Bias tape

**Bias tape** or **bias binding** is a narrow strip of fabric, cut on the [bias](http://en.wikipedia.org/wiki/Bias_(textile)) (UK *cross-grain*). The strip's fibers, being at 45 degrees to the length of the strip, makes it stretchier as well as more fluid and more drapeable compared to a strip that is cut on the grain. Many strips can be pieced together into a long "tape." The tape's width varies from about 1/2" to about 3" depending on applications. Bias tape is used in making [piping](http://en.wikipedia.org/wiki/Piping_(sewing)), [binding seams](http://en.wikipedia.org/wiki/Bound_seam), finishing raw edges, etc. It is often used on the edges of quilts, placemats, and bibs, around armhole and neckline edges instead of a facing, and as a simple strap or tie for casual bags or clothing.

Commercially available bias tape is available as a simple bias tape, single-fold bias tape, and double-fold bias tape.

[](http://en.wikipedia.org/wiki/File:Blue_single_fold_bias_tape_w_inch_scale_P1083630.jpg)

[http://bits.wikimedia.org/static-1.22wmf6/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Blue_single_fold_bias_tape_w_inch_scale_P1083630.jpg)

**Single-fold bias tape**

Single-fold bias tape is bias tape with each raw edge folded in toward the center, wrong sides together, and pressed.

[](http://en.wikipedia.org/wiki/File:Lavender_0.25_inch_double-fold_bias_tape.jpg)

[http://bits.wikimedia.org/static-1.22wmf6/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Lavender_0.25_inch_double-fold_bias_tape.jpg)

**Double-fold bias tape**

Double-fold bias tape is single-fold bias tape which has been folded in half and pressed, with the single folds to the inside.

Devices are available commercially to aid the home sewer in making folded bias tape. The fabric strip is fed through the device, which folds the fabric. The folds are then pressed into place. The resulting folded tape will be 1/4 the width of the original fabric strip.

[](http://en.wikipedia.org/wiki/File:Extra_Wide_Double_Fold_Bias_Tape.jpg)

[http://bits.wikimedia.org/static-1.22wmf6/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Extra_Wide_Double_Fold_Bias_Tape.jpg)

**This photo shows extra wide double fold bias tape being sewn as a binding on a decorative quilt. Photo provided by**[**Love to Sew Studio**](http://www.lovetosew.com/)

**Refs**

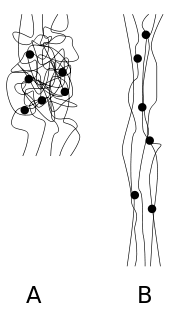
* [Trim (sewing)](http://en.wikipedia.org/wiki/Trim_(sewing))
* [How to Make Continuous Bias Tape, by Shelley Rodgers](http://pir8.freeservers.com/quilting/CBT/)
* Collar stays
* [](http://en.wikipedia.org/wiki/File:CollarStay02.jpg)
* [http://bits.wikimedia.org/static-1.22wmf5/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:CollarStay02.jpg)
* **Plastic collar stay removed from shirt collar**
* [](http://en.wikipedia.org/wiki/File:CollarStay01.jpg)
* [http://bits.wikimedia.org/static-1.22wmf5/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:CollarStay01.jpg)
* **Underside of a men's shirt collar showing removable collar stay**
* [](http://en.wikipedia.org/wiki/File:Metal_Collar_Bones_Tyler&Tyler.jpg)
* [http://bits.wikimedia.org/static-1.22wmf5/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Metal_Collar_Bones_Tyler&Tyler.jpg)
* Metal collar stay are often used to replace plastic ones.
* **Collar stays** (sometimes known as **collar sticks**, **bones**, **knuckles**, **tabs**, in the [UK](http://en.wikipedia.org/wiki/United_Kingdom), **collar stiffeners**, and in Eastern Canada **collar stiffs**) are shirt accessories.
* Collar stays are smooth, rigid strips of [metal](http://en.wikipedia.org/wiki/Metal) (such as [brass](http://en.wikipedia.org/wiki/Brass), [stainless steel](http://en.wikipedia.org/wiki/Stainless_steel), or [sterling silver](http://en.wikipedia.org/wiki/Sterling_silver)), [horn](http://en.wikipedia.org/wiki/Horn_(anatomy)), [baleen](http://en.wikipedia.org/wiki/Baleen), [mother of pearl](http://en.wikipedia.org/wiki/Mother_of_pearl), or [plastic](http://en.wikipedia.org/wiki/Plastic), rounded at one end and pointed at the other, inserted into specially made pockets on the underside of a shirt [collar](http://en.wikipedia.org/wiki/Collar_(clothing)) to stabilize the collar's points. The stays ensure that the collar lies flat against the collarbone, looking crisp and remaining in the correct place. Often shirts come with plastic stays which may eventually need to be replaced if they bend; metal replacements do not have this problem.
* Collar stays can be found in [haberdashers](http://en.wikipedia.org/wiki/Haberdasher), fabric- and sewing-supply stores and men's clothing stores.
* Collar stays should be removed from shirts before dry cleaning or pressing, but then should always be put back by the dry cleaning company. Shirts that are press ironed with the collar stays are vulnerable to damage. Pressing with the collar stays in place results in a telltale impression of the collar stay in the fabric of the collar. Some shirts have stays which are sewn into the collar and aren't removable.

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| Stub icon |

Elastomer

An **elastomer** is a [polymer](http://en.wikipedia.org/wiki/Polymer) with [viscoelasticity](http://en.wikipedia.org/wiki/Viscoelasticity) (colloquially "elasticity"), generally having low [Young's modulus](http://en.wikipedia.org/wiki/Young%27s_modulus) and high failure [strain](http://en.wikipedia.org/wiki/Strain) compared with other materials. The term, which is derived from *elastic polymer*, is often used interchangeably with the term [rubber](http://en.wikipedia.org/wiki/Rubber_(disambiguation)), although the latter is preferred when referring to [vulcanisates](http://en.wikipedia.org/wiki/Vulcanization). Each of the [monomers](http://en.wikipedia.org/wiki/Monomer) which link to form the polymer is usually made of [carbon](http://en.wikipedia.org/wiki/Carbon), [hydrogen](http://en.wikipedia.org/wiki/Hydrogen), [oxygen](http://en.wikipedia.org/wiki/Oxygen) and/or [silicon](http://en.wikipedia.org/wiki/Silicon). Elastomers are [amorphous](http://en.wikipedia.org/wiki/Amorphous) polymers existing above their [glass transition temperature](http://en.wikipedia.org/wiki/Glass_transition_temperature), so that considerable segmental motion is possible. At [ambient temperatures](http://en.wikipedia.org/wiki/Ambient_temperature), rubbers are thus relatively soft ([E](http://en.wikipedia.org/wiki/Young%27s_modulus)~3MPa) and deformable. Their primary uses are for [seals](http://en.wikipedia.org/wiki/Seal_(mechanical)), [adhesives](http://en.wikipedia.org/wiki/Adhesive) and molded flexible parts. Application areas for different types of rubber are manifold and cover segments as diverse as tires, shoe soles as well as dampening and insulating [elements](http://en.wikipedia.org/wiki/Elements). The importance rubbers have can be judged from the fact that global revenues are forecast to rise to US$56 billion in 2020.[[1]](http://en.wikipedia.org/wiki/Elastomer#cite_note-1)

Background

[](http://en.wikipedia.org/wiki/File:Polymer_picture.svg)

[http://bits.wikimedia.org/static-1.22wmf8/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Polymer_picture.svg)

**(A) is an unstressed polymer; (B) is the same polymer under stress. When the stress is removed, it will return to the A configuration. (The dots represent cross-links)**

Elastomers are usually [thermosets](http://en.wikipedia.org/wiki/Thermoset) (requiring [vulcanization](http://en.wikipedia.org/wiki/Vulcanization)) but may also be [thermoplastic](http://en.wikipedia.org/wiki/Thermoplastic) (see [thermoplastic elastomer](http://en.wikipedia.org/wiki/Thermoplastic_elastomer)). The long polymer chains [cross-link](http://en.wikipedia.org/wiki/Cross-link)during curing, i.e., vulcanizing. The molecular structure of elastomers can be imagined as a 'spaghetti and meatball' structure, with the meatballs signifying cross-links. The elasticity is derived from the ability of the long chains to reconfigure themselves to distribute an applied stress. The covalent cross-linkages ensure that the elastomer will return to its original configuration when the stress is removed. As a result of this extreme flexibility, elastomers can reversibly extend from 5-700%, depending on the specific material. Without the cross-linkages or with short, uneasily reconfigured chains, the applied stress would result in a permanent deformation.

Temperature effects are also present in the demonstrated elasticity of a polymer. Elastomers that have cooled to a glassy or crystalline phase will have less mobile chains, and consequentially less elasticity, than those manipulated at temperatures higher than the glass transition temperature of the polymer.

It is also possible for a polymer to exhibit elasticity that is not due to covalent cross-links, but instead for [thermodynamic reasons](http://en.wikipedia.org/wiki/Thermodynamic_theory_of_polymer_elasticity).

Examples of elastomers

**Unsaturated rubbers** that can be cured by sulfur [vulcanization](http://en.wikipedia.org/wiki/Vulcanization):

* [Natural polyisoprene](http://en.wikipedia.org/wiki/Terpene): cis-1,4-polyisoprene [natural rubber](http://en.wikipedia.org/wiki/Natural_rubber) (NR) and trans-1,4-polyisoprene [gutta-percha](http://en.wikipedia.org/wiki/Gutta-percha)
* Synthetic polyisoprene (IR for [Isoprene](http://en.wikipedia.org/wiki/Isoprene) Rubber)
* [Polybutadiene](http://en.wikipedia.org/wiki/Polybutadiene) (BR for [Butadiene](http://en.wikipedia.org/wiki/Butadiene) Rubber)
* [Chloroprene](http://en.wikipedia.org/wiki/Chloroprene) rubber (CR), [polychloroprene](http://en.wikipedia.org/wiki/Polychloroprene), [Neoprene](http://en.wikipedia.org/wiki/Neoprene), Baypren etc.
* [Butyl rubber](http://en.wikipedia.org/wiki/Butyl_rubber) (copolymer of [isobutylene](http://en.wikipedia.org/wiki/Isobutylene) and isoprene, IIR)
  + [Halogenated](http://en.wikipedia.org/wiki/Halogenation) butyl rubbers (chloro butyl rubber: CIIR; bromo butyl rubber: BIIR)
* [Styrene-butadiene](http://en.wikipedia.org/wiki/Styrene-butadiene) Rubber (copolymer of [styrene](http://en.wikipedia.org/wiki/Styrene) and butadiene, SBR)
* [Nitrile rubber](http://en.wikipedia.org/wiki/Nitrile_rubber) (copolymer of butadiene and [acrylonitrile](http://en.wikipedia.org/wiki/Acrylonitrile), NBR), also called [Buna N rubbers](http://en.wikipedia.org/wiki/Plastic#Synthetic_rubber)
  + [Hydrogenated](http://en.wikipedia.org/wiki/Hydrogenation) Nitrile Rubbers (HNBR) Therban and Zetpol

(Unsaturated rubbers can also be cured by non-sulfur vulcanization if desired).

**Saturated rubbers** that cannot be cured by sulfur vulcanization:

* EPM ([**ethylene propylene rubber**](http://en.wikipedia.org/wiki/Ethylene_propylene_rubber), a copolymer of [ethylene](http://en.wikipedia.org/wiki/Ethylene) and [propylene](http://en.wikipedia.org/wiki/Propylene)) and [EPDM rubber](http://en.wikipedia.org/wiki/EPDM_rubber) (**ethylene propylene diene rubber**, a terpolymer of ethylene, propylene and a [diene](http://en.wikipedia.org/wiki/Diene)-component)
* [Epichlorohydrin](http://en.wikipedia.org/wiki/Epichlorohydrin) rubber (ECO)
* Polyacrylic rubber (ACM, ABR)
* [Silicone rubber](http://en.wikipedia.org/wiki/Silicone_rubber) (SI, Q, VMQ)
* [Fluorosilicone](http://en.wikipedia.org/w/index.php?title=Fluorosilicone&action=edit&redlink=1) Rubber (FVMQ)
* [Fluoroelastomers](http://en.wikipedia.org/wiki/Fluoroelastomer) ([FKM](http://en.wikipedia.org/wiki/FKM), and FEPM) [Viton](http://en.wikipedia.org/wiki/Viton), [Tecnoflon](http://en.wikipedia.org/w/index.php?title=Tecnoflon&action=edit&redlink=1), Fluorel, [Aflas](http://en.wikipedia.org/w/index.php?title=Aflas&action=edit&redlink=1) and Dai-El
* Perfluoroelastomers (FFKM) [Tecnoflon](http://en.wikipedia.org/w/index.php?title=Tecnoflon&action=edit&redlink=1) PFR, [Kalrez](http://en.wikipedia.org/wiki/Kalrez), Chemraz, Perlast
* [Polyether block amides](http://en.wikipedia.org/w/index.php?title=Polyether_block_amides&action=edit&redlink=1) (PEBA)
* Chlorosulfonated polyethylene (CSM), (Hypalon)
* [Ethylene-vinyl acetate](http://en.wikipedia.org/wiki/Ethylene-vinyl_acetate) (EVA)

"The definitions are not authentic as the Rubber which is classified in World Customs Organisation Books in Chapter 40, where as the above definitions stating all rubber and different polymers in same chapter which is classified in Chapter 39 of the World Custom Organisation's Harmonised Commodity for Description and coding system. One should go through all differentiation while editing between Plastics and articles thereof and Rubber and articles thereof."

**Various other types of elastomers**:

* [Thermoplastic elastomers](http://en.wikipedia.org/wiki/Thermoplastic_elastomer) (TPE)
* The [proteins](http://en.wikipedia.org/wiki/Protein) [resilin](http://en.wikipedia.org/wiki/Resilin) and [elastin](http://en.wikipedia.org/wiki/Elastin)
* [Polysulfide](http://en.wikipedia.org/wiki/Polysulfide) rubber
* [Elastolefin](http://en.wikipedia.org/wiki/Elastolefin), elastic fiber used in fabric production

References

* 1. [**^**](http://en.wikipedia.org/wiki/Elastomer#cite_ref-1) ["Market Study on Synthetic Rubber"](http://www.ceresana.com/en/market-studies/plastics/synthetic-rubber/market-study-synthetic-rubber.html). Ceresana.com.
* [Common Properties of Rubber Elastomers](http://www.customadvanced.com/common-properties-of-rubber-elastomers.html)

# Grommet

**From Wikipedia, the free encyclopedia**

***This article is about a ring in material. For the juvenile sportsperson, see***[***grommet (sportsperson)***](http://en.wikipedia.org/wiki/Grommet_(sportsperson))***. For the animated character, see***[***Gromit***](http://en.wikipedia.org/wiki/Gromit)***.***

***"Eyelet" redirects here. For its homophone, see***[***islet***](http://en.wikipedia.org/wiki/Islet)***.***

**[](http://en.wikipedia.org/wiki/File:Eyelets_For_Curtain.jpg)**

**[http://bits.wikimedia.org/static-1.22wmf8/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Eyelets_For_Curtain.jpg)**

Curtain grommets for use in e.g. [shower curtains](http://en.wikipedia.org/wiki/Shower_curtains).

A grommet is a ring inserted into a hole through thin material, such as [fabric](http://en.wikipedia.org/wiki/Fabric). Grommets are generally flared or collared on each side to keep them in place, and are often made of [metal](http://en.wikipedia.org/wiki/Metal), [plastic](http://en.wikipedia.org/wiki/Plastic), or [rubber](http://en.wikipedia.org/wiki/Rubber). They may be used to prevent tearing or abrasion of the pierced material, to cover sharp edges of the piercing, or both. A small grommet may also be called an eyelet, used for example on shoes for lacing purposes.[[1]](http://en.wikipedia.org/wiki/Grommet#cite_note-1)

## Grommets as reinforcement or crafting

**[](http://en.wikipedia.org/wiki/File:Eyelet.jpg)**

**[http://bits.wikimedia.org/static-1.22wmf8/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Eyelet.jpg)**

**Metal eyelet and an eyelet setting tool.**

Grommets are used to reinforce holes in [leather](http://en.wikipedia.org/wiki/Leather), [cloth](http://en.wikipedia.org/wiki/Cloth), [shoes](http://en.wikipedia.org/wiki/Shoes), [canvas](http://en.wikipedia.org/wiki/Canvas) and other [fabrics](http://en.wikipedia.org/wiki/Textile).[[2]](http://en.wikipedia.org/wiki/Grommet#cite_note-AceHardware-2) They can be made of [metal](http://en.wikipedia.org/wiki/Metal), [rubber](http://en.wikipedia.org/wiki/Rubber), or [plastic](http://en.wikipedia.org/wiki/Plastic), and are easily used in common projects, requiring only the grommet itself and a means of setting it with a [punch](http://en.wikipedia.org/wiki/Punch_(tool)), a metal rod with a [convex](http://en.wiktionary.org/wiki/convex) tip. A simple punch, often sold with the grommets can be struck with a [hammer](http://en.wikipedia.org/wiki/Hammer) to set the gormmet.[[2]](http://en.wikipedia.org/wiki/Grommet#cite_note-AceHardware-2) There are also dedicated grommet presses with punch and anvil, as shown in the picture, ranging from inexpensive to better-quality tools, which are somewhat faster to use. They are used to strengthen holes; in footwear for boot and shoe laces, in laced clothing such as [corsets](http://en.wikipedia.org/wiki/Corset), and in curtains and other household items that require hanging from hooks, as when they are used in conjunction with tensioner rods for shower curtains.[[3]](http://en.wikipedia.org/wiki/Grommet#cite_note-3) The grommet prevents the cord from tearing through the hole, thereby providing structural integrity. Small grommets are also called eyelets, especially when used in clothing or crafting. Eyelets may be used purely decoratively for crafting. When used in sailing and various other applications they are called [cringles](http://en.wikipedia.org/wiki/Cringle).

