Winchester Toggle Link 101
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"Why are Winchester 73's so OAL (overall length) sensitive." "Why won't my 66 in .44 Special feed .44 Russians?" You see these kinds of questions on the SASS wire and newcomers ask these questions at matches all the time. There have been numerous articles written on the evolution of the Hunt, Jennings, and Volcanic rifles into the Winchester toggle link rifles--the Henry, Model 66, Model 73 and the Model 76. They are the oldest practical repeating rifles yet the elegance and utter simplicity of their design, and their almost 100% reliability, has made them the hands down favorite of cowboy action shooters. However, few articles have been written about the internal workings of these mechanical works of art. So, sit back, grab a beverage, and welcome to Toggle Link 101, your introductory course on the Winchester toggle link rifles.

The key to the functioning of the toggle link rifles is their ammunition. Photo 1 (above) shows the original rounds for the toggle link rifles. (This article is focused on the pistol caliber rifles. The Model 76 functions the same as the other toggle links. However, since it is not a main match rifle its rounds are not shown.) Starting on the left is the .44 Henry Flat, next is the .32-20, the .38-40 and the .44-40. The Civil War vintage Henry rounds used round nose bullets. However, the OAL was the same. All of the original Winchester center fire toggle link rounds have the same overall length. Reproduction toggle links have been chambered in the original center fire calibers as well as the .38 Special, .357 Magnum, .44 Special and the .45 Colt.

Photo 2 (above) shows the range of cartridges available in the toggle links and their OAL's. Starting in the middle is the ubiquitous .44-40. On the left are the .357 Magnum, .38 Special with the 158 grain Snakebite bullet, a milspec .38 Special, and a .38 Special with a 125 grain bullet. To the right of the .44-40 is a .45 Cowboy Special (which is about the same OAL as a .44 Russian), a Schofield loaded with a 160 grain bullet, a Schofield with a 200 grain bullet (which is about the same OAL as the .44 Special) and a .45 Colt with a 250 grain bullet. Looking at Photo 1 and Photo 2 it is apparent that the .357 Magnum and the .45 Colt are the same OAL as the original chamberings. That being the case, it is no surprise that they function fine in the toggle links. However, how is it that the toggle links also function with rounds much shorter than the original chamberings?

The primary way Winchester dealt with the issue of cartridge length was to change the carrier lengths to match the OAL of the cartridges. Uberti also took this approach when it introduced its first Model 66s in the 1970s.

Photo 3 (above) shows the .44 Henry Flat and a Henry/66 carrier on the left. Next is a 1970s vintage Uberti Model 66 carrier for the .38 Special and to the extreme right is a current production Uberti carrier that is used for all calibers in the Henry, 66 and 73

models. (Original Winchester 73 carriers are the same nominal length as the current Uberti carriers.) Even with ammunition and carrier lengths optimized, normal variations in OAL and machining tolerances would lead to jamming as the edge of the carrier tried to rise and hit on a casing rim. How the factories dealt with this issue is the key to the toggle links' ability to smoothly feed a variety of different OAL ammo.

Photo 4 (above) shows an original carrier from a Winchester 73 manufactured in 1876 on the right and a current production Uberti carrier on the left. On the front of the original carrier Winchester put a very slight bevel. This bevel is about .050" deep at the top end. In other words, the bevel is roughly the thickness of a casing rim. The nominal length of a 73 carrier is 1.600". All of the original calibers for the 73 have a maximum OAL of 1.592". Since all of the ammunition was made to the same OAL the small bevel on the front of the carrier was more than enough to compensate for minor variations in OAL and carrier length. The early Uberti carriers (i.e., the originals from the 1970s like the one shown in Photo 3) were built just like an original Winchester. They had a very slight bevel on the front of the carrier that was about the thickness of a casing rim.

I don't know if this is an urban myth, but the stories I have read indicate that when Uberti starting thinking about making a rifle for the American market they knew the .38 Special was a popular cartridge, but that round is virtually unknown in Europe. The only ammunition they had was milspec ammunition so they designed their carrier around that ammunition. Milspec ammo tends to be at the maximum for OAL for the .38 Special. When I acquired an old Uberti 66 a few years ago, I took it out for a test run and it would not feed any of the .38 Special ammo I had with me, even factory loaded 158 grain round nose flat points. As the carrier was rising it was jamming on the rim of the cartridge coming out of the magazine tube. I went home and got some military hard ball .38 Special and it functioned flawlessly. When Uberti decided to expand its market and build reproduction 73s and Henrys, it standardized all its carriers at 1.600", the same as an original Winchester 73. Thus, the carriers in new Model 66's that were chambered for

.38 Special would be to long to reliably feed .38 Special ammunition if it was designed like the carriers used in the early Uberti Model 66s. Uberti dealt with this issue by deepening the bevel on the front of the carriers and forming a steep ramp as shown on the front of the carrier on the left in Photo 4. Now that we have an idea of the types of ammunition a toggle length will digest and how variations in OAL are addressed on the current guns, let's see how all this actually works.

