

Instructions for:

# LABORATOR 184

Counter-weight spring adjustment.



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# WARNING!

Working with the counterweight spring in a Durst Laborator 184, Laborator 138SP, or Laborator 138S is extremely dangerous. There is a high risk for personal injury and damage to the equipment when working with this counter weight spring.

The spring combined with the spring tool is capable of releasing an impact with a force of more than 2000 pounds per square inch.

This manual is put at your disposal on the clear condition that DURST-PRO-USA, Inc. their employees, owners, Durst-Italy, the original reseller and the original manufacturer of the enlarger under no circumstances what so ever can be held responsible for personal injury or damage to the equipment, this also holds true if this manual is faulty, in case of personal injury or damage to the equipment.

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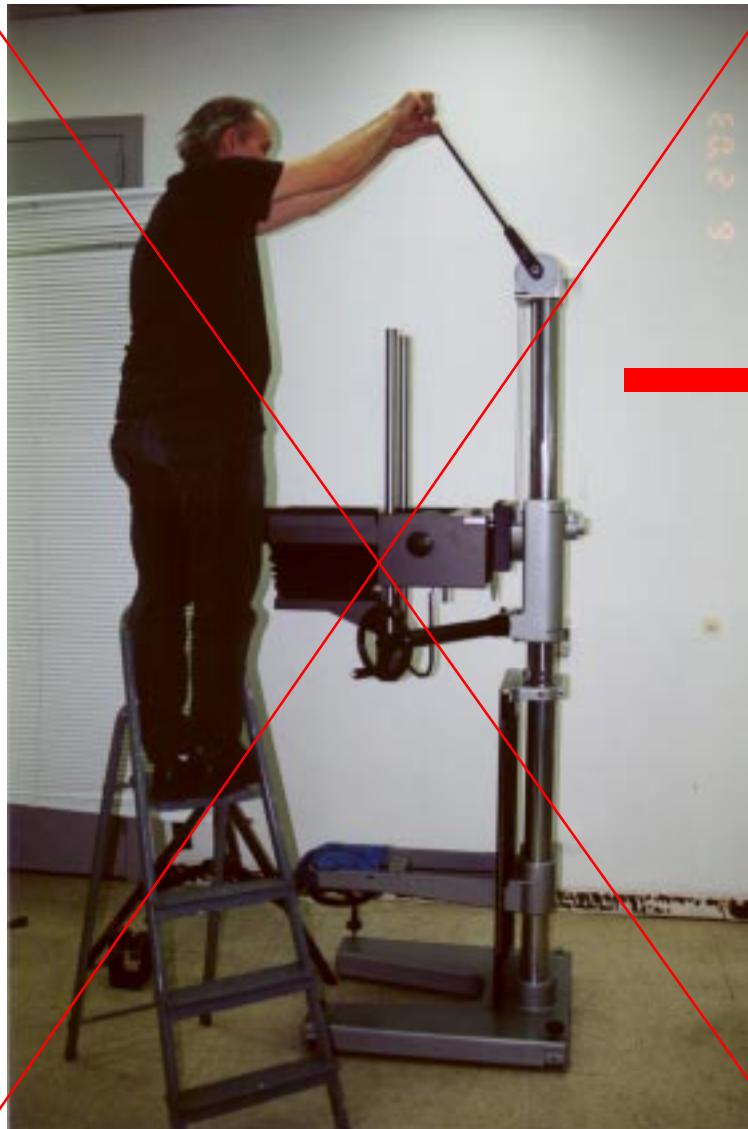
This manual is issued to \_\_\_\_\_

To avoid any responsibility, on your part, from third party claims we advice not to duplicate or copy this manual.

