Machinery and Appliances.

IMPROVED ARRANGEMENT FOR GRINDING CARDING ENGINE FLATS.

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It has long been admitted by practical men that carding is the most important process in the series grouped under the head of and collectively described as cotton spinning. That this conviction is both widely and strongly entertained is proved by the great amount of money, time, and ingenuity, that has been spent upon the improvement of the card during the past fifteen years. That this labour has not been misspent the results attained testify, for that an unprecedented advance towards perfection has been made will not be disputed by any one having the slightest knowledge of the facts. The harvest of these labours is the revolving flat card, which has now greatly distanced all its competitors. But perfection in the structure of the carding engine alone is not sufficient; however good a start may be made the wear and tear of usage soon carries it away from that position. This is most especially and quickly felt in the necessity of grinding and the consequent wearing down of the card clothing. For some time the ordinary arrangements for grinding have been known to be radically defective, and attempts to remedy the faults of the system have evoked a good deal of ingenuity. We have previously drawn the attention of our readers to several of these, and have pleasure now in calling it to what is, we believe, the most recent one.

This is the invention of an improved arrangement for grinding the face of the card clothing of the flats in such a manner that they will work perfectly true with the surface of the main cylinder; in other words, to ensure such accurate grinding that all the points of the wire upon the flats when in their working position shall be equi-distant from those of the clothing upon the cylinder, so far as accuracy of grinding can effect that object. That the ordinary method of grinding them with their working surfaces uppermost is unsound, any one will admit when we remark upon the well known fact that a bar of iron suspended horizontally upon its extremities will be deflected more or less by its own weight, so as to form a slight curve. This curvature will be increased when pressure comes to be applied, as when in the case of a card flat the grinding roller is acting upon it. The result in this instance will be that the greatest abrasion of the wire will necessarily be near the ends of the flats, and the least in the central part, so that when the flat is brought to its work it is impossible to set it accurately to it. If set to accord with the condition of its central portion, the sides will be too distant and will very imperfectly card the cotton, probably rolling it; if set for the sides to work properly, the wire upon the central portion will come into contact with that of the cylinder, and will nip the cotton, rolling the single fibres into small balls, commonly called "neps." The presence of these, it is well known, very seriously depreciates the value of any yarn in which they may appear.

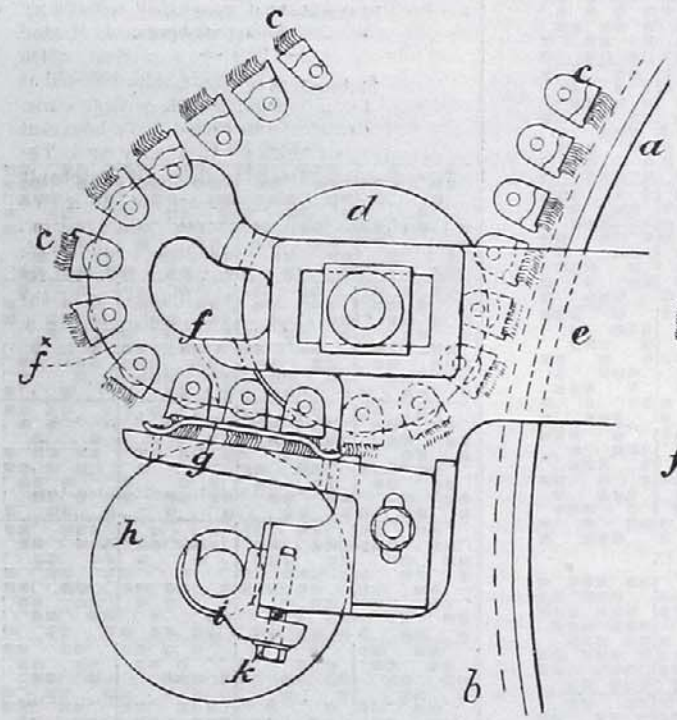


FIG. 1.

