

001-50700-1

car model

THE HOW TO DO IT MAGAZINE FOR
MODEL CAR
BUILDERS
...RACERS
...COLLECTORS



Hank Borger Builds the ALL AMERICAN

HOW TO BUILD A RIGGEN HO
ANGLEWINDER

LEE GILBERT DOES HIS THING
Beginning a 1/24 Pro Building
Series



LEE GILBERT DOES HIS THING

IT'S BEEN QUITE SOME TIME SINCE CAR MODEL HAS PRESENTED AN IN-DEPTH HOW-TO SERIES ON THE CONSTRUCTION AND MAINTENANCE OF 1/24 RACE CARS. TO FILL THIS VOID CM STAFFER, LEE GILBERT, HAS CONSENTED TO GIVE US HIS ALL. TO SAY THAT LEE COMES TO US EXPERIENCED IS ALMOST AS MUCH AN UNDERSTATEMENT AS LABELING HIM SIMPLY AS OUTSPOKEN. HIS THREE YEARS OF PROFESSIONAL RACING, BUILDING AND MANUFACTURING DURING THOSE GOLDEN YEARS OF SLOT-CAR RACING HAVE EARNED HIM A PLACE OF RESPECT, IF NOTHING ELSE, AMONG THE OTHER ALL-TIME PROFESSIONALS OF THIS FASCINATING HOBBY/SPORT. WHETHER YOU ARE A WEEKEND GROUP RACER, A DIE-HARD EVIL-BUCKS OPEN CLASS FREAK OR SOMEWHERE IN THE MIDDLE WITH A NEW OPEN GROUP 20 CAR, YOU WON'T WANT TO MISS THE NEXT SEVERAL ISSUES OF CM AS LEE DOES HIS THING; WHICH, AFTER ALL IS OUR THING TOO!

by LEE GILBERT and FRIENDS

BEFORE WE GET down to the business of building your outrageous 1/24 race car, let me tell you what is going here. Being a sometimes vocal critic of bygone How-To articles, it is my purpose here to ease the strain on your mind and wallet by keeping things as simple and as economy-minded as possible. With this in mind, the ensuing articles will be quite simple and a lot of fun. Some of the steps may almost insult your intelligence due to their simplicity, but face it, not everyone is as bright as you are and the steps themselves can be easily overlooked.

To make this series a little more fun I'll be utilizing two beautiful and very talented people. My Girl Friday, Dona Holloway, which you'll find on the tool list and throughout this article is a definite necessity. Get one! She will come in handy to soothe your sweaty brow and bandage your swollen bleeding fingers. Dona as a person knows absolutely nothing about slot cars, but she kind of livens up an otherwise uneventful day. My man behind the camera is none other than Sundance Coates. Actually he knows nothing about taking pictures but his enthusiasm and genius make up for his inexperience. I'd like to have a picture of him in here for you to have a good laugh over, but I conveniently ran out of space. If you don't want to completely lose your mind, you'll need a couple good buddies to keep you from getting entirely too serious. Besides, buddies are always good



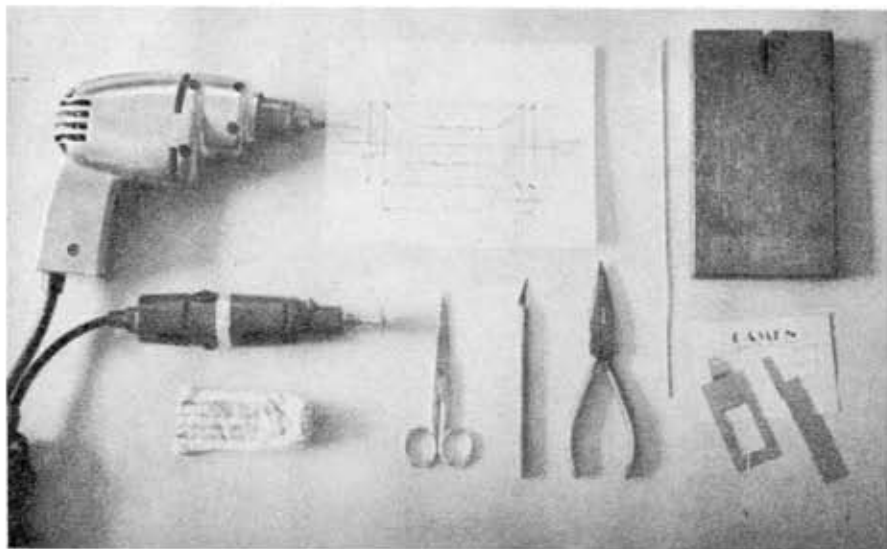
"I can't tell you how thrilled I am to be here."

for the loan of a few tools. The way I see it is to get together with a buddy or two, pool your tools and talent, order a pizza and work out on several cars. You'll be stoked with the good times and the results.

If you've already peaked, you'll notice that Stage I illustrates the construction of your jig. This is a very crucial step in the making of any great race car. The techniques involved were ripped-off from my old buddy, Larry Halter. This has to be the easiest and best way I've found to make your jig right.

In the proceeding months we'll finish the chassis, build a fool-proof powerplant, paint and mount the body correctly, set the whole thing up and even race the thing after some fiddling at the track with lead, air control and driving techniques. If you pay attention, no way can you fail.

STAGE 1: BUILDING YOUR JIG



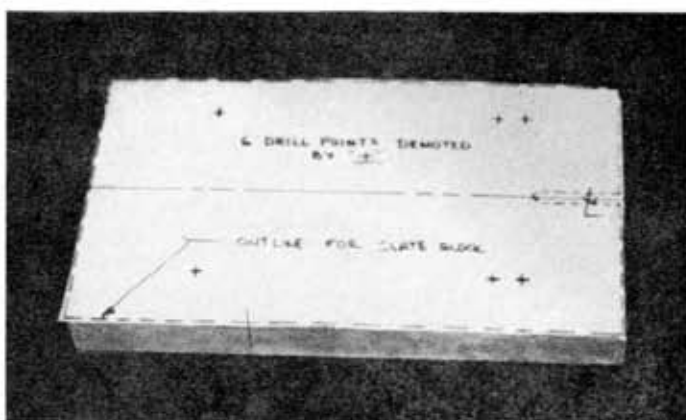
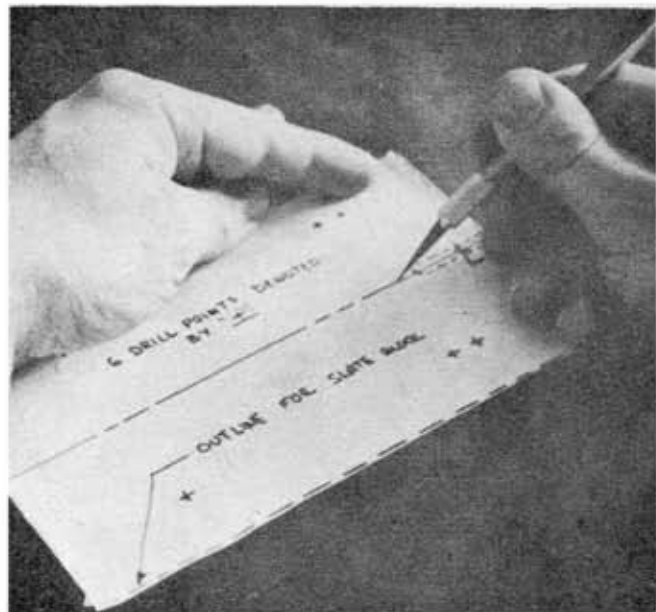
TOOL LIST & MATERIALS

Long nosed pliers
X-Acto Knife with No. 11 blade
Straight-edged scale
Scissors
Contact Cement
Dremel Moto-Tool with
No. 409 cutting disc
1/4" Drill
1/4" Drill bit
Drill pattern from Car Model
Champion slate
Camen 1-1/4" drop arm
Camen bat pan
.063 piano wire
.055 piano wire
A Girl Friday (Dona)



STEP 1 Assemble tools & materials. Cut out drill pattern along border line.

STEP 3 Mark center line at each end through pattern onto slate. (Don't get ahead of me, we'll scribe the centerline itself a little later.)



STEP 2 Tack glue drill pattern to slate.

STEP 4 To drill your peg holes without a drill press, utilize your girl Friday. One of you must sight the drill bit in perpendicular to the slate. The holes should be 1/2" deep. To do this, mark the bit with a piece of tape wrapped around the bit at a point measured up 1/2" from the sharp end. Take your sweet time . . . this is the part you don't want to botch.



"What do you mean keep your eye on the drill!"

+

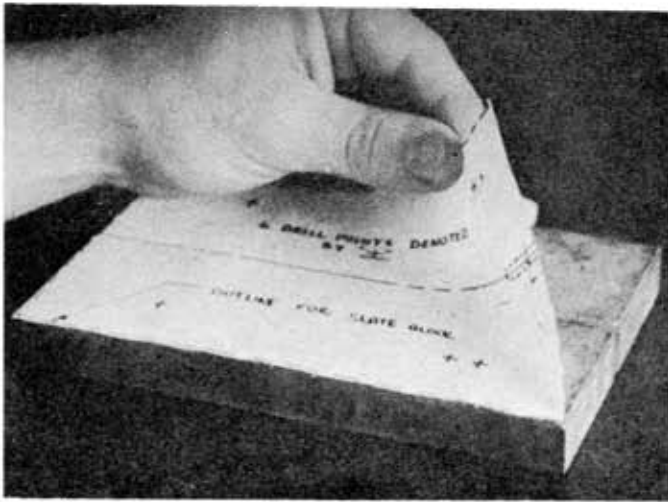
+ +

6 DRILL POINTS DENOTED BY "+"

OUTLINE FOR SLATE BLOCK

+

+ +

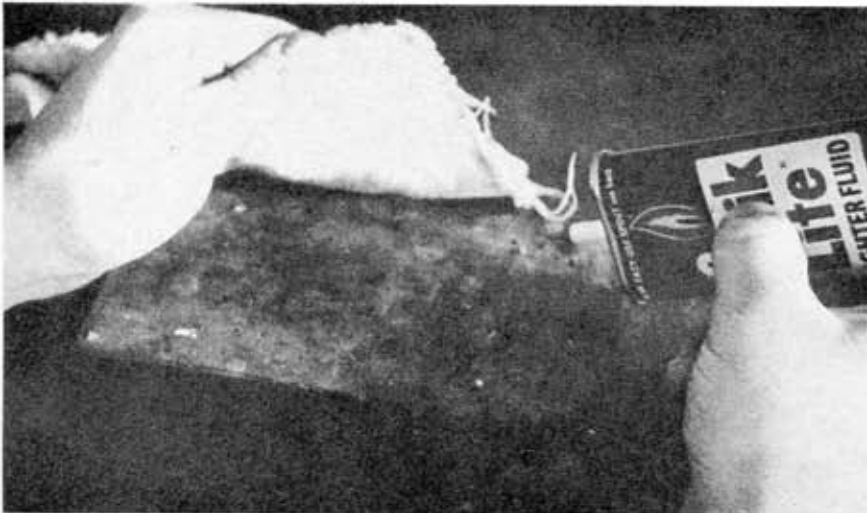


STEP 5 Now you can remove the pattern.

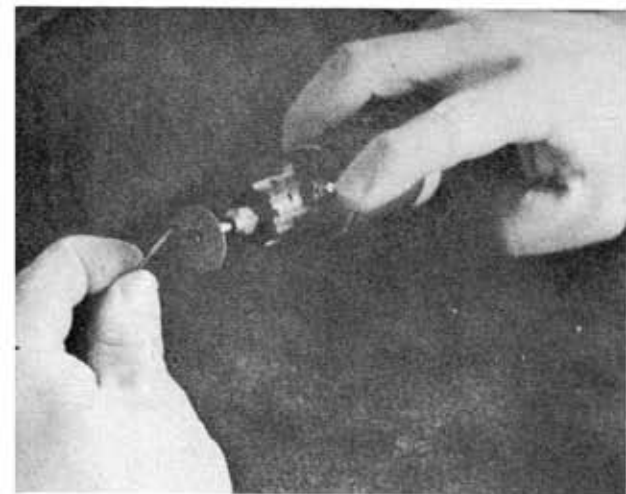


STEP 6 Scribe the centerline through the points you've already marked in Step No. 5. Use your straight edge, it's easier that way.

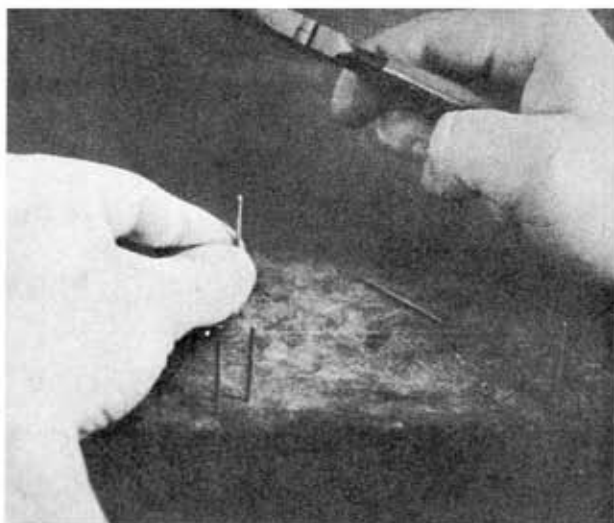
STEP 7 Clean up your slate.



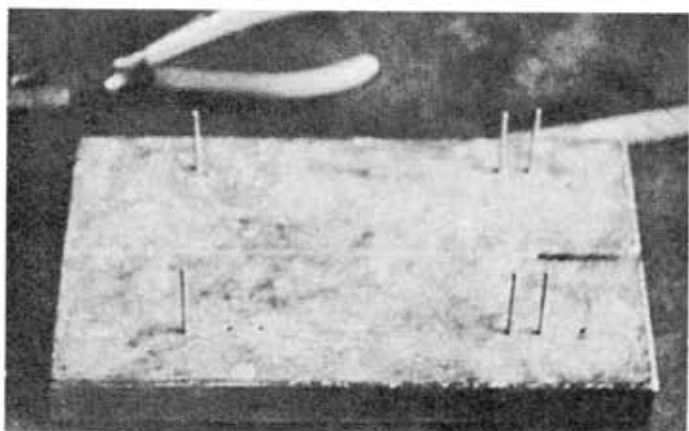
STEP 8 Take your .063 piano wire and cut six pegs each 1-1/2" long.



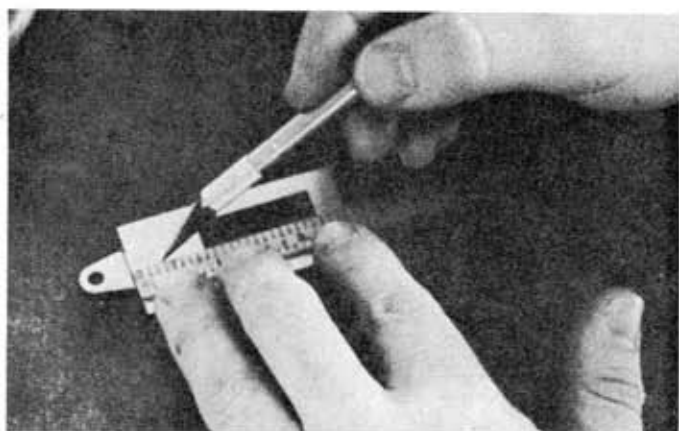
STEP 9 Use your Dremel to sharpen one end of each peg.



STEP 10 Beat the six pegs (sharp end first, Ambrose) in your precision drilled slate.

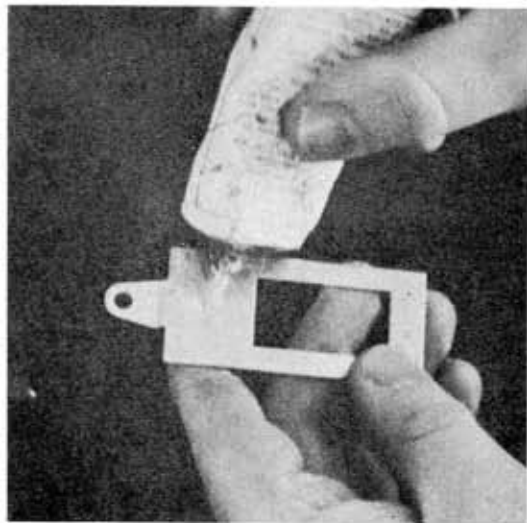


STEP 11 This is what you should have so far. If yours looks strange; you blew it.

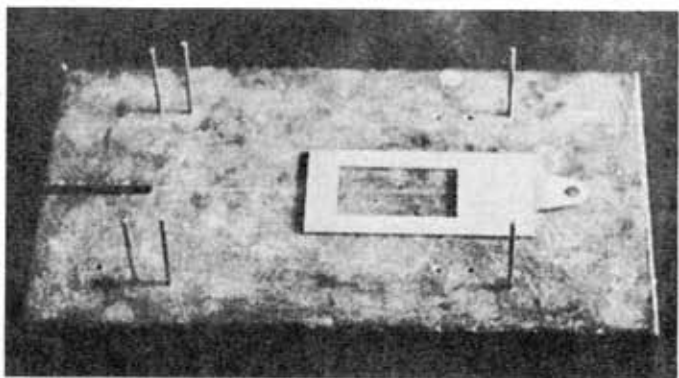


STEP 12 Scribe a centerline on top of your Camen drop arm. The center is 5/8" from either side.

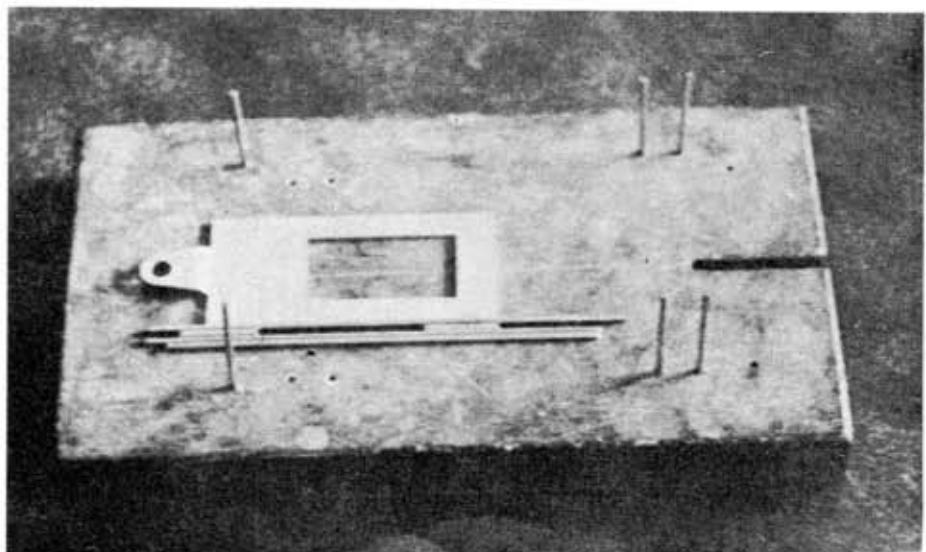
STEP 13 Glue-up the bottom of the drop arm.

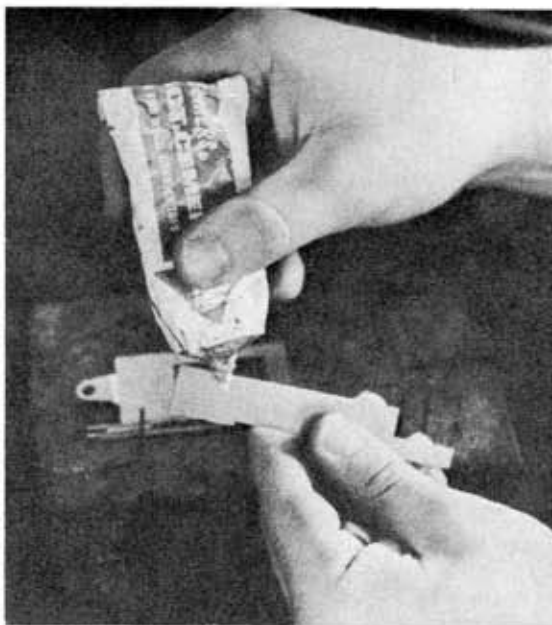


STEP 14 Place the drop arm on the slate in approximately this position. Make certain that you line up the centerline of the slate with the one on the drop arm.

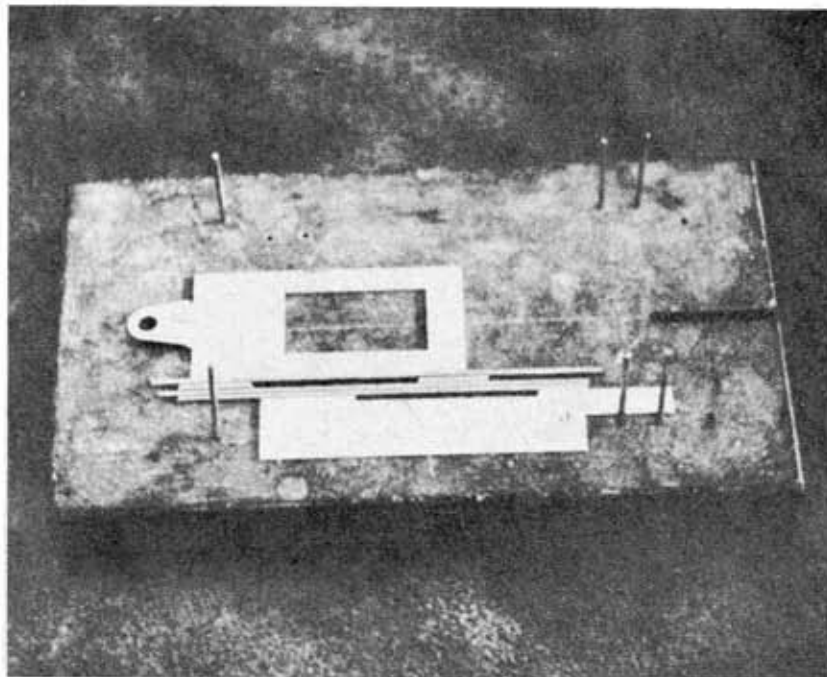


STEP 15 Now to simulate the main rails and plumber of the chassis, lay in three pieces of .063 wire and one of .055. I cut down one of the .063 pieces here to better illustrate the distance between the main rails.

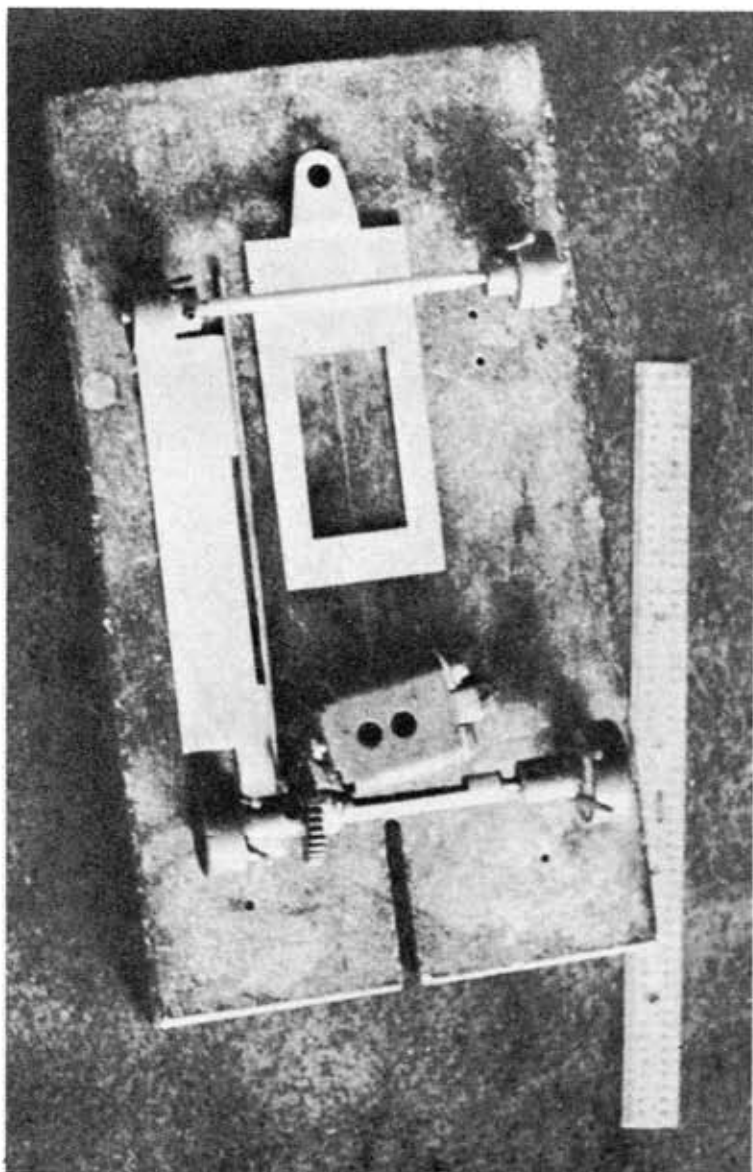




STEP 16 Just like the drop arm, glue-up the Camen bat pan.



STEP 17 Place the bat pan on the slate as shown. Don't worry if this looks backwards to you, there is a good reason for doing it this way.



STEP 18 This is how your finished masterpiece should look with your jig wheels and jig motor in place. We'll start at this point next month.



"If you don't know what to do at this point, you're beyond my help!"

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

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 of 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

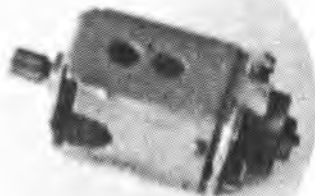
A Dremel Moto-Tool and several No. 400 cutting discs
An Ungar Soldering handle with a No. 4037 Iron Clad Tip
Sta-brite silver solder and acid
An old sponge, cloth or tip cleaner for soldering iron (use wet)
Jig and jig accessories... front jig wheels — 1/2" rear — 11/16" (for small tired car)
A Champion Slate or equivalent
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

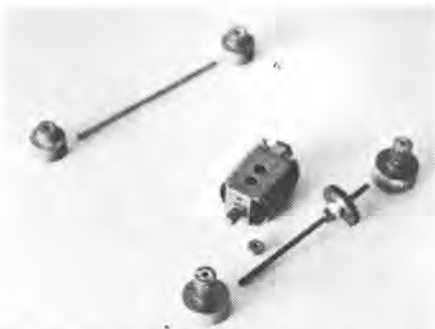


PARTS LIST FOR COMPLETE CHASSIS

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.



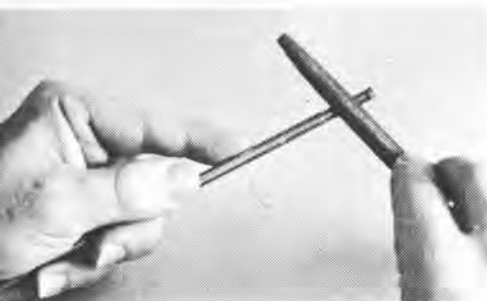
Here is all of the things you'll need to use with the jig that we built last month. Included are a set of Champion jig wheels shimmed with 1/8" K&S tubing, Parma 3/32" axles and oilite bearings, a Cox 32 tooth gear shimmed with 1/8" tubing with the bottom cut off, and your jig motor.



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.

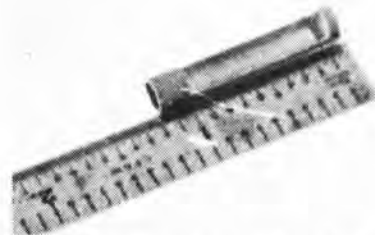


The use of glue or a little more care in chassis tuning is a better method of getting traction.

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

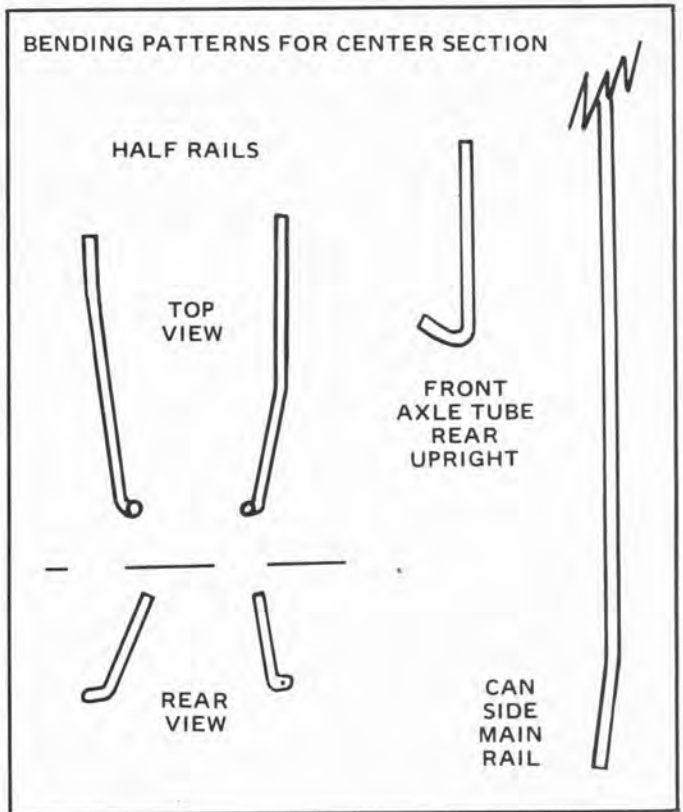
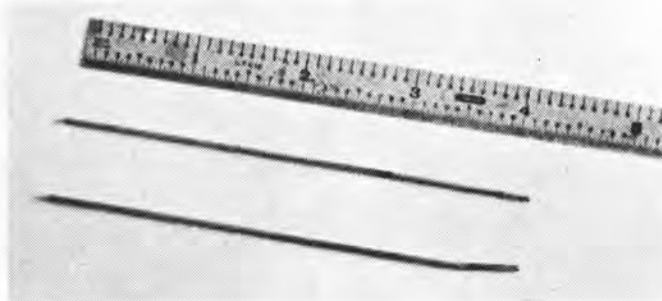


If your rear axle tube doesn't look as outrageously beautiful as mine you must not be paying attention.

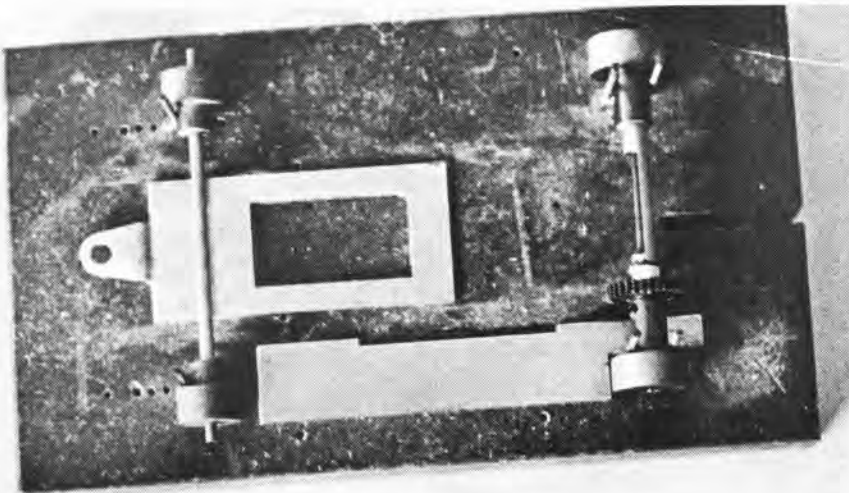
STEP 5 While working with tubing is still on your mind, cut some 1/8" tubing (K&S brass of course) for the front axle. Make it 2" long as shown.