# WARNING!

**DO NOT ATTEMPT TO CARRY OUT THE SPRING ADJUSTMENT ALONE!**

**SPRING ADJUSTMENT IS A TWO-PERSON JOB.**

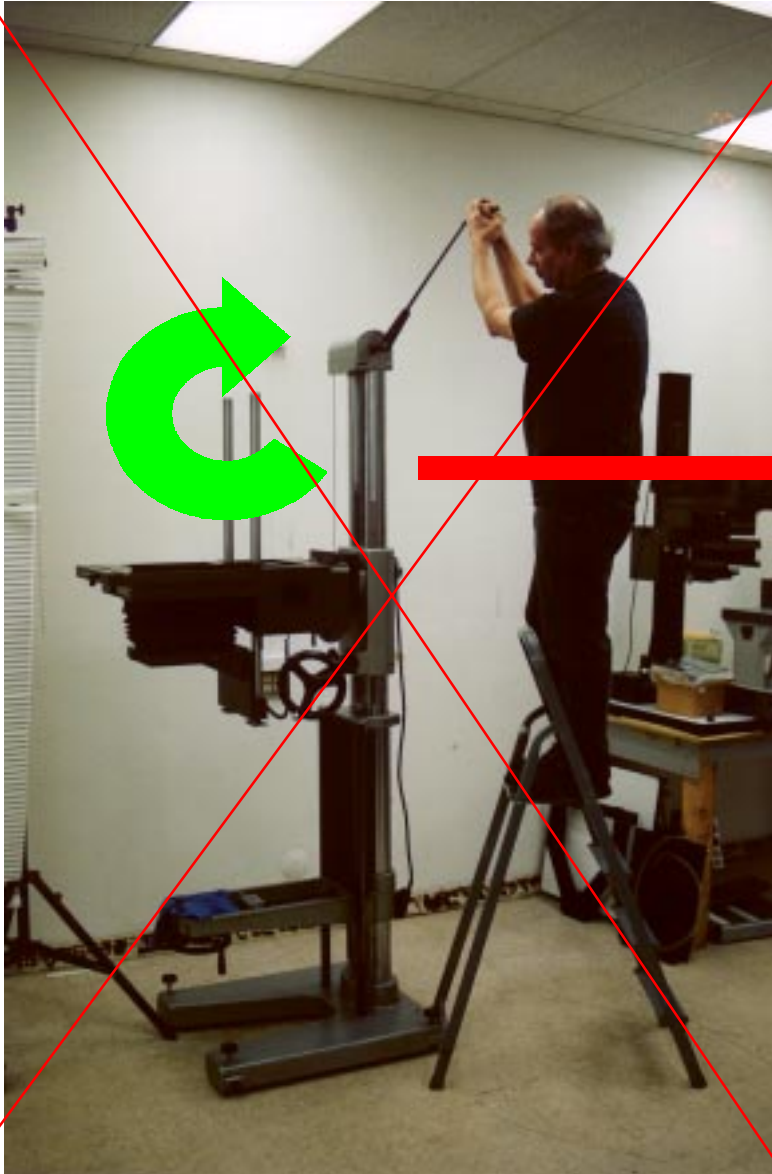


If this person continues the travel of the tool in a downwards direction the force of the spring will make the enlarger travel in the direction of the red arrow, it will pull you of the ladder and possible hit you in the head with the end of the tool. NEVER STAND IN THE LINE OF TRAVEL OF THE TENSION TOOL.

# WARNING!

**DO NOT ATTEMPT TO CARRY OUT THE SPRING ADJUSTMENT ALONE!**

**SPRING ADJUSTMENT IS A TWO-PERSON JOB.**



If this person continues the travel of the tool in a downwards direction the force of the spring will make the enlarger travel in the direction of the red arrow, as soon as you start the upwards motion. It will pull you of the ladder and possible hit you in the head with the end of the tool. The force released by the tension tool is several thousand pounds per square inch, enough to KILL if hit in the head or the face.

**The two springs inside the spring housing are each 4" wide, 1/8" thick and fastened to a 1/2" chrome steel axle.**



**The front plate on the spring housing is 4mm thick plate aluminum. If the spring is allowed to uncoil uncontrolled it will knock off this plate, ripping ALL SIX 4mm screws from their sockets.**



