



SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution



Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A+' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

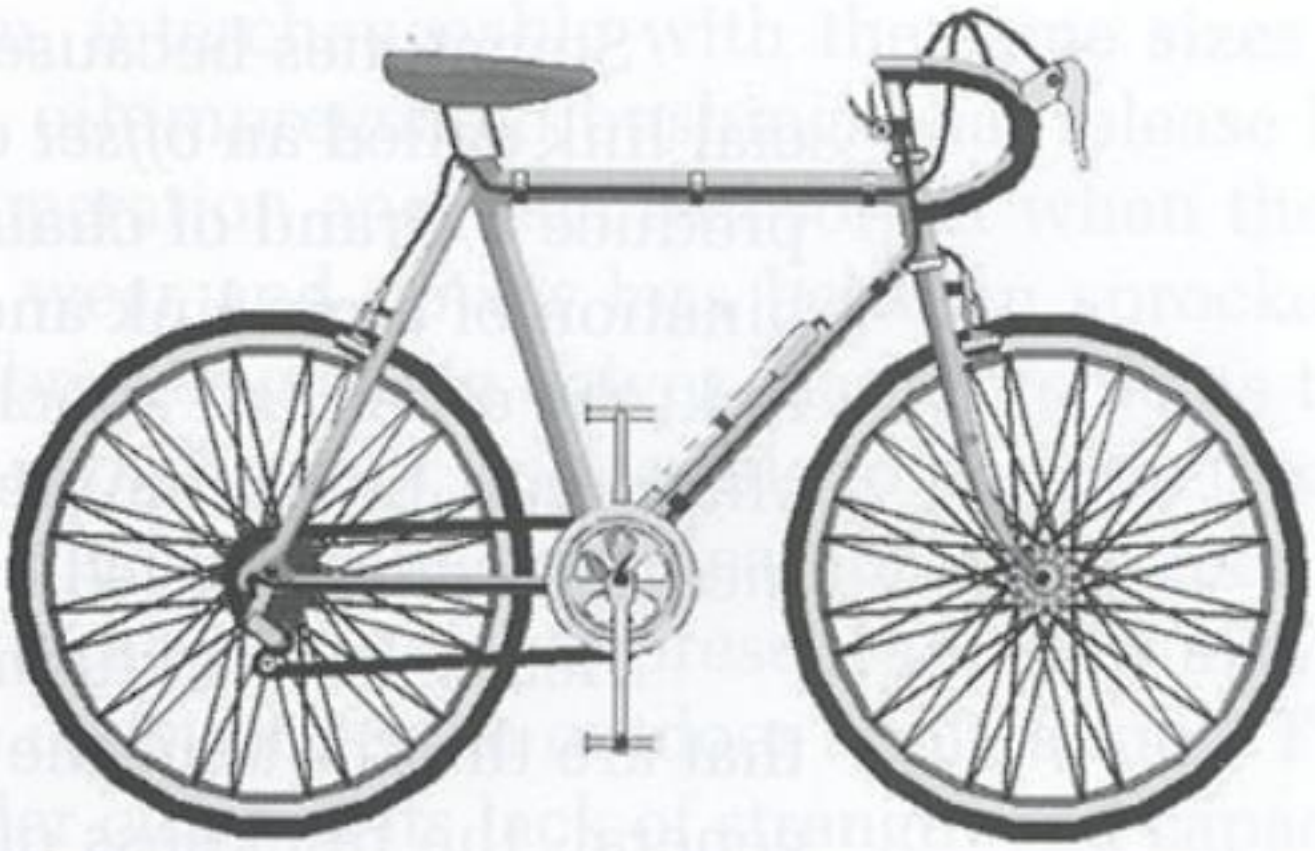
DEPARTMENT OF MECHANICAL ENGINEERING

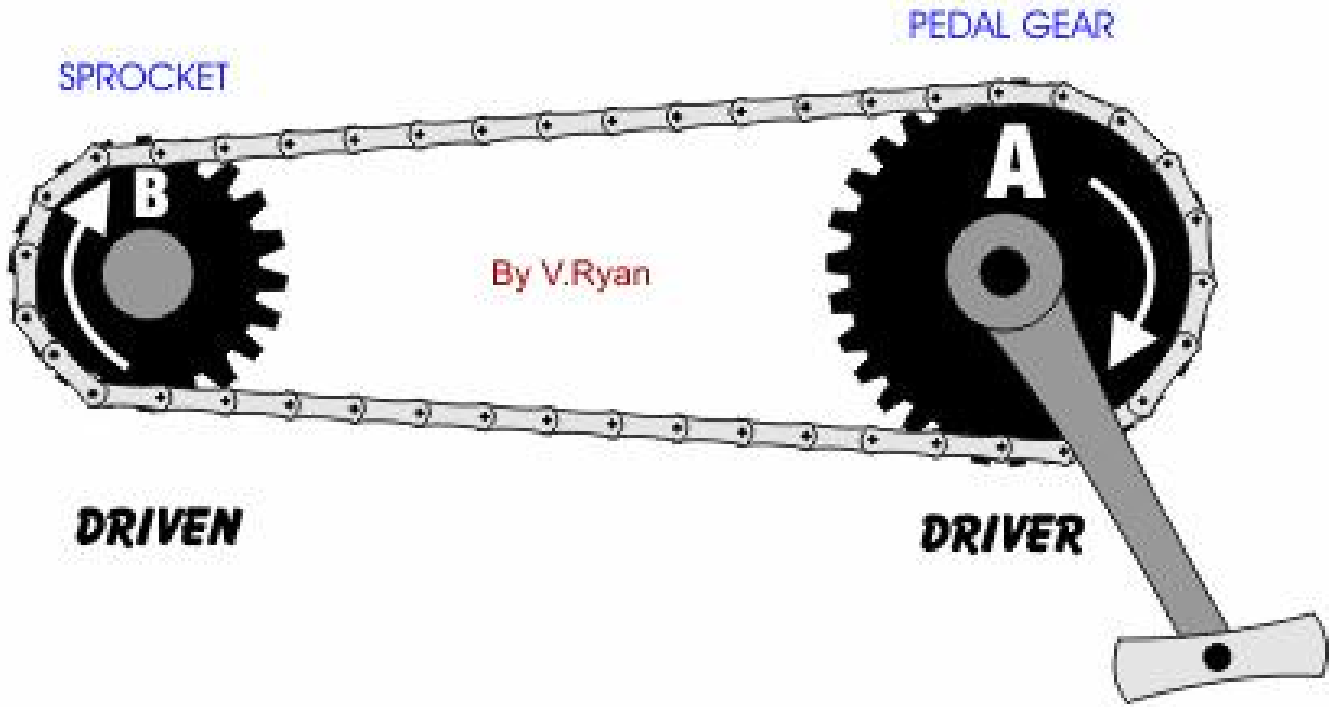
DESIGN OF Transmission System

III YEAR VISEM

UNIT 2– Design of Flexible Transmission Elements

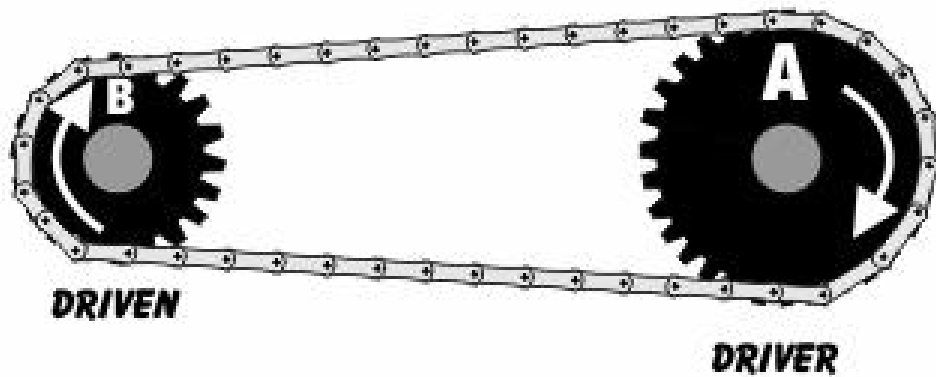
TOPIC :Chain Drive



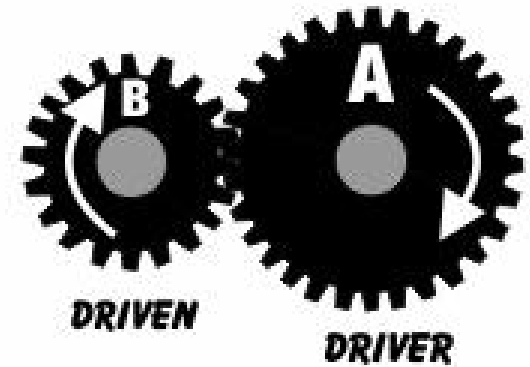


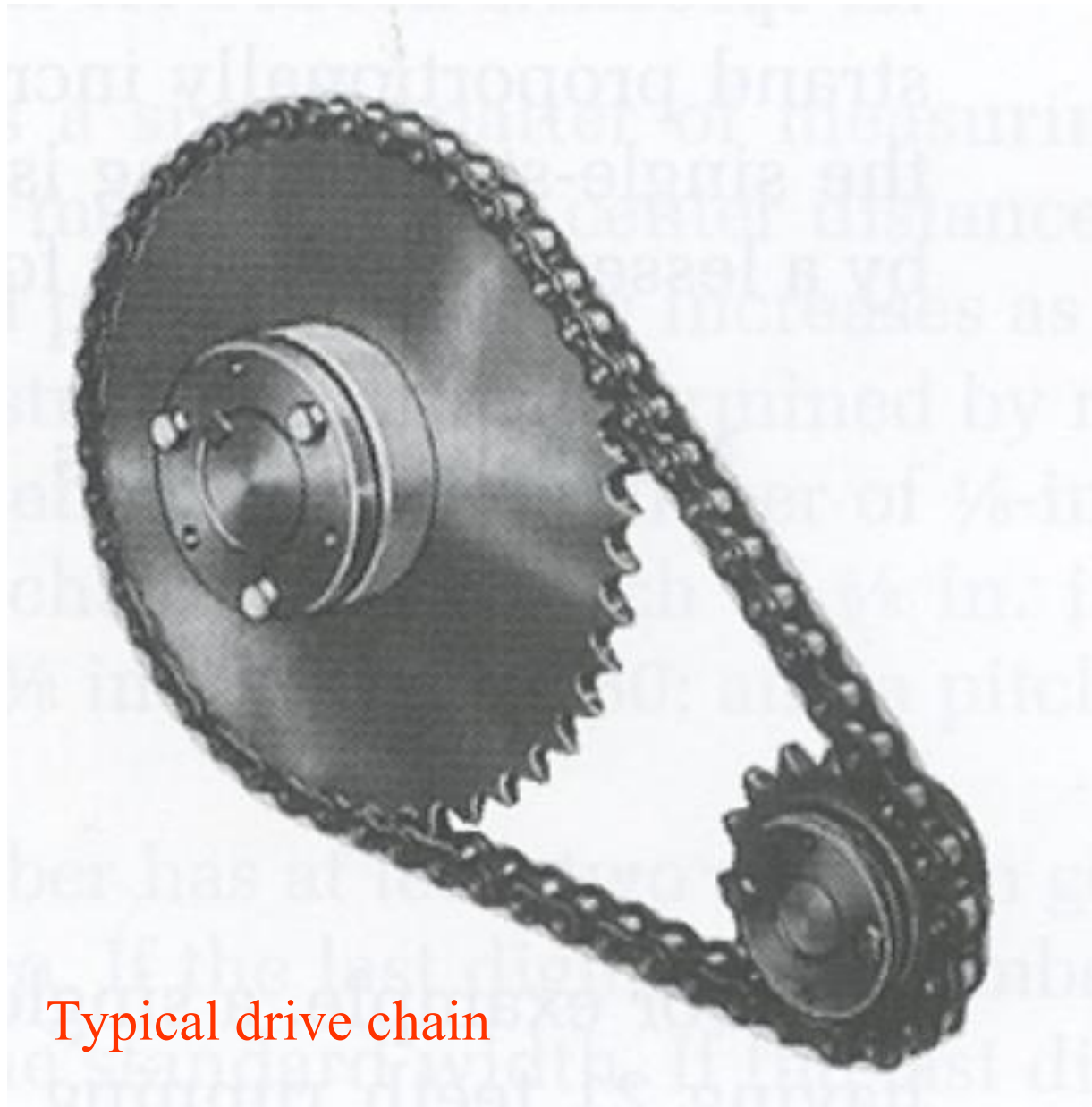


CALCULATE THE RPM OR RATIO BY IGNORING THE CHAIN



=





Typical drive chain



Drive Chain **Advantages**

- Positive drive
- No slip--no wasted energy
- More efficient than belt drives



Drive Chain **Advantages**

- Wide range of power available
- Can be used over a long distance
- Can be used in low speed, high torque applications
- Can absorb shock loads



Drive Chain **Advantages**

