



Assembly Manual  
w/ Part Master

**Edition**

GREENHOUSE TECHNOLOGY INC.

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Greenhouse Irrigation and Control

# Boomerangs Installation Guide

## Getting Familiar With Your Machine

Congratulations on your commitment to improving the quality and value of your plants! With the Boomerang® Basket System you have everything you need to exceed all of your growth and economical expectations!

With all of the irrigation choices available today, finding the best watering solution for your needs can be confusing. Everyone at Greenhouse Technology, Inc. would like to congratulate you and thank you for selecting the Boomerang® Basket System.

The Boomerang® Basket System's superior design and quality is unmatched by any other single piece of equipment available today. You will not believe the outstanding performance above others in the industry.

The Boomerang® is the best overhead basket system product available, and you're about to prove it to yourself.



### Basic Assembly Principles

To help you assemble the Boomerang® Basket System a quick and easy way there are a few basic principles that you should follow.

1. To make the assembly process go faster and save you extra time and effort, gather the pieces you need for each step and thoroughly read the assembly instructions for that step prior to starting assembly for the step.
2. Be sure to have all the tools required for the assembly ready before hand. A list of the required and suggested tools is provided in this manual.

\*Based on 100ft, 2 layer Boomerang® System

### Parts List

Item No.	Qty.	Item No.	Qty.
1	1	24	2
2	1	25	2
3	1	26	28*
4	1	27	28*
5	1	28	225*
6	1	29	225*
7	1	31	113*
8	1	32	113*
9	2	33	0*
10	4	34	113*
11	4	35	113*
12	4	36	0*
13	2	37	1
14	2	38	2
15	2	39	2
16	2	40	2
17	1	41	20(Ft)
18	2	42	1
19	2		
20	9(Ft)		
21	4(Ft)		
22	2		
23	6		

3/4" Spray Head Nozzel

Tension Anchor Plate

Aluminum Extrusion 11"

2" Strap

Basket Hook

Basket Hook Clip

Black Plastic Tab

Green Plastic Tab

Blue Plastic Tab

Counter Weight

Basket Hanger (20")

Basket Hanger (40")

Pull Cord Housing

Pencil Magnet Reader

Earth' Magnet

OMRON Switch

Network Wire

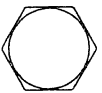
Boomerang® Controller



# Hardware Guide

Below is a description of the hardware you will using for the installation of your Boomerang®

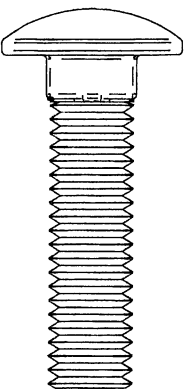
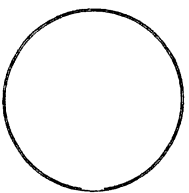
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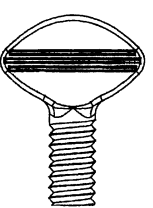
Item#: A  
Qty: 4  
Decr: 1/4 x 1"  
Tap Bolt



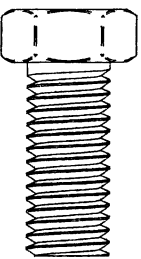
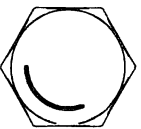
Item#: F  
Qty: 4  
Decr: 6-32 x 1 1/8"  
Pan Head Screw



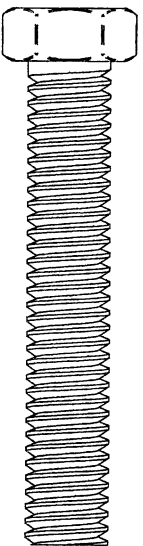
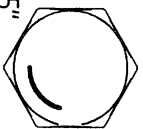
Item#: B  
Qty: 20  
Decr: 3/8 x 1"  
Carriage Bolt



Item#: G  
Qty: 1  
Decr: 1/2-20 x 3/4"  
Thumb Screw



Item#: C  
Qty: 56  
Decr: 3/8 x 1"  
Tap Bolt

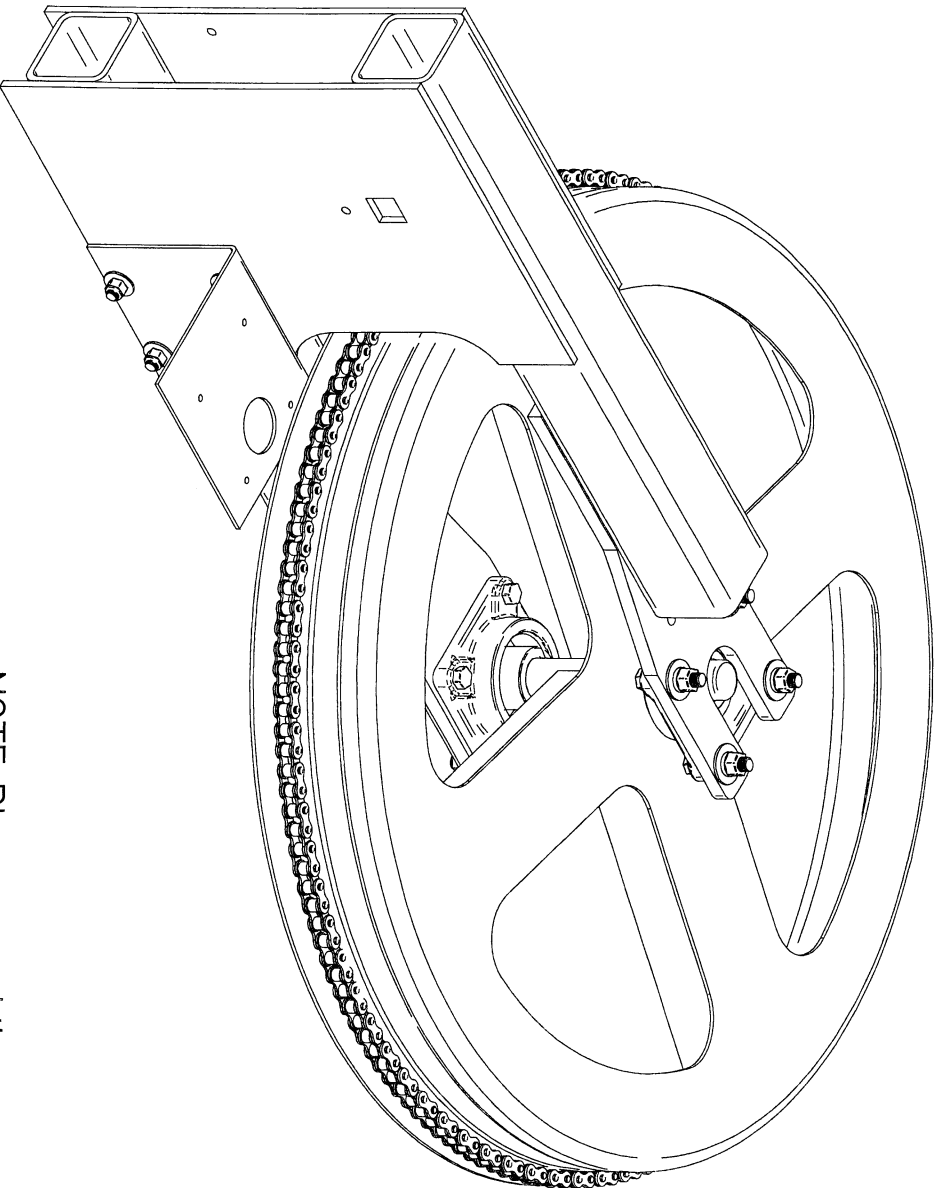


Item#: D  
Qty: 4  
Decr: 3/8 x 2.5"  
Tap Bolt



Item#: E  
Qty: 2  
Decr: 6-32 x 2"  
Pan Head Screw

# Boomerang Assembly Manual: Part 1/drum assm.

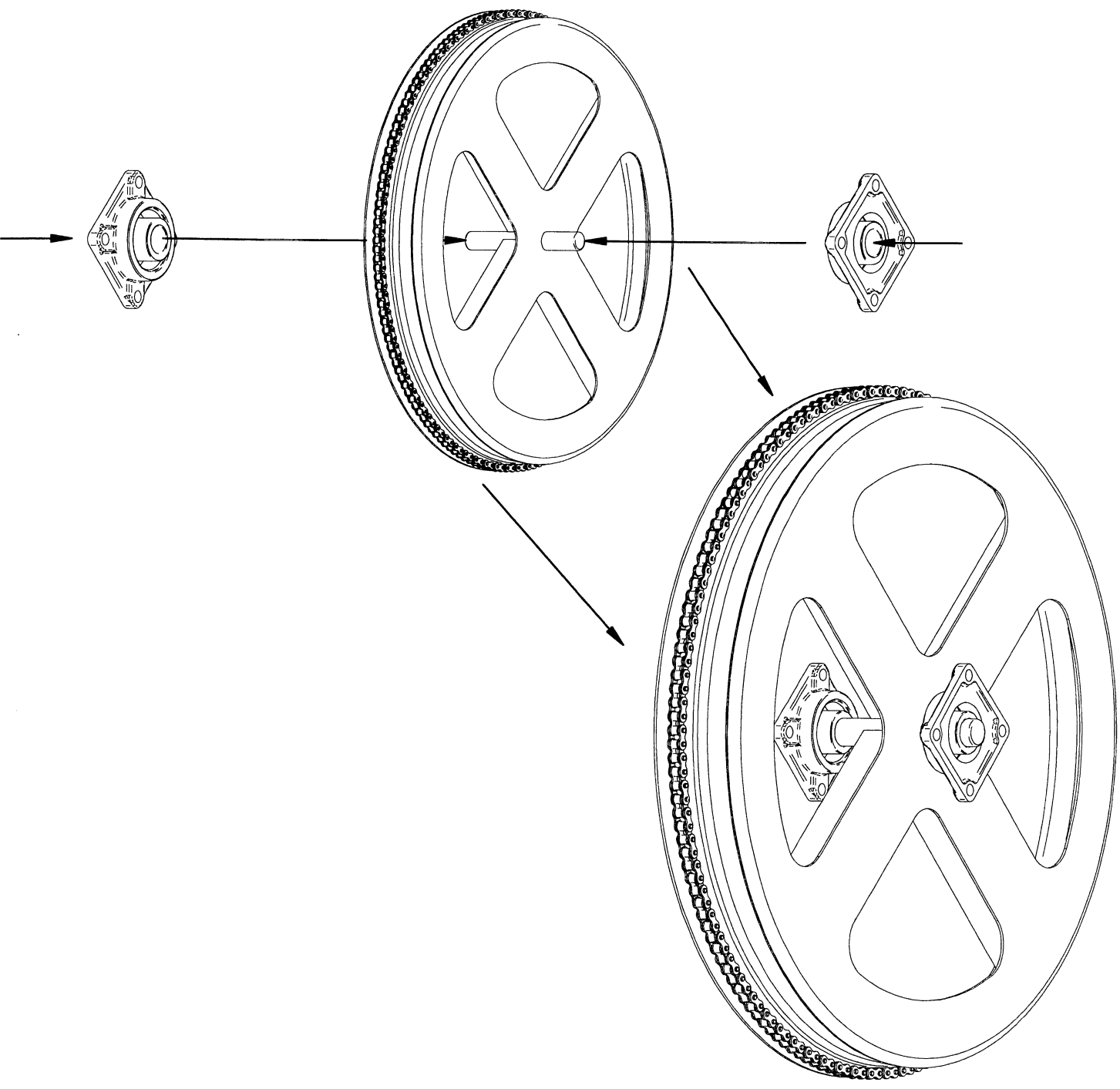


NOTE: Please read the construction manual thoroughly and identify all hardware and materials before beginning assembly. This assures proper placement of all parts and a smooth installation.

