Part 1: Tools and Supplies

I'm going to show you the fundamental steps to tune a spring gun. Although I won't show every kind of gun, I will talk about how underlevers and sidelevers differ from breakbarrels. If you're clever enough to do this kind of work, you'll be able to figure out the particulars for yourself. I'm just going to show you the important points to get you started. We'll begin by looking at the tools and supplies needed to work on spring guns. I assume you have a standard set of tools and all the screwdrivers and Allen wrenches you need for any job. If you don't have them all now, get them as you need them. Never try to make one tool do the job of another - that's how accidents happen and mistakes are made.

Pin punches

You need a good set of these, because there are hundreds of uses for them when working on spring guns. We will use them from the beginning, so get a small set of punches right away. Airgunsmiths need small punches, because most of the pins encountered are small. I bought my set at Sears, and it has four punches - 1/16", 3/32", 1/8", 5/32", plus a 5/32" alignment tool.

Plastic and rubber-headed hammer

This is also a general tool that's used all the time. Get one that's small and handy to use. This kind of hammer is essential. You can buy one at Sears or Home Depot; if you like shopping on internet, try Boston Industrial. They have one for $2.10.

A hammer with rubber and plastic heads is an essential tool for the airgunsmith.

A vice

Vices are not as useful as you might think. Spring gun tuners have very little need for vices, save one. A fine, inexpensive mainspring compressor can be made with the right kind of vice. I will give you the plans for how to build a compressor, and I'll also tell you where to buy one if you don't want to build it.

Dowel rods and rubber bands

Get at least one half-inch hardwood dowel. You'll use it to lubricate the mainspring cylinder. If you have a screwdriver with an 18" long blade, it can take the place of the dowel. Also, get a supply of thin rubber bands, to use with the dowel. I will explain what to do when we get there. A dowel 36" long is more than enough. All you need for most jobs is about 18".

Lubricants

Lubricants are a major part of a spring-piston tuner's bag of tricks. Ten years ago, the market had

the products you needed and they were easy to find. For example, Beeman sold M-2-M moly paste that was wonderful stuff. Well, they don't sell it anymore, so you now have to buy your lubricants elsewhere. I want you to at least get black tar and moly paste. I'm sending you to Air Rifle Headquarters for these things. They are also an excellent source for replacement mainsprings, piston seals, spring guides and other important parts you will need to tune a gun. They have already created drop-in tuning kits for many popular spring rifles like the Benjamin Legacy and the FWB 124/127. So, this is a place you aspiring tuners need to bookmark.

Next time we'll look at mainspring compressors, and I'll show you how to make one for less than $20.

Part 2: Building a Mainspring Compressor

This is the most important tool a spring gun tuner owns. It may not be used for every job, but working without one when you need it is like walking a tightrope without a net. I now use a B-Square compressor, but for many years I used a homemade rig that did everything I asked of it. The plans for my compressor came from Tom Gaylord's Beeman R1 book. I've seen simpler compressors, but I've never seen one that was easier to make.

Mainsprings are under tension

To get maximum power from an airgun, the mainspring is usually under tension (compression). In modern spring guns, the trend is toward more compression than in the past. A few rifles such as the TX200 are under almost none - but they are the exception.

You can't contain it!

Never think you can contain the force of a mainspring. Eventually, you'll be able to do so with certain guns you have disassembled many times or even with certain gun models you may have learned very well; but the first time you work on a spring gun, you need to use a compressor.

Simple design

All a compressor does is restrain the rifle while relaxing (or decompressing) the mainspring with control. The task would be simple if all spring guns were built alike - but they aren't. I will address several different methods of gun design in a later posting. For now, just take my word that the compressor has to be very adaptable.

This compressor is built on a 2x8 piece of wood. All the parts attach to a plank.

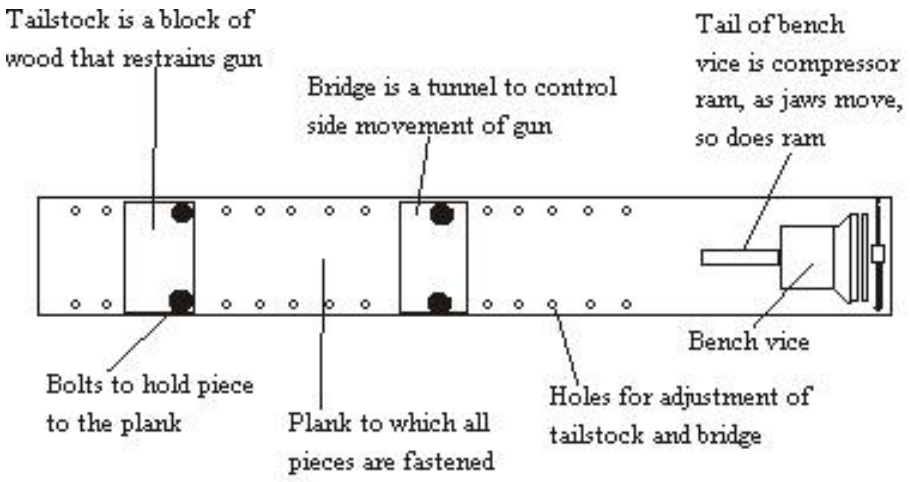
The headstock, the bridge and the tailstock

The headstock contains the moving ram that compresses the mainspring. You can make a rugged one from a bench vise. There's really nothing to build! The vise is bolted to the plank and used in reverse. The tail of the vise puts tension on the end of the gun holding the mainspring.

