

Hytrol's ABC Conveyor Book

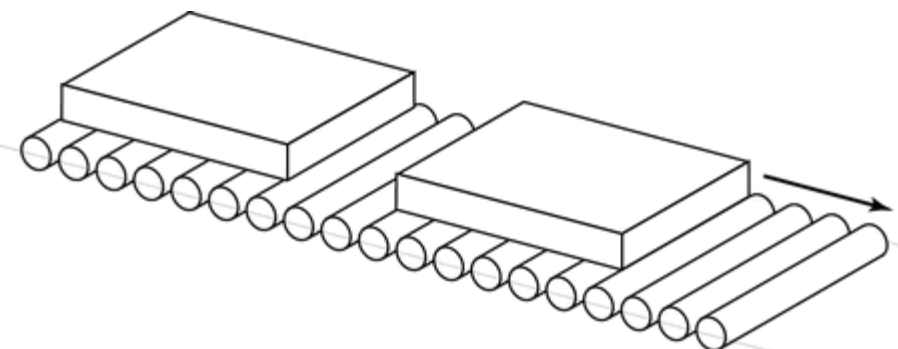


WHAT IS A CONVEYOR?

A conveyor moves material.

A conveyor moves cardboard boxes, wood boxes, metal boxes and plastic boxes.

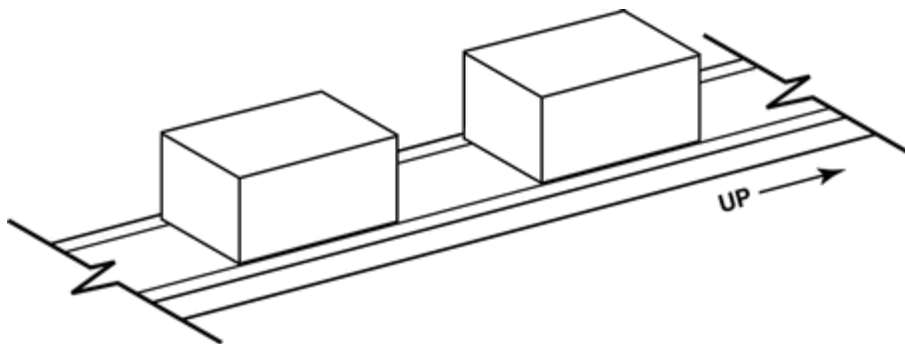
A conveyor can move material



BY GRAVITY

This is called a GRAVITY CONVEYOR.

A conveyor can do more. It can move boxes UP against gravity . . . DOWN . . . or HORIZONTAL on a moving belt.

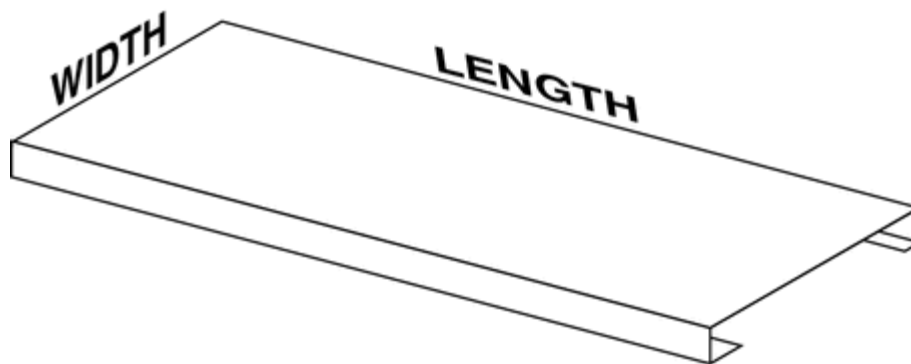


The belt is moved by electric power.
This is called a BELT CONVEYOR.

WHAT IS A BELT CONVEYOR?

It is a machine with a moving BELT.
The machine is made with these parts:

A BED

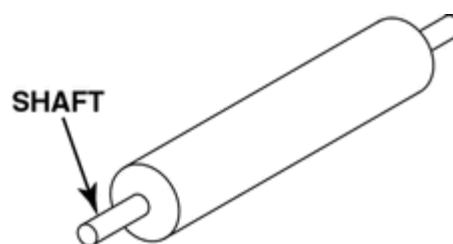


This is a conveyor bed.
It comes in many sizes-many lengths-many widths.

A PULLEY

A pulley is like an IRON pipe.
Pulleys are put on each end of the bed.

The pulleys are as wide as the "bed".
Each pulley has a steel shaft through it.



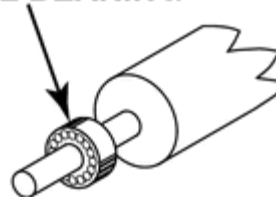
The shaft turns on a bearing . . . and the pulley turns with the shaft.

WHAT IS A BEARING?

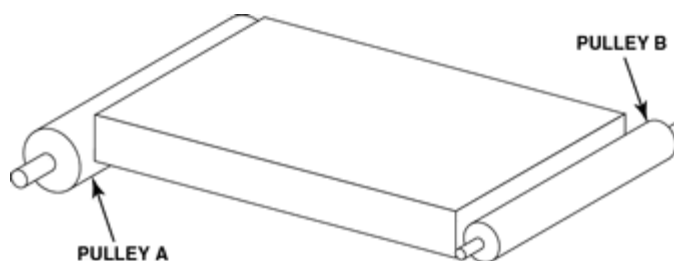
When two pieces of steel touch each other; they cannot turn easily without bearings.

Bearings use little steel balls to keep the pulley shaft and the conveyor bed from rubbing together.

