

The EASY BALANCE

Fabrication and Assembly Plans

Everything Needed to Build-

- Material List
- Cut List
- Fully Illustrated Plans
- Operation Instructions

AUTO ROTISSERIE

Hydraulic Jacking
Rock Solid Disc Brake Locks
Hand Crank Balance System
Portable
Adjustable For Any Vehicle

Easy Balance Rotisserie

Multiple Height Positions Using Lock Pins

- Locking pins provide extra safety measure against accidental jack malfunction

Rock Solid Disc Brake Mechanism

- Strong, positive locking mechanism
- Holds vehicle in any position

Easy Hydraulic Jacking System

- Allows vehicle to be raised from a 19" bumper height to desired working position, up to almost four feet off the ground

Strategically Located Jam Bolts

- Jam bolts stabilize rotisserie to reduce vehicle rocking and swaying

Innovative Hand Crank Balance System

- Balances car perfectly in just a few minutes with vehicle mounted on rotisserie
- Eliminates pendulum effect
- Vehicle can be turned with one hand
- Allows on-the-fly balance adjustments as components are removed or installed on vehicle

Reinforcements For High Stress Areas

Adjustable Vehicle Mounts

- Adjustable to almost five feet for any vehicle width

Retractable Legs For Easy Transportation

- Legs retract into base to allow rotisserie to fit in four foot wide spaces, such as truck beds
- Legs extend to a wide six feet for extra stability

Choice Of Size Of Casters

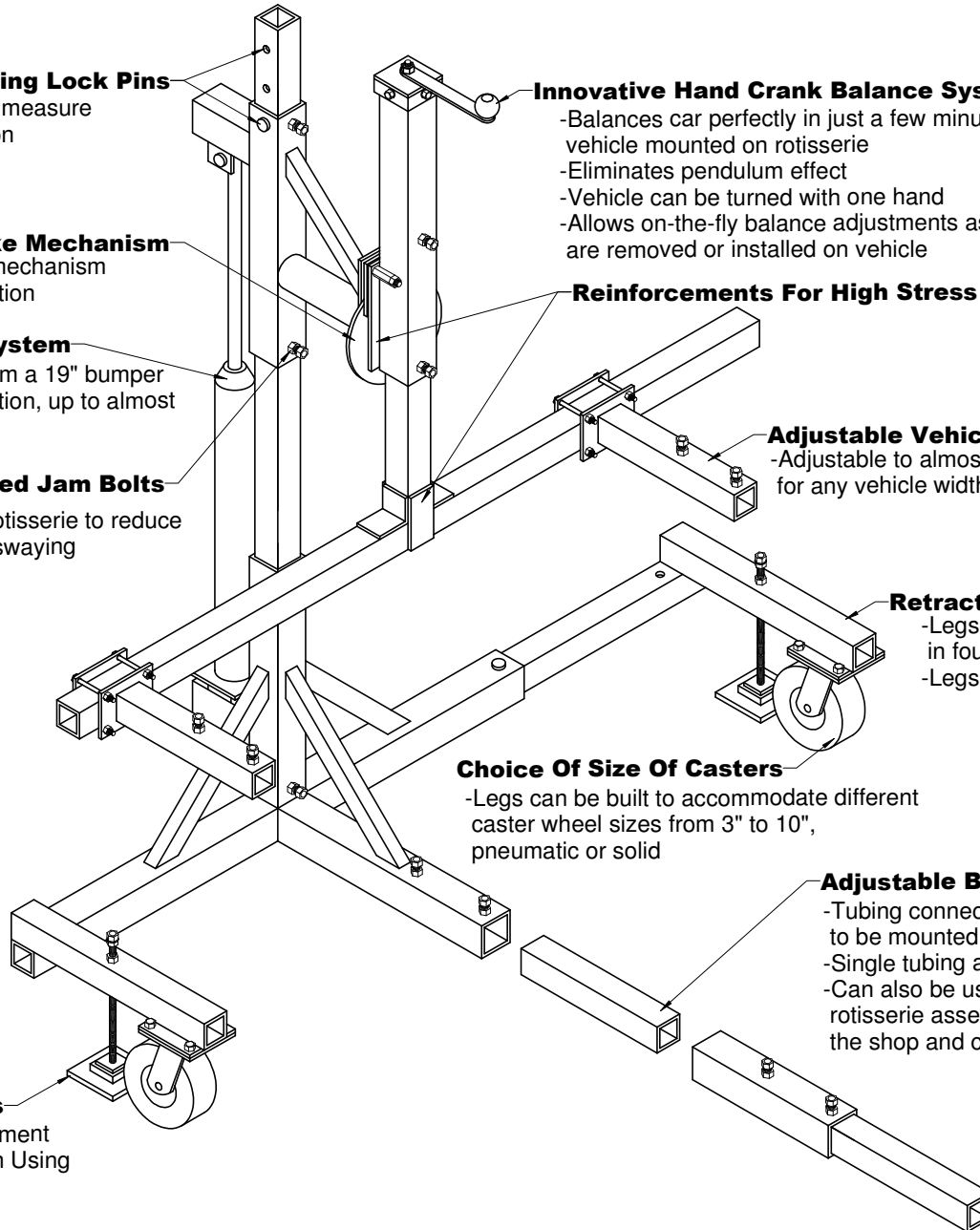
- Legs can be built to accommodate different caster wheel sizes from 3" to 10", pneumatic or solid

Adjustable Body Length Connectors

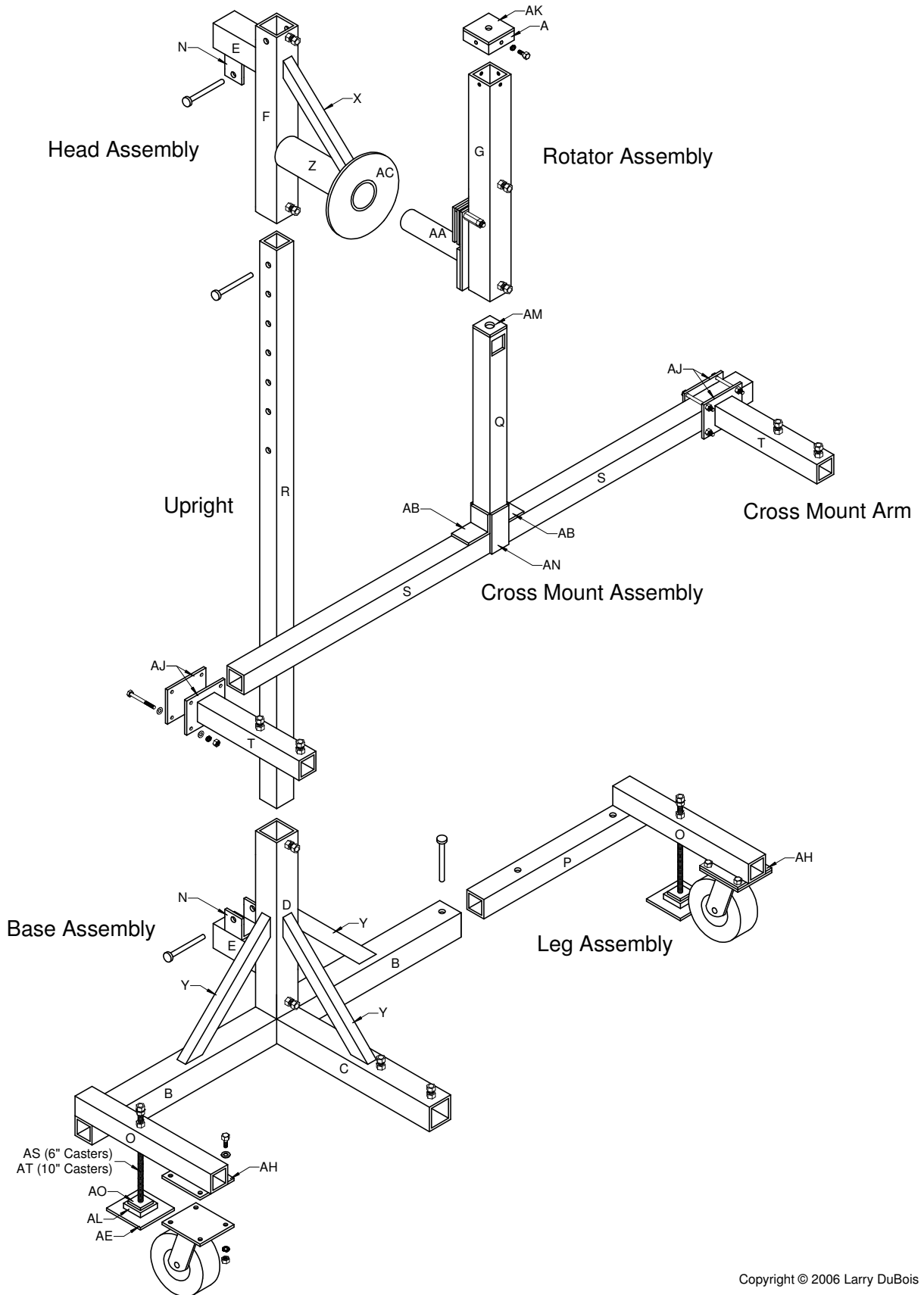
- Tubing connectors allow bodies up to 18 feet long to be mounted to rotisserie
- Single tubing assembly is out of the way, easy to work around
- Can also be used to connect both ends of rotisserie assemblies for easy movement around the shop and compact storage (approximately a 4' x4' area)

Optional Screw Jacks

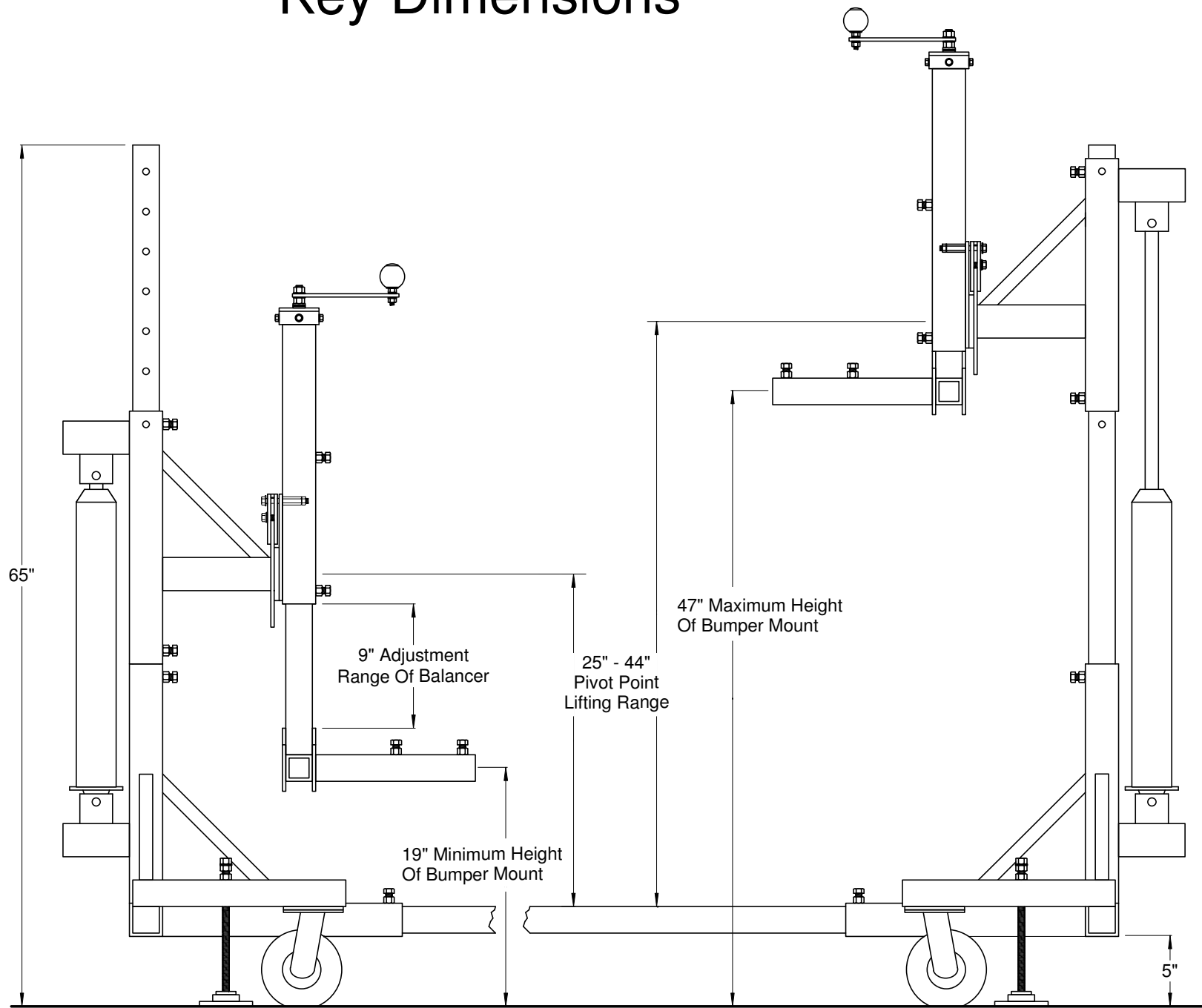
- Quick And Easy Adjustment For Extra Stability When Using Pneumatic Casters



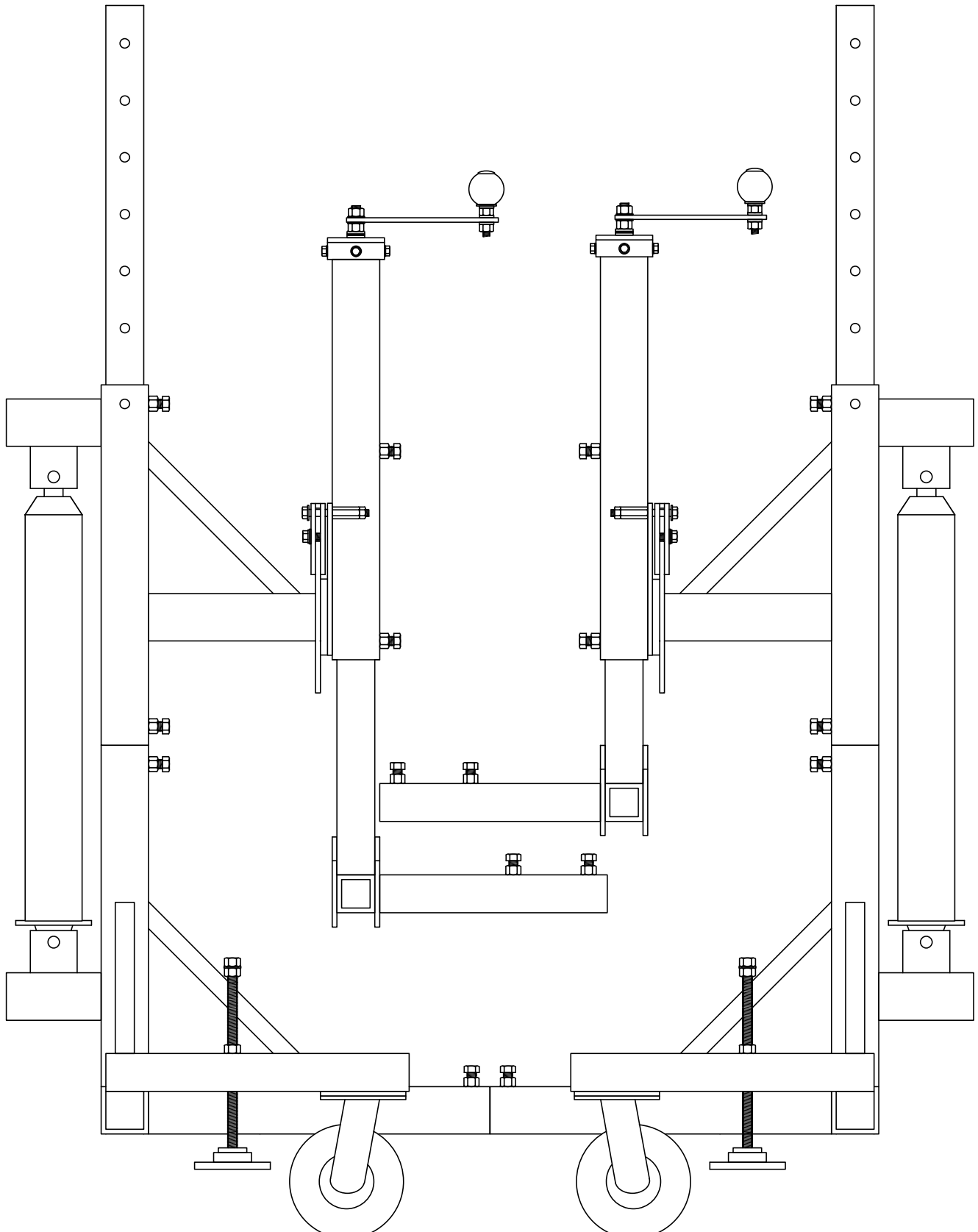
Exploded View



Key Dimensions



Rotisserie Storage



Material List

(All square tubing is 3/16" wall except 1" square tubing, which is 1/8").

