Machinery and Appliances.

IMPROVED REVOLVING FLAT CARDING ENGINE.

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It is a fact, patent to everybody having the slightest connection with the cotton trade, that the makers of cotton machinery have, during the past ten years, surpassed all their previous efforts in their endeavours to improve their various machines in both principle and detail. And the fact that these efforts have been successful in a very high degree is equally evident. The card, the mule, and the ring frame, have each received an especially large share of attention, and if we said that the first had secured the most of all we should probably be within the bounds of strict accuracy. In the race as to who should first arrive at the goal of perfection in the construction of the card, it may naturally be anticipated that old and favourite makers would be found well to the front, a truth which investigation soon demonstrates.

We have pleasure in drawing the attention of our readers to the improvements made in the revolving flat carding engine, by the eminent firm of machine makers whose name stands at the head of this article. Taking their well-known type of the revolving flat card as a basis embodying the soundest mechanical principles, and realizing these, they have sought, by improvements in and careful attention to details, to achieve a high degree of excellence, rather than by attempting to introduce any revolutionary principle in its construction. Looking therefore in this direction, we find many important improvements have been made. Each part of the machine is now made to a template, and is carefully and accurately finished and tested before being passed as fit to enter into the construction of the machine. The great importance of this method of handling the parts in securing perfect fitting and adjustment, and, consequently, both quality and quantity of work, with a prolongation of the life of the machine, will be obvious without any effort on our part to enforce the point. To secure an exact and permanent relationship between the cylinder pedestal and the bend, these parts are cast in one piece, the whole casting afterwards being turned and planed from the centre. The bend itself is so constructed as to lie quite closely to the cylinder, thus preventing the side waste from the ends of the flats, which is unavoidable where this

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the highest importance. It must be well made, well finished, and well clothed. In this case the attention has been given to it that its importance demands. The flat has been so strengthened that deflection is reduced to a minimum. Special care is devoted to finishing the ends and the working and grinding surfaces must accurately, these being done by special machinery, devised and constructed by the firm for the purpose. When finished, they are tested in the most crucial manner in every part and in every respect, the result being as near to mathematical accuracy as it is possible to attain. Having secured this excellent foundation, the flat is next carefully clothed, either by the ordinary plan of rivetting, or by one of the new and improved systems recently introduced. As will be seen from the accompanying illus-
To obviate this, the "Cordon" process was tried. It promised great things, but in the end involved those who entered on it very heavy loss. In a washing process, but the same end by picking the fibre with needles. This was done so often that the wood was literally cut into dust, and was easily got rid of. But in the present state of the flax, was also picked until it was cut into tow, soft and without strength. The new patent of Mr. Wallace combines the fluted roller with only as much picking as suffices without hurting the fibre. This enables the woody heart to fall out in the scutching. Mr. Wallace's machine is very highly spoken of. But this new patent of Mr. Spiegelberg's, which we have seen in operation, avoids altogether the picking process. The straw is fed on as if it were a threshing machine. It is handled by small fluted rollers more to hold it than to crush it. By a clever mechanical contrivance a lateral and vertical motion is given. The fibre is picked up by the fluted rollers Mississippi, and is stirred between a pair of India-rubber rollers. Under them is a pair of small cylinders, on the face of them is a flange, which, like a corrugated spout, cover some width. The prick the fibre, and being driven at a high speed, effectually rid it of all the flax, or making very little cootilla. It is claimed for this machine that it takes a very high percentage of fibre out of the straw, as it does not break it. Especially, also, the yield on this backside is much higher, as there is no broken fibre to make tow; the whole length being preserved from end to end, there is much more line.

The problem of scutching fibre is one of supreme interest. In India, as well as in Africa, there are millions of acres of valuable fibre lost, because of the cost of freeing it from the inside wood or the outside gum. This machine gives great promise of a being a success. Much has yet to be done to simplify its details and probably the "rubbing" process will be made one machine, and the scutching the other. The inventor has a thorough knowledge of flax, being indeed a flax merchant in Dundies, and familiar with the growing and scutching of flax from his boyhood.