The bridge is a tunnel through which the body of the gun passes. It keeps the body of the gun from moving sideways when the mainspring is under tension but not restrained by the gun.

The tailstock is a block of wood with the grain end exposed. The muzzle is pressed against it and the gun cannot move.

The bridge and tailstock are adjustable to accommodate different guns. They can also adjust for a gun that has the barrel on or off.



Here is the thousand-word picture. The bridge has a large hole running through it for the gun.

A great vise for a compressor. The tailstock has a long reach!

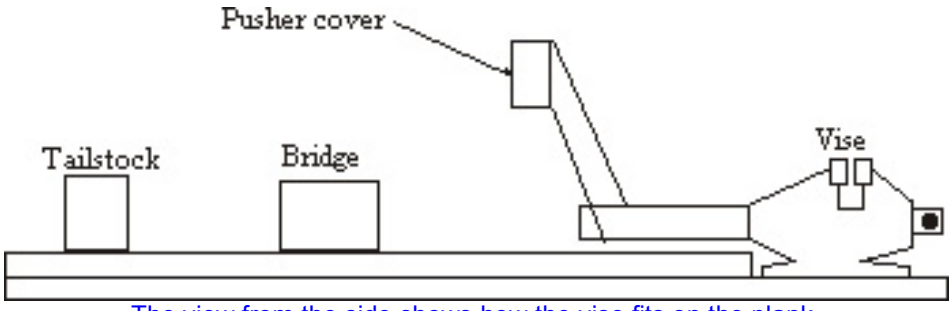
Tomorrow, I'll finish this project and have some details and dimensions for you.

Part 3: Building a Mainspring Compressor (Cont'd)

Today, I'll finish the mainspring compressor with details, dimensions and important tidbits.

The plank

The plank has to be long enough to accommodate any spring gun held between the vise and the tailstock. I used two 2"x8" boards, one on top of the other, but the top one isn't as long as the bottom, which has to could accommodate the vise. Look at the side view to see what I mean. The bottom board is longest (mine is 58").



The view from the side shows how the vise fits on the plank.

The tailstock and bridge are both held to the plank by long bolts. I found it unnecessary to use nuts on the tailstock bolts because all the force was lateral. The nuts on the bridge bolts restrain the gun from moving in all directions. When the mainspring comes out of the gun, it can push in all directions.

The pusher cover
Make a wooden cap to pad the steel pusher ram of the vise. The wooden cover pushes against the end cap of the gun or against another pusher adapter that reaches inside a gun. For a BSA rifle, use a dowel to reach inside the mainspring tube. Cut a wide slot in the center to reach past a retaining pin. As you work on different airguns, you'll create special tools to accommodate them.

The bridge
The bridge is three pieces of wood attached in a U-shaped pattern. It covers the gun laying on the plank and is held to the plank by long bolts. Make it wide enough for any gun to fit through it. Use pieces of wood inside the bridge to shim the gun tight once the bridge has been tightened to the plank. If the plank is 8" wide, make the bridge almost as wide. Align the vertical attachment holes with the holes in the plank (see part 2).

The tailstock
Make the tailstock as wide as the plank. Stack three pieces of plank board to make the tailstock and position them with the edge of the grain toward the vise. The muzzle of the gun pushes against the tailstock, and the end grain cushions best.

The headstock/tailstock relationship
The headstock and tailstock accommodate a spring rifle action between them. When you disassemble the rifle, the headstock ram is pulled back (away from the tailstock) several inches to relax tension on the mainspring. Then FWB 124 and HW 77 need the most travel (about 4"), so factor that into your building plans. When you assemble those rifles, the ram must be allowed to travel the same distance in the other direction. It's bad when you almost get a rifle disassembled, only to discover that your compressor won't let you put it together because it doesn't have sufficient travel.

Part 4: Let's disassemble a gun !

Enough build-up. Today, the disassembly begins! I've selected a Beeman R1 to tune for you. That means I'm now going to get specific about parts and how they come off, but I will make

provisions for other airguns, as well. What I can't do is provide complete disassembly instructions for every spring gun made because there isn't enough time and I haven't taken all of them apart. I'll provide general instructions for different categories of guns, and you'll have to be clever enough to follow along and to figure things out on your own.

Before you start

Is this a project you SHOULD do, or are you a person who goes halfway and quits? If the latter is the case, DON'T START! I will not assemble any basket cases for anyone, nor is Pyramyd Air responsible in any way for your actions. I am doing this series so those who want to learn about their spring gun powerplant - can. I make no guarantees to anyone about anything.