Metal

<u>Size</u>	<u>Description</u>	<u>Length</u>
3"	Square Tubing	6"
2 1/2"	Square Tubing	43'
2"	Square Tubing	52'
1"	Square Tubing	8'
2 1/2"	Schedule 40 Pipe	2'
2"	Schedule 40 Pipe	2'
2" x 2" x 3/16"	Angle	9"
8" x 1/4"	Strap	17"
4" x 3/8"	Strap	9"
4" x 1/4"	Strap	33"
4" x 3/16"	Strap	36"
3 1/2" x 1/4"	Strap	38"
3" x 3/16"	Strap	7"
2" x 1/2"	Strap	9"
2" x 3/16"	Strap	22"
1 1/2" x 3/16"	Strap	7"
1" x 1/4"	Strap	17"
1/4"	Square Stock	9"

Hardware

<u>Size</u>	<u>Description</u>	<u>Quantity</u>
3/8" x 3"	Carriage Bolt	2
3/8" x 3 1/2"	Bolt	20
3/8" x 1"	Bolt	54
1/4" x 3/4"	Bolt	8
1/2"	Nut	8
1/2"	Lock Nut	6
3/8"	Nut	80
1/2"	Lock Washer	10
3/8"	Lock Washer	38
1/4"	Lock Washer	8
7/16"	Flat Washer	2
5/16"	Flat Washer	54
3/8" x 1/2" x 2"	Steel Spacer	2
1/2"	Threaded connector	2
3/8"	Threaded Connector	4
1/2" x 4"	Clevis Pin	10
1/2"	All Thread	6' (When Using 6" Casters)
1/2"	All Thread	7' (When Using 10" Casters)
	Shifter Ball	2 (HELP! #76933 or Equiv.)
	Torrington Bearing	2 (McMaster-Carr #5909K31 or Equiv.)
	Bearing Washers	4 (McMaster-Carr #5909K44 or Equiv.)
	3 Ton Hydraulic Jack	2 (Northern #144878 or Equiv.) (25" - 44 1/2" Operating Range)
	6" Pneumatic Caster	4 (Northern #189222 or Equiv.)
	10" Pneumatic Caster	4 (Northern #11000 or Equiv.)

Cut List

Label	Material	Name	# Of Pieces	Length
A	3" Square Tubing	Rotator Top Cover Side	2	1"
B	2 1/2" Square Tubing	Lateral Base	2	41" *
C	2 1/2" Square Tubing	Longitudinal Base	2	18" *
D	2 1/2" Square Tubing	Base Upright	2	18" *
E	2 1/2" Square Tubing	Jack Mount, (Upper and Lower)	4	5" *
F	2 1/2" Square Tubing	Head Slider	2	19" *
G	2 1/2" Square Tubing	Rotator Housing	2	22" *
H	2 1/2" Square Tubing	Base Connector	1	54" *
I	2 1/2" Square Tubing	Base Connector	1	48" *
J	2 1/2" Square Tubing	Base Connector	1	42" *
K	2 1/2" Square Tubing	Base Connector	1	36" *
L	2 1/2" Square Tubing	Base Connector	1	30" *
M	2 1/2" Square Tubing	Base Connector	1	24" *
N	2 1/2" Square Tubing	Jack Mount	4	2 1/2" *
O	2" Square Tubing	Leg	4	16" *
P	2" Square Tubing	Leg Insert	4	22 1/2" *
Q	2" Square Tubing	Cross Mount Upright	2	22" *
R	2" Square Tubing	Main Upright	2	57" *
S	2" Square Tubing	Lateral Cross Mount	2	60" *
T	2" Square Tubing	Cross Mount Attach Arm	4	12" *
U	2" Square Tubing	Base Connector Link	6	15" *
V	2" Square Tubing	Connector Link (For Rotisserie Storage)	1	24" *
W	2" Square Tubing	Leg Extension (10" Casters)	4	4" *
X	1" Square Tubing	Head Brace	2	11 1/2"
Y	1" Square Tubing	Base Upright Brace	6	11 1/2"
Z	2 1/2" Schedule 40 Pipe	Rotator Outer Pipe	2	9"
AA	2" Schedule 40 Pipe	Rotator Inner Pipe	2	9 1/2"
AB	2" x 2" x 3/16" Angle	Cross Mount Brace	4	2"
AC	8" x 1/4" Strap	Brake Rotor	2	8"
AD	4" x 3/8" Strap	Brake Assembly Spacer Plate	2	4"
AE	4" x 1/4" Strap	Stabilizer Jack Base Plate	4	4"
AF	4" x 1/4" Strap	Inner Brake Pad	2	3 3/4"
AG	4" x 1/4" Strap	Outer Brake Pad	2	3 3/4"
AH	4" x 3/16" Strap	Caster Mount	4	4 1/2"
AI	4" x 3/16" Strap	Brake Assembly Backing Plate	2	8"
AJ	3 1/2" x 1/4" Strap	Attach Arm Mount	8	4 1/2"
AK	3" x 3/16" Strap	Rotator Top Cover	2	3"
AL	2" x 1/2" Strap	Stabilizer Jack Swivel Block	4	2"
AM	2" x 3/16" Strap	Cross Mount Top Plate	2	2"
AN	2" x 3/16" Strap	Cross Mount Brace	4	4"
AO	1 1/2" x 3/16" Strap	Stabilizer Jack Top Plate	4	1 1/2"
AP	1" x 1/4" Strap	Balance Jack Crank Handle	2	8"
AQ	1/4" Square Stock	Brake Pad Spacer	2	4"
AR	1/2" Threaded Rod	Balance Jack Assembly	2	14"
AS	1/2" Threaded Rod	Stabilizer Jack (6" Casters)	4	11"
AT	1/2" Threaded Rod	Stabilizer Jack (10" Casters)	4	13"

* To minimize waste, cut tubing as follows:

Cut details for 2 1/2" tubing:

Pieces B, C, D, and E, F and M are cut from 20' length of 2 1/2" tubing.

Pieces G, H, I, J, K and N are cut from 20' length of 2 1/2" tubing.

Piece L is cut from 3' length of 2 1/2" tubing.

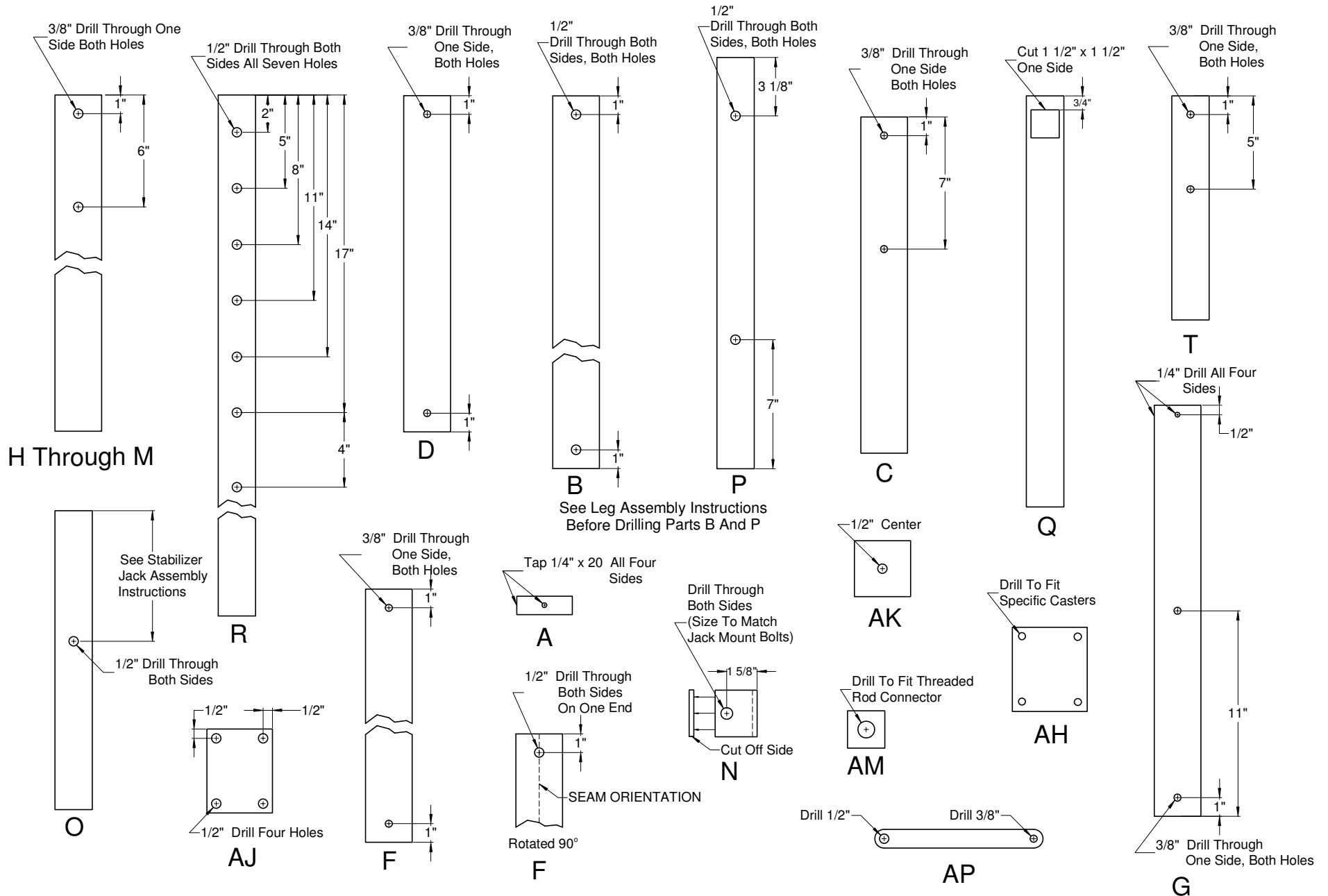
Cut details for 2" tubing:

Pieces O, P, Q, V and W (W is for 10" Casters) are cut from 20' length of 2" tubing.

Pieces R and S are cut from 20' length of 2" tubing.

Pieces T, and U, are cut from 12' length of 2" tubing.

Drill Diagram



See Leg Assembly Instructions Before Drilling Parts B And P

See Stabilizer Jack Assembly Instructions

Rotated 90°

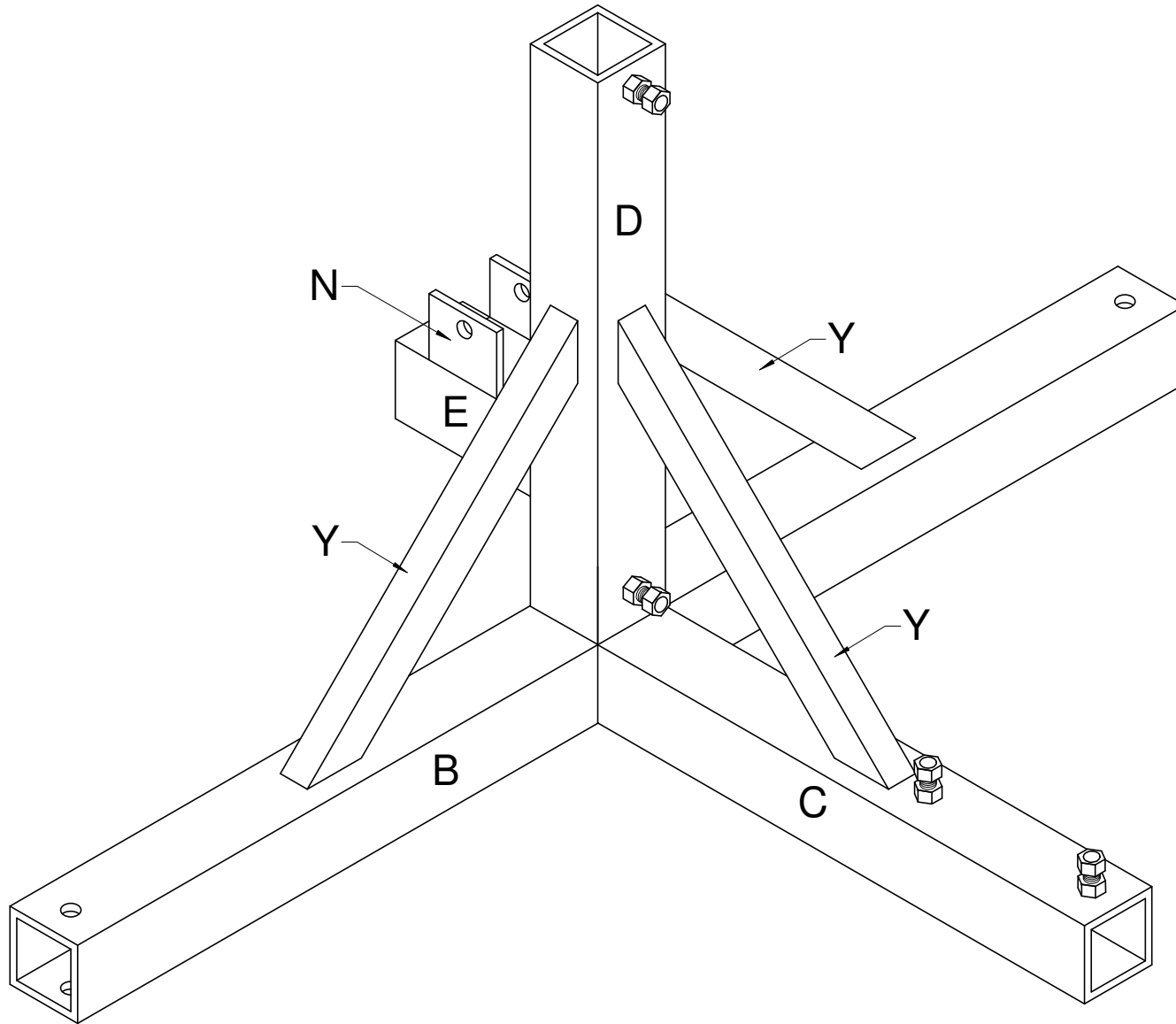
Assembly Notes

1. Construction of the EASY BALANCE Rotisserie only requires basic metal fabrication and welding skills. Ensure that all joints to be welded are clean of all dirt, grease and rust preventative protection. Pay particular attention to the welding notes in the assembly instructions on the stressed areas that need to be welded securely and as instructed for proper strength.

