2 frames the kilogramme it would cost 120 francs. Now a single factory with one printing machine costs about 200,000 to 250,000 francs. If a capital in copper only of 10,000 francs (21,000), and in the case of large factories we find some that have as many as 800,000 to 1,000,000 francs as a loss.

For some time efforts have been made to find a method of production, which will reduce the same, and with which can be employed, with the least cost and the minimum modifications, the methods of engraving that are at present in use. From 1888, M. Spirals, engineer at the National Expositions in Bucharest, and now, have been the subject of various prototypes of different compositions which cost far less than copper. After many failures, are obtained satisfactory results, sufficient to give employment to a considerable number with the addition of a little time.

Among the numerous difficulties which it has been necessary to overcome, one of the greatest has been that of the engraving or cutting of the metal. It is well known that zinc is easily modified by the presence of very small quantities of foreign bodies. So M. Djukie, working with copper, found that it was absolutely necessary to avoid arsenic. A homogenous mixture can only be obtained by rapidly running off the metal with a strong runner. This must be followed by a very quick cooling, which ought to take place as far as possible under the action of considerable pressure.

When the metal has once been obtained, it is necessary to harmonize the usual methods of engraving, with the qualities of the metal, so that this is done in the following manner—After the roller has been cast and turned to the required dimensions in the ordinary way. When the first operation is completed the metal is galvanised from a copper, nickel or cobalt, or nickel and cobalt, this combination yields the best results. Experience has shown that a layer of about 0.015 millimetres or about 0.0006 inch in thickness is necessary, in order to resist the pressure and friction effecting the engraving.

It has been observed that the important solution of the galvanic deposit was an obstacle to the general use of this method of engraving. This objection was well founded a few years ago, but at the present time a galvanic deposit can be applied at pleasure, costs less to have weight, and is applicated in a metallic layer of good thickness which is essential to the proper effect on the engraving tool. Formerly the copper was deposited on paper, and then the engraving took place. Now the metal is engraved, and only when the engraving is finished is the metal layer deposited. It is the active impregnation which may influence the copper layer, and all practical people know that many engravers when some operation which takes place to-day, the rollers are galvanised several dozen, in order to obtain different degrees of intensity, and yet the deposit adheres perfectly. Another objection which may be made is that the copper deposit is more difficult to the roller. It is also the thickness of the deposit is connected with the sizes of the galvanic deposit. This point, however, is not a difficult problem for serious consideration. The advantage of this is that the white metal is less expensive than copper. This would hold if the metal were one centimetre in thickness, but if the metal is from 3 to 5 centimetres in thickness, the advantages are considerable. To this end, the metal is applied to the roller, and when the rollers are engraved, the deposit is sufficient to cover the surface of the rollers. This advantage is further increased by the fact that the metal is not heated, and the roller is thoroughly tested and examined by the engraver before use.

This disadvantage presented by this system may be summed up as follows:

1st.—Considerable dissimilarity in the weight. This dissimilarity is owing to the difference in the density, that of copper being 8.9, and that of white metal, 7. Per cent, takes a roller deposited in the technological museum of the Industrial Society of Bucharest. This roller had under the same conditions a length of 50 centimetres, an internal diameter of 98 millimetres, a thickness of 35 millimetres, and a weight of 1 kilogramme 686 grammes. The same roller in red copper would weigh 73 grammes, or 12 per cent. more.

2nd.—Lack of production. Another disadvantage, perhaps, the most important, is the price. It is well known that the price of copper, so far as the rollers are concerned, is likely to be nearly twice as much as that of zinc. Moreover, once determined, it is very difficult to make use in some cases of the difference in density, so that under the most unfavourable conditions a loss of about 40 per cent. at least occurs by using copper compared to this white metal.

Copper required for its fusion far more expensive than zinc, copper melting at 1,092 degrees, and zinc at 907 degrees. The depreciation on the old casting is about 40 per cent. in the case of copper, and 20 per cent. in the case of zinc. Nevertheless, the difference in the capital sunk is in favour of the white metal.

The superior quality of white metal may be used for all sorts of printing, but is particularly appropriate so far as textiles are concerned, for handkerchiefs and crepe.

THE REVOLVING FLAT CARDING ENGINE.

The flats upon the Revolving Flat Carding Engine should be so placed in relation to the main cylinder that the wire clothing with which they are covered will be supported in such near proximity to the wire clothing upon the main cylinder, that the cotton fibres passing between the cylinder and the flat shall be ombred, carded, or cleaned, and laid as nearly even and parallel in their relation to one another as may be, the operation directing the cotton as nearly as practicable of short fibre, fluff, dirt, shell, and other matter incidental to the production of good yarn.