BALL BEARING



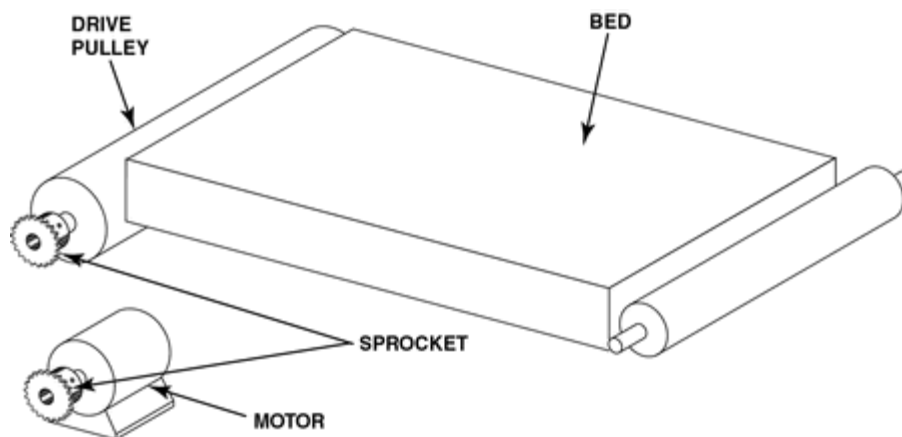
Now the shaft can turn easily.



Pulley "A" is the drive pulley.
Pulley "B" is the tail pulley.
The drive pulley is usually larger because it does the work.

HOW THE DRIVE PULLEY DOES THE WORK

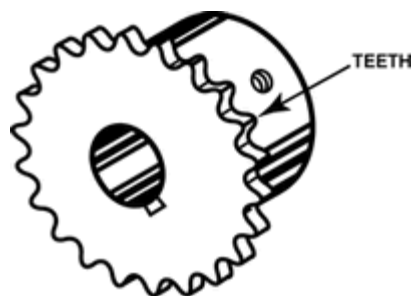
The drive pulley is turned (driven) by a motor. A sprocket is put on the drive pulley shaft.



A sprocket is put on the motor.

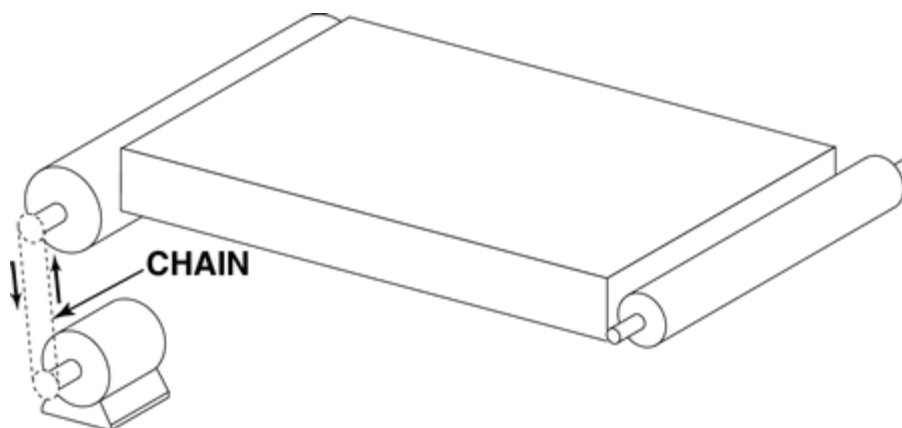
WHAT IS A SPROCKET?

A sprocket is a metal "wheel" with "teeth" on the outside.



HOW THE DRIVE PULLEY IS "DRIVEN"

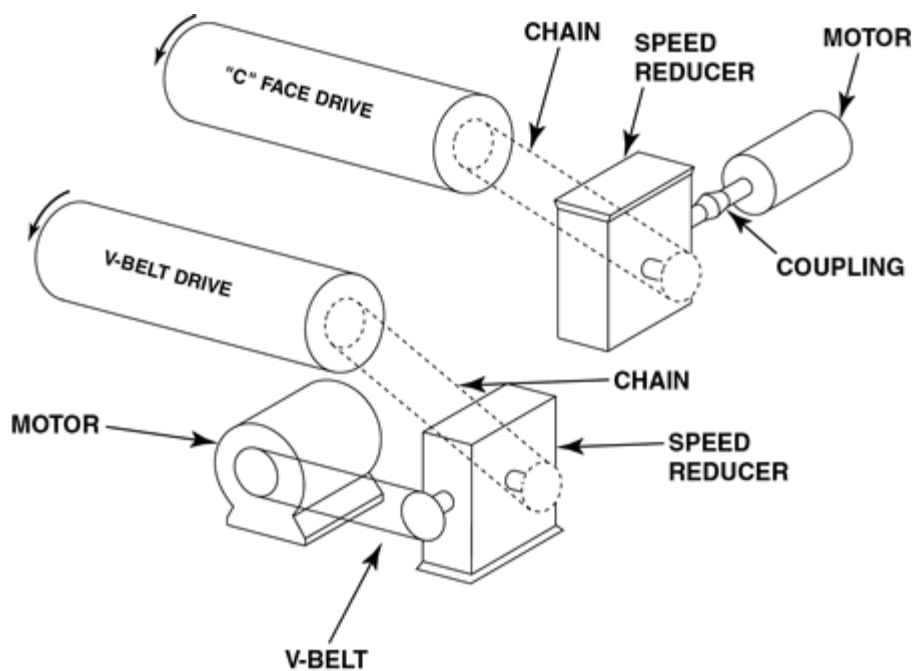
A chain is put around the Drive Pulley Sprocket and the motor sprocket.



The chain moves when the motor is started.
The chain turns the drive pulley.

BUT ! . . .

Because a motor turns very fast (1750 times per minute). . .
A SPEED REDUCER must also be used.
The SPEED REDUCER is put between the motor and the drive pulley.



. . . The motor is connected to the reducer with a V-Belt (like the fan belt in your car) or a "C" Face Coupling.

