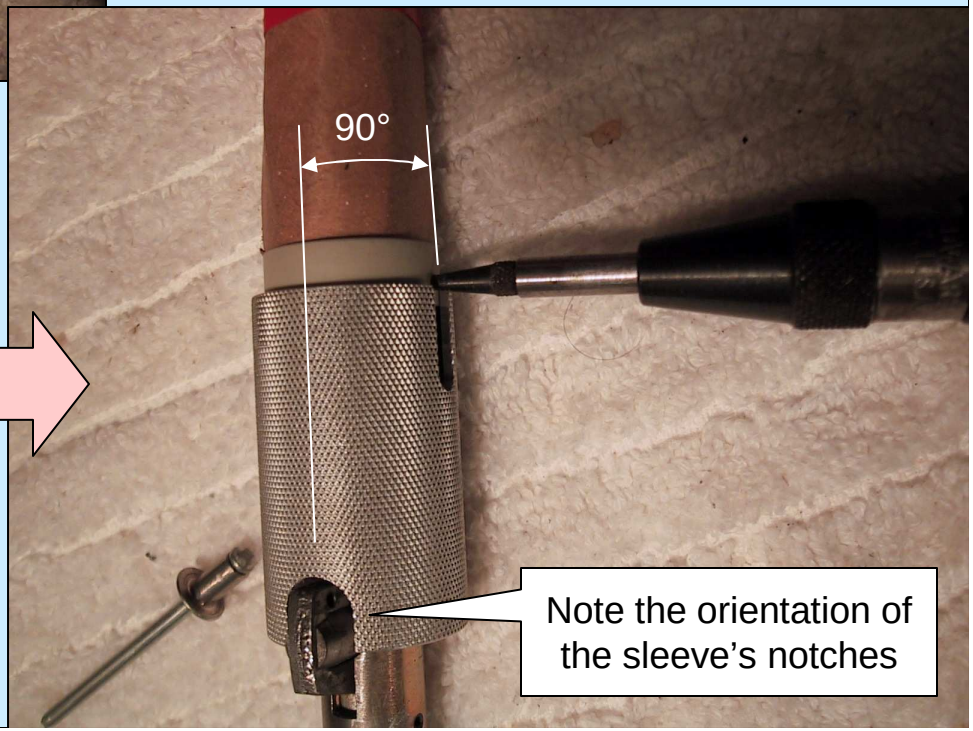
Final trial assembly testing before drilling any irreversible holes.

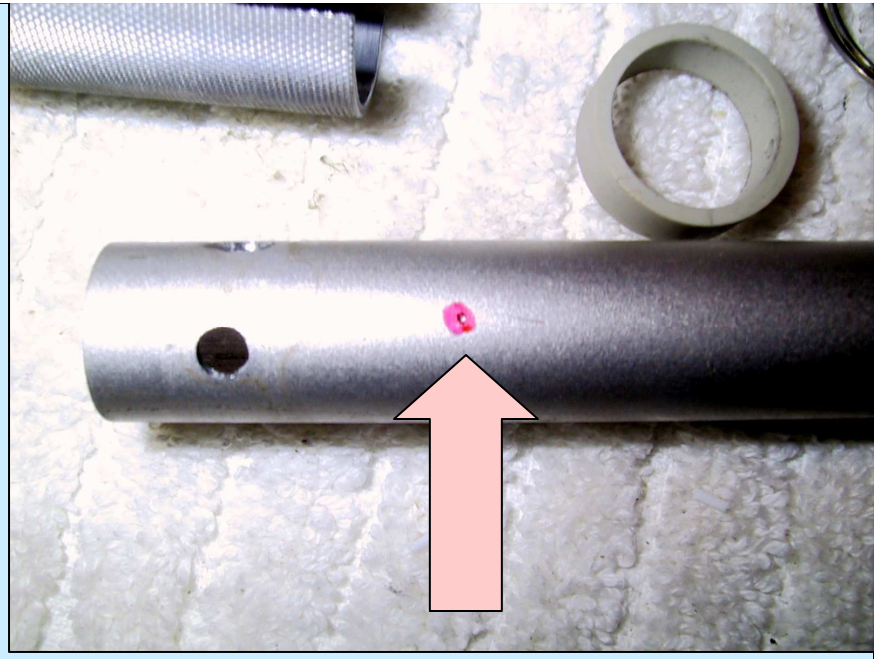
The roll pin alignment hole (on the rear bushing) can be seen near the sleeve slot, 90° to the L'Hotellier cam. With the roll pin is inserted the Wedekind sleeve will not be able to rotate out of position.

