Machinery and Appliances.

ROSSKOTHEN'S PATENT IMPROVED PIRN WINDER.

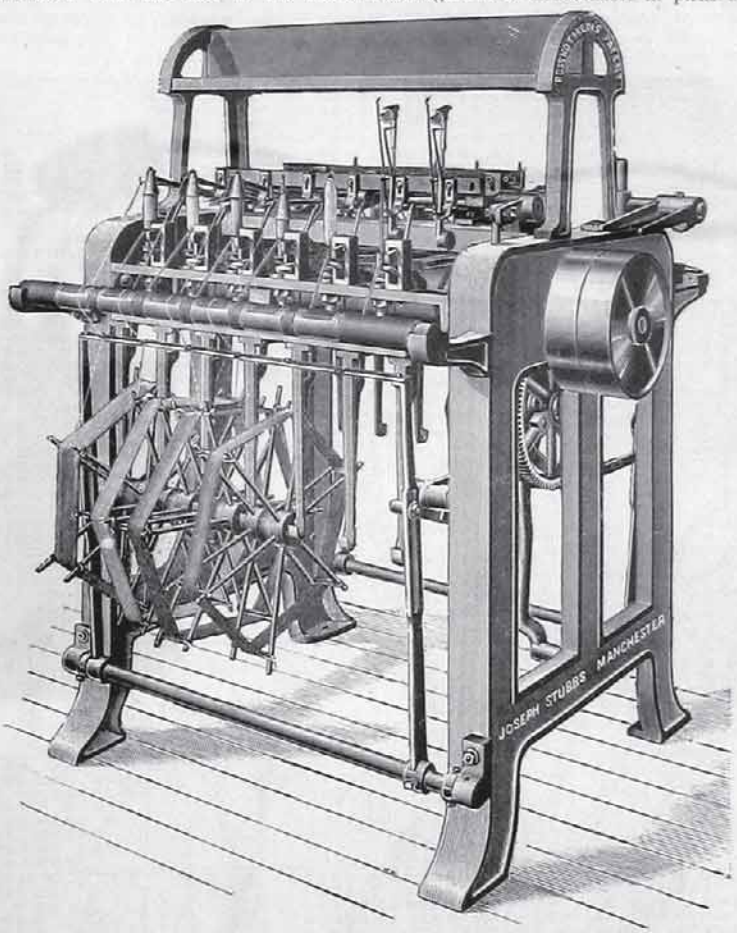
MR. JOSEPH STUBBS, MILL STREET WORKS, ANCOATS, MANCHESTER.

In the early days of the textile industries pirn winding was common, if not universal and indispensable, to each of them. This arose from the fact that by the methods of spinning in vogue it was not possible to so prepare the weft as to fit it for direct use, or to make cops of the requisite shape and firmness that would admit of their being used directly in the shuttles; hence those whose memories carry them back to the days of hand-loom weaving will well remember that the little bobbin winder was an adjunct of every household that had its loom shop, or alternatively the old woman who performed the same duty. One cause of this process being a necessity was the smallness of the shuttles used in the hand-looms. The machine used for pirn winding, if such it could be called, was the single thread winding wheel, which is not yet quite extinct. But even when good small cops could be made for the small shuttles of the hand-loom the forces of prejudice and habit were so strong that the winding of the weft upon pirns was continued, often because it was thought to improve the weaving quality of the weft if the latter was first saturated in soap and water, which it admitted of being when wound upon the wood pirns. But in all plain weaving this has long ago disappeared, excepting here and there in a weaving mill where the hand-wheel is retained to supply the small quantity of coloured heading weft required by the weavers.