- Easier to remove/replace than belts
- Compact
- Somewhat flexible
- Relatively inexpensive
- Can handle heat, dirt, weather exposure (when properly lubricated)



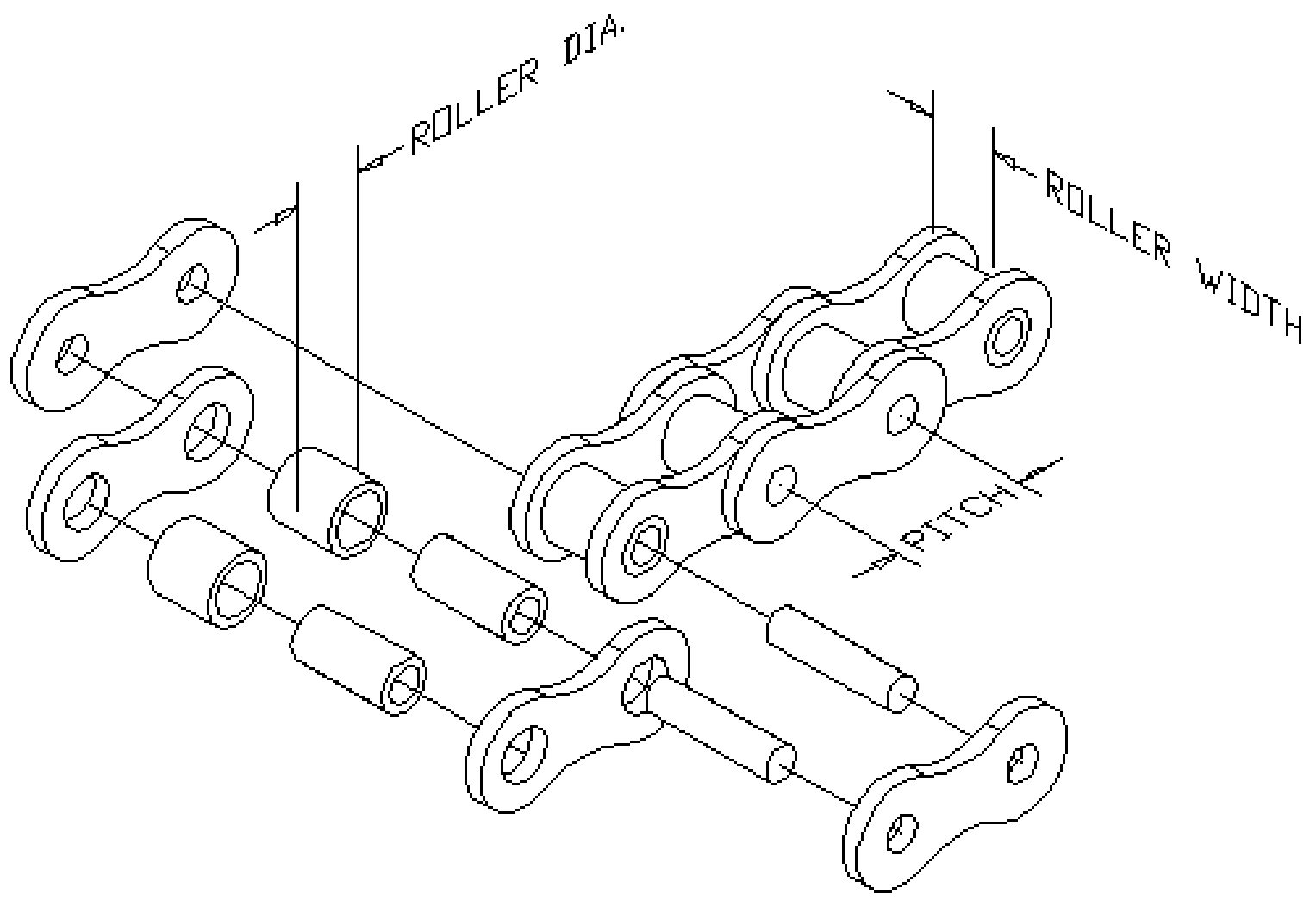
Drive Chain **Disadvantages**

- Allow very little misalignment
- Require frequent lubrication
- Are noisy
- Heavier than belts
- Can not slip



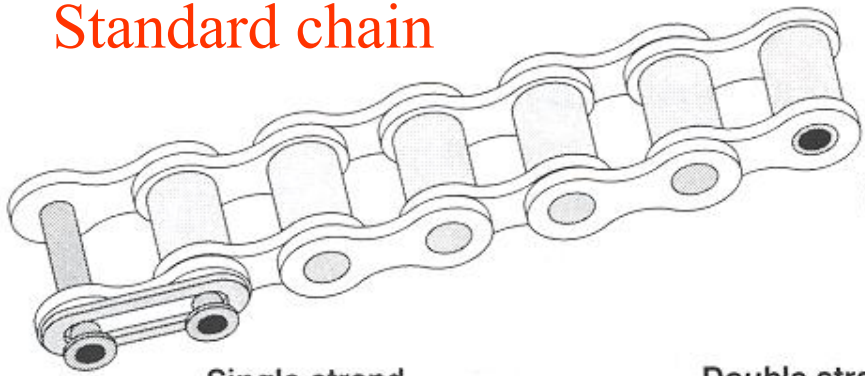
Terminology

- Sprocket
- Chain pitch
- Pitch diameter
- Ultimate strength
- Chain rating

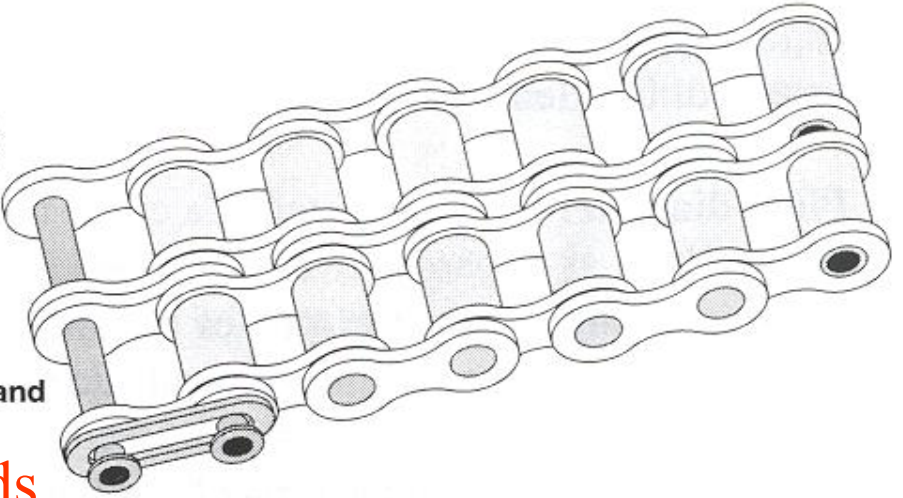




Standard chain



Single strand



Double strand

Stronger, can handle heavier loads



Roller Chains

- Most common type of drive chain.
- Standards set by ANSI.
- Have rollers that rotate on bushings.
- Makes rolling contact with the sprocket teeth rather than sliding contact, thus reducing friction and wear.
- Generally, single strand chain is used.
- High power units may use multiple strands.



