# LEE GILBERT KEEPS DOING HIS THING...

**Last month Lee got the ball rolling for what is to be the most comprehensive 1/24 race car building series ever offered in Car Model. He pointed us in the right direction and has come back this month with another detailed construction article. The heart of a slot car's handling is the chassis and the heart of the chassis is the center section. The things Lee has been keeping to himself about chassis construction for years are now brought to light right here just for you. If you are at all serious about slot racing plug in your Dremel Moto-Tool and soldering iron and get-it-on.**

*by LEE GILBERT and FRIENDS*

## STAGE II CENTER SECTION

I ASSUME THAT you and your racing buddies have become expert jig builders since last month and have possibly tried a hand at some chassis work. At any rate, I hope that you are ready to get going on a new race chassis. This month I'm going to lay a lot of Gilbert Chassis Theory on your mind in hopes that you will start thinking about what you're doing and why. If you can do that . . . start thinking . . . you'll be ahead of 9/10 of the pro slot racers and almost everyone else.

The kind of chassis I'll be starting for you this month is not a far-out wild radical thing but a proven design that is easily adapted to track. It's one similar to the current West Coast pro chassis used by the most consistent winners. Don't worry if the thing looks familiar to you at first. I want to get you in the winners circle, and no one is going to give you a trophy for originality. You have to first *understand* chassis' before you can *improve* them and only until recently has anyone really begun to get the full potential out of these standard designed creations lovingly referred to as *plumbers nightmares.*

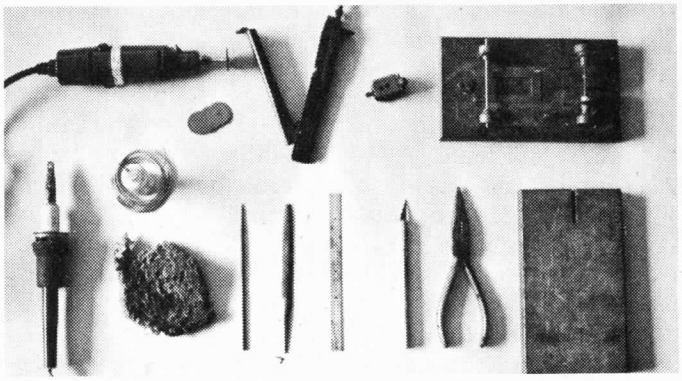
Now down to some really heavy Gilbert Chassis Theory. Just to blow your mind I'm going to throw the four most important things affecting a slot car's handling. In order or importance they are: 1) main rail combination; 2) wheel base length; 3) tire size; and 4) motor angle. These are the *most* important things to develop and understand if you want to really master slot car racing; not just chassis building.

Main rail configuration can be summed up in one word: *flex*. Flex determines traction. Contrary to popular opinion a stiff car will have much better bite than a loose one. I'm building a 063/055 car in this article and it can be made to excell on almost all tracks. It is a fairly stiff chassis. As a general rule stiff cars are good on flat tracks and loose cars are good on super banked tracks, however I wouldn't recommend any combination except the 063/055. It is the easiest to tune and most forgiving. Try this one first if you're not a pro. If you are a pro, what are you doing reading this anyway?

Wheel base length also affects traction. I usually run a 3-13/16" car and that's what your jig is set up to build. Generally a shorter car will give you a little more traction but consistency goes down the tube. By consistency I mean that a car won't feel solid and will become unpredictable in corners and coming onto straights. I've never found a car with a wheel base length shorter than 3-3/4" to be worth anything.

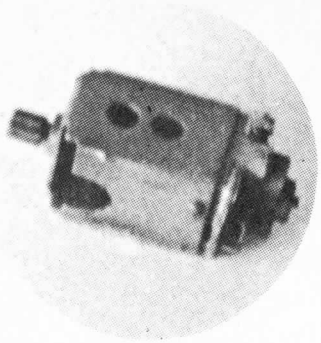
*TOOL LIST*

A Dremel Moto-Tool and several No. 400 cutting discs
An Ungar Soldering handle with a No. 4037 Iron Clad Tip
Sta-brite silver solder and acid
An old sponge, cloth or tip cleaner for soldering iron (use wet)
Jig and jig assessories . . . front jig wheels — 1/2" rear — 11/16" (for small tired car)
A Champion Slate or equivilent
Long-nosed pliers
X—Acto knife handle and No. 11 blade.
6" scale or ruler
Small half-round file
Small square file . . . And don't forget . . . 1 girl Friday

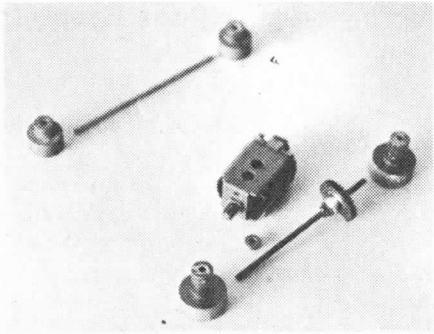


*PARTS LIST FOR COMPLETE CHASSIS*

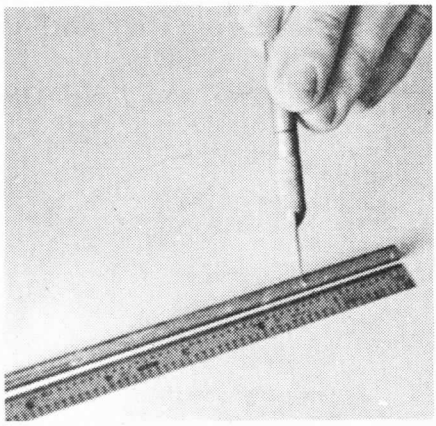
5 pieces 0.063" K&S plated piano wire (1 foot length)
2 pieces 0.055" K&S plated piano wire (1 foot length)
1 piece 0.047" K&S plated piano wire (1 foot length)
3 pieces 0.032" K&S plated piano wire (1 foot length)
1 strip of 0.016X1/4" K&S brass strip
1 piece 3/32" K&S brass tubing
1 piece 1/8" K&S brass tubing
1 piece 1/16" K&S brass tubing
1 piece 7/32" K&S brass tubing
1 Camen 1—1/4" Drop arm 0.040" (or Parma)
1 set Camen bat pans 0.032" (or Parma set)



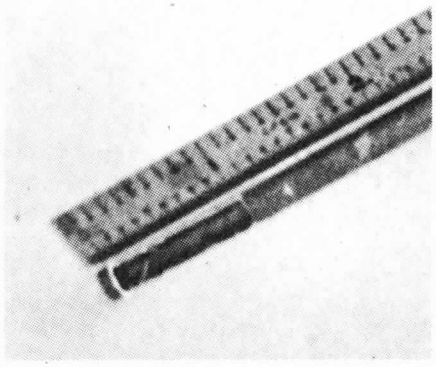
This is your jig motor. Just throw together some of your funky old motor parts as shown. Use a coughed arm with the same size pinion gear you'll be using on the track. Note; the notch added to the rear side of the motor can is designed to give plenty of axle-tube clearance.



