Magazine Drop in Savage Axis Bolt-action Rifles

November 2020

I recently purchased a Savage Axis bolt action rifle (mine happens to be chambered for .308 Winchester). I love the rifle. But it had one annoying habit: When you fired the gun with cartridges in the magazine, the back end of the magazine would drop out from the rifle. This leaves the bolt unable to contact and engage and load the next round in the magazine.

Looking at online forums, I saw that many others had this issue as well. But not everyone has it, so there must be some relationship with build variation.

Anyway, I thought about it and figured out what the problem is. **Figure 1** shows a stylized version of how the Axis magazine (capacity = 4) is supported by the rifle stock (**purple**). The small bent over tab at the back sits above the edge of the cutout for the magazine and the **snap at the front of the magazine** engages in the lower edge of the stock at the cutout for the magazine. (This is a notional figure, the details are not exact.)

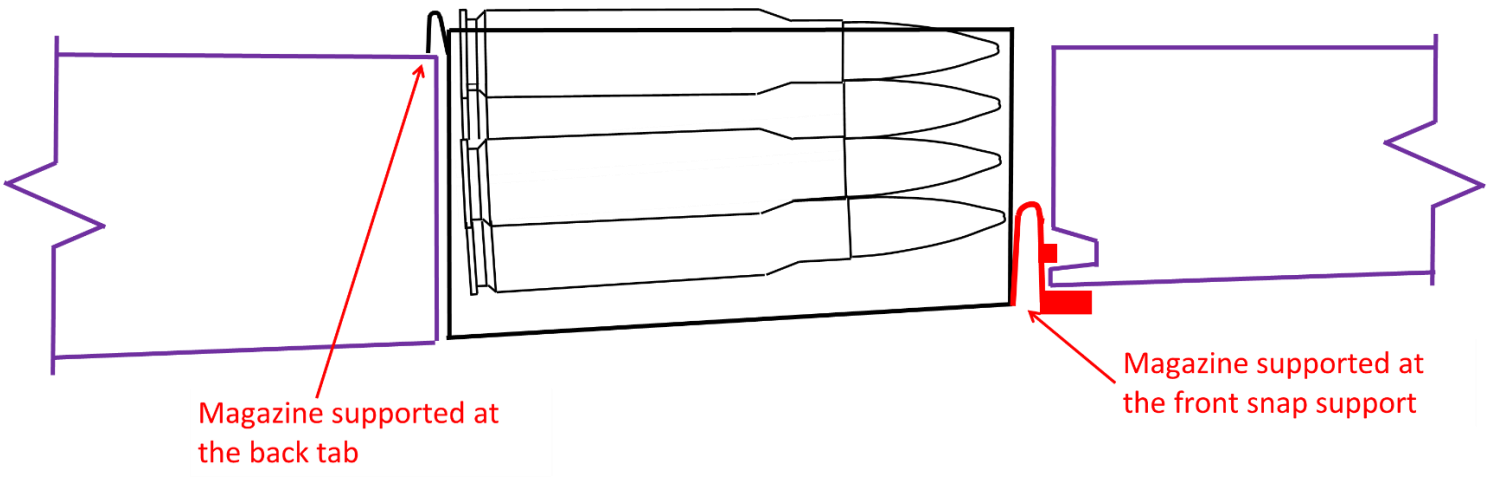

Figure 1: Magazine Support for Savage Axis

Figure 2 shows a schematic version of the supports for the magazine and the loads acting on it at rest. There is likely (I can't state for sure) downward pressure on the rounds in the magazine from the bolt (the bolt needs to protrude below the top of the cartridge on top in order to engage and load it into the barrel). There is also gravity acting on the magazine and the cartridges in the magazine.

The front snap support acts both as a vertical support for the magazine and as horizontal spring.