Roller Chains

- Parts
- 1. Pin link plate
- 2. Roller link plate
- 3. Roller
- 4. Bushing
- 5. Pin



Pin Link Plate



Roller Link Plate



Rollers



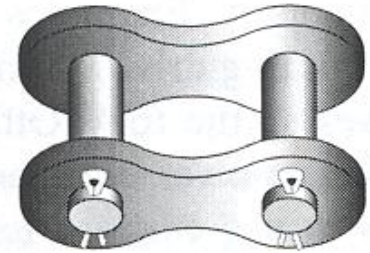
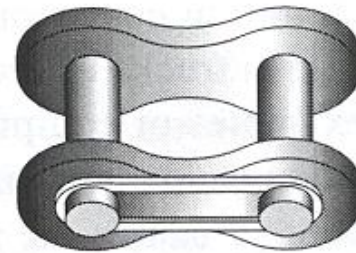
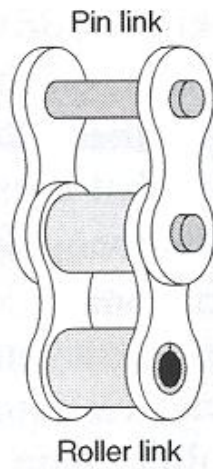
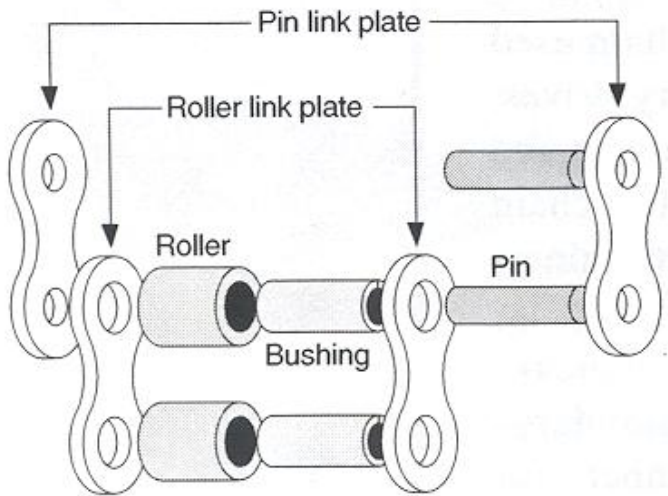
Bushings



Roller Link Plate

Pin Link Plate







Connecting Links

- Called master links
- Allow easy assembly/disassembly of the chain
- Available in full link or in half link
- (Sometimes called full pitch and 1/2 pitch)



Connecting Links



Spring Clip



Cotter Pins



Cottered and Spring Clip type connecting links are available in both slip-fit and press-fit configurations, slip-fit is the standard.

Cottered Type Connecting Link

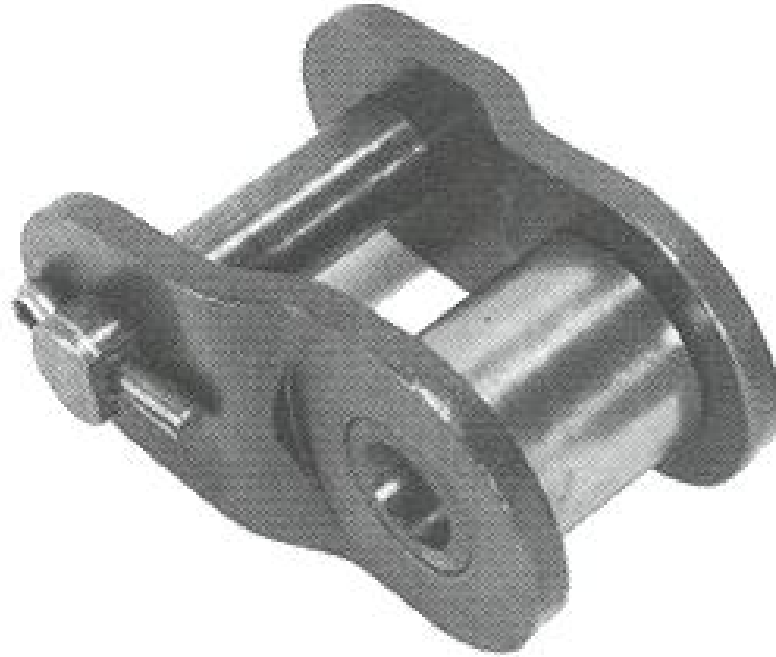


Connecting Links - Standard #60 & Smaller - Spring Clip Type #80 & Larger - Cottered Type others available upon request

Spring Clip Type Connecting Link



Half Link





Rollerless Chains

- A modification of standard roller chain
- Often used as a hoist chain but
- Can be used as a drive chain in gritty, abrasive environments
- Why????

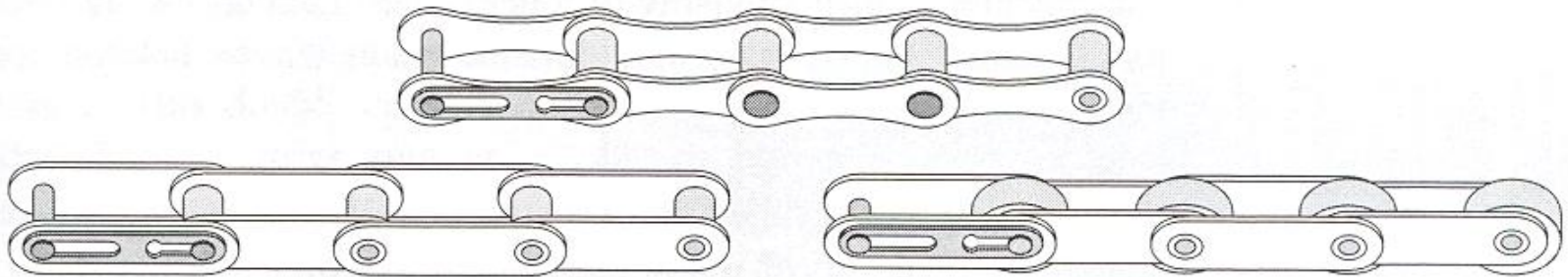


Double Pitch Chains

- The rollers are spaced twice as far apart as in the standard roller chain
- All other dimensions remain the same as for the standard chain
- For light duty applications at low to moderate speeds
- Can be used with standard or special sprockets