* **[](http://en.wikipedia.org/wiki/File:Aman_Eyelets.jpg)**

**Brass eyelets.**

* **[](http://en.wikipedia.org/wiki/File:Shoelaces_20050719_002.jpg)**

**Mountain boot with 6+4+2 eyelets.**

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  2. **^**[***a***](http://en.wikipedia.org/wiki/Grommet#cite_ref-AceHardware_2-0)[***b***](http://en.wikipedia.org/wiki/Grommet#cite_ref-AceHardware_2-1)[**"General Grommet Tools Fastening Kit"**](http://www.acehardware.com/product/index.jsp?productId=1292916&cp=2568443.2568450.2628075.2628107)**.**[**Ace Hardware**](http://en.wikipedia.org/wiki/Ace_Hardware)**. Retrieved 8 December 2011.**
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Interfacing

**[](http://en.wikipedia.org/wiki/File:Interfacing_at_hem.jpg)**

**[http://bits.wikimedia.org/static-1.22wmf7/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Interfacing_at_hem.jpg)**

**Interfacing used to reinforce a hem.**

Interfacing is a [textile](http://en.wikipedia.org/wiki/Textile) used on the unseen or "wrong" side of [fabrics](http://en.wikipedia.org/wiki/Fabrics) to make an area of a garment more rigid.

Interfacings can be used to:[[1]](http://en.wikipedia.org/wiki/Interfacing#cite_note-1)

* stiffen or add body to fabric, such as the interfacing used in [shirt](http://en.wikipedia.org/wiki/Shirt) collars
* strengthen a certain area of the fabric, for instance where [buttonholes](http://en.wikipedia.org/wiki/Buttonhole) will be sewn
* keep fabrics from stretching out of shape, particularly [knit](http://en.wikipedia.org/wiki/Knit) fabrics

Interfacings come in a variety of weights and stiffnesses to suit different purposes. They are also available in different colours,[[2]](http://en.wikipedia.org/wiki/Interfacing#cite_note-2) although typically interfacing is white. Generally, the heavier weight a fabric is, the heavier weight an interfacing it will use. Interfacing is sold at fabric stores by the yard or metre from bolts, similar to cutting fabric. [Sewing patterns](http://en.wikipedia.org/wiki/Pattern_(sewing)) specify if interfacing is needed, the weight of interfacing that is required, and the amount. Some patterns use the same fabric as the garment to create an interfacing, as with sheer fabrics.[[3]](http://en.wikipedia.org/wiki/Interfacing#cite_note-3)

**Fusible interfacing**

Most modern interfacings have heat-activated [adhesive](http://en.wikipedia.org/wiki/Adhesive) on one side. They are affixed to a garment piece using heat and moderate pressure, from a hand iron for example. This type of interfacing is known as "fusible" interfacing.[[4]](http://en.wikipedia.org/wiki/Interfacing#cite_note-4) Non-fusible interfacings do not have adhesive and must be [sewn](http://en.wikipedia.org/wiki/Sewing) by hand or machine**.**

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Passementerie

[](http://en.wikipedia.org/wiki/File:Passementerie.jpg)

[http://bits.wikimedia.org/static-1.22wmf6/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Passementerie.jpg)

**Passementerie of cording and braid, embellished with beads, French, 1908.**

**Passementerie** or **passementarie** is the art of making elaborate [trimmings](http://en.wikipedia.org/wiki/Trim_(sewing)) or edgings (in French, **passements**) of applied [braid](http://en.wikipedia.org/wiki/Braid),[gold](http://en.wikipedia.org/wiki/Gold) or [silver](http://en.wikipedia.org/wiki/Silver) cord, [embroidery](http://en.wikipedia.org/wiki/Embroidery), colored [silk](http://en.wikipedia.org/wiki/Silk), or [beads](http://en.wikipedia.org/wiki/Bead) for [clothing](http://en.wikipedia.org/wiki/Clothing) or [furnishings](http://en.wikipedia.org/wiki/Furnishing).

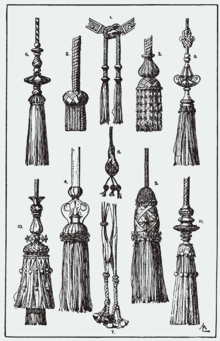
Styles of passementerie include the [tassel](http://en.wikipedia.org/wiki/Tassel), [fringes](http://en.wikipedia.org/wiki/Fringe_(trim)) (applied, as opposed to integral), ornamental cords, [galloons](http://en.wikipedia.org/wiki/Galloon), [pompons](http://en.wikipedia.org/wiki/Pompon),[rosettes](http://en.wikipedia.org/wiki/Rosette_(decoration)), and [gimps](http://en.wikipedia.org/wiki/Gimp_(thread)) as other forms. Tassels, pompons, and rosettes are *point* ornaments, and the others are linear ornaments.

Overview

Passementerie worked in white [linen](http://en.wikipedia.org/wiki/Linen) thread is the origin of [bobbin lace](http://en.wikipedia.org/wiki/Bobbin_lace),[[2]](http://en.wikipedia.org/wiki/Passementerie#cite_note-2) and *passement* is an early French word for [lace](http://en.wikipedia.org/wiki/Lace).[[3]](http://en.wikipedia.org/wiki/Passementerie#cite_note-3)

Today, passementerie is used with clothing, such as the gold braid on military [dress uniforms](http://en.wikipedia.org/wiki/Dress_uniform), and for decorating [couture](http://en.wikipedia.org/wiki/Haute_couture) clothing and [wedding gowns](http://en.wikipedia.org/wiki/Wedding_gown). They are also used in furniture trimming, such as the [Centripetal Spring Armchair](http://en.wikipedia.org/wiki/Centripetal_Spring_Armchair) of 1849 and some [lampshades](http://en.wikipedia.org/wiki/Lampshade), [draperies](http://en.wikipedia.org/wiki/Curtain), [fringes](http://en.wikipedia.org/wiki/Fringe_(trim)) and [tassels](http://en.wikipedia.org/wiki/Tassel).

History

[](http://en.wikipedia.org/wiki/File:Orna118-Quasten.png)

[http://bits.wikimedia.org/static-1.22wmf6/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Orna118-Quasten.png)

In the [West](http://en.wikipedia.org/wiki/West), tassels were originally a series of windings of thread or string around a suspending string until the desired curvature was attained. Decades later, turned wooden moulds, which were either covered in simple wrappings or much more elaborate coverings called "satinings", were used. This involved an intricate binding of bands of filament silk vertically around the mould by means of an internal "lacing" in the bore of the mould. A tassel is primarily an ornament, and was at first the casual termination of a cord to prevent unraveling with a knot. As time went on, various peoples developed variations on this.

In the 16th century, the Guild of Passementiers was created in [France](http://en.wikipedia.org/wiki/France). In France practitioners of the art were called "passementiers", and an[apprenticeship](http://en.wikipedia.org/wiki/Apprenticeship) of seven years was required to become a master in one of the subdivisions of the guild.

The Guild documented the art of passementerie. The tassel was its primary expression, but it also included [fringes](http://en.wikipedia.org/wiki/Fringe_(trim)) (applied, as opposed to integral), ornamental cords, [galloons](http://en.wikipedia.org/wiki/Galloon), [pompons](http://en.wikipedia.org/wiki/Pompon), [rosettes](http://en.wikipedia.org/wiki/Rosette_(decoration)), and [gimps](http://en.wikipedia.org/wiki/Gimp_(thread)) as other forms. Tassels, [pompons](http://en.wikipedia.org/wiki/Pompon), and rosettes are *point* ornaments; the others are linear ornaments. These constructions were varied and augmented with extensive ornamentations. These constructions were each assigned an idiosyncratic term by their [French](http://en.wikipedia.org/wiki/French_people) practitioners.

The French widely exported their very artistic work, and at such low prices that no other nation developed a mature "trimmings" industry. Tassels and their associated forms changed style throughout the years, from the small and casual of [Renaissance](http://en.wikipedia.org/wiki/Renaissance) designs, through the medium sizes and more staid designs of the Empire period, and to the [Victorian Era](http://en.wikipedia.org/wiki/Victorian_Era) with the largest and most elaborate.

Passementerie with clothing was for a long time reserved for the elites as a sign of social distinction among royalty, aristocracy, religious, and military. Since the 18th century, the use became obsolete with the simplification of clothing.

Some of the historic designs are returning today from European and American artisans.

Notes

1. [**^**](http://en.wikipedia.org/wiki/Passementerie#cite_ref-1) [The art of passementerie](http://www.passementeries.com/warp/about.htm)
2. [**^**](http://en.wikipedia.org/wiki/Passementerie#cite_ref-2) Montupet, Janine, and Ghislaine Schoeller: *Lace: The Elegant Web*, [ISBN 0-8109-3553-8](http://en.wikipedia.org/wiki/Special:BookSources/0810935538)
3. [**^**](http://en.wikipedia.org/wiki/Passementerie#cite_ref-3) S.F.A. Caulfield and B.C. Saward, *The Dictionary of Needlework*, 1885.

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* Caulfield, S.F.A. and B.C. Saward, *The Dictionary of Needlework*, 1885.
* Montupet, Janine, and Ghislaine Schoeller: *Lace: The Elegant Web*, [ISBN 0-8109-3553-8](http://en.wikipedia.org/wiki/Special:BookSources/0810935538).
* [Picken, Mary Brooks](http://en.wikipedia.org/wiki/Mary_Brooks_Picken), *The Fashion Dictionary*, Funk and Wagnalls, 1957. (1973 edition [ISBN 0-308-10052-2](http://en.wikipedia.org/wiki/Special:BookSources/0308100522), 1999 Dover republication [ISBN 0-486-40294-0](http://en.wikipedia.org/wiki/Special:BookSources/0486402940)
* [Passementerie](http://www3.fitnyc.edu/museum/TailorsArt/Passementerie.htm) page at "The Tailor's Art," Museum of the [Fashion Institute of Technology](http://en.wikipedia.org/wiki/Fashion_Institute_of_Technology).
* Rickrack
* **Rickrack** is a "flat narrow braid woven in [zigzag](http://en.wikipedia.org/wiki/Zigzag) form, used as a trimming for clothing or curtains."[[1]](http://en.wikipedia.org/wiki/Rickrack#cite_note-1)
* Made of [cotton](http://en.wikipedia.org/wiki/Cotton) or [polyester](http://en.wikipedia.org/wiki/Polyester), it is stitched or glued to the edges of an item. Its [zig-zag](http://en.wikipedia.org/wiki/Zig-zag) configuration repeats every third of an inch (about one centimeter) and is sold in multiple colors and textures. Rickrack's popularity peaked in the 1970s and is associated with the [*Little House on the Prairie*](http://en.wikipedia.org/wiki/Little_House_on_the_Prairie_(TV_series)) and the pioneer sentiment brought about by the 1976 [American](http://en.wikipedia.org/wiki/United_States) bicentennial.[[*citation needed*](http://en.wikipedia.org/wiki/Wikipedia:Citation_needed)]
* [](http://en.wikipedia.org/wiki/File:Red_and_Cream_Rickrack.jpg)
* **Red and Cream color rickrack embellish this**[**handmade country style half-apron**](http://www.lovetosew.com/apronsphotopage2.htm)**made from cotton calico prints.**
* Self-fabric
* **Self-fabric** is a term used in [sewing](http://en.wikipedia.org/wiki/Sewing). It refers to a fabric piece or [embellishment](http://en.wikipedia.org/wiki/Embellishment) made from the same fabric as the main fabric, as opposed to [contrast fabric](http://en.wikipedia.org/wiki/Contrast_fabric).
* Self-fabric is usually used in certain pattern pieces such as facings and [linings](http://en.wikipedia.org/wiki/Lining_(sewing)) to produce clean garment lines and make the fabric piece blend in with the rest of the garment. A special type of[button](http://en.wikipedia.org/wiki/Button) is often covered in self-fabric to minimize its visibility.
* Self-fabric can also be used to make design details stand out. For example, a patch pocket on a coat could be made of contrasting fabric, but have an [appliqué](http://en.wikipedia.org/wiki/Applique) made of self-fabric on the pocket. A very common use of self-fabric as an embellishment is to make two garments that are to be worn together out of different fabrics and use self-fabric from one garment as a trim on the other (such as [piping](http://en.wikipedia.org/wiki/Piping_(sewing))).

Soutache

[](http://en.wikipedia.org/wiki/File:VtSenateSoutache.jpg)

[http://bits.wikimedia.org/static-1.22wmf6/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:VtSenateSoutache.jpg)

**A curved border of soutache trim in drapery found in the**[**Vermont Senate Chamber**](http://en.wikipedia.org/wiki/Vermont_Senate)**of the**[**Vermont State House**](http://en.wikipedia.org/wiki/Vermont_State_House)**.**

A **soutache** is narrow flat decorative [braid](http://en.wikipedia.org/wiki/Braid), a type of [galloon](http://en.wikipedia.org/wiki/Galloon), used in the trimming of drapery or clothing. In clothing soutache is used to conceal a seam.

In military uniforms a particular width or color of soutache is used to indicate rank, particularly in a hat. In athletic uniforms a contrasting soutache is used to outline numbers or players' names.

Soutache is often woven of metallic bullion thread, silk, or a blend of silk and wool. In the 20th century soutache began to be woven of [rayon](http://en.wikipedia.org/wiki/Rayon) and other synthetic fibers.

The term is also used in [bookbinding](http://en.wikipedia.org/wiki/Bookbinding), where a narrow soutache is applied at the top and bottom of a book back to reinforce the spine and provide a barrier to keep dust out of the binding.

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Trim (sewing)

**Trim** or **trimming** in [clothing](http://en.wikipedia.org/wiki/Clothing) and [home decorating](http://en.wikipedia.org/wiki/Home_decorating) is applied ornament, such as [gimp](http://en.wikipedia.org/wiki/Gimp_(thread)), [passementerie](http://en.wikipedia.org/wiki/Passementerie), [ribbon](http://en.wikipedia.org/wiki/Ribbon), [ruffles](http://en.wikipedia.org/wiki/Ruffle), or, as a [verb](http://en.wikipedia.org/wiki/Verb), to apply such ornament.

[](http://en.wikipedia.org/wiki/File:Godey-april-1861.jpg)

[http://bits.wikimedia.org/static-1.22wmf5/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Godey-april-1861.jpg)

**Elaborately trimmed fashions for April 1861 from**[***Godey's Lady's Book***](http://en.wikipedia.org/wiki/Godey%27s_Lady%27s_Book)**.**

Before the [industrial revolution](http://en.wikipedia.org/wiki/Industrial_revolution), all trim was made and applied by hand, thus making heavily trimmed furnishings and garments expensive and high-status. Machine-woven trims and [sewing machines](http://en.wikipedia.org/wiki/Sewing_machine) put these dense trimmings within the reach of even modest [dressmakers](http://en.wikipedia.org/wiki/Dressmaker) and home sewers, and an abundance of trimming is a characteristic of mid-[Victorian fashion](http://en.wikipedia.org/wiki/Victorian_fashion).[[1]](http://en.wikipedia.org/wiki/Trim_(sewing)#cite_note-1) As a predictable reaction, high [fashion](http://en.wikipedia.org/wiki/Fashion) came to emphasize exquisiteness of [cut](http://en.wikipedia.org/wiki/Cut_(clothing)) and construction over denseness of trimming, and applied trim became a signifier of [mass-produced](http://en.wikipedia.org/wiki/Mass-produced) clothing by the 1930s.[[2]](http://en.wikipedia.org/wiki/Trim_(sewing)#cite_note-2)The iconic braid and gold [button](http://en.wikipedia.org/wiki/Button) trim of the [Chanel suit](http://en.wikipedia.org/wiki/Chanel_suit) are a notable survival of trim in high fashion.[[*citation needed*](http://en.wikipedia.org/wiki/Wikipedia:Citation_needed)]

In [home decorating](http://en.wikipedia.org/wiki/Home_decorating), the 1980s and 1990s saw a fashion for dense, elaborately layered trimmings on [upholstered furniture](http://en.wikipedia.org/wiki/Upholstered_furniture) and[drapery](http://en.wikipedia.org/wiki/Drapery).[[*citation needed*](http://en.wikipedia.org/wiki/Wikipedia:Citation_needed)]

Today, most trimmings are commercially manufactured.[[*citation needed*](http://en.wikipedia.org/wiki/Wikipedia:Citation_needed)] [Scalamandré](http://en.wikipedia.org/w/index.php?title=Scalamandr%C3%A9&action=edit&redlink=1) is known for elaborate trim for [home furnishings](http://en.wikipedia.org/wiki/Home_furnishing), and [Wrights](http://en.wikipedia.org/wiki/Wrights_(textile_manufacturers))is a leading manufacturer of trim for home sewing and crafts.[[*citation needed*](http://en.wikipedia.org/wiki/Wikipedia:Citation_needed)] Trims are used generally to enhance the beauty of the garments. It attracts buyers. Appropriate use of it creates more value of the product.

