CASE Garden Tractor Foot Control - Updated 12-26-2010

I know a lot of fellows would like to have a foot travel control on their older Case Garden tractors, and I threw this web page together with some decent photos of what I did to accomplish such. My method is simply a lever not much unlike you would find to shift gears on a motorcycle. Step down to go forward, and lift up with your toe to back up. When I first considered building a foot control, I thought about attempting to utilize a "rocker" type pedal, but had concerns about being able to maintain steady speeds on rough surfaces. I also had concerns as to whether there would even be enough room to consider the heel control for reverse aspect. On top of all that, I recognized that it might get real difficult to get on and off without accidentally hitting a rocker pedal, and I also kept thinking about the dangers of having someone just "jump on" who was not familiar with the machine. Lastly, could a rocker pedal be added easily ? I concluded no, not with the current footrests.

I added this method of foot control to my project tractor and have found it priceless. With the holding valve, I have incredible and precise control for snow plowing. The project tractor has the foot control on the left side because it will have dual brake pedals on the right eventually for dual disc brakes. If you have not seen that ongoing project, you can find it here: http://www.data-cut.com/case448.htm

At this point, I have added this same foot control method to four different tractors and have made some minor changes to the method along the way. So, with that, some of the first photos of the foot lever itself are dated. You can see the final lever design near the end of the page.

The images provided below are from my conversion on my stock 446 and will show the foot control on the right side of the tractor. There really is no difference in which side has the pedal, but on the stock tractors, the original brake pedal can get in the way if you have big feet like I do (11.5's), or if you wear steel toe boots. So, lets get started !

Here is the beginnings of what you need. A "lever", about 12" of 1/4" cold rolled steel, two short peices of 3/8" ID x 1/2" OD tubing, Some 3/8" rod or shaft, a 3/8" washer or two, and a shaft collar. (note that newer designs use a longer piece of cold rolled flat bar)

Before you get flustered over that fancy "Lever", let me just tell you that it is nothing more than 1" wide x 1/4" thick flat bar. If you have a hacksaw, vice, propane torch, file (or grinder) and a hammer, you too can make one. I left the material about 2" longer than necessary, then marked out a taper from the full width down to about 3/4", putting the fancy little ball ends on it in order to hold a rubber grommet on the end. Then with the Mapp torch, I heated up the bend area and gave it a tight twist right near the end. The direction of the twist shown will work better on one side or the other of the tractor, so keep that in mind when you bend yours. I then held it up to the tractor and made some additional bends that will be necessary to clear the big pin that is in the right hand hydraulic lift plate, then marked a good spot for a 3/8" hole.

Here is a picture with the grommet I happened to have in a junk drawer. I know that this grommet is from the shift lever of a Yamaha 650 V-Star. I KNEW it would come in handy one day..... Har !.. and women think we keep too much "junk".... Ya, GOOD JUNK !!

Below, we find the two short sections of tubing to act as "bushings" for the cross shaft. These are made from the 3/8' ID x 1/2" OD tubing, simply cut off at 3" long each. The holes are drilled thru just one side and countersunk to offer a location to drop in a few drops of oil now and then. Because of their length, a little oil should go a long, long way, and frankly because of the surface area, I dont think I will be around anymore when they wear out. On this installation, the holes were put inward, so this means you will have to remove your inspection plate to oil them. If that concerns you, you could put in a little forethought as to other methods of lubrication if you so desire. On newer installations, I have installed the bushings such that these "oil holes" are just stiking out on the outside of the steering tower, so note that when viewing these photos.

Note below, that the bushings need to be installed into your steering tower. Now I did not have three extra arms to use in order to take pictures of how these 1/2" holes got here, but essentially, you need to mark the holes center locations carefully on each side of the tractor, and drill them first with a 1/8" drill bit. The locations must be such that the bottom edge of the 1/2" diameter bushings ride just above the weld line, right along the top of the frame, and right tight to the vertical bend in the tower, just ahead of where it angles back to the inspection plate. To get the height the same from side to side, it might be easiest to quickly pull the bolts from the footrests and remove them, then measure up from the bottom of the frame. While this photo does not clearly show that bend line in the tower, subsequent photos will. Once your 1/8" holes are in, you can slide some 1/8" rod completely thru from side to side to double check your locations. The best drill you can use for a nice tight 1/2" hole is a step drill. If one of your 1/8" holes ends up off just a touch, you can often "steer" a change of direction in with side pressure on the step drill as each step makes its way thru.