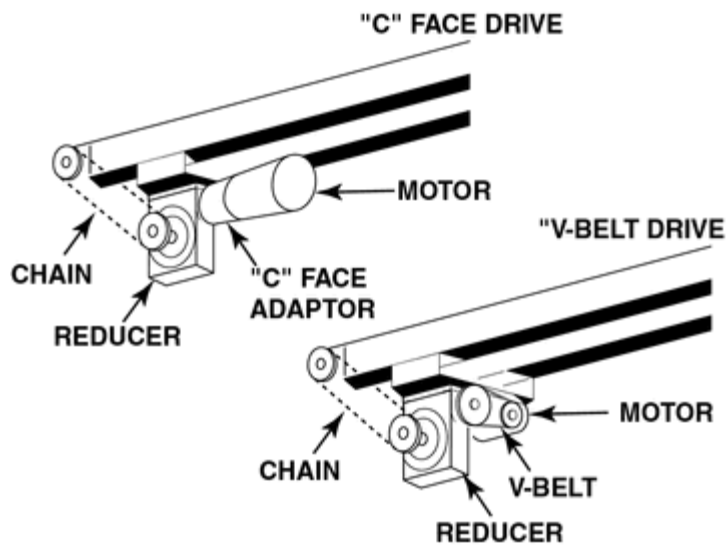
The reducer is connected to the drive pulley with a chain . . . Now the Drive Pulley turns slower.

All those parts (the motor, the speed reducer, and the drive pulley) are called:

THE CONVEYOR DRIVE

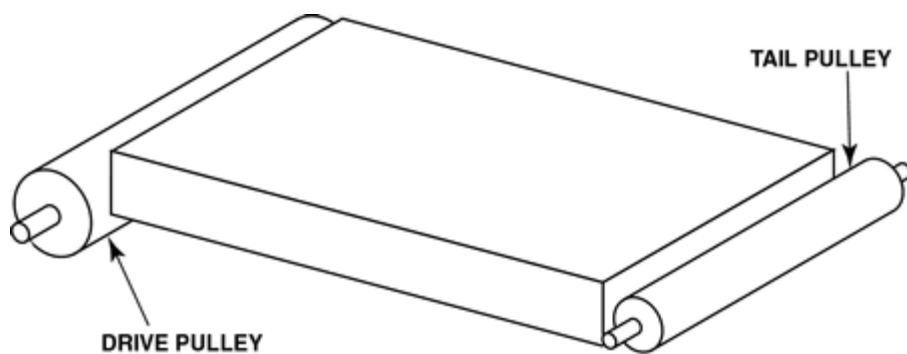
They must be put together to take up as little space as possible - so

The motor and reducer are put under and within the conveyor BED.



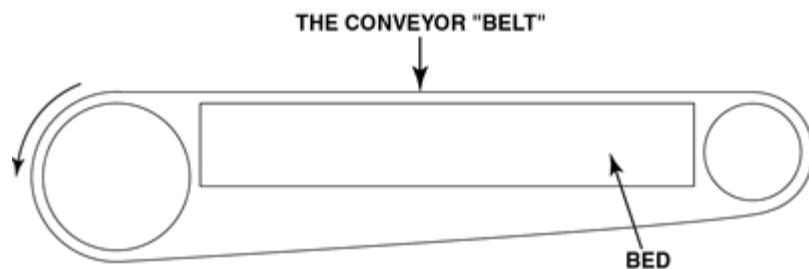
But what about the

TAIL PULLEY?



The tail pulley is located at the tail end of the conveyor and it turns freely.

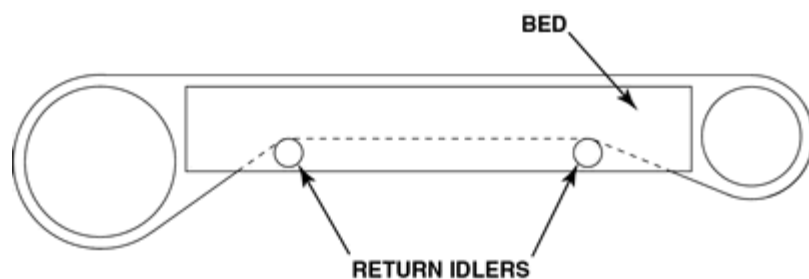
Now a "belt" can be put around the pulleys.



The Drive Pulley turns and moves the belt around . . . and around . . . and around.

BUT . . .

. . . it is dangerous to have the belt hang down under the conveyor bed - So small rollers are put into the Conveyor Bed to hold up the belt.

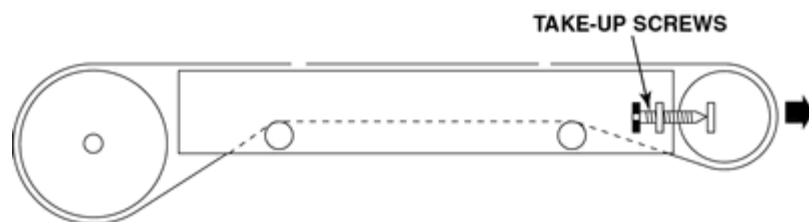


These turn freely -- and just idle.
They are called "Return Idlers".

SOME TYPES OF BELTS STRETCH MORE THAN OTHERS

What to do?

1. Move the tail pulley! It can be moved to "take-up" the belt stretch.

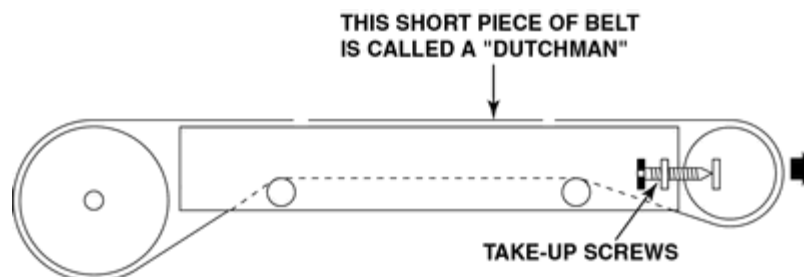


There are "take-up" screws on **both** sides of the conveyor.

