

History of Elastic and Rubber Bands

Ancient rubber

The ancient Mayan People used latex to make rubber balls, hollow human figures, and as bindings used to secure axe heads to their handle and other functions. Latex is the sap of various plants, most notably the rubber tree. When it is exposed to the air it hardens into a springy mass. The Mayans learned to mix the rubber sap with the juice from morning glory vines so that it became more durable and elastic, and didn't get quite as brittle. Both the rubber tree and the morning glory were important plants to the Mayan people - the latter being a hallucinogen as well as a healing herb. They two plants tended to grow close together. Combining their juices, a black substance about the texture of a gum-type pencil eraser was formed. Native peoples in the region still make rubber in the same way.

Vulcanized rubber

In 1736 several rolled sheets of rubber were sent to France where it fascinated those who saw it. In 1791, an Englishman named Samuel Peal discovered a means of waterproofing cloth by mixing rubber with turpentine. English inventor and scientist, Joseph Priestly, got his hands on some rubber and realized it could be used to erase pencil marks on sheets of paper.

Thomas Hancock was an English inventor who founded the British rubber industry. He invented the masticator, a machine that shredded rubber scraps, allowing rubber to be recycled after being formed into blocks or rolled into sheets. In 1820, Hancock patented elastic fastenings for gloves, suspenders, shoes and stockings. In the process of creating the first elastic fabrics, Hancock found himself wasting considerable rubber. He invented the masticator to help conserve rubber. The first masticator was a wooden machine that used a hollow cylinder studded with teeth - inside the cylinder was a studded core that was hand cranked. In 1821, Hancock joined forces with the Scottish chemist and inventor of waterproof fabrics, Charles Macintosh. Together they produced Macintosh coats, or Mackintoshes, named after Charles Macintosh.

In 1823, Charles Macintosh patented a method for making waterproof garments by using rubber dissolved in coal-tar naphtha for cementing two pieces of cloth together. While he was trying to find uses for the waste products of gasworks, Macintosh discovered that coal-tar naphtha dissolved India rubber. He took wool cloth and painted one side with the dissolved rubber preparation and placed another layer of wool cloth on top.

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In 1837, Hancock finally patented the masticator, when Macintosh's waterproofing patent was being challenged. In the pre-Goodyear and pre-vulcanization age of rubber age, the masticated rubber that Hancock invented was used for pneumatic cushions, mattresses, pillows and bellows, hose, tubing, solid tires, shoes, packing and springs. It was used everywhere. Hancock became the largest manufacturer of rubber goods in the world. The wooden masticator turned into a steam-driven metal machine, used to supply the Macintosh factory with masticated rubber.

This created the first practical waterproof fabric, but the fabric was not perfect. It was easy to puncture when it was seamed, the natural oil in wool caused the rubber cement to deteriorate. In cold weather the fabric became stiffer and in hot weather the fabric became sticky. When vulcanized rubber was invented in 1839, Macintosh's fabrics improved since the new rubber could withstand temperature changes.

Charles Goodyear, an American whose name graces the tires under millions of automobiles, is credited with the modern form of rubber. Before 1839, rubber was subject to the conditions of the weather. If the weather was hot and sticky, so was the rubber. In cold weather it became brittle and hard. Goodyear's recipe, a process known as vulcanization, was discovered when a mixture of rubber, lead and sulfur were accidentally dropped onto a hot stove. The result was a substance that wasn't affected by weather, and which would snap back to its original form if stretched. The process was refined and the uses for rubber materials increased as well. This new rubber was resistant to water and chemical interactions and did not conduct electricity, so it was suited for a variety of products. The process of making the rubber product improved as time went by, and now various chemicals are added before the mix is poured into molds, heated and cured under pressure.

But who invented the rubber bands?

On March 17, 1845, Stephen Perry of the rubber manufacturing company Messers Perry and Co, Rubber Co Manuf London patented the first rubber bands made of vulcanized rubber. Perry invented the rubber band to hold papers or envelopes together.

At the present time Antoon Versteegde uses the same kind of rubber bands to fasten the bamboo poles in his transient constructions.

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Rubber tapping

Latex (a natural, stretchy substance from which rubber is made) is extracted from rubber trees. Rubber trees are large trees (belonging to the spurge family, family Euphorbiaceae) that live in tropical (warm) areas. These trees are tapped for their latex, which is produced in their bark layers (latex is not the sap). The Pará rubber tree (*Hevea brasiliensis*) is native to South American rain forests, and grows to be over 30 m tall.

In 1876, an Englishman named Sir Henry Wickham collected about seventy thousand rubber tree seeds from the Para rubber tree (taken from the lower Amazon area of Brazil) and brought them to London, England. Seedlings were grown in London, and later sent to the East Indies, Ceylon and Singapore, where he started rubber plantations. The technique of tapping rubber trees for their latex was developed in Southeast Asia (before that, the trees were cut down to extract the rubber). Commercial rubber production now takes place in Malaysia, Thailand, Indonesia, and Sri Lanka (but not significantly in South America).

In 1877 an American named Chapman Mitchell learned to recycle used rubber into new products.

Modern rubber

Today about three quarters of the rubber in production is a synthetic product made from crude oil. World War II cut the United States off from rubber supplies worldwide, and they stepped up production of synthetic rubber for use in the war effort. There are about 20 grades of synthetic rubber and the intended end use determines selection. In general, to make synthetic rubber, byproducts of petroleum refining called butadiene and styrene are combined in a reactor containing soapsuds.

A milky looking liquid latex results. The latex is coagulated from the liquid and results in rubber "crumbs" that are purchased by manufacturers and melted into numerous products.

There is only one kind of natural rubber. Because the rubber plant only thrives in hot, damp regions near the equator, so 90% of true rubber production today occurs in the Southeast Asian countries of Malaysia and Thailand and in Indonesia. Indonesia's production has dropped in recent years and new plantations were started in Africa to take up the slack.