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2.1 KL-200 OVERVIEW

This section explains the purpose of the KL-200 winder and describes the various parts of the machine, including the operator control bench and built-in safety features. A cross-sectional view of the winder is presented at the end of the section. Detailed operating procedures are presented in Section 3.

2.2 KL-200 RECLAIM WINDER

The KL-200 reclaim winder is designed to convert culled rolls from a machine winder into a salable product with good roll quality.

The machine is divided into three sections:

The Delta-Frame unwind section is designed to chuck a roll at floor level and elevate it to an acceptable position for unwinding. Pneumatic brakes on the chucking heads provide controlled web tension. Automatic edge guiding and unwind stand oscillation help correct unwind roll defects.

The slitter section trims or slits the web, if necessary, to create shipping rolls of acceptable width, with straight edges.

The windup section provides controlled torque and nip loading to assure production of a quality roll with straight edges featuring uniform or slightly diminishing hardness from the core to the outside of the rolls.

Each of these sections has been engineered to achieve maximum efficiency and operator convenience.

2.3 DELTA-FRAME SHAFTLESS UNWIND

Unwind Frame

The unwind frame consists of two slide bases connected by a cross tube. The cross tube serves as a mechanical way to guide the traversing action of the unwind stands. When the cross tube is shifted in a cross-machine direction by a hydraulic cylinder, the unwind stands follow in unison, producing oscillation or edge guide motion.

Stands

The unwind stands are supported by rollers that make it possible for the stands to traverse in a cross-machine direction for chucking a roll or adjusting the sidelay. The stands, which are motor-driven through a rack-and-pinion arrangement, can traverse independently or together.

Unwind heads

The unwind heads travel from the pickup/chucking position to the unwind position along inclined ways. Their travel is powered by a motor-driven machine screw arrangement. The unwind heads must be fully raised for operation.

Brakes

The unwind heads are equipped with pneumatic brakes for controlling the rate of unwind, which in turn controls web tension. Load cells mounted on the after-slitter roll provide a web tension signal that serves as feedback to the brake control system. Tension level is operator adjusted from the console.

Core Chucks

Core chucks can be engaged in the unwind roll core by traversing the unwind stands until the chucks engage. When the unwind roll begins turning against the resistance of the unwind brake, the chucks automatically tighten themselves inside the core.

Oscillation

The unwind stands can be oscillated back and forth in a cross-machine direction to spread out web defects, such as caliper bulk or moisture, over a wider area of the wound roll. Oscillation limits are operator adjustable from zero up to +/- three inches.

Edge Guide

The KL-200's edge guide system automatically shifts the unwind stands to maintain location of the web edge, thereby producing a straight-edged roll without trimming.

2.4 SLITTER SECTION

Guide Rolls

The slitter section is equipped with an adjustable, motor-driven guide roll for straightening the paper web as it approaches the slitters. Some slitter sections are also equipped with a spreader roll to add cross-machine tension to the web prior to slitting.

Threading Devices

Some slitter sections are equipped with threading wheels which can be lowered onto the top of the guide roll to form a nip. When paper is fed into the nip, the guide roll pulls it through and feeds the web toward the slitters.

