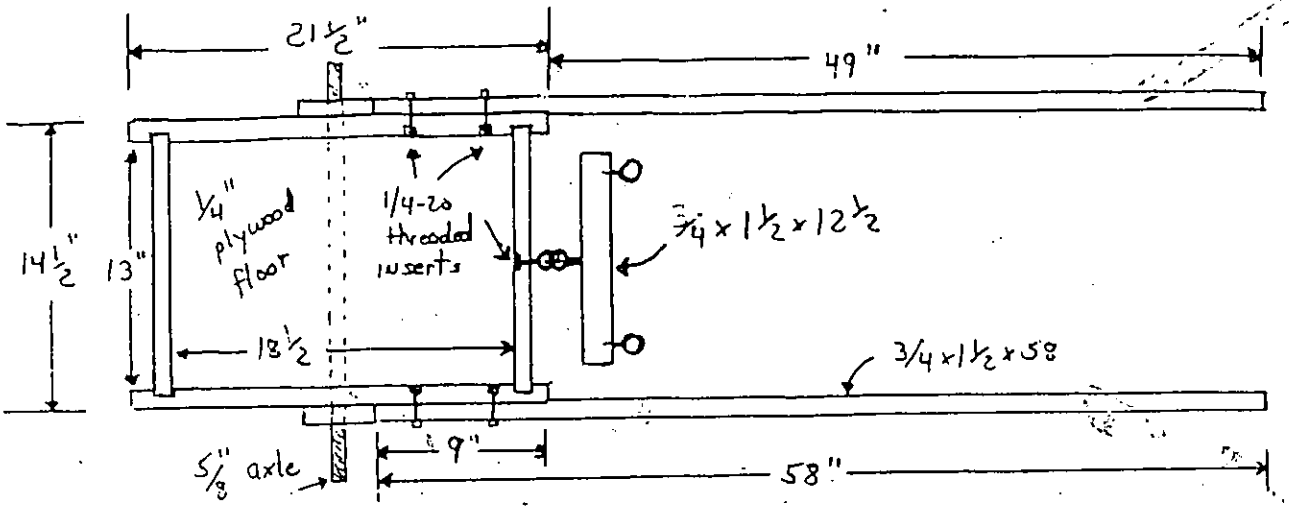
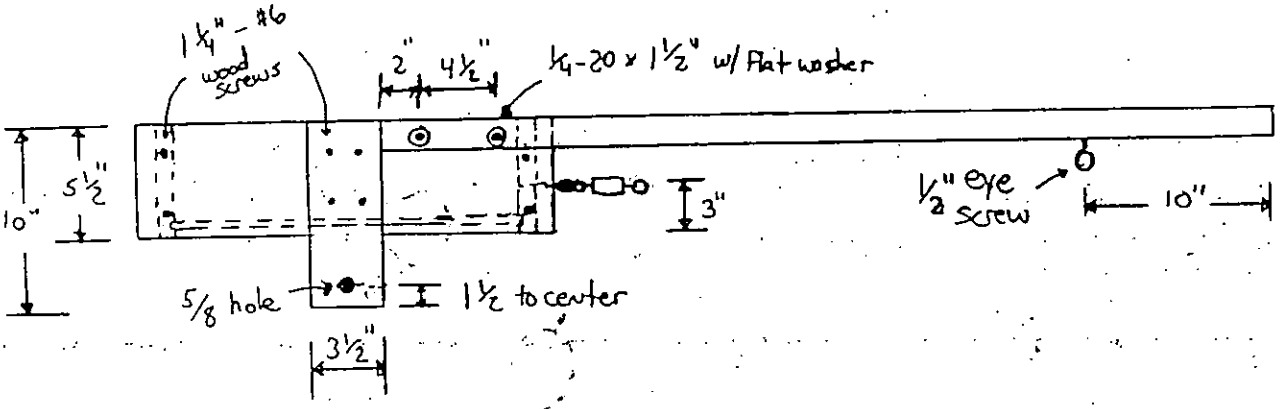
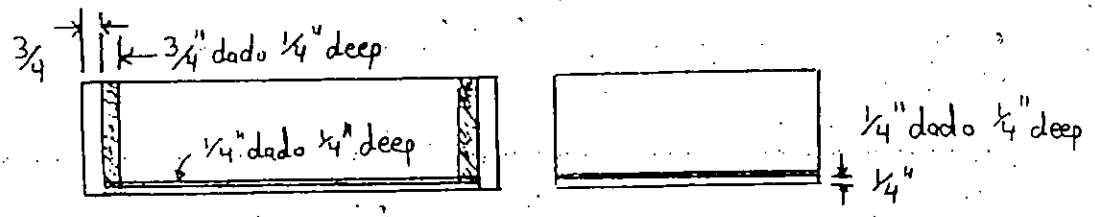
Low Profile Draft Cart