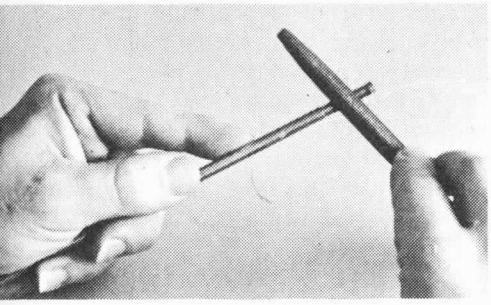
Here is all of the things you'll need to use with the jig that we built last month. Included are a set of Champion jig wheels shimmed with 1/8" K&S tubing, Parma 3/32" axles and oilite bearings, a Cox 32 tooth gear shimmed with 1/8" tubing with the bottom cut off, and your jig motor.



**STEP 1** Mark a piece of 7/32" K&S brass tubing at 0.1", 1.0" and 1.2" as shown.

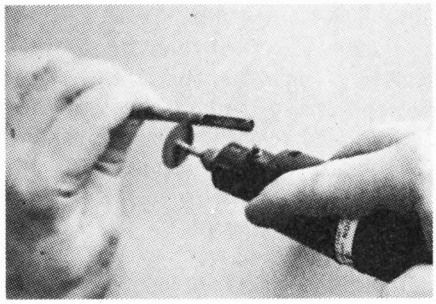


**STEP 2** Taking your trusty Moto-Tool in hand, proceed on your own initiative and cut out approximately 1/3 of the tubing between the 0.1" mark and the 1.0" mark.



**STEP 3** File the cut out area smooth.

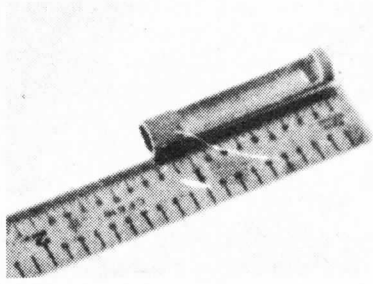
**STEP 4** If this looks like a rather long rear axle tube to you, then cut it off square at the 1.2" mark and file smooth.



The use of glue or a little more care in chassis tuning is a better method of getting traction.

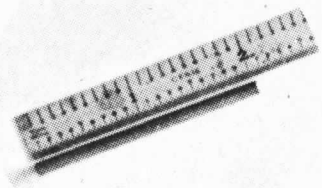
Tire diameter has only recently become a positive factor in a car's handling characteristics. The reason for that is the new USRA rule changes that allow more rubber on the track at the rear while lowering the center of gravity at the same time. Now that we are out of the dark ages you can build a race car instead of a wagon wheel load. I like 5/8" for the front and 13/16" for the rears. You can go smaller on the rear but I like to have a little wear room. Don't tell me about scale. Are we building a race car or a shelf model that really won't look good in the first place? The biggest drawback to running small tires is having to cut down your jig wheels. Even though the racers are coming out of the dark, most manufacturers are still in their own world; which isn't necessarily the same as ours. You'll find that small tires really help you jet around corners faster due to the lower C.G. If you are unable to run smaller tires do the best you can. You have my sympathy.

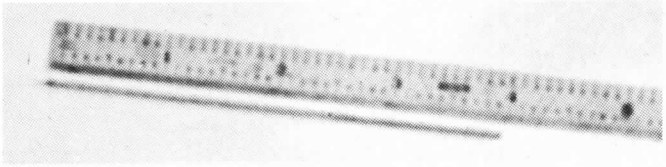
Motor angle is the angle measured between the rear axle and the armature shaft of a car. Even though low motor angled cars have been around for some time don't believe that if a small angle is good; an even smaller one will be better. Motor angle is critical and generally the shallower it is the more bite you can get. This is known to be true but don't go out and try to build a full sidewinder. Granted, it's



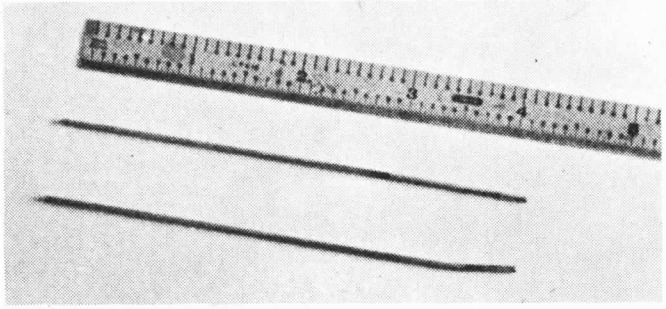
If your rear axle tube doesn't look as outrageously beautiful as mine you must not be paying attention.

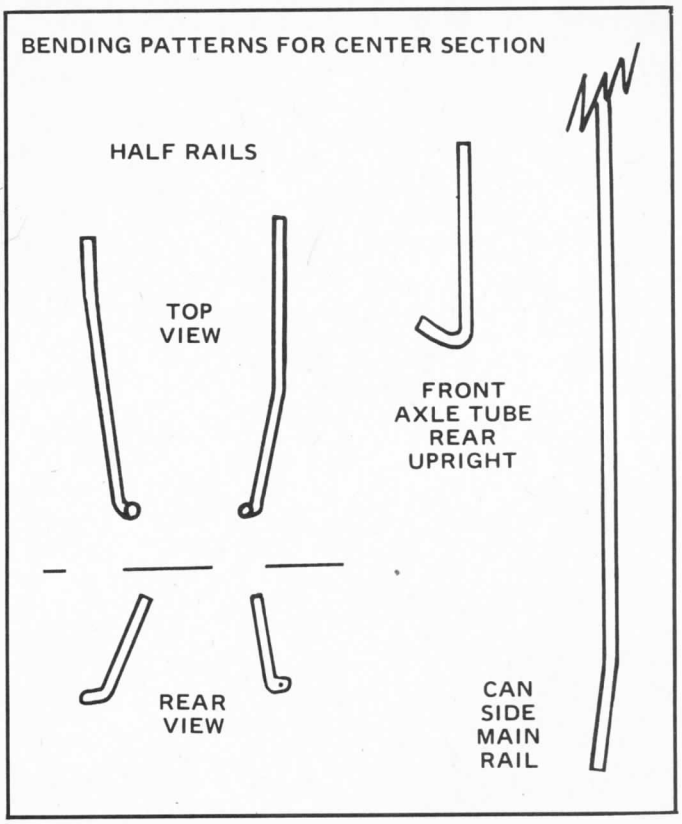
**STEP 5** While working with tubing is still on your mind cut some 1/8" tubing (K&S brass of course) for the front axle. Make it 2" long as shown.