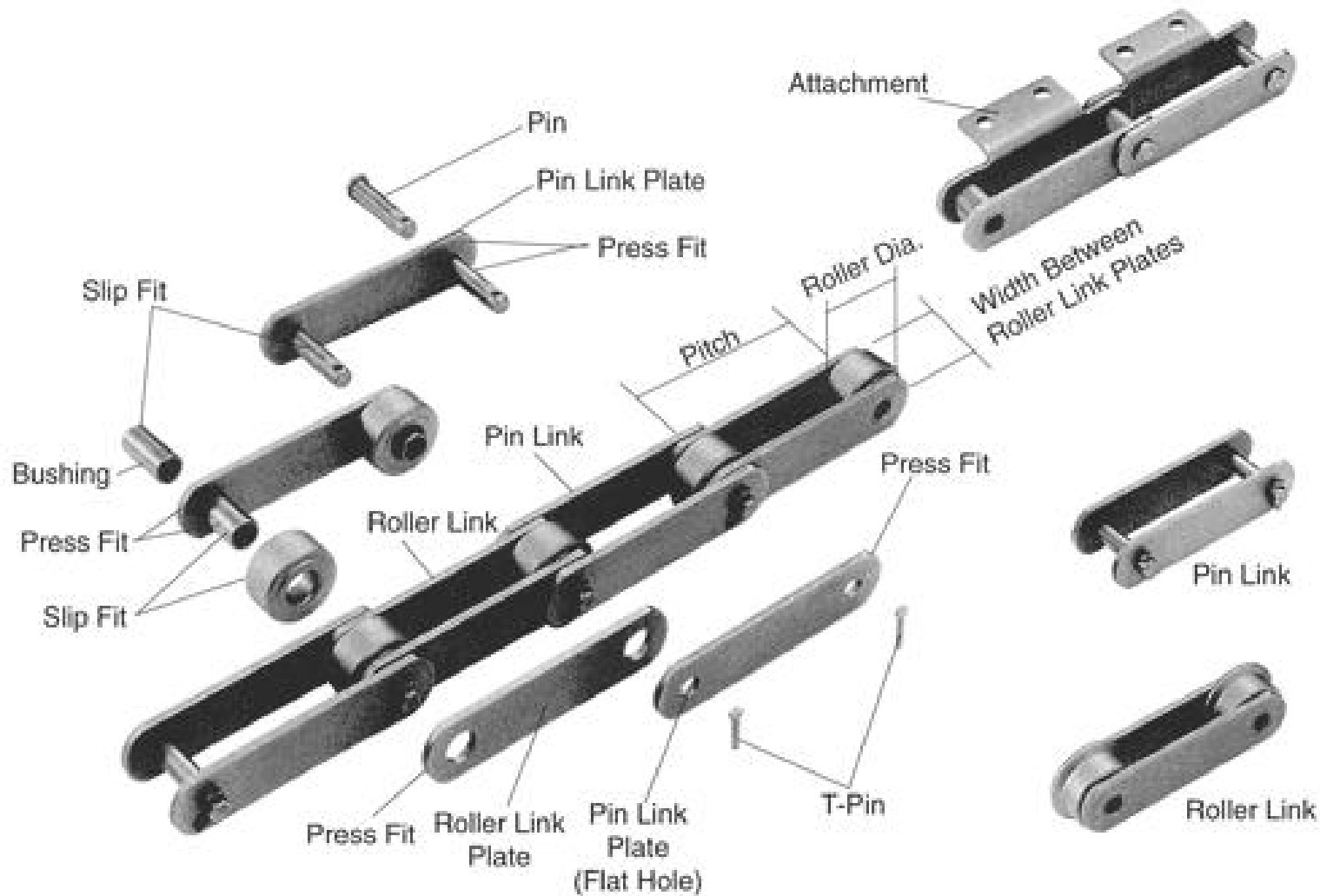


Double pitch chain





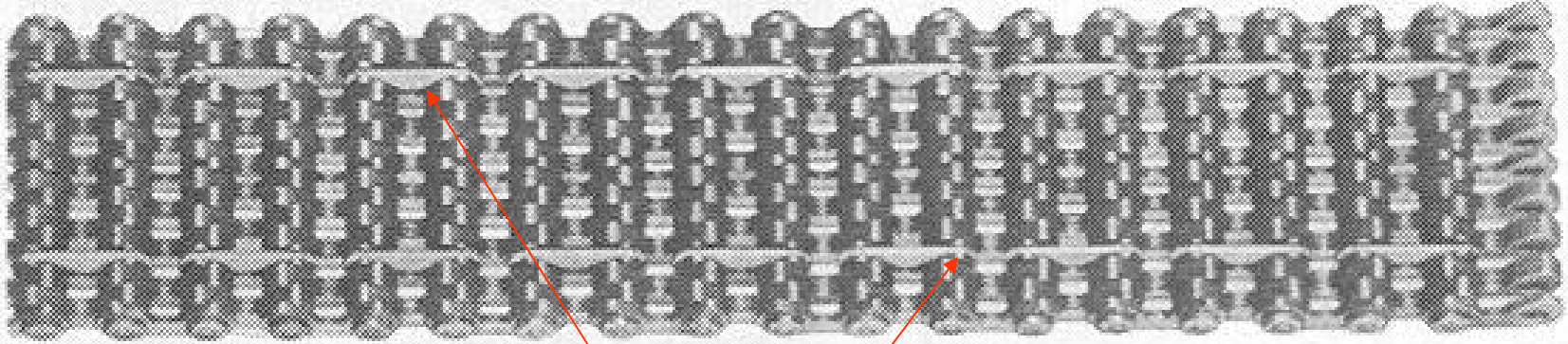
Conveyor Chain



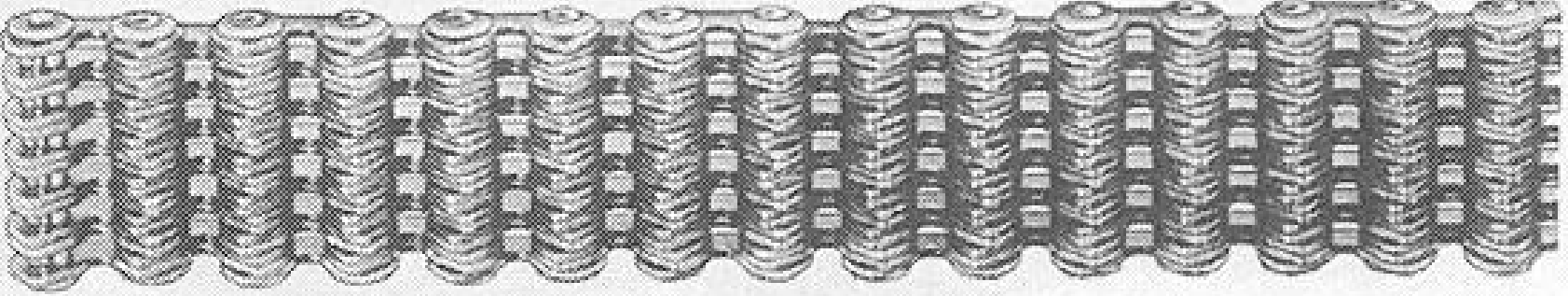


Silent Chain

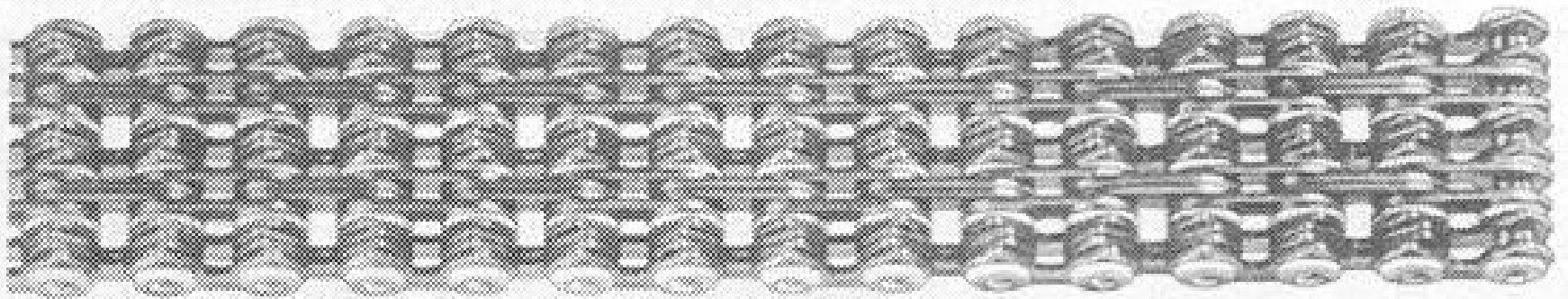
- Smooth and fairly quiet operation
- Made of heat treated high-carbon or alloy steel,
- Can be made of stainless steel
- May have a center guide plate, 2 guide plates, side-guide plates or with no guide plates
- Can be made with a tooth contour on both sides