Move these screws out slowly.
 Move them **the same amount on both sides!**
 This keeps the belt tight.

2. What do you do when the take-up screws are still all the way out - and the belt still stretches?

LONGER CONVEYORS ARE PROVIDED WITH ONE OR MORE SHORT PIECES OF BELT ADDED.



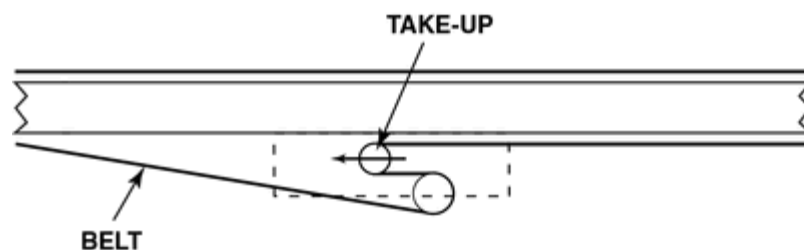
REMOVE THE SHORT PIECE(S) OF BELT.

Now you can start the "take-up" procedure all over again.

NOTE: If a "Dutchman" was not provided, you may need to add an **UNDERSIDE TAKE-UP** to your conveyor.

HOW TO GET MORE BELT TAKE-UP

There is more belt stretch on a long, long conveyor than the regular take-up and dutchman will give. So an "Underside Take-Up" should also be used.



WHEN TO USE UNDERSIDE TAKE-UP?

ON CONVEYORS 60 FT. LONG (OR MORE)

NOTE: AN **UNDERSIDE TAKE-UP** is often used when the overall length of conveyor cannot be changed and the **TAIL PULLEY "take-up"** cannot be used.

HOW CONVEYORS ARE MADE TO DO A BETTER JOB

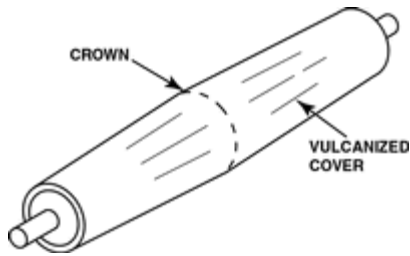
1. BELT MOVES AT SPEED OF 65 FEET PER MINUTE (FPM)

This is best speed to move objects from one place to another.

A person can walk about 4 miles per hour. If they were carrying a box they would walk much slower. Conveyors move boxes at about the

same speed as a person carrying them. This is about 65 feet per minute (or about 3/4 of a mile per hour).

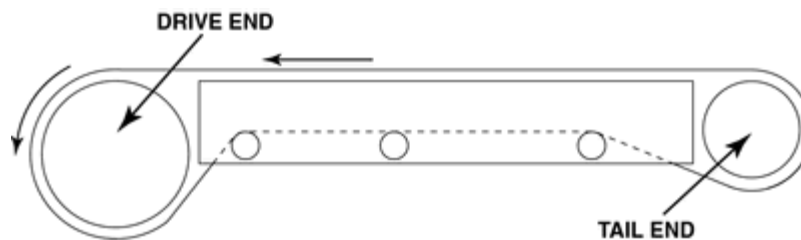
2. DRIVE PULLEY IS CROWNED AND LAGGED.



A. The drive pulley is larger in the center than the ends. This helps keep the belt in the center. This is called a "Crown".

B. The drive pulley is completely covered with vulcanized rubber. It is called "lagging". This keeps the pulley from slipping under the belt.

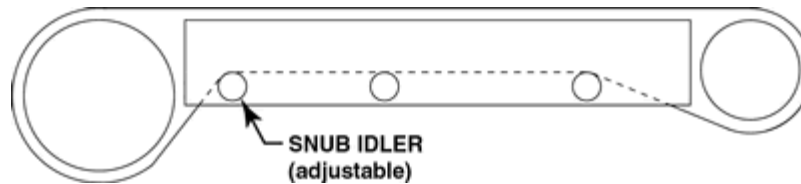
3. THE CONVEYOR DRIVE IS NORMALLY LOCATED AT THE END TO WHICH THE BELT MOVES.



SO A DRIVE PULLEY "PULLS" THE BELT.

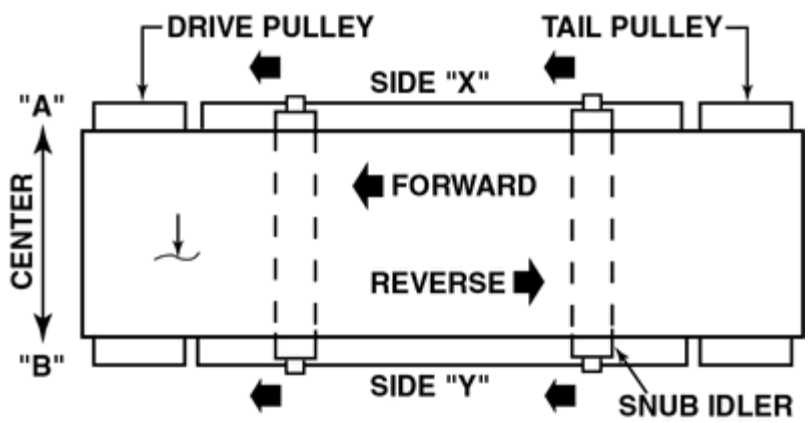
NOTE: If the belt movement were reversed, the pulley would be pushing the belt. When the conveyor was fully loaded or when the belt stretched, the pulley could turn and not move the belt.