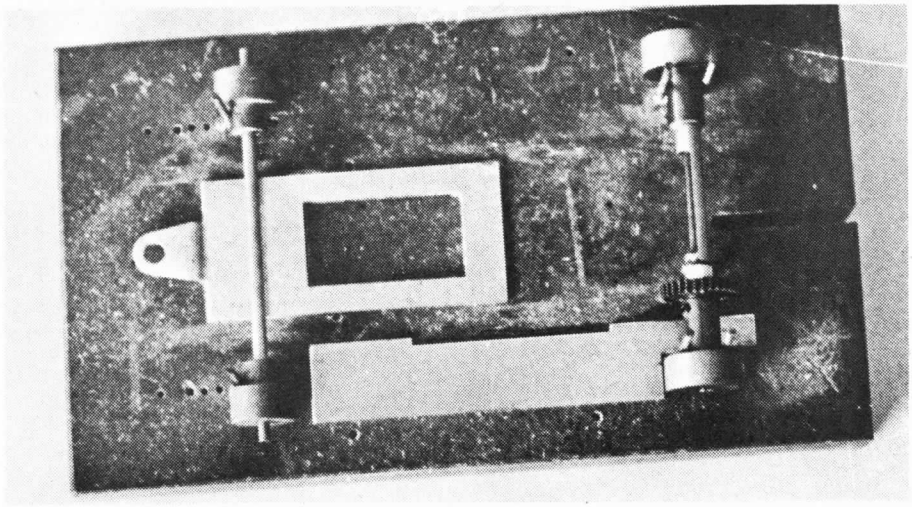


**STEP 6** Cut two pieces of 0.063" piano wire just like the one shown only not as fuzzy. These are your inside main rails if you're building a .063/.055 car. Make them 4" long.





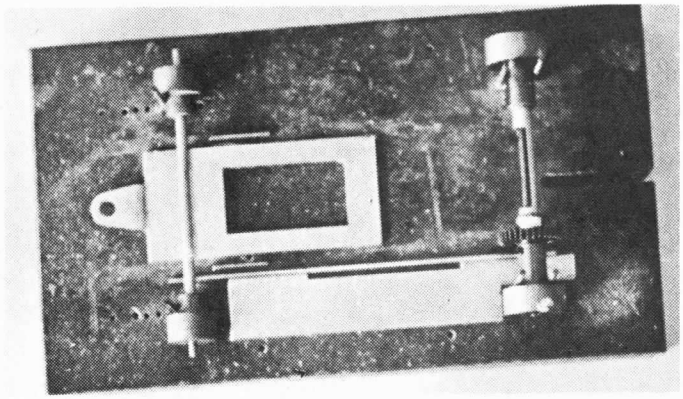

**STEP 7** Now cut two pieces of 0.055" piano wire for the outside main rails. Bend one only using the handy-dandy pattern printed somewhere around here.

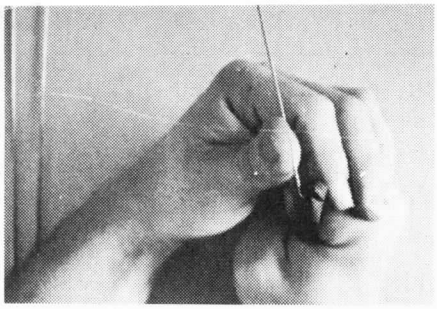


**STEP 8** Set up your jig from last month's article with your jig wheels, axles, axle tubes, oilites and gear as shown. Make certain that the rear jig wheel next to the gear is up firm against its pegs. This will insure the correct positioning of the gear and rear axle tube in relation to rest of the chassis.

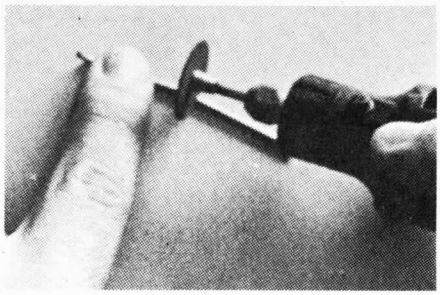
**STEP 9** Make three spacers out of .063" piano wire. Cut one 4" and the other about 1". This should be easy enough for your girl Friday to do correctly, so if you haven't put her to work yet; do it.

possible even if you're using small tires but the building problems are many. Besides that, the things just don't work with the heavy motors we have now . . . (remember when I thought the Green can was the ultimate thing?). There is just too much weight at the rear of a full sidewinder and the front gets light at the strangest times even when the thing seems to be tuned and balanced. They're just strange. Maybe with the development of a new lighter motor (smaller too) the full sidewinder will come into its own time. On the chassis that I'm building the motor angle is right for most tracks. If you have a partic-

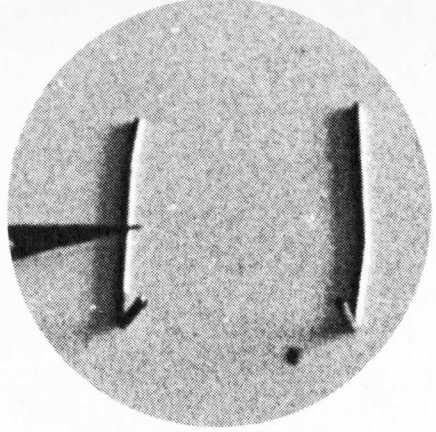




**STEP 10** Now comes the part you don't want to goof. You shouldn't have to spend more than a few minutes doing this critical bending of the half rails, but accuracy is more important than swiftness. Just follow the pattern I made for you and it should be easy.

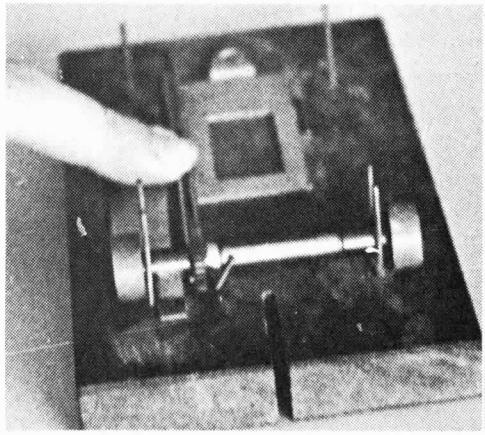


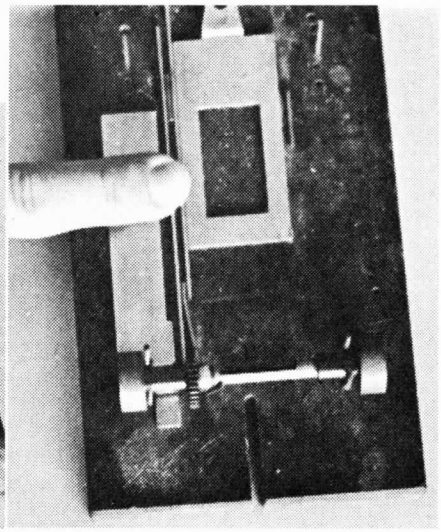
**STEP 11** After getting the half rails bent correctly, finish them off with your Moto-Tool. If you've kept track of all that other stuff we've been bending and cutting so far, have your Girl Friday go fetch it for you.



