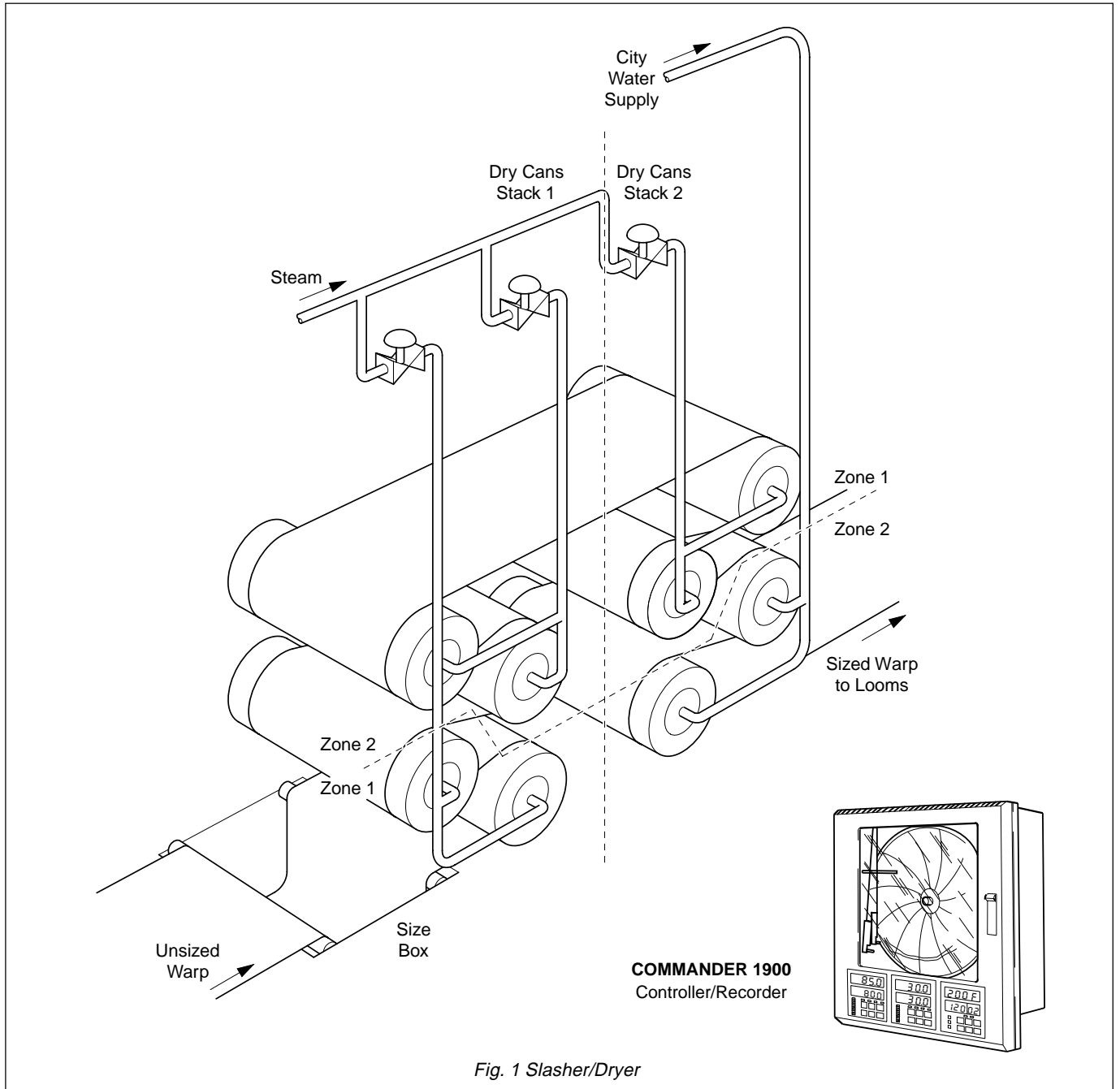


Temperature Control of Slasher Dryer Cans in the Textile Industry Using the COMMANDER 1900R



Why Use a COMMANDER 1900R?

The COMMANDER 1900R can increase weave-room efficiency, improve product quality and reduce production and utility costs. Features include:

- ▶ Automatic temperature control for increased production and operational efficiency.
- ▶ Large, easy-to-read digital displays, status and alarm indicators, and deviation bar graph for improved operation
- ▶ Direct-connected RTD and/or thermocouple inputs reduce installation costs.
- ▶ Simultaneous recording of up to four process variables.
- ▶ Access codes assure process integrity by providing security. Unauthorized tuning and configuration is prevented.
- ▶ Easy-clean NEMA4X/IP66 front face.

