Bleach'ing. The art of removing color from fabrics, etc. It was known in India, Egypt, and Syria, and in ancient Gaul.

As at present practiced, the process dates back only to the beginning of the present century.

Linen was formerly sent from England to Holland to be bleached. This was performed by several months' exposure to air, light, and moisture. The linens were spread on the ground and sprinkled with pure water several times daily. They were called Hollands, and the name still survives.

In 1749 the system of *bucking* and *crofting*, that is, soaking in alkaline lye and spreading on the grass, was introduced into Scotland. After five or six repetitions of these processes, the linen was dipped in sour milk and then *crofted*. The processes were repeated. The cotton manufacture at this time was in its earliest infancy.

The next improvement was the substitution of dilute sulphuric acid for sour milk. This reduced the time one half.

Scheele, in 1774, had discovered chlorine; and Berthollet, in 1784, ascertained that an aqueous solution of chlorine discharged vegetable colors. This he communicated to Watt, and it was soon adopted in Scotland with linen. Berthollet added potash to the water to preserve the health of the workmen and the texture of the goods.

Dr. Henry, of Manchester, substituted lime for potash, the goods being passed through a cream of lime and then exposed to chlorine. This formed a chloride of lime on the cloth.

In 1798, Tennant, of Glasgow, adopted a saturated solution of chloride of lime, and subsequently impregnated dry lime with the gas, making bleaching powder.

Bleaching, of cotton goods especially, is conducted on a systematic large scale, and includes singeing and washing; the former to remove the fibrous down from the surface, and the latter to remove the dirt and impurities acquired in spinning and weaving.

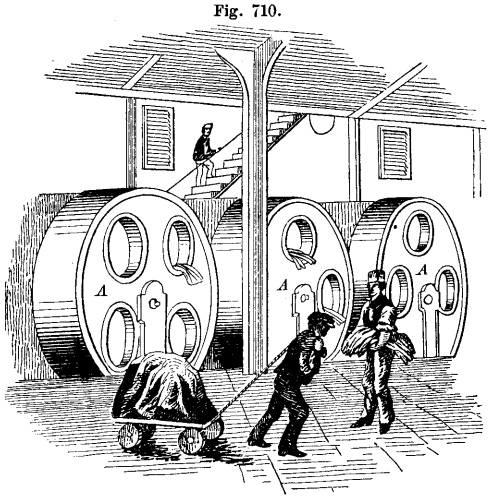
The following process is employed for cotton goods: —

In singeing, the cloth is passed rapidly over a red-hot roller, which removes protruding fibers.

The cloth is then placed in the dash-wheels *A A A* (Fig. 710), which rotate on horizontal axes, and have quadrantal compartments which hold the cloth. Water is introduced through the hollow axes, and a rapid rotation subjects the cloth to the combined effects of agitation and the dashing of the water.

The cloth is next *bucked*, or washed by an alkaline solution which removes the greasy and resinous matters. The goods are placed on the grated bottom of a vat, in the center of which is a stand-pipe by which the stream of boiling alkaline solution is brought in a shower upon the cloths. A deflecting plate on

Fig. 710.



Dash-Wheels.

the top of the stand-pipe distributes the water upon the cloths, through which it percolates and finds its way down through the grating, to be again pumped up. See BUCKING-KIER.

This shower of boiling alkaline solution is maintained for about seven hours, after which the cloth is again washed in the wheels.

The cloths are now *chemicked* by steeping for six hours in a dilute solution of chloride of lime, after which they are steeped in what is called a *souring* vat; this is a bath of very dilute sulphuric acid, which disengages the chlorine from the lime, and brings the gas into intimate contact with the fiber, which is thereby *bleached*.

The washing, boiling, bleaching, and souring are repeated as may be necessary to produce the complete effect.

The process takes from 24 to 48 hours, and the cloths are handled by machinery.

Linen is now bleached in a similar way, but the operation is more troublesome and requires a longer time, on account of the greater affinity of the material for coloring matter.

Wool is bleached by exposing it to the action of fuller's-earth and soap in a fulling-mill, after which it is washed and dried. When it is intended to preserve it white, it is usually run through water tinged with indigo, or exposed to the fumes of burning sulphur. The last method, unless very carefully conducted, is apt to cause the goods to acquire a harsh feeling, which is removed by washing in soap and water, but this usually reproduces the original yellowish-white tinge.

Silk is bleached by boiling in white soap and water, and then carefully rinsing it. When required to be very white, the material is usually subjected to the fumes of burning sulphur. Straw is generally bleached by the fumes of sulphur, but oxalic acid or chloride of lime is preferable.