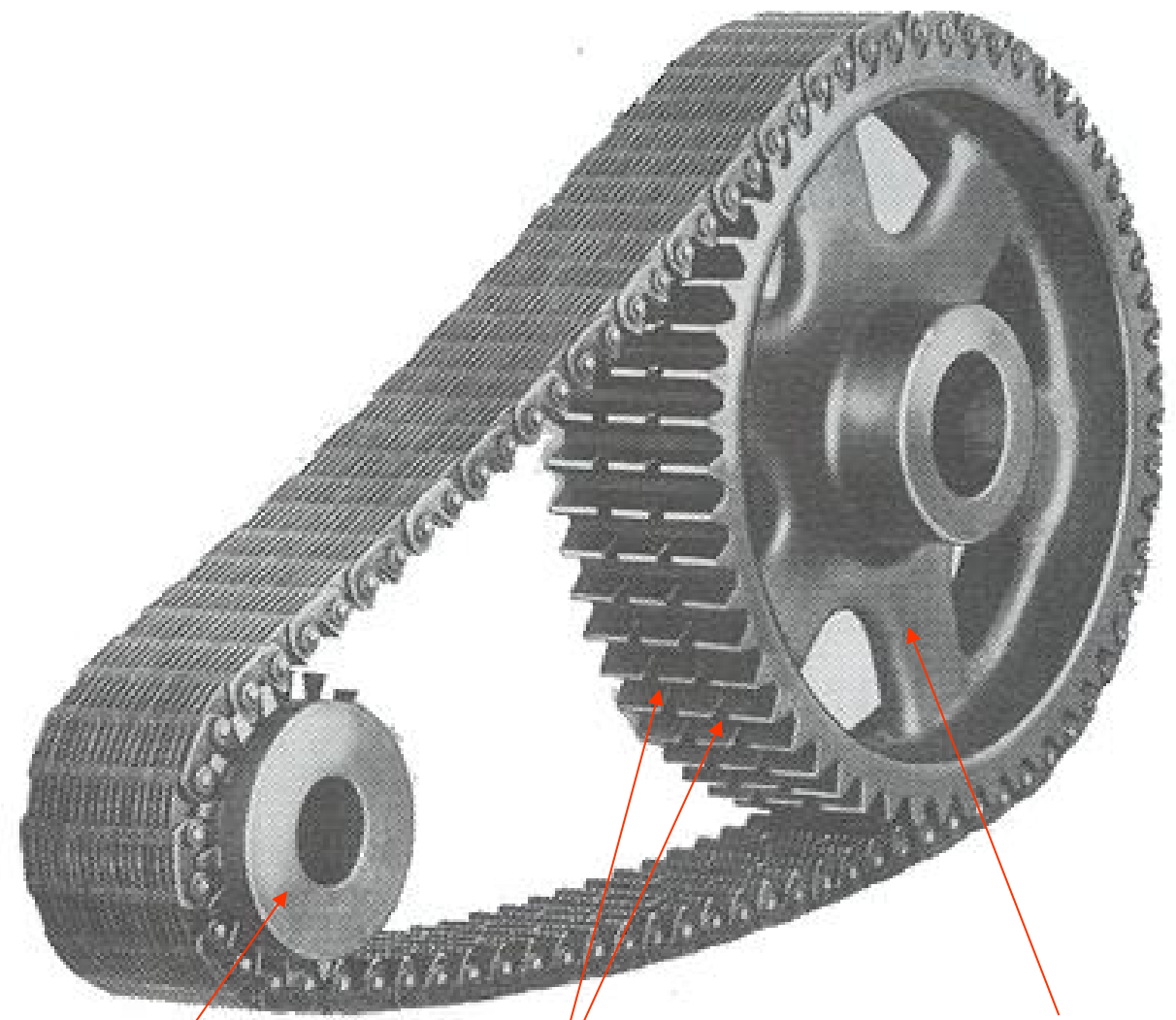
Double guide



Nonflange silent chain



Duplex silent chain



Solid sprocket

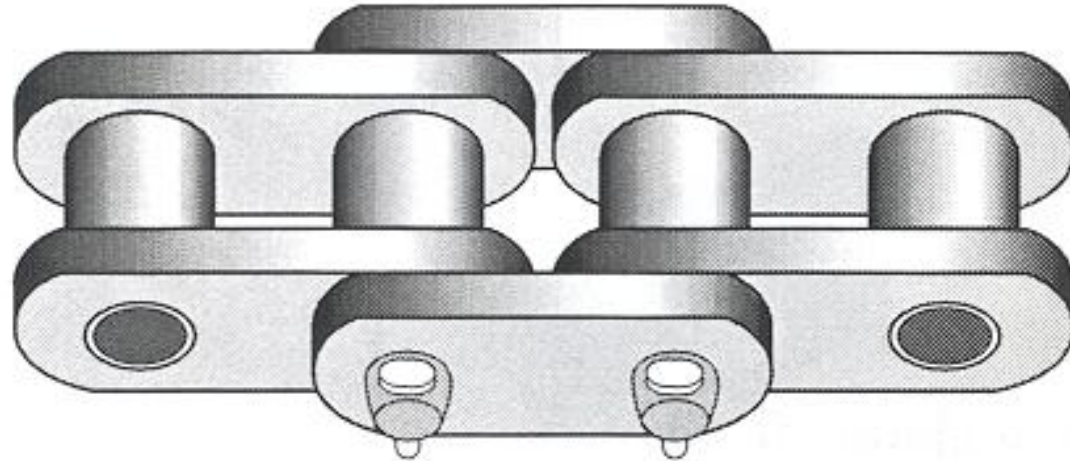
Guides

Spoked sprocket

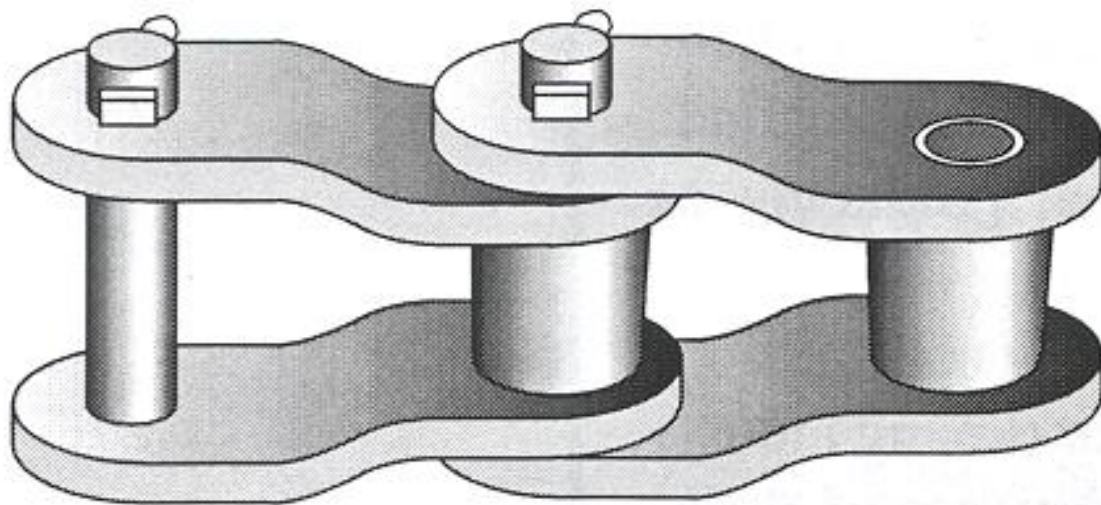


Engineering Class Chain

- Stronger, heavier chain, generally low speed applications
- Roller or rollerless
- Straight sidebars or offset sidebars



Straight sidebars



Offset sidebars



Cast Drive Chain

- Not used for high speed or where precision control is important.
- Can be a drive chain or a conveyor type chain.
- Generally made of malleable iron, which may be further processed for higher strength.
- Off-set sidebars.
- Generally, not for reversing drives.

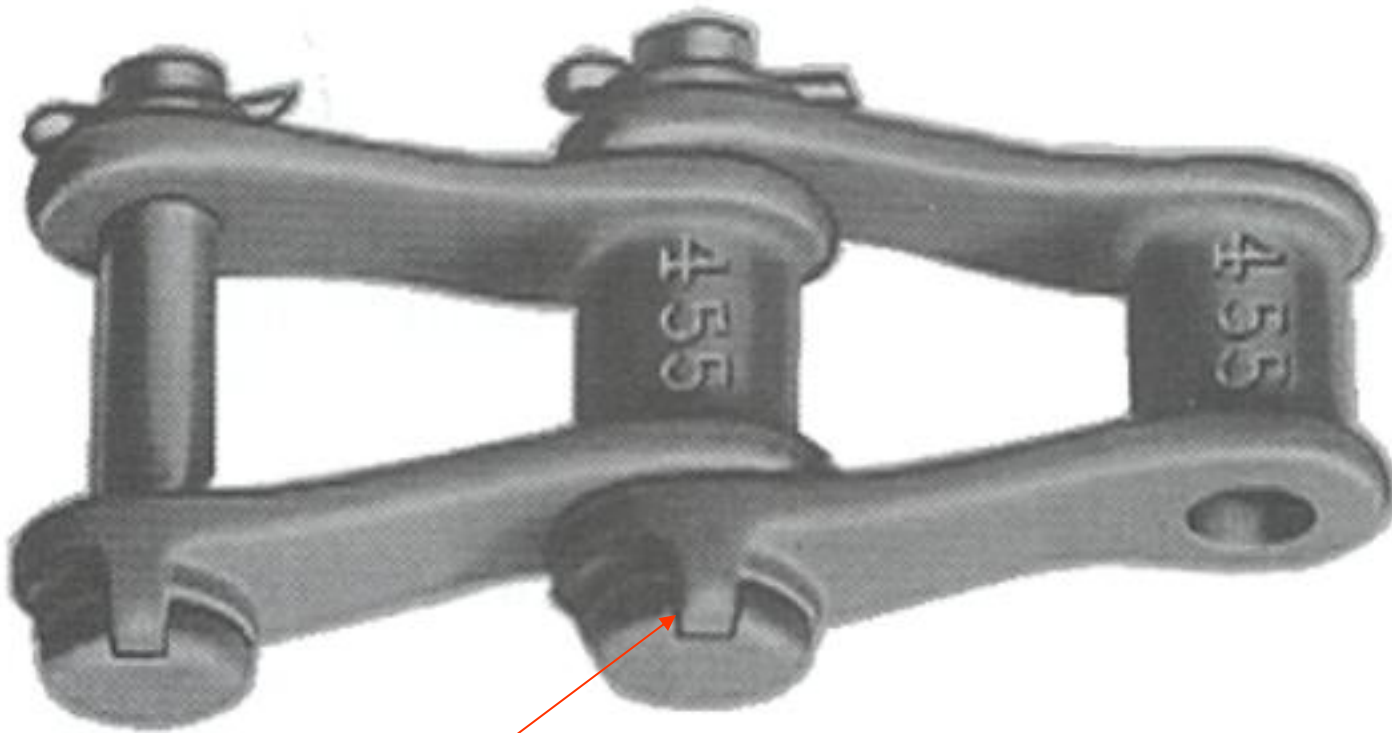


Cast Drive Chain

- Often used in nasty environments;
- 1. High moisture areas
- 2. Dirty, gritty areas
- 3. In areas with high concentrations of chemicals or corrosives
- 4. In high temperature areas



Cast chain



Pin keeper



Sprockets

- Solid or spoked
- Classes
 - A, b, c, d
- Teeth may be hardened or manufactured by the “chill mold” method which makes better wear properties in the tooth area
- May have plain bores or may use a taper hub



Sprockets

- Made of cast iron, cast steel or fabricated steel
- Drive chain sprockets require a locking device

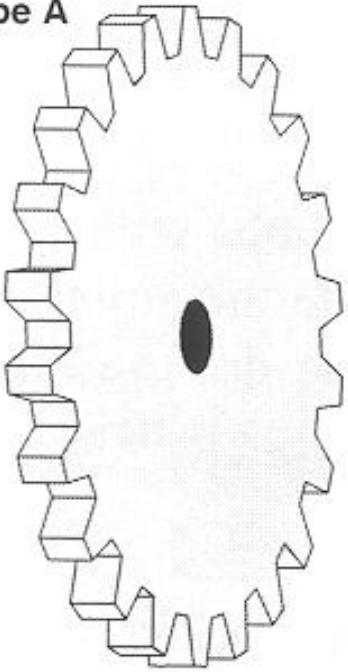


Sprockets

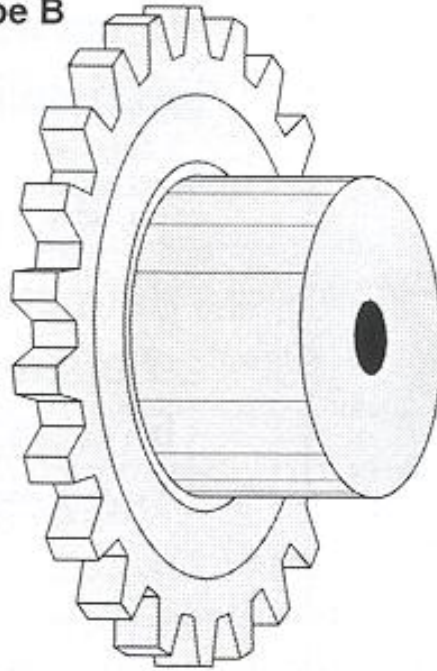
- Most common is the key-way, key and set-screws
- Double pitch chain uses either single duty or double duty sprockets



