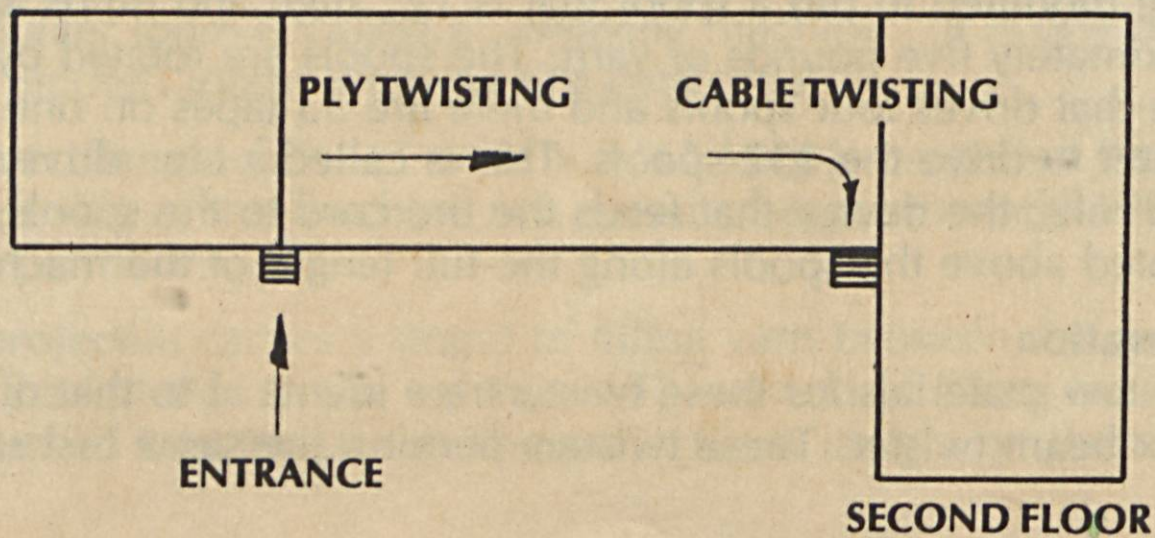
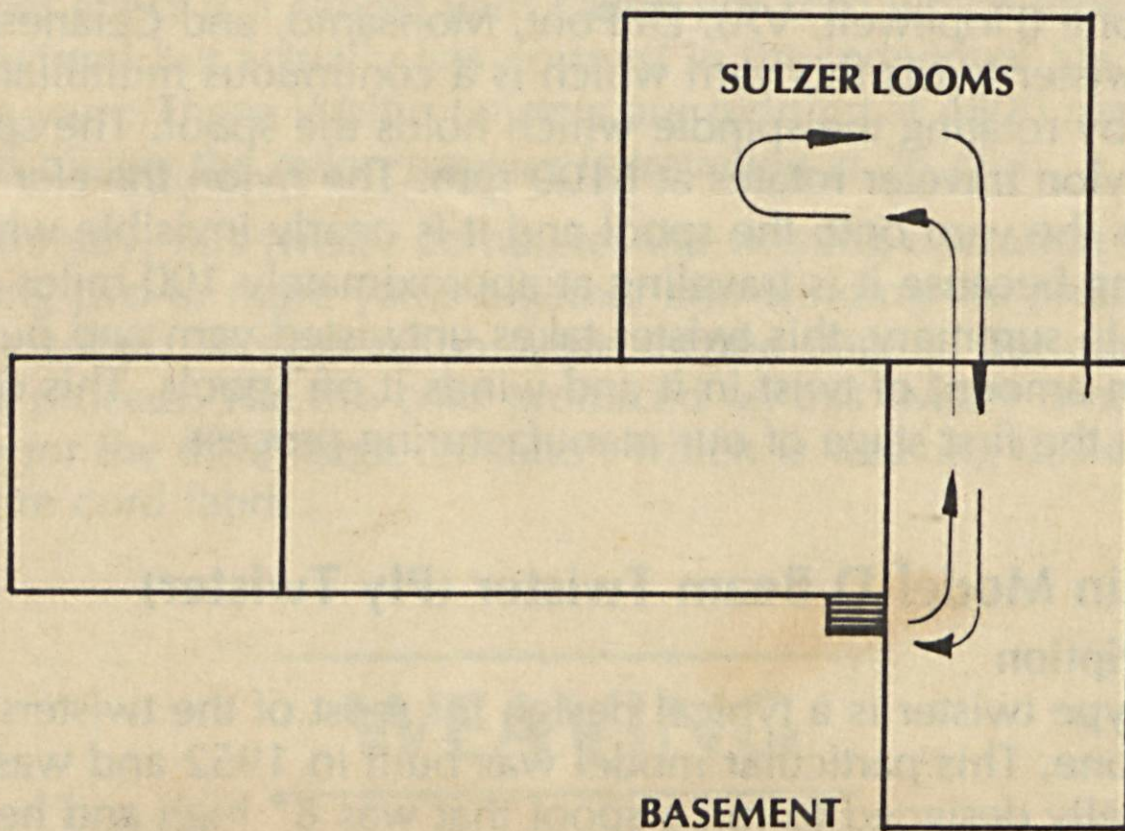
