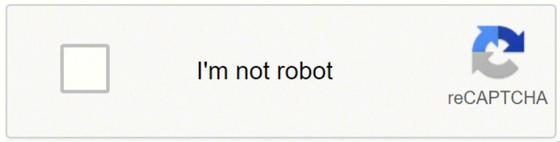

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Glenfield model 60 feed throat conversion kit

Note: This is an expanded and updated version of the earlier article on this topic. However, since I still saw traffic to the original article, but without traffic to the updated article, I have chosen to replace the older article with the new article. Marlin 60 "Glenfield" As you can tell from the photograph above, the Marlin Model 60 is a semi-automatic rifle in .22 LR caliber, fed from an underbarrel tube magazine. It is one of the most popular, if not the most popular, .22 rifles produced, with approximately 11 million made to date. The rifle has been in continuous production since 1960 in various configurations or variants. Prior to 1980, the rifle boasted a 22-inch micro-groove barrel, and the magazine held 17 rounds. About 1980, the magazine capacity was reduced to 14-rounds. Subsequently, the barrel was shortened to 19 inches to match the shorter magazine. The rifle uses a simple blowback system. Although older rifles, such as the one pictured above, did not have a bolt hold-open, I understand that the newer versions do so. The front sight is a simple ramp. The rear site is an open semi-buckhorn style adjustable for elevation. Older models used birchwood stocks and had pressed "checkering" and patterns, including the squirrel hunter shown above. Newer models have plain walnut, laminated, or synthetic stocks, depending on the specific variant. Mechanically, the rifle has changed very little over its history--with one significant exception. The original rifles used a cast pot-metal (aluminum, probably) "feed throat" through which the bullet was lifted and fed into the chamber. The "feed throat" has the feed ramp and an integral ejector molded into it. In the older models, it was molded in two pieces that fit together length wise, that were held together with a single rivet. Due to reliability and durability issues, this design was later changed to a single cast piece that uses one tail of the lifter spring as the ejector. (Sources: Wikipedia, Marlin Firearms, Chuckhawks, Gunreports). The particular model shown here is an older model, although I don't know the specific date of manufacture. It features the longer barrel and tube magazine, as well as the original feed throat design. When I first obtained the rifle, it was missing the rear sight elevator ramp, which was easily replaced. I discovered that the rifle also had feeding problems. Although the rifle ejected without trouble, about every other round would misfeed, being pushed up and into the rear of the barrel instead of into the chamber. Initially, I just assumed this was perhaps due to inadequate cleaning. However, after a complete disassembly and cleaning, I still had the same problem. I took the rifle to a gunsmith who, a couple months later, told me the issue was simply one of ammunition. Nevertheless, I still experienced the same feeding problem no matter what type of ammunition I used. After disassembling the rifle again and paying more attention to how the mechanism worked, I discovered that the screws attaching the action to the receiver had loosened, allowing the feed throat to be forced apart--just enough that it allowed a cartridge to feed at too steep of angle to go into the chamber. After I tightened the screws down, the problem was mostly solved. However, the side plates that hold the action together cannot be tightened down enough to completely eliminate the gap between the pieces of the feed throat. I decided to replace the feed throat with a newer, one-piece version. Marlin sells a feed throat conversion kit to adapt the older models, although you can also buy the pieces separately. Brownells, Numrich and Midway carry parts--I used Numrich and Midway for the parts for this project. Brownells has an exploded parts diagram that may be useful, even though it is for the newer version of the Model 60. Warning: The modifications and instructions set out herein were for my firearm, but may not work for yours. All information is presented for entertainment purposes only, and you rely on it at your own risk. The installation of a new feed throat into an older Marlin 60 is not a simple drop-in procedure. Besides requiring the firearm's action to be disassembled, there are some minor modifications that must be made to the feed throat. It is also necessary to use a different cartridge lifter and lifter spring/ejector. Front view -- old feed throat on right. Note that the old feed throat is angled on both sides, while the new feed throat is squared off on one side. As described below, the new feed-throat will need to be filed down to be angled on both sides. Back view -- old feet throat on right. You will notice that the old feed throat includes an ejector, while the new one does not. Instead, the new feed throat uses part of the lifter spring to act as the ejector--it