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.



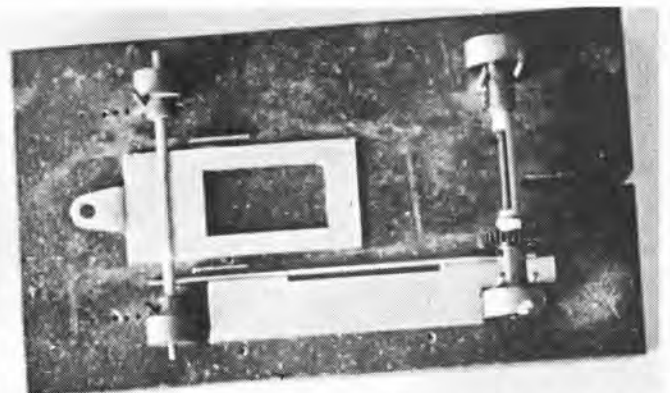
STEP 7 Now cut two pieces of 0.055" piano wire for the outside main rails. Bend one only using the handy-dandy pattern printed somewhere around here.



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.

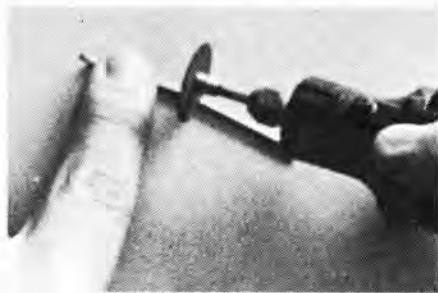
STEP 9 Make three spacers out of .063" piano wire. Cut one 4" and the other about 1". This should be easy enough for your girl Friday to do correctly, so if you haven't put her to work yet; do it.

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-

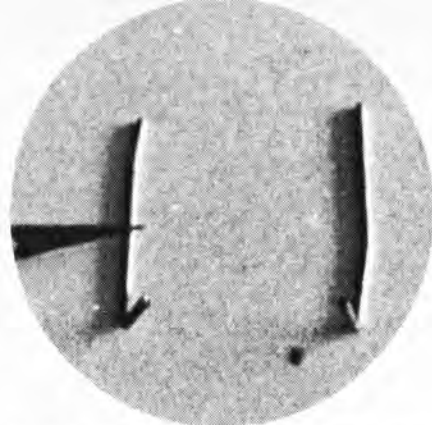




STEP 10 Now comes the part you don't want to goof. You shouldn't have to spend more than a few minutes doing this critical bending of the half rails, but accuracy is more important than swiftness. Just follow the pattern I made for you and it should be easy.



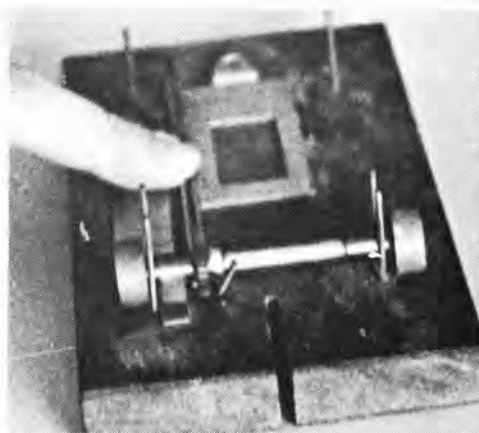
STEP 11 After getting the half rails bent correctly, finish them off with your Moto-Tool. If you've kept track of all that other stuff we've been bending and cutting so far, have your Girl Friday go fetch it for you.



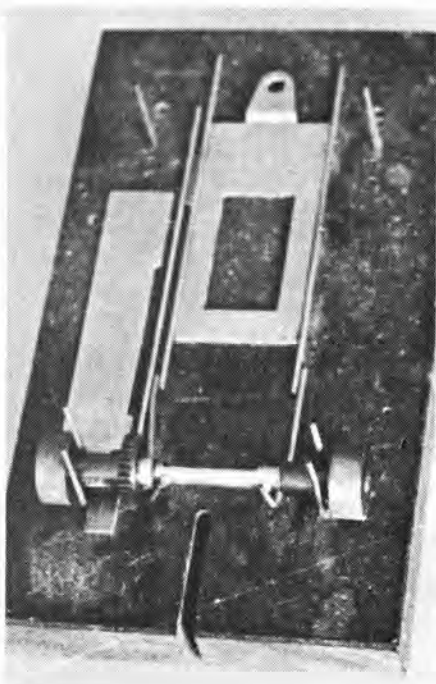
Hopefully, this is what your left and right half rails should look like.



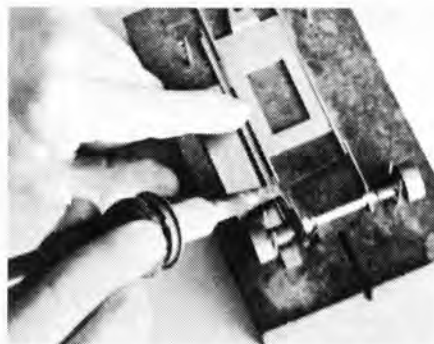
"Well, Dona, it's long enough for sure, but . . ."



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 aligned 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.



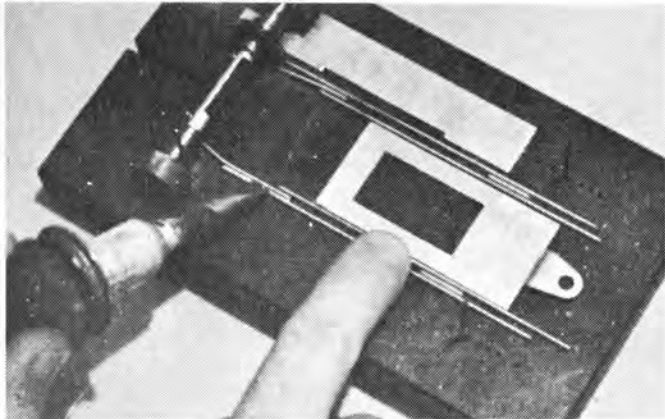
STEP 13 If you made it through the right side try the left and this is what you're shooting for. If you're having trouble just hang in there and do a little fiddling on your own or go back to where you got lost. It'll come to you.



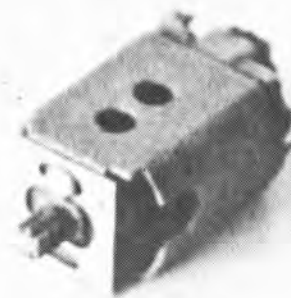
STEP 14 From now on out our center section should be a breeze. Slide the .063 spacer out of the way and add the pre-bent .055 outside half rail as shown. Now tack solder only the outside rail and the half rail.

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

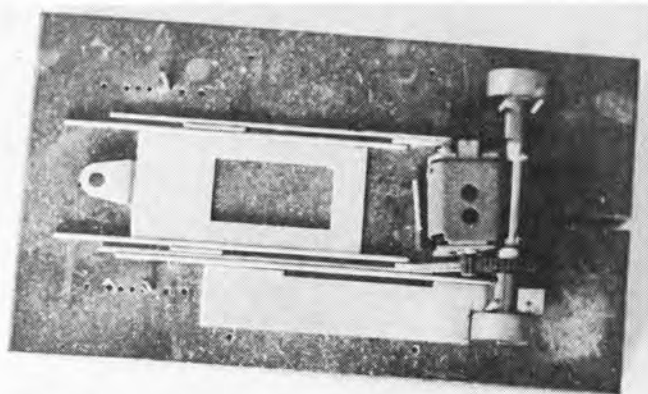
There are a few other points I'd like to make before you get started with your masterpiece. Take your time and do it all right or don't do it at all. Jerry Brady was the only racer I know that got by with shabby workmanship and he lost many more races than he should have because of his building habits.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



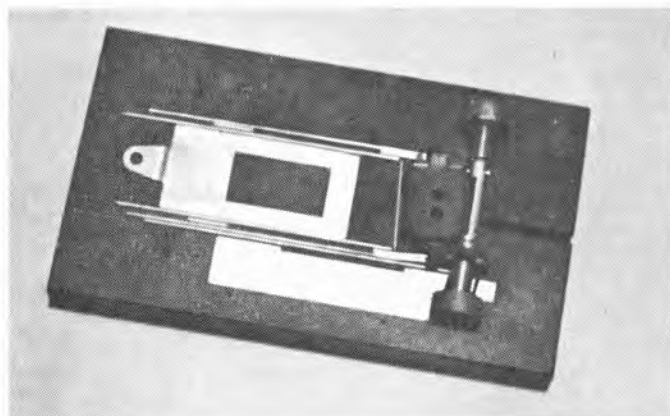
STEP 15 If you handled the right side all right, go ahead and work out on the left using the straight .055 main rail piece.



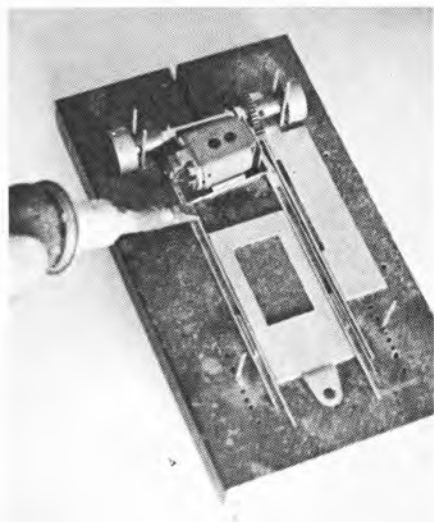
STEP 16 Mount your motor bracket to your jig motor as shown.



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

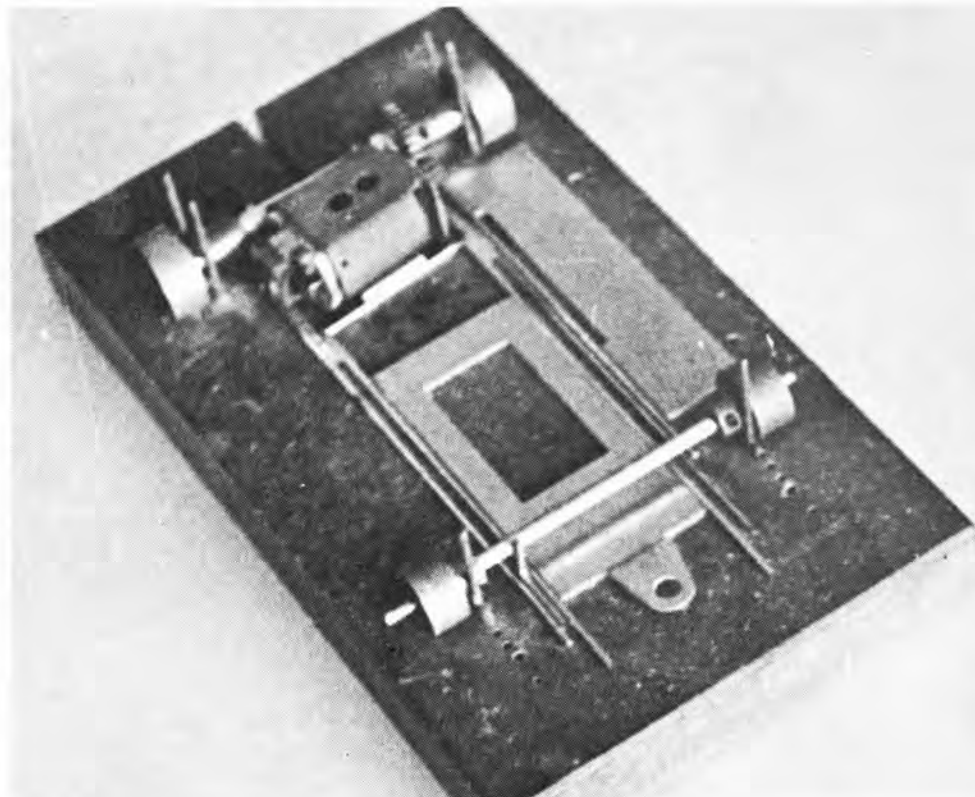


STEP 18 Set the motor angle appropriate for your track (if you read the text you'll have a better idea of what to do here). Cut a piece of .055 piano wire to fit as a crosspiece in front of the spacer and motor at the preferred angle.

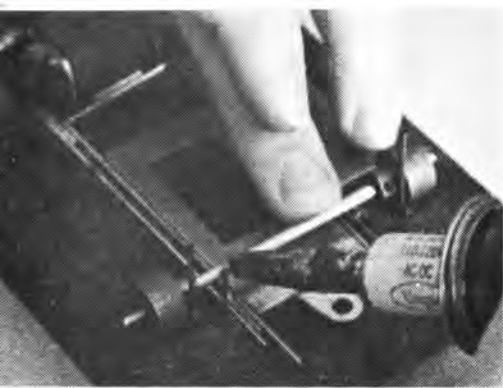


STEP 19 Move the inside main rails back against the crosspiece and solder as shown.

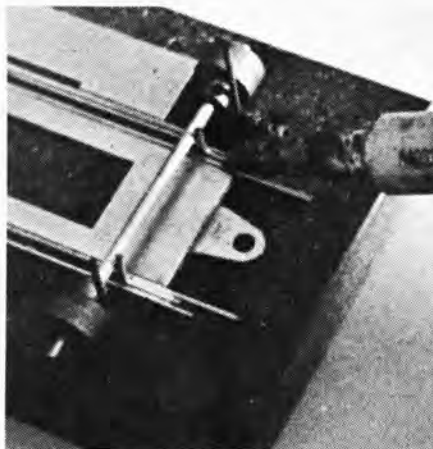
STEP 20 Bend four pieces of .063 piano wire as shown. These will be used as both front and rear axle tube braces.



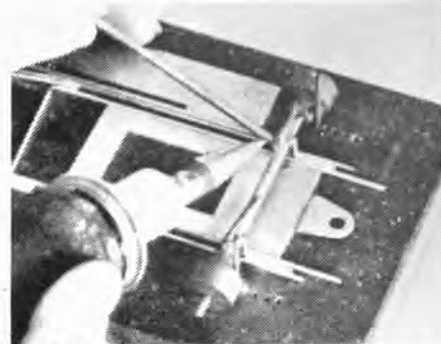
STEP 21 Remove the short main rail spacers and add the front axle tube and jig wheels. Slide the front assembly up against the rear of the front pegs. Center the mess and add two front upright braces between the main rails as shown.



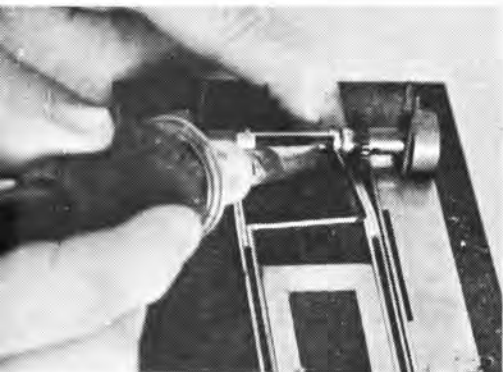
STEP 22 Hold the axle tube assembly forward and tack solder both uprights to the axle tube. Make the uprights perpendicular to the jig if you like to burn your fingers and be neat all at the same time.



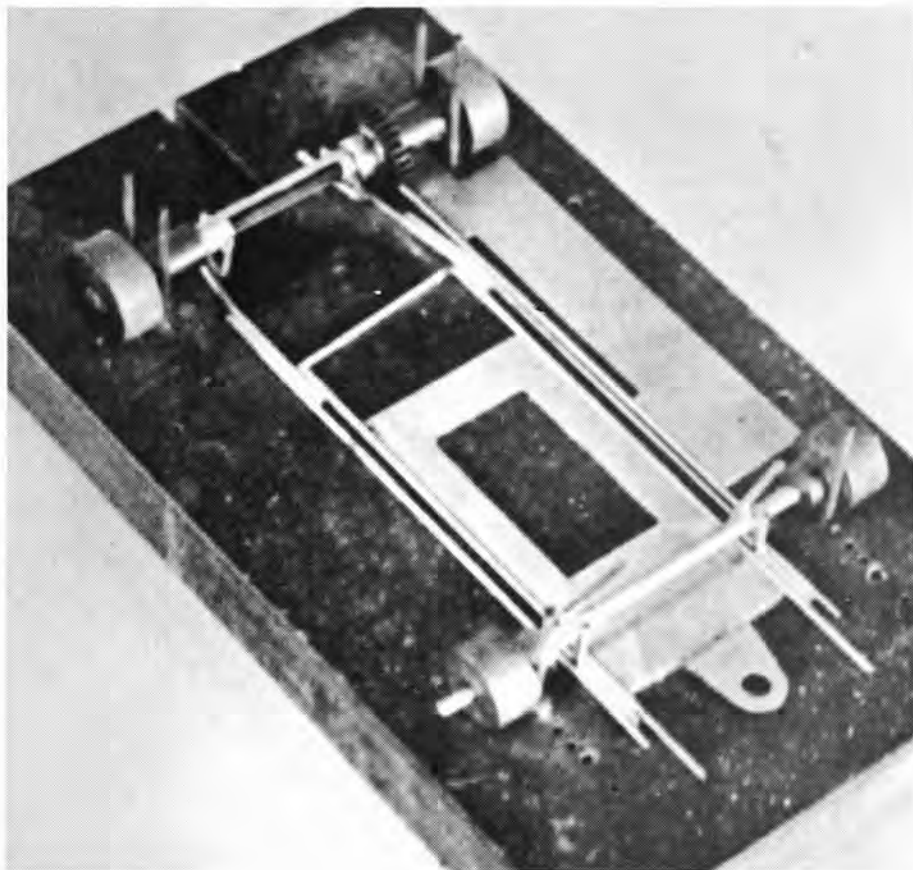
STEP 23 Solder the front like you see here.



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.



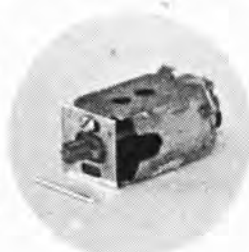
Is this what you have so far?

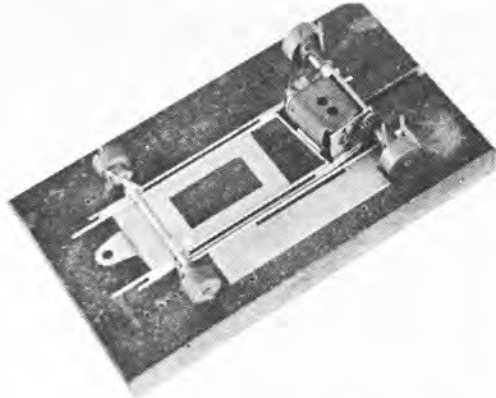
to look at but right now we have enough to worry about just building this thing and then trying to make it get around your track quickly. Another tip is to practice building. Try to improve your soldering, bending and expertise with the Dremel Moto-Tool. Concentrate on the stuff you have trouble with 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.

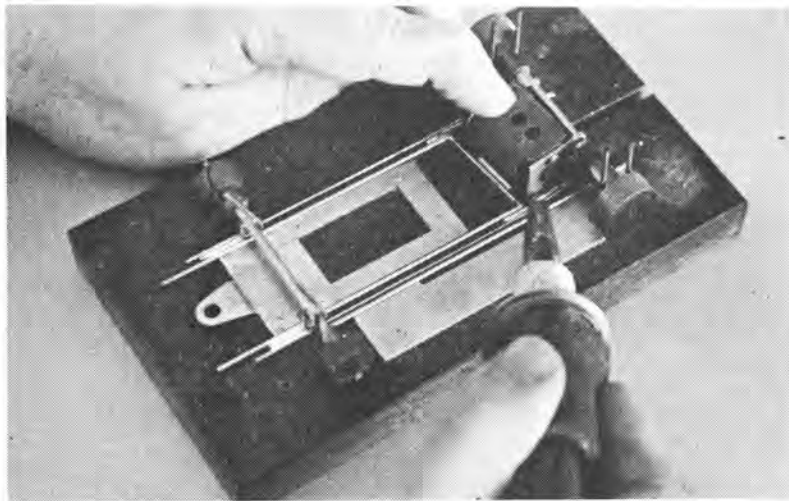


STEP 27 To center your motor and gear, cut a piece of .047" wire to the length of the motor bracket. Use this as a spacer between the bracket and half rail.

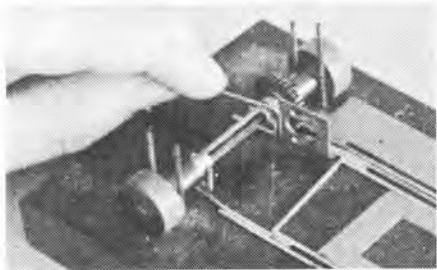




STEP 28 Drop the motor bracket and spacers in position to check fit. Re-bevel bracket if needed.

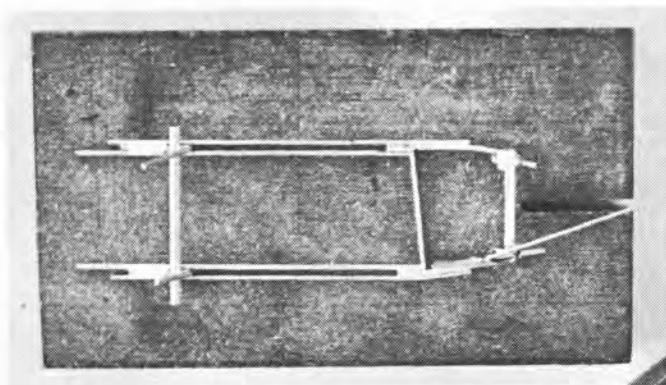
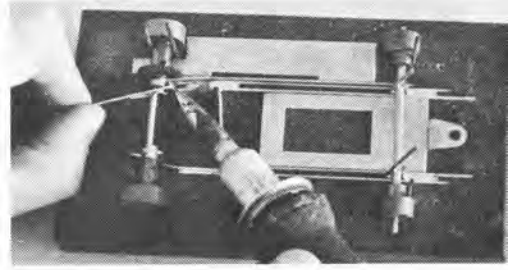


STEP 29
Solder it up.

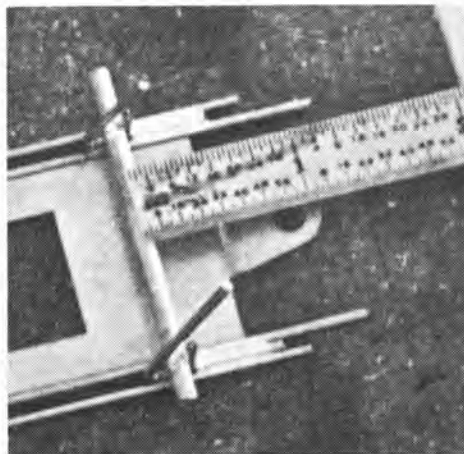


STEP 30 Remove your jig motor for the last time and bend a piece of .047 wire at a right angle as shown. This will be used as a motor bracket brace.

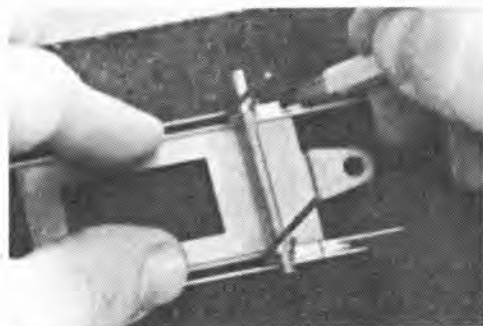
STEP 31 Tack solder the brace to the motor bracket as shown. If the motor bracket falls off you got things too hot and the motor will have to go in one more time. Sorry about that.



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

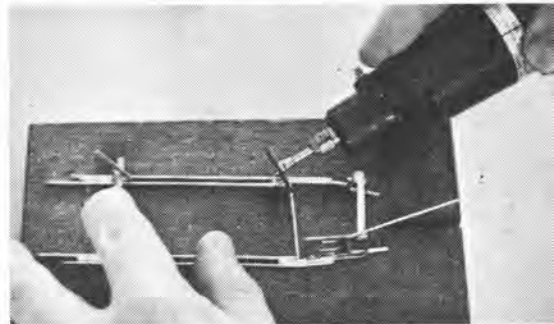


STEP 33 Position the drop arm for a 7/8" guide lead as shown. Measure from the center of the axle tube to the center of the guide hole.



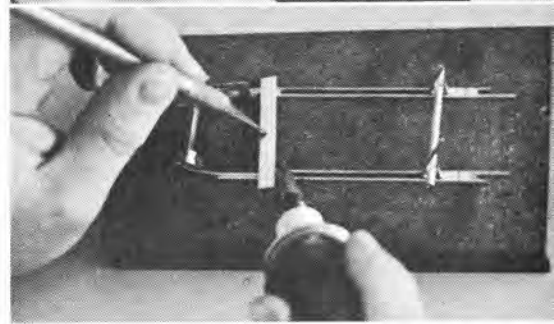
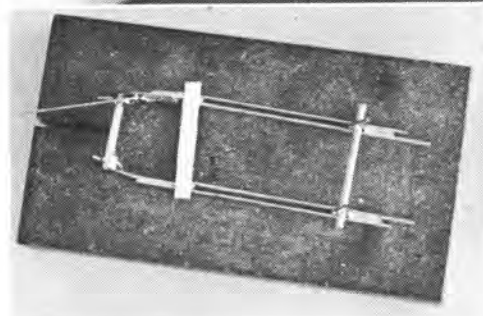
STEP 34 Use a pencil or felt-tipped pen to mark across the main rails as shown. The mark should be approximately 1/16" to the rear of the drop arm.

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.

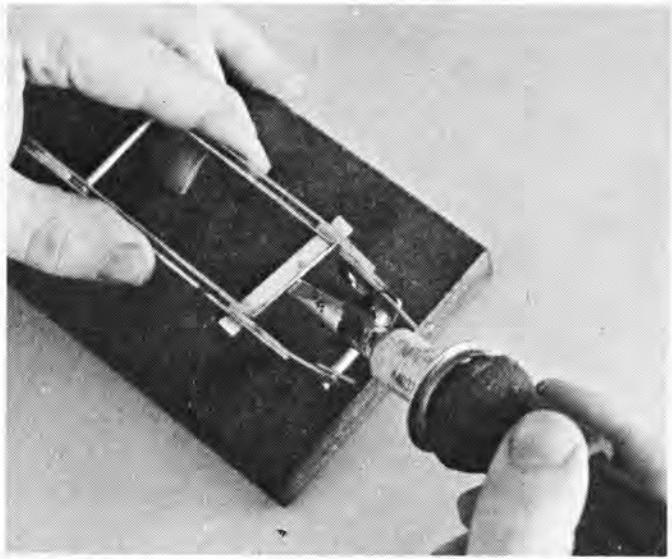
1) Always use plenty of soldering acid (flux) when doing the final solder. You will have less trouble with cold solder joints and find soldering much easier.

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.

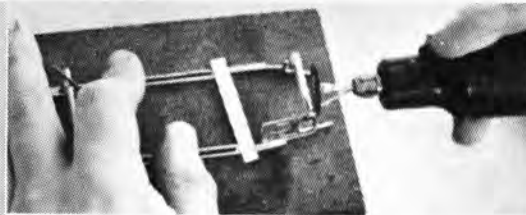
3) Always use silver solder on all chassis joints. A good, easy to obtain brand is Sta-Brite.

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 1/8". 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.

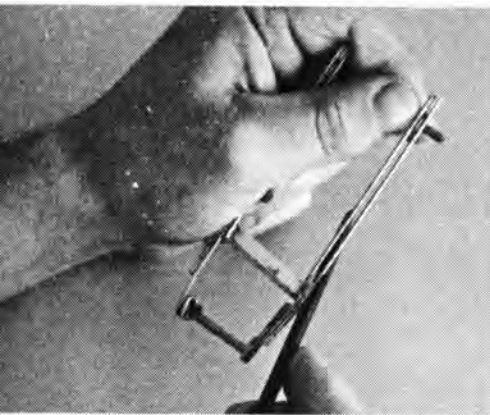
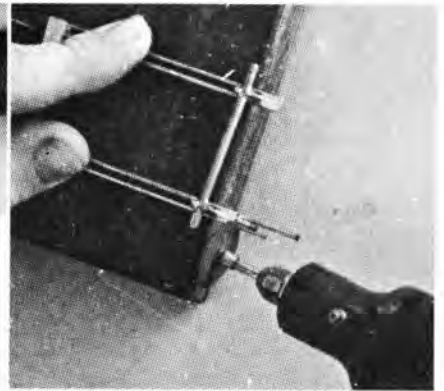
One last thing, don't listen to any know-it-all pseudo-engineer slot fanatic. You don't need expensive tools or all kinds of physics text books to build an effective race car. Textbook theory is nice to know but only when you've proven it to yourself. Common sense cannot be over used in this sport and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



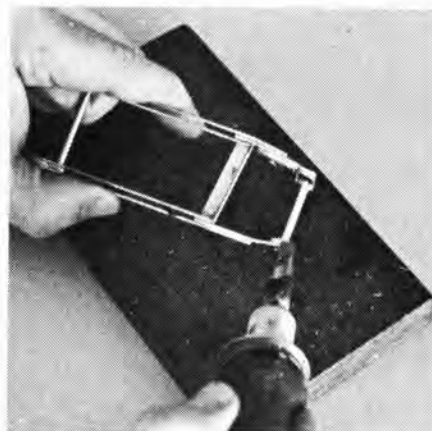
STEP 38 Flip the unit over and lightly solder the rear of the crosspiece plate to the crosspiece wire.



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.

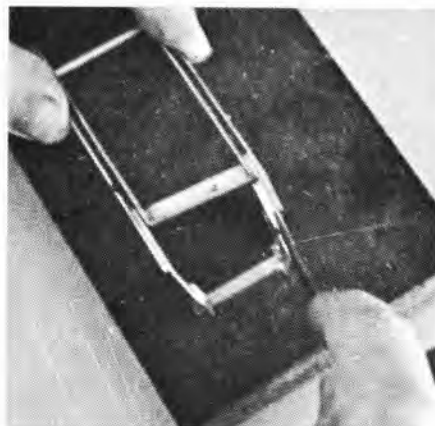


STEP 40 After working out with the Moto-Tool file the sides of the crosspiece plate smooth.



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

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.



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

LEE GILBERT DOING

HIS THING

STAGE

III

HANGING ON THE GOODIES



" . . . and for this I turned down a job with Ray Hoy?"

