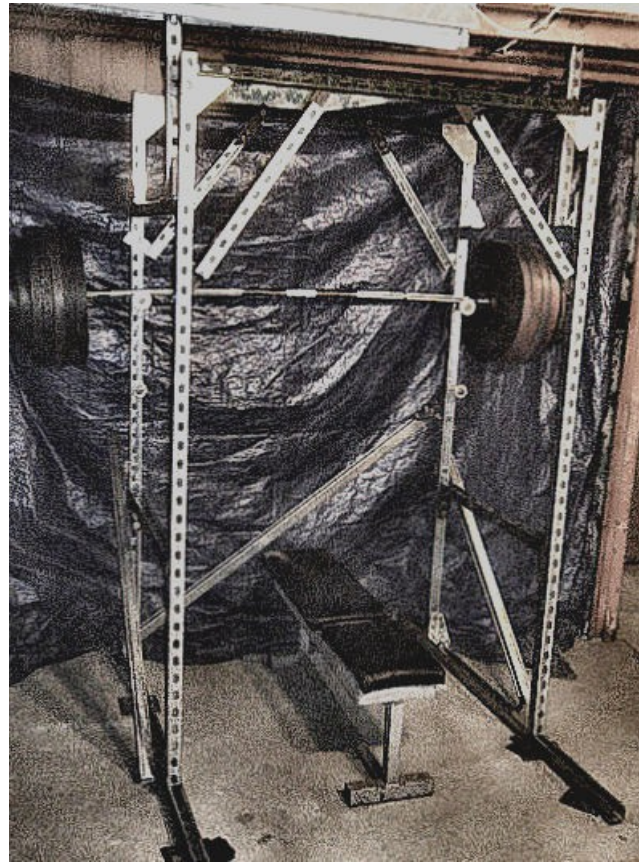
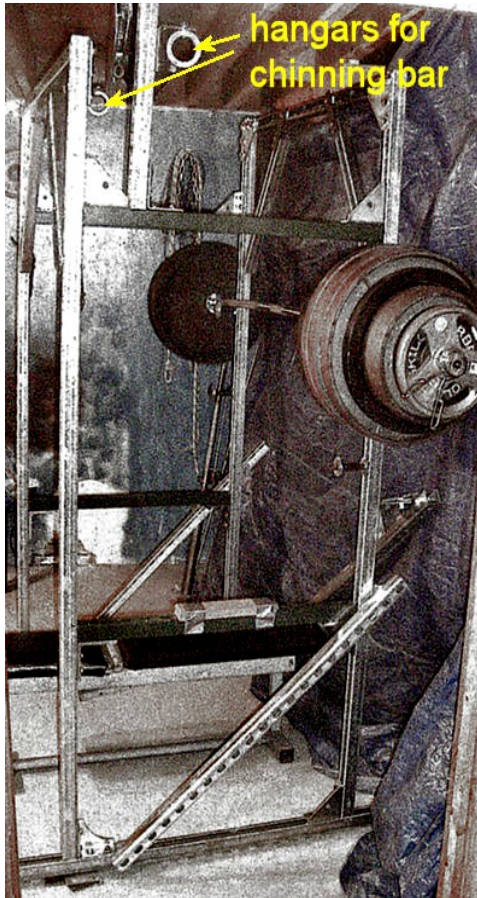


# EXAMPLE OF A POWER RACK BUILT WITH STRUT CHANNEL



# GUIDE FOR BUILDING A POWER RACK WITH STRUT CHANNEL

This is a guide to building a weightlifting power rack (cage) with strut channel. Construction requires simple tools, mainly wrenches, and a metal cutting saw.

Strut channel is a common family of hardware used to build all sorts of support structures. Originally developed by the Unistrut Corp, there are now multiple manufacturers of identical and compatible hardware. Rather than try to explain a very extensive array of hardware, you should take a look at the Unistrut catalog which provides a very thorough description of the stuff you will be working with, how to put it together, and complete specifications – a bible. You can download the catalog here: <http://www.unistrut.us/E-document/Unistrut-General-Engineering-Catalog-Number-17/>

Once you get a little feel for strut channel, you can see how versatile it is. The rack shown in this guide is an example. Building with strut channel, you have great design flexibility. You can pick dimensions to suit your needs, and add features easily.

