

# ORANGE CRATE DERBY CAR CONSTRUCTION

## LUMBER

Figure SK-1 shows the basic lumber required to build a car. It consists of two 8 foot long 2 x 2s, two 8 foot 2 x 4s, one 8 foot 2 x 8, and one 4 foot by 8 foot sheet of  $\frac{3}{4}$  inch plywood.

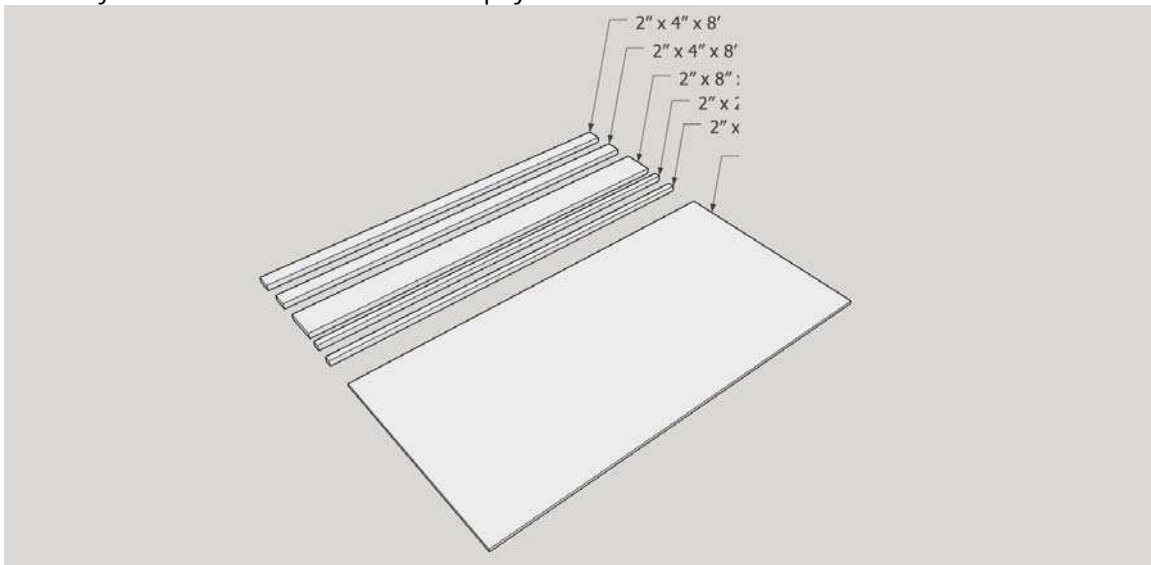


Fig. SK-1

## CONSTRUCTION

These instructions will describe 9 areas that make up a complete car.

1. Frame (or chassis)
2. Steering frame
3. Brakes
4. Steering wheel

5. Axles
6. Steering system
7. Wheels
8. Crate
9. Seat, side panels and bumper

## FRAME

Figures SK-2 and SK-3 show the recommended cutting of the sheet of plywood

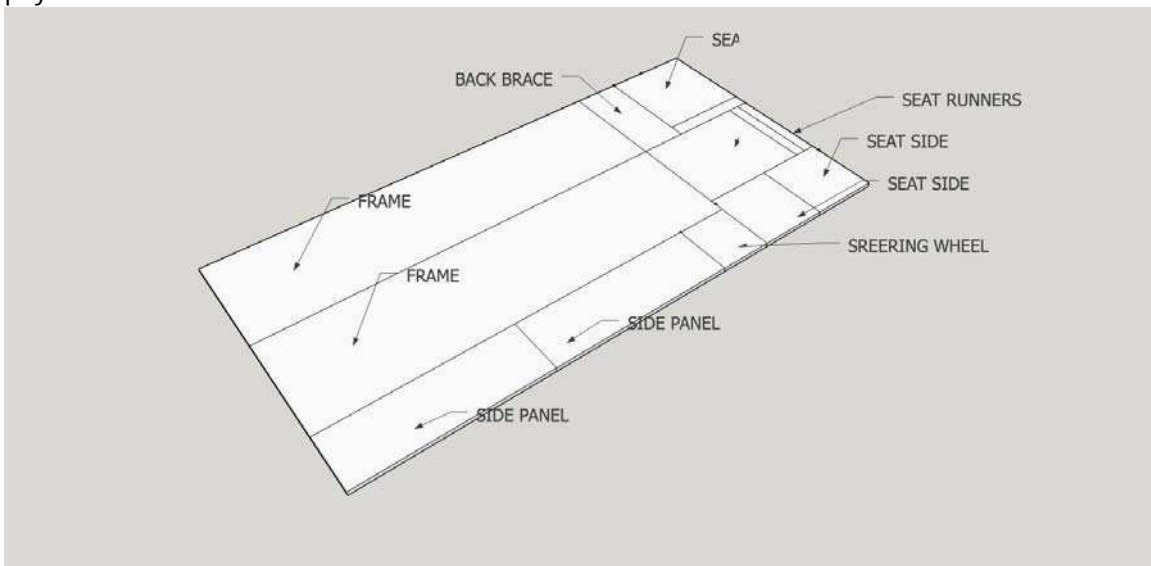


Fig. SK-2

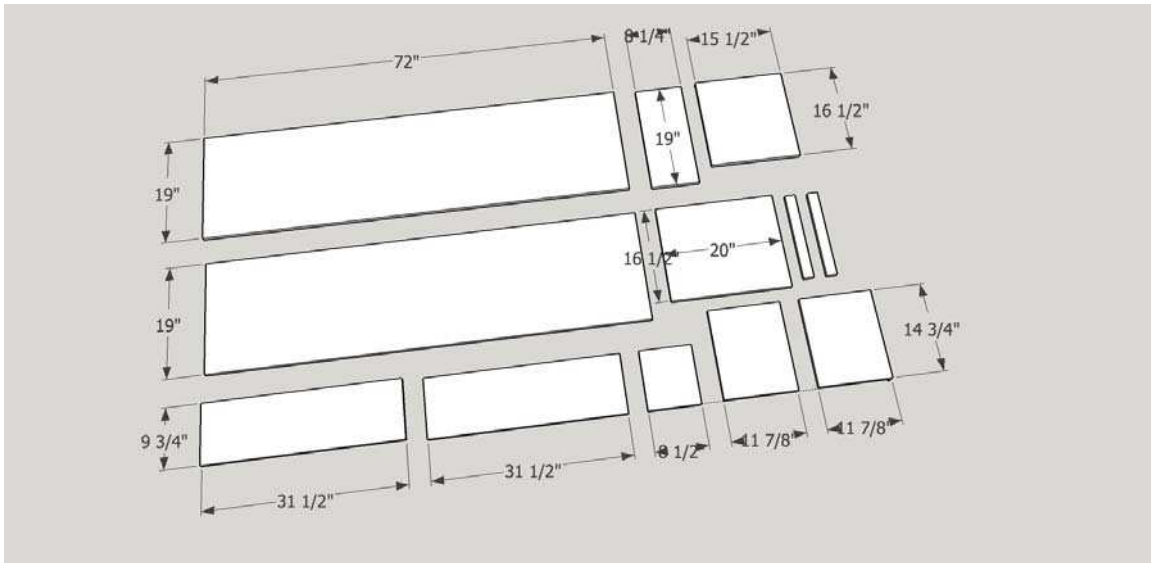


Fig. SK-3

The two pieces marked as "frame" are glued and wood screwed together as shown in figures SK-4 and SK-5. This results in a frame 72" long, 19" wide, and 1 1/2" thick. TITEBOND III Glue should be used.

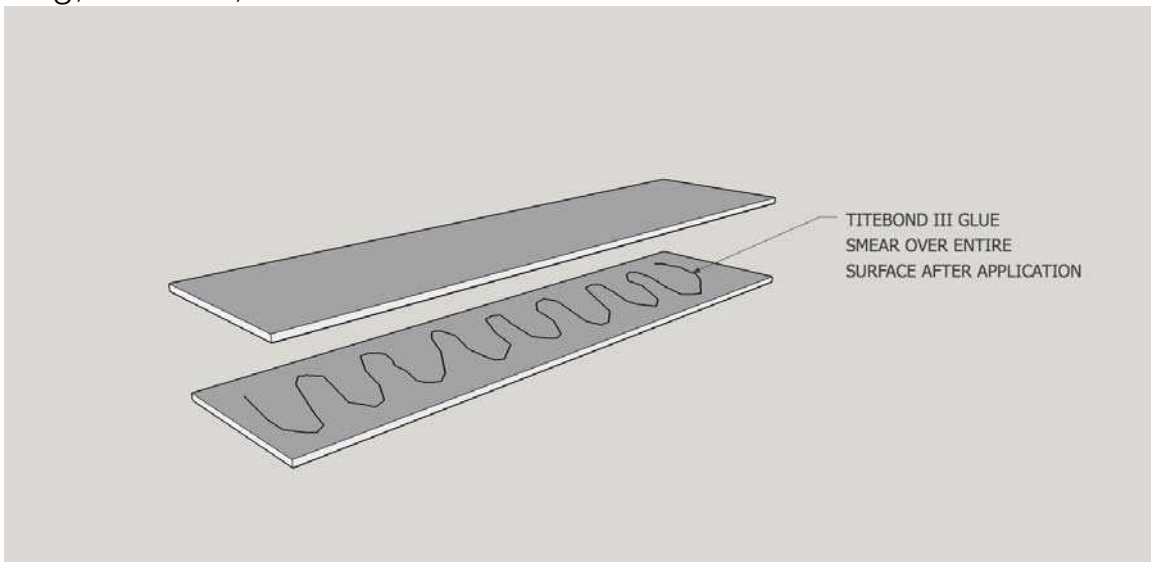


Fig. SK-4

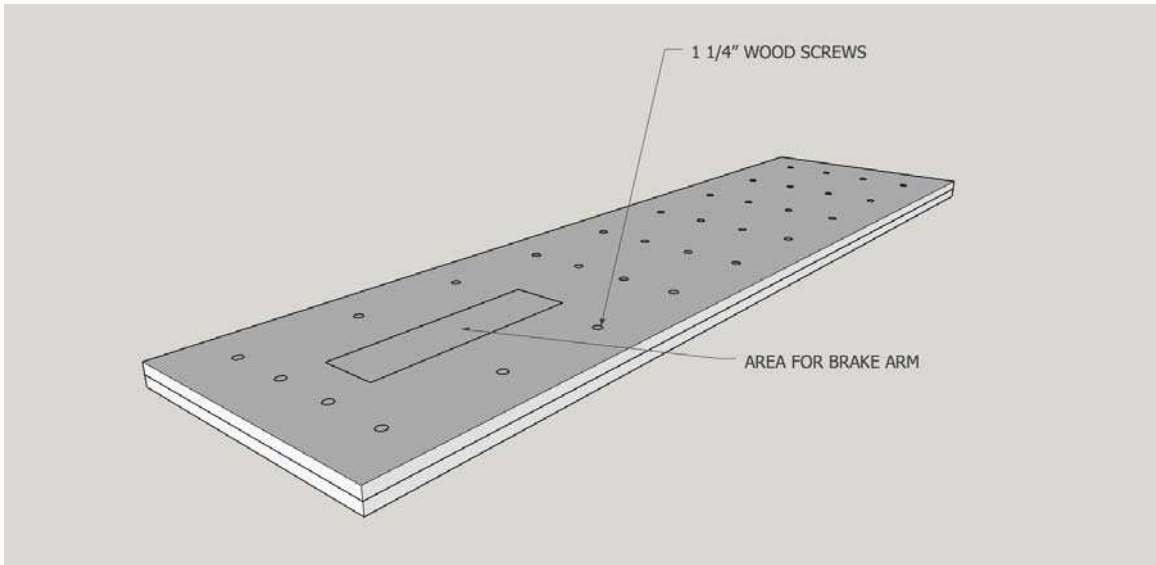


Fig. SK- 5

After fastening the two pieces of plywood together, cut and drill openings as shown in figure 6. In the previous step make sure no wood screws are placed where cuts or holes are made.