Last month we found ourselves in the middle of some pretty heavy Gilbert Chassis Theory. We lightly hit upon many of the ideas that I've found to be true after more than three years serious study. More than once I had to rely on these ideas to put food on the table the next day, so you can see why I believe in them and have the confidence to pass them on to you. If you were able to comfortably wade through all of last month's article and have come back roaring to go, I suppose I should commend you for your initiative . . . but I won't. If you want to learn anything you'll have to dig, so pick up a shovel and let's go. Stage III concerns itself with the completion of the chassis. It would be wise, as it was last month, to finish reading this text before you start bendin' and cuttin'.

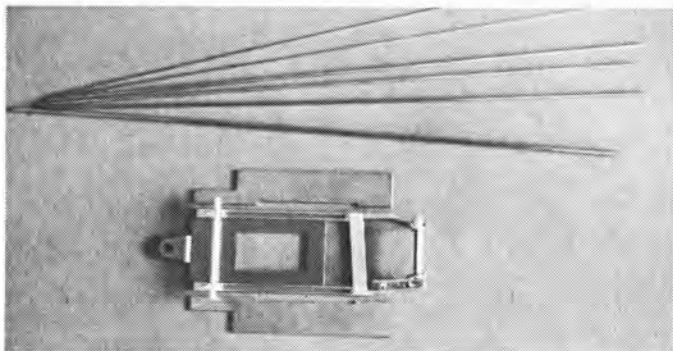
Gather around the fire now with your Girl Friday and we'll get started.

EVEN THOUGH THE center section is the heart of the chassis, and therefore the most important item affecting your car's handling, we will pay considerable attention to the rest of the construction. The placement of the drop arm, the guide lead, the plumber configuration and overall chassis weight all affect a chassis' handling in their own way and if you want to know how . . . read on.

The first thing we will concern ourselves with is the guide lead. This is the distance measured between the centerline of the front axle tube and the center of the drop arm guide hole. If you measure it any other way you're strange. I could make things easy just by telling you to make this distance 7/8" only and leave it at that, but too many of you home grown inquisitors would wake me up in the middle of the

night just to ask; *why?* Since you asked I'll lay it on you. This happens to be the best compromise between too much or too little traction/reactivity/predictability. A general rule to follow when fooling around is that a car will have a little more bite as you shorten the guide-lead. However, this will quicken the car's responsiveness to your driving reactions. Also the car's predictability goes down markedly, so unless you are Superman, don't try it. The lengthening of the measured guide-lead distance will have much the opposite affect on handling. I've tried every measurement possible and 7/8" works best most often, so use it. Fiddle on your own time.

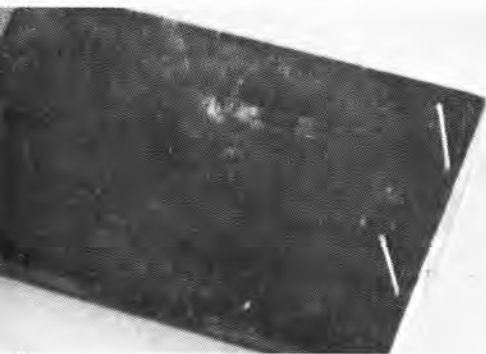
Now that you know where to locate the drop arm in the chassis, we'd better go over its pivot point together. A lot of strange things are still going on in the art of



PARTS LIST:

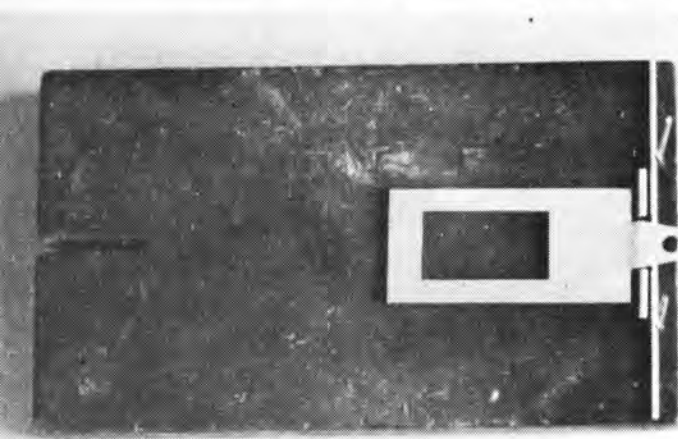
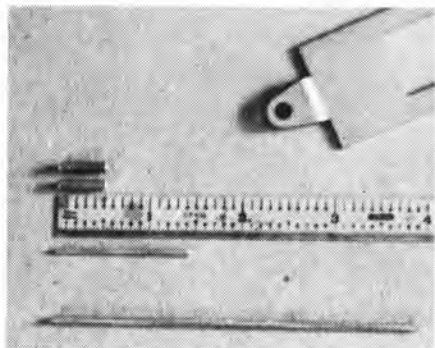
- 1 piece 1/16" K&S brass tubing
- 1 piece 3/32" K&S brass tubing
- 2 pieces 1/16" K&S piano wire
- 3 pieces 0.32" K&S piano wire
- 1 piece 0.47" K&S piano wire
- 1 Camen or Parma 0.40 drop arm with hole
- 1 set Camen or Parma 0.32 pans

Here's the goodies you'll need to finish your missile.

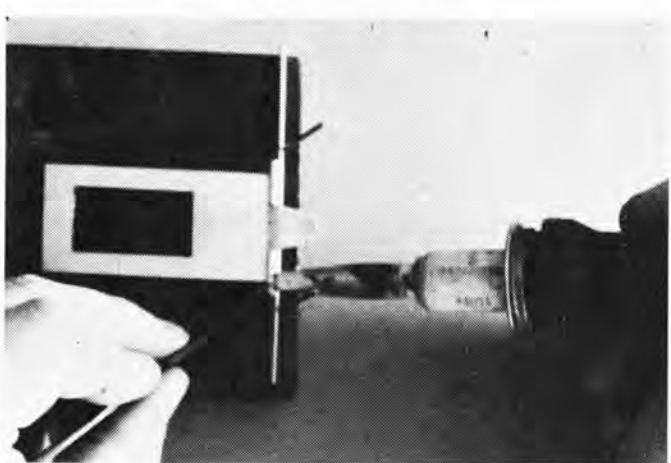


STEP 1 Drill two holes in your slate about 2-1/2" apart for 1/16" wire pegs. Beat the pegs in. If you had fun getting your 1/16" pegs to stay in the 1/4" holes two months ago, don't worry, so did I.

STEP 2 Cut two pieces of 3/32" K&S brass tubing, each 1/2" long. Assemble the rest of the stuff you'll need for the drop arm assembly. Use a Parma or Camen 0.40 drop arm, a 3" piece of 1/16" wire and a piece of 0.47 wire 1-1/2" long.



STEP 3 Place drop arm and parts on pegged slate as shown. Leave the 0.47 wire off for right now.



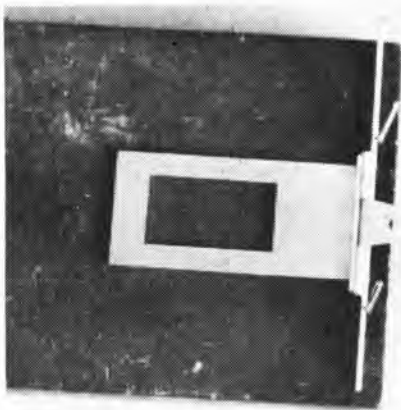
STEP 4 Carefully tack solder the 3/32" tubing to the 1/16" wire as shown. Be certain that the entire drop arm is held securely against the pegs.

hinging a drop arm so pay attention now and you shouldn't be out-psyched later by some babbling egotist (like me). The main reasons for shuffling a drop arm's pivot point are directly related to the track you race on. The type of track surface (generally: smooth or rough) and the configuration (flat or banked, mostly straights or mostly turns) dictate the amount and kind of traction you will need to master the track. Whether you are allowed to use glue will also influence the pivot placement. Smooth no glue tracks hurt for traction. Shorter pivots place less effective weight on the nose (guide) of the car making more traction possible at the rear wheels where it is needed for this type of track. Long pivots have been used to get cars over bumpy high traction courses and they also allow you to drive deeper into

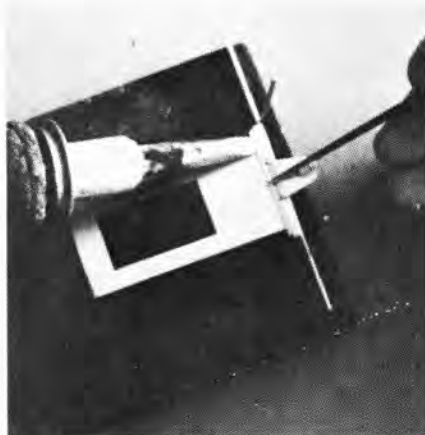
corners than shorter pivots. A good place to start is with the arrangement we're building here. Happy mediums are not always easy to find and they usually take a lot of serious work and study to uncover.

If your mind is becoming tweaked, why don't you take your pizza out of the oven and reflect a bit before going on. Hopefully between you and your buddies and your girl Friday you will be able to learn something this month; or get tired of pizza, trying.

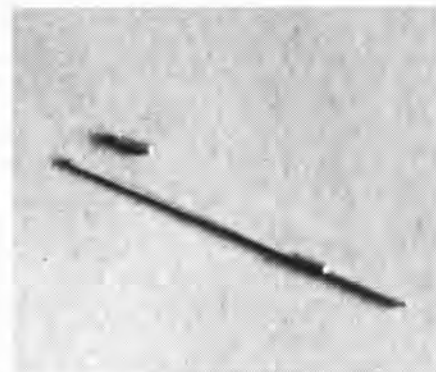
The plumber configuration also has a little to do with traction. The car we are building has a drop arm mounted plumber and this design will put more effective weight on the nose of the car. Once again this takes weight off the rear wheels and reduces traction but at the same time allows the car to be driven much deeper



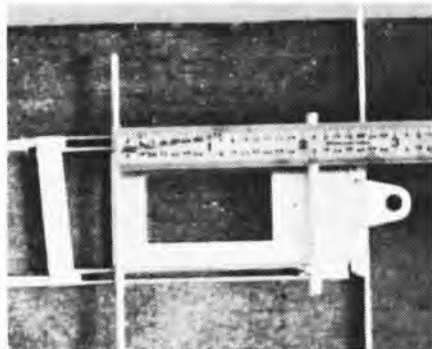
STEP 5 Place the 0.47 wire behind the 3/32 tubes as shown. Center it if you like to be neat.



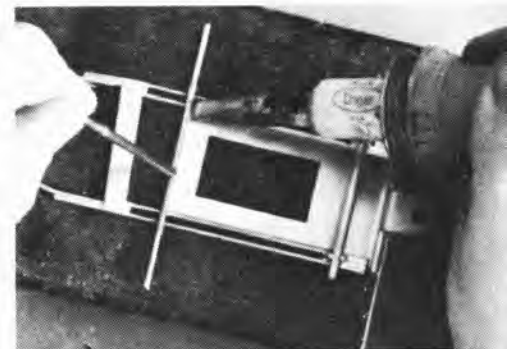
STEP 6 Hold the 0.47 wire down and solder the whole mess up. Don't spare the heat and acid.



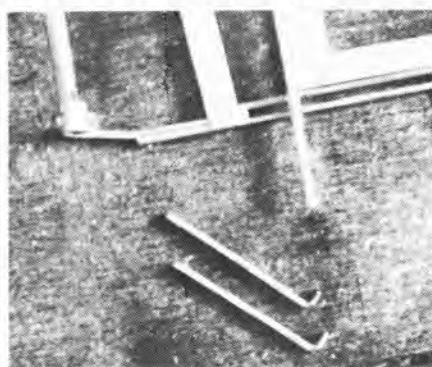
STEP 7 Cut two pieces of 3/32" brass tubing each about 1/4" long to be used as hinge points on the rails for the drop arm. Slip a piece of 1/16" wire through the two pieces of tubing to aid in aligning the hinge points on the rails.



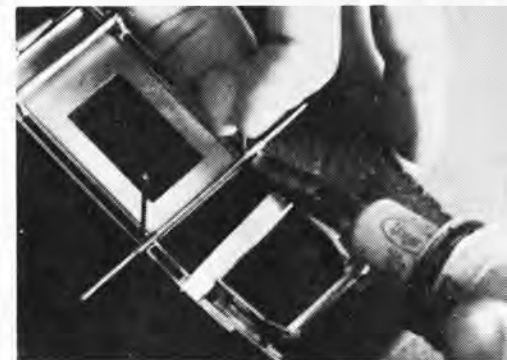
STEP 8 Set drop arm in the center section at 7/8" guide lead (see text). Measure the drop arm pivot points back from the center of the front axle tube 2-1/4". Mark and lay the hinge tubing on the wire across the center section as shown. Are you with me?



STEP 9 Tack solder the 3/32" hinge tubing as shown. Easy on the acid and solder. You might wind up with some crazy hinge tubes if you don't go easy.



STEP 10 Bend two pieces of 0.55" wire for hinge braces as shown.

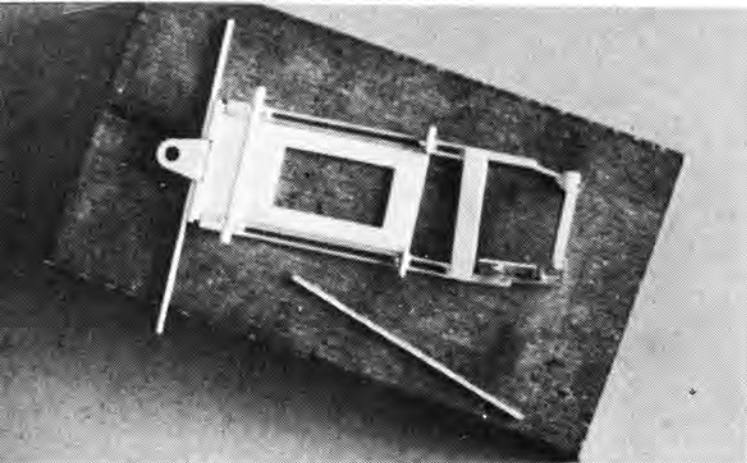


STEP 11 Lay the short end of the braces under the hinge tubes and tack solder as shown.

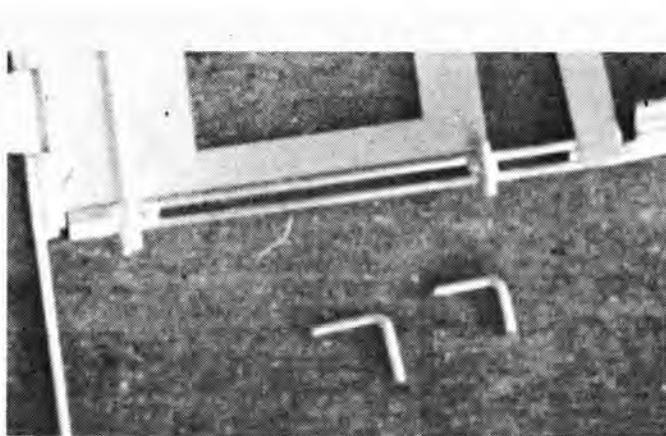
into corners. You've probably seen rail mounted plumbers before but did you know that this design was initiated to give more traction? Usually rail plumbered cars will run better with no glue tracks and sometimes even on glue tracks during the summer months when everyone seems to be hurting for traction. (Though most of these construction points affect traction in a peculiar manner, it will be of your interest to be reminded that the center section still plays the vital role in the production of good bite.) At this time we're ready to move on to the rest of the plumber design. The rear crosspiece and pan hanger bar positioning will affect the stiffness of the plumber and rails and therefore can increase traction or lose it accordingly. The farther to the rear the crosspiece is mounted, the more rear tire

traction can be attained because of more stiffness in the plumber rails. The opposite is true for mounting the crosspiece farther forward. A good trick to try when traction is needed coming out of turns but interferes with handling through esses, is to try a very flexible cross piece mounted far back on the chassis. Where there is a method, there is a compromise.

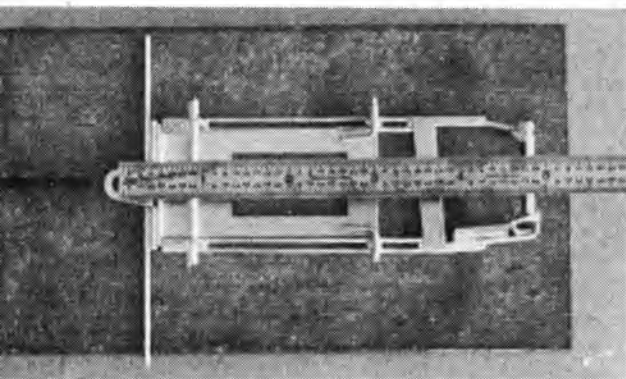
What would you like to know about pans? I've been known to use all sorts of weird things to blow opponents minds but the fact remains that pans do little more than provide a good place for lead to be glued. The hinge placement will affect the plumber stiffness again but the pans themselves just transfer weight and deadens unwanted vibration that raises havoc with traction again. We'll get into lead and how to use it later so don't get excited. Already



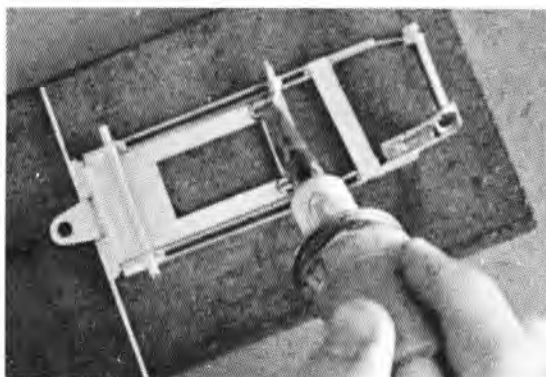
STEP 12 Yank the wire out of the hinge tubes and, if you'd like to have your body fit later, trim the braces.



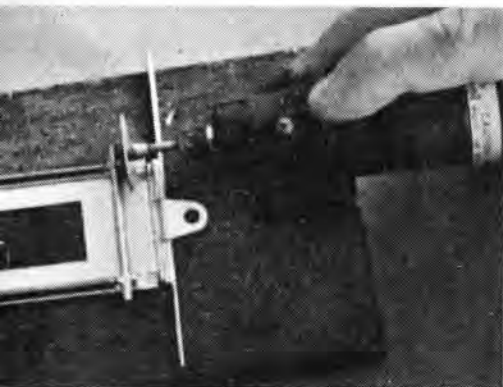
STEP 13 Bend two pieces of 1/16" wire as shown to be used as the other half of the drop arm hinge. An old fashioned right angle works fine.



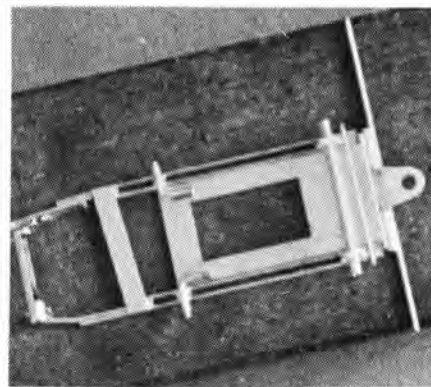
STEP 14 Insert the drop arm hangers into the hinge tubes. Re-check the guide lead.



STEP 15 Solder the hangers to the drop arm.



STEP 16 Using your trusty Dremel Moto-Tool, grind two notches for the drop arm up-stop, one on either side of the drop arm as shown. The notches should be as deep as the drop arm and wide enough to accommodate 0.32" wire.



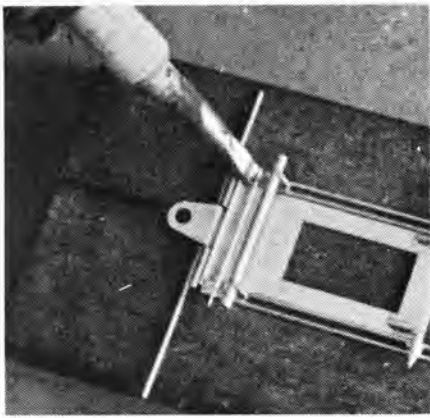
STEP 17 Lay a piece of 0.32" wire, wider than the main rails, across the drop arm and center section as shown.

you know more about chassis' than 90% of our self-proclaimed pro chassis builders.

So far I've failed to mention anything specific about your car's weight. I've found that a medium weight car with 0.40" drop arm and 0.32" pans is the best place to start for most tracks. Anything lighter will stop a little quicker but will invariably be weaker and covered with lead. If you're worried about weight slowing down acceleration, don't. Next month we'll build your motor right and you won't need to worry about it. Again, brakes are the only thing really affected by a car's weight. On the other hand, you don't want to build a tank right off (maybe later). Too much weight can seriously affect the articulated portions of your chass and their effects on your car's handling so stick to the how-to chassis now and build your own load later.

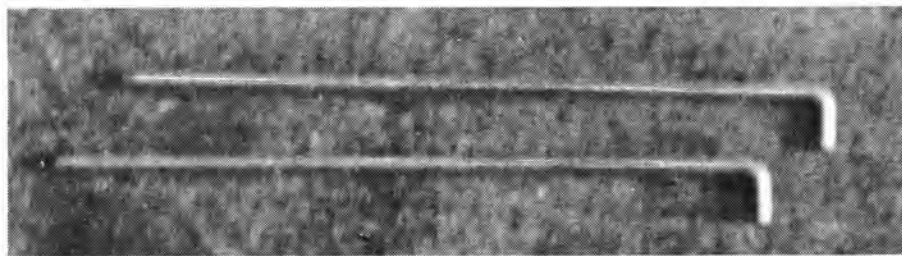
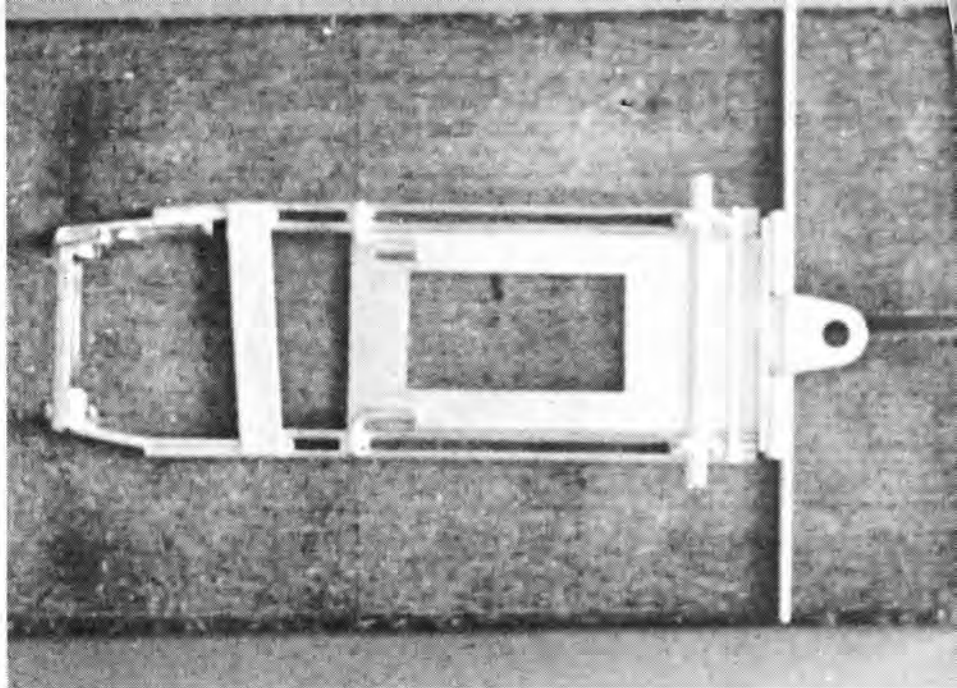
Forget solid drop arms. They waste weight that could be more effectively used elsewhere. If you don't think about that you'll find that this agrees with everything else I've said here and hopefully it will make sense if your mind is a little free and used to thinking.

I suppose many of you will not have the patience to hold off until next month to try your new chassis so let me give you brave people a few hints. If you find that the chassis is a little weird and won't break the track record the first time out, then you might want to try a new center section. This is the quickest and easiest way to make a new chassis out of an old one. I'm always amazed at the difference between two seemingly identical chassis. Each center section seems to take on a personality of its own. You can change rail



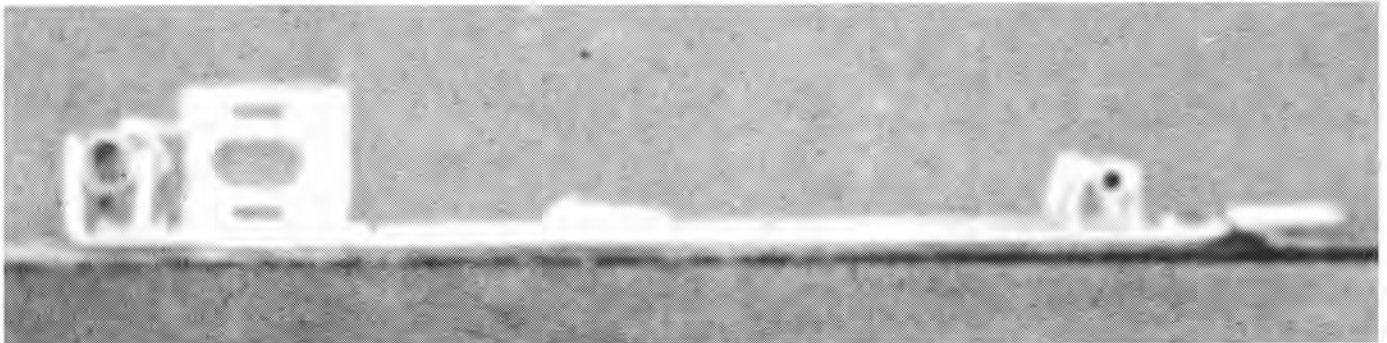
STEP 18 Solder the wire to the center section only. Make sure that everything is flat.

STEP 19 Trim the excess off the up-stop wire and take a look at your work. The drop arm should swing free and everything lay flat before we go on.



STEP 20 Now for the plumber set-up. Bend two pieces of 1/16" wire 3-1/2" long as shown.

STEP 21 Insert the plumber rails into the tubing at the front of the drop arm, one on either side. You will notice that an additional bend is needed to keep the plumber rail flat against the slate. Hope you can see this all right.



combinations if you want but I wouldn't recommend it at first. Any changes you make should be thoroughly thought out and done separately. As much sorting out as possible should be done before anything new is tried. We'll get deeply into this in the last stage of building our race car, so just hang loose.

One last thing on building. Always make certain that all solder joints are solid and perfect. With use, a chassis can weaken and undoubtedly become ill handling if the solder joints are weak. Continually check your work right down to the drop arm spring (it should always keep the drop arm *very* tight against the up stop). If anything even looks bad, fix it. A good chassis will definitely go bad if you don't take care of it. Once in awhile a bad chassis will get better but don't count on it. I've only had

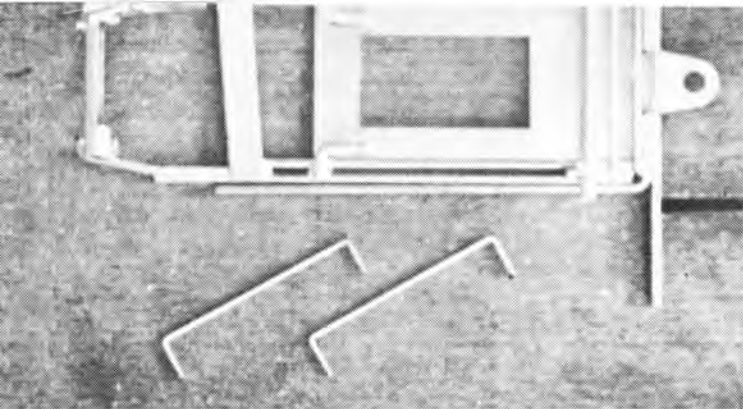
that happen once out of over 3,000 chassis (and that's because I've only had one bad chassis!).

Next month is motor time. If you think that you have been digging into the theory so far, just wait until Stage IV. In the meantime, put away the shovels and take your buddies to lunch because I think your Girl Friday just burnt the heck out of your pizza.

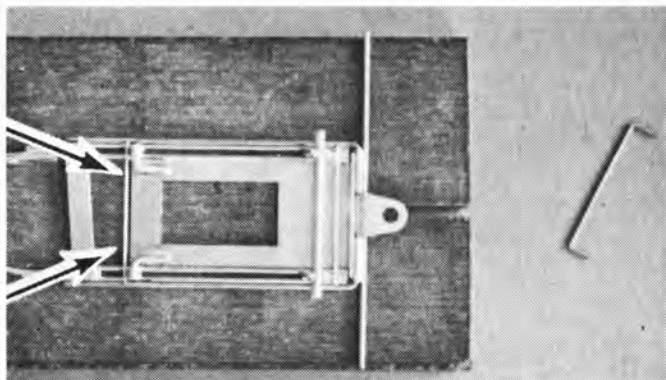
If you missed the start of this excellent article by Lee Gilbert, you can catch up by ordering your copy from our back issue department.

Part 1 — Building Your Jig — Oct. 1972
Part 2 — The Center Section — Nov. 1972

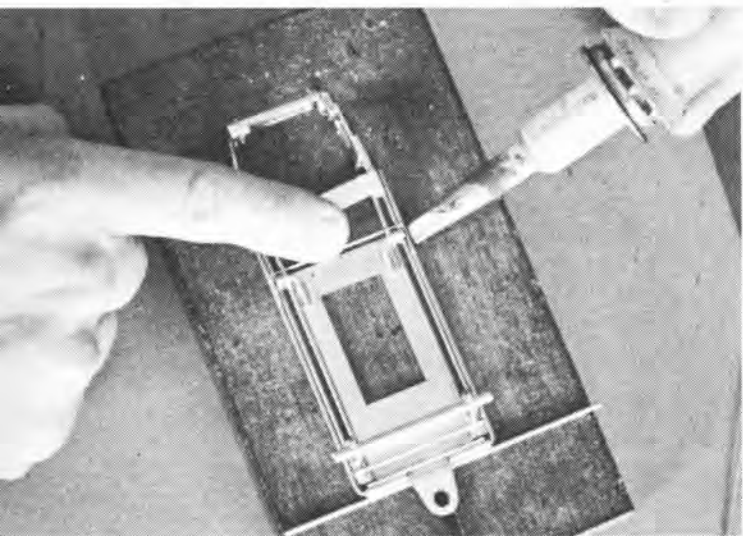
Just send 80¢ for each issue wanted to:
Car Model Back Issue Dept.
1301 East McDowell Road
Phoenix, Arizona 85006



STEP 22 Bend two pieces of 0.32" wire as shown for plumber rail crosspieces. You may blow a few getting them the right length and flat enough. Don't sweat it, I've blown hundreds.



