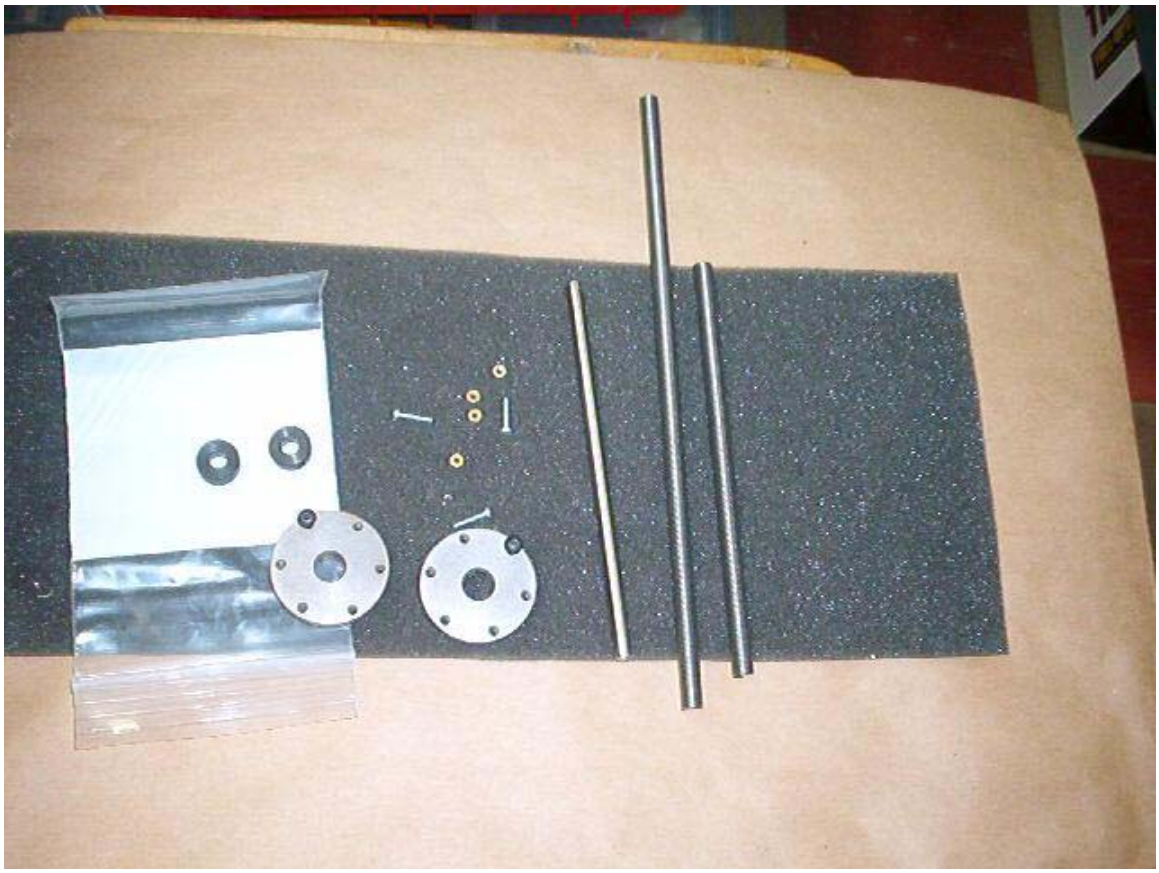