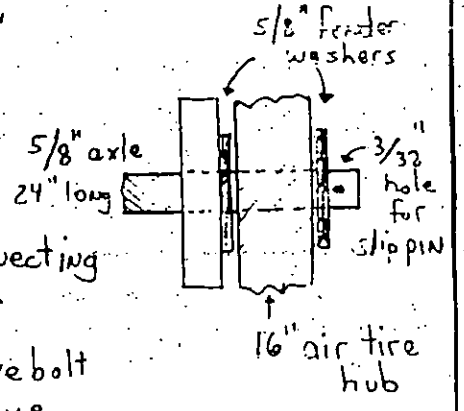


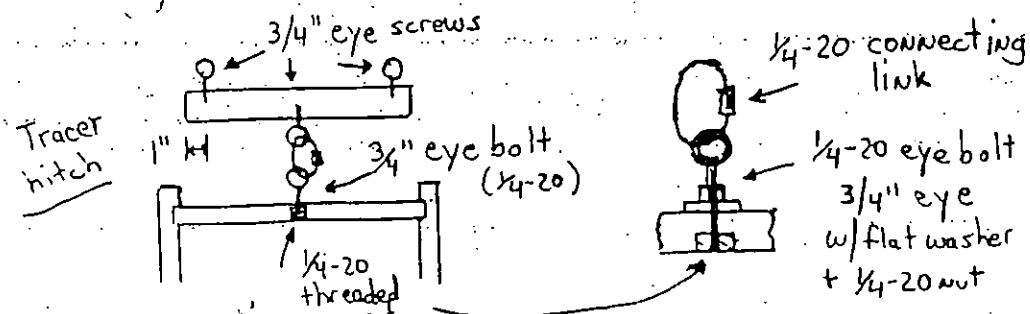


2 @ ¾ x 5½ x 21½

2 @ ¾ x 5½ x 13½

Floor - ¼ x 13½ x 19





ISSUE	ENGR MJG	TITLE	AT&T Bell Laboratories
	DRAWN 2/20/99	Low Profile Draft Cart	SHEET
			NO. OF SHEETS PER SET

Parts List

3/4" OAK

x1 - 1 x 6 x 72" 17.94
x1 - 1 x 4 x 24" 5.44
x2 - 1 x 2 x 60" $4.56
1 - 1 x 2 x 24" 2.75 ÷ 2

x 1/4" plywood - 13 1/2" x 19" @ 2.55

hardware

1 - 5/8" x 24" steel rod
(drill 3/32" hole 1/4" from each end - for slip pin)

2 - 16" air tires for 5/8" axle (dogworks)

16 - #6 1 1/4" wood screws
2 - 3/32" slip pins
4 - 5/8" fender washers
5 - 1/4" flat washers
4 - 1/4-20 x 1 1/2" hexhead bolts
1 - 1/4-20 eyebolt - 3/4" eye
3 - eye screw - 3/4" eye
2 - eye screw - 1/2" eye
1 - 1/4" connecting link
5 - 1/4-20 threaded inserts
1 - 1/4-20 hexhead nut

8.90 ÷ 2 = @ 4.45

ISSUE	ENGR MJG	TITLE Low Profile Draft Cart	AT&T Bell Laboratories
	DRAWN 2/20/99		SHEET

11-3-99

PVC CART PLANS

PARTS LIST/PRICES

The following is a list of parts and estimates prices:

Qty.	Description	Total $	Distributor (if Applic.)
2	20" pneumatic tires @ $19.98 ea	$39.96	Northern
2	4" long 2 – ½" angle iron @ $5.00 ea	10.00	
1	2' x 4' board (ply or solid) ½"- ¾" thick	15.95	
3	10' 1- ¼" PVC Schedule 40 @ $2.94 ea	8.82	
2	10' ¾" conduit @ $2.15 ea	4.30	
20	1- ¼" PVC "TEE" connections @ $1.18 ea	23.60	
12	1 – ¼" PVC "ELL" connections @ $1.02 ea	12.24	
8	¼" x 20 x 4" bolts @ $0.10 ea	.80	
4	¼" x 20 x 3" bolts @ $0.10 ea	.40	
2	¼" x 20 x 3" eyebolts @ $0.29 ea	.58	
12	¼" washers @ $0.02 ea	.24	
14	¼" x 20 nuts @ $0.02 ea	.28	
4	¼" washers – wide flange @ $0.05 ea	.20	
4	¼" washers – lock @ $0.02 ea	.08	
4	½" washers – wide flange @ $0.05 ea	.20	
2	1/8" hitch pins @ $0.45 ea	.90	
1	½" steel rod	3.10	
2	¾" conduit clamps @ $0.15 ea	.30	
1	pint PVC cement	3.97	
2	7/8" protective rubber leg tips @ $0.45 ea	.90	
	TOTAL	$126.82	

The following is based on a cart that is 2' x 3':

BASE

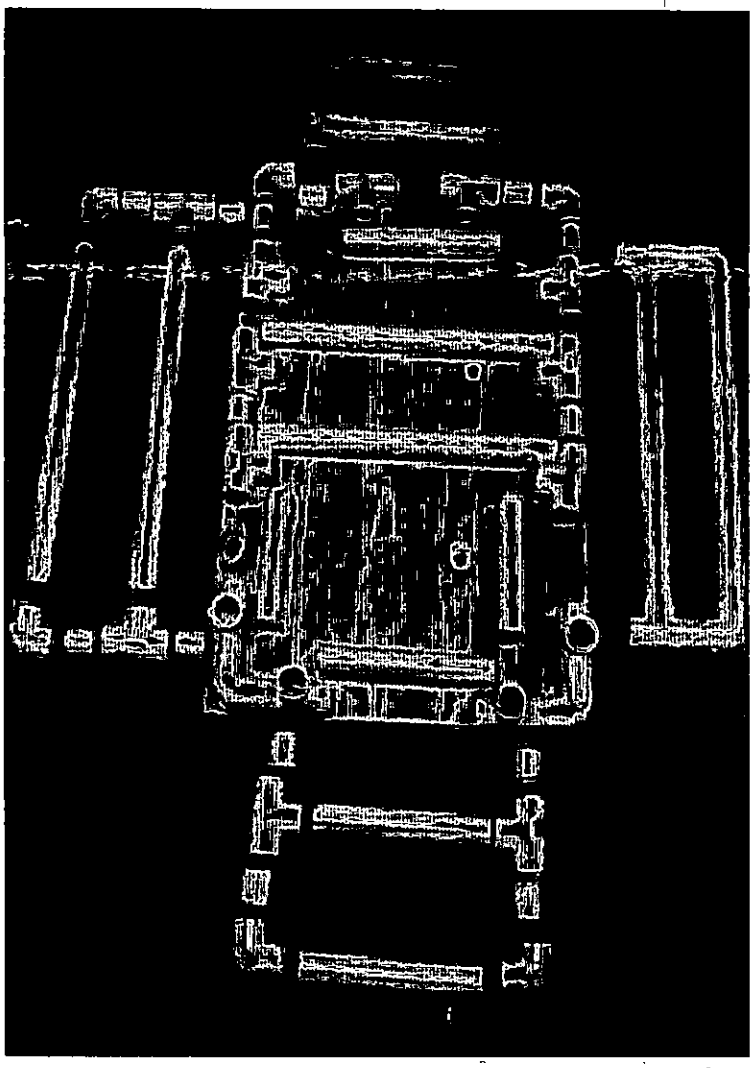
Cut 1' off the 2' x 4' board to equal 2' x 3'.