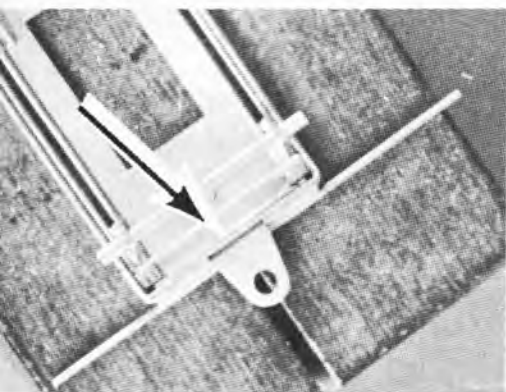
STEP 23 Lay one cross piece across the plumber rails just behind drop arm hinges.



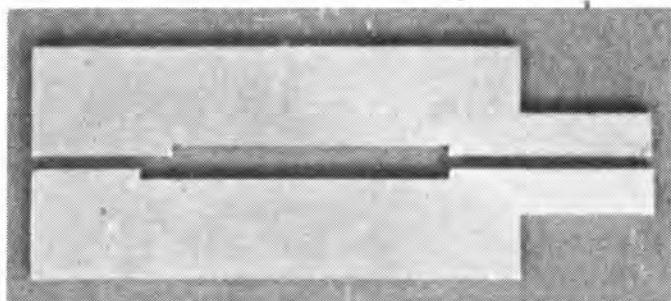
STEP 24 Solder the crosspiece. Don't worry about having the plumber rails in tight against the main rails. Leave them right there.



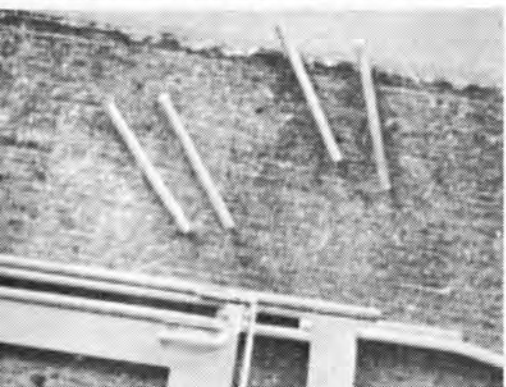
"You don't really think I'd trust her with our masterpiece, do you?"



STEP 25 On to the front crosspiece. Lay it across, in the notch between the plumber hinge tubes and their brace, as shown and solder.

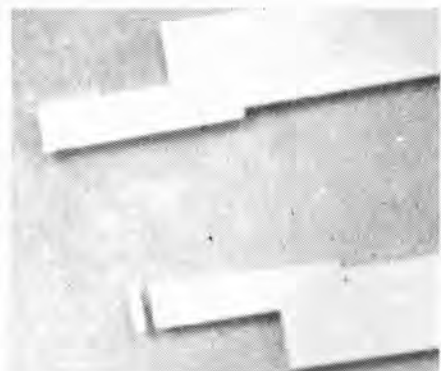


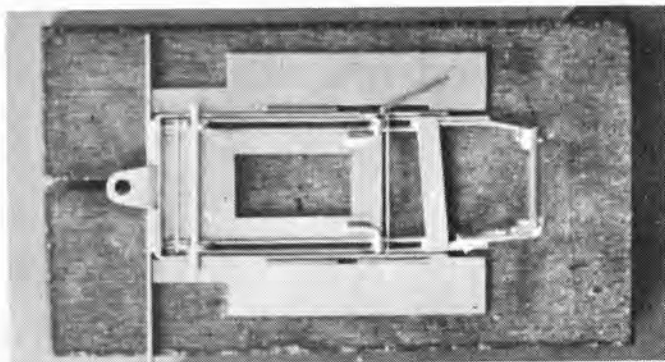
STEP 26 Grab your pans and notch the rear end of the hinge slot an extra 1/4" back. It's too bad the factory can't handle that for us.



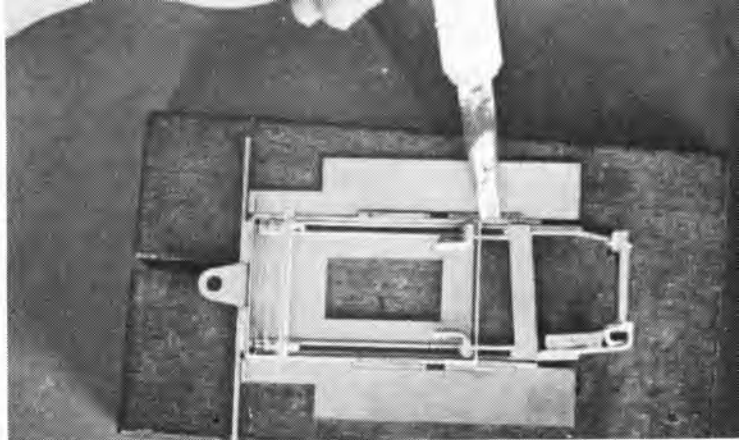
STEP 27 Cut four pieces of 1/16" brass tubing for pan hinge tubes. Make them about 7/8" long each.

STEP 28 A little more work is needed to make the pans right. Add a piece of 0.47 wire to the front of the pans as shown and trim. This makes the chassis go together better, and look neat, while keeping things aligned properly.

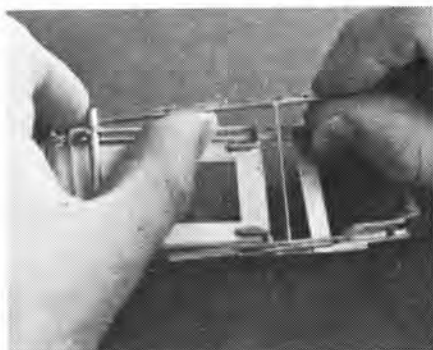




STEP 29 Lay the pans up against the plumber rails on either side, making certain that the forward edge of each pan is resting against pan bumper. You know... the thing you soldered to the drop arm earlier. Now drop in the pan hinge tubes.

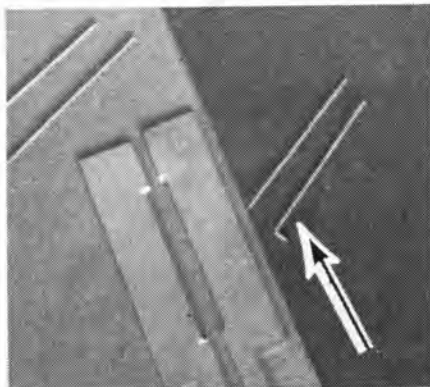
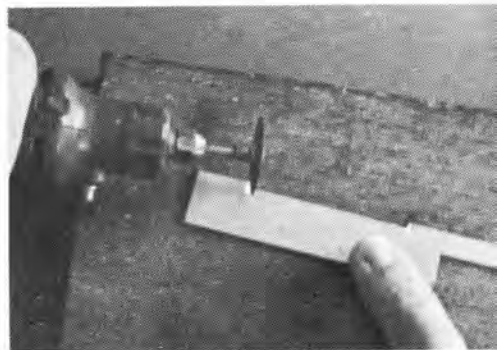


STEP 30 Solder the pan hinge tubes to the plumber rails. Do the rear tubes first. This little hint cuts the probability of rail warpage down a bit.



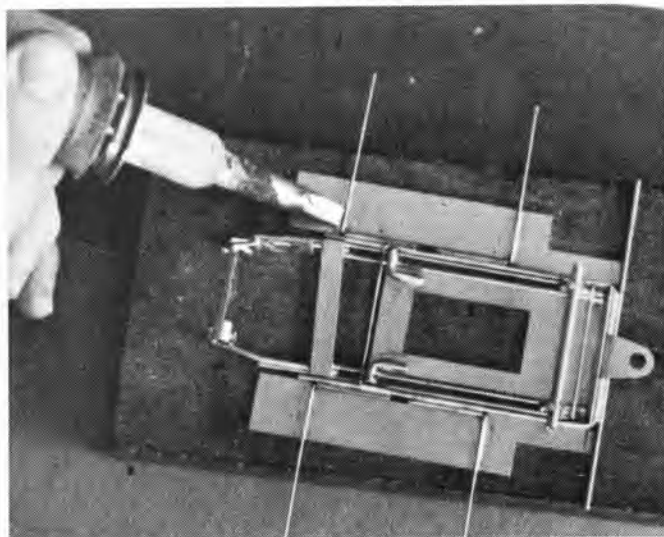
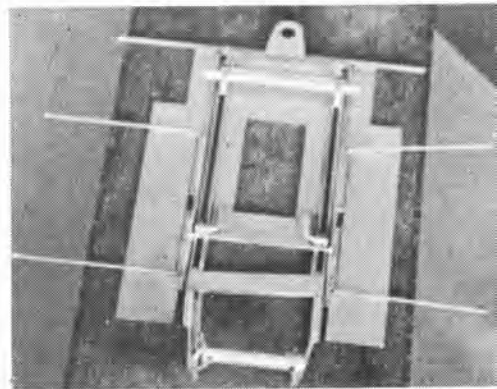
STEP 31 After you solder up all four hinetubes you may find a slight *wow* (warped area) in each plumber rail. The best way to remove the wow is to slightly bend the rails as shown... or you can use any other method that won't totally destroy the work you have done so far.

STEP 32 After you've made the plumber rails perfectly straight again, grind both pans as shown. These notches will help the hinge wire to fit better.

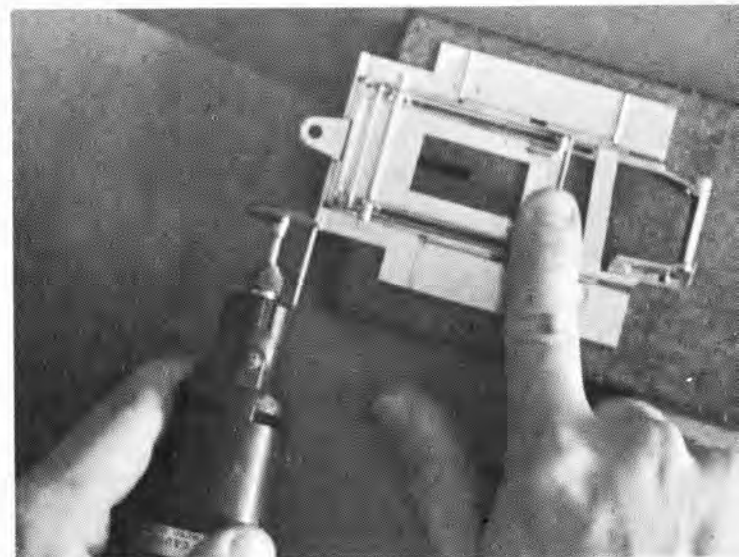


STEP 33 Bend four pieces of 0.32 wire, like the one shown, for pan hinges.

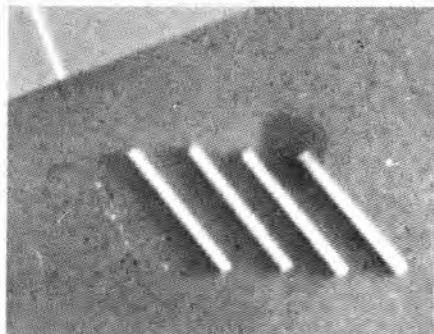
STEP 34 If you've already inserted the hinge wires in the pan hinge tubing you'll note that they don't lay flat on the top of the pans. To make things neat, take your pliers and crank on each wire until it fits. This is similar to the fiddling you've already done with the front of the plumber rails.



STEP 35 Use lots of heat and acid to solder up the hinge wires. Keep the pans in tight to the plumber rail and make sure everything lays flat before you solder.

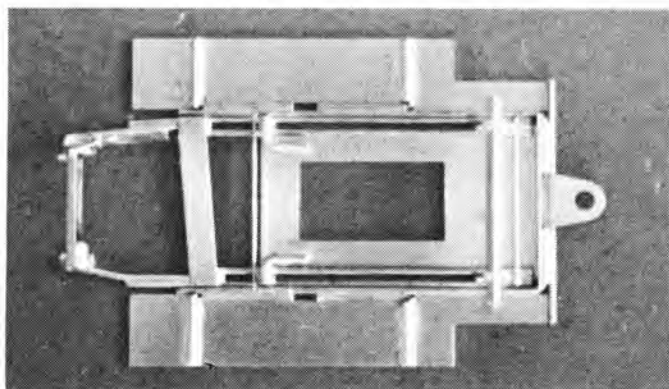
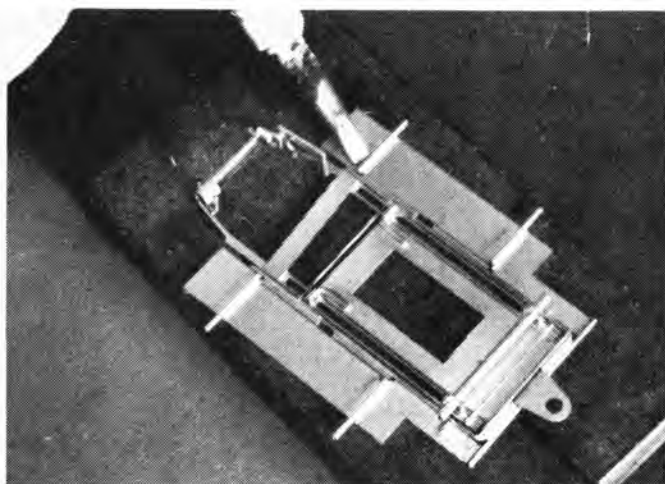


STEP 36 If you're in the mood, now is as good as time as any to trim all excess wires.

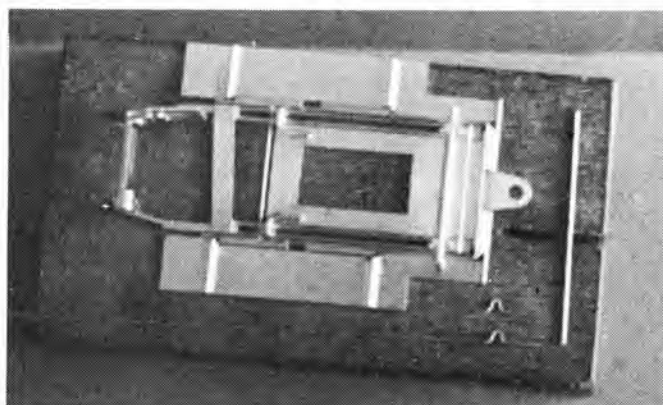


STEP 38 Lay the mounting tubes in as shown and solder up. You'll need lots of heat again.

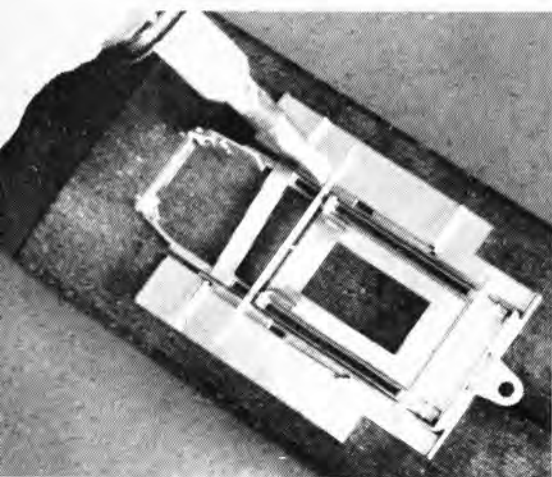
STEP 37 Now cut four pieces of 1/16" brass tubing for body mounts. Make each about 3/4" long and keep the ends smooth.



STEP 39 Trim the mounting tubes and file smooth. A good trick, to make things easier later, is to countersink the ends of these tubes with your X-Acto knife.

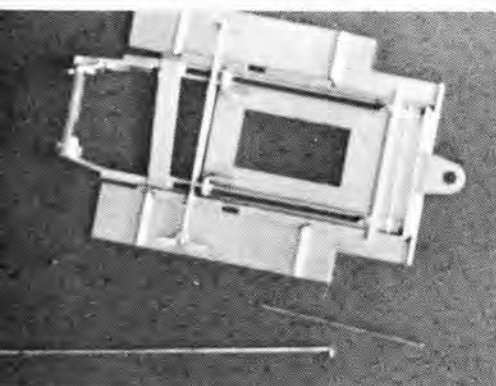
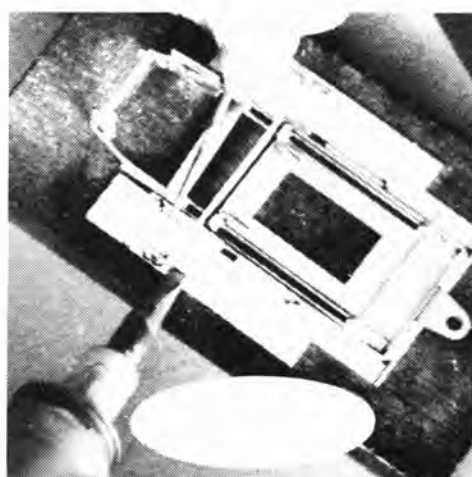


STEP 40 For the pan up-stops you'll have to cut a 2-3/4" long piece of 0.55" wire.



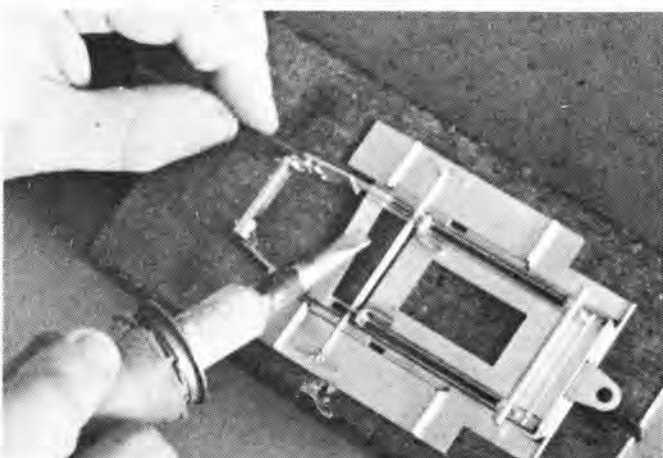
STEP 41 Drop the up-stop behind the rear plumber cross-piece and center it as shown. Solder the up-stop, being very careful not to make your chassis a solid unit like I do about half the time. Just be mellow and go easy on the solder.

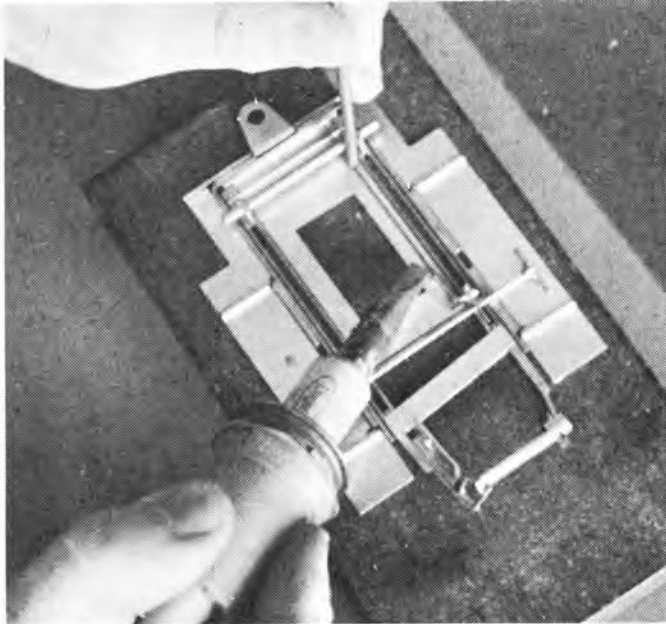
STEP 42 Bend two pan down-stops from 0.32 wire using the pattern provided. Solder the down-stops to the pans only, as shown.



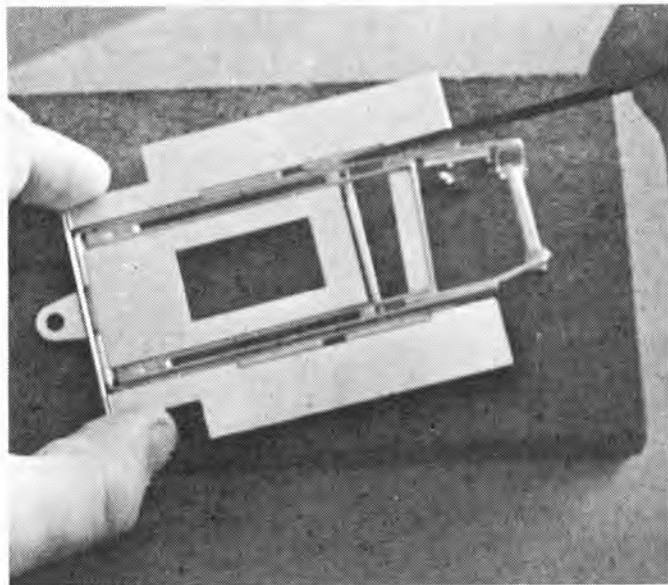
STEP 44 Now solder one plumber up-stop to the top of each drop arm hinge tube. Yes, this is another time to be mellow.

STEP 43 Bend two plumber up-stops from 0.32 wire as shown.





STEP 45 Make a drop arm spring from a 2" piece of 0.32 wire. Solder as shown and make as tight as possible without being ridiculous. After all, this is supposed to be a spring.

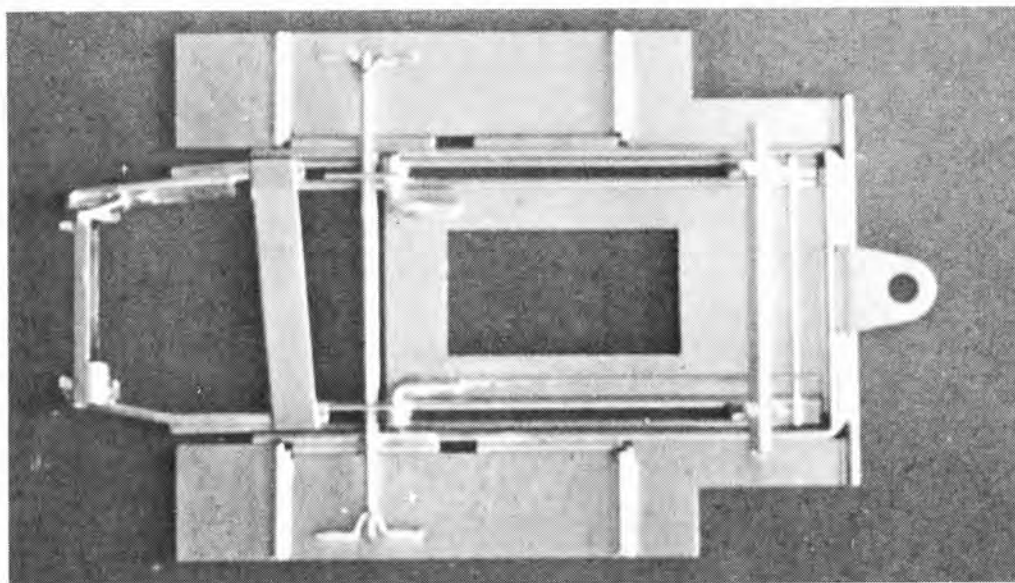
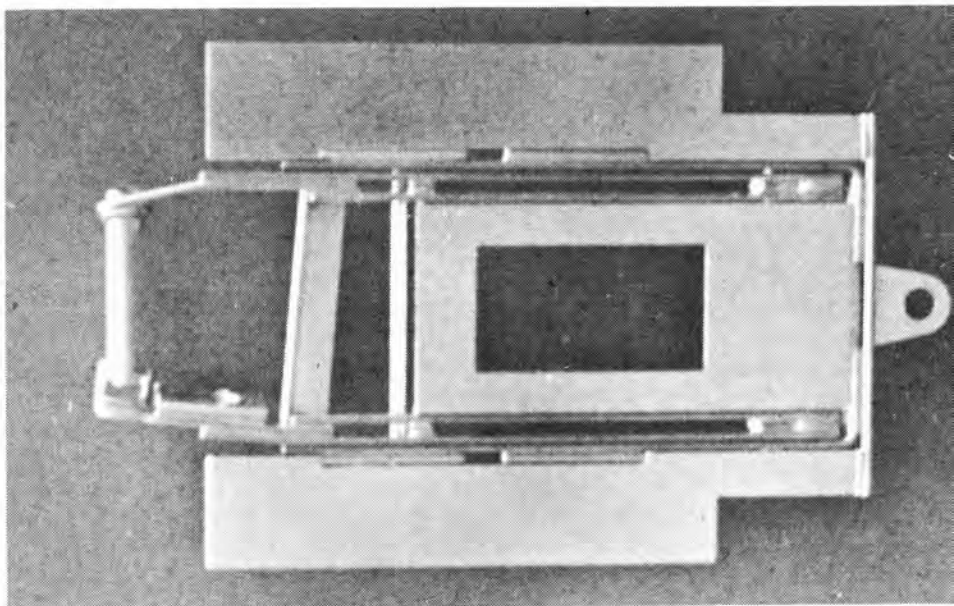


STEP 46 Clean up your soldering messes with a square file. Spend as much time as you need to make your chassis look real.

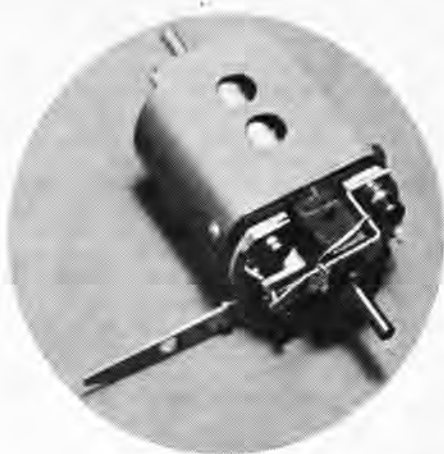
STEP 47 Grab the bathroom cleansers and your mom's favorite scrub brush and work out. Use plenty of elbow on this step.



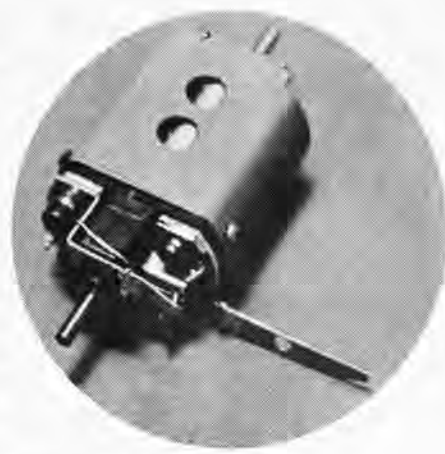
"Keep it clean, Dona."



Well, here it is; your very own Gilbert Masterpiece. How did you do?



TO MY FRIENDS AT THE CERTUS CO., I DEDICATE THE FOLLOWING ARTICLE. WITHOUT THEIR FINANCING AND FAITH, BOB GREEN AND MYSELF WOULD NOT HAVE BEEN ABLE TO GO ON IN THE MOTOR DEVELOPMENT THAT GAVE BIRTH TO SUCH HOUSEHOLD SLOT CAR PRODUCTS AS THE GREEN CAN AND PRECISION SLOT CAR RACING MOTORS. THE THINGS WE LEARNED OVER



NEARLY THREE YEARS OF BUILDING AND RACING CAN'T BE PASSED ON IN A ONE SHORT ARTICLE BUT IF ANYBODY CAN LEARN FROM THIS OFFERING HERE, I GUESS IT ALL DIDN'T GO TO WASTE. THANKS, CHUCK

IT ONLY TAKES two things to build a great racing motor and I'll bet that you can guess just one. Workmanship is the most important physical thing we will have to overcome, and if you can master the most important mental thing; call it attitude, the physical stuff will be easy. To have the correct attitude you are going to have to learn some theory, so sit back and forget everything you ever were taught, learned, or were ever told about slot car motors. What you are about to read is truth in the form of Gilbert/Green Motor Theory. I blame most of what I think I know on Bob Green and what we learned together during the development of the Green Can and Vulcan Arms. Again, this article contains no tricks or mysterious formulas, just a lot of common sense that may be totally uncommon to many home-grown motor wizards. Listen to me; you'll win.

What makes a good motor? Torque? Top-end? Brakes? Reliability? All of these in the right proportions make a good motor. We'll be working with the particular variables that we can control these performance basics with, like cans, magnets, over-the-counter arms, etc. If you've run on more than one track you must know that a different percentage of each performance basic is required in a particular motor to take the best advantage of a track situation. More simply, a missile

motor on one track might be a total load on another.

To find the right motor for a track what is the first thing we fiddle with? Arms, right? WRONG. Armature selection is important, of course, but cans and magnets are the main things that control the performance basics. I hope this will explode any misconceptions on your part. From what I've proved to myself, a small change in a can/magnet combo will have more effect on motor performance than anything else outside of turning off the track's power. This being a good time, let's talk about cans.

What makes a good can? The most important variables are material, hole pattern, height and width. Most of you will agree that a good quality magnetic field conducting material is best, right? WRONG. We need a semi-garbage metal and right now Mura has it. Don't ask why just now. To answer that one I'd need a book. Hole pattern should be designed for cooling the arm and still allow the maximum magnetic field flow, right? WRONG. Bob Green and I tried every hole pattern you can imagine and more. Believe me, Mura has the best. I've blown a few hundred arms to prove that. If you've got the time and the bucks, go ahead and prove me wrong. The holes do aid cooling but only as a side effect to trimming the magnetic field (flux) flow to a usable level. Excess flow causes

EVERYTHING YOU'VE ALWAYS WANTED TO KNOW ABOUT SLOT CAR MOTORS *

*** But were too dumb to ask.**

by LEE GILBERT



"Dona would like to point out to all of you that these articles take no special tools; especially when you have a mind like hers. Empty your pockets and kitchen cupboards and let's get to work."

disaster in permanent magnet motors. Can height also regulates field flow. The best height is 0.555". The Green can is 0.563 thanks to the fact that most of us have to use production magnets. Don't worry, this height will work. The amount of gain in chopping a can and magnets isn't really worth the gain in horses so forget that idea right now.

That is all you need to know about cans at this stage and don't let the gaping holes in this explanation bother you. Go along with me for awhile before you condemn me for life. What I'm talking about works; textbooks haven't yet been written for this area of electromotives. In case you haven't guessed by now, I recommend the Green can 100%. This is the only one ever produced that has been race tested before going into production. Something that should be the rule with racing products instead of the exception. I've tried several other cans but none gave me the most consistent number of performance basics as frequently.

Now on to magnets, the choice being DZ's, Blue-Dots, or Black Power. There isn't much to be said here except that I've used all successfully but prefer the Black Power simply because they are easier to sand. The quality of the Black Power magnets means a lot less work, and I'm all for that. The Black Power and Blue-Dots are the most powerful choices but please remember that your can is the most important factor here and magnet strength is neat but not critical. Two things are critical

on magnets regardless of type and you don't want to be a hatchet man on these. Most important is to have them zapped before every race and second is to sand all surfaces smooth to achieve constant air gap and better seating of the magnet in the can. A good zap cannot be over emphasized. The only place I know that gives good magnet zaps is Ron Granlee's Speed & Sport Raceway, at P.O. Box 39, Buena Park, Calif. 90621. You can have an unbelievably good set-up but it will be wasted without a good zap. Performance and reliability go down proportionately with lack of zapped magnets no matter how strong they feel. If you don't sand your magnets your measured and actual air gap will be two different things. The air gap is the measured distance between the magnet surface and the armature plates. The best results in performance come from an air gap of .005" to .009". More on air gap later. The best thing to do is just fiddle and find what works best for you on your track.

