Machinery and Appliances.

IMPROVED CARD.

MESSRS. JOHN HETHERINGTON AND SONS, VULCAN WORKS, POLLARD STREET, MANCHESTER.

We resume our notice of this card, and in doing so may dwell briefly upon a point not brought forward in our last, namely, the method adopted by Messrs. Hetherington to obtain a well-constructed flexible bend, and to restore it after any subsequent wear and tear.

On the importance of having every part of the working surface of a flexible bend exactly concentric with the cylinder it is unnecessary to dilate. The best condition, and we may say the condition essential for securing good work, is that in which the wire of all the flats resting on the bends shall be brought as uniformly close to the wire upon the cylinder as possible without touching, and shall so remain throughout every portion of their traverse over the cylinder. It is equally necessary that this uniform space between the two surfaces should also be maintained throughout the length of the flats, or across the face of the cylinder. Should contact take place at any part the cotton will be nepped; should the space be increased the flat will cease to work at that portion and the cotton will be rolled. This shows the necessity of the bends being constructed and arranged so as to render the course of the flats resting upon them perfectly concentric with the cylinder. This could be readily obtained, but it becomes more difficult when it is found that provision must be made for an adjustment of the relationship of the parts rendered necessary owing to the wearing down of the wire upon both cylinder and flats. This wear requires that the latter shall occasionly be brought nearer to the periphery of the cylinder, which can only be done by reducing the flexible bend to make it correctly represent a true section of a smaller circle. To obtain this result was an exceedingly difficult problem and puzzled mechanics and inventors for a long time. An approximate success was obtained, but little more, until the invention of an appliance by Messrs. Hetherington, which was named a "Flexible-bend Trueing Machine."

The sources of error and difficulty in the case are numerous. For instance it is required that the pair of bends for each card—one for each side—shall be uniform in strength and elasticity not only throughout each but with one another. The weight of the flats causes a deflection and this may not be alike in each bend, the result being that the flat may be properly working on one side and not at the other; or be working properly at one part of the traverse and nepping the cotton, or not working at all in another. In springing the bends in the process of resetting also the bends are liable to buckle and so destroy the uniform level of their circular surfaces, thus causing the flats to be lifted from their work in passing these uneven places. In order to overcome these and several other difficulties, the trueing appliance was invented. Its mechanism and method of working is shown by the following illustrations, Fig. 1 showing a side view, and Fig. 2 a front view, of so much of the card as is necessary to illustrate the working of the appliance. The cylinder, uncovered with clothing, having been placed in position, the bends BB, which have been turned a little larger than requisite, are fixed in their proper working positions. To obtain the deflection due to the weight of the flats, they are weighted by the rods and weights Y at the points shown. It may be well to mention here that the deflection of a beam weighted in the middle is exactly the same as if twice the same weight were spread uniformly. Knowing the weight of the flats, the weights Y are easily determined to give exactly the same effect. To the cylinder is attached, temporarily of course, the trueing-up apparatus, consisting chiefly of the milling cutters H—one for each bend—and both on the same shaft G. The cutters are driven from a temporary pulley and the band F through the shaft E. The toothed segment X, with the worm and gearing on bracket O, temporarily attached, is actuated by the bands shown. This part of the arrangement is the feeding motion. It turns the cylinder very slowly, and in the course of a few hours' work the milling cutters will have passed from one end of the bends to the other, accurately trueing them over their whole lengths, taking out all the irregularities due to the uneven springing, buckling, and weight of flats. For trueing the bends of existing carding engines the milling cutters are carried by an arm (Fig. 3) which is fixed on the shaft W. The flats are removed, and the apparatus, which clears all the brackets and fixings on the engine, trues up the existing bends in the same accurate manner. The patentees have thus improved a large number of carding engines with revolving flats, enabling them to turn out much better work than formerly.

FIG. 1.