# Part I: step A

Assembly of the drum and corresponding parts

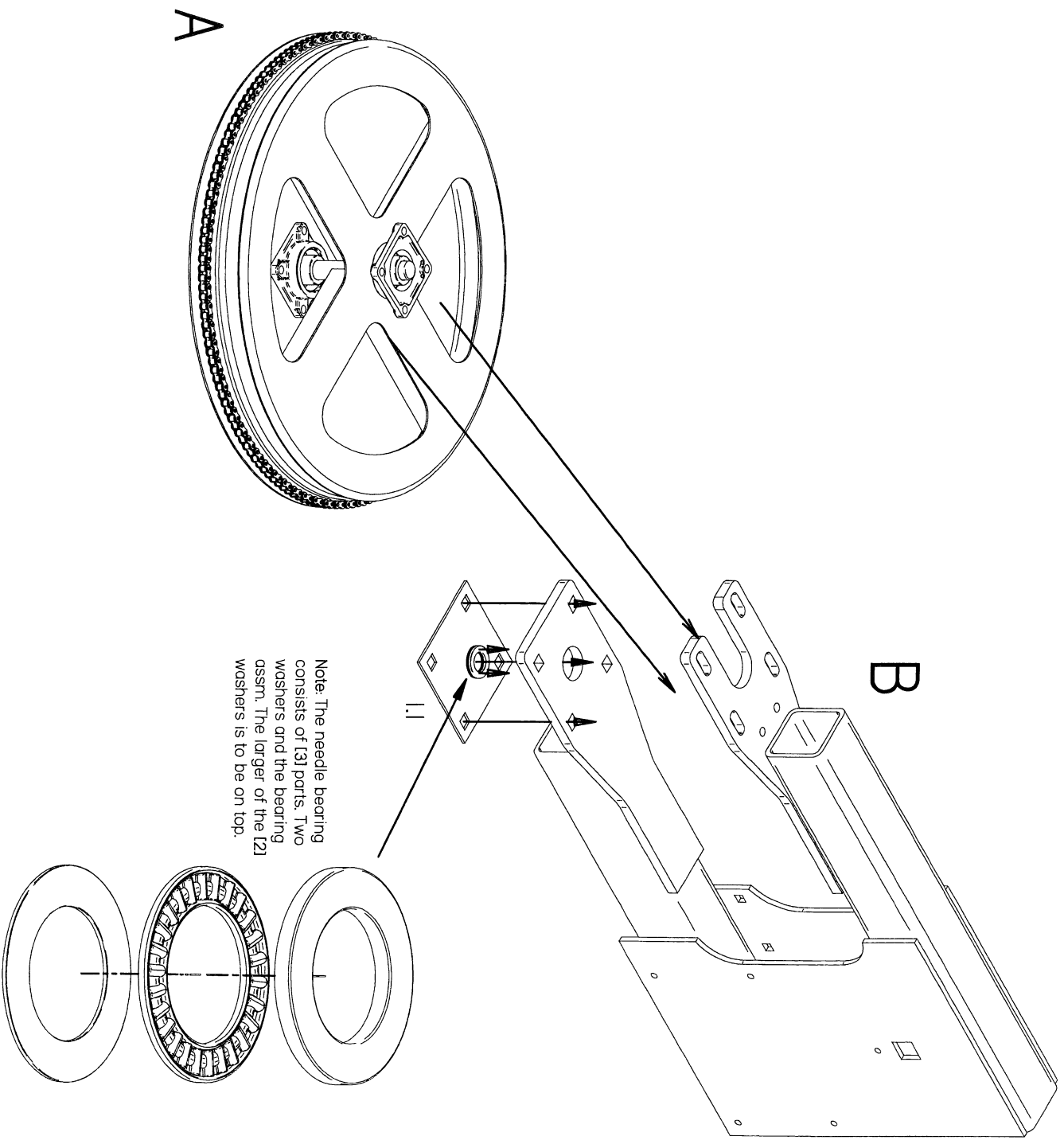
Mount pillow blocks to both ends of the drum axlesee figure 1./1.



# Part I: step B

Mating of the drum assm./step A/ with the B part.

Before fastening A into B, be certain that the 'needle' bearing is in place with support plate/see figure 1.1/.



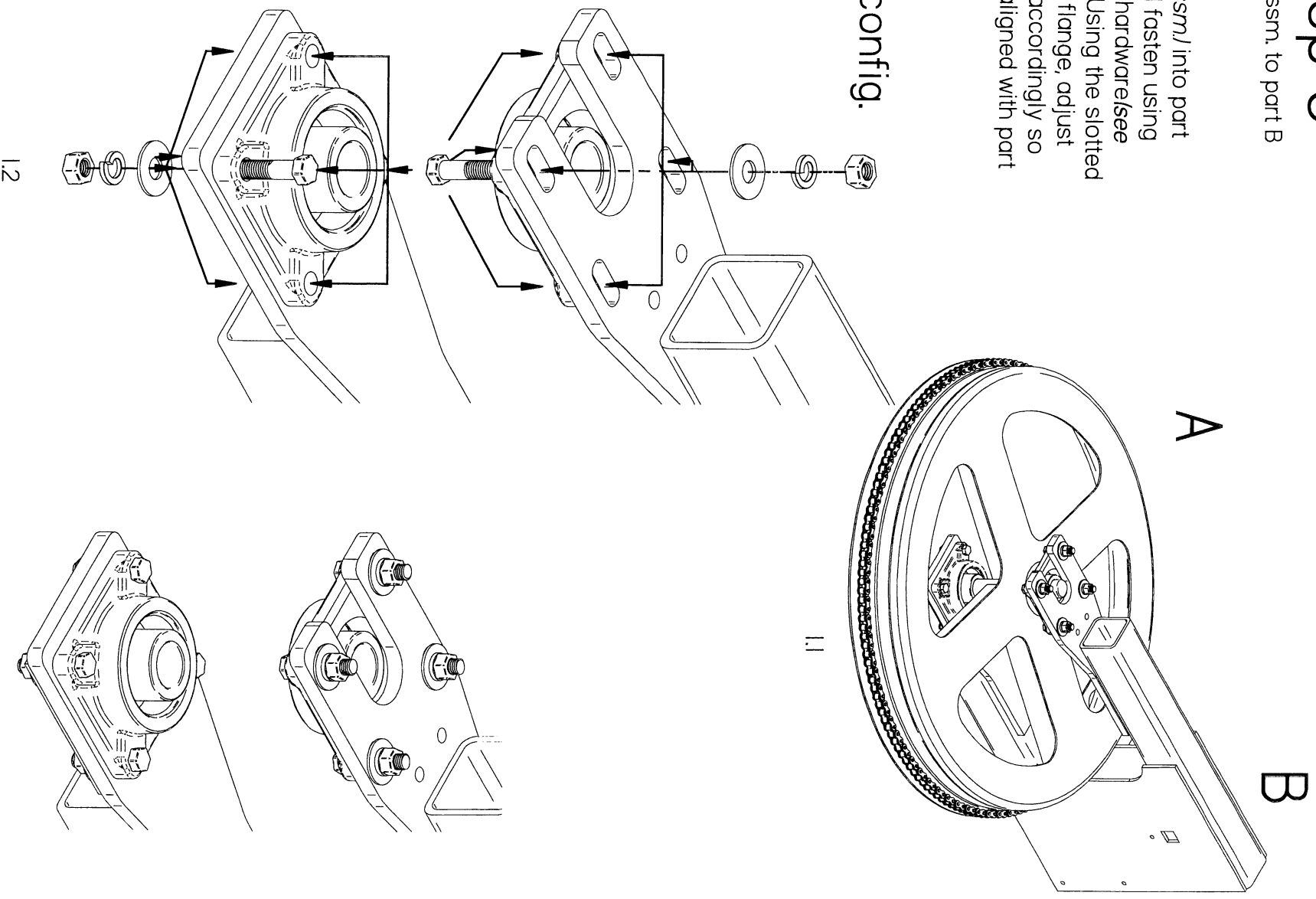


# Part I: step C

Fastening the drum assm. to part B

Position Aldrum assm./ into part B  
B. See figure 1.1/ and fasten using the provided 7/16" hardware/see figures 1.2 and 1.3/. Using the slotted holes in the upper flange, adjust the Aldrum assm./ accordingly so that it is properly aligned with part B. See next page.

Hardware config.



Note: The steps up to this point are duplicated on the other end of the Boomerang, otherwise known as the Idler Assembly.

# Part I: step D

Mounting the motor plate

1x3/8" bolts/d are fed from behind and fasten the motor plate as illustrated in figure 1.1 and 1.2.

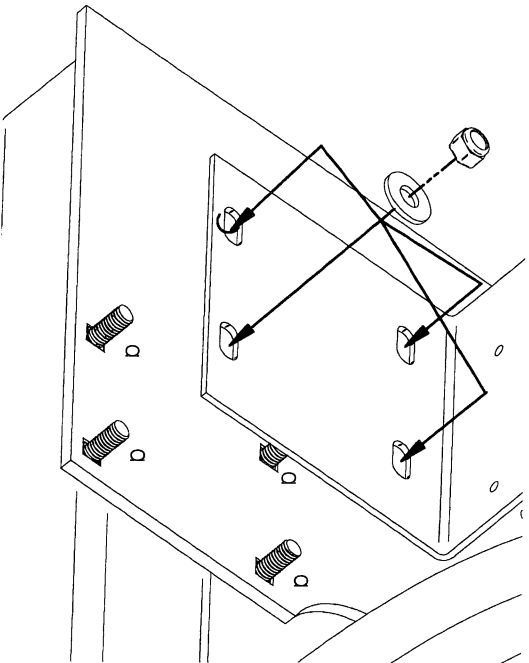


Figure 1.1

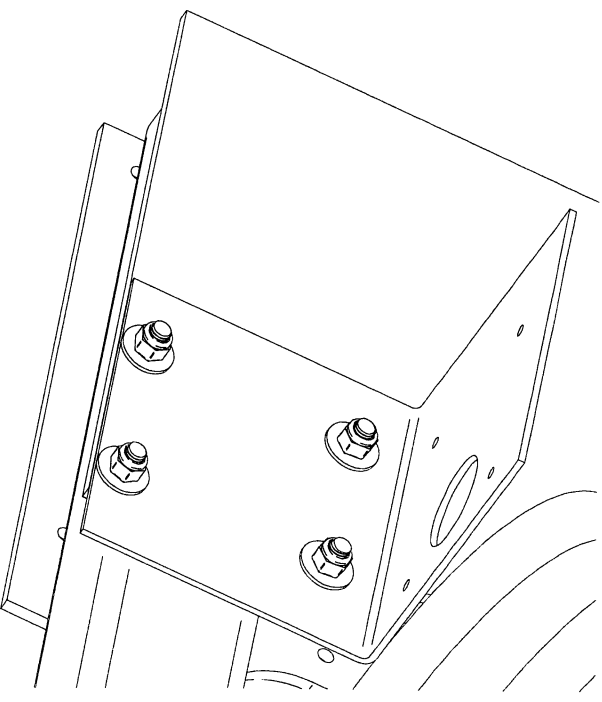
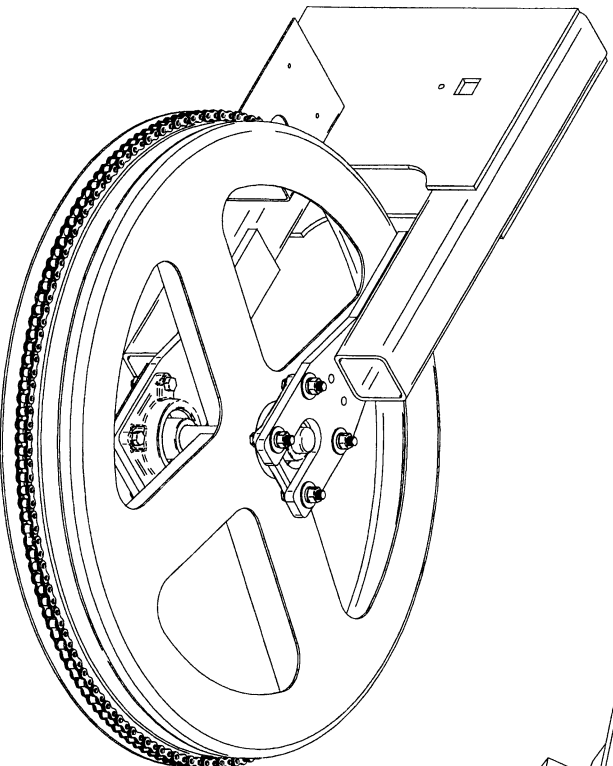