To sum up cans and magnets let me remind you that too much field is the greatest cause of poor performance. This is contrary to what most people say and think these days but it's true nonetheless. Luckily for me, most people were just saying and believing . . . when I was doing. Try my way and I'm certain you will be rewarded.

Armatures. Most of us don't wind our own armatures and I hope to discourage that inborn desire to do so right now. I prefer arms wound on Mura or Thorp blanks because they have the best design and material for the can/magnet situation I just discussed. Below is a rough list of how to select an arm for your track if there isn't a current hot one that you know about. Even if there is a favorite, look this over.

If your track has:

*Good Battery Power
Medium Battery Power
Poor Battery Power
Good Power Pack
Medium Power Pack
Poor Power Pack*

Try this armature wind:

*24 or 26-27
25 or 27-28
25 or 27-28 or 26
25 or 27-28
25 or 27-28 or 26
26 or Grp. 20*

If you are curious about timing you'll be interested to know that most manufacturers have that down pretty good now and you should be safe laying bucks down for just about any little goodie. It's always fun to hand pick your own race arm from several in stock. I always look for the best workmanship (that sort of thing turns me on) but in reality there is no sure way of picking one hot arm over another. Some will be rockets, some piles and some in-between. As soon as the armature boys figure that out you won't have to take pot-luck but for now the best bets are: Pooch, Vulcan, Steube, or Thorp. There are other good arms too but with these four I've had enough experience to be confident.

I didn't really hit on lamination thickness or stack length or diameter of an armature because we'll just be buying one over the counter. All of these things affect armature performance but you and I have no control over what the arm boys are doing so we shouldn't even worry about it. Just stay clear of super short stacks or super long ones. Be mediocre. One more thing about arms. Always keep them in balance and have the commutators trued. When the thing slows down (usually after one or two good runs) send it off to Proto or Camen Balancing Service.

Brushes and springs are next on the agenda and if you are getting weary at this point go out to the kitchen and grab a Coke while holding your eyeballs under the cold water faucet.

The best brushes to use are the old Mabuchi 36-D's. These can be found in old 36-D motors. There aren't many of these things left but if you know of a shop with a museum you may be in luck. If not, use Mura's. They are the most consistent and you always know what you are getting. That is seldom the case with some other brands. Play this safe. You don't want a cheap set of motor brushes messing up your investment.

On motor springs I've found the three-coil Mura's to be the best (M-97). If you can't get these try the new MPP stuff. I don't use a fiddlestick or any other trick nazi. Bend MPP's to 110 degrees or M-97's to 90 degrees for the best results. Too little brush tension is far worse than a tad too much. This angle can be best sighted with the spring on the motor before slipping it behind the spring retainer tab. These ideas are fairly standard and not over critical as some people seem to think. Just keep it in the right ballpark and you'll be fine.

Armature spacing between the two shaft bearings has never really excited me a whole lot. Monty likes about .020" slop while I dig zero slop as long as the arm spins freely. I prefer close spacing due to the fact that the thing wears nearly .002" for every ten minutes running anyway and I like the brushes to ride on the narrowest track possible. What this breaks down to is that armature spacing isn't really an important item. Don't lose any sleep over it. Just make sure that the arm is centered in the magnetic flow of the can before shimming.

Ball bearings are one of the most overemphasized motor magic bits of our time. To sum that up quickly: I don't believe in magic. The only thing I've ever noticed about using them was the fact that my wallet always seemed thinner. In reality they hurt braking but keep the motor a little cooler. The difference isn't worth a dime let alone the cost of BB's.

Shunts for the motor brushes are sometimes overlooked. Don't you. It's a simple matter of resistance. Come on man, let's get some juice to the thing.

Here are some important things to remember when following this building article. In order of importance we should first try to be conscientious in attaining good workmanship in our motor building. This comes only one way: with lots of hard work and practice. Secondly comes some of the techniques that really help in

PARTS LIST

- 1 Mura II Green Can
- 1 Mura II Endbell Kit
- 1 Set Black Power Magnets and clips
- 2 Champion .004" magnet shims
- 1 Pooch 25 armature (or what you think best for your track situation)
- 2 Mura M-97 brush springs
- 2 Mura 36-D motor brushes
- 1 Package Mura .007" brass armature spacers
- 1 Mura fiber washer
- 4 Mura pin tabs and drill bit
- 1 Piece Rigen leadwire (orange)

(SPECIAL TOOLS TO BORROW)

- 1 Mura Alignment Tool
- 1 Semi-workable Caliper

perfecting good race motors into great ones. Alignment of everything on the whole motor is a good thing to become proficient at. Start with the brush hoods and work around to the whole endbell/can/magnet relationships. Next is to select good motor parts. This is easily done with some experience at the drivers panel and a little common sense. Just remember that high-dollar or new trick units aren't necessarily the way to go. Buy from a little experience and with a little common sense. The fourth item of importance is having good zapped magnets regardless of their code name or number. The fifth thing to keep in mind throughout is cleanliness. Dirt is a bummer. If you have time, the last thing you should always do to insure that your latest missile motor is just that, a missile; try praying. At least you'll have somebody to blame if things go sour.

In the beginning of this theory session I said something about the correct combination of things (performance basics) that would lead to an inevitably strong motor for your particular situation. Now I'll try to bring all of this cram theory course together for you. A super correct combination of performance basics may not mean ultimate horses or brakes or top end. The right amount of each of these things is needed. Torque is neat but what can you do with a car that jumps out of the slot or breaks its tires loose all the way down the straight. Top end is cool but not if you have a track with long straights of less than ten feet. Can you see what this combination thing is all about? Design your motor for your track and chassis. You can't win a race by spending time on the floor or in a turn marshall's hands.

Here's how most of the individual performance basics affect what a motor has or doesn't have in the end. Torque for short means brakes and generally low end. We have several ways to control torque. For less torque we can use an armature with fewer turns of wire (an MPP—Vulcan) or move your magnets out to increase the air gap by about two or three thousands. I think



you can see the easiest to play around with. More torque can be had from doing the opposite things (try a Steube arm). The smoothest motors I've run always seem to be 27-28's, with .008" clearance; whatever that means to you.

Experiment with different set-ups and don't become discouraged by some nut with a weird car that passes yours down the straight. Dragsters are neat, of course, but lap totals win races . . . not impressive bursts of speed down a straight. One other thing not to concern yourself over is the reliable motor that can last for two years. I figure an hour is plenty. That's enough time for a main event with enough cushion to handle a situation where qualifying may dump you in a semi. If any of us do worse than that in qualifying we should forget winning for that day anyway. They say that winning isn't everything but losing is nothing.

Future trends in motors are already showing signs of reverting to the past. New self proclaimed motor wizards are repeating many of the errors of yesteryear just because their 1972 textbooks were written for engineers. No matter what anybody else says, I know that slot car motors left the textbooks in the weeds years ago, and I've yet to see any engineer truly understand them. Use what I've thrown out to you in very small doses and you can't go wrong. Listen to anybody else and you may find yourself using all sorts of fancy face-savers for things that should have worked but don't.

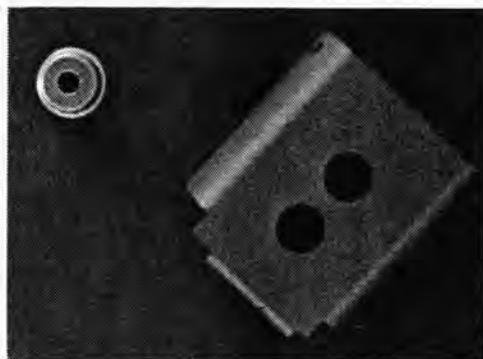
What the future should hold is the development of an all new small motor that would allow a higher degree of chassis experimentation. Don't expect that to happen until our sport becomes rich enough again to handle the costs of such development. When, and if, this does come to be I'll be in the wings to let you know whether or not it was done right . . . don't fret!

I think that now is the perfect time to leave you with probably the greatest single statement ever to come out of the resident California motor wizard: Bill Steube Sr. This was taken from his recent comments in the *Grundy Gazette*. "The design and manufacture of slot car motors is a science of vague assumptions based on debatable figures taken from inconclusive data, obtained with equipment of problematical (?) accuracy by persons of doubtful reliability and questionable mentality." Right on, Bill!

Handy hints for those of you that have time to fiddle.

One fun thing to do that really impresses endbell freaks is to thread (tap as it were) all of the holes for brush hood retainers, spring posts and endbell mounting tabs. Use 0-80 tap and screws for the endbell mounting holes and 2-56 stuff for the other. Most good hobby shops stock goodies like this for their customers and sometimes even hardware stores will have them. This action makes maintenance a breeze and it looks pretty sharp too. One other thing you might try if your motor seems to be power robbed with other cars on the track is to shim the top and bottom of each magnet with .003" brass. This cuts the field a tad and will allow the motor to run on less power at a decent speed. This trick is usually something to try if your track has fairly grim power in the first place but don't expect to make a totally sour arm perform.

STEP 1
Lightly tap the can bearing out of the can. Be gentle.

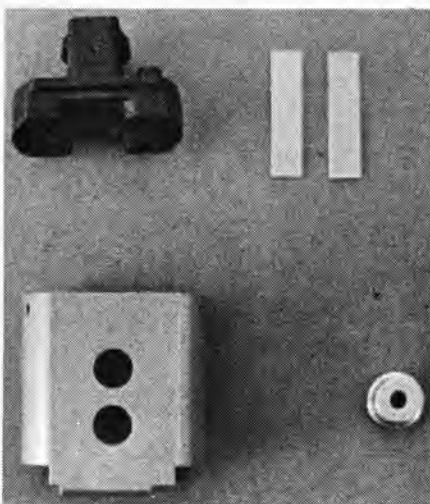


STEP 2 Grab one of the self-tapping motor screws from your endbell kit and thread only the top hole of your can. We have to do this now to keep the can bearing in alignment later.



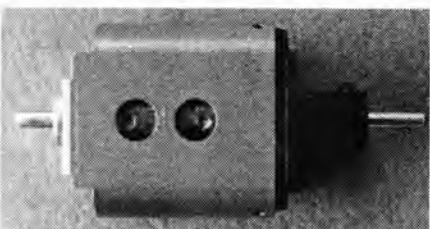
STEP 3 Lightly file the can bearing hole so that the bearing will just drop into its lip without any help from your muscled fingers.

Gather up your endbell and alignment brass shims with your can and bearing.



STEP 4 This is important. Lay the brass alignment shims on the top and bottom of your endbell as shown. This will give your endbell proper spacing between the top and bottom of your can. This is necessary since the endbell is really a modified "B" can unit which was lower than the Green can.

STEP 6 Solder in the can bearing as shown. Use some heat, Pete.



STEP 5 Drop the can bearing in where it belongs with an old couched arm (or one you wished to heck you never bought). Next, insert the endbell with the shims into the can. The kit endbell should already have the endbell bearing pressed inside. Do it straight and neat.





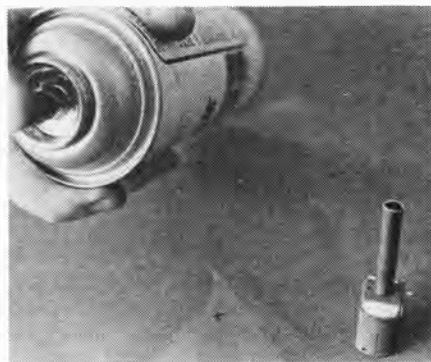
STEP 7 As soon as the bearing is soldered in hit it with the oil can. Most of the oil already in the bearing boiled out and must be replaced.

STEP 8 Now's the time to drill your pin-tab holes. If you are uncool with a drill as I seem to be, you'll be glad you used an old arm.

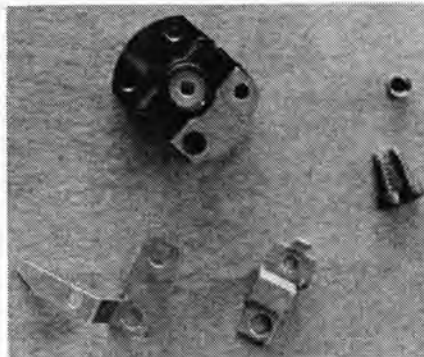


STEP 9 To aid in alignment of the can to the endbell make a small nazi (scratch or mark) on one side of the two as shown.

STEP 10 Remove the endbell and arm. Clean up your messy soldering job with a little filing and scrubbing.

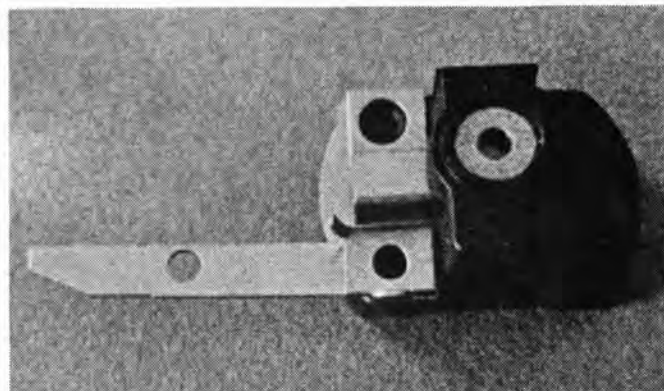
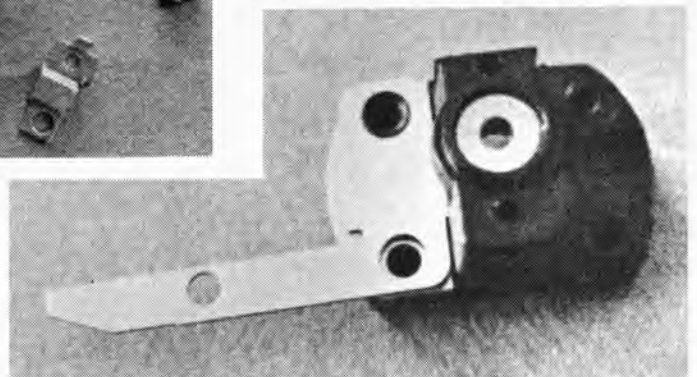


STEP 11 Now we should paint the can... but first fill the inside with tissue paper and cover the outside of the can bearing with a chunk of 1/4" tubing as shown. As soon as you have all of the critical areas protected paint the can any color that turns you on; I prefer a meek shade of magenta.

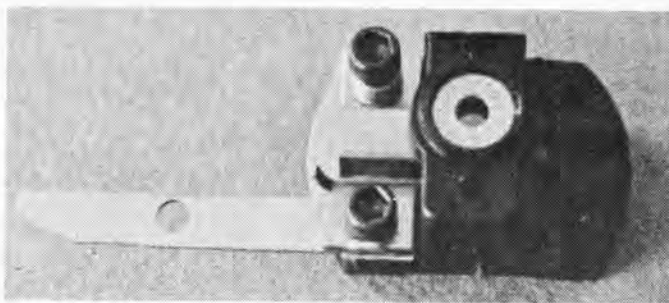


Scrape up your endbell goodies and make sure you haven't inhaled any vital unit.

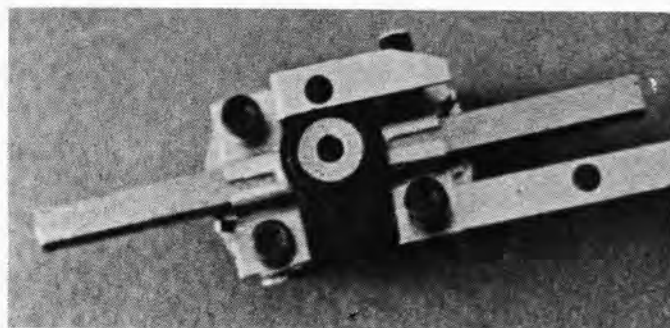
STEP 12 Start building this side first. Lay the heatsink (that aluminum thingie), then the buss bar thingie down on the endbell as shown.



STEP 13 If you look closely at this picture you will notice that the brush hood looks stock. That is because I was keeping an eye on my Girl Friday when I should have been cutting a slot on the top of each brush hood. The slot is designed for a better shunt wire system. This picture was taken prematurely but the slots will turn up later. Don't forget to cut yours now. Hold each hood with a pliers and be gentle with your Dremel. Once the hoods have been notched and filed free of any burrs, go ahead and lay the unit on top of the other endbell parts as shown.

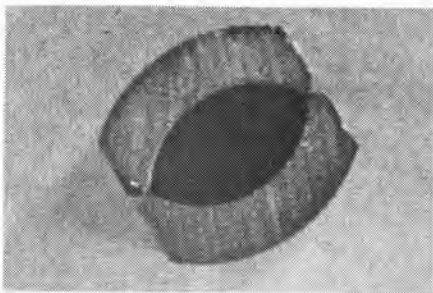


STEP 14 Cram the screws in the holes as you've always done before. Keep them loose for a moment. Remember to keep the screw collar on the proper hole/post (the one opposite the buss bar for this side only). Going on, just do up the other side neat too and keep it loose for a moment also.

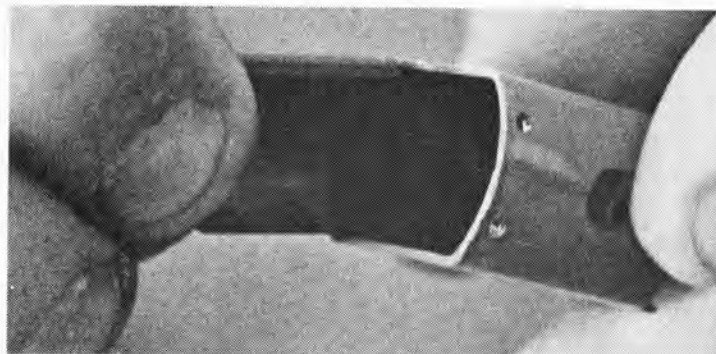


STEP 15 Slip a Mura alignment tool through the brush hoods and eyeball the thing in parallel to the top and bottom of the can. Tighten the screws down. Don't forget to remove the alignment tool and return it to your buddy.

In case you have forgotten, this is what magnets look like.



STEP 16 See if you can stuff these beauties in your can. Do they fit?



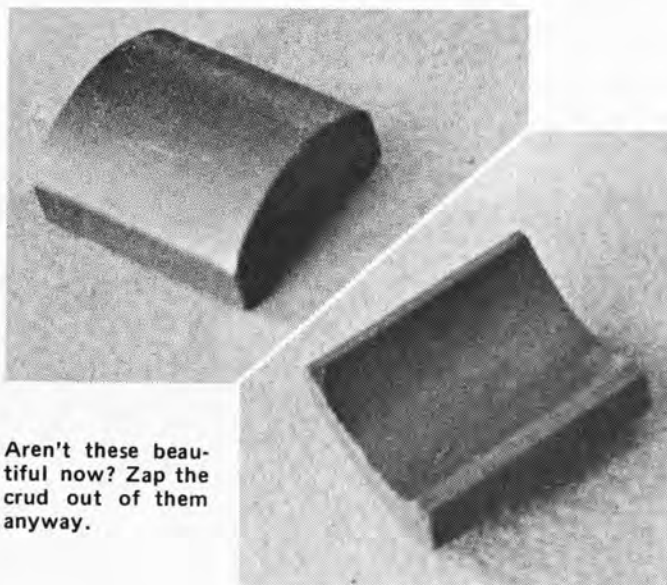
STEP 17 If the magnets stuff a little hard today, sand the tops and bottoms a little with some decent 250 grit sandpaper (aluminum lasts neat).



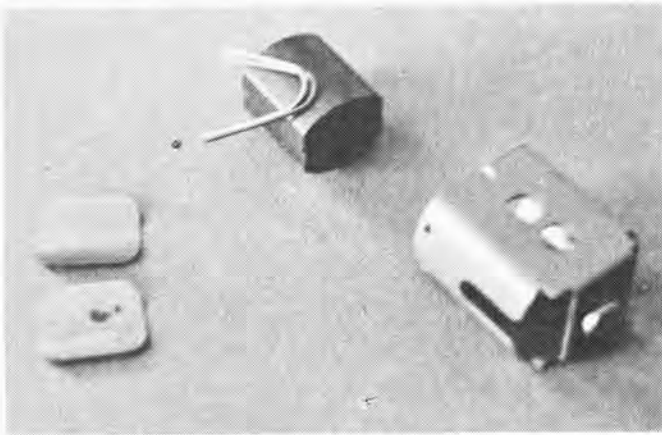
STEP 18 Sand the face, back, and ends of the magnets while you're at it (it's hard to stop once you get going). The best way to do the faces of the magnets is to use a half inch dowel with the sandpaper wrapped around it. I can never seem to find a dowel that size but an X-Acto handle is a good way to fake it. Sand those little babies until you can see your face in them. Wipe clean with a damp cloth.



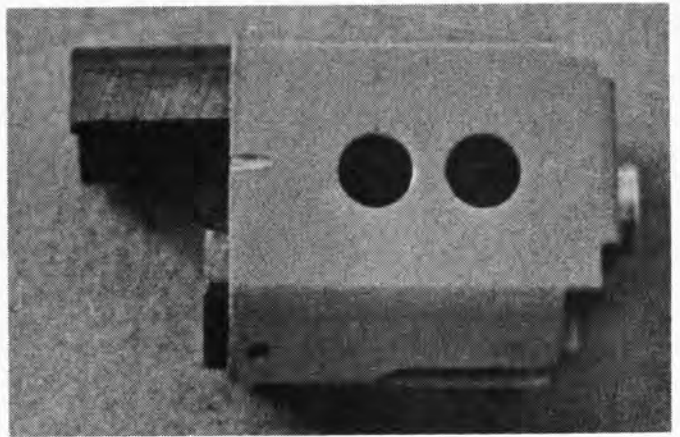
Sand, sand, sand. See the idiot do it!



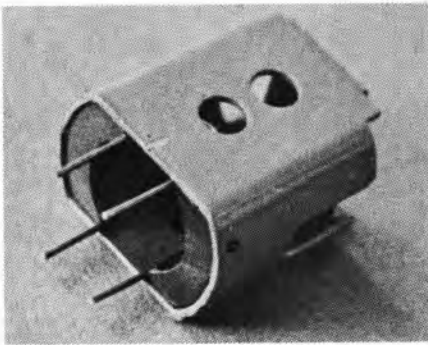
Aren't these beautiful now? Zap the crud out of them anyway.



STEP 19 Scrounge up your shims, magnet retainer clips and can.

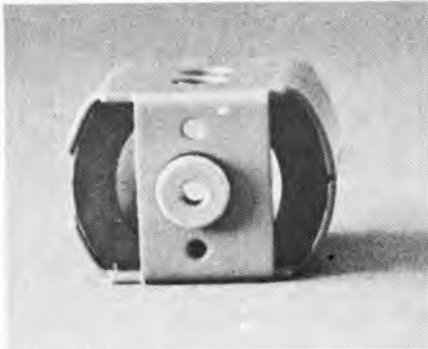


STEP 20 Slip the magnets in the can without the shims for now.

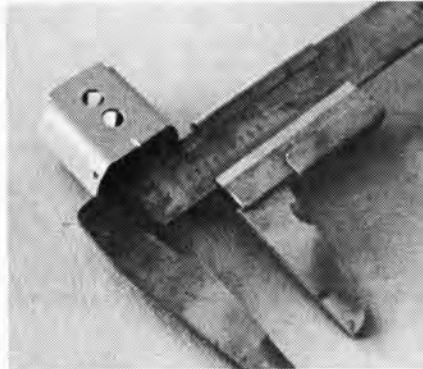


STEP 21 Insert the retainer clips.

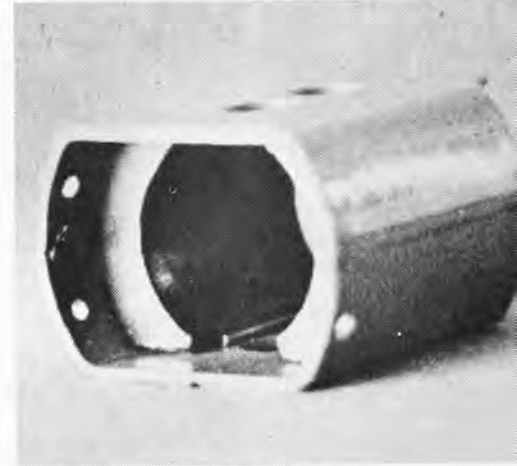
STEP 22 Jam them all the way back with anything handy. Now is a good time to check the distance between the magnet faces. We want .0075" air gap on each side of the arm. My armature is .510" so the distance between the magnets has to be .525". Use your calipers to check that.



STEP 23 There was too much clearance on my set-up so I crammed the Champion shims in behind the magnets. Shove the whole works back into the can flush with the end of the can sides.



STEP 24 Check everything again now. Mine worked out right but you may have to fiddle with different shim thicknesses if you haven't followed instructions.



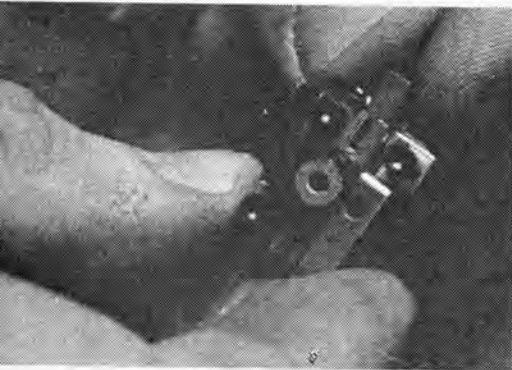
Isn't this a sight to behold?



Remember, cleanliness is Gilbertness. Had to find *some* reason to get her picture in again.

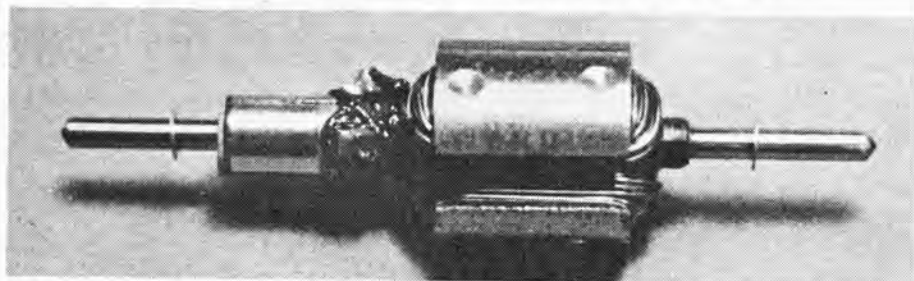


STEP 25 There are a couple extra tabs on your endbell so go ahead and trim away anything not needed.



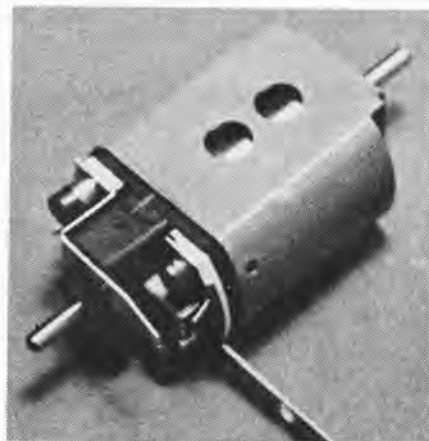
STEP 26 Drop your motor brushes through both sides of the endbell brush hoods. If they fell freely through like mine, you won't have to pick up a square file and file the brush hoods to death. Don't overlook this critical step that even pros slip up on once in awhile. It'll save your bod heartache later.

STEP 27 Take a sharp X-Acto knife and clean the comm slots on your armature. Don't slip here. You'll definitely screw up the works or bleed all over the table.

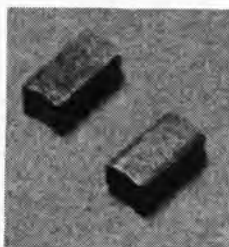


STEP 28 Stick the fiber washer on the commutator end of the armature shaft and jam as many .007 spacers as you need to center the arm. I hope you read the text.

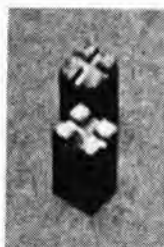
STEP 29 After you've accomplished this centering jazz, beat in the pin tabs even though you don't see them here. Can't you do anything on your own?



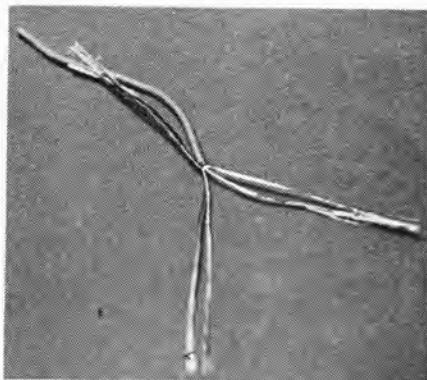
STEP 30 Now for the brushes. File the sides in the manner shown. One is filed and one is stock. You'll have to do the other one yourself.



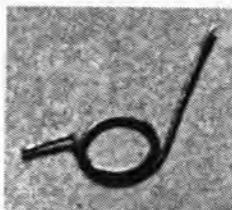
STEP 31 Notch the spring end of the motor brush as shown. If this looks like a positive plus as opposed to a negative minus, you really must be on the ball today.



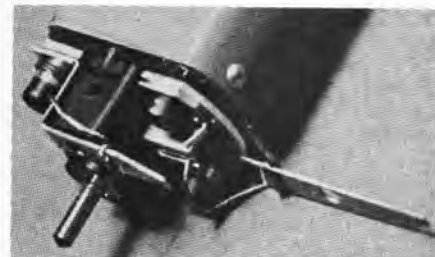
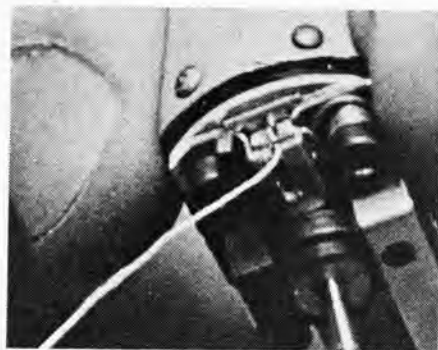
STEP 32 Now for the shunts. We'll use some good Riggen lead wire for this purpose so strip some of the insulation off of a piece right now. Inside, you'll find six strands of twisted smaller wire. Twist two of these bigger strands together for each shunt. Make just two shunts.



STEP 33 Get bent (at 90 degrees), you brush spring.



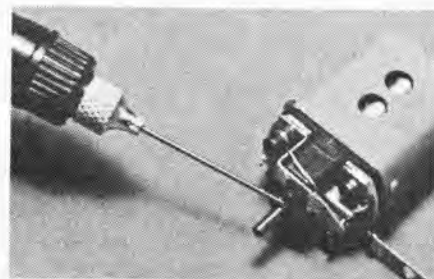
STEP 34 Drop your modified brush in and lay the shunt wire in place as shown. Clamp the works down with a brush spring.



STEP 35 Wrap the loose end of the shunt wire around its corresponding buss bar. Leave some slack, Jack.

