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Articles, Correspondence, Reports, Items of News, on all matters of novelty and interest bearing upon the Textile Industries, home or foreign, are solicited. Correspondents should write as briefly as possible, on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication, but as a guarantee of good faith. When payment is expected, an intimation to that effect should be sent with the contribution. The Editor will do his best to return ineligible MSS., if accompanied by the requisite postage stamps, but will not guarantee their safe return.

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THE SCOTCH COTTON TRADE.

The *North British Daily Mail* has a thoroughly sensible article on the Scotch cotton trade contrasted with that of Lancashire, and some caustic remarks on the intervention of Mr. James Mawdsley in its affairs. We reproduce it in another column for the benefit of our readers. In it a very important point is raised, that of the monopoly asserted by minders to the great bulk of the earnings made upon a pair of mules in the spinning branch of the trade, and which they are enabled to appropriate by intervening between the master spinner and the piecers, by which they constitute themselves middlemen or "sweaters," a function they fulfil to perfection in relation to their piecers. This is a question that must before long command the consideration not only of employers but also of the piecers themselves, who we think will hardly care to look forward to a perpetuity of such iniquitous arrangements as those that now prevail.

MORE ABOUT WELSH TEXTILES.

The following notes are in continuation of those on "Welsh Textiles," which appeared in the last issue of *The Textile Mercury*. There is mention of buying "undressed cloth" in a charter granted to Shrewsbury in the reign of Henry III. to indicate the busy trade which was developed afterwards. The Corporation asserted some time after that the town had enjoyed a free market for all merchandise, including cloth, since the days of John. There were local dealings in textiles at different places, and some districts had special reputation for their manufactures, as Giraldus Cambrensis affirms that "the inhabitants of the district of Ross in Pembrokeshire, who derived their origin from Flanders, were much addicted to and greatly excelled in the woollen manufactory," but it is to the towns on the borders that we turn for particulars as to the trade in Welsh fabrics brought there regularly for sale. In 1586 Camden describes Shrewsbury as "a fine city, well inhabited, and of good commerce, and by the industry of the citizens, and their cloth manufacture and their trade with the Welsh is very rich, for hither the Welsh commodities are brought as to the common mart of both nations;" and Blome, in his *Britannia*, published nearly a century later, says that "it is a place of great resort, and well inhabited, both by the English and the Welsh, who speak both speeches, and enjoyeth a great trade for cloths, cottons, frizes, and a variety of other commodities, thus being the common mart between England and Middle Wales." A strange and picturesque sight must these markets have been, with the country people, distinct in dress and speech, dealing with the softer-mannered factors, sometimes with an interloping London broker, who tried to get a foothold for himself in the trade, instead of buying what he wanted at Blackwell Hall, the wool mart of the Metropolis, from locally established men. When such enormities were discovered, prompt action was taken against offenders, in manner such as the following petition betokens:—

> Petition of the drapers of Shrewsbury and Oswestry to the Privy Council, to restrain merchants and drapers of London and their factors from buying and engrossing Welsh cloths and friezes in North Wales and exporting them before they come to Oswestry, where such cloths are usually bought by the petitioners, and by the drapers of Whitchurch, Chester, and Coventry, according to the Council orders made in 1613, and before, which settled that such merchants, etc., should buy only at Blackwell Hall and in London. John Bryad, of London, merchant, and his factor, and William Thomas, of Oswestry, clothworker, have infringed these regulations, and export cloths forestalled to Rochelle, Bordeaux, and St. Mallowes.

Besides the risk of being detected in irregular trade, there was considerable personal peril in carrying on traffic, some danger from robbery, more hazard from storms and stress of weather, in the slow-travelling pack-horse days in a wild country, and more than once the plague brought business to a standstill, or caused it to be carried on, in fear and trembling we may be sure, at some remote place, so that the terrors of going into an infected town might be avoided. But in its happier aspects the trade is well sketched by Owen and Blakeway in their "History of Shrewsbury." "Every Thursday (the market was originally held on Friday, but was changed in 1649) the central parts of the town were all life and bustle. Troops of hardy ponies, each with a halter of twisted straw, and laden with two bales of cloth, poured into the market-place in the morning, driven by stout Welshmen in their country coats of blue cloth and striped linsey waistcoats; and the description given by Dyer may boast an accuracy seldom to be found among the poets:—

> The northern Cambrians, an industrious tribe,
> Carry their labours on pygmæan steeds,
> Yet strong and sprightly; over hill and dale
> They travel unfatigued, and lay their bales
> In Salop's streets, beneath whose lofty walls,
> Pearly Sabrina wafts them in her barks,
> And spreads the swelling sheet.

After dinner, *i.e.*, at two o'clock, the drapers, with their clerks and shearmen, assembled under the market house, and proceeded upstairs in seniority, having by ancient usage the right of preëmption in that order. The market being over, drays were seen in all directions conveying the cloths to the several warehouses, and more than 600 pieces of web have been sold in a day. The whole was a ready-money business, and as the Welshmen left much of their cash behind them, in exchange for malt, groceries, and other shop goods, the loss of such a trade to the town may be easily conceived."

MONOPOLIES IN WELSH TEXTILES.

How profitable the Welsh trade was even in early days may be gathered from the legal regulation of it, as well as from the struggles between Oswestry and Shrewsbury to get or keep the control of it. It had been found necessary in the reign of Henry VIII. to provide that Welsh cloths should be folded the same as those of other places, the Act then passed stating that "they had been used to be so craftily and hard rolled together, that the buyer could not perceive the untrue making thereof," and in 1551 another statute prescribed the lengths, breadths, and weight which all "Walshe Cottonne and Cottonnes," as well as the frizes of Cardigan, Carmarthen, and Pembroke, should contain when offered for sale. Early in Elizabeth's reign, Shrewsbury had secured the monopoly of dealing in woollen goods "called Welsh Cloth, and another sort called Lining," on the plea that such a step was taken at the instance and for the benefit of the poor of the town. In some curious old Chronicles of Shrewsbury, which the late Rev. W. A. Leighton edited, we find that this exclusive privilege was soon endangered by the agitation of others interested, and when Sir Harry Sydney came to Shrewsbury in 1570, on his way from Ireland to Parliament, the Shearmen tried to obtain his help "against the Drapers conserninge an Act for byenge of Walshe clothe to be at lybertie." Whether through the Lord Deputy's influence or not, the year was tided over without trouble, but in the next year there is another tale to tell—"This yeare was a soodden p'lyment called the viijth of May, when there were iij barrons made, in the wch p'lyment was made an Act for the town of Shrewsbery conserninge the Buyinge of Walshe clothe wch was put at lybertie for all men to bye, but not to dress theyre own clothe." This was absolute freedom of trade compared with a grant which Henry VIII., in the 24th year of his reign, made to William Webbe, giving him, for a substantial consideration no doubt, the subsidy and control of all the woollen cloths, frize, cotton, lining, broad cloth, and kersey, for a specified term of years in the County of Monmouth, and all the twelve shires of Wales. These were the good old times of monopolies, but this was a monopoly with a vengeance. Whatever position he held before, William Webbe, with his woollen-weaving name, undoubtedly became a very wealthy man, for old Aubrey mentions particularly the commanding

trade position he held in another respect —"as Greville and Wenman bought all the Coteswold, soe did Halle and Webbe all the wooll of Salisbury Plaines."

Decline in Welsh Textile Manufactures.

By 1677, according to Lewes Roberts, a good Welshman who wrote the earliest of trade treatises, Welsh woollens and some linens were distributed throughout England, "and so thence shipped and conveyed to supply the defects of *Normandy*, *Britainy*, and *Picardy*, and of late have found a current vent in *Spain*, *Turkey*, and other countries." At this time Oswestry had obtained the upper hand. A century later Shrewsbury was the more important town of the two, and then boasting of a trade in cottons and flannels estimated to amount to £1,000 a week, one with another. But the ebb tide had set in. Some part at least of the trade had been carried away to London, where a great vault under the Guildhall was known as the "Welsh Hall," taking that name "from its being occupied by the people of that nation, as a market-place where they sell cottons, plains, bags, and flannels of their own manufacture." What brought about the ultimate downfall of the border towns was the interference of outsiders, when the companies had probably lost the power to successfully oppose them. Traders began to save the people the trouble of taking their goods to market by calling at farms and houses prepared to buy any woollens at once. About 1795, according to the *History of Shrewsbury*, "the market was most materially impaired, and almost ceased with the century. Till at length, in March, 1803, the Drapers' Company relinquished the great room in which they had so long carried on their business, and though much business is still [1824] carried on within our walls, the town has entirely lost the advantage which it derived from the weekly visits of the Cambrian farmers, which produced so much emolument to the drapers, and raised so many families who now shine in the foremost ranks of our gentry." By way of postscript it may be mentioned that, although it has not been thought necessary to point out that Welsh cottons were woollen cloths, probably *coatings*, there was an actual cotton industry in Merionethshire, and some large mills belonging to a Cotton Twist Company established at Holywell. Those who are interested either in Welsh or Lancashire industries can moralise hereupon to their hearts' content. And, as regards the hint that Welsh home industries might, could, or should be cultivated, it is only fair to state that the idea is not by any means a new one. As far back at least as 1774 a number of gentlemen in Brecknockshire formed themselves into a society with the intention of "encouraging agriculture in all its branches, of introducing the linen and extending the woollen manufactures, of amending and making new roads, and, in short, of cherishing and supporting industry of every kind." That they did not succeed in their ambitious attempt need be no discouragement to try a less comprehensive programme.

Cost of Producing Carpets in England and the United States.

The rapid strides made in the American carpet industry during the past decade has already been remarked upon in these columns. This development is one of the most striking features in connection with the textile trades of the Republic, for the United States may now lay claim to being the largest producer of carpets in the world. This result, be it noted, would have been impossible of achievement had it not been that Americans, in common with many other characteristics, such as a love for embroidered shirts and silk stockings, possess a passion for carpets. With, practically speaking, no foreign trade, it would have been impossible for the out-put of the mills in Philadelphia and elsewhere to find an outlet had it been otherwise. An inevitable consequence of extensive production is a reduction in the cost of manufacturing; and it is not surprising to find the claim put forward by such an authority as Mr. J. Schoenhof—(formerly the United States Consul at Tunstall, and the writer of one of the best reports on the English silk trade ever forwarded to the Washington Government), —that certain classes of carpets can be produced more cheaply in Philadelphia than in this country. Claims of this kind have, we are aware, been put forward before; but they have proceeded from prejudiced men, and have, for that reason, been worthless. Mr. Schoenhof, however, is not one of these. As we have already pointed out, he has the courage to expound views advocating free trade in a country where the free trader finds the avenues to official advancement closed against him. For this reason we think that Mr. Schoenhof's article in the *New York Times*, on the comparative cost of English and American carpets, is worthy of reference. The statement is made by the writer that carpets are made in America at a lower cost than in England—at least in the lower grades, such as ingrain (Kidderminster) carpets, and as cheaply as here in the lower grades of Brussels, etc. A comparison relating to 2-ply ingrains is given below, in dollars and cents:

	Philadelphia			Leeds		
	Labo'r	Exp'nse	Total.	Labo'r	Exp'nse	Ttal.
Yarn			38 75	..		28 75
Weaving 5 25			7 92	4 50		8 26
General labour.... 2 67				3 76		
General expenses..		2 4	4 40		5 0	7 50
Selling expenses..		2 0			2 5	
Total $7 92		4 4	51 07	8 26	7 5	44 51

Mr. Schoenhof states that much of this class of goods is made here by handloom, and that the handloom weaver gets 5d. a yard. It would, however, be incorrect to assume that a large proportion of output of ingrains here is produced by hand; and, in any case, the industry is not now an important one, for ingrains—or 'Kidders,' as we call them here—are out of date altogether, as they deserve to be, seeing that other carpets of much more attractive appearance, commencing with tapestries, can now be bought so cheaply. An English manufacturer who has seen Mr. Schoenhof's figures asserts that the manufacturing cost has been placed too low; that burling, warping, finishing, and general expenses would not be covered by the allowances mentioned. The higher cost of American yarn is ascribed to the dearness of wool in consequence of the tariff. Without this tax Mr. Schoenhof considers that the United States could easily export carpets, and it is with the object of emphasising this belief that he has written a report which to Englishmen should provide food for thought. Strangely enough these statements have been challenged by an Anglo-American, Mr. Dobson, of Philadelphia, who is, however, effectually disposed of. Mr. Dobson says it costs him 12·21 cents for labour to make a yard of Kidder, from the yarn upwards, instead of 7·92 cents as shewn in the above table. He also adds that in England only 5½ cents is paid; to which the answer is given that the English manufacturer manages to obtain 2s. 2d. a yard for what the American manufacturer sells at 2s. or 1s. 9½d. net. Here we leave Mr. Schoenhof to answer for the figures; for as no particulars are given we are at a loss to understand what width of carpet he refers to. Two shillings and twopence a yard for common narrow Kidders would be considered a high price here; but perhaps Mr. Schoenhof speaks of double widths. As to this we should like further information. In the meantime we may add that on the new Knowles and Crompton looms the labour cost is reckoned at 4 cents per yard, the production being about 40 yards per day.

French Protectionists and the Duty on Schappe.

The spun silk industry of this country has now attained such important dimensions that proposals of the character of those which have recently been before the French Chamber affect, of necessity, a wider circle than can be found in France itself. Germany and Switzerland are, it may be added, interested also; while at home, Nottingham, as a consumer of schappe yarns, cannot view with displeasure an attempt to increase the cost of the material to its Calais rivals. Nor can Bradford witness unmoved the intrigues of the French schappe spinners, upon the outcome of which so much depends. Summarised briefly, the situation is this: A few firms, producing yarns of the nature referred to, desire increased protection. Their market is limited, and they do not employ over 7,000 hands. The consumers of such yarns in France, on the other hand, are numerous, and the employés may be reckoned by the scores of thousands. Given these elements in the protectionist game of "beggar my neighbour," the result does not call for much explanation. A powerful opposition to the proposals of the spinners has been created, and a counter-demand for a reduction in the existing duties put forward. On further examination it is found that yet a third element clamours for the maintenance of the *status quo ante*. Put in tabular form, the aspirations of these opposing tariff tinkerers are seen below. The first column represents the duties adopted by the Chamber of Deputies and the Senate Committee. The second refers to the proposals of Messrs. Lecomte and Huguet. The third is that of Messrs. Gayot and Decanville, and the fourth that of Messrs. Berge, Raymond, and others. The duties are francs per 100 kilos. G. and M. represent general and minimum tariffs, respectively:—

	G.	M.	G.	M.	G.	M.	G.	M.
Single Yarns:—								
80,500 metres or less..	95	75	50	40	95	75	35	28
Over 80,500 and less than 200,000.....	150	120	76	60	150 205	120 175	50	40

The proposals relating to doubled yarns shew as wide a divergence as those named. Put in plain language, our table shews that spinners are satisfied with the present rates on yarns measuring less than 200,000 metres to the kilogramme, but demand more protection for the higher counts. We doubt whether this modest request will be conceded, for there are others in France besides the handful of schappe spinners whose claims will have to be considered by the legislature. French schappe spinners consume, according to the report of M. Grand-George, 679,000 kilos. of home silk per annum, in addition to large quantities of waste from Italy, China, and Japan. There are 119,500 spindles at work, producing 1,700,000 kilogrammes of yarn per annum, valued at 47,000,000 francs. The consumers of schappe in France demand the abolition of the duties which spinners wish to see raised. They say that spun silk yarns form their raw material; that French agriculturists are not interested in the matter; that a duty only benefits three firms, of which one asks for free trade; and that the tariff strikes at the wages of their workers, who are much more numerous than those engaged by spinners. The position is not without interest, although the issue, as we have said, is doubtful. The existence of large mills in Germany, which would be affected by

increased tariff proposals, may induce the Goverment to sanction the proposals of the ultra-protectionists. In this event, the silk lace and plush trade of England should be benefited.

Yorkshire and its Difficulties.

Lancashire manufacturers in considering their own troubles are apt to forget those of their neighbours in the woollen districts. That the latter have their difficulties has been amply shewn during the past twelve months, although the absence of such statistics as those relating to the Oldham limiteds renders it impossible to illustrate this fact so strikingly as can be done in the case of the cotton industry. Huddersfield, like Bradford, has been a heavy sufferer of late; and the wages question greatly handicaps manufacturers, who are unable to compete with firms elsewhere in certain branches of the trade, such as printed meltons and serges, owing to high cost of production arising from dear labour. Our "News in Brief" columns have afforded repeated evidences of late of the annoyances to which manufacturers are subjected by the strikes which, though apparently insignificant in themselves, are of too frequent occurrence not to leave evil traces behind. The recent dispute at Golcar will, it is feared, affect the whole of the Colne Valley, unless the Board of Arbitration, consisting of equal numbers of employers and employed, now considering the matter, can arrive at a satisfactory solution of the question. In twelve months there has been a falling-off from £824,000 to £686,000 in the value of Huddersfield shipments to the United States alone—a fact which should give joy to U.S. Commercial Agent Smyth, whose remarks on the "decline" of the Irish linen trade we commented upon a short time ago. In most other foreign markets recent experience has been of an unsatisfactory character. Fancy worsteds, cheviots, and homespuns still find an outlet in Germany and Austria, but the competition of native manufacturers is now more strongly felt, and it is probable that some other class of trade will have to be taken up to keep looms going. If Mr. Charles Vickerman can only succeed in producing the new cloth which merchants are clamouring for, the trade of the town will no doubt improve. It would puzzle outsiders, however, to imagine how a fabric that will not become too glossy, and that will be attractive, durable, and cheap, can be made to take the place of the handsome worsteds, serges, and tweeds now in the market. In a recent lecture at the Yorkshire College, Mr. Vickerman held out hopes of success in the direction referred to; and the result of his labours will be awaited with interest, and even anxiety. The silk plush trade has almost been crushed out by the adverse experiences of the past few years, but astrachans and kyrle cloth have been to the front. At such a time as the present, when new designs and colourings are required to woo the fancy of home and foreign buyers, the value of the excellent technical schools with which the West Riding is provided is specially noticeable. We believe that these institutions in the near future will become of increasing service to the woollen districts generally, for only a plentiful use of brains can keep the Yorkshire trade on its feet. Something requires to be done now to compensate for the falling-off in the fine fancy worsted trade; but only one thing—the obstinacy of the operatives—can succeed in preventing the successful issue of the efforts now being made by masters to surmount what is undoubtedly a time of anxiety to all connected with the staple trade of Yorkshire. Our neighbours, it must be remembered, have to face in the home market the organised opposition of experienced foreign firms, who likewise meet them all over the world. In this respect the woollen manufacturers of the country have even more to complain of than firms in the cotton trade.

Protectionist Demands and English Silk Manufacturers.

Mr. Joseph Wright, J.P., of Macclesfield, has just made public some interesting facts concerning the efforts made by himself and Mr. Oliver to bring the above question before the Foreign Office and the Board of Trade. He complains that little encouragement was given by the Macclesfield Chamber of Commerce, although every sympathy was extended to "the fairness of the case" by the Government officials. As on several previous occasions, however willing, the Government, Mr. Wright and his colleague found, was powerless to induce France to open her ports. In answer to this, adds the gentleman mentioned, English free traders will say, "Why should it concern us if Frenchmen resolve to tax themselves? It is the importer who pays the duty." Mr. Wright suspects that English producers will soon be heard saying: "The exporter pays the penalty." We present this reproduction of the Macclesfield manufacturer's views, because, although, as we said the other week in an article which has been quoted by the *Macclesfield Advertiser*, there are many free traders in the town, there is another section of employers composed of men who have repeatedly held out that their industry requires protection. The ingenious individual who, according to the *Daily Telegraph*, makes £1,500 a year out of half an acre of sandy soil in Bedfordshire by growing mushrooms, might, had his lot been cast in Macclesfield, have been able to teach manufacturers as he has taught agriculturists, that there is still money to be made in free trade England. The Cheshire view, however, is that protection's aid should be called in to improve the trade. One local organ, in supporting this view, advises the strengthening of that party in the House of Commons which is striving to get "these great industrial questions arranged on a more equitable basis." Of this party the member for Macclesfield is one. We record these facts without expressing an opinion, as our views on such matters have been repeatedly set forth already. It will be interesting, however, to watch the movements of Mr. Howard Vincent and his allies in the agricultural centres and in Sheffield, Macclesfield, Leek, and other towns. Lord Masham presumably is the representative of the new party in the House of Lords, and if an opportunity offers it will, we fancy, make itself troublesome. In Sheffield the party is exceptionally strong, the powerful aid of Sir Wm. C. Leng, who controls two daily papers there, being assured. Bradford, too, has, since the troubles caused by the McKinley Bill, been muttering threats of retaliation, and it is worthy of remark that the Fair Traders have been unusually active since the enactment of recent protectionist legislation in the Old World and the New.