I used the board as a layout for the PVC.

Next cut the PVC into the following pieces:

- **6 x 10 ½"**
- **4 x 7 ¾"**
- **2 x 19"**
- **4 x 22 ½"**

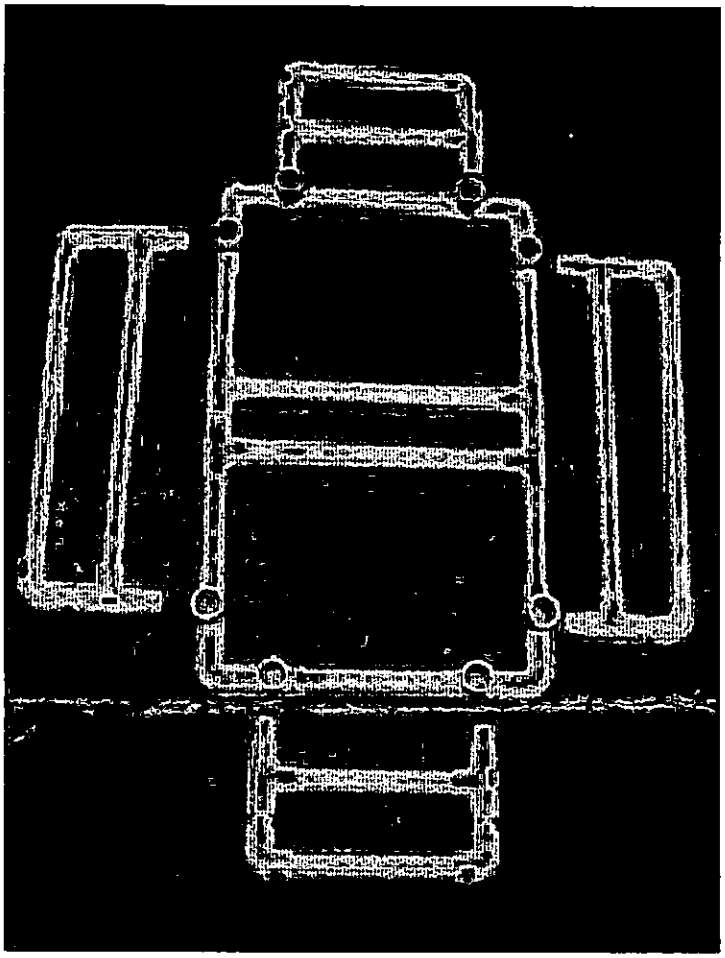
28 x 2" total 44 pieces



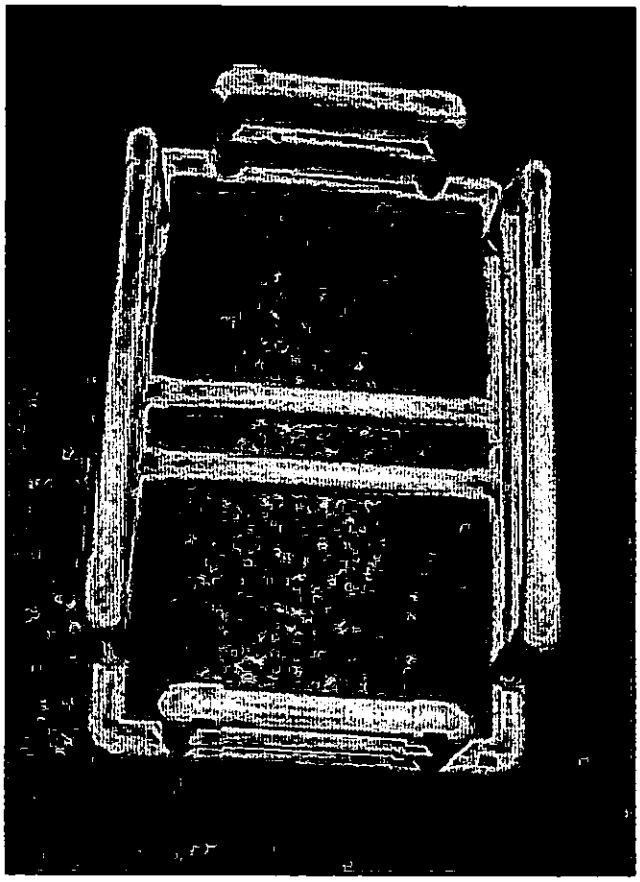
The above gives the approximate layout of the pieces.