A thing you will notice about the sample rack is that it has diagonal braces connecting horizontal and vertical rack members. This bracing is very important because it provides rack rigidity.

The big home improvement stores like Lowes and Home Depot carry the strut itself which normally comes in ten foot lengths. But they do not carry much of the connecting hardware. It is recommended that you buy your strut locally to avoid high shipping costs, and buy the connecting hardware online. Do a web search for “strut channel” and you will find many sources. G-P LLC <http://www.strutchannelfittings.com/> is a vendor I came across that has a pretty complete line of strut channel hardware, at reasonable prices.

Estimated cost: the channel and fastening hardware for this rack was about \$250.

Tools: Metal cutting saw, tape measure, and wrenches. If you have the strength and energy, a hack saw will work, but a power saw will make life easier, and get the job over faster. A torque wrench and level are useful.

Skills: No craft skills such as welding and metal working are required. Everything is bolted.

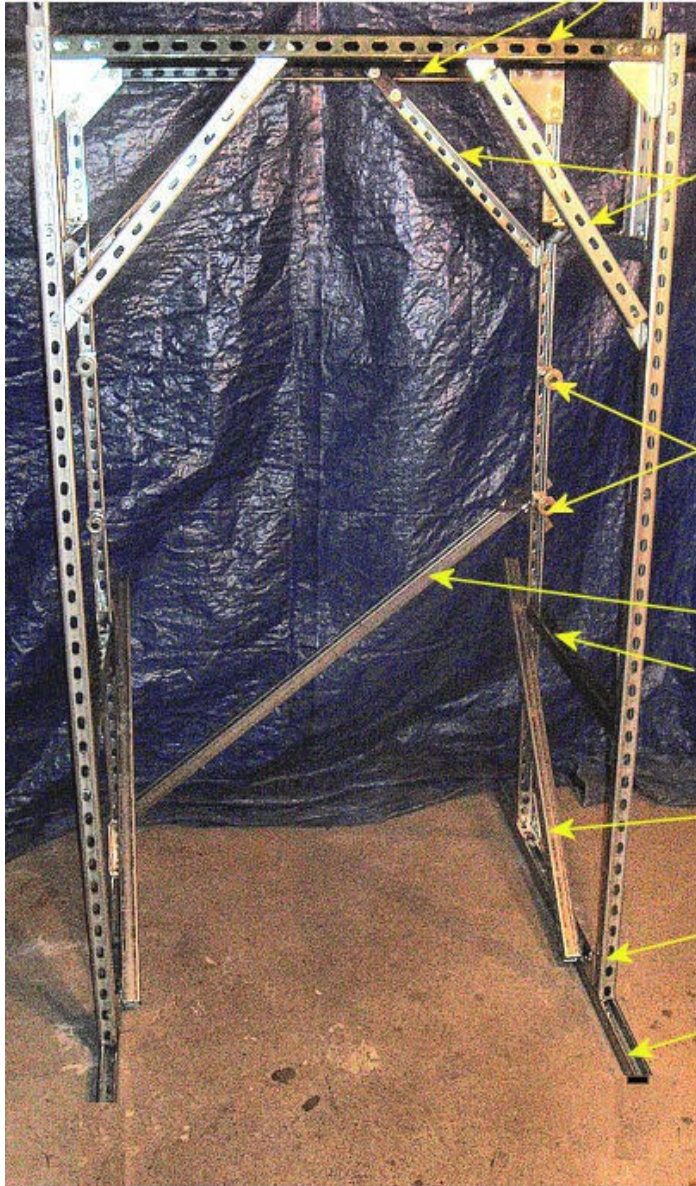
First step: The first thing you have to do, after deciding to build a strut channel power rack is to design it. You could use this example or go off on your own. Browsing through the Unistrut Catalog is a good way to familiarize yourself with all the channel types and hardware. May give you some ideas.

