

Machinery and Appliances.

IMPROVEMENT IN THE PNEUMATIC TUBES OF "EXHAUST" COTTON OPENERS.

MESSRS. WM. CATTERALL & Co., PRESTON.

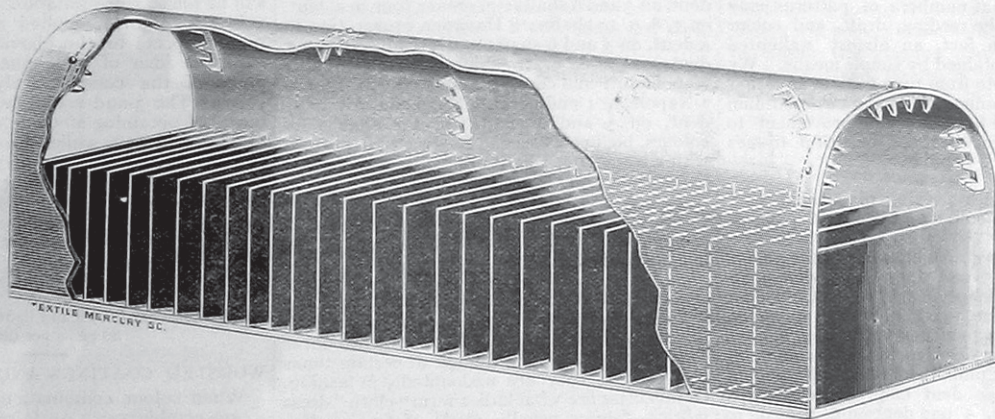
The "Exhaust" cotton opener is a machine that seems to be steadily growing in favour in the estimation of the cotton trade. In it, as is generally known, the feeding table is placed at a distance from the opener proper, and the cotton is drawn by pneumatic force through a tube and so delivered to the opener. The air in the tube is exhausted by means of the fans in the opener, and to increase the power an auxiliary fan is in most cases also employed. Two advantages have been mainly sought to be gained by this method of feeding the opener, the first being that the cotton could be readily fed into the trunk in the mixing-room and carried a very considerable distance with the greatest ease and least cost, thus enabling the mixing and store room to be quite separated from the room containing the openers,

plate having four saw-like teeth or projections extending from its inner side. The front side of the tooth is slightly cut away from the vertical, the cut at the back being at a greater angle, two together bringing the bottom of the tooth to a chisel point. It is constructed thus to obviate the risk of such arrest of the material as might lead to any choking of the tube. These plates, to the number of say 10, are attached to the inner surface of the sides and crown of each section of the tube, or as many of them as may be regarded as sufficient for the effectual cleaning of the cotton. Their arrangement is as follows: three of the plates are placed in the first line, with the distance of the size of a plate between them. This forms the first line of resistance to the free passage of the cotton. The second consists of two plates arranged about 12 in. behind the first, partly overlapping spaces left vacant in the first line. The third line is a repeat of the first, and the fourth of the second, the lines being a foot apart. Each tube is thus armed with 40 strong teeth. The cotton in entering is thus dashed from one series of obstructions to another. This opens out the matted masses in a most remarkable manner, and liberates both the light and heavy impurities that may be present. By breaking up the matted masses of the cotton it also pre-

compares with 18 lb., the usual yield before the introduction of the improvement, obtained from 1½ in. spaces. The latter consisted very largely of good cotton.

The cotton in use at this mill, from which these results were obtained, is about middling fair Egyptian, an 1 good middling American, and is passed through the opener at about the rate of 25,000 lb. per week.

It will be obvious from the above description that several other advantages beyond those we have dwelt upon will result from the adoption of this improvement. The removal of the larger percentage of the sand and heavy dirt before the passage of the cotton through the feed rollers of the scutcher and lap machines, will prevent laceration of the fibres arising from the compression of the cotton when it contains sand. The much looser condition in which the material is presented to the beaters will enable it to be struck off the mass by them with less resistance and consequently less injury. In all the cleaning processes up to and including carding, each machine will have less labour and will accomplish its work in less time and with less injury to the fibre than before, by which its length, strength, and lustre will be better preserved. The outcome will be a yarn superior in every respect, from a



scutchers, and lap machines. By this arrangement the risk of heavy damages in the event of fires breaking out has been greatly diminished. The second advantage was that the trunk was utilised for taking out the heavier impurities, such as small stones, grit, particles of heavy vegetable matter, etc. These were trapped in cavities constructed for the purpose at the bottom of several sections of the trunk. This was an admirable arrangement, and since its introduction much less has been heard of fires in blowing-rooms originating in the beaters of the machines striking hard substances that have passed undetected into them. Nearly all our leading cotton machinists have adopted and supply the pneumatic feed to their openers.