BASE FRAME & RAILS

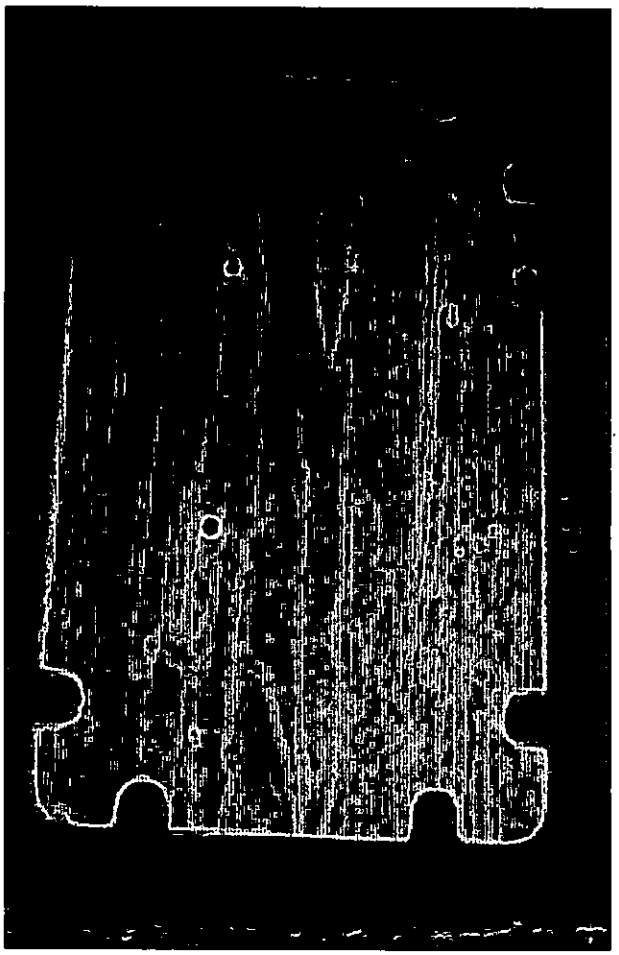
The next step is to "dry-fit" all the pieces as shown in the below photo.



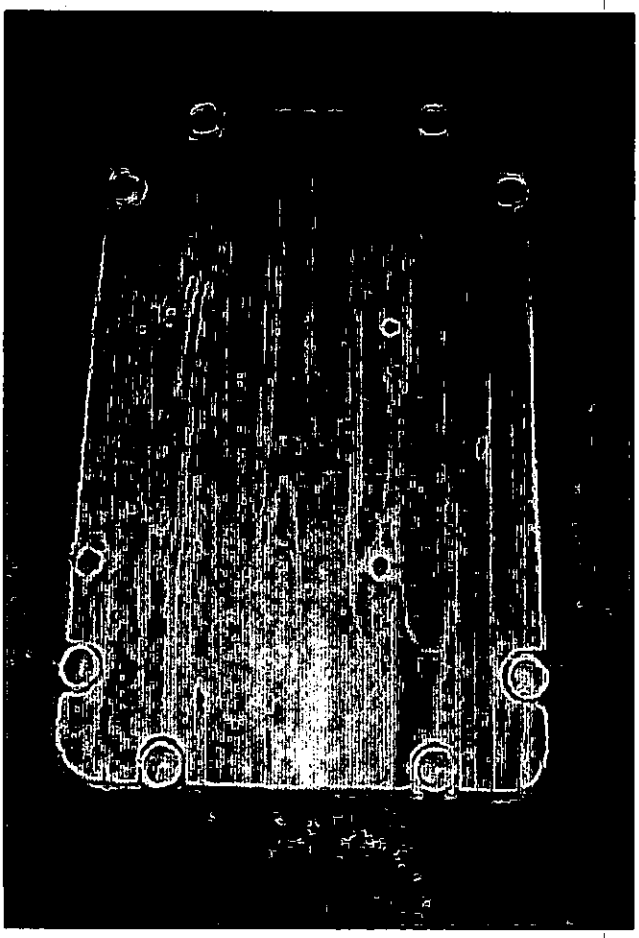
Then "dry-assemble" the entire frame and rails as shown below.



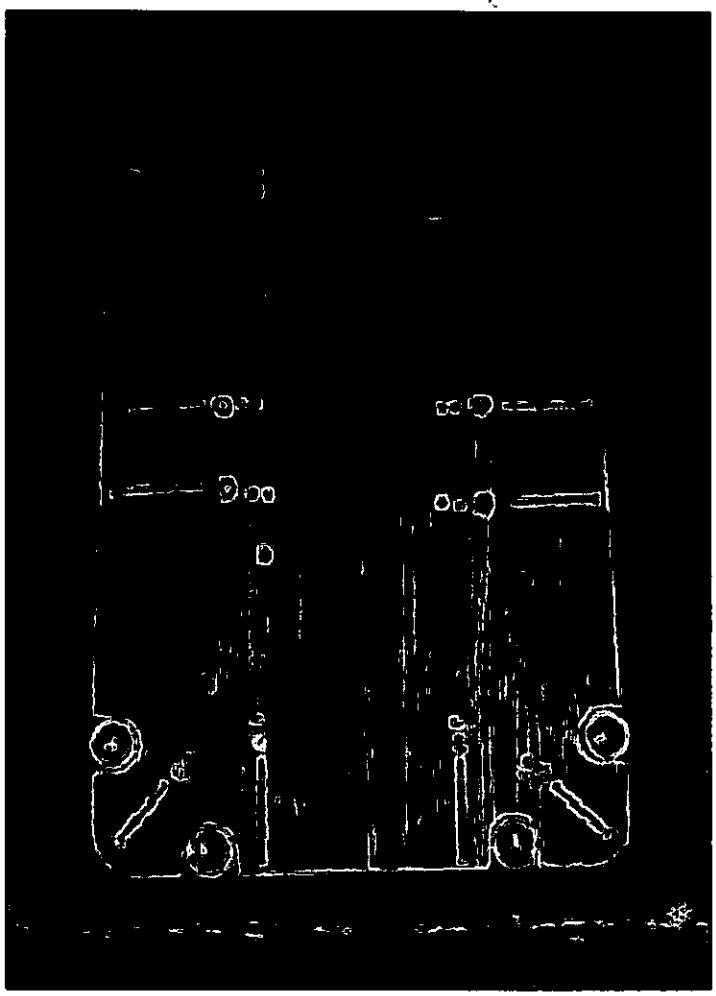
Using the base PVC frame cut the 2' x 3' board to accept the uprights.