By preference the point of nearest contact is that which is known as the heel of the flat wire. This necessitates that the working, or sliding portion of the flat shall be made bevel or taper in its relation to the cylinder upon which it rests, which forms the foundation of the wire; this layer requiring specially devised tools in order to its proper construction.

In considering the flat in its relation to the cylinder we have here three especially variable elements to deal with—

1st. In order to efficient carding the points of the wire upon the flat and the points of the wire upon the cylinder require to be maintained in a sharp condition, so that no particles of loose fibre or dirt may escape. In order to their maintenance in this condition, periodic grinding is required and resorted to, hence the wires upon the flat and the wires upon the cylinder are subjected to wear, and this causes the effective con-figurability of the carding wires to be an ever varying quantity.

2nd. It is well known that in the revolving flat carding engine the flats are caused to traverse or “revolve” round the cylinder or that section of the cylinder which is covered by them, and that in their movement from back to front of the engine, they are supported by their ends resting upon what is technically known as the “Flexible band,” which in most cases forms a course upon which the flats are caused to slide. This sliding or revolving movement cannot take place without a corresponding wear of the parts working in contact, and it is absolutely certain that from various causes each flat cannot wear equally with its neighbour.

3rd. A third element of variation is found in the fact that the flats are usually ground whilst supported from special facing, not being identical with those which support the flat during the operation of carding; these facing also are subject to wear which will not be identical with the wear of the carding surfaces nor the wear of one flat equal to the wear of another.

Besides these elements of uncertainty which arise from the working of the engine, in the course of construction irregularities are certain to creep in, notwithstanding the perfection to which tools have been brought; the revolving flat card being a machine in which there are many parts that require to be made with the utmost accuracy in order to secure the best results.

Any arrangement which will tend to reduce the number of working surfaces, requiring accurate adjustment, will usually liable to change, will be hailed by both spinners and machinists as a welcome improvement in this already advanced machine, to which so much skilled attention is now being given.

Inventors and machinists are giving a great deal of thought to the question of reducing the liability to error in the working parts of the Revolving Flat Card arising from the causes mentioned, and with varying success. The relative merits of the many devices now before the cotton spinning public is not the purpose of this article to discuss, but simply to state certain leading principles which appear to be important in order to secure the efficiency which is sought. As before stated, a considerable item of variation arises from the fact that the flats are not usually ground from the same sliding surface as is at work during carding, and this is now pretty generally admitted to be an item of considerable consequence. The problem at first sight appears to be a very simple one, i.e., grind the flats from their working surface and so dispose of the "special facing" at the back of the flat as an element in the question of adjustment, and at the same time remove the source of which in the wear of the sliding part of the flat may not affect the working length of the wire between the supporting surface and the point of contact, the supporting surface being represented by the line A, and the wire in contact by the line B.

This, of course, is a solution of the question as regards the grinding of the flats, and if the points of the wires, the foundation of the wire, and the sliding or supporting surface of the flat, lay in line parallel the one to the other, the problem would be a simple one, and easily managed, but as this is not the case and, for the reasons above stated, the flats are commonly made to slide upon the surface, in relation to the points of the wires a more complex problem is involved, and how to guide or support the flats whilst grinding from the working surface so that the wire shall move in a line at right angle with the centre of the grinding roller, whilst the supporting surface maintains a diagonal position. There are many ways in which this is proposed to be done, but in the opinion of practical men, simplicity should be combined with efficiency in the accomplishment of this much-to-be-desired end; and the engine in present use for simplicity
THE TEXTILE MERCURY.

should not be encumbered with more mechanism than is absolutely necessary. It seems needful also that each flat should remain free to choose its own position in relation to the grinding roller, uncontrolled by any mechanism except that which acts directly upon its working surface. The question is undoubtedly one well deserving the very careful consideration of all users of the Revolving Flat Card. A simple and efficient arrangement by which the flats could be ground from their working surface, would not only obviate the evil arising from irregular wear of those surfaces, but would also prevent the mischief arising from wear, or the special fixtures provided for grinding at the back of the flats.

setting.

It is well known, as previously stated, that as the carding wires are worn down by grinding, the relative positions, of the flat and cylinder carding surfaces being thus changed requires to be readjusted by what is called “setting.” This can only be done by reducing the radius of the bend or flat course upon which the flats are supported whilst carding.