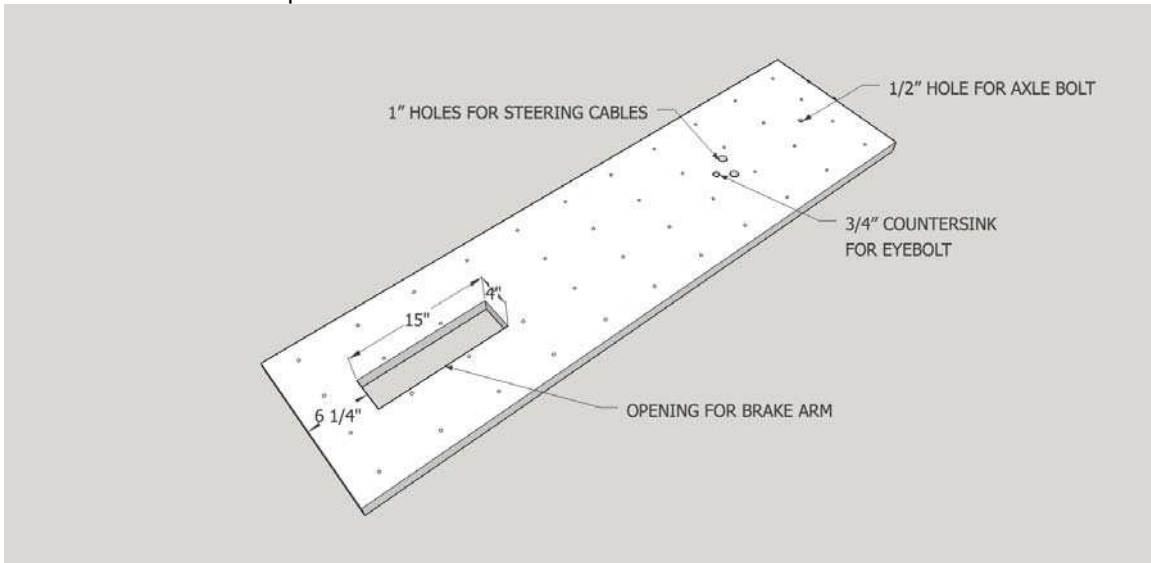


Fig. SK-6

## STEERING FRAME

The steering frame is made of 2 x 4s as shown in figures SK-7 and SK-8. This frame will hold the steering wheel assembly.

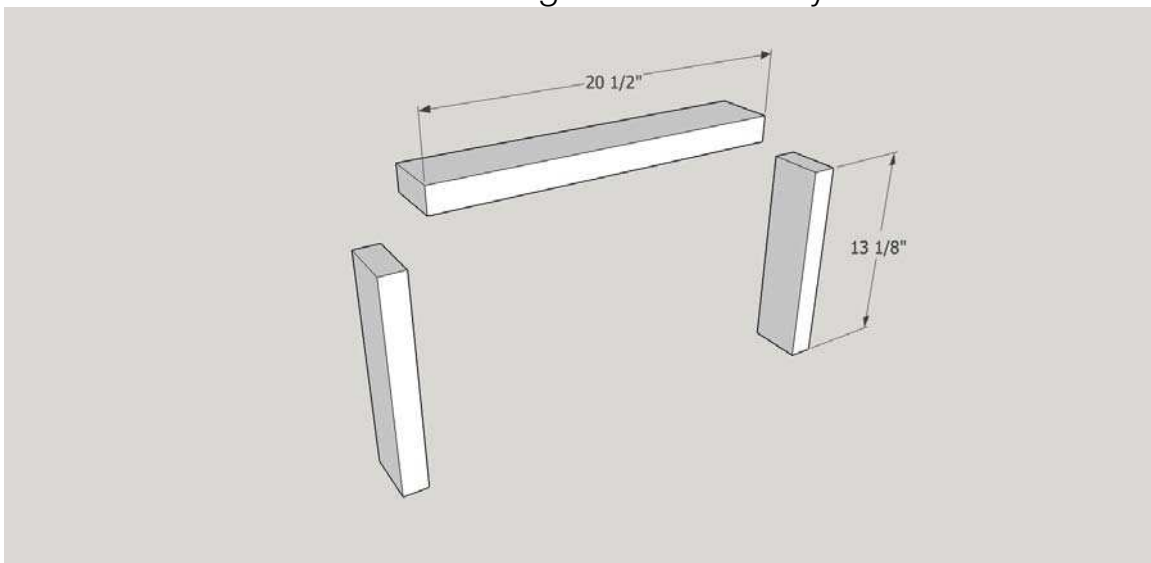


Fig. SK-7,

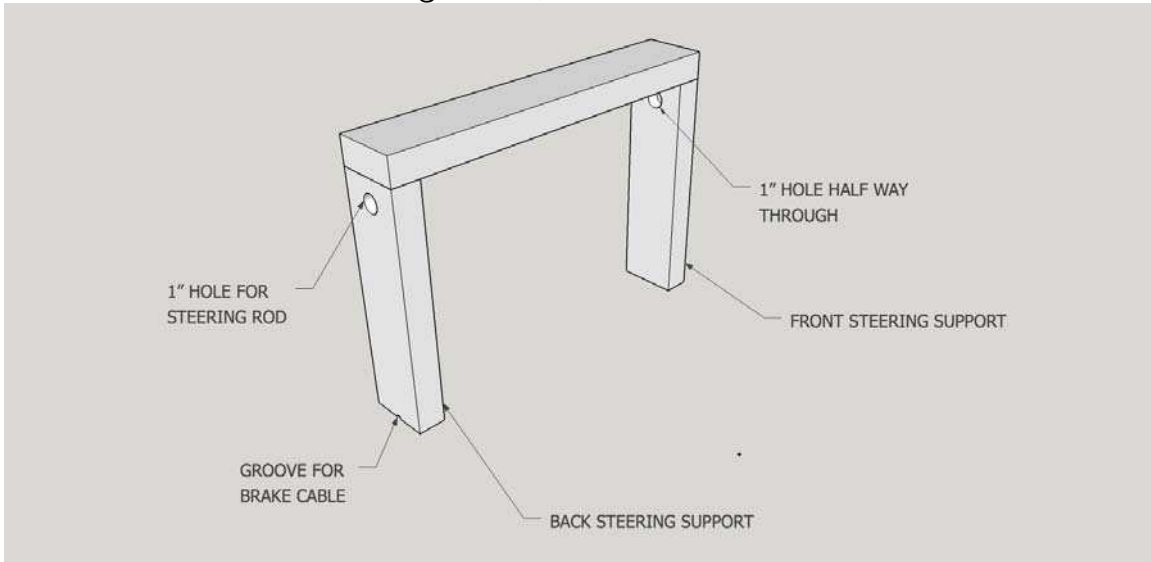


Fig. SK-8

When the steering frame is complete, mount it to the frame as shown in figure SK-9. It should be held in place with wood screws from the underside of the frame.

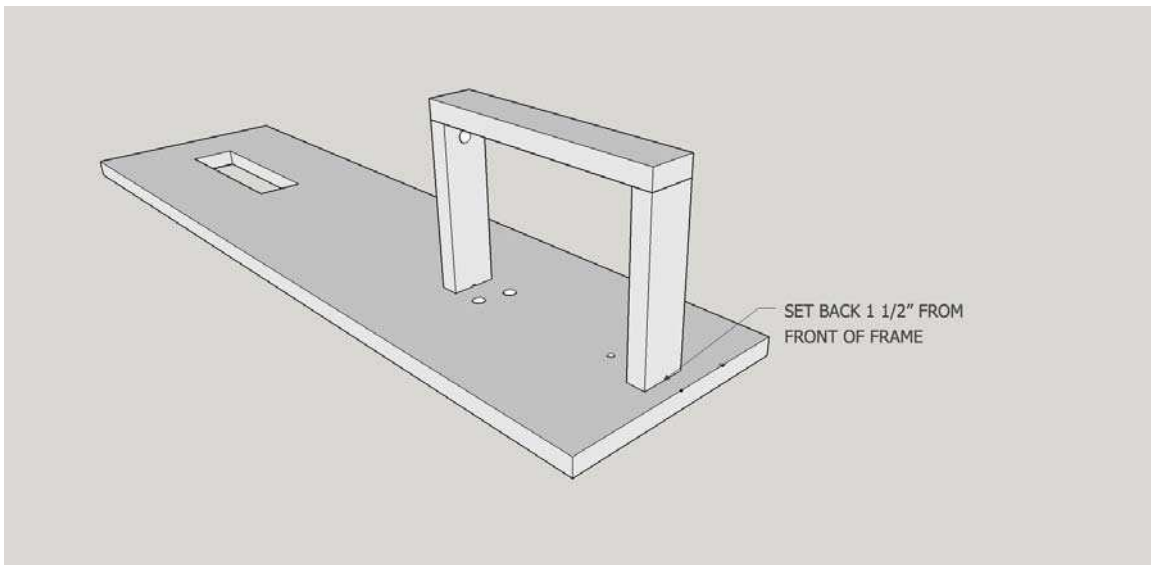


Fig. SK-9

## BRAKES

The brakes consist of three components, the housing, the arm and linkage assembly, and the pedal. The housing is made up of two supports and a top piece, as shown in figure SK-10. Note that the front support has a pulley and an eyebolt installed.