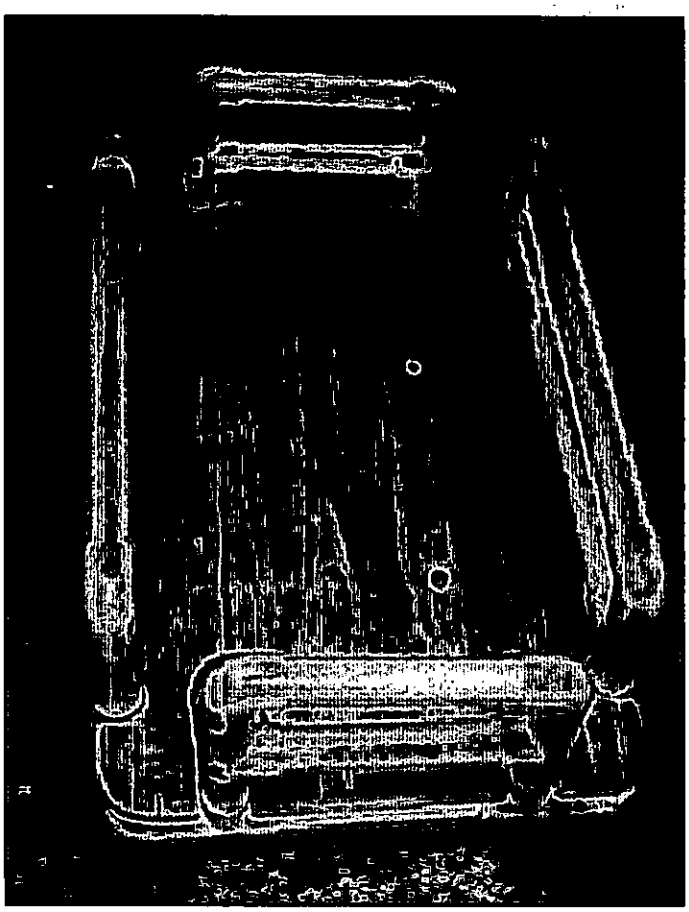
The cut wooden base then lays over the PVC base as shown below.



The below photo shows the approximate layout of the bolts. The 3" bolts are in each of the four corners to attach the wooden base to the PVC base. The 4 - 4" x ¼" x bolts with ¼" wide-flange washer, ¼" washer, ¼" lock washer and ¼" nut will attach the angle iron to the PVC base as well as the wooden base. The remaining 4 - ¼" x 20 x 4" will be used to attach the shafts to the PVC base.



"Dry-fit" all parts before gluing.

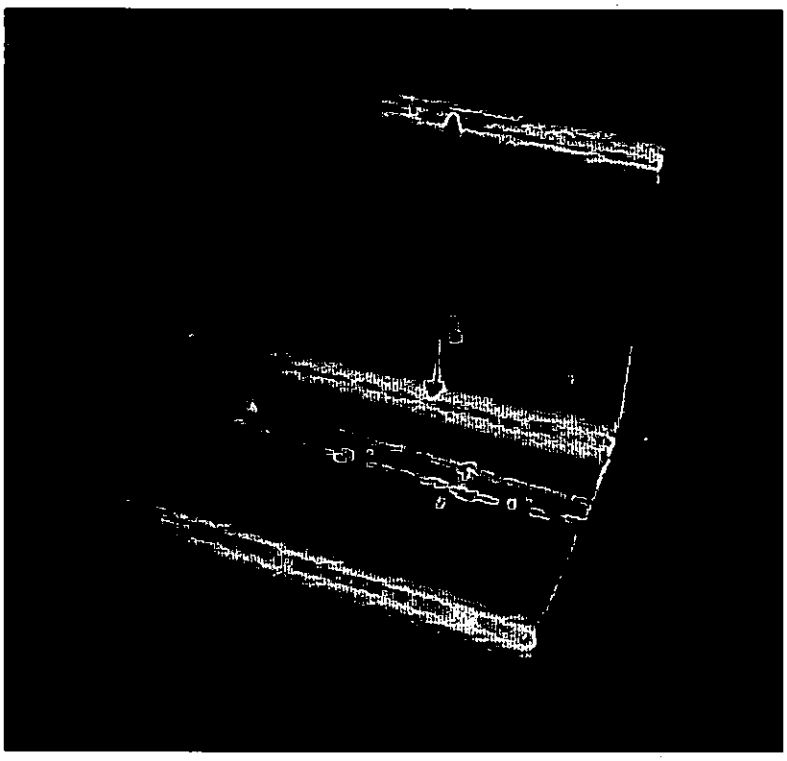


When gluing pieces together it is not necessary to apply glue to both surfaces as you are not concerned with water-tightness. Remember you only have about 10 seconds before glue sets up, so be sure all pieces are squared as you insert. I found it easiest if I applied the glue to the female

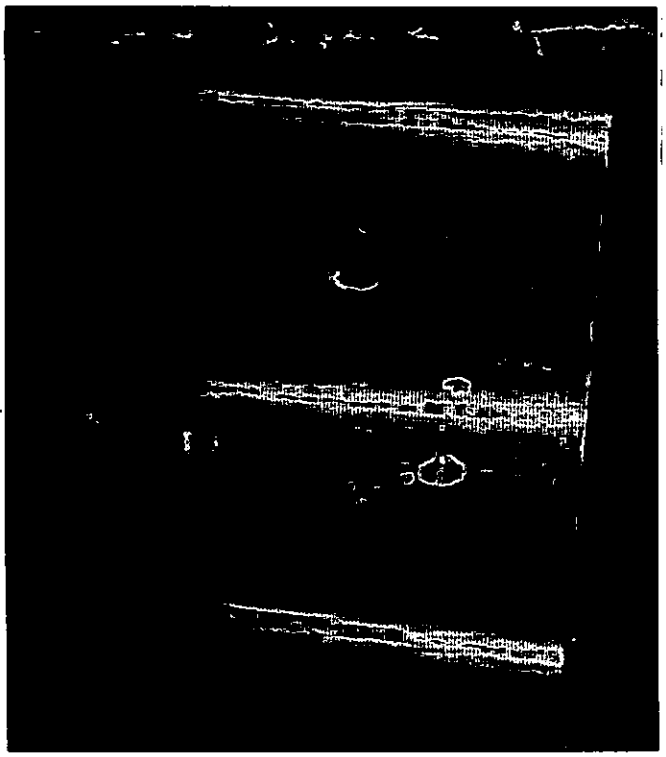
Piece and inserted the male. Also there was less mess. I used the 2' x 3' board as a square and to be sure all the pieces we seated properly, and a square block of wood to ensure all upright pieces were at 90 degrees to the wooden surface.