The next thing to do, is test fit the components, so slide one of the bushings into the hole on the left side, then slide in a spare piece of 3/8" rod all the way across and out the other hole on the right side.

Then, slide in the bushing from the right side.

Below, push both bushings in so that about 1/4", or the minimal amount you feel confident that you can tack into place with a welder remains outside the tower. The section of rod will maintain alignment. Again, understand that on newer installations I have kept the bushings out slightly farther, so that oil holes could be located there rather than inside behind the access panel.

Below, take a peek inside the tower and make sure that your oil holes are pointed upward, likewise if your keeping them outside of the tower. This shot also lets you see the relationship between the newly added shaft and the 1/4" travel valve actuation rod that is cotter pinned to the travel lever. Our goal here is to insert a bellcrank or linkage arm right in between the hose on the left and the actuator rod. The original 5/16" linkage rod will need to have a short piece of 1/4" rod welded 90 degrees to it to engage our new bellcrank. More on this as we continue....

Below is a view of the right side bushing.

Below, you will see that I tacked the bushings from outside the tower in 3 spots. One in the front, one in the back, and one underneath. If your a halfways decent welder (I admit, I'm not), you might be able to get one heavy tack right underneath, and do very little paint damage. NOTE that I tack welded these WITH the 3/8" temporary rod in place to maintain alignment, but removed it here so you could see the bushing more clearly. So, keep the rod IN place until after you have welded the bushings in place. On newer installations, I have been able to keep the welds inside the tower as I had the tractors dis-assembled and could easily get in there to tack weld a few spots on each bushing.

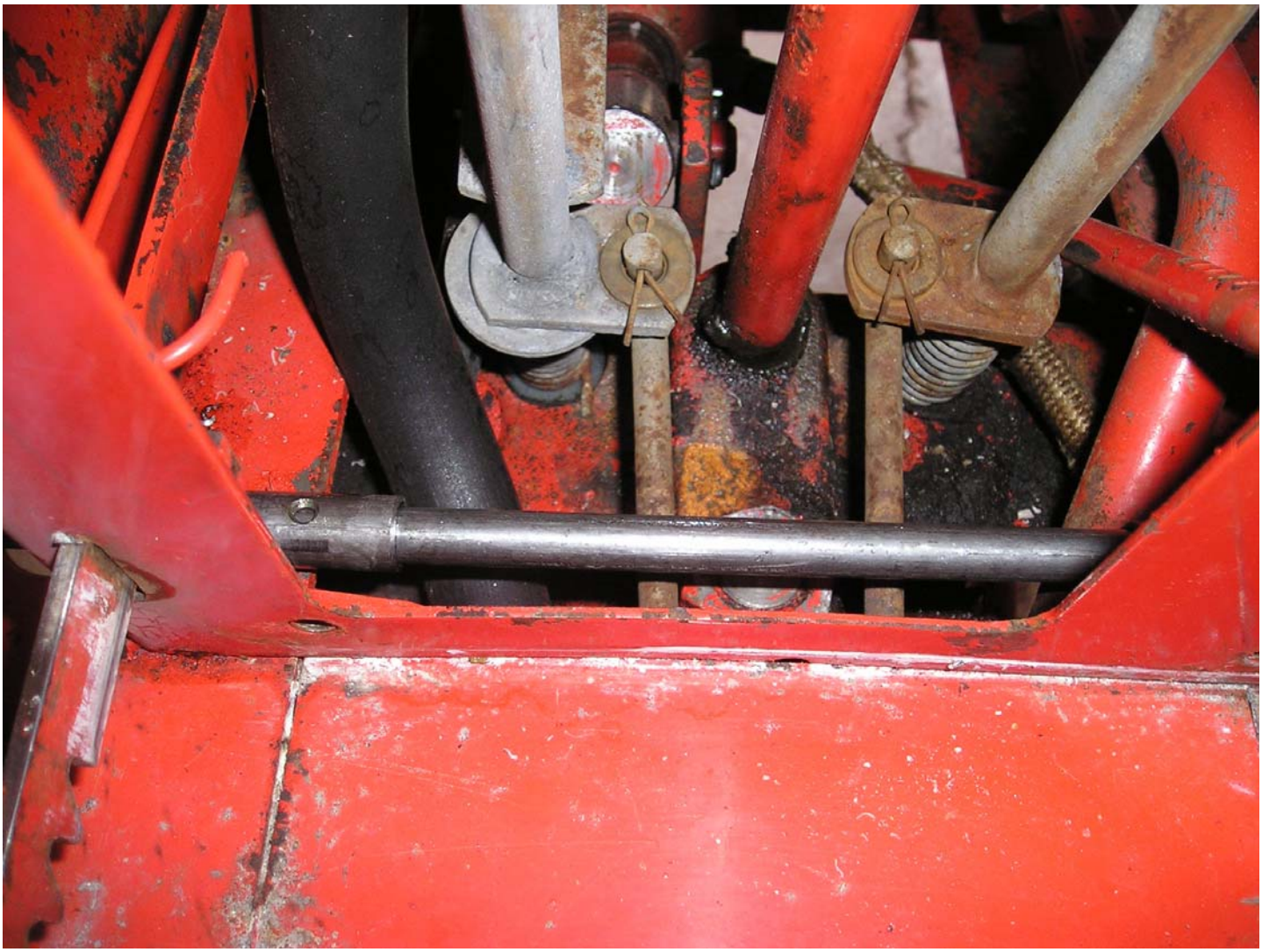
The other side..... (ignore that big disgusting hole in the right footrest that the previous owner hacked in it - I will need to pick one up to replace it)