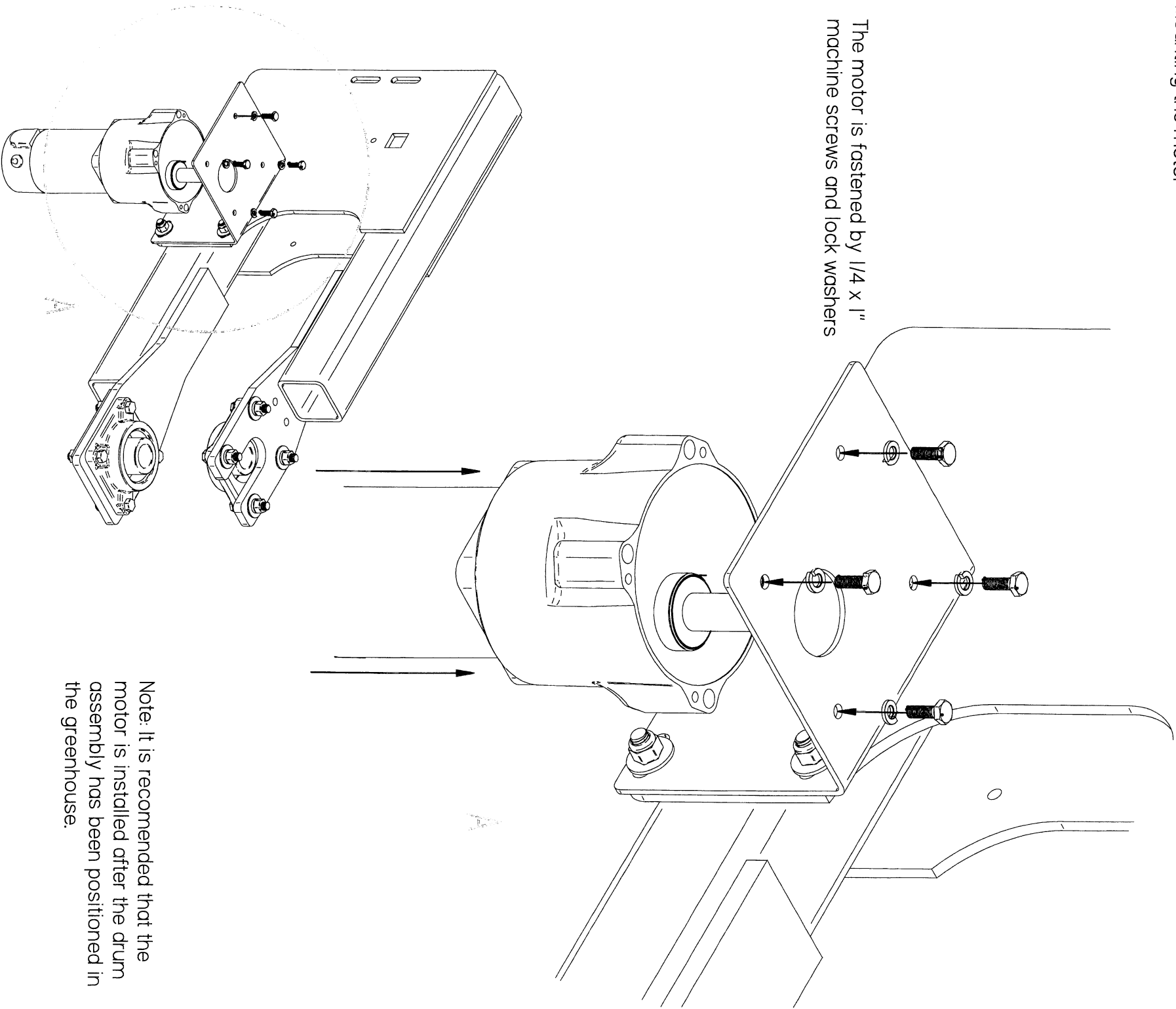
Figure 1.2



# Part I: step E

Mounting the motor

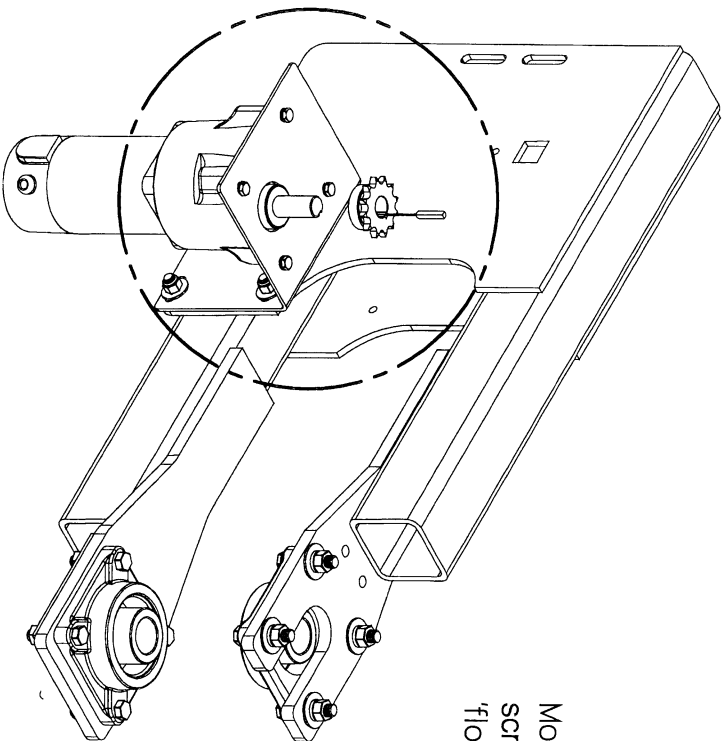
The motor is fastened by 1/4 x 1" machine screws and lock washers



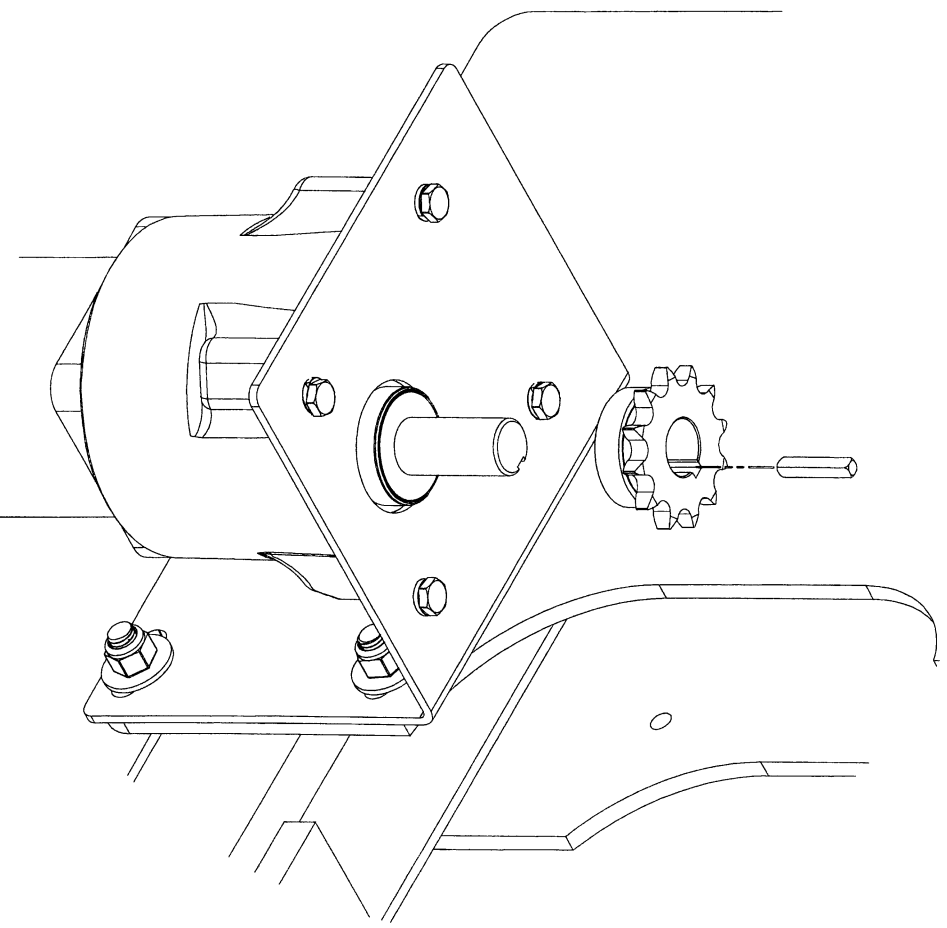
Note: It is recommended that the motor is installed after the drum assembly has been positioned in the greenhouse.

# Part I: step E

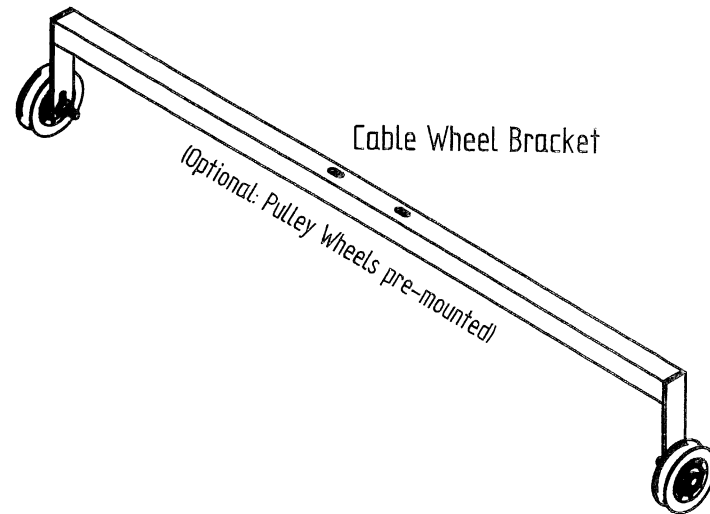
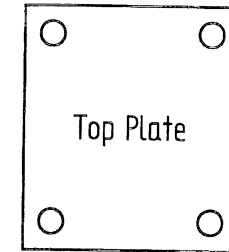
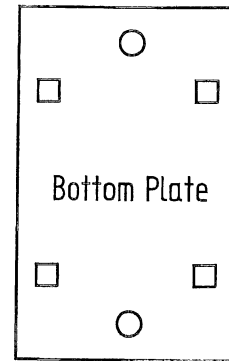
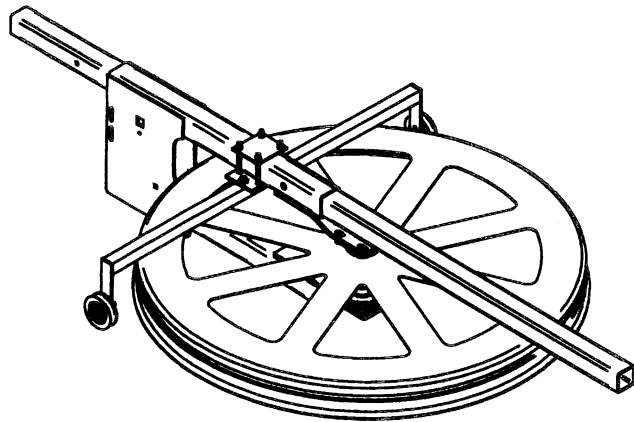
Sprocket



Mount the sprocket and key. Remove both the set screws on the sprocket. The sprocket is to be left 'floating' on the motor axle.



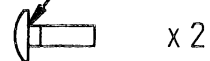
# Mounting The Cable Wheel Guide Bracket