Still there is a considerable section of the different textile trades, and we may add that these are increasing in dimensions, where pirn winding is a necessity. The section to which we particularly refer is the coloured goods branch of the cotton trade, which is mainly located in and around Manchester, at Failsworth, Pendleton, Patricroft, Swinton, Farnworth, Radcliffe, Bury, Heywood, Rochdale, and other places in South Lancashire. The extension of the dhootie trade in Preston and Blackburn and their outlying villages, has led to a great increase of the same process in those localities. In Nelson, Barrowford, Colne, and Todmorden, a considerable trade has sprung up in coloured goods, in which pirn winding is a necessity. In the Yorkshire districts, Carlisle, and Scotland, the system is in extensive use, so that simple as the process is there is a considerable field for the exploitation of the inventor who can surpass previous efforts in this direction, in which, to say the truth, no great results have been achieved, owing probably to the fact that the very simplicity of the process has created the impression that nothing more was required. Perhaps also the field open for such a machine was not considered sufficiently large to justify the expenditure of either genius or time by the reward it was likely to give in return. A careful review of what has been accomplished in pirn winding machines would disprove the first of these notions, while the enumeration of the districts in which its use exists and is extending would dispel the second. But those given are in the cotton trade alone. In addition, there are the various spheres of use offered by the woollen, worsted, silk, and linen industries, in all of which wefts on pirns are used.

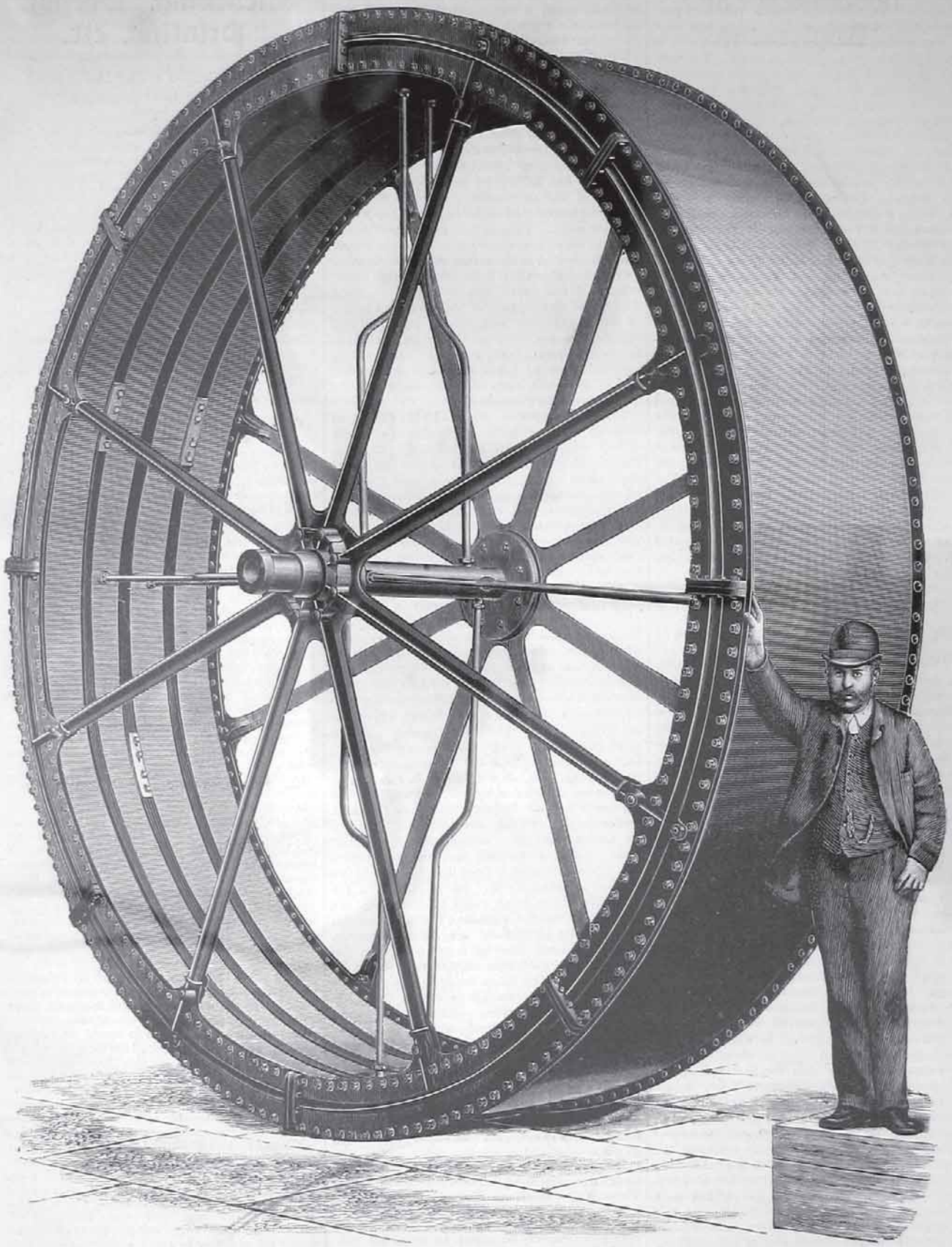
This comparative neglect of the pirn winding process by inventors has to a considerable extent just been atoned for by a machine which is being introduced by Mr. Joseph Stubbs, machine maker, Mill Street Works, Ancoats, Manchester, whose reputation as a maker of winding machines is widely known.