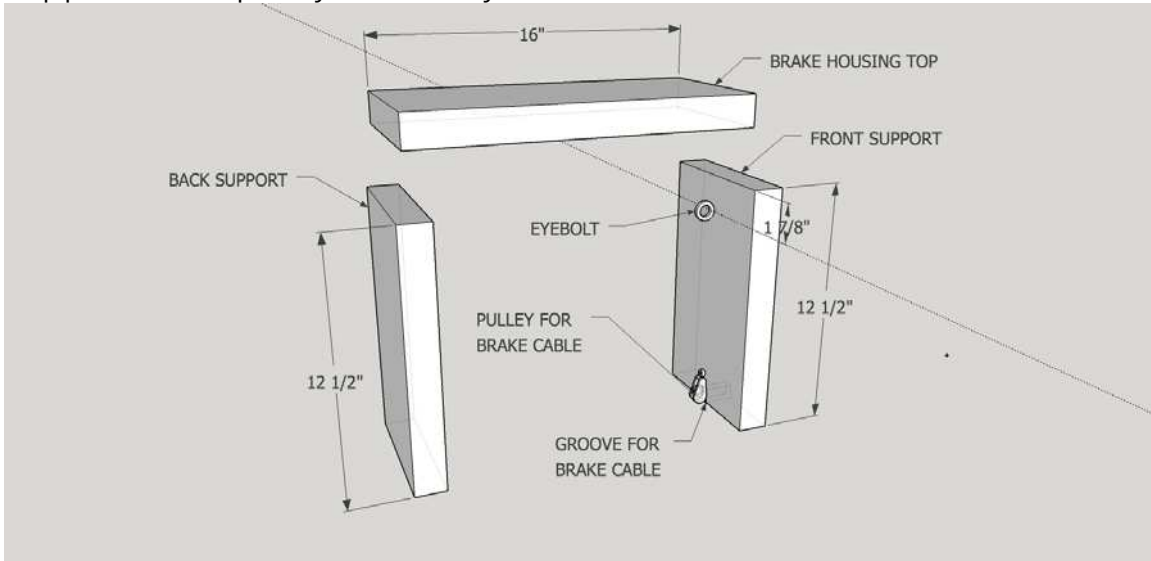


Fig. SK-10

Install the two housing supports to the frame with wood screws from underneath the frame as shown in figure SK-11.

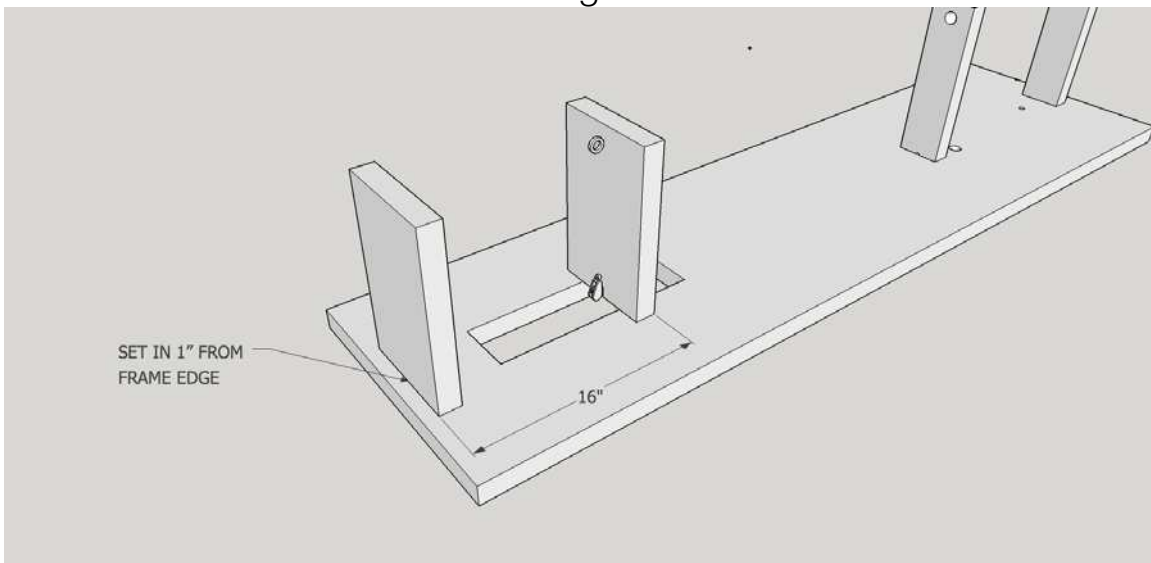


Fig. SK-11

The arm and linkage assembly is made from 2 x 4 material as shown in figure SK-12.

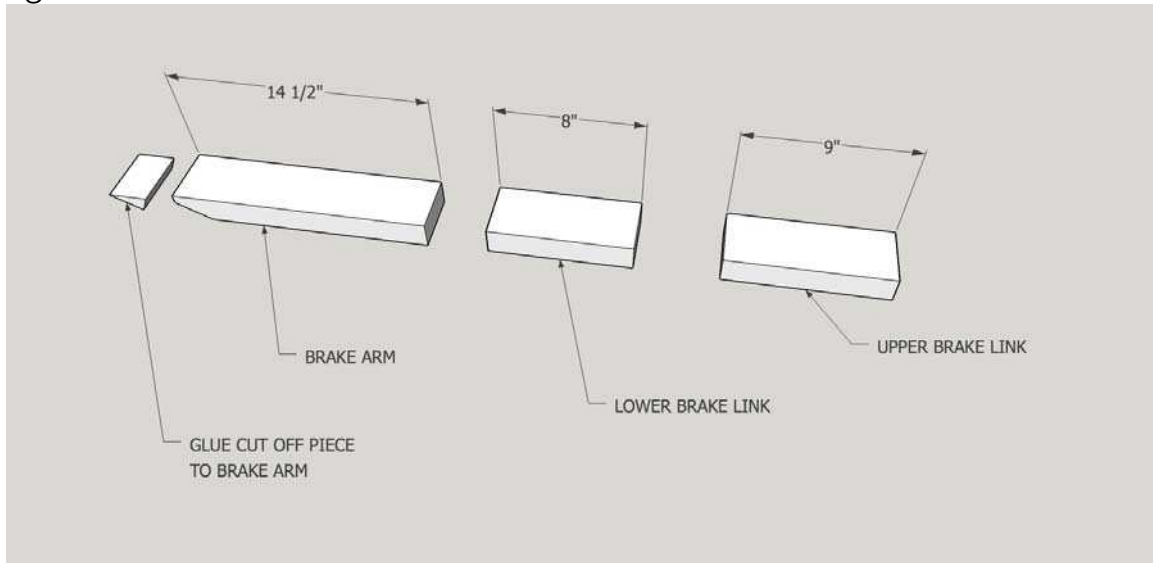


Fig. SK-12

The arm and linkage assembly goes together as shown in figure SK-13, and is then fastened to the housing top as shown in figure SK-14.

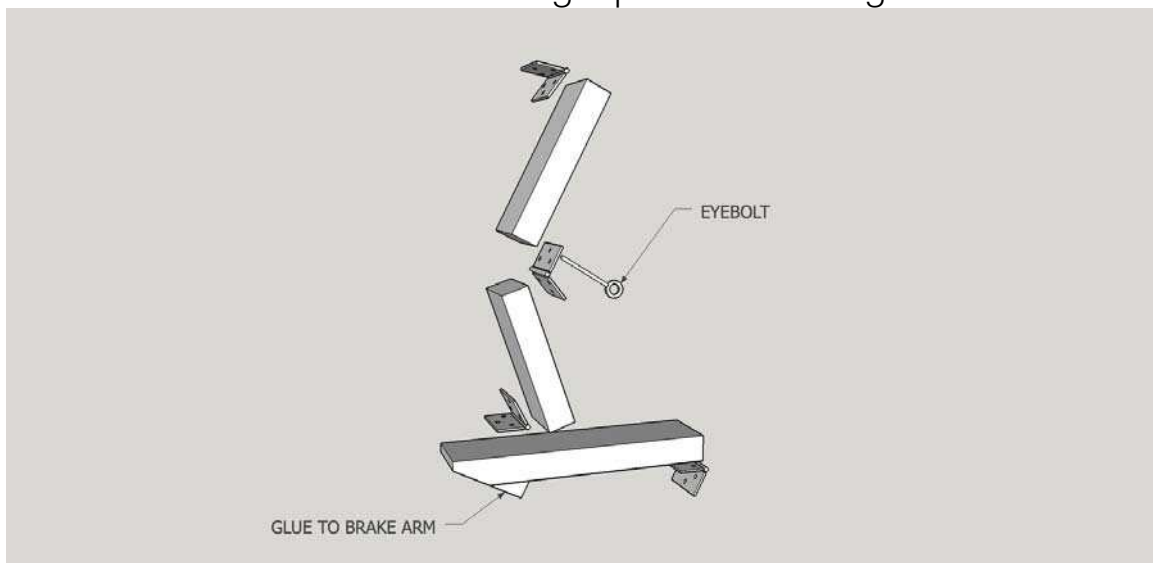


Fig. SK-13,



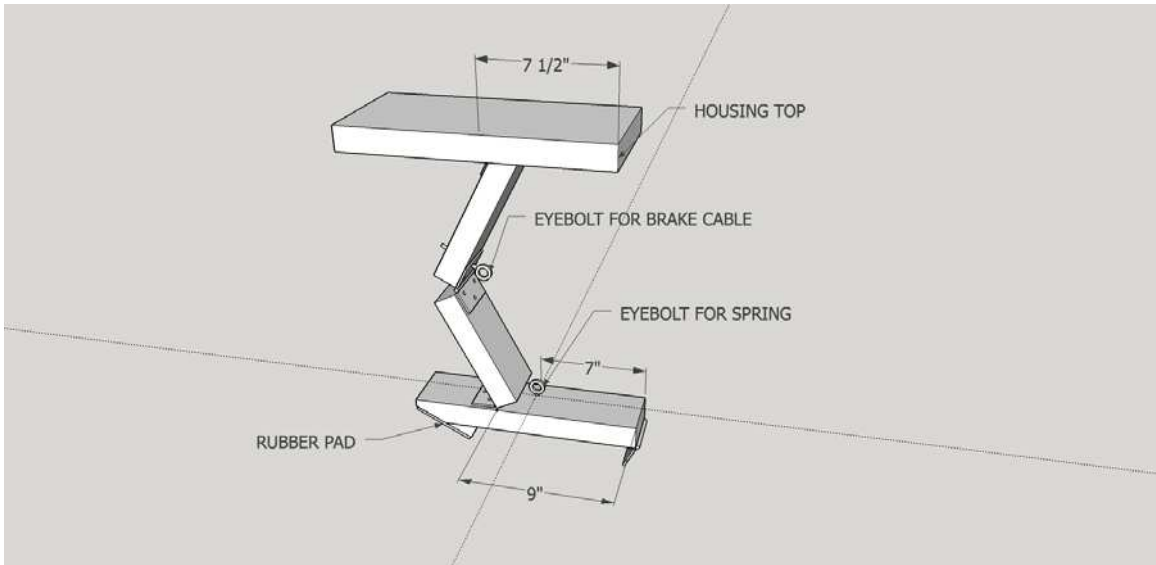


Fig. SK-14

The brake pedal is made from a piece of plywood and a piece of 2 x 4 with an eyebolt near the top. See figure SK-15.