4. THE SNUB IDLER



The Snub Idler is closer to the drive pulley. It makes the belt hug more of the drive pulley surface. The Snub Idler is **ADJUSTABLE**. It is **ADJUSTABLE ON BOTH SIDES** of the conveyor. (Each side of snub idler can be adjusted independently). Reason - The Snub Idler is used to steer the belt.

5. HOW TO "STEER" THE BELT

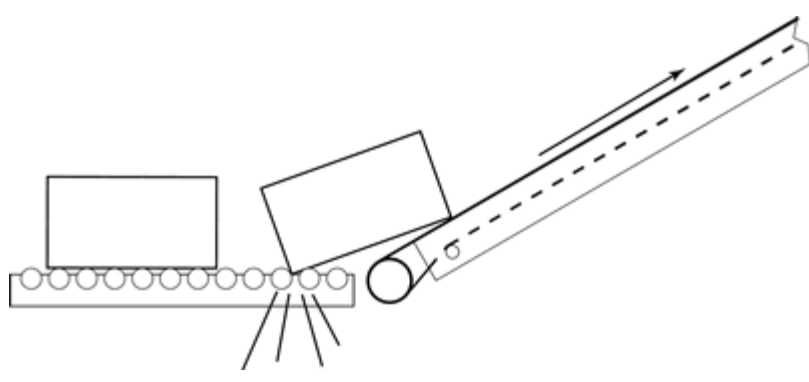


- When belt runs forward and if it moves toward side "A" - move return idler nearest tail pulley on side "Y" toward "B". If belt moves toward side "B" - move return idler on side "X" toward "A".
- When belt runs in reverse and if it moves toward side "A" - move snub idler on side "X" toward "A". If belt moves toward side "B" - move snub idler on side "Y" toward "B".

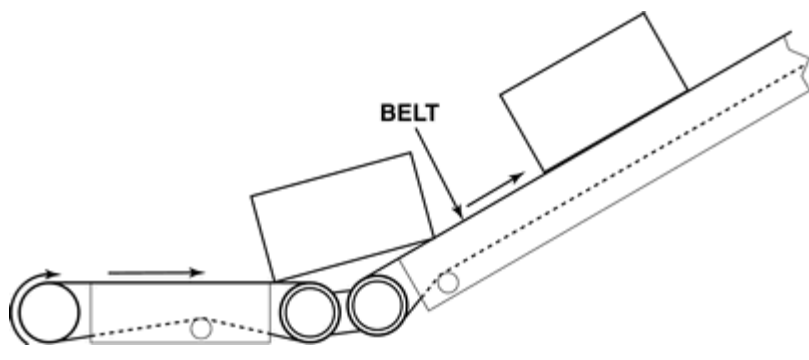
IMPORTANT: Move snub idler or return idler only 1/16 in. at a time. Then wait a few minutes to see if belt moves back to center. Only small adjustments are usually necessary.

6. POWER FEEDER (Used with incline Belt Conveyors)

A. When boxes move from gravity conveyor to inclined belt conveyor, the box usually stops or "hangs up". The box will not transfer.



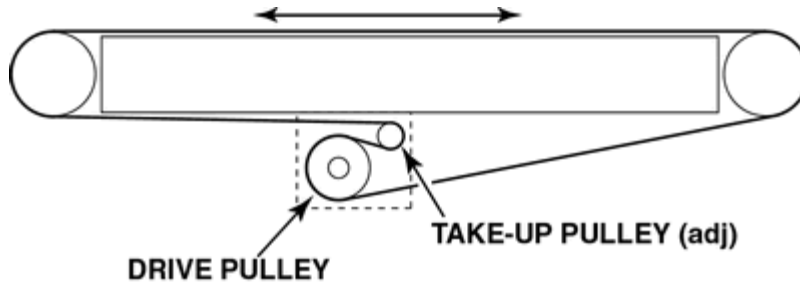
B. With a Power Feeder, transfer of the box is positive.



The Power Feeder is driven from main conveyor by a short chain connection.

7. CENTER DRIVE (Used with Horizontal Belt Conveyors)

- A. When belt movement is REVERSIBLE (on conveyors 40 ft. long or more)
- B. When overall length of conveyor cannot change (belt take up by tail pulley increases conveyor length)



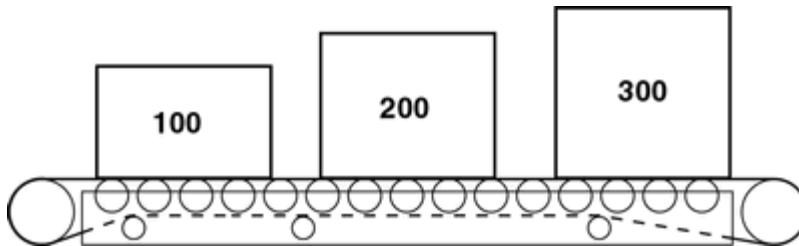
CENTER DRIVE SHOULD BE USED

Because:

- A. Drive pulley now "pulls" belt in either direction
- B. Take-up pulley can now be used to take-up belt.

8. ROLLER BED CONVEYORS

When heavy total loads must be moved, it is best to use a conveyor bed with rollers (instead of regular conveyor bed).



This is a Roller Bed belt conveyor

Heavy total loads can be moved without using large motors when a **ROLLER BED** belt conveyor is used.

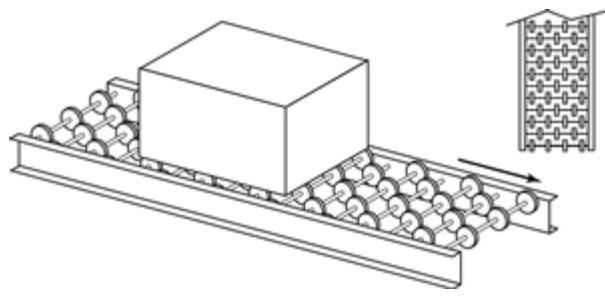
BELT CONVEYORS are often used with **GRAVITY CONVEYORS**.