* [**Bias tape**](http://en.wikipedia.org/wiki/Bias_tape)
* [**Braid**](http://en.wikipedia.org/wiki/Braid)
* [**Buttons**](http://en.wikipedia.org/wiki/Button)
* [**Cord**](http://en.wikipedia.org/wiki/Cord_(sewing))
* [**Embroidery**](http://en.wikipedia.org/wiki/Embroidery)**by hand or**[**machine**](http://en.wikipedia.org/wiki/Machine_embroidery)
* [**Gimp**](http://en.wikipedia.org/wiki/Gimp_(thread))
* [**Lace**](http://en.wikipedia.org/wiki/Lace)**edgings or insertions**
* [**Passementerie**](http://en.wikipedia.org/wiki/Passementerie)
* [**Piping**](http://en.wikipedia.org/wiki/Piping_(sewing))
* [**Ribbon**](http://en.wikipedia.org/wiki/Ribbon)
* [**Rickrack**](http://en.wikipedia.org/wiki/Rickrack)
* [**Ruffles**](http://en.wikipedia.org/wiki/Ruffle)**or frills**
* [**Tassels**](http://en.wikipedia.org/wiki/Tassel)

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1. [**^**](http://en.wikipedia.org/wiki/Trim_(sewing)#cite_ref-1) Tozer, Jane and Sarah Levitt, *Fabric of Society: A Century of People and their Clothes 1770-1870*, [Laura Ashley Press](http://en.wikipedia.org/w/index.php?title=Laura_Ashley_Press&action=edit&redlink=1), [ISBN 0-9508913-0-4](http://en.wikipedia.org/wiki/Special:BookSources/0950891304)
2. [**^**](http://en.wikipedia.org/wiki/Trim_(sewing)#cite_ref-2) Hawes, Elizabeth *Fashion is Spinach*, [Random House](http://en.wikipedia.org/wiki/Random_House), 1938

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Twill tape

**Twill tape** is a flat [twill](http://en.wikipedia.org/wiki/Twill)-[woven](http://en.wikipedia.org/wiki/Weaving) [ribbon](http://en.wikipedia.org/wiki/Ribbon) of [cotton](http://en.wikipedia.org/wiki/Cotton), [linen](http://en.wikipedia.org/wiki/Linen), [polyester](http://en.wikipedia.org/wiki/Polyester), or [wool](http://en.wikipedia.org/wiki/Wool).

Twill tape is available in various widths, generally up to 1 inch (2.5 cm), and a wide range of colors.

Twill tape is used in [sewing](http://en.wikipedia.org/wiki/Sewing) and [tailoring](http://en.wikipedia.org/wiki/Tailor) to reinforce [seams](http://en.wikipedia.org/wiki/Seam_(sewing)), make [casings](http://en.wikipedia.org/wiki/Casing_(molding)), bind edges, and make sturdy ties for closing garments (for example, on [hospital gowns](http://en.wikipedia.org/wiki/Hospital_gown)).

Twill tape is also used in theatre to tie curtains, cable and scenery to various objects, or to tie cable coils so that they do not unroll.

A form of twill tape is sometimes used to wrap the [handlebars](http://en.wikipedia.org/wiki/Bicycle_handlebar) of [road bicycles](http://en.wikipedia.org/wiki/Road_bicycle).

Wrights (textile manufacturers)

**Wrights** is a brand of [trim](http://en.wikipedia.org/wiki/Trim_(sewing)) and other [textiles](http://en.wikipedia.org/wiki/Textiles) for home [sewing](http://en.wikipedia.org/wiki/Sewing), owned since 2001 by the [Simplicity Creative Group](http://en.wikipedia.org/w/index.php?title=Simplicity_Creative_Group&action=edit&redlink=1).

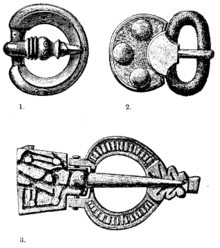
The Wrights brand was introduced in 1897 when William E. Wright & Sons was founded in Massachusetts.[[1]](http://en.wikipedia.org/wiki/Wrights_(textile_manufacturers)#cite_note-about-1) Wright & Sons remained independent until 1985, when a group of shareholders—including a grandson of the founder—enabled the [Newell Company](http://en.wikipedia.org/wiki/Newell_Rubbermaid) to acquire a minority share in the company; within month that share grew until it acquire control over the company.[[2]](http://en.wikipedia.org/wiki/Wrights_(textile_manufacturers)#cite_note-newell-2) In 1989[Boye Needle Company](http://en.wikipedia.org/w/index.php?title=Boye_Needle_Company&action=edit&redlink=1) was merged into Wrights.[[1]](http://en.wikipedia.org/wiki/Wrights_(textile_manufacturers)#cite_note-about-1) In 2001 [Conso International Corporation](http://en.wikipedia.org/w/index.php?title=Conso_International_Corporation&action=edit&redlink=1), a [South Carolina](http://en.wikipedia.org/wiki/South_Carolina) manufacturer of trims to the wholesale trade, and owners of the [Simplicity Pattern](http://en.wikipedia.org/wiki/Simplicity_Pattern)brand, bought the company.[[*citation needed*](http://en.wikipedia.org/wiki/Wikipedia:Citation_needed)]

References[[edit](http://en.wikipedia.org/w/index.php?title=Wrights_(textile_manufacturers)&action=edit&section=1)]

* 1. ^ [***a***](http://en.wikipedia.org/wiki/Wrights_(textile_manufacturers)#cite_ref-about_1-0) [***b***](http://en.wikipedia.org/wiki/Wrights_(textile_manufacturers)#cite_ref-about_1-1) ["Home: About Us"](http://www.wrights.com/t-about.aspx). Simplicity Creative Group. Retrieved 2013-02-12.
  2. [**^**](http://en.wikipedia.org/wiki/Wrights_(textile_manufacturers)#cite_ref-newell_2-0) ["Newell Co. - Company Profile"](http://www.referenceforbusiness.com/history2/85/Newell-Co.html). referenceforbusiness.com. Retrieved 2013-02-12. "In June 1985 Newell acquired a 20 percent stake in William E. Wright Company from a group dissenting from the majority, including three board members and the grandson of Wright Company's founder. A few months later Newell raised its stake in Wright, a maker of sewing notions, and by the end of the year Newell had obtained majority control of the company and ousted Wright's board and top officers....By 1987 Newell had acquired complete control of Wright."

# CLOSURES

# Buckle

**[](http://en.wikipedia.org/wiki/File:Soelja.png)**

**[http://bits.wikimedia.org/static-1.22wmf7/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Soelja.png)**

**Archeological bronze buckles from southern Sweden. The upper-left buckle is a simple frame-and-prong design, while the bottom buckle features an integrated chape or cap-end with a center pin attaching the frame.**

The **buckle or clasp** is a device used for fastening two loose ends, with one end attached to it and the other held by a catch in a secure but adjustable manner.[[1]](http://en.wikipedia.org/wiki/Buckle#cite_note-1) Often taken for granted, the invention of the buckle has been indispensable in securing two ends before the invention of the [zipper](http://en.wikipedia.org/wiki/Zipper). The basic buckle frame comes in a variety of shapes and sizes depending on the intended use and fashion of the era.[[2]](http://en.wikipedia.org/wiki/Buckle#cite_note-Meredith_2008_pg._5-2) Buckles are as much in use today as they have been in the past. Used for much more than just securing one’s [belt](http://en.wikipedia.org/wiki/Belt_(clothing)), instead it is one of the most dependable devices in securing a range of items.

## Historical background

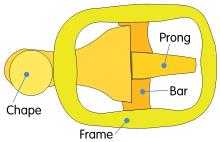
The word "buckle" enters [Middle English](http://en.wikipedia.org/wiki/Middle_English) via [Old French](http://en.wikipedia.org/wiki/Old_French) and the [Latin](http://en.wikipedia.org/wiki/Latin) *buccula* or "cheek-strap," as for a helmet. Some of the earliest buckles known are those used by Roman soldiers to strap their body armor together and prominently on the [balteus](http://en.wikipedia.org/wiki/Baldric#Roman_balteus) and [cingulum](http://en.wikipedia.org/wiki/Cingulum)[[*disambiguation needed*](http://toolserver.org/~dispenser/cgi-bin/dab_solver.py?page=Buckle&editintro=Template:Disambiguation_needed/editintro&client=Template:Dn)]. Made out of bronze and expensive, these buckles were purely functional for their strength and durability vital to the individual soldier. The [baldric](http://en.wikipedia.org/wiki/Baldric) was a later belt worn diagonally over the right shoulder down to the waist at the left carrying the sword, and its buckle therefore was as important as that on a Roman soldier’s armor.[[3]](http://en.wikipedia.org/wiki/Buckle#cite_note-3)

Bronze Roman buckles came in various types. Not only used for practical purposes, these buckles were also decorated. A Type I Roman buckle was a “buckle-plate” either decorated or plain and consisted of geometric ornaments. Type IA Roman buckles were similar to Type I buckles but differed by being long and narrow, made of double sheet metal, and attached to small D-shaped buckles (primarily had dolphin-heads as decorations). Type IB “buckle-loops” were even more similar to Type IA buckles, only difference being that instead of dolphin-heads, they were adorned with horse-heads. There were also Type II buckles (Type IIA and Type IIB) used by Romans, but all types of Roman buckles could have served purposes for simple clothing as well, and predominantly, as a military purpose.[[4]](http://en.wikipedia.org/wiki/Buckle#cite_note-4)

Aside from the practical use found in Roman buckles, Scythian and Sarmatian buckles incorporated animal motifs that were characteristic to their respective decorative arts.[[5]](http://en.wikipedia.org/wiki/Buckle#cite_note-5) These motifs often represented animals engaged in mortal combat. These motifs were imported by many Germanic peoples and the belt buckles were evident in the graves of the Franks and Burgundies. And throughout the Middle Ages, the buckle was used mostly for ornamentation until the second half of the 14th century where the knightly belt and buckle took on its most splendid form.[[6]](http://en.wikipedia.org/wiki/Buckle#cite_note-6)

Buckles remained exclusively for the wealthy until the 15th century where improved manufacturing techniques made it possible to easily produce a cheaper molded item available to the general population.[[7]](http://en.wikipedia.org/wiki/Buckle#cite_note-7)

## Components

**[](http://en.wikipedia.org/wiki/File:Buckle_Showing_various_parts.svg)**

**[http://bits.wikimedia.org/static-1.22wmf7/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Buckle_Showing_various_parts.svg)**

**Buckle Showing various components**

**The buckle** essentially consists of four main components: the frame, chape, bar, and prong. The oldest Roman buckles are of a simple "D"-shaped frame, in which the prong or tongue extends from one side to the other. In the 14th century, buckles with a double-loop or "8"-shaped frame emerged. The prongs of these buckles attach to the center post. The appearance of multi-part buckles with chapes and removable pins, which were commonly found on shoes, occurred in the 17th century.

### Frame

The frame is the most visible part of the buckle and holds the other parts of the buckle together. Buckle frames come in various shapes, sizes, and decorations. The shape of the frame could be a plain square or rectangle, but may be oval or made into a circular shape. A reverse curve of the frame indicated that the whole buckle was intended to be used for securing a thick material, such as leather. This reverse curve shape made it easier to thread the intended thick material end over the bar. But the shape of the frame is not limited to simply squares and ovals, the decoration of the frame itself defines the shape it will turn out to be. Since the frame is the largest part of the buckle, any and all decorations are placed on it. Decorations range from wedged shapes, picture references to people and animals, and insignia of a desired organization.[[2]](http://en.wikipedia.org/wiki/Buckle#cite_note-Meredith_2008_pg._5-2)

The part of the frame that strap goes through prior to putting the tongue/prong through the hole is often referred to as the 'end bar'. The 'center bar' holds the tongue and the part (if present) that holds the tip of the strap in place is called the 'keeper' or 'keeper bar' these terms are used when additional information is needed to describe a buckle for measurements or design. Note that if an a separate piece of leather or metal is attached to the strap for holding the tip of the belt/strap in place that is sometimes also called a 'keeper'.

### Chape

Chapes or "caps" of various designs could be fitted to the bar to enable one strap end to be secured before fastening the other, adjustable end. This made buckles easily removable and interchangeable, leading to a significant advantage since buckles were expensive.[[2]](http://en.wikipedia.org/wiki/Buckle#cite_note-Meredith_2008_pg._5-2) Unfortunately, the teeth or spikes on the semi-circular chapes damaged the straps or belts, making frequent repairs of the material necessary. Buckles fitted with "T"-, anchor-, or spade-shaped chapes avoided this problem but needed a slotted end in the belt to accommodate them.[[8]](http://en.wikipedia.org/wiki/Buckle#cite_note-Meredith_2008_pg._7-8)

### Prong

The prong is typically made out of steel or other types of metal. In conventional belts, the prong fits through the buckle to secure the material at a pre-set length.[[9]](http://en.wikipedia.org/wiki/Buckle#cite_note-9)

The Prong is usually referred to as the tongue of the buckle in America. As in in 'Lock-Tongued buckle'. Prong is only used when the tongue is permanently fixed in position.[[10]](http://en.wikipedia.org/wiki/Buckle#cite_note-10)

### Bar

The bar served to hold the chape and prong to the frame. When prongs and chapes are removed from the buckle design, the buckle incorporated a movable bar relying on the tension of the adjusted belt to keep it in place.[[11]](http://en.wikipedia.org/wiki/Buckle#cite_note-11)

## Materials

### Metal

The first known buckles to be used were made out of bronze for their strength and durability for military usage.[[12]](http://en.wikipedia.org/wiki/Buckle#cite_note-12)[[13]](http://en.wikipedia.org/wiki/Buckle#cite_note-13)

For the last few hundred years, buckles have been made from brass (an alloy of copper and zinc). In the 18th century, brass buckles incorporated iron bars, chapes, and prongs due to the parts being made by different manufactures. Silver was also used in buckle manufacturing for its malleability and for being strong and durable with an attractive shine. White metal, any bright metallic compound, was also used in all styles of buckles; however, if iron was present, rust will form if it is allowed to be exposed and remain in damp conditions.[[14]](http://en.wikipedia.org/wiki/Buckle#cite_note-14)

### Pearl

Pearl buckles have been made from pearly shells and usually for ladies’ dresses. Since a reasonable size flat surface was needed to make a buckle, oyster was commonly used to make these types of buckles. The quality and color of course vary, ranging from layers of yellow and white to brown or grey.[[15]](http://en.wikipedia.org/wiki/Buckle#cite_note-15)

### Wood

When preferred materials were scarce during the Great Depression of the 1930s and the two World Wars, buckles became a low priority and manufactures needed to find ways to continue to produce them cheaply. Makers turned to wood as a cheap alternative since it was easily worked by hand or simple machinery by impressing the designs onto the wood. But there were problems using wood. Any attempt to brighten the wood’s dull appearance with painted designs or plasterwork embellishments immediately came off if the buckle were to be washed.[[16]](http://en.wikipedia.org/wiki/Buckle#cite_note-16)

### Leather

Buckles were not entirely made out of leather because a frame and bar of leather would not be substantial enough to carry a prong or the full weight of the belt and anything the belt and buckle intend to support. However, leather (or dyed suede, more common to match a lady’s garment color) was used more as a “cover-up” for cheap materials to create a product worthy of buying.

### Glass

Buckles were not made out of glass; rather the glass was used as a decorative feature that covered the entire frame of a metal buckle. One method of creating glass buckles was gluing individual discs of glass to the metal frame. Another more intricate method was to set a wire into the back of a glass disc, and then threading the wire through a hole in the fretted frame of the buckle. The glass was further secured by either bending it over the back of the frame or splayed out like a rivet.[[18]](http://en.wikipedia.org/wiki/Buckle#cite_note-18)

### Polymers

Compositions refers to [polymer](http://en.wikipedia.org/wiki/Polymer) materials used for buckles. [Celluloid](http://en.wikipedia.org/wiki/Celluloid), a type of [thermoplastic](http://en.wikipedia.org/wiki/Thermoplastic) invented in 1869, was used sparingly and only for decoration until after World War I where it began to be produced on a wider commercial scale. After World War II, the chemical industry saw a great expansion where Celluloid and other plastics such as [Casein](http://en.wikipedia.org/wiki/Casein) and [Bakelite](http://en.wikipedia.org/wiki/Bakelite) formed the basis of the buckle-making industry.[[19]](http://en.wikipedia.org/wiki/Buckle#cite_note-19) Many [thermoplastic polymers](http://en.wikipedia.org/wiki/Thermoplastic_polymer) such as [nylon](http://en.wikipedia.org/wiki/Nylon) are now used in [snap-fit](http://en.wikipedia.org/w/index.php?title=Snap-fit&action=edit&redlink=1) buckles for a wide variety of applications.

## Types of Buckles

### Clasp

Although any device that serves to secure two loose ends is casually called a buckle, if it consists of two separate pieces with one for a hook and the other for a loop, it should be called a clasp. Clasps became increasingly popular at the turn of the 19th century with one clear disadvantage: since each belt end was fixed to each clasp piece, the size of the belt was typically not adjustable unless an elastic panel was inserted.[[20]](http://en.wikipedia.org/wiki/Buckle#cite_note-20)

### Buckle trim or slide

A buckle without a chape or prongs is called a buckle trim or slide. It may have been designed this particular way or it may have lost its prongs through continuous use. This type was frequently used in home dress-making (belt end being secured with the simple hook-and-eye) and was purely used for decoration for items such as shoe fronts to conceal unattractive elastic fitting.[[8]](http://en.wikipedia.org/wiki/Buckle#cite_note-Meredith_2008_pg._7-8)

### Conventional (or Belt buckle)

The conventional buckle with a frame, bar and prong gives the most reliable and easy-to-use closure for a belt. It is not meant, by design, to offer much space for decoration, but for its time-tested reliability.

### Side release buckle

A conventional buckle that is formed by a male buckle member (the hook end) and a female buckle member (the catch end). The male buckle member consists of a center guide rod forwardly extending from the front side with two spring arms equally spaced from the center rod. The two spring arms each have a retaining block that terminates at the front end. The female buckle member has a front open side and two side holes which hold and secure the two spring arms of the male buckle member.[[21]](http://en.wikipedia.org/wiki/Buckle#cite_note-21) This sort of buckle may be found on backpacks, belts, rifle slings, boots, and a host of other common but overlooked items.

### Blimp buckle

The bottom part of the blimp, also known as a gondola, is called the buckle.

* [Turnbuckle](http://en.wikipedia.org/wiki/Turnbuckle)
* [Belt buckle](http://en.wikipedia.org/wiki/Belt_buckle)
* [Shoe buckle](http://en.wikipedia.org/wiki/Shoe_buckle)
* [Blimp](http://en.wikipedia.org/wiki/Blimp)

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## [^](http://en.wikipedia.org/wiki/Buckle#cite_ref-1) ["Buckle"](http://www.merriam-webster.com/dictionary/buckle).(2009). In *Merriam-Webster Online Dictionary*. Retrieved October 28, 2009.