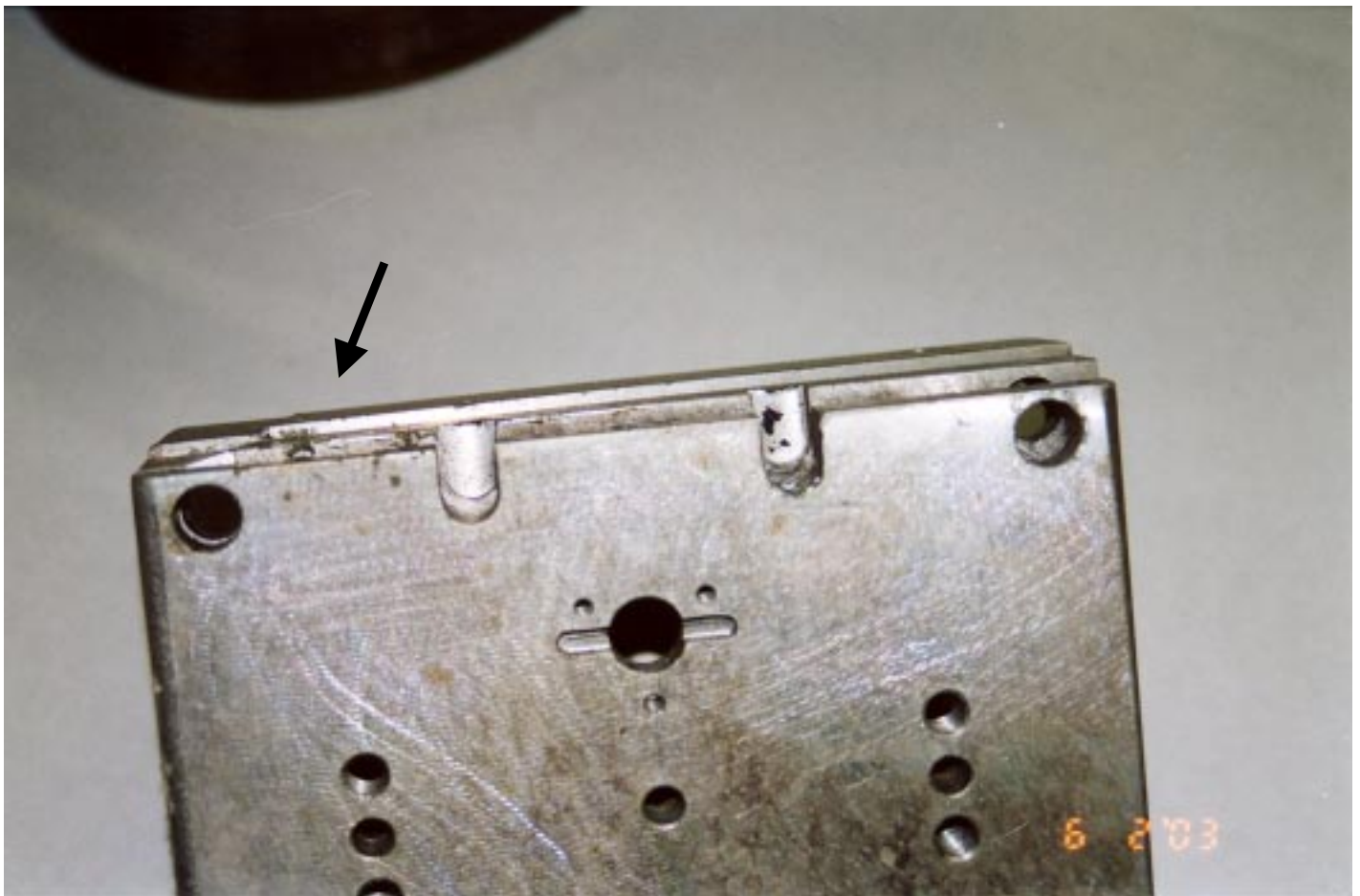
**If the spring is uncoiled uncontrolled it will crack the 1/2 to 1" thick cast aluminum housing**



**On this picture you will see the effect of a spring accident. The force of the spring knocked the 1/2 - 1" thick aluminum housing almost 1/2 inch out of shape.**



If you look careful at the image below you can see that the entire 10 pound aluminum housing has been knocked out of shape by more than 1/4". The aluminum housing is 1/2" thick at its thinnest place. The force released by an uncontrolled spring is several thousand pounds



# The correct way to work

**SPRING ADJUSTMENT IS A TWO-PERSON JOB.**



**This is the correct way to operate the spring tension tool. The person holding on to the chassis should be able to exert a force equal to lifting approx 50 pounds.**

