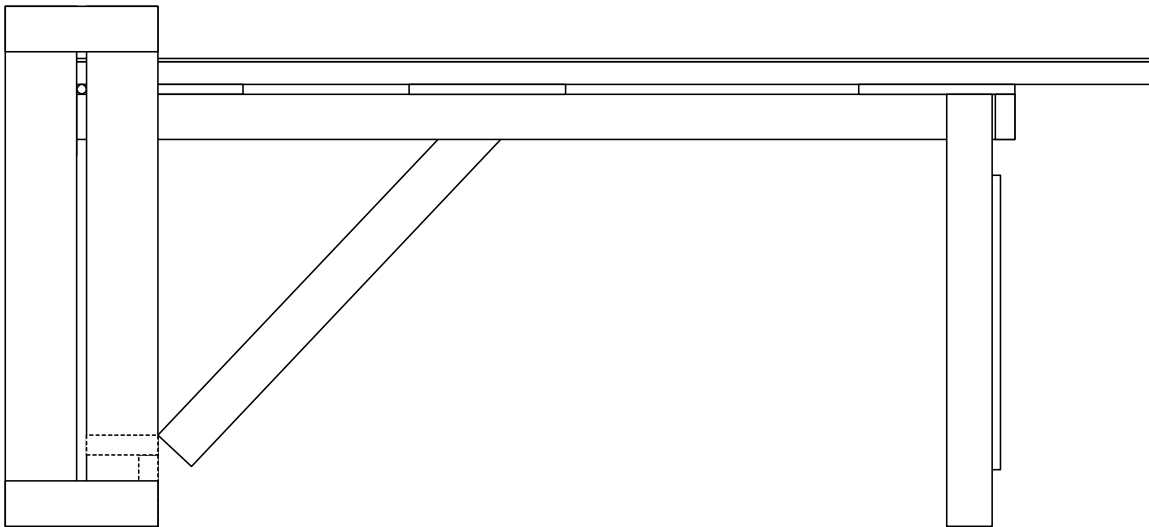


## Fold-up Work Surface

I only have 14in between the wall and where I park my full-size truck; also, the ceiling is 8' 6".

The base is designed on a sliding four-bar linkage.

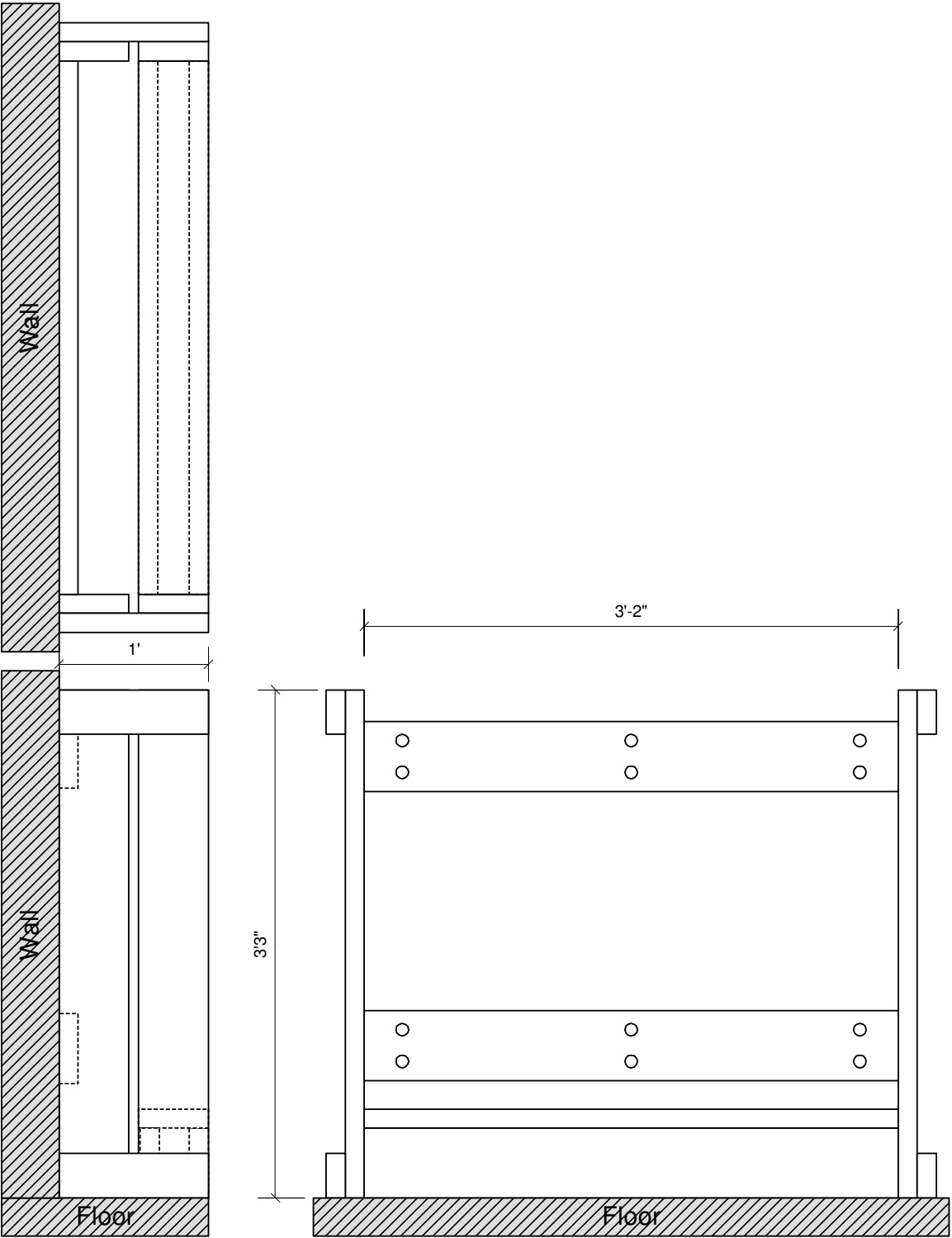
Here's a drawing of the unit in the down position:



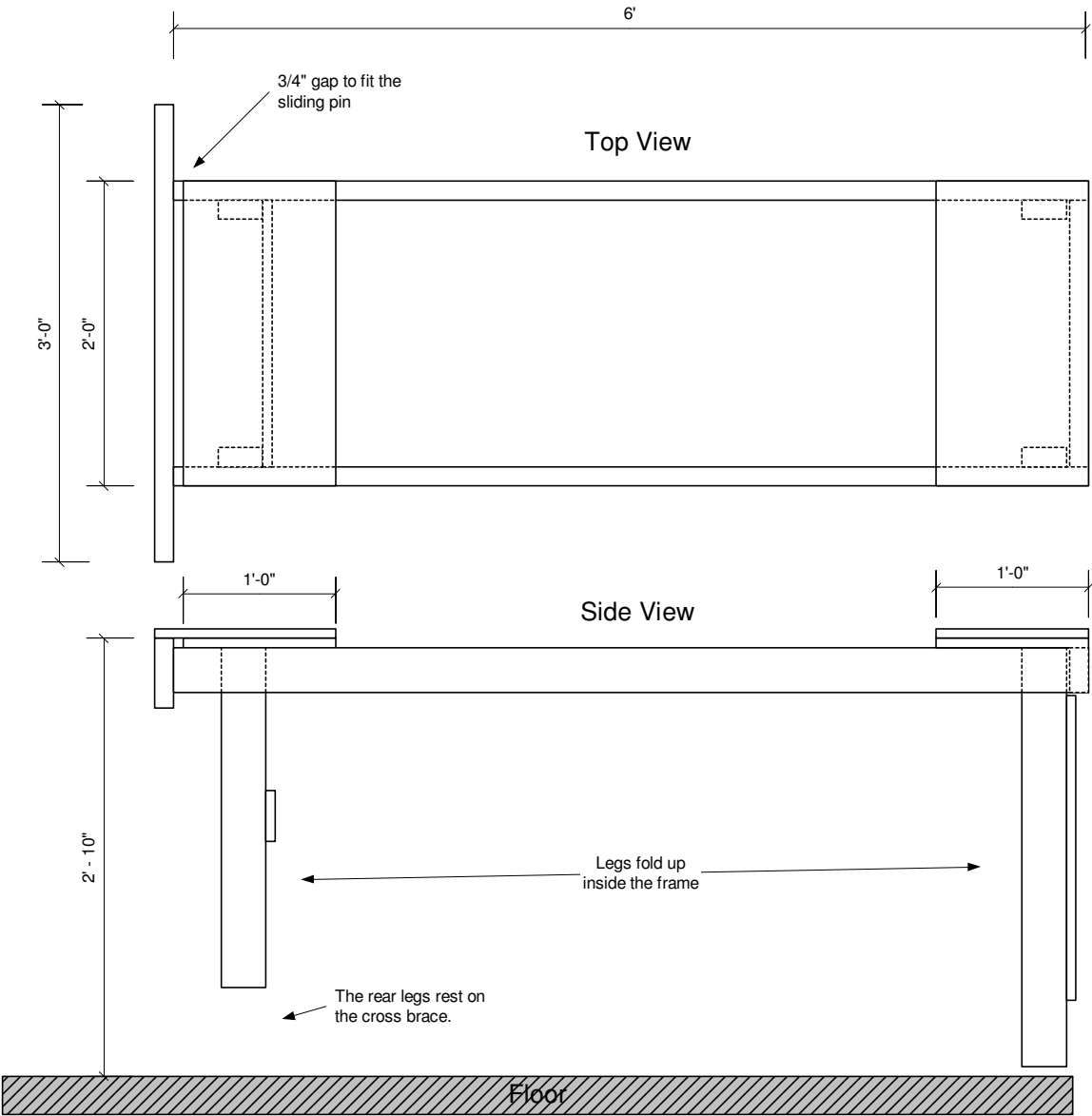
The unit consists of four major parts:

- 1 – the base unit which bolts to the wall is made up of 2x6 and 2x4 lumber
- 2 – the frame unit which consists of a 2x4 frame with fold-up front and real legs
- 3 – the radius arm which is a pair of 2x4s
- 4 – the sliding pin which is a  $\frac{3}{4}$ " threaded rod (with nuts and washers on the outside of the unit to keep it from slipping out.)

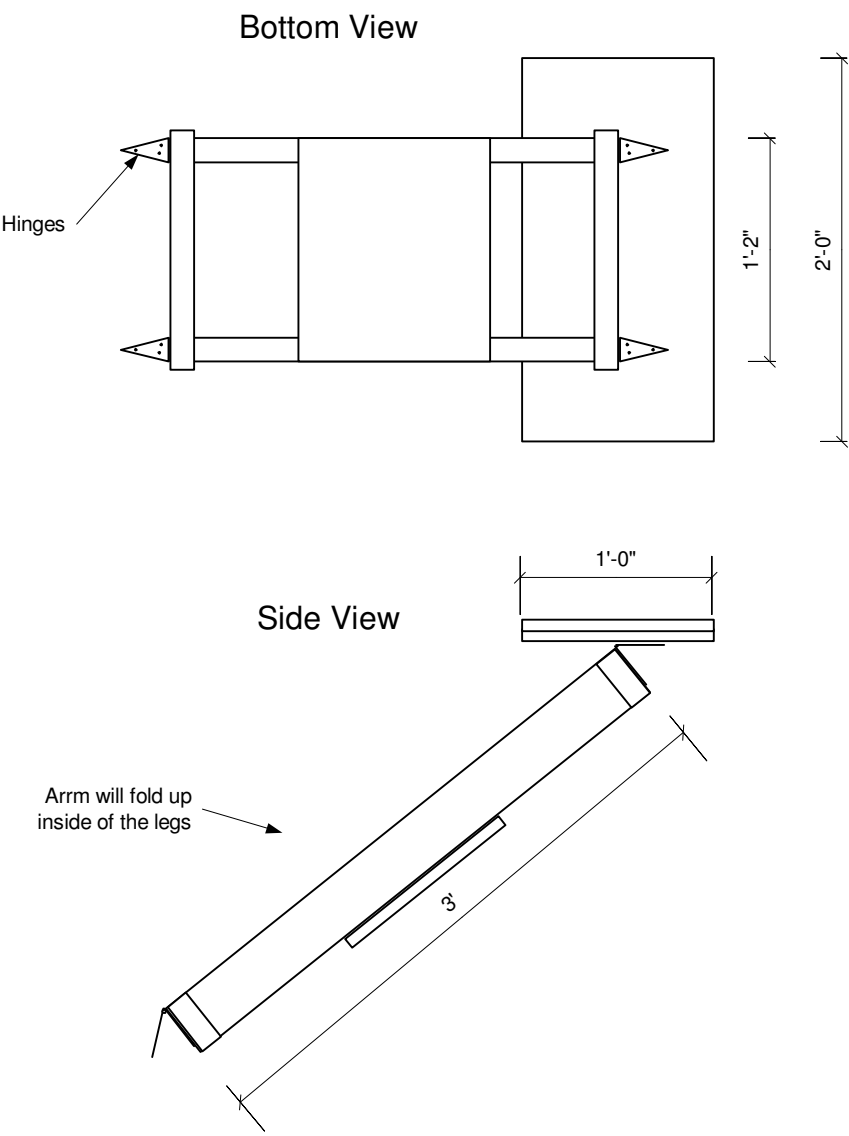
Base (Tip/Side/Front Views):