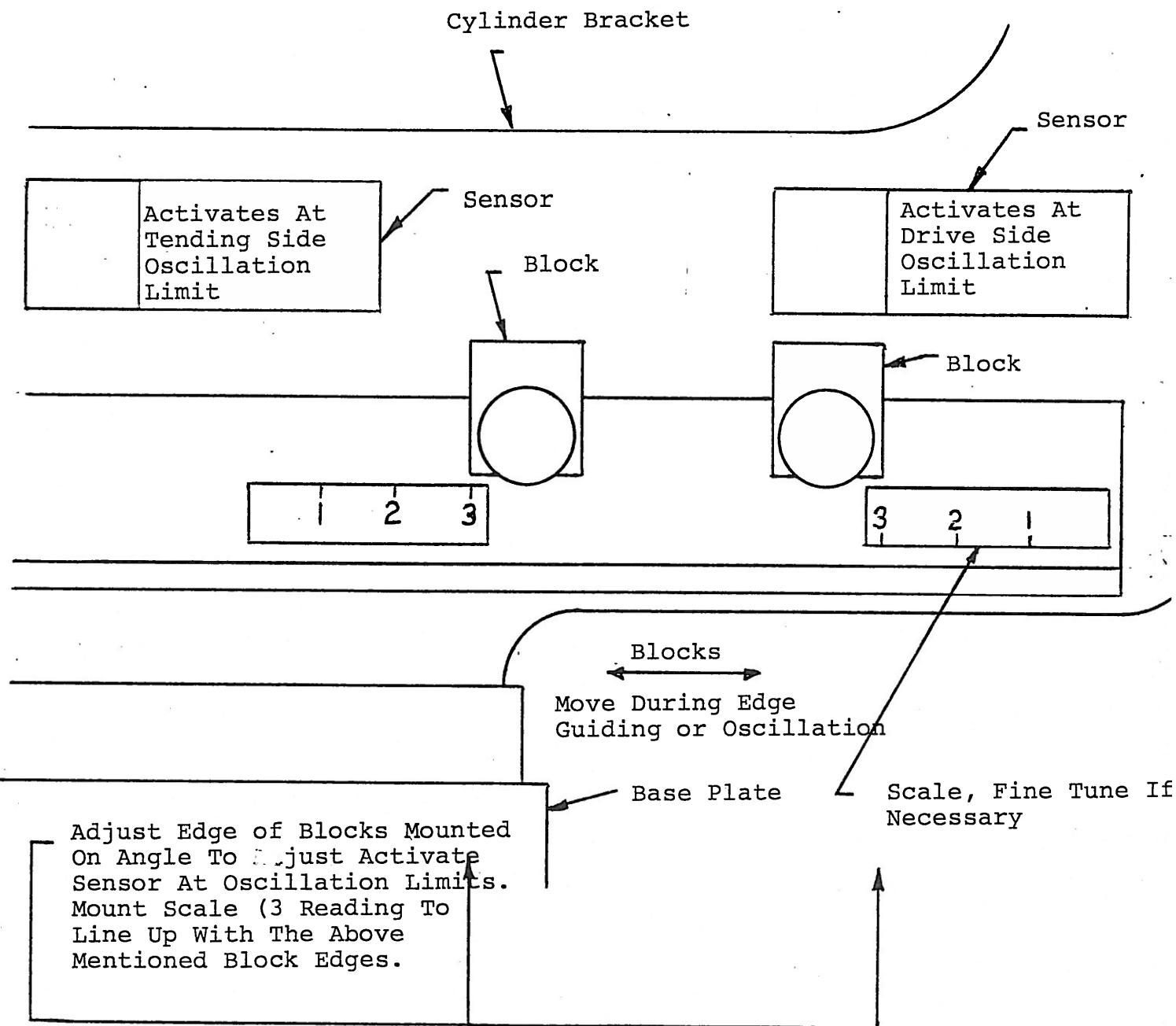
Slitter Table

Slitting takes place at the slitter "Table"-- a flat surface formed by the web as it travels over two sets of rotating aluminum rolls. One of the rolls is mounted on load cells which measure web tension by sensing the pressure exerted by the web as it travels over the roll.

Salvage (Delta) Unwind Oscillation Setup
Unwind Oscillation (And Edge Guide) Cylinder - 6" Stroke
-+3 About Centerline of Winder

← To Tending Side

To Drive Side →



Blades/Bands

Slitters are situated midway between the two rolls. They operate in pairs, with bottom bands driven by the web or by A-C motors and top blades held against them by air pressure. The top slitters are lifted out of position during threading so the web can be threaded over the slitter table without catching or tearing.

Positioning

Slitters can be positioned in a cross-machine direction by a variety of mechanisms ranging from manually operated systems to fully automatic systems with motor-driven transfer bars.

Downstream Spreading

Spreading devices are normally situated immediately downstream from the slitter table. The devices may consist of a stationary bow tube and D-Bar, two sectional roll spreaders or a combination of stationary and/or rotating members. In any case, the spreading devices are designed to separate the slit sections and then straighten them as they approach the winding drums.