As mentioned before, the diagonal braces are essential to making the rack rigid. Keep them in your design. My first attempt did not include the braces, and I quickly noticed wobble. To keep track of what was happening as I added the various braces, I started by placing a 700lb barbell on the upper rear j-hooks, and left it there till I was finished. After every alteration I'd give the rack a good hard shake test to see if it got more rigid.

The rest of the information here pertains to the details of the example rack.

Feel free to contact me. [sherm@shermworks.com](mailto:sherm@shermworks.com)

## FRONT VIEW OF RACK



front and rear  
horizontal struts - 44" 2

front and rear  
upper braces - 24" 4

j-hooks 4

rear lower brace - 60" 1

safeties - 30" 2  
(inside rack depth)

side braces - 42" 2

vertical posts - 78" 4

rack foot - 48" 2

This picture shows the length of each length of channel

## STRUT CUTTING TABLE

| Strut # | L=78" | 48" | 30" | 42" | 24" | 44" | 60" | 18" |
|---------|-------|-----|-----|-----|-----|-----|-----|-----|
| 1       | 1     |     |     | 1   |     |     |     |     |
| 2       | 1     |     |     | 1   |     |     |     |     |
| 3       | 1     |     |     |     |     |     |     | 2   |
| 4       | 1     |     |     |     |     |     |     |     |
| 5       |       | 2   |     |     | 1   |     |     |     |
| 6       |       |     | 4   |     |     |     |     |     |
| 7       |       |     |     |     | 3   | 1   |     |     |
| 8       |       |     |     |     |     | 1   | 1   |     |

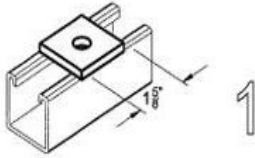
The strut cutting table is a convenient way to minimize waste when the struts are cut for the various parts of the rack. Eight 10 foot struts were used to construct the rack. The first column on the left assigns a reference number for each of the struts. Each of the remaining columns represent a particular cutting length for the various rack parts.

Example: strut# 5 has 2 cuts of 48" length, and 1 cut of 24", for a total utilization of 120" (full strut).

It's a good idea to mark each piece so you don't have to scramble through a big pile to find what you are looking for.

# STRUT HARDWARE

**SQUARE STRUT WASHER**  
1-5/8" X 1-5/8"

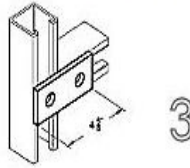


**STRUT NUT WITHOUT SPRING**

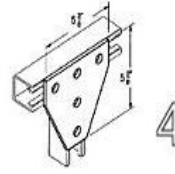
Material:  
Electro-galvanized carbon steel.  
Also available in stainless steel.



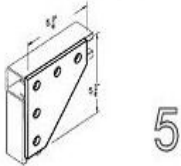
**2-HOLE SPLICE PLATE**  
1-5/8" X 4-5/8"



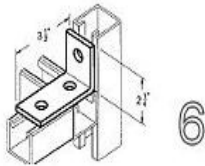
**5-HOLE TEE GUSSET**  
5-3/8" X 5-3/8"



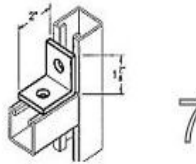
**5-HOLE CORNER GUSSET**  
5-3/8" X 5-3/8"



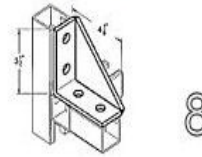
**3-HOLE CORNER ANGLE**  
2-1/4" X 3-1/2"



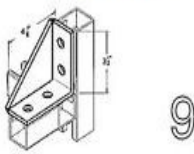
**2-HOLE CORNER ANGLE**  
1-7/8" X 2"