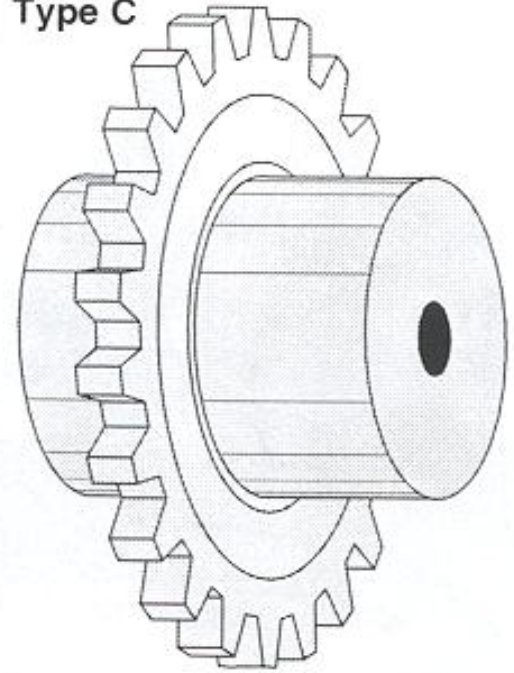
Type A

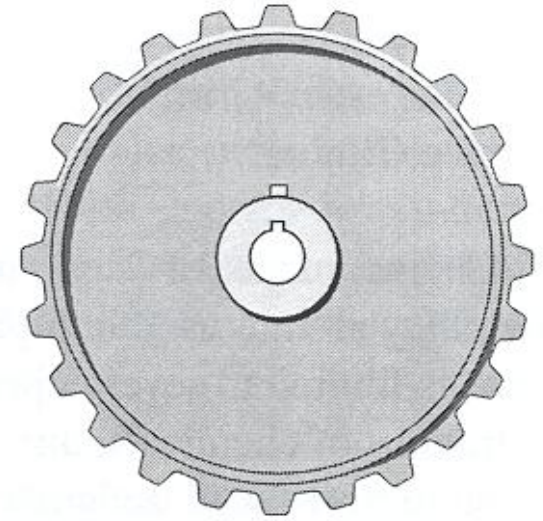
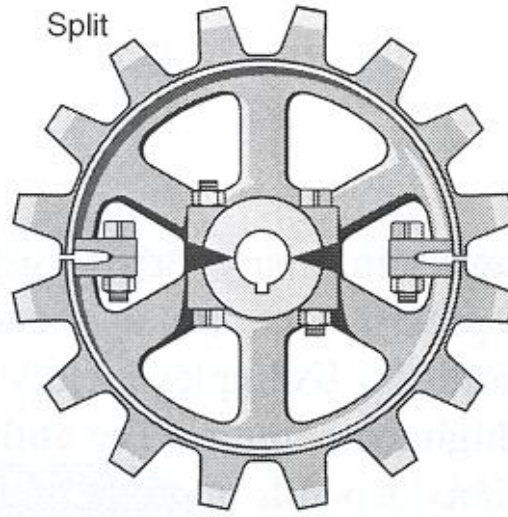
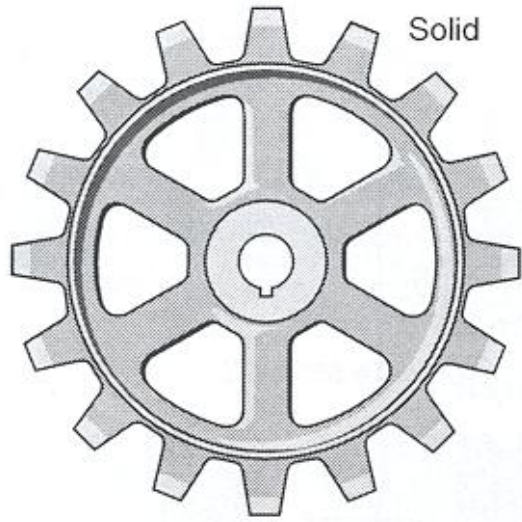