2.5 WINDUP SECTION

Overview

The windup section consists of a pair of winding drums (separated by a small gap) and a rider roll, along with threading devices and additional equipment for locking cores in place and discharging finished rolls. The winding drum closest to the discharge end of the machine is known as the front drum. The drum behind the front drum (when viewed from the discharge end of the machine) is known as the rear drum.

Threading Devices

During threading the web is directed toward the windup section by guideplates and air nozzles. The web approaches the drums from below. A set of rubber wheels forms a nip on the underside of the rear drum, allowing the web to be pulled up between the drums. The web is then taped or glued to cores lying in the "pocket" between the tops of the drums.

Drum Surfaces

The front winding drum (situated toward the cradle end of the winder) has a special non-grooved Tungsten Carbide surface for improved traction and better transmission of torque to the shipping rolls. The rear drum is grooved so air can escape from between the web and the wound rolls during winding operations.

Drum Drives

The front and rear drums are powered by separate drives. The rider roll holds the cores (and then the wound rolls) tight against the drums, causing both the drums and the rolls to rotate as a single unit with uniform surface speeds. The tightness of the wind (and the hardness of the rolls) is determined by the amount of torque provided by each drum. Front drum torque tightens the wind; rear drum torque loosens the wind.

Core Chucks

In addition to being held against the drums by the rider roll, the cores are held in place laterally with a pair of adjustable core chucks. The chucks are equipped with spindles which fit snugly inside the cores, turning freely as the cores rotate but preventing them from shifting to either side. Hydraulic cylinders help relieve the weight of the core chucks, allowing them to rise easily as the wound rolls increase in

Core Chucks (Continued)

diameter. When the chucks are opened, the relief pressure is increased, raising the chucks to the full raised position, awaiting the ejection of the wound roll.

Rider Roll

The rider roll is mounted on a heavy beam for greater stability and better control. The beam travels up and down along guides mounted on the winder frame. Gear racks mounted on the frame are engaged by pinion gears which are mounted on the beam and secured to a single cross shaft, assuring proper alignment of the beam at all positions. Ratchet wheels are mounted on the same cross shaft. The ratchets are engaged by pawls connected to pneumatic cylinders, which act as safety locks to prevent accidental lowering of the rider roll beam.

Relief Cylinders

When the rider roll rests on the wound rolls, hydraulic cylinders help relieve the weight of the roll and its beam--keeping nip pressure between the rolls and the winding drums at a near-constant level. The cylinders are connected directly to the rider roll beam to assure minimum resistance and maximum control of the rider roll pressure at all times.

Roll Ejector

Behind and slightly above the rear winding drum is a roll ejector plate which pivots about the rear drum. Hydraulic cylinders move the ejector through an arc to push wound rolls off the drums and into the lowering cradle. When the rolls approach the cradle, the cradle starts its lowering motion in unison with the ejector plate.

Lowering Cradle

The lowering cradle is pivot mounted and hydraulically actuated. As rolls are ejected from the winding drums into the cradle, the cradle lowers to an intermediate position and then all the way to the floor to discharge the rolls, at the operator's convenience.

2.6 OPERATOR CONTROL BENCH

The operator control bench is organized for convenient operation of KL-200 systems. Generally speaking, the controls for each section of the machine are grouped together. Meters, digital readouts and other indicators are grouped together toward the top of the control bench. Many push buttons have built-in indicator lights as well.

Slitter Control Station

Controls for slitter setup and operation, threading pan operation and drive controls required to thread the winder are conveniently located near the tending side of the slitter section.

Cradle Control Station

The cradle control station located near the roll cradle on the tending side frame houses controls required for roll changes. This includes core chuck and rider roll controls, ejector, cradle thread pans and drive mode functions.

2.7 BUILT-IN SAFETY FEATURES

Overview

The KL-200 has numerous built-in safety features. Operators should make themselves familiar with the function and purpose of each feature, and make sure none of the features is ever violated. If any of the features are violated or become disabled, the machine should not be operated until repairs are made and all safety features are restored.