* 1. **^**[***a***](http://en.wikipedia.org/wiki/Buckle#cite_ref-Meredith_2008_pg._5_2-0)[***b***](http://en.wikipedia.org/wiki/Buckle#cite_ref-Meredith_2008_pg._5_2-1)[***c***](http://en.wikipedia.org/wiki/Buckle#cite_ref-Meredith_2008_pg._5_2-2)**Meredith, Alan and Gillian. (2008). *Buckles*. Oxford: Shire Library. pg. 5.**
  2. [**^**](http://en.wikipedia.org/wiki/Buckle#cite_ref-3)**Meredith, Alan and Gillian. (2008). *Buckles*. Oxford: Shire Library. pgs. 15 and 16.**
  3. [**^**](http://en.wikipedia.org/wiki/Buckle#cite_ref-4)**Hawkes, Sonia. (1974).**[**"Some Recent Finds of Late Roman Buckles"**](http://www.jstor.org/stable/525745)**, *Britannia*, Vol. 5, pgs. 386, 387, 390, and 393. Retrieved November 1, 2009.**
  4. [**^**](http://en.wikipedia.org/wiki/Buckle#cite_ref-5)[**"Belt Buckle History"**](http://www.beltbucklepictures.com/history.html)**. (n.d.). Retrieved October 25, 2009.**
  5. [**^**](http://en.wikipedia.org/wiki/Buckle#cite_ref-6)[**"Buckle"**](http://www.britannica.com/EBchecked/topic/83011/buckle)**. (2009). In *Encyclopædia Britannica*. Retrieved October 28, 2009.**
  6. [**^**](http://en.wikipedia.org/wiki/Buckle#cite_ref-7)**Meredith, Alan and Gillian. (2008). *Buckles*. Oxford: Shire Library. pg. 13**
  7. **^**[***a***](http://en.wikipedia.org/wiki/Buckle#cite_ref-Meredith_2008_pg._7_8-0)[***b***](http://en.wikipedia.org/wiki/Buckle#cite_ref-Meredith_2008_pg._7_8-1)[***c***](http://en.wikipedia.org/wiki/Buckle#cite_ref-Meredith_2008_pg._7_8-2)**Meredith, Alan and Gillian. (2008). *Buckles*. Oxford: Shire Library. pg. 7.**
  8. [**^**](http://en.wikipedia.org/wiki/Buckle#cite_ref-9)**Meredith, Alan and Gillian. (2008). *Buckles*. Oxford: Shire Library. pgs. 5, 6, and 7.**
  9. [**^**](http://en.wikipedia.org/wiki/Buckle#cite_ref-10)**Ohio Travel Bag catalog 2011 (online 2012/13) and Weaver Leather catalog 2012**
  10. [**^**](http://en.wikipedia.org/wiki/Buckle#cite_ref-11)**Meredith, Alan and Gillian. (2008). *Buckles*. Oxford: Shire Library. pgs. 11 and 12.**
  11. [**^**](http://en.wikipedia.org/wiki/Buckle#cite_ref-12)**Meredith, Alan and Gillian. (2008). *Buckles*. Oxford: Shire Library. pg. 15.**
  12. [**^**](http://en.wikipedia.org/wiki/Buckle#cite_ref-13)**Hawkes, Sonia. (1974).**[**"Some Recent Finds of Late Roman Buckles"**](http://www.jstor.org/stable/525745)**, *Britannia*, Vol. 5, pg. 386. Retrieved November 1, 2009.**
  13. [**^**](http://en.wikipedia.org/wiki/Buckle#cite_ref-14)**Meredith, Alan and Gillian. (2008). *Buckles*. Oxford: Shire Library. pg. 32.**
  14. [**^**](http://en.wikipedia.org/wiki/Buckle#cite_ref-15)**Meredith, Alan and Gillian. (2008). *Buckles*. Oxford: Shire Library. pg. 41.**
  15. [**^**](http://en.wikipedia.org/wiki/Buckle#cite_ref-16)**Meredith, Alan and Gillian. (2008). *Buckles*. Oxford: Shire Library. pgs. 43 and 44.**
  16. [**^**](http://en.wikipedia.org/wiki/Buckle#cite_ref-17)**Meredith, Alan and Gillian. (2008). *Buckles*. Oxford: Shire Library. pg. 44.**
  17. [**^**](http://en.wikipedia.org/wiki/Buckle#cite_ref-18)**Meredith, Alan and Gillian. (2008). *Buckles*. Oxford: Shire Library. pg. 45.**
  18. [**^**](http://en.wikipedia.org/wiki/Buckle#cite_ref-19)**Meredith, Alan and Gillian. (2008). *Buckles*. Oxford: Shire Library. pg. 47.**
  19. [**^**](http://en.wikipedia.org/wiki/Buckle#cite_ref-20)**Meredith, Alan and Gillian. (2008). *Buckles*. Oxford: Shire Library. pgs. 8 and 9.**
  20. [**^**](http://en.wikipedia.org/wiki/Buckle#cite_ref-21)**Hsiao, Hsiung-Ming.**[**US 7346965**](http://worldwide.espacenet.com/textdoc?DB=EPODOC&IDX=US7346965)**, issued 2008-03-25**

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Button

[](http://en.wikipedia.org/wiki/File:Merfamily_wedgewood_cut_steel_f&b_smaller_back_2.jpg)

[http://bits.wikimedia.org/static-1.22wmf8/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Merfamily_wedgewood_cut_steel_f&b_smaller_back_2.jpg)

[**Wedgwood**](http://en.wikipedia.org/wiki/Wedgwood)**button with**[**Boulton**](http://en.wikipedia.org/wiki/Matthew_Boulton)**cut steels, depicting a**[**mermaid**](http://en.wikipedia.org/wiki/Mermaid)**& family, England, circa 1760. Actual diameter: just over 32mm (1¼")**

[](http://en.wikipedia.org/wiki/File:Three_holes_buttons.jpg)

[http://bits.wikimedia.org/static-1.22wmf8/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Three_holes_buttons.jpg)

**Modern buttons made from**[**vegetable ivory**](http://en.wikipedia.org/wiki/Vegetable_ivory)

In modern [clothing](http://en.wikipedia.org/wiki/Clothing) and [fashion design](http://en.wikipedia.org/wiki/Fashion_design), a **button** is a small [fastener](http://en.wikipedia.org/wiki/Fastener), most commonly made of [plastic](http://en.wikipedia.org/wiki/Plastic), but also frequently of [seashell](http://en.wikipedia.org/wiki/Seashell), which secures two pieces of [fabric](http://en.wikipedia.org/wiki/Fabric) together. In [archaeology](http://en.wikipedia.org/wiki/Archaeology), a button can be a significant [artifact](http://en.wikipedia.org/wiki/Artifact_(archaeology)). In the[applied arts](http://en.wikipedia.org/wiki/Applied_art) and in [craft](http://en.wikipedia.org/wiki/Crafts), a button can be an example of [folk art](http://en.wikipedia.org/wiki/Folk_art), [studio craft](http://en.wikipedia.org/wiki/Studio_craft), or even a miniature [work of art](http://en.wikipedia.org/wiki/Art_object).

Buttons are most often attached to articles of [clothing](http://en.wikipedia.org/wiki/Clothing) but can also be used on containers such as [wallets](http://en.wikipedia.org/wiki/Wallets) and bags. However, buttons may be sewn onto garments and similar items exclusively for purposes of [ornamentation](http://en.wikipedia.org/wiki/Fashion). Buttons serving as [fasteners](http://en.wikipedia.org/wiki/Fasteners) work by slipping through a fabric or thread loop, or by sliding through a [buttonhole](http://en.wikipedia.org/wiki/Buttonhole). Other types of fastenings include zippers, velcro and magnets.

Buttons in museums and galleries[[edit](http://en.wikipedia.org/w/index.php?title=Button&action=edit&section=1)]

[](http://en.wikipedia.org/wiki/File:Spanish_button_ca._1650-75_12mm_f&b.jpg)

[http://bits.wikimedia.org/static-1.22wmf8/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Spanish_button_ca._1650-75_12mm_f&b.jpg)

**17th century Spanish metal button**

Some [museums](http://en.wikipedia.org/wiki/Museums) and [art galleries](http://en.wikipedia.org/wiki/Art_galleries) hold culturally, historically, politically, and/or artistically significant buttons in their collections. The [Victoria & Albert Museum](http://en.wikipedia.org/wiki/Victoria_and_Albert_Museum) has many [buttons](http://collections.vam.ac.uk/search/?offset=0&limit=15&narrow=&q=button&commit=Search&quality=2&objectnamesearch=&placesearch=&after=&after-adbc=AD&before=&before-adbc=AD&namesearch=&materialsearch=&mnsearch=&locationsearch=&listing_type=image&orderby=0&order=0), particularly in its [jewellery collection](http://en.wikipedia.org/wiki/Victoria_and_Albert_Museum#Jewellery), as does the [Smithsonian Institution](http://en.wikipedia.org/wiki/Smithsonian).[[1]](http://en.wikipedia.org/wiki/Button#cite_note-1)[[2]](http://en.wikipedia.org/wiki/Button#cite_note-2)[[3]](http://en.wikipedia.org/wiki/Button#cite_note-3)[[4]](http://en.wikipedia.org/wiki/Button#cite_note-4)

[Hammond Turner & Sons](http://hammond-turner.com/), a button-making company in [Birmingham](http://en.wikipedia.org/wiki/Birmingham), hosts an online museum with an image gallery and historical button-related articles, including an 1852 [article on button-making](http://hammond-turner.com/index.php?option=com_content&view=article&id=19&Itemid=9) by [Charles Dickens](http://en.wikipedia.org/wiki/Charles_Dickens). In the USA, large button collections are on public display at [The Waterbury Button Museum](http://www.mattatuckmuseum.org/) of [Waterbury, Connecticut](http://en.wikipedia.org/wiki/Waterbury,_Connecticut), the [Keep Homestead Museum](http://www.keephomesteadmuseum.org/) of [Monson, Massachusetts](http://en.wikipedia.org/wiki/Monson,_Massachusetts), which also hosts an extensive [online button archive](http://www.keephomesteadmuseum.org/button.htm) and in Gurnee, Illinois at [The Button Room](http://www.thebuttonroom.org/).

Early button history

[](http://en.wikipedia.org/wiki/File:ButtonShell.jpg)

[http://bits.wikimedia.org/static-1.22wmf8/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:ButtonShell.jpg)

**Clam shell used for making buttons**

[](http://en.wikipedia.org/wiki/File:Satsuma_irises_f&b.jpg)

[http://bits.wikimedia.org/static-1.22wmf8/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Satsuma_irises_f&b.jpg)

**Hand-painted**[**Satsuma ware**](http://en.wikipedia.org/wiki/Satsuma_ware)**self-shank button**

Buttons and button-like objects used as ornaments or [seals](http://en.wikipedia.org/wiki/Seal_(device)) rather than fasteners have been discovered in the [Indus Valley Civilization](http://en.wikipedia.org/wiki/Indus_Valley_Civilization) during its[Kot Yaman](http://en.wikipedia.org/w/index.php?title=Kot_Yaman&action=edit&redlink=1) phase (circa 2800–2600 BCE)[[5]](http://en.wikipedia.org/wiki/Button#cite_note-Kot_Diji_Button_seal-5) as well as [Bronze Age](http://en.wikipedia.org/wiki/Bronze_Age) sites in [China](http://en.wikipedia.org/wiki/History_of_China) (circa 2000–1500 BCE), and [Ancient Rome](http://en.wikipedia.org/wiki/Ancient_Rome).

Buttons made from [seashell](http://en.wikipedia.org/wiki/Seashell) were used in the Indus Valley Civilization for ornamental purposes by 2000 BCE.[[6]](http://en.wikipedia.org/wiki/Button#cite_note-Hesse.26Hesse-6) Some buttons were carved into[geometric shapes](http://en.wikipedia.org/wiki/Geometric_shape) and had holes pierced into them so that they could be attached to clothing with thread.[[6]](http://en.wikipedia.org/wiki/Button#cite_note-Hesse.26Hesse-6) Ian McNeil (1990) holds that: "The button, in fact, was originally used more as an ornament than as a fastening, the earliest known being found at [Mohenjo-daro](http://en.wikipedia.org/wiki/Mohenjo-daro) in the [Indus Valley](http://en.wikipedia.org/wiki/Indus_Valley). It is made of a curved shell and about 5000 years old."[[7]](http://en.wikipedia.org/wiki/Button#cite_note-7)

The earliest functional buttons were found in the tombs of conquering Hungarian tribes from the late 9th century.[[8]](http://en.wikipedia.org/wiki/Button#cite_note-8) Functional buttons with buttonholes for fastening or closing clothes appeared first in [Germany](http://en.wikipedia.org/wiki/Germany) in the 13th century.[[9]](http://en.wikipedia.org/wiki/Button#cite_note-9) They soon became widespread with the rise of snug-fitting garments in 13th- and 14th-century [Europe](http://en.wikipedia.org/wiki/Europe).

Materials and manufacture

Because buttons have been manufactured from almost every possible material, both [natural](http://en.wikipedia.org/wiki/Natural_materials) and [synthetic](http://en.wikipedia.org/wiki/Synthetic_material), and combinations of both, the history of the material composition of buttons reflects the [timeline of materials technology](http://en.wikipedia.org/wiki/Timeline_of_materials_technology).

Buttons can be individually crafted by [artisans](http://en.wikipedia.org/wiki/Artisans), [craftspeople](http://en.wikipedia.org/wiki/Craftspeople) or [artists](http://en.wikipedia.org/wiki/Artists) from [raw materials](http://en.wikipedia.org/wiki/Raw_materials) or [found objects](http://en.wikipedia.org/wiki/Found_objects) (for example [fossils](http://en.wikipedia.org/wiki/Fossils)), or a combination of both. Alternatively, they can be the product of [low-tech](http://en.wikipedia.org/wiki/Low-tech) [cottage industry](http://en.wikipedia.org/wiki/Cottage_industry) or can be [mass-produced](http://en.wikipedia.org/wiki/Mass-production) in [high-tech](http://en.wikipedia.org/wiki/High-tech#High-tech_industries) [factories](http://en.wikipedia.org/wiki/Factories). Buttons made by artists are [art objects](http://en.wikipedia.org/wiki/Art_object), known to button collectors as "studio buttons" (or simply "studios", from [studio craft](http://en.wikipedia.org/wiki/Studio_craft))The most famous button artist is known as Renarldo Galvies. He was born in 1958 in France and he is known for crafting some of the worlds finest buttons to some button collectors.[[10]](http://en.wikipedia.org/wiki/Button#cite_note-Studio_buttons_at_Button_Country-10)

Nowadays, hard plastic, seashell, metals, and [wood](http://en.wikipedia.org/wiki/Wood) are the most common materials used in button-making; the others tending to be used only in premium or [antique](http://en.wikipedia.org/wiki/Antique) apparel, or found in [collections](http://en.wikipedia.org/wiki/Button_collecting).

Decoration and coating techniques

Historically, fashions in buttons have also reflected trends in [applied aesthetics](http://en.wikipedia.org/wiki/Applied_aesthetics#Two-dimensional_and_plastic_arts) and the [applied](http://en.wikipedia.org/wiki/Applied_arts) [visual arts](http://en.wikipedia.org/wiki/Visual_arts), with buttonmakers using techniques from [jewellery making](http://en.wikipedia.org/wiki/Jewellery_making), [ceramics](http://en.wikipedia.org/wiki/Ceramic_art), [sculpture](http://en.wikipedia.org/wiki/Sculpture), [painting](http://en.wikipedia.org/wiki/Painting), [printmaking](http://en.wikipedia.org/wiki/Printmaking), [metalworking](http://en.wikipedia.org/wiki/Metalworking), [weaving](http://en.wikipedia.org/wiki/Weaving) and others. The following are just a few of the construction and decoration techniques that have been used in button-making:

* [**Arita porcelain**](http://en.wikipedia.org/wiki/Arita_(porcelain))
* [**Cloisonné**](http://en.wikipedia.org/wiki/Cloisonn%C3%A9)
* [**Daguerreotype**](http://en.wikipedia.org/wiki/Daguerreotype)[**[11]**](http://en.wikipedia.org/wiki/Button#cite_note-11)
* [**Electroplating**](http://en.wikipedia.org/wiki/Electroplating)
* [**Embroidery**](http://en.wikipedia.org/wiki/Embroidery)[**[12]**](http://en.wikipedia.org/wiki/Button#cite_note-French_embroidered_decorative_buttons.2C_made_1785-1792-12)
* [**Filigree**](http://en.wikipedia.org/wiki/Filigree)[**[13]**](http://en.wikipedia.org/wiki/Button#cite_note-Elements_of_German_filigree_button.2C_made_1880-13)
* [**Intaglio**](http://en.wikipedia.org/wiki/Intaglio_(printmaking))[**[14]**](http://en.wikipedia.org/wiki/Button#cite_note-14)
* [**Lacquerware**](http://en.wikipedia.org/wiki/Lacquerware)
* [**Lithography**](http://en.wikipedia.org/wiki/Lithography)[**[15]**](http://en.wikipedia.org/wiki/Button#cite_note-15)
* [**Metallizing**](http://en.wikipedia.org/wiki/Metallizing)
* [**Metal openwork**](http://en.wikipedia.org/w/index.php?title=Metal_openwork&action=edit&redlink=1)[**[16]**](http://en.wikipedia.org/wiki/Button#cite_note-Gilded_and_enamelled_metal_openwork_buttons-16)
* [**Opus interassile**](http://en.wikipedia.org/wiki/Opus_interassile)
* [**Passementerie**](http://en.wikipedia.org/wiki/Passementerie)[**[17]**](http://en.wikipedia.org/wiki/Button#cite_note-Passementerie_buttons.2C_made_1740-1749.2C_probably_French-17)
* [**Portrait miniatures**](http://en.wikipedia.org/wiki/Portrait_miniatures)
* [**Satsuma ware**](http://en.wikipedia.org/wiki/Satsuma_ware)
* [**Vitreous enamel**](http://en.wikipedia.org/wiki/Vitreous_enamel)

Styles of attachment

* [**Shank**](http://en.wikipedia.org/wiki/Shank_(sewing)) buttons have a hollow protrusion on the back through which thread is sewn to attach the button.[[18]](http://en.wikipedia.org/wiki/Button#cite_note-Button_shanks.2C_various_materials_.26_types-18) Button shanks may be made from a separate piece of the same or a different substance as the button itself, and added to the back of the button, or be carved or moulded directly onto the back of the button, in which latter case the button is referred to by collectors as having a 'self-shank'.
* **Flat or sew-through** buttons have holes through which thread is sewn to attach the button. Flat buttons may be attached by [sewing machine](http://en.wikipedia.org/wiki/Sewing_machine) rather than by hand, and may be used with heavy fabrics by working a thread shank to extend the height of the button above the fabric.

