We have model 'R' without hydraulic pump

ASH-DOME MAINTENANCE - OPERATING INSTRUCTIONS page 1

With regular maintenance your new **Ash-Dome** should provide many years of service. The following general information also attempts to provide you with basic dome operations.

1) When your Ash-Dome is not being used it is suggested you keep the shutters turned into the prevailing winds. This practice minimizes the possibility of blowing dust, fine snow or driving rain from entering the dome.
2) Should your observatory be located over or near a heated area it is recommended the observing area be vented to keep the temperature ambient with the outside air. This will greatly reduce condensation from forming inside the dome or on the telescope.
3) The Ash-Dome is a positive rack and gear drive system in the shutter and azimuth drives. These require attention and it suggested a regular maintenance schedule be followed.
4) Apply a good grade of all weather grease to the shutter drive gear teeth and the worm gear. (This can be done BI annually)
5) The edges of the shutter drive track should also be greased to minimize wear over years. (This can be done BI annually)
6) The Neoprene Weather Seals along each side of the dome aperture, around the azimuth rollers and across the front and back of the shutter should be sprayed with a dry silicone to extend the life of the material.
(This can be done BI annually)
7) The oil levels in the azimuth drive and upper shutter drive gear boxes are filled with: Klubersynth UH16-460. If you do not see any oil leaking it is not necessary to change this oil.
8) The MEBH Ash-Dome uses a hydraulic pump to operate the lower dropout shutter. The reservoir on the pump should be at least 3/4 full and should be checked regularly. Refill to 3/4 using any all temperature hydraulic oil. Mobil DTE 24 or equal: see pump manual (This can be done BI annually)
9) The Model 'M' Ash-Dome rotates on steel tires with sealed roller bearings. The area between the tire and the dome track should be greased. (This can be done BI annually)
10) The Model 'R' Ash-Dome rotates on steel tires with open bearing rollers. These should be lubricated with alight spray oil. (This can be done BI annually.)
11) The azimuth drive on Model 'R' Ash-Domes may require adjustment over time. The azimuth drive gear may need to be pressed down further into the drive track. This is done using the wing nut in the motor mounting bracket. The azimuth drive system should be adjusted so the gear engages the azimuth drive track just pressing against the track. The azimuth drive motor mount is spring-loaded and the drive gears more or less floats along in the drive track. Over tightening of the compression spring and drive gear will promote excessive wear of the drive gear and track. The drive track itself requires no lubrication.
12) During the fabrication roll forming, drilling, cutting, grinding and welding is done. Upon completion of the fabrication and testing, the dome is marked, disassembled, cleaned and made ready for shipment. The welds and any raw edges are sprayed with a rust inhibitor. After the assembly on the observatory site it may be necessary to re-spray these areas. (These areas should be checked BI annually.)
13) If it is felt necessary to paint your Ash-Dome after years of service, any high quality exterior paint used on metal buildings should be adequate. Follow the manufactures instructions.
14) The shutters have horizontal seams sealed with silicone tube caulking. In the event the silicone sealant separates from the metal any exterior high quality silicone tube caulking can be used to re-seal these areas. (See Sketch)
15) The areas along the sides of the dome aperture are sealed with a high quality caulking. Over time this material may shrink and need to be sealed over. After removing any lose material it is suggested a tube silicone be used right over the area.

1) Model 'R' Ash-Dome shutter drive units typically use a drum switch control. The lever action is limited with a safety slide-lock. With the lever in the neutral position the slide-lock must be moved manually from either one side or to the other side of the switch. This action allows the operator to move the lever from neutral to **OPEN** or **CLOSE**. The slide-lock causes a forced delay. The delay is required to prevent any attempt to make an instant change of the shutter's direction without allowing the electrical drive motor come to a complete **STOP**. The motor is not an instant reversing motor and will not reverse direction if it does not **STOP** completely. (See sketch)
2) The Model 'M' Ash-Dome shutter drive motor also uses the same drum switch without the slide-lock.
3) Azimuth drive motor or motors use a drum switch to control motions. (See sketch)
4) Should your Ash-Dome be fitted with contactor bars, remote control or other options please see the additional cut sheets.
5) The positive rack and gear azimuth drive system, Model 'R' Ash-Dome should be adjusted so the gear engages the drive track, just pressing against the track. Model 'M' azimuth drive motor mounts are spring loaded and the drive gear more or less floats along in the drive track. Over tightening the extension spring and drive gear will promote excessive wear of the azimuth drive gear and track. The drive track itself requires no lubrication.
6) The Ash-Dome fitted with the Type 'B' shutter style; the lower drop out door section should be fully closed before closing the upper door section completely. If not, sever damage to the shutters could result. Do not attempt to open the lower drop out door section with the upper door section closed. Any slack in the operating cable will cause sever damage to the shutter system.
   NEVER walk away from your Ash-Dome while the dome is in motion.
   NEVER operate the Ash-Dome with any of the guards removed.
   NEVER allow un-trained personnel to operate the observatory dome. This is a major cause of equipment failure.

DO NOT AT ANY TIME ATTEMPT TO OPEN OR CLOSE THE UPPER SHUTTER USING THE MANUAL OVERRIDE WITHOUT INSURING THE ELECTRIC POWER IS TUNED OFF. SERIOUS INJURY MAY RESULT, POSSIBLE DEATH.

Owner's Responsibility:

1) As the owner, you are responsible for the maintenance of your Ash-Dome.

2) Should any unusual conditions be noticed which appear to be beyond the capabilities of local mechanics to correct, please call this office.

Ash Manufacturing Company, Inc.
Ph: 815 436 9403, fax 815 436 1032
Email: ashdome@ameritech.net

Optional Remote Control Paddle Operation: Jan 2011

Selector Switch to Remote Control
To reverse any dome motion you must push the STOP BUTTON first.

Upper Shutter OPEN:
Press **START** button and hold, a green paddle light will blink, release button:
Press **Upper Shutter OPEN: Yellow Light Delay**, 5 seconds, **Green Light**, motion. The shutter motor will **stop** when the shutter reaches the completely open position.

Upper Shutter CLOSE:
Press **START** button and hold, the green paddle light will blink, release button:
Press **Upper Shutter CLOSE: Yellow Light Delay**, 5 seconds, **Green Light**, motion. The upper shutter will not close unless the lower drop out shutter is completely closed. The shutter drive motor will **stop** when the shutter reaches the completely close position.

NOTE: The lower shutter will not active **OPEN** or **Close** unless the upper shutter is opened beyond a safety limit or proximity switch. The **upper shutter** must be open approx. 12".

Lower Drop Out Shutter OPEN:
Press **START button** and hold, the green paddle light will blink, release button:
Press **Lower Shutter OPEN: Yellow Light Delay**, 5 seconds **Green Light**, motion. The shutter motor will **stop** when the shutter reaches the completely open position.

Lower Drop Out Shutter CLOSE:
Press **START** button and hold, the green paddle light will blink, release button:
Press **Lower Shutter CLOSE: Yellow Light Delay**, 5 seconds **Green Light**, motion. The shutter motor will **stop** when the shutter reaches the completely open position.

Azimuth Remote Control:
Press Start - Clockwise & Counter Clockwise: There is **NO** time delay on the azimuth rotation motor. Before reversing direction you must **STOP** the dome. There is **no** shut off on the azimuth.

TROUBLE SHOOTING: Should the controls fail to respond to any correct commands.

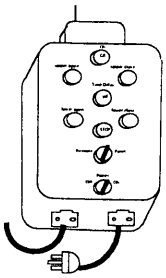
Turn **KEY Switch OFF**. Wait 1 minute, and then turn the **KEY Switch ON**.
This action will reset the system.

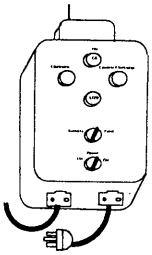
DO NOT ALLOW any untrained personnel to operate this equipment.

Should you have any questions call:

Ash Manufacturing Company 815 436 9403

Push Button – Remote, Dome Operating Instructions **Jan 2011**





BEFORE OPERATING: The Observatory dome must be clear of any obstructions.

TURN KEY Switch ON:
Select Remote Control or **Panel Control:**
Sending a Command:

Yellow Light Time Delay, 5 seconds – A time delay is built into the command system. The delay occurs before **ANY** movement. The dome motors will not accept any command they cannot complete. Any command can be ended immediately by pushing the **STOP** button. To reverse any dome motion you must push the **STOP BUTTON first.**

Shutter Operation Using Panel Push Buttons:
Before reversing any shutter control command you must push the **STOP BUTTON**.

Upper Shutter OPEN: Yellow Light Delay, 5 seconds, **Green Light**, motion. The shutter will activate and travel to the open position. The shutter will stop when completely open. The upper shutter can also be stopped at anytime in-between.

Upper Shutter CLOSE: **Yellow Light Delay**, 5 seconds, **Green Light**, motion. The shutter will start to move closed. The shutter will stop when completely closed or can be stopped anywhere in between. The upper shutter will **not** close until the lower drop out shutter is completely closed.

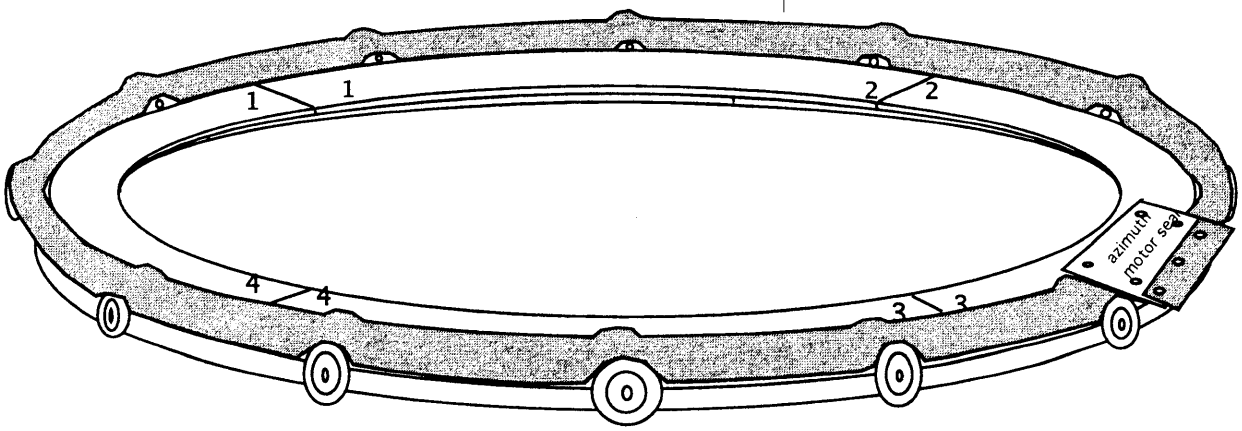
Lower Drop Out Shutter Operation: Yellow Light Delay, 5 seconds, **Green Light**, motion. The lower shutter will not activate open or close until the upper shutter section is raised past the safety limit switch or approx 12". The winch or hydraulic pump will not activate the dropout shutter.

Lower Drop Out Shutter OPEN: Yellow Light Delay, 5 seconds, **Green Light**, motion. The lower shutter will hinge out and travel to the open position. The shutter will stop when it reaches the completely open position after a short time delay.

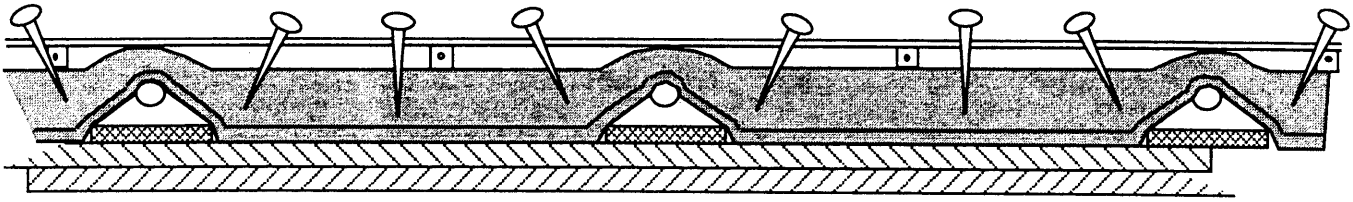
Lower Drop Out Shutter CLOSE: **Yellow Light Delay**, 5 seconds, **Green Light**, motion. The lower shutter will hinge in bringing the door to the closed position. The shutter will stop when it reaches the completely closed position after a short time delay.

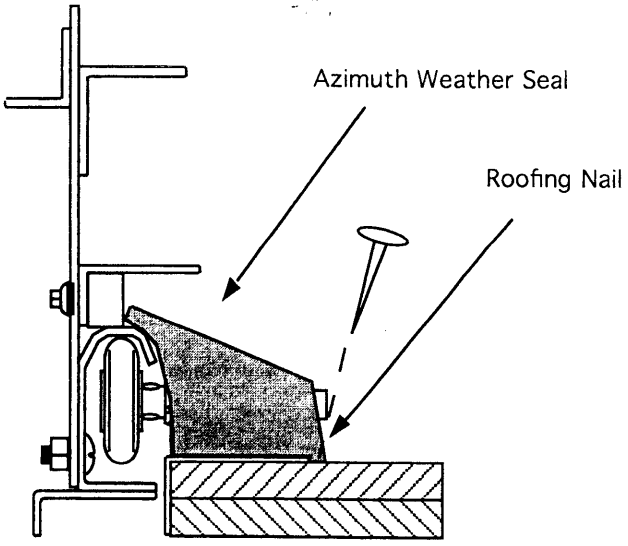
Azimuth Panel Push Buttons: Clockwise & Counter Clockwise: There is **NO** time delay on the azimuth rotation motor. Before reversing direction you must **STOP** the dome.

Azimuth Weather Seal



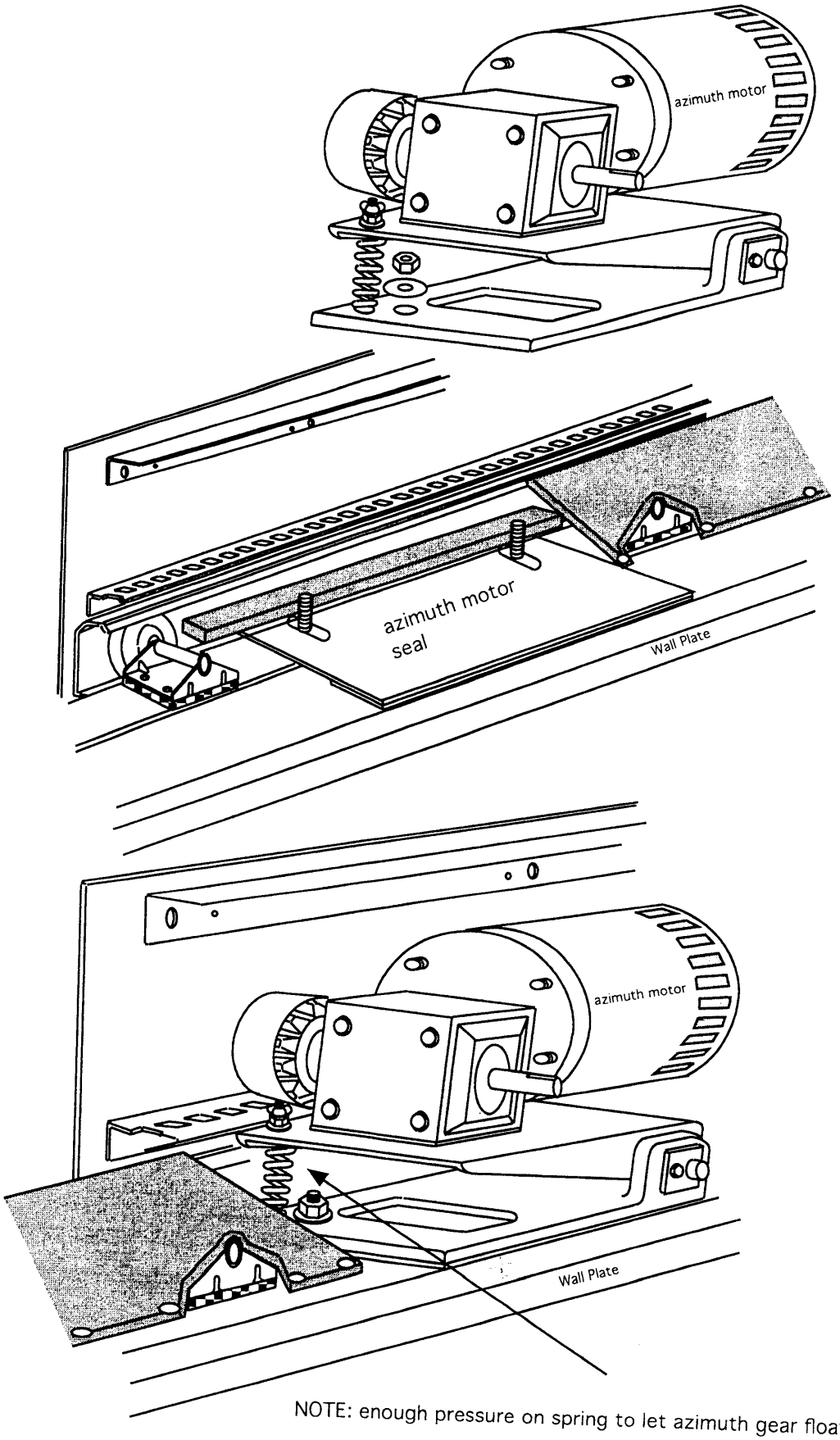
inside dome looking at dome skirt





Ash-Dome wall plate

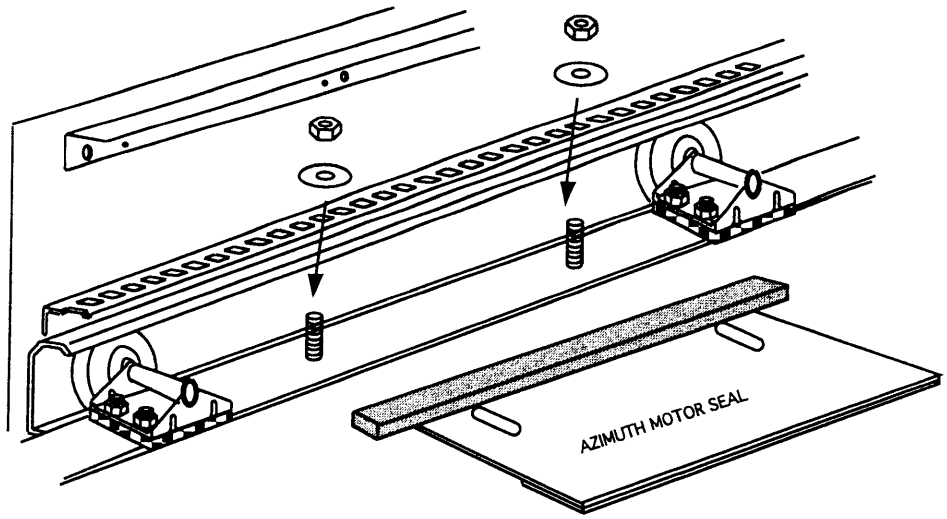
Installing Azimuth Motor

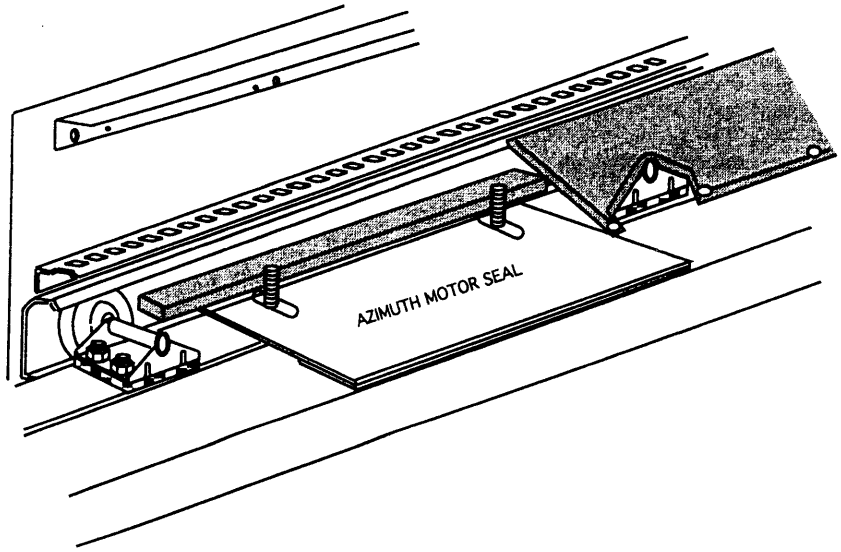


NOTE: enough pressure on spring to let azimuth gear float in track

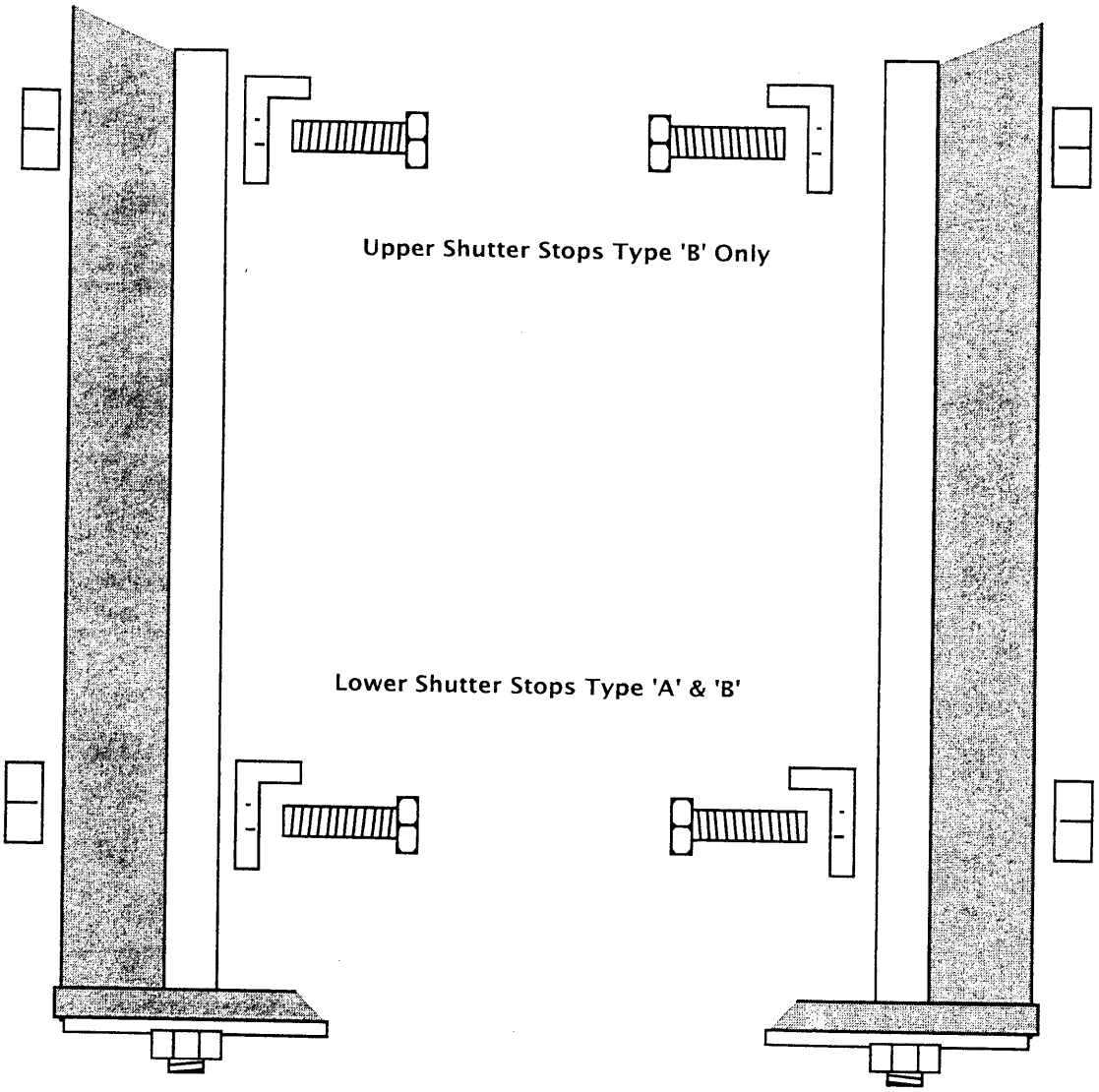
Azimuth Weather Seal & Motor Seal

remove nuts and washers



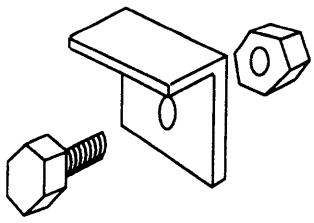


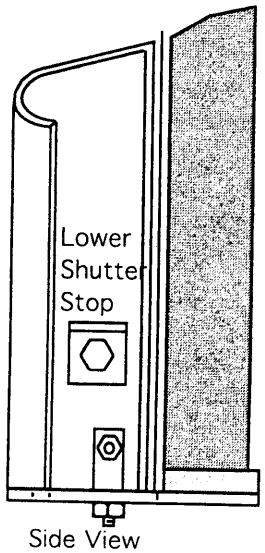
Shutter Stops



Upper Shutter Stops Type 'B' Only

Lower Shutter Stops Type 'A' & 'B'

