

Lomo Biolam C1Y4.2 Microscope Disassembly and Servicing

There is a well-deserved joke that Russian microscopes from the Soviet era were lubricated with the same grease as used on Soviet tank treads. The grease does dry out after decades to become so hard that moving parts in the microscope are extremely stiff or completely frozen. Trying to force knobs may well damage fragile internal parts. A complete disassembly, cleaning and lubrication are necessary to restore the microscope back to practical service.



Figure 1

Disassembly Procedure

- * Remove the eyepiece and objectives for their safety.
- * Remove the mirror by pulling it straight out from the focus block.
- * Remove the condenser by removing the long set screw and then pulling the condenser downward to remove it from the condenser carrier. You may have to twist the condenser as you pull it downward.
- * Raise the arm as high as it will go, using the black coarse-focus knobs.
- * Remove the black Lomo model tag located above the silver fine-focus knob. (Figure 2) Keep your thumb firmly pressed on top of the tag as you remove both screws because there is a coiled spring beneath it.



Figure 2

- * Remove the coiled spring that is located under the Lomo model tag.
- * Raise the arm straight up until it separates from the focus block.

You will realize during disassembly that the coarse-focus assembly rides piggyback atop the fine-focus assembly.

- * Lay the microscope on its side and remove all four screws under the base that join the focus block and base together. Set the base aside.



Figure 3

* Lower the condenser carrier by turning the black knob until the condenser carrier separates from the focus block. (Figure 3) Set the condenser carrier aside.

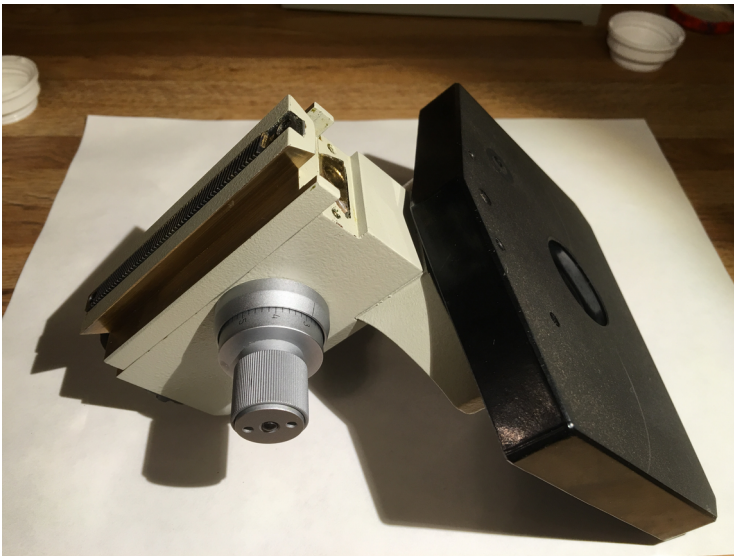


Figure 4

* Remove four screws under the black plastic stage to remove it from the stage carrier. (Figure 3, Figure 4) Set the stage aside.

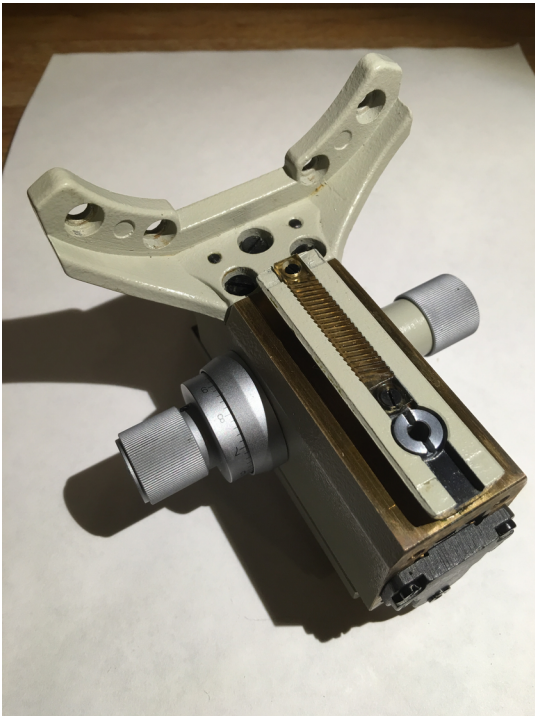


Figure 5

* Remove the two screws that fasten the flat clear plastic gear atop the dovetail track. Note the position of the ends of the plastic gear, because they are different. Also note that the screw heads are different on the underside– one is beveled and the other is flat. The holes in the plastic gear are countersunk to correspond to those screws. (Figure 5)

* Remove the three screws that fasten the stage carrier to the focus block. (Figure 6) Note that two pins also hold the two parts in tight alignment.

