Machinery and Appliances.

PATENT STOP-MOTION TWISTER FOR THE PRODUCTION OF KNOPPED, LOOPED, CURLED, AND OTHER FANCY YARNS.

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It is about 15 years since the present writer drew the attention of manufacturers and the trade generally to the comparative neglect with which the production of fancy yarns was treated in this country, and the vast field which lay open to them in this direction for obtaining an endless variety of beautiful and rich effects. He pointed out that almost all efforts up to then were endeavours to produce absolute uniformity of effect both in the yarn and cloth: the aim being to make the thread as level and uniform as a fine drawn wire, and the fabric smooth as a sheet of writing paper. It was pointed out that all the beauty of variety was lost by thus travelling in the rut of precedent, while by the departure indicated, and the introduction of colour, an incalculable number of variations could be made, and that those who could handle the materials with which they were dealing with good taste and skill would be assured of a great success.

More than one firm immediately adopted the suggestion and put it into practice, much to their benefit. Since then a great change has taken place, and from the variegated yarns that have been rendered available manufacturers have produced fancy fabrics in abundance. The plain, dyed, checked, and printed, on which fashion's changes had been mainly rung, have since been reproduced, but in such a changed form as to present a more beautiful and attractive appearance than was ever obtained in the past, by a kaleidescopic variation, which as yet shews no signs of exhaustion, and of which the public exhibits no symptom of becoming tired. As yet this field has been mainly worked by the woollen and worsted trades, and notably by the latter, for which it is especially suitable and by which it has been correspondingly appreciated. In the production of dress goods for the gentle sex it has been of the highest service, readily yielding variety to suit every imaginable taste. In the cotton trade there is a wide field of a like kind in which, as yet, very little use has been made of this style of yarns. In the northern half of the temperate latitudes, woollens and worsteds are mainly worn, but in the warmer half of the same, variegated cotton fabrics, produced in the manner indicated, would, we believe, find an enormous field of consumption. Let those having connections with the markets of these regions make the experiment, and we think their enterprise will not go unrewarded. But it may be asked—where and how are these variegated yarns in cotton to be obtained? There are several firms that produce them in woollen, worsted, silk, and union materials, and if the demand arose they would be equally ready to produce them in cotton. Failing this, however, there is little difficulty in establishing the manufacture of them by each man in his own establishment. The following is a description of a machine on which an endless variety can be produced.

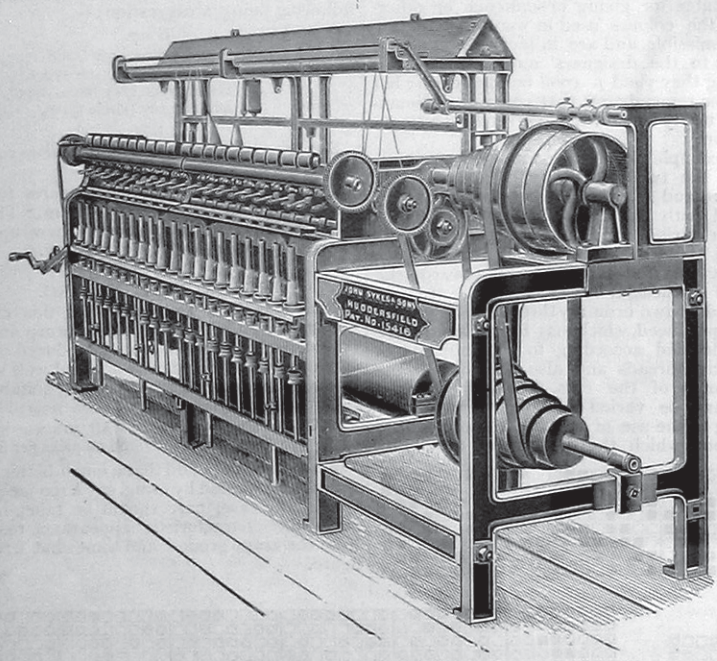

FIG. 1.—PATENT STOP-MOTION TWISTER.—MESSRS. JOHN SYKES AND SONS, HUDDERSFIELD.