The fabricator/assembler should understand how each assembly goes together before each step is started. The accuracy in the cutting, grinding, modifying and assembly of each part is important to insure that the accurate and functional operation of the rotisserie are as advertised. **To insure a safe product, the end result regarding the final quality, application, and maintainance of this product is the sole responsibility of the person constructing, assembling and maintaning this rotisserie.**

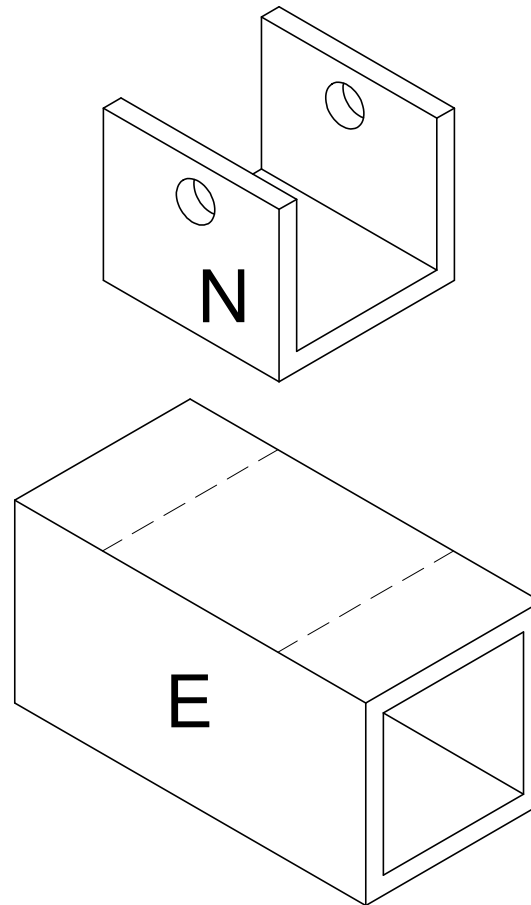
2. Cut pieces from Material List by using Cut List sheet. Follow suggested cutting combination of each piece of steel to minimize waste. After each cut, mark each piece with the corresponding letter ID as listed in the Cut List for easy identification.
3. Drill and modify cut pieces. Use Drill Diagram for dimensions.
4. On all 3/8" jam nuts, carefully center nuts over 3/8" holes of the 2-1/2" square tubing pieces and weld, taking care not to overheat and distort the nut.
5. Assemble and tack weld subassemblies together by following Assembly Sheets. Note that on the Head Assembly, page 3, Part N should be welded to Part F after verifying its postion using the compressed length of the hydraulic jack when it is attached to the Part N of the Base Assembly.
6. After rotisserie subassemblies are assembled and tacked together, verify proper operation. Then securely weld all joints. Note the lubrication of key parts during the final assembly.
7. When constructing the Leg Assemblies, choose which size caster is desired and follow the appropriate drawing.
8. When welding the connector Parts U to the 2-1/2" tubing, (Parts H through M), keep the free end of Part U up about an 1/8" from its free hanging position. When the conectors are assembled together, this will impart a slight upward preload that arches the connectors up in the middle to prevent possible sagging if a heavy vehicle is mounted on the rotisserie.
All six Base Connectors do not have to built if the vehicle that will be mounted on the rotisserie is shorter than 18'.
9. Paint all surfaces with a quality paint of choice.