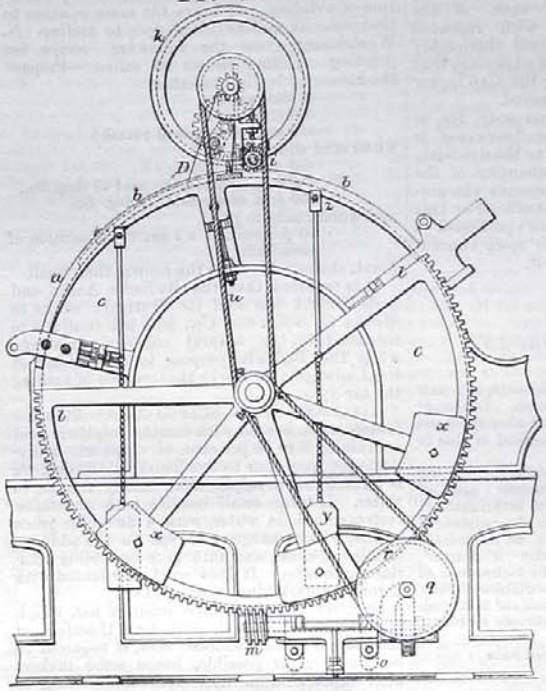


FIG. 2.

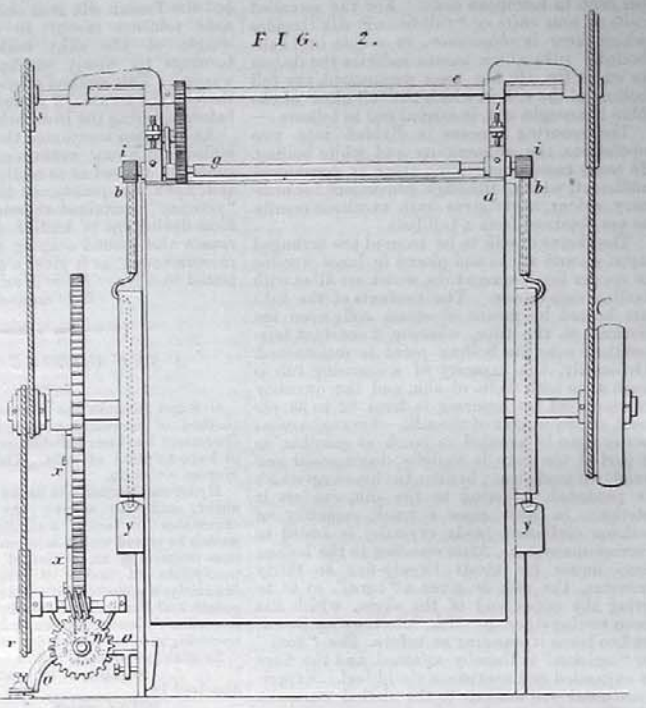
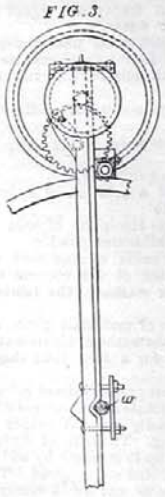


FIG. 3.



Having dealt with the leading features of its construction we may now examine an important adjunct for maintaining the perfection of its original condition. This is the grinding apparatus. When the increased attention of which we spoke in our last issue began to be devoted to the card it was soon found that the method of grinding was radically imperfect, because what was called the grinding surface of the flat could never, under any conceivable conditions of the working life of the card, be a duplicate of the working surface. Yet this is exactly what it was bound to be if it had to be placed in the best condition for grinding. Seeing that this could not be obtained and maintained, it soon appeared that the only thing to be done was to devise means of grinding the flats from their working surfaces. Very soon a number of minds were bent towards accomplishing the solution of this problem, and, as is usually the case, more than one method of getting at the result was devised. This indicates a great step forward towards obtaining the best theoretical results, making, as it does, good work independent of irregular wear in the ends of the flats, as when the latter are ground from their working surfaces they must perforce be alike.

