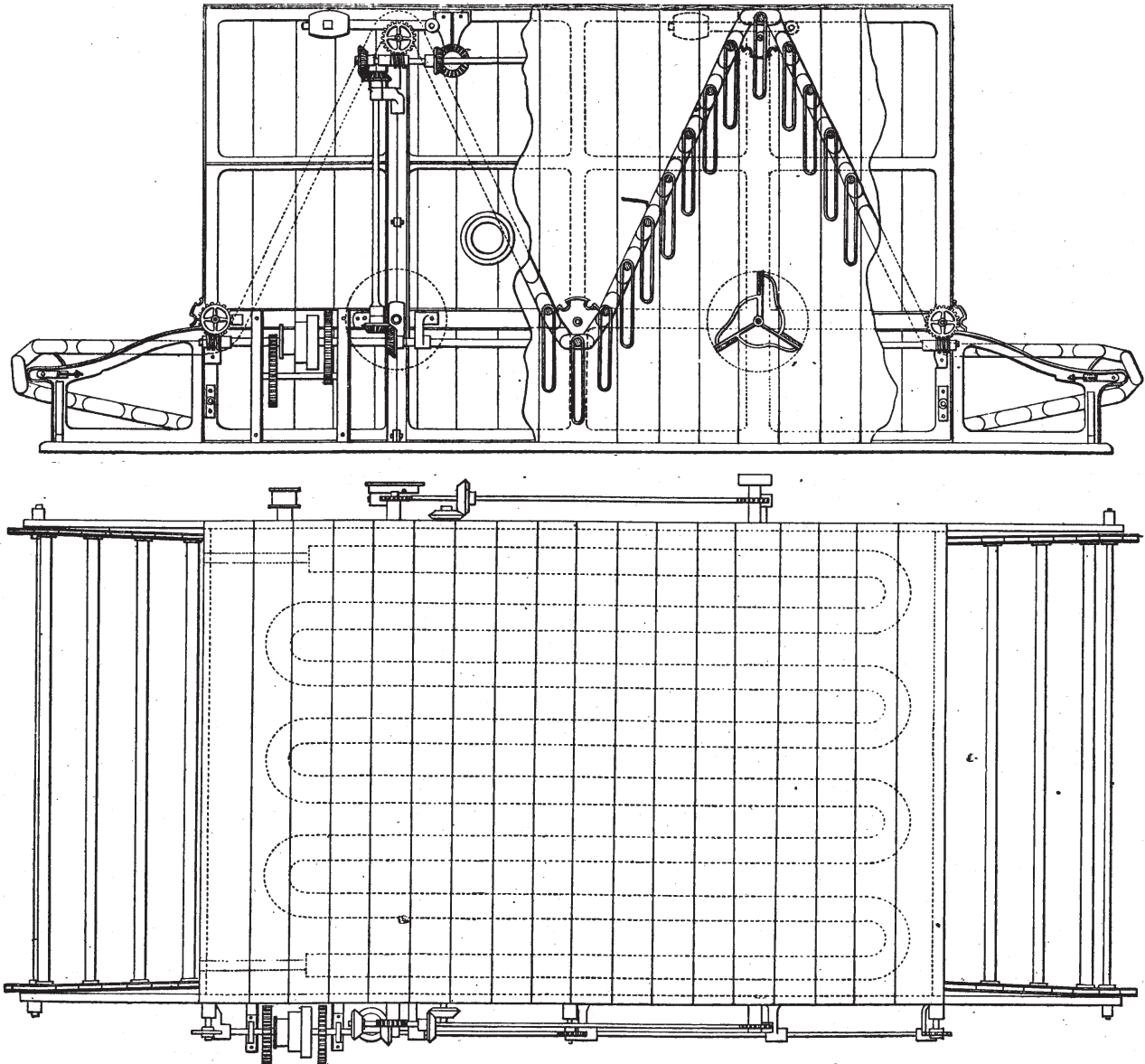


YARN-DRYING MACHINE.

CONSTRUCTED BY THE SÄCHSISCHE MASCHINEN-FABRIK (FORMERLY R. HARTMANN AND CO.), CHEMNITZ.



TEXTILE INDUSTRY AT THE VIENNA EXHIBITION.—No. XVI.

By DR. H. GROTHE.

MACHINES FOR DYEING AND PRINTING.