Base Assembly

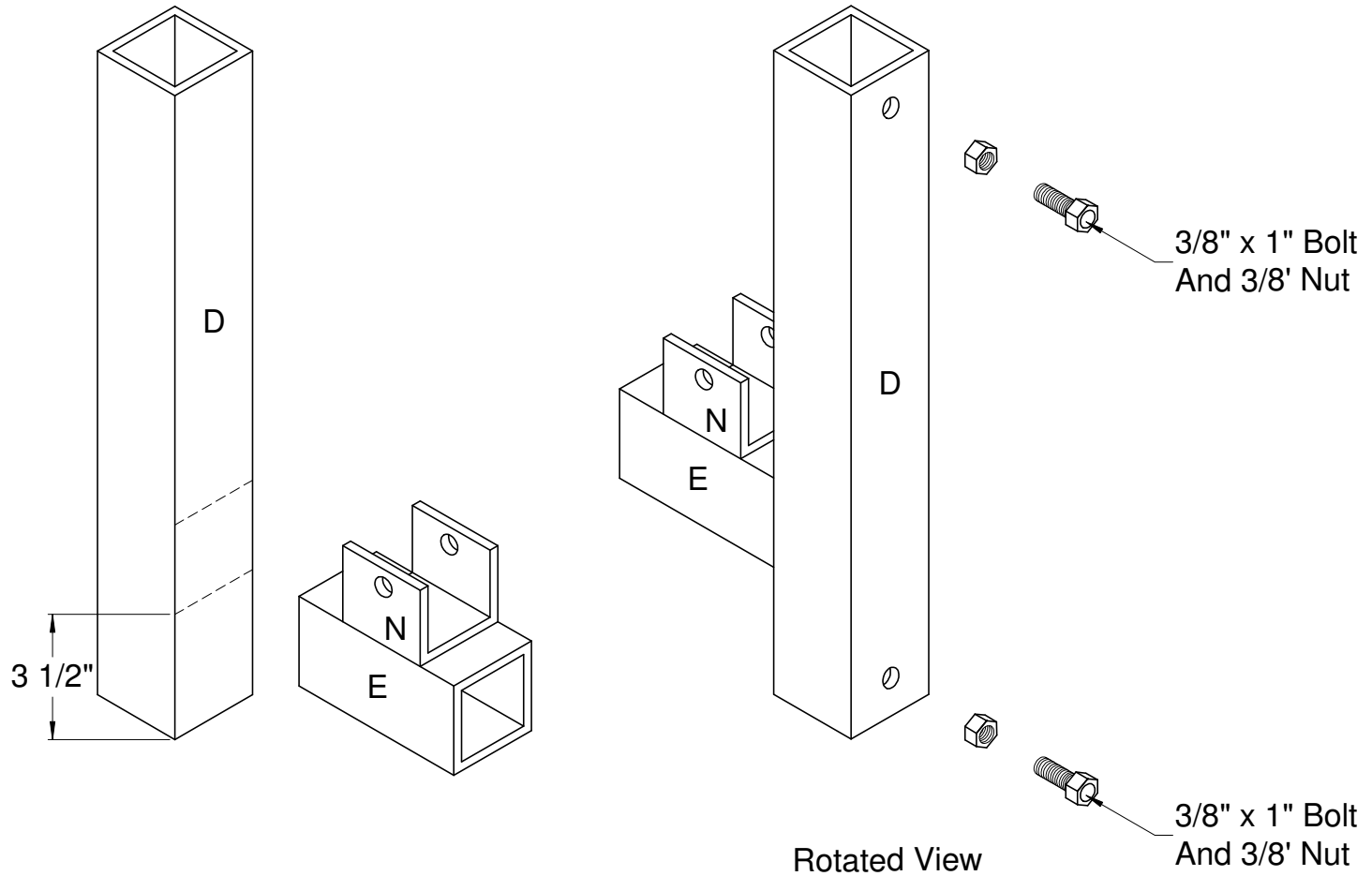


Base Assembly

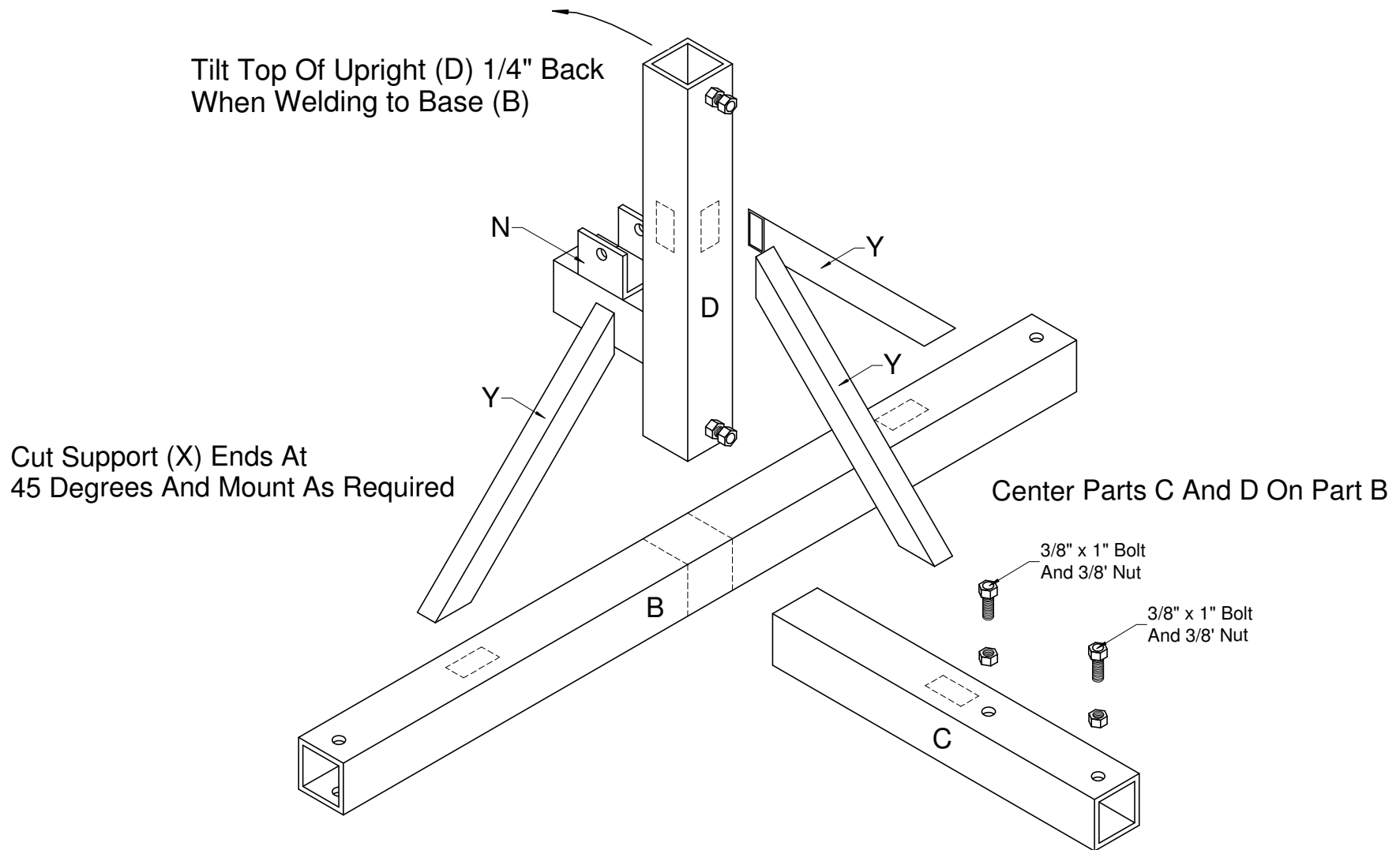
2



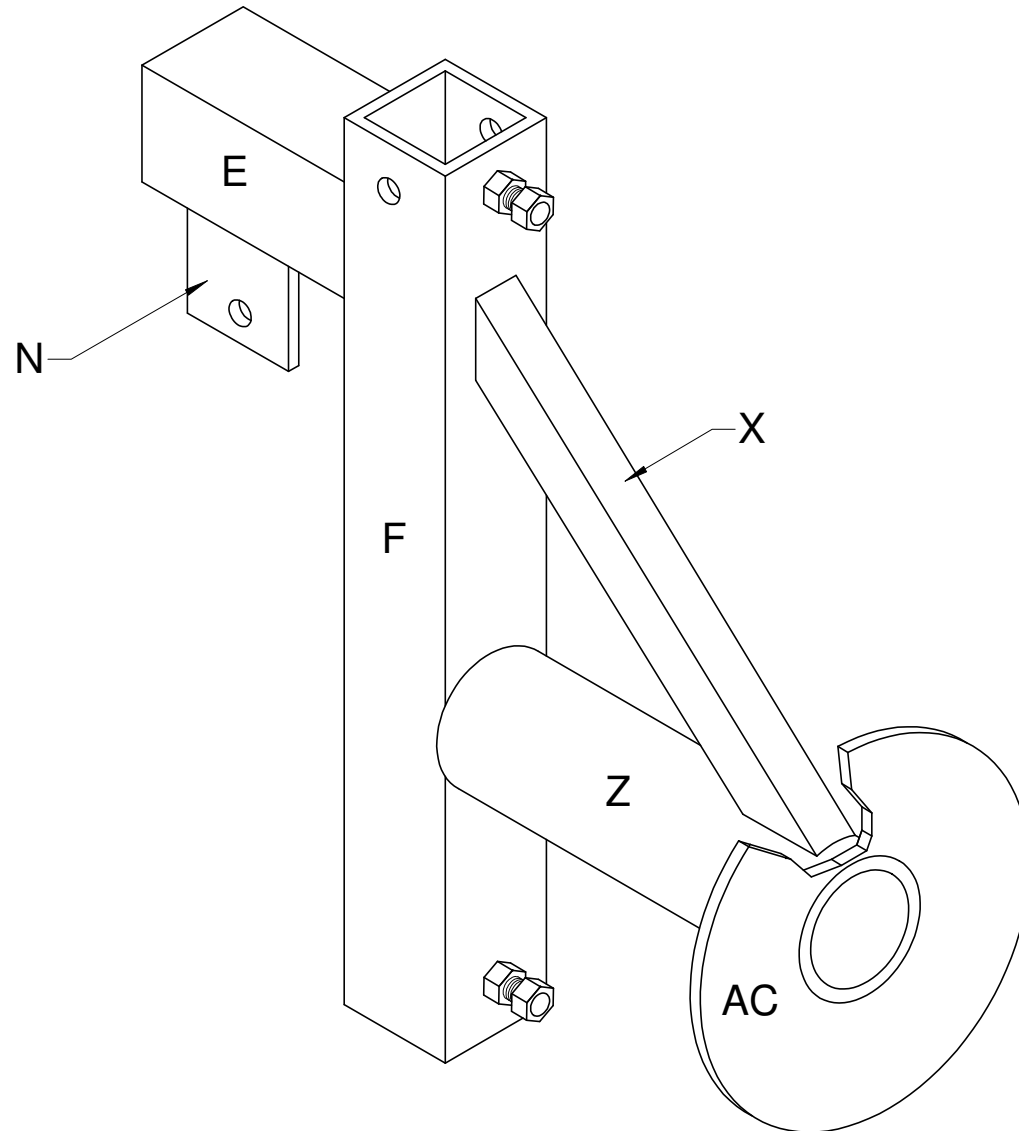
Base Assembly



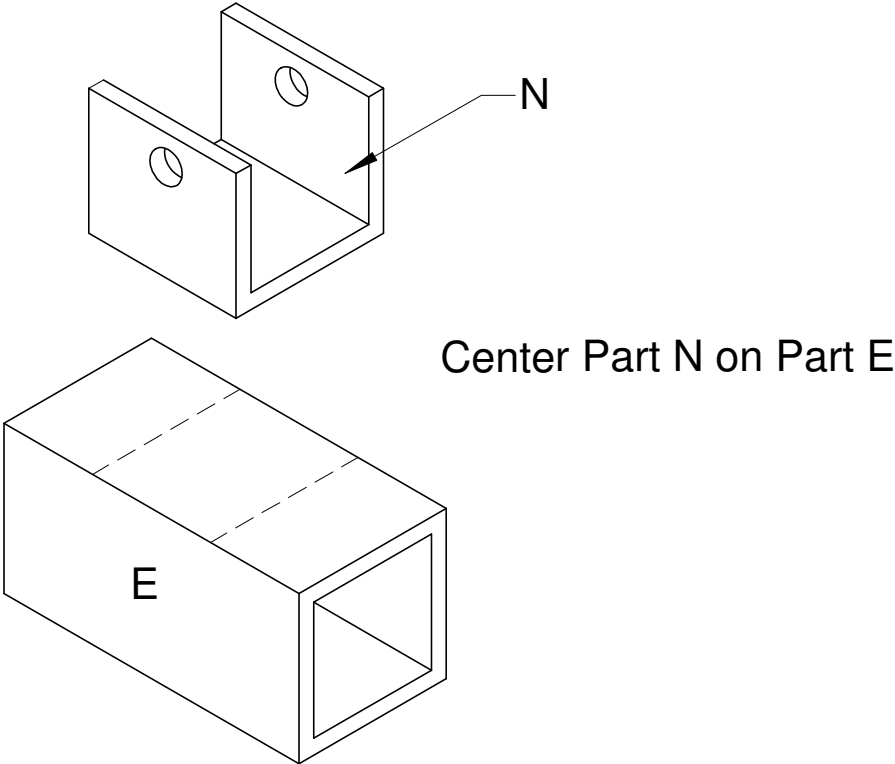
Base Assembly