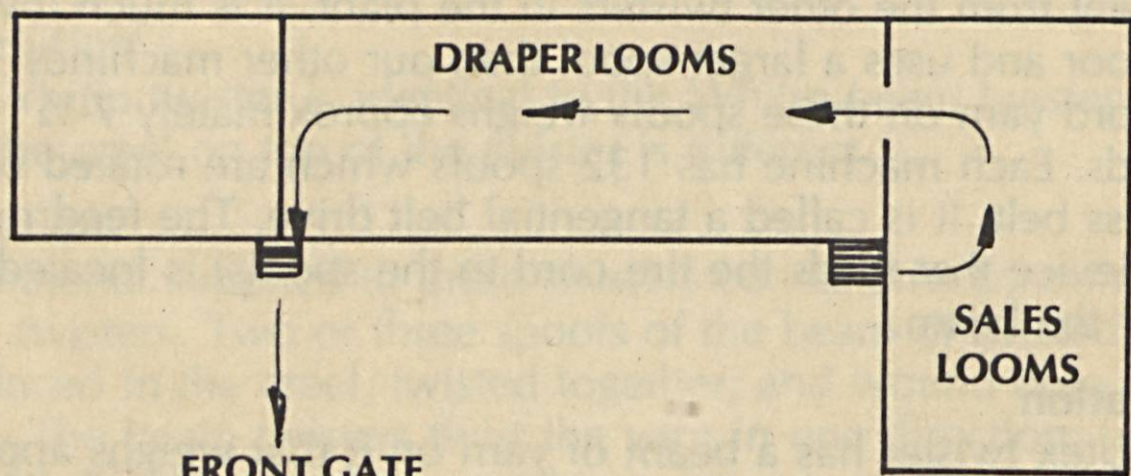