Hopefully, this is what your left and right half rails should look like.

"Well, Dona, it's long enough for sure, but . . ."

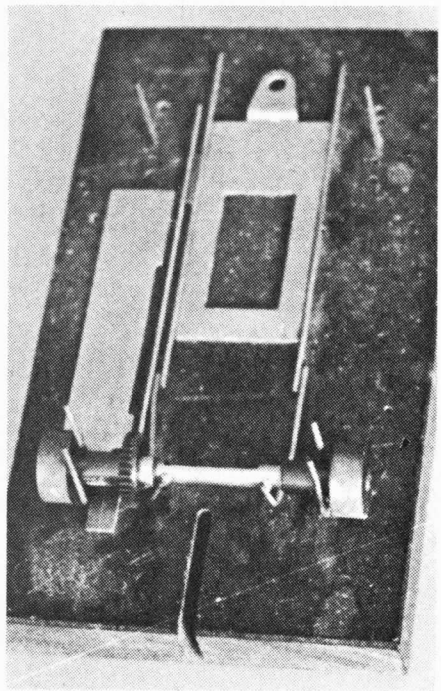




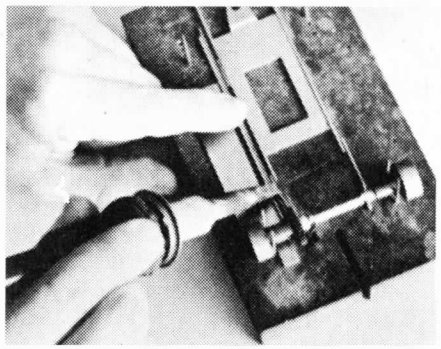
**STEP 12** Now that we have our respective helpers straightened out, let's put the right side of the chassis together. First lay in one of your inside half rails (0.063") next to the drop arm. Add the right side half rail and one of your .063 spacers (short) next to the main rail. Use your long .063 spacer to help position the half rail properly. Make certain that the half rail is against the axle tube and alligned with the main rail as shown. Better yet, just make your thing look like the pictures. Now tack solder the half rail at the rear of the axle tube only.

ularly bumpy track or one with ramps you should probably open the angle up a tad . . . as long as the traction there is good.

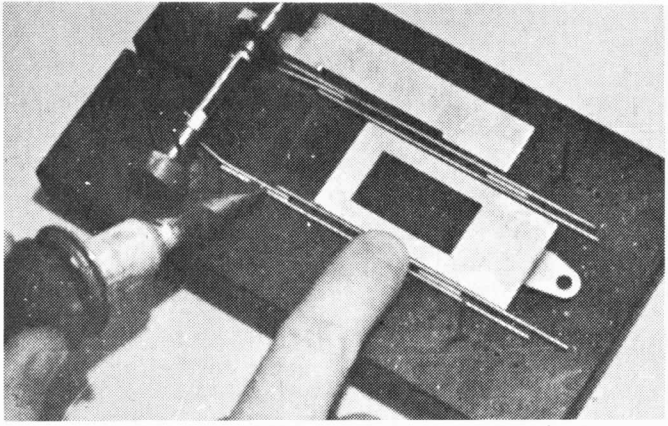
There are a few other points I'd like to make before you get started with your masterpiece. Take your time and do it all right or don't do it at all. Jerry Brady was the only racer I know that got by with shabby workmanship and he lost many more races than he should have because of his building habits. Also keep these things simple. Plummber's nightmares, in the literal sense, are neat



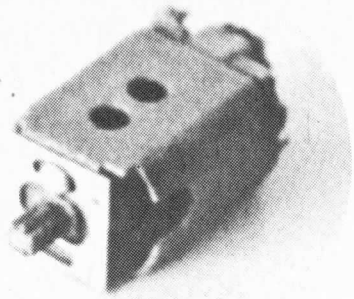
**STEP 13** If you made it through the right side try the left and this is what you're shooting for. If you're having trouble just hang in there and do a little fiddling on your own or go back to where you got lost. It'll come to you.



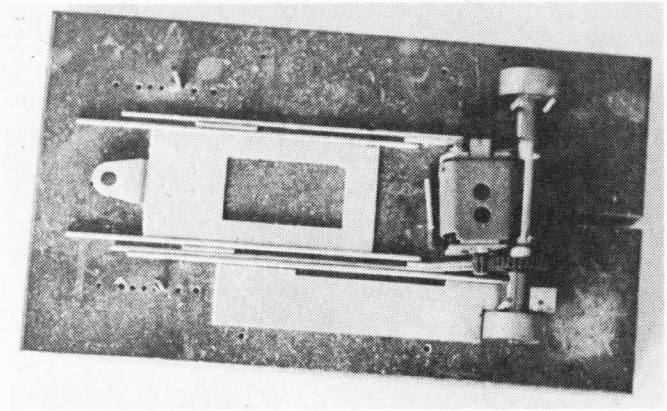
**STEP 14** From now on out our center section should be a breeze. Slide the .063 spacer out of the way and add the pre-bent .055 outside half rail as shown. Now tack solder only the outside mail rail and the half rail.



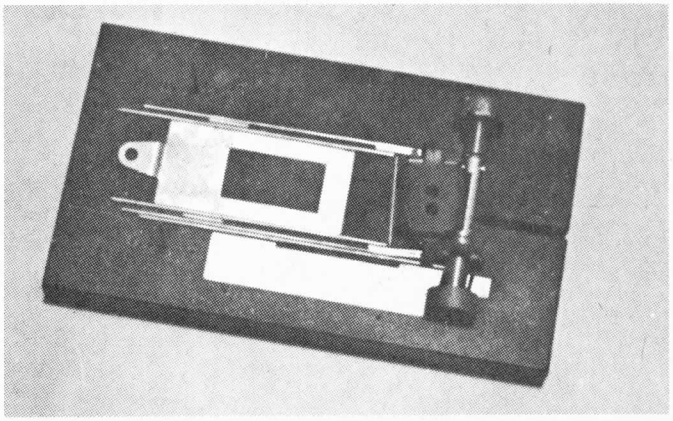
**STEP 15** If you handled the right side all right, go ahead and work out on the left using the straight .055 main rail piece.