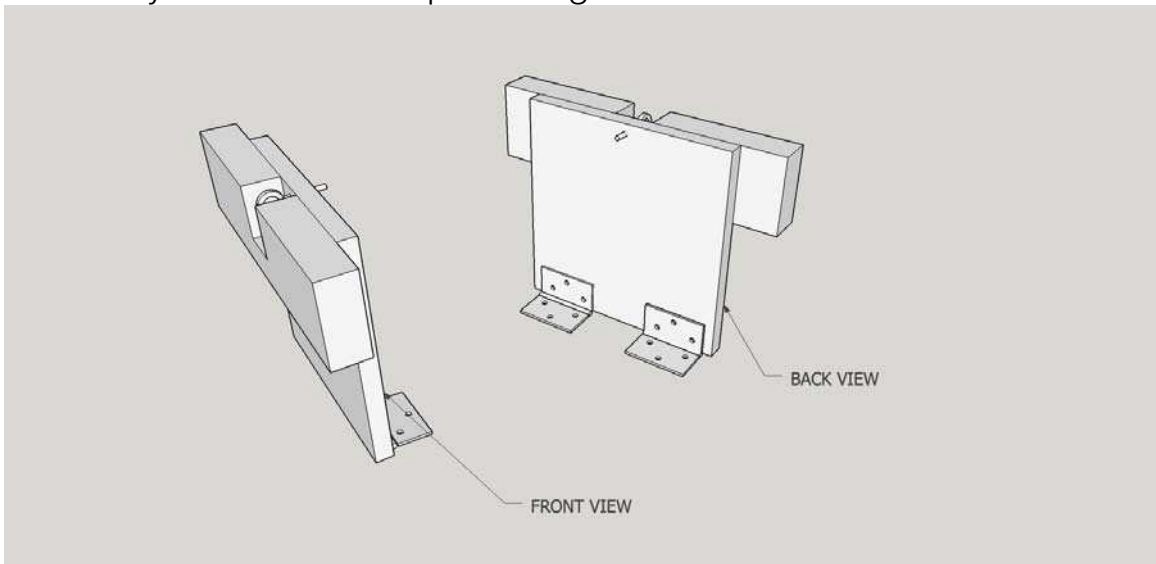


Fig. SK-15

The arm, linkage, and housing top assembly is placed so that the arm goes through the opening in the frame, and the top is fastened to the supports with lag bolts. The pedal is attached to the frame under the steering frame with the two hinges as shown in figure SK-16

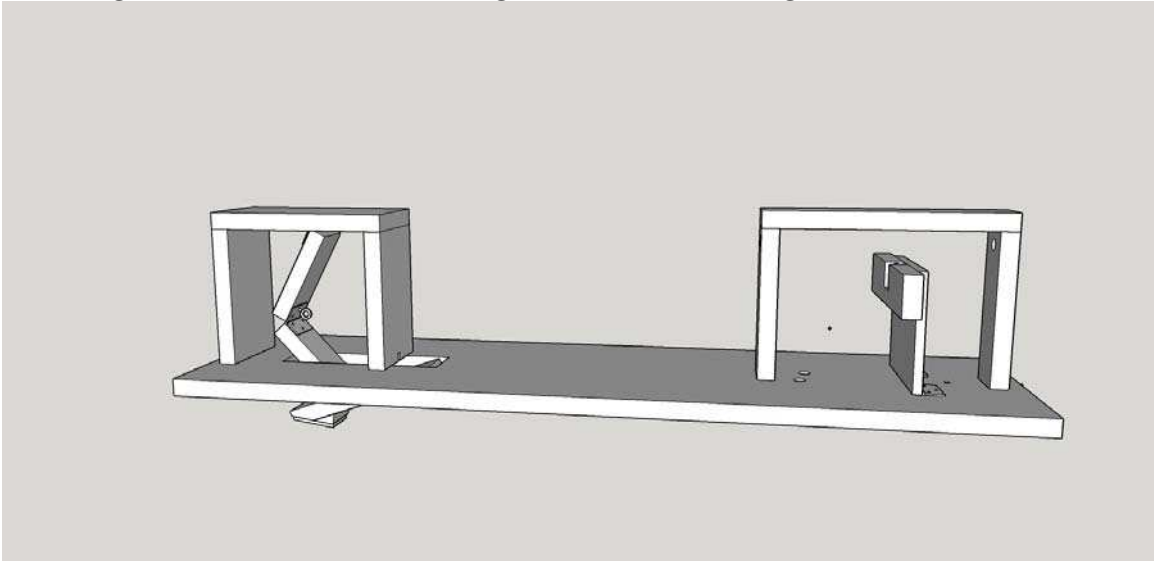


Fig. SK-16

## STEERING WHEEL

The steering wheel is made from plywood cut in a circle. A 2 x 4 block with a 1" hole through is fastened to the back of the wheel, as shown in figure SK-17.

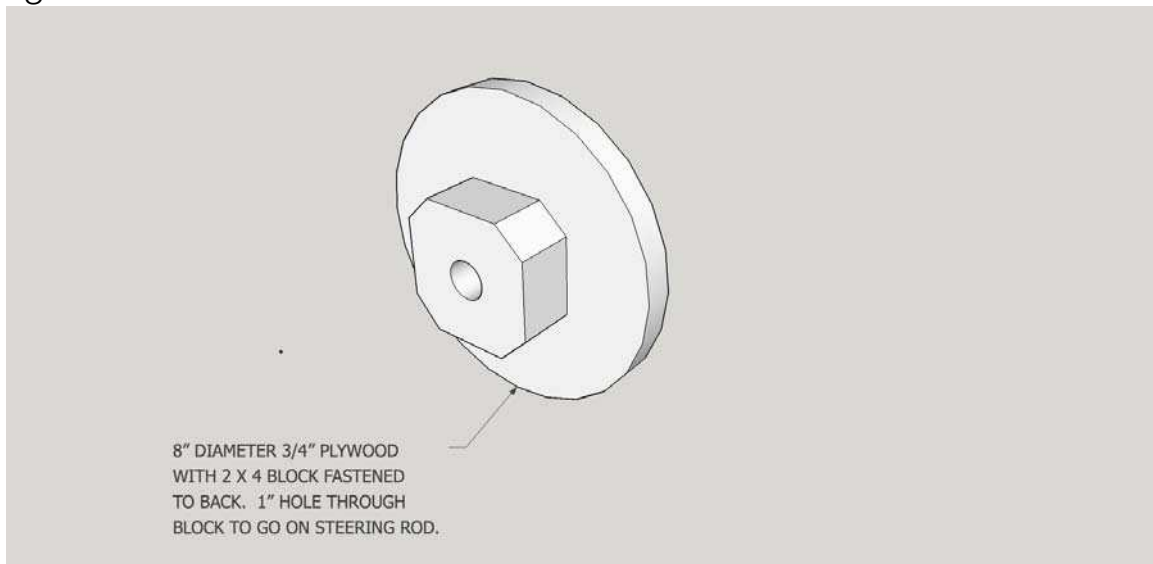


Fig. SK-17

The steering rod, a 1" diameter wood dowel, is fastened to the wheel through the block, and installed in the steering frame as shown in figure SK-18.

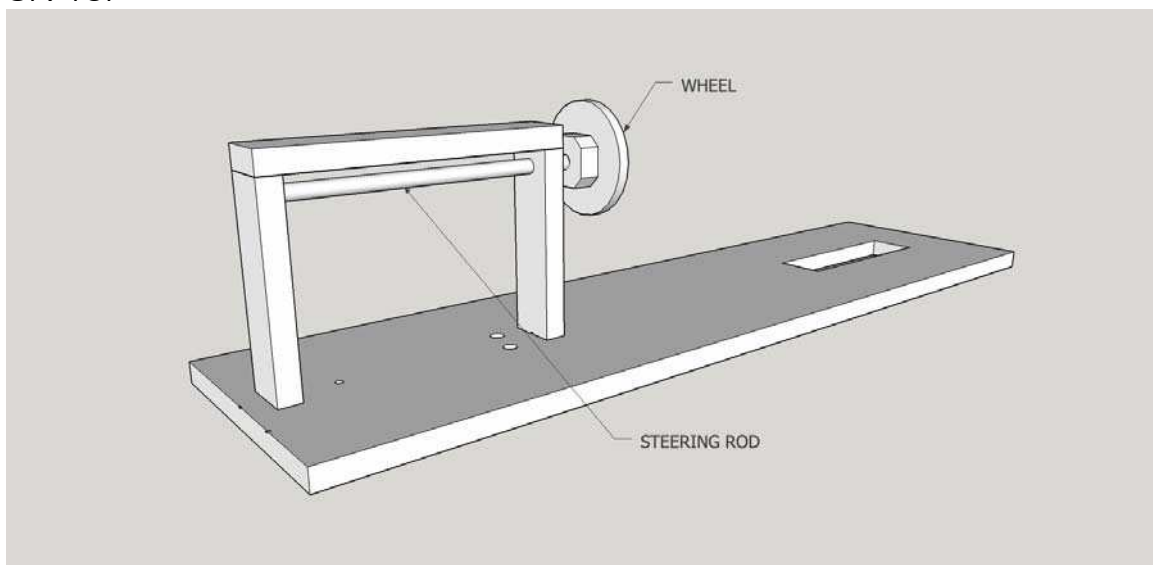


Fig. SK-18

## AXLES

The axles are made from 2 x 4s with a  $\frac{1}{2}$ " threaded steel rod attached in a groove cut in the bottom of the 2 x 4s. The threaded rod is held in place by mending plates, and prevented from turning by one or more wood screws placed between the rod and the edge of the groove. The front axle has a  $\frac{1}{2}$ " drilled in its center for the axle bolt. It also has two  $\frac{1}{4}$ " holes drilled at the ends for eyebolts. See figures SK-19 and SK-20