AXLE BARCKETS

Next measure the angle iron brackets to accommodate axle as below. I am using 2 ½" x 4" aluminum angle iron pieces. The hole for the axle should be centered, i.e. 1-1/8" from the edge of the flange and 2" from the side. Holes for the ¼" bolts that attach the flange to the base are to be located 1" from either side and about 1 ¼" from the flange edge, i.e. centered over the PVC.



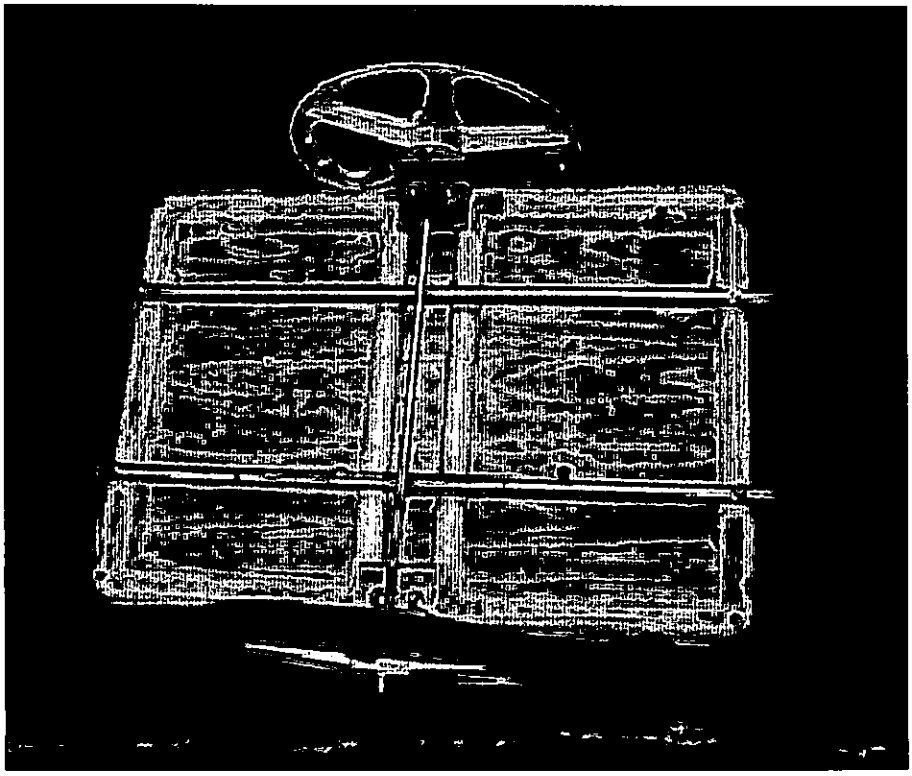
Drill a hole slightly larger than ½" to accept axle, and slightly larger than ¼" to accept the 4" bracket bolts as shown below.