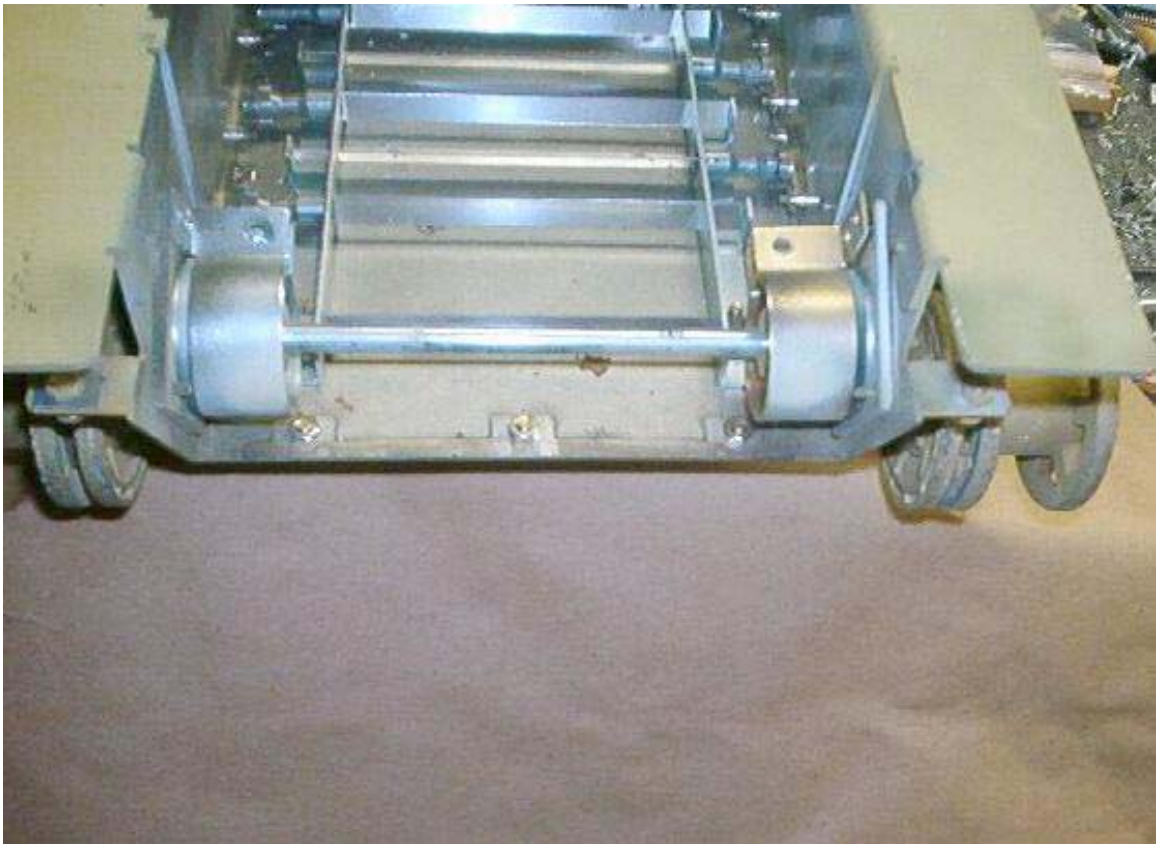