**Please use your common sense when working with the spring.**

**Go slow and anticipate your next move.**

**DO NOT ATTEMPT TO USE AN ADJUSTABLE WRENCH FOR SPRING TENSIONING**



# MANUAL FOR SPRING TENSION AND SPRING REPLACEMENT ON A DURST LABORATOR 184.

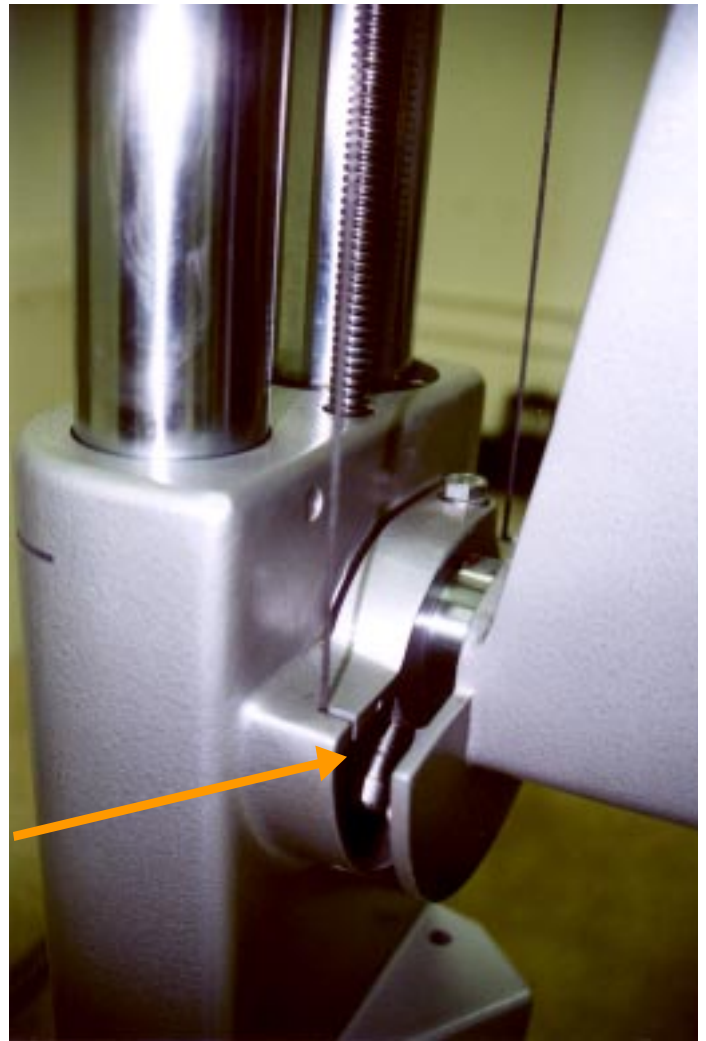
**A)**

REMOVE THE LIGHT HEAD FROM THE ENLARGER and drive the head carriage to its BOTTOM position, this will move the camera out of the way and it will ensure that the spring-wire is in its most exposed position.

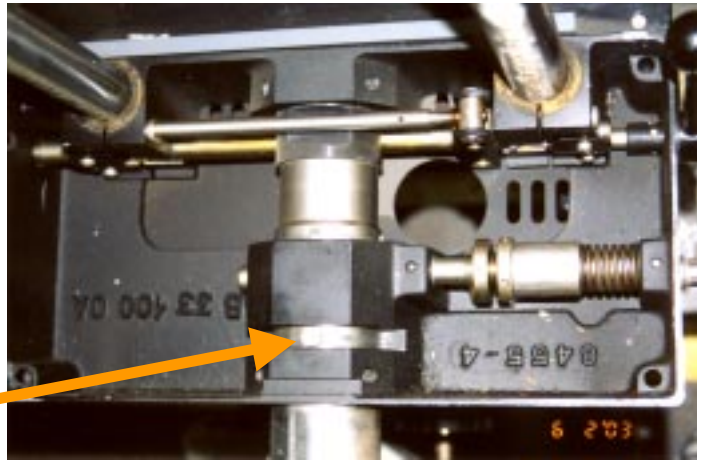
**B)**

In some cases it is necessary to remove the camera also to access the wire behind the half-moon shaped scale.

On some models the wire is situated behind two large 10mm bolts behind the scale, it is not possible to reposition the wire without removing the scale.



In order to remove the camera on an L184 it is only necessary to remove one screw. When this screw is removed the camera will slide off the support arm. Here it is also helpful to be two persons, one person to hold on to the chassis and one to pull the camera off. The camera is quite heavy, be careful not to drop it



The tool kit consist off:

1. Tension tool - 4 foot wrench w/ handle and stop.
2. Bolt to secure tool to spring housing.
3. "C" shaped 1/4" steel bracket
4. Wire brace tool.



If a replacement wire has been ordered the wire kit will be enclosed with the tools. It is metric wire. It is important to use the right thickness wire,



The wire is coiled up inside the wire wheel.

If the wire is too thin it will break, and ruin the spring housing, if it is too thick it will not fit inside the wire wheel. An excess thickness of less than one millimeter – less than 1/32" of one inch – will prevent the right amount of wire fitting inside the wire wheel.

Remove the cover from both sides of the spring housing.



**1)**

Move the enlarger head / head carriage to it's bottom position.