How Artificial Silk can be Made Non-inflammable.—The description of M. Viriot's method of producing artificial silk, which appeared in our issue of last week, may be apropos followed up with a short account of the way in which another distinguished inventor, M. Frémy, proposes to meet the very grave difficulty connected with the use of all silk of this kind, namely, its tendency to blaze up like gun-cotton, owing to the presence of the nitric compound. The latter is the nitric compound of oxygen, on the presence of the nitro-comound. The nitro compound is eliminated by M. Frémy in the following manner:—The vegetable silk is treated cold, with a dilute solution of the sulphochloride of ammonia. The green element in the tussah is thus rendered soluble in water, and is entirely absorbed by the sulphur compound. The fibres consequently contain in the insoluble state, and can be purified simply by washing in cold water. This solution of the sulphochloride of ammonia and the dissolved silk so rapidly that it is completed in a few hours, and so thoroughly that the resultant fibre does not burn more quickly than cotton. The decipitated silk preserves all its original properties. It is tenacious, it is as glossy as the parent silk in the market, and is more inflammable than cotton yarn.

Bleaching, Dyeing, Printing, etc.

Chrome Mordants for the Alizarine Colours.

Although the alizarine colours, as they are called, can be dyed or printed on wool, cotton, and silk, with aluminous and iron mordants, yet the chrome mordants are by far the preferable and economical. This arises from the fact that chrome mordants have a great affinity for these three colours. This is the case: as, for instance, for iron mordants do, and they are more generally applicable. The chrome mordants most generally used are the bichromates of potash and soda, chrome alum and acetate of chrome. Chrome alum is the double sulphate of chromium and potassium, which crystallises with 24 molecules of water of crystallisation in the form of octahedron crystals, and is obtained as a by-product in the manufactur of alizarine. It is well suited for mordanting wool, although it is rarely used, which is due to the fact that it takes longer boiling to bring about the unification of the tanning and dyeing processes, and that larger quantities of cream of tartar are used with it; this is not advisable on account of the increased expense.

The bichromate of potash is the chrome mordant mostly used in wool dyeing. The operation of scrambling and boiling this salt is done in the presence of the solution that the chromic acid is reduced to oxalate of chromium, and the latter, as it were, deposited on the wool fibre in a united condition, thus bringing about an unusually intimate and firm fixation. This reduction of the chromic acid takes place when reducible substances, such as organic acids, or salts, are added to the bichromate of potash; but the oxalic acid is not used, nor reducible or inorganic acids or salts be added to the mordanting bath, the chromatic is converted into oxide, and to a less degree by the reducing action of the wool fibre itself.

The former method, the addition of reducible organic substances, is preferable, in order to preserve the strength, etc., of the wool fibre, and the reducing agents used are tartrate (bichromate of potash), and oxalic acid. Sometimes small quantities of organic or inorganic acids or acid salts are added to the bichromate of potash, which used contains a large quantity of lime; acetic or oxalic acid give the best results in this case; the mordanting bath must be adjusted to contain a large quantity of lime, being a neutralising effect, these acid additions must be made to correct this action. As these reduced substances are very expensive, and the cheaper substitutes are often offered, but give very inferior results, both as regards thorough exhaustion of the dye-bath, and brightness and solidity of the shades obtained.

When bichromate of potash and organic reducing agents are used, the mordanted wool has a green colour, due to the oxide of chromium which is deposited on the fibre; while, if the bichromate be used alone, or with sulphuric acid or inorganic salts, the wool has a yellow colour, due to its taking up chromic acid. The former condition is most suitable for taking up such dyes, as alizarine, and the latter for logwood dyeing. As the result of experience of the mordanting agents that give the best results have been found to be: 1 per cent. of Bichromate of potash and 2 per cent. of tartar, or 3 per cent. bichromate and 1 per cent. sulphuric acid. The latter are about 30 or 35 times the weight of the wool; the smaller proportion in the former is about 12 per cent., and consequently, the less perfect will be the pre-plication of the chromium oxide on the wool.

When small quantities of the mordanted solution are placed in large vats, it is advisable to increase this proportion. Each ingredient is said to be increased separately, and a third of the reduction is then entered, and the whole kept rapidly boiling for from 14 to 3 hours. For very light shades, requiring little light shades, requiring little