You should know about **GRAVITY CONVEYORS TOO!**

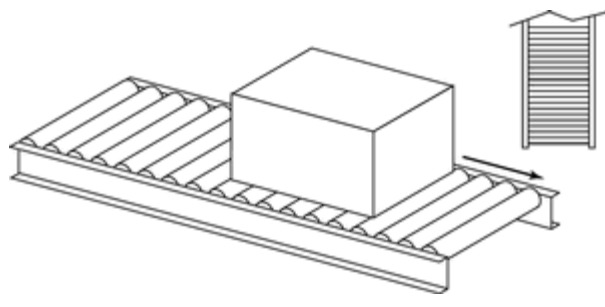
WHAT IS A GRAVITY CONVEYOR?

A gravity conveyor moves objects without motor power.

To help objects move "easier" . . . and with as little slant or slope as possible -



WHEELS OR . . .

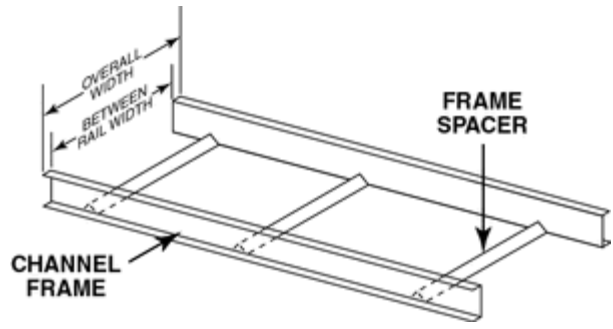


ROLLERS . . .

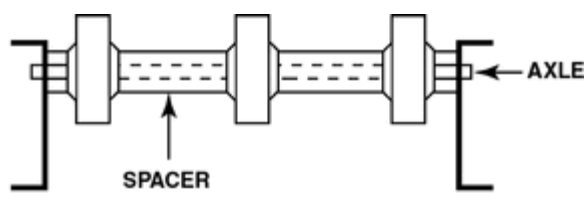
ARE USED

The WHEELS or ROLLERS are put into channel frames held together with "bed spacers."

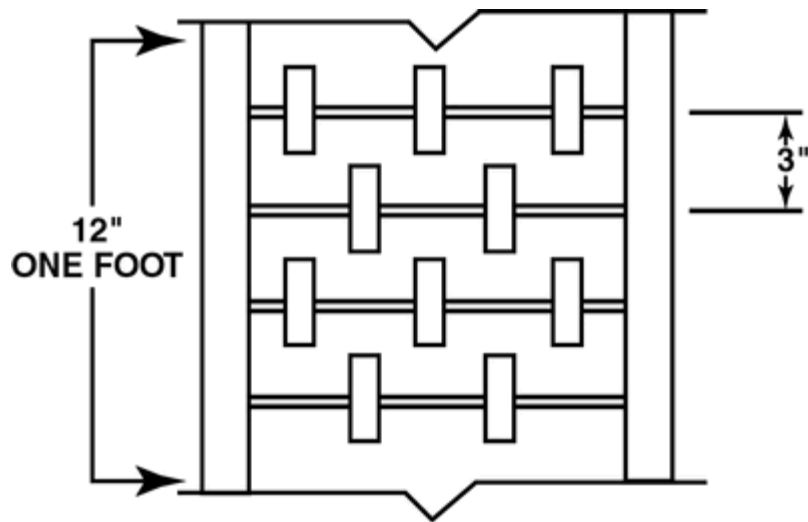
Different widths can be made. Frames can be either STEEL or ALUMINUM.



WHEEL CONVEYORS



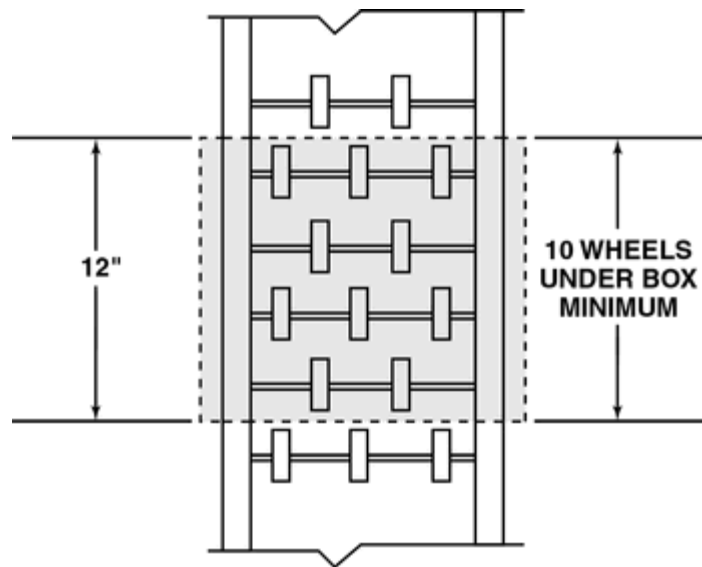
Wheels are put on axles. Aluminum spacer tubes are put on the axle between the wheels. This keeps wheels from moving from side to side on the axle.



In the drawing above, the axles are on 3 in. centers (also available in 1-1/2 in. centers). The number of wheels on each axle can vary. This determines the number of wheels per foot on the conveyor.

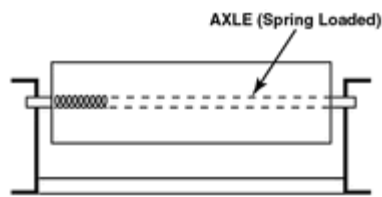
BUT . .

There should always be a minimum of 10 wheels under a box.



This helps you decide the number of wheels per foot to order.