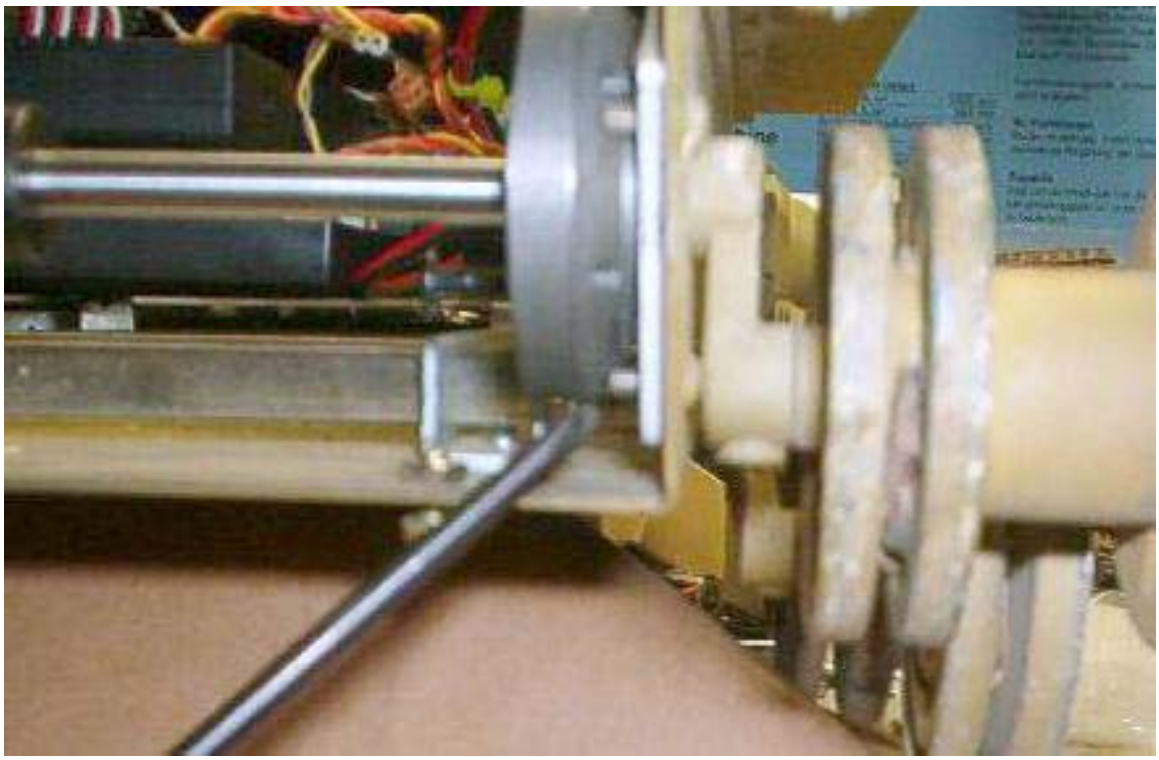
Lay out the parts. Parts include two “cast iron wheels” with screws (the larger screws are 4-40 and only fit the cast iron parts), one pre-cut length of 5mm rod, two 5mm set collars, spring material (enough to practice cutting on, also), assorted smaller 2mm screws and 2mm nuts. There will be extras left over. Save these. The longer 2mm screws are anchors for the springs. The shorter 2mm screws are used for replacing existing screws or filling in holes.
Also included are small wrenches for the 4-40 screws and the 5mm set collars. The wrench sizes are 1/16 inch and 1.5mm respectively.