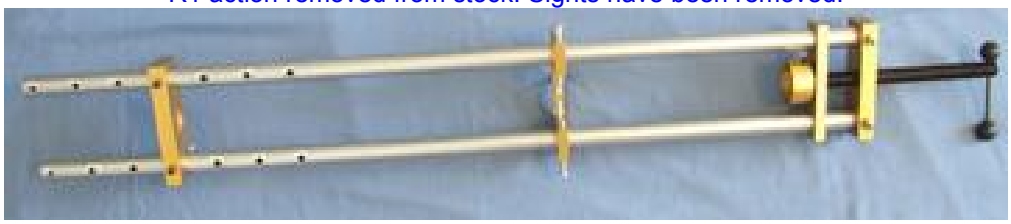
First

Make certain the gun is neither loaded nor cocked. You'll be sorry if you get the gun partly disassembled, only to discover that it's cocked. It can kill you if you don't handle it carefully, so take NO CHANCES.

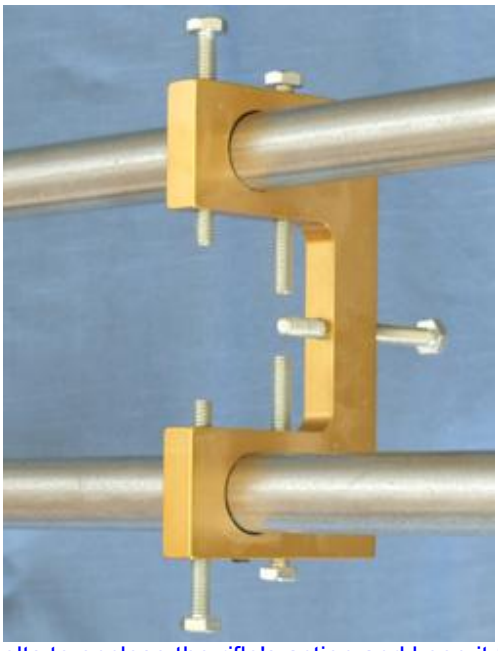
Remove the action from the stock

The R1 has two forearm screws and two screws through the triggerguard. All four are removed, and the triggerguard comes off before the action is removed from the stock.

R1 action removed from stock. Sights have been removed.



B-Square's mainspring compressor is lightweight and very adjustable. Can you identify the headstock, bridge and tailstock?



The bridge uses five bolts to enclose the rifle's action and keep it from moving when the mainspring is decompressed.
The bolts on top will pass over the action. I use a heavy leather belt around the gun to keep from scratching the metal.

Install the action in the mainspring compressorI'm using a B-Square mainspring compressor, and the big thing with that one is to restrain the middle of the action. Since the bridge is different than the one found on homemade compressors, you have to spend a little time snugging the middle of the gun. Also, make sure you allow enough travel in the headstock so the mainspring can be decompressed all the way. If you don't, you'll have to assemble the gun again and adjust the compressor.

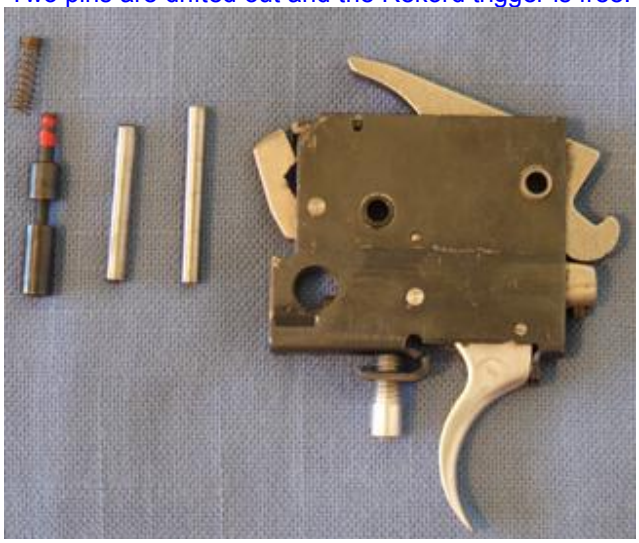
What if you have no idea how far the mainspring will travel to decompress? Well, that happens when taking apart a gun that's new to you. Don't trust what anyone tells you, because your gun may have an aftermarket spring that's a lot longer than they say. What I do is allow a maximum of five inches of headstock travel when I'm not familiar with a certain gun. The worst I have seen was about 4 inches of travel on factory FWB 124s (all of them) and also once on a tuned HW77.

Tomorrow, I'll put the rifle in the compressor and remove some parts !

Part 5: Powerplant Disassembly

First, the trigger comes out by drifting two crosspins from the left. The safety is spring-loaded and will be released when the trigger unit drops free.

Two pins are drifted out and the Rekord trigger is free.



Here's the trigger with the crosspins, the safety and its spring.

Unscrew the end cap

The end cap is the reason Weihrauch spring rifles are much easier to disassemble. It holds the mainspring in the gun under compression. It simply unscrews from the spring tube. The first time you take it off it may be hard to start, so insert a wrench handle in the slot where the Rekord trigger was and bump it from the side. Mine's been off before so it simply unscrews.

The end cap simply unscrews !
The action is not yet in the compressor because the end cap is still restraining the spring, however, at this point, it goes in!