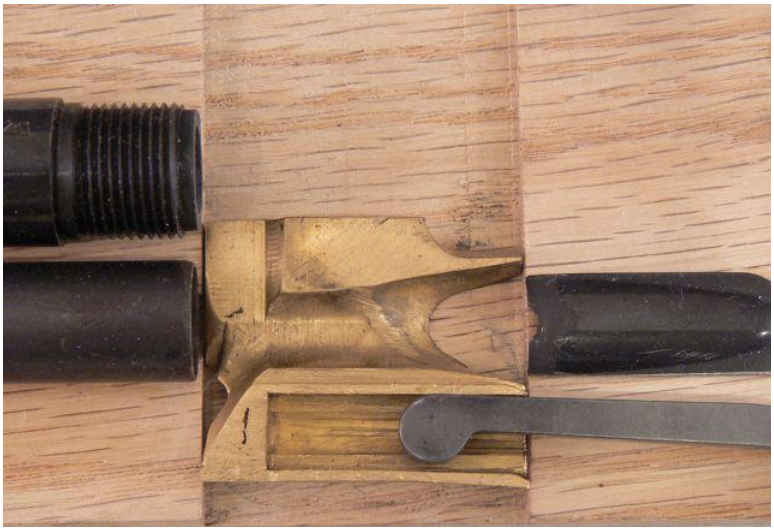


Photo 5 Above) shows all the parts involved in feeding ammunition in a toggle link. Starting on the upper left and going counter clockwise is the barrel, the magazine tube, the carrier, the carrier lift arm, and the loading gate. (The bolt is left out of our model gun for clarity.) That's it, that's all there is inside a toggle link. The toggle links have no cartridge stop or mechanism for regulating ammunition coming out of the magazine tube. The ammunition is, in fact, the cartridge stop and is part of the feeding mechanism. The tab on the loading gate does not regulate ammunition coming out of the magazine. Its function is to keep rounds from going back into the receiver. (Those with sharp eyes will notice that the loading gate in Photo 5 is from a 66 and that the tab is actually broken off. This is a common problem with 66 gates.) Notice on the front of the lower part of the sectioned carrier is the ramp shown in Photo 4. OK, let's load up our rifle and see how it functions.

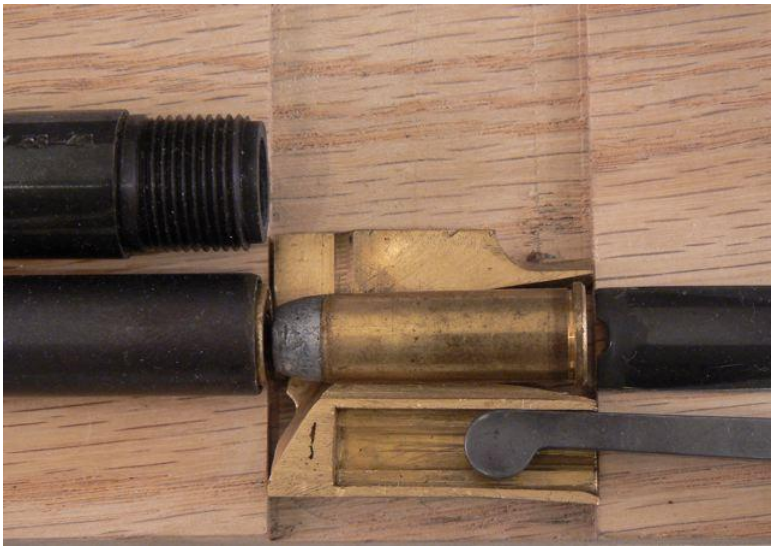
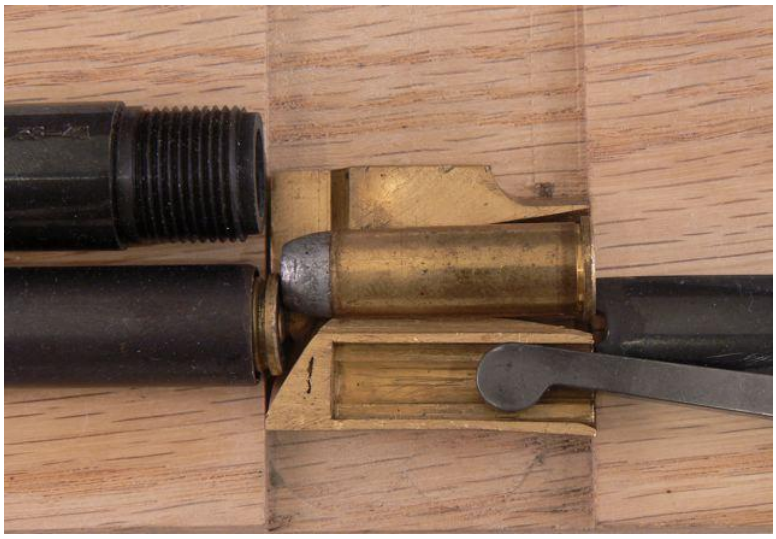