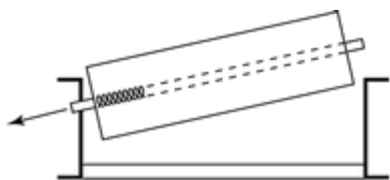
ROLLER CONVEYORS



Rollers have their own axles. Most axles are **SPRING-LOADED**. This means. . .

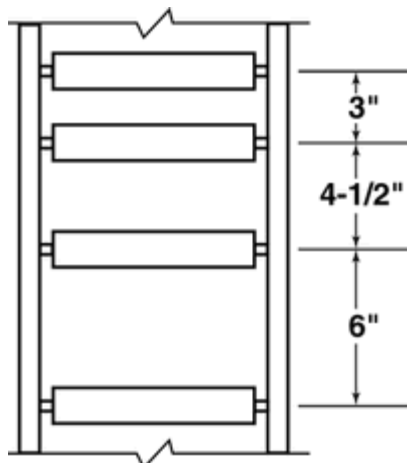


...The axle can be moved to one side.

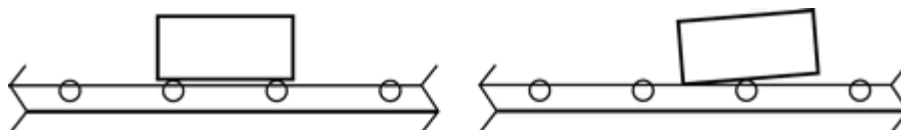


Rollers can be easily removed or replaced in Conveyor Channel frame. The spring also keeps the roller in place.

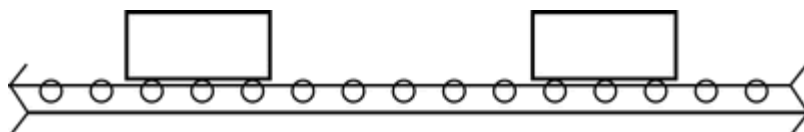
The rollers are put in the frame as close together -



or as far apart as necessary . . . **BUT** there should always be **THREE (3)** rollers under the box.



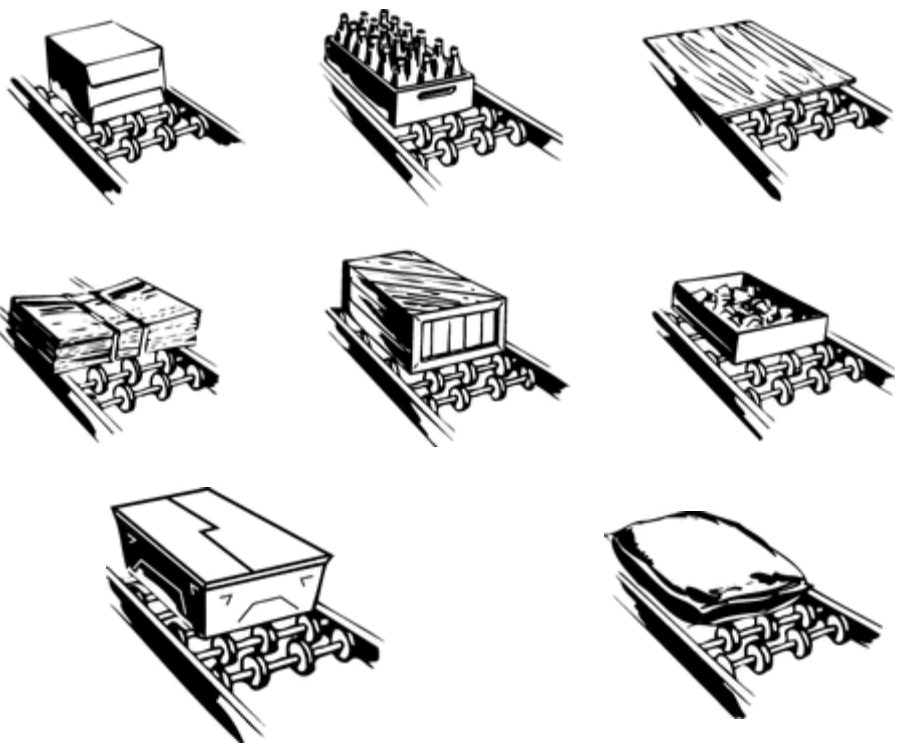
LESS THAN 3 ROLLERS . . . box tumbles



BEST-3 ROLLERS UNDER BOX AT ALL TIMES! This determines the **ROLLER CENTERS** to order.

MOVE THESE ON WHEEL CONVEYORS

(Any items with a smooth, flat bottom. These items can be wider than the conveyor, 6 in. over on each side is not too much. Extra wide items like plywood, can be moved O.K., but center it carefully.)