Protection in New South Wales.

There is one serious drawback in government by party, as we know it in this and other countries, under what is termed a constitutional *régime*—that is, the tendency always existing to subordinate the interests of the community to the good of the party. During the past half century in England a great deal of this kind of action has been seen. In other countries, such as the United States and Canada, where unlimited democracy controls everything, the most pitiable exhibitions are being made in which the welfare of the State is unblushingly and openly sacrificed to the interests of parties and individuals. We are sorry to see that the same spirit has found a lodgment in Australia, and that our finest colony there, New South Wales, is falling under its influence. A protectionist party, which in its essence is a party governed by selfishness, has been formed and has succeeded in displacing the free-trade ministry of Sir Henry Parkes. This has not been accomplished in the ordinary straightforward way of pitting one policy against another, but the leader of the protectionist section of the Parliament has availed himself of the aid of another party more selfish than his own—one which to secure its ends would sacrifice both of the others, and the entire community also, if they stood in its way. This is the so-called Labour Party. The recent labour disputes have led to an extensive organisation of the working classes, and under the guidance of a lot of unscrupulous and ignorant leaders they have at the genera election a few weeks ago won a sufficient number of seats to hold the balance between the two leading parties. The latter have accordingly begun the bidding system for support by which votes are purchased, and with which this country is already too familiar. The consequence is that the first victory has been scored by the protectionist party, which has ousted that led by Sir Henry Parkes. The Labour party wanted an eight-hours law, a demand which Sir Henry refused to endorse; the leader of the opposition, Mr. Dibbs, promised it, and secured their support, with the result indicated. An Eight Hours Bill has already been passed, and the reward for this has to be the support to the protectionist budget of Mr. Lee, the finance minister. It looks at present as if the Australian Colonies were about to re-enact the history of protectionism in the United States, with all its baleful outcomings. The lessons of history are very badly conned in many countries that, having a clean sheet on which to commence their records, might make an excellent showing in the future, were they to read them aright.

Mr. Alderman Bailey on Lancashire Inventiveness.

Mr. Alderman W. H. Bailey, head of the firm of Messrs. W. H. Bailey and Company, Limited, brass founders, etc., Salford, many of whose admirable inventions have a world-wide reputation, opened an Industrial Exhibition in St. Luke's schoolroom, Weaste, on Saturday last. Upon declaring the Exhibition open, Mr. Alderman Bailey said it was a somewhat remarkable thing that nearly the whole of the mechanical inventions of the world, with the exception of, perhaps, the steam engine, were invented in the county of Lancaster. Lancashire men had invented nearly all the appliances used in cotton mills, in the manufacture of locomotives, and in the production of machinery generally. Everything connected with the textile manufacture and tool making—that was to say, the large tools used in the manufacturing machine shops of the world—came from this county. It had always puzzled those who had thought about the subject how it was that Lancashire had more mechanical ingenuity than the rest of the world, and why it was that this county had produced nearly all the mechanical inventions to be found in the encyclopædia of invention. We were still producing those inventions, and whatever might be said of the ingenuity of the Americans or the Germans, if anyone would look, as he did, at the various mechanical works published in those countries he would simply see illustrated copies of Lancashire machines and Lancashire inventions. In the endeavour to arrive at a solution of that question Professor Reynolds was somewhere about right when he said that the mechanical invention of a people or the wit or ingenuity of a people might be considered to

be in proportion to their natural disadvantages. Where the sun did not shine, or where the fruits of the earth were not to be found in abundance, there the wit of the people was sharpened to produce something else to enable them to live. Those conditions might, with truth, be said to apply to Lancashire. It was also to be noted that most of those inventions were the production of illiterate men. Scarcely any of the mechanical inventors of the past were what might be called educated men. That period, however, had now passed away, and a new era had set in, and at the end of the 19th century it would be found that inventions were to be attributed to educated men. Bessemer, for example, was an educated man, but his great invention in connection with steel was perhaps chemical rather than mechanical. There existed on every hand the most cogent reasons why we should sharpen the wits of our young people, and he was glad to see the increased attention that was now being paid to the subject of technical instruction in the arrangement of a national system. In Salford there was being erected a splendid institution which would be to the great advantage of the youth of the borough in the matter of technical education. There were now 4,000,000 scholars in the various day schools of the country, and education was becoming a subject of increasing importance, but he thought we should not be satisfied with the position of things until the money spent upon it was three or four times as much as that expended in keeping our workhouses and gaols going. We had been content to keep up our workhouses and gaols at an enormous cost, but in the future he hoped the great buildings of a town would be the school and the town hall. It was only reasonable that that should be the case. If we attended to our education he thought we need have no fear of foreign competition. These observations will be endorsed by everybody who is equipped with the knowledge requisite to form an opinion, though they are calculated to disturb the large section of Englishmen who accept the Americans at their own valuation.

"LIBERTY, EQUALITY, AND FRATERNITY," AMONGST WORKING MEN.

It is clear from recent manifestations that the leaders of the trades-unionists of this and most other countries have only a very nebulous conception of the Democratic heaven, in which the principles embodied in the leading article of the Democrat's political creed, "Liberty, Equality, and Fraternity," shall govern the social and political relationship of men. Society, as it exists in its average condition, is far from being perfect, or all that could be desired, even from a reasonable standpoint. It is, however, infinitely preferable to what it would be under the rule of such men as these, if we may draw conclusions from their actions. They love liberty, and are loud-voiced enough in demanding it, but it is for themselves alone; and it consists in having perfect freedom to come, go, and do as they please. They must be free to observe or repudiate every contract, obligation, or agreement with their employers and other persons, as it suits their momentary whim. Further, they must have the right to associate, whilst they deny to others the converse right, that of declining to associate. They claim and act upon the right to leave their employment for any reason great in magnitude or infinitesimally small, or even for no reason whatever. They would deem themselves grossly insulted were anybody to evince the slightest disposition to interfere with the exercise of their liberty in these respects. On the other hand, they deny to their employer the right to discharge a man whom he no longer cares to retain; they even refuse to permit him to discharge any man, unless, forsooth, they concur in the sufficiency of the reasons advanced for the course taken. Even when a man's services are superseded by an improved machine he must be foisted upon the establishment as a permanent pensioner; the sacred rights of trades-union principles would be contravened were the staff to be reduced by any invention. An employer cannot even venture to display a little charity to a superannuated, workless, and decaying working man to save him from the workhouse, without its bringing him within the toils of the union. Not long ago a case occurred in which such a poor man from a charitable motive was given employment to do the little odds and ends of jobs of which a number can always be found in a large establishment, and he was glad of the shop at, we believe, 15s. per week. He was, however, not in the Union; so he must enter, or the other employés would strike. In order to prevent his friend, the employer, from having trouble on his account he complied with the pressure put upon him and joined the union. He had not been long in his noviciate before it was pointed out to him that he was working under the allowable union tariff of wages, and that he must apply for an advance. He did so, and his surprised employer, remembering the circumstances under which he first engaged him, reminded him of them, and told him he had better leave his service if he was not satisfied. But no; this was not in accord with trades-union policy. It was an outrage against the society that one of its members should be dismissed for asking for an advance of wages to the standard rate. He must not be discharged, and he must be advanced, and if the demands of the society were not complied with in regard to him the mill would be struck. The kindly dispositioned employer, to avoid trouble and annoyance, submitted, and so he is now saddled with a supernumerary employé, and the cost of maintaining him, whilst his work would go on just as well without him.

Another case, which has just occurred during the holidays, may be mentioned as illustrative of the trades-unionist conception of the obligation of fulfilling an engagement. It is only a trifling matter but it shews how easily and with what nonchalance the unionists repudiate their undertakings. An employer was waited upon a day or two before Christmas Day by a deputation of his operatives, who came to request that they should also have Saturday, the 26th, as a holiday. After some conversation *pro* and *con*, the employer said he did not mind granting their request provided they undertook not to make a similar one regarding the day after New Year's Day. This engagement they readily accepted, and so the mill was closed for both the Friday and Saturday, 25th and 26th ult. Last week the very same men who had made that agreement came up to prefer an identical request for a holiday for January 2nd. They were confronted with their previous week's undertaking, and in reply said "Oh, this week is not last week," substantially affirming that the engagements of one week were not binding the week following, and inferentially that any engagements they might make were of no value whatever when they did not choose to observe them. The employer very properly rounded upon them for their dishonourable conduct and low moral principle. In reply, all they could say was to put the question: "Do you always keep your word to us?" He instantly replied "Yes," and challenged them to adduce a single instance in which he had failed, and he would make them compensation on the spot. Of course they could not. Our pages during the past year or two have afforded plenty of instances that may be recalled as illustrations pertinent to and confirmatory of our other statements on this point. In fact every week affords material in abundance demonstrative of the conclusion that in the minds of the official and officious few who lead our working classes, there is no conception of what constitutes moral principles, and not the slightest regard is paid to them. But a worse feature is that the more intelligent portion of the workers who have some sense of justice and fair dealing have not firmness enough to resist the leadership of the domineering cliques that have seized upon the administration of their societies and dictate their course of action. This has been largely brought about by the system of shop and public persecution that is directed against all who dare to differ from the ukases of the committees. Under the influence of this they subside and say "we must do as others do." Hence, when any shadow of a dispute arises, the few noisy ones lay down their work and the others follow like a flock of sheep.

It is sufficiently obvious from what has been already stated that the trades-unionists have no notion of allowing other persons an equality of rights and privileges. Their views on most points are in such direct antagonism to all principles of liberty and equality that to allow others the same degree of freedom would be of necessity to withdraw their own—a procedure they would never think of. Hence there can be no equality between man and man in a community where trades-union principles prevail. The only conditions allowable, are on one side a dominancy, and on the other a subserviency that would have disgraced the feudal ages.

The third section of the democratic plank, fraternity, the brotherhood of man, becomes a farce in the light of the statements advanced, and calls for no consideration whatever. Its existence is simply incompatible with any principles of trades-unionism as now propagated by its leaders and advocates. There is, therefore, no need to wonder at the decided antagonism towards it of philosophical politicians and those who have actively sought to embody their views in modern political institutions, because they have been sufficiently clear-sighted to discern the fact that to bring trades-union notions into a dominant position would be merely to substitute the tyranny of the many for that of the few. Here we must leave the matter for the present, but trust to have an early opportunity of shewing this subject in yet another phase of its character.

Foreign Correspondence.

TEXTILE MATTERS IN THE UNITED STATES.

BOSTON, Dec. 28th.

The falling-off in the importations of cotton hosiery since the passing of the McKinley Bill has been much greater than may have been imagined. The following table shews the imports for the first ten months of 1891 and 1890 respectively:—

	1891.	1890.
Cotton:		
Month of October	$185,097	$864,647
10 months ending October 31	4,323,835	7,568,484
Woollen:		
Month of October	$85,840	$84,597
10 months ending October 31	967,291	1,757,967

Seamless goods are now preferred to cut hose, and manufacturers of the latter in Philadelphia are complaining. Foreign competition is also said to have had an injurious effect upon the Philadelphia manufacturers; but Philadelphia is one of the leaders of protection, and

the cry about the foreigner forms an important item in its stock-in-trade.

An American textile machinist has been interviewed with reference to the problem of driving spinning machinery by electricity. His opinion is given below:—"If we are troubled now by the presence of electricity, what will happen if the very thing we try to get rid of is multiplied in power and applied to the machine direct?" *Per contra* comes a statement to the effect that though this was, undoubtedly, an insurmountable difficulty a few years ago, it is now almost wholly overcome by the use of moistening apparatus which kills the electrical phenomena in the air. Thus the difficulty, it is held, is practically done away with, so that it is simply necessary to construct the proper kind of a machine and the end is attained.

A contemporary, in the course of a lengthy article on the condition of the silk industry, says, among other things:—

Everyone in the silk trade knows full well that the silks of Europe are so badly loaded with coal-dust and gums that no intelligent woman dare buy a piece of cheap silk to make up into a dress, simply because before a month the same would crack in every crease. Europe need not send us any more of such stuff; we have had enough of it in two years. American silks are not wholly free from the evils alluded to, but they are far superior to the imported goods. Nothing but the finest and the most costly, rich silks have been good sellers for more than a year, and ladies need much coaxing and low prices to induce them to change from the present fashion of wearing woollen and worsted dresses. We believe that silk manufacturers are thoroughly aware that every word we utter is the real truth, and we are inclined to think they mean to take our advice and make a much better class of silks. When they do this American women will buy the goods again. The tide is already on the turn, but there is still great room for improvement.

The silk industry here has undoubtedly attained an important position; although, like most things American, it is belauded too much.

The Manufacturers' Exchange of Denver, Colorado, has just been re-organised with a view of admitting all the manufacturers of the district, over 200 in number. Mr. Thomas Tonge, formerly of Manchester, has been appointed secretary. Denver is fast becoming quite a manufacturing centre, having during 1891 added a cotton mill, with 16,200 spindles and 480 looms, costing about £100,000; a paper mill, 616 feet long, costing £70,000; a knitted underwear factory, employing 40 hands; and other manufacturing enterprises. Denver declares that it still needs a blanket factory, woollen mill, tannery, etc., etc.

Bleaching, Dyeing, Printing, etc.

PRINTING FAST AZO-COLOURS ON COTTON.

It is a well-known fact that the azo colouring matters are capable of being made in two forms, one insoluble, the other soluble in water. The former variety cannot be used in dyeing or printing of textile fabrics, and the latter can only be used for dyeing or printing wool or silk; they are practically useless for the production of colour on cotton. Some years ago Messrs. Read Holliday and Sons discovered a process for producing the insoluble azo colours on cotton, which has been used for dyeing cotton, and of late years it is coming into use for printing on cotton or other fibres.

It may be advisable to point out briefly the general composition of the azo dyes. There are a numerous class of chemical compounds derived from coal tar, which contain the group NH_2; these are called amido compounds. In their simplest forms, such as aniline $C_6H_5NH_2$, toluidine $C_6H_6CH_3NH_2$, or naphthylamine $C_{10}H_7NH_2$, they contain only two chemical groups and are known as amines. On the other hand, some amido bodies have a more complex composition, such as amido azo benzene, $C_6H_4NH_2N{=}NC_6H_5$; and nitro para toluidine, $C_6H_3CH_3NO_2NH_2$. Now all these bodies when acted on by an acid solution of sodium nitrite undergo what is called diazotising, *i.e.*, they lose the two H atoms of the NH_2 group, taking up an atom of N in their place; the two atoms of N forming a kind of binding group between two other groups of atoms. This reaction is illustrated in the following equations:—

$$C_6H_5NH_2 + NaNO_2 + 2HCl$$
Aniline. Sodium nitrite.
$$= C_6H_5N{=}NCl + NaCl + OH_2.$$
Diazobenzene chloride.
$$C_6H_4NH_2N{=}N\,C_6H_5 + NaNO_2 + 2HCl$$
Amido azo benzene.
$$= C_6H_5N{=}NC_6H_4N{=}N\,Cl.$$
Benzene azo benzene diazo chloride.

The diazo compounds are very unstable bodies, in which fact lie at once one of their most valuable properties, and one of their defects in so far as regards their use and application in dyeing and calico printing. The property for which they are of value is that when brought into contact with other bodies, especially with what are called phenols, they immediately enter into combination, and a coloured product is the result: thus, when diazo benzene chloride is brought into contact with *b*-naphthol, it combines and forms benzeneazo naphthol, $C_6H_5N{=}NC_{10}H_6OH$, which is bright orange in colour. The coloured bodies so produced are quite insoluble in water.

This property may, as was shewn by Messrs. Holliday, be taken advantage of in the production of colour on the fibre, by first preparing the goods in a bath of a solution of naphthol, and then passing the prepared goods through a bath of aniline diazotised, when the colour is immediately developed.

The same principle may be applied in calico printing in the following manner:—For cotton the cloth is prepared in a bath made with

2 lb. *b*-naphthol,
2 lb. caustic soda of 70° Tw.,
6 gallons of water.

After padding, the cloth is dried in any convenient way. It should not be kept too long before using, certainly not more than 24 hours, as there is a gradual deterioration, and after some time the naphthol loses its power of combination with the base to form a colour.

Wool and silk are best padded in a bath made with

2 lb. caustic soda, 70° Tw.,
2 lb. *b*-naphthol,
6 gallons water,

after which they are passed through a bath containing

5 lb. salammoniac,
10 gallons water.

This causes a deposit of free naphthol on the cloth; afterwards they are passed through a rinsing water and partly dried. After drying, the cloth in either case is ready for printing. The printing colour is made by taking

1 molecular weight of the base,
2½ molecular weights of hydrochloric acid,
1 molecular weight of sodium nitrite.

This mixture contains rather more acid than is theoretically required, but it has been found that to take exactly the theoretical quantities does not give good results, especially when working with the naphthylamines, and so it is advisable to take rather more acid and to add the sodium acetate to neutralise this excess of acid. The base is first dissolved in the acid; when dissolved, 1 molecular weight of sodium nitrite is added, which causes the formation of the required diazo body, then the sodium acetate is added and sufficient tragacanth or gum thickening. This printing colour must be made cold and used cold; in summer time it is advisable to make it with iced water, as heat causes it to decompose, when no results can be obtained by its use. It will keep for about 24 hours, but after that time it cannot be depended on to work well. The cloth is printed with this colour in the usual way, and almost as soon as the colour touches the cloth the actual colour is produced; at all events it does not take more than five minutes for the colour to develop on cotton, while on wool or silk a few seconds is quite sufficient.

After printing, wash and dry.

The molecular weight of sodium nitrite is 70, and the commercial product is nearly pure. The molecular weight of sodium acetate is 136. for the crystals, which form the commercial product. The molecular weight of hydrochloric acid is 36·5, and the commercial product contains 30% of its weight of the pure acid. The molecular weights of the base or amine vary with the particular body, and are given in the table shewing the shades which may be obtained, given below. The commercial qualities of these are fairly pure, and for all practical purposes may be considered so.

The following table shews the bases which may be used, and the colours which they give with the two naphthols. This table also shews the importance of careful distinction between these two isomeric bodies.

Base and Molecular Weight.	*Gives with A-naphthol.*	*With B-naphthol.*
Aniline 93	Brown	Bright orange
Toluidine 107	Brown	Brown
Paratoluidine 107	Brown	Very bright orange
Metanitraniline 136	Brown	Bright red
Paranitraniline 136	Yellow brown	Red
Nitroparatoluidine 150	Yellow brown	Orange
A-naphthylamine 143	Puce	Claret
B-napthhylamine 143	Nearly black	Bluish red
Amidoazobenzol 207	Yellow brown	Dull red
Amidoazotoluol 221	Red brown	Yellow
Xylidine 121		Orange red
Cumidine 135		Red
Benzidine 176*		Dark brown
Tolidine 204*		Dark brown

*Being diamines, only half these quantities are required.

A very important point for either the dyer or the calico printer is their fastness to light, soaping, etc. The following tables record the results of some experiments on this point:—

The colours may be roughly divided into fast, moderately fast, and very loose, but it is difficult exactly to give any definite information on this point, as the line of division is not very sharp.

The following are fast to soaping: The combination of *a*-naphthol with toluidine, *a* and *b*-naphthylamines, amidoazobenzene. The combination of *b*-naphthol with toluidine, paranitraniline, nitroparatoluidine, and the *a* and *b*-naphthylamines.

The following are only moderately fast: The combination of *a*-naphthol with aniline, paranitraniline and orthoamidoazotoluol, and the combination of *b*-naphthol with metanitraniline and amidoazobenzol.

The following are very loose to soaping: The combination of *a*-naphthol with paratoluidine, metanitraniline, and nitroparatoluidine, and the combination of *b*-naphthol with aniline, paratoluidine, and orthoamidoazotoluol.

On the whole the colours are much faster to light than they are to soaping. The following combinations are fast to a short exposure to light: Those of *a*-naphthol with aniline, toluidine, metanitraniline, paranitraniline, nitroparatoluidine, *b*-naphthylamine, amidoazobenzol, orthoamidoazotoluol, the combinations of *b*-naphthol with aniline, paratoluidine, metanitraniline, paranitraniline, *a* and *b*-naphthylamines. The combination of *a*-naphthol with nitroparatoluidine is only moderately fast, while those of *a*-naphthol with paratoludine and *a*-napthylamine and of *b*-naphthol with toluidine, amidoazobenzol and orthoamidoazotoluol are very loose to the action of light.

By printing on a cloth the thickened solutions of several diazo bodies, designs in several colours can be produced. The preparation of the cloth with naphthol does not interfere with the printing on it of any of the ordinary steam colours, so that these may be used, if desired, in conjunction with any of the colours specially dealt with in this article. Of course, after printing, it will be necessary to steam and finish the cloths in the usual way. Resists can be printed on if thought necessary, or if required to produce white designs on a coloured ground. A good resist is made from 15 lb. tin crystals in one gallon of thickening.