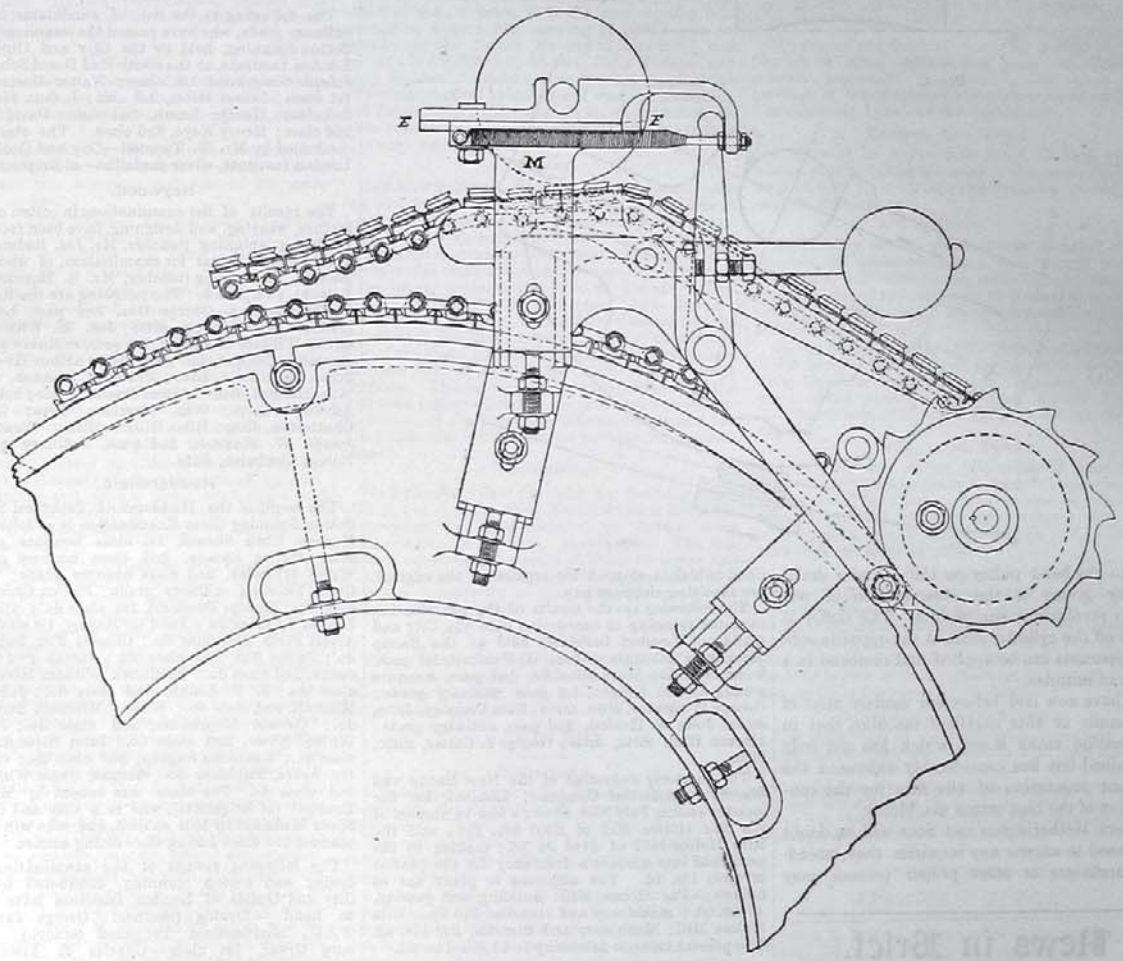
The grinding apparatus, invented by Messrs. Hetherington, is illustrated in figs. 4, 5, and 6. The problem to solve is stated by the inventors as follows :—

"To obtain the desired 'heel' in the flat the two ends of the flat are cut as indicated by the line A B, Fig 5, and it is evident that if no special provision were made, and the flat were pressed against this surface during the grinding, the clothing would be ground, as shown by dotted line X Y, parallel with the line A B, and spoiled by having all the heel taken out. Up to the present it has been customary to prepare a second surface, C D, upon the back of the flat, parallel with the surface of the points of the clothing, and upon these surfaces the flat slides during the grinding. Both the surfaces A B and C D gradually wear, and that unequally; so that only a few of the flats can be set to the cylinder, and the others are at some distance and cannot be adjusted, and consequently are making imperfect carding. It is thus of the first importance to maintain the relation between the surface A B of the flat and that of the points of the wire clothing absolutely equal in each flat. To arrive at this, however, it is necessary to find a means of grinding from the surface A B, and at the same time to preserve the angle between this and the surface of the clothing. We have invented and patented the following mechanism, which completely accomplishes this end:

Upon each side of the card are fixed two pieces, M and G H, Fig. 6. The piece G H is fixed, and the curve on the under side of it corresponds with the curve upon which the flats work while carding; the top portion, E F of the piece M, is formed to a certain angle corresponding with the curve G H, and this part can be regulated up and down according to the length of the wire of the clothing of the flats, without changing the angle formed with the part G H. The bearings of the grinding roller are made to slide upon the surface E F, and the movement is controlled by a cam-wheel of the form required. This cam-wheel turns along with the flats, and has a tooth for each flat which passes. The flats, on arriving under the piece G H, have the clothing exposed on the top of them, are pressed up by a lever on both sides with their surface A B, Fig. 5, against the curved surface of the piece G H. As soon as the first needles of the clothing of a flat arrive under the roller, the roller bearings commence to slide upon the piece E F in the direction indicated by the arrow, the flat moving in the opposite direction; it is thus ground upon all its width to the desired angle by the sliding movement of the roller. The height of the clothing remains equal on each flat, notwithstanding whatever wear there may be of the flat ends. The grinding of one flat being finished, the grinding roller, whilst opposite the space between the flats, returns to its first position without touching the next flat until this has arrived at the position in which it is to be ground.

This card carries 104 flats. The star wheel contains 13 teeth, thus each tooth submits to the grinding roller 8 flats and the same tooth the same 8 flats continuously and no other. This is a further advantage as it secures absolute uniformity in the grinding of every flat, as in the operation each flat is thus always ground from the same seat. The cam wheel referred to above is also a duplicate of the star wheel and acts correspondingly on the grinding roller. As indicated above, the cam wheel acting on a compound lever draws forward the bearings of the grinding roller whilst the flats are travelling backwards, each part thus travelling half the distance of the width of the wire of the flat. The lever holding the flats in position against the piece G H is not rigidly held, so that in the

Fig. 4.



event of any derangement taking place it would yield and prevent breakages.

The firm have also invented a new slow grinding apparatus on the differential principle which can be applied to any existing card. It consists of two internal wheels, connected by two spur wheels, one of the internal wheels being held. The spur wheels fit on an eccentric which gears the spurs into the internals and carries them round the stationary internal wheel, the eccentric being actuated by means of band pulleys from the loose pulley on the cylinder shaft. On the differential wheel is a grooved pulley from which the power is carried

Fig. 5.

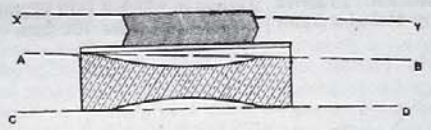
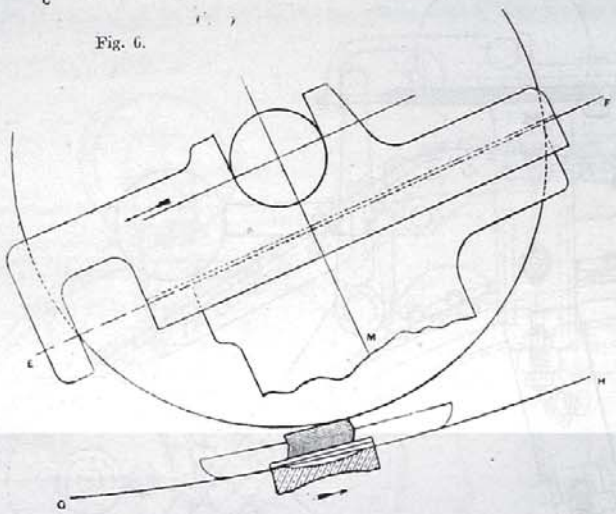


Fig. 6.



back to the band pulley on the cylinder shaft, thereby giving it the slow motion of one to two revolutions per minute. The doffer is driven off the cylinder shaft at the opposite side The apparatus can be applied and removed in a couple of minutes.

We have now laid before our readers most of the details of this excellent machine, that in combination make it one, which has not only maintained but has considerably enhanced the excellent reputation of the firm for the construction of the best cotton machinery.

Messrs. Hetherington and Sons will no doubt be pleased to answer any inquiries that intending purchasers or other proper persons may make.

News in Brief,

FROM LOCAL CORRESPONDENTS AND CONTEMPORARIES.

ENGLAND.

Accrington.