fits into the slot visible to the left on new feed throat. Side View -- Old feed throat on top You can see some of the differences between the old and new feed throat designs in the photographs above. Of course, one of the differences is the fact that the old feed throat is a two-piece design that is held together with a single rivet. As the photograph of the back of the feed throats illustrates, the two halves can be forced apart slightly (at least in my specimen), which I believe to be the cause of the feeding problem. Another difference you will note is that the older design has three knobs or studs projecting from the sides, which fit into holes in the side plates of the action. These knobs hold the the feed throat in place. However, the new feed throat has 4 knobs. Obviously, the fourth knob (if you are looking at the feed throat from the front, it is the front-left knob, roughly corresponding to the location of the rivet in the old design) will need to be removed. In the side view, you can easily see a third major difference, which is that the old feet throat has an integral ejector cast into it. There is no corresponding feature on the new feed throat. Instead, one of the tails of the lifter spring fits into a notch in the back of the feed throat (you can see this in the middle photograph) and projects slightly over the top of the feed throat, thereby serving double duty as the ejector. Finally, looking at the front view, you will notice that in the old feed throat, both sides of the top of the feed throat are angled. These match up with angles cut in the bottom of the bolt. But on the new feed throat, one side (the left, as viewed from the front) is squared off. This will also have to be shaped with a file to fit into the old bolt. The instructions below will tell you when to make the modifications to the new feed throat. There are also differences between the lifters and springs. Old Feedthroat, Lifter and Spring New feed throat, lifter and spring As you can see from the photographs above, the old cartridge lifter is longer and shaped slightly differently from the new cartridge lifter. The old cartridge lifter will NOT work with the new feedthroat. Although the old cartridge lifter will fit into the new feedthroat, it will not depress far enough for the bolt to travel freely over the feed throat. You must install a new cartridge lifter. The springs are also different. On the old spring, the two tails (or arms, if you prefer) are close to the same length. One tail has the end sharply bent to one side, and fits through a hole in the side plate to anchor the spring. The other tail fits underneath the cartridge lifter. The new spring has very different lengths of tails. The short tail, with the sharply bent hook, actually fits under the cartridge lifter. The other tail fits into a groove at the back of the feed throat, and projects slightly over the top to act as the ejector. After making sure that the firearm is unloaded, turn the firearm over so you can see the bottom of stock and trigger guard, so you can see the screws that hold the receiver and stock together. At least on my particular specimen, the slots of the screws are each different sizes, so you will need at least three screw drivers or screw driver bits with varying widths and thicknesses of blades. It is easy to mar the screws if you do not use the correct size of screw driver bit. Bottom of firearm -- remove the circled screws As you can see, there are three screws through the trigger guard (at least in the particular model I own) and larger headed screw forward of the trigger guard. Only the three right-most screws need to be removed. Screws removed With those three screws removed, the barrel and action should pull away from the stock and trigger/trigger guard assembly. Back of Action Front of action At the front and back of the action are screws that hold the action to the receiver and barrel assembly. Remove these. As with the other screws, the size of the slots are different, and you will need at least two different sized screw drivers or screw driver bits. Screws removed. With these screws removed, you should be able to pull the action loose from the receiver/barrel assembly. Be careful as you remove it to pull down and to the rearward to clear the plunger in the tube magazine (or simply remove the plunger completely--i.e., turn and pull out the tube just as if you were loading the firearm). This plunger will be projecting into the hold on the front of the feed throat, and can be damaged or broken if you pull the action straight downward. Useful tools for disassembly and assembly of the action. Left to right: a small upholstery nail puller, a straightened paper clip, and an awl. Some tools that will be useful are (1) a small upholstery nail puller (or you can use a flat screwdriver with a slot cut into the blade), (2) a paper clip or piece of wire, and (3) an awl or scribe. The nail puller