Note that I did not have to remove the actual idler wheels from the idler arms.

Picture above shows the basic layout of the design as it would look in the tank.



Remove the Tamiya parts: tracks, rear hull plate (5 screws and nuts), speaker (two screws on bottom), the idler drum clamps and all remaining idler parts. The actual idler wheels do not have to be removed from the idler arms.

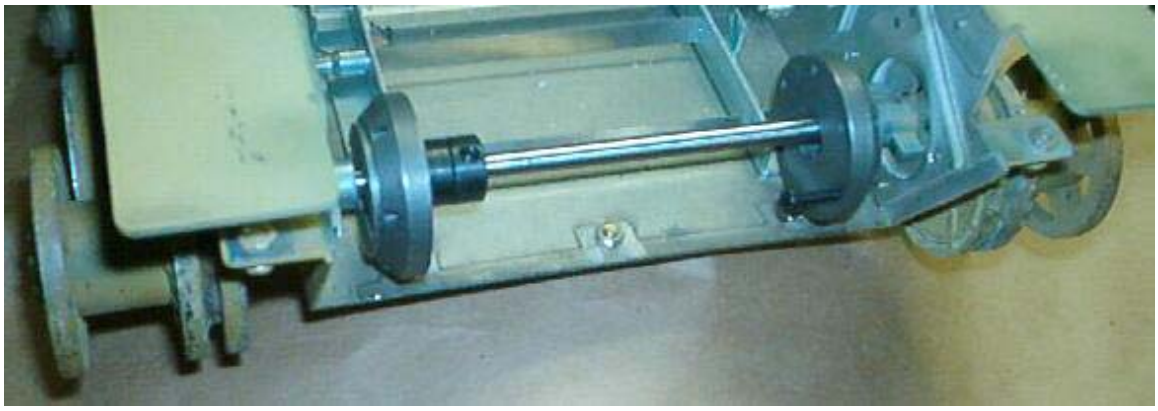


The small 2mm screws that secure the aluminum reinforcement plate must not protrude more than a 1/32 inch. Either grind these down or replace them with my 2mm screws. The top picture of a “new chassis” shows a set-up ready for the new idler parts.