The machine in question is the invention of Mr. Rosskothen, a gentleman already known for his accomplishments in the winding branch of the textile industries. It is to a great extent original in principle and design, differing widely from anything of the kind hitherto constructed. The first important feature in it is the substitution of strong Rabbeth spindles for those ordinarily employed. These are fastened on strong girder rails, and are driven from two tin rollers precisely as in a ring frame. Each spindle is furnished with a fast and loose wharve, and a separate automatic stop motion. The latter on the breakage of a thread transfers the driving band by suitable mechanism from the fast to the loose wharve, by which the spindle is immediately brought to a stand. The advantage of this arrangement will be obvious to those who are acquainted with the process, in preserving the layers last wound from being frayed by friction against the cone cup, as occurs in pirn winders having the ordinary iron cups. The yarn is wound on bare spindles, or on wood or paper tubes, by a light steel guide, which is gradually lifted from the base to the top of the spindle by the cup shaper, which itself is raised by the added layers of yarn upon the pirn. It is well known that in mule spinning a great amount of money, time, and skill was expended in the effort to secure a good firm build for the cop, especially in weft yarns, in order to prevent the cops from breaking in the shuttle whilst at work in the loom. This was accomplished by causing the winding faller to make a quick descent from the apex to the base of the cone of the cop in course of formation, and not winding more than three or four turns during the descent; the faller rises much more slowly, and during its upward movement the winding is mainly done. This process makes a cop which is least likely to be damaged or broken in the weaving process, and is the most easily got straight, or "readied," with the minimum of waste if ruffled. The inventor of this machine has very cleverly imitated this structure of the mule cop, by a simple arrangement causing the thread guide to make a quick descent and a slow upward movement. During the former about one-fourth of the length of thread that is wound during the ascent of the guide is wound on the pirn. Thus all the advantage of a well-built mule cop is secured for the pirn, including the very considerable one of a great reduction of waste as compared with that which has hitherto been regarded as unavoidable in pirns built in the ordinary way. This is an important advantage when the high price of dyed yarns is borne in mind.



ROSSKOTHEN'S PIRN WINDER.—MR. JOSEPH STUBBS, MANCHESTER.

In winding yarn from hanks upon pirns it is well known that the drag upon the rices is a very uneven one, consisting of a succession of jerks and a slowing down from the motion this gives until the rice almost stops. The jerk is caused when the winding is taking place upon the base of the cone, or the largest diameter of the pirn; the slowing down is from that point to the apex or smallest diameter, which when attained is succeeded by another jerk, and this is repeated continuously. This is very trying to the yarn and causes more breakages than anything else, as the comparative inertia of the rice and the hank it carries has to be overcome at every jerk, and that by the drag of a single thread of no great strength. This feature has been observed and its disadvantages cleverly obviated by the



CAVITY DRYING CYLINDER.—CONSTRUCTED BY MR. LANG BRIDGE, ACCRINGTON.

(*For description see Page 48.*)

invention of a speed-regulating motion, by which the drag upon the rice is rendered perfectly uniform in spite of the differential rate of the winding explained above. This result is obtained in a very simple manner. Between the spindle and the rice the inventor introduces an oscillating or rocking parallel bar, over which the threads pass. The range of movement of this bar is constant, but its rate, which is obtained from and governed by a specially-constructed cam, is variable, being an exact counterpart of the drag of the spindle when winding the yarn on the various diameters of the cone. The regulator being adjusted so that its minimum influence shall be exerted when the maximum of the drag of the spindle is being made, and that it shall rise from that to its maximum point exactly as the other diminishes and arrives at its minimum, it will be evident that an equipoise is established between them, the result being a steady, uniform strength of pull upon the rices. This greatly diminishes the number of breakages that have hitherto been experienced in winding pirns from hanks.