will be used to press the hammer strut bridge (a small plate at the bottom of the hammer strut) and compress the hammer spring. The paper clip will be used to hold the hammer strut bridge in place so you don't have the hammer strut bridge and hammer spring go flying across the room. The awl will be used to remove and install a couple small c-clips. Paper clip through a hole at the base of the hammer strut Before going further, place the paper clip through a small hole you will see at the base of the hammer strut, as shown above. This will keep you from losing the hammer strut bridge or hammer spring. The two c-clips to be removed Next, remove the two c-clips shown above, so you can take off the right hand side plate. (Do not attempt to remove the other side-plate as most of the other parts are connected to that side plate, and it will greatly complicate reassembly). Old feed throat, lifter and spring With the right side plate removed, the feed throat and lifter will be exposed, and can be easily lifted out. Old Lifter Spring. As you can see, one part of the old spring fits into a hole in the side of the action, while the other "arm" fits under the lifter. At this point, you will need to grind off the extra knob on the new feed throat. The metal is soft and non-ferrous. So, if you are using a power grinder, be careful as the metal will be removed quickly and without the usual spray of sparks thrown off by steel to warn you when the grinding wheel has contacted the metal. New feed throat with knob ground down Next, put the new spring on its pin. New Spring. The new spring does not fit into the side of the action at all. Instead, the longer "arm" will fit into the groove on the back of the new feed throat to act as the ejector, while the shorter "arm" fits underneath the new lifter. Then place the new feed throat into place, and position the long tail of the lifter spring into the groove on the back of the feed throat. With that done, it is time to push the lifter arm into place. The small hole in the lifter goes over the pin to the far left of the photograph, above. Obviously, the front part of the lifter must slide first into the feed throat. I found it easiest to hold the feed throat in place (you can hold it with your hand, or wind a rubber band around it), hook the short tail of the spring into place, and then push the lifter forward and down (at an angle) into the back of the feed throat, and then maneuver it into place into the pin at the rear of the lifter. Orientation of the new lifter and spring. Remember, though, that the short "arm" of the spring (to the left in the photograph above) will need to go under the lifter. If you have not done so at this point, wind a rubber band around the feed throat to hold it in place. New feed throat, lifter and spring in place. You can see the bit of the spring that fits under the lifter above, as well as how the longer arm of the spring fits against the back of the feed throat, and protrudes over the top, to act as the ejector. I found the reassembly after this point to be the trickiest part, simply because of the difficulty of compressing the hammer spring so you can fit the tabs on each side of the hammer strut bridge into their respective holes. Although you may find an easier method, this is what I did: Using the upholstery nail remover, place it so the strut will fit up through the cut in the blade, and push it (compressing the hammer spring) until you can fit the tab into its hole in the left side plate. Then put the right side plate over the right tab of the hammer strut bridge, and, holding it tightly together, shift the side plate around until you can fit it over the other pins that hold it in place. If your experience is like mine, you probably are best doing this step away from children because you will likely be cursing a lot. Be mindful that the paper clip stays in its hole, or you may see the hammer strut bridge and hammer spring fly across the room! Once the side plate is on, use a second rubber band to hold it in place, and push the two c-clips into place. You can then unwind the second rubber band. You will probably just have to cut the first rubber band loose from around the feed throat. Finally, remove the paper clip. Back together! If you have not done so previously, it is helpful at this point to remove the bolt from the receiver to help with the final fitting and shaping of the feed throat. Putting the bolt into its rearmost position over the action, you will notice that the bolt will not ride over the new feed throat. This is, as I mentioned earlier, because one side of the feed throat is squared off rather than angled. Look at the bolt and feed ramp from the front, and you will be able to see what I'm talking about. At this point, you will need to take a file and shape an angle into the side of the feed throat. Again, the metal is soft and easily removed. So stop often and check against the bolt. Don't