Temporarily fit the cast iron wheels onto the 5mm shaft and install the idler arms back into the sides of the tank hull. This will enable you to determine how much material needs to be removed from the plastic rear hull, namely the “D” parts shown. Use a Dremel tool or file to remove the material. Wear safety glasses. Ensure that the cast iron wheel clears the plastic parts. When satisfied, remove the cast iron wheels and shaft. Clean all parts and areas on the inside of the tank at this time also.

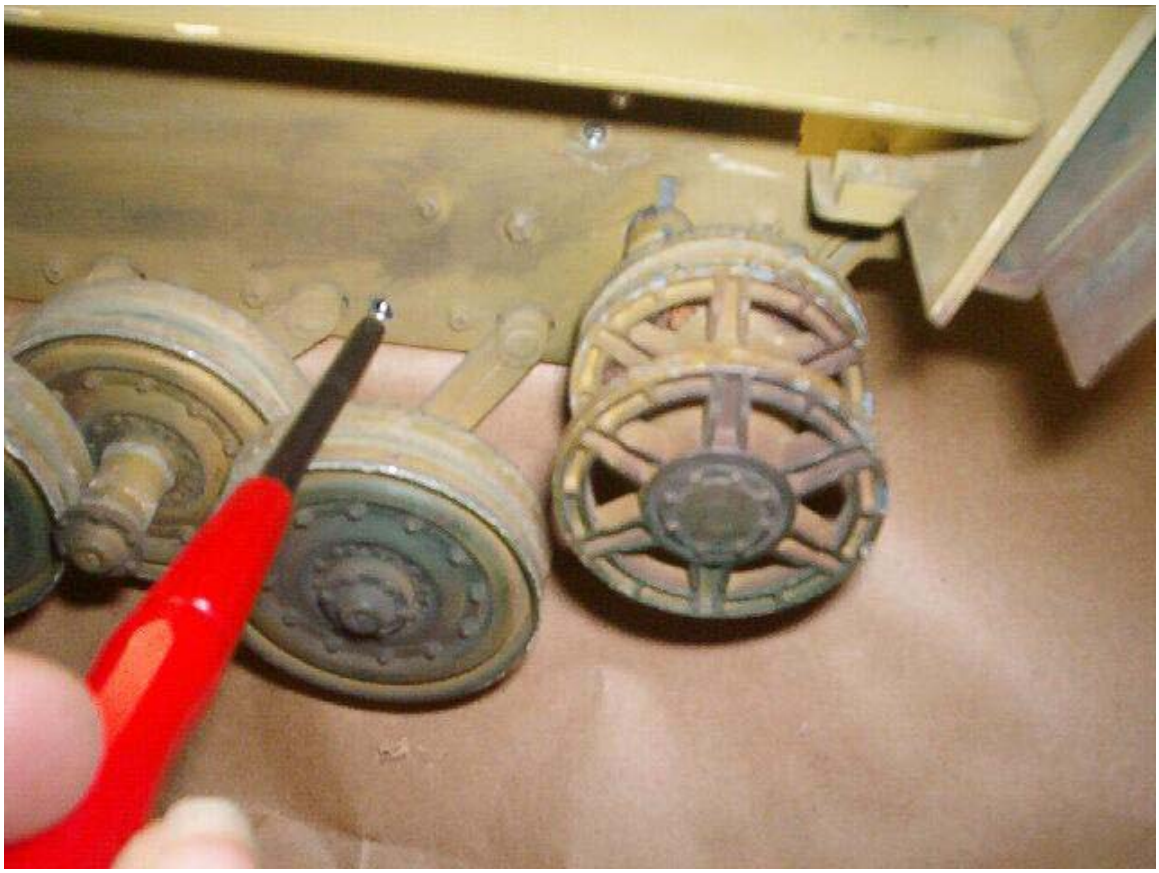
The anchors for the spring can be located almost anywhere. However, the dynamics of the springs require a certain minimum and a certain maximum distance. Too short of a spring will result in a very stiff idler action, and too long of a spring will result in either too soft of an idler action or worse, one that does not 'snap' back to position after a rock incursion. To fine tune the spring, stiffening will result if you remove one or two coils or loops of wire at a time.
About a 1-1/4 and a 1-1/2 inch length for the 'main spring' is what I used. This 'main spring' is anchored from one suspension arm mount screw to a screw in the cast iron wheel. This method of anchoring does not require making additional holes and keeps the spring below the speaker box (thus eliminating the need to modify that as well).
The second, shorter spring, which connects in a more vertical manner, is shorter than 1-1/4 inch. The ideal length for this particular spring was achieved by trial and error until the idler wheel (with tank tracks installed) moved and returned crisply during tank operation over rough terrain. Do not cut and fit these springs until a little later.