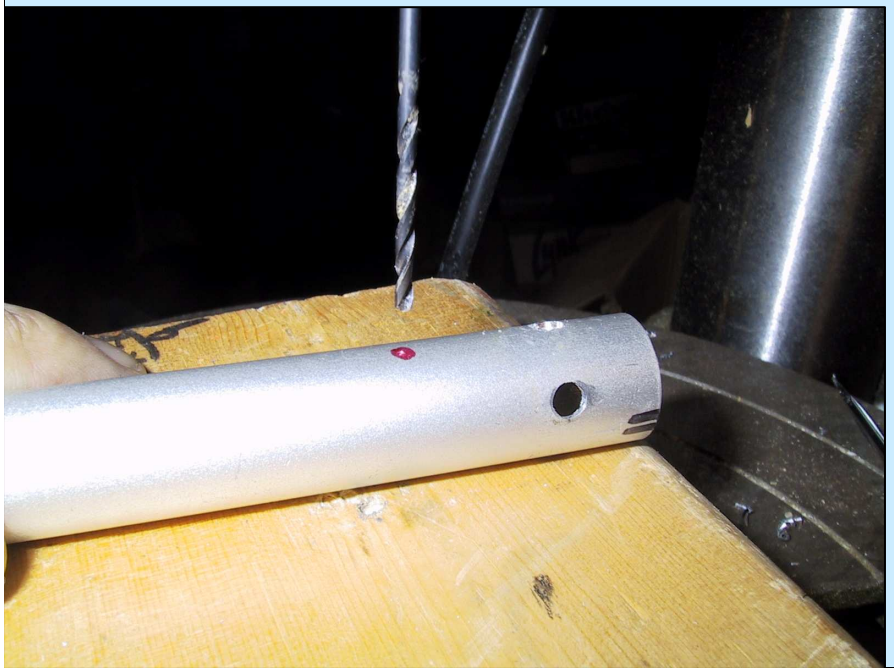
I am holding the rear bushing in place with a tube made of cardboard to determine the correct final location of the bushing by testing the action of the spring loaded sleeve. Test! Test! Test!

One I have accurately determined the location for the roll pin hole, I used a center punch to mark it.

Note the orientation of the sleeve's notches for the roll pin and the L'Hotellier release.

