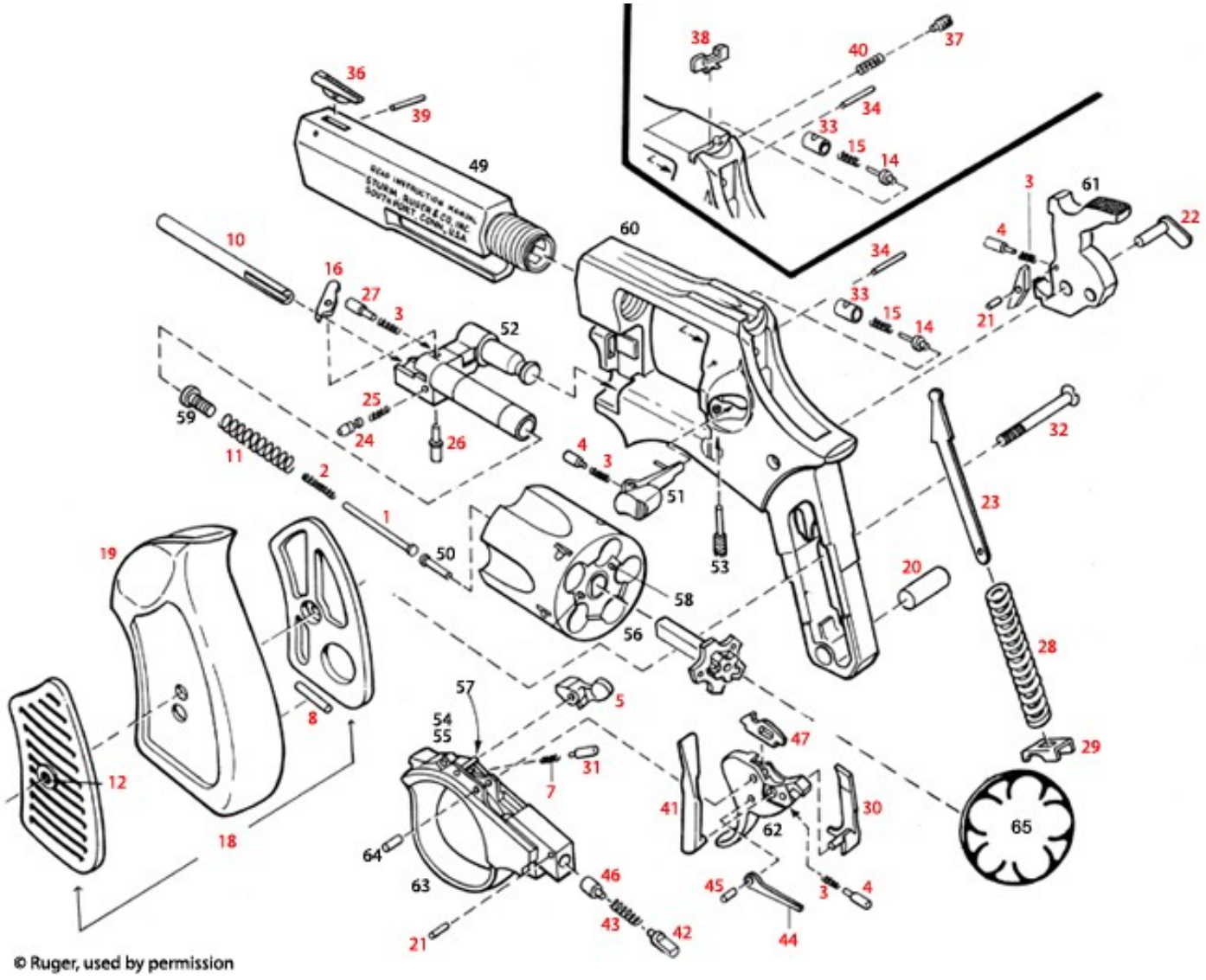
Iowegan’s Book of Knowledge for the Ruger GP-100 revolver
Written by Iowegan



Introduction: The Ruger GP-100 is a six shot double action revolver chambered in 38 Special or 357 Magnum. Its robust design evolved from the older Security-Six series. The GP-100 has a larger frame, thicker cylinder, improved grip mounting system, trigger return spring, front sight, internal cylinder retainer, and trigger guard latch. Other than these minor changes, both the Security-Six and GP-100 internal designs are nearly identical, as are the Ruger SP-101 and Ruger Super Redhawk.

Design: Ruger engineers did an excellent job designing the GP-100. Most of the parts are contained by push-out pins or spring-loaded plungers and a mere 3 screws. The design is a modular concept with three main assemblies. The barrel and frame are the host assembly. The trigger guard assembly and cylinder assembly make up the rest of the gun. The GP-100 has been manufactured in several configurations but the internal parts are all interchangeable. Primarily, the different variations have to do with barrel

length, barrel shroud, sights, and grips. GP-100s have been produced in both blued and stainless steel models. The only other parts that are unique to a certain model are the cylinders when chambered for a 38 Special or 357 Magnum or hammers in DAO models (bobbed).

Grips: GP-100s with fixed sights are equipped with compact rubber grips with inserts. The adjustable sight models come with full sized rubber grips with inserts. Grips are interchangeable between all models and are also the same as Ruger Super Redhawk grips. The grip inserts for the compact grips are the same size as SP-101 inserts.

Sights: GP-100s equipped with adjustable sights also have a “plug-in” front sight. This unique system allows the front sight to be changed in seconds by pushing in the front sight plunger and lifting the sight out of the channel. The standard front sight is black. Super Redhawk front sights are interchangeable with the GP-100 and have a red insert. There are several Ruger and aftermarket plug-in front sights available in different colors or styles. The adjustable rear sights are the same as most other Ruger revolvers and are click-adjustable for both windage and elevation. Some rear sights have a white outline blade while others are black or V-notch. Fixed sight models are available in 3 and 4 inch barrels. Adjustable sight models are available in 4 and 6 inch barrels.