The beneficial results attending the introduction of this system, especially in the removal of heavy foreign substances from the cotton, recently suggested the query as to whether it could not also be utilised in extracting a considerably greater portion of the lighter impurities, such as sand, dust, motes, and short fibre, that are always present. This question occurred to the managing staff of Messrs. Paul Catterall, Son, and Co., Newhall-lane Mill, Preston. They accordingly began a series of experiments having this end in view, the outcome of which we have pleasure in bringing before the notice of the trade.

The invention consists of a very simple arrangement, which is illustrated herewith. As will be seen, it consists of a small segmental

vents their being trapped in the bottom, as has hitherto been the case to such a considerable extent. This is abundantly evident when the sections of the tube are cleaned out. It is then seen that the character of the waste extracted is modified to a very important extent, to the advantage of the proprietor.

The inventors have had the new arrangement applied for some months, and have tested it with the most satisfactory results. In an early test with the form it has been decided to adopt, and with 1 inch openings in the dirt traps at the bottom of the tube, after a six hours' run there was taken from the fifth section ¼ lb. weight of waste, consisting of 1½ lb. of fibrous material and 2 lb. 12 ozs. of dust and sand. Without the improved arrangement and with 1½ inch openings, the result was 2 lb. 12 oz., being 1 lb. 6 oz. of fibrous matter and the same weight of sand, dust, etc. The fibrous material was in a large proportion good cotton, this being almost entirely absent from the matter extracted in the first instance. In both these trials the same weight of cotton, and from the same mixing, was run through. Subsequent experience has given 25 lb. of refuse from the first four sections of the tube, while the remaining seven sections have yielded 23 lb. in an ordinary working day. The material thus obtained consists to a much greater extent than before of sand and dust, motes and seeds, whilst good cotton has been almost entirely absent. This was obtained with the inch spaces in the trunk bottom. It

mercantile and useful point of view, and which will have been obtained at lessened cost of production. The inventors may be communicated with on application to Messrs. William Catterall and Co., Newhall-lane Mill, Preston, who will be glad to afford any further information, and shew the invention at work to those interested.

SHUTTLE-GUARDS.—The offer of a prize for the best shuttle-guard, which was made two years ago by the Saxon Textilgenossenschaft, has led to the production of a very large number of appliances professing to meet the desired purpose. One remarkable circumstance in connection with this competition is the fact that scarcely any technical specialists have taken part in it; why, it is impossible to say. Did they question the good faith of those who offered the prize, or did they consider the problem insoluble? The latter view is probably wrong. It seems quite possible that some satisfactory method may be invented of protecting workpeople against this particular danger, but there are some difficulties in the way of the general adoption of any such process, however efficient and cheap it may be. The only person who can make any profit out of it is the person who has made it, whereas the manufacturer who uses it has to incur expense in keeping it in order.

NEW MILL.—A cotton spinning mill for 25,000 spindles on the ground-floor is in course of construction at Eutechede, in the Low Countries. The undertaking has been entrusted to M. M. F. and P. Sée, of Lille, who will execute the contract in five months. It will have a triple expansion engine.

April 18, 1891.

APPARATUS FOR DETERMINING PERCENTAGE OF MOISTURE IN MATERIALS.

DR. O. KNOFFER AND CO., CHARLOTTENBURG, GERMANY.

The apparatus represented in the accompanying figure is intended to make the exact determination of the amount of water present in fibrous and other stuffs—such as wool, cotton, silk, dye-wood, cellulose, etc.—in large average samples an operation that can be easily and safely conducted by any workman.