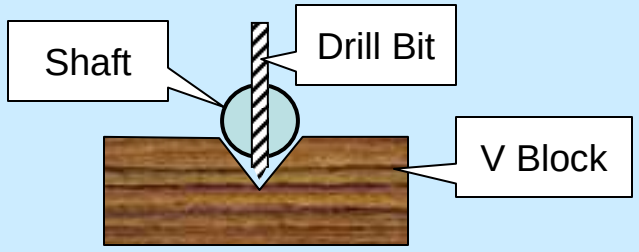




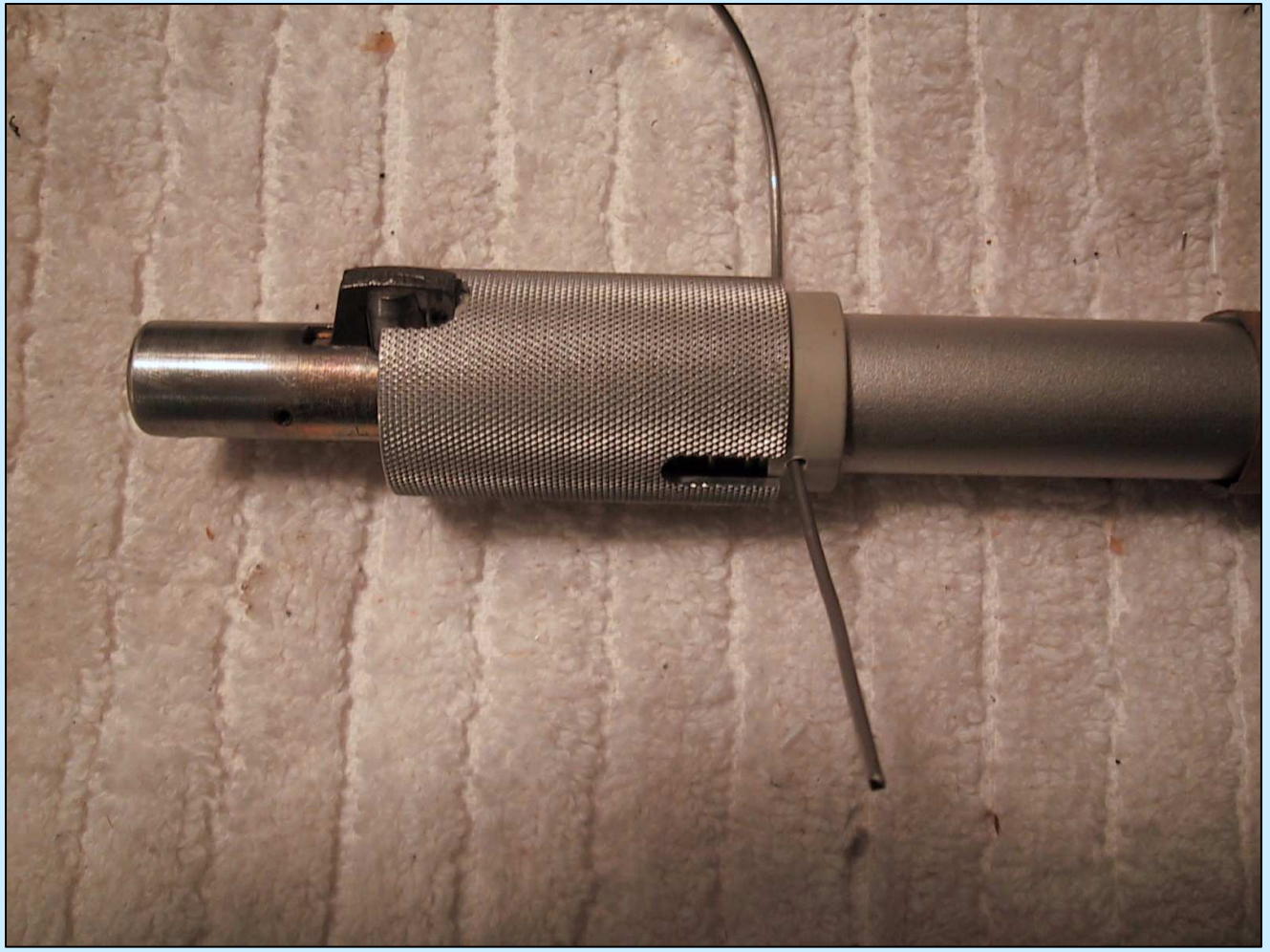


To avoid any mistakes, I clearly highlighted the roll pin location mark before drilling a 2mm hole.