Cutting the spring is easy. Use a pair of medium size wire cutters, and snip the wire. To create a “hook” or “eye” of the spring, place the wire cutter in between the last and the next to last coil or loop. Squeeze the wire cutters but don’t cut through. This will force the last coil of spring to permanently deflect away from the body of the spring, forming an ‘eye’. You can then use a pair of needle nose pliers to fully extend the spring eye and shape or otherwise open the eye to suit the installation. This will create an “eye” to clip over the attachment screws. Practice this method on the first half-inch or so of spring to get a feel for how it cuts and bends. WEAR SAFETY GLASSES. Look over the instructions in their entirety to get a feel for how the springs are fitted. The main spring, which is to be 1-1/4 and 1-1/2 inch long or so, is the first to be installed (later). You will need one each of 1-1/4 and 1-1/2 inch springs, while the “secondary” spring which is the adjustment spring, will be two in quantity.

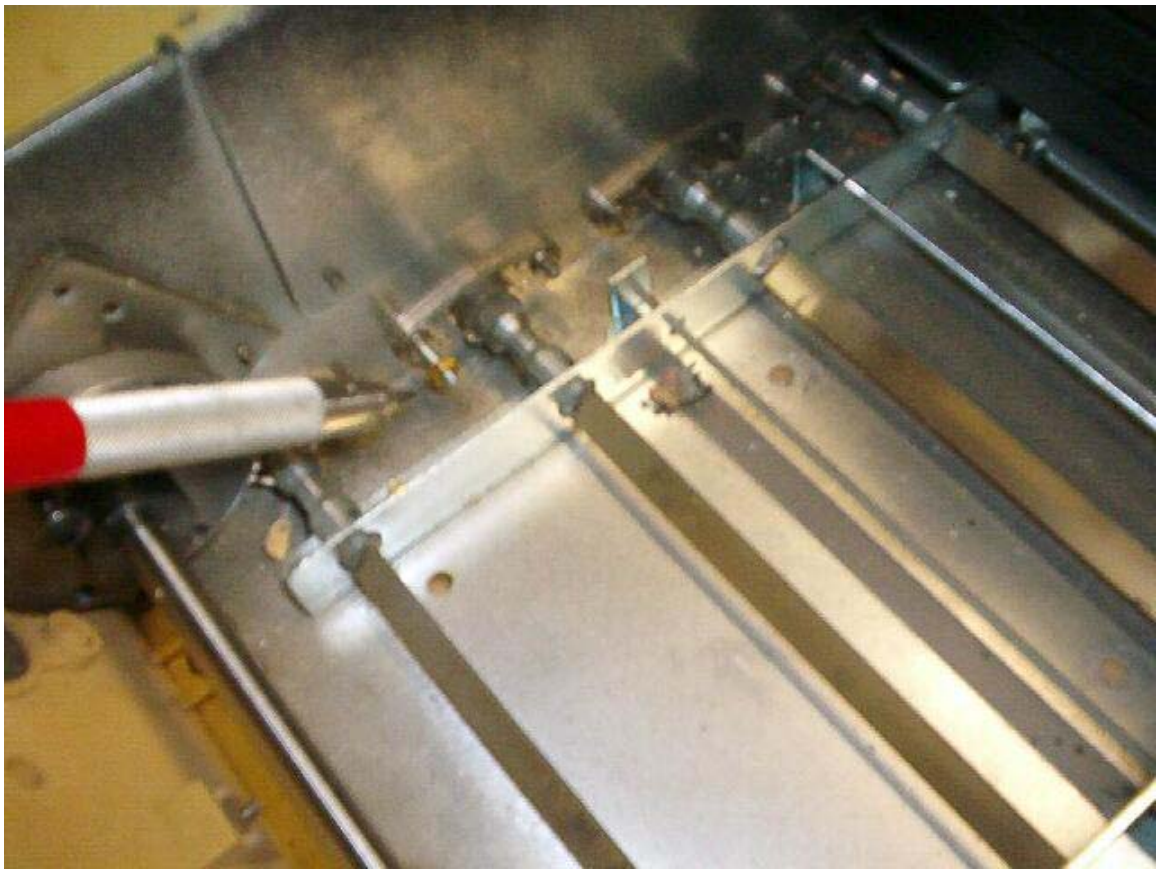


Lubricate the inside areas of the reinforcement plate, so the idler arm and cast iron wheel will move smoothly when they are installed. Apply a small amount of grease inside each idler arm hole also. Only a small amount is needed. Too much will create hydraulic lock and prevent the 5mm shaft from fitting all the way into the hole.

Finish installing the idler parts at this point. The 4-40 screws in the cast iron wheel are the anchors for the springs. One is shown here but you should screw these in later.
Slide the two 5mm set collars and cast iron wheels onto the long 5mm shaft. Insert an idler arm into the hull side. From inside the hull, slide one end of the 5mm shaft into the other empty hole and then into the idler arm. Install the other idler arm. Slide the cast iron wheel onto the ears of the idler arms and then slide a set collar up to the cast iron wheel and snug into place. Adjust them until all parts rotate smoothly with no binding. Use grease where needed. I installed the rear hull plate at this time but I suggest you may want to leave it off until later.

