Let's Take A Closer Look At What It Takes To Produce Quality Wool Cloth

It takes many steps it takes to produce wool yarn and fabric from raw wool! Here is a breakdown of the process, including some cool machines and fun facts.

Step One: Scouring

Scouring raw wool is the process of removing lanolin. Lanolin is the natural oil in sheep wool. It needs to be removed along with dirt, dust, sticks, grass, and anything else the sheep may have on them. Today, detergent is used to scour wool. The wool is moved from bucket to bucket, usually by an automated machine, until it is clean and ready for carding. This method wasn't widely used until 1880. In the past, wool producers would use a large tub filled with stale urine and water to remove the lanolin (gross!).

Then one day, a wool producer in Europe invented the revolutionary machine, the **Scouring Train.** The scouring train is a series of six tubs. The first two or three tubs hold a weak solution of water and sodium carbonate. The remaining tubs contain plain water. The wool goes into the first tub, and then through a combination of human power and machine power, it is picked up and plopped into the next tub. The wool gets rinsed more and more, until it is all clean!

Step Two: Picking.

Picking is plucking out unwanted bugs, dirt, sticks, plants, rocks, and possibly poop – really anything stuck to the raw wool. This process was done by hand until around 1810, when picking machines became widely available in the U.S. **The Picker** used rotating teeth to clean the wool. The wool was laid out on a short conveyor belt, which moved the raw wool through rotating teeth at the end. The teeth combed the wool to separate the fibers and release any sticks and dirt. The wool was treated at this step to prevent the fibers from breaking.

Step Three: Carding.

Carding is the combing, lining up, and blending of fibers into one loose piece. Before machinery became widely used for this task, the process was done by hand using cards. Cards are combs with little metal teeth. The wool is brushed between the cards until it is ready to spin.

Hand cards

The **Dryden Carding Engine,** invented in Massachusetts in the 1820s, made this whole process easier and quicker. The carding engine did the same work as the hand-powered cards, but instead of flat combs, it used rotating cylinders. This made it easier to process larger amounts of wool, but there was one major problem. Early carding machines could not make continuous strands (rovings) of carded wool. Instead, it produced large sheets of combed wool.

Waterpowered Carding Engine
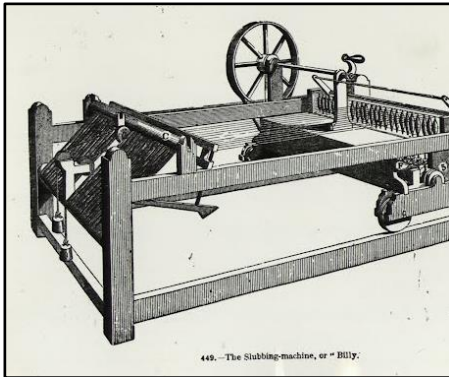
Slubbing Billy

The **Slubbing Billy** was invented to fix this. It made continuous strands of wool that were ready for spinning. This additional step is called condensing.The machine took a lot of work to run, requiring multiple children and one adult to operate. Kids often started working in mills at ages 8 or 9 during the 1800s. After 1860, newer carding machines had technology that made condensing unnecessary.

Step Four: Spinning.

Spinning takes combed wool and stretches and twists into yarn or thread. Over the past 250 years, various tools and machines have been created to make spinning wool easier and faster. The spinning wheel is one example. This simple machine was designed to be used by one person at home, not factory production.

Great Wheel or Walking Spinning Wheel

Waterpowered Spinning Jack

The **Spinning Jenny** was one of the first major inventions that increased the amount of yarn one person could produce. It was invented in 1770 and was a hand-powered spinner with multiple spindles instead of just one. But it was hard to run and not very efficient.

Next was the **Spinning Jack,** which was water or steam-powered and had 100-200 spindles. It required one skilled operator and the help of several children. By 1840, almost every American textile mill had these machines.

Step Five: Weaving

Weaving is the process of interlocking yarn at right angles to create a solid cloth. Woven cloth can be produced by hand at home using manual looms. It is a popular craft, even today. Machines make it possible to weave a lot of cloth at the same time. Water-powered looms were widely used in the U.S. starting in the 1830s. Over the years they were improved, increasing the amount of wool cloth produced. The **Power Loom** resulted in the huge factories across Maine and New England.

Waterpowered Loom

Step Six: Fulling

Fulling wool cloth allows loosely hand-woven cloth to be improved by beating and felting it. **Falling Stocks** were an early machine that pounded the wool to full it. Today there are more advanced ways to full machine-made cloth. The result is a softer, more tightly woven fabric.
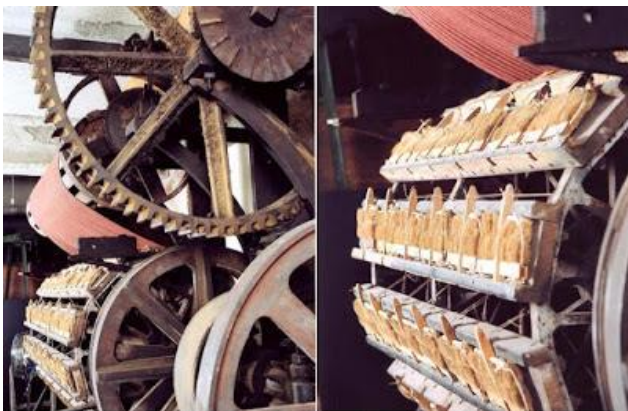

Falling Stocks

Step Seven: Napping and Shearing

Napping and shearing make the wool cloth nice and smooth. Nap refers to the extra fibers sticking up on a piece of fabric. Traditionally, individuals would raise these fibers off the cloth with teasels. Teasels are a type of flowering plant like burdock, but larger and less velcro-like. Smaller mills might use a hand held comb made of rows of teasels, larger mills made use of the **Teasel Gig.** The gig was invented to automate the process, making it quicker and more efficient. Like other machines in the wool production process, it used the rotary system. The teasels were attached to a wide wooden wheel, and then the fulled cloth was placed so that the teasels would rotate under it, napping the cloth. The teasels would wear out and needed to be changed out frequently. The fabric at this stage was fluffy and dense. The fabric now needed to be sheared to remove unwanted fibers and to create a smooth even finish. Large, heavy hand-held **Cast-iron Shears** where initially used, but quickly the automated **Rotary Shear** was invited to do this tedious task more efficently. Eventually After this process, the cloth is complete!

Teasel Gig

Teasel, a flowering plant

Finished Wool Cloth

Reflection Question: Thinking about the machines invented to clean, comb, spin, and weave wool, can you create a device that makes the process better? What would your textile machine of the future look like? Does it use robotic arms? Remote controls? Do humans need to be present to run it? Draw your machine, or make a model!