This is where other spring guns cause problems. In a later posting, I'll discuss several of the other common ways of holding the mainspring in the rifle.

The end cap is out and the mainspring is coming out of the tube.
This is where you really need to keep the gun under control, and the compressor does that for you.

With the end cap out, I simply back off tension until the mainspring relaxes and I can safely remove the action from the compressor. Now, the mainspring and spring guide will come out of the rifle, but not the piston! It's held in by the cocking link that's connected to the barrel (this is a breakbarrel, remember?).

The end cap is off, and the mainspring is out, but the piston is still connected to the barrel by the barrel link, shown here.

Separate the barrel from the spring tube to release the piston.
This involves removing the pivot bolt that serves as the barrel's axle when it breaks open. On Weihrauch rifles, there is a nut on the right side that's removed first.

The pivot nut looks like a large screw head. It has been removed from the bolt in this photo.

I'll finish disassembly in the next post.

Part 6: Disassembly Completed

Now, the pivot bolt can be unscrewed from the left side of the compression/mainspring tube.

The pivot bolt has been removed from the left side of the compression/mainspring tube. The large washer sitting on the base block next to the bolt hole is one of two thrust washers that fit between the base block and the sides of the compression/mainspring tube. They allow the base block to pivot freely without galling the compression/mainspring tube.

Pay attention here !

Notice the large thrust washer laying on the base block. It is very thin, but it allows the base block to pivot without scraping against the compression/mainspring tube. You can see where it wore some of the finish from the base block around the pivot bolt hole. Lubricating these washers (there is another one on the other side of the base block) with a heavy-duty lube is very important to a smooth cocking cycle. Also, lubricate the pivot bolt, itself, for the same reason. I use a moly-impregnated grease, because molybdenum disulfide particles bond with the steel and continue to lubricate the region for a long time. Moly is one of the slickest substances known.

Notice that the cocking link is riveted to the base block. It never needs to come off unless there's a problem. As of this moment, the cocking link is still attached to the piston by a sliding link. It is quite easy to now separate the barrel cocking link from the sliding link by just moving the barrel away from the compression/mainspring tube.

The cocking link has been separated from the sliding link in the piston. The sliding link is seen at 7 o'clock to the center of this photo.

How to get the piston out

You can see an enlargement in the cocking slot under the cocking link in the picture. The sliding link can be slid up to this enlargement and drop free of the gun, making the piston free to come out. The piston will require some coaxing, because it is really tight in the compression/mainspring tube. Use a screwdriver blade through the cocking slot to gently shove the piston to the rear of the tube.

BE CAREFUL - SHARP EDGES!

The edges around the cocking slot are razor-sharp, and I am not exaggerating. Working around the slot to remove the piston, you can easily slice your fingers. Please be careful. Also, the piston has a cocking slot in it that's nearly as sharp. Handle these parts as though they were knives.

The powerplant consists of the piston, mainspring and spring guide.
The end cap is aligned with the spring guide exactly as it was inside the gun (look at the picture of the end cap when it came loose from the mainspring tube).

This disassembly took about 30 minutes. The first time you do it with a brand new R1 should take 2 hours. Other spring guns are not as easy to disassemble and will take longer. I'll stop here today. I will return in a few days to discuss the other ways guns come apart. I want to do a few other reports before then so we don't bore anybody.

Part 7: Disassembly of Other Spring Guns

Thanks for being patient. Today, I'll show the other common types of spring gun disassemblies. Few other airguns have the screw-in end cap like Weihrauch (except for many Beeman R-series guns, of course); but, in the 1950s, Anschütz made a military model called the Hakim and a civilian version of the same gun and both had a screw-in end cap.

Stock disassembly

When disassembling the action from the stock, you'll find both triggerguard screws don't attach to the action on some rifles. Usually, the rear screw is just a wood screw. When you find this, just leave it in place. Some modern guns, such as the Gamo CF-X, have only a single stock screw in the triggerguard area. Because the stock is a one-piece molded affair, the triggerguard doesn't have to be held on, and this is obviously just the rear action screw.

Study the action

Something has to hold the powerful mainspring in place. If you study the action long enough, it becomes clear what that is. There are two very common methods of holding a spring gun powerplant assembly inside the mainspring tube - the vertical bolt and the crosspin.

Vertical bolt

This type is found on the FWB 124, the TX 200 and others. A large bolt comes up from the bottom of the mainspring tube and holds either the trigger housing or a sheetmetal sleeve that restrains the mainspring. Some guns, such as the 124, come apart in pieces, and you have to catch several small parts and springs as the assembly backs out of the mainspring tube. Others, such as the TX200, are modular. The TX trigger unit is held in place by the same two pins I showed you in the R1. The end cap is held in by the bolt.

A large vertical bolt holds the FWB 124 together

Before you start to remove the vertical bolt, try to relieve the tension the mainspring is putting on it. There's usually something in the end of the mainspring tube that can be pushed by your mainspring compressor to do this. This is where you'll need to make various pusher blocks to augment your compressor. If you look at the R1 disassembly, you'll see I put folded cardboard inside the headstock cup to push on the end cap.