After printing and padding in the diazo solution, the cloths are passed through an acid bath, then washed and dried.

RECIPES FOR CALICO PRINTERS.

Dark Violet.

The printing colour is made with

62 lb. acetic starch tragacanth thickening,
30 lb. chrome violet,
8 lb. chrome acetate of 32° Tw.

Steam for one hour without pressure; pass for

20 minutes in a chalk bath at 100°F.; wash, and dry.

BRIGHT BLUE.

Prepare a printing colour with

6 gallons acetic starch tragacanth thickening,
30 lb chrome blue,
8 lb acetate of chrome, 32° Tw.

Print and work as for dark violet above.

OLIVE YELLOW.

8 lb. acetic starch tragacanth thickening,
6½ oz chrome acetate, 32° Tw,
3¼ oz. acetate of lime, 20° Tw.,
1½ lb. diamond flavine.

This pattern is steamed as with the violet above.

REDDISH ORANGE.

7½ lb. acetic starch tragacanth thickening,
2 lb. diamond orange,
9 oz acetate of chrome, 32° Tw.,

Print; then steam for one hour without pressure; then pass through a chalk bath for 20 minutes, and wash.

PALE OLIVE.

Prepare the printing colour with

2½ lb. olive yellow colour,
1 lb blue colour.

Print; steam for one hour without pressure; pass through a chalk bath; wash, and dry.

DARK OLIVE.

2 lb. cœruleine colour,
1 lb. olive yellow colour.

Work as described above.

CŒURLEINE.

7¼ gallons acetic starch tragacanth thickening,
20 lb cœruleine,
8 lb. acetate of chrome, 32° Tw.

TERRA-COTTA BROWN.

Prepare the printing colour with

6¼ gallons acetic starch tragacanth thickening,
9 lb alizarine SX,
13 lb. acetate of chrome, 32° Tw.,
5 lb. acetate of lime, 22° Tw.,
5 lb. diamond flavine G.

Print and work as described above.

WHITE DESIGNS ON BLACK STOCKINGS.

These may be produced without much difficulty by dyeing the stockings with aniline black and then printing on a reserve which will prevent the complete formation of the black. For the black the following three solutions are made: (1st) One of 18 ozs. ferrocyanide of potassium (yellow prussiate of potash) in one gallon of water. (2nd) A solution of 1¾ lb. aniline crystals in half a gallon of water. (3rd) A solution of 13½ ozs. chlorate of soda in half a gallon of water. All these solutions may be made with boiling water, but they must be allowed to get quite cold before using. The solutions may be kept separately for any length of time before using, but if mixed together and allowed to stand there is a gradual formation of aniline black in the mixture. This floats about as an insoluble black precipitate, which will settle on the goods if the mixture has been kept a long while before using, and this deposit not being properly fixed on the goods is loose, and causes them to rub a good deal. To avoid this defect it is advisable not to mix the solutions a long time before using.

To make the dye-bath these three solutions are mixed together in the proportion of two gallons of No. 1 to one gallon of each of the others. The bath is heated to about 120°F., and in it the stockings are worked for about half an hour, the handling being thoroughly done so as to ensure that the goods are thoroughly impregnated with the dye liquor. The goods are then placed in the hydro-extractor and the surplus liquor is whizzed out. They are next placed on the wood forms, and put into the drying chamber at about 100°F., until the goods acquire an olive green colour, when they are printed with a reserve. This reserve can be made out of a variety of bodies, of which the following are a few examples:—

Reserve A.

24 lb. dextrine liquor, 1 in 4,
15 lb. acetate of lime, 32°Tw.,
1 lb. potassium sulphocyanide.

Reserve B.

8 lb. dextrine liquor, 1 in 4,
4 lb. crystal soda,
6 lb. sodium acetate.

Dissolve by heating together, then allow to cool, and add 1 lb. bisulphite of soda at 52° Tw.

Reserve C.

18 lb. dextrine liquor, 1 in 4,
6 lb. acetate of soda,
2½ lb. caustic soda, 52° Tw.

After the printing the stockings are dried, then taken off the wooden forms and steamed in a steaming chest to develop the black, which will take about an hour. The goods are then taken out and passed through a bath of

1 lb. bichromate of soda,
½ lb. soda crystals,
10 gallons water.

The bath is used at from 120° to 130° F., and the goods are immersed therein for 10 minutes, after which they are well washed and dried.

CH. DREVET gives, in the *Moniteur de la Teinture*, the following method for dyeing yellow on cotton:—For 100 lb. of cotton, prepare a dye-bath with ¼ lb. thioflavine S and 5 lb. soap. The dyeing is done at the boil, and takes one hour. This operation presents no difficulty, as the dye-stuff goes on to the cotton very easily and evenly. The cotton is washed in cold water, and is then passed into a diazotising bath made with nitrite of soda and hydrochloric acid. This bath is used cold, and the cotton is left in for 15 minutes; it is then taken out, rinsed lightly in water, and passed into a bath containing ¼ lb. thioflavine S dissolved in water. In this it is allowed to remain for 20 minutes, after which it is taken out, washed, and dried.

FOR extracting grease out of oily waste or tops, three systems are available:—(1st.) The waste may be pressed in a hydraulic press under a pressure of about two tons, and at a temperature of 130 to 140°F. The fault of this system is that it does not extract more than about 90%. (2nd.) The second system consists in boiling the waste with soda and water—an operation that can be carried out in any ordinary boiler. The cost of the process is not great: about 5 lb. of soda are required for one cwt. of waste, and with care the whole of the oil may be extracted. The operation has to be repeated two or three times before the oil is properly extracted. The defect is that the oil is extracted in a form in which it is not useable, and it has, therefore, to be run away. (3rd.) The third process is by the use of some solvent such as bisulphide of carbon or petroleum spirit. This is the best process of the three, as it extracts the whole of the oil, and in a form in which it may be used for various purposes. Essentially, the process consists in treating the waste in a suitable closed vessel with the solvent, which dissolves out the oil, and the solvent and oil run off into a still. Two or three repetitions of this process are then sufficient to extract out all the oil. The used solvent is run into the still, and by the aid of steam heat is distilled off and recondensed, to be used over again, while the oil remains in the still, and can be sold for various purposes. Carbon bisulphide is the best solvent to use, but it has a rather objectionable odour, which, however, by repeated use gets less. It costs about 2d. per lb., and for 1 cwt. of waste something like 1 cwt. would be required, but nearly the whole of this is recovered for re-use at an expense of not more than 1d. for 10 lb. This expense represents the cost of this process so far as chemicals are concerned. Petroleum spirit is used in the same way: it costs about 10d. a gallon, and it will take about 10 gallons for 1 cwt. of grease; the great bulk of this is recovered for re-use. The size of the apparatus which is employed can be adapted to suit the quantity of waste which it is desired to treat.

THE discontent engendered by the shearers' strike in Queensland a few months ago has not disappeared. A number of mounted men, who are connected with the Shearers' Union, have camped at Clermont with the evident intention of harassing the free shearers. The police force in the western districts has been increased, and regular patrols have been arranged.

THE COTTON INDUSTRY IN SCOTLAND.

It is an interesting question what is to become of the cotton industry in the West of Scotland in the future. Since Mr. Henderson, the superintending inspector of factories, drew attention to the subject a year or two ago, and pointed out the danger which threatened the trade from the competition of Lancashire, but little satisfactory light has been thrown upon the subject. The trade has been allowed to drag on in much the old way, and thousands of pounds' worth of cloth which might all be perfectly well woven in this city and the neighbourhood is being sent weekly from Manchester to be printed and finished in Scotland, and thence exported abroad. Among the causes which Mr. Henderson assigned for this very anomalous state of things, it may be recollected, was this—that the Scotch weavers declined to work more than two looms, while their Lancashire competitors willingly attended to three or four, or sometimes even six, when aided by a young person or a child as a tenter. Mr. Henderson merely stated the facts in this respect, but made no attempt to explain them; but at a later date the Women's Protective League—a philanthropic association, recently established in this city, which has for its main object the amelioration of the condition of the women employed in factories—despatched an agent to Lancashire to make enquiries into the subject. The result of that enquiry, so far as we know, was never formally made public, which we think was a great mistake. Informally, however, it did come to be known that Mr. Henderson's statements were perfectly correct. The agent of the Women's Protective League did find that in Lancashire it was a common custom for women weavers to attend to three and four looms when weaving the same sorts of cloth as the weavers in Glasgow were engaged on, and who protested that it was impracticable to work more than two looms. And not only so, but the representative of the Women's Protective League also ascertained the fact that in respect to certain classes of cloth the manufacturers in Scotland were actually paying a higher rate for their weaving than their Lancashire competitors, and yet their workpeople were not making more than one half of the Lancashire wages. This is explained by the fact that weavers are paid in both countries by the piece, and as the cloth is all woven by machinery, if a girl will attend to four looms her remuneration will be twice as great as if she insisted upon attending only to two. And, as a matter of fact, this is precisely what happens. A weaver in Scotland in the cotton manufacture will not make more than 8s. to 10s. a week on an average; in Lancashire it will be 16s. to 20s. Now, the practical question is—What is the cause of this very remarkable contrast between the earnings of the Scotch and English weavers in the cotton trade? Hitherto we have looked in vain for anything like a satisfactory answer. It cannot be pretended that the Scotch girls are less intelligent or less industrious than those of Lancashire. What, then, can it be? The agent of the Women's Protective League, so far as we know, although he was understood to be a practical man, threw no satisfactory light upon it, and the association were no more successful last week in solving the difficulty by the aid of Mr. James Mawdsley, of Manchester. Mr. Mawdsley is a leading light among the trades unionists of Lancashire, and on the principle, we suppose, that there is nothing like leather, his panacea for the declining cotton trade in Scotland, and for the low wages earned by the weavers here, was the formation of a trades-union! Now, we have no antipathy whatever to trades-unions, for when wisely guided we think them both valuable and useful; but it was, perhaps, a lucky thing for Mr. Mawdsley himself that his audience was very limited on this occasion, and that there were few to listen to the nonsense which he talked upon this subject. Mr. Mawdsley knows the secret of the strength of a trades-union better than the society which he represents—the operative spinners of Lancashire—who work the oracle to their own advantage. They strictly limit their numbers, and this, as we will shew, at the expense of a class of their fellow-workmen. An operative spinner in a Lancashire factory is nothing more nor less than a sweater. He contracts with his employer to spin a certain quantity of cotton into yarn for a certain price, he employs assistants or piecers whom he pays small but fixed wages, and he "sweats" them by working them overtime and in other ways, while he pockets all the money paid by the occupier of the factory except the small pittance doled out to the "piecer." The position occupied by these poor "piecers" is deserving of all sympathy. Many of them have worked for a long term of years, and have been as competent at the trade as the spinner who employs them but their earnings will not average 14s. or 15s. a week, while the spinner will pocket three times that amount. This is the sort of unionism which finds an advocate in Mr. Mawdsley; but we would like to ask the philanthropic ladies and gentlemen who lend their names to the Women's Protective League in this

city if they approve of this sort of division of wages, and if it is this system which they would desire to see established in the cotton industry in Scotland? The truth is that if any independent employer were to treat his workpeople after the manner which finds favour with Mr. Mawdsley and the operative spinners of Lancashire, he would be denounced broadcast as a tyrant and a miserable oppressor of the poor. The facts which we have here referred to in connection with the operative spinners of Lancashire were brought to light recently before the Labour Commission, and it was with satisfaction that we noted that one of the witnesses stated that the "piecers" were now agitating for a union to protect themselves against their fellow-workmen, the spinners. We wish them all success, for they evidently stand as much in need of it as the cotton operatives in the West of Scotland. But apart from this, Mr Mawdsley's appearance in Glasgow as an authority in Scotch manufacturing was a blunder. He is ignorant of the merits of the case altogether, and talked a lot of nonsense about want of capital and inferior machinery, which has no existence except in his own imagination. The Scotch manufacturer is a capitalist as a rule; the Lancashire manufacturers who are in that position, thanks to the stupid and short-sighted action of men like Mr. Mawdsley, are year by year becoming fewer and fewer. Stranger things have happened in history than to find the cotton industry of Scotland revive and prosper on the blunders and mistakes committed by her competitors in the South.—*N. B. Daily Mail.*

A CARPET factory has been opened in the neighbourhood of Moscow for the production of Persian carpets. Its products are distinguishable from the genuine Persian carpets neither in colour nor in design, but they are softer than the genuine articles, and therefore wear out less rapidly. Their price is said to amount to only about half.

THE commercial museum in Constantinople, which has already been mentioned in these columns as in prospect, is now open. It is under the superintendence of the Ministry of Commerce, and embodies, besides an exhibition of domestic and foreign products and goods, various arrangements for the promotion of commercial intercourse in Turkey.

A FEW cotton-spinning factories and factories for stockings and flannels have been started in Syra.

THE wool-washing, drying, and carbonising establishment of Deru and Renier, at Threux, in Belgium, recently sustained damage from fire to the amount of 350,000 francs.

SPANISH TEXTILE INDUSTRIES.—Consul Turner, of Cadiz, says that, although Spain does not figure among the leading manufacturing nations of the world, it cannot be denied that during the last few years great advancement in the development of this branch of industry has been made. Most of the hemp of Spain is exported, but some of it is used in the manufacture of matting, among which that of Crevillente is well known. The canvas made of this hemp is used in the manufacture of shoes, and is an industry of some importance in Southern Spain. The manufacture of cotton goods, which is almost confined to Catalonia, is constantly growing. The principal factories are located in Barcelona, Mataro, Esparraguera, Sans, Granollers de Valls and Villanueva y la Geltru. There are others of less importance out of Catalonia, such as those of Valladolid, Saragossa, Cavada, Malaga and Guipuzcoa. The manufacture of knitted goods is confined to Barcelona, Mataro, Esparraguera and Reus. The manufacture of woollen goods has six principal centres—Catalonia, Alcoy, Bejar, Ezcaray, Antequera, and Palencia. In Caceres, Toledo, and a few other cities, there are also factories of some importance. The principal silk factories are in Valencia and its province, and in Murcia, Seville, and Almagro.

Designing.

NEW DESIGNS.

FANCY SHIRTINGS, ETC., FOR SPRING.

Some twelve or fifteen shades, well chosen, ought to suffice for the requirements of the most important spring fabrics without complicating the dyeing. A multiplicity of colour is always a source of embarrassment, and of no material advantage to the production: simplicity is at all times charming, if not rendered too tame or monotonous. The new cotton and linen textures ought to prove successful. Owing to modern finishing machinery these goods are made to rival silks in softness and delicacy of tone. Some very beautiful multi-coloured stripes and sprigs will furnish the most charming of spring dress materials. It is evident that the Arabesque will be a special form of ornamentation. There is something very fascinating to the eye in a design of this nature, if properly conceived and carried out apart from vagaries or wild flights of the imagination.

The following list of colours will be found useful as a guide for spring fancies:—

Pale pink, with yellow and crimson.
Pale blue, with purple, yellow, and green.
Black, with every gradation of the rainbow.
Pale blue, sky and turquoise blue.
China pink and cream.
Dark blue, shaded off to lizard green, with lines of gold colour.
Rose pink, with violet, crimson, and garnet.

In silk or woollen goods, the broader the *rep* and the more fashionable the fabrics.

Plush and velvet and velveteen of the best quality will continue popular, especially for trimmings, moss colour being the favourite, as it blends delightfully with pale pink or deep grenat colour.

Large checks will be in favour, of satin and thick corded silk, not less than 3 in. square, of two colours, alternating in stripes of each. Thus the gamet or claret squares of satin and silk alternate with stripes made in pink silk and pink satin.

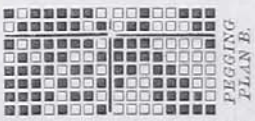
Design A is for shirtings, dress materials, and aprons, in cotton warp and weft: 20's cotton twist for warp, 36 dents per inch, two in a dent, 56 picks per inch of 16's bleached cotton weft.

1st Warp Pattern: 12 dark blue, 4 bright red, 20 dark blue. This makes the draft as shewn, and repeat from 12 dark blue. The actual pattern is 4 bright red, 32 dark blue.

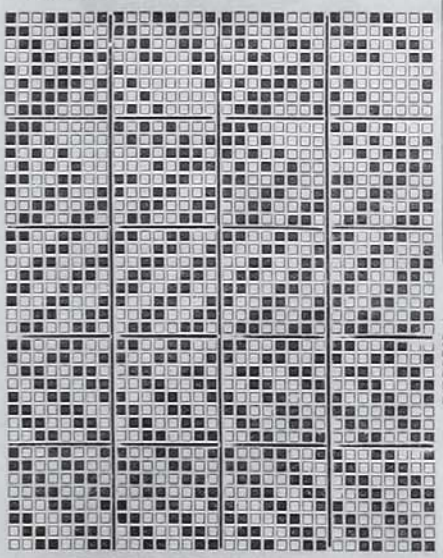
2nd Warp Pattern: Dark brown for blue, white for red; weft, bleached. All one shuttle.

3rd Warp Pattern: 2 blue, 2 white, 2 blue, 2 white, 2 blue, 2 white, 4 red, 2 white, 2 blue, 2 white, 2 blue, 2 white, 10 blue, all two in a heald, one heald per dent; repeat from the first 2 blue. The patterns can be extended by increasing the draft. This pattern is made by the second pegging plan.

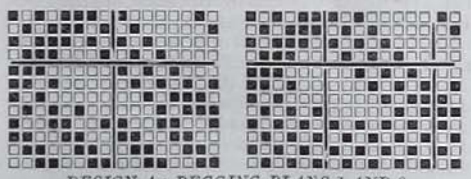
Design B is a fancy shirting idea, 40 dents per inch, two in a dent of 24's cotton twist, 56 picks per inch of 14's soft cop weft; all dark-blue warp or dark brown. The patterns, however, may be diversified to an almost unlimited extent by following the draft. We give a pegging plan, eight to the round, but a little study of the design will give other arrangments. The dots are weft to the surface, and the double plain thread at each side of the centre stripe is two ends of 20's, one red, the other white, slightly twisted, put in one heald.



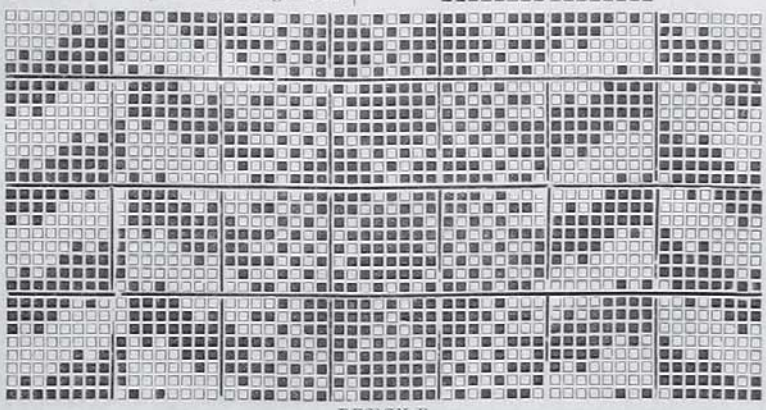
PEGGING PLAN B.



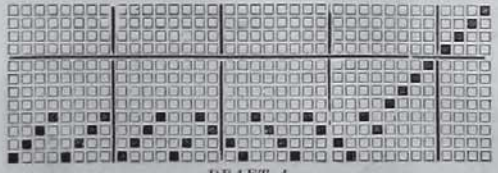
DESIGN A. SHIRTINGS, &c.



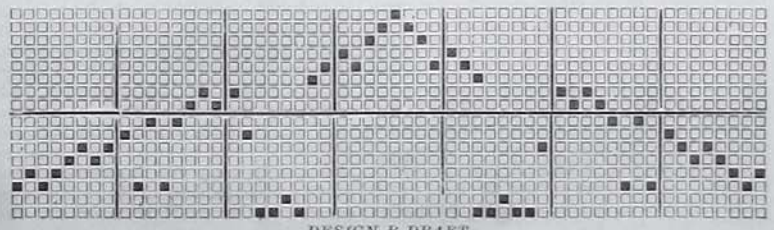
DESIGN A: PEGGING PLANS 1 AND 2.



DESIGN B.



DRAFT A.



DESIGN B DRAFT.

Machinery and Appliances.

IMPROVED REVOLVING FLAT CARDING ENGINE, WITH WILKINSON'S PATENT REVOLVING DISCS.

MESSRS. BROOKS AND DOXEY, MACHINISTS, MANCHESTER.
(LATE SAMUEL BROOKS.)

As we have frequently had occasion to remark, the contest amongst cotton machinists as to which shall first closely approximate to, if not attain, absolute perfection in the carding engine, still continues, and judging from the present outlook it is not likely soon to terminate. As is now very definitely decided, the favourite and winning type of the machine is the revolving flat card. All others are now, to use a sporting metaphor, out of the running.

