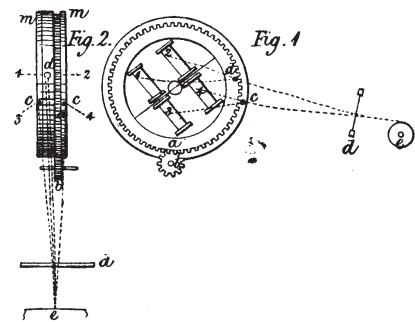


TEXTILE INDUSTRY AT THE VIENNA EXHIBITION.—No. VI.

By DR. H. GROTHE.

WEAVING MACHINERY.—(Continued.)

HAVING thus glanced at the exhibits connected with silk weaving, we pass on to the whole of the remaining branches, and we feel compelled to speak first of an apparatus exhibited by Mr. George Hodgson, of Bradford. After the roller has been known for hundreds of years, and weaving has been done for as many years according to one well-known method, Mr. George Hodgson comes forward with a new system of weaving by means of rollers without the heddles and leafs, used until now. If we have a roller with two bobbins carrying yarn, and if we run the threads from the roller to the cloth beam, having at each side threads firmly fastened between a bobbin at the side of the roller and the fixed cloth beam, the former threads can be passed through the latter by a simple third or half revolution of the beam, whence above and below the fixed threads a shed is formed through which the shuttle is passed. This idea has been worked out by Mr. Hodgson in the manner represented by the sketch annexed. The ring *a*, Fig. 1, carries four bobbins, which are provided with springs, and allow there-



fore of the yarn being wound off only when a certain amount of power is exercised; the ring *a* is hollow, and is provided on the circumference with a hole, *d*, which is lined with glass or porcelain.

The ring *a* is also provided with a toothed circumference gearing into the spur wheel *b*, and is carried by the fixed frame *m*, each half of which contains an eye, *c*, through which the threads 3 and 4 are passed. It will be seen from the figure that by turning the ring *a* in the direction of the arrow, the threads 1 and 2 pass below the horizontal line formed by 3 and 4 from *c* to *e*. This arrangement represents a new idea for the construction of looms, which can be carried out, however, at present for coarse weaving only, on account of the width of the rings (which has been shown in the illustration disproportionately) requiring too much space for close weaving. Nevertheless, this invention shows us how to do away with the inconvenient warping and beaming. We may mention also that the apparatus forms sheds if the ring *a* is turned round continuously, in which case the eyes, *d* and *c*, are omitted, and the threads run simply to *e* at the side of the ring, the motion of which is then rotating, whilst in the case described above this motion was taken as oscillating. The shed becomes perfect and free during the rotating motion if the threads 3 and 4 are in a horizontal plane, and if one of the sides of the angles forming the shed coincide with this horizontal plane, whilst the threads 1 and 2 pass through the corresponding planes for the other side of the angle forming the shed. Both cases will be understood from the model exhibited. We must here, however, state distinctly that Mr. Hodgson has not constructed this apparatus for the purpose of weaving, but for another end closely connected with the latter process. It is well known that mechanical looms are constructed for two widths of stuff, and that for the division of the pieces border or list-threads are put in. These borders are formed by Mr. Hodgson's apparatus, which is also provided in front of the reed, and close to the cloth beam, with a rotating knife, for the cutting asunder of the border or list threads between the two widths of stuff. For the purpose of forming the border the apparatus has to rotate, and a close examination will show that the threads of each side form a sort of twine which firmly holds the weft-threads. This explanation of the proper purpose of this apparatus gives us another hint, namely, that of producing stuffs with twined warp, as the twining could be done by means of this apparatus on the loom itself.

Perhaps we may expect more of this apparatus than any one else; but it contains certainly much that is worth the full attention of all interested in textile industry.