The next step is to weld the "lever" to the 12" long peice of 3/8" cold rolled. I temporarily put a shaft collar on the rod to dictate the depth and squareness of the lever to the rod, then remove it after I have it tacked. I let about 3/16" of the rod stick thru the hole in the lever, then welded around and on top of the protruding rod. My welds are not the greatest, but this is "Foot Control" guys.... NOT "Foot Control OF THE YEAR" !

Next, slip a 3/8" washer onto the shaft and slide the whole shaft in from the left side into place for a test feel. Note the smooth curves in the lever necessary to clear the hydraulic lift pin. I set the length of this assembly up such that my heel is fully back in the footrest, and when pressed down, it pretty much comes flush with the front edge of the footrest. I think the measured distance I came up with from the corner of the foot rest to the inside edge of the lever where the rubber is came to about 10". This will be a push down to go forward.....

And a "Toe under" and LIFT to back up. I've gotten REAL used to it, but I also ride cycle, so it is almost a natural.

Below, another shot that shows the relationship between the new cross shaft and the travel valves push rod. Again, we are going to fit a bell crank right between the hose and the push rod.



Now since I could not put my fingers on a nice universal bellcrank (though I KNOW they are out there in the HVAC market), I just conjoured this one up. I do have the advantage of having a CNC machine, so with a quick cad drawing of what I thought I needed, I had one in a few minutes. The concept here is simple. We are going to slide this bellcrank onto the 3/8" rod right where I explained earlier. That top hole is for the 3/8" rod and the slot and bolt allows us to adjust and tighten it on the shaft exactly where we want it. There is exactly 1/2" of space between the bottom of the 3/8" hole, and the top of the slot. The lower slot is 5/16" wide and 1" long, and our goal here will be to use a plastic 1/4" ID x 5/16" OD flanged plastic bushing to slide in it, and the bushing will get slid over the top of the stub of 1/4" rod we still need to weld to the original travel valve pushrod.