We are called upon on the present occasion to chronicle the contribution towards the object stated above, of the firm of Mr. Samuel Brooks, which has just changed its style and title to that of Brooks and Doxey. The principle adopted by this firm as the one in their opinion affording the best chance of attaining the end sought, is that embodied in Wilkinson's patent card. In all other revolving flat carding engines the series of flats are made to travel over an arc of a circle concentric to the cylinder. This arc is the fixed course termed the bend. The ends of the flats travel upon these bends, with the natural result that there arises a certain amount of friction, which causes a proportionate amount of wear and tear of the surfaces in contact, namely, that of the bend itself and the ends of the flats. It is contended, and no doubt justifiably so, that as long as this friction continues, so long will the wearing down of the parts affected go on, and that in an irregular manner, owing to the varying density and hardness of the materials employed in the construction of the bends and flats, and that the consequences of this cannot be altogether obviated. We know that the greatest care is taken by machinists to minimise these influences and results in the working of cards constructed on this principle, yet it must be obvious that to eliminate the friction altogether is the only perfect method of avoiding its results, due care being taken not to introduce other defects of either the same or a different character.

Our illustration Fig. 1 shews a perspective view of the card constructed by Messrs. Brooks and Doxey, embodying Wilkinson's patent, by which the flats are carried upon the periphery of an adjustable slowly revolving wheel or disc when they are performing their work upon the cylinder. By this means friction is absolutely obviated, the bend or flat course disappearing altogether, all the flats being carried through their traverse upon the periphery of the disc.

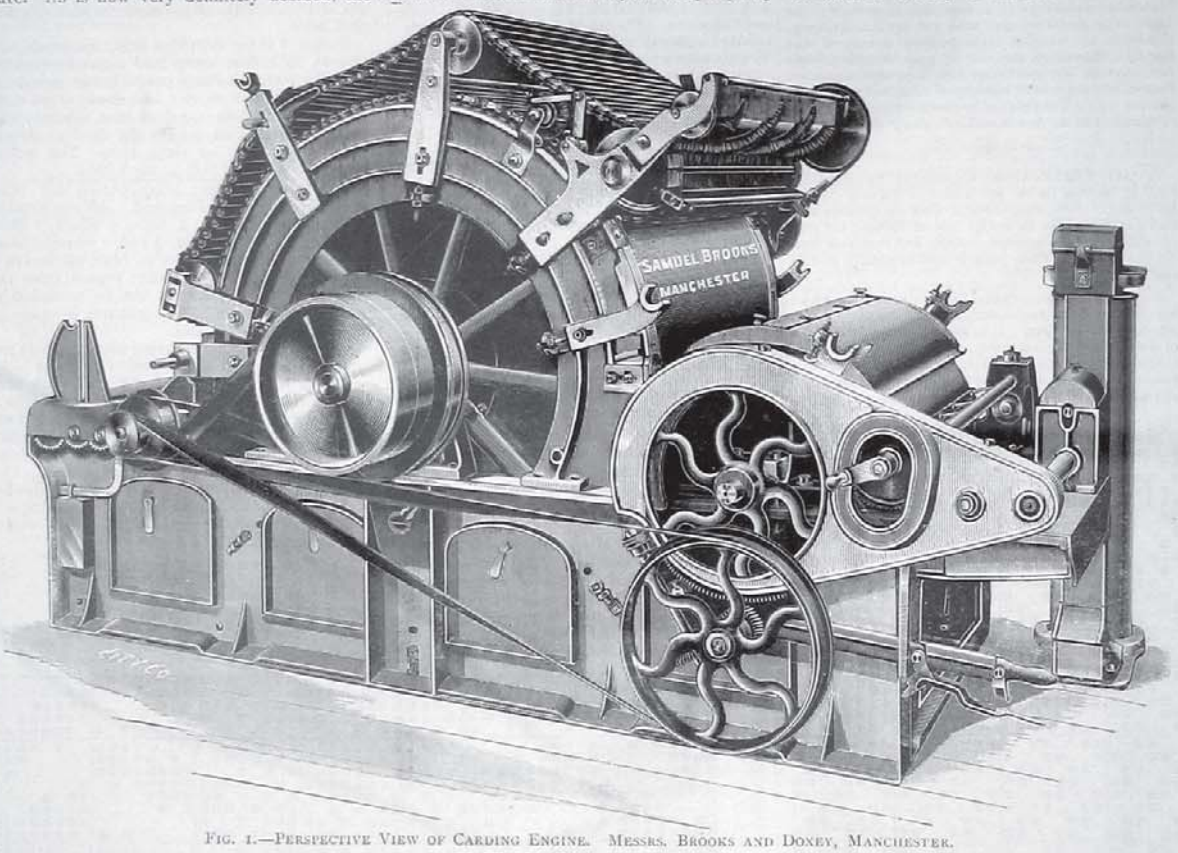
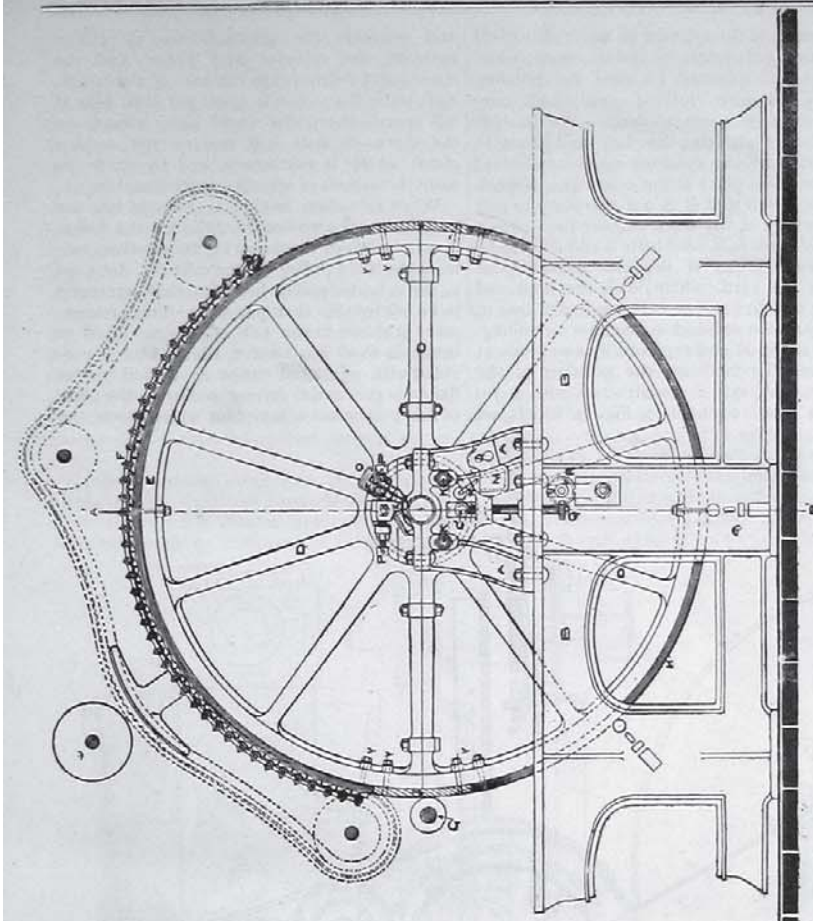


FIG. 1.—PERSPECTIVE VIEW OF CARDING ENGINE. MESSRS. BROOKS AND DOXEY, MANCHESTER.

Our illustrations Figs. 2, 3, respectively exhibiting a cross section and side elevation of the parts, elucidate the construction and arrangement of the parts very clearly, and will enable the reader to comprehend it with ease. A pedestal A is bolted to the frame B, and C is an adjustable bush, on which is mounted a revolving disc D, which is the leading feature of the invention. To the rim E of this disc is attached a tyre for the support of, and upon which rest the working flats. This tyre is an inch wide, and the weight of the flats, with the aid of the usual means of traversing them, is sufficient to carry the disc round without any gearing arrangement. This secures a perfect equality of the rate of motion of the disc and its incumbent flats, which is easily demonstrated by chalk-marking the position of the flat upon the disc when it commences work, when it will be found that the two marks remain precisely in the same relationship until the flat leaves its position upon the periphery of the disc. Thus friction in these parts, and consequently wear and tear, with all its disadvantages, is entirely prevented.

The discs are bored in the centre, and are mounted upon adjustable bushes, 9 in. dia., one on each side the machine, fixed perfectly true with the shaft, and from this centre are turned on the edges to a perfect circle, so as to revolve in exact concentricity to the cylinder, and as all the working flats rest upon the discs the difficulty usually experienced in setting—at different points—the bends, and consequently the flats, is entirely obviated, and as the wire of each of the working flats is exactly one and the same distance from the wire of the cylinder, the most regular and perfect carding of the cotton is ensured. Another most important feature is that exactly the same accuracy and regularity can be maintained so long as the carding engine itself will work; as, when the wire of the cylinder has been ground, it is only necessary to reduce the diameter of the discs, and the flats, resting upon the latter, naturally follow the reduced radius, and are thus brought to the correct position. This is accomplished in the simplest manner, without removing the flats, and without any loss of time, as the operation is begun and completed whilst the engine is carding.

It is claimed that in this carding engine there is the most perfect mathematical and mechanical working of the flats in relation to the cylinder that has yet been introduced. It will be noticed from the sketch, Fig. 2, that the cylinder ends are secured to the cylinder shaft by means



PART SIDE ELEVATION

FIG. 3.

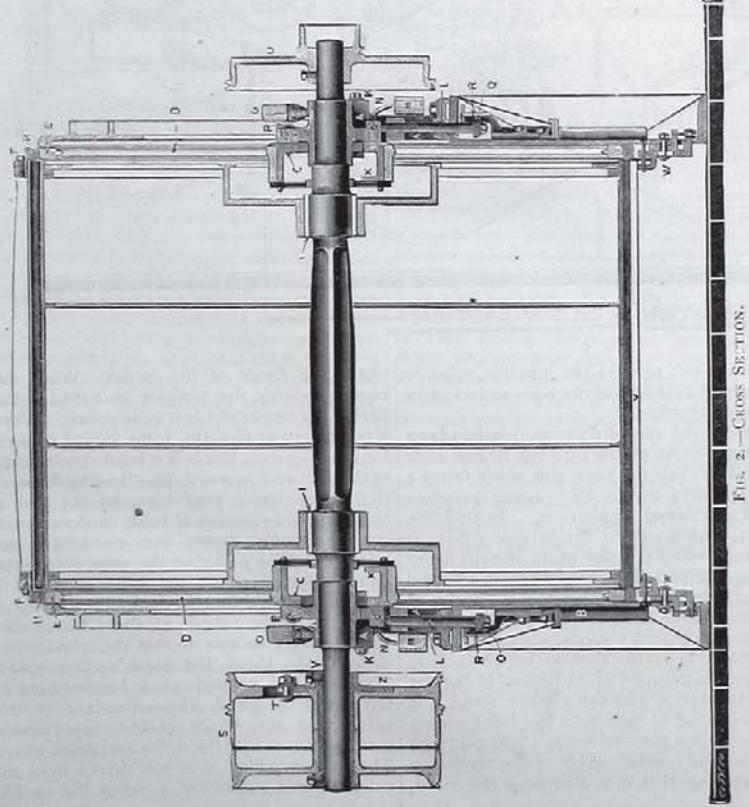


FIG. 2.—CROSS SECTION.

of the usual conical split bushes, I, driven into position. This system facilitates the removal of the cylinder shaft when necessary. The cylinder ends have been sunk in to admit of the following parts—disc D is bored out in the centre and revolves upon a bush, C, 9 in. diameter. The hole in this bush being larger in diameter than the boss, which forms the bearing for the cylinder shaft, allows space for adjustment, permitting the bush and the disc to be moved in a vertical or horizontal direction, to facilitate the setting of the flats. By means of slots cut in the pedestal and the three bolts K (see Fig. 3) passing through the pedestal A and the bush itself, and the two setting screws F, the bush is secured in any position desired. To bring the flats to this position, the tyres H are reduced in diameter by means of milling cutters G, shewn in Fig. 3. One of these placed against each tyre, at the back of the carding engine, and consequently the flats resting upon the tyres are lowered to the required distance, and this guarantees in the rim or tyre an exact circle.

The setting operation of the flats is effected by a micrometer arrangement, in the following manner:—Inside the pedestal A is an upright screw L, on the top of which rests a stud C', fixed to the adjustable bush C, and upon this bush the boss of the revolving disc, which carries the flats, works. This upright screw is cut to pitch 25, *i.e.*, there are 25 threads to the inch; thus it would require one complete turn of this screw to lower the bush, and consequently the discs and flats one twenty-fifth part of an inch. If it is required to lower the discs and flats one-thousandth part of an inch, it will be seen that to accomplish this it is only necessary to turn this screw one-fortieth of a revolution to the left, which turn is gauged as follows: At the bottom of the upright screw is fixed a worm wheel Q, containing twenty teeth, which gears into a small single worm fixed at the end of the dial stud R, so that, if the dial and worm are turned half a revolution, the twenty-teeth wheels will have been turned half a tooth, or the required one-fortieth of a revolution, which, as explained above, lowers the bush (with disc and flats) resting upon the top of the upright screw L, one-thousandth part of an inch. By making further divisions in the dial, it is, of course, possible to measure a finer setting distance than one-thousandth part of an inch, were this ever desired. The dial above referred to has notches in it, and a catch engages in same, holding it and the worm securely. The milling cutters are set by means of an exactly similar arrangement to that used for setting the flats.

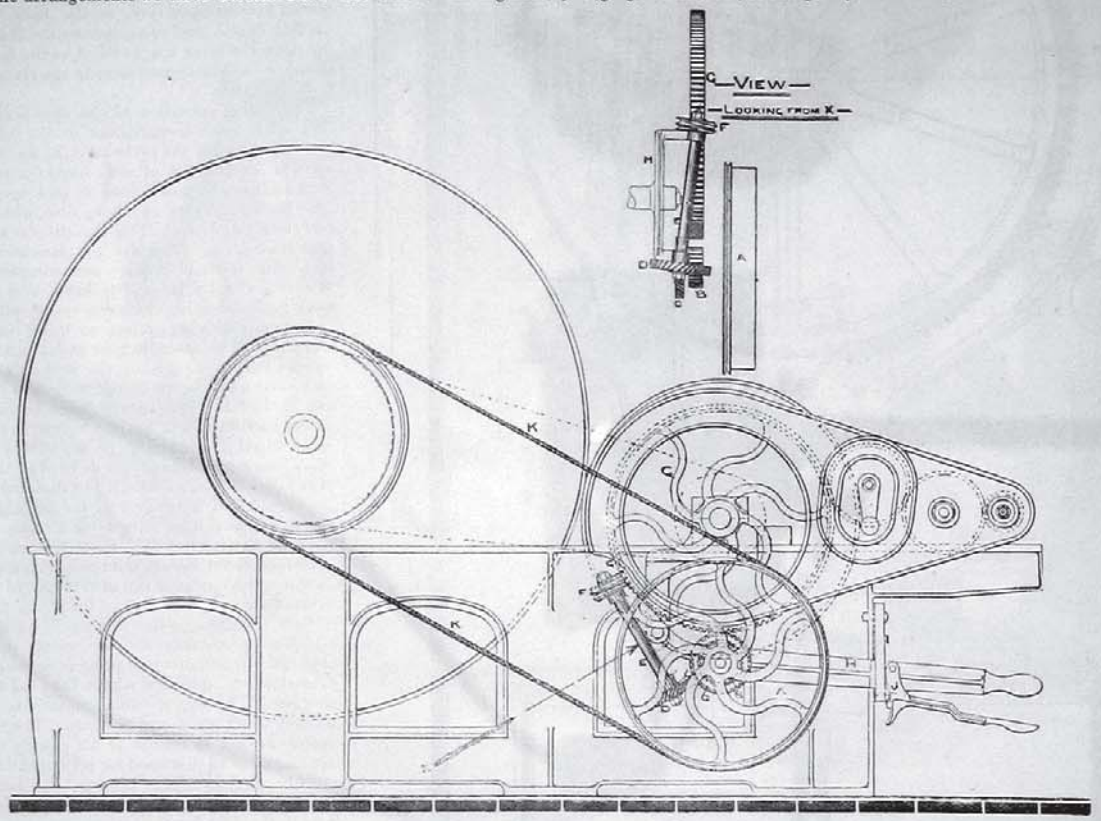
After the grinding process, the following means of readjusting the relationship of the flats to the cylinder are brought into use. The three screws K must be slackened so that the top of the upright screw L has resting upon it the stud C', and, consequently, the bush and disc. As explained above, each half revolution of the dial to the left represents lowering the flats $\frac{1}{1000}$th part of an inch, so that a complete revolution means $\frac{1}{500}$th part of an inch; two complete revolutions $\frac{1}{250}$th, and so on. The dial may be turned half a revolution or a complete revolution, or one-and-a-half revolutions, or sufficient to bring the wire of the flats into "whispering" contact with the wire of the cylinder, and careful note should be taken of how many turns it had received; then the dial should be turned as many revolutions to the right as it had previously been turned to the left, and by this movement the bush and disc are replaced to the normal position. The three bolts K are next tightened up again. Now, supposing that it has required two complete turns of the dial to make the wire of the flats "whisper" with the wire of the cylinder, this would mean that the flats had been lowered $\frac{1}{250}$th part of an inch, and, if it were considered

advisable to work the flats $\frac{1}{200}$th part of an inch from the cylinder, it is obvious that the flats would require lowering equal to one complete turn of the dial—which is effected by setting in the milling cutters to this extent—their dials receiving one turn, the principle for gauging being, as stated above, exactly the same as that for gauging the setting distance for the flats; and the working flats naturally follow the reduced radius of the disc and tyre produced by the milling cutters, the teeth of which are cross-cut in a similar manner to that of a file, and so made that they will mill off a very minute quantity from the rim of the disc at one time. Fig. 4 gives a front and side elevation of the milling cutter. Finer setting distances are gauged in the same manner, *i.e.*, by the number of revolutions of the dials.

By the arrangements we have described two important points in which wear takes place have been eliminated. It has not yet, however, been found possible to treat in the same manner the wear of the cylinder shaft bearings, which may occur in every make of carding engine. In course of time, from the pull of the strap, neglected lubrication, and other destructive incidents of machine life, the cylinder bearings will probably be found to wear appreciably, which, of course, will cause the cylinder to leave its correct position. In this card provision has been made to meet this contingency, in the adjustability of the bush, by which the cylinder can be restored to its proper relationship to the other parts of the machine. The pedestal supporting the cylinder is a fixture upon the side of the frame, and forms a permanent gauge-point for setting all the other parts of the engine, the flat course also being adjustable to the cylinder, and not the cylinder to the flat course. The position of the doffer and taker-in to the cylinder is never disturbed with this fixed centre pedestal, except when being set and adjusted to meet the grinding away of the wire clothing, and which only occurs once or twice a year. Provision is made also for adjusting the flats and discs to the position of the cylinder when any lateral wear has taken place in the bearings. Experience has shewn that it is not necessary to mill the periphery of the discs oftener than once a year, and then only very little is required to be cut away. When it becomes necessary to reclothe the card, which, with the improved clothing now in use, is a rare event, the tyre H, which has been reduced in diameter by milling, is easily taken off and replaced by a new one at little cost. To facilitate the grinding of the cylinder, each tyre is constructed with a removable small segment, J, Fig. 3, which, on being taken out, permits the grinding roller to pass beyond the edges of the wire, and so effect a thorough grinding.

An improved slow-driving motion has been introduced by which the card can be run more slowly when changing cans, and which forms a convenient slow motion for grinding purposes without additional appliances. Behind the pulley A, usually termed the barrow pulley, is the change wheel B, which gears into the doffer wheel G. Behind the change wheel is a helical wheel C, gearing into another helical wheel D, at the bottom of the upright stud E, at the top of which stud is placed a single worm F. When it is required to put the slow motion into action, the lever H is dropped to the bottom of the slot in the bracket I, and the change wheel B is thus thrown out of gear with the doffer wheel; the same action puts the worm F into gear with the latter, and revolves at about one revolution per minute—so that it is always on the move, and prevents the accumulation of cotton between the cylinder and doffer, and the consequent detriment to the wire of the latter; and, when the pinion is again put into gear at full speed—the doffer wheel being already on the move—it does not receive the sudden shock which is customary, and to which so many breakages of wheels are attributable.

