thread made, and its brittleness and liability to snap. As showing the extraordinary effects that could be produced by this, he had known a mill which, when starting its new machinery, had several breakdowns of the openers and scutchers, but more particularly scutchers, after stopping the machine and restarting. A little observation showed that in each case a huge parcel of cotton of considerable density had been carried to the metallic cages, and by over-pressure, owing to the great thickness, had caused breakages of the wheels. A little examination showed that, after running some time, the whole of the interior of the beaters, from the centre shaft to the blade of the beater, contained a dense block of cotton, which filled in the space as symmetrically as if it had been made purposely in wood. After a certain time, when the machine had been stopped long enough to allow the electricity to be disengaged, these pieces fell as the machine restarted and were thrown by centrifugal force into the cages. These extraordinary blocks of cotton were examined, and it was found that the fibres were ranged parallel end to end in line from the centre of the beater shaft to the inside surface of the beater blade. In this case the objectionable phenomena disappeared as soon as the room had been heated, and the straps driving the machine had been thoroughly well moistened with composition. The fact was, the machines were at first thoroughly insulated from the floor; the driving strap slipping on the line-shaft pulley was acting as a sort of electric machine, and charging, by means of the strap, the opening or scutching machine driven. In America this had been considered of such importance that in many mills there were special arrangements for preventing conduction of electricity from the driving straps to the machines. Mr. Buchanan said, in the *Phil. Mag.*, U.S., Vol. I., page 581, that "in a factory at Glasgow the accumulation of electricity in one room in particular, in which was a large cast-iron lathe, shears and other machinery driven with great velocity by belts, was so great that it was necessary, in order to protect the workmen from unpleasant shocks, to connect the machinery with copper wire with the iron columns of the buildings, and that when a break in the wire was made at a quarter of an inch the succession of sparks was very rapid. The electricity was positive." Thus, in the case of the scutchers I have named, the phenomena ceased when the slipping of the strap was prevented by the composition, which at the same time acted as a non-conductor, preventing the surface of the leather from touching the surface of the iron drum.

DRY BRUSHING FOR FINISHING.

The necessary smoothness and elegant appearance of fine woolen cloths must, first of all, be imparted to nap goods by the teaseling and laying in nap. The more thoroughly a cloth is teaseled or has its felt loosened down to the body, and the oftener and more thoroughly it is teaseled wet in this condition, the smoother and more lustrous, at the same time softer, will be its face. Worn teasel sets were formerly used, but they are at present frequently replaced by brushes to effect the same purpose. Besides this wet treatment for the purpose of laying the nap well, fine woolen goods require a special treatment in a dry condition, and for this the brush and the steaming apparatus, or table, are used. This steaming table and brush have recently been combined into one machine in such a manner that the cloth is first steamed and then brushed, which is the most appropriate method under all circumstances.

While medium and ordinary woolen goods, even if submitted to a steam lustering, are generally shorn without delay after drying, and at once finished, fine cloth is brushed both with and without steam between the stages of finishing, especially between pressing and steam lustering, and again during the several stages of shearing. This is done for several reasons, one of which is that in consequence of the prolonged wet teaseling and the pressing and steam lustering, the nap is, as it were, pasted down, and must be raised again slightly, so that on the one hand the shearing cylinder is better able to seize it more readily and uniformly, and on the other to better conceal the more or less pronounced weave by the flexibility of the nap.

It is well known that wool, when dry, retains the position imparted to it in a wet state. When teaseled and napped cloth, therefore, appears more or less wavy when dried, the surface, no matter how much nap it has, permits the form of the weave to appear, especially when the extra long nap has been reduced by the shearing. The curly appearance of plain cloth, or the appearance of the twill, was formerly well liked, but is no longer desired, and to correct this feature recourse must be had to dry brushing. Steam and brush must be employed to aid in covering the weave by partially raising and stretching the nap. Occasionally it is required before the first shearing to pass the dry cloth over the steam brush. It must be stated, however, that when the cloth was uneven from the commencement, say in breadth, or when it possessed traces of cockles, which were subsequently got out by tentering and drying, it is better to avoid the use of steam and only employ the brush until the pieces are first fixed in their corrected condition by the steam lustering. Generally speaking, the steaming employed in brushing must be so feeble that the nap is only raised a little and becomes supple and elastic in order to make the work of the brush effective. The steam must act but slightly on the body of the cloth, and this part of the finisher's work, therefore, requires great care and expertness.

Upon the correct handling of steam brush the success of the finishing operation and the appearance of the finished cloth depends in a great degree. The finisher must decide beforehand how the face of the cloth shall look in its finished state, and he must shape his processes accordingly before the pressing. It is still more imperative that this should be done before the steam lustering. This rule must be observed especially when the pieces, after having been pressed, are to be