4" Carriage Bolt



1" Carriage Bolt



3/8 Washer



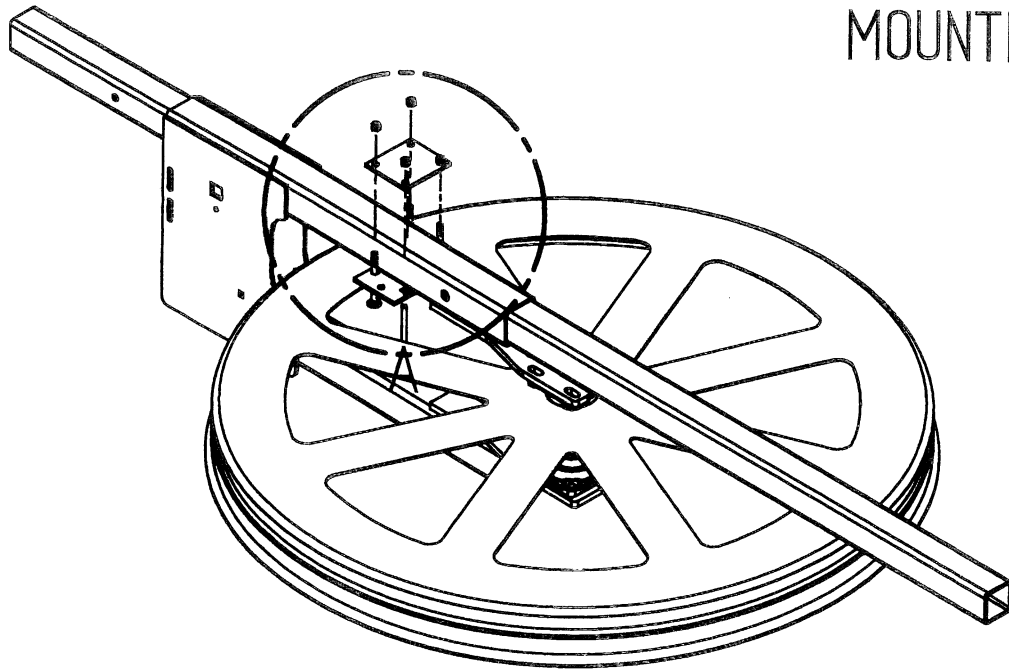
3/8 NYLOCK



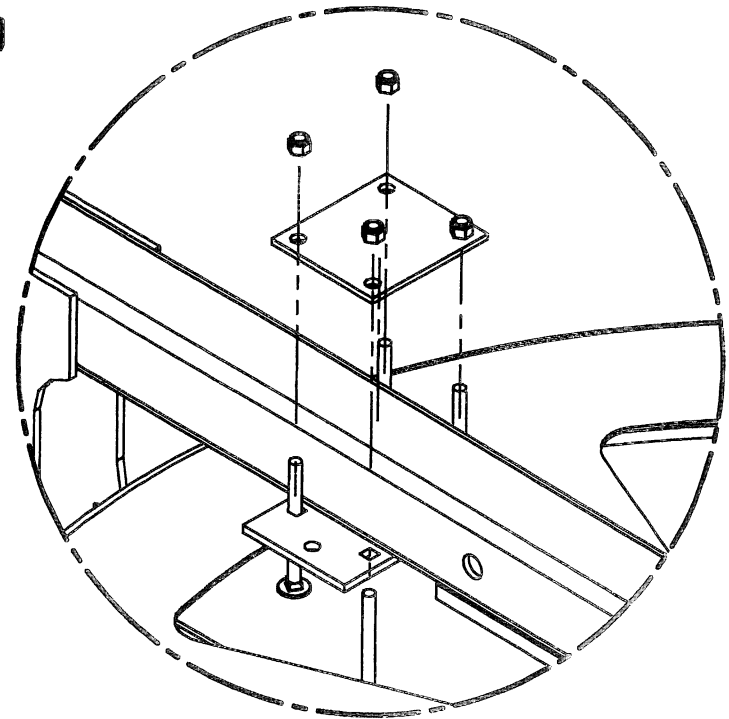
3/8 Jam NYLOCK



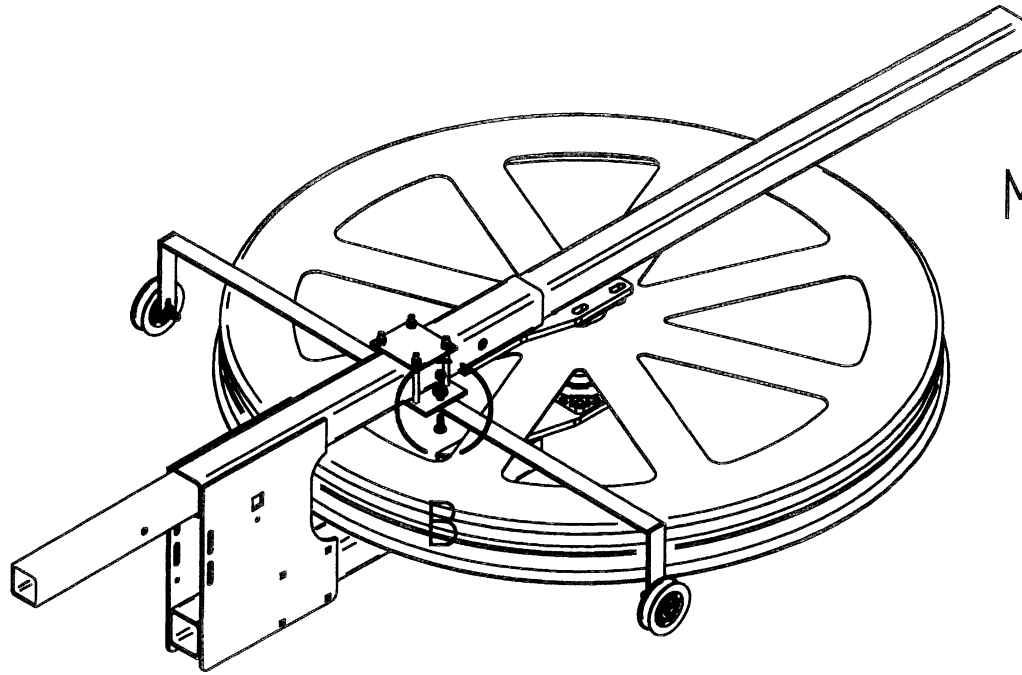
## MOUNTING TOP & BOTTOM PLATES



Using 4- 3/8 x 4" carriage bolts and 4 3/8 Nylocks position the Top and Bottom plates as shown in Detail A and HAND tighten each nylock (they should be facing up for easier access). DO NOT tighten completely as this will be needed to be adjustable in later steps.



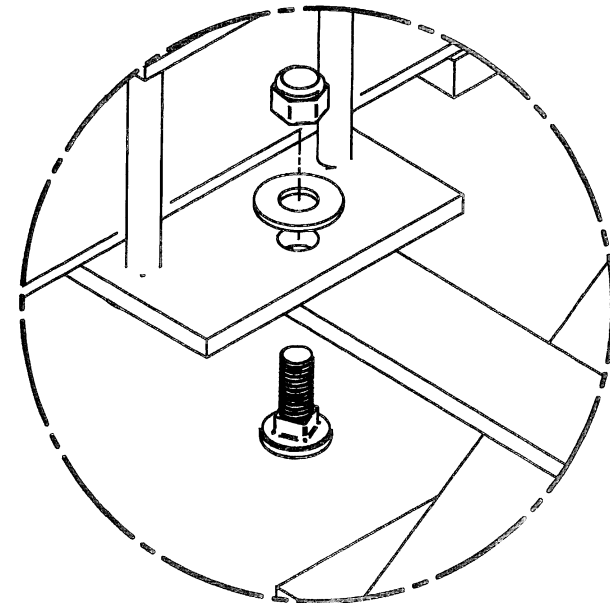
DETAIL A



## MOUNTING CABLE WHEEL BRACKET

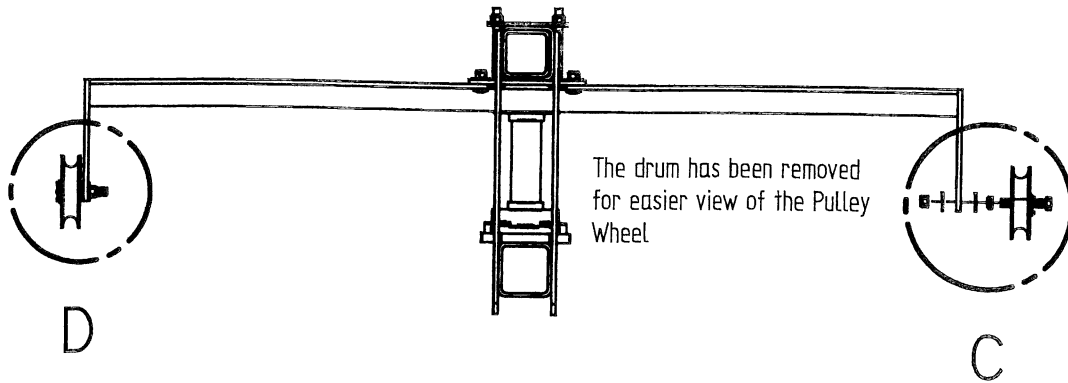
Taking the Cable Support Bar, fasten it to the two outer holes on the Bottom Plate using the 3/8 x 1" Carriage bolt, Flat Washer, and Nylock. Again HAND tighten for later adjustment.

Repeat on opposite side



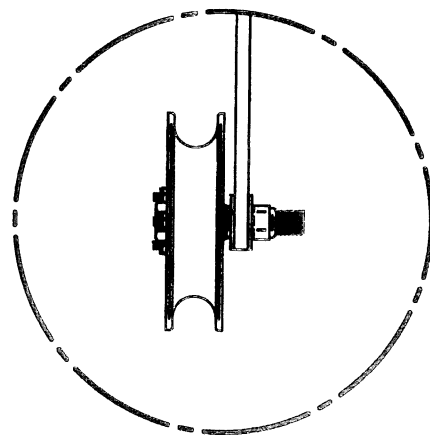
DETAIL B

# CABLE WHEEL ASSEMBLY

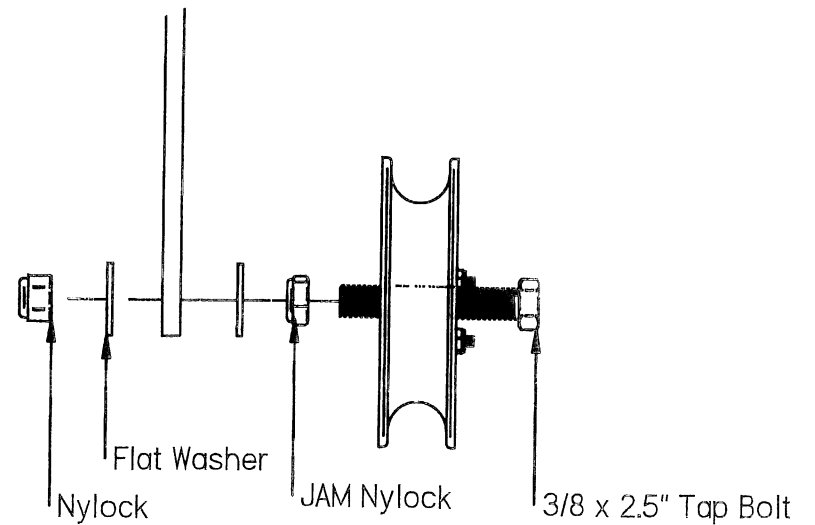


Note: this step can be completed at any stage during this assembly.

Using Detail C, assemble the hardware in the following order  
DO NOT over torque the JAM Nylock as this could cause the bearing inside the Pulley Wheel to seize. Notice the slotted hole you are bolting through is also utilized for verticle adjustment so final adjustment of the Nylock should not be completed until cable is fully tensioned.