**2)**

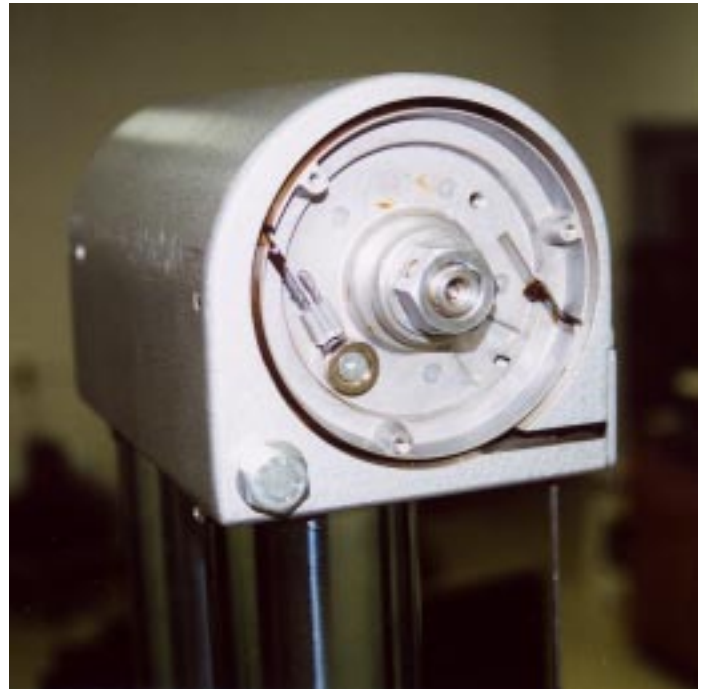
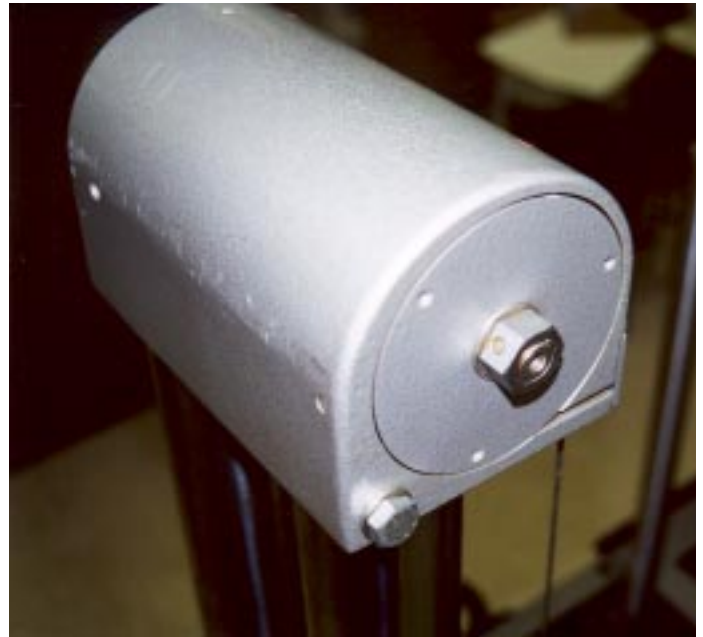
Moving the head to to the bottom position will thighten the counter weight spring

**2A)**

.Continue by removing the cover from the right side of the spring housing.

**2B)**

Please NOTE the round hole inside the chrome axle. The axle is the round rod inside the large nut. This hole is threaded inside. The threads will accept the large bolt which are part of the tool kit.



3)

Install the tension tool on the bolt on the left side of the spring housing. Slide the tool onto the chrome nut in a position approximately as shown.

3A)

SECURE the tool with the enclosed 4" long bolt, the bolt screws into the threaded hole in the end of the chrome axle.

**MAKE SURE THAT YOU HAVE AN ASSISTANT HOLDING ON TO THE CHASSIS - THIS IS THE MOST DANGEROUS POSITION OF THE ENTIRE OPERATION.**

**The long tension tool will allow you to excercise a force equal to several hundrede pounds of lift and the chassis is enclined to escape in the direction of the red arrow.**

4)

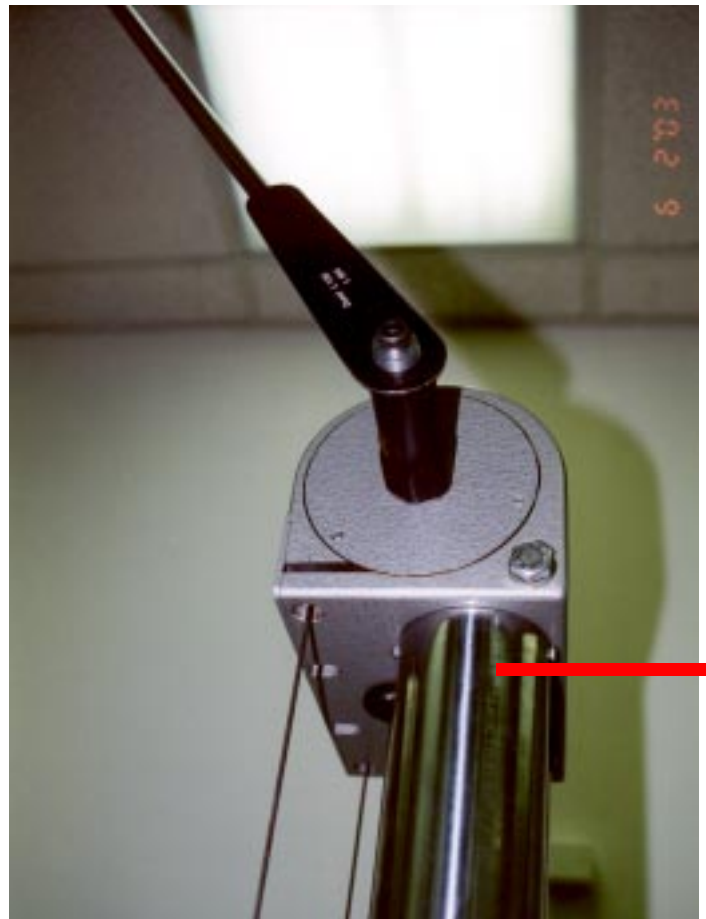
Turn the tool counter clockwise to a position where it is paralel with the chasis and the wire is starting to slack.