We shall now speak at once about the other mechanical looms exhibited by Mr. George Hodgson. They are looms with alternate slays, for one colour, for checked, and for alpaca stuffs; we can state from personal experience (the author of this article has used a few hundreds of these looms in Italy, Russia, and Germany), that the looms by Mr. Hodgson may be employed with advantage for all stuffs, as also for silk, and especially for stuffs with more than one colour. The loom for one-colour stuff exhibited at Vienna is one of the usual sort, with 30 in. space of reed; it works with 250 picks per minute, whilst we saw a loom of the same construction working in 1862, at London, with 430 picks, and in 1867, at Paris, with 350 picks; of course these trials with the unusual number of picks were made only in order to prove the strength of the construction and the proper action of the various parts. The normal speed of these looms is from 200 to 250 picks, whilst for a larger width they make only from 190 to 200 picks per 34 in. reed space; from 170 to 180 for 39 in.; 160 to 170 for 42 in.; 145 to 155 for 48 in.; and from 135 to 140 for 59 in. reed space. For the working of ten looms of this construction one horse power is required, and 100 42-in. looms, for instance, will take up the following space: 42 in. added to 66 is equal to 108 in. or 9 ft., which multiplied by 5, equals 45 square feet for one loom, or 4500 square feet, equal to 500 square yards for 100 looms. The height of the driving shaft from the floor should be, at least, 9 ft. 6 in.

The circular box looms with six shuttles, exhibited by Mr. Hodgson, at Vienna, belong, according to our opinion, to the best patterns we have met with. The weft-stopping motion (*Wechsel*) is guided in a very simple and ingenious manner, whence it works with great exactness. If two-coloured stuffs only have to be produced, Mr. Hodgson's loom with sliding box and with two shuttles may be used; but even in this case we would recommend the revolving box, this offering unusual facilities by allowing the use of three shuttles, thus increasing, in a corresponding degree, the time during which weaving can be carried on before the material has to be renewed. The manufacturer knows how to value these advantages.

We now come to the loom exhibited by Mr. Henry Livesey, of Greenbank, Blackburn. This loom works very quickly, is made for shirting and printing cloth, is provided with a self-acting disengaging apparatus, and makes between 250 and 300 picks per minute. The construction of the loom is light and very agreeable to the eye. Besides the mechanical loom just mentioned, Mr. Livesey exhibits a number of winding machines of excellent construction, and which may be applied for various purposes, and not only for the winding off of the yarn from the reel to the bobbins, but also for the winding up upon the pirns. On one of these machines we find a very simple arrangement for the re-using of the waste healds, although the apparatus can only be applied under the supposition that the healds have been made by one of Livesey's heald knitting machines, which, as is known, supply 20,000 eyes per day. This apparatus consists of a hollow cylinder, upon which are fastened the lower healds freed from the waste over healds; the end of the thread is then passed through an eye at the axis of the cylinder, when the latter is put into motion. The heald knitting machine performing its work only by a twisting of the threads, and the cylinder on this apparatus rotating in a direction opposite to that required by the work of the heald knitting machine, the latter work is simply undone by the new apparatus. We should further mention the rich collection exhibited by Mr. Livesey of details for the weaving process, as, for instance, shuttles, pickers, bobbins, warps, healds, reeds, &c., all of which are of best quality and excellent workmanship.

Heald knitting machines are further exhibited by Messrs. Entwistle and Kenyon, of Ewbank Works, Accrington, and by Mr. Barraclough, of Manchester; but the latter differs in its arrangements from all the others. Of reed-making machines, we find three exhibits, one in the English department, by Mr. Thomas Barraclough, another in the Swiss section by Mr. F. Ruegg, of Aarburg, and a third in the Austrian division by Mr. Carl Winter, of Vienna; the two first-named machines are horizontally

arranged, whilst the latter one is of the vertical type. Returning, however, again to the looms, we find in the English department a large loom for weaving cloth; this machine, which has a mechanism permitting the moving only of one or two treadles, being exhibited by Messrs. Platt Brothers, of Oldham. Although the arrangement of the loom is somewhat heavy, it still possesses considerable interest, so that we shall give on a future occasion a special description of it.