Photo 6 (above) shows the gun loaded with .44-40s. Notice that the rim of the round coming out of the magazine tube is about even with the front of the carrier and the rear of the round in the carrier is resting on the loading gate tab. As we lower the lever the carrier begins to rise and the rim of the cartridge coming out of the magazine hits the ramp. See Photo 7 (below).



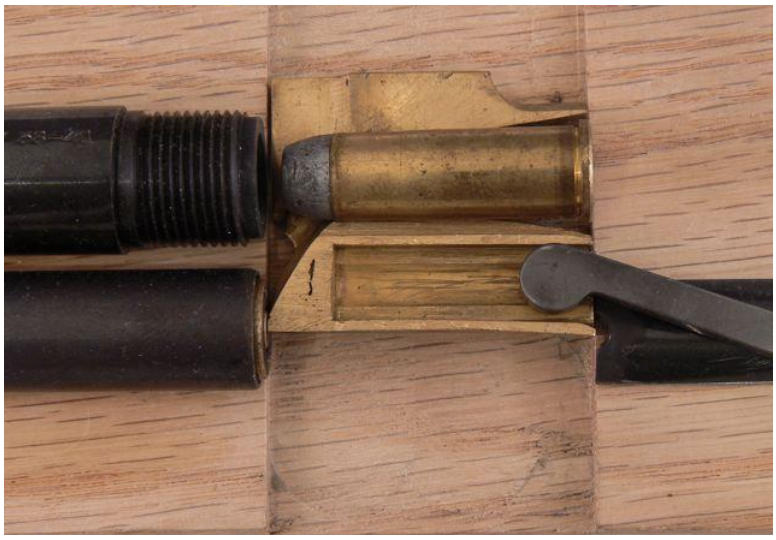


Photo 8 (above) shows the carrier at the top of its travel. The top round is ready to be pushed into the chamber by the bolt, and the bottom round has been fully pushed back into the magazine tube by the bottom of the carrier. Everything is working perfectly and rounds near the original max OAL of the Winchester design (i.e., 1.592") will feed flawlessly. Now let's see what happens when we use rounds of a shorter OAL.

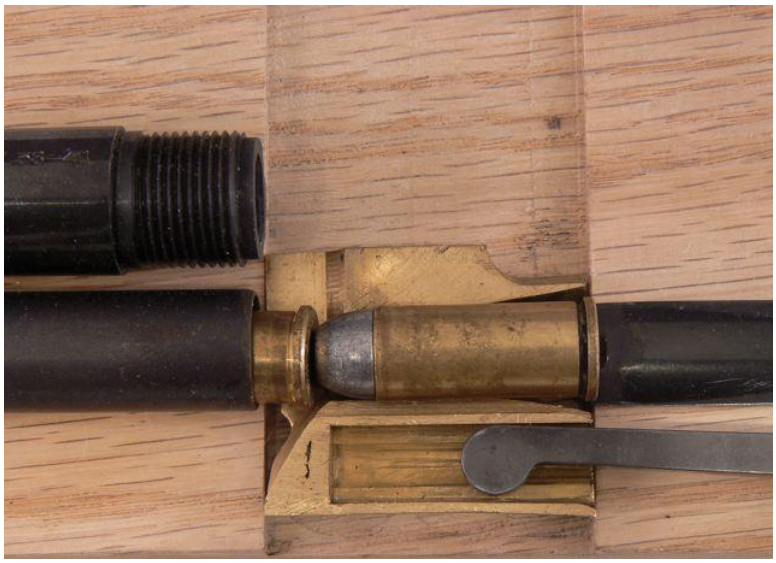


Photo 9 (above) shows our rifle loaded with .45 Schofields loaded with 200 grain bullets. As can be seen in the photo, the cartridge coming out of the magazine is sticking far into the carrier. Although the rim of the incoming round is striking the carrier near the top of the ramp, as the carrier raises it will still push the incoming round back into the magazine tube and our rifle should function fine.