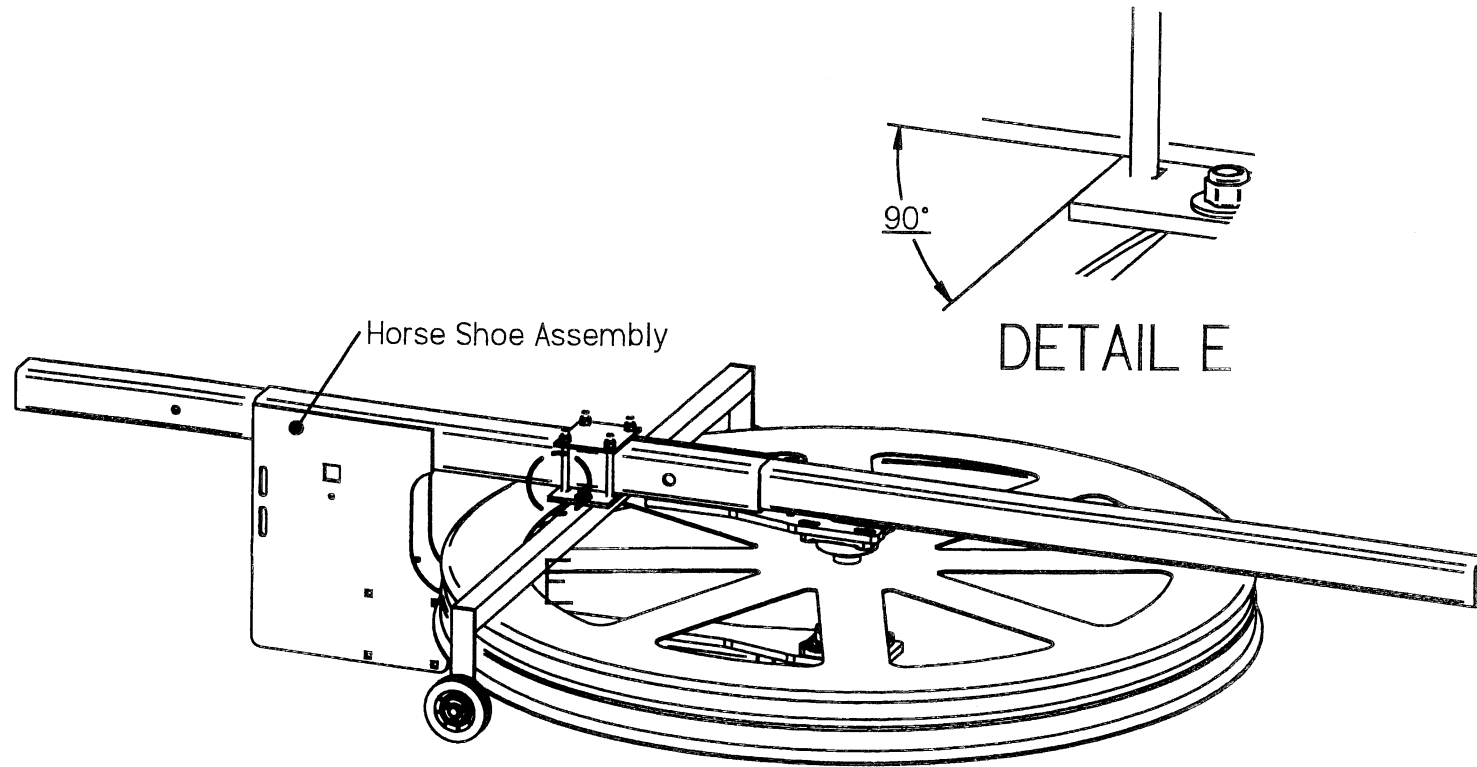
DETAIL D



DETAIL C

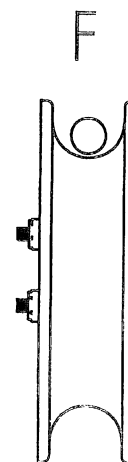


# FINAL ADJUSTMENT

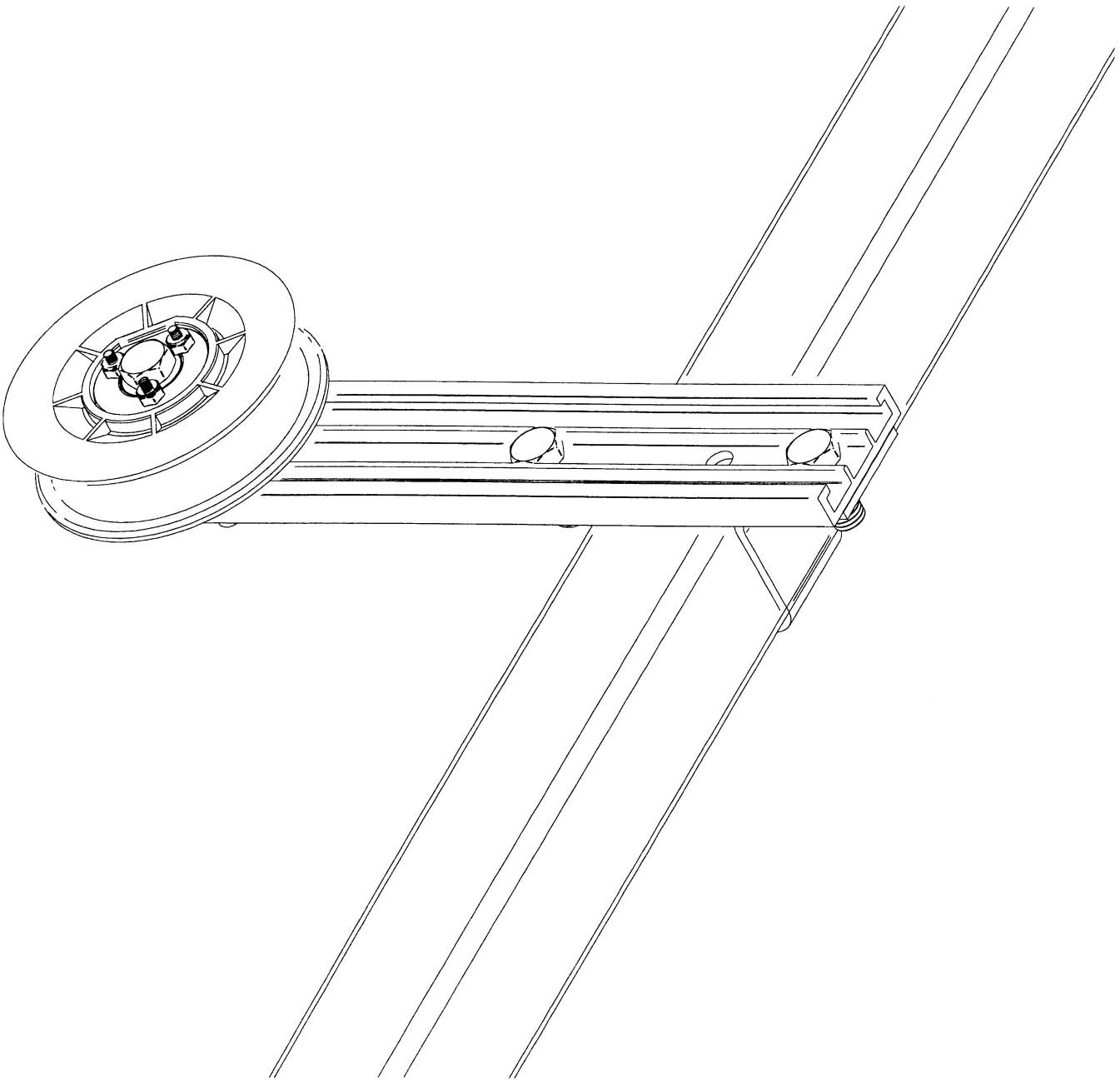


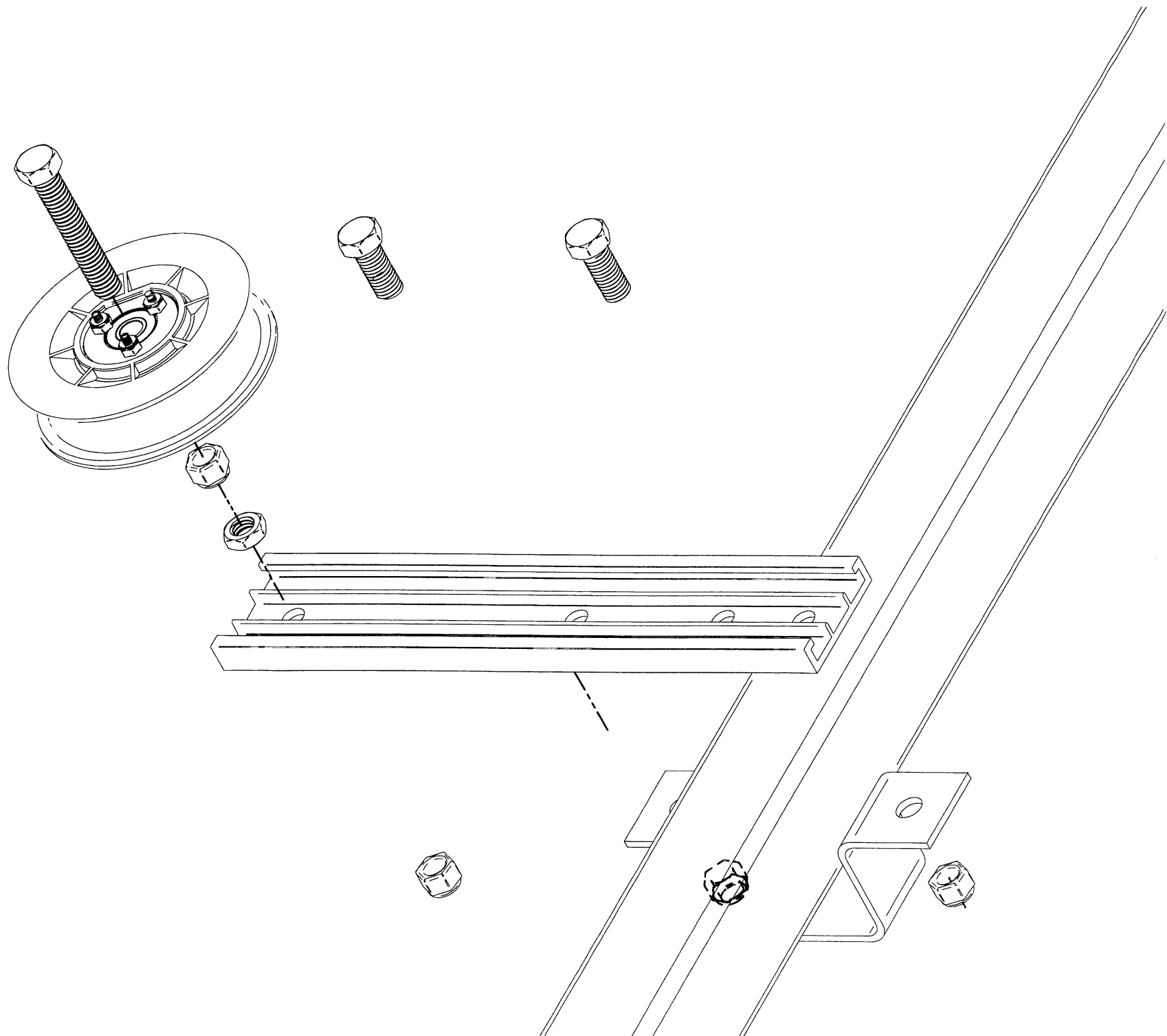
Once your cable has been fully run you may being to make the final adjustments to the whole Cable Wheel Bracket Assembly. It is best to begin with tightening the Top and Bottom plates (it is critical that the Bottom plate is properly aligned to 90 degrees[E] with the Horse Shoe assembly to allow maximum lateral adjustment once the Bottom plate has been fully tightened).

Final positioning of the Cable Wheel Bracket and Pulley Wheels should be stressed towards centering the cable directly within the pulley wheel so excessive wear and stress is minimized. An unloaded cable should just barely touch the top of the Pulley wheel (F)



# Installing the cable wheels





# Installing the support tubing

The Boomerang Basket System™ does not include the support tubing needed to complete the installation. This will be supplied by you the customer as needed.

Below are two variations for supporting the boomerang in a greenhouse. Variant 2:1 is the most commonly used while variant 2:2 is more towards a specific setup.

Care and attention must be given to mounting the support tubing as straight as possible+ or - 1/4" maximum variance the full length of the system is required!

It is recommended that a laser or mason twine be used for best results. Ultimate satisfaction in the reliability of the system relies on a "straight" system.

Be sure to keep the path of the hanging baskets free and clear of any obstructions. Personal injury or damage to the system may result if this is not paid strict attention.

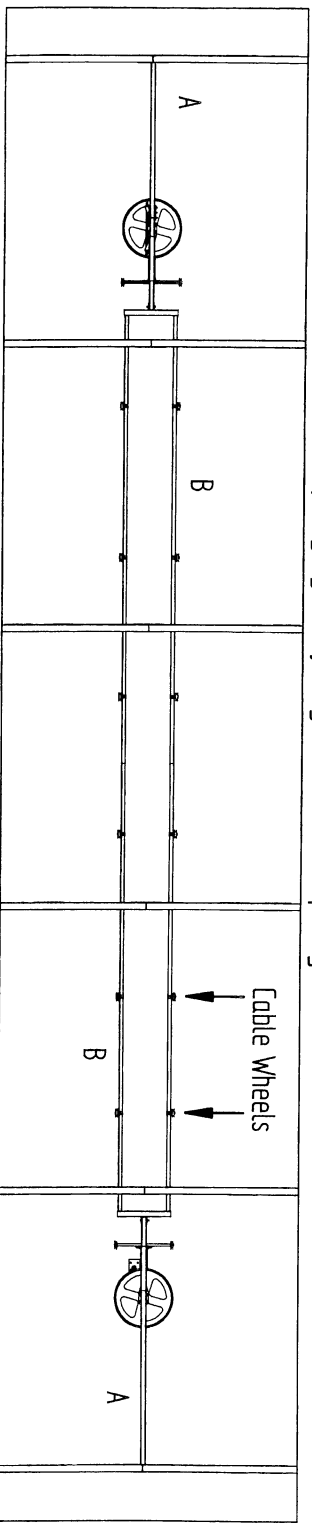
## Variant 2:1 ONLY

Calculate the required amount of square tubing as follows:

$$A. 2 \frac{1}{2}" \text{ Sq. } 12 \text{ gauge } [2 \times \text{Truss Spacing} = \text{Total}]$$

Support Tubing Variant 2:1

$$B. 2" \text{ Sq. } 14 \text{ gauge } [\text{Bay Length} - (2 \times \text{Truss Spacing}) \times 2 = \text{Total}]$$



A. 2 1/2" Sq. 12 gauge

B. 2" Sq. 14 gauge

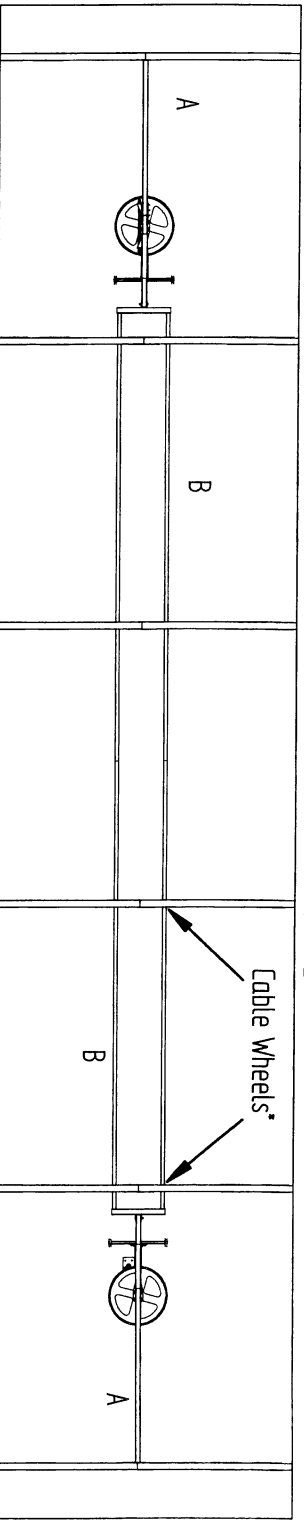
## Variant 2:2 ONLY

Calculate the required amount of square tubing is as follows:

$$A. 2 \frac{1}{2}" \text{ Sq. } 12 \text{ gauge } [2 \times \text{Truss Spacing} = \text{Total}]$$

Support Tubing variant2:2

$$B. 2" \text{ Sq. } 14 \text{ gauge } [\text{Bay Length} - (2 \times \text{Truss Spacing}) = \text{Total}]$$