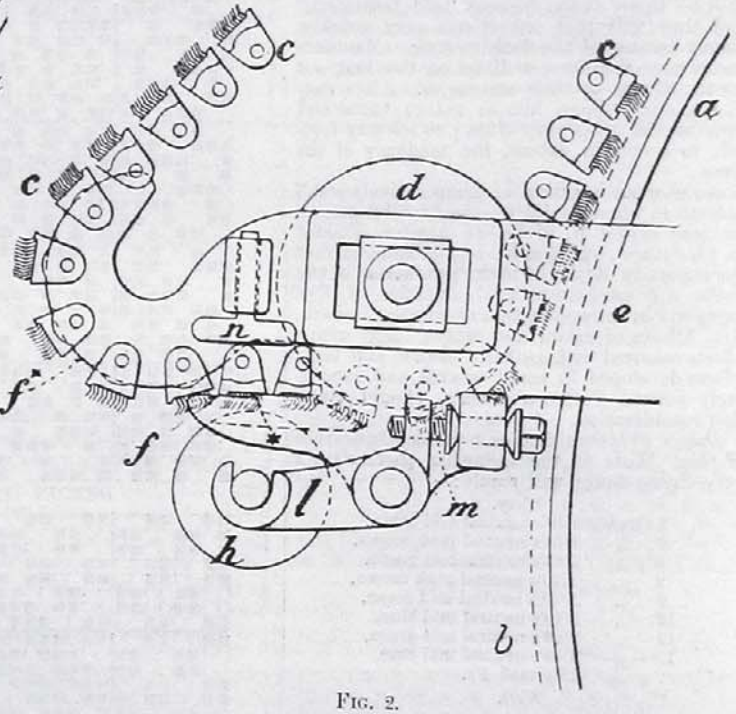


FIG. 2.

Mr. Seel has, therefore, along with other inventors, so devised his arrangement that the flat shall be ground in its working position of face downwards. This ensures that the face of the flat shall thus be ground perfectly level from one end to the other, admitting thereby the most accurate adjustment to the periphery of the cylinder, so essential for the production of the best work.

The manner in which this is accomplished is shewn by the accompanying illustration. Fig. 1, we may observe in passing, is the arrangement devised by the inventor for application to existing cards, and Fig. 2 for new cards. In both illustrations the portion marked *a* represents a section of the main cylinder, and the dotted circle *b* shews the relative position of the "taker-in" to the periphery of the cylinder. The chain of flats is indicated at *c*, and *d* similarly points out the bottom roller or pulley around which the chain of flats passes. To the bracket *e*, which carries the roller *d*, the inventor casts or attaches a guide *f*, which consists of a flat surface arranged so as to be tangential or nearly so, or it may be placed rather lower to the cylinder and another part *fx*, which is properly curved to receive the flats and deliver them to the guide *f*, which ensures their proper subjection to the grinding process. In Fig. 1 the flat portion of this guide is shewn as above the ends of the flats; in Fig. 2 it is given as arranged below.

In the arrangement delineated in Fig. 1, the chain of flats as they pass from the curved part of the guide *fx*, and before they come into contact with the periphery of the grinding roller *h*, pass upon the upper surface of a strong plate spring *g*, which presses them upward against the flat part of the guide *f* as they pass the grinding roller *h*. In Fig. 2 the weight *n* performs the same function. Theoretically we regard this as the more correct arrangement of the two, because in the first arrangement the spring *g* forces the upper surface ends of the flat—those which in the old style were known as the grinding surfaces—against the flat face of the guide *g*, and the grinding takes place upon such a position of the points of the card wire as results from the contact of these two surfaces, which may be—we don't say will be—different from the face presented by the contact of the actual surfaces upon which the flat travels when at work, and the flat of the guide in Fig. 2, in which the weight presses the two together, thus ensuring grinding from the actual working face of the flat. In the first arrangement this is not as fully assured. The arrangement shewn in Fig. 1, however, perfectly eliminates the defects arising from the deflection of the flat. In the second, a step is made in the flat part of the guide which receives a rib upon the flat, and this levels the flat as it passes over the grinding roller *h*. The grinding roller is adjustable in both cases.