Base metal and finish: GP-100s are made in two basic configurations. The blued models are investment cast from high strength steel and are finished with a hot blue process. Bluing only affects the surface of the metal so it will wear off, especially from using holsters. The surface is resistant to corrosion but it will rust easily if moisture is allowed to contact the gun. This could be from the climate or from fingerprints. Normally, a light coat of rust preventative oil will protect the surface from rusting. The worst thing you can do with any blued gun is to store them in a leather holster. Stainless steel investment cast GP-100s are much more resistant to corrosion. In extreme cases, even a stainless gun will rust. All Ruger stainless guns also have stainless steel internal parts. The exceptions are the springs where stainless is inferior. Besides the springs, the only non-stainless parts are the grips and sights. GP-100s have been made in the standard “brushed” finish and a small quantity in the high polish finish.

Initial inspection: Though many “specs” are nothing more than “braggin’ rights”, some things do have an effect on how well the GP-100 will perform. Many times, specs are borrowed from another firearm brand and are meaningless due to different designs. The GP-100 was designed to operate with fairly loose tolerances so don’t get alarmed if your gun doesn’t measure as tight as another brand. Refer to the schematic when part numbers are referenced.

Fit and Finish: Examine the overall fit and finish. Likely you will find scratches, machine marks and other cosmetic issues that have no affect on function. Rugers are intended to be a strong durable gun but seldom do you find one with a perfect finish or where the cosmetic fit is up to the standards of more expensive manufacturers.

B/C gap and endshake: We will start by measuring the barrel-to-cylinder (B/C) gap and cylinder endshake. You will need an automotive type gap gauge set (looks like a pocket knife with multiple blades of different thickness, AKA feeler gauge). With the gun in a static condition, hold the cylinder to the rear and slide the thickest gap gauge blade that will fit between the rear barrel surface and the front face of the cylinder. This will be the “true” B/C gap and should be between .004” and .008” with .006” being optimum. If the

gap is too tight, the cylinder will drag on the barrel when it gets fouled from shooting. If the gap is too wide, you will loose a little velocity but accuracy will not be affected. Repeat the same test only this time hold the cylinder forward and insert the thickest blade that fits with minimal friction. Subtract the last measurement from the first one. This will be “cylinder endshake”. Endshake should be .002 to .005”. If endshake is too tight, the gun may bind up when you shoot it. If endshake is too loose, it could affect other functions of the gun such as cylinder timing, light primer hits, and cylinder lock-up.

Headspace: This test requires a “virgin” empty case. Insert the case in a chamber and locate it directly in line with the firing pin hole. While holding the cylinder firmly to the rear, slide the thickest blade of a gap gauge that will fit with friction between the case head and recoil shield (frame). This should measure .008-.012” with .010” as optimum. If headspace is too tight, the case heads may drag on the recoil shield and hamper cylinder movement. If headspace is excessive, you can get misfires and/or expanded case heads.

Cylinder-to-bore alignment: This requires using a Range Rod and a calibrated cartridge case. Insert the Range Rod into the bore and push it in slowly until the tip of the Range Rod moves through the cylinder and contacts the frame. You may have to help it a little by wiggling the cylinder. Pull the Range Rod out until the tip is past the face of the cylinder and observe the collar in reference to the muzzle. This will give an indication on how deep the Range Rod has been inserted when testing. Turn the Range Rod handle so the reference post is in the 12 o’clock position. Listen and feel for the feeler tip of the Range Rod to contact the cylinder face as you move the Range Rod in and out. Repeat the test with the reference post in the 3, 6, and 9 o’clock position. Ideally, the Range Rod will enter the chamber throat without “ticking” on the cylinder face in all positions. If all chambers pass this test, the gun is within specifications.

Timing sequence: Timing is the series of events that happen from the moment you begin to squeeze the trigger in DA or begin to cock the hammer in SA and ends when the trigger finally resets for the next shot.
Single Action Cycle:
As the hammer is being cocked:
1. Trigger begins to move to the rear.
2. Cylinder latch is pulled down, releasing the cylinder.
3. The pawl engages the extractor ratchet and begins to rotate the cylinder CCW.
4. Cylinder latch is released and snaps up to ride on the cylinder.
5. Cylinder latch engages the cylinder notch.
6. Transfer bar is lifted into position.
7. Pawl cams off of the extractor ratchet.
8. Hammer reaches the cocking point and is held to the rear by the SA sear.
As the trigger is pulled:
9. Trigger moves to the rear raising the transfer bar slightly.
10. SA sear releases the hammer.
11. Hammer moves forward under tension of the hammer spring.
12. Hammer strikes the transfer bar.
13. Transfer bar strikes the firing pin.
14. Firing pin strikes the primer causing the gun to fire.
15. Firing pin retracts under spring tension.
As the trigger is released:
16. Trigger begins to move forward.

17. Transfer bar is pulled down.
18. Trigger plunger resets on cylinder latch.
19. Pawl is pulled down to reset position.
20. Trigger is fully forward and at rest.
Double Action Cycle:
As the trigger is pulled
1. Trigger cams the hammer back.
2. Cylinder latch is pulled down, releasing the cylinder.
3. Pawl moves up and begins to rotate the cylinder CCW.
4. Cylinder latch is released and pops up to ride on the cylinder.
5. Trigger and hammer continue to move to the rear raising the transfer bar.
6. Cylinder stop engages the cylinder notch and locks.
7. Hammer dog releases the hammer allowing it to transfer to the DA sear.
8. DA sear releases hammer allowing it to spring forward.
9. Hammer strikes the transfer bar.
10. Transfer bar strikes the firing pin.
11. Firing pin strikes the primer causing the gun to fire.
12. Firing pin retracts under spring tension.
As the trigger is released:
13. Trigger begins to move forward.
14. Transfer bar is pulled down.
15. Trigger plunger resets on cylinder latch.
16. Pawl is pulled down to reset position.
17. Trigger is fully forward and at rest.