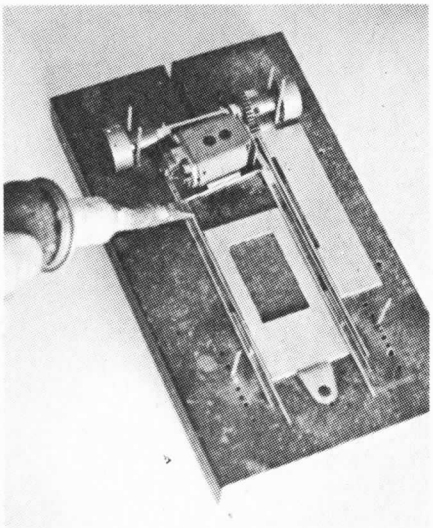
**STEP 16** Mount your motor bracket to your jig motor as shown.



**STEP 17** Drop your motor and bracket into the jigged center section as shown. Add a chunk of 3/32 tubing for a crosspiece spacer.

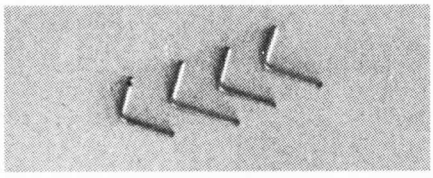


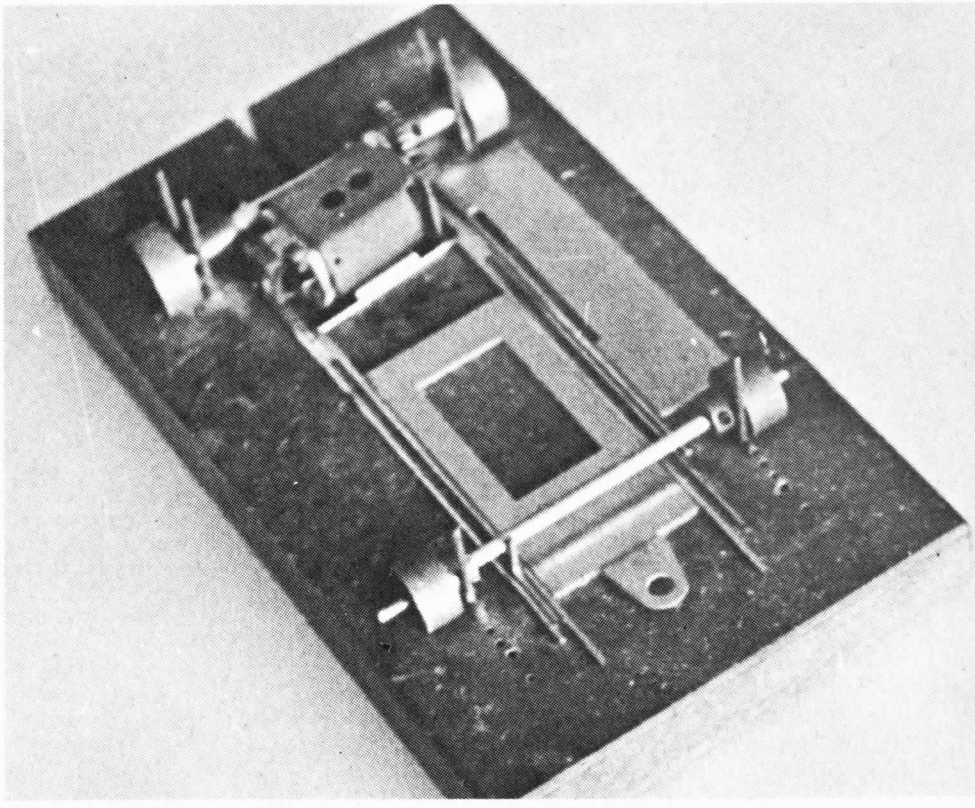
**STEP 18** Set the motor angle appropriate for your track (if you read the text you'll have a better idea of what to do here). Cut a piece of .055 piano wire to fit as a crosspiece in front of the spacer and motor at the preferred angle.



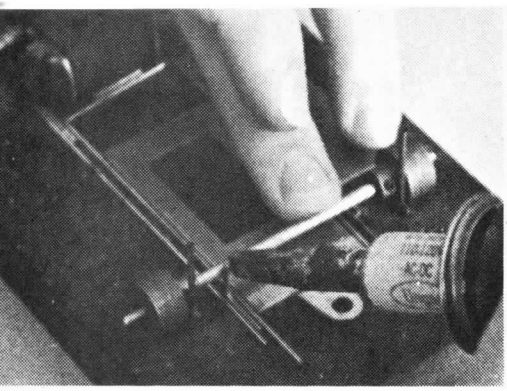
**STEP 19** Move the inside main rails back against the crosspiece and solder as shown.

**STEP 20** Bend four pieces of .063 piano wire as shown. These will be used as both front and rear axle tube braces.

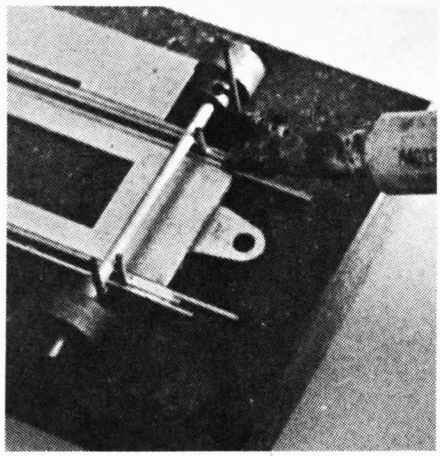




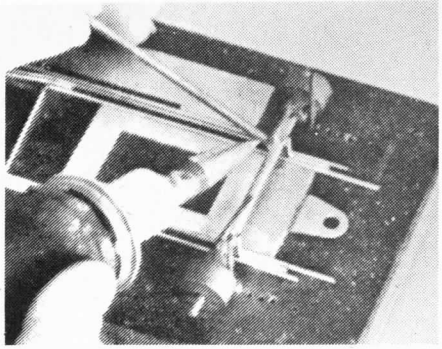
**STEP 21** Remove the short main rail spacers and add the front axle tube and jig wheels. Slide the front assembly up against the rear of the front pegs. Center the mess and add two front upright braces between the main rails as shown.



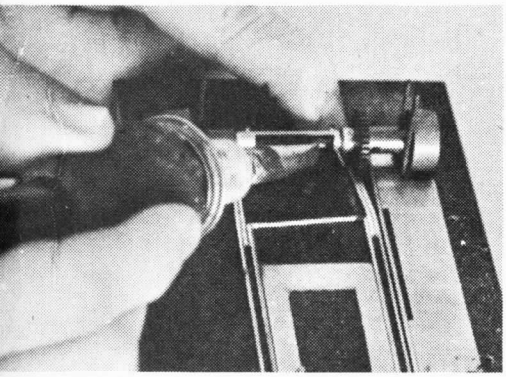
**STEP 22** Hold the axle tube assembly forward and tack solder both uprights to the axle tube. Make the uprights perpendicular to the jig if you like to burn your fingers and be neat all at the same time.