Type B



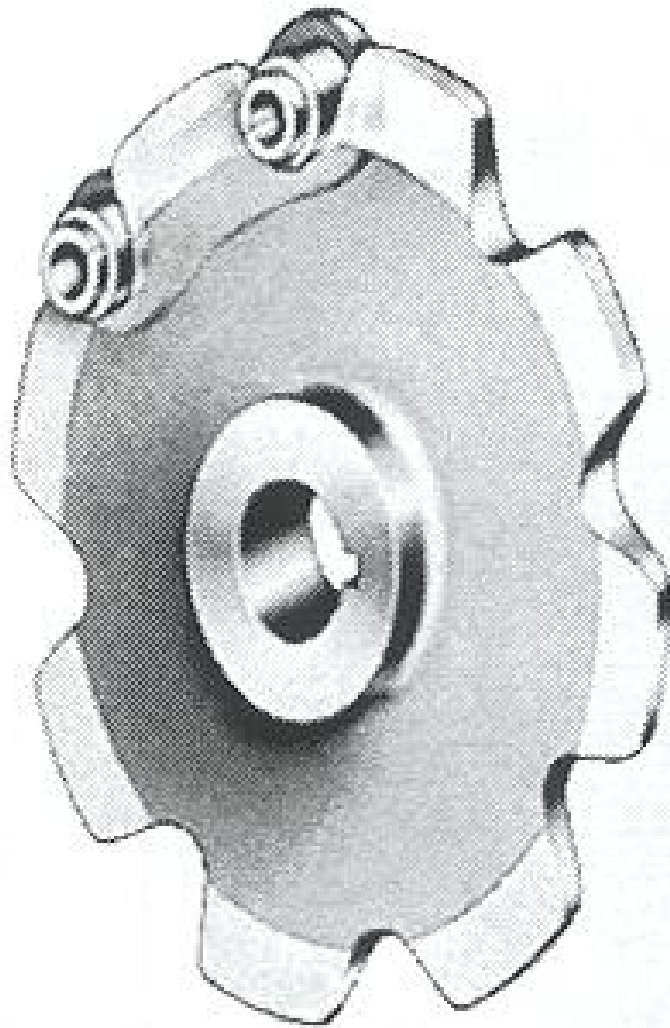
Type C



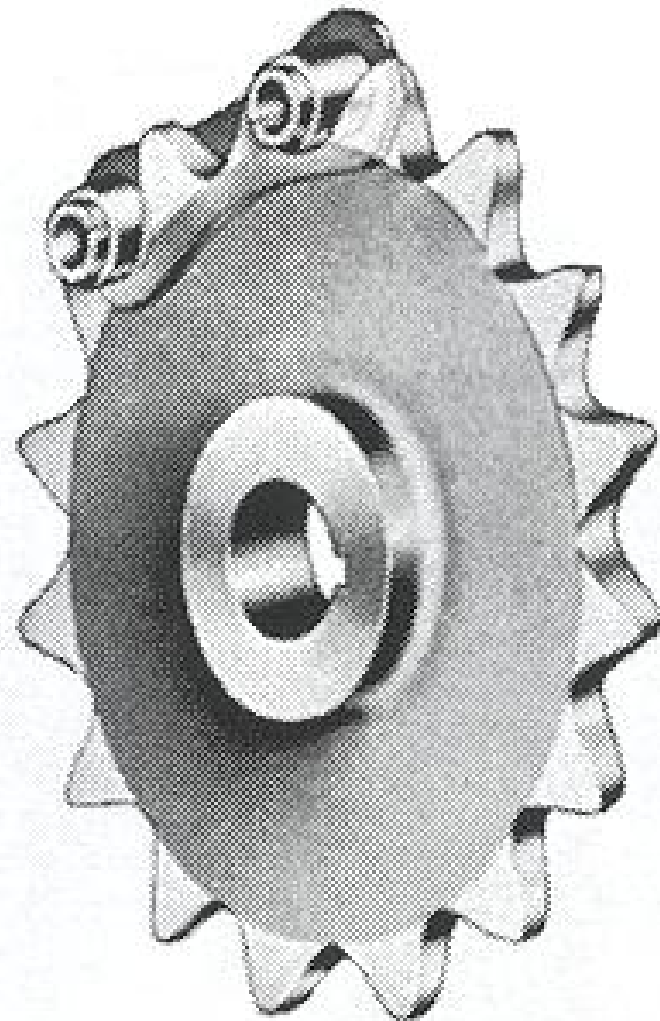


Arm types

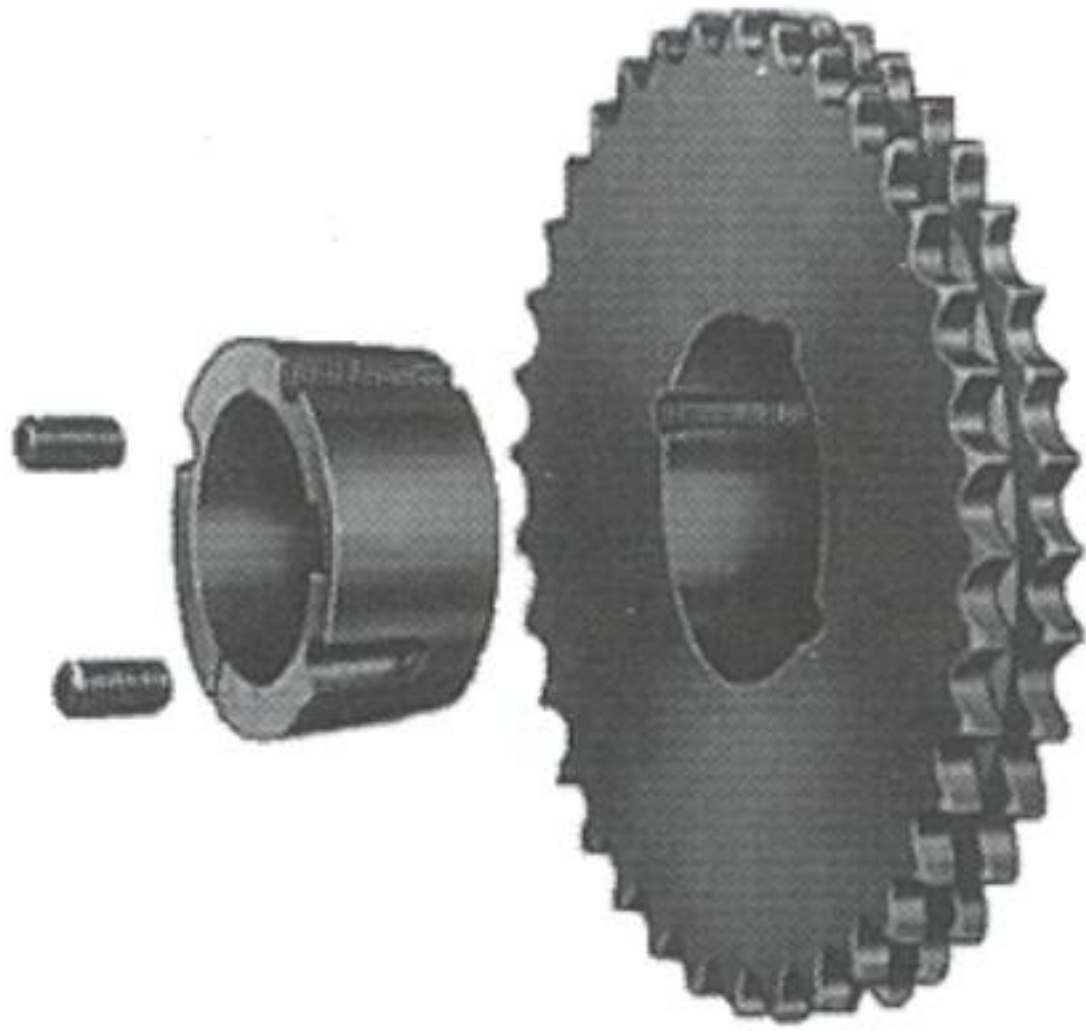
Class D sprocket



Single duty



Double duty

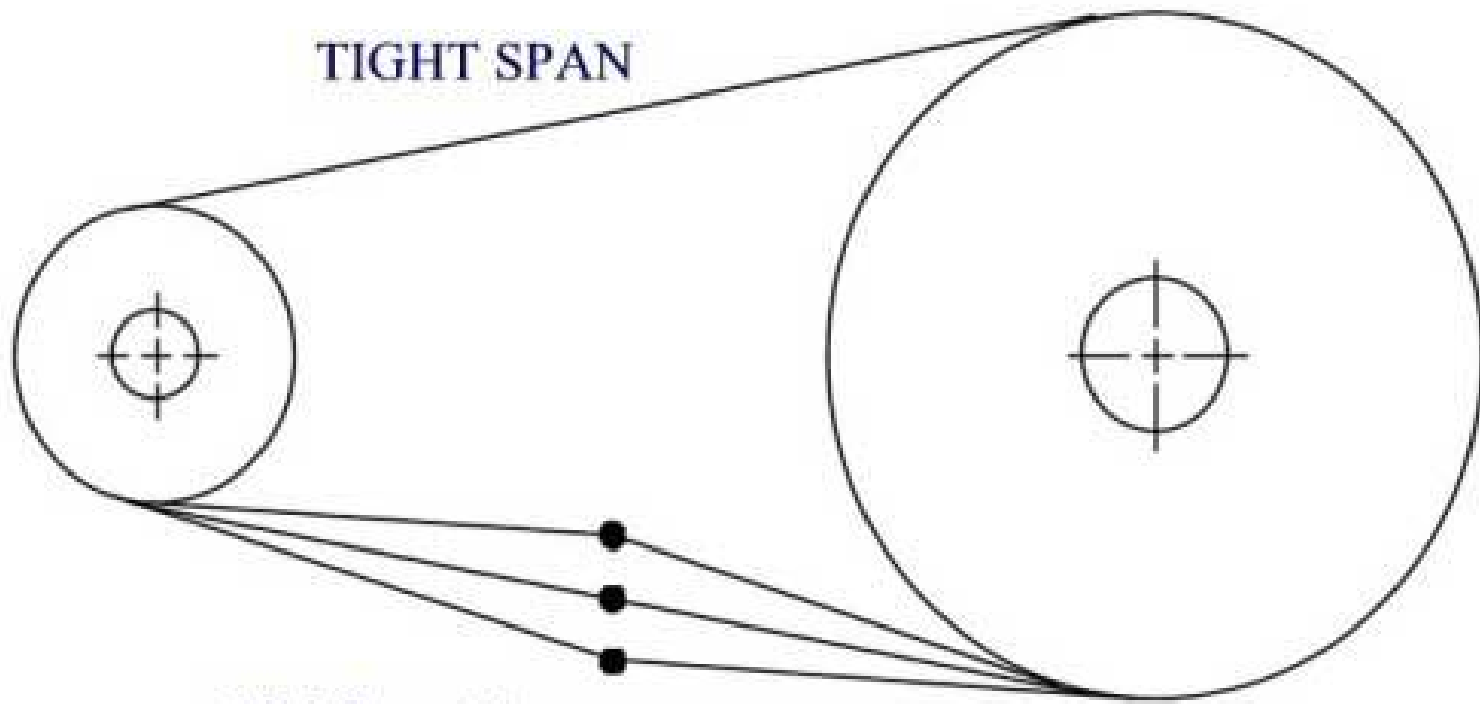






Installation

- Alignment of sprockets is critical to long life of the chain and sprockets
- Proper sag is about 1/4 inch for every 12" between the sprocket centers (2%)
- Safety guards
- Lubrication
- Periodic inspections



Mid-Span Movement

Diamond Chain Company



Chain Sag

- The proper chain tension is critical to achieving acceptable service life as excessive tension can cause accelerated wear or chain overload and excessive slack can cause rough chain operation and possibly result in the chain skipping a sprocket tooth, resulting in a catastrophic failure.



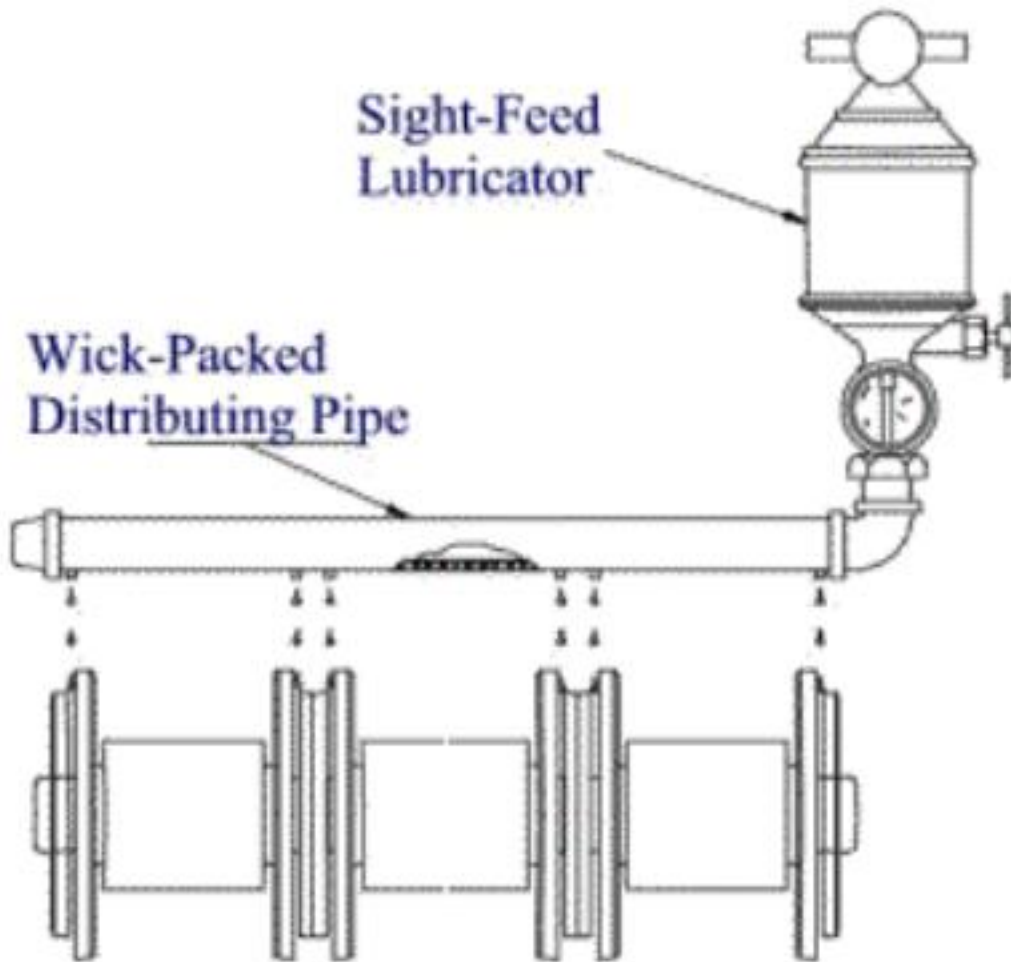
Chain Sag

- For the majority of slow and medium speed drives, the **total mid-span movement** in the slack span of the chain should be approximately 4-6% of the drive's center distance. For drives operating at high speeds, impulse or reversing loads, the total mid-span movement should be reduced to 2-3% of the center distance.



Chain Sag

- Drives with vertical centers should also be adjusted to the smaller percentage. If the drive is designed to incorporate shaft adjustment or an idler, the amount of movement or "take-up" should always allow for the removal of two pitches of chain.