The requirements of a flat course are that it shall form a rigid base for the flats whilst at work, incapable of deflection from the downward pressure of the flats, irrespective of the tightness or slackness of the chain which couples them together, that there should be no lateral strain upon the bend rendering it liable to vibratory movement from oscillation, &c. The bend should not be encumbered with movable parts requiring to be replaced by others. There should be no parts liable to wear or displacement from oscillation or vibration. The bend should be simple, with the smallest possible amount of mechanism and the forestalling of fitting parts.

The setting should be done at one point only, if possible, and so more should depend upon the skill of the operator than can be avoided. The flat course should be made upon, each principle that it will always maintain an absolutely true circle concentric with the cylinder and of varying diameter throughout the life of the wire, and should be capable of infinitesimal adjustment, say to the 1/10 of an inch with facility. Periodic skimming up should be avoided if possible.

With a rigid bend provision is needed by which any wear of the cylinder bearings may be easily readjusted, although under ordinary conditions this readjustment should not be required for years.

IMPROVED CARDING ENGINE.

MESSRS. JOHN TATHAM AND SONS, LIMITED, ROCHDALE.

(KNOWLES AND TATHAM’S PATENT.)

Perhaps no machine has excited a stronger rivalry or a more extraordinary contest amongst machinists than the revolving flat carding engine. It would, however, be somewhat presumptuous in any one to declare that victory has as yet very strongly declared itself in favour of any of the loading competitors whose machines have at all become conspicuous candidates for the laurel wreath of the victor.

As is well known from many of our previous notices, the particular points that have demanded and received the greatest attention from inventors and machine makers have been—1st, the provision of a theoretically perfect flat course; that is, a course which throughout its length should maintain the chain of flats when working in a position perfectly concentric to the periphery of the cylinder; and, to combine with this a capability of the finest adjustment to permit of the rectification of the relationship of the working parts when deranged by wear and tear; 2nd, the prevention of wear in the bearings of the cylinder, or the provision of facile means of securing perfect readjustment should such wear occur; 3rd, to secure perfect rigidity in the flats when in their working position; 4th, to secure the working surfaces of the flat ends, and the bends upon which they move from wear; and 5th to secure the most perfect grinding of the flats by grinding them from their working surfaces. The respective makers have their several plans for dealing with these various points, but our present task is to draw the attention of our readers to those adopted by Messrs. John Tatham and Sons, and which are incorporated in their improved revolving flat carding engine which owing to these changes has become a strong aspirant for a first place in the estimation of the trade.

The first improvement incorporated in Messrs. Tatham’s card, to which we call attention, is the improved flexible bend, the invention of Mr. Thomas Knowles, of Bolton. In this arrangement Mr. Knowles constructs the fixed bend of a peculiar form, making it, not as usual concentric to the cylinder, but upon such a line as would if continued, form a helix. Upon this is mounted the flexible bend, the inner surface of which corresponds to that of the fixed bend constituting as it would if continued an internal helix. Its outer surface on the con-
News in Brief
FROM LOCAL CORRESPONDENTS AND CONTEMPORARIES.

ENGLAND.

Ashton.

Many of the mills in the town have adopted automatic sprinklers. The Whieldons Twist Co., Messrs. Samuel Newson and Co., Ltd., and J. N. and A. Hasley have decided to adopt them, while other local firms are considering the merits of installing them in the future.

Barnoldswick.

The machinery at Well House Mill is advertised to be sold at the subject's rooms in the cotton corner, and a resolution was carried recommending the Executive to call a special meeting of members to alter the rules so as to enable the committee to give assistance.

Bolton.

The Cotton Twist Company (Messrs. Rylands and Sons), commenced running short time last week, in the spinning department.

The iron trade in the town continues very brisk, overstocking extensively resisted. Messrs. Deacon and Barlow, machinists, have orders in hand for about 25 months, the orders being nearly all from the continent and America.

Colne.

The County Select Committee, appointed by the Chairman of the District, has placed on the Commission for the Parish of the County Lancaster the names of six new cotton growers. Messrs. Robert Shaw, Cols., J. Bowery, Nelson, William Peate Robinson, and Henry Rushton, are the committee.

Darwen.

The following gentlemen's names have been placed on the Commission for the Peace for Darwen: Messrs. A. C. Rose, and John W. Shorrocks, Longmoss.

Farnworth.

The technical committee held this week's winter session, and are being well patronised.

Trade here is reviving, a lively, and manufacturers are looking for a better time. Messrs. Petts and Sons, who have several factories, have increased the price of cotton at all their factories, and have raised the price of the goods.

Messrs. Purdy Bros. and Co., manufacturers, have closed two days this week, owing to a breakdown of the engine.