Initial timing: Swing the cylinder open and look for the cylinder latch that is located on the bottom flat area of the frame, just above the trigger. Now close the cylinder and rotate it slightly until the cylinder locks up. Watch the cylinder latch from the right side as you begin cocking the hammer. The cylinder latch should drop and free the cylinder before the cylinder actually begins to rotate. Do the same test in DA by pulling the trigger and watching the cylinder latch. Again, the latch should drop before the cylinder begins to rotate. If initial timing is slow, the cylinder will try to rotate before it is released. This will cause a bind in DA trigger pull or a hard start cocking for SA. A worn or out of spec trigger plunger (part #48) or cylinder latch (part #6) will cause late initial timing.

Carry-up timing: Carry-up is a condition where the cylinder is supposed to lock up near the end of a hammer stroke. To test, watch the cylinder latch and slowly cock the hammer. The latch should drop then pop back up and drag on the cylinder. The cylinder latch should engage a cylinder lock notch and lock the cylinder in place before the hammer is fully cocked in all six positions. Again in the DA mode, slowly pull the trigger and make sure the cylinder locks up in each of the six positions before the hammer releases. An excessively premature carry-up can cause a trigger pull gag near the end of the trigger stroke. Late carry-up could allow the gun to fire before the cylinder is locked. Normally, GP-100s tend to carry-up a bit early. A pawl that is too long causes premature carry-up. Late lockup is caused by a worn or out of spec pawl or extractor ratchets.

Trigger pull: Use a trigger pull test scale to measure SA and DA trigger pull weight. This will be a good reference point for a “before and after” scenario You can also use a string and can then start filling the can with shot or sand until the hammer trips. Even a “fish scale” will work for measuring trigger pull. Normal out-of-the-box SA trigger pull is 6 lbs. DA trigger pull is normally 14 lbs.

Firing pin protrusion: The firing pin in a GP-100 is an “inertia” device. This means it is spring loaded so the firing pin will retract after being struck. When the hammer strikes the transfer bar and in turn the transfer bar strikes the firing pin, the firing pin will be driven considerably farther than one would think. If you examine the firing pin protrusion with the trigger pulled and the hammer pushing the transfer bar forward, you will get a false indication of protrusion. Note: a longer firing pin than the standard factory firing pin will not apply any more energy to the primer. If you get light primer hits, it’s very rarely the firing pin but rather the hammer energy. The protrusion test is best conducted after the hammer has been removed and is detailed later in the text.

Push off: The sear is designed to hold the hammer cocked in the SA mode. If the sear is altered or defective, the sear could release by pushing on the hammer. To test, cock the hammer and apply considerable forward pressure to the top of the hammer. Do not overdo it or you will break the sear. If the hammer pushes off, you will need to repair the sear or replace the hammer (part #64) or trigger (part #68). Note: both the hammer and trigger are factory fitted parts and are not sold by Ruger or Brownell’s as spare parts.

Cylinder lock-up: To test, dry fire the gun and hold the trigger all the way back to simulate the condition of the gun when fired. Rock the cylinder from side to side. A few thousandths play is normal. If side play is excessive, a new cylinder latch (part # 6) may be needed.

Parts function, disassembly, tuning, and reassembly

As each of the subassemblies and individual parts are discussed, a “*” will indicate a potential problem that may need attention. A schematic has been included for part number reference on page 16. Clean each part with solvent before inspecting or dressing. Remove all grease, oil, powder residue, and bullet residue as you go.

Grips: To remove the grips, unscrew the grip screw (part #19) most of the way out then push on the head of the screw to dislodge the left grip panel (part #17). Once the left panel is pushed out, a small disassembly pin (part # 9) will drop out. Remove the grip screw. Push in on the grip panel locator (part #18) from the left side until the right grip panel pops out. Pull the grip panel locater out of the right side. Slide the grip (part #14) down and off the grip frame.

* **Hammer strut subassembly**: The purpose of the hammer strut assembly is to contain the mainspring and provide a means to push the hammer forward. It is made up of a hammer strut, mainspring, and the mainspring seat. To remove the hammer strut assembly, cock the hammer then place the disassembly pin (part #9) in the hole near the end of the hammer strut (part #22). If you don’t have the disassembly pin, a paper clip will do. Ease the hammer down until it stops. Grab the strut assembly and pull it out of the gun. Note the “offset” in the strut. When you reassemble, the strut must be installed the same exact way it came out. Tighten the tip of the strut in a vise. Use a kitchen fork and place the tines of the fork in the spring coils near the seat. Push down to tension the spring enough to remove the disassembly pin. Note the way the mainspring seat (part #28) is installed. It must be reinstalled exactly the same way it came off. Ease the spring and seat off the strut. Be careful with this step because if you slip off, the spring and seat will launch under considerable force. The hammer strut is a stamped part that typically has very sharp edges. These edges and the ball tip need to be dressed

down so the strut does not bind or drag on the mainspring or fulcrum seat in the hammer. Use a file or Dremmel Tool to round all four edges of the strut.

* **Mainspring (hammer spring) considerations**: The mainspring develops the energy needed to propel the hammer hard enough to detonate a primer. It also affects “lock time”, which is the time it takes for the hammer to hit the primer once the sear releases. Ruger typically installs a stronger mainspring than is necessary. A stronger mainspring will make both DA and SA trigger pull harder but it also reduces lock time. For best accuracy, you want to keep lock time as short as possible yet reduce trigger pull to a more comfortable level. The factory mainspring is rated at 14 lbs. A good compromise is a 12 lb mainspring. A spring kit is available from www.Brownells.com that includes a 9, 10, and 12 lb hammer spring (Brownell’s P/N 080-665-103). If you choose a mainspring lighter than 12 lbs, you may experience light primer hits (misfires) and will have a much longer lock time. Install the spring of your choice by placing the strut back in the vise. Slide the spring in place then use the kitchen fork to compress the spring. Place the mainspring seat on the strut and secure it with the disassembly pin. Remove the fork and set the strut assembly aside for now.