In the American department we find a small mechanical loom, which contains two interesting details namely, an instantaneous stopping gear for the motion, and a new arrangement of the springs for the motion of the arms of the picker. According to the pattern-loom at the Exhibition, the arm of the lever itself has to take the place of the picker. The arrangement of springs acts in a very powerful manner, and appears to offer greater advantages than those formerly adopted. The loom makes 300 picks per minute, and has been constructed, and is exhibited by, the Star Tool Company, of Providence, Rhode Island. Entering now the Swiss department, we meet with a loom for fine "jaconets," exhibited by Mr. Caspar Honegger, which is as well designed and made as the other machines of the same exhibitor already referred to.

Messrs. Escher, Wyss, and Co., of Zurich, have exhibited three looms for weaving coloured stuffs, with a reed space of 105 centimetres. These looms are arranged for different mountings, and they work with three, with four, and with five shuttles. We should mention here Messrs. Kussmaul and Sons, of Basle, who have exhibited, besides the loom for ribbon-weaving mentioned above, a loom for tapestry with high warp, with jacquard machine of 1500 lifting wires (the latter built by the manufacturer of jacquard machines, Mr. F. T. Gerster, of Gelterkinden); also a loom for the elastic of boots, and another one for braces. The two latter looms are mechanical ones, and belong, with respect to the arrangement of the warp, to the class of the ribbon looms in which the shuttles are moved through the opened sheds in a straight line, or in circular guides by means of racks. The arrangements for regulation are of the ordinary kind, and the loom for the elastic of boots is provided with the ordinary stretching contrivance. The execution and workmanship of these looms are excellent.

In the whole of the French department we find but one mechanical loom, namely, that by E. O. Petit-Toulouse, of Homblères. Belgium is represented in this branch of industry by a loom on M. O. F. de Grave's system, which the inventor has adopted and carried out for more than ten years for hand weaving, and which allows of several parts of the loom being exchanged for heavy or for light ware. For well-arranged hand-looms, De Grave's system may be strongly recommended.

The process of weaving, and all necessary tools connected with it, are numerous represented in the German department of the Exhibition. We meet at first with the well-known loom of the Sächsische Webstuhlfabrik (formerly Louis Schoenherr) of Chemnitz. We shall fully illustrate and describe this loom, with all its improvements, in an early number, because it is the loom that may most nearly claim universal use.

The author of these articles has set to work these looms of Schoenherr for the lightest as well as for the heaviest stuffs; for the closest and for the widest arrangement of the warp; with change of weft; with or without jacquard machine; and always with the most eminent success. With the exception of the loom of Mr. George Hodgson, no other looms can compete with those of Schoenherr's pattern. This loom has been arranged by the Sächsische Webstuhlfabrik for sail-cloth up to a width of 5½ metres. The problems to be considered in constructing a loom upon which such a width could be produced were, firstly, to guide the lathe or batten over this considerable length uniformly and without oscillation; secondly, to arrange the motion of the batten in such a manner that the shuttle had sufficient time for passing over its way; thirdly, to regulate the action of the picker in such a manner that its force should be sufficient for the driving of the shuttle from one end to the other without forcing it out of its course. All these conditions have been fulfilled in an excellent manner. Looms of such a width are now at work at the sail-cloth weaving establishment of Messrs. Bodeway and Co., of Cologne, and they give highly satisfactory results.

The Sächsische Webstuhlfabrik exhibits further a loom with treadle arrangement for the manufacture of buckskin, this being provided with a new and patented weft-stopping motion of a very efficient kind. The Sächsische Webstuhlfabrik was founded in 1851, and employs at the present time about 700 workmen. The importance of Schoenherr's construction was already seen at the Exhibition of Paris, when it was found that the looms of Normandy, and especially those exhibited by Stehelin and Co., were in fact nothing but imitations of Schoenherr's construction. A similar case is to be found at Vienna, where the imitation has been carried out by the Austrian manufacturers, Messrs. Sternickel and Gülcher, of Biala, but we are sorry to say in a manner not worthy of a favourable notice.