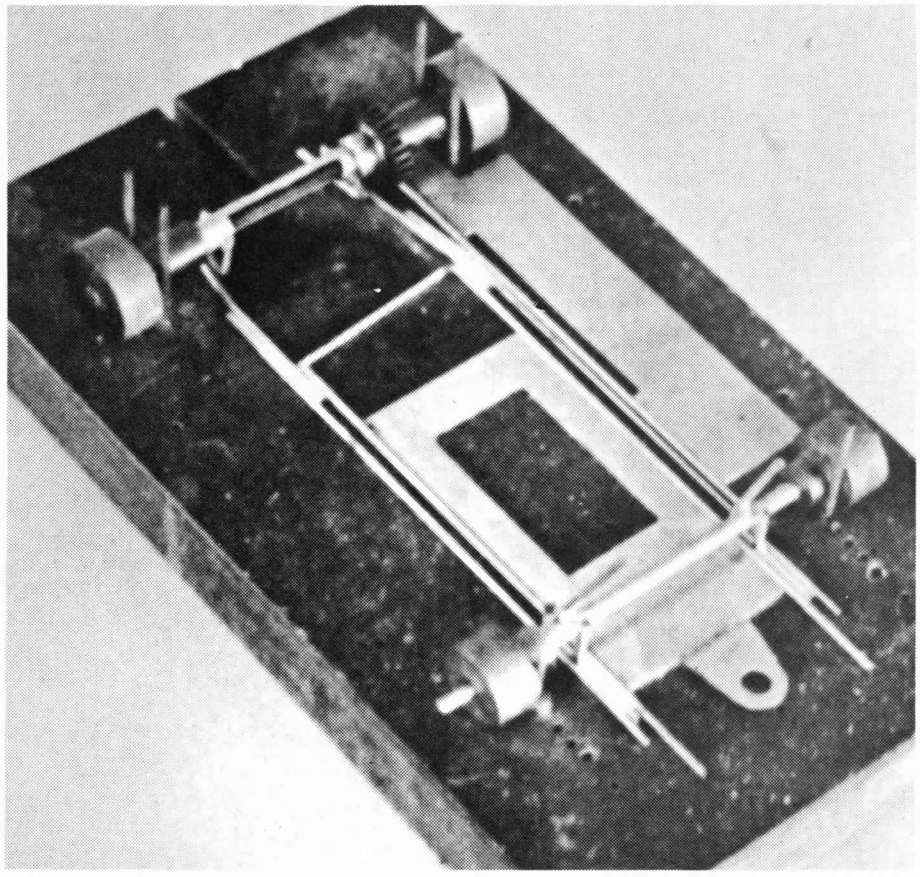
**STEP 23** Solder the front like you see here.



**STEP 24** Use the pattern to bend two more uprights for the front axle tube. These will go behind the axle tube and should be bent from .063 piano wire. Use your trick tool to aid in soldering these (if you read the text you'd be up on the tool already and should save burned fingers).



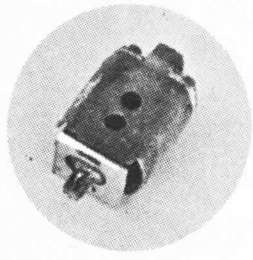
**STEP 25** The extra axle tube braces should be soldered to the rear axle tube now. Be careful not to solder your oilites to the tube.

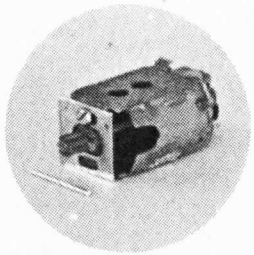


Is this what you have so far?

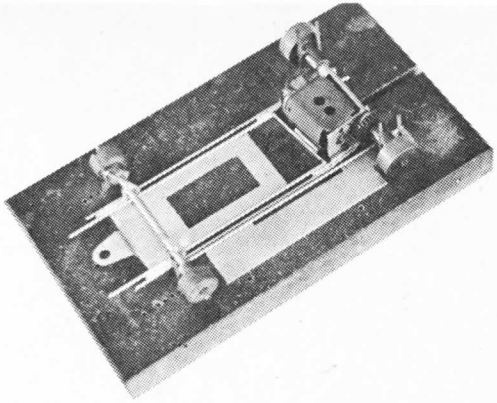
to look at but right now we have enough to worry about just building this thing and then trying to make it get around your track quickly. Another tip is to practice building. Try to improve your soldering, bending and expertise with the Dremel Moto-Tool. Concentrate on the stuff you have trouble with and keep on building. The last tip I'd like to leave you with concerns the time you spend on your car. Always spend more time on setting-up and building your chassis than on your motor. I've seen many more races won by a *handling* car with an average motor than a total load with a rocketship motor. Remember, most tracks have more turns to go through than straights to go over and you'll usually crash in the turns; not the straights.

**STEP 26** Take your jig motor and grind the bottom of the mounted motor bracket. Bevel it toward the rear as needed to give you the motor angle you want and still have the motor bracket flush against the half rail.

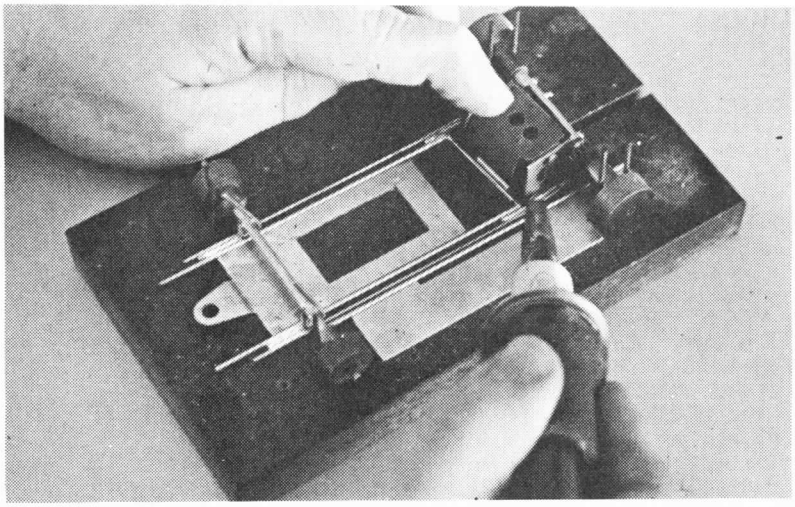




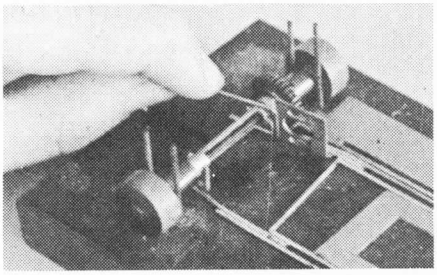
**STEP 27** To center your motor and gear, cut a piece of .047" wire to the length of the motor bracket. Use this as a spacer between the bracket and half rail.