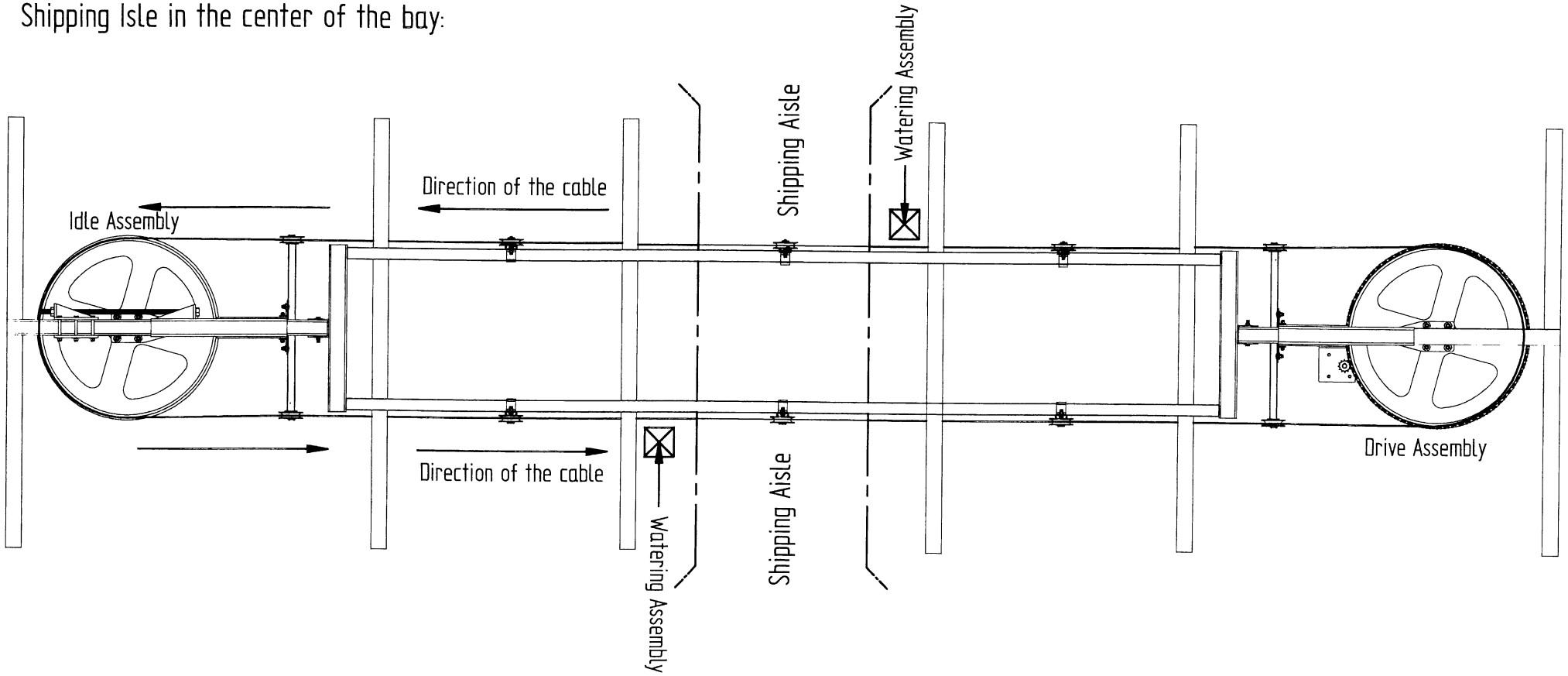


\*Cable wheels are mounted under the truss(not shown)

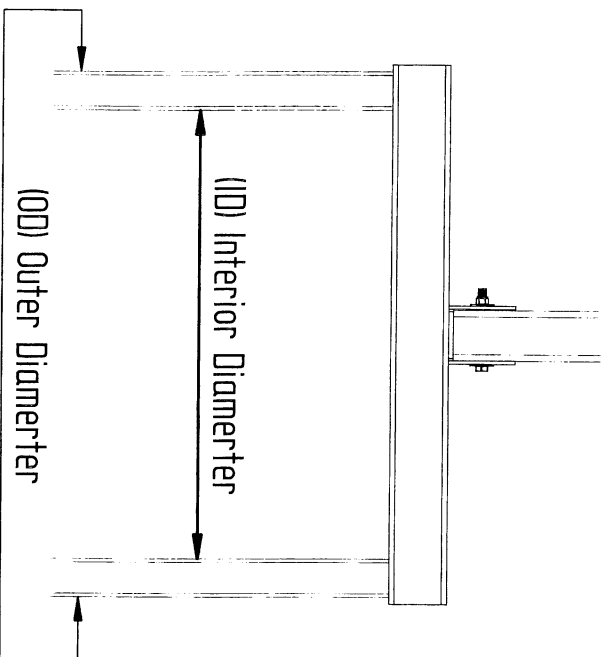
# Locating the Irrigation Assembly 2:1

This illustration shows the (2) positions where the watering assembly may be mounted. It is important to be sure that drainage from the basket after watering is over the center isle.

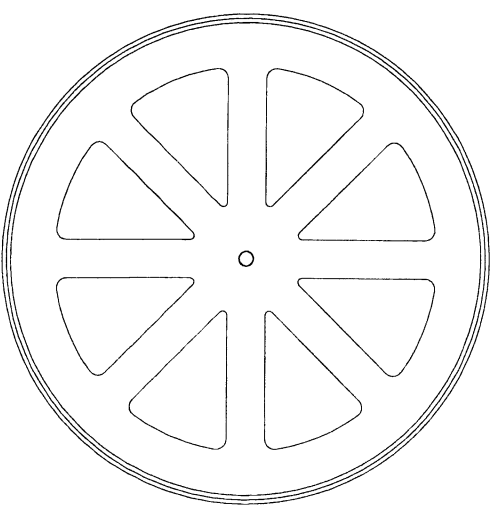
Shipping Isle in the center of the bay:



# Spacing of the Support Tubing

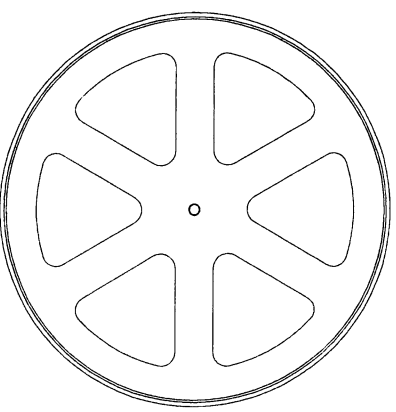


50" Drum



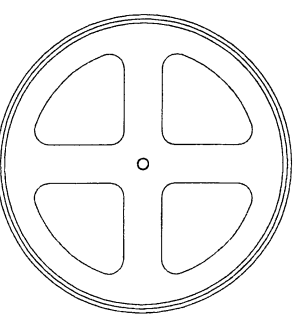
ID 43 3/8" | 47 3/8" OD

40" Drum



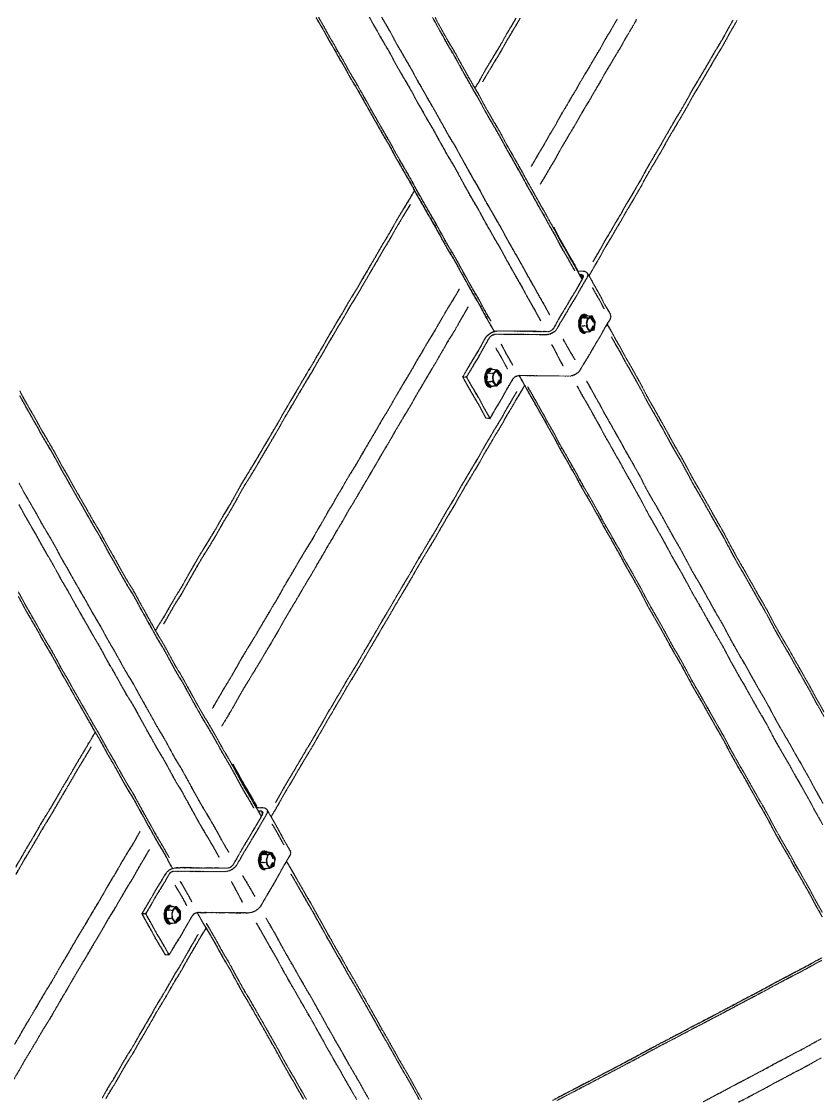
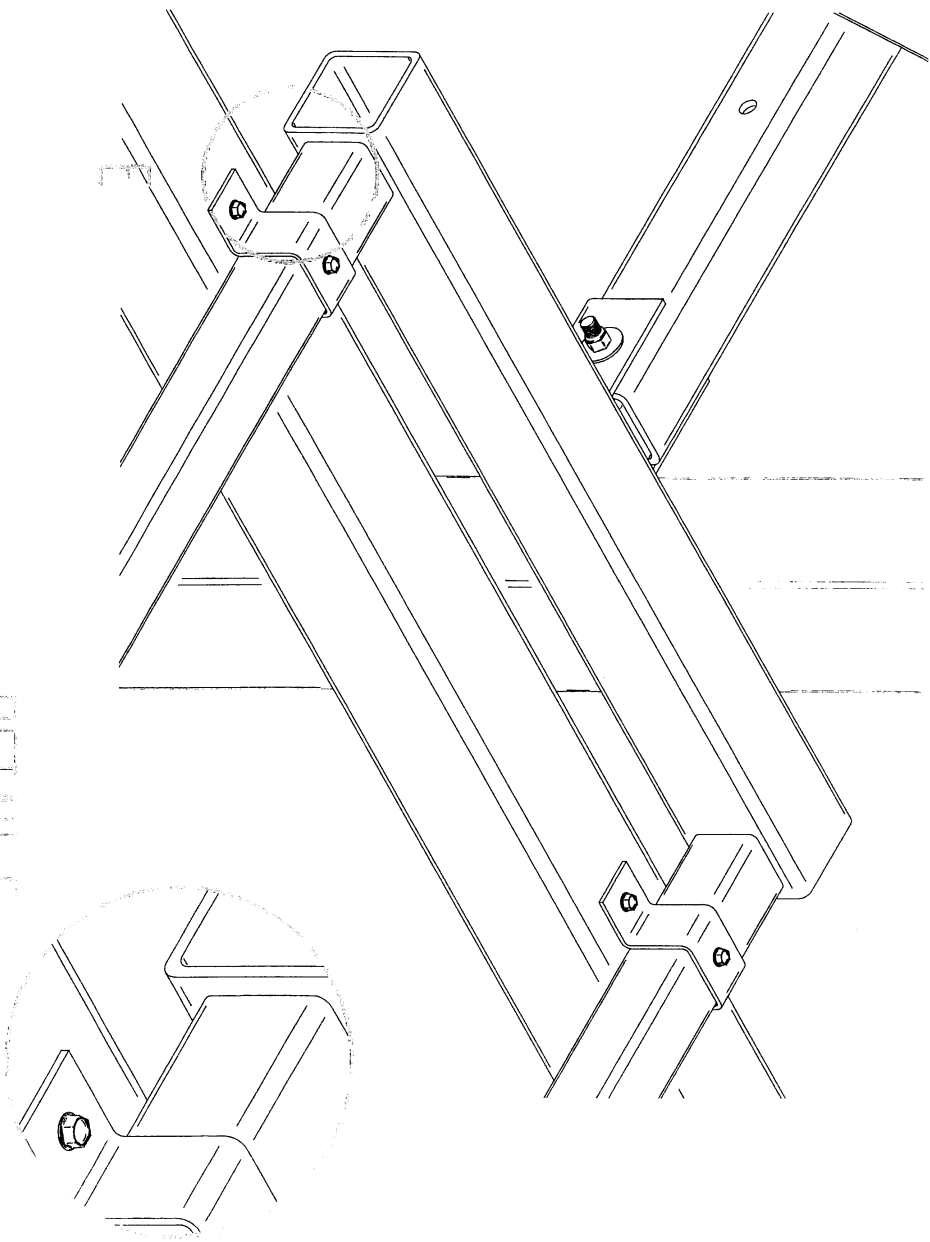
ID 33 3/8" | 37 3/8" OD