Then have your assistant install the "C" shaped bracket around the tool and the column. You can hold on to the chassis.

5)

When the bracket is installed slowly let go of the tention tool untill it is secured by the "C" bracket in a position as shown on the right.

The steel bracket has to be positioned in such a manner that it will not SLIDE up on the tool. Most of our tools are equipped



with a cross rod for this purpose. If the tool is not equipped with a cross rod use tape or a rubber band to make sure that it will not slide and lose the grip on the tension tool.

This whole procedure is done with the purpose of rendering the wire slack enough to make it possible to remove the wire on the right side of the spring housing.

## 6)

When the wire is slack it is possible to remove the wire and the wire disk on the right side of the spring housing.

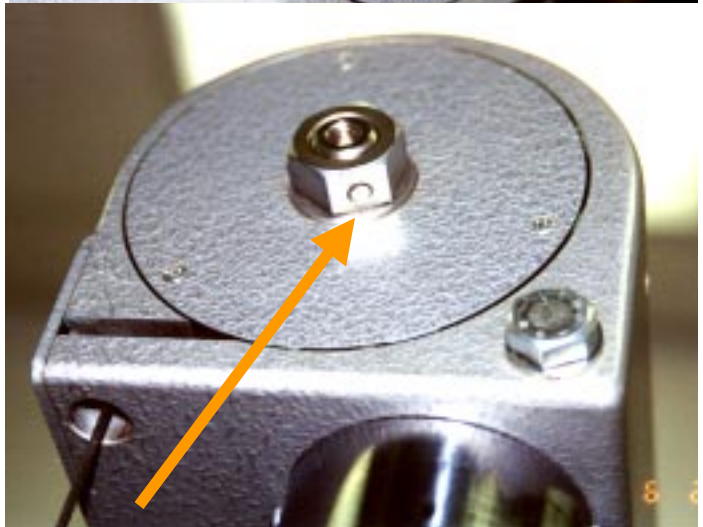
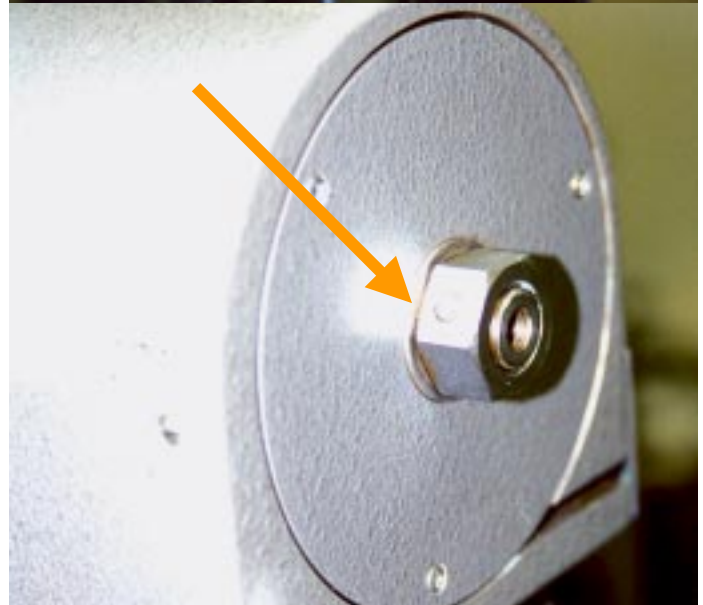
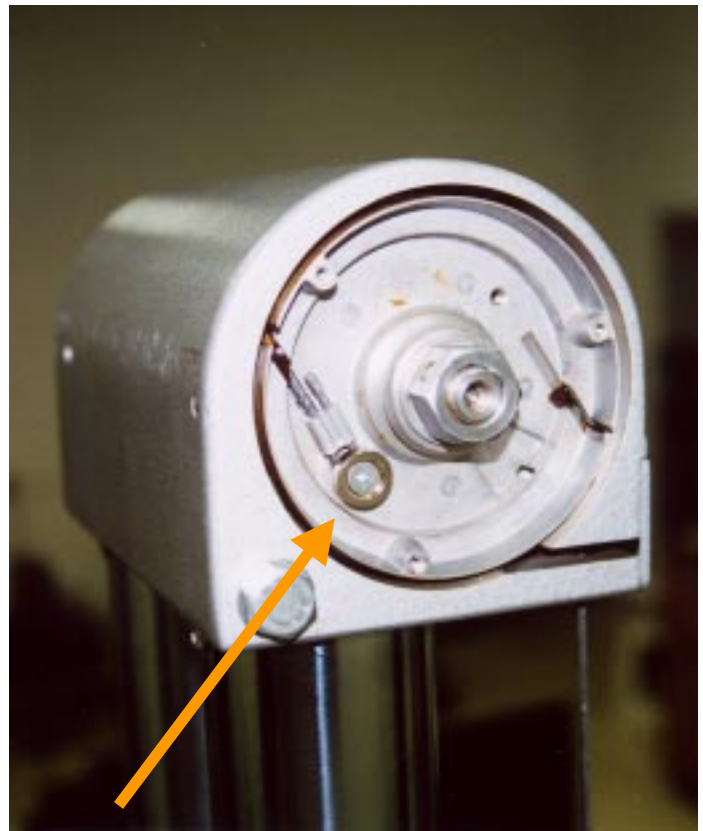
First remove the screw and the disk holding the wire securely in place.