When this slow motion is brought into use for grinding the wire of the cylinder and doffer, it is then driven as shewn by the drawing, viz., from the main pulley on the cylinder, by rope K, the cylinder pulley being specially arranged to be set free for that purpose. This arrangement is shewn to the left of Fig. 2. Fixed to the main shaft is a bush Y, which bush is provided with a slotted flange Z. Bolted to this flange is the main driving pulley S; the plate of this pulley has a long slot which meets the slot in the flange of the bush Y. When the card is working, the pulley S is bolted to the bush Y, by means of a bolt T, as shewn. When it is required to free the main driving pulley S for grinding, etc., this bolt T is lifted to the top of the slot and screwed up—the result being that the pulley S runs loose on the bush Y. When the slow motion is being used for grinding, the doffer makes two revolutions per minute, and the pulley on the other side of the doffer drives back to the cylinder pulley U (Fig. 2) and, as shewn in dotted lines in Fig. 5, turns the latter round at the rate of one revolution per minute, so that the cylinder and doffer make about the same surface speed. The lever H is carried on a bracket fixed to the doffer pedestal, the advantage of this being that the whole of the slow motion material moves with the doffer and doffer wheel. The barrow pulley A is not driven from the cylinder, as shewn in Fig. 5, when the card is



ELEVATION OF SLOW MOTION

Fig. 5.

in working order, but from the takers-in, as usual, the rope K being put on specially for grinding. The advantage of this motion will be recognised by spinners, as it is well known that a careless can-tenter will allow a doffer to stand a long time, and thus permit the cotton to collect and rub at the point between the cylinder and doffer, taking the edge off the wire, and often causing flat places, as before named, to form on the doffer wire, and the formation of "neps" in the web. These evils are prevented by the application of this slow motion, and as the feed at the taker-in is at a proportionately slow speed to the doffer, the sliver can be pieced up to the can at once. If it is ever desired to stop the doffer entirely, this can be done by putting the centre notch of catch J, on lever H, on to the lug in slot of bracket I, and the doffer ceases to revolve, both the wheel and worm being then thrown out of gear.

Carding engines being now run at much higher speeds than was formerly the case, in order to ensure a greater production, it has been necessary to increase the diameter and speed of the doffer, it being now usually made 24 in. diameter, and making from 12 to 18 revolutions per minute; and experience has shewn that, to suddenly put the doffer on full speed, has resulted in many breakages of doffer and barrow wheels, and it is claimed that the slow driving motion now introduced entirely obviates the evil.

Besides the points we have described, there are numerous improvements in details, which we have only space to barely enumerate. These consist of an adjustable mote knife; a sliding bracket, or tray, which, by means of one setting-screw, simultaneously sets the feeder, taker-in, mote knife, and undercasings; a strong and improved form of doffer-comb; improved calender-box, preventing roller laps, to which also Holland's web conductor is applied; a patent system of clothing the flats, and subsequent careful testing; and many other points, in which slight improvements in details have been effected.

These cards are fitted when desired with Edge's patent grinding apparatus, which was some time ago first described in our columns, and which grinds the flats from their working surfaces. They can also be supplied with another patent of the same inventor for testing the uniformity of the results after the grinding process. These inventions can also be applied to existing cards.

We have only to add that this card as now being constructed is giving the highest satisfaction in all places where it has been introduced, and the increasing demand shews that it is rapidly rising in the estimation of the trade. Messrs. Brooks and Doxey will have much pleasure in affording any further information that may be desired.

PATENT BELT EVENER FOR PARING LEATHER BELTS TO A UNIFORM THICKNESS.

MESSRS. DRONSFIELD BROS., LIMITED, ATLAS WORKS, OLDHAM.

In every mechanical appliance, or connection thereof, in which motion, whether revolving or progressive, is the the normal condition of working, it is desirable to make this as uniform as possible. Everything out of balance, or that tends to throw other things out, is a disadvantage, and on economical considerations ought to have this condition altered, or tendency prevented. There is one field in which irregularity of action, though well known to exist, has only hitherto received scant attention. This is in the transmission of power by belts and ropes from either prime or intermediate motors to machinery. The existence of irregularity of weight in belting is strikingly shewn in the "swagging" of the belt between the two pulleys on which it runs, yet the cause is seldom divined by those in charge. In ropes it is very probable that there is less of this defect, because in looking at large installations of rope driving, the observer is immediately struck with the steady running of the ropes. In a greater or less degree this holds good throughout all sizes of belting, and in every instance has its proportionate effect upon the machine to which it brings motive power, inducing in it the same degree of irregularity of action. The sudden acceleration or diminution of speed that results is sure to produce defects in both yarns and cloths in all the textile trades, and defects of a corresponding nature in the work of other machines.

Of course we are fully aware that other causes contribute to the production of this kind of irregularity as well as the unevenness of the belt; but if the latter can be got rid of a chief cause will certainly have been removed.

We have pleasure in drawing attention to a newly invented machine, just now being placed upon the market by Messrs. Dronsfield Bros., Limited, Oldham, the purpose of which is to enable the belt manufacturer, or the users of belting, to pare off the irregularities, and so to minimise the mischief that springs from them. The accompanying figure is an illustration. The drum A, which is fitted in adjustable bearings, is set by the hand wheel C to the required position to suit the thickness of the belt. The distance of the drum from the fluted roller B determines the thickness of the belt. By turning the handle the belt is drawn between the roller B and the drum A, and comes in contact with the knife placed immediately behind the roller. The upper roller is fitted to rise and fall, according to the varying thickness of the belt, and is pressed down by strong springs fitted on each bearing. As the belt is passed through, the knife cuts off all the thick portions of the belt which project above the required thickness, and thus the belt is pared to one uniform thickness. The advantage of using this machine, where true and steady driving is a desideratum, will be obvious. The machines now in use are giving full satisfaction to the purchasers. It can be fitted with driving pulleys instead of handles when desired. It has a capacity for the reception of belts up to a width of 12 inches. The durability of a belt which has been made even in this machine will be increased because of the relief obtained from the burden caused by thick and heavy portions which induce strain and uneven running. The makers will afford any other desired information to applicants.

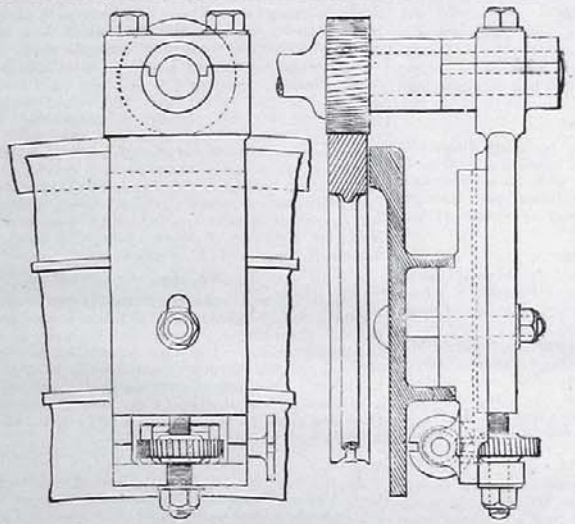
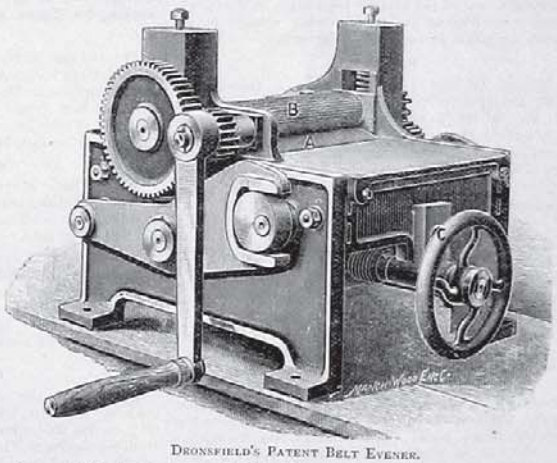


FIG. 4.—FRONT AND SIDE ELEVATION OF MILLING CUTTER.



DRONSFIELD'S PATENT BELT EVENER.

ARMITAGE'S PATENT SCROLL TAPPET.—We understand that Messrs. Robert Hall and Sons, machinists, Bury, have acquired all the rights in this patent tappet. The appliance is for the production of spotted effects upon fabrics, for a great range of which it is very effective and economical, hardly costing as many shillings as dobbies do pounds. Messrs. Hall and Sons will furnish any other desired information.

A RUSSIAN Factories Society has decided to represent to the Ministry of Finance the expediency of making a rule that only persons familiar with the Polish and Russian languages should be eligible to be managers of factories; and another rule providing that the same person cannot be manager of more than one factory at the same time.

THE Central Provinces Swadeshi Cotton Spinning and Manufacturing Co., Limited, of Nagpur, India, started its machinery "a complete success" on New Year's Day, according to a telegram despatched by the company to Messrs Brooks and Doxey, of Manchester, who have supplied all the ginning, blowing room, carding, and other preparation, spinning, reeling, and bundling machinery.

News in Brief.

ENGLAND.

Ashton-under Lyne.

The Minerva Spinning Co., when completed, will contain 52,320 weft and 34,176 twist spindles, or a total of 86,496 spindles. The whole of the machinery is being supplied by Messrs. Hetherington and Co. Limited, Manchester.

Barnoldswick.

The partnership between Messrs. Nutter and Edmondson, cotton manufacturers, Long-Ing Shed, has been dissolved. The business will in future be carried on by Mr. T. S. Edmondson. Mr Nutter has taken the space for 400 looms, which is being provided by the Calf Hall Shed Co. in their new extension at Calf Hall.

Blackburn.

The weavers employed at the Canterbury-street Mill struck work on Monday morning in consequence of alleged bad material, but on Tuesday they resumed operations.

The weavers, about 500 in number, representing nearly 1,000 looms, who struck work at Messrs. W. Almond's Moorgate Mill three weeks ago, in consequence of alleged bad material and breach of contract with respect to an increase of wages at the rate of 1s per loom, held a meeting on Tuesday, and decided to return to work. They went to the mill at breakfast time on Wednesday morning with the intention of resuming operations. The employers, it is alleged, discharged two of the leading supporters of the work-people, whereupon the latter bodily refused to re-commence work, and again left the mill.

Bradford.

Messrs. William Fison and Co., of Greenholme Mills, Burley-in-Wharfedale, the firm with which the late Mr. W. E. Forster was connected, on Monday night gave a dinner to about 50 guests at the Midland Hotel, Bradford, in celebration of the fiftieth anniversary of the establishment of the firm. Among those present were Lord Colville, K.T., Mr. Alfred Illingworth, M.P., and Mr. H. Byron Reed, M.P.

Bury.

The Daisyfield Mill, Elton, and the mills of Messrs. J. K. Schofield and Co., Bury, have resumed work after the holidays, each place having been stopped for about a week, the latter in consequence of a breakdown of driving power.

During the year just past the Bury and District Card-room Hands' Association have had an increase in membership of 700, the total membership now being 1,420, and an increase in funds of £252 18s 0½d. The income was nearly £1,000, and the expenditure about £740, while there had been paid in benefits to the members nearly £300. The Weavers' Association has increased in membership from about 2,300 to over 4,000 during the year.

Derby.

Mr. J. S. Smith, C. E., one of the inspectors of the Local Government Board, will hold an enquiry at Derby, on the 14th instant, into the proposal of the Corporation to borrow £12,000 for the purpose of extending the School of Art (recently presented to the town by the trustees) and converting it into a technical school.

Halifax.

On Saturday morning Mr. David Smith, head of the firm of David Smith and Sons, Halifax, succumbed to an attack of bronchitis, at the age of 72.

On Monday the Technical Instruction Committee of the Halifax Corporation met to decide upon the final selection of plans for the new Technical Institute to be erected opposite Belle Vue, in Hopwood-lane. Eight sets of plans had been sent in for competition. A sub-committee had previously gone through the plans, and their recommendations were adopted by the committee. The first place in order of merit, with a premium of £50, was given to the plans of Messrs. Jackson and Fox, architects, George-street. The second place, with a premium of £25, was given to the plans of Messrs. George Buckley and Son. The estimated cost of the building is £11,890. The competition was limited to local firms.

Heywood.

Mr. Isaac Hoyle, M.P., with Mrs. Hoyle and some members of his family, have gone to the Riviera. After a short stay at San Remo they will proceed to Naples and Sicily.

Huddersfield.

The people of Huddersfield and the district learned with deep regret that on Saturday Mr. Edward Huth died at his residence, Oakfield Lodge, Edgerton. For five or six years the deceased gentleman had been in failing health, and for the past eighteen months he had been confined to his bed, and finally he was seized with congestion of the lungs, from which he died. Mr. Huth was a native of Wiesbaden, Germany, where he was born in 1816. He came to England at the age of 24 years, and shortly afterwards became a naturalised Englishman. Forty-five years ago he settled in Huddersfield, and there he and the late Mr. Fischer entered into partnership as woollen cloth merchants in the German and Austrian trade, and that partnership was continued until the death of Mr. Fischer, in 1879. Since then the business has been carried on by Mr. Huth and his sons. Soon after settling in Huddersfield he took an active interest in the promotion of the education of the people, particularly in technical matters. He was president of the Mechanics' Institution in 1863, 1865, and 1866, and was afterwards for many years a vice-president or a member of the committee. His knowledge of Continental trade and tariffs made him a valuable member of the Huddersfield Chamber of Commerce, of which he was for some years on the Council, and was at one time a vice-president. He was one of the fifteen gentlemen appointed on the Commission of the Peace for the borough upon its incorporation. Mr. Huth was a Unitarian. He was a gentleman of cultured intelligence, broad views, and independent thought; and though an ardent Radical, he severed himself from the Liberal party when Mr. Gladstone came forward with his Home Rule Bill, and became the first president of the Liberal Unionist Association.

Liversedge.

Yesterday week, at the Dewsbury Police Court, a man named Greaves, one of those on strike at Messrs. Briggs's dye-works, was fined 40s. and costs for kicking another man in order to compel him to desist from working for Messrs. Briggs.

London.

Mr. George Richards, lately managing director of Messrs. Geo. Richards and Co., Limited, engineers, of Broadheath, near Manchester, who retired from that position last June, has established the Richards Machine Tool Co., with offices at Suffolk House, Laurence Pountney Hill, E.C.

Manchester.

Messrs. John Munn and Co., 53, Fountain-street, Manchester, have admitted into partnership Mr. John Roddan, son of their late partner, and Mr. George William Winkfield.

It is announced that the partnership between Mr. John Noton and Mr. William Higginbotham (Thomas Noton and Sons) has been dissolved, and that the business of the firm of Thomas Noton and Sons has been taken over by Mr. Higginbotham and Mr. W. J. Ashworth. The reconstituted firm will retain the old name.

Mansfield.

In respect to the recent dispute in the silk hosiery trade at Sutton-in-Ashfield, near Mansfield, the secretary of the federation has received a communication from the Board of Trade, and efforts are being made to return a complete reply as to the cause of the dispute. A deputation is to be sent to London early next spring to give evidence before the Labour Commission, and in the meantime circulars are being sent out to various places asking for particulars which will enable the deputation to describe exactly the position of the hand-made hosiery trade in the district. It is understood that they will be instructed to express an opinion in favour of the establishment of an independent board of arbitration or board of arbitration composed equally of masters and men as the best means of preventing or settling labour disputes.

Meltham.

Fire broke out on Wednesday evening on the premises of Messrs. Joseph Taylor and Sons, Spinkmires Mill, Meltham, and damage was done to the amount of between £5,000 and £6,000.

New Mills.

On Tuesday a fire broke out at the cotton mills belonging to Mr. Francis Rowbottom, and raged for nearly an hour. Fire engines arrived from Hayfield, Birchdale, and Watford Bridge, and the apparatus belonging to the Brunswick Mill rendered good service. Two storeys were nearly gutted.

Nelson.

On Tuesday morning a fire occurred at Newbridge, near Nelson, on the premises of the Barrowford Room and Power Co. The premises, which were erected last year, are tenanted by Messrs. C. Stevenson and Co., with 700 looms, and Messrs. Wilson and Hartley, with 200 looms. The main building is a three-storyed one, twenty-two windows in length, and has the engine-house adjacent to it, and a shed to hold 1,600 looms in the rear. The fire broke out in the twisting-room, which is situated at one end of the top storey of the main building. It was caused by the accidental ignition of some healds. Information was despatched to the Nelson Fire Brigade station, and in twenty minutes the brigade were playing upon the fire. They could, however, only prevent the extension of the fire to the shed and engine-house, and the main building was completely gutted. It included the warehouse, and the stock and other articles in the portion tenanted by one of the firms is valued at £9,000. The damage to the building will probably not come under £6,000. About 300 people are thrown out of employment.

Milnrow.

Mr. J. Franklin has this week severed his connection with the Garfield Spinning Co., of which he has been manager for several years. Mr. Sparks, formerly manager of the Empire Spinning Co, Oldham, has been appointed to the vacancy, and Mr. W. Schofield, of Oldham, has received the appointment of salesman, and he will also represent the Ellenroad Spinning Co. in a similar capacity.

Oldham.

The Cotton Buying Co. has a profit on the quarter's trade of £948, from which the directors recommend the payment of a dividend of 6s. per £100 on members' purchases, and 3s. on non-members'.

Mr. Edwin Booth has been appointed mule overlooker at the No. 1 Mill belonging to the Oldham Twist Co., in the place of Mr. James Brierley; while Mr. John Wood, of Shaw, has received the appointment of mule overlooker at the Earl Spinning Co.

Mr. John Wilkinson, who for several years has held the position of secretary and salesman to the Prince of Wales Spinning Co, has been appointed to a similar position under the Earl Mill Co., which is a new company, whose mill is about to commence work.

An extraordinary general meeting of the shareholders of the Bankside Spinning Co. was held on Tuesday evening, in the House and Mill Co's. rooms, Union-street, for the purpose of considering the position of the company. After due deliberation, a resolution was passed to the effect that it was advisable to wind up the company, inasmuch as it could not, by reason of its liabilities, continue its business. Mr. James Dawson, accountant, Union-street, Oldham, was appointed liquidator, to act with a committee of inspection consisting of Messrs John Cheetham, J. Kauntz, T. Coates, and C. Kershaw.

Preston.

The report and accounts of the Oxhey Cotton Spinning and Manufacturing Co., Limited, have been issued. There has been a net profit of £1,066 on the half-year's working. The usual depreciation has been allowed, and the machinery maintained in an efficient condition. The directors recommend the payment of a dividend at the rate of £5 per cent. per annum, absorbing £406 7s. 6d., leaving £1,723 17s. 10d. to carry forward to the next account.

Ramsbottom.

At the Ramsbottom Spinning and Manufacturing Co.'s Union Works Mill, Stubbins, Ramsbottom, the repairs to the engine were completed by noon on Tuesday, and work was resumed.

Most of the mills and works in Ramsbottom resumed work on Monday after the holidays, the exceptions being the ironworks, the paper mill, part of the Stubbins' printworks, and one or two mills at which repairs were taking place.

The fortunes of the little village of Nuttall, near Ramsbottom, have been of a varied and somewhat chequered character. Owing to the stoppage of the mill and its subsequent uninviting condition, the place was in truth an exemplification of Goldsmith's "Deserted Village." However, when the Nuttall Manufacturing Co., Limited, took over the concern, the mills were renovated, the houses beautified, and gradually its wonted busy-bee-hive-like appearance came back again. The new *régime*, however, was faulty in construction, for only about three years have sufficed to bring about its dissolution, with the loss, after paying the whole of the debts in full, of the whole, or pretty nearly so, of the capital invested. The entire concern has been transferred to Messrs. A. and T. Rymer and Sons, of Manchester, and the mill will be run under the title of Messrs. Brooks and Co. The mill at the Nuttall end is being managed by Mr. John Geldard, manager to the late firm, but the Manchester part of the business will be taken in hand by the owners. The machinery, it is said, has been bought out from Mr. J. G. Lawson, of Nuttall Hall, and there is under the new firm every prospect of more regular time being worked by the employés

Stalybridge.

The strike at the mills of the Stalybridge Spinning Co continues without any signs of a settlement. The directors, in their report for the past quarter, during which time the mill has been closed, state that they have received from the Employers' Association £1,131 as compensation for the loss through the stoppage, and a further sum of £187 10s. towards paying a dividend of five per cent, but they add that the apparent loss to the company is £38 18s. 7d.

Stockport.

The Stockport Technical School was on Monday evening formally transferred to the care of the Corporation of that borough. The Executive Committee will now consist of members of the Town Council and representatives of various educational agencies in the town and district.

Tyldesley.

An amicable settlement has at last been arranged between the weavers lately on strike at Messrs. James Burton and Sons' Mills, Tyldesley, and the employers, with the result that work was resumed on Monday morning. In future payment will be made according to the Blackburn standard list, by which wages are regulated. The settlement really is a victory for the masters, who were perfectly justified in reducing their employés when it was found they were being over-paid. Messrs. Burton and Sons employ 230 weavers.

SCOTLAND.

Crieff.