**STEP 28** Drop the motor bracket and spacers in position to check fit. Re-bevel bracket if needed.

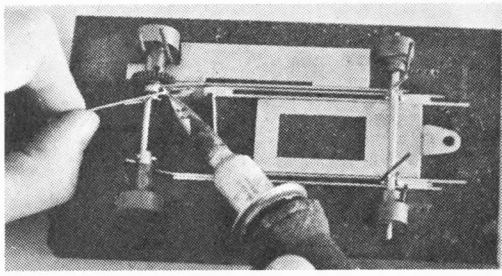


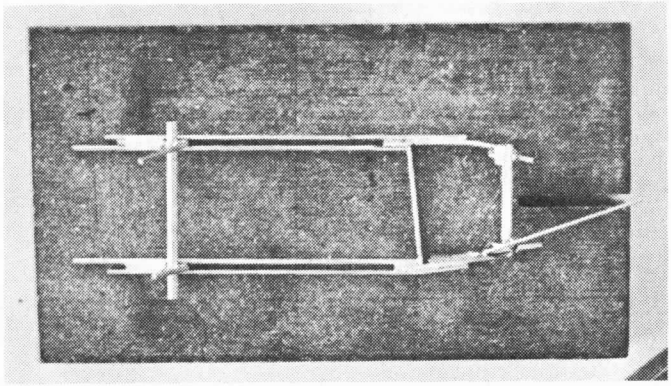
**STEP 29** Solder it up.



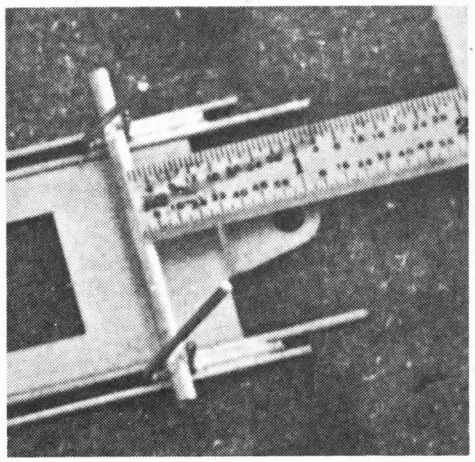
**STEP 30** Remove your jig motor for the last time and bend a piece of .047 wire at a right angle as shown. This will be used as a motor bracket brace.

**STEP 31** Tack solder the brace to the motor bracket as shown. If the motor bracket falls off you got things too hot and the motor will have to go in one more time. Sorry about that.

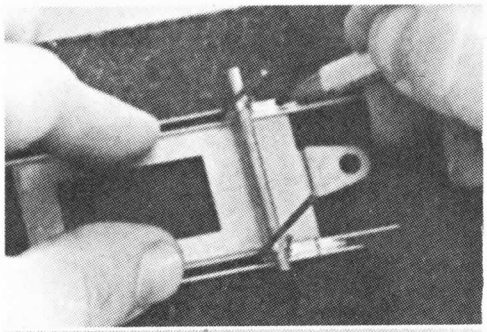


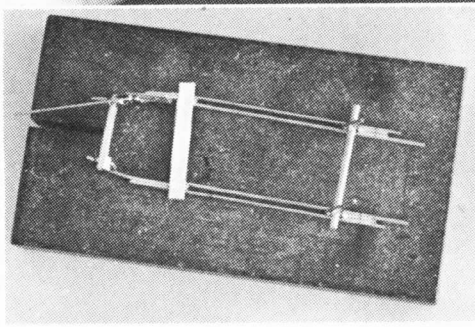


**STEP 32** Yank your almost completed masterpiece (?) out of the jig and place it gently on a flat slate.



**STEP 33** Position the drop arm for a 7/8" guide lead as shown. Measure from the center of the axle tube to the center of the guide hole.



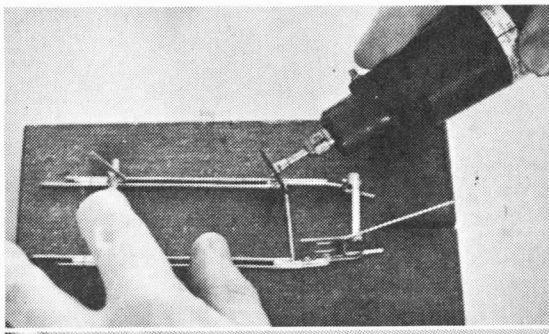


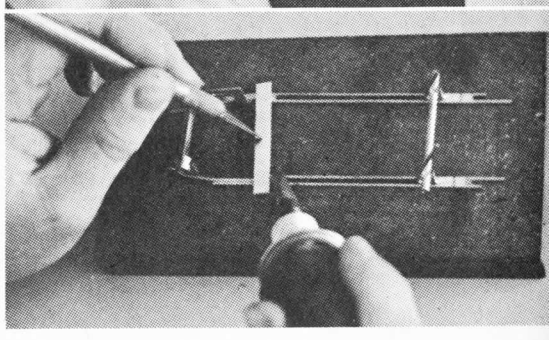
**STEP 34** Use a pencil or felt-tipped pen to mark across the main rails as shown. The mark should be approximately 1/16" to the rear of the drop arm.

**STEP 35** Use your Moto-Tool to lightly grind down the .063 main and half rails flush with the .055 crosspiece and main rails on both sides. Grind an area 1/4" from the crosspiece forward only.

**STEP 36** Cut a piece of 1/4" .016 brass strip a little longer than the width of the center section. Lay the strip across the center section parallel and even with the wire crosspiece.

**STEP 37** Hold the crosspiece plate firm against the center section and tack solder the front on both sides.





## A FEW BUILDING TRICKS:

I've learned a few tricks in building chassis over the years that might help you with this and any future building you may do.