STEP 36 Solder the shunt wrappings lightly. Ease off on the acid and heat.

Touch the front and rear bearings with some oil. That's it.



LEE GILBERT'S THING ..STAGE



ON THROWING THE WHOLE BEAUTIFUL MESS TOGETHER



"... and for this I turned down a job with Hugh Hefner?"

YOU SHOULD HAVE THE MOTOR AND CHASSIS DONE BY NOW AND, IF YOU MADE IT THROUGH ALL OF THAT THEORY, I HOPE YOU'RE READY TO PUT IT ALL TOGETHER. THE ASSEMBLY OF THE CAR CAN REALLY MAKE OR BREAK WHAT YOU'VE ALREADY DONE SO YOU DON'T WANT TO BLOW IT NOW. STICK WITH ME AND YOU'LL DO ALL RIGHT.

MATERIAL LIST

- 1 Counterfeit Gilbert Chassis
- 1 Set up motor
- 1 Set Associated Front/Rear tires — 5/8" & 13/16" cut down jobs.
- 1 Pair Mura 3/32" ball bearings
- 1 Pair Mura lead wire (purple and yellow)
- 2 Parma 3/32" axles
- 1 Cox 32 tooth gear
- 1 Weldun or Monza steel pinion gear (7 tooth)
- 1 Camen super purple guide kit
- Set of Parma guide spacers
- Set 3/32" axle spacers
- Strip of .015" brass for guide clips
- A chunk of 1/8" K&S brass tubing
- 1 Length of .055" wire
- And don't forget one Girl Friday

THERE ARE THREE things to keep in mind while throwing your chassis and motor together. Take your time... keep it clean... and be neat. All of these principles may be applied to any group car as well as an open machine. When you're building any kind of a race car you want it to be as perfect as possible in order to get the most out of what it was built for. If you are wondering what perfect is, just stick around and I'll tell you, of course.

The way we'll be building this car is exactly the way I build all of my cars. The techniques herein are the ones that I've enjoyed the most success with in the past.

The first thing that you'll notice (besides Dona) about this article is the trick job we did on the buss bar from last time. Don't worry about that now, just

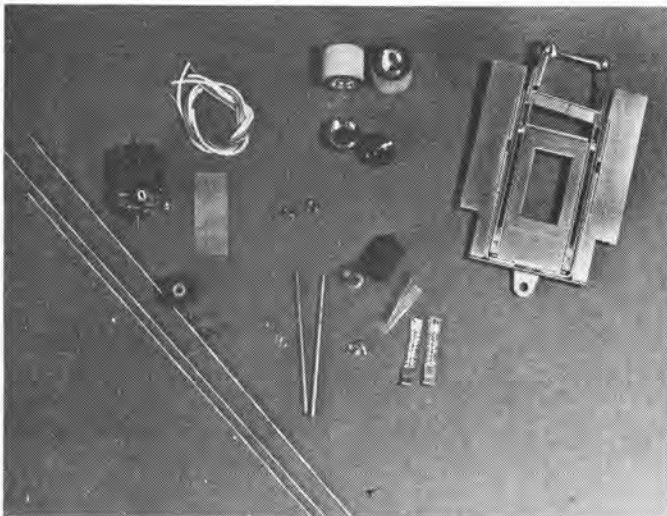
get your stuff together and I'll lay some rather light Gilbert throw-together theory on ya'. Start out by paying attention to details. Things like removing the dirt shields from the axle bearing make maintenance and running much smoother later. So take a few minutes and do it. A good set-up job on the gears and rear tires alone can determine whether or not your car will become a load or a missile. When you start to mount your motor make certain that the gear mesh is just right. Fiddle a little before you solder it all up. The right play is a loose none. That is a bad statement if you're into making sense of this, but it does best describe the way to get gears to stay in mesh. Plastic gears are usually in a hurt so you may have to become lucky as well as darn talented when going for the perfect feel. The axle

will warp slightly when you tighten the gear set-screw and tend to throw the tires and wheels out of round. Taking some time and finding the best in-true spot for the tires will make the car smooth right out of the box and give full advantage to the tire surface. In this case we cut down some new Associated rears to a tad over 13/16". The rubber is neat and you'll get the right kind of bite from it. If you can't get cut down Associateds, or get someone to do it for you, I recommend Aquirre's wide rims and tires. They're neat too but the rubber is as bad as that East Coast stuff the Camen crew has to run.

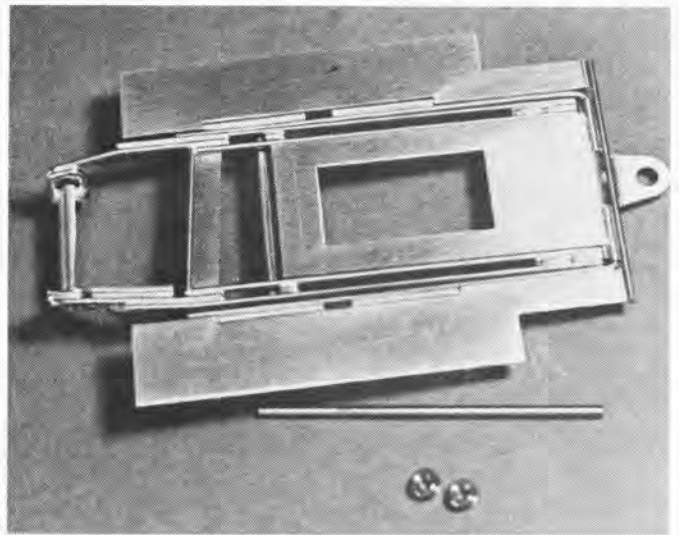
Once the motor, gears and rear tires are all in and bolted down relax awhile. You've just gone through the most unnerving thing to do with the whole car. The rest is easier but important just the same.

For the fronts (wheels/tires) we cut down some Associateds to a tad over 5/8". There are small fronts on the market but I prefer cut down ones of the Associated/Riggin variety. Use what you can get. We will play with front-end slop at the track so just use the article as a starting point. Generally, no slop for no glue and much play for glue. Fiddle in between for tuning.

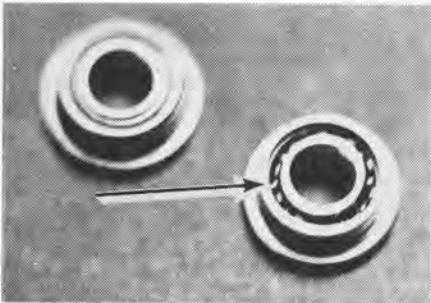
Stage V closes just before body mounting time. We wanted to get a little farther but space wouldn't allow that for this month. Next month we'll finish the car and do a little testing at the track and hopefully race the thing. Keep in mind that what you are learning here can be applied to all kinds of 1/24 race cars and even other scales in varying degrees. Just one more to go, and then man, are we going to have a party!



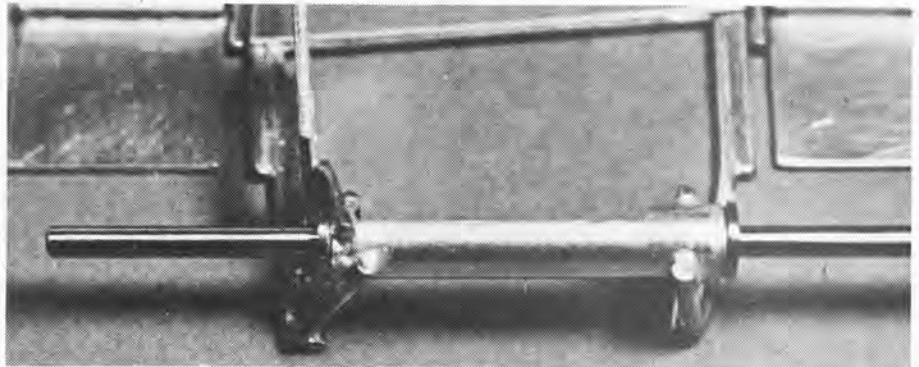
This is what you'll need to bolt your missile together. In a couple hours it might actually start to look like something.



STEP 1 Single out your bearings, axle and chassis.

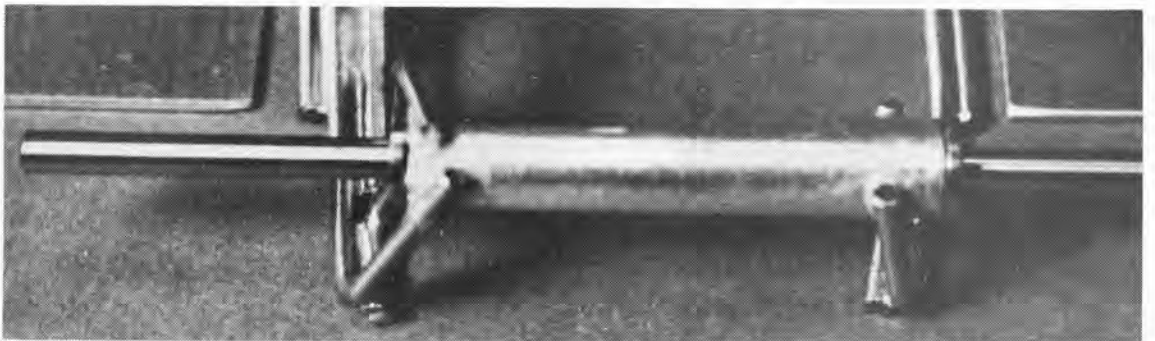


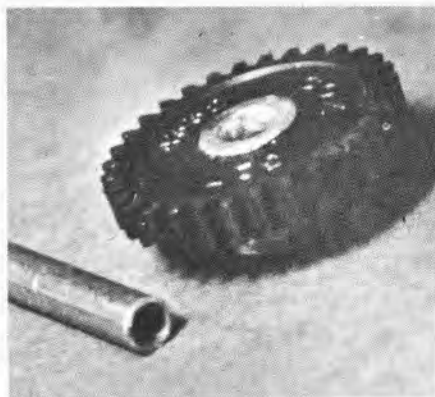
STEP 2 Beat the dirt shields out of the front and rear of each rear axle ball bearing. Yes, there is another use for old X-Acto knife blades.



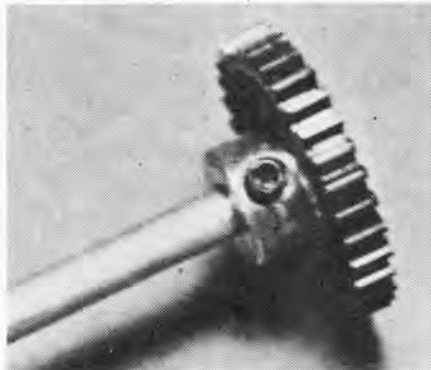
STEP 3 Align the modified bearings in the axle tube with your axle.

STEP 4 Solder the bearings to the axle tube. Be meek with the solder and acid. Use TigerMilk to clean your bearings.

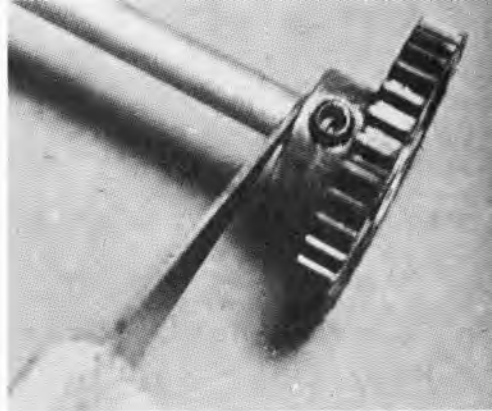




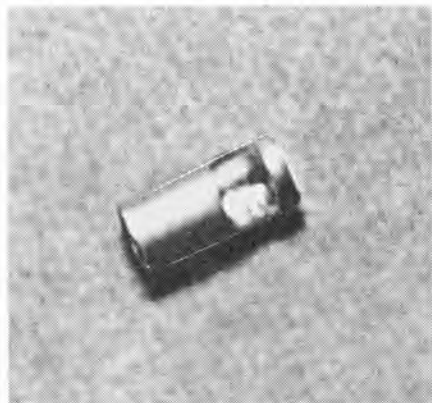
STEP 5 Grab your gear and a piece of 1/8" tubing. We're using a Cox 32.



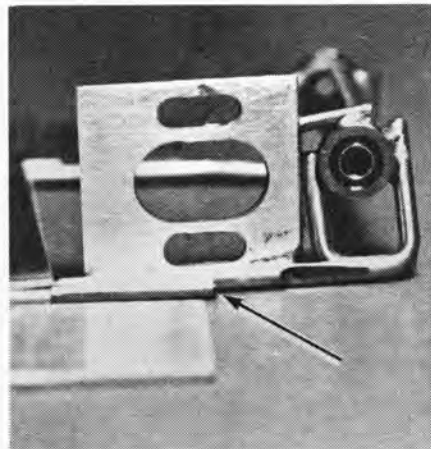
STEP 6 Insert the tubing in your gear flush with one end as shown. Crank the set-screw down firmly.



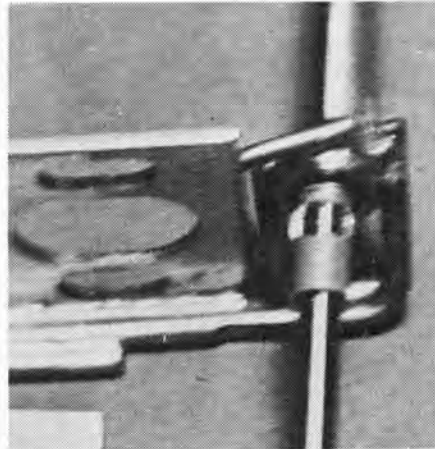
STEP 7 Here's another use for your crusty old X-Acto knife blade. Mark the opposite end for trimming.



STEP 8 Cut a notch at the set-screw mark and *then* trim the little jewel off the long tubing. If you didn't do it this way, have your Girl Friday get some jam for your toasted fingers.



STEP 9 You may need to do a small bit of trimming on this half rail to clear a plastic gear.

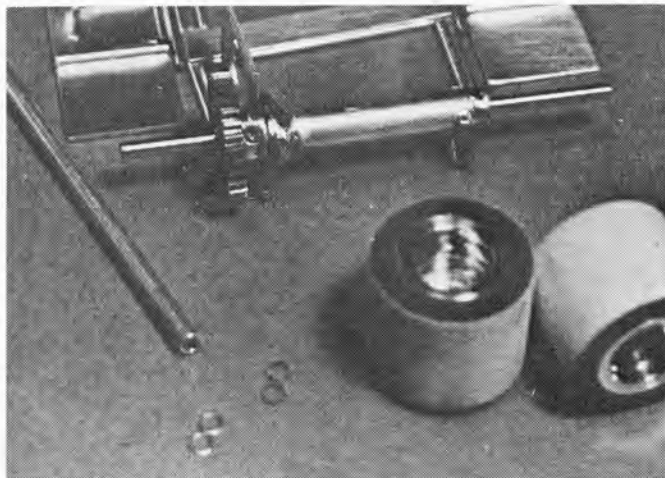
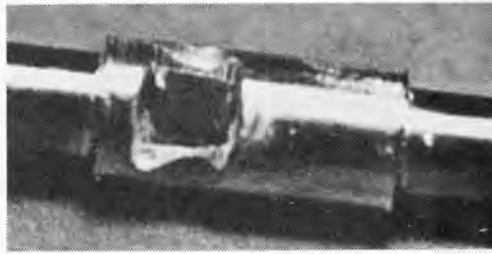


STEP 10 Center your axle in the chass and slip your gear hole reducer up snug to the proper bearing.

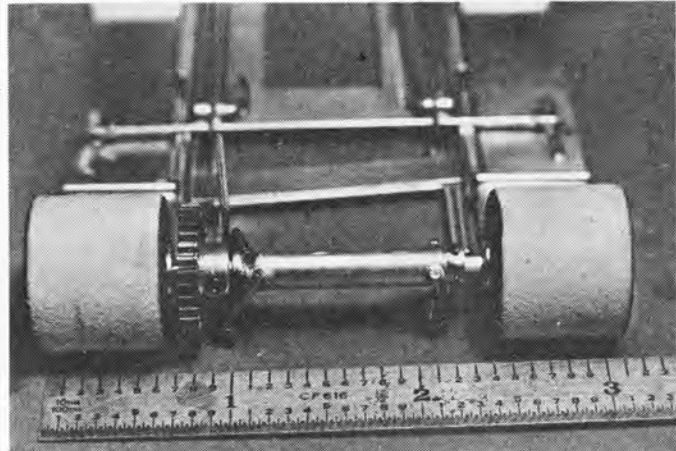


STEP 11 Slip the axle out of the bearings without moving the reducer. Drop some acid... on the notch, George, and sweat solder the reducer in place.

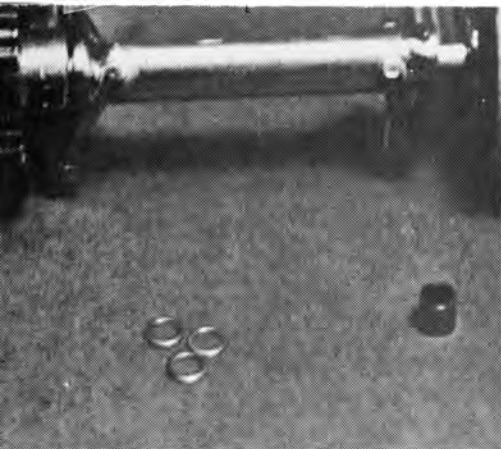
STEP 12. File and Dremel to your heart's content or at least until the thing looks like this unit.



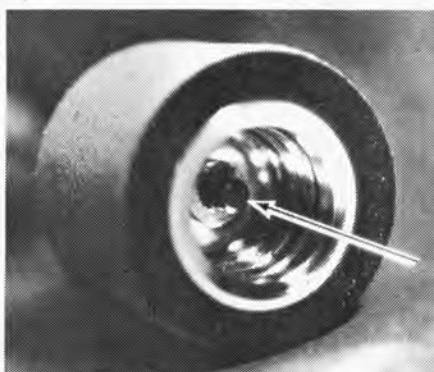
STEP 13 To mount the rear tires (13/16" Associated's) you'll need some axle spacing stuff.



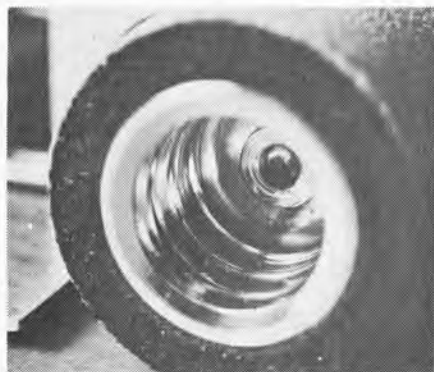
STEP 14 Using 3.1" for track width, center the tires at that width on the axle and in the chassis. Don't forget to bolt the gear down hard.



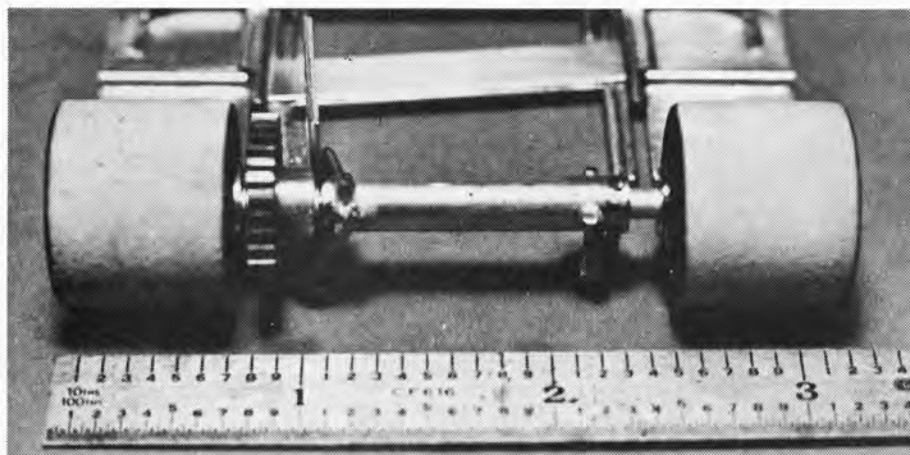
STEP 15 Guesstimate on the size spacers you'll need.



STEP 16 Mount the tires at the proper spacing and mark the axle where it protrudes from the wheel.



STEP 17 Trim the axles and remount the tires. This isn't done just to be neat, but it helps.



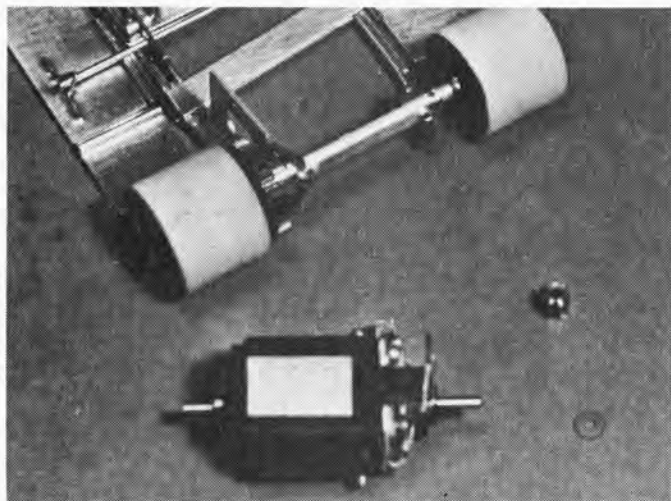
STEP 18 Recheck your work and spacing.



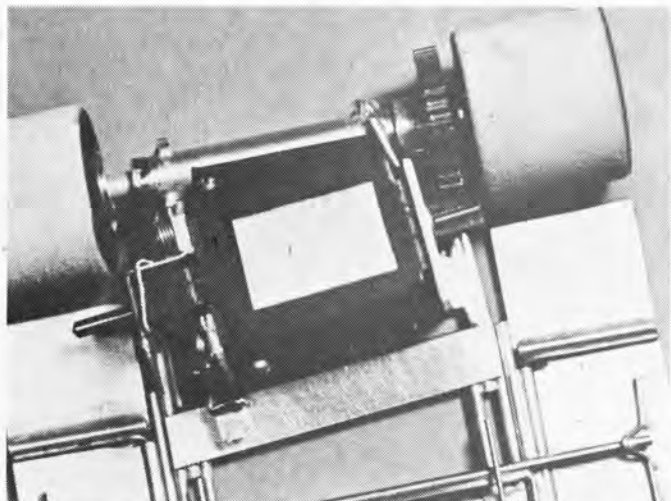
STEP 19 Before you get too excited and bolt everything down tight, eyeball the tires on true. You'll have to rotate the tires on the axle until you find the best spot. Once that is done, crank the tires down and you're done.



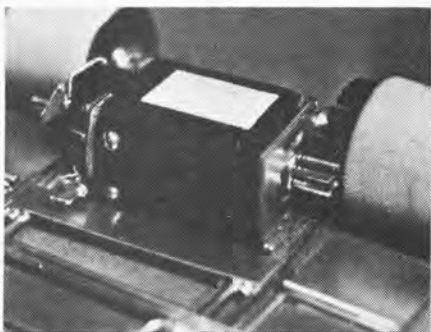
STEP 20 Take your motor from last time and twist the lower buss bar to look like this. Trim. Tape the can holes.



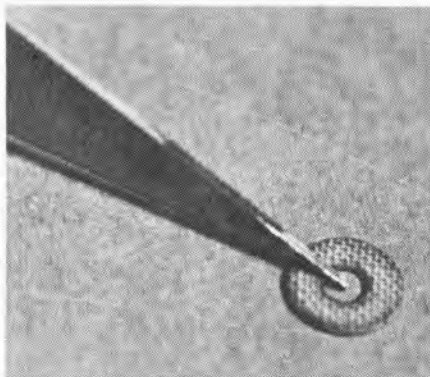
STEP 21 Now we are ready to mount the motor in the chassis and set the gear mesh all at once.



STEP 22 Slip (not pound) your pinion on the armature shaft and drop the unit in the chassis for a minute.



STEP 23 Make certain that everything clears. Trim axle tube and armature shaft to fit, if needed. Things should be ready to mesh about now.



STEP 24 Split one end of a fiber armature spacer.



STEP 25 Slip the spacer on the shaft as shown. This will help to keep nasty acid out of the bearing hole.

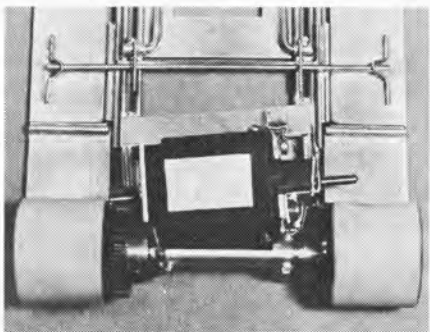


STEP 26 Lightly tin (you know, just a tad) the shaft.

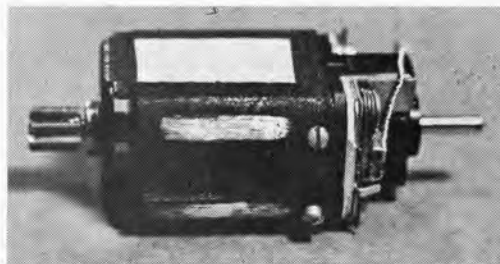
STEP 27 Drop some more acid . . . down the gear hole, guys. Sweat the gear on until it turns poiple (not wed, Goiski). Clean it up and oil the bearing after you remove the fiber spacer.



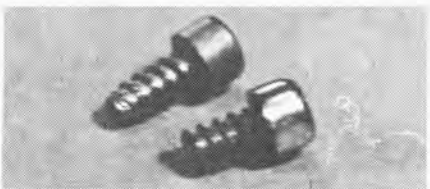
"Ah . . . , that's clean enough, Dona."



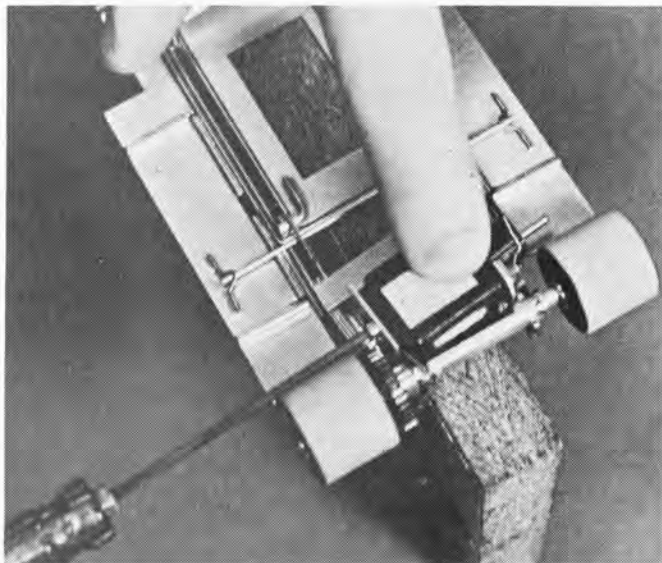
STEP 28 Drop the motor back in the chassis and mark the back of the motor can for soldering areas.



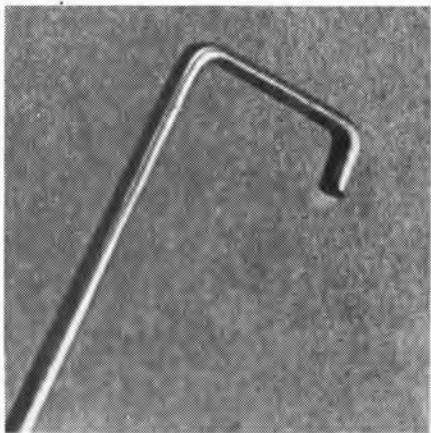
STEP 29 Scrub the paint off between your marks as shown.



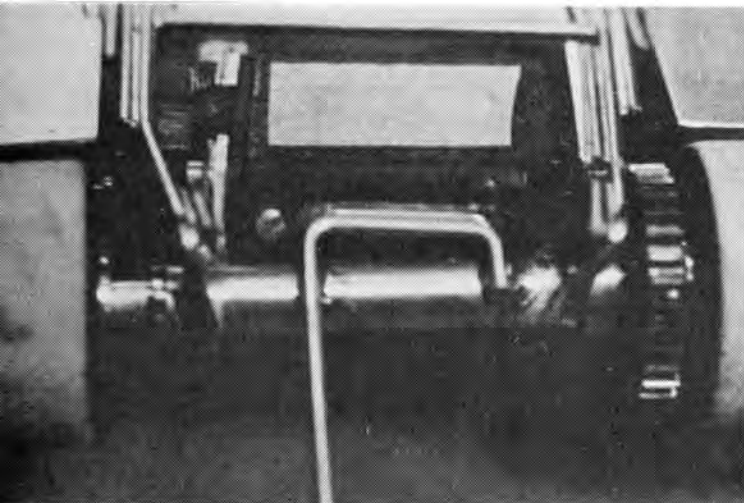
STEP 30 While you're at it, trim one motor screw and polish the opposite end for soldering later.



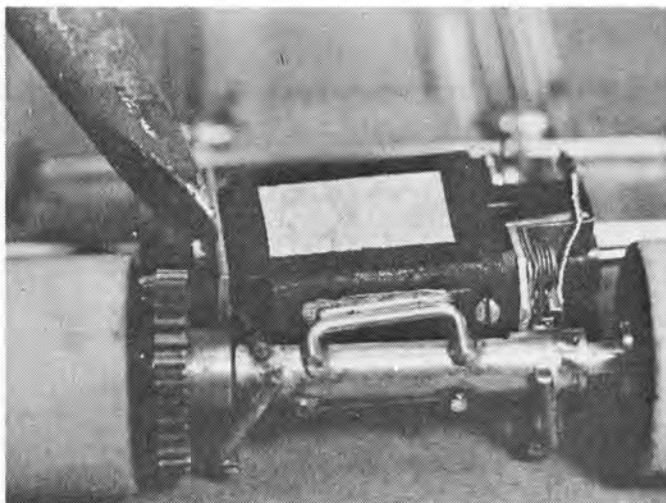
STEP 31 Turn your set-up block on end and drop the motor in. Turn the screw down and set the gear mesh as hit upon in text. The screw just makes mounting easier but if you live on the East Coast you may be ridiculed for doing it this way. At least you won't contract a bad case of gear smash.



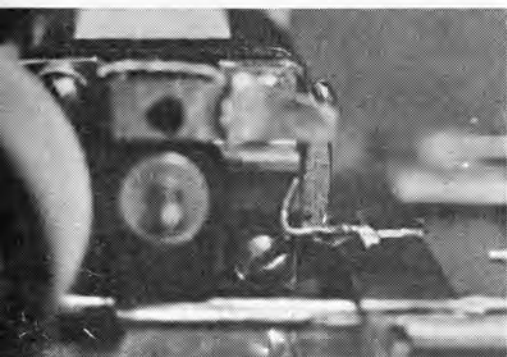
STEP 32 Use .055" wire to bend this cute little nazi.



STEP 33 Solder the nazi (the brace, Elmo) to the axle tube first, then to the motor. Use the long end for a handle if you like.