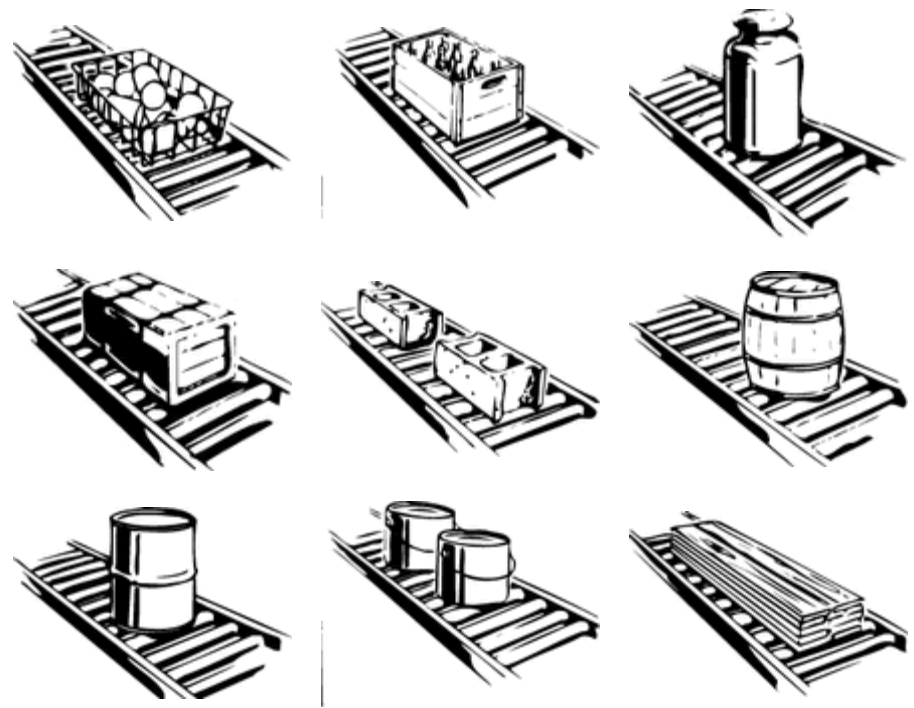


Tote boxes will not move easily

Use as many wheels as possible for best results.

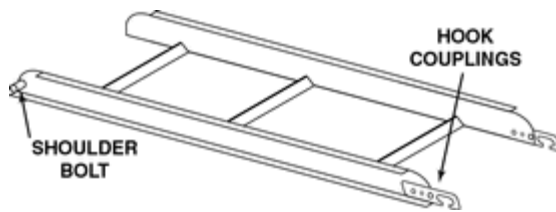
MOVE THESE ON ROLLER CONVEYORS

Any Items with an uneven or open bottom, or with a rim on the bottom. These items should never be bigger around than the rollers are long.

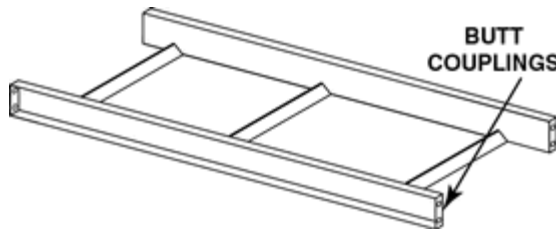


HOW GRAVITY CONVEYORS ARE SET UP

- 1. ALL SECTIONS HAVE COUPLINGS**



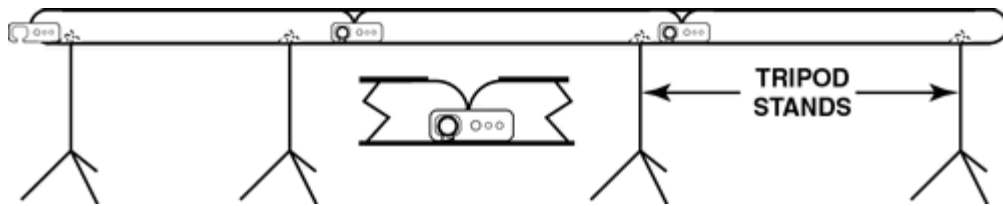
PORTABLE TYPE



PERMANENT TYPE

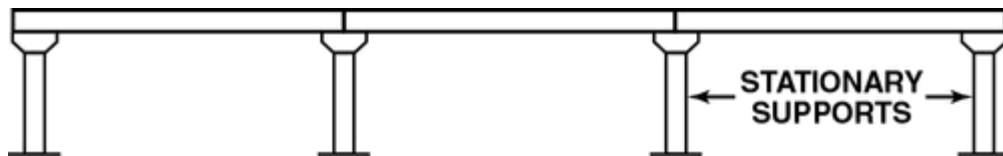
Sections can then be used together by coupling them to each other.

2. PORTABLE SET-UP USS TRIPOD STANDS



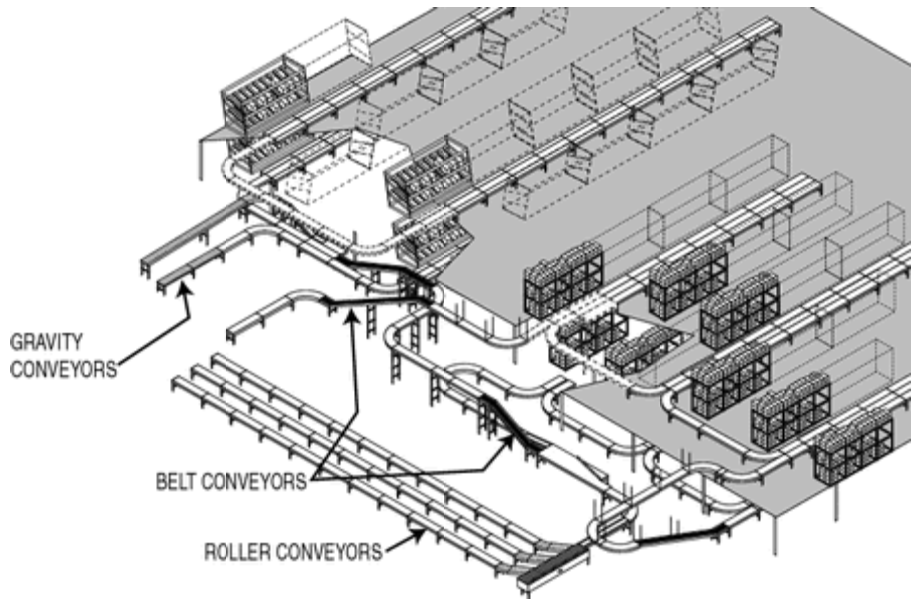
Always use one more stand than the number of conveyor sections (3 sections use 4 stands.)

3. PERMANENT SET-UP USES STATIONARY SUPPORTS



Always use one more support than the number of conveyor sections (3 sections use 4 supports.)

POWERED AND GRAVITY CONVEYORS CAN BE USED TOGETHER!



This is called a "Flow System".