It will be observed from the above description that this machine possesses many novel features, which are very properly and justly claimed to yield great advantages. Not the least of these is the greatly increased speed at which it can be worked, the only limit being the strength of the yarn in use. The increase of production is consequently very great, which will effect a corresponding saving in the cost of labour. It is strongly made and well finished. The maker will be glad to shew it at work and give any further information regarding it that may be desired upon application as above.

A GRAND CAVITY DRYING CYLINDER.

MR. LANG BRIDGE, PARADISE WORKS, ACCRINGTON.

In almost every one of the textile industries, in one or other of their processes, either of preparation or finishing, the use of steam is resorted to for drying purposes. A familiar example is found in the cotton trade in the sizing process. The yarn after immersion and saturation requires to be rapidly dried, and after passing between a pair of compression rollers, which press out the superfluous size, it immediately passes in the form of a sheet of parallel threads upon a large steam-heated cylinder. The steam is maintained in this cylinder at a considerable pressure, and a large quantity is used, as rapid condensation takes place owing to the heat being abstracted and utilised in drying the yarn upon the outer surface. It is desirable to complete the drying if possible in one passage of the material over the cylinder, but this is not easy to accomplish in such a case as that under notice, as to do it would require cylinders of inconveniently large magnitude. In the cotton sizing machine there are, therefore, nearly always two cylinders, the second one of smaller dimensions than the first. It will be obvious that only one side of the sheet of yarn can come in contact with the first cylinder in its passage, and that, therefore, if any dampness remains it will be mainly in that side of the yarn which is away from contact with the hot surface. When the yarn passes upon the second cylinder the relative positions are reversed, the side which has been away from the cylinder in the second coming into contact with it, and thus the drying is completed. There are both theoretical and practical objections to this method of drying either yarn or cloth—for the process with the latter is almost identical, excepting that the number of cylinders is considerably increased, in some instances ascending as high as twenty-three in the drying machines used in bleach-works.

As in the sizing machine of the cotton trade, which is really a combined sizing and drying machine, there are in the other processes and industries numerous combination machines in which steam drying cylinders form a part. In most cases—indeed in all where the cylinders are built on the ordinary principles of construction, in which the cylindrical part is usually or at least often of copper, and is fastened to its ends of tinned plate or sheeting by means of solder—much trouble is experienced with them from the frequent steam leakages that arise, owing to the failure of the soldered joint to withstand the alternating expansion and contraction encountered under the usual conditions of their work. This defect is—or perhaps it will be more correct to say, was—formerly often illustrated in the sizing rooms of weaving establishments, they being frequently under repair. A few years ago, however, Mr. Lang Bridge, of Accrington, a widely-known maker of sizing machine and other steam drying cylinders, so far improved their construction as to obviate these defects, since which time cotton manufacturers at least have enjoyed an immunity from this class of annoyances such as they never before experienced.

The improvement effected in the open cylinder were equally applicable to cavity drying cylinders used for finishing purposes. But the defects referred to above had so far discredited them that they had almost gone out of use, notwithstanding their suitableness in many respects, and superiority in some, over those by which they had been superseded. The knowledge of this fact, when it gets properly spread amongst the finishing trade, may lead to an extensive revival of their use.

