Machinery and Appliances.

IMPROVED REVOLVING FLAT CARDING ENGINE.

MESSRS. ASA LEES & CO., LIMITED, OLDHAM.

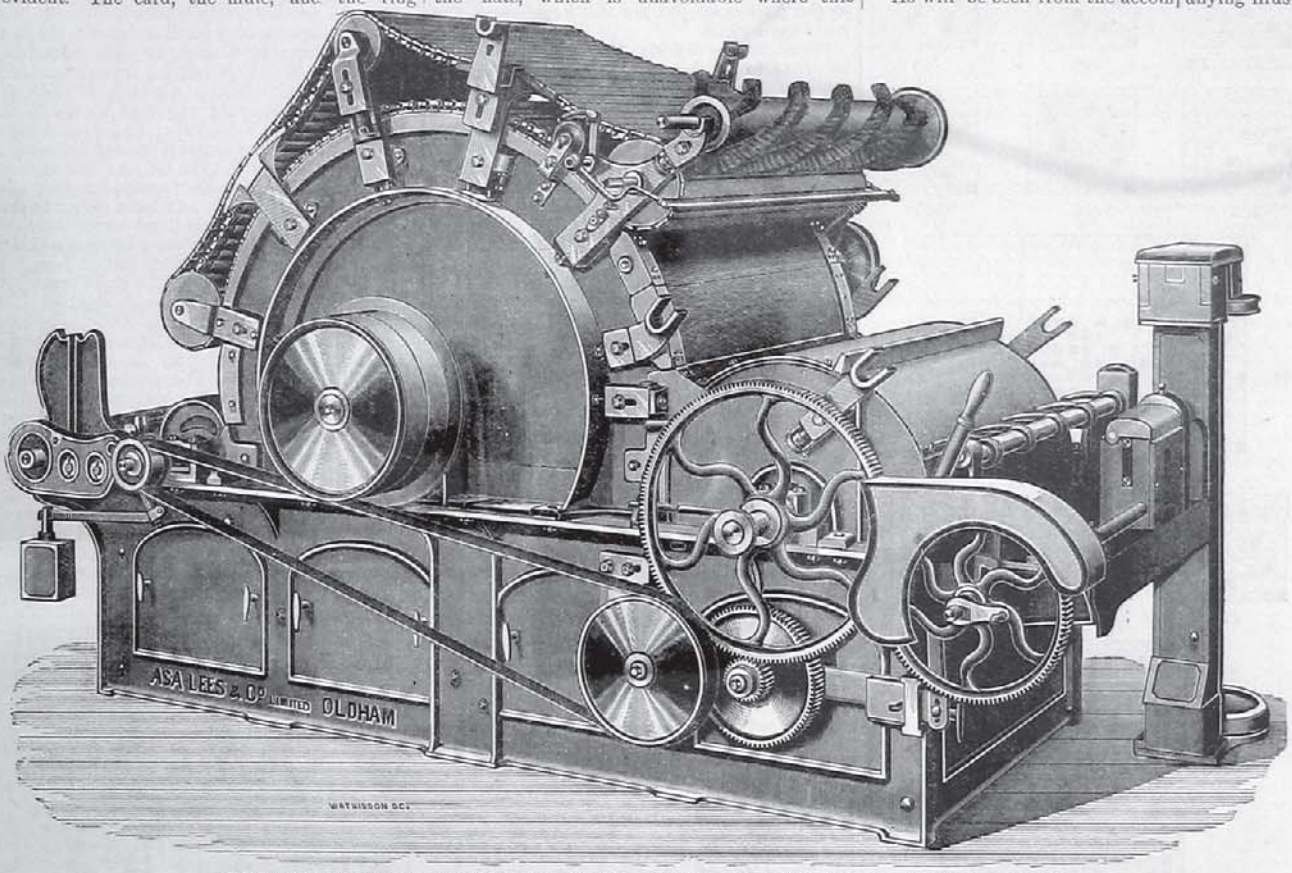
It is a fact, patent to everybody having the slightest connection with the cotton trade, that the makers of cotton machinery have, during the past ten years, surpassed all their previous efforts in their endeavours to improve their various machines in both principle and detail. And the fact that these 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 retaining 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 fit quite closely to the cylinder, thus preventing the side waste from the ends of the flats, which is unavoidable where this form of construction has not been introduced. To prevent the wear of the pedestal a loose cast-iron bush is introduced, and the shaft being of the same material every guarantee is obtained that only a minimum of wear will take place. The excellent flexible bend for which Messrs. Asa Lees and Co.'s card has long been noted, has been further improved by the introduction of a loose foot and stud in the centre upon which it rests, which makes its adjustment easier and renders it more accurate. The bends are carefully finished by special machinery, and are accurately tested like every other part. There are five setting points, and as all are obtained from the centre, the setting is positive and thoroughly accurate at all stages of the wearing of the wire. The cylinder and doffer are completely cased in with strong polished steel plates, which fit closely, and are easy of adjustment. The doffer cover is made to meet the cylinder stripping plate, which arrangement leaves no room for and thus obviates the accumulation of waste.

