

Spiral Conveyors

Basic Concept

Spirals are often used for continuous processes such as proofing, cooling or freezing. In its simplest form a Low Tension spiral consists of an upright motor driven drum, or cage, around which a side flexing conveyor belt is wrapped. The conveyor belt moves either up or down in a helical path and is supported by continuous belt support rails fixed to the other frame of the conveyor in a helical path.

The belt is primarily driven by the frictional force between the rotating cage and the inner edge of the belt, and by a secondary drive force, the take up motor that positively drives the belt with sprockets. See fig. 3-24.

The secondary drive force applies sufficient pulling force to the conveyor belt to ensure that it wraps around the cage, so that there will be contact between the cage and the inner edge of the belt, and therefore a frictional driving force between the belt and cage.

Basic Principles of Operation

To understand how a Low Tension spiral works it can be compared to a simple rope and capstan used to move a ship into a docking area. The capstan turns when the drive motor is turned on. The rope attached to the ship is wrapped several times around the capstan. Nothing will happen until someone pulls the loose end of the rope. When the rope tightens around the capstan, the frictional force of the capstan against the wraps of rope, plus the drive force of the motor driving the capstan will be able to pull the boat into dock. This will continue as long as someone keeps pulling on the rope.

The Low Tension spiral works in a similar manner. One big difference is that the belt (rope) is endless. So we have to have a place for the belt to accumulate, as it gets longer from wear, higher belt tension or temperature changes. We let the belt accumulate right after the second drive, in what we call the belt take up loop. Another difference is that instead of a big load at the end of the rope, we have the load spread out all over the belt. The belt has to remain level to carry the product, so we have continuous belt support rails under the belt. Low-Tension spirals are a big friction machine. They use the friction between the moving cage and the inside edge of the taut belt to provide the drive means. The main drive has to overcome the friction force between the loaded belt and the support rails. How well this all works is a function of the coefficient of friction between belt edge and cage and belt underside and support rails.

General System Design Requirements

For details on basic general system requirements for Low Pull spiral systems using modular belts please contact uni-chains engineering.

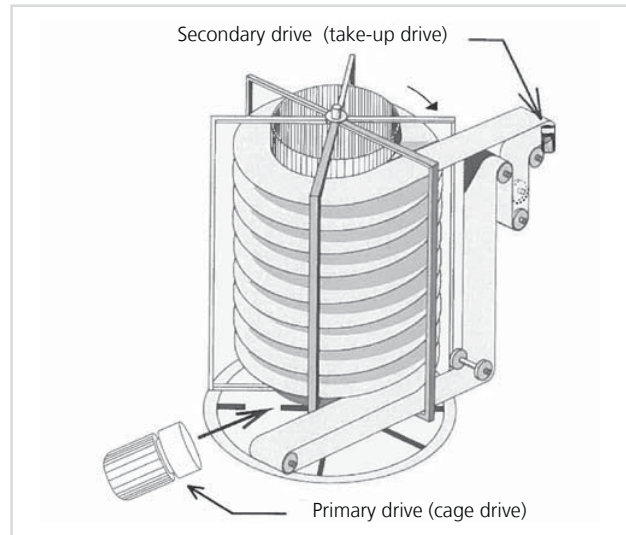


Fig. 3-24

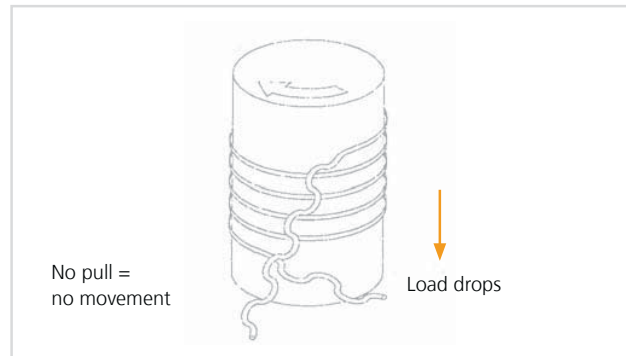


Fig. 3-25

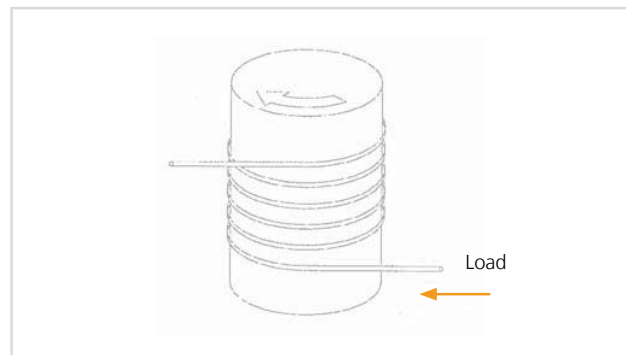


Fig. 3-26