Hammer assembly: The purpose of the hammer is to apply a striking force to the primer when the SA or DA sear is tripped. The hammer has a small notch on the extension. This notch mates with the extension on the trigger to form the SA sear. When the hammer is cocked, the trigger extension is held by the hammer’s notch until the trigger is pulled. You can look in the frame slot just in front of the hammer and see the relationship of the SA sear. The spring loaded hammer dog (part #65) is picked up by the trigger cam extension in DA. As the trigger is pulled, the trigger extension cams the hammer back until the hammer dog slips off the trigger extension and is picked up by the DA sear. When the DA sear releases, it causes the hammer to thrust forward and fire. To remove the hammer (part # 64), pull the trigger all the way back and hold it there then use the round end of the hammer strut (part # 22) to push the left end of the hammer pivot pin (part #21) out. Grab the right flange on the hammer pivot pin and pull it completely out. Lift the hammer out of the frame. Release the trigger. See photos on pages 17 &18.

* Inspect the hammer’s sear notch for rough spots. Dress with a fine stone if necessary. Do not change the sear angle and don’t remove any more metal than absolutely necessary to clean up the sear notch.

To remove the hammer dog, use a paper clip or small pin punch to push the hammer dog pin (part #20) out of the hammer. The hammer dog plunger (part #5) and spring (part #4) will fall out.

* The lower inside area of the hammer dog is the mating surface for the DA sear. It must be smooth or DA trigger pull will feel raspy. Use a Dremmel Tool with a buffing wheel and fine grit compound to dress the lower rear surface of the hammer dog. Inspect the sides of the hammer for smoothness. Dress as necessary to remove sharp edges, rough spots, or residue. See photo on page 18.

Replace the hammer dog spring and plunger. Hold the hammer dog in position and install the hammer dog pivot pin. Test the hammer dog for free movement and spring return.

Trigger guard assembly: The assembly contains the trigger, cylinder latch, transfer bar, pawl, and their associated springs, plungers and pins. The assembly is held in the frame by a spring-loaded plunger (part #43). The tip of the plunger snaps into a hole in the frame, just behind the trigger guard and inside the grip frame. Locate the plunger tip and push it forward with a screwdriver or other tool while pulling downward lightly on the trigger guard. The complete assembly will pop out. Set the rest of the gun aside for now. Pull the trigger back slightly then remove the transfer bar (part #42). Hold the trigger back with your left forefinger and position your left thumb over the rear of the pawl (part #29). With your right hand, pull the pawl to the right to remove. The pawl spring (part #8) and pawl plunger (part #5) will try to pop out and launch unless you contain them with your thumb. Remove the pawl spring and plunger. Place your left index finger in the trigger guard behind the trigger. Use your left thumb to push the trigger guard latch in (part #43). Use a paper clip or stiff wire and push the latch retaining pin (part #20) completely out. Release the trigger guard latch (part #43) and pull it out. Pull the trigger guard latch spring (part #44), and the trigger link plunger (part #47) out of the hole in the trigger guard (part #69).

* Before removing the rest of the trigger parts, test the trigger for free movement. You should be able to move the trigger from stop to stop with no binding or dragging. If you detect a bind, try to isolate it by watching the trigger move inside the struts. Once the trigger is out, you can dress the high spots on the sides of the trigger or the inside of the struts. A fine file will work well to remove burrs or high spots.

Use a paperclip or small pin punch to push the trigger pin (part #70) all the way out. The trigger (part #68) and trigger plunger (part #48) will fall out. Position your left thumb over the cylinder latch (part #6) and slide the latch to the right to remove. The spring-loaded plunger may launch so keep you thumb in position until the latch is all the way out. Remove the latch plunger (part #30) and the spring (part #8) from the trigger guard assembly.

* The trigger plunger (part #48) is a stamped part, typically with sharp edges on one side. The nose (looks like ½ an arrowhead) activates the cylinder latch. If it isn’t perfectly smooth, the trigger doesn’t want to reset when released. If the nose of the trigger plunger is too short, you will get late initial timing. Place the rough side down on a piece of 400 grit sandpaper and burnish the side smooth. Buff the ramp of the ½ arrowhead until it is polished like chrome. Buff the little notch under the front of the arrowhead, especially the tip. This is the surface that pulls the cylinder latch down. If it is rough, you will feel a gag in the DA stroke.

* The cylinder latch (part #6) is a cast part with a machined surface on the bottom. Buff the top of the latch (the rounded part that locks into the cylinder) until it looks like chrome. Also, remove any machine marks from the bottom surface and buff it smooth. Remove any rough casting marks or sharp edges from the sides of the cylinder latch.

* The trigger (part #68) is cast and typically has sharp edges or rough surfaces. The cam surface at the top end of the trigger is the area used to cam back the hammer in DA and mates with the back edge of the hammer dog. It must be very smooth. The machined end of the cam is the SA sear. It too must be very smooth. Use a buffer to make these surfaces look like chrome. See photo on page 17.

* The pawl (part #29) is also a cast part and may have sharp edges or a rough surface. The top left tip of the pawl mates with the cylinder's ratchets to rotate the cylinder. The top left side of the pawl should be polished like chrome.

* The transfer bar (part #42) is a cast part that almost always has sharp edges or casting marks. Dress the transfer bar with a 400-grit sandpaper to smooth it up.