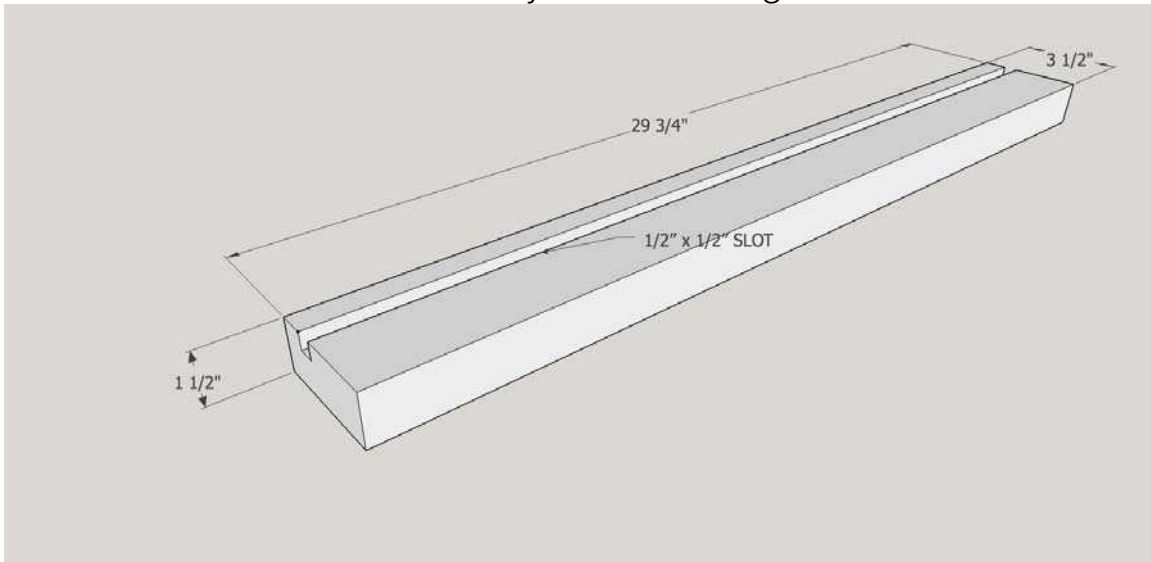


Fig. SK-19,

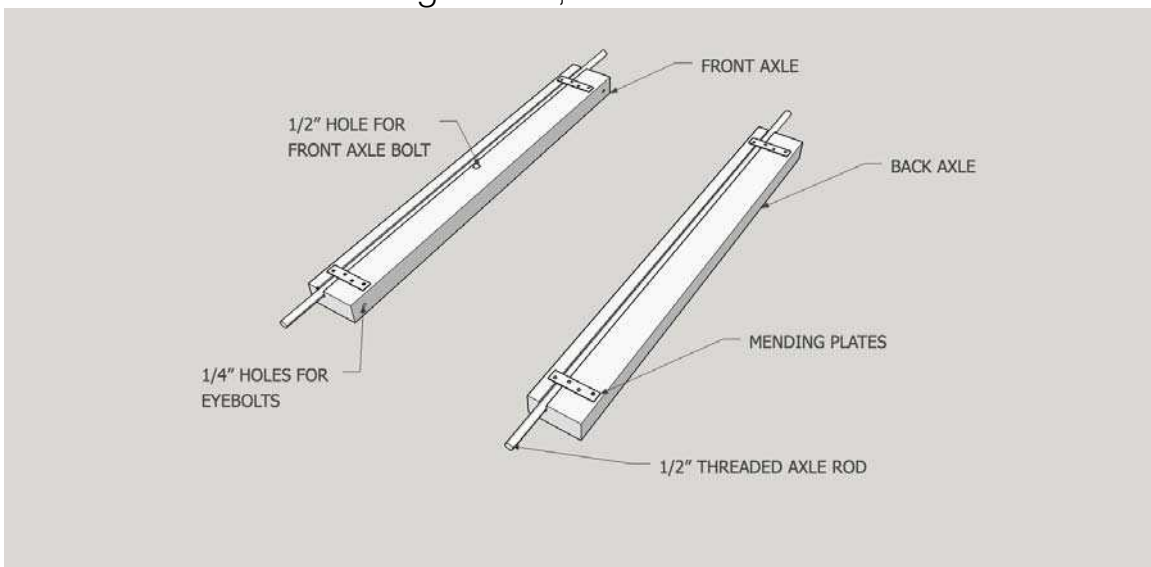


Fig. SK-20

The axles are installed to the frame as shown in figure 21. The back axle is bolted in place with 1/2" bolts, and the front axle pivots on the axle bolt as shown in detail A.

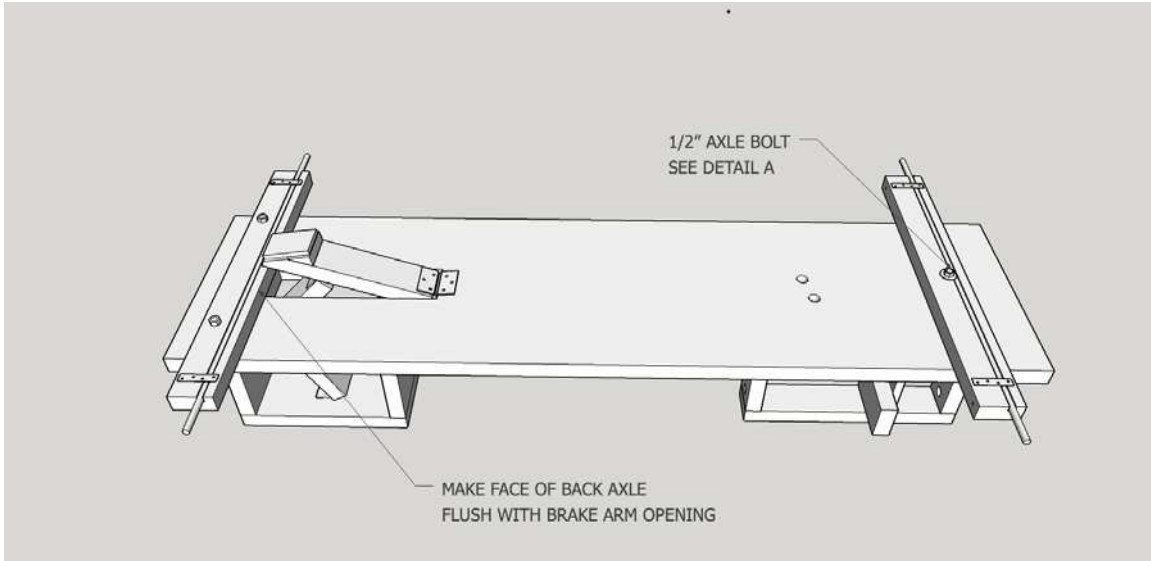
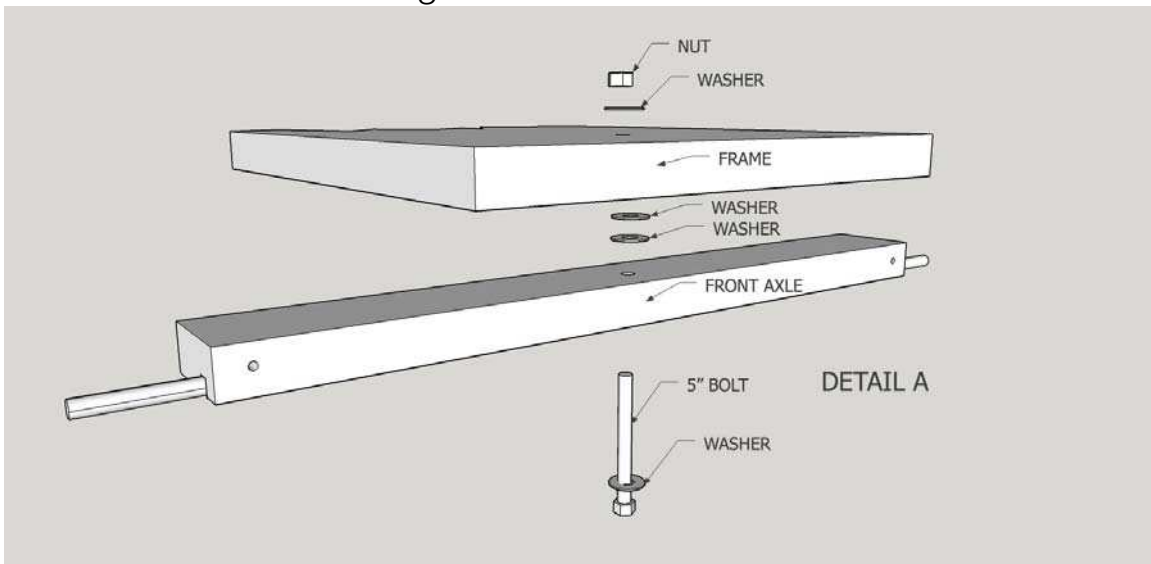


Fig. SK-21



Detail A

## STEERING SYSTEM

The steering system consists of the steering wheel and rod, steering cable, pulleys, turnbuckles, eyebolts, and front axle. These are shown in figures SK-22 and SK-23. A 1/8" hole is drilled through the steering rod for the steering cable. The cable is then wrapped three turns in each direction, as shown in detail B. Each end of the cable then crossed under the steering rod, passing through the 1" holes in the frame, the pulleys, to the turnbuckles, which are attached to the eyebolts at the ends of the front axle.