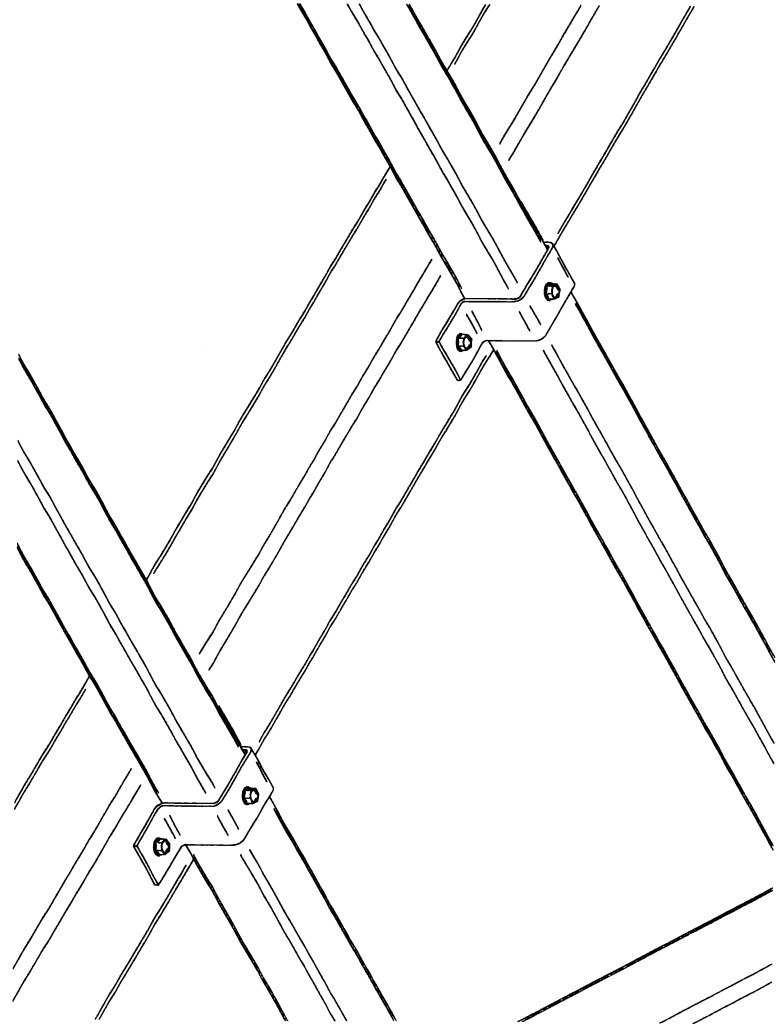
30" Drum



ID 23 3/8" | 27 3/8" OD

DETAIL E

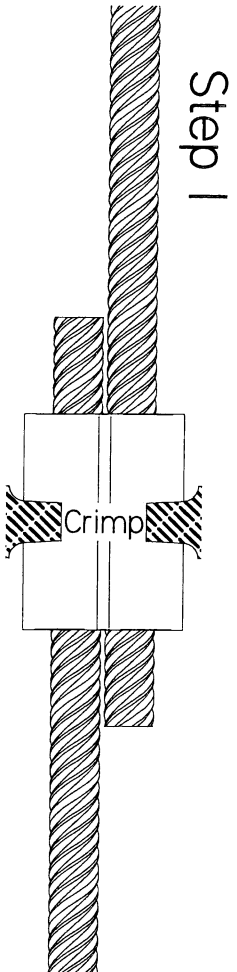
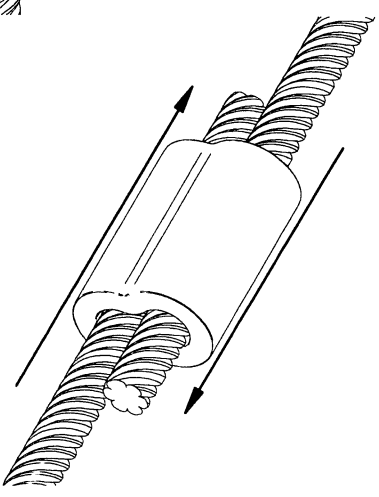






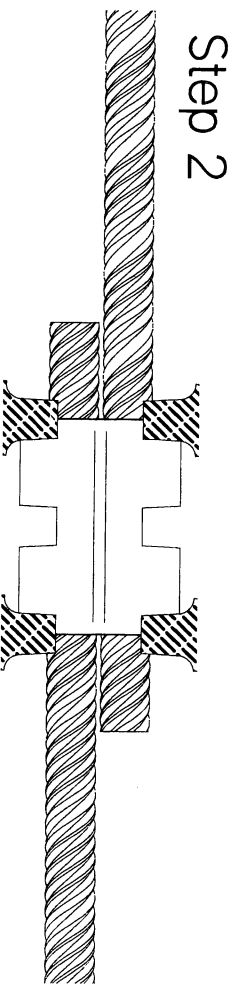
# Crimping the Cable

Cable Direction



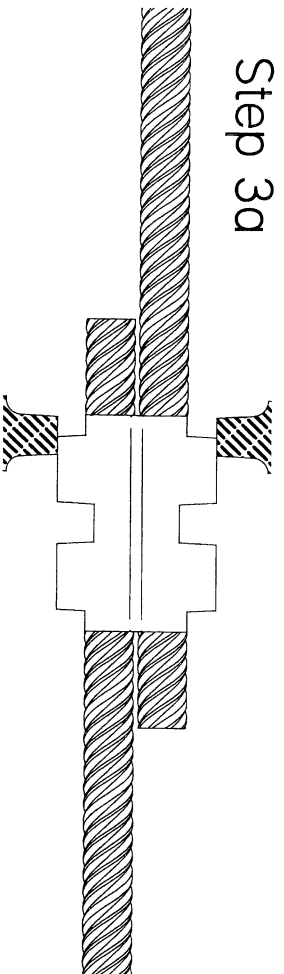
Step 1

Hand tension the cable as much as possible and place your first crimp as illustrated. *Specialty tools are not required because the cable is tightened later on at the idler drum.*



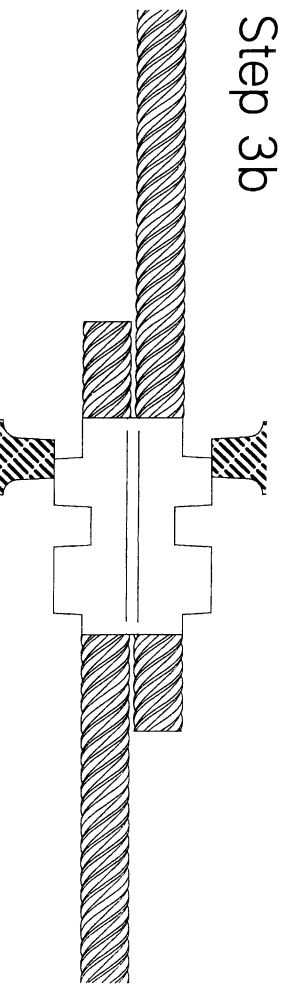
Step 2

Crimp the ends of the Master Crimp as shown. About half of the tool's crimping surface is used to give the Master Crimp clean edges at both ends.



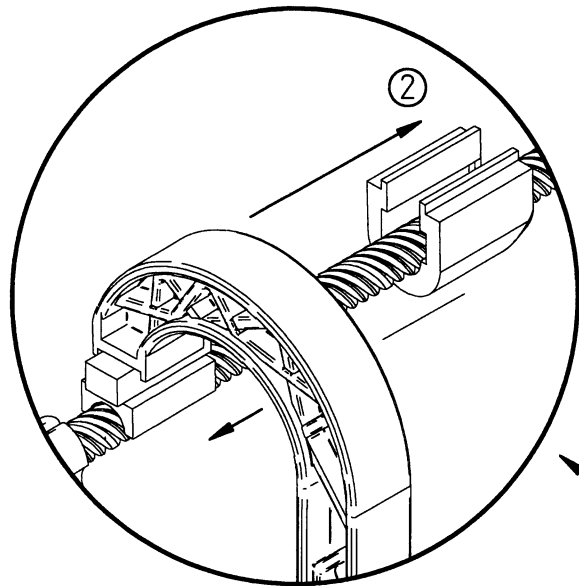
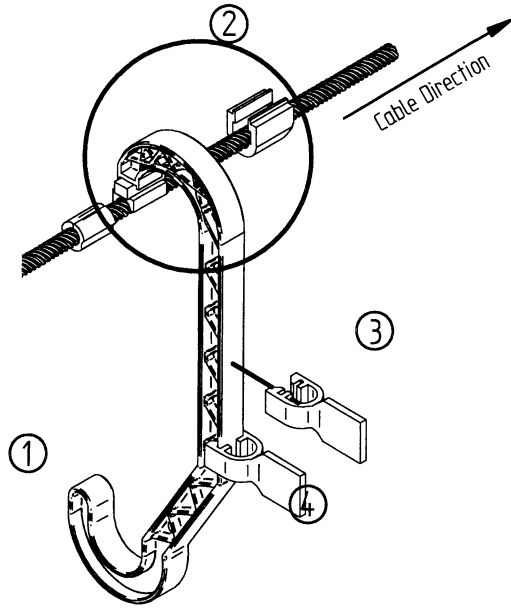
Step 3a

Continue from either the right or left (left shown) as shown in Steps 3a & 3b maintaining approximately half the crimping surface as used before.



Step 3b

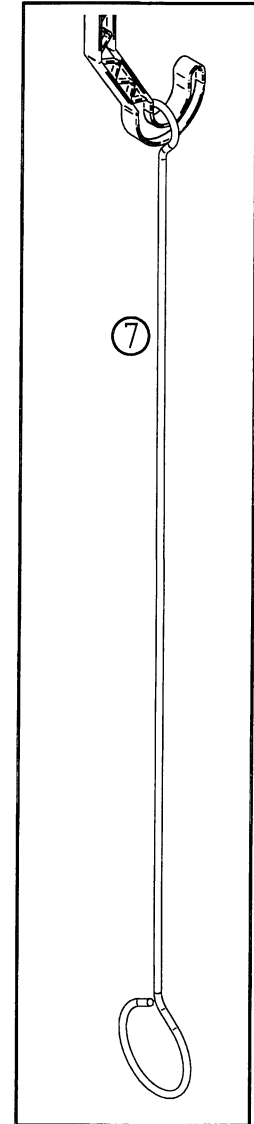
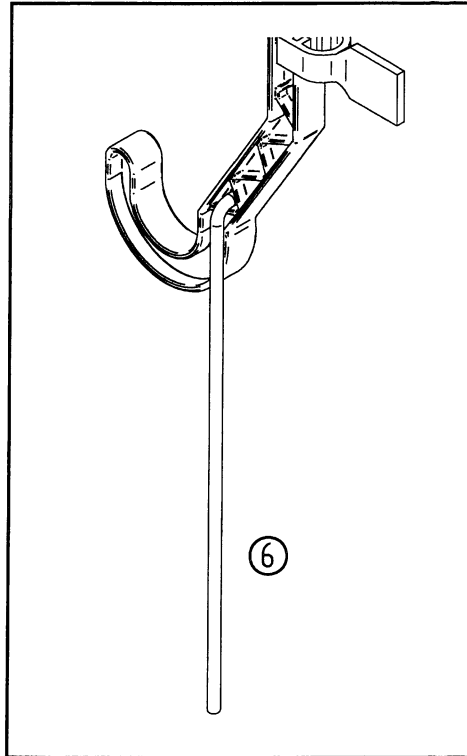
# Assembling Hook with Clip



Rounded edge of clip faces away from aluminum crimp.

Hangers are placed on hooks without a counter weight

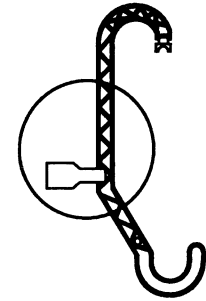
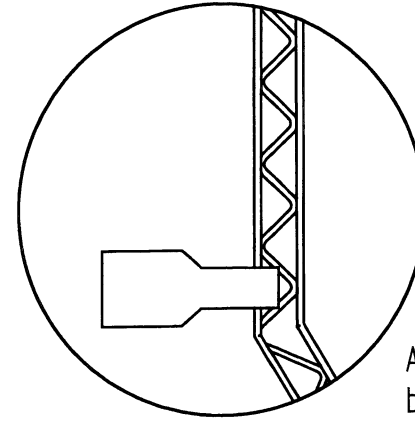
Counter weights are placed every other hook



# Tab Positioning

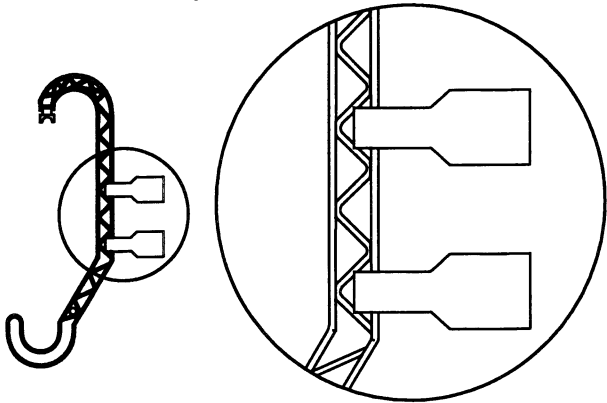
Each hook receives one tab clipped along the back edge, teeth resting in between ribs.

## Single-Tier Systems



A single-tier system has only black tabs, all set in the same place: the first space above the hook elbow.