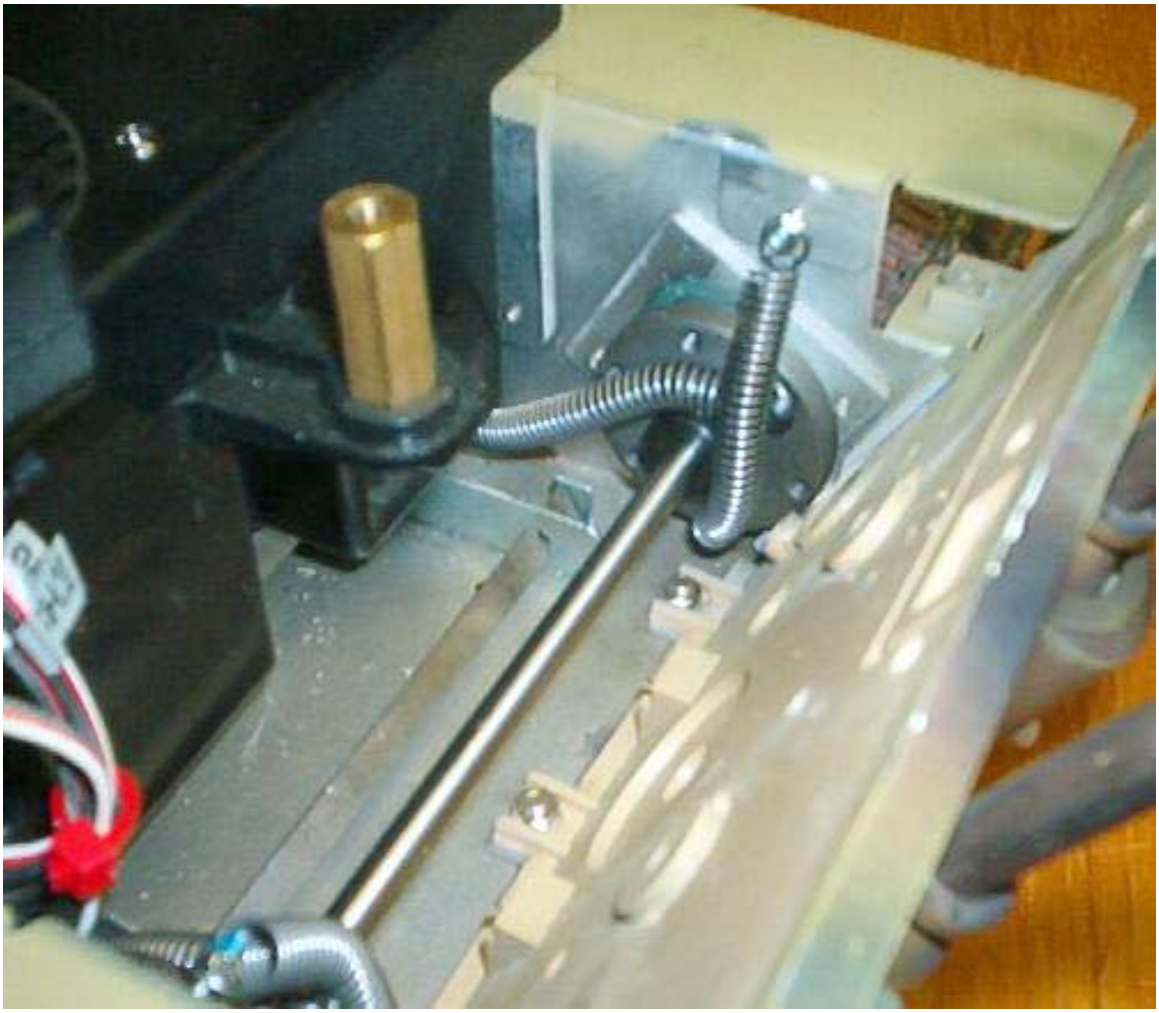


I replaced two mounting screws that attach the suspension arm bearings with longer screws and nuts, to create a spring anchor. There is a left and right side, and their location is so that the spring has little impact on the speaker housing. On the left side, use the second to last road wheel location, on the right side, use the last road wheel location. The longer replacement screws are 2mm thread and long enough to stick farther out the opposite side.
This creates an anchor to attach the spring to.



Install a nut on the long screw length, to create a hook to keep the spring from falling off. This should be secured with liquid thread lock. This picture shows the left side but the right side also requires a nut.

View of left side, with one spring in place. This is the 1-1/4 inch long spring. Length is approximate. Right side should be about 1-1/2 or so. Too short of a spring is just as ineffective as too long of a spring. This is what worked for my set-up. Use needle-nose pliers to help form the eye of the springs and slip it over the larger screw. Slipping the other eye end over the smaller nut will be easier. Note the 4-40 screw location. Also, you may want to sand away the plastic boss feature that is visible on the back hull in this photo. It does not interfere with the cast iron wheel but the screw might hit it under certain circumstances. The model in the photo does not have it removed. There is a left and right side feature. This feature might interfere with idler rotation under extreme conditions.

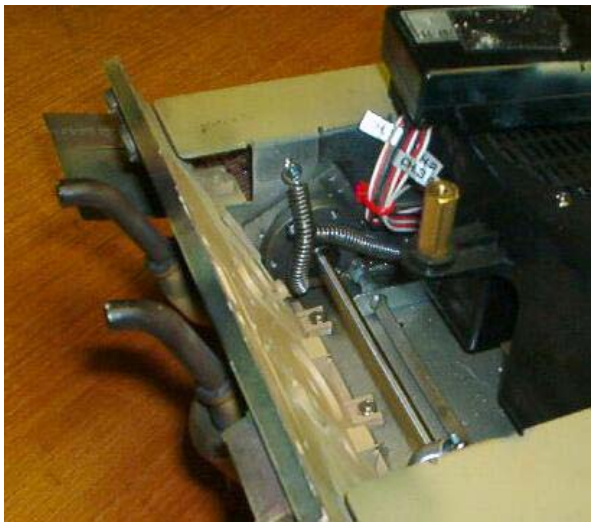


Install another screw and nut in the top hole of the hull, as in picture. This will provide a second anchor point for the secondary springs, which help fine-tune the track tension. These springs are a bit shorter than the main 1-1/4 and 1-1/2 inch set you cut and installed. If you are working on an older King Tiger hull, this hole may not exist. Drill a 2mm or 5/64 hole to allow the screw to pass through. Hole location can be approximate to the photo.