As an evidence of the likelihood of this soon occurring we illustrate herewith a gigantic cavity cylinder recently constructed by Mr. Bridge for finishing purposes. In some classes of finishing very large cylinders are highly desirable, as by their use fabrics may be completely dried by one passage without the intervention of winces or carrier rollers coming into contact with the front of the fabric, which has an injurious effect upon its appearance, marks often being left. Large cylinders are therefore required in order to avoid these objectionable results. To the open cylinder in the largest sizes there are several practical objections, and beyond a certain diameter resort is had to a modification of the construction, such as is shewn in the accompanying illustration. This is termed the cavity system, to contradistinguish it from the open cylinder method of construction. As is shewn in the illustration, the large rings of the ends are formed of cast-iron segments, having flanges at each end, by which they are bolted together. By this plan any size of a cylinder that the nature of the work may require can easily be constructed. The rings being completed, the next part of the process is to attach the body to the exterior portion, which is of copper, and the interior, of tinned sheets. The former have flanges constructed upon them turned upwards, and these are brought against the lateral face of the rings; a second ring is then placed against the flange, and the three are bolted together with the bolts at such a pitch as to make a thoroughly firm, steam-tight joint, free from all the defects of the old system due to the contact of two metals differing in their rate and extent of expansion and contraction under the influence of heat or of its absence. There is now really no obstacle in the way of constructing cylinders of this kind of any dimensions, and those interested in their use may now properly be asked to carefully consider the advantages they possess over other kinds, and this without any set-off on account of their previous defects. Any information on the subject that may be desired will be supplied by Mr. Bridge on application as above.

Bleaching, Dyeing, Printing, etc.

NOTES ON RECENT ENGLISH PATENTS IN DYEING AND DYES.

Messrs. Brooke, Simpson, and Spiller produce new direct dyeing colours from three bases that have been known for some years but not hitherto used for this purpose. These are: Para-azoxy-ortho-toluidine, $C_6H_3(CH_3)(NH_2)N:NOC_6H_3(NH_2)(CH_3)$, para-azo-ortho-toluidine $C_6H_3(CH)_3(NH_2)N:NC_6H_3(NH_2)(CH_3)$, and para-hydrazo-ortho-toluidine, $C_6H_3(CH_3)(NH_2)N_2H_2C_6H_3(NH_2)(CH_3)$, all of which were described by Limpricht in 1885. These are diazotised in the usual way, and the product is then combined with phenols and amines to form colouring matters; thus, for instance, a bluish red colour is obtained by taking the first named, diazotising it with hydrochloric acid and sodium nitrite, and combining with sodium naphthol sulphonate. The other bases yield similar products. The specification is silent as to the properties of these new dyes, except that they will dye unmordanted cotton.

Graemiger's invention for dyeing cotton or other fibres is somewhat novel. Many attempts have been previously made to dye loose or spun fibres by pumping the dye liquor through them, but Graemiger forms the fibrous material into the piston of the pump which is then worked in the dye liquor.

Azo-colours are combinations of an amine which has been diazotised with another amine, a phenol, or their sulphonic acids. Thus, for instance, the ordinary Scarlet R is a combination of diazo-naphthylamine with naphthol sulphonic acid. A recent patent of the Farbenfabriken describes the use of a sulphonic acid of di-oxy-naphthalene in place of the naphthol acid, whereby bluer shades of red are obtained. Thus, for instance, if diazo-anisol and di-oxy-naphthalene sulphonic acid are combined, a dye-stuff is obtained which resembles acid magenta in the tints it dyes. This patent specifies the use of no less than twenty-one amines with which combinations can be made. We wonder how many of these have been made, and how many would have to be disclaimed if the validity of the patent came to be contested. The state of our patent law permits of this condition of affairs in chemical patents because a disclaimer in such cases apparently reduces and does not extend the patent, whereas the patent was really extended before taken out, with a view to possible disclaimers of products that had not been originally made, in case circumstances arose demanding such a course. This state of things will only be altered when our patent laws require chemical patentees to deposit samples of the products they patent.

Ever since indigo was first used as a dye—of which history has no record—inventors of processes or methods of rendering it soluble have been numerous, and it may be reasonably supposed that it will continue to be so. Yet out of the many numerous methods which have been described in English patents, how many have been a practical success? Very few. Of late the favourite idea of inventors has been to produce preparations of indigo which only require mixing with water to make a dye vat ready for use. A Kendal gentleman describes four methods of attaining this object. In the first he takes powdered indigo and mixes it with zinc dust, warm water, and bisulphite of soda in certain proportions to obtain a dye vat ready for use. In the second he takes these ingredients in a dry form and mixes them all together; the powder so obtained only requires dissolving in water to form a dye vat, and in a dry place the powder will keep for months. The other two methods consist in using an acid or lime. In dissolving the mixed indigo powder just noted, the use of an acid enables the dyeing to be done when necessary in an acid bath; or