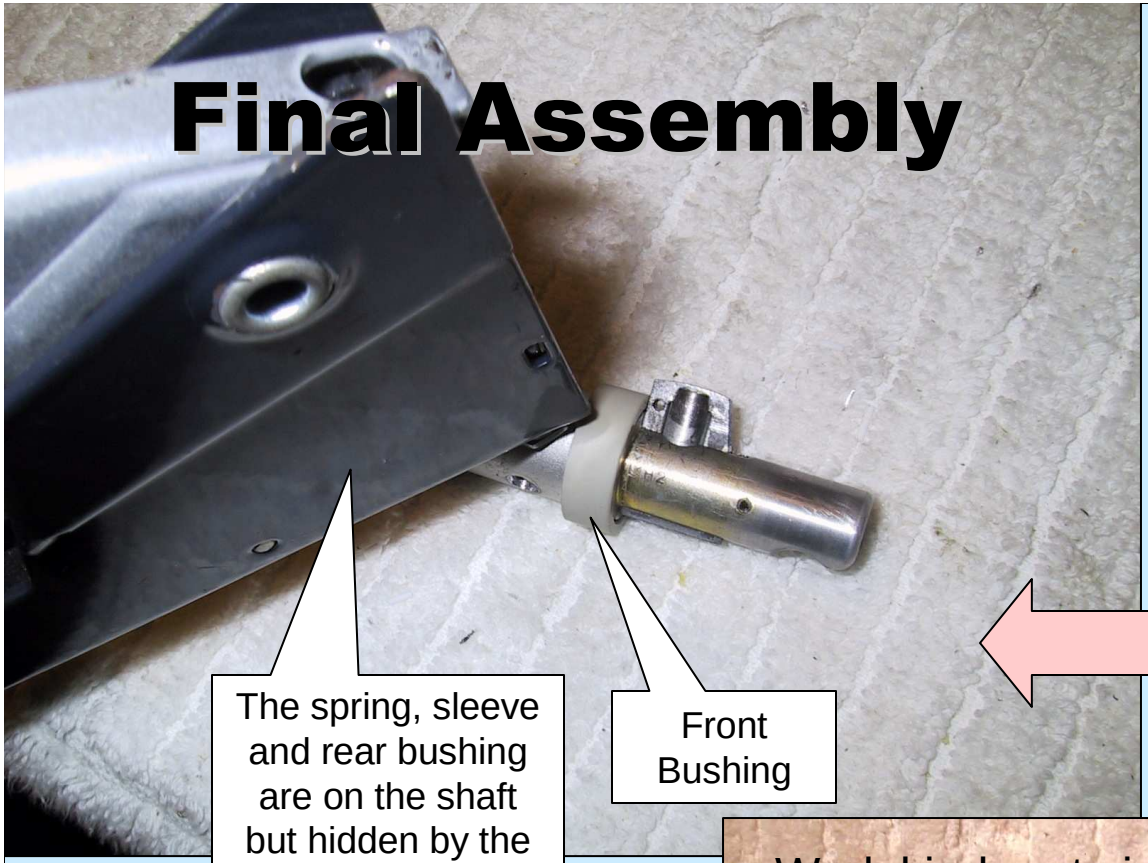
The drill must go through the exact opposite sides of the shaft and be 180° from one another. I recommend using a V-shaped block as shown below to accurately hold and center the shaft before drilling.



Here the rear bushing is temporarily held in position by placing some stiff safety wire through the drift pin holes. At this point I have only drilled a single hole in the shaft for the drift pin and can test the complete action of the sleeve in its final form.