Crosspins

The other mainspring restraining method is with crosspins, and two is the normal number. Diana has long been using two crosspins on their rifles. The older models had trigger assemblies that were not constrained by anything more than the mainspring tube. When disassembling these guns, watch for trigger parts that try to fly everywhere. Reassembly of these guns is an art that must be learned and practiced often. Newer guns have unitized trigger assemblies that contain all the little parts. These guns are much easier to work on, except for the automatic safety bar that has to be fiddled in between the two crosspins.

This vintage Diana 27 has two pins at the very rear of the spring tube.
Modern pins are farther forward than this.

Often, one crosspin will have all the tension on it, and the other is just a backup. Dianas are like that. In older Webley guns, one crosspin is held by a grub screw that is hard to locate. If pins don't drift out easily, look for things like this.

Tomorrow, I'll write about underlevers, sidelevers and anti-beartrap mechanisms.

Part 8: Disassembly of Other Spring Guns (Cont'd)

Today, I'll discuss sidelevers, underlevers and anti-beartrap mechanisms. All these things are additions to what is basically the same mechanism we looked at in the breakbarrel Beeman R1. In fact, there are some Walther target rifles that are breakbarrels with the same type of anti-beartrap mechanisms as the underlever HW77. So, what you already know about spring powerplant disassembly still applies.

Sidelevers

Both sidelevers and underlevers usually employ a sliding compression chamber that moves the piston into the cocked position. The exception is any gun with a different type of breech, like BSA's rotary breech (the Gamo CF-X has one), all taploaders and guns that use a flip-up transfer port to gain access to the breech, like the Diana 46 and the Webley Eclipse.

When a gun has a sliding compression chamber, disconnect the cocking mechanism from the sliding chamber and remove it from the gun. In some cases, certain underlevers are held on by rivets, so just take off the connecting link.

The Diana 48 and 52 sidelevers are fairly easy to work on. Pop the sidelever away from the receiver and remove the pins that hold it to the cocking link and receiver. Notice that the cocking link is slightly bent. The bend goes against the receiver to keep tension on the sidelever when it is stored. Leave the cocking link attached to the sliding chamber until the mainspring is out. Finally, remove the ratchet safety mechanism located under the receiver.

You can now install the receiver in your compressor, put some tension on the end cap and remove the two crosspins we discussed yesterday. Back off the tension on the compressor and the trigger block will be pushed out of the gun, followed by the mainspring. The piston can be removed now, too.

The sliding chamber can now be slid to access the Allen screw that holds the cocking link. Then, the chamber will come out of the tube as well. Other sidelevers are just variations of this theme.

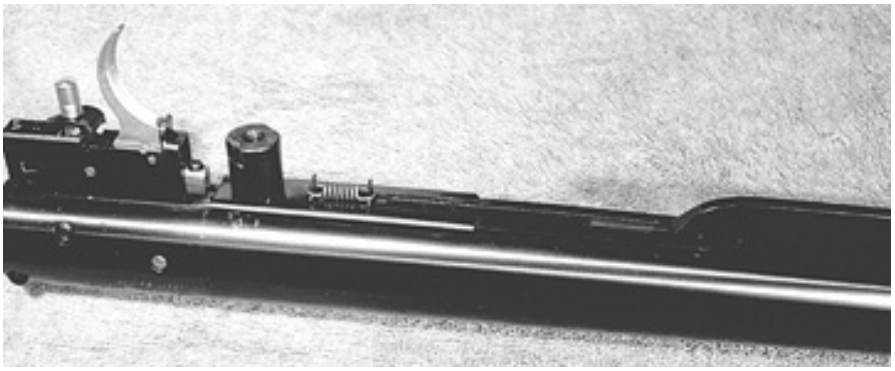
Underlevers

Think of an underlever as a sidelever turned 90 degrees, because that's all it is. Look at the TX200.

The TX200 cocking link looks similar to the R1 link. This link is connected to the sliding compression chamber that houses the piston.
It must slide back to cock the gun, then forward to act as a compression chamber when the piston springs forward.
Notice the large vertical bolt (extreme right) that holds the TX powerplant together.

The cocking link connects to the sliding chamber.

Anti-beartrap devices
Most anti-beartrap devices are simple, like the ratchet on the RWS 48/52, but Weihrauch uses a sliding steel bar that connects the cocking lever to the trigger.



The big bolt in front of the HW97 trigger doesn't hold the mainspring.
It's a bushing for the stock screw and holds down the anti-beartrap mechanism (small spring).

The HW97 anti-beartrap mechanism is disassembled.

That's the end of powerplant disassembly. Next, I'll show you how to tune a gun. The mainspring compressor will be shown in greater detail in that segment.

Part 9: Cleaning and Deburring

We're ready to tune the Beeman R1. This will be a low-power tune using an aftermarket coiled steel mainspring and the factory piston and seal. The R1 factory piston is pretty good, and the piston seal is very good. I am looking for a smooth-shooting gun that cocks easily.

First, we deburr
There are several parts of the powerplant that have extremely sharp edges. Sometimes, these edges get mashed or rolled into the path of moving parts, so it's a good tip to remove the burrs before the tuneup. Be very careful when handling all parts, because they can cut as quick as an exposed razor.