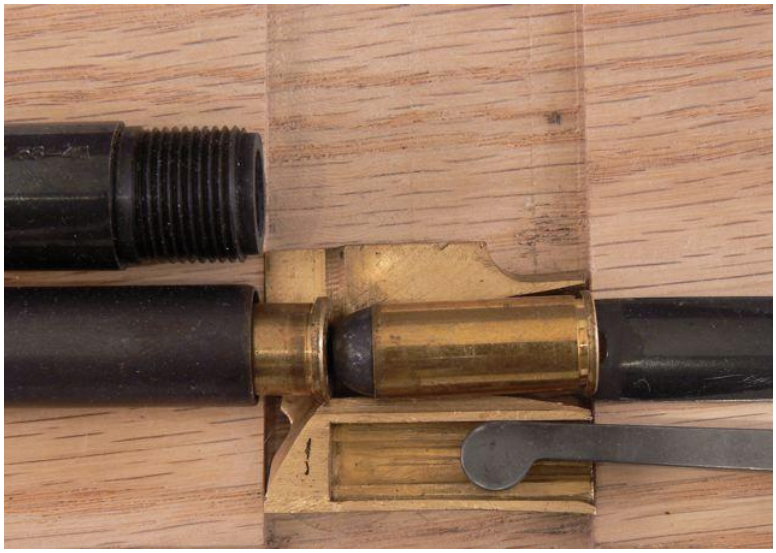


Photo 10 (above) shows our rifle loaded with .45 Schofields loaded with 160 grain bullets. The rim of the incoming round is now beyond the top of the ramp. As the carrier raises it is going to catch on the incoming round and our rifle is going to jam.

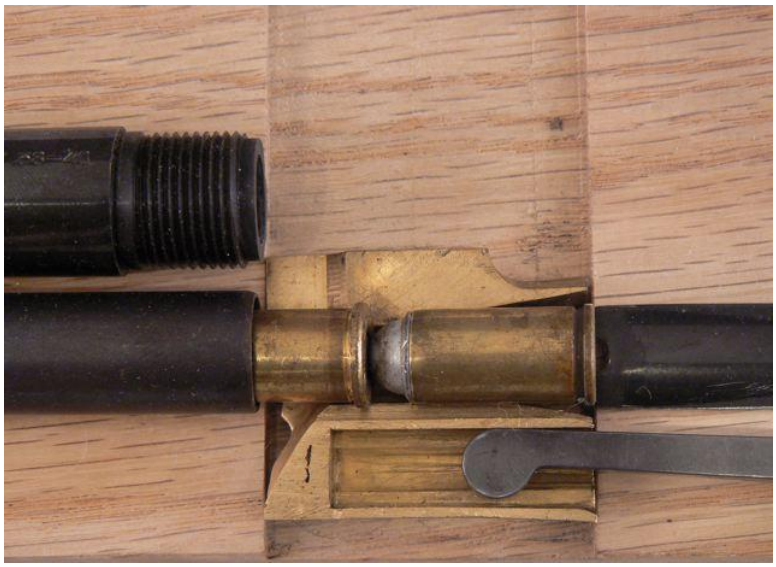


Photo 11 (above) shows our rifle loaded with .45 Cowboy Specials. Over half of the incoming round is in the carrier and well beyond the top of the ramp. Our rifle will absolutely not function with these rounds. With the stock carrier the limiting factor is the steepness of the ramp. It cannot be pushed back much further than the ramp on the factory carrier for two reasons. First, as the ramp gets steeper and rounds extend further into the carrier instead of pushing rounds back into the magazine tube you will get a lifting or chopping action and the gun will jam. Also, as can be seen from the cut-away carrier in the photos, if the ramp is cut much deeper it will penetrate the lifter arm cavity and the ramp will have a hole in it which, again, will cause jams.

As the old saying goes, where there is a will there is a way.

Photo 12 (above) shows a carrier modified with what is functionally a miniature-loading gate milled into the side of the carrier. As rounds push past the gate they sit on a tab that holds them toward the front of the carrier. With rounds held at the front of the carrier,

see Photo 13 (above), the round coming out of the magazine tube will strike the feed ramp so that the gun functions normally. Even this mod creates some issues and for most shooters it is probably best to stick with ammunition that fits within the parameters of the original toggle link design. By doing so, the toggle link will function at the high degree of reliability that has made it a CAS favorite. Maintaining proper ammunition is easy, especially now that everyone attending Toggle Link 101 knows how the toggle link feeding mechanism works. Every toggle link has a maximum case length gauge built right in. All you have to do is lower the lever and sit a loaded round in the carrier mortise. See Photo 14 (below).

If a round won't go in or drags, it's to long. (Remember, max OAL for toggle link ammunition should be 1.592".) The minimum OAL will vary from rifle to rifle depending on the steepness of the ramp. With a dummy round in the carrier and the muzzle pointed up slightly (to make sure the round is sitting on the loading gate tab) if you can see the top of the ramp in front of the nose of your bullets, the rounds are

definitely to short. With a second round inserted into the magazine you can see how far the rim of the cartridge is sticking out of the magazine tube. The closer the rim of the cartridge coming out of the magazine tube is to the top of the ramp, the more likely your rifle will jam.