ALTHOUGH the number of machines for dyeing and printing fabrics exhibited at Vienna was not great, yet all the special varieties of this branch of industry were represented. Thus altogether the following machines were exhibited:

A. For the preparation of dyeing materials and colours: machine for grinding logwood by M. Berendorf fils, of Paris; a machine for the same purpose by Messrs. Huxham and Brown, of Exeter; colour mills for indigo, cochineal, &c., by G. Stein, of Berlin, Andes and Froebe, of Vienna, Wilhelm Sattler, of Schweinfurt, Carl Schranz, of Vienna, Franz Coblener, of Cologne, and a colour-boiling apparatus by S. Huber, of Frague.

B. For the dyeing of stuffs, &c., no machines were exhibited, with the exception of that mentioned in our last article, namely, the craping machine shown by the Zittauer Maschinenfabrik und Eisengiesserei (Albert Kiessler and Co.).

C. For the printing of yarn: machines by Mr. Thomas Barraclough, of Manchester, and Herr B. Hippe, of Berlin.

D. Machines specially adapted for drying dyed

yarns and fabrics by the Sächsische Maschinenfabrik zu Chemnitz, formerly Richard Hartmann, of Chemnitz, and by Messrs. Pierron et Dehaitre, of Paris (drying machine for dyed pieces of cloth). Besides these there belong to this class the centrifugal wringing and roller drying machines, as well as all the drying apparatus fixed to the cotton-printing machines.

E. Machines for printing fabrics, namely, the three-colour printing machine by M. Ducommun (Messrs. Heilmann, Ducommun and Steinlen), of Mulhouse; the perrotine by Herr C. Hummel, of Berlin; the roller printing machine, by Mather and Platt, of Manchester; the eight-colour printing machine with drying apparatus of the latest construction, by Messrs. Tulpin frères, of Rouen; and, finally, a machine for the printing of woollen flock or barège, and gauze stuffs, by Messrs. Fr. Scheffel and Co., of Reichenbach (patent of Carl Hauser and Son). We may also add to this class the lithographic press, which, as a remembrance of the great Exhibition, printed a view of the Rotunda on many thousands of handkerchiefs.

F. Machines and apparatus for the manufacture of the printing rollers. This class of machines was represented by the new double pantograph engraving machine of Messrs. John M. Sumner and Co., of Manchester (Lockett, Leake, and Co.'s

patent), for whole pieces of stuffs, and by another pantograph engraving machine for borders of shawls, and by the ingenious machine, with various additions, exhibited by Messrs. Ducommun and Steinlein, of Mulhouse.