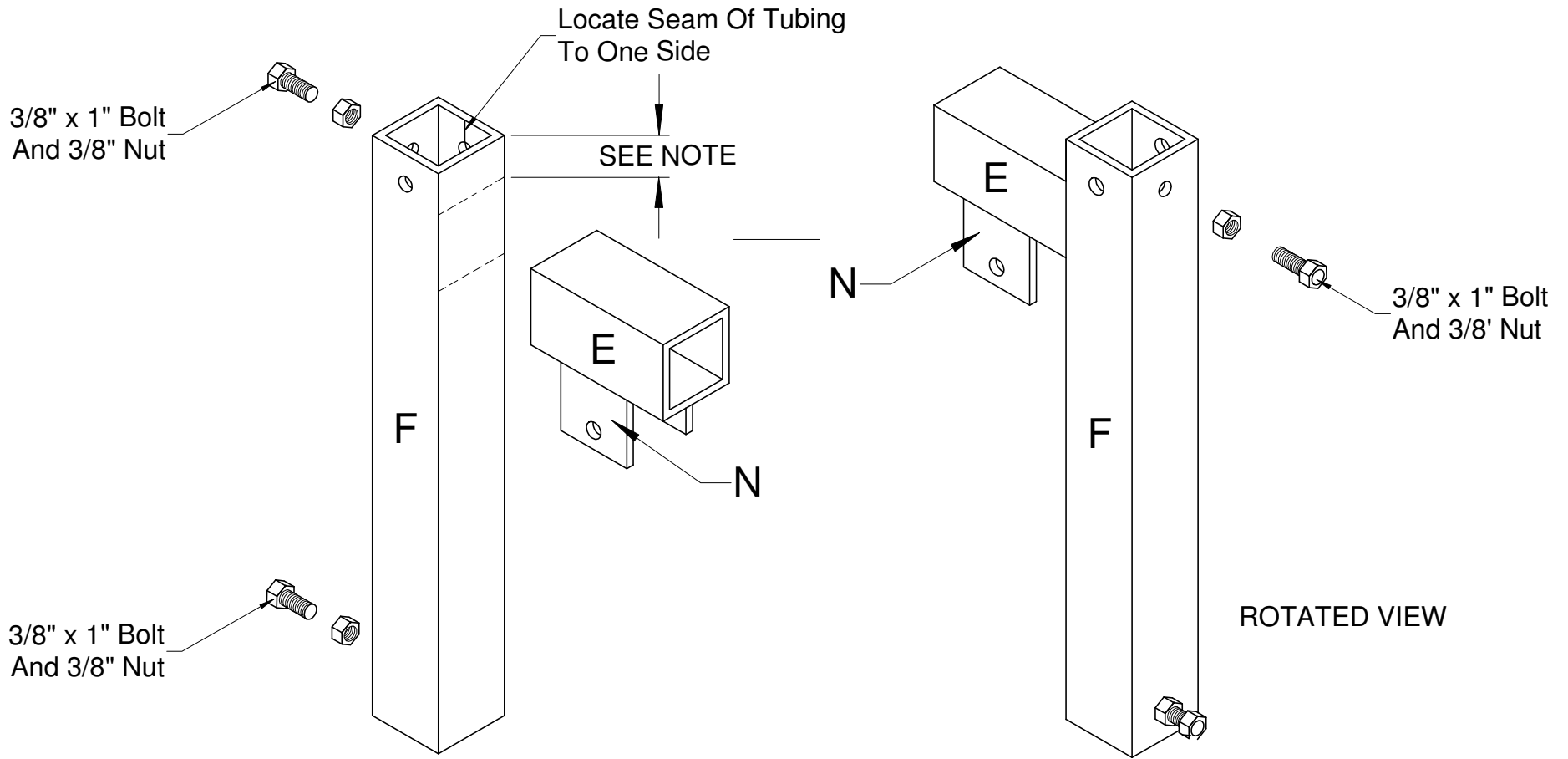
Head Assembly



Head Assembly

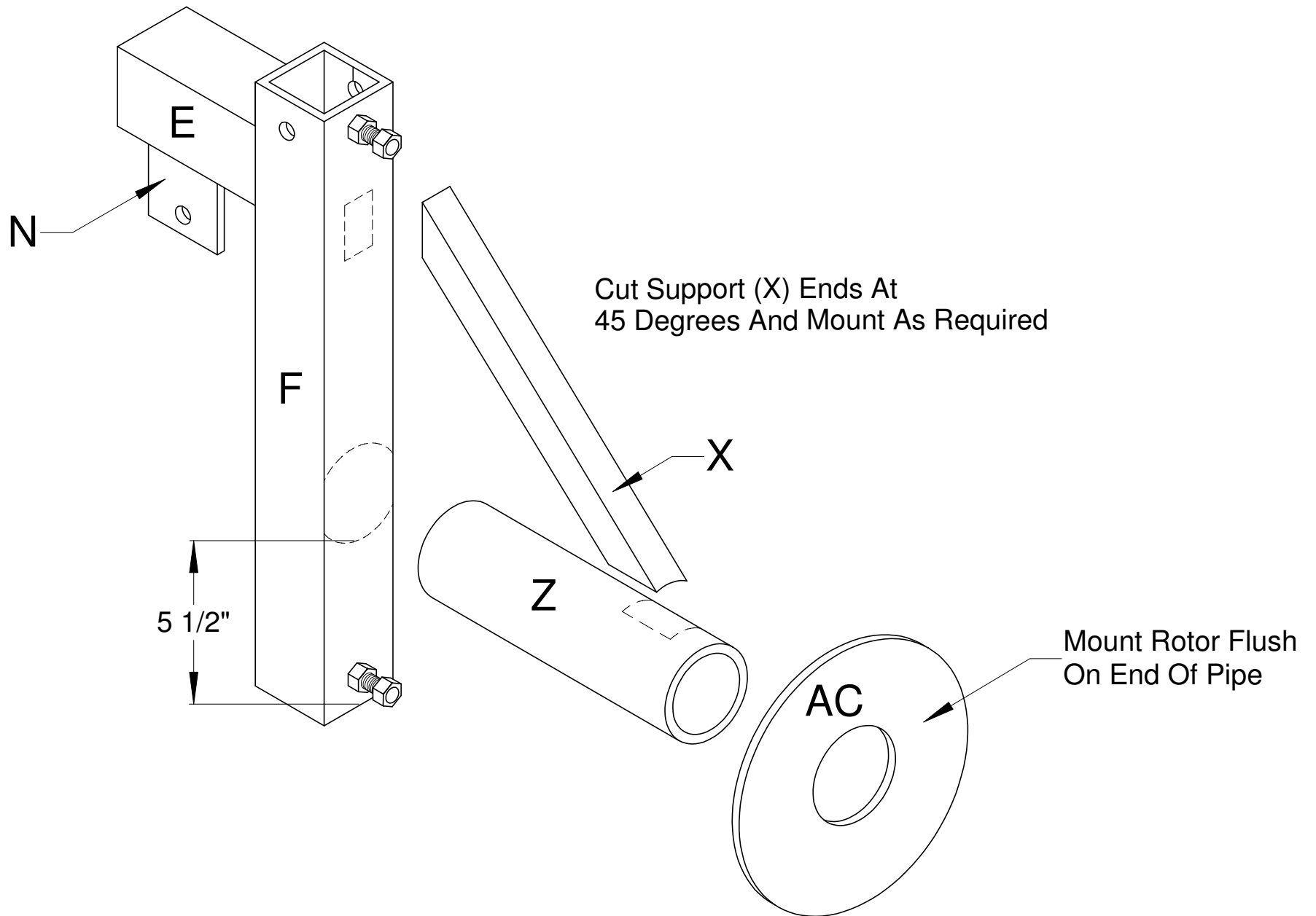


Head Assembly

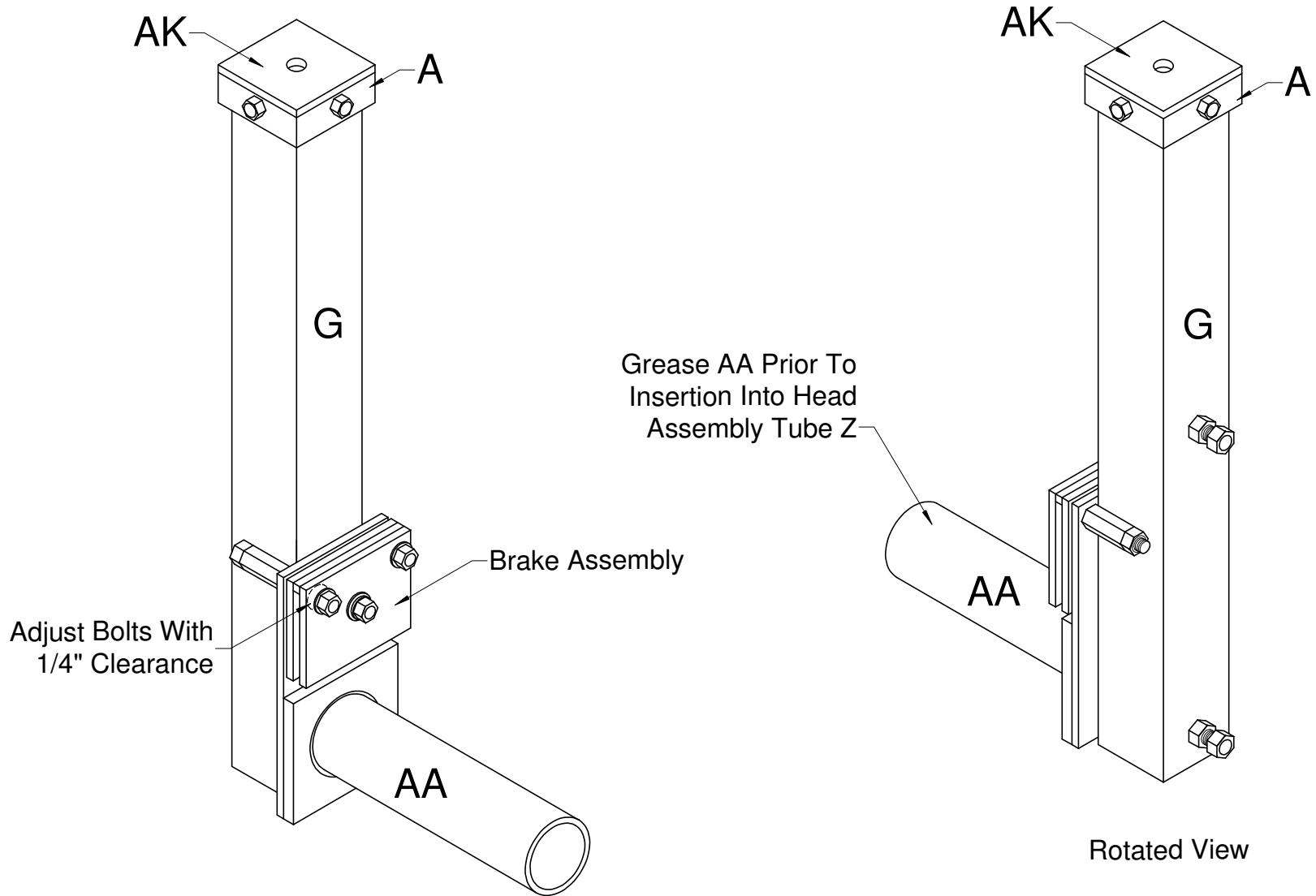


NOTE: THIS DIMENSION TO BE DETERMINED BY LENGTH OF COMPRESSED HYDRAULIC JACK (SEE ASSEMBLY NOTES)