The flat itself in all revolving flat cards is of 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. Especial care is devoted to finishing the ends and the working and grinding surfaces most 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 illustration, the doffer is driven from the taker-in by an open strap, which is so arranged that sufficient space is provided for the use of driving pulleys up to 20in. diameter if required. The under casings of the cylinder are set by adjusting screws, arranged just behind the panel doors from the outside, which enables perfect accuracy to be obtained in the setting. The two knives under the taker-in are also each supplied with adjusting screws, by which they can be set separately. When the knives have been correctly set to the taker-in, the grid and knives can be moved altogether, along with feed roller and taker-in as may be required. This gives great facility of adjustment with very little trouble in securing it. The cylinder is clothed quite up to the edges, and the doffer is flanged at each end, by which protection is afforded to the wire and a good selvage ensured.

In order to stop the accumulations that so often take place at the ends of the taker-in, an improved shroud has been introduced which effectually achieves its purpose. The taker-in is covered with the makers' inserted metallic



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saw-tooth wire. The improved fly comb-stock or doffer comb, specially constructed to work at a very high speed, is always applied. At the option of the purchaser a slow motion can be supplied for driving the cylinder at a slow speed whilst the grinding operation is in process. It is applied with facility, and is as easily detached when the grinding is done. One of these appliances will serve 20 cards. When it is preferred to grind the flats from the working surface a patent apparatus is supplied.

In the desire to improve this card in every possible point it has not been forgotten to make each part as easily accessible as possible, so as to facilitate any work that may be required to be performed. Another important matter that has engaged attention is the possibility of diminishing the space usually occupied by the card. Success has attended the efforts of the firm in this direction, as the space covered by the new card, 37 inches on the wire, with cylinder 50 inches diameter, is only 10 ft. by 5 ft. 1 in., thus shewing an important reduction and ensuring an economy in space that will be appreciated by spinners. We have only to add that a machine 37 inches on the wire will card a lap 38 inches wide; or a lap equal in width to that which could be carded on an old style of card, 40 inches on the wire, and proportionately the same with other widths.

The firm will be glad to afford any other information that intending purchasers may desire, on application.

A NEW FLAX SCUTCHING MACHINE.

Messrs. Urquhart, Lindsay, and Co., of Dundee, have at their works the new scutching machine patented by Mr. Arthur Spiegelberg. It is a very clever invention, and although only the first and rude model, shews excellent results.

There have been many attempts to separate the fibre from the wood. Most fibres, including jute and flax, resemble a tree. There is the wood inside the bark, and the glossy varnish on the bark. In the Rhea fibre the chief difficulty is to get rid of this varnish or gum. In all, the bark is the fibre and is the valuable part of the plant. The Indian grower takes the jute stalks, which are like a bundle of small fishing rods. After they have been steeped in water for a short time, he peels a little of the bark or jute off the thick end, and then grips the bare wood or heart of the stalk, and threshes the water with the stalks; the skin is shaken off as if one shook off a glove from one's hand. The fibres or outside shell are rapidly dried, and are then packed, as boys pack a great snowball, by rolling them into "drums." These go to the balers at Calcutta, who assort them. In Ireland the peasant takes the flax when it is pulled, steeps it for eight or ten days, then dries it, sometimes over a peat fire, hence the peculiar smell of some Irish flax. Then he heats the flax to break the heart of it. He takes it in handfuls, and with the edge of a sharp wooden sword strikes it quickly while it lies over a rest like the back of a wooden chair. This is hand-scutched Irish. Milled Irish is treated by steeping, then passing it through fluted iron rollers. This cracks the outer skin, and breaks the wood into short lengths. Then the strikes or handfuls are taken, and held over a rest against wooden swords, which revolve rapidly on a shaft. Much of the fibre is broken in the process of passing through these heavy iron rollers, and, when the swords strike it, a great deal of valuable fibre is driven off among the waste woody shore. This is the codilla of commerce.