Messrs. Hay, woollen manufacturers, Earnvale, Bridgend, are making extensive alterations and additions to their premises. A large engine is being erected, and a stalk, 60 feet high, is to be built. Several of the buildings are to be enlarged.

Dundee.

Mr. Thomas H. Cox, of Maulesden, near Brechin, and one of the senior partners of Messrs. Cox Brothers, Camperdown Jute Works—the largest jute manufacturing works in the world, employing as they do 5,000 hands—died yesterday week at his residence, Duncarse. Deceased had been away from business for only a fortnight, although he had been in failing health since his wife's death some three years ago. A Deputy-Lieutenant and a J.P. for the county of Forfar, Mr. Cox was also a director of the Northern Assurance Company and several local companies. His generosity to the Established Church was unbounded, and besides erecting St. Luke's, Lochee, and contributing largely to its Endowment Fund, he renewed Lochee Parish Church, and provided an organ and a hall at a total cost of £8,000. A little over a year ago his firm presented Lochee with a public park at a cost of £16,000, and a couple of years before, the late gentleman gave £12,000 to establish and endow a Chair of Anatomy in the Medical School of University School. Mr. Cox, who was 74 years of age, has left no family, but his brothers, William and George, and several of his nephews, are still in the firm.

Forfar.

The women weavers in the employment of Messrs. John Lowson, jun., and Co., Victoria Works, engaged on narrow looms, have this week been paid an increased rate for weaving. The increase is 3d. per cut on plain goods and 2d. per cut on twills, or a rise of something like 7½ to 10%. The firm's rates of wages were already the highest in the town. The recently published tabulated statement of weaving rates did not affect Messrs. Lowson's work so far as weavers are concerned, as the rates compared were for weaving jute, while the fabrics turned out in Victoria Works are flaxes.

Glasgow.

Messrs. F. H. M'Leod and Sons, wool brokers, Glasgow, have removed to the stores and offices occupied by the late firm of Messrs. Girdwood and Forrest, wool brokers, at Bishop Gardens, No. 61, Bishop-street.

The following table gives the value and destination of the exports of cotton and linen goods from the Clyde for last week, and also the totals of the previous week. The first line refers to *cotton* goods, and the second to *linen*:—

U.S. & Canada.	W. Indies and S. America	Australasia.	African.	Continent.	Totals.	Totals previous week.
£14,347	3,667	259	810	—	19,083	25,228
11,495	530	28	20	129	12,202	15,515

Lanark.

H.M.'s Chief Inspector of Factories has appointed Dr. Prentice, Lanark, to the office of certifying surgeon for the district of Lanark, rendered vacant by the resignation of Dr. James Ewing.

It is gratifying to report that the Ayrshire lace trade is busy just now, the dreaded injury of the McKinley tariff not having yet shewn itself. The fact is, in the matter of quality the Americans cannot cope with Ayrshire and Nottingham.

The negotiations for a new treaty of commerce between Spain on the one hand and Germany and Austria-Hungary on the other will begin at Berlin immediately. As soon as they are concluded, that with the Netherlands will be undertaken.

Miscellaneous.

A VISIT TO LEEK.

(By our Special Commissioner.)

It is a comparatively easy matter for the traveller by road or rail to visit the three leading centres of the English silk trade, making several calls in each, within the space of a couple of days. Macclesfield, Congleton, and Leek are a few hours' walk of one another, and minor centres, such as Sandbach and Middlewich, where the silk trade was formerly conducted, are within comparatively easy reach. Buglawton, near Congleton, has one throwing mill, while at the last-named centre there are over a score of firms engaged in throwing and manufacturing. All this information I elicited from the driver of the vehicle, which on Saturday last conveyed a small party from Macclesfield to Leek, *viâ* Bosley and Rudyard Lake—the sheet of water which is said to have suggested the name of the novelist. The route referred to leads through some of the prettiest roadside scenery in England, the country undulating considerably for the greater part of the distance. The most remarkable thing about Leek itself in the eyes of many visitors is the double sunset, seen by the spectator standing in Leek churchyard, which is about six miles from the hill known as the Cloud, and which he faces as the sun is setting. The hill is almost perpendicular on the northern side, and at the time of the summer solstice the sun seems to cut the edge of it so nicely as to produce the effect referred to. The craggy and precipitous rocks and the lofty hills, some of which are 1,600 feet high, in the neighbourhood, furnish sufficient attraction to the tourist apart from the manufactures of the town. As it was with the latter that I was chiefly concerned, it was disappointing that on the day of my arrival many of the authorities whom I most desired to consult could not be found. It was not difficult, however, to arrive at a fair idea of the extent of the silk industry, which almost entirely employs the labour of the moorland town. Leek enjoys the reputation of being practically the only textile town in Staffordshire. At Cheadle, ten miles away, Messrs. Wm. Chorlton and Co., the silk crape manufacturers of Manchester and Droylsden, have a branch factory. There is a cotton mill at Newcastle, and a smallware factory of about 400 looms, with bleachworks, at Tamworth. These are practically the only establishments of the kind outside of Leek, although the vast population of the county, exceeding a million, is engaged in other branches of manufacture at Stoke and the Pottery towns generally. Silk in Staffordshire is a small industry when compared with the vast coal and iron interests of the county; but there are over fifty firms engaged in the trade in Leek alone for all that. The water supply is of the best, the high lands which traverse the county arresting the vapours blown across the country from the Atlantic, and ensuring an abundant supply of moisture. Staffordshire in parts is in fact much too moist. It is a rough, breezy, hilly district in the north, where the doors of the dwelling-houses, as found at Bosley, require to be of ponderous weight and size to withstand the fierce gales which sweep over the neighbourhood in winter time. Like other silk towns, the character of the trade conducted in Leek has changed considerably during the past half century. Fifty years ago there were several large establishments for twisting and doubling, the number of silk mills being seven, which, with one cotton factory, employed 844 hands. The population in 1831 was returned at 10,780. It is now about 15,000, so the place has not grown much. The trade of the town was established by Macclesfield men, and at one time it possessed over 400 hand looms for broad silks, and power looms. There were in 1884, according to Mr. Wardle, about 30 hand looms and 300 broad silk power looms, the chief productions of the town being, however, sewing silks and twists, fringes and embroidery silks, buttons, galloons, ferrets, Prussian and other bindings, webs, braids, serges, handkerchiefs, mufflers, brocades, and damasks. Sewing silks are preëminently the speciality of the place, and it is in connection with this branch that the manufacturers display the greatest enterprise. There is one throwing mill, but Leek has never held a strong position for the output of throwns, the present trade being probably as great as it has ever been. There are only a few cottage hand-looms in Leek, and about thirty factory hand-looms. The weavers appear to be intelligent men as a rule, their characteristics shewing several points of strong divergence from those of Macclesfield, twelve miles away. On the whole, Leek appears to be in a much stronger position than Macclesfield. Its dyers and manufacturers are men of enterprise, who seem determined to keep up their "end of the plank," no matter how others may fare elsewhere. If they could only persuade the sleepy officials of the North Staffordshire Railway Company to provide a better service of trains north and south, the town would be benefited considerably. The last train from Manchester leaves at 5.30, at which hour the Leek business man must hurry home or stay in the city overnight. On Saturdays there is a train at 7-30, *viâ* Stoke, a circuitous route which brings the traveller to Leek, a distance of 31 miles, in four hours! It would be better to "get out and walk," a wish often expressed by persons using the N.S. service. Staffordshire men, however, must be a patient class of humanity, for a friend residing at a small village on one of the N.S. loop lines — the company's lines all seem "loops," being spread out like the arms of an octopus, with Stoke as the centre—tells me he has practically only one train a day from Manchester. I do not know whether to believe him or not, but all things are possible on the N.S., which allows Macclesfield Station to remain a disgrace to the town, while those of the North-Western, on the line to Manchester, shame it in comparison. But this is digressive.

Leek formerly furnished employment to large numbers of women and children throughout the country side in connection with the production of Florentine buttons. At Fiash and on Biddulph Moor, hand-made buttons of three-cord silk twist mixed with mohair are still produced largely; and the mohair braid trade is an important one, the wholesale houses of London, Glasgow, and Manchester being largely supplied by the enterprising manufacturers of the town, who boast—and with much reason—that they can beat the foreigner, who is not able to exercise his "weighting" arts so extensively in connection with this branch of our industries. *Apropos*, Sleigh, in his "History of Leek," states that the earliest incidental allusion to the staple trade of the place is an entry in the churchwardens' accounts, dated June 21st, 1686: "Collected then for the ffrench Protestants, in the parish of Leeke, in ye county of Stafford, the sum of £6 5s." The poor hunted creatures who had been driven from France by the brutality of the *Grande Monarque*, or of his advisers, in 1685, had evidently reached the moorland town, upon which, in return for its hospitality, they conferred lasting benefits by introducing ribbon manufacturing and ferreting. We have seen several times, during the course of these articles, that the Huguenots proved benefactors to their benefactors in other parts of the country. It would be a good thing for this country if, through a modern Louis Quatorze, we could receive another supply of such desirable immigrants. Such fortune, we fear, is not to be ours again. Apparently the only contributions which the Continent cares to make to our population consists of Russian and Polish Jews, with other undesirable races. It is said that James Horton, of Coventry, was the first weaver of figured ribbons in Leek, about 1800, and Mr. Sleigh adds that one Ball, early in the century, commenced the twisting of sewings in the town.

Leek, in 1839, possessed 150 broad looms and 186 engine looms, one half of which, however, were idle. The hand-loom weavers were engaged on black, checked, or figured silk kerchiefs, and a few *gros de Naples* and fine figured gown pieces were also turned out, together with good plain black ribbons and

silk serges. These were intended for the better class of home trade buyers, and each firm throwed its own silk, weaving or twisting it, and disposing of their goods, by their own agents, to the retailer, or occasionally to the warehouseman. Much of the trade in tailors' goods is even now transacted direct, instead of through wholesale houses; and the manufacturers of the town have frequently expressed annoyance at being compelled to sell goods for export to merchants in the first place. Leek, it will be remembered, produced the champion in our own day of the cause which advocates the marking of foreign silks with the name of the country of origin—a suggestion which, of course, is aimed at the "middleman," but which does not promise to be carried out. That it should be made, however, seems to indicate that Leek men are fond of quarrelling with the merchants. Mr. Wardle states that, according to current tradition, the first silk dealers in Leek were pedlars, who made their own goods. He recommends manufacturers to sell silks direct to the Colonies, as there would, he thinks, be less need of weighting. If Leek is able to provide the capital which shippers require, and to run the risks they are constantly incurring, it may be able to do this. Long credits, extending sometimes to twelve months, have to be given in the Colonial trade, and occasionally a shipper is required to finance a shaky customer. Will the Leek manufacturers desirous of cultivating a direct trade with the Colonies care to do the same? We fancy not! It is a pity that so much is said by friends of the silk trade to rouse the opposition of the merchants of the country. With reference to the dyeing trade of Leek, the beautiful raven black is still a speciality of the town. The Churnet water, which runs by the town, possesses qualities which, it is thought, assist in producing this result, and when black ribbons were turned out extensively this dye assisted to keep up the trade.

I have been unable to obtain figures shewing the number of dyers at Leek at the best period of the trade. There are now, however, about 400, a number which exceeds that of Macclesfield, Coventry, Spitalfields, or Derby. There are, no doubt, large numbers of silk dyers in the Bradford district, so that it would be unsafe to say that in Leek the industry is more important than in any other centre. The dyeing trade of the town is nevertheless an important one, as the figures given abundantly testify. Richard Badnall, of Leek, is said to have been the first to apply sugar for weighting. The saccharine adulterant will increase the weight of the silk by from one to three ounces per lb. Bichloride of tin, however, is now preferred, as it possesses a chemical affinity for the silk fibre. The dyeing trade of Leek, already spoken of favourably, is not confined to supplying the requirements of local manufacturers. On the contrary, the dyers of the town work for every silk centre in the country, and also secure business from abroad.

When the broad trade of Leek was flourishing there were many Irish employed, but these afterwards removed to Manchester or Macclesfield, leaving natives or long residents in the factories. The prices paid for weaving handkerchiefs were by the dozen, other broad silks by the yard, and ribbons by the piece of 36 yards. Messrs. Ellice Russell and Co. paid as follows:—

Black Sarcenet Ribbons.

2	4	6	8	10	12	16	20
7½d.	9½d.	11½d.	1s. 1½d.	1s. 4d.	1s. 7d.	2s. 3d.	2s. 10d.

Plain Black Bandana Handkerchiefs.

32 in.	34 in.	36 in.
5s. per doz.	5s. 6d. per doz.	6s. 6d. per doz.

Black Barcelonas, 3 threads.

26 in.	28 in.	30 in.	32in.	34 in.	36 in.
4s. 6d.	4s. 6d.	5s.	5s.	5s. 6d.	6s. 6d.

Fancy Hankerchiefs.

From 6s. to 16s. per dozen, according to quality and pattern.

The broad silk weavers in 1834 endeavoured to get a formal agreement among the masters to a list of prices. A principal house said they would pay the men's list if others would. This was not agreed to, however, and there was an unsuccessful strike, two men being tried at Stafford for it. At one time embezzlement of the silk at the factories prevailed at Leek to an enormous extent, receivers being found readily for the stolen goods. The reputation of the workers, however, has on the whole generally been high. The following list gives the approximate earnings of the silk hands at the present time:—Weavers, 7s. 6d. to 9s. per week; doublers, 10s. to 11s.; twisters, 25s.; spoolers, 4s., 11s. to 12s.; pickers, 15s.

The braids made in the town include silk braids and mohair braids, the output of the latter being by far the most important. St. Chamond has interfered with the prosperity of the former branch by the introduction of heavily weighted goods, with which it has flooded the English markets. In the production of mohair braids, however, Leek is able to hold its own against all comers, and broad and narrow woollen braids are also produced largely. The braids are, of course, made by machine plaiting. Spool and box making are now industries worth note in Leek, and although Italian linings have greatly injured the serge trade, silk serges are still produced.

Speaking generally, Leek has maintained its position as no other English silk centre has, during the recent years of depression in the silk industry. The commencement of the cheap sewing silk trade by Mr. Lister and others who used *schappe*, affected the town, but the pure silk article being stronger has again resumed its hold. German and Manchester bindings and braids may be said to interfere with the business of the manufacturers, but the sewing silk trade, the staple industry of the town, is scarcely touched by outsiders. This is a fact of which few other towns can boast in connection with their principal industry.

SOCIAL GATHERINGS.

MESSRS. PLATT BROS. AND CO., LIMITED, OLDHAM.

The annual dinner in connection with the machine erectors' department at Messrs. Platt's works was held on Saturday evening, at the Hartford Hotel, Werneth, when a company numbering between seventy and eighty sat down to an excellent repast. The after-proceedings were presided over by Mr. William Hilton, foreman over the speeds department; and Mr. Napoleon Duckworth, foreman over the fitting department, occupied the vice chair.—The Chairman, in the course of his opening observations, said he thought they might congratulate themselves that during the last year they had had a very fair share of the labour in their particular line of business. (Hear, hear.) Messrs. Platt always kept their hands pretty well employed, which was the best sign about their orders, and the number they had on their books. He had glanced over the work that day, and he found that they had done better during the past year than the preceding. They were doing a very considerable portion of the machine making of the world, as they always had done during the last twenty-five or thirty years. (Hear, hear.) The firm of Messrs. Platt had equalled almost all other machine-making firms combined—that was to say, that their turnout had been equal to, if not more than, the whole of the machine making firms in this country. (Hear, hear.) He did not say this in any spirit of boasting. The establishment required it. It had increased and progressed to such an extent that it was necessary they should do much more than their competitors to keep themselves fully employed, and he hoped they had not seen the day yet when they would begin to go backwards, or when hey would have reached the zenith of their power as machine producers. (Hear, hear.) The outlook for the current year was very encouraging, and they might congratulate themselves that at any rate the year they had just entered upon would prove no worse than the one which had just died. (Hear, hear.) Those present that night were the representatives of the principal departments for the erection of machinery made at Messrs Platt Bros. and Co.—that was, all the various classes, including cotton, worsted, woollen, silk, merino, and everything which came within the range of spinning and manufacturing. The productions in their departments penetrated almost to the utmost limits of the earth, throughout all civilised nations, and their men were sent out to erect their machinery. That spoke volumes for Messrs. Platt Bros. and Co. (Hear, hear.) In Australia a new company had recently been started, but their firm had been sending woollen machinery there during the last twenty years. He thought that when the whole had been said that could be said, the firm of Messrs. Platt Bros. and Co. held the premier position as machine makers in the world. (Hear, hear.) He hoped it would be long before they would lose that position. They would never lose it, to his mind, until the whole of the British nation declined, and that was not likely to come yet awhile. (Hear, hear.)—The Secretary (Mr. Alfred Davies) read letters of regret from various gentlemen who were unable to attend the gathering, including Mr. W. Richardson, sen., Mr. James E. Platt, Mr. Dodd, Mr. J. W. Nuttall (directors of the company), Mr. Henry Platt Hall, and Mr. W. H. Richardson, jun., who wrote as follows:—

Derker, December 31st, 1891.

Mr. A. Davies.—Sir,—Kindly convey to your committee that I cannot be present at the yearly gathering, on the 2nd instant. That this long-established reunion of shop mates will pass off with its usual heartiness and success is an assured fact, but I venture to predict that even this record will be broken under the genial conditions with which each man will take his seat, when he recalls that it has been a year of unbroken employment for all. With regard to trade, I am glad to say that our firm have, in spite of keen competition, been exceptionally busy during the past year. Indeed, many of the departments have had to undergo considerable extension to meet the heavy demands made upon them. This pressure of business has not applied to any particular speciality or machine, but embraces the whole of the textile machinery used in a cotton mill, beginning with the initial machine or bale-breaker, and so on, to the mules or ring frames. This is a very satisfactory, and at the same time a most important fact, as it clearly indicates that the great investors of capital in cotton spinning concerns are fully convinced of our proved ability to make, not a portion of the machinery required, but to entrust us with their complete orders for all that is necessary for the equipment of modern concerns. The prospects for the ensuing year are not so encouraging as they might be, but let us hope that the various causes that have led to what we trust is only a temporary depression in the cotton trade will be quickly ameliorated, and disappear with the advent of the new year. To commence with, it is a cheering feature to know that the local mills, including the Pine, Holly, Peel, Ellen-road, and Pearl Spinning Companies, representing about 500,000 spindles, and which are all on our order books, are rapidly approaching completion, and for the most part ready for the delivery of machinery. With such a substantial list at the outset, seconded by the determination of each man to fully maintain our prestige for workmanship, we may look forward with every confidence to the future. With the wish that all assembled will enjoy a happy and prosperous new year,—I am, yours faithfully,

Wm. H. Richardson.

—The assembly then proceeded to transact the customary annual business of electing the committee and officers for the arrangement of the anniversary, which was followed by the usual loyal and other toasts, which were honoured with true Oldham heartiness.

MESSRS. F. REDDAWAY AND COMPANY, PENDLETON.

The annual entertainment which Messrs. Reddaway and Company give each Christmastide to their employés was duly observed on Tuesday of last week. Mr. Reddaway, as we have previously indicated in these columns, is the founder of his own fortune. It is nearly 20 years since he established the business, which has now grown to such large proportions. During that time the progress has been steady and permanent; and during the past year further extensions have been made, another mill, situate in Lissadel-street, and adjoining the old mill, having been purchased by the firm. The original mill in Cheltenham-street is now used entirely for warehouse and office purposes, having undergone a complete re-arrangement. Several new branches of industry have been added to the firm's well-known productions, and we have no doubt that Mr. Reddaway will meet with as great success in the new articles as has hitherto attended him in his well-known manufactures of machine beltings and canvas hose. The arrangements for the comfort of the work-people at the new mills have been well considered and carried out, the rooms being well heated, and separate dining rooms for men and women provided.