* The cast trigger guard frame (part #69) should be "unpopulated" at this point. Inspect it carefully and remove any burrs from the lock lip in the front. Do not mess with the sharp side edges because they mate with the frame for cosmetics. Insert the trigger guard in the frame. Note the fit. Often the factory leaves the back surface (the flat area around the trigger guard latch hole) longer than it should be. This makes trigger guard removal very difficult. If the trigger guard has to be forced into the frame to fit, you can file down the rear flat surface until the trigger guard inserts into the frame with minimal friction.

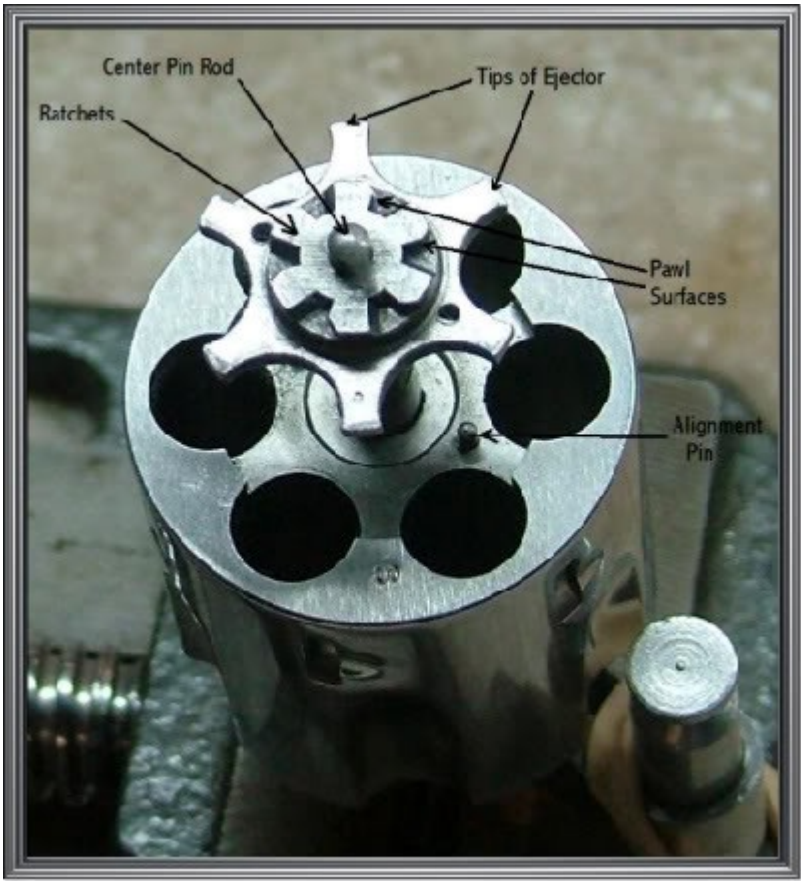
* The hole in the trigger guard where the trigger/latch spring goes (part # 44) is often very rough from drill marks and is sometimes undersized. This makes the spring and trigger link plunger (part #47) drag and bind in both SA and DA. Use a 13/64" drill bit and "hand turn" it to clean up the hole. Do not try to drill any deeper, just get the hole smooth. Insert the trigger link plunger after you clean up the hole. It should move freely all the way through the hole. If the plunger does not move freely, dress the hole some more. Remove the trigger link plunger.

Reassembly of the trigger guard assembly: Insert the cylinder latch spring and plunger (parts #8 & 30) into the hole at the top front of the trigger guard frame, just under the horizontal shaft. Note: there are two spring and plunger sets. You want the longer one. With the cylinder latch (part #6) rounded area up, start the cylinder latch on the trigger guard frame shaft (top front). It will go on about half way before it contacts the plunger. Carefully use a tool to push the plunger down while pushing the cylinder latch fully on the shaft. If you slip off the plunger it will launch so be careful. Once the cylinder latch is on the shaft, check for free spring-loaded movement.

Set the trigger plunger (part #48) in the slot in the top of the trigger. The ½ arrowhead should be up and to the front. It is easiest to install by placing the arrowhead end in first while holding the back up at an angle. Once the trigger plunger is in position, insert the trigger into the trigger guard frame making sure the spring strut is in the trigger spring hole. Use a paper clip or wire as a follower and insert it into the trigger pivot pin hole. Insert the trigger pivot pin while pulling the follower out. This keeps the parts aligned. Once the trigger pivot pin is installed, make sure it is flush on both ends. As you rock the trigger guard back and forth, the trigger should move freely from stop to stop. Insert the trigger link plunger (part #47) in the hole dimple end first. Apply a drop of oil in the hole.

* Now is a good time to decide on a trigger return/trigger guard latch spring. The factory spring is a little heavy (11 lbs). The above referenced spring kit comes with an 8 lb and 10 lb spring. You may be able to use either one, however the 10 lb spring will have a more positive trigger reset. The stronger the spring, the heavier both SA and DA trigger pull will be. Insert the trigger return/trigger guard latch spring (part #44) of your choice. Insert the trigger guard latch (part #43) with the flat surface up. Hold the latch in with your left thumb against spring tension while inserting the latch-retaining pin (part #20) in the hole with your right hand. Make sure the retaining pin is flush on both sides. Hold the trigger all the way back with your left hand and middle finger. Insert the pawl spring and plunger (parts #8 & 5) in the hole of the trigger, just under the cam surface. Apply a drop of oil to the plunger. Start the pawl shaft into the hole with the pawl leaning forward. Push the plunger down while sliding the pawl in. Note: the plunger and spring are notorious for launching. This step is best done inside a clear plastic bag to prevent loosing the plunger & spring. Once the pawl is in all the way, position it vertically and

allow the trigger to move forward. Pull the trigger back slightly, apply a drop of oil to the transfer bar lug then insert the transfer bar (part #42) into the hole opposite the pawl. Allow the trigger to spring forward to retain both the transfer bar and pawl. Set the trigger guard assembly aside for now.