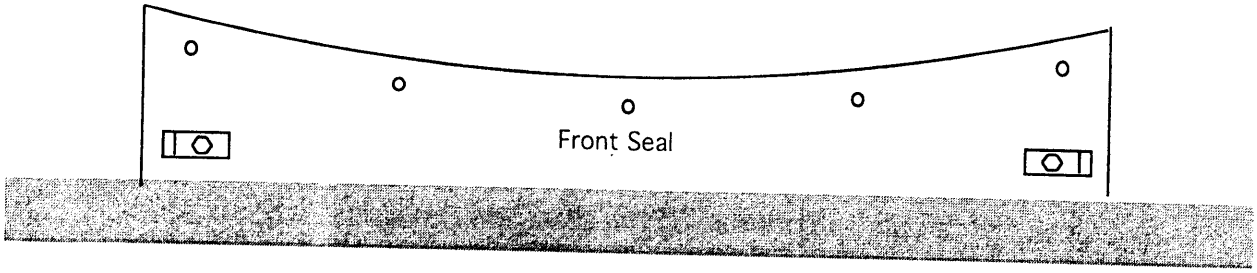




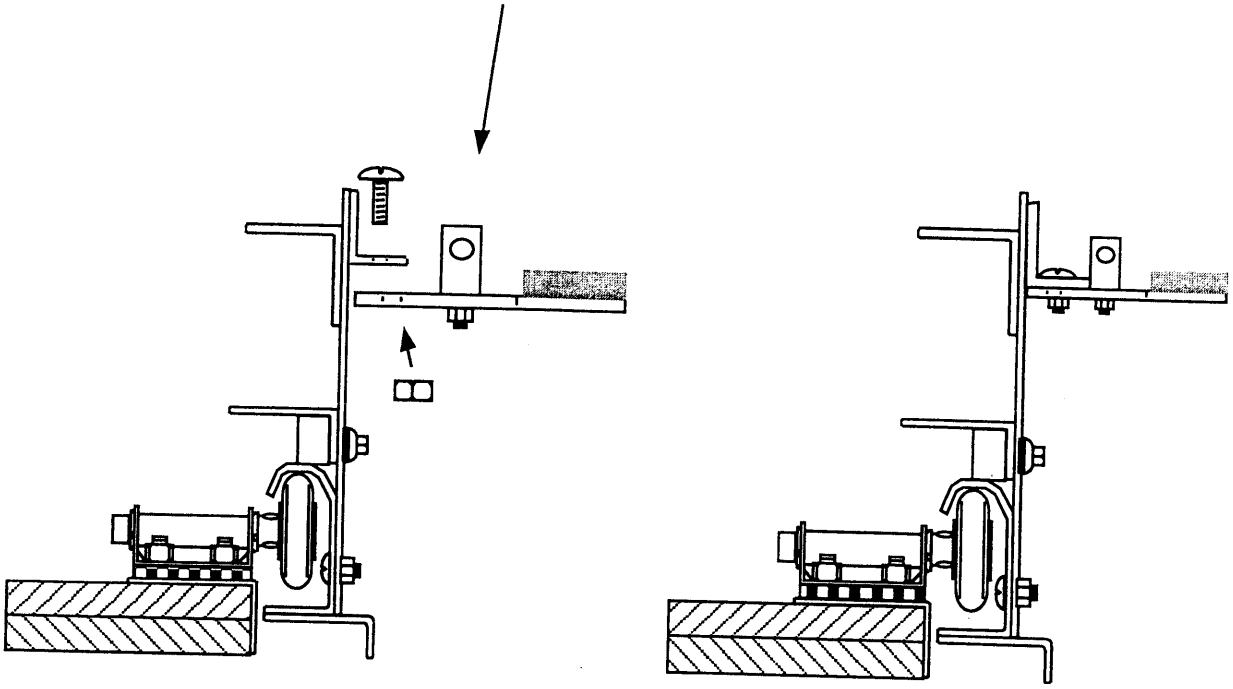
Side View

Installation of Front Shutter Seal

step#8

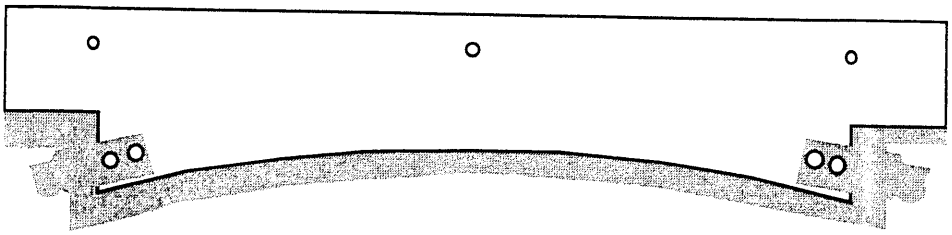


TAB bolt goes through overhead shutter track

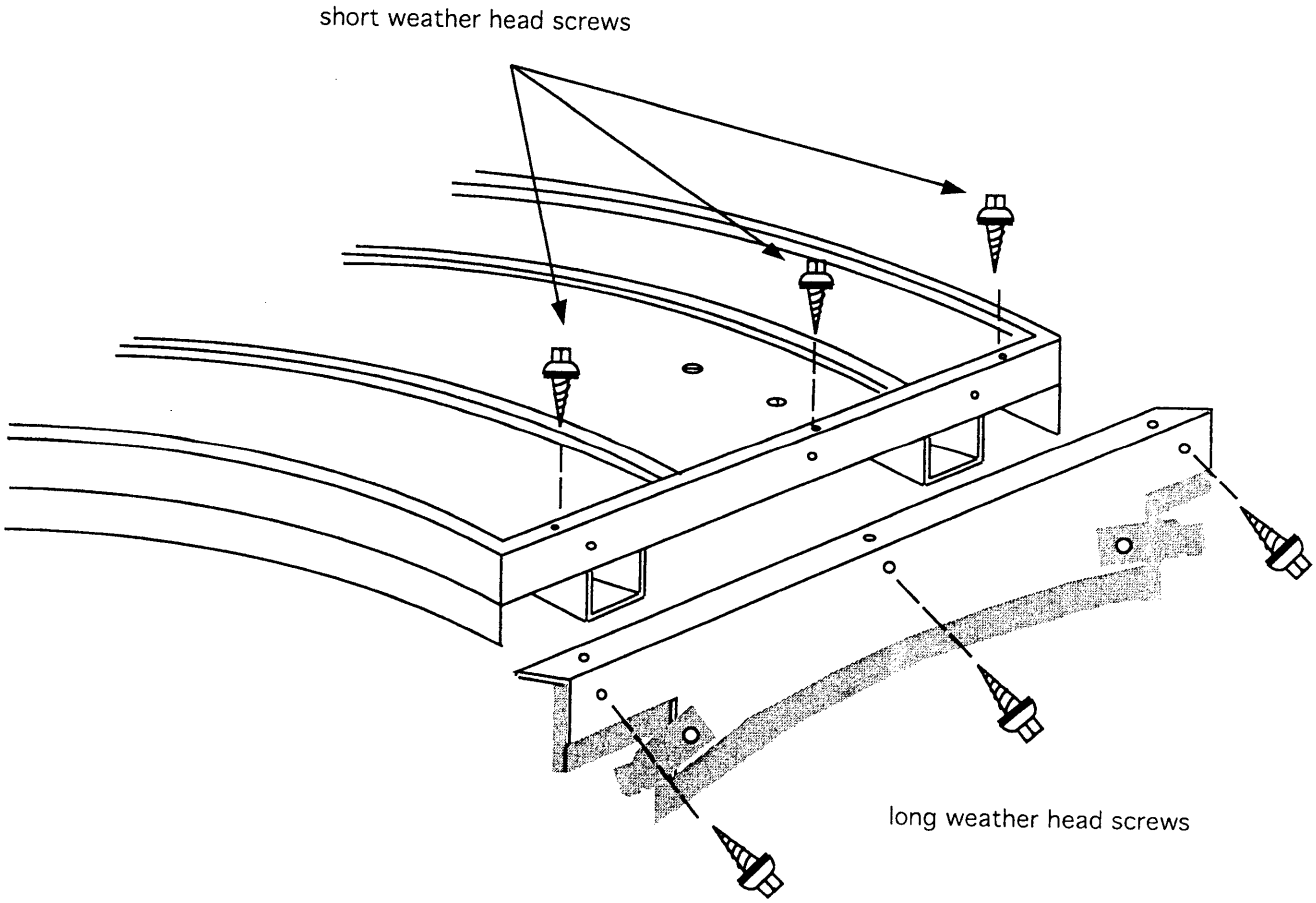


Front Shutter Seal slides under front of skirt

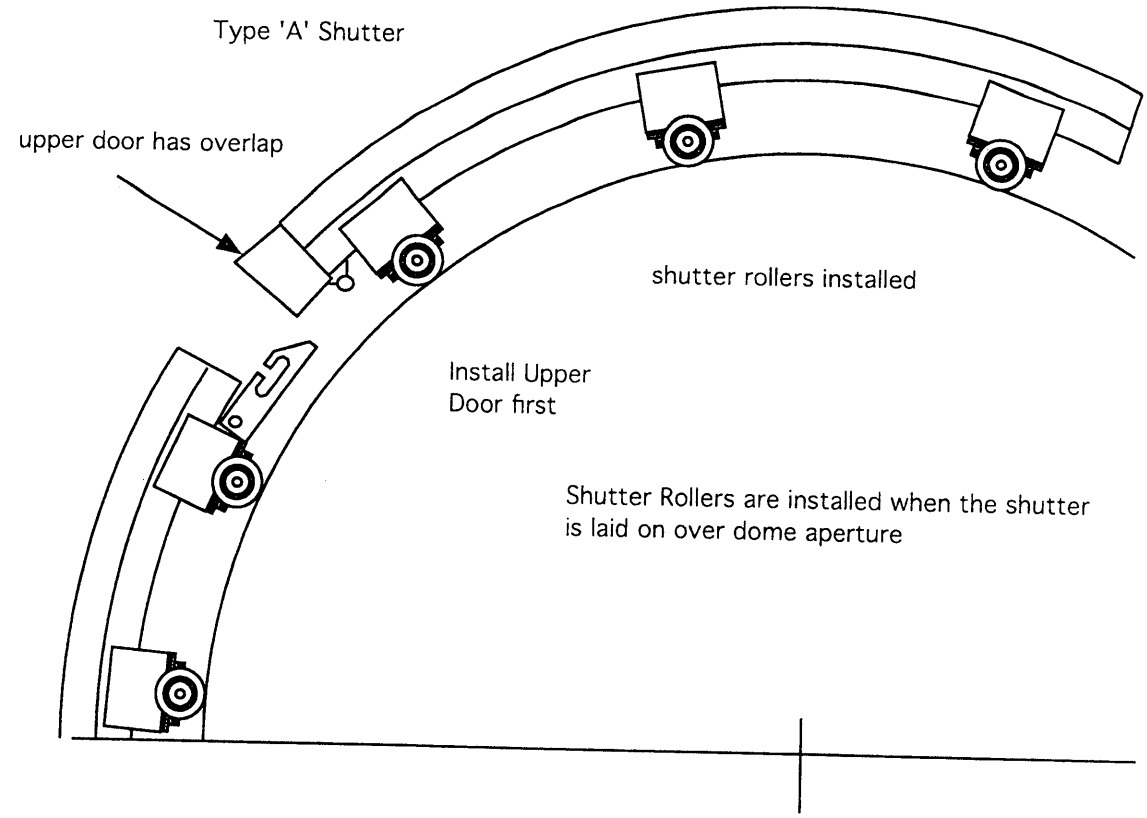
Installation of Back Shutter Seal

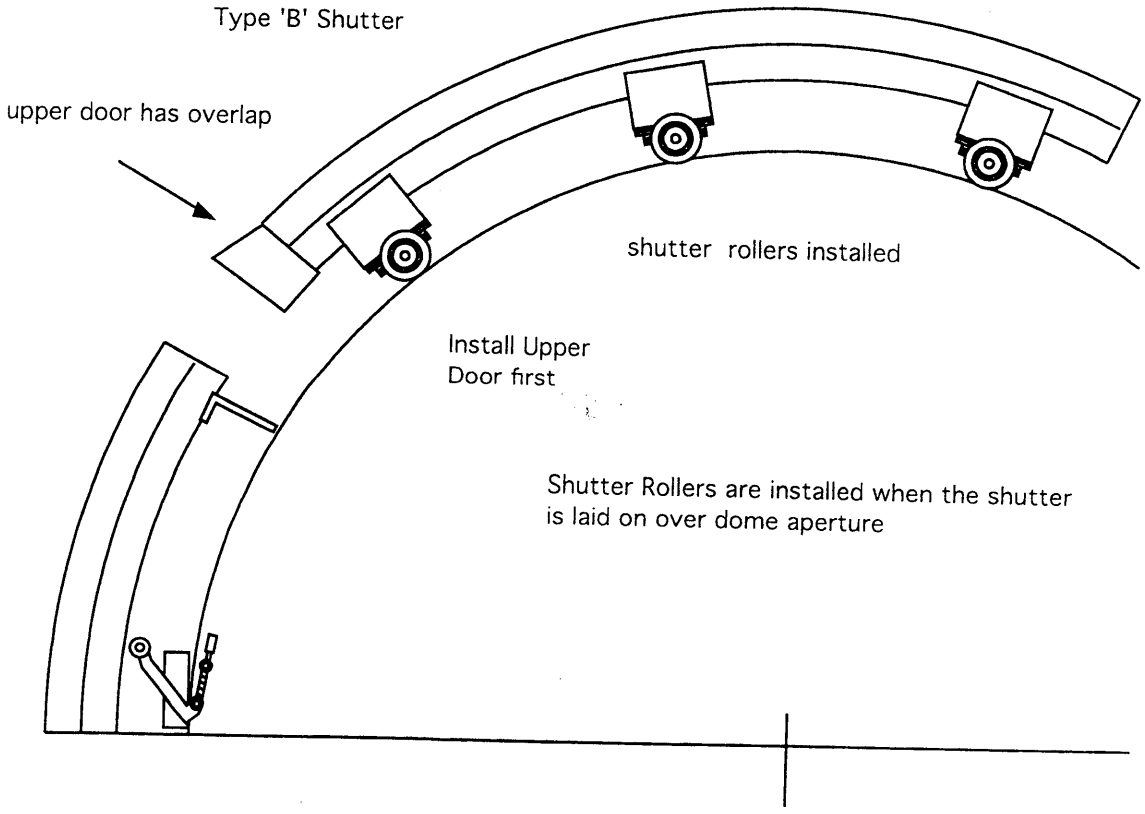


TIP: run the upper shutter completely open and install from back of dome

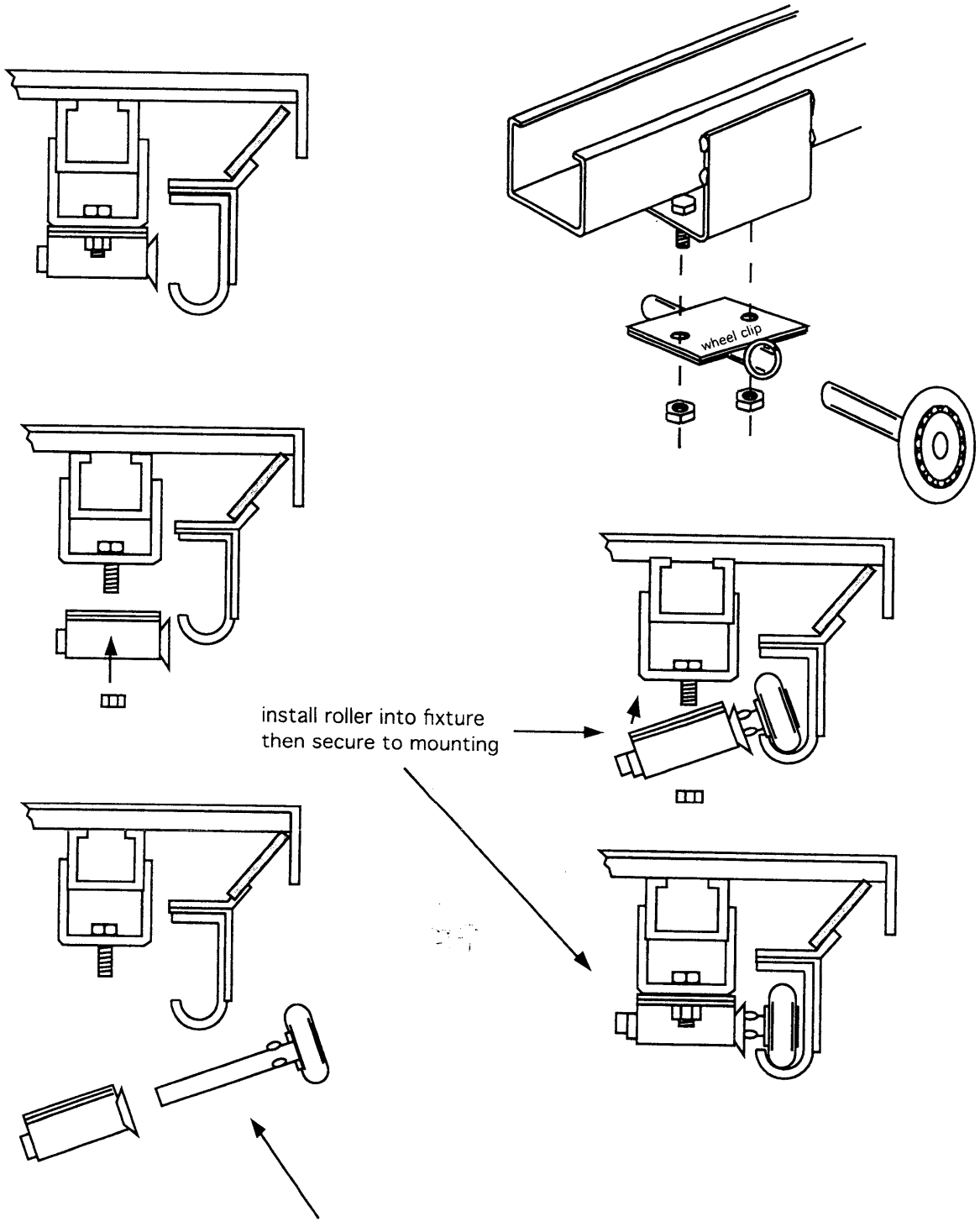


Installation of Shutter Sections

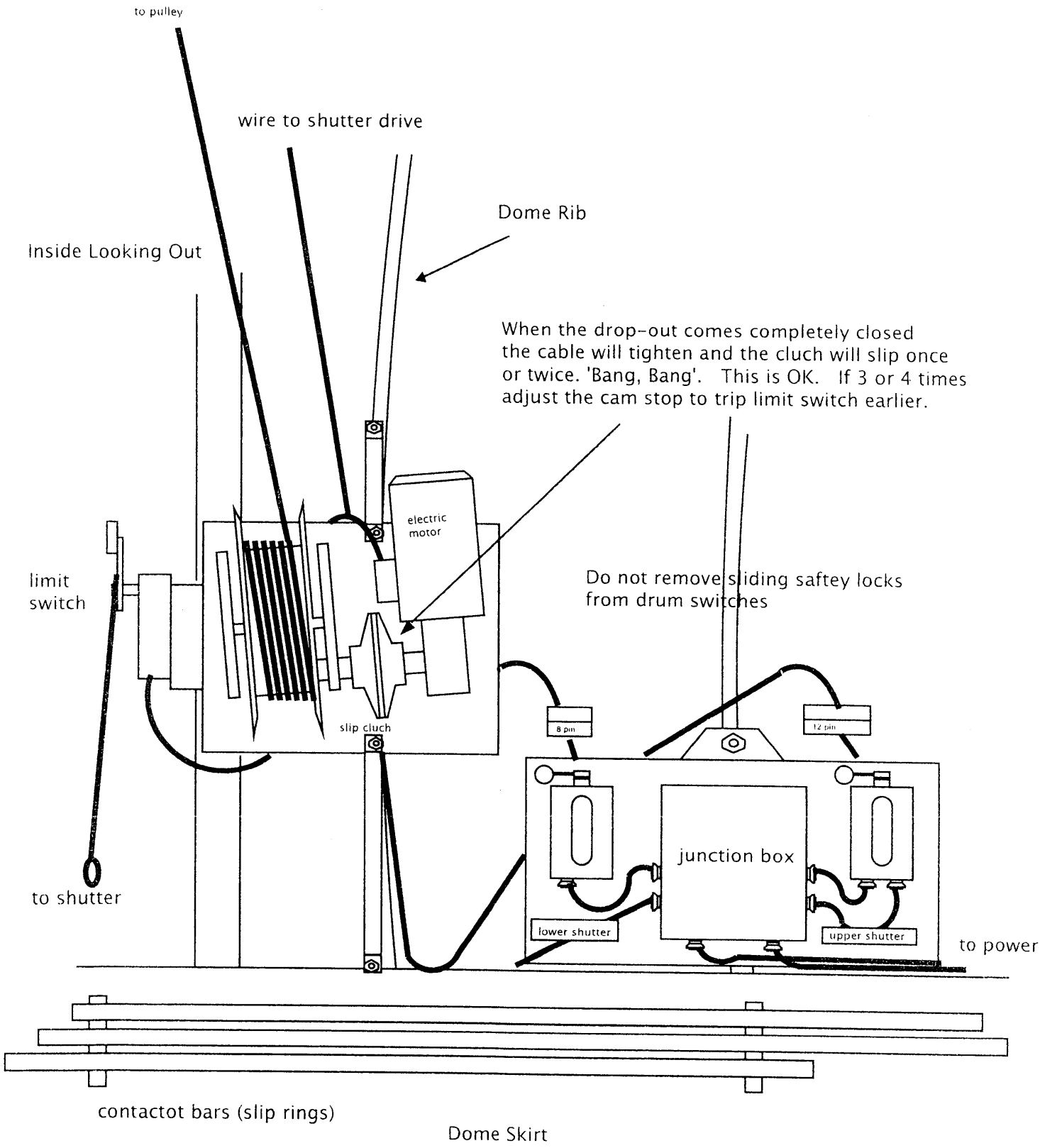


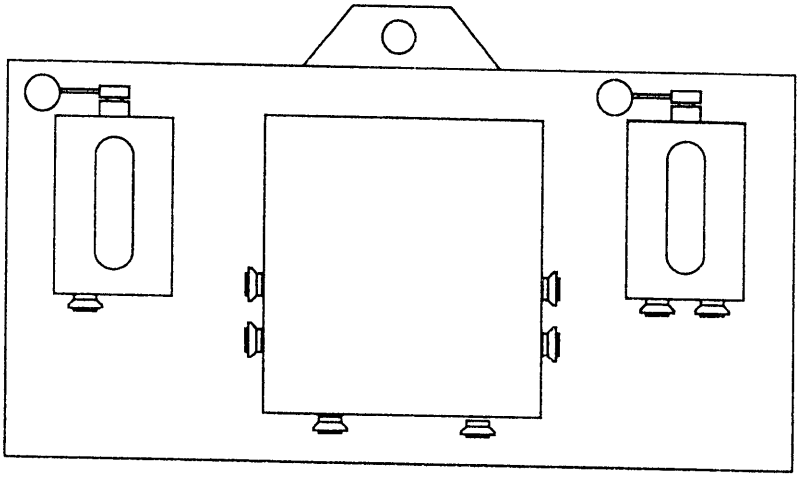


Installation of Shutter Sections

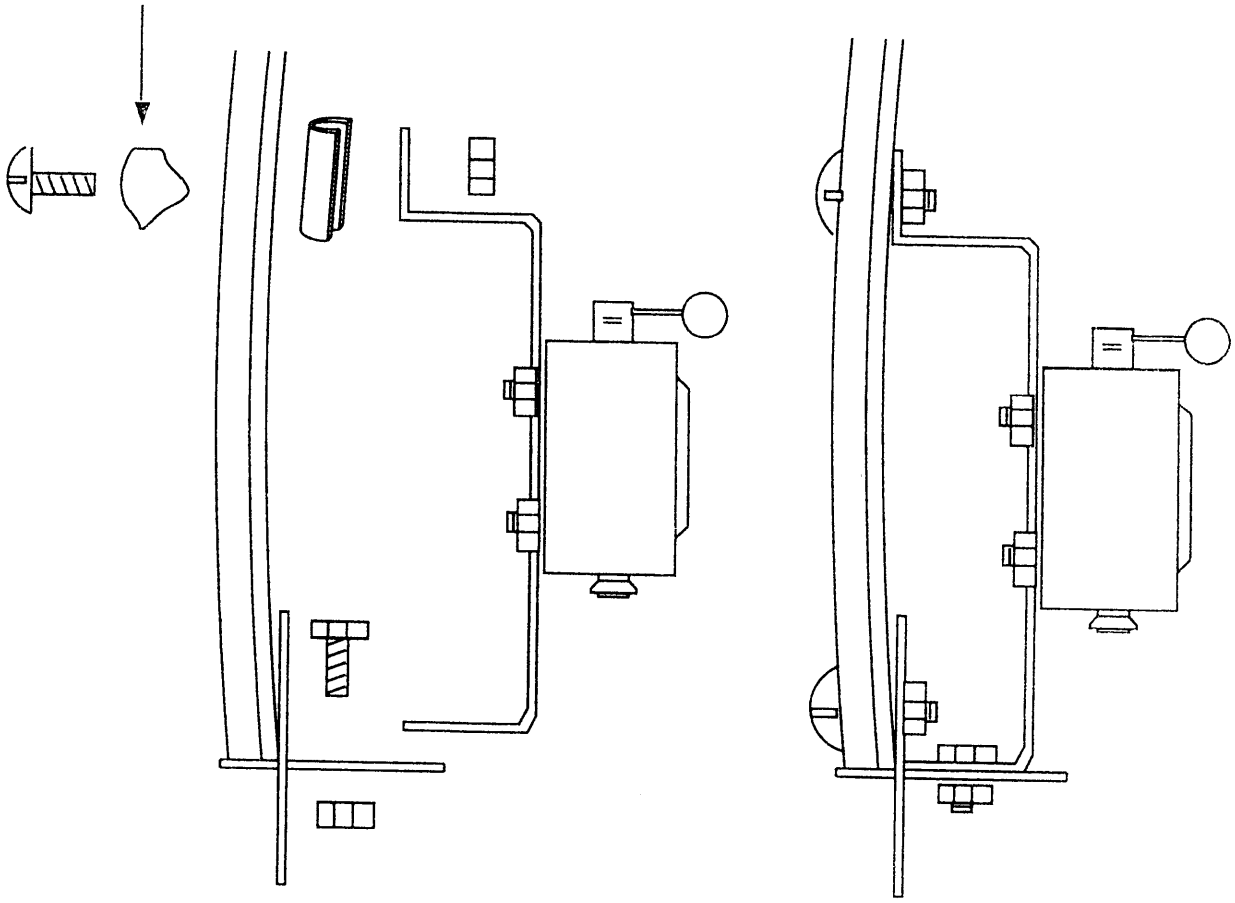


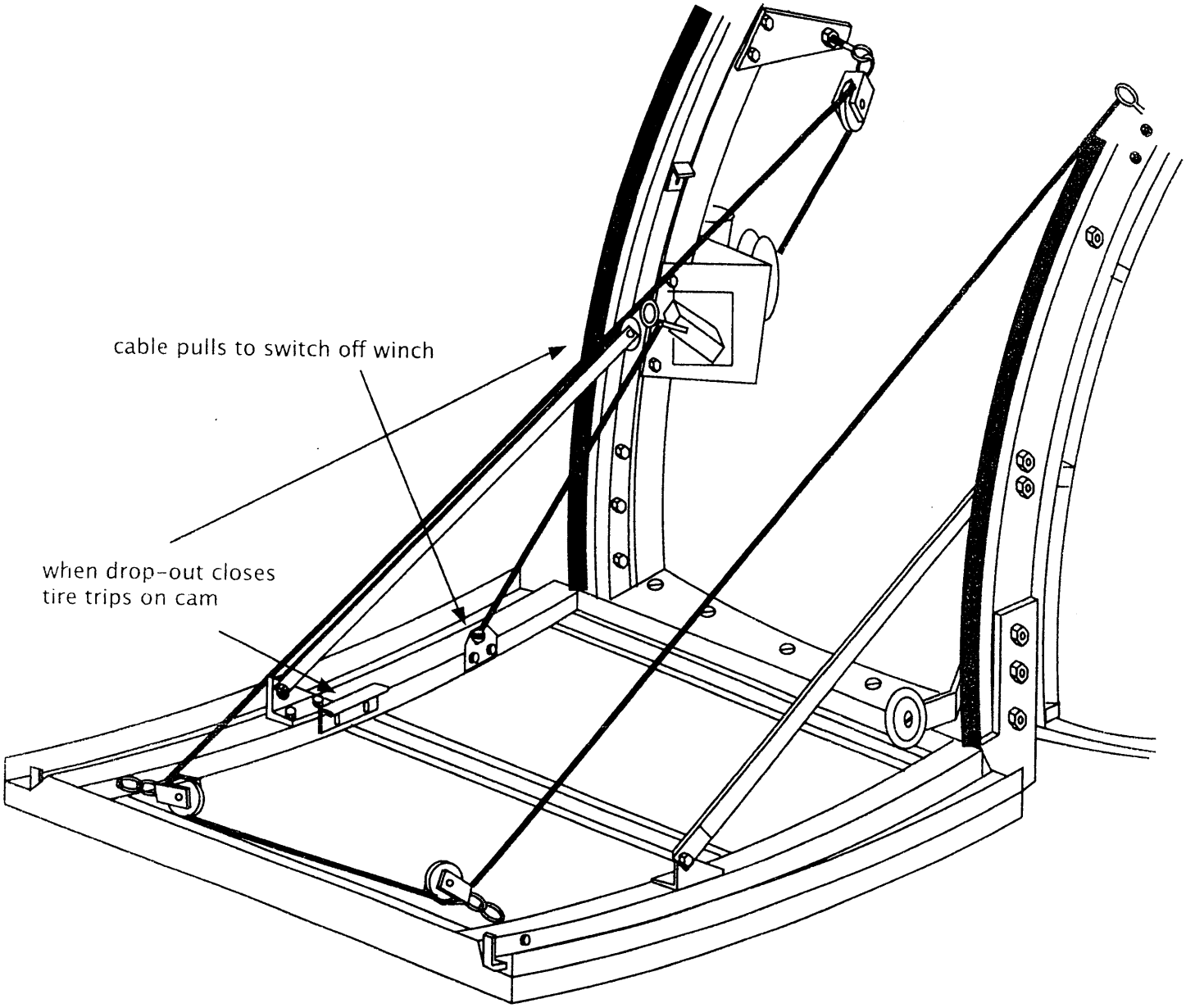
shutter roller shaft should be greased at this time

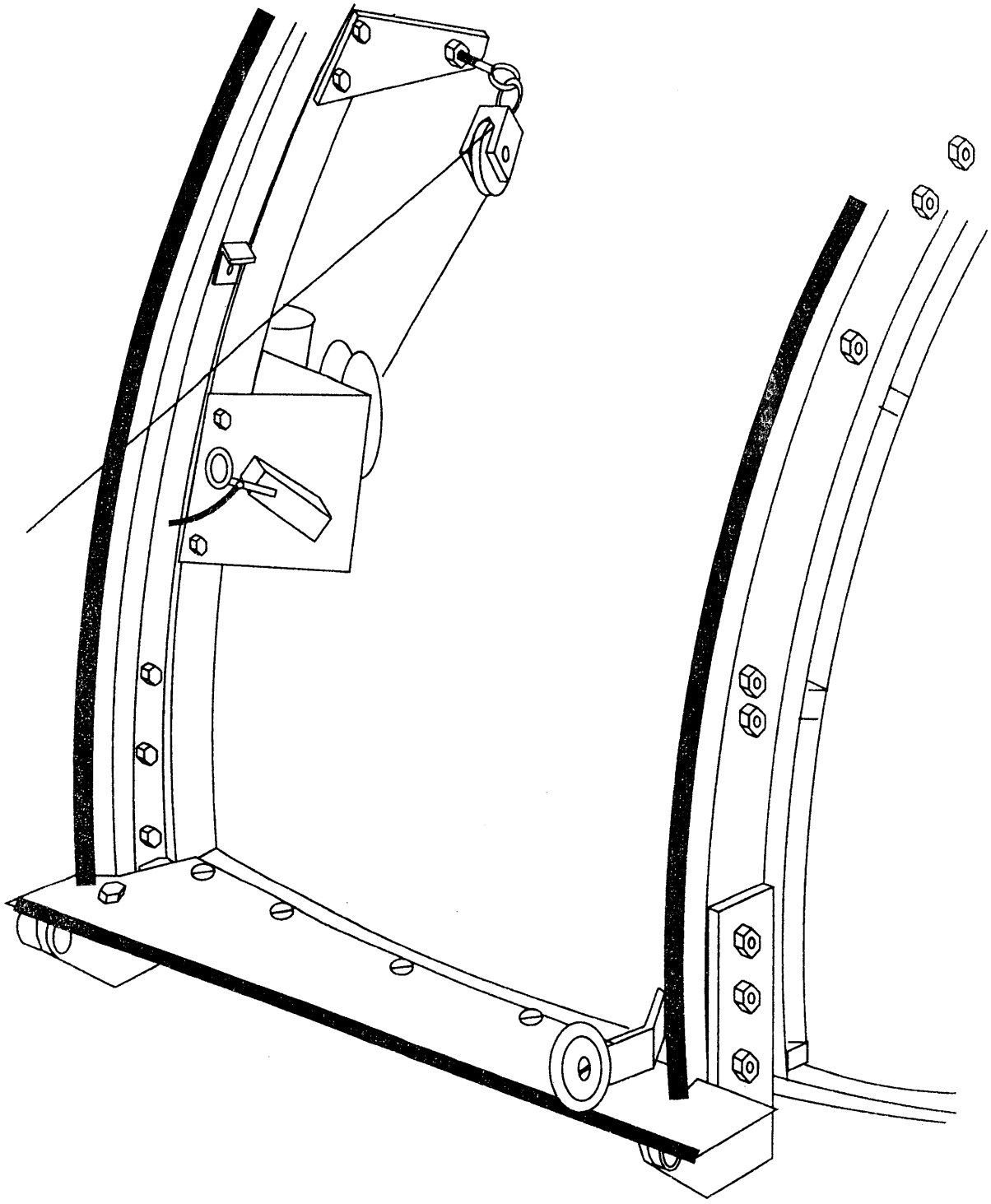

to pulley
wire to shutter drive
Dome Rib
Inside Looking Out
When the drop-out comes completely closed the cable will tighten and the cluch will slip once or twice. 'Bang, Bang'. This is OK. If 3 or 4 times adjust the cam stop to trip limit switch earlier.
electric motor
limit switch
Do not remove sliding saftey locks from drum switches
slip cluch
8 pin
12 pin
junction box
lower shutter
upper shutter
to power
to shutter
contactot bars (slip rings)
Dome Skirt



use caulking around screw heads to help seal out water

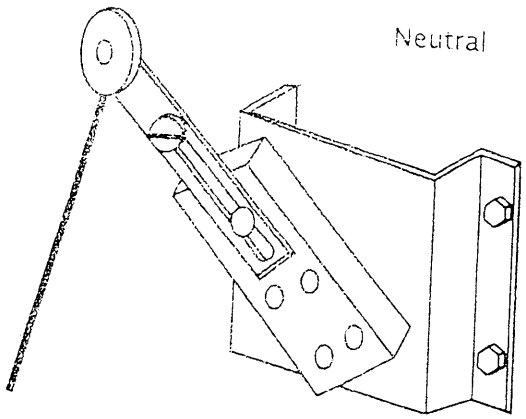



cable pulls to switch off winch
when drop-out closes
tire trips on cam

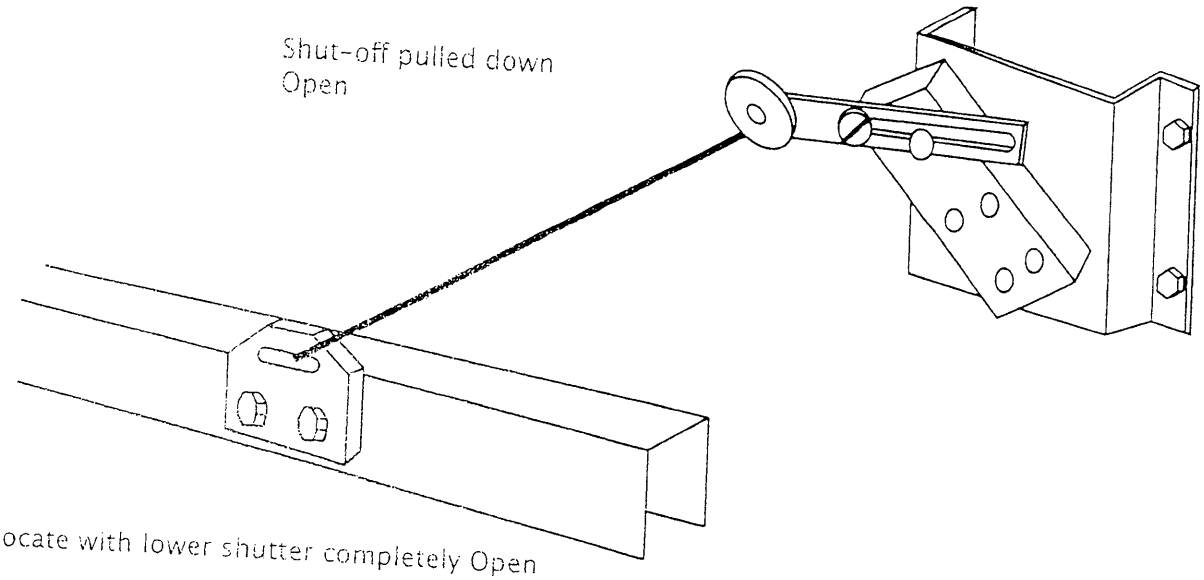


Drum Switch Control

Neutral



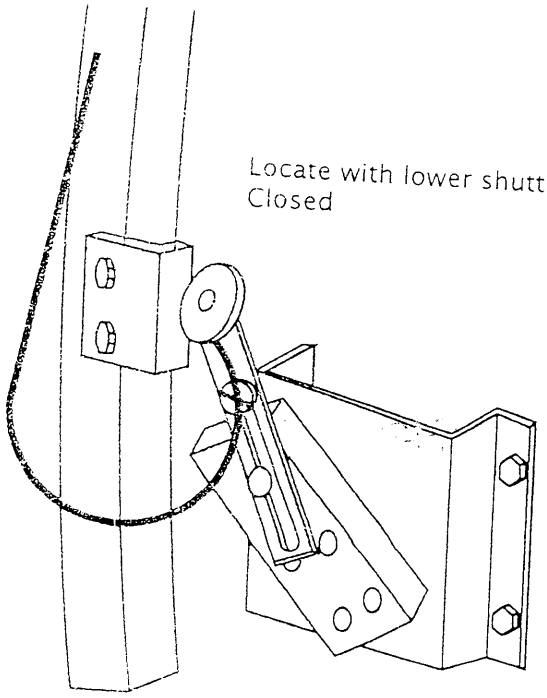
Shut-off pulled down
Open

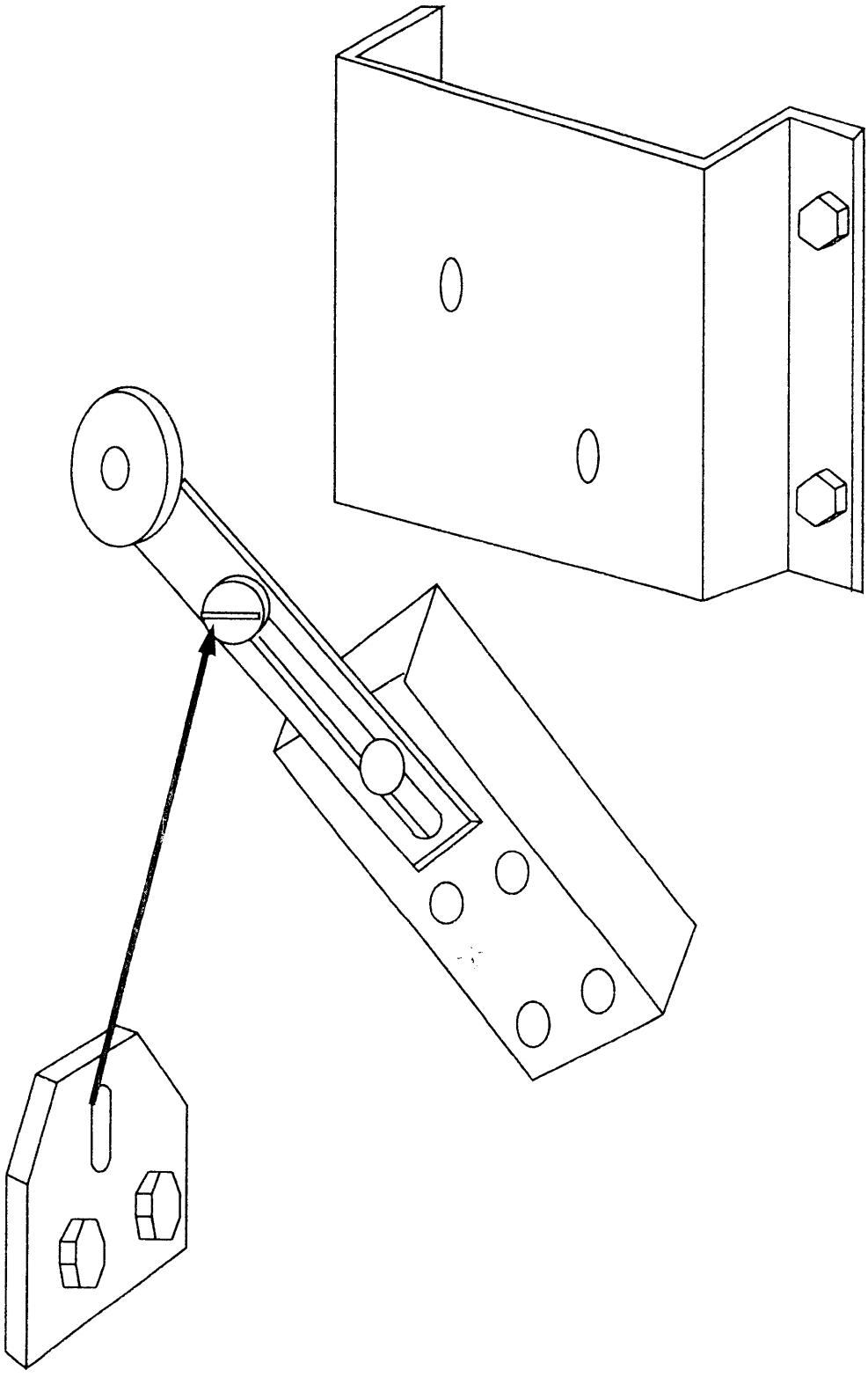


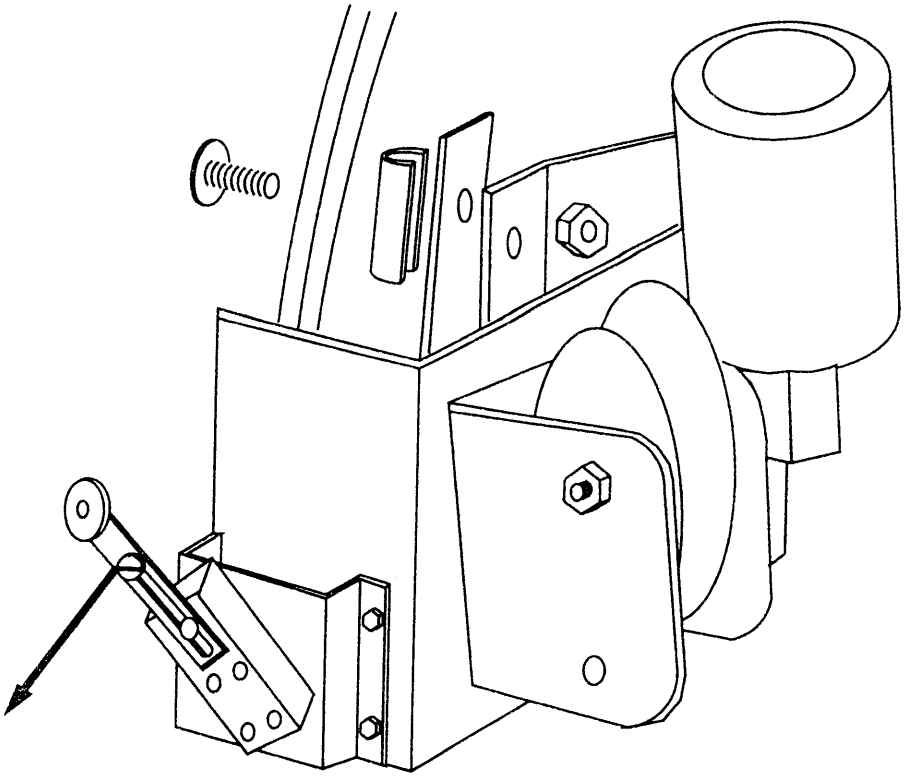
Locate with lower shutter completely Open