The machine to which we refer in its main features was described in *The Textile Mercury* of November 16th, 1889. It has since been modified in its details to permit of the production upon it of the variegated yarns to which reference has been made above. As we have observed before, the winding of yarn is a process common to all the textile industries. It is, perhaps, the simplest of all the series, yet it varies considerably according to requirement, and is modified also by the differences of material. Single thread winding is its simplest form, this being for the purpose only of facilitating the attainment of a parallel arrangement of the threads, as seen in a warp. In doubling-winding much more care is required, and the process becomes more complex. This is for the purpose of obtaining a parallel arrangement of two or more threads, the tension being required to be perfectly alike in order to permit of their being twisted together in an even manner, that is, in which the threads shall be mutually twisted round each other; not "corkscrewed," as when one preserves a straight line and the other is wrapped around it. All practical men know how objectionable this is in the manufacture of any class of doubled yarns. Doubling-winding requires the nicest adjustment in the parts of the machine. It will be obvious, however, that in this class of winding, one thread may break or become exhausted, and the other continue to be wound. In single winding in such a case no harm is done; in doubling or manifold winding all the yarn wound after one thread has broken becomes waste, as it must be pulled off the bobbin, otherwise bad work will be the result. The prevention of both these defects was for a long period entirely dependent upon the skill and care of the operative in charge of the work, and as these qualities were mostly present in a minimum quantity, a large percentage of waste and much bad work were usually the outcome. These facts brought the inventors into the field, and there has since been a great race for the goal of absolute excellence.

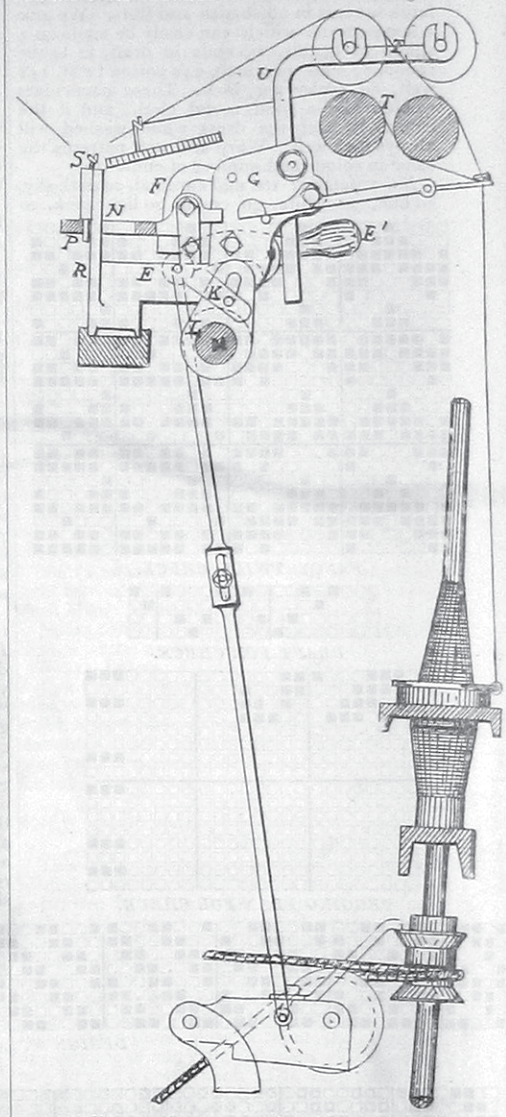

FIG. 2.—SECTION OF STOP-MOTION.

In Fig. 1 is shewn a perspective view of the machine. As previously stated it was devised principally for stopping the rotation of the spindle when a thread breaks, before it passes within the influence of the twisting spindle and is wound upon the bobbin, and so to prevent the waste occurring when twisted yarn deficient in a component thread has to be drawn off. A second object the inventor had in view was to stop the spindle when the yarn has broken after being twisted, and so to prevent the waste arising from this cause. The following is the way in which the inventor accomplishes these results, and the means he employs. The frame