**4-HOLE WEBBED CORNER ANGLE, RIGHT HAND**  
3-1/2" X 4-1/8"



**4-HOLE WEBBED CORNER ANGLE, LEFT HAND**  
3-1/2" X 4-1/8"



**1-5/8 X 1-5/8  
12 GAUGE STRUT  
SLOTTED**

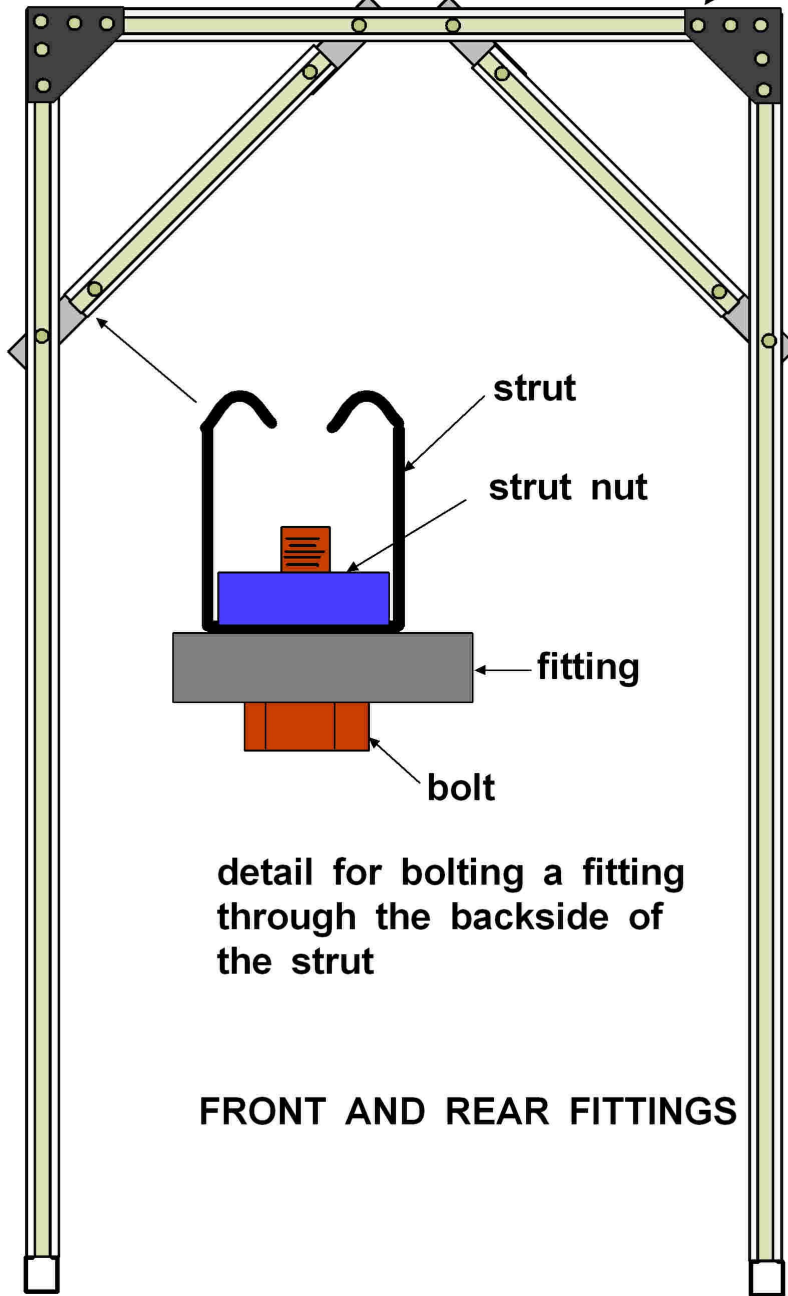


**bolts for all items except for #4 and #5 are 3/8-16 x 1 1/4"**

**bolts for #4 and #5 are 1/2-13 x 1 1/4"**

fitting 3  
3/8-16 bolts  
and nuts

fitting 5 1/2-13 bolts  
and nuts



detail for bolting a fitting  
through the backside of  
the strut

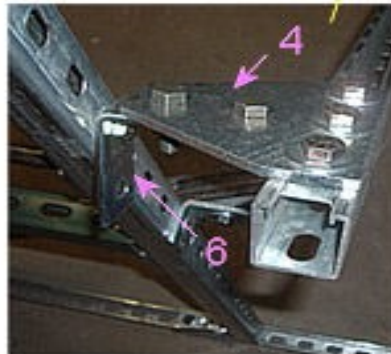
**FRONT AND REAR FITTINGS**

# HARDWARE DETAILS

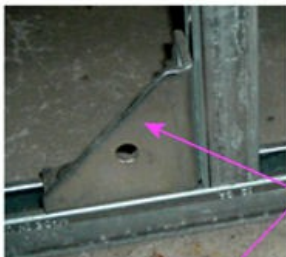
**BACK BRACE (lower rear of rack)**  
3/8-16 bolts and nuts  
lower end mouting



upper end mounting



The back brace fittings provide a rear offset to the brace so it won't interfere with lifts.