It will thus be seen that this invention secures the grinding of the flats from their working sur-

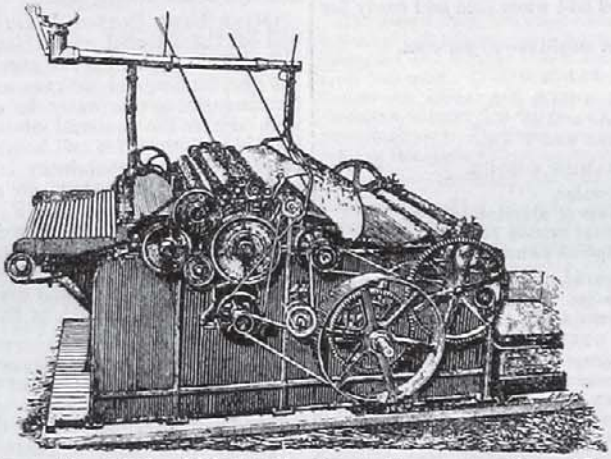
faces, they passing along with their leading edges, slightly raised, by which their faces are ground to a true surface and the proper angle secured to give the set required.

Our practical readers will now be able to form their own opinion as to the character and efficiency of this invention. In conclusion, we need only say that Mr. Seel is thoroughly acquainted with his subject both in practice and theory, and therefore qualified to be his own critic, which is an advantage, as if it were more generally the property of inventors it would prevent the world being troubled with a large number of crude and imperfectly wrought-out ideas. Those who wish to know more of this excellent device may write to Mr. Seel as above.

THE MECHANICAL BURRING OF FOREIGN WOOLS.

The problem of the burring of wool is one of those in wool manufacturing that have occasioned very long and laborious researches. When foreign wools began to be employed, especially those of La Plata, manufacturers found themselves confronted by so serious a drawback that the definite adoption of these wools was delayed for a considerable period.

The fault is owing to the numerous quantity of burrs (strictly speaking, of the seeds of the *medicago sativa*) which they contain. This seed is enclosed in a furrowed envelope composed of very slender filaments, rolled on one



another in the form of a spiral, which unroll during work, and blend in parallel lines with the filaments of wool in such a way that they constitute an obvious fault in the thread, and afterwards in the fabric. Attempts were at once made to eliminate this vegetable body, and the process of eliminating it was called, in French, *échardonnage*; in English, *burring*.

Messrs. Houzet and Teston, and subsequently Messrs. Célestin Martin, of Verviers, did much in the direction of producing special machines for this purpose, but these machines are only applicable for short wool. Chemical cleaning progressed at the same time, but this plan, although employed on a large scale, is and always will be faulty, because the contact of an acid with a body as sensitive as wool cannot but injure it in some degree. The combing of wool, therefore, has had to struggle with this inconvenience for more than thirty years, and but few appliances for removing it have been introduced during this period.

In 1883, great progress was made in wool burring by the Messrs. Harmel Bros., of Valdes-Bois, whose efforts were seconded by Mr. Jonathan Holden, of Rheims, who was the first to apply to the combing card a pair of cylinders, one of which was fluted and designed to cut the burr contained in the sliver. Their idea, which originated with Hofferman, of Leipzig, had been previously reduced to practice, but abandoned, or nearly so, in consequence of unsatisfactory experimental results. The machinists named returned, however, to the problem, and succeeded in obtaining a result that had a short interval of popularity, but is to-day almost entirely abandoned. The notable trial which took place between them and Mr. Isaac Holden, directed the attention of the combing industry to the weak side of this department of manufacture. Mr. Holden had already put into practice the idea of removing the burrs from long wool by chemical means, but after spending considerable sums of money it was found to be an unsatisfactory method.

It now appeared as if every comber wished to have his own burring system; there was a veritable struggle as to which factory would leave the smallest amount of burrs in its sliver. Among other experimenters in this field of invention, Messrs. Buret and Sons, of Roubaix-Turcoing, produced a machine consisting of three pairs of cylinders placed one above another, with a distance of a few tenths of a millimetre between them, which crushed all the burrs present in the wool after washing without any preliminary sorting. Messrs. Parfait Dubois, or rather M. Meselle, next produced a machine of the same class but which differed in that the wool underwent a drawing process before it passed between the crushing rollers.