The Accrington Spinning Company, Limited, have given the order for the preparatory machinery for their new mill, to Messrs. Howard and Bullough; and the order for the mules (45,000 spindles), to Messrs. Platt Bros. and Co., Limited, Oldham.

Ashton.

Mr. J. Hague, late manager for Messrs. S. H. Swire and Co., Limited, has accepted the position of manager for Mr. Richard Fitton, Shawside, Shaw. He leaves Ashton with many good wishes.

The majority of the mills in Ashton and Dukinfield are stopped for the whole of this week for the annual wakes holidays. Last week about 400 spinners received stoppage pay from their local society, on account of the cotton corner, at a cost of £200.

The Portland Street Mills Company bids fair to become a lucrative concern. Mr. Samuel Smethurst has had a large experience as a director of spinning companies, and also as a mill manager. Mr. O. W. Rowley has been cradled in the spinning and manufacturing which have made Hurst mills famous since the time of the honoured names of John and Oldham Whittaker, who were the pioneers of the industry at Hurst. Messrs. Williams, Pooley and Thomas, are just making their debut, and we hope Ashton-under-Lyne may be benefited by their experience and technical culture, if we may so express it.

Bacup.

All weavers who are members of the Bacup Weavers' Association, and are employed at Albion Shed (which is stopped for repairs to the engine), are receiving stoppage pay.

The following are the results of the examination in cotton spinning in connection with the City and Guilds of London Institute, held at the Bacup Mechanics' Institute:—John W. Patchett, 1st pass, honours grade; Mark Sutcliffe, 2nd pass, honours grade; Arthur Knight, 1st pass, ordinary grade; George Whittaker, ditto, ditto; Sam Crossley, ditto, ditto; John W. Holden, 2nd pass, ordinary grade; Horace Hall, ditto, ditto; George J. Carter, ditto, ditto.

The quarterly statement of the New Bacup and Wardle Commercial Company, Limited, for the quarter ending July 31st, shows a loss in respect of the Far Holme Mill of £381 18s. 2½d, and the Kiln Holme Mill of £143 2s. 7d.; making in the profit and loss account a deficiency for the quarter of £595 15s. 7d. The additions to plant are as follows:—Far Holme Mill: Building and gearing, £7 2s. 9d.; machinery and utensils, £10 10s. Kiln Holme Mill: Machinery and utensils, £21 12s. 6d. The present balance deficiency is £1,892 14s. 2d.

Brighouse.

During the holidays of last week several firms took advantage of "The Feast" stoppage, which extends from Saturday noon till Wednesday morning, to thoroughly overhaul their engines, boilers, and economisers. The town itself during the early part of the week presented a very woe-begone appearance, owing to the absence of the vast number of operatives, who regularly avail themselves of this annual holiday to spend the time at one or other of our favourite watering places. Just at present business seems brisk in all departments.

The Brighouse cotton spinning class, lately taught by Mr. Tunstall, City and Guilds of London silver medallist, has obtained the following list of passes, as the result of the examination held in May last:—Ernest Henry Sugden, 1st pass, honours grade, 1st prize, £3 and silver medal; John North, 1st pass, honours grade; George Hartley, ditto; Tom Stansfield, ditto; Tom Hirst, 2nd pass, honours grade; William Marsden, 2nd ditto; Herbert J. Lister, 1st pass, ordinary grade; George A. Creighton, ditto; T. C. Adamson, ditto; Smith Hirst, 2nd pass, ordinary grade; Edward Joyce, ditto; Sidney Gibson, ditto; Joseph Hy. Creighton, ditto; J. T. Wadsworth, ditto; Wilkinson Nutton, ditto. Mr. Ernest Henry Sugden, who takes the first place in the country this year in cotton spinning, is the eldest son of Mr. Henry Sugden, of the firm of Messrs. H. and J. Sugden, cotton spinners, George-street mills, Brighouse. Mr. Sugden, who is 27 years of age, has been noted for his regular attendance and close application to the studies of the class. The position he has attained is an honour to himself and to Mr. Tunstall.

Dewsbury.

The following students have been successful in the examinations of the City and Guilds of London Institute in dyeing:—Wool dyeing: 1st pass ordinary grade, C. E. Oldroyd; 2nd ditto, G. Ellis, E. Hainsworth, C. Ferguson, and J. Newsome. 2nd pass honours grade, W. Addison. Cotton dyeing: 2nd ordinary, T. E. Gate. 1st class honours. (1st prize, silver medal and £3), H. Hey.