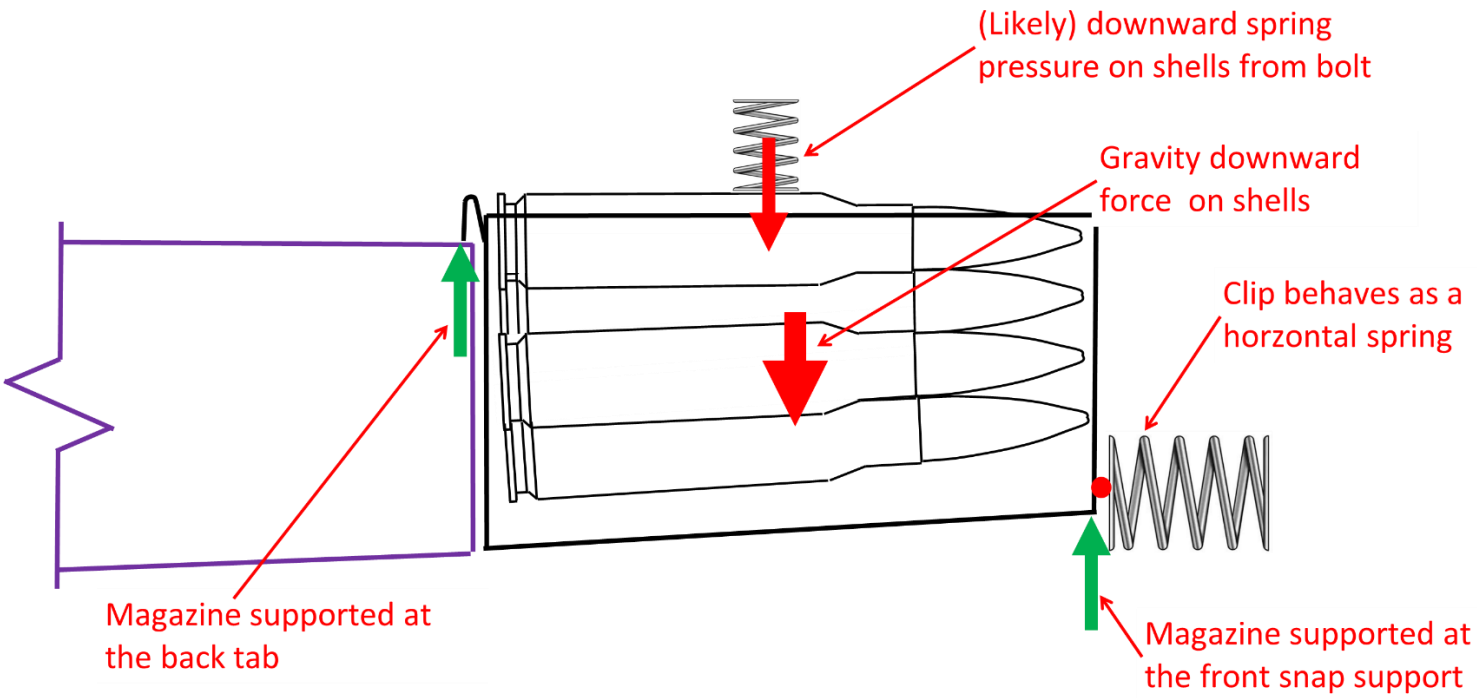

Figure 2: Schematic of Loads and Supports for the Magazine

Figure 3 shows the loads and support system for the magazine, just milliseconds after firing. The gun jumps backwards, impelled by the recoil force from the fired bullet and escaping gasses from the muzzle of the gun. The magazine is only held in place by a little friction at the back tab and a small spring force (you can compress the spring with one finger, by design) at the front snap. Because of its inertia, the magazine remains stationary (Newton's second law of motion), the spring of the front snap compresses, and back tab slides off of its support on the inside of the stock.