Use a file to remove any burrs found on powerplant parts. The cocking slot shown here is a likely place for them.

I use Swedish files for this job. They make short work of the burrs. If you have never filed or applied stones to steel surfaces before, you'll want to go very slow. This isn't like sanding wood. Sometimes, all it takes is a single light stroke to accomplish your goal.

Parts that usually have burrs

1. The cocking slot in the spring tube.

2. The spring guide, where the piston passes through.

3. The cocking slot in the piston.

4. Any articulated linkage in the cocking link.

5. Any link between the cocking link and the piston.
Those are the usual places that have burrs on a new gun. You can find the others by running your finger LIGHTLY around all the parts that move. Be careful, because you can easily get a metal splinter this way!

Now we clean
We clean every surface of the powerplant and parts, both inside and out. Inside is the most important. The two hardest places to reach are also two of the most important places that have to be very clean - inside the piston and inside the mainspring tube. To reach into these two deep places, I have a screwdriver with an 18" blade that I wrap with paper toweling. It takes only a small piece of towel at one time. I use rubber bands to hold it on the blade, and I use denatured alcohol to clean the gun parts. It dissolves all greases and dries completely. Mineral spirits leave

an oily surface that has to be dried before you can continue. WD-40 leaves a film that turns to yellow varnish. Alcohol is the best solvent I have ever found to clean a sprung gun.

Wrap a piece of paper towel around something long, such as a screwdriver blade or even a dowel, and secure it with a rubber band.
Dipped in denatured alcohol, it dissolves grease quickly.

The smaller parts are cleaned with cotton swabs dipped in denatured alcohol. I always have a couple dozen clean ones when doing this job. You also need rags for general wipes, and I like to work on a terrycloth towel. It not only protects the surface of the table, it also prevents tiny parts from rolling far.

The next step is lubrication.

Part 10: Lubrication and Re-Assembly

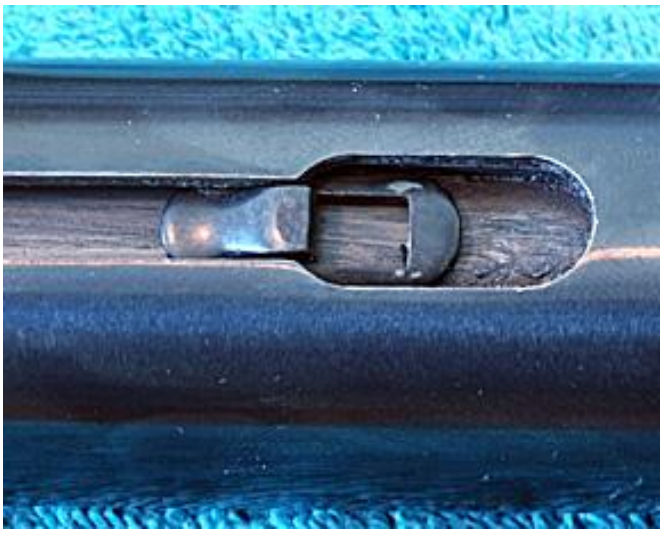
Lube the parts just before you reassemble them so they won't attract dirt. Use another paper towel-wrapped screwdriver blade or dowel to spread a thin coat of moly grease on the walls of the clean spring cylinder/compression chamber. You'll be able to see the metal through this coat because it is so thin.

The piston and seal

Spread a thin even coat of moly grease around the piston seal and about a seal's width back on the body of the piston. Also, coat the rear piston skirt where it flares out wider. Coating the entire HW piston is pointless, because it doesn't contact the cylinder except where it is larger in the rear. I lube the front of the piston, behind the seal, in case the seal ever melts and there is metal-to-metal contact. Also lube the piston's cocking slot and the spring guide rod inside the piston. (Note: some guns don't have guide rods inside the piston) Next, insert the piston into the spring tube, keeping the cocking slot in the piston aligned with the one in the spring tube. Be careful not to cut the seal as it goes into the tube, and don't worry about the lube that's scraped off as it goes in. That's why you lubed the inside of the cylinder, as well.

The piston seal is coated uniformly with a thin layer of moly grease.
Note that I also coated the front part of the piston body, as well as the cocking slot.

When the piston is far enough forward, you can insert the sliding link through the cocking slot in the spring tube. Once installed, the sliding link keeps the piston aligned properly. Lube the sides and bottom of the sliding link with moly grease.



When the sliding cocking link is installed, it keeps the piston from rotating.
It's also lubed with moly.

The mainspring

The mainspring must fit inside the piston with a little room to move, but not much. The closer the fit, the less vibration the gun will have.

If there is too much room, a thin piece of strong metal plate such as stainless steel can be bent to line the inside of the piston, taking up space. This plate needs to be as long as the inside of the piston, and it should line the entire inside without overlapping. The mainspring has to fit inside this liner, so measure carefully before cutting. I don't care for this method, so I search for the tightest-fitting mainspring I can find.