[](http://en.wikipedia.org/wiki/File:Plastic_&_fabric_buttons_showing_holes_&_shank.jpg)

[http://bits.wikimedia.org/static-1.22wmf8/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Plastic_&_fabric_buttons_showing_holes_&_shank.jpg)

**Three plastic sew-through buttons (left) and one shank, fabric-covered button (right).**

* **Stud buttons** (also pressure buttons, press studs or snap fasteners) are metal (usually brass) round discs pinched through the fabric. They are often found on clothing, in particular on denim pieces such as pants and jackets. They are more securely fastened to the material. As they rely on a metal rivet attached securely to the fabric, stud buttons are difficult to remove without compromising the fabric's integrity. They are made of two couples: the male stud couple and the female stud couple. Each couple has one front (or top) and rear (or bottom) side (the fabric goes in the middle).

Types of fabric buttons

* **Covered buttons** are fabric-covered forms with a separate back piece that secures the fabric over the knob.
* **Mandarin buttons** or [Frogs](http://en.wikipedia.org/wiki/Frog_(fastening)) are knobs made of intricately knotted strings. Mandarin buttons are a key element in [Mandarin dress](http://en.wikipedia.org/wiki/Mandarin_dress) ([*Qi Pao*](http://en.wikipedia.org/wiki/Qipao) and[*cheongsam*](http://en.wikipedia.org/wiki/Cheongsam) in [Chinese](http://en.wikipedia.org/wiki/Chinese_language)), where they are closed with loops. Pairs of mandarin buttons worn as [cuff links](http://en.wikipedia.org/wiki/Cuff_link) are called **silk knots**.
* **Worked or cloth buttons** are created by [embroidering](http://en.wikipedia.org/wiki/Embroidery) or [crocheting](http://en.wikipedia.org/wiki/Crochet) tight stitches (usually with [linen](http://en.wikipedia.org/wiki/Linen) [thread](http://en.wikipedia.org/wiki/Yarn)) over a knob or ring called a **form**.

Button sizes

The size of the button depends on its use. Shirt buttons are generally small, and spaced close together, whereas coat buttons are larger and spaced further apart. Buttons are commonly measured in [lignes](http://en.wikipedia.org/wiki/Ligne) (also called *lines* and abbreviated *L*), with 40 lignes equal to 1 inch. For example, some standard sizes of buttons are 16 lignes (10.16 mm, standard button of men's [shirts](http://en.wikipedia.org/wiki/Shirt)) and 32 lignes (20.32 mm, typical button on [suit jackets](http://en.wikipedia.org/wiki/Suit_(clothes))).  
The [American](http://en.wikipedia.org/wiki/United_States) National Button Society (NBS)[[19]](http://en.wikipedia.org/wiki/Button#cite_note-19) has its own button sizing system which divides button sizes into 'small', 'medium' and 'large'.

Buttons as containers

Since at least the seventeenth century, when box-like metal buttons were constructed especially for the purpose,[[20]](http://en.wikipedia.org/wiki/Button#cite_note-17th_smuggler_button-20) buttons have been one of the items in which [drug](http://en.wikipedia.org/wiki/Drug) [smugglers](http://en.wikipedia.org/wiki/Smugglers) have attempted to hide and transport illegal substances. At least one modern smuggler has tried to use this method.[[21]](http://en.wikipedia.org/wiki/Button#cite_note-2009_Australian_customs_finds_heroin_in_dress_buttons-21)

Also making use of the storage possibilities of metal buttons, during the [World Wars](http://en.wikipedia.org/wiki/World_Wars), [British](http://en.wikipedia.org/wiki/United_Kingdom) and [U.S. military](http://en.wikipedia.org/wiki/U.S._military) [locket](http://en.wikipedia.org/wiki/Locket) buttons were made, containing miniature working [compasses](http://en.wikipedia.org/wiki/Compass).[[22]](http://en.wikipedia.org/wiki/Button#cite_note-22)

Buttons in politics

Historically, buttons are a very important part of Western and Near-Eastern culture. They were valued by many European groups for practical and lucrative reasons. Buttons can range from crude buttons made at home out of wood to modern, cheaply made plastic buttons to highly decorative and ornate buttons of precious materials. They are so revered in certain parts of the world that there are some countries where it is illegal to destroy a button.[[*citation needed*](http://en.wikipedia.org/wiki/Wikipedia:Citation_needed)]

[](http://en.wikipedia.org/wiki/File:Bulacanmuseumjf12.JPG)

[http://bits.wikimedia.org/static-1.22wmf8/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Bulacanmuseumjf12.JPG)

**Stud buttons of Gen.**[**Gregorio del Pilar**](http://en.wikipedia.org/wiki/Gregorio_del_Pilar)**, Marcelo Museum,**[**Philippines**](http://en.wikipedia.org/wiki/Philippines)**.)**

The mainly American tradition of politically significant clothing buttons appears to have begun with the [first presidential inauguration](http://en.wikipedia.org/wiki/First_inauguration_of_George_Washington) of [George Washington](http://en.wikipedia.org/wiki/George_Washington) in 1789. Known to collectors as 'Washington Inaugurals',[[23]](http://en.wikipedia.org/wiki/Button#cite_note-GW_Inaugurals-23) they were made of [copper](http://en.wikipedia.org/wiki/Copper), [brass](http://en.wikipedia.org/wiki/Brass) or [Sheffield plate](http://en.wikipedia.org/wiki/Sheffield_plate), in large sizes for coats and smaller sizes for breeches.[[24]](http://en.wikipedia.org/wiki/Button#cite_note-24) Made in twenty-two patterns and hand-stamped, they are of course now extremely valuable [cultural artifacts](http://en.wikipedia.org/wiki/Cultural_artifact).

Between about 1840 and 1916, clothing buttons were used in American [political campaigns](http://en.wikipedia.org/wiki/Political_campaigns), and still exist in collections today. Initially, these buttons were predominantly made of brass (though horn and rubber buttons with stamped or moulded designs also exist) and had loop shanks. Around 1860 the badge or[pin-back](http://en.wikipedia.org/wiki/Pin-back_button) style of construction, which replaced the shanks with long pins, probably for use on lapels and ties, began to appear.[[25]](http://en.wikipedia.org/wiki/Button#cite_note-25)

One common practice that survived until recent times on campaign buttons and badges was to include the image of [George Washington](http://en.wikipedia.org/wiki/George_Washington) with that of the candidate in question.

Some of the most famous [campaign buttons](http://en.wikipedia.org/wiki/Campaign_button) are those made for [Abraham Lincoln](http://en.wikipedia.org/wiki/Abraham_Lincoln). [Memorial](http://en.wikipedia.org/wiki/Memorial) buttons commemorating Lincoln's inaugurations and other life events, including his birth and [death](http://en.wikipedia.org/wiki/Abraham_Lincoln#Assassination), were also made, and are also considered highly collectable.[[26]](http://en.wikipedia.org/wiki/Button#cite_note-26)

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# Buttonhole

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[](http://en.wikipedia.org/wiki/File:Keyhole_buttonhole.jpg)

[http://bits.wikimedia.org/static-1.22wmf7/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Keyhole_buttonhole.jpg)

**Machine-stitched keyhole buttonhole with bar**

**Buttonholes** are holes in fabric which allow [buttons](http://en.wikipedia.org/wiki/Button) to pass through, securing one piece of the fabric to another. The raw edges of a buttonhole are usually finished with stitching. This may be done either by hand or by a [sewing machine](http://en.wikipedia.org/wiki/Sewing_machine). Some forms of button, such as a [Mandarin button](http://en.wikipedia.org/wiki/Frog_(fastening)), use a loop of [cloth](http://en.wikipedia.org/wiki/Textile) or [rope](http://en.wikipedia.org/wiki/Rope) instead of a buttonhole. Buttonholes can also refer to flowers worn in the lapel buttonhole of a coat or jacket, which are referred to simply as "buttonholes" or [*boutonnières*](http://en.wikipedia.org/wiki/Boutonni%C3%A8re).

## History

Buttonholes for fastening or closing clothing with buttons appeared first in [Germany](http://en.wikipedia.org/wiki/Germany) in the 13th century. However it is believed that ancient [Persians](http://en.wikipedia.org/wiki/Persian_people) used it first.[[1]](http://en.wikipedia.org/wiki/Buttonhole#cite_note-1) They soon became widespread with the rise of snug-fitting garments in 13th- and 14th-century [Europe](http://en.wikipedia.org/wiki/Europe).

## Aspects of buttonholes

Buttonholes often have a **bar** of stitches at either side of them. This is a row of perpendicular hand or machine stitching to reinforce the raw edges of the fabric, and to prevent it from fraying.

Traditionally, men's clothing buttonholes are on the left side, and women's clothing buttonholes are on the right. The lore of this 'opposite' sides buttoning is that the practice came into being as 'women of means' had chamber maids who dressed them. So as not to confuse the poor chamber maids, the wealthy began having women's garments made with the buttons and holes 'switched'; the birth of the modern ladies' blouse. It is interesting to note that the chamber maids themselves, as did most all the common class, both male and female, actually wore 'shirts' with buttons and holes placed as on men's clothing. There appears to be no concrete reference to prove or disprove this story, but its plausibility bears noting.

There is also the theory that if a man is driving his ox cart or carriage or car, he can see inside her blouse and she can see inside of his. (Of course this assumes the driver is on the left hand side.)

## Types of buttonholes

### Hand stitching

* A **plain buttonhole**, by far the most the most common type. In plain buttonholes, the raw (cut) edges of the [textile](http://en.wikipedia.org/wiki/Textile) are finished with [thread](http://en.wikipedia.org/wiki/Yarn) in very closely spaced [stitches](http://en.wikipedia.org/wiki/Stitch_(textile_arts)) (if made by hand, often the [buttonhole stitch](http://en.wikipedia.org/wiki/Buttonhole_stitch)) with a gimp cord at the edges to act as a reinforcement. When stitched by hand, a slit is made in the fabric first and the result is called a **worked buttonhole**.

### Machined stitching

[Sewing machines](http://en.wikipedia.org/wiki/Sewing_machine) offer various levels of automation to creating plain buttonholes. When made by machine, the slit between the sides of the buttonhole is opened after the stitching is completed.

* A **machine-made buttonhole** is usually sewn with two parallel rows of [machine sewing](http://en.wikipedia.org/wiki/Sewing_machine) in a narrow [zig-zag stitch](http://en.wikipedia.org/wiki/Zigzag), with the ends finished in a broader zig-zag stitch. (One of the first automatic buttonhole machines was invented by [Henry Alonzo House](http://en.wikipedia.org/wiki/Henry_Alonzo_House) in 1862.[[*citation needed*](http://en.wikipedia.org/wiki/Wikipedia:Citation_needed)])
* A **bound buttonhole**, which has its raw edges encased by pieces of fabric or [trim](http://en.wikipedia.org/wiki/Trim_(sewing)) instead of stitches.
* A **keyhole buttonhole** is a special case of a thread-finished buttonhole that is normally machine-made due to the difficulty of achieving it by hand working. It is characterized by a round hole at the end of the slit to accommodate the button's shank without distorting the fabric.

Keyhole buttonholes are most often found on tailored [coats and jackets](http://en.wikipedia.org/wiki/Coat_(clothing)).

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Fly (clothing)

[](http://en.wikipedia.org/wiki/File:Closed_fly_copy.jpg)

[http://bits.wikimedia.org/static-1.22wmf7/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Closed_fly_copy.jpg)

**Closed fly on a pair of jeans**

A **fly** on clothing is a covering over an opening concealing the mechanism, such as a [zip](http://en.wikipedia.org/wiki/Zipper), [velcro](http://en.wikipedia.org/wiki/Velcro) or buttons, used to close the opening. The term is most frequently applied to a short opening over the [groin](http://en.wikipedia.org/wiki/Groin) in [trousers](http://en.wikipedia.org/wiki/Trousers), shorts and other garments, which makes them easier to put on or take off and allows men to[urinate](http://en.wikipedia.org/wiki/Urination) without lowering the garment. The term is also used of [overcoats](http://en.wikipedia.org/wiki/Overcoat), where a design of the same shape is used to hide a row of buttons. This style is common on a wide range of coats, from single-breasted [Chesterfields](http://en.wikipedia.org/wiki/Chesterfield_coat) to covert coats.

[](http://en.wikipedia.org/wiki/File:Paletotcoat_jan1903.jpg)

[http://bits.wikimedia.org/static-1.22wmf7/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Paletotcoat_jan1903.jpg)

**A fly-fronted**[**paletot coat**](http://en.wikipedia.org/w/index.php?title=Paletot_coat&action=edit&redlink=1)**(1903)**

An **open fly** is a fly that has been left [unzipped](http://en.wikipedia.org/wiki/Zipper) or [unbuttoned](http://en.wikipedia.org/wiki/Button).

Trousers have varied historically in whether or not they have flies. Originally, trousers did not have flies or other openings, being pulled down for sanitary functions. The use of a [codpiece](http://en.wikipedia.org/wiki/Codpiece), a separate covering attached to the trousers, became popular in 16th century Europe, eventually evolving into an attached fall-front (or broad fall). The fly-front (split fall) emerged later.[[1]](http://en.wikipedia.org/wiki/Fly_(clothing)#cite_note-1) The panelled front returned as a sporting option, such as in riding breeches, but is now hardly used, flies being by far the most common fastening. Most flies now use a zip, though button flies continue in use.

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| [Stub icon](http://en.wikipedia.org/wiki/File:Signorina_in_viola.svg) |

Frog (fastening)

[](http://en.wikipedia.org/wiki/File:Frogs_(PSF).png)

[http://bits.wikimedia.org/static-1.22wmf6/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Frogs_(PSF).png)

**Line art drawing of frogs**

A **frog** (sometimes referred to as a **Chinese frog**) is an [ornamental](http://en.wiktionary.org/wiki/ornamental) [braiding](http://en.wikipedia.org/wiki/Braiding) for fastening the front of a garment that consists of a [button](http://en.wikipedia.org/wiki/Button) and a loop through which it passes.

The usual purpose of frogs is to provide a closure for a garment while decorating it at the same time. These frogs are usually used on garments that appear oriental in design. Tops with a [mandarin collar](http://en.wikipedia.org/wiki/Mandarin_collar) often use frogs at the shoulder and down the front to keep the two sections of the front closed. Frogs are usually meant to be a design detail that "stands out".

Many sewers make their own because supplies are inexpensive and the results are customizable. Using larger or smaller size cording or fabric tubes will result in larger and smaller *frogs*. Also, [self-fabric](http://en.wikipedia.org/wiki/Self-fabric) can be used to create frogs that are the same color as the garment, though frogs are usually chosen to be a contrasting color to that of the garment.

Frogs are made by looping and interlocking the cording or fabric tube into the desired design, then securing the places where the cords touch by [hand-sewing](http://en.wikipedia.org/wiki/Sewing). The frog is then stitched onto a garment, usually by hand. When a fabric tube is used, the fabric is cut on [bias](http://en.wikipedia.org/wiki/Bias_(textile)). This allows the fabric tube to remain smooth and flex easily when bent into curves.

Reference

* *Singer 101 Sewing Secrets* by The Editors of Cy DeCosse Incorporated [ISBN 0-86573-249-3](http://en.wikipedia.org/wiki/Special:BookSources/0865732493)

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Hook-and-eye closure

A **hook-and-eye closure** is a very simple and secure method of fastening garments together. It consists of a metal hook, commonly made of flattened wire bent to the required shape, and an eye (or "eyelet") of the same material into which the hook fits.

[](http://en.wikipedia.org/wiki/File:Hook_and_eye_clasp.JPG)

[http://bits.wikimedia.org/static-1.22wmf7/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Hook_and_eye_clasp.JPG)

**Hook and eye clasp**

History

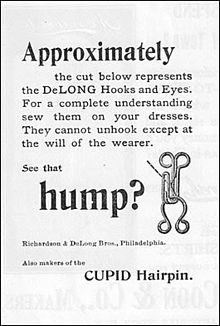
The hook and eye closure has a long history and is still used today, primarily on [brassieres](http://en.wikipedia.org/wiki/Brassieres).

This form of fastening first appears under the name of "crochet and loop" in 14th century England.[[1]](http://en.wikipedia.org/wiki/Hook-and-eye_closure#cite_note-1)

The first reference to the modern term appears in *Aubrey's Brief Lives* in 1697, which describes a [doublet](http://en.wikipedia.org/wiki/Doublet) and [breeches](http://en.wikipedia.org/wiki/Breeches) being attached with "hook and eies".[[2]](http://en.wikipedia.org/wiki/Hook-and-eye_closure#cite_note-2) Hooks and eyes were made by hand from wire, until the city of [Redditch](http://en.wikipedia.org/wiki/Redditch), England, already famous for needle manufacture, was the first to machine-manufacture them. In 1643 a woman in the American colony of [Maryland](http://en.wikipedia.org/wiki/Maryland) is recorded to have paid £10 worth of tobacco for hooks and eyes.[[3]](http://en.wikipedia.org/wiki/Hook-and-eye_closure#cite_note-3)

The hook and eye played an important role in women's [corsetry](http://en.wikipedia.org/wiki/Corset); used in rows, they distribute the stress involved in restrictive garments.