We find further at the Exhibition the so-called universal looms, by Messrs. C. G. Peisker and Co., of Schweidnitz, in Silesia, of which we may say that they will scarcely become "universal," although we cannot deny that the design contains some good ideas which have, however, been carried out in a rough and unfinished manner. Messrs. Peisker's mechanism for the putting out of gear of the jacquard machine during the intersection is well worth noticing.

We now get to two mechanical looms of Messrs. Mohring and Co., of Berlin, for the manufacture of cloth and buckskin. These looms are well-known for their good arrangement of the communicator, of the guide and fixing of the levers of the pickers, and of the tappets for the shafts. The next loom we have to mention is that by M. William Gminder, of Reutlingen; the details of this loom are similar to those of Keighley's looms, but it is besides provided with an excellent arrangement of the leafs, which transfers the design directly to the slays. The looms both of Mr. Möhring and of Mr. Gminder will be described hereafter in detail. There is left now in the German department for our review the Crompton loom, built and exhibited by the Sächsische Maschinen Fabrik (formerly Richard Hartmann), who bought this loom in 1867 at the Paris Exhibition, since which time an attempt has been made to introduce it into practical use. The necessarily heavy weight of the loom, its high price, and especially the competition of Schoenherr's loom have prevented, however, a satisfactory result. At Vienna the Crompton loom appears again, but this time in a lighter and more simple form, and there may still be an opportunity of seeing it more generally adopted.

Entering now the Austrian department, we cannot say that we find there looms which show anything original or extraordinary. Besides the looms on Schoenherr's system, imitated and exhibited by Messrs. Sternickel and Gülcher, of Biala, there are at work in the Austrian department three looms of the Tannenwald Cotton Works, which are composed of all possible elements of other looms. We recognise in them parts of Keighley's loom, and parts of Hodgson's, Gminder's, and other looms, although we cannot deny that the combination and workmanship is very good. Of no greater originality are the looms of Messrs. Schmidt Brothers and Co., of Bresens, whilst Mr. Max-Strakosch, of Brünn, has tried, and perhaps not without success, to introduce a loom on the Crompton system, and we must say that this loom may be considered as the best exhibit in the Austrian weaving department. Mr. A. Roder, of Vienna, exhibits a loom of ordinary construction, the workmanship of which is well worthy of praise.

We should finally mention a loom for the weaving of wire-work, exhibited by Mr. G. Bauer, of Vienna. The healds of this loom consist of strips of steel plates of about 9 in. in length, fastened to wires, which are supported at several places, so as to prevent bending. The shafts are adjustable, and the shuttles have to be worked by hand, whilst all the other parts are put in motion mechanically.

Looking back now on this part of the Exhibition at Vienna, we find that looms are exhibited by the following firms:

1. For Heavy Ware.
Cloth.—Schoenherr; Möhring and Co.; Sächsische Maschinenfabrik-Crompton; Schoenherr-Sternickel and Gülcher; Strakosch-Crompton; Platt Brothers; De Grave.
Linen.—Schoenherr.
2. For Damask.
C. G. Peisker; George Hodgson.
3. For Light Ware.
Silk.—Tonnar; Honegger; Scheller and Berchtold; Petit-Toulouse.

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ENGINEERING.

Cotton and Mixed Stuffs.—Star Tool Company; Honegger;
Escher, Wyss, and Co.; Livesey; Hodgson; Tannenberg
Cotton Works; Schmidt and Söhne.

4. *For Ribbons, Elastics, &c.*
Tonnar; Röder Arzt; Kussmaul and Son.