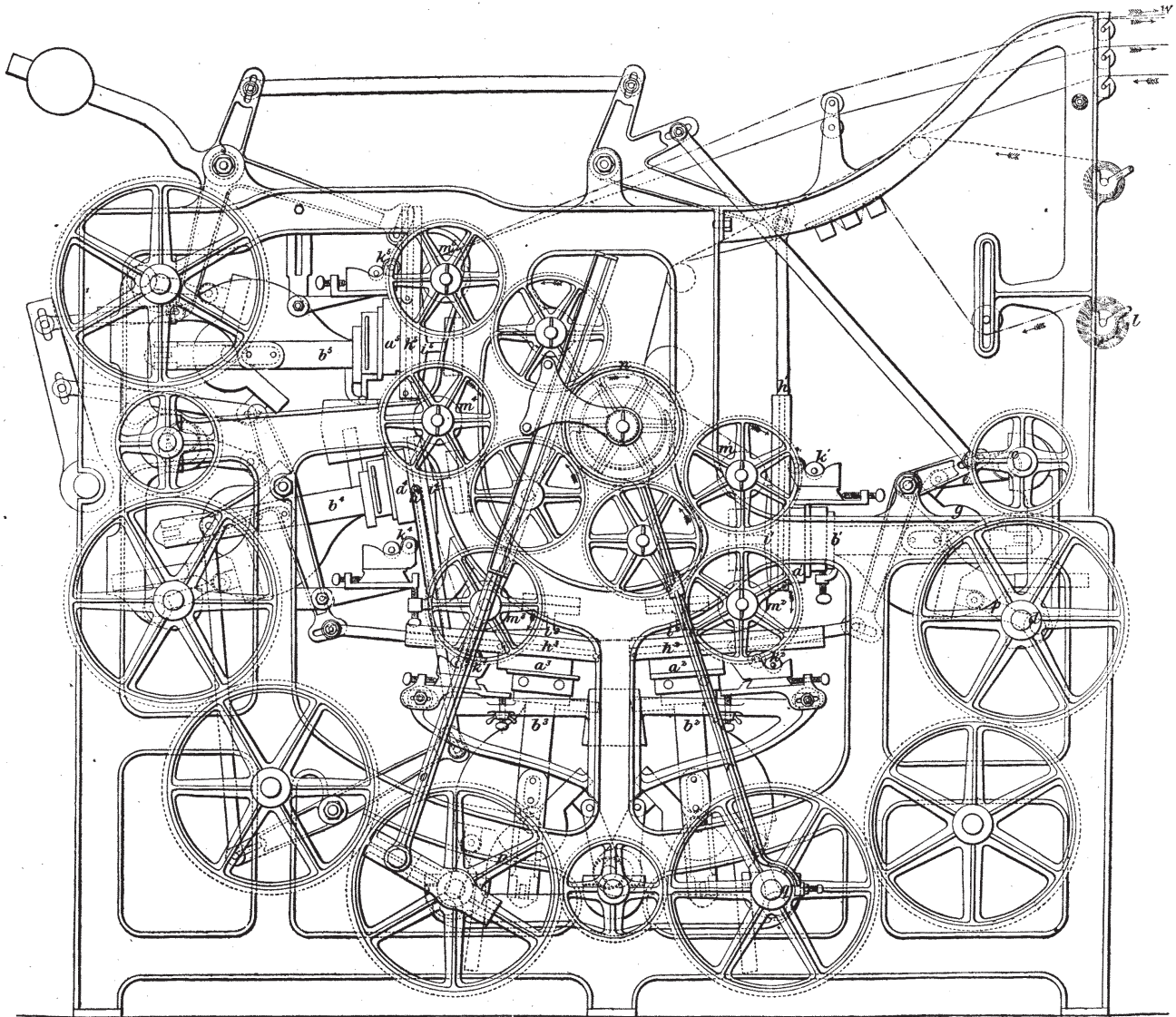
As intermediate apparatus we have to consider a number of stretching, washing, singeing, drying, measuring, and pressing machines, which we have already mentioned in our former articles on finishing machines. If these various machines are added to those included in the above-mentioned divisions, A to F, we may be well entitled to say that this important branch of industry was fully and successfully represented at the Vienna Exhibition. We shall proceed now with the report on the machines specially mentioned.

The machine for grinding logwood by Messrs. Berendorf fils, of Paris, may be ranked amongst the best which have hitherto been constructed for this purpose; this machine allows of shavings being cut to various sizes, an arrangement which is of great importance on account of all log and other dye woods not being equally extractive; the wood of one tree is harder and less porous than that of another, so that the machine has to be adjusted according to the character of the materias to be cut. On a future occasion we shall give illustrations and full description of this machine.

EIGHT-COLOUR PERROTINE PRINTING MACHINE.

CONSTRUCTED BY MR. C. BIALON (LATE C. HUMMEL) ENGINEER, BERLIN.

(For Description, see Page 472.)



The logwood-grinding machine exhibited by Messrs. Huxham and Brown, of Exeter, consists of two parts, the first of which is formed by two axes carrying narrow cutting wheels gearing through iron gratings, and is used for cutting the wood; the cuttings thus formed pass along an inclined passage of wirework to the second part of the machine, which performs the grinding operation. This second part consists of a conical grinding roller provided with spiral grooves sharply cut, and moving in a casing having grooves correspondingly formed in it; so that as the cone is adjusting with more or less clearance between it and the casing, the shavings or cuttings of the wood are more or less finely ground. The exhibitors intend this machine for general use—for bark, for tan, for wood used for the manufacture of paper, and for logwood.

The pigment mills exhibited at Vienna were all built on one system, similar to that just described, and consisted of an iron cone rotating in a corresponding casing, upon which a hopper is fixed for the continual and proper feeding of cochineal, indigo, &c. The best of these mills were exhibited by Herr G. Stein, of Berlin. The pigment-boiling apparatus exhibited by Herr S. Huber, of Prague, is a close imitation of the apparatus exhibited in 1867, at Paris, by Messrs. Tulpin Brothers, of Rouen, so that we need not refer to it more particularly.