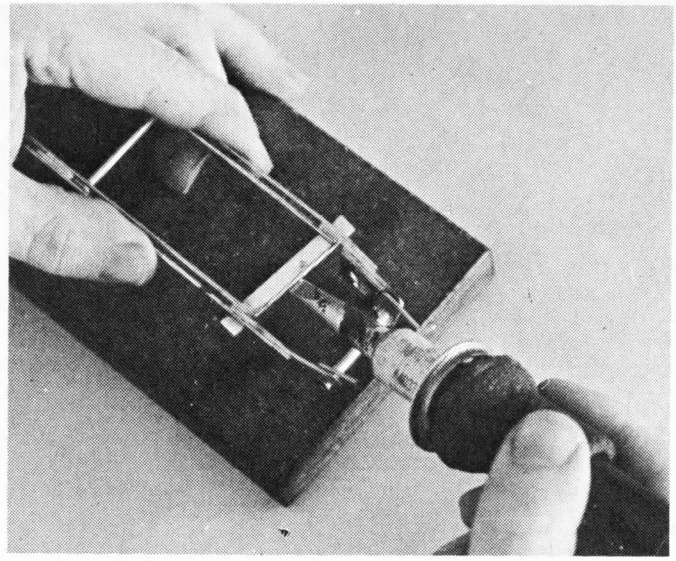
1) Always use plenty of soldering acid (flux) when doing the final solder. You will have less trouble with cold solder joints and find soldering much easier.

2) Make a spout for your acid bottle out of 1/16" brass tubing. Cut it about 2" long and smooth the ends with a file. Then stuff the tubing down the throat of the original hole. This helps put the acid right where you want it and just the amount you need.

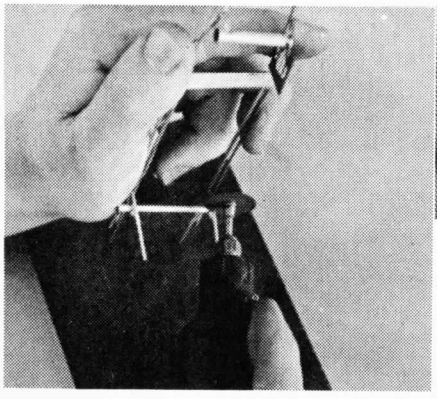
3) Always use silver solder on all chassis joints. A good, easy to obtain brand is Sta-Brite.

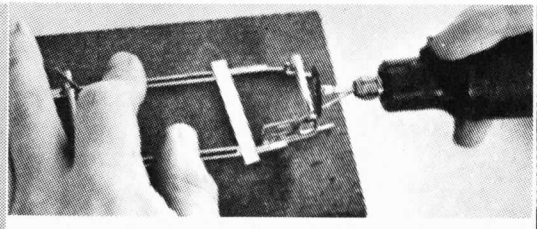
4) To keep from burning your pinkies to a crisp, build yourself a little holding tool from piano wire. All you need is some extra 1/8" and 3/32" brass tubing. Cut a piece of each about 2" for the 3/32" and 1" for the 11/8. Notch the end of the 1/8 tubing in a "U" that should easily accept 1/16" piano wire. Solder the 3/32 piece into the other end for a handle.

One last thing, don't listen to any know-it-all pseudo-engineer slot fanatic. You don't need expensive tools or all kinds of physics text tooks to build an effective race car. Textbook theory is nice to know but only when you've proven it to yourself. Common sense cannot be over used in this sport and if you use yours, you may find yourself winning.

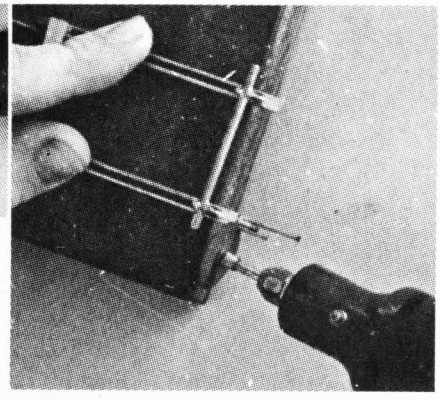


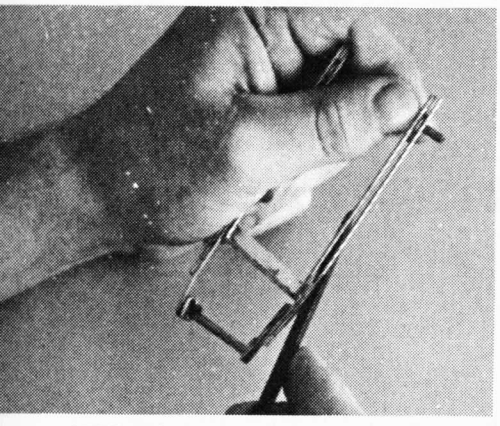
**STEP 38** Flip the unit over and lightly solder the rear of the crosspiece plate to the crosspiece wire.



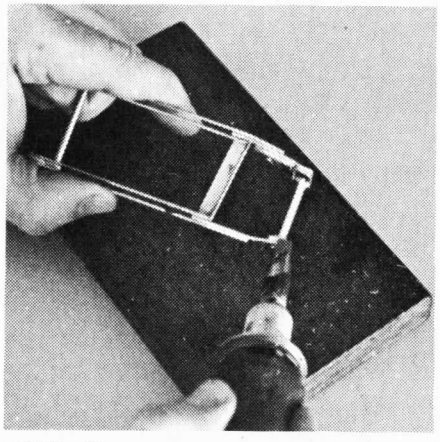


**STEP 39** Trim off all of the excess garbage making sure not to wipe out the axle tubes and the other work you and your buddy have labored so long to complete. Trim the main rails at the pencil marks you made earlier.

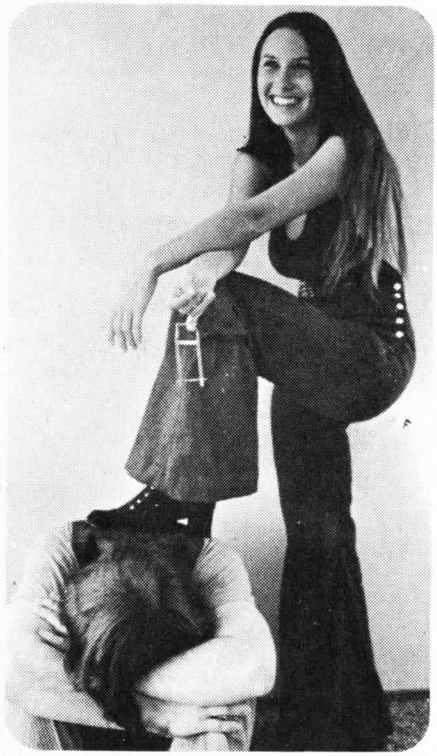




**STEP 40** After working out with the Moto-Tool file the sides of the cross-piece plate smooth.



**STEP 41** Now solder everything that looks like it might fall off.



"Gee, Lee, does this mean we're engaged?"

**STEP 42** Now take your small square file and attack all of the excess solder on any and all joints. This will really impress everybody to the point of them asking you how you learned to solder so neat. After that, grab your mom's kitchen cleanser and a scrub brush and work out under the hot water faucet for awhile. This also really does a fine job on your hands since they're probably dirtier than sin by now anyway.