Cylinder assembly removal: Press the cylinder release button (part #52) and swing the cylinder out. Pull the crane and cylinder forward to remove it from the frame. Note: taking the cylinder assembly apart and putting it back together is tricky. There really aren't any parts that need dressed inside the cylinder so you may not want to take it apart, however powder residue does accumulate inside the cylinder so you may need to clean and lubricate it. If the endshake test at the beginning was out of spec (more than . 005"), you will need to take the cylinder apart to install endshake bearings.

* You can get to the ejector (part #58) without taking the cylinder assembly apart. Push the ejector rod in all the way. Place your thumb and fingers between the bottom of the ejector (star wheel) and the top of the cylinder to hold the ejector up. Inspect all six tips of the ejector by dragging your fingernail across the tips. Typically, the tips have a line of galling on the top outer edge. These raised lines will not allow the cartridges to seat properly and will cause them to drag on the recoil shield. Use a fine file to dress the tips.

* Closely inspect the edges of the ratchets. Hold the cylinder as before so you are looking down at the ejector. The tip of the pawl catches the right leading edge of the ratchets to rotate the cylinder. The inside edge of each ratchet (the side with the angle cut) must be smooth and free of burrs. You can remove any burrs on the outside diameter of the ratchet and the inner slots with a fine jeweler's file. Any rough spot will cause the pawl to dig in, make DA trigger pull raspy, and will wear the tip of the pawl. See photo on page 19. If you decide not to disassemble the cylinder, move on to the Frame topic.

Cylinder disassembly: Locate the hole drilled on the flat surface of the crane (part #51). Use a paper clip or small pin punch inserted in the hole and push down. You should feel the spring-loaded plunger (parts # 22 & 23) move down. While pressing the plunger down, push the latch pivot pin (part #25) out from the inside of the crane. The front latch (part #13), latch plunger (part #26), and latch plunger spring (part #4) will fall out. Pull the ejector rod (part #11) out of the cylinder. Pull the crane (part #51) out of the cylinder. You can accomplish a good cleaning without taking the internal cylinder parts out. Flood the inside of the cylinder hole with a good cleaner and blow it out with compressed air.

This next step is not recommended unless you have the proper tool. Use a hollow shaft flat tip screwdriver and unscrew (left hand thread) the ejector retainer (part #60). Note: the ejector retainer is secured with thread lock. Pull the center pin rod (part #2) and center pin spring (part #3) out from the front and the ejector (part #58) out from the rear. After the parts have been cleaned, insert the ejector from the rear and the spring and center pin rod from the front. Thread the ejector retainer back on being careful not to get it cross-threaded or tightening it too much.

Note: Now is the time to install cylinder endshake bearings if needed. The endshake bearings are nothing more than washers .002” thick. (Brownell’s P/N 713-200-002) You can stack them if necessary. Example: if your endshake was .006”, you could install one bearing to bring the endshake back in spec (.002-.005”) or two bearings leaving .002” of endshake. Never set endshake to less than .002”. To install endshake bearings, put a drop of oil on the end of the crane tube and another drop on the front tube flange. Place endshake bearing(s) on the crane tube and insert the crane into the cylinder. Do not force the crane into the hole or you will ruin the endshake bearings.

Cylinder reassembly: Put a drop of gun oil on the end of the crane tube and another drop on each ball bearing. Do not over lubricate or powder residue will form a gritty paste and bind up the cylinder. Insert the crane into the cylinder hole until it fully seats. Put a drop of oil on the short slotted end of the ejector rod (part #11). Hold the crane so the flat surface is up. Insert the slotted end of the ejector rod with the short slot up, into the crane and cylinder hole. Look in the slot at the front of the crane. You should see a hole drilled to accommodate the plunger spring. Insert the front latch spring and plunger (parts #4 & 26) in the slot and move the spring until it falls in the hole. Insert the end of the front latch (part #13) with the squared step into the lower long slot of the ejector rod. The curved nose should capture the plunger tip. Insert a wire in the top hole of the flat surface of the crane and push down against spring tension. Insert the latch pivot pin (part #25). Maneuver the pivot pin until it goes through the hole in the front latch. You may have to press and release the spring loaded plunger with the wire a few times to get the pivot pin to seat all the way. When the pivot pin is fully seated, the pin will be flush with the inside surface of the crane. Test the ejector rod by pushing it in and allowing it to spring back. If there is a bind, you will have to disassemble and find out why. Hold the crane vertical with the ejector rod down. Spin the cylinder. It should spin freely with no binds. Set the cylinder assembly aside for now.

* **Frame inspection and deburring**: Inspect the inside of the frame. Look for galls or splinters of metal, especially where the nose of the trigger guard assembly hooks into the frame and the inner sides of the frame where the hammer fits. Remove any galls and clean the channels inside the frame.

* **Firing pin**: Use a tool to push the firing pin all the way forward. You should feel the spring tension of the firing pin spring. Firing pin travel should be smooth. If not, force solvent into the firing pin hole and push the firing pin in multiple times to help clean out the firing pin and hole. Blow it out with compressed air. When pushed in all the way, the firing pin should protrude .055-.065”. This can be measured by laying gap gauge blades on the recoil shield and matching protrusion to thickness. The firing pin is secured by a recoil plate (part #31) and held in place by a recoil plate cross pin (part #66). Removing the firing pin is not recommended because it will damage the finish. The firing pin is a factory fitted part. To remove the firing pin, you must first drive the cross pin out then push the recoil plate (AKA firing pin bushing) from the rear. A coil spring (part #12) is installed between the collar on the firing pin and the recoil plate.

Barrel inspection: Clean the bore and forcing cone thoroughly before inspecting. Look for chatter marks in the bore where the rifling is interrupted. Look for a restriction at the area where the barrel screws into the frame. If the bore is damaged, the gun must be returned to the factory for a barrel replacement. Minor rough spots are not an issue. Closely inspect the forcing cone. If you see machine marks, low spots, or any corruption, the forcing cone should be chamfered with a reamer. An 11 degree reamer provides a smoother transition from throat to bore and is recommended. A corrupted forcing cone will affect accuracy and will increase bullet fouling.