is the ordinary twisting frame, having spindles carrying combined fast and loose wharves, and driven in the usual manner. Fig. 2 is of the working parts. It will be seen that the driving band is carried over a tension pulley, mounted on a stud projecting from one end of the lever C, which is pivoted near the middle. The opposite end of this lever constitutes a balance weight, and a pin projecting from it affords means of attaching a connecting-rod, the opposite end of which is attached to one end of a drop lever E pivoted to a bracket bolted to a rail, and carrying on its opposite extremity the handle E_1. On the extremity of the drop lever opposite to that carrying the handle is a small "sneck" or projection, which, when the yarn is being twisted and wound upon the spindle, rests upon and is supported by a catch projecting from the side of a weighted lever F hinged at its upper extremity to the pedestal at G. The latter lever carries a stud upon which is mounted the cranked lever K, the lower end of which carries a stud, which enters a slot formed in the arm of the lever L mounted upon the rocking shaft M. This shaft extends the length of the machine. The upper end of the cranked lever is connected to a plate N having a horizontal traverse forward and backward, entering and sliding to and fro in the opening P in the pedestal R. This plate constitutes a grid, having openings cut into it to correspond with the number of drop wires it is intended to employ. These wires S are arranged above, and loosely supported in the pedestal R. The two lines of draw rollers are arranged as shewn T T_1. The top rollers are supported by the bracket U, which is hinged to the pedestal R, and having its lower extremity resting against the curved end of the drop lever E. The rocking shaft M is actuated by a pinion E on the shaft of the driven drawing roller T, which gears into a pinion W carried on a stud projecting from the side of the machine. One end of a rod is connected eccentrically to the face of this pinion, whilst the opposite end is attached to the loose end of the lever mounted upon the rocking shaft M. The revolution of this pinion rocks the shaft by the means we have described.

The above description will give the reader a fair idea of the structure of the machine, and the novelty of its chief parts. We may now describe its action. The bobbins are mounted as shewn in the creel, and the threads may be drawn over suitable guide rails if so desired. They are, however, shewn as passing straight to and through the eyelets of the drop wires, S, through the fixed eyelets near the latter, between the draw rollers, and down through the guide wire to the traveller of the spindle. The tension of the threads as they pass from the bobbins through the drop wires lifts the lower ends of the latter clear of the traversing plate N. As long as the threads remain unbroken, and the supply continues unexhausted, the cranked lever, K, traverses the grid plate, N, the drop lever being held in its working position by a catch on the lever, F, which sustains the knocking-off mechanism in the position shewn in Fig. 2. When, however, a thread breaks or becomes exhausted, the drop wire falls and the grid plate in its traverse exposing a portion of its slots, the wire drops into it and prevents its return. The result is that the fulcrum of the cranked lever, owing to its connections, is changed from the stud near its middle to the stud by which it is attached to the traverse or grid plate N, so that on the return movement of the arm of the lever L upon the rocking shaft M, the cranked lever K and the weighted lever F are forced into a position where the catch is withdrawn from under the end of the drop lever, when the latter through its several connections is drawn into the position shewn in Fig. 2, by which the driving band is transferred from the fast to the loose wharve upon the spindle, and the projection upon the tension pulley lever is brought into contact with the fast wharve and instantly stops the spindle. The rapidity with which the spindle is stopped, and the certainty of the action of the parts is remarkable, proving the arrangement to be an excellent one in every respect.

As long as the position of the parts shewn in Fig. 2 is maintained the crank lever K will continue to oscillate upon the stud, connecting it with the grid or traversing plate. When the threads have been pieced or restored the attendant presses down the handle E_1, which restores the parts to the working position, and work recommences. A second part of the invention, which we have not space to describe in detail, consists in using the parts already named for the purpose of stopping any spindle when the twisted yarn between it and the drawing rollers has broken. The traverse plate is prevented completing its journey in the opposite direction, which has the same effect as before, stopping the several parts by bringing them into the position shewn in Fig. 2.

It will be obvious from Fig. 1 that the machine can be used as an ordinary twisting frame, as well as for the production of the variegated yarns referred to above. By this arrangement manufacturers secure a considerable advantage, as when not required for one purpose it can be put to use for the other. The capacity to produce an unlimited variety of fancy yarns, however, is its chief feature and its recommendation to manufacturers, and in this respect we believe it is unequalled, as with the greatest facility, either plain, twisted, curled, knotted, looped, or sliver-inserted yarn can be produced at will, and by making changes that only require a few minutes' time to accomplish. The driving arrangements are sufficiently shewn in Fig. 1. The two sides are independently driven, and may therefore be employed at the same time on the production of different sorts of yarn. The machine is, in fact, a combination machine, many in one, enabling the manufacturer to produce a variety of yarns which under ordinary circumstances he could not possibly do unless by the use of many more machines, which of course would mean the occupation of much more space and the expenditure of more capital.