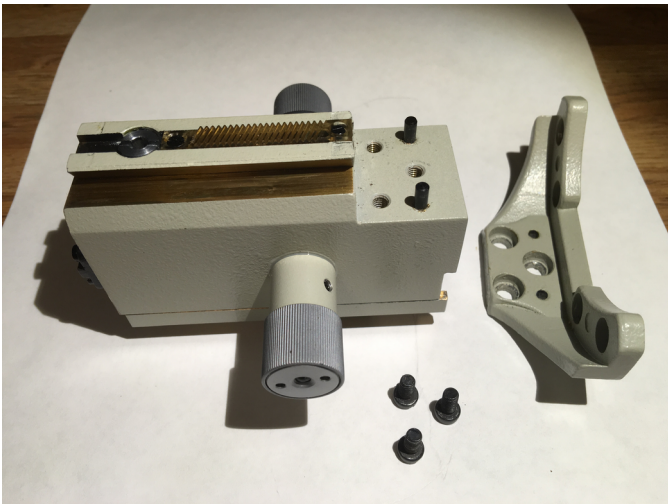


Figure 6

* Pull the stage carrier from the focus block. The pins are fitted very tight and it will take patient wiggling and pulling to separate the parts without bending the pins. (Figure 6)

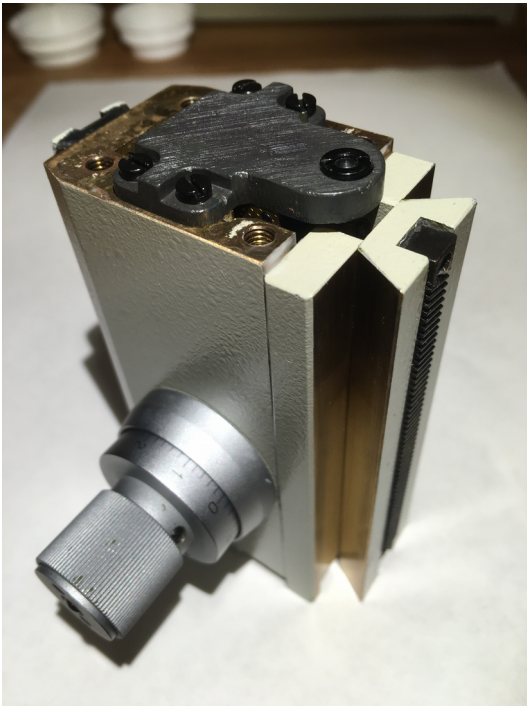


Figure 7

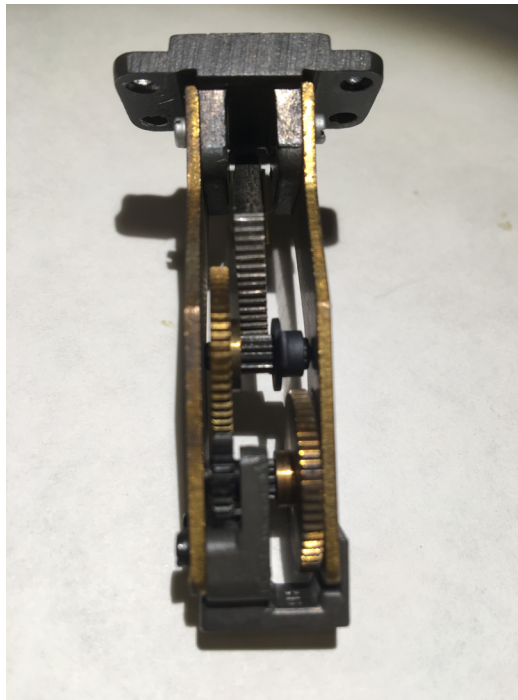


Figure 8

* Remove four screws from the bottom side of the focus block that fastens the black base plate of the fine-focus gear cluster. (Figure 7)