About the same time Mr. Isaac Holden announced that he had brought out, or at least purchased from M. Colson, Roubaix, an invention applicable to the card, and which was the desideratum that had been so long sought for. It consisted in making the picking shafts move from right to left, instead of from left to right, but no great success attended it.

In 1884, at the time when MM. Harmel issued their patent, M. Fraysse, wool comber, Antwerp, brought out a machine designed for the burring of the wool in the raw condition by means of water. The principle on which the inventor relied was the washing away of the burrs from the raw wool by means of cold water without working the wool up, so that when dried it could be sold again as washed wool free from burrs. It was based upon the fact that in the raw wool the burr is found attached to the extremity of the filament. In its natural condition it adheres very loosely, as it has only been caught by the animal while moving about in the field. Consequently it must be more easily and thoroughly extracted than when the wool has received the least washing, as it then becomes fast in the fleece and imprisoned in numerous filaments. This machine consisted substantially of a large hollow drum clothed on the outside with fine needles set very closely together. The wool was spread upon these needles, and by means of cold water under pressure it was forced in among them and the burrs remained on the extremity of the needles from which they could be easily taken away. The wool was thrown off by some more water flowing from the interior of the cylinder. The invention was an ingenious one, but the machine was not yet thoroughly satisfactory. Its principle, however, being admittedly reasonable, a considerable amount of capital was placed at the disposal of M. Fraysse to help him in perfecting it.

For four consecutive years the invention has been constantly improved, and another has been added which makes it possible at one single stroke to treble the production of the machine while perfecting it with respect to the stripping off of the burrs. We refer to the feeding apparatus of the Count of Nyoprusa, which is claimed to be the best in this department. It was only in August, 1889, that a machine was produced which yielded thoroughly satisfactory results. After extracting fifty per cent. of sand and foreign bodies it gives a product which after drying can be made up in bales and sold as raw wool from the sheep's back without burrs. The first machines constructed have been sent to the countries which produce burry wool. The adoption of the method in Europe will probably meet with many objections, but it is too advantageous not to be adopted sooner or later. It is the only one, (in the opinion of our French *Le Génie Civil*, to which we are indebted for these particulars and the illustration of the machine), that can guarantee regular progress in combing, because it removes every burr from the wool before commencing to work it up.

The results which the makers guarantee are as follows:—From one kilogramme of raw wool it takes away per minute at least 85 to 90 per cent. of the burrs and crushes the others—15 to 10 per cent.—so as to reduce them to powder, whatever be the nature and the quality of the wool. An experiment made at the Hoboken-lez-Anvers yielded only two burrs in 120 metres of sliver.

The machine occupies three square metres. It requires 1½ h.p. to drive, and consumes two or three cubic metres of water per day.

In New Zealand new "flax mills" are still going up wherever there is a supply of phormium available, and it is to be feared that unless steps are at once taken to cultivate the plant on an extensive scale the supply of the raw material will, in a few years, or even months, prove inadequate to the demand for the fibre, as many—it would probably not be too much to say a great majority—of the mill-owners and proprietors of flax swamps, with a reckless disregard of the future, cut all the leaves close to the ground, a process which in many cases has the effect of destroying the plant. Much may be done by the simple draining of swamps to improve both the size and quality of the leaves, but the capabilities of the fibre will never be thoroughly demonstrated until plantations are made of the best varieties only, such as were used by the Maories for their hand-scraped fibre, which has never yet been equalled. It would be a thousand pities if this promising industry were to come to a standstill through the carelessness or greed of those engaged in cutting the leaves, as if properly managed, the fibre promises to be second only to wool as an article of export. In some respects, indeed, it is of more importance, as employing labour proportionally to a much greater extent, and diffusing the profits more equally. The greater part of the wool exported is raised by a few large run-holders, employing a very small number of hands except at shearing time.

Mr. Howard Vincent has introduced into the House of Commons for the third time a bill providing that foreign goods capable of being marked shall be stamped with an indication of the place where made, to prevent their being stamped after importation as British manufactures.