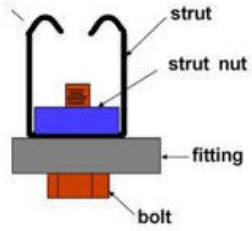


corner web  
#8 on right side  
#9 on left side

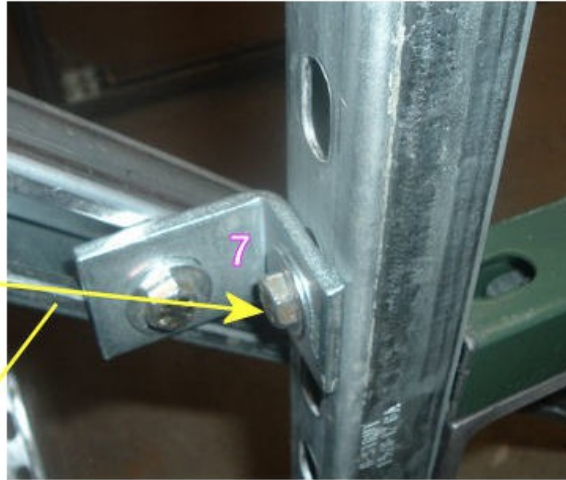


# side braces

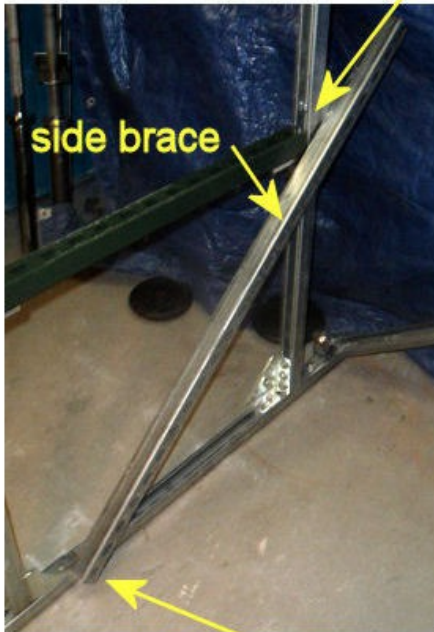
3/8-16 bolts and nuts



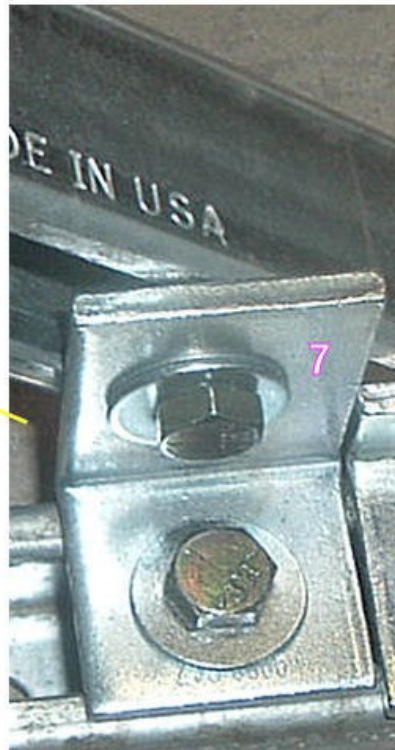
detail for bolting a fitting through the backside of the strut