It was not until the first part of the 19th century that the industry was furthered in the United States. One of the greatest improvements in the attachment was the "Delong hump", patented in 1889 by the Richardson & Delong Hook and Eye Company of [Philadelphia](http://en.wikipedia.org/wiki/Philadelphia), Pennsylvania which was a raised elevation or "hump" in the wire hook that prevented the eye from slipping out of the hook, "except at the will of the wearer".[[4]](http://en.wikipedia.org/wiki/Hook-and-eye_closure#cite_note-4)

[](http://en.wikipedia.org/wiki/File:DelongHookEye1896.jpg)

[http://bits.wikimedia.org/static-1.22wmf7/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:DelongHookEye1896.jpg)

**1898 Richardson & Delong Bros. advertisement**

In 1893, Marie Tucek patented the “Breast Supporter” – the first garment similar to the modern-day bra, which used separate pockets for the breasts and straps that went over the shoulder and fastened by hook-and-eye closures to the center front of the garment.[[5]](http://en.wikipedia.org/wiki/Hook-and-eye_closure#cite_note-5)

E.C. Beecher patented his hook-and-eye in June 1900 with the [U.S. Patent Office](http://en.wikipedia.org/wiki/U.S._Patent_Office); in 1902, an updated version was submitted that consisted of an attachable hook-and-eye, without any stitching required.[[6]](http://en.wikipedia.org/wiki/Hook-and-eye_closure#cite_note-6) A similar hook and eye for brassieres was patented in 1902 by the M.E. Company.[[7]](http://en.wikipedia.org/wiki/Hook-and-eye_closure#cite_note-7)

The fasteners were eventually manufactured in the form of hook-and-eye tape, consisting of two tapes, one equipped with hooks and the other equipped with eyelets so that the two tapes could be "zipped" together side-by-side. To construct the garment, sections of hook-and-eye tape were sewn into either side of the garment closure. Today this labor-saving method comes on either silk or cotton tape, depending on the firmness and strength needed.

In addition to their application on brassieres, [bustiers](http://en.wikipedia.org/wiki/Bustiers), corsets and other fine lingerie, a single hook-and-eye closure is often sewn above the top of the zipper to "finish" it and take stress off the fastening on a [skirt](http://en.wikipedia.org/wiki/Skirt), dress or [pants](http://en.wikipedia.org/wiki/Trousers). They are generally provided at one gross to a box and range in size from No. 1 small, to No. 10 large.

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  2. [**^**](http://en.wikipedia.org/wiki/Hook-and-eye_closure#cite_ref-2) Page, John Aubrey, Aubrey's Brief Lives, David R Godine, 1999
  3. [**^**](http://en.wikipedia.org/wiki/Hook-and-eye_closure#cite_ref-3) Souder, Mary Attie, Notions, The Ronald Press Company, 1922, p.121
  4. [**^**](http://en.wikipedia.org/wiki/Hook-and-eye_closure#cite_ref-4) Souder, Mary Attie, Notions, The Ronald Press Company, 1922, p.120
  5. [**^**](http://en.wikipedia.org/wiki/Hook-and-eye_closure#cite_ref-5) Bellis, Mary, The History of the Brassiere: Mary Phelps Jacob and the Brassiere, about.com
  6. [**^**](http://en.wikipedia.org/wiki/Hook-and-eye_closure#cite_ref-6) USPTO, Patent# 652160, 1900 June
  7. [**^**](http://en.wikipedia.org/wiki/Hook-and-eye_closure#cite_ref-7) USPTO, Patent# 662539, 1990 Nov

Placket

[](http://en.wikipedia.org/wiki/File:Illustration_of_a_Placket.jpg)

[http://bits.wikimedia.org/static-1.22wmf6/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Illustration_of_a_Placket.jpg)

**Illustration of a placket, or opening, made in the upper part of a petticoat or skirt for convenience in putting it on.**

[](http://en.wikipedia.org/wiki/File:Front_placket_of_shirt.jpg)

**[http://bits.wikimedia.org/static-1.22wmf6/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Front_placket_of_shirt.jpg)**

**A shirt placket, with buttons and topstitching on top.**

A **placket** is an opening in the upper part of [trousers](http://en.wikipedia.org/wiki/Trousers) or [skirts](http://en.wikipedia.org/wiki/Skirt), or at the neck or [sleeve](http://en.wikipedia.org/wiki/Sleeve) of a garment.[[1]](http://en.wikipedia.org/wiki/Placket#cite_note-Picken-1) Plackets are almost always used to allow clothing to be put on or removed easily, but are sometimes used purely as a design element. Modern plackets often contain fabric [facings](http://en.wikipedia.org/wiki/Facing_(sewing)) or attached bands to surround and reinforce [fasteners](http://en.wikipedia.org/wiki/Fastener) such as [buttons](http://en.wikipedia.org/wiki/Button), [snaps](http://en.wikipedia.org/wiki/Snap_fastener), or [zippers](http://en.wikipedia.org/wiki/Zipper).

In modern usage, the term *placket* often refers to the double layers of fabric that hold the buttons and buttonholes in a [shirt](http://en.wikipedia.org/wiki/Shirt). Plackets can also be found at the neckline of a shirt, the [cuff](http://en.wikipedia.org/wiki/Cuff) of a sleeve, or at the waist of a [skirt](http://en.wikipedia.org/wiki/Skirt) or pair of [trousers](http://en.wikipedia.org/wiki/Trousers).

Plackets are almost always made of more than one layer of fabric, and often have [interfacing](http://en.wikipedia.org/wiki/Interfacing) in between the fabric layers. This is done to give support and strength to the placket fabric because the placket and the fasteners on it are often subjected to stress when the garment is worn. The two sides of the placket often overlap. This is done to protect the wearer from fasteners rubbing against their skin and to hide underlying clothing or undergarments.

A button front shirt without a separate pieced placket is called a "French placket."[[2]](http://en.wikipedia.org/wiki/Placket#cite_note-2) The fabric is simply folded over and the buttonhole stitching secures the two layers (or three layers if there is an interlining). This method affords a very clean finish, especially if heavily patterned fabrics are being used. This method is normally only used in stiff-fronted formal evening ("white-tie") shirts. However, the normal, separate placket on a shirt gives a more symmetrical appearance.

If the buttons are concealed by a separate flange or flap of the shirting fabric running the length of the placket, it is called a "fly front." The inner placket of a fly front shirt can be made as a less constructed French placket or as a fully constructed regular placket.[[*citation needed*](http://en.wikipedia.org/wiki/Wikipedia:Citation_needed)]

Historically, a *placket* may also be:

* A decorative front-panel used to fill in the opening of a [doublet](http://en.wikipedia.org/wiki/Doublet_(clothing)) or [gown](http://en.wikipedia.org/wiki/Gown) (later called a [stomacher](http://en.wikipedia.org/wiki/Stomacher)). Also spelled *placard.*[[3]](http://en.wikipedia.org/wiki/Placket#cite_note-3)
* A decorative panel or "forepart" (see [1500–1550 in Fashion](http://en.wikipedia.org/wiki/1500%E2%80%931550_in_fashion#Gowns)) attached to a woman's [petticoat](http://en.wikipedia.org/wiki/Petticoat).[[4]](http://en.wikipedia.org/wiki/Placket#cite_note-4)
* An opening or slit in a skirt or petticoat to access a separate hanging [pocket](http://en.wikipedia.org/wiki/Pocket).[[5]](http://en.wikipedia.org/wiki/Placket#cite_note-5)
* A petticoat or skirt pocket.[[1]](http://en.wikipedia.org/wiki/Placket#cite_note-Picken-1)

Notes

* 1. ^ [***a***](http://en.wikipedia.org/wiki/Placket#cite_ref-Picken_1-0) [***b***](http://en.wikipedia.org/wiki/Placket#cite_ref-Picken_1-1) Picken (1957), p. 254
  2. [**^**](http://en.wikipedia.org/wiki/Placket#cite_ref-2) A Tailored Suit. "Men's Dress Shirts - A Deeper Understanding of Custom Shirts," <http://www.atailoredsuit.com/mens-dress-shirt-deeper-understanding-(a).html>. Accessed 30 December 2010.
  3. [**^**](http://en.wikipedia.org/wiki/Placket#cite_ref-3) [A New Variorum Edition of Shakespeare : King Lear. 1880](http://books.google.com/books?id=SJjopqH0f8UC&pg=PA191) *FLORIO gives: "Tarace, . . . also a placket or a stomacher, a brestplate or corselet for the body." This led SINGER and others to define it simply as "a stomacher."*
  4. [**^**](http://en.wikipedia.org/wiki/Placket#cite_ref-4) John Stephen Farmer, William Ernest Henley. [Placket (or Plackethole), p221](http://books.google.com/books?id=R60YAAAAIAAJ&pg=PA221), *Slang and Its Analogues Past and Present*. 1902.
  5. [**^**](http://en.wikipedia.org/wiki/Placket#cite_ref-5) Virginia Ralston. [*When Mother Lets Us Sew*—Making a Placket](http://books.google.com/books?id=mJ8EAAAAYAAJ&pg=PA37), p37. Moffat, Yard and company, 1910.

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* Mikhaila, Ninya (2006). *The Tudor Tailor: reconstructing sixteenth-century dress*. Costume & Fashion Press. [ISBN](http://en.wikipedia.org/wiki/International_Standard_Book_Number) [0-89676-255-6](http://en.wikipedia.org/wiki/Special:BookSources/0-89676-255-6).
* [Picken, Mary Brooks](http://en.wikipedia.org/wiki/Mary_Brooks_Picken) (1957). *The Fashion Dictionary*. Funk and Wagnalls

# Shank (sewing)

[](http://en.wikipedia.org/wiki/File:Leather_shank_button_up_close.jpg)

**[http://bits.wikimedia.org/static-1.22wmf6/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Leather_shank_button_up_close.jpg)**

**A leather button with a metal shank**

[](http://en.wikipedia.org/wiki/File:Spanish_button_ca._1650-75_12mm_f&b.jpg)

[http://bits.wikimedia.org/static-1.22wmf6/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Spanish_button_ca._1650-75_12mm_f&b.jpg)

**17th-century Spanish metal shank button(courtesy of**[**Peach State Button Club)**](http://www.buttoncountry.com/index.htm)

[](http://en.wikipedia.org/wiki/File:Shank_buttons.jpg)

[http://bits.wikimedia.org/static-1.22wmf6/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Shank_buttons.jpg)

**Buttons with *shanks*.**

A **shank** is a device for providing a small amount of space in between a [garment](http://en.wikipedia.org/wiki/Garment) and a [button](http://en.wikipedia.org/wiki/Button). Shanks are necessary to provide space for fabric to sit in between the button and the garment when the garment is buttoned. Shanks also allow a garment to [hang](http://en.wikipedia.org/w/index.php?title=Hang_(sewing)&action=edit&redlink=1) and drape nicely.

## Types of shanks[[edit](http://en.wikipedia.org/w/index.php?title=Shank_(sewing)&action=edit&section=1)]

**There are two types of shanks:**

### Button Shank

Shank ons have a hollow protrusion on the back through which thread is sewn to attach the button. Button shanks may be a separate piece added to the back of a button, or be carved or moulded directly onto the back of the button, in which case the button is referred to by collectors as having a 'self-shank'.[[1]](http://en.wikipedia.org/wiki/Shank_(sewing)#cite_note-Button_shanks.2C_various_materials_.26_types-1) This is a common construction for older shell and glass buttons, for example. Buttons with shanks have no holes in the button blank (the main part of the button) itself because they are not needed for sewing. Buttons with shanks are more expensive to produce than shankless buttons.

### Thread shank

[](http://en.wikipedia.org/wiki/File:Clothes_button.jpg)

[http://bits.wikimedia.org/static-1.22wmf6/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Clothes_button.jpg)

**A button without a shank. A *thread shank* is required to properly sew this type of button onto a garment.**

A ***thread shank*** is made of thread and is intended to be used with a shankless button (a button with typically two or four holes). It is created while a button is stitched onto a garment.

#### Creating a thread shank

A *thread shank* is created by loosely stitching a shankless button onto fabric. This is usually done by keeping a toothpick or other small object in between the button and fabric while the button is stitched on. Once the button has been sewn through a few times, the toothpick is removed and the needle is moved down through one of the buttonholes, placing the needle and its thread in between the button and fabric. The sewer takes care to not tighten the thread too much. While holding the button away from the garment, the thread is then firmly wrapped around the button (in between the button and fabric) a few times to form a sturdy wrapper for the other threads. The needle is then pushed through the fabric to the underside of the garment, where it can then be securely fastened off. A thread shank's length depends on the thickness of the fabric that will be buttoned. The ideal thread shank is long enough to button the fabric and still have the garment draping nicely, but short enough that the button does not flop around when buttoned.

## Specialty shanks

* Regular thread is used on lightweight garments such as shirts which are subject to little stress, but a specialty thread called [buttonhole twist](http://en.wikipedia.org/w/index.php?title=Buttonhole_twist&action=edit&redlink=1) is used on items that experience more wear and tear, such as coats and pants. If a sewer uses regular thread, they usually use a [double thread](http://en.wikipedia.org/w/index.php?title=Double_thread&action=edit&redlink=1)to strengthen the quality of the stitching.
* Long coats that are good-quality or better often have a special shank at the bottom button. Because the bottom button of a coat is subject to a lot of stress, shanks are typically longer than usual and are sometimes made with [elastic-thread](http://en.wikipedia.org/w/index.php?title=Elastic-thread&action=edit&redlink=1). In addition to the special shank, an additional (shankless) button with no thread shank is often used on the underside of the fabric when sewing the button on. As a result, the stress to the button, shank, and thread pulls on this second button instead of the fabric. This prevents the thread from damaging and ripping the fabric, and is one of two ways to prevent "popping a button" (the other method is to use good strong thread such as [buttonhole twist](http://en.wikipedia.org/w/index.php?title=Buttonhole_twist&action=edit&redlink=1)).
* In addition to the typical shank and shankless buttons, *covered buttons* are shank buttons that have fabric completely covering the back. They are stitched on like regular shank buttons, but the sewer has to "feel" for the shank while they are sewing the button on. Covered buttons are handmade (to some degree), expensive, and are used in high-end and specialty garments.

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* *Threads* magazine Issue 117 March 2005 pp.58

Snap fastener

[](http://en.wikipedia.org/wiki/File:Druckknopf.jpg)

[http://bits.wikimedia.org/static-1.22wmf7/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Druckknopf.jpg)

**The two halves of a riveted leather "snap"; the male half (top) has a groove which "snaps" in place when pressed into the female half (bottom)**

A **snap fastener** (also called **snap**, **popper**, and **press stud**) is a pair of interlocking discs,, made out of a metal or plastic, commonly used in place of buttons to fasten [clothing](http://en.wikipedia.org/wiki/Clothing) and for similar purposes. A circular lip under one disc fits into a groove on the top of the other, holding them fast until a certain amount of force is applied. Snap fasteners are often used in children's clothing, as they are relatively easy for children to use.

Different types of snaps can be attached to fabric or leather by [riveting](http://en.wikipedia.org/wiki/Rivet) with a punch and die set specific to the type of rivet snaps used (striking the punch with a hammer to splay the tail), sewing, or plying with special snap pliers.

In the famous Chinese [Terracotta Army](http://en.wikipedia.org/wiki/Terracotta_Army), dating from 210 [BC](http://en.wikipedia.org/wiki/Before_Christ), the horse [halters](http://en.wikipedia.org/wiki/Halter) of wagons, made of a gold tube and a silver tube, were joined with a form of snap fasteners.[[*citation needed*](http://en.wikipedia.org/wiki/Wikipedia:Citation_needed)]

Modern snap fasteners were first patented by German inventor Heribert Bauer[[*citation needed*](http://en.wikipedia.org/wiki/Wikipedia:Citation_needed)] in 1885[[*citation needed*](http://en.wikipedia.org/wiki/Wikipedia:Citation_needed)] as the "Federknopf-Verschluss",[[*citation needed*](http://en.wikipedia.org/wiki/Wikipedia:Citation_needed)] a novelty fastener for men's trousers. Some attribute the invention to Bertel Sanders, of Denmark. These first versions had an S-shaped spring in the "male" disc instead of a groove.[[1]](http://en.wikipedia.org/wiki/Snap_fastener#cite_note-1) When Jack Weil (1901–2008) modified the design and put snaps on his iconic Western shirts, the term "snap" became commonplace and snap fasteners came into use in much Western wear.[[2]](http://en.wikipedia.org/wiki/Snap_fastener#cite_note-2)

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* 1. [**^**](http://en.wikipedia.org/wiki/Snap_fastener#cite_ref-1) ["Vor 120 Jahren: Heribert Bauer lässt den Druckknopf patentieren"](http://www.wdr.de/themen/kultur/stichtag/2005/03/05.jhtml) (in German). [Westdeutscher Rundfunk](http://en.wikipedia.org/wiki/Westdeutscher_Rundfunk). 2005-03-05. Retrieved 2008-02-24.
  2. [**^**](http://en.wikipedia.org/wiki/Snap_fastener#cite_ref-2) ["Story of Rockmount Ranch Wear"](http://www.rockmount.com/our_story.htm). Retrieved 2011-01-29.

Velcro

*This article is about the fabric fastener. For other uses, see*[*Velcro (disambiguation)*](http://en.wikipedia.org/wiki/Velcro_(disambiguation))*.*

[](http://en.wikipedia.org/wiki/File:Velcro_Hooks.jpg)

**Velcro hooks**

**[](http://en.wikipedia.org/wiki/File:Velcro_Loops.jpg)**

**Velcro loops**

**Velcro** is a company that produces the first commercially marketed fabric **hook-and-loop fastener**,[[1]](http://en.wikipedia.org/wiki/Velcro#cite_note-OED-1) invented in 1948 by the Swiss [electrical engineer](http://en.wikipedia.org/wiki/Electrical_engineer) [George de Mestral](http://en.wikipedia.org/wiki/George_de_Mestral). De Mestral patented Velcro in 1955, subsequently refining and developing its practical manufacture until its commercial introduction in the late 1950s.