This end is attained by the peculiar construction of the apparatus, which consists of an upright cylindrical vessel enclosing a circular air-chamber with very large heating surface, which is filled with water and warmed by a heating arrangement. In the air-chamber, which is warmed to 100° C., is a basket made of wire of corresponding form, which serves to receive the material, and hangs freely above from a balance which is fastened to the chimney, but which may be shifted if necessary. The interior tube of the chimney is connected after the putting on of the lid with the drying-chamber; the outer tube serves to conduct away the fumes developed in the heating-vessel. The balance, by which the basket and the material are weighed—without the latter needing to be removed from the drying-chamber—has 10 numbered notches on its longer beam, and enables the operator, with the help of three weights, to determine exactly the loss of weight effected by the drying, down to 1-10 per cent., by direct reading-off. Owing to the height of the apparatus, and especially to the tall double chimney, a strong draught is produced; and a good circulation of air for the removal of the vapours developed from the material dried is made possible by the introduction of air from without through tubes attached below in the drying-chamber. This vigorous circulation of air, in combination with the great heating surface, which by its peculiar form the apparatus offers to the material to be dried, has for a result that the time of drying is reduced to a minimum.

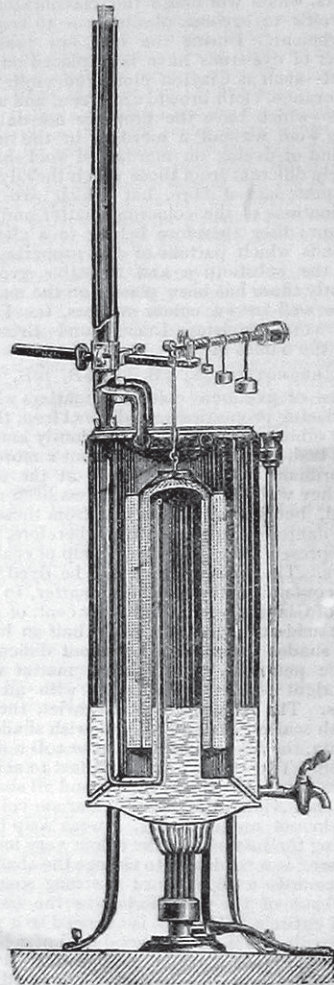
The special advantages of this process over others are said to be the following:—

- (1.) Simplicity of manipulation, in that the material to be dried need not be removed from the chest until the drying is completed.
- (2.) Simplification of the weighing process by the application of only three weights; to which must be added the circumstance that the weighing is not interrupted by the necessity for removal of the material from one receptacle to another.
- (3.) The avoidance of all labour in calculation, the required information being obtained simply by reading-off from the scale.
- (4.) Shortening of the time for drying by the great heating-surface, and the good circulation of air.
- (5.) Simplicity of the whole process, which presupposes no sort of technical knowledge, and can be superintended by any workman.
- (6.) Absolute correspondence of different experiments with the same material, in that the drying is always carried on at the same temperature, viz., 100° C.

The apparatus is used as follows: When, after screwing off the chimney, the apparatus has been filled to about 1-5 with water, and the lid screwed with the chimney has been taken down, the balance is screwed tight, and so high that the basket hanging on to it projects quite freely above the drying-chamber, and equipoise is restored by screwing the little sliding-weight at the end of the long arm. Then the largest of the three weights is hung on point 10, and the basket is filled with the material to be dried (somewhat finely distributed) as evenly and loosely as possible, until perfect equipoise is again produced.

Then the balance, with the basket hanging to it, is screwed so low that the latter is found quite in the drying-chamber, and the balance can move in either direction without the basket striking against anything. The basket is now suspended from the balance, the lid is put on, the parts belonging to it are screwed up, and the apparatus is heated.

When the water boils in the apparatus, and the temperature of 100° C. is thus reached in the drying-chamber, the flame—or in the case of heating by steam the valve—is so arranged that some, but only a little, steam constantly escapes from the outer chimney. In proportion as the material in the basket dries, and therefore diminishes in weight, the weight originally fixed at 10 must recede in order to maintain equilibrium. If the former stands at nine there is 90 per cent. of dry material. For more exact determination there are two small weights, the one weighing 1-10th and the other 1-100th of the largest.