Messrs. Irlam and Co., manufacturers, have finished brickworks on which they have been working for some months, and have completed their new reservoir.

Mr. William Crompton, of this town, has succeeded in gaining the highest position in the honours grade at the recent examinations in weaving, held under the auspices of the City and Guilds of London Institute, being awarded 3s. 4d. and a silver medal. This is the second time Mr. Crompton has taken a medal, the other being for the 1st position in the ordinary grade.

Two Scotch machinists at the Albert New Mill have been taken out of work, and are being replaced by new ones.

Leeds.

A new warehouse and factory is being erected on the Chippendale estate of the Roy Family, manufacturers. The building is a large, well lighted, and combined with the improvement, the character of the buildings of this estate.

The Honorary Students' Association have initiated a movement for the collection of books for the benefit of the students. A number of the leading honours' manufacturers have also formed a committee to assist in carrying the project to a successful end. The committee appointed the architect.

Mr. W. H. H. Clifford, Chairman of the Oldham Master Cotton Spinners' Association, has just paid a visit to this town, and, by the courtesy of a few firms, has met some of the most interesting ladies and gentlemen. He has expressed himself as greatly impressed with the magnitude of the industry in this district, and highly pleased with the reception he received.

Macclesfield.

The Mill and Technical Colleges School has been visited by the Mayor and Guilds of London Institute Examinations. In the subjects of "silk weaving" and "silk throwing," the students of this school for the year won less than six silver medals, two bronze medals, 4s. 6d., but in mechanics, and four certificates, the majority being in the honours grade. Some splendid examples of weaving were executed by students in advance for the press in the honours grade. The master of the weaving school in Mr. J. R. P. W. (Biller), and the weaving master at the Preston and Blackburn Technical Schools, the master of the mill school to Mr. W. W. Walmsley.

Manchester.

Mr. S. Bibby (Messrs. Sharpe and Son) Limited, Liverpool, was in town on Wednesday.

D. E. Anderson is managing the branch just opened here by Messrs. Williams and Sons, Liverpool, of Forfar.

No news has yet been received of David Duff, the jute agent, who arrived several months ago with nearly 4,000,000 of other people's money.

Mr. William Hicks, who represents Messrs. Thomas, Lewis and Sons, Leeds, and D. and R. Duke, of Broomhill, has removed from York Street to 13, Musgrave Street.

Messrs. Campbell, Smith and Co., London, the contractors for the decoration of the Franchise Theatre, have ceased work on the pit with which our earnings are being paid out of the receipts. The happiness of the audience is naturally improved in such circumstances.

The announcement that Messrs. T. W. and Co., Limited, have opened a warehouse in London, has given great encouragement to the trade in this country. The step is a bold one, and the result of the various interpretations of the law is yet to be seen. The committee appointed to examine the question of the rights of the manufacturers has been meeting. The result of the discussions must be even more favorable than this, and that the name of the country has not been in vain.

Mr. C. L. Mann, whose premises were injured by the recent Portland-street fire, has been released from his imprisonment by the local government. Messrs. Henry Widdow and Co. of the same firm, have increased the price of cotton at all their factories. Messrs. Widdow and Co., Limited, of Darwen, manufacturers of Axminster, Westmoreland, are.

Oldham.

A notice has been posted at the County End Mill, Lees, indicating that the new mill would probably close Thursday night for an indefinite period.

The mills of the Coldburnt and Anchor Spinning Companies did not recommence work on Monday, following the Wakes holidays, and on account of repairs to the engines not having been completed, but were carried on in a limited way. The Grove was also in a similar position.

Mr. Ezekiel Hawkins, late manager of the Woodville Spinning Company, has been appointed manager of the Hathern Spinning Company, vice Mr. R. G. Shaw, who has vacated the position of manager and salesman of the Quick Edge Spinning Company, in which the management will be undertaken by two of the directors.

The former were previously referred to the large number of orders which Messrs. Platt Brothers and Co., Limited, and Messrs. A. A. and Co., Limited, cotton and woollen manufacturers.

As an illustration we learn that a spinning company in the town decided an early delivery of canvass machinery, but in consequence of being unable to obtain this, they had to consult a firm elsewhere, who were able to deliver the goods on the terms required.

The promptness of the Stamford Spinning Company speaks creditably of successfullynost the new venture, notwithstanding that many hesitations before taking up work in any undertaking on the Yorks and Leeds route, have been overcome, having 2,369,000, out of the £60,000 capital required, consisting of 1,200 of £50 each, subscribed for. So sure are they that the matter that prevarication is being made for engrossing the construction of the new mill, and the following was appointed the architect.

News in Brief