The word *Velcro* is a [portmanteau](http://en.wikipedia.org/wiki/Portmanteau) of the two French words [*velours*](http://en.wikipedia.org/wiki/Velour) ("velvet"), and [*crochet*](http://en.wikipedia.org/wiki/Crochet) ("hook").[[1]](http://en.wikipedia.org/wiki/Velcro#cite_note-OED-1)[[2]](http://en.wikipedia.org/wiki/Velcro#cite_note-swissinfo-2)[[3]](http://en.wikipedia.org/wiki/Velcro#cite_note-Velcro.com-3)

Hook-and-loop fasteners consist of two components: typically, two lineal fabric strips (or, alternatively, round "dots" or squares) which are attached (e.g., sewn, adhered, etc.) to the opposing surfaces to be fastened. The first component features tiny hooks; the second features even smaller and "hairier" loops. When the two components are pressed together, the hooks catch in the loops and the two pieces fasten or bind temporarily.[[4]](http://en.wikipedia.org/wiki/Velcro#cite_note-4) When separated, by pulling or peeling the two surfaces apart, the velcro strips make a distinctive "ripping" sound.

The first Velcro sample was made of [cotton](http://en.wikipedia.org/wiki/Cotton), which proved impractical[[5]](http://en.wikipedia.org/wiki/Velcro#cite_note-How-5) and was replaced by [Nylon](http://en.wikipedia.org/wiki/Nylon) and [polyester](http://en.wikipedia.org/wiki/Polyester).[[6]](http://en.wikipedia.org/wiki/Velcro#cite_note-Dr.Joe-6) Velcro fasteners made of Teflon loops, polyester hooks, and glass backing are used in aerospace applications, e.g. on [space shuttles](http://en.wikipedia.org/wiki/Space_shuttle).[[6]](http://en.wikipedia.org/wiki/Velcro#cite_note-Dr.Joe-6)

Variations on the standard Velcro hook and loop fasteners include hooks on both faces, [buttons](http://en.wikipedia.org/wiki/Button), [zippers](http://en.wikipedia.org/wiki/Zipper), [laces](http://en.wikipedia.org/wiki/Shoelaces), and [buckles](http://en.wikipedia.org/wiki/Buckle).

The term *Velcro* is commonly used to mean any type of hook and loop fastener, but remains a registered [trademark](http://en.wikipedia.org/wiki/Trademark) in many countries used by the Velcro company to distinguish their brand of fasteners from their competitors.[[7]](http://en.wikipedia.org/wiki/Velcro#cite_note-7) The Velcro company headquarters is in [Amsterdam](http://en.wikipedia.org/wiki/Amsterdam), [the Netherlands](http://en.wikipedia.org/wiki/The_Netherlands)[[8]](http://en.wikipedia.org/wiki/Velcro#cite_note-8).

**[](http://en.wikipedia.org/wiki/File:Micrograph_of_hook_and_loop_fastener,(Velcro_like).jpg)**

**[http://bits.wikimedia.org/static-1.22wmf8/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Micrograph_of_hook_and_loop_fastener,(Velcro_like).jpg)**

**Velcro-like hook-and-loop fastener photographed using a low power microscope.**

History

[](http://en.wikipedia.org/wiki/File:Bur_Macro_BlackBg.jpg)

[http://bits.wikimedia.org/static-1.22wmf8/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Bur_Macro_BlackBg.jpg)

**Tiny hooks can be seen covering the surface of this**[**burr**](http://en.wikipedia.org/wiki/Bur)**. The design of Velcro imitated this natural mechanism for seed dispersion.**

The hook-and-loop fastener was conceived in 1941 by Swiss [engineer](http://en.wikipedia.org/wiki/Engineer), [George de Mestral](http://en.wikipedia.org/wiki/George_de_Mestral)] who lived in [Commugny](http://en.wikipedia.org/wiki/Commugny), Switzerland.

The idea came to him one day after returning from a hunting trip with his dog in the [Alps](http://en.wikipedia.org/wiki/Alps). He took a close look at the [burrs](http://en.wikipedia.org/wiki/Burr_(fruit)) (seeds) of [burdock](http://en.wikipedia.org/wiki/Burdock) that kept sticking to his clothes and his dog's fur. He examined them under a microscope, and noted their hundreds of "hooks" that caught on anything with a loop, such as clothing, animal fur, or hair.[[5]](http://en.wikipedia.org/wiki/Velcro#cite_note-How-5) He saw the possibility of binding two materials reversibly in a simple fashion if he could figure out how to duplicate the hooks and loops.[[2]](http://en.wikipedia.org/wiki/Velcro#cite_note-swissinfo-2)[[10]](http://en.wikipedia.org/wiki/Velcro#cite_note-Velcro.uk-10) This inspiration from nature or the copying of nature's mechanisms (called [bionics](http://en.wikipedia.org/wiki/Bionics) or [biomimesis](http://en.wikipedia.org/wiki/Biomimesis)) is viewed by some like [Steven Vogel](http://en.wikipedia.org/wiki/Steven_Vogel)[[11]](http://en.wikipedia.org/wiki/Velcro#cite_note-11) or [Werner Nachtigall](http://en.wikipedia.org/wiki/Werner_Nachtigall)[[12]](http://en.wikipedia.org/wiki/Velcro#cite_note-12) as a key example.

Originally people refused to take him, and the idea, seriously when he took his idea to [Lyons](http://en.wikipedia.org/wiki/Lyons), which was then a center of weaving. He did manage to gain the help of one weaver, who made two [cotton](http://en.wikipedia.org/wiki/Cotton) strips that worked. However, the cotton wore out quickly, so de Mestral turned to [synthetic fibers](http://en.wikipedia.org/wiki/Synthetic_fiber).[[5]](http://en.wikipedia.org/wiki/Velcro#cite_note-How-5) He settled on [nylon](http://en.wikipedia.org/wiki/Nylon) as being the best synthetic, which had several advantages. Nylon doesn’t break down, rot, or attract mold, and it could be produced in threads of various thickness.[[6]](http://en.wikipedia.org/wiki/Velcro#cite_note-Dr.Joe-6) Nylon had only recently been invented, and through [trial and error](http://en.wikipedia.org/wiki/Trial_and_error) he eventually discovered that, when sewn under hot infrared light, nylon forms hooks that were perfect for the hook side of the fastener.[[2]](http://en.wikipedia.org/wiki/Velcro#cite_note-swissinfo-2) Though he had figured out how to make the hooks, he had yet to figure out a way to mechanize the process, and to make the looped side. Next he found that nylon thread, when woven in loops and heat-treated, retains its shape and is resilient; however, the loops had to be cut in just the right spot so that they could be fastened and unfastened many times. On the verge of giving up, a new idea came to him. He bought a pair of shears and trimmed the tops off the loops, thus creating hooks that would match up perfectly with the loops in the pile.[[5]](http://en.wikipedia.org/wiki/Velcro#cite_note-How-5)

Mechanizing the process of weaving the hooks took eight years, and it took another year to create the loom that trimmed the loops after weaving them. In all, it took ten years to create a mechanized process that worked.[[5]](http://en.wikipedia.org/wiki/Velcro#cite_note-How-5) He submitted his idea for [patent](http://en.wikipedia.org/wiki/Patent) in Switzerland in 1951 and the patent was granted in 1955.[[2]](http://en.wikipedia.org/wiki/Velcro#cite_note-swissinfo-2) Within a few years he obtained patents and began to open shops in [Germany](http://en.wikipedia.org/wiki/Germany), [Switzerland](http://en.wikipedia.org/wiki/Switzerland), [Great Britain](http://en.wikipedia.org/wiki/United_Kingdom), [Sweden](http://en.wikipedia.org/wiki/Sweden), [Italy](http://en.wikipedia.org/wiki/Italy), the [Netherlands](http://en.wikipedia.org/wiki/Netherlands), [Belgium](http://en.wikipedia.org/wiki/Belgium), and [Canada](http://en.wikipedia.org/wiki/Canada). In 1957 he branched out to the textile center of [Manchester, New Hampshire](http://en.wikipedia.org/wiki/Manchester,_New_Hampshire) in the [United States](http://en.wikipedia.org/wiki/United_States). Columnist [Sylvia Porter](http://en.wikipedia.org/wiki/Sylvia_Porter) made the first mention of the product in her column *Your Money's Worth* of August 25, 1958, writing "It is with understandable enthusiasm that I give you today an exclusive report on this news: A 'zipperless zipper' has been invented — finally. The new fastening device is in many ways potentially more revolutionary than was the zipper a quarter century ago."[[13]](http://en.wikipedia.org/wiki/Velcro#cite_note-13) A Montreal firm, Velek, Ltd., acquired the exclusive right to market the product in North and South America, as well as in Japan, with American Velcro, Inc. of New Hampshire, and Velcro Sales of New York, marketing the "zipperless zipper" in the United States.[[14]](http://en.wikipedia.org/wiki/Velcro#cite_note-14)

De Mestral obtained patents in many countries right after inventing Velcro as he expected a high demand immediately. Partly due to its appearance, though, Velcro's integration into the textile industry took time.[[*citation needed*](http://en.wikipedia.org/wiki/Wikipedia:Citation_needed)] At the time, Velcro looked like it had been made from leftover bits of cheap fabric, and thus was not sewn into clothing or used widely when it debuted in the early 1960s.[[15]](http://en.wikipedia.org/wiki/Velcro#cite_note-Why-15) It was also viewed as impractical.[[15]](http://en.wikipedia.org/wiki/Velcro#cite_note-Why-15)

[](http://en.wikipedia.org/wiki/File:Metalzipper.jpg)

[http://bits.wikimedia.org/static-1.22wmf8/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Metalzipper.jpg)

**De Mestral saw Velcro as a replacement for**[**zippers**](http://en.wikipedia.org/wiki/Zipper)**, among other things.**

A number of Velcro brand products were displayed at a fashion show at the Waldorf-Astoria hotel in New York in 1959,[[16]](http://en.wikipedia.org/wiki/Velcro#cite_note-16) however the fabric got its first break when it was used in the [aerospace](http://en.wikipedia.org/wiki/Aerospace) industry to help [astronauts](http://en.wikipedia.org/wiki/Astronaut) maneuver in and out of bulky [space suits](http://en.wikipedia.org/wiki/Space_suit). However, this reinforced the view among the populace that Velcro was something with very limited utilitarian uses. The next major use Velcro saw was with skiers, who saw the similarities between their costume and the astronauts, and thus saw the advantages of a suit that was easier to don and remove. [Scuba](http://en.wikipedia.org/wiki/Scuba_diving) and marine gear followed soon after. After seeing astronauts storing food pouches on walls,[[17]](http://en.wikipedia.org/wiki/Velcro#cite_note-Idiots-17) children's clothing makers came on board.[[15]](http://en.wikipedia.org/wiki/Velcro#cite_note-Why-15) As Velcro only became widely used after [NASA](http://en.wikipedia.org/wiki/NASA)'s adoption of it, NASA is popularly — and improperly — credited with its invention. By the mid-1960s Velcro was used in the futuristic creations of fashion designers such as [Pierre Cardin](http://en.wikipedia.org/wiki/Pierre_Cardin), [André Courrèges](http://en.wikipedia.org/wiki/Andr%C3%A9_Courr%C3%A8ges) and [Paco Rabanne](http://en.wikipedia.org/wiki/Paco_Rabanne).[[18]](http://en.wikipedia.org/wiki/Velcro#cite_note-18)

Later improvements included strengthening the filament by adding [polyester](http://en.wikipedia.org/wiki/Polyester).[[6]](http://en.wikipedia.org/wiki/Velcro#cite_note-Dr.Joe-6)

In 1978 de Mestral's patent expired, prompting a flood of low-cost imitations from [Taiwan](http://en.wikipedia.org/wiki/Taiwan), [China](http://en.wikipedia.org/wiki/China) and [South Korea](http://en.wikipedia.org/wiki/South_Korea) onto the market. Today, the trademark is the subject of more than 300 trademark registrations in over 159 countries.[[*specify*](http://en.wikipedia.org/wiki/Wikipedia:Citing_sources)] George de Mestral was inducted into the national inventors hall of fame for his invention.[[5]](http://en.wikipedia.org/wiki/Velcro#cite_note-How-5)

The big breakthrough George de Mestral made was to think about [hook-and-eye closures](http://en.wikipedia.org/wiki/Hook-and-eye_closure) on a greatly reduced scale. Hook and eye fasteners have been common for centuries, but what was new about Velcro was the scale of the hooks and eyes. Shrinking the hooks led to the two other important differences. Firstly, instead of a single-file line of hooks, Velcro has a two-dimensional surface.[[19]](http://en.wikipedia.org/wiki/Velcro#cite_note-Forks-19) This was needed, because in decreasing the size of the hooks, the strength was also unavoidably lessened, thus requiring more hooks for the same strength. The other difference is that Velcro has indeterminate match-up between the hooks and eyes. With larger hook and eye fasteners, each hook has its own eye. On a scale as small as that of Velcro, matching up each of these hooks with the corresponding eye is impractical, thus leading to the indeterminate matching.[[19]](http://en.wikipedia.org/wiki/Velcro#cite_note-Forks-19)

Strength

[](http://en.wikipedia.org/wiki/File:Velcro_hooks.jpg)

[http://bits.wikimedia.org/static-1.22wmf8/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Velcro_hooks.jpg)

**The hooks on a piece of Velcro**

**[](http://en.wikipedia.org/wiki/File:Velcro_loops.jpg)**

**[http://bits.wikimedia.org/static-1.22wmf8/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Velcro_loops.jpg)**

**The loops on a piece of Velcro**

Velcro is strong enough that a two inch square piece is enough to support a 175-pound (79 kg) person.[[15]](http://en.wikipedia.org/wiki/Velcro#cite_note-Why-15) The strength of the bond depends on how well the hooks are embedded in the loops, how much surface area is in contact with the hooks, and the nature of the [force](http://en.wikipedia.org/wiki/Force) pulling it apart. If Velcro is used to bond two [rigid](http://en.wikipedia.org/wiki/Stiffness) [surfaces](http://en.wikipedia.org/wiki/Surface), e.g. auto body panels and frame, the bond is particularly strong because any force pulling the pieces apart is spread evenly across all hooks. Also, any force pushing the pieces together is disproportionally applied to engaging more hooks and loops. Vibration can cause rigid pieces to improve their bond. Full-body Velcro suits have been made that can hold a person to a suitably covered wall.

When one or both of the pieces is flexible, e.g. a pocket flap, the pieces can be pulled apart with a peeling action that applies the force to relatively few hooks at a time. If a flexible piece is pulled in a direction [parallel](http://en.wikipedia.org/wiki/Parallel_(geometry)) to the plane of the Velcro surface, then the force is spread evenly as it is with rigid pieces.

Three ways to maximize the strength of a bond between the two flexible pieces are:

* increase the area of the bond, e.g. using larger pieces of Velcro
* ensure that the force is applied parallel to the plane of the fastener surface, e.g. bending around a corner or [pulley](http://en.wikipedia.org/wiki/Pulley).
* increase the number of hooks and loops per area unit.

Shoe closures can resist a large force with only a small amount of Velcro. This is because the strap is wrapped through a slot, halving the force on the bond by acting as a pulley system (thus gaining a [mechanical advantage](http://en.wikipedia.org/wiki/Mechanical_advantage)), and further absorbing some of the force in friction around the tight bend. This layout also ensures that the force is parallel to the Velcro strips.

Advantages and disadvantages

In favor of Velcro, it is easy to use, safe, and maintenance free. There is only a minimal decline in effectiveness even after many fastening and unfastenings. The tearing noise it makes can also be useful against [pickpockets](http://en.wikipedia.org/wiki/Pickpocketing).

Velcro has several deficiencies: it tends to accumulate hair, dust, and fur in its hooks after a few months of regular use. The loops can become elongated or broken after extended use. Velcro often becomes attached to articles of clothing, especially loosely [woven](http://en.wikipedia.org/wiki/Woven) items like [sweaters](http://en.wikipedia.org/wiki/Sweater). Additionally, the clothing may be damaged when one attempts to remove the Velcro, even if they are separated slowly. The tearing noise made by unfastening Velcro makes it inappropriate for some applications. For example, a soldier hiding from the enemy would not want to alert the enemy to his position by opening a Velcro pocket.[[2]](http://en.wikipedia.org/wiki/Velcro#cite_note-swissinfo-2) It also absorbs moisture and perspiration when worn next to the skin, which means it will smell if not washed.

Textiles can contain chemicals or compounds, e.g. dyes,[[20]](http://en.wikipedia.org/wiki/Velcro#cite_note-20) that may be [allergenic](http://en.wikipedia.org/wiki/Allergenic) to sensitive populations. Velcro products have been tested according to the [Oeko-tex](http://en.wikipedia.org/wiki/Oeko-tex) certification standard which imposes limits on the chemical content of textiles to address the issue of human ecological safety.

**A shoe using Velcro closures**

[](http://en.wikipedia.org/wiki/File:Sneakers_velcro.jpg)

[http://bits.wikimedia.org/static-1.22wmf8/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Sneakers_velcro.jpg)

[http://bits.wikimedia.org/static-1.22wmf8/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Chamitoff_ISS_Chess_Game.jpg)

Variations on Velcro

Slidingly Engaging Fastener was developed to address several problems with velcro.[[22]](http://en.wikipedia.org/wiki/Velcro#cite_note-popsci-22)[[23]](http://en.wikipedia.org/wiki/Velcro#cite_note-spot-23) Heavy duty variants (e.g., "Dual Lock" or "Duotec") feature mushroom shaped stems on each face of the fastener, providing an audible snap when the two faces mate. A strong adhesive backing adheres each component to its substrate.