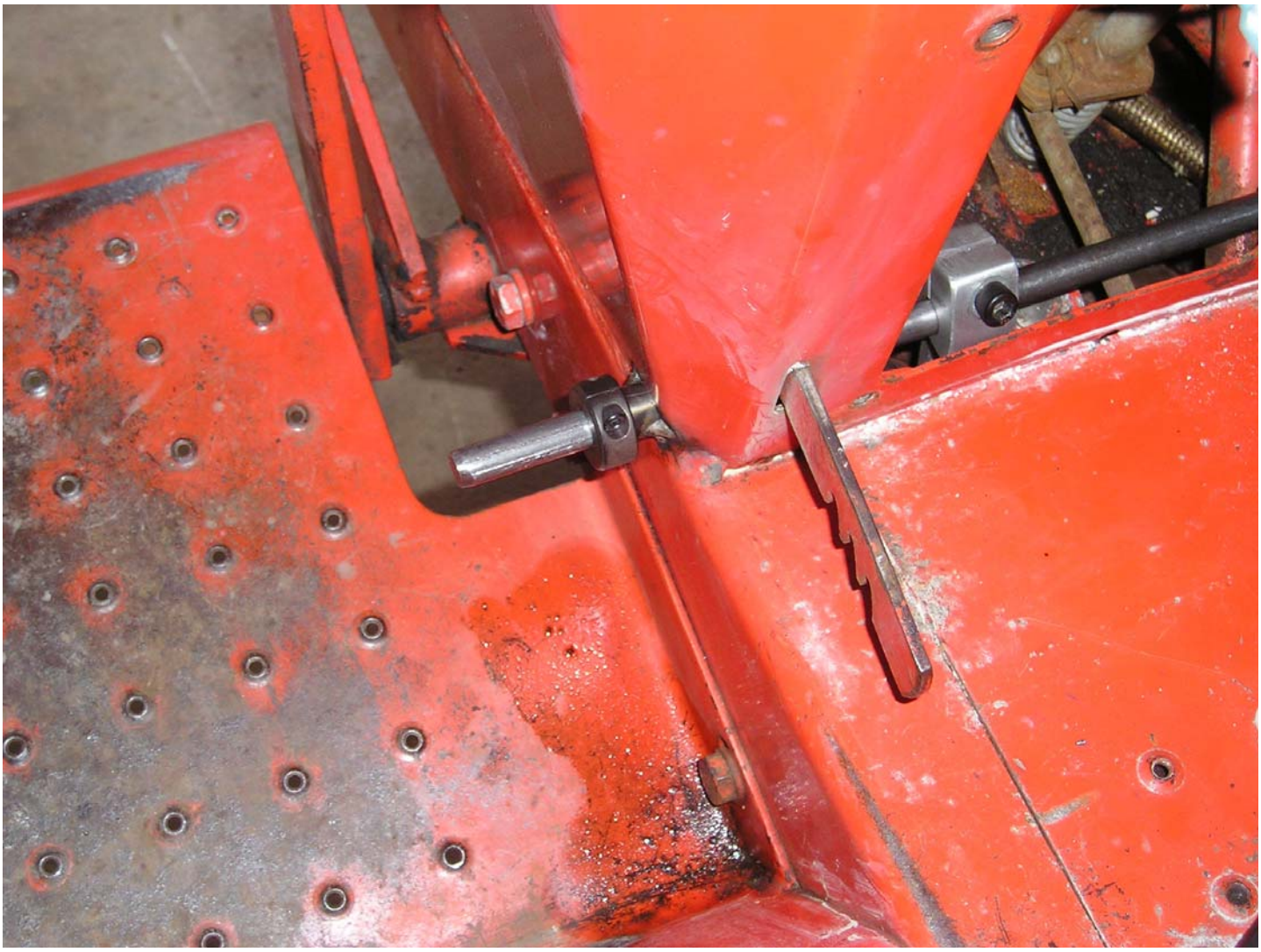
Below is a shot of the backside. The narrowed portion is 1/2" thick and will give the bushing some decent surface area to ride in. That will make things last longer. Now again, keep in mind that you do not necessarily need to make this part. There are some cast bellcranks in Mcmaster-Carr's catalog that might work, and I am sure Grainger has something too. I used something similar to this that I had laying in a junk drawer on my other 400 series tractor that was just a plain old vent actuator or plenum control arm. If I had the time and the means, I would find all these parts and be selling this as a kit !