* Lift the black plate straight up to remove the fine-focus gear cluster from the focus block. This gear cluster should already be clean and free of any grease or oil. (Figure 8, Figure 9)

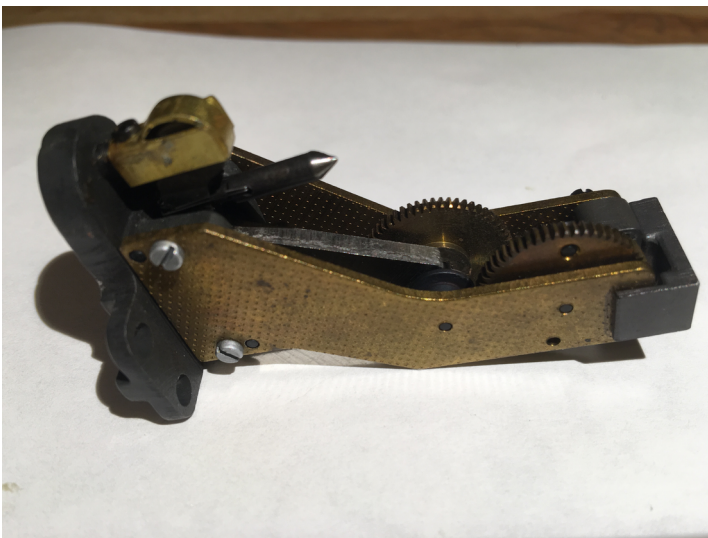


Figure 9

Notice the pointed steel pin. The gears raise and lower this pin to push a fine-focus dovetail slide up and down. The fine-focus dovetail slide has a hole in the end to receive this pin. (Figure 9)

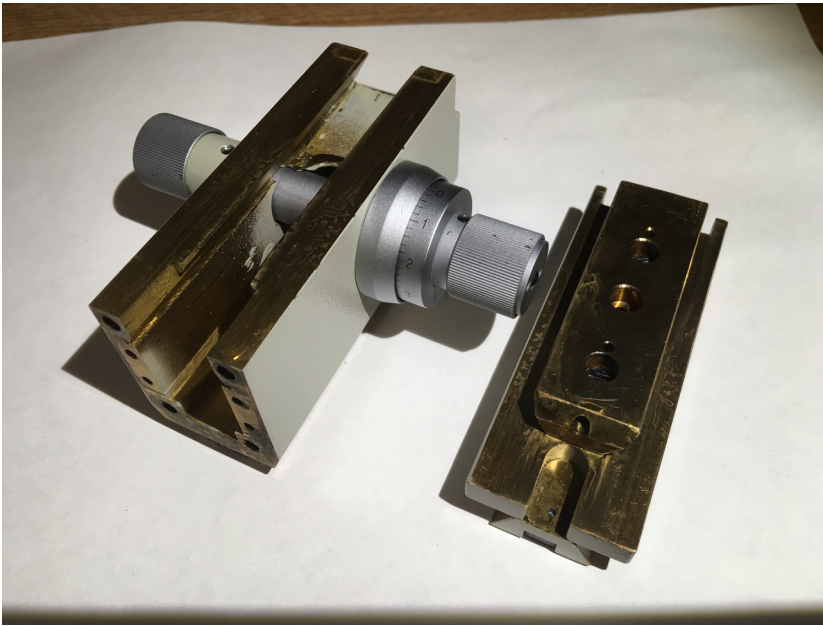


Figure 10

* The fine-focus dovetail slide [part on the right] must be removed from the focus block by sliding it down toward the bottom of the focus block. Remove it from the bottom. (Figure 10)

The parts could be glued together by dried grease so tight that you cannot push the slide out by hand. I had to use a hammer to gently and repeatedly tap the slide out using a blunt steel rod as a drift punch. To do that, stand the focus block in an upright position on top of a block of wood so that the fine-focus dovetail slide overhangs the edge of the wood block. (The fine-focus dovetail slide actually consists of three pieces – a sandwich of dovetail bar, flat bar, and dovetail bar, all screwed together.) Place the drift punch on top of the middle bar of that sandwich and tap down gently until the slide becomes loose.