The apparatus is made in three different sizes (a) for single determinations; (b) for three at once; and (c) for six at once. As 300 grammes of material of average moisture usually need about four hours, so in 12 hours a c apparatus can make 18 determinations. The b and c apparatus are intended for steam only; the a apparatus is arranged also for gas or petroleum.—*Textil Zeitung*.

ONE of the most energetic of French Protectionists, M. Pouyer-Quertier, died a few days ago at Rouen, in his seventy-first year. In the time of the Empire he was one of the violent opponents of the Free-Trade policy of the Imperial Government, and for eighteen years he gave voice to the protests of the French manufacturers against the effects of the Treaty of Commerce with England. Since then he has repeatedly made great exertions in the cause of Protection, as for instance, in 1879, and in 1884 and 1885, when he conducted a Protectionist campaign, which is still remembered. He was not only a political economist, but also a manufacturer, having founded at Rouen the famous spinning factory called *La Foudre*, while he possessed other establishments of the same kind in the valley of the Adelle. His best services to France, however, were those rendered in his capacity as a minister under M. Thiers in the negotiations for peace between France and Germany in 1871.

Bleaching, Dyeing, Printing, etc.

PAPERS ON BLEACHING.—XII.

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The actual drying of the warps is done over the 'tins,' as they are called: these are a number of large cylinders measuring about 20 inches in diameter and about—*for warp drying*—five feet long; usually they are arranged vertically in two tiers, each tier consisting of about five cylinders, not arranged directly one above another, but in a zig-zag manner, the centres of the first, third, and fifth being in one line, and the centres of the others in another line. The cylinders are made to revolve by suitable driving mechanism, and into them is sent steam at about 5 to 10 lb. pressure, which heats up the cylinders, whereby the warp passing over them is dried. This drying may be partial or complete, being regulated by the speed at which the warps pass over the cylinders, and by the quantity of steam passed into the same; the quicker the speed, and the smaller the amount of steam, the less the warps are dried; while on the other hand the slower the speed, and the larger the amount and greater the pressure of the steam, the quicker and more thoroughly are the warps dried. As there is a great deal of water formed in the cylinders by the condensation of the steam, means are always provided for carrying off this water, as its retention in the cylinders often leads to serious results and damage to the machine.

Hank Bleaching.—So far as the chemical part of hank bleaching is concerned it does not differ from that of warp bleaching; the same operations and proportions of chemicals may be used, and in the same order, but there is some difference in the machinery which is used. The hanks may be manipulated in two ways: they may be either kept in separate hanks, which is the method mostly in vogue in modern bleach-houses; or they may be linked together in the form of a chain. In the latter case the operations and the machinery may be the same as used in the madder bleach, with a few unimportant minor differences. In the final washing the 'dumping machine' is used, which consists of two wooden bowls set over a wooden trough containing the wash waters; the top bowl is covered with a thick layer of rope, and merely rests on the bottom bowl by its own weight, and is driven by friction from the latter. The chain of hanks passing through between the two bowls has the surplus liquor squeezed out of it; and as there is considerable increase in thickness at the points of linkage between the hanks, when these pass through the bowls they lift up the top bowl, which, when the thick places have passed through, falls down with a sudden bump upon the thin places, and this bumping drives out all surplus liquor, and drives the liquor itself into the very centre of the hanks, which is sometimes an advantage.

In modern bleach-houses the chain form is gradually giving place to the method of bleaching separate hanks, partly because so many improvements have been made in hank-bleaching machinery of late years, which enables bleachers to handle the yarn in the form of separate hanks better than they could do formerly; and as bleaching in separate hanks means that the cotton is kept in a more open form, and is thus more easily penetrated by the various liquors which are used, it follows that the bleach will be better and more thorough, which is what the bleacher aims at. At the same time weaker liquors—or, what is the same thing, less material—can be used, which means a saving in the cost of the process. For bleaching yarn in the hank, the following process may be followed with good results:—

- 1st. Ley boil, using for 1,000 lb. yarn, 40 lb. caustic soda of 70%, and 50 lb. of soda ash of 58%, giving five to six hours' boil at a low pressure.
- 2nd. Wash through washing machine.
- 3rd. Second ley boil, using 40 lb. soda ash of 58%, and giving two to three hours' boil; wash again through washing machine.