As is usual with these annual meetings, the Pendleton Town Hall presented a very animated and attractive appearance. It had been neatly decorated, the body of the hall and platform being arranged with great taste. Mr. Reddaway occupied the chair, and was supported on the platform by about 50 invited guests. A sumptuous dinner was served, after which

Mr. Jacob Williams, who was cordially received, said: I am wishful to introduce briefly at this stage of the proceedings the usual toast of "Success to the firm of Frank Reddaway and Co." (Cheers.) To most present it seems but as the other week when this room rang with an enthusiastic welcome home to Mr. and Mrs. Reddaway after a long voyage. Since then a year has elapsed, and many things have happened. For one thing we have had during the past twelve months the advantage of Mr. Reddaway's personal attendance each day at the mills—(hear, hear)—which has proved of great

benefit. This has been an unusual occurrence; but if his peregrinations have not been as extensive in 1891 as in former years, his movements in other respects have been none the less active in providing facilities to cope with the incessant increased demand for his goods. (Cheers.) Within the past few months additional premises in Lissadel-street have been secured, and with the sweeping energy characteristic of Mr. Reddaway's actions the principal portions of the operations are well-nigh complete, so that the concern will not only be in a position to meet all the requirements for which it is renowned, but will stand unrivalled in the commercial world in regard to its particular and well-known specialities. (Cheers.) The superiority thus attained would not have been accomplished without close and continuous mental and physical hard work on the part of the proprietor, who has made it the ruling practice of the establishment to look especially to the quality of the work produced, to the purposes it would serve, and to the appreciation of it by others. (Hear, hear.) Such high standard of excellence has its merits, and is bound to bring in its train its ultimate reward, as is evidenced in the enlarged measures already taken to meet the current wants of the market. (Cheers.) Mr. Reddaway's ambition in his particular manufactures is on a par with that of an ex-President of an extensive rail works where about 7,000 men are employed. The President was asked what was the secret of such a development of business as his. "We have no secret," was the answer; "we always try to beat our last batch of rails; that's all the secret we have, and we don't care who knows it." (Cheers.) With all the ingenuity necessary on the part of the employer, much depends upon the intelligent care and skill of the workman; and if those representing the several departments in Mr. Reddaway's employ will each aspire to a similar ambition, and do his and her duty faithfully and well and to the best of their ability to excel in what they do, they will be contributing their substantial share in maintaining the uniform superiority of the productions, and will thus add to the continued success of the company and to the permanency of their own employment. (Cheers.) Our reasons for proposing success to Mr. Reddaway are, firstly, because of the high-class material he produces, which works to the direct advantage of the users themselves; and, secondly, because his enterprises furnish remunerative employment to a large number of people, and thus, whilst increasing our means of enjoyment, contribute to the general welfare of the community. (Cheers.) I want you, therefore, to join heartily with me in wishing continued prosperity to Mr. Reddaway, with health and long life, coupled with the name of Mrs. Reddaway and family, adding specially that of the young scion who has recently appeared on the stage, and who, it is hoped, will be spared to play his important part in time to come as "Frank Reddaway and Son," perpetuating a name as wide as the world is round and as honoured as it is as widely known. (Cheers.)

Colonel WALKER supported the toast in a few well-chosen remarks.

Mr. REDDAWAY, on rising, was heartily applauded, and the company sang, "He's a jolly good fellow." He said: My friends,—Again we are able to meet and make merry together at what has become from long usage our annual celebration, and to everyone present I offer the heartiest welcome it is possible to extend, and express the hope that you will so enjoy the evening that its pleasant memories may carry you right on through the New Year, so that whatever Time may have in store for us we shall look back to it as a bright spot in our lives, cheering us onward with hope. A year has almost gone, since last we met together. How it has sped to each one present is only known to yourselves. Sorrow and grief has touched some, and to those I offer my sympathy and wish them, with all my heart, freedom from such trials during the coming year. To others now present it has been a year of gladness, and to these I would wish an uninterrupted continuation of that blessing. To a very great extent it lies in the power of the individual as to whether happiness or misery shall be his or her experience in the future. . . . With regard to business, I have not very much to say beyond this—that, taking advantage of the opportunity, I have incorporated another mill into the firm's property, making a total of five mills, all engaged in civilising the world; and I think we are now in a position to belt the earth at the rate of about 6,000,000 feet a year. (Cheers.) All we require is to retain the markets we have by sending out goods which will sustain and perpetuate the high reputation we have acquired through quality alone. (Cheers.) Now to you belt weavers, one and all, I will say, continue to do your best, believing that every pick you put in helps the prosperity of the firm; and let me see who among you will bear away at our next meeting the prize of £5 for the best work during the year. I have pleasure in now offering this prize, and shall have very much more in presenting it to the successful man. (Cheers.) With our hose-piping we protect from fire many cities and towns and millions of pounds' worth of property. I am glad to observe that the demand for cheap rubbish is decreasing, and that the better grades of hose are now in much greater demand. (Hear, hear.) We have a prospect before us of better times in this department. Here, again, no other point should be considered except that of quality. There is not the slightest reason for any hose weaver to scamp his work; he can earn 35s. weekly if he choose, but to further encourage him I shall have very much pleasure in presenting to the weaver at our next meeting a prize of £5 for the best hose produced throughout the year. (Cheers.) That is to say, all hose will be carefully examined and tested, and the best will win. (Hear, hear.) I will be the sole arbiter in these matters, and I hope that in all cases the man most deserving the prize will receive it. (Cheers.) At the same time let the faint-hearted never despair, for should there be a good second he shall not go unrewarded. (Cheers.) Now my endeavour to rouse a feeling of personal interest in your work should be accepted in the same spirit in which I offer it to ensure its successful working, and I commend it accordingly. To those employed in the other departments in my mills I would most strongly urge their continued careful attention to their work, and never to forget that on the quality of the goods they are making depends the continuation of our prosperity; and in concluding my remarks as applied to your work all round I will ask each one to give his or her very best attention to the work in hand, so that no shadow may ever fall across that reputation I have laboured so long and successfully to acquire, and which it is my most cherished desire to maintain unbroken by any blemish, so long as the name of Reddaway is connected with the business. (Cheers.) This brings me to the point at which I might take you into my confidence for a few minutes, and tell you that there have been times when, wearied by the cares of business, I have seriously asked myself why I should continue in it. This question has been answered in a most emphatic and satisfactory manner by Mrs. Reddaway, who on December 21st presented me with a son. (Cheers.) What this means to me can only be understood by those who are in the position I was, and now, instead of harbouring thoughts such as I have referred to, I must buckle to more than ever, and make this business one my boy shall be proud to succeed to. (Cheers.) My most ardent wish is that he should grow up and take his place amongst our greatest men; and if you ask me who is the greatest man, I answer, the best; and, again, if you require me to say who is the best, I would say, he that deserves most of his fellow creatures. (Cheers.)—He then submitted the toast, and in conclu-

FRANK REDDAWAY, ESQ., J.P.

sion thanked them all for the manner in which they had received it.

A musical entertainment with recitations followed, and capital dance music was provided. Mr. Reddaway provided a magic lantern entertainment in one of the adjoining rooms. The views represented interesting incidents and scenery taken by Mr. Reddaway himself during his travels last year in the various countries he visited. Mr. Reddaway illustrated the views personally, and proved an admirable lecturer.

During the early hours of the morning supper was served, at which were present several of the invited guests and officials of the firms.

Complimentary telegrams were also received from the firm's branches abroad, together with others from various parts of England.

THE WORK OF THE PATENT OFFICE.

Although the year which has just closed has not been an eventful one, so far as the work of the Patent Office is concerned, there has been no lack of enterprise on the part of inventors. On the contrary, there is a very substantial increase to record in the number of applications for patents—an increase which, with one exception, has been unprecedented since the passing of the Act of 1883. This is, to some extent, a surprise. At the end of 1889 it was found that the applications for that year had been 1,905 in excess of those sent in during 1888, this being the largest increase in any one year since the Act above referred to came into force. When, therefore, at the close of 1890 an advance of only 290 as compared with the preceding 12 months was shewn, it was assumed by many that a maximum had been reached, and that in future the annual return would be practically constant, as was the case during the few years which preceded the Act of 1883. This prediction is falsified by the particulars now obtainable, which shew a total number of applications during 1891 of 22,872, exceeding those of the previous year by 1,565. This result must certainly be considered satisfactory, except by those who hold the theory—an unproved if not disproved one—that the activity of inventors is in inverse proportion to the prosperity of trade.

Regarded merely in relation to the financial position of the Patent Office, it is undoubtedly gratifying. No statistics are as yet available to shew the actual amount of the receipts, but the increase in numbers must lead to corresponding increase in revenue. The work of 1890 resulted in a surplus which appreciably exceeded £100,000, and it is obvious that—as the operations of the office have since been conducted in a practically identical manner—there will be an even greater surplus arising from the business of 1891.

It is generally admitted that the Patent Office should not be regarded as a revenue-earning department; and the question at once arises—How should the surplus be most legitimately employed? After allowing a reasonable margin for unforeseen possibilities it seems fair that the money should be spent for the benefit of inventors. The fact that the work of extending the Patent Office building has been undertaken, indicates a disposition to do this. The structure in Southampton Buildings, though of considerable size, is by no means too conveniently arranged, and indeed was never designed for its present use. Not only is it too small for the satisfactory conduct of the greatly increased work of the last few years, but it has disadvantages which seriously interfere with its public utility. Not the least of these is that there is no room in it for the sales branch, which is consequently separated from it, being located in a building in Cursitor-street. The excellent library of technical works, too, is at present very inconveniently placed on the topmost floor of the building, being alike difficult of access and limited in area. The enormous annual accumulation of specifications alone needs for its proper stowage a great wall space which the present building will soon be unable to provide. It is obvious that this invaluable collection should be made as easily accessible to the public as possible, and it is hoped that the new work now begun will include the formation of a library on the ground floor. The intentions of the Government in regard to the structural alterations have not yet become known, but as new ground has been acquired, there is reason to suppose that considerable extension is contemplated.

Amongst other suggestions for the employment of the surplus that of reducing the fees payable for obtaining patents has often been made. It is by no means certain, however, that such a step would be to the public advantage. It will be remembered that the Act of 1883 effected a substantial diminution in this direction—namely, from £5 and £25 to £1 and £3 respectively. Those who oppose any further reduction urge that no person who has an invention of worth to bring forward can be debarred by the present small sum from securing the protection he desires; and they maintain that the establishment of lower fees would, in all probability, lead to an influx of comparatively valueless matter which, while necessitating the employment of a larger staff at the Patent Office, would result in no corresponding advantage. The suggestion, nevertheless, has been so long discussed in interested circles that its adoption sooner or later has come to be considered as, at least, a possibility.

The opinion is strongly held that a part of the excess should be applied to the completion of the work of abridging and indexing specifications accepted prior to 1884, a work which, as is well known, has been long in arrear. The value of these publications to inventors and agents in facilitating search cannot be easily exaggerated. Their practical utility has been amply demonstrated; they are in demand, and their issue is favoured by the Board of Trade. For many years past something has been done in this direction, but in the early part of 1888 arrangements were made for greatly increasing the number of abridgers, and these—working under the immediate supervision of the examining staff of the Patent Office—have practically completed abridgments and indexes of all specifications printed between the years 1877-1883, both inclusive. The publication of this matter is looked forward to with much interest, and it is therefore regrettable that delay has arisen in giving it to the public. For reasons not stated, too, the work of the abridgers has been suspended, at any rate temporarily.

Textile Markets.

COTTON.

MANCHESTER, FRIDAY.

The holiday season has now closed, and business has been resumed mainly under similar conditions to those in which it was laid down. As during the first section of the holidays, so in the second, there has been a relapse of prices. The enormous weight of this year's cotton crop, coming upon a predecessor of similarly great magnitude, has so burdened cotton growers and dealers in the raw material that they find it impossible to carry stocks without exhibiting a weakness that results in a decline of values. Amidst all this, the "bull" element of the market—more particularly on the American side of the water—has continued to advance specious arguments why the trade on this side should pay higher prices for its cotton than it is doing at the present moment. The bogie being held up to view just now is a threatened restriction of the cultivation of cotton next year owing to the unremunerative prices being obtained. The cotton planter, it is alleged, is not receiving the cost of production, and next year he will plant wheat, maize, and increase his stock in hogs, rather than continue cotton growing on the extensive scale of the past two seasons. It is stated that he is thoroughly impoverished, and compelled to resort on a large scale to money lenders, who exact an enormous interest, as without the help thus derived he cannot conduct his operations. The money-lender, it is alleged, always imposes the obligation that four-fifths of the land he cultivates shall be laid down in cotton, whereas the planter's desire is that not more than half should be devoted to the fibre. Those who advance these arguments do not see that they are inconsistent with one another, because, if the cotton planters are in such financial straits as described, they will certainly prove utterly unable to extract themselves from the toils of the money-lender by the time planting must again begin. The result will be planting on as large a scale as before. The predicted abrupt falling-off in the plantation deliveries and to the ports has not yet begun, and it will be quite safe to affirm that henceforward for this season there will be the usual percentage of cotton coming into sight. On this side we are glad to see that a change of views is coming over the Liverpool market. The "impossible large crop" this year is not only beginning to be seen to be not only possible but exceedingly probable, and the writer of one private cotton circular has just turned his back upon himself in a manner that will probably induce his clients to demand an explanation beyond what he has already vouched. Throughout the market there is an increasing disposition on the part of the "bulls" to throw up the sponge and admit themselves utterly beaten.

COTTON.—We think we fairly indicated the fact that no real importance was to be attached to the trade's buying rather more freely in view of the closure of the market for the holidays, and which, it was contended in some quarters, might be the commencement of a full and healthy demand. Circumstances have already disproved it. Yesterday week a fair business was done at steady prices, and futures gained 1 to 1½ points on the day. On Friday and Saturday the market was closed. On Monday it re-opened, displaying a considerable loss of the little strength with which it closed. Though spots were in fair request they eased off in price, and futures gradually sank until they closed with a loss of 4½ to 5 points on the day. Transatlantic prices broke down on Monday and Tuesday, and met with a prompt response here. Spots declined 1/16d., and futures on the day lost 3 points, bringing values down to the unprecedented figure of 3-62. Wednesday passed with the market in a prostrate state, and prices tending easier, though quotably unchanged. Yesterday the market again displayed great weakness, and though a fair demand existed spots were reduced 1/16d., and a further heavy reduction in futures took place of 5 to 5½ points, bringing the current months down to 3 29/64d. Brazilian is in limited request, and 1/16d. lower. Egyptian has given way 1/16d. to 1/8d. Peruvian is irregular, and smooth 1/8d. lower. East Indian has been neglected, and has declined 1/8d. African has declined 1/4d. The market is utterly demoralised, and exceedingly weak in every department.

The following particulars of the business of the week are from the official report issued by the Liverpool Cotton Association:—

	Import.	Forward.	Sales.	Stock.	Actual Export.
American	94,757..	63,968.	44,900	1,235,710..	5,264
Brazilian ..	2,910..	1,031..	980..	40,590..	—
Egyptian ..	18,795..	7,998..	2,390..	114,660..	662
West Indian	3,801..	733..	1,040..	23,880..	87
East Indian	333..	1,603..	2,400 .	51,750..	460
Total ..	120,596..	75,333..	51,710	1,466,690..	6,473

The following are the values of futures at mid-day on each day of the week—American deliveries—any port; bases of middling: low middling clause; (the fractions are in 64ths of a penny):—

PRICES OF FUTURES AT 1.20 P.M. EACH DAY.

	Saturday.	Monday.	Tuesday.	Wednesday.	Thursday	Friday
January.	Holiday.	4·4 5	3·63 4	4·1 b	3·61 s	3·57 b
Jan.-Feb		4·4 5	3·63 4	4·1 b	3·61 s	3·57 b
Feb.-Mar..		4·8 9	4·3 b	4·4 5	4·0 s	3·60 61
Mar.-April		4·12 13	4·7 b	4·8 9	4·4 s	4·1 v
April-May		4·16 17	4·11 s	4·12 13	4·7 8	4·4 5
May-June.		4·20 21	4·14 15	4·16 v	4·11 b	4·8 s
June-July.		4·24 s	4·18 19	4·19 20	4·14 15	4·11 v
July-Aug..		4·27 b	4·22 s	4·23 v	4·18 s	4·14 15
Aug.-Sept.		4·30 v	4·24 25	4·25 26	4·21 s	4·16 17
Oct-Nov. .		4·34	—	—	—	—
Price of Mid. American.	—	4 3-16	4 3-16	4⅛	4 1-16	4
Estimated Sales including Spec. and Export.	—	10,000 1,000	7,000 1,000	10,000 1,000	10,000 1,500	8,000 1,000

The following are the official quotations:—

	G.O.	L.M.	Md.	G.M. M.F.
American	3 11/16 ..	3 7/8 ..	4 1/16 ..	4 1/4 .. 4 1/2
			M.F.	Fair. G.F.
Pernam			4 1/16 ..	4 3/4 .. 5 1/8
Ceara			4 1/16 ..	4 1/16 .. 5 1/16
Paraiba			4 3/8 ..	4 1/16 .. 5
Maranham			4 1/2 ..	4 3/4 .. 5
			Fr. G.F.	F.G.F. Gd.
Egyptian			4 9/16	4 13/16 4 15/16 5 1/4
Ditto white			4 7/8*	5* — 5 3/8*
	Fr. F.F.	G.F. F.G.	F.G.F.	Gd. F.G. Fine.
M.G. Broach ..	— —	— —	—	3 5/8 3 13/16 4 1/16
Dhollerah	3 1/8 3 1/4	3 3/8	3 1/2	3 5/8 3 3/4 4*
Oomra	3 3/16* 3 5/16	3 7/16	3 9/16	3 11/16 3 13/16 4*
Bengal	— —	3*	3 1/8*	3 3/16 3 1/2 3 3/4
Tinnivelly	3 3/4* —	3 13/16	3 15/16	4 1/8 — —

* Nominal.

YARNS.—Yarns have been in only the most limited enquiry, and the business that has passed has been of a meagre character in every department. Spinners in view of the further decline, are easier to deal with, but not to such an extent as to induce free operations on the part of buyers. There is, however, a fair amount of orders being held in reserve that will undoubtedly be forthcoming when some degree of steadiness arises.

CLOTH.—Much the same remarks may be made of cloth as those above, save that it is hardly anywhere quite so depressed as yarns. Still there are many manufacturers wanting orders, particularly amongst those making specialities. Favourite makers of Eastern goods are not pressed to any extent, being fairly engaged.

To-day cotton is very quiet; American is 1/16d. lower, and Indian has declined the same amount. In yarns and cloth very little business is being put through, buyers generally awaiting developments.

WOOLLENS AND WORSTEDS.

BRADFORD.—Business is still quiet, although the tone is a steady one throughout the trade. Staplers do not get the prices they ask, but remain firm nevertheless. Colonial and English wools have been in better demand. Yarns are brisker, export orders having come forward with slightly greater freedom. The rates asked by sellers are, however, higher than shippers in many cases appear disposed to pay. There is a steady home trade enquiry. For plushes the demand is regrettably small. Woollen piece goods are in average request, and further improvement is hoped for.

LEEDS.—Shipments to the French market have increased in volume, in anticipation of the new tariff. The improvement in the South American trade is partly accountable for the revival in shipments to Hamburg. Prospects of trade with the United States have improved, and a revival in the spring demand is looked forward to. Serges, unions, and meltons are enquired for by the home-trade houses, but prices have a drooping tendency. Flannels and ladies' dress goods are in steady request. Blankets are slow.

ROCHDALE.—The flannel trade is quiet, and it is not likely that there will be an improvement for some little time. The turnover is of an average character, and with the setting in of seasonable weather a continued improvement may be looked forward to. Producers are very firm, and only a fall in wool will, it is thought, weaken their position. Stocks are said to be low.

GLASGOW.—Messrs. Ramsey and Co., hide and wool brokers, in their report dated 5th January, 1892, say—*Wool:* In the wool market business has been at a standstill during the week, owing to holidays. The year opens, however, with a better feeling in the market, which it is hoped will lead to more activity shortly. *Sheep Skins:* Quantities continue well maintained, but the continued depression in the wool trade is quietening the competition, and rates were easier.

FLAX AND JUTE.

DUNDEE, WEDNESDAY.—The market opens with considerable excitement. Jute in Calcutta is again dearer. Business is being done in jute at extreme rates, while from New York the telegrams indicate an entire absence of demand at prices to justify the present prices paid for jute. On all hands one hears of proposals to stop machinery. One difficulty connected with all these proposals is that some firms have large stocks of cheap jute, and, of course, they can hardly be expected to listen to suggestions of this kind at present. The position is strained, and some little time must elapse before values adjust themselves. Yarn to-day is quoted at 1s. 7d. for 8 lb. cops, and 1s. 8½d. for 8 lb. warps. For fine yarn 3d. a pound is now the price and for the smaller sizes ⅛d. per pound more. Flax is without change in value; and spinners are acting with caution, as the qualities of this season's shipments are coming in very irregular. Flax yarn is firmer, and for good spins a little more money is paid to-day. Tow sorts remain dull and irregular in price, except the finest warps, which are held for a small advance. Jute cloth is held for an advance, but the result is to stop business, as buyers have no instructions to pay a rise. Linen goods are in fair demand, and are enquired for. Forfar and Fifeshire are both fairly employed, and full list prices are insisted on. Manufacturers feel the pinch of the more costly bleaching, as well as the firmer tone in green linen yarns. Arbroath remains exceptionally dull in all the heavier makes of coarse canvas. Dundee fancy jute goods are quiet, and the increasing price of jute tells against makers. Twines, cords, and ropes are in good demand, and makers are all well engaged.

SILK.