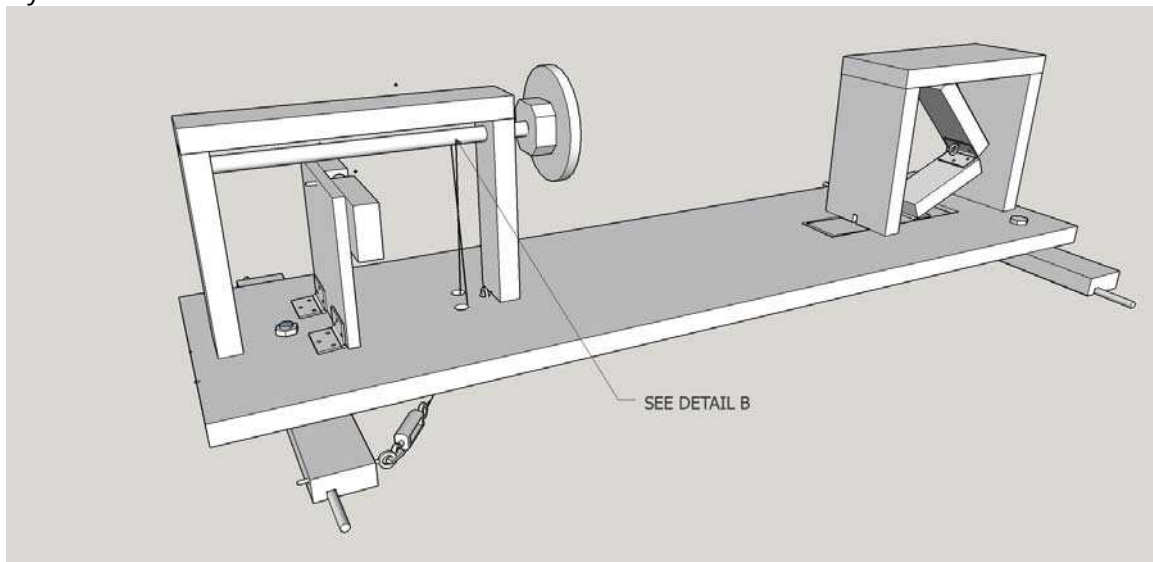


Fig. SK-22

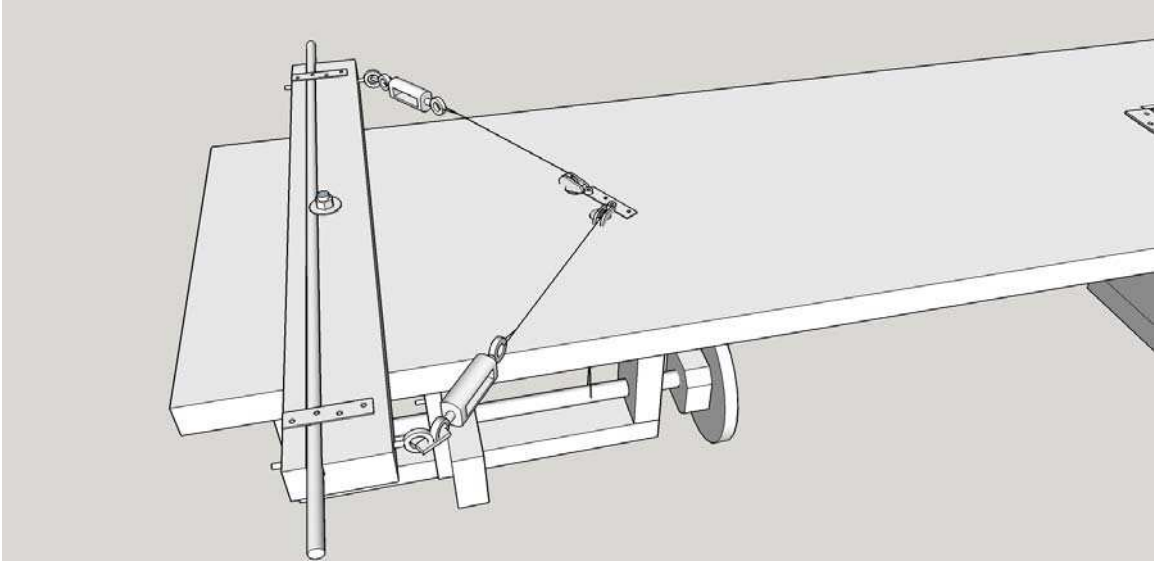
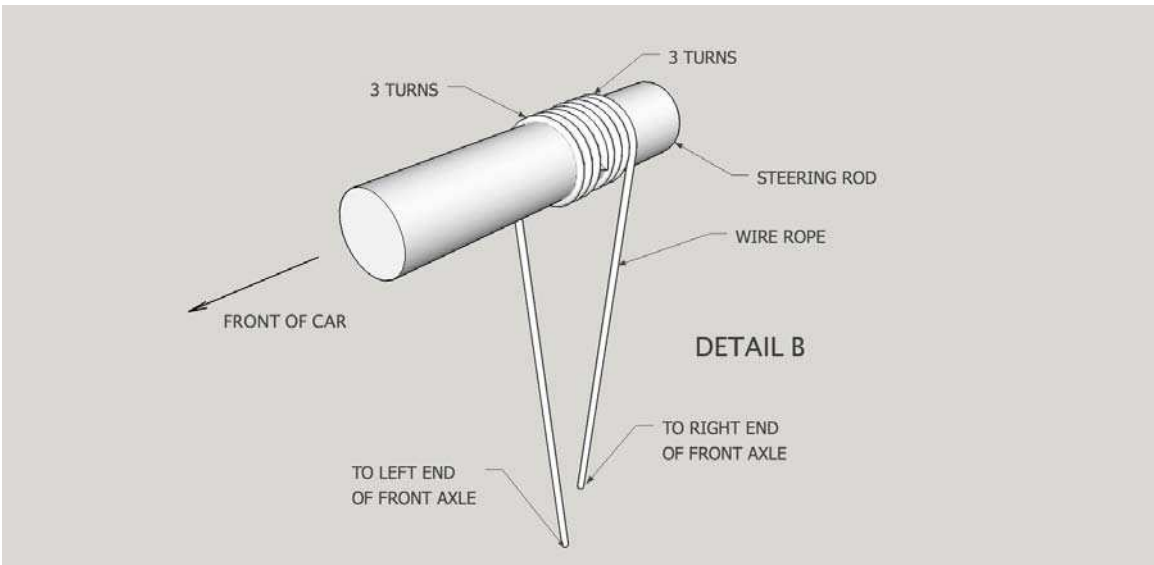


Fig. SK-23



Detail B

The last part of the steering system is a stop block to limit the amount of front axle movement. Turning shall be limited to 1 ½" movement, measured at the ends of the threaded axle rod, in each direction from straight ahead. The block and its installation are shown in figures SK-24 and SK-25.



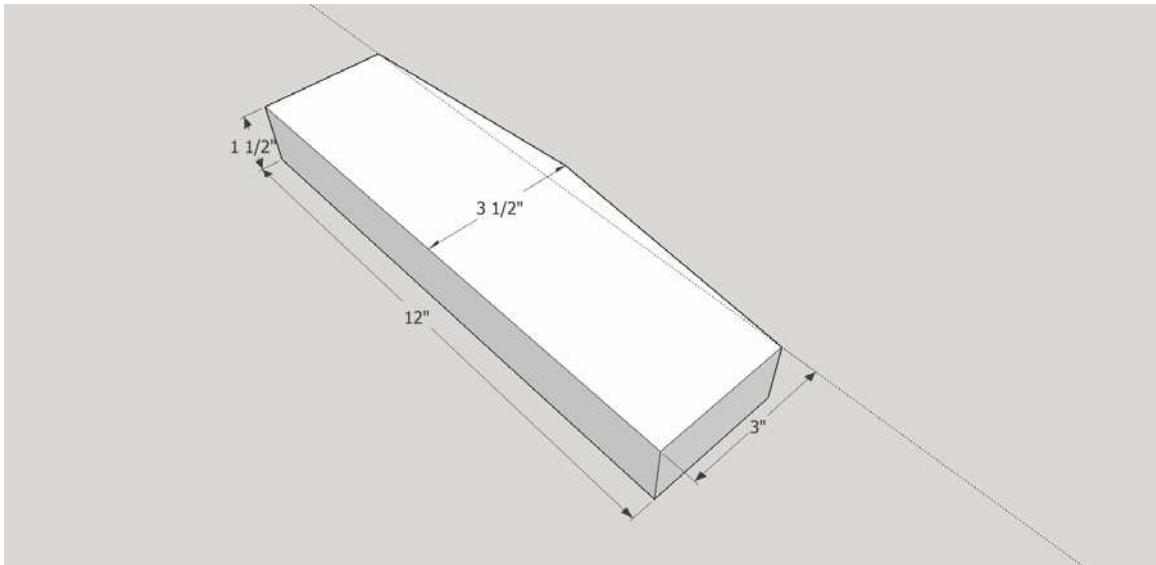


Fig. SK-24

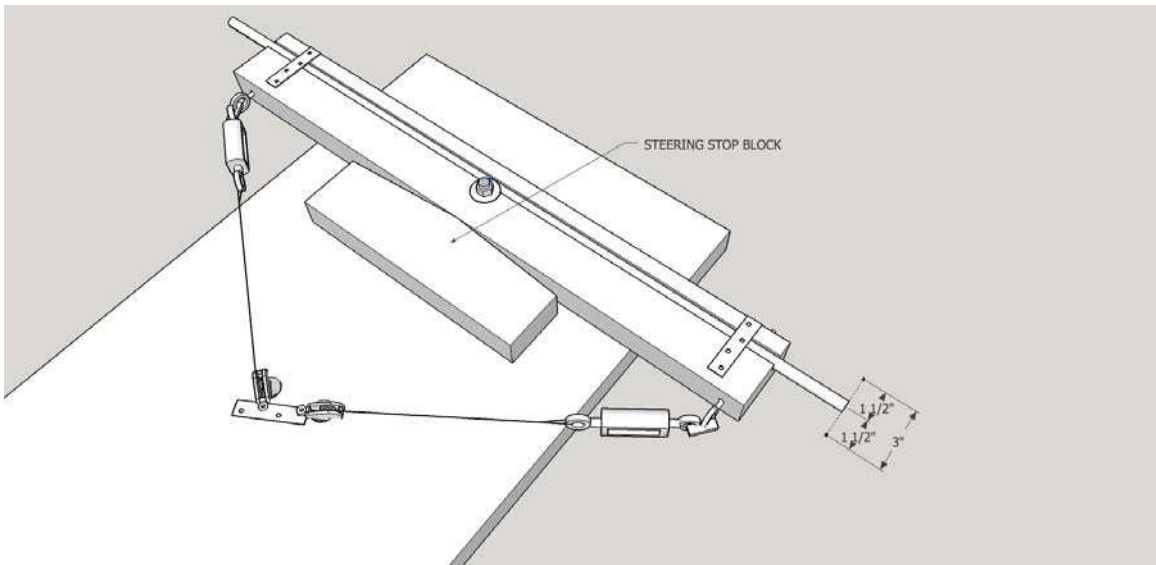


Fig. SK-25

Once all of the previous has been accomplished, the brake cable and spring may be attached as shown in figure SK-26

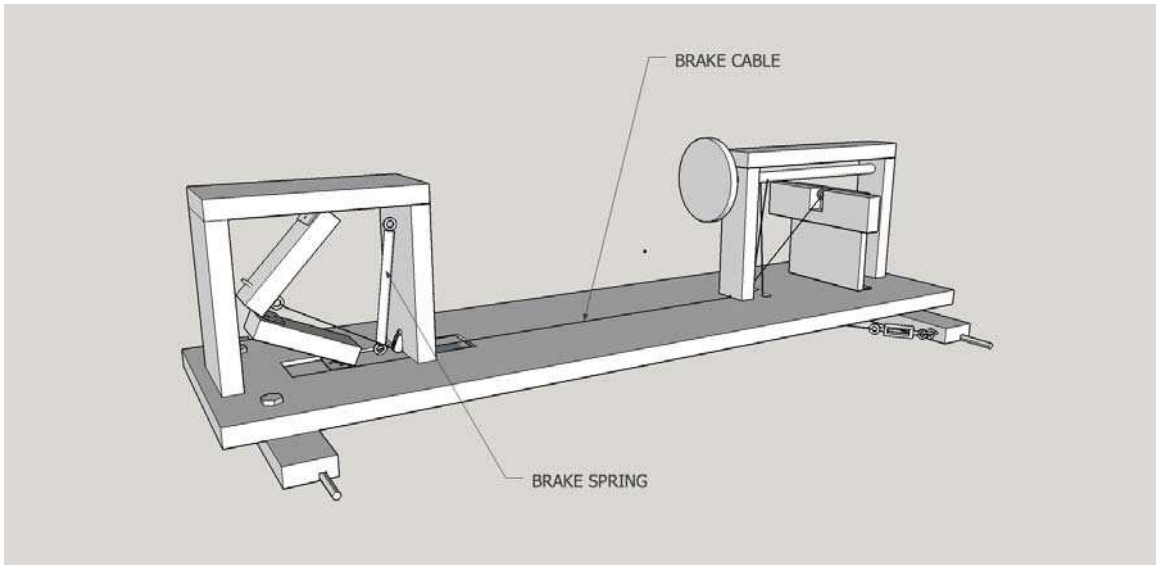


Fig. SK-26

## WHEELS

The wheels are 10" diameter ball bearing, rubber rimmed disks, mounted on the ends of the axles as shown in figure SK-27. Care should be taken not to over-tighten the wheel retaining lock nuts. A recommended procedure is to just snug up the nut, and back it off about one quarter of a turn.