Then remove the pin sitting through the axle and the nut using the pin extractor enclosed with the tool set and a hammer. The hammer is not supplied.

The pin will be clearly thicker in one end, it is important to knock it out by hammering on the THIN end.

When the pin has been removed it is possible to remove the nut.

When the nut has been removed it is possible to remove the wire disk. It is often hard to remove the disk. The disk is attached to the axle with a pin on the backside. In order to disengage that pin it may be necessary to manipulate the disk clockwise and counter clockwise, and possibly tapping with a semi hard tool, a rubber



When the wire disk in the right side has been removed and the wire hanging loose it is possible to bring the tension tool back to a position where it is parallel with the column and then remove the “C” bracket.

**7)**

After the “C” bracket has been removed it is possible to move the tension tool several times clockwise until the spring is completely slack and no tension is on the tension tool.

While loosening the spring the existing wire will be wound partly on to the wire disk on the right side of the spring housing.

When this position is obtained the tension tool can be removed, the cover plate, the nut and the wire disk in the left side of the spring housing can be removed. After the left wire disk has been removed it is possible to remove the old wire and install a new fresh wire.

*Please notice that the nut is NOT symmetrical, it is important to reinstall the nut with the same side facing the spring housing as was facing the spring housing before you removed it. If this little detail is ignored it will not be possible to align the pin hole in the nut with the pin hole in the axle.*

**8)**

**THE NEW WIRE:**

1) Install the nut on the left side of the spring housing without any wire disk in place in either side of the head.

**11)** Tighten the spring entirely without any wire disks installed in either side.

A) Release the spring 0.5 to 1 turn.

B) Install the “C” bracket.

**13)** install the wire disk in the right side of the spring housing

To install the right wire disk you have to:

A) Secure the wire to the wire disk by threading it through the hole in the disk, create a wire loop and seal it with a copper brace using the wire tool enclosed with the tool kit, and finally securing the wire loop with the screw and a thick washer.

B) thread the wire through the hole in the spring housing

C) install the wire disk on the axle by threading the loose end of the wire through the hole in the spring housing and angling the wire disk in place.

D) Refit the nut and the pin in the nut.

**14)** slack the spring entirely, or until the wire taken up block further movement, thus taking up the wire on the wire disk, make sure that you keep the wire tight at all times because the space is so limited inside the spring housing that even the least bit of slop will get the wire caught between the disk and the spring housing.

**15)** Move the tension tool to the side with the disk installed.

**16)** Retighten the spring using the tension tool. While doing so the wire that was just wound up is now being exposed. While the wire is being exposed it is im-

portant to keep the wire tight. If it gets caught between the spring housing and the wire disk it will get “kinked” and you will have to start all over again.

A) When the spring is completely tightened secure the tension tool using the “C” bracket

B) Remove the nut in the left side of the spring housing.

C) Thread the wire through the slots in the camera carriage and through the hole in the spring housing.

