

FELT, FELTING.

FELT, FELTING, a fabric formed without weaving, by taking advantage of the natural tendency of the fibres of hair and wool to interlace with and cling to each other. The hatters' tradition concerning the invention of felt affords as good an illustration as any we can find of the principle of this manufacture. In most Roman Catholic countries, the hatters celebrate as a festival the 23d of November, St Clement's Day, as they formerly did in this country; and it is stated that St Clement, when on a pilgrimage, put carded wool between his feet and the soles of his sandals, and found on his journey's end that the wool was converted into cloth. Although this tradition is very questionable, as the manufacture of felt is of far more ancient origin, there can be no doubt that if carded wool were thus continually trodden, and at the same time moistened, it would become felt, and all the manufacturer's processes of felting are but modifications of such treatment.

This matting or felting of the fibres of hair and wool results from their structure, for, when examined by the microscope, the hair of all animals is found to be more or less jagged or notched on its surface; in some animals it is distinctly barbed; and this structure is so directed that the teeth or barbs all point towards the tip of the hair. See HAIR. If a piece of human hair (in which this structure is less marked than in most animals) be held between the finger and thumb, and rubbed in the direction of its length, it will invariably move between the fingers in the direction of its root; for the skin, while moving towards the tip of the hair, slides freely upon it, but moving in the other direction, against the inclination of the barbs, it brings the hair with it. It will be easily understood that when a number of hairs are pressed together, those which lie in opposite directions to each other and in contact will interlock at these barbs or teeth, and thus resist any effort to tear them asunder. When once this close contact and interlocking is established between any two or more hairs, they remain attached, but the others that are differently arranged, or not in contact, will still be free to move upon each other; and therefore, if subjected to continual blows, pushing, and pressure, like the treading of the feet in walking, the unattached hairs will be continually shifting until they reach others in suitable positions for clinging together, either by crossing obliquely or by lying in the same line, and overlapping at their ends or any other portion. When the hair has a natural tendency to curl, the felting is still more readily brought about by the additional interlacing. This is the case with wool to such an extent, that when free from grease it cannot be retained in the straight carded condition required for spinning and weaving. When it is required to be felted, the natural grease has to be removed. This tendency to felt is shewn in the hard lumps formed in wool-mattresses that have been long used.

The beaver-hat maker produces his felt by taking a few ounces of the mixed fur, distributing it in an even layer by twanging a bowstring against the heap, and then condensing this into a felt by a sort of kneading process with his hands. See HAT.

The felt now extensively used for carpeting and other purposes is made by machinery, chiefly from the waste wool from the weaving-mills. Many patents have been taken out for the various details of felting-machinery, but the main principle is the

same in all. The wool is carded more or less perfectly, and steamed or moistened with hot water, and passed between beaters, which act like the pilgrim's feet in the manner already described. When used as drugget for covering carpets, or as a substitute for carpet, the felt is printed by means of blocks with various patterns, or simply dyed. Felt is also used for padding coats and other garments, sometimes for cloaks and capes; for table-covers, some of which are beautifully embossed and printed; for carriage-linings, upholstery work, polishing cloths, pianoforte hammers, and various other purposes where a coarse or thick cloth is required. A simple kind of saddle, cut out of very thick felt, is in common use in South America.

The 'felted sheathing' used as a non-conducting covering for retaining the heat in steam-boilers, is a substance intermediate between felt and paper, being composed of the commonest woollen refuse from paper-mills, &c., made into a semi-pulp, and beaten to produce a partial felting. This when dried hardens, and though possessing but little tenacity, and unfit for the wear of friction, is, from its compactness, better adapted than ordinary felt for the purposes to which it is applied.

Asphalted Roofing-felt is a very coarse felt saturated with pitch, asphalt or coal-tar—usually the latter, on account of its cheapness; it is retailed at one penny per foot, and used for covering sheds and other buildings. A more expensive kind, free from coal-tar, is called *Inodorous Felt*, and used as a lining for damp walls upon which paper has to be hung. Asphalted felt is also used as a flooring for granaries and similar buildings, and has been recommended for public schools, to prevent the noise from the shuffling of the children's feet.