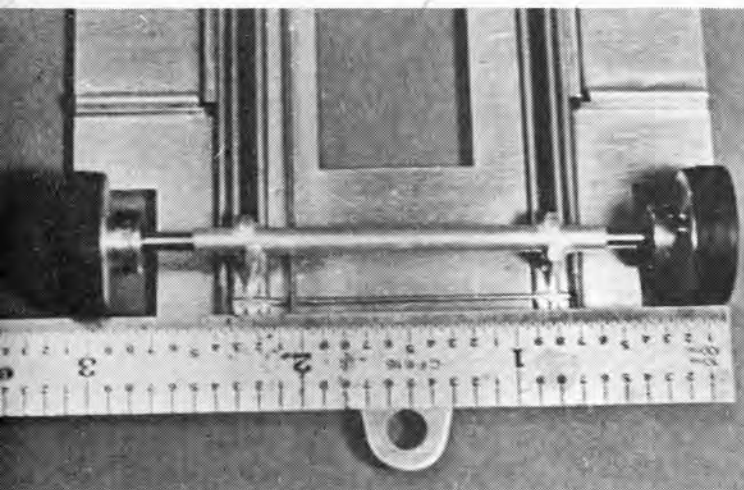
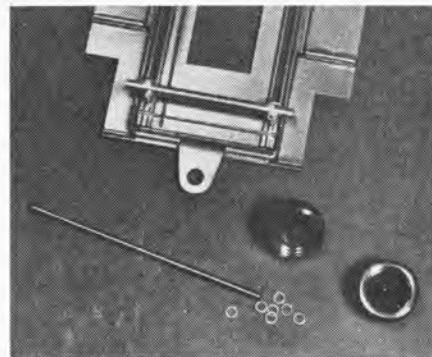


STEP 34 Do it again, Sam. This time on top and tack solder the mounting screw because it's there. Cut off all your excess baggage.

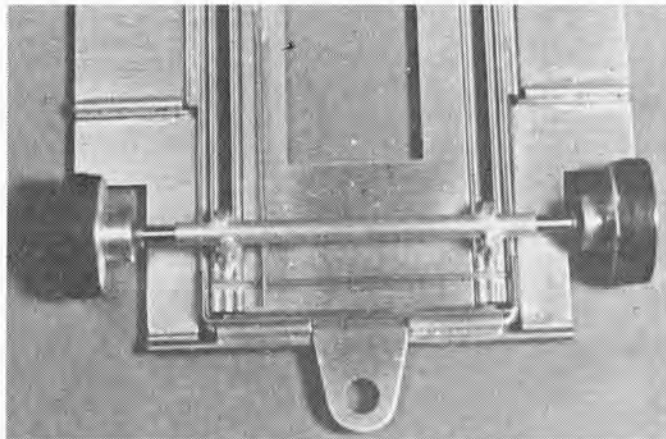


STEP 35 See how neat that buss bar set-up works? So stop admiring your handywork and clean the area a bit.

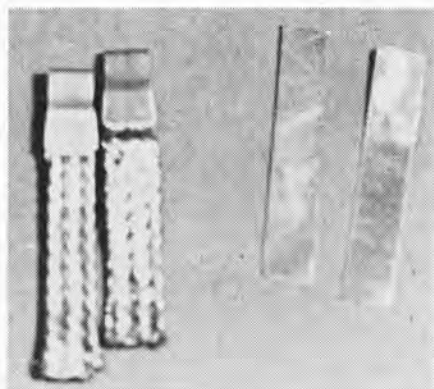
STEP 36 Now we'll do the front-end. Here's the goodies we'll need.



STEP 37 Stick the axle in the front tube and space the front tires at 3.1" again as shown.

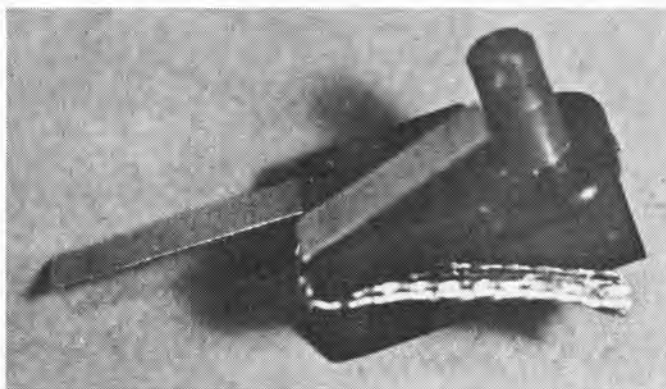


STEP 38 Guesstimate how many spacers you will need to use to keep the front tires from touching the pans. Put them in and lock the wheels down, making certain that the track width is set right.



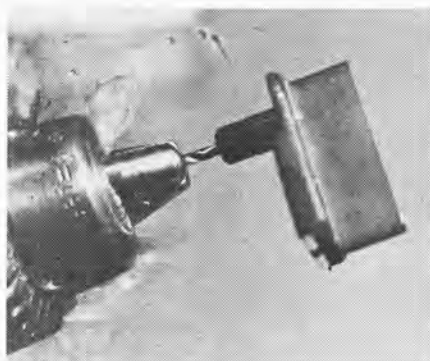
STEP 39 Guide time.

STEP 40 Use some braid-wide strips of .015" brass for guide clips. Jam them in above the braid as shown and bend back around the top of the guide.





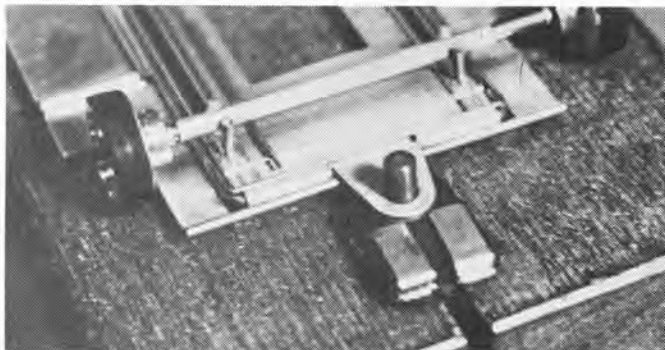
STEP 41 Trim, file and flatten (generally beat on) the clips until they look, and lay in there, like this.



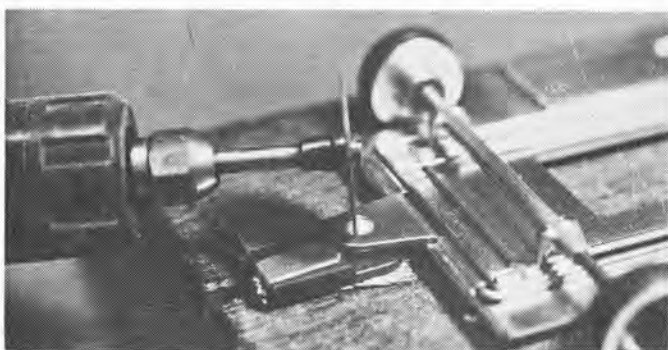
STEP 42 Use a drill bit the size of the guide hole and drill the hole down just into the blade.



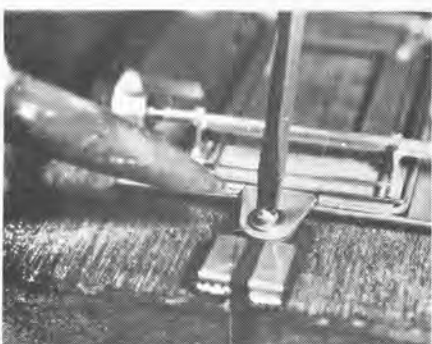
STEP 43 Drop a few spacers on the guide as a starting point for mounting. Don't forget to leave the braid in the guide for this.



STEP 44 Use a test block or slate and fiddle with guide spacers until the front tires just barely touch.

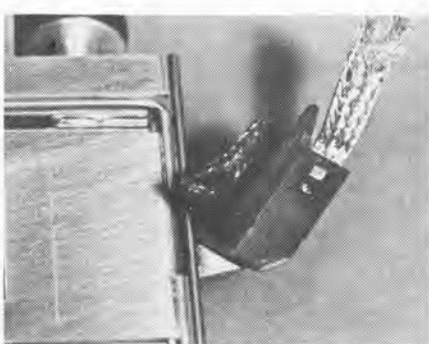


STEP 45 Trim the guide post and detail it down with a Dremel.

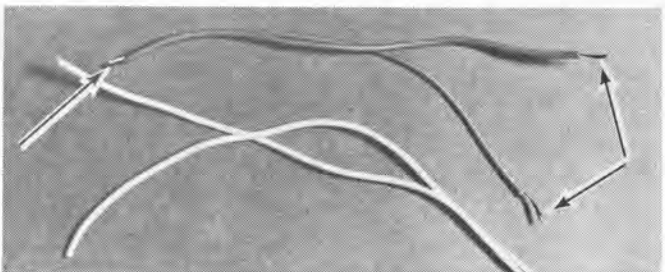


STEP 46 Use your long screw and washer to secure guide in tight. Contrary to popular method, spare the heat and just use enough to loosen the guide up. Use bits of heat at a time until it is as loose as you like it. If the screw comes oozing back out at you, you blew it. Grab a new guide and start again. I know this because it did happen to me... *once.*

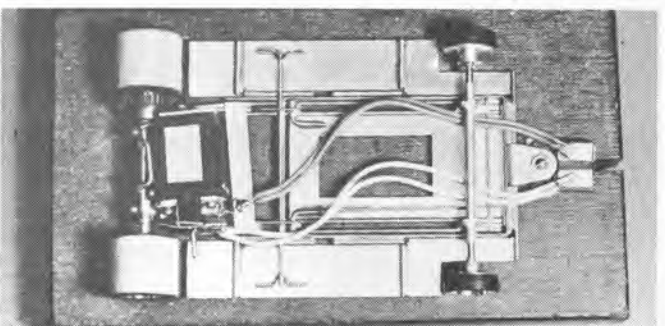
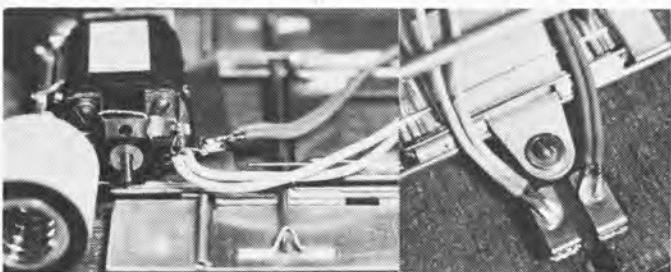
STEP 47 Trim the back of the guide so it may turn this far.



STEP 48 Measure off four lengths of lead wire for your missile. Strip the ends, tin with solder after you twist the ends as shown.



STEP 49 Solder them on to the front and rear tabs as shown. Don't worry about the polarity now. Just bring your mind to the track.



A'wuniful,
a'wuniful.

"You mean to tell me that you finished before I did?"



HERE IT IS. THE FINAL EPISODE OF ONE OF THE MOST UNIQUE AND COMPREHENSIVE HOW-TO ARTICLES EVER PUBLISHED (WE COULDN'T PUBLISH *THE* MOST UNIQUE ONE). WE AT CAR MODEL BELIEVE THAT THIS SERIES WILL BE ONE TO HANG ONTO FOR THE FUTURE AS WELL AS USE RIGHT NOW. MANY OF THE SPECIFICS AND MUCH OF THE THEORY DISCUSSED IN THE PAST FIVE MONTHS CAN BE HELPFUL IN BUILDING *ANY* SLOT RACE CAR. LEE GILBERT AND HIS FRIENDS (LET'S NOT FORGET HIS FRIENDS, NOW) HAVE SET THE FOUNDATION FOR YOU TO BUILD YOUR OWN CONCEPTS AND DESIGNS. THE GANG AT CM HOPES YOUR IMAGINATION AND ASPIRATIONS HAVE BEEN SPARKED AS MUCH AS OURS

LEE GILBERT DOING HIS THING

STAGE VI

OR

"Now that the body's arrived,
let's go play with it."



by Lee Gilbert, Sundance Coates
and Girl Friday . . . Dona



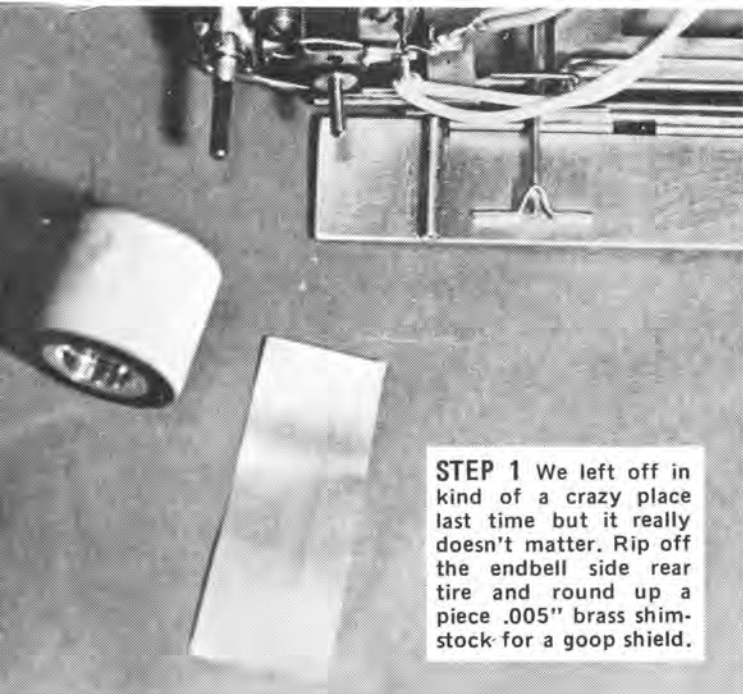
THIS has to be the slowest I've ever built one car. Sundance keeps claiming that Dona has been getting in the way . . . and I assure you that both statements are true. Onward.

The goop shield has been scoffed at, praised and ho-hummed in the past but all that can be summed up by saying; use one. It doesn't matter if it's a lexan job from MAC or one of the brass creations I like to toss on a car. They are essential. Dirt, glue, or gremlins; it doesn't matter, all can hurt your motor. We can handle two with the shield, continue to pray for handling the last.

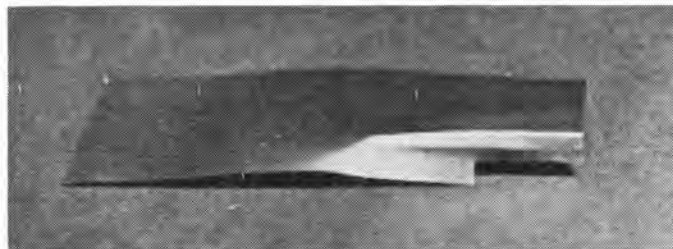
The body can be as hard and complicated to mount as it may be to select. Here's some theory to both. In selection of the right body for a particular track, it's always easiest to run what the majority does. It's crazy, but that usually works pretty good if the majority of the guys are fast and have been running a bod that has been out for a little while. That last thing shouldn't matter but it helps if you want to be a follower.

In truth, a body can affect handling nearly as much as the chassis itself. They affect top speed and smoothness too. The best way to find the right body

"If you think this is weird, you ought to see where Lee keeps his controller!"

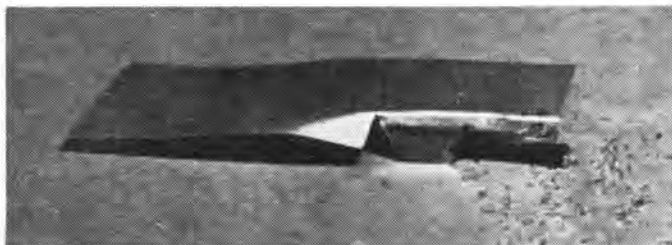


STEP 1 We left off in kind of a crazy place last time but it really doesn't matter. Rip off the endbell side rear tire and round up a piece .005" brass shim-stock for a goop shield.



STEP 2 Bend and notch the brass something like this to fit behind the endbell and in front of the axle tube.

STEP 3 This slice shows where we will bend the brass over the top of the motor can.



is to know the track. You should know it pretty well if you just built a chassis for it so I don't think we'll have any problem with finding the right bod. For high speed tracks with glue use a bod that has good wedge shape and rounded features. Examples would be the MAC Ferrari, the Kirby 612, the new Associated Porsche, etc. for a well powered King or long Engleman track. This kind of bod has good frontal down force when mounted correctly and is known to

be slimey from the stand point of bite at the rear wheels. The opposite idea would be a no-glue track, low power and a lot of turns. Here we need more bite and don't really care about down-force on the front for high speed straightaways. Examples would be custom built powerpack tracks (flat) and the body could be a Kirby Nissan (old type), Lancer/MAC Porsche 917, the newer Kirby Nissan, etc. This type of bod is thought of as tilting and gives tremendous bite with its squared off lines. Just to give you an idea of what is in-between, look at the Kirby 312-P or the MAC Lola T-290. Kinda' squarish but good wedge shape. The Lola is the most slippery down the straights but the Ferrari is the body to use when in doubt.

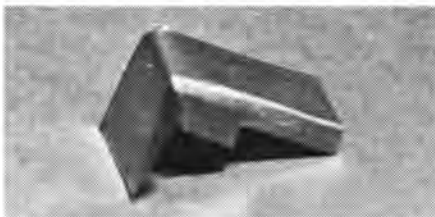
Now all of that info may be only slightly helpful but there is still a few more things we have to consider when selecting a body. Just as with the chassis itself, we have to consider our own personalities and abilities. One type of body may be easier for you to drive or have a certain handling quirk that could help you during a race or in qualifying. To find that special bod for your track you may have to search awhile, but don't fret; there's one around and you'll know when you find it. I'd recommend starting with the Kirby 312-P. It's the most consistent at most tracks no matter what their configuration or power. The 312-P is the body we used in this article, but remember the technique and mounting theory is important.

Now after you've spent months (it's taken me weeks, sometimes) finding that right bod, you're going to have to learn how to mount it correctly or everything you've done up to this point will be wasted. First of all mount the front low. Shove the body forward if you have to get more guide clearance. Chop the guide if you need even more. Make the front tires almost touch the tops of the front fenders. Mount the rear of the body up fairly high if your running a bumpy high speed track. Experiment with rear-end height for progressively



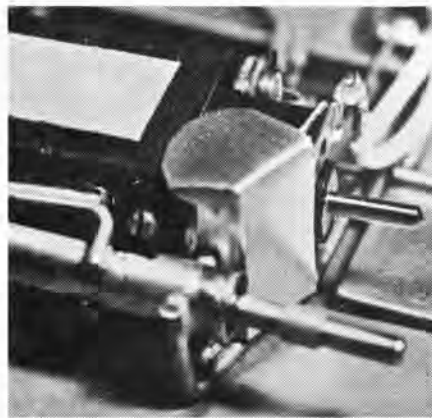
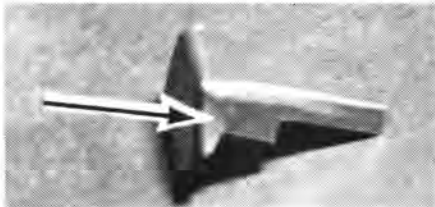
Lee: "Any time you're ready, Sundance. I need that body I paid you fifty cents for five months ago?"

Ted: "One body comin' up. Do you prefer Dona as a redhead or a brunette?"



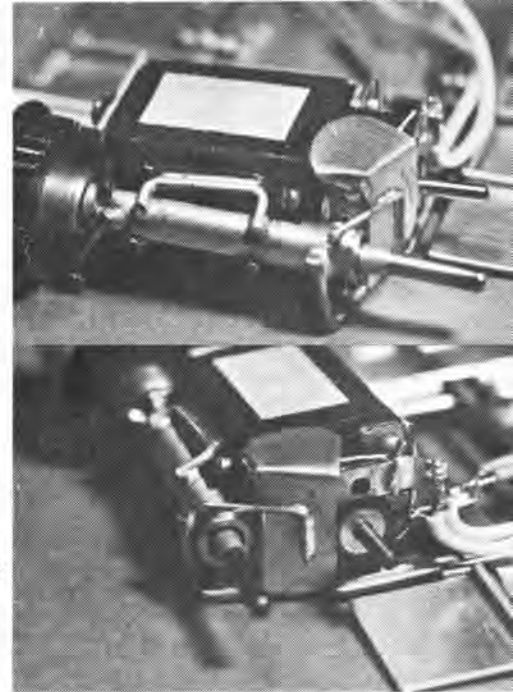
STEP 4 Bend the unit at a right angle like this.

STEP 5 Trim the shield up neat and bend that back little tab over against your first bend as shown. Make it look pretty and solder it up after you check the fit one more time.



STEP 6 Here's what you'd better have so far.

STEP 7 Bend a little brace to hold the shield in place. Use .032 wire and solder the thing to the back axle tube and the shield itself. Don't worry about a short, Mort. We just decided to defy electricity.



different tracks. What we're doing here is adjusting the built-in down-force of our selected body. One body that can't be used no matter how much fiddling is done is the Kirby T1 22. The real car was poorly designed and the slot car body is just as bad (the R/C copies deserve no comment . . . they're worse). This type of design is also found on the ever popular Lancer 917 and shouldn't be used on high speed tracks due to the built-in launching qualities. The very sexy troughs on either side of the cockpit create a mini-vacuum and can definitely cause launching. In spite of this, many so-called hot dogs in the East still use the thing. Don't you. On slower drivers courses they'll be fine.

Don't worry about the overall length of a bod. It seems that a myth is being tossed about that has to do with bod length. Short ones are popular: forget them. Short bodies will hurt you if you're not careful. The current built-in rear spoiler fad has restricted air control experimentation and effectively shortened nearly all bodies. Only the MAC Lola is long enough at present and may be used with or without the built in air device. The myth about long bodies sliming around tracks is just untrue. Try some experimenting yourself on this score.

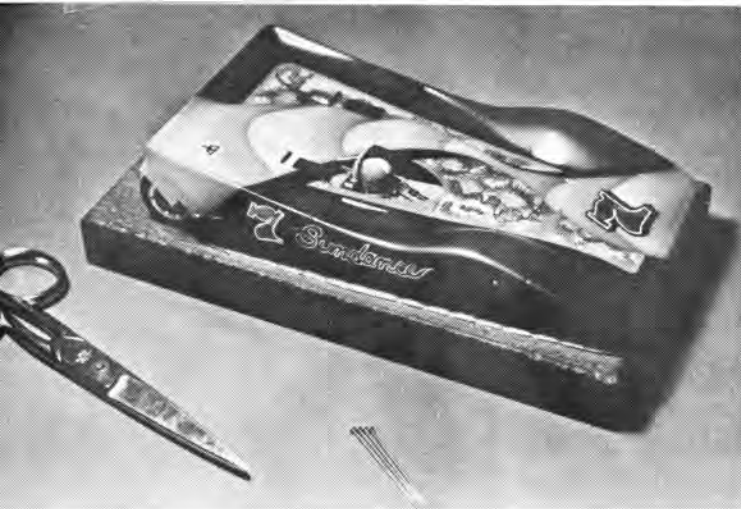
Air control can be one of the most gratifying methods of trimming and even changing your race car's handling characteristics. Unfortunately, way too many people go hog-wild and freak out on so many grotesque creations that they forget what they are trying to do. Probably the best advice at this point could come from our Girl Friday: "Keep it clean, folks". Keep it simple too. Ultra high dams aren't necessary for most tracks. Start out with a simple design and work on it. The length and height of the dams will keep the car more or less steady on straights while the angle of the rear spoiler will effect the down-force along the whole length of the car. To put more force at the nose, crank the angle of the spoiler up from 45 degrees off the ground. Watch it here, though, the more you move this up the more

you slow the car down. Take some construction paper to the track with you and play with airfoils until you get what you want. Heck, I've run races with chunks of light cardboard running up the back of my car just to get the bite I needed. Don't be afraid to chop up a few pieces of paper and spend an hour or so at the track fiddling to get what you want. It'll be worth it.

Fiddling is something I've talked about vaguely from time to time but never really explained. Now is a good time to set you straight. There is no substitute for the knowledge and the self-confidence gained from fiddling if you know what to do and how to do it. Here's how. At the track break out the bucks and



Now that our Sundance Body has arrived we can gather up some pins, strapping tape, scissors and X-Acto knife and get on to mounting the thing. If you think this design looks good on a 312-P, you should see the affect it had on Dona.



STEP 8 Start the mounting procedures by setting the body over the chassis and checking how much trimming is needed.

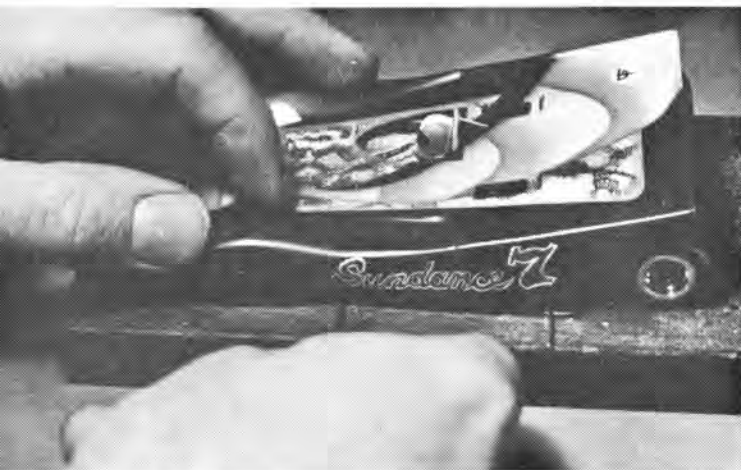
STEP 9 Start the trimming slowly and check periodically to make certain that the guide and front tires clear.

buy at least an hour of track time and plan on at least one more. Forget about practicing. You may only run one fourth of that time. Plug in your iron and bring all of your tools. Plan on accomplishing something. As an example, say you want to set-up the right body. Bring two or three that you think will work all ready set-up. Now fiddle. Run each bod on the same car about ten consecutive hot laps. Notice straight-away speeds and compare. Check and remember the feel of each car through each corner, around the donut or whatever. Make mental notes. Jack the bodies up in the rear or lower them and take another ten laps with each. In other words, fiddling means making one change at a time and thoroughly evaluating and comparing each change as you go along. The second you make two changes at a time you destroy what you're trying to do and you won't know what you've done. It's through fiddling like this that I've been able to lay down the so-called Gilbert

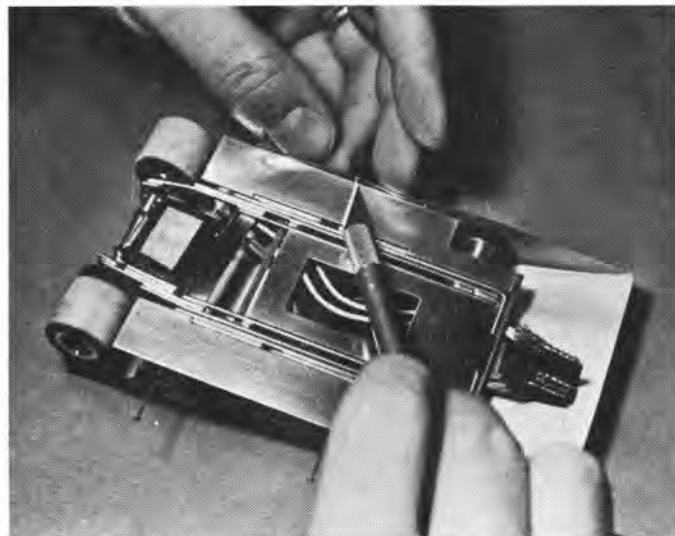


Chass Theory with complete confidence. Pretty soon, after doing your homework like this, you'll be able to walk into a track and just about know what will work. If not that, you'll at least know where to start.

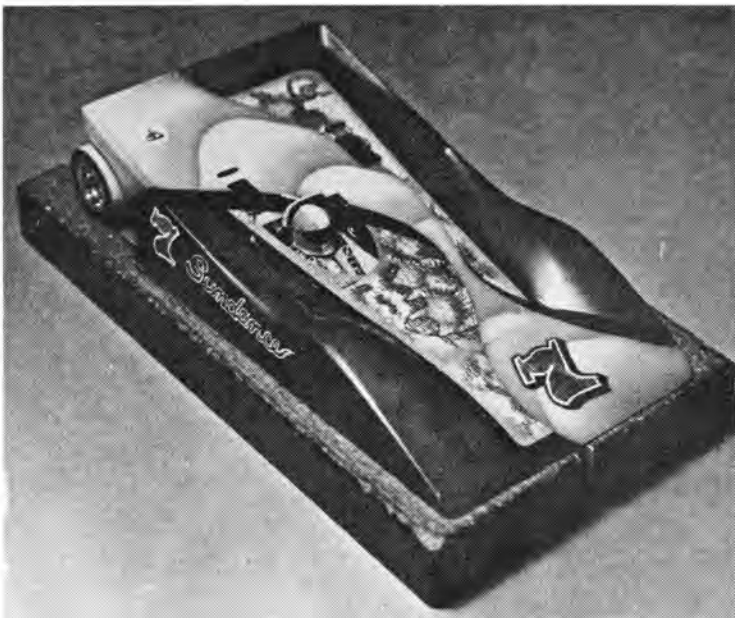
Man, did I ever ramble on. Send your Girl Friday into the kitchen to see how your kringle is doing. We kind of got pizza-ed out lately and a giant kringle really can hit the spot. The Dremel Manufacturing Co. in Racine, Wisconsin, you know . . . Moto-Tool, has a character for a V.P. and he sent us a Danish Kringle in the *mail* yet! They go pretty good with coffee but a week in the mail would make even the box taste good with Dona's coffee. Even a Dremel tool would taste good with Dona's coffee. Anyway, if you're interested, I have now in my possession an old family recipe for these weird Danish Kringles. Stop by and I'll lay a piece on ya'. They may not tease your tastebuds but they'll turn in the threes on a King track.



STEP 11 Use four long pins to start the mounting holes. It might help to position the pinholes with the 1/16" tubing on the pans. Your body will stay on a little better that way. Check for squariness, you don't want the car to look like a crab going down the pike.



STEP 12 Flip the entire unit over and gingerly mark the lower edge of the body with the back of an X-Acto knife.



STEP 10 After getting the body down in front the way you like it (per text) hack out the rear wheel openings. After that job, trim the back off as shown.