Before closing we may add that the makers fit this machine (at the option of the purchaser) with their new patented ball bearings for spindles, which are applicable both to collars and footsteps. By the use of these bearings a far higher speed can be attained, combined with the greatest steadiness and a diminution of wear and tear, as friction is reduced to a minimum. Much less power also is required for driving. These bearings can be arranged in any manner according to requirement. This spindle is worth the attention of the trade. As we observed in our previous notice this machine is a very ingenious piece of mechanism, and excellently designed to accomplish its object. It is suited for use in all the several textile industries, requiring only the special adaptation the different natures of the fibres necessitate. It is well worth the attention of practical men, who will, we are confident, find it to possess some special merits. The makers will be pleased to afford facilities for inspection on application as above, where the machine can be seen at work.

It is stated that Lord Cross has intimated to the Indian Government that the proposed amendment of the Indian Factory Bill so as to legalise the employment of children on two shifts of four hours' each *per diem* would be contrary to the pledges given in the Imperial Parliament, and could not be accepted. No objection would be taken to three shifts in two days; and it is possible that a compromise may be suggested in this direction.

Bleaching, Dyeing, Printing, etc.

PAPERS ON BLEACHING.—VII.

(*Continued from page* 174.)

9th. Chemicing.—We now come to the final stage, or nearly so, of the bleaching process, viz., the actual bleaching operation, familiarly known as '*chemicing*,' that is, the treatment of the goods with bleaching powder. The previous operations have resulted in obtaining a cloth free from grease, natural or acquired, and from other impurities, but it still has a slight brownish colour. This has to be removed before the goods can be considered a good white, which it is the aim of every bleacher they should be. To get rid of this colour they are subjected to two final operations, the first of which is now to be considered. The chemicing consists in running the goods through a weak solution of bleaching powder (chloride of lime), piling the goods up into heaps, and allowing them to lie overnight; the next day they are finished. As the cloth has received or ought to have received a thorough bottoming, only a weak bath of chemic is required: about ½ to 1° Tw. is quite sufficient. The solution is prepared in a stone cistern. There is very little difficulty in making it: the only precaution necessary is to have the solution quite clear and free from undissolved particles of bleaching powder, as, if these get upon the cloth, they will either lead to the production of minute holes, or they may over-bleach the fibre, which in such case will have the power of attracting excess of colour in any subsequent dyeing process and thus lead to stains, the origin of which is not readily grasped at first sight. It is best, therefore, either to allow the solution to settle in the cistern till quite clear, which is the simplest way; or to filter through cloth. (It is almost needless to say that when the settling method is adopted the cistern should be cleaned out from time to time of any dirt or grit which has accumulated.) For fresh liquor the Twaddell is a sufficient guide to its actual strength, but when in use this is not the case. Now as it is desirable to keep the strength of the liquor in the chemicing machine as uniform as possible, it is advisable to test it from time to time during the progress of the operation, which can be done in a few minutes by a simple chemical test with sufficient accuracy by the foreman bleacher. This test is as follows:—

1st. A solution of 5 grains of pure arsenious acid is made by heating in 1 quart of caustic soda liquor at 15° Tw.

2nd. A solution of 1 oz. indigo extract—this should be of good quality and of a make of which successive batches can be relied on as being of uniform quality;—2 oz. sulphuric acid at 186° Tw., and 6 oz. water. The operator has now to prepare a graduated test glass; to do this he takes 1 oz. of the arsenic solution, adds ¼ oz. of the indigo solution, and fills up the test glass with chemic at 1° Tw. nearly to the top, making a scratch mark at this point: he then slowly runs it into the coloured arsenic solution until the latter is just decolourised; a mark is now made on the test glass at this point; similar tests are made with the chemic of ¾, ½, ¼° Tw., and when these are done the operator will have a test glass by which he will be able to ascertain the strength of his chemic fairly accurately, care being taken always to take the same quantity of arsenic solution (1 oz.) and the same quantity of indigo (¼ oz.). The testing of the chemic will only occupy a few minutes, and if done at regular intervals, say every hour or hour and a half, as the pieces are running through the chemicing machine, the bleacher will then know whether the liquor is up to strength. It is a good plan to have a liquor rather stronger that which is actually used, and as the liquor in the machine gets too weak by use, to run some of this strong liquor in to bring it up to the full working strength.

The chemicing is best done cold and with weak solutions, at ½° Tw. rather than 1° Tw. Warming the liquor increases the rapidity of