upper end mounting



lower end mounting

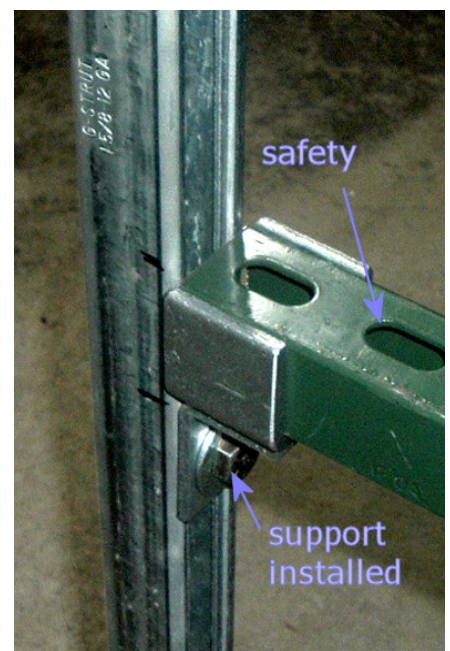
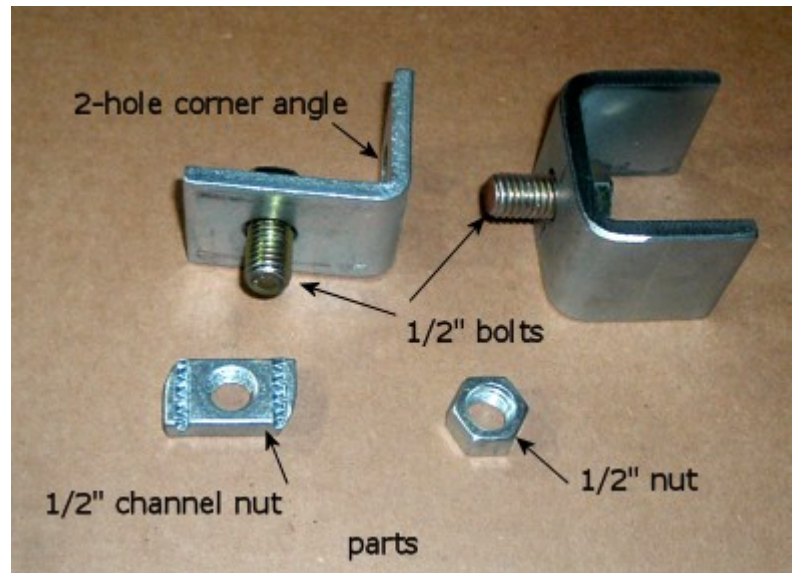
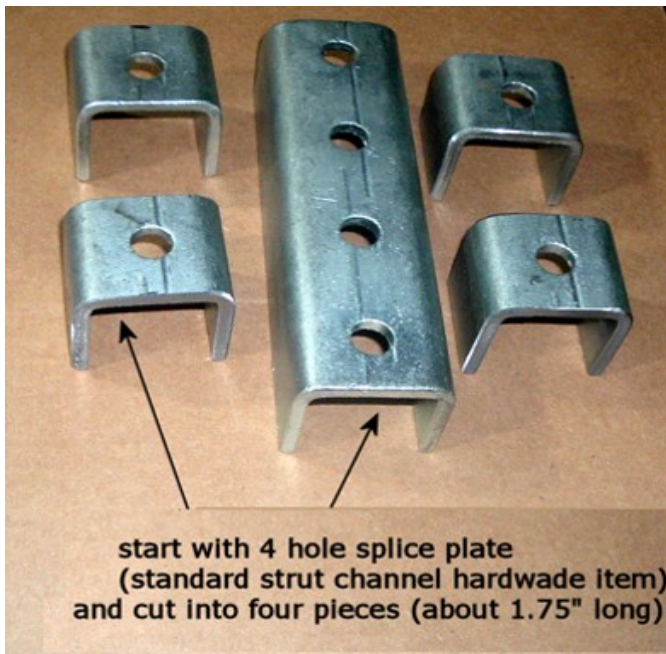
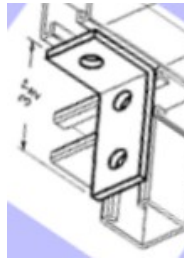