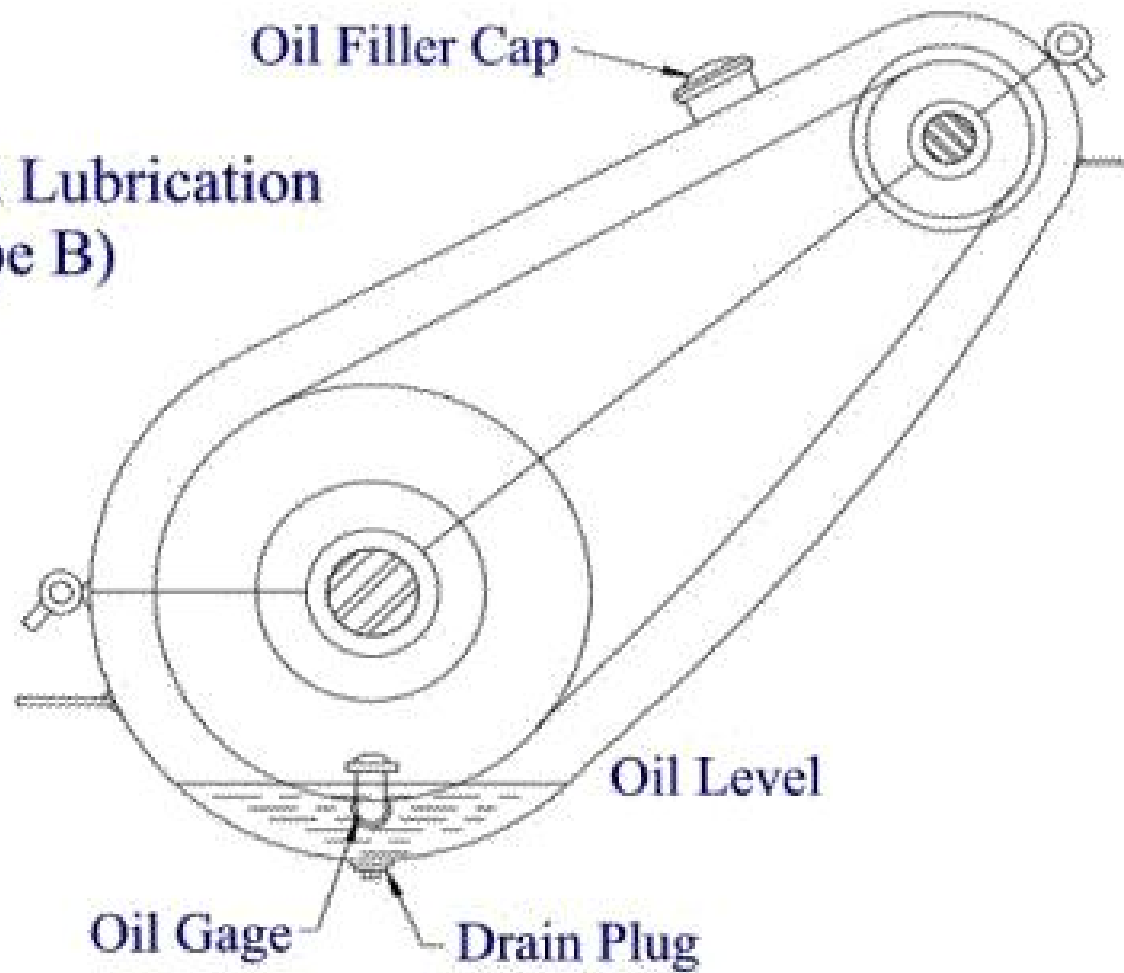


Drip Lubrication (Type A)

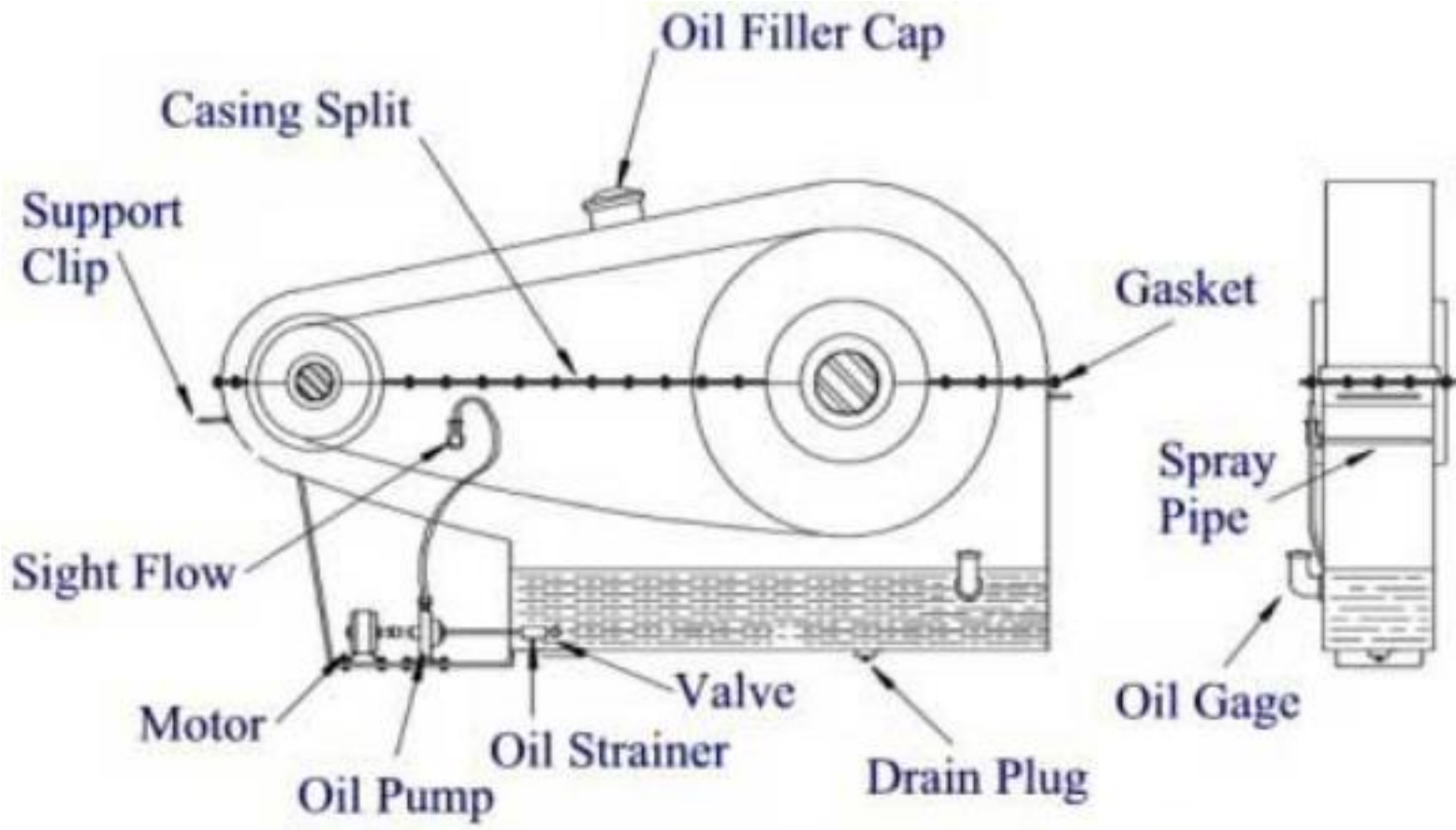
Diamond Chain Company



Bath Lubrication (Type B)



Diamond Chain Company



Forced or Circulated Lubrication (Type C)

Diamond Chain Company

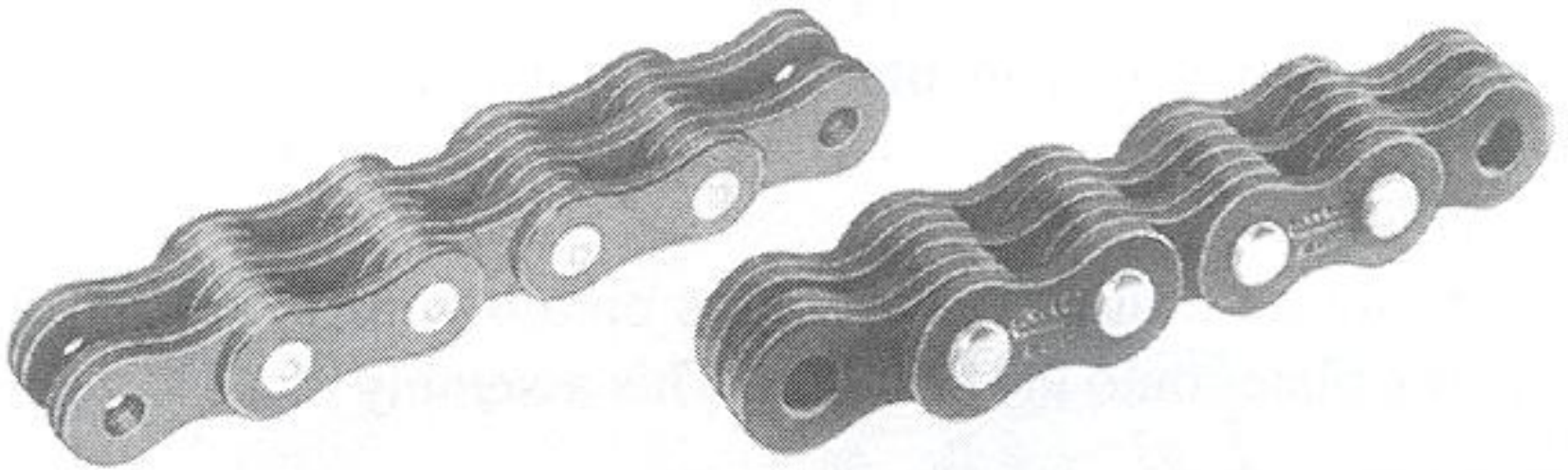


Leaf Chains

- Are not used as drive chains
- Used in forklift trucks and hoisting devices
- A modification is the wrench chain used in pipe vices and chain wrenches



Leaf Chain





Wrench Chain





Safety

- Lock out/tag out.
- Watch for sharp edges or teeth on worn sprockets.
- Do a finger count.
- No loose clothing.(Long sleeves, ties, shirt-tails.).
- Tie back long hair.



Lock out/tag out





The End!!!!