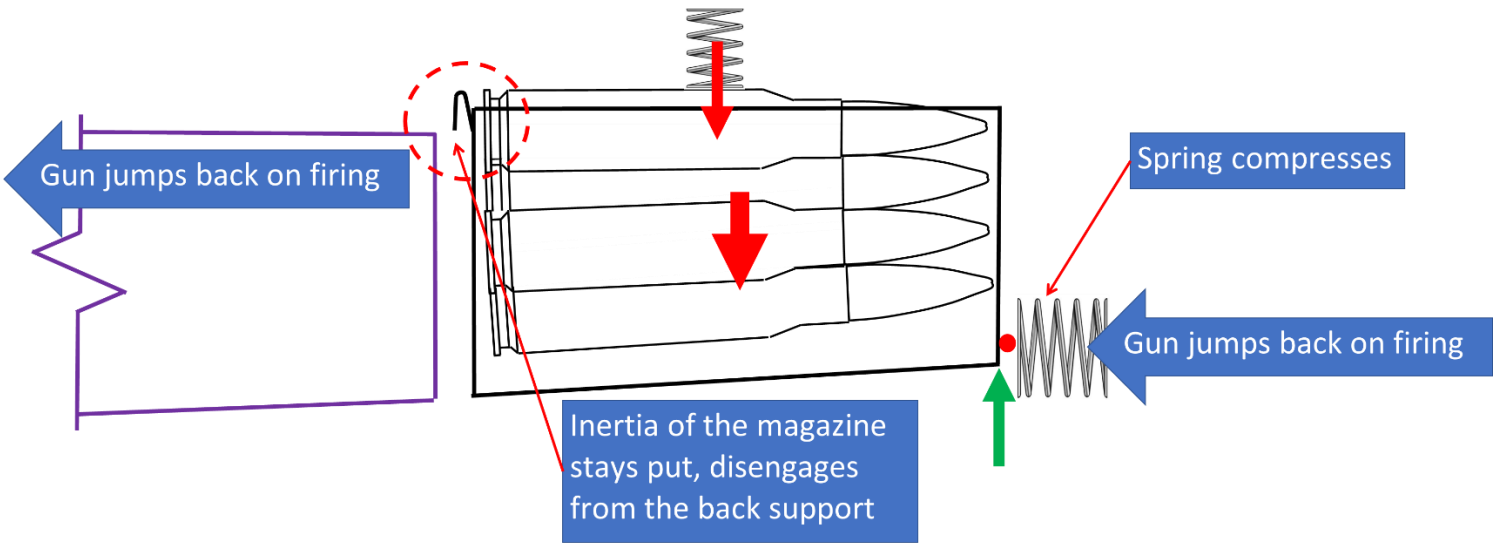

Figure 3: Loads Support System Just After Firing

The magazine loses its support at the back of the magazine and the back end drops down, Figure 4, away from the bolt and the rifle stock, impelled by the force of gravity and the spring force pressing down on it from the bolt action. The support at the front snap is not lost because the backward movement of the gun further engages the front snap.

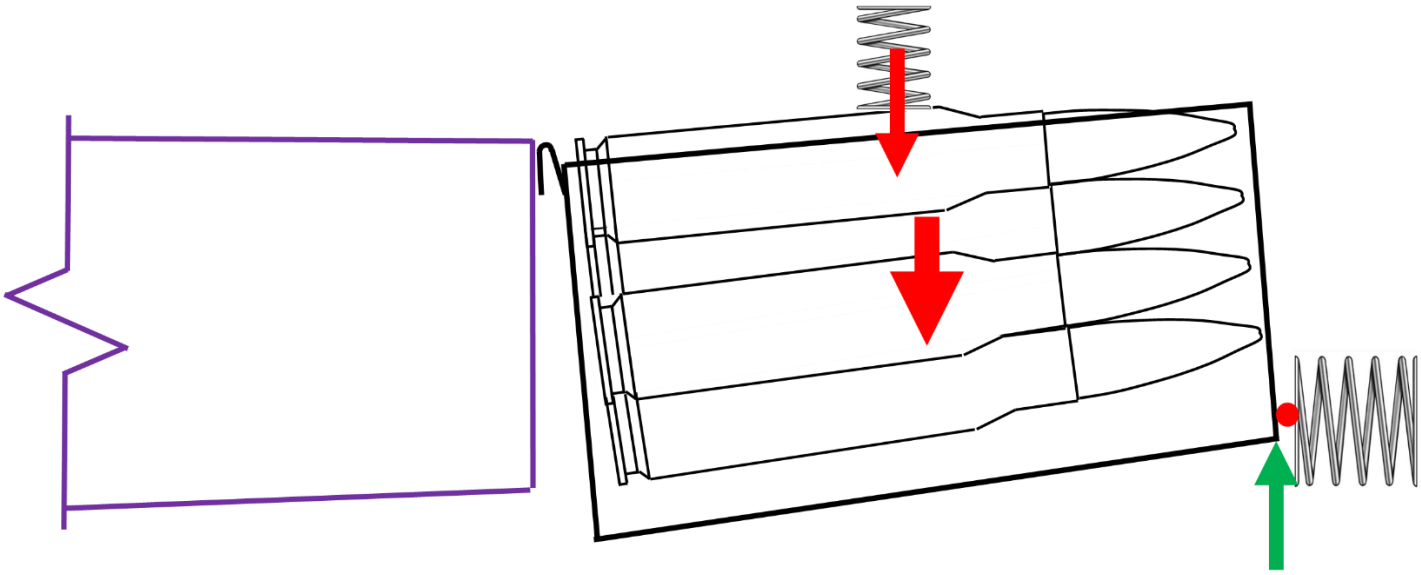

Figure 4: Magazine Drops Away at Its Back End

This was an annoying habit. What good does a magazine do you if it drops out and you can't load the next round? The whole point is to be able to reload rapidly.

I thought more about this and concluded that it doesn't happen to all guns or magazines, only some. This tells me that it's a build variation issue and that it's not "off by a mile". So, how to fix it? Make the tab at the back of the magazine extend a little bit further out and maybe it won't slip off the support inside the gun.