Crane latch inspection: When the cylinder is closed and latched, the rear of the cylinder is secured by the center pin rod in the hole of the frame under tension of the ejector spring. The crane’s front latch is pushed into a slot in the frame. When the cylinder is opened, the crane latch (AKA cylinder release button, part #52) will spring in. The center pin rod is pushed forward and releases from the frame hole. The center pin rod releases the front cylinder latch.

* Push on the front edge of the crane latch to check for free movement against spring tension. Inspect the recoil shield center pin hole. The tip of the crane latch should be flush with the recoil shield surface (+or- a few thousandths). If the pin is flush and the latch operates smoothly, there is no need to remove the latch. If the crane latch pin protrudes past flush, you will have to file a little off the end. If it is too short, a new one will have to be fitted and installed at the Ruger factory. A long crane latch pin will prevent the front latch from securing the front of the cylinder assembly. A short pin will make it very difficult to release the cylinder. If the latch binds, you will have to locate the bind and dress the frame or crane latch. To remove the crane latch, use a small hollow ground flat tip screwdriver and unscrew the crane latch pivot screw (part #53), hidden under the crane latch. Once the screw is out, manipulate the latch until it falls out. Note: the spring and plunger (parts #4&5) will also fall out. The screw has thread lock. Dress the crane latch and partially insert it in the frame. Insert the spring and plunger into the latch and position the latch so the crane latch pivot screw will enter the hole in the latch. Tighten the screw until it stops but do not over tighten.

Front sight inspection: If the barrel is threaded into the frame improperly, the front sight will tilt to one side or the other. Check vertical alignment by making sure the barrel rib is aligned with the front top strap. On adjustable sight models, the front sight can be easily removed and replaced with a different type sight. Use a small punch or screwdriver and push in on the front sight plunger (part #38). Lift the rear of the sight to unlatch. Remove the front sight (part #32). The sight plunger (part #38) and spring (part #39) can be removed if necessary by pushing the plunger forward with a stiff wire from

inside the sight channel. After cleaning, insert the spring then insert the plunger with the slot up. Place the front dovetail of the sight in the channel. Push the sight plunger in while holding the sight down until the sight drops in place. Note: there are a host of different front sights available from Ruger or aftermarket sources. All Super Redhawk sights will fit a GP-100.

Rear sight inspection: On adjustable sight models, insert a proper fitting flat blade screwdriver in the windage screw (part #35). Turn the screw in and out. The rear sight should click at each of the 8 positions and the rear sight should move up when rotating counter-clockwise or down if rotated clockwise. Each click moving the rear sight up will raise the bullet's point of impact. Insert a small flat blade screwdriver in the windage screw (part #40). Each of the six positions should click. Turning the screw clockwise will move the sight blade to the left and will move the point of impact to the left as well. To remove the rear sight, hold the rear sight blade down with your thumb and unscrew the elevation screw all the way. Ease the sight up to release spring tension. Push the sight pivot pin (part #37) out with a stiff wire or pin punch. Lift the sight off. There will be two springs (part #36) under the sight. To reinstall, place the springs in the pre-drilled holes. Lay the sight in position and push the sight pivot pin into the hole and through the sight until it is flush on both sides. Insert the elevation screw. Hold the rear of the sight down and tighten the screw to the desired position. Note: Black, white outline, and V notch rear sight blades are available from Ruger. Several other styles are available from aftermarket sources. To remove the rear sight blade, turn the windage screw counter-clockwise until the right edge of the sight blade is flush with the sight base. Put your thumbnail in the sight notch and pull the sight blade to the left against spring tension until the right side pops up and releases from the captive windage screw. Pull the sight blade up and out of the channel. To install a new sight blade, insert the left lower corner into the coil spring. Pull the blade to the left with your thumbnail until the right side of the blade drops in. Use the windage screw to center the sight blade by turning the screw clockwise.

Installing the subassemblies: Put a drop of gun oil on the shaft of the crane. Insert the crane shaft into the frame hole while holding the cylinder in the open position. Once seated, swing the cylinder into the latched position.

Apply a drop of oil to the trigger pivot pin and trigger plunger. Hold the gun with the muzzle down and insert the front tab of the trigger guard assembly into the frame notch. Snap the trigger guard assembly into position. Note: if the trigger guard assembly doesn't snap in, don't force it. Chances are the transfer bar or the pawl is not positioned properly. You may be able to position the parts by inserting a wire through the hammer slot. Once the trigger guard assembly is snapped in, make sure it is fully latched and the surfaces of the frame mate with the surfaces of the trigger guard assembly.

Pull the trigger all the way back and hold it there. Drop the hammer into the slot. Turn the gun sideways with the serial number side up. Align the hammer's frame hole with the hammer hole. Apply a drop of oil on the hammer pivot pin then insert it into the frame. Release the trigger.

With the hammer fully forward, insert the hammer strut assembly in the grip frame. The straight edge of the strut goes up. The notched end of the strut seat goes down with the flat surface to the front. Cock the hammer and remove the disassembly pin. Apply a few drops of oil along the hammer spring. Pull the trigger and ease the hammer down.

Slip the rubber grip over the grip frame until the big hole in the grip aligns with the hole in the grip frame. Slide the grip panel locator into position with an equal amount of pin extending from both sides. Lay the disassembly pin in the slot at the bottom of the left side. Snap the left grip insert into position. Snap the right grip insert into position. Insert the grip screw from the right side and tighten it with a screwdriver.

Dry fire the gun several times to make sure everything works properly.

Advanced Action Work

There are a number of things you can do with a GP-100 that require machining or skills beyond a hobbyist. The hammer cannot be purchased from Ruger or Brownell's so if you ruin it, you're out of luck. You may find a used one from Numrich or E-bay.