To obviate this, the "Cordon" process was tried. It promised great things, but in the end involved those who entered on it into very heavy loss. It avoided this crushing process, but attained the same end by pricking the fibre with needles. This was done so often that the wood was literally cut into dust, and was easily got rid of. But unfortunately the precious skin, the flax, was also pricked until it was cut into tow, soft and without strength. The new patent of Mr. Wallace combines the fluted roller with only as much pricking as splits without injuring 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 pricking process. The straw is fed on as if it were a threshing machine. It is seized by small fluted rollers more to hold it than to crush it. By a clever mechanical contrivance a lateral and vertical motion is given, which acts on the fibre precisely as if one took a handful and rubbed it between closed fists. This effectually splits the outer shell without breaking or pricking it. It then passes on upon a feed cloth, and is gripped between a pair of india-rubber rollers. Under them are a pair of small cylinders; on the face of them is a flange, which, like a corrugated spiral, curls round them. These strike the flax, and being driven at a high speed effectually rid it of all the pith or wood, making very little codilla. It is claimed for this machine that it takes a much higher percentage of fibre out of the straw, as it does not break it. Especially, also, the yield on the heckle 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 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 into another. The inventor has a thorough knowledge of flax, being indeed a flax merchant in Dundee, and familiar with the growing and scutching of flax from his boyhood.

How Artificial Silk can be made Non-inflammable.—The description of M. Vivier's method of producing artificial silk, which appeared in our issue of last week, may be appropriately followed up with a short account of the way in which another distinguised 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, combined with the cellulose. This nitric compound is eliminated by M. Frémy in the following manner:—The vegetable silk is treated cold, with a dilute solution of the sulphohydrate of ammonia. The nitric element in the tissue is thus rendered soluble in water, and is entirely absorbed by the sulphurous compound. The fibrous cellulose principle remains in the insoluble state, and can be purified simply by washing in cold water. This action of the sulphohydrate of ammonia on vegetable silk is so rapid that it is completed in a few hours, and so thorough that the resultant fibre does not burn more quickly than threads of cotton. The denitrated silk preserves all its original properties. It is tenacious, it is as glossy as the purest silk in the market, and it not 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 alumina and iron mordants, yet the chrome mordants are by far the best for the purpose. This arises from the fact that chrome mordants on the whole fix these colours better and therefore give faster shades than the other mordants; further, they yield purer shades, do not alter them as much, for instance, as 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 octahedral crystals, and is obtained as a by-product in the manufacture of alizarine. It is well suited for the mordanting of wool, although it is rarely used, which is due to the fact that it takes longer boiling to bring about the mordanting of the wool unless larger quantities of cream of tartar are used with it; this is not admissible on account of the increased expense.

The bichromate of potash is the chrome mordant mostly used in wool dyeing. The operation of this salt in mordanting is based upon the fact that the chromic acid is reduced to oxide of chromium, and the latter is, as it were, deposited on the wool fibre in a nascent condition, thus bringing about an unusually intimate and firm fixation of the colouring matter. This reduction of the chromic acid takes place when reducible substances, such as organic acids or salts, are added, at the expense of the latter, or if these be not used, or non-reducible or inorganic acids or salts be added to the mordanting bath, the chromic acid is converted into oxide, but 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. The reducing agents mostly used are tartar (bitartrate of potash), and oxalic acid. Sometimes small quantities of organic or inorganic acids or acid salts are added when the water used contains a large quantity of lime; acetic or oxalic acids give the best results in this case; the mordanting bath must be slightly acid, and, lime having a neutralising effect, these acid additions must be made to correct this action. As these mordant assistants (tartar, oxalic acid) are rather expensive, cheap substitutes are often offered, but these 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 dyestuffs as alizarines, and the latter for logwood dyeing. As the result of experience the proportions of the mordanting agents that give the best results have been found to be 3 per cent. of bichromate of potash and 2½ per cent. of tartar, or 3 per cent. bichromate and 1 per cent. sulphuric acid. The mordanting bath must be about 20 or 30 times the weight of the wool, the smaller the proportion is, the slower, and, consequently, the less perfect will be the precipitation of the chromium oxide on the wool. When small quantities of wool are to be mordanted in large vats, it is advisable to increase this proportion. Each ingredient is dissolved separately, and added to the bath. The wool is then entered, and the whole kept rapidly boiling for from 1½ to 2 hours. For very light shades, requiring little dyestuff, it is best to diminish the proportions of the mordant.