Here is a shot of the part being cut out of aluminum. And yep, thats just a wood router with a wood carbide bit. I have two real milling machines, but have not converted them to CNC control yet. Luckily I can make one off parts like this on my router when necessary. If you want to see my router, there is a whole site about it here: http://www.data-cut.com/

Below: So here you can see the bellcrank on the shaft, and right next to the original push rod. Now you might be able to see why my slot and tightening bolt was at a funny angle on that bellcrank.... it will make it easier for me to get at that fastener to tighten it.

Below is a little better camera angle of what's at stake here. If you look closely, you can see that 5/16" slot in the bellcrank. We need to weld on a 1/2" long piece of 1/4" rod to the original 5/16" push rod, such that it protrudes squarely INTO that slot. Alignment is important, and when you get the original rod out on the bench, it can get confusing as to where to weld and at what angle, but it is not near as difficult as one would think because the goal is to jump in there with a sharpie marker, and put a black line on the original pushrod as an indicator of where this protrusion must go. Then, once out where you can work on it, you are able to clamp that forward edge in a vice and easily tack the peice on perpendicular and square to the original push rod because the front edge of that shaft has a clean vertical bend. it clamps up pretty square automatically if you get my point. Tack it first then reinstall it before you really stick it tight.

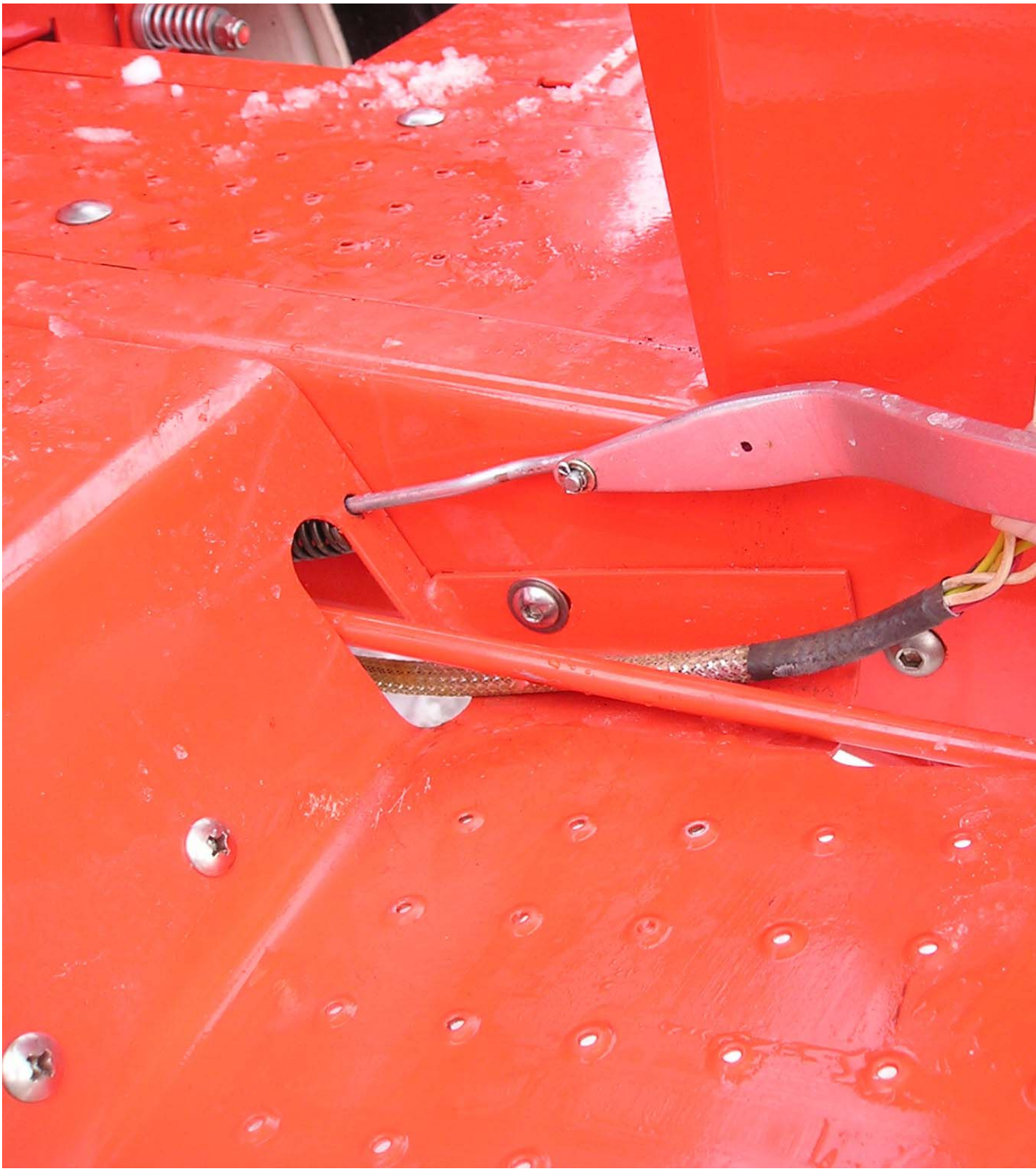
Below: You can see that the whole assembly is held in place by the shaft collar on the left side. You can file or grind the bushing off pretty close to the tower on this side and that will put the collar much more out of the way. At some point too, you can mark the excess 3/8" rod and cut it off.