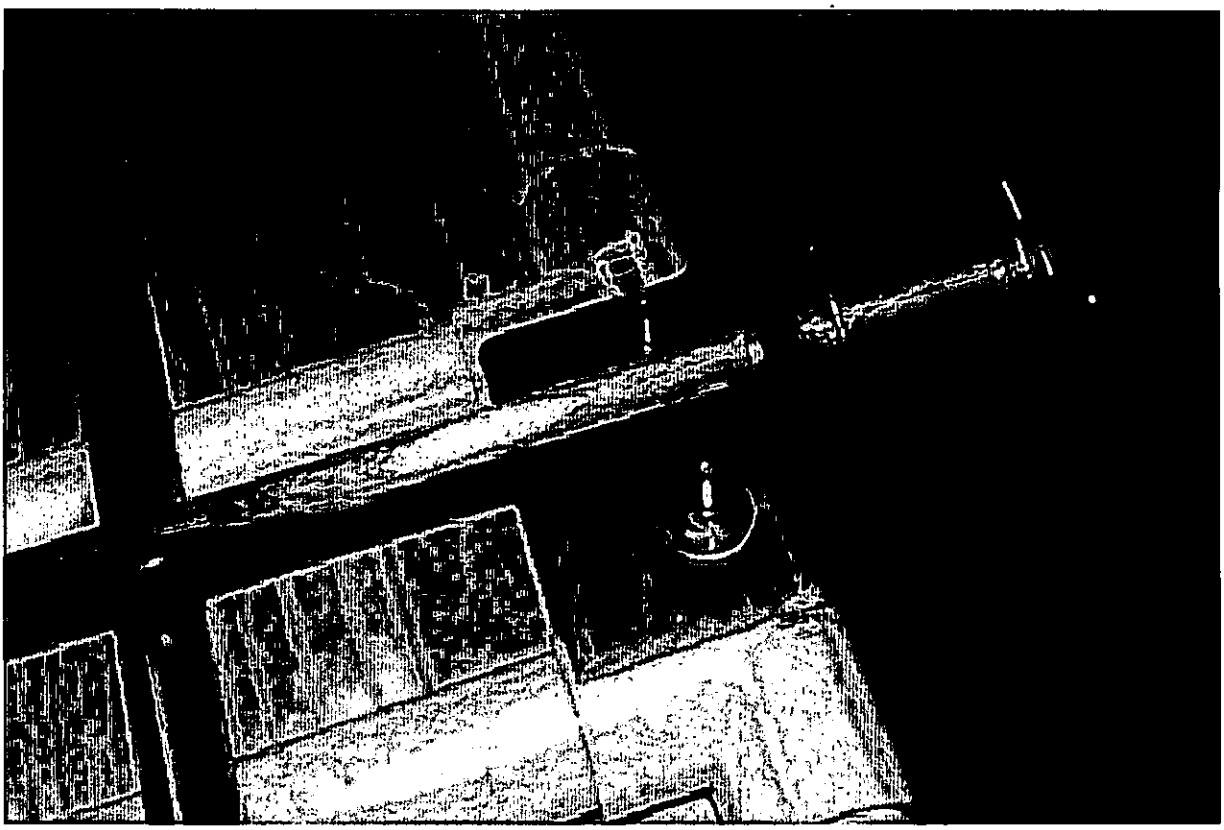
ATTACH BASE

Drill holes through wooden board and PVC. One in each corner, two for each axle bracket, four for the shafts (I was able to space the shaft bolts about 11" apart)

The under-carriage is shown below.



A close up of axle bracket and washer/hitch pin assembly is shown below.



AXLE

Next measure axle for fit. I used one ½" wide-flanged washer on either side of wheel hub, allowed for about 1/16" space between washer and hitch pin, and drilled 1/8" hole for the pin.

SHAFTS

The next step is to bend the conduit for the shafts. This is where a friendly electrician comes in handy. You will need to know how far the shafts need to rise from the underside of the cart assembly to the mid-point on your dog's shoulder. In the case with my Swissy this rise needed to be about

10-11". As the length of the cart was 36" I started the first bend at 37". Bending the pipe a full 90 degrees. I then measured along the bend from the 37" mark, 15 ½" and did a reverse bend. The conduit will tend to straighten out with this 2nd bend but the finished product will look fine.

SINGLETREE

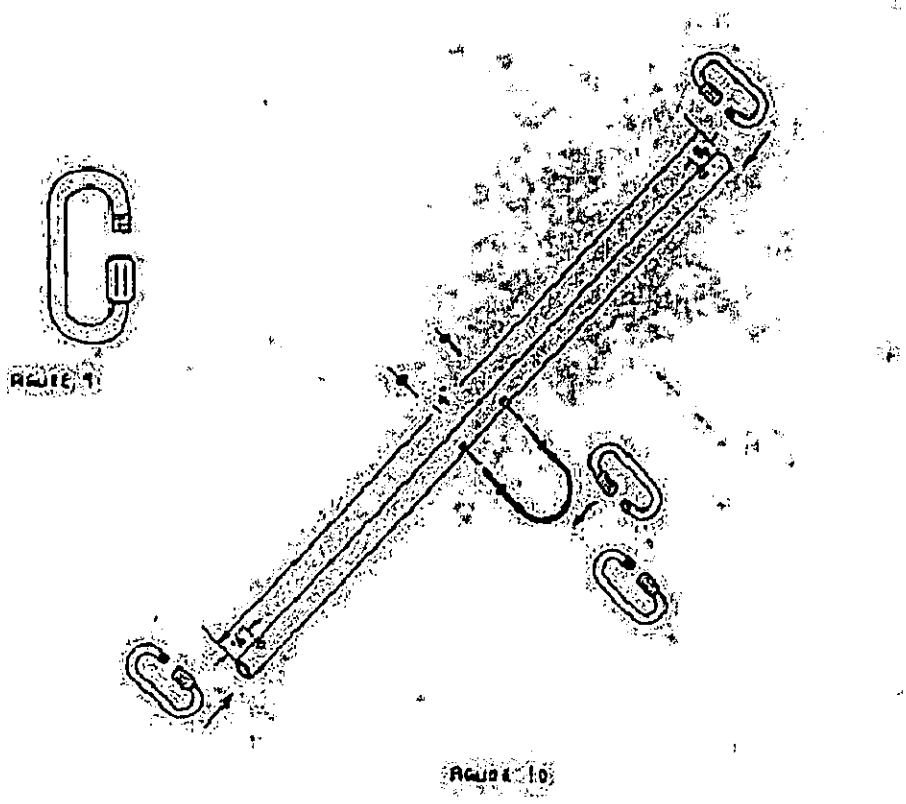
I do not use a singletree as I have found that there is more control of the cart if the traces

are attached directly to the base. Therefore I drill two ¼" holes through the PVC just to the outside of the shaft bolts and insert ¼" x 3" eyebolts into each hole, with washers on both sides of PVC.

If you are interested in constructing a singletree, use a piece of the left over conduit. It should be longer than the opening between the shafts is wide. As these shafts are about 11" apart and singletree of 13-14" would suffice.

Drill ¼" holes 5/8" from either end but only through one wall of conduit. Drill two more holes 1 5/8" on center this time entirely through the conduit to accept a 2" "U" bolt. Attach the "U" bolt by first a-fixing a nut to the end of the threading, attach with 2 - ¼" lock washers and 2 - ¼" nuts. Through the ¼" holes at each end insert a 2" connecting link. The singletree can be attached to a "single" ¼" x 3" eyebolt that has been a-fixed in the center of the PVC, between the shafts.

A sketch of a singletree is below.