take off too much material. When it is done, the bolt should ride over the feed throat without lifting up. You do not need to do any shaping of the rear of the feed throat or the side that is already angled. One thing I found is that the lifter spring/extractor scraped and caught against the bolt. I had to bend the spring down slightly so it wasn't angled so steeply. However, check your bolt before you do this. You don't want to end up having to order a new spring. Once the bolt rides fairly smooth, you can put the bolt back into place and finish your reassembly. Reassembly from this point forward is the opposite of the disassembly. Again, be careful of the plunger in the tube magazine. As some of you may know, I had previously written up this project, and wound up having ejection problems. My error in my previous attempt was thinking that I could mix parts, using the new feed throat but the old spring and lifter. As I mentioned, the old lifter does not depress far enough to let the bolt clear. However, it was not immediately obvious to me that this was the problem. So, I ground too much off the new feed throat, including on the back of it. By the time I figured out what was wrong, I had removed the cut in the back of the feed throat for the lifter spring/ejector. Of course, I didn't know what problems that was going to cause because I didn't realize that the spring also acted as the ejector. I simply replaced the old lifter with a new lifter, and used the old spring. As I reported in my earlier post, when I took the rifle out to test fire, I had no more feeding issues, but it now wouldn't eject. Looking into the issue further was when I realized that the change in design of the feed throat included a change in the ejector. So, the end result is that I had to order a new feed throat and do the whole project over again. Currently, I have tested the feeding by hand, but I haven't had an opportunity to go out shooting. I will report on any issues that I have. However, the ejection seemed pretty positive when operating the bolt by hand, so I'm confident that the ejection issues are solved. And since the replacement of the feed throat last summer had solved the feeding problems, I anticipate that those issues are also resolved. Obviously, ordering a new feed throat kit (the feed throat, lifter, and spring) is a significant cost relative to the cost of a used Marlin 60. So my hope is to see if there is some way to fix the old feed throat to improve reliability. That will probably be a project for this coming summer. If you have any experiences or thoughts you would like to relate, please comment. Update (3/2/2015): I took the rifle out shooting this past weekend and put about 100 rounds of a couple different brands of standard .22 lead round nose through it without any failures to feed or extract. So, I consider the project a success. Update (6/17/2015): Last Friday, a reader emailed asking when my Marlin Model 60 was manufactured. Interesting question. I knew that the particular model I used in my article dated from before the mid-1970's, but not the particular year of manufacture. In making a quick search, I came across the web-page for a company calling itself the Antique and Collectible Firearms and Militaria Headquarters which had several resources for determining manufacture dates for various manufacturers, including Marlin. It stated that, for Marlin firearms made between 1969 and 1990, "[t]he first two digits of the serial number designate the year of manufacture, either as the last two digits of the year (in 1969-71) or as a number code (1971 and later)." According to my reader, the system for 1971 and later was to subtract the first two digits of the serial number from 100 and that would give you the year (in a 2-digit format). My particular model was made in 1970. Update (9/9/2015): I expanded the descriptions as to a few of the photographs to give more of an explanation of the differences between the old feed throat and spring, and the new feed throat and spring. Update (11/30/2015): I had the rifle with me this past weekend, shooting in temperatures between 20 and 25 degrees Fahrenheit. Out of approximately 50 rounds, I had two failures to eject ("smokestacks") and one where the bolt cycled far enough to eject the spent casing, but not enough to pick up a new round. Considering the temperatures, and that the gun had been sitting in the cold while I used other weapons, I thought it did pretty well. Update (10/15/2016): I had a request asking for additional photos of the feed throat after the shaping allowing it to use the old bolt. So, without further ado: Update (8/11/2018): I saw on a forum that cited to this article that there were complaints about the photograph showing the fully assembled rifle at the top of this article. Accordingly, I have replaced it with a new photograph that better shows the rifle.

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