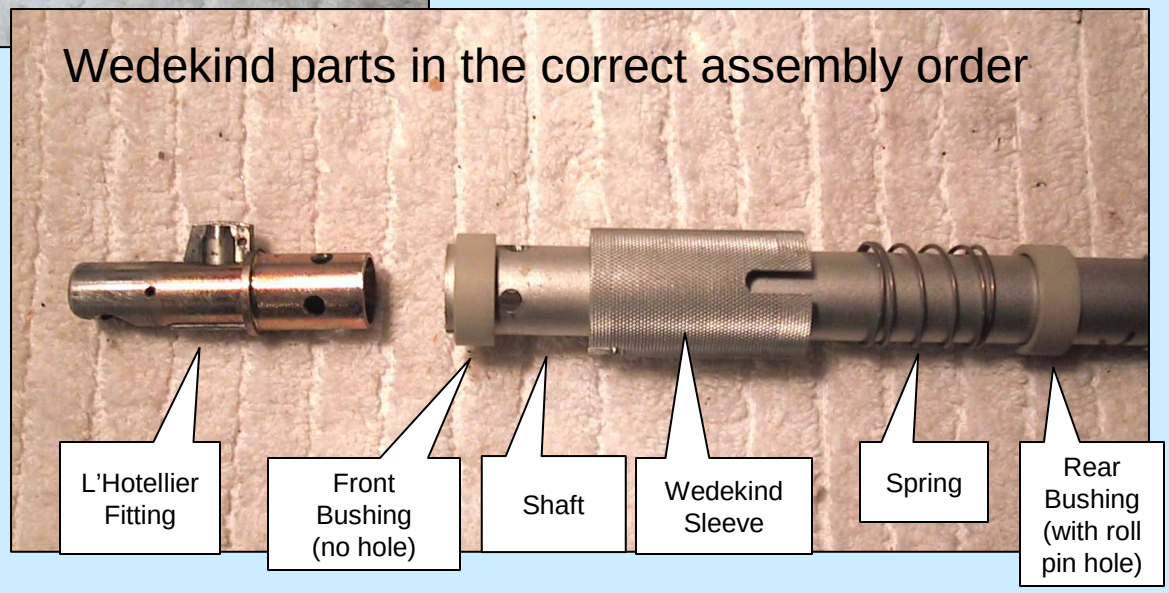
Final Assembly



Slide all the parts on the shaft as shown below.

The front bushing must be between the L'Hotellier fitting and the rivets. Then rivet the L'Hotellier fitting back into place.

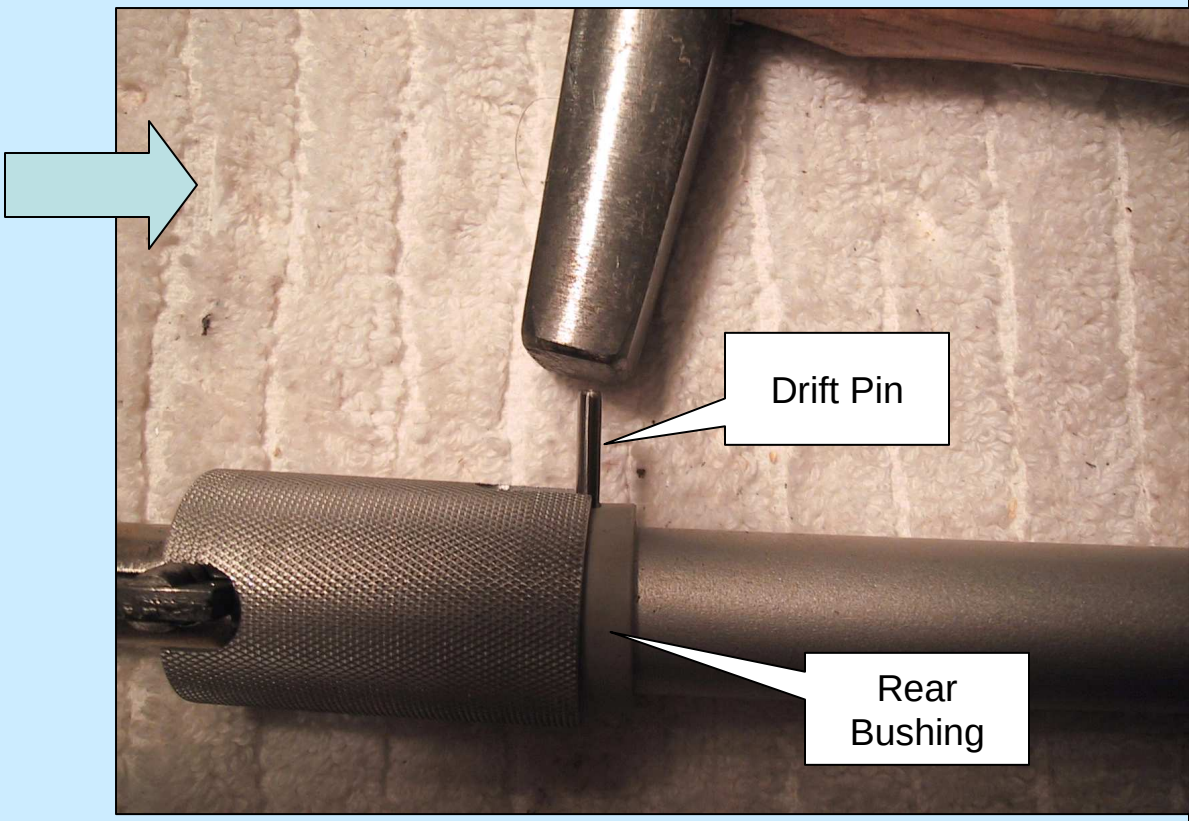
Per the AD/TN, the shaft's rivet holes needed to be re-drilled (oversized to 4.1mm) to accommodate the replacement 4mm "POP" rivets.