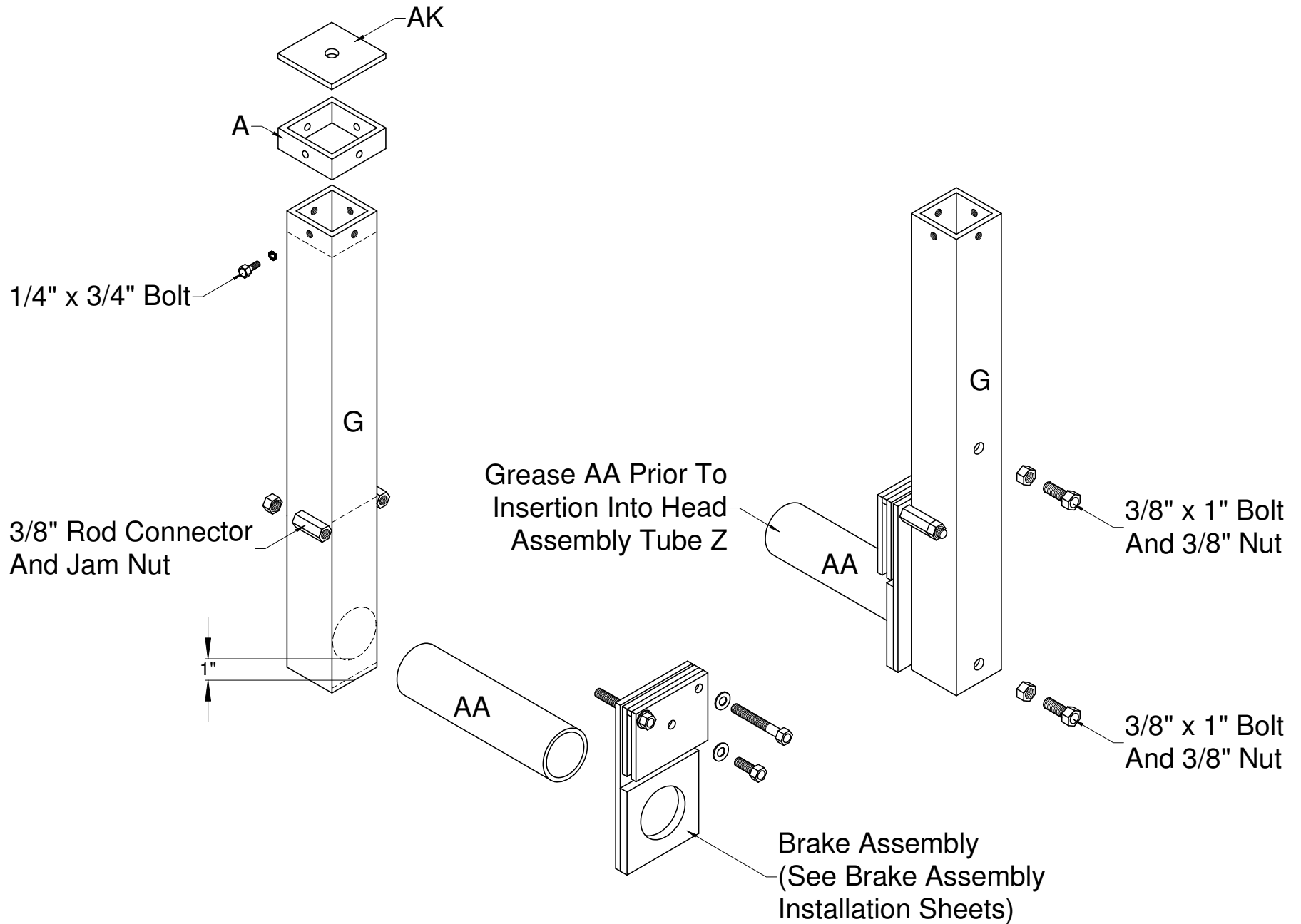
Head Assembly



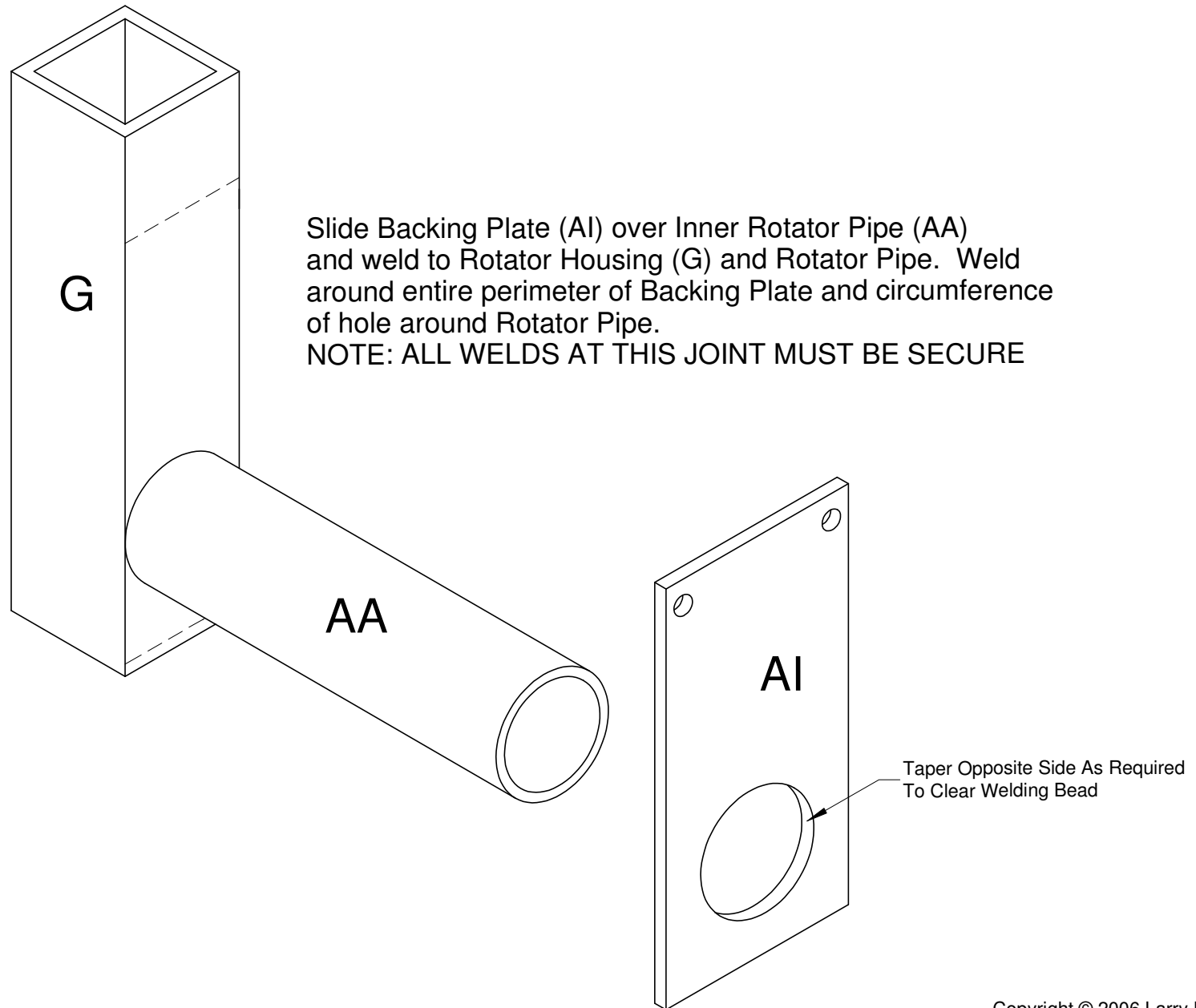
Rotator Assembly



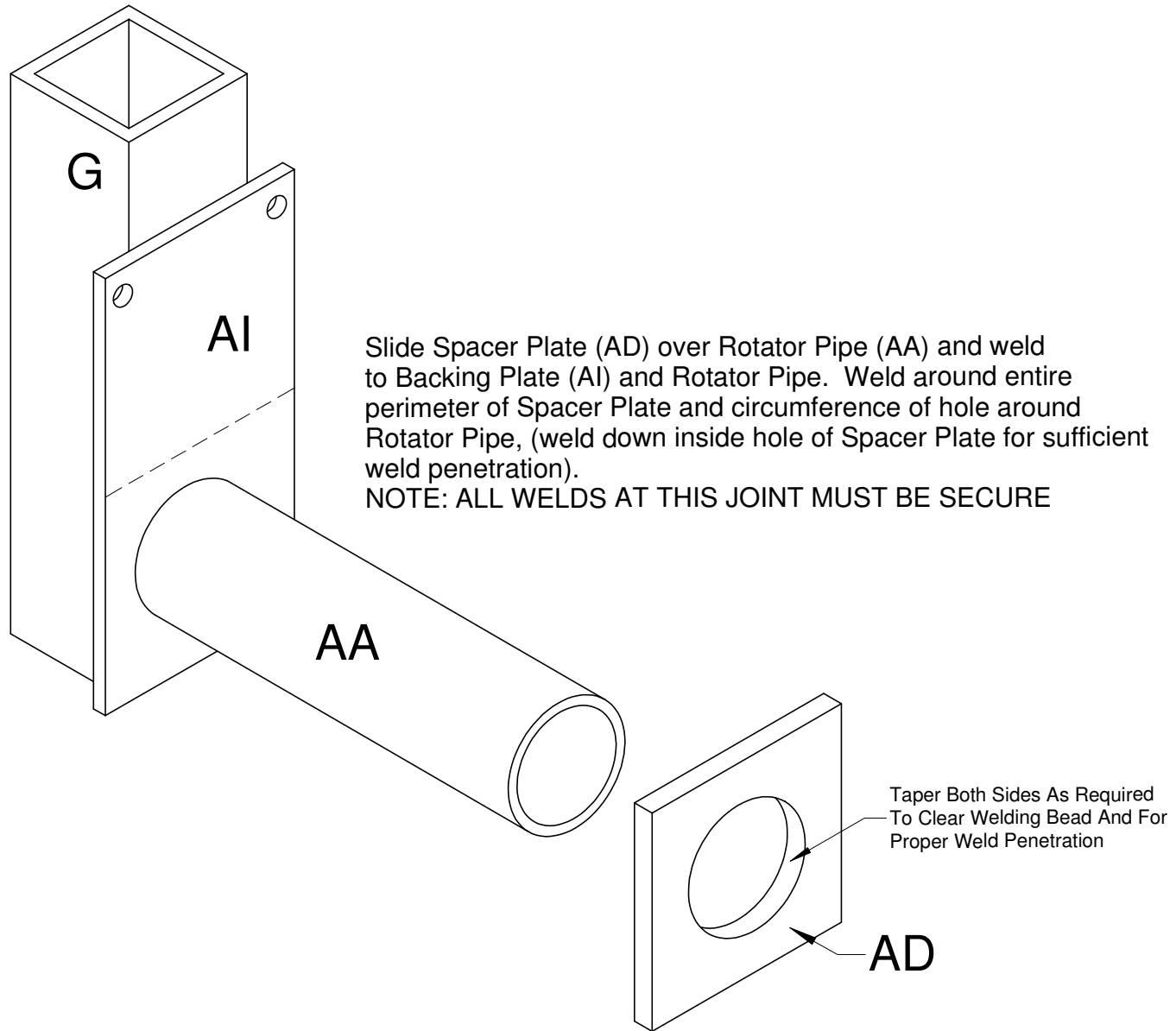
Rotator Assembly



Brake Assembly Installation

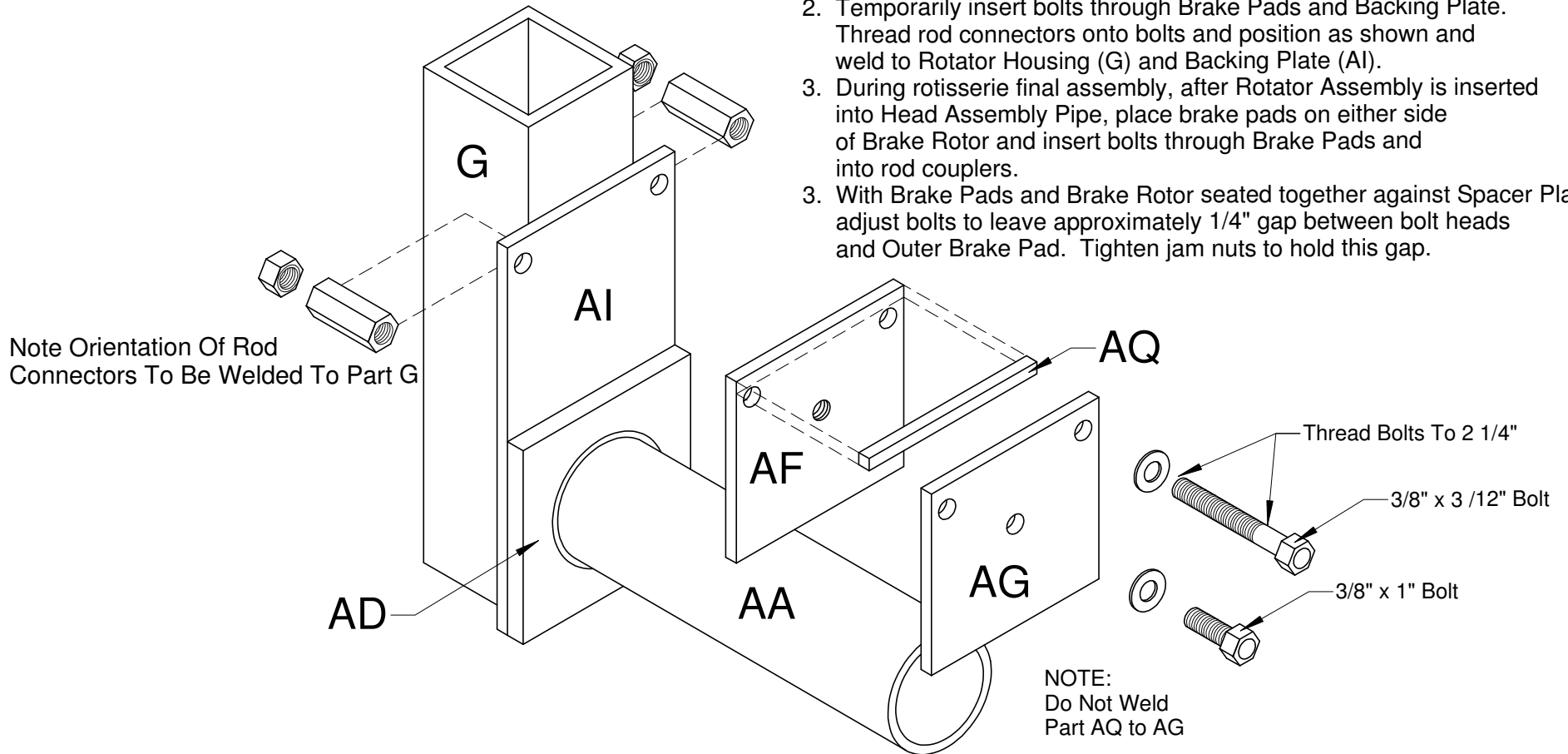


Brake Assembly Installation

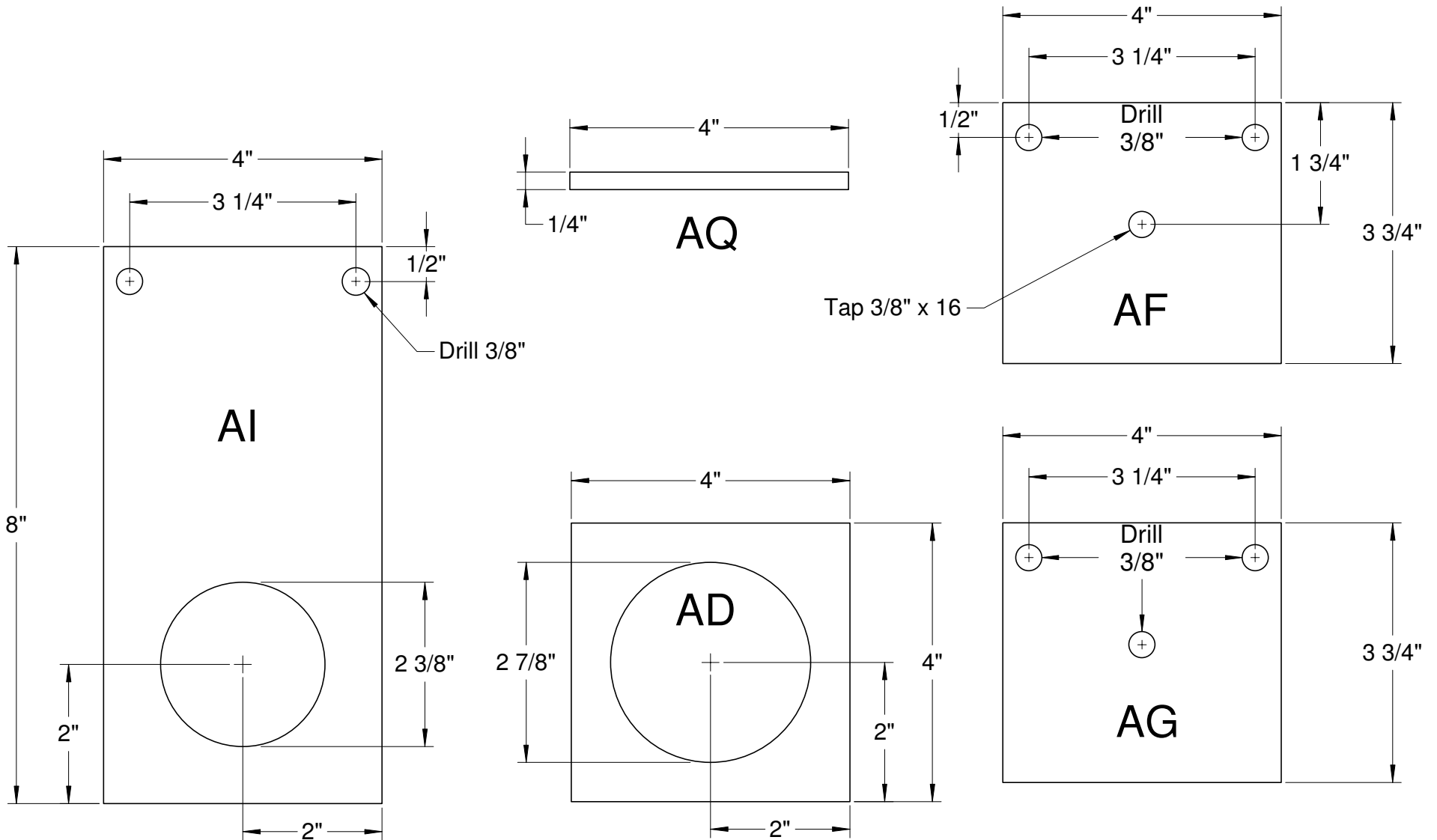


Brake Assembly Installation

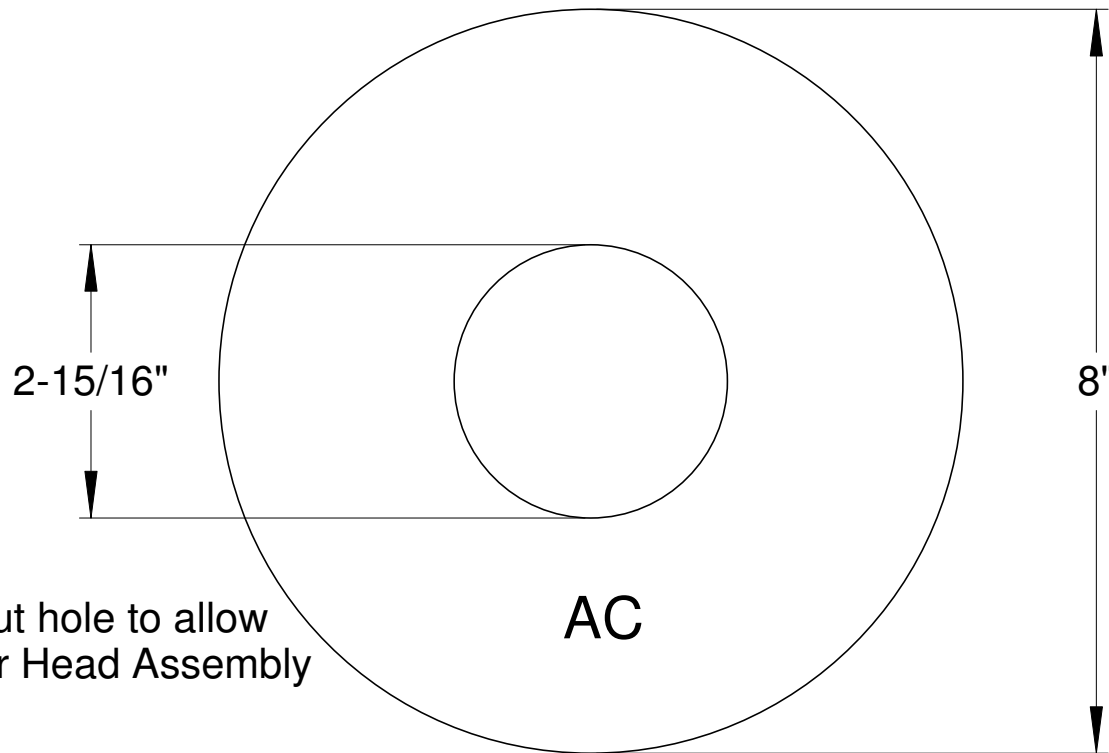
1. Weld Brake Pad Spacer (AQ) to Inner Brake Pad (AF).
2. Temporarily insert bolts through Brake Pads and Backing Plate. Thread rod connectors onto bolts and position as shown and weld to Rotator Housing (G) and Backing Plate (AI).
3. During rotisserie final assembly, after Rotator Assembly is inserted into Head Assembly Pipe, place brake pads on either side of Brake Rotor and insert bolts through Brake Pads and into rod couplers.
3. With Brake Pads and Brake Rotor seated together against Spacer Plate, adjust bolts to leave approximately 1/4" gap between bolt heads and Outer Brake Pad. Tighten jam nuts to hold this gap.