Threading

As a general safety feature, web threading can be performed only at crawl speed (approximately 50 FPM.) More specific safety features are listed below for convenient reference:

E-Stop

The Emergency Stop button on the operator control bench is designed to stop movement of all winder components except the rider roll. The same is true of any remote Emergency Stop buttons on the machine.

E-Stop Ribbon Switch

An E-Stop ribbon switch is located along the inside surface of the roll lowering cradle in a manner that it can be toe actuated while standing in the cradle.

Jog Footswitch

Drive jog can be toe actuated while standing on the roll lowering cradle by a button switch located at the center of the cradle. It is located under a toe guard to prevent accidental engagement.

Threading Nip

On vertical slitter sections, the nip between the guide roll and the web threading wheels cannot be reached by hand. The weight of the threader assembly is all that holds it against the roll, further reducing the danger posed by this nip.

Individual Slitters

Individual slitter motors are powered through manual motor starters, overload circuit breakers and line disconnects conveniently located near the slitter section in the tending side frame. The operator disables all motors using the line disconnect when changing blades or bands or any time he is in direct contact with the slitter cutting edges. Additionally the slitter motor "Stop" pushbutton and "Slitters Disengage" pushbutton both have lockable tabs which hold in the pushbutton thus preventing engagement.

Slitter pneumatic engagement hoses are fitted with quick disconnect fittings for positive disabling of the slitter engagement.

BE SURE SLITTER BANDS AND BLADES HAVE COME TO REST

BEFORE ATTEMPTING TO REACH INTO THIS AREA.

Rider Roll

The rider roll is electrically interlocked to prevent it from being manually raised when the winder is running at speeds over 100 FPM. When the rider roll is raised the beam moves to its upper limit. There are no intermediate positions. Should the roll accidentally raise due to a control problem the winder will go into the normal stop mode.

Safety Locks

Once raised, the rider roll cannot be lowered unless the pawl-and-ratchet safety locks have been simultaneously controlled open for more than one second. The downward movement decelerates to slow speed unless the selector switch is held in the down position. A rider roll close approach switch will decelerate the roll as it approaches the empty cores.

Relief Cylinders

The hydraulic cylinders that help relieve the weight of the rider roll and beam are equipped with hose-break valves that prevent the beam from free falling in the event of damage to a hose or fitting.

Lowering Cradle

The discharge edge of the lowering cradle is equipped with a rubber guard to reduce the risk of foot injuries when the cradle is lowered. In addition the lower edge of the cradle is equipped with a ribbon switch to stop the cradle if anything actuates it.

The lowering cradle will move downward only when the cradle lower pushbutton is pressed and held in. Normally, the cradle raise button can be pressed and released to initiate upward movement of the cradle. But, unless the cradle raise button is being held in, the cradle's upward movement will stop if the toe-actuated ribbon switch E-Stop or the roll eject photo switch is actuated.

Cradle/Eject Movements

The roll ejector and roll lowering cradle must function together to eject the wound roll. To initiate the eject sequence the winder must be at zero speed. The rider roll, core chucks, and the roll lowering cradle must be fully raised.

When the eject button is pressed, the ejector will begin to push the wound roll. When the roll approaches the raised cradle, it actuates a photo switch that tells the cradle to lower simultaneously as the ejector continues its motion. The cradle stops moving when it reaches its intermediate position. In order for the cradle to drop all the way to the floor, the cradle lower pushbutton must be actuated.

Cradle Eject (Continued)

The "Eject" pushbutton must be held in until the ejector has completed its full stroke. If the eject pushbutton is released before the ejector makes its full stroke the eject sequence will be aborted; the ejector will return and the cradle will remain in its last position.

If "Cradle Lower" is pushed and held in after the eject sequence has started but before the cradle reaches its intermediate position, the cradle motion can be continuous to the floor.

Set Changes

Machines equipped for automatic set changes have additional safety circuits. The automatic sequence cannot be started unless the cradle, ejector, core inserter, core locks, rider roll and other devices are in specified positions for start-up..

The set change sequence can be stopped by pressing the stop button for any of the set change devices. It also can be stopped with the Emergency Stop button, E-Stop switch or the Set Change off switch. After an automatic set change is interrupted, it must be completed under manual control or restarted from the beginning with all devices in their proper starting positions.