Firestone

FIBERS & TEXTILES COMPANY



Gastonia, N.C.



side by a braking mechanism. It is then pushed to a conveyor where it is transported back to the left side. Eleven to seventeen projectiles are used in each machine. A torquing bar is used to propel the projectile from the left to the right side.

The spools in the creel are collected in a sheet and are drawn individually into a harness eye. The harnesses are moved up and down as the projectile is propelled between them, depositing a strand of filling and forming the sheet of fabric.

The fabric is rolled up in the front of the loom on an off-loom take-up stand. These rolls are normally 36" to 46" in diameter.

Draper Looms

The Draper loom is a power loom (fly shuttle) that weaves our tire cord fabric. It drives a shuttle back and forth between two sheets of cord, laying a strand of filling yarn between the cords as it goes from one side to the other. The cords reverse themselves from top to bottom as each filling strand is laid between them, forming a woven piece of fabric.

The shuttle contains a quill (bobbin) that is wound with filling yarn which leaves the pick between the cords as it passes from side to side. The cord comes from spools in the creel which are collected in a sheet behind the loom. These individual cords are threaded through an eye in the harness. The harnesses are moved up and down by a cam action, allowing the filling yarn in the shuttle to be placed over one sheet of cord, then reversed, allowing filling yarn to be placed under the sheet of yarn which interlocks, thus forming the fabric.

The fabric is rolled up in the front of the loom on an off-loom take-up stand. These rolls are normally 36" to 46" in diameter.

TWISTING

Utex Model 8 Beam Twister (Ply Twister)

Description

This type twister was manufactured for Firestone in 1968 and is different from the other twisters in the plant. It is much lower to the floor and uses a larger spool than our other machines. The tire cord yarn on these spools weighs approximately 7-½ pounds. Each machine has 132 spools which are rotated by an endless belt. It is called a tangential belt drive. The feed roll (the device that feeds the tire cord to the spools) is located just under the beam.

Operation

This Utex twister has a beam of yarn on it that weighs approximately 1200 pounds. We process nylon, polyester, rayon, and aramid yarn which are manufactured by companies like Firestone (Hopewell, VA), DuPont, Monsanto, and Celanese. The twister twists this yarn which is a continuous multifilament yarn, by rotating the spindle which holds the spool. The spool and nylon traveler rotates at 6100 rpm. The nylon traveler guides the yarn onto the spool and it is nearly invisible while running because it is traveling at approximately 100 miles per hour. In summary, this twister takes untwisted yarn and puts a certain amount of twist in it and winds it on spools. This operation is the first stage of our manufacturing process.

Whitin Model D Beam Twister (Ply Twister)

Description

This type twister is a typical design for most of the twisters at Firestone. This particular model was built in 1952 and was originally designed to run a spool that was 8" high and held slightly over three pounds of yarn. Around 1960, the twisters were modified to run a spool that is 12" high and holds approximately five pounds of yarn. The spools are rotated by a tape that drives four spools and there are 33 tapes on one twister to drive the 132 spools. This is called a tape drive. The feed rolls, the device that feeds the tire cord to the spools, are located above the spools along the full length of the machine.

Operation

The raw materials for these twisters are identical to that of the Utex beam twister. These twisters perform the same first stage

operation as the Utex beam twister. These Whitin twisters are running at 4800 rpms, which means the nylon traveler is traveling at 80 mph. Again, this twister is putting a certain amount of twist in the untwisted yarn coming from the beam and is winding it onto a spool.

Whitin Model D Cable Twister

Description

This Whitin twister is identical to the Whitin beam twister except the creel on top of the twister is different.

Operation

The material supplied to these twisters comes directly from the beam twisters. Two or three spools of the beam of twisted yarn are placed in the creel, twisted together, and wound onto a spool. The beam twisters twist the yarn in one direction, usually the "Z" direction, and these cable twisters twist the yarns together in the opposite direction, usually the "S" direction. The net effect is a cabled yarn called tire cord which looks like it is twisted but actually has no twist in the individual filaments of the yarn. These Whitin twisters are running at 4500 rpms which means the nylon traveler is traveling at 75 mph.

In summary, this twister completes the twisting operation by twisting two or more yarns together and winding the product onto a spool. This operation is the second stage of our manufacturing process. The tire cord produced on this twister is now ready for the third stage operation which is weaving this cord into tire cord fabric.

WEAVING

Sulzer Looms

The Sulzer loom is called a "weaving machine." It is one of the most modern looms weaving tire cord today.

A projectile which is ½" wide x 3-½" long is propelled from the left side of the machine at a speed of approximately 120 miles per hour.

The projectile carries a strand of filling yarn between the cords from the left side to the right side. This strand of filling is cut and tucked into the fabric. The projectile is caught on the right