The machines for printing yarns consist generally of two rollers, placed in a horizontal plane parallel to each other; one of these rollers is carried by a fixed frame, whilst the other is supported by a movable bracket fastened to this frame, so that if the bracket is moved towards the frame the two rollers come into contact with each other. These rollers are made either of wood or brass, and they have to act as pressure rollers for printing marks of various sizes at certain points in the yarn; for this purpose the rollers are provided on their surfaces with projections so placed that if they come into contact, the projections of the one will touch the projections of the other, thus squeezing the yarn, which is passed through them in threads. If the surface of the projections is provided with colouring or printing matter, the latter will be transferred to the threads of the yarn. The colouring matter is supplied to the rollers from a trough underneath each roller by means of an endless sieve-cloth and a feeding roller. The machine exhibited by Herr B. Hippe is provided with wooden rollers, the projections of which are made of boxwood, whilst Mr. T. Barraclough's machine has brass rollers with projections for so-called fine pearl print.

Amongst the drying machines for dyed stuffs and yarns we may first call special attention to the machine exhibited by Pierron and Dehaitre, of

Paris. Although this machine is often misunderstood and overlooked, it is, nevertheless, the only properly designed drying apparatus for small pieces. In an early number we intend publishing illustrations and full description of this machine.

The yarn-drying machine, exhibited at Vienna by the Sächsische Maschinenfabrik zu Chemnitz (formerly R. Hartmann,) of Chemnitz, which we mentioned in our last article, and illustrations of which we publish this week on the opposite page, represents a type which has been successfully applied for about four years. At Berlin alone, fifteen of these machines are already in use in the various dyeing establishments. The chief advantage of the arrangement, which will be easily understood from our illustrations, is that it is continuous in its work. The wet yarn is suspended on one side of the machine, and is taken off in a dried state at the other side, two parallel chains for the support of the drying rods carrying the yarn uniformly through the machine. Drying by means of heated air is another advantage of this machine, and it is chiefly the air which effects the work, this mode of drying being generally acknowledged as the best; high degrees of heat—which were formerly used—and their disadvantageous consequences, are thus avoided. The air is made to act by means of a fan, which draws off the moist air, so that a perpetual current of fresh air passes through

the machine. The air is heated by the steam pipes at the bottom, for which the exhaust steam from the engine is generally used, if the temperature in the machine has not to exceed 90 deg. Fahrenheit (32 deg. Celsius). The machine shown in our illustration, and exhibited at Vienna, is the smallest size of this system built by the Sächsishe Maschinenfabrik, and is, as stated already in a former article, 9 ft. 5 in. high, 11 ft. 7 in. wide, and 23 ft. 4½ in. long. The machine dries per day 750 kilogrammes (1650 lb.) of woollen yarns, weighs 3½ tons, and is provided with 31 drying bars.

The printing machine exhibited by Messrs. Ducommun and Co., of Mulhouse, is a three-colour machine, but the system allows of it being extended to a larger number of colours; it is, however, applicable only to stuffs with coloured longitudinal stripes. Under each printing roller a trough is placed, this trough being divided over its length into three or more compartments, each of which is provided with a sieve-cloth and a feeding roller which transfers the printing matter to the rollers at the proper distances. Each compartment contains one colour, and as many colours may be printed longitudinally as there are compartments. This machine has specially been applied, and with success, for silk ribbons.

One of the finest machines to be seen at the Vienna Exhibition was Hummel's perrotine. As is well known, the printing of woven stuffs of cotton, wool, and linen is chiefly performed by means of two systems of printing machines, namely, the cylinder printing machines and the perrotines, these differing materially from each other in their construction and use. In cylinder printing machines copper rollers, upon the surface of which the design has been engraved, are caused to revolve under pressure against a larger cast-iron roller, called the pressure roller, and covered with an elastic material.

The surfaces of the copper cylinders are each covered with colour by means of suitable colouring rollers, the excess of colour being taken off again by scrapers; the fabric to be printed is passed in a stretched state between the copper rollers and the pressure roller, and the design is thus impressed upon the stuff. A machine of this kind was the twelve-colour printing machine exhibited at Vienna by Messrs. Mather and Platt, of Manchester, and of which we hope shortly to publish illustrations and full description.