Brake Assembly Dimensions

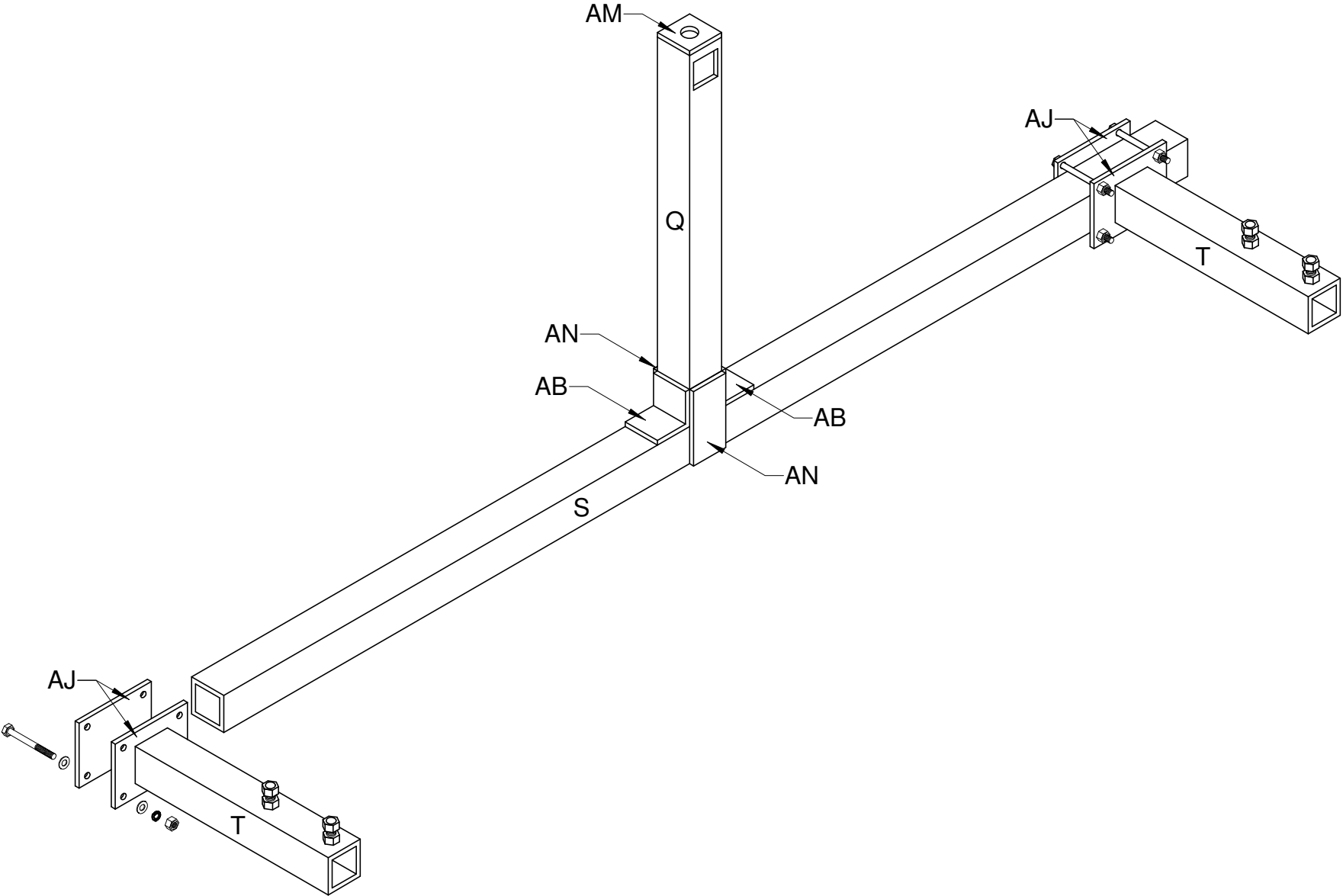


Brake Assembly Dimensions

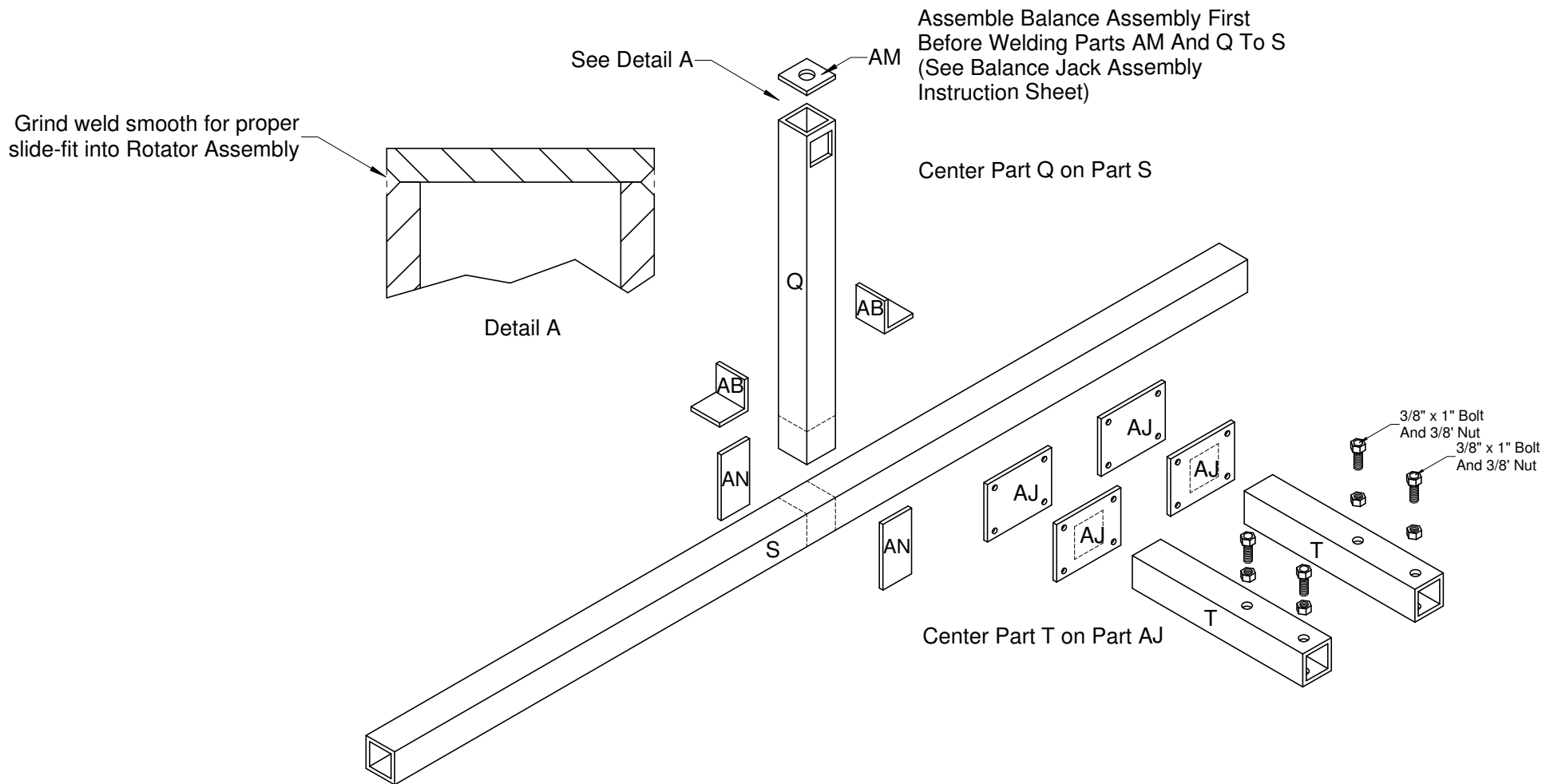


NOTE: Cut hole to allow slip fit over Head Assembly part Z

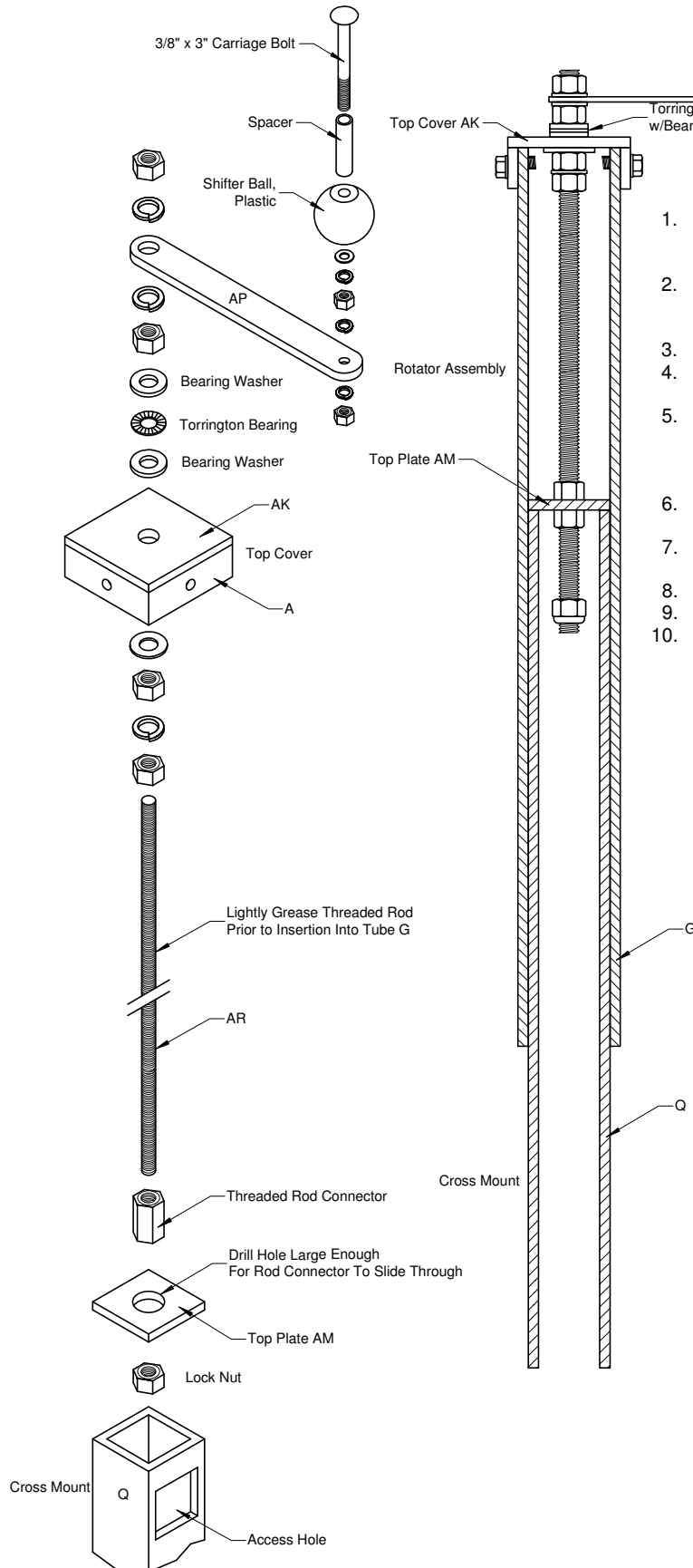
Cross Mount Assembly



Cross Mount Assembly



Balance Jack Assembly

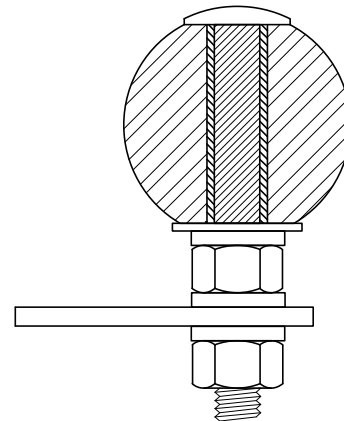


Balance Jack Assembly Instructions

1. Install threaded rod connector, Top Plate (of Cross Mount), then nylon lock nut onto bottom of threaded rod. Install lock nut about 1/4" from bottom of rod.
2. Slide rod connector into Top Plate half way through hole. Weld rod connector to Top Plate. NOTE: Threaded rod must be centered and aligned along center line of Jack Tube G.
3. Weld Top Plate to top of Cross Mount assembly.
4. With rod still in place, insert Cross Mount assembly into Rotator Assembly until rod protrudes from top of Rotator.
5. Install remaining parts on rod in this order from bottom to top: Nut, lock washer, nut, flat washer, Top Cover, bearing washer, torrrington bearing, bearing washer, nut, lock washer, Crank Handle, (AP), lock washer, and nut.
6. Tightly jam nuts and lock washers tightly to secure Crank Handle to rod. Top nut should be about 1/8" from end of rod.
7. Thread the next nut below top plate upwards until finger tight, preloading bearing.
8. Tightly jam this nut against remaining nut below.
9. Lightly grease threaded rod and oil Torrington Bearing.
10. Install Assembly into Rotator Assembly Tube G and secure Top Cover on G with 1/4" bolts, and lock washers.

(Note) To separate Rotator and Cross Mount, reverse assembly steps. Use access hole in top of Cross Mount to gain access to lock nut.

Crank Handle Knob Assembly Instructions

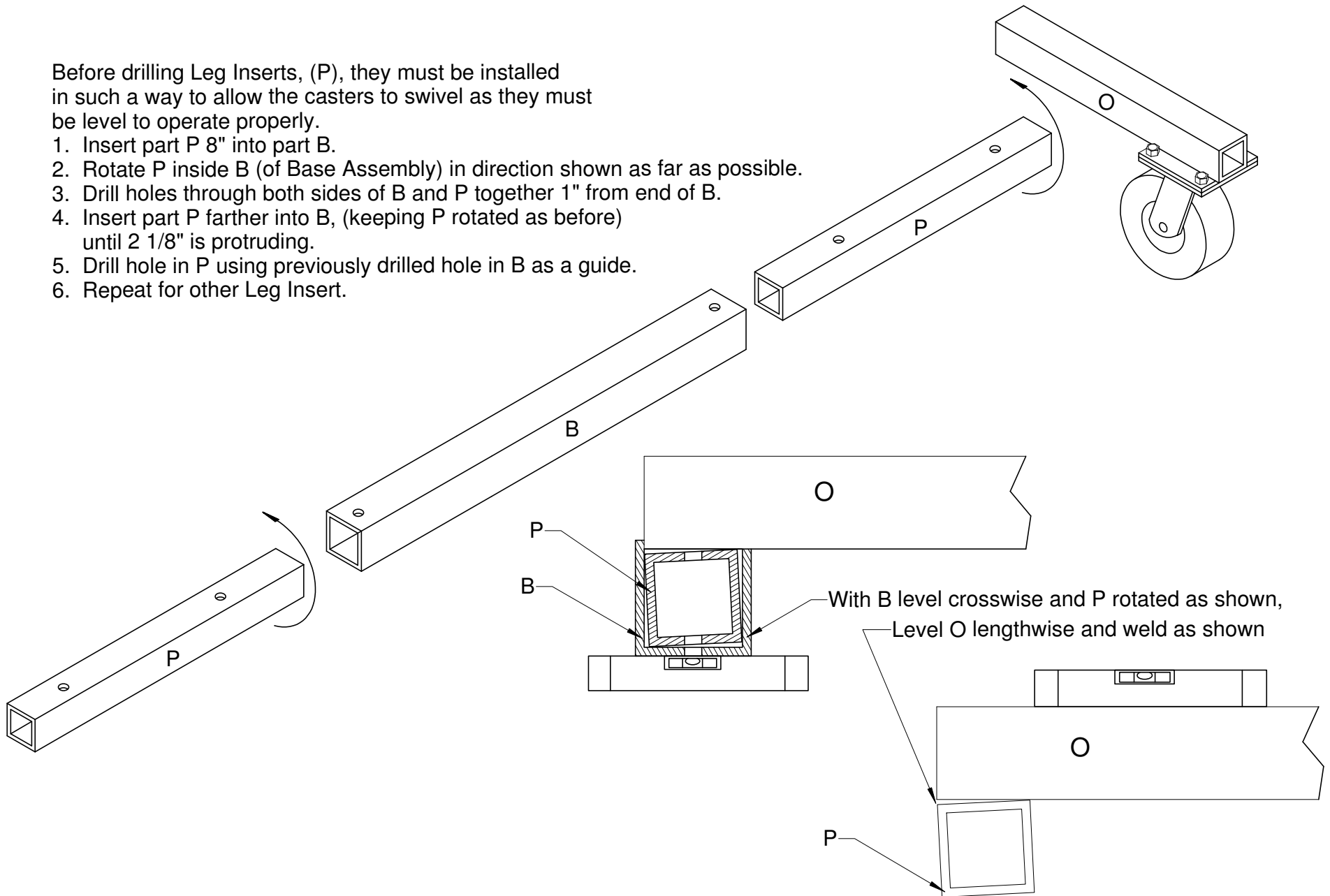


1. Drill 1/2" hole completely through shifter ball.
2. Machine top of ball flat approximately 7/8" in diameter.
3. Grind square section under bolt head until it is the same diameter as bolt.
4. Cut spacer so it protrudes from bottom of ball no more than 1/16" when spacer is flush with top of ball.
5. Lightly grease bolt, then insert bolt and spacer through top of ball.
6. Install flat washer, lock washer and nut.
7. Tighten nut against washers and spacer. Ensure that bolt rotates freely.
8. Install lock washer, crank handle, lock washer, and nut.
9. Jam nuts together tightly.

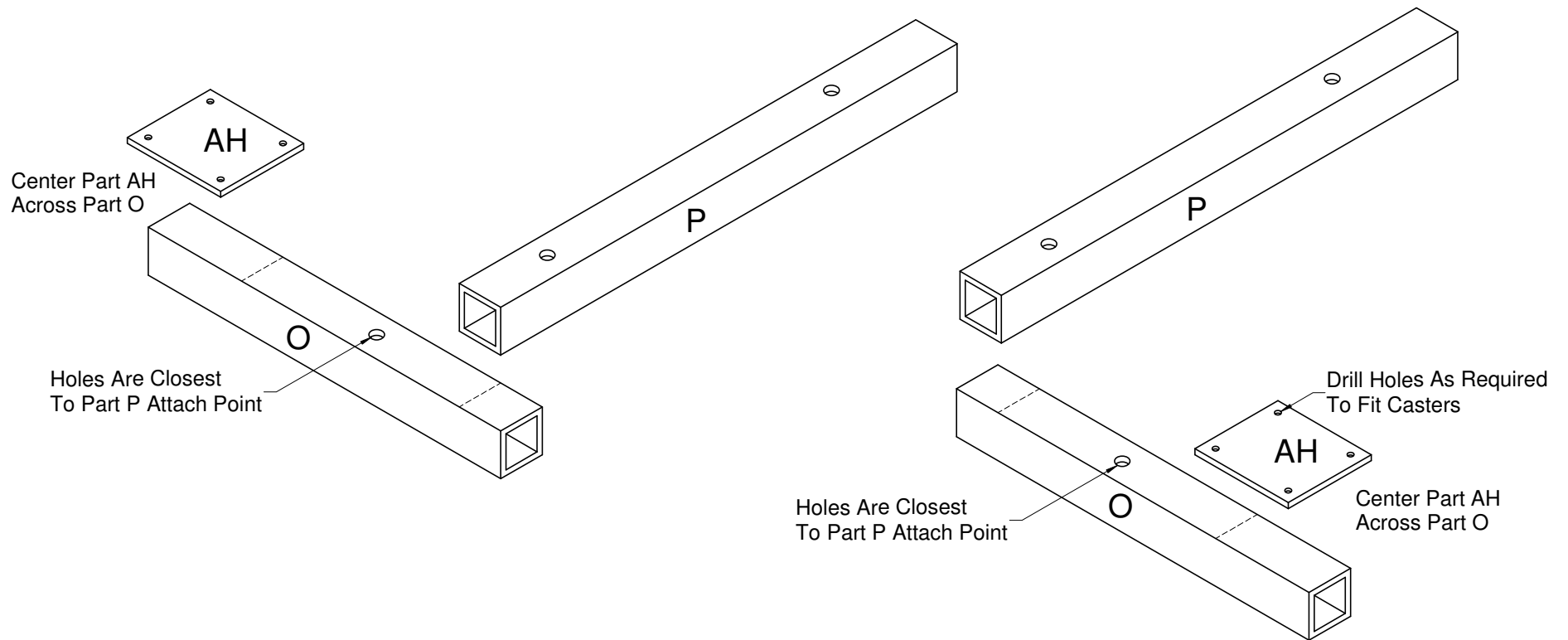
Leg Assembly Details

Before drilling Leg Inserts, (P), they must be installed in such a way to allow the casters to swivel as they must be level to operate properly.