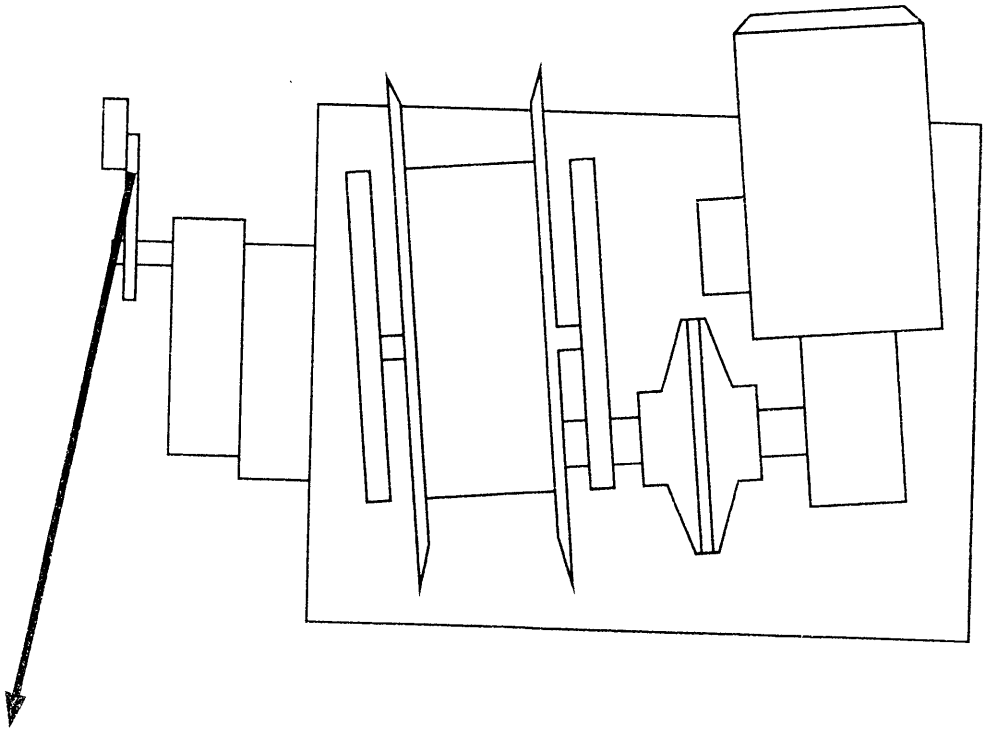
Shut-off Closed

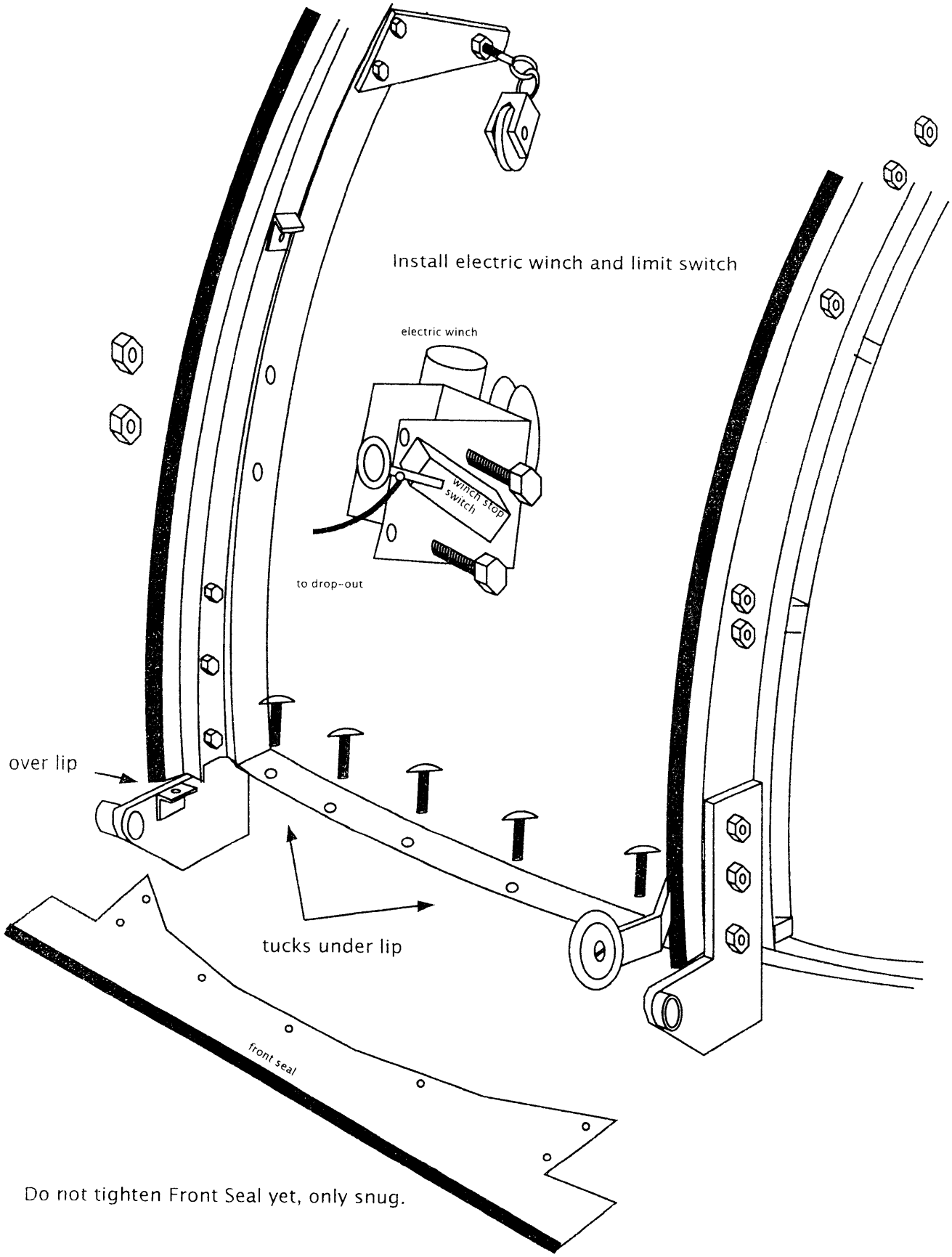
Locate with lower shutter
Closed



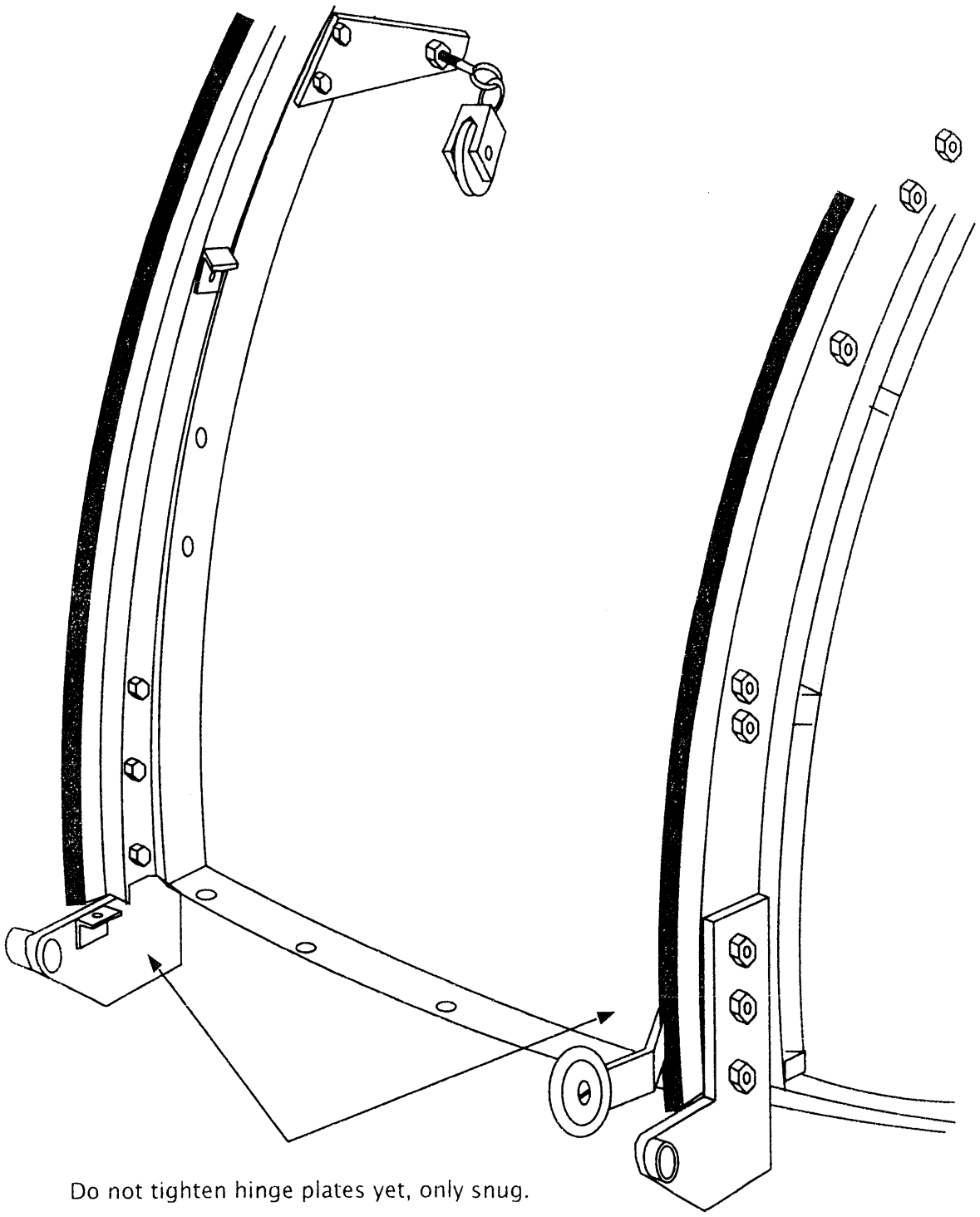




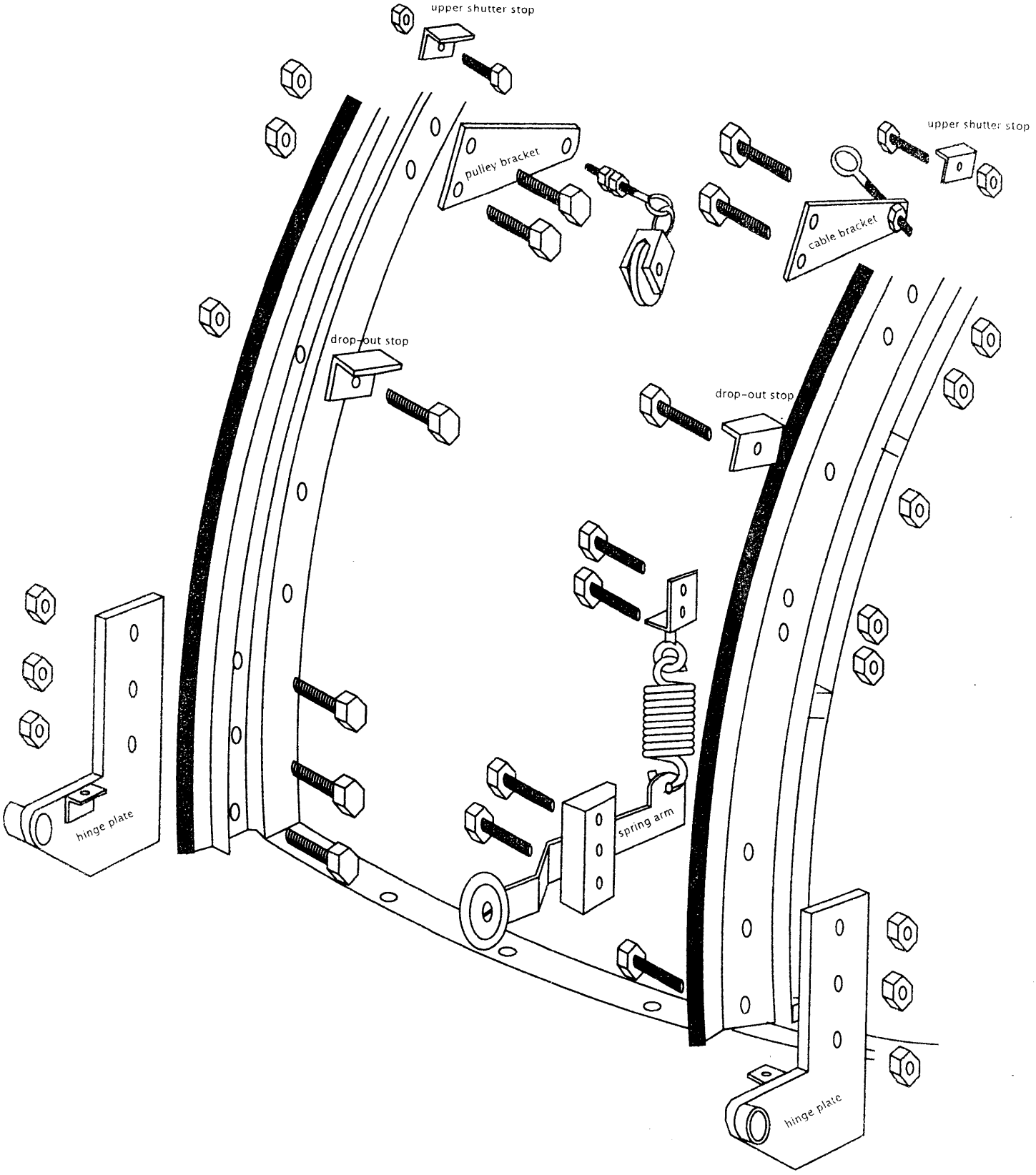


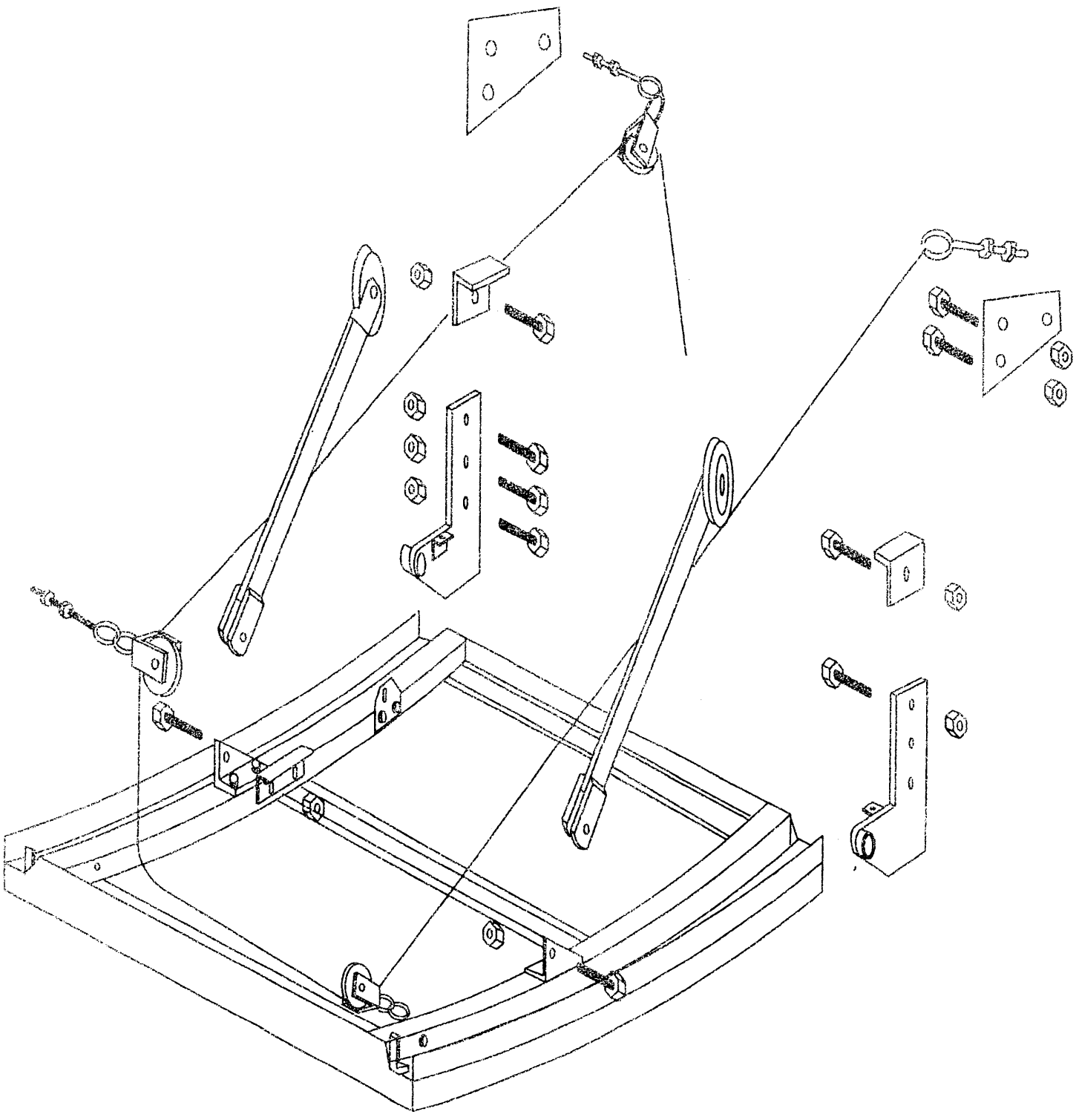


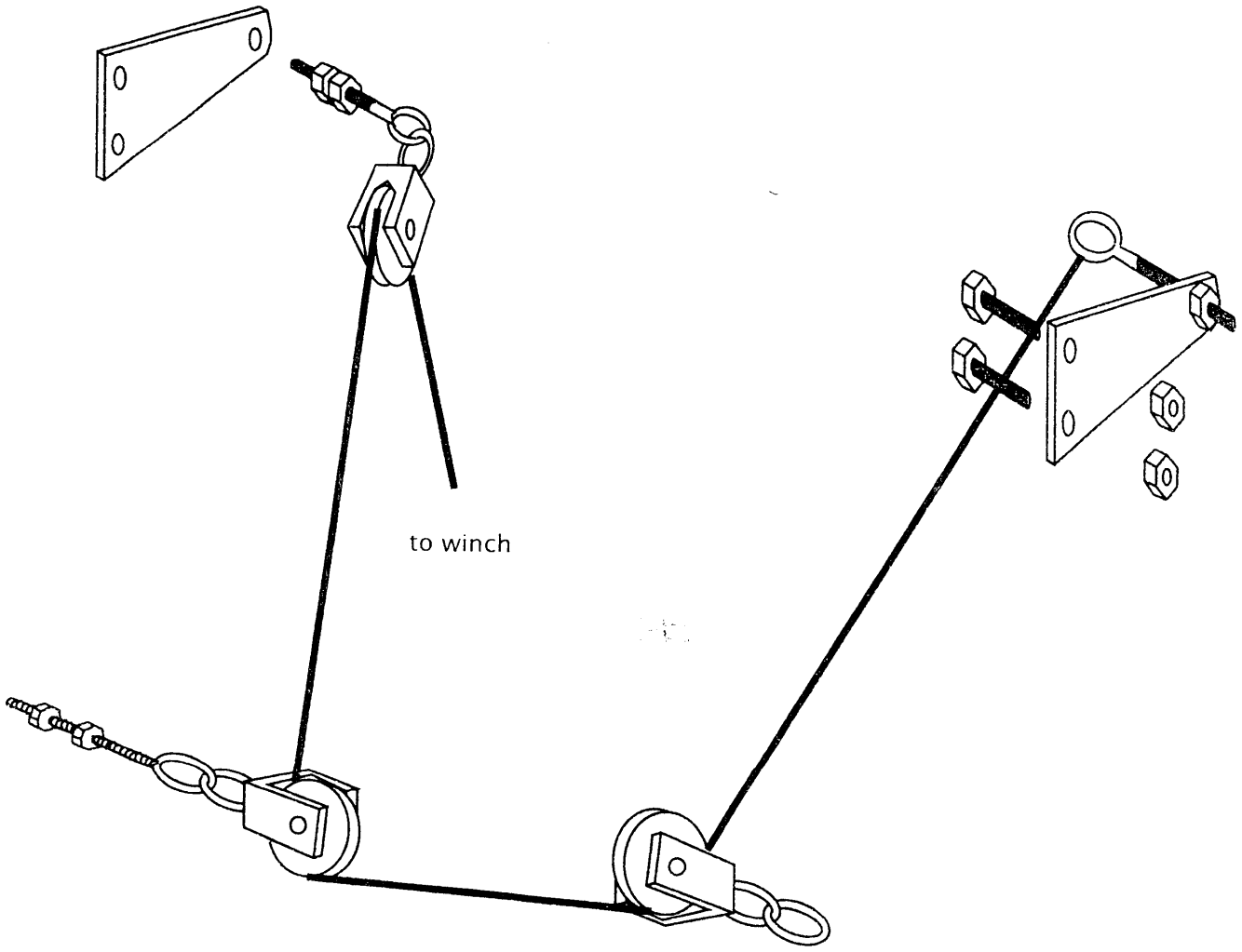
Do not tighten Front Seal yet, only snug.



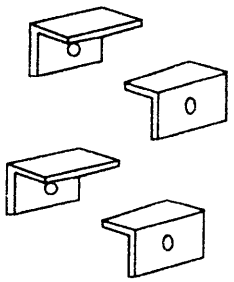
Do not tighten hinge plates yet, only snug.

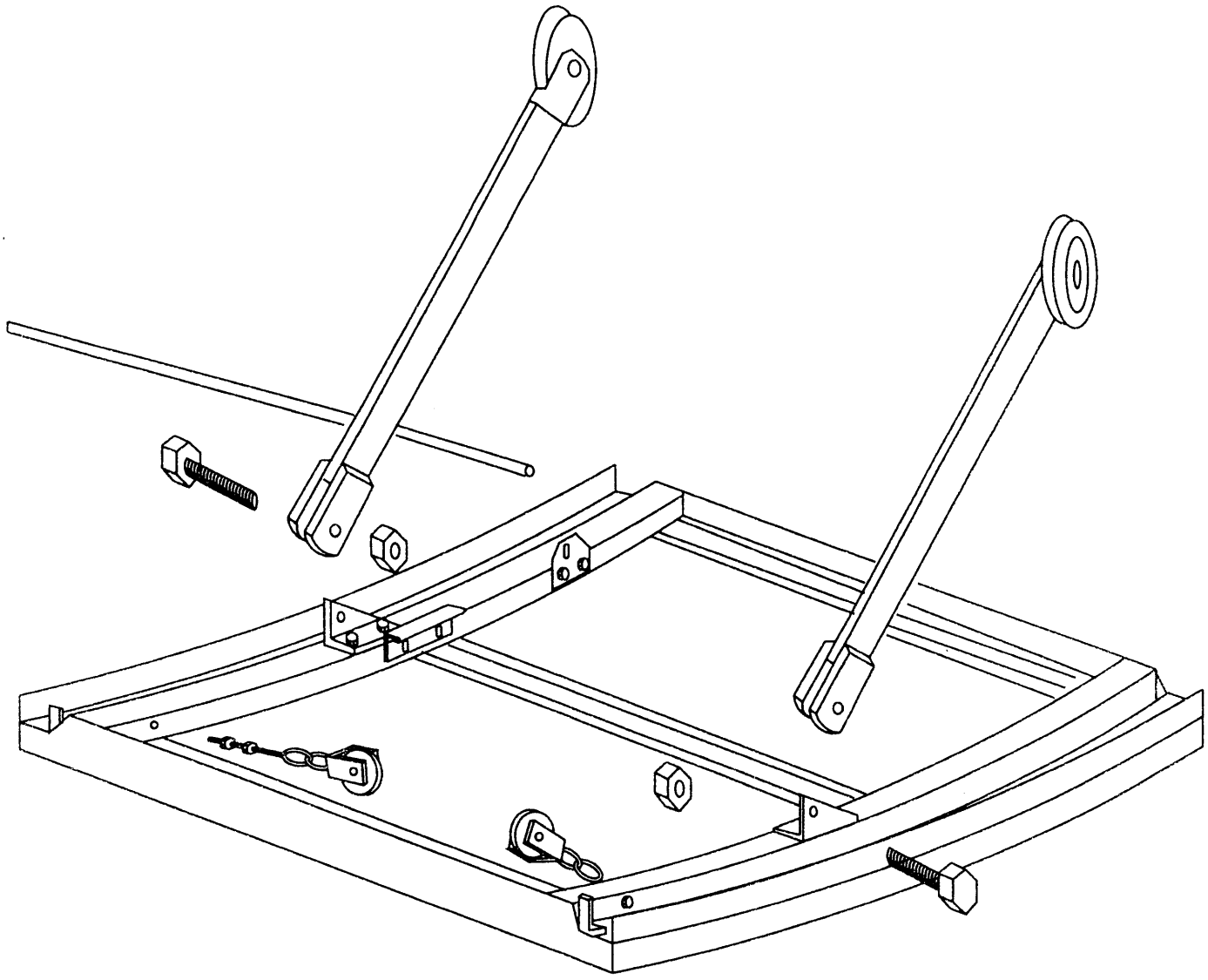

upper shutter stop
pulley bracket
upper shutter stop
cable bracket
drop-out stop
drop-out stop
hinge plate
spring arm
hinge plate

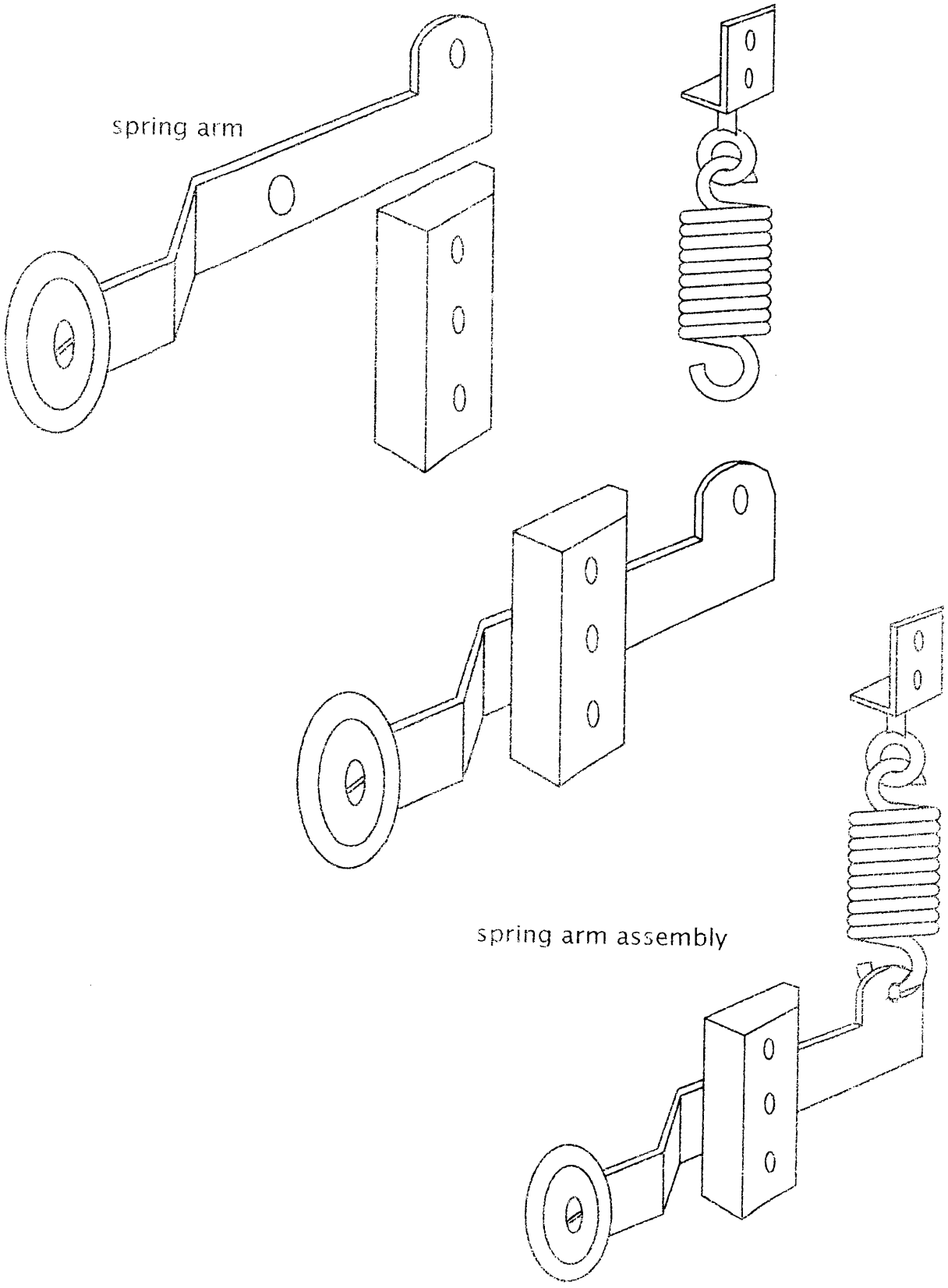


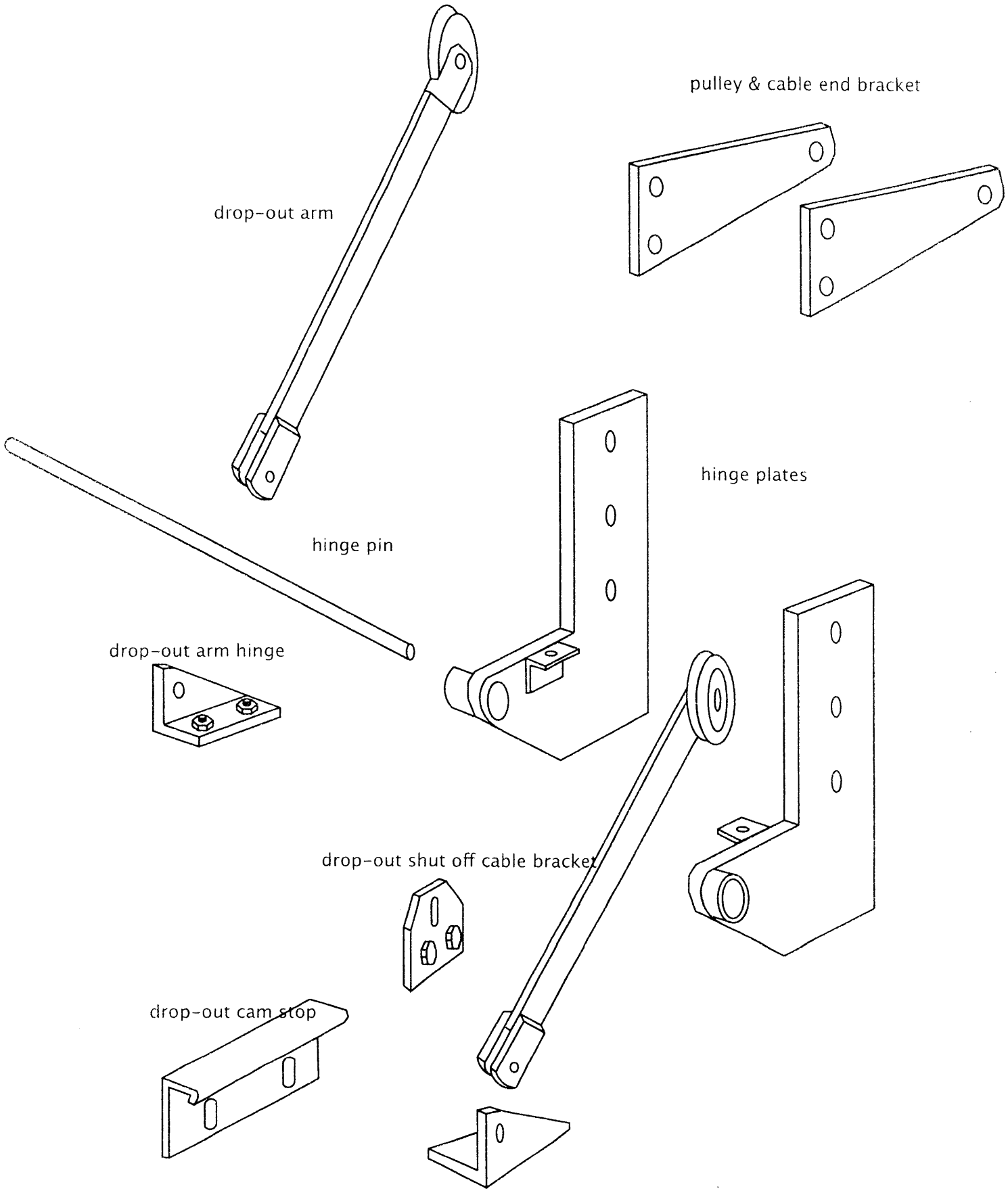


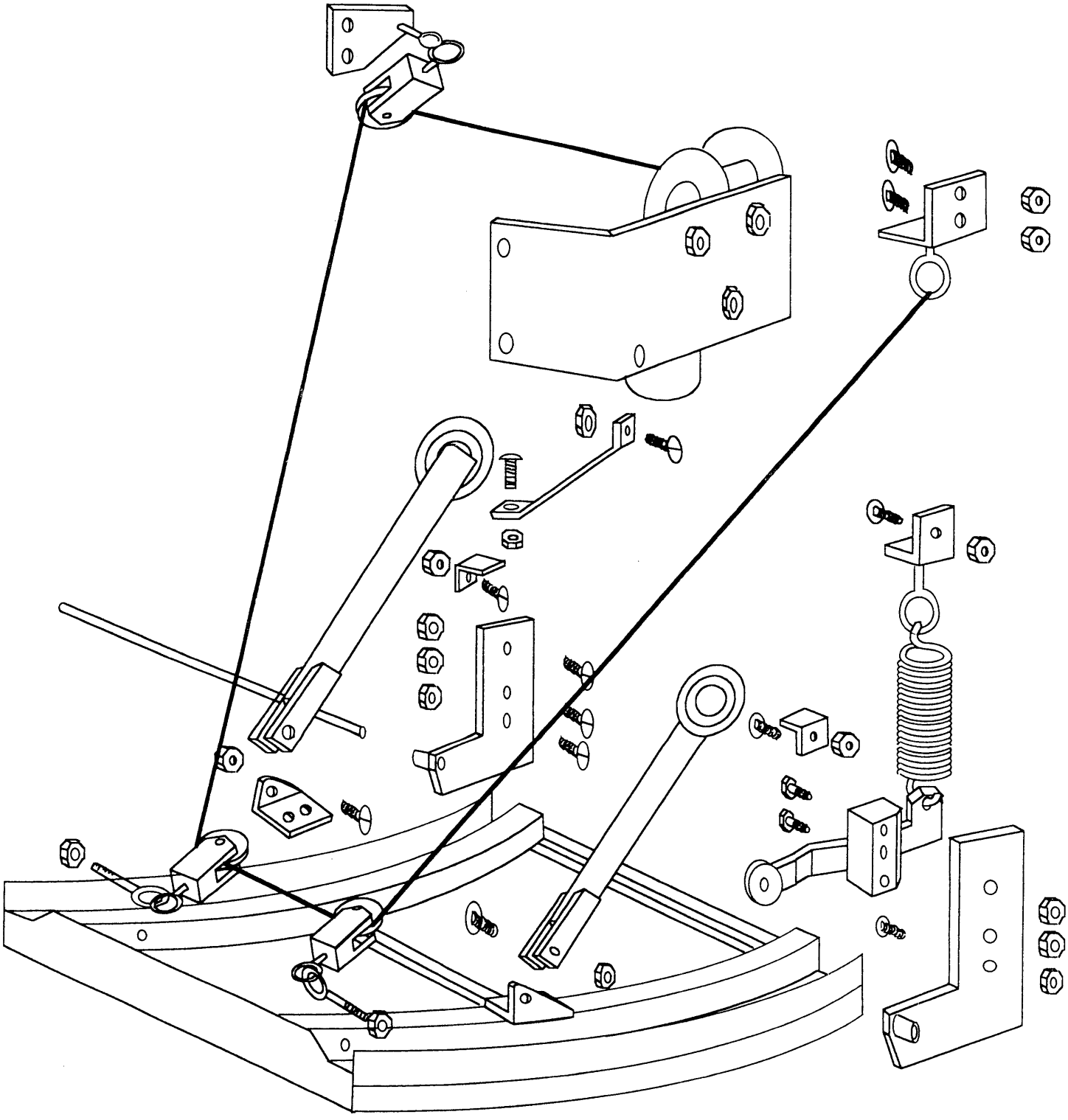
shutter stops



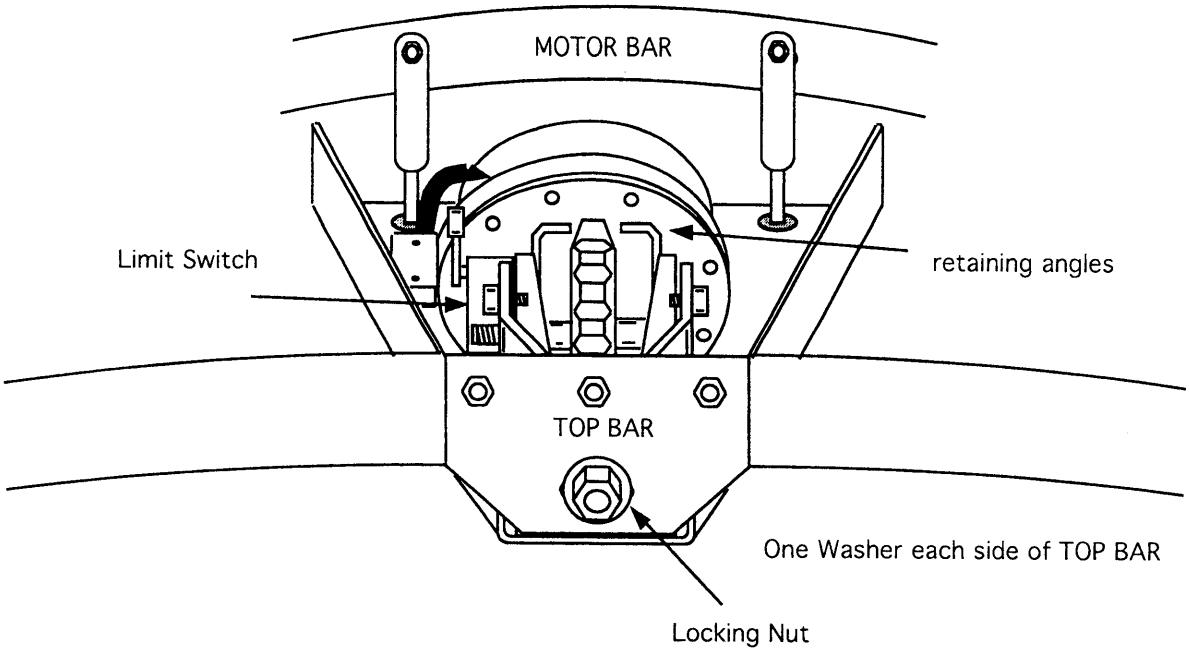


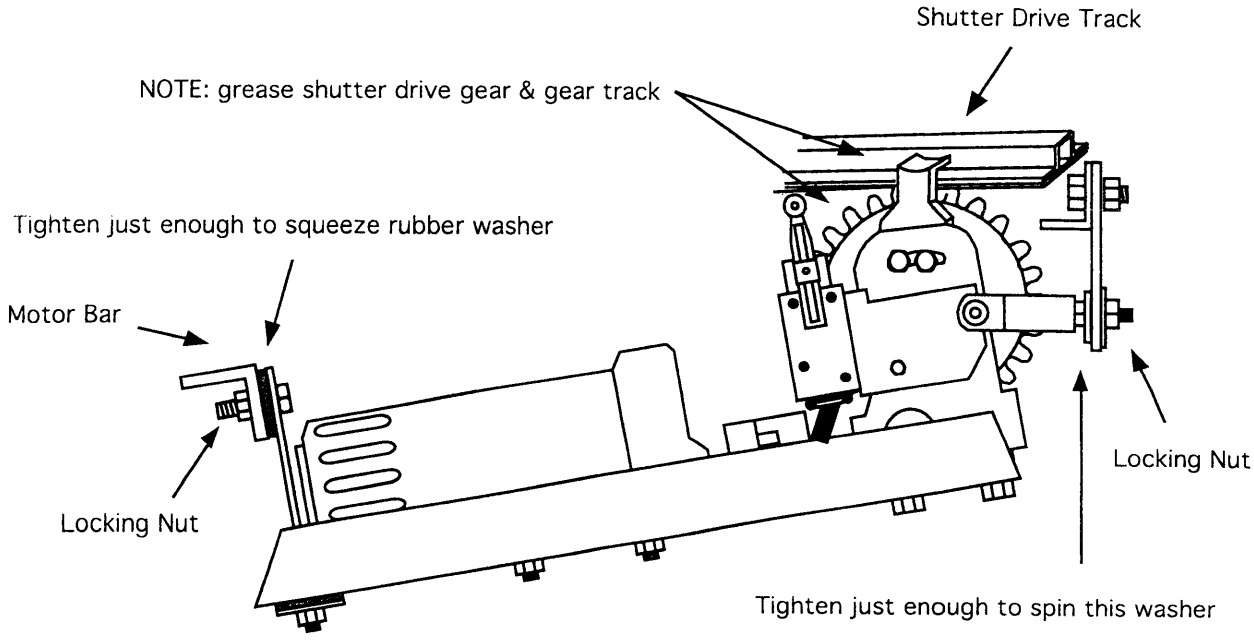

spring arm
spring arm assembly


drop-out arm
pulley & cable end bracket
hinge plates
hinge pin
drop-out arm hinge
drop-out shut off cable bracket
drop-out cam stop