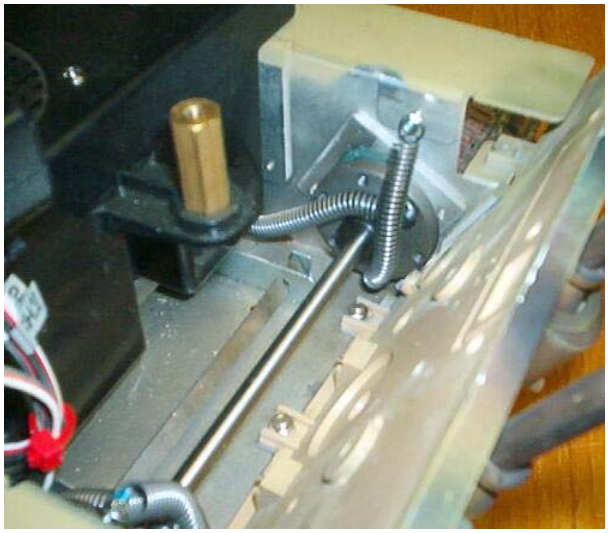
If you have not already done so, you can fit the rear hull plate.

This is how the springs are arranged. Two springs are recommended. The extra vertical spring helps prevent undesired torquing of the cast iron wheel and thus reduces the effort to actually rotate the idler arm. It essentially helps to fine-tune the springing of the idler and ensures it does so in a consistent manner. You can wrap this spring behind the 4-40 screw or just leave it over it as shown. There is no real guideline for this.
Note that the second 4-40 screw that is attached to the cast iron wheel is located one hole away from the other screw. Again, all fasteners should have liquid thread lock to prevent them from falling out.

When installing the speaker, the main springs will be in contact with the bottom of the speaker box. This should not affect the spring performance.



Layout of springs on left side.



Layout of springs on right side.
This worked well for me. Other variations are possible. You can experiment with arms (attached to the 4-40 screws), different springs, and even R/C car shocks, but the set-up as I provide is the simplest way to get maximum travel from the idler arms and not have too many parts.
This layout is for the stock Tamiya plastic track. Metal track will require this system to exert a lot of tension and will require a somewhat stiffer idler arm spring set-up. Metal track tends to place additional stress on other parts of the tank as well, and should be used with caution. Plastic track is cheap to replace if you break a link compared to gearbox damage, which the metal track places additional stress upon.

Ideal spacing of idler. The correct number of track links is crucial. On all King Tigers that I have worked on, all had track that was one link too long. Long track does not place enough tension on the drive sprocket and does not allow enough idler travel. At rest, the track should contact about half of the road wheels on top. It should wrap around the sprocket with some tension, so that the track does not skip the sprocket teeth, but will allow “give” when a rock or twig is scooped between the sprocket and track. Without track installed, the idler should want to “swing” backwards and up, towards the fender if one is installed as is on this tank.

Ideal spacing of idler. Spacing of idlers from one side of the tank to the other won't be equal based on the road wheels. The distance between the idler and the road wheel gap on the left side will always be greater than that on the right. In fact, the right side idler tends to overlap the closest road wheel. Again, also on this side, the idler wheel should have the tendency to want to swing backwards and up if there was no track installed.

By the way, the two holes that are now unoccupied by any screw, shown in the picture above, can be filled in with putty, tape or short screws. If you use screws with nuts, be sure they do not interfere with spring operation on the inside. I have provided some extra screws if you wish to use them for this purpose. Just be sure they do not contact any internal part such as a spring.

Note how the track does not come in contact with the top of all the road wheels.
Test drive the tank and adjust accordingly if needed. Once proper adjustment is made, the entire system should require minimal cleaning and maintenance and should perform well over all terrain.

THANK YOU FOR USING THIS UPGRADE!