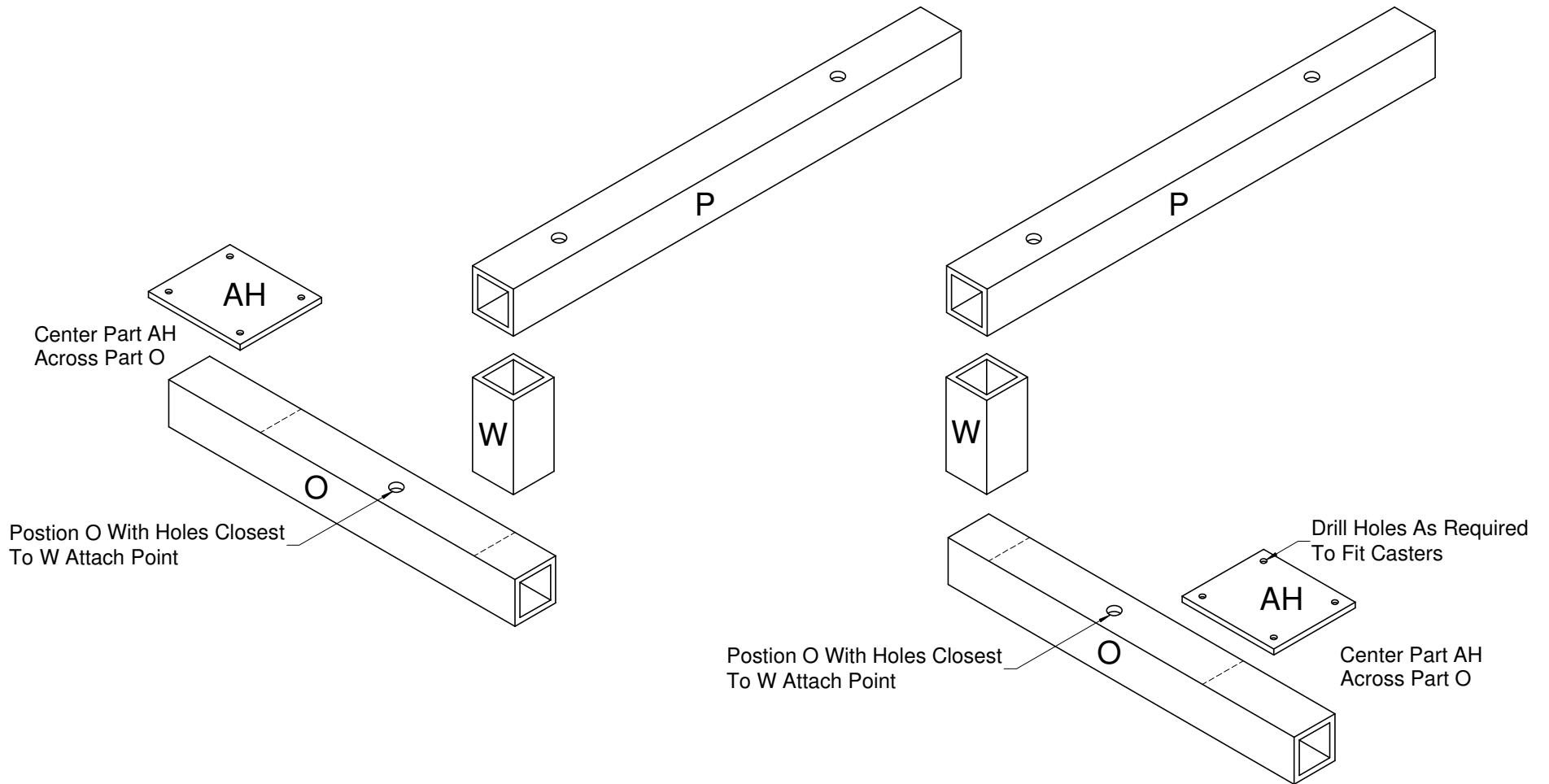
1. Insert part P 8" into part B.
2. Rotate P inside B (of Base Assembly) in direction shown as far as possible.
3. Drill holes through both sides of B and P together 1" from end of B.
4. Insert part P farther into B, (keeping P rotated as before) until 2 1/8" is protruding.
5. Drill hole in P using previously drilled hole in B as a guide.
6. Repeat for other Leg Insert.



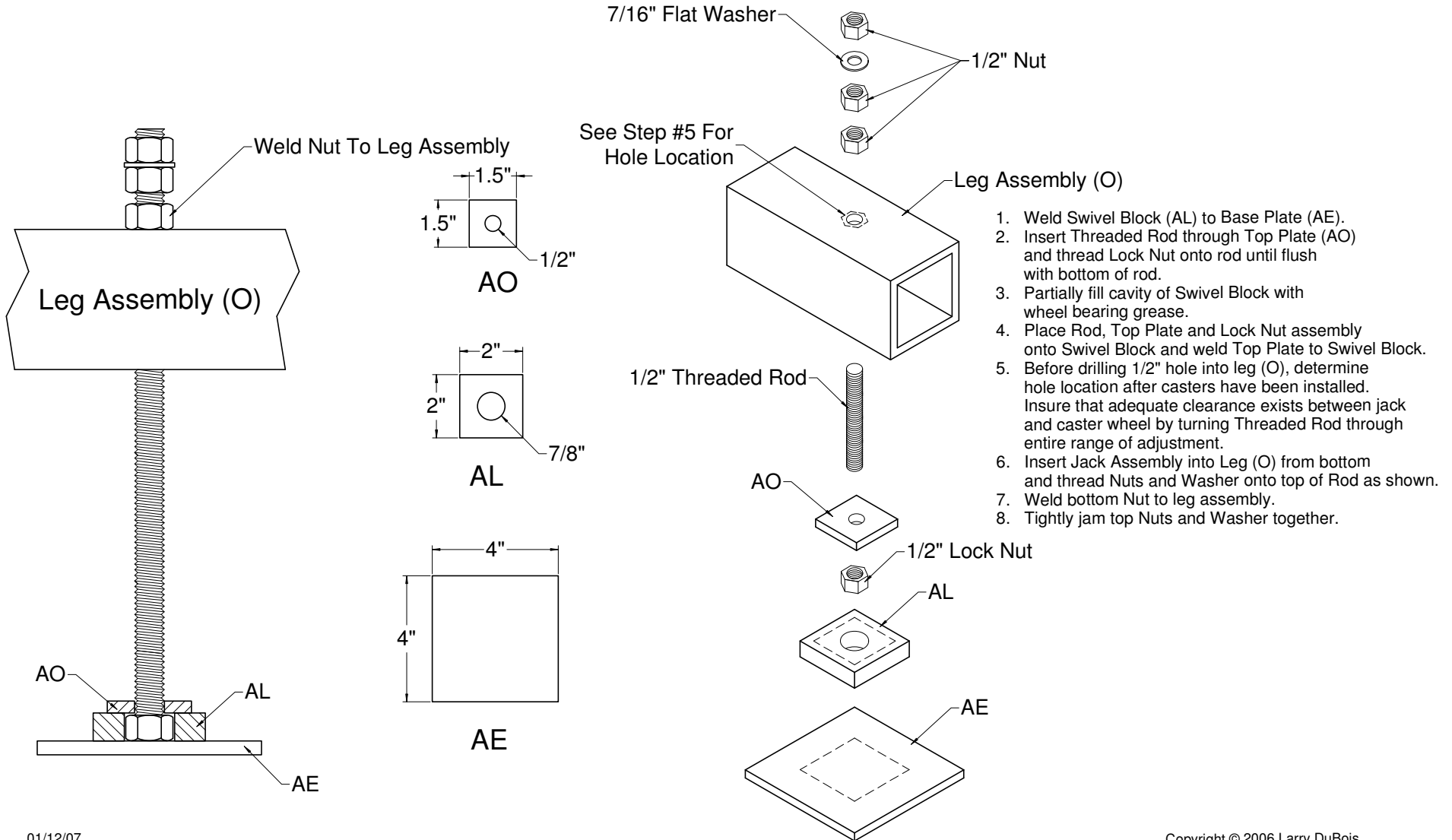
Leg Assemblies 6" Casters



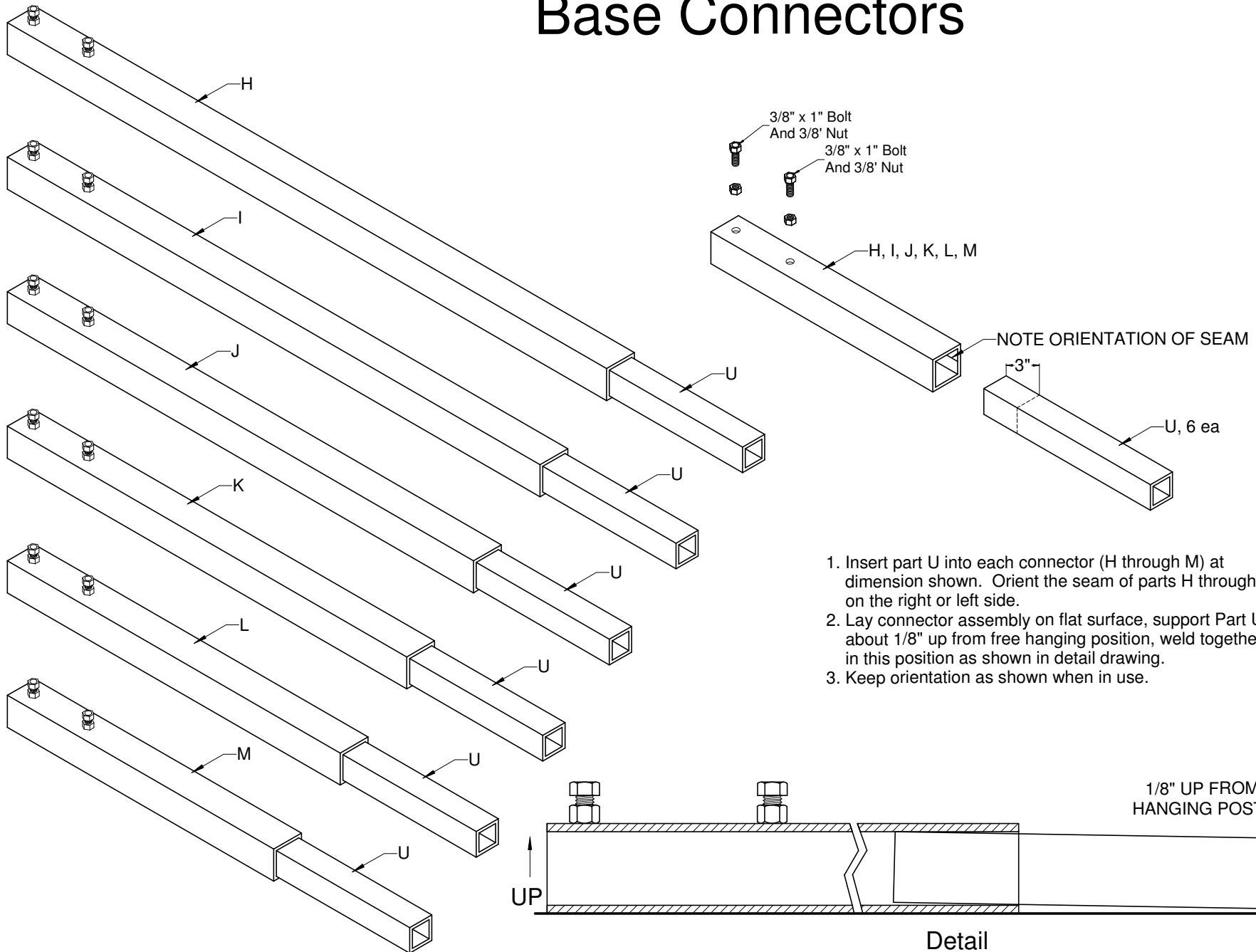
Leg Assemblies 10" Casters



Stabilizer Jack Assembly



Base Connectors



Connector Usage Chart

Vehicle Length	Connector Sections To Use					
	H	I	J	K	L	M
18	X	X	X	X	X	X
17.5	X	X	X	X	X	X
17	X	X	X	X	X	X
16.5	X	X	X	X	X	X
16	X	X	X	X	X	
15.5	X	X	X	X		X
15	X	X	X		X	X
14.5	X	X		X	X	X
14	X		X	X	X	X
13.5	X	X	X	X		
13	X	X	X		X	
12.5	X	X		X	X	
12	X		X	X	X	
11.5	X		X	X		X
11	X		X		X	X
10.5	X	X	X			
10	X	X		X		
9.5	X		X	X		
9	X		X		X	
8.5	X		X			X
8	X			X		X
7.5	X				X	X
7	X	X				
6.5	X		X			
6	X			X		
5.5	X				X	
5	X					X
4.5		X				X
4			X			X
3.5				X		X
3	X					
2.5		X				
2			X			
1.5				X		
1					X	
0.5						X

(Cut Piece "H" To 48")
 (Cut Piece "H" To 42")
 (Cut Piece "H" To 36")

Operation Instructions

Congratulations on the successful construction of the EASY BALANCE Auto Rotisserie! A few minutes spent here will allow you to get the most out of the world's easiest-to-use rotisserie!

The EASY BALANCE Rotisserie will support the typical weight of any passenger vehicle or light truck with the transmission and engine removed. When selecting the caster's load capacity for mobile use, keep in mind the total weight of the vehicle and the rotisserie.

There are many combinations of ways to mount a vehicle on the rotisserie based on the type of vehicle and the attachment points selected. Therefore, it is the responsibility of the user to fabricate the mount adapters that best fit the vehicle. Keep in mind when choosing the location of the mounting points that they must be located within the range of the rotisserie's Balance Jacks to provide proper balance of the vehicle. After the adapter design is selected and fabricated, they are simply welded to 12" lengths of 1-1/2" square tubing. This tubing will be inserted into the Cross Mount Assembly Arms.

The first step in mounting the vehicle on the rotisserie is to select the proper combination of Base Connectors using the "Connector Usage Chart". Use the Connectors that will allow the Mount Adapters to be inserted as deep as possible into the Cross Mount Attach Arms.

Move the rotisserie into place at each end of the vehicle. If the legs with casters are being used, lowering the Stabilizer Jack Pads to the floor will help keep each rotisserie end stable until the Base Connectors are attached. Sliding the Leg Assemblies to their outer position will give better stability when rolling the rotisserie and vehicle across unlevel surfaces.

Attach the required number of base connectors. Slide the Cross Mount Arms along the Cross Mount until they match the mounting points on the vehicle, being sure to center the arms on the Cross Mount. It is usually easier to slide the mount adapters into the Cross Mount Arms then loosely attach the adapters to the vehicle.

If the mounting point heights are different at each end of the vehicle, extend the Hydraulic Jack at the appropriate end of the rotisserie until the Mount Arms are at the proper height to mount to the vehicle in a level condition.

After everything is aligned, tighten all bolts securely, including the Base Connector Jam Bolts and the Base Assembly Jam Bolts. Note that the Cross Arm Mount clamps do not have to be tightened to the extreme.

The clamping action secures the Mounts with minimal bolt torque.

After all loose items in the vehicle are removed, the jacking process can begin. Normally, the Balance Jacks are in their fully lowered position prior to jacking. To ensure that the vehicle does not rotate as the result of an out-of-balance condition, engage both Brake Assemblies by tightening the Caliper Bolt on each Brake.

Note that the brakes are very efficient. Only apply the necessary torque to the Caliper Bolts to lock the vehicle in the desired position.

Begin jacking both ends of the rotisserie equally until the vehicle is approximately at the height needed to clear the Base Connectors when the vehicle is rotated. The final height will be determined later after the vehicle is balanced on the rotisserie.

NOTE: To prevent damage to the vehicle, do not allow one end of the rotisserie to become appreciably higher than the other. If jacking is being accomplished by one person, jack each end a few inches at a time.

Carefully loosen the Brake Caliper Bolts to determine the balance condition of the vehicle. Normally, with the Balance Jacks in the lowered position, the vehicle will be bottom heavy. Rotate the vehicle back and forth to determine the balance. Crank each Balance Jack Handle equally to raise the vehicle until balance is achieved. Tighten the Rotator Assembly Jam Bolts to minimize movement. Once properly balanced, the vehicle will rotate easily.

If necessary, extend the Hydraulic Jacks to the minimum height required to fully rotate the vehicle 360 degrees. For safety, jack to the nearest hole to insert the Safety Pins through the Head Assemblies at each Upright. Tighten the Head Assembly Jam Bolts. This helps keep the Head Assembly in alignment and keeps slack in the rotisserie to a minimum.

Use part V (24" x 2" square tubing) to connect the rotisserie base ends for transportation and storage.

Maintenance of the EASY BALANCE Rotisserie is simple. The only lubrication that is necessary is the occasional light oiling of the Stabilizer Jack threads and the Balance Jack Torrington Bearing. Also, keep the Rotator Assembly Pivot Tube well greased and Balance Jack Knob greased. The Balance Jack threads should be greased during assembly. No lubrication is necessary on the sliding areas of the Upright Tube and Head Assembly.