Now lube the mainspring with what Jim Maccari calls velocity tar. It's an extremely viscous grease that clings to the coils of the spring and dampens vibration. And, to answer a reader's question from several weeks ago, it doesn't slow the velocity much at all. The difference in smoothness is worth the 10 f.p.s. you may lose. No other lube works as well as velocity tar. Look at the picture for how much to use.

Beeman used to sell Mainspring Dampening Compound, which was a thick silicone grease, but it did cut velocity significantly. Regular petroleum and lithium greases are simply not up to the task for this application, though they do work well in lower-powered spring rifles such as Diana 27s and IZH 61s.

Slide the mainspring as far into the cylinder as it will go. The spring that sticks out is what the mainspring compressor has to compress before the threads on the end cap start to engage.

This is what a low-powered spring looks like when it's pushed in as far as it will go. More powerful springs are longer and stick out farther. Note how much velocity tar was used on the spring. The spring guide is installed and also has tar on it.

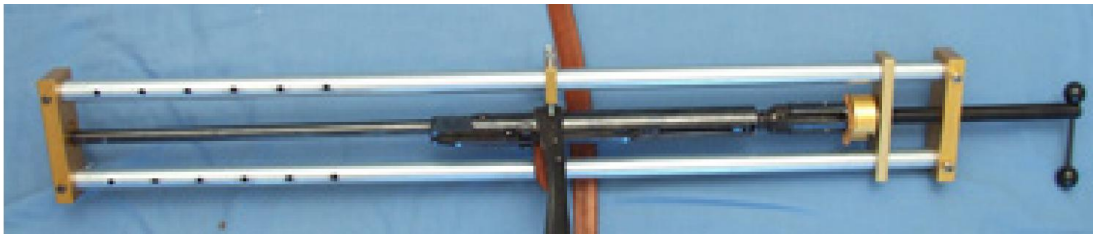
Part 11: Lubrication and Re-Assembly (Cont'd)

Time to install the barrel. Lube the thin thrust washers with moly as well as the sides of the base block where they ride. That helps to hold them in place as you install the barrel. Connect the cocking link on the barrel to the sliding link in the piston, then carefully work the base block back between the arms of the mainspring tube. To get the base block aligned with the hole through the spring tube arms, the cocking link has to push the piston backwards, which is why we haven't installed the end cap yet. You'll have to realign the thrust washers on both sides after the base block hole is aligned for the pivot bolt.

The long cocking link is connected to the sliding link in the piston and the piston was pushed backwards to allow the base block
to align with the holes in the spring tube arms. The pivot bolt passes through the left side of the gun. Don't forget the two thrust washers!

Coat the pivot bolt with moly and slide it through the left mainspring tube arm and the base block. DON'T FORGET to put a lockwasher on each side of the bolt. The bolt is what holds the joint tight, so tighten it until the barrel can't fall open from its own weight. Then, snug the nut on the other side.

Now, install the rifle in the mainspring compressor, allowing room for the end cap. Slowly compress the spring. As the end cap threads approach the mainspring tube, it's important that they line up correctly. You can move the end cap in the headstock by small amounts to make the alignment. And, if you use the B-Square mainspring compressor shown here, you can also adjust the position of the barreled action. When the end cap enters the mainspring tube, start turning the cap to engage the threads. You have to gradually increase tension on the compressor as the two parts thread together. When the threads engage and the cap begins threading into the tube, continue to keep tension on the cap with the compressor. Don't stop until a significant portion of the threads are engaged.



This is the entire barreled action in the mainspring compressor.

The end cap is under slight compression in this picture.
As it comes closer to the mainspring tube, you have to make positioning adjustments to align the screw threads.

The bridge of the B-Square compressor has five bolts to finely adjust the position of the mainspring tube.
Notice the leather belt I am using to protect the rifle's finish. No precision here!

I have shown the complete barreled action in the compressor and two closeups of the headstock and bridge. This is for those readers who asked for a closer look.

There will be more postings to finish putting the gun together, but tomorrow I want to give you a final report on the Remington Genesis rifle. I think I have some good news for Genesis owners.