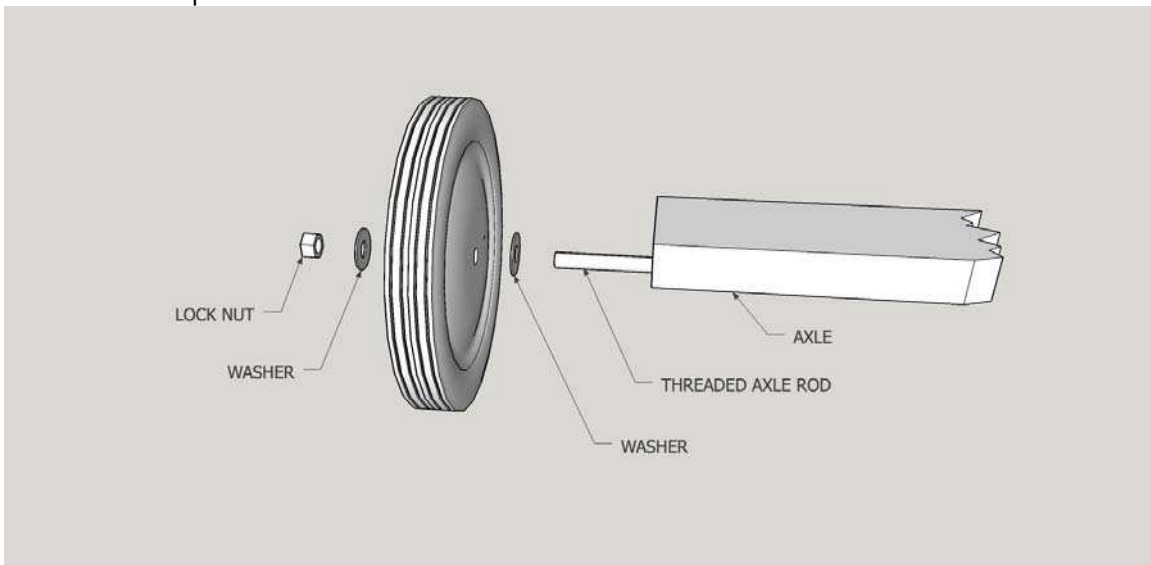


Fig. SK-27

## CRATE

The crate is the signature piece of the car. It must look like an old time orange crate. The crate frame is made of 2 x 2 wood as shown in figure SK-28.

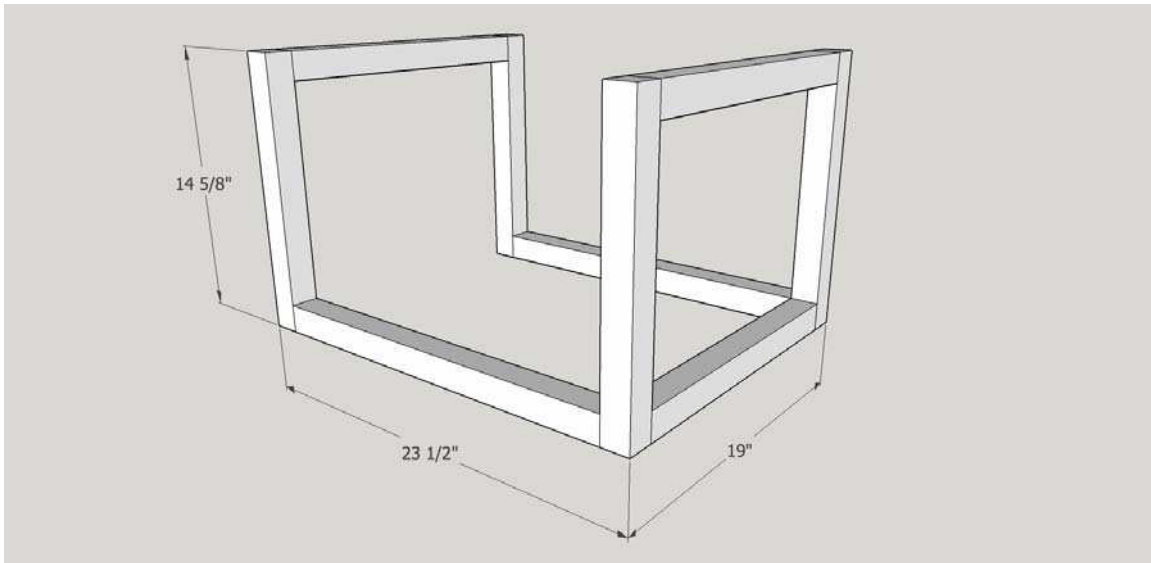


Fig. SK-28

It is fasten to the frame with 4 (or more) 3" wood screws, and must fit snugly over the steering frame. See figure SK-29.

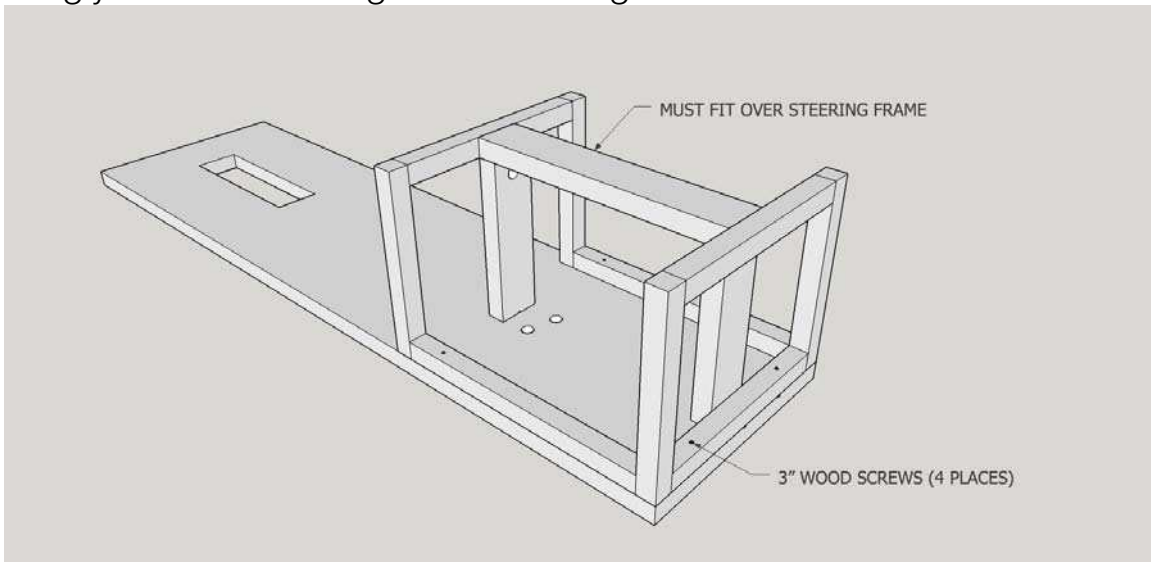


Fig. SK-29

The crate frame is covered with slats made of approximately 3/8" thick wood, about 3 1/2' wide and 23 1/2" long. Three slats on each side, and four on top. See figure SK-30.

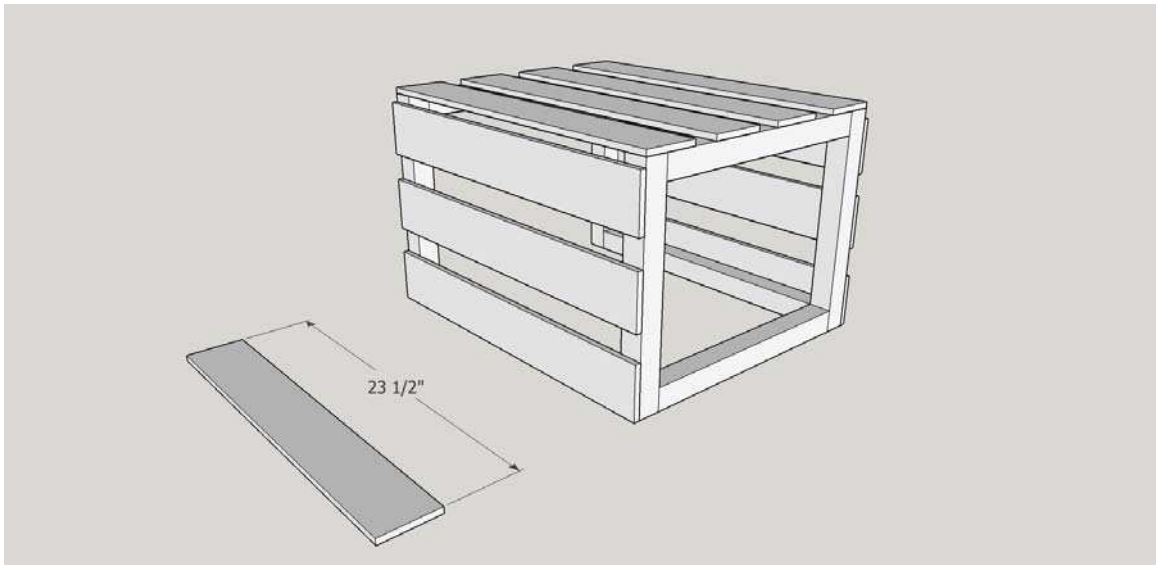


Fig. SK-30

When the crate has been constructed, fasten it to the frame as shown in figure SK-31.

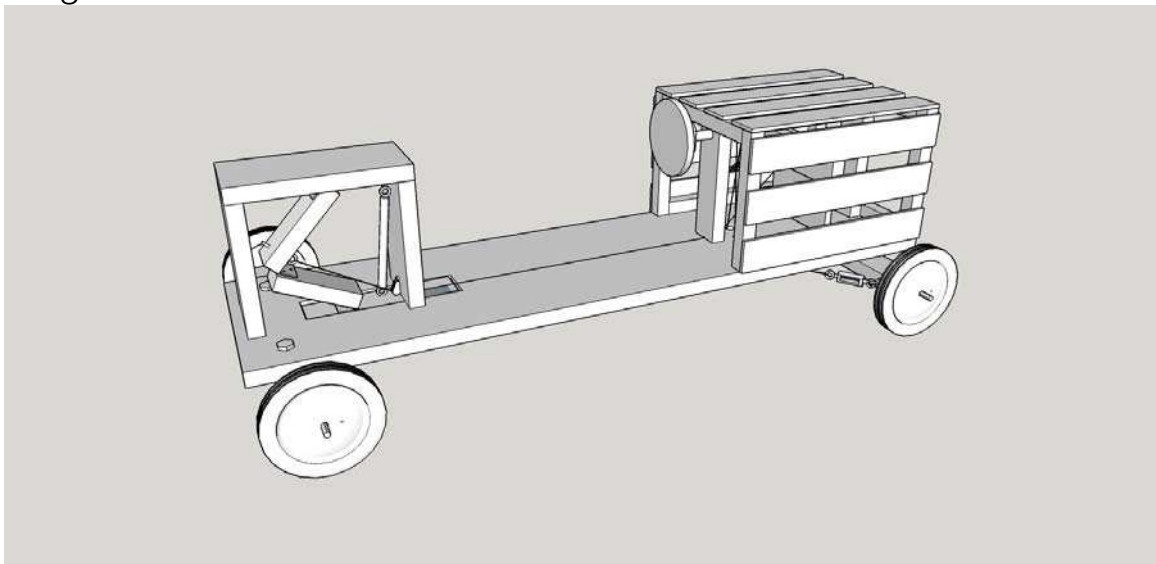


Fig. SK-31

## SIDE PANELS, SEAT, AND BUMPER

The first step for the side panels is to install the back brace as shown in figure SK-32.