LONDON.—Messrs. Durant and Co., in their circular dated the 1st of January, say:—We beg to hand our annual statement of stock, imports, and deliveries of silk. You will find, as compared with last year, in bales

	Import. Incr'se.	Decr'se.	*Delivery.* Incr'se.	Decr'se.
China silk	3,062	—	—	2,179
Japan silk	1,237	—	—	711
Canton silk	—	810	—	156
Tussah silk	—	453	110	—
Bengal silk	369	—	—	243

The above figures shew in the aggregate an increase in the importations of 23 per cent., and a decrease in the deliveries of 15 per cent. The new year opens with stocks in the aggregate almost identical. The past year must have been a very unprofitable one both to the importer and distributor. Starting in January at what was reasonably considered a very moderate range of prices, there was every hope that with a normal production of the raw material, and every chance of an increased consumption, prices would at least remain firm; but the result has proved quite otherwise, for the market was allowed to drag on from month to month, notwithstanding that the early estimates received from China gave but very moderate figures for their probable export. Then came the first reports of the Italian crop, giving every reason to expect a plentiful production, which at once caused a feeling of weakness, and quickly resulted in a fall of 6d. per lb. As time went on the accounts of the progress of the crops of both Italy and China continued to improve, forecasting a large increase in the supply—this was too much for our market, and caused a further drop of 1s., which, however, had but little effect in producing business, and so all continued quiet, with a slowly drooping tendency, until the end of the year, by which time we had lost another 6d., making a fall of fully 2s. to 2s. 6d. from the opening rates of January. Foreign manufacturers were not slow in taking advantage of the very low range of prices, and all Continental Condition Houses have for some time past marked large consumption—even English manufacturers seem to be doing rather better, as our Board of Trade returns shew some improvement in the export of manufactured silk goods. One of the features of the year has been the determination on the part of the Chinese to keep moving, the continued fall in the exchange enabling them to get a very fair tael price for their silk; this desire to sell clearly shewing that their production was larger than their early estimates, again proving that these estimates cannot be relied upon. The Japan crop has also been very plentiful, and settlements to date shew large figures. The Americans have been by far the largest buyers, having taken advantage of the continued improvement in the reeling of this silk, some of the best filatures being now as near perfection as can be. Our manufacturers seem slow, however, to appreciate their merits. In Italy the crop has undoubtedly been a large one, and reelers were most current sellers till the month of November, when a syndicate was started in Milan for the purchase of cocoons; this at once gave great strength, and prices quickly advanced 1s., with the result of again checking business. The very low range to which prices had fallen was fully appreciated by American consumers, who purchased largely. Our own manufacturers also appear to have adapted themselves to an increased use of this silk to the diminished consumption of China and Japan. The present year opens with a range of prices almost the lowest on record, and as we have now received the bulk of our supplies from the East, and Italy must have realised a large part of her production, we may reasonably expect, should the present rate of consumption continue, to see diminished stocks and an improved demand for the raw material, as fashion is said to be tending in favour of silk goods.

ARRIVALS IN DECEMBER, 1891.

Bengal.	China.	Japan.	Canton.	Tussah.
3	925	43	113	114

HOSIERY AND LACE.

NOTTINGHAM.—Cotton yarns have been consumed more freely, both the net and curtain trades being buyers. Both hosiery and silk yarns are slow. Millinery, lace, and bobbin nets are steady. Orders, however, are not evenly distributed.

DRY GOODS.

MANCHESTER.—The opening of the new year has not been attended by any special activity in the warehouses. Travellers have not yet been able to book many fresh orders, but it is confidently anticipated that a larger trade in flannels and blankets will be met with shortly, owing to the seasonable weather which has set in. The demand for tweeds, serges, and worsteds has been fairly steady, and buyers have had the best of the position, prices being in many instances against manufacturers. Printed meltons are favourites still. The low prices at which these goods can be offered, together with their attractive appearance, has so far kept them to the front, and it is hoped that this steadiness will be maintained. On makers of better qualities of cloths the competition of these goods is rather severe. Carpets have improved their position. For laces the demand is very small.

Joint Stock and Financial News.

NEW COMPANY.

AINSWORTH VALE COMPANY, LIMITED.

Registered by W. J. Crossfield, 16, Marsh-lane, E.C., with a capital of £10,000 in £1 shares. Object, to carry into effect an agreement, made December 12, between P. Thomas William Knight and J. E. Hutter of the one part, and Charles Quanbust, on behalf of this company, of the other part; and generally to carry on business as spinners, weavers, bleachers, and finishers in all its branches. The regulations of Table A apply.

Gazette News.

WINDING-UP NOTICE.

The Wilton Spinning Co., Ltd., Heywood.

PARTNERSHIPS DISSOLVED.

Alexander, B., and Jaffe, S., merchants, Princess-street, Manchester, as Jaffe and Sons.

Sherriff, T. A., and Whiteley, A., soap and size manufacturers, New Wakefield-street, Oxford-road, Manchester.

Pickard, J. E., and Sons, lambswool and worsted spinners, Leicester, as regards J. E. Pickard.

Kershaw, John, and Kershaw, James, cotton spinners, Valley Mills, Mossley, as C. Kershaw and Son.

Liebrich, F. E., and Beardsell, H., wool merchants, Huddersfield.

Shackleton and Raw, manufacturers, Mount-street Mills, Bradford.

Eason, Barry, and Co., cotton brokers, Liverpool.

Bond and Riley, cotton manufacturers, Bolton, Manchester, and London, as regards J. Riley.

Pegg and Co., Morledge Mills, Derby, and elsewhere, as regards F. Swindell.

Fletcher and Leithes, rope manufacturers, Sunderland.

Patents.

SPECIFICATIONS PUBLISHED.

1890.

19,622 ELSEY and KIRK. Lace fabrics. 8d.

20,012 ELLERSHAUSEN. Treating soda waste. 4d.

1891.

57 GRANGER and DALBY. Lace machines, etc. 8d.

445 TAYLOR. Marking cotton bales, etc. 8d.

478 FOSTER and FROST. Dyeing wool, silk, etc. 6d.

918 BRIMELOW. Looms. 6d.

1,385 HAIGH and THEWLIS. Drying fibres. 8d.

1,758 VICKERMAN. Looms. 8d.

1,781 REDDAWAY. Woven driving belting. 8d.

1,799 HULME. Printing calicoes. 8d.

1,927 BEGG. Looms. 6d.

1,996 BUCKLEY. Printing calico, etc. 8d.

2,171 REDDAWAY. Driving belting. 4d.

2,183 PLATT. Steaming, etc., textile fabrics. 11d.

2,223 HALLEN and ADAMS. Loom shuttle eye machines. 6d.

2,424 LUNN. Hosiery. 4d.

2,527 HODGSON and others. Looms. 8d.

3,174 DOUGALL. Tightening belts and bands. 6d.

6,437 SCHOFIELD and ASHWORTH. Carding engines. 8d.

7,511 DECOCK. Dyeing textile materials. 11d.

8,593 HAYNES and WILCOCK. Bobbins, spools. 8d.

8,709 J. and J. BARLOW. Soaping cop bottoms, hard waste, etc. 6d.

10,446 J. and J. BARLOW. Mixing cotton waste. 8d.

13,154 JUSTICE. (*Forrester* and *anr.*) Napping machines. 8d.

13,544 TALBOT. Woven fabrics. 8d.

14,426 ASHWORTH. Braiding machines. 8d.

16,036 BROOKES (*Butler*). Knitting machinery. 1s. 1d.

16,037 BROOKES (*Butler*). Stockings. 8d.

18,826 BREIGER. Surgical bandages. 6d.

18,965 SOOTHILL. Wool combing machines. 6d.

18,966 PECKHAM. Wool washing machines. 11d.

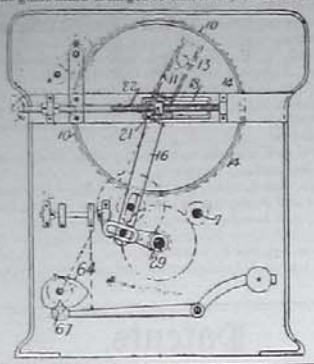
19,325 TOLAT. Yarn warping machine. 6d.

ABSTRACTS OF SPECIFICATIONS.

10,991. July 15, 1890. **Spinning**. J. BUCKLEY, 37, Adelaide-street, Southport.

Ring frames, etc.—In order that the yarn may be spun uniformly and wound into firm cops either on to bobbins or on the bare spindle, the delivery rollers and lifting rail are both driven from a wheel 10 which is connected with the wheel 14 by a pin and slot arrangement 13, 11 and, during the formation of the body of the cop, is eccentric to the latter, and is therefore driven at a variable rate. The axle of the wheel 10 is mounted in guides 18 and on the end of a lever 16, in a slot in which is mounted an intermediate wheel in the gearing connecting the wheel 14 with the driving shaft 7. On commencing a set of cops, the axles of the wheel 14, 10 are opposite to one another, and as the cop-bottom is formed the axle of the wheel 10 is moved along the guides 18, the wheel 14 being connected by worm, etc., gearing with the screw and nut arrangement 21, 22. When the cop-bottom is completed, the wheel 10 remains stationary by reason of one of the worm wheels in the train of gearing being a segmental wheel and the corresponding worm ceasing to engage with the toothed segment. In order that the yarn may be wound firmly on the nose of the cop a "die," raised slightly above the roller 67, is placed on one or both sides of the same, and the pointed end of the heart cam 64 is increased in thickness so that it will engage with it. For preventing soft yarn when commencing a set of cops, the shafts 29 and 7 may be connected by two sets of gearing having slightly different numbers of teeth and brought into action automatically as required by

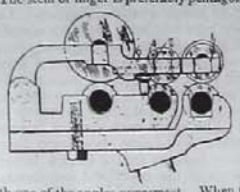
means of clutch mechanism. To prevent waste when doffing, etc., the guide board is hinged so that it may be moved from the



horizontal to the vertical position when required; it is held in the horizontal position by spring bolts. Before commencing a fresh set the yarn is wound on to the bare spindle below the cops, the driving shaft being operated for this purpose by means of a handle and the travellers prevented from rotating by means of fingers mounted on a shaft beneath the ring rail. 8½d.

11,006 July 15, 1890. **Spinning, etc.** E. TWEEDALE, Globe Works, Accrington.

Rollers and roller heads.—The support 1 of the front top roller is cast with an angular stem or finger 2, which takes into a corresponding slot in the lower part of the support 4 of the second top roller. The stem or finger is preferably pentagonal in section,



a ...nged with one of the angles uppermost. When the support 1 has been properly adjusted, the parts are secured in position by a screw 6. By the use of this arrangement the support may be made much thinner in section than heretofore, and the removal of loose fibres which may collect about the axles is facilitated. 6½d.

10,995. July 15, 1890. **Cutting pile.** J. J. MANN, Ordsall Lane Mills, Salford.

On machines of the class described in Specifications No. 16,996 (1887), and No. 16,905 (1889) in which the fabric is held at each end of the machine in tightening rollers, and is carried past the knife by a travelling carriage, the tightening rollers are carried in spring bearings. 6½d. *Drawings.*

11,055. July 15, 1890. **Bleaching; fire-proofing.** A. and B. GRATZ, St. Louis, Missouri, U.S.A.

Consists in applying to textile fabrics, such as bagging made from jute butts, a solution of a suitable chemical, such as borax, soda, alum, or chloride of sodium, while on the calender, and then rolling up the damp fabric and leaving it for the chemical to effect the bleaching action. The process is also said to render the fabric fireproof. 4½d.

TEXTILE MACHINERY, APPLIANCES, &c.—DIRECTORY OF MAKERS.

Auctioneers:
Rushton, Edward, and Son, Blackburn, and Manchester.
Salisbury & Hamer, Blackburn and Manchester.

Bandings, Tape and Tubular:
Hart, Thomas, Blackburn.

Belting:
Fleming, Thos., Son, & Co., Halifax.
Reddaway, F., and Co., Pendleton.
Rossendale Belting Co., Manchester.
Sampson and Co., Stroud.

Bobbins, Spools, Shuttles:
Dixon, John, & Son, Steeton, near Keighley.
Hall, Robert, & Sons, Bury.
Kay, John, Rochdale.
Livesey, Henry, Limited, Blackburn.
Wilson Brothers, Limited, Todmorden.

Boilers:
Fernihough, J., & Sons, Stalybridge.
Galloways, Limited, Manchester.

Braiding Machinery:
McGowan & Hadwen, Manchester.

Calenders:
Hall, Robert, & Sons, Bury.
Hoyle, E., and Sons, Limited, Halifax.
Riley, J. H., and Co., Bury.

Card Clothing:
Sykes, Joseph, Brothers, Huddersfield.
Wilson & Ingham, Liversedge.

Card Grinding Machinery:
J. Jones, Dukinfield.

Cement, Mineral Fusible:
Fox and Williams, Manchester.

Chaining Machine:
Hurst, W., & Co., Rochdale.

Cop-Tubes:
Jagger & Co., Oldham.

Cop-Tubing Apparatus:
Jagger and Co., Oldham.

Cotton Driving Ropes:
Hart, Thomas, Blackburn.

Crystoleine:
Wells, M., & Co., Manchester.

Doffing Comb Motion:
Brooks, Samuel, Manchester.

Driving Ropes, Bandings, &c.:
Hart, Thomas, Blackburn.
Kenyon & Sons, Dukinfield.

Drying Machinery:
Hall, Robert, & Sons, Bury.
Whiteley, Wm. & Sons, Huddersfield.

Emery Filleting:
Dronsfield Brothers, Oldham.

Engines:
Goodfellow, Ben., Hyde.
Musgrave and Sons, Ltd., Bolton.

Filtering Cisterns:
Nell, F., London.

Fire Hose:

Fire Pumping Engines:
Worthington Pumping Engine Co., London and Manchester.
Reddaway, F., & Co., Pendleton.

Fustian Cutting Machines:
Lockwood and Keighley, Huddersfield.

Humidifyers:
Howorth, Jas., & Co., Farnworth.
Matthews and Yates, Manchester.
Parsons, P., Blackburn.

Hydraulic Presses:
Dickinson, Wm., & Sons, Blackburn.
Hall, Robert, & Sons, Bury.
Livesey, Henry, Limited, Blackburn.

Hydro-Extractors:
Broadbent, Thomas, and Sons, Huddersfield.
Watson, Laidlaw & Co., Glasgow.

Indicators:
Orme, G., and Co., Oldham.

Jacquard and Card Cutting Machinery:
Ayrton, Wm., and Co., Manchester.
Devoge & Co., Manchester.
McMurdo, James, Manchester.

Knitting Machinery:
Harrison, W., Manchester.
Rothwell, W. & Co., Limited, Bolton.

Lattices, Pegs, Jacquard Slips, &c.:
Livesey, Henry, Limited, Blackburn.

Looms, etc.:
Butterworth and Dickinson, Burnley.
Dickinson, Wm., & Sons, Blackburn.
Hacking and Co., Bury.
Hall, Robert, and Sons, Bury.
Hutchinson, Hollingworth, and Co., Doboross, Oldham.
Livesey, Henry, Limited, Blackburn.
McGowan and Hadwen, Manchester.
Platt Brothers and Co., Limited, Oldham.
Tattersall & Holdsworth, Burnley.

Machinery (Bleaching, Dyeing, Printing, &c.):
Hawthorn, John, & Co., New Mills, Stockport.
Dickinson, Wm., & Sons, Blackburn
Heppenstall, E., Huddersfield.
Hall, Robert, & Sons, Bury.
Mather and Platt, Manchester.
Riley, J. H., and Co., Bury.
Whiteley, Wm. & Sons, Huddersfield.

Machinery (Cotton Preparation, Spinning, Doubling, etc.):
Ayrton Wm., and Co., Manchester.
Bethel, J., Manchester.
Brooks, Samuel, Manchester.
Coulthard, T., & Co., Preston.
Dobson & Barlow, Bolton.
Guest and Brookes, Manchester.
Hetherington, John, and Sons, Manchester.
Hall, Robert, & Sons, Bury.
Horrocks, John, and Son, Manchester.
Howard and Bullough, Ltd., Accrington.
Lees, Asa, and Co., Limited, Oldham.
Lord Brothers, Todmorden.
Platt Brothers and Co., Limited, Oldham.
Stott, J. H., Rochdale.
Stubbs, Joseph, Manchester.
Tattersall & Holdsworth, Burnley.
Taylor, Lang and Co., Stalybridge.
Threlfall, Rd., Bolton.

Machinery (Flax, Tow, Jute, &c., Preparation and Spinning):
Fairbairn, Naylor, Macpherson & Co., Leeds.

Machinery (Thread):
Ayrton, Wm., and Co., Manchester.
Brooks, Samuel, Manchester.

Machinery (Silk):
Brooks, Samuel, Manchester.
Coulthard, T., & Co., Preston.
Dobson & Barlow, Bolton.
Guest and Brookes, Manchester.
Hall, Robert, & Sons, Bury.
Horrocks, John, and Son, Manchester.
McGowan and Hadwen, Manchester.
Platt, Brothers and Co., Limited, Oldham.
Stubbs, Joseph, Manchester.
Sykes, John, and Sons, Huddersfield.
Taylor, Lang and Co., Limited, Stalybridge.

Machinery (Sizing, Filling, &c.)
Dickinson, Wm., & Sons, Blackburn.
Hall, Robert, & Sons, Bury.
Livesey, Henry, Limited, Blackburn.
Whiteley, Wm., & Sons, Huddersfield.

Machinery (Soaping, etc.):
Mather and Platt, Manchester.

Machinery (Woollen and Worsted):
Brooks, Samuel, Manchester.
Coulthard, T., & Co., Preston.
Dobson & Barlow, Bolton.
Guest and Brookes, Manchester.
Hetherington, John, and Sons, Manchester.
Hall, Robert, & Sons, Bury.
Horrocks, Jno., and Son, Manchester.
Lees, Asa, and Co., Limited, Oldham.
Platt Brothers and Co., Limited, Oldham.
Stubbs, Joseph, Manchester.
Sykes, John, and Sons, Huddersfield.
Taylor, Lang and Co., Stalybridge.
Tattersall & Holdsworth, Burnley.
Whiteley, Wm., & Sons, Huddersfield.

Needles for Hosiery, &c. Machinery:
Ellis, Philip, Lenton, Nottingham.

Oil:
Wells, M. & Co., Manchester.

Oil Cans and Oilers:
Jagger & Co., Oldham.

Oilcloth Machinery:
Ayrton, Wm., and Co., Manchester.

Patent Agents:
Dutton & Fulton, Manchester.
Thompson, W. P., & Co., Manchester, Liverpool and London.

Picker Steepers:
Green, James, Blackburn.

Pistons:
Lancaster and Tonge, Pendleton.

Pulleys:
Richards, Geo., and Co., Broadheath.
"Unbreakable" Pulley and Mill Gearing Co., Limited, Manchester.

Pumping Engines:
Worthington Pumping Engine Co., London and Manchester.

Roller Leather:
Meredith-Jones, J., and Sons, Wrexham.

Rust Preventives;
Wells, M., & Co., Manchester.

Shuttles:
Kay, John, Rochdale.
Livesey, Henry, Limited, Blackburn.
Wilson Brothers, Limited, Todmorden.

Shuttle Swells:
Hall, Robert, & Sons, Bury.
Livesey, Hy., & Co., Ltd., Blackburn.
Whalley, J., Blackburn.

Sizing and Filling Preparations:
Adley, Tolkien, and Co., Blackburn.
Eastwood, James, Manchester.

Smoke Consumers:
Automatic Smoke Prevention Syndicate, Ltd., Manchester.
Greaves, W. McG., Manchester.

Sprinklers, Automatic:
Dowson, Taylor & Co., Ld., Manchester and London.
Witter & Son, Bolton and London.

Steam Traps:
Lancaster and Tonge, Pendleton.
Whiteley, Wm., & Sons, Huddersfield.
Crowley and Co., Ltd., Sheffield.

Temples, etc.:
Blezard, James, and Sons, Padiham.
Brooks, Samuel, Manchester.
Hall, Robert, & Sons, Bury.
Lupton Brothers, Accrington.

Tools (Machine):
Hetherington, John, and Sons, Manchester

Ventilation:
Matthews and Yates, Manchester.
Parsons, P., Blackburn.
Pickup, J. H., & Co., Ltd., Bury.

Warping Machinery:
Bethel, J., Manchester.
Hall, Robert, & Sons, Bury.
Livesey, Henry, Limited, Blackburn.
Stott, J. H., Rochdale.
Whiteley, Wm., & Sons, Huddersfield.

Waste (Cotton) Picking Machinery:
Brooks, Samuel, Manchester.

Wool Extractors:
Jarmain & Son, Huddersfield.

Yarn Testing, &c., Machine:
Wallwork, Henry, and Co., Manchester.