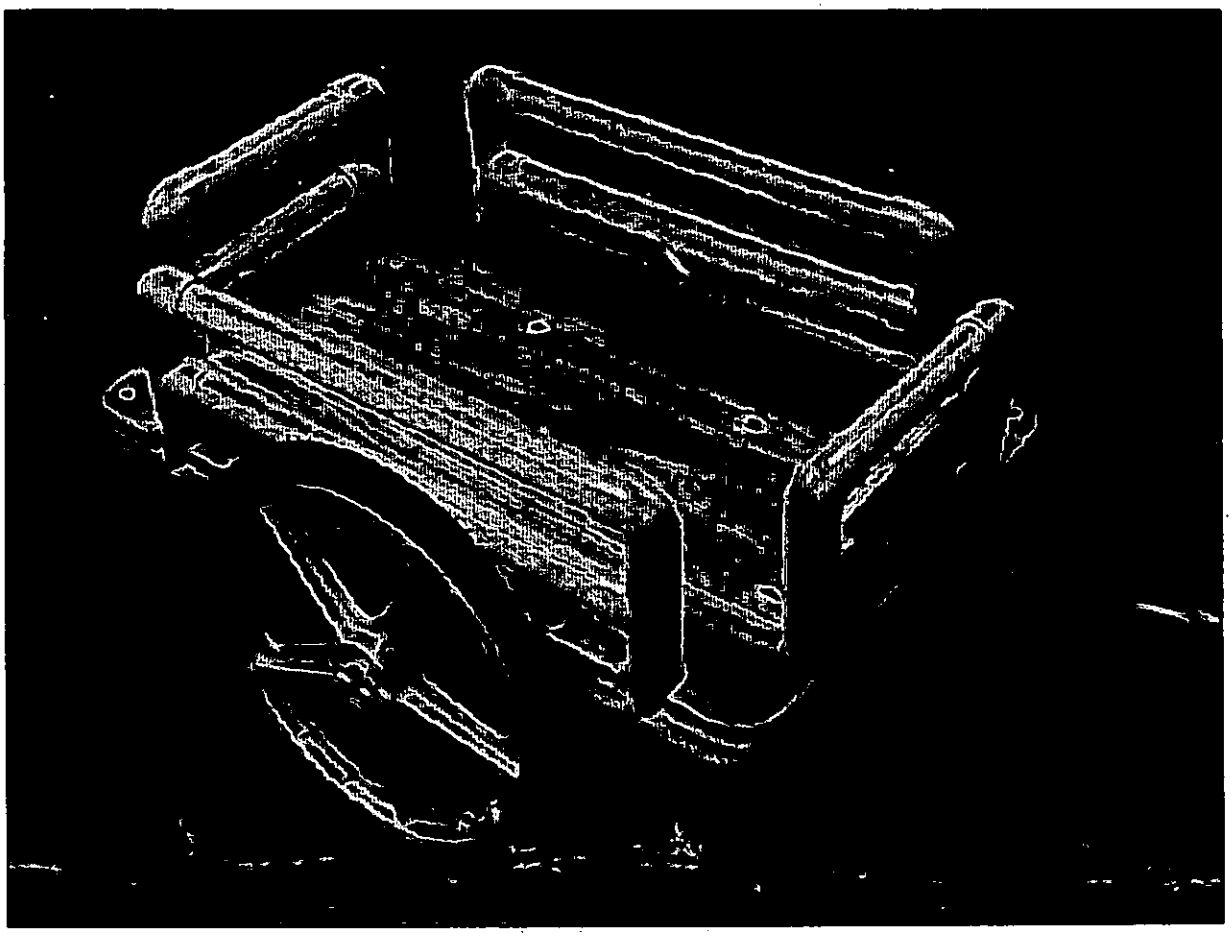


SHAFT STOPS/BRAKES

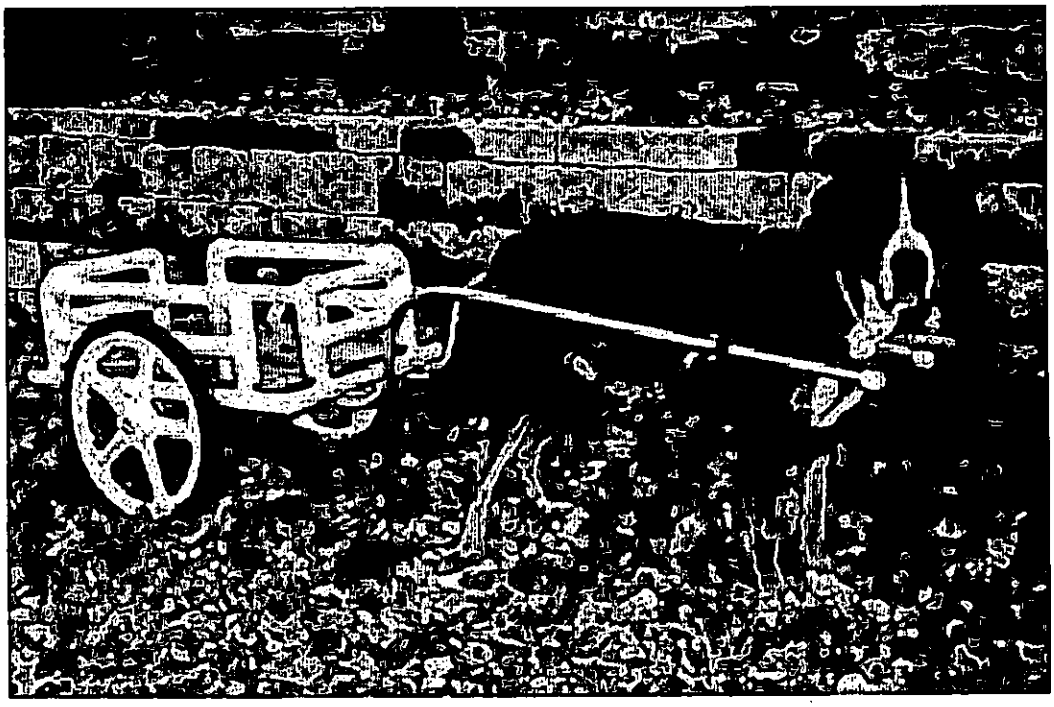
These can be anything that can be anchored to the ¾" conduit to prevent the harness from slipping and the cart from riding up onto the dog. With this cart I used conduit hangers that could be positioned and then tighten in place.

THE COMPLETED CART

The completed cart is shown below, note the double-bent conduit shafts.



IKE MODELING HIS NEW CART



GOOD LUCK AND HAPPY CARTING

Cliff Dahl