In the perrotines the printing is effected by flat formes which produce an embossed design, imitating thus the work of the hand-printing. On the previous page we publish an illustration of the eight-colour perrotine exhibited at Vienna by Herr C. Bialon, of Berlin (formerly C. Hummel); in this illustration $a_1, a_2, a_3, a_4, a_5, a_6$ are the formes fastened to iron supports, which are carried by the pressure bars b_1, b_2, b_3, b_4, b_5 . These latter execute a so-called "interference motion," which, as may be examined in the case of the pressure bar b_1 , is produced by the two crank pins c and d —of which c makes twice as many revolutions in a given time as d —by the joint levers e and f , and the stay or frame g . Through the rotation of the crank pins c and d the formes are at first fully drawn back, whilst by means of a special combination of levers, all the colour plates (chassis) h are placed between the formes $a_1, a_2, a_3, a_4, a_5, a_6$ and the printing tables $i_1, i_2, i_3, i_4, i_5, i_6$. The colour plates are flat cast-iron plates covered with an elastic material upon which colour is transferred while passing the colour rollers $k_1, k_2, k_3, k_4, k_5, k_6$. The printing tables, which are also covered with an elastic material, serve as a support for the stuff during the operation of the printing. The stuff to be printed is rolled off the beam l , and passing over one stretching roller, three stretching bars, and a wooden guide roller, is carried by means of the needle rollers m_1, m_2, m_3, m_4, m_5 , over the printing tables, passing out of the machine at w , and being then led off to a drying apparatus. With a further rotation of the crank pins, the pressure bars advance so far only that the formes touch the colour plates, the embossed designs of the former thus being caused to receive colour from the latter. The pressure bars b_1, b_2, b_3, b_4, b_5 are now withdrawn with the forme covered with colour, whilst the colour-plates pass back in the mean time to the colouring apparatus, where they receive a fresh supply. Another rotation of the crank pins advances the formes close to the printing table, and presses the design covered with colour upon the stuff in front of the printing tables. After this operation the formes are drawn back; the

colour plates are again placed between the formes and the printing tables, and the same operations are repeated during the following rotations of the crank pins.

During the time the colouring plates are moved up and down again, or, in other words, during the time in which the formes are not in contact with the stuff, the latter advances as much as the width of the forme (length of "guide"), so that the next impression takes place close behind the one previously executed. The stuff is moved forward by means of the "guide" mechanism, whilst the five needle-rollers, m_1, m_2, m_3, m_4, m_5 , are moved by means of spur wheels gearing into the main "guide" wheel n ; this latter is put in rotation by the rack o , and the wheel p , but only in the direction indicated by the arrow, the wheel n is not being moved when the rack is drawn back; this effect is attained by transferring the motion by means of a ratchet with wheel and brake. In order to shift the stuff exactly as much as required by the width of the forme, the rack has to be adjusted for each width, and the position of the draw pin of the former, with respect to the centre of the wheel p has to be altered accordingly, for which purpose the sliding piece is provided with a scale.

By a special contrivance it is rendered possible to cause each forme to strike the stuff on one and the same place twice successively, after having taken up colour in the intermediate time. This is accomplished by throwing the "guide" motion out of gear between the first and second print, whence the stuff remains in the same position during the two impressions. For this purpose the shaft q carries in front of the spur wheel an eccentric, which transfers during one revolution of the shaft q an oscillating motion to the lever r with its fulcrum at s , whilst at the following revolution the lever is kept in its position. In this manner the short arm of the lever r moves a conical slide, disengaging the trigger or catch which transfers the motion from the main "guide" wheel n through the spur wheels to the needle rollers, whence the latter are prevented from rotating. If the lever r passes back again into its original position, the "guide" again follows the action of the rack. This arrangement facilitates finishing heavy stuffs, of which large surfaces have to be printed uniformly with colour, in a clear and proper manner. Herr C. Bialon, builds these machines for one, two, three, four, and five colours, and nearly 500 of them have been supplied to Germany, Switzerland, Austria, Russia, America, and our own country. They are chiefly used in dyeing establishments for printing cotton or linen stuffs dyed with indigo, and are preferred to the cylinder printing machines, on account of the flat formes being considerably cheaper to produce than the engraved copper rollers of the cylinder machines, and on account of their being generally worked by manual power, whilst the cylinder printing machines require steam or other motors.

The cylinder printing machine exhibited by Messrs. Tulpin Brothers, of Rouen, is chiefly interesting on account of the drying apparatus connected with it, and an illustration of which we shall publish in an early number. Finally, with respect to the machine for printing woollen flocks on "barège" and "gauze stuffs," exhibited by Messrs. Fr. Scheffel and Co., of Reichenbach, we must simply regard it as never likely to become of any importance; besides, it serves only for a special design, which, as an article of the season, may be in fashion only once every eight or ten years.

The two machines for engraving printing rollers which were exhibited at Vienna are both so excellent for their construction that we intend to publish, on a future occasion, detailed drawings and full descriptions of both of them.