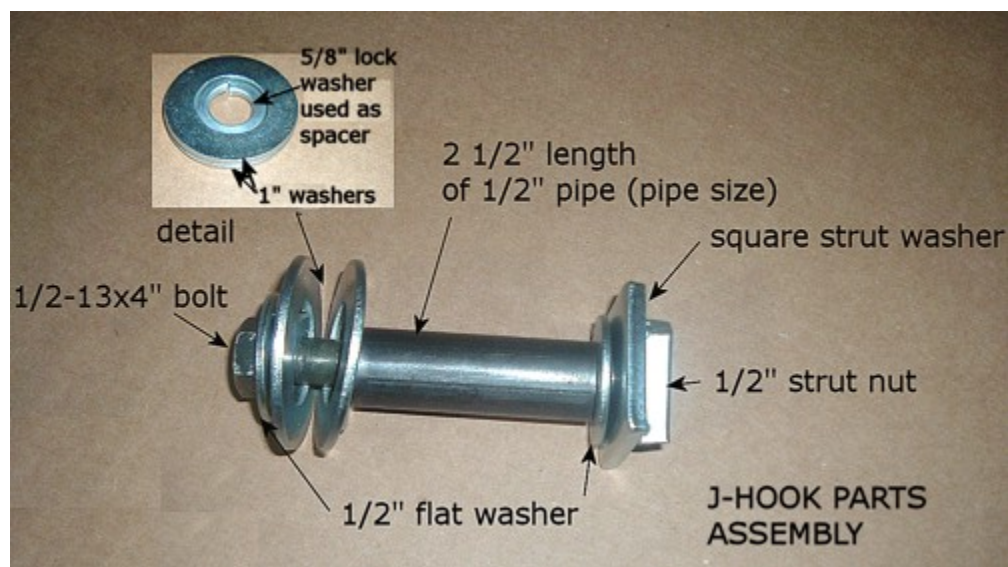
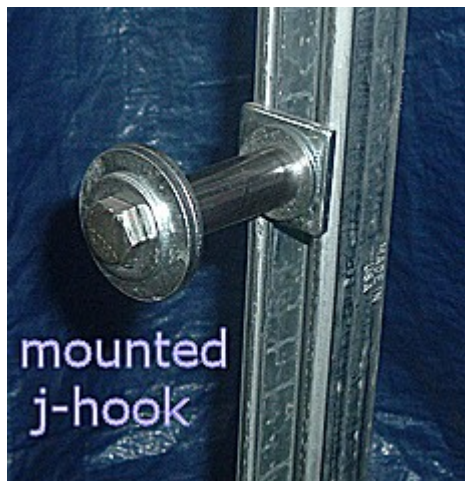
## SAFETY SUPPORTS

An advantage of using strut channel is that the safeties can be positioned anywhere along the vertical posts. The safety support shown here is kept in place with a 1/2" bolt and channel nut. The safety supports are moved by loosening the bolt, sliding it to the new position, and re-tightening.. For convenience multiple sets of supports could be mounted at heights for specific lifts – bench and squat.

Note: for a more secure support use 3-hole corner angles instead of 2-hole. The 2 hole side fastens to the vertical post.