Final Assembly

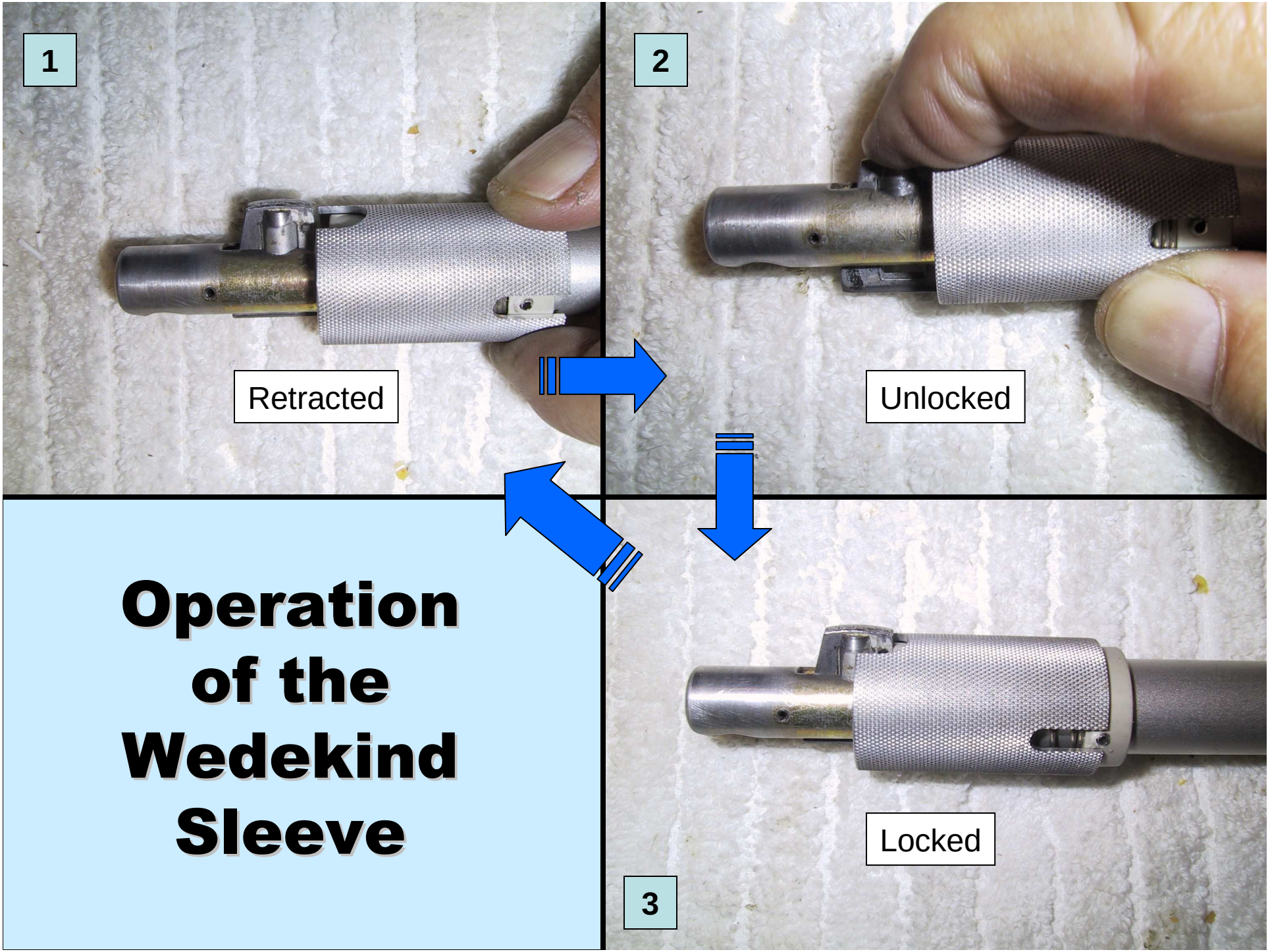
Slide the spring, sleeve and rear bushing into place, set the 2mm drift pin in place.

The roll pin is slightly longer than the rear bushing to engage the sleeve slots and prevent the sleeve from rotationing out of alignment.



This completes the 180° straight airbrake shaft asse mbly

Operation of the Wedekind Sleeve



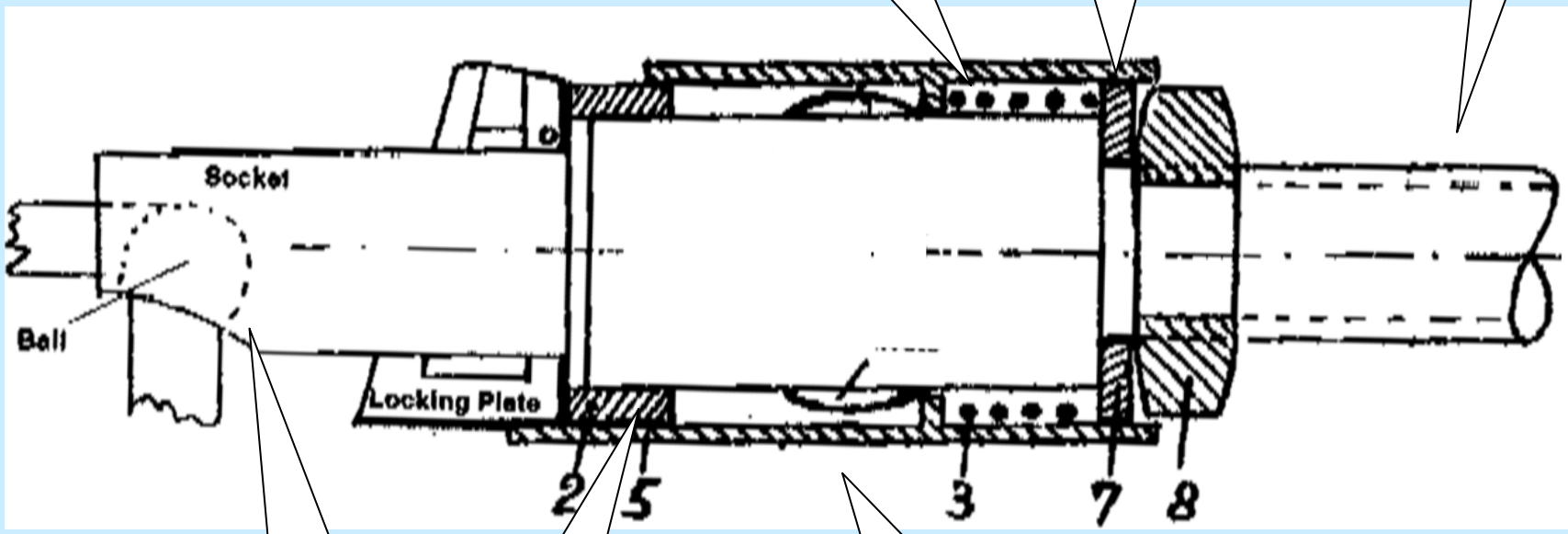
DG-101 Aileron Shaft Procedure

90°(right angle) L'Hotellier Fitting (Type W)

The assembly is basically identical to the airbrake shaft installation procedure except for a few important differences.

1) The aileron push tube isn't removed from the glider. The L'Hotellier fitting is removed (unscrewed) from the push tube before installation of the Wedekind sleeve.
2) Instead of riveting the fitting in place, a large diameter washer (item #7 on the next page) is used to hold all the components into place. No riveting is necessary.
3) Test the sleeve for proper action and mark the proper location of the roll pin. Drill the hole for the roll pin, replace all the parts, test once more, then drive in the roll pin. Then screwed the assembly back onto the push tube.

90° (right angle) Detail



Note: This diagram is not perfectly accurate for DG-100 use and should be used for general reference purposes only.

Miscellaneous Information about Wedekind Sleeves

I bought my Wedekind sleeves from McLean Aviation (UK LS DG Dealer). Nice folks.
However their Wedekind information didn't cover the DG airbrake installation sleeves that they sold me.
York, UK +44-1904-738-653 http://www.mcleanaviation.co.uk/

I received some very good information from Solaire Canada (LS DG Dealer)