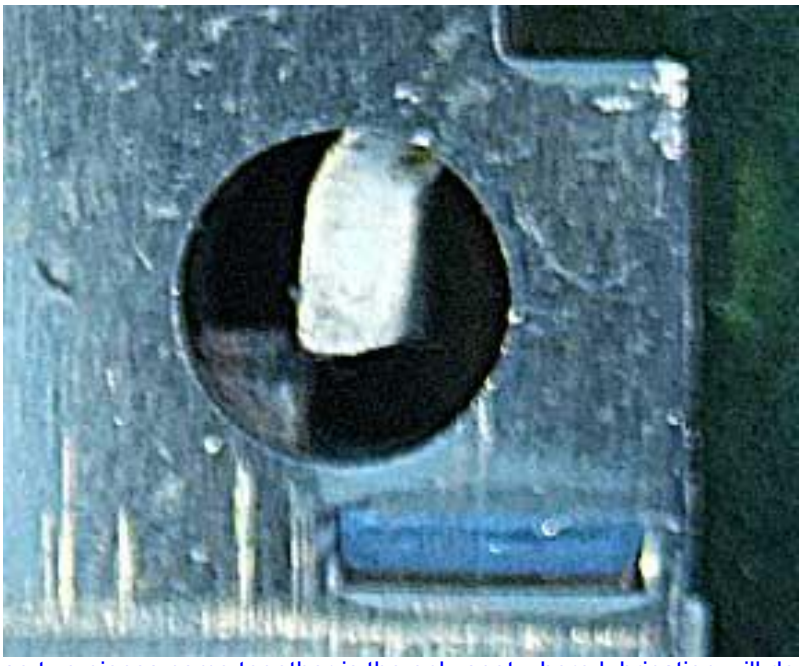
Part 12: Finish Re-Assembly and Test

Clean and lube the trigger
Okay, just a few more steps to complete this project. The Rekord trigger will be installed next, but let's first take a look at how it's lubricated. I have seen extremes of both over- and under-lubricating from the factory. Look at all the parts through the access holes and remove all the grease you can see. There's only one point in a Rekord that can be lubricated for better performance, and it applies to all Rekords, whether they are the match type or the standard sporting trigger that you see here.

Rekord trigger uncocked.

Rekord trigger cocked. The rear of the piston release has been pressed down until the sear caught.

To see the single lube point, cock the trigger by pressing down on the back of the piston release. The area where the sear and piston release catch make contact can be lubed with a small amount of moly grease. Small means the size of the head of a pin. Pay attention to the nut at the bottom rear of the trigger housing. It receives the rear triggerguard screw; on some guns, it's not held tight inside the housing and can fall out.



Where these two pieces come together is the only spot where lubrication will do any good.

Install the trigger

Once the trigger is cleaned and lubed it's ready to install. First, install the safety button and spring. Hold in the safety as you install the trigger. It takes a little fiddling - no force - to slide the trigger housing into the large slot in the end cap until the pin holes align. I put the front pin (the longer one) in first, and I inserted the pins on the right side of the end cap. On most guns, I can push at least one of the pins nearly all the way through with my fingers. You can release the safety when both pins are through.

The pins slide in, and the trigger is fired.

The trigger is still cocked, but the rifle isn't, so fire the trigger now. Drop the action into the stock and attach the triggerguard and the two stock screws. And, you're done! Cock and shoot the gun a couple times to make sure everything went back together as it should.

I am very pleased with the results of my tuneup. The rifle now fires without a hint of vibration, plus it's easy to cock. I'll have to do a range test and share the results with you.

Part 13: Range Testing the R.1 we just Tuned

Well, it's time to range-test the results of our Beeman R1 tuneup. You may recall that I said I wanted to lower the power to have a light-cocking, smooth-shooting rifle. What I didn't tell you was that my R1 had a gas spring in it before the tuneup. It was working fine, but I was tired of having to cock 50 lbs. every time I wanted to shoot. I had a special low-powered mainspring that I used with the factory piston and spring guide. After the tuneup, I knew the gun was easy to cock and shooting smoothly, but I had to take it to the range to learn the rest.

My R1 has a plain walnut stock, a Vortec muzzlebrake and a Bushnell Trophy 6-18x in Leapers Accushot medium rings.
The low-power tune makes it very enjoyable.

Super-quiet!

I hadn't counted on this benefit, but the R1 is now extremely quiet. I doubt my neighbors would know I was shooting if they didn't see the gun or hear the strike of the pellet. After testing magnum guns for the past 6 months, it was a real pleasure to shoot a rifle this smooth and quiet; sort of the reason I got into airgunning in the first place.

Low power - but not THAT low

The tuned R1 spits out a 15.8-grain JSB Exact at 645 f.p.s., on average. That works out to 14.67 foot-pounds at the muzzle. A factory R1 in .22 caliber will generate about 17-19 foot-pounds, so this tune is definitely lower, but not so much that I can't do the same things with the rifle. And, that was also tested at the range.

Accurate

Shooting an R1 requires a lot of technique. You simply cannot grab the stock and hope to hit anything. But, let it float and watch out! My results with JSBs at 40 yards were not as good as I had hoped. Usually, the JSB Exact groups tighter than any other pellet, but not in my R1. The best I could do was still slightly over an inch.

Beeman Kodiaks, however, brightened the day. They sailed through group after group and nothing measured larger than one inch. The best for the day was 0.847". It looks like only four holes, but two pellets went through one of them.

Having also had some luck with heavy Logun Penetrators in the past, I tried them, as well. The best group of five measured over 1.3". That left Kodiaks as the pellet of choice.

One of these holes passed two pellets. This was the best group of Beeman Kodiaks.

Barrel joint loosened

The barrel joint loosened during the shooting, so it would not stay in any position other than closed once the gun was cocked. I expected this to happen because of the lubrication. It didn't affect accuracy, but I still tightened it once I returned home. Remember, the test for the pivot bolt being tight enough is that the barrel of a cocked gun will stay where it's put.

This rifle is now a genuine pleasure to shoot. I am inclined to just sight it in at 20 yards and leave it that way. It might even become a "go-to" rifle, because it is just as quiet as my TX200 or Talon SS and lots of fun to shoot.