Unfortunately, I did not take photos of welding the 1/4" protrusion to the 5/16" actuation rod, but I think you get the idea. When the protrusion has been added to the original push rod, and you have adjusted everything to give smooth motion once the plastic bushing has been place over the pushrod and engages with the slot, you can block up the foot lever to a height that you can easily get your foot under, center the travel lever, and tighten the bellcrank. Thats almost IT.... The final thing is something that is different from tractor to tractor, and that is the ACTUAL type of travel valve spring/return to center action your particular valve has. I have seen the gamut already with numerous variables when it comes to these valves, so if your valve does not want to return to center automatically, you will need to insert some method to make it center. I have a lazy valve on my other tractor that needs "help" in one direction. I simply hung a spring underneath to help it along and it works fine. Some individuals who have done this same conversion have found that they need to push down on their hand control to move into reverse. Some feel this is a good safety feature. On newer installations, I have removed the neutral safety switch block and used a dremel to take the "bumps" off the switch, creating smooth ramps in each direction. When reinstalled, the neutral switch remains active, and the ramps help to self center the valve.

Below are a few photos of the best way to help self-center a valve by making the foot lever longer in the back, then using a rod and spring in conjunction with the foot rest to pull the

valve to center. You'll have to excuse the snow and dirt... this is a working tractor !