Their Wedekind information was written by Jurgen Nick (see below) which was much better than the information received from McLean's (which is DG's TN). They show instructions for three types, Type V (not used on DG's) Type W is for the DG's ailerons and Type S is for the airbrakes.
Ed Hollestelle 519-461-1464
http://www.solairecanada.com/

Installation of Wedekind sleeves on a Nimbus with pictures
This is nearly identical to what is needed for the aileron connections on the DG-101
http://www.jimphoenix.com/jimphoenix2/pages/Nimbus/Wedekind/subWedekind.html

Some information on the Internet references a Jurgen Nick who is the "North America Distributor" of Wedekind sleeves. He translated the original instructions and added "hints". He contacted me in 2009 and provided the following contact information.

P.O. Box 4447 Cave Creek , AZ 85327
e-mail: Juergen_nick@msn.com

FAA AD 97-08-06 for securing L'Hotellier fittings.
http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgAD.nsf/0/5D82C2B301824AE586256A400073C1FE?OpenDocument&Highlight=dg100
http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgad.nsf/0/5D82C2B301824AE586256A400073C1FE?OpenDocument

Glaser Dirks DG-100 Technical Note on securing L'Hotellier fittings and includes the original Wedekind drawings and instructions.
ftp://dgflugzeugbau.de/tn/dg-100/TN301-old/TN%20301-16.pdf

DG-200 related Hotellier fittings - http://www.sli-institute.ac.uk/~bob/dg200/hotellier.htm

Sources for Wedekind Sleeves (some may be obsolete)

McLean Aviation (UK LS DG Dealer).
York, UK 01904-738-653
http://www.mclean-aviation.com/

Solaire Canada (LS DG Dealer)
Ed Hollestelle 519-461-1464
http://www.solairecanada.com/

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