Notice the hole drilled into the bottom end of the upper dovetail. (Figure 10) That hole receives the steel pointed pin of the fine-focus gear cluster. (Figure 9) Set the fine-focus slide aside.

Disassembly of the Fine-Focus Knobs and Shaft

Dried grease between the focus shaft and the bearing that it turns in may cause the shaft to be extremely hard to rotate. Dried grease will also defeat the safety purpose of a detent built inside of each fine-focus knob, so everything must be disassembled and cleaned.

The end of each fine-focus knob has a metal disk separate from the fluted knob itself. The disk has two exterior “snake-eye” holes, into which the pins of a spanning tool can be inserted to loosen the disk. Each disk is screwed onto the threaded end of the fine-focus shaft. **Inside the knob behind each disk is a loose ball bearing and coiled spring waiting to pop out!** The inside surface of the disk has a detent hole to catch the spring-loaded ball bearing. Thus, the fluted focus knob is only loosely coupled through the disk to the fine-focus shaft. This limits torque by detent slippage and prevents damage trying to focus beyond the range of the gear cluster.

Note and write down the sequence of disk, knob, pinned collar and placement of various washers, for each side of the focus block. Keep those components separate. **The shaft IS NOT symmetrical.**

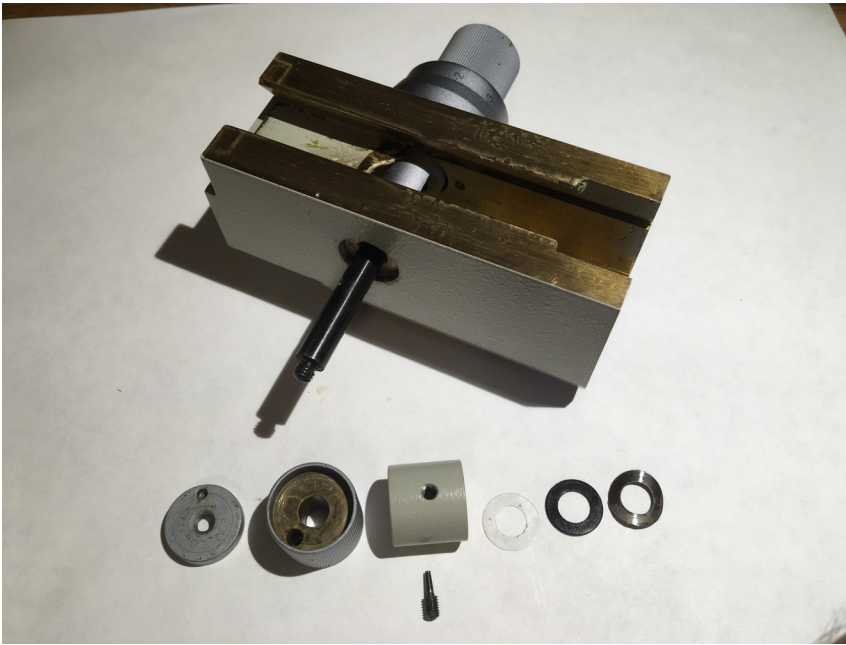


Figure 11 – the ball bearing and coiled spring that fit between disk and knob are not pictured here

- * Unscrew and remove disk. Don't let the ball bearing pop out!
- * Pull fluted knob from shaft.
- * Remove coiled spring from hole in knob.
- * Remove tapered screw/pin from collar.
- * Pull collar from shaft.
- * Note the correct placement of all washers. The sequence in Figure 11 may not be correct. I forget!