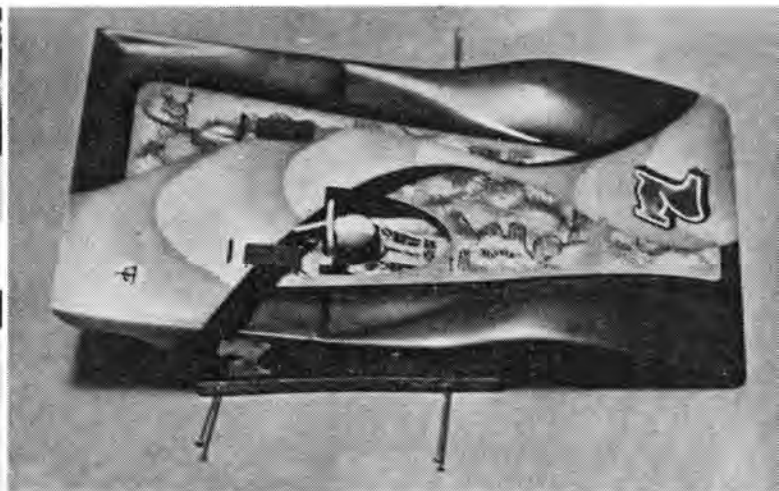


Now on to lead. Your Girl Friday may tell you that extra weight isn't good for a darn thing but don't you believe it. This is one easy way to trim the handling and, if all else fails, to get the car to handle in the first place. The theory behind lead is to pile it on the front of the pans for slime and on the rear for bite but usually not on the rear without the front. The best place to start laying lead is on the middle of the pans. This should smooth the car out a tad. Don't be afraid to pile lead double or triple high. The only thing weight will affect is brakes. If your motor is right, don't sweat it. Don't be afraid to pile lead more on one side of the car than the other. Sometimes a donut will need it. One last word on lead before you start to fiddle on your own. *Do* be afraid to pile it in the middle of your car. That is the one place that lead will not do one bit of good. Air control and body mount would be a much better substitute. Pans are made for lead so use them for that if you need to.

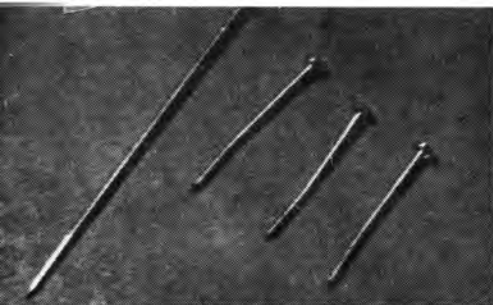
Since this article is intended to take you right up to actually racing the car I suppose I should drop in a word about breaking in the car (motor/tires). No more than a couple of laps should be needed to do the job if the tires are true and the motor is balanced. Try not to practice too much on your race motor, though. No sense in wearing the old girl out too fast.

One quick thing about glue. Use Stick-it and fiddle on your own after you follow this article's starting point. One important rule to remember is to NEVER use glue on the outside of a turn. Follow the article for brakes and turns. Experiment on how much and where.

Gee, I don't really know if this should be a happy or sad time for everybody concerned with this project. The gang at CM has really put up with a lot of strange happenings lately and Sundance's wife has consulted the Missing Persons Bureau more than twice. Dona's mom keeps calling up to make certain



STEP 13 Now that you've made a pin cushion out of your trick Sundance Bod, tape the thing up with some good heavy-duty strapping tape. Re-poke the mounting holes in the correct region.



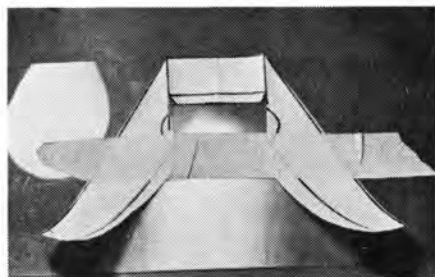
STEP 14 Whip out your Dremel Moto-Tool and carve a set of shortened pins for yourself. That's right, you're gonna' have to do the last one yourself. Slightly crook the pins. Helps them stay in a tad better.

STEP 15 Beat the bod back on the chass again and start looking for your sharpest X-Acto knife blade (No. 11). Carefully trim the front wheel well openings out to a size just a smiggen more than the front tire diameter. Watch the tires and paint.

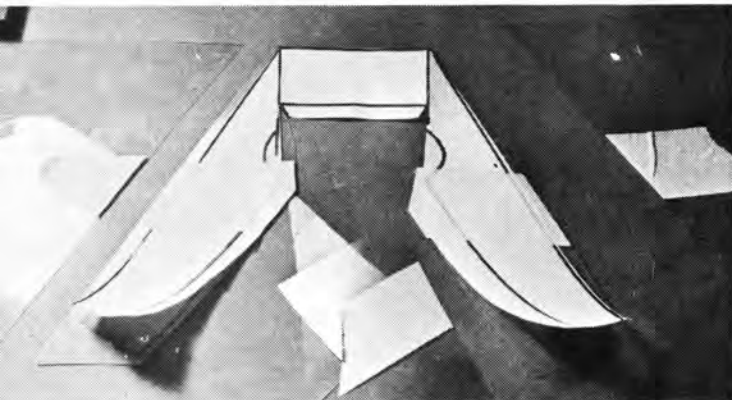


that her daughter is not in the bathtub and is still wondering what all of her pictures have to do with slot cars. Hopefully, if you didn't get anything else out of this article maybe you were entertained. I know I was.

Thank you, Car Model, for letting me enlighten those in quest of truth, justice and a damn fast car. I expect to hear from some of you group advocates as well as the fast crew on this series of articles. Remember, if you want to go fast you'll have to understand what you're doing even if it isn't yet understandable . . . understand? In other words, hope your car turns out well even if it did take you six months to make.



STEP 16 Whip out your handy-dandy pattern and nail it to a good chunk of .010" lexan.

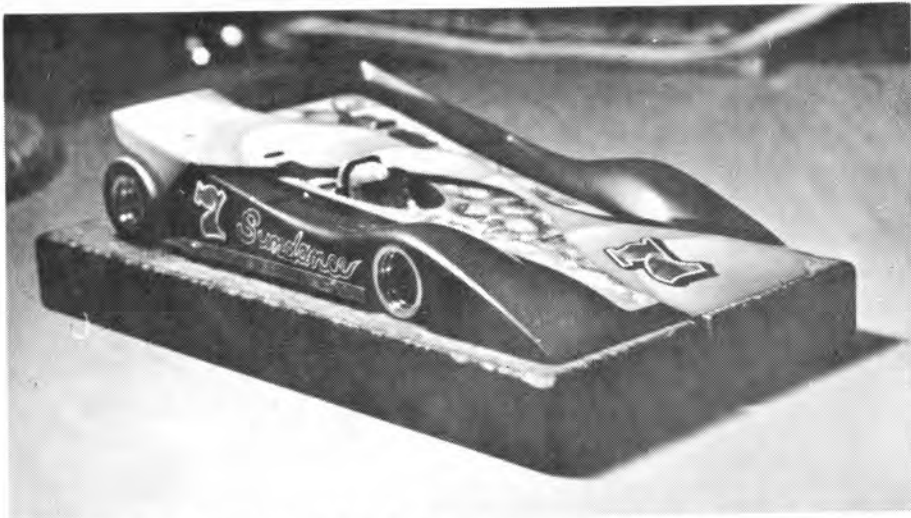


STEP 17 Chop it out around the correct lines and be sure to leave a little extra.

HANDY-DANDY PATTERN

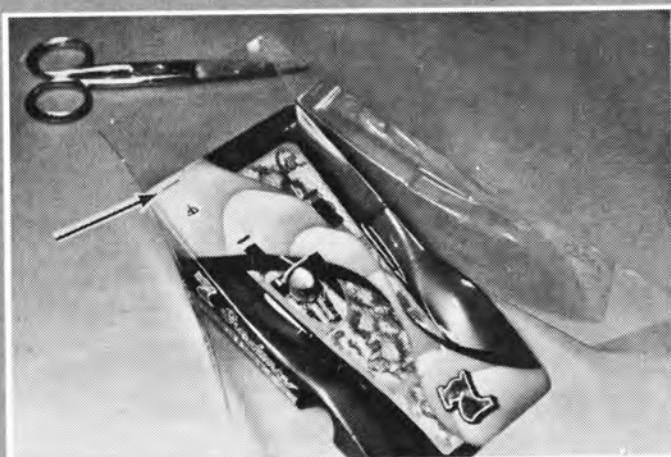


STEP 18 Bend right angles at the spoiler/dam junction. Remove the pattern once the mess you've begun starts to look like something.

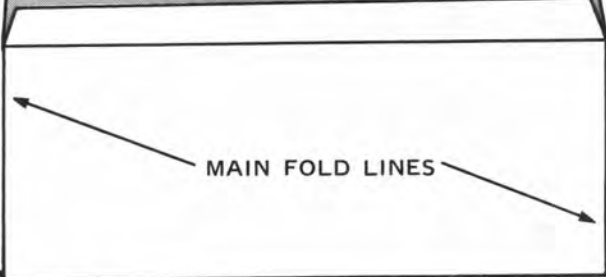


This is what you should have so far. Don't worry about that lamp. We'll show you how to make one next years. (What lamp, dum-dum? — Ed.)

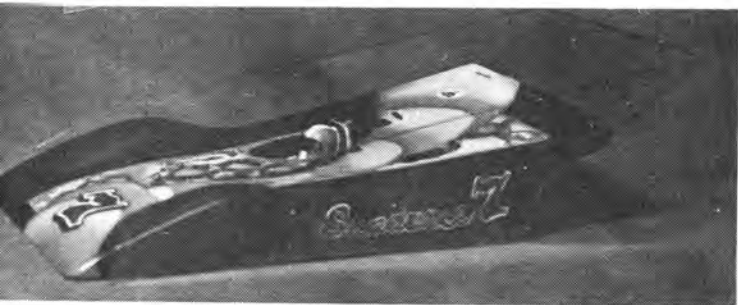
We used our Girl Friday to test out our wind tunnel. What do you think?




STEP 19 Staple the spoiler portion of your unit air control thingie to the rear of your trimmed body.

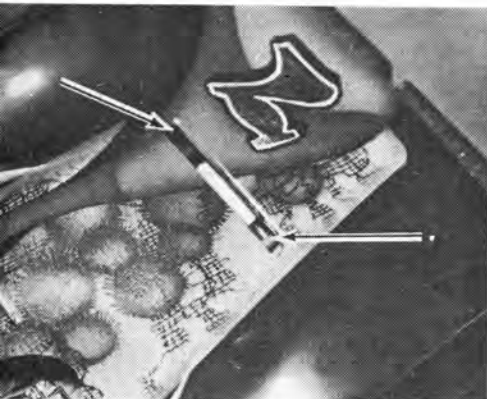
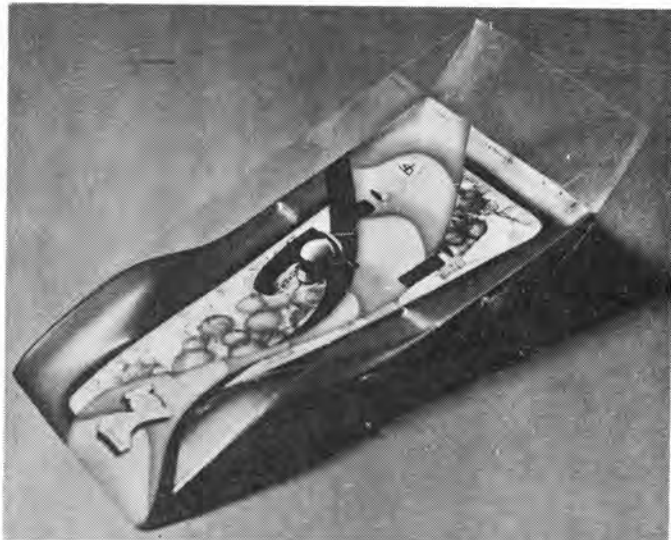


STEP 20 I'm old fashioned and like to use staples for the side dams as well as the rear so staple the sides down. Make certain that you have the proper spoiler angle (per text) for your type of racing before you nail it. Save the front staples for last.




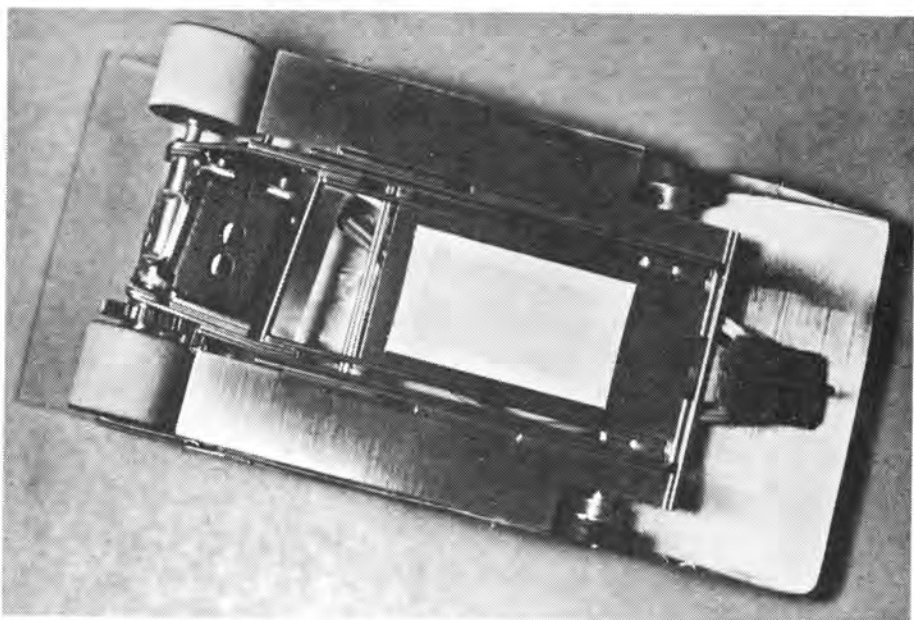
STEP 21 When doing the front staples as shown, be very careful not to tweak the bod in so doing. Relax and go easy on this part. Trim the top and bottom of the side dams (per text). I did the dams all the way down to the bottom of the bod. It's neat for additional bullit-proofing.

STEP 22 Trim the front wheel well openings and re-stab the pin mounting holes. Remount the bod and make certain that everything flip-flops neat. Tell your mom and dad that you made it yourself. 



STEP 25 Hack a hole where one should be. This will let out a little of that nasty old air that may get under the schnozz.

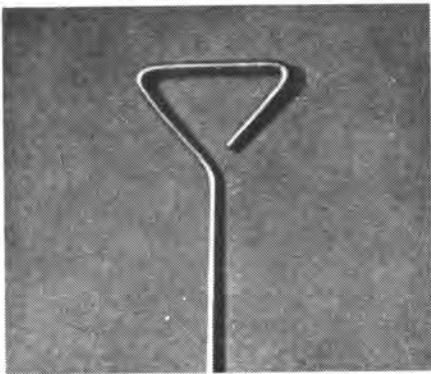
STEP 26 Tape the drop arm hole up with a healthy chunk of tape for any mythical reason you desire. I simply like to keep my lead wires off the track. 



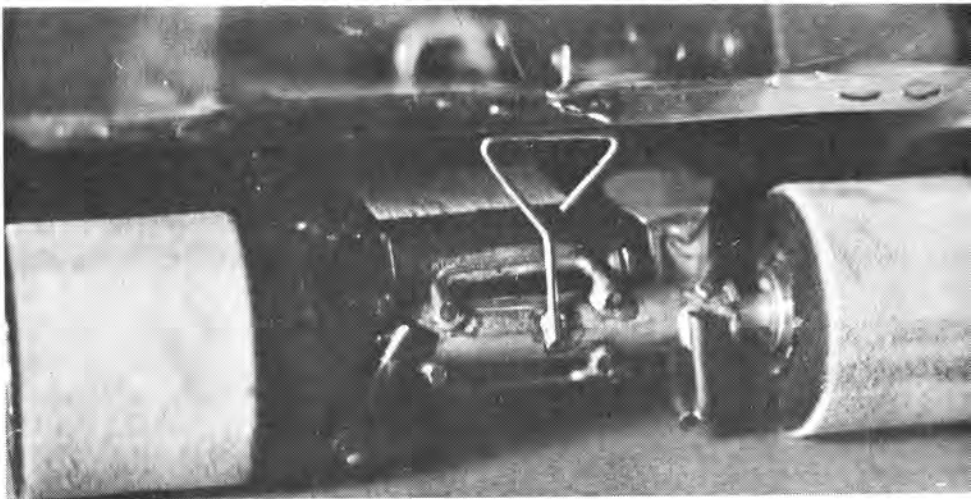
Would you believe that something this neat could come forth from such an outstanding developmental lab . . . I don't.



"Good heck, Gilbert, I thought you needed an extra painted bod for the track today. Besides, fifty cents is fifty cents!"




STEP 23 Bend a body brace thingie like this out of .032 wire. You may want to try your car without one but it can help traction a nick and keep your bod off the tires if you're running wagon wheels.

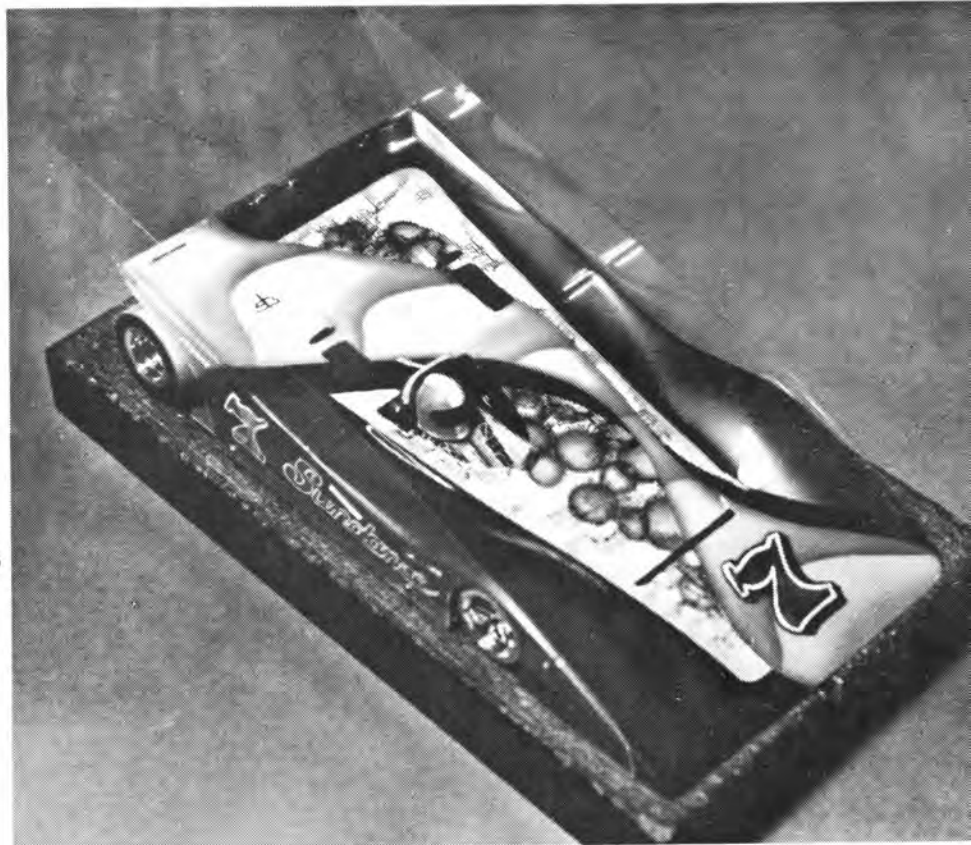


STEP 24 Solder the brace in place, Grace. Set it as close as possible without touching. The body must float free.

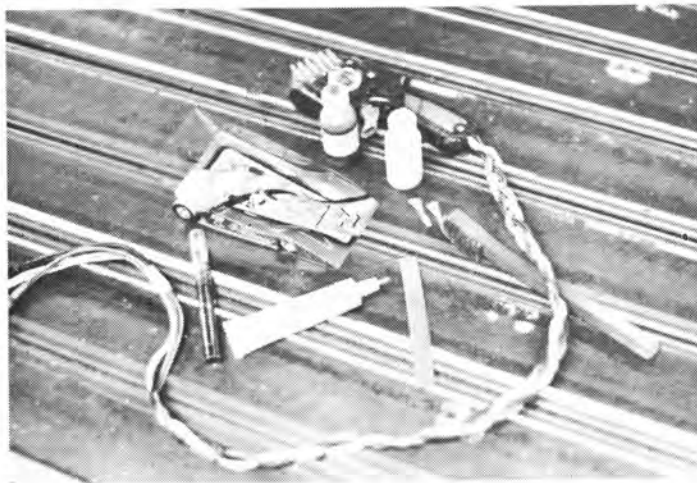


For you scale freaks (like Sundance) here's a neat thing to do for those ugly rims you're running. These may look like Lola rims but actually they're Associated with a touch of Sundance added.

Well, here it is gang. The culmination of six short months and fifty pounds of pizza and Coke. 



"Ta-da! Where's the band?"



Here's what you should have brought to the track to test your new missile. Don't leave it on the track too long, however, the guy in the lane next to you might get bent. Remember, you're not Lee Gilbert and can't get away with meek stuff.



The first thing you do is have Wolfman here oil all of the wiggly and moving parts on your bomb. (Damn, dimples!)

One lap around the track and our typical turn marshal (girl Friday) a little too enthusiastically retrieves our stalled gem.



"I don't care if you do think it's funny, Dona, I'm gonna' knock your head cleean off!"

DID YOU MISS ANY OF THE FIRST FIVE PARTS OF THIS GREAT ARTICLE?

Stage 1: — BUILDING YOUR JIG

Stage 2: — BUILDING THE CHASSIS CENTER SECTION — CHASSIS THEORY

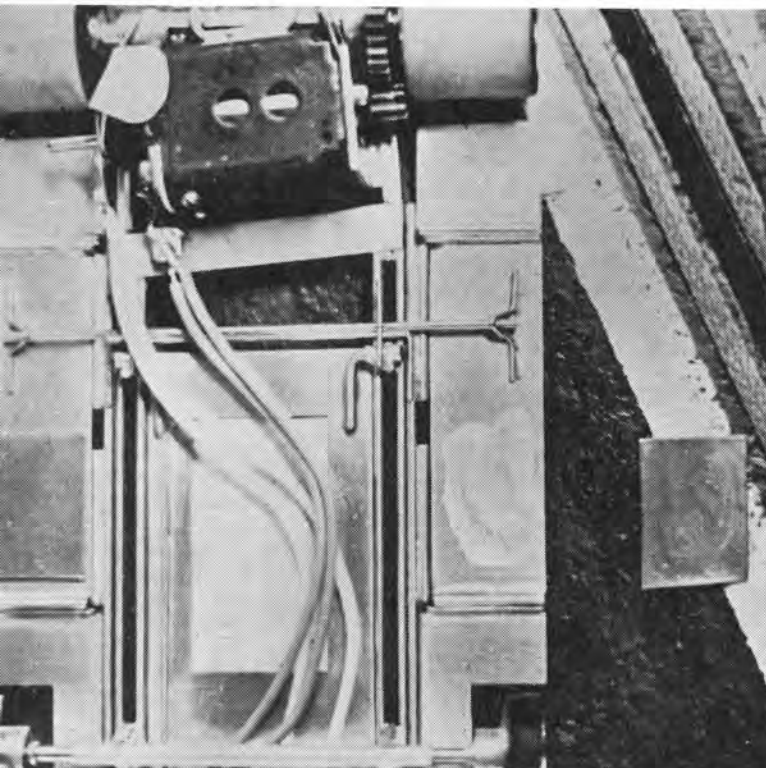
Stage 3: — COMPLETING THE CHASSIS

Stage 4: — EVERYTHING YOU NEED TO KNOW TO BUILD A WINNING MOTOR

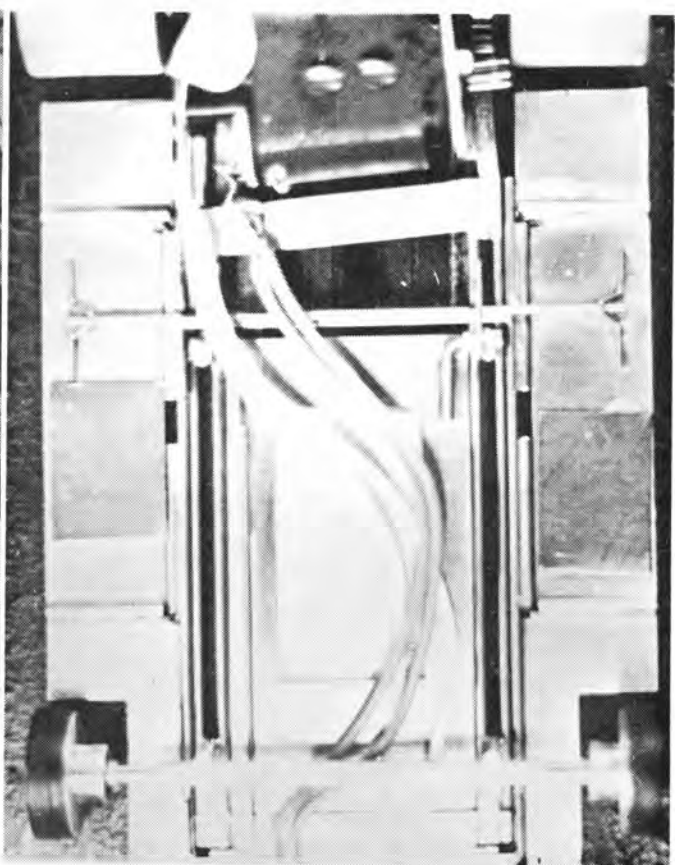
Stage 5: — HOW TO ASSEMBLE AND RACE TUNE YOUR CAR

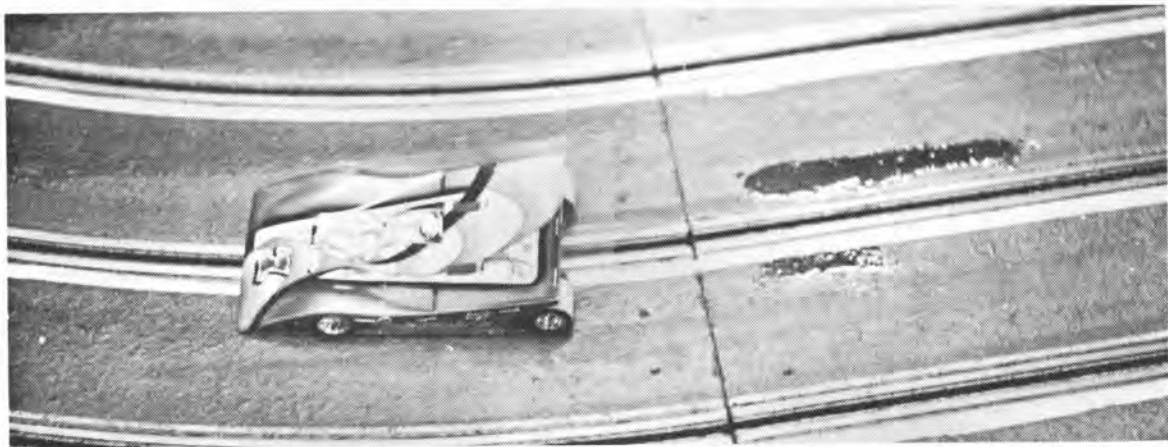
ALL PARTS ARE AVAILABLE FROM OUR BACK ISSUE DEPARTMENT

For Each Stage Wanted Send 75¢ to Car Model Magazine, 1301 E McDowell Rd., Phoenix, AZ 85006

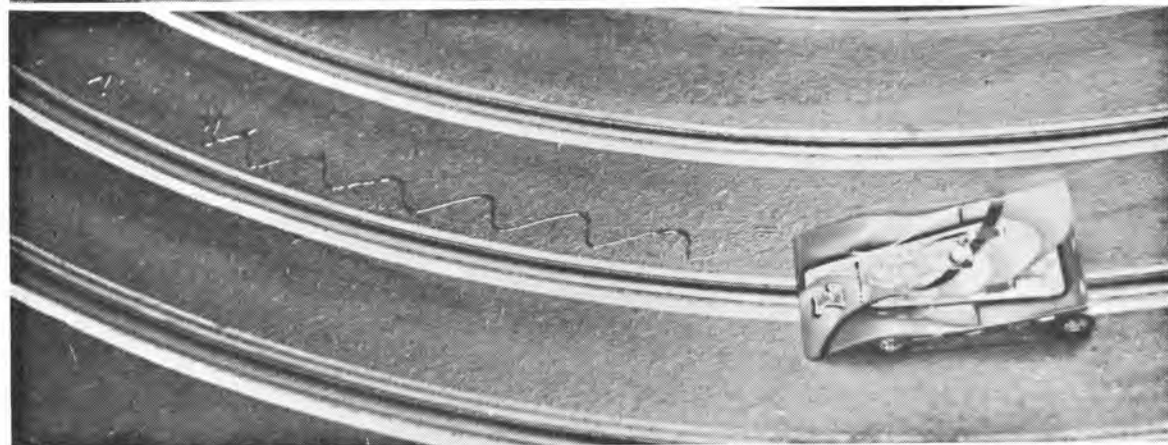


After a little fiddling we found that a tad of lead was needed on the pans in about this position. The right side slipped back here. Move it up and glue it like the left side.

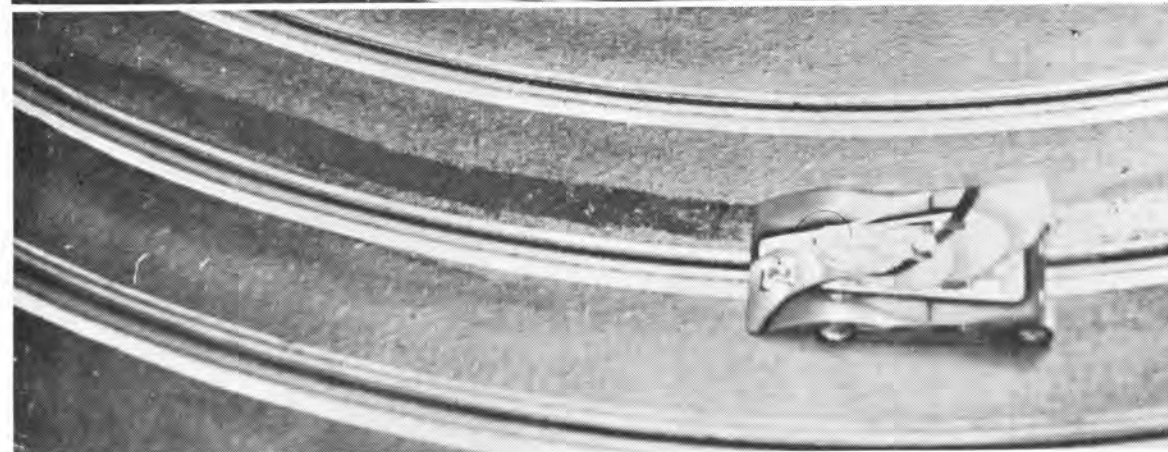




Now that the car is ready here's how to put it through a couple quick paces. Grab your Stick-it and let's glue. Here's the way brakes should be set up ahead of a turn.



This is the way to do the whole turn. Make a wiggly line all the way through the turn on the inside only.



Okay, just smear it in as shown. If you're close this is what you'll have. If you seem to be bogged, drive the turns a little deeper before braking and punch harder and quicker once in the glue. Most turns can be handled flat out with a quick brake in this manner. Use your head and some of that common sense I've taught you.



"You didn't really think that I'd get *my* hands all gooey, did ya'?"

"Pilot to Ground Control: how do I land?"