Elland.

The following is the list of candidates in the ordinary grade, who have passed the examination in Cotton Spinning, held by the City and Guilds of London Institute, at the South End Board School:—Joseph Greenwood, 1st class; Walter Greenwood, 1st class; James Bates, 1st class; Joshua Iredale, 2nd class; George Lumb, 2nd class; David Dean, 2nd class; Henry Kaye, 2nd class. The class was conducted by Mr. W. Tunstall—City and Guilds of London Institute, silver medallist—of Brighouse.

Heywood.

The results of the examinations in cotton manufacture, weaving, and designing, have been received. In Cotton spinning (teacher, Mr. Jas. Redman, of Todmorden), 19 sat for examination, of whom 14 passed. In weaving (teacher, Mr. S. Horrocks, of Bolton), two passed. The following are the lists:—Cotton spinning—George Gee, 2nd pass, honours grade; George Ogden, ditto; Jas. W. Whitworth, ditto; William Chadwick, 1st pass, ordinary grade; Benjamin Cropper, 2nd pass, ditto; Arthur Howarth, ditto; Ben. Stott, ditto; Frank Y. Ashton, ditto; Wm. Holmes, ditto; Alfred Barrett, ditto; Edmund Ashworth, ditto; Wm. Harrison, ditto; George Chatterton, ditto; Elias Ellison, ditto. Weaving—Joseph W. Maxwell, 2nd pass, ordinary grade; Robert Chadwick, ditto.

Huddersfield.

The result of the Huddersfield Technical School Cotton Spinning Class Examination is as follows:—Herbert Emil Sheard, 1st class honours grade; John Mellor Stoney, 2nd class honours grade; Willie Whiteley, 2nd class honours grade; Willie Cliffe, 1st class ordinary grade; Joshua Crowe, 1st class do.; George Dewhirst, 1st class do.; Allen R. Dyson, 1st class do.; John G. Hayley, 1st class do.; Albert Firth, 2nd class do.; Charles Fox, 2nd class do.; James Fox, 2nd class do.; James Fox Hardcastle, 2nd class do.; Frederick William Hirst, 2nd class do.; J. F. Lumb, 2nd class do.; John W. Mitchell, 2nd class do.; Walter Mitchell, 2nd class do.; Oswald Moorhouse, 2nd class do.; Joseph Wilfred Shaw, 2nd class do.; John Siswick, 2nd class do.; Zaccheus Sugden, 2nd class do.; George Hy. Sykes, 2nd class do.; Samuel Shaw Whiteley, 2nd class do. The class was taught by Mr. W. Tunstall (of Brighouse), who is a City and Guilds Silver Medallist in this subject, and who will again conduct the class during the coming session.

The following results of the examinations in dyeing and cotton spinning, conducted by the City and Guilds of London Institute have come to hand:—Dyeing (teacher: George Jarmain, F.I.C., Huddersfield Technical School.) *Ordinary Grade*, 1st class—Charles E. Field (3rd prize, £1 and bronze medal), Joe. Ainley, W. H. Houghton. *Ordinary Grade*, 2nd class—Joab Gledhill, Chas. Wm. Moon, Chas. E. Rothery, Ephraim Thornton, Willie Whitley. The cotton spinning class taught by Mr. Adam Hardman at the Lockwood Mechanics' Institute has obtained the following passes in the recent examinations of the City and Guilds Institute:—*Honours Grade*, 1st class—Albert Ainley (2nd prize, silver medal and £1), Levi Sykes. *Honours Grade*, 2nd class—Jas. Wood, Alf. Sykes. John Standing. *Ordinary Grade*, 1st class—F. Hall, Edwin Hardman, Allen Boothroyd, Fred. Balmforth. *Ordinary Grade*, 2nd class—Jas. W. Smith, Fred. Ernshaw, Joseph Jackson, Alfred Crowther, David Jackson, Hy. Kershaw. The results in weaving and designing have not yet been made known.

Hyde.

Messrs. Platt Brothers and Company, Limited, have secured the order for supplying the preparatory machinery to the mill just acquired by the Slack Mill Company, Hyde.