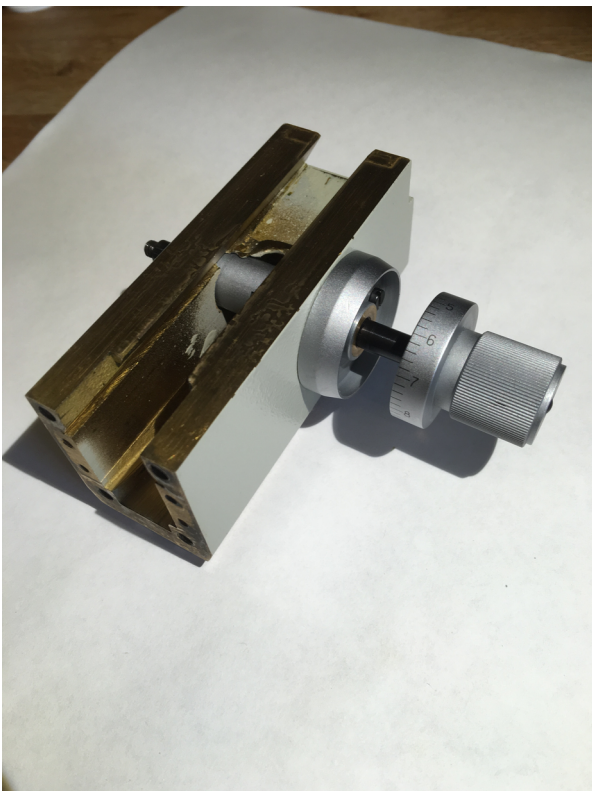


Figure 12

- * Pull fine-focus shaft from focus block. I would suggest tying a wire or string through the hole in that shaft as a reminder which end is which. The shaft is not symmetrical! (Figure 12)
- * Remove from the shaft the other disk, ball bearing, coiled spring, fluted knob and washers as before.
- * Remove tapered screw/pin from calibrated collar.
- * Pull calibrated collar from shaft.

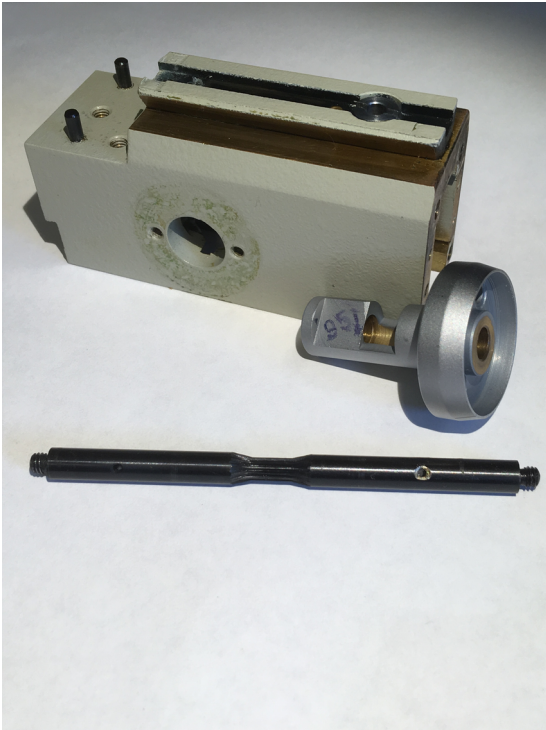


Figure 13

Do NOT remove the shaft bushing from the focus block as I did. It was not necessary for cleaning the bushing, and in fact, the sloppy screws do not necessarily hold the bushing in good enough alignment to mesh the fluted shaft to the tiny teeth of the fine-focus gear cluster. (Figure 13)

Disassembly is complete! I cleaned all parts using cotton swabs saturated with WD-40 solvent. I spray some solvent into a tiny jar for dipping the swabs. Sometimes that hard green Russian grease requires something stronger. I used several silicon greases for bushing and dovetail slides. Do not lubricate the gear cluster. Reassemble in reverse order.

Sometimes the condenser's iris diaphragm is gummy and stiff. Remove the lower swinging lens and filter holder (after loosening any set screw). Unscrew and remove the top lens assembly. That leaves just the iris assembly, which can be dunked in Xylene/Xylol paint thinner to dissolve any dried oil or grease. After soaking awhile, you should be able to close the aperture and see the blades. You might brush them lightly as possible while in the solvent with the softest camel hair brush to remove stubborn grease. After the solvent has completely dried out, place a couple of drops of very thin gum-free gun or clock oil to the iris blades to prevent rust.

Written and illustrated by SaraLee Shepherd, USA.

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Editor's note:

The arm may be seized when trying to remove. Also the rotation of the stage in models with that feature. Consult the [Micscape LOMO Biolam resources](#) page for articles that may address these problems.

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