Frame:



Radius Arm:



### Assembly Notes:

For the sliding rod, I used a piece of  $\frac{3}{4}$ " threaded rod to match the thickness of the wood attached to the top of the frame.

#### Base:

The gap between the two vertical pieces of lumber on the side of the frame is the same as the O.D. of the sliding rod. Anchor the base unit to the wall and check that it is plumb and level. Be sure to use two lag screws per stud on the upper stretcher since this will carry a tremendous load when the table is lowered. Install a  $\frac{3}{4}$ " plywood cover plate to cover the lower stretchers and scribed to fit to the wall. Add a rabbit along the lower stretcher to fit the hinge.

#### Frame:

1'x2'  $\frac{3}{4}$ " plywood was used on the top of the frame to provide a place to attach the various hinges as well as the work surface. Laminate two pieces together to make a 1  $\frac{1}{2}$ " thick plate. The rear frame member is raised  $\frac{3}{4}$ " to match the height of the plywood and the rod. The rear plywood is spaced from the rear member to create a gap for the  $\frac{3}{4}$ " rod. Attach  $\frac{3}{4}$ " plywood to cover the rear plate, rod, and rear frame member. The rear frame member is wide to minimize any flex in the rod. Mount the legs so that they are near the inside of the frame. Position the rear legs after you place the frame in the base so you can determine a location as close to the rear of the frame as possible. (With the rear legs extended, I made the rear legs line up vertically with the face of the stretcher that's on the lower front of the base unit.)

To help the rear legs rest on the base stretcher when setting up workbench latter, add a small block of wood with a screw that can be rotated up to prevent the rear legs from swinging past the base cross bar.

With the frame unit in the base with the front and rear legs lowered and with the  $\frac{3}{4}$ " rod in place, make any changes necessary to make the frame level. It helps to use adjustable feet on the legs. I used a 1-1/2"  $\frac{3}{8}$ " bolt and tee-nut on each leg to make any length adjustments necessary.

Drill two holes on the side of the frame so you can add some pins to hold the front and rear legs inside the frame. (I used some small 3" bolts and drilled the holes in the frame where the adjustable feet on the legs are located when the legs are folded up.) This will make it easier to raise and lower the workbench because the legs won't be swinging around.

#### Radius Arm:

The length of the radius arm is such so that it is near the center of gravity of the work surface, but on the wall side of the center of gravity. The unit will tend to fold up by

itself if the center of gravity is between the two hinges. This worked out very well having the CG near the upper hinge, because a 200lb workbench could now be lifted with about 20lbs of force. The spacing of the radius arms places them inside of the legs.

With the frame level and legs extended, lower the radius arm assembly into the frame. Attach the lower hinges of the radius arm to the base. Screw the upper radius arm assembly to the frame.

Note: Use the strongest hinges you can find (e.g. 6" or 8" strap hinges or 3 1/2" industrial door hinges.).

Raise and lower the frame to check for any binding.

Attach the work surface.

#### Operation:

1. From the raised position, lower the workbench until the rear is slightly higher than the front. (You may have to push in on the workbench to make it go up in the rear. Or you can just lift it up in the rear.)
2. Lower the rear legs
3. Rotate the rear leg stop to keep rear legs above the base crossbar.
4. Raise the workbench until the rear legs contact the base crossbar.
5. Lower the front legs into position.

#### Notes:

If I were to do it over again

- I'd use a 3/4" O.D. conduit/pipe with a piece of threaded rod on the inside instead of a 3/4" rod. You could then make some smaller pieces of conduit to create a simple bearing to ride inside the slot in the base unit. With a 3'9" threaded rod (equal to the ID of the conduit), the assembly would be: a nut, washer, 3" piece of conduit (the bearing), washer, 3' piece of conduit, washer, 3" piece of conduit, washer, and then the other nut. (I hope this make sense.)

Here is how the workbench transitions between the up and down positions:

