Spring Encyclopedia Article

Spring

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Nearly any solid material possesses a certain amount of elasticity, or resistance to bending. A substance that has enough elasticity to cause it to recover its initial shape when bent is called a spring.

Probably the first springs were branches and young saplings used by primitive hunters for traps, such as noose-traps. More advanced peoples developed bows using two springs--a bent frame of wood and a stretched piece of sinew, or string. Soon, these simple springs became the basis for a series of new tools, such as looms, lathes, and drills. Some time around 4 B.C., it was observed that these flexible materials resisted twisting as well as bending, thus inspiring the *torsion* spring. The torsion spring quickly found use in weapons, such as the crossbow and the catapult, as well as in new domestic devices.

Since these early times, the spring has become one of society's simplest and most frequently used tools, appearing in many forms and adapted to a wide variety of tasks. Probably the most familiar is the *coil* spring, but many others--*helical*, *leaf*, *balance*, and *mainspring* springs--have been developed.

Within a spring's molecular structure are two forces: the attracting force and the repelling force, derived ultimately from the electrical forces between the spring's material's atoms and molecules. When the spring is at rest, these two forces balance. However, when a spring is compressed, the repelling force increases, pushing the molecules outward; thus, when released, the spring expands. The converse is true for a stretched spring, wherein the attracting force escalates in an attempt to contract the spring.

Today, springs can be found just about everywhere, from the coils in a bed's mattress, to the helical spring in a mousetrap, to the leaf spring in an automobile's suspension. One of the most important springs ever invented is the mainspring that drives all wind-up clocks. A very special device, it is a coiled length of thin metal designed to uncoil itself at a specific and unvarying rate, so that the inner workings of the clock can be regulated. A similar spring, called the *balance* spring, was invented by the Dutch scientist Christiaan Huygens.