complete substitution of new and heavier shafting, etc., to a great increase in the dead load on the structure generally, while with an electric installation little or no radical alteration is required.

In the advocated new system of driving, outside the engines or prime movers (which are neglected as being common to both systems), all the shaftings, gears, belts, bearings, etc., are replaced by simple fixed conductors of very small weight, and by separate motors to each machine or tool; where, however, the power required does not warrant this, a separate motor is used to drive a group of machines from a short line of light shaftings. These shafts or groups of machines can be placed in any position found most convenient for working, regardless of their neighbors.

The nature of electrical generation and dynamo working is such that only a sufficient amount of current required to do the work in hand is used, so its economy is at once obvious. In factories where the machine is working intermittently, and liable to great fluctuations, the economy of working is even more marked, as the electric current can be switched on or off with the greatest ease and rapidity, after which cross belts and fast and loose pulleys appear a heavy and clumsy, not to say unscientific, method of handling power.

In electrical transmission 80 per cent. of the power generated by the engine is usefully employed in the machines, and where each machine can have its own motor, a unique and highly economical method of using power is obtained. It is hardly necessary to point out that no hard or fast law can be laid down; each case must be individually considered, and that system adopted which gives the best results. For old and existing works probably the cost of conversion would seldom be warranted, but for new factories or renovations without doubt the question for electric driving should be most seriously considered.

In these days of fierce competition, and when profits are reduced to their lowest ebb, the careful study of every possible means of economical working is of vital importance to the manufacturer. The use of electricity for driving all kinds of hoisting machinery is extremely satisfactory and most economical, it is easily and instantly controlled, and allows the driver to concentrate the whole of his attention to the work being handled.

For heavy machinery, such as exists in sugar works, electric driving would without doubt be very advantageous in effecting economy, and give great convenience in working, and the facility with which electric lighting could be adopted is also an incidental, but important, advantage to be derived from its use.

Lastly, this system for motive power purposes lends itself most admirably to the subdivision of the motive power engines and dynamos into several units, the consequence being that by this multiplication the chances of total or even serious breakdown are rendered impossible.

Before concluding, we would mention that where factories, or mills, etc., are within a reasonable distance, say ten miles, of reservoirs, waterfalls, or mountain streams, when water can be relied upon, the motive power could be obtained from them with advantage by generating current at the site, and distributing it to the works on the high-tension system.

THE PREPARATION OF WOOLENS FOR THE NEEDLE.

In England, not many years ago, says the *Textile Manufacturer*, the final stage of the finishing process of woolens, aptly called "preparing for the needle," was the work of the tailor or steam-lusterer, but at the present time customers demand an entirely finished cloth from the manufacturer. If it were asked what is meant by "preparing for the needle," and what are the manipulations required to furnish such a cloth, the answer would be that a cloth can only be so designated when it remains unchanged while in the tailor's hands, especially in the operation of ironing with the hot goose, applied upon a piece of wet linen laid over the garment. No artificial lustre produced thereby is permitted, as the cloth would become full of spots.

For the tailor and the steam-lusterer, it was not so difficult formerly to prepare a piece of cloth for the needle, and they did not care how rough and unsightly it became in their hands, as they could easily restore its appearance by ironing. But the case is quite different with the manufacturer. His cloth is sent over the globe, figuratively speaking, and is laid before the foreign as well as the home purchaser, and the goods are perhaps tossed about for months before they are finally disposed of.

In order to impart the above-mentioned characteristics to a cloth, it requires the experience of the skilful finisher, who is obliged to arrange his method of treating it from the very commencement. The greatest difficulties will be presented by a slightly fulled cloth, while others, the felting capacity of which is nearly exhausted, will conform more readily to the treatment. From the grey woven piece to the finished fabric he must proceed with the strictest attention. In the scouring, he must regulate the strength of the liquor to a minimum, and avoid having the pieces run too long in the same folds. A rapid solution of the weaver's size must be followed by a slow rinsing with water. When the pieces are clean they must be removed at once from the washing machine. If they are left in the machine too long, creases which can only be removed with great difficulty are apt to form. Even though they are small and no longer visible after fulling and tentering, they will nevertheless invariably reappear when the cloth is being prepared for the needle, and impart an unfinished appearance to it. Soft cloth is rather less inclined to retain these creases, while hard cheviots should be examined closely, and even if they have only a trace of creases, these should be removed at once.

When the finisher is treating a cloth that is to have a felted surface, and he desires to loosen the nap somewhat before fulling, in order to obtain the desired