Features and Benefits

Comprehensive Display

- ▶ The COMMANDER 1900R has dedicated operator stations for each controller with a large front display panel. The displayed information includes the process variable in the upper display and control set point or output percentage in the lower display. The size of the display allows the operator to view process parameters clearly from a distance. Each controller faceplate is also equipped with indicators to show active alarms, local/remote set point, autotune status and control mode status.
- ▶ Recorder faceplates provide alarm status indication.
- ▶ All process variables and control set points are continuously displayed negating the need to scroll between channels using key strokes.

Direct Connecting I/O Reduces Installation Costs

- ▶ With the COMMANDER 1900R, RTD or thermocouple inputs are connected directly to the instrument. Linearization and ranging are automatic. This not only simplifies installation, it also reduces installation costs by eliminating the need for special termination panels or conversion equipment.

The Application

Warp slashing is the process of conditioning the warp in preparation for weaving and involves three critical steps:

- Maintaining the level and temperature of the size in the size box.
- Controlling the pressure of the squeeze roll.
- Controlling the temperature of the slasher drying cylinders or "cans".

The process first involves the application of size to the warp, followed by pressure squeezing to remove the excess size. Finally, the warp is passed through a series of heated cans where it is carefully dried to the optimum condition for weaving.

During the drying procedure, the physical properties of the warp change:

- Resistance to mechanical abrasion is increased; the warp is lubricated to reduce friction by applying a comparatively hard size (a solution of oil and starch) to the warp which forces the fibers to lay down against the warp, making it smoother and more compact.
- Warp strength, stiffness, and elasticity are increased; adjacent fibers are bonded together which reduces breakage and slippage between fibers.
- The static charge on the warp is reduced.

Since a slasher can operate at speeds approaching 180 meters per minute and supply warps for as many as 1000 looms, automatic controls are essential to the slashing process in order to maintain warp consistency.

Control System Objectives

The moisture content of the warp as it leaves the slasher is of great importance. A constant warp moisture content is maintained by accurately controlling the temperature of the slasher drying cylinders or "cans".

Fig. 1 shows a basic slasher drying system with a size box. Any number of drying cans can be used in a slasher dryer and they can be connected in parallel with a common steam header, a condensate bypass, and condensate return lines.

The first two cans in Zone 1, Stack 1 are maintained at the same temperature as each other to begin heating the warp without cooking the surface too quickly. These two cans would be the coolest of the heated cans. Each of the next four cans are at a progressively higher temperature than the preceding one. Finally, the last two cans may be fed by the mains cold water supply in order to cool the warp.

The pressure within the common steam header system feeding the cans can be regulated by the COMMANDER 1900R in conjunction with a pressure transmitter such as the 600T. This arrangement eliminates variations in can temperature due to plant steam fluctuations. The control objective is to modulate the quantity of steam entering each can in order to maintain a constant can temperature.

Condensate is withdrawn from each can via a siphon which is connected through a rotary joint to a trap which feeds into a condensate return system.

Control Issues

Two methods of measuring temperature are common for both high and relatively low temperature applications.

For high temperature applications, where steam input is great enough to provide adequate condensate flow, an RTD is mounted in the condensate return line in front of the trap. For lower temperatures with small or intermittent condensate volumes, a special rotary joint for inserting the RTD directly into the hub of the rotating can is used.

An air purge is applied to cans operating near atmospheric pressure, to eliminate large condensate accumulations and to speed up the dynamic behavior of the control system. An air header is set to approximately 5 psi. From the header to each can journal there is an air connection with a spring-loaded ball check-valve. When the pressure in the can falls below 5 psi, pressurized air enters through the check-valve in order to maintain sufficient pressure to remove the condensate. When can pressure is above 5 psi, the check-valve is forced shut and steam is prevented from entering the air line.

COMMANDER 1900R for Dryer Cylinder Control

The COMMANDER 1900R is ideally suited for controlling the temperature of the drying cans. It can be equipped with two microprocessor-based controllers that accurately control and record drying can temperature and pressure for increased production capacity and weave room efficiency. The control accuracy and repeatability of the instrument improves product quality, operator efficiency, and can reduce the production costs associated with utility consumption and raw materials.

Control Flexibility

As a recording controller, the COMMANDER 1900R can be equipped with two microprocessor-based controllers. Each controller features "on-demand" automatic tuning and can be set up to operate either in a multivariable arrangement, such as a single station cascade, or as independent controllers. For example, each control unit can be set up to control drying can temperature for two separate stacks of drying cans.

The COMMANDER 1900R has the flexibility to perform the following types of control:

- PID
- Time Proportioning
- Current Proportioning
- Position Proportioning
- Dual Output Control
- Internal Cascade
- Ramp & Soak

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