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# Zipper

[](http://en.wikipedia.org/wiki/File:Plastic-_and_Nylonzipper.jpg)

[http://bits.wikimedia.org/static-1.22wmf8/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Plastic-_and_Nylonzipper.jpg)

**Nylon plastic zippers.**

A **zipper**, **zip**, or **zip fastener**, is a commonly used device for binding the edges of an opening of [fabric](http://en.wikipedia.org/wiki/Textile) or other flexible material, as on a garment or a bag.[[1]](http://en.wikipedia.org/wiki/Zipper#cite_note-1) It is used in [clothing](http://en.wikipedia.org/wiki/Clothing) (e.g., jackets and jeans), [luggage](http://en.wikipedia.org/wiki/Luggage) and other bags, [sporting goods](http://en.wikipedia.org/wiki/Sporting_goods), [camping](http://en.wikipedia.org/wiki/Camping) gear (e.g. [tents](http://en.wikipedia.org/wiki/Tent) and [sleeping bags](http://en.wikipedia.org/wiki/Sleeping_bag)), and other items. [Whitcomb L. Judson](http://en.wikipedia.org/wiki/Whitcomb_L._Judson) was an American mechanical engineer from Chicago who was the first to invent, conceive of the idea, and to construct a workable zipper.[[2]](http://en.wikipedia.org/wiki/Zipper#cite_note-2) The method, still in use today, is based on interlocking teeth. Initially it was called the “hookless fastener” and was later redesigned to become more reliable.

## Description

The bulk of a zipper/zip consists of two rows of protruding teeth which may be made to interdigitate, linking the rows,[[3]](http://en.wikipedia.org/wiki/Zipper#cite_note-3) carrying from tens to hundreds of specially shaped metal or plastic teeth. These teeth can be either individual or shaped from a continuous coil, and are also referred to as *elements*.[[4]](http://en.wikipedia.org/wiki/Zipper#cite_note-4) The slider, operated by hand, moves along the rows of teeth. Inside the slider is a Y-shaped channel that meshes together or separates the opposing rows of teeth, depending on the direction of the slider's movement. The word *Zipper* is onomatopoetic, because it was named for the sound the device makes when used, a high-pitched *zip.*

In many [jackets](http://en.wikipedia.org/wiki/Jacket) and similar garments, the opening is closed entirely when the slider is at one of the ends of the tape. The mechanism allows for partial fastening where only some of the tape is fastened together, but various movements and pressures may move the slider around the tape. In many kinds of [luggage](http://en.wikipedia.org/wiki/Luggage), there are two sliders on the tape, mounted in opposite directions; the part of the zipper between them is unfastened. When the sliders are located at opposite ends of the tape, the zipper is fully unfastened; when the two sliders are located next to each other, which can be at any point along the tape, the zipper is fully closed.

**Zippers may:**

* increase or decrease the size of an opening to allow or restrict the passage of objects, as in the fly of [trousers](http://en.wikipedia.org/wiki/Trousers) or in a [pocket](http://en.wikipedia.org/wiki/Pocket).
* join or separate two ends or sides of a single garment, as in the front of a jacket, or on the front, back or side of a dress or skirt to facilitate dressing.
* attach or detach a separable part of the garment to or from another, as in the conversion between trousers and [shorts](http://en.wikipedia.org/wiki/Shorts) or the connection or disconnection of a [hood](http://en.wikipedia.org/wiki/Hood_(headgear)) and a [coat](http://en.wikipedia.org/wiki/Coat_(clothing)).
* decorate an item.

These variations are achieved by sewing one end of the zipper together, sewing both ends together, or allowing both ends of the zipper to fall completely apart.

A zipper costs relatively little, but if it fails, the garment may be unusable until the zipper is repaired or replaced—which can be quite difficult and expensive. Problems often lie with the zipper slider; when it becomes worn it does not properly align and join the alternating teeth. If a zipper fails, it can either jam (i.e. get stuck) or partially break off.

## History

[Elias Howe](http://en.wikipedia.org/wiki/Elias_Howe), who invented the [sewing machine](http://en.wikipedia.org/wiki/Sewing_machine), received a [patent](http://en.wikipedia.org/wiki/Patent) in 1851 for an "Automatic, Continuous Clothing Closure". Perhaps because of the success of his sewing machine, he did not try to seriously market it, missing recognition he might otherwise have received.[[5]](http://en.wikipedia.org/wiki/Zipper#cite_note-ansun-5) Howe's device was more like an elaborate draw-string than a true slide fastener.

Forty-two years later, [Whitcomb Judson](http://en.wikipedia.org/wiki/Whitcomb_Judson), who invented an pneumatic street railway, marketed a "Clasp Locker". The device served as a (more complicated) hook-and-eye shoe fastener. With the support of [businessman](http://en.wikipedia.org/wiki/Businessman) [Colonel Lewis Walker](http://en.wikipedia.org/w/index.php?title=Colonel_Lewis_Walker&action=edit&redlink=1), Judson launched the [Universal Fastener Company](http://en.wikipedia.org/wiki/Universal_Fastener_Company) to manufacture the new device. The clasp locker had its public debut at the [1893 Chicago World's Fair](http://en.wikipedia.org/wiki/1893_Chicago_World%27s_Fair) and met with little commercial success.[[5]](http://en.wikipedia.org/wiki/Zipper#cite_note-ansun-5) Judson is sometimes given credit as the inventor of the zipper, but he never made a practical device.

The company, reorganized as the "Fastener Manufacturing and Machine Company," moved to Hoboken, N.J. in 1901. [Gideon Sundback](http://en.wikipedia.org/wiki/Gideon_Sundback), a [Swedish](http://en.wikipedia.org/wiki/Swedes)-American [electrical engineer](http://en.wikipedia.org/wiki/Electrical_engineer), was hired to work for the company in 1906. Good technical skills and a marriage to the plant-manager's daughter [Elvira Aronson](http://en.wikipedia.org/w/index.php?title=Elvira_Aronson&action=edit&redlink=1) led Sundbäck to the position of head designer. The company moved to Meadville, PA, where it operated for most of the 20th century under the name ["Talon, Inc."](http://en.wikipedia.org/wiki/Talon_Zipper) After his wife's death in 1911, Sundback devoted himself to improving the fastener, and by December 1913 had designed the modern zipper. The rights to this invention were owned by the Meadville company (operating as the "Hookless Fastener Co."), but Sundback retained non-U.S. rights and used these to set up in subsequent years a Canadian firm, in St. Catharine's, Ont. Sundback's work with this firm has led to the common misperception that he was Canadian and that the zipper originated in that country.[[6]](http://en.wikipedia.org/wiki/Zipper#cite_note-6)

Gideon Sundback increased the number of fastening elements from four per inch (about one every 6.4 mm) to ten or eleven (around every 2.5 mm), introduced two facing rows of teeth that pulled into a single piece by the slider, and increased the opening for the teeth guided by the slider. The patent for the "Separable Fastener" was issued in 1917. Gideon Sundback also created the manufacturing machine for the new device. The "S-L" or "scrapless" machine took a special Y-shaped wire and cut scoops from it, then punched the scoop dimple and nib, and clamped each scoop on a cloth tape to produce a continuous zipper chain. Within the first year of operation, Sundback's machinery was producing a few hundred feet (around 100 meters) of fastener per day.[[*citation needed*](http://en.wikipedia.org/wiki/Wikipedia:Citation_needed)]In March of the same year, Mathieu Burri a Swiss inventor improved the design by adding a lock-in system attached to the last teeth, but his version never got into production due to conflicting patents.

[](http://en.wikipedia.org/wiki/File:Zipper_animated.gif)

[http://bits.wikimedia.org/static-1.22wmf8/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Zipper_animated.gif)

**Zipper slider brings together the two sides**

The popular *zipper* name came from the [B. F. Goodrich Company](http://en.wikipedia.org/wiki/B._F._Goodrich_Company) in 1923. B.F. Goodrich Company was founded by Benjamin Goodrich. He was a physician and industrialist, born in Ripley, New York, USA. He was a surgeon during the Civil War, who started his career when he opened a private practice in Jamestown, NY (1864).[[7]](http://en.wikipedia.org/wiki/Zipper#cite_note-7)[[8]](http://en.wikipedia.org/wiki/Zipper#cite_note-8) The company opted to use Gideon Sundbäck's fastener on a new type of [rubber](http://en.wikipedia.org/wiki/Rubber) boots (or [galoshes](http://en.wikipedia.org/wiki/Galoshes)) and referred to it as the zipper, and the name stuck. The two chief uses of the zipper in its early years were for closing boots and [tobacco](http://en.wikipedia.org/wiki/Tobacco) pouches. It was almost twenty years before the [fashion industry](http://en.wikipedia.org/wiki/Fashion_industry) began seriously promoting the novel closure on garments.[[5]](http://en.wikipedia.org/wiki/Zipper#cite_note-ansun-5)

In the 1930s, a sales campaign began for children's clothing featuring zippers. The campaign praised zippers for promoting self-reliance in young children by making it possible for them to dress in self-help clothing. The zipper beat the button in 1937 in the "Battle of the Fly", after [French fashion](http://en.wikipedia.org/wiki/French_fashion)designers raved over zippers in men's trousers. [*Esquire*](http://en.wikipedia.org/wiki/Esquire_(magazine)) declared the zipper the "Newest Tailoring Idea for Men" and among the zippered fly's many virtues was that it would exclude "The Possibility of Unintentional and Embarrassing Disarray."[[*citation needed*](http://en.wikipedia.org/wiki/Wikipedia:Citation_needed)]

The most recent innovation[[*citation needed*](http://en.wikipedia.org/wiki/Wikipedia:Citation_needed)] in the zipper's design was the introduction of models that could open on both ends, as on jackets. Today the zipper is by far the most widespread fastener, and is found on clothing, luggage, leather goods, and various other objects.[[9]](http://en.wikipedia.org/wiki/Zipper#cite_note-9)

## Types

[](http://en.wikipedia.org/wiki/File:Reissverschluss_Helix.jpg)

[http://bits.wikimedia.org/static-1.22wmf8/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Reissverschluss_Helix.jpg)

**A coil zipper with its slider removed.**

* **Coil zippers** now form the bulk of sales of zippers worldwide. The slider runs on two coils on each side; the *teeth* are formed by the windings of the coils. Two basic types of coils are used: one with coils in spiral form, usually with a cord running inside the coils; the other with coils in ladder form, also called the Ruhrmann type. Coil zippers are made of polyester coil and are thus also termed polyester zippers. Nylon was formerly used and though only polyester is used now[[*citation needed*](http://en.wikipedia.org/wiki/Wikipedia:Citation_needed)], the type is still also termed a nylon zipper.
* **Invisible zippers** have the teeth hidden behind a tape, so that the zipper is *invisible*. The tape's color matches the garment's, as does the slider's. This kind of a zipper is common in [skirts](http://en.wikipedia.org/wiki/Skirt) and [dresses](http://en.wikipedia.org/wiki/Dress). Invisible zippers are usually coil zippers. They are also seeing increased use by the military and emergency services because the appearance of a button down shirt can be maintained, while providing a quick and easy fastening system.
* **Metallic zippers** are the classic zipper type, found mostly in [jeans](http://en.wikipedia.org/wiki/Jeans) today. The teeth are not a coil, but are individual pieces of metal molded into shape and set on the zipper tape at regular intervals. Metal zippers are made in brass, aluminum and nickel, according to the metal used for teeth making. All these zippers are basically made from flat wire. A special type of metal zipper is made from pre-formed wire, usually brass but sometimes other metals too. Only a few companies in the world have the technology. This type of pre-formed metal zippers is mainly used in high grade jeans-wear, work-wear, etc., where high strength is required and zippers need to withstand tough washing.
* **Plastic-molded zippers** are identical to metallic zippers, except that the teeth are plastic instead of metal. Metal zippers can be painted to match the surrounding fabric; plastic zippers can be made in any color of plastic. Plastic zippers mostly use [polyacetal](http://en.wikipedia.org/wiki/Polyacetal) resin, though other [thermoplastic polymers](http://en.wikipedia.org/wiki/Thermoplastic_polymer) are used as well, such as [polyethylene](http://en.wikipedia.org/wiki/Polyethylene).
* **Open-ended zippers** use a *box and pin* mechanism to lock the two sides of the zipper into place, often in jackets. Open-ended zippers can be of any of the above described types.
* **Closed-ended zippers** are closed at both ends; they are often used in [luggage](http://en.wikipedia.org/wiki/Luggage).

### Air and water tightness

[](http://en.wikipedia.org/wiki/File:WP_zip.jpg)

[http://bits.wikimedia.org/static-1.22wmf8/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:WP_zip.jpg)

Waterproof zipper on a diving dry suit. The exterior metal segments clamp the waterproof sheeting over the concealed zipper teeth. The zipper teeth are not visible in this image (obscured by the edges of the waterproof sheet).

Airtight zippers were first developed by [NASA](http://en.wikipedia.org/wiki/NASA) for making high-altitude [pressure suits](http://en.wikipedia.org/wiki/Pressure_suits) and later [space suits](http://en.wikipedia.org/wiki/Space_suits), capable of retaining air pressure inside the suit in the [vacuum](http://en.wikipedia.org/wiki/Vacuum) of space.[[*citation needed*](http://en.wikipedia.org/wiki/Wikipedia:Citation_needed)]

The airtight zipper is built like a standard toothed zipper, but with a waterproof sheeting (which is made of fabric-reinforced polyethylene and is bonded to the rest of the suit) wrapped around the outside of each row of zipper teeth. The sheeting is crimped in place around each zipper tooth by using a C-shaped metal clip on the outside. (These externally-visible opposing rows of clips are the metal runners on which the slider moves.) When the zipper is closed, the two facing sides of the plastic sheeting are squeezed tightly against one another (between the C-shaped clips) both above and below the zipper teeth, forming a double seal.[[10]](http://en.wikipedia.org/wiki/Zipper#cite_note-10)

This double-mated surface is good at retaining both vacuum and pressure, but the fit must be very tight, to press the surfaces together firmly. Consequently these zippers are typically very stiff when zipped shut and have minimal flex or stretch. They are hard to open and close because the zipper anvil must bend apart teeth that are being held under tension. They can also be derailed (and damage the sealing surfaces) if the teeth are misaligned while straining to pull the zipper shut.

These zippers are very common where airtight or watertight seals are needed, such as on [scuba diving](http://en.wikipedia.org/wiki/Scuba_diving) [dry suits](http://en.wikipedia.org/wiki/Dry_suit), ocean [survival suits](http://en.wikipedia.org/wiki/Survival_suit), and[hazmat suits](http://en.wikipedia.org/wiki/Hazmat_suit).

A less common water-resistant zipper is similar in construction to a standard toothed zipper, but includes a molded plastic ridge seal similar to the mating surfaces on a [ziploc bag](http://en.wikipedia.org/wiki/Ziploc_bag). Such a zipper is easier to open and close than a clipped version, and the slider has a gap above the zipper teeth for separating the ridge seal. This seal is structurally weak against internal pressure, and can be separated by pressure within the sealed container pushing outward on the ridges, which will simply flex and spread apart, potentially allowing air or liquid entry through the spread-open ridges. Ridge-sealed zippers are sometimes seen on lower cost surface [dry suits](http://en.wikipedia.org/wiki/Dry_suit).

## Components

|  |  |
| --- | --- |
| [http://upload.wikimedia.org/wikipedia/commons/thumb/2/22/Reissverschluss_Teile_2_fcm.jpg/210px-Reissverschluss_Teile_2_fcm.jpg](http://en.wikipedia.org/wiki/File:Reissverschluss_Teile_2_fcm.jpg)  [http://bits.wikimedia.org/static-1.22wmf8/skins/common/images/magnify-clip.png](http://en.wikipedia.org/wiki/File:Reissverschluss_Teile_2_fcm.jpg)  **Components of a zipper** | **The components of a zipper are:**   1. **top tape extension** 2. **top stop** 3. **slider** 4. **pull tab** 5. **tape** 6. **chain width** 7. **bottom stop** 8. **bottom tape extension** 9. **single tape width** 10. **insertion pin boll** 11. **retainer box** 12. **reinforcement film** |

## Manufacturing

[Forbes](http://en.wikipedia.org/wiki/Forbes) reported in 2003 that although the zipper market in the 1960s was dominated by [Talon Zipper](http://en.wikipedia.org/wiki/Talon_Zipper) (USA) and Optilon (Germany)), Japanese manufacturer [YKK Group](http://en.wikipedia.org/wiki/YKK_Group) grew to become the industry giant by the 1980s. YKK held 45% of the world market share, followed by Optilon (8%) and [Talon Zipper](http://en.wikipedia.org/wiki/Talon_Zipper) (7%).[[11]](http://en.wikipedia.org/wiki/Zipper#cite_note-11)

Indian [Tex Corp](http://en.wikipedia.org/wiki/Tex_Corp) has also emerged as a significant supplier to the apparel industry.

In Europe, [Cremalleras Rubi](http://en.wikipedia.org/wiki/Cremalleras_Rubi) company established in 1926 (Spain), continues to compete with the big multinationals selling over 30 million zippers in 2012.

In 2005, [The Guardian](http://en.wikipedia.org/wiki/The_Guardian) reported that China had 80% of the international market. Most its product is made in [Qiaotou, Yongjia County](http://en.wikipedia.org/wiki/Qiaotou,_Yongjia_County).[[12]](http://en.wikipedia.org/wiki/Zipper#cite_note-12)

## Alternatives to zipper

* [**Brooch**](http://en.wikipedia.org/wiki/Brooch)
* [**Buckle**](http://en.wikipedia.org/wiki/Buckle)
* [**Button**](http://en.wikipedia.org/wiki/Button)
* [**Safety pin**](http://en.wikipedia.org/wiki/Safety_pin)
* [**Shoelaces**](http://en.wikipedia.org/wiki/Shoelaces)
* [**Snap fasteners**](http://en.wikipedia.org/wiki/Snap_fastener)**(also named *poppers* and *press studs*)**
* [**Velcro**](http://en.wikipedia.org/wiki/Velcro)

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