Trigger shimming: Remove the trigger guard assembly and measure the side play between the one side of the trigger and the strut. Normally, there will be about .008" trigger side play, yours may vary. Subtract .002" and divide the remainder by 2. In the case of .008" gap, .008-.002=.006"; .006/2=.003" Make shim washers .003" thick and install them on both sides of the trigger between the struts. This will serve as a boss or bearing surface and will keep the trigger from moving sideways when pulled. It will reduce friction from the struts and will force the trigger to make a more uniform contact with the hammer. Shim specs: OD=.3"; ID=.1" After installing the shims, make sure the trigger moves freely in the struts.

Hammer shimming: With the gun fully assembled, measure the gap between one side of the hammer and the frame. Much like the trigger, you will usually see about .008" of slack. This slack allows the hammer to wander a bit horizontally. Look at the sides of the hammer. If you see arc like scratches, it means the hammer has been dragging on the frame. This reduces hammer thrust and prevents the hammer from seating with the trigger exactly the same for each shot. This is evidenced by measuring the SA trigger pull 10 times and getting different pull weights. Use the same formula as with the trigger. Assuming a .008" gap, install .003" shim washers on both sides of the hammer. This creates a "boss" at the hammer's pivot point and not only controls side drift, it acts like a bearing to reduce friction and prevents the hammer from rubbing on the frame. Installing the shims is a trick. The best way is to insert the hammer then slide the shim down the side of the hammer. Use a gap gauge blade to push it into position. Do the serial number side of the gun first then start the hammer pivot pin and do the other side. Shim specs: OD=.5"; ID=.2" When both shims are in and the hammer pivot pin is seated, check the hammer for free movement.

Transfer bar, hammer and firing pin relationship: When the hammer strikes the transfer bar and in turn the firing pin, much of the energy is dissipated by the top step on the hammer hitting the frame. Instead of energy being efficiently transferred to the firing pin, much of the energy is wasted. This becomes very important when light hammer springs are used. You need all the energy you can get to prevent light primer hits. The solution is to remove some metal from the top step of the hammer so less energy is wasted. If you remove too much metal from the top step, the hammer will "capture" the transfer bar and not allow it to retract. This would cause a failure to reset condition for the trigger (won't spring back). You can safely take .020" off the top hammer step. If the

transfer bar captures, you can remove a few thousandths at a time from the rear surface of the transfer bar until it resets properly.

Skeletonizing the hammer: Energy is derived from velocity squared times mass. As you can see, velocity has more influence than mass. With spring-powered devices such as a hammer, you can reduce mass in non-critical areas and increase hammer velocity considerably. This has two major advantages. The lock time will be greatly reduced and the amount of energy on the firing pin will be increased. You can then install very light hammer springs and still get lock times just as fast as a factory spring with a factory hammer while having plenty of energy on the firing pin for reliable primer detonation. There are a number of patterns and techniques you can use. The critical mass portion of the hammer is the spur and above. This mass functions much like a hammer used to drive nails. The “handle” of the hammer is the area below the spur and above the fulcrum (pivot pin). You don’t want to remove any metal within ¼” of the center of the pivot pin hole, or the hammer will develop too much side play. So, any metal between that point and the spur is fair game. Ruger made the hammer very massive so you can easily reduce the weight by 25% without compromising strength. You can drill holes through the sides of the hammer or machine the hammer sides to give an “hour glass” figure when viewed from the rear. When a factory hammer is installed, you can trace the contour of the frame and remove all metal from just below the spur to the back edge. Installing hammer shims also improves this technique.

Chamfering the chambers: When GP-100s are used for competition, speed loaders will also be used. Cartridges don’t like being poked into a sharp hole, especially lead bullets. You can chamfer the mouth of the chambers with an 8 degree reamer. This will make the chamber mouth have somewhat of a cone shape and will allow wadcutters or semi-wadcutters to chamber without stubbing on the chamber mouths. Chamfering the mouths will not restrict using full power loads nor will it have any other adverse affect. Use a forcing cone reamer and cut just enough to see a cone develop. Remove the cylinder assembly from the frame and insert 5 spent cases in the chambers. Ream the empty chamber then switch cases to expose another chamber until all are chamfered.

Optimizing for lead bullets: GP-100s come from the factory optimized for jacketed bullets. The bore diameter is typically very uniform at .357~.3575”. Cylinder throats are typically .3575”. This is a bit tight for lead bullets. You can open the throats to .3585” with a throat reamer from Brownell’s. This will make all throats the same size. It allows lead bullets to “bump-up” in diameter then get sized to bore diameter by the forcing cone. Chamfering the forcing cone to 11 degrees is also recommended. Optimizing for lead bullets will improve accuracy and reduce lead fouling. You can still shoot jacketed bullets with near-equal performance to the factory set up. Accuracy will probably not change but fouling will be reduced. You will lose a token amount of velocity, typically 25-50 fps for a magnum load.

Bore lapping: Fire lapping products are not recommended. They create excessive wear to the edges of the rifling and have the same effect as firing thousands of rounds of ammunition. Using valve grinding compound and a cloth patch hand powered on a cleaning rod works best. Working from the muzzle and taking about 100 back and forth strokes will smooth the striation marks quite well yet leave the sharp rifling in tact. Lapping will help reduce fouling but does very little for accuracy or velocity.

Ruger GP-100

Due to copyright issues the schematic had to be removed. Please refer to the following link at Brownells for the schematic.

http://www.brownells.com/.aspx/pid=0/sid=19/schematicsdetail/GP100

Note: Part numbers in RED are available from Ruger or Brownell's. Part numbers in BLACK are factory fitted parts and are not sold without sending the gun to Ruger.

The End

Check the Ruger forum for additional work by Iowegan on various Ruger firearms at http://www.rugerforum.net