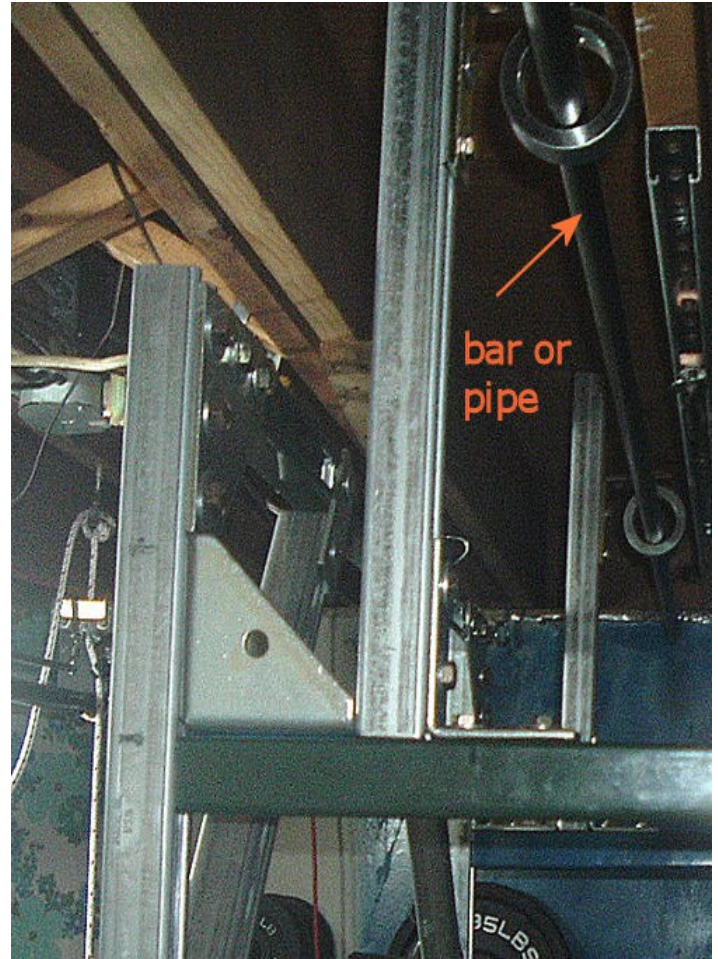
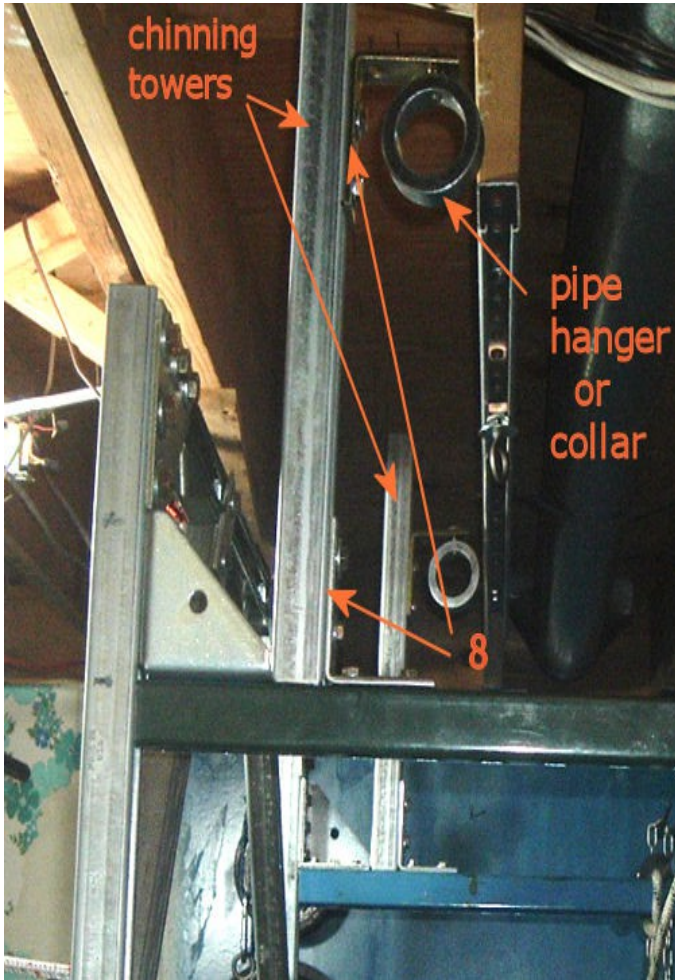
# J-HOOKS



If using the j-hook as a plate hanger, select bolt and pipe lengths to meet your needs.

## CHINNING TOWERS

This is an chinning bar add-on you might want to try. The *chinning towers* can reach as high as you want. The height of the pipe hangers is adjusted to your desired bar height. The bar is easily removed when not in use and a variety of bars can be inserted in the hangers, depending on the inside diameter of the hangers. Thread locker should be used when fastening the hangars to keep them from working loose.



## OVERHEAD PRESS



The upper front to rear struts can be used to help you with overhead presses. They position the bar for starting the lift, and support the bar at the end of the lift. They also function as safeties for the overhead press.

The struts must be placed high enough so as not to interfere with the top bar position for squats. This may be higher than the height you want to start off your overhead press. If that is the case you could stand on boards or a platform that will bring you up to the desired starting overhead press starting point.