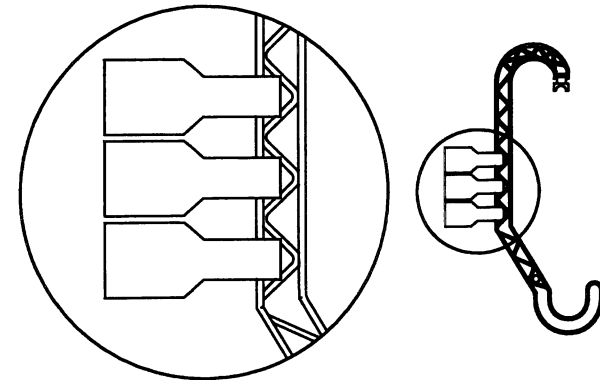
## Double-Tier Systems



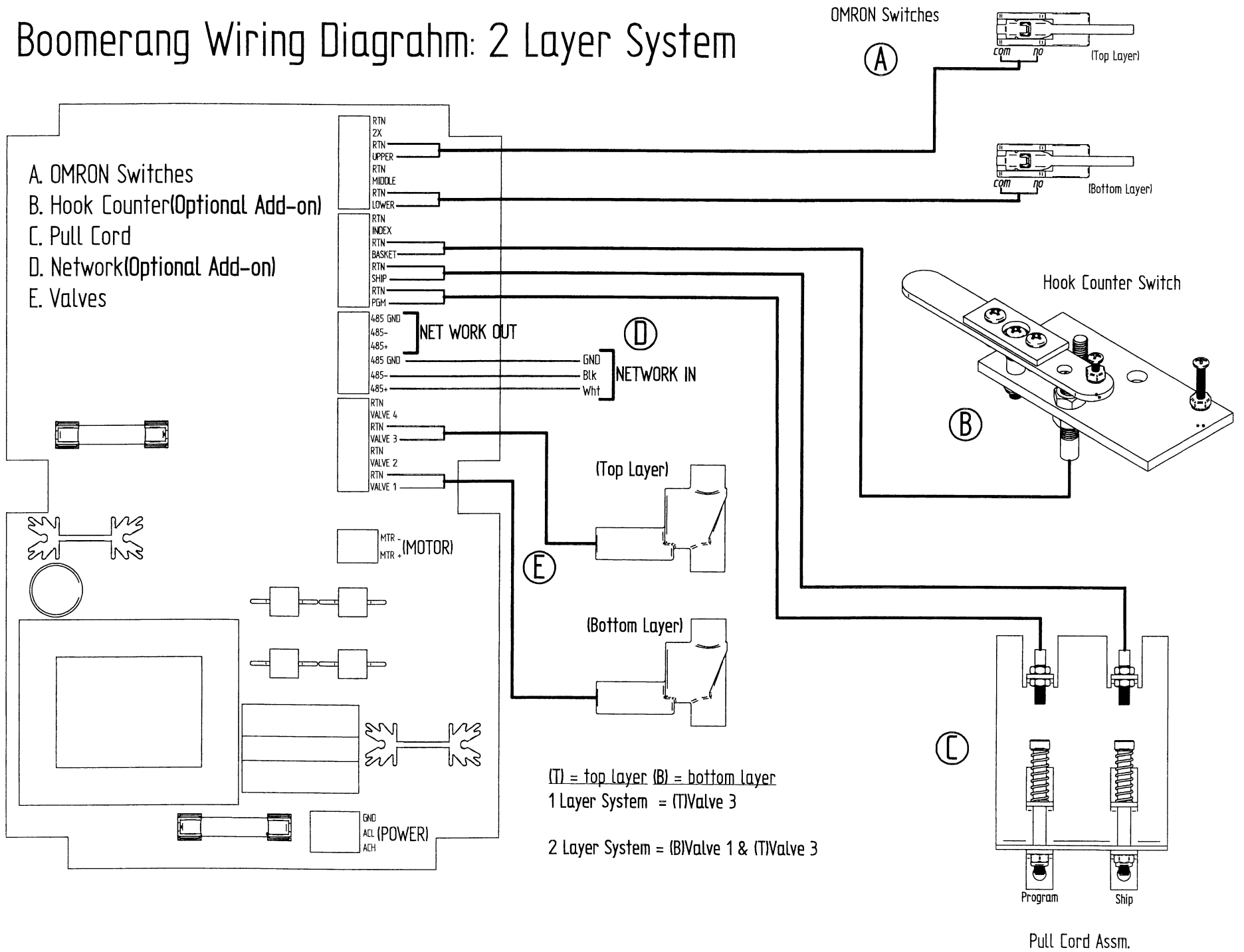
In a double-tier system, top tier hooks receive a green tab in the upper position shown and bottom tier hooks receive a black tab in the lower position.

## Triple-Tier Systems

The three-tier system has three tab placements: green tabs go in the top position on top-tier hooks, blue tabs in the middle position on middle tier hooks, and black tabs in the bottom position on bottom tier hooks.



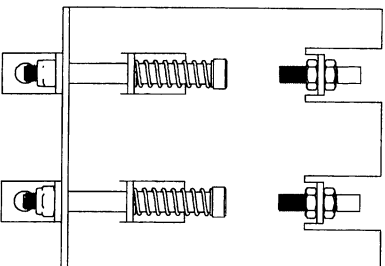
# Boomerang Wiring Diagram: 2 Layer System



Part Master

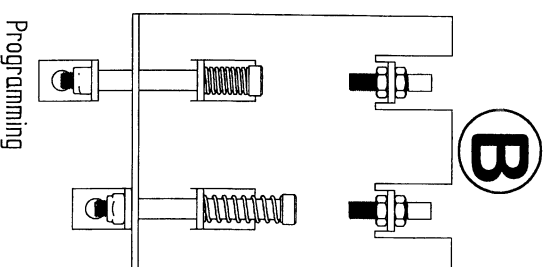
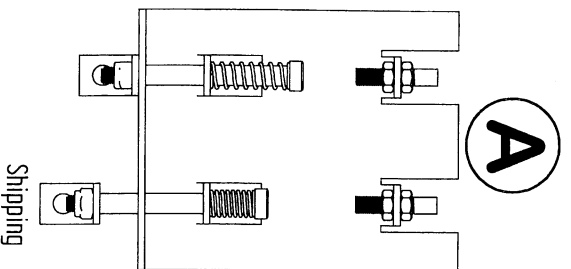
# BOOMERANG STARTUP GUIDE

## STANDARD WATERING

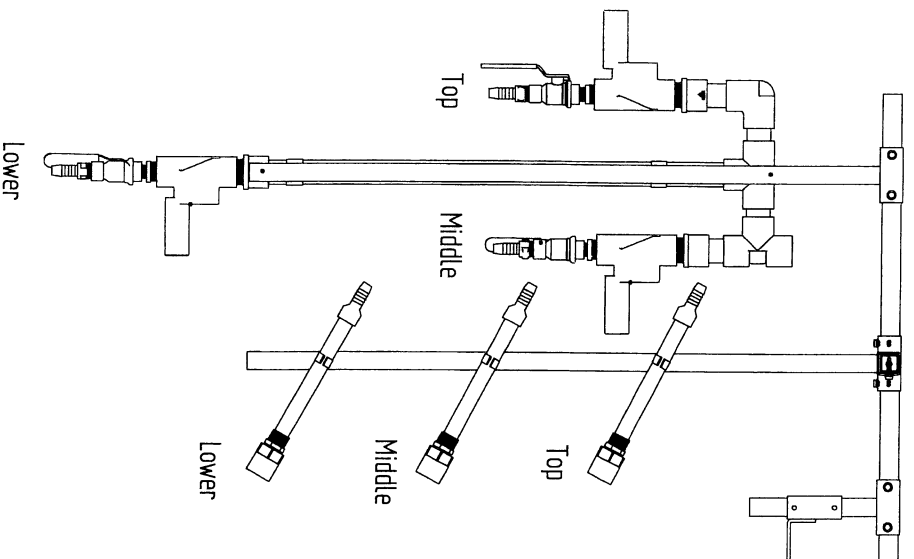


From the Boomerang startup there are 2 options: Shipping & Programming mode. Shipping mode simply moves the baskets along with no watering capability. In this mode you can adjust the speed or how fast a basket travels. Programming mode allows you to move the baskets along while they are being watered simultaneously. The length of time a basket is watered as well the speed of the basket are also adjustable in this mode. Depending on how many basket layers your system has you are also given the option of watering just individual or multiple layers during the programming phase.

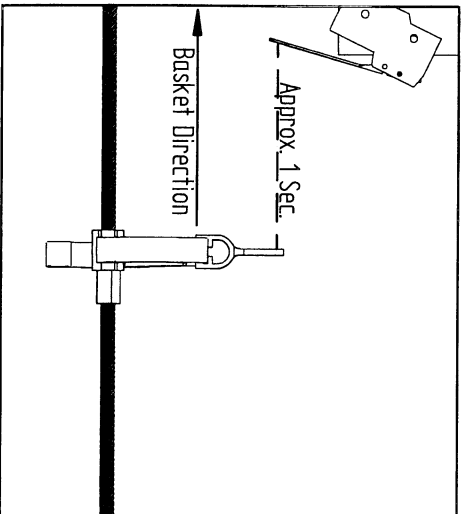
To begin you must first identify which is your "Programming" and "Shipping" pull cord (if you have not already identified them). Starting from the powerup of the Boomerang begin by pulling one cord at a time. If the system begins to move immediately you have identified the "Shipping" cord (A). Mark that cord "Shipping" for later reference. If the system does not move and your electric water valves begin to make a 'clicking' sound, you have identified the "Programming" cord (B). If your water mains have been connected you may also notice water flow from the watering heads at that time. Mark that cord "Programming" for later reference.



After identifying your pull cords you may now begin operating the Boomerang. To begin a normal watering cycle pull the "Programming" cord once (A). If you have connected your water your water mains you should see water flowing from your nozzle heads. If your mains have not been connected you should be able to hear a 'clicking' sound inside each valve indicating they are functional.

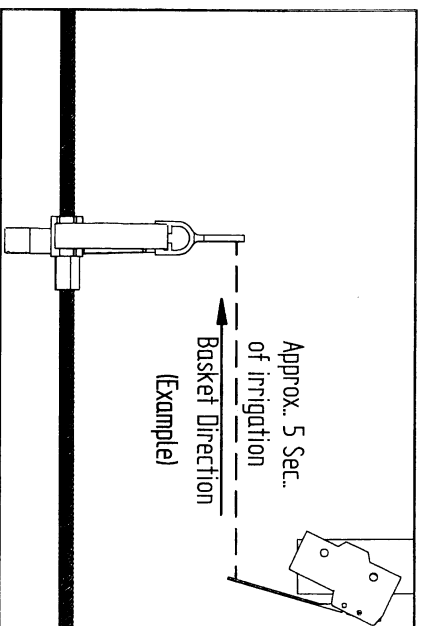


In this stage each valve and /or watering head represents a basket layer on your Boomerang. Water flow or a valve 'clicking' indicates that that layer will be watered in the next cycle. No water flow or 'clicking' means it will not be watered. To select which layer you want irrigated pull the "Shipping" cord once to cycle between different valve combinations. (NOTE: This does not apply to Boomerangs with only 1 Layer. For a single layer simply pull the "Programming" cord twice to start the watering cycle). Once you have selected your valve combination pull the "Programming" cord once. This should begin your watering cycle and water each basket until 1 basket has made a full revolution around the Boomerang. Even after the Boomerang has begun a watering cycle it is still possible to make changes as it is moving such as watering duration and the travelling basket speed.

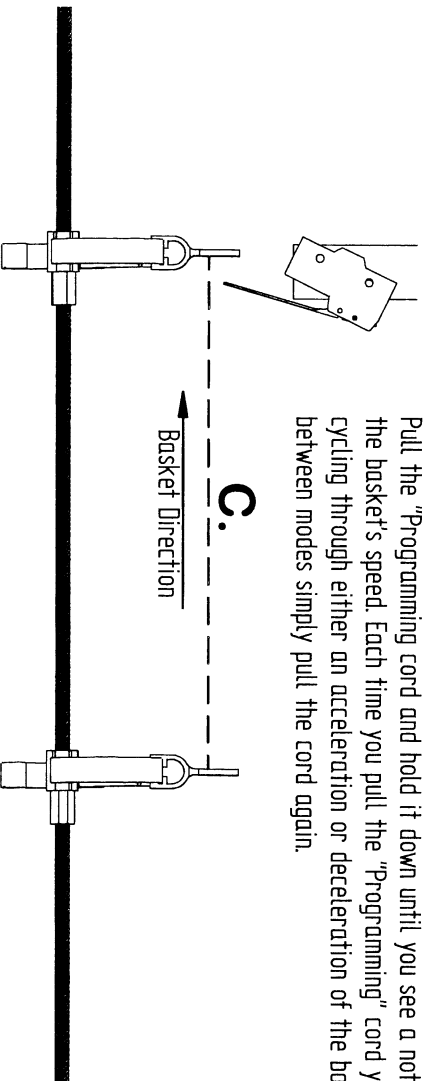


**A.**

To adjust the watering duration of your baskets watch as the basket hooks 'click' by the OMRON snap switch. As the next basket approaches the OMRON switch wait before the basket hook makes contact with the switch and pull and hold the "Programming" cord(A). As the basket 'clicks' past the OMRON switch the water valve should open and begin to water. The number of seconds you want the basket to be watered starts from the moment the valve opens. Count off the seconds you need and release the "Programming" cord(B). Until you make another adjustment all future baskets will be watered for the same amount of time. NOTE: if you change the speed of the basket after you have set the watering time you will need to readjust the watering duration.



**B.**



To adjust the basket travel speed while the Boomerang is moving wait for a period when the OMRON switches are not engaged and the valves are off (a quiet period 'C'). Pull the "Programming" cord and hold it down until you see a noticeable difference in the basket's speed. Each time you pull the "Programming" cord you will be either cycling through either an acceleration or deceleration of the basket. To alternate between modes simply pull the cord again.