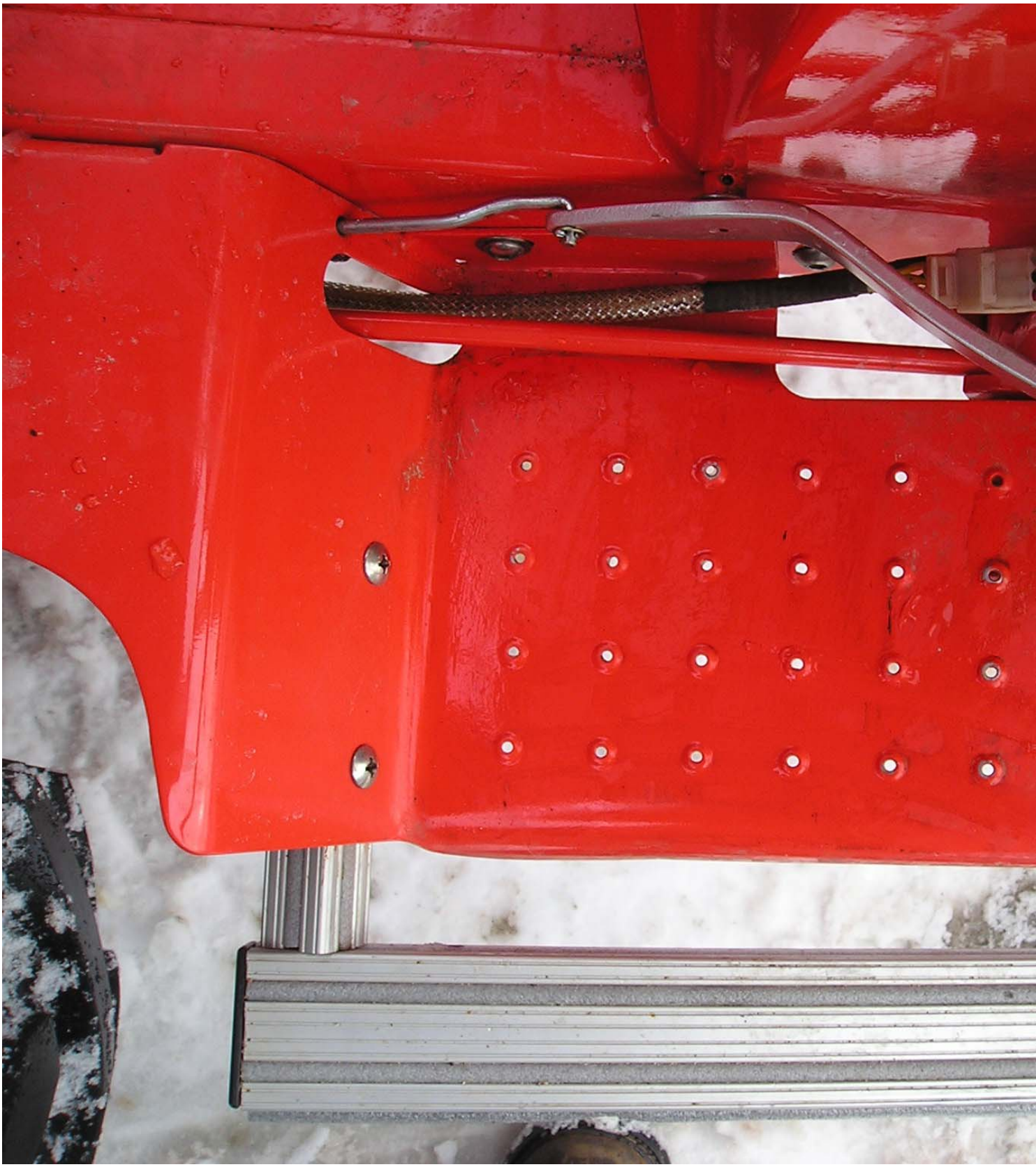


So, you can see the longer tang on the back of the lever that engages a rod that goes through the foot rest to use spring tension to celf center the lever. The rod has a shaft collar slid onto the end that allows tension adjustment of the system. This has worked excellent. I only have a hole thru the foot rest at this point. Next summer I will install the rod through a nice bushing

and also make a bushing to hold the spring in the center of the spring where it hits the foot rest. This setup is on my newest tractor and I had a lot to do before snowfall came this year so it ended up unfinished.

Top view. The aluminum you see is the lower door jamb of my Cab, so dont get confused looking at that. You'll also have to ignore that plug and wires in the photos too. They are the

connections for my blower chute turn and height control switches.



Once you have installed a foot control, you will wonder in amazement how this wonderfully made tractor could have been made without this accessory. Having both hands to STEER and

work hydraulic controls or chute controls is indeed priceless.

But there are some WARNINGS I will add. It is SO easy to jump off of these tractors and leave them running, only to have a neighbor or friend "jump on" to "move it" a little. They WILL get the surprise of their life when they accidentally find that pedal. KIDS around these tractors can be a real hazard if they are not trained to use them properly, but it sure is safer to give them RIDES when you do not have to mess with a travel HANDLE.

So, for safety >>> I find myself always pulling the rear axle in neutral and setting the brake if I am going to get off, and I advise others to do the same. I still feel that this foot lever style is far better and safer than a rocker pedal..... the lever is far forward of the main step area which makes it a little harder for people to get a lurching surprise.

Finally, there is a GOOD reason that I am not able to work on Tractors near as much as I would like to.....

My first GRAND DAUGHTER !

Her name is VADA, and I spend every moment I get with her wondering where I was when my kids where little (I know actually.. working!).

Sure, we ride tractors around and she loves it, but I thought I have to get her on her own "wheels" early. At 10 months, shes got this down pat.

Be safe guys and enjoy your KIDS, GRANDKIDS and Case Tractors!