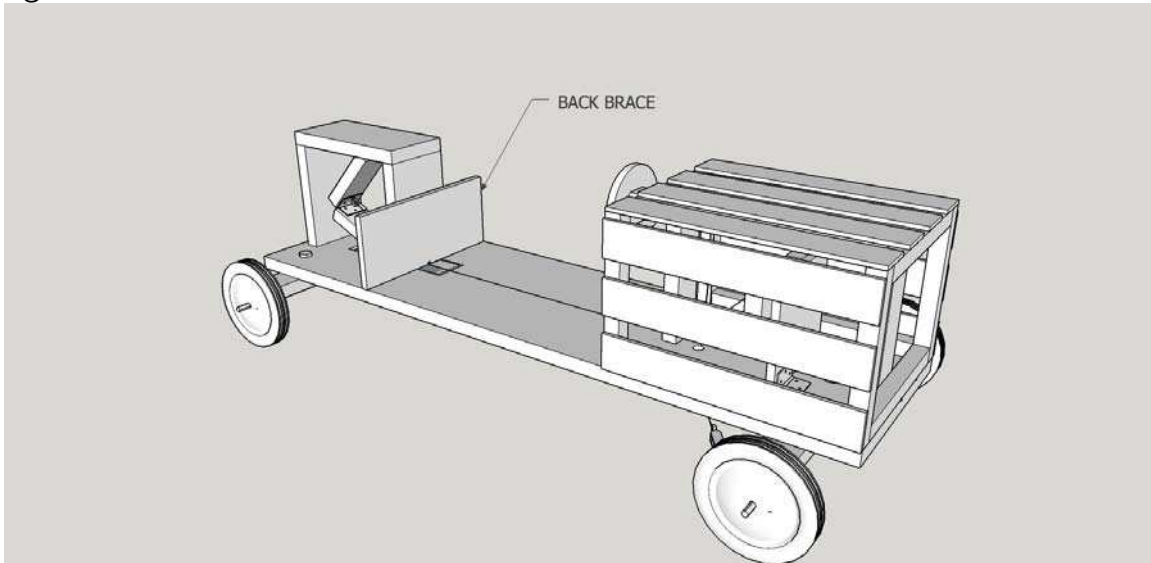


Fig. SK-32

Two side panels are made from plywood as shown in figure SK-33.

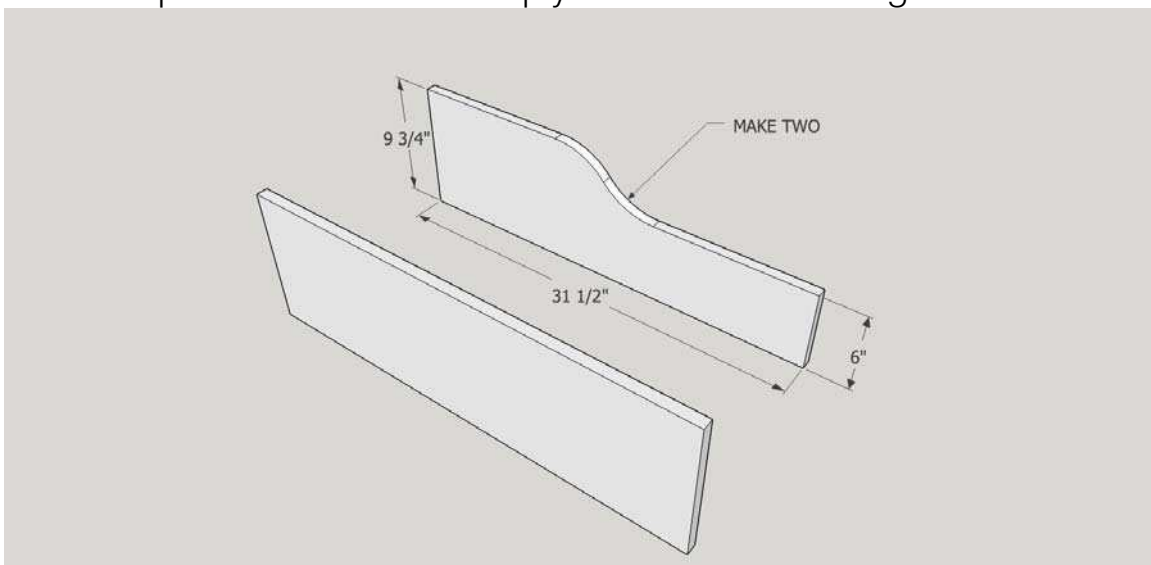


Fig. SK-33

The seat is made from plywood as shown in figure SK-34. The two runners under the seat are to provide clearance for the brake cable. The seat will be held in place with several wood screws that are removable so the seat may be adjusted for different sized drivers.

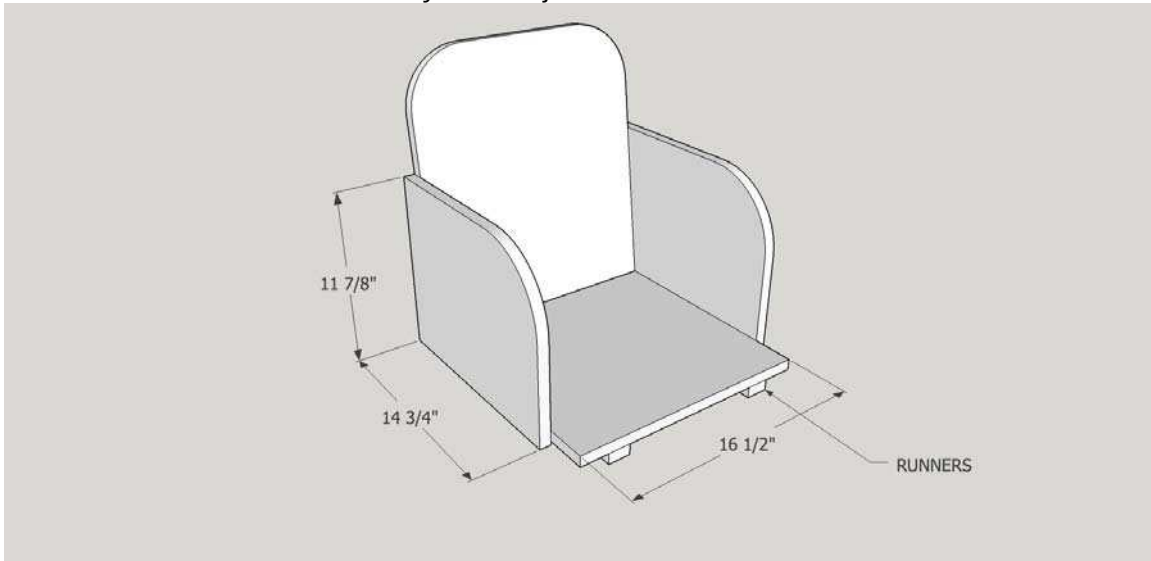


Fig. SK-34

The bumper is made from 2 x 4 wood as shown in figure SK-35.

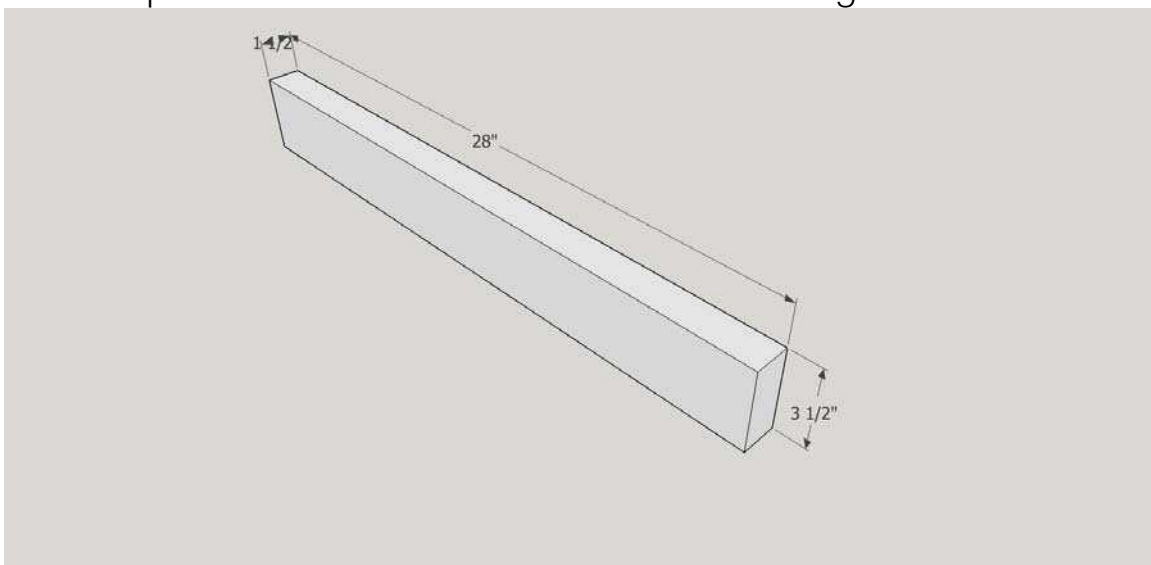


Fig. SK-35

Add the side panels, seat and bumper to the car as shown in figure SK-36, and the Orange Crate Derby car is COMPLETE.

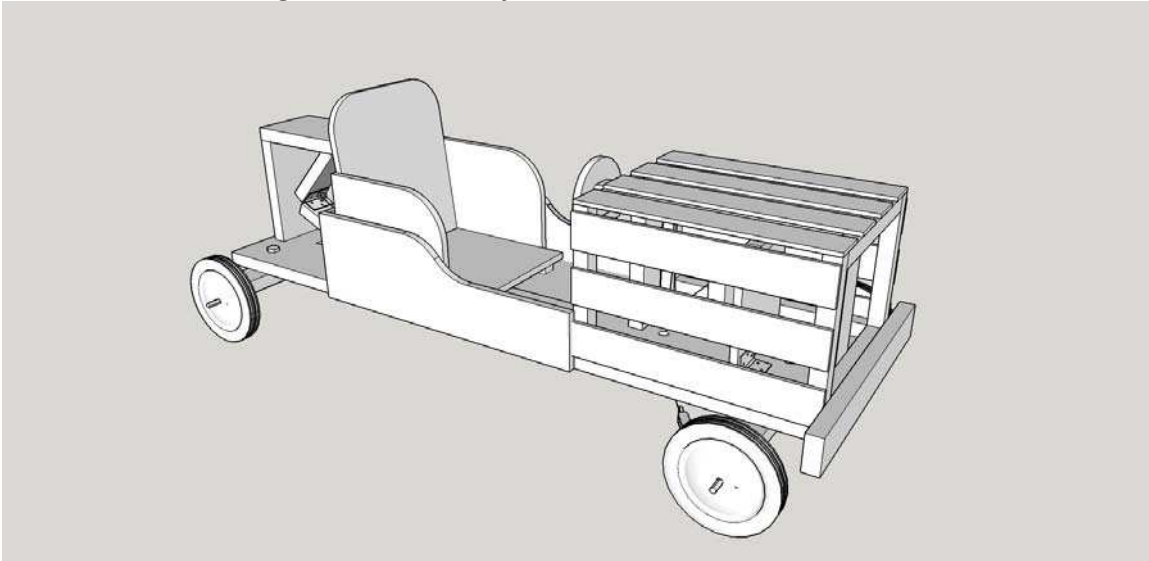


Fig. SK-36