First I tried to bend the tab out a little bit. BAD IDEA! The bend in the tab is very heavily cold-worked by the process of forming it and I could not move it at all – right up until it snapped clean off with a ping! (A $30 magazine, argh!).

So, I needed to ADD material. I tried two solutions: Add a piece of bent sheet metal (it is aluminum roof flashing stock from Home Depot, completely annealed and easy to bend). And, for the magazine where I snapped off the tab, I formed and epoxied on a small brass block to make a replacement tab.

I measured my four magazines and the protrusion (backwards relative to the rifle) on each of the tabs was almost exactly 0.060 inch. **Figure 5**.

The bent sheet metal is only about 0.020 inch thick. Very pliable metal. I stuck the strip inside the back tab, bent it over the back tab, and then bent it back again and shaped it to fit. This gave me effectively an additional 0.040 inch (+) on the length of the tab (backwards), for a total protrusion of about 0.10 inch. **Figure 6**. This was epoxied in place. I used high quality 24-hour cure epoxy. I also epoxied between the folds of the sheet metal. It's critical to clean all surfaces before gluing. VM&P Naphtha works great to remove all residual machining oils, etc.

For the brass block, I made it about 0.10 inch thick and the same width as the tab, again epoxied in place. **Figure 7** shows the first try with liquid nails as the adhesive and the block much too thick. (Trial and error.)

Figure 5: Original Back Tab on the Magazine

Figure 6: Modified Back Tab (Sheet Metal), Side View (not to the same scale)

Figure 7: Modified Back Tab (Brass Block), Side View

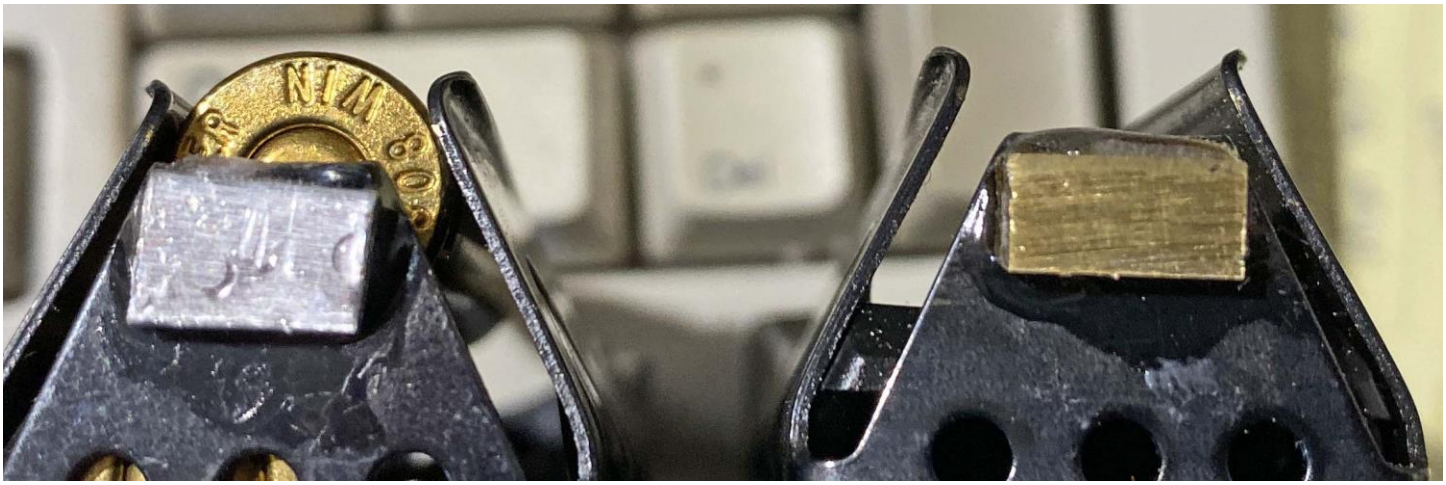

Figure 8: Modified Back Tabs, End View, Looking Forward (relative to the rifle)

So, how did it work? I had to do several versions of the brass block one, adjusting its size to get it to engage in the rifle (I started out too big and it would not insert into the rifle). But the sheet metal fix worked the first try. It's important to have the sheet metal end at the same height (relative to the vertical axis of the rifle when shooting) as the original tab. This is to ensure it engages properly into the rifle.

The real test: **Firing:** Both fixes worked perfectly with the rifle. No more dropping out with a full magazine! They take a small amount more effort to install and remove; but it's well worth it to have the system functioning properly. I expect the parts will eventually fall off; but replacing them is super-easy too.

This is a great fix that permanently alters neither your rifle nor the magazines.