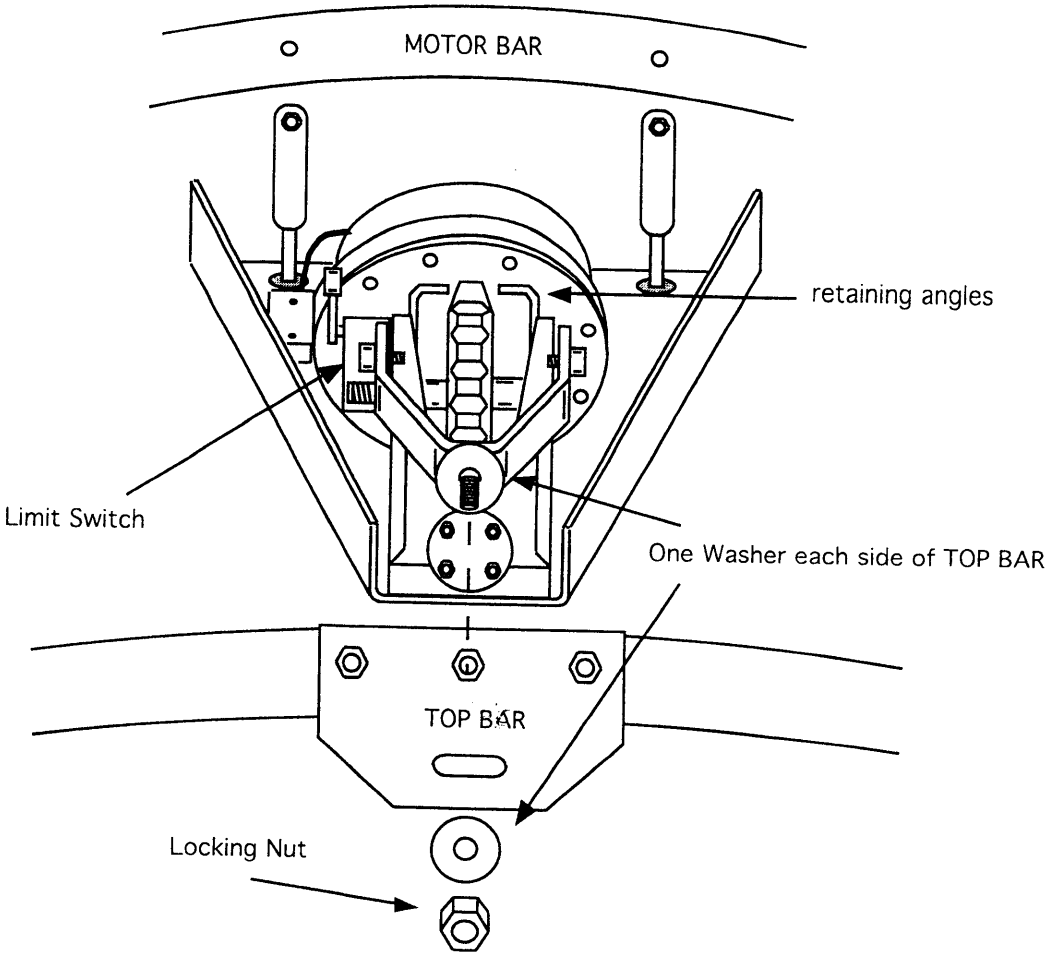


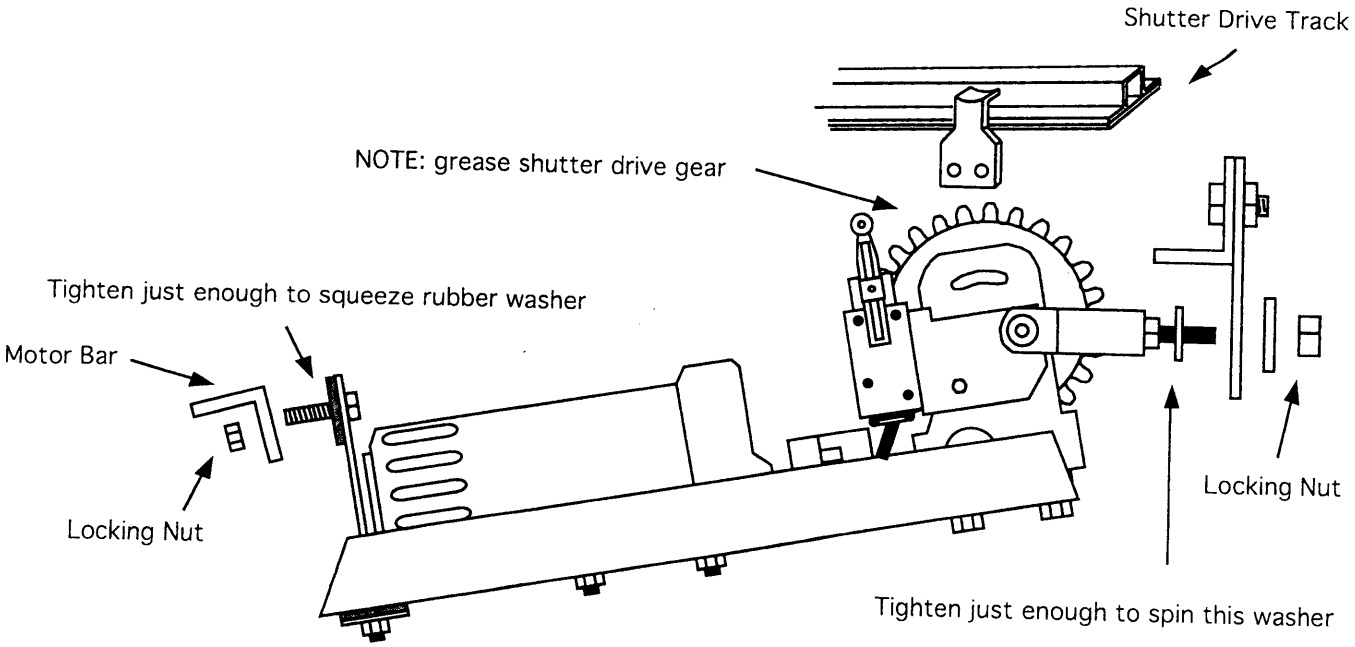
Installation of Shutter Drive Unit



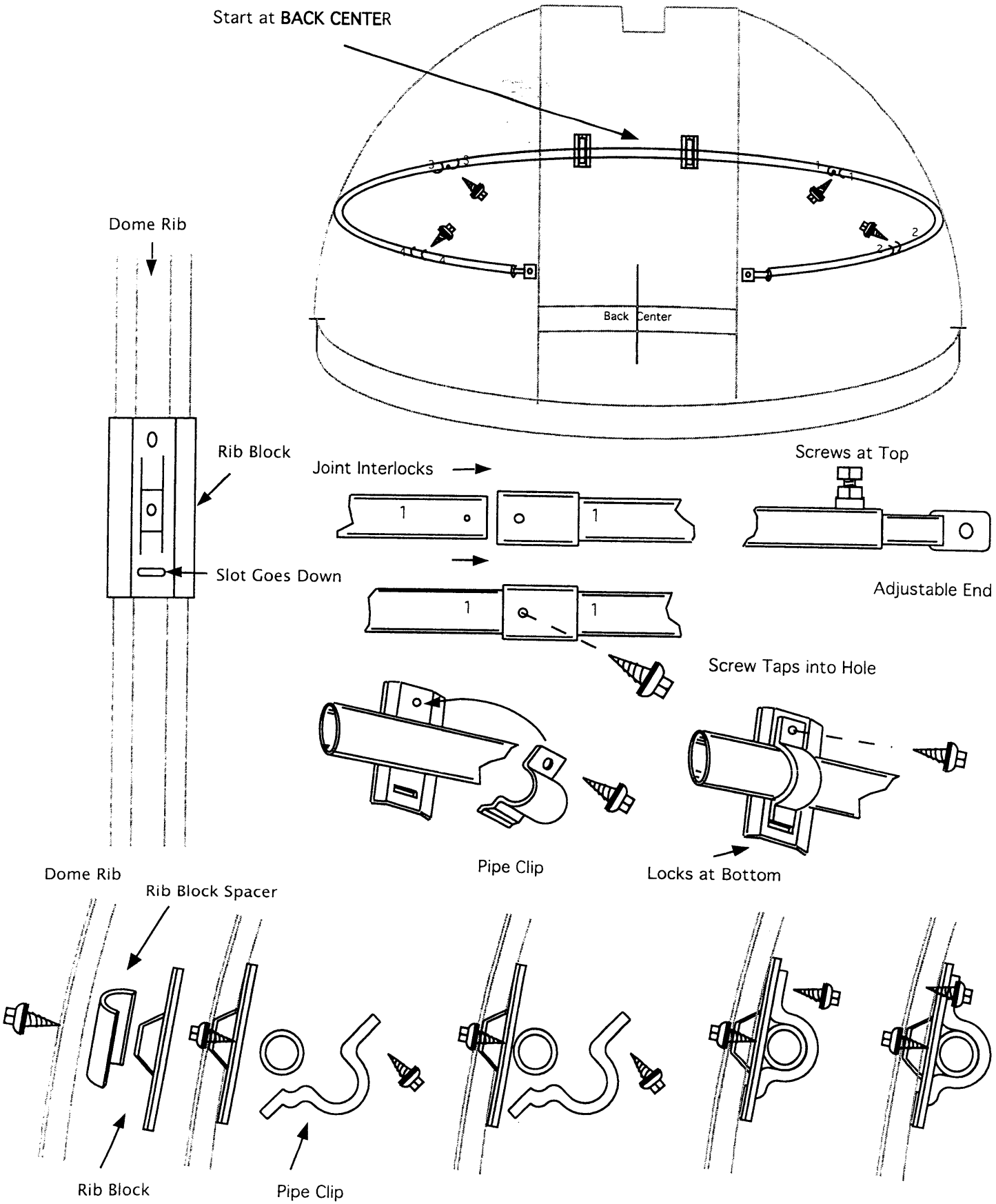


Installation of Shutter Drive Unit

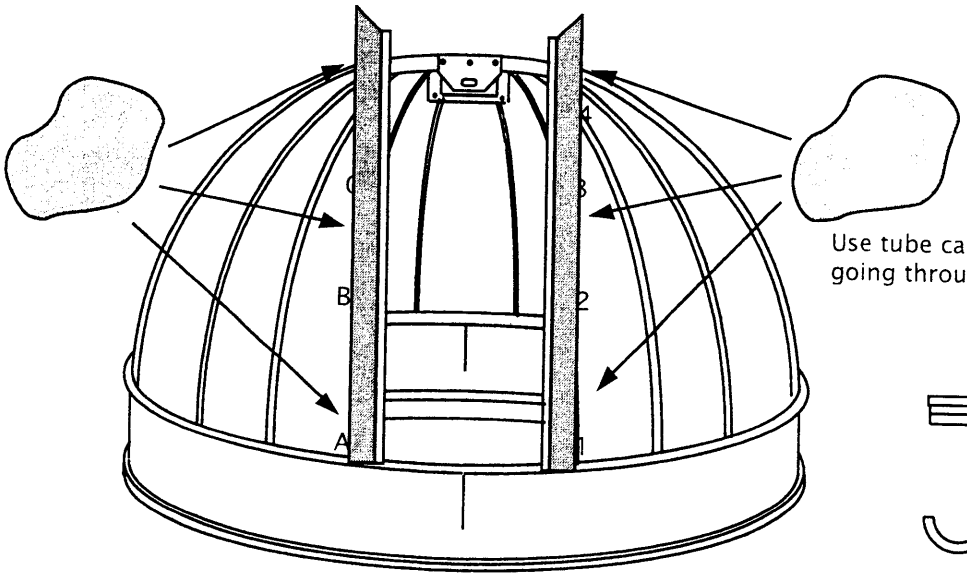




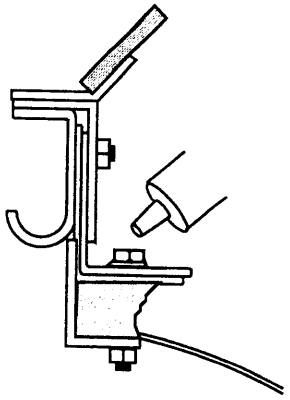
Installation of Reinforcing Ring - 14'6" & Larger Domes



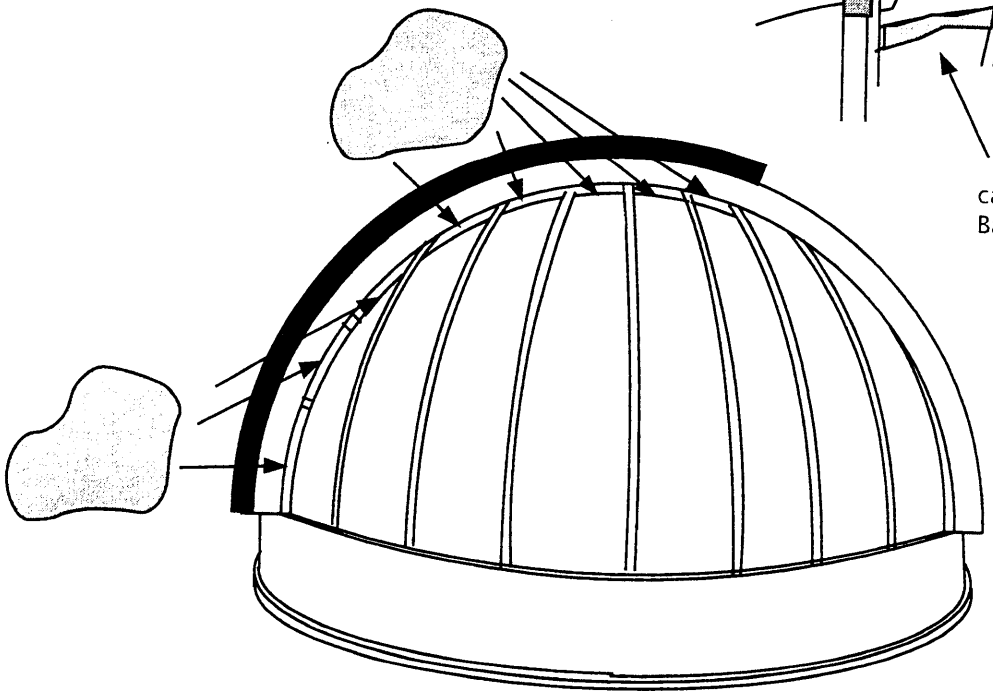
Installing Caulking Sealant along Dome Aperture and across under the Back Seal Angle

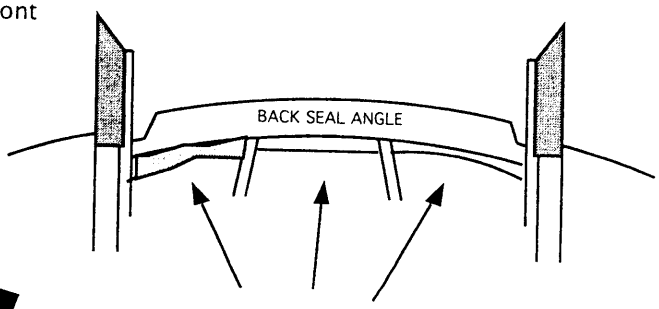


Use tube caulking around bolt heads going through shutter tracks.



Caulking is pushed to back of flashing from Bottom Front to the Back Seal Angle on each side.

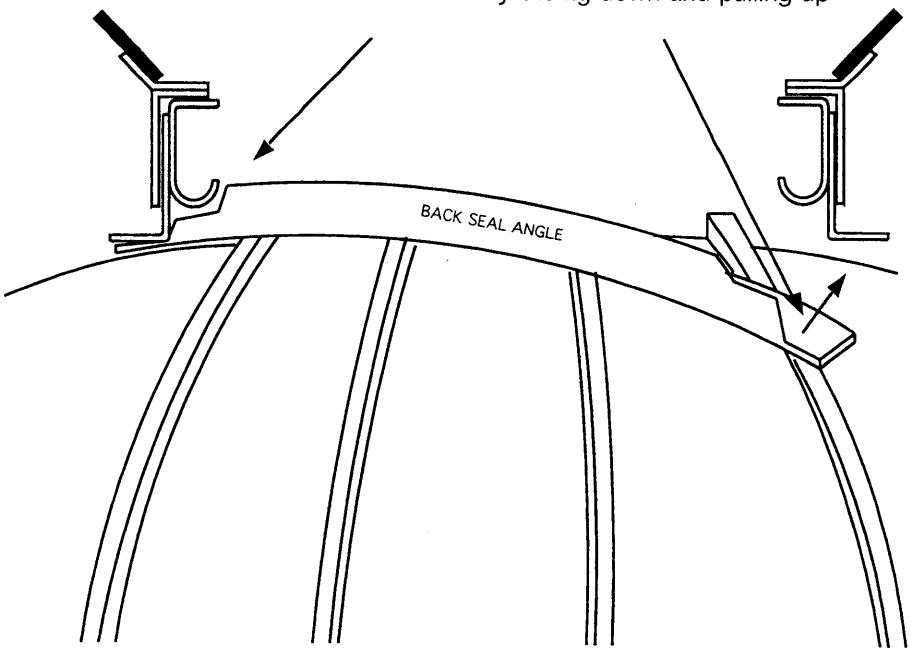




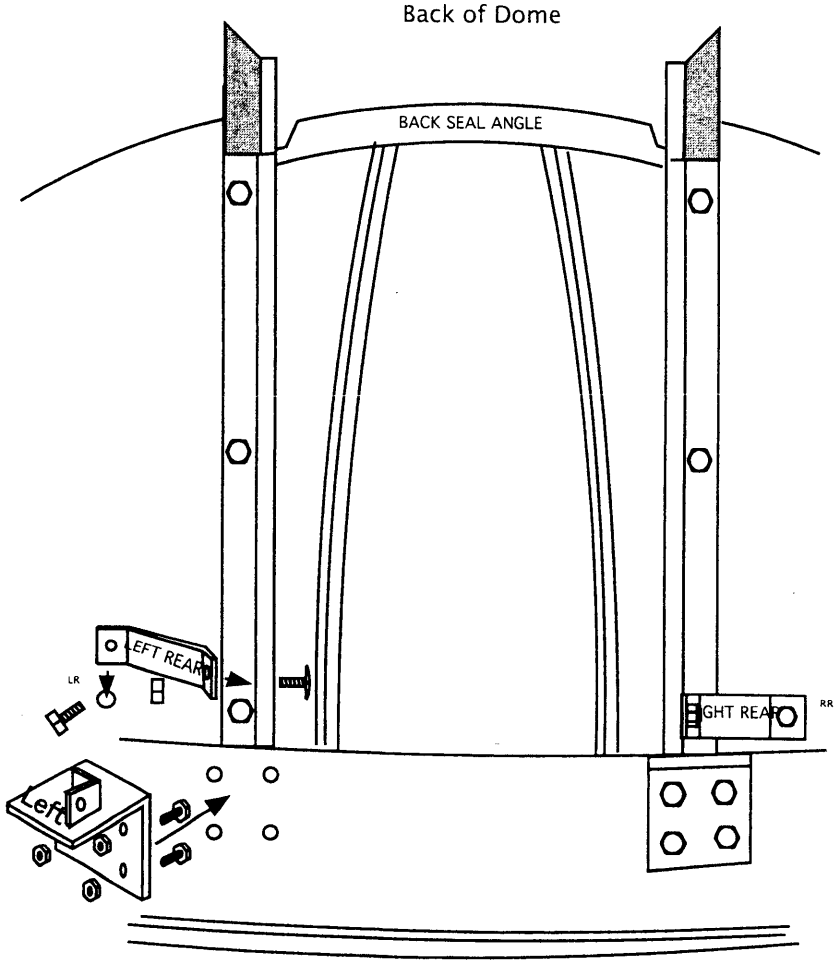
caulk these areas under Back Seal Angle

Installed Back Seal Angle and Back Shutter Track Braces

NOTE: tuck one end of the Back Seal Angle under the shutter track and twist the other end under the track by sliding down and pulling up

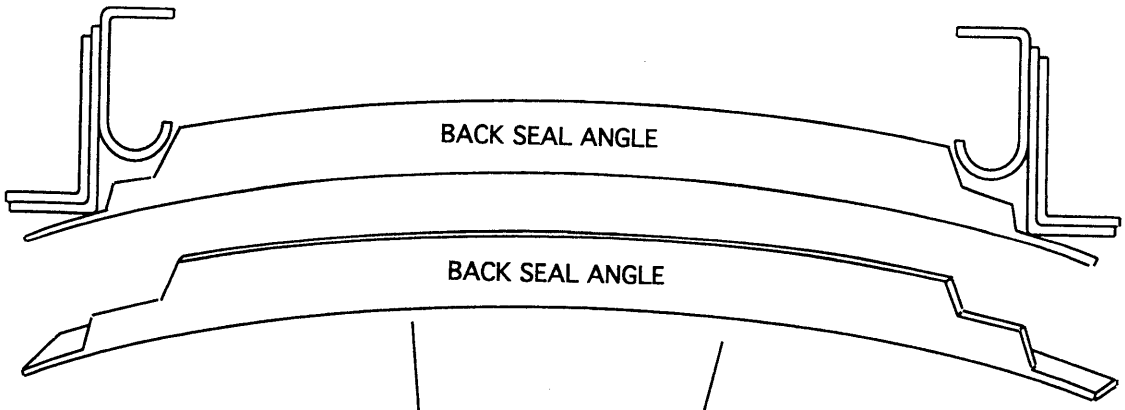


Back of Dome

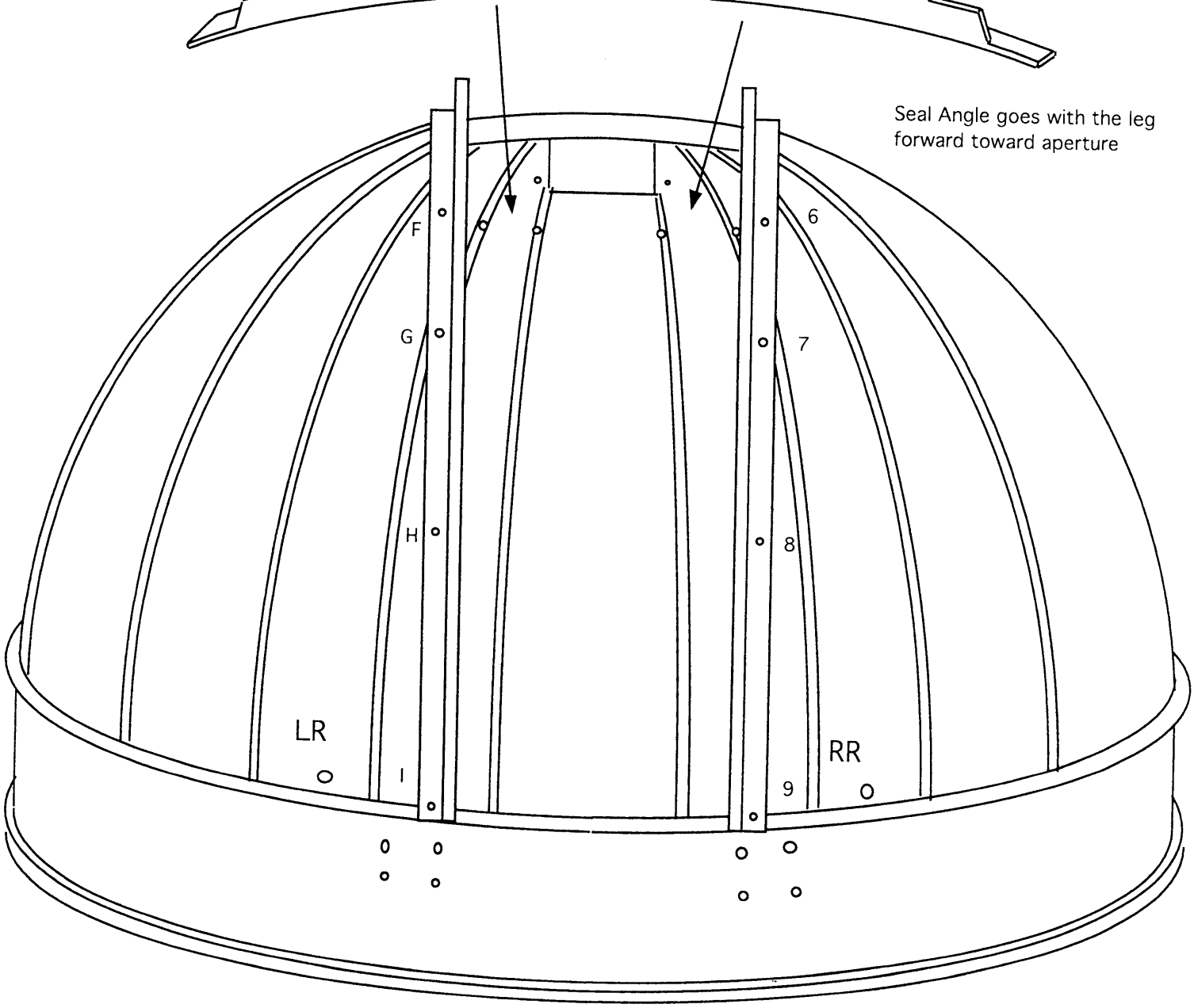


In some cases you might have a bracket to secure the back of the shutter tracks

Installing Back Seal Angle and Back Shutter Track Braces



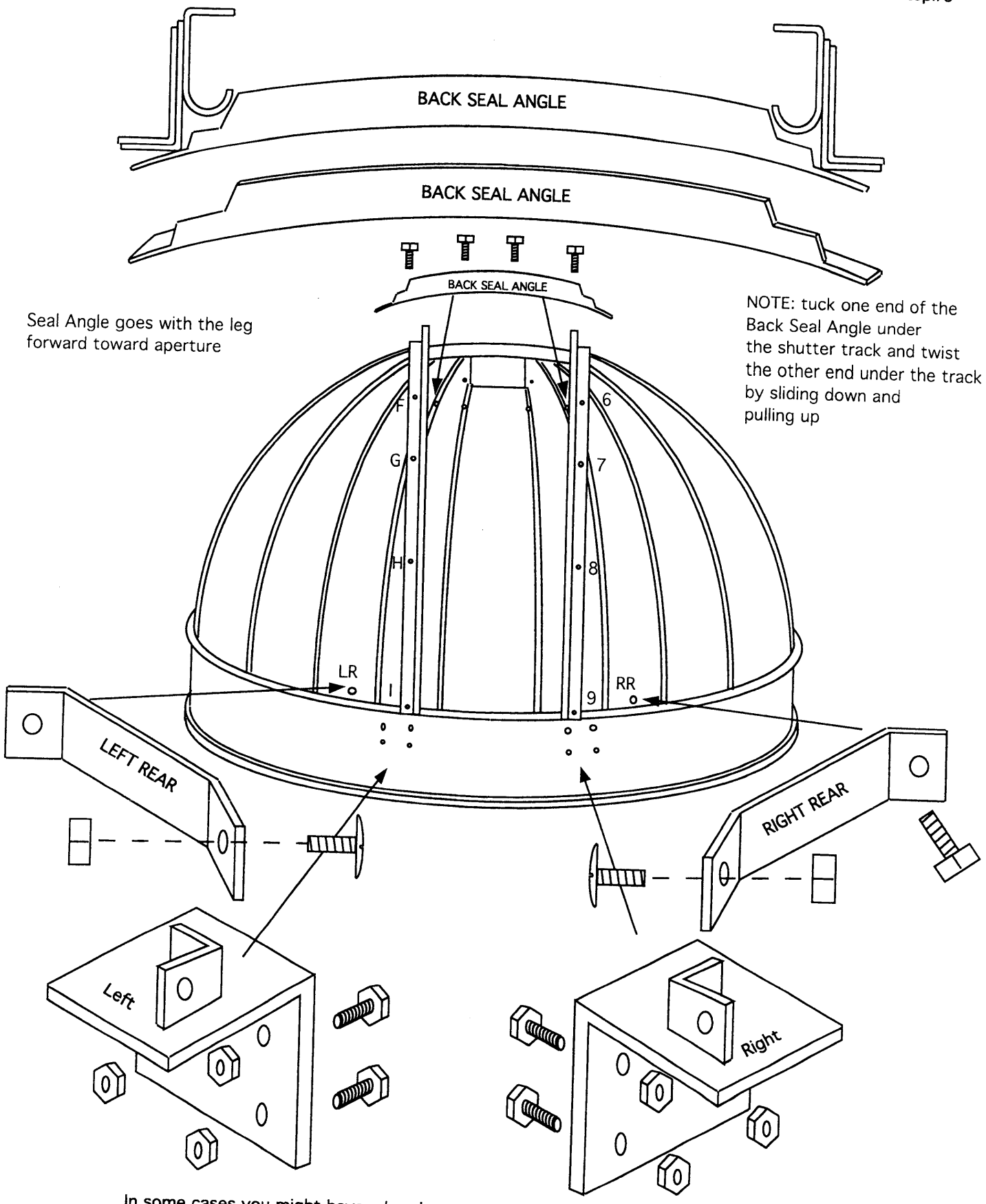
Seal Angle goes with the leg forward toward aperture



Backside of Dome

Installing Back Seal Angle and Back Shutter Track Braces

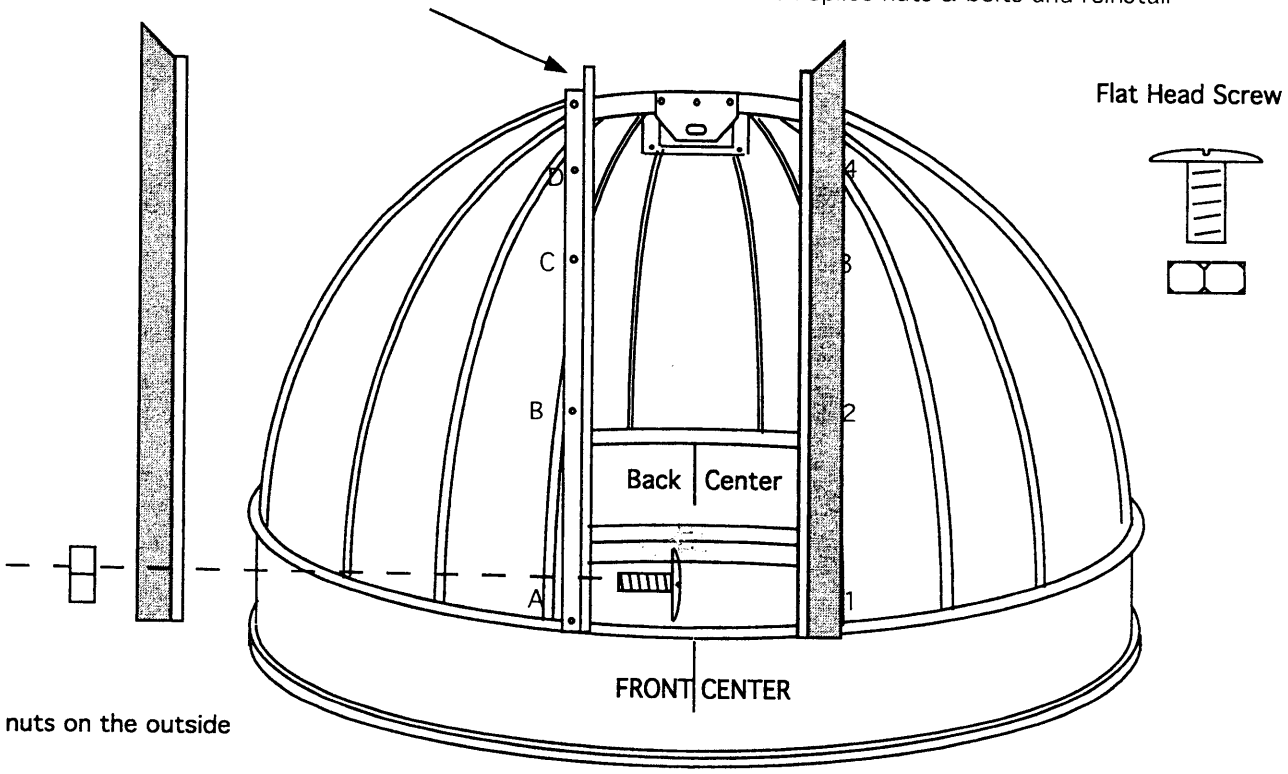
step#5



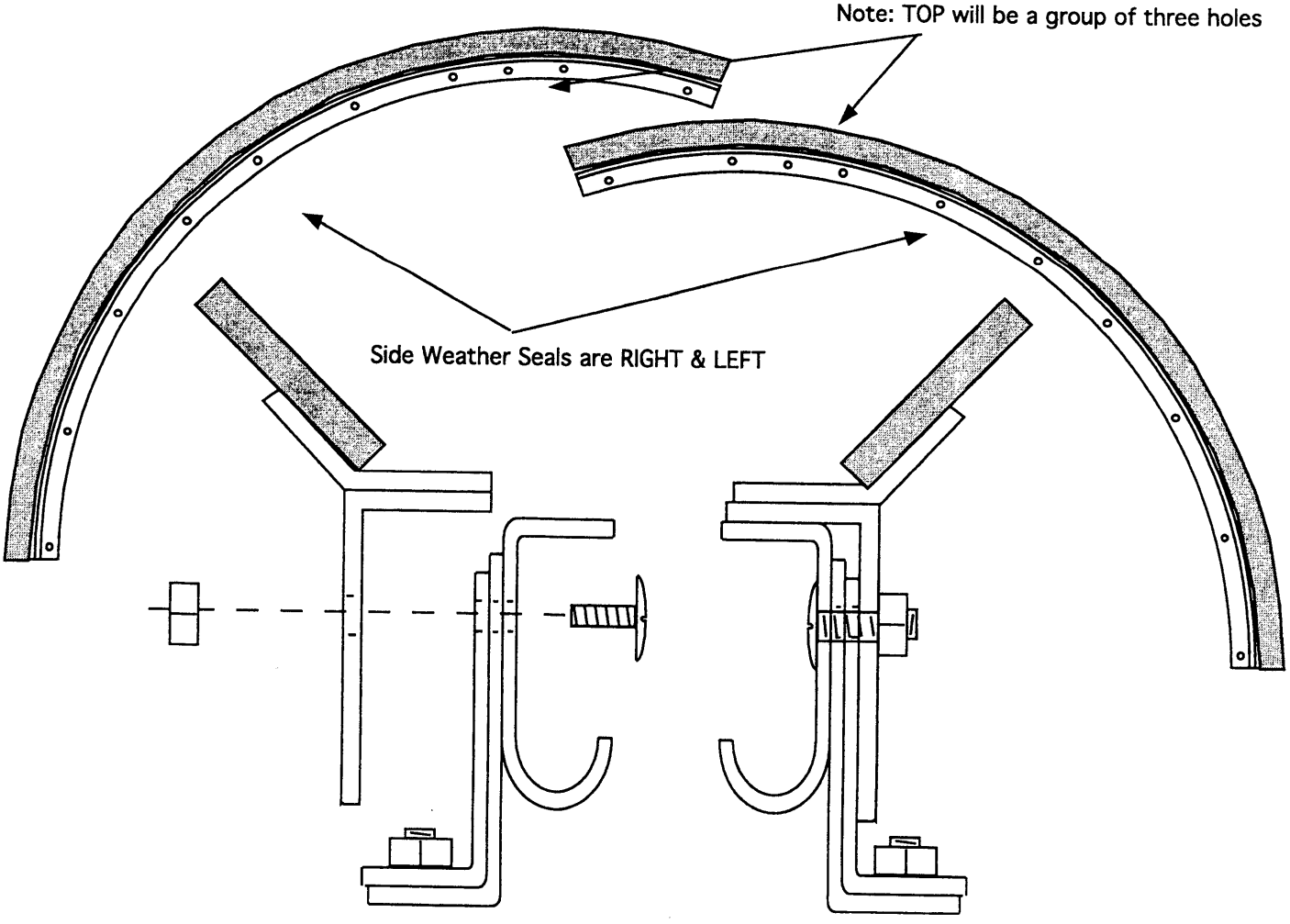
In some cases you might have a bracket to secure the back of the shutter track

Installing Shutter Side Weather Seals

NOTE: You will have to remove the Shutter Track Splice nuts & bolts and reinstall

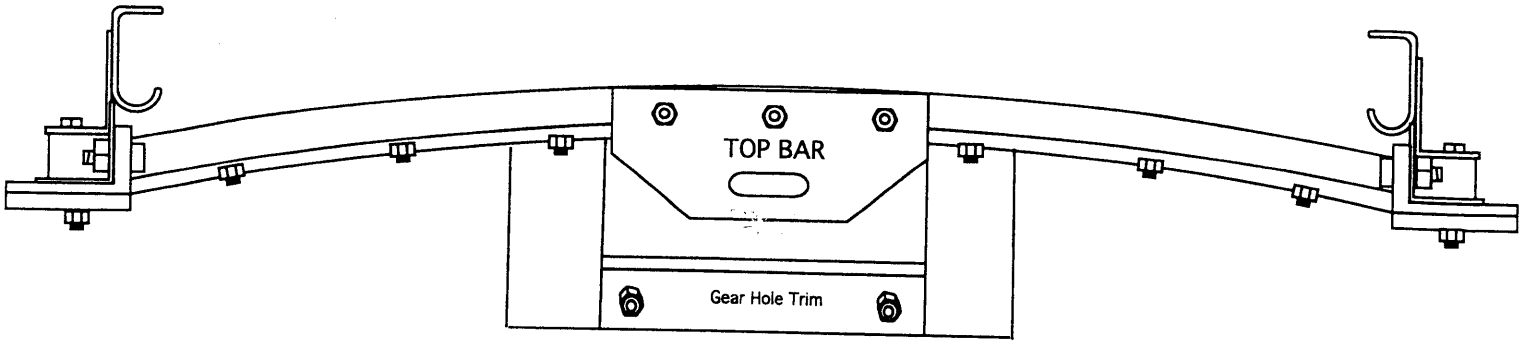


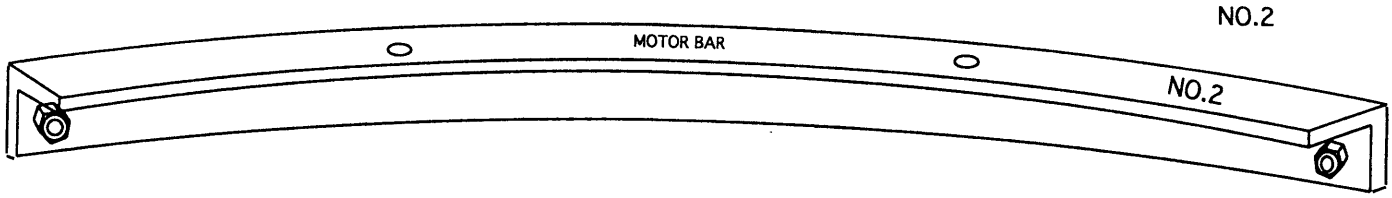
Note: TOP will be a group of three holes

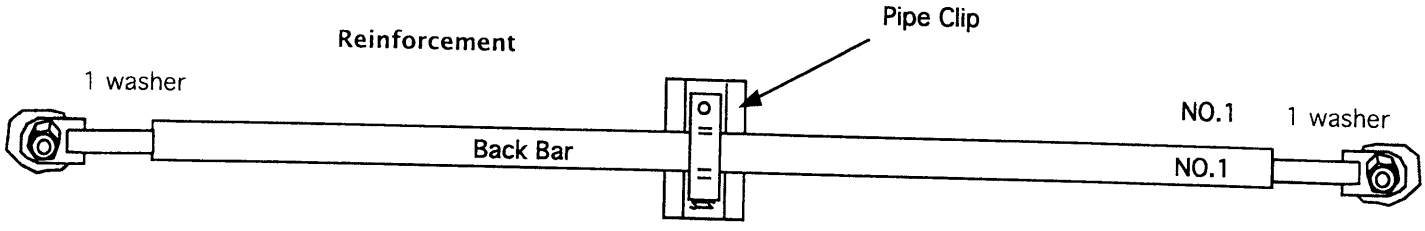


Installed Interior Bracing and Gear Hole Trim

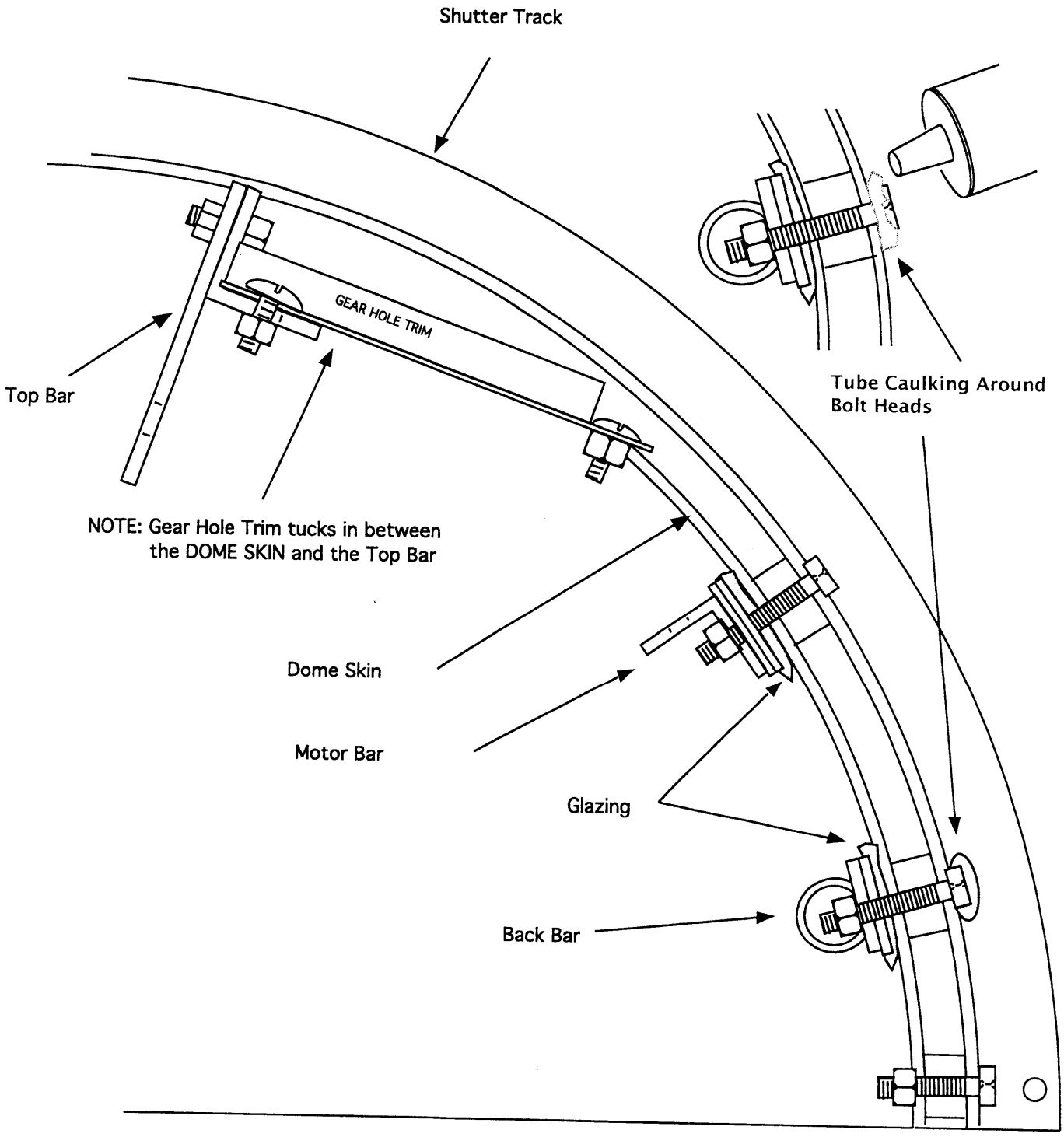
step#5



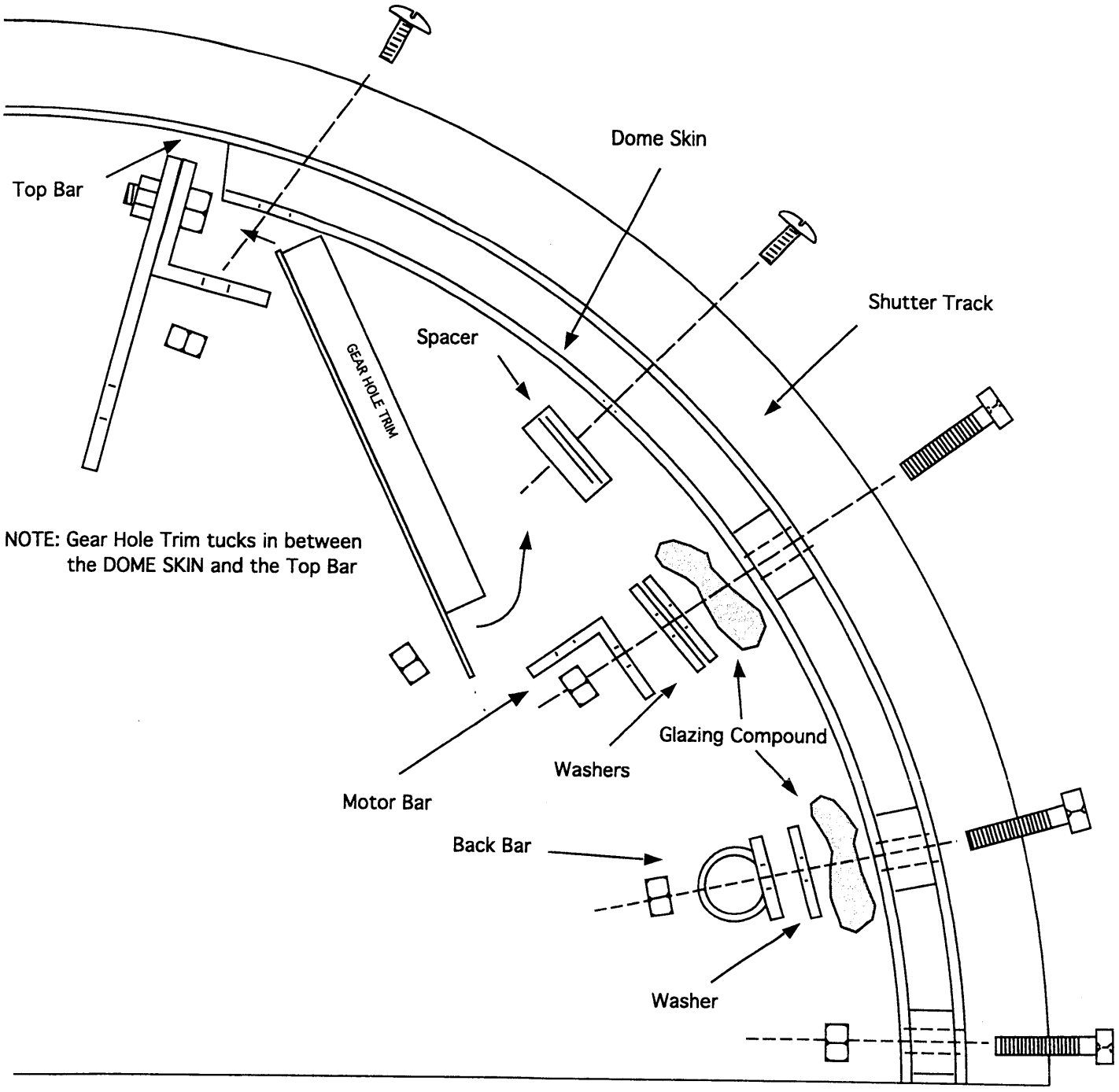




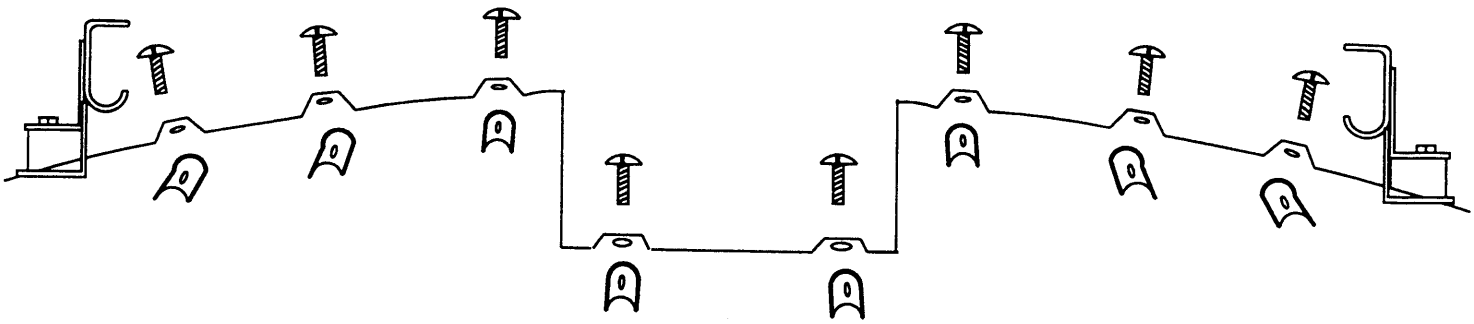
Installed Interior Reinforcing and Gear Hole Trim

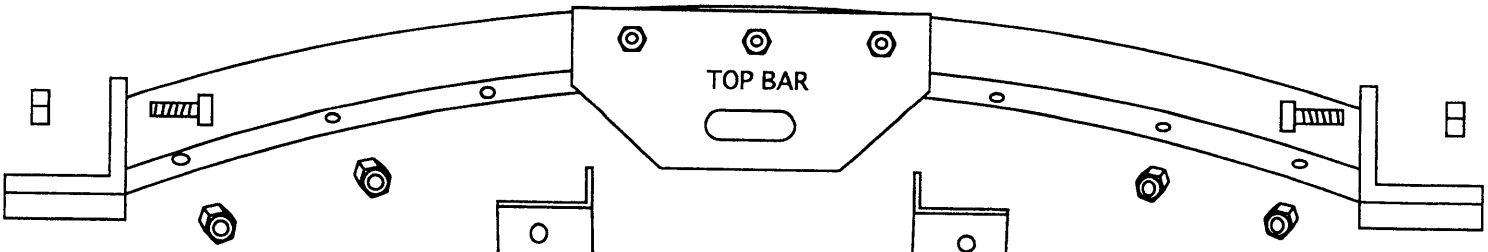


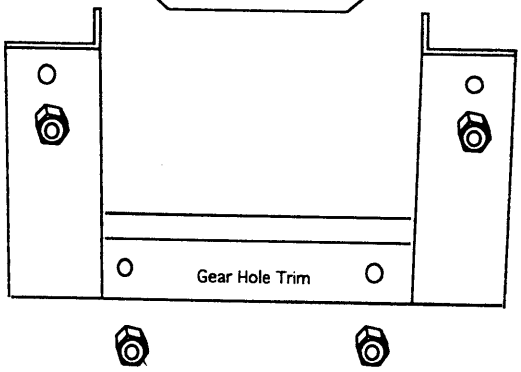
Installing Interior Reinforcing and Gear Hole Trim

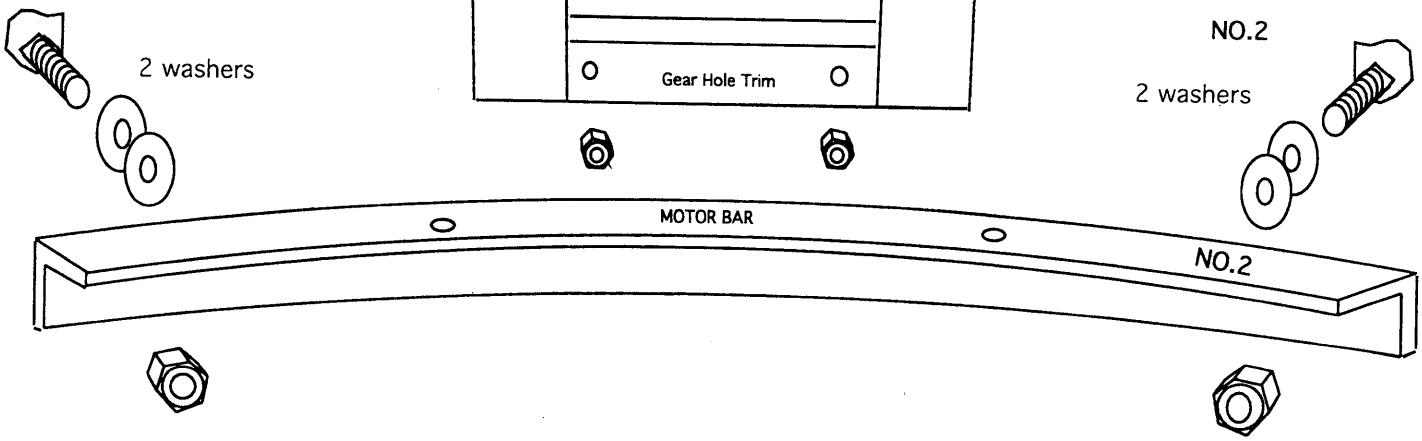


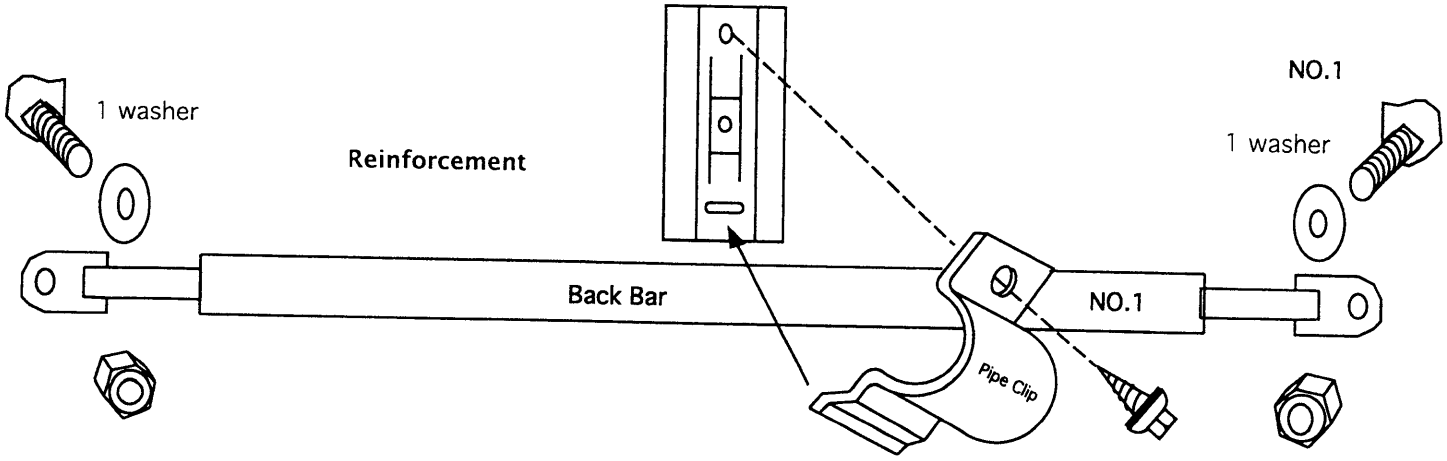
Installing Interior Bracing and Gear Hole Trim





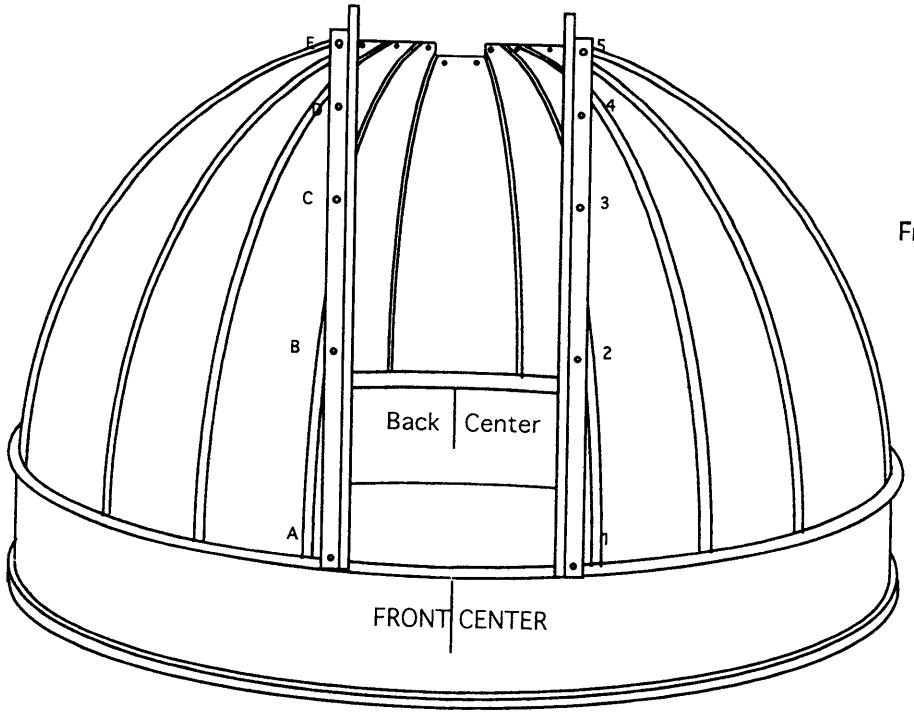




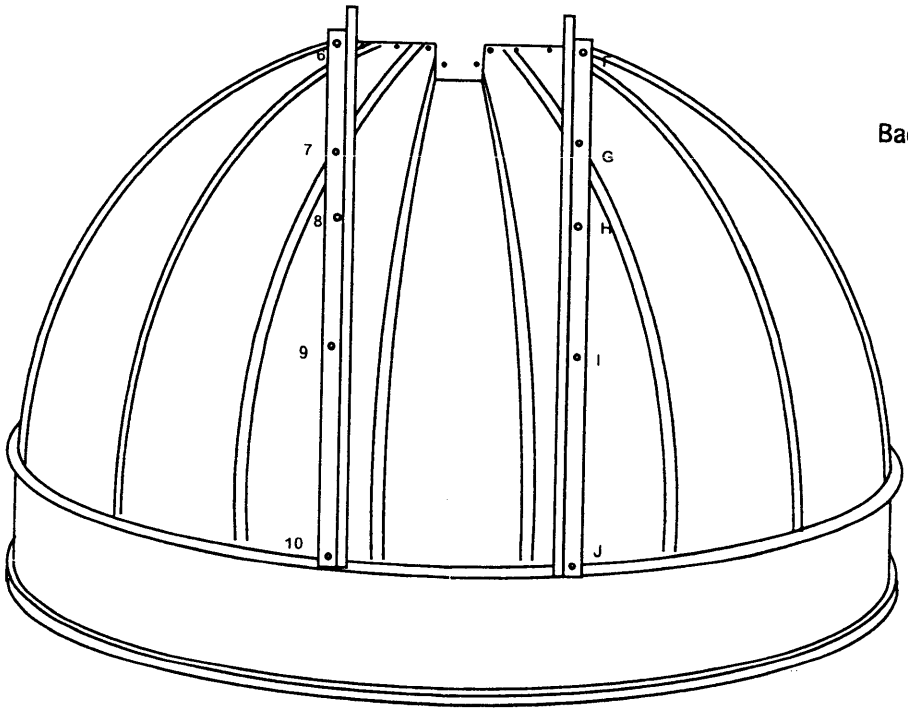


Installed Shutter Track on Dome

step#5A

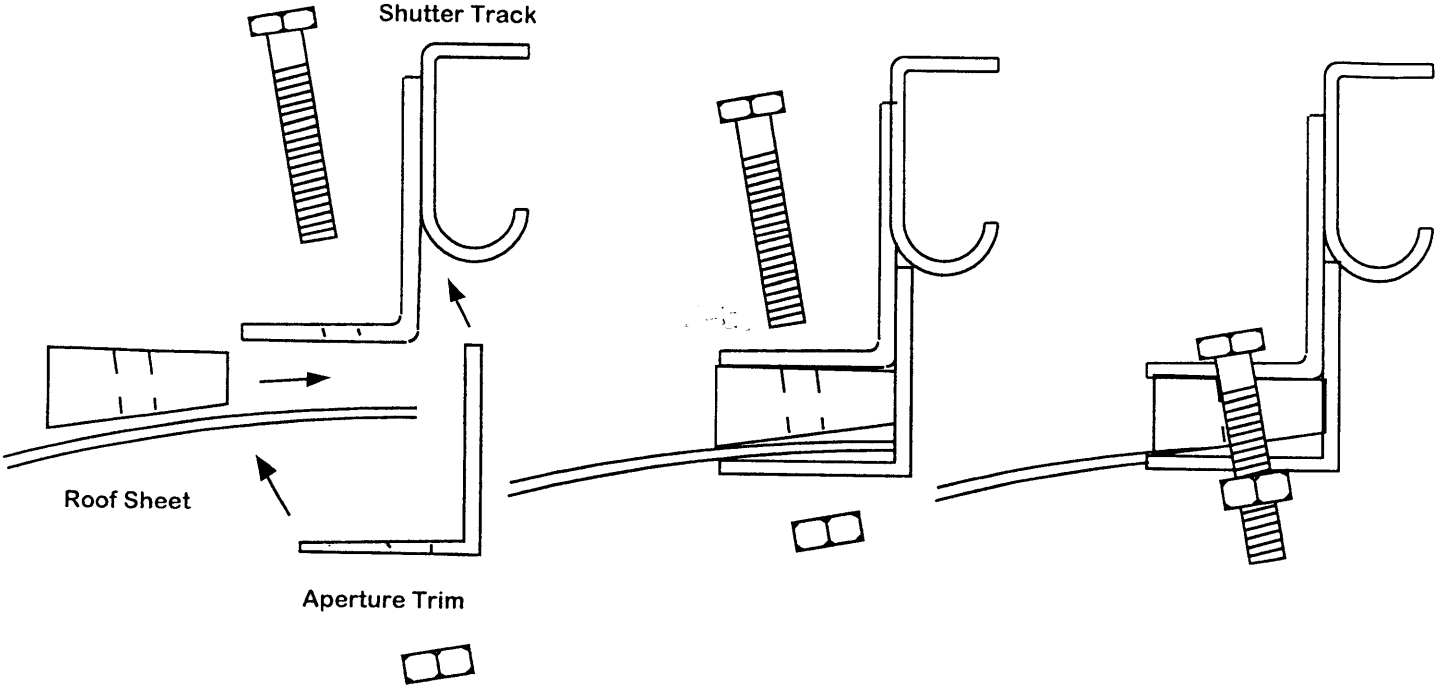


Front of Dome

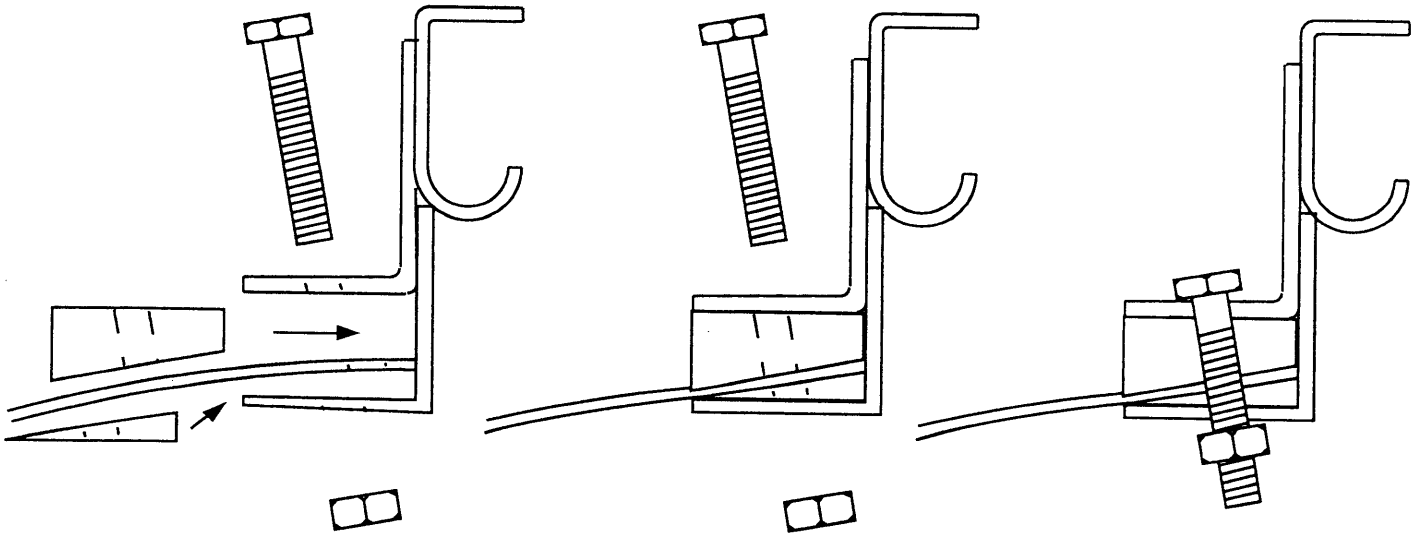


Back of Dome

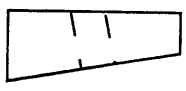
Installing Shutter Track on Dome and Aperture Trim



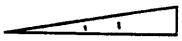
NOTE: If you have a double shim, the number or letter is always on the outside of the dome. Bolts will always angle slightly toward the center of the dome.



squared side of the block →

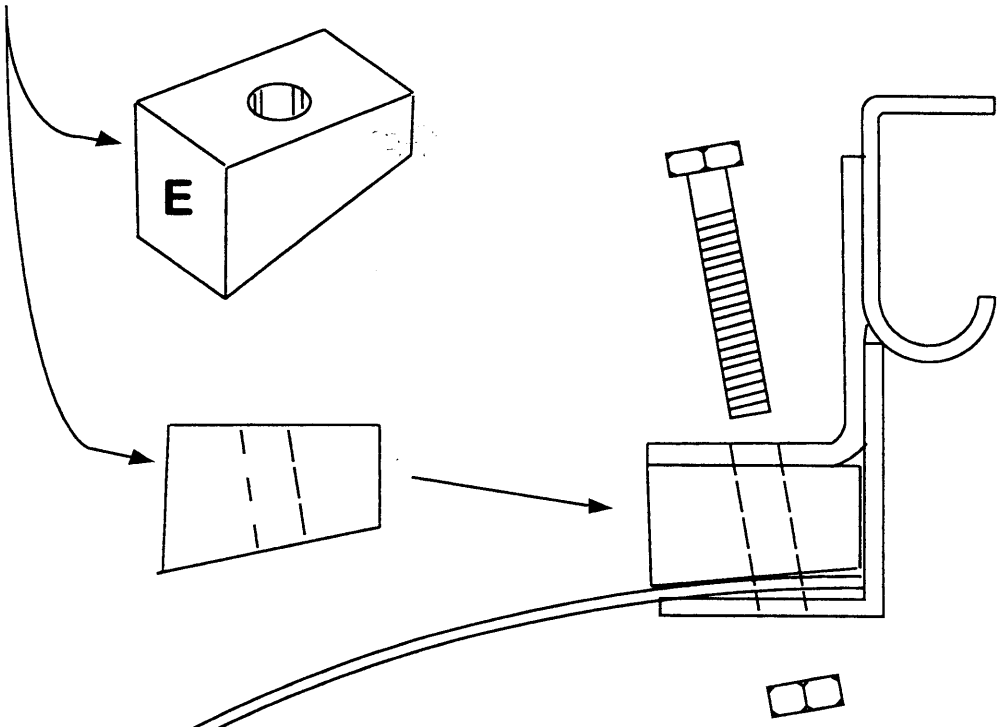


tapered side of the block →

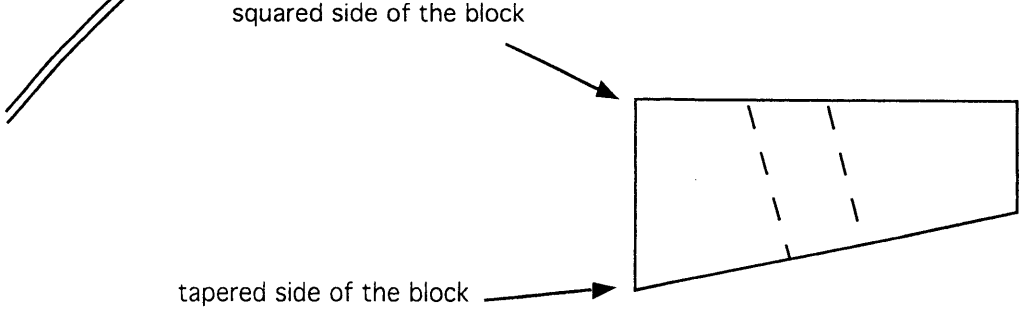


Installing Shutter Track on Dome

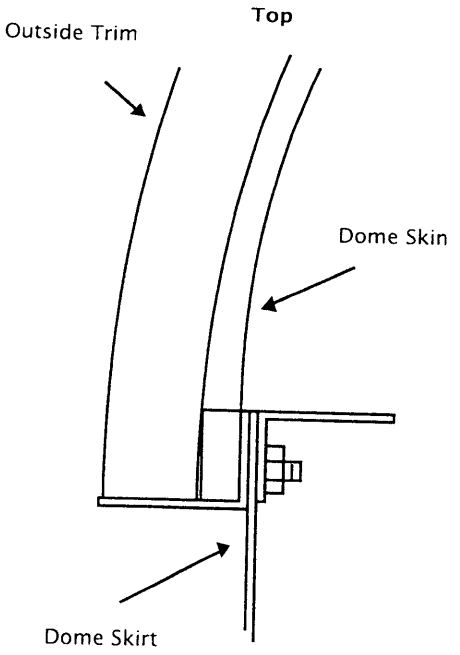
NOTE: All blocks are lettered or numbered.
These will always be on the outsie edge of the block.

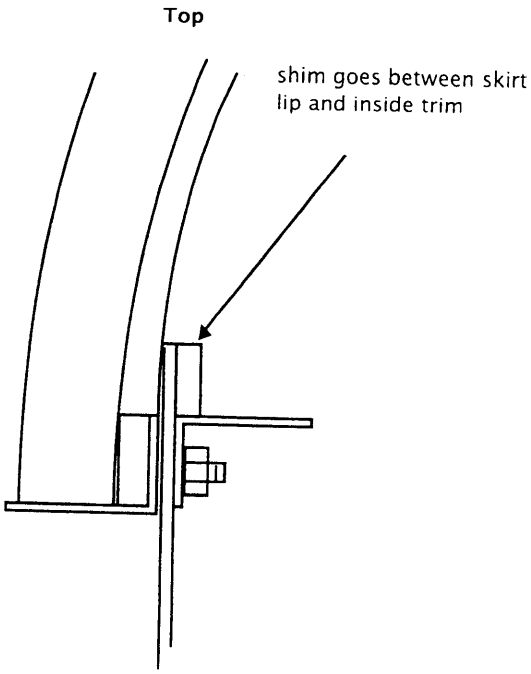


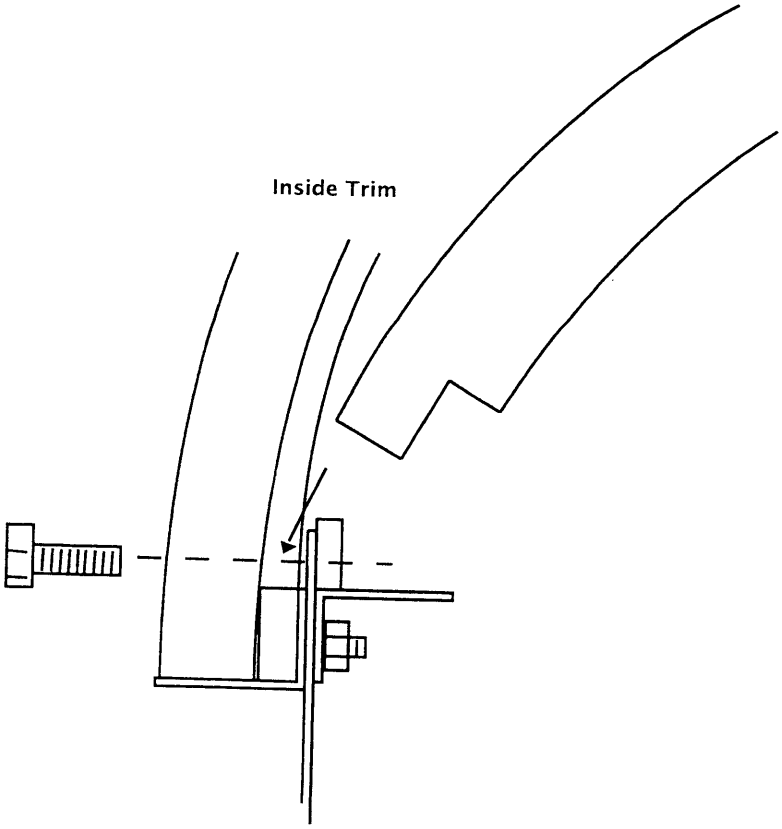
NOTE: Bolts will always angle slightly toward the center of the dome.

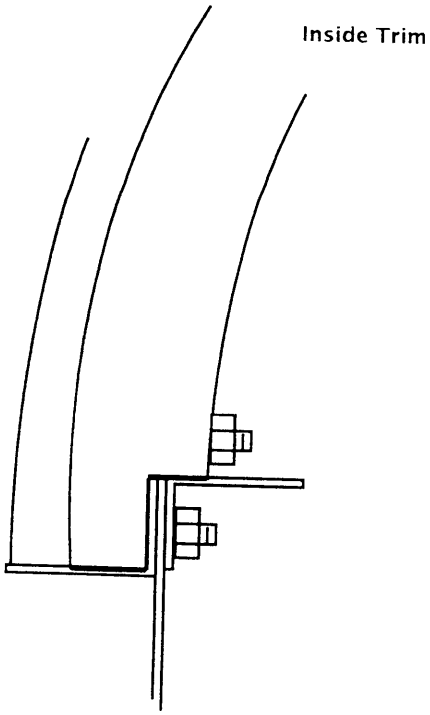


Inside Aperture Trim

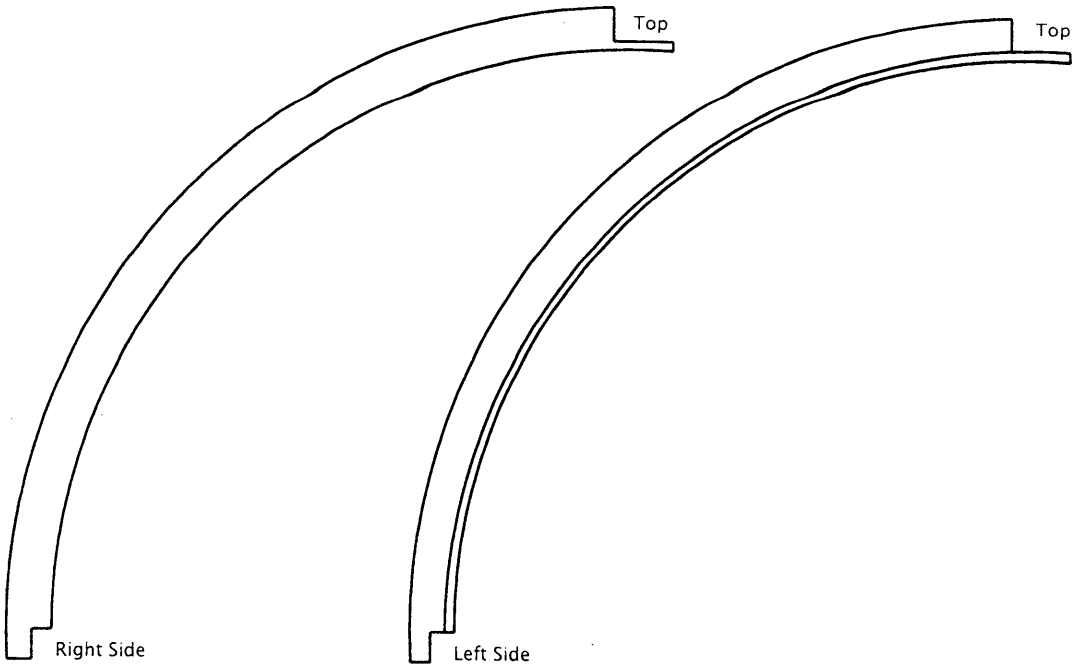


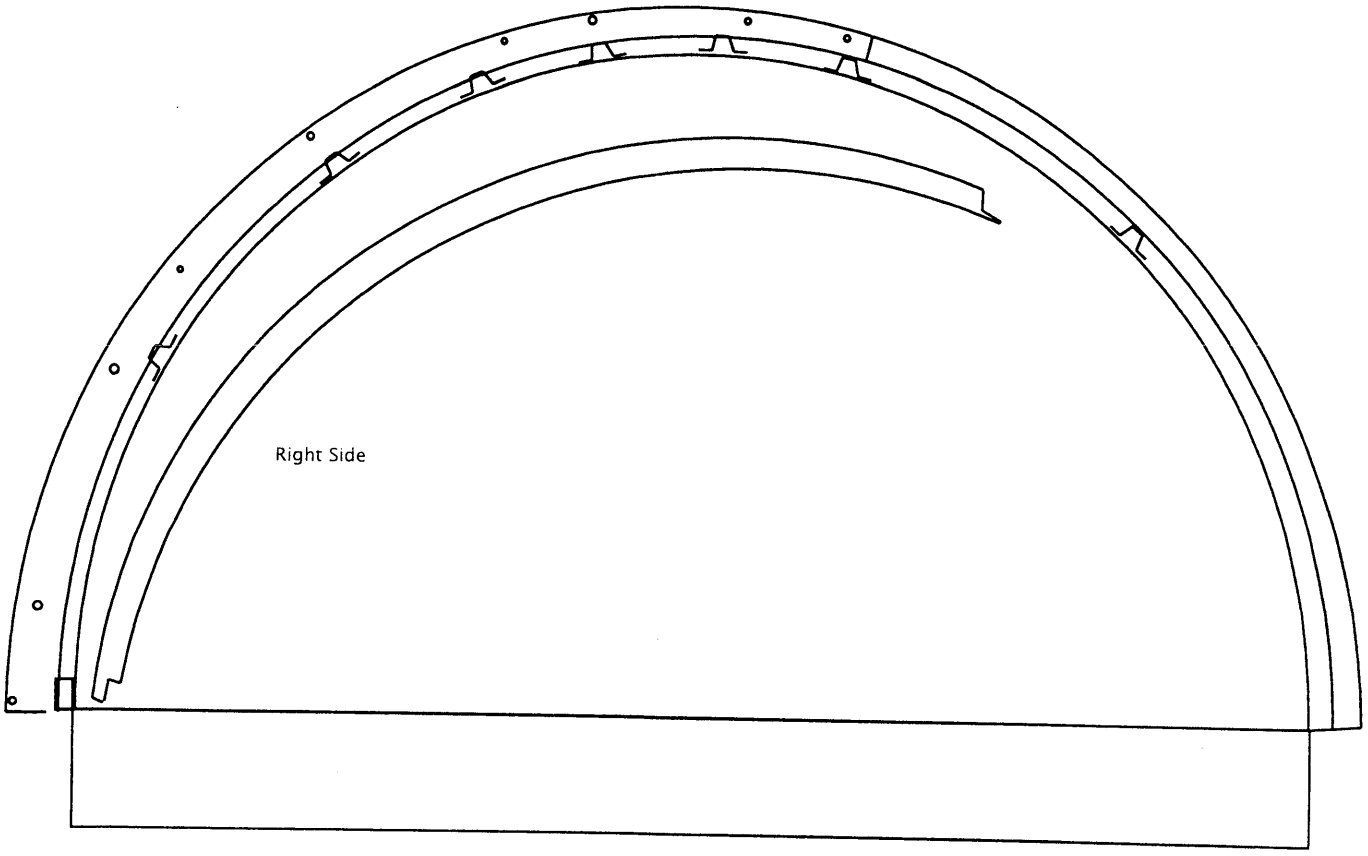






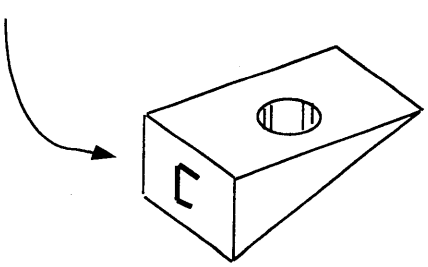
Installin Inside Aperture Trim Angles

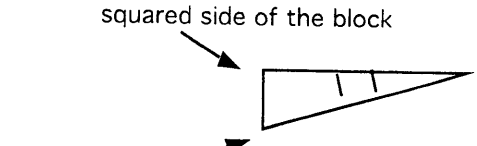


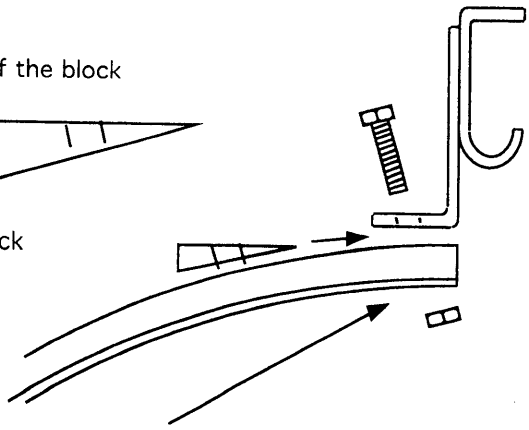


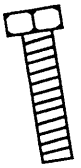
Installing Shutter Track on Dome

NOTE: All blocks are lettered or numbered.
These will always be on the outside edge of the block.

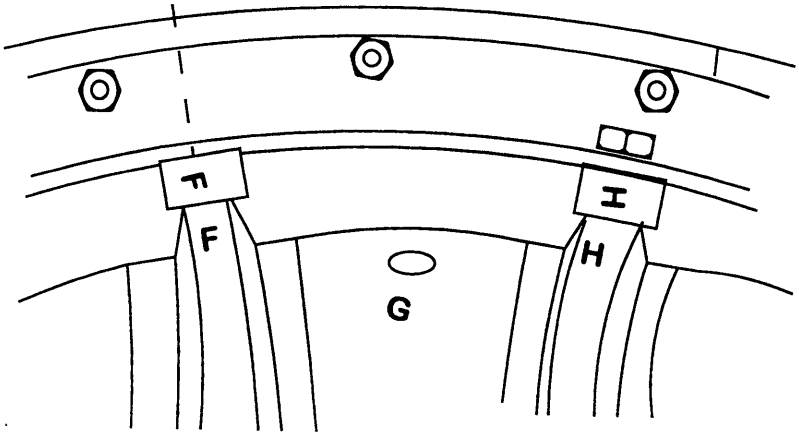


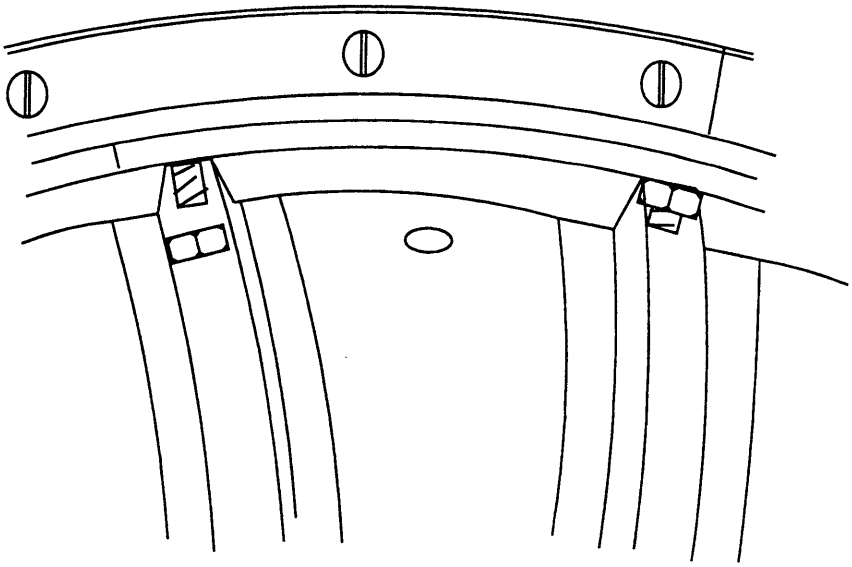






NOTE: When you install the shim, the number or letter is always on the outside of the dome. Bolts will always angle slightly toward the center of the dome. When all shims through ribs are installed tighten all of them before next step.

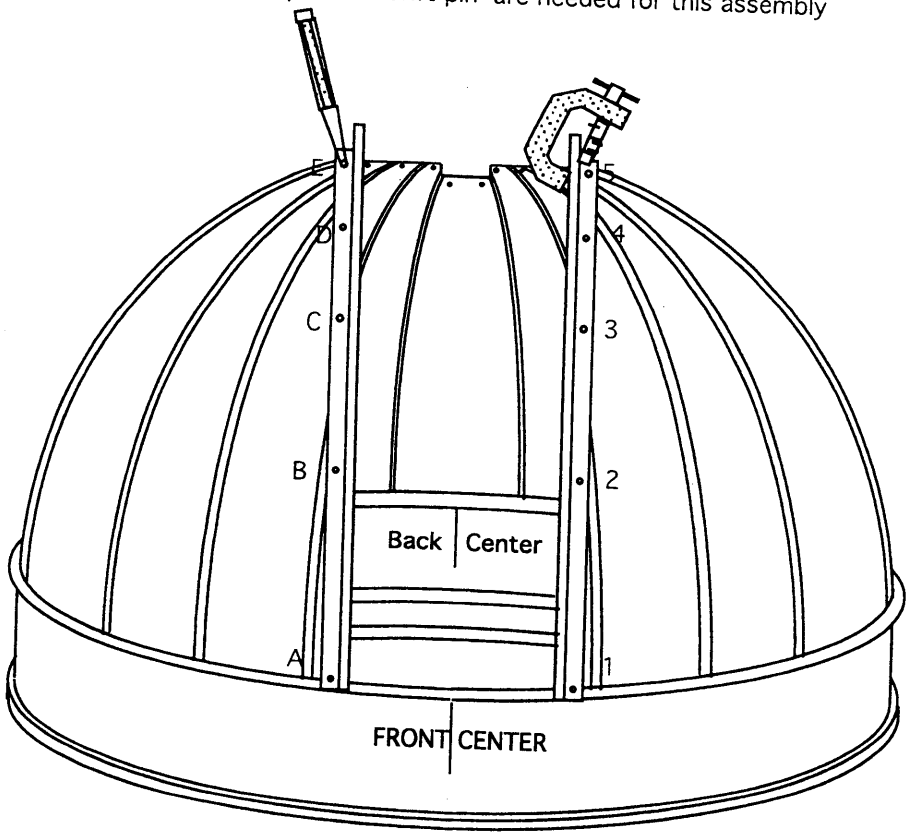




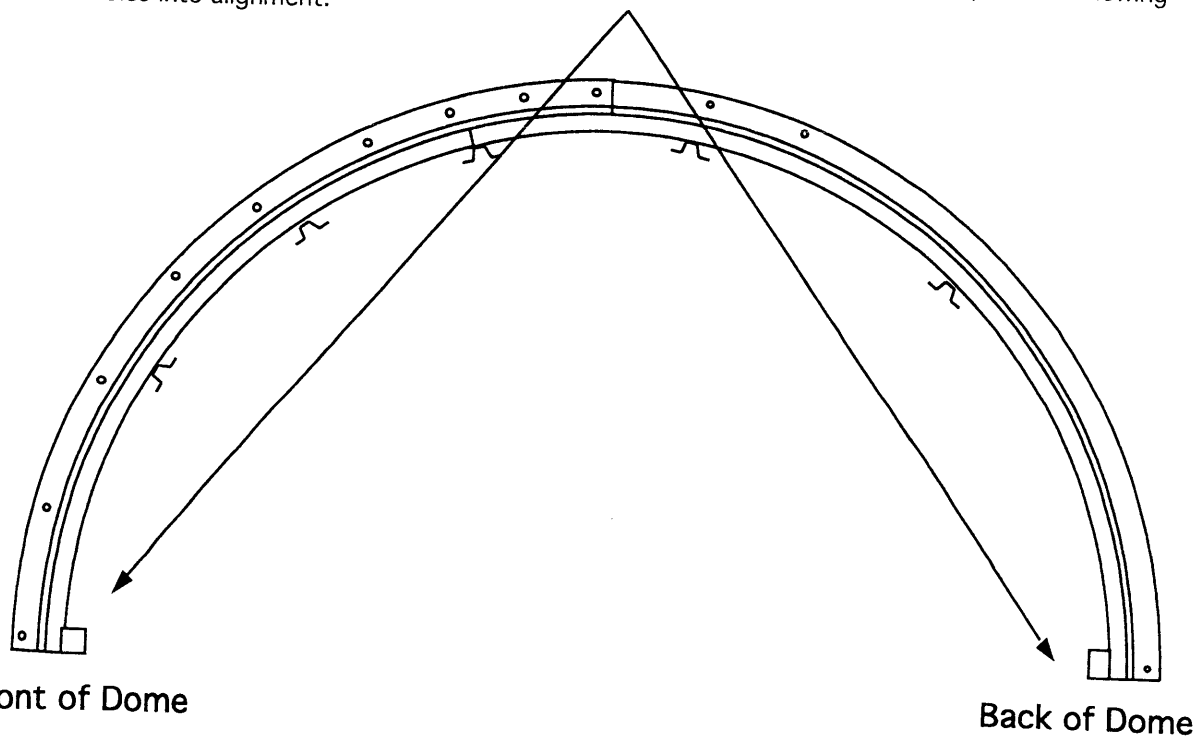
Installing Shutter Track on Dome

step#5A

NOTE: a large 'C' clamp and a 'drift pin' are needed for this assembly



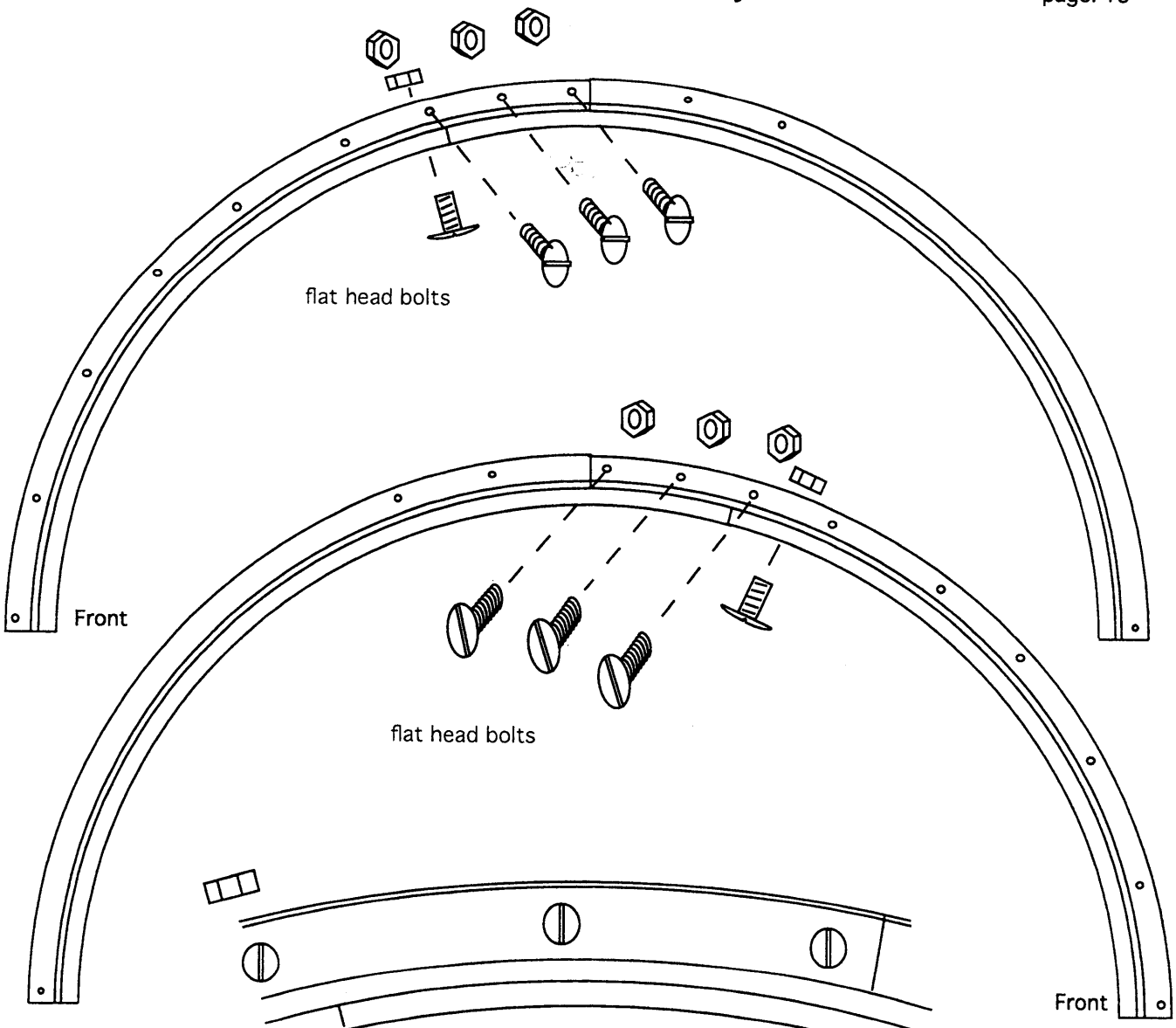
NOTE: Secure the block at the bottom on backside of the tracks first and then come back around to the front. Install either lettered block A or No.1. Install the thin blocks in the dome ribs first. Work your way up the front from the bottom up. This will pull the following holes into alignment.



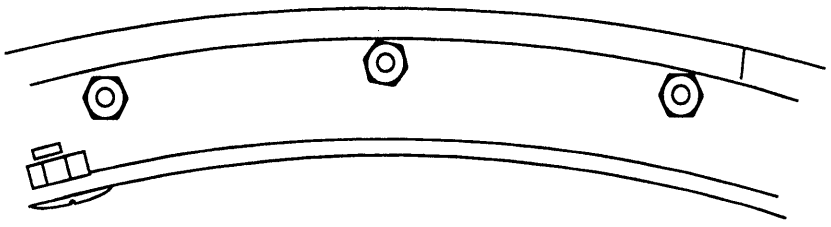
Front of Dome

Back of Dome

Shutter Track Assembly



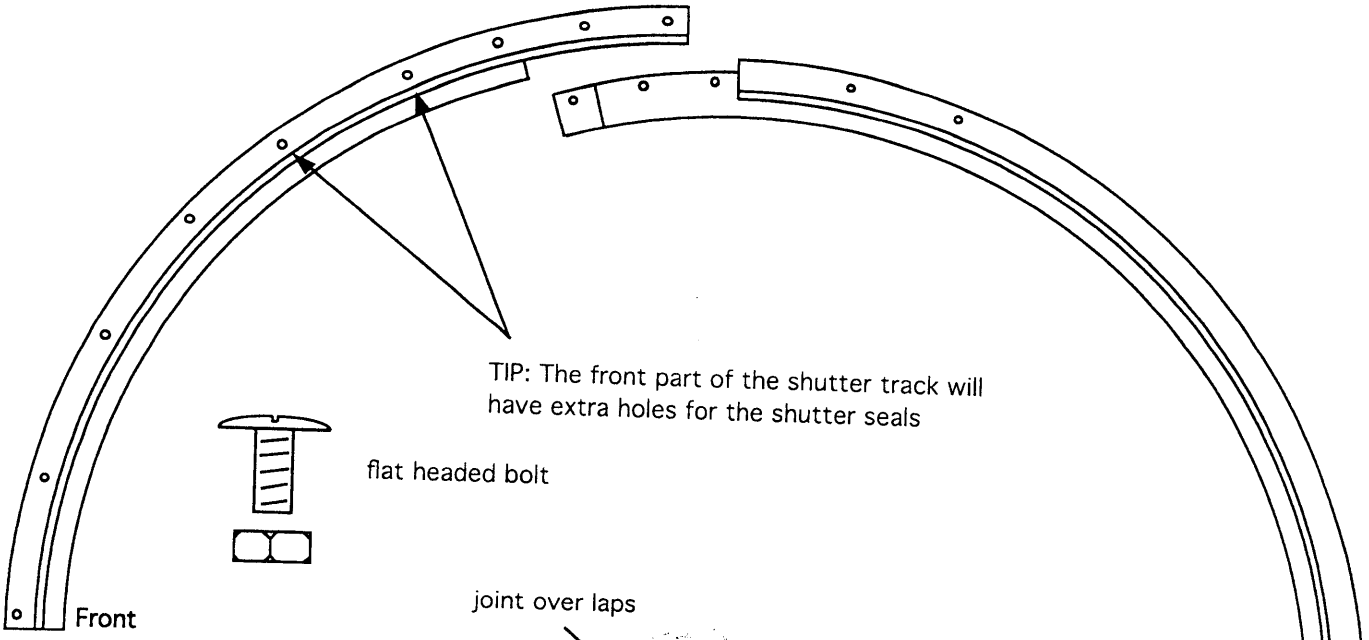
bolt goes up from bottom



bolt goes up from bottom

Shutter Track Assembly

NOTE: The shutter tracks are right and left sides

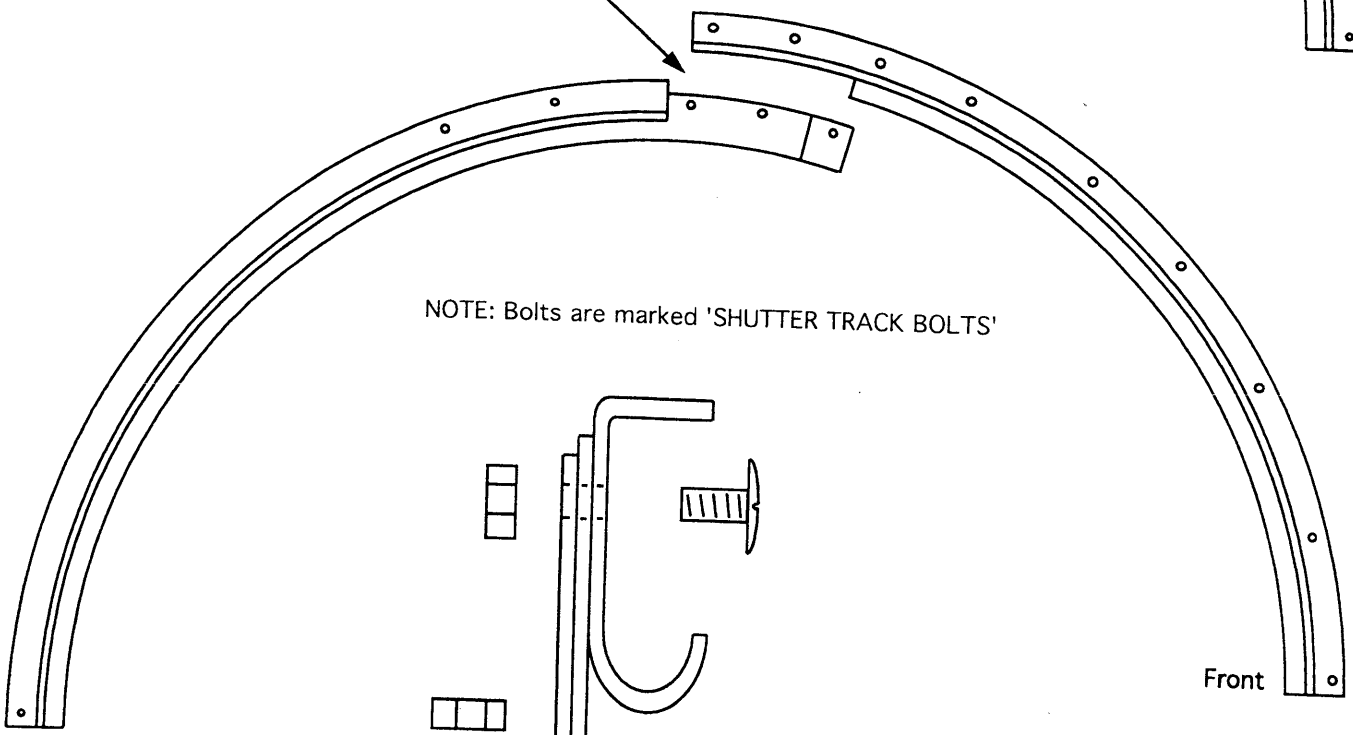


TIP: The front part of the shutter track will have extra holes for the shutter seals

flat headed bolt

Front

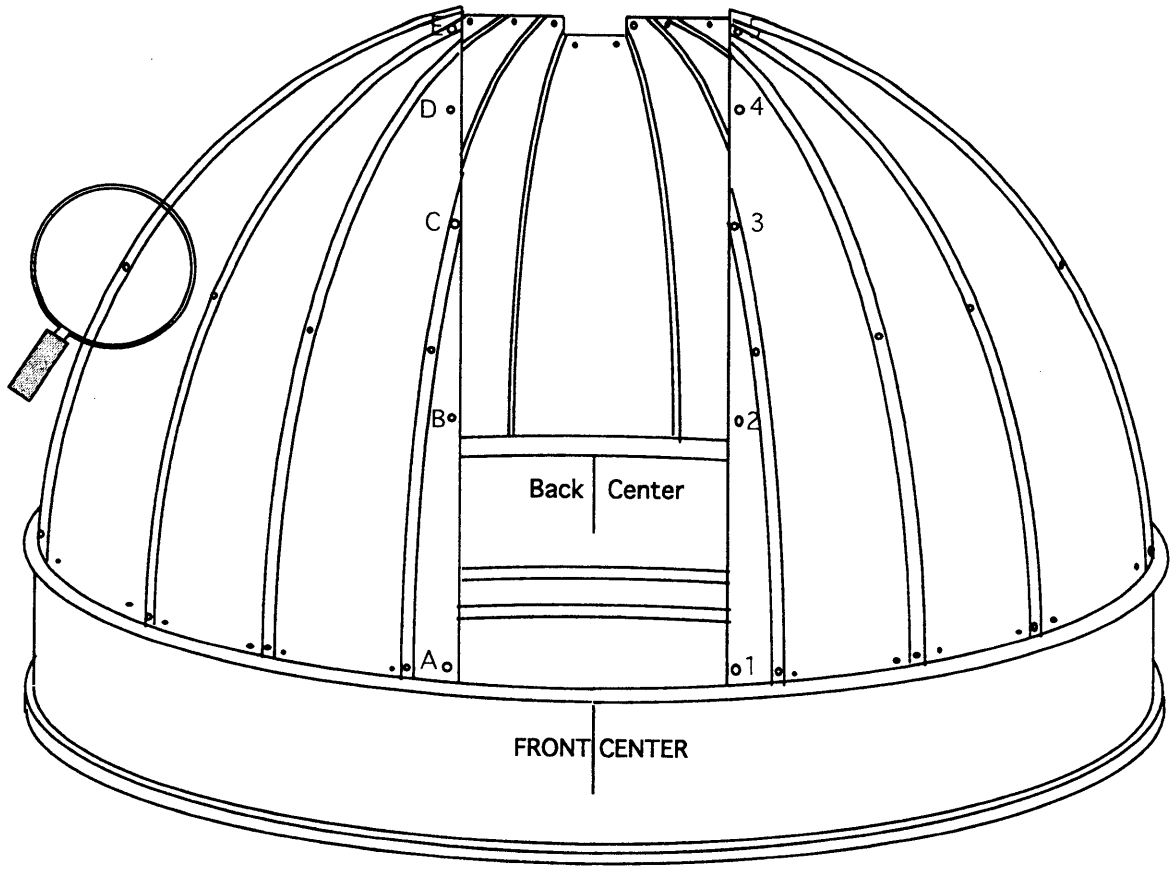
joint over laps

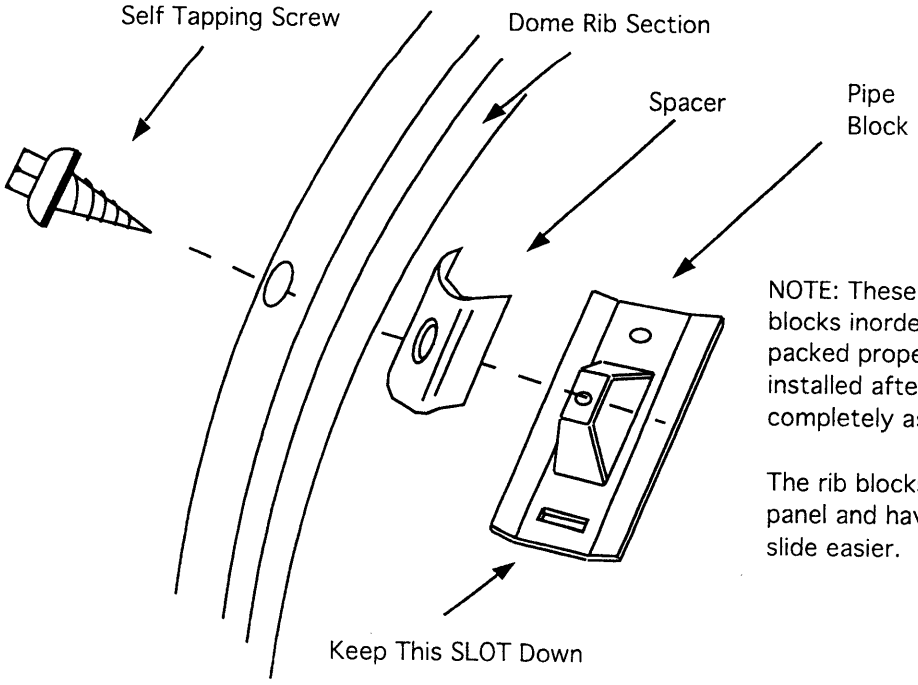


NOTE: Bolts are marked 'SHUTTER TRACK BOLTS'

Front

Installation of Pipe Reinforcing Blocks





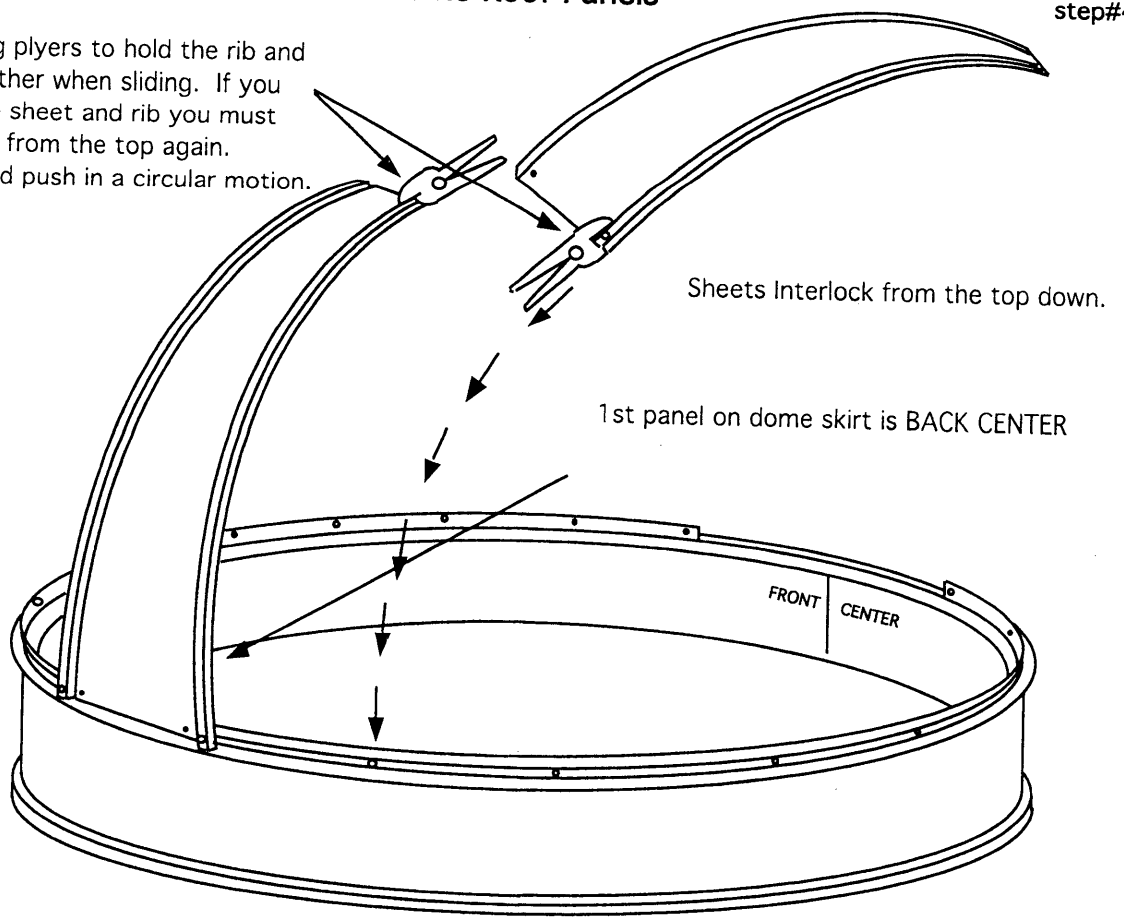
NOTE: These units are shipped without the pipe rib blocks inorder to allow the roof sheets to be packed properly. These rib blocks should be installed after the roof sheets have been completely assembled.

The rib blocks also tighten the ribs on the roof panel and having them removed will let the sheets slide easier.

Dome Roof Panels

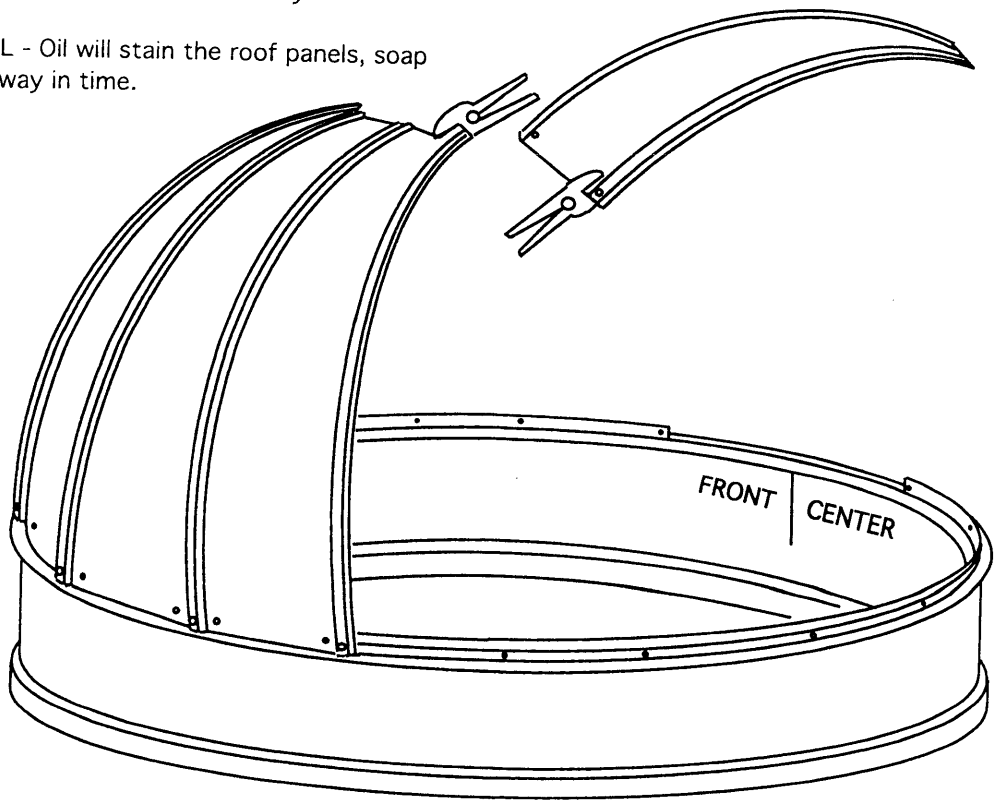
step#4

TIP: Use locking plyers to hold the rib and the sheet together when sliding. If you should slipt the sheet and rib you must start the sheet from the top again. Wear gloves and push in a circular motion.

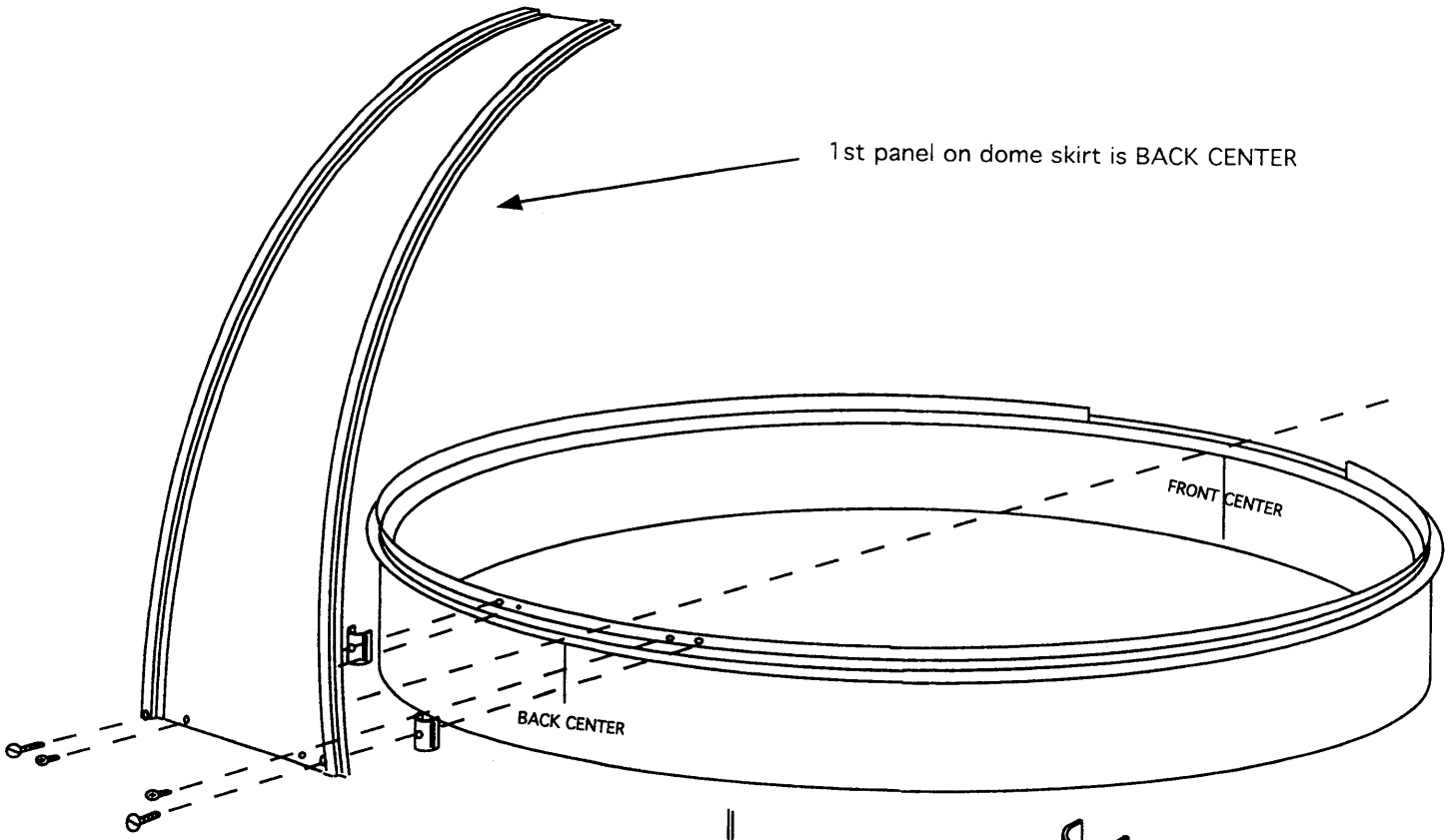


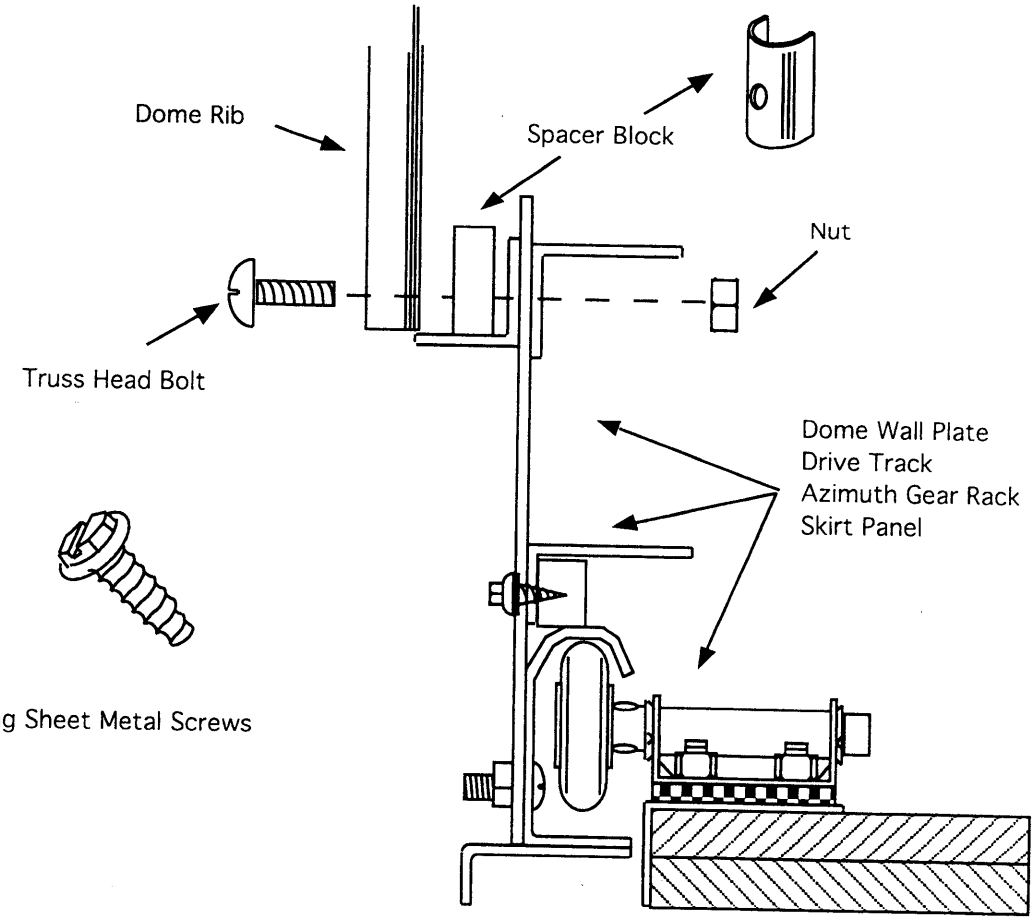
When sliding the roof panels you may squirk a liquid soap into the joints to ease the assembly.

DO NOT USE OIL - Oil will stain the roof panels, soap will just wash away in time.



Installing Dome Roof Sheets

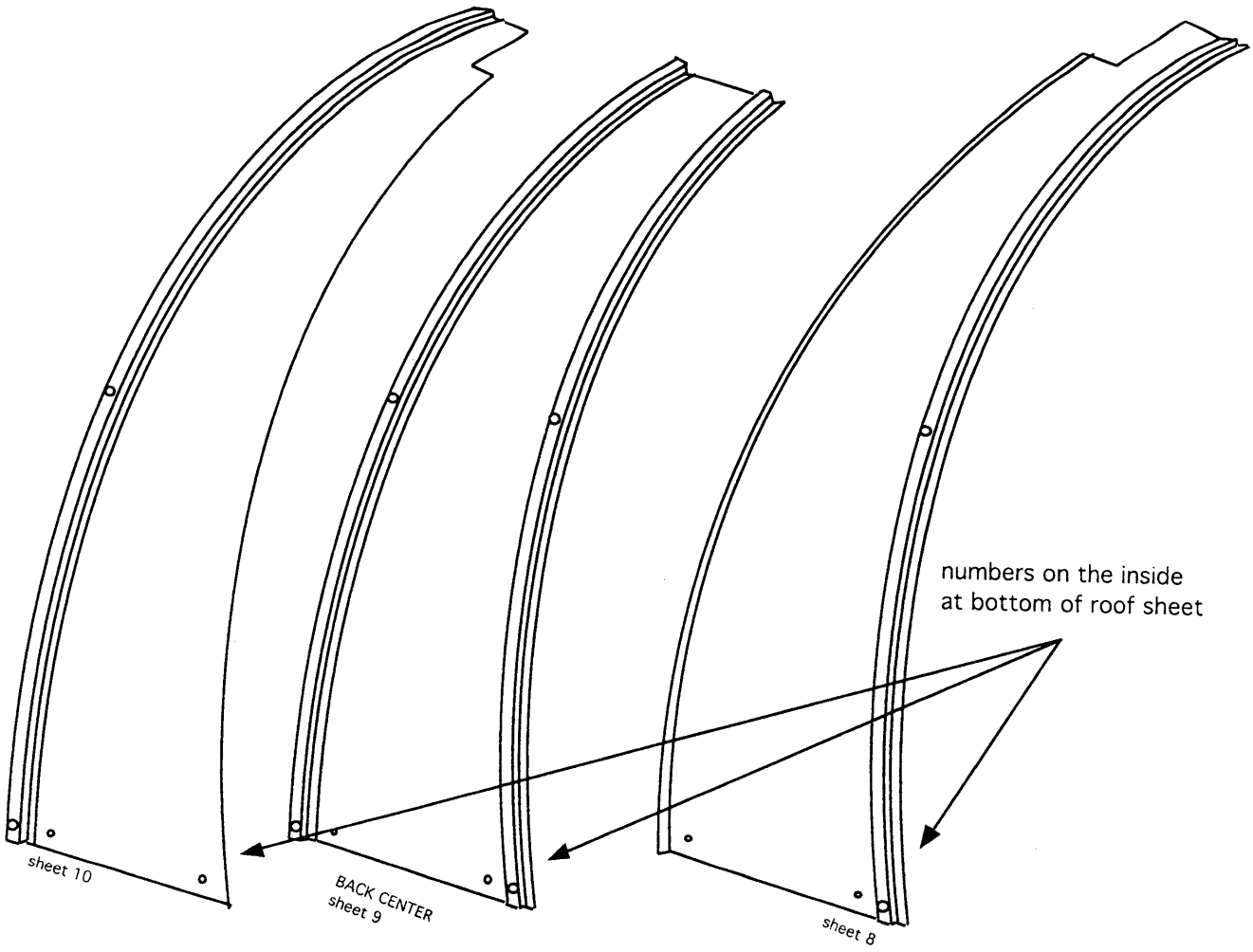


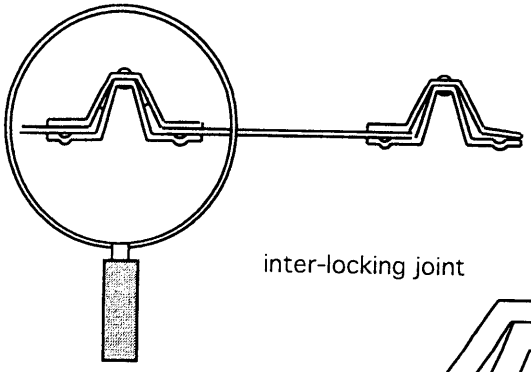


18-8 SS - Self Tapping Sheet Metal Screws

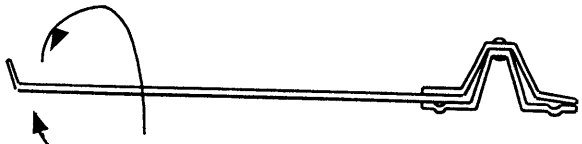
Installing Dome Roof Sheets - Layout

EXAMPLE

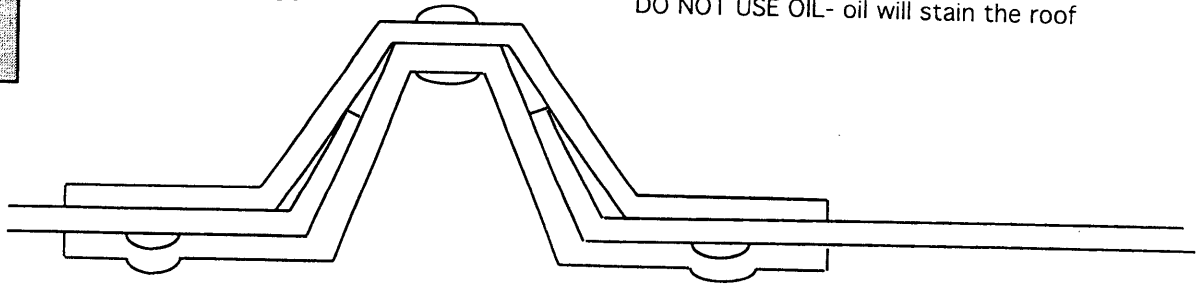




inter-locking joint

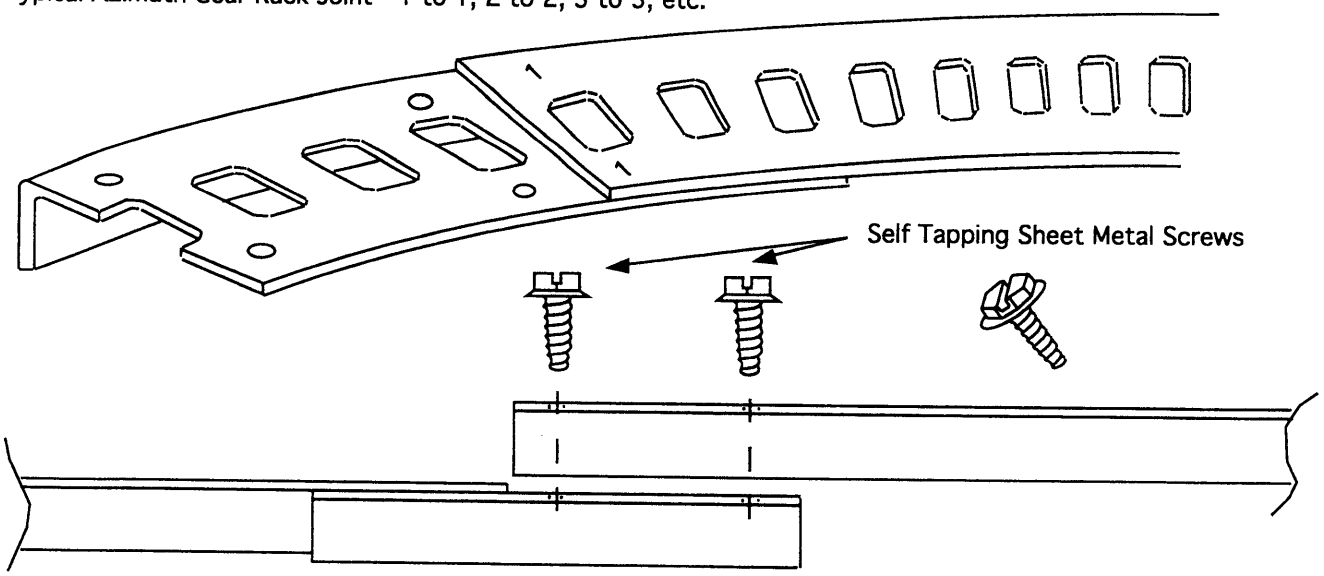


TIP: use soap or wax to lubricate interlock
both sides of sheet
DO NOT USE OIL- oil will stain the roof

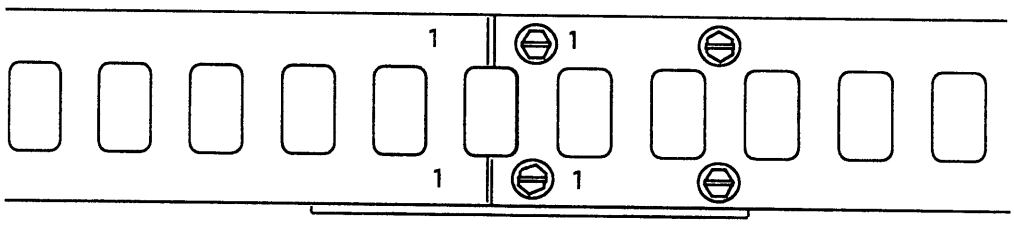


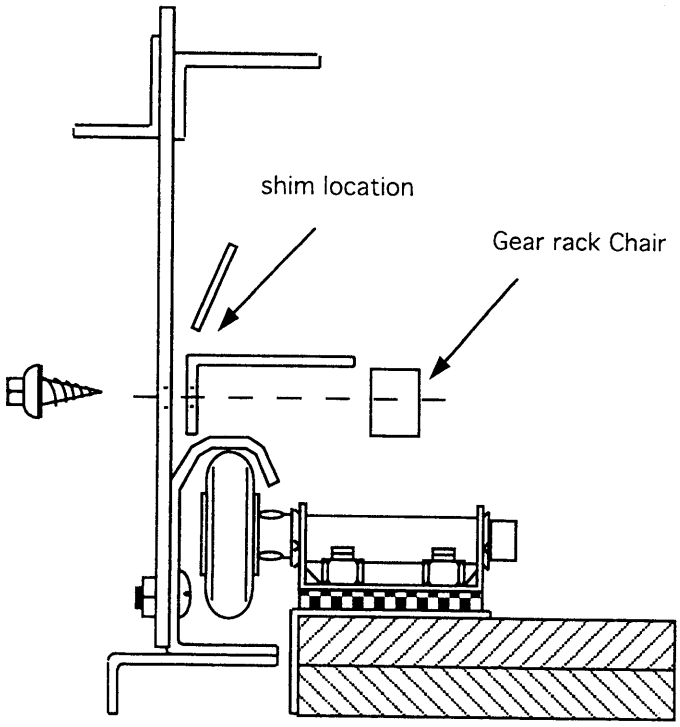
Azimuth Gear Rack Installation

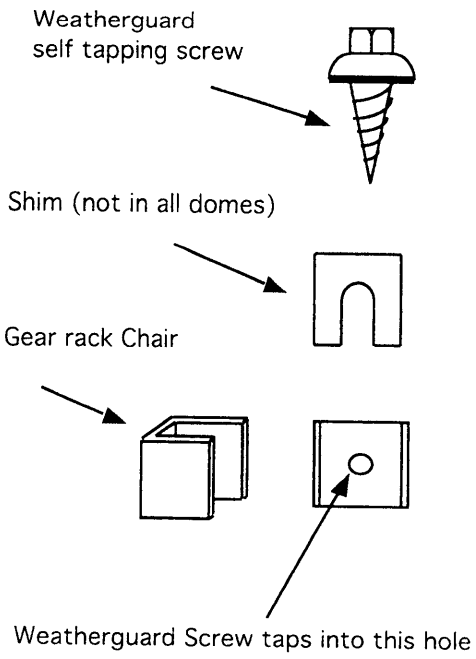
Typical Azimuth Gear Rack Joint - 1 to 1, 2 to 2, 3 to 3, etc.



Top View

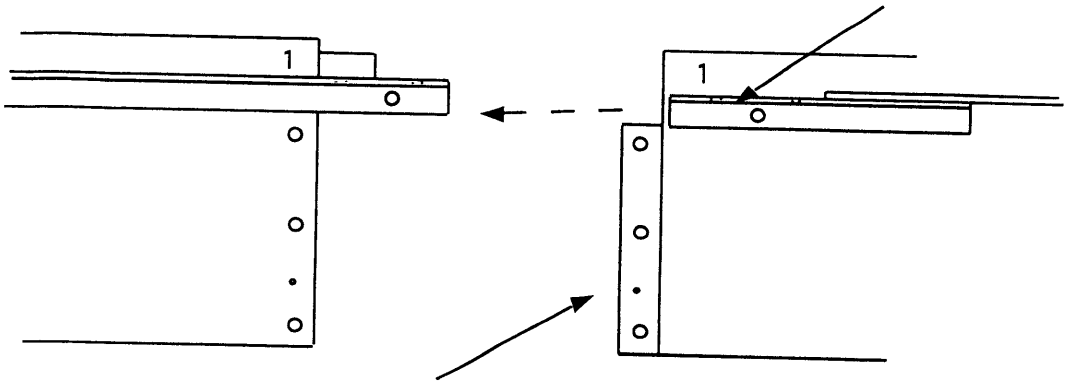




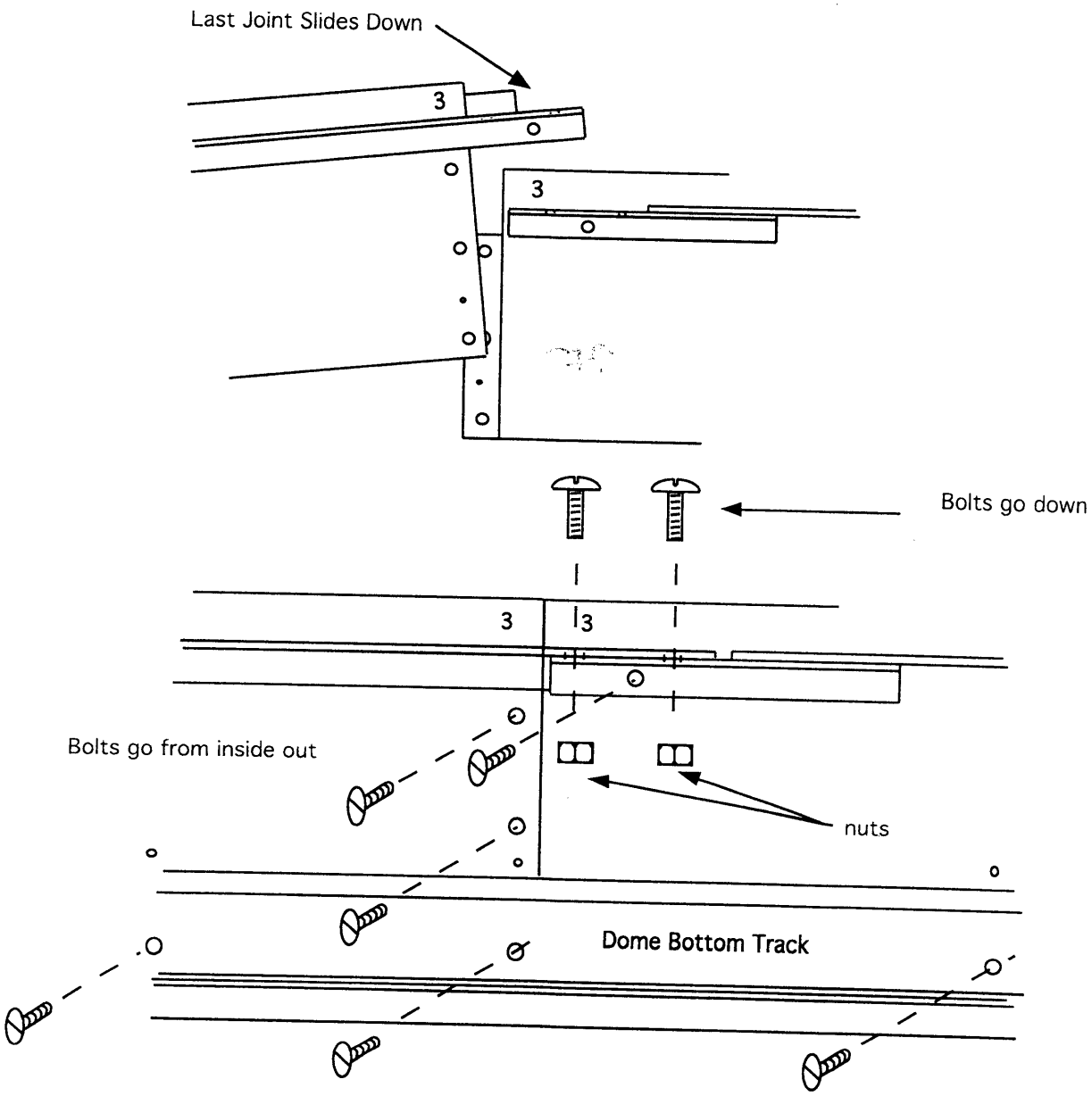


Dome Skirt Assembly

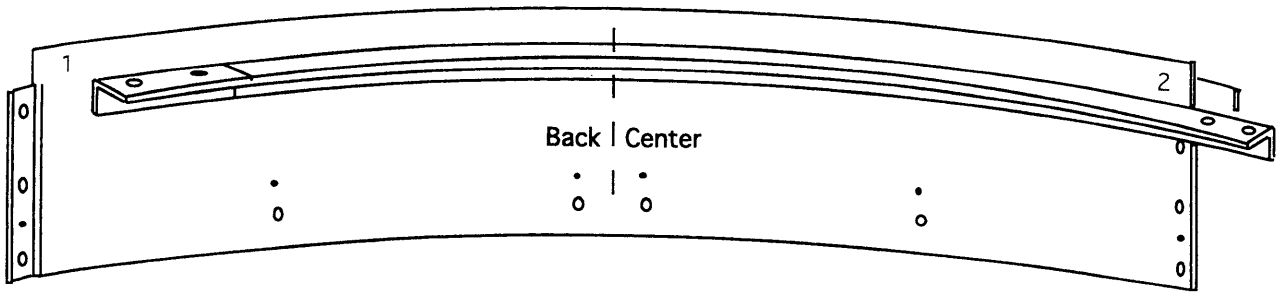
step#3



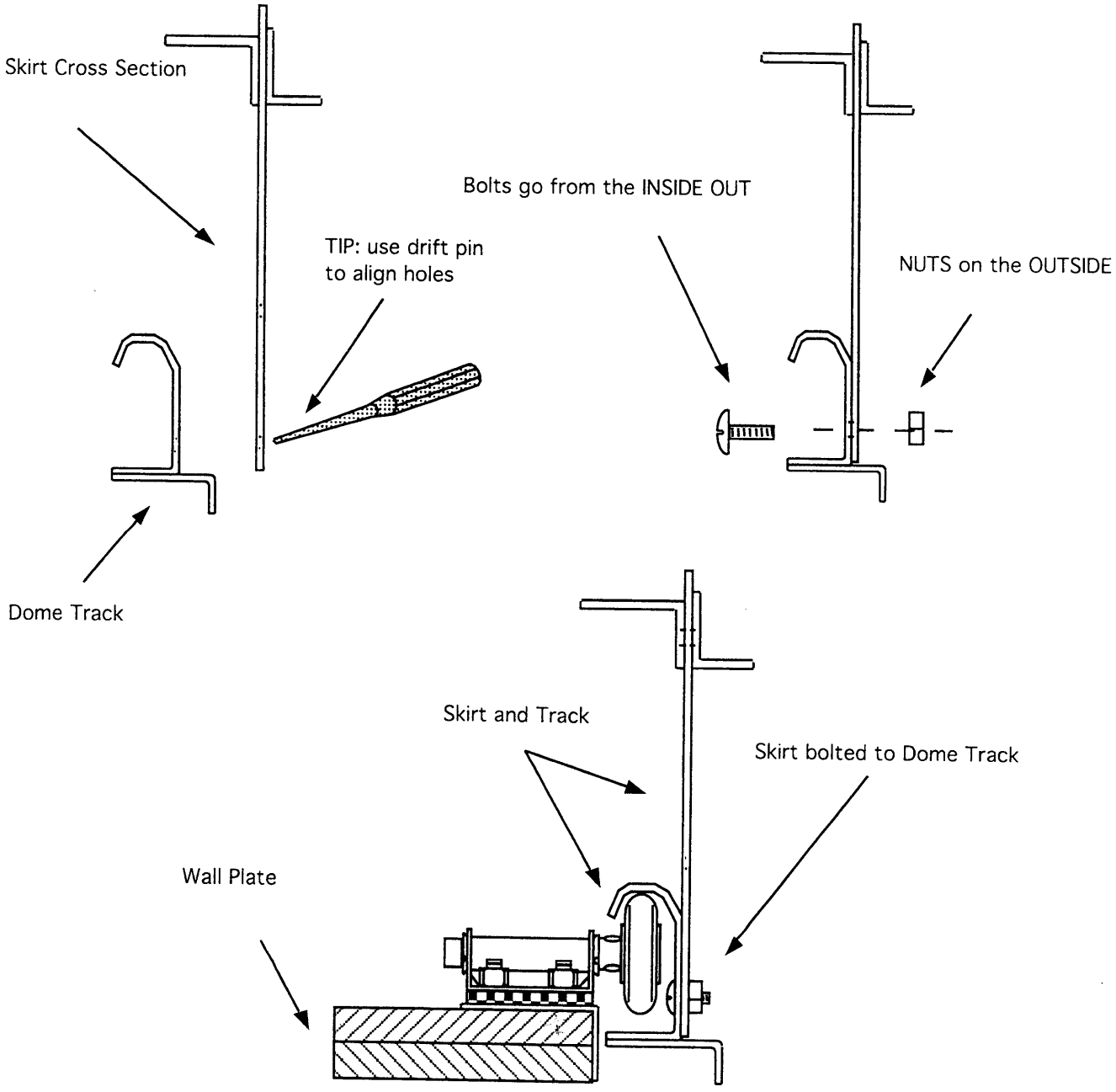
Skirt Tab goes over outside of adjacent panel, 1 to 1, 2 to 2, 3 to 3, ect.



Dome Skirt Assembly

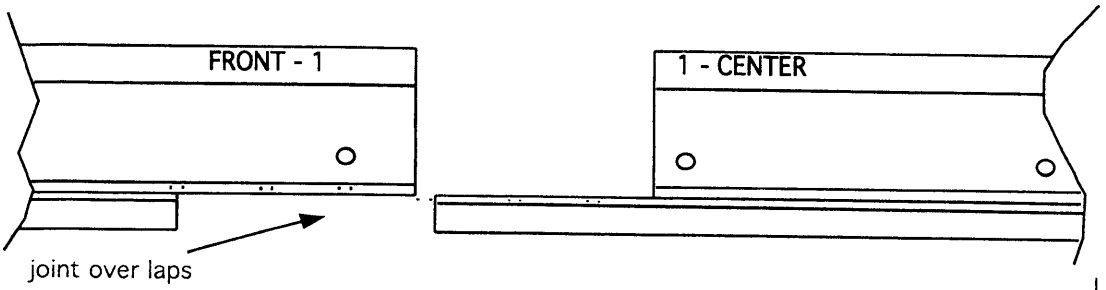


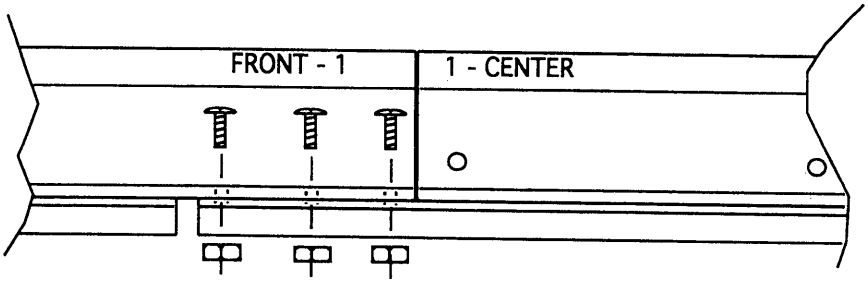
BACK CENTER is usually located in the center of a skirt panel
Panels fit 1 to 1, 2 to 2, 3 to 3, ect.

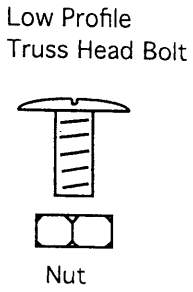


Installing Dome Support Track

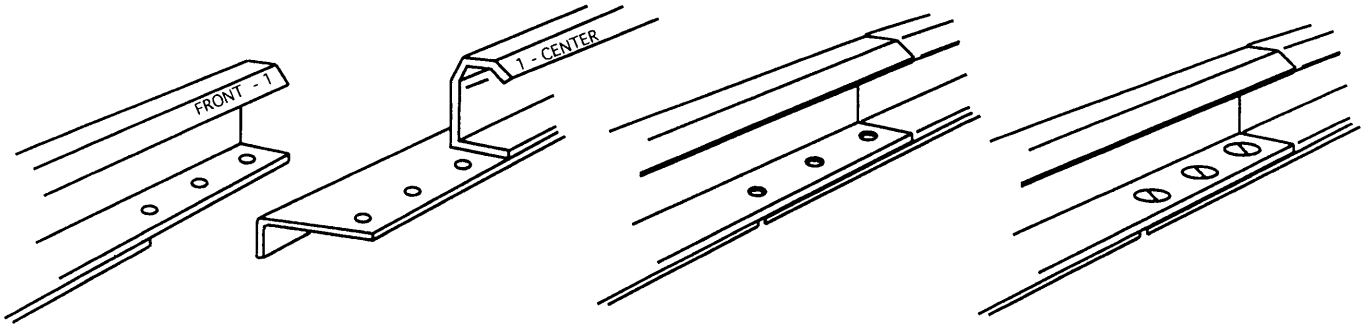
step#2



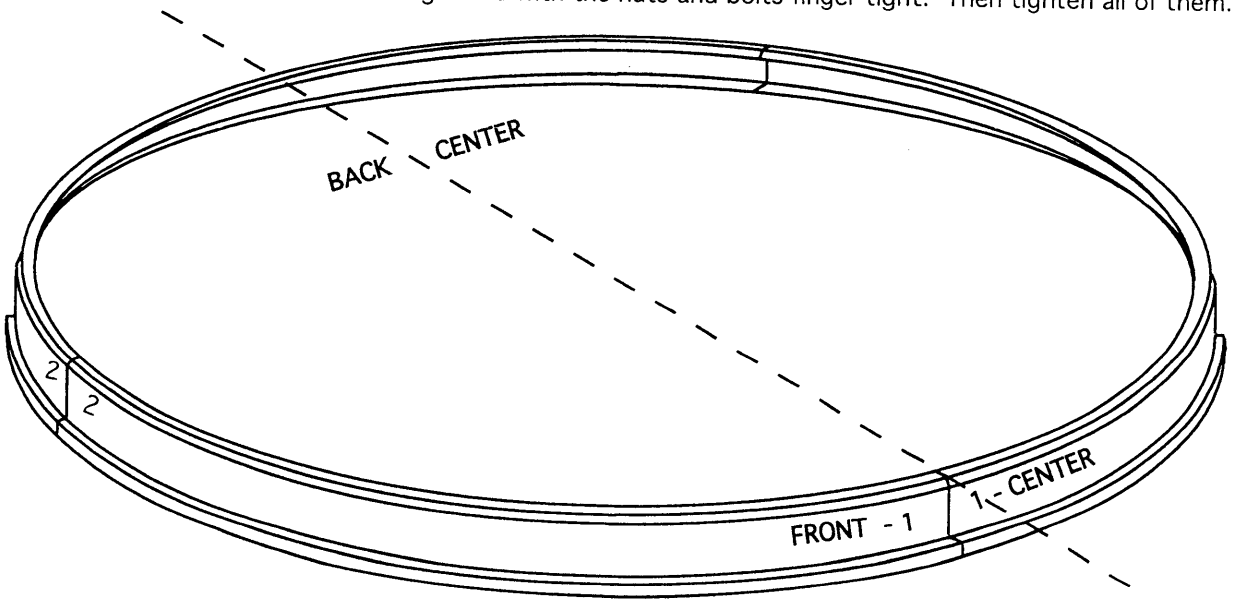




The bolts go down through the track , nuts on the bottom, this allows the dome track to turn without being unobstructed.