**17)** Thread the wire through the wire wheel and slide the wire wheel in place while

**18)** Pull the wire tight to make sure that it remains without any “kinks”.

**19)** Secure the wire to the wire disk by creating a copper sealed wire loop and finally securing the wire loop with the screw and a thick washer.

Replace the nut and the pin.

**19)** Replace the wire wheel covers.

Now the spring is completely tightened with the camera in the lowest position. This is ideal.

You are finished.

One final remark - make sure that the wire is completely secured in both wire disks. If not - it will slip and the spring will uncoils it self and destroy the spring housing.

Good luck.

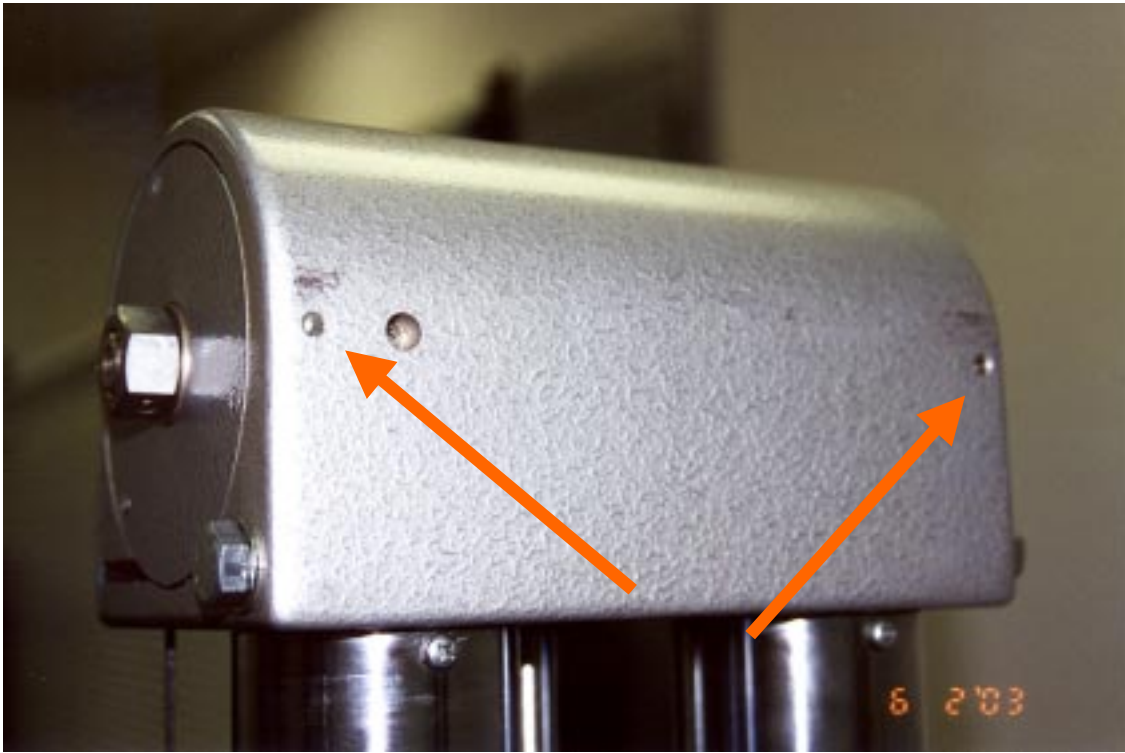


# RESUME:

- 1) Head carriage in bottom position.
- 2) Spring is tight.
- 3) Install tension tool
- 4) Turn to slack wire.
- 5) Secure tension tool with “C” bracket.
- 6) Remove wire disk in opposite side of tension tool.
- 7) Slack spring until it is fully slack or blocked by wire taken up.
- 8) Install nut and pin in side without wiredisk installed.
- 9) Move tool to opposite side - the side with no wire disk and where you just installed the nut and pin.
- 10) Tighten slightly to allow the second wiredisk to be removed.
- 11) after both wire disk are removed tension spring fully.
- 12) Install the new wire in the wire disk
- 13) Install wire wheel in opposite side of tension tool.
- 14) Release the spring until spring is completely slack or blocked by the wire taken up.
- 15) move the tension tool to the side with the wire wheel installed.
- 16) Tighten spring completely or until further motion is blocked by the wire taken up
- 17) thread wire through the head carriage loop and through the spring housing.
- 18) pull the wire tight while sliding last wire wheel into position. Avoid kinks.
- 19) install and secure wire in wire wheel.
- 20) replace wire wheel covers.

**end.**





Note.

It is possible to simplify the process by using the locking feature built into the spring housing.

The two screws indicated with arrows are lock screws that can be used to lock the two wire wheels in position, one at a time, without using the tension tool to lock the spring.

These screws are prone to fail under strain and we strongly advise against using the set screws.