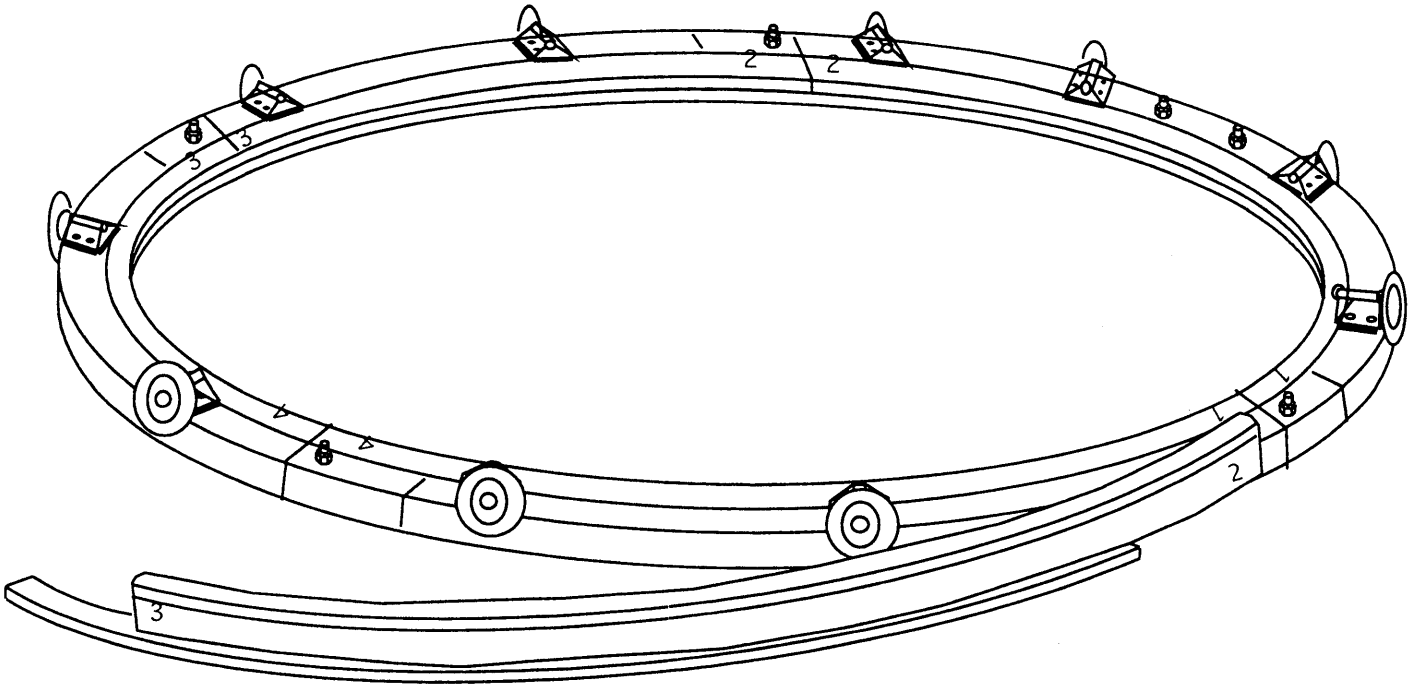


TIP: Assemble all dome track segments with the nuts and bolts finger tight. Then tighten all of them.



FRONT & BACK CENTER are always across from each other and will be your references during the construction.

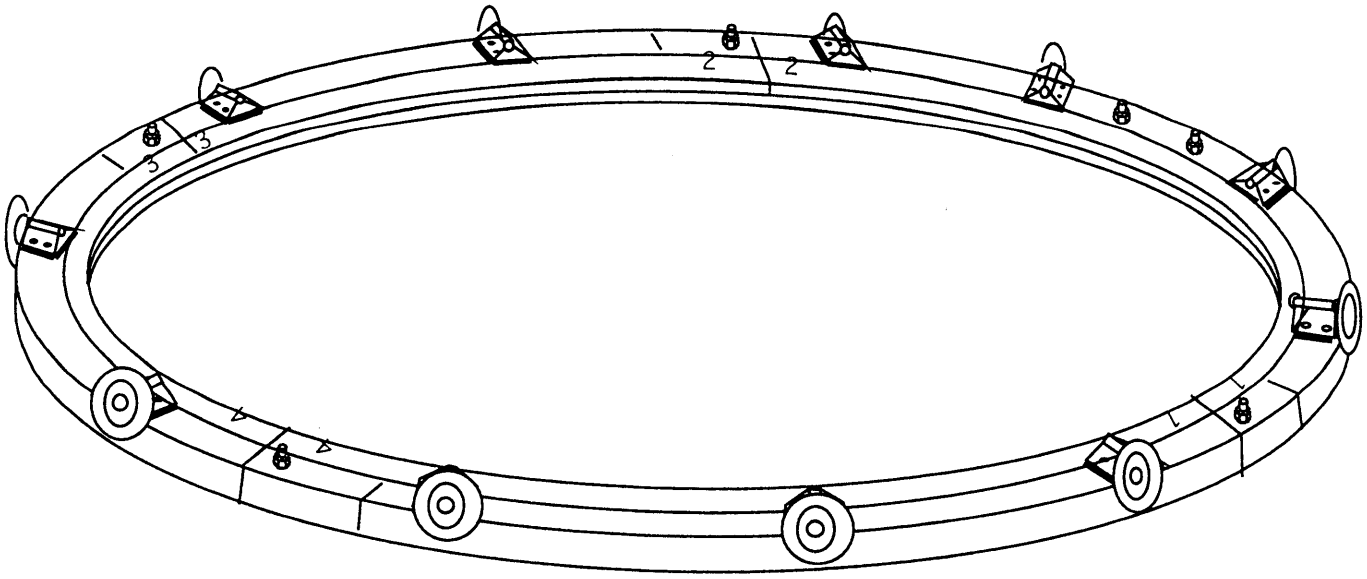
Installing Dome Bottom Track



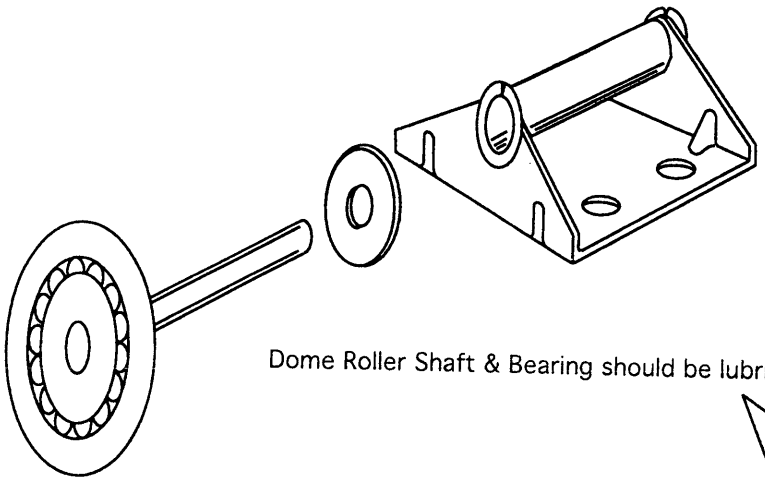
INSIDE VIEW: To put dome track on the wall plate, place one end of the dome track over a roller and roll the track segment onto the rollers. Then roll the next track segment onto the rollers, the numbers on the track should be adjacent to each other, 1 to 1, 2 to 2, 3 to 3, etc.

Dome Roller Installation

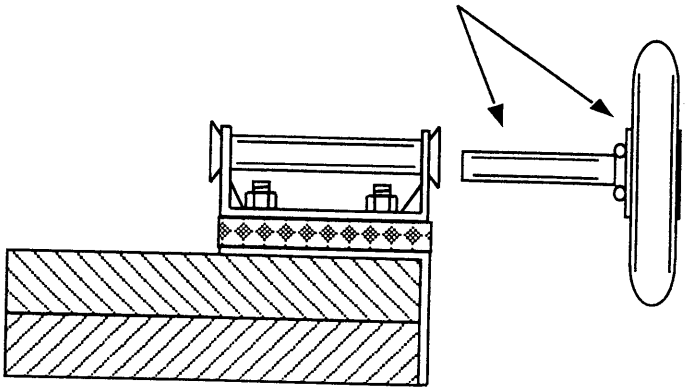
Step#1



If run out on dome seems excessive put a washer on wheel shaft on each side of the joints in the wall plate assembly.

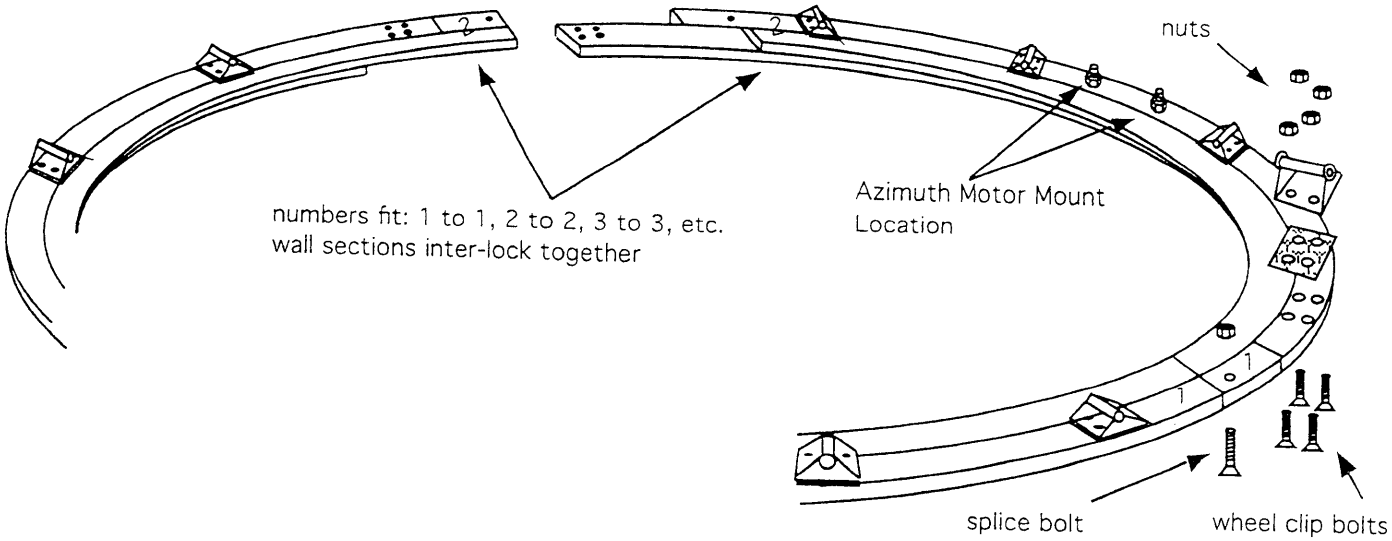


Dome Roller Shaft & Bearing should be lubricated annually

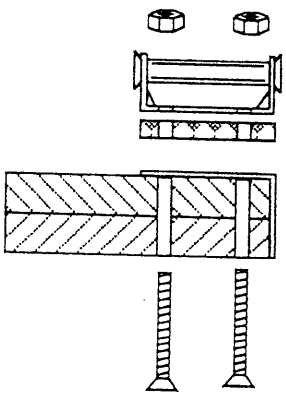


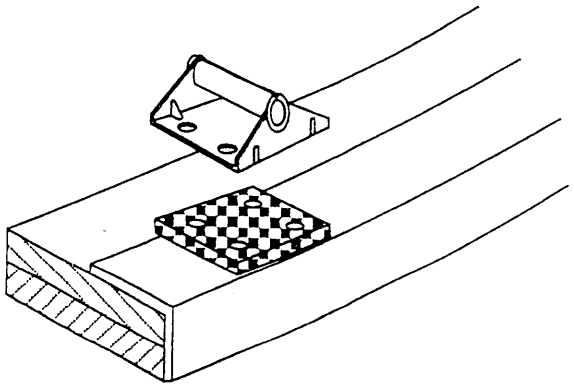
Step#1

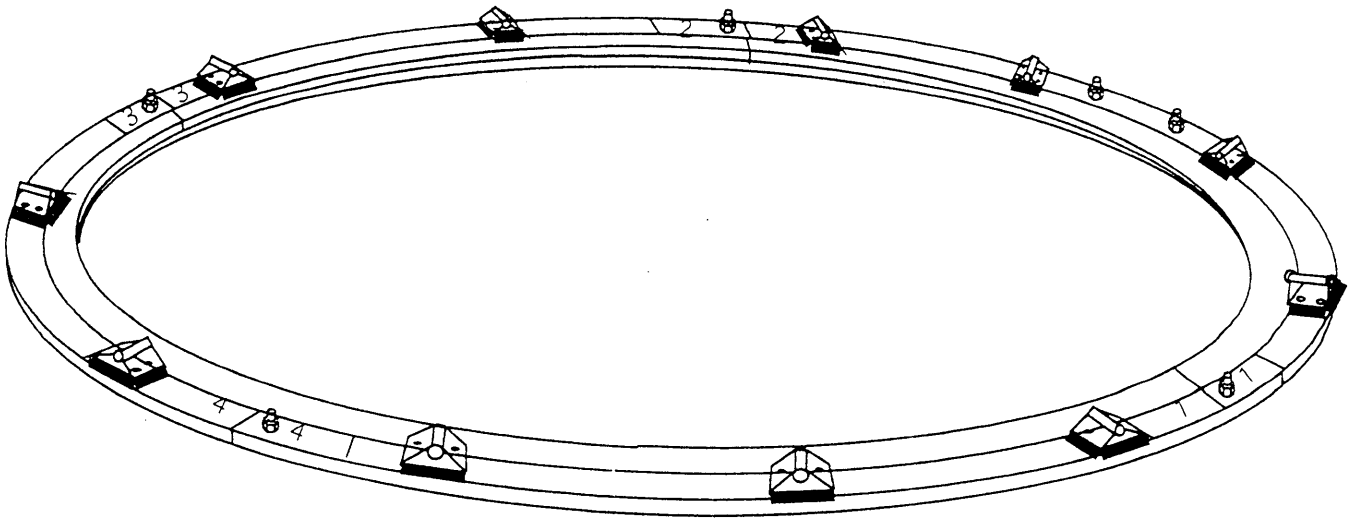
Wall Plate Assembly



Bolts come up through wood plate, steel trim, isolation pad and wheel clip.
TIP: Bolt holes for wheel clips will align easier if you install plate splice bolt first.

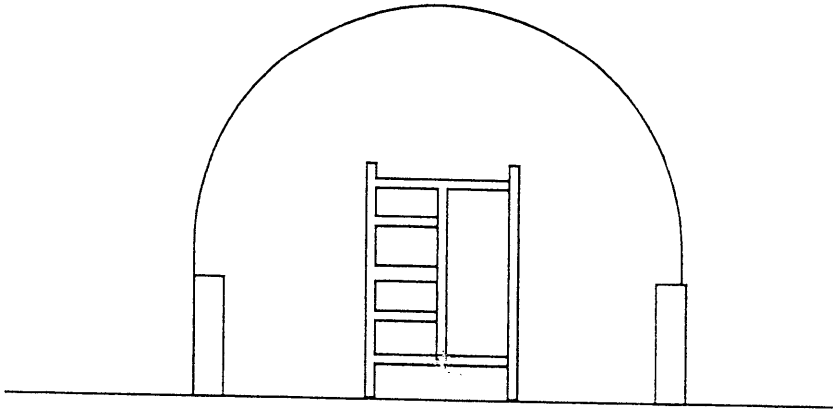


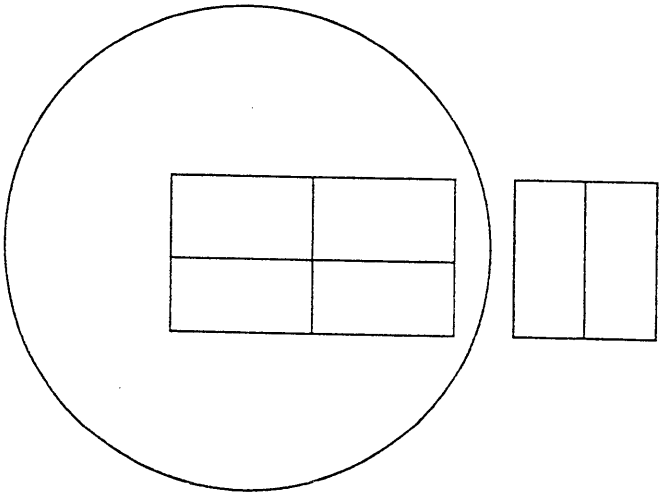


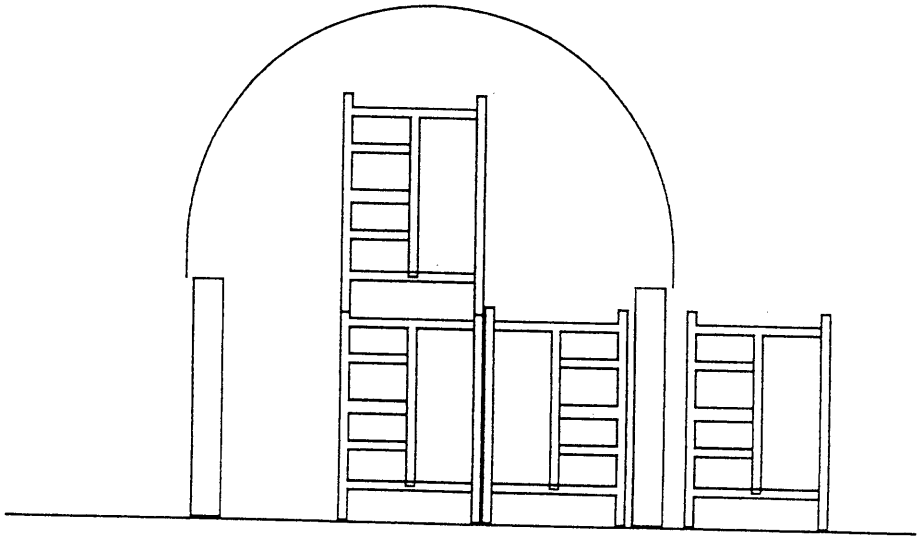


Scaffolding Sketch

A person wants to be able to work chest high in the top center of the dome. At least knee high on the inside and the outside of the dome. Once the dome track and skirt have been installed you will be working from one location. The dome will turn to the work area.







ELECTRIC POWER TO OPERATE DOME AND POWER TOOLS
(110/115V,60cyc 1ph)

1 - Metal cutting saw 1 - Skill saw for cutting wood
1 - 3/8" Variable speed electric drill 1 - 3/4" wood drill bit
1 - Drill index 1/8 - 1/2 1 - Saber saw
1 - 1/4" masonary drill bit 1 - Hack saw
NOTE:
You must furnish the nuts and washers for the anchor bolts.

1 - Impact screw gun (electric screw driver) with a 5/16" & 3/8" nut driver
2 - Straight blade screw drivers 1 - 4 ft level
2 - Hammers 1 - 20 ft tape measure
1 - Set of open end wrenches 3/8 - 3/4 2 - Ladders (12' or 3.5M long)
1 - Ratchets 3/8 drive with one set of sockets
from 7/16" - 3/4" deep sockets

2 - Pry bars 1 - Adjustable wrench
2 - Drift pins (tool used to align holes in metal)
2 - "C" Clamps (large)
2 - Bar clamps (18") 1 - Caulking gun
2 - Putty knives 1 - Banding cutters
3 - Vise grips (locking pliers)
1 - Electrical extension cord 110V

Gloves for workers1 - Large pair of scissors

1 - 5 ft section of scaffolding & planks 50 - Feet of rope

1 - Engineers level (used to level ASH-DOME wall plate assembly)

2 OR 3 WORKERS THAT ARE ACCUSTOM TO WORKING CONSTRUCTION AND HAVE SOME WORKING KNOWLEDGE OF HOW WOODEN AND METAL BUILDINGS ARE ASSEMBLED

STEP # 1 - INSTALLATION OF CIRCULAR WALL PLATE ASSEMBLY

Remove all excess cement and mortar from the top of the support wall. THIS IS IMPORTANT, the ASH-DOME wall plate must lay flat and level to ensure all the following components will align properly during the fabrication. All anchor bolts should be straightened to a vertical position, (straight up and down). The ASH -DOME wall plate assembly consists of circular segments which when fastened together form a continuous circular base plate with the dome roller fixtures attached and evenly spaced.

Interlock the segments in a manner that brings similar numbers to be adjacent at the spliced joints. (Page #1) Install the WALL PLATE SPLICE BOLTS at this time. Next install the dome azimuth roller fixtures at each splice in the wall plate. The nuts on the bolt holding the dome azimuth roller fixtures should be drawn down tightly, and then backed off until slightly tighter than finger tight. This allows the hard rubber cushion to act as a cushion to make up for any slight variations in the level plane of the wall plate assembly when finished. Rest the circular wall plate upon the protruding ends of the anchor bolts and lay out the bolt locations for drilling.

Note the location of the azimuth motor mounting bolts. This is where the drive is secured to the wall plate. Then shift the all plate assembly around until the azimuth drive motor is in an ideal location for electrical connections and to minimize interference between anchor bolts and dome support roller fixtures. Most Northern hemisphere astronomers prefer to locate the azimuth drive unit in a Northern quadrant. Southern observers usually choose Southern quadrant location for their azimuth drive unit. Adjust the entire wall plate assembly to become concentric with the support foundation wall. Check the outside diameter of the circular wall plate at many points and make any necessary adjustments to cause the plate to be resting in a truly circular configuration. When the outside diameter measurements are equal length, the wall plate assembly will be resting in a true circle. Next mark the locations of the anchor bolts and drill the holes. Drill the holes slightly larger than the diameter of the anchor bolts. (It may be necessary to cut anchor bolts off at some locations of wheel fixtures or the azimuth motor mount.) Lower the wall plate assembly down over the anchor bolts to a resting position on the wall top. Now, using a leveling instrument determine the highest elevation around the top of the support wall. Record the elevations along the inside or outside edge of the wall plate. When the high point has been located, further elevate this point by approximately 1/4" by inserting tapered shims between the underside of the plate and the wall top on either side of the anchor bolt, as indicated on drawing R-100. Install a washer and nut on this anchor bolt and draw the nut down tight. This is the highest elevation on your support wall. You must bring all the other points up to this elevation by using the leveling instrument and the tapered shims provided. Adjust the entire wall plate to this elevation and secure to the support wall.

DO NOT - Take the elevations from the top of the roller fixtures attached to the wall plate.

Taking elevations from the fixture on the rubber isolation pad will not give you an accurate reading. When the entire wall plate assembly has been adjusted to a flat and level plane, it will be noted the width of the space between the underside of the wall plate and the wall top will vary as the elevations of the support wall top vary. This space should be filled with a cement grout or dry pack material at this time; however, it can be done after the

ASH-DOME ASSEMBLY INSTRUCTIONS

GENERAL INFORMATION

Every ASH-DOME unit is completely fabricated, components numbered, inspected, thoroughly tested for operation, disassembled, cleaned and remarked before being packed for shipment. Average carpenters or mechanics shall not find the assembly difficult. With the exception of an Engineers Leveling Instrument, the entire assembly process can be completed with the hand tools found in an average carpenters or mechanics toolbox.

Most of the assembly work is done from the center of the dome, it is suggested a platform or scaffolding be erected approx. 4 or 5 feet below the top of the finished dome height. A person needs to be able to work at chest height in the center of the dome. All of the dome roof panels, the shutter track rails, the observing aperture trim members, the shutter drive assembly and the shutter itself will be installed from this center platform. It is also necessary to have a work platform available for a worker on the outside of the support wall for the installation of all nuts, bolts and screws around the outside of the dome structure. The top of the wall should be a knee height. When the dome track and skirt have been assembled the dome is continually turned to this installer. It is not necessary for this person to move from this location.

UNLOADING THE DOME COMPONENTS

Wear gloves. Most of the parts will not be that heavy but being long and in a radius they are awkward to handle. It is suggested that all dome parts be removed from the pallet or crate and laid out in an orderly manner. Similar parts lay together. This will acquaint the mechanic with the general appearance of the parts and provide him with a reasonably good concept of the eventual locations during the assembly. You will find most parts are readily identifiable by their general appearance. Others are numbered to aid in locating their final positions. Please keep in mind while unloading that all parts are ONE of ONE.

CAUTION

DO NOT attempt to assemble an ASH-DOME unit during periods of high or gusting winds. Unexpected gusts may cause an installer to lose a roof panel or a high gust could tear apart a partially assembled dome from the structure. With the exercise of a reasonable amount of care, and closely following these instructions, it is certain the final result will be a very high quality observatory dome structure with excellent operating characteristics.

completion of the dome. Recheck all elevations and outside diameter measurements, make any adjustments necessary to attain a truly circular, flat and level wall plate assembly. It is essential you use care in these adjustments of the wall plate assembly. This will guarantee the finished observatory dome structure will move in azimuth without a binding action in the dome support track rail or support rollers. Also by starting the assembly from a level plain the following components will come into alignment much easier. Trim off any excess length on the adjusting shims before installing the dome support track rails. The shims should be cut flush with the edges of the wall plate assembly. Take care not to loosen the shims during trimming. Cut off any extra length from the anchor bolts at this time.

STEP # 2 - INSTALLATION OF DOME SUPPORT ROLLERS AND TRACK RAILS SECTIONS

Apply any good grade of all weather lubricating grease to each dome support roller shaft and insert the shafts into the fixtures mounted about the wall plate. (Page # 1) When a minimum amount of lateral (run out) movement is desired, install a spacer washer on the roller shaft before inserting it into the roller fixture. This will not be required on each roller shaft but they should be spaced evenly. When all dome rollers have been mounted, install one segment of the dome track by inserting one end of the track over a roller. Now, roll the segment over the following dome rollers until the track segment is supported on the dome rollers. Note the number on the ends of the track rail and install following segments in a manner, which causes similar numbers to become adjacent (Page # 2). As each additional track segment is installed, it must be bolted to the previously installed segment. This joint is made at the over lap or splice joints. Use the 5/16" x 3/4" low profile truss head bolts, these will be marked BOTTOM TRACK SPLICE NUTS & BOLTS. Install only the bolts that are in a straight up-and-down position. These go on the inside of the dome track, the bolts go down, the nuts go on the bottom side of the dome track. This allows the dome track rail to roll around the wall plate assembly without any obstructions. The horizontal holes are used for the next step of the assembly. During the installation of the dome track rail segments, care must be exercised to prevent the support roller shafts from sliding out of the mounting fixtures. Roll the dome track on keeping it tight to the wall plate, as it will roll off just as easy as it rolls on at this time. Don't let the dome track rail fall from the structure, this could result in a radius change and in a track rail that may not turn as freely as it should. When all the segments have been installed and bolted together the track should revolve freely. The track may appear to be somewhat loose at this time but this characteristic shall not be apparent after the dome roof panels are in place.

STEP # 3 - DOME SKIRT ASSEMBLY

The dome skirt, which is installed around the outside of the dome track, is made of sections of 14 Gage galvanized steel with curved angles spot-welded to them. (Page # 3,4) These sections sit on the outside edge of the dome track rail. Locate the BACK CENTER marked on the dome track rail. This should be clearly marked and is directly across from a mark indicating the FRONT CENTER. Start with the section marked BACK CENTER. Bolt

AND BLOCKS and secure this angle into position. These rib blocks will only fit one way and are, rights and lefts. Next install the gear hole frame marked GEAR HOLE TRIM at the top of the aperture. This installs coming from the inside and slipping into position between the roof panels and the TOP BAR. This is the location where the shutter drive gear meets the shutter gear rack. Next install the BACK SHUTTER SEAL ANGLE (Page # 20). This is mounted on the outside of the dome just past the gear hole trim. It will fit in-between the shutter tracks, the flange of the angle faces the gear hole trim. Use the bolts marked BACK SEAL ANGLE BOLTS. The bolts go down into the dome, nuts on the inside. There are two diagonal track rail braces on the back of the dome. These are marked BACK BRACES, Right & Left and should be installed at this time.

STEP # 6 - INSTALLATION OF THE SIDE WEATHER SEALS AND GLAZING

The SIDE WEATHER SEALS are now ready to be mounted (Page # 19). The weather seals fit along either side of the dome aperture and bolt to the side of the shutter tracks. In order to mount the sections you must remove the nuts from the shutter track splices and fit the assembly over the track rail bolts first. After all parts of the shutter track, side weather seal system and back shutter seal angle are secured in place you now have to caulk the dome (Page # 21). This glazing compound is squeezed into the space between the track rails and the skin of the dome, up both sides of the aperture. You start at the bottom and work your way up, across and under the back shutter seal angle and down the front. DO NOT CONTINUE OVER THE BACK PAST THE BACK SEAL ANGLE. You are only sealing the area under the dome shutter when it is in the closed position. Make certain that you have sealed all openings leading into the aperture completely. It is also recommended that a small amount of tube caulking be used around the head of each bolt used to secure the shutter track rails.

STEP # 7 - INSTALLATION OF THE REINFORCING RING

All ASH - DOMES with a diameter larger than 12'6" are built with one or more reinforcing rings installed. A reinforcing ring consists of a number of circular segments of steel tubing with adjustable ends (Page # 22). The ring is held in position on the inside of the dome by means of a fixture attached to the rib of each roof panel. The rail segments are clearly marked to indicate the sequence of assembly. A, BACK CENTER point is indicated on one of the circular tube segments. This mark must coincide with the BACK CENTER point of the dome. Other segments are marked so as number aligns to number. The rail ends secure to the sides of the observing aperture with readily identified fixtures. Start at this "BACK CENTER" and work your way around to the aperture, securing the clips as you go. The adjustable ends will bolt onto the sides of the aperture. When these ends have been secured tighten the setscrews.

STEP # 8 - INSTALLATION OF IHE SHUTTER DRIVE UNIT

All shutter drive gear units are mounted in the same manner, whether manually or electrically operated. Remove the two small retaining angles which are bolted through slots at the top of the gear housing (Page # 23). The purpose of these angles is to lock the gear in mesh with the shutter drive track after the shutter has been

installed. The shutter drive track runs down the center on the upper shutter section. Remove one nut (flex lock nut) and washer from the front support bolt; also remove the flex lock nuts from the brackets at the back of the motor assembly. Lift the unit into position and insert the 1/2" bolt through the slotted hole at the center of the top bar. Replace the washer and the self-locking nut to hold the motor drive unit in position. Bolt the hanger bolts into the holes drilled in the motor bar and tighten so as to just start to squeeze the rubber grommet on the bolt. Leave the self-locking nut on the front support bolt loose at this time.

STEP # 9 - INSTALLATION OF THE SHUTTER SECTIONS

The main shutter section may now be raised into position over the observing aperture. Lift it on to the dome, resting upon the shutter track rails and side weather seal strips. Make certain the end with the back shutter seal is up, the over lap will be the bottom of the door (Page #24,25).

Remove the support roller mounting fixtures from the shutter side rails; insert the shaft of the support roller into each fixture. Then replace each fixture with the roller intact, locking it into the track rail. It is necessary to elevate the shutter somewhat to replace the fixtures with the roller installed. When all the rollers are in place, slide the shutter section upward until the top end is well past the back shutter seal angle. DO NOT PUSH THE SHUTTER OVER THE BACK SIDE OF THE DOME. BE CAREFUL; SECURE THIS SECTION WITH A VISE GRIP IN THE TRACK SO THE SHUTTERR CANNOT MOVE EITHER DIRECTION. Now the shutter drive track is positioned over the shutter drive gear unit. Raise the shutter drive gear unit upward until the gear is meshed with the shutter drive rack, and reinstall the two small angle brackets which lock the gear into this position. Some slight forward or backward adjustments may be necessary to position the angles to allow freedom of movement, yet maintaining a permanent lock between the drive gear and the shutter drive track. Shifting the angle fastener bolts slightly in the curved mounting slots cut into the shutter drive gear housing does this. The angles must appear to lay flat on the top of the shutter drive track. Tighten the nut on the shutter drive unit front support bolt, allow about 1/32" clearance to provide this bolt to shift with the movement of the shutter. This movement is necessary because of possible wind loading. After this is done, the shutter drive unit cannot move except unless it is electrically operated. Install the short shutter section in the same manner. Make certain the locking device is upward and will be in proper position so that when the two sections are brought together they meet and lock. The two shutter sections should then move together if this is a TYPE "A" shutter style. Should this be a TYPE "B" style the lower door is mounted on hinges and the two sections should meet evenly (Page# 26). Run the main shutter section open and install the BACK SHUTTER SEAL. Bring the lower door section up, also and install the front shutter seal. Some adjustment may be necessary so the shutter stops in the correct position.

STEP # 1 0 - INSTALLATION OF AZIMUTH DRIVE AND WEATHER SEAL

Insert the weather seal over the bolts and roller fixtures around the wall plate assembly. The edge of this seal should wipe against the inside of the dome track and fit into the space between the track and azimuth gear rack. (Page # 29) The opening between the dome track rail and the topside of the wall plate assembly is very effectively sealed using this method. The azimuth drive seal mounts at the location where the azimuth motor

mounts. This is where you start with the rubber seal and end with the roll of rubber. This piece fits under the motor so as to prevent dust *from* blowing in around the motor. (See ASH-DOME drawing R- 104)

STEP # 11 - INSTALLING THE AZIMUTH DRIVE UNIT

The location of this drive unit should already be known. It has also been marked clearly on the wall plate assembly. Two mounting bolts are extending upward from this location through the azimuth motor seal. (See ASH-DOME drawing R - 105) Mount the unit in a manner, which causes the drive gear to mesh with the circular azimuth gear rack. It should remain in this position throughout one complete revolution of the dome. It may be necessary to shift the unit somewhat to accomplish this. Using the hex nut and the locking wing nut, adjust gear down into the azimuth drive track. Tighten the hex nut down until light pressure is applied to the circular rack. Then lock the hex nut using the wing nut. The gear should more or less float in this rack while remaining engaged.

STEP # 12 - LUBRICATION

All dome and shutter support rollers have ball bearings. These have been lubricated. It is suggested that the inside configuration of all shutter and dome support track rollers be lubricated with the same type lubricating oil. It is important that the top and sides of the shutter drive rack be greased over the length of the drive rack; also grease the rack openings, which come into contact with the shutter drive gear. The drive motor gearboxes are filled with lubricating oil at the factory, however, it is suggested that the oil level be checked and oil added if necessary. Any good grade all temperature oil should be suitable.

PAINTING

All ASH-DOMES are fabricated of galvanized and Galvalume steel. These materials do not require painting, but some purchasers choose to do so. Should it be desired to paint your observatory clean the surface with a detergent and rinse. This will remove any oils used during the roll forming process. It is recommended you contact a local paint supplier and seek a paint used on commercial metal buildings.

OWNERS RESPONSIBILITIES

As the owner, you are responsible for maintaining your ASH - DOME properly. Repairs required as a result of failure to maintain your Ash-Dome properly are the owner's